



ST TAMMANY

PARISH HAZARD MITIGATION

UPDATE - 2015



ACKNOWLEDGMENTS

This 2015 St Tammany Parish Hazard Mitigation Plan Update was coordinated by the St Tammany Parish Hazard Mitigation Plan Update Steering Committee, in collaboration with the participating jurisdictions as well as community stakeholders and the general public. The participating jurisdictions are made up of the following communities:

St Tammany Parish
City of Covington
City of Mandeville
City of Slidell
Town of Abita Springs
Town of Madisonville
Town of Pearl River
Village of Folsom
Village of Sun

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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 Tammany 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 Tammany Parish less vulnerable and more disaster resistant. It also includes mitigation project scoping to further identify scopes of work, estimated costs, and implementation timing requirements of proposed selected mitigation projects. Information in the plan will be used to help guide and coordinate mitigation activities and local policy decisions affecting future land use.

The St Tammany Parish HMPU is a multi-jurisdictional plan that includes the following jurisdictions which participated in the planning process:

- City of Covington
- City of Mandeville
- City of Slidell
- Town of Abita Springs
- Town of Madisonville
- Town of Pearl River
- Village of Folsom
- Village of Sun

Because the Cities of Covington, Mandeville, and Slidell are participating in the St Tammany Parish Hazard Mitigation Plan Update, an update of their respective original HMP separate from the parish is not needed.

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

This hazard mitigation plan is a comprehensive plan for disaster resiliency in St Tammany 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 the Federal Emergency Management Agency (FEMA), "hazard mitigation" means any sustained action taken to reduce or eliminate the long-term risk to life and property from a hazard event.

Why this plan? Every community faces different hazards and every community has different resources and interests to bring to bear on its problems. Because there are many ways to deal with natural hazards and many agencies that can help, there is no one solution or cookbook for managing or mitigating their effects.

Planning is one of the best ways to correct these shortcomings and produce a program of activities that will best mitigate the impact of local hazards and meet other local needs. A well-prepared plan will ensure that all possible activities are reviewed and implemented so that the problem is addressed by the most appropriate and efficient solutions. It can also ensure that activities are coordinated with each other and with other goals and programs, preventing conflicts and reducing the costs of implementing each individual activity.

Mitigation activities need funding. Under the Disaster Mitigation Act of 2000 (42 USC 5165), a mitigation plan is a requirement for Federal mitigation funds. Therefore, a mitigation plan will both guide the best use of mitigation funding and meet the prerequisite for obtaining such funds from FEMA. FEMA also recognizes plans through its Community Rating System, a program that reduces flood insurance premiums in participating communities. This program is described at the end of this chapter.

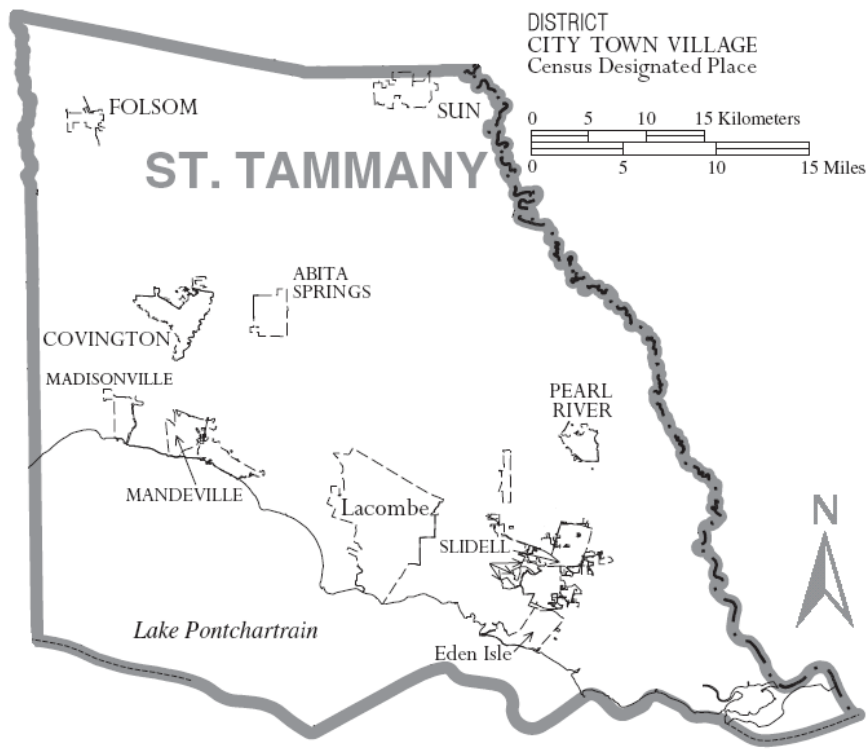
This Plan identifies activities that can be undertaken by both the public and the private sectors to reduce safety hazards, health hazards, and property damage caused by natural hazards. It fulfills the Federal mitigation planning requirements, qualifies for Community Rating System credit and provides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

Location, Demography and Economy

St. Tammany Parish is located in southeastern Louisiana, on the north shore of Lake Pontchartrain. The Parish measures approximately 25 miles north to south and 35 miles east to west. It covers 877 square miles and is the fifth largest parish in the state.



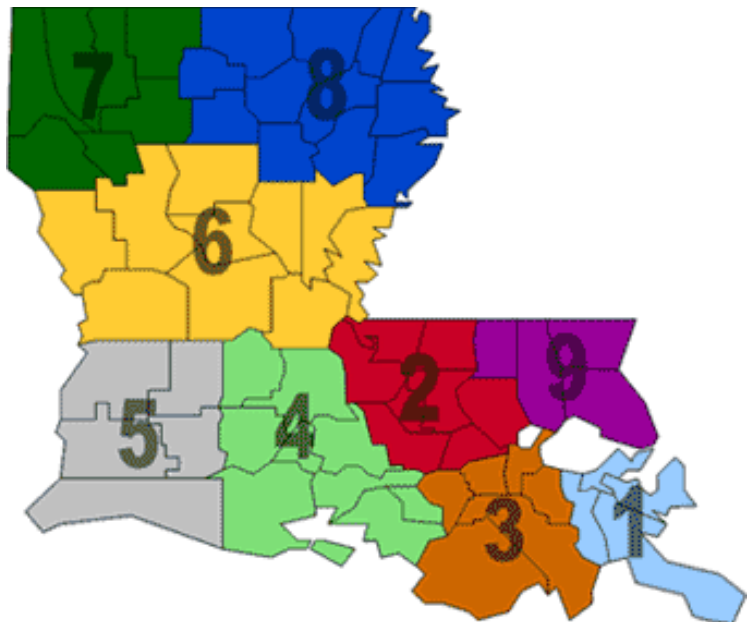
Map 1 - St Tammany Parish Location



Map 2 identifies the municipalities and the main features of the Parish. Lake Pontchartrain is to the south. To the east is the Pearl River, the boundary between Louisiana and Mississippi. To the southeast is the City of Slidell and US Highways 11 and 90 and Interstate 10, the main roads to the eastern entry to New Orleans.

Map 2 - St Tammany Parish

In the western part of the Parish are the cities of Covington, Mandeville, Madisonville and Abita Springs. Crossing the Lake from Mandeville is the Causeway, the 24 mile over water link to the western suburbs of New Orleans. Folsom, Sun and Pearl River are located to the north of the two larger population centers. St Tammany Parish is located in Louisiana Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP) Region 9.



Map 3 – GOHSEP Regional Map

Most of St. Tammany Parish is geologically considered Eastern Pleistocene Terrace and Gulf Coast Flatwood. In the northeast and east, the predominant landscape feature is the floodplain of the Bogue Chitto and Pearl Rivers. Along the Lake to the south, the land is mostly marsh.

The population of St. Tammany Parish has nearly tripled since 1970, making it one of the fastest growing parish in Louisiana. With an influx of nearly 500 people per month, the present population is 242,333 according to the 2013 Census estimate. If the current growth rate continues, the St. Tammany Economic Development Foundation predicts the population will exceed 280,000 by the year 2015.

Table 1 shows that the Parish's population more than tripled between 1970 and 2013. The US Census Bureau (2006) estimates the population at 231,000. The most recent US Census Data Bureau data estimates the 2013 population at 242,333, an increase of over 11,000 citizen since the last update.

Table 1-1 - Population, Source - US Census

The graph below is from the Parish's 10-year infrastructure plan, which was published in 2005. Both Table 1 and the graph show a steady increase in population in St. Tammany Parish. It is expected that the growth rate will be even higher in response to the surge of growth that has followed Hurricane Katrina.

Parish	Population
1970	63,500
1980	110,800
1990	144,500
2000	190,000
2006	231,000
2013	242,333

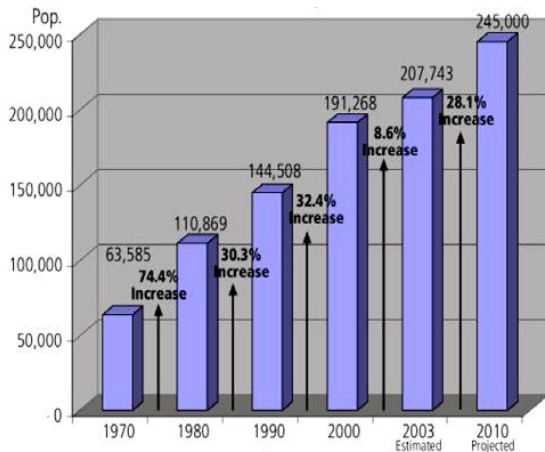


Figure 1-1 -Source - Parish 10 Year Infrastructure Plan

While St. Tammany Parish is faced with a variety of natural hazards and all the problems that accompany fast growth, it also has the potential to mitigate their adverse effects through current and new programs and projects.

Since the last update, several factors continue to contribute to St Tammany being one of the fastest growing parishes in the state. To measure this growth, the St Tammany Economic Development Foundation weighs and combines each of these factors into a unifying picture. The parish grown measures employment, residential building permits, commercial building permits, total parish sales, and housing unit sales considered over the course of several years. Growth in the parish from 2010 – 2014 and economic indicators used to measure this growth can be seen in tables 3 and 4 below.

Table 1-2- Source St Tammany Economic Development Foundation

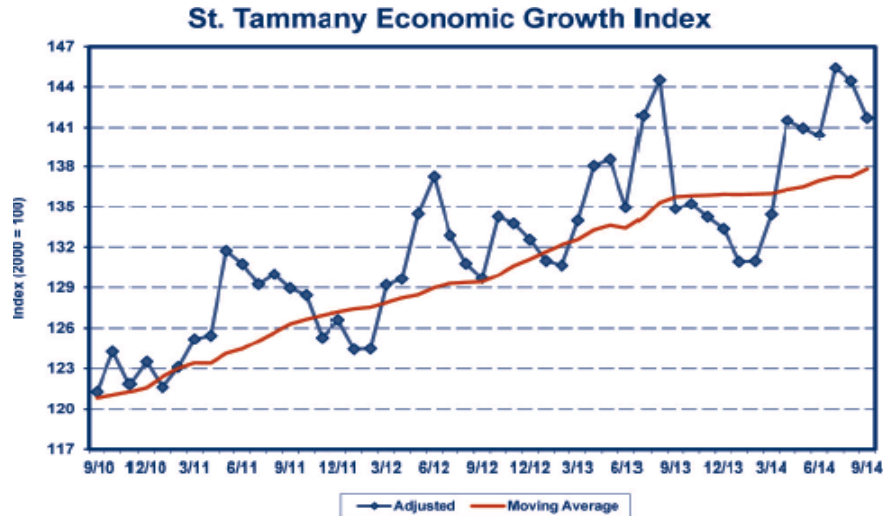


Table 1-3 - Source: St Tammany Economic Development Foundation

St. Tammany Parish Ten Year Economic Indicators

Economic Indicators	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2013/2012 Compare	2013/2008 Compare
Population (July)(a)(b)(r)(1)													
St. Tammany Parish	205,883	211,529	217,407	223,062	226,315	229,384	231,495	233,740	236,785	239,453	242,333	1.2%	5.6%
Slidell	28,237	26,845	26,840	27,384	26,632	27,967	27,485	27,068	27,419	27,369	27,526	0.6%	2.5%
Covington	8,702	8,882	9,347	8,439	8,976	8,580	8,334	8,765	8,880	9,058	9,352	3.2%	5.3%
Mandeville	10,714	11,511	11,632	11,640	12,255	12,124	11,943	11,560	11,708	12,112	12,193	0.7%	5.9%
Income													
Per Capita Income (\$) (c)	31,639	32,896	28,270	34,760	43,206	42,988	44,949	45,562	47,508	48,954	n.a.	3.0%	13.9%
Total Personal Income (\$000) (c)	6,565,576	7,027,647	6,214,212	7,794,222	9,775,807	9,880,770	10,405,516	10,588,473	11,249,000	11,722,169	n.a.	4.2%	18.9%
Median Family Inc. (\$) (a)(4)	67,273	70,637	74,168	77,877	81,771	84,224	86,750	89,353	92,034	94,795	97,639	3.0%	15.9%
Median H.H. Inc. (\$) (a)(4)	58,202	61,112	64,168	67,376	70,745	72,867	75,053	77,305	79,624	82,012	84,472	3.0%	15.9%
Total Covered Employment & Wages (e)													
Average Employment (Covered)	63,485	66,612	65,823	69,824	75,207	74,586	75,047	74,895	77,309	79,403	80,804	1.8%	8.3%
Total Wages (\$000) (Covered)	1,737,951	1,902,440	2,063,405	2,412,826	2,649,879	2,735,367	2,784,141	2,911,356	3,077,850	3,269,260	3,429,166	4.9%	25.4%
Average Annual Wage (\$)	27,376	28,560	31,348	34,556	35,234	36,674	37,099	38,873	39,812	41,173	42,438	3.1%	15.7%
Unemployment Rate (%) (December)	4.5	3.9	4.2	3.4	2.8	3.5	4.8	5.4	5.2	4.3	5.6	30.2%	60.0%
Professional, Scientific & Technical Covered Employment & Wages (e)													
Average Employment (Covered)	2,778	3,164	3,236	3,500	3,753	3,804	3,937	3,932	4,185	4,138	4,189	1.2%	10.1%
Total Annual Wages (Covered)	105,075,764	133,233,463	137,756,589	162,911,727	181,738,119	196,725,863	201,731,635	213,744,803	234,647,962	238,341,325	254,252,468	6.7%	27.3%
Average Annual Wage (\$)	37,824	42,109	42,570	46,546	48,425	52,504	51,246	54,364	56,069	57,598	60,699	5.4%	15.6%
Building Permits													
Single Family Units Permits Issued (g)	2,455	2,920	2,255	2,238	1,310	796	535	549	624	736	951	29.2%	19.5%
Number Single Family Units (a)(2)(*)	64,162	66,586	68,457	70,315	71,402	72,063	72,507	72,962	73,480	74,091	74,881	1.1%	3.9%
Commercial Units Permits Issued (g)	446	454	581	558	495	455	436	407	305	246	289	17.5%	-36.5%
Residential Housing Sales (h)													
Units Sold	3,916	4,071	6,506	6,464	3,045	2,346	2,232	2,227	2,600	2,964	3,221	8.7%	37.3%
Volume Sold (\$000)	677,118	745,918	1,368,837	1,444,603	757,235	550,137	502,115	496,074	556,683	631,117	719,807	14.1%	28.5%
Average Sales Price (\$)	172,911	183,227	210,396	223,484	248,682	238,763	224,962	223,652	215,263	212,927	225,540	5.9%	-5.5%
Apartment Rent (2 bedrooms, 1 1/2 or 2 baths)(professional/managerial households)(m)													
Average Rent (\$)			841	893	1,099	1,166	1,101	1,082	1,127	1,161	1,165	0.3%	-0.1%
FDIC Commercial Bank Deposits (\$000) (j)													
St. Tammany Parish Deposits	2,231,591	2,390,264	2,702,105	4,374,521	4,484,832	4,362,592	4,525,071	4,303,112	4,340,606	4,136,598	3,897,514	-5.8%	-10.7%
State Deposits	52,625,735	55,171,416	57,069,067	71,902,742	72,979,532	74,694,781	78,827,540	82,817,085	86,819,308	88,771,454	89,055,191	0.3%	19.2%
Percent of State Deposits	0	0	0	0	0	0	0	0	0	0	0	-6.1%	-26.1%
Number of Parish Banking Offices	67	71	76	84	93	100	101	102	102	98	86	-12.2%	-14.0%
Total Sales Tax Collections (\$) (k)													
Total Sales (Estimate)(\$000) (m)(3)	140,463,861	151,217,598	181,761,759	231,157,406	209,157,700	194,676,231	178,722,930	176,242,170	184,957,306	194,084,403	202,940,949	4.6%	4.2%
Total DMV Sales Tax Collections (\$) (k)	2,944,700	3,170,200	3,810,500	4,846,067	4,384,900	4,081,300	3,746,800	3,694,800	3,877,500	4,068,855	4,254,500	4.6%	4.2%
								18,540,693	20,316,951	22,592,440	25,083,938	11.0%	n.a.
Business Establishments (e)													
Number	5,562	5,817	6,261	6,689	6,908	7,225	7,283	7,487	7,267	7,540	7,656	1.5%	4.3%
New Businesses/Incorporations (q)													
	1,702	2,287	2,611	2,988	2,266	2,201	2,198	2,424	2,565	2,592	2,290	-11.7%	4.0%

In other words, while nature has presented the Parish with a variety of hazards, the Parish has the human resources that can face those hazards and manage the impact they have on people and property.

This plan will discuss hazards affecting St Tammany Parish. Hazard Profiles (see Section Two) contain detailed information on the likelihood of occurrence, possible magnitude or intensity, areas of the parish that could be affected and conditions that could influence the manifestation of the hazard.

Hazard Mitigation

To fully understand hazard mitigation efforts in St Tammany 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 2 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 2 demonstrates, mitigation relies on updating in the wake of disaster. This can give the appearance that mitigation is only reactive rather than proactive. In reality, however, post-disaster revision is a vital component of improving mitigation. Each hazardous event affords an opportunity to reduce the consequences of future occurrences.

Unfortunately, this cycle can be painful for a community. For instance, the risks of disasters that could create catastrophic incidents in Louisiana were thought to be relatively well-understood prior to 2005. However, the impact of the 2005 hurricane season on the Gulf Coast region of the United States prompted a new level of planning

and engagement related to disaster response, recovery, and hazard mitigation. Hurricanes Katrina and Rita hit three weeks apart and together caused astonishing damage to human life and to property. The two storms highlighted a hurricane season that spawned 28 storms—unparalleled in American history. The 2005 hurricane season confirmed Louisiana’s extreme exposure to natural disasters and both the positive effects and the concerns resulting from engineered flood-protection solutions.

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

General Strategy

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

Part of the ongoing integration process is that GOHSEP encourages the parishes and the local municipalities with independent hazard mitigation plans to utilize the same plan format and methodologies as the State Hazard Mitigation Plan in order to create continuity of information from local to state mitigation plans and programs.



Figure 1-2 - The four phases of emergency management and their relation to future hazard mitigation (source: Louisiana State Hazard Mitigation Plan 2014)

The 2015 St Tammany Parish Hazard Mitigation Plan (HMP) maintains much of the information from the 2006 and 2010 plan versions, but it now reflects the order and methodologies of the 2011 Louisiana State Hazard Mitigation Plan. The sections in the 2010 St Tammany HMP were as follows:

- Section One Introduction
- Section Two Hazard Profile
- Section Three Vulnerability Assessment
- Section Four Goals
- Section Five Property Protection
- Section Six Preventative Measures
- Section Seven Emergency Response
- Section 8 Flood Control
- Section 9 Public Information
- Section 10 Action Plan
- Appendices

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

[2015 Plan update](#)

This 2015 plan update proceeds with the six previous goals of the St Tammany Parish hazard mitigation plan. One goal was added by the Steering Committee to make for a total of seven. The current goals are as follows:

Goal 1: Protect the lives and health of the Parish's residents from the dangers of natural hazards

Goal 2: Ensure that public services and critical facilities operate during and after a disaster

Goal 3: Ensure that adequate evacuation routes, streets, utilities and public and emergency communications are maintained and available during and after a disaster

Goal 4: Protect homes and businesses from damage

Goal 5: Use new infrastructure and development planning to reduce the impact of natural hazards

Goal 6: Give special attention to repetitively flooded areas

Goal 7: Maintain and improve CRS ratings throughout the parish

This plan update makes a number of textual changes throughout. But the most obvious changes are data related and structural. First, the Spatial Hazard Events and Losses Database for the United States (SHELDUS) was used as a data source for hazard identification because it incorporates all storm event data from the National Climatic Data Center (NCDC) Storm Events Database used in previous plans, as well as storm event

data from other sources including the NOAA Storm Prediction Center, National Hurricane Center, and U.S. Fire Administration. Furthermore, all of the sections were updated to reflect the most current information and the most current vision of the plan update. Second, instead of eleven, separate sections for numerous tables, maps and appendices, the present plan update has five sections and five appendices. The most significant changes are the newly developed hazard profiles and risk assessments, the removal of much repetition between sections from the previous plan updates. The 2015 plan update is organized generally as follows:

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

Section two and three of the old plan (hazard profile and vulnerability assessment) has been moved to Section 2 (Hazard Identification and Parish-wide Risk Assessment) in the update. It was also synthesized with the Risk Assessments for parish-wide and parish- and municipally-owned assets for each hazard. Additionally, Saltwater Intrusion and Sea Level Rise were added under the Coastal Erosion category, while other hazards were moved. Lightning, Hail, and High Wind were all profiled under Thunderstorms, and Hurricanes and Tropical Storms are now classified as Tropical Cyclones. Furthermore, Storm Surge was profiled as a subcategory of Tropical Cyclones.

The Risk Assessment (previously comprising Section Four) and the Risk Assessment for Parish- and local-Owned Assets (previously comprising Section two and four) were consolidated within Section Two of the present Update. In addition, this update changes the methodology used in the Risk Assessment for parish- and local-Owned Assets to reflect current data on damage.

The Capability Assessment (section 3 of update) has been added as a new section.

The Planning Process (previously in the introduction) has been moved to an appendix in this document.

Section four, and ten were moved to Mitigation Strategies - Section Four of the present update. The six identified goals from the previous plan remain in the current plan with the addition of one new goal. The Mitigation Action section has been revised to reflect the process used in this plan update, as well as the results from the St Tammany evaluation and ranking of hazards. New actions were added.

Lastly, Section 10.4 (Plan Maintenance) was moved to an appendix in this document.

Table 1-4 - 2015 Plan Update Crosswalk

2010 Plan	Revised Plan (2015)
Section 1: Introduction	Section 1: Introduction Appendix A: Planning Process
Section 2: Hazard profile	Section 2: Hazard Identification and Parish-wide Risk Assessment
Section 3: Vulnerability Assessment	Section 2: Hazard Identification and Parish-wide Risk Assessment
Section 4: Goals	Section 4: Mitigation Strategies
Section 5: Property Protection	N/A
Section 6: Preventative Measures	N/A
Section 7: Emergency Response	N/A
Section 8: Flood Control	N/A
Section 9: Public Information	Section 3: Capability Assessment
Section 10: Action Plan	Section 4: Mitigation Strategies Appendix B: Plan Maintenance
Appendices	Appendix C Mapping Methodology Appendix D Plan Adoption Appendix E State Required Worksheets

Despite changes in this plan update, the plan remains consistent in its emphasis on the few types of hazards that pose the most risk to loss of life, injury, and property in St Tammany Parish and its municipalities. The extent of this risk is dictated primarily by its geographic location. Most significantly, St Tammany Parish remains at high risk of water inundation from various sources, including flooding; failure of dams/levees and forced drainage systems, tornadoes and tropical cyclone activity. All of the parish is also at high risk of damages from high winds and wind-borne debris—caused by various meteorological phenomena. Other hazards threaten the parish and/or its municipalities although not to such great degrees and not in such widespread ways. In all cases, the relative social vulnerability of areas threatened and affected plays a significant role in how governmental agencies and their partners (local, parish, state and federal) prepare for and respond to disasters.

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

2 Hazard Identification and Parishwide Risk Assessment

This section assesses the various hazard risks St. Tammany Parish faces in order to identify a strategy for mitigation. Having identified the categories of hazards, emergencies, disasters, and catastrophes, this section details the major climatological and natural/human-influenced hazards by (1) defining them, (2) explaining how they are measured, (3) describing their geographic extent, (4) surveying their previous occurrences, and (5) evaluating their future likelihood of occurrences.

The table below provided an overview of the hazards that had been previously profiled in the St. Tammany Parish Hazard Mitigation plan published in 2009, as well as the hazards that were identified in the State's 2014 Hazard Mitigation Plan that were considered to be of high or medium risk for the parish by the State. Those hazards identified as high or medium risk by the state or previously identified as a risk by the parish, have been determined to provide a risk to the parish and will be profiled in this section.

Table 2-1: Hazard Profile Summary

Hazard	Profiled in Last Plan	Considered Medium or High Risk in the State's HM Plan	Profiled in the 2015 Update
Coastal Land Loss	X	X	X
Dams	X	X	X
Drought	X		X
Earthquakes	X	X	X
Expansive Soils			
Fog	X		X
Floods	X	X	X
Levee Failure	X	X	X
Termites			
Sinkhole			
Subsidence			
Thunderstorms (Hail, Lightning & Wind)	X	X	X
Tornado	X	X	X
Tropical Cyclones	X	X	X
Wildfires	X		X
Winter Storm			

Prevalent Hazards to the Community

While many of the hazards identified in Table 2-1 occur in the parish, their occurrence was not merited for further study by the planning committee. The determination was made to focus attention and resources on the most prevalent hazards which include the hazards previously profiled. The following hazards have been selected to be included in this risk assessment:

a) Dams

- b) Earthquake
- c) Flooding (backwater, storm surge, riverine, localized storm water event)
- d) Fog
- e) Tropical Cyclones (flooding and high winds)
- f) Coastal Land Loss
- g) Levee Failure (also a flooding threat)
- h) Termites
- i) Tornadoes
- j) Thunderstorms
- k) Drought
- l) Wildfires.

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

- Flooding from rivers and waterways, rain storms, tropical storms, and hurricanes in the following forms:
 - a) Riverine
 - b) Storm water
 - c) Surge
 - d) Back water flooding (as the result of river flooding and surge)
- High wind damage most commonly resulting from hurricanes, thunderstorms and tornadoes
- Levee failure (St. Tammany Parish currently has three ring barriers that protect subdivisions south of Slidell).
- Land loss as a result of land subsiding and coastal erosion which have been combined into a single hazard since they both result in increased potential for flooding.
- Dam failures have also been selected for an initial review since such an event has the potential to impact the parish.

The potential destructive power of Tropical Cyclones was determined to be the most prevalent and the most frequent hazard to the parish. Thirteen of the twenty-one presidential declarations St. Tammany Parish has received resulted from tropical cyclones which validates this as the most significant hazard. Therefore, the issue of hurricanes will serve as the main focus during the mitigation planning process. Hurricanes present risks from the potential for flooding, primarily resulting from storm surge, and high wind speeds. While storm surge is considered the hazard with the most potential destructive potential, the risk assessment will also assess non-storm surge flooding as well. Since 1965, St. Tammany Parish has received 8 Presidential Declarations as a result of flooding.

Hurricanes, tropical storms, and heavy storms are fairly common occurrences and resultant wind damage is of utmost concern. Damage from high winds can include roof damage, destruction of homes and commercial buildings, downed trees and power lines, and damage and disruption to services caused by heavy debris. A wind map for St. Tammany Parish is included as Figure 2-44.

Because St. Tammany Parish is a parish with a significant coastline along Lake Pontchartrain it is also susceptible to land loss through coastal erosion and land subsidence. The coastal wetlands serve as an important natural barrier to potential storm surge from tropical cyclones and their loss through erosion and subsidence has the potential to significantly increase the risk to St. Tammany Parish.

Levee failure was also identified as a potential threat to the parish. The parish maintains three local ring levees around subdivisions south of Slidell. These levees were overtopped during Hurricane Katrina. St. Tammany Parish also has four dams located within the parish boundaries that are considered to be significant potential hazard dams by the USACE. The parish also has 23 low risk dams as well. St. Tammany also considers fog, termites, and wildfires as part of the overall risk assessment.

Previous Occurrences

Table 2-2 summarizes federal disaster declarations for St. Tammany Parish in the last fifty years. Information includes names, dates and types of disaster.

Table 2-2: St. Tammany Parish Major Disaster Declarations.

Disaster Declaration Number	Date	Type of Disaster
208	9/10/1965	Tropical Cyclone – Hurricane Betsy
272	8/18/1969	Tropical Cyclone – Hurricane Camille
374	4/27/1973	Severe Storm, Flood
3031	2/22/1977	Drought and Freezing
616	4/9/1980	Severe Storm, Flood
679	4/20/1983	Severe Storm, Flood
752	11/1/1985	Tropical Cyclone – Hurricane Juan
902	5/3/1991	Flood
956	8/25/1992	Tropical Cyclone – Hurricane Andrew
978	2/2/1993	Severe Storm, Flood
1049	5/8/1995	Rainstorm, Flood
1246	9/30/1998	Tropical Cyclone – Hurricane Georges
1380	6/5/2001	Tropical Cyclone – TS Allison
1435	9/27/2002	Tropical Cyclone – TS Isidore
1437	10/3/2002	Tropical Cyclone – Hurricane Lili
48	9/15/2001	Tropical Cyclone – Hurricane Ivan
1603	8/29/2005	Tropical Cyclone – Hurricane Katrina
1607	9/24/2005	Tropical Cyclone – Hurricane Rita
1786	9/2/2008	Hurricane – Hurricane Gustav
4080	8/29/2012	Hurricane – Hurricane Isaac

Probability of Future Hazard Events

The probability of a hazard event occurring in St. Tammany Parish is estimated below. The percent chance of an event happening during any given year was calculated by posting past events and dividing by the time period. Unless otherwise indicated the time period used to access probability followed the method used in the State of Louisiana's most current Hazard Mitigation Plan. The primary source for historical data used throughout the plan is the Spatial Hazards Events and Losses Database (SHELDUS) which provides historical hazard data from 1960 to 2014. In staying consistent with the state plan, the SHELDUS database was evaluated for the last twenty five years (1989 – 2014) in order to determine future probability of a hazard occurring. While the twenty five year record used by the State was adopted for the purpose of determining the overall probability, to assist with determining estimated losses, unless otherwise stated the full 54 year record was used when HAZUS-HM wasn't available to determine losses. This full record was used to provide a more extensive record to determine losses. All assessed damages were adjusted to inflation to reflect the equivalent amount of damages with the value of the U.S. dollar today. In addition, the National Climatic Data Center (NCDC) was also used to help identify hazard data specific to the municipalities as it contains specific data for cities, whereas SHELDUS is limited to parishes.

The following tables shows the annual probability for each hazard occurring across the parish and in separate jurisdictions.

Table 2-3: Probability of Future Hazard Reoccurrence.

Hazard	Probability				
	St. Tammany Parish (unincorporated)	Abita Springs	Covington	Folsom	Madisonville
Coastal Land Loss	100%	0%	100%	0%	100%
Dam Failure	0.01%	0%	0%	0%	0%
Drought	4%	4%	4%	4%	4%
Earthquakes	2%	2%	2%	2%	2%
Floods	100%	4%	12%	4%	20%
Fog	7%	7%	7%	7%	7%
Levee Failure	1%	0%	0%	0%	0%
Termites	100%	100%	100%	100%	100%
Thunderstorm - Hail	28%	28%	28%	28%	28%
Thunderstorm - Lightning	72%	72%	72%	72%	72%
Thunderstorm - Winds	100%	100%	100%	100%	100%
Tornado	100%	100%	100%	100%	100%
Tropical Cyclones	76%	76%	76%	76%	76%
Wildfires	1%	1%	1%	1%	1%

Table 2-4: Probability of Future Hazard Reoccurrence.

Hazard	Probability			
	Mandeville	Pearl River	Slidell	Sun
Coastal Land Loss	100%	0%	100%	0%
Dam Failure	0%	0%	0%	0%
Drought	4%	4%	4%	4%
Earthquake	2%	2%	2%	2%
Floods	44%	4%	80%	4%
Fog	7%	7%	7%	7%
Levee Failure	0%	0%	0%	0%
Termites	100%	100%	100%	100%
Thunderstorm – Hail	28%	28%	28%	28%
Thunderstorm –Lightning	72%	72%	72%	72%
Thunderstorm – Winds	100%	100%	100%	100%
Tornado	100%	100%	100%	100%
Tropical Cyclones	76%	76%	76%	76%
Wildfires	1%	1%	1%	1%

As shown in Table 2-3 & Table 2-4, tornadoes, thunderstorms winds, flooding, termites and coastal erosion have the highest chance of occurrence in the parish (100%), with coastal erosion limited to the unincorporated areas of the parish, Mandeville and Madisonville. The 100% chance of flooding is limited to just unincorporated St. Tammany. This is followed by flooding in Slidell at 80%, tropical cyclones in the entire planning area (76%) and lightning strikes in the St. Tammany planning area (72%). The less likely events to occur are hail (28%), significant fog (4%), drought, (4%), earthquakes (2%), wildfires (1%) and levee failures (1%).

Inventory of Assets for the Entire Parish

As part of the Risk Assessment, the planning team identified essential facilities throughout the parish. Several methods were used to assist in identifying all essential facilities including field data collected by the Louisiana Governor’s Office of Homeland Security and Emergency Preparedness on critical infrastructure from a previous hazard mitigation project.

Within the entire planning area there are an estimated value of \$25,683,572,000 in structures throughout the parish. The table below provides the total estimated value for each structure by occupancy.

Table 2-5: Estimated total of potential losses throughout St. Tammany Parish.

Occupancy	St Tammany Parish	Unincorporated St Tammany	Abita Springs	Covington	Folsom
Agricultural	\$53,787,000	\$42,440,000	\$1,169,000	\$2,154,000	\$902,000
Commercial	\$2,775,357,000	\$2,085,893,000	\$13,344,000	\$175,624,000	\$11,383,000
Government	\$107,612,000	\$57,424,000	\$1,112,000	\$5,788,000	\$0
Industrial	\$470,687,000	\$374,346,000	\$2,965,000	\$16,158,000	\$319,000
Religion	\$269,392,000	\$193,284,000	\$3,734,000	\$18,019,000	\$2,160,000
Residential	\$21,871,409,000	\$17,605,234,000	\$220,396,000	\$831,733,000	\$51,672,000
Education	\$135,328,000	\$94,454,000	\$319,000	\$7,932,000	\$1,669,000
Total	\$25,683,572,000	\$20,453,075,000	\$243,039,000	\$1,057,408,000	\$68,105,000

Table 2-6: Estimated total of potential losses throughout St. Tammany Parish.

Occupancy	Madisonville	Mandeville	Pearl River	Slidell	Sun
Agricultural	\$0	\$3,120,000	\$189,000	\$3,813,000	\$0
Commercial	\$2,213,000	\$191,384,000	\$7,805,000	\$286,208,000	\$1,503,000
Government	\$1,813,000	\$34,230,000	\$0	\$6,139,000	\$1,106,000
Industrial	\$2,432,000	\$27,048,000	\$1,375,000	\$43,725,000	\$2,319,000
Religion	\$2,258,000	\$11,481,000	\$1,492,000	\$35,871,000	\$1,093,000
Residential	\$3,036,000	\$979,180,000	\$127,534,000	\$2,012,134,000	\$40,490,000
Education	\$1,799,000	\$17,166,000	\$0	\$11,989,000	\$0
Total	\$13,551,000	\$1,263,609,000	\$138,395,000	\$2,399,879,000	\$46,511,000

Essential Facilities of the Parish.

Below are the locations and names of the essential facilities within the parish.

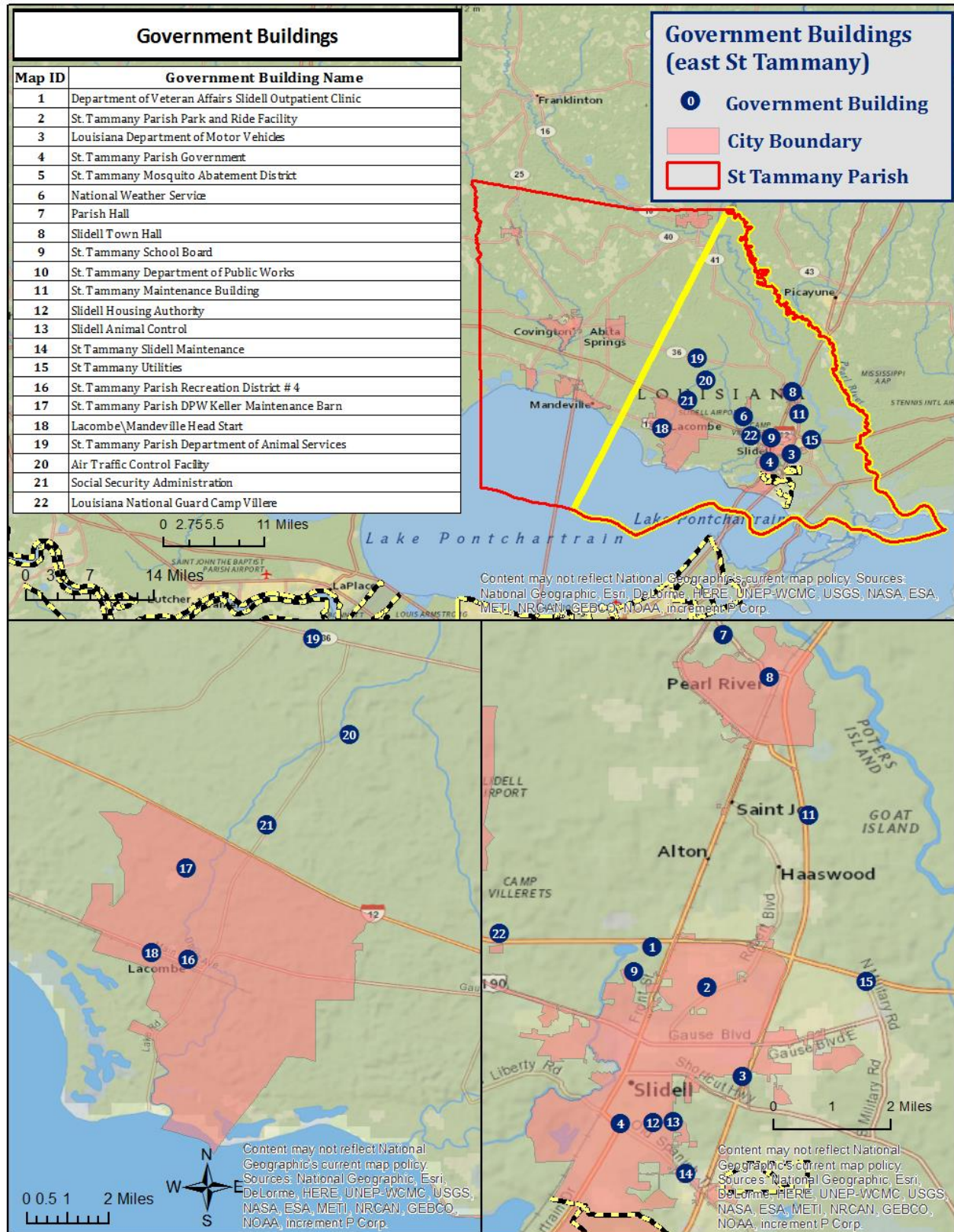


Figure 2-1: Government Buildings throughout eastern St. Tammany Parish.

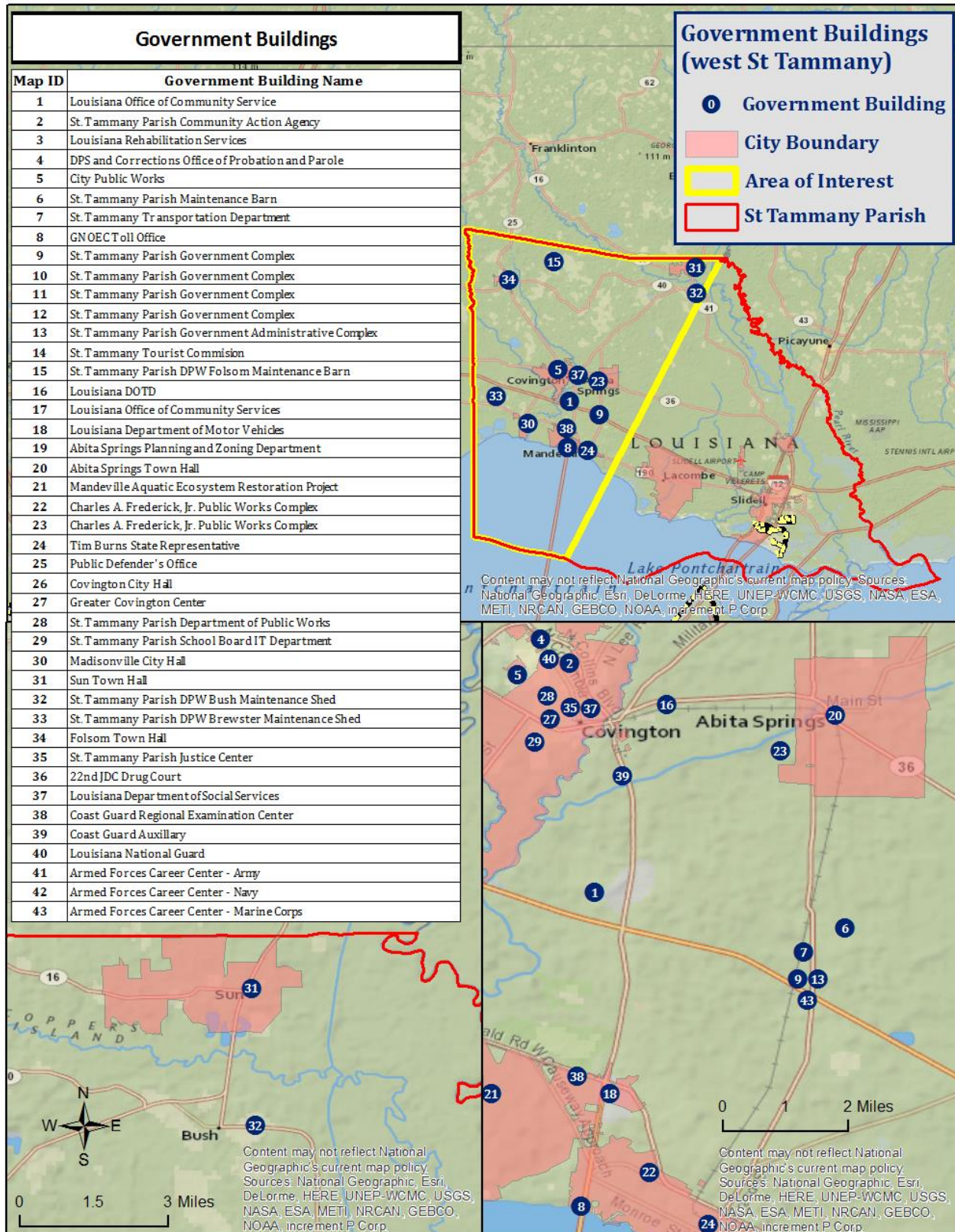


Figure 2-2: Government Buildings throughout western St. Tammany Parish.

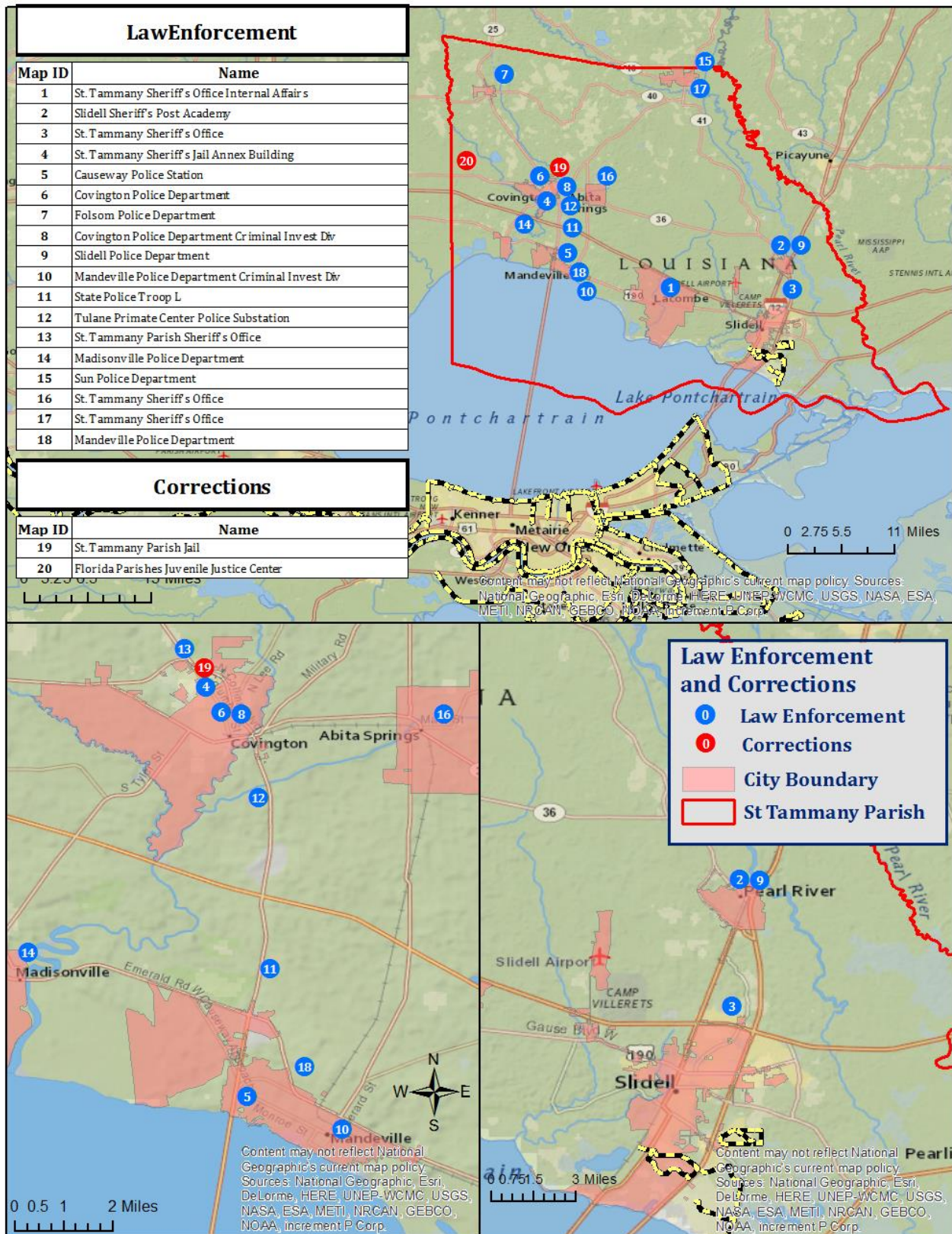


Figure 2-3: Law Enforcement facilities in St. Tammany Parish.

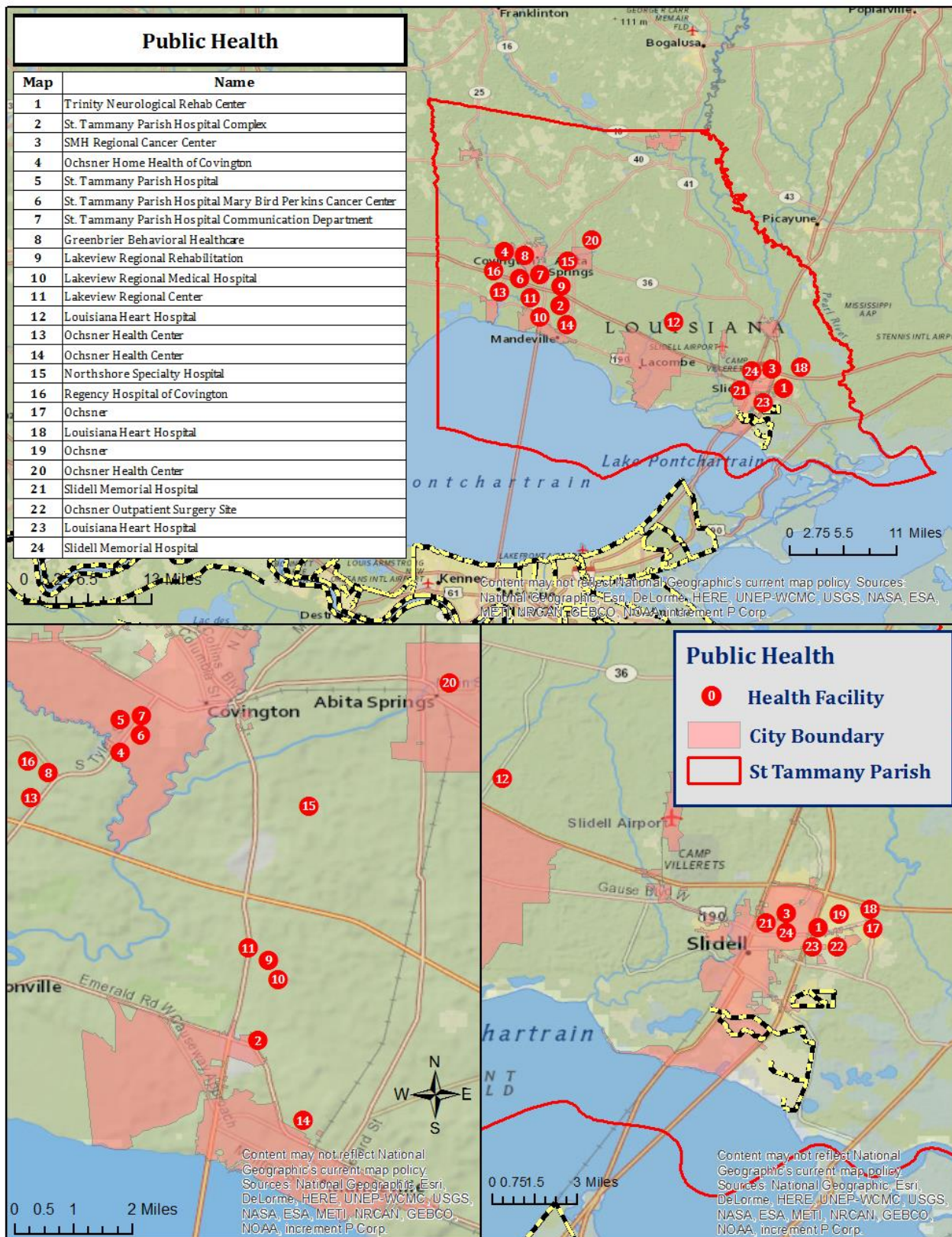


Figure 2-4: Public Health facilities in St. Tammany Parish

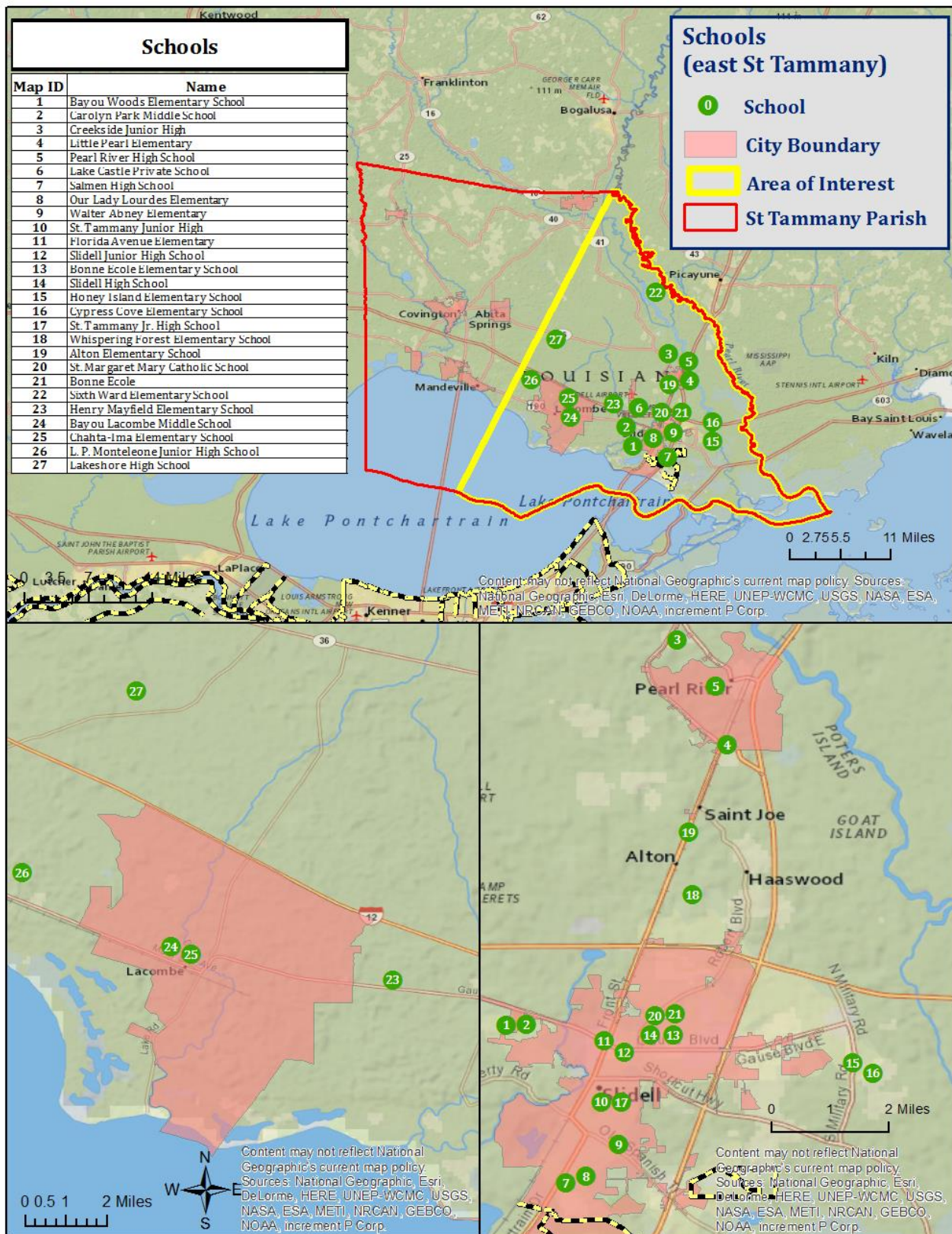


Figure 2-5: Educational Facilities in eastern St. Tammany Parish.

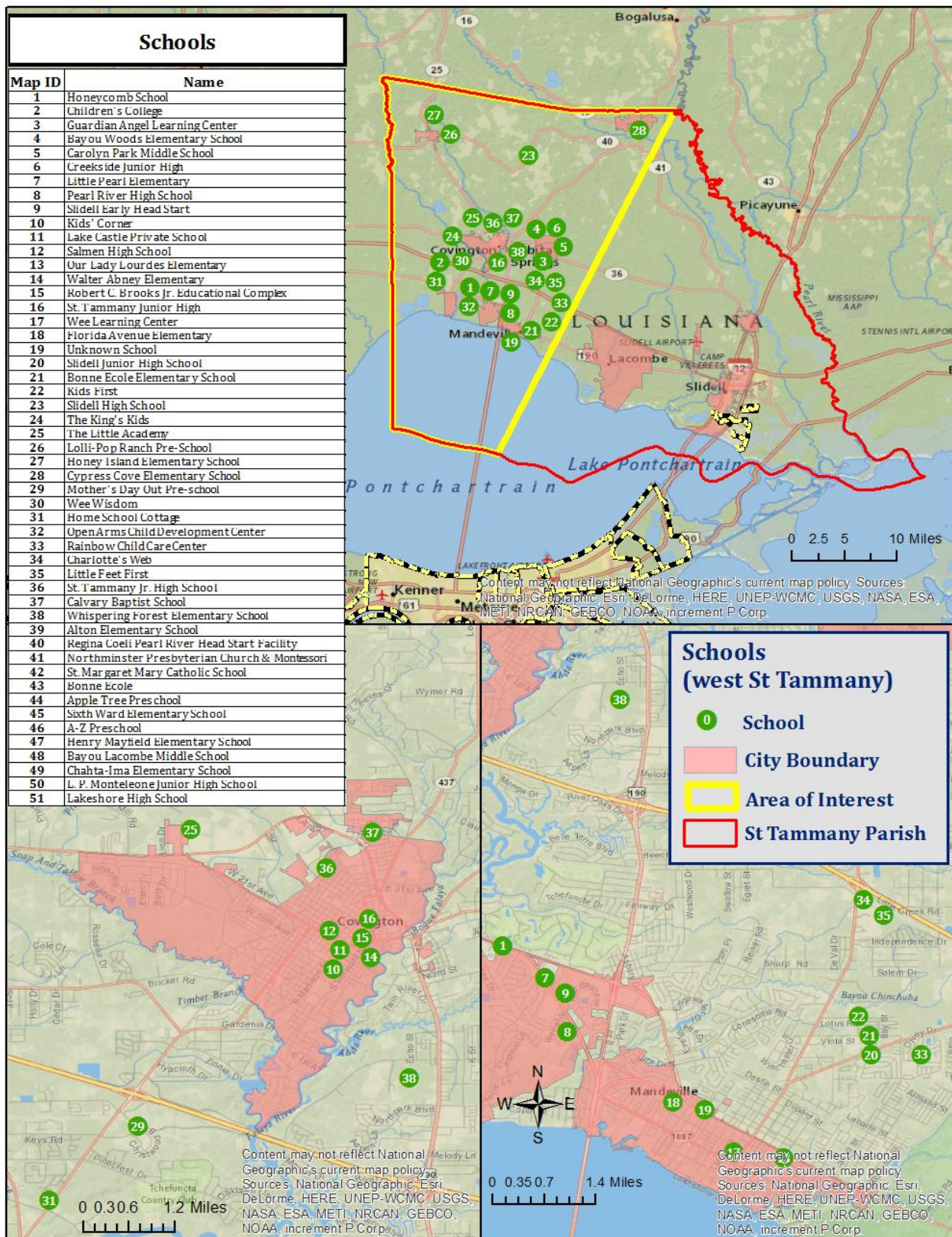


Figure 2-6: Educational facilities in western St. Tammany Parish.

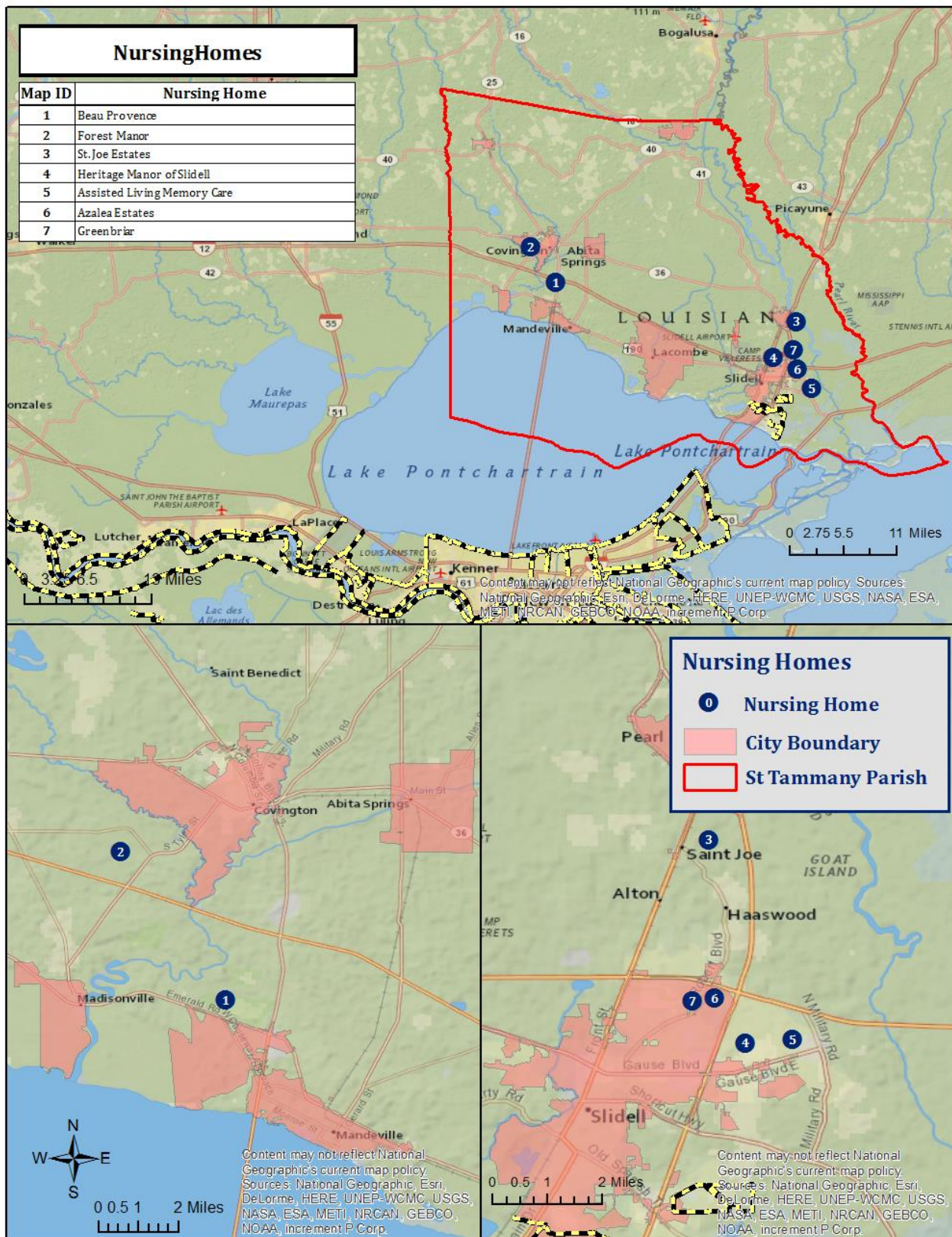


Figure 2-7: Nursing Home facilities in St. Tammany Parish.

Future Development Trends

The majority of parish growth is expected to take place near Mandeville, Madisonville and Covington. St. Tammany Parish has been experiencing significant growth as more people elect to move from New Orleans to find affordable housing in St. Tammany parish. Much of the growth in St. Tammany Parish is centered on access to the I-12 corridor. St. Tammany Parish's population grew by 58% between 1980 and 2000, from 110,869 to 191,268 persons, which was an average growth rate of nearly 3% annually. The parish continued to grow at an accelerated rate the following ten year period with a 2010 population of 233,740. While not maintaining the same level of growth as the previous decades, St. Tammany still grew at a very respectable 2.2% annually. Since the 2010 census, the 2013 population for St. Tammany Parish is estimated to be at 242,233 people. The future population and number of buildings can be estimated using U.S. Census Bureau housing and population data. The tables below show population and housing unit estimates from 2000 to 2013.

Table 2-7: Population Growth Rate for St. Tammany Parish.

Total Population	Abita Springs	Covington	Folsom	Madisonville	Mandeville
1-Apr-00	1,957	8,483	525	677	10,489
1-Apr-10	2,377	8,765	718	752	11,560
1-Jul-13	2,450	9,352	741	789	12,193
Population Growth between 2000 – 2010	21.46%	3.32%	36.76%	11.08%	10.21%
Average Annual Growth Rate between 2000 – 2010	2.15%	0.33%	3.68%	1.11%	1.02%
Population Growth between 2010 – 2013	3.07%	6.70%	3.20%	4.92%	5.48%
Average Annual Growth Rate between 2010 – 2013	1%	2%	1%	2%	2%

Table 2-8: Population Growth Rate for St. Tammany Parish.

Total Population	Pearl River	Slidell	Sun	St. Tammany Unincorporated	St. Tammany Parish
1-Apr-00	1839	25,695	471	141,132	191,268
1-Apr-10	2518	27,068	470	179,512	233,740
1-Jul-13	2553	27,526	470	186,259	242,333
Population Growth between 2000 – 2010	36.92%	5.34%	-0.21%	27.19%	22.21%
Average Annual Growth Rate between 2000 – 2010	3.69%	0.53%	-0.02%	2.72%	2.22%
Population Growth between 2010 – 2013	1.39%	1.69%	0.00%	3.76%	3.68%
Average Annual Growth Rate between 2010 – 2013	0%	1%	0%	1%	1%

Table 2-9: Housing Growth Rate for St. Tammany Parish.

Total Housing Units	Abita Springs	Covington	Folsom	Madisonville	Mandeville
1-Apr-00	813	3,565	222	346	4,669
1-Apr-10	1,069	4,048	318	372	5,033
1-Jul-13	1,069	3,815	298	438	5,160
Housing Growth between 2000 – 2010	31.49%	13.55%	43.24%	7.51%	7.80%
Average Annual Growth Rate between 2000 – 2010	3.15%	1.35%	4.32%	0.75%	0.78%
Housing Growth between 2010 – 2013	0.00%	-5.76%	-6.29%	17.74%	2.52%
Average Annual Growth Rate between 2010 – 2013	0%	-2%	-2%	6%	1%

Table 2-10: Housing Growth Rate for St. Tammany Parish.

Total Housing Units	Pearl River	Slidell	Sun	St. Tammany Unincorporated	St. Tammany Parish
1-Apr-00	788	10,133	217	54,645	75,398
1-Apr-10	1,033	11,155	232	72,152	95,412
1-Jul-13	923	11,235	176	73,048	96,162
Housing Growth between 2000 – 2010	31.09%	10.09%	6.91%	32.04%	26.54%
Average Annual Growth Rate between 2000 – 2010	3.11%	1.01%	0.69%	3.20%	2.65%
Housing Growth between 2010 – 2013	-10.65%	0.72%	-24.14%	1.24%	0.79%
Average Annual Growth Rate between 2010 – 2013	-4%	0%	-8%	0%	0%

As shown in the Tables 2-7 – Table 2-9, St. Tammany Parish population and housing has grown significantly over the last 13 years. Population rates grew at 2.2% between 2000 – 2010 and 3.68% in population between 2010 – 2013, while housing grew at a little slower rate at 2.65%. From 2000 – 2013, the unincorporated areas of the parish have experienced real growth. In addition, the communities of Abita Springs, Covington, Madisonville, Mandeville and Slidell experienced significant growth. While many people are moving to the extents of Covington, Mandeville, and Slidell, there has been a growing trend in the Town of Madisonville. Many young couples are fleeing New Orleans and establishing residency in the Madisonville area, just north of Lake Pontchartrain due to affordable housing.

Future Hazard Impacts

Hazard impacts were estimated for five years and ten years in the future (2019 and 2024). Yearly population and housing growth rates were applied to parish inventory assets for composite flood, tropical cyclones, and levee failures. Commercial structures were estimated to increase by 270 structures a year which has been a consistent average of growth over the past five years. Average growth rates were estimated at 759 new structures for housing and 1.2% for population based on recent growth rates in the parish, which have been trending down. A summary of estimated future impacts is shown in the table below. Dollar values assume are expressed in future costs and assume an annual rate of inflation of 1.02%.

Table 2-11: Estimated Future Hazard Impacts, 2019-2024.
(Source: HAZUS, US Census Bureau)

Hazard / Impact	Total in Parish (2014)	Hazard Area (2014)	Hazard Area (2019)	Hazard Area (2024)
Flood Damage				
Structures	106,739	54,436	57,100	59,893
Value of Structures	\$26,145,876,296	7,582,304,125	\$8,525,274,903	\$9,576,637,962
# of People	245,289	125,097	132,785	140,946
Tropical Cyclone				
Structures	106,739	106,739	111,962	117,440
Values of Structures	\$26,145,876,296	\$26,145,876,296	\$29,397,499,669	\$33,022,889,527
# of People	245,289	245,289	260,364	276,365
Levee Failure				
Structures	106,739	1,500	1,573	1,650
Value of Structures	\$26,145,876,296	\$470,625,773	\$529,154,993	\$594,412,011
# of People	245,289	4,441	4,714	5,004

Zoning and Land Use

The Comprehensive Plan for St. Tammany Parish was revised under the program called “New Directions 2025” (ND 2025). To date, this effort has produced the “Vision Element” which contains “value statements”, which provide guidance, similar to goals statements. There are four value statements for natural hazards:

1. All residents and their property will be protected from natural hazards to the maximum feasible extent. We will find ways to achieve these goals that also enhance and complement the natural beauty of St. Tammany Parish.
2. For those natural hazards from which residents cannot be protected in place, both adequate warning and safe escape measures will be available to save as many lives as possible.
3. All future development will be sited and constructed in such a way so as to not only (a) be at less risk than existing development but also (b) to not increase the risk to pre-existing developments.
4. Enhanced cooperation will exist among all bodies of local government.

ND 2025 is also developing a land use element. It includes a future land use plan, the current draft of which is shown as Figure 2-8. Comparing the new land use plan to Figure 2-22, the floodplain map for the parish, shows that the draft land use element goes far toward setting aside the flood prone areas. Most of the undeveloped areas in the Bogue Chitto and Pearl River flood plains and the Lakeshore floodplain (areas south of US 190) are preserved as conservation (light green). Many other floodplains are reserved for timber.

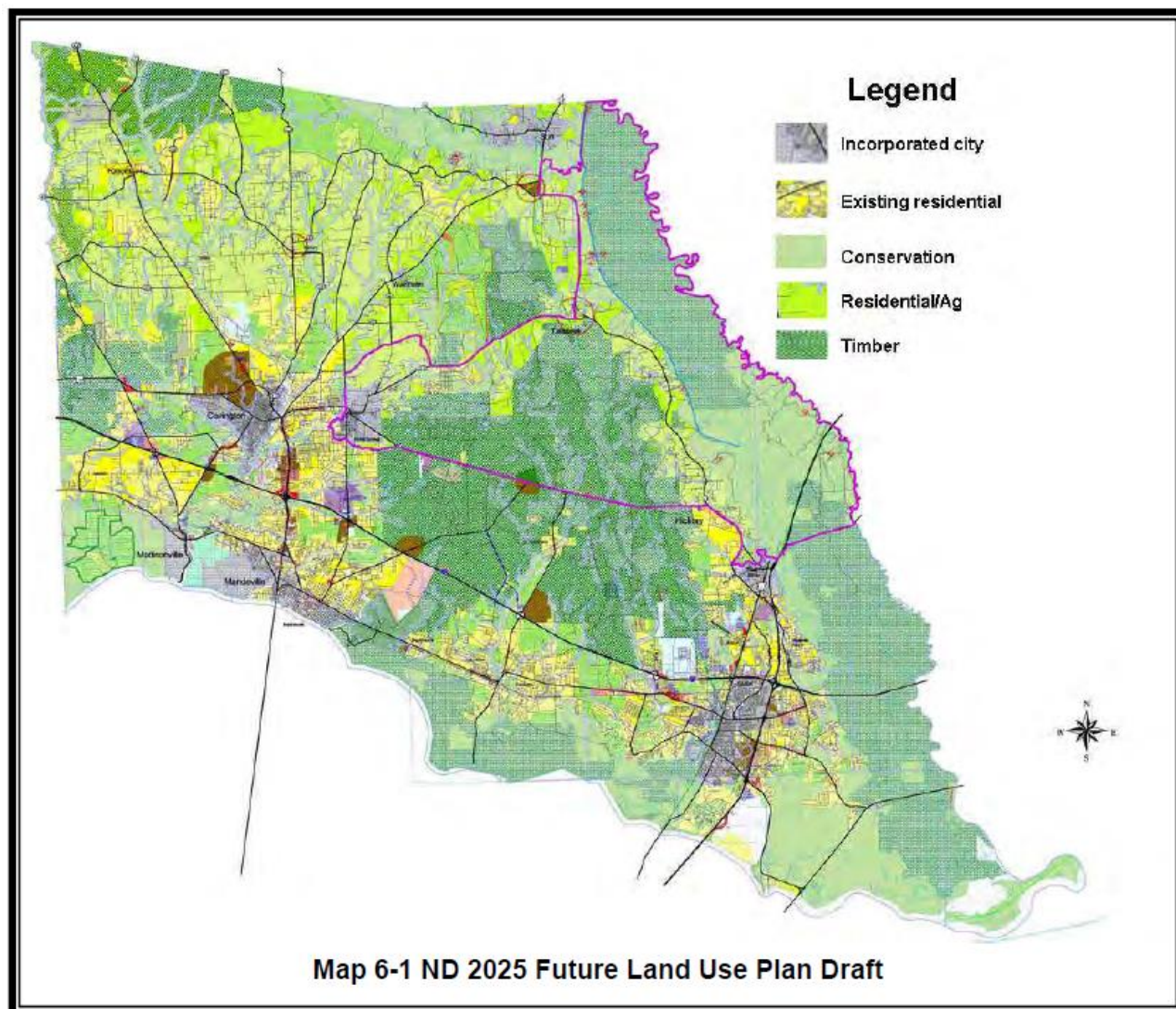


Figure 2-8: St. Tammany Parish Zoning.
 (Source: St. Tammany Hazard Mitigation Plan Update – 2009)

The ND 2025 plan set the stage for the follow-on implementation tools. The most important of these is the comprehensive rezoning of the Parish. This involved a review of the zoning classification of the entire parish. This two year effort was the implementation of the St. Tammany Parish Unified Development Code – Volume 1 (Zoning Ordinance). This code replaced the previous Land use 523 Zoning Ordinance originally drafted more than 20 years ago. The comprehensive rezoning effort included five study areas that were officially adopted between April 2009 and April 2010.

The St. Tammany Parish Land Use table is provided below, residential, commercial and industrial areas account for only 11% of the parish's land use. Wetlands are by far the largest category with over 223,000 acres (72%), followed by water (25%), forest (18%), and agriculture (4%).

*Table 2-12: St. Tammany Parish Land Use.
(Source: USGS Land Use Map)*

Land Use	Acres	Percentage
Agricultural Land, Cropland, and Pasture	33,197	4%
Wetlands	300,538	42%
Forest land (not including forested wetlands)	127,116	18%
Urban/Development	77,040	11%
Water	181,500	25%

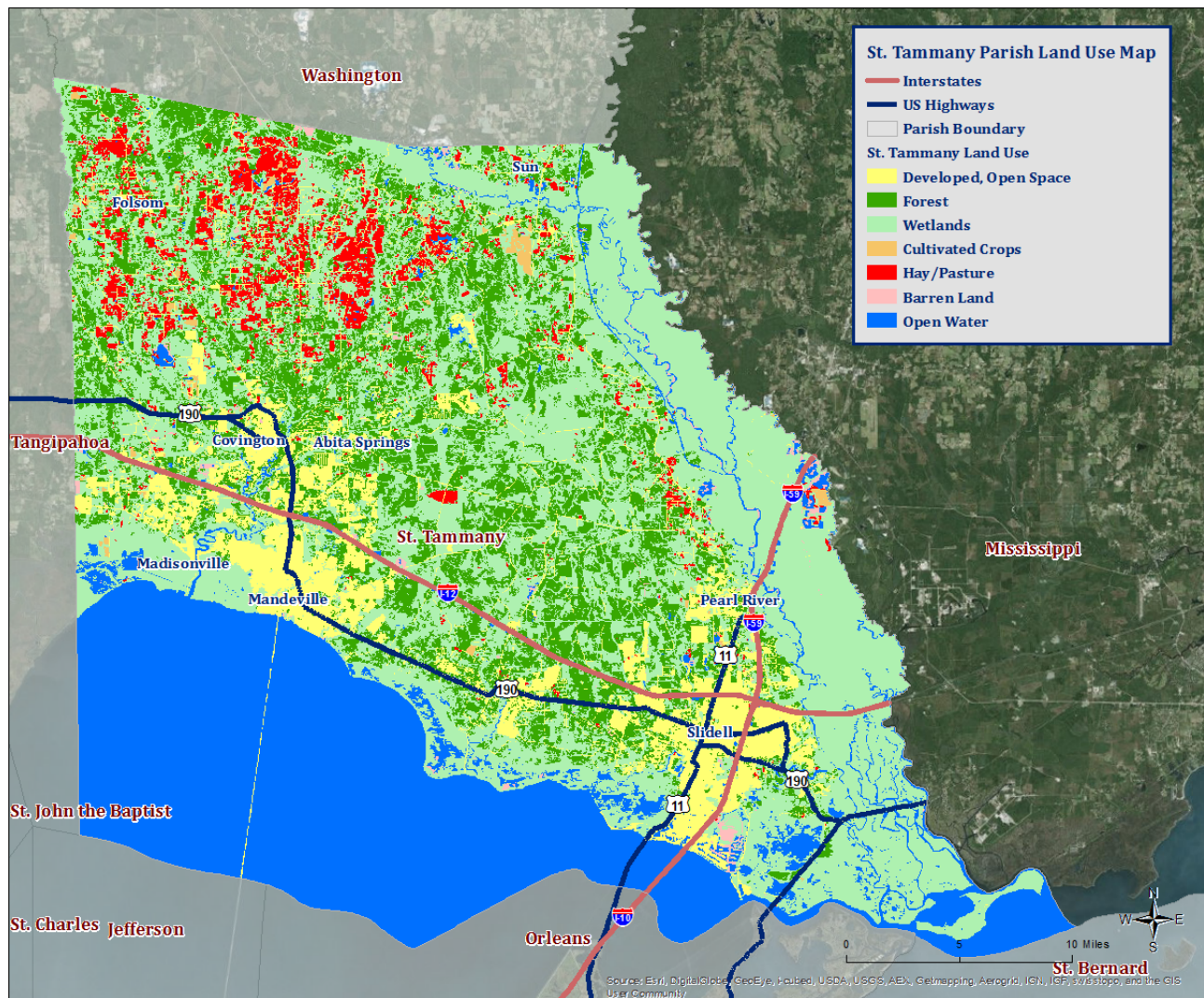


Figure 2-9: St. Tammany Parish Land Use Map.
(Source: USGS Land Use Map)

Hazard Identification

Coastal Land Loss

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

Some of the worst recent contributors to coastal land loss in the state are the tropical cyclones of the past decade. Two storms that stand out in this regard are Hurricanes Katrina and Rita. These powerful cyclones completely covered large tracts of land in a very brief period, permanently altering the landscape. The disastrous legacy of these storms concentrated already ongoing efforts to combat coastal land loss. Consistent with the 2014 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.

Location

Historic areas of coastal land loss and gain (Figure 2-10) and subsidence rates (Figure 2-11) have been quantified for St. Tammany 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 mi², while the average annual land gain has been 3 mi² for a net loss of 32 mi² per year. Land loss is primarily currently occurring on the north shore of Lake Pontchartrain in unincorporated St. Tammany Parish and in some portions of Mandeville, Lacombe, and Slidell (Figure 2-10). Subsidence is occurring in southeast St Tammany Parish, outside of incorporated jurisdictions (Figure 2-11).

Previous Occurrences / Extent

Coastal land loss is an ongoing process, including discrete (hurricanes) and continuous (subsidence, sea level rise) processes. While historic flood loss data undoubtedly include the effects of coastal land loss, specific previous occurrences have not been identified as a source of direct disaster damage in Louisiana. Rather, the effects of the underlying flood or hurricane storm surge hazard are recorded. Land loss is a significant hazard, however, and assessment of the added flood impacts caused by land loss is quantified in the following sections.

Frequency / Probability

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

Table 2-13: Annual probability of coastal land loss in St. Tammany Parish.

Coastal Land Loss Probability St. Tammany Parish								
Unincorporated St. Tammany Parish	Abita Springs	Covington	Folsom	Madisonville	Mandeville	Pearl River	Slidell	Sun
100%	0%	100%	0%	100%	100%	0%	100%	0%

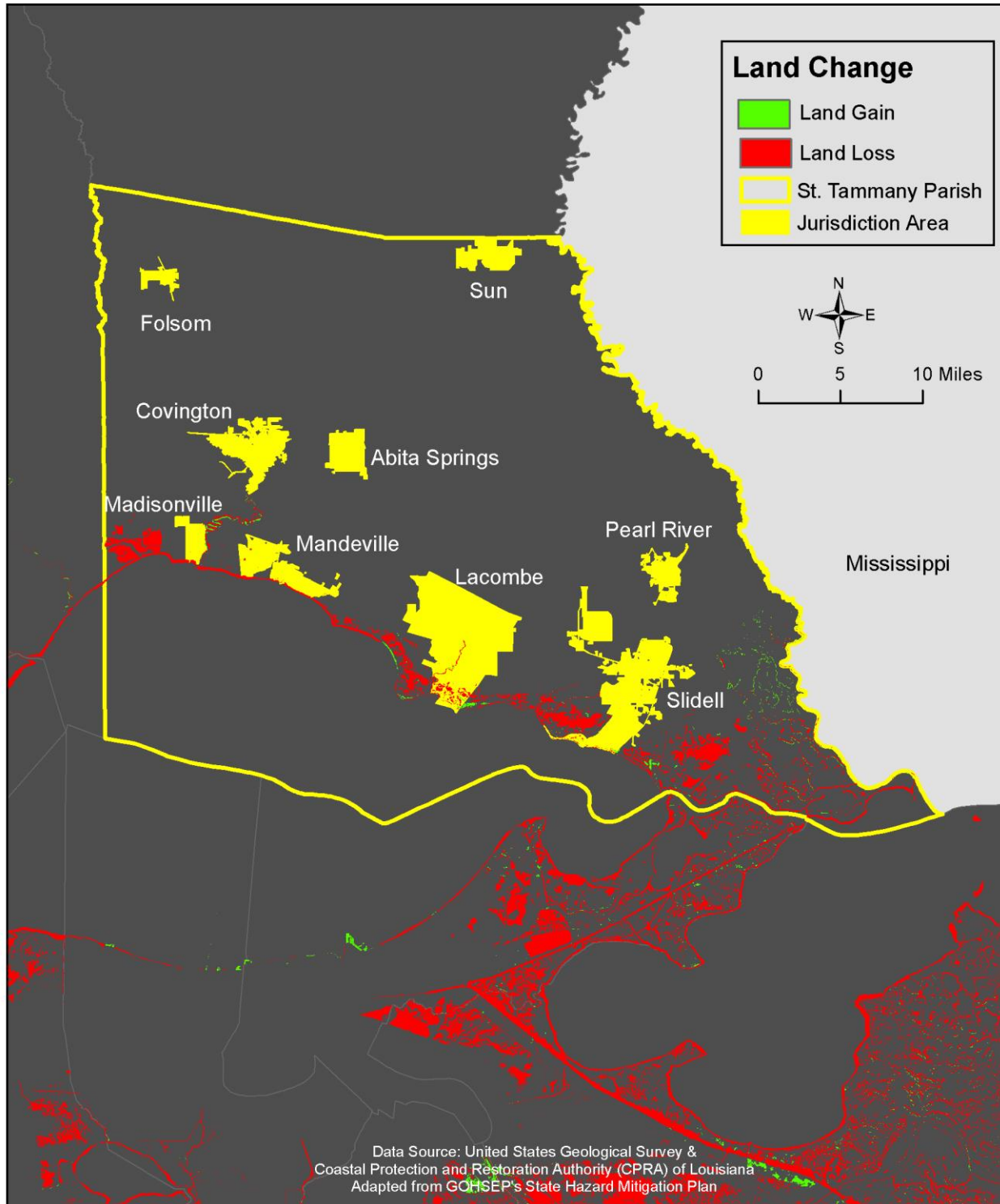


Figure 2-10: Historical areas of land loss and gain between 1932 and 2010
(Source: State of Louisiana Hazard Mitigation Plan)

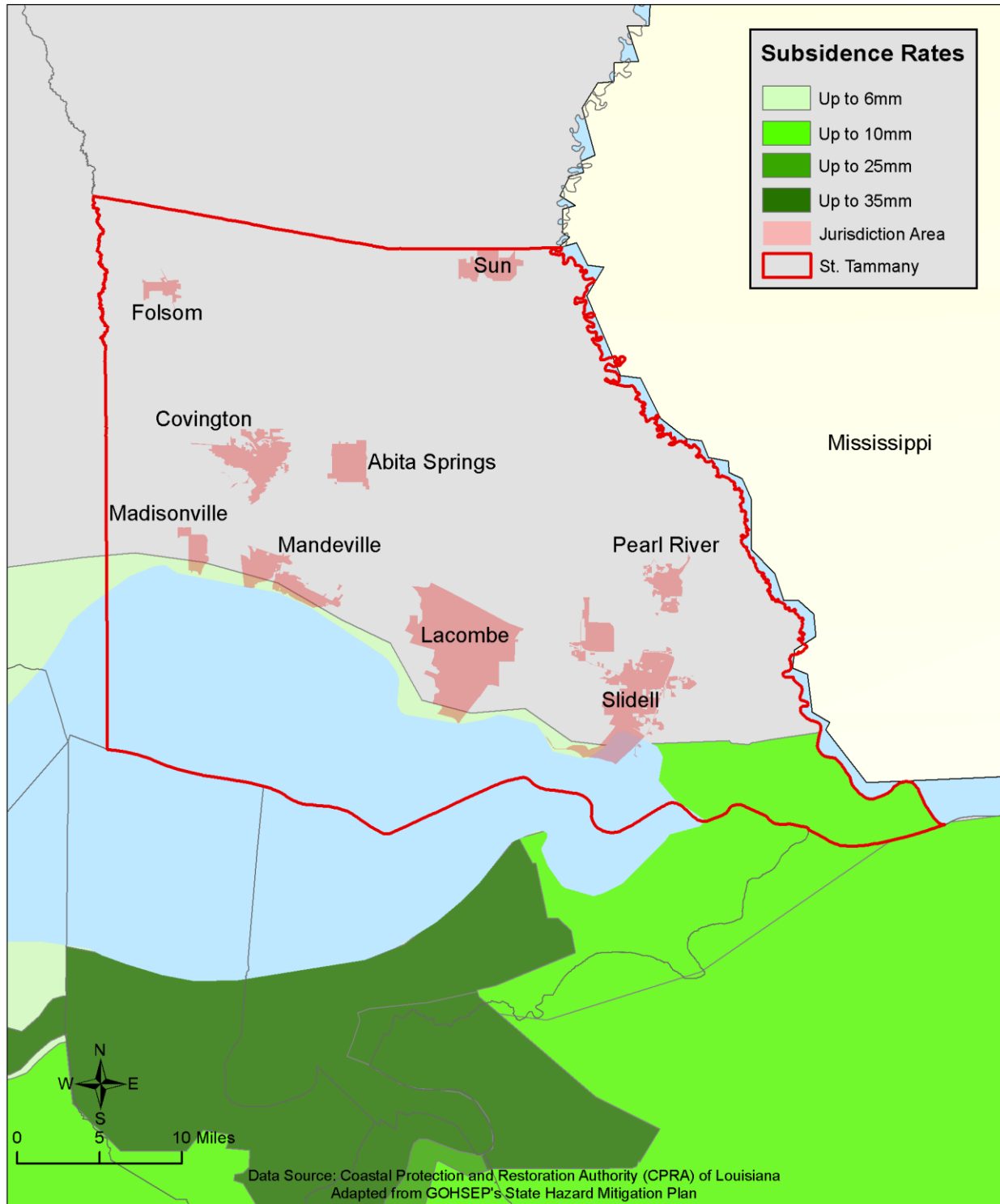


Figure 2-11: Maximum annual subsidence rates based on subsidence zones in coastal Louisiana.
(Source: State of Louisiana Hazard Mitigation Plan)

Estimated Potential Losses

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

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

$$SLR_{2024} = 0.0031 \frac{m}{year} \times 10 \text{ years}$$
$$SLR_{2024} = 0.031 \text{ meters} = 0.10 \text{ ft in 2024}$$

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

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

Figure 2-12 shows the projected increase in total flood loss resulting from a SLOSH Category 1 MOM in the year 2014, with many areas, primarily in unincorporated St. Tammany Parish, expecting increase in losses. Some areas that would be currently unaffected by a SLOSH Category 1 MOM would be impacted in ten years based on subsidence and sea level rise projections (Figure 2-13).

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

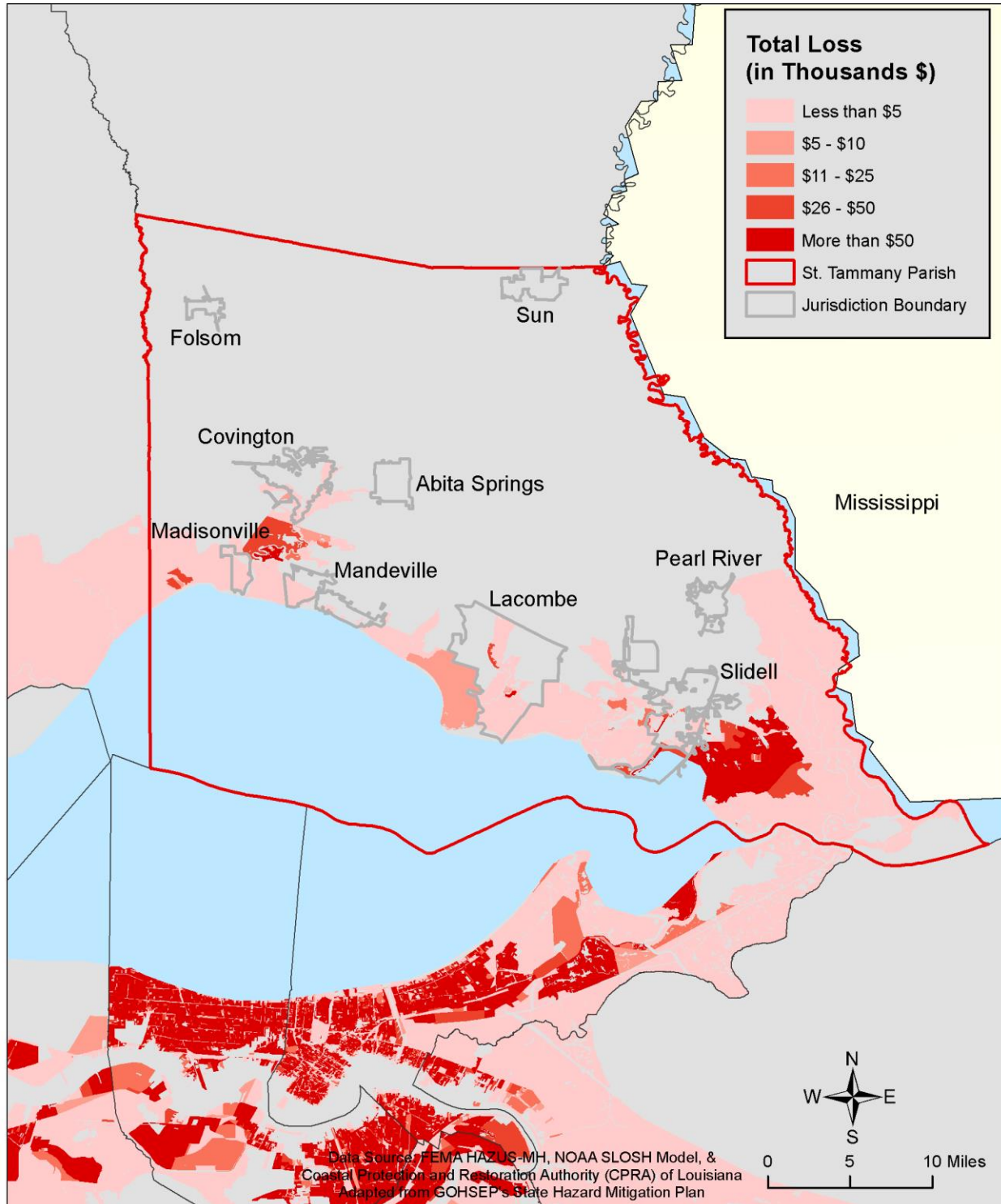


Figure 2-12: Increase in total loss estimates in 2024 by census block group based on the Hazus-MH flood model and NOAA SLOSH model.

(Source: State of Louisiana Hazard Mitigation Plan)

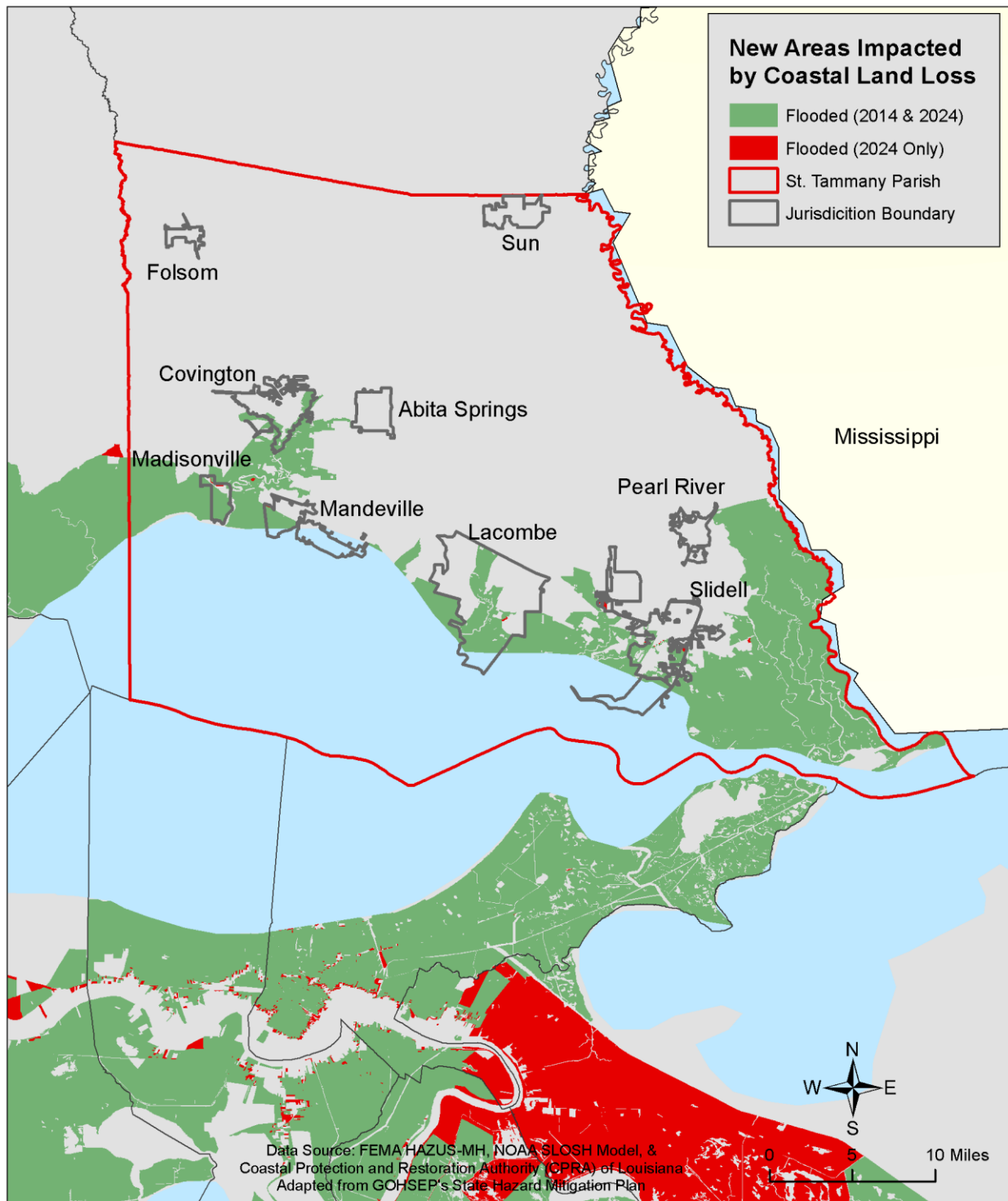


Figure 2-13: Census block groups not currently impacted by Category 1 hurricane storm surge but expected to be impacted in 2024 are shown in red.
(Source: State of Louisiana Hazard Mitigation Plan)

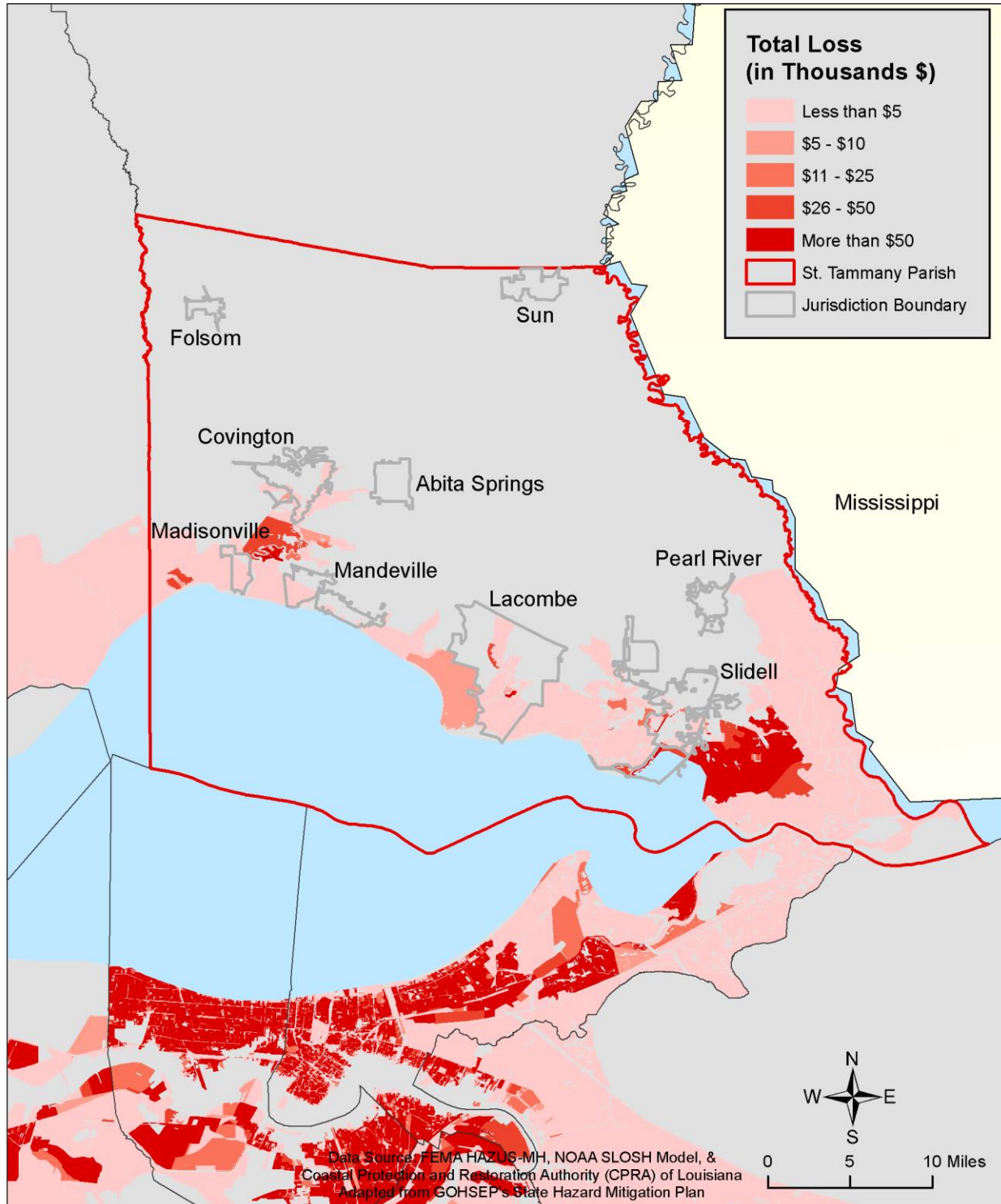


Figure 2-14: Estimated annual losses for coastal land loss by census block group.

Table 2-14: Estimated annual losses for coastal land loss in St. Tammany Parish.
(Source: HAZUS-MH)

Coastal Land Loss Estimated Annual Potential Losses for St. Tammany Parish								
Unincorporated St. Tammany Parish	Abita Springs	Covington	Folsom	Madisonville	Mandeville	Pearl River	Slidell	Sun
\$70,300	\$0	\$2,000	\$0	\$1,300	\$700	\$0	\$16,300	\$0

Table 2-14 shows the current and future exposure potential based on the Hazus-MH 2.1 inventory database.

Threat to People

Coastal land loss can impact all demographics and age groups. Buildings located within highly vulnerable coastal land loss areas could be eventually permanently shut down and forced to re-locate. Long-term sheltering and permanent relocation could be a concern for communities that are at the highest risk for future coastal land loss. The total population within the parish that is susceptible to the effects of coastal land loss are shown in Table 2-15.

Table 2-15: Number of people susceptible to coastal land loss in St. Tammany Parish.
(Source: HAZUS-MH)

Number of People Exposed to Coastal Land Loss			
Location	# in Community	# in Hazard Area	% in Hazard Area
St. Tammany Parish (Unincorporated)	179,542	45,613	25.3%
Abita Springs	2,365	0	0%
Covington	8,765	2,531	28.9%
Folsom	716	0	0%
Madisonville	748	568	75.9%
Mandeville	11,560	4,108	35.5%
Pearl River	2,506	0	0%
Slidell	27,068	8,169	30.2%
Sun	470	0	0%

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

Table 2-16: Population vulnerable to coastal land loss in unincorporated St. Tammany Parish.

(Source: HAZUS-MH)

St. Tammany Parish (Unincorporated)		
Category	Total Numbers	Percentage of People in Hazard Area
Number in Hazard Area	45,613	25.3%
Persons Under 5 years	2,646	5.8%
Persons Under 18 years	11,312	24.8%
Persons 65 Years and Over	6,568	14.4%
White	38,497	84.4%
Minority	7,116	15.6%

Table 2-17: Population vulnerable to coastal land loss in Covington.

(Source: HAZUS-MH)

Covington		
Category	Total Numbers	Percentage of People in Hazard Area
Number in Hazard Area	2,531	28.9%
Persons Under 5 years	160	6.3%
Persons Under 18 years	604	23.9%
Persons 65 Years and Over	379	15%
White	1,968	77.8%
Minority	563	22.2%

Table 2-18: Population vulnerable to coastal land loss in Madisonville.

(Source: HAZUS-MH)

Madisonville		
Category	Total Numbers	Percentage of People in Hazard Area
Number in Hazard Area	568	75.9%
Persons Under 5 years	36	6.3%
Persons Under 18 years	125	22%
Persons 65 Years and Over	84	14.8%
White	494	87%
Minority	74	13%

*Table 2-19: Population vulnerable to coastal land loss in Mandeville.
(Source: HAZUS-MH)*

Mandeville		
Category	Total Numbers	Percentage of People in Hazard Area
Number in Hazard Area	4,108	35.5%
Persons Under 5 years	211	5.1%
Persons Under 18 years	1017	24.8%
Persons 65 Years and Over	664	16.2%
White	3,720	90.6%
Minority	388	9.4%

*Table 2-20: Population vulnerable to coastal land loss in Slidell.
(Source: HAZUS-MH)*

Slidell		
Category	Total Numbers	Percentage of People in Hazard Area
Number in Hazard Area	8,169	30.2%
Persons Under 5 years	576	7.1%
Persons Under 18 years	2,081	25.5%
Persons 65 Years and Over	1,142	14%
White	6,204	75.9%
Minority	1,965	24.1%

Dam Failure

Dams are water storage, control, or diversion barriers that impound water upstream in reservoirs. Dams are a vital part of our nation's infrastructure, providing drinking water, flood protection, renewable hydroelectric power, navigation, irrigation, and recreation. These critical daily benefits are also inextricably linked to the potential harmful consequences of a dam failure.

Dam failure is a collapse or breach in the structure. A dam failure can result in severe loss of life, economic disaster, and extensive environmental damage. While most dams have storage volumes small enough that failures have few repercussions, dams with large storage volumes can cause significant flooding downstream. Dam failures often have a rapid rate of onset, leaving little time for evacuation. The first signs of the failure may go unnoticed upon visual inspection of the dam structure. However, continual maintenance and inspection of dams often provide the opportunity to identify possible deficiencies in their early stages and can prevent a possible catastrophic failure event.

The duration of the flooding event caused by the failure depends largely on the amount of water and downstream topography. Given smaller volumes of water and a topography suited for transporting the water rapidly downstream, the event may only last hours. Because of the lack of seasonality and other predictive factors, a predictive frequency or likelihood of dam failures cannot be determined. However, the National Dam Safety Program (NDSP) produces hazard rankings (high, significant, and low) and definitions of dam structures, based on potential impact.

Dam/reservoir failures can result from any one of or a combination of the following causes:

- Prolonged periods of rainfall and flooding, which cause most failures;
- Inadequate spillway capacity, resulting in excess overtopping flows;
- Internal erosion caused by embankment or foundation leakage or piping;
- Improper maintenance, including failure to remove trees, repair internal seepage problems, replace lost material from the cross-section of the dam and abutments, or maintain gates, valves, and other operational components;
- Improper design, including the use of improper construction materials and construction practices;
- Negligent operation, including the failure to remove or open gates or valves during high flow periods;
- Failure of upstream dams on the same waterway;
- Landslides into reservoirs, which cause surges that result in overtopping;
- High winds, which can cause significant wave action and result in substantial erosion; and
- Earthquakes, which typically cause longitudinal cracks at the tops of the embankments that can weaken entire structures.

The USACE National Inventory of Dams classifies dams as a “high hazard potential,” “significant hazard potential,” and “low hazard potential.” These categories are defined below.

- *High hazard potential* dams are dams where failure or improper operation will probably cause loss of human life.
- *Significant hazard potential* dams are those where failure or improper operation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or other impacts. Dams classified as having “significant hazard potential” are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.
- *Low hazard potential* dams are those where failure or improper operation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner’s property.

In Louisiana there are 513 dams included in the Army Corps of Engineers National Inventory of Dams. Of these, 41 are considered high hazard, 63 are significant hazard and 409 are low hazard potential dams.

Location

According to the National Inventory of Dams, St. Tammany Parish has 23 low hazard potential dams and four significant hazard potential dams. All of the low hazard dams are located in unincorporated St. Tammany Parish and are privately owned except the Huey P. Long Fish Hatchery Dam located in Lacombe and owned by the State of Louisiana. The following is a summary of the low hazard dam data contained within the National Inventory of Dams by location.

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Table 2-21: Low hazard dams located in St. Tammany Parish.
(Source: National Inventory of Dams)

Inventory of Low Hazard Dams in St. Tammany Parish						
Dam Name	Year Completed	Structural Height (Ft.)	Hydraulic Height (Ft.)	Surface Area (Acres)	Normal Storage (Acre-Ft)	Drainage Area (Sq. Miles)
Unincorporated St. Tammany Parish						
Abbey Pond	1960	8	6	16	60	1.5
Carden Dam No. 1	1984	16	15	28.2	225.59	2
Carden Dam No. 2	1984	21	15	30.6	459	2
Conway Farrel Pond	1996	34	24	12	86	0.26
Cormorant Lake	1988	10	8	33.8	338	1.5
Crane Lake	1988	25	23	98	2450	1.5
Egret Pond	1988	20	18	14.3	286	1.5
Goodyears Pond	1968	16	14	142	1800	1
Grande Hills Lake Dam	-	12	15	59.6	894	1.5
Gum Swamp	1963	7	6	20	75	1.5
Hemphill Lake Dam	1982	12	10	25	250	2
Heron Lake	1988	12	10	26.8	-	1
Hillcrest Pond	1964	10	8	60	178	1
Lake Ramsey	1966	8	6	355	755	1
Loon Pond	1988	8	6	9.4	75.2	1
Money Hill Pond No. 1	1971	10	8	44	290	1
Money Hill Pond No. 2	1982	8	6	47.6	285.6	1
P+L Ranch Pond	1974	13	10	3	65	0.05
Polly Eagan Pond	1996	18.5	16.5	18.5	66	0.08
Spells Pond	1973	10	8	15	80	1
Thurmans Pond	1953	10	8	10	90	1
TL James Pond	1956	10	7	26	120	0.05
Lacombe						
Huey P Long Fish Hatchery	1934	8	7	9	56	-

Details regarding the four significant hazard potential dams are provided below:

Two of the significant hazard dams are federally owned dams with the primary purpose of navigation, located on the Pearl River Canal in the Bogue Chitto National Wildlife Refuge along the eastern side of unincorporated St. Tammany Parish. The first of these dams, the Pearl River Lock #1 & Spillway, is a concrete dam built in 1949. It is 200 feet long, structural height is 15 feet, and hydraulic height is 11 feet. It can discharge, at maximum, 4,200 cubic feet per second. Its maximum storage is 3,400 acre-feet of water and has a surface area of 107 acres. The drainage area of this dam is 7,960 square miles. There is no emergency action plan in place. The second of these dams, the Bogue Chitto Sill and Pearl River Lock #1, is a gravity dam built in 1950. It is 310 feet long, structural height is 21 feet, and hydraulic height is 6 feet. It can discharge, at maximum, 7,500 cubic feet per

second. Its maximum storage is 1,300 acre-feet of water and has a surface area of 30 acres. The drainage area of this dam is 7,896 square miles. There is no emergency action plan in place.

The remaining two of the significant hazard dams are owned by the Highlands Homeowners Association for the purpose of retaining successive fish and wildlife ponds along Bills Creek in northwest unincorporated St. Tammany Parish. Both are earthen dams built in 1980 and 1983, 810 feet and 1107 feet long, respectively. Structural heights for the dams are 20 feet and 26 feet with hydraulic heights of 17 feet and 22 feet, respectively. The dams' normal storage is 286 acre-feet and 590 acre-feet of water, with maximum storage of 320 acre-feet and 700 acre-feet, respectively and have no discharge. The surface areas of the dams are 33.7 acres and 59 acres, with drainage areas of 1.1 square miles and 0.7 square miles, respectively. The larger of the two dams, located upstream of the smaller dam, has an emergency action plan in place.

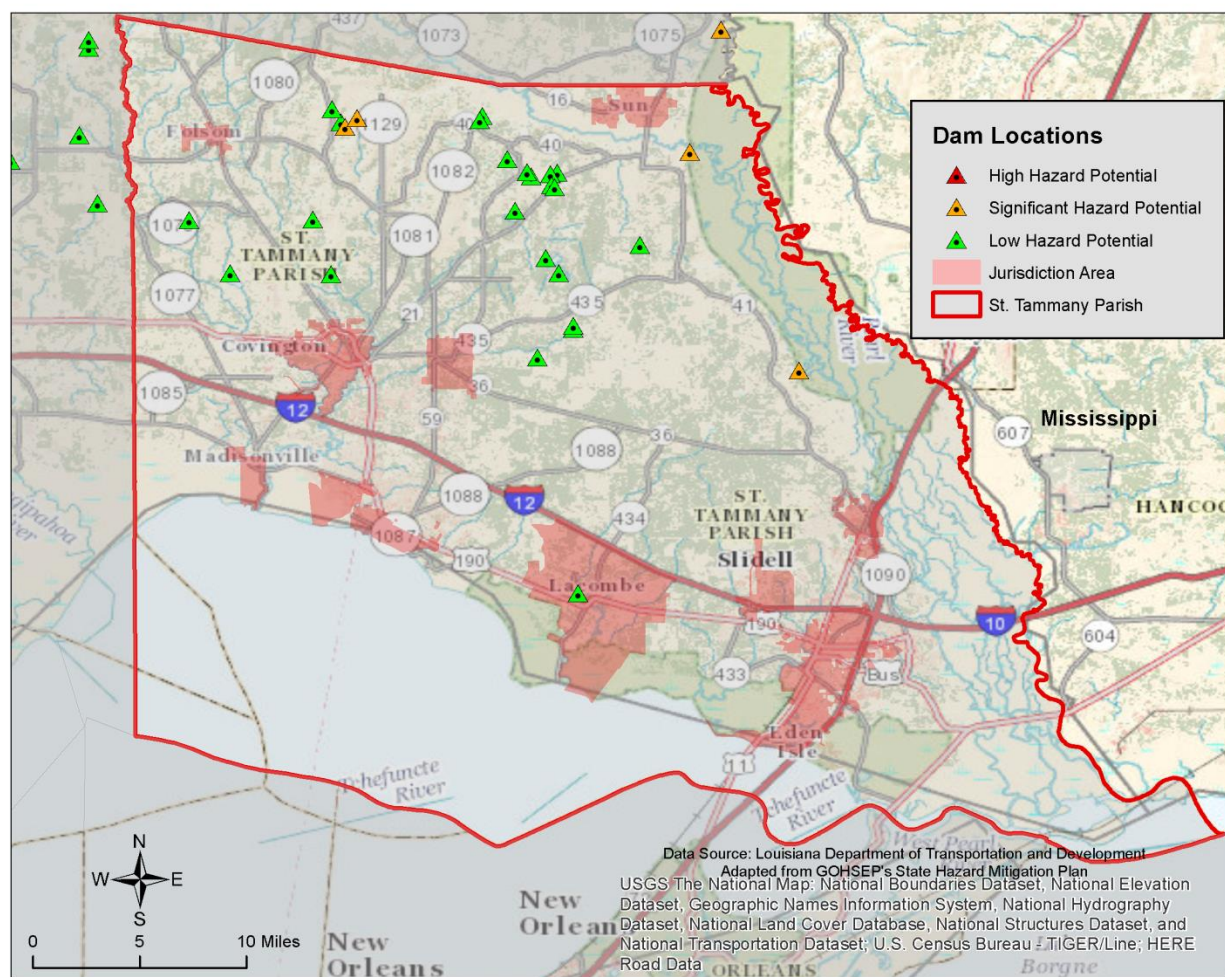


Figure 2-15: Dam locations in St. Tammany Parish with respect to hazard potential
(Source: National Inventory of Dams)

Previous Occurrences / Extent

The National Performance of Dams Program (NPDP), a database of dam incidents maintained by Stanford University, lists one dam incident in Louisiana, which occurred at the Kisatchie Lake Dam in Grant Parish in 1991. After heavy rains, the 25' high earthen dam was breached at the concrete spillway structure. There are no other reports of dam incidents in Louisiana reported by NPDP. Based on the inundation model, the worst-case scenario for dam failures in St. Tammany Parish would be 2 to 3 feet of flooding in the unincorporated areas of the parish.

Frequency / Probability

Guidance from the Bureau of Reclamation, among others, suggests an average probability of failure for dams to be 10^{-4} , or 0.1% annual probability, to be appropriate. The probability of a dam failure in unincorporated St. Tammany Parish is therefore assessed at 0.1%.

Estimated Potential Losses

For the two significant hazard dams located in the Bogue Chitto National Wildlife Refuge, there is the potential for environmental disruption, but there is little development exposed. There are some hunting/fishing camps downstream of these two dams, so there is a possibility of a safety hazard and building damage. Assuming each camp is valued at \$25,000 and 20 camps receive moderate damage, the total estimated physical damage cost in unincorporated St. Tammany Parish is $\$25,000 \times 0.4 \times 20 = \$200,000$.

For the two significant hazard dams located along Bills Creek, a worst-case scenario considering cascading (simultaneous) failure of the two successive dams was evaluated. Estimated potential losses were determined by mapping the expected inundation area and calculating economic losses were calculated by census block group using HAZUS-MH. Figure 2-16 shows the inundation extent for the failure of these two dams.

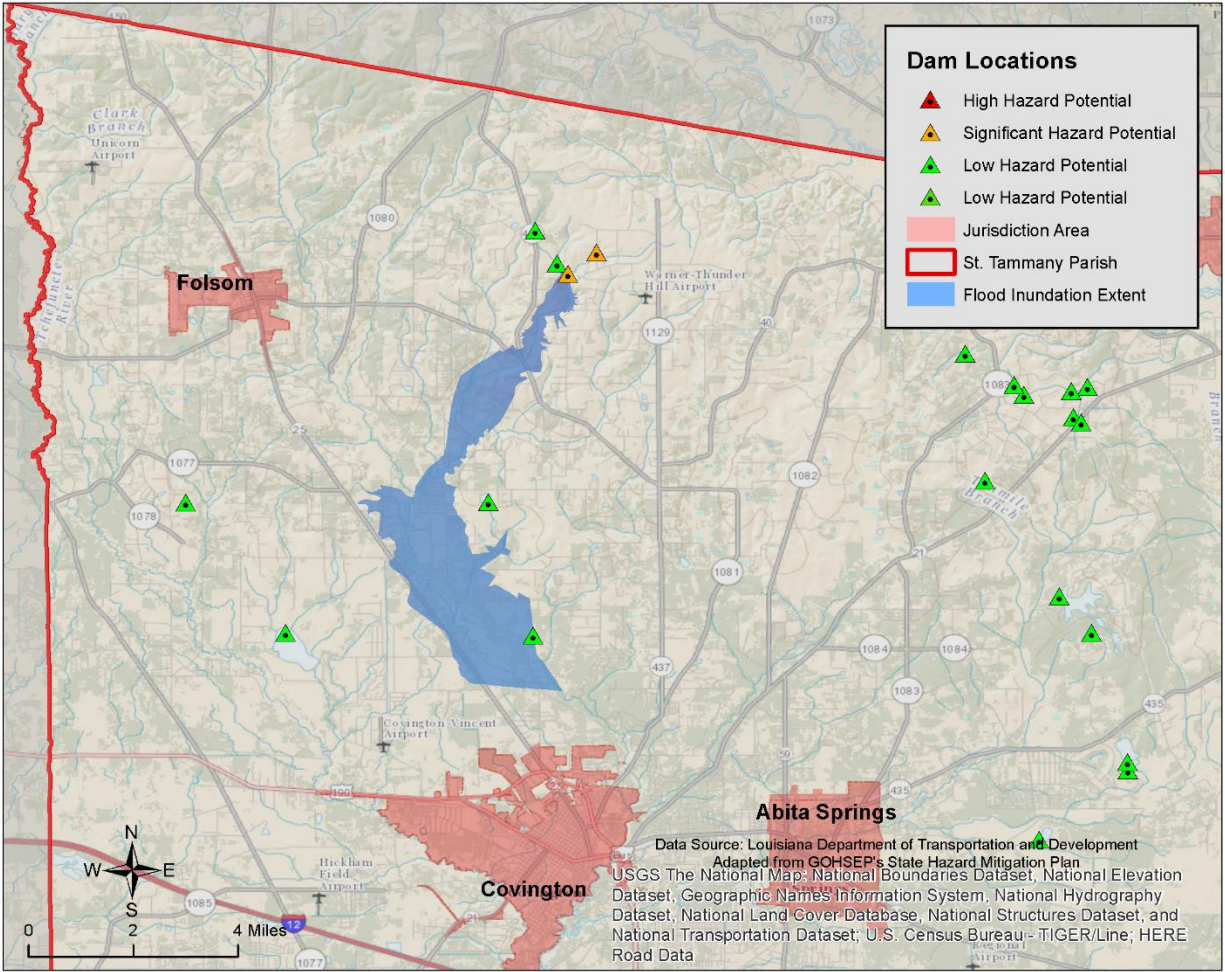


Figure 2-16: Expected inundation area for significant hazard dams in St. Tammany Parish with the potential for significant economic and human threat.
(Source: HAZUS -MH)

Using the Hazus-MH Flood Model, estimates of economic losses were derived for the inundation area. Table 2-22 provides an estimate of worst-case dam failure potential losses for St. Tammany Parish.

Table 2-22: Estimated losses in unincorporated St. Tammany Parish for dam failure.
(Source: HAZUS-MH)

St. Tammany Parish (Unincorporated Areas)	Estimated total Losses from 100 Year Hurricane Event
Agricultural	\$615,000
Commercial	\$7,311,000
Government	\$102,000
Industrial	\$966,000
Religious / Non-Profit	\$2,166,000
Residential	\$44,929,000
Schools	\$493,000
Totals	\$56,582,000

Threat to People

The total population within unincorporated St. Tammany Parish that is susceptible to a dam failure hazard is shown in the table below.

*Table 2-23: Number of people susceptible to a dam failure event in St. Tammany Parish.
(Source: HAZUS-MH)*

Number of People Exposed to a Dam Failure Event			
Location	# in Community	# in Hazard Area	% in Hazard Area
Parish (Unincorporated)	233,740	2,927	1.3%

The HAZUS-MH flood model was also extrapolated to provide an overview of vulnerable populations exposed to a dam failure hazard in unincorporated St. Tammany Parish in the tables below:

*Table 2-24: Vulnerable populations in unincorporated St. Tammany Parish for a dam failure event.
(Source: HAZUS-MH)*

St. Tammany Parish (Unincorporated)		
Category	Total Numbers	Percentage of People in Hazard Area
Number in Hazard Area	2,927	100%
Persons Under 5 years	169	5.8%
Persons Under 18 years	726	24.8%
Persons 65 Years and Over	421	14.4%
White	2,470	84.4%
Minority	457	15.6%

Drought

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

Drought is a unique and insidious hazard. Unlike other natural hazards, no specific threshold of "dryness" exists for declaring a drought. In addition, the definition of drought depends on stakeholder needs. For instance, the onset (and demise) of agricultural drought is quick, as crops need water every few days; once they get rainfall, they improve. But hydrologic drought sets in (and is alleviated) only over longer time periods. A few dry days will not drain a reservoir, but a few rain showers cannot replenish it, either. Moreover, different geographical regions define drought differently based on the deviation from local, normal precipitation. And drought can occur anywhere, triggered by changes in the local-to-regional-scale atmospheric circulation over an area or by broader-scale circulation variations such as the expansion of semi-permanent oceanic high-pressure systems or the stalling of an upper-level atmospheric ridge in place over a region. The severity of a drought depends upon the degree and duration of moisture deficiency, as well as the size of the affected area. Periods of drought tend to be associated with other hazards such as wildfires and/or heat waves as well. Lastly, drought is a slow onset event, causing less direct—but tremendous indirect—damage. Depletion of aquifers, crop loss, and livestock and wildlife mortality rates are examples of direct impacts. Since the groundwater found in aquifers is the source of about 38% of all county and city water supplied to households (and comprises 97% of the water for all rural populations that are not already supplied by cities and counties), droughts can potentially have direct, disastrous effects on human populations. The indirect consequences of drought such as unemployment, reduced tax revenues, increased food prices, reduced outdoor recreation opportunities, higher energy costs as water levels in reservoirs decrease and consumption increases, and water rationing are not often fully known. This complex web of impacts causes drought to affect people and economies well beyond the area physically experiencing the drought.

This hazard is often measured using the Palmer Drought Severity Index (PDSI, also known operationally as the Palmer Drought Index). The PDSI, first developed by Wayne Palmer in a 1965 paper for the U.S. Weather Bureau, measures drought through recent precipitation and temperature data with regard to a basic supply-and-demand model of soil moisture. It is most effective in long-term calculations. Three other indices used to measure drought are the Palmer Hydrologic Drought Index (PHDI); the Crop Moisture Index (CMI), which is derived from the PDSI; and the Keetch-Byram Drought Index (KBDI), created by John Keetch and George Byram in 1968 for the U.S. Forest Service. The KBDI is used mainly for predicting likelihood of wildfire outbreaks. As a compromise, the PDSI is used most often for droughts since it is a medium-response drought indicator. The objective of the PDSI is to provide measurements of moisture conditions that are standardized so that comparisons using the index can be made between locations and between months. Table 2-25 displays the range and Palmer classifications of the PDSI index. Due to the varying types and severities of drought that rely on different indicators, great caution should be exercised in interpreting and inferring from the results of the PDSI maps.

Table 2-25: Palmer Drought Severity Index classification and range.

Range	Palmer Classifications
4.0 or more	Extremely Wet
3.0 to 3.9	Very Wet
2.0 to 2.9	Moderately Wet
1.0 to 1.99	Slightly Wet
0.5 to 0.99	Incipient Wet Spell
0.49 to -0.49	Near Normal
-0.5 to -0.99	Incipient Dry Spell
-1.0 to -1.99	Mild Drought
-2.0 to -2.99	Moderate Drought
-3.0 to -3.99	Severe Drought
-4.0 or less	Extreme Drought

Results from the PDSI indicate that the drought risk across St. Tammany Parish increased, although not significantly from a statistical perspective, between 1958 and 2007. The PDSI best measures the duration and intensity of drought-inducing circulation patterns at a somewhat long-term time scale, although not as long term as the PHDI. Long-term drought is cumulative, so the intensity of drought during the current month is dependent on the current weather patterns plus the effects of cumulative patterns of previous months—or longer. Although weather patterns can change almost literally overnight from a long-term drought pattern to a long-term wet pattern, as a medium-response indicator, the PDSI responds relatively rapidly. The current drought severity index published by the National Drought Mitigation Center indicates that St. Tammany Parish is currently at normal conditions and is not experiencing any drought events.

The experimental “Long-Term Blend” approximates drought-related impacts (such as reservoir stores, irrigated agriculture, groundwater levels, and well water depth) that respond to precipitation on time scales ranging from several months to a few years by blending data from those time scales. As of January 31, 2015, conditions in St. Tammany Parish are normal.

Location

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

Previous Occurrences / Extents

The previous update to the St. Tammany Parish plan reported a total of 2 droughts occurring within the boundaries of St. Tammany Parish between the years of 1960 - 2014. The SHELDS database does not report any drought events occurring post 2000 within the boundaries of St. Tammany Parish. Table 2-26 identifies the date of occurrence and estimated crop damage for the droughts that have occurred in St. Tammany Parish. Based on previous occurrences, the worst case scenarios for droughts in St. Tammany Parish would be a Severe Drought based on the Palmer Classification.

Table 2-26: Drought events with crop damage totals for St. Tammany Parish.
(Source: SHEL DUS)

Date	Crop Damage	Palmer Classification
August 1998	\$5,034,625	Severe Drought
December 2000	\$6,072,695	Moderate Drought

Frequency / Probability

Based on previous occurrences of 2 droughts in 54 years, the probability of drought occurrence in the planning area in any given year is 4%.

Estimated Potential Losses

According to the SHEL DUS database, there have been 2 droughts that have caused some level of crop damage. The total agricultural damage from these events is \$11,107,320 with an average cost of \$5,553,660 per drought event. When annualizing the total cost over the 54 year record, total annual losses based on drought is estimated to be \$205,691. Table 2-27 presents an analysis of agricultural exposure that are susceptible to droughts by type for St. Tammany Parish.

Table 2-27: Agricultural exposure by crop type for droughts in St. Tammany Parish.
(Source: LSU AG Center 2013 Parish Totals)

Agricultural Exposure by Type for Drought			
Blueberry	Nursery Crops	Hay	Forestry
\$330,000	\$6,450,000	\$144,750	\$5,882,722

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

Earthquake

An earthquake is a sudden motion or trembling of the Earth caused by an abrupt release of stored energy in the rocks beneath the Earth's surface. The energy released results in vibrations which are known as seismic waves. Ground motion from seismic waves is expressed as peak ground acceleration (PGA), the fastest measured change in speed for a particle at ground level that is moving because of an earthquake. PGA is commonly measured as a percentage of acceleration due to Earth's gravity (%g). This measurement is relied on to determine seismic load engineering design and construction requirements. Earthquakes are typically described in terms of magnitude and intensity. Magnitude is the measure of the amplitude of the seismic wave and is often expressed by the Richter scale, and intensity is a measure of how strong the shock was felt at a particular location, indexed by the Modified Mercalli Intensity (MMI) scale. The Richter scale is a logarithmic measurement whereby an increase in the scale by one whole number represents a tenfold increase in measured ground motion of the earthquake (and an increase in energy released of more than 30 times). An increase by two whole numbers represents a 102 (or 100-fold) increase in ground motion, and thus more than 302 (or 900) times the energy released. Table 2-28 shows the rough correlation between the Richter scale, PGA, and the MMI. The relationship between these is approximate and depends upon such specifics as the depth of the focus (the location of the actual rock movement) and distance from the epicenter (the location on the Earth's surface above the earthquake focus) of the earthquake.

*Table 2-28: Comparison of earthquake magnitudes for PGA, Richter, and MMI.
(Source: USGS Earthquake Hazards Program)*

COMPARISON OF EARTHQUAKE METRICS			
PGA (%g)	Magnitude (Richter)	Intensity (MMI)	Description (MMI)
<0.17	1.0 - 3.0	I	I. Not felt except by a very few under especially favorable conditions.
0.17 - 1.4	3.0 - 3.9	II - III	II. Felt only by a few persons at rest, especially on upper floors of buildings. III. Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motorcars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
1.4 - 9.2	4.0 - 4.9	IV - V	IV. Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motorcars rock noticeably. V. Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
9.2 - 34	5.0 - 5.9	VI - VII	VI. Felt by all. Some heavy furniture moved; a few instances of fallen plaster. Damage slight. VII. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.

COMPARISON OF EARTHQUAKE METRICS			
PGA (%g)	Magnitude (Richter)	Intensity (MMI)	Description (MMI)
34 - 124	6.0 - 6.9	VII - IX	<p>VIII. Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, and walls. Heavy furniture overturned.</p> <p>IX. Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.</p>
>124	7.0 and higher	VIII or higher	<p>X. Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.</p> <p>XI. Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly.</p> <p>XII. Damage total. Lines of sight and level are distorted. Objects thrown into the air.</p>

The system of subsidence faults in southern Louisiana developed due to accelerated land subsidence and rapid sediment deposition from the Mississippi River. The system stretches across the southern portion of the state from Beauregard Parish in the west to St. Tammany Parish in the east and it includes every parish south of this line. This system is thought to be responsible for many of the recorded earthquakes from 1843 to the present. All of the earthquakes that occurred over this period of time were of low magnitude, resulting mostly in limited property damage (such as broken windows, damaged chimneys, and cracked plaster). While faults throughout the northwestern parishes are thought to be inactive, the New Madrid seismic zone lies just to the north of Louisiana and originates in the region of New Madrid, Missouri. The magnitude of historic earthquakes originating in the New Madrid seismic zone is far greater than that generated by the subsidence fault system in coastal Louisiana. A significant seismic event from the New Madrid seismic zone is more likely to have a greater impact on Louisiana than a seismic event from the subsidence fault system.

Location

An earthquake event impacts a region and not one specific parish or jurisdiction. Since earthquakes are a regional event, they have the same probability of occurrence throughout the entire planning area for St. Tammany Parish.

Previous Occurrences / Extents

Both the SHELDES and National Climatic Data Center report no earthquake events occurring within the boundaries of St. Tammany Parish between the years of 1960 – 2014. The National Oceanic and Atmospheric Administration's National Geophysical Data Center reports 5 earthquake events occurring within the boundaries of St. Tammany Parish between the years 1886 – 2014. Table 2-29 summarizes the earthquake events that have occurred within St. Tammany Parish. Figure 2-17 displays the location and

intensity of each earthquake event in St. Tammany and surrounding parishes. Based on previous occurrences, the worst-case scenario for St. Tammany parish is an earthquake with a Modified Mercalli Intensity of 5.

Table 2-29: Summary of earthquakes in St. Tammany Parish.

Date	Location	Intensity (MMI)
September 1, 1886	Covington	2
October 19, 1930	Covington	5
October 19, 1930	Mandeville	3
October 19, 1930	Ramsey	3
October 19, 1930	Slidell	4

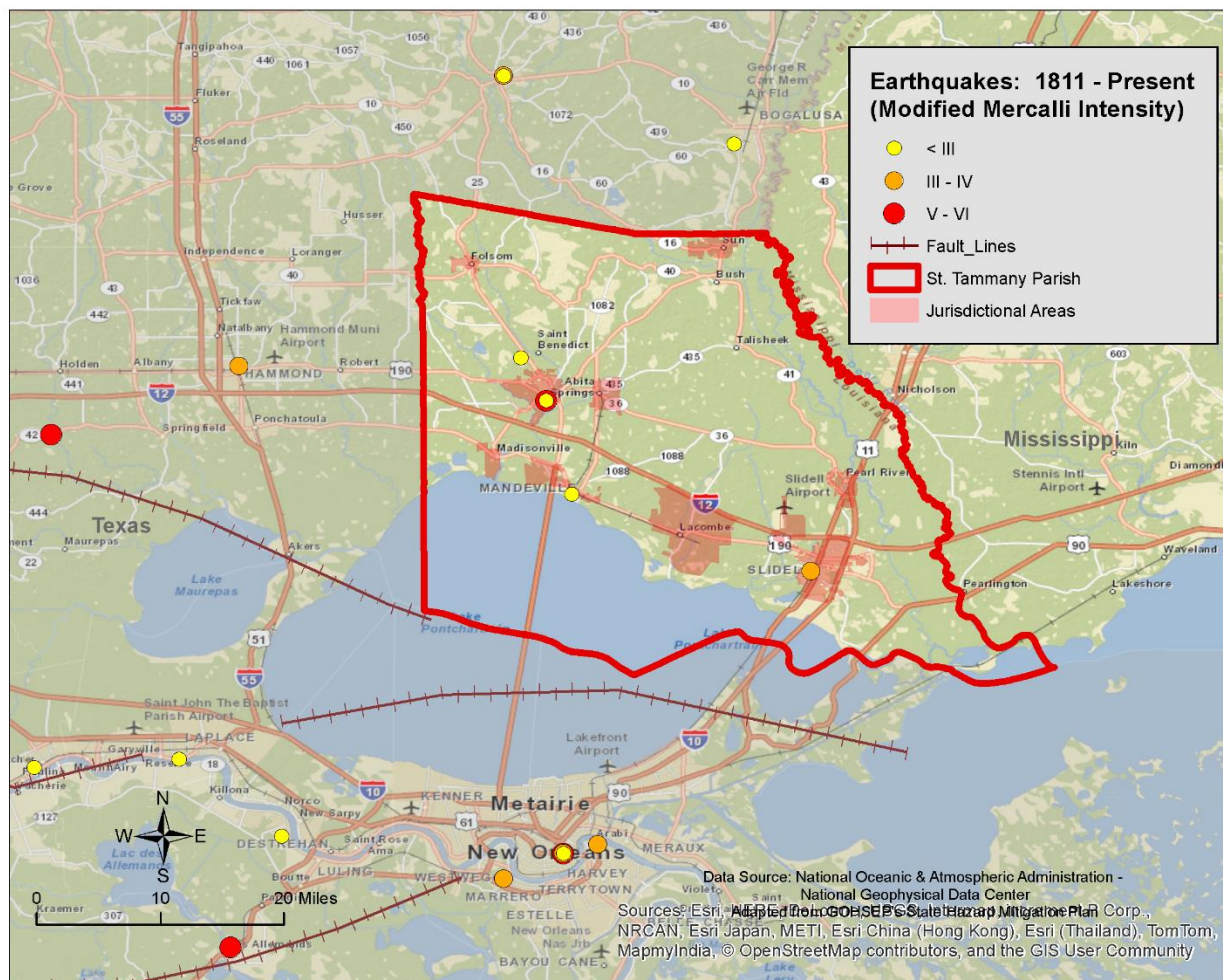


Figure 2-17: Location and intensity (MMI) of earthquakes in St. Tammany Parish.

Frequency / Probability

Earthquakes are an extremely rare occurrence within St. Tammany Parish with an annual chance of occurrence calculated at 2% based on records from the years 1811 – 2014. Based on this historical record and Louisiana's State Hazard Mitigation Plan, it is determined that the risk associated with an earthquake event to people and property is low for the entire St. Tammany Parish planning area and is discounted. Therefore, a technical risk assessment is not included for earthquakes.

Flooding

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

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

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

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

In cooler months, particularly in the spring, Louisiana is in peak season for severe thunderstorms. The fronts that cause these thunderstorms often stall while passing over the state, occasionally producing rainfall totals exceeding 10 in. within a period of a few days. Since soil tends to be nearly saturated at this time (due to relatively low overall evaporation rates), spring typically becomes the period of maximum stream flow across the state. Together, these characteristics increase the potential for high water, and low-lying, poorly drained areas are particularly prone to flooding during these months.

In Louisiana, six specific types of floods 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 and the shape and land cover of its drainage basin. The smaller the river, the faster water levels rise and fall. Thus, the Mississippi River levels rise and fall slowly due to its large capacity. Generally, elongated and intensely-developed drainage basins will reach faster peak discharges and faster falls than circular-shaped and forested basins of the same area.

- **Flash flooding** occurs when locally intense precipitation inundates an area in a short amount of time, resulting in local stream flow and drainage capacity being overwhelmed.
- **Ponding** occurs when concave areas (e.g., parking lots, roads, and clay-lined natural low areas) collect water and are unable to drain.
- **Backwater flooding** occurs when water slowly rises from a normally unexpected direction where protection has not been provided. A model example is the flooding that occurred in LaPlace during Hurricane Isaac in 2012. Although the town was protected by a levee on the side facing the Mississippi, floodwaters from Lake Maurepas and Lake Pontchartrain crept into the community on the side of town opposite the Mississippi River.
- **Urban flooding** is similar to flash flooding but is specific to urbanized areas. It takes place when storm water drainage systems cannot keep pace with heavy precipitation, and water accumulates on the surface. Most urban flooding is caused by slow-moving thunderstorms or torrential rainfall.
- **Coastal flooding** can appear similar to any of the other flood types, depending on its cause. It occurs when normally dry coastal land is flooded by seawater, but may be caused by direct inundation (when the sea level exceeds the elevation of the land), overtopping of a natural or artificial barrier, or the breaching of a natural or artificial barrier (i.e., when the barrier is broken down by the sea water). Coastal flooding is typically caused by storm surge, tsunami, and gradual sea level rise.

In St. Tammany parish, all six types of flooding have historically been observed. For purposes of this assessment, ponding, flash flood and urban flooding are considered to be flooding as a result of storm water from heavy precipitation thunderstorms

Based on stream gauge levels and precipitation forecasts, the National Weather Service (NWS) posts flood statements watches and warnings. The NWS issues the following weather statements with regard to floods:

- **Flood Categories**
 - Minor Flooding: Minimal or no property damage, but possibly some public threat.
 - Moderate Flooding: Some inundation of structures and roads near streams. Some evacuations of people and/or transfer of property to higher elevations.
 - Major Flooding: Extensive inundation of structures and roads. Significant evacuations of people and/or transfer of property to higher elevations.
 - Record Flooding: Flooding which equals or exceeds the highest stage or discharge at a given site during the period of record keeping.
- **Flood Warning**
 - Issued along larger streams when there is a serious threat to life or property.
- **Flood Watch**

- Issued when current and developing hydro meteorological 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-yr flood event, for example, is an event of small magnitude (in terms of stream flow or precipitation) but with a relatively high annual probability of recurrence (10%). A 100-yr flood event is larger in magnitude, but it has a smaller chance of recurrence (1%). A 500-yr flood is significantly larger than both a 100-yr event and a 10-yr event, but it has a lower probability than both to occur in any given year (0.2%). It is important to understand that an x-yr flood event does not mean an event of that magnitude occurs only once in x years. Instead, it just means that on average, we can expect a flood event of that magnitude to occur once every x years. Given that such statistical probability terms are inherently difficult for the lay 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-yr flood event has having a 25% chance of occurring over the life of a 30-yr mortgage.

It is essential to understand that the magnitude of an x-yr flood event for a particular area depends on the source of flooding and the area's location. The size of a specific flood event is defined through historic data of precipitation, flow, and discharge rates. Consequently, different 100-yr flood events can have very different impacts. The 100-yr flood events in two separate locations have the same likelihood to occur, but they do not necessarily have the same magnitude. For example, a 100-yr event for the Mississippi River means something completely different in terms of discharge values (ft^3/s) than, for example, for the Amite River. Not only are the magnitudes of 100-yr events different between rivers, they can be different along any given river. A 100-yr event upstream is different from one downstream since river characteristics (volume, discharge, and topography) change. As a result, the definition of what constitutes a 100-yr flood event is specific to each location, river, and time, since floodplain and river characteristics change over time. Finally, it is important to note that each flood event is unique. Two hypothetical events at the same location, given the same magnitude of stream flow, may still produce substantially different impacts, if there were different antecedent moisture characteristics, different times of day of occurrence (which indicates the population's probable activities at the flood's onset), or other characteristic differences.

The 100-yr event is of particular significance since it is the regulatory standard that determines the obligation or lack thereof to purchase flood insurance. Flood insurance premiums are set depending on the flood zone as modeled by National Flood Insurance (NFIP) Rate Maps. The NFIP and FEMA suggest insurance rates based on special flood hazard areas (SFHAs), as diagrammed in Figure 2-18.

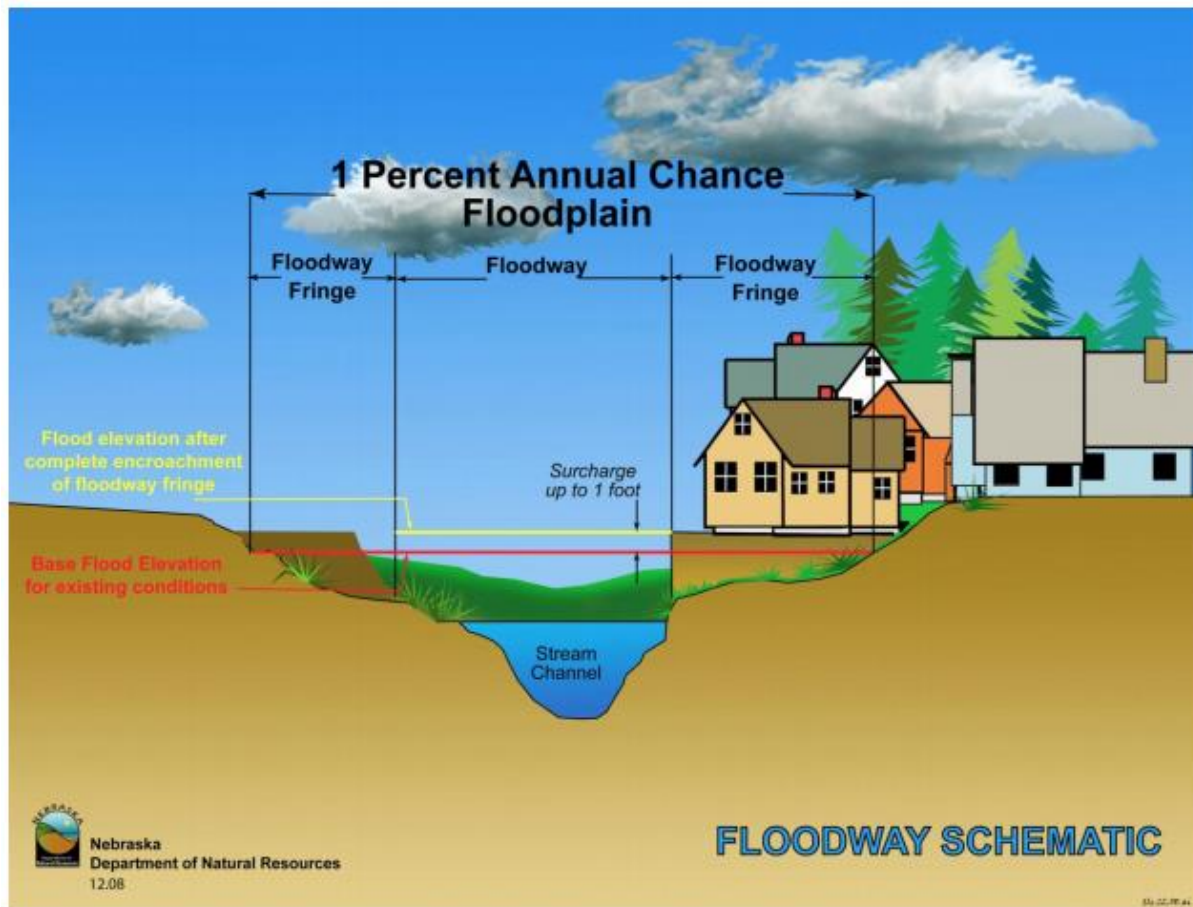


Figure 2-18: Schematic of 100-yr floodplain. The special hazard area (SFHA) extends to the end of the floodway fringe.

(Source: Nebraska Department of Natural Resources Desk Reference).

A SFHA is the land area covered by the floodwaters of the base flood (red line in Figure 2-18), where the NFIP's floodplain management regulations must be enforced and the area where the mandatory purchase of flood insurance applies.

Property Damage

The depth and velocity of flood waters are the major variables in determining property damage. Flood velocity is important because the faster water moves, the more pressure it puts on a structure and the more it will erode stream banks and scour the earth around a building's foundation. In a few situations, deep and fast moving waters will 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 has the potential to fall apart 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 is 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. Has incurred flood-related damage on 2 occasions, in which the cost of the repair, on the 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. Is covered under a contract for flood insurance made available under the NFIP; and
- b. Has incurred flood related damage –
 - 1) For which 4 or more separate claims payments have been made under flood insurance coverage with the amount of each claim exceeding \$5,000 and with the cumulative amount of such claims payments exceeding \$20,000; or
 - 2) For which at least 2 separate claims payments have been made under such coverage, with the cumulative amount of such claims exceeding the market value of the insured structure.

Repetitive loss properties for St. Tammany Parish are provided below:

Table 2-30: Repetitive Loss Structures for St. Tammany Parish.

Jurisdiction	Number of Structures	Residential	Commercial	Government	Total Claims	Total Claims Paid	Average Claim Paid
St. Tammany Parish (Not Incorporated)	2,032	1971	61	0	5,924	\$244,558,986	\$41,283
Abita Springs, Town of	4	4	0	0	9	\$151,142	\$16,794
Covington, City of	57	47	10	0	214	\$4,505,933	\$21,056
Folsom, Village of	1	1	0	0	2	\$21,186	\$10,593
Madisonville, Town of	54	47	7	0	138	\$7,731,241	\$56,023
Mandeville, City of	211	196	15	0	641	\$29,457,471	\$45,955
Pearl River, Town of	3	3	0	0	7	\$89,870	\$12,839
Slidell, City of	1,030	978	52	0	3,155	\$149,432,459	\$47,364
Sun, Village of	6	6	0	0	21	\$466,790	\$22,228
St. Tammany Parish Total	3,398	3253	145	0	10,111	436,415,078	\$43,162

Of the 3,398 repetitive loss structures, 3,395 were able to be geocoded to provide an overview of where the repetitive loss structures are located throughout the parish. Figure 2-19 shows the approximate location of the 3,395 structures, while Figure 2-20 shows where the highest concentration of repetitive loss structures are located. Through the density map, it is clear that the primary concentrated area of

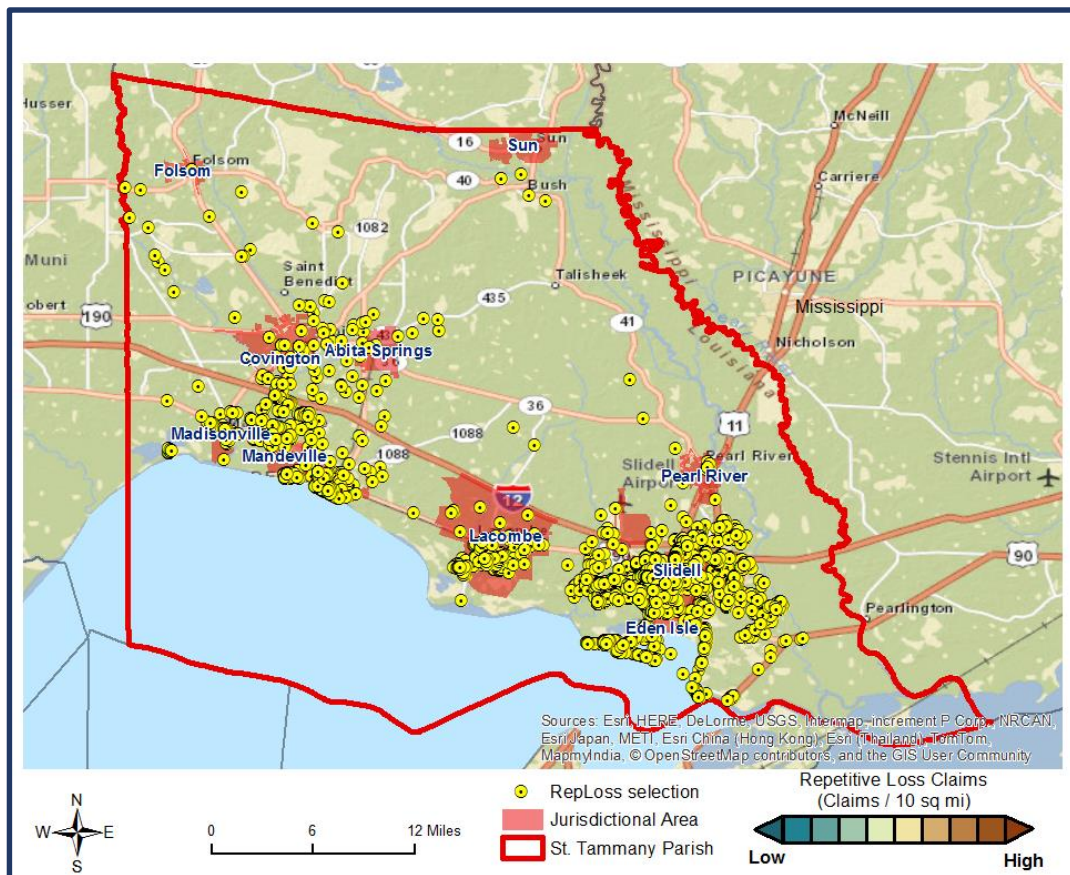


Figure 2-19: Repetitive Loss Properties in St. Tammany Parish.

Repetitive loss structures are focused around the southern portion of the parish near the shore line of Lake Pontchartrain.

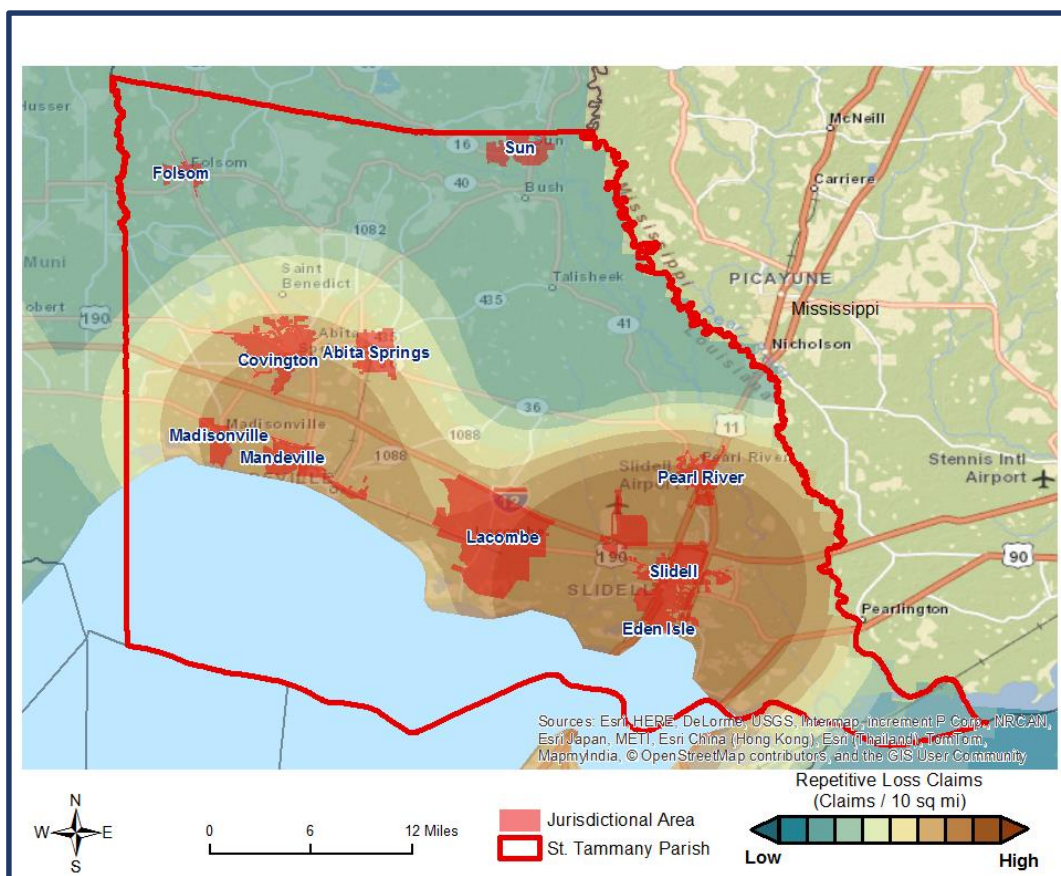


Figure 2-20: Repetitive Loss Property Densities in St. Tammany Parish.

National Flood Insurance Program

Flood insurance statistics indicate that St. Tammany Parish has nearly 47,500 flood insurance policies with the NFIP with total annual premiums in excess of \$31 million. St. Tammany Parish, Abita Springs, Covington, Folsom, Madisonville, Mandeville, Pearl River, and Slidell are all participants in the NFIP. The Village of Sun is the only jurisdiction in the parish that doesn't participate in the program. Flood insurance statistics and additional NFIP participation details for the unincorporated part of St. Tammany Parish and incorporated municipalities are provided in the tables to follow.

Table 2-31: Summary of NFIP Policies for St. Tammany Parish.

Location	No. of Insured Structures	Total Insurance Coverage Value	Annual Premiums Paid	No. of Insurance Claims Filed	Total Loss Payments
St. Tammany Parish (Not	35,005	\$10,202,832,800	20,799,216	16,298	\$1,102,054,763
Abita Springs, Town of	367	\$99,559,200	\$179,092	52	\$662,788
Covington, City of	1,306	\$373,741,200	\$978,422	392	\$7,234,706
Folsom, Village of	13	\$2,937,600	\$5,646	7	\$87,622
Madisonville, Town of	310	\$78,266,200	\$390,048	305	\$13,326,084
Mandeville, City of	2,721	\$730,498,300	\$2,079,269	1,224	\$43,953,219
Pearl River, Town of	169	\$45,838,400	\$79,848	24	\$366,559
Slidell, City of	7,598	\$1,801,456,500	\$6,808,384	7,938	\$455,861,047
Sun, Village of	1	\$230,000	\$752	0	\$0
Total	47,489	\$13,335,360,200	\$31,320,677	26,240	\$1,623,546,788

Table 2-32: Summary of Community Flood Maps for St. Tammany Parish.

CID	Community Name	Initial FHBM Identified	Initial FIRM Identified	Current Effective Map Date	Date Joined the NFIP	Tribal
225205	St. Tammany Parish (Not Incorporated)	4/23/1971	4/23/1971	4/21/1999	4/23/1971	No
220199	Abita Springs, Town of	5/17/1974	5/17/1988	5/17/1988	5/17/1988	No
220200	Covington, City of	12/28/1973	11/19/1980	11/19/1980	11/19/1980	No
220285	Folsom, Village of	7/18/1975	3/16/1982	3/16/1982	3/16/1982	No
220201	Madisonville, Town of	3/22/1974	12/2/1980	3/16/1983	12/2/1980	No
220202	Mandeville, City of	6/28/1974	9/28/1979	5/16/2012	9/28/1979	No
220203	Pearl River, Town of	5/24/1974	5/4/1988	5/4/1988	5/4/1988	No
220204	Slidell, City of	11/16/1973	12/16/1980	4/21/1999	12/16/1980	No
220082	Sun, Village of	8/30/1974	7/1/2013	7/1/2013	7/1/2013	No

According to the Community Rating System (CRS) list of eligible communities dated June 1, 2014, St. Tammany Parish along with Covington, Mandeville and Slidell also participate in the Community Rating System (CRS). Table 2-32 provides details regarding CRS Participation.

Table 2-33: Summary of the Community Rating System (CRS) Participation for St. Tammany Parish.

Community Number	Name	CRS Entry Date	Current Effective Date	Current Class	% Discount for SFHA	% Discount for Non-SFHA	Status
225205	St. Tammany Parish	10/1/1992	5/1/2011	7	15%	5%	C
220200	Covington	10/1/1995	10/1/1996	10	0%	0%	R
220202	Mandeville	10/1/1992	10/1/2008	7	15%	5%	C
220204	Slidell	10/1/1992	5/1/2013	7	15%	5%	C

Threat to People

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

Major health concerns are also associated with floods. Floodwaters 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. Floodwaters can also infiltrate sewer lines and inundate wastewater treatment plants, causing sewage to backup and creating a breeding ground for dangerous bacteria. This infiltration may also cause water supplies to become contaminated and undrinkable.

Flooding in St. Tammany Parish

By definition, flooding is caused by more water than the drainage system can convey. Flooding is dependent on three factors: precipitation, conditions in the watershed, and conditions in the drainage channel.

Precipitation: St. Tammany Parish receives an average of 64 inches of rain each year. The rain comes from tropical storms, convective thunderstorms, and storms caused by the interaction of warm moist air with colder air from the north. The amount of rain that falls varies from storm to storm and varies over an area. Where this rain goes depends on the watershed.

The watershed: A “watershed” is an area of land that drains into a lake, stream or other body of water. The runoff from rain is collected by ditches and sewers which send the water to small streams (tributaries), which send the water to larger channels and eventually to the lowest body of water in the watershed (the main channel, Lake Pontchartrain or the Gulf). When one of these conveyance channels receives too much water, the excess flows over its banks and into the adjacent area – causing a flood. St. Tammany Parish has 7 major watersheds. Data on these watersheds are displayed in Table 2-10. Within these major watersheds are smaller subwatersheds that drain into the tributaries. All of these streams have adjacent floodplains that are inundated during a flood.

There are several watershed conditions that affect flooding. The first is the size of the watershed. Smaller watersheds will flood more quickly. The Pearl River has a much larger watershed in Mississippi upstream of St. Tammany Parish. As with most major rivers and watersheds, the Pearl River responds more slowly to rain and runoff than do the other, smaller, streams in the Parish. But when floods do occur on the Pearl River, the duration of the flooding can extend for much longer than it does for the smaller streams. The second watershed factor that affects flooding is the slope of the land. More rain will run off the land and into the streams if the terrain is steep. Because much of St. Tammany Parish is so flat, water tends to pond where it falls and run off slowly. This results in very localized flooding conditions, before the water reaches the local drainage system.

A third factor is what development has done to the watershed and drainage system. Given the flat topography of the southern part of the parish, the natural drainage ways that drain runoff can be hard to discern and are often disrupted or even built on during construction. In areas that have been developed, farm fields and forests have been converted to pavements and rooftops. As a result, the amount of storm water that runs off increases. The original natural drainage system cannot handle the increased loads and localized flooding occurs. These watershed conditions mean that St. Tammany Parish is faced with two types of flooding: longer-lasting, overbank flooding from the larger rivers and quick or “flash” storm water flooding in areas where the runoff overloads the local drainage system. The former may be caused by rain falling upstream in the watershed while the latter is caused by rain falling on the affected area. Because overbank flooding takes longer to occur, there may be advance warning time, but there is very little warning of local storm water flooding.

The channel: Flooding can be aggravated by obstructions in the drainage system. There are two kinds: channel obstructions, such as small bridge or culvert openings or log jams, and floodplain obstructions, such as road embankments, fill and buildings. Channel obstructions will aggravate smaller, more frequent floods, while floodplain obstructions impact the larger, less frequent floods where most of the flow is overbank, outside the channel. Channel obstructions can be natural (e.g., log jams or growth) or manmade (e.g., broken culverts or debris). Channel obstructions can be cleared out by work crews or washed away during larger floods. Floodplain obstructions tend to be more permanent.

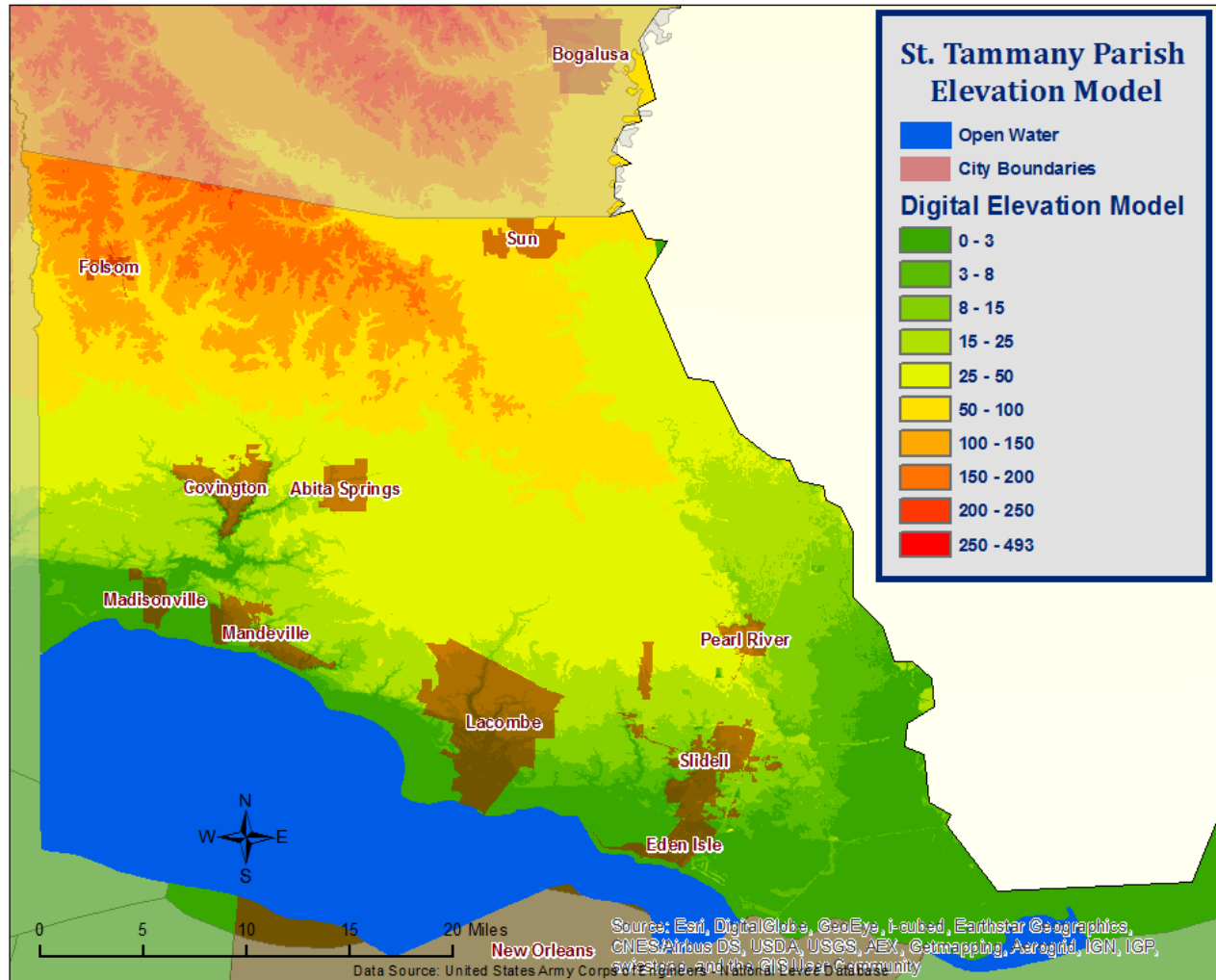


Figure 2-21: Elevation throughout St. Tammany Parish.

Looking at the digital elevation model (DEM) in Figure 2-21 for St. Tammany Parish is instructive in visualizing where the low lying and risk areas are for the parish. The St. Tammany Parish DEM, which is based on LIDAR captured by FEMA as part of a hazard mitigation project, shows that the elevations in the elevation along the north shores of Lakes Pontchartrain are relatively low. The elevation of all of Madisonville is no greater than 3 feet, while large parts of Mandeville are less than 3 feet as well. The most southern parts of Slidell are 3 feet or less while the majority of Slidell sits on higher ground with the northern portion of the city reaching elevations of 15 feet. The highest elevations in the parish are located in the northwestern area of the parish with elevation exceeding 200 feet just north of the Village of Folsom.

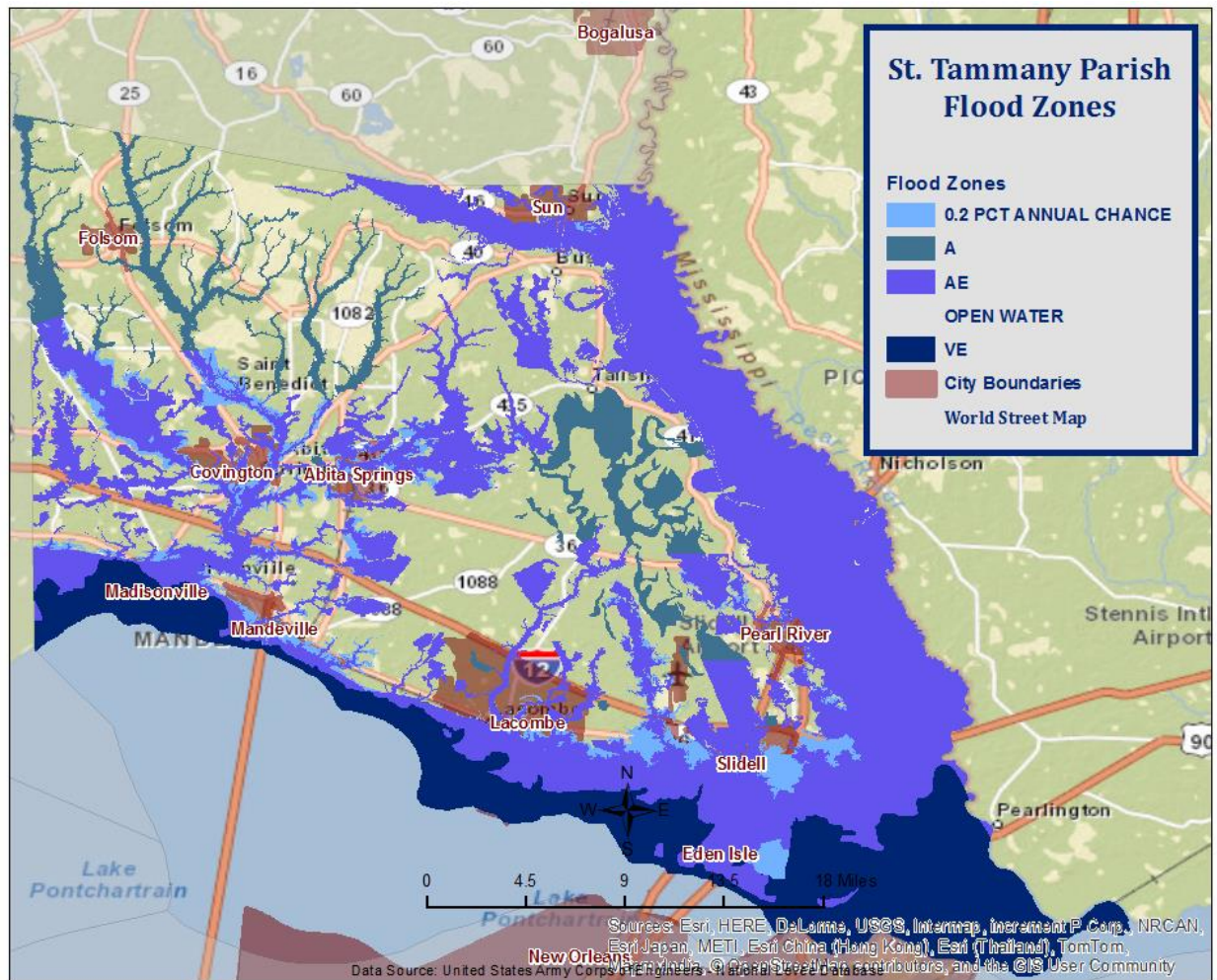


Figure 2-22: The 100 Year Floodplain for St. Tammany Parish with Levee Systems.

Communities that are fully located in the 100-year floodplain include Madisonville and nearly all of Slidell. Those that are partially located in the floodplain are Abita Springs, Covington, Folsom, Mandeville, Pearl River and Sun.

Location

St. Tammany parish has experienced significant flooding in its history and can expect more in the future. The parish is susceptible to riverine flooding from the Pearl River on its eastern border and the Tchefuncte River in the west which passes through the City of Covington and the Town of Madisonville. St. Tammany is also susceptible to storm surge along the north shore of Lake Pontchartrain where the elevation is less than 3 feet in most areas just north of the lake. Madisonville, Mandeville, and Slidell are at risk to storm surge as are the unincorporated area of Lacombe and Eden Isle. Below are enlarged maps of the eight incorporated areas showing the areas within each jurisdiction that are at risk to flooding.

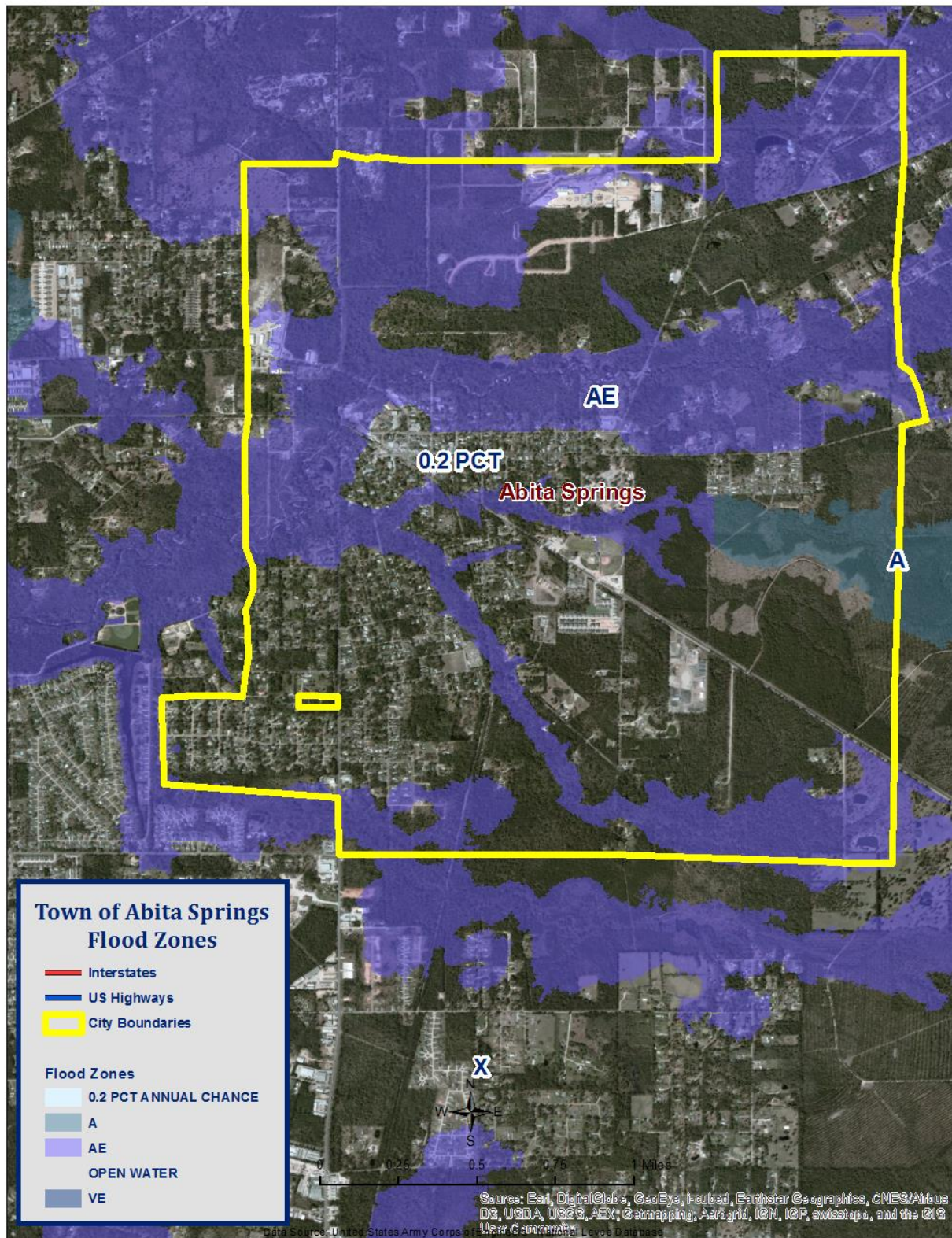


Figure 2-23: Town of Abita Springs areas within the Flood Zones.

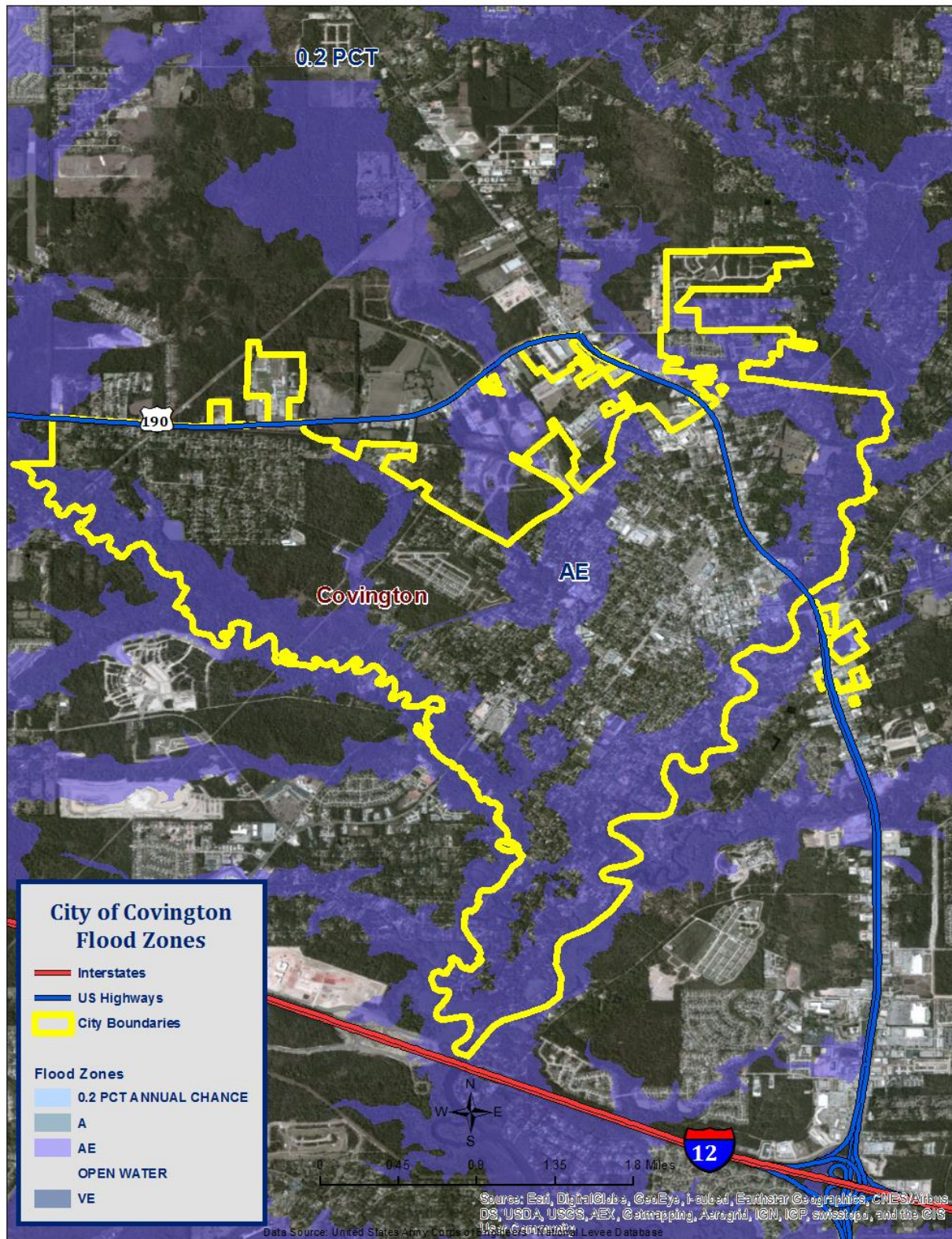


Figure 2-24: City of Covington areas within the Flood Zones.

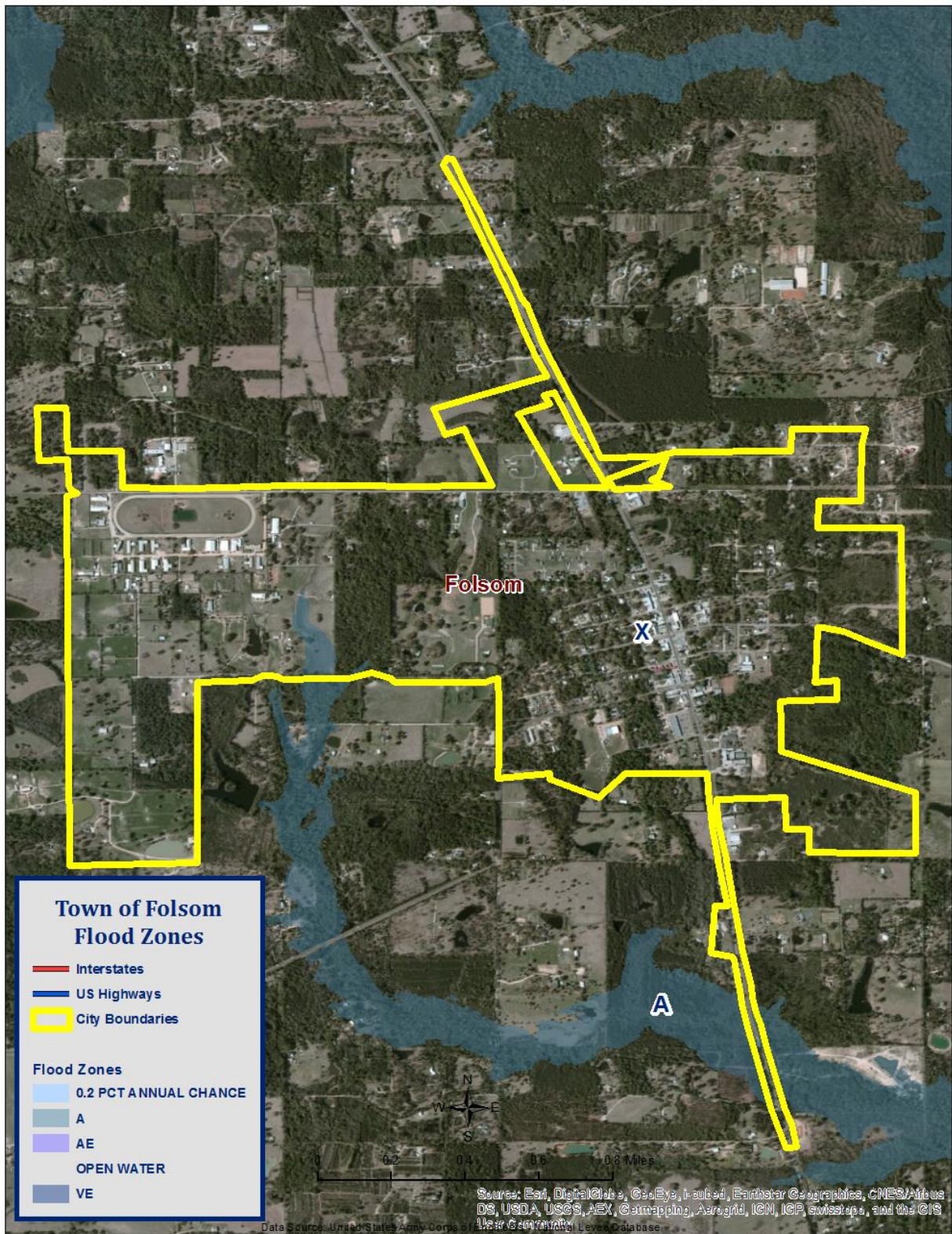


Figure 2-25: Village of Folsom areas within the Flood Zones.

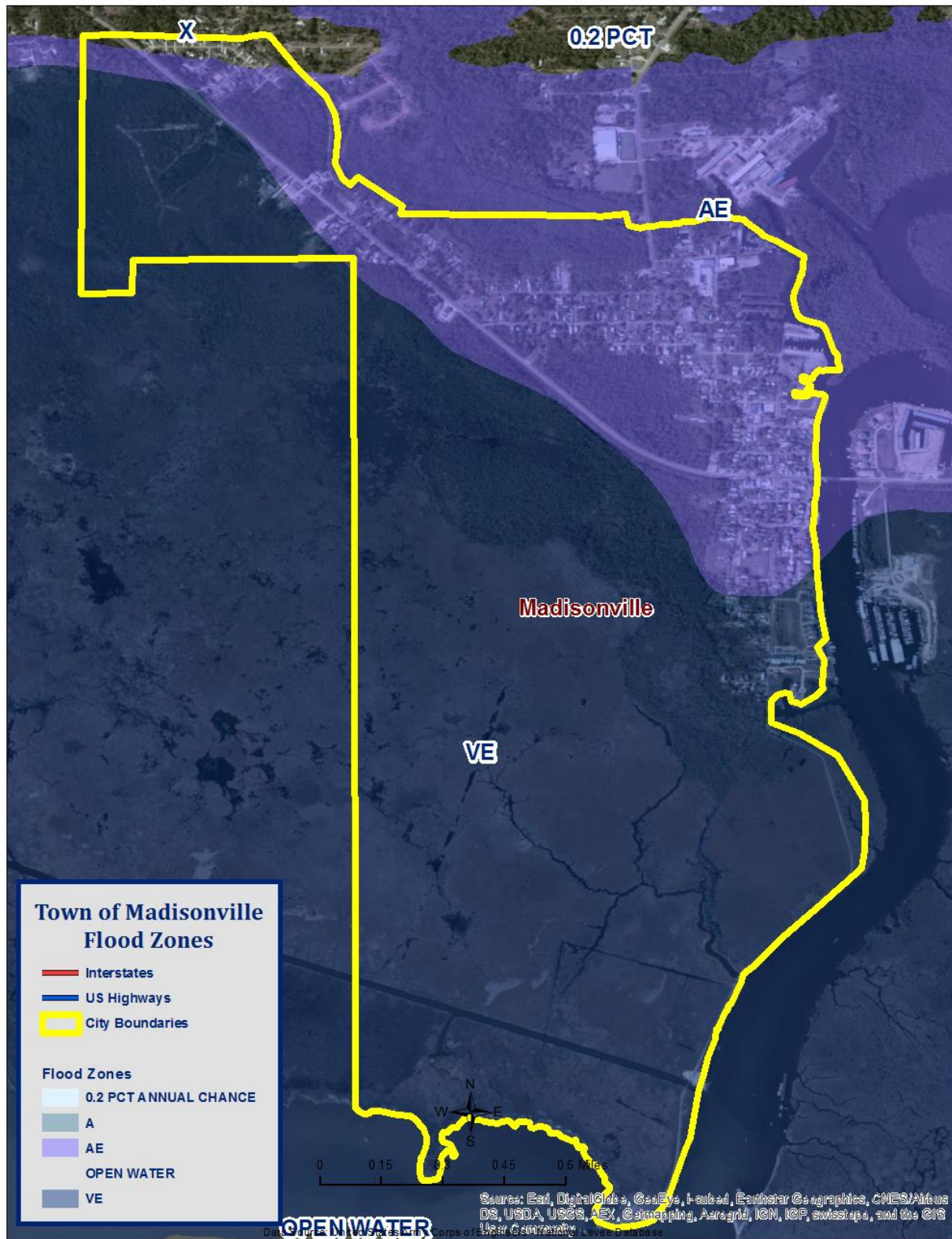


Figure 2-26: Town of Madisonville areas within the Flood Zones.



Figure 2-27: City of Mandeville areas within the Flood Zones.

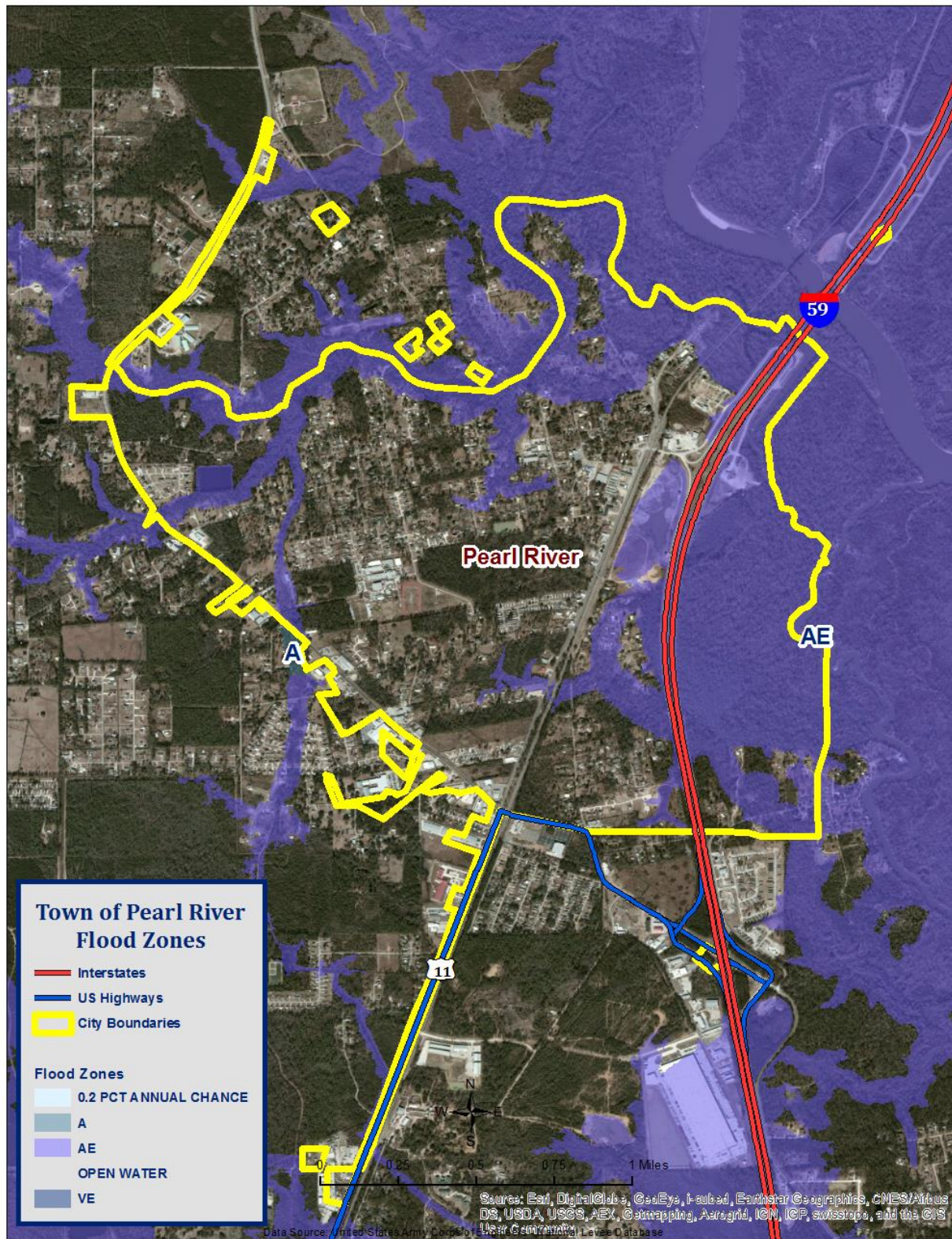


Figure 2-28: Town of Pearl River areas within the Flood Zones.

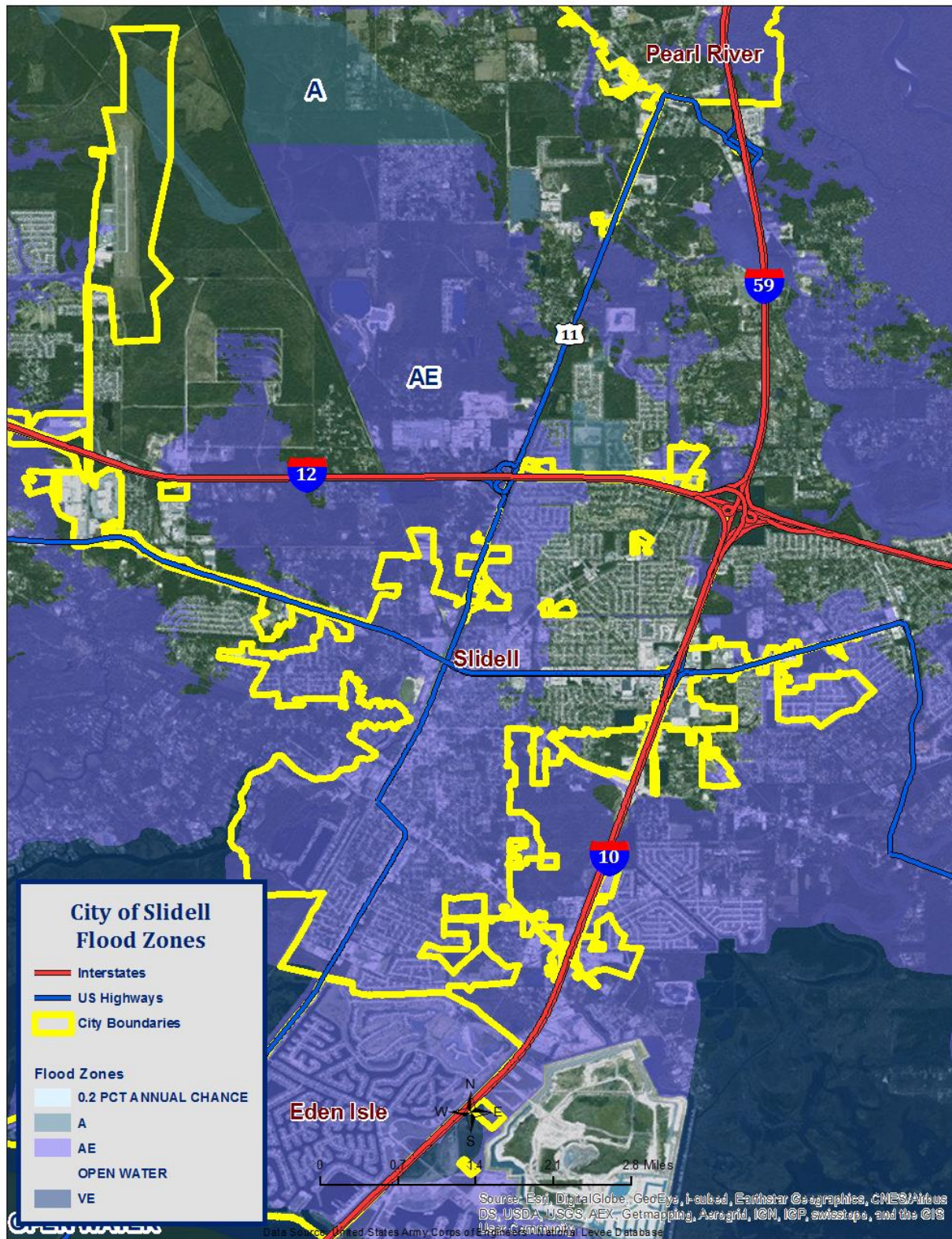


Figure 2-29: City of Slidell areas within the Flood Zones.

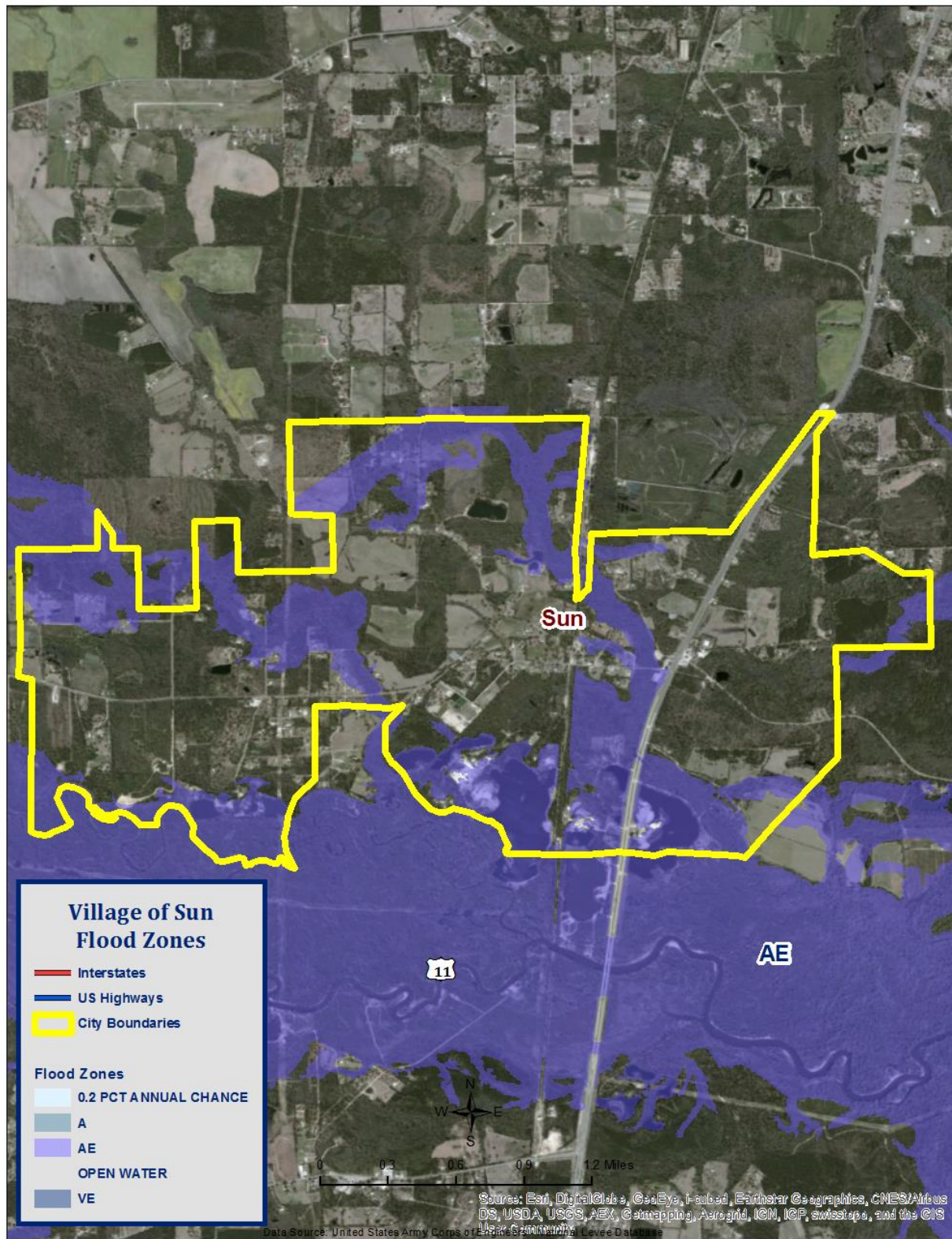


Figure 2-30: Village of Sun areas within the Flood Zones.

Previous Occurrences and Extents

Historically, there have been 49 flood events that have created significant flooding in St. Tammany parish between 1989 – 2014. Below is a brief synopsis of the 49 flooding events over the last 25 years, including each flooding event that has occurred since the parish’s last planning update.

Table 2-34: Historical floods in St. Tammany Parish with locations from 1989 - 2014.

Date	Extents	Type of Flooding	Estimated Damages	Location
3/3/2001	Heavy rainfall caused severe flooding of a number of streets and secondary roadways.	Flash Flood	\$0	St. Tammany Parish (Unincorporated)
6/6/2001	Rains waters from TS Allison flooded a few homes and businesses.	Flash Flood	\$50,000	St. Tammany Parish (Unincorporated)
6/7/2001	Heavy rainfall resulted in businesses and homes along Hwy 190 flooding from TS Allison.	Flash Flood	\$75,000	St. Tammany Parish (Unincorporated)
6/8/2001	Heavy rainfall resulted in major flooding along the Bogue Falaya River in St. Tammany Parish.	Flood	\$150,000	St. Tammany Parish (Unincorporated)
6/11/2001	Severe flooding developing primarily in the southeast portion of St. Tammany Parish. Numerous streets were impassable. Parish officials estimate that over 1000 houses were flooded, primarily in the Slidell area.	Flash Flood	\$2,000,000	St. Tammany Parish (Unincorporated) Slidell
8/5/2002	Heavy rainfall of 3 to 4 inches within a couple of hours developed as Tropical Storm Bertha was moving onshore, resulting in flash flooding in extreme southeast St. Tammany Parish.	Flash Flood	\$10,000	St. Tammany Parish (Unincorporated)
8/6/2002	The remnant circulation of Tropical Storm Bertha continued to affect southeast Louisiana with several bands of heavy rainfall. Between 5 to 8 inches of rain occurred in northern St. Tammany Parish during the morning hours resulting in flash flooding on small streams and flooding of several main roadways in northern St. Tammany Parish.	Flash Flood	\$40,000	St. Tammany Parish (Unincorporated)
10/3/2002	Heavy rainfall from TS Lee caused flash flooding of streets, secondary highways, and some property in	Flash Flood	\$0	St. Tammany Parish (Unincorporated)

Date	Extents	Type of Flooding	Estimated Damages	Location
	several communities of St. Tammany Parish.			
6/30/2003	Rain bands from TS Bill resulted in intense rainfall overwhelming drainage capacity. Roadways were severely flooded and some automobiles were flooded.	Flash Flood	\$500,000	St. Tammany Parish (Unincorporated)
6/30/2003	Storm Surge from TS Bill flooded southern area of the parish.	Storm Surge/tide	\$500,000	St. Tammany Parish (Unincorporated)
7/1/2003	Moderate to major flooding developed on the lower portion of the Bogue Falaya and Tchefuncte Rivers in St. Tammany Parish. The flooding was the result of heavy rain caused by TS Bill. Most rivers crested late on July 1st. River flooding damaged some man-made structures and flooded and damaged some roadways	Flood	\$2,000,000	St. Tammany Parish (Unincorporated)
7/5/2003	Persistent heavy rain of 3 to 5 inches from mid-morning through early afternoon caused the flooding of a few outbuildings in the Slidell and resulted in extensive, and deep street flooding.	Flash Flood	\$0	Slidell
7/20/2003	Thunderstorms producing heavy rain resulted in widespread street flooding in western areas of St. Tammany Parish, including Covington, Mandeville and Abita Springs. The heavy rain flooded about 10 homes and four cars just west of Mandeville and flooded about 6 homes and 3 businesses in Covington.	Flash Flood	\$100,000	St. Tammany Parish (Unincorporated) Covington Mandeville Abita Springs
5/10/2004	Torrential rainfall overwhelmed local drainage and caused flash flooding in and near Slidell. Parish officials estimated water entered approximately 60 homes. Numerous streets were impassable due to high water.	Flash Flood	\$300,000	St. Tammany Parish (Unincorporated) Slidell
9/15/2004	Storm surge from Hurricane Ivan	Storm Surge/tide	\$40,000	St. Tammany Parish (Unincorporated)
10/9/2004	Storm surge from Tropical Storm Matthew	Storm Surge/tide	\$10,000	St. Tammany Parish (Unincorporated)
5/29/2005	Heavy rainfall of 2 to 4 inches within a few hours' time caused extensive flooding of roadways in southeast St. Tammany Parish. A	Flash Flood	\$0	St. Tammany Parish (Unincorporated) Slidell

Date	Extents	Type of Flooding	Estimated Damages	Location
	few homes experienced minor flooding in the Slidell area.			
8/29/2005	Extensive flooding from Hurricane Katrina	Storm Surge/tide	\$3,003,000,000	St. Tammany Parish (Unincorporated) Slidell Mandeville Madisonville
9/23/2005	Flooding caused by Hurricane Rita	Storm Surge/tide	\$8,640,000	St. Tammany Parish (Unincorporated)
4/29/2006	Rainfall amounts of up to 6 inches resulted in the flooding of about 10 homes and caused considerable street flooding in portions of Mandeville.	Flash Flood	\$0	Mandeville
10/16/2006	High tides overtopped the floodwall in Mandeville with some flooding roadways and property. Other tidal flooding was reported in Slidell area near bayous along Lake Pontchartrain.	Coastal Flood	\$0	St. Tammany Parish (Unincorporated) Slidell Mandeville
10/22/2007	No Data	Flash Flood	\$0	St. Tammany Parish (Unincorporated)
5/2/2008	Several roads were flooded in the Folsom area when 6 to 10 inches of rain fell across the area.	Flash Flood	\$0	Folsom
9/1/2008	Minor to moderate flooding occurred near Lake Pontchartrain with the most significant flooding extending from the Mandeville lakefront area to Madisonville. Some structures experienced mainly minor flooding.	Storm Surge/tide	\$700,000	St. Tammany Parish (Unincorporated) Mandeville Madisonville
9/11/2008	Storm surge flooding of 4 to 6 feet above normal on Lake Pontchartrain caused flooding of low lying areas including roadways and some structures in the southern part of the parish. Early estimates were that about 200 structures flooded from Slidell to the Madisonville area.	Storm Surge/tide	\$5,000,000	St. Tammany Parish (Unincorporated)
12/12/2009	Heavy rainfall resulted in widespread and significant street flooding in the Slidell area.	Flash Flood	\$0	Slidell

Date	Extents	Type of Flooding	Estimated Damages	Location
6/3/2010	Residents of Forest Brook and Monterrey subdivisions reporting water in streets and approaching homes.	Flash Flood	\$0	Mandeville
3/9/2011	Standing water was reported on Interstate 10 at Irish Bayou. Also received reports of several inches of water in the road at City Hall in Old Town Slidell.	Flash Flood	\$0	Slidell
3/9/2011	Water was reported over Vista Road.	Flash Flood	\$0	Madisonville
7/25/2011	A few roads were reported closed in the Lacombe area due to flooding.	Flash Flood	\$0	St. Tammany Parish (Unincorporated)
9/2/2011	Storm surge flooding along Lake Pontchartrain resulted in flooding of low lying roadway and property. Approximately 60 houses had minor flooding in the Slidell, Lacombe, Mandeville and Madisonville areas.	Storm Surge/tide	\$160,000	St. Tammany Parish (Unincorporated) Mandeville Madisonville
2/18/2012	Several roads were closed due to high water in downtown Slidell.	Flash Flood	\$0	Slidell
3/21/2012	Flash flooding of Bonfouca Drive in the Palm Lake Subdivision was reported by the Slidell Fire Department.	Flash Flood	\$0	Slidell
6/10/2012	Multiple roads on the north side of Covington had 1 to 2 feet of water covering the roadway, making them impassable.	Flash Flood	\$0	Covington
6/10/2012	Several streets across Mandeville with 1 to 2 feet of water covering the roadways, making them impassable.	Flash Flood	\$0	Mandeville
7/19/2012	Deep water over several main roads in Slidell. Some locations included Airport Road near the Interstate 12 interchange, Rue Rochelle and Gause Boulevard areas.	Flash Flood	\$0	Slidell
7/19/2012	Portions of Highway 59 and Sharp Road were under water. Half of Highway 190 near Soult was blocked off. The CVS parking lot near the intersection of Highway 1088 and Highway 59 was completely flooded.	Flash Flood	\$0	Mandeville
8/11/2012	Multiple streets were impassable in Slidell, mainly across northern	Flash Flood	\$0	Slidell

Date	Extents	Type of Flooding	Estimated Damages	Location
	portions of the city. Over 5 inches of rain was measured at Slidell Airport in 2 hours and 15 minutes.			
8/28/2012	Storm surge flooding along Lake Pontchartrain resulted in flooding of low lying roadway and property as a result of Hurricane Isaac	Storm Surge/tide	\$42,000,000	St. Tammany Parish (Unincorporated) Slidell Madisonville Mandeville
6/6/2013	Numerous streets were flooded in Slidell with several cars stalled by the flood waters.	Flash Flood	\$0	Slidell
7/11/2013	Several reports of flooding were received from the Slidell area, with numerous streets impassable, and water encroaching on homes. Some areas affected included the Gause Boulevard area, as well as Lake Village and Robert Park subdivisions.	Flash Flood	\$0	Slidell
11/6/2013	Minor tidal flooding was reported along Lakeshore Drive in Mandeville.	Coastal Flood	0.00K	Mandeville
3/28/2014	Rainfall of 3 to 5 inches produced widespread street flooding in and around Slidell. Some sections of roads were impassable to low profile vehicle due to one to two feet of water. Some vehicles were stranded according to reports from television, radio, print media and social media sites.	Flash Flood	0.00K	Slidell
3/28/2014	Two homes were reported flooded on Rue Charlemagne in east Slidell.	Flash Flood	0.00K	Slidell
4/14/2014	Flooding was reported on Vinson Road off Deer Run, as well as at the intersection of Louisiana Highways 41 and 36.	Flash Flood	0.00K	Pearl River
5/28/2014	The Parish Emergency Manager reported a few homes and garages with water in them on the southwest side of Covington. Flooding began mid to late morning with the event time estimated.	Flash Flood	0.00K	Covington
5/29/2014	Water was reported about 1.5 feet deep near the corner of Defiance Drive and Celeste Circle in north Slidell. Flooding was also reported	Flash Flood	0.00K	Slidell

Date	Extents	Type of Flooding	Estimated Damages	Location
	on Gause Boulevard near Front Street.			
7/11/2014	Several vehicles were stalled in flood waters along Gause Boulevard, as well as on Independence Drive.	Flash Flood	0.00K	Slidell
10/13/2014	Water was reported 8 to 10 inches deep on Gause Boulevard at the entrance to the Huntwyck Subdivision.	Flash Flood	0.00K	Slidell

There have not been any significant flooding events within the Village of Sun since the last plan update in 2010. Based on previous flood events and the unapproved D-FIRM maps for St. Tammany Parish, the worst-case scenarios debts are based on two types of flooding. Unincorporated St. Tammany, Slidell, Madisonville, and Mandeville could experience up to 18 feet of flooding in the most southern parts of the parish based on the current SLOSH Maximum Envelop of Water (MEOW) maps. The interior parts of the parish worse-case scenario flooding is based on riverine flooding and backwater flooding. Covington could expect to have flooding of 5 to 7 feet; Abita Springs and Sun could have flooding from 8 to 12 feet; and Folsom could experience flooding from 1 to 2 feet.

Frequency / Probability

While other parts of this plan, along with the State's Hazard Mitigation Plan have relied on the SHELATUS database to provides the annual probability, due to St. Tammany parish having multiple jurisdictions, it was necessary to assess the historical data found in the National Climatic Data Center's for St. Tammany parish and its jurisdictions to properly determine probability for future flood events. The table below shows the probability and return frequency for each jurisdiction.

Table 2-35: Flood annual probabilities for St. Tammany Parish

Jurisdiction	Annual Probability	Return Frequency
St. Tammany Parish	100%	1 – 2 Per Year
St. Tammany Parish (Unincorporated)	100%	1 Per Year
Abita Springs	4%	25 Years
Covington	12%	6 Years
Folsom	4%	25 Years
Madisonville	20%	5 Years
Mandeville	44%	2 – 3 Years
Pearl River	4%	25 Years
Slidell	80%	1 – 2 Years
Sun	4%	25 Years

Based on the State's Hazard Mitigation Plan, the overall probability for the entire St. Tammany Parish Planning area is 100% with 49 events taking place over a 25 year period. Based on the amount of significant flood events that have taken place throughout the parish, the St. Tammany Parish Planning area can anticipate having 1 to 2 significant flood events a year.

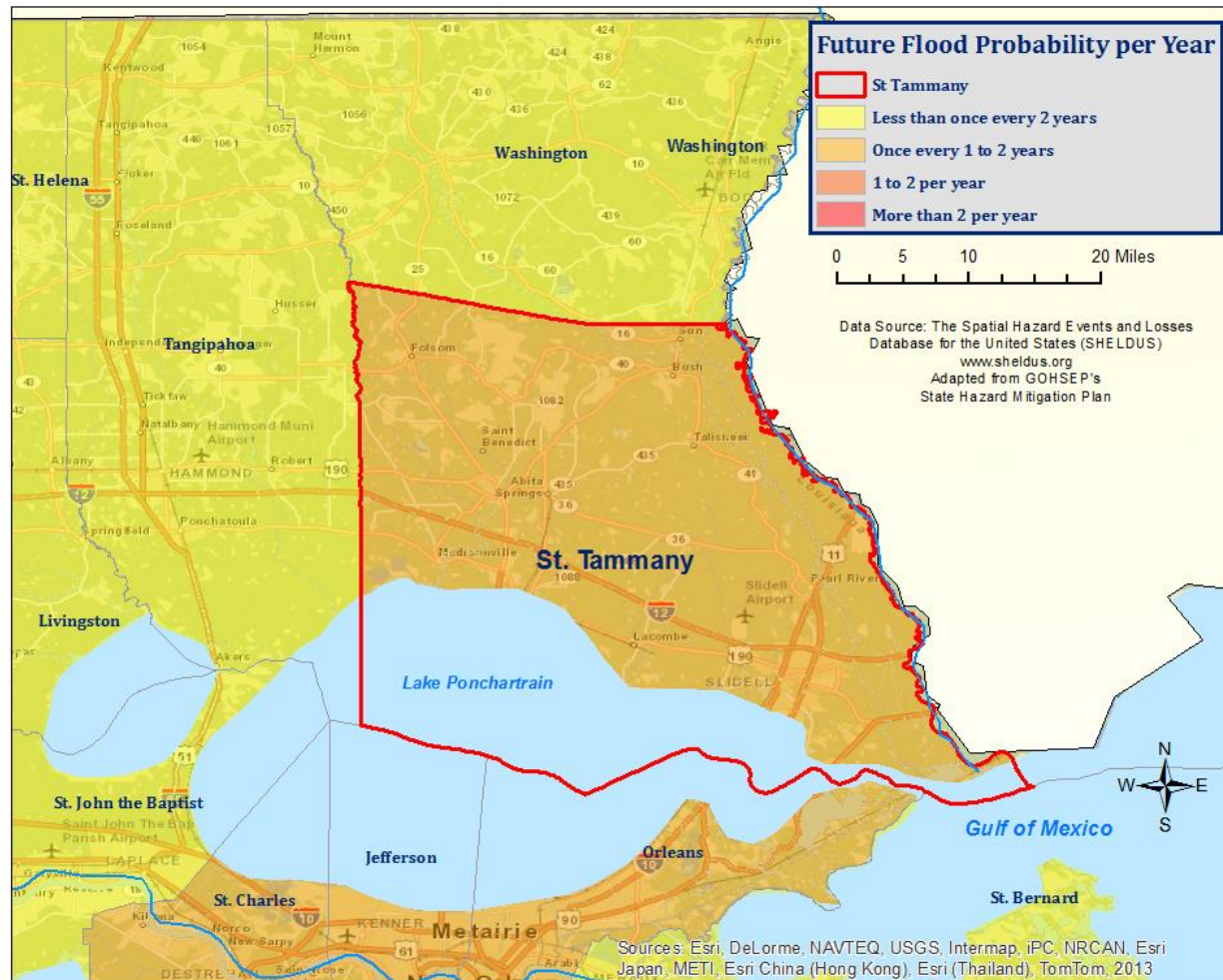


Figure 2-31: Flood Probability for St. Tammany Parish

Estimated Potential Losses

Using Hazus-MH Flood Model the 100 year flood scenario, along with the Parish DFIRM, was analyzed to determine losses from this worst-case scenario. Table 2-35 shows the total economic losses that would result from this occurrence.

Table 2-36: Estimated losses in St. Tammany Parish from a 100 year flood event.

Jurisdiction	Estimated total Losses from 100 Year Flood Event
St. Tammany Parish (Unincorporated)	\$5,442,665,000
Abita Springs	\$24,672,000
Covington	\$199,610,000
Folsom	\$54,000
Madisonville	\$94,664,000
Mandeville	\$250,022,000
Pearl River	\$20,506,000
Slidell	\$1,139,696,000
Sun	\$7,394,000
Total for the Parish	\$7,179,283,000

The Hazus-MH Flood model also provides a breakdown by jurisdiction for seven primary sectors (Hazard occupancy) throughout the parish. The losses for each jurisdiction by sector are listed in the tables below.

Table 2-37: Estimated 100 year flood losses for unincorporated St. Tammany Parish by sector.
(Source: HAZUS-MH)

St. Tammany Parish (Unincorporated Areas)	Estimated total Losses from 100 Year Flood Event
Agricultural	\$4,409,903,000
Commercial	\$706,468,000
Government	\$170,902,000
Industrial	\$14,300,000
Religious / Non-Profit	\$83,723,000
Residential	\$28,552,000
Schools	\$28,817,000
Totals	\$5,442,665,000

*Table 2-38: Estimated 100 year flood losses for Abita Springs by sector.
(Source: HAZUS-MH)*

Abita Springs	Estimated total Losses from 100 Year Flood Event
Agricultural	\$20,203,000
Commercial	\$2,155,000
Government	\$1,224,000
Industrial	\$310,000
Religious / Non-Profit	\$330,000
Residential	\$450,000
Schools	\$0
Totals	\$24,672,000

*Table 2-39: Estimated 100 year flood losses for Covington by sector.
(Source: HAZUS-MH)*

Covington	Estimated total Losses from 100 Year Flood Event
Agricultural	\$151,637,000
Commercial	\$35,672,000
Government	\$3,501,000
Industrial	\$506,000
Religious / Non-Profit	\$3,987,000
Residential	\$188,000
Schools	\$4,119,000
Totals	\$199,610,000

*Table 2-40: Estimated 100 year flood losses for Folsom by sector.
(Source: HAZUS-MH)*

Folsom	Estimated total Losses from 100 Year Flood Event
Agricultural	\$43,000
Commercial	\$0
Government	\$0
Industrial	\$0
Religious / Non-Profit	\$4,000
Residential	\$0
Schools	\$7,000
Totals	\$54,000

*Table 2-41: Estimated 100 year flood losses for Madisonville by sector.
(Source: HAZUS-MH)*

Madisonville	Estimated total Losses from 100 Year Flood Event
Agricultural	\$62,975,000
Commercial	\$20,117,000
Government	\$3,925,000
Industrial	\$0
Religious / Non-Profit	\$2,628,000
Residential	\$3,036,000
Schools	\$1,983,000
Totals	\$94,664,000

*Table 2-42: Estimated 100 year flood losses for Mandeville by sector.
(Source: HAZUS-MH)*

Mandeville	Estimated total Losses from 100 Year Flood Event
Agricultural	\$180,199,000
Commercial	\$44,318,000
Government	\$13,340,000
Industrial	\$807,000
Religious / Non-Profit	\$5,677,000
Residential	\$39,000
Schools	\$5,642,000
Totals	\$250,022,000

*Table 2-43: Estimated 100 year flood losses for Pearl River by sector.
(Source: HAZUS-MH)*

Pearl River	Estimated total Losses from 100 Year Flood Event
Agricultural	\$15,917,000
Commercial	\$2,353,000
Government	\$1,360,000
Industrial	\$68,000
Religious / Non-Profit	\$808,000
Residential	\$0
Schools	\$0
Totals	\$20,506,000

Table 2-44: Estimated 100 year flood losses for Slidell by sector.
(Source: HAZUS-MH)

Slidell	Estimated total Losses from 100 Year Flood Event
Agricultural	\$828,762,000
Commercial	\$217,642,000
Government	\$40,710,000
Industrial	\$3,162,000
Religious / Non-Profit	\$27,336,000
Residential	\$10,632,000
Schools	\$11,452,000
Totals	\$1,139,696,000

Table 2-45: Estimated 100 year flood losses for Sun by sector.
(Source: HAZUS-MH)

Sun	Estimated total Losses from 100 Year Flood Event
Agricultural	\$6,036,000
Commercial	\$596,000
Government	\$762,000
Industrial	\$0
Religious / Non-Profit	\$0
Residential	\$0
Schools	\$0
Totals	\$7,394,000

Threat to People

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

Table 2-46: Number of people potentially exposed to a 100 year flood event.
(Source: HAZUS-MH)

Number of People Exposed to Hurricane Hazards			
Location	# in Community	# in Hazard Area	% in Hazard Area
Parish (Unincorporated)	179,542	81,565	45%
Abita Springs	2,365	813	34%
Covington	8,765	4,619	53%
Folsom	716	119	17%
Madisonville	748	688	92%

Mandeville	11,560	5,867	51%
Pearl River	2,506	944	38%
Slidell	27,068	23,435	87%
Sun	470	132	28%
Total	233,740	118,182	51%

The HAZUS-MH flood model was also extrapolated to provide an overview of vulnerable populations throughout the jurisdictions in the tables below:

Table 2-47: Vulnerable populations susceptible to a 100 year flood event in unincorporated St. Tammany parish.

(Source: HAZUS-MH)

St. Tammany Parish (Unincorporated)		
Category	Total Numbers	Percentage of People in Hazard Area
Number in Hazard Area	81,565	45%
Persons Under 5 years	4,731	5.80%
Persons Under 18 years	20,228	24.80%
Persons 65 Years and Over	11,745	14.40%
White	68,841	84.40%
Minority	12,724	15.60%

Table 2-48: Vulnerable populations susceptible to a 100 year flood event in Abita Springs.

(Source: HAZUS-MH)

Abita Springs		
Category	Total Numbers	Percentage of People in Hazard Area
Number in Hazard Area	813	34%
Persons Under 5 years	143	6%
Persons Under 18 years	555	23.50%
Persons 65 Years and Over	311	13.20%
White	2,176	92.10%
Minority	189	7.90%

Table 2-49: Vulnerable populations susceptible to a 100 year flood event in Covington.
(Source: HAZUS-MH)

Covington		
Category	Total Numbers	Percentage of People in Hazard Area
Number in Hazard Area	4,619	53%
Persons Under 5 years	291	6.30%
Persons Under 18 years	1,104	23.90%
Persons 65 Years and Over	688	14.90%
White	3,594	77.80%
Minority	1,025	22.20%

Table 2-50: Vulnerable populations susceptible to a 100 year flood event in Folsom.
(Source: HAZUS-MH)

Folsom		
Category	Total Numbers	Percentage of People in Hazard Area
Number in Hazard Area	119	17%
Persons Under 5 years	10	8.40%
Persons Under 18 years	28	23.20%
Persons 65 Years and Over	15	12.40%
White	87	73.50%
Minority	32	26.50%

Table 2-51: Vulnerable populations susceptible to a 100 year flood event in Madisonville.
(Source: HAZUS-MH)

Madisonville		
Category	Total Numbers	Percentage of People in Hazard Area
Number in Hazard Area	688	92%
Persons Under 5 years	44	6.40%
Persons Under 18 years	151	21.90%
Persons 65 Years and Over	102	14.80%
White	598	86.90%
Minority	90	13.10%

Table 2-52: Vulnerable populations susceptible to a 100 year flood event in Mandeville.
(Source: HAZUS-MH)

Mandeville		
Category	Total Numbers	Percentage of People in Hazard Area
Number in Hazard Area	5,867	51%
Persons Under 5 years	299	5.10%
Persons Under 18 years	1455	24.80%
Persons 65 Years and Over	950	16.20%
White	5,316	90.60%
Minority	1,092	9.40%

Table 2-53: Vulnerable populations susceptible to a 100 year flood event in Pearl River.
(Source: HAZUS-MH)

Pearl River		
Category	Total Numbers	Percentage of People in Hazard Area
Number in Hazard Area	944	38%
Persons Under 5 years	67	7.10%
Persons Under 18 years	227	24%
Persons 65 Years and Over	128	13.60%
White	879	93.10%
Minority	65	6.90%

Table 2-54: Vulnerable populations susceptible to a 100 year flood event in Slidell.
(Source: HAZUS-MH)

Slidell		
Category	Total Numbers	Percentage of People in Hazard Area
Number in Hazard Area	23,435	87%
Persons Under 5 years	1,664	7.10%
Persons Under 18 years	5,976	25.50%
Persons 65 Years and Over	3,257	13.90%
White	17,811	76%
Minority	5,624	24%

*Table 2-55: Vulnerable populations susceptible to a 100 year flood event in Madisonville.
(Source: HAZUS-MH)*

Sun		
Category	Total Numbers	Percentage of People in Hazard Area
Number in Hazard Area	132	28%
Persons Under 5 years	6	4.50%
Persons Under 18 years	31	23.60%
Persons 65 Years and Over	16	12.30%
White	109	82.90%
Minority	23	17.10%

Vulnerability

See Appendix C-1 to C-2 for parish and municipality buildings that are susceptible to flooding due to proximity within the 100 year flood plain.

Fog

Fog forms near the ground when water vapor condenses into tiny liquid water droplets that remain suspended in the air. Many different processes can lead to the formation of fog, but the main factor is saturated air. Two ways that air can become saturated are by cooling it to its dew point temperature or by evaporating moisture into it to increase its water vapor content. Although most fog, by itself, is not a hazard because it does not actually apply destructive forces, the interaction between humans and fog can be a dangerous situation, sometimes resulting in disastrous consequences.

Fog has consistently impacted society, and in particular the transportation sector – sometimes with deadly consequences. The primary risks from fog involve the dangers of traveling under conditions of limited visibility. Although some modes of transportation, such as aircraft, are well regulated, other modes, including simple pedestrian travel, may involve risks that have not been properly accounted for by those who are focused merely on reaching their destination as quickly as possible. Localized fog is especially dangerous, as drivers can be caught by surprise.

Location

Fog in general is a climatological based hazard and has the same approximate probability of occurring in St. Tammany Parish as all adjacent parishes. Because fog has a similar probability of occurring anywhere within the St. Tammany Parish Planning area, all jurisdictions are equally at risk for fog.

Previous Occurrences / Extents

The SHELDUS database reports a total of 4 fog events occurring within the boundaries of St. Tammany Parish between the years of 1960 – 2014. Table 2-55 summarizes these events and provides estimated property damage for each event. In the last five years there has only been one reported significant event that was related to fog. On February 18, 2014 two crashes occurred as a result of heavy fog that blanketed Interstate 12, south of Covington. After the first crash, a second crash occurred when traffic began to back up due limited visibility as a result of heavy fog. Fog severity can be measured in visibility conditions on the road. Hazardous driving conditions occur when visibility becomes less than 0.12 miles. Fog of this nature is classified as Thick Fog. Based on previous conditions in St. Tammany Parish, the worse-case scenario for the parish in regards to fog are conditions in which visibility is less than 0.12 miles.

*Table 2-56: Summary of fog events in St. Tammany Parish.
(Source: SHELDUS)*

Date	Property Damage
February 1972	\$928
October 1978	\$178,648
March 1987	\$0
December 1995	\$0

Frequency / Probability

Based on previous occurrences of 4 significant fog events in 54 years, the probability of a significant fog event occurrence in St. Tammany Parish in any given year is calculated at 7%.

Estimated Potential Losses

According to the SHELATUS database, there have been 2 fog events that have caused some level of property damage. The total damage from the actual claims for property is \$179,576 with an average cost of \$44,894 per fog event. When annualizing the total cost over the 54 year record, total annual losses based on fog is estimated to be \$3,325. To provide an estimated annual loss per jurisdiction, the 2010 Census population was used to assign the estimated potential losses proportionally across the jurisdictions. Based on the 2010 Census data, Table 2 -56 provides an annual estimate of potential losses for St. Tammany parish.

Table 2-57: Estimated annual losses for fog in St. Tammany Parish.

Coastal Land Loss Estimated Annual Potential Losses for St. Tammany Parish								
Unincorporated St. Tammany Parish (76.2% of Population)	Abita Springs (1% of Population)	Covington (4% of Population)	Folsom (0.3% of Population)	Madisonville (0.3% of Population)	Mandeville (5% of Population)	Pearl River (1% of Population)	Slidell (12% of Population)	Sun (0.2% of Population)
\$2,534	\$33	\$133	\$10	\$10	\$166	\$33	\$399	\$7

The Parish has suffered through a total of 3 fog events that have accounted for 38 injuries and 4 fatalities during this 54 year period (Table 2-57). The average injury per event for St. Tammany parish is 9.5 per fog event with an average of 0.7 per year for the 54 year period. The average fatality per event is 1 with an average of 0.07 per year for the 54 year record.

Table 2-58: Fog events in St. Tammany Parish that caused injuries or deaths.

Date	Deaths	Injuries
October 1978	2	19
March 1987	2	17
December 1995	0	2

Levees

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

The northern half of Louisiana is protected by levees on the Ouachita River, under the authority of the Vicksburg District of the United States Army Corp of Engineers (USACE). The Vicksburg District encompasses 68,000 mi² in the states of Arkansas, Mississippi and Louisiana. They manage seven drainage basins, including the Yazoo, Pearl, Big Black, Red, Ouachita, and Mississippi Rivers; 12 locks and dams on the Pearl, Red, and Ouachita Rivers; 1,808 miles of levees, including 468 miles along the Mississippi River; and multiple lakes with 1,709 miles of shoreline.

Coastal and southern Louisiana are protected by an extensive levee system under the authority of the New Orleans District of the USACE. This system includes 30,000 mi² of Louisiana south of Alexandria, including 961 miles of river levees in the Mississippi River and Tributaries Project, 449 miles of river levees in the Atchafalaya Basin, and 340 miles of hurricane-protection levees. Other levees have been built along stretches of rivers throughout Louisiana by local levee districts and private citizens. The data regarding these non-federal levees are managed by the individual entity responsible for construction and subsequent maintenance and are not kept in a consistent format for comprehensive hazard analysis.

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

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

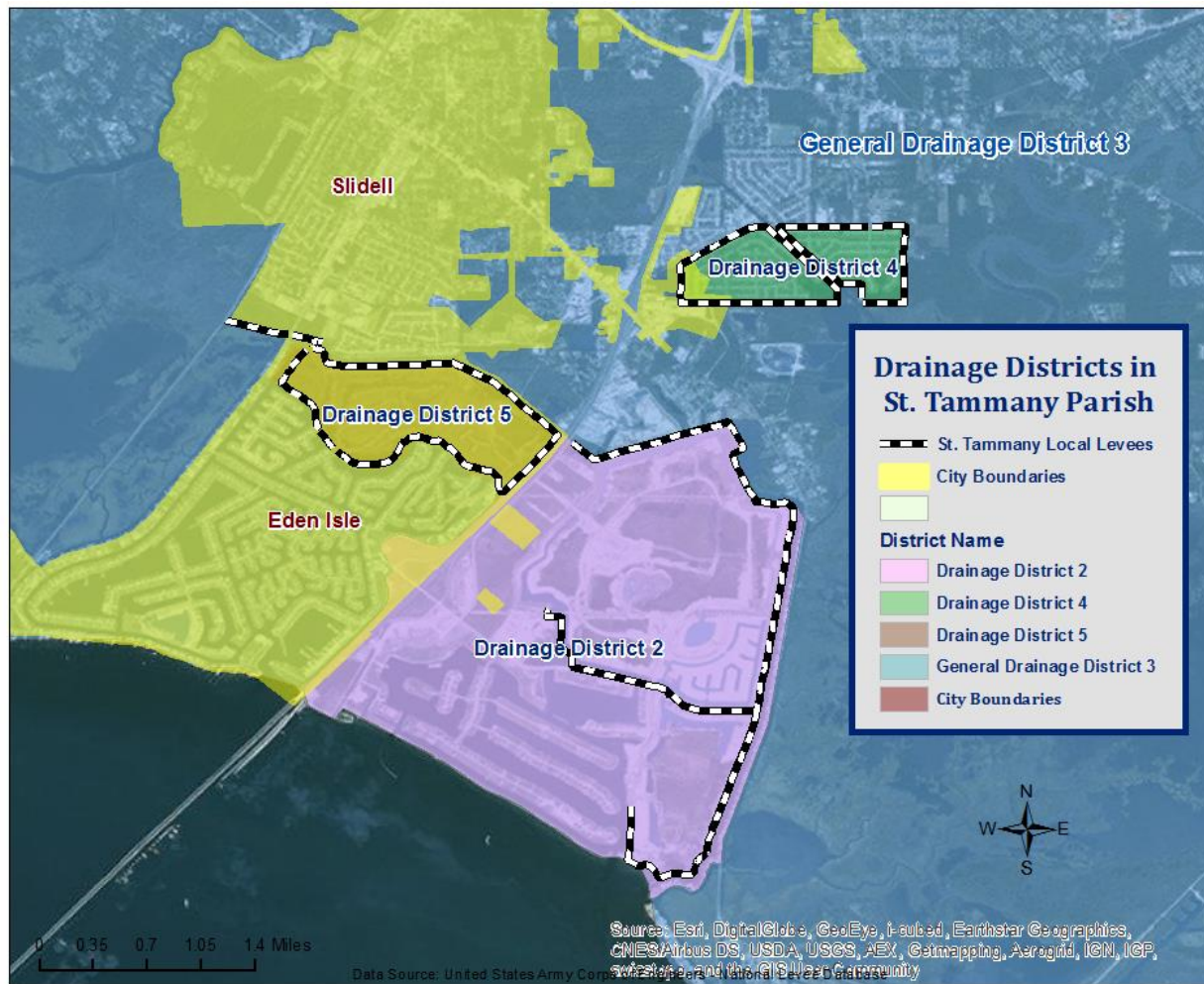


Figure 2-32: St. Tammany Local Drainage Districts.



Figure 2-33: St Tammany Parish levee locations.



Figure 2-34: Location of the Kingspoint and Fox Hollow Levees in St. Tammany Parish.

Location

There are three levee systems in unincorporated St. Tammany Parish. All three are centrally located by each other south of Slidell. The three levees within the parish are:

- Oak Harbor Levee
- Kingspoint Levee
- Fox Hollow Levee

The locations of the levees located in St. Tammany Parish are shown in Figure 2-34 and Figure 2-35. In addition to the three ring levees, there is also a drainage levee located between the ring levees. The Kingspoint and Fox Hollow levees are managed by Drainage District #4. To the southwest, Oak Harbor

levee is managed by Drainage District #5. Within these three levee systems are approximately 1,500 homes that are being protected from flood waters. The Kingspoint and Fox Hollow levees were designed to protect the subdivisions from a 100 year flood. The Oak Harbor levee is built approximately 13 feet above sea level. The Oak Harbor levee also has an intricate pump system that is designed to empty the artificial lake and allow any water overtopping the levee to settle in the empty lakes. In this capacity, the artificial lake in Oak Harbor also serves as a retention pond for the community. The three pumps are able to pump approximately 36,000 gallons per minute.

In 2014 legislation was passed that allowed St. Tammany to withdraw from the Southeast Louisiana Flood Protection Authority-East and form its own levee district. On December 10, 2014 the newly formed Drainage and Conservation District met for the first time with its nine-member board. Creation of the new levee district was an important step in insuring that the parish will have the ultimate authority in determining which level of flood protection is best for its citizens. The new board was granted taxing authority for future drainage and flood protection projects, subject to voter approval.

Previous Occurrences / Extent

Since 2010, there have not been any recorded levee failures in the St. Tammany parish planning area. However, all three existing levees were overtopped during Hurricane Katrina in 2005. Waters from Lake Pontchartrain were driven onto the north shore as storm surge on the morning of August 29, 2005. The Kingspoint and Fox Hollow subdivisions received the most damage with nearly every house in both subdivisions being flooded. Flooding estimates for Kingspoint and Fox Hollow were 6 to 8 feet. Oak Harbor fared much better with only a total of 77 houses receiving some level of flooding. The flooding that occurred during Hurricane Katrina, 6 to 8 feet, is representative of a worst-case scenario for the three levee's within the parish.

Frequency

Levee failures are a rare occurrence within St. Tammany Parish with an annual chance of occurrence calculated at 1% for St. Tammany Parish unincorporated.

Estimated Potential Losses

To estimate the potential losses for an overtopping or breach of the three ring levee, all three areas are assumed to have overtopped or failed inundating the three subdivisions they protected with approximately 5 feet of flood waters. This is similar to the actual overtopping that took place during Hurricane Katrina in 2005.

Using data from the HAZUS-MH model, the levee failure scenario was analyzed to determine losses from this worst-case scenario. Table 2-59 shows the economic losses that would result from this occurrence.

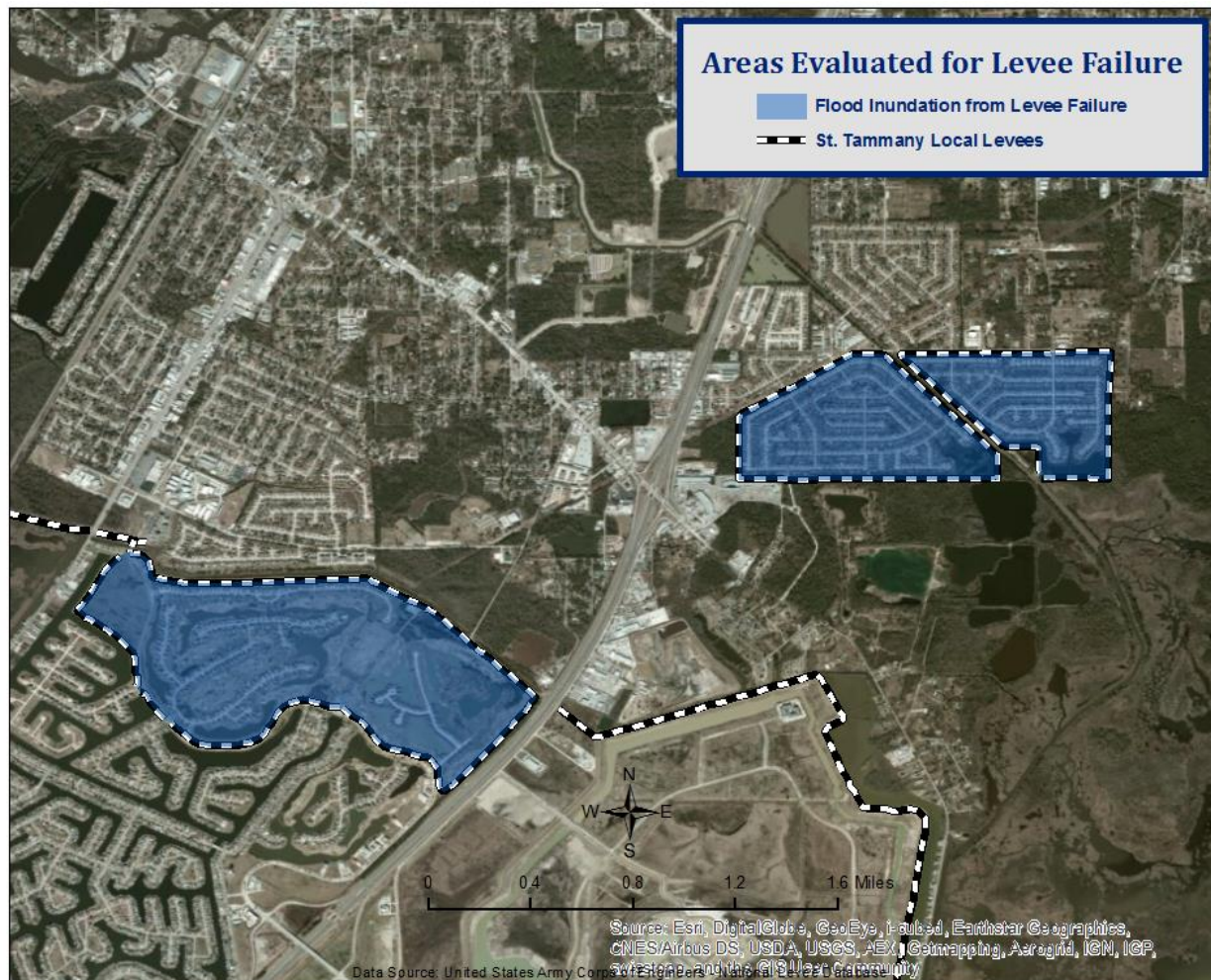


Figure 2-35: Areas evaluated for Flood Failure

Table 2-59: Total estimated losses from worst-case scenario levee failures from the St. Tammany Local Levees.

(Source: HAZUS-MH)

Jurisdiction	Estimated total Losses from Worst-Case Scenario Levee Failure
St. Tammany Parish (Unincorporated)	\$313,371,000

The Hazus-MH model also provides a breakdown by jurisdiction for seven primary sectors (HAZUS occupancy) throughout the parish. The losses for each jurisdiction by sector are listed in the tables below.

Table 2-60: Total estimated losses for unincorporated St. Tammany Parish in worst-case scenario levee failures from the local ring levees.

(Source: HAZUS-MH)

St. Tammany Parish (Unincorporated Areas)	Estimated total Losses from Worst-Case Scenario Levee Failure
Agricultural	\$0
Commercial	\$4,872,000
Government	\$0
Industrial	\$529,000
Religious / Non-Profit	\$2,221,000
Residential	\$305,749,000
Schools	\$0
Totals	\$313,371,000

Threat to People

The total population within the parish susceptible to a levee failure is shown in the table below.

Table 2-61: Number of people in St. Tammany parish exposed to a worst-case scenario levee failure.

(Source: HAZUS-MH)

Number of People Exposed to Worst-Case Scenario Levee Failure			
Location	# in Community	# in Hazard Area	% in Hazard Area
St. Tammany Parish (Unincorporated)	179,512	4,389	2.5%
St. Tammany Parish Total	233,740	4,389	1.8%

The HAZUS-MH worst-case scenario levee failure was also extrapolated to provide an overview of vulnerable populations throughout the jurisdictions in the tables below:

*Table 2-62: Vulnerable populations in a worst-case scenario levee failures in unincorporated St. Tammany parish.
(Source: HAZUS-MH)*

St. Tammany Parish (Unincorporated)		
Category	Total Numbers	Percentage of People in Hazard Area
Number in Hazard Area	4,389	100%
Persons Under 5 years	255	5.80%
Persons Under 18 years	1,088	24.80%
Persons 65 Years and Over	632	14.40%
White	3,704	84.40%
Minority	685	15.60%

Vulnerability

There are no essential facilities within the ring levees as all structures within are residential areas.

Termite

Termites are small pale colored insects that live off of wood and wooden structures at or near the ground. These creatures are similar to ants as they both live in colonies, they both have workers that gather and collect food, and they both have a queen that is in charge of the colony. Queen termites can lay upwards of 10,000 eggs per year and the worker termites are responsible for maintaining and caring for these eggs.

Termites tend to live close to the ground and near areas of moisture and sources of food or wood. Their role in nature is to recycle wood. They can cause significant damage to any wooden structure if the conditions are favorable for a termite colony's development. There are two types of termites that live in southeastern Louisiana: drywood termites and subterranean termites. Drywood termites live in the wood they are ingesting and do not require soil and moisture. Subterranean termites require soil and moisture to survive. They will carry the soil and moisture with them into the wood they are infesting. Mud tubes are created and lead from the colony's home to the infested wood in order to supply the area with moisture and soil.

The Formosan termite is a species of the subterranean termite that are very aggressive. They create the largest colonies of any termites in North America and can cause extensive damage in a short time. To reach food and water, Formosan termites can chew through materials such as thin sheets of soft metals, rubber, stucco, and seals on water lines.

The Formosan termite was originally introduced into the New Orleans area and other coastal areas just after World War II. By the time it was identified in 1966, the insect was firmly entrenched into the local environment. Because this termite has no natural predators in the area, it is free to breed and spread without control.

Location

The main concentration of termites occurs in southeastern Louisiana, specifically, those areas south of Interstates 10 and 12 making the communities of Lacombe, Slidell, Madisonville, and Mandeville a high risk for termite infestations. However, termites are not contained to these areas alone and they continue to spread throughout the parish making the entire parish and its jurisdictional areas susceptible to this hazard.

Previous Occurrences / Extents

Residential buildings comprise the majority of building stock in St. Tammany Parish making it difficult to summarize previous occurrences involving termites. Because termite treatment is handled by the homeowner, databases such as SHELDUS do not track the extent of occurrences. It is important to note that Hurricane Katrina caused a massive swarming season which increased colonization of termites throughout the entire parish.

Frequency / Probability

The entire parish is susceptible to termite infestations. Because Formosan termites are considered an invasive species with no natural predators, it is calculated that the probability of a termite occurrence in St. Tammany Parish in any given year is 100%.

Estimated Potential Losses

Any structure can have a termite problem, even brick structures on slab foundations since all buildings have a wooden component used in construction. Therefore, every building in St. Tammany Parish is subject to termite damage. Louisiana State University's Agricultural Center reports that Formosan termites can cause major structural damage to a home in a six month time interval and nearly complete destruction of a home in two years if untreated. Table 2-62 presents an analysis of building exposure that are susceptible to termites by general occupancy type for St. Tammany Parish. The LSU Agricultural Center also estimates that in Louisiana termites inflict approximately \$500,000,000 in damages annually. To assess an annual cost to each jurisdiction in St. Tammany Parish, the estimated annual termite damages in Louisiana was assessed proportionally to the multiple jurisdictions in St. Tammany Parish which can be seen in Table 2-63. Based on Louisiana's annual losses to termite damage, the total estimated losses for St. Tammany parish is \$26, 057,311.

*Table 2-63: Building exposure by General Occupancy Type for Termites in St. Tammany Parish.
(Source: FEMA's Hazus-MH 2.2)*

Building Exposure by General Occupancy Type for Tornadoes Exposure Types (\$1,000)						
Residential	Commercial	Industrial	Agricultural	Religion	Government	Education
14,991,974	2,012,966	359,647	40,163	210,272	91,445	96,568

Table 2-64: Estimated annual losses resulting from termites in St. Tammany Parish.

Coastal Land Loss Estimated Annual Potential Losses for St. Tammany Parish								
Unincorporated St. Tammany Parish (76.2% of Population)	Abita Springs (1% of Population)	Covington (4% of Population)	Folsom (0.3% of Population)	Madisonville (0.3% of Population)	Mandeville (5% of Population)	Pearl River (1% of Population)	Slidell (12% of Population)	Sun (0.2% of Population)
\$19,855,671	\$260,573	\$1,042,292	\$78,172	\$78,172	\$1,302,866	\$260,573	\$3,126,877	\$52,115

There have been no reported injuries or deaths as a direct result to termites in St. Tammany Parish.

Vulnerability

See Appendix C-1 to C-2 for parish and municipality agricultural exposure to termite hazards.

Thunderstorms

The term “thunderstorm” is usually used as a catch-all term for several kinds of storms. Here “thunderstorm” is defined to include any precipitation event in which thunder is heard or lightning is seen. Thunderstorms are often accompanied by heavy rain and strong winds and, depending on conditions, occasionally by hail or snow. Thunderstorms form when humid air masses are heated, which causes them to become convectively unstable and therefore 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, multicell, 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 multicell 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, and warming 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) have 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:

- *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 (parishes).

A variety of hazards might be produced by thunderstorms, including lightning, hail, tornadoes or waterspouts, flash floods, and high-speed winds called downbursts. Nevertheless, given all of these criteria, the National Oceanic and Atmospheric Administration (NOAA) characterizes a thunderstorm as severe when it produces one or more of the following:

- Hail of 1 inch in diameter or larger
- Wind gusts to 58 mph or greater
- One or more tornadoes

Tornadoes and flooding hazards have been profiled within this report; therefore, for the purpose of thunderstorms, the sub hazards of hail, high winds, and lightning will be profiled.

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

Hazard Description

Hailstorms

Hailstorms are severe thunderstorms in which balls or chunks of ice fall along with rain. Hail develops in the upper atmosphere initially as ice crystals that are bounced about by high-velocity updraft winds. The ice crystals grow through deposition of water vapor onto their surface, fall partially to a level in the cloud where the temperature exceeds the freezing point, melt partially, get caught in another updraft whereupon re-freezing and deposition grows another concentric layer of ice, and fall after developing enough weight, sometimes after several trips up and down the cloud. The size of hailstones varies depending on the severity and size of the thunderstorm. Higher surface temperatures generally mean stronger updrafts, which allows more massive hailstones to be supported by updrafts, leaving them suspended longer. This longer time means larger hailstone sizes. 2-54 displays a spectrum of hailstone diameters and their everyday equivalents.

*Table 2-65: Spectrum of hailstone diameters and their everyday description.
(Source: National Weather Service)*

Spectrum of Hailstone Diameters	
Hail Diameter Size	Description
1/4"	Pea
1/2"	Plain M&M
3/4"	Penny
7/8"	Nickle
1" (severe)	Quarter
1 1/4"	Half Dollar
1 1/2"	Ping Pong Ball / Walnut

Spectrum of Hailstone Diameters	
Hail Diameter Size	Description
1 3/4"	Golf Ball
2"	Hen Egg / Lime
2 1/2"	Tennis Ball
2 3/4"	Baseball
3"	Teacup / Large Apple
4"	Softball
4 1/2"	Grapefruit
4 3/4" – 5"	Computer CD-DVD

Hailstorms can cause widespread damage to 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.

High Winds

In general, high winds can occur in a number of different ways, within and without thunderstorms. The Federal Emergency Management Agency (FEMA) distinguishes these as shown in Table 2-55.

*Table 2-66: High winds categorized by source, frequency, and duration.
(Source: Making Critical Facilities Safe from High Wind, FEMA)*

High Winds Categories			
High Wind Type	Description	Relative Frequency in Louisiana	Relative Maximum Duration in Louisiana
Straight-line Winds	Wind blowing in straight line; usually associated with intense low-pressure area	High	Few-minutes – 1 day
Downslope Winds	Wind blowing down the slope of a mountain; associated with temperature and pressure gradients	N/A	N/A
Thunderstorm Winds	Wind blowing due to thunderstorms, and thus associated with temperature and pressure gradients	High (especially in the spring and summer)	~Few minutes – several hours
Downbursts	Sudden wind blowing down due to downdraft in a thunderstorm; spreads out horizontally at the	Medium-to-High (~5% of all thunderstorms)	~15 – 20 minutes

High Winds Categories			
High Wind Type	Description	Relative Frequency in Louisiana	Relative Maximum Duration in Louisiana
	ground, possibly 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 and land	N/A	N/A
Hurricane Winds	Wind blowing in spirals, converging with increasing speed toward eye; associated with temperature and pressure gradients between the Atlantic and Gulf and land	Low-to-Medium	Several days
Tornado Winds	Violently rotating column of air from base of a thunderstorm to the ground with rapidly decreasing winds at greater distances from center; associated with extreme temperature gradient	Low-to-Medium	Few minutes – few hours

The only high winds of present concern are thunderstorm winds and downbursts. Straight-line winds are common but are a relatively insignificant hazard (on land) compared to other high winds. Downslope winds are common but relatively insignificant in the mountainous areas of Louisiana where they occur. Nor'easters are cyclonic events that have at most a peripheral effect on Louisiana, and none associated with high winds. Winds associated with hurricanes and tornadoes will be considered in their respective sections.

Table 2-56 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 2-67: Beaufort Wind Scale.
(Source: NOAA's SPC)*

Beaufort Wind Scale			
Force	Wind (MPH)	WMO Classification	Appearance of Wind Effects on Land
			Calm, smoke rises vertically
1	1-3	Light Air	Smoke drift indicates wind direction, still wind vanes
2	4-7	Light Breeze	Wind felt on face, leaves rustle, vanes begin to move
3	8-12	Gentle Breeze	Leaves and small twigs constantly moving, light flags extended
4	13-17	Moderate Breeze	Dust, leaves, and loose paper lifted, small tree branches move
5	18-24	Fresh Breeze	Small trees in leaf begin to sway

Beaufort Wind Scale			
Force	Wind (MPH)	WMO Classification	Appearance of Wind Effects on Land
6	25-30	Strong Breeze	Larger tree branches moving, whistling in wires
7	31-38	Near Gale	Whole trees moving, resistance felt walking against wind
8	39-46	Gale	Twigs breaking off trees, generally impedes progress
9	47-54	Strong Gale	Slight structural damage occurs, slate blows off roofs
10	55-63	Storm	Seldom experienced on land, trees broken or uprooted, "considerable structural damage"
11	54-73	Violent Storm	
12	74+	Hurricane	

Major damage directly caused by thunderstorm winds is relatively rare, while minor damage is common and pervasive, and most noticeable when it contributes to power outages. These power outages can have major negative impacts such as increased tendency for traffic accidents, loss of revenue for businesses, increased vulnerability to fire, food spoilage, and other losses that might be sustained by a loss of power.

Power outages may pose a health risk for those requiring electric medical equipment and/or air conditioning.

Lightning

Lightning is a natural electrical discharge in the atmosphere that is a by-product of thunderstorms. Every thunderstorm produces lightning. There are three primary types of lightning: intra-cloud, cloud-to-ground, and cloud-to-cloud. Cloud-to-ground lightning has the potential to cause the most damage to property and crops, while also posing as a health risk to the populace in the area of the strike.

Damage caused by lightning is usually to homes or businesses. These strikes have the ability to damage electrical equipment inside the home or business and can also ignite a fire that could destroy homes or crops.

Lightning continues to be one of the top three storm-related killers in the United States per FEMA, but it also has the ability to cause negative long-term health effects to the individual that is struck.

Hazard Profile

Hailstorms

Location

Because hailstorms is a climatological based hazard and has the same probability of occurring in St. Tammany parish as all of its jurisdictions, the entire planning area for St. Tammany Parish is equally at risk for hailstorms.

[Previous Occurrences / Extents](#)

The SHELDUS database reports a total of 7 significant hailstorms occurring within the boundaries of St. Tammany Parish between the years of 1989-2014. The hailstorm diameters experienced in St. Tammany Parish have ranged from .75 inches to 3 inches according to the National Climatic Data Center over the 25 year period. The most frequently recorded hail size has been 1 inch diameters. Figure 2-48 displays the density of hailstorms in St. Tammany parish and adjacent parishes. Table 2-67 provides an overview of hail storms that have impacted the St. Tammany Parish Planning area since 2009. Of these 20 events, none were considered significant and did not result in damages to property and/or people. There have not been any recorded hail events that have impacted Madisonville or Folsom since the last plan update. St. Tammany can expect to experience hail up to 3.00 inches which occurred in 1988.

*Table 2-68: Previous Occurrences of Hailstorms in St. Tammany Parish.
(Source: NCDC)*

Date	Recorded Hail Size	Location
April 2, 2009	0.68 in	Slidell
May 3, 2009	0.88 in	Mandeville
May 16, 2009	1.00 in	Sun
May 29, 2010	1.75 in	Covington
October 24, 2010	1.75 in	Covington
October 24, 2010	1.00 in	Covington
May 26, 2011	1.00 in	Lacombe (Unincorporated St. Tammany Parish)
May 26, 2011	1.75 in	Lacombe (Unincorporated St. Tammany Parish)
May 26, 2011	1.25 in	Slidell
May 26, 2011	1.00 in	Bonfouca (Unincorporated St. Tammany Parish)
June 6, 2011	1.75 in	St. Joe (Unincorporated St. Tammany Parish)
June 6, 2011	1.00 in	Slidell
April 2, 2012	1.00 in	Slidell
July 4, 2012	1.00 in	Slidell
February 22, 2013	1.75 in	Lacombe (Unincorporated St. Tammany Parish)
February 22, 2013	1.00 in	Pearl River
February 22, 2013	1.00 in	Slidell
March 31, 2013	1.00 in	Abita Springs
June 6, 2013	1.25 in	Slidell
June 6, 2013	1.00 in	Slidell

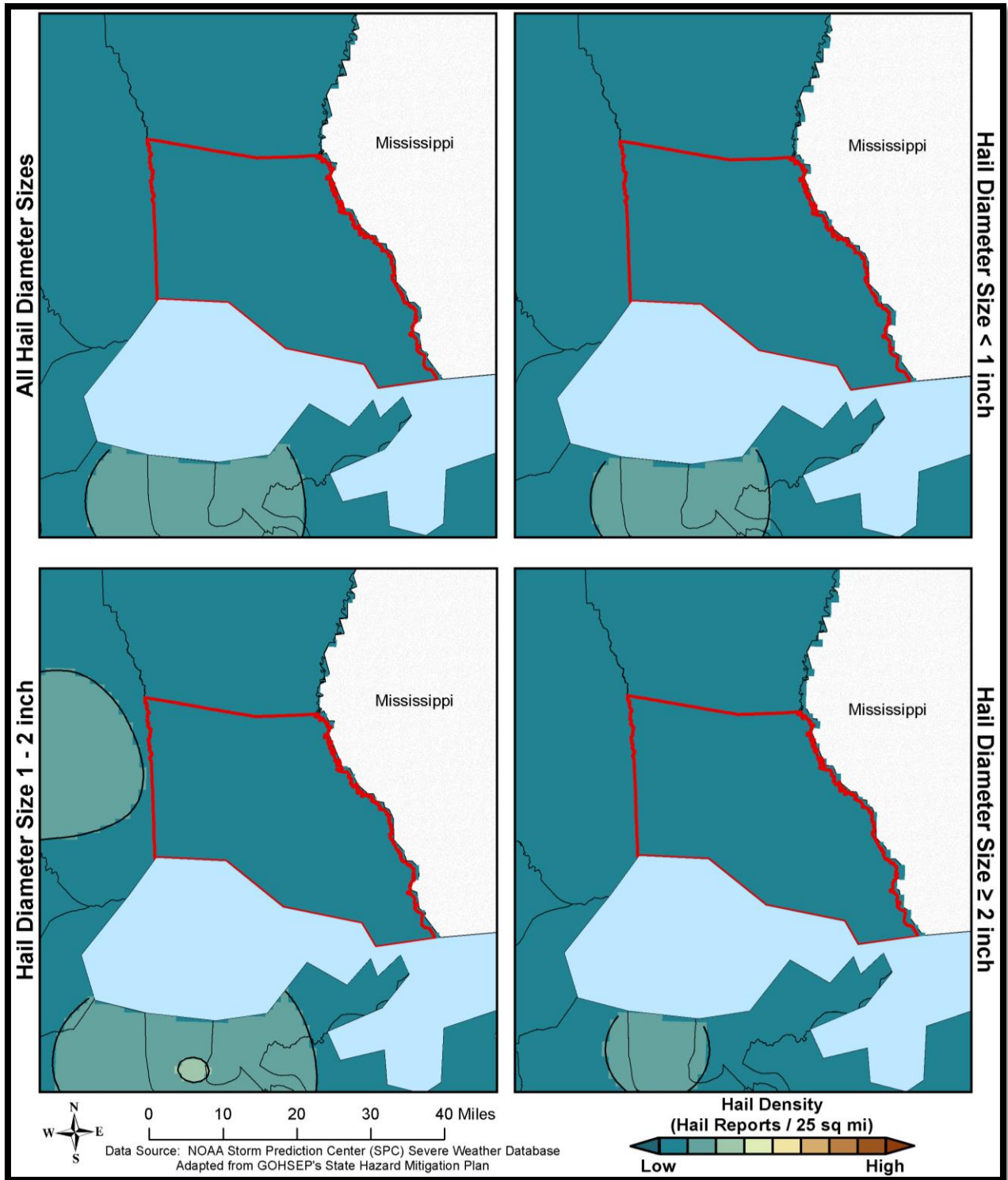
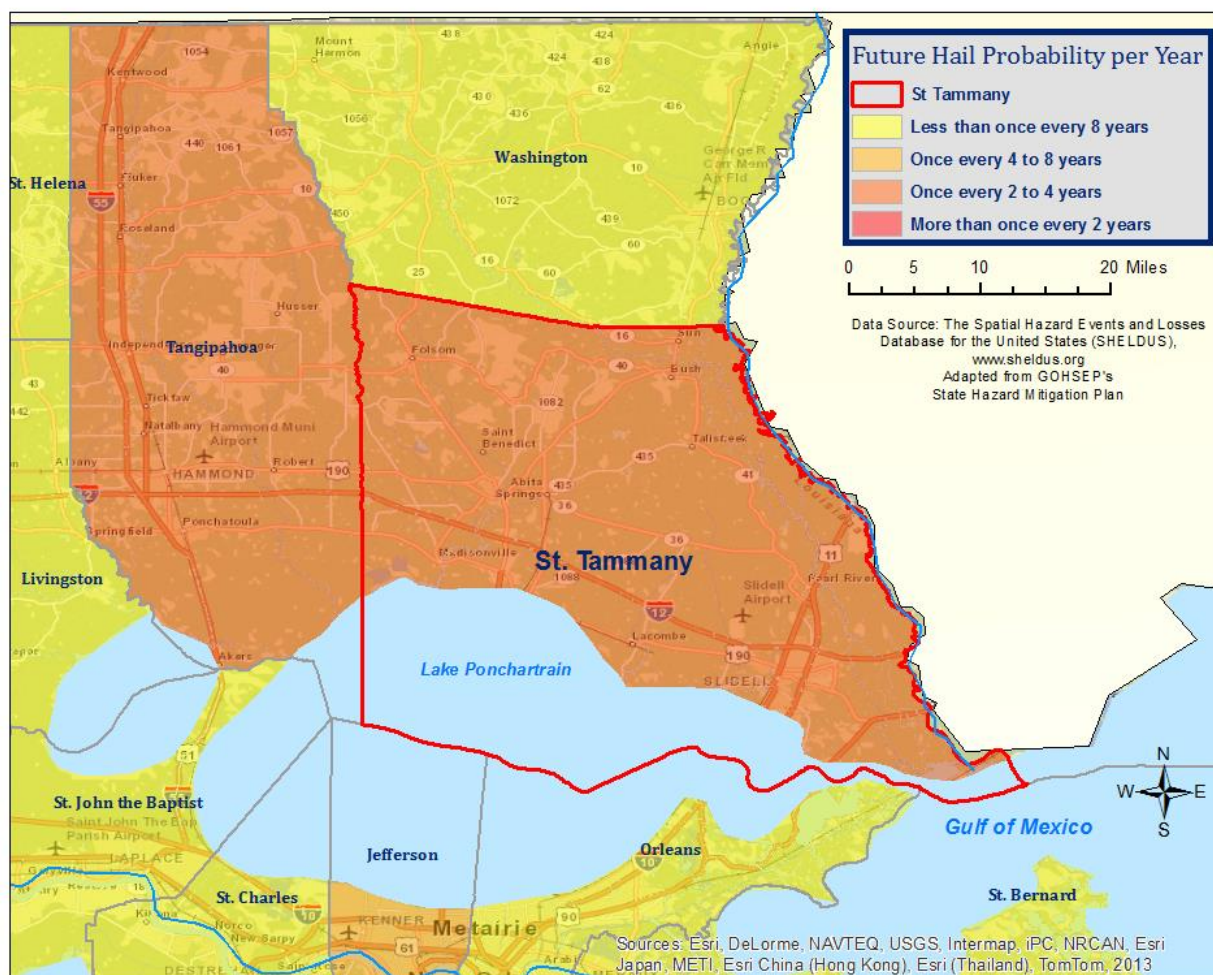


Figure 2-36: Density of hailstorms by by diameter from 1950-1964
 (Source: State of Louisiana Hazard Mitigation Plan)

Frequency

The State of Louisiana Hazard Mitigation plan estimated the probability of occurrence at approximately 28%, with a return frequency of once every 2 to 4 years. The probability was determined based on a review of significant hail data that has caused damages in the last twenty five years, in which St. Tammany parish has had seven recorded events (Figure 2-37).



*Figure 2-37: Probability of hailstorm events in St. Tammany Parish from 1987-2012.
(Source: State of Louisiana Hazard Mitigation Plan 2014)*

Estimated Potential Losses

According to the SHELDUS database, property damage due to hailstorms in St. Tammany Parish have totaled approximately \$11,088,378 since 1960. A list of total damages by event can be found in Table 2-57. To estimate the potential losses of a severe weather event on an annual basis, the total damages recorded for hailstorms was divided by the total number of years of available hailstorm data in SHELDUS (1960 – 2014). This provides an annual estimated potential loss of \$205,340. To access potential losses to the participating jurisdictions, the 2010 Census population was used to assign the estimated potential

losses proportionally across the jurisdictions. Based on the 2010 Census data, the following table provides an estimate of potential property losses for St. Tammany Parish:

Table 2-69: Property damage caused by hailstorms in St. Tammany Parish.

(Source: SHEL DUS)

Date	Property Damage
March 1961	\$12,985
April 1962	\$3,013
July 1963	\$1,982
April 1964	\$202,545
June 1967	\$1,816
July 1967	\$1,362
May 1968	\$17
March 1971	\$11,234
March 1972	\$3,496
November 1972	\$1,088
May 1974	\$315
May 1975	\$11,276
May 1985	\$1,546
May 1988	\$10,830,629
December 1990	\$178
April 1991	\$85
June 1991	\$427
February 1992	\$4,151
May 1999	\$233

Table 2-70: Estimated annual property losses in St. Tammany Parish from hailstorms.

Estimated Annual Potential Losses from Hailstorms for St. Tammany Parish								
Unincorporated St. Tammany Parish (76.2% of Population)	Abita Springs (1% of Population)	Covington (4% of Population)	Folsom (0.3% of Population)	Madisonville (0.3% of Population)	Mandeville (5% of Population)	Pearl River (1% of Population)	Slidell (12% of Population)	Sun (0.2% of Population)
\$156,469	\$2,053	\$8,214	\$616	\$616	\$10,267	\$2,053	\$24,641	\$411

The Parish has suffered no deaths or injuries due to hailstorms from 1960 – 2014.

Vulnerability

See Appendix C-1 to C-2 for parish and municipality buildings that are susceptible to hailstorms.

High Winds

Location

Because high winds are a climatological based hazard and have the same probability of occurring in St. Tammany parish as all of its jurisdictions, the entire planning area for St. Tammany Parish is equally at risk for high winds.

Previous Occurrences / Extents

The SHELATUS database reports a total of 201 thunderstorm wind events occurring within the boundaries of St. Tammany Parish between the years of 1989-2014. The significant thunderstorm wind events experienced in St. Tammany Parish have ranged from a wind speed of 58 mph to 81 mph. Since the hazard mitigation plan was last updated there have not been any observed significant thunderstorm winds in the Village of Sun. St. Tammany Parish can expect to receive winds up to 81 mph.

Table 2-71: Previous Occurrences for Thunderstorm High Wind Events.

Location	Date	Recorded Wind Speeds	Property Damage	Crop Damage
Madisonville	April 2, 2009	58 mph	\$1,500	\$0
Slidell	April 2, 2009	60 mph	\$1,500	\$0
Covington	July 2, 2009	60 mph	\$5,000	\$0
Slidell	August 21, 2009	58 mph	\$2,000	\$0
Covington	May 24, 2010	60 mph	\$20,000	\$0
Lacombe	May 25, 2010	60 mph	\$2,000	\$0
Mandeville	May 29, 2010	60 mph	\$0	\$0
Slidell	June 4, 2010	60 mph	\$2,000	\$0
Slidell	June 5, 2010	60 mph	\$500	\$0
Mandeville	November 30, 2010	60 mph	\$2,000	\$0
Folsom	March 8, 2011	69 mph	\$1,000	\$0
Bush	April 4, 2011	81 mph	\$50,000	\$0
Mandeville	April 4, 2011	81 mph	\$15,000	\$0
Mandeville	April 4, 2011	81 mph	\$1,000	\$0
Chinchuba	April 4, 2011	69 mph	\$5,000	\$0
Lacombe	April 4, 2011	69 mph	\$3,000	\$0
Alton	April 4, 2011	69 mph	\$5,000	\$0
Slidell	April 4, 2011	69 mph	\$10,000	\$0
Slidell	April 4, 2011	69 mph	\$1,000	\$0
St. Joe	April 4, 2011	69 mph	\$1,000	\$0
North Shore	April 4, 2011	69 mph	\$50,000	\$0
Chinchuba	May 26, 2011	60 mph	\$0	\$0
Chinchuba	May 26, 2011	60 mph	\$5,000	\$0

Location	Date	Recorded Wind Speeds	Property Damage	Crop Damage
Slidell	June 6, 2011	63 mph	\$5,000	\$0
Blond	July 3, 2011	60 mph	\$5,000	\$0
Pearl River	August 24, 2011	60 mph	\$2,000	\$0
McClane City	November 16, 2011	60 mph	\$20,000	\$0
Abita Springs	February 18, 2012	60 mph	\$15,000	\$0
Abita Springs	February 18, 2012	60 mph	\$10,000	\$0
Abita Springs	February 18, 2012	60 mph	\$10,000	\$0
Oaklawn	May 7, 2012	58 mph	\$5,000	\$0
McClane City	July 4, 2012	69 mph	\$25,000	\$0
Alton	July 6, 2012	60 mph	\$1,000	\$0
Goodbee	August 10, 2012	58 mph	\$0	\$0
Folsom	February 22, 2013	70 mph	\$15,000	\$0
Covington	March 31, 2013	64 mph	\$10,000	\$0
Blond	April 11, 2013	60 mph	\$5,000	\$0
Pearl River	April 11, 2013	60 mph	\$5,000	\$0
McClane City	March 16, 2014	63 mph	\$0	\$0
Goodbee	June 21, 2014	60 mph	\$300	\$0
Mandeville	October 13, 2014	63 mph	\$0	\$0
Chinchuba	October 13, 2014	63 mph	\$0	\$0
Mandeville	October 13, 2014	75 mph	\$0	\$0
Mandeville	October 13, 2014	63 mph	\$0	0

Frequency

High winds are a fairly common occurrence within St. Tammany Parish with an annual chance of occurrence calculated at 100%. According to the State Hazard Mitigation Plan, St. Tammany parish has a future probability of experiencing more than 4 wind events annually as seen in Figure 2-39.

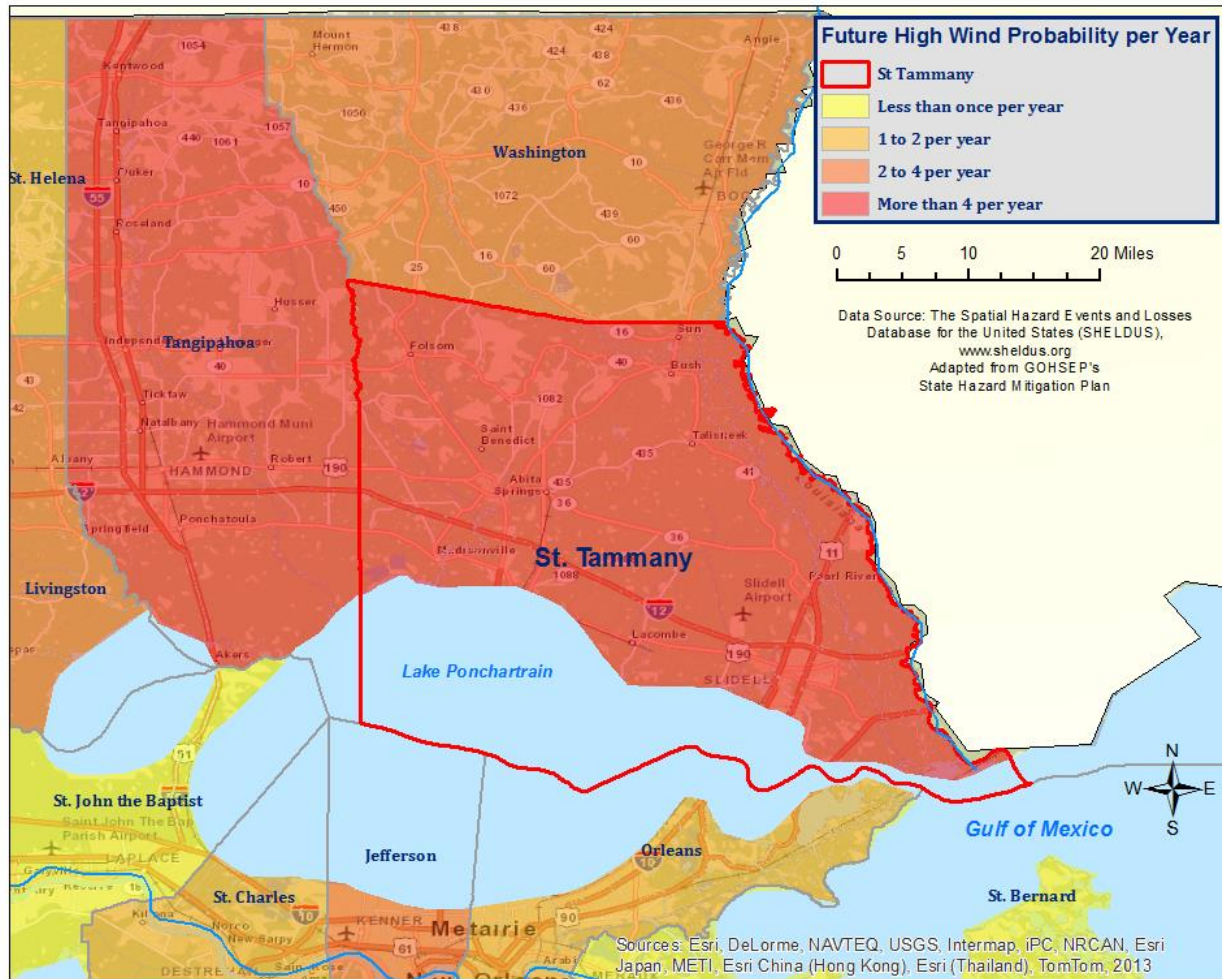


Figure 2-38: Probability of high wind events in St. Tammany and adjacent parishes.
(Source: State of Louisiana 2014 Hazard Mitigation Plan)

Estimated Potential Losses

Since 1960, there have been 203 significant wind events that have resulted in property damages according to the SHELDUS database. The total property damages associated with those storms have totaled \$2,132,619. To estimate the potential losses of a wind event on an annual basis, the total damages recorded for wind events was divided by the total number of years of available wind data in SHELDUS (1960 – 2014). This provides an annual estimated potential loss of \$39,492. To access potential losses to the participating jurisdictions, the 2010 Census population was used to assign the estimated potential losses proportionally across the jurisdictions. Based on the 2010 Census data, the following table provides an estimate of potential property losses for St. Tammany Parish:

Table 2-72: Estimated annual property losses in St. Tammany parish resulting from wind damage.

Estimated Annual Potential Losses from Thunderstorm Winds for St. Tammany Parish								
Unincorporated St. Tammany Parish (76.2% of Population)	Abita Springs (1% of Population)	Covington (4% of Population)	Folsom (0.3% of Population)	Madisonville (0.3% of Population)	Mandeville (5% of Population)	Pearl River (1% of Population)	Slidell (12% of Population)	Sun (0.2% of Population)
\$30,093	\$395	\$1,580	\$118	\$118	\$1,975	\$395	\$4,739	\$79

There have been 2 reported injuries and 2 deaths as a result of a wind event over the 54 year record.

Vulnerability

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

Lightning

Location

Like hail and high winds, lightning is a climatological based hazard and has the same probability of occurring throughout the entire planning area for St. Tammany Parish, making all jurisdictions equally at risk for lightning.

Previous Occurrences / Extent

The SHELDUS database reports a total of 39 lightning events occurring within the boundaries of St. Tammany Parish between the years of 1960-2014. The SHELDUS database only records lightning events that cause death, injuries, crop damage, and/or property damage, so these numbers do not accurately reflect the number of lightning events in St. Tammany Parish which occur on a nearly monthly basis. The table below provides an overview of significant lightning strikes over the last five years.

*Table 2-73: Previous occurrences of significant lightning strikes in St. Tammany Parish from 2009 – 2014.
(Source: NCDC & SHELDUS)*

Location	Date	Summary	Property Damage
Slidell	August 21, 2009	Two vehicles were struck by lightning with one strike resulting in a minor fire. Three homes were struck by lightning with one resulting in a fire.	\$5,429
Mandeville	June 4, 2010	Lightning struck a tree which fell into a home in Mandeville, damaging three rooms	\$10,683
Unincorporated St. Tammany Parish	August 13, 2011	Lightning struck near a large group of people gathered for a four-wheel vehicle event north of Covington At least 12 people were evaluated with three people taken to the hospital for treatment.	\$0

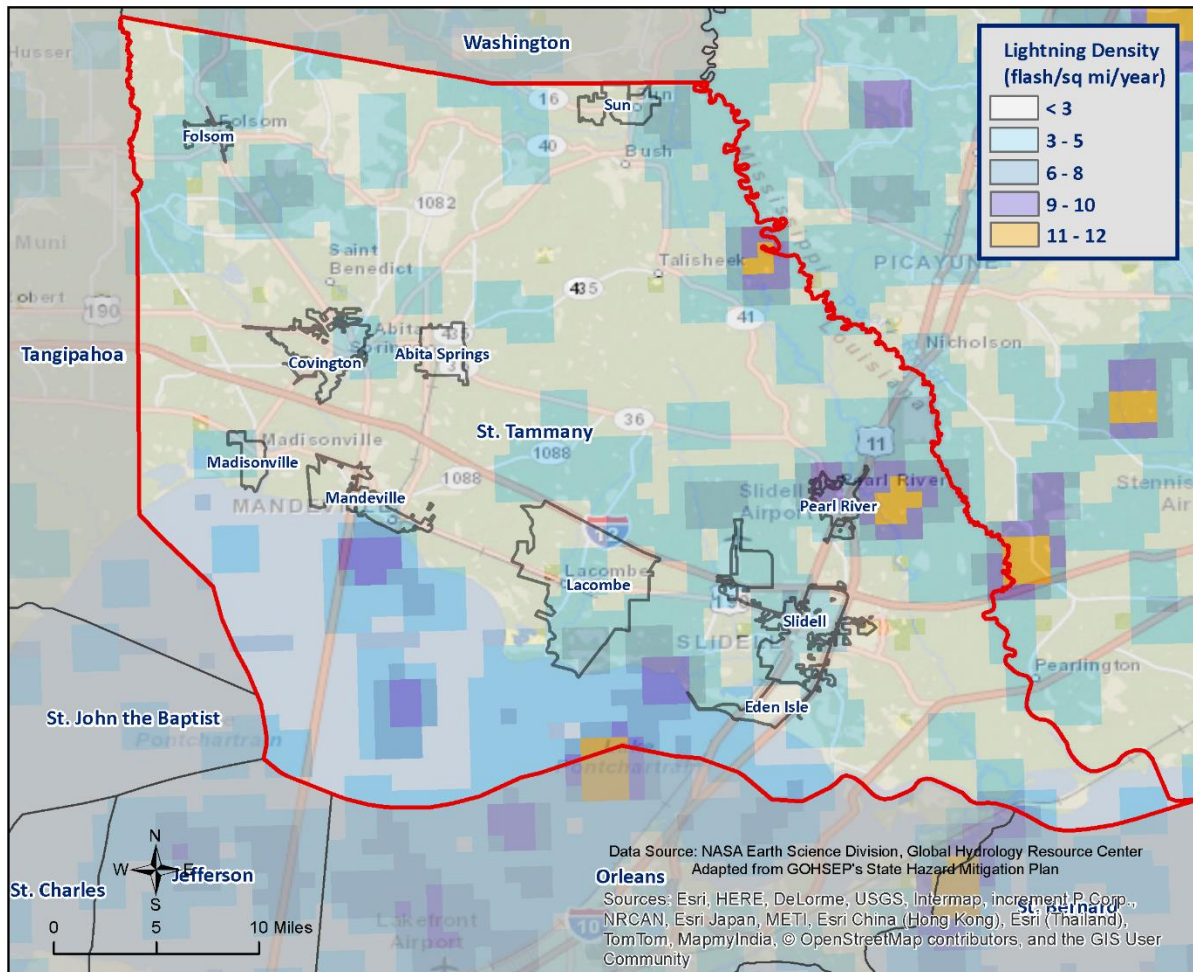


Figure 2-39: Lightning Density Reports for Iberia Parish.

Frequency

Lightning can strike anywhere and is produced by every thunderstorm, so the chance of lightning occurring in St. Tammany Parish is high. However, lightning that meets the definition that is used by SHELDUS and the NCDC that actually results in damages to property and injury or death to people is a less likely event. According to the State Hazard Mitigation Plan, a major lightning strike in St. Tammany parish is likely to occur every 1 to 4 years as depicted in Figure 2-40. This is consistent with SHELDUS, which has 39 lightning events that have caused property damages or injuries over the last 54 years, establishing an annual probability of 72%.

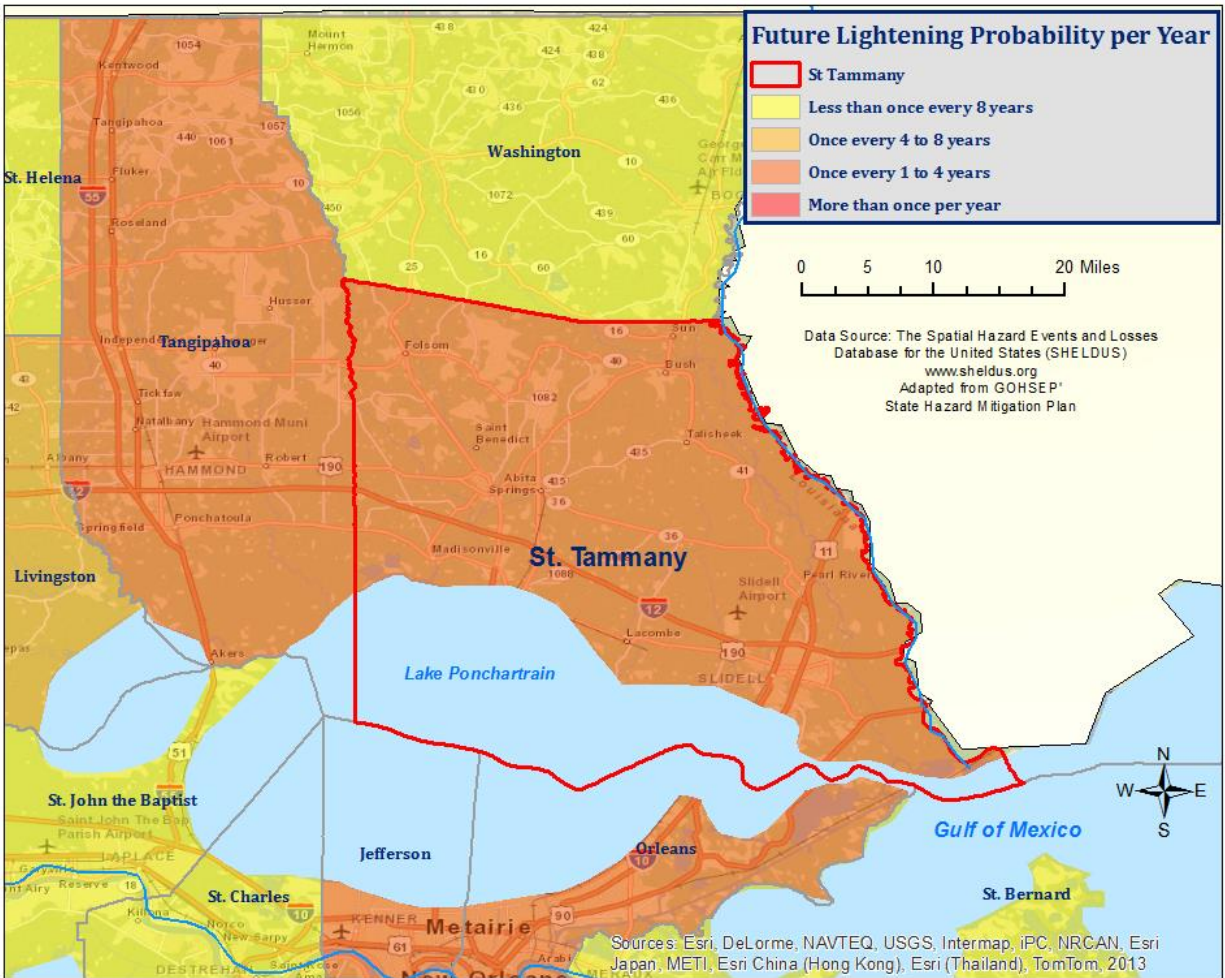


Figure 2-40: Probability of lightning events in St. Tammany and adjacent parishes.
(Source: State of Louisiana Hazard Mitigation Plan)

Estimated Potential Losses

Since 1960, there have been 39 significant lightning strikes with 32 of those strikes resulting in property damages according to the SHELDUS database. The total property damages associated with those events have totaled \$989,446. To estimate the potential losses of a lightning event on an annual basis, the total damages recorded for lightning events was divided by the total number of years of available major lightning strike data in SHELDUS (1960 – 2014). This provides an annual estimated potential loss of \$18,323. To access potential losses to the participating jurisdictions, the 2010 Census population was used to assign the estimated potential losses proportionally across the jurisdictions. Based on the 2010 Census data, the following table provides an estimate of potential property losses for St. Tammany Parish:

Table 2-74: Estimated annual property losses in St. Tammany Parish from lightning.

Estimated Annual Potential Losses resulting from Lightning strikes for St. Tammany Parish								
Unincorporated St. Tammany Parish (76.2% of Population)	Abita Springs (1% of Population)	Covington (4% of Population)	Folsom (0.3% of Population)	Madisonville (0.3% of Population)	Mandeville (5% of Population)	Pearl River (1% of Population)	Slidell (12% of Population)	Sun (0.2% of Population)
\$13,962	\$183	\$733	\$55	\$55	\$916	\$183	\$2,199	\$37

There have been 25 reported injuries as a result of a lightning strikes over the 54 year record. There have been 5 deaths for St. Tammany Parish relating to lightning events within recent history.

Vulnerability

See Appendix C-1 to C-2 for parish and municipality building exposure to lightning hazards.

Tornadoes

Tornadoes (also called twisters and cyclones) are rapidly rotating funnels of wind extending between storm clouds and the ground. For their size, tornadoes are the most severe storms, and 70% of the world's reported tornadoes occur within the continental United States, making them one of the most significant hazards Americans face. Tornadoes and waterspouts form during severe weather events, such as thunderstorms and hurricanes, when cold air overrides a layer of warm air, causing the warm air to rise rapidly, which usually occurs in a counterclockwise direction in the northern hemisphere. The updraft of air in tornadoes always rotates because of wind shear (differing speeds of moving air at various heights), and it can rotate in either a clockwise or counterclockwise direction; clockwise rotations (in the northern hemisphere) will sustain the system, at least until other forces cause it to die seconds to minutes later.

Since February 1, 2007, the Enhanced Fujita (EF) Scale has been used to classify tornado intensity. The EF Scale classifies tornadoes based on their damage pattern rather than wind speed; wind speed is then derived and estimated. This contrasts with the Saffir-Simpson scale used for hurricane classification, which is based on measured wind speed. Table 2-74 shows the EF scale in comparison with the old Fujita (F) Scale, which was used prior to February 1, 2007. When discussing past tornadoes, the scale used at the time of the hazard is used. Adjustment between scales can be made using Table 2-74.

Table 2-75: 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

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.

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 on 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 missiles are generally stopped by interior walls. However, if a building has no partitions, any glass, brick, or other debris blown into the interior is life threatening. Following a tornado, damaged buildings are a potential health hazard due to instability, electrical system damage, and gas leaks. Sewage and water lines may also be damaged.

Peak tornado activity in Louisiana occurs during the spring, as it does in the rest of the United States. Nearly one-third of observed tornadoes in the United States occur during April. About half of those in Louisiana, including many of the strongest, occur between March and June. Fall and winter tornadoes are less frequent, but the distribution of tornadoes throughout the year is more uniform in Louisiana than in locations farther north.

Location

While there is a significant tornado record in St. Tammany parish with actual locations, tornadoes in general are a climatological based hazard and have the same approximate probability of occurring in St. Tammany parish as all of its jurisdictions. Because a tornado has a similar probability of striking anywhere within the planning area for St. Tammany parish, all jurisdictions are equally at risk for tornadoes.

Previous Occurrences / Extent

St. Tammany Parish has not experienced any federally declared disasters due to a tornado alone. SHELDUS reports a total of 25 tornadoes or waterspouts occurring within the boundaries of St. Tammany Parish between the years of 1989-2014. The tornadoes experienced in St. Tammany Parish have ranged from EF0 to EF3 on the EF scale and ranged from F0 to F2 on the F scale. The worst-case scenario tornado for St. Tammany is expected in the future is an EF3.

The tornado that caused the most damage to property and resulted in the most injuries was a F2 that occurred on November 2, 1997. The tornado passed through the downtown area of Covington causing \$5,085,139 in property damage and 43 injuries.

Table 2-76: Historical tornadoes in St. Tammany Parish with locations from 1960-2014.

Date	Impacts	Property Damage	Location	Magnitude
August 26, 1992	14 mile path with a width of 20 yards. Minor crop damage.	\$8,310	Lacombe and Covington	F1
August 26, 1992	1 mile path with a width of 20 yards. Minor damage to buildings and crops.	\$822	Mandeville	F1
November 2, 1995	.2 mile path with a width of 0 yards. Waterspout that caused minor damage to trees and mobile homes.	\$1,528	Slidell	
December 18, 1995	.5 mile path with a width of 10 yards. Minor damage to trees.	\$3,057	Covington	F1
November 21, 1997	9 mile path with a width of 200 yards. Severe damage to trees, homes, and cars with 43 injuries.	\$5,085,139	Covington	F2
November 21, 1997	1 mile path with a width of 50 yards.	\$103,778	Talisheek	F1
January 7, 1998	.2 mile path with a width of 30 yards. Minor damage to trees and power lines in the Ozone Woods subdivision.	\$285	Slidell	F0
August 23, 2000	1.5 mile path with a width of 30 yards. Minor damage to a home and vehicle with minor tree damage.	\$13,528	Abita Springs	F0
November 6, 2000	1 mile path with a width of 30 yards. Damaged dozens of trees and utility poles. Moderate damage to approximately 20 homes.	\$87,933	Slidell	F1
October 3, 2002	.2 mile path with a width of 30 yards. Spawned from Hurricane Lili.	\$31,726	Slidell	F1
October 3, 2002	.3 mile path with a width of 25 yards. Spawned from Hurricane Lili.	\$33,020	Covington	F0

Date	Impacts	Property Damage	Location	Magnitude
November 11, 2002	.3 mile path with a width of 150 yards. Moderate damage to 3 homes and outbuilding structures.	\$45,322	Goodbee	F1
November 24, 2004	4 mile path with a width of 50 yards. Severely damaged 9 homes and damaged an additional 152 homes.	\$924,921	Slidell	F2
May 15, 2008	5.02 mile path with a width of 75 yards. Minor roof damage to several structures.	\$54,099	Folsom	EF1
September 2, 2008	0.2 mile path with a width of 20 yards. Spawned from Hurricane Gustav.	\$16,176	Abita Springs	EFO
September 2, 2008	0.2 mile path with a width of 20 yards. Spawned from Hurricane Gustav.	\$108,253	Bush	EF0
March 26, 2009	0.15 mile path with a width of 25 yards. Minor tree damage.	\$855	Slidell	EF0
March 27, 2009	0.3 mile path with a width of 150 yards. Substantial roof damage to 3 homes.	\$16,247	Pearl River	EF1
March 9, 2011	11 mile path with a width of 300 yards. Damage to home windows, garage doors, and sidings.	\$77,673	Lacombe	EF1
March 9, 2011	0.5 mile path with a width of 100 yards. Significant damage to 2 homes and minor tree damage.	\$129,456	Bush	EF1
March 9, 2011	1.86 mile path with a width of 250 yards. Significant damage to approximately 30 homes.	\$310,693	North Slidell	EF2
May 26, 2011	6.06 mile path with a width of 150 yards. Significant roof damage to 2 homes and approximately 15 mobile homes.	\$414,258	Blond	EF3

Date	Impacts	Property Damage	Location	Magnitude
March 21, 2012	0.53 mile path with a width of 100 yards. Minor roof and tree damage.	\$4,972	Houltonville	EF0
March 21, 2012	1.41 mile path with a width of 25 yards. Minor roof and tree damage.	\$5,174	Abita Springs	EF0
April 11, 2013	8.76 mile path with a width of 120 yards. Moderate roof damage and several trees and power lines knocked down.	\$100,000	Oaklawn	EF1

Since 2008, the year the last update to this hazard mitigation plan was written, St. Tammany parish has had 9 tornado touch downs. The following is a brief synopsis of these events:

[March 26, 2009– EF0 Tornado in Slidell](#)

A stalled frontal boundary drifted back and forth across the area producing an extended duration of rain, thunderstorms, and tornadoes. A tornado touched down in the Springhill subdivision resulted in minor tree damage. The estimated wind speed with this tornado was approximately 65 mph.

[March 27, 2009– EF1 Tornado in Pearl River](#)

Several episodes of widespread weather and heavy rainfall occurred from March 26th to the 28th throughout the area. A tornado touched down briefly just north of Hickory causing substantial roof damage to 3 homes near Highway 41.

[March 9, 2011– EF1 Tornado in Lacombe](#)

Thunderstorms in advance of a strong cold front produced numerous reports of severe weather in the area. A tornado touch down south of Interstate 12 and west of Louisiana Highway 434 that impacted the Fairhope subdivision. Windows, garage doors, and roof and brick veneer were damaged. The tornado traveled across Louisiana Highway 35, Louisiana Highway 41, and eventually dissipated on the west bank of the Pearl River. Estimated wind speed was approximately 95 mph.

[March 9, 2011– EF1 Tornado in Bush](#)

A tornado touched down along Esbon Road destroying a wood frame home secured to a cinder block foundation. Half of the roofing deck on another home was removed and several softwood pine trees had limbs removed and bark missing. One person was injured during this tornado event. Estimated wind speed was approximately 115 mph.

March 9, 2011– EF2 Tornado in North Slidell

A tornado touched down near Pearl Drive and Azalea Lane proceeding north- northeast for approximately 2 miles to Davis Landing Road. The tornado damaged approximately 30 homes in Lake Village Subdivision and 2 other homes sustained roof damage near Lewis Stables.

May 26, 2011– EF3 Tornado in Blond

A cold front moved through the areas during the daytime hours of May 26th producing severe weather. A tornado touched down near Birtue Road east of Louisiana Highway 40 traveling eastward producing EF2 damage to homes on Birtue Road and Thornhill Road. The tornado produced EF3 damage near the intersection of Louisiana Highway 40 and Jenkins Cemetery Road. Two homes had significant roof damage and collapse of exterior walls while 3 other homes sustained significant damage resulting in the injuries of 4 people. Approximately 15 unanchored mobile homes also received some form of damage due to the tornado.

March 21, 2012– EF0 Tornado in Houltontown

A stalled cold front produced several waves of thunderstorms and heavy rain in the area over a 3 day period. A tornado formed northeast of Madisonville touching down near the clubhouse in the Tchefuncta Country Club Estates neighborhood. The tornado continued in a northeast direction downing trees and producing minor roof damage to 2 homes before dissipating.

March 21, 2012– EF0 Tornado in Abita Springs

A weak EF0 tornado touched down near the intersection of Silver Springs Drive and Allen Road moving north crossing Jarrel Road. Several pine trees were destroyed and one roof was destroyed from a fallen tree. The estimated wind speed for this tornado was approximately 65 mph.

April 11, 2013– EF1 Tornado in Oaklawn

A strong cold front produced a squall line that moved across southeast Louisiana. A weak tornado touched down approximately 3 miles southeast of Lacombe and continued east of Slidell Airport. Minor to moderate roof damage occurred to several homes, and several trees were snapped or uprooted. Several power lines were knocked down by fallen trees and limbs. The estimated peak wind gust was approximately 88 mph.

Frequency / Probability

Tornadoes are a sporadic occurrence within St. Tammany Parish with an annual chance of occurrence calculated at 100% based on the records for the past 25 years (1989-2014). Figure 2-40 displays the density of tornado touchdowns in St. Tammany Parish and neighboring parishes. Based on the State Hazard Mitigation Plan, the overall probability of a tornado touching down in St. Tammany Parish is more than once per year.

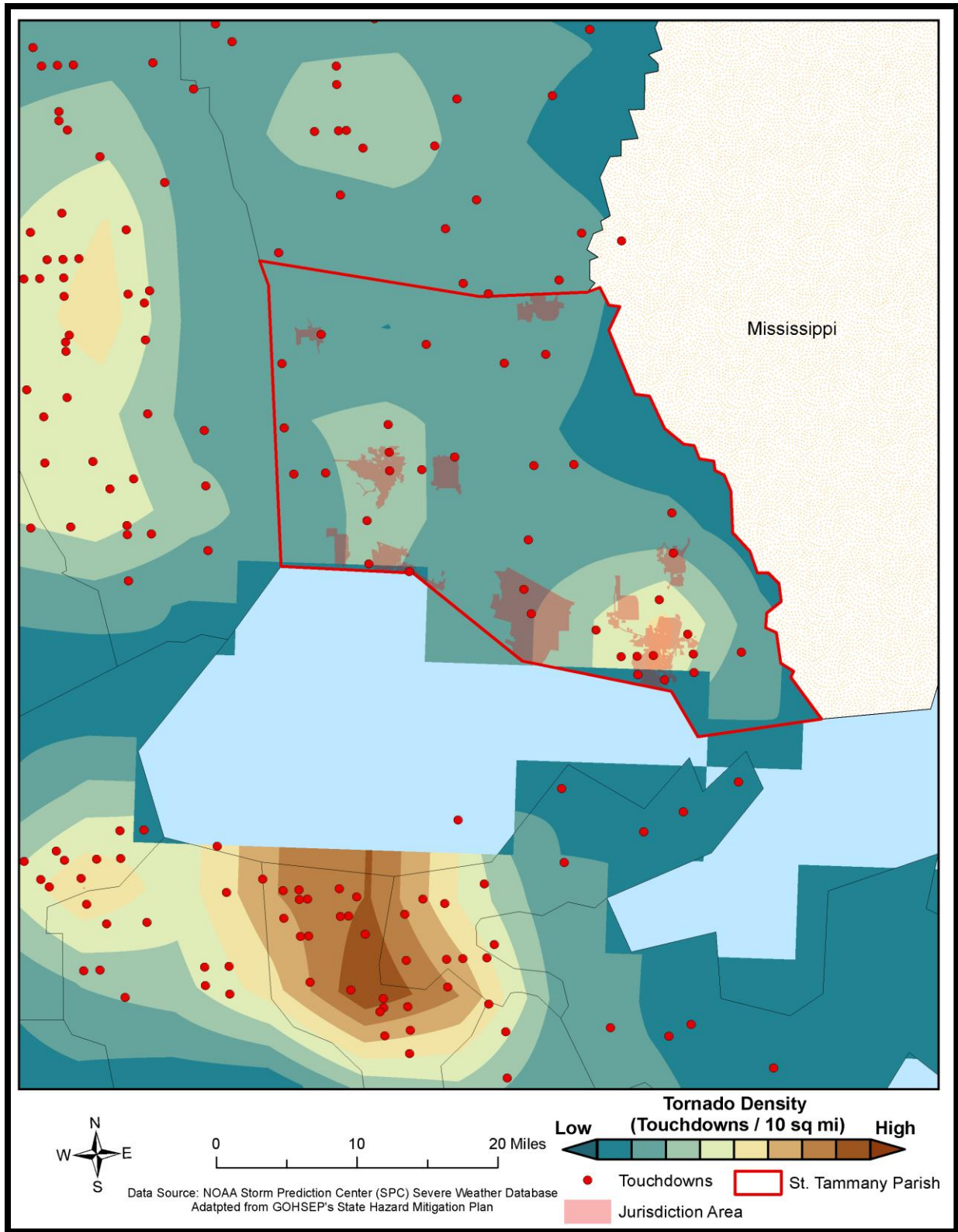


Figure 2-41: Location and density of tornadoes to touchdown in St. Tammany Parish.
(Source: NOAA/SPC Severe Weather Database)

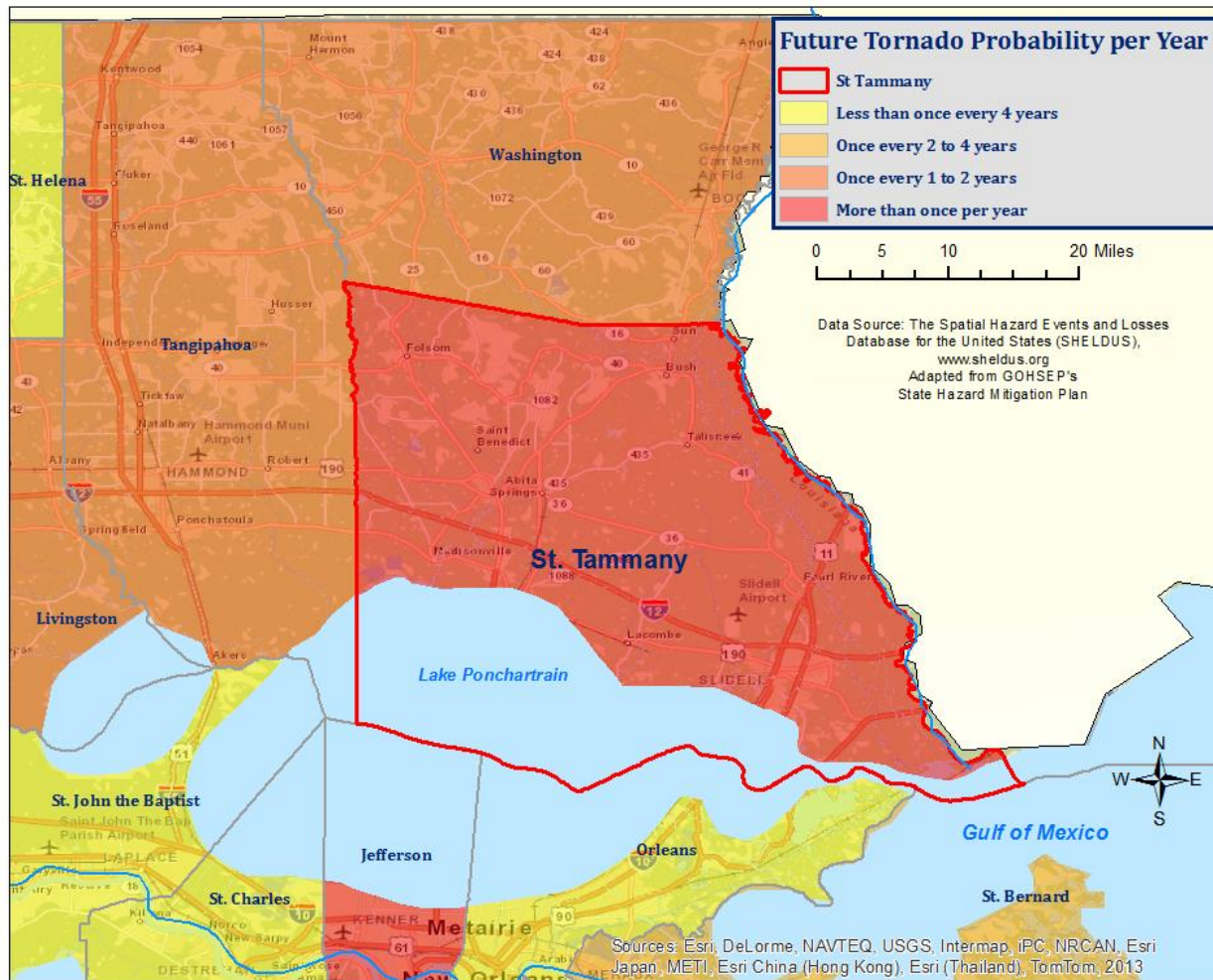


Figure 2-42: Probability of tornado events in St. Tammany and adjacent parishes based on data from 1987-2012.

(Source: State of Louisiana Hazard Mitigation Plan)

Estimated Potential Losses

According to the SHELDUS database, there have been 25 tornadoes that have caused some level of property damage. The total damage from the actual claims for property is \$9,870,018 with an average cost of \$548,339 per tornado strike. When annualizing the total cost over the 25 year record, total annual losses based on tornadoes are estimated to be \$394,800. To provide an estimated annual estimated potential loss per jurisdiction, the 2010 Census population was used to assign the estimated potential losses proportionally across the jurisdictions. Based on the 2010 Census data, Table 2-39 provides an annual estimate of potential losses for St. Tammany parish.

Table 2-77: Estimated annual losses for tornadoes in St. Tammany Parish.

Coastal Land Loss Estimated Annual Potential Losses for St. Tammany Parish								
Unincorporated St. Tammany Parish (76.2% of Population)	Abita Springs (1% of Population)	Covington (4% of Population)	Folsom (0.3% of Population)	Madisonville (0.3% of Population)	Mandeville (5% of Population)	Pearl River (1% of Population)	Slidell (12% of Population)	Sun (0.2% of Population)
\$300,838	\$3,948	\$15,792	\$1,184	\$19,740	\$10,827	\$3,948	\$47,376	\$790

Table 2-78 presents an analysis of building exposure that are susceptible to tornadoes by general occupancy type for St. Tammany Parish along with the percentage of building stock that are mobile homes.

Table 2-78: Building exposure by General Occupancy Type for Tornadoes in St. Tammany Parish.

(Source: FEMA's Hazus-MH 2.2)

Building Exposure by General Occupancy Type for Tornadoes Exposure Types (\$1,000)							
Residential	Commercial	Industrial	Agricultural	Religion	Government	Education	Mobile Homes (%)
14,991,974	2,012,966	359,647	40,163	210,272	91,445	96,568	10.2%

The Parish has suffered through a total of 4 days in which tornadoes or waterspouts have accounted for 10 injuries during this 25 year period (Table 2-79). The average injury per event for St. Tammany parish is 0.4 per tornado with an average of 0.4 per year for the 25 year period. There have been no deaths as a result of a tornado event in St. Tammany Parish.

Table 2-79: Tornadoes in St. Tammany Parish by magnitude that caused injuries or deaths.

Date	Magnitude	Deaths	Injuries
August 23, 2000	F0	0	1
November 24, 2004	F2	0	4
March 9, 2011	EF1	0	1
May 26, 2011	EF3	0	4

In accessing the overall risk to population, the most vulnerable population throughout the parish are those residing in manufacturing housing. Approximately 10.2% of all housing in St. Tammany parish consists of manufactured housing. Based on location data collected in a previous hazard mitigation project, there are 24 known locations where manufactured housing is concentrated. Those 24 locations have an overall number of manufactured houses ranging from 4 to 159. The location and density of manufactured houses can be seen in Figure 2-42.

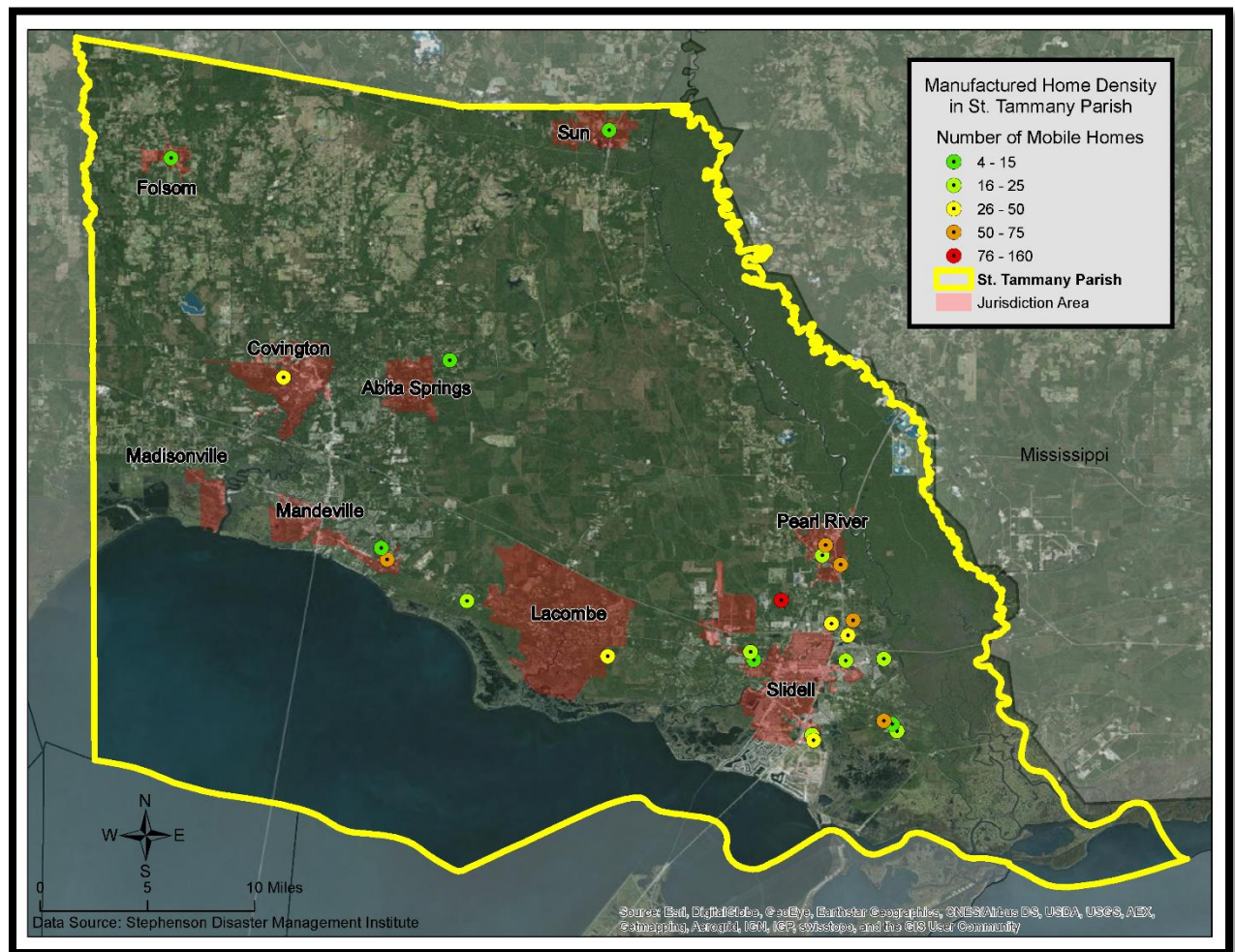


Figure 2-43: Location and approximate number of units in manufactured housing locations throughout St. Tammany Parish.

Vulnerability

See Appendix C-1 to C-2 for parish and municipality building exposure to tornado hazards.

Tropical Cyclones

Tropical cyclones are among the worst hazards Louisiana faces. These spinning, low-pressure air masses draw surface air into their centers and attain strength ranging from weak tropical waves to the most intense hurricanes. Usually, these storms begin as clusters of oceanic thunderstorms off the western coast of Africa, moving westward in the trade wind flow. The spinning of these thunderstorm clusters begins because of the formation of low pressure in a perturbation in the westerly motion of the storms associated with differential impacts of the Earth's rotation. The west-moving, counterclockwise-spinning collection of storms-now called a tropical disturbance-may then gather strength as it draws humid air toward its low-pressure center, forming a tropical depression (defined when the maximum sustained surface wind speed is 38 mph or less), then a tropical storm (when the maximum sustained surface wind ranges from 39 mph to 73 mph), and finally a hurricane (when the maximum sustained surface wind speeds exceed 73 mph). Table 2-42 presents the Saffir-Simpson Hurricane Wind Scale, which categorizes tropical cyclones based on sustained winds.

Table 2-80: 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	
Tropical Storm	39-73 mph	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 likely will 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 will be unavailable for several days to weeks after the storm passes.
4	130-156 mph	13.3-13.7 psi	Catastrophic damage will occur: Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be

			snapped or uprooted especially after the soil becomes waterlogged, and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
5	157 mph or higher	<13.7 psi	Catastrophic damage will occur: A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks to months.

Many associated hazards can occur during a hurricane, including heavy rain, 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 5 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 10 m in some places that can inflict high numbers 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 in St. Bernard Parish, near Alluvial City.

Property can be damaged by the various forces that accompany a tropical storm. 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 pressures 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). Buildings needing maintenance and mobile homes are most subject to wind damage. High winds mean bigger waves. Extended pounding by waves can demolish any structure not properly designed. The waves also erode sand beaches, roads, and foundations. When foundations are undermined, the building will collapse.

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

Location

Hurricanes are the single biggest threat to all of south Louisiana. With any single hurricane having the potential to devastate multiple parishes during a single event, the risk of a tropical cyclone has the probability of impacting anywhere within the planning area for St. Tammany parish. As such, all jurisdictions are equally at risk for tropical cyclones.

Previous Occurrences / Extent

The central Gulf of Mexico coastline is among the most hurricane-prone locations in the United States, and hurricanes can affect every part of the state. The SHELDUS database reports a total of 16 tropical cyclone events occurring within the boundaries of St. Tammany Parish between the years 2002-2014 (Table 2-43). The previous update to the hazard mitigation plan included 5 significant tropical cyclone events that impacted the parish. The tropical cyclone events experienced in St. Tammany Parish include depressions, storms, and hurricanes.

*Table 2-81: Historical tropical cyclone events in St. Tammany Parish from 2002- 2014.
(Source: SHELDUS)*

Date	Name	Storm Type While Impacting Parish Name Parish
August 8, 2002	Bertha	Tropical Storm
September 27, 2002	Isidore	Tropical Storm
October 3, 2002	Lili	Hurricane – Cat 1
June 30, 2003	Bill	Tropical Storm
September 15, 2004	Jeanne	Tropical Depression
September 15, 2004	Ivan	Tropical Storm
October 9, 2004	Matthew	Tropical Storm
July 5, 2005	Cindy	Tropical Storm
August 28, 2005	Katrina	Hurricane – Cat 1
September 23, 2005	Rita	Tropical Storm
August 24, 2008	Fay	Tropical Depression
September 1, 2008	Gustav	Hurricane – Cat 2
September 12, 2008	Ike	Tropical Storm
September 9, 2009	Ida	Tropical Storm
September 2, 2011	Lee	Tropical Storm
August 29, 2012	Isaac	Tropical Storm

Hurricane Betsy (1965)

Hurricane Betsy made landfall in September 1965 as a Category 3 hurricane and caused extensive damage in St. Tammany Parish. Winds were measured at up to 92 mph, and an estimated \$7,812,500

dollars of damage occurred. Injuries in St. Tammany Parish alone totaled 273 people and while there were no deaths in the parish, Hurricane Betsy claimed 74 lives statewide.

[Tropical Storm Allison \(2001\)](#)

In June 2001, Tropical Storm Allison made landfall in the state of Texas and moved across Louisiana causing extensive flood damage. Up to 30 inches of rain fell in some areas of the state. The Bogue Falaya River at Covington exceeded flood stage for several days, cresting twice with near-record floods, threatening levees and producing major flooding.

Allison's flooding occurred primarily in the southeast portion of St. Tammany Parish. Numerous streets were impassable and it was estimated that over 1,000 homes in Slidell and 200 homes in Covington were flooded. Slidell reported approximately 21.35 inches of precipitation and Folsom 19.66 inches during Tropical Storm Allison.

[Tropical Storm Isidore \(2002\)](#)

Tropical Storm Isidore made landfall in Grand Isle, Louisiana on September 27, 2002. Tropical Storm Isidore had a large circulation with high force winds extending several hundreds of miles from its center. This caused significant storm surge over a large area specifically on Lake Pontchartrain where storm surges of 4 to 5 feet above normal were measured. Low lying areas, roadways, and some non-elevated structures on the lake were flooded.

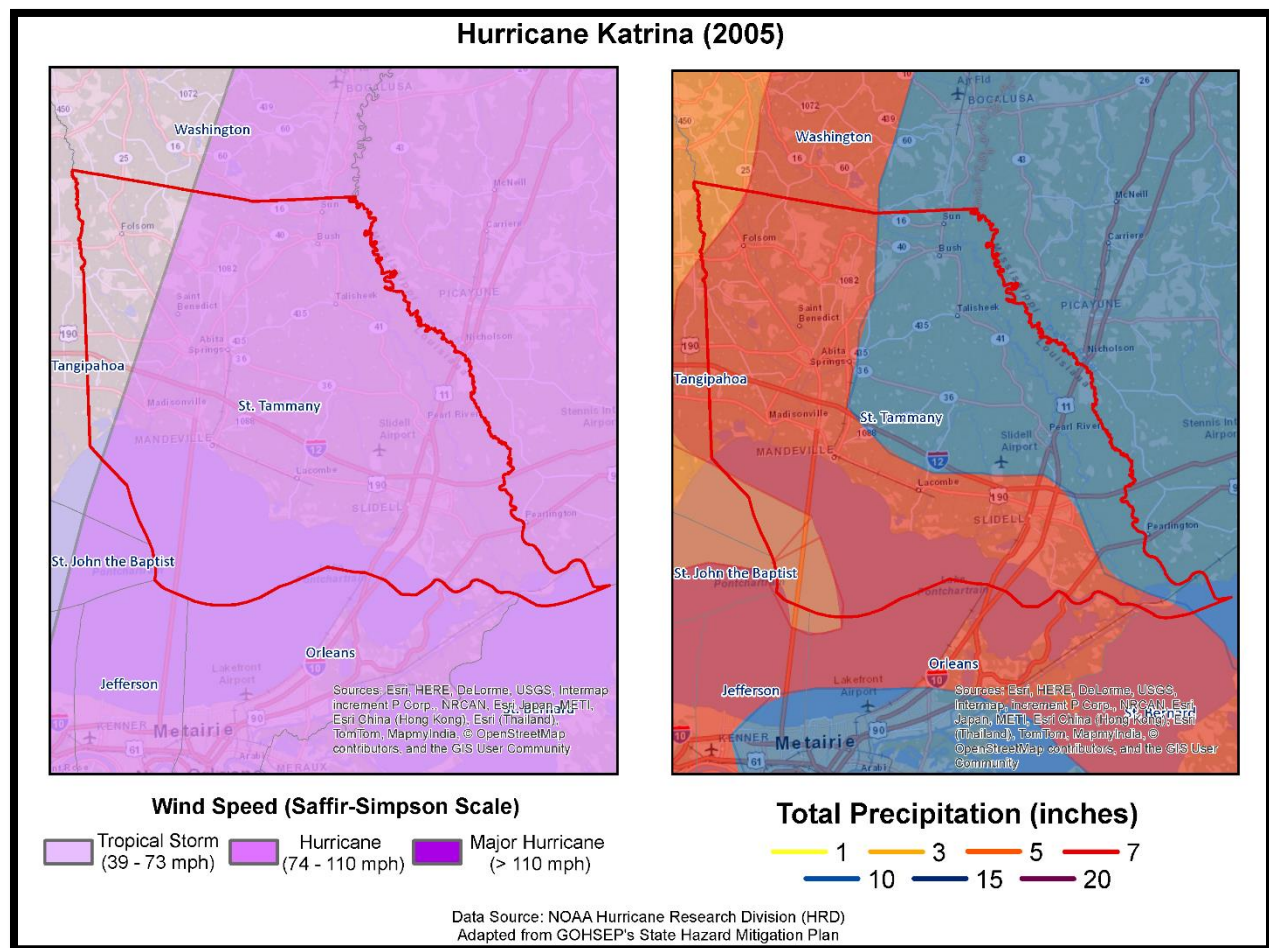
St. Tammany Parish was particularly hard hit with storm surge flooding when Isidore moved north and the winds shifted to a southwest direction causing water levels to rapidly increase along the north shore of Lake Pontchartrain. The storm surge overtopped or breached a small local levee system in southern portions of Slidell causing water to flood several hundred homes in Slidell. Approximately 1,000 homes were flooded in the parish from either storm surge, river flooding, or from flooding from heavy rain. Mandeville received approximately 24 inches of precipitation which caused extensive flooding throughout the area.

[Hurricane Katrina \(2005\)](#)

Hurricane Katrina was one of the strongest and most destructive hurricanes on record to impact the coast of the United States. The National Hurricane Center ranked Katrina as the costliest storm (both before and after adjusting for inflation) and the third deadliest in the U.S. since 1851. The hurricane made landfall in Plaquemines Parish on August 29, 2005, as a Category 3 storm and continued on a north northeast track with a second landfall occurring near the Louisiana and Mississippi border.

Storm surge due to Hurricane Katrina was especially devastating to St. Tammany Parish. The entire 57 miles of coastline in the parish was impacted by storm surge including the areas of Lacombe, Madisonville, and Mandeville. Storm surge east of Mandeville extended a half a mile inland and up to 6 miles inland to the west and east of Mandeville which inundated the communities of Slidell, Avery Estates, Lakeshore Estates, Oak Harbor, Eden Isles, and Northshore Beach. The eastern section of St.

Tammany Parish experienced an extreme surge from the Pearl and Bonfouca river systems as well as Lake Borgne. At Pearl River, storm surge inundated areas up to 20 miles inland.

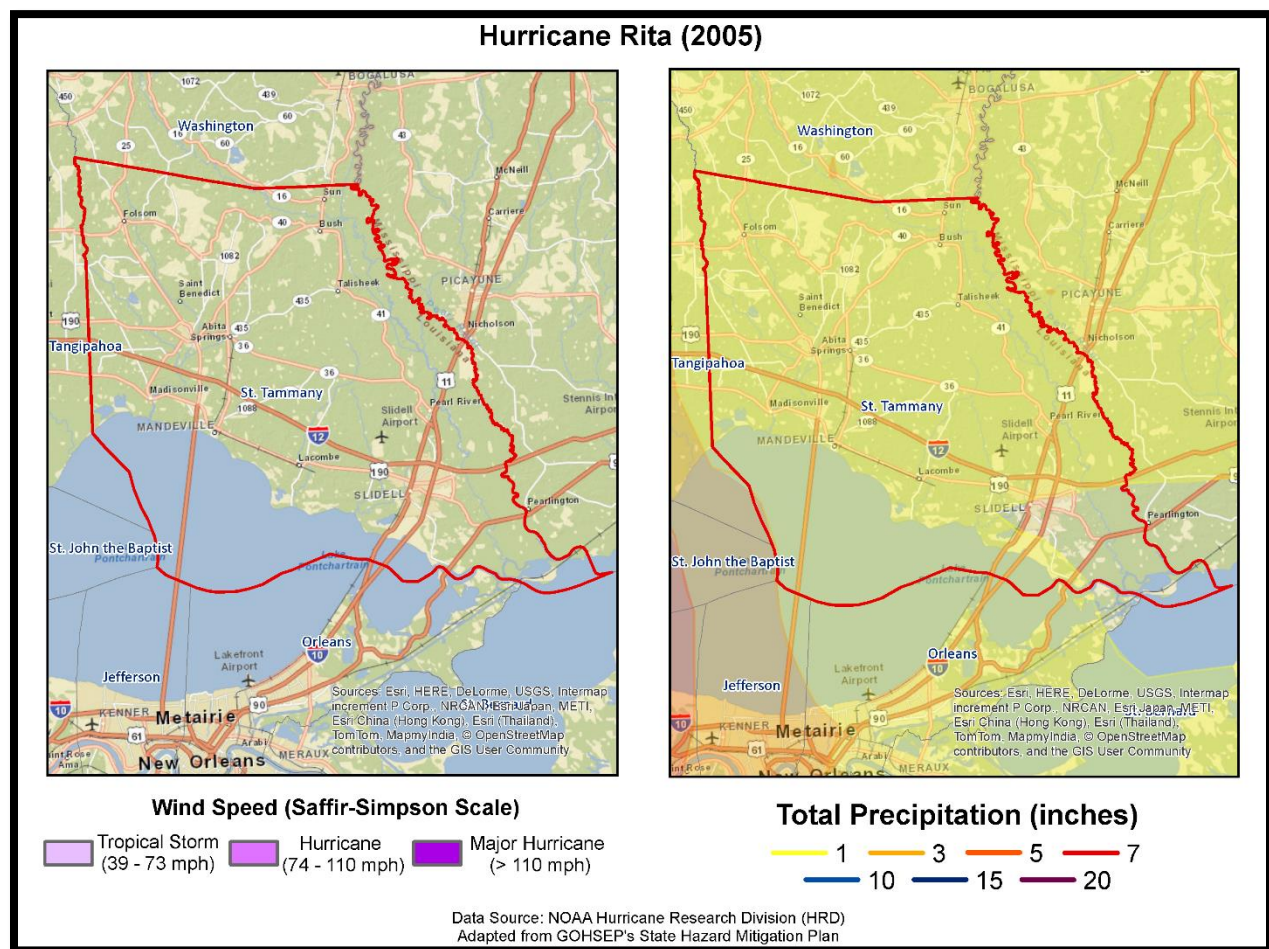


Hurricane Katrina caused extensive damage to roads and buildings virtually destroying the Twin Spans of Interstate 10 between Slidell and New Orleans East. Per the United States Department of Housing and Urban Development, approximately 70% (48,792) of housing units in St. Tammany Parish were damaged due to Hurricane Katrina. The Lake Pontchartrain Causeway and United States Highway 11 bridge connecting the north and south shore of Lake Pontchartrain were closed to traffic and only opened for emergency vehicles. Hurricane force winds toppled trees and telephone poles throughout the parish blocking several roads and causing wide spread power outages throughout the parish.

Hurricane Rita (2005)

While Hurricane Katrina and resulting levee failures captured headlines worldwide, lesser known but just as destructive Hurricane Rita wreaked havoc on southwestern Louisiana less than a month later. The storm made landfall as a Category 3 hurricane but impacted St. Tammany Parish as a tropical storm. Across southeast Louisiana, the main affect from Hurricane Rita was the substantial storm surge flooding

that occurred in low lying communities across coastal areas of southern Terrebonne, southern Lafourche, and southern Jefferson Parishes where numerous homes and businesses were flooded. Some of the most substantial damage occurred in southern Terrebonne Parish where storm surge of 5 to 7 feet above normal overtopped or breached local drainage levees inundating many small communities. Newspaper accounts indicated approximately 10,000 structures were flooded in Terrebonne Parish. Lafitte and other communities in lower Jefferson Parish also suffered extensive storm surge flooding. Storm surge flooding also occurred in areas adjacent to Lake Pontchartrain and Lake Maurepas with some homes and businesses flooded from Slidell to Mandeville and Madisonville. Approximately 1500 structures were reported flooded in Livingston Parish near Lake Maurepas. Repaired levees damaged by Hurricane Katrina in late August were overtopped or breached along the Industrial Canal in New Orleans resulting in renewed flooding in adjacent portions of New Orleans and St. Bernard Parish, although the flooding was much more limited in areal coverage than during Hurricane Katrina.

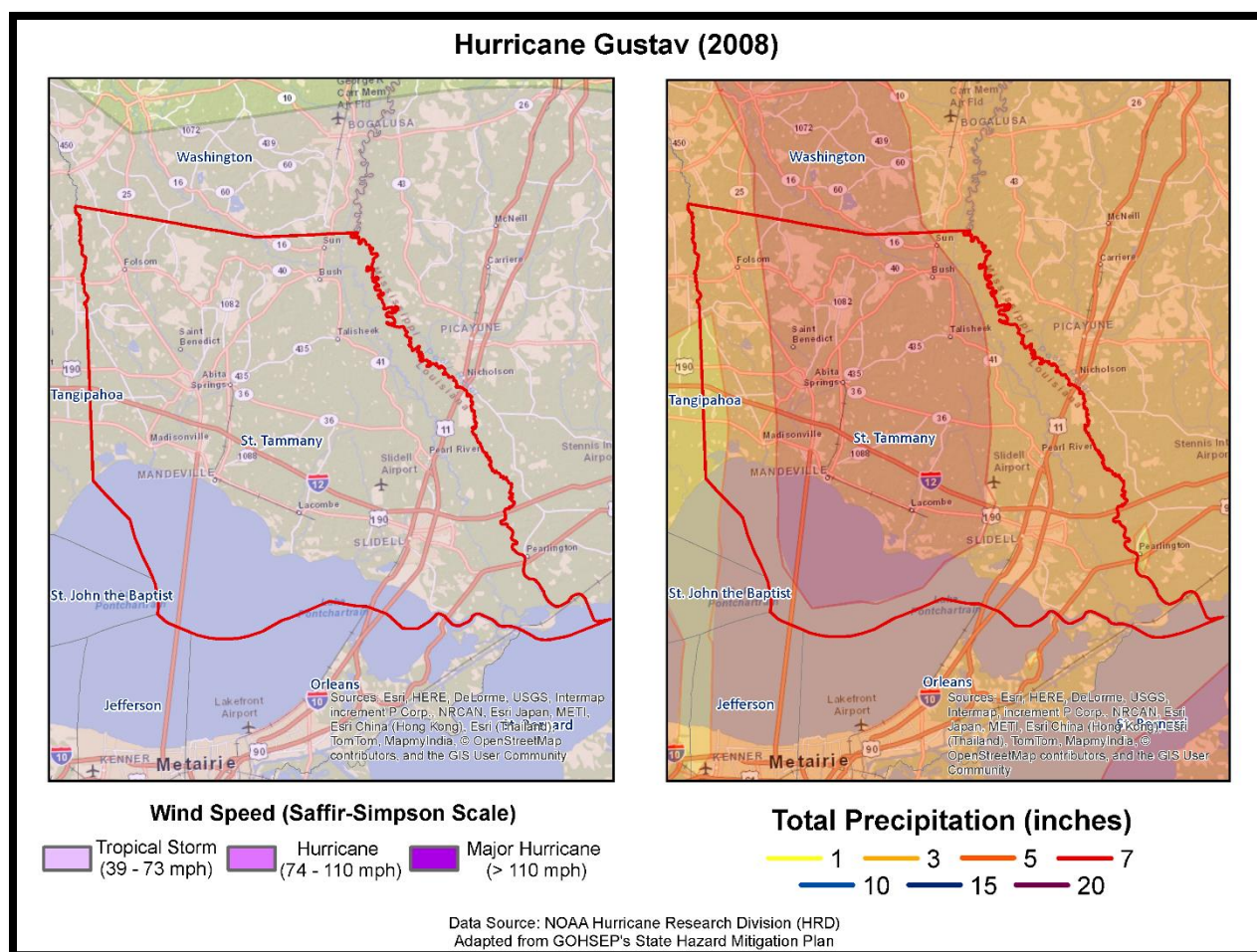


Hurricane Gustav (2008)

Hurricane Gustav emerged into the southeast Gulf of Mexico as a major category 3 hurricane on August 31st after developing in the Caribbean Sea and moving across western Cuba. Gustav tracked northwestward across the Gulf toward Louisiana and made landfall as a category 2 hurricane near Cocodrie, Louisiana during the morning of September 1st. Gustav continued to move northwest across

south Louisiana and weakened to a Category 1 storm over south central Louisiana later that day. The storm diminished to a tropical depression over northwestern Louisiana on September 2nd.

The highest wind gust recorded was 102 knots or 117 mph at a USGS site at the Houma Navigational Canal and at the Pilot Station East C-MAN at near the Southwest Pass of the Mississippi River. The highest sustained wind of 91 mph was recorded at the Pilot's Station East C-MAN site. However, due to the failure of equipment at some observation sites during the storm higher winds may have occurred. The minimum sea level pressure measured was 951.6 millibars at a USGS site at Caillou Lake southwest of Dulac and 954.5 millibars at the LUMCON facility near Dulac. Rainfall varied considerably across southeast Louisiana ranging from around 4 inches to just over 11 inches.



Gustav produced widespread wind damage across southeast Louisiana, especially in the area from Houma and Thibodaux through the greater Baton Rouge area including St. Tammany Parish. Hurricane force wind gusts occurred across the inland areas through the Baton Rouge area and surrounding parishes. A peak wind gust of 91 mph was recorded at the Baton Rouge (Ryan Field) Airport at 112 PM CST. This was only one mph less than the highest wind gust recorded during Hurricane Betsy in 1965. The electric utility serving most of southeast Louisiana reported 75 to 100 percent of utility customers were without power after the storm from Lafourche and Terrebonne Parishes northwest through the Baton Rouge area to southwest Mississippi and central Louisiana. Considerable damage occurred to many houses and

structures as large tree limbs and trees were toppled by the hurricane force winds. Preliminary estimates from the American Red Cross indicated that around 13,000 single family dwellings were damaged by the hurricane in southeast Louisiana, and several thousand more apartments and mobile homes. Early estimates from Louisiana Economic Development indicated that Gustav caused at least \$4.5 billion in property damage in Louisiana, including insured and uninsured losses.

Storm surge averaged between 6 and 7 feet across most of the Lake Pontchartrain shoreline which resulted in significant flooding along the Mandeville lakefront around Lakeshore Drive. The lower Tchefuncte River spilled over its banks causing flood waters to inundate portions of Madisonville. Approximately 45,000 customers experienced power outage in St. Tammany Parish mostly due to fallen trees that fell on power lines.

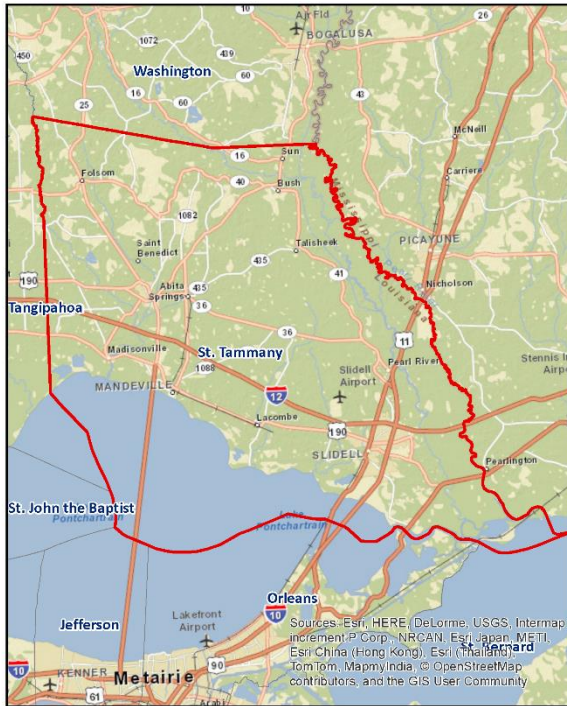
[Tropical Storm Lee \(2011\)](#)

Tropical Storm Lee initially developed as Tropical Depression Thirteen in the middle of the Gulf of Mexico on Thursday evening September 1st, 2011. The depression moved slowly north and gradually strengthened, eventually reaching tropical storm strength just south of the Louisiana coast on Friday afternoon September 2nd, 2011. Tropical Storm Lee made only slow and haltingly northward progress over the next 24 hours, eventually moving onshore the Louisiana coast Saturday night, September 3rd, 2011, with a maximum sustained wind estimated around 60 mph. Lee moved slowly inland to the north of Baton Rouge late Sunday September 4th, 2011, and eventually weakened to a tropical depression Sunday evening.

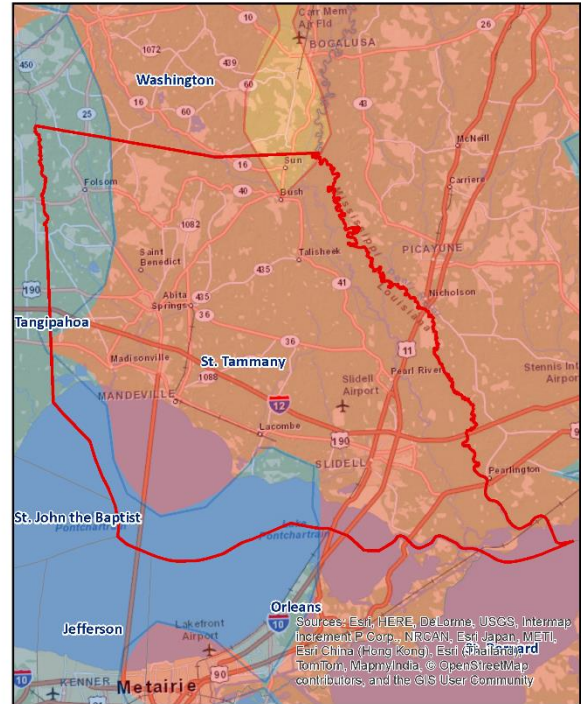
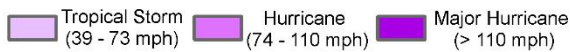
Tropical Depression Lee then moved steadily northeast throughout Monday, September 5th, 2011, taking on extra-tropical characteristics over the next 24 hours as it interacted with an upper level disturbance moving through the region. The maximum wind observed in Louisiana was a southerly wind of 40 kts (46 mph) sustained, 50 kts (58 mph) gust at New Orleans Lakefront Airport on September 4th, 2012 at 0528CST. The lowest minimum central pressure was 993.2 mb at Baton Rouge Ryan Field at Sept 4, 2012 at 0959CST. As Tropical Depression Lee was moving northeast and taking on mid-latitude characteristics, strong northerly winds were experienced across the region, occasionally gusting to higher levels than experienced when Lee was characterized as a tropical storm. No fatalities or injuries were associated with any Tropical Storm Lee hazards.

The main impacts associated with Tropical Storm Lee were associated with storm surge and rainfall. Both of these impacts were related to its slow forward speed as it crossed the region, which allowed the circulation to linger over the area for several days. Storm surge associated with Lee caused storm tides 3 to 5 feet above normal, causing lowland flooding. Additional detailed information about Tropical Storm Lee's storm surge is contained in the separate storm surge report. Four day total rainfall ranged between 7 and 15 inches across the area. A maximum of 15.48 inches was recorded near Holden in Livingston Parish. Due to dry antecedent conditions, river flooding was minimal for the amount of rainfall that occurred. Wind impacts were generally minimal due to only tropical storm strength winds being recorded, resulting in tree limbs being blown down, and weak trees toppling, causing power outages.

Tropical Storm Lee (2011)



Wind Speed (Saffir-Simpson Scale)



Total Precipitation (inches)



Data Source: NOAA Hurricane Research Division (HRD)
Adapted from GOHSEP's State Hazard Mitigation Plan

Effects from the landfall of Tropical Storm Lee were felt in different areas throughout St. Tammany Parish and its incorporated jurisdictions. According to the National Weather Service, the following statistics were recorded in association with Tropical Storm Lee:

- **Rainfall totals:** Covington – 12.33 inches, Slidell – 11.75 inches, Abita Springs – 10.41 inches, Mandeville – 9.27 inches, Sun – 7.32 inches
- **Overall synopsis:** Zero deaths or injuries; storm surge flooding in the southern portion of the parish along Lake Pontchartrain.

- Source: National Weather Service Post Tropical Cyclone Report

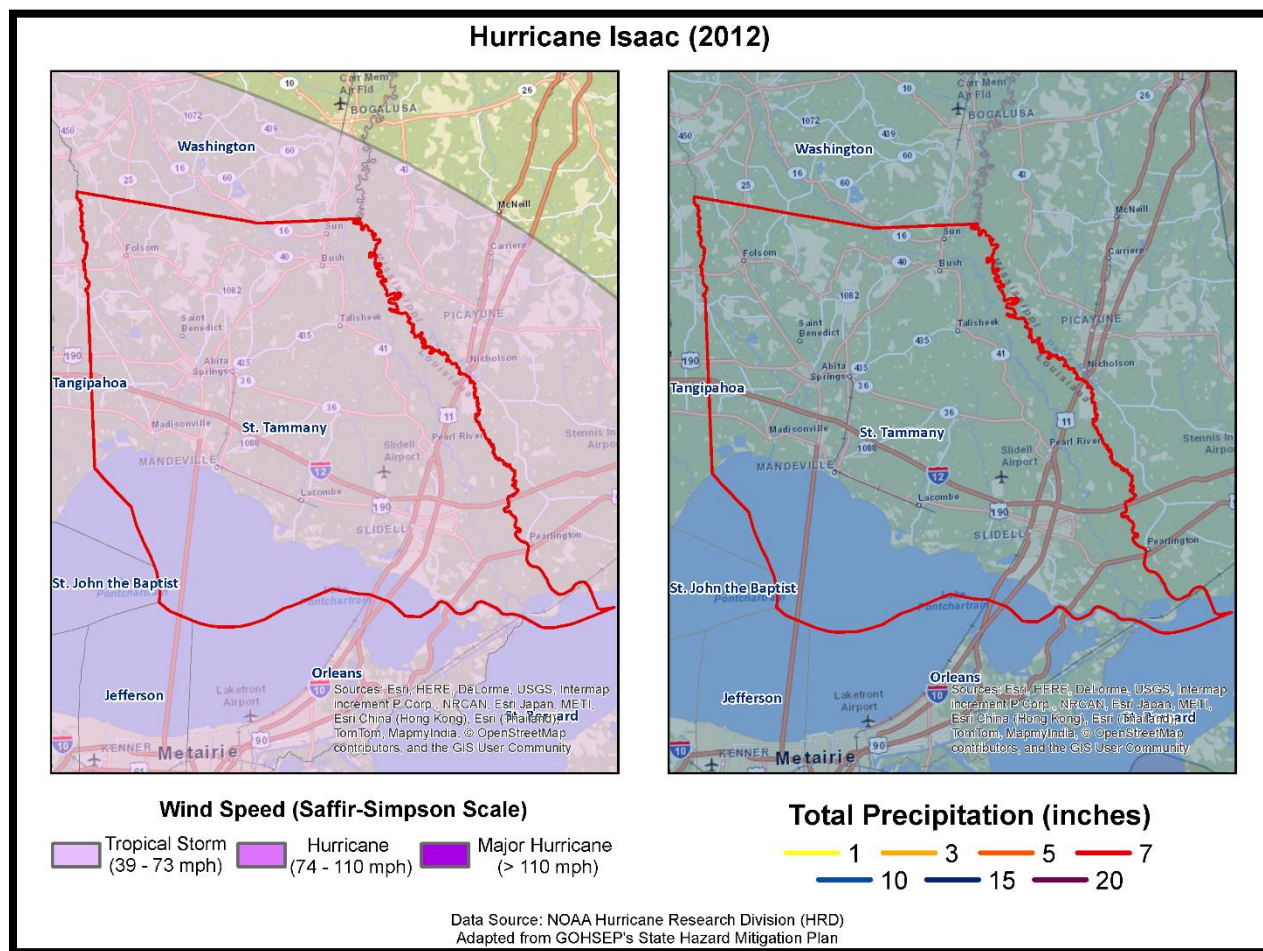
In St. Tammany Parish, overall there were minimal reports of damage to residences or infrastructure. However, with the onset of rising water, flooding was reported in the Three Rivers area of Covington, Indian Village area east of Slidell, Lakeshore Drive in Mandeville, and Palm Lake neighborhood in Slidell. Approximately 2,000 customers experienced power outages due to Tropical Storm Lee mainly in communities along the shore of Lake Pontchartrain. Most of the power outages in Slidell were along Gause Boulevard and Fremaux Avenue and in the Timbers and Woobridge subdivisions in Mandeville.

High winds knocked down several trees that prohibited travel on Donya Street and Medley Lane in Slidell, South 12th Street and St. Louis in Lacombe, and Louisiana 25 in Covington.

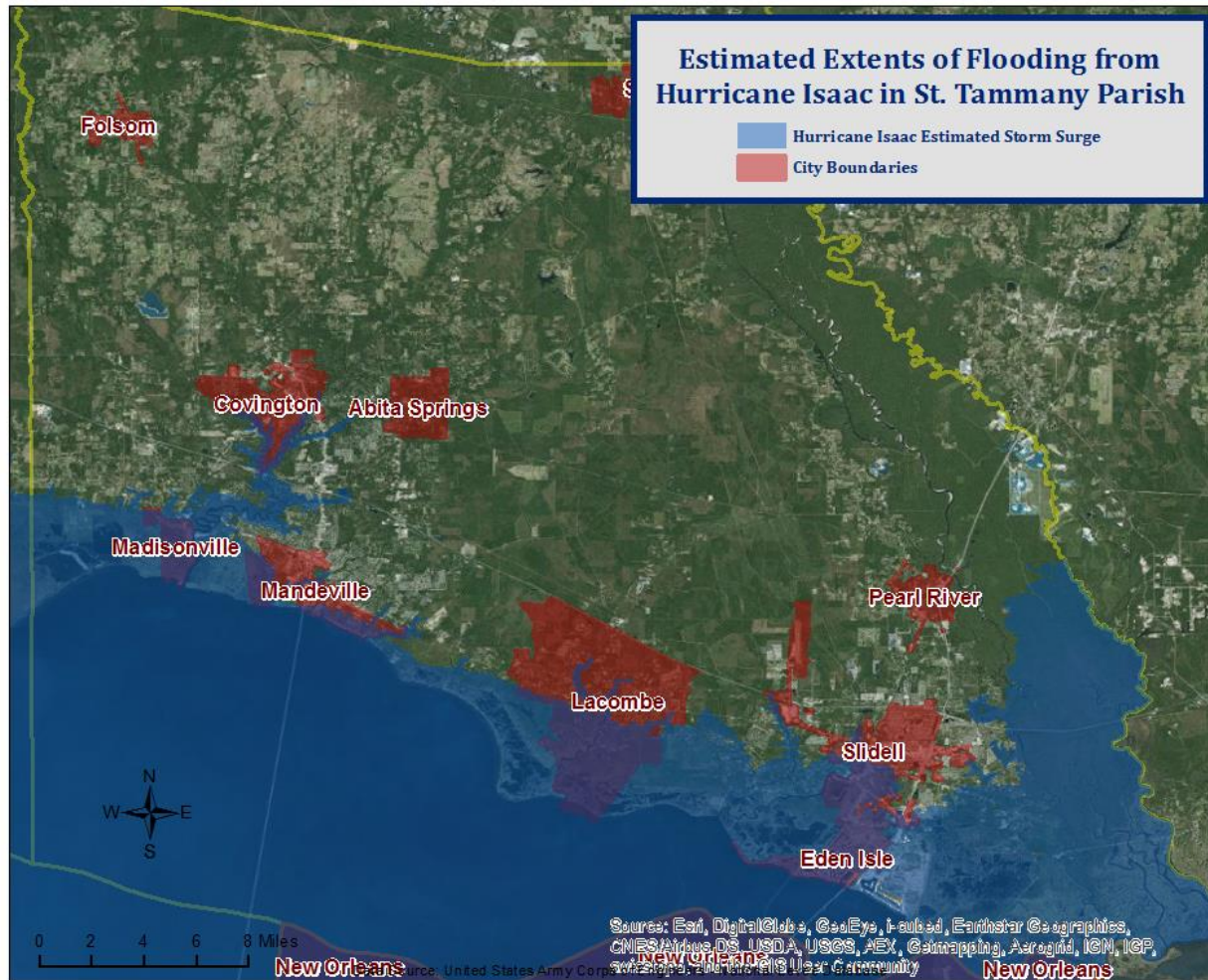
Flooding caused extensive road closures throughout St. Tammany Parish. In Slidell, Coin du Lestin, Kings Point, River Gardens, Bayou Liberty, Voters Road, and Bayou Paquet Road were all closed due to high water. Lacombe Harbor Road, Sampson Road, Barringer Road, Joe Road, and Jeron Road were closed in Lacombe. Gottschalk Road, Taulla Drive, and Monga Drive were closed in Covington. Lake Shore Drive along Lake Pontchartrain in Mandeville was inundated by flood waters when waves pushed water over the seawall.

[Hurricane Isaac \(2012\)](#)

Isaac entered the Gulf of Mexico as a tropical storm on August 26, moving northwest after crossing Haiti, Cuba and the Florida Straits. Isaac strengthened into a hurricane on the morning of the 28th when it was 75 miles south-southeast of the mouth of the Mississippi River. Isaac made landfall in Plaquemines Parish as a Category 1 Hurricane near Southwest Pass of the Mississippi River on the evening of the 28th. A second landfall occurred near Port Fourchon the following morning. The storm weakened to a tropical storm on the afternoon of the 29th about 50 miles west southwest of New Orleans, and weakened further to a tropical depression on the afternoon of the 30th near Monroe, Louisiana.



The highest wind gust recorded on land in Louisiana was 75 knots, or 86 mph, measured by a portable weather station (Texas Tech University) near Buras on the evening at August 28. The maximum sustained wind in Louisiana was 65 knots, or 75 mph, at the same portable weather station near Buras on the evening of August 28. There were several marine observations near the coast that had slightly higher wind readings, but their observation heights were generally 80 ft or higher.



feet. Five to 10 thousand homes were flooded in low lying areas of that border these lakes of the following parishes: St. Tammany, Tangipahoa, Livingston, Ascension, St James and St John the Baptist. Laplace in St. John the Baptist was especially hard hit with over 5,000 homes flooded by storm surge. An additional storm surge fatality occurred in St. Tammany Parish on the morning of the 30th when a 75 year old man drove his car into a storm surge filled ditch. Storm surge flooding also affected areas south and southwest of New Orleans with a storm tide of 4 to 7 feet. Roadways and low lying property were flooded. Local levees around Lafitte and Myrtle Grove were overtopped and/or breached resulting flooding of numerous houses and property in this area.

Many areas of southeast Louisiana received 8 to 12 inches of rain with a few locations having 15 inches of rain or more. Maximum storm total rainfall was 20.66 inches at the New Orleans Carrollton gauge on the Mississippi River. Rainfall run-off produced moderate to major flooding on the Tangipahoa, Tchefuncte,

Tickfaw, Amite, Pearl, Bogue Chitto and Bogue Falaya Rivers. Storm surge and high tides restricted outflow of the rivers near the coast and lakes exacerbating flooding in those areas.

Overall impacts of Isaac resulted in at least \$600 million in damages in southeast Louisiana, 3 direct fatalities, and 2 indirect fatalities. Storm surge flooding accounted for the bulk of damage, estimated around \$500 million and the three direct storm surge fatalities in Louisiana. Winds accounted for a much lesser amount of slightly more than a \$100 million.

In St. Tammany Parish, Isaac caused significant building damage and power outages throughout the parish. In Slidell, nearly 600 structures received significant damage as a result of Hurricane Isaac. 326 homes in Lacombe were damaged or flooded, 152 homes in Mandeville, and 99 homes in Madisonville. A reported 41,000 customers were without power with approximately 23,000 of these in the Slidell area, 10,000 in the Covington area, and the remaining 8,300 in Mandeville.

Figure 2-45 displays the wind zones that affect St. Tammany Parish in relation to critical facilities throughout the Parish.

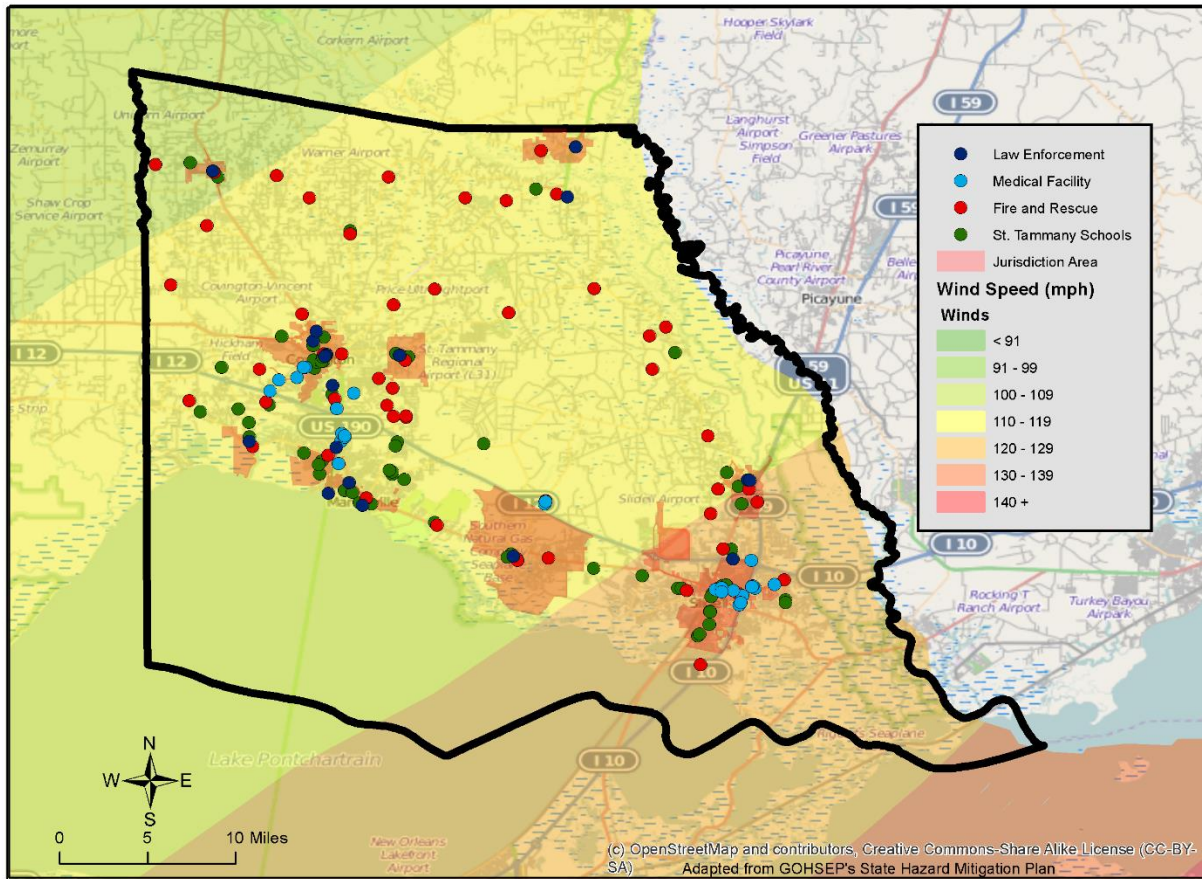


Figure 2-45: Winds zones for St. Tammany Parish in relation to critical facilities.

Frequency / Probability

Tropical cyclones are large natural hazard events that occur regularly within St. Tammany Parish. The annual chance of occurrence for a tropical cyclone occurrence is estimated at 76% for St. Tammany parish and its municipalities.

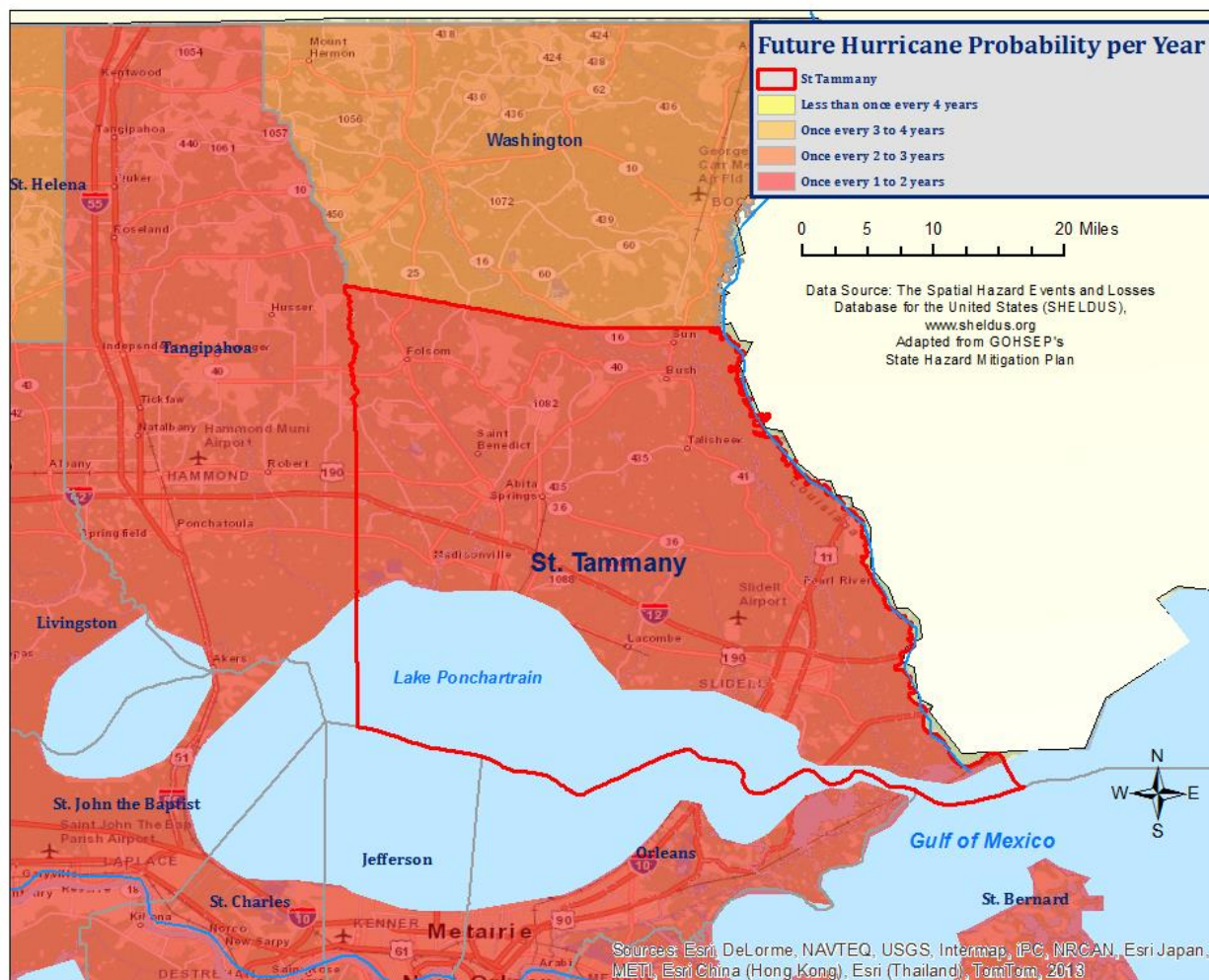


Figure 2-46: Probability of Tropical Cyclones impacting St. Tammany Parish.
(Source: State of Louisiana Hazard Mitigation Plan)

The tropical cyclone season for the Atlantic Basin is from June 1st through November 30th with most of the major hurricanes (Saffir-Simpson Categories 3,4,5) occurring between the months of August and October. Based on geographical location alone, St. Tammany Parish is highly vulnerable to tropical cyclones. This area has experienced several tropical cyclone events in the past and can expect more in the future. Based on historical record, illustrated in Figure 2-46, the probability of future occurrence of tropical cyclones in St. Tammany Parish is approximately one event every 1 to 2 years.

Estimated Potential Losses

Using Hazus-MH 100 year hurricane model, the 100 year hurricane scenario was analyzed to determine losses from this worst-case scenario. Table 2-44 shows the total economic losses that would result from this occurrence.

*Table 2-82: Total estimated losses for a 100 Year Hurricane Event.
(Source: HAZUS-MH)*

Jurisdiction	Estimated total Losses from 100 Year Hurricane Event
<i>St. Tammany Parish (Unincorporated)</i>	<i>\$855,492,737</i>
<i>Abita Springs</i>	<i>\$11,226,938</i>
<i>Covington</i>	<i>\$44,907,755</i>
<i>Folsom</i>	<i>\$3,368,083</i>
<i>Madisonville</i>	<i>\$3,368,081</i>
<i>Mandeville</i>	<i>\$56,134,694</i>
<i>Pearl River</i>	<i>\$11,226,938</i>
<i>Slidell</i>	<i>\$134,723,266</i>
<i>Sun</i>	<i>\$2,245,388</i>
<i>Total</i>	<i>\$1,122,693,880</i>

The Hazus-MH hurricane model also provides a breakdown by jurisdiction for seven primary sectors (Hazus occupancy) throughout the parish. The losses for each jurisdiction by sector are listed in the tables below.

*Table 2-83: Estimated losses in unincorporated St. Tammany Parish for a 100 year hurricane event.
(Source: HAZUS-MH)*

St. Tammany Parish (Unincorporated Areas)	Estimated total Losses from 100 Year Hurricane Event
Agricultural	\$427,746
Commercial	\$45,341,115
Government	\$1,283,239
Industrial	\$6,843,942
Religious / Non-Profit	\$3,421,971
Residential	\$793,897,260
Schools	\$4,277,464
Totals	\$855,492,737

*Table 2-84: Estimated losses in Abita Springs for a 100 year hurricane event.
(Source: HAZUS-MH)*

Abita Springs	Estimated total Losses from 100 Year Hurricane Event
Agricultural	\$5,613
Commercial	\$595,028
Government	\$16,840
Industrial	\$89,816
Religious / Non-Profit	\$44,908
Residential	\$10,418,598
Schools	\$56,135
Totals	\$11,226,938

Table 2-85: Estimated losses in Covington for a 100 year hurricane event.
(Source: HAZUS-MH)

Covington	Estimated total Losses from 100 Year Hurricane Event
Agricultural	\$22,454
Commercial	\$2,380,111
Government	\$67,362
Industrial	\$359,262
Religious / Non-Profit	\$179,631
Residential	\$41,674,397
Schools	\$224,539
Totals	\$44,907,755

Table 2-86: Estimated losses for Folsom for a 100 year hurricane event.
(Source: HAZUS-MH)

Folsom	Estimated total Losses from 100 Year Hurricane Event
Agricultural	\$1,684
Commercial	\$178,508
Government	\$5,052
Industrial	\$26,945
Religious / Non-Profit	\$13,472
Residential	\$3,125,581
Schools	\$16,840
Totals	\$3,368,083

Table 2-87: Estimated losses for Madisonville for a 100 year hurricane event.
(Source: HAZUS-MH)

Madisonville	Estimated total Losses from 100 Year Hurricane Event
Agricultural	\$1,684
Commercial	\$178,508
Government	\$5,052
Industrial	\$26,945
Religious / Non-Profit	\$13,472
Residential	\$3,125,579
Schools	\$16,840
Totals	\$3,368,081

*Table 2-88: Estimated losses for Mandeville for a 100 year hurricane event.
(Source: HAZUS-MH)*

Mandeville	Estimated total Losses from 100 Year Hurricane Event
Agricultural	\$28,067
Commercial	\$2,975,139
Government	\$84,202
Industrial	\$449,078
Religious / Non-Profit	\$224,539
Residential	\$52,092,996
Schools	\$280,673
Totals	\$56,134,694

*Table 2-89: Estimated losses for Pearl River for a 100 year hurricane event.
(Source: HAZUS-MH)*

Pearl River	Estimated total Losses from 100 Year Hurricane Event
Agricultural	\$5,613
Commercial	\$595,028
Government	\$16,840
Industrial	\$89,816
Religious / Non-Profit	\$44,908
Residential	\$10,418,598
Schools	\$56,135
Totals	\$11,226,938

*Table 2-90: Estimated losses for Slidell for a 100 year hurricane event.
(Source: HAZUS-MH)*

Slidell	Estimated total Losses from 100 Year Hurricane Event
Agricultural	\$67,362
Commercial	\$7,140,333
Government	\$202,085
Industrial	\$1,077,786
Religious / Non-Profit	\$538,893
Residential	\$125,023,191
Schools	\$673,616
Totals	\$134,723,266

Table 2-91: Estimated losses for Sun for a 100 year hurricane event.
(Source: HAZUS-MH)

Sun	Estimated total Losses from 100 Year Hurricane Event
Agricultural	\$1,123
Commercial	\$119,006
Government	\$3,368
Industrial	\$17,963
Religious / Non-Profit	\$8,982
Residential	\$2,083,720
Schools	\$11,227
Totals	\$2,245,388

Threat to People

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

Table 2-92: Number of people susceptible to a 100 year hurricane event in St. Tammany Parish.
(Source: HAZUS-MH)

Number of People Exposed to Hurricane Hazards			
Location	# in Community	# in Hazard Area	% in Hazard Area
Parish (Unincorporated)	179,542	179,542	100%
Abita Springs	2,365	2,365	100%
Covington	8,765	8,765	100%
Folsom	716	716	100%
Madisonville	748	748	100%
Mandeville	11,560	11,560	100%
Pearl River	2,506	2,506	100%
Slidell	27,068	27,068	100%
Sun	470	470	100%

The HAZUS-MH hurricane model was also extrapolated to provide an overview of vulnerable populations throughout the jurisdictions in the tables below:

*Table 2-93: Vulnerable populations in unincorporated St. Tammany Parish for a 100 year hurricane.
(Source: HAZUS-MH)*

St. Tammany Parish (Unincorporated)		
Category	Total Numbers	Percentage of People in Hazard Area
Number in Hazard Area	179,542	100%
Persons Under 5 years	10,413	5.8%
Persons Under 18 years	44,526	24.8%
Persons 65 Years and Over	25,854	14.4%
White	151,533	84.4%
Minority	28,009	15.6%

*Table 2-94: Vulnerable populations in Abita Springs for a 100 year hurricane.
(Source: HAZUS-MH)*

Abita Springs		
Category	Total Numbers	Percentage of People in Hazard Area
Number in Hazard Area	2,365	100%
Persons Under 5 years	143	6%
Persons Under 18 years	555	23.5%
Persons 65 Years and Over	311	13.2%
White	2,176	92.1%
Minority	189	7.9%

*Table 2-95: Vulnerable populations in Covington for a 100 year hurricane.
(Source: HAZUS-MH)*

Covington		
Category	Total Numbers	Percentage of People in Hazard Area
Number in Hazard Area	8,765	100%
Persons Under 5 years	554	6.3%
Persons Under 18 years	2095	23.9%
Persons 65 Years and Over	1,311	14.9%
White	6,816	77.8%
Minority	1949	22.2%

*Table 2-96: Vulnerable populations in Folsom for a 100 year hurricane.
(Source: HAZUS-MH)*

Folsom		
Category	Total Numbers	Percentage of People in Hazard Area
Number in Hazard Area	716	100%
Persons Under 5 years	60	8.4%
Persons Under 18 years	166	23.2%
Persons 65 Years and Over	89	12.4%
White	526	73.5%
Minority	190	26.5%

*Table 2-97: Vulnerable populations in Madisonville for a 100 year hurricane.
(Source: HAZUS-MH)*

Madisonville		
Category	Total Numbers	Percentage of People in Hazard Area
Number in Hazard Area	748	100%
Persons Under 5 years	48	6.4%
Persons Under 18 years	164	21.9%
Persons 65 Years and Over	111	14.8%
White	650	86.9%
Minority	98	13.1%

*Table 2-98: Vulnerable populations in Mandeville for a 100 year hurricane.
(Source: HAZUS-MH)*

Mandeville		
Category	Total Numbers	Percentage of People in Hazard Area
Number in Hazard Area	11,560	100%594
Persons Under 5 years	594	5.1%
Persons Under 18 years	2,862	24.8%
Persons 65 Years and Over	1,868	16.2%
White	10,468	90.6%
Minority	1,092	9.4%

Table 2-99: Vulnerable populations in Pearl River for a 100 year hurricane.

(Source: HAZUS-MH)

Pearl River		
Category	Total Numbers	Percentage of People in Hazard Area
Number in Hazard Area	2,506	100%
Persons Under 5 years	178	7.1%
Persons Under 18 years	602	24%
Persons 65 Years and Over	340	13.6%
White	2,333	93.1%
Minority	173	6.9%

Table 2-100: Vulnerable populations in Slidell for a 100 year hurricane.

(Source: HAZUS-MH)

Slidell		
Category	Total Numbers	Percentage of People in Hazard Area
Number in Hazard Area	27,068	100%
Persons Under 5 years	1,909	7.1%
Persons Under 18 years	6,895	25.5%
Persons 65 Years and Over	3,785	13.9%
White	20,559	76%
Minority	6,509	24%

Table 2-101: Vulnerable populations in Sun for a 100 year hurricane.

(Source: HAZUS-MH)

Sun		
Category	Total Numbers	Percentage of People in Hazard Area
Number in Hazard Area	470	100%
Persons Under 5 years	21	4.5%
Persons Under 18 years	111	23.6%
Persons 65 Years and Over	58	12.3%
White	390	82.9%
Minority	80	17.1%

Vulnerability

See Appendix C-1 to C-2 for parish and municipality buildings that are susceptible to hurricanes.

Wildfire

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

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

According to the State of Louisiana Forestry Division, most forest fires in Louisiana are caused by intentional acts (arson) or carelessness and negligence committed by people, exacerbated by human confrontation with nature. The wildland–urban interface is the area in which development meets wildland vegetation, where both vegetation and the built environment provide fuel for fires. As development near wildland settings continues, more people and property are exposed to wildfire danger. Figure 2-49 displays the areas of wildland-urban interaction in St. Tammany Parish.

Location

Wildfires impact areas that are populated with forests and grasslands. Because every jurisdictional area in St. Tammany Parish has some form of wildland-urban interface or wildland-urban intermix, the entire planning area is equally at risk for wildfires.

Previous Occurrences / Extents

Both the SHELUS and National Climatic Data Center report no wildfire events occurring within the boundaries of St. Tammany Parish between the years of 1960 – 2014. The United States Fire Service's Active Fire Mapping Program estimates 336 wildfire events have occurred within the boundaries of St. Tammany Parish between the years 2001 – 2014. This discrepancy between the different databases is attributed to SHELUS and NCDC only recording events that cause damage to crops and property, or injuries and deaths. Based on the Southern Group of State Foresters Risk Assessment Portal, all jurisdictions within St. Tammany Parish are considered to be in a High Risk Intensity area. Based on the definition of a High Risk Intensity Area, residents can expect large flames up to 30 feet in length.

Frequency / Probability

Wildfire events are a frequent occurrence within the boundaries of St. Tammany Parish with an annual chance of occurrence calculated at 100% based on the United States Fire Service's Active Fire Mapping Program data. Because there has been no reported event that has caused damage to property, crops, or life, the State Hazard Mitigation Plan accesses the overall probability of a significant wildfire event occurring within St. Tammany Parish as less than once every 100 years.

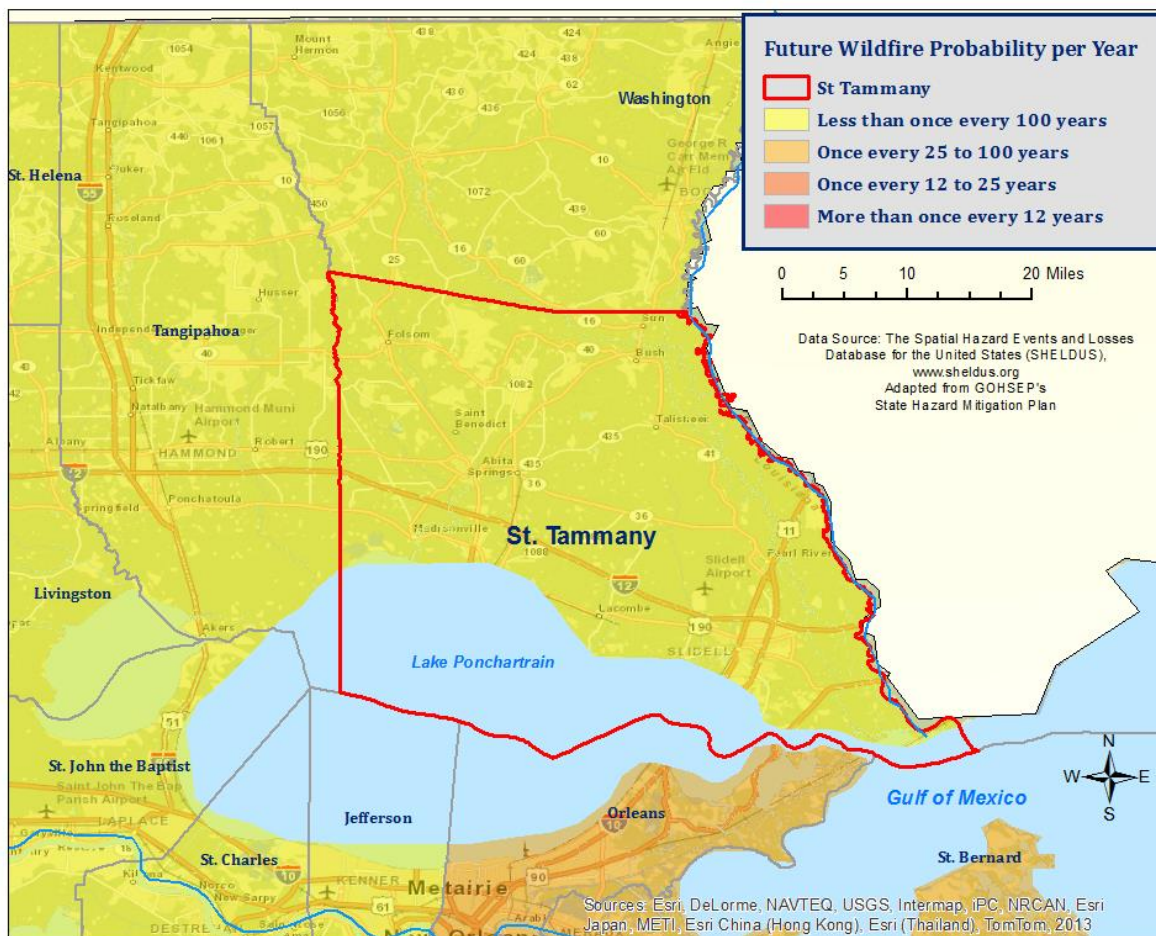


Figure 2-47: Probability of wildfire events in St. Tammany and adjacent parishes based on data from 1987-2012. (Source: State of Louisiana Hazard Mitigation Plan)

Estimated Potential Losses

According to the SHELDES database, there have been no wildfire events that have caused property damage, crop damage, injuries, or fatalities in St. Tammany Parish. In accessing the overall risk to population, the most vulnerable population throughout the parish consists of those residing in areas of wildland-urban interaction. Figure 2-49 displays the areas of wildland-urban interaction in St. Tammany Parish.

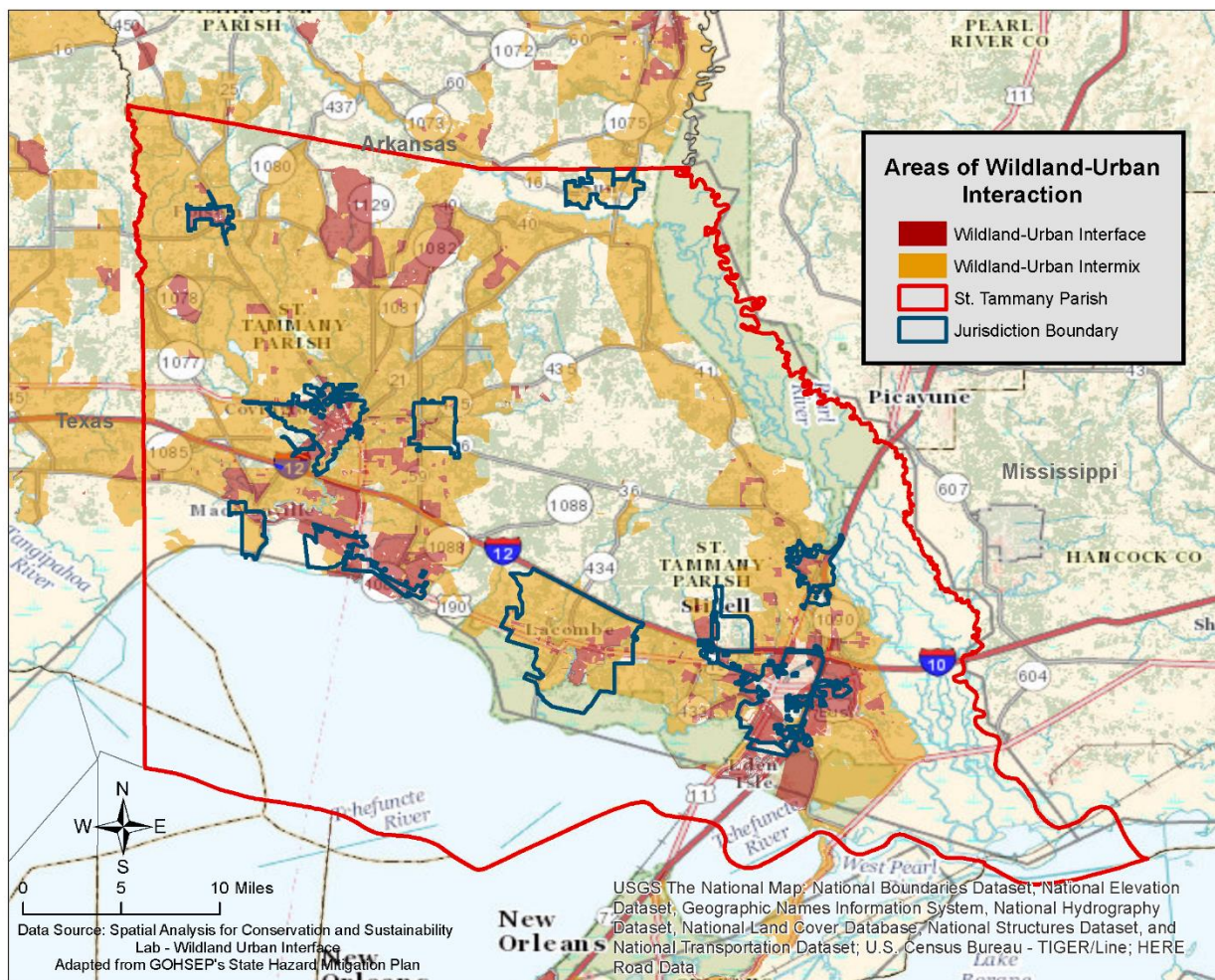


Figure 2-48: Wildland-Urban Interaction in St. Tammany Parish

Vulnerability

See Appendix C-1 to C-2 for parish and municipality facilities that could potentially be exposed to a wildfire hazard. Buildings were determined based on whether or not they fall within the wildfire-urban interface and/or intermix.

3 Capability Assessment

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

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

Policies, Plans and Programs

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

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

Building Codes, Permitting, Land Use Planning and Ordinances

As of the 2015 Update St Tammany Parish and its jurisdictions ensures that all building codes adopted are enforced and in compliance relating to the construction of any within the boundaries of the parish. The St Tammany Code of Ordinances, Appendix D Building code¹ outlines the administration and enforcement of any construction which occurs, or will occur, within the parish. Permitting and inspections capabilities in place within the Parish and its incorporated jurisdictions are also addressed in the Code of Ordinances. Some examples of leveraging these capabilities within the parish are seen above in table 1.

While local capabilities for mitigation can vary from community to community, St Tammany Parish as a whole has 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

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

Administration and Technical								
	Abita Springs	Slidell	Mandeville	Madisonville	Sun	Folsom	Covington	Pearl River
Administration	Yes / No							
Planning Commission	Y	Y	Y	Y	N	N	Y	N
Mitigation Planning Committee	Y	N	N	N	Y	Y	N	Y
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	Y	Y	Y	Y	N	N	Y	N
Staff	Yes / No; FT/PT; % Hazard Mitigation							
Chief Building Official	Y/PT	Y	Y/FT/40	Y	N	N	Y/50	N
Floodplain Administrator	Y/FT	Y	Y/FT/40	Y	N	N	Y	N
Emergency Manager	Y/PT	Y	Y/FT	N	N	N	N	N
Community Planner	Y/FT	Y	Y/FT/20	N	N	N	Y/1	N
Civil Engineer	Y/PT	Y	Y/FT/40	Y	N	N	Y/5	N
GIS Coordinator	N/A	Y	Y/FT/20	N	N	N	Y/5	N
Grant Writer	Y/PT	N	Y/FT	Y	Y	N	Y/3-5	N
Technical	Yes / No							
Warning Systems / Service (Reverse 911, outdoor warning signals)	Y	Partial	Y	Y	Y	Y	Y	Y
Hazard Data & Information	Y	Y	Y	N	N	N	N	N
Grant Writing	Y	Y	Y	N	Y	N	Y	N
Hazus Analysis	Y	Y	Y	N	N	N	N	N

¹ [http://www.stpgov.org/files/Development-%20Permits/Building_Code_Of_St__Tammany_\(1\).pdf](http://www.stpgov.org/files/Development-%20Permits/Building_Code_Of_St__Tammany_(1).pdf)

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

The follow resources are available to fund mitigation actions in St Tammany Parish and its jurisdictions:

Financial												
	Abia Springs		Siddell		Mandeville		Madisonville		Sun	Folsom	Covington	Pearl River
Funding Resource	Yes / No											
Capital Improvements project funding	Y	Y	Y	N	N	N	N	Y	N			
Authority to levy taxes for specific purposes	N	Y	Y	N	N	N	N	N	N			
Fees for water, sewer, gas, or electric services	Y	Y	Y	Y	Y	Y	Y	N	Y			
Impact fees for new development	Y	N	Y	Y	N	N	N	N	N			
Stormwater Utility Fee	N	N	Y	N	N	N	N	N	N			
Community Development Block Grant (CDBG)	Y	Y	Y	N	Y	N	N	N	N			
Other Funding Programs	Y	Y	Y	N	Y	N	Y	Y	N			

Education and Outreach

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

St Tammany Parish and its jurisdictions have 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:

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

In some cases, the jurisdictions rely on St Tammany Parish OHSEP and/or St Tammany Parish Government Agencies for the above listed planning and regulatory, Administrative and Technical, Financial, and Education and Outreach Capabilities. Comments regarding the jurisdictions utilization or intentions to utilize and leverage the capabilities of the parish government can be found in Appendix E in the jurisdictional specific worksheets.

As reflected with above existing regulatory mechanisms, programs and resources within each jurisdiction, St Tammany Parish and each jurisdiction remains committed to expanding and improving on the existing capabilities within the parish. Each participating jurisdiction will work toward increased participation in funding opportunities and available mitigation programs. Should funding become available, the hiring of additional personnel to dedicate to Hazard Mitigation initiatives and programs, as well as increasing ordinances within the jurisdictions will all enhance and expand risk reduction measures within the parish.

With the sharing of these capabilities, the following municipalities and entities are recognized by the Parish of St Tammany under the Hazard Mitigation Plan allowing them to apply for available hazard mitigation funding for as long as these municipalities and entities notify the Parish of their intentions and the Parish concurs.

- St Tammany Parish
- City of Covington
- City of Mandeville
- City of Slidell
- Town of Abita Springs
- Town of Madisonville
- Town of Pearl River
- Village of Folsom
- Village of Sun

Flood Insurance and Community Rating System

St Tammany Parish is a participant in the Community Rating System (CRS). Maintaining and improving the CRS rating for the Parish and participating jurisdictions is recognized as a high priority by the Hazard Mitigation Steering Committee with the addition of a new goal directly relating to CRS. Participation in the CRS strengthens local capabilities by lowering flood insurance premiums for jurisdictions that exceed NFIP minimum requirements.

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 Table). 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.			

* In determining CRS Premium Discounts, all AR and A99 Zones are treated as non-SFHAs.

During the last update, Thirty-eight Louisiana communities participate, including Slidell (class 8), Mandeville (class 7), and St. Tammany Parish (class 9). Mandeville, Shreveport, and Jefferson and East Baton Rouge Parishes had the best classifications in the state, Class 7. As of the 2015 update, Jefferson Parish, East Baton Rouge and Terrebonne all lead the state with best classifications, Class 6.

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

As of May 2012, 310 communities in the State of Louisiana participate in the Federal Emergency Management Agency's National Flood Insurance Program (NFIP). Of these communities, 41 (or 13%) participate in the Community Rating System (CRS). Of the top 50 Louisiana communities, in terms of total Flood Insurance policies held by residents, 27 participate in the CRS. The remaining 23 communities present an outreach opportunity for encouraging participation in the CRS. In St Tammany Parish, the following communities participate; including Mandeville (class 7), Slidell (class 7), and St Tammany Parish (class 7).

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.

Community	Number of Flood Insurance Policies	CRS Class
St Tammany Parish	35,736	7
Mandeville	3,063	7
Slidell	8,062	7

First, the Parish will receive CRS credit for this Plan when it is adopted. To retain that credit, though, the Parish must submit an evaluation report on progress toward implementing this Plan to FEMA by October 1 of each year. That report must be made available to the media and the public.

Second, the Parish must annually recertify to FEMA that it is continuing to implement its CRS credited activities. Failure to maintain the same level of involvement in flood protection can result in a loss of CRS credit points and a resulting increase in flood insurance rates to residents.

In 2011², the National Flood Insurance Program (NFIP) completed a comprehensive review of the Community Rating System (CRS) that will result in the release of a new CRS Coordinator's Manual.

The changes to the 2013 CRS Coordinator's Manual are the result of a multi-year program evaluation that included input from a broad group of contributors to evaluate the CRS and refine the program to meet its stated goals.

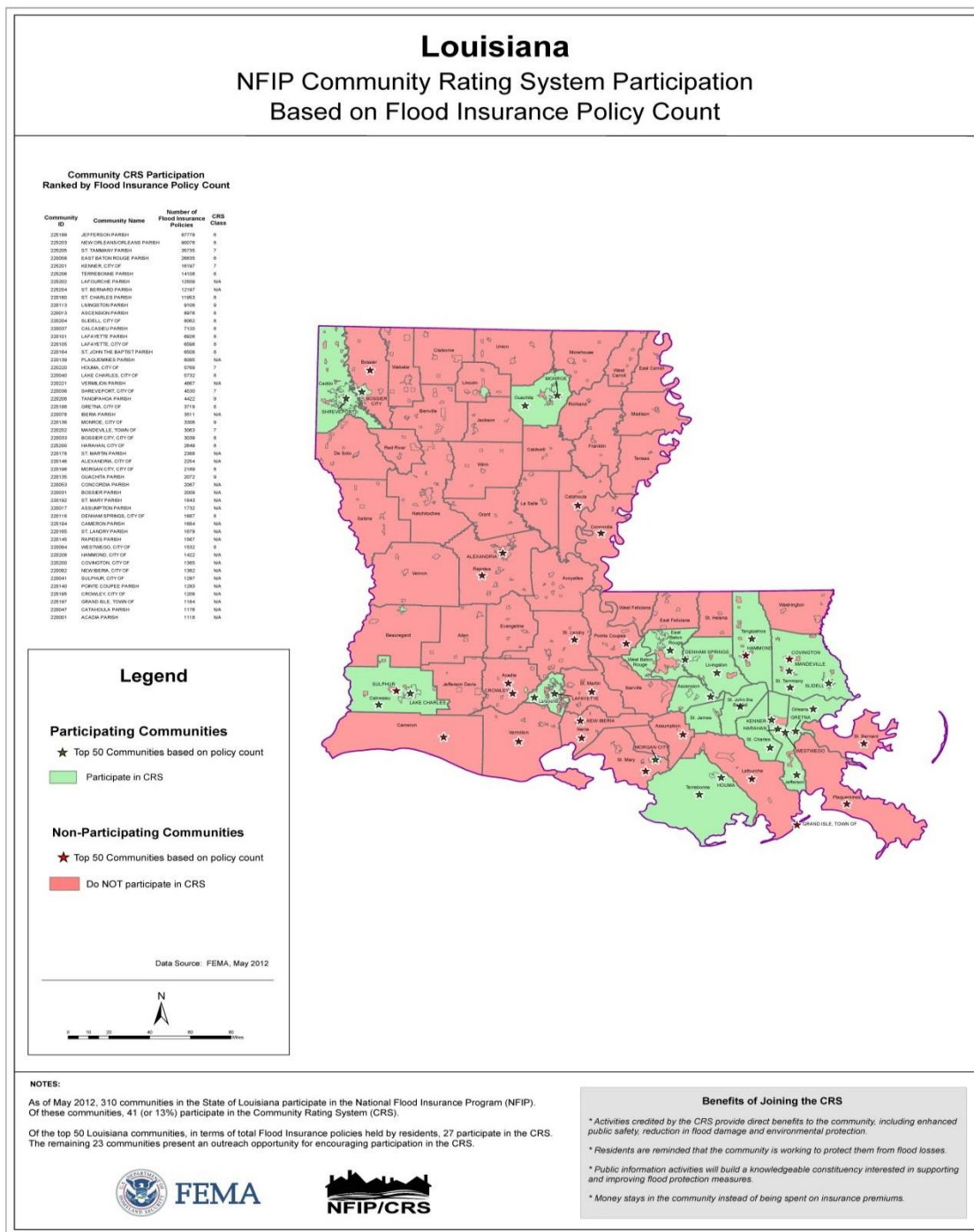
The upcoming changes will drive new achievements in the following six core flood loss reduction areas important to the NFIP: (1) reduce liabilities to the NFIP Fund; (2) improve disaster resiliency and sustainability of communities; (3) integrate a Whole Community approach to addressing emergency management; (4) promote natural and beneficial functions of floodplains; (5) increase understanding of risk, and; (6) strengthen adoption and enforcement of disaster-resistant building codes.

The 2013 CRS Coordinator's Manual changes will impact each CRS community differently. Some communities will see an increase in the points they receive since points for certain activities have increased (e.g., Activity 420 Open Space Preservation). Other communities will receive fewer points for certain activities (e.g., Activity 320 Map Information Service). It is likely that some communities with marginal CRS Class 9 programs will have to identify new CRS credits in order to remain in the CRS.

Typically, CRS communities do not request credit for all the activities they are currently implementing unless it would earn enough credit to advance the community to a higher CRS Class. A community that finds itself losing CRS credit with the 2013 Manual could likely identify activities deserving credit they had not previously received.

Due to the changes in both activities and CRS points, community CRS coordinators should speak with their ISO/CRS Specialist to understand how the 2013 Manual will impact their community and when.

² <https://www.fema.gov/national-flood-insurance-program-community-rating-system>



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

³ http://www.fema.gov/media-library-data/20130726-2128-31471-9581/ks_ky_la_crs_may_2012_508.zip

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; and
 - 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.
4. Technical assistance in designing and implementing a number of activities is available at no charge from the Insurance Services Office.
5. The public information activities will build a knowledgeable constituency interested in supporting and improving flood protection measures.
6. A community would have an added incentive to maintain its flood programs over the years. The fact that its CRS status could be affected by the elimination of a flood related activity or a weakening of the regulatory requirements for new developments would be taken into account by the governing board when considering such actions.
7. Every time residents pay their insurance premiums, they are reminded that the community is working to protect them from flood losses, even during dry years.

**More information on the Community Rating System can be found at www.fema.gov/nfip/crs.shtm

NFIP Worksheets

Parish and Participating Jurisdiction NFIP worksheets can be found in Appendix E: State Required Worksheets

4 Mitigation Strategy

Introduction

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

An online public opinion survey was conducted of St Tammany Parish residents between August and October 2014. The 25 question survey was completed by 140 parish residents over the age of 18.

The survey was designed to capture public perceptions and opinions regarding natural hazards in St Tammany Parish. In addition, the survey collected information regarding the methods and techniques preferred by the respondents for reducing the risks and losses associated with local hazards.

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

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

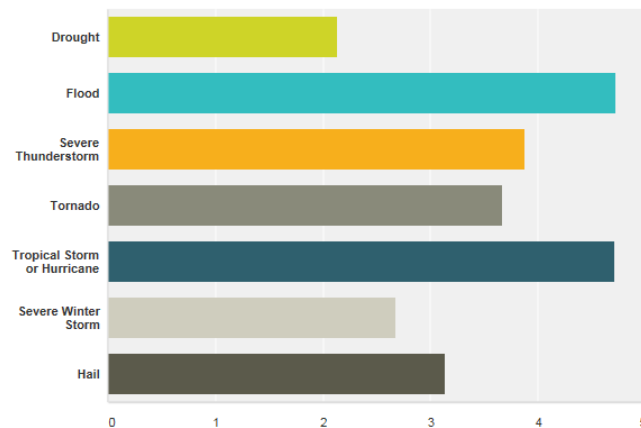
	1	2	3	4	5	6	Total	Score
Human (Loss of life and/or injuries)	46.15% 48	19.23% 20	8.65% 9	10.58% 11	9.62% 10	5.77% 6	104	4.64
Economic (Business closures and/or job losses)	16.35% 17	29.81% 31	20.19% 21	22.12% 23	9.62% 10	1.92% 2	104	4.15
Infrastructure (Damage or loss of bridges, utilities, schools, etc.)	21.15% 22	25.96% 27	33.65% 35	13.46% 14	2.88% 3	2.88% 3	104	4.40
Cultural/Historic (Damage or loss of libraries, museums, historic sites)	2.88% 3	6.73% 7	7.69% 8	33.65% 35	19.23% 20	29.81% 31	104	2.51
Environmental (Damage or loss of forests, pastureland, waterways, etc.)	10.58% 11	4.81% 5	12.50% 13	15.38% 16	44.23% 46	12.50% 13	104	2.85
Governance (Ability to maintain order and/or provide public amenities and services)	2.88% 3	13.46% 14	17.31% 18	4.81% 5	14.42% 15	47.12% 49	104	2.44

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

1. Hurricane
2. Flood
3. Severe thunderstorms

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

Answered: 128 Skipped: 12

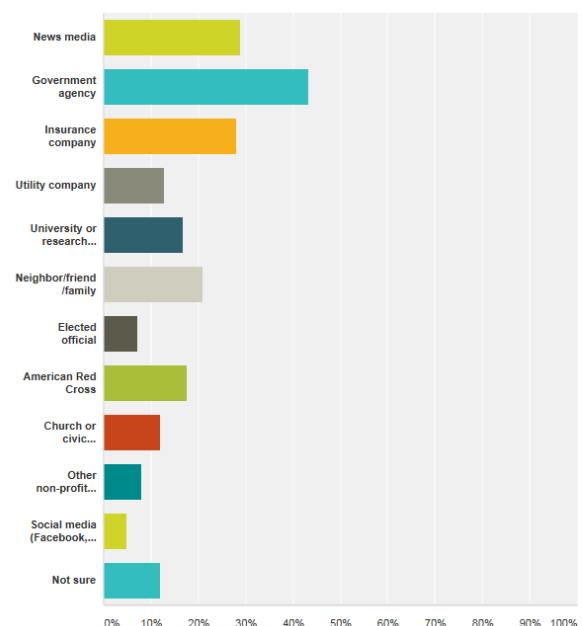


The online survey also showed a level of trust in the parish government for disaster related issues, further highlighting the collaborative relationship between citizen and government agencies. This indicated that the strategies and actions being implemented within the communities is trusted and important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

St Tammany Parish revised the goals, objectives, actions and projects over the period of the hazard mitigation plan update process. The mitigation actions and projects in this 2015 HMP update are a product of analysis and review of the St Tammany Parish Hazard Mitigation Plan Steering Committee under the coordination of the St Tammany Parish Office of Homeland Security and Emergency Preparedness. The Committee was presented a list of projects and actions, new and from the 2009 plan, for review From September 2014 - December 2014.

Whom would you MOST TRUST to provide you with information about how to make your household and home safer from natural disasters? (Check up to three answers)

Answered: 125 Skipped: 15



During the series of public meetings in September the committee and participating jurisdictions provided a status of the projects from 2009 and the proposed actions for the 2015 update. Breakout forums were provided for citizens to discuss each project with subject matter experts from the Parish.

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

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

<https://www.surveymonkey.com/results/SM-3P7XXXGV/>

The goals represent the guidelines 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 Tammany 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 Tammany Parish and its jurisdictions can make progress toward reducing identified risks.

For the purposes of this Plan Update, goals and action items are defined as follows:

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

Goals

The current goals of the St Tammany Parish Hazard Mitigation Plan Update steering committee represent long-term commitments by the parish and its jurisdictions. After assessing these goals, the committee decided that the current six goals remain valid and agreed to the addition of a seventh goal.

The goals are as follows:

Goal 1: Protect the lives and health of the Parish's residents from the dangers of natural hazards

Goal 2: Ensure that public services and critical facilities operate during and after a disaster

Goal 3: Ensure that adequate evacuation routes, streets, utilities and public and emergency communications are maintained and available during and after a disaster

Goal 4: Protect homes and businesses from damage

Goal 5: Use new infrastructure and development planning to reduce the impact of natural hazards

Goal 6: Give special attention to repetitively flooded areas

Goal 7: Maintain and improve CRS ratings throughout the parish

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

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

2015 Mitigation Actions and Update on Previous Plan Actions

The St Tammany Parish Hazard Mitigation Plan Steering Committee and participating jurisdictions each identified actions that would reduce and/or prevent future damage within St Tammany Parish and their respective communities. In that effort, each jurisdiction focused on a comprehensive range of specific mitigation actions. These actions were identified in thorough fashion by the consultant team, the committee and the individual jurisdictions by way of frequent and open communications and meetings held throughout the planning process.

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

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

The established and agreed upon parish and jurisdiction actions relative to the parish-wide goals are below. Additionally, action updates from the previous plan updates can be found at bottom of each table.

Table 1 - Mitigation Actions for Unincorporated St Tammany Parish

St Tammany Unincorporated

Mitigation Actions for St Tammany Unincorporated							
Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
STP1: Eddins Canal	Improve storm water conveyance in Eddins Canal, improving subsurface conveyance within the subdivision to Eddins Canal and adding an outfall at Heather Drive to the W15 Channel.	FEMA/HMPG	9/28/2016	St Tammany Parish/ Department of Engineering	Flooding, Tropical Cyclone	1,2,4,6,7	New
STP2: Cloverland Drainage	Improve drainage of Tag-a-long Creek in the Cloverland Acres Subdivision area. Will require acquisition and clearing of land to develop an overflow canal.	FEMA/HMPG	Phase 1 Complete, 1-5 years	St Tammany Parish/ Department of Engineering	Tropical Cyclone, Flooding	1,4,6	New
STP3: Bayou Chinchuba Detention Pond Retrofit	Retrofitting the existing Bayou Chinchuba pond to increase water quality function.	FEMA/HMPG	1-5 years	St Tammany Parish/ Department of Engineering	Tropical Cyclone, Flooding	1,2	New
STP4: Safe Room Project	The project will include design and construction for Multi-use Facility and Safe Room.	FEMA/HMPG	1-3 years	St Tammany Parish/ Facilities Management	Tornado, wind	1,2,3	New
STP5: Elevation of Severe Repetitive Loss and Repetitive Loss Structures	Currently there are 3,213 properties listed on FEMA's SRL/RL list Properties will be prioritized based on the SRL / RL.	FEMA HMPG	Ongoing	St Tammany Parish/ Grant Department	Tropical Cyclone, Flooding	1,4,6,7	New

Mitigation Actions for St Tammany Unincorporated

Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
STP6-STP17: South Slidell Levee System Projects	STP6: Segment 1L, STP7: Segment 05, STP8: Segment 06, STP9: Segment 07, STP10: Segment 08, STP11: Segment 09, STP12: Segment 10, STP13: Segment 11, STP14: Segment 12, STP15: Segment 13, STP16: Segment 14, STP17: Segment 15. The benefit is to provide 100 year flood protection for a large portion of the Parish and Slidell area, greatly reducing property flood loss as well as injuries and deaths.	Federal, State, Local, Capital Outlay	1-5 years	St Tammany Parish	Tropical Cyclone, Flooding, levee failure	1,2,3,4,5,6,7	New
STP18: Schnieder Canal – SE1LA	The proposed project includes both levee and pumping capacity improvements. This project will provide flood protection.	FEMA, USACE, State, Local	1-5 years	St Tammany Parish/ Department of Engineering	Tropical Cyclone, Flooding, Levee Failure	1,4,6,7	New
STP19 East St Tammany Storm Protection	Project will mitigate the damage caused by the construction of the south Slidell Schneider Canal Levee; it will extend storm surge protection to the communities south of the Schneider Canal levee including the community of Eden Isle with over 7,000 residents.	FEMA HMPG, Other Federal Funds	1-10 years	St Tammany Parish	Tropical Cyclone, Flooding	1,4,7	New
STP20 FEMA/LAMP DFIRM	The STP LAMP program will collaborate with FEMA to characterize the levee reaches in the parish, gather all available data, determine additional data needs that are critical for certification, and procure data.	Federal, State, Local	Mid 2015	St Tammany Parish	Tropical Cyclone, Flooding, levee failure	1,5	New

Mitigation Actions for St Tammany Unincorporated

Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
STP21: W-14 Canal - SELA	Design and construction of the Initial Robert Boulevard Detention Pond, West Diversion Detention Pond and Channel Improvements.	FEMA, USACE, State, Local	1-5 years	St Tammany Parish/ Department of Engineering	Tropical Cyclone, Flooding	1,4,6	New
STP22: Hardening of Critical Facilities	Identify and hardening of Critical Facilities	FEMA, HMPG	1-5 years	St Tammany Parish	Tropical Cyclone, wind, hail, tornado	1,2,3,	New
STP23: Acquisition	Give special attention to repetitively flooded areas or areas susceptible to other hazards by Identification and acquisition of land and/or properties to mitigate against future damages, lives and property lost.	FEMA, HMPG	1-5 years	St Tammany Parish	Coastal Erosion, Dam Failure, Levee Failure, Flooding, Tropical Cyclone, Wildfire, Termites	1,3,4,5,6	New
STP24: Storm Water Detention Ponds	Ponds will remove a portion of the storm water runoff from the channels, thus reducing peak flows. Locations: Abita River, Big Branch, Bayou Bonfouca, Bayou Lacomb_LA 434, Belair North, Belair South, East Fork Little Bogue Falaya, Little Bogue Falaya, La Tice, Robert Road, Upper Tchefuncte, Venchy Branch, W-14_West Diversion East	FEMA, State, Local	1-5 years	St Tammany Parish	Tropical Cyclone, Flooding	1,2,7	New

Mitigation Actions for St Tammany Unincorporated

Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
STP25: Wastewater Subdivision Project	285 unsewered neighborhoods throughout the Parish (by drainage basin). Requires Installation of a gravity sewer collection system and pump station in each neighborhood	FEMA, EPA, State, Local	1-5 years	St Tammany Parish/ Department of Engineering	Flooding	1,2	New
STP26: Oak Harbor Elevation	Raise Oak Harbor Blvd where it goes over the levee near HWY 11. Currently the road height is lower than the adjacent levee and doesn't meet current USACE design standards for a road crossing a levee.	Local	Feb 2015 - TBD	St Tammany Parish	Flooding, Tropical Cyclone	1,2,3,4	New
STP27: HWY 11 Road Raising	HWY 11 will be raised from the current elevation of 9' to an elevation of 18' at the crest.	DOTD, Local	1-5 years	St Tammany Parish	Flooding, Tropical Cyclone	1,2,3,4	New
STP28: Lower W15 Area Drainage	Provide localized improvements by improving channel conveyance and widening of the existing W-15 main canal and placing storage within the Basin to lower the tail water condition placed on the Lower W15 subdivisions	FEMA/HMPG	Present – 9/1/2016	St Tammany Parish/ Department of Engineering	Flooding	1,2,3,4,6,7	New
STP29: HMPG Lift Stations Upgrades and Elevations	Elevation of 10 electrical control panel boxes located in flood prone areas to prevent disruption of operation due to inundation.	FEMA/HMPG	Ongoing; 1-5 years	St Tammany Parish/ Department of Engineering	Flooding, Tropical Cyclone	6	Carried Over

Mitigation Actions for St Tammany Unincorporated

Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
STP30: Coastal MP St Tammany Shore	The West St. Tammany Shoreline Protection project is a 24,773 linear foot project. The goal of this project is the restoration of 15,677 feet of shoreline and the protection of 9106 feet shoreline.	FEMA, CPRA, EPA, State, Local	1-5 years	St Tammany Parish/ Department of Engineering	Coastal Erosion	1,4,5	New
STP31: Coastal MP Guste Isle	Guste Island Marsh Creation project is a 685 acre marsh creation project. The goal of this project is the restoration of 651 acres of marsh as well as the nourishment of 34 acres of stressed marsh land.	FEMA, CPRA, EPA, State, Local	1-5 years	St Tammany Parish/ Department of Engineering	Coastal Erosion	1,4,5	New
STP32: Coastal MP Bayou Cane	The Bayou Cane Marsh Creation project is a 4,117 acre marsh creation project. The goal of this project is the restoration of 850 acres of low salinity marsh as well as the nourishment of 3,293 acres of stressed marsh land.	FEMA, CPRA, EPA, State, Local	1-5 years	St Tammany Parish/ Department of Engineering	Coastal Erosion	1,4,5	New
STP33: Coastal MP Faciane Canal	The Faciane Canal Marsh Creation project is a 2,853 acre marsh creation project. The goal of this project is the restoration of 1,997 acres of low salinity marsh as well as the nourishment of 630 acres of stressed marsh land.	FEMA, CPRA, EPA, State, Local	1-5 years	St Tammany Parish/ Department of Engineering	Coastal Erosion	1,4,5	New

Mitigation Actions for St Tammany Unincorporated

Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
STP34: Coastal MP Bayou Lacombe	The Bayou Lacombe Marsh Creation project is a 3,114 acre marsh creation project. The goal of this project is the restoration of 623 acres of low salinity marsh as well as the nourishment of 2,336 acres of stressed marsh land.	FEMA, CPRA, EPA, State, Local	1-5 years	St Tammany Parish/ Department of Engineering	Coastal Erosion	1,4,5	New
STP35: Coastal MP Fritchie	The Fritchie North Marsh Creation project is a 4,395 acre marsh creation. The goal of this project is the restoration of 2,417 acres of marsh as well as the nourishment of 1,997 acres of stressed marsh land.	FEMA, CPRA, EPA, State, Local	1-5 years	St Tammany Parish/ Department of Engineering	Coastal Erosion	1,4,5	New
STP36: Riverwood Drainage Study	Construction of a parallel drainage line with additional catch basins along Laurelwood Drive, Magnolia Lane and Crapemyrtle Road in Riverwood Subdivision.	Statewide Flood Control	1-5 years	St Tammany Parish/ Department of Engineering	Flooding	1,2,3,4	New
STP37: Mitigation Public Outreach Program	Enhance the public outreach programs for the parish and all jurisdictions by increasing awareness of risks and safety as well as providing information on high risk areas. Educating citizens on proper mitigation efforts will create resiliency within the parish	FEMA, HMPG	Ongoing	St Tammany Parish	Coastal Erosion, Dam Failure, Levee Failure, Flooding, wind, lightning, hail, Tornado, Tropical Cyclone, Wildfire, Termites, Fog	1,7	New

Mitigation Actions for St Tammany Unincorporated

Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
STP38: Reconstruct Fire Station #16	Raise the living quarters, offices, operations room, and equipment rooms above St. Tammany Parish's DFE while leaving the fire trucks and vehicles at grade level but indoors to protect them from high wind and windblown debris	FEMA, HMPG	March 2016-March 2019	St Tammany Parish	Tropical Cyclone, wind, Flooding	1,2,3,4,6	New
Based on BCEGS findings, the Permits Department will strengthen procedures for enforcing building code and floodplain regulations	N/A	Staff Time	In progress	Department of Permits and Regulatory, St Tammany OHSEP, Cultural and Governmental Affairs	Tropical Cyclone, wind, Flooding, Tornado, Dam Failure, Levee Failure, Termites	N/A	Carried Over
Replace standard building code with new State Uniform Construction Code	N/A	Staff Time	In progress	Department of Permits and Regulatory	Tropical Cyclone, wind, Flooding, Tornado, Dam Failure, Levee Failure, Termites	N/A	Carried Over
Community Rating System—The Parish did not apply for a class improvement, but is expected to move from class 9 to an 8 based on the results of 2008 cycle verification visit	N/A	Staff Time	Completed	Department of Permits and Regulatory	Tropical Cyclone, Flooding,	N/A	Completed

Mitigation Actions for St Tammany Unincorporated

Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
Evaluate properties to determine if they need to be retrofitted or modified to protect them from hazards	N/A	Local	Completed	St Tammany OHSEP	Tropical Cyclone, Flooding, wind, lightning, hail, Tornado	N/A	Completed
Parish will implement an urban forestry program modeled on the criteria of the Tree City USA program	N/A	Staff Time	Completed	Department of Permits and Regulatory	Tropical Cyclone, wind, Tornado	N/A	Completed
St. Tammany Parish Multi-Hazard Emergency Operations Plan will be reviewed to determine when improvements can be made and how to maximize credit under the Community Rating System	N/A	Staff Time	Completed	St Tammany OHSEP	Tropical Cyclone, Flooding, wind, lightning, hail	N/A	Completed

Table 2 - Mitigation Actions for Town of Abita Springs

Town of Abita Springs

Mitigation Actions for Town of Abita Springs							
Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
AS1: Safe Room Project	The project will include design and construction for Multi-use Facility and Safe Room.	FEMA/HMPG	1-3 years	St Tammany Parish/ Abita Springs	Tornado, wind	1,2,3	New
AS2: Elevation of Severe Repetitive Loss and Repetitive Loss Structures	Currently there are 3,213 properties listed on FEMA's SRL/RL list Properties will be prioritized based on the SRL / RL.	FEMA HMPG	Ongoing	St Tammany Parish/ Grant Department/Abita Springs	Tropical Cyclone, Flooding	1,4,6,7	New
AS3: FEMA/LAMP DFIRM	The STP LAMP program will collaborate with FEMA to characterize the levee reaches in the parish, gather all available data, determine additional data needs that are critical for certification, and procure data.	Federal, State, Local	Mid 2015	St Tammany Parish	Tropical Cyclone, Flooding, levee failure	1,5	New
AS4: Hardening of Critical Facilities	Identify and hardening of Critical Facilities	FEMA, HMPG	1-5 years	St Tammany Parish/Abita Springs	Tropical Cyclone, wind, hail, Tornado	1,2,3,	New
AS5: Acquisition	Give special attention to repetitively flooded areas or areas susceptible to other hazards by Identification and acquisition of land and/or properties to mitigate against future damages, lives and property lost.	FEMA, HMPG	1-5 years	St Tammany Parish/Abita Springs	Coastal Erosion, Dam Failure, Levee Failure, Flooding, Tropical Cyclone, Wildfire, Termites	1,3,4,5,6	New

Mitigation Actions for Town of Abita Springs							
Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
AS6: Mitigation Public Outreach Program	Enhance the public outreach programs for the parish and all jurisdictions by increasing awareness of risks and safety as well as providing information on high risk areas. Educating citizens on proper mitigation efforts will create resiliency within the parish	FEMA, HMPG	Ongoing	St Tammany Parish/Abita Springs	Coastal Erosion, Dam Failure, Levee Failure, Flooding, Fog, wind, hail, lightning, Tornado, Tropical Cyclone, Wildfire	1,7	New
Based on BCEGS findings, the Permits Department will strengthen procedures for enforcing building code and floodplain regulations	N/A	Staff Time	In progress	Department of Permits and Regulatory, St Tammany OHSEP, Cultural and Governmental Affairs/Abita Springs	Tropical Cyclone, wind, Flooding, Tornado, Dam Failure, Levee Failure, Termites	N/A	Carried Over
Replace standard building code with new State Uniform Construction Code	N/A	Staff Time	In progress	Department of Permits and Regulatory/Abita Springs	Tropical Cyclone, wind, Flooding, Tornado, Dam Failure, Levee Failure, Termites	N/A	Carried Over
Flood Plain Management	N/A	Staff Time	Completed	Department of Permits and Regulatory/Abita Springs	Tropical Cyclone, Flooding	N/A	Completed

Mitigation Actions for Town of Abita Springs							
Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
Parish will implement an urban forestry program modeled on the criteria of the Tree City USA program	N/A	Staff Time	Completed	Department of Permits and Regulatory /Abita Springs	Tropical Cyclone, wind, Tornado	N/A	Completed

Table 3 - Mitigation Actions for Pearl River

Town of Pearl River

Mitigation Actions for Pearl River							
Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
PR1: Safe Room Project	The project will include design and construction for Multi-use Facility and Safe Room.	FEMA/ HMPG	1-3 years	St Tammany Parish/ Pearl River	Tornado, wind	1,2,3	New
PR2: Elevation of Severe Repetitive Loss and Repetitive Loss Structures	Currently there are 3,213 properties listed on FEMA's SRL/RL list Properties will be prioritized based on the SRL / RL.	FEMA HMPG	Ongoing	St Tammany Parish/ Grant Department/ Pearl River	Tropical Cyclone, Flooding	1,4,6,7	New
PR3: FEMA/LAMP DFIRM	The STP LAMP program will collaborate with FEMA to characterize the levee reaches in the parish, gather all available data, determine additional data needs that are critical for certification, and procure data.	Federal, State, Local	Mid 2015	St Tammany Parish	Tropical Cyclone, Flooding, levee failure	1,5	New

Mitigation Actions for Pearl River							
Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
PR4: Hardening of Critical Facilities	Identify and hardening of Critical Facilities	FEMA, HMPG	1-5 years	St Tammany Parish/Pearl River	Tropical Cyclone, wind, hail	1,2,3,	New
PR5: Acquisition	Give special attention to repetitively flooded areas or areas susceptible to other hazards by Identification and acquisition of land and/or properties to mitigate against future damages, lives and property lost.	FEMA, HMPG	1-5 years	St Tammany Parish/Pearl River	Coastal Erosion, Dam Failure Levee Failure, Flooding, Tropical Cyclone, Wildfire	1,3,4,5,6	New
PR6: Mitigation Public Outreach Program	Enhance the public outreach programs for the parish and all jurisdictions by increasing awareness of risks and safety as well as providing information on high risk areas. Educating citizens on proper mitigation efforts will create resiliency within the parish	FEMA, HMPG	Ongoing	St Tammany Parish/Pearl River	Coastal Erosion, Dam Failure Levee Failure, Flooding, Fog, wind, lightning, hail, Tornado, Tropical Cyclone, Wildfire, Termites	1,7	New
Replace standard building code with new State Uniform Construction Code	N/A	Staff Time	In progress	Department of Permits and Regulatory/ Pearl River	Tropical Cyclone, wind, Flooding, Tornado, Dam Failure, Levee Failure, Termites	N/A	Carried Over
Evaluate properties to determine if they need to be retrofitted or modified to protect them from hazards	N/A	Local	Completed	St Tammany OHSEP/Pearl River	Tropical Cyclone, Flooding, wind, hail, Tornado	N/A	Completed
Flood Plain Management	N/A	Staff Time	Completed	Department of Permits and Regulatory/ Pearl River	Tropical Cyclone, Flooding	N/A	Completed

Mitigation Actions for Pearl River							
Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
Parish will implement an urban forestry program modeled on the criteria of the Tree City USA program	N/A	Staff Time	Completed	Department of Permits and Regulatory Pearl River	Tropical Cyclone, Tornado	N/A	Completed

Table 4 - Mitigation Actions for Village of Folsom

Village of Folsom

Mitigation Actions for Village of Folsom							
Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
F1: Safe Room Project	The project will include design and construction for Multi-use Facility and Safe Room.	FEMA/HMPG	1-3 years	St Tammany Parish/Folsom	Tornado, wind	1,2,3	New
F2: Elevation of Severe Repetitive Loss and Repetitive Loss Structures	Currently there are 3,213 properties listed on FEMA's SRL/RL list Properties will be prioritized based on the SRL / RL.	FEMA HMPG	Ongoing	St Tammany Parish/Grant Department/Folsom	Tropical Cyclone, Flooding	1,4,6,7	New
F3: FEMA/LAMP DFIRM	The STP LAMP program will collaborate with FEMA to characterize the levee reaches in the parish, gather all available data, determine additional data needs that are critical for certification, and procure data.	Federal, State, Local	Mid 2015	St Tammany Parish	Tropical Cyclone, Flooding, levee failure	1,5	New
F4: Hardening of Critical Facilities	Identify and hardening of Critical Facilities	FEMA, HMPG	1-5 years	St Tammany Parish/Folsom	Tropical Cyclone, wind, hail	1,2,3,	New

Mitigation Actions for Village of Folsom							
Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
F5: Acquisition	Give special attention to repetitively flooded areas by Identification and acquisition of land and/or properties to mitigate against future damages, lives and property lost.	FEMA, HMPG	1-5 years	St Tammany Parish/Folsom	Coastal Erosion, Dam Failure, Levee Failure, Flooding, Tropical Cyclone, Wildfire	1,3,4,5,6	New
F6: Mitigation Public Outreach Program	Enhance the public outreach programs for the parish and all jurisdictions by increasing awareness of risks and safety as well as providing information on high risk areas. Educating citizens on proper mitigation efforts will create resiliency within the parish	FEMA, HMPG	Ongoing	St Tammany Parish/Folsom	Coastal Erosion, Dam Failure, Levee Failure, Flooding, Fog, wind, hail, lightning, Tornado, Tropical Cyclone, Wildfire, Termites	1,7	New
Based on BCEGS findings, the Permits Department will strengthen procedures for enforcing building code and floodplain regulations	N/A	Staff Time	In progress	Department of Permits and Regulatory, St Tammany OHSEP, Cultural and Governmental Affairs/Folsom	Tropical Cyclone, wind, Flooding, Tornado, Dam Failure, Levee Failure, Termites	N/A	Carried Over
Replace standard building code with new State Uniform Construction Code	N/A	Staff Time	In progress	Department of Permits and Regulatory/Folsom	Tropical Cyclone, wind, Flooding, Tornado, Dam Failure, Levee Failure, Termites	N/A	Carried Over
Flood Plain Management	N/A	Staff Time	Completed	Department of Permits and Regulatory/Folsom	Tropical Cyclone, Flooding	N/A	Completed

Mitigation Actions for Village of Folsom							
Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
Parish will implement an urban forestry program modeled on the criteria of the Tree City USA program	N/A	Staff Time	Completed	Department of Permits and Regulatory Folsom	Tropical Cyclone, wind, Tornado	N/A	Completed

Table 5 - Mitigation Actions for Village of Sun

Village of Sun

Mitigation Actions for Village of Sun							
Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
SU1: Safe Room Project	The project will include design and construction for Multi-use Facility and Safe Room.	FEMA/HMPG	1-3 years	St Tammany Parish/Sun	Tornado, wind	1,2,3	New
SU2: Elevation of Severe Repetitive Loss and Repetitive Loss Structures	Currently there are 3,213 properties listed on FEMA's SRL/RL list Properties will be prioritized based on the SRL / RL.	FEMA HMPG	Ongoing	St Tammany Parish/Grant Department/Sun	Tropical Cyclone, Flooding	1,4,6,7	New
SU3: FEMA/LAMP DFIRM	The STP LAMP program will collaborate with FEMA to characterize the levee reaches in the parish, gather all available data, determine additional data needs that are critical for certification, and procure data.	Federal, State, Local	Mid 2015	St Tammany Parish/Sun	Tropical Cyclone, Flooding, levee failure	1,5	New

Mitigation Actions for Village of Sun							
Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
SU4: Hardening of Critical Facilities	Identify and hardening of Critical Facilities	FEMA, HMPG	1-5 years	St Tammany Parish/Sun	Tropical Cyclone, wind, hail, Flooding	1,2,3,	New
SU5: Acquisition	Give special attention to repetitively flooded areas by Identification and acquisition of land and/or properties to mitigate against future damages, lives and property lost.	FEMA, HMPG	1-5 years	St Tammany Parish/Sun	Coastal Erosion, Dam Failure Levee Failure, Flooding, Tropical Cyclone, Wildfire	1,3,4,5,6	New
SU6: Mitigation Public Outreach Program	Enhance the public outreach programs for the parish and all jurisdictions by increasing awareness of risks and safety as well as providing information on high risk areas. Educating citizens on proper mitigation efforts will create resiliency within the parish	FEMA, HMPG	Ongoing	St Tammany Parish/Sun	Coastal Erosion, Dam Failure, Levee Failure, Flooding, Fog, wind, hail, lightning, Tornado, Tropical Cyclone, Wildfire, Termites	1,7	New
Based on BCEGS findings, the Permits Department will strengthen procedures for enforcing building code and floodplain regulations	N/A	Staff Time	In progress	Department of Permits and Regulatory, St Tammany OHSEP, Cultural and Governmental Affairs/Sun	Tropical Cyclone, Flooding, Tornado, wind, Dam Failure, Levee Failure, Termites	N/A	Carried Over
Flood Plain Management	N/A	Staff Time	Completed	Department of Permits and Regulatory/Sun	Tropical Cyclone, Flooding	N/A	Completed
Parish will implement an urban forestry program modeled on the criteria of the Tree City USA program	N/A	Staff Time	Completed	Department of Permits and Regulatory Sun	Tropical Cyclone, wind, Tornado	N/A	Completed

Mitigation Actions for Village of Sun							
Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
Replace standard building code with new State Uniform Construction Code	N/A	Staff Time	In progress	Department of Permits and Regulatory/Sun	Tropical Cyclone, wind, hail, Flooding, Tornado, Dam Failure, Levee Failure, Termites	N/A	Carried Over

Table 6 - Mitigation Actions for City of Covington

City of Covington

Mitigation Actions for City of Covington							
Action	Summary	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
C1: Mile Branch Drainage Improvements	The proposed project involves stabilization of existing channel banks due to damage from erosion of existing banks. The purpose of the project is to reduce potential structure damage due to erosion along the channel.	Local, FEMA HMPG	24 months from start	City of Covington/St Tammany Parish	Flooding, Tropical Cyclone	1,4	New
C2: Simpson Creek Drainage Improvements	The proposed project involves increase flow capacities in major drainage channel to mitigate flood risk to area. Simpson Creek drains a large developed portion of the City of Covington. Improvements would be made to reduce flood risk to structures located along the drainage way.	Local, FEMA HMPG	18 months from start	City of Covington	Flooding, Tropical Cyclone	1,2,3,4,7	New

Mitigation Actions for City of Covington							
Action	Summary	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
C3: Poole Creek Drainage Improvements	The proposed project involves increase flow capacities in major drainage channel. Poole Creek drains a large developed portion of the City of Covington. Improvements would be made to reduce flood risk to structures located along the drainage way.	Local, FEMA HMPG	18 months from start	City of Covington	Flooding, Tropical Cyclone	1,2,3,4,7	New
C4: Safe room Construction at Critical City Facilities	The proposed project would include the installation of safe room's at all critical City of Covington facilities. Safe room availability will allow first responders to be on the scene of hazard situations therefore preventing losses from occurring during the hazardous event and after the hazard has passed.	Local, FEMA HMPG	12 months from start	City of Covington	Tropical Cyclone, wind, tornado, wildfire	1,2,3	New
C5: Covington Police Station Hardening	The proposed project includes hardening the building with impact-resistant window coverings and doors and installing roof straps. The Covington Police Department at 609 N. Columbia Street serves as a staging area for the Covington Police. The purpose of the building hardening is to ensure its continued use as a staging area by strengthening the building components to withstand the forces of high winds and minimize damage and avoid building failure by envelope.	Local, FEMA HMPG	12 months from start	City of Covington	Flooding, Tropical Cyclone, wind, hail, Tornado	1,2,3	New

Mitigation Actions for City of Covington

Action	Summary	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
C6: Covington Public Works Facilities Hardening	The proposed project includes hardening of several buildings located on the Public Works campus with impact-resistant window coverings and doors and installing roof straps. The Public Works Buildings at 1700 W. 27th Avenue serve as a staging area for the Covington Public Works operations and treatment of wastewater for the entire city. The purpose of the building hardening is to ensure its continued use as a staging area by strengthening the building components to withstand the forces of high winds and minimize damage	Local, FEMA HMPG	12 months from start	City of Covington	Flooding, Tropical Cyclone, hail, wind, Tornado	1,2,3,4	New
C7: Covington Fire Station Hardening	The proposed project includes hardening the building with impact-resistant window coverings and doors and installing roof straps. The Covington Fire Department at 525 N. Jefferson Street and serves as a staging area for the City's fire response. The purpose of the building hardening is to ensure its continued use as a staging area by strengthening the building components to withstand the forces of high winds and minimize damage and avoid building failure by envelope.	Local, FEMA HMPG	12 months from start	City of Covington	Flooding, Tropical Cyclone, wind, hail, Tornado	1,2,3	New

Mitigation Actions for City of Covington							
Action	Summary	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
C8: Generators at Critical Sewer Lift Station Facilities	The proposed project includes installing permanent generators at 5 major lift stations within the City of Covington: 1st Avenue, 9th Avenue, 8th Avenue, US 190, and 19th Avenue. During power outages, lift stations must remain in function to prevent losses to structures due to failed sewer function.	Local, Federal	12 months from start	City of Covington	Flooding, Tropical Cyclone, wind, lightning, Tornado	1,2,3	New
Improve drainage capacity to reduce flooding hazards	N/A	City, Grants	Carried Over	City Engineer/Public Works Director	Flooding, Tropical Cyclone	N/A	Carried over
Add automatic turn on switches to back up power supply/ generators at water system wells at River Forest Subdivision, Theard Street, and Industry Lane within the city.	N/A	City, Grants	Carried Over	Fire Chief, Public Works Director	Flooding, Tropical Cyclone, wind, lightning, Tornado	N/A	Carried over
Harden critical facilities and facilities housing sensitive populations including the construction of safe rooms to protect critical personnel during hazard events	N/A	City, Grants	Carried Over	Public Works Director, Police, Fire, Director of Admin.	Flooding, Tropical Cyclone, wind, hail, Tornado	N/A	Carried over - See specific Actions above.

Mitigation Actions for City of Covington

Action	Summary	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
Investigate and implement a localized interior drainage projects in repetitive loss areas to reduce damages from flooding.	N/A	Community Development Block Grant (CDBG) FMA, HMPG, SBA Funds, Capital Outlay, USARCA,	In progress	Parish and City Floodplain Managers, Public Works Director	Flooding, Tropical Cyclone	N/A	In progress
Pursue elevation/ Acquisition /flood proofing/Pilot Reconstruction projects and structural solutions to flooding by pursuing funding opportunities for the repetitive loss structures.	N/A	City, Grants, HMPG	In progress	Building Permit Director, City Emergency Manager, St Tammany Parish	Flooding, Tropical Cyclone,	N/A	In progress
Develop additional subdivision guidelines that would help reduce flooding, such as requiring freeboard above the Base Flood Elevation (BFE) in flood prone areas	N/A		Ongoing	Planning Director, Planning Consultant	Flooding, Tropical Cyclone	N/A	Ongoing
Create a new hazard page on the city's website to increase public awareness of hazards, hazardous areas and storm preparation. Distribute public awareness information regarding flood hazards, SFHA's and potential	N/A	City Budget, Business and industry	Ongoing	Mayor, Chief of Police, Director of Admin	Tropical Cyclone, Flooding, Tornado, wind, lightning, hail	N/A	Ongoing

Mitigation Actions for City of Covington							
Action	Summary	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
mitigation measures using the local newspapers.							
Add generators to all sewer lift stations and critical facilities	N/A	City Budget and Grants	Carried over	Public Works Director	Flooding, Tropical Cyclone, wind, lightning, Tornado	N/A	Carried over
Participate in the CRS. Improve record keeping of localized flooding events and public works work orders	N/A	City Budget	Ongoing	Parish and city floodplain managers	Flooding, Tropical Cyclone	N/A	Ongoing

Table 7 - Mitigation Actions for Town of Madisonville

Town of Madisonville

Mitigation Actions for Town of Madisonville							
Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
MAD1: Safe Room Project	The project will include design and construction for Multi-use Facility and Safe Room.	FEMA/HMPG	1-3 years	St Tammany Parish/Madisonville	Tornado ,wind	1,2,3	New

Mitigation Actions for Town of Madisonville

Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
MAD2: Elevation of Severe Repetitive Loss and Repetitive Loss Structures	Currently there are 3,213 properties listed on FEMA's SRL/RL list. Properties will be prioritized based on the SRL / RL.	FEMA HMPG	Ongoing	St Tammany Parish/ Grant Department/Madisonville	Tropical Cyclone, Flooding	1,4,6,7	New
MAD3: FEMA/LAMP DFIRM	The STP LAMP program will collaborate with FEMA to characterize the levee reaches in the parish, gather all available data, determine additional data needs that are critical for certification, and procure data.	Federal, State, Local	Mid 2015	St Tammany Parish	Tropical Cyclone, Flooding, levee failure	1,5	New
MAD4: Hardening of Critical Facilities	Identify and hardening of Critical Facilities	FEMA, HMPG	1-5 years	St Tammany Parish/Madisonville	Tropical Cyclone, wind, hail, Flooding	1,2,3,	New
MAD5: Acquisition	Give special attention to repetitively flooded areas by Identification and acquisition of land and/or properties to mitigate against future damages, lives and property lost.	FEMA, HMPG	1-5 years	St Tammany Parish/Madisonville	Coastal Erosion, Dam Failure, Levee Failure, Flooding, Tropical Cyclone, Wildfire	1,3,4,5,6	New

Mitigation Actions for Town of Madisonville							
Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
MAD6:Mitigation Public Outreach Program	Enhance the public outreach programs for the parish and all jurisdictions by increasing awareness of risks and safety as well as providing information on high risk areas. Educating citizens on proper mitigation efforts will create resiliency within the parish	FEMA, HMPG	Ongoing	St Tammany Parish/Madisonville	Coastal Erosion, Dam Failure, Levee Failure, Flooding, Fog, wind, hail, lightning, Tropical Cyclone, Wildfire, Termites	1,7	New
Based on BCEGS findings, the Permits Department will strengthen procedures for enforcing building code and floodplain regulations	N/A	Staff Time	In progress	Department of Permits and Regulatory, St Tammany OHSEP, Cultural and Governmental Affairs/Madisonville	Tropical Cyclone, wind, Flooding, Tornado, Dam Failure, Levee Failure, Termites	N/A	Carried Over
Parish will implement an urban forestry program modeled on the criteria of the Tree City USA program	N/A	Staff Time	Completed	Department of Permits and Regulatory Madisonville	Tropical Cyclone, wind, Tornado	N/A	Completed
Replace standard building code with new State Uniform Construction Code	N/A	Staff Time	In progress	Department of Permits and Regulatory/Madisonville	Tropical Cyclone, wind, hail, Flooding, Tornado	N/A	Carried Over

Table 8 - Mitigation Actions for City Of Mandeville

City of Mandeville

Mitigation Actions for City of Mandeville							
Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
MAN1: Elevation of Severe Repetitive Loss and Repetitive Loss Structures	Currently there are 59 properties listed on FEMA's SRL/RL list. Properties will be prioritized based on the SRL / RL. The City elevates properties as funding is made available while developing strategies for coastal and flood control protection and mitigation.	FEMA HMPG	1-5 Years	City of Mandeville	Flooding, Tropical Cyclone	1,4,6,7	New/Ongoing
MAN2: Sewerage Treatment Plant Flood Mitigation	The proposed project would include the construction of either an earthen berm or I-wall surrounding a portion of the sewerage treatment plant to prevent the inundation of flood waters from storm surge. The project will also include the elevation of Ultraviolet lights used in the final stage of sewerage treatment.	FEMA HMPG	1-5 Years	City of Mandeville	Flooding, Tropical Cyclone	1,2,3,7	New
MAN3: Monroe Street Drainage	The proposed project would change the elevation of a section of roadway that is inundated by flood waters on a regular basis. Additionally, it would improve the drainage along portions of Kleber Street where there is a history of flooding including of structures.	FEMA HMPG	1-5 years	City of Mandeville	Flooding, Tropical Cyclone	1,2,3,7	New

Mitigation Actions for City of Mandeville

Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
MAN4: Wind Retrofit of Mandeville Police Department Headquarters	Mandeville Police Department Headquarters will be retrofitted to provide protection from high winds. The Scope of Work includes but is not limited to hardening windows, doors, and mechanical equipment. This retrofit will exceed the International Building Code wind load requirements for this location.	Local, State, Federal	1-5 years	City of Mandeville	Tropical Cyclone, wind, hail, Tornado	1,2,3	New
MAN5: Madison Street Drainage	The proposed project would close in the existing open ditches with new 36" RCP culverts, with associated catch basins and drop inlets. Madison Street from Marigny Avenue to Little Bayou Castain is approximately 1,200 linear feet. The project will help drainage in an area with a history of flooding, and where homes have received flood damage in the past.	Local, State, Federal	1-5 Years	City of Mandeville	Tropical Cyclone, Flooding	1,4,7	new
MAN6 Wind Retrofit of Mandeville Community Center	Mandeville Community Center will be retrofitted to provide protection from high winds. Includes but is not limited to hardening windows, doors, and mechanical equipment. This retrofit will exceed the International Building Code wind load requirements for this location.	Local, State, Federal	ongoing	City of Mandeville	Tropical Cyclone, wind, hail, tornado	1,2,3	New

Mitigation Actions for City of Mandeville							
Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
MAN7: Wind Retrofit of Mandeville Public Works Department Facility	Mandeville Public Works Department Facility will be retrofitted to provide protection from high winds. The Scope of Work includes but is not limited to hardening windows, doors, and mechanical equipment. This retrofit will exceed the International Building Code wind load requirements for this location.	FEMA HMPG	1-5 years	City of Mandeville	Tropical Cyclone, wind, hail, tornado	1,2,3	new
MAN8: Wind Retrofit of Mandeville City Hall	Mandeville City Hall will be retrofitted to provide protection from high winds. The Scope of Work includes but is not limited to hardening windows, doors, and mechanical equipment. This retrofit will exceed the International Building Code wind load requirements for this location.	FEMA HMPG	1-5 Years	City of Mandeville	Tropical Cyclone, wind, hail, tornado	1,2,3	new
MAN9: Cypress Swamp/Green Fund Coastal Restoration and Armoring	The proposed project would construct a berm of a yet to be determined type in Lake Pontchartrain in front of an endangered cypress swamp along the shoreline of the City of Mandeville. The berm would armor the identified section of shoreline against continued coastal erosion as well as reduce the velocity of storm runoff thereby allowing suspended sediments to rebuild land.	FEMA HMPG	1-5 Years	City of Mandeville	Tropical Cyclone, Coastal Hazards, Flooding	1,5	new

Mitigation Actions for City of Mandeville

Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
No. 1: Upgrade the flow capacity of storm water along Lake Shore Drive in Golden Glen Subdivision and along Bayou Chincuba, Bayou Castine, and Little Bayou Castine by expanding and sloping the canals and replacing any inferior culverts along the major drainage laterals	N/A	City budget and Grants	Ongoing - Scheduled for complete in 2020	Street Supervisor/Public Works Director	Flooding, Tropical Cyclone	N/A	Ongoing
No. 2: Add Back up power supply/generators at critical locations such as Mandeville Fire Station, and sewer lift stations.	N/A	City Budget, Grant, Fire budget	COMPLETE	Public Works and Wastewater Supervisor	Flooding, Tropical Cyclone, wind, lightning, tornado	N/A	COMPLETE
No.3: Develop a master drainage plan which will evaluate drainage projects at major drainage laterals to determine best method of increasing drainage capacity. Implement recommended projects resulting from drainage plan.	N/A	City Budget,	Ongoing- Scheduled for complete in 2020	City Engineer and or Department of Public Works	Flooding, Tropical Cyclone	N/A	Ongoing
No.4: Madison (Marigny to Little Bayou Castain); Overlay (1,200' x 18') Drainage (36" RCPA)	N/A	City Budget, potential for FEMA grant	Carried Over	City Engineer and or Department of Public Works	Flooding, storm surge	N/A	Carried over

Mitigation Actions for City of Mandeville

Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
No.5: Coffee (Villere to Jefferson); Overlay (2,300' x18') Drainage (24" RCPA to 54" RCPA)	N/A	City Budget, potential for FEMA grant	COMPLETE	City Engineer and or Department of Public Works	Flooding, Storm Surge	N/A	COMPLETE
No.6: Trace drainage (Marigny to Lamarque and Capusel to Little Bayou Castine)	N/A	City Budget	Ongoing - Scheduled for complete in 2020	City Engineer and or Department of Public Works	Flooding, Storm Surge	N/A	Ongoing
No.7: Trace Drainage (Lafitte to Coffee)	N/A	City Budget	Ongoing - Scheduled for complete in 2020	City Engineer and or Department of Public Works	Flooding, Storm Surge	N/A	Ongoing
No.8: Wilkinson (Extend 60" RCPA) (North of Monroe)	N/A	City Budget	COMPLETE	City Engineer and or Department of Public Works	Flooding, Storm Surge	N/A	COMPLETE
No. 9: Carondelet (Junction Box at School)	N/A	City Budget	Ongoing - Scheduled for complete in 2020	City Engineer and or Department of Public Works	Flooding, Storm Surge	N/A	Ongoing
No.10: Esquinance (Oak to City limits)Reconstruct Roadway (550' x 20') Drainage (18" RCPA)	N/A	City Budget	Ongoing - Scheduled for complete in 2020	City Engineer and or Department of Public Works	Flooding, Storm Surge	N/A	Ongoing
No.11:Carroll (Hwy 190 to Monroe) Overlay (2200'x18') Drainage (18'RCPA to 24" RCPA)	N/A	City Budget	Ongoing - Scheduled for complete in 2020	City Engineer and or Department of Public Works	Flooding, Storm Surge	N/A	Ongoing

Mitigation Actions for City of Mandeville

Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
No.12:Wilkinson (ravine aux Coquilles to Jefferson) (capital outlay request submitted) Overlay (1300'x18') Drainage (24"RCPA)	N/A	City Budget	COMPLETE	City Engineer and or Department of Public Works	Flooding, Storm Surge	N/A	COMPLETE
No.13: Lamarque (LA Hwy 190 to lakeshore) Overlay (4400'x2-') Drainage (18"RCPA @ roadways and drives) Water (La Hwy 190 to Livingston)	N/A	City Budget	COMPLETE	City Engineer and or Department of Public Works	Flooding, Storm Surge	N/A	COMPLETE
No.14:Sandra Lee (W. Causeway to Lovers) Concrete (800'x20')	N/A	City Budget	COMPLETE	City Engineer and or Department of Public Works	Flooding, Storm Surge	N/A	COMPLETE
No.15: Wind retrofit of Mandeville City Hall	N/A	FEMA grants with city matching funds	Ongoing - Scheduled for complete in 2020	Public Works Department	Tropical Cyclone, wind, tornadoes	N/A	Ongoing
No.16: Wind retrofit of Mandeville Department of Public Works building	N/A	FEMA grants with city matching funds	Ongoing - Scheduled for complete in 2020	Public Works Department	Tropical Cyclone, wind, tornadoes	N/A	Ongoing
No.17: Wind retrofit of Mandeville Police Headquarters	N/A	FEMA grants with city matching funds	Ongoing - Scheduled for complete in 2020	Public Works Department	Tropical Cyclone, wind, tornadoes	N/A	Ongoing
No.18: Wind retrofit of Mandeville Community Center	N/A	FEMA grants with city matching funds	Ongoing - Scheduled for complete in 2020	Public Works Department	Tropical Cyclone, wind, tornadoes	N/A	Ongoing

Mitigation Actions for City of Mandeville

Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
No.24: City has used a program called "Drain Team" to increase public awareness and involvement in keeping ditches and drainage inlets free of obstruction. Notably, the city has also prepared and initiated a sandbag distribution plan, which has been successfully deployed twice during the last few years. This is an ongoing effort that the city intends to continue	N/A	City Budget	Ongoing - Scheduled for complete in 2020	City floodplain Manager and "Drain Team"	Tropical Cyclone, flooding, storm surge	N/A	Ongoing
No.25: The city continues to provide hazard education to the public through public service advertising, meetings with schools and neighborhood organizations, and distribution of materials at retailers, the library, and city hall	N/A	City Budget and grants	Ongoing - Scheduled for complete in 2020	Mayor's Office and Public Works Director	Flooding, Tropical Cyclone, wind, hail, lightning	N/A	Ongoing

Mitigation Actions for City of Mandeville

Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
No. 26: The city continues active participation in various FEMA grant programs, in particular the HMGP, which has funded multiple elevation projects in Mandeville.	N/A	City Budget and grants	Ongoing - schedule now estimated for completion by 2020-- Change verbiage to 59 properties and cost to \$8,850,000	City Building Permit Director and City Floodplain manager	Flooding, Tropical Cyclone	N/A	Ongoing
No.28: Improve seawall along lakeshore drive by increasing its size to better protect structures from Tropical Cyclone and tropical storm induced tidal flooding. (Public opposition to this proposal probably means that it will not be initiated)	N/A	City Budget and Grants	Ongoing - schedule now estimated for completion by 2020 – Corps of Engineers is currently doing an economic feasibility study	Public Works Department	Flooding, Tropical Cyclone, Storm Surge	N/A	Ongoing
No.29: On October 1, 2008 the city improved from a CRS class 8 to a class 7. This improvement qualifies residents for an additional 5% discount on flood insurance premiums. The city will continue its activities to improve the CRS rating.	N/A	City Budget	Ongoing - Scheduled for complete in 2020	City Floodplain Manager	Flooding, Tropical Cyclone, wind, lightning, Storm Surge	N/A	Ongoing

Mitigation Actions for City of Mandeville							
Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
No.30: Continue enforcement of floodplain regulations, subdivision regulations, engineering standards, and building code to ensure that all future development is implemented in such a way that risk from natural hazards is minimized	N/A	City Budget	ongoing	Floodplain manager/building inspector	Flooding, Tropical Cyclone, wind, Storm Surge	N/A	ongoing

Table 9 - Mitigation Actions for City of Slidell

City of Slidell

Mitigation Actions for City of Slidell							
Action	Summary	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
SL1: W-14 Pumping Station Construction	Construct a pumping station at the mouth/terminus of the W-14 Drainage Canal. A pump at the mouth of the W-14 would allow water to continue to be pumped out of the city even when the Lake is full and will impede back flooding.	Federal, State, Local	3/2016-3/2019	City of Slidell	Tropical Cyclone, Flooding	1,2,3, 4	New
SL2: City Waste Treatment Elevation	Continuing waste water treatment during and after a storm event is critical to residents' health and safety and to protect the environment. The City's Waste Water Treatment Plant's Motor Control Center is below Base Flood Elevation (BFE). Elevating the Motor Control Center would enable the City to continue to treat waste water during and after a storm event.	Federal, State, Local	Ongoing	City of Slidell	Tropical Cyclone, Flooding	1,2,3, 4	New
SL3: Levee Protection Project	Construct a Levee or Flood Wall paralleling the Norfolk-Southern railroad tracks from its intersection with the Schneider Canal Levee to Gause Blvd.	Federal, State, Local	3/2016-3/2020	City of Slidell	Tropical Cyclone, Flooding, Levee Failure	1,2,3, 4,5,6, 7	New

Mitigation Actions for City of Slidell							
Action	Summary	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
SL4: Bayou Patassat Improvements	Bayou Patassat Drainage Canal needs to be reshaped. The channel needs to be reshaped and smoothed so the water is effectively and efficiently conveyed to the pumps upgraded from the last hazard mitigation plan and discharged into Bayou Bonfouca. Additionally, the subsurface section of the channel should be removed and upgraded to match the increased in capacity for the reshaped sections.	Federal, State, Local	3/2016-3/2018	City of Slidell	Tropical Cyclone, Flooding	1,2,4	New
SL5: Elevation of Severe Repetitive Loss and Repetitive Loss Structures	Homes outside levee protection need to be elevated above the City of Slidell's Design Flood Elevation (DFE). The majority of the City's residences were built pre-FIRM. Approximately 973 repetitive loss homes have not yet been elevated.	Federal	3/2016-3/2018	City of Slidell	Tropical Cyclone, Flooding	1,4,6, 7	New
SL6: Pontchartrain Drive Drainage Improvements	Pontchartrain Drive is an older commercial corridor. Drainage along the corridor was constructed and modified in a piecemeal fashion spanning decades. These factors have combined to create a drainage system that struggles to handle heavy rain	Federal, State, Local	3/2016-3/2018	City of Slidell	Tropical Cyclone, Flooding	1,2,4, 6,7	New

Mitigation Actions for City of Slidell							
Action	Summary	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
	events because the system's slope is not uniform, the channel is not straight, and the water has a long way to travel until it is safely discharged into Lake Pontchartrain. During events the system becomes overwhelmed and adjacent properties are flooded.						
SL7: Audubon Ditch Drainage Improvements	Improving the shape and slope of the Audubon ditch and removing debris and other obstructions would allow storm water to move quicker and more efficiently from the neighborhoods and out of the city, thereby reducing the threat of flooding during storm events	Federal, State, Local	3/2015-3/2018	City of Slidell	Tropical Cyclone, Flooding	1,2,4, 6,7	New
SL8: Breckenridge Ditch Improvements	The Breckenridge ditch discharges first into a detention pond then into the W-15. Improving the Breckenridge ditch design and removing debris and other obstructions would allow storm water to move quicker and more efficiently from the neighborhoods and out of the city, thereby reducing the threat of flooding during storm events.	Federal, State, Local	3/2015-3/2018	City of Slidell	Tropical Cyclone, Flooding	1,2,4, 6,7	New

Mitigation Actions for City of Slidell							
Action	Summary	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
SL9: Carollo Drive Drainage Improvements	Improving the Carollo Drainage, especially the detention pond, would allow for the capture and controlled release of storm and flood water during storm events, thereby reducing the threat of flooding.	Federal, State, Local	3/2015-3/2018	City of Slidell	Tropical Cyclone, Flooding	1,2,4, 6,7	New
SL10: Rue Miramon Drainage Improvements	Improving the Rue Miramon drainage system is key to removing storm water from the Bon Village subdivision and reducing flooding on Gause Blvd.	Federal, State, Local	3/2016-3/2018	City of Slidell	Tropical Cyclone, Flooding	1,2,4, 6,7	New
SL11: Lindeberg Dr Drainage Improvements	This project would redesign and improve the affected sections of these drainage canals, especially where they converge.	Federal, State, Local	3/2016-3/2018	City of Slidell	Tropical Cyclone, Flooding	1,2,4, 6,7	New
SL12: W-14 / W-15 Detention Pond	Failure of this node has led to overtopping of the canal and ditch and flooding of nearby homes and businesses. Creation of a detention pond and controlled release of storm/floodwaters at this point in City's drainage system would provide for temporary relief during a storm or flood event.	Federal, State, Local	3/2016-3/2018	City of Slidell	Tropical Cyclone, Flooding	1,2,4, 6,7	New

Mitigation Actions for City of Slidell							
Action	Summary	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
SL13: Mitigation Public Outreach Program	Enhance the public outreach programs for the parish and all jurisdictions by increasing awareness of risks and safety as well as providing information on high risk areas. Educating citizens on proper mitigation efforts will create resiliency within the parish	FEMA, HMPG	Ongoing	St Tammany Parish/Slidell	Coastal Erosion, Dam Failure Levee Failure, Flooding, wind, hail, lightning, Tornado, Tropical Cyclone, Wildfire, Termites, Fog	1,7	New
No.2: City Barn and Floodgate and Automated Bar Screen Replacement	N/A	Local, State, FEMA	Completed	Slidell Department of Engineering	Tropical Cyclone, Flooding	N/A	Completed
No.3: Schneider Canal Storm water Pump Station Bar Screen Improvements	N/A	Local, state, FEMA	Completed	Slidell Department of Engineering	Tropical Cyclone, Flooding	N/A	Completed
No.4: W-15 Lateral Canal Re-Construction	N/A	Local, COE	Completed Phase 1 Study (Const'n not feasible)	Slidell Department of Engineering	Tropical Cyclone, Flooding, Levee Failure	N/A	Completed Phase 1 Study (Const'n not feasible)
No.5: Eastwood Storm Drain Line Improvements	N/A	Local, FEMA	Ongoing July 2010-March 2017	Slidell Department of Engineering	Tropical Cyclone, Flooding	N/A	Ongoing July 2010-March 2017
No.6: Markham/Peachtree Box Culvert Improvements	N/A	Local, FEMA	Ongoing July 2011-2017	Slidell Department of Engineering	Tropical Cyclone, Flooding	N/A	Ongoing July 2011-2017
No.7: Dellwood Storm water Pump Station Improvements	N/A	Local, FEMA	Oct. 2011-March 2020	Slidell Department of Engineering	Tropical Cyclone, Flooding	N/A	Oct. 2011-March 2020

Mitigation Actions for City of Slidell							
Action	Summary	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
No.8: Hermadel Subdivision Storm Sewer System	N/A	Local, FEMA	July 2009-March 2020	Slidell Department of Engineering	Tropical Cyclone, Flooding	N/A	Ongoing
No. 1: Safe Rooms Construction	N/A	Local	Nov. 2006-March 2020	Slidell Department of Engineering	Tornado, wind	N/A	In progress
No.2: Gause Boulevard and Robert Road Intersection Drainage Improvements	N/A	Local, LADOTD	Nov 2009-March 2020	Slidell Department of Engineering	Tropical Cyclone, Flooding	N/A	In progress
No.3: North Boulevard Roadway Elevation	N/A	Local	Oct 2009-March 2020	Slidell Department of Engineering	Tropical Cyclone, Flooding	N/A	In progress
No.4: Beechwood Street/Walnut Street Drainage Improvements	N/A	Local, FEMA	Nov 2012-March 2020	Slidell Department of Engineering	Tropical Cyclone, Flooding	N/A	In progress
No.5: W-15 Canal Improvements	N/A	Local, STP	Nov 2010-March 2020	Slidell Department of Engineering	Tropical Cyclone, Flooding	N/A	In progress
No.7: Wind Retrofits Evaluation and Installation	N/A	Local, State, FEMA	March 2010-March 2020	Slidell Department of Engineering	Tropical Cyclone, wind, tornado	N/A	In progress
No.8: Evaluation and Implementation of Levee System	N/A	Local, FEMA	2010- March 2020	Slidell Department of Engineering	Tropical Cyclone, Flooding, Levee Failure	N/A	In progress
No.9: Development of a Comprehensive Storm water Master Plan	N/A	Local	2011- March 2020	Slidell Department of Engineering	Tropical Cyclone, Flooding	N/A	In progress

Mitigation Actions for City of Slidell							
Action	Summary	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
No.10: Review and Update of Storm water Ordinances and Design Manual	N/A	Local, FEMA	2011- March 2020	Slidell Department of Engineering	Tropical Cyclone, Flooding	N/A	In progress
No. 11: Purchase and Installation of Emergency Generators at Key Facilities	N/A	Local, State, FEMA	March 2010- March 2020	Slidell Department of Engineering	Tropical Cyclone, Flooding, wind, lightning, tornado	N/A	In progress
No.12: Passing Building Codes to Reduce Residential and Commercial Water Usage	N/A	Local, FEMA	March 2010- March 2020	Slidell Department of Engineering	Drought	N/A	In progress
No.13: Development of a Public Education Outreach on Water Conservation Measures	N/A	Local, FEMA	Ongoing March 2010- March 2020	Slidell Emergency Management	Drought	N/A	In progress
No. 14: Development of a Public Education Outreach on Lightning Dangers	N/A	Local	Ongoing March 2010- March 2020	Slidell Emergency Management	Tropical Cyclone, lightning	N/A	In progress
No.15: Identification of Critical Infrastructure Vulnerable to Lightning and Installation of Lightning Rods	N/A	Local, FEMA	March 2010- March 2020	Slidell Department of Engineering	Tropical Cyclone, lightning	N/A	In progress
1.1.9: De Snag and clean Bayou Vincent. The portion from Hwy 190/Gause BLVD West northward to I-12 still needs to be cleaned	N/A	N/A	Ongoing March 2010- March 2020	City Engineer	Tropical Cyclone, Flooding	N/A	In progress
3.1.1: Elevate the low spot near Palm Lake on Bonfouca Drive	N/A	N/A	Ongoing March 2010- March 2020	City of Slidell	Tropical Cyclone, Flooding	N/A	In progress

Mitigation Actions for City of Slidell							
Action	Summary	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
3.1.2: Upgrade the culvert on Bonfouca Drive near Palm Lake	N/A	N/A	Ongoing March 2010-March 2020	City of Slidell	Tropical Cyclone, Flooding	N/A	In progress

Action Prioritization

During the prioritization process, each Jurisdiction and the Steering Committee considered the costs and relative benefits of each new action. Costs can usually be listed in terms of dollars, although at times it involves staff time rather than the purchase of equipment or services that can be readily measured in dollars. In most cases, benefits, such as lives saved or future damage prevented, are hard to measure in dollars, many projects were prioritized with these factors in mind.

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

The jurisdictions numerically prioritized the possible activities that could be pursued. Jurisdictions and the steering committee members consulted appropriate agencies in order to assist with the prioritizations. The result were items that address the major hazards, are appropriate for those hazards, are cost-effective, and are affordable. The steering committee met at the Mitigation Action meeting to review and approve each jurisdictions and unincorporated St Tammany mitigation actions.

St Tammany Parish and the jurisdictions will implement and administer the identified actions based off of the proposed timeframes and priorities for each action.

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Appendix A: Planning Process

Purpose

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

The St Tammany Parish Hazard Mitigation Plan Update

The St Tammany Parish Hazard Mitigation Plan Update process began in August 2014 with a series of meetings and collaborations between the contractor (SDMI) and the participating jurisdictions. Update activities were intended to give each jurisdiction the opportunity to shape the plan to best fit their community's goals. Community stakeholders and the general public were invited to attend and contribute information to the planning process during specific time periods or meetings.

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

Date	Meeting or Outreach	Location	Public Invited	Purpose
8/1/14	Coordination Conference Call	Telephone	No	Discuss with Parish HM coordinator and any steering committee members expectations and requirements of the project.
8/06/14	Kick-Off Meeting	St Tammany OHSEP, Covington, LA	No	Discuss with the plan steering committee expectations and requirements of the project. Assign plan worksheets to jurisdictions.
9/17/14	Risk Assessment overview	St Tammany OHSEP, Covington, LA	No	Discuss and review the risk assessment with the steering committee discuss and review expectations for public meeting.
9/17/14	Public Meeting #1	Slidell City Auditorium, Slidell, LA	Yes	The public meeting allowed the public and community stakeholders to participate and provide input into the hazard mitigation planning process. Maps of the St Tammany parish communities were provide for the meeting attendees to identify specific areas where localized hazards occur.
9/18/14	Public Meeting #2	Mandeville Council Chambers	Yes	The public meeting allowed the public and community stakeholders to participate and provide input into the hazard mitigation planning process. Maps of the St Tammany parish communities were provide for the meeting attendees to identify specific areas where localized hazards occur.

1/28/15	Mitigation Strategy Meeting	St Tammany OHSEP, Covington, LA	No	Discussed, reviewed and prioritized new mitigation actions with the steering committee and reviewed action status from previous update.
ongoing	Public Survey Tool	Online	Yes	This survey asked participants about public perceptions and opinions regarding natural hazards in St Tammany Parish. In addition, we asked about the methods and techniques preferred for reducing the risks and losses associated with these hazards. Survey Results: https://www.surveymonkey.com/s/sttamhmp .
2 week period	Public Plan Review (Digital)		Yes	Parish Website or other locations determined by Steering committee

Planning

The plan update process consisted of several phases

	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8
Plan revision								
Data collection								
Risk assessment								
Public input								
Mitigation strategy and actions								
Plan review by GOHSEP and FEMA								
Plan adoption								
Plan approval								

Coordination

The St Tammany Parish Office of Homeland Security and Emergency Preparedness (OH/SEP) oversaw the coordination of the 2015 Hazard Mitigation Plan Update Steering Committee during the update process. The Parish OH/SEP was responsible for identifying members for the committee.

The Parish Director and SDMI were jointly responsible for inviting the steering committees and key stakeholders to planned meetings and activities. SDMI assisted the Parish Director with press releases and social media statements for notification to the media and general public for public meetings and public outreach activities.

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

Neighboring Community, Local and Regional Planning Process Involvement

From the outset of the planning process, the Hazard Mitigation Team encouraged participation from a broad range of jurisdictional entities. The involvement of representatives from the City, state, and regional agencies provided diverse perspectives and mitigation ideas.

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

- Participation in Hazard Mitigation Team meetings at the local and parish level
- Sharing local data and information
- Local action item development
- Plan document draft review
- Formal adoption of the Hazard Mitigation Plan document by each jurisdiction following provisional approval by The State of Louisiana and FEMA

The 2015 Hazard Mitigation Plan Update Steering Committee consisted of representatives from the following parish, municipal or community stakeholders:

- St Tammany Parish Government
- St Tammany Office of Homeland Security and Emergency Preparedness
- City of Covington
- City of Mandeville
- City of Slidell
- Town of Abita Springs
- Town of Madisonville
- Town of Pearl River
- Village of Folsom
- Village of Sun

The Parish of Tangipahoa was invited to participate as well in an effort to collaborate with neighboring communities. Agencies such as the US Army Corps of Engineers were also involved at the parish and jurisdiction levels, specifically during the mitigation action update and new action processes. The participation of the GOHSEP Region 9 Coordinator during the process also contributed to neighboring community representation.

The most notable involvement of communities and outside agencies is the East St Tammany Storm Surge Mitigation Project Action 1.2.8 that was presented by the Eden Isles Homeowners Association to St Tammany Parish. Through the Public Meeting and additional local and parish meetings, this action item was added to the St Tammany mitigation action table (found in section 4). This mitigation action may include the following entities: Louisiana Coastal Protection & Restoration Authority (CPRA), Louisiana Department of Transportation and Development, Regional Planning Commission, the communities of Eden Isles, Clipper Estates, Lakeview, Moonraker, Oak Harbor, Mariner's Cove, The Fairways, The Inlets, Cypress Lakes, Grand Champions, Masters Point and The Moorings, along with the various businesses located within the project area.

As part of the coordination and planning process, each jurisdiction was provided the State Required Hazard Mitigation Plan Update Worksheet. Jurisdictions with the capability to complete and return these worksheets returned them to assist with the 2015 update. The completed worksheets can be found in Appendix E – State Required Plan Update Worksheets

Below is a detailed list of the 2015 HMPU Steering Committee:

Member/Title	Jurisdiction/Entity	Address	Phone/Email
Dexter Accardo Director	St Tammany Parish OH/SEP	510 Boston Street Suite 100, Covington, LA	985-867-3787; daccardo@stpgov.org
Clarence Powe Deputy Director	St Tammany Parish OH/SEP	510 Boston Street Suite 100, Covington, LA	985-867-3787; cpowe@stpgov.org
Paul Reeb	St Tammany Parish OH/SEP	510 Boston Street Suite 100, Covington, LA	985-774-9710; pjreeb@stpgov.org
Susan Willie	Village of Folsom	82378 June Street, Folsom, LA 70437	985-796-5607; swillie@villageoffolsom.com
Ginger Strauss	Village of Sun		601-569-1356; gbays@yahoo.com
Collins Simoneaux	Governor's Office of Homeland Security and Emergency Preparedness	510 Boston Street Suite 100, Covington, LA	225-329-4261; collinssimoneaux@la.gov
Eric Lundin	City of Slidell	250 Bouscaren Street, Suite 203 Slidell, Louisiana 70458	985-646-4320; elundin@cityofslidell.org
Donna O'Dell	City of Slidell	2056 2nd St, Slidell, LA 70458	985-646-4270; dodell@cityofslidell.org
Mayor Greg Lemons	Town of Abita Springs	22161 Level Street	985-789-1537; lemon_g@bellsouth.net

		Abita Springs, LA 70420	
Cindy Chatelain	Town of Abita Springs	22161 Level Street Abita Springs, LA 70420	Cindy.chatelain@townofabitasprings.com
Kyle Matthews	Town of Madisonville	403 Saint Francis Street Madisonville, LA	985-893-7311; Kylem@townofmadisonville.com
Daniel Hill	City of Covington	317 N. Jefferson Avenue Covington, LA 70433	985-982-1811;dhill@covla.com
Beth Warren	St Tammany Parish Government	21490 Koop Dr. Mandeville, LA 70471	985-276-6420;eawarren@stpgov.org
Jeanne Betbeze	St Tammany Parish Government	21490 Koop Dr. Mandeville, LA 70471	985-867-5095;jbetbeze@stpgov.org
David DeGeneres	City of Mandeville	3101 East Causeway Approach Mandeville, LA	985-624-3106;ddegeneres@cityofmandeville.com
Chris Brown	City of Mandeville	3101 East Causeway Approach Mandeville, LA	985-624-3104;cbrown@cityofmandeville.com
Stan Heinrich	Town of Pearl River	64592 Church Street, Pearl River, LA 70452	985-960-1152; deputychief@pearlriverpolice.com

Program integration

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

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

Opportunities to integrate the requirements of this Hazard Mitigation Plan into other local planning mechanisms will continue to be identified through future meetings of the Parish and Jurisdictions and

through the five-year review process described in the Plan Maintenance Section. The primary means for integrating mitigation strategies into other local planning mechanisms will be through the revision, update and implementation of each jurisdiction's individual city/town plans that require specific planning and administrative tasks (e.g. risk assessment, plan amendments, ordinance revisions, capital improvement projects, etc.).

The members of the St Tammany Parish Hazard Mitigation steering committee will remain charged with ensuring that the goals and strategies of new and updated local planning documents for their jurisdictions or agencies are consistent with the goals and actions of the Hazard Mitigation Plan, and will not contribute to increased hazard vulnerability in Parish. Existing plans, studies, and technical information were incorporated in the planning process. Examples include flood data from FEMA, the U. S. Army Corps of Engineers (USACE or Corps), and the U. S. Geological Survey. Much of this data was incorporated into the risk assessment component of the plan relative to plotting historical events and the magnitude of damages that occurred. The parish's 2005 Hazard Mitigation Plan was also used in the planning process. Other existing data and plans used in the planning process include those listed below.

- St Tammany Coastal Master Plan
- Parish and Local Emergency Operations Plans
- State of Louisiana Hazard Mitigation Plan
- Storm water Management Plan (City and Parish)
- Capital Improvement Plan (City and Parish)
- Comprehensive Master Plan (City and Parish)

Further information on the plans can be found in the Capabilities Assessment, section 3.

Meeting Documentation and Public Outreach Activities

The following pages contain documentation of the agendas, attendees, and presentations, as well as any other related documents, for the meetings and public outreach activities conducted during this hazard mitigation plan update for St Tammany parish.

Meeting #1: Coordination Conference Call

Date: August 1, 2014

Location: Teleconference

Purpose: Discuss with the hazard mitigation lead for the parish (OHSEP director) the expectations and requirements of the hazard mitigation plan update process and to establish an initial project timeline.

Public Initiation: No

Invitees included:

Member/Title	Jurisdiction/Entity
Dexter Accardo Director	St Tammany Parish OH/SEP
Clarence Powe Deputy Director	St Tammany Parish OH/SEP
Paul Reeb	St Tammany Parish OH/SEP
Susan Willie	Village of Folsom
Ginger Strauss	Village of Sun
Collins Simoneaux	Governor's Office of Homeland Security and Emergency Preparedness
Eric Lundin	City of Slidell
Donna O'Dell	City of Slidell
Mayor Greg Lemons	Town of Abita Springs
Cindy Chatelain	Town of Abita Springs
Kyle Matthews	Town of Madisonville
Daniel Hill	City of Covington
Beth Warren	St Tammany Parish Government
Jeanne Betbeze	St Tammany Parish Government
David DeGeneres	City of Mandeville
Chris Brown	City of Mandeville
Stan Heinrich	Town of Pearl River

Agenda**St Tammany Parish Hazard Mitigation Plan Update Parish Director Meeting #1**

- Welcome – GOHSEP
- Parish Introductions
- SDMI Introductions
- Overview of Plan Update Process and Con Call Objectives
 - Objectives
 - Overview of Plan Update Process
 - Parish Expectations for Update Process
 - Discuss tentative dates for First Planning Meeting
- Plan Update Process will consist of the below main action items:
 - 1) Planning Team Meeting
 - 2) Worksheet Completion/Data Collection
 - 3) Plan Update Begins
 - 4) Public Meeting
 - 5) Public Draft Review
 - 6) Plan Update Final Draft to Parish and GOHSEP
- Planning Team Meeting
 - Select Date and Location (parish can help secure location or provide suggestions for SDMI to coordinate)
 - Parish to think about identifying stakeholders, provide SDMI with a list of these stakeholders to coordinate invitations
 - Worksheets will be provided at this meeting for data collection
- Worksheets
 - Parishes/Stakeholders to have 2 weeks to complete the worksheets
 - Will return completed worksheets to SDMI
- Plan Update begins – Approximately 30 days
 - SDMI will review data submitted in worksheets and update the HM plan based off of information received by parish and stakeholders. This will include:
 - Mitigation Strategy
 - Previous Occurrences
 - Mapping
 - Risk Assessment
- Public Meeting – Mitigation Plan DRAFT for public review/changes
 - Date/location
- Public Draft Review (put plan at library or other public place for 2 weeks to allow time for comments)
- Plan Update from Draft to Final – Approximately 30 days
 - Submission of final plan to GOHSEP HM Officer
- Closing Remarks

Attendees

- Parish of St Tammany
 - Dexter Accardo, Parish Director
- GOHSEP
 - Not represented
- Contractor-LSU-SDMI
 - Brant Mitchell

Meeting #2: Hazard Mitigation Plan Update Kick-Off

Date: August 6, 2014**Location:** Covington, Louisiana

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

Public Initiation: No**Invitees Included:**

Member/Title	Jurisdiction/Entity
Dexter Accardo Director	St Tammany Parish OH/SEP
Clarence Powe Deputy Director	St Tammany Parish OH/SEP
Paul Reeb	St Tammany Parish OH/SEP
Susan Willie	Village of Folsom
Ginger Strauss	Village of Sun
Collins Simoneaux	Governor's Office of Homeland Security and Emergency Preparedness
Eric Lundin	City of Slidell
Donna O'Dell	City of Slidell
Mayor Greg Lemons	Town of Abita Springs
Cindy Chatelain	Town of Abita Springs
Kyle Matthews	Town of Madisonville
Daniel Hill	City of Covington
Beth Warren	St Tammany Parish Government
Jeanne Betbeze	St Tammany Parish Government
David DeGeneres	City of Mandeville
Chris Brown	City of Mandeville
Stan Heinrich	Town of Pearl River

Agenda-Meeting #2

St Tammany Parish Hazard Mitigation Plan Update

Mitigation Coordination Committee Kick-off Meeting

August 6, 2014

INTRODUCTIONS AND BACKGROUND

- Officials
- Mitigation Coordination Committee
- SDMI Team
- Governor's Office of Homeland Security

HAZARD MITIGATION PLANNING PROCESS

- Multi-jurisdictional Approach
- Federal Requirements
- Expectations
- Timeline

OUTREACH STRATEGY

COMMUNITY CAPABILITIES

RISK ASSESSMENT

- Hazard Identification
- Community Assets
- Risk Analysis
- Vulnerabilities

MITIGATION STRATEGY

PLAN APPROVAL PROCESS

PLAN ADOPTION BY JURISDICTIONS

FINAL PRODUCT

ASSIGNMENT: WORKSHEETS FOR EACH JURISDICTION

ADJORN

Roster-Meeting #2

ST TAMMANY PARISH HAZARD MITIGATION PLAN UPDATE KICK-OFF MEETING
August 6, 2014

Name	Organization	Email	Phone	Comments
MARGARET M. REECE	SDMI-LSU	mpierre@lsu.edu	225-578-6396	
Susan Willie	Village of Folsom	swillie@villageoffolsom.com	985-796-5607	
Eric Lundin	City of Slidell	elundin@cityofslidell.org	985-646-4330	
Dexter Accard	STP CO	DACCARD@STPGOV.ORG	985-8982359	
Paul Reeb	STP OHSEP	preeb@stpgov.org	985-774-9710	
Ginger Bays Strauss	Village of Sud	gbays@yahoo.com	601-569-1356	
Collins Simoneaux	GOHSEP	collins.simoneaux@agor 225-329-4261	225-329-4261	
Greg Lemay	Town of Abbeville	lemau_g@ball2out.net	985-789-1537	
Diane O'Dell	City of Slidell	dodelle@cityofslidell.org	985-646-4270	
Kyle Matthews	Town of Abbeville	kylem@townofabbeville.org	985-845-7011	
Daniel Hye	Lovington	dhill@calva.com	985-892-1811	
Bath Warren	STP Gov.	ebathwarren@stpgov.org	985-276-6420	
Jane Betha	STPG	jbetha@stpgov.org	985-861-5095	
David deGenere	Mandeville	ddegenere@cityofmandeville.org	985-624-3106	
Lauren Stevens	SDMI-LSU	lstevens@lsu.edu	225-578-6702	
Lexie Andrews	SDMI-LSU	landrews@lsu.edu		
Brant Mitchell	SDMI-LSU	bmitch@lsu.edu		



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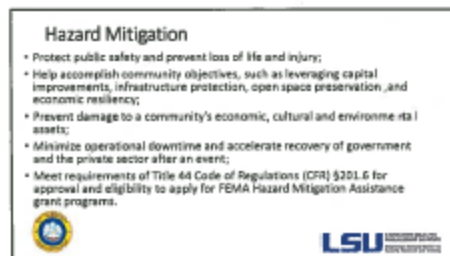
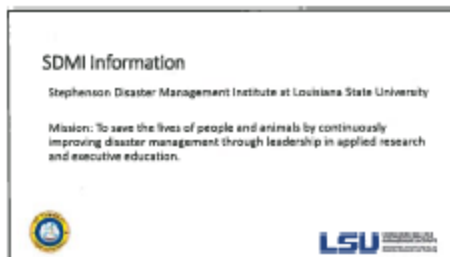
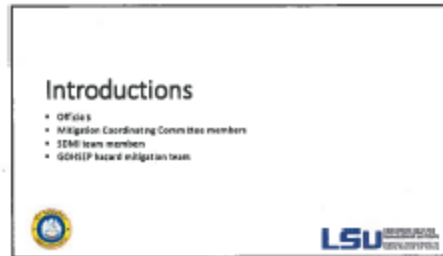
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Security Research and Training

August 6, 2014

Name	Organization	Email	Phone	Comments
Sarah Heinrich	Pearce River T.D.	deborah.n.d.p@pearce.riv.tn.gov	905-968-1172	
Doris Brown	City of Mandeville	dobson@cityofmandeville.com	905-624-3104	
Louise Kidd	City of Hamanville	kidd@cityofhamanville.com	905-624-3403	
Doreen Wilson	-	doreen.wilson@hamanville.com		



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Hazard Mitigation Plan Update Requirements

- The plan must be updated every five (5) years;
- Re-assess hazard identification and risk assessment;
 - Consider any changes since the last plan update, and address events that have occurred since the last plan;
- Incorporate local planning efforts;
- Report mitigation strategy (projects) progress and discuss adjustments;
- Address any weaknesses identified in the previous plan review.



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The Planning Team: A Multi-jurisdictional approach

- Each jurisdiction will have at least one representative on the planning team;
- This representative will need to report back to their community on a regular basis, as well as gather feedback and input into the plan;
- Utilize a council resolution or memorandum of understanding (MOU) to gain official recognition for the planning team.



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Federal Requirements

- Disaster Mitigation Act of 2000 (DMA 2000)
 - Section 322 of the Act specifically addresses mitigation planning and requires state and local governments to prepare multi-hazard mitigation plans as a precondition for receiving FEMA mitigation project grants;
- Title 44 Code of Federal Regulations (CFR) §201.6 for FEMA approval and eligibility to apply for FEMA Hazard Mitigation Assistance



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Expectations

Jurisdictions

- Each jurisdiction **MUST** show active participation in the planning process;
- Each jurisdiction **MUST** complete the mitigation action implementation worksheets;
- A local jurisdiction **MUST** review and revise its plan to reflect progress in local mitigation efforts;
- Each jurisdiction **MUST** adopt the final plan.



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Expectations

Planning Team Member

- Planning team members **MUST** attend meeting (s);
- Planning team members review plan drafts;
- Planning team members **MUST** assist with public involvement and plan adoptions.



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Expectations

SDMI (Contractor)

- SDMI **WILL** facilitate the process;
- SDMI **WILL** lend technical expertise;
- SDMI **WILL** draft the revised plan for GOSHSP and FEMA review;
- SDMI **WILL** make plan revisions as required by GOSHSP and FEMA in preparation for submission to FEMA for plan approval.



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Timeline*

Activity	Details	Notes
Key staff meeting	Jurisdiction users to complete needed information for plan updates	July
Jurisdiction-specific workshops	Stakeholders share in complete needed information for plan updates	One by Aug 20th
Public meeting	The general public and community stakeholders are invited to participate in the planning process. The public will be invited to participate in an online mitigation survey. These tools to identify possible mitigation strategies.	August 21, 1st 10 ^{AM}
Plan development	SCM will work to incorporate appropriate mitigation plan	August-September
Public plan review	The plan will be available to the public for review and comment for a two-week period.	October 15, 2011
Plan review workshop	SCM will present and provide input for revisions. SCM will coordinate with stakeholders	October 15 – Nov 1st
Plan review E-Link	ETM will review and provide input for revisions. SCM will coordinate with stakeholders	November-December
Jurisdiction adoption of plan	Each jurisdiction will adopt the plan	February-March
ETM plan approval	The plan with all agreed adoption will be submitted to ETM for approval	By March 20, 2011



Community Capabilities

Primary types of capabilities for reducing long-term vulnerability through mitigation planning are:

- Planning and regulatory
- Administrative and technical
- Financial
- Educational and outreach




Risk Assessment

- STEP 1: Describe hazards
- STEP 2: Identify community assets
- STEP 3: Analyze risk
- STEP 4: Summarize vulnerability

Previous Occurrences – 84 Events
(January 1, 2010 – present)

Number of Defined Event areas affected	5
Number of Days with Event	41
Number of Days with Event and Property Damage	1
Number of Days with Event and Death or Injury	0
Number of Days with Event and Property Damage	13
Number of Days with Event and Loss of Life	0
Number of Days with Event and Loss of Life	1




Risk Assessment: Hazard Identification

Type	Occurrence	Type	Occurrence
Flooding/Inundation	18	Wildfire	0
Flooding	17	Drought	0
Hail	17	Fog	0
Highwinds	35	Earthquake	0
Tornadoes	3	Land failure	0
Tropical Cyclone	2	Dam failure	0

Risk Assessment: Hazard Identification

Type	Occurrence
Levee Failure	0
Winter Storm	2
Terrilites	0

Risk Assessment- Community Assets

- **People**
 - Population concentration
 - Special needs (functional needs) and demographics
 - Project population growth
- **Economy**
 - Major employers
 - Dependence between economic sectors and infrastructure
- **Built Environment**
 - Building types and age
 - Infrastructure and critical facilities
 - Future development
 - Historic and cultural significance
- **Natural Environment**
 - Areas that protect and mitigate hazards
 - Critical habitat and important environmental features

Mitigation Strategy



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Mitigation Strategy

- The plan should be updated with the status current mitigation strategies.
- According to Section 10: By June 30 each year, the CHS/EP's Deputy Director for Planning will draft an annual evaluation report on progress toward implementing the Update's 14 action items for the Mitigation Coordinating Committee.
- The coordinating committee should identify any new strategies for their jurisdictions and work together to prioritize the updated list.



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Previous Goals

1. Protect the lives and health of the Parish's residents from the dangers of natural hazards
2. Ensure that public services and critical facilities operate during and after a disaster
3. Ensure that adequate evacuation routes, streets, utilities and public and emergency communications are maintained and available during and after a disaster
4. Protect homes and businesses from damage
5. Use new infrastructure and development planning to reduce the impact of natural hazards
6. Give special attention to repetitively flooded areas



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Plan Approval Process



Adopt the Plan

Each jurisdiction **MUST** adopt the final plan.

- As a planning team member be aware of the policies for your jurisdiction
- Know the process for putting this plan on the docket for adoption
- Make sure you make the required deadlines



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The Final Product

- FEMA approved Hazard Mitigation Plan
 - Meets requirements of Title 44 Code of Regulations (CFR) §201.6 for approval and eligibility to apply for FEMA Hazard Mitigation Assistance grant programs
 - A hazard mitigation project strategy for each jurisdiction
 - A comprehensive list of jurisdiction owned properties
 - Assessment of natural disaster-related risks and vulnerabilities



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Reminder-Timeline*

Activity	Details	When
Kick-off meeting	Jurisdictions work to complete needed documents for plan update	July
Jurisdiction specific workshops		Early Aug. till 9
Public meeting	The general public and community stakeholders are invited to participate in the planning process. The public will be invited to provide input on the initial mitigation survey. Jurisdictions will identify priority mitigation strategies	August 23, 24, 25, 26, 27, 28, 29, 30, 31
Plan development	SDMI will work to incorporate community input into the plan	August 31 - September 1
Public plan review	The plan will be available to the public for review and comment for a two-week period	October 1 - 15
Plan review	SDMI will review and provide input for revisions. SDMI will coordinate with jurisdictions and make revisions	October 16 - 19 and 20
Plan review	SDMI will review and provide input for revisions. SDMI will coordinate with jurisdictions and make revisions	October 20 - 23
Final plan adoption	Each jurisdiction will adopt the plan	February 1 - 15
Final plan approved	The plan will be submitted to FEMA for approval	By March 15, 2025

Contact Us

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Lauren Stevens, HMI Project Lead
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Stephenson Disaster Management Institute
www.sdmi.lsu.edu



Meeting #3 Risk Assessment Overview

Date: September 17, 2014

Location: Covington, LA, Louisiana

Purpose: Members of the St Tammany Parish OH/SEP Office (members of HMPU Steering Committee) were presented the results of the most recent risk assessment and an overview of the public meeting presentation during this overview. The assessment was conducted based on hazards identified during previous plans.

Public Initiation: No

Attendees: Dexter Accardo, St Tammany OHSEP and EOC Staff

Lauren Stevens, SDMI, HM Project Lead

Lexie Andrews, SDMI HM Project Lead

Stuart Nolan, SDMI GIS Technician

Neil Landry, SDMI GIS Technician

Chris Rippetoe, SDMI GIS Technician

Meeting #4: Public Meeting

Date: September 17th and September 18th, 2014 **Location:** Slidell, Louisiana and Mandeville, LA

Purpose: The public meeting allowed the public and community stakeholders to participate and provide input into the hazard mitigation planning process. Maps of the St Tammany parish communities were provide for the meeting attendees to identify specific areas where localized hazards occur. Due to the size and nature of St Tammany Parish, two public meetings were held to give citizens more opportunity to participate in the process.

Public Initiation: Yes

Invitees Included:

Member/Title	Jurisdiction/Entity
Dexter Accardo Director	St Tammany Parish OH/SEP
Clarence Powe Deputy Director	St Tammany Parish OH/SEP
Paul Reeb	St Tammany Parish OH/SEP
Susan Willie	Village of Folsom
Ginger Strauss	Village of Sun
Collins Simoneaux	Governor's Office of Homeland Security and Emergency Preparedness
Eric Lundin	City of Slidell
Donna O'Dell	City of Slidell
Mayor Greg Lemons	Town of Abita Springs
Cindy Chatelain	Town of Abita Springs
Kyle Matthews	Town of Madisonville
Daniel Hill	City of Covington
Beth Warren	St Tammany Parish Government
Jeanne Betbeze	St Tammany Parish Government
David DeGeneres	City of Mandeville
Chris Brown	City of Mandeville
Stan Heinrich	Town of Pearl River
Dawson Primes	Tangipahoa OHSEP

****Subject Matter Experts from parish government were also invited by the St Tammany OHSEP Director to attend to answer specific questions about proposed projects from any citizens.**

Agendas -Meeting #4 (Slidell and Mandeville)



Agenda

St Tammany Parish Hazard Mitigation Plan Update
Steering Committee Public Meeting –Slidell, LA
September 17, 2014
6:30p.m.-8:30 p.m.

INTRODUCTIONS AND BACKGROUND (5 minutes)

- Officials
- Planning Steering Committee
- SDMI Team
- Governor's Office of Homeland Security

HAZARD MITIGATION PLANNING PROCESS (10 minutes) – SDMI Staff

- What is Hazard Mitigation? (Video)
- Federal Requirements
- Multi –Jurisdictional Approach and Timeline
- Slidell – State of Louisiana Hazard Mitigation Plan Highlight

RISK ASSESSMENT (20 minutes) – SDMI Staff

- Hazard Identification – Currently Identified St Tammany Parish Hazards
- Risk Analysis
- Vulnerabilities

UPDATE ON PREVIOUS/CURRENT MITIGATION PROJECTS (10 minutes) – St Tammany Parish

- City of Slidell
- St Tammany Parish

PUBLIC FORUM (Remaining Time up until 8:30) – SDMI Staff/St Tammany Parish

- Mitigation strategies (Open Discussion)
 - ✓ Review of current St Tammany Parish Goals
 - ✓ Public Input on Mitigation Actions/Action Plan
- Risk Analysis (Activity)
 - Hazard occurrences
- Identification of problems (Jurisdiction and Parish Maps)
- Completion of public survey
 - Electronic: <https://www.surveymonkey.com/s/sttamhmp>.
 - Paper copy

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Agenda

St Tammany Parish Hazard Mitigation Plan Update
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 - Paper copy

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Meeting notices-Meeting #4



STPGOV.ORG

St. Tammany Parish
Government

For Release, Tuesday, August 25, 2014
Contact Ronnie Simpson 985-898-5243

St. Tammany Parish Government Public Meeting for Natural Hazard Mitigation Plan Update

St. Tammany Parish Government will host a round of Community Meetings for all interested residents to discuss and learn about the Natural Hazard Mitigation Plan Update for the Parish. The public is invited to attend meetings on either Wednesday, September 17, 2014 at 6:30 p.m., at the Slidell City Auditorium, 2056 Second Street, or on Thursday, September 18, at 6:30p.m. at St. Tammany Parish Government Council Chambers, Building A, at 21490 Koop Drive in Mandeville. The St. Tammany Natural Hazard Mitigation Plan is a parish-wide assessment of our vulnerability to natural hazards that may impact our region. It includes action plans and projects for managing and reducing risk. During the meetings there will be a brief presentation of the plan updates. Residents will then have the opportunity to identify areas on the map that have experienced flooding.

The St. Tammany Parish Department of Homeland Security and Emergency Preparedness, in collaboration with Abita Springs, Covington, Folsom, Madisonville, Mandeville, Pearl River, Slidell, unincorporated St. Tammany and Sun, is in the beginning stages of updating its hazard mitigation plan. Residents are asked to participate in a survey about the public perceptions and opinions regarding natural hazards in the Parish. The survey results will be used in the development of the plan. The survey can be found at <https://www.surveymonkey.com/s/sttamhmp>.

Stephenson Disaster Management Institute (SDMI) has been contracted by the Governor's Office of Homeland Security & Emergency Preparedness to produce the Natural Hazard Mitigation Plan. In order to receive Hazard Mitigation grant funds, FEMA requires that the plan be updated every five years. For more information on the program or for questions regarding the public meeting, please contact the Department of Homeland Security and Emergency Preparedness (985) 898-2359.

###



St. Tammany government will seek input on hazard mitigation plan

Page 1 of 1



Everything New Orleans

St. Tammany government will seek input on hazard mitigation plan

st. tammany parish government.JPG

St. Tammany Parish government complex on Koop Drive, north of Mandeville. (*Robert Rhoden, NOLA.com | The Times-Picayune*)

Kim Chatelain, NOLA.com | The Times-Picayune By **Kim Chatelain, NOLA.com | The Times-Picayune**

Email the author | Follow on Twitter

on August 27, 2014 at 11:10 AM, updated August 27, 2014 at 11:27 AM

The St. Tammany Parish government will host two community meetings to discuss an update to the parish's natural hazard mitigation plan. **FEMA requires local governments to develop such plans** and to update them every five years to remain eligible for hazard mitigation grant money.

The public is invited to attend the first meeting at the Slidell Municipal Auditorium, 2056 Second St., on Sept. 17 at 6:30 p.m. On Sept. 18, a second community meeting will be held at 6:30 p.m. at the St. Tammany Parish Council Chambers, 21490 Koop Drive, Building A, near Mandeville.

The mitigation plan includes projects for managing and reducing risks from natural hazards. During each meeting, there will be a brief presentation on proposed updates to the plan. Residents will then have an opportunity to provide input and identify areas that have experienced flooding.

The parish and its various municipalities are in the beginning stages of updating its hazard mitigation plan. Residents are being asked to participate in a survey regarding natural hazards in the parish. The results will be used in the development of the plan. The survey can be found at **<https://www.surveymonkey.com/s/sttamhmp>**.

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Roster-Meeting #4

ST TAMMANY PARISH HAZARD MITIGATION PLAN UPDATE PUBLIC MEETING
Slidell, LA September 17, 2014

[illegible]

ST TAMMANY PARISH HAZARD MITIGATION PLAN UPDATE PUBLIC MEETING
Slidell, LA September 17, 2014

Name	Organization	Email	Phone	Comments
MICHAEL NOTO	CITY OF SLIDELL	MNOTO@CITYOFSLIDELL.ORG	985-646-4381	
Carol Barber	Clippers HOA	cabarber@mc.com	985-285-2440	
Tim Brown	St. Tammany Parish	tbrown@stpn.org	985-898-2535	
Charlotte Collins	Bayou Liberty Beach	charlotte.collins@slidell.la.gov	404-784-6880	
Pat F. Patrick	Lakeview Residence Association	drpfit@yahoo.com	985-788-9488	
Carol Franze	Resident	cfranzen@agcenter.lsu.edu	641-0317	
John Faust	Resident	516.1340@gmail.com	985-641-8854	
Kevin McDonald	Resident	Ksmcdona@bellsouth.net	985-641-8621	
BARBARA PARRIS	RESIDENT (HOA) Waveland	humm1947@ymail.com	985-707-5093	

ST TAMMANY PARISH HAZARD MITIGATION PLAN UPDATE PUBLIC MEETING
Mandeville, LA - September 18, 2014

[illegible]

ST TAMMANY PARISH HAZARD MITIGATION PLAN UPDATE PUBLIC MEETING
Mandeville, LA - September 18, 2014

[illegible]

Presentation-Meeting #4



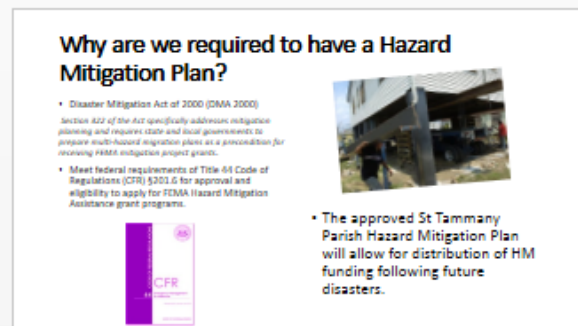
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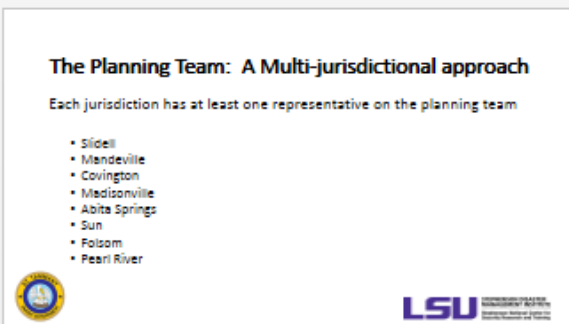
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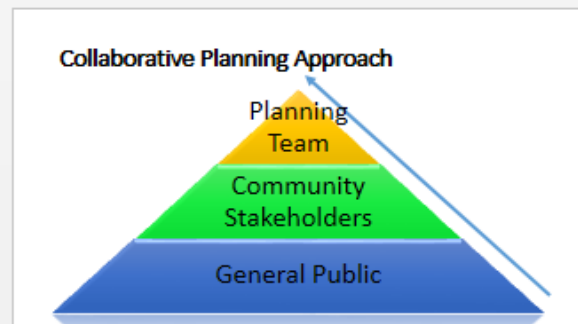
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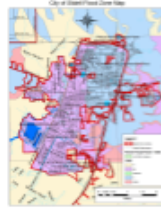
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State of Louisiana Hazard Mitigation Plan - Slidell

- Slidell was highlighted in the Louisiana HM Plan for their comprehensive mitigation program
- Elevating existing homes above Base Flood Elevation (BFE) remains a priority for the City of Slidell. Even before Hurricane Katrina, the city actively supported efforts by its residents and business owners to elevate
- The city is also pursuing policies and programs that protect larger groupings of homes and businesses. These efforts included passing and enforcing zoning, subdivision, flood protection, and storm water management ordinances
- Slidell has taken a more holistic and long-term approach to flood hazard mitigation. The city supports elevating homes and businesses above the BFE. The City invests a large portion of its budget in capital projects intended to reduce the threat from flooding



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Plan Update Timeline

Activity	Detail	When
Kick-off Meeting	Steering committee	August 2014
Jurisdiction-specific meetings and Workshops	Jurisdictions	August 2014
Public Meeting	Steering committee and Public	September 2014
Plan development	Contractor (SOM)	September – October 2014
Public plan review	Public	October 2014
Plan review-GOISEP	GOISEP	November 2014
Plan review-FDMA	FDMA	November-December 2014
Jurisdiction adoption of plan	Jurisdictions	January-March 2015
FDMA plan approval	FDMA	By 31 March 2015

*Timeline subject to change.



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Risk Assessment: Hazard Identification

- The plan includes descriptions of the natural hazards that affect the jurisdictions in the planning area.
- A hazards identification should include the
 - locations affected
 - the extent or strength
 - previous occurrences
 - Probability of future events



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Risk Assessment: Analyze Risk and Summarize Vulnerability

- Risk analysis involves evaluating vulnerable assets, describing potential impacts, and estimating losses for each hazard.
- This helps the community understand the greatest risks facing the area.
- Methods can include exposure risk analysis, historical analysis and scenario analysis.
- Through the risk analysis the community should be able to verbalize or create problem statements about the identified risks.



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Flooding

- A flood is the overflow of water onto land that is usually not inundated.
- The National Flood Insurance Program defines a flood as a general and temporary condition of partial or complete inundation of two or more acres of normally dry land area or of two or more properties from overflow of inland or tidal waves, unusual and rapid accumulation or runoff of surface waters from any source, mudflow, or collapse or subsidence of land along the shore of a lake or similar body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels that result in a flood as defined above.



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Flooding

Types of flooding may include the following:

- Riverine
- Flash
- Ponding
- Backwater
- Urban
- Coastal



In Slidell alone, 6,723 structures are exposed to flood risk in the in the flood zone.



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Repetitive Flooding

- Some areas flood more often than other properties, even more than those in the mapped 100-year floodplain.
- FEMA defines a "repetitive loss" property as one which has received two flood insurance claim payments for at least \$1,000 over any 10-year period since 1978.
- These properties are important to the National Flood Insurance Program and the Community Rating System because even though they comprise 1% of the policy base, they account for 30% of the country's flood insurance claim payments.



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100 Year Flood



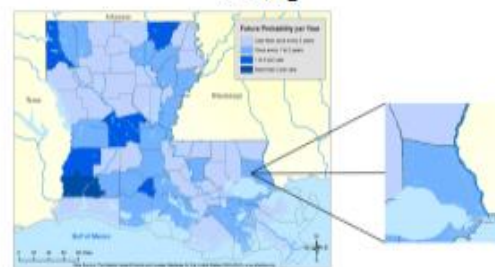
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100 Year Flood Consequences

Total Building Exposure	\$16,350,793,179
Total Economic Loss	\$737,700,243
Total Damaged Buildings	3,596
Building Loss	\$877,762,643
Short Term Shelter Needs	14,321
Essential Facilities Damaged (Fire & Police Stations; Schools)	8

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Flooding



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Flood Risks and Vulnerabilities



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Tropical Storm/Hurricane

- Tropical cyclones are defined spinning, low-pressure air masses that draw surface air into their centers and attain strength ranging from weak tropical waves to the most intense hurricanes

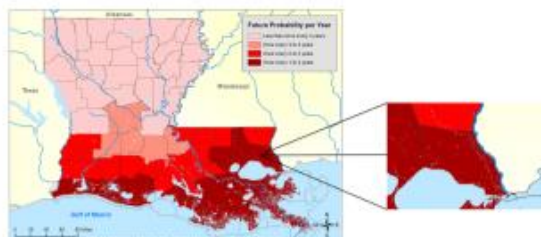


Saffir-Simpson Hurricane Wind Scale	
Increased Wind Speed	Damage
Category 1 74-95 mph (118-153 km/h)	Minor damage to roofs, siding, windows, and trees. Some power outages. Coastal flooding by storm surge.
Category 2 96-110 mph (155-177 km/h)	Extensive damage to roofs, siding, windows, and trees. Significant power outages. Coastal flooding by storm surge.
Category 3 111-129 mph (178-208 km/h)	Extensive damage to roofs, siding, windows, and trees. Significant power outages. Coastal flooding by storm surge.
Category 4 130-155 mph (209-249 km/h)	Extensive damage to roofs, siding, windows, and trees. Significant power outages. Coastal flooding by storm surge.
Category 5 156 mph or greater (251 km/h or greater)	Extensive damage to roofs, siding, windows, and trees. Significant power outages. Coastal flooding by storm surge.

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MANAGEMENT SYSTEMS

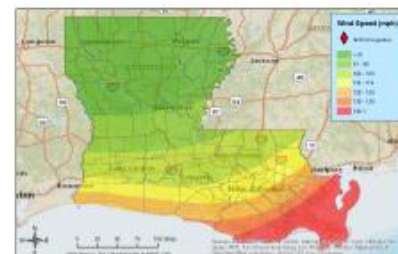
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Tropical Storm/Hurricane



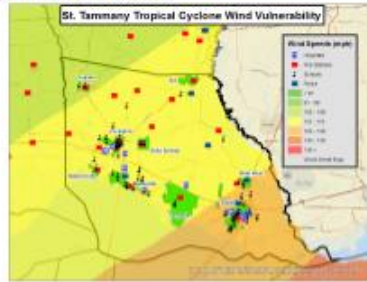
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Tropical Storm/Hurricane



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Tropical Storm/Hurricane



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Tropical Storm



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Hurricane



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Tornadoes

- Tornadoes (also called twisters and cyclones) are rapidly rotating funnels of wind extending between storm clouds and the ground.
- Tornadoes are the most severe storms for their size, and 70% of the world's reported tornadoes occur within the continental United States.

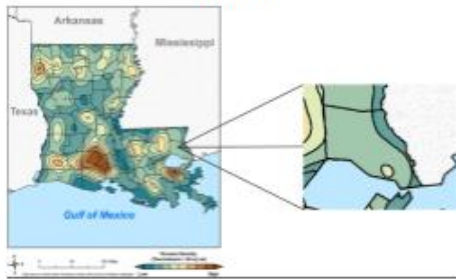


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ORIGINAL FUJITA SCALE	ENHANCED FUJITA SCALE
F5 261-318 mph	EF5 150-208 mph
F4 207-254 mph	EF4 136-155 mph
F3 158-206 mph	EF3 113-135 mph
F2 113-157 mph	EF2 96-112 mph
F1 73-112 mph	EF1 80-110 mph
F0 41-72 mph	EF0 65-85 mph

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Tornado



Tornados



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Fog

- Fog is a cloud that is on the ground. Fog forms once evaporation into the air results in super saturation, usually because the ground surface is very wet and the air is cooler.
- Fog is common in situations over water or where a daytime shower saturates the soil, vegetation and boundary layer and then skies clear in the evening into the night hours.
- Fog has historically been and continues to be a major problem on the causeway leading to closures year round, typically during the colder months.



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Fog



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Fog



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Hailstorm

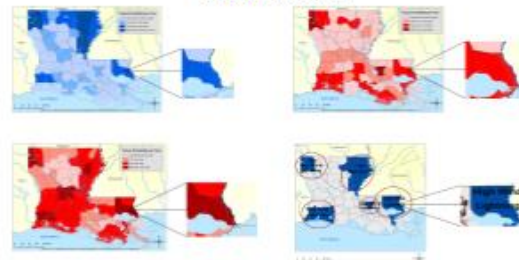
- Hailstones are products of thunderstorms and are developed by downdrafts and updrafts that develop inside cumulonimbus clouds of a thunderstorm, where super cooled water droplets exist.
- Hailstorms occur most frequently during the late spring and early summer, when the jet stream moves northward across the Great Plains. During this period, extreme temperature changes occur from the surface up to the jet stream, resulting in the strong updrafts required for hail formation.



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Thunderstorms



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Hailstorm

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Hailstorm

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Severe Winter

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



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Severe Weather

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Severe Winter

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Severe Winter

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Dam Failure

- Dams are water storage, control, or diversion barriers that impound water upstream in reservoirs. Dams are a vital part of our nation's infrastructure, providing drinking water, flood protection, renewable hydroelectric power, navigation, irrigation, and recreation.
- These critical daily benefits are also inextricably linked to the potential harmful consequences of a dam failure.
- Dam failure is a collapse or breach in the structure. A dam failure can result in severe loss of life, economic disaster, and extensive environmental damage.



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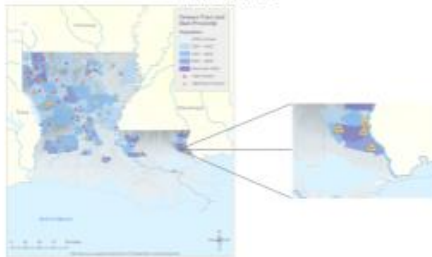
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Dam Failure



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Dam Failure



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Dam Failure



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Dam Failure



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Levee Failure

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



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Wildfire

- A wildfire is combustion in a natural setting, marked by flames or intense heat.
- Most frequently, wildfires are ignited by lightning or unintentionally by humans. Fires set purposefully (but lawfully) are referred to as controlled fires or burns.
- The primary areas affected by wildfires are the forests. Sixty-five percent of St. Tammany Parish is covered in timber.
- While loss of timber is a problem, the real hazard is when wildfires threaten developed areas. As more development moves into and next to forested areas, the hazards to people and property increases.

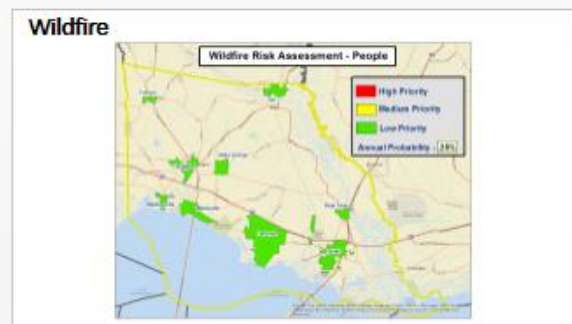
ST. TAMMANY FIRE SITES
15,000 acres of land in St. Tammany Parish, Louisiana, are currently under a wildfire risk assessment.

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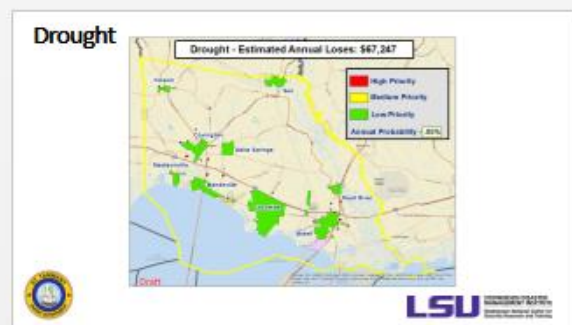
Drought

- A drought is a deficiency in water availability over an extended period of time, caused by precipitation totals and soil water storages that do not satisfy the environmental demand for water either by evaporation or transpiration through plant leaves.
- There are four classes of drought, based upon what is impacted by the shortage of water:
 - Meteorological Drought
 - Hydrologic Drought
 - Agricultural Drought
 - Socioeconomic Drought
- The entire parish can be affected by drought

U.S. Drought Monitor
November 11, 2004
www.drought.gov

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Earthquake

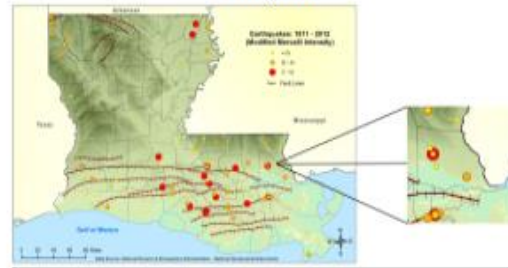
- An earthquake is a sudden motion or trembling of the Earth caused by an abrupt release of stored energy in the rocks beneath the Earth's surface.



Year	Location	Magnitude	Notes
1905	St. Louis	7.0	One of the largest earthquakes in Louisiana history.
1907	St. Louis	6.8	One of the largest earthquakes in Louisiana history.
1918	St. Louis	6.5	One of the largest earthquakes in Louisiana history.
1925	St. Louis	6.2	One of the largest earthquakes in Louisiana history.
1935	St. Louis	6.0	One of the largest earthquakes in Louisiana history.
1945	St. Louis	5.8	One of the largest earthquakes in Louisiana history.
1955	St. Louis	5.5	One of the largest earthquakes in Louisiana history.
1965	St. Louis	5.2	One of the largest earthquakes in Louisiana history.
1975	St. Louis	5.0	One of the largest earthquakes in Louisiana history.
1985	St. Louis	4.8	One of the largest earthquakes in Louisiana history.
1995	St. Louis	4.5	One of the largest earthquakes in Louisiana history.
2005	St. Louis	4.2	One of the largest earthquakes in Louisiana history.

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Earthquake



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Land Failure

- Land failure is a term that describes the combined effects of sea-level rise and land subsidence. Both of these geologic processes impact Louisiana in a similar manner, making it difficult to separate the effects of one from the other.
- Sea-level rise and land subsidence have not been identified as significant contributors to direct disaster damages in Louisiana.
- There are three subsidence faults in the St. Tammany Parish area, known as the Goose Point, Causeway and Madisonville Faults. They are mostly under Lake Pontchartrain and generally parallel the lakeshore.



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Land Failure



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Termites

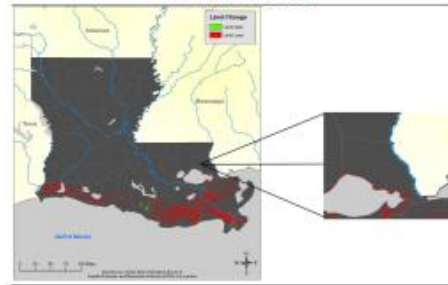
- Termites are small pale colored insects that live off of wood and wooden structures at or near the ground.
- There are two types of termites that live in southeastern Louisiana: drywood termites and subterranean termites.
- The main concentration of termites occurs in southeastern Louisiana, specifically those areas south of Interstates 10 and 12. Most of St. Tammany Parish is affected.



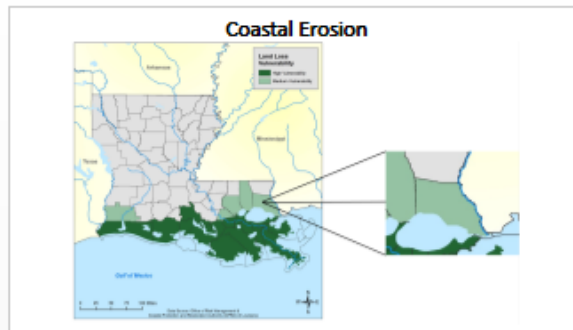
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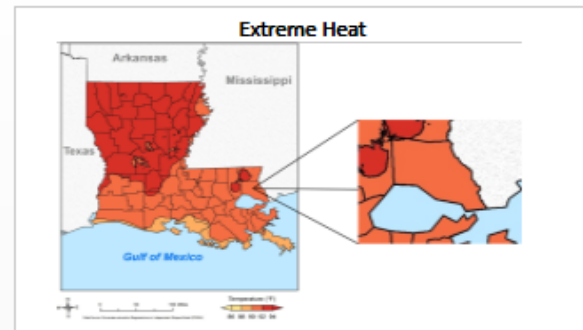
Coastal Erosion



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Risk Assessment: Public Input

- Through breakout activities the community may provide input
 - Maps, project manager specialists, risk analysis activity

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Mitigation Strategy-Hazard Mitigation Goals

Goal One: Protect the lives and health of the Parish's residents from the dangers of natural hazards.

Goal Two: Ensure that public services and critical facilities operate during and after a disaster.

Goal Three: Ensure that adequate evacuation routes, streets, utilities and public and emergency communications are maintained and available during and after a disaster.

Goal Four: Protect homes and businesses from damage.

Goal Five: Use new infrastructure and development planning to reduce the impact of natural hazards.

Goal Six: Give special attention to repetitively flooded areas.




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Proposed Mitigation Projects for Plan Update

Dexter Accardo, St Tammany Parish OHSEP: Project Update Report

Projects include:

- Elevation of Severe Repetitive Loss and Repetitive Loss Structures
- St. Tammany Parish Coastal Master Plan
- Watershed Management
- South Slidell Levee Project
- CDM Lift Stations
- Safe Drinking Water




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Mitigation Strategy-Hazard Mitigation Goals

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- St. Tammany Parish Coastal Master Plan
- Watershed Management
- South Sillwell Levee Project
- CDM Lift Stations
- Safe Drinking Water



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Public Forum Breakout Sessions

- Project Manager Specialists
- Risk Analysis Activity (Hazard Occurrences)
- Problem Area Identification (Jurisdiction and Parish Maps)
- Survey



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Contact Us

Dexter Accardo, Director, St Tammany Parish Office of Homeland Security and Emergency Preparedness

Brant Mitchell, SDMI Director of Research & Operations
bmitch@lsu.edu

Lauren Stevens, SDMI St Tammany Parish HMP Project Lead
lstevens@lsu.edu

Stephenson Disaster Management Institute
www.sdmi.lsu.edu



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Outreach Activity #1: Public Opinion Survey

Date: Ongoing throughout planning process

Location: Web survey

Public Initiation: Yes

DRAFT

St Tammany Parish Hazard Mitigation Public Opinion Survey**SURVEY INFORMATION**

You have been asked to participate in this survey about public perceptions and opinions regarding natural hazards in St Tammany Parish. In addition, we would like information regarding the methods and techniques you prefer for reducing the risks and losses associated with these hazards. The questionnaire should be completed by an adult, preferably the head of household. The information you provide will be used to help improve public/private coordination, mitigation, and risk reduction efforts in your parish. The survey should take less than 30 minutes to complete.

This is a public opinion survey, the results of which will inform local natural hazard mitigation planning in Louisiana.

This survey is being conducted by a division of Louisiana State University on behalf of St Tammany Parish government.

CONSENT INFORMATION

This survey has 25 questions and should take about 30 minutes to complete.

Results of this study may be published, but no names or identifying information will be included in the publication. Subject identity will remain confidential unless disclosure is required by law.

This study has been approved by the LSU IRB. For questions concerning participants rights, please contact the LSU Institutional Review Board Chair, Dr. Dennis Landin at 225-578-8862 or irb@lsu.edu. The Principal Investigator for this survey, Mr. Brant Mitchell, SDMI, can be reached at or bmitch9@lsu.edu

I agree to participate in the study described above and do so by continuing to the survey by clicking the "Next" button below. I acknowledge that I may request from the investigators a hard copy of this consent form for my signature.

IRB Approval #

1. Are you EIGHTEEN (18) years old or older?

- ☐ Yes
☐ No

2. Do you live in St Tammany Parish

- ☐ Yes
☐ No

NATURAL HAZARD INFORMATION

First we would like to know about your experiences involving natural hazards and your exposure to preparedness information.

St Tammany Parish Hazard Mitigation Public Opinion Survey

3. During the past five years in the parish you currently reside in, have you or someone in your household directly experienced a natural disaster such as a severe windstorm, flood, tropical storm or other type of natural disaster?

- ☐ Yes
☐ No

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

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

Other (please specify)

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

	Not Concerned	Not Very Concerned	Neutral	Somewhat Concerned	Very Concerned
Drought	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Flood	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Severe Thunderstorm	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tornado	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tropical Storm or Hurricane	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Severe Winter Storm	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hall	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other (please specify)

6. Have you ever received information about how to make members of your household and your home safer from natural disasters?

- ☐ Yes
☐ No

St Tammany Parish Hazard Mitigation Public Opinion Survey**7. How recently?**

- ☐ Within the last 6 months
- ☐ Between 6 and 12 months
- ☐ Between 1 and 2 years
- ☐ Between 2 and 5 years
- ☐ 5 years or more

8. From whom did you LAST receive information about how to make members of your household and your home safer from natural disasters? (Check only one)

- | | |
|--|---|
| <input type="radio"/> News media | <input type="radio"/> Elected official |
| <input type="radio"/> Government agency | <input type="radio"/> American Red Cross |
| <input type="radio"/> Insurance company | <input type="radio"/> Church or civic association |
| <input type="radio"/> Utility company | <input type="radio"/> Other non-profit organization |
| <input type="radio"/> University or research institution | <input type="radio"/> Social media (Facebook, etc.) |
| <input type="radio"/> Neighbor/friend/family | <input type="radio"/> Not sure |

Other (please specify)

9. Whom would you MOST TRUST to provide you with information about how to make your household and home safer from natural disasters? (Check up to three answers)

- | | |
|---|--|
| <input type="checkbox"/> News media | <input type="checkbox"/> Elected official |
| <input type="checkbox"/> Government agency | <input type="checkbox"/> American Red Cross |
| <input type="checkbox"/> Insurance company | <input type="checkbox"/> Church or civic association |
| <input type="checkbox"/> Utility company | <input type="checkbox"/> Other non-profit organization |
| <input type="checkbox"/> University or research institution | <input type="checkbox"/> Social media (Facebook, etc.) |
| <input type="checkbox"/> Neighbor/friend/family | <input type="checkbox"/> Not sure |

Other (please specify)

St Tammany Parish Hazard Mitigation Public Opinion Survey

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

- | | | |
|--|--|--|
| <input type="checkbox"/> Newspaper stories | <input type="checkbox"/> Online news outlets | <input type="checkbox"/> Fact sheet/brochure |
| <input type="checkbox"/> Newspaper ads | <input type="checkbox"/> Social media (Facebook, etc.) | <input type="checkbox"/> Chamber of Commerce |
| <input type="checkbox"/> TV news | <input type="checkbox"/> Schools | <input type="checkbox"/> Library |
| <input type="checkbox"/> TV ads | <input type="checkbox"/> Billboards | <input type="checkbox"/> Public workshops/meetings |
| <input type="checkbox"/> Radio news | <input type="checkbox"/> Books | <input type="checkbox"/> Displays in public places (mall, grocery, etc.) |
| <input type="checkbox"/> Radio ads | <input type="checkbox"/> Mail | <input type="checkbox"/> University or research institution |
| <input type="checkbox"/> Email newsletters | <input type="checkbox"/> Fire department | |

Other (please specify)

11. Prior to taking this survey, were you aware of your parish's Hazard Mitigation Plan (HMP)?

- ☐ Yes
☐ No

12. Prior to taking this survey, were you aware that the Federal Emergency Management Agency (FEMA) requires your parish to update the hazard mitigation plan every five years in order for your parish to be eligible for federal pre- and post-disaster hazard mitigation funds?

- ☐ Yes
☐ No

COMMUNITY VULNERABILITIES AND HAZARD MITIGATION STRATEGIES

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

St Tammany Parish Hazard Mitigation Public Opinion Survey

13. Community assets are features, characteristics, or resources that either make a community unique or allow the community to function. In your opinion, which of the following CATEGORIES are most susceptible to the impacts caused by natural hazards in your parish?

(Rank the community assets in order of vulnerability, 1 being most vulnerable and 6 being least vulnerable)

<input type="text"/>	Human (Loss of life and/or injuries)
<input type="text"/>	Economic (Business closures and/or job losses)
<input type="text"/>	Infrastructure (Damage or loss of bridges, utilities, schools, etc.)
<input type="text"/>	Cultural/Historic (Damage or loss of libraries, museums, historic sites)
<input type="text"/>	Environmental (Damage or loss of forests, pastureland, waterways, etc.)
<input type="text"/>	Governance (Ability to maintain order and/or provide public amenities and services)

14. Next we would like to know what specific types of COMMUNITY ASSETS are most important to you.

(Check the corresponding box for each asset)

	Not Important	Not Very Important	Neutral	Somewhat Important	Very Important
Nursing homes/Assisted-living facilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Schools (K-12)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hospitals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Major bridges	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fire/Police stations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Museums/Historic buildings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Major employers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Small businesses	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
College/Universities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Parish or City Buildings (City Hall, Courthouse, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other (please specify)

St Tammany Parish Hazard Mitigation Public Opinion Survey

15. A number of activities can reduce your community's risk from natural hazards. These activities can be both regulatory and non-regulatory.

(Check the box that best represents your opinion of the following COMMUNITY-WIDE STRATEGIES to reduce the risk and loss associated with natural disasters)

[illegible]

St Tammany Parish Hazard Mitigation Public Opinion Survey

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

(Tell us how important each one is to you.)

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

MITIGATION AND PREPAREDNESS ACTIVITIES IN YOUR HOUSEHOLD

Households can mitigate and prepare for natural hazards in order to prevent damage to property, injuries, and loss of life. The precautions you take and training you receive can make a big difference in your ability to recover from a natural disaster or emergency. Access to basic services, such as electricity, gas, water, telephones and emergency care can be cut off temporarily, or you may have to evacuate at a moment's notice. The following questions focus on your household's preparedness for disaster events.

St Tammany Parish Hazard Mitigation Public Opinion Survey

17. In the following list, please check those activities that you HAVE DONE in your household, PLAN TO DO in the near future, HAVE NOT DONE, or are UNABLE TO DO.

(Check one answer for each preparedness activity)

	Have Done	Plan to Do	Not Done	Unable to Do
Attended meetings or received written information on natural disasters or emergency preparedness?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Talked with members in your household about what to do in case of a natural disaster or emergency?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Developed a "Household/Family Emergency Plan" in order to decide what everyone would do in the event of a disaster?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Prepared a "Disaster Supply Kit" (stored extra food, water, batteries or other emergency supplies)?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the last year, has anyone in your household been trained in First Aid or Cardio-Pulmonary Resuscitation (CPR)?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Discussed or created a utility shutoff procedure in the event of a natural disaster?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

GENERAL HOUSEHOLD INFORMATION

Finally, we would appreciate any information you are willing to share with us about you and your household. This information will remain confidential and is for survey comparison purposes only.

18. Gender

☐ Female

☐ Male

Other (please specify)

St Tammany Parish Hazard Mitigation Public Opinion Survey

19. How much total combined money did all members of your HOUSEHOLD earn last year?

- ☐ \$0 to \$9,999
- ☐ \$10,000 to \$24,999
- ☐ \$25,000 to \$49,999
- ☐ \$50,000 to \$74,999
- ☐ \$75,000 to \$99,999
- ☐ \$100,000 to \$124,999
- ☐ \$125,000 to \$149,999
- ☐ \$150,000 to \$174,999
- ☐ \$175,000 to \$199,999
- ☐ \$200,000 and up
- ☐ Prefer not to answer

20. In what ZIP code is your home located? (enter 5-digit ZIP code; for example, 00544 or 94305)

21. Do you rent or own the place where you live?

- ☐ Own
- ☐ Rent
- ☐ Neither (please specify)

22. Which category below includes your age?

- ☐ 17 or younger
- ☐ 18-20
- ☐ 21-29
- ☐ 30-39
- ☐ 40-49
- ☐ 50-59
- ☐ 60 or older

St Tammany Parish Hazard Mitigation Public Opinion Survey

23. Does anyone in your household own a business or a farm?

- ☐ Yes
☐ No

24. Which race/ethnicity best describes you? (Please choose only one.)

- ☐ American Indian or Alaskan Native
☐ Asian / Pacific Islander
☐ Black or African American
☐ Hispanic American
☐ White / Caucasian
☐ Multiple ethnicity / Other (please specify)

25. Please feel free to provide any additional comments in the space provided:

Outreach Activity #2: Incident Questionnaire

Date: Public Meeting Activity**Location:** Public Meeting**Public Initiation:** Yes

**Public Meeting
Incident/Issue Questionnaire**

1. Hazard Type(s):
 - a. Flooding
 - i. Riverine
 - ii. Storm Surge
 - iii. Street
 - iv. Other (describe):
 - b. High winds (not tropical)
 - c. Coastal
 - i. Saltwater Intrusion
 - ii. Erosion
 - iii. Other (describe):
 - d. Tropical Systems
 - e. Winter Weather
 - f. Other: _____
2. Describe incident or issue:

3. Location:
 - a. City: _____
 - b. Address or Area: _____
 - c. Localized or dispersed: _____
4. Intensity:
 - a. Depth (flooding) or Size (hail, etc.) _____
 - b. Wind strength
5. Re-occurring or one-time
 - a. If re-occurring, how often? _____
6. What type of interruptions does/did the incident or issue cause? (business closure, damage, evacuation, etc.) _____

7. How long was the interruption (hours, days, weeks, etc.)? _____
8. How could this problem or impact be prevented, fixed or alleviated?

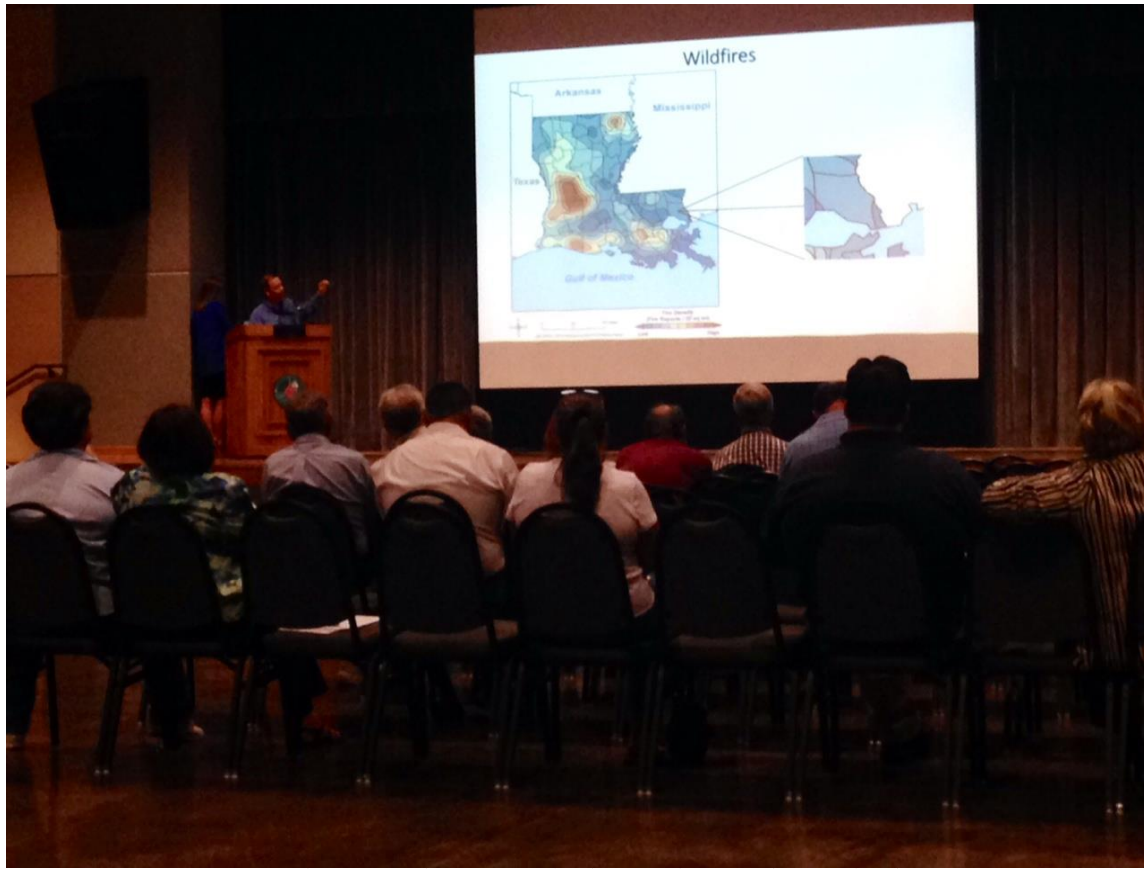
9. Can we contact you if we have further questions about this incident? Yes/No
10. Contact Information (optional)
 - a. Name: _____
 - b. City: _____
 - c. Phone: (_____) _____
 - d. Email: _____

Outreach Activity #3 Mapping Activities

Public meeting attendees were asked to identify areas on jurisdictional maps provided that were “problem areas”. They were also asked to indicate any areas of new development. This activity gave the public an opportunity to interact with SDMI’s GIS Mapping section to as well as provide valuable input on areas that may flood repeatedly during rain events that may not get reported to local emergency managers a significant events.









DRAFT

Meeting #5 Mitigation Strategies/Action Meeting

Date: January 26, 2015**Location:** Covington, LA, Louisiana

Purpose: Members of the Steering Committee were presented the compiled list of parish wide and jurisdiction specific projects. The committee agreed on the priority of each mitigation action for St Tammany Parish and each participating jurisdiction.

Public Initiation: No**Invitees Included:**

Member/Title	Jurisdiction/Entity
Dexter Accardo Director	St Tammany Parish OH/SEP
Clarence Powe Deputy Director	St Tammany Parish OH/SEP
Paul Reeb	St Tammany Parish OH/SEP
Susan Willie	Village of Folsom
Ginger Strauss	Village of Sun
Collins Simoneaux	Governor's Office of Homeland Security and Emergency Preparedness
Eric Lundin	City of Slidell
Donna O'Dell	City of Slidell
Mayor Greg Lemons	Town of Abita Springs
Cindy Chatelain	Town of Abita Springs
Kyle Matthews	Town of Madisonville
Daniel Hill	City of Covington
Beth Warren	St Tammany Parish Government
Jeanne Betbeze	St Tammany Parish Government
David DeGeneres	City of Mandeville
Chris Brown	City of Mandeville
Stan Heinrich	Town of Pearl River

Roster for Meeting #5

Name	Organization	Email	Phone	Comments
Beth WARREN	STP	ebwarren@stpgov.org	985-276-6420	
Jeanne BETHEZ	STP	jbethez@stpgov.org	985-607-5095	
Chris Brown	Manders, LLC	cbrown@cityofmandersville.com	985-624-3104	
Donna O'Dell	City of Slidell	dodell@cityofslidell	985-646-4230	
Dexter McCann	STP O&D	daccann@stpgov.org	985-898-2357	
Daniel Mue	City of Covington	dhill@covla.com	985-892-1811	
Eric Slundin	City of Slidell	eslundin@cityofslidell.org	985-646-4320	
Chad Jones	STP O&D	cpjones@stpgov.org	985-698-4715	
Lauren Stevens	SPNIT	lstevens@slu.edu	225-445-6037	
Susan Willis	Folsom	susanwillis@villageofslu.com		

ST. TAMMANY PARISH HAZARD MITIGATION PLAN UPDATE – Action Priorities
Covington, LA January 28, 2015

[illegible]

Agenda for Meeting #5



Agenda

St. Tammany Parish Hazard Mitigation Plan Update

Action Priorities Meeting – Covington, LA

January 28, 2015

1:00 pm – 2:30 pm

- Mitigation Strategies and Goals
- Proposed Mitigation Projects
- Mitigation Action Evaluation and Prioritization
 - St. Tammany Parish
 - City of Covington
 - City of Mandeville
 - City of Slidell
 - Town of Abita Springs
 - Town of Madisonville
 - Town of Pearl River
 - Village of Folsom
 - Village of Sun
- Committee Approval Process
- Adjourn

Presentation for Meeting #5



St Tammany Parish Hazard Mitigation Plan Update Mitigation Action Prioritization Meeting

January 28, 2015
 Covington, LA



Louisiana State University
 Agricultural and Mechanical College
 Baton Rouge, Louisiana

1



Agenda

- Mitigation Strategies/Goals
- Mitigation Action Evaluation and Prioritization by Committee

2

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Baton Rouge, Louisiana 70803-5000
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Mitigation Strategy

```
graph LR; A((GOALS: What long-term outcome do you want?)) --> B((ACTIONS: What specific actions will local government, community organizations, and others take to reduce risk to hazards?)); B --> C((ACTION PLAN: How will the actions be prioritized and implemented?));
```

GOALS: What long-term outcome do you want?

ACTIONS: What specific actions will local government, community organizations, and others take to reduce risk to hazards?

ACTION PLAN: How will the actions be prioritized and implemented?

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Louisiana State University
Baton Rouge, Louisiana 70702-5000

3

2015 Hazard Mitigation Plan Goals

- Protect the lives and health of the Parish's residents from the dangers of natural hazards.
- Ensure that public services and critical facilities operate during and after a disaster.
- Ensure that adequate evacuation routes, streets, utilities and public and emergency communications are maintained and available during and after a disaster.
- Protect homes and businesses from damage.
- Use new infrastructure and development planning to reduce the impact of natural hazards.
- Give special attention to repetitively flooded areas.

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BAYLOR UNIVERSITY AND TEXAS

Parish wide Mitigation Action Plan

Actions will be prioritized and agreed upon by the committee

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Baton Rouge, Louisiana 70803
Biology, Chemistry, Physics, and Earth Sciences

5

[illegible]

★

★

★

★

★

★

Section 2.2.1 (Updated) Emergency Preparedness and Recovery	The emergency plan should establish a series of steps to be implemented prior to any disaster or in the event of an emergency. The plan should include steps for the evacuation of the City of Mandeville. The plan should include the location of the City of Mandeville and the location of the City of Mandeville and the location of the City of Mandeville.	Emergency Preparedness	Emergency Recovery	Emergency Recovery	Emergency Recovery	Emergency Recovery
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13



Committee Approval

14



Contact Us

Brant Mitchell, SDMI Director of Research & Operations
bmitch@lsu.edu
 (225) 578-5039

Lauren Stevens, HMI Project Lead
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Stephenson Disaster Management Institute
www.sdmi.lsu.edu

15



16



Public Plan Review Documentation



Appendix B: Plan Maintenance

Purpose

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

Monitoring, Evaluating, and Updating the Plan

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

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

These descriptions are followed by an explanation of how and when the plan will be periodically updated.

Responsible Parties

The St Tammany Parish Gants department is the parish department directly responsible for maintaining the plan. The Hazards Mitigation Specialist is the individual responsible for assuring that plan monitoring and evaluating are done in accordance with the procedures outlined in this section. The St Tammany Parish Hazard Mitigation Steering Committee is responsible for updating the plan. Designee's from each of the eight jurisdictions (listed below) will work directly with the Hazards Mitigation Specialist for all plan maintenance, monitoring, evaluation and updates.

- Slidell
- Mandeville
- Covington
- Madisonville
- Abita Springs
- Sun

- Folsom
- Pearl River

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

- At a minimum, monitoring activities by the Hazards Mitigation Specialist should be done every six months;
- Best practice is that the update should start a year and a half prior to plan expiration date, taking into consideration one year of development and six months to receive plan approval. Notices regarding annual evaluations should be sent by the Hazards Mitigation Specialist to the St Tammany Parish Hazard Mitigation Coordination Committee;
- The timetable for evaluations for the first four years is expected to last up to four months (March - June), and approximately one year for the update in the fifth year for re-submittal to FEMA.

Methods for Monitoring and Evaluating the Plan

On an semi-annual basis (and as warranted by circumstances such as a major disaster declaration), the Hazards Mitigation Specialist will monitor the plan in order to assess the degree to which assumptions and underlying information contained in the plan may have changed. For example, the St Tammany Parish Hazards Mitigation Specialist will look for the following:

- Changes in the information available to perform vulnerability assessments and loss estimates. For example: as the parish and municipal risk assessments and plans are integrated into this Plan Update, the Hazards Mitigation Specialist will be soliciting feedback from parish and municipal officials about any changes in their real or perceived risks.
- Changes in laws, policies and regulations. Changes in parish or jurisdictional departments and/or their procedures, including the St Tammany Parish OHS/EP and the administration of grant programs

The St Tammany Parish Hazards Mitigation Specialist will contact each responsible agency quarterly to determine the agencies progress. If a jurisdiction is not making acceptable progress, Hazards Mitigation Specialist will report it to the Parish President or the appropriate mayor. The results of these monitoring efforts will be made available to the St Tammany Parish Hazard Mitigation Steering Committee as they are produced.

Using the compiled results of ongoing monitoring efforts, the plan will be evaluated annually, generally by June 30th, (unless circumstances indicate otherwise). The St Tammany Parish the Hazards Mitigation Specialist will initiate the evaluations by contacting parish and municipal departments identified as responsible parties in the Mitigation Action Plan, as well as other departments and organizations that have been involved in developing the plan. By June 30 each year, the Hazards Mitigation Specialist will draft an annual evaluation report on progress toward implementing the Update's action items for the Mitigation Steering Committee. The report will cover the following points:

- A description of how the evaluation report was prepared and how it is submitted to the governing body, released to the media, and made available to the public.

- How the reader can obtain a copy of the original Plan and Update;
- A review of action item, including a statement on how much was accomplished during the previous year;
- A discussion of why any objectives were not reached or why implementation is behind schedule;
- Recommendations for new projects or revised recommendations.

The annual evaluation report will be reviewed, revised, and adopted by the Mitigation Steering Committee as recommendations to the Parish and municipal Councils. It will be submitted to the governing bodies, released to the media, made available to the public, and included as part of the communities' annual CRS recertification.

The St Tammany Parish Hazards Mitigation Specialist and the St Tammany Parish Hazard Mitigation Steering Committee have the authority to determine if other organizations should also be involved in the process. The St Tammany Parish Hazard Mitigation Steering Committee shall be encouraged to include other departments/organizations which have specific technical knowledge and/or data pertaining to risks.

The initial contacts will be made no later than June of each year for the first four years and in August in the fifth year (in anticipation of the required Plan Update for FEMA re-approval). The initial contact will advise the appropriate agencies/organizations that the plan will be re-evaluated in the coming months, and request their participation in the process.

The St Tammany Parish OHS/EP, Grants Department and Hazards Mitigations Specialist also has the authority to evaluate and update the plan at times other than those identified in this section under the following general conditions: (1) After a major disaster declaration; (2) At the request and in conjunction with the Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP); or (3) When significant new information regarding risks or vulnerabilities is identified.

Any modifications, amendments, or regular plan maintenance to the plan needed prior to the annual evaluation report will be at the discretion and direction of the St Tammany Parish Hazard Mitigation Steering Committee. The members of the committee will follow all applicable parish and jurisdiction policies and procedures regarding approval of any plan maintenance that takes place prior to the FEMA required update.

Plan Evaluation Criteria

The evaluations will consider several basic factors which are similar to those addressed in the monitoring process, and any additional review indicated by GOHSEP or the St Tammany Parish Hazard Mitigation Steering Committee. The factors that will be taken into consideration during these periodic evaluations of the plan include the following:

1. Changes in vulnerability assessments and loss estimations. The evaluation will include an examination of the analyses conducted for hazards identified in the plan and determine if there have been changes in the level of risk to the state and its citizens to the extent that the plan (in particular the strategies and prioritized actions the parish/jurisdiction is considering) should be modified.

2. Changes in laws, policies, ordinances, or regulations. The evaluation will include an assessment of the impact of changes in relevant laws, policies, ordinances, and regulations pertaining to elements of the plan.
3. Changes in parish/jurisdiction departments or their procedures (in particular the St Tammany Parish OHS/EP and Grants Department which is responsible for maintaining the plan) that will affect how mitigation programs or funds are administered.
4. Significant changes in funding sources or capabilities.
5. Progress on mitigation actions (including project closeouts) or new mitigation actions that the parish/jurisdiction is considering.

Updating the Plan

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

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

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

St Tammany Parish Steering Committee, led by the Parish Hazard Mitigation Specialist will initiate, coordinate and lead all plan updates. The next two paragraphs describe the procedures for amendments and five-year updates, respectively.

The nature of Plan amendments will be determined by the evaluation process described above. In general, the St Tammany Parish Hazards Mitigation Specialist will notify the St Tammany Parish Hazard Mitigation Steering Committee that the parish is initiating an amendment, and describe the circumstances that created the need for the amendment (per the list in the Plan Evaluation Criteria section above). The St Tammany Parish Hazards Mitigation Specialist will determine if the St Tammany Parish Hazard Mitigation Steering Committee should be consulted regarding potential changes. If it is determined that the St Tammany Parish Hazard Mitigation Steering Committee should be involved, the nature of the involvement will be at the discretion of St Tammany Parish OHS/EP and Grants Department. When involved in any amendments, the jurisdictional representatives on the Mitigation Steering Committee will forward information on any proposed change(s) to all interested parties including, but not limited to, all affected parish and municipal departments, residents and businesses. When a proposed amendment may directly affect particular private individuals or properties, jurisdictions will follow existing local, state or federal notification requirements, which may include published public notices as well as direct mailings. When amendments are completed absent the

involvement of the St Tammany Parish Hazard Mitigation Steering Committee, the St Tammany Parish Hazards Mitigation Specialist will advise all committee members via email that the plan has been amended, and describe the nature of the update. In addition, the St Tammany Parish Grants Department will provide GOHSEP with a copy (although there is no requirement to have the plan re-approved by FEMA for amendments).

As required by the DMA 2000, the plan will be updated every five years and re-submitted to FEMA for re-approval. In those years, the evaluation process will be more rigorous, and will examine all aspects of the plan in detail. It is anticipated that several meetings of the St Tammany Parish Hazard Mitigation Steering Committee will be required and that the parish and each jurisdiction will formally re-approve the plan prior to its submission to FEMA.

Based on the five-year renewal requirements for Plan Updates, the Hazard Mitigation Steering Committee anticipates that the submission date for the required update will be March 2019. Prior to that time, the St Tammany Parish Hazards Mitigation Specialist will contact the committee members and other appropriate agencies/organizations to confirm a schedule for the Plan Update.

2015 Plan Version Plan Method and Schedule Evaluation

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

Incorporation into Existing Planning Programs

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

- Strategic Plans
- Ordinances, Resolutions, Regulations
- St Tammany Coastal Master Plan
- Parish and Local Emergency Operations Plans
- State of Louisiana Hazard Mitigation Plan
- Storm water Management Plans (City and Parish)
- Capital Improvement Plans (City and Parish)
- Comprehensive Master Plans (City and Parish)

Opportunities to integrate the requirements of this Plan into other local planning mechanisms will continue to be identified through future meetings of the St Tammany Parish Hazard Mitigation Steering Committee and through the five-year review process described herein. The primary means for integrating mitigation strategies into other local planning mechanisms will be through the revision, update and implementation of each jurisdiction's individual plans that require specific planning and administrative tasks (e.g. risk assessment, plan amendments, ordinance revisions, capital improvement

projects, etc.). The members of the Steering Committee will remain charged with ensuring that the goals and strategies of new and updated local planning documents for their jurisdictions or agencies are consistent with the goals and actions of the St Tammany Parish Hazard Mitigation Plan, and will not contribute to increased hazard vulnerability within the Parish.

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

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

On behalf of the jurisdictions of Abita Springs, Covington, Folsom, Madisonville, Mandeville, Pearl River, Slidell and Sun, St Tammany Parish has the authority to incorporate the contents of the Hazard Mitigation Plan into the parish's existing regulatory mechanisms. Agreements are currently in place with jurisdictions to allow for the parish incorporation mechanisms to take place.

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

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Appendix C: Essential Facilities

St Tammany Parish Unincorporated

St. Tammany Parish Unincorporated Essential Facilities									
Type	Name	Coastal Land Loss	Flood	Tornado	Tropical Cyclone	Hail	Lightning	Wind	Wildfires
Fire and Rescue	Abita Springs Fire Station			X	X	X	X	X	X
	Andrew L. "Red" Erwin Memorial Fire Station			X	X	X	X	X	X
	B. K. Dawsey Memorial Station Fire District 6			X	X	X	X	X	X
	Carol Lee Cusachs Memorial Fire Station			X	X	X	X	X	X
	Charlotte Lee Memorial Fire Station			X	X	X	X	X	X
	Ernest Prieto Memorial Fire Station District 4			X	X	X	X	X	X
	Fire District 2 - Weldon W. Poole Memorial Station			X	X	X	X	X	X
	Fountainbleau Fire Station Fire District 4			X	X	X	X	X	X
	Goodbee Vol Fire Department - Daniel T. Mathis Memorial			X	X	X	X	X	X
	Hickory Volunteer Fire Department		X	X	X	X	X	X	X
	Johnny F. Smith Fire Station			X	X	X	X	X	X
	Johnny Smith Memorial Fire Station			X	X	X	X	X	X
	Mandeville Fire Station			X	X	X	X	X	X
	Marguerite Reid Fire Department			X	X	X	X	X	X
	Northpark Fire Station			X	X	X	X	X	X
	Oak Park Fire Station			X	X	X	X	X	X

	Ramon Monroe Fire Department			X	X	X	X	X	X
	St. Tammany Fire District 1 Station 14			X	X	X	X	X	X
	St. Tammany Fire District 12			X	X	X	X	X	X
	St. Tammany Fire District 12			X	X	X	X	X	X
	St. Tammany Fire District 12 Station 125			X	X	X	X	X	X
	St. Tammany Fire District 4 Training Facility		X	X	X	X	X	X	X
	St. Tammany Fire District 6			X	X	X	X	X	X
	St. Tammany Fire District 7			X	X	X	X	X	X
	St. Tammany Fire District 8			X	X	X	X	X	X
	St. Tammany Fire Training Facility		X	X	X	X	X	X	X
	St. Tammany Fire Training Facility		X	X	X	X	X	X	X
	St. Tammany Parish Fire District			X	X	X	X	X	X
	St. Tammany Parish Fire District 3			X	X	X	X	X	X
	St. Tammany Parish Fire District 9			X	X	X	X	X	X
	St. Tammany Parish Fire District 9			X	X	X	X	X	X
	St. Tammany Parish Fire District 9 Station 91			X	X	X	X	X	X
	St. Tammany Parish Fire Protection District 7 Station 2			X	X	X	X	X	X
	St. Tammany Fire Protection Station			X	X	X	X	X	X
Government	Air Traffic Control Facility			X	X	X	X	X	X
	Armed Forces Career Center - Army			X	X	X	X	X	X
	Armed Forces Career Center - Marine Corps			X	X	X	X	X	X
	Armed Forces Career Center - Navy			X	X	X	X	X	X
	Charles A. Frederick, Jr. Public Works Complex			X	X	X	X	X	X
	Coast Guard Auxiliary			X	X	X	X	X	X

Department of Veteran Affairs Slidell Outpatient Clinic		X	X	X	X	X	X	X
Louisiana Department of Motor Vehicles		X	X	X	X	X	X	X
Louisiana DOTD		X	X	X	X	X	X	X
Louisiana National Guard Camp Villere			X	X	X	X	X	X
Louisiana Office of Community Service			X	X	X	X	X	X
Louisiana Office of Community Services			X	X	X	X	X	X
Parish Hall			X	X	X	X	X	X
Social Security Administration			X	X	X	X	X	X
St Tammany Utilities			X	X	X	X	X	X
St. Tammany Department of Public Works			X	X	X	X	X	X
St. Tammany Maintenance Building		X	X	X	X	X	X	X
St. Tammany Parish Department of Animal Services			X	X	X	X	X	X
St. Tammany Parish DPW Brewster Maintenance Shed			X	X	X	X	X	X
St. Tammany Parish DPW Bush Maintenance Shed			X	X	X	X	X	X
St. Tammany Parish DPW Folsom Maintenance Barn			X	X	X	X	X	X
St. Tammany Parish Government Administrative Complex			X	X	X	X	X	X
St. Tammany Parish Government Complex		X	X	X	X	X	X	X
St. Tammany Parish Government Complex			X	X	X	X	X	X
St. Tammany Parish Government Complex			X	X	X	X	X	X
St. Tammany Parish Government Complex			X	X	X	X	X	X
St. Tammany Parish Maintenance Barn		X	X	X	X	X	X	X
St. Tammany School Board		X	X	X	X	X	X	X

	St. Tammany Tourist Commission		X	X	X	X	X	X	X
	St. Tammany Transportation Department			X	X	X	X	X	X
Law Enforcement	St. Tammany Parish Sheriff's Office			X	X	X	X	X	X
	St. Tammany Sheriff's Jail Annex Building			X	X	X	X	X	X
	St. Tammany Sheriff's Office			X	X	X	X	X	X
	St. Tammany Sheriff's Office			X	X	X	X	X	X
	State Police Troop L		X	X	X	X	X	X	X
	Tulane Primate Center Police Substation		X	X	X	X	X	X	X
Corrections	Florida Parishes Juvenile Justice Center			X	X	X	X	X	X
	St. Tammany Parish Jail			X	X	X	X	X	X
Public Health	Greenbrier Behavioral Healthcare			X	X	X	X	X	X
	Lakeview Regional Center			X	X	X	X	X	X
	Lakeview Regional Medical Hospital			X	X	X	X	X	X
	Lakeview Regional Rehabilitation			X	X	X	X	X	X
	Louisiana Heart Hospital			X	X	X	X	X	X
	Louisiana Heart Hospital		X	X	X	X	X	X	X
	Northshore Specialty Hospital			X	X	X	X	X	X
	Ochsner		X	X	X	X	X	X	X
	Ochsner Health Center			X	X	X	X	X	X
	Ochsner Home Health of Covington			X	X	X	X	X	X
	Regency Hospital of Covington			X	X	X	X	X	X
Schools	Alton Elementary School			X	X	X	X	X	X
	Archbishop Hannan High School	X		X	X	X	X	X	X
	Baton Rouge Fine Arts Academy			X	X	X	X	X	X
	Christwood Episcopal School			X	X	X	X	X	X
	Cypress Cove Elementary School	X	X	X	X	X	X	X	X
	Fifth Ward Schools Junior High			X	X	X	X	X	X
	Folsom Junior High School			X	X	X	X	X	X

	Fountainbleau High School			X	X	X	X	X	X
	Fountainbleau Junior High School			X	X	X	X	X	X
	Henry Mayfield Elementary School			X	X	X	X	X	X
	Honey Island Elementary School	X	X	X	X	X	X	X	X
	Joseph B. Lancaster Elementary School			X	X	X	X	X	X
	L. P. Monteleone Junior High School			X	X	X	X	X	X
	Lake Castle Private School		X	X	X	X	X	X	X
	Lake Castle School		X	X	X	X	X	X	X
	Lake Harbor Middle School			X	X	X	X	X	X
	Lakeshore High School			X	X	X	X	X	X
	Lee Road Junior High School			X	X	X	X	X	X
	Little Pearl Elementary			X	X	X	X	X	X
	Lyon Elementary School			X	X	X	X	X	X
	Madisonville Elementary School			X	X	X	X	X	X
	Madisonville Middle School			X	X	X	X	X	X
	Magnolia Trace Elementary School			X	X	X	X	X	X
	Marigny Elementary School			X	X	X	X	X	X
	Northlake Christian School			X	X	X	X	X	X
	Sixth Ward Elementary School			X	X	X	X	X	X
	Whispering Forest Elementary School		X	X	X	X	X	X	X
Nursing Homes	Assisted Living Memory Care		X	X	X	X	X	X	X
	Forest Manor			X	X	X	X	X	X
	St. Joe Estates			X	X	X	X	X	X

Town of Abita Springs

Abita Springs Essential Facilities									
Type	Name	Coastal Land Loss	Flood	Tornado	Tropical Cyclone	Hail	Lightning	Wind	Wildfires
Fire and Rescue	Abita Springs Fire Station			X	X	X	X	X	X
Government	Abita Springs Planning and Zoning Department		X	X	X	X	X	X	X
	Abita Springs Town Hall		X	X	X	X	X	X	X
Law Enforcement	St. Tammany Sheriff's Office		X	X	X	X	X	X	X
Public Health	Ochsner Health Center		X	X	X	X	X	X	X
Schools	Abita Springs Elementary		X	X	X	X	X	X	X
	Abita Springs Middle School		X	X	X	X	X	X	X
	Southern Magnolia Montessori School		X	X	X	X	X	X	X
	Southern Magnolia Montessori School		X	X	X	X	X	X	X

City of Covington

Covington Essential Facilities									
Type	Name	Coastal Land Loss	Flood	Tornado	Tropical Cyclone	Hail	Lightning	Wind	Wildfires
Fire and Rescue	Ernest J. Cooper Memorial Fire Station			X	X	X	X	X	X
Government	22nd JDC Drug Court		X	X	X	X	X	X	X
	City Public Works			X	X	X	X	X	X
	Covington City Hall			X	X	X	X	X	X
	DPS and Corrections Office of Probation and Parole			X	X	X	X	X	X
	Greater Covington Center			X	X	X	X	X	X
	Louisiana Department of Social Services		X	X	X	X	X	X	X
	Louisiana National Guard			X	X	X	X	X	X
	Louisiana Rehabilitation Services			X	X	X	X	X	X
	Public Defender's Office			X	X	X	X	X	X
	St. Tammany Parish Community Action Agency			X	X	X	X	X	X
	St. Tammany Parish Department of Public Works			X	X	X	X	X	X
	St. Tammany Parish Justice Center			X	X	X	X	X	X
	St. Tammany Parish School Board IT Department			X	X	X	X	X	X
Law Enforcement	Covington Police Department			X	X	X	X	X	X
	Covington Police Department Criminal Investigations Division			X	X	X	X	X	X
Public Health	St. Tammany Parish Hospital		X	X	X	X	X	X	X
	St. Tammany Parish Hospital Communication Department			X	X	X	X	X	X
	St. Tammany Parish Hospital Mary Bird Perkins Cancer Center		X	X	X	X	X	X	X
Schools	C. J. Schoen Middle School			X	X	X	X	X	X
	Covington Elementary School		X	X	X	X	X	X	X

	Covington High School			X	X	X	X	X	X
	Pine View Middle School			X	X	X	X	X	X
	St. Paul's Catholic School		X	X	X	X	X	X	X
	St. Peter Catholic School			X	X	X	X	X	X
	St. Scholastica Academy			X	X	X	X	X	X
	William Pitcher Junior High School			X	X	X	X	X	X

Eden Isle – Census Designated Place

Eden Isle Essential Facilities									
Type	Name	Coastal Land Loss	Flood	Tornado	Tropical Cyclone	Hail	Lightning	Wind	Wildfires
Fire and Rescue	Memorial Fire Station			X	X	X	X	X	X

Village of Folsom

Folsom Essential Facilities									
Type	Name	Coastal Land Loss	Flood	Tornado	Tropical Cyclone	Hail	Lightning	Wind	Wildfires
Fire and Rescue	J.C. Pittman Memorial Fire Station			X	X	X	X	X	X
Government	Folsom Town Hall			X	X	X	X	X	X
Law Enforcement	Folsom Police Department			X	X	X	X	X	X
Schools	Folsom Elementary School			X	X	X	X	X	X

Lacombe – Census Designated Place

Lacombe Essential Facilities									
Type	Name	Coastal Land Loss	Flood	Tornado	Tropical Cyclone	Hail	Lightning	Wind	Wildfires
Fire and Rescue	St. Tammany Fire District 3			X	X	X	X	X	X
	St. Tammany Fire District 3			X	X	X	X	X	X
	St. Tammany Parish Fire District 3 Admin & Trng Fac			X	X	X	X	X	X
Government	Lacombe\Mandeville Head Start			X	X	X	X	X	X
	St. Tammany Parish DPW Keller Maintenance Barn			X	X	X	X	X	X
	St. Tammany Parish Recreation District # 4			X	X	X	X	X	X
Law Enforcement	St. Tammany Sheriff's Office Internal Affairs			X	X	X	X	X	X
Schools	Bayou Lacombe Middle School			X	X	X	X	X	X
	Chahta-Ima Elementary School			X	X	X	X	X	X

Town of Madisonville

Madisonville Essential Facilities									
Type	Name	Coastal Land Loss	Flood	Tornado	Tropical Cyclone	Hail	Lightning	Wind	Wildfires
Government	Madisonville City Hall	X	X	X	X	X	X	X	X
Law Enforcement	Madisonville Police Department	X	X	X	X	X	X	X	X
Schools	Madisonville Junior High School	X	X	X	X	X	X	X	X

City of Mandeville

Mandeville Essential Facilities									
Type	Name	Coastal Land Loss	Flood	Tornado	Tropical Cyclone	Hail	Lightning	Wind	Wildfires
Fire and Rescue	Mandeville Fire Station			X	X	X	X	X	X
	St. Tammany Fire District 4		X	X	X	X	X	X	X
	St. Tammany Fire District 4 Administrative Building		X	X	X	X	X	X	X
Government	Charles A. Frederick, Jr. Public Works Complex			X	X	X	X	X	X
	Coast Guard Regional Examination Center			X	X	X	X	X	X
	GNOEC Toll Office	X	X	X	X	X	X	X	X
	Louisiana Department of Motor Vehicles			X	X	X	X	X	X
	Mandeville Aquatic Ecosystem Restoration Project		X	X	X	X	X	X	X
	Tim Burns State Representative		X	X	X	X	X	X	X
Law Enforcement	Causeway Police Station		X	X	X	X	X	X	X
	Mandeville Police Department			X	X	X	X	X	X
	Mandeville Police Department Criminal Invest Div		X	X	X	X	X	X	X
Public Health	Ochsner Health Center		X	X	X	X	X	X	X
	St. Tammany Parish Hospital Complex			X	X	X	X	X	X
Schools	Cedarwood Primary School			X	X	X	X	X	X
	Mandeville Elementary School		X	X	X	X	X	X	X
	Mandeville High School			X	X	X	X	X	X
	Mandeville Junior High School		X	X	X	X	X	X	X
	Mandeville School of Music			X	X	X	X	X	X
	Mary Queen of Peace Catholic School			X	X	X	X	X	X
	Our Lady of the Lake Roman Catholic School			X	X	X	X	X	X
	Pontchartrain Elementary School			X	X	X	X	X	X
	Woodlake Elementary School			X	X	X	X	X	X
Nursing Homes	Beau Provence			X	X	X	X	X	X

Town of Pearl River

Pearl River Essential Facilities									
Type	Name	Coastal Land Loss	Flood	Tornado	Tropical Cyclone	Hail	Lightning	Wind	Wildfires
Fire and Rescue	St. Tammany Fire District 11			X	X	X	X	X	X
Schools	Creekside Junior High			X	X	X	X	X	X
	Pearl River High School			X	X	X	X	X	X

Village of Sun

Sun Essential Facilities									
Type	Name	Coastal Land Loss	Flood	Tornado	Tropical Cyclone	Hail	Lightning	Wind	Wildfires
Fire and Rescue	St. Tammany Parish Fire District 9 Station 94			X	X	X	X	X	X
Government	Sun Town Hall			X	X	X	X	X	X
Law Enforcement	Sun Police Department			X	X	X	X	X	X

City of Slidell

Slidell Essential Facilities									
Type	Name	Coastal Land Loss	Flood	Tornado	Tropical Cyclone	Hail	Lightning	Wind	Wildfires
Fire and Rescue	Peter Pravata Memorial Fire Station		X	X	X	X	X	X	
	St. Tammany Fire Protection District 1		X	X	X	X	X	X	
Government	National Weather Service			X	X	X	X	X	
	Slidell Animal Control		X	X	X	X	X	X	X
	Slidell Housing Authority		X	X	X	X	X	X	
	Slidell Town Hall			X	X	X	X	X	
	St Tammany Slidell Maintenance	X	X	X	X	X	X	X	X
	St. Tammany Mosquito Abatement District			X	X	X	X	X	
	St. Tammany Parish Government		X	X	X	X	X	X	
Law Enforcement	Slidell Police Department			X	X	X	X	X	
	Slidell Sheriff's Post Academy			X	X	X	X	X	
Public Health	Louisiana Heart Hospital		X	X	X	X	X	X	X
	Ochsner		X	X	X	X	X	X	
	Ochsner Outpatient Surgery Site		X	X	X	X	X	X	X
	Slidell Memorial Hospital			X	X	X	X	X	
	Slidell Memorial Hospital			X	X	X	X	X	
	SMH Regional Cancer Center		X	X	X	X	X	X	
	Trinity Neurological Rehab Center		X	X	X	X	X	X	
Schools	Bayou Woods Elementary School		X	X	X	X	X	X	X
	Bonne Ecole		X	X	X	X	X	X	
	Bonne Ecole Elementary School		X	X	X	X	X	X	
	Carolyn Park Middle School		X	X	X	X	X	X	
	Florida Avenue Elementary		X	X	X	X	X	X	

	Our Lady Lourdes Elementary		X	X	X	X	X	X	X
	Salmen High School		X	X	X	X	X	X	X
	Slidell High School		X	X	X	X	X	X	
	Slidell Junior High School		X	X	X	X	X	X	
	St. Margaret Mary Catholic School		X	X	X	X	X	X	
	St. Tammany Jr. High School		X	X	X	X	X	X	
	St. Tammany Junior High			X	X	X	X	X	
	Walter Abney Elementary		X	X	X	X	X	X	
Nursing Homes	Azalea Estates			X	X	X	X	X	
	Greenbriar			X	X	X	X	X	
	Heritage Manor of Slidell		X	X	X	X	X	X	

Appendix D: Plan Adoption



BOBBY JINDAL
GOVERNOR

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

KEVIN DAVIS
DIRECTOR

May 22, 2015

GOHSEP-AFO-BR

The Honorable Patricia Brister
Parish President
St. Tammany
P.O. Box 628
Covington, LA 70433

SUBJECT: Hazard Mitigation Plan Update Approvable Pending Adoption
St. Tammany Parish - Hazard Mitigation Plan Update
Project Number – HMGP # 4080-0005

Dear Ms. Brister:

I am pleased to inform you the St. Tammany Parish Hazard Mitigation Plan was reviewed by the Governor's Office of Homeland Security (GOHSEP) and the Federal Emergency Management Agency (FEMA). Per this review, the St. Tammany Parish Hazard Mitigation Plan has been granted an Approvable Pending Adoption (APA) status. Before FEMA can provide St. Tammany Parish with an official approval letter, the plan must be formally adopted by resolution. After official adoption of the current version of the plan, please provide a signed copy of the resolution as documentation. Additionally, an electronic copy (CD) of the plan in single digital format, including the signed resolutions for St. Tammany Parish must be submitted to GOHSEP.

Thank you for your interest in mitigation and your prompt delivery of this plan. We look forward to receiving your adoption resolutions and electronic copies of your plan to allow formal approval from FEMA.

If you have any questions, please contact your Project Officer, Nicolette English at 225.267.2607 or at nicolette.english@la.gov.

Sincerely,

A handwritten signature in blue ink that reads "Jeffrey Giering".

Jeffrey Giering
State Hazard Mitigation Officer

JG: nbe

Enclosures: 1) FEMA APA Letter Dated May 12, 2015

U.S. Department of Homeland Security
Region VI
800 N. Loop 288
Denton, TX 76209-3698



FEMA

May 12, 2015

Mr. Jeffrey Giering
Louisiana Office of Homeland Security
and Emergency Preparedness
1500 North Main Street
Baton Rouge, LA 70802

RE: Approvable Pending Adoption of the Multi-Jurisdictional Hazard Mitigation Plan for
St. Tammany Parish, Louisiana.
HMGP: FEMA-4080-DR-LA; #05

Dear Mr. Giering:

This office has concluded its review of the referenced plan, in conformance with the Final Rule on Mitigation Planning (44 CFR Part 201.6). Formal approval of this plan is contingent upon the adoption by resolution by the participants on Enclosure A, as well as the receipt of a CD containing all components of this plan.

Adopting resolutions must be submitted to this agency for review and approval no later than **90 days** from the date of this letter. Failure to submit these resolutions in a timely manner could lead to a required update of the plan prior to FEMA approval.

Once this final requirement has been met, a letter of official approval will be generated. The Local Hazard Mitigation Planning Tool, with the reviewer's comments has been enclosed to further assist the jurisdictions in complying with planning requirements.

If you have any questions, please contact Bart Moore, Community Planner at (940) 898-5363.

Sincerely,

A handwritten signature in black ink, appearing to read "Ronald C. Wanhanen", is written over a faint, circular official stamp.

Ronald C. Wanhanen
Acting Chief, Risk Analysis Branch

Enclosures

cc: John Washington, R6-MT-HM

Enclosure A

**St. Tammany Parish, Louisiana
Multi-Jurisdictional
Hazard Mitigation Plan Participants**

Attached is the list of participating governments included in the May 12, 2015 review of the referenced Hazard Mitigation plan.

1. St. Tammany Parish
2. Abita Springs, Town of
3. Covington, City of
4. Folsom, Village of
5. Madisonville, Town of
6. Mandeville, Town of
7. Pearl River, Town of
8. Sun, Village of
9. Slidell, City of

FEMA Region 6 requests that the procedures for **Adoption Submittals** to the Regional office as referenced in the State or Tribal Submittal Procedures for Hazard Mitigation Plans –March 5, 2007. As a reminder, all plans must be submitted through the state except for Tribal plans. Any local plan bypassing the state review process will be returned.

Adoption Submittal (Final)

Region VI recommends that all jurisdictions refrain from adopting a plan until receipt of the Approvable Pending Adoption letter. Once this letter is received all participants are provided 90 days to adopt the plan. Local plans must be submitted through the state. For multi-jurisdictional plans, multiple adoptions should be submitted as a complete package as outlined below.

- ✓ Include a state transmittal letter containing:
 - ✓ Verbiage “For Official Use Only”
 - Plan name, sub-grantee, FEMA funding source, grant or disaster number, and project number, as applicable.
 - Information on enclosed adoptions.
- ✓ Include a CD containing the final plan formatted as a single document, and all signed resolutions as an additional single document on the disk.
 - Track changes, strikethroughs, highlights must be removed from the final plan.
 - A hard copy of full plan is not required for this submittal.
 - Plan must be dated to final adoption month and year.
- ✓ E-mail submittals will not be accepted.
- ✓ Submittals which do not conform to the above requirements will be returned to the State for resubmission.

Town of Abita Springs, La.

TOWN CLERK
CLERK OF TOWN
KATHY ARMAND
FINANCIAL CLERK
NEKI MENDOW
COUNCIL CLERK
LEANNE SCHAEFER
ATTORNEY
EDWARD BEANO
CERTIFIED BUILDING OFFICIAL
DAVID CHATELAIN
PUBLIC WORKS DIRECTOR
JOHNNY CLAY
PUBLIC WORKS CLERK
REE STANBURY



MAYOR
GREG LEMONS

ALDERMEN
GINA KILPATRICK HARPER
(MAYOR PRO TEM)
PATRICK BERRIGAN
DANIEL J. CURTIS
RYAN MURPHY
LESLIE BLITCH WELLIVER
STREET MANAGER
DEBRA MACLEAN
UTILITY CLERK II
LINDA MEERER
PLANNING & ZONING DIRECTOR
CINDY CHATELAIN
TOWN MANAGER
JOE CANDLOHA

A RESOLUTION TO ADOPT THE UPDATED ST. TAMMANY PARISH NATURAL HAZARDS MITIGATION PLAN

Whereas, The Town of Abita Springs is subject to tropical storms, hurricanes, flooding, tornadoes, and other natural hazards that can damage property, close businesses, disrupt traffic, and present a public health and safety hazard; and

Whereas, several Federal programs require that the Parish and Municipalities have an adopted hazard mitigation plan to qualify for Federal Hazards Mitigation benefits; and

Whereas, the St Tammany Parish Council and participating municipalities passed a resolution adopting the Natural Hazards Mitigation Plan in 2004 and adopted changes to the plan in 2010.

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

Whereas, the Town of Abita Springs participated in the development and the update of the Natural Hazards Mitigation Plan subsequently making the Town eligible for benefits associated with the Natural Hazards Mitigation Plan and the Hazards Mitigation Grant Program (HMGP).

Whereas, the Natural Hazards Mitigation Plan is required by the Federal Emergency Management Agency (FEMA) to be updated and revised every five years; and,

Whereas, the 2015 Parish Natural Hazards Mitigation Plan 2015 update will include the municipalities of Covington, Mandeville, and Slidell, which in the past have had individual plans. The addition will make this Natural Hazards Mitigation Plan a comprehensive parish-wide jurisdiction plan.

NOW, THEREFORE, BE IT RESOLVED,

1. The Town of Abita Springs hereby states its continued interest in participating in the Parish's mitigation planning process.
2. The appointed representative to the Parish's Mitigation Planning Committee is charged with:
 - a. Attending the regular meetings of the Parish's Mitigation Planning Committee;
 - b. Keeping the Town staff and this Council informed of the Committee's activities and recommendations;
 - c. Assisting the Parish's efforts to collect information about the hazards facing the Town of Abita Springs and our current policies and programs that can mitigate the impacts of those hazards; and
 - d. Obtaining input from Town Staff on mitigation issues relevant to their work.

BE IT FURTHER RESOLVED, that the Town of Abita Springs hereby adopts the current updates to the St. Tammany Parish Natural Hazards Mitigation Plan.

This resolution was moved for adoption by Alderman Blitch Welliver, seconded by Alderman Murphy on this 21st day of July, 2015. Mayor Pro Tem Kilpatrick-Harper acting as the presiding officer in the Mayor's absence did not cast a vote. The vote thereon was as follows:

Yeas: 3, Aldermen Berrigan, Murphy, and Blitch Welliver

Nays: 0

Abstain: 0

Absent: 1, Aldermen Curtis

ATTEST Kathy Armand, Town Clerk

**CITY OF COVINGTON
STATE OF LOUISIANA**

RESOLUTION NO. 2015-14

**A RESOLUTION OF THE COVINGTON CITY COUNCIL
ADOPTING THE ST. TAMMANY PARISH HAZARD
MITIGATION PLAN UPDATE – 2015**

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

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

WHEREAS, the Covington City Council adopted the City-wide Hazard Mitigation Plan for the City of Covington by Resolution No. 2011-02 dated February 1, 2011; and

WHEREAS, the Federal Emergency Management Agency (FEMA) requires that the Hazard Mitigation Plan be updated and revised every five (5) years; and

WHEREAS, the City of Covington desires to participate in the St. Tammany Parish Hazard Mitigation Plan Update – 2015 which was coordinated by the St. Tammany Parish Hazard Mitigation Plan Update Steering Committee, in collaboration with the participating jurisdictions as well as community stakeholders and the general public; and

WHEREAS, the St. Tammany Parish Hazard Mitigation Plan Update – 2015 will include the City of Covington, which in the past has had an individual plan. The addition will make this Hazard Mitigation Plan Update a comprehensive parish-wide jurisdiction plan.

NOW, THEREFORE, BE IT RESOLVED that the City Council for the City of Covington, at a meeting duly convened, hereby adopts the said St. Tammany Parish Hazard Mitigation Plan Update – 2015 on behalf of the City of Covington.

MOVED FOR ADOPTION by ROLLING, seconded by CONER,

was then submitted to a vote, the vote thereon being as follows:

Resolution No. 2015-14
Adopt STP Hazard Mitigation Plan
Page 2 of 2

1

2	<u>MEMBERS</u>	<u>YEAS</u>	<u>NAYS</u>	<u>ABSENT</u>	<u>ABSTAINING</u>
3	John Callahan	<u>✓</u>	<u> </u>	<u> </u>	<u> </u>
4	Jerry Coner	<u>✓</u>	<u> </u>	<u> </u>	<u> </u>
5	Mark Wright	<u>✓</u>	<u> </u>	<u> </u>	<u> </u>
6	Larry Rolling	<u>✓</u>	<u> </u>	<u> </u>	<u> </u>
7	Rick Smith	<u>✓</u>	<u> </u>	<u> </u>	<u> </u>
8	R.S. "Sam" O'Keefe	<u>✓</u>	<u> </u>	<u> </u>	<u> </u>
9	Lee S. Alexius	<u>✓</u>	<u> </u>	<u> </u>	<u> </u>
10					

11 And the resolution was declared adopted on this, the 14th day of July, 2015.

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LEE S. ALEXIUS
COUNCIL PRESIDENT


BONNIE D. CHAMPAGNE
COUNCIL CLERK

CERTIFICATE

I, Bonnie D. Champagne, Council Clerk of the City of Covington, certify that the above and foregoing constitutes a true and correct copy of a Resolution passed and adopted by the City of Covington on the 14th day of July, 2015, at which meeting a quorum was present and voting.

Covington, Louisiana, this 14th day of July, 2015.


BONNIE D. CHAMPAGNE
COUNCIL CLERK

VILLAGE OF FOLSOM**RESOLUTION****A RESOLUTION ADOPTING THE 2015 ST. TAMMANY PARISH
HAZARD MITIGATION PLAN UPDATE**

WHEREAS, the Village of Folsom is subject to tropical storms, hurricanes, flooding, tornados, and other natural hazards that can damage property, close businesses, disrupt traffic and present public health and safety hazards; and

WHEREAS, the Village of Folsom Mitigation Plan was originally developed, approved and adopted in 2004 and updated in 2010; and

WHEREAS, the 2015 St. Tammany Parish Hazard Mitigation Plan Update includes the addition of the Village of Folsom which previously had an individual plan; and

WHEREAS, the Village of Folsom as well as the other municipalities within St. Tammany Parish will make the St. Tammany Parish Natural Hazards Mitigation Plan a comprehensive parish-wide jurisdiction plan as required by law.

NOW THEREFORE BE IT RESOLVED by the Village of Folsom that it hereby adopts the 2015 St. Tammany Parish Hazard Mitigation Plan Update.

MOVED FOR ADOPTION by LANCE WILLIE, seconded by JILL MATHIES.

ALDERWOMAN PAULETTE LEE
ALDERWOMAN JILL MATHIES
ALDERMAN LANCE WILLIE

<u>YEA</u>	<u>NAY</u>
	___
	___
	___

THIS RESOLUTION WAS DECLARED ADOPTED on the 13th day of July, 2015,
at a regular meeting of the Board of Aldermen, a quorum of the members being present and
voting.


BETTYE M. BOGGS, MAYOR

CERTIFICATE

I, Andree Core, Municipal Clerk of the Village of Folsom, certify that the above and
foregoing constitutes a true and correct copy of a Resolution passed and adopted by the Village
of Folsom on this 13th day of July, 2015, at which a quorum was present and voting.


ANDREE CORE, MUNICIPAL CLERK

July 13, 2015.

Resolution No. 07-01-2015

Resolution adopting St. Tammany Parish Natural Hazards Mitigation Plan
with current updates.

WHEREAS, the Town of Madisonville is subject to tropical storms, hurricanes, flooding, tornados and other natural hazards that can damage property, close businesses, disrupt traffic and present a public health and safety hazard; and

WHEREAS, several Federal programs require the Town of Madisonville have an adopted hazard mitigation plan to qualify for Federal benefits; and

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


WHEREAS, the Natural Hazards Mitigation Plan is required by the Federal Emergency Management Agency (FEMA) to be updated and revised every 5 years; and

NOW, THEREFORE, BE IT RESOLVED, the Natural Hazards Mitigation Plan is hereby adopted as the plan of the Town of Madisonville.

ADOPTED this the 8 day of July, 2015


Clerk
Town of Madisonville

APPROVED this the 8 day of 2015, 2015


Peter Gitz, Mayor
Town of Madisonville, Louisiana

1 *THE FOLLOWING RESOLUTION WAS INTRODUCED BY COUNCIL*
2 *MEMBER BUCHHOLZ; AND SECONDED FOR ADOPTION BY COUNCIL*
3 *MEMBER DANIELSON*

4
5 **RESOLUTION NO. 15-33**

6
7 *A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF*
8 *MANDEVILLE ADOPTING THE CHANGES TO THE CITY OF*
9 *MANDEVILLE'S UPDATED HAZARDS MITIGATION PLAN ORIGINALLY*
10 *PASSED IN 2004 AND THE CHANGES ADOPTED IN 2010.*

11
12 **WHEREAS**, the City of Mandeville is subject to tropical storms, hurricanes, flooding,
13 tornadoes, and other natural hazards that can damage property, close businesses, disrupt traffic
14 and present a public health and safety hazard; and

15
16 **WHEREAS**, several Federal programs require that the City of Mandeville have an
17 adopted hazard mitigation plan to qualify for Federal benefits,

18
19 **WHEREAS**, the City of Mandeville passed a resolution which adopted the Natural
20 Hazards Mitigation Plan in 2004 and adopted changes to the Plan in 2010; and

21
22 **WHEREAS**, the Natural Hazards Mitigation Plan is required by the Federal Emergency
23 Management Agency (FEMA) to be updated and revised every 5 years; and

24
25 **WHEREAS**, the City of Mandeville desires to participate in the updated Natural
26 Hazards Mitigation Plan 2015 prepared by St. Tammany Parish Council comprised of Parish-
27 wide representatives; and

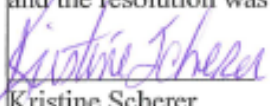
28
29 **WHEREAS**, the St. Tammany Parish's Natural Hazards Mitigation Plan 2015 update
30 will include the City of Mandeville which in the past has had an individual plan. The addition
31 will make this Natural Hazards Mitigation Plan a comprehensive parish-wide jurisdiction plan.

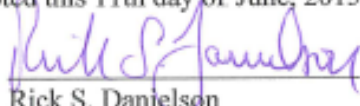
32
33 **NOW, THEREFORE, BE IT RESOLVED** that the Mandeville City Council hereby
34 adopts the said updated Hazards Mitigation Plan on behalf of the City of Mandeville and St.
35 Tammany Parish.

36 With the above resolution having been properly introduced and duly seconded, the vote
37 was as follows:

38 AYES: 4 (Danielson, Madden, Buchholz, Ellis)
39 NAYS: 0
40 ABSENT: 1 (Burguières)
41 ABSTENTIONS: 0

42 and the resolution was declared adopted this 11th day of June, 2015.

43
44 
45 Kristine Scherer
46 Clerk of Council

47 
48 Rick S. Danielson
49 Council Chairman



DAVID McQUEEN
Mayor

VIRGIL R. PHILLIPS
Mayor Pro Tempore

TIMOTHY MATHISON
Town Attorney

MATHIEU E. DAIGLE
Assistant Town Attorney

TOWN OF PEARL RIVER

39460 Willis Alley ~ Town Hall

P.O. Box 1270

Pearl River, Louisiana 70452

Phone (985) 863-5800

FAX (985) 863-2586

townhall@townofpearlriver.net

BRIDGETT BENNETT
LORA CUTRER
DAVID McGREGOR
KATHRYN WALSH
Aldermen

JOHNNY "JJ" JENNINGS
Chief of Police

JACOB de BRAM
Town Clerk

BRENDA WICHTERICH
Deputy Clerk

RESOLUTION NO. 06-16-15

RESOLUTION: Adopting changes to the St. Tammany Parish Natural Hazards Mitigation Plan Originally Passed in November 2004 and The Changes Adopted in 2010.

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

WHEREAS, Several Federal programs require that the Parish and Municipalities have an adopted hazard mitigation plan to qualify for Federal Hazards ad Mitigation benefits; and

WHEREAS, St. Tammany Parish Council and participating municipalities passed a resolution adopting the Natural Hazards Mitigation Plan in November 2004 and adopted changes to the Plan in 2010; and

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

WHEREAS, the Natural Hazards Mitigation Plan is required by the Federal Emergency Management Agency (FEMA) to be updated and revised every 5 years; and

WHEREAS, the Natural Hazards Mitigation Plan 2015 update has been completed and forwarded to FEMA for reviews and requires the adoption of the changes by the parish and participating municipal councils; and

WHEREAS, Natural Hazards Mitigation Plan 2015 update will include the additions of the municipalities of Covington, Mandeville, and Slidell which in the past have individual plans. The addition will make this Natural Hazards Mitigation Plan a comprehensive parish-wide jurisdiction plan.

THE TOWN OF PEARL RIVER HEREBY RESOLVES to adopt the changes to the St. Tammany Parish Natural Hazards Mitigation Plan.

THIS RESOLUTION HAVING BEEN SUBMITTED TO A VOTE, THE VOTE THEREON WAS AS FOLLOWS:

MOVED FOR ADOPTION BY: KATHRYN WALSH AND SECONDED BY: VIRGIL PHILLIPS


YEAS: 5

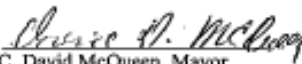
NAYS: 0

ABSTAIN: 0

ABSENT: 0

ADOPTED this 16th day of June, 2015


Jacob de Bram, Town Clerk
Town of Pearl River, Louisiana


C. David McQueen, Mayor
Town of Pearl River, Louisiana

APPROVED this 16th day of June, 2015

Introduced May 26, 2015, by
Councilwoman Harbison, seconded by
Councilman Borchert, (by request of
Administration)

RESOLUTION R15-18

A resolution adopting the 2015 St. Tammany Parish Hazard Mitigation Plan Update.

WHEREAS, the City of Slidell is subject to tropical storms, hurricanes, flooding, tornados, and other natural hazards that can damage property, close businesses, disrupt traffic and present public health and safety hazards; and

WHEREAS, City of Slidell Hazard Mitigation Plan was originally developed, approved and adopted in 2006 and updated in 2010; and

WHEREAS, the 2015 St. Tammany Parish Hazard Mitigation Plan Update includes the addition of the City of Slidell which previously had an individual plan; and

WHEREAS, the addition of the City of Slidell as well as the other municipalities within St. Tammany Parish will make the St. Tammany Parish Natural Hazards Mitigation Plan a comprehensive parish-wide jurisdiction plan as required law.

NOW THEREFORE BE IT RESOLVED by the Slidell City Council that it hereby adopts the 2015 St. Tammany Parish Hazard Mitigation Plan Update.

ADOPTED this 26th day of May, 2015.

Kim Harbison
President of the Council
Councilwoman-at-Large

Thomas P. Reeves
Council Administrator

RESOLUTION 07-14-2015

A RESOLUTION OF THE VILLAGE OF SUN DESIGNATING THE VILLAGE COUNCIL TO ADOPT CHANGES TO THE ST. TAMMANY PARISH NATURAL HAZARDS MITIGATION PLANNING.

Whereas, The Village of Sun is subject to tropical storms, hurricanes, flooding, tornadoes, and other natural hazards that can cause damaged property, close businesses, disrupt traffic, and present a public health and safety hazard: and

Whereas, Several Federal programs requires that the Parish and Municipalities have an adopted hazard mitigation plan to qualify for Federal Hazard Mitigation benefits: and

Whereas, St. Tammany Parish Council and participating municipalities passed a resolution adopting the Natural Hazards Mitigation Plan in 2010.

Whereas, The Village of Sun participated in the development and the update of the Natural Hazards Mitigation Plan and subsequently making the Village eligible for benefits associated with the Natural Hazard Mitigation Plan and the Hazards Mitigation Grant Program (HMGP).

Whereas, The Natural Hazards Mitigation Plan is required by the Federal Emergency Management Agency (FEMA) to be updated and revised every four (4) years.

Whereas, This Hazards Mitigation Plan update will entitle St. Tammany Parish and participating jurisdiction the eligibility for the Hazards Mitigation Grant Program for the next five (5) years expiring March 22, 2020.

Now, therefore, be it resolved that:

1. The Village of Sun hereby states its continued interest in participating in the Parish's Mitigation Planning process by adopting the current updates to the Natural Hazards Mitigation Plan.
2. The appointed representative to the Parish's Mitigation Planning Committee is charged with:
 - a. Attending the regular meetings of the Parish Mitigation Planning Committee;
 - b. Keeping Village staff and this council informed of the Committee activities and recommendations;
 - c. Assisting the Parish's efforts to collect information about the hazards facing the **Village of Sun** and our current policies and programs that can mitigate the impacts of those hazards, and.
 - d. Obtaining input from The Village staff on mitigation issues relevant to their work.
3. When the Parish's Mitigation Planning Committee has completed its work and presents its recommended plan, this council will review it with the intention of adopting all or parts of it. It is understood that this resolution of commitment to participate in the planning process does not constitute a commitment to enact the recommended plan.

MOVED FOR ADOPTION BY Burrell Mullett_____,
Seconded by Will Talley_____ motion was carried.

Was then submitted to a vote, the vote thereon being as follows:

<u>MEMBERS</u>	<u>YEAS</u>	<u>NAYS</u>	<u>ABSENT</u>	<u>ABSTAINING</u>
Will Talley	x			
Clint Shaw			x	
Burrell Mullett	x			

And the resolution was declared adopted on the, 14th day of July, 2015

I Ginger Bays, Clerk of the Village of Sun do hereby certify the foregoing to be a true and correct copy of a Resolution adopted by the Village of Sun Board of Alderman at a meeting on ____14TH__ day of July 2015.

My signature this 14th day of July 2015

Ginger Bays

Ginger Bays - Clerk

APPROVED this 14th day of July 2015

Richard T. Kivett

Richard T. Kivett
Mayor
Village of Sun, Louisiana



ST. TAMMANY PARISH COUNCIL

RESOLUTION

RESOLUTION COUNCIL SERIES NO: C-4348

COUNCIL SPONSOR: TANNER/BRISTERPROVIDED BY: GRANTS ON BEHALF OF EOC

RESOLUTION TO ADOPT CHANGES TO THE ST. TAMMANY
PARISH NATURAL HAZARDS MITIGATION PLAN ORIGINALLY
PASSED IN NOVEMBER 2004 AND THE CHANGES ADOPTED IN
2010.

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

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

WHEREAS, the Parish Council and participating municipalities passed a resolution adopted the Natural Hazards Mitigation Plan in November 2004 and adopted changes to the Plan in 2010; and

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

WHEREAS, the Natural Hazards Mitigation Plan is required by the Federal Emergency Management Agency (FEMA) to be updated and revised every 5 years; and

WHEREAS, the Natural Hazards Mitigation Plan 2015 update has been completed and forwarded to FEMA for review and requires the adoption of the changes by the parish and participating municipal councils; and

WHEREAS, this Natural Hazards Mitigation Plan 2015 update will include the additions of the municipalities of Covington, Mandeville and Slidell which in the past have individual plans. The addition will make this Natural Hazards Mitigation Plan a comprehensive parish-wide jurisdiction plan.

THE PARISH OF ST. TAMMANY HEREBY RESOLVES to adopt the changes to the St. Tammany Parish Natural Hazards Mitigation Plan.

THIS RESOLUTION HAVING BEEN SUBMITTED TO A VOTE, THE VOTE THEREON WAS AS FOLLOWS:

MOVED FOR ADOPTION BY: MR. BELLISARIO SECONDED BY: MR. STEFANCIK

YEAS: DEAN, SHARP, THOMPSON, FALCONER, TANNER, GROBY, BELLISARIO, O'BRIEN, STEFANCIK, BINDER, ARTIGUE, SMITH (2)

NAYS: (0)

ABSTAIN: (0)

ABSENT: GOULD, CANULETTE (2)

Resolution Council Series No. C-4348

PAGE 2 OF 3

THIS RESOLUTION WAS DECLARED ADOPTED ON THE 7 DAY OF MAY, 2015, AT A REGULAR MEETING OF THE PARISH COUNCIL, A QUORUM OF THE MEMBERS BEING PRESENT AND VOTING.


RICHARD E. TANNER, COUNCIL CHAIRMAN

ATTEST:


THERESA L. FORD, COUNCIL CLERK

ADMINISTRATIVE COMMENT

This Resolution is to adopt changes to the St. Tammany Parish Natural Hazards Mitigation Plan originally passed in November 2004 and the changes adopted in 2010.

Appendix E: State Required Worksheets

During the planning process (Appendix A) the Hazard Mitigation Plan Update Steering Committee was provided state-required plan update process worksheets to be filled out by each jurisdiction. The worksheets were presented at the Kickoff Meeting by the contractor as tools for assisting in the update of the Hazard Mitigation Plan. The plan update worksheets allowed for collection of information such as planning team members, community capabilities, critical infrastructure and vulnerable populations and NFIP information. The following pages contain documentation of the worksheets.

Mitigation Planning Team

Member/Title	Jurisdiction/Entity	Address	Phone/Email
<u>Dexter Accardo</u> Director	St Tammany Parish OH/SEP	510 Boston Street Suite 100, Covington, LA	985-867-3787; daccardo@stpgov.org
<u>Clarence Powe</u> Deputy Director	St Tammany Parish OH/SEP	510 Boston Street Suite 100, Covington, LA	985-867-3787; cpowe@stpgov.org
<u>Paul Reeb</u>	St Tammany Parish OH/SEP	510 Boston Street Suite 100, Covington, LA	985-774-9710; pjreeb@stpgov.org
Susan Willie	Village of Folsom	82378 June Street, Folsom, LA 70437	985-796-5607; swillie@villageoffolsom.com
Ginger Strauss	Village of Sun		601-569-1356; gbays@yahoo.com
<u>Collins Simoneaux</u>	Governors Office of Homeland Security and Emergency Preparedness	510 Boston Street Suite 100, Covington, LA	225-329-4261; collinssimoneaux@la.gov
<u>Eric Lundin</u>	City of Slidell	250 Bouscaren Street, Suite 203 Slidell, Louisiana 70458	985-646-4320; elundin@cityofslidell.org
Donna O'Dell	City of Slidell	2056 2nd St, Slidell, LA 70458	985-646-4270; dodell@cityofslidell.org
Mayor Greg Lemons	Town of Abita Springs	22161 Level Street Abita Springs, LA 70420	985-789-1537; lemon_g@bellsouth.net
Cindy Chatelain	Town of Abita Springs	22161 Level Street Abita Springs, LA 70420	Cindy.chatelain@townofabitasprings.com
Kyle Matthews	Town of Madisonville	403 Saint Francis Street Madisonville, LA	985-893-7311; Kylem@townofmadisonville.com
Daniel Hill	City of Covington	317 N. Jefferson Avenue Covington, LA 70433	985-982-1811; dhill@covla.com
Beth Warren	St Tammany Parish Government	21490 Koop Dr. Mandeville, LA 70471	985-276-6420; eawarren@stpgov.org
Jeanne Betbeze	St Tammany Parish Government	21490 Koop Dr. Mandeville, LA 70471	985-867-5095; jbetbeze@stpgov.org
David DeGeneres	City of Mandeville	3101 East Causeway Approach Mandeville, LA	985-624- 3106; ddegeneres@cityofmandeville.com
Chris Brown	City of Mandeville	3101 East Causeway Approach Mandeville, LA	985-624- 3104; cbrown@cityofmandeville.com
Stan Heinrich	Town of Pearl River	64592 Church Street, Pearl River, LA 70452	985-960-1152; deputychief@pearlriverpolice.com

Capability Assessment

Table 0-1- Town of Abita Springs

Plans	Yes / No Year (1)	How often is the plan updated?
Comprehensive / Master Plan	Y	WHEN NECESSARY
Capital Improvements Plan	Y	WHEN NECESSARY
Economic Development Plan	Y	WHEN NECESSARY
Local Emergency Operations Plan	Y	WHEN NECESSARY
Continuity of Operations Plan	N	
Transportation Plan	N	
Stormwater Management Plan	Y	MS 4 PLAN UPDATED 2013
Community Wildfire Protection Plan	N	
Other plans (redevelopment, recovery, coastal zone management)	Y	HAZARD MITIGATION PLAN ST TAMMANY PARISH

Table 0-2- City of Slidell

Plans	Yes / No Year (1)	How often is the plan updated?
Comprehensive / Master Plan	No	City went through the process of developing a master plan, but it was never formally adopted. Land use patterns in the City have remained constant for several years to decades. As City is largely built out, infill has been regulated by these previous plans/patterns. One recent refinement is the development of the Fremaux Town Center and the corridor leading from it to the City's historic town center. The City Council put in place ordinances to control design and limit Use along the Fremaux corridor to make it more appealing and to limit encroachment into neighboring areas.
Capital Improvements Plan	Yes	Projects for hazard mitigation and event preparation are incorporated in both the capital and operations budget.
Economic Development Plan	No	
Local Emergency Operations Plan	Yes	City publishes emergency operations detailing authorities and responsibilities of key emergency management personnel during an event. Plan identifies who must remain/report to work and what their storm event tasks are. The Plan identifies resources and apportions those resources to tasks, personnel, and stockpiles. Plan lays out procedures for command and control during the event and during recovery.
Continuity of Operations Plan	Partial	The City's Emergency Operation Plan details how city command and control will shift to back info systems and the establishment and support of Emergency Operations Center at Public Operations. Finance has plans to safeguard and continuing processing payroll and the execution of event and recovery contracts to include assessments, pushing/clearing rights of way of debris, and debris removal.
Transportation Plan	Yes	City has identified key bridges and roadways that must be re-opened to respond to emergencies and to recover from event.
Stormwater Management Plan	Yes	Intergrated into Hazard Mitigation plan an in the capital budget for improvements and new projects and the operations budget for maintenance.
Community Wildfire Protection Plan	No	
Other plans (redevelopment, recovery, coastal zone management)	Yes	Housing annual plan.

Table 0-3- City of Mandeville

Plans	Yes / No Year (1)	How often is the plan updated?
Comprehensive / Master Plan	Yes, 2007	25 year plan
Capital Improvements Plan	yes	annually
Economic Development Plan	no	in process
Local Emergency Operations Plan	yes, 2011	as needed
Continuity of Operations Plan	yes, 2011	as needed
Transportation Plan	no	
Stormwater Management Plan	no	
Community Wildfire Protection Plan	NO	
Other plans (redevelopment, recovery, coastal zone management)	yes. See below	
Bicycle and Pedestrian Plan	2008	n/a
B-3 Area Plan	2007	n/a
Old Mandeville Redevelopment Strategy Plan	2006	n/a
Annexation Growth Plan	2003	n/a
Town Center Resiliency Plan	2011	n/a
Old Mandeville Economic Resiliency Plan	2011	n/a
Mandeville Lakefront Park Master Plan	2007	n/a
Historic Preservation Study Committee Report	2012	n/a
Lakefront Wetlands Restoration Plan	2011	n/a
Shoreline Protection Study	2014	n/a

Table 0-4 - Town of Madisonville

Plans	Yes / No Year (1)	How often is the plan updated?
Comprehensive / Master Plan	?	
Capital Improvements Plan	?	
Economic Development Plan	?	
Local Emergency Operations Plan	Yes	Gas system emergency plan
Continuity of Operations Plan	?	
Transportation Plan	?	
Stormwater Management Plan	?	
Community Wildfire Protection Plan	?	
Other plans (redevelopment, recovery, coastal zone management)	?	

Table 0-5- Village of Sun

Plans	Yes / No Year (1)	How often is the plan updated?
Comprehensive / Master Plan	No	
Capital Improvements Plan	No	
Economic Development Plan	No	
Local Emergency Operations Plan	No	
Continuity of Operations Plan	No	
Transportation Plan	No	
Stormwater Management Plan	No	
Community Wildfire Protection Plan	yes	As needed
Other plans (redevelopment, recovery, coastal zone management)	No	

Table 0-6 - City of Covington

Plans	Yes / No	How often is the plan updated?
Comprehensive / Master Plan	Yes	Every 8-10 yrs. (Updated in 1998 and last update in 2007)
Capital Improvements Plan	Yes	Every year in the budget.
Economic Development Plan	yes	Reviewed yearly and updated every 4 years.
Local Emergency Operations Plan	yes	annually
Continuity of Operations Plan	yes	annually
Transportation Plan	yes	part of St. Tammany's plan
Stormwater Management Plan	yes	annually
Community Wildfire Protection Plan	no	
Other plans (redevelopment, recovery, coastal zone	no	

Table 0-7- Town of Abita Springs

Building Code, Permitting and Inspections	Y	Are the codes adequately enforced? YES
Building Code	Y	Version / Year IRC, IBC CURRENT YEAR ENFORCED
Building Code Effectiveness Grading Schedule (BCEGS) Score		Score
Fire Department ISO rating	Y	Rating 3
Site plan review requirements	Y	BEFORE ACTUAL PERMITTING
Land Use Planning and Ordinances	Yes / No	Is the ordinance adequately administered and enforced? YES
Zoning Ordinance	Y	ENFORCED
Subdivision Ordinance	Y	ENFORCED
Floodplain Ordinance	Y	ORD # 180...1985
Natural Hazard Specific Ordinance (stormwater, steep slope, wildfire)	Y	UPDATED & ACCEPTED 2013
Flood Insurance Rate Maps	N	NOT APPROVED AS OF 8/15/14
Acquisition of land for open space and public recreation uses	N	
Other		

Table 0-8- City of Slidell

Building Code, Permitting and Inspections	Yes / No	Are the codes adequately enforced?
Building Code	Yes	2012 International Building Code, 2012 International Residential Code; 2012 International Existing Building Code; 2012 International Fuel Gas Code; 2102 International Mechanical Code; 2011 National Electrical Code; NFPA 101 Life and Safety Code 2012 Edition; NFPA 13 and 13R (sprinkler system) 2013 Editions; ADA-ABA July 2004, also know as the 2010 Standard; Commercial Energy Code ANSI/ASHRAE/IESNA 90.1 dated 2007; Wind loads - Residential = 110 mph to 120 mph (3 sec gust), Commercial = Cat II 140 Vult; All buildings are in Wind Blown Debris Region, Snow Load 5 lb/sq. ft., Termite Infestation Probability Map = High.
Building Code Effectiveness Grading Schedule (BCEGS) Score	Yes	Residential = 3d Class; Commercial = Fourth Class
Fire Department ISO rating	Yes	ISO 3; Code = NFPA 1 (2012 Edition) Chapter 18 (Fire Department Access & Water Supply) to review site plans.
Site plan review requirements	Yes	Site plan reviews are compilation of a number of City ordinances to include design, set backs, uses, parking, flood prevention to name but a few. Early on, before the developer has proceeded very far, the City's Planning Department holds a meeting with the developer's team, City of Slidell, and other agencies to include LA Dept of Hospitals. The developer briefs their plan then the experts provide input on how the plan can meet city's requirement. When the plans are submitted all affected departments review the plan and must sign in the city's permit system before the permit is issued. Throughout construction departments conduct a number of inspections to ensure construction is in compliance with approved plan. Before a certificate of occupancy is issued each department must conduct a final inspection and sign off on the permit. Throughout process elevation requirements are checked - Plan review, after foundation is laid but before walls are begun, and when construction is finished. At any time, if the structure is not meeting flood elevation requirements work can and is halted until developer corrects the error and is inspected for compliance. The local Fire District, St Tammany Parish Fire District 1, uses NFPA 1 (2012 Edition) Chapter 18 (Fire Department Access & Water Supply) to review site plans.
Land Use Planning and Ordinances	Yes / No	Is the ordinance adequately administered and enforced?
Zoning Ordinance	Yes	In addition to identifying permitted uses by district the zoning ordinance provides for landscaping requirements to help meet storm water management benchmarks. Zoning code is several decades old. City is considering replacing zoning, subdivision, flood prevention, and other ordinances with one integrated Unidified Development Code.
Subdivision Ordinance	Yes	
Floodplain Ordinance	Yes	City has entire chapter in code of ordinances; Ch 15, that deals with flood prevntion. Orindance covers requirement to elevate to or above Base Flood Elevation, adopts a design flooe elecation of Advisory Base Flood Elevation (ABFE) + 1 foot for areas of city most at risk of flooding, use of fill, and keeping debris and silt out of drainage system so it can function properly. Ordinance also deals with floodproofing of accessory structures.
Natural Hazard Specific Ordinance (stormwater, steep slope, wildfire)	Yes	Stormwater Management
Flood Insurance Rate Maps	Yes	Current FIRM dated 21 April 1999.
Acquisition of land for open space and public recreation uses	Yes	Have acquired properties and demolished the structures on the lot. Acquired prroperty have restriction per CFR 44 recorded in the deeds.

Table 0-9- City of Mandeville

Building Code, Permitting and Inspections	yes	yes
Building Code	yes	2012 International Residential and Building Codes (Current edition of the Louisiana State Uniform Construction Code - LSUCC)
Building Code Effectiveness Grading Schedule (BCEGS) Score	yes	6 over 6
Fire Department ISO rating	yes	Class 2
Site plan review requirements	yes	yes
Land Use Planning and Ordinances	Yes / No	Is the ordinance adequately administered and enforced?
Zoning Ordinance	yes	yes
Subdivision Ordinance	yes	yes
Floodplain Ordinance	yes	yes - updated May 16, 2012
Natural Hazard Specific Ordinance (stormwater, steep slope, wildfire)	yes	
Flood Insurance Rate Maps	yes	updated May 16, 2012
Acquisition of land for open space and public recreation uses	yes	yes

Table 0-10 - Town of Madisonville

Building Code, Permitting and Inspections	Yes / No	Are the codes adequately enforced?
Building Code	Yes	IBC, IRC, ELECT. 2012
Building Code Effectiveness Grading Schedule (BCEGS) Score	?	Score
Fire Department ISO rating	Yes	5
Site plan review requirements	?	
Land Use Planning and Ordinances	Yes / No	Is the ordinance adequately administered and enforced?
Zoning Ordinance	Yes	Yes
Subdivision Ordinance	Yes	Yes
Floodplain Ordinance	Yes	Yes
Natural Hazard Specific Ordinance (stormwater, steep slope, wildfire)	?	
Flood Insurance Rate Maps	Yes	Yes
Acquisition of land for open space and public recreation uses	?	
Other	?	

Table 0-11 - Village of Sun

Building Code, Permitting and Inspections	Yes / No	Are the codes adequately enforced?
Building Code	No	Version / Year-The Village of Sun is under agreement with Washington Parish For our Building Coding
Building Code Effectiveness Grading Schedule (BCEGS) Score	No	Score
Fire Department ISO rating	No	Rating -Fire Dept is under Distract #10
Site plan review requirements	No	
Land Use Planning and Ordinances	Yes	Is the ordinance adequately administered and enforced?
Zoning Ordinance	NO	
Subdivision Ordinance	NO	
Floodplain Ordinance	No	
Natural Hazard Specific Ordinance (stormwater, steep slope, wildfire)	Yes	
Flood Insurance Rate Maps	No	We have A FEMA RATE MAP
Acquisition of land for open space and public recreation uses	Yes	

Table 0-12 - City of Covington

Building Code, Permitting and Inspections	Yes / No	Are the codes adequately enforced?
Building Code	yes	Version / Year: IBC IRC-Louisiana State Code 2012
Building Code Effectiveness Grading Schedule (BCEGS) Score	yes	Score: 0
Fire Department ISO rating	yes	Rating: Fire Protection Class 3
Site plan review requirements	yes	
Land Use Planning and Ordinances	Yes / No	Is the ordinance adequately administered and enforced?
Zoning Ordinance	yes	yes
Subdivision Ordinance	yes	yes
Floodplain Ordinance	yes	yes
Natural Hazard Specific Ordinance (stormwater, steep	yes	yes
Flood Insurance Rate Maps	yes	yes
Acquisition of land for open space and public recreation uses	yes	yes
Other	yes	yes

Table 0-13- Town of Abita Springs

Administration	Yes / No	Comments
Planning Commission	Y	MEET MONTHLY
Mitigation Planning Committee	Y	NEW COMMITTEE
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	Y	DEBRIS PICK-UP, DITCH CLEANING.TREE TRIMMING
Staff	Yes / No FT/PT (2)	Percentage of time spent on hazard mitigation
CERTIFIED Building Official	Y PT	
Floodplain Administrator	Y FT	
Emergency Manager	Y PT	
Community Planner	Y FT	
Civil Engineer	Y PT	
GIS Coordinator		
Grant Writer	Y PT	
Other		
Technical	Yes / No	Describe capability
Warning Systems / Service (Reverse 911, outdoor warning signals)	Y	WEATHER ALERT ON TOWN HALL BUILDING
Hazard Data & Information		
Grant Writing	Y	STAFF & OUTSIDE PERSONEL
Hazus Analysis		
Other	Y	DITIGAL TOWN SIGN

Table 0-14- City of Slidell

Administration	Yes / No	Comments
Planning Commission	Yes	Meets monthly. Tasked with ensuring public infrastructure, especially drainage, is included in all annexations and subdivisions.
Mitigation Planning Committee	No	
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	Yes	Carried out by Public Operations and Parks and Recreation Departments.
Staff	Yes / No FT/PT (%)	Percentage of time spent on hazard mitigation
Chief Building Official	Yes	15%. Two full time planners on staff, one consultant who assists with housing and CDBG related issues.
Floodplain Administrator	Yes	40%. Director of Engineering, a Certified Flood Plain Manager, has additional duty of Flood Plain Administrator.
Emergency Manager	Yes	5%. City Chief Administrative Office is designated as the City Emergency Manager.
Community Planner	Yes	40%. One planner and one planning assistant on staff. Planning is section within larger department that includes a permit section and Building Safety Section.
Civil Engineer	Yes	Same person as Floodplain Administrator. The Director of Engineering, who is also the Flood Plain Administrator, is a Civil Engineer and has a Professional Engineer certification.
GIS Coordinator	Yes	5%. Trained ARC GIS staff member oversees GIS. City official map is GIS based and widely available to all city employees and leadership and routinely used in decision making and day-to-day work routine.
Grant Writer	No	0%. Ancillary task for multiple staff personnel
Code Enforcement	Yes	0%. City is using grant money to maintain one part time code enforcement person focussed on the zoning, building, subdivision code. 10% A separate two employee code enforcement section focuses on drainage canals and other vegetation and debris that could adversely impact the city's drainage system.
Technical	Yes / No	Describe capability
Warning Systems / Service (Reverse 911, outdoor warning signals)	Partial	Rely on St. Tammany Parish to provide reverse 911. Post messages on web site.
Hazard Data & Information	Yes	Public operations maintains rain gages to inform leadership of rain levels and to warn leadership when water is rising too high. St. Tammany Parish also has system of automated rain and river gages on main waterways and drainage canals.
Grant Writing	No	Ancillary task for multiple staff members
Hazus Analysis	No	

Table 0-15 - City of Mandeville

Administration	Yes / No	Comments
Planning Commission	yes	Active Planning Commission
Mitigation Planning Committee	no	
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	yes	public tree maintenance, continual drainage clearing and maintenance
Staff	Yes / No FT/PT (2)	Percentage of time spent on hazard mitigation
Chief Building Official	FT	40
Floodplain Administrator	FT	40
Emergency Manager	FT	parish level position
Community Planner	FT	20
Civil Engineer	FT	40
GIS Coordinator	FT	20
Grant Writer	FT	parish level position
Other		
Technical	Yes / No	Describe capability
Warning Systems / Service (Reverse 911, outdoor warning signals)	yes	Reverse 911 and other at parish level
Hazard Data & Information	yes	GIS/NOAA/FEMA
Grant Writing	yes	partnership with Solutient, Inc.
Hazus Analysis	yes	parish level capability

Table 0-16- Town of Madisonville

Administration	Yes / No	Comments
Planning Commission	Yes	
Mitigation Planning Committee	No	
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	Yes	
Staff	Yes / No FT/PT (2)	Percentage of time spent on hazard mitigation
Chief Building Official	Yes	
Floodplain Administrator	Yes	
Emergency Manager	?	
Community Planner	?	
Civil Engineer	Yes	
GIS Coordinator	?	
Grant Writer	Yes	
Other	?	
Technical	Yes / No	Describe capability
Warning Systems / Service (Reverse 911, outdoor warning signals)	Yes	St. Tammany Parish 911 System
Hazard Data & Information	?	
Grant Writing	?	
Hazus Analysis	?	

Table 0-17 - Village of Sun

Administration	Yes / No	Comments
Planning Commission	No	
Mitigation Planning Committee	Yes	Committee is currently being formed
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	No	St. Tammany Parish handles this
Staff	Yes / FT (2)	Percentage of time spent on hazard mitigation
Chief Building Official	No	Contract with Washington Parish
Floodplain Administrator	No	
Emergency Manager	No	
Community Planner	No	
Civil Engineer	No	
GIS Coordinator	No	
Grant Writer	Yes	
Other Village of Sun (2) Clerks	YES	
Technical	No	Describe capability
Warning Systems / Service (Reverse 911, outdoor warning signals)	Yes	
Hazard Data & Information	No	
Grant Writing	Yes	
Hazus Analysis	No	
Other	No	

Table 0-18 - City of Covington

Administration	Yes / No	Comments
Planning Commission	yes	
Mitigation Planning Committee	no	St. Tammany Parish Government
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	yes	
Mutual Aid Agreements	yes	
Staff	Yes / No	Percentage of time spent on hazard mitigation
Chief Building Official	yes	50%
Floodplain Administrator	yes	
Emergency Manager	no	Refer to Parish
Community Planner	yes	1%
Civil Engineer	yes	5%
GIS Coordinator	yes	5%
Grant Writer	yes	3%-5%
Other		
Technical	Yes / No	Describe capability
Warning Systems / Service	yes	Website
Hazard Data & Information	no	
Grant Writing	yes	one on-staff grant writer
Hazus Analysis	no	

Table 0-19- Town of Abita Springs

Funding Resource	Yes / No	Could the resource be used to fund future mitigation actions
Capital Improvements project funding	Y	POSSIBLY
Authority to levy taxes for specific purposes	?	
Fees for water, sewer, gas, or electric services	Y	NO
Impact fees for new development	Y	INFRASTRUCTURE CAPACITY FEES ON NEW CONSTRUCTION
Stormwater Utility Fee	?	
Community Development Block Grant (CDBG)	Y	POSSIBLY
Other Funding Programs	Y	GRANTS

Table 0-20 - City of Slidell

Funding Resource	Yes / No	Could the resource be used to fund future mitigation actions
Capital Improvements project funding	Yes	Yes. Capital projects are included in yearly budget and, where necessary in the mid-year supplemental.
Authority to levy taxes for specific purposes	Yes, but	Unlikely. Any new taxes would require approval by vote of the community.
Fees for water, sewer, gas, or electric services	Yes	Unlikely. Fees for connecting water and sewer, fees for water usage,
Impact fees for new development	No	No
Stormwater Utility Fee	No	Possible
Community Development Block Grant (CDBG)	Yes	Possible
Other Funding Programs	Yes	Possible. All building permits require a fee, multi family housing projects subject to additional planning fee.

Table 0-21 - City of Mandeville

Funding Resource	Yes / No	Could the resource be used to fund future mitigation actions
Capital Improvements project funding	yes	yes
Authority to levy taxes for specific purposes	yes	yes, if authorized
Fees for water, sewer, gas, or electric services	yes	yes
Impact fees for new development	yes	yes
Stormwater Utility Fee	yes	yes, if authorized
Community Development Block Grant (CDBG)	yes	yes, if authorized by program guidance
Other Funding Programs	yes	HMGP and FMA through FEMA and GOHSEP

Table 0-22 - Town of Madisonville

Funding Resource	Yes / No	Could the resource be used to fund future mitigation actions
Capital Improvements project funding	?	
Authority to levy taxes for specific purposes	?	
Fees for water, sewer, gas, or electric services	Yes	
Impact fees for new development	Yes	
Stormwater Utility Fee	?	
Community Development Block Grant (CDBG)	?	
Other Funding Programs	?	

Table 0-23- Village of Sun

Funding Resource	Yes / No	Could the resource be used to fund future mitigation actions
Capital Improvements project funding	no	
Authority to levy taxes for specific purposes	No	
Fees for water, sewer, gas, or electric services	Yes	Water Only
Impact fees for new development	No	
Stormwater Utility Fee	No	
Community Development Block Grant (CDBG)	Yes	
Other Funding Programs	Yes	CWEF/LGAP

Table 0-24 - City of Covington

Funding Resource	Yes / No	Could the resource be used to fund future mitigation actions?
Capital Improvements project funding	yes	Annually budget for drainage projects
Authority to levy taxes for specific purposes	no	
Fees for water, sewer, gas, or electric services	no	
Impact fees for new development	no	Studying possible impact fees now
Stormwater Utility Fee	no	
Community Development Block Grant (CDBG)	yes	through St. Tammany Parish Government
Other Funding Programs		

Table 0-25 - Town of Abita Springs

Program / Organization	Yes / No	Comments
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Y	MS4 PLAN...WATCHDOG COMMITTEE
Ongoing public education or information program (responsible water use, fire safety, household preparedness, environmental education)		GAS,,,PUBLIC AWARENESS PROGRAM
Natural Disaster or safety related school program	Y	PUBLIC AWARENESS HANDOUT/FLYERS SENT TO SCHOOLS
Storm Ready certification		
Firewise Communities certification	Y	
Public/Private partnership initiatives addressing disaster-related issues		
Other		

Table 0-26- City of Slidell

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	Keep Slidell Beautiful is an organization supported by city funds to remove trash and litter and increase vegetated areas in the city. City has a tree board that applies for grants to plant trees and to distribute trees to residents to plant on private property. Tree Board also provides advice to city residents on benefits of trees, appropriate tree for their situation, and how to properly plant and maintain.
Ongoing public education or information program (responsible water use, fire safety, household preparedness, environmental education)	Yes	Green Schools initiative for educating school age kids.
Natural Disaster or safety related school program	No	
Storm Ready certification	No	
Firewise Communities certification	No	
Public/Private partnership initiatives addressing disaster-related issues	No	
Fire Prevention	Yes	Fire District use programs to include "Risk Watch", "Learn not to Burn" and "Remembering When to educate all ages of the community. Fire District sends fireman to the elementary schools every October to teach fire safety. Additional fire prevention programs include offering voluntary home inspections, give away and install free smoke detectors, and work with City and Parish Code Enforcement to identify abandoned structures that pose a fire hazard to surrounding neighborhoods.

Table 0-27 - City of Mandeville

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	Keep Mandeville Beautiful, Council on Aging, STARC,
Ongoing public education or information program (responsible water use, fire safety, household preparedness, environmental education)	yes	Participate in the Community Rating System that requires annual and ongoing public outreach and education...multiple programs
Natural Disaster or safety related school program	no	
Storm Ready certification	no	
Firewise Communities certification	no	
Public/Private partnership initiatives addressing disaster-related issues	yes	Developing a Program for Public Information authorized by the Community Rating System and Committee Includes Public and Private members
Other	yes	Developing a Program for Public Information authorized by the Community Rating System

Table 0-28- Town of Madisonville

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

Building Inventory

Purpose/Category (select one)	Facility Name	Address	City	Latitude	Longitude	Construction Type (select one)
Government (municipality-owned)	Building #1	2045 Second St	Slidell	30°N	89°46'54.575"W	Steel
Government (municipality-owned)	Building #2	250 Bouscaren	Slidell	30°16'31.484"N	89°46'56.624"W	Steel
Government (municipality-owned)	Animal Control Center	2700 Terrace Ave	Slidell	30°15'56.383"N	89°46'14.725"W	
Government (municipality-owned)	Auditorium	2056 Second St.	Slidell	30°16'31.821"N	89°46'52.119"W	Steel
Law Enforcement	Police Evid/Admin Bldg.	429 Bouscaren	Slidell	30°16'29.446"N	89°46'48.543"W	
Government (municipality-owned)	DISA Building	1010 Gause Blvd.	Slidell	30°17'9.445"N	89°46'8.934"W	
Government (municipality-owned)	Railroad Depot	1827 Front Street	Slidell	30°16'42.273"N	89°46'57.158"W	
Parks/Recreation	Possum Hollow Park Concession/Restroom Bldg	801 Cousin Street	Slidell	30°16'21.582"N	89°46'36.039"W	Reinforced Masonry
Government (municipality-owned)	Records Building	1319 Bayou Lane	Slidell	30°17'3.939"N	89°46'55.573"W	Metal
Government (municipality-owned)	Public Operations - Vehicle Maintenance	1327 Bayou Lane	Slidell	30°16'57.008"N	89°46'58.682"W	Steel
Government (municipality-owned)	Public Operations - Purchasing	1329 Bayou Lane	Slidell	30°16'56.830"N	89°46'58.447"W	Steel
Parks/Recreation	Fritchie Park Restroom Building	704 Howze Beach Road	Slidell	30°14'47.519"N	89°46'20.876"W	Wood
Government (municipality-owned)	Public Operations - Administration	1325 Bayou Lane	Slidell	30°17'2.608"N	89°46'57.445"W	Steel
Government (municipality-owned)	Public Operations - Employee Building	1325 Bayou Lane	Slidell	30°17'2.198"N	89°46'59.244"W	Steel
Government (municipality-owned)	Public Operations - Tool Shop	1325 Bayou Lane	Slidell	30°17'1.060"N	89°46'58.883"W	Steel
Government (municipality-owned)	Public Ops #6	1325 Bayou Lane	Slidell	30°16'55.704"N	89°46'58.459"W	Steel
Parks/Recreation	Heritage Park Amphitheater	101 Bayou Lane	Slidell	30°16'48.794"N	89°47'3.301"W	Reinforced Masonry
Government (municipality-owned)	Wastewater Treatment Plant	2800 Terrace Avenue	Slidell	30°15'48.592"N	89°46'7.361"W	
Parks/Recreation	John Slidell Park Concession/Restroom	105 Robert Blvd.	Slidell	30°18'22.969"N	89°44'52.099"W	
Parks/Recreation	John Slidell Park Storage & Maint.	105 Robert Blvd.	Slidell	30°18'23.648"N	89°44'45.772"W	Reinforced Masonry
Parks/Recreation	John Slidell Park Log Cabin	105 Robert Blvd.	Slidell	30°18'19.093"N	89°44'58.129"W	Wood
Government (municipality-owned)	Airport Hanger/Office	62512 Airport Road	Slidell	30°20'32.869"N	89°49'23.131"W	Steel
Parks/Recreation	Duckworth Park Restroom Building	1191 Campbell Drive	Slidell	30°N	89°W	Reinforced Masonry
Parks/Recreation	Heritage Park Guard Building	1701 Bayou Lane	Slidell	30°16'44.789"N	89°46'57.752"W	Metal
Government (municipality-owned)	City Hall	2055 Second Street	Slidell	30°16'31.685"N	46°54.448	Wood
Government (municipality-owned)	Guardians of Slidell History Museum	2065 Second Street	Slidell	30°16'31.085"N	89°46'54.524"W	Wood
Government (municipality-owned)	City Museum	2020 First Street	Slidell	30°16'32.925"N	89°46'56.845"W	Wood
Parks/Recreation	Fritchie Park Gym	704 Howze Beach Road	Slidell	30°14'46.640"N	89°46'16.679"W	Steel
Law Enforcement	Police Storage Building	2112 Third Street	Slidell	30°16'29.512"N	89°46'48.535"W	
Parks/Recreation	John Slidell Park Gym	105 Robert Rd.	Slidell	30°18'21.804"N	89°44'43.140"W	Steel
Government (municipality-owned)	Rufus Viner Center	1010 Schley	Slidell	30°16'17.277"N	89°46'33.496"W	Wood
Law Enforcement	City Police Building & Jail	2112 Third Street	Slidell	30°16'29.512"N	89°46'48.535"W	
Law Enforcement	City Court	501 Bouscaren	Slidell	30°16'30.042"N	89°46'44.361"W	

Figure 0-1- City of Slidell

Purpose/Category (select one)	Facility Name	Address	City	Latitude	Longitude	Assessed Value	Year Built	Construction Type (select one)
Government (municipality-owned)	City Hall	3101 East Causeway Approach	Mandeville	30°22'22.87"	90° 04'42.13"W	1608316	1974	Unreinforced Masonry
Government (municipality-owned)	Community Center	3090 East Causeway Approach	Mandeville	30°22'16.84"	90° 04'42.24"W	925434	1979	Unreinforced Masonry
Government (municipality-owned)	Trailhead Facility	675 Lafitte Street	Mandeville	30°21'39.89"	90° 03'52.17"W	899149	2000	Reinforced Masonry
Historical Site (National)	Dew Drop Building	430 Lamarque Street	Mandeville	30°21'21.54"	90° 03'44.19"W	77499	1895	Wood
Parks/Recreation	Basketball Court Cover	530 Lamarque Street	Mandeville	30°21'27.55"	90° 03'40.05"W	60000	2001	Metal
Parks/Recreation	Tyler Thomas Park Bathrooms	530 Lamarque Street	Mandeville	30°22'16.84"	90° 04'42.24"W	80000	2014	Wood
Parks/Recreation	Harbor Pavilion	1500 Lakeshore Drive	Mandeville	30°20'56.71"	90° 03'35.86"W	300000	2008	Wood
Parks/Recreation	Paul Cordes Park Bathrooms	3131 East Causeway Approach	Mandeville	30°21'28.60"	90° 03'40.94"W	100000	1995	Reinforced Masonry
Law Enforcement	Police Investigations Annex	1923 Jefferson Street	Mandeville	30°21'18.76"	90° 03'57.16"W	175000	1955	Wood
Law Enforcement	Police Department Complex	1870 Hwy 190	Mandeville	30°22'25.26"	90° 04'37.13"W	1191079	1983	Unreinforced Masonry
Law Enforcement	Police Maintenance Bldg	1870 Hwy 190	Mandeville	30°22'22.86"	90° 04'36.54"W	24309	1986	Wood
Government (municipality-owned)	Old Water Works Bldg	1926 Madison Street	Mandeville	30°21'26.44"	90° 03'55.52"W	484832	1971	Unreinforced Masonry
Utilities (water)	Water Tower	3350 Monroe Street	Mandeville	30°22'07.02"	90° 05'12.42"W	400000	1957	Steel
Utilities (water)	St. Ann Water Tower	1461 North Causeway Boulevard	Mandeville	30°23'20.25"	90° 05'17.37"W	2000000	2002	Steel
Utilities (water)	Water Pump Station Bldg	1462 North Causeway Boulevard	Mandeville	30°23'20.25"	90° 05'17.37"W	9000	1982	Steel
Utilities (water)	Water Pump Station Bldg	1010 Atalin Street	Mandeville	30°21'37.29"	90° 03'02.22"W	250000	2004	Steel
Utilities (water)	Water Pump Station Bldg	1876 Hwy 190	Mandeville	30°22'22.86"	90° 04'36.54"W	250000	2004	Steel
Utilities (water)	Water Pump Station Bldg	1923 Jefferson Street	Mandeville	30°21'20.22"	90° 03'56.44"W	250000	1938	Steel
Utilities (water)	Water Pump Station Bldg	3350 Monroe Street	Mandeville	30°22'07.02"	90° 05'12.42"W	1000000	1957	Unreinforced Masonry
Utilities (wastewater)	Sewerage Treatment Plant	1000 Mandeville High Boulevard	Mandeville	30°22'35.58"	90° 05'59.04"W	200000	1989	Reinforced Masonry
Government (municipality-owned)	Public Works Facility	1100 Mandeville High Boulevard	Mandeville	30°22'35.58"	90° 05'59.04"W	1500000	2003	Steel
Utilities (water)	Water Pump Station Bldg	225 Mandeville High Boulevard	Mandeville	30°22'53.47"	90° 05'53.16"W	250000	1999	Steel

Figure 0-2- City of Mandeville

Purpose/Category (select one)	Facility Name	Address	City	Latitude	Longitude	Construction Type (select one)
Government	Town Hall	403 St. Francis St.	Madisonville	30°24'14"N	90°9'22"W	Reinforced Masonry
	Maintenance Barn	500 Johnson St.	Madisonville			Steel
	Police Department	400 Cedar St.	Madisonville			Wood
	Lift Station	Main St.	Madisonville			Concrete
	Lift Station	First St.	Madisonville			Concrete
	Lift Station	St. Louis St.	Madisonville			Concrete
	Lift Station	Johnson St.	Madisonville			Concrete
	Lift Station	Old Ponchatoula Highway	Madisonville			Concrete
	Lift Station	Highway 22	Madisonville			Concrete
	Lift Station	Taverny Ct.	Madisonville			Concrete
	Water Well	Pine St.	Madisonville			Metal
	Water Well	Old Ponchatoula Highway	Madisonville			Metal
	Sewer Treatment Plant	500 Johnson St.	Madisonville			Concrete

Figure 0-3 - Town of Madisonville

Purpose/Category (select one)	Facility Name	Address	City	Latitude	Longitude	Assessed Value (\$)	Year Built	Construction Type (select one)
Law Enforcement	City Hall & Police Department	609 N. Columbia St.	Covington	30°28'45.53"N	90°5'44.05"W	\$ 2,145,000.00	1960	Wood
Utilities	Maintenance (Maintenance Barn)	1300 W.27th Ave.	Covington	30°29'16.35"N	90°6'31.58"W	\$ 350,000.00	1960	Metal
Utilities	Maintenance (Vehicle Storage Shed)	1300 W.27th Ave.	Covington	30°29'15.95"N	90°6'32.26"W	\$ 54,000.00	1960	Metal
Utilities (water)	Tower & Pump Shed (Water Tower)	436-444 N. Theard St.	Covington	30°28'40.78"N	90°5'49.41"W	\$ 135,000.00	1960	Metal
Utilities (water)	Tower & Pump Shed (Old Pump Bldg.)	436-444 N. Theard St.	Covington	30°28'41.20"N	90°5'49.09"W	\$ 72,000.00	1960	Reinforced Masonry
Parks/Recreation	Bogue Falaya Park (Park Pavillion)	213 Park Dr.	Covington	30°28'14.35"N	90°5'41.06"W	\$ 216,000.00	1960	Wood
Parks/Recreation	Bogue Falaya Park (Park Picnic Shelter)	213 Park Dr.	Covington	30°28'15.00"N	90°5'42.25"W	\$ 12,600.00	1970	Wood
Parks/Recreation	Bogue Falaya Park (Park Storage Bldg.)	213 Park Dr.	Covington	30°28'13.93"N	90°5'41.49"W	\$ 19,200.00	1960	Metal
Parks/Recreation	Bogue Falaya Park (Park Storage Bldg.)	213 Park Dr.	Covington	30°28'13.97"N	90°5'42.47"W	\$ 10,200.00	1970	Metal
Church	Mausoleum	1402 N. Columbia St.	Covington	30°29'32.12"N	90°6'4.32"W	\$ 462,000.00	1960	Reinforced Masonry
Utilities (water)	Water Tower	739 S. Filmore St.	Covington	30°28'33.11"N	90°6'46.77"W	\$ 590,000.00	1960	Metal
Utilities (water)	Water Pumping Station	739 S. Filmore St.	Covington	30°28'32.79"N	90°6'46.03"W	\$ 19,000.00	1960	Unreinforced Masonry
Law Enforcement	DTD Office/Police	434 N. Theard St.	Covington	30°28'40.12"N	90°5'49.61"W	\$ 200,000.00	1960	Wood
Utilities (wastewater)	Office at Sewer Plant	1400 W. 27th Ave	Covington	30°29'19.93"N	90°6'38.12"W	\$ 72,000.00	1960	Unreinforced Masonry
Government (municipality-owned)	Greater Convention Center	317 N. Jefferson Ave.	Covington	30°28'39.28"N	90°5'58.62"W	\$ 5,453,750.00	1980	Wood
Utilities (water)	Water Tower	1324 N. Columbia St.	Covington	30°29'31.24"N	90°6'0.80"W	\$ 590,000.00	2000	Metal
Parks/Recreation	Concession Stand	4000 Deporres Rd.	Covington	30°29'27.97"N	90°6'42.29"W	\$ 200,000.00	2008	Unreinforced Masonry
Parks/Recreation	Scoreboard	4000 Deporres Rd.	Covington	30°29'26.20"N	90°6'40.15"W	\$ 10,000.00	2008	Metal
Parks/Recreation	Scoreboard	4000 Deporres Rd.	Covington	30°29'29.67"N	90°6'44.67"W	\$ 10,000.00	2008	Metal
Parks/Recreation	Scoreboard	4000 Deporres Rd.	Covington	30°29'25.99"N	90°6'44.38"W	\$ 10,000.00	2008	Metal
Parks/Recreation	Visitor's Center	419 N. New Hampshire St.	Covington	30°28'37.53"N	90°5'47.64"W	\$ 425,000.00	2008	Wood
Parks/Recreation	Bandstand	419 N. New Hampshire St.	Covington	30°28'38.26"N	90°5'46.57"W	\$ 175,000.00	2008	Steel
Parks/Recreation	Campanille	419 N. New Hampshire St.	Covington	30°28'38.15"N	90°5'47.19"W	\$ 245,000.00	2008	Steel
Parks/Recreation	Open Air Market	419 N. New Hampshire St.	Covington	30°28'38.58"N	90°5'47.27"W	\$ 115,000.00	2008	Steel
Parks/Recreation	Sign Tower	419 N. New Hampshire St.	Covington	30°28'40.72"N	90°5'48.85"W	\$ 18,000.00	2008	Steel
Parks/Recreation	Sign Tower	419 N. New Hampshire St.	Covington	30°28'39.15"N	90°5'47.15"W	\$ 18,000.00	2008	Steel
Fire Department	Covington Fire Department	525 N. Jefferson Ave.	Covington	30°28'46.59"N	90°5'52.66"W	\$ 804,927.00	1985	Reinforced Masonry
Fire Department	Covington Fire Department (Station #2)	2059 Philip Dr.	Covington	30°29'33.94"N	90°6'58.16"W	\$ 253,094.00	2000	Unreinforced Masonry

Figure 0-4 - City of Covington

Purpose/Category (select one)	Facility Name	Address	City	Construction Type (select one)
Government (municipality-own)	TOWN HALL	22161 LEVEL STREET	ABITA SPRINGS	Wood
Government (municipality-own)	MAINTENANCE BARN (3 STRUCTURES)		ABITA SPRINGS	Metal
Fire Department	FIRE DEPT	HWY 36	ABITA SPRINGS	Metal
Government (municipality-own)	ABITA TRAILHEAD MUSEUM		ABITA SPRINGS	Wood
Government (municipality-own)	ABITA TRAILHEAD PAVILLION		ABITA SPRINGS	Wood
Government (municipality-own)	SEWER LIFT STATIONS	BRYAN STREET	ABITA SPRINGS	Concrete
Government (municipality-own)	""	PEARL STREET	ABITA SPRINGS	Concrete
Government (municipality-own)	""	ST CHARLES STREET	ABITA SPRINGS	Concrete
Government (municipality-own)	""	INDIAN TRAIL	ABITA SPRINGS	Concrete
Government (municipality-own)	""	SOUTH STREET	ABITA SPRINGS	Concrete
Government (municipality-own)	""	DUNDEE STREET	ABITA SPRINGS	Concrete
Government (municipality-own)	""	HWY 59 @ HARRISON RD	ABITA SPRINGS	Concrete
Government (municipality-own)	""	DUNDEE STREET	ABITA SPRINGS	Concrete
Government (municipality-own)	""	MAPLE STREET	ABITA SPRINGS	Concrete
Government (municipality-own)	""	MINKLER STREET	ABITA SPRINGS	Concrete
Government (municipality-own)	""	HWY 59 @ BALL FIELD	ABITA SPRINGS	Concrete
Government (municipality-own)	""	GORDON AVE	ABITA SPRINGS	Concrete
Government (municipality-own)	""	ABITA OAKS LOOP	ABITA SPRINGS	Concrete
Government (municipality-own)	""	PETERS STREET	ABITA SPRINGS	Concrete
Government (municipality-own)	""	ROSALIE STREET	ABITA SPRINGS	Concrete
Government (municipality-own)	""	SEWER PLANT	ABITA SPRINGS	Concrete
Government (municipality-own)	SEWER PLANT		ABITA SPRINGS	Steel
Government (municipality-own)				
Government (municipality-own)	WATER WELL	HWY 36	ABITA SPRINGS	Steel
Government (municipality-own)	WATER WELL	BEHIND TOWN HALL	ABITA SPRINGS	Steel
Government (municipality-own)	WATER WELL	MILLAR STREET	ABITA SPRINGS	Steel
Government (municipality-own)	WATER WELL	BEHIND THE MIDDLE SCHOOL (MAIN ST)	ABITA SPRINGS	Steel
Government (municipality-own)	GAS REGULATOR STATIONS	NURSERY @ HWY 36	ABITA SPRINGS	Steel
Government (municipality-own)	""	RAINBOW & JOSEPH STREETS	COVINGTON	Steel
Government (municipality-own)	""	ABITA MIDDLE SCHOOL & HWY 36	ABITA SPRINGS	Steel
Government (municipality-own)	GAS RECTIFIER STATION	GORDON AVE @ PEARL STREET	ABITA SPRINGS	Steel
Government (municipality-own)				
Government (municipality-own)	GENERATOR SHED	PEARL STREET	ABITA SPRINGS	Wood

Figure 0-5 - Town of Abita Springs

Purpose/Category (select one)	Facility Name	Address	City	Construction Type (select one)
Fire Department	Fire Station #4	28666 Hwy 16	Sun, Louisiana	Metal
Law Enforcement	Sun Police Department	30285 Lock #3 Rd	Sun, Louisiana	Concrete
Government (municipality-own)	Sun Town Hall	30285 Lock #3 Rd	Sun, Louisiana	Concrete
Utilities (water)	Sun Water System Tower	30285 Lock #3 Rd	Sun, Louisiana	Metal
Utilities (water)	Sun Water System Tower	30285 Lock #3 Rd	Sun, Louisiana	Metal
Utilities (water)	Sun Water System Tower	28666 Hwy 16	Sun, Louisiana	Metal

Figure 0-6- Village of Sun

Critical Facilities and Vulnerable Populations

Property	Description	Parish
Agriculture and food	Centers that supply seed and feed and that handle harvested crops and food processing	0
Water	Centers for water supply, treatment and storage and wastewater treatment	56
Public health	Hospitals, health clinics, mental health facilities, nursing homes, blood-supply facilities, laboratories	25
Emergency services	Police and fire stations, emergency operations centers, and ambulance services	64
Defense industrial base	Defense industries, ports and shipping facilities	0
Telecommunications	Facilities that support telephone, television, radio and data transmission	12
Energy	Sites that generate, transmit and distribute electricity, natural gas, gasoline and other oil products	13
Transportation	Airports, railroads, major highways, and riverine and maritime shipping facilities, key bridges, bus terminals	19
Banking and finance	Banks, lending institutions, and the regulatory and support facilities that service them	66
Chemical industry and hazardous materials	Sites for research, production, storage and distribution of chemicals and hazardous materials	15
Postal and shipping	Post offices, packaging and shipping companies	34
Key Assets		
Government	City halls, local, state and federal offices, community centers, museums, and libraries	51
Schools	Elementary and high schools, colleges, school offices and day care centers	164
Shelters	Schools that have been identified as shelters for evacuation or temporary housing of disaster victims	49

Figure 0-7 - St Tammany Parish Critical Facilities - Inclusive of All Jurisdictions

Critical Facilities					
City Hall	3101 E. Causeway Approach	Mandeville	70448	30°22'22.87"N	90° 04'42.13"W
Police Department	1870 Hwy 190	Mandeville	70448	30°22'25.26"N	90° 04'37.13"W
Police Department Investigations Annex	1923 Jefferson St	Mandeville	70448	30°21'18.76"N	90° 03'57.16"W
Public Works Facility / Sewerage Treatment	1100 Mandeville High Blvd	Mandeville	70471	30°22'35.58"N	90° 05'59.04"W
Community Center	3090 E. Causeway Approach	Mandeville	70448	30°22'16.84"N	90° 04'42.24"W
Lift Station #01	Rapatel St at Florida St	Mandeville	70448	30°21'13.25"N	90° 02'30.35"W
Lift Station #02	Atalin St at Railroad	Mandeville	70448	30°21'21.57"N	90° 03'11.94"W
Lift Station #03	Jackson Ave at Jefferson St	Mandeville	70448	30°21'04.99"N	90° 03'31.84"W
Lift Station #04	Foy St at Claiborne St	Mandeville	70448	30°21'07.10"N	90° 03'45.02"W
Lift Station #05	Jefferson St at Coffee St	Mandeville	70448	30°21'27.23"N	90° 04'16.04"W
Lift Station #06	Adair St at Lakeshore Dr	Mandeville	70448	30°21'20.59"N	90° 04'28.75"W
Lift Station #07	Carondelet St at Lakeshore Dr	Mandeville	70448	30°21'30.09"N	90° 04'47.76"W
Lift Station #08	Kleber St at East Causeway Appr	Mandeville	70448	30°22'04.20"N	90° 05'04.93"W
Lift Station #09	Monroe St at East Causeway Appr	Mandeville	70448	30°22'16.97"N	90° 05'31.23"W
Lift Station #10	Antibes East at Mariners' Blvd	Mandeville	70448	30°22'03.68"N	90° 05'19.91"W
Lift Station #11	Antibes West south of Mariners' Blvd	Mandeville	70448	30°22'04.51"N	90° 05'30.51"W
Lift Station #12	North Causeway near Monroe St	Mandeville	70448	30°22'22.40"N	90° 05'31.58"W
Lift Station #13	Service Rd south of Monroe St	Mandeville	70448	30°22'15.83"N	90° 05'34.97"W
Lift Station #14	2600 Florida St	Mandeville	70448	30°22'07.14"N	90° 04'16.18"W
Lift Station #15	Laura Drive North	Mandeville	70448	30°22'39.45"N	90° 04'29.67"W
Lift Station #16	200 Block of Devon Dr	Mandeville	70448	30°22'22.87"N	90° 05'02.44"W
Lift Station #17	Corin St at Katherine Ct	Mandeville	70448	30°22'44.12"N	90° 05'13.30"W
Lift Station #18	Corin St by the Bridge	Mandeville	70448	30°22'46.67"N	90° 05'14.23"W
Lift Station #19	Live Oak Blvd at West Hickory	Mandeville	70471	30°22'54.08"N	90° 05'58.15"W
Lift Station #20	North end of Dorado Dr	Mandeville	70471	30°23'26.63"N	90° 06'35.29"W
Lift Station #21	South end of Dorado Dr	Mandeville	70471	30°23'26.50"N	90° 06'45.31"W
Lift Station #22	Heavens Dr at Libra	Mandeville	70471	30°23'56.06"N	90° 06'54.96"W
Lift Station #23	Cedarwood Dr	Mandeville	70471	30°23'50.45"N	90° 06'47.45"W
Lift Station #24	3601 Hwy 190 near Starbucks	Mandeville	70471	30°23'34.56"N	90° 05'06.31"W
Lift Station #25	St. Ann St at the Service Road	Mandeville	70471	30°23'23.50"N	90° 05'19.50"W
Lift Station #26	1800 North Causeway Blvd	Mandeville	70471	30°23'29.63"N	90° 05'23.85"W
Lift Station #27	End of Mandeville High Blvd	Mandeville	70471	30°22'40.40"N	90° 05'57.64"W
Lift Station #28	Hwy 22 near Rouquette Lodge	Mandeville	70471	30°23'47.49"N	90° 05'50.77"W
Lift Station #29	Casey Dr at Elizabeth Dr	Mandeville	70471	30°23'42.15"N	90° 06'58.99"W

Figure 0-8- City of Mandeville

Lift Station #28	Hwy 22 near Rouquette Lodge	Mandeville	70471	30°23'47.49"N	90° 05'50.77"W
Lift Station #29	Casey Dr at Elizabeth Dr	Mandeville	70471	30°23'42.15"N	90° 06'58.99"W
Lift Station #30	1402 North Causeway Blvd at Fontainebleau	Mandeville	70471	30°23'13.43"N	90° 05'25.98"W
Lift Station #31	1153 Rue Bayonne	Mandeville	70471	30°23'16.22"N	90° 05'41.22"W
Lift Station #32	Shadow Oak Ln	Mandeville	70471	30°22'54.92"N	90° 05'36.75"W
Lift Station #33	St. Ann St at Chinchuba Creek	Mandeville	70471	30°23'19.19"N	90° 05'06.52"W
Lift Station #34	1459 North Causeway Blvd	Mandeville	70471	30°23'21.17"N	90° 05'20.43"W
Lift Station #35	Fontainebleau Rue Bayonne	Mandeville	70471	30°23'20.48"N	90° 05'37.04"W
Lift Station #36	1225 West Causeway Appr	Mandeville	70471	30°23'01.52"N	90° 05'43.87"W
Lift Station #37	Cardinal Ln	Mandeville	70471	30°23'18.58"N	90° 06'43.83"W
Lift Station #38	4520 Hwy 22	Mandeville	70471	30°23'50.01"N	90° 06'14.35"W
Lift Station #39	Woodstone Dr at Christian Ct	Mandeville	70471	30°23'06.07"N	90° 06'10.76"W
Lift Station #40	1501 West Causeway Appr	Mandeville	70471	30°23'23.11"N	90° 05'57.22"W
Lift Station #41	4350 Hwy 22	Mandeville	70471	30°23'41.19"N	90° 05'55.95"W
Lift Station #42	4575 Lasalle St	Mandeville	70471	30°23'45.27"N	90° 05'24.72"W
Lift Station #43	721 Libby Ln	Mandeville	70471	30°23'42.37"N	90° 06'42.58"W
Lift Station #44	Pintail Dr	Mandeville	70471	30°22'48.58"N	90° 06'34.10"W
Lift Station #45	1241 North Causeway Blvd	Mandeville	70471	30°23'03.47"N	90° 05'23.61"W
Lift Station #47	Sanctuary Dr	Mandeville	70471	30°22'34.07"N	90° 06'45.77"W
Lift Station #48	Antibes West at Tops'l	Mandeville	70448	30°22'04.59"N	90° 05'30.51"W
Lift Station #50	1117 North Causeway	Mandeville	70471	30°22'55.59"N	90° 05'25.54"W
Lift Station #A	Montgomery St near Dupre St	Mandeville	70448	30°21'08.46"N	90° 02'34.94"W
Lift Station #B	Montgomery St near Colbert St	Mandeville	70448	30°21'10.95"N	90° 02'50.42"W
Lift Station #C	Villere St near Soult St	Mandeville	70448	30°21'17.90"N	90° 02'54.06"W
Lift Station #C/C	West Florida near North Causeway Blvd	Mandeville	70448	30°22'42.79"N	90° 05'31.43"W
Lift Station #D	Clausel St near Livingston St	Mandeville	70448	30°21'24.11"N	90° 03'26.32"W
Lift Station #E	Albert St near Madison St	Mandeville	70448	30°21'02.93"N	90° 03'16.25"W
Lift Station #F	Walmart at East Causeway Approach	Mandeville	70448	30°22'19.72"N	90° 04'40.52"W
Lift Station #G	Castine Point Subdivision	Mandeville	70448	30°21'10.04"N	90° 02'19.00"W
Lift Station #H	Hermitage on the Lake / Sunset Point	Mandeville	70448	30°21'51.79"N	90° 04'59.98"W
Lift Station #I	Chenier at Hwy 190	Mandeville	70448	30°22'35.25"N	90° 04'30.53"W
Water Well #1	1923 Jefferson St	Mandeville	70448	30°21'20.22"N	90° 03'56.44"W
Water Well #2	3350 Monroe St	Mandeville	70448	30°22'07.02"N	90° 05'12.42"W
Water Well #5	225 Mandeville High Blvd	Mandeville	70471	30°22'53.47"N	90° 05'53.16"W
Water Well #6	1010 Atalin St	Mandeville	70471	30°21'37.29"N	90° 03'02.22"W
Water Well #7	1876 Hwy 190	Mandeville	70471	30°22'22.86"N	90° 04'36.54"W

Figure 0-9- City of Mandeville

Fire Station #41 and Administration	709 Girod St	Mandeville	70448	30°21'39.93"N	90° 03'46.09"W
Fire Station #42	3951 Hwy 22	Mandeville	70471	30°23'46.11"N	90° 05'39.60"W
Woodstone Pump Station	109 Woodstone Dr	Mandeville	70471	30°23'01.06"N	90° 06'08.22"W
Rapatel Street Water Tower	800 Block of Rapatel St	Mandeville	70448	30°21'03.93"N	90° 02'22.75"W
St Ann Street Water Tower	1461 North Causeway Blvd	Mandeville	70471	30°23'20.25"N	90° 05'17.37"W
AT&T Building	516 Lafitte St	Mandeville	70448	30°21'34.88"N	90° 04'00.32"W
Shelters					
Community Center	3090 E. Causeway Approach	Mandeville	70448	30°22'16.83"N	90° 04'42.33"W
Hospitals					
Lurline Smith Mental Health Clinic	900 Wilkinson St	Mandeville	70448	30°22'10.97"N	90° 04'14.84"W
Schools					
Woodlake Elementary School	1620 Livingston St	Mandeville	70448	30°21'22.75"N	90° 03'31.58"W
Mandeville Junior High School	639 Carondelet St	Mandeville	70448	30°21'55.98"N	90° 04'28.32"W
Our Lady of the Lake Catholic School	316 Lafitte St	Mandeville	70448	30°21'26.44"N	90° 04'08.19"W
Mandeville Elementary School	519 Massena St	Mandeville	70448	30°22'02.47"N	90° 04'50.56"W
Mandeville High School	1 Skipper Dr	Mandeville	70471	30°22'53.13"N	90° 06'05.22"W
Pontchartrain Elementary School	1500 West Causeway Appr	Mandeville	70471	30°23'19.34"N	90° 06'05.87"W
Mary, Queen of Peace Catholic School	1515 West Causeway Appr	Mandeville	70471	30°23'30.76"N	90° 05'55.27"W
Tchefuncte Middle School	1530 West Causeway Appr	Mandeville	70471	30°23'19.93"N	90° 06'08.83"W
Cedarwood School	601 Heavens Dr	Mandeville	70471	30°23'52.71"N	90° 06'50.26"W
Daycares					
Cedarwood School	601 Heavens Dr	Mandeville	70471	30°23'52.71"N	90° 06'50.26"W
Townhouse Preschool	200 Chestnut St	Mandeville	70471		
Music Academy for the Performing Arts	4244 Hwy 22	Mandeville	70471		
Old Mandeville Preschool	2130 Monroe St	Mandeville	70448		
My Little Sprouts Too	641 Lotus Dr	Mandeville	70471		
Play and Learn Northshore Academy	2433 Monroe St	Mandeville	70448		
Tender Years	2490 Florida St	Mandeville	70448		
Nursing Homes/Assisted Living					
Pontchartrain Health Care Centre	1401 Florida St	Mandeville	70448	30°21'33.19"N	90° 03'06.36"W
Beau Provence	100 Beau West Dr	Mandeville	70471	30°24'00.93"N	90° 06'37.61"W
Heritage Manor of Mandeville	1820 W. Causeway Appr	Mandeville	70471	30°23'47.82"N	90° 06'17.72"W
Rouquette Lodge	4300 Hwy 22	Mandeville	70471	30°23'44.52"N	90° 05'49.20"W
Emeritus at Mandeville	1414 N. Causeway Blvd.	Mandeville	70471	30°23'17.92"N	90° 05'28.90"W
Windsor Senior Living Community	1770 N. Causeway Blvd.	Mandeville	70471	30°23'26.957"N	90° 05'31.43"W

Figure 0-10 - City of Mandeville

Mobile Home Parks					
Bridges					
1500 Block of Lakeshore Dr	Lakeshore Dr	Mandeville	70448	30°20'58.30"N	90° 03'43.67"W
2300 Block of Lakeshore Dr	Lakeshore Dr	Mandeville	70448	30°21'20.66"N	90° 04'28.07"W
200 Block of Coffee St	Coffee St	Mandeville	70448	30°21'24.81"N	90° 04'20.71"W
1700 Block of Madison St	Madison St	Mandeville	70448	30°21'15.84"N	90° 03'40.14"W
100 Block of Corin Dr	Corin Dr	Mandeville	70448	30°22'46.54"N	90° 05'13.90"W
North Causeway @ Monroe St Overpass	North Causeway Blvd	Mandeville	70448	30°22'18.86"N	90° 05'33.36"W
West Causeway Flyover Ramp	North Causeway Blvd	Mandeville	70471	30°22'30.11"N	90° 05'31.78"W
North Causeway @ Chinchuba Creek	North Causeway Blvd	Mandeville	70471	30°22'46.76"N	90° 05'28.48"W
North Causeway @ Hwy 22 Overpass	North Causeway Blvd	Mandeville	70471	30°23'37.90"N	90° 05'19.20"W
West Causeway @ Chinchuba Creek	West Causeway Approach	Mandeville	70471	30°22'45.46"N	90° 05'38.22"W
West Causeway Pedestrian Bridge @ Chi	West Causeway Approach	Mandeville	70471	30°22'45.28"N	90° 05'39.21"W
Hwy 190 @ Chinchuba Creek - Eastbound	Hwy 190	Mandeville	70471	30°23'03.62"N	90° 04'44.62"W
Hwy 190 @ Chinchuba Creek - Westbound	Hwy 190	Mandeville	70471	30°23'03.76"N	90° 04'44.04"W
Florida St over the Tammany Trace	Florida St (Hwy 190)	Mandeville	70448	30°22'00.24"N	90° 04'04.67"W
Florida St @ Little Bayou Castine	Florida St (Hwy 190)	Mandeville	70448	30°21'34.37"N	90° 03'13.38"W
Florida St @ Bayou Castine	Florida St (Hwy 190)	Mandeville	70448	30°21'05.15"N	90° 02'15.35"W
Tammany Trace @ Bayou Castine		Mandeville	70448	30°21'00.74"N	90° 02'20.51"W
Tammany Trace @ Little Bayou Castine		Mandeville	70448	30°21'25.18"N	90° 03'20.56"W
Pedestrian Bridge @ Ravine Aux Coquille	Lakeshore Dr	Mandeville	70448	30°21'19.38"N	90° 04'28.88"W
Pedestrian Bridge @ Little Bayou Castine	Lakeshore Dr	Mandeville	70448	30°20'58.07"N	90° 03'43.80"W
Pedestrian Bridge @ Jackson bike path	Jackson Ave	Mandeville	70448	30°21'15.48"N	90° 03'24.44"W
Boat Ramp end of Jackson		Mandeville	70448	30°20'54.25"N	90° 03'41.31"W
Boat Ramp at Jackson		Mandeville	70448	30°20'59.55"N	90° 03'33.60"W

Figure 0-11- City of Mandeville

Critical Facilities					
Fire District 1 Headquarters	1358 Corporate Square	Slidell	70458	30°16'59.816"N	89°45'24.946"W
Fire Station #11	322 Bouscaren St	Slidell	70458	30°16'31.487"N	89°46'50.753"W
Fire Station #12	1570 West Hall Ave	Slidell	70458	30°17'6.314"N	89°45'57.615"W
Fire Station #13	101 Normandy Drive	Slidell	70458	30°17'41.987"N	89°45'57.615"W
Fire Station #16	320 Marina Dr	Slidell	70458	30°17'41.987"N	89°47'16.018"W
Fire Station #XX		Slidell	70458	30°	89°
Fire Station #XX		Slidell	70458	30°	89°
Police Headquarters and City Jail	212 Sgt Alfred	Slidell	70458	30°16'29.684"N	89°46'48.662"W
Public Operations Headquarters	1325 Bayou Lane	Slidell	70458	30°17'2.576"N	89°46'57.775"W
Public Operations Vehicle Maintenance Facility	1327 Bayou Lane	Slidell	70458	30°16'57.052"N	89°46'58.642"W
Sewage Treatment Facility	2800 Terrace Ave	Slidell	70458	30°15'50.968"N	89°46'8.855"W
Water Well/Pump	Kostmayer Ave	Slidell	70458	30°15'29.957"N	89°47'8.466"W
Water Well/Pump		Slidell	70458	30°	89°
Water Well/Pump		Slidell	70458	30°	89°
		Slidell	70458	30°	89°
Bayou Pattasatt Pump Station		Slidell	70458	30°16'24.094"N	89°47'18.377"W
Shelters					
		Slidell	70458	30°	89°
		Slidell	70458	30°	89°
		Slidell	70458	30°	89°
		Slidell	70458	30°	89°
Hospitals					
Slidell Memorial Hospital	1001 Gause Blvd	Slidell	70458	30°17'3.779"N	89°46'11.836"W
Ochsner Hospital	100 Medical Center Dr	Slidell	70458	30°17'12.738"N	89°44'34.93"W
		Slidell	70458	30°	89°

Figure 0-12- City of Slidell

Bridges					
Gause Blvd bridge over Bayou Vincent	Intersection Bayou Vincent and Gause Blvd	Slidell	70458	30°17'28.249"N	89°47'24.838"W
Gause Blvd overpass over I-10	Intersection Gause Blvd and I-10	Slidell	70460	30°17'5.333"N	89°44'58.573"W
West Hall Ave bridge over Bayou Vincent	Intersection Bayou Vincet and West Hall Ave	Slidell	70460	30°17'5.125"N	89°47'30.913"W
Bryan Street bridge over South Fork Bayou Patassat	Intersection South Fork Bayou Patassat and Bryan St.	Slidell	70458	30°16'10.171"N	89°46'59.943"W
Carey Street bridge over South Fork Bayou Patassat	Intersection South Fork Bayou Patassat and Carey St.	Slidell	70458	30°16'14.066"N	89°47'1.375"W
Carey Street bridge over North Fork Bayou Patassat	Intersection North Fork Bayou Patassat and Carey St.	Slidell	70458	30°16'15.586"N	89°47'1.351"W
Cousin Street bridge over North Fork Bayou Patassat	Intersection North Fork Bayou Patassat and Cousin St.	Slidell	70458	30°16'26.623"N	89°46'44.678"W
Cousin Street bridge over W-14 Drainage Canal	Intersection Cousin St. and W-14 Drainage Canal	Slidell	70458	30°16'27.345"N	89°46'16.872"W
Florida Ave bridge over W-14 Drainage Canal	Intersection Florida Ave and W-14 Drainage Canal	Slidell	70458	30°16'57.899"N	89°46'7.446"W
Sgt Alfred St bridge over North Fork Bayou Patassat	Intersection Sgt Alfred St and North Fork Bayou Patassat	Slidell	70458	30°16'22.172"N	89°46'49.640"W
Olive Dr. bridge over the WP-20 Drainage Canal	Olive Dr. intersection with the WP-20 Drainage Canal	Slidell	70458	30°15'10.377"N	89°46'55.144"W
Hickory Dr. bridge over the WP-20 Drainage Canal	Hickory Dr. intersection with the WP-20 Drainage Canal	Slidell	70458	30°15'13.771"N	89°46'54.091"W
Independence Dr bridge over W-14 Drainage Canal	Intersection Independence Dr. and W-14 Drainage Canal	Slidell	70458	30°17'26.494"N	89°46'3.331"W
Spartan Dr. bridge over the WP-20 Drainage Canal	Spartan Dr. intersection with the WP-20 Drainage Canal	Slidell	70458	30°14'47.972"N	89°47'25.224"W
North Blvd bridge over W-14 Drainage Canal	Intersection North Blvd and W-14 Drainage Canal	Slidell	70458	30°18'5.268"N	89°16'23.767"W
Hwy 11 Bridge over Railroad tracks	Intersection HWY 11 and Rail Line	Slidell	70458	30°17'42.173"N	89°46'34.614"W
Gause Blvd (Hwy 190 east) over W-15 Canal	Intersection Gause Blvd (Hwy 190 east) and W-15 Canal	Slidell	70458	30°17'16.494"N	89°43'55.716"W

Figure 0-13- City of Slidell

Name	Street	City	Zip Code	Latitude	Longitude
Robert Blvd bridge over W-14 Canal	Intersection Robert Blvd and W-14 Canal	Slidell	70458	30°17'34.837"N	89°46'2.475"W
Robert Blvd overpass over I-12	Intersection Robert Blvd and I-12	Slidell	70458	30°18'30.635"N	89°44'55.369"W
Shortcut Hwy overpass over I-10	Intersection Shortcut Hwy and I-10	Slidell	70458	30°16'13.109"N	89°45'18.052"W
Airport Rd overpass over I-10	Intesection Airport Rd and I-10	Slidell	70458	30°18'47.665"N	89°49'33.106"W
Bill Garrett Rd bridge over W-14	Intersection Bill Garrett Rd and W-14 canal	Slidell	70458	30°15'46.604"N	89°45'30.050"W
Lift Stations					
PS 200 Linberg Dirve	Linberg Drive	Slidell	70458	30°16'52.541"N	89°45'8.158"W
PS 251 Pearl Acres	Intersection Pearl Acres and Gause Blvd (East)	Slidell	70461	30°17'11.499"N	89°44'10.774"W
PS 500 Old City Barn	Bayou Lane	Slidell	70458	30°16'23.052"N	89°47'10.326"W
PS 550 Bayou Lane and West Hall Ave	Intersection of Bayou Lane and West Hall Ave	Slidell	70458	30°17'4.512"N	89°46'53.542"W
		Slidell	70458	30°	89°
Water Wells					
Front Street Tower	3500 Front St	Slidell	70458	30°15'35.974"N	89°47'33.205"W
Kostmayer	631 Kostmayer Ave	Slidell	70458	30°15'29.828"N	89°47'9.019"W
MRO	1075 Caruso Blvd	Slidell	70461	30°14'44.276"N	89°45'22.536"W
Northshore Hospital	301 Gateway	Slidell	70461	30°17'17.746"N	89°44'32.060"W
Target	61125 Airport Blvd	Slidell	70460	30°19'5.370"N	89°49'49.127"W
Mall South	138 Northshore Blvd	Slidell	70460	30°18'16.609"N	89°49'20.135"W
Mall North	158 Northshore Blvd	Slidell	70460	30°18'40.239"N	89°49'18.547"W
West Hall Ave	1291 West Hall Ave	Slidell	70460	30°17'4.317"N	89°47'33.717"W
Robert Rd Tower	1055 Robert Rd	Slidell	70458	30°17'22.102"N	89°46'15.517"W
Walmart	161 Northshore Blvd	Slidell	70460	30°18'24.818"N	89°49'48.092"W

Figure 0-14 - City of Slidell

Name	Street	City	Zip Code	Latitude	Longitude
Critical Facilities					
ABITA SPRINGS TOWN HALL	22161 LEVEL STREET (2 BUILDINGS)	ABITA SPRINGS	70420		
MAINTENANCE BARN	ORME STREET				
SEWER TREATMENT PLANT	ORME STREET				
SEWER LIFT STATIONS	VARIOUS SITES AROUND TOWN				
ABITA FIRE DEPT	HWY 36				
Schools					
ABITA SPRINGS ELEMENTARY	LEVEL STREET				
ABITA SPRINGS MIDDLE	HWY 36				
SOUTHERN MAGNOLIA MONTESSORI	LIVE OAK STREET (2 BUILDINGS)				
HEALING WATERS MONTESSORI					
Daycares					
CHRISTIAN DAYCARE	MAIN STREET				
ABITA CHILDRENS ACADEMY	LEVEL STREET				
Bridges					
HICKORY STREET BRIDGE	HICKORY @ NORTH STREET				
KELLER STREET	KELLER STREET				
ST JOSEPH	ST JOSEPH				
HICKORY BRIDGE	HICKORY @ EADS				

Figure 0-15 - Town of Abita Springs

Critical Facilities			
NONE			
Shelters			
Fifth Ward Jr. High School	81419 Hwy 21 (985-886-3273)	Bush	70431
Hospitals			
NONE			
Schools			
Fifth Ward Jr. High School	81419 Hwy 21	Bush	70431
Daycares			
NONE			
Nursing Homes/Assisted Living			
NONE			
Mobile Home Parks			
Rose Laird Trailer Park	30085 Hwy 16	Sun	70463
Bridges			
Wrights Creek	La Hwy 16	Sun	70463
Holden's Creek	La Hwy 16	Sun	70463
Wrights Creek	La Hwy 21	Sun	70463

Figure 0-16 -Village of Sun

Name	Street	City	Zip Code	Latitude	Longitude
Municipal Buildings					
St. Tammany Parish 911 and EOC	510 E. Boston St.	Covington	70433	30°28'33.24"N	90° 5'43.59"W
Covington City Hall & Greater Convention Center	317 N. Jefferson Ave.	Covington	70433	30°28'39.28"N	90° 5'58.62"W
St. Tammany Justice Center (Courthouse)	701 N. Columbia St.	Covington	70433	30°28'48.50"N	90° 5'47.11"W
Law Enforcement Facilities					
Covington Police Department	609 N. Columbia St.	Covington	70433	30°28'45.53"N	90° 5'44.05"W
St. Tammany Parish Sheriff Substation	2070 N. Collins Blvd.	Covington	70433	30°29'53.49"N	90° 6'14.54"W
St. Tammany Parish Sheriff Office	1280 Champagne St.	Covington	70433	30°29'37.82"N	90° 6'19.87"W
St. Tammany Parish Jail	1200 Champagne St.	Covington	70433	30°29'33.18"N	90° 6'24.17"W
Emergency Shelters					
Covington High School	73030 Lion Dr.	Covington	70433	30°29'37.69"N	90° 7'57.08"W
Hospitals					
St. Tammany Parish Hospital	1202 S. Tyler St.	Covington	70433	30°28'7.13"N	90° 6'46.31"W
Vulnerable Facilities to Protect in Hazard Event					
City of Covington Sewer Plant	1400 W. 27th Ave.	Covington	70433	30°29'19.93"N	90° 6'38.12"W
Covington Water Well #1	669 Filmore & W. 16 th Ave	Covington	70433	30°28'33.00"N	90° 6'46.31"W
Covington Water Well #3	Bollfield rd. & Branch Crossing	Covington	70433	30°30'1.14"N	90° 6'0.51"W
Covington Water Well #2	2626 W. 15 th & Ellen	Covington	70433	30°29'13.58"N	90° 8'11.02"W
Sewer Lift Station #1 (Major)	431 E. 1st Avenue	Covington	70433	30°27'20.86"N	90°06'37.77"W
Sewer Lift Station #3 (Major)	330 W. 8th Avenue	Covington	70433	30°27'56.60"N	90°06'44.28"W
Sewer Lift Station #4 (Major)	400 E. 9th Avenue	Covington	70433	30°27'48.16"N	90°06'21.67"W
Sewer Lift Station #6 (Major)	233 E. 14th Avenue	Covington	70433	30°28'03.19"N	90°06'10.18"W
Sewer Lift Station #9 (Major)	111 S. New Hampshire Street	Covington	70433	30°28'20.66"N	90°05'45.32"W
Sewer Lift Station #10 (Major)	901 W. 19th Avenue	Covington	70433	30°28'40.25"N	90°06'35.57"W
Sewer Lift Station #11 (Major)	730 W. 26th Avenue	Covington	70433	30°29'01.56"N	90°06'15.59"W
Sewer Lift Station #15 (Major)	61 Patricia Drive	Covington	70433	30°28'57.49"N	90°08'23.16"W
Sewer Lift Station #52 (Major)	1032 Ronald Reagan Highway	Covington	70433	30°29'48.47"N	90°06'54.82"W
Sewer Lift Station #55 (Major)	601 Barkley Blvd.	Covington	70433	30°29'09.28"N	90°06'52.27"W
Sewer Lift Station #57 (Major)	4000 De Porres Road	Covington	70433	30°29'37.31"N	90°06'49.01"W
Minor Sewer Lift Station Network	City-wide	Covington	70433	City-wide	City-wide
Cleco Transfer Substation #1	Philip Dr.	Covington	70433	30°29'30.96"N	90° 6'51.46"W
Cleco Transfer Substation #2	W. 8th Ave.	Covington	70433	30°27'58.69"N	90° 6'46.38"W
Cleco Transfer Substation #3	E 25th Ave and N. Theard St.	Covington	70433	30°28'42.01"N	90° 5'51.19"W
Cleco Transfer Substation #4	W 21st Ave. and Maple Ln	Covington	70433	30°29'12.59"N	90° 7'16.05"W
Schools/Daycares					
Covington Elementary School	325 S. Jackson St.	Covington	70433	30°28'29.07"N	90° 6'22.49"W
Lyon Elementary School	1615 N. Florida St.	Covington	70433	30°29'37.10"N	90° 5'53.24"W
Pine View Middle School	1200 W. 27th Ave.	Covington	70433	30°29'12.42"N	90° 6'23.48"W
William Pitcher Junior High School	418 S. Jefferson Ave.	Covington	70433	30°28'22.58"N	90° 6'15.22"W
Covington High School	73030 Lion Dr.	Covington	70433	30°29'37.69"N	90° 7'57.08"W
St. Peter's Elementary School	130 E. Temperance St.	Covington	70433	30°28'25.39"N	90° 5'60.00"W
St. Paul's School	917 S Jahncke Ave.	Covington	70433	30°28'2.42"N	90° 6'19.45"W
Covington Pathways	801 N. Tyler St.	Covington	70433	30°29'6.97"N	90° 6'5.46"W
Christ Episcopal School	120 S. New Hampshire St.	Covington	70433	30°28'21.74"N	90° 5'42.62"W
St. Scholastica Academy	122 S. Massachusetts St.	Covington	70433	30°28'27.31"N	90° 5'54.91"W
Kehoe France Elementary School	25 Patricia Dr.	Covington	70433	30°28'56.88"N	90° 7'52.79"W
Covington Montessori School	116 N. Monroe St.	Covington	70433	30°28'36.56"N	90° 6'8.04"W
Lakeview Maria Montessori School	502 N. Florida St.	Covington	70433	30°28'42.10"N	90° 5'36.36"W
Daycare Circle of Love	1114 N. Polk St.	Covington	70433	30°29'17.41"N	90° 6'0.94"W
Bambi's Kids Academy	1201 W 22nd Ave.	Covington	70433	30°28'55.46"N	90° 6'38.62"W
Patticakes Christian Daycare	1326 W 21st Ave.	Covington	70433	30°28'56.84"N	90° 6'45.33"W
Covington Early Head Start	73134 E. Stadium Dr.	Covington	70433	30°29'44.33"N	90° 7'51.04"W
Bright Minds Preschool	614 W 19th Ave.	Covington	70433	30°28'37.29"N	90° 6'26.42"W
Lil' Lighthouse Christian Academy	706 W 14th Ave.	Covington	70433	30°28'22.01"N	90° 6'40.37"W
Little Red School House	304 E 32nd Ave.	Covington	70433	30°29'23.31"N	90° 5'32.80"W
Little Oak Preschool	118 N. Jefferson Ave.	Covington	70433	30°28'32.31"N	90° 6'0.97"W
Little School of First United Methodist Church	203 N. Jefferson Ave.	Covington	70433	30°28'36.11"N	90° 6'0.62"W
Nursing Homes/Assisted Living					
Forest Manor Nursing Home	71338 Hwy 21	Covington	70433	30°27'35.25"N	90° 7'14.95"W

Figure 0-17 - City of Covington

Bridges					
Bogue Falaya River Bridge	E. Boston St.	Covington	70433	30°28'35.06"N	90° 5'21.95"W
Mile Branch Bridge	W 21st Ave.	Covington	70433	30°28'50.02"N	90° 6'35.66"W
Mile Branch Bridge	W 23rd Ave.	Covington	70433	30°28'54.85"N	90° 6'28.42"W
Mile Branch Bridge	W 19th Ave.	Covington	70433	30°28'40.64"N	90° 6'35.32"W
Mile Branch Bridge	W 15th Ave.	Covington	70433	30°28'35.25"N	90° 6'56.96"W
Mile Branch Bridge	W 11th Ave.	Covington	70433	30°28'27.95"N	90° 7'16.55"W
Mile Branch Bridge	W 25th Ave.	Covington	70433	30°29'1.16"N	90° 6'23.52"W
Mile Branch Bridge	W 28th Ave.	Covington	70433	30°29'11.75"N	90° 6'18.67"W
Mile Branch Bridge	W 29th Ave.	Covington	70433	30°29'15.23"N	90° 6'16.79"W
Mile Branch Bridge	N. Columbia St.	Covington	70433	30°29'36.50"N	90° 6'9.59"W
Tchefuncte River Bridge	S. Tyler St.	Covington	70433	30°27'50.52"N	90° 7'3.60"W
Rattlesnake Branch Bridge	S. Cleveland St.	Covington	70433	30°28'27.66"N	90° 7'28.33"W

Figure 0-18- City of Covington

Name	Street	City	Zip Code	Latitude	Longitude
Critical Facilities					
Town Hall	403 St. Francis St.	Madisonville	70447	30° 24'14"N	90° 3'22"W
Maintenance Barn	500 Johnson St.	Madisonville	70447	30.410961	90.16436
Police Department	400 Cedar St.	Madisonville	70447	30.407788	90.159318
Shelters					
Hospitals					
Schools					
Daycares					
Nursing Homes/Assisted Living					
Mobile Home Parks					
Bridges					
Tchefuncte River Draw Bridge	Highway 22				

Figure 0-19 - Town of Madisonville

National Flood Insurance Program (NFIP)

St Tammany Parish

Work Sheet 4.3	
National Flood Insurance Program (NFIP)	
NFIP Topic	Comments
Insurance Summary	
How many NFIP policies are in the community? What is the total premium and coverage?	<u>PIF (6/30/14):</u> 2,716 (Pre-FIRM)+32,306 (Post-FIRM)= 35,032 <u>Premiums:</u> \$2,547,073 (Pre-)+&18,232,327 (Post-)= \$20,779,400 <u>Coverage:</u> \$638,215,900 (Pre-)+\$9,531,320,700(Post-)= \$10,169,536,600
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage? (UNKN)	<u>No.Claims Pd:</u> 5,384 (Pre-)+10,642 (post-)= 16,026 Amt Claims Pd: \$240,078,645 (Pre-)+\$848,371,253 (Post-)= \$1,088,449,898
How many structures are exposed to flood risk with in the community?	(Activity 230 CRS Data Table, Sept 30, 2013): 30,949 (SFHA)+6,758 (critical drainage area outside SFHA)= 37,707
Describe any areas of flood risk with limited NFIP policy coverage. (UNKN)	
Staff Resources	
Is the Community FPA or NFIP Coordinator certified?	Yes
Is flood plain management an auxiliary function?	No. Mandatory
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	Assist developers, customers & builders, Review all permits. Engineering Dept carries out subdivision, commercial & institutional inspections. Permits Dept inspects residential. No Certificate of Occupancy is issued unless in compliance w/NFIP regulations. Inspections are also conducted upon receipt of complaints, after each major storm and/or a need for maintenance is identified.
What are the barriers to running an effective NFIP program in the community, if any? (UNKN)	Coordination & communication among Departments.
Compliance History	
Is the community in good standing with the NFIP?	Yes
Are there any outstanding compliance issues (i.e., current violations)?	No
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact(CAC)?	Jul-13
Is a CAV or CAC scheduled or needed? If so when?	None needed at this time
Regulation	
When did the community enter the NFIP?	1975
Are the FIRMs digital or paper?	Both
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Yes. 1 ft freeboard in Pearl River Basin
Community Rating System (CRS)	
Does the community participate in CRS?	Yes
What is the community's CRS Class Ranking?	7
Does the plan include CRS planning requirements?	Yes

City of Slidell

Insurance Summary	Source of Information	Comments
How many NFIP policies are in the community? What is the total premium and coverage?	State NFIP Coordinator or FEMA NFIP Specialist	Contact FEMA Region VI for updated information
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?	FEMA NFIP or Insurance Specialist	Claims paid since 1978 through 30 June 2014: Number claims = 7,769; total amount paid = 451,492,545.00. Do not know how many claims were for substantial damage
How many structures are exposed to flood risk within the community?	Community Floodplain Administrator (FPA)	There are 6,732 in the flood zone.
Describe any areas of flood risk with limited NFIP policy coverage.	Community FPA and FEMA Insurance Specialist	
Staff Resources		
Is the Community FPA or NFIP Coordinator certified?	Community FPA	Professional Engineer and Certified Flood Plain Manager
Is flood plain management an auxiliary function?	Community FPA	Yes, Director of Engineering is also the Flood Plain Administrator
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	Flood Plain administrator provide flood zone determination upon request, requires. Requires construction elevation certificates for all projects in flood plain and reviews, and ensure project meets design flood elevation by construction elevation certificates for all plans
What are the barriers to running an effective NFIP program in the community, if any?	Community FPA	45% of the city's housing units were built Pre-FIRM. A large percentage of commercial/retail structures are also Pre-FIRM. As a result many are below both the Base Flood Elevation the Design Flood Elevation, where adopted. These units are often clustered together in neighborhoods and commercial nodes increasing their vulnerability. While the city has supported the elevation and demolishing of many of these at risk structures there is still a large number with their lowest floor below BFE.
Compliance History		
Is the community in good standing with the NFIP?	State NFIP Coordinator or FEMA NFIP Specialist, community records	Yes
Are there any outstanding compliance issues (i.e., current violations)?		No
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	Louisiana Department of Transportation and Development	28-Feb-12
Is a CAV or CAC scheduled or needed? If so when?		None scheduled at this time.

Community Rating System (CRS)		
Does the community participate in CRS?	Community FPA, State, FEMA NFIP	Yes
What is the community's CRS Class Ranking?	Flood Insurance Manual: http://www.fema.gov/flood-insurance-manual	Class 7
What categories and activities provide CRS points and how can the class be improved.	CRS certification	The city has CRS points in 310, 320, 330, 340, 350, 360, 420, 430, 440, 450, 510, 520, 530, 540, and 630. One are that could be improved is 410: additional flood data; 340: hazard disclosure; 360 Flood Protection Assistance, 610 Flood Warning
Does the plan include CRS planning requirements?	Community FPA; FEMA CRS Coordinator; ISO; CRS manual (http://www.fema.gov/media-library/assets/documents/8768)	
Regulation		
When did the community enter the NFIP?	NFIP Community Status Book: http://www.fema.gov/cis/LA.html	16 December, 1980
Are the FIRMs digital or paper?	Community FPA	Paper, effective FIRM date is 21 April, 1999. In 2008 proposed DFIRMs were developed. They are being contested and so have not been adopted by the City of Slidell.
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Community FPA	City has adopted Advisory Base Flood Elevation (ABFE) plus 1 foot for the majority of the city in the floodplain.
Provide an explanation of the permitting process.	Community FPA; State, FEMA NFIP; Flood Insurance Manual (http://www.fema.gov/flood-insurance-manual); Community FPA, FEMA CRS Coordinator, ISO representative	All development in the flood plain requires a Development Permit from the city. As part of the development review plans are submitted and reviewed to ensure they meet city ordinances. During the plan review phase a pre-construction elevation certificate showing that the lowest floor meets the city's flood protection ordinance are required. Once the plan is approved a building permit is issued. Throughout construction inspections are conducted to ensure site is being built per approved plans. One key step is ensuring the foundation elevation is determined. Prior to erecting walls the developer/contractor must submit an elevation certificate identifying the height of the lowest floor. A stop work order is issued if the foundation is too low and will cause the lowest floor to be below DFE. The developer must correct DFE failures before construction is allowed to continue. After construction is complete and before a Certificate of Occupation is issued a final construction elevation certificate must be provided to the city showing completed construction is in accordance with the approved plan.

Town of Abita Springs

Insurance Summary	Source of Information	Comments
How many NFIP policies are in the community? What is the total premium and coverage?	State NFIP Coordinator or FEMA NFIP Specialist	
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?	FEMA NFIP or Insurance Specialist	
How many structures are exposed to flood risk with in the community?	Community Floodplain Administrator (FPA)	
Describe any areas of flood risk with limited NFIP policy coverage.	Community FPA and FEMA Insurance Specialist	
Staff Resources		
Is the Community FPA or NFIP Coordinator certified?	Community FPA	NFIP
Is flood plain management an auxiliary function?	Community FPA	YES
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	ALL PERMITS ARE ISSUED THROUGH THE P&Z DEPARTMENT. ALL APPLICATION ARE REVIEWED FOR DOCUMENTED COMPLIANCE WITH ALL STATE AGENCIES. ELEVATION CLARIFICATION IS REQUIRED.
What are the barriers to running an effective NFIP program in the community, if any?	Community FPA	NONE IF ALL PROPER DOCUMENTATION IS PRESENT
Compliance History		
Is the community in good standing with the NFIP?	State NFIP Coordinator or FEMA NFIP Specialist, community records	YES
Are there any outstanding compliance issues(i.e., current violations)?		NO
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact(CAC)?		ITS BEEN A FEW YEARS..MAYBE 2011
Is a CAV or CAC scheduled or needed? If so when?		NO
Regulation		
When did the community enter the NFIP?	NFIP Community Status Book: http://www.fema.gov/cis/LA.html	1985 ORD # 180
Are the FIRMs digital or paper?	Community FPA	
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Community FPA	MEETS THE REGS...
Provide an explanation of the permitting process.	Community FPA; State, FEMA NFIP; Flood Insurance Manual (http://www.fema.gov/flood-insurance-manual); Community FPA, FEMA CRS Coordinator, ISO representative	THE APPLICATION MUST INCLUDE A CERTIFIED SURVEY WITH THE FLOOD ELEVATION INFORMATION ON IT.

City of Mandeville

Insurance Summary	Source of Information	Comments
How many NFIP policies are in the community? What is the total premium and coverage?	State NFIP Coordinator or FEMA NFIP Specialist	2723, \$2,090,497 in annual premium, and \$727,986,400 in coverage
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?	FEMA NFIP or Insurance Specialist	1225, \$41672795, 201 claims for substantial damage
How many structures are exposed to flood risk with in the community?	Community Floodplain Administrator (FPA)	3780
Describe any areas of flood risk with limited NFIP policy coverage.	Community FPA and FEMA Insurance Specialist	NONE
Staff Resources		
Is the Community FPA or NFIP Coordinator certified?	Community FPA	YES, CERTIFIED FLOODPLAIN MANAGER (CFM)
Is flood plain management an auxiliary function?	Community FPA	Combined with Building Official
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	Permit review, education and outreach, grant administration, GIS, floodplain inspections, resources available to realtors and insurance agents, engineering
What are the barriers to running an effective NFIP program in the community, if any?	Community FPA	Staff resources
Compliance History		
Is the community in good standing with the NFIP?	State NFIP Coordinator or FEMA NFIP Specialist, community records	YES
Are there any outstanding compliance issues(i.e., current violations)?	Community FPA	NONE
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact(CAC)?	Community FPA	2013
Is a CAV or CAC scheduled or needed? If so when?	Community FPA	NO
Regulation		
When did the community enter the NFIP?	NFIP Community Status Book: http://www.fema.gov/cis/LA.html	28-Sep-79
Are the FIRMs digital or paper?	Community FPA	Digital
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Community FPA	Yes, the city requires 2 feet of freeboard for new and substantially damaged/improved structures, and the city uses cumulative damage and improvement over 10-years in order to determine substantial damage/improvement
Provide an explanation of the permitting process.	Community FPA; State, FEMA NFIP; Flood Insurance Manual (http://www.fema.gov/flood-insurance-manual); Community FPA, FEMA CRS Coordinator, ISO representative	application submitted, reviewed by responsible staff, permit issued if compliant in all reviews, inspections performed at various benchmarks and prior to concealment of building elements, permit finalized and approved if all inspections pass

Community Rating System (CRS)		
Does the community participate in CRS?	Community FPA, State, FEMA NFIP	yes
What is the community's CRS Class Ranking?	Flood Insurance Manual: http://www.fema.gov/flood-insurance-manual	7
What categories and activities provide CRS points and how can the class be improved.	Community FPA	We received points in the following activities: 310 - Elevation Certificates, 320 - Map Information, 330 - Outreach Projects, 340 - Hazard Disclosure, 350 - Flood Protection Information, 360 - Flood Protection Assistance, 420 - Open Space Preservation, 430 - Higher Regulatory Standards, 440 - Flood Data Maintenance, 450 - Stormwater Management, 502 - Repetitive Loss, 510 - Floodplain Management Planning, 520 - Acquisition and Relocation, 540 - Drainage System Maintenance. We are currently working to improve our class rating by improving our planning for public outreach and education through the development of a Program for Public Information (PPI). Additionally, we are hoping to better map and manage our storm water drainage network.
Does the plan include CRS planning requirements?	Community FPA; FEMA CRS Coordinator; ISO; CRS manual (http://www.fema.gov/media-library/assets/documents/8768)	yes

Town of Madisonville

Insurance Summary	Source of Information	Comments
How many NFIP policies are in the community? What is the total premium and coverage?	State NFIP Coordinator	\$421,615 Prem.; \$78,797,100 Coverage
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?	FEMA NFIP or Insurance Specialist	391 Claims; \$13,295,976 Pd.; 53 Substantial Damage
How many structures are exposed to flood risk with in the community?	Community Floodplain Administrator (FPA)	A & AE Zones; 278 Policies
Describe any areas of flood risk with limited NFIP policy coverage.	Community FPA and FEMA Insurance Specialist	
Staff Resources		
Is the Community FPA or NFIP Coordinator certified?	Community FPA	No
Is flood plain management an auxiliary function?	Community FPA	Yes
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	Permit Reviews; Inspections
What are the barriers to running an effective NFIP program in the community, if any?	Community FPA	Politics

Compliance History		
Is the community in good standing with the NFIP?	State NFIP Coordinator or FEMA NFIP Specialist, community records	Yes
Are there any outstanding compliance issues(i.e., current violations)?	Community FPA	Yes
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact(CAC)?	Community FPA	11-Jun-14
Is a CAV or CAC scheduled or needed? If so when?	Community FPA	No
Regulation		
When did the community enter the NFIP?	NFIP Community Status Book: http://www.fema.gov/cis/LA.html	Ord. No. 18 03/11/1987
Are the FIRMs digital or paper?	Community FPA	Paper
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Community FPA	Yes Ord. No. 129 Eff. 09/13/2014
Provide an explanation of the permitting process.	Community FPA; State, FEMA NFIP; Flood Insurance Manual (http://www.fema.gov/flood-insurance-manual); Community FPA, FEMA CRS Coordinator, ISO representative	Yes; Ord. No. 129 Pg. 11 Sect. C Permit Pcedures
Community Rating System (CRS)		
Does the community participate in CRS?	Community FPA, State, FEMA NFIP	No

Village of Sun

Insurance Summary	Source of Information	Comments
How many NFIP policies are in the community? What is the total premium and coverage?	State NFIP Coordinator or FEMA NFIP Specialist	
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?	FEMA NFIP or Insurance Specialist	
How many structures are exposed to flood risk with in the community?	Community Floodplain Administrator (FPA)	
Describe any areas of flood risk with limited NFIP policy coverage.	Community FPA and FEMA Insurance Specialist	
Staff Resources		
Is the Community FPA or NFIP Coordinator certified?	Community FPA	
Is flood plain management an auxiliary function?	Community FPA	
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	
What are the barriers to running an effective NFIP program in the community, if any?	Community FPA	
Compliance History		
Is the community in good standing with the NFIP?	State NFIP Coordinator or FEMA NFIP Specialist, community records	Yes
Are there any outstanding compliance issues(i.e., current violations)?		None
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact(CAC)?		
Is a CAV or CAC scheduled or needed? If so when?		
Regulation		
When did the community enter the NFIP?	NFIP Community Status Book: http://www.fema.gov/cis/LA.html	
Are the FIRMs digital or paper?	Community FPA	
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Community FPA	
Provide an explanation of the permitting process.	Community FPA; State, FEMA NFIP; Flood Insurance Manual (http://www.fema.gov/flood-insurance-manual); Community FPA, FEMA CRS Coordinator, ISO representative	This is handled through Washington Parish
Community Rating System (CRS)		
Does the community participate in CRS?	Community FPA, State, FEMA NFIP	Yes
What is the community's CRS Class Ranking?	Flood Insurance Manual: http://www.fema.gov/flood-insurance-manual	
What categories and activities provide CRS points and how can the class be improved.		
Does the plan include CRS planning requirements?	Community FPA; FEMA CRS Coordinator; ISO; CRS manual (http://www.fema.gov/media-library/assets/documents/8768)	

City of Covington

Work Sheet 4.3 National Flood Insurance Program (NFIP)		Instructions: Use this worksheet to collect information on your community's participation in and the continued compliance with the NFIP, as well as identify areas for improvement that could be potential mitigation actions. Indicate the source of information, if different from the one included.
NFIP Topic	Source of Information	Comments
Insurance Summary		
How many NFIP policies are in the community? What is the total premium and coverage?	State NFIP Coordinator or FEMA NFIP Specialist	1,304; \$984,197.00
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	FEMA NFIP or Insurance Specialist	Number of Paid Claims: 392; Total Amount of Paid Claims: \$7,234,706; Claims for substantial damage: 38
How many structures are exposed to flood risk with in the community?	Community Floodplain Administrator (FPA)	1,228
Describe any areas of flood risk with limited NFIP policy coverage.	Community FPA and FEMA Insurance Specialist	
Staff Resources		
Is the Community FPA or NFIP Coordinator certified?	Community FPA	3 CFMs: Daniel Hill, Gina Hayes, David Zechenelly
Is flood plain management an auxiliary function?	Community FPA	yes
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	permit review, GIS, inspection, outreach, ; engineering capability
What are the barriers to running an effective NFIP program in the community, if any?	Community FPA	time constraints
Compliance History		
Is the community in good standing with the NFIP?	State NFIP Coordinator, FEMA NFIP Specialist, community records	yes
Are there any outstanding compliance issues(i.e., current violations)?		no
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact(CAC)?		scheduled but cancelled due to illness
Is a CAV or CAC scheduled or needed? If so when?		in the process of rescheduling
Regulation		
When did the community enter the NFIP?		They entered the Emergency Phase of the program on 4/8/1374, and then the regular phase on 11/13/1380
Are the FIRMs digital or paper?		paper
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?		yes-- 1 foot freeboard
Community Rating System (CRS)		
Does the community participate in CRS?		no
What is the community's CRS Class Ranking?		N/A
Does the plan include CRS planning requirements?		N/a

Village of Folsom

Worksheet 4.3: National Flood Insurance Program (NFIP) Worksheet

Jurisdiction: Folsom

Insurance Summary	Source of Information	Comments
How many NFIP policies are in the community? What is the total premium and coverage?	State NFIP Coordinator or FEMA NFIP Specialist	13; Insurance in-force \$2,937,600; Written premium in-force:5,646
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?	FEMA NFIP or Insurance Specialist	2 claims, \$21,186
How many structures are exposed to flood risk with in the community?	Community Floodplain Administrator (FPA)	1 structure that is residential
Describe any areas of flood risk with limited NFIP policy coverage.	Community FPA and FEMA Insurance Specialist	n/a
Staff Resources		
Is the Community FPA or NFIP Coordinator certified?	Community FPA	Yes, Parish
Is flood plain management an auxiliary function?	Community FPA	yes
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	permit reviews and inspections
What are the barriers to running an effective NFIP program in the community, if any?	Community FPA	none
Compliance History		
Is the community in good standing with the NFIP?	State NFIP Coordinator or FEMA NFIP Specialist, community records	yes
Are there any outstanding compliance issues(i.e., current violations)?		no
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact(CAC)?		Parish visit, July 2013
Is a CAV or CAC scheduled or needed? If so when?		no
Regulation		
When did the community enter the NFIP?	NFIP Community Status Book: http://www.fema.gov/cis/LA.html	Int FHBM Identified: 7/18/1975; Initial FIRM Identified 3/16/82; Current Eff Map Date: 3/16/82
Are the FIRMs digital or paper?	Community FPA	paper
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Community FPA	yes.
Community Rating System (CRS)		
Does the community participate in CRS?	Community FPA, State, FEMA NFIP	Yes, St Tammany Parish
What is the community's CRS Class Ranking?	Flood Insurance Manual: http://www.fema.gov/flood-insurance-manual	St Tammany Parish Class 7
What categories and activities provide CRS points and how can the class be improved.		Multi Jurisdictional Hazard Mitigation Plan, Education and outreach.
Does the plan include CRS planning requirements?	Community FPA; FEMA CRS Coordinator; ISO; CRS manual (http://www.fema.gov/media-library/assets/documents/8768)	Yes

Town of Pearl River

Worksheet 4.3: National Flood Insurance Program (NFIP) Worksheet

Jurisdiction: Pearl River		
Insurance Summary	Source of Information	Comments
How many NFIP policies are in the community? What is the total premium and coverage?	State NFIP Coordinator or FEMA NFIP Specialist	171; insurance in-force \$46,492,300; written in-force 80,696
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?	FEMA NFIP or Insurance Specialist	7 claims; \$89,870 claims paid; avg claim \$12,839
How many structures are exposed to flood risk with in the community?	Community Floodplain Administrator (FPA)	3 residential
Describe any areas of flood risk with limited NFIP policy coverage.	Community FPA and FEMA Insurance Specialist	n/a
Staff Resources		
Is the Community FPA or NFIP Coordinator certified?	Community FPA	Yes, Parish
Is flood plain management an auxiliary function?	Community FPA	yes
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	permits issued. All applications are reviewed for compliance with all state agencies.
What are the barriers to running an effective NFIP program in the community, if any?	Community FPA	none
Compliance History		
Is the community in good standing with the NFIP?	State NFIP Coordinator or FEMA NFIP Specialist, community records	yes
Are there any outstanding compliance issues(i.e., current violations)?		not aware of any
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact(CAC)?		not sure
Is a CAV or CAC scheduled or needed? If so when?		n/a
Regulation		
When did the community enter the NFIP?	NFIP Community Status Book: http://www.fema.gov/cis/LA.html	init FHBM Indidentified: 5/24/1974; Init FIRM Identified: 6/25//1976
Are the FIRMs digital or paper?	Community FPA	paper
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Community FPA	yes. 1 ft freeboard pearl river basin
Community Rating System (CRS)		
Does the community participate in CRS?	Community FPA, State, FEMA NFIP	yes, parish
What is the community's CRS Class Ranking?	Flood Insurance Manual: http://www.fema.gov/flood-insurance-manual	St Tammany Parish Class 7
What categories and activities provide CRS points and how can the class be improved.		Multi Jurisdictional Hazard Mitigation Plan
Does the plan include CRS planning requirements?	Community FPA; FEMA CRS Coordinator; ISO; CRS manual (http://www.fema.gov/media-library/assets/documents/8768)	Yes