Livingston Parish

Hazards Mitigation Plan

2016

Created By:

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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 Livingston 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 Livingston Parish less vulnerable and more disaster resistant. Information in the plan will be used to help guide and coordinate mitigation activities and local policy decisions affecting future land use.

The Livingston Parish HMPU is a multi-jurisdictional plan that includes the unincorporated areas of the parish as well as the following incorporated communities which participated in the planning process:

- Albany
- Denham Springs
- French Settlement
- Killian
- Livingston (Town of)
- Port Vincent
- Springfield
- Walker

This plan addresses natural hazards only. The HMPU Committee agreed at its first meeting not to pursue human-caused hazards in this update. Although the Federal Emergency Management Agency (FEMA) encourages integration of human-caused hazards into the mitigation planning process, the scope of this effort did not address these human-caused hazards for three reasons. First, planning activities for mitigation of and emergency response to human-caused hazards are the responsibility of specially designated organizations. Secondly, the Disaster Mitigation Act of 2000 (DMA) requires extensive public information and input conflicting with security and confidentiality issues associated with elements such as chemical hazards deemed to be particularly vulnerable to terrorist acts.

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.

The DMA requires state and local governments to develop and periodically update hazard mitigation plans to maintain eligibility for certain federal disaster assistance and hazard mitigation funding programs. Compliance with these requirements will maintain continued eligibility for certain hazard mitigation grant programs from FEMA for each organization participating in this planning process.

2015 Update

The 2015 Livingston Parish Hazard Mitigation Plan (HMP) maintains much of the information from the 2006 and 2011 plan versions, but it now reflects the order and methodologies of the 2014 Louisiana State Hazard Mitigation Plan. The most obvious changes in this plan update 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 and the National Hurricane Center.

Structurally, all of the sections were updated to reflect the most current information and the most current vision of the plan update. In addition, the present plan update has four sections and three 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.

Coastal land loss was addressed as a hazard for the first time in the Livingston Parish Plan to mirror the State of Louisiana Hazard Mitigation Plan Update 2014. There have been no changes in development that have affected the planning area's overall vulnerability since the last plan update in 2011.

This plan will identify cost effective and environmentally sound mitigation strategies that will reduce or eliminate long-term risk to human life and property from natural hazards. Implementation of this plan can reduce the enormous cost of disasters to property owners and all levels of government. Mitigation strategies often include protecting critical community facilities, reducing exposure to liability and minimizing community disruption. Land development planning, adoption of building codes, elevation of homes, and acquisition and relocation of homes away from floodplains are just a few examples of mitigation strategies.

Location

Livingston Parish, Louisiana, is situated along the southeastern portion of Louisiana. To the east is Tangipahoa Parish, to the west East Baton Rouge and Ascension Parishes, to the south St. John the Baptist Parish, and to the north St. Helena Parish.

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. The following table 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 PDSI maps.

Drought Severity Index classifications 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 Livingston 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. Data compiled by the National Drought Mitigation Center indicates near normal conditions (i.e., neither drought nor moist conditions) exist in Livingston Parish at the time this Plan went to publication.

Location

Drought typically impacts a region and not one specific parish or jurisdiction. While the entire planning area can experience drought, cities themselves are unaffected as drought events in the planning area primarily affect crops, and there are no crops grown in city limits.

Previous Occurrences / Extent

There have been a total of 2 droughts occurring within the boundaries of Livingston Parish between the years of 1950 - 2014. The SHELDUS database does not report any drought events occurring after 2000 within the boundaries of Livingston Parish. The following table identifies the date of occurrence and

estimated crop damage for the droughts that have occurred in Livingston Parish. Based on previous events, droughts up to Severe Drought on the Palmer Classification can be expected in the planning area. There have been no reported injuries or deaths as a direct result of drought in Livingston Parish.

Drought events with crop damage totals for Livingston Parish 1960-2014.
(Source: SHELDUS)

Date	Crop Damage	Palmer Classification
August 1998	5,116,296	Severe Drought
December 2000	6,171,205	Moderate Drought

Frequency / Probability

Based on previous occurrences of 2 droughts in 64 years, the probability of drought occurrence in the planning area in any given year is 3 %.

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.
- **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 Livingston 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 hydrometeorological conditions are such that there is a threat of flooding, but the occurrence is neither certain nor imminent.

Floods are measured mainly by probability of occurrence. A 10-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 2-17.
A SFHA is the land area covered by the floodwaters of the base flood (red line in Figure 2-17), 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 to 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 Structures for Livingston Parish.

Jurisdiction	Number of Structures	Total Claims	Total Claims Paid	Average Claim Paid
Livingston Parish (Not Incorporated)	617	2,161	$37,088,124.90	$17,162.48
Albany	0	0	0	0
Denham Springs	157	531	$9,514,378.49	$17,917.85
French Settlement	7	20	$151,461.07	$7,573.05
Killian	40	159	$4,172,441.96	$26,241.77
Livingston	0	2	$19,265.53	$9,632.77
Port Vincent	33	33	$1,241,812.39	$11,187.50
Springfield	3	18	$142,532.03	$79,818.45

Walker	10	40	$535,282.05	$13,382.05
Livingston Parish Total	867	927	$52,865,298.42	$182,915.92

National Flood Insurance Program

Flood insurance statistics indicate that Livingston Parish has 12,563 flood insurance policies with the NFIP with total annual premiums of $9,360,925. Livingston Parish unincorporated, Albany, Denham Springs, French Settlement, Killian, Town of Livingston, Port Vincent, Springfield and Walker are all participants in the NFIP. Livingston Parish and each of the incorporated jurisdictions will continue to adopt and enforce floodplain management requirements, including regulating new construction in Special Flood Hazard Areas, and will continue to monitor activities including local requests for map updates. Flood insurance statistics and additional NFIP participation details for the unincorporated part of Livingston Parish and incorporated municipalities are provided in the tables to follow.

Summary of NFIP Policies for Livingston Parish

Location	No. of Insured Structures	Total Insurance Coverage Value	Annual Premiums Paid	No. of Insurance Claims Filed Since 1978	Total Loss Payments
Livingston (unincorporated)	9,766	$19,926,379	$6,679,951	3624	$52,167,469
Albany	29	$7,836,100	$18,597	4	$163,417
Denham Springs	1,597	$295,667,600	$1,742,603	1,429	$19,254,817
French Settlement	131	$25,140,700	$110,561	95	$1,002,695
Killian	179	$ 37,951,600	$134,842	292	$6,261,496
Livingston	74	$14,573,400	$54,767	18	$95,151
Port Vincent	105	$19,296,400	$73,201	185	$ 1,677,024
Springfield	16	$4,695,000	$11,447	7	$66,099
Walker	835	$172,720,100	$666,887	116	$1,231,725
Total	12,563	$2,466,160,800	$9,360,925	6,486	$ 83,418,350

Summary of Community Flood Maps for Livingston Parish.

CID	Community Name	Initial FHBM Identified	Initial FIRM Identified	Current Effective Map Date	Date Joined the NFIP	Tribal
220113	Livingston Parish	07/12/77	09/30/88	04/03/12	09/30/88	No
220114	Albany	04/12/74	12/02/80	04/03/12	10/14/83	No
220116	Denham Springs	03/15/74	10/15/81	04/03/12	10/15/81	No
220117	French Settlement	10/25/74	10/15/85	04/03/12	10/15/85	No

220355	Killian	06/25/76	08/01/87	04/03/12	08/01/87	No
220118	Livingston	09/19/75	08/23/01	04/03/12	04/15/79	No
220119	Port Vincent	08/13/76	08/16/88	04/03/12	08/16/88	No
220120	Springfield	02/04/77	08/23/01	04/03/12	03/24/98	No
220121	Walker	10/01/76	02/17/82	04/03/12	02/17/82	No

According to the Community Rating System (CRS) list of eligible communities dated May 1, 2015, there are four communities in Livingston Parish that are participating in the CRS System. Listed below are the communities with their class ratings:

Livingston Parish Communities with CRS Ratings

Community	CRS Rating
Livingston Parish	9
French Settlement	9
Port Vincent	10
Walker	8

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.

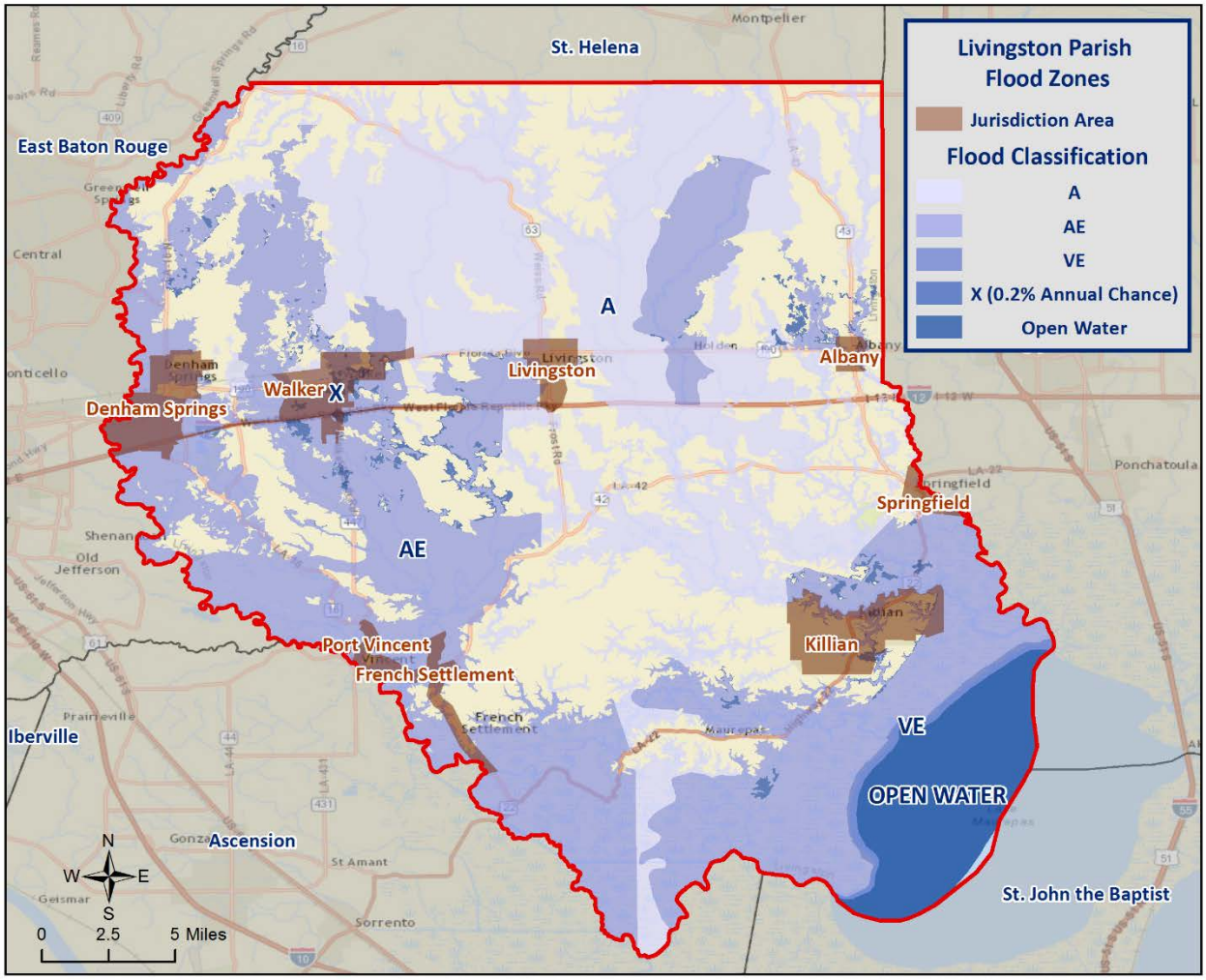
Flooding in Livingston Parish

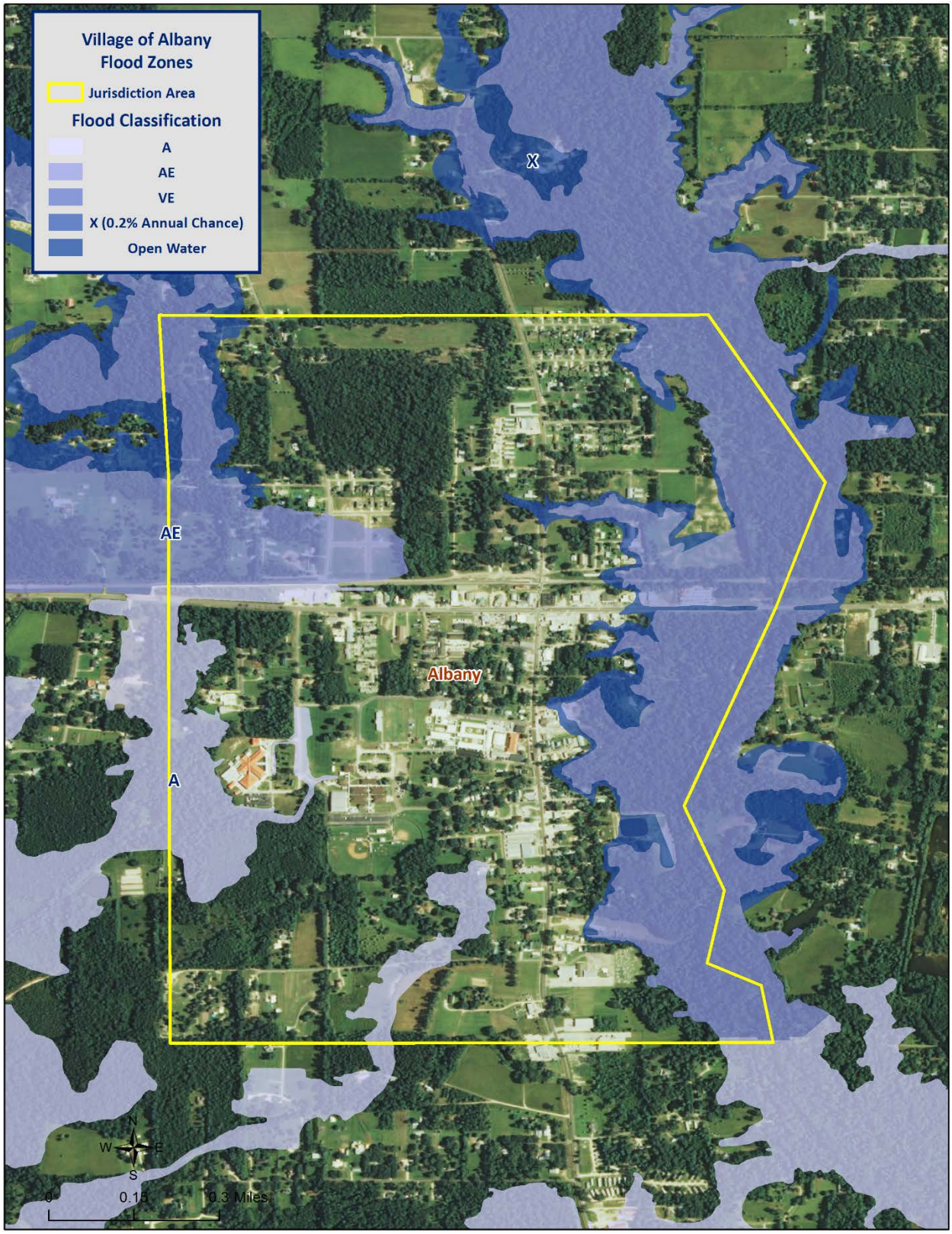
Livingston parish has experienced significant flooding in its history and can expect more in the future. Minor flooding is virtually a yearly occurrence for a number of rivers and tributaries, and major flooding can be considered a regular occurrence. Ponding occurs in many areas parish-wide due to high volume of rainfall and the landscape of Livingston Parish. Ponding can be found anywhere in the parish. Backwater flooding occurs along marsh areas and areas along bayous that may be close to lakes, bayous and other bodies of water that may breech their levee and flood populated areas. Urban flooding occurs in parish-wide urban areas when drainage cannot keep up with heavy rainfall. This type of flooding affects a great deal of residential areas anywhere in the parish. Coastal flooding occurs in the southern

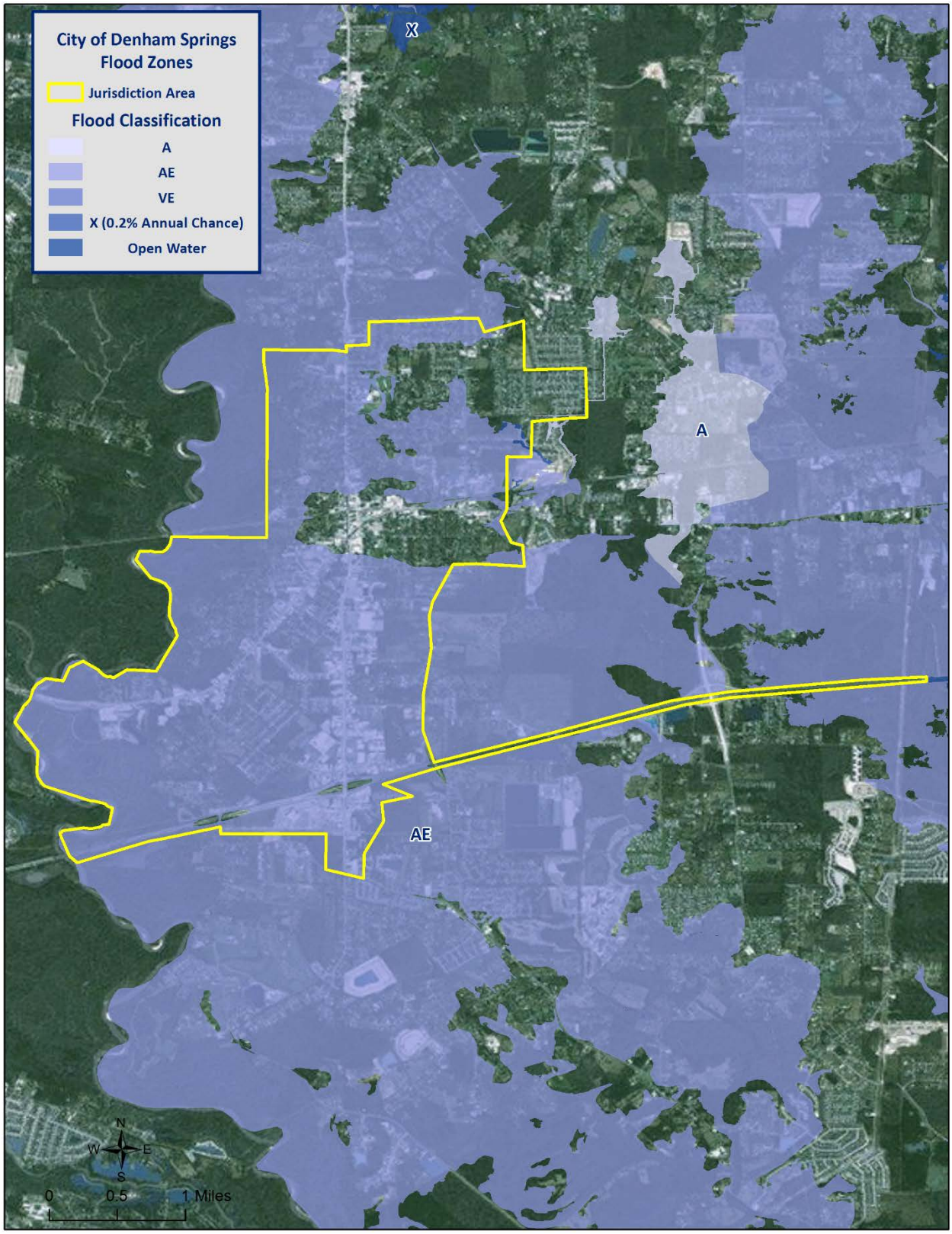
region of the parish due to the southerly winds caused by the storm surge of a hurricane or a tropical storm.

Location

Livingston parish has experienced significant flooding in its history and can expect more in the future. The best indication of areas that are at risk of flooding can be found in the 100 year flood plain map for Livingston parish and the eight incorporated areas can be seen in following maps.




Village of Albany
Flood Zones
Jurisdiction Area
Flood Classification
A
AE
VE
X (0.2% Annual Chance)
Open Water
X
AE
A
Albany
N
W
E
S
0
0.15
0.3 Miles


City of Denham Springs
Flood Zones
Jurisdiction Area
Flood Classification
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AE
VE
X (0.2% Annual Chance)
Open Water
X
A
AE
N
W
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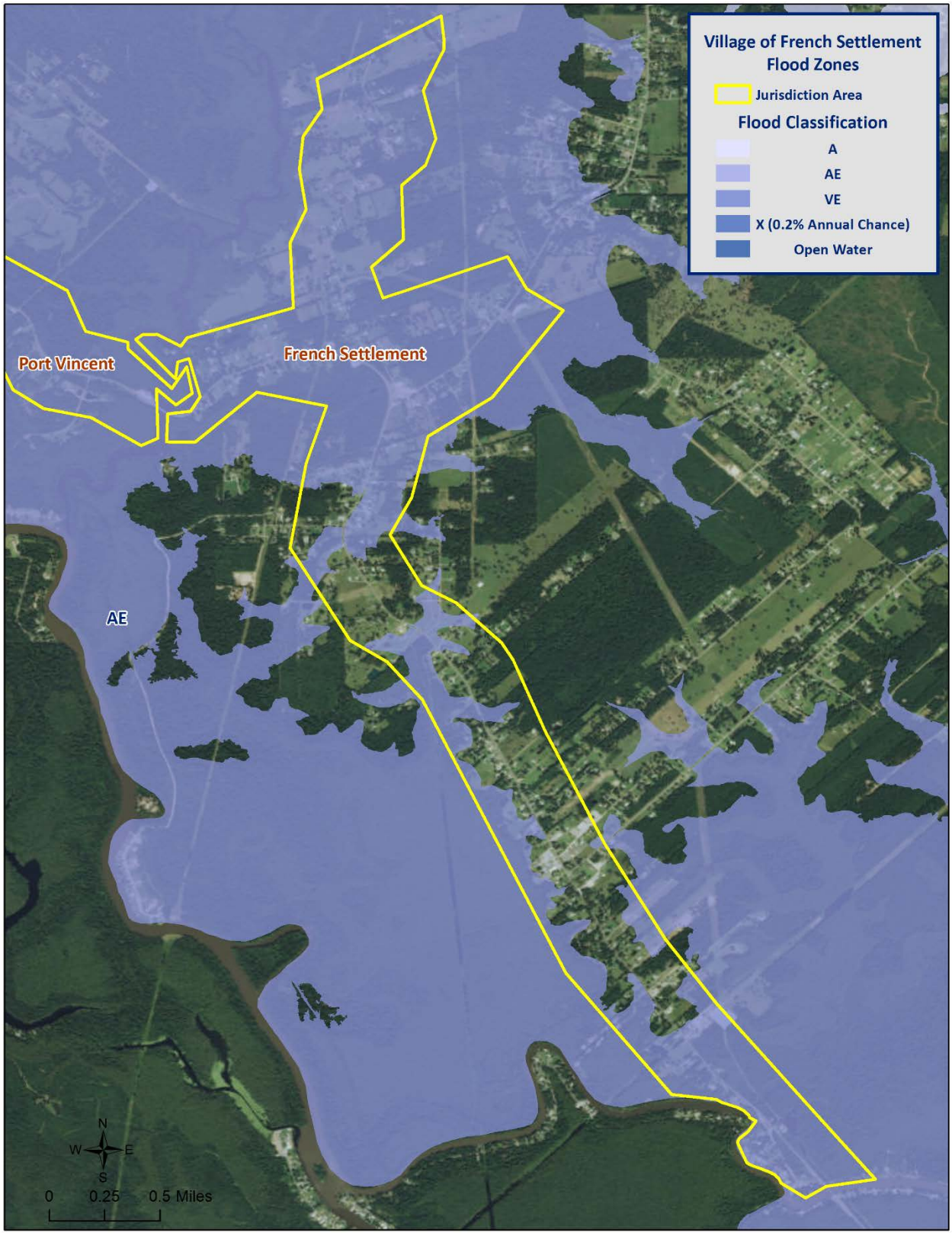
S
0
0.5
1 Miles


Village of French Settlement
Flood Zones
Jurisdiction Area
Flood Classification
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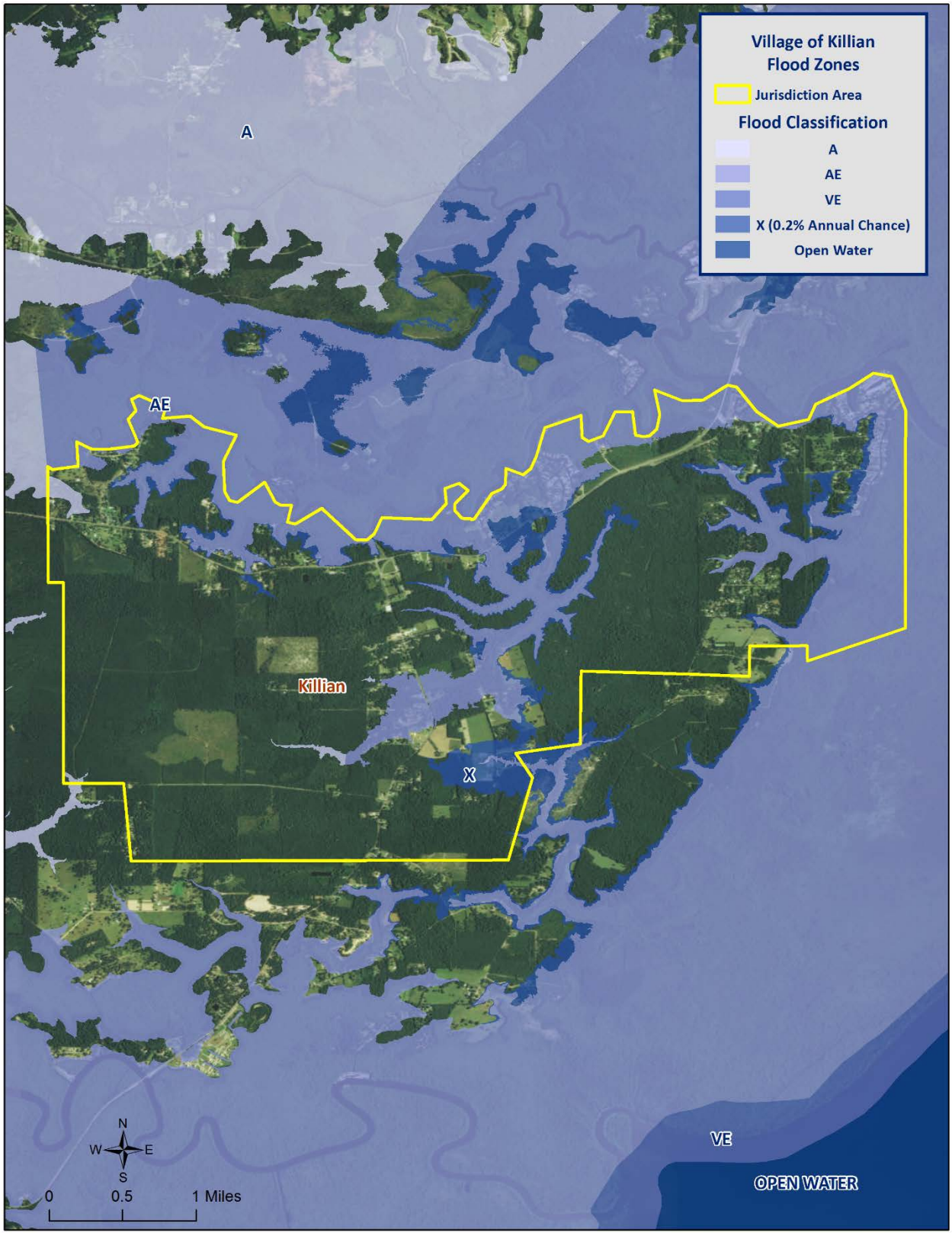
AE
VE
X (0.2% Annual Chance)
Open Water
Port Vincent
French Settlement
AE
N
W
E
S
0
0.25
0.5 Miles


Village of Killian
Flood Zones
Jurisdiction Area
Flood Classification
A
AE
VE
X (0.2% Annual Chance)
Open Water
A
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Killian
X
VE
OPEN WATER
N
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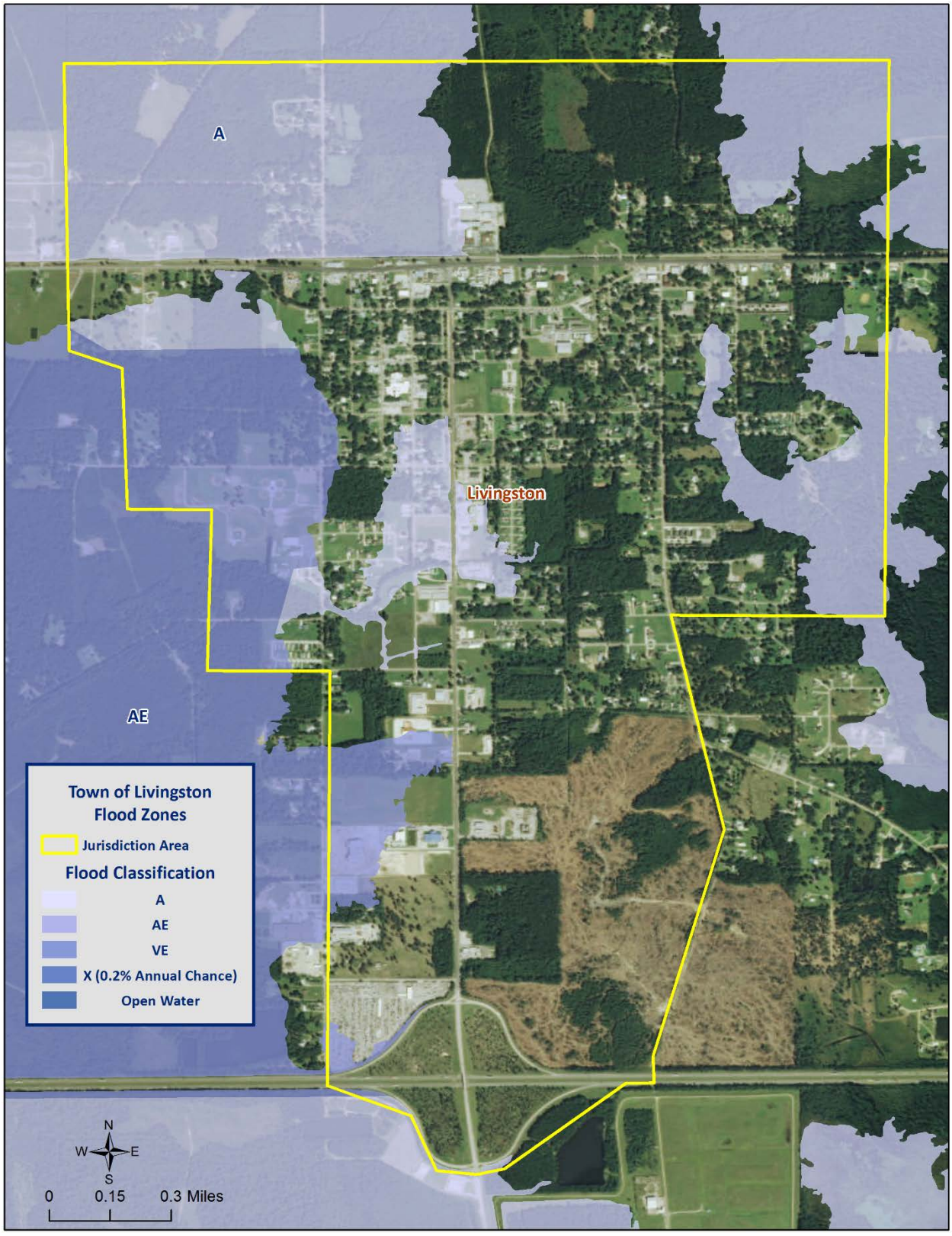
1 Miles


A
Livingston
AE
Town of Livingston
Flood Zones
Jurisdiction Area
Flood Classification
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AE
VE
X (0.2% Annual Chance)
Open Water
N
W
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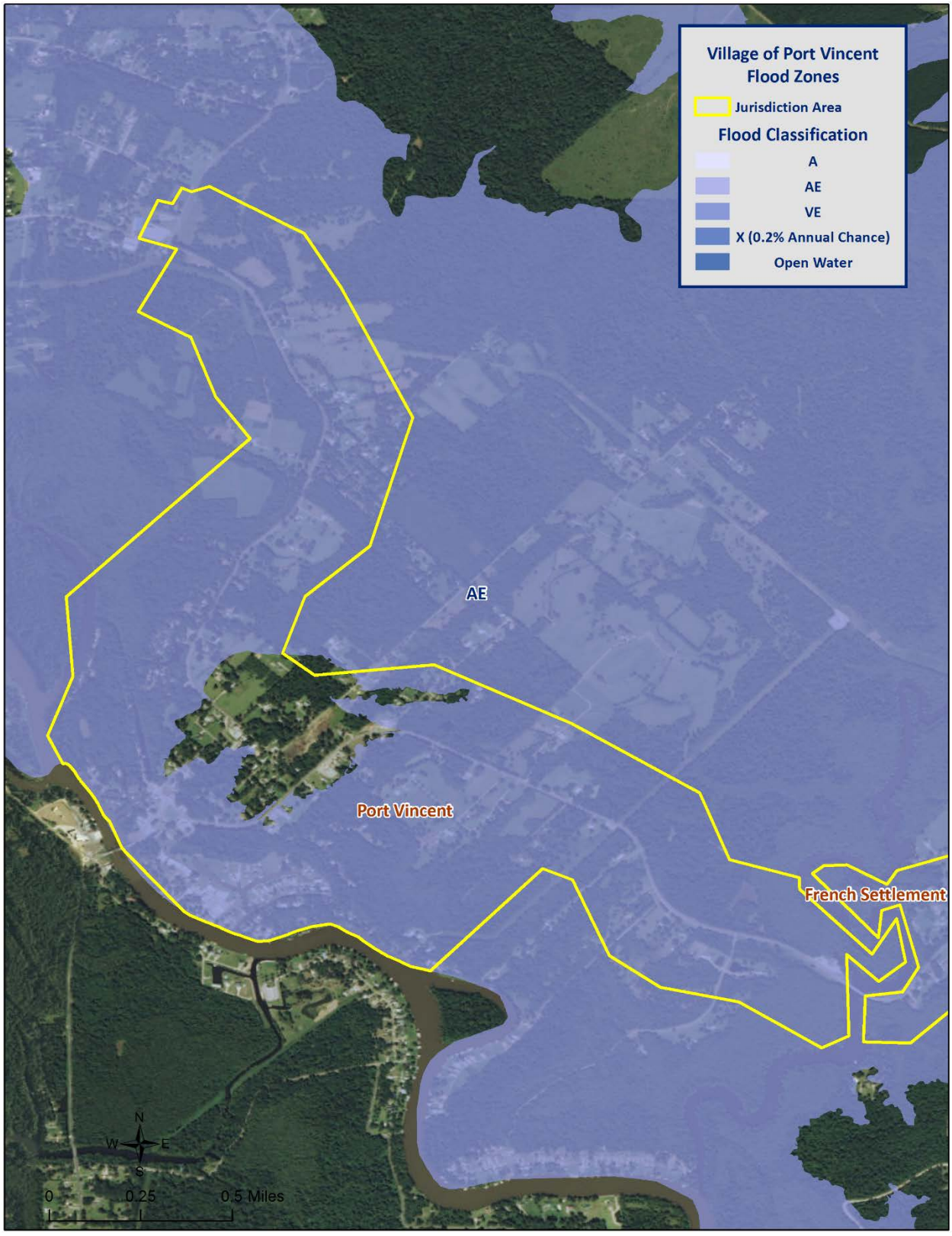
S
0
0.15
0.3 Miles


Village of Port Vincent
Flood Zones
Jurisdiction Area
Flood Classification
A
AE
VE
X (0.2% Annual Chance)
Open Water
AE
Port Vincent
French Settlement
N
W
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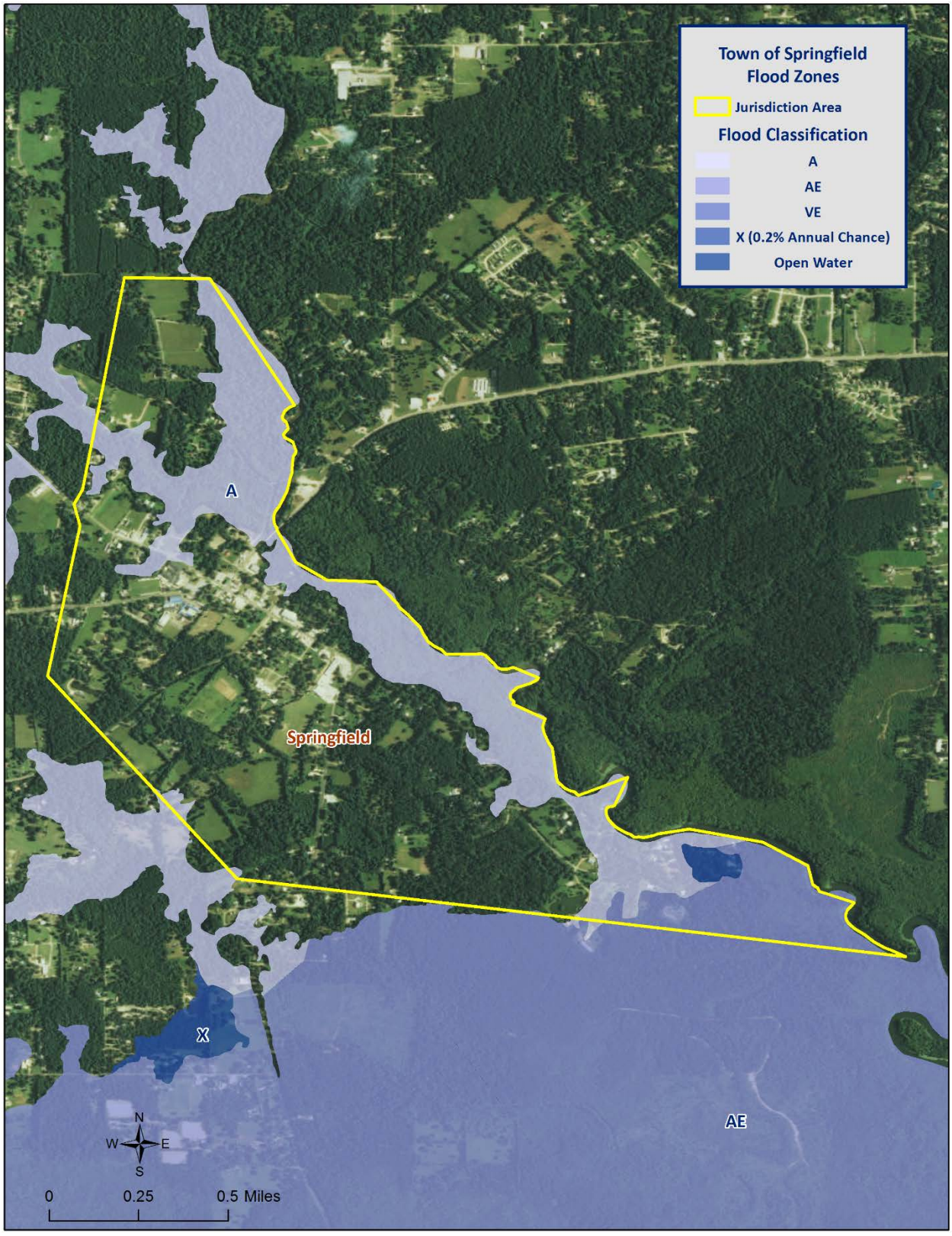
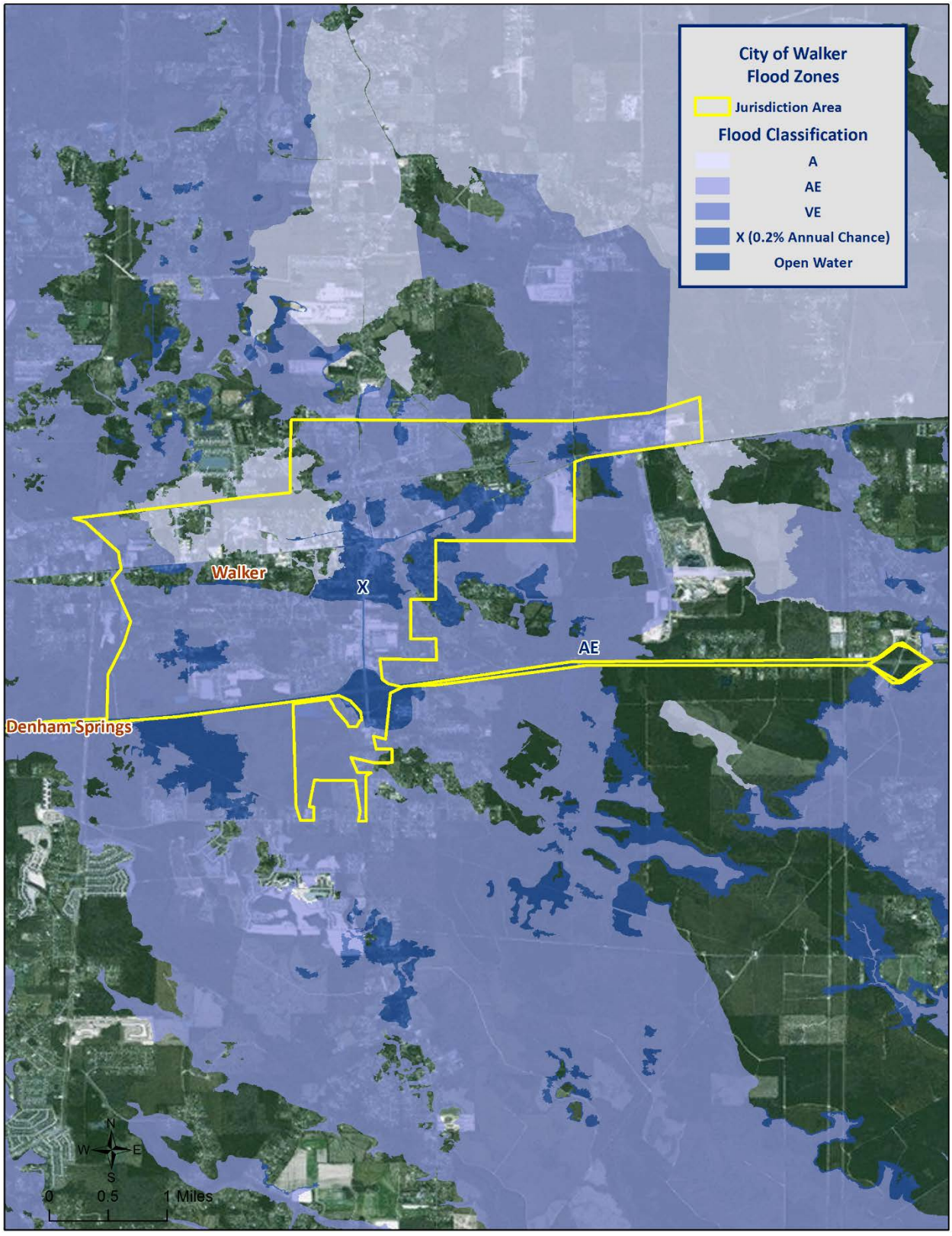
0
0.25
0.5 Miles


Town of Springfield
Flood Zones
Jurisdiction Area
Flood Classification
A
AE
VE
X (0.2% Annual Chance)
Open Water
A
Springfield
X
AE
N
W
E
S
0
0.25
0.5 Miles


City of Walker
Flood Zones
Jurisdiction Area
Flood Classification
A
AE
VE
X (0.2% Annual Chance)
Open Water
Walker
X
AE
Denham Springs
N
W
E
S
0
0.5
1 Miles

Previous Occurrences and Extent

Livingston Parish Flooding Events 2010 - 2014

Date	Extents	Type of Flooding	Location
9/3/2011	10 Inches of rain, Wind gusts up to 54 mph. Road closures due to high water. Power outages experienced. Camps, homes, and other properties were flooded and numerous roads were impassable across lower Livingston Parish.	Flash	Denham Springs, Killian, Port Vincent, Unincorporated Parish areas
08/28/2001 thru 09/02/2011	10 inches of rain. Sewer treatment plant down due to pump stations being flooded. Continuous patrols to monitor flooded streets and highways.	Flash	Springfield
1/9/2013	5.5 inches of rain. Widespread street closures due to high water.	Flash	Denham Springs, Livingston, Albany
9/22/2011	5.5 inches of rain in 3 hour period. Parts of Red Oaks Drive and Magnolia Drive were closed to high water due to back water flooding of West Colyell Creek.	Backwater	Walker
1/9/2011	5.5 inches of rain, 20% of the village roadways impacted by rain driven flash flood, but quickly ran off	Flash	French Settlement
3/22/2012	Parish OEP closed all waterways to recreational vehicles south of I12 because of flooding. Closure lasted from March 22nd to March 26th	Heavy Rain	Unincorporated Parish

Probability

Based on previous occurrences the annual probability of flooding in the unincorporated Parish areas and Denham Springs is 40 percent. Springfield, Albany, Killian, Walker, Livingston, French Settlement and Port Vincent can expect an annual probability of flooding of 20 percent.

Coastal Land Loss Subsidence/Saltwater Intrusion

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.

Saltwater intrusion is one of the major causes of subsidence and marshland loss. Saltwater intrusion refers to the movement of salty water into freshwater aquifers or to the encroachment of saline water into freshwater estuaries. This intrusion is into streams discharging into the Gulf of Mexico as well as into the marsh areas and subsequently into freshwater streams. Intrusion of saltwater causes the loss of fresh and intermediate vegetation, which results in rapid erosion of marsh soils and the ultimate conversion of the area to open water.

Location

Historic areas of coastal land loss and gain and subsidence rates have been quantified for Livingston Parish using data from the U.S. Geologic Survey and Louisiana Coastal Protection and Restoration Authority (CPRA). Since 1932, the average annual land loss in Louisiana is 35 mi^2, while the average annual land gain has been 3 mi^2 for a net loss of 32 mi^2 per year. Land loss is primarily occurring on southeastern coastline along Lake Maurepas in unincorporated Livingston parish and along the banks of the Tickfaw River, Amite River, and Natalbany River. These rivers run adjacent to several incorporated areas of Livingston Parish making them susceptible to land loss. The Natalbany River runs adjacent to Springfield, the Tickfaw River travels along the border of Killian, and the Amite River travels in the proximity of French Settlement and Port Vincent. Subsidence is occurring in the southern portions of the parish impacting mostly the unincorporated areas and the southern portion of Killian.

Previous Occurrences / Extent

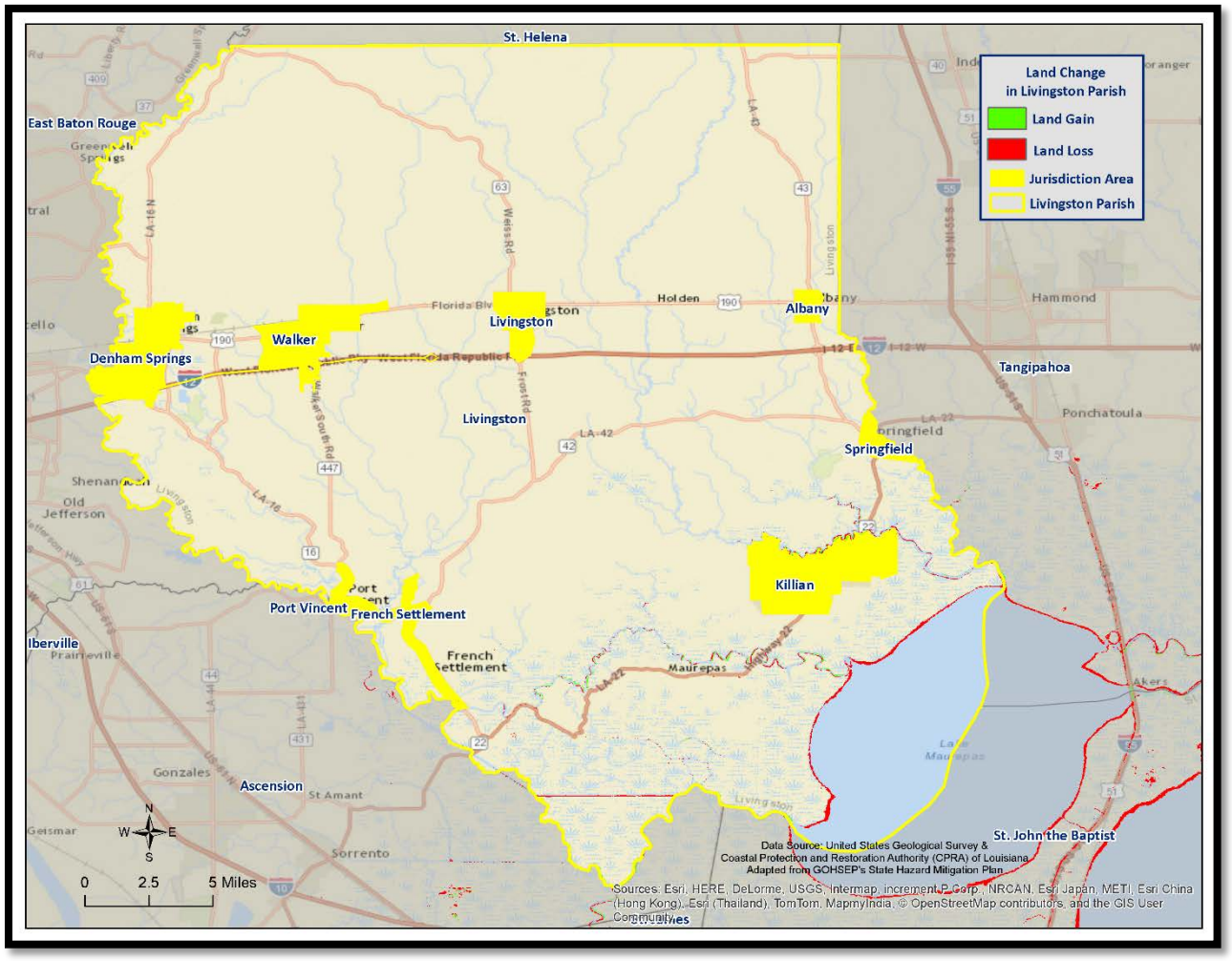
Coastal land loss is an ongoing process, including discrete (hurricanes) and continuous (subsidence, sea level rise) processes. While historic flood loss data undoubtedly include the effects of coastal land loss, specific previous occurrences have not been identified as a source of direct disaster damage 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

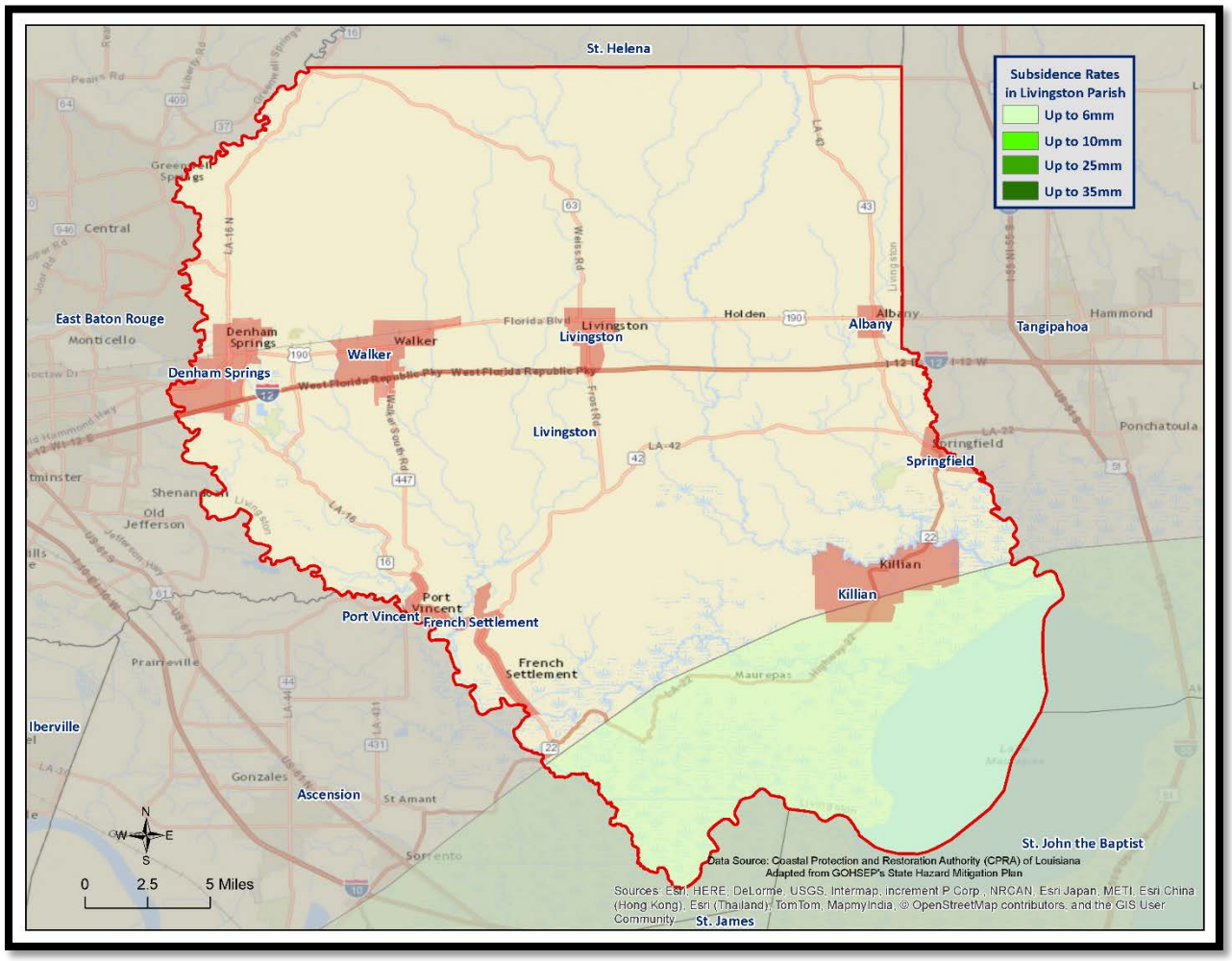
Subsidence, sea level rise, and coastal land loss are ongoing hazards. Based on historical subsidence rates and land loss/gain trends, the probability of future land loss in Louisiana is 100% certain, but actual rates of subsidence and land loss/gain vary along the coast based on various meteorological,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

Annual Probability of Coastal Land Loss and Subsidence in Livingston Parish.

Livingston Parish (Unincorporated Area)	Albany	Denham Springs	French Settlement	Killian	Livingston	Port Vincent	Springfield	Walker
100%	0%	0%	100%	100%	0%	100%	100%	0%



Historical Areas of Land Loss and Gain between 1932 and 2010
(Source: State of Louisiana Hazard Mitigation Plan)



Maximum Annual Subsidence Rates based on Subsidence Zones in Coastal Louisiana. (Source: State of Louisiana Hazard Mitigation Plan)

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

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

The life of a thunderstorm proceeds through three stages: the developing (or cumulus) stage, the mature stage, and the dissipation stage. During the developing stage, the unstable air mass is lifted as an updraft into the atmosphere. This sudden lift rapidly cools the moisture in the air mass, releasing latent heat as condensation and/or deposition occurs, 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.

Hail

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. Table 2-47 displays a spectrum of hailstone diameters and their everyday equivalents.

Spectrum of hailstone diameters and their everyday description.
(Source: National Weather Service)

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

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

Location

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

Previous Occurrences / Extents

Livingston Parish Documented Hail Events 2010-2014

Date	Recorded Hail Size	Location
4/24/2010	1	ALBANY
6/4/2011	1	DENHAM SPGS
6/6/2011	1	DENHAM SPGS
6/7/2011	1	DENHAM SPGS
9/22/2011	1.75	DENHAM SPGS
9/22/2011	1.75	DENHAM SPGS
9/22/2011	1	WALKER
9/22/2011	1	WALKER
11/5/2012	1	DENHAM SPGS
11/5/2012	1.75	DENHAM SPGS
2/18/2013	1.0	LIVINGSTON
2/25/2013	1.75	WALKER
02/25/2013	1.5	PORT VINCENT
04/04/2014	1.25	SPRINGFIELD
4/6/2014	1	DENHAM SPGS

4/6/2014	1.75	Unincorporated Parish area
4/6/2014	1	DENHAM SPGS
4/8/2014	0.75	DENHAM SPGS
04/27/2015	1	DENHAM SPGS

There have been no reported hail events in Killian or French Settlement in the past 5 years.

Frequency

Based on previous occurrences the annual probability of a hail event in the planning area is 100 percent.

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.

Location

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

Previous Occurrences / Extent

Typically only lightning events that cause death, injuries, crop damage, and/or property damage are reported. These records do not accurately reflect the number of lightning events in Livingston Parish which occur on a nearly monthly basis but are rarely reported. Since the last update of this Livingston Parish Hazard Mitigation Plan, there have been two reported lightning events in the planning area which can be seen below.

Previous Occurrences of Significant Lightning Strikes in Livingston Parish 2010-2014

Location	Date	Summary	Property Damage
Denham Springs	05/03/2013	Lighting strike caused a series of two oil tank explosions and forced the evacuation of more than two dozen homes	Not Reported
Denham Springs	04/24/15	Lighting lightning strike somewhere in the neighborhood and knocked ATT u-verse and internet out	$100

Based on the lightning density maps provided by Vaisala-GAI, the planning area can expect to experience 8 to 16 flashes/sq. km/year.

Frequency

Lightning can strike anywhere and is produced by every thunderstorm, so the chance of lightning occurring in the Livingston Parish planning area 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. A major lightning strike, which produces recordable damage in Livingston parish has an annual probability of 25 percent.

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 the table below.

High winds categorized by source, frequency, and duration.

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

	temperature and pressure gradients between the Atlantic and Gulf and land		
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

(Source: Making Critical Facilities Safe from High Wind, FEMA)

The only high winds of present concern in the planning area are thunderstorm winds and downbursts. Straight-line winds are common but are a relatively insignificant hazard (on land) compared to other high winds. Winds associated with hurricanes and tornadoes will be considered in their respective sections.

The table below 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.

Beaufort Wind Scale.

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

10	55-63	Storm	Seldom experienced on land, trees broken or uprooted, "considerable structural damage"
11	54-73	Violent Storm	
12	74+	Hurricane	

(Source: NOAA's SPC)

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.

Location

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

Previous Occurrences / Extent

Livingston Parish High Wind Events 2010-2015

Location	Date	Extent	Narrative
DENHAM SPGS	5/18/2010	52 kts	Wind damage to a roof and broken window. Pea size hail also.
KILLIAN	8/5/2010	52 kts	Trees were downed by thunderstorm winds on Highway 444 between Highway 63 and Bull Run Road
PORT VINCENT	8/23/2010	52 kts	A few trees were reported down with one onto a shed and another onto a carport.
PORT VINCENT	3/5/2011	60 kts	A downed tree was blocking Highway 42 near Port Vincent
WALKER, LIVINGSTON, SPRINGFIELD	4/4/2011	60 kts	Large tree limbs were snapped and a small tree was uprooted along Louisiana Highway 42.
DENHAM SPGS, WALKER	7/1/2011	65 kts	Tree damage, power lines down, and some damage to an apartment complex along Eden Church Road near U.S. Highway 190 between Walker and Denham Springs.
DENHAM SPGS, WALKER, LOCHART (unincorporated area of the parish)	9/22/2011	52 kts	A tree was blown down across U. S. Highway 190 between Juban Road and Eden Church Road. Also a A tree was

			blown down on a house on Dabney Drive
FRENCH SETTLEMENT	12/22/2011	56 kts	Trees and power lines were reported down on Louisiana Highway 444 east of King George Bay Road and Louisiana Highway 22, 5 miles southeast of French Settlement.
PORT VINCENT	2/18/2012	52 kts	Livingston Parish Sheriff's office reported several trees were blown down in the southwest portion of the parish in the vicinity of Highway 16 and Highway 1033
WALKER, LIVINGSTON, SATSUMA (unincorporated area of parish)	3/21/2012	55 kts	A roof was damaged on a house on Satsuma Road east of Walker. Scattered trees were reported down across the parish.
DENHAM SPGS	7/4/2012	50 kts	Media reported several trees blown down just east of Denham Springs.
LIVINGSTON	3/31/2013	52 kts	Limbs 4 inches in diameter were snapped.
LIVINGSTON	7/2/2014	52 kts	Several trees and large tree limbs were blown down in Livingston.
DENHAM SPGS, WALKER	4/27/2015	52 kts	Numerous trees were reported blown down near Julia Road.
ALBANY	07/05/15	52 kts	At 4:49pm cdt, trained weather spotters reported a severe thunderstorm producing damaging winds near 60 mph. This storm was located over Albany, or 8 miles west of Hammond, and moving east at 50 mph.

The Livingston Parish planning area can expect to see high wind events up to 70 knots per hour.

Probability

High wind events are common occurrences within Livingston Parish with an annual chance of occurrence calculated at 100 percent annually.

Tornados

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 2-57 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 the table below.

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

Previous Occurrences / Extent

Livingston Parish has not experienced any federally declared disasters due to a tornado alone. The tornadoes experienced in Livingston Parish have ranged from EF0 to EF1 on the EF scale and ranged from F0 to F1 on the F scale. Based on previous occurrences the planning area could expect to see EF0 to EF3.

Previous Occurrences of Tornados in Livingston Parish.

Date	Extent	Location
5/2/2008	EF0	LIVINGSTON (Town of)
3/26/2009	EF0	KILLIAN
4/2/2009	EF0	WATSON
3/5/2011	EF0	UNICORPORATED PARISH AREA
4/4/2011	EF1	UNICORPORATED PARISH AREA

3/21/2012	EF1	UNICORPORATED PARISH AREA
11/16/2014	EF0	UNICORPORATED PARISH AREA, DENHAM SPRINGS
11/16/2014	EF1	LIVINGSTON, DENHAM SPRINGS

There have been no tornados reported in Springfield, Port Vincent, Albany, French Settlement and Walker over the past 5 years.

Probability

Tornadoes are a sporadic occurrence within Livingston Parish with an annual chance of occurrence calculated at approximately one to every two years.

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). The table below presents the Saffir-Simpson Hurricane Wind Scale, which categorizes tropical cyclones based on sustained winds.

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 as 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 Livingston 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 5 tropical cyclone events occurring within the boundaries of Livingston Parish between the years 2002-2014 (see table below). The tropical cyclone events experienced in Livingston Parish include depressions, storms, and hurricanes.

Historical tropical cyclone events in Livingston Parish from 1960 - 2014.
(Source: SHELDUS)

Date	Name	Storm Type While Impacting Parish
September , 1961	Carla	Tropical Storm
September, 1963	Cindy	Tropical Storm
September 10, 1965	Betsy	Hurricane – Cat 2
August, 1969	Camille	Hurricane – Cat 3
August , 1978	Debra	Tropical Storm
July, 1979	Bob	Tropical Storm
September, 1980	Danielle	Tropical Storm
August 15, 1985	Danny	Hurricane-Cat 1
October 29, 1985	Juan	Tropical Storm
August 10, 1988	Beryl	Tropical Depression
June, 1989	Allison	Tropical Storm
July, 1989	Chantal	Tropical Storm
October, 1989	Jerry	Tropical Storm
August 26, 1992	Andrew	Hurricane – Cat 3
September 30, 1998	Georges	Tropical Storm

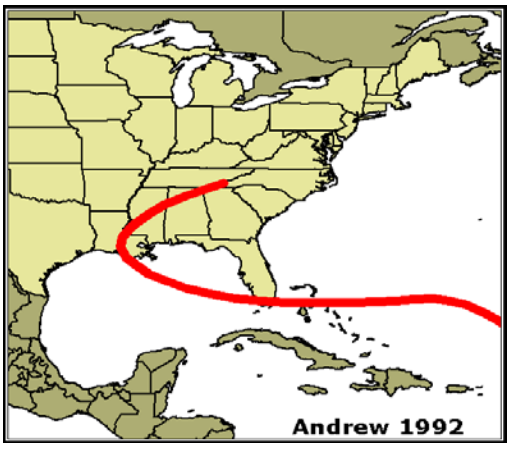
September 25, 2002	Isidore	Tropical Storm
October 3, 2002	Lili	Hurricane – Cat 1
August 29, 2015	Katrina	Hurricane – Cat 3
September 23, 2005	Rita	Tropical Storm
September 1, 2008	Gustav	Hurricane – Cat 2
September 12, 2008	Ike	Tropical Storm
August 29, 2012	Isaac	Tropical Storm

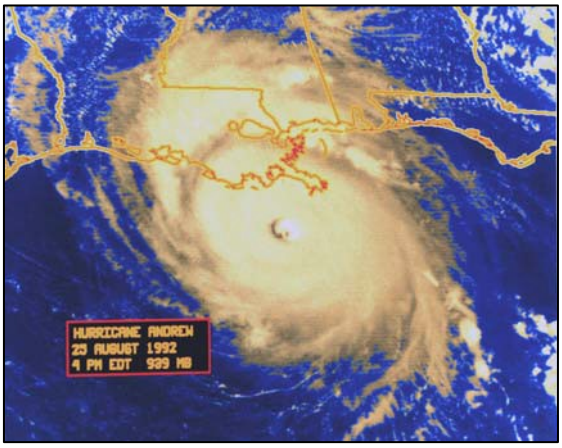
Hurricane Betsy (1965)

Hurricane Betsy made landfall in September 1965 as a Category 3 hurricane and caused extensive damage in Livingston Parish. Winds were measured at up to 92 mph, and an estimated $7,812,500 dollars of damage occurred. Many injuries resulted with 74 fatalities occurring statewide.

Hurricane Andrew (1992)

Hurricane Andrew came ashore in Louisiana August 26, 1992, as a Category 3 storm. As it traveled through Livingston Parish, it brought heavy rains and hurricane force winds. In Jeanerette, an anemometer measured sustained winds at 80 mph. Many houses, mobile homes, and businesses suffered extensive damage, and two high schools in Jeanerette and New Livingston had significant roof damage. The heavy winds downed trees and power lines and caused extensive damage to crops. Before Hurricanes Katrina and Rita hit in 2005, Andrew was considered the most costly storm in U.S. history with damage totals nearing $25 billion.





Hurricane Andrew Path and satellite image taken on 25 August 1992.

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. Hurricane Katrina caused minimal damage to Livingston Parish but presented many challenges for housing more than 2,000 evacuees from the eastern part of the state in motels, shelters, and private residences. Volunteers coordinated and supported more than 1,200 meals per day, created shelters and services centers, and responded to evacuee needs.

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 Livingston Parish as a tropical storm. Because of the size and extent of Hurricane Rita, many inland parishes such as Livingston were affected. Storm surge was a significant problem for Livingston Parish. The storm surge extended further east, into Livingston and St. Mary Parishes, where an estimated 5 to 10 ft storm surge damaged homed along and south of Louisiana Highway 90.

In addition, the impacts of Katrina and Rita on the coastal Louisiana landscape were extensive, widespread, and devastating. Rips to the root mass of intermediate and fresh marshes were documented in Barataria, Terrebonne Basins, and in eastern Terrebonne and Cote Blanche Bay by the National Wetlands Research Center in 2005. Storm water held on the landmass by dikes and control structures has caused salt and sulfide impacts on vegetation. Accelerated erosion of wetlands and shoreline by the hurricane are documented at GPS points in Vermilion Bay. Land loss averaged more than six feet, up to a maximum of 21.47 feet according to Vermilion Bay Shoreline Monitoring Stations.

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 Livingston 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.

Hurricane Ike (2008)

Hurricane Ike caused tropical storm wind gusts of 50 to 60 mph, resulting in minor wind damage across Acadia Parish. Hurricane Ike caused wind damage, storm surge flooding, and tornadoes across southwest Louisiana. Ike made landfall near Galveston, TX early in the morning on September 13th as a strong category 2 hurricane. Sustained hurricane force winds were confined to extreme western Cameron Parish. The highest recorded winds in southwest Louisiana were at Lake Charles Regional Airport with sustained winds of 46 kts. (53 mph) and gusts of 67 kts. (77 mph). The lowest pressure reading occurred at Southland Field near Sulphur, LA, with a low of 994.6 mb. Several tornadoes were reported across southwest Louisiana. The most significant one was near Mamou, where a home lost its roof, and another 10-15 homes were damaged. Storm surge was a significant event. Water levels ranged from 14 ft. in western Cameron Parish, to 8 ft. in St. Mary Parish. This resulted in widespread flooding of the same areas that flooded in Hurricane Rita in 2005. Most of Cameron Parish was under water. Over 3000 homes were flooded. This extended north into Calcasieu Parish, where another 1000 homes flooded in Lake Charles, Westlake, and Sulphur. In Vermilion Parish, at least 1000 homes flooded in Pecan Island, Forked Island, Intracoastal City, and Henry. This extended east into Livingston Parish, where another 1000 homes flooded south of Highway 14 and Highway 90. In St. Mary Parish, some of the worst flooding occurred in Franklin, where a man-made levee failed, flooding over 450 homes. Maximum storm total rainfall ranged from 6 to 8 inches across Cameron, Calcasieu, and Beauregard Parishes. No fatalities were reported in southwest Louisiana. Total property damages, however, were high. Losses are estimated to be almost 420 million dollars across southwest Louisiana. Agricultural losses were over 225 million dollars.

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.

Effects from Tropical Storm Lee were throughout Livingston Parish. In the Town of Livingston fallen tree limbs cause power outages. Walker experienced 3 road closures on Red Oaks, Magnolia and Colyell roads due to high water conditions from the 5.5 inches of rain that fell in a 3 hour period. Wind damage was experienced when 10 trees down on private properties and streets. Officials and residents in the city of Walker said it was some of the highest flood waters they've seen in years. A shelter was opened at Walker Freshman High School at 13443 Burgess Avenue. Springfield experienced sewer treatment plant down due to pump stations being flooded. Continuous patrols were authorized to monitor flooded streets and highways.

Extensive flooding developed as Tropical Storm Lee evolved and later pushed out of the region. The combination of tides of 3 to 5 feet above normal and storm surges to 5 feet above mean sea level caused coastal flooding along the southeastern Louisiana coast and across coastal Mississippi. Flooding started on September 3rd at French Settlement on the Amite River and at Killian on the Tickfaw River. Major flooding developed at Killian as the storm intensified through September 4th. Camps, homes, and other properties were flooded and numerous roads were impassable across lower Livingston Parish.

Denham Springs experienced a total of 10 inches of rain, wind gusts up to 54 mph with sustained winds of 49 mph. Road closures due to high water and power outages also occurred. Highway 16 at Port Vincent was closed due to high water. Albany was affected by Tropical Storm Lee in the same manner as it affected the surrounding cities. Albany experienced high winds which caused downed trees and power outages. Albany reported some minor flooding. The mayor reported that police and maintenance crews were on extra patrols.

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.

Due to Isaac's very large size, and slow forward speed, tropical storm force winds lasted in excess of 48 hours in many areas of coastal southeast Louisiana. Occasional hurricane gusts of 70 to 85 mph were recorded across southeast Louisiana during the night of the Aug 28th and early on the 29th, especially south of Lake Pontchartrain. Interior areas of southeast Louisiana such as around Baton Rouge and northward experienced tropical storm force winds. Widespread power outages occurred across the area. Local utility companies reported over 700,000 customers were without power at the peak of the storm in southeast Louisiana. Generally, most of the wind damage was limited to downed trees and power lines, and roof damage caused by wind and falling trees and tree limbs.

Significant impact also occurred around Lakes Pontchartrain and Maurepas with a storm tide of 5 to 9 feet. 5 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.

Town of Livingston experienced 8 to 15 inches of rain causing flooding and waste water sewer plant to overflow. Springfield experienced one road closure and moderate flooding. Also of major concern was the fact that the flooding caused the sewer treatment plant to shut down. Continuous police patrols were dispatched to monitor street floods and highways. The city of Springfield also experienced power outage for several days. Numerous trees were down throughout the city. During the weather event created by Hurricane Isaac about 8/28/2012 and several days following, Port Vincent experienced some

flooding on many of our lower-lying streets which had to be closed to traffic. We are not aware that any rescues were required in our jurisdiction. None of the state highways were closed due to water , but we had debris and limbs everywhere caused by the extended high winds which did initially affect traffic flow. Power outages were widespread and affected most of the community for two to three days. Government offices were closed, however, our police department stayed at the town hall on duty 24 hours a day for several days. Port Vincent had some damage to the roof of the town hall requiring emergency repair and there probably was damage to local businesses and residences. Minor flooding developed at Denham Springs, Bayou Manchac Point and Port Vincent on the Amite River.

The SPCA of Livingston in Walker, LA reported on it received high numbers of calls about owner surrenders from people evacuating. There were so many calls that the shelter did not have enough crates for the animals it was being asked to take. North Carolina Baptist Men's disaster recovery team arrived in Walker, La., to help people impacted by Hurricane Isaac. Approximately 450 homes in the area were affected by the storm.

Killian experienced 50 mph sustained winds with gusts up to 60 mph. Flooding experienced in some homes in Kings Point of Cypress Dr. Power lines downed and power was out throughout Killian. All roads had downed trees and lines. Chief Hill had all units park at the Town Hall during the peak of the storm. Total rainfall for Killian was 15.6 inches.

Impact to Albany: 18 hours prior to hurricane the town emergency team, Albany Police Department, District 1 Fire Department and maintenance personnel were mobilized. The high school was opened as a shelter for flood victims. The town experienced minor flooding, trees down, electrical power outages and all sewer lift stations went down.

Across the southern end of Livingston Parish, more than 2,000 homes were damaged, many in rural, low-lying hamlets such as French Settlement, Maurepas and Head of Island. In some areas, people were evacuated by boats and large trucks. Due to Hurricane Isaac Livingston Parish is looking at improving emergency communications and drainage in the southern part of the parish.

Denham Springs no lives were lost and damage was minimal. There were a number of downed trees and limbs causing some damage as well as power and cable outages. There was some minor flash flooding in neighborhoods. Tarps and sandbags were provided to residents out of the Government Drive fire station.

The planning area could see a range of tropical cyclones from tropical depressions to a Category 5.

Probability

Tropical cyclones are large natural hazard events that occur regularly within Livingston Parish. The annual chance of occurrence for a tropical cyclone occurrence is estimated at once every one to two years in the planning area.

Jurisdictional Vulnerability

Critical Facility	Name of Facility	Drought	Flooding	Hail	High Wind	Lightining	Subsidence/ Coastal Erosion	Tornados	Tropical Cyclone
Livingston Parish									
X	911 Facility		x	x	x	x		x	x
	Animal Shelter		x	x	x	x		x	x
	Bridge Tender Shack		x	x	x	x		x	x
X	Coroners Building at 911		x	x	x	x		x	x
	Old Courthouse		x	x	x	x		x	x
	Courthouse Annex		x	x	x	x		x	x
	LP Courthouse		x	x	x	x		x	x
X	Detention Center		x	x	x	x		x	x
	Health Unit		x	x	x	x		x	x
X	LOHSEP Storage Building		x	x	x	x		x	x
X	LP Governmental Building		x	x	x	x		x	x
X	Maintenance & Garage (DPW)		x	x	x	x		x	x
X	Maurepas Senior Center		x	x	x	x		x	x
	Mosquito Abatement		x	x	x	x		x	x
	Office of District Attourney		x	x	x	x		x	x
	Quad Area Building		x	x	x	x		x	x
	Registrar of Voters		x	x	x	x		x	x
	Tax Assessors Office (OSC)		x	x	x	x		x	x
	Voting Precint -6-A & 6-B		x	x	x	x		x	x
Albany									
X	Town Hall/Municipal Building (A)		x	x	x	x		x	x
X	Police Station (B)		x	x	x	x		x	x
X	Maintenance & Equipment Bldg. ©		x	x	x	x		x	x
X	District 1 - Fire Station #1		x	x	x	x		x	x
X	Equipment Building (D)		x	x	x	x		x	x
X	Water Well #1 w/ Buildings	x	x	x	x	x		x	x
X	Water Well #2 w/ Buildings	x	x	x	x	x		x	x
X	Water Well #3 w/Buildings	x	x	x	x	x		x	x
X	Sewer Treatment Facility		x	x	x	x		x	x
X	Sewer Treatment Maintenance Bldg.		x	x	x	x		x	x
X	District 1 - Fire Station #2		x	x	x	x		x	x
X	Tank Potable Water Pressure	x	x	x	x	x		x	x
X	Tower #1 Albany Water Wks	x	x	x	x	x		x	x
X	Tower #2 Albany Water Wks	x	x	x	x	x		x	x
X	Water Piping System (approx 180 miles)	x	x	x	x	x		x	x
Denham Springs									
X	Police Station		x	x	x	x		x	x
X	Fire Department HQ		x	x	x	x		x	x
X	Fire station #1		x	x	x	x		x	x
X	Fire station #2		x	x	x	x		x	x
X	Fire station #3		x	x	x	x		x	x
X	City of Denham Springs City Hall		x	x	x	x		x	x
	City of Denham Springs Old City Hall		x	x	x	x		x	x
X	Denham Springs Street Department		x	x	x	x		x	x
	DS Street Department-B Maintenance		x	x	x	x		x	x
	DS Street Department-D Maintenance		x	x	x	x		x	x
	Utility Warehouse (112 Brignac St)		x	x	x	x		x	x
X	Denham Springs Animal Shelter		x	x	x	x		x	x
X	Denham Springs Motor Pool		x	x	x	x		x	x
X	Denham Springs Council on Aging		x	x	x	x		x	x
X	Livingston Youth and Family Counseling		x	x	x	x		x	x
	Livingston Parish Chamber of Commerce/Arts		x	x	x	x		x	x
X	City of Denham Springs Gas Dept		x	x	x	x		x	x
X	City of Denham Springs Water Dept		x	x	x	x		x	x
X	Brignac water tower		x	x	x	x		x	x
X	Pete's Hwy water tower		x	x	x	x		x	x
	Springhill Drive water tower		x	x	x	x		x	x
X	Brignac water well		x	x	x	x		x	x
X	Rodeo water well		x	x	x	x		x	x
X	Carolyn Street water well		x	x	x	x		x	x
X	Rushing water well		x	x	x	x		x	x
X	City of Denham Springs Sewer Dept		x	x	x	x		x	x
X	Pete's Hwy pump station		x	x	x	x		x	x
X	East Street pump station		x	x	x	x		x	x
X	High Point pump station		x	x	x	x		x	x
X	Riverview pump station		x	x	x	x		x	x
X	Montgomery pump station		x	x	x	x		x	x
X	Health Unit pump station		x	x	x	x		x	x
X	La Maison Belle pump staion		x	x	x	x		x	x

X	Vulcan Pump Station		x	x	x	x		x	x
X	Chateau Jon Pump Station		x	x	x	x		x	x
X	Connie Drive Pump Station		x	x	x	x		x	x
X	Fleur Gardens Pump Station		x	x	x	x		x	x
X	Rushing Road Pump Station		x	x	x	x		x	x
X	Crawfords Pump Station		x	x	x	x		x	x
X	K&B Pump Station		x	x	x	x		x	x
X	Cathryn Pump Station		x	x	x	x		x	x
X	Citi Place Pump Station		x	x	x	x		x	x
X	Bass Pro Pump Station		x	x	x	x		x	x
X	Alvin Fairburn Pump Station		x	x	x	x		x	x
X	991 Government Street Pump Station		x	x	x	x		x	x
X	2263 Augusta Lane Pump Station		x	x	x	x		x	x
X	25101 Plantation Blvd Pump Station		x	x	x	x		x	x
X	Enterprise Blvd-Plantation Estates Pump Station		x	x	x	x		x	x
X	Shadow Springs 3rd Filing Pump Station		x	x	x	x		x	x
X	Lakeland Acres Pump Station		x	x	x	x		x	x
X	9300 Forrest Delatte Pump Station		x	x	x	x		x	x
X	Eastover Estates Pump Station		x	x	x	x		x	x
X	Rosedown Pump Station		x	x	x	x		x	x
X	25470 Rearwood Pump Station		x	x	x	x		x	x
X	LePlace Subd (Off of Vincent Rd) Pump Station		x	x	x	x		x	x
X	Lake Park Pump Station		x	x	x	x		x	x
X	Springwood Blvd Pump Station		x	x	x	x		x	x
X	3081 S. Range Ave Pump Station		x	x	x	x		x	x
X	Rushing Road Pump Station		x	x	x	x		x	x
X	Carolyn (Off of Ruhsing) Pump Station		x	x	x	x		x	x
X	29120 S. Redwood Pump Station		x	x	x	x		x	x
X	29195 S. Redwood		x	x	x	x		x	x
X	23670 South Point Pump Station		x	x	x	x		x	x
X	23517 Springhill Pump Station		x	x	x	x		x	x
X	23774 Sandlewood Pump Station		x	x	x	x		x	x
X	12365 Falcon Crest Pump Station		x	x	x	x		x	x
X	8222 Allen Crossing Pump Station		x	x	x	x		x	x
X	24909 Plantation Lakes Pump Station		x	x	x	x		x	x
X	11621 Mary Lee Drive Pump Station		x	x	x	x		x	x
X	2812 Cabo Lane Pump Station		x	x	x	x		x	x
X	28964 Abyss Lane Pump Station		x	x	x	x		x	x
X	23701 South Point Lane Pump Station		x	x	x	x		x	x
X	24240 LA Hwy 1032 Pump Station		x	x	x	x		x	x
X	10187 Averette Pump Station		x	x	x	x		x	x
X	8903 Cook Road Pump Station		x	x	x	x		x	x
X	8788 Hess Rd Pump Station		x	x	x	x		x	x
X	8555 Wayne Dr Pump Station		x	x	x	x		x	x
X	8802 Eastover Pump Station		x	x	x	x		x	x
X	25719 Gill Rd Pump Station		x	x	x	x		x	x
X	9225 Vidalia Dr Pump Station		x	x	x	x		x	x
X	8221 Allen Crossing Pump Station		x	x	x	x		x	x
X	8338 King Dr Pump Station		x	x	x	x		x	x
X	8559 Harris Rd Pump Station		x	x	x	x		x	x
X	24998 Heritage Dr Pump Station		x	x	x	x		x	x
X	24949 LA Hwy 16 Pump Station		x	x	x	x		x	x
X	25002 Denver St Pump Station		x	x	x	x		x	x
X	9210 Greystone Pump Station		x	x	x	x		x	x
X	9344 Greyston Pump Station		x	x	x	x		x	x
X	25675 Wax Rd Pump Station		x	x	x	x		x	x
X	8602 Clearwater Pump Station		x	x	x	x		x	x
X	24412 Raymond Dr Pump Station		x	x	x	x		x	x
X	9006 Henderson Dr Pump Station		x	x	x	x		x	x
X	24003 Ferry Landing Pump Station		x	x	x	x		x	x
X	10806 LA Hwy 1033 Pump Station		x	x	x	x		x	x
X	26771 LA Hwy 1032 Pump Station		x	x	x	x		x	x
X	7516 Vincent Rd Pump Station		x	x	x	x		x	x
X	7488 Vincent Rd Pump Station		x	x	x	x		x	x
X	25701 LA Hwy 1032 Pump Station		x	x	x	x		x	x
X	26040 LA Hwy 1032 Pump Station		x	x	x	x		x	x
X	8445 Rushing Rd E Pump Station		x	x	x	x		x	x
X	24933 LA Hwy 1032 Pump Station		x	x	x	x		x	x
X	24504 LA Hwy 1032 Pump Station		x	x	x	x		x	x
X	Wastewater Treatment Plant		x	x	x	x		x	x
French Settlement									
x	Town Hall / Police		x	x	x	x		x	x
x	Emergency Storage Bldg		x	x	x	x		x	x
x	Pavillion		x	x	x	x		x	x
x	Public Restroom		x	x	x	x		x	x
x	Museum		x	x	x	x		x	x
Killian									
x	Town Hall						x		
x	Water Department						x		
x	Police						x		

Livingston, Town of									
X	Town Hall		x	x	x	x		x	x
X	Public Works		x	x	x	x		x	x
X	3-Concessions		x	x	x	x		x	x
X	Fire Station		x	x	x	x		x	x
	Restrooms (6)		x	x	x	x		x	x
	Restrooms (2)		x	x	x	x		x	x
Port Vincent									
x	Police Department		x	x	x	x		x	x
x	Community Events/Shelter		x	x	x	x		x	x
x	Water		x	x	x	x		x	x
Springfield									
	Town Hall		x	x	x	x		x	x
	Springfield Treatment Sewer Facility		x	x	x	x		x	x
	Springfield Sewer Pump Station		x	x	x	x		x	x
	Springfield Sewer Pump Station		x	x	x	x		x	x
	Springfield Sewer Pump Station		x	x	x	x		x	x
	Springfield Sewer Pump Station		x	x	x	x		x	x
	Museum City and Field		x	x	x	x		x	x
Walker									
x	City Hall		x	x	x	x		x	x
x	Public Works		x	x	x	x		x	x
x	Water Tower		x	x	x	x		x	x
x	Sewer Plant		x	x	x	x		x	x
x	Police Station		x	x	x	x		x	x
x	Animal Shelter		x	x	x	x		x	x
x	Purchase Department		x	x	x	x		x	x

Estimated Losses

Livingston Parish Total Annualized Estimated Losses

Flooding	Hail	High Wind	Lightning	Tornados	Tropical Cyclone
$2,251,003.00	$3,688.00	$3,021,469.00	$308,245.00	$49,372.00	$21,208,485.00

Estimated Annualized Estimated Losses Per Jurisdiction

Jurisdiction	Flooding	Hail	High Wind	Lightning	Tornados	Tropical Cyclone
Livingston, Unincorporated	$1,870,250	$3,064	$1,870,250	$1,870,250	$41,020	$17,621,113
Albany	$18,206	$29	$18,206	$18,206	$399	$171,541
Denham Springs	$169,383	$277	$169,383	$169,383	$3,715	$1,595,897
French Settlement	$18,405	$30	$18,405	$18,405	$403	$173,416
Killian	$21,175	$34	$21,175	$21,175	$464	$199,506
Livingston, Town of	$31,389	$51	$31,389	$31,389	$688	$295,744
Port Vincent	$12,171	$19	$12,171	$12,171	$266	$114,673
Springfield	$8,091	$13	$8,091	$8,091	$177	$76,240
Walker	$101,779	$166	$101,779	$101,779	$2,232	$958,944

Drought

According to the SHELDUS database, there have been 2 droughts that have caused some level of crop damage. The total agricultural damage from these events was $11,287,501 with an average cost of $5,643,750 per drought event. When annualizing the total cost over the 64 year record, total annual losses based on drought is estimated to be $176,367. The table below represent an analysis of agricultural exposure that is susceptible to droughts by major crop type for Livingston Parish.

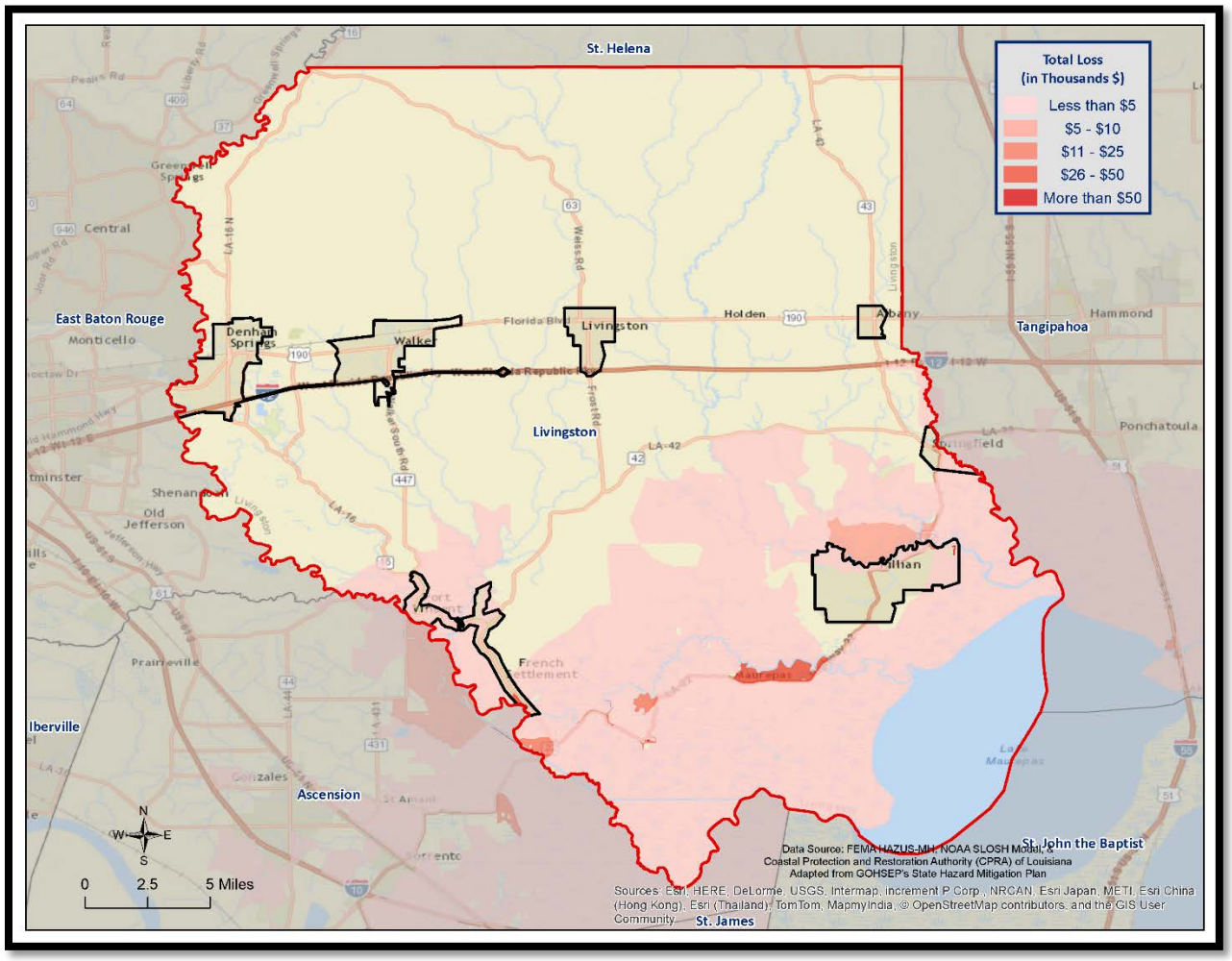
Agricultural exposure by Crop Type for Droughts in Livingston Parish.

Agricultural Exposure by Crop Type for Drought				
Forestry	**Hay**	**Home Gardens**	**Blueberries**	**Total**
$18,567,628	$2,040,000	$2,625,000	$211,750	23,595,878

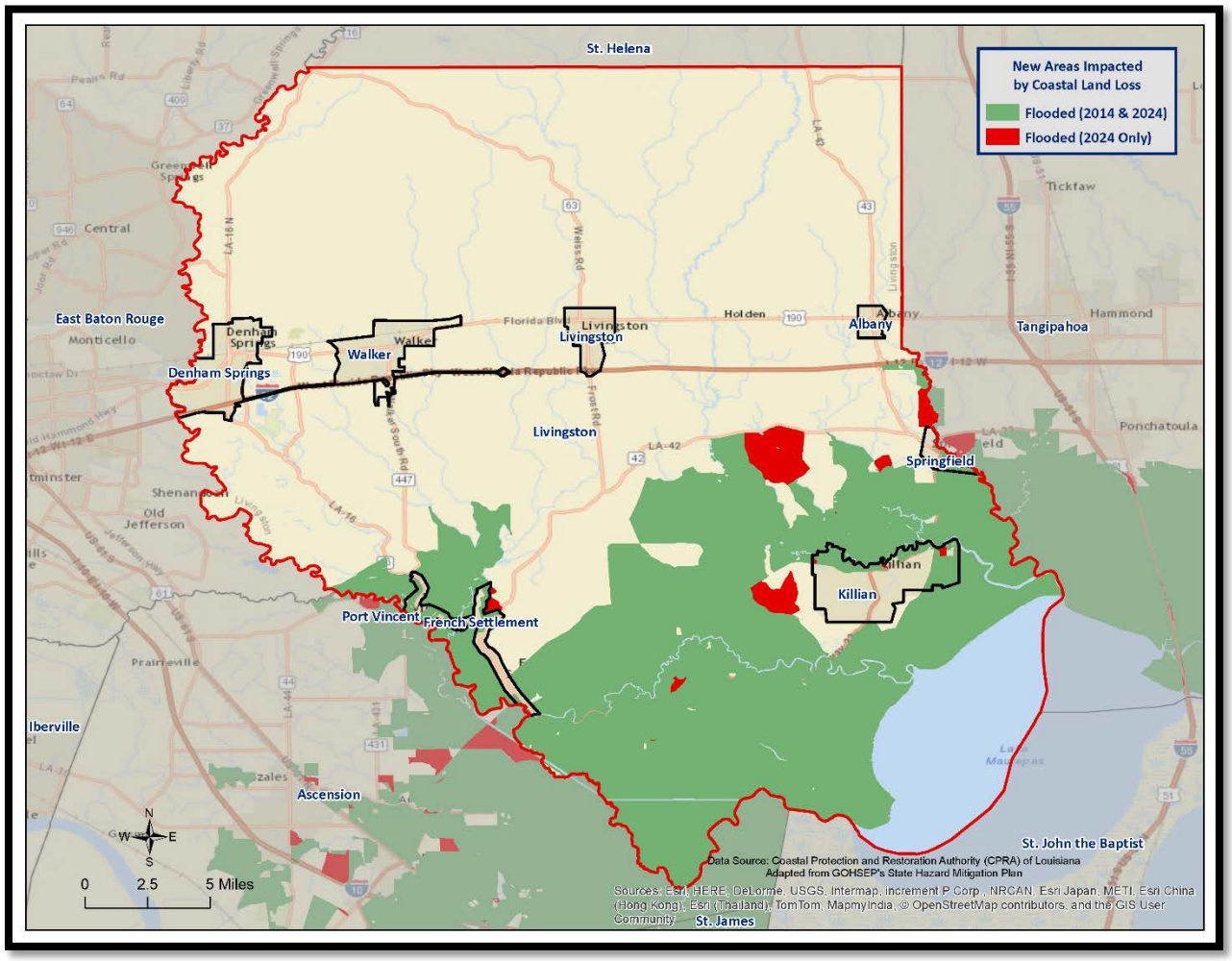
(Source: LSU Ag Center 2014 Parish Totals)

Coastal Land Loss Subsidence/Saltwater Intrusion

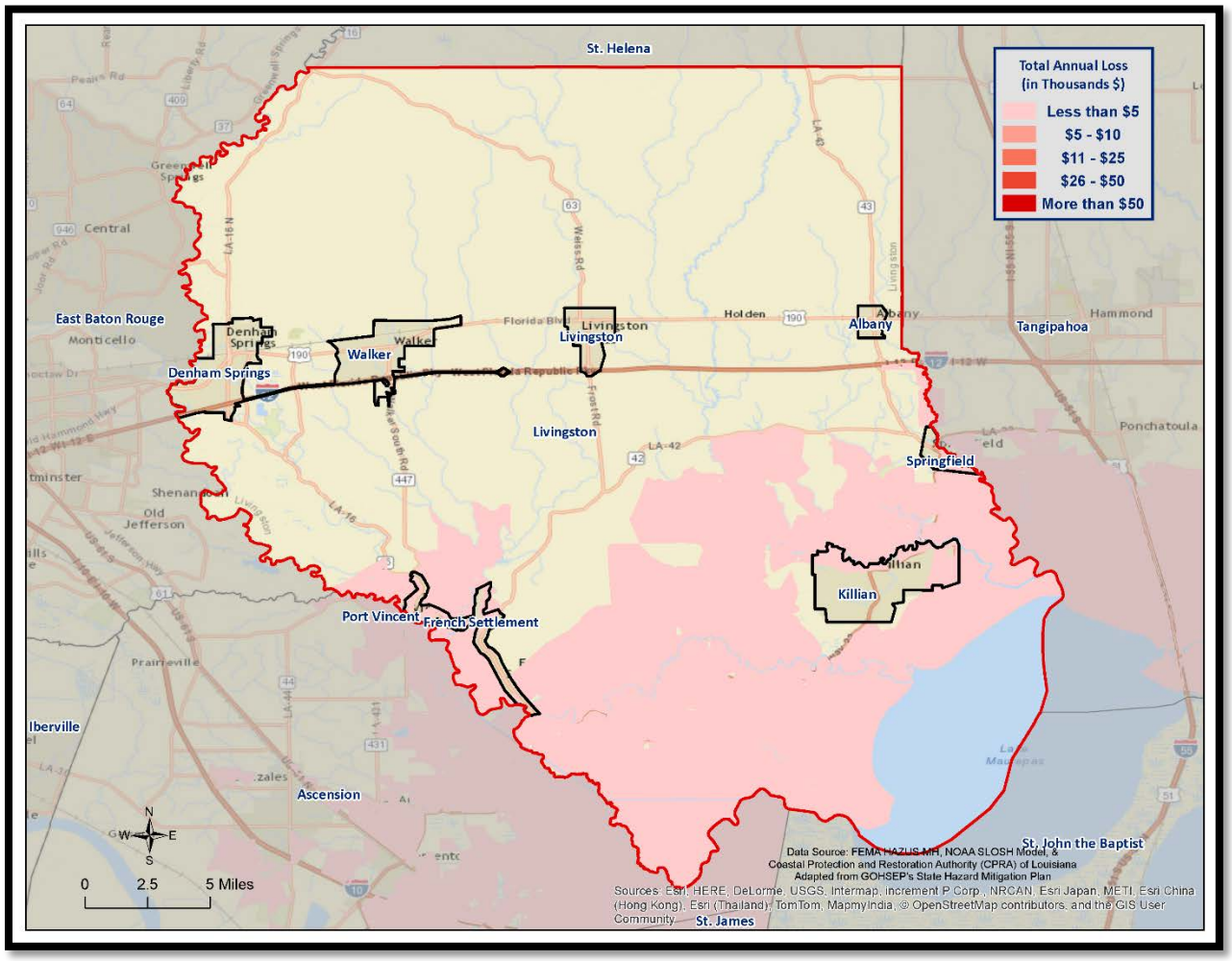
To determine the estimated potential losses, the methodology implemented in the 2014 Louisiana State Plan Update was used.



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)



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)



Estimated Annual Losses for Coastal Land Loss by Census Block Group.

Estimated Annual Losses for Coastal Land Loss and Subsidence in Livingston Parish. (Source: HAZUS-MH)

Coastal Land Loss Estimated Annual Potential Losses for Livingston Parish				
Livingston Parish (Unincorporated Area)	**French Settlement**	**Killian**	**Port Vincent**	**Springfield**
$36,900	$3,200	$5,800	$0	$0

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 the tables below.

Population Vulnerable by Jurisdiction in Livingston Parish.

Number of People Exposed to Flood Hazards			
Location	**# in Community**	**# in Hazard Area**	**% in Hazard Area**
Livingston Parish (Unincorporated)	**105,266**	**7,954**	**7.6%**
French Settlement	**1,116**	**132**	**11.8%**
Killian	**1,206**	**69**	**56.4%**
Total	**128,026**	**8,766**	**6.8%**

Population Vulnerable to Coastal Land Loss and Subsidence in Unincorporated Livingston Parish. (Source: HAZUS-MH)

Livingston Parish (Unincorporated Parish)		
Category	**Total Numbers**	**% of People in Hazard Area**
Number in Hazard Area	7,954	7.6%
Persons Under 5 years	549	6.9%
Persons Under 18 years	2,116	26.6%
Persons 65 Years and Over	899	11.3%
White	7,302	91.8%
Minority	652	8.2%

Population Vulnerable to Coastal Land Loss and Subsidence in French Settlement. (Source: HAZUS-MH)

French Settlement		
Category	**Total Numbers**	**% of People in Hazard Area**
Number in Hazard Area	132	11.8%
Persons Under 5 years	9	6.7%
Persons Under 18 years	25	19.2%
Persons 65 Years and Over	16	11.8%
White	127	96.4%
Minority	5	3.6%

Population Vulnerable to Coastal Land Loss and Subsidence in Killian.
(Source: HAZUS-MH)

Killian		
Category	**Total Numbers**	**% of People in Hazard Area**
Number in Hazard Area	680	56.4%
Persons Under 5 years	33	4.8%
Persons Under 18 years	118	17.3%
Persons 65 Years and Over	96	14.2%
White	602	88.5%
Minority	78	11.5%

Capability Assessment

This section summarizes all efforts to develop plans, policies, programs, and activities that directly or indirectly support hazard mitigation. Livingston Parish and its jurisdictions will work to expand their capabilities by adding to their existing plans, as well as work to create new plans that will address a long-term recovery and resiliency framework. In instances where jurisdictions do not have any plans, there will be a commitment to explore opportunities to create new plans that will address long-term recovery and resiliency framework as parish and local resources allow.

***** Each jurisdiction that does not have a local Emergency Operations Plan, Continuity of Operations, Stormwater Management Plan, Emergency Manager, Warning System/Service, Community Development Block Grant (CDBG), and Educations and Outreach Programs will fall under the Livingston Parish's plans, staff, programs and grants.*****

Jurisdiction: Town of Albany

Planning and Regulatory		
Plans	Yes / No	How often is the plan updated?
Comprehensive / Master Plan	NO	
Capital Improvements Plan	NO	
Economic Development Plan	NO	
Local Emergency Operations Plan	YES	yearly
Continuity of Operations Plan	NO	
Transportation Plan	NO	
Stormwater Management Plan	NO	
Community Wildfire Protection Plan	NO	
Other plans (redevelopment, recovery, coastal zone management)	NO	
Building Code, Permitting and Inspections	Yes / No	Are the codes adequately enforced?
Building Code	YES	Version /Year- IEBC (2009), Imc(2009) NFPA-NEC(2008), LAPC(2008), IFGC(2009)
Building Code Effectiveness Grading Schedule (BCEGS) Score	NO	Score
Fire Department ISO rating	YES	Rating 4
Site plan review requirements	NO	
Land Use Planning and Ordinances	Yes / No	Is the ordinance adequately administered and enforced?
Zoning Ordinance	YES	
Subdivision Ordinance	YES	
Floodplain Ordinance	YES	
Natural Hazard Specific Ordinance (stormwater, steep slope, wildfire)	NO	
Flood Insurance Rate Maps	YES	
Acquisition of land for open space and public recreation uses	NO	
Other		
Administration and Technical		
Administration	Yes / No	Comments
Planning Commission	YES	starting stages active board members.
Mitigation Planning Committee	YES	Parish/Towns/ OHEP-. *LPMPC 2015
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	YES	Maintenance department has equipment and personnel / Parish designated collection sites.

Staff	Yes / No	Percentage of time spent on hazard mitigation
Chief Building Official	YES	
Floodplain Administrator	YES	
Emergency Manager	YES	
Community Planner	NO	
Civil Engineer	YES	Gary McClure /Nikki Gill, Shread-Kuyrkendall & Associates, Inc.
GIS Coordinator	NO	
Grant Writer	YES	Gary McClure /Nikki Gill, Shread-Kuyrkendall & Associates, Inc.
Other	NO	
Technical	Yes / No	Describe capability
Warning Systems / Service (Reverse 911, outdoor warning signals)	YES	Parish System
Hazard Data & Information	YES	MSDS Data sheets file in the Town Clerks Office
Grant Writing	YES	Gary McClure /Nikki Gill, Shread-Kuyrkendall & Associates, Inc.
Hazus Analysis	NO	
Other		
Financial		
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	
Impact fees for new development	YES	
Stormwater Utility Fee	NO	
Community Development Block Grant (CDBG)	YES	
Other Funding Programs	NO	
Education and Outreach		
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	Bethlehem Baptist Church Disaster work crew.
Ongoing public education or information program (responsible water use, fire safety, household preparedness, environmental education)	YES	Town - Water use. *District 1, Fire Dept. fire safety
Natural Disaster or safety related school program	NO	
Storm Ready certification	NO	
Firewise Communities certification	NO	
Public/Private partnership initiatives addressing disaster-related issues	NO	
Other		

Staff	Yes / No	Percentage of time spent on hazard mitigation
Chief Building Official	Yes	10
Floodplain Administrator	Yes	10
Emergency Manager	No	(This function is performed by multiple departments: Fire, Police, Street, Office of Planning & Development, and LOHSEP)
Community Planner	No	(Generic planning functions are performed through the Office of Planning & Development and Planning Commission)
Civil Engineer	Yes	Community uses third party for engineering services. Total amount of time spent on hazard mitigation is unknown.
GIS Coordinator	No	
Grant Writer	Yes	15
Other	No	
Technical	**Yes / No**	**Describe capability**
Warning Systems / Service (Reverse 911, outdoor warning signals)	Yes	Parish provides reverse 911. Outdoor warning signal in place at Fire Station One.
Hazard Data & Information	Yes	City of Denham Springs has a hazard mitigatino plan in place. It was adopted in Dec. 2013.
Grant Writing	Yes	
Hazus Analysis	No	
Other	No	
Financial		
Funding Resource	**Yes / No**	**Could the resource be used to fund future mitigation actions?**
Capital Improvements project funding	~	Parish - yes; City - no
Authority to levy taxes for specific purposes	No	
Fees for water, sewer, gas, or electric services	Yes	No
Impact fees for new development	Yes	No
Stormwater Utility Fee	No	
Community Development Block Grant (CDBG)	No	
Other Funding Programs	No	
Education and Outreach		
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	Churches, etc.
Ongoing public education or information program (responsible water use, fire safety, household preparedness, environmental education)	Yes	Fire Safety; Mailouts for stormwater maintenance (grass clippings, etc.); Meetins with contractors to discuss erosion control measures for construction sites; Public outreach through CRS; etc.
Natural Disaster or safety related school program	Yes	Fire safety through the fire department
Storm Ready certification	No	
Firewise Communities certification	No	
Public/Private partnership initiatives addressing disaster-related issues	No	
Other	No	

Jurisdiction: French Settlement		
Planning and Regulatory		
Plans	Yes / No	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	NO	
Other plans (redevelopment, recovery, coastal zone management)	NO	
Building Code, Permitting and Inspections	Yes / No	Are the codes adequately enforced?
Building Code		Version / Year
Building Code Effectiveness Grading Schedule (BCEGS) Score		Score
Fire Department ISO rating		Rating
Site plan review requirements		
Land Use Planning and Ordinances	Yes / No	Is the ordinance adequately administered and enforced?
Zoning Ordinance	NO	
Subdivision Ordinance	NO	
Floodplain Ordinance	NO	
Natural Hazard Specific Ordinance (stormwater, steep slope, wildfire)	NO	
Flood Insurance Rate Maps	NO	
Acquisition of land for open space and public recreation uses	NO	
Other	NO	
Administration and Technical		
Administration	Yes / No	Comments
Planning Commission	NO	
Mitigation Planning Committee	NO	
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	NO	
Staff	Yes / No	Percentage of time spent on hazard mitigation
Chief Building Official	NO	
Floodplain Administrator	NO	
Emergency Manager	NO	
Community Planner	NO	
Civil Engineer	NO	
GIS Coordinator	NO	
Grant Writer	NO	
Other	NO	

Technical	Yes / No	Describe capability
Warning Systems / Service (Reverse 911, outdoor warning signals)	NO	
Hazard Data & Information	NO	
Grant Writing	NO	
Hazus Analysis	NO	
Other	NO	
Financial		
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	NO	
Impact fees for new development	NO	
Stormwater Utility Fee	NO	
Community Development Block Grant (CDBG)	NO	
Other Funding Programs	NO	
Education and Outreach		
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)	NO	
Natural Disaster or safety related school program	NO	
Storm Ready certification	NO	
Firewise Communities certification	NO	
Public/Private partnership initiatives addressing disaster-related issues	NO	
Other	NO	

Jurisdiction: Killian		
Planning and Regulatory		
Plans	Yes / No	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	NO	
Other plans (redevelopment, recovery, coastal zone management)	NO	
Building Code, Permitting and Inspections	Yes / No	Are the codes adequately enforced?
Building Code		Version / Year
Building Code Effectiveness Grading Schedule (BCEGS) Score		Score
Fire Department ISO rating		Rating
Site plan review requirements		
Land Use Planning and Ordinances	Yes / No	Is the ordinance adequately administered and enforced?
Zoning Ordinance	NO	
Subdivision Ordinance	NO	
Floodplain Ordinance	NO	
Natural Hazard Specific Ordinance (stormwater, steep slope, wildfire)	NO	
Flood Insurance Rate Maps	NO	
Acquisition of land for open space and public recreation uses	NO	
Other		
Administration and Technical		
Administration	Yes / No	Comments
Planning Commission	NO	
Mitigation Planning Committee	NO	
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	NO	
Staff	Yes / No	Percentage of time spent on hazard mitigation
Chief Building Official	NO	
Floodplain Administrator	NO	
Emergency Manager	NO	
Community Planner	NO	
Civil Engineer	NO	
GIS Coordinator	NO	
Grant Writer	NO	
Other	NO	

Technical	Yes / No	Describe capability
Warning Systems / Service (Reverse 911, outdoor warning signals)	NO	
Hazard Data & Information	NO	
Grant Writing	NO	
Hazus Analysis	NO	
Other	NO	
Financial		
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	NO	
Impact fees for new development	NO	
Stormwater Utility Fee	NO	
Community Development Block Grant (CDBG)	NO	
Other Funding Programs	NO	
Education and Outreach		
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)	NO	
Natural Disaster or safety related school program	NO	
Storm Ready certification	NO	
Firewise Communities certification	NO	
Public/Private partnership initiatives addressing disaster-related issues	NO	
Other		

Jurisdiction: Livingston Parish		
Planning and Regulatory		
Plans	Yes / No	How often is the plan updated?
Comprehensive / Master Plan	YES	
Capital Improvements Plan	NO	
Economic Development Plan	YES	
Local Emergency Operations Plan	YES	
Continuity of Operations Plan	NO	
Transportation Plan	NO	
Stormwater Management Plan	YES	
Community Wildfire Protection Plan	YES	
Other plans (redevelopment, recovery, coastal zone management)		
Building Code, Permitting and Inspections	Yes / No	Are the codes adequately enforced?
Building Code		Version / Year 2012 - IBC/IRC 2012-IBC/IRC
Building Code Effectiveness Grading Schedule (BCEGS) Score	NO	Score YES
Fire Department ISO rating	9	Rating YES
Site plan review requirements	YES	
Land Use Planning and Ordinances	Yes / No	Is the ordinance adequately administered and enforced?
Zoning Ordinance	NO	NO
Subdivision Ordinance	YES	YES
Floodplain Ordinance	YES	YES
Natural Hazard Specific Ordinance (stormwater, steep slope, wildfire)	YES	YES
Flood Insurance Rate Maps	YES	YES
Acquisition of land for open space and public recreation uses	YES	YES
Other		
Administration and Technical		
Administration	Yes / No	Comments
Planning Commission	Y	
Mitigation Planning Committee	Y	
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	Y	DPW
Staff	Yes / No	Percentage of time spent on hazard mitigation
Chief Building Official	Y	20%
Floodplain Administrator	Y	30%
Emergency Manager	Y	
Community Planner	Y	5%
Civil Engineer	Y	
GIS Coordinator	Y	
Grant Writer	Y	
Other	Y	

Technical	Yes / No	Describe capability
Warning Systems / Service (Reverse 911, outdoor warning signals)	Y	First call, School Board, e-mail
Hazard Data & Information	Y	
Grant Writing	Y	
Hazus Analysis		
Other		DOTD, PW
Financial		
Funding Resource	Yes / No	Could the resource be used to fund future mitigation actions
Capital Improvements project funding	Y	
Authority to levy taxes for specific purposes	N	
Fees for water, sewer, gas, or electric services	Y	NO
Impact fees for new development	N	
Stormwater Utility Fee	Y	
Community Development Block Grant (CDBG)		
Other Funding Programs		Road Program, Bridge Program, (All-System)
		DOTD, PW
Education and Outreach		
Program / Organization	Yes / No	Comments
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.		Baptist, Catholic, Methodist
Ongoing public education or information program (responsible water use, fire safety, household preparedness, environmental education)		YES
Natural Disaster or safety related school program		YES
Storm Ready certification		YES
Firewise Communities certification		NO
Public/Private partnership initiatives addressing disaster-related issues		C.E.R.T.
Other		

Jurisdiction: Town of Livingston		
Planning and Regulatory		
Plans	Yes / No	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	NO	
Other plans (redevelopment, recovery, coastal zone management)	NO	
Building Code, Permitting and Inspections	Yes / No	Are the codes adequately enforced?
Building Code		Version / Year
Building Code Effectiveness Grading Schedule (BCEGS) Score		Score
Fire Department ISO rating		Rating
Site plan review requirements		
Land Use Planning and Ordinances	Yes / No	Is the ordinance adequately administered and enforced?
Zoning Ordinance	NO	
Subdivision Ordinance	NO	
Floodplain Ordinance	NO	
Natural Hazard Specific Ordinance (stormwater, steep slope, wildfire)	NO	
Flood Insurance Rate Maps	NO	
Acquisition of land for open space and public recreation uses	NO	
Other	NO	
Administration and Technical		
Administration	Yes / No	Comments
Planning Commission	NO	
Mitigation Planning Committee	NO	
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	NO	
Staff	Yes / No	Percentage of time spent on hazard mitigation
Chief Building Official	NO	
Floodplain Administrator	NO	
Emergency Manager	NO	
Community Planner	NO	
Civil Engineer	NO	
GIS Coordinator	NO	
Grant Writer	NO	
Other	NO	

Technical	Yes / No	Describe capability
Warning Systems / Service (Reverse 911, outdoor warning signals)	NO	
Hazard Data & Information	NO	
Grant Writing	NO	
Hazus Analysis	NO	
Other	NO	
Financial		
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	NO	
Impact fees for new development	NO	
Stormwater Utility Fee	NO	
Community Development Block Grant (CDBG)	NO	
Other Funding Programs	NO	
Education and Outreach		
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)	NO	
Natural Disaster or safety related school program	NO	
Storm Ready certification	NO	
Firewise Communities certification	NO	
Public/Private partnership initiatives addressing disaster-related issues	NO	
Other		

Jurisdiction: Port Vincent		
Planning and Regulatory		
Plans	Yes / No	How often is the plan updated?
Comprehensive / Master Plan	NO	NO
Capital Improvements Plan	NO	NO
Economic Development Plan	NO	NO
Local Emergency Operations Plan	NO	NO
Continuity of Operations Plan	NO	NO
Transportation Plan	NO	NO
Stormwater Management Plan	NO	NO
Community Wildfire Protection Plan	NO	NO
Other plans (redevelopment, recovery, coastal zone management)	NO	NO
Building Code, Permitting and Inspections	Yes / No	Are the codes adequately enforced?
Building Code		Version / Year
Building Code Effectiveness Grading Schedule (BCEGS) Score		Score
Fire Department ISO rating		Rating
Site plan review requirements		
Land Use Planning and Ordinances	Yes / No	Is the ordinance adequately administered and enforced?
Zoning Ordinance	NO	NO
Subdivision Ordinance	NO	NO
Floodplain Ordinance	NO	NO
Natural Hazard Specific Ordinance (stormwater, steep slope, wildfire)	NO	NO
Flood Insurance Rate Maps	NO	NO
Acquisition of land for open space and public recreation uses	NO	NO
Other	NO	
Administration and Technical		
Administration	Yes / No	Comments
Planning Commission	NO	NO
Mitigation Planning Committee	NO	NO
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	NO	NO
Staff	Yes / No	Percentage of time spent on hazard mitigation
Chief Building Official	NO	NO
Floodplain Administrator	NO	NO
Emergency Manager	NO	NO
Community Planner	NO	NO
Civil Engineer	NO	NO
GIS Coordinator	NO	NO
Grant Writer	NO	NO
Other	NO	NO

Technical	Yes / No	Describe capability
Warning Systems / Service (Reverse 911, outdoor warning signals)	NO	NO
Hazard Data & Information	NO	NO
Grant Writing	NO	NO
Hazus Analysis	NO	NO
Other	NO	NO
Financial		
Funding Resource	Yes / No	Could the resource be used to fund future mitigation actions?
Capital Improvements project funding	NO	NO
Authority to levy taxes for specific purposes	NO	NO
Fees for water, sewer, gas, or electric services	NO	NO
Impact fees for new development	NO	NO
Stormwater Utility Fee	NO	NO
Community Development Block Grant (CDBG)	NO	NO
Other Funding Programs	NO	NO
Education and Outreach		
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	NO
Ongoing public education or information program (responsible water use, fire safety, household preparedness, environmental education)	NO	NO
Natural Disaster or safety related school program	NO	NO
Storm Ready certification	NO	NO
Firewise Communities certification	NO	NO
Public/Private partnership initiatives addressing disaster-related issues	NO	NO
Other	NO	NO

Jurisdiction: Springfield		
Planning and Regulatory		
Plans	Yes / No	How often is the plan updated?
Comprehensive / Master Plan	NO	NO
Capital Improvements Plan	NO	NO
Economic Development Plan	NO	NO
Local Emergency Operations Plan	NO	NO
Continuity of Operations Plan	NO	NO
Transportation Plan	NO	NO
Stormwater Management Plan	NO	NO
Community Wildfire Protection Plan	NO	NO
Other plans (redevelopment, recovery, coastal zone management)	NO	NO
Building Code, Permitting and Inspections	Yes / No	Are the codes adequately enforced?
Building Code		Version / Year
Building Code Effectiveness Grading Schedule (BCEGS) Score		Score
Fire Department ISO rating		Rating
Site plan review requirements	NO	
Land Use Planning and Ordinances	Yes / No	Is the ordinance adequately administered and enforced?
Zoning Ordinance	NO	NO
Subdivision Ordinance	NO	NO
Floodplain Ordinance	NO	NO
Natural Hazard Specific Ordinance (stormwater, steep slope, wildfire)	NO	NO
Flood Insurance Rate Maps	NO	NO
Acquisition of land for open space and public recreation uses	NO	NO
Other	NO	
Administration and Technical		
Administration	Yes / No	Comments
Planning Commission	NO	NO
Mitigation Planning Committee	NO	NO
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	NO	NO
Staff	Yes / No	Percentage of time spent on hazard mitigation
Chief Building Official	NO	NO
Floodplain Administrator	NO	NO
Emergency Manager	NO	NO
Community Planner	NO	NO
Civil Engineer	NO	NO
GIS Coordinator	NO	NO
Grant Writer	NO	NO
Other	NO	NO

Technical	Yes / No	Describe capability
Warning Systems / Service (Reverse 911, outdoor warning signals)	NO	NO
Hazard Data & Information	NO	NO
Grant Writing	NO	NO
Hazus Analysis	NO	NO
Other	NO	NO
Financial		
Funding Resource	Yes / No	Could the resource be used to fund future mitigation actions?
Capital Improvements project funding	NO	NO
Authority to levy taxes for specific purposes	NO	NO
Fees for water, sewer, gas, or electric services	NO	NO
Impact fees for new development	NO	NO
Stormwater Utility Fee	NO	NO
Community Development Block Grant (CDBG)	NO	NO
Other Funding Programs	NO	NO
	NO	
Education and Outreach		
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	NO
Ongoing public education or information program (responsible water use, fire safety, household preparedness, environmental education)	NO	NO
Natural Disaster or safety related school program	NO	NO
Storm Ready certification	NO	NO
Firewise Communities certification	NO	NO
Public/Private partnership initiatives addressing disaster-related issues	NO	NO
Other	NO	NO

Jurisdiction: Walker		
Planning and Regulatory		
Plans	Yes / No	How often is the plan updated?
Comprehensive / Master Plan	Yes	
Capital Improvements Plan	Yes	
Economic Development Plan	Yes	
Local Emergency Operations Plan	Yes	
Continuity of Operations Plan	No	
Transportation Plan	Yes	
Stormwater Management Plan	Yes	
Community Wildfire Protection Plan	No	
Other plans (redevelopment, recovery, coastal zone management)	No	
Building Code, Permitting and Inspections	Yes / No	Are the codes adequately enforced?
Building Code	Yes	Version / Year 1CC 2009
Building Code Effectiveness Grading Schedule (BCEGS) Score	No	Score
Fire Department ISO rating	Yes	Rating #5
Site plan review requirements	Yes	
Land Use Planning and Ordinances	Yes / No	Is the ordinance adequately administered and enforced?
Zoning Ordinance	Yes	
Subdivision Ordinance	Yes	
Floodplain Ordinance	Yes	
Natural Hazard Specific Ordinance (stormwater, steep slope, wildfire)	Yes	
Flood Insurance Rate Maps	Yes	
Acquisition of land for open space and public recreation uses	Yes	
Other	No	
Administration and Technical		
Administration	Yes / No	Comments
Planning Commission	Yes	
Mitigation Planning Committee	Yes	
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	Yes	
Staff	Yes / No	Percentage of time spent on hazard mitigation
Chief Building Official	Yes	
Floodplain Administrator	Yes	
Emergency Manager	Yes	
Community Planner	No	
Civil Engineer	Yes	
GIS Coordinator	Yes	
Grant Writer	Yes	
Other		

Technical	Yes / No	Describe capability
Warning Systems / Service (Reverse 911, outdoor warning signals)	Yes	Parish
Hazard Data & Information	No	
Grant Writing	Yes	City
Hazus Analysis	No	
Other		
Financial		
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		
Fees for water, sewer, gas, or electric services	Yes	If impacted service to utility
Impact fees for new development	No	
Stormwater Utility Fee	No	
Community Development Block Grant (CDBG)	No	
Other Funding Programs	Yes	Granite
Education and Outreach		
Program / Organization	Yes / No	Comments
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.		Revival Temple Church, 28521 Walker Road South, Walker Baptist Church, 10696 Florida Blvd., Walker, La 70785
Ongoing public education or information program (responsible water use, fire safety, household preparedness, environmental education)	NO	
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	
Other		

Mitigation Strategy

Goals

The Livingston Parish Hazard Mitigation Plan Update Committee reviewed and analyzed the risk assessment evaluation performed for the parish as well as goals reflective of that risk assessment. After review of each goal from the 2011 plan, the committee determined they were valid; therefore, the goals remained unchanged.

The goals are as follows:

Goal 1- Identify and pursue preventative measures that will reduce future damages from hazards.

Goal 2- Enhance public awareness and understanding of disaster preparedness

Goal 3- Reduce repetitive flood losses.

Goal 4- Facilitate sound development in the parish and municipalities to reduce or eliminate the potential impacts of hazards.

2015 Mitigation Action Plan

The 2015 Mitigation Action Plan focuses 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. During the prioritization process, each jurisdiction and the Steering Committee considered the costs and relative benefits of each 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. Other factors considered 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, environmental, cultural factors in addition to cost. No actions were deleted. New actions for Drought, Lightning and Coastal Land Loss were added. This was due to the change in priorities due to the Livingston Parish Plan being updated to mirror the 2014 State of Louisiana Hazard Mitigation Plan Update.

2015 Mitigation Action Plan

Action	Description	Funding Source	Timeframe	Responsible Party	Hazard(s) Addressed	Status	Jurisdiction
1	Wind harden structures using shutters, screens, window film, and/or roof straps	HMGP, local, regional, and federal	1-5 yrs	Existing parish and municipal administration	Tropical Cyclone, High Wind, Hail, Tornado	Ongoing	Unincorporated Parish, Denham Springs, Livingston, Springfield, Walker, Albany, French Settlement, Killian and Port Vincent
2	Install saferooms in critical facilities	HMGP, local, regional, and federal	1-5 yrs	Existing parish and municipal administration	Tropical Cyclone, High Wind, Hail, Tornado	Started	Unincorporated Parish, Denham Springs, Livingston, Springfield, Walker, Albany, French Settlement, Killian and Port Vincent
3	Install a hazard early warning system	HMGP, local, regional, and federal	1-5 yrs	Existing parish and municipal administration	Flooding, Hail, High Wind, Lightning, Tornado	Started	Unincorporated Parish, Denham Springs, Livingston, Springfield, Walker, Albany, French Settlement, Killian and Port Vincent
4	Construct new shelters	HMGP, local, regional, and federal	1-5 yrs	Existing parish and municipal administration	Flooding, High Wind, Tornado, Tropical Cyclone	Ongoing	Unincorporated Parish, Denham Springs, Livingston, Springfield, Walker, Albany, French Settlement, Killian and Port Vincent
5	Upgrade current shelters to include food pantries, kitchens and climate control systems	HMGP, local, regional, and federal	1-5 yrs	Existing parish and municipal administration	Flooding, High Wind, Tornado, Tropical Cyclone	Not Started	Unincorporated Parish, Denham Springs, Livingston, Springfield, Walker, Albany, French Settlement, Killian and Port Vincent

6	Purchase generators for critical facilities to ensure operation during and after a hazard event	HMGP, local, regional, and federal	1-5 yrs	Existing parish and municipal administration	Flooding, High Wind, Hail, Lightning, Tornado, Tropical Cyclone	Ongoing	Unincorporated Parish, Denham Springs, Livingston, Springfield, Walker, Albany, French Settlement, Killian and Port Vincent
7	Upgrade drainage ways by concrete lining, widening and/or enlarging culverts and catch basins.	HMGP, local, regional, and federal	1-5 yrs	Existing parish and municipal administration	Flooding, Coastal Land Loss, Tropical Cyclone	Ongoing	Unincorporated Parish, Denham Springs, Livingston, Springfield, Walker, Albany, French Settlement, Killian and Port Vincent
8	Upgrade capacity of storm water retention and detention areas, thereby protecting both existing structures and future development	HMGP, local, regional, and federal	1-5 yrs	Existing parish and municipal administration	Flooding, Coastal Land Loss, Tropical Cyclone	Ongoing	Unincorporated Parish, Denham Springs, Livingston, Springfield, Walker, Albany, French Settlement, Killian and Port Vincent
9	Upgrade sewer system to ensure stormwater infiltration does not cause a service interruption	HMGP, local, regional, and federal	1-5 yrs	Existing parish and municipal administration	Flooding, Coastal Land Loss, Tropical Cyclone	Ongoing	Unincorporated Parish, Denham Springs, Livingston, Springfield, Walker, Albany, French Settlement, Killian and Port Vincent
10	Continue to advertise public meetings during the hazard mitigation planning process	HMGP, local, regional, and federal	3-5 yrs	Existing parish and municipal administration	Drought, Flooding, Coastal Land Loss, Hail, High Wind, Lightning, Tornado, Tropical Cyclone	Ongoing	Unincorporated Parish, Denham Springs, Livingston, Springfield, Walker, Albany, French Settlement, Killian and Port Vincent

11	Sponsor a "Multi-Hazard Awareness Week"	HMGP, local, regional, and federal	Ongoing	Existing parish and municipal administration	Drought, Flooding, Coastal Land Loss, Hail, High Wind, Lightning, Tornado, Tropical Cyclone	Ongoing	Unincorporated Parish, Denham Springs, Livingston, Springfield, Walker, Albany, French Settlement, Killian and Port Vincent
12	Elevate, acquire or pilot reconstruct all Repetitive Loss and Severe Repetitive Loss structures	HMGP, local, regional, and federal	1-10 yrs	Existing parish and municipal administration	Flooding, Coastal Land Loss, Tropical Cyclone	Ongoing	Unincorporated Parish, Denham Springs, Livingston, Springfield, Walker, Albany, French Settlement, Killian and Port Vincent
13	Flood proof all public buildings vulnerable to flood damage	HMGP, local, regional, and federal	1-5 yrs	Existing parish and municipal administration	Flooding, Coastal Land Loss, Tropical Cyclone	Not Started	Unincorporated Parish, Denham Springs, Livingston, Springfield, Walker, Albany, French Settlement, Killian and Port Vincent
14	Pursue upgrading of parking lots to pervious concrete	HMGP, local, regional, and federal	1-10 yrs	Existing parish and municipal administration	Flooding, Coastal Land Loss, Tropical Cyclone	Not Started	Unincorporated Parish, Denham Springs, Livingston, Springfield, Walker, Albany, French Settlement, Killian and Port Vincent
15	Ensure all municipalities and parish work together to produce a cohesive drainage plan	HMGP, local, regional, and federal	1-10 yrs	Existing parish and municipal administration	Flooding, Coastal Land Loss, Tropical Cyclone	Ongoing	Unincorporated Parish, Denham Springs, Livingston, Springfield, Walker, Albany, French Settlement, Killian and Port Vincent

16	Ensure future development does not increase hazard losses by enforcing building codes, introducing new codes or modifying existing building codes.	HMGP, local, regional, and federal	Ongoing	Existing parish and municipal administration	Drought, Flooding, Coastal Land Loss, Hail, High Wind, Lightning, Tornado, Tropical Cyclone	Ongoing	Unincorporated Parish, Denham Springs, Livingston, Springfield, Walker, Albany, French Settlement, Killian and Port Vincent
17	Guide future development away from hazard areas using zoning regulations while maintaining other parish goals such as economic development and improving the quality of life.	No additional funds required	1-5 yrs	Existing parish and municipal administration	Drought, Flooding, Coastal Land Loss, Hail, High Wind, Lightning, Tornado, Tropical Cyclone	Ongoing	Unincorporated Parish, Denham Springs, Livingston, Springfield, Walker, Albany, French Settlement, Killian and Port Vincent
18	Determine what new regulations could be passed to reduce the effects of hazards on new buildings and infrastructure.	No additional funds required	Ongoing	Existing parish and municipal administration	Drought, Flooding, Coastal Land Loss, Hail, High Wind, Lightning, Tornado, Tropical Cyclone	Ongoing	Unincorporated Parish, Denham Springs, Livingston, Springfield, Walker, Albany, French Settlement, Killian and Port Vincent
19	Participate in existing programs at the state and federal levels oriented to environmental enhancement and conservation.	HMGP, local, regional, and federal	Ongoing	Existing parish and municipal administration	Drought, Flooding, Coastal Land Loss, Hail, High Wind, Lightning, Tornado, Tropical Cyclone	Ongoing	Unincorporated Parish, Denham Springs, Livingston, Springfield, Walker, Albany, French Settlement, Killian and Port Vincent

20	Continue to participate in the NFIP	No additional funds required	Ongoing	Existing parish and municipal administration	Flooding, Coastal Land Loss, Tropical Cyclone	Ongoing	Unincorporated Parish, Denham Springs, Livingston, Springfield, Walker, Albany, French Settlement, Killian and Port Vincent
21	Establish a public outreach campaign to ensure all homeowners in floodplains are aware of the various types of coverage options under the NFIP	HMGP, local, regional, and federal	Ongoing	Existing parish and municipal administration	Flooding, Coastal Land Loss, Tropical Cyclone	Ongoing	Unincorporated Parish, Denham Springs, Livingston, Springfield, Walker, Albany, French Settlement, Killian and Port Vincent
22	Establish homeowner education program on flood mitigation measures.	HMGP, local, regional, and federal	Ongoing	Existing parish and municipal administration	Flooding, Coastal Land Loss, Tropical Cyclone	Ongoing	Unincorporated Parish, Denham Springs, Livingston, Springfield, Walker, Albany, French Settlement, Killian and Port Vincent
23	Evaluate ways to improve CRS ratings to reduce the flood insurance premiums	No additional funds required	Ongoing	Existing parish and municipal administration	Flooding, Coastal Land Loss, Tropical Cyclone	Ongoing	Unincorporated Parish, Denham Springs, Walker, French Settlement
24	Evaluate future participation in the CRS	No additional funds required	Ongoing	Existing parish and municipal administration	Flooding, Coastal Land Loss, Tropical Cyclone	Ongoing	Livingston, Springfield, Albany and Killian
25	Adopt ordinance requiring water-saving measures in time of drought.	HMGP, local, regional, and federal	1-5 yrs	Existing parish and municipal administration	Drought	New	Unincorporated Parish, Denham Springs, Livingston, Springfield, Walker, Albany, French Settlement, Killian and Port Vincent

26	Installation of Lightning rods and surge protectors to facilities	HMGP, local, regional, and federal	1-5 yrs	Existing parish and municipal administration	Lightning	New	Unincorporated Parish, Denham Springs, Livingston, Springfield, Walker, Albany, French Settlement, Killian and Port Vincent
27	Purchase weather radios for public, to be used for emergency notification	HMGP, local, regional, and federal	1-5 yrs	Existing parish and municipal administration	Drought, Flooding, Coastal Land Loss, Hail, High Wind, Lightning, Tornado, Tropical Cyclone	New	Unincorporated Parish, Denham Springs, Livingston, Springfield, Walker, Albany, French Settlement, Killian and Port Vincent

Planning Process

Livingston Parish has developed this second update to its parish-wide Hazard Mitigation Plan (2006) which included the eight incorporated communities in the parish, and the entirety of the unincorporated area. As noted previously, the municipalities are Denham Springs, Livingston, Springfield, Walker, Albany, French Settlement, Killian and Port Vincent. The Livingston Parish Office of Homeland Security (LOHSEP) was in charge of directing and writing the plan update.

A hazard mitigation plan update committee (HMPUC) was created to assist in the planning process. The planning process used is a combination of the procedure spelled out in CFR 201.6, workshop manuals, and how to guidelines. Goals of the HMPU committee include incorporating new data, information from the 2014 Louisiana State Hazard Mitigation Plan Update, hurricane Isaac and tropical storm Lee information to update the risk and vulnerability assessments, and updating mitigation goals and action items.

Each municipality contributed to each section of the HMPUC. Some committee members also reported back to their respective boards about the HMPUC planning process allowing for broader public input. Below is a list of each jurisdiction and their representatives.

HMPU Committee Member	Jurisdiction	Title
Gene Glascock	Albany	Mayor
Gary Glascock	Albany	Director of Public Works
Gerard Landry	Denham Springs	Mayor
Rick Foster	Denham Springs	Building Official
Toni Guitreau	French Settlement	Mayor
Lawrence Callender	French Settlement	Police Lt.
Craig McGehee	Killian	Mayor
Ronnie Sharp	Killian	Parish Councilman
Derral Jones	Town of Livingston	Mayor
Nathan Corkern	Town of Livingston	Director of Public Works
Mary T. Gourdon	Port Vincent	Exec Asst.
Brant Villenurve	Port Vincent	Police Chief
Charles Martin	Springfield	Mayor
Jimmy Jones	Springfield	Police Chief
Rick Ramsey	Walker	Mayor
Fred Raiford	Walker	Chief of Ops
Tim Kuylen	Livingston OHSEP	PT&E Coordinator
Brandi Janes	Livingston OHSEP	Deputy Director
Mark Harrell	Livingston OHSEP	Director
DeeDee Delatte	Livingston Parish	Deputy Building Official
Chuck Vincent	Livingston Parish	Chief Building Official

Summary Of Meetings

Meeting No. 1---February 24, 2015

The first representatives meeting was held on 2/24/2015 in the Overwatch room 216 here at the LOHSEP office. At the beginning of the meeting we gave a brief overview of the hazard mitigation plan. All eight jurisdictions were present with a total of sixteen reps in total. Nicolette English from GOHSEP was also present and was very helpful in fielding some of the questions put forth by the representatives. We discussed the state required worksheets and, we listed and defined all of the hazards that could affect each jurisdiction. No single jurisdiction completed the worksheets that day, and we agreed that we would we would turn in the work sheet on March 11th, 2015. Over the next two weeks all eight of the jurisdictions turned in their work sheets.

Meeting No.2 --- March 26, 2015

The risk assessment meeting was open to the public. Because the meeting was open to the public, the meeting was held in the environmental conference room on the first floor of the health unit. Although the proper postings were made of the meeting, no one from the general public was present at the meeting. The main focus of the meeting was to recount and list previous weather occurrences in each jurisdiction. Nicolette English from GOHSEP was present to help answer questions and assist in guiding the process. Many representatives asked questions pertaining to defining previous occurrences of weather hazards. Representatives of each jurisdiction reviewed the following maps in order to gather data on previous occurrences: Livingston Parish Base Map, Livingston Parish FEMA Flood Map, Livingston Parish Land Use Map, Livingston Parish Critical Facilities-Governmental Map, Livingston Parish Critical Facilities-Schools Map, Livingston Parish Critical Facilities- Fire Stations Map, Livingston Parish Critical Facilities- Police Stations Map, Livingston Parish Critical Facilities-Public Health Map, Livingston Parish Lidar Elevations Map, Livingston Parish Tropical Storm Allison Map, Livingston Parish Hurricane Katrina Inundation Map, Livingston Parish Hurricane Rita Inundation Map, Livingston Parish Hurricane Gustav Inundation Map, Livingston Parish Hurricane Ike Inundation Map, Livingston Parish Wind Speed Map, Livingston Parish Repetitive Loss Structures Map, Livingston Parish Composite Risk Map, Livingston Parish Composite Risk-Albany Map, Livingston Parish Composite Risk- Denham Springs Map, Livingston Parish Composite Risk- French Settlement Map, Livingston Parish Composite Risk-Killian Map, Livingston Parish Composite Risk-Livingston Map, Livingston parish Composite- Port Vincent Map, Livingston Parish Composite Risk-Springfield Map, Livingston parish Composite Risk-Walker Map.

Notifications for the public meeting were posted at the locations below on 3/11/15.

- Livingston Parish Main Branch Library, 29390 Iowa street in Livingston.
- Albany Springfield Branch Library, 26941 La Hwy 43 in Hammond.
- Denham Springs Walker Library, 8010 US highway 190 in Denham Springs.
- South Branch library, 23477 Highway 447 in Livingston.
- Watson Branch Library, 36581 Outback Road in Watson.
- The Livingston Parish Courthouse in Livingston.
- The Livingston Parish Governmental Building.
- The Livingston Parish Health Unit.

Once the Risk Assessment was completed the current mitigation actions were emailed on August 31, 2015 to the

HMPUC members. The HMPUC contact for each jurisdiction reviewed and evaluated the potential project list and returned their comments back to the LOHSEP Officer in charge of the update. The Mitigation Action Strategy was then updated and sent out to via email on September 18, 2015 to neighboring parishes OEP Directors for comments. No comments were received back. The neighboring parishes consisted of: Ascension, East Baton Rouge, West Baton Rouge, East Feliciana, Iberville, Tangipahoa and St. Helena.

On November 3rd, 2015 the draft was emailed out to the HMPUC members for final review and comments. It was also posted the parish website for public comment. No comments were received.

Plan Maintenance Procedures

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.

Livingston Parish has developed a plan maintenance process to ensure that regular review and update of the Hazard Mitigation Plan occurs. The parish has formed a Hazard Mitigation Plan Evaluation Committee that consists of selected members from municipalities, local agencies, and the Hazard Mitigation Plan Update Committee which prepared the HMPU as included herewith. The HMPU Evaluation Committee will consist of the following representation:

1. Livingston Parish President
2. Livingston Parish Director of Public Works
3. Livingston Parish Director of Office of Homeland Security and Emergency Preparedness (responsible for overall coordination of HMP maintenance activities)
4. Livingston Parish Grant Coordinator
5. Mayor of each of the eight municipalities or their representative

The OHSEP director of the parish will be responsible for contacting each of the committee members during January of every year. Members will have a one month period in which to respond to initiate a meeting if any one member feels that issues, such as change in committee membership need to be addressed. However, should a major hazard event occur, a meeting will be called to evaluate the risk assessment to see if any change in hazards or risk exposure has occurred. An evaluation and/or monitor meeting can be called at any time by the OEP Director or by a committee member.

The OHSEP director will also be responsible for maintaining plan review comments and will monitor the overall plan. The plan's mitigation stagey will be monitored and evaluated on an ongoing basis using phone calls and emails to contact those responsible to implementing action items and bring the project status reports to the yearly evaluation meetings. These meetings will evaluate the Hazard Mitigation Plan in regard to its current accuracy, relevance, and applicability. In particular, the Mitigation Steering Committee will review the Hazard Mitigation Plan in light of the following:

- Change in state priorities
- A review of the goals, policies, and objectives to determine whether they remain an appropriate approach to the problems they are intended to address
- The goals and objectives address current and expected conditions
- The nature, magnitude, and/or type of risks have changed
- The ability of the identified Hazard Mitigation Planning goals to address current and anticipated future conditions
- Any known or perceived changes in the parish's vulnerability to the identified hazards
- The current capabilities (i.e. institutional, legal, fiscal, political, and technical) of the parish and its constituent municipalities
- There are implementation problems, such as technical, political, legal, or coordination issues with other agencies
- The successes, failures, and/or lessons learned from implementing the identified hazard mitigation recommendations during the three-year period

- The need to address additional hazards in the plan and/or need for other modifications to the plan
- Advances in the parish's GIS structure database that would allow for more detailed analysis of asset vulnerability and loss estimation

If the Mitigation Steering Committee determines that updates and/or changes are needed to the Hazard Mitigation Plan, assignments will be made to the representative members and the committee will meet as deemed necessary until all updates and/or changes have been completed and incorporated into the Hazard Mitigation Plan.

In addition to the yearly evaluations, the questions listed above and additional considerations will be made during the formal update process to be completed and approved by FEMA within a five-year cycle. Updates to the Hazard Mitigation Plan will be made fully utilizing the representation of the HMP committee formed for this purpose.

Incorporation into Existing Planning Programs

When appropriate, local governments, by way of the individuals who served on the Livingston Parish Hazard Mitigation Evaluation Committee, will address the need to incorporate requirements of the mitigation plan into their respective zoning ordinances, comprehensive plans, and/or capital improvement plans if deemed necessary and if not previously included. An effort will be made by all Hazard Mitigation Evaluation Committee members to ensure consistency in all future planning efforts with the mitigation goals and Risk Assessment presented in this plan. Consistency between all planning efforts will ensure a decrease in losses related to hazard events within future and existing developments. During the life of the plan since the previous update process, the Hazard Mitigation Evaluation Committee was not incorporated into other formal planning mechanisms as none occurred during that time period. However, goals and actions items were frequently discussed at both Parish and Municipal council meetings.

If amendments to existing ordinances or new ordinances are required, each political jurisdiction will be responsible for its respective updates. However, based upon the findings of this plan, little need exists for creating new ordinances or revising existing ordinances as the parish has been dealing with the flood mitigation issues for decades as its livelihood depends on it.

On behalf of the jurisdictions of Albany, Denham Springs, French Settlement, Killian, Livingston, Port Vincent, Springfield and Walker, Livingston Parish has the authority to incorporate contents of the Hazard Mitigation Plan into the parish's existing regulatory mechanisms.

The following parish and local plans incorporate requirements of this Hazard Mitigation Plan Update as follows:

Livingston Unincorporated

- Comprehensive Master Plan – Updated every 5 years, LOHSEP is the responsible agency.
- Economic Development Plan- Updated every 5 years, LEDC and Livingston Parish are the responsible agencies.
- Local Emergency Operations Plan – Updated yearly, LOHSEP is the responsible agency.
- Stormwater Management Plan – Updated yearly, LOHSEP is the responsible agency.
- Community Wildfire Protection Plan – Updated as needed, LOHSEP and Livingston Parish Fire Chief are the responsible parties.

Albany

- Local Emergency Operations Plan – Updated every year, the Mayor, Fire Chief and Police Chief are the responsible parties.

Denham Springs

- Comprehensive Master Plan - Updated as needed, Grant Director is the responsible party.

- Local Emergency Operations Plan – There is not a formal developed plan but there are established procedures in place.
- Stormwater Management Plan- Updated as needed, City Building Official is the responsible party.

Walker

- Comprehensive Master Plan - Updated every 5 years, Mayor's Office is the responsible agency.
- Capital Improvements- Plan Updated every 5 years, Mayor's Office is the responsible agency.
- Economic Development -Plan Updated every 5 years, Mayor's Office is the responsible agency.
- Local Emergency Operations Plan- Updated every 3 years, Mayor's Office and LOHSEP are/is the responsible agency(ies).
- Transportation Plan- Updated every 10 years, Mayor's Office Mayor's Office is the responsible agency.
- Stormwater Management Plan - Updated as needed, Mayor's Office Mayor's Office is the responsible agency.

French Settlement, Killian, Port Vincent, Springfield, Town of Livingston: No plans currently in place.

Continued Public Participation

Responsibility for continued public participation will be that of the OHSEP director. Copies of the plan will be kept on file at the parish government office and with each municipality. In addition, copies of the plan and any proposed changes will be posted on the parish government website. The parish website will also be used to notify the public of any maintenance and/or periodic review activities taking place. The website will also have an e-mail address and phone numbers to which the public can direct their comments or concerns.