



# Lafourche Parish Hazard Mitigation Plan Update Public Meeting

April 13, 2015



# Agenda

- Hazard Mitigation Planning Process – SDMI Staff
- Risk Assessment – SDMI Staff
- Update on Previous/Current Mitigation Projects – Lafourche Parish OHSEP
- Public Outreach Activities – SDMI Staff/Lafourche Parish OHSEP



# Hazard Mitigation

- Protect public safety and prevent loss of life and injury;
- Help accomplish community objectives, such as leveraging capital improvements, infrastructure protection, open space preservation, and economic resiliency;
- Prevent damage to a community's economic, cultural and environmental assets;
- Minimize operational downtime and accelerate recovery of government and the private sector after an event



# Why are we required to have a Hazard Mitigation Plan?

- Disaster Mitigation Act of 2000 (DMA 2000)

*Section 322 of the Act specifically addresses mitigation planning and requires state and local governments to prepare multi-hazard migration plans as a precondition for receiving FEMA mitigation project grants.*

- Meet federal requirements of Title 44 Code of Regulations (CFR) §201.6 for approval and eligibility to apply for FEMA Hazard Mitigation Assistance grant programs.



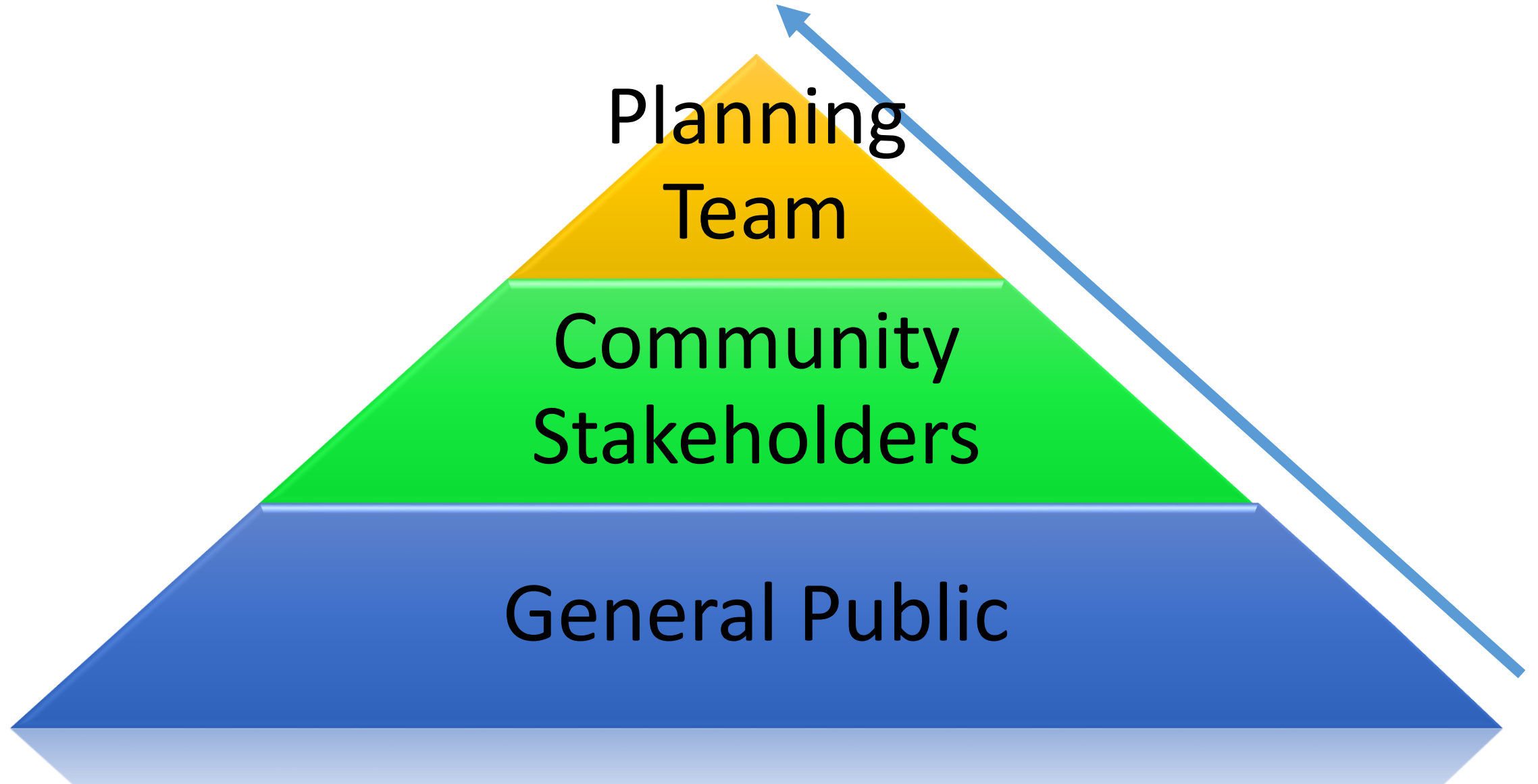
- The approved Lafourche Parish Hazard Mitigation Plan will allow for distribution of HM funding following future disasters.

# The Planning Team: A multi-jurisdictional approach

- Each jurisdiction has at least one representative as part of the Hazard Mitigation Steering Committee:
  - Lafourche Unincorporated
  - Thibodaux
  - Lockport
  - Golden Meadow



# Collaborative Planning Approach



# Planning Development



# New Plan Layout

- Section 1: Introduction
  - Updated demographics
  - Economics
  - Update parish/jurisdiction descriptions
- Section 2: Hazard Identification and Parishwide Risk Assessment
- Section 3: Capability Assessment
- Section 4: Mitigation Strategies
  - New actions
  - Action updates
  - Survey results



# New Plan Layout

- Appendix A: Planning Process
- Appendix B: Plan Maintenance
- Appendix C: Parish Essential Facilities
- Appendix D: Plan Adoption
- Appendix E: State Required Worksheets

# Hazard Identification and Risk Assessment

- Based on currently profiled risks
- Any newly identified risks
- Prevalent Hazards
- Previous occurrences
- Probability of future events
- Assets Inventory
- Essential Facilities
- Hazard Impact
- Future Development
- Future Hazard Impacts
- Zoning and Land Use
- Hazard Profiles

# Hazard Identification and Risk Assessment

- Coastal Erosion (Subsidence, Coastal Land Loss)
- Levee Failure
- Flooding
- Tropical Cyclones
- Tornadoes
- Sinkholes
- Severe Thunderstorm

# Risk Assessment: Hazard Identification

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



# Risk Assessment: Analyze Risk and Summarize Vulnerability

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

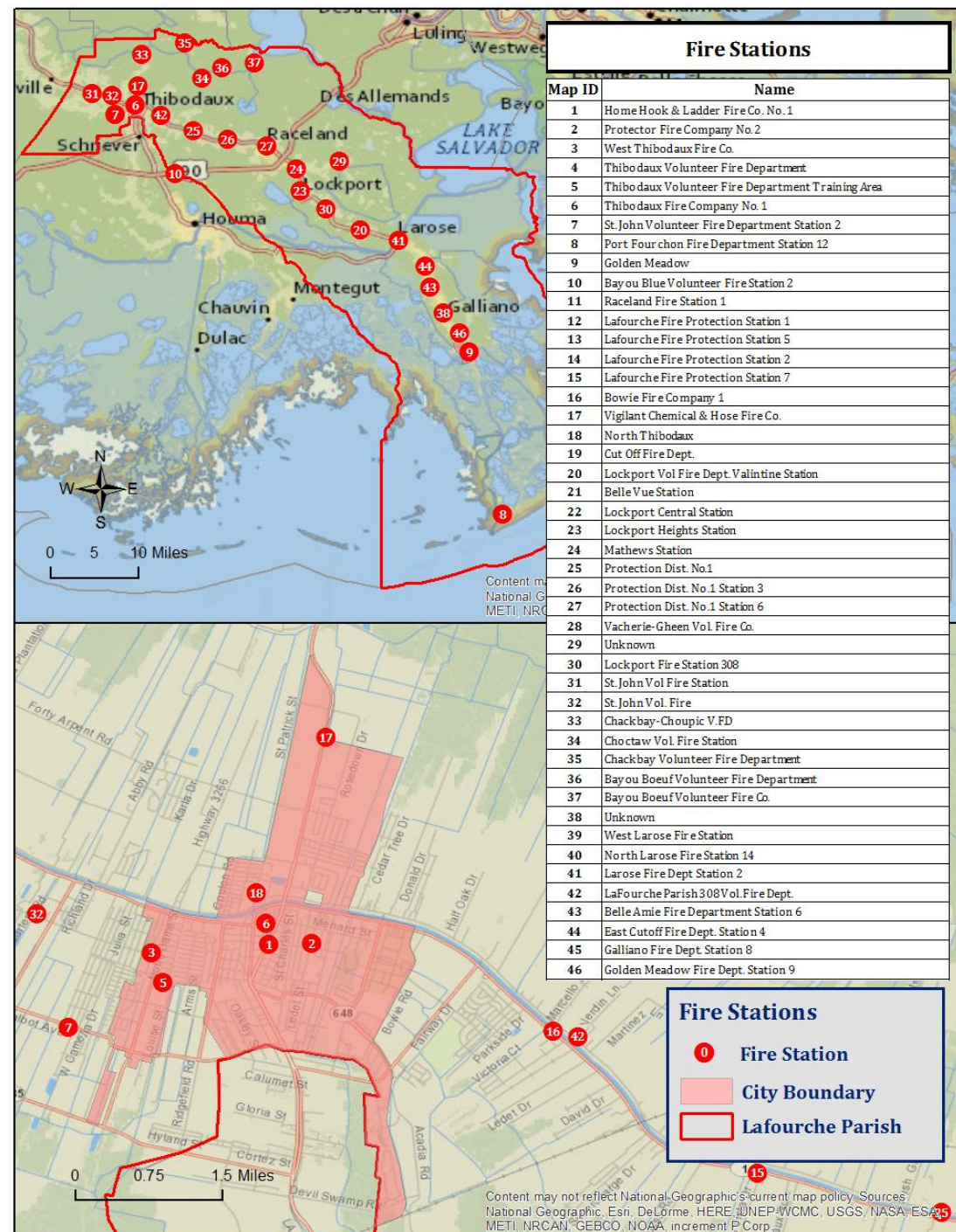
# Risk Assessment: Hazards Identified

- These natural hazards were selected based on an assessment of the overall impact (geographic extent, magnitude, probability, and exacerbating or mitigating conditions) affecting Lafourche Parish;
- The hazards that pose the greatest potential for a negative impact are:
  - **Flooding, tropical cyclones, thunderstorms with lighting and high winds, tornadoes, coastal erosion, and levee failure.**



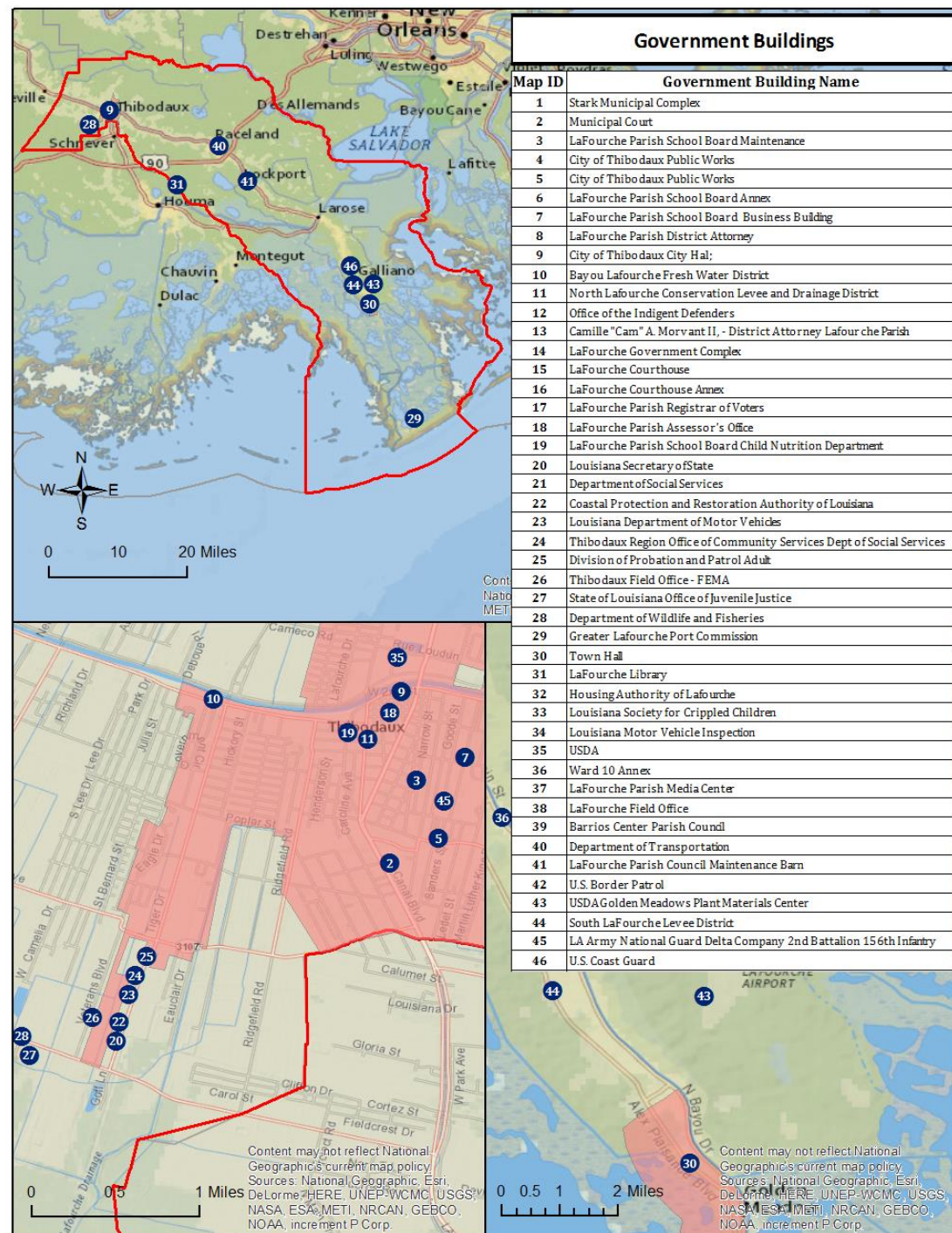
# Critical Facilities

## – Fire Stations



# Critical Facilities

## – Government Buildings

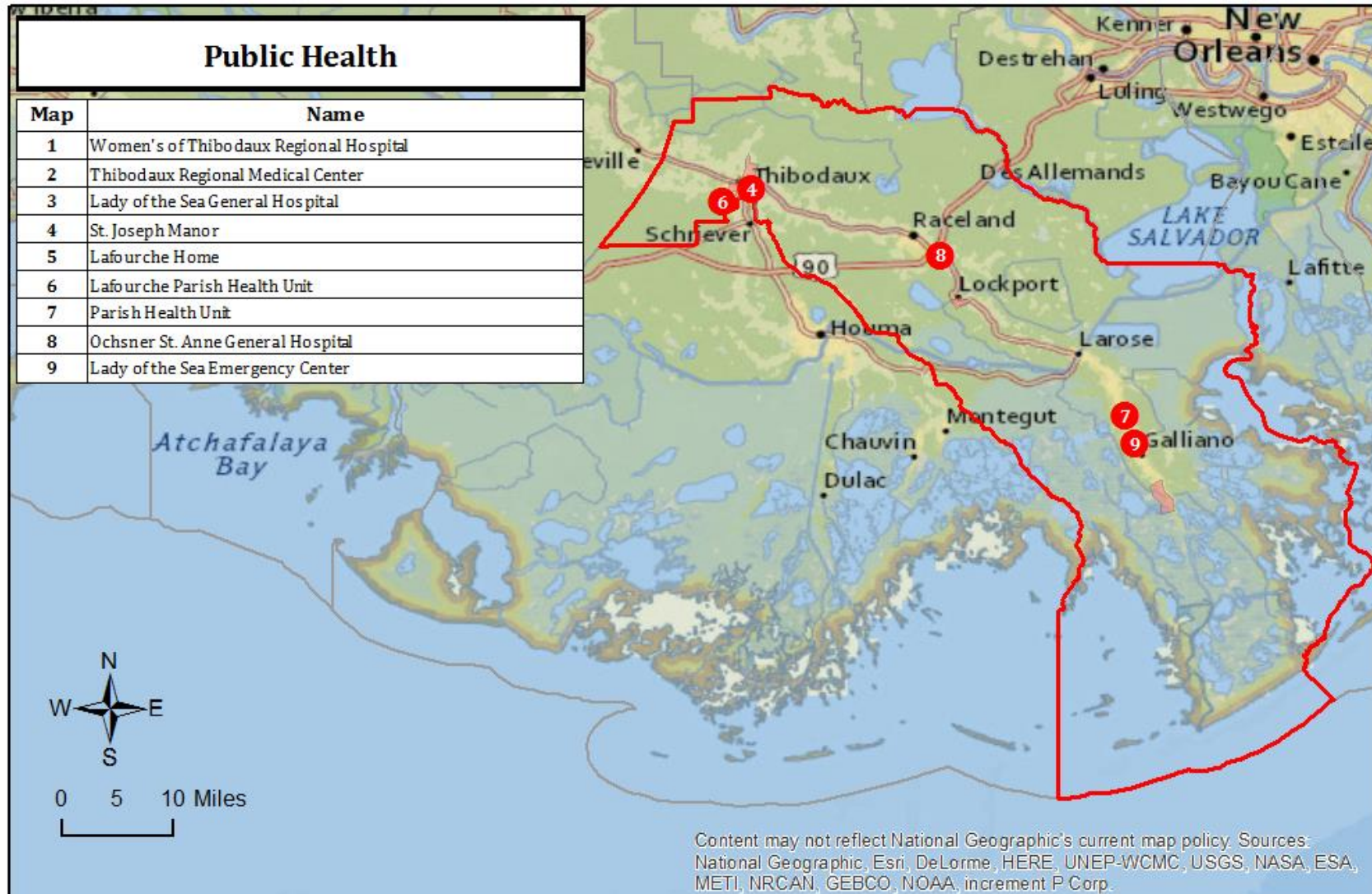


# Critical Facilities

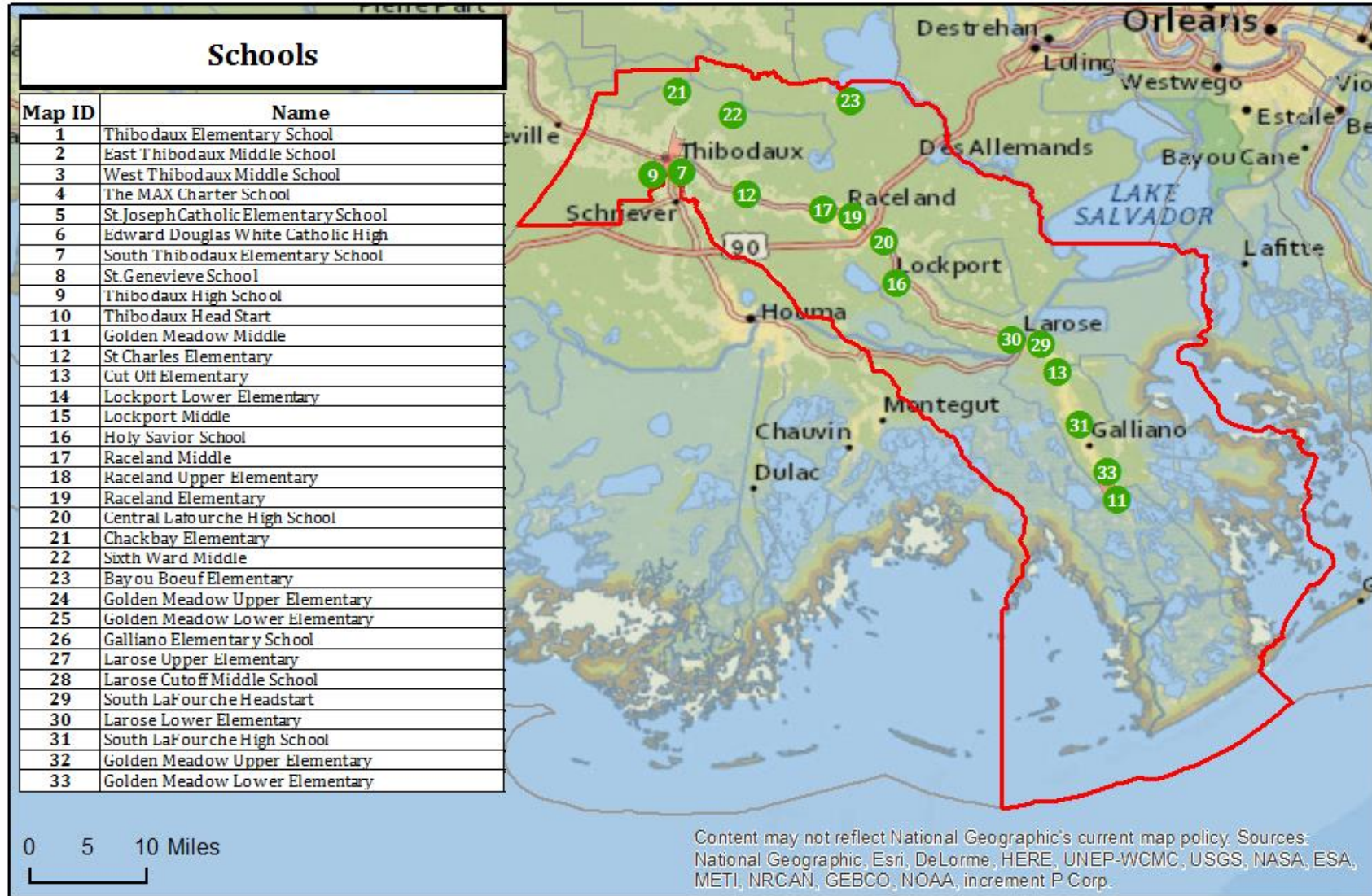
- Law Enforcement



# Critical Facilities – Public Health



# Critical Facilities – Schools

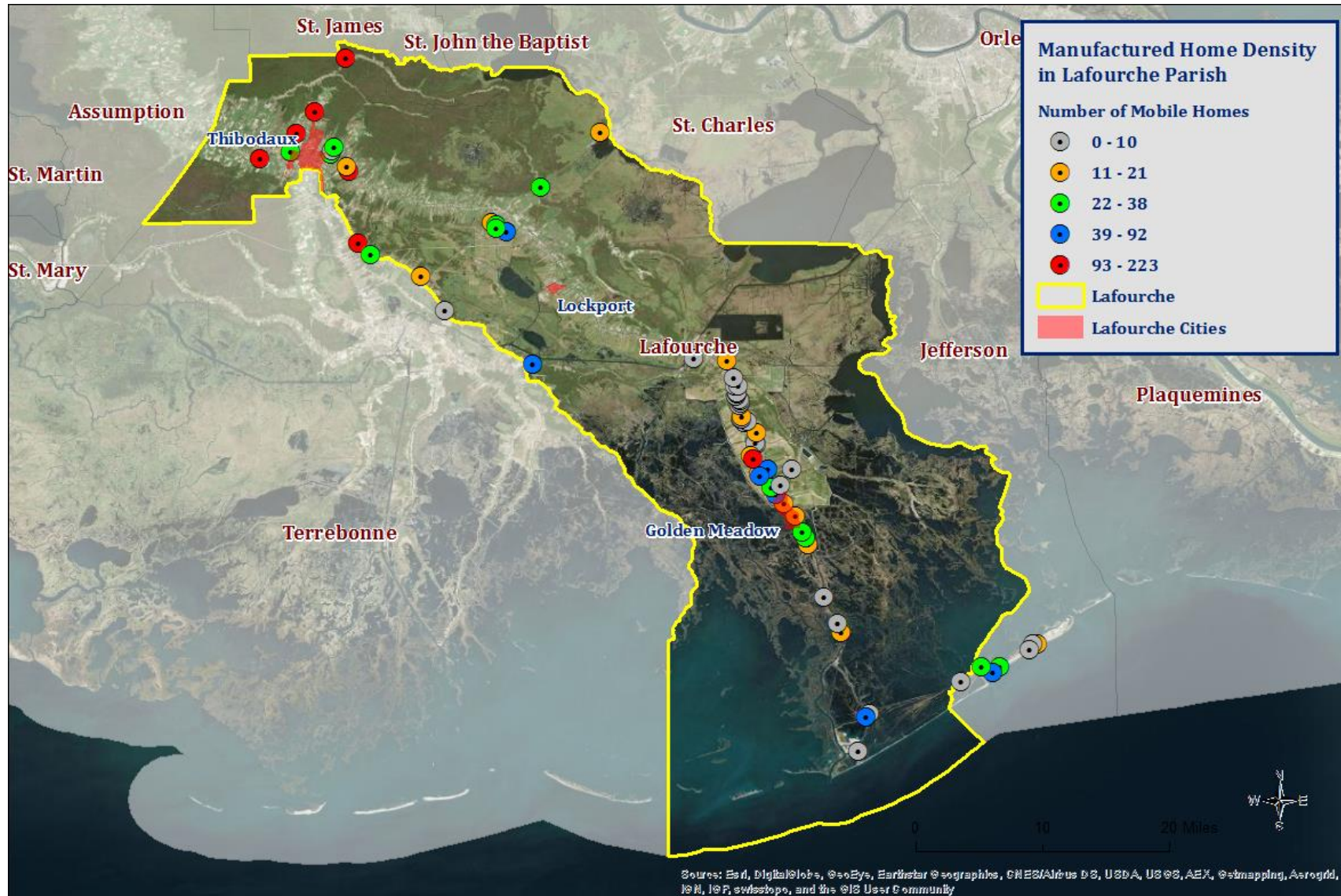


# Estimated Total Structural Value for Lafourche Parish

Occupancy	Lafourche Parish	Lafourche Parish (Unincorporated)	Golden Meadow	Lockport	Thibodaux
Agricultural	\$45,534,000	\$37,434,000	\$1,540,000	\$0	\$6,560,000
Commercial	\$2,183,015,000	\$1,277,482,000	\$56,832,000	\$48,977,000	\$799,724,000
Government	\$84,973,000	\$48,231,000	\$1,538,000	\$50,000	\$35,154,000
Industrial	\$760,348,000	\$624,206,000	\$9,960,000	\$8,491,000	\$117,691,000
Religion	\$195,018,000	\$123,804,000	\$6,554,000	\$12,058,000	\$52,602,000
Residential	\$10,730,705,000	\$8,411,509,000	\$252,132,000	\$234,999,000	\$1,832,065,000
Education	\$177,590,000	\$56,506,000	\$11,626,000	\$12,784,000	\$96,674,000
Total	\$14,177,183,000	\$10,579,172,000	\$340,182,000	\$317,359,000	\$2,940,470,000

Source: HAZUS-MH Software

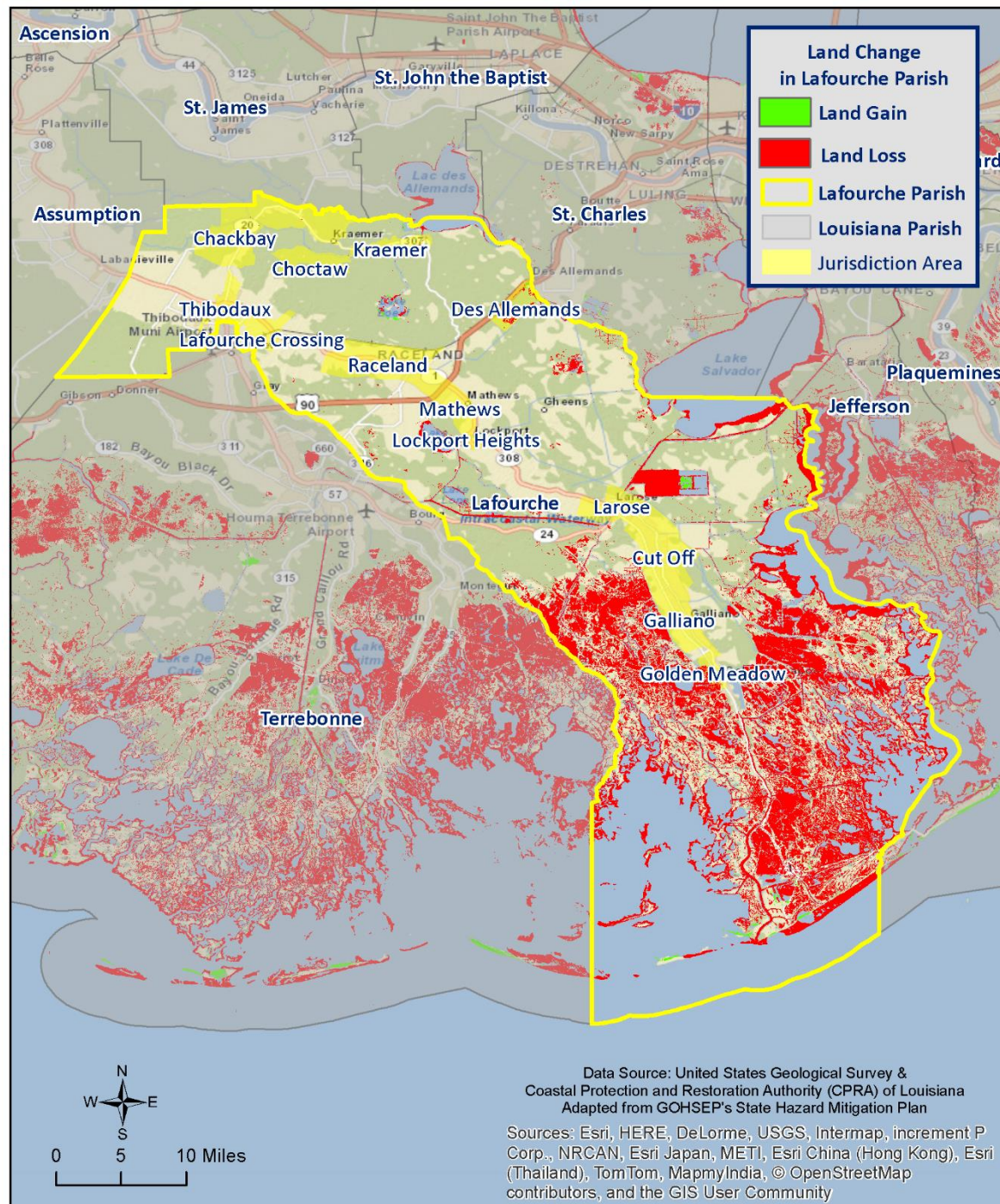
# Vulnerable Populations



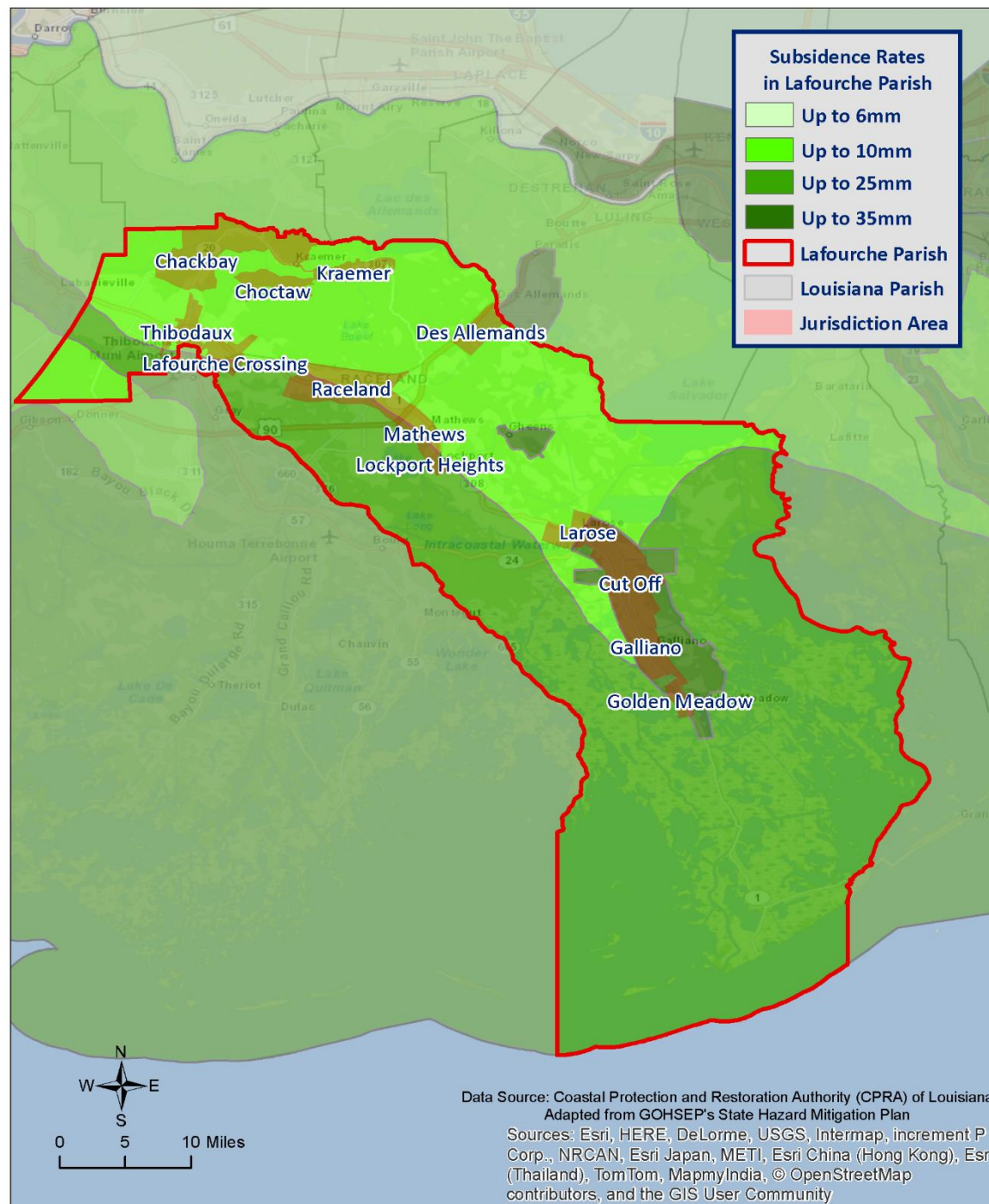
# Coastal Erosion

- Land failure is a term that describes the combined effects of sea level rise and land subsidence. Both of these geologic processes impact Louisiana in a similar manner, making it difficult to separate the effects of one from the other.
- Sea-level rise and land subsidence have not been identified as significant contributors to direct disaster damages in Louisiana.

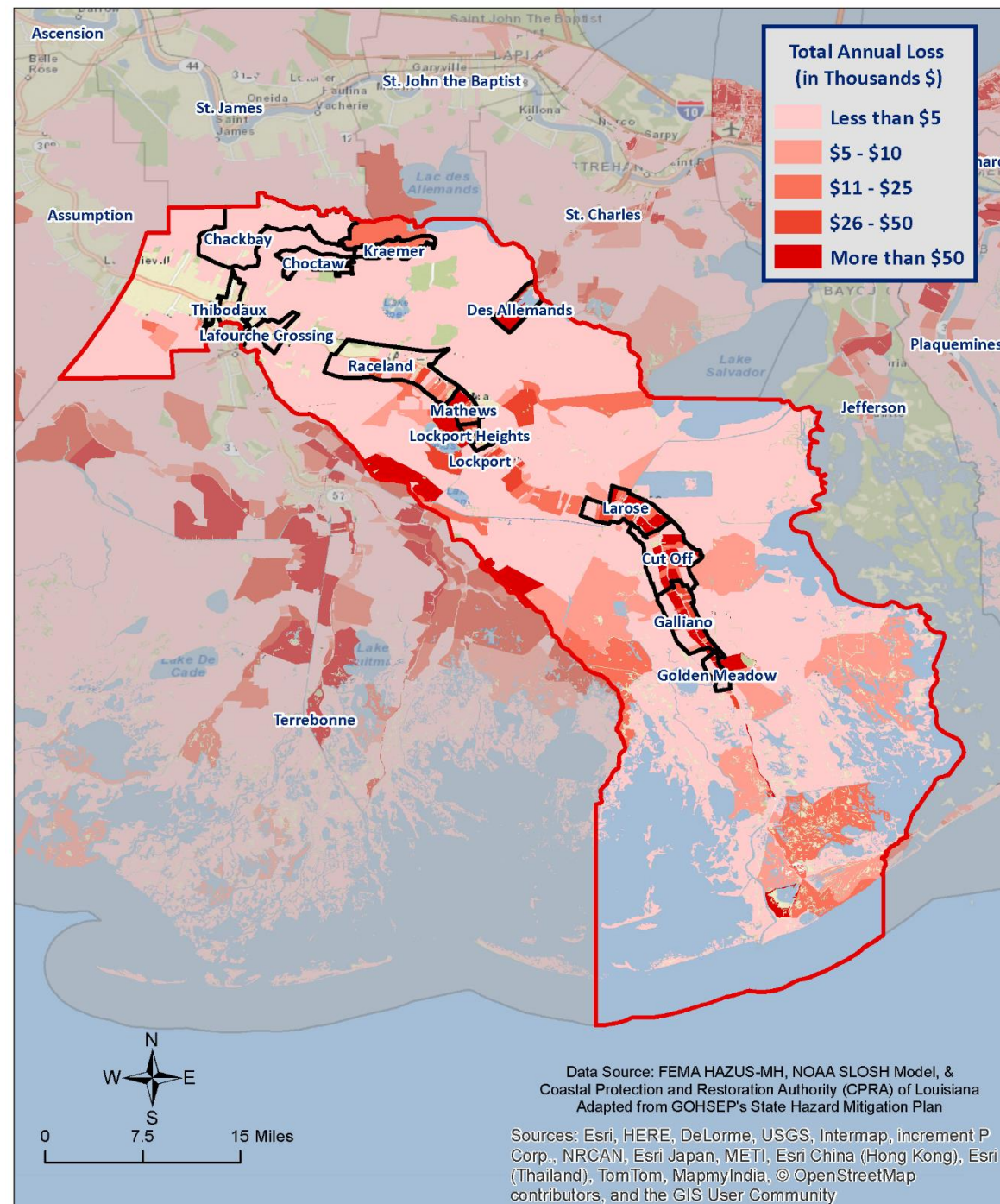
# Land Change in Lafourche Parish



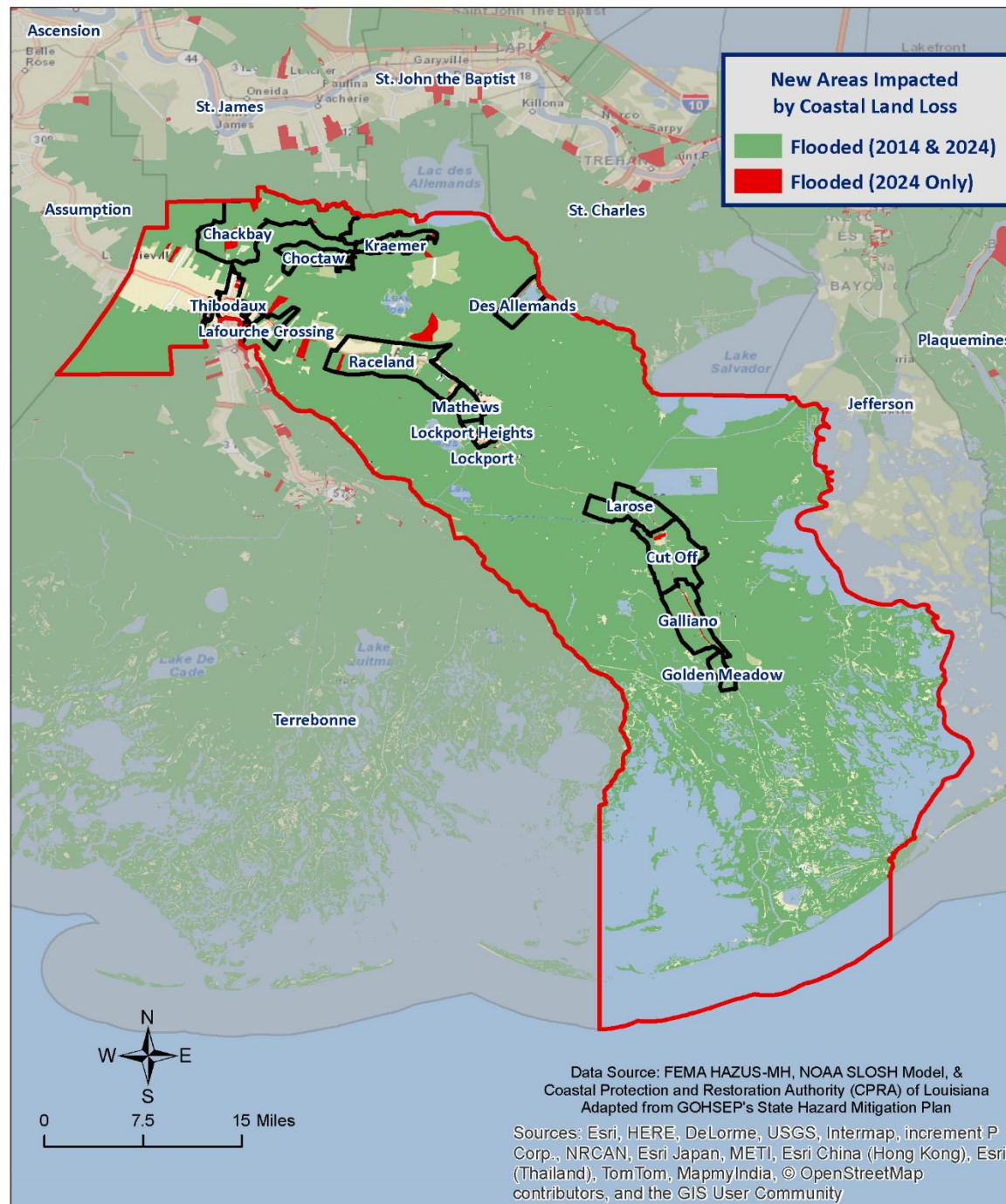
# Subsidence



# Coastal Erosion Annual Losses



# Coastal Erosion Annual Losses



# 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.



# Flooding

Types of flooding may include the following:

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



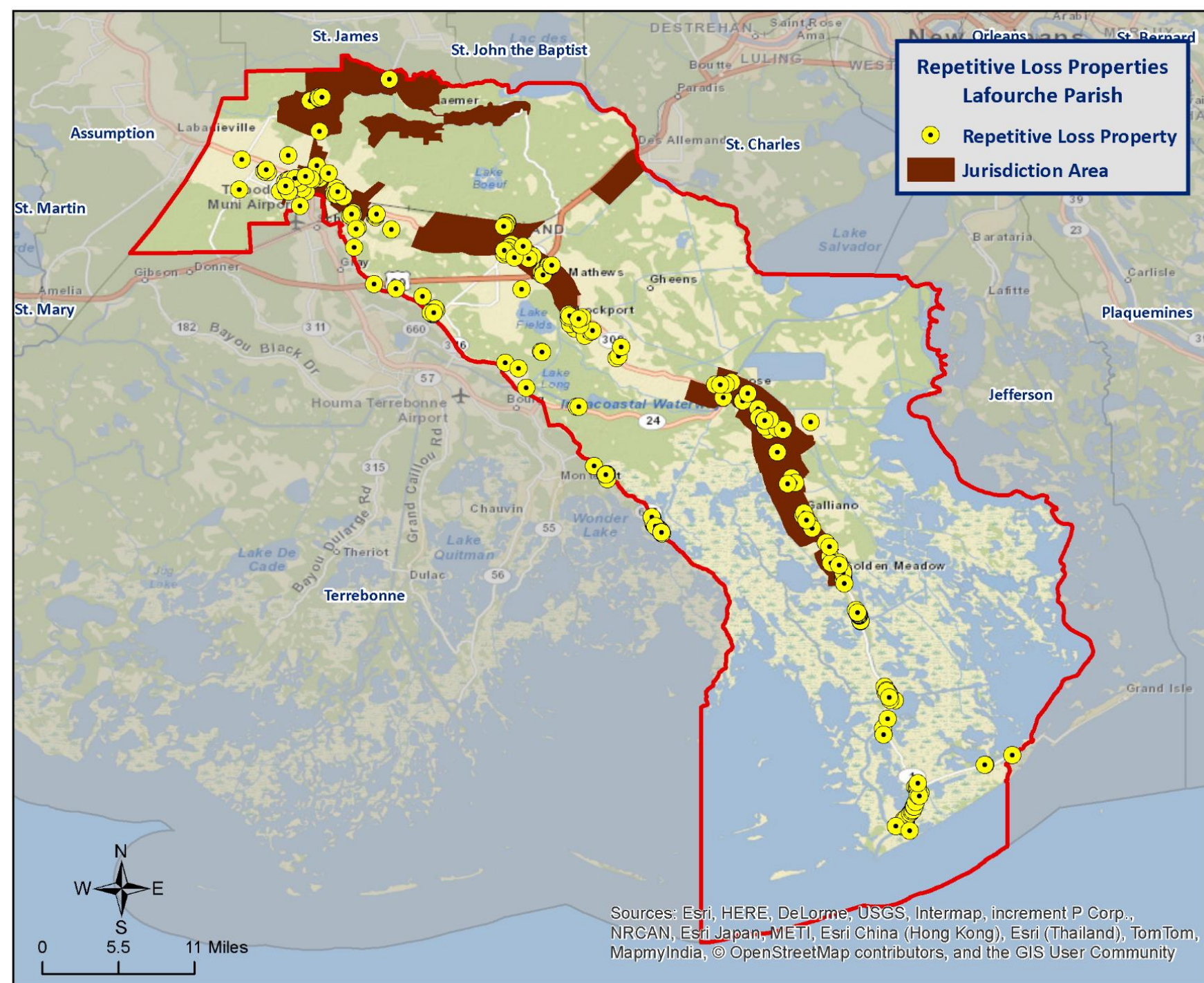
# Repetitive Flooding

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

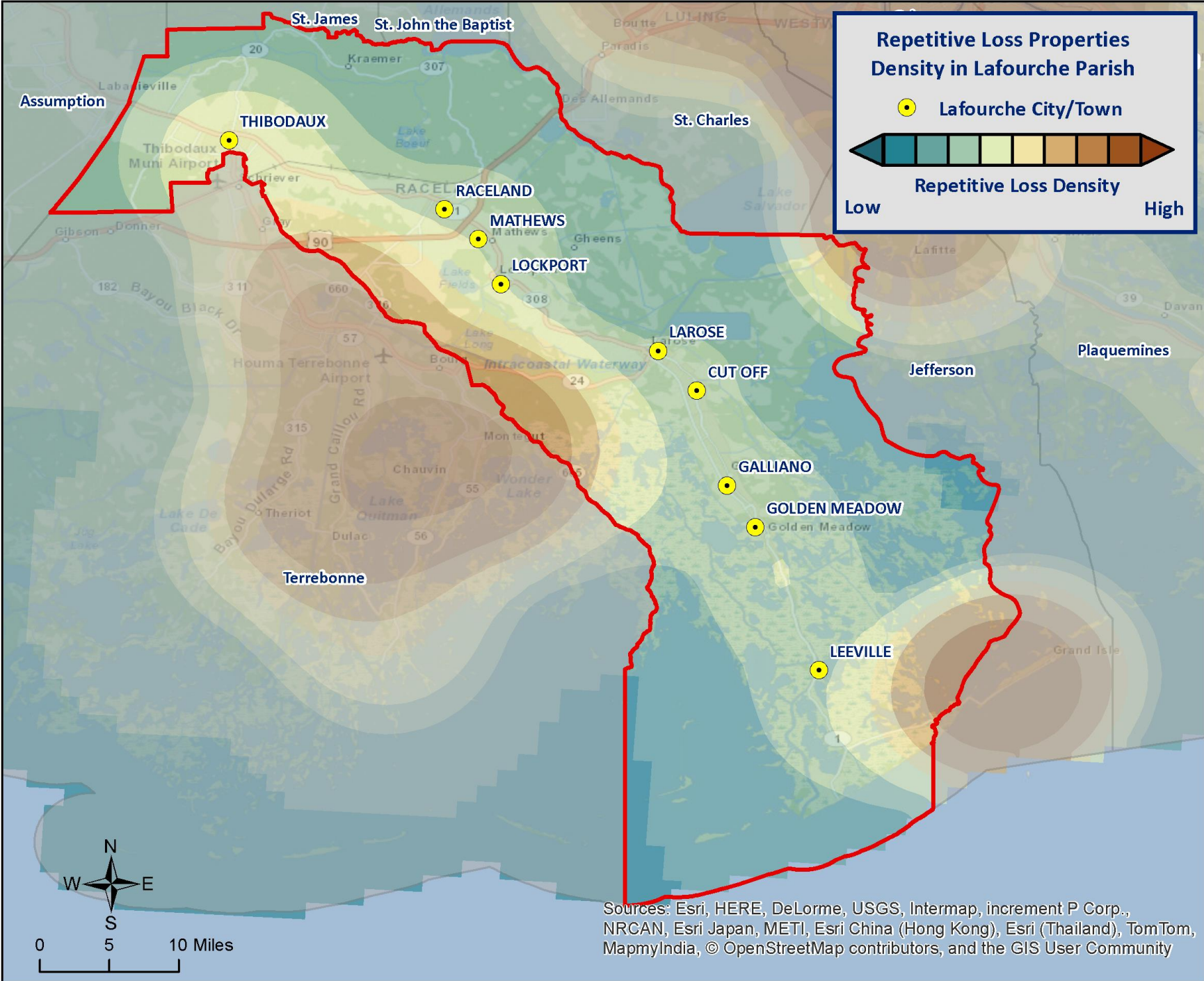


# Repetitive Losses

- 439 Structures
- 81 Severe Repetitive Loss Structures
- Total Payments: \$12,894,251
- Total Claims: 1,320
- Average Payment: \$61,472



# Repetitive Losses



# NFIP Policies

Location	No. of Insured Structures	Total Insurance Coverage Value	Annual Premiums Paid	No. of Insurance Claims Filed Since 1978	Total Loss Payments
Lafourche Parish (Not Incorporated)	11,528	\$2,343,609,800	\$9,124,885	4,524	\$57,788,478
Golden Meadow, Town of	309	\$46,005,600	\$328,223	307	\$2,796,191
Lockport, Town of	347	\$65,098,700	\$287,255	153	\$2,039,874
Thibodaux, City of	750	\$200,389,100	\$396,745	259	\$3,500,874
<b>Total</b>	12,934	\$2,655,103,200	\$10,137,108	5,243	\$66,125,417

# Community Flood Maps

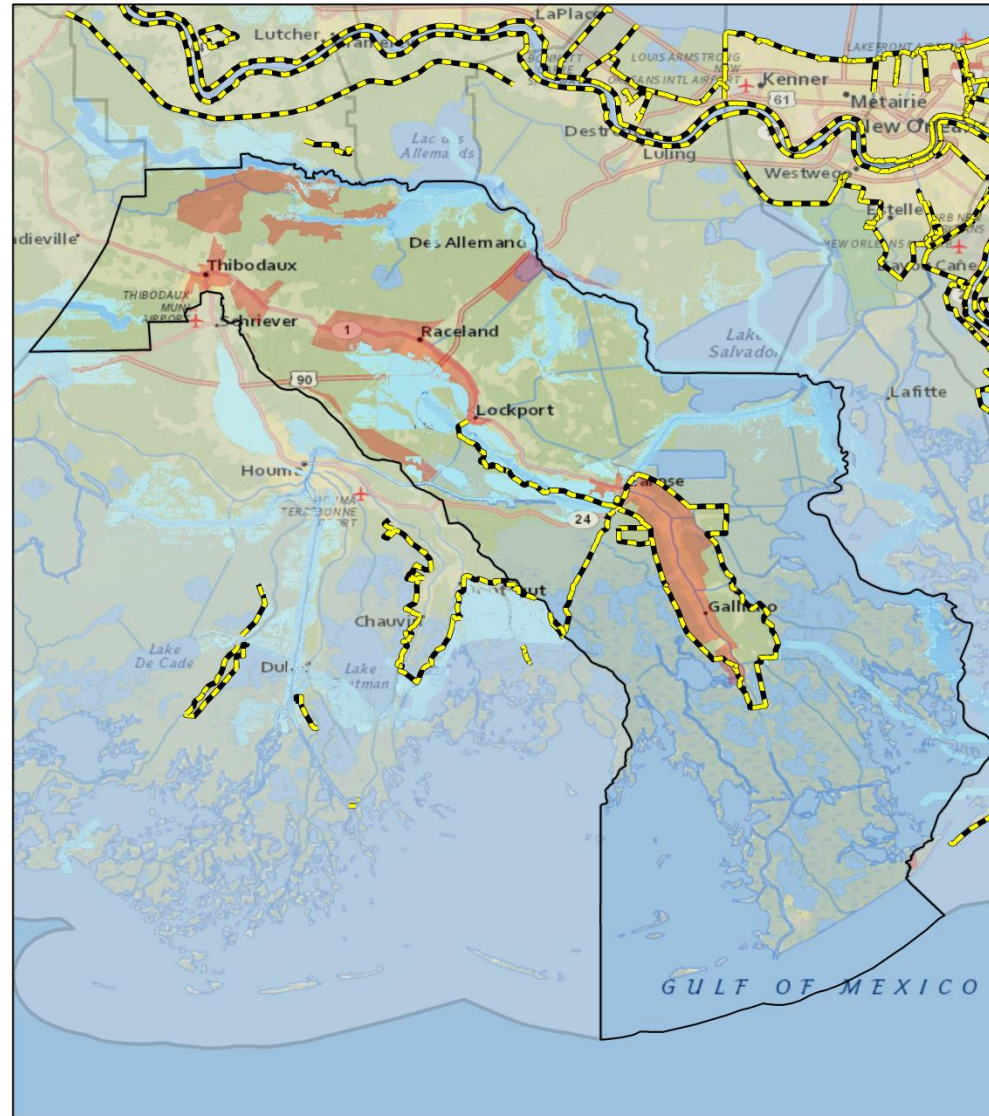
CID	Community Name	Initial FHBM Identified	Initial FIRM Identified	Current Effective Map Date	Date Joined the NFIP	Tribal
225202	Lafourche Parish (Not Incorporated)	5/8/1971	7/1/1974	5/4/1992	4/17/1985	No
225196	Golden Meadow, Town of	11/20/1970	9/11/1970	7/11/1975	11/12/1970	No
220254	Lockport, Town of	1/10/1975	8/15/1980	8/15/1980	8/15/1980	No
220111	Thibodaux, City of	2/12/1974	2/7/1978	12/15/1989	2/7/1978	No

- Not a current Participant in the Community Rating System

# 100 Year Flood Map



## Lafourche Parish Modeled Flood Depth for 100-year Flood Event



0 10 20 Miles

Data Source: FEMA HAZUS-MH

### Flood Depth (ft)

#### Value

High : 62.1538

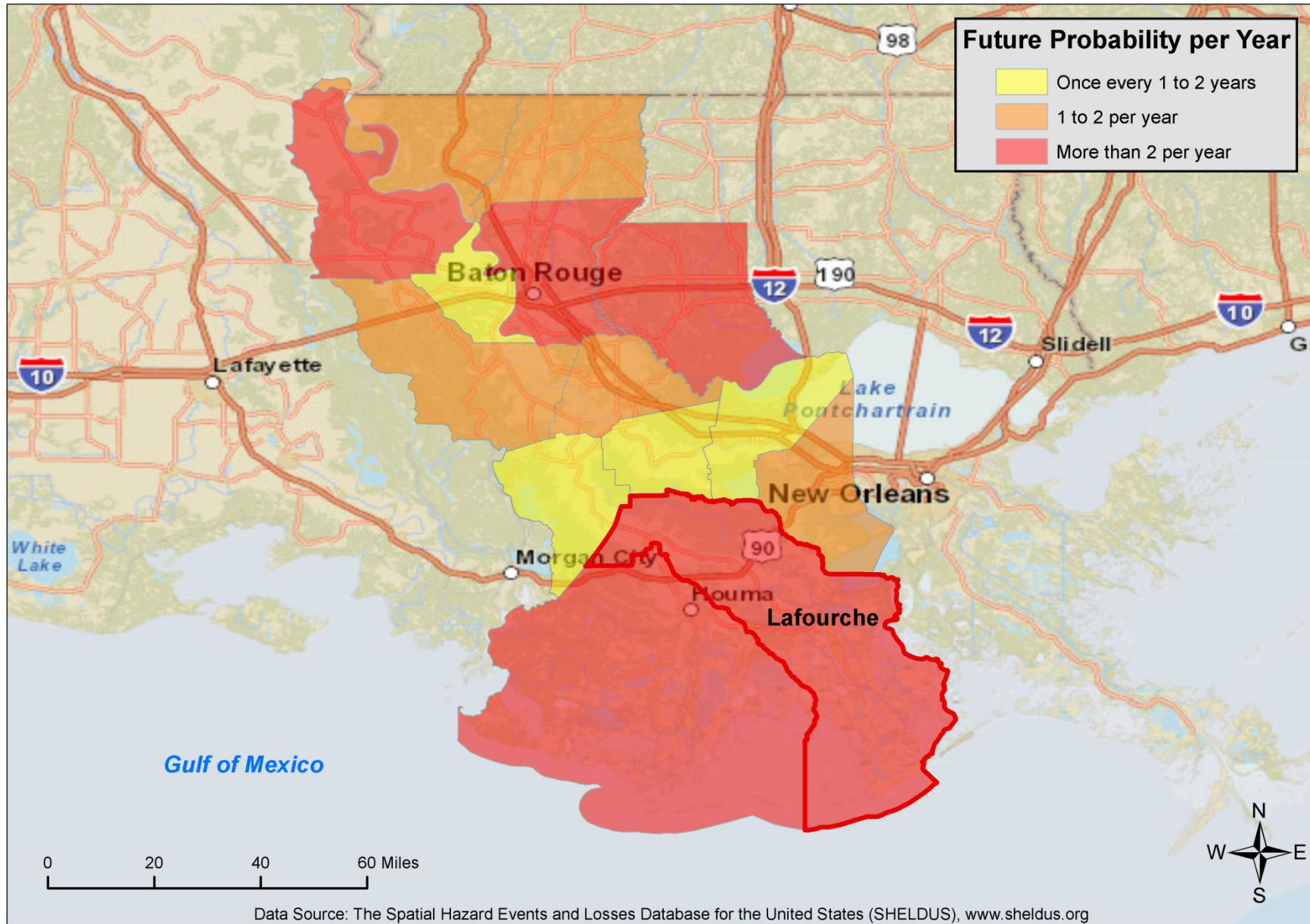
Low : 0

Levee

Incorporated Area



# GOHSEP Regions 2 and 3 Vulnerability: Flooding Probability



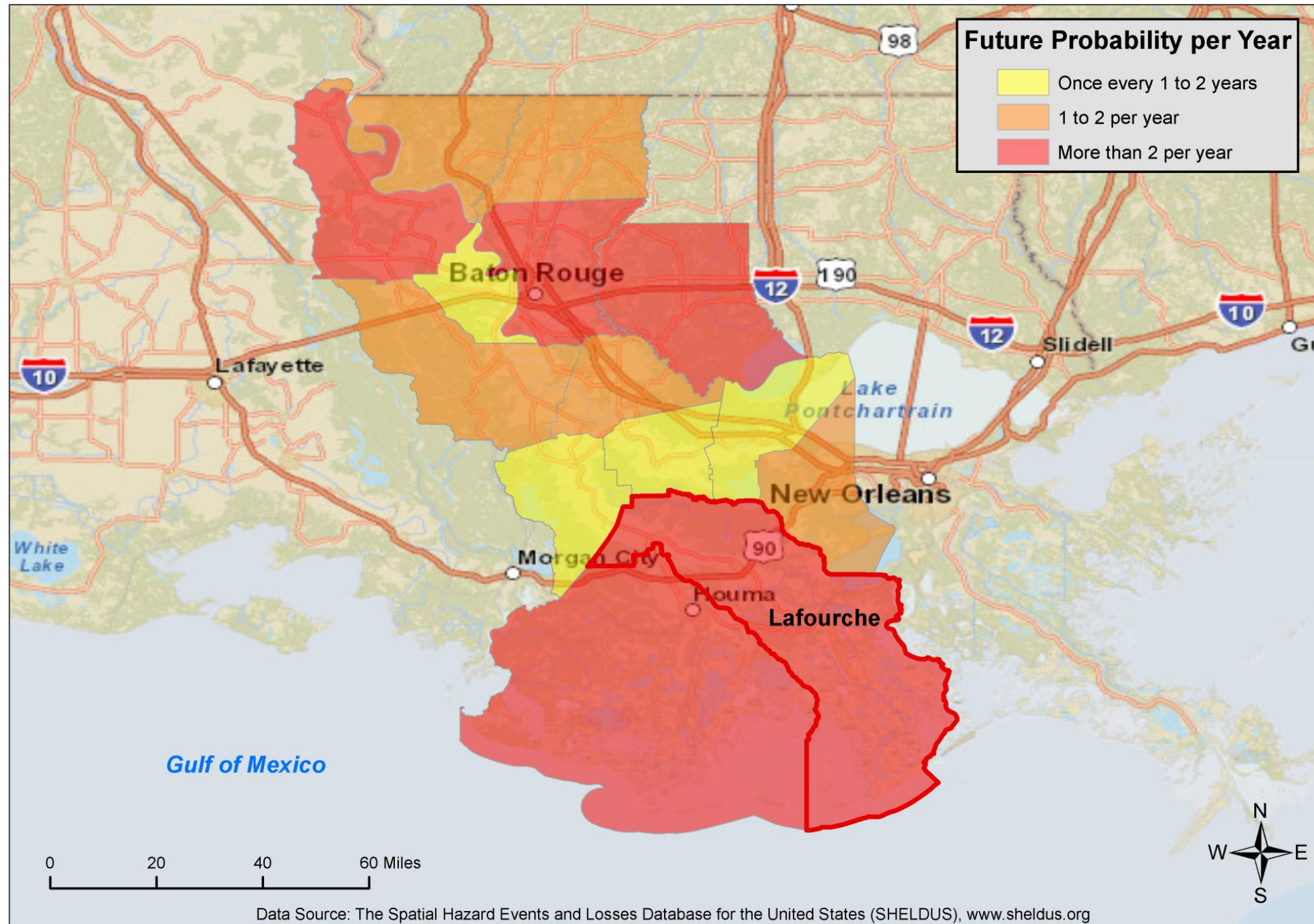
# Tropical Cyclones

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

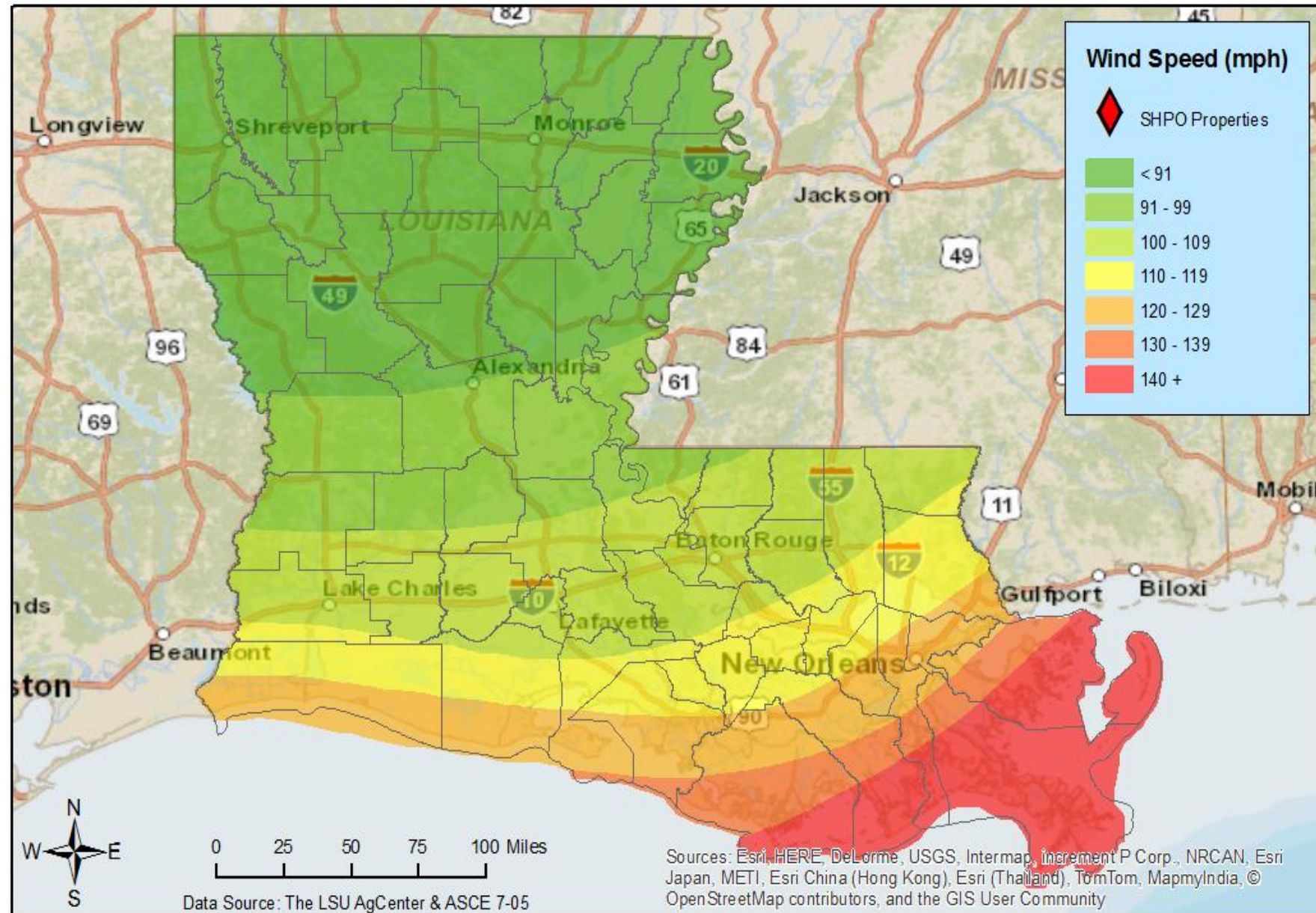
Saffir-Simpson Hurricane Wind Scale		
	Sustained Wind Speed	Effects
Category 1	74-95 mph (119-153 km/hr)	Very dangerous winds will produce some damage. Low-lying coastal roads flooded, minor pier damage
Category 2	96-110 mph (154-177 km/hr)	Extremely dangerous winds will cause extensive damage. Major damage to exposed mobile homes, evacuation of some shoreline residents
Category 3	111-130 mph (178-209 km/hr)	Devastating damage will occur. Some structural damage to small buildings; serious flooding at coast and many smaller structures near coast destroyed
Category 4	131-155 mph (210-249 km/hr)	Catastrophic damage will occur. High risk of injury or death to people, livestock, and pets due to flying and falling debris. Long-term water shortages will increase human suffering. Most of the area will be uninhabitable for weeks or months.
Category 5	> 155 mph (249 km/hr)	Catastrophic damage will occur. People, livestock, and pets are at very high risk of injury or death from flying or falling debris.  A high percentage of frame homes will be destroyed. Long-term power outages and water shortages will render area uninhabitable for weeks or months.



# Tropical Cyclones



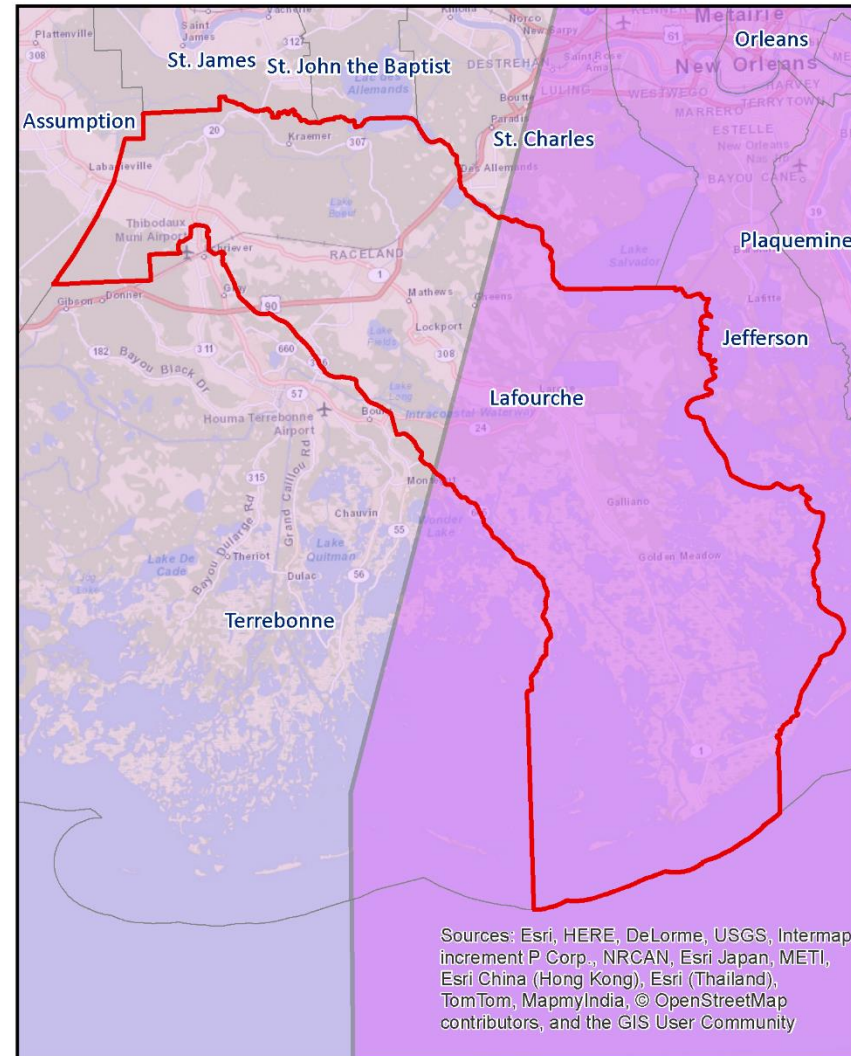
# Tropical Cyclones



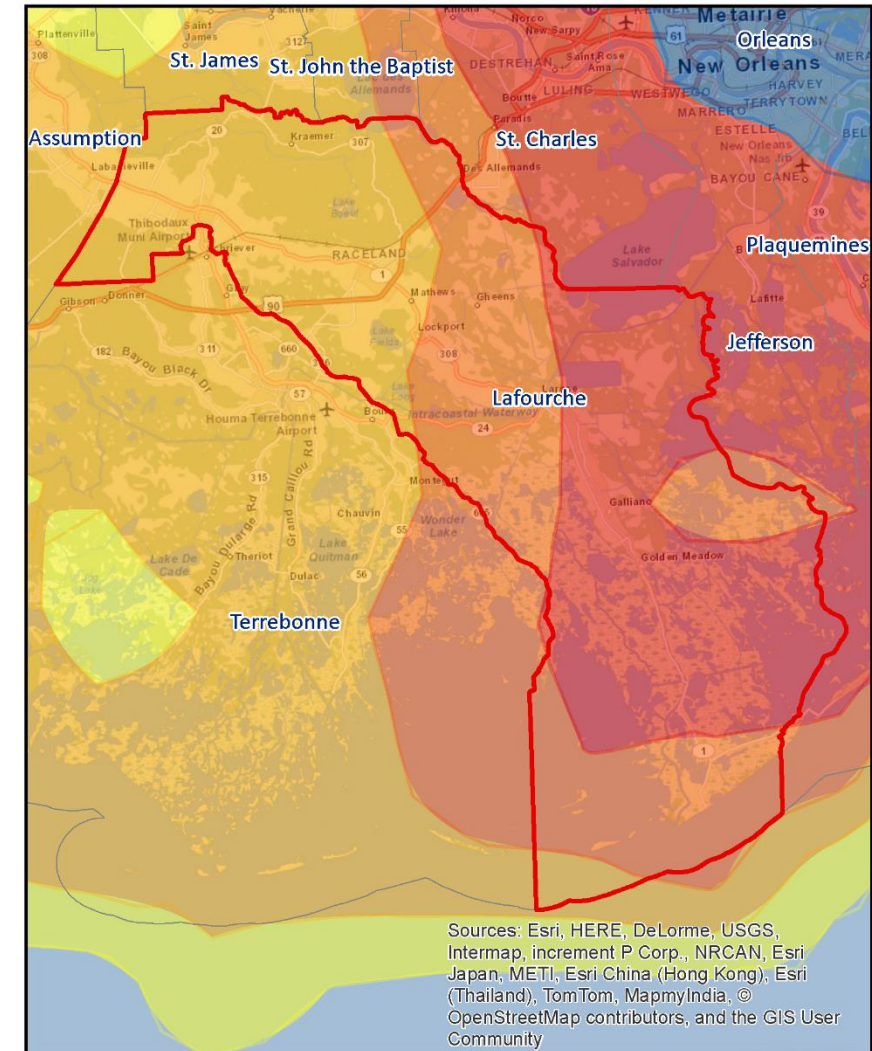
# Tropical Cyclones

- Approximately \$7,138,24,126 caused in property damage

Hurricane Katrina (2005)



Wind Speed (Saffir-Simpson Scale)



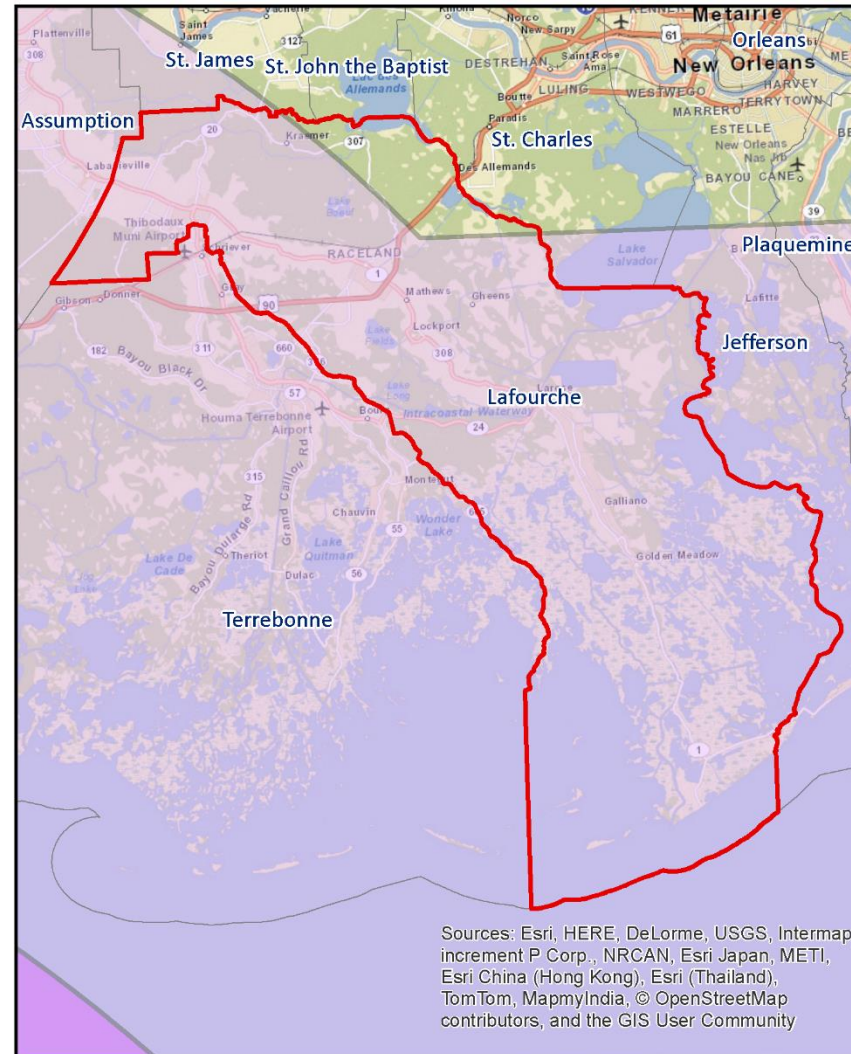
Total Precipitation (inches)



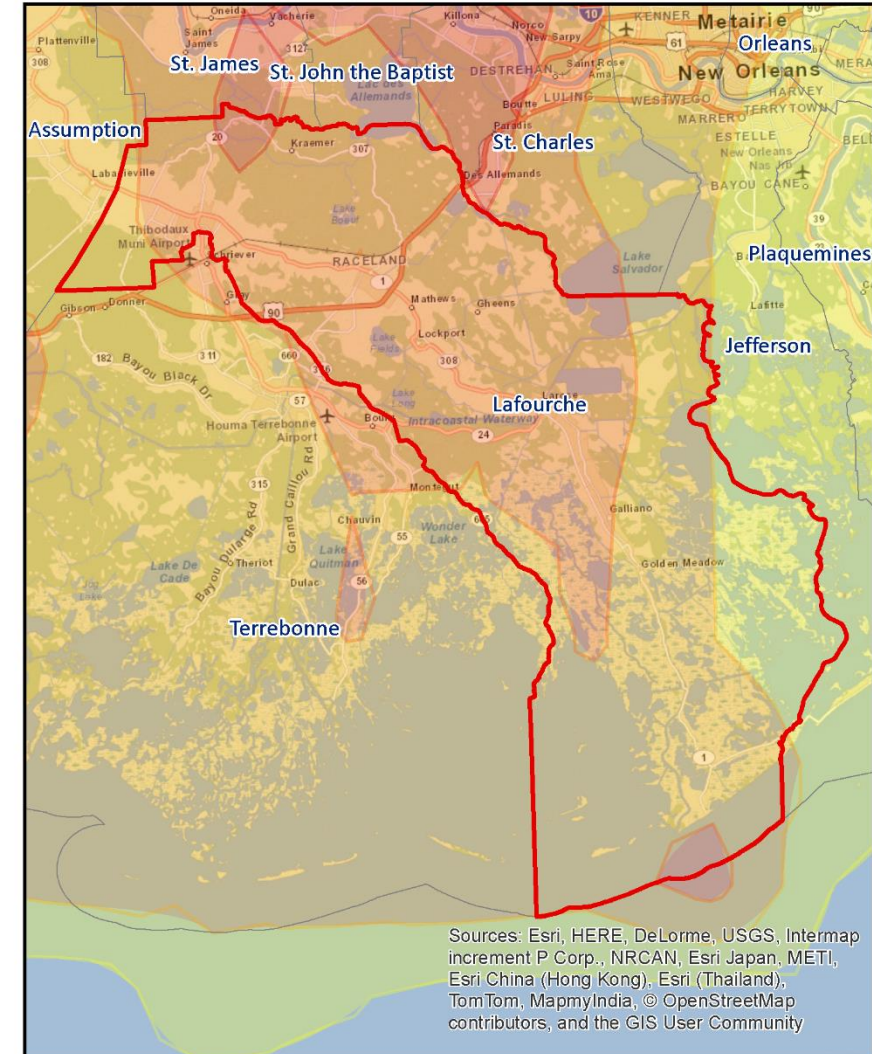
# Tropical Cyclones

- Approximately \$49,571,581 caused in property damage

Hurricane Rita (2005)



Wind Speed (Saffir-Simpson Scale)



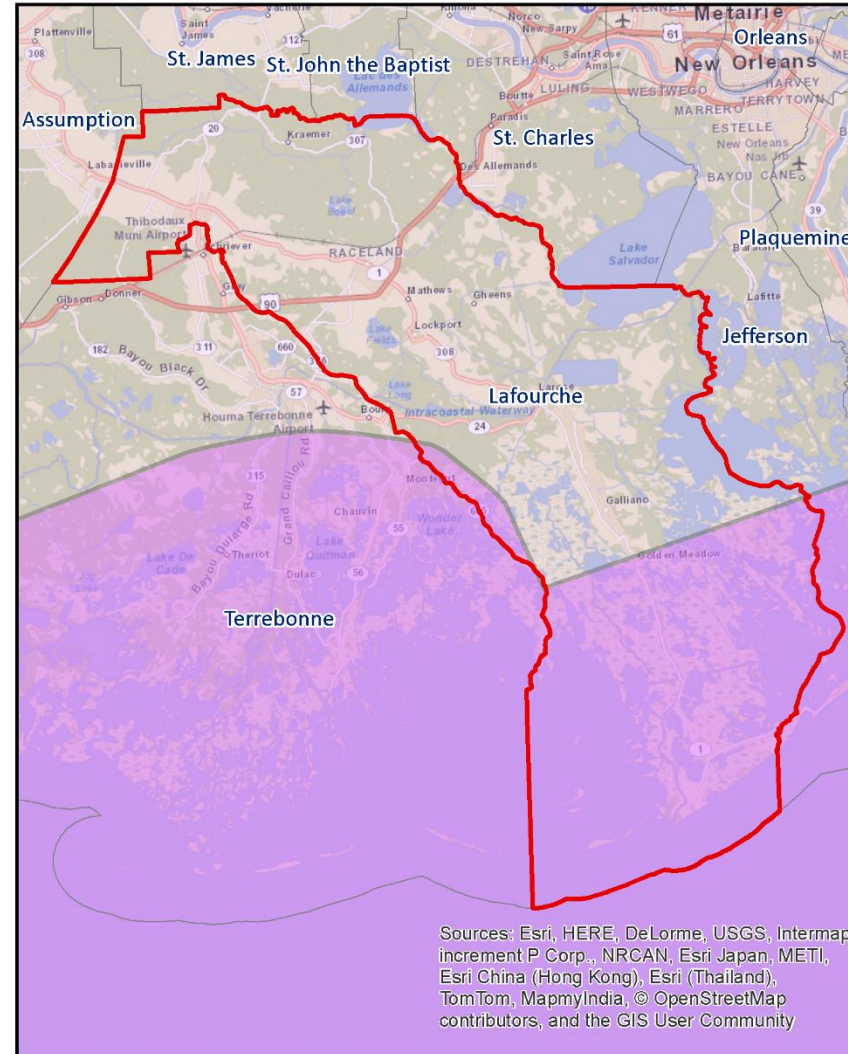
Total Precipitation (inches)



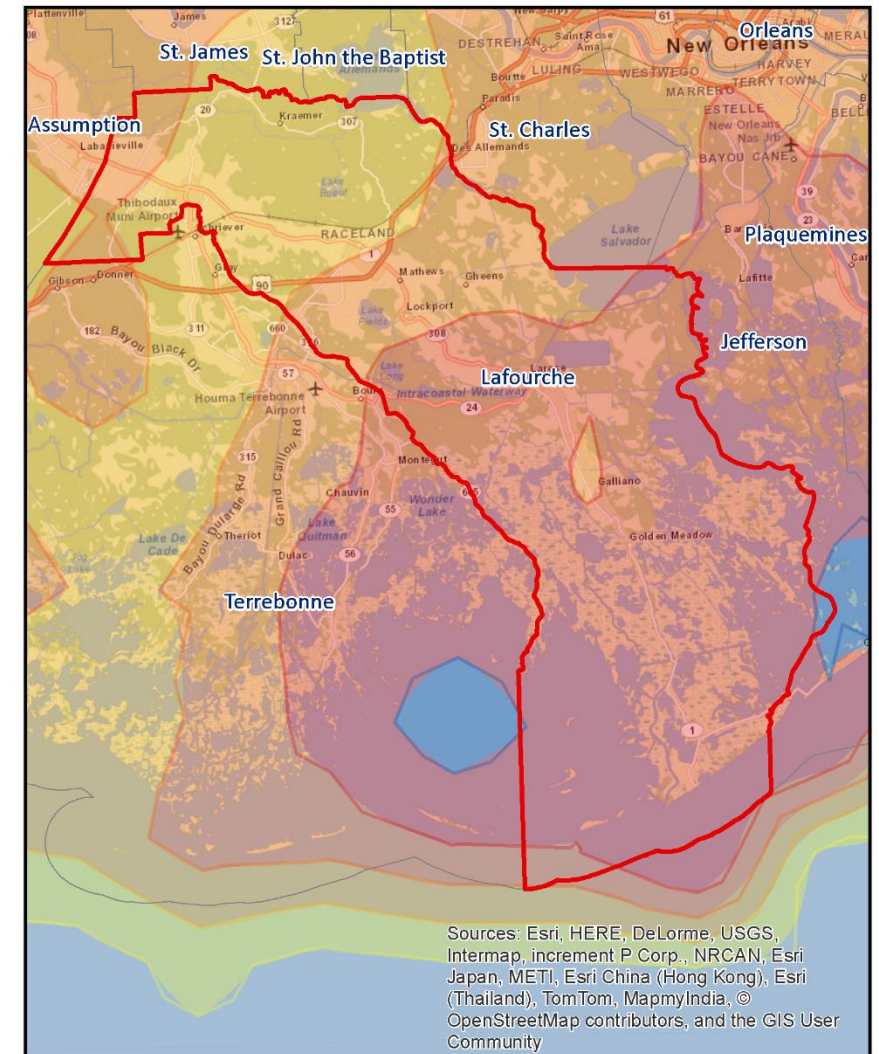
# Tropical Cyclones

- Approximately \$6,397,653 caused in property damage

## Hurricane Gustav (2008)



### Wind Speed (Saffir-Simpson Scale)



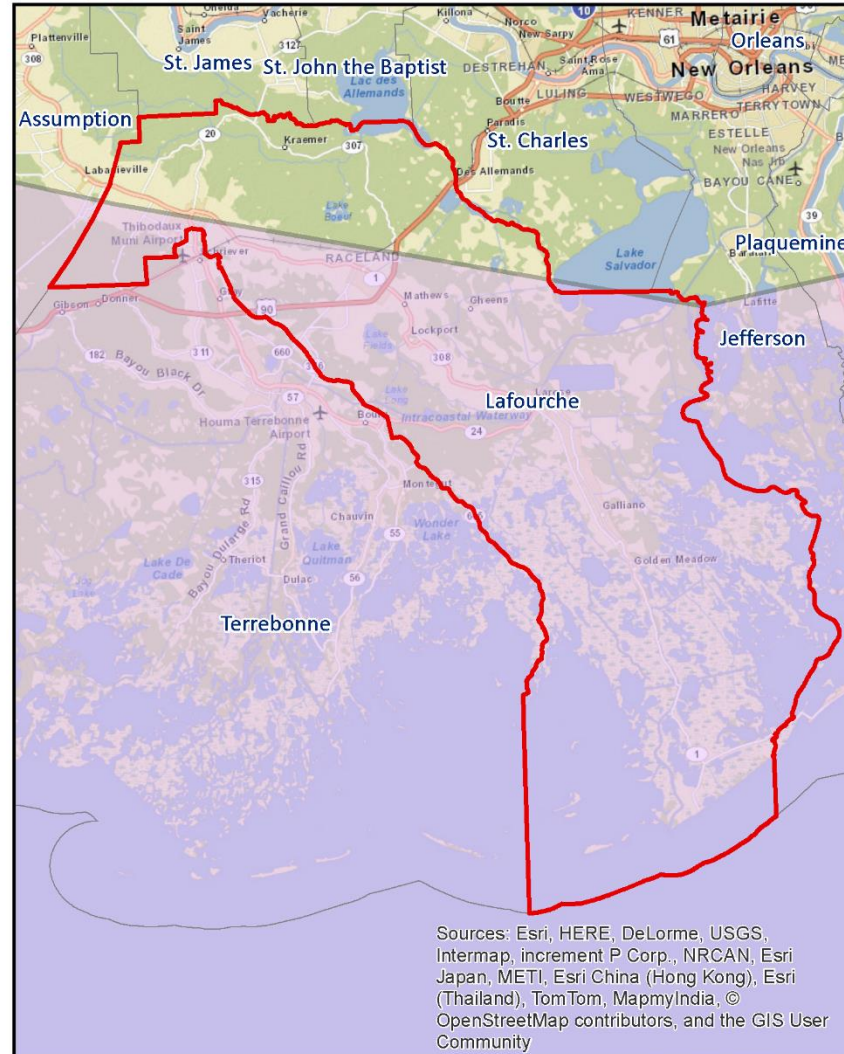
### Total Precipitation (inches)



# Tropical Cyclones

- No Significant Damages Observed in Lafourche Parish

Hurricane Ike (2008)



Wind Speed (Saffir-Simpson Scale)



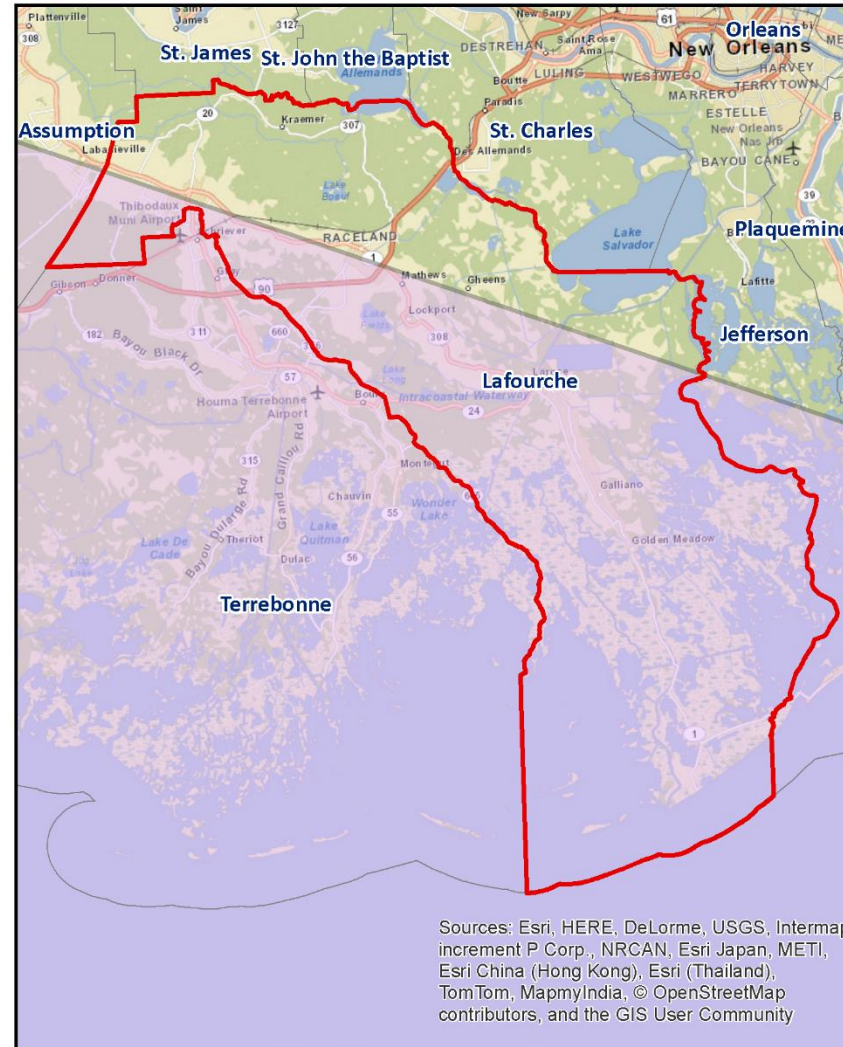
Total Precipitation (inches)



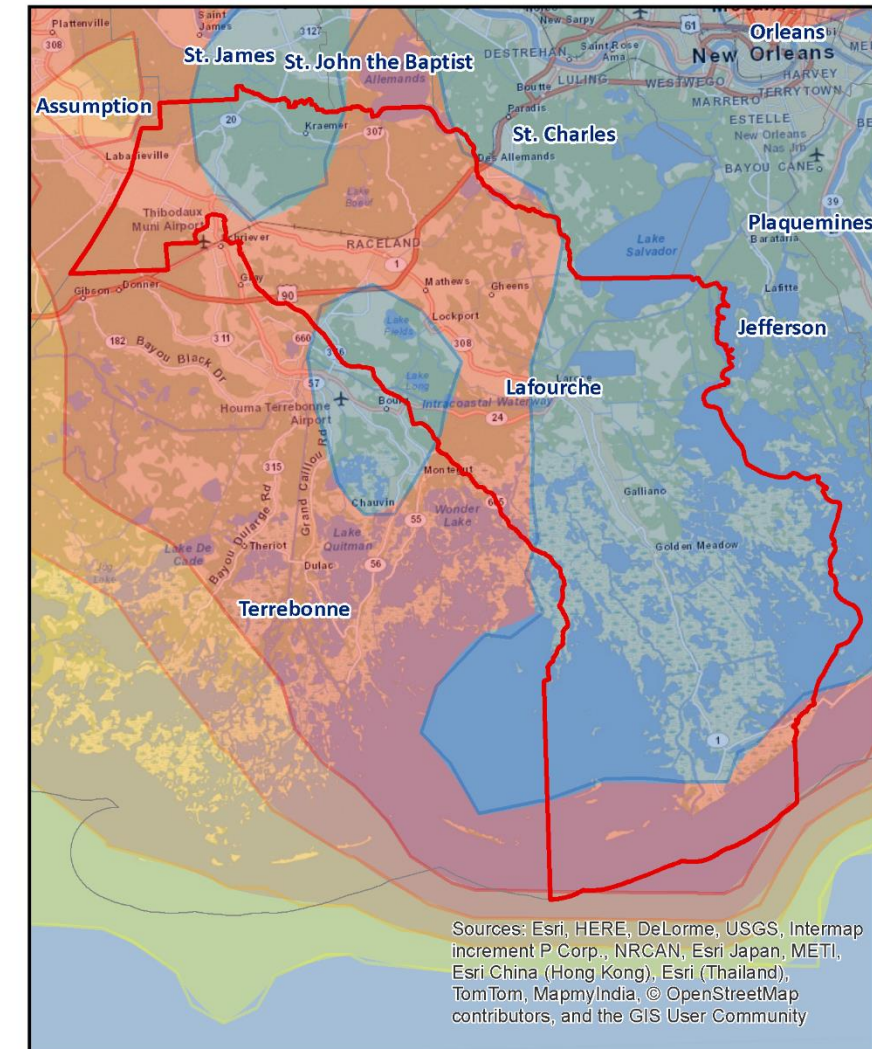
# Tropical Cyclones

- No Significant Damages Observed in Lafourche Parish

## Tropical Storm Lee (2011)



### Wind Speed (Saffir-Simpson Scale)



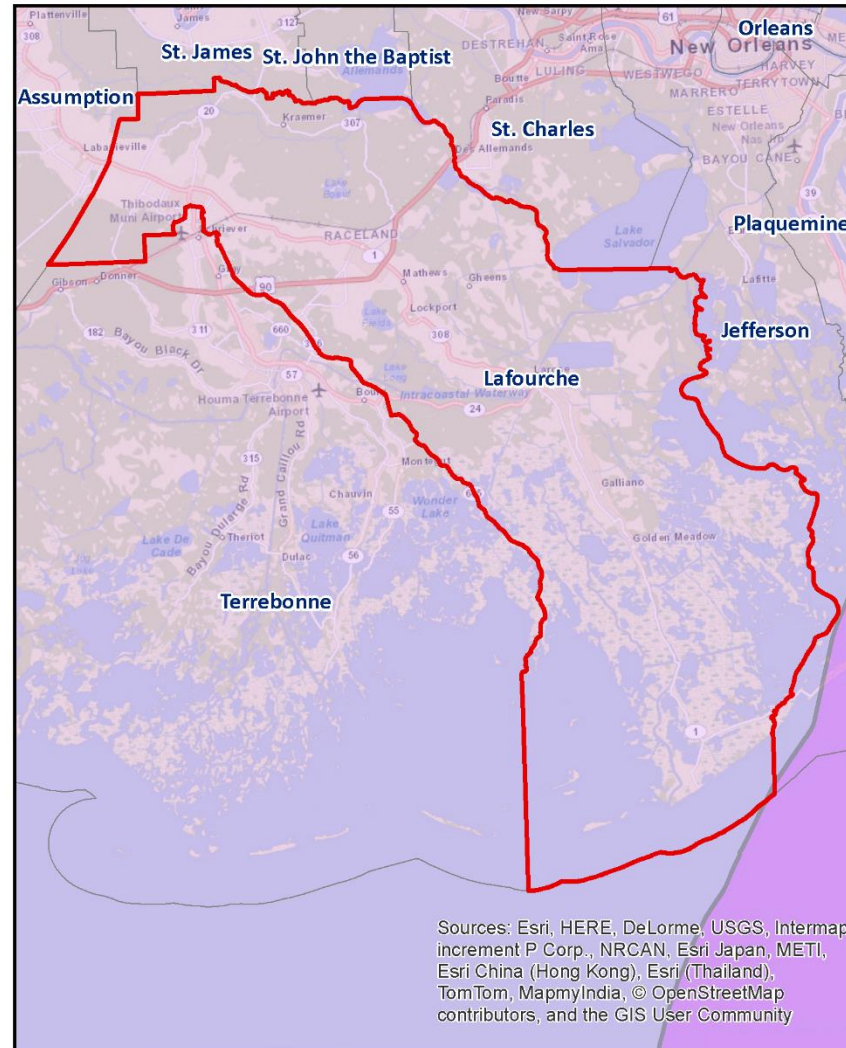
### Total Precipitation (inches)



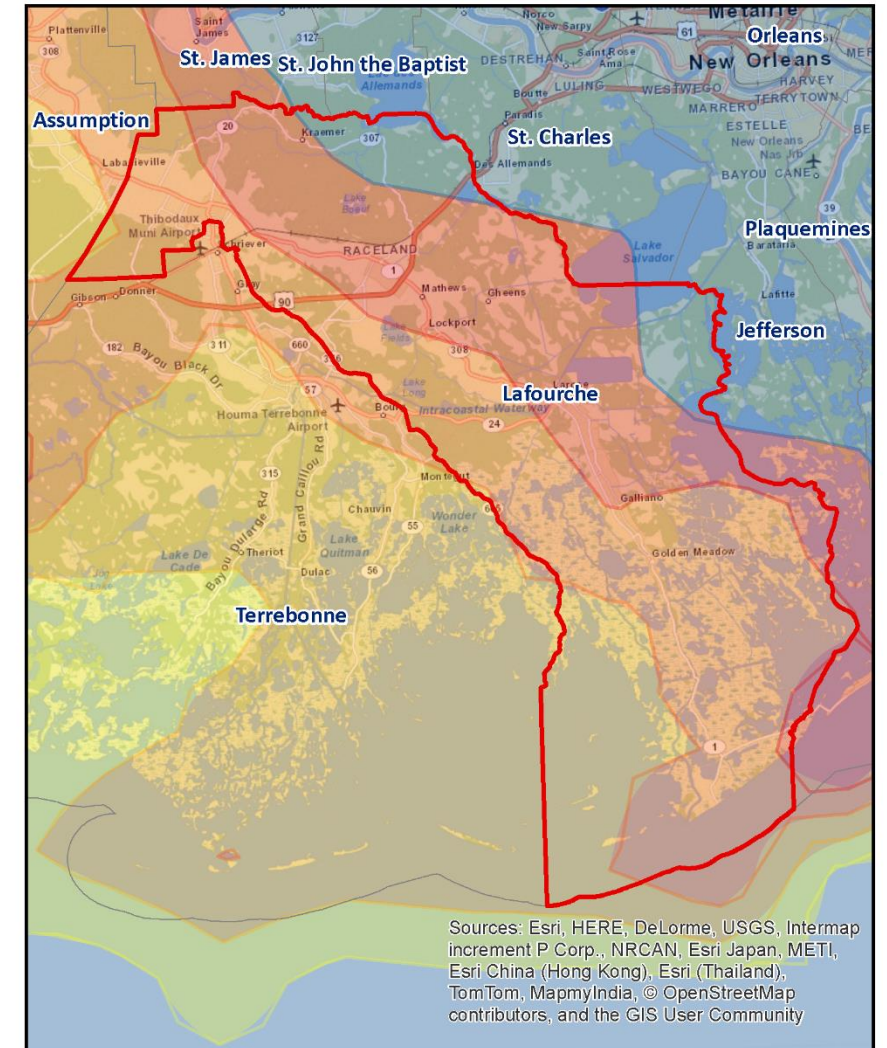
# Tropical Cyclones

- Approximately \$2,759,841 caused in property damage

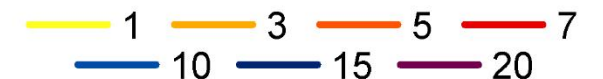
## Hurricane Isaac (2012)



### Wind Speed (Saffir-Simpson Scale)

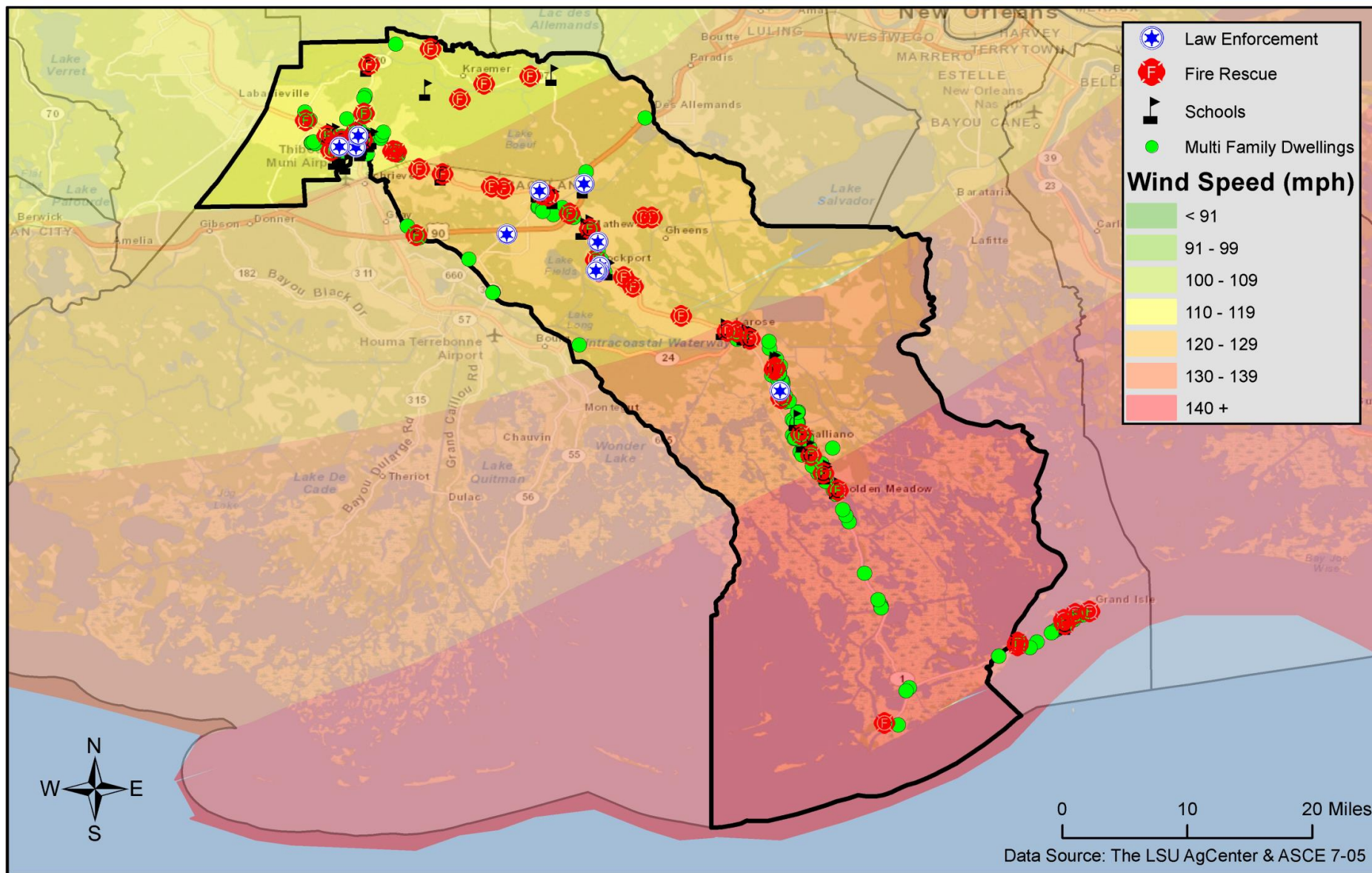


### Total Precipitation (inches)



# Tropical Cyclones – Estimated Losses

Lafourche Parish	Estimated total Losses from a Composite Hurricane
Agricultural	\$4,876,000
Commercial	\$224,481,000
Government	\$374,000
Industrial	\$40,882,000
Religious / Non-Profit	\$9,926,000
Residential	\$1,304,322,000
Schools	\$10,289,000
Totals	\$1,595,150,000



# Tornadoes

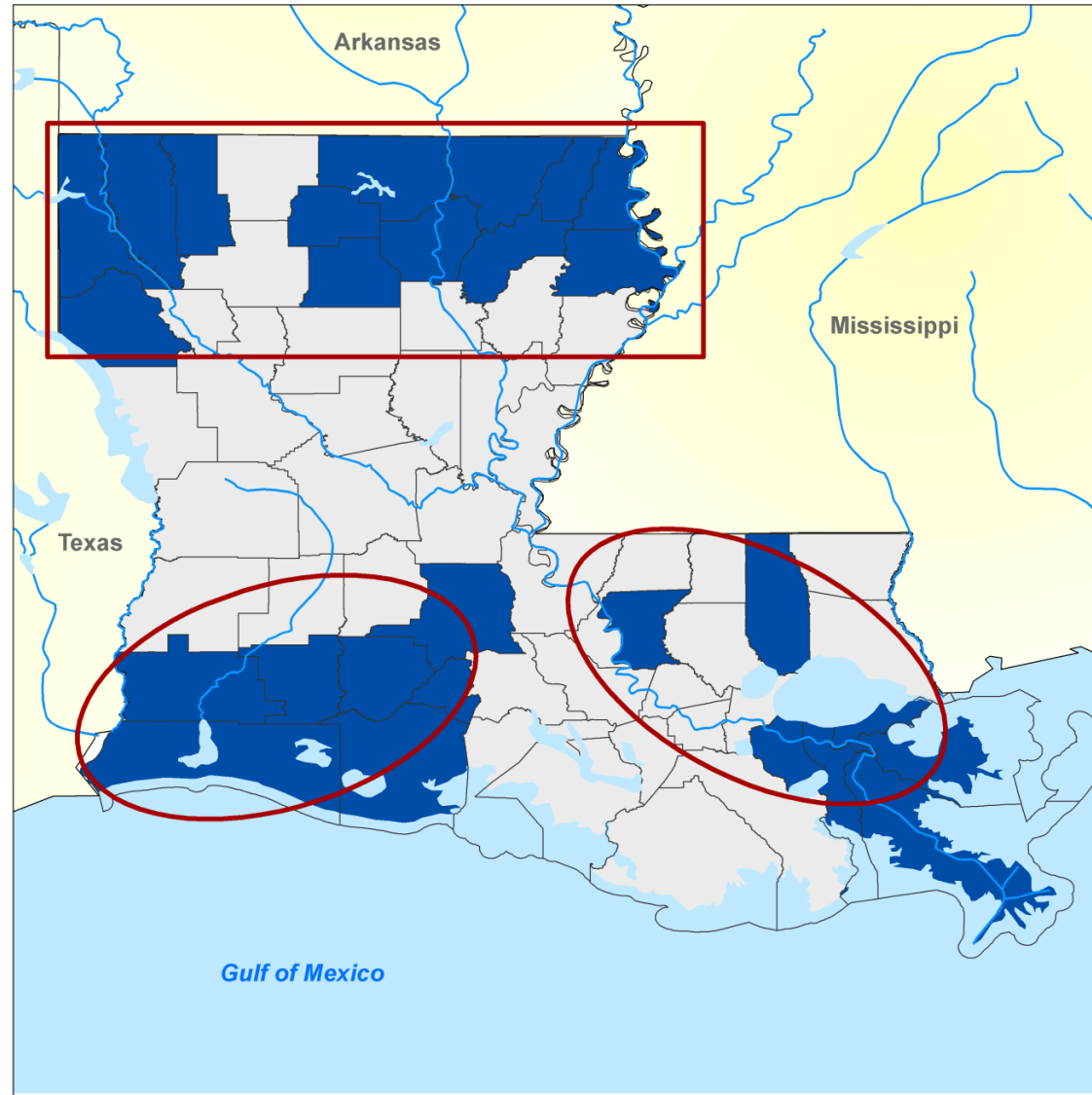
- Tornadoes (also called twisters and cyclones) are rapidly rotating funnels of wind extending between storm clouds and the ground.
- Tornadoes are the most severe storms for their size, and 70% of the world's reported tornadoes occur within the continental United States.



ORIGINAL FUJITA SCALE		ENHANCED FUJITA SCALE	
F5	261-318 mph	EF5	+200 mph
F4	207-260 mph	EF4	166-200 mph
F3	158-206 mph	EF3	136-165 mph
F2	113-157 mph	EF2	111-135 mph
F1	73-112 mph	EF1	86-110 mph
F0	<73 mph	EF0	65-85 mph



# High Risk Areas for Tornadoes in Louisiana

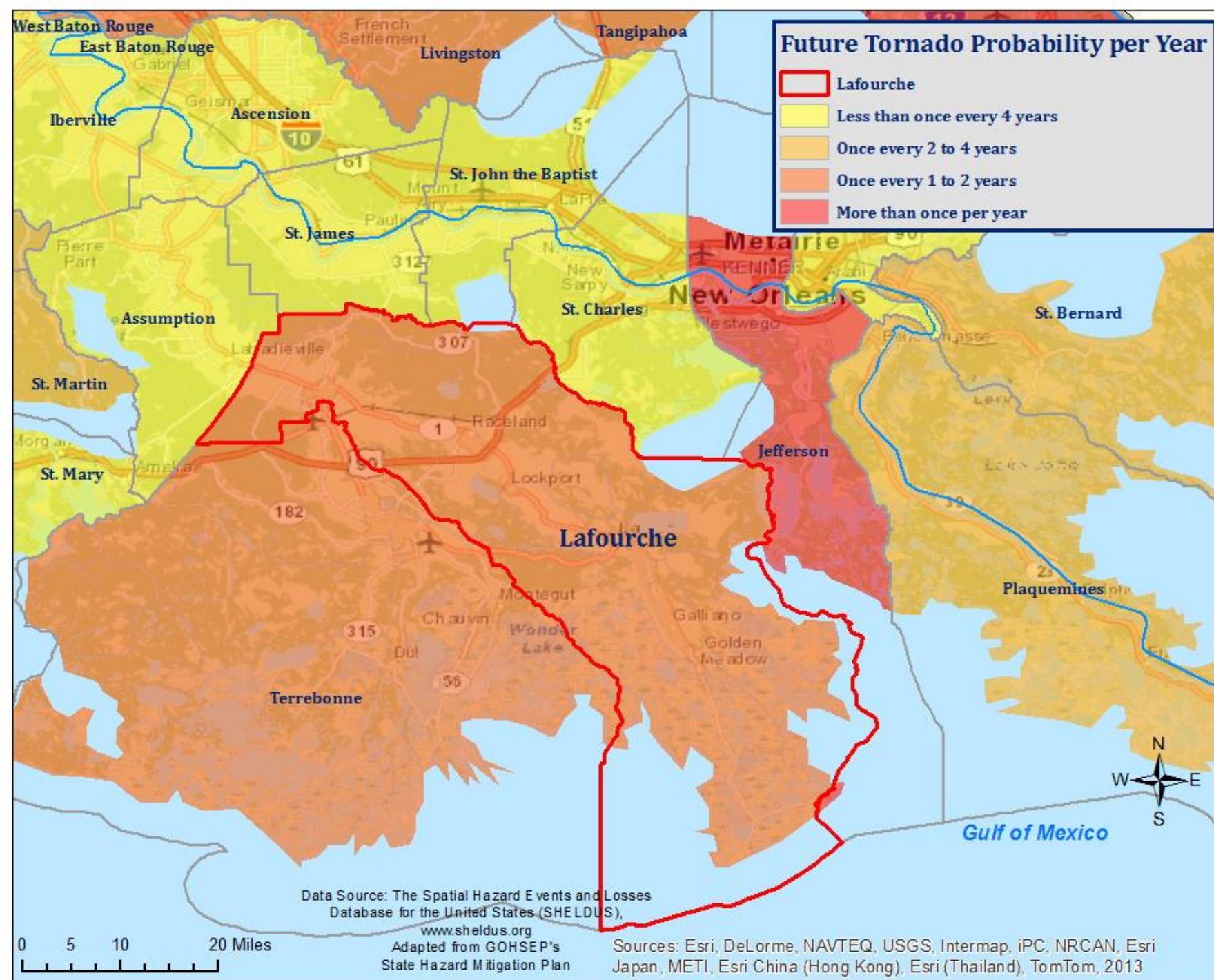


0 20 40 60 80 Miles



Data Sources: SHELUS, NCDC, NOAA

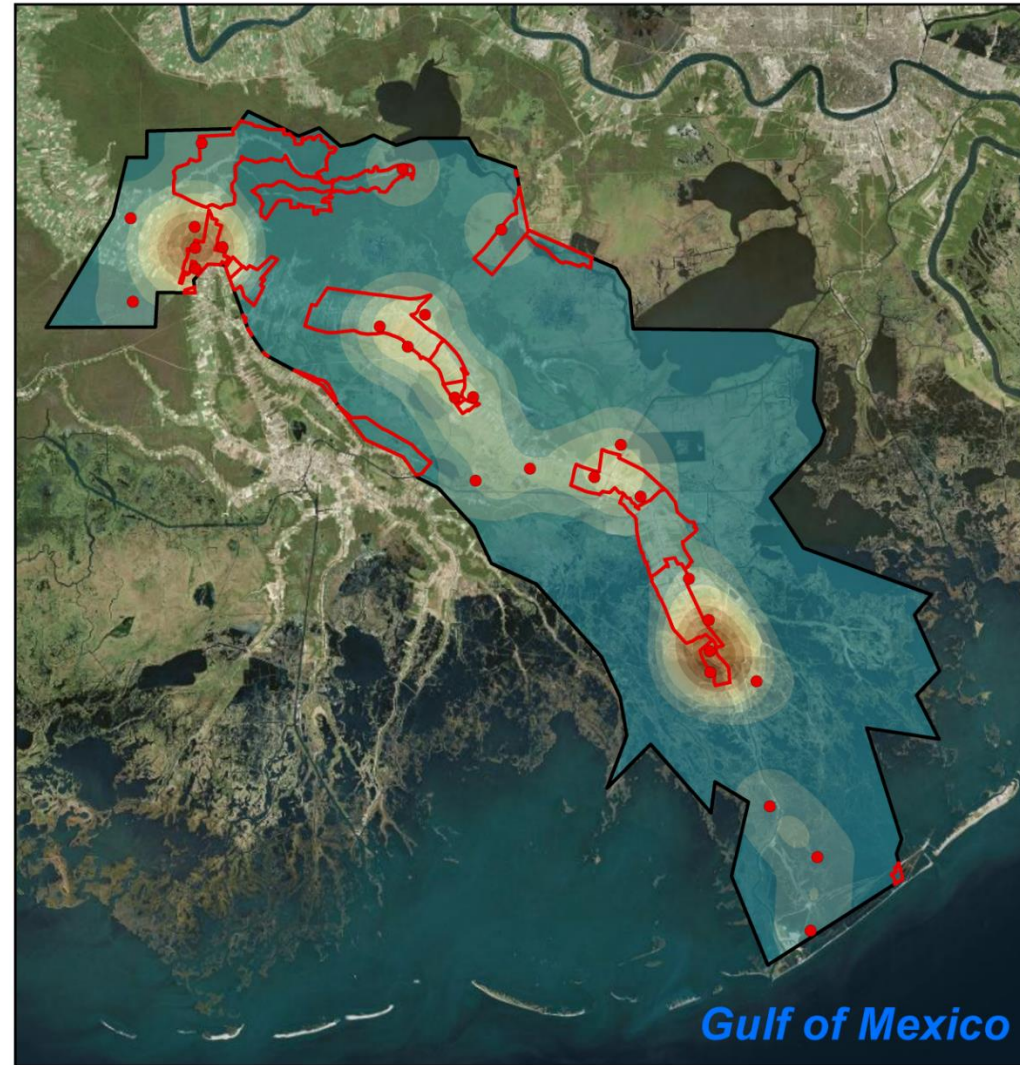
# Tornado Probability



# Tornado Location



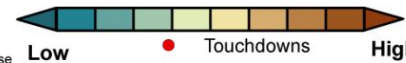
## Lafourche Parish Tornado Density



0 10 20 Miles

Data Source: NOAA Storm Prediction Center (SPC) Severe Weather Database

Tornado Density  
(Touchdowns / 5 sq mi)



• Touchdowns

□ Incorporated Areas

# Tornadoes – Previous Occurrences & Estimated Losses

- There have been 17 Tornadoes that have impacted Lafourche Parish since 1989
- In the last five years there have been 2 tornadoes:
  - July 2012 – \$15,219 in damages
  - February 2013 - \$50,000 in damages
- Total Damage History for last 25 years: \$1,749,429
- Average cost per event: \$102,907
- Estimated Annual Losses due to Tornadoes: \$69,997

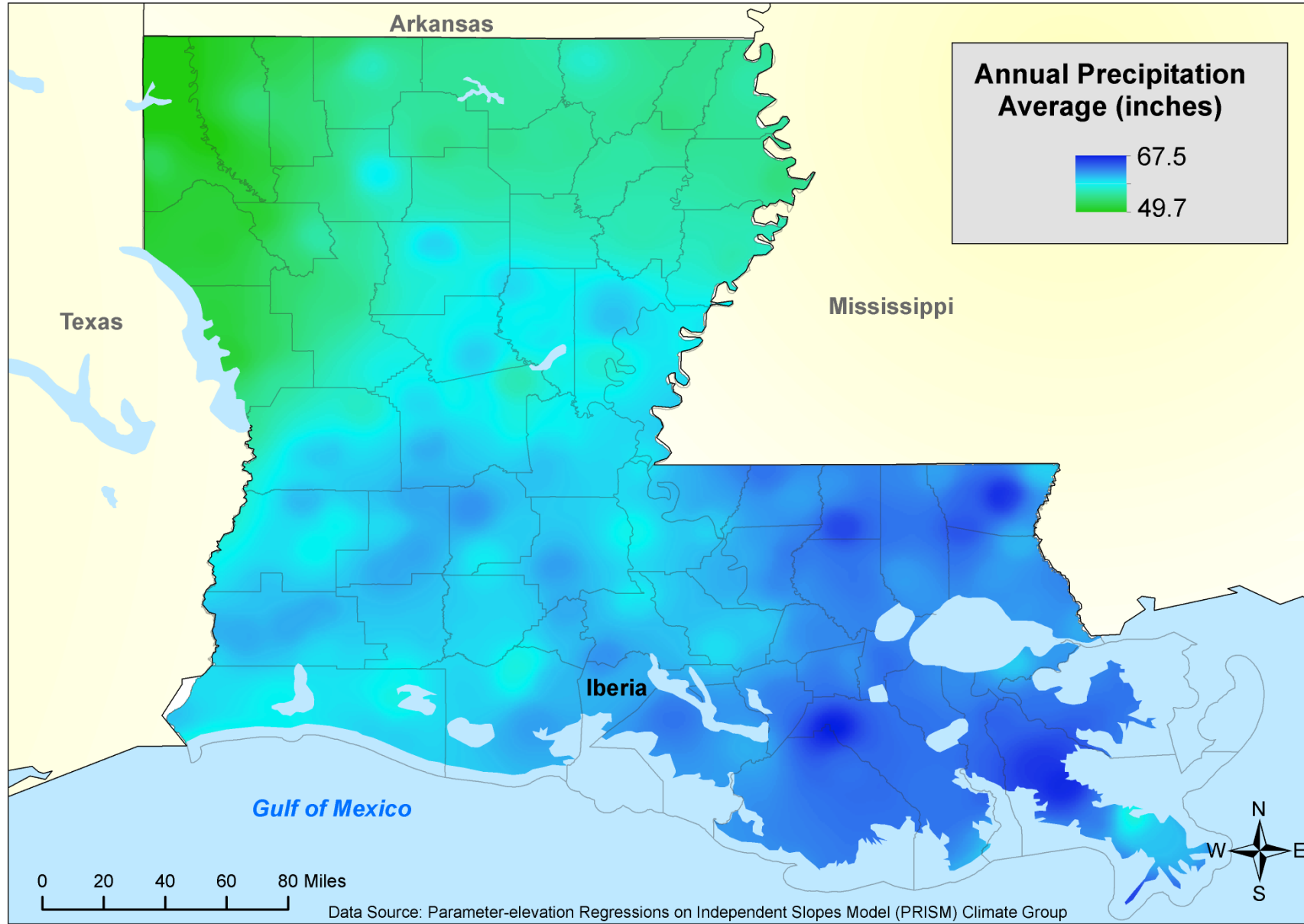
# Thunderstorms (lightning, high wind)

- Thunderstorms can produce deadly and damaging tornadoes, hailstorms, intense downburst and microburst winds, lightning, and flash floods
- NWS estimates that over 100,000 thunderstorms occur each year on the U.S. mainland
- Thunderstorm and lightning events are generated by atmospheric imbalance and turbulence due to a combination of conditions:
  - Unstable warm air rising rapidly into the atmosphere;
  - Sufficient moisture to form clouds and rain; and
  - Upward lift of air currents caused by colliding weather fronts



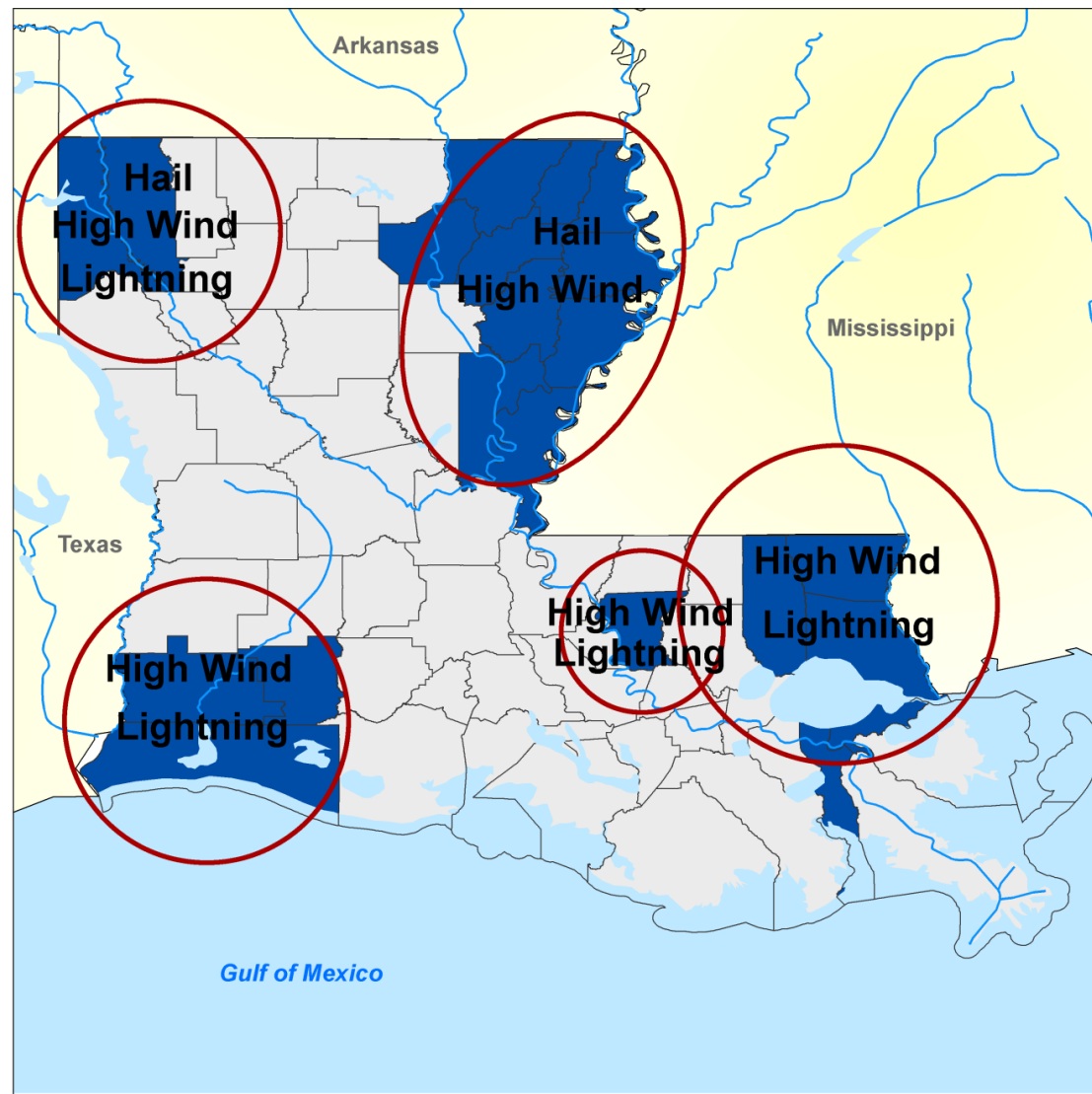


# Louisiana Average Annual Precipitation (1981-2010)





# High Risk Areas for Thunderstorms in Louisiana



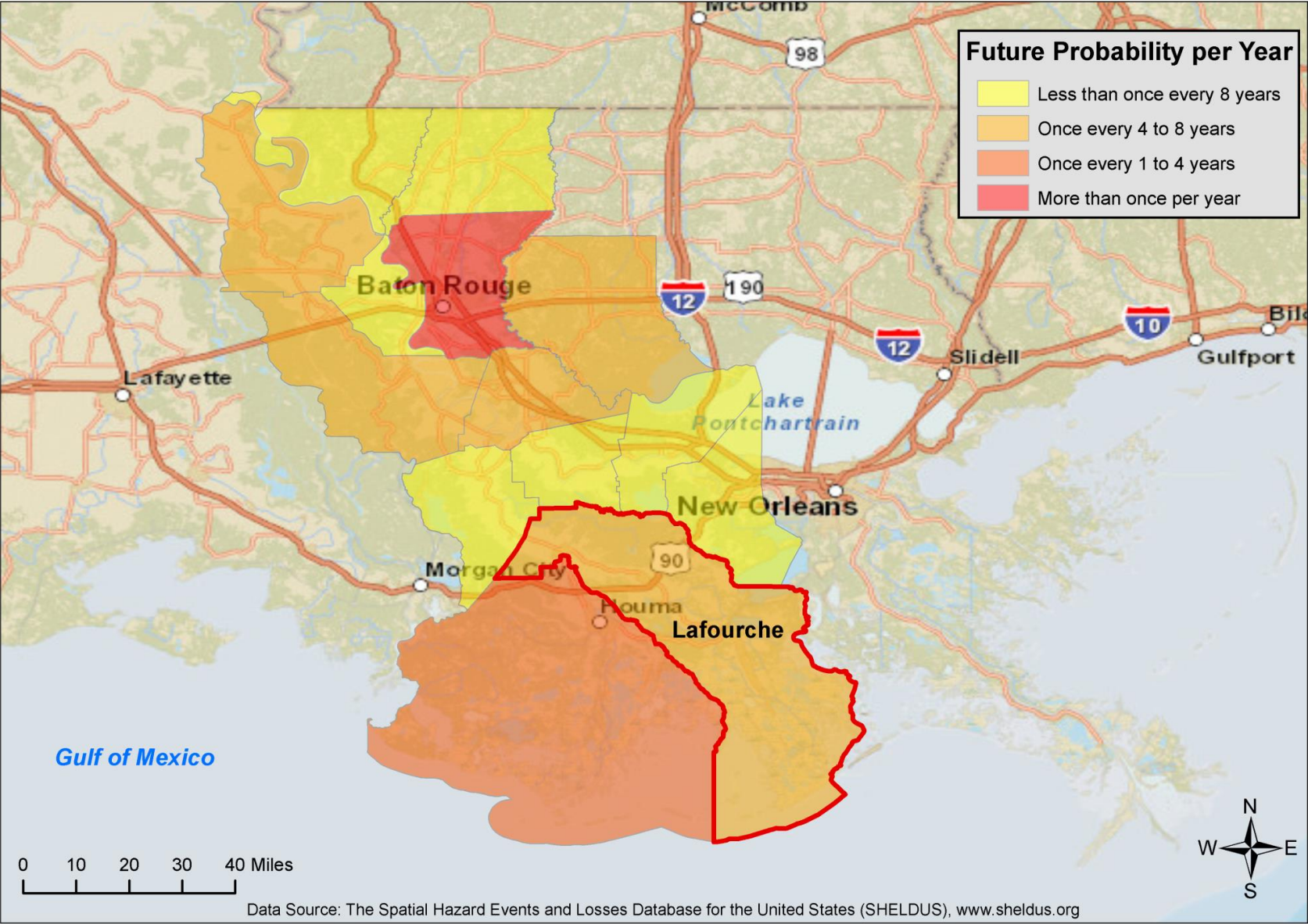
0 20 40 60 80 Miles

Data Sources: SHELDES, NCDC, NOAA



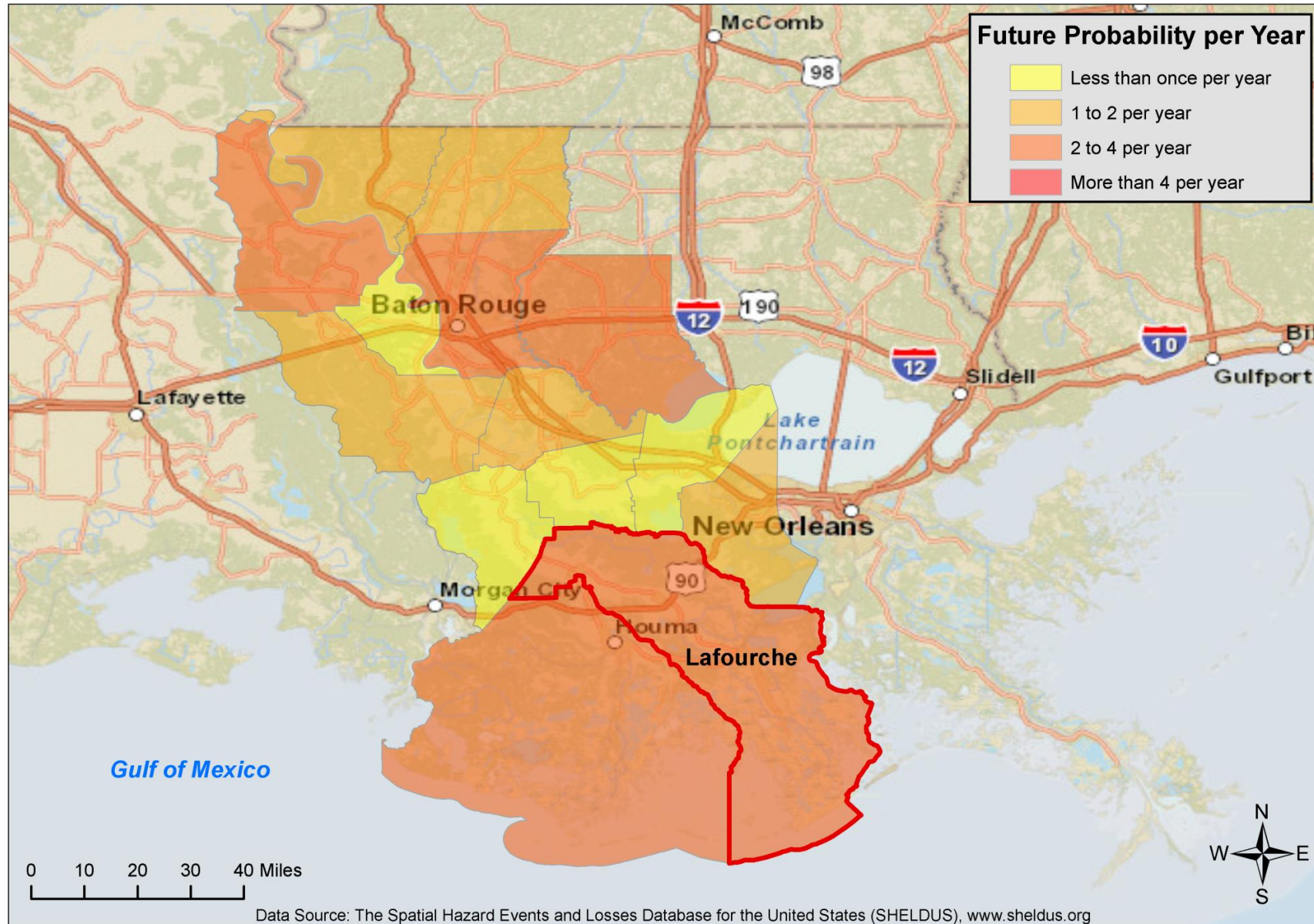


# GOHSEP Regions 2 and 3 Vulnerability: Lightning Probability



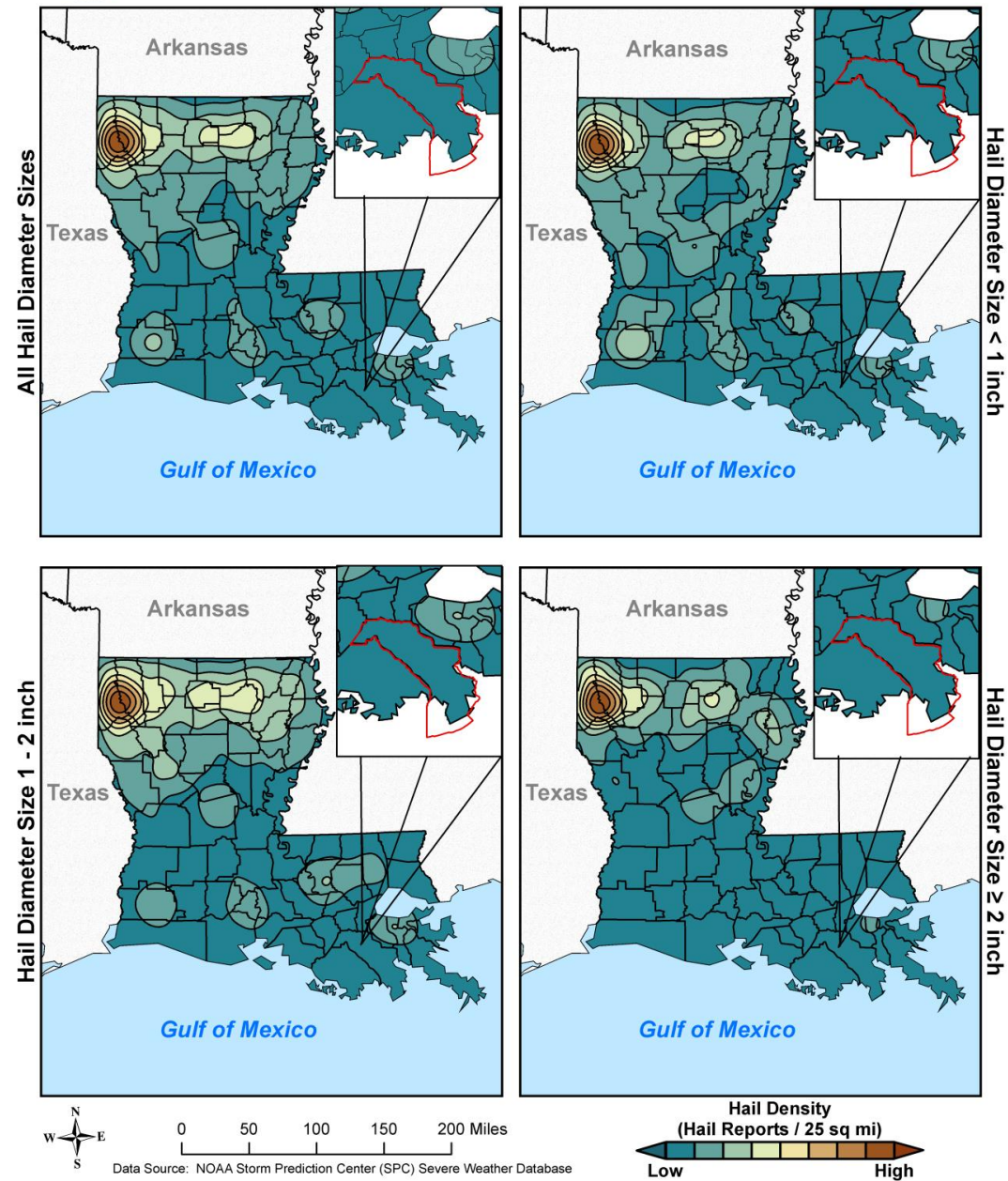


# GOHSEP Regions 2 and 3 Vulnerability: High Wind Probability



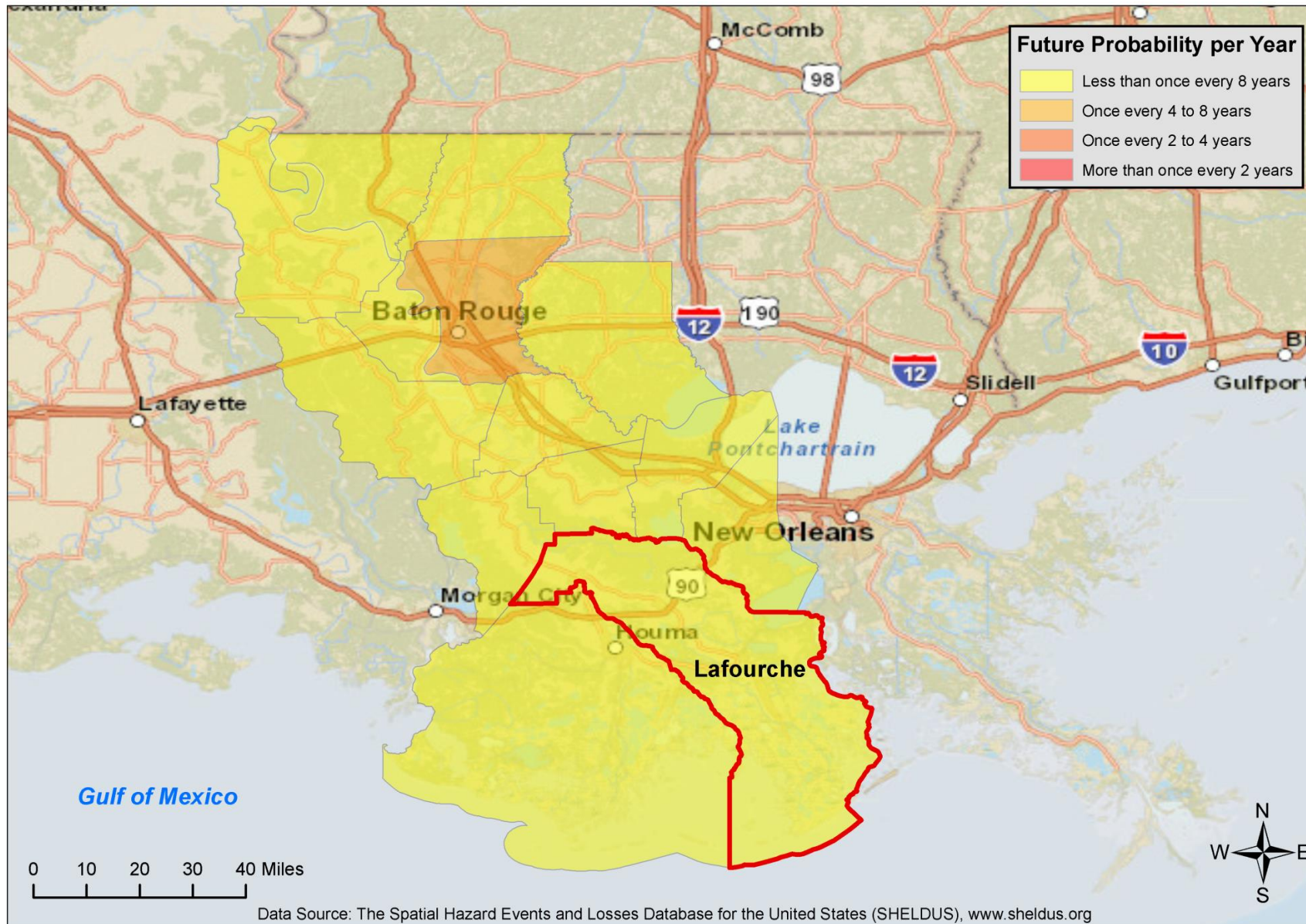


# Hail Density in Louisiana and Lafourche Parish





# GOHSEP Regions 2 and 3 Vulnerability: Hail Probability



# Thunderstorms

## Estimated Losses

Thunderstorm Hazard	Number of Events since 1989	Estimated Losses	Estimated Annual Losses
Hail*	41	\$0	\$0
High Winds	45	\$751,036	\$30,041
Lightning	6	\$267,581	\$10,703

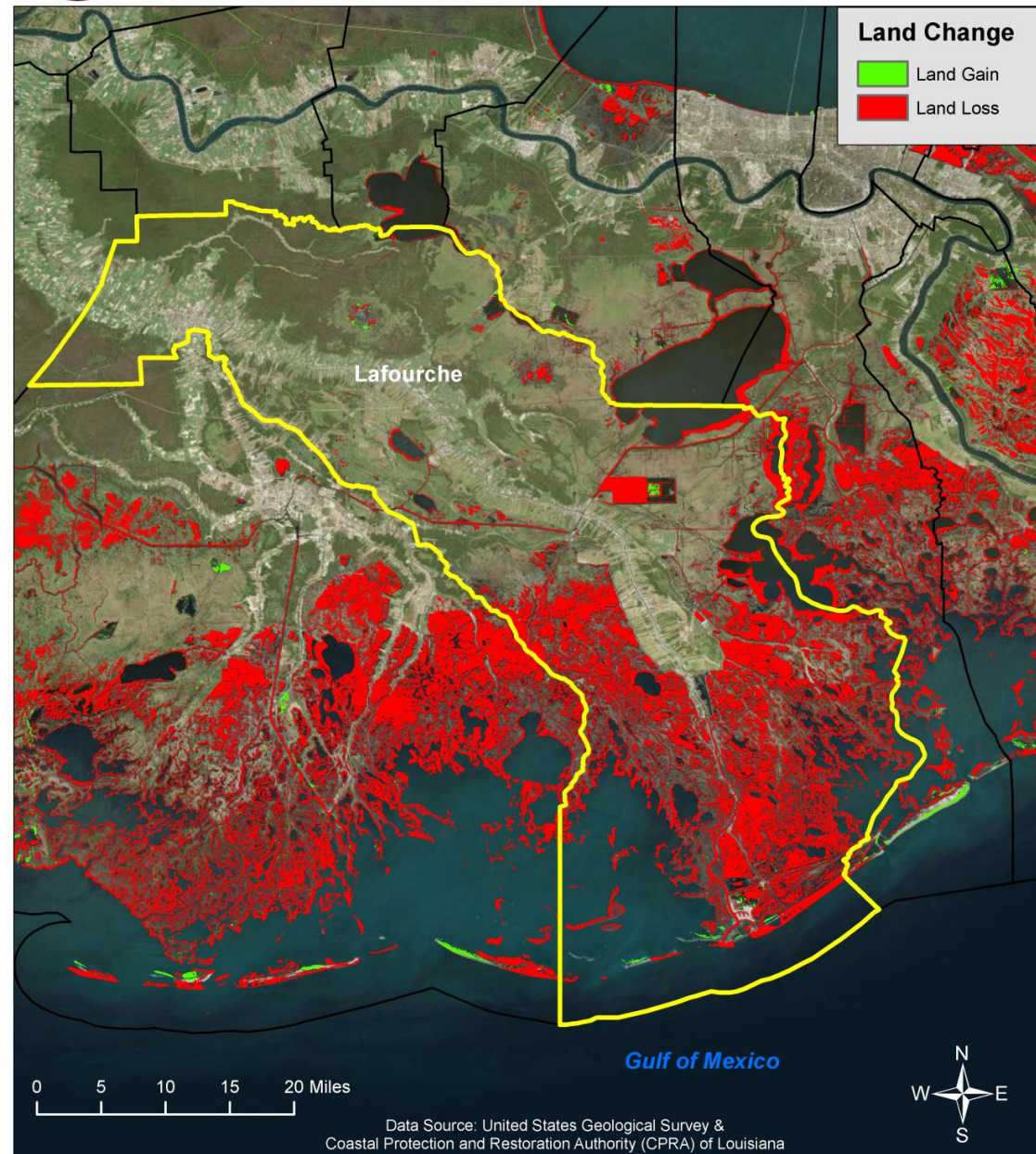
# Coastal Land Loss

- Coastal land loss is the loss of land (especially through beach, shoreline, or dune material) by natural and/or human influences.
- Coastal land loss occurs through various means, including coastal 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.





# Lafourche Parish: Land Loss/Gain: 1932-2010





# Lafourche Parish Vulnerability: Subsidence and Coastal Erosion



# Levee Failure

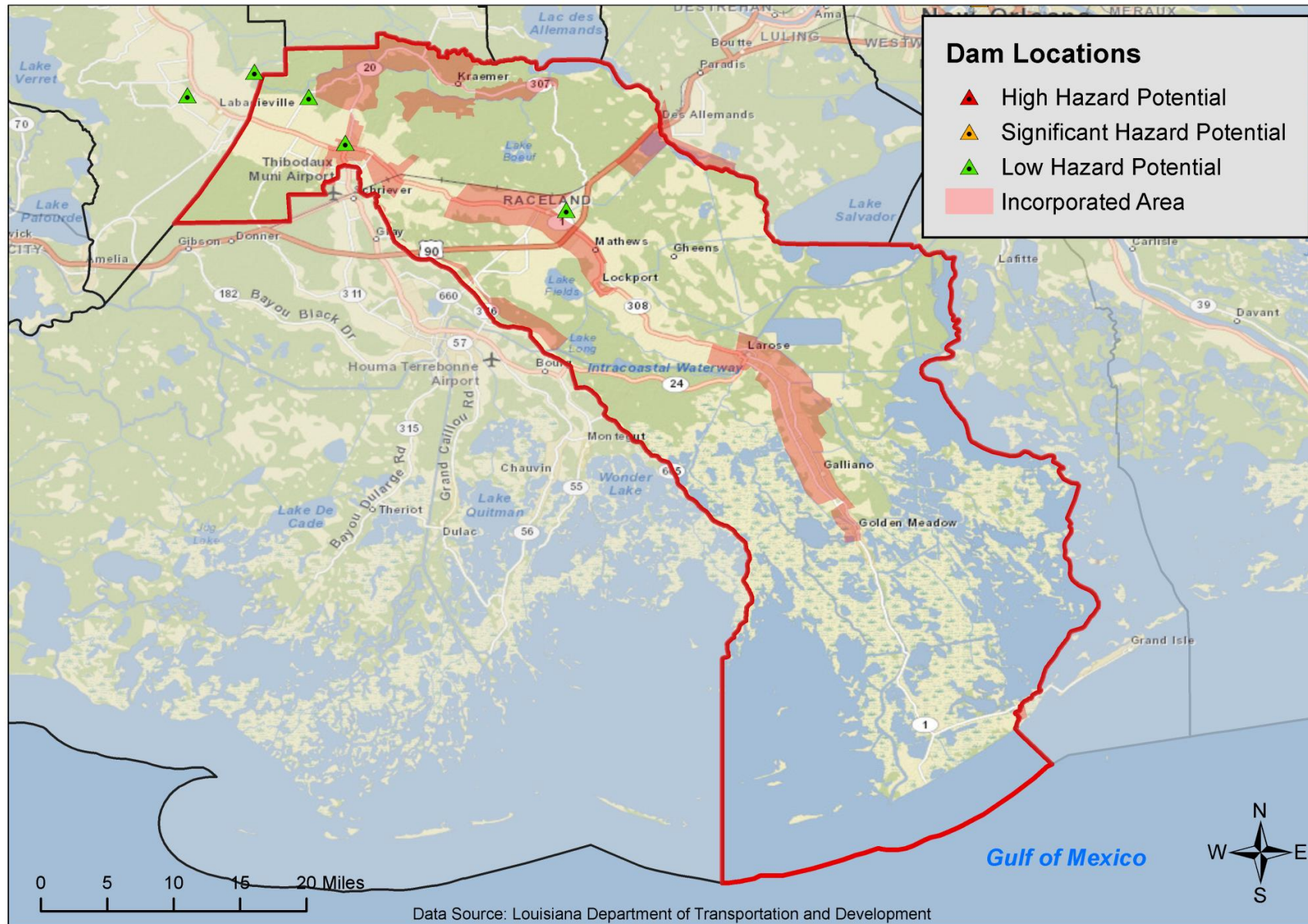
- Levees and floodwalls are flood control barriers constructed of earth, concrete, or other materials. For the purposes of this plan, levees are distinguished from smaller flood barriers (such as berms) by their size and extent.
- Levees and floodwalls are barriers that protect significant areas of residential,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



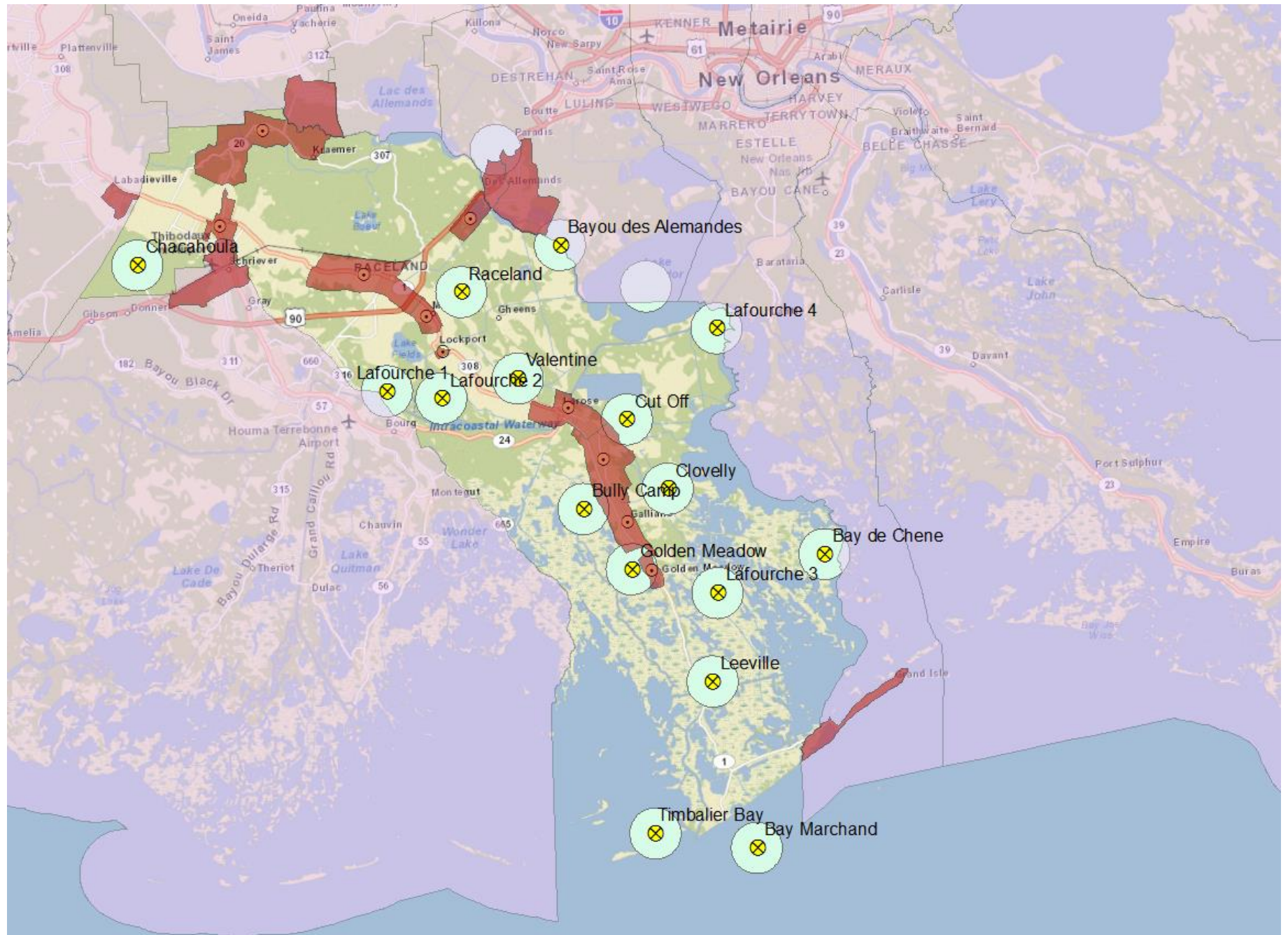




# Lafourche Parish Dam Locations



# Sinkholes



# Mitigation Strategy – Parish Goals

- Identify and pursue preventative measures that will reduce future damages from hazards
- Enhance public awareness and understanding of disaster preparedness
- Reduce repetitive flood losses in the parish by pursuing various mitigation measures (acquisitions, elevations, and flood-proofing)
- Facilitate sound development in the parish so as to reduce or eliminate the potential impact of hazards



# 2009-2014 Parish HM Project Status

- Director's Comments



# Public Outreach Activities

- Risk Analysis Activity (Hazard Occurrences)
- Problem Area Identification (Parish Maps)
- Survey

