St. Bernard Parish Hazard Mitigation Plan Update Public Meeting

August 13, 2015

Chalmette, LA

OFFICE OF HOMELAND SECURITY
ST. BERNARD PARISH GOVERNMENT
EMERGENCY PREPAREDNESS

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Agenda

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

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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

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Why are we required to have a Hazard Mitigation Plan?

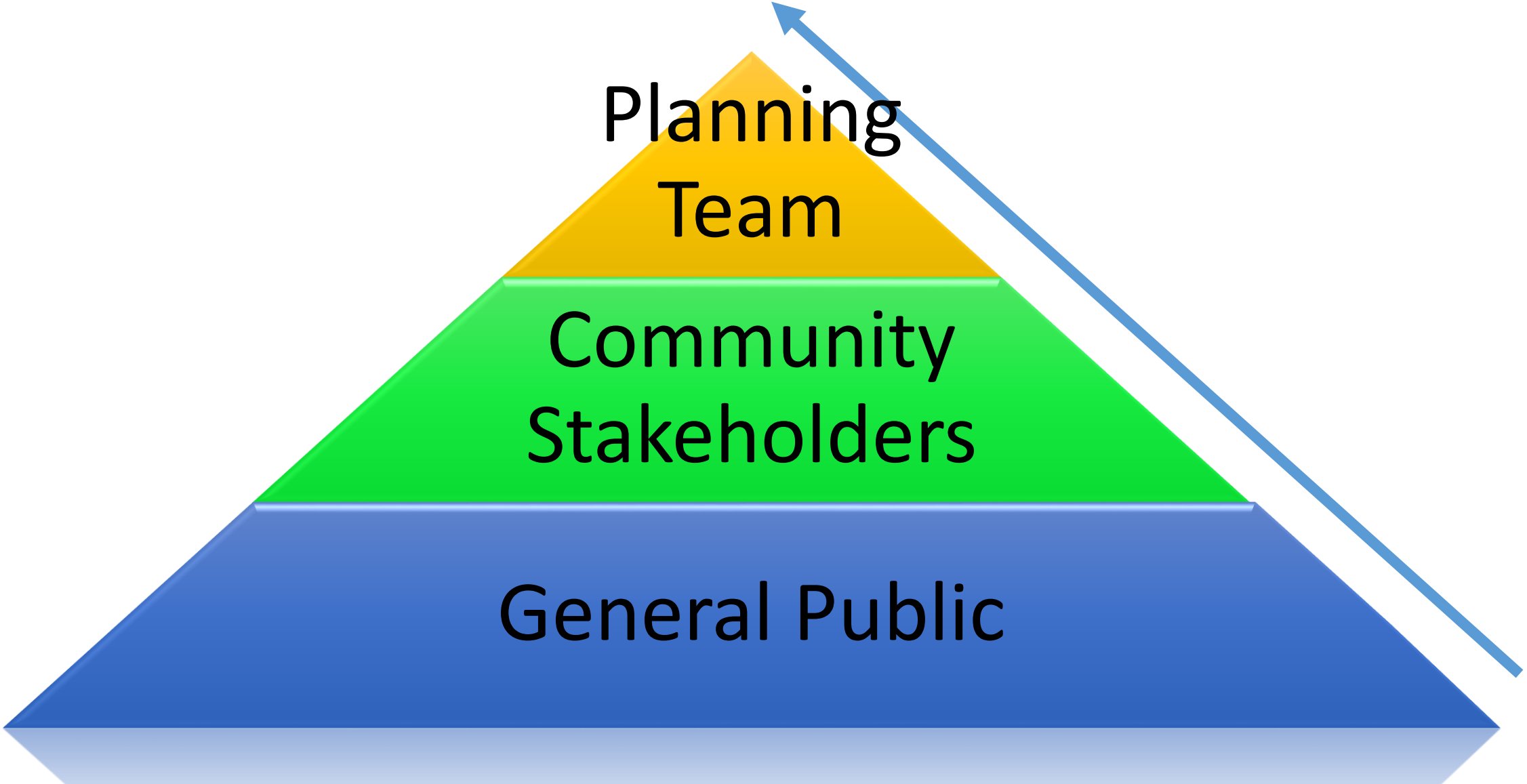
- Disaster Mitigation Act of 2000 (DMA 2000)

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 St. Bernard Parish Hazard Mitigation Plan will allow for distribution of HM funding following future disasters.

Collaborative Planning Approach



Planning Development

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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

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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

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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

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Hazard Identification and Risk Assessment (previous plan)

- Flooding
- Hurricanes
- Thunderstorms
- Hailstorms
- Land Subsidence
- Levee Failure
- Tornadoes
- Wildfires
- Hazardous Materials Incidents

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Risk Assessment: Hazard Identification

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

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Risk Assessment: Analyze Risk and Summarize Vulnerability

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

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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 Beauregard Parish;
- The hazards that pose the greatest potential for a negative impact are:

  -Flooding, Sinkholes, Subsidence/Saltwater Intrusion, Tropical Cyclones, Thunderstorms

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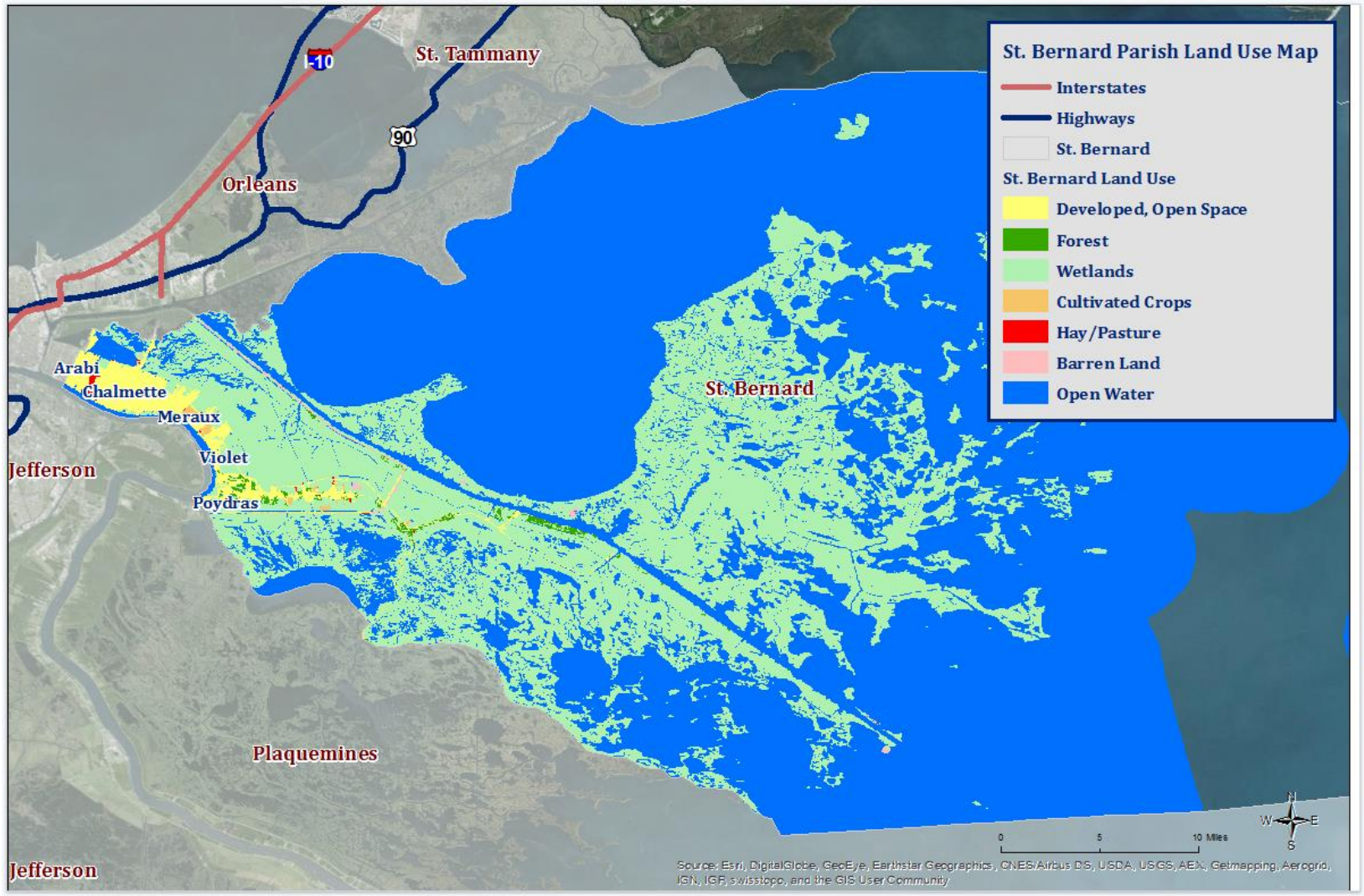
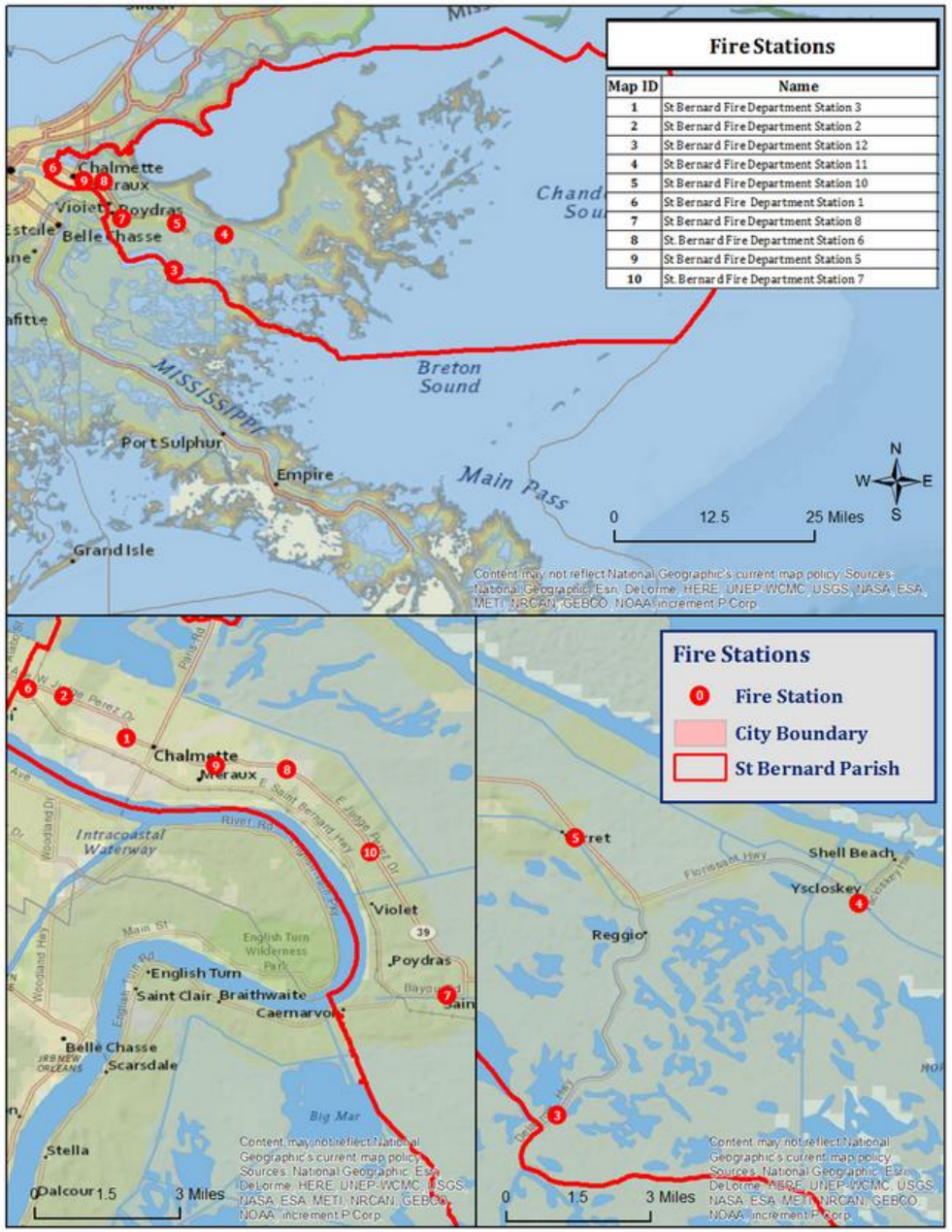
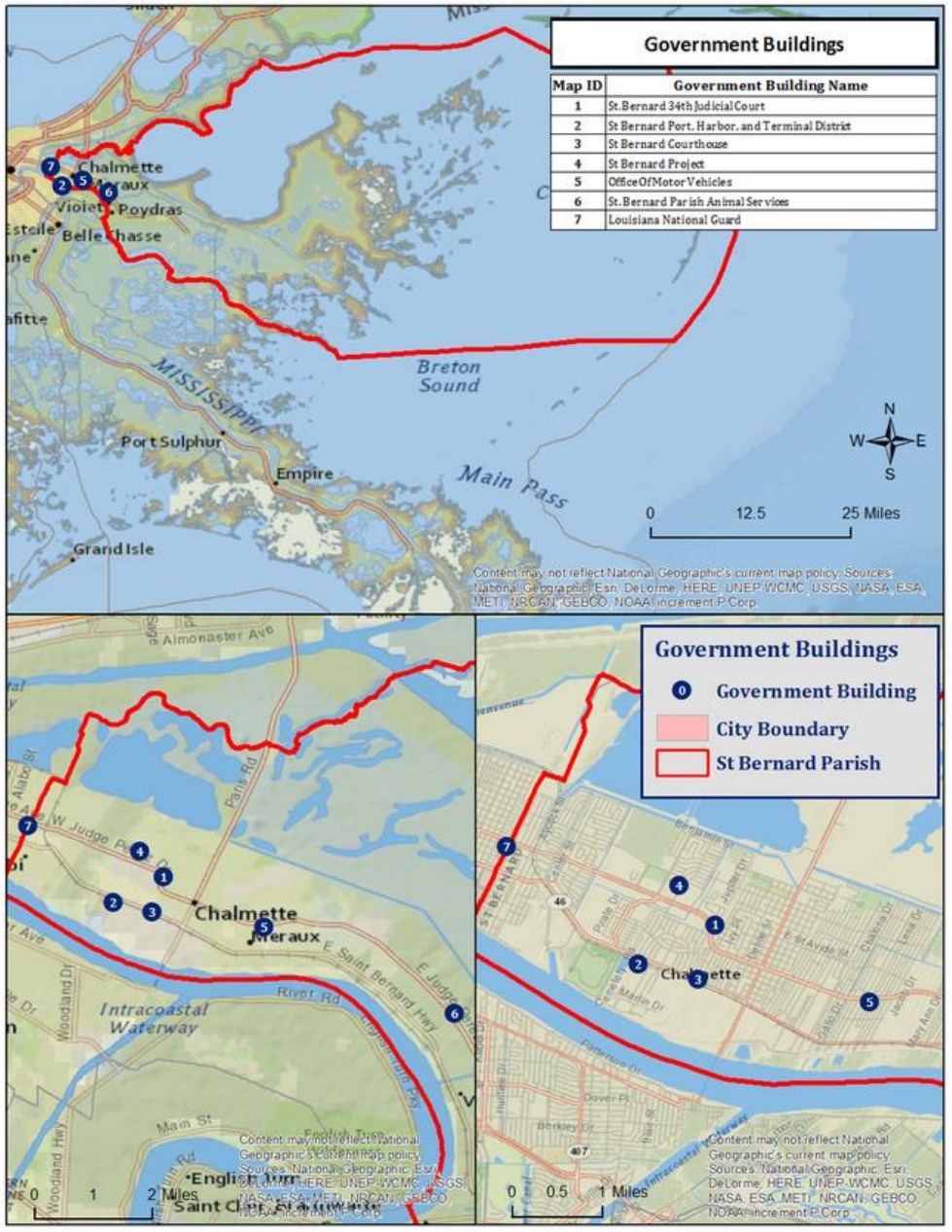
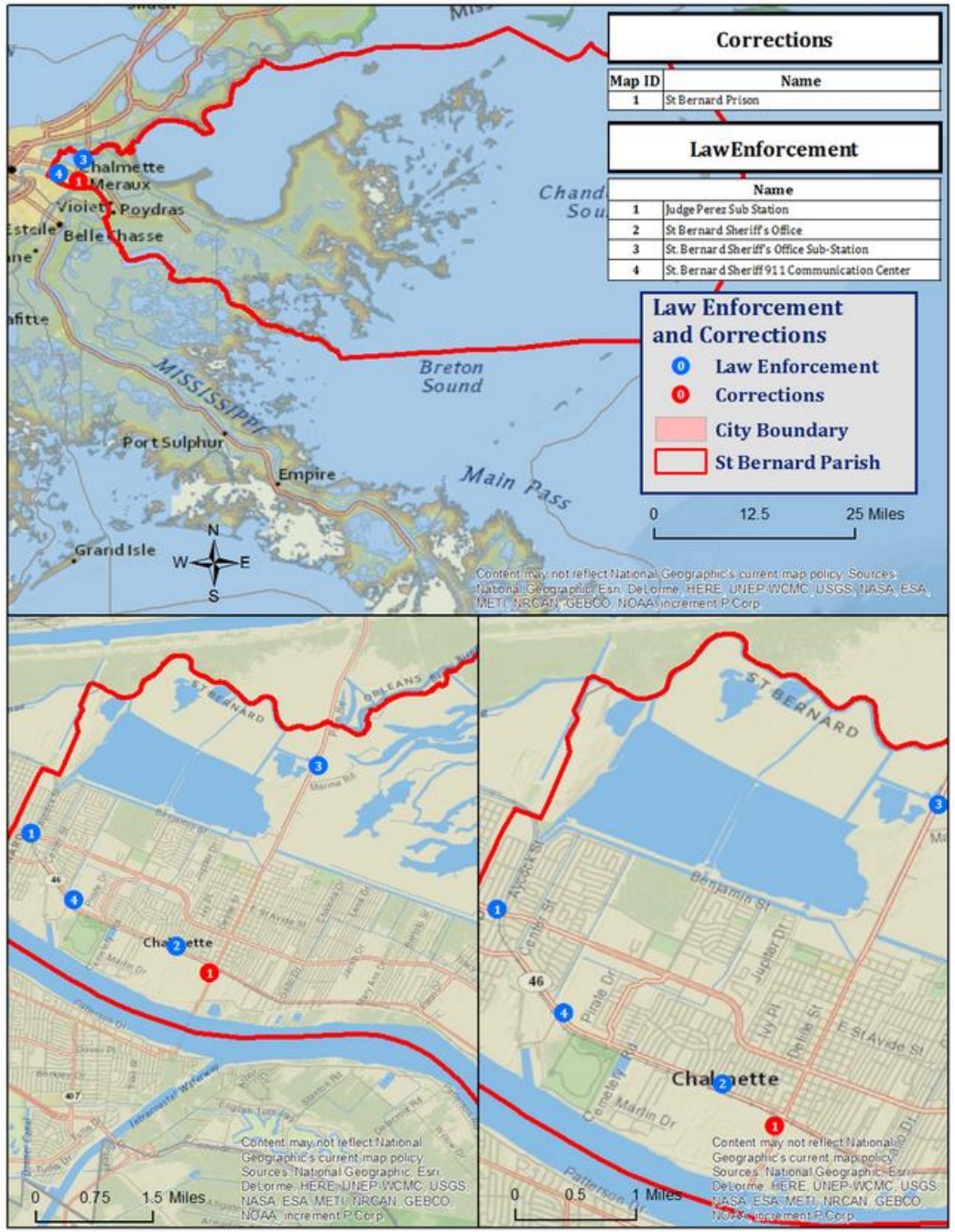
St. Bernard Parish – Land Use Map

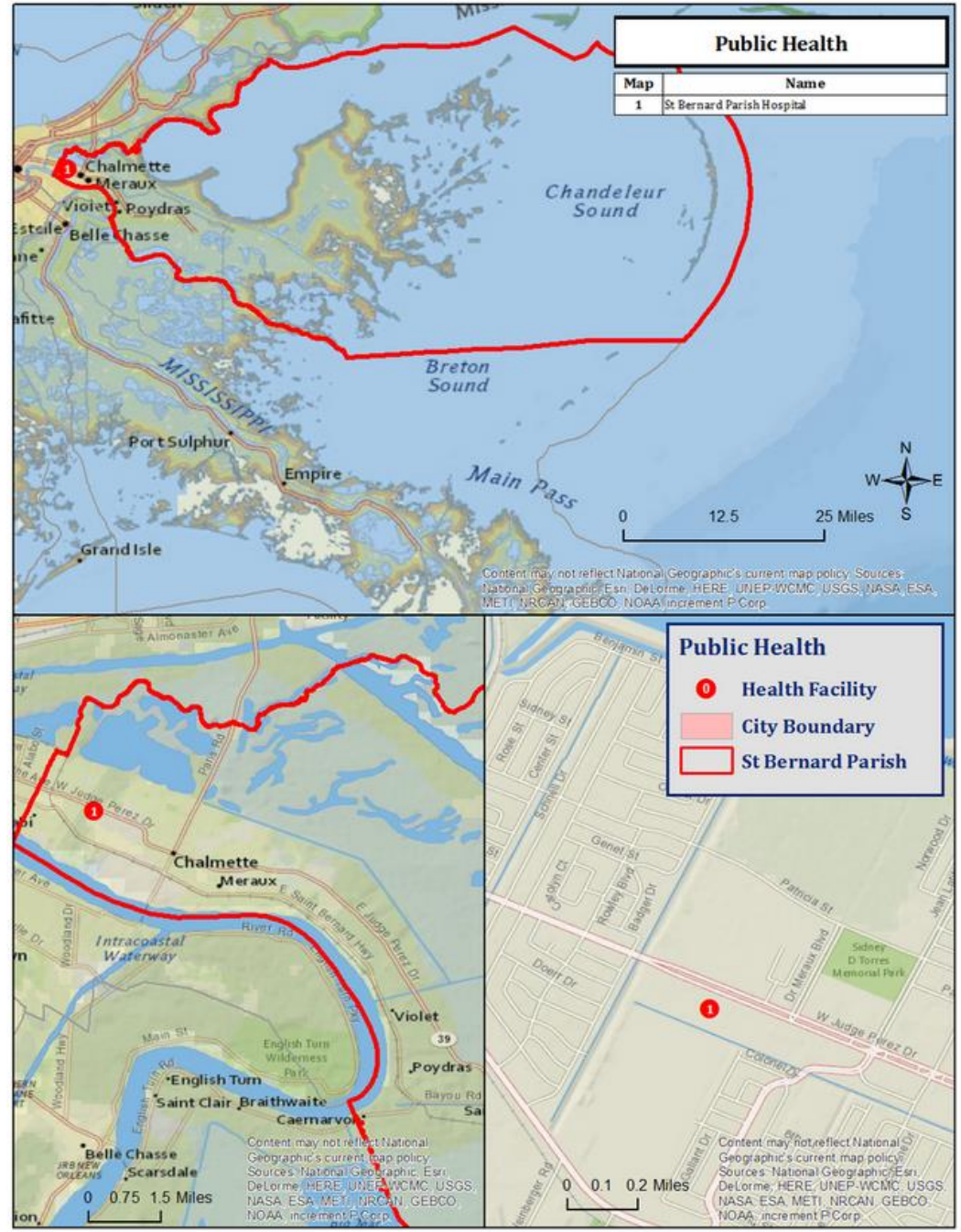


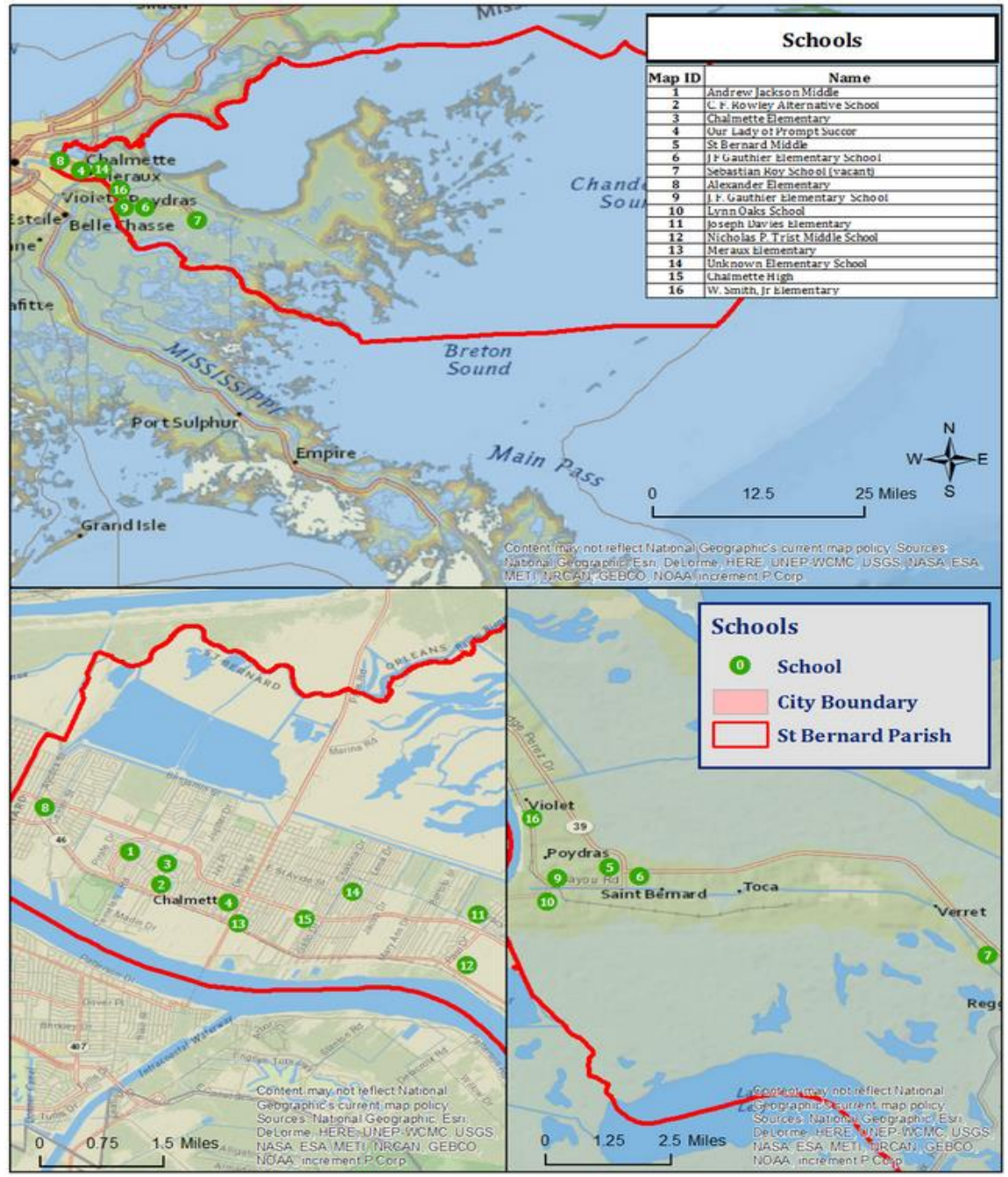
St. Bernard Parish – Essential Facilities






Corrections
Map ID | Name
1 | St Bernard Prison
LawEnforcement
Name
1 | Judge Perez Sub Station
2 | St Bernard Sheriff's Office
3 | St. Bernard Sheriff's Office Sub-Station
4 | St. Bernard Sheriff 911 Communication Center
Law Enforcement and Corrections
Law Enforcement
Corrections
City Boundary
St Bernard Parish
Chalmette
Meraux
Violet
Poydras
Belle Chasse
Port Sulphur
Empire
Grand Isle
Breton Sound
Main Pass
MISSISSIPPI
0 12.5 25 Miles
N W E S
Content may not reflect National Geographic's current map policy. Sources: National Geographic, Esri, DeLorme, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp
0 0.75 1.5 Miles
0 0.5 1 Miles


Public Health
Map | Name
1 | St Bernard Parish Hospital
Public Health
Health Facility
City Boundary
St Bernard Parish
Chalmette
Meraux
Violet
Poydras
English Turn
Saint Clair
Braithwaite
Caernarvon
Belle Chasse
Scarsdale
Port Sulphur
Empire
Grand Isle
Chandeleur Sound
Breton Sound
Main Pass
MISSISSIPPI
Intracoastal Waterway
0 12.5 25 Miles
N W E S
Content may not reflect National Geographic's current map policy. Sources: National Geographic, Esri, DeLorme, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp
0 0.75 1.5 Miles
0 0.1 0.2 Miles


Schools
Map ID | Name
1 Andrew Jackson Middle
2 C. F. Rowley Alternative School
3 Chalmette Elementary
4 Our Lady of Prompt Succor
5 St Bernard Middle
6 J F Gauthier Elementary School
7 Sebastian Roy School (vacant)
8 Alexander Elementary
9 J F. Gauthier Elementary School
10 Lynn Oaks School
11 Joseph Davies Elementary
12 Nicholas P. Trist Middle School
13 Meraux Elementary
14 Unknown Elementary School
15 Chalmette High
16 W. Smith, Jr Elementary
Chalmette
Meraux
Violet
Poydras
Belle Chasse
Breton Sound
Mississippi
Port Sulphur
Empire
Main Pass
Grand Isle
N
W
E
S
0 12.5 25 Miles
Content may not reflect National Geographic's current map policy. Sources: National Geographic, Esri, DeLorme, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.
Schools
School
City Boundary
St Bernard Parish
Violet
Poydras
Saint Bernard
Toca
Verret
0 0.75 1.5 Miles
0 1.25 2.5 Miles

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

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Repetitive Flooding

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

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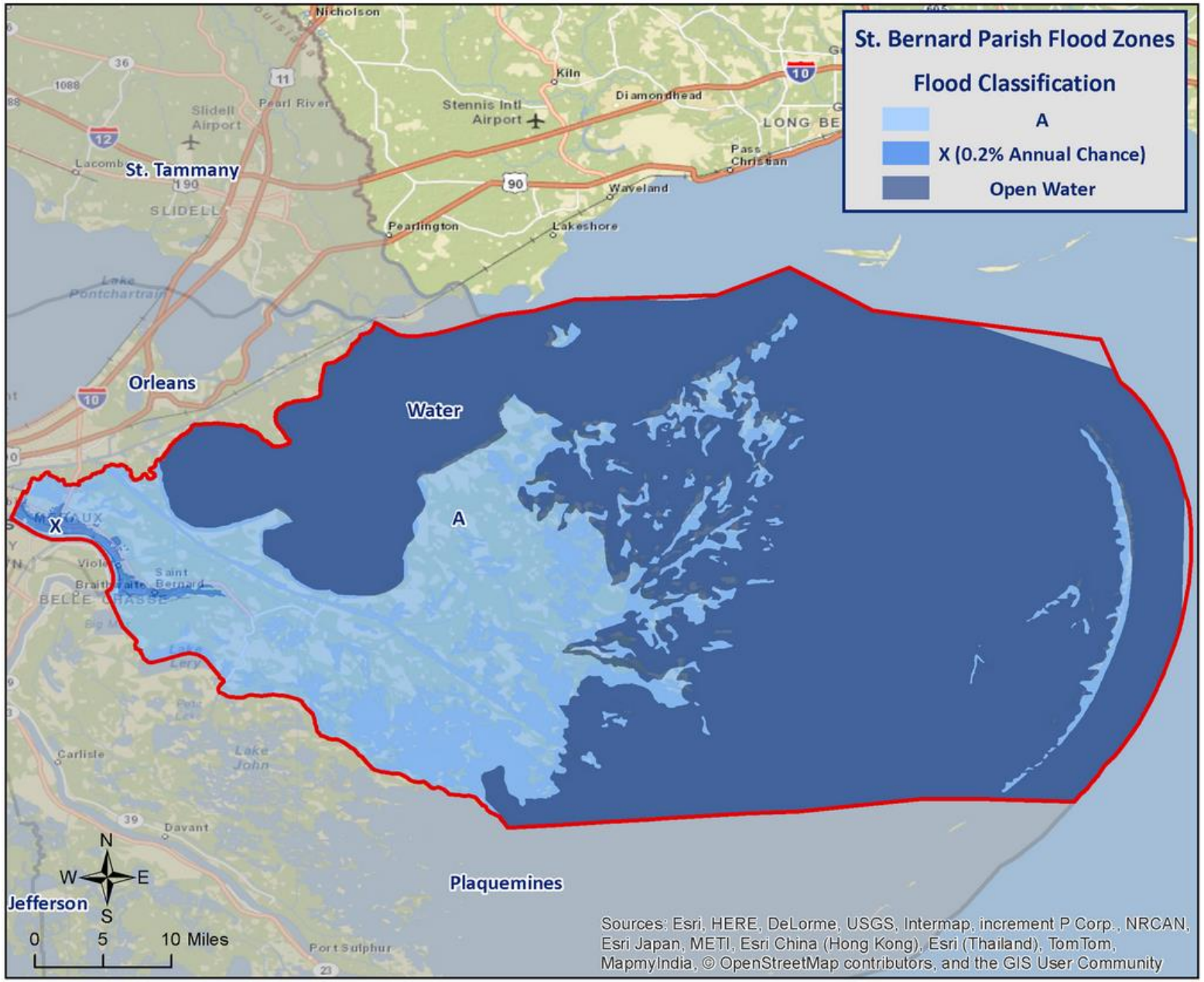
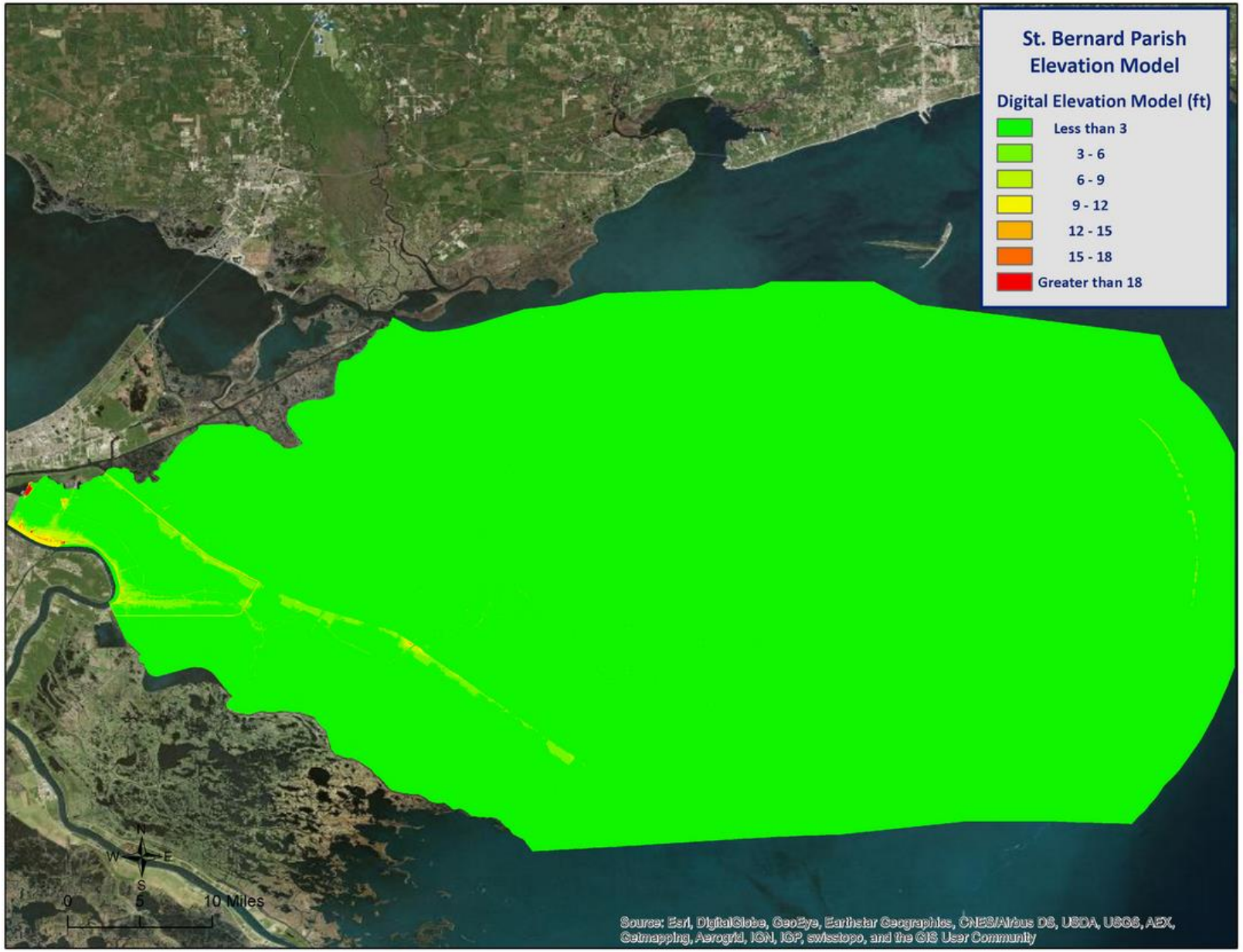
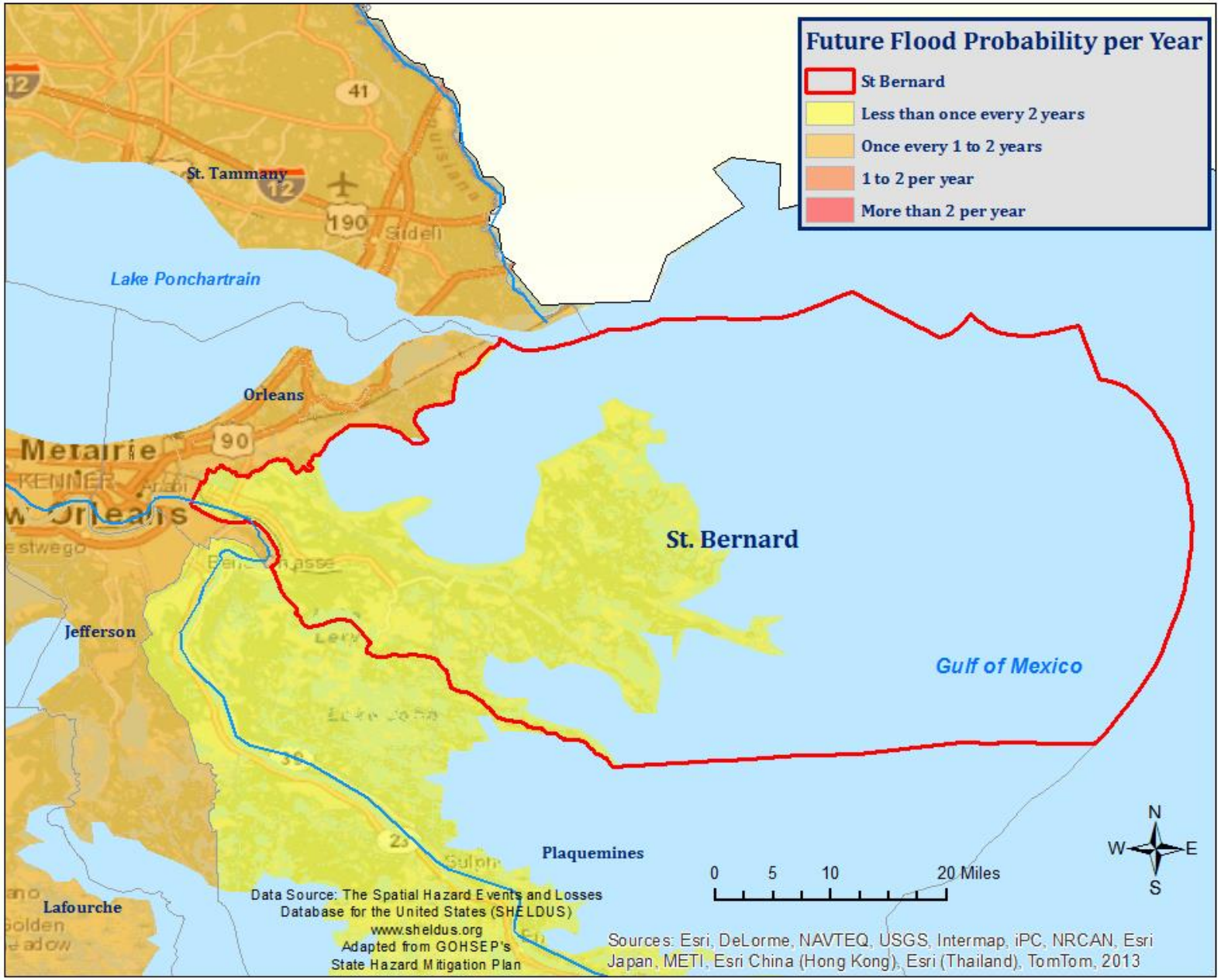
Flooding – Elevation Model



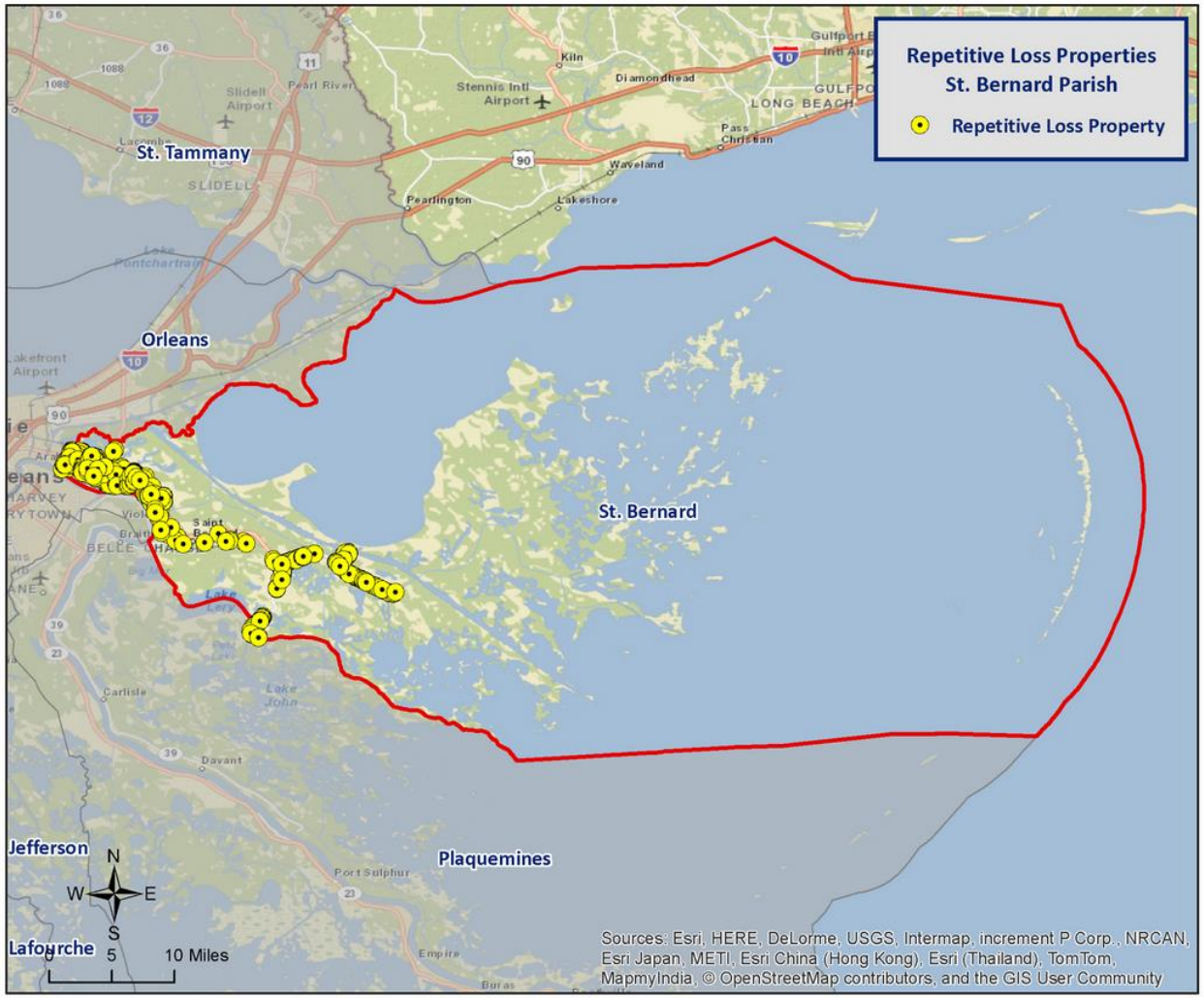
Flooding – Elevation Model

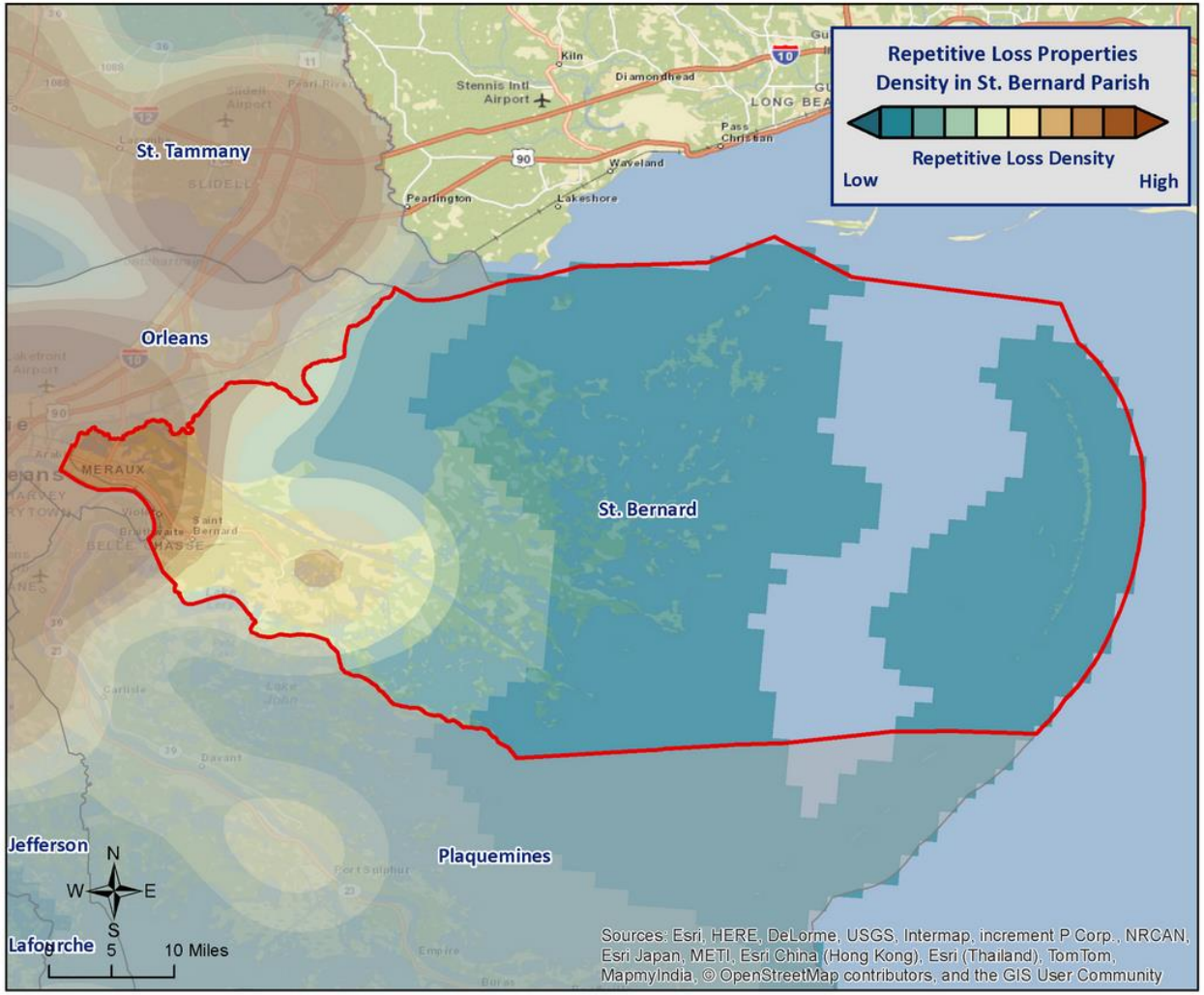


Future Flood Probability



Repetitive Loss Properties





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.

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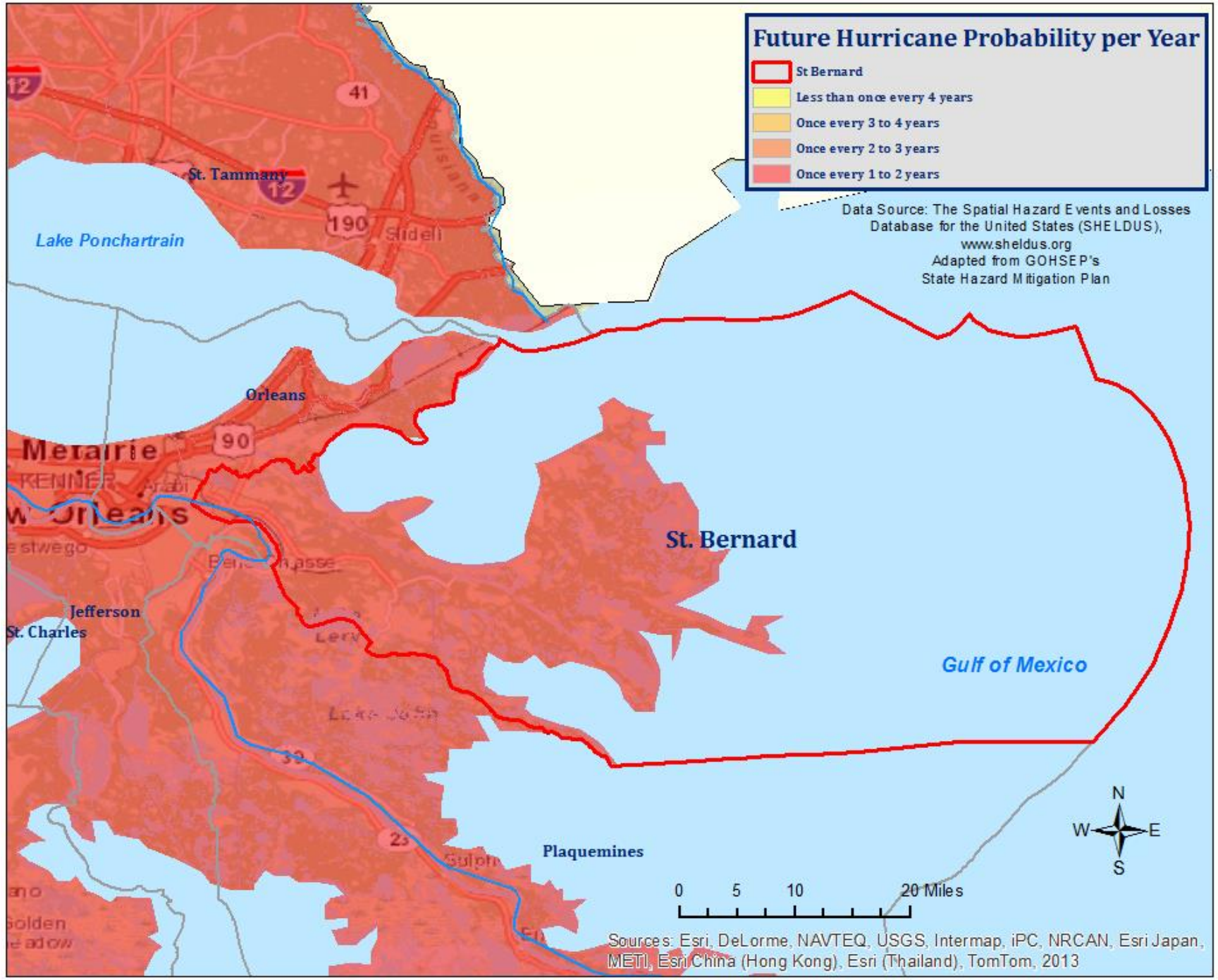
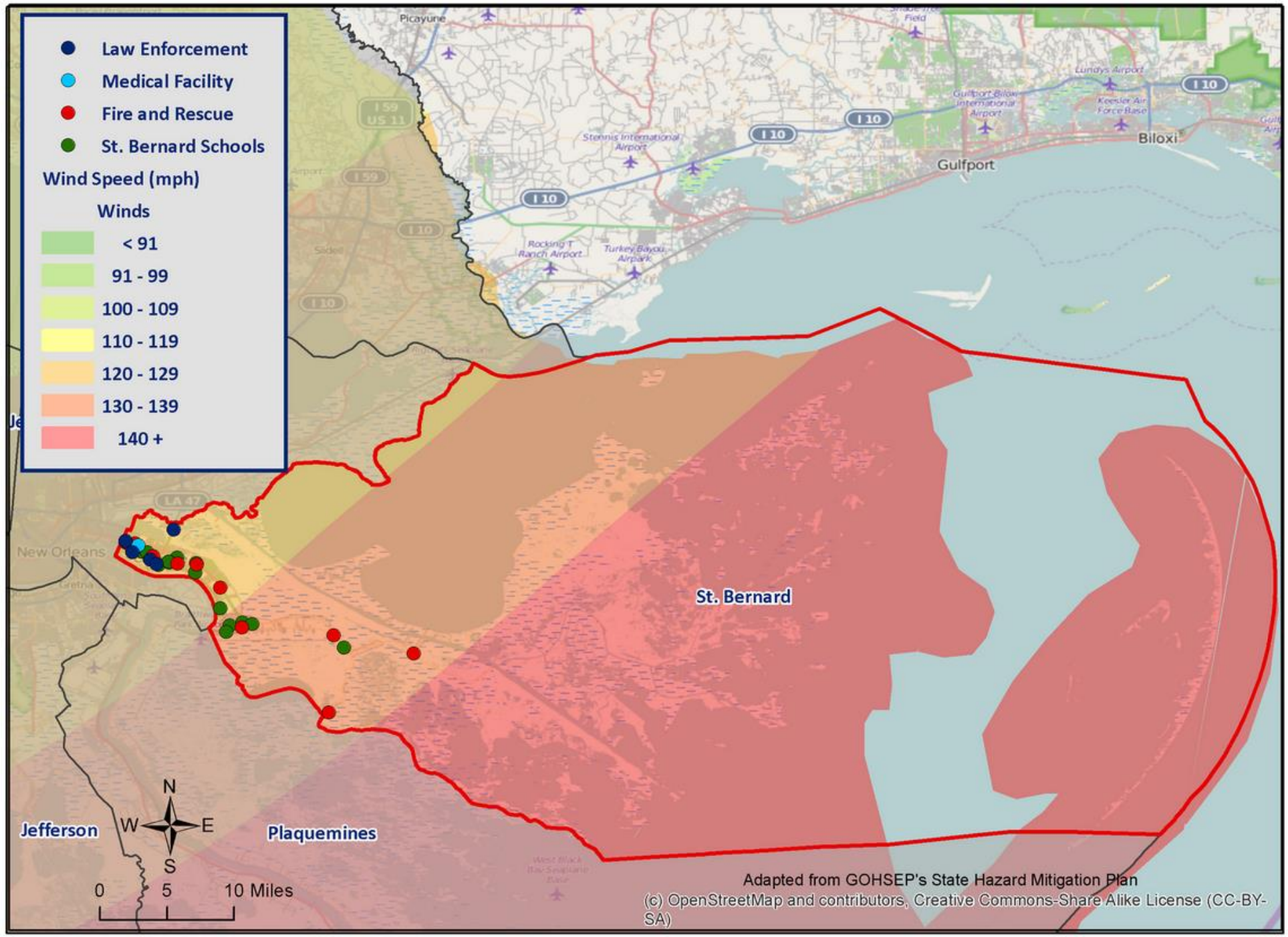
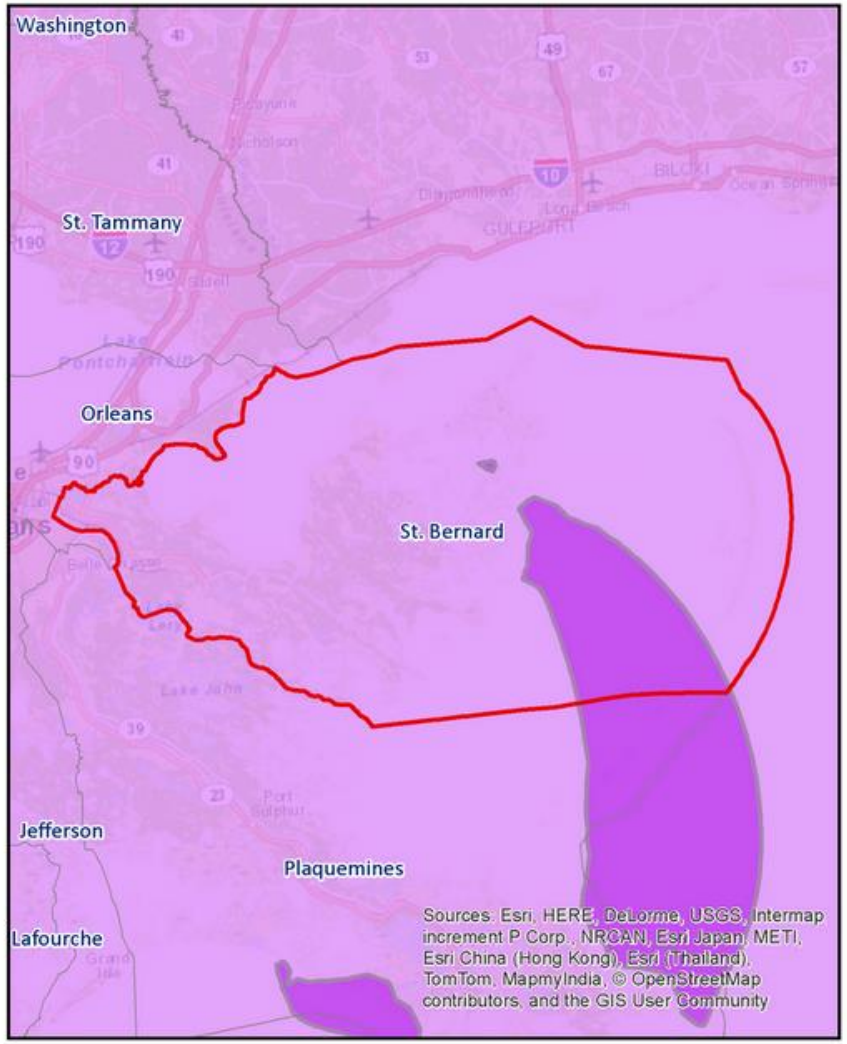
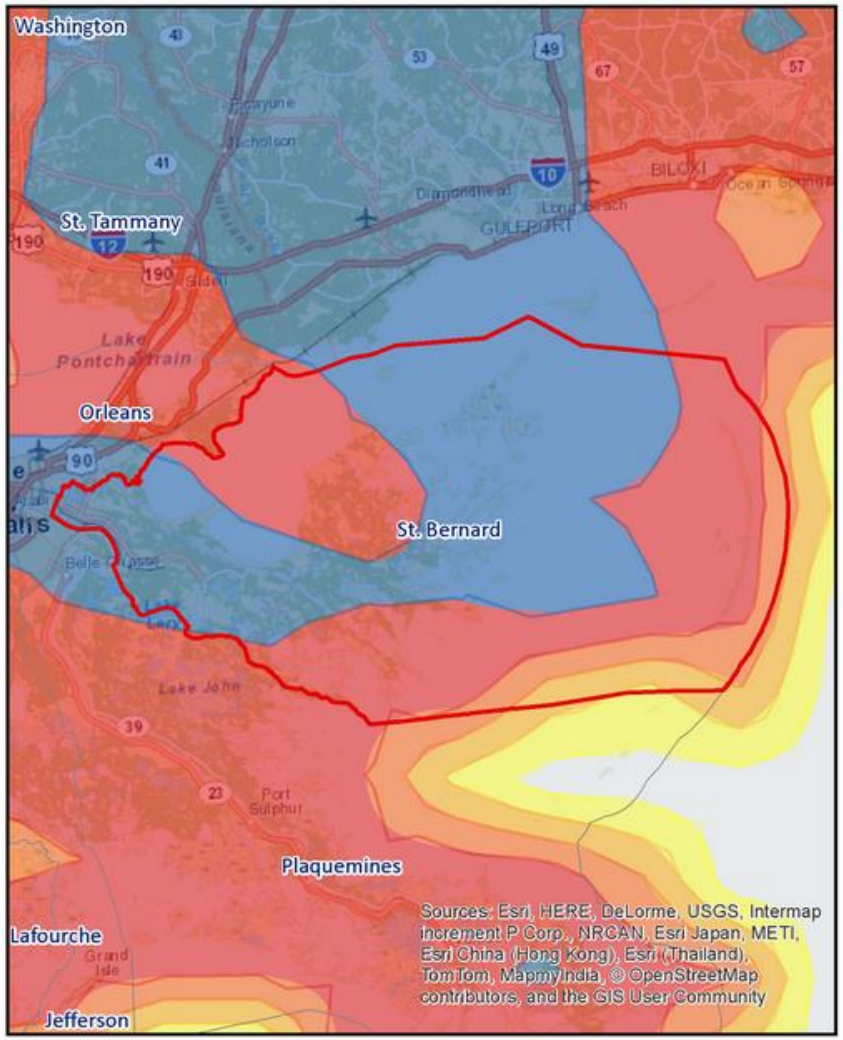

Future Hurricane Probability per Year
St Bernard
Less than once every 4 years
Once every 3 to 4 years
Once every 2 to 3 years
Once every 1 to 2 years
Data Source: The Spatial Hazard Events and Losses Database for the United States (SHELDUS), www.sheldus.org
Adapted from GOHSEP's State Hazard Mitigation Plan
St. Tammany
Lake Ponchartrain
Slidell
Orleans
Metairie
KENNER
New Orleans
St. Bernard
Jefferson
St. Charles
Gulf of Mexico
Plaquemines
Sulphur
N
W
E
S
0 5 10 20 Miles
Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013


Law Enforcement
Medical Facility
Fire and Rescue
St. Bernard Schools
Wind Speed (mph)
Winds
< 91
91 - 99
100 - 109
110 - 119
120 - 129
130 - 139
140 +
Picayune
Gulfport
Biloxi
New Orleans
St. Bernard
Jefferson
Plaquemines
N
W
E
S
0
5
10 Miles
Adapted from GOHSEP's State Hazard Mitigation Plan
(c) OpenStreetMap and contributors, Creative Commons-Share Alike License (CC-BY-SA)

Hurricane Katrina (2005)





Wind Speed (Saffir-Simpson Scale)

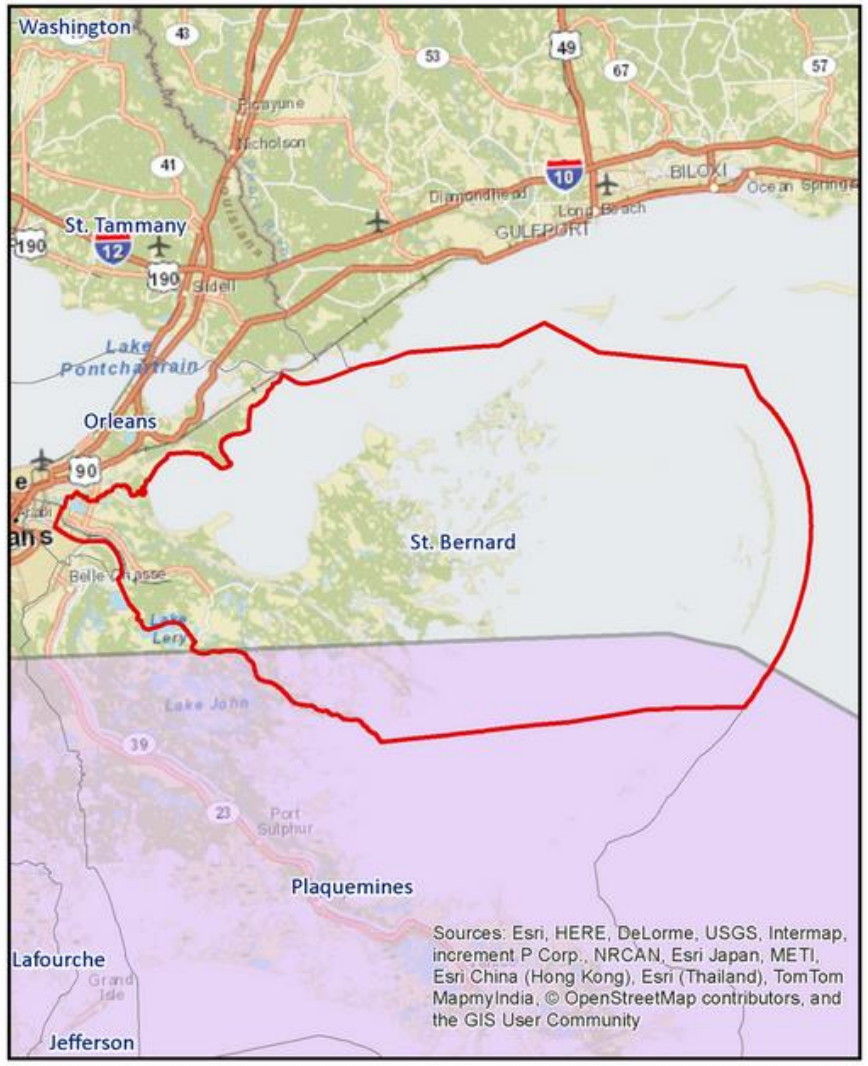
- Tropical Storm (39 - 73 mph)
- Hurricane (74 - 110 mph)
- Major Hurricane (> 110 mph)

Total Precipitation (inches)

1 3 5 7 10 15 20

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

Hurricane Rita (2005)



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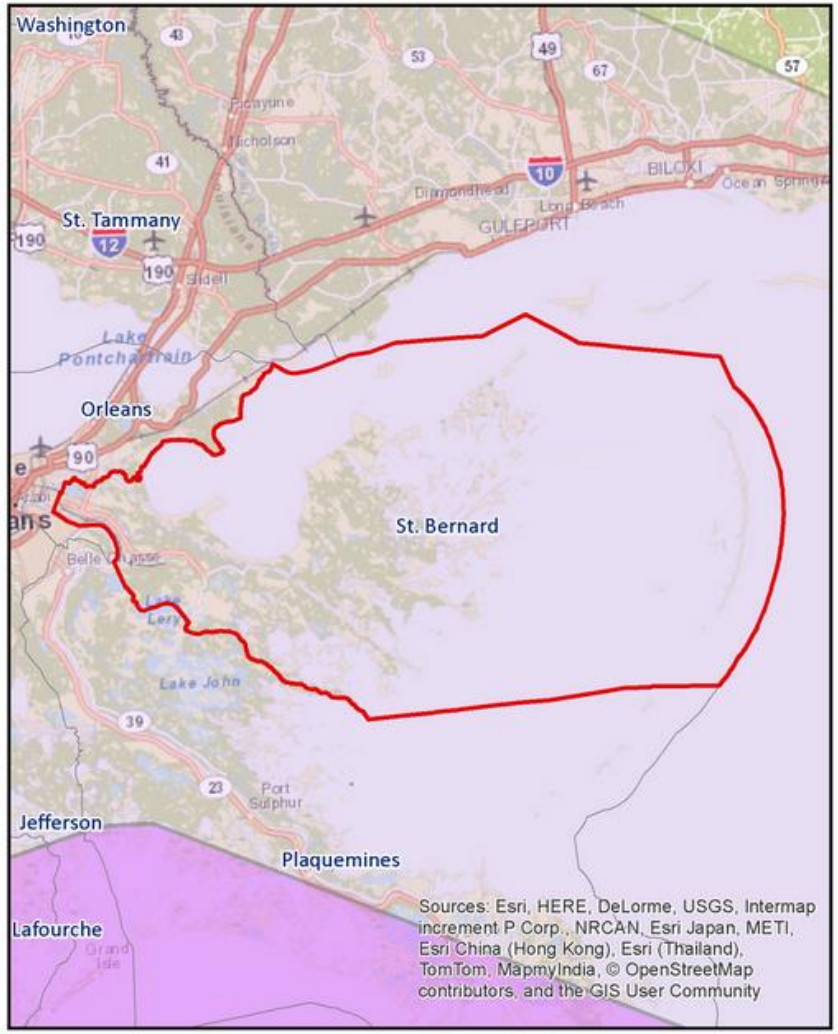
- Major Hurricane (> 110 mph)

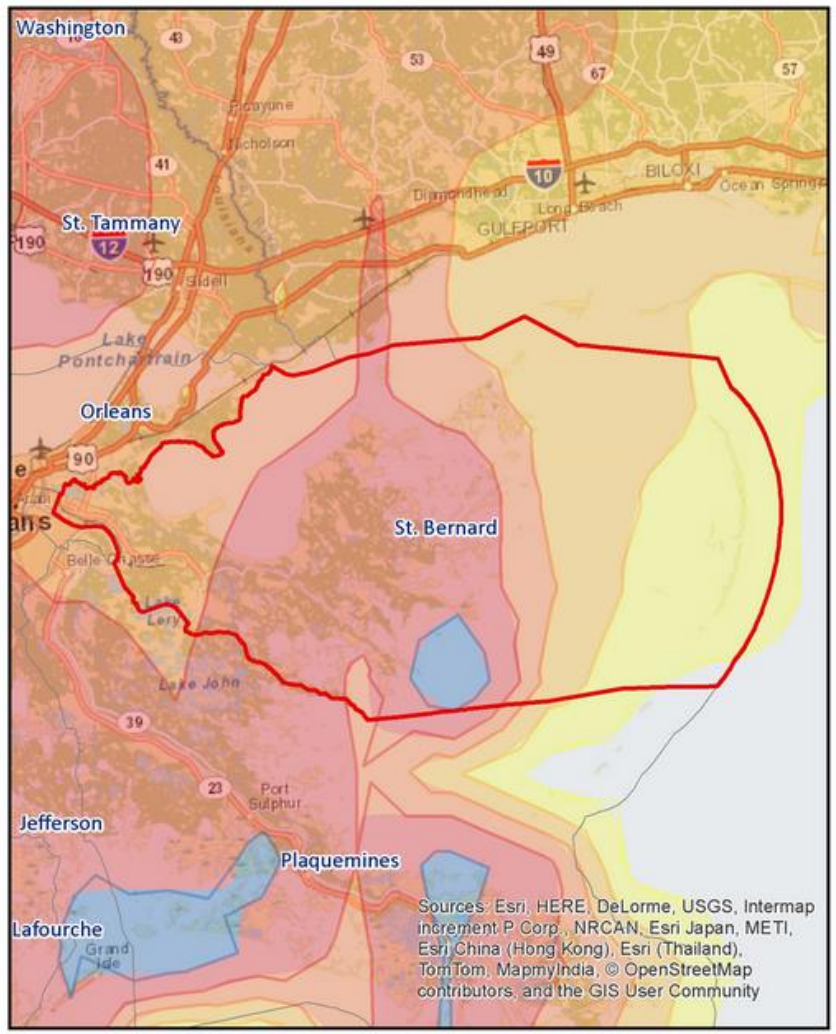
Total Precipitation (inches)

1 3 5 7 10 15 20

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

Hurricane Gustav (2008)





Wind Speed (Saffir-Simpson Scale)

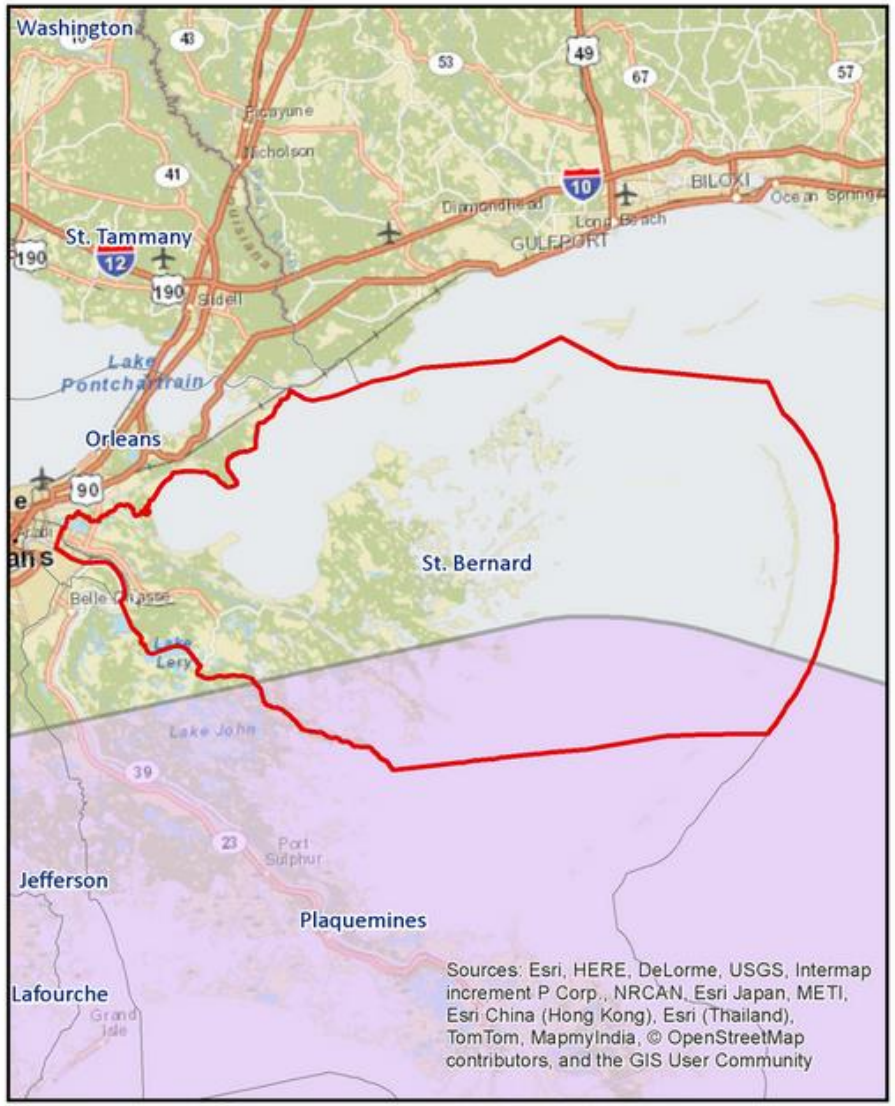
Tropical Storm (39 - 73 mph) | Hurricane (74 - 110 mph) | Major Hurricane (> 110 mph)

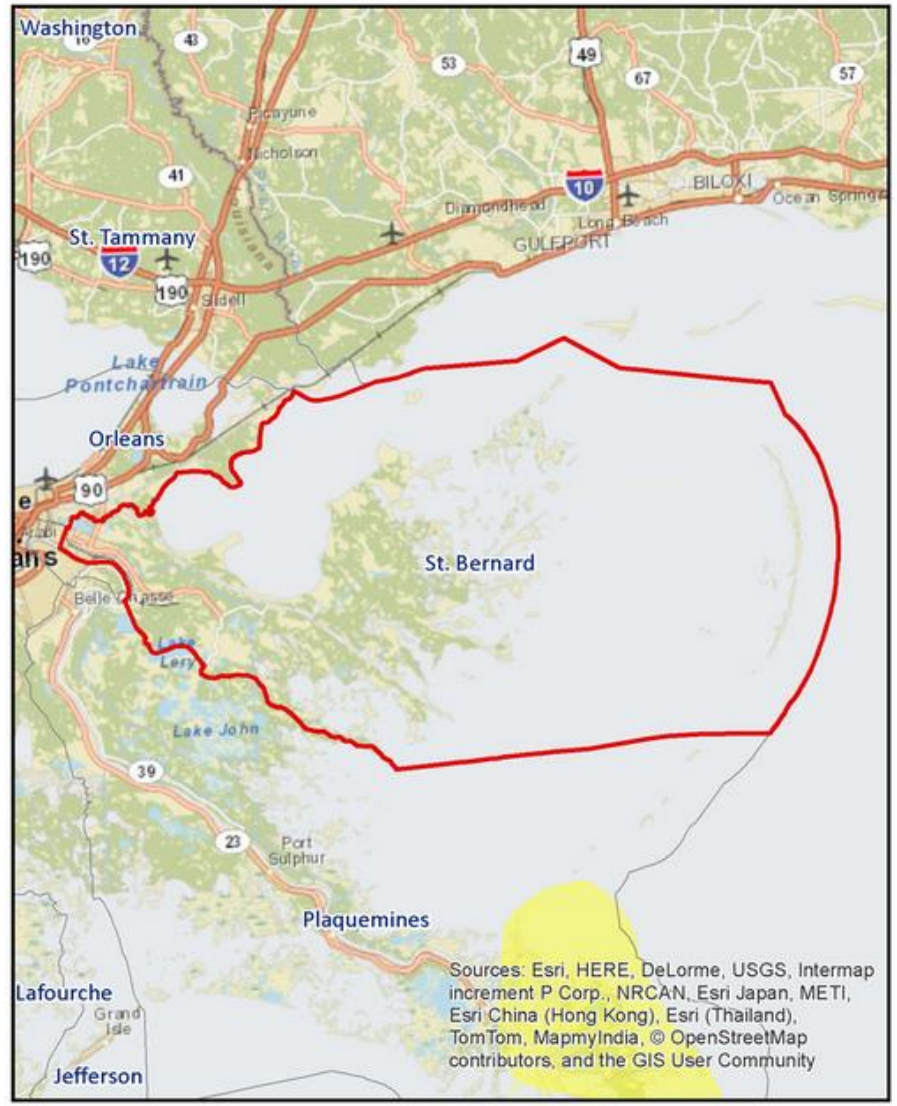
Total Precipitation (inches)

1 | 3 | 5 | 7 | 10 | 15 | 20

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

Hurricane Ike (2008)





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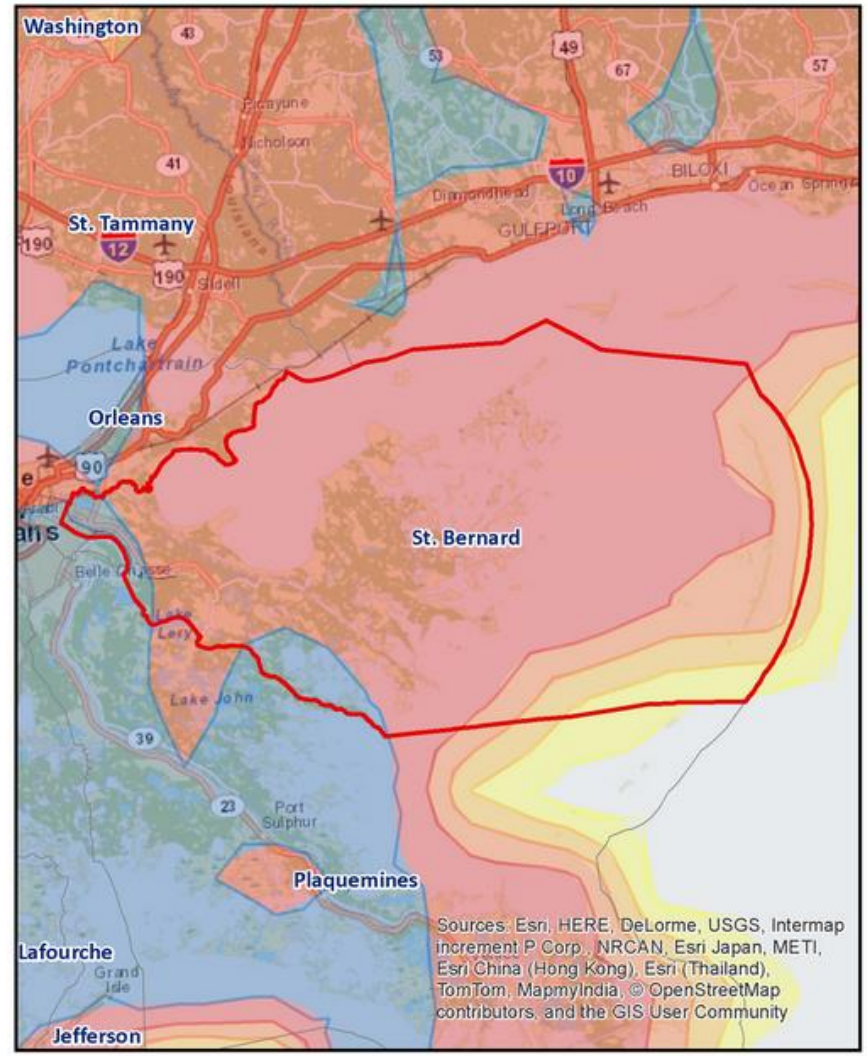
- Hurricane (74 - 110 mph)
- Major Hurricane (> 110 mph)

Total Precipitation (inches)

1 3 5 7 10 15 20

Data Source: NOAA Hurricane Research Division (HRD)

Tropical Storm Lee (2011)



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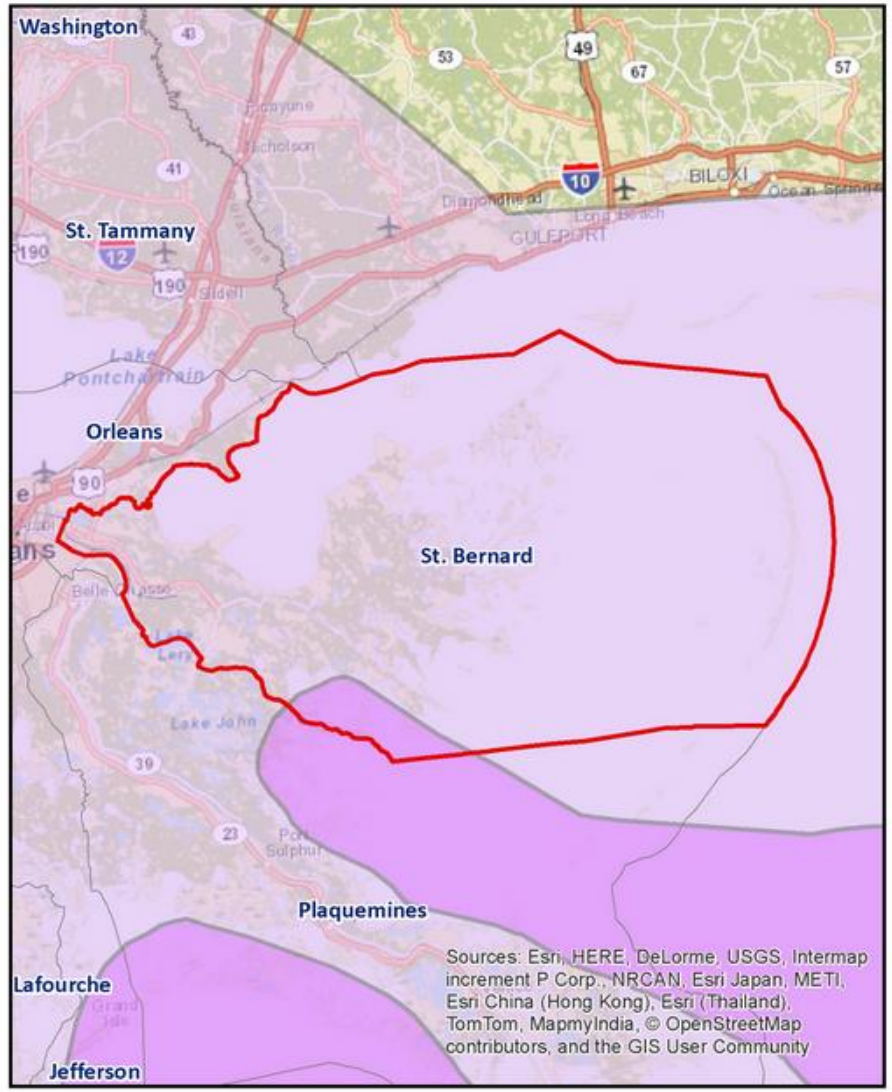
- Hurricane (74 - 110 mph)
- Major Hurricane (> 110 mph)

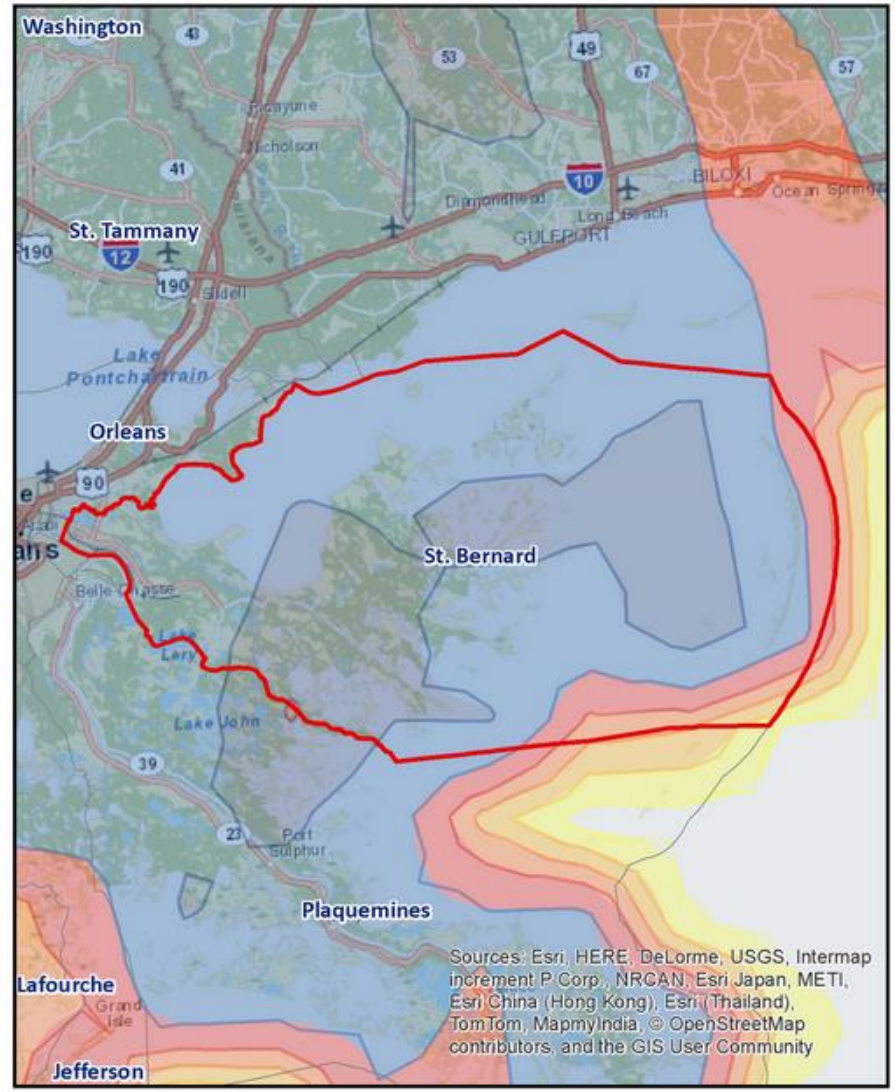
Total Precipitation (inches)

1 3 5 7 10 15 20

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

Hurricane Isaac (2012)





Wind Speed (Saffir-Simpson Scale)

Tropical Storm (39 - 73 mph)

Hurricane (74 - 110 mph)

Major Hurricane (> 110 mph)

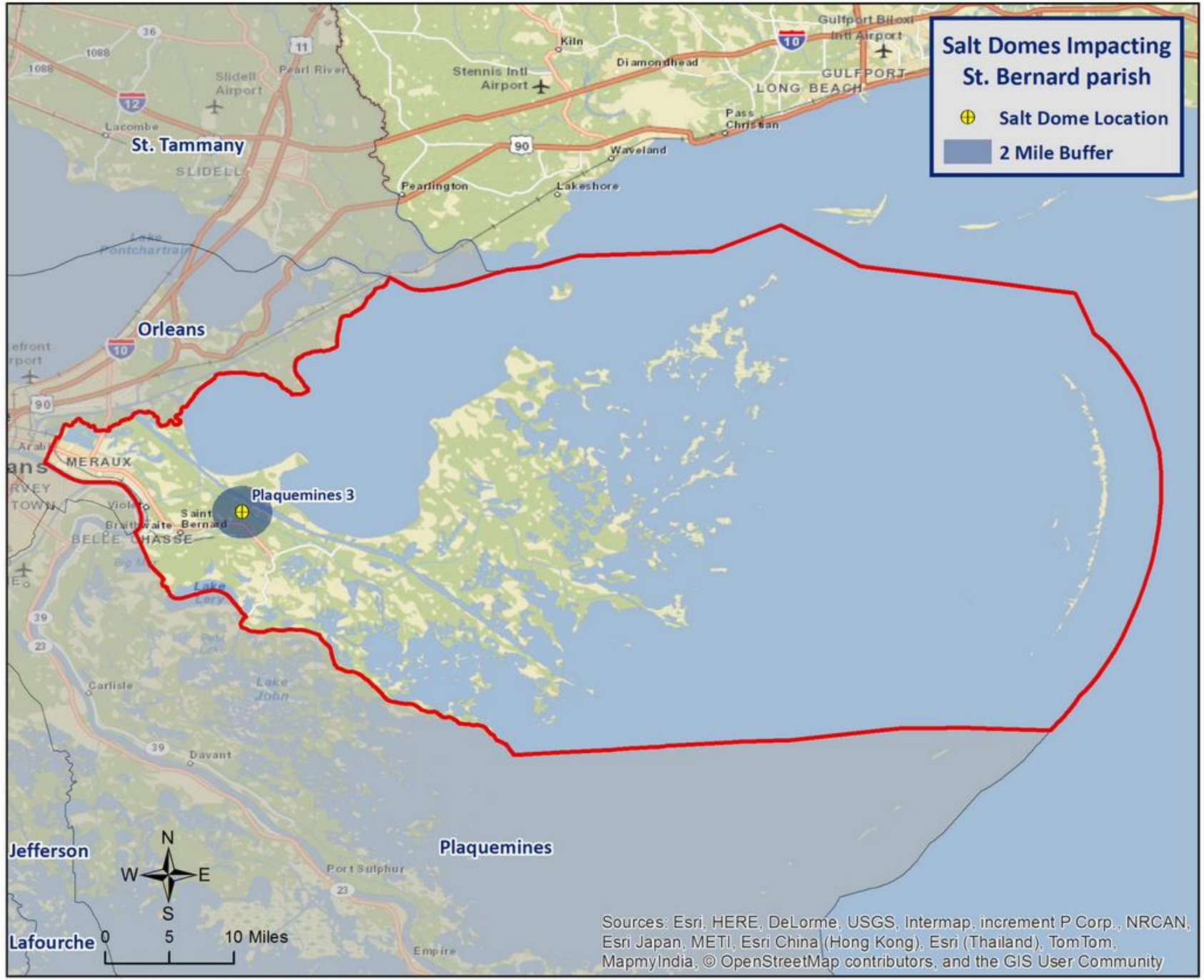
Total Precipitation (inches)

1 3 5 7 10 15 20

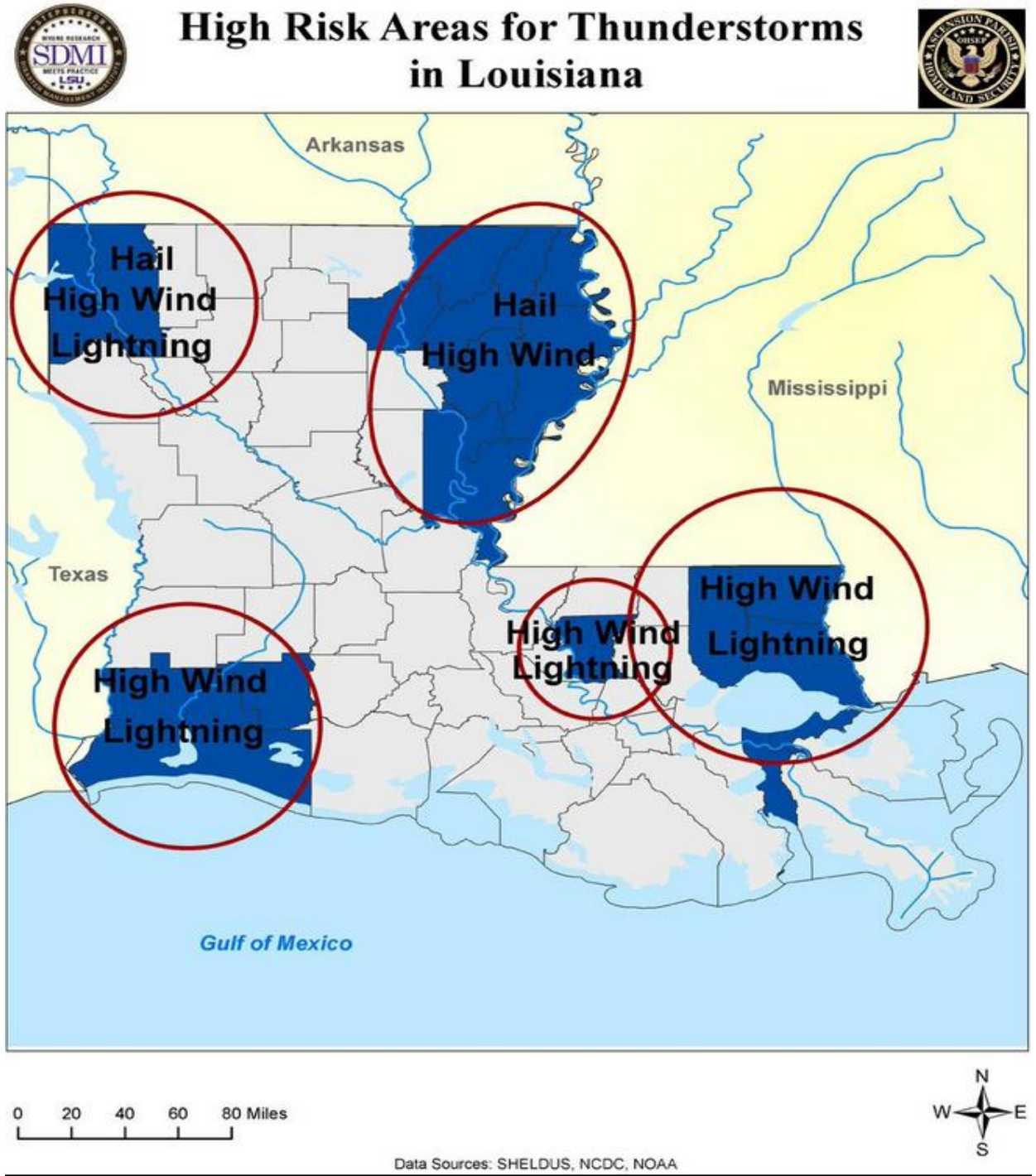
Data Source: NOAA Hurricane Research Division (HRD)
Adapted from GOHSEP's State Hazard Mitigation Plan

Sinkholes

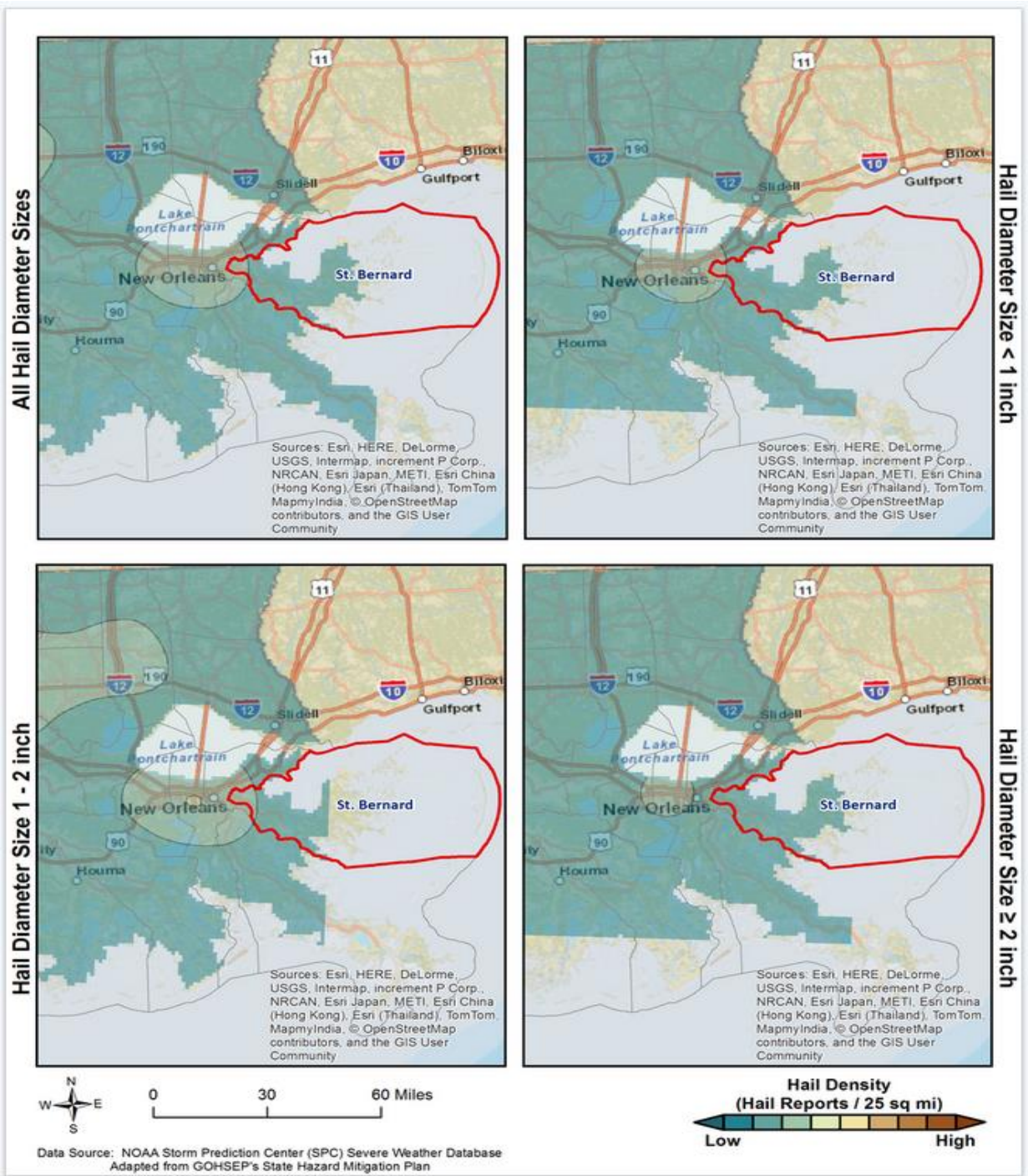
- A sinkhole is an area of ground that has no natural external surface drainage – when it rains, all of the water stays inside the sinkhole and typically drains into the subsurface.
- Sinkholes form in areas where the rock below the land surface is limestone, carbonate rock, salt beds, or rocks that can naturally be dissolved by groundwater circulating through them.
- As the rock dissolves, spaces and caverns develop underground. Once the spaces underground become too large, there is not enough support for the land above the spaces which causes a sudden collapse on the land surface.

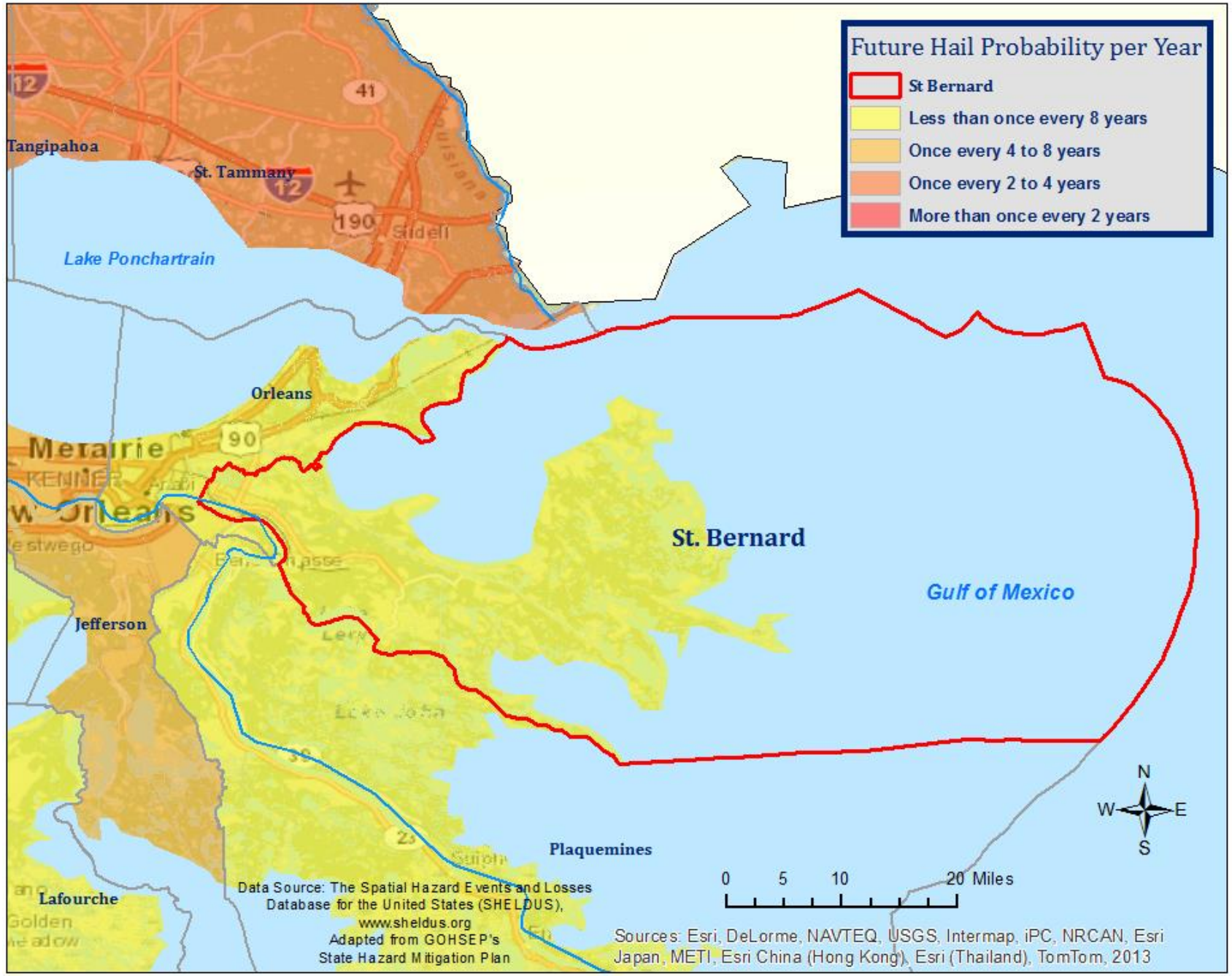

Salt Domes Impacting St. Bernard parish
Salt Dome Location
2 Mile Buffer
St. Tammany
Orleans
Plaquemines 3
Plaquemines
Jefferson
Lafourche
MERAUX
Saint Bernard
Braithwaite
BELLE CHASSE
Lake Pontchartrain
Lake Lery
Lake John
Carlisle
Davant
Port Sulphur
Empire
Pearlington
Lakeshore
Waveland
Pass Christian
Kiln
Diamondhead
Stennis Intl Airport
Slidell Airport
Pearl River
Lacombe
SLIDELL
GULFPORT
LONG BEACH
Gulfport Biloxi Intl Airport
N
W
E
S
0
5
10 Miles
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Thunderstorms

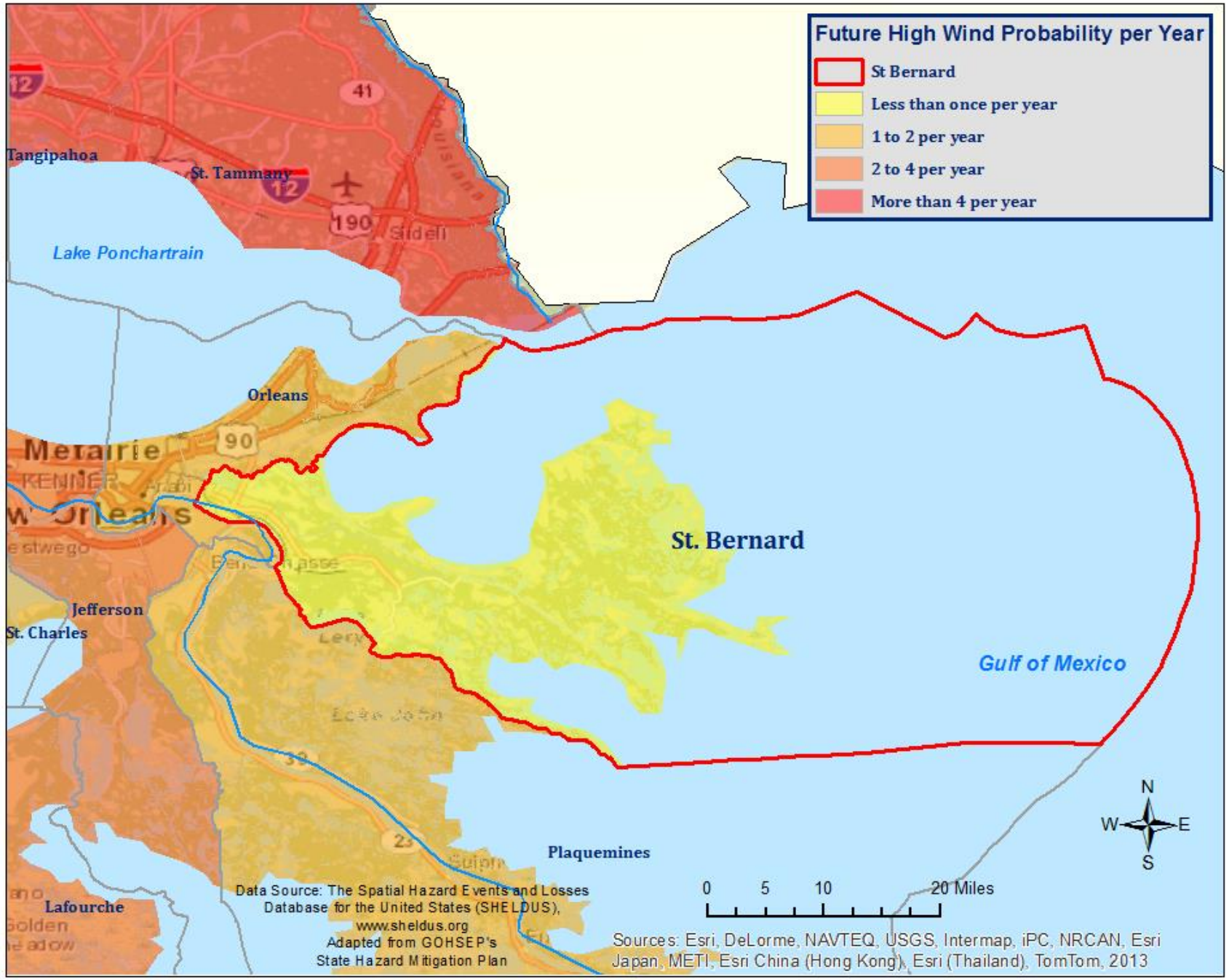


Hail

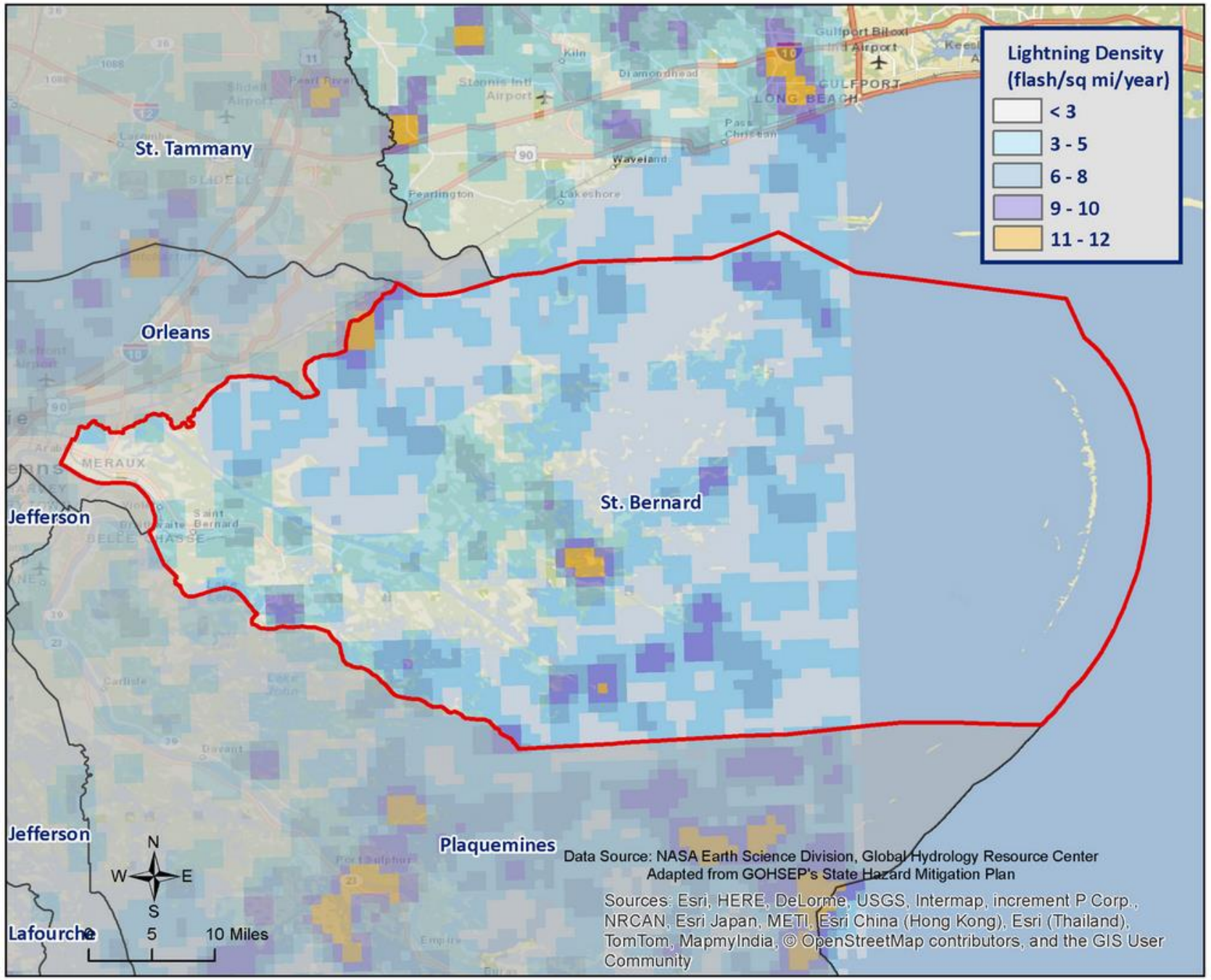

All Hail Diameter Sizes
Hail Diameter Size < 1 inch
Hail Diameter Size 1 - 2 inch
Hail Diameter Size ≥ 2 inch
New Orleans
St. Bernard
Gulfport
Slidell
Houma
Lake Pontchartrain
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
N
W
E
S
0
30
60 Miles
Hail Density
(Hail Reports / 25 sq mi)
Low
High
Data Source: NOAA Storm Prediction Center (SPC) Severe Weather Database
Adapted from GOHSEP's State Hazard Mitigation Plan

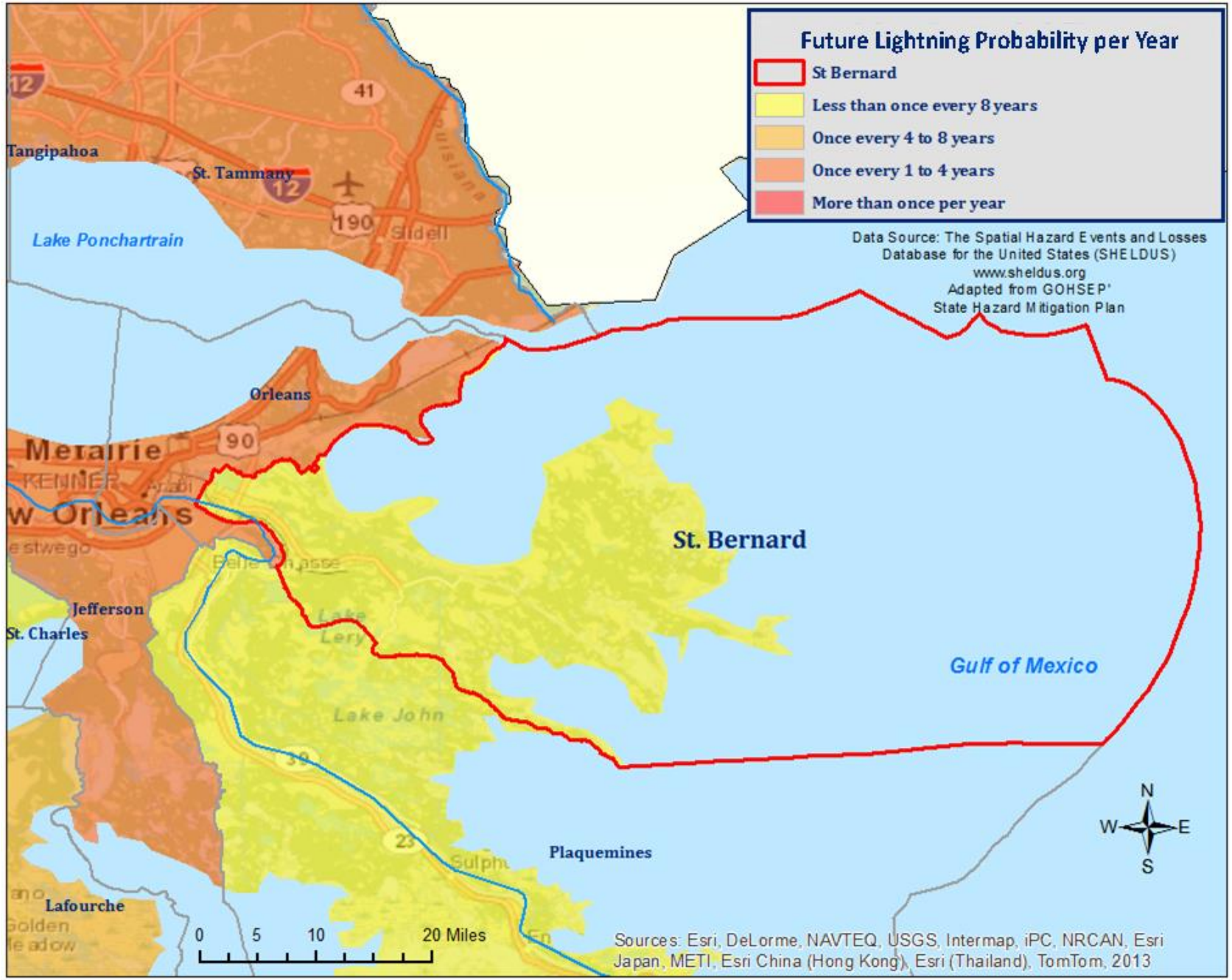

Future Hail Probability per Year
St Bernard
Less than once every 8 years
Once every 4 to 8 years
Once every 2 to 4 years
More than once every 2 years
Tangipahoa
St. Tammany
Slidell
Lake Ponchartrain
Orleans
Metairie
Jefferson
St. Bernard
Gulf of Mexico
Plaquemines
Lafourche
N
W
E
S
0 5 10 20 Miles
Data Source: The Spatial Hazard Events and Losses Database for the United States (SHELDUS), www.sheldus.org
Adapted from GOHSEP's State Hazard Mitigation Plan
Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013

High Wind


Future High Wind Probability per Year
St Bernard
Less than once per year
1 to 2 per year
2 to 4 per year
More than 4 per year
Tangipahoa
St. Tammany
Slidell
Lake Ponchartrain
Orleans
Metairie
Jefferson
St. Charles
St. Bernard
Gulf of Mexico
Plaquemines
Lafourche
N
W
E
S
0 5 10 20 Miles
Data Source: The Spatial Hazard Events and Losses Database for the United States (SHELDUS), www.sheldus.org
Adapted from GOHSEP's State Hazard Mitigation Plan
Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013

Lightning

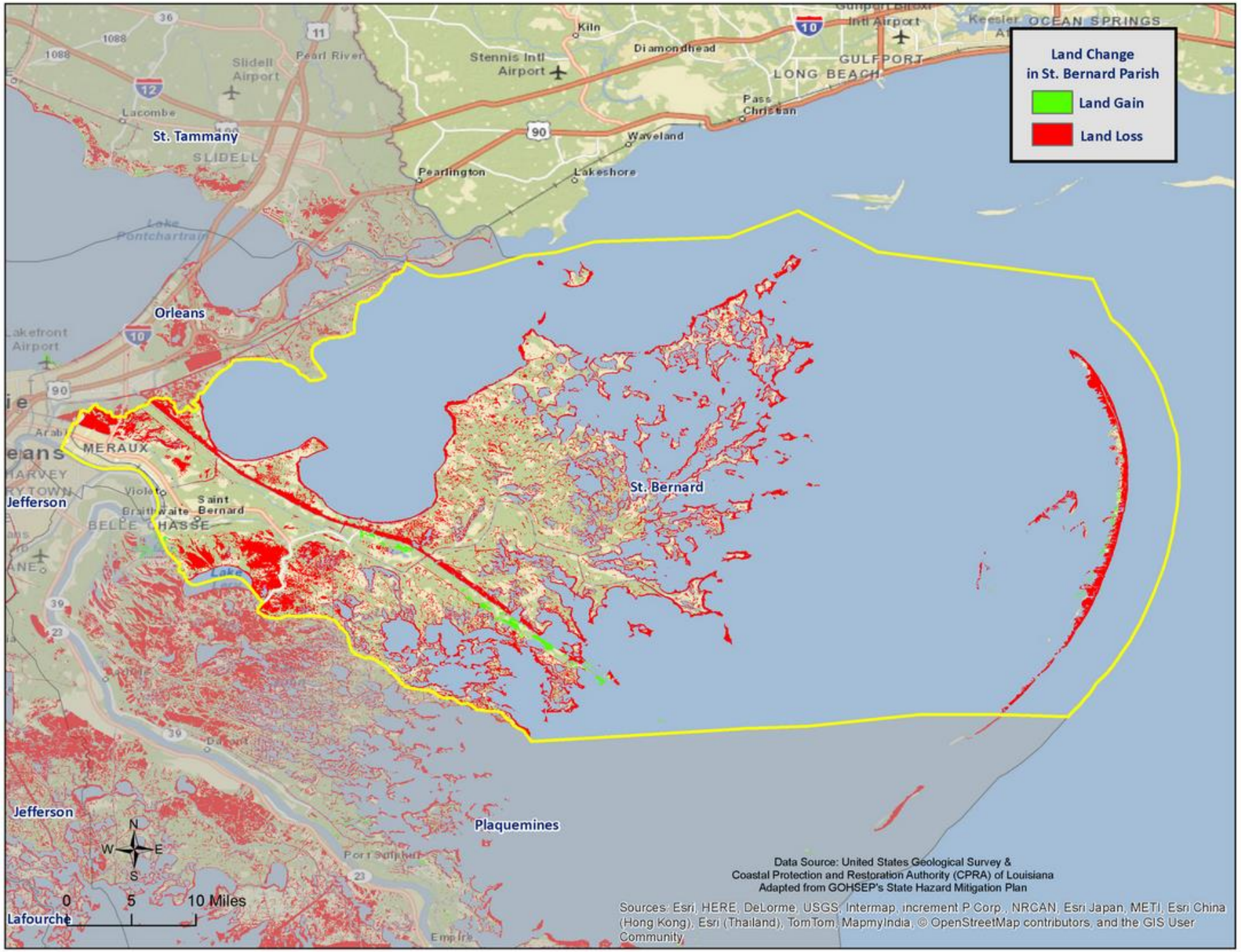

Lightning Density
(flash/sq mi/year)
< 3
3 - 5
6 - 8
9 - 10
11 - 12
St. Tammany
Orleans
Jefferson
St. Bernard
Jefferson
Plaquemines
Lafourche
N
W
E
S
0
5
10 Miles
Data Source: NASA Earth Science Division, Global Hydrology Resource Center
Adapted from GOHSEP's State Hazard Mitigation Plan
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community


Future Lightning Probability per Year
St Bernard
Less than once every 8 years
Once every 4 to 8 years
Once every 1 to 4 years
More than once per year
Data Source: The Spatial Hazard Events and Losses Database for the United States (SHELDUS)
www.sheldus.org
Adapted from GOHSEP' State Hazard Mitigation Plan
Tangipahoa
St. Tammany
Lake Ponchartrain
Slidell
Orleans
Metairie
KENNER
New Orleans
Westwego
Jefferson
St. Charles
St. Bernard
Gulf of Mexico
Lake Lery
Lake John
Plaquemines
Lafourche
Golden Meadow
N
W
E
S
0 5 10 20 Miles
Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013

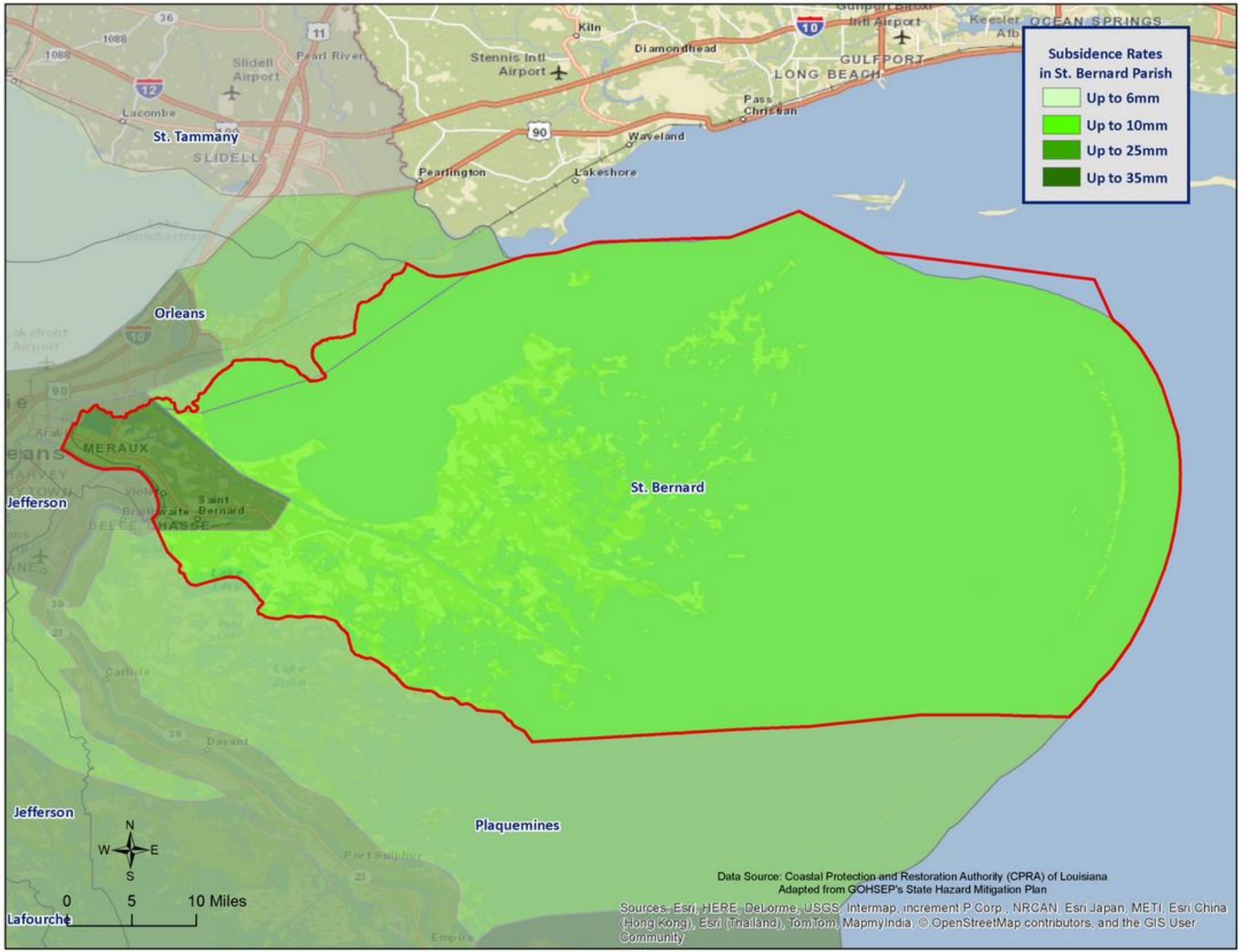
Land Change – Subsidence, Saltwater Intrusion

- **Subsidence** is the gradual caving in or sinking of an area of land
  - Slow-acting process with impacts that can be readily seen in coastal parishes over the course of decades
  - Lowers elevations in coastal Louisiana, accelerates the effects of saltwater intrusion
  - Causes structures to become more vulnerable to flooding by lowering elevations
- **Saltwater intrusion** is the movement of salty water into freshwater aquifers or is the encroachment of saline water into freshwater estuaries
  - One of the major causes of subsidence and marshland loss
  - 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

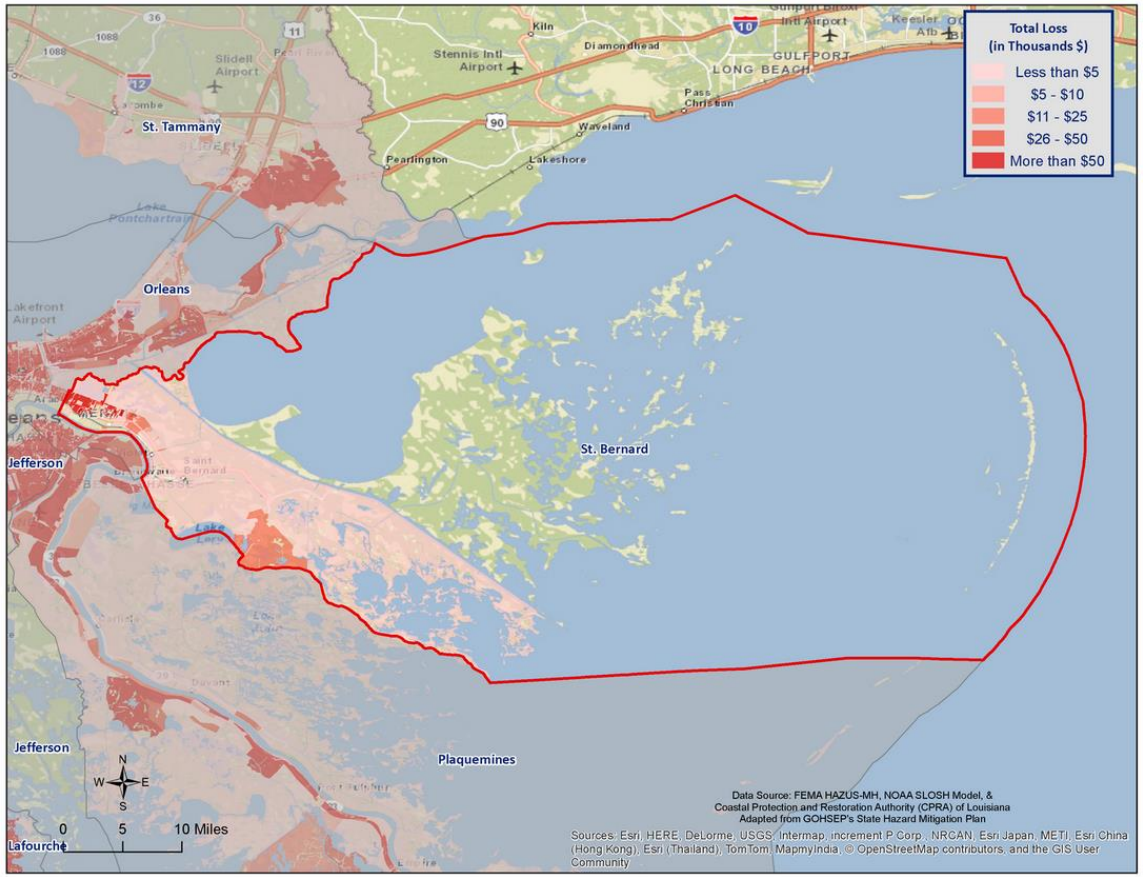
Land Change


Land Change
in St. Bernard Parish
Land Gain
Land Loss
St. Tammany
Orleans
Jefferson
St. Bernard
Plaquemines
Lafourche
MERAUX
Saint Bernard
Slidell Airport
Stennis Intl Airport
Pearl River
Lake Pontchartrain
Pearlington
Lakeshore
Waveland
Pass Christian
Diamondhead
GULFPORT
LONG BEACH
OCEAN SPRINGS
Kiln
N
W
E
S
0
5
10 Miles
Data Source: United States Geological Survey &
Coastal Protection and Restoration Authority (CPRA) of Louisiana
Adapted from GOHSEP's State Hazard Mitigation Plan
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

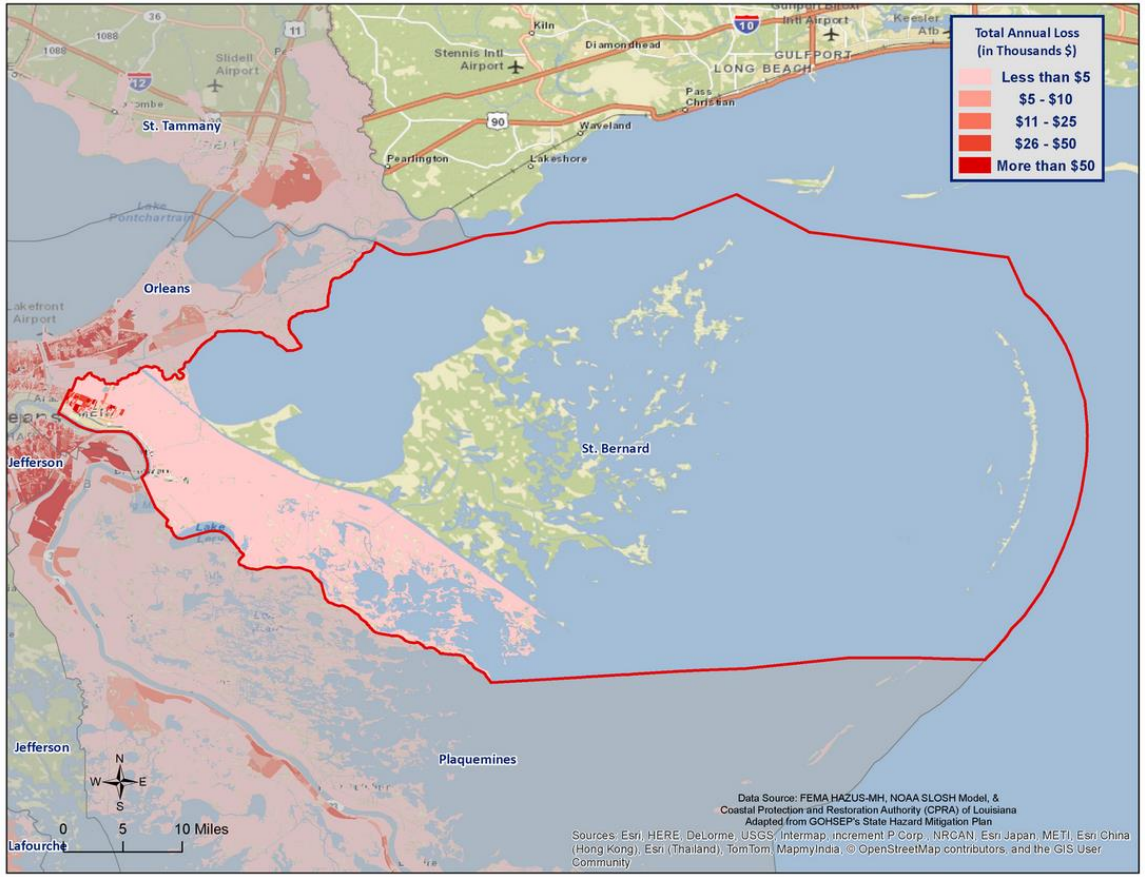
Subsidence Rates



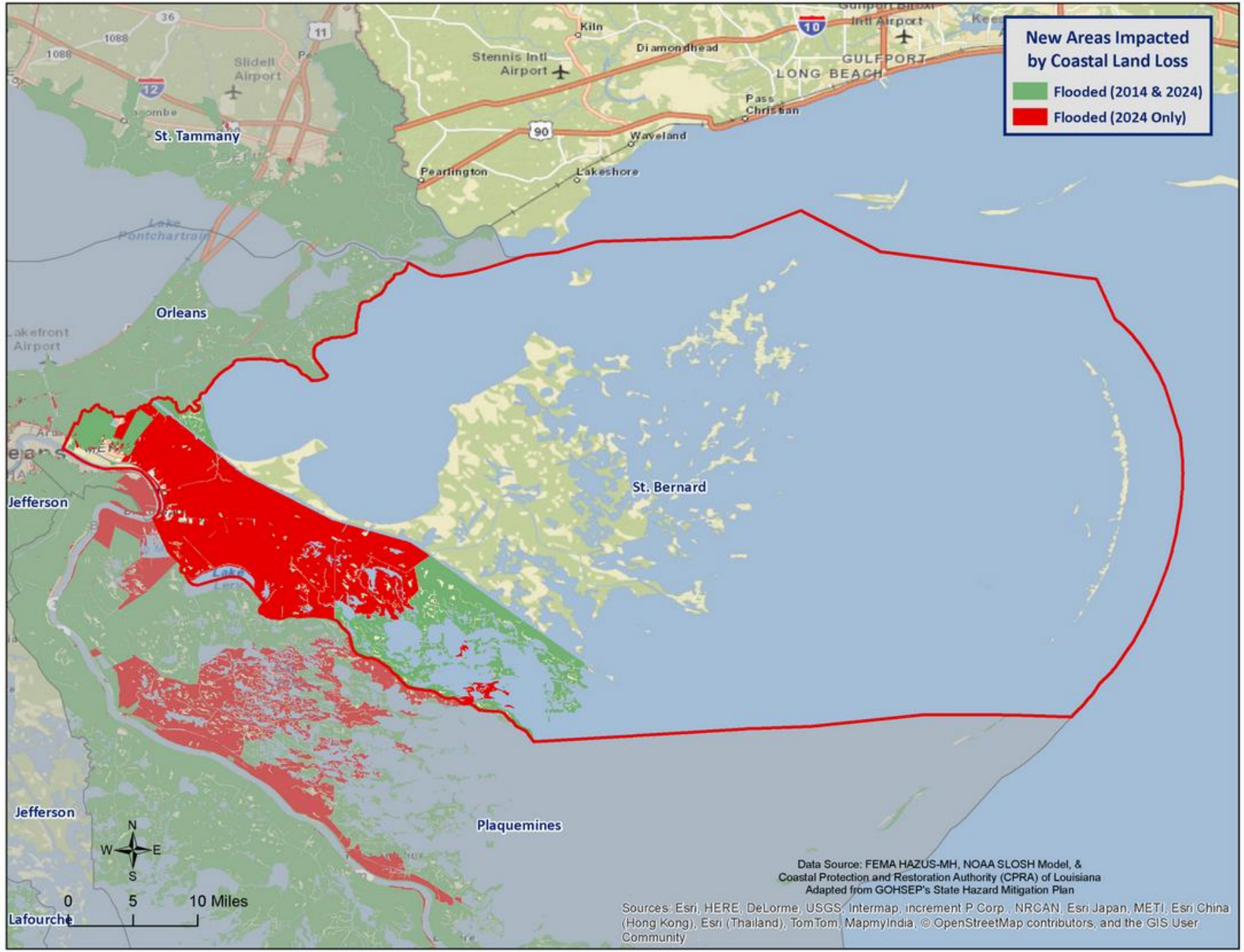
Total Loss



(thousands)



Annual Loss (thousands)


New Areas Impacted by Coastal Land Loss
Flooded (2014 & 2024)
Flooded (2024 Only)
St. Tammany
Orleans
Jefferson
St. Bernard
Plaquemines
Jefferson
Lafourche
Kiln
Stennis Intl Airport
Diamondhead
Gulfport Intl Airport
GULFPORT
LONG BEACH
Pass Christian
Waveland
Pearlington
Lakeshore
Slidell Airport
Lakefront Airport
Lake Pontchartrain
N
W
E
S
0
5
10 Miles
Data Source: FEMA HAZUS-MH, NOAA SLOSH Model, &
Coastal Protection and Restoration Authority (CPRA) of Louisiana
Adapted from GOHSEP's State Hazard Mitigation Plan
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Mitigation Strategy – Parish Goals

- 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 in the parish
- Goal 4: Facilitate sound development and rebuilding in the parish so as to reduce or eliminate the potential impacts of hazards

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2009-2015 Parish HM Project Status

- Director's Comments

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Public Outreach Activities

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

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Contact Us

Brant Mitchell, SDMI Director of Research & Operations
bmitch9@lsu.edu
(225) 578-5939

Lexie Andrews, HM Project Lead
aandrews1@lsu.edu
(225) 578-7034

Lauren Stevens, HM Project Lead
lstevens@lsu.edu
(225) 578-0502

Stephenson Disaster Management Institute
www.sdmi.lsu.edu

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