Section Five
Statewide Risk Assessment

Contents of this Section

5.1 IFR Requirements for Statewide Risk Assessment

The IFR includes two specific requirements regarding statewide risk assessments:

- Vulnerability Assessment per Requirement §201.4(c)(2)(ii): "[The State risk assessment shall include an] overview and analysis of the State's vulnerability to the hazards described in this paragraph (c)(2), based on estimates provided in local risk assessments as well as the State risk assessment. The State shall describe vulnerability in terms of the jurisdictions most threatened by the identified hazards, and most vulnerable to damage and loss associated with hazard events."
- Estimated Losses per Requirement §201.4(c)(2)(iii): "[The State risk assessment shall include an] overview and analysis of potential losses to the identified vulnerable structures, based on estimates provided in local risk assessments as well as the State risk assessment."

5.2 Introduction

A statewide risk assessment was prepared for the hazards identified in Section Four:

- Flood
- High Wind – Hurricane
- High Wind – Tornado
- Ice Storm
- Storm Surge
- Subsidence (Land Loss)
- Wildfire
- Dam and Levee Failure
- Hazardous Materials Incident

Map 4-1 (see page 4-2) shows the State of Louisiana and the political boundaries for the individual parishes and serves as a reference for this section. A general overview of the risk assessment methodologies and summary results for these hazards are presented in the subsections that follow. Detailed discussions of risk assessment methodologies for each of these hazards, along with related maps and tables, are presented in Volume II, Appendix E.

This section concludes with a summary that includes a discussion of the limitations regarding use of these results.

5.3 Methodology

The statewide risk assessment was focused on determining the relative risk of the 64 parishes in the State to the eight hazards identified in Section Four. The SHMPC determined that parishes were the appropriate political unit for this part of the study for the following reasons:

- The majority of local hazard mitigation plans are being developed at the parish level. These plans, as multi-jurisdictional plans under the DMA 2000 requirements, account for the planning needs of all participating jurisdictions within each parish. As a result, local communities and parishes can both be effectively "covered" by this approach.
- Similarly, it was decided early in the planning process by the SHMPC that future interactions between the OHSEP, the SHMT and local communities would be via the parish emergency management agencies (EMAs) using established channels of communication.
- Finally, in many cases, as documented below and in Volume II, Appendix E, there was limited data available for analysis and therefore detailed analyses below the parish level would not yield any increased accuracy in the results.

The relative risk for each parish was determined using the best available data. The end result was a high / medium / low hazard ranking for each hazard for each parish. In some cases, numerical rankings (from 1 to 64) were determined representing the relative risk for all the parishes. However, since the quality and availability of data varies considerably, the specific methodologies for determining the hazard rankings differ between hazards.

It is important to note here that §201.4(c)(2)(ii) of the IFR makes specific reference to using the results of local risk assessments as a component of the statewide risk assessment. At the time the risk assessment was developed for this Plan, no local hazard mitigation plans had been approved in the State of Louisiana and this information was not available. Therefore, OHSEP and the SHMPC decided to proceed with other more readily available data sources and make provisions to include the results of local risk assessments as part of future updates of the Plan (see Sections Nine and Ten).

Even though the local and state planning efforts are not synchronized during this first round of planning, the results of the statewide risk assessment will be useful to:

- Provide a basis to review results of local community and parish hazard mitigation plans.
- Provide a frame of reference for local communities and parishes for future updates of their risk assessments and plans.
- Form the basis for comparing the relative risk of parishes as part of evaluating future hazard mitigation grant applications. As explained in Volumes III and IV, the OHSEP and SHMT will be able to refer to these results as they:
    - Develop specific Implementation Strategies for HMGP funding on a disaster by disaster basis; and
    - Decide how to award pre- and post-disaster mitigation grant funds to competing grant applications.

To better understand the methodology for this study, it is necessary to define the following key terms: risk, vulnerability, value, and probability.

Risk represents the impacts that disasters could inflict on a community. A "community" can include everything from a small village to a state or even a whole country. As noted above, the community level that is being studied in this section of the Plan is the parish.

Risk can be described qualitatively, using terms like high, medium or low. When there is sufficient data, risk can also be described quantitatively by estimating the losses that may be expected from a specific hazard event (e.g., a "100-year" flood) or more broadly from a type of hazard (e.g., flooding). Loss estimates are often expressed in dollars of future expected losses. When possible, it is calculated this way so that potential losses from different kinds of hazards can be compared.

In addition, it is possible to take the results of a quantitative risk assessment and produce a qualitative ranking. For example, the communities with the highest estimated losses would be assigned the highest relative hazard ranking.

Risk is a product of several factors including vulnerability, value and probability.

Vulnerability is the extent to which something can be damaged by a hazard. Vulnerability is based on the severity of the identified hazard, what type of assets are exposed to the hazard including physical (such as buildings and infrastructure) and functional (such as government or business operations), and the characteristics of those assets.

> Severity is the measure of "how bad" a particular hazard event is. The severity of different hazards is measured in different ways. For example, as discussed in Section Four (and Volume II, Appendix D), floods can be measured in terms of depth, velocity, duration, contamination potential, debris flow, etc., and tornadoes are measured primarily in terms of wind speed. Related terms include magnitude and intensity. Magnitude represents severity in terms of a physical measurement such as wind speed. Intensity focuses on the related effects of the hazard, like the expected damage levels due to tornadoes of different magnitudes.
>
> Exposure refers to the number of people or structures at risk for loss of life, property damage and economic impact due to a particular hazard.
>
> Asset characteristics that are important in a vulnerability assessment differ depending on the type of hazard. For example, a building that is located in an area subject to high winds will be more or less vulnerable to high wind depending on how substantially the walls and roof are constructed and connected to each other. In this example, the weaker the structure, the higher the vulnerability to the effects of a high wind.

Value is how much something is worth. When performing risk assessments, a monetary value is assigned to community assets (both physical and functional), and in some cases, citizen injuries and casualties. For instance, if a building is substantially or partially damaged, the buildings replacement value serves as the basis for quantifying the loss. Vulnerability assessments for a specific hazard event result in a percent of estimated damage to an asset. This percent can then be multiplied by the value of the asset. The result is an estimate of the losses that would be anticipated under those specific hazard conditions for that particular asset.

For example, researchers have determined that different types of buildings respond in reasonably predictable ways to winds of different speeds This research has resulted in “damage curves” that indicate the percentage of the total value of a building that will be damaged for a range of wind speeds. To predict the damage (or lost value) that would result to a particular building from high wind of a certain magnitude or speed, the damage curves are used to determine the corresponding percentage and multiply it times the value of the building to determine the expected losses for that specific event. For the Plan, which covers broad geographic areas, average property values were derived from sources like the Census 2000.

Probability is the likelihood that an event of a particular severity will occur. The most commonly known example is the “100-year flood”. As defined in Section Four, the “100-year flood” is the flood event that has a 1 percent change of occurring in any given year.

Probability is a key element of risk assessment because it determines how often an event is likely to happen. Probability allows a calculation of total annual estimated losses associated with all high wind events, as opposed to only being able to state the losses anticipated from a single high wind event with one maximum speed (as calculated from building value and vulnerability). By factoring in the probability of different wind hazard events that may occur in any given year (for example, a wind event with winds ranging from x to x has an x% chance of occurring on an annual basis), along with their associated loss estimates, a true assessment of the total risk faced by a particular building or asset to a type of hazard is possible. The resulting annual estimated losses are then long-term weighted averages of lost value in a single year.

The ability to accurately determine probability depends on the type of hazard. For instance, flood studies can provide reasonably accurate estimates of how often water will reach particular places and elevations. On the other hand, the occurrence of tornadoes and earthquakes are difficult to predict. Tornadoes do not have an easily definable specific location like floods, and earthquakes can occur in a broad range of locations and severities.

Hazard Rankings. The preceding definitions indicate that data is needed at several points in the process to produce a true risk assessment yielding annual estimated losses. Most states and communities do not have all the required data, and Louisiana is no exception. Although much is known about the history of hazards and disasters in the State, a number of specific data points do not yet exist. For example, much more detail about historical occurrence of hazards in the State is needed to determine the probabilities of most of the possible hazard events. Almost any kind of hazard can be quantified and its risk expressed. Exceptions include infrequent or highly unpredictable events such as meteors hitting the earth. In these cases, the element of probability is virtually impossible to characterize, and the risk calculus cannot be accurate without it.

Therefore, the hazard rankings developed in this risk assessment are based on different kinds of analyses and vary from hazard to hazard in terms of level of detail and reliability. The different analyses can be categorized as follows:

- Hazard Profiles – This information as presented here restates the results of the hazard identification and profiling. The profile information is needed to determine relative risk based on where hazard events have happened the most in the past. This is useful to the extent the data record is lengthy enough to provide a representation of which parishes are more at risk than others.
- Exposure – Exposure information quantifies the exposure of assets to provide a way to compare potential losses between parishes. Exposure data includes the total value of the assets that are in harm's way and therefore it typically overstates the losses that should be anticipated since it does not account for the more likely occurrence of only partial damage to an asset. Nevertheless, exposure information is useful for comparing parishes for a given type of hazard. GIS -based hazard profile information is layered over readily available information about assets within the parishes. For example, data about building types, critical facilities[15], infrastructure and demographics (see Volume II, Appendices E.1 – E.3) from the US Census 2000 can be laid over locations of hazards with predictable extents (such as the 100-year floodplain for the 100-year flood event) to determine the total exposure of buildings and people to the effects of the hazard.
- Annual Estimated Losses – Estimating expected annual losses is done for single hazard events based on generalized data regarding building types. This information is used to make determinations about relative risk among assets. This type of result is a step above just using exposure as a proxy for vulnerability since it provides a more accurate assessment of actual anticipated losses. While this technique is used for a number of hazards in this study, the accuracy of the results is still hampered by the coarseness of the data used to make the determinations. Estimated losses were calculated from historic data records regarding severity, losses and probability and were then overlaid with data inventory files containing the number and characteristics of built assets. These calculations were made manually or in some cases were modeled by computer programs such as HAZUS-MH.

  HAZUS-MH is a hazard loss estimation model developed by FEMA for use by states and communities nationwide. HAZUS-MH includes default data from the US Census 2000 and a host of other available data sources and includes algorithms that can mathematically model hazard events to calculate estimated losses for earthquakes, floods and high winds due to hurricanes.[16] See Volume II, Appendix E.14 for information about the types of data inventories used to develop HAZUS-MH.

  The basic steps in the process of estimating losses includes:

  - Compile data regarding historic hazard events from national and local sources;
  - Conduct statistical analysis of hazard data to relate historical patterns within data to existing loss estimation models (i.e., maximum, minimum, average and standard deviation of historic loss data);
  - Prepare data for input to models and/or calculation procedures based on statistical analysis, requirements of the models / procedures and risk engineering judgment;
  - Apply the hazard model or undertake the calculations to develop severity and probability tables and curves;
  - Model or calculate simple damage function to related hazard severity to a level of damage;
  - Determine the threshold level of damage for each hazard that relates to an annual probability of occurrence; and
  - Develop annual estimated losses.

[15] Critical Facilities as used in Section Five refer to local community or parish medical care facilities, police stations, fire stations, emergency operations centers and schools. These are facilities deemed critical in responding to and recovering from a hazard event or facilities (like schools) that contain sensitive populations and/or may be used as shelters in an emergency.

[16] Information about HAZUS – MH is readily available online at http://www.fema.gov.hazus/.

Table 5-1 provides an overview of the types of results (i.e., hazard profile, exposure or annual loss estimate) and basic data inputs and methodologies for each hazard. A detailed account of the hazard methodologies is presented in Volume II, Appendix E.

Table 5-1: Risk Assessment Results and Methodologies

Hazard	Type of Results	Data Inputs / Methodology
Flood	Hazard Profile	Annual Average Losses per NFIP
High Wind (Hurricane)	Annual Estimated Loss	National Weather Service / HAZUS-MH
High Wind (Tornado)	Annual Estimated Loss	Statistical Analysis
Ice Storm	Exposure	National Climatic Data Center
Storm Surge	Annual Estimated Loss	National Weather Service / HAZUS-MH
Subsidence/Land Failure	Exposure	U.S. Census and USGS National Land Cover Data
Wildfire	Exposure	U.S. Census and USGS National Land Cover Data
Dam Failure	Hazard Profile	Dam Classifications / HAZUS
Levee Failure	Hazard Profile	U.S. Census
Hazardous Material Incident	Exposure	US Census / ALOHA

From these results, low, medium and high hazard rankings were determined in several ways, depending on the available output for each hazard including:

- The tabulated results were examined for "natural breaks" in the data for hazards where loss results were able to be generated: i.e., for flood, high wind, storm surge;
- The hazard ranking for ice-storm was determined by the number of recorded historical incidents;
- The hazard ranking for subsidence was based on "natural breaks" of the property value exposure;
- The hazard ranking for wildfire was based on "natural breaks" of the acreage burnt during an average ten-year period;
- The hazard ranking for dam failure was based on whether a parish had one or more high, significant or low hazard dam within the parish boundary;
- The hazard ranking for levee failure was based on "natural breaks" of the concentration of population located within one-half mile from all levees in the parish; and
- The hazard ranking for hazardous materials incident was based on "natural breaks" of the potentially affected populations within a one-mile radius from each hazardous materials facility in the parish.

Table 5-2 identifies the criteria used for assigning relative risk rankings for each hazard. For more information, refer to the ranking section of the methodologies for each hazard in Volume II, Appendix E.

Table 5-2: Ranking of Relative Risk for Each Hazard

Hazard	Relative Risk		
	High	Medium	Low
Flood	Average Annual Loss >/= $1M	$1M> Average Annual Loss >/= $100K	$100K>Average Annual Loss
High Wind-Hurricane	Annual Estimated Loss >/= $5M	$5M> Annual Estimated Loss >/= $400K	Annual Estimated Loss <$400K
High Wind -Tornado	Annual Estimated Loss >/= $200K	$200K>Annual Estimated Loss >/= $75K	Annual Estimated Loss <$75
Ice Storm	> 4 recorded ice storms	1 – 4 recorded ice storms	No recorded ice storms
Storm Surge	Annual Estimated Loss >/= $15 B	$15 B >Annual Estimated Loss >=$250M	Annual Estimated Loss <$250M
Subsidence	High property value within high subsidence rates	Moderate property value within high subsidence rates	Low to moderate property value within lower rate subsidence rates
Wildfire	>/= 1,000 Acre (10-year average recorded burnt area)	> 0 Acre < 1,000 Acre	0 (No record)
Dam Failure	High Hazard Dam in Parish	Significant Hazard Dam in Parish	Low Hazard Dam in Parish
Levee Failure	High concentrations of population within ½ mile	Moderate concentrations of population within ½ mile	Low concentrations of population within ½ mile
Hazardous Material Incident	Affected population >= 1K	1K>Affected population>=90	Affected population<90

The following subsections contain a summary of the hazard rankings for each hazard. In addition, Volume II, Appendix E contains more detail regarding methodologies and results for these hazards.

5.4 Flood

The flood hazard ranking was based on the Average Annual Losses as determined from NFIP records. The Average Annual Losses as compiled by NFIP represent the total NFIP claims payments for each parish divided by the number of years the parish has participated in the NFIP during 1978 through 2003. The total of the Average Annual Losses for all the parishes is $52,777,787. The Average Annual Loss figures were used because NFIP loss data provided the best relative measure for all the parishes in Louisiana. Other candidate sources of information did not provide uniform coverage throughout the State (e.g., digital floodplain mapping that would lend itself to this type of analysis is only available for 37 out of the 64 parishes) or were not considered as reliable in the opinion of the SHMPC;

The high / medium / low rankings for each parish were developed by:

- Obtaining the NFIP Average Annual Loss data;
- Sorting the list by parish from highest to lowest losses;
- Assigning the high rank to parishes with losses greater than or equal to $1 million;
- Assigning the medium rank to parishes where losses are less than $1 million but greater than or equal to $100 thousand; and
- Assigning the low rank to parishes with losses less than $100 thousand.

The resulting ranked parishes are shown in Table 5-3. Map 5-1 presents the ranking of all the parishes with high, medium and low risk to floods.

Table 5-3: Ten Parishes with Highest Average Annual Flood Losses

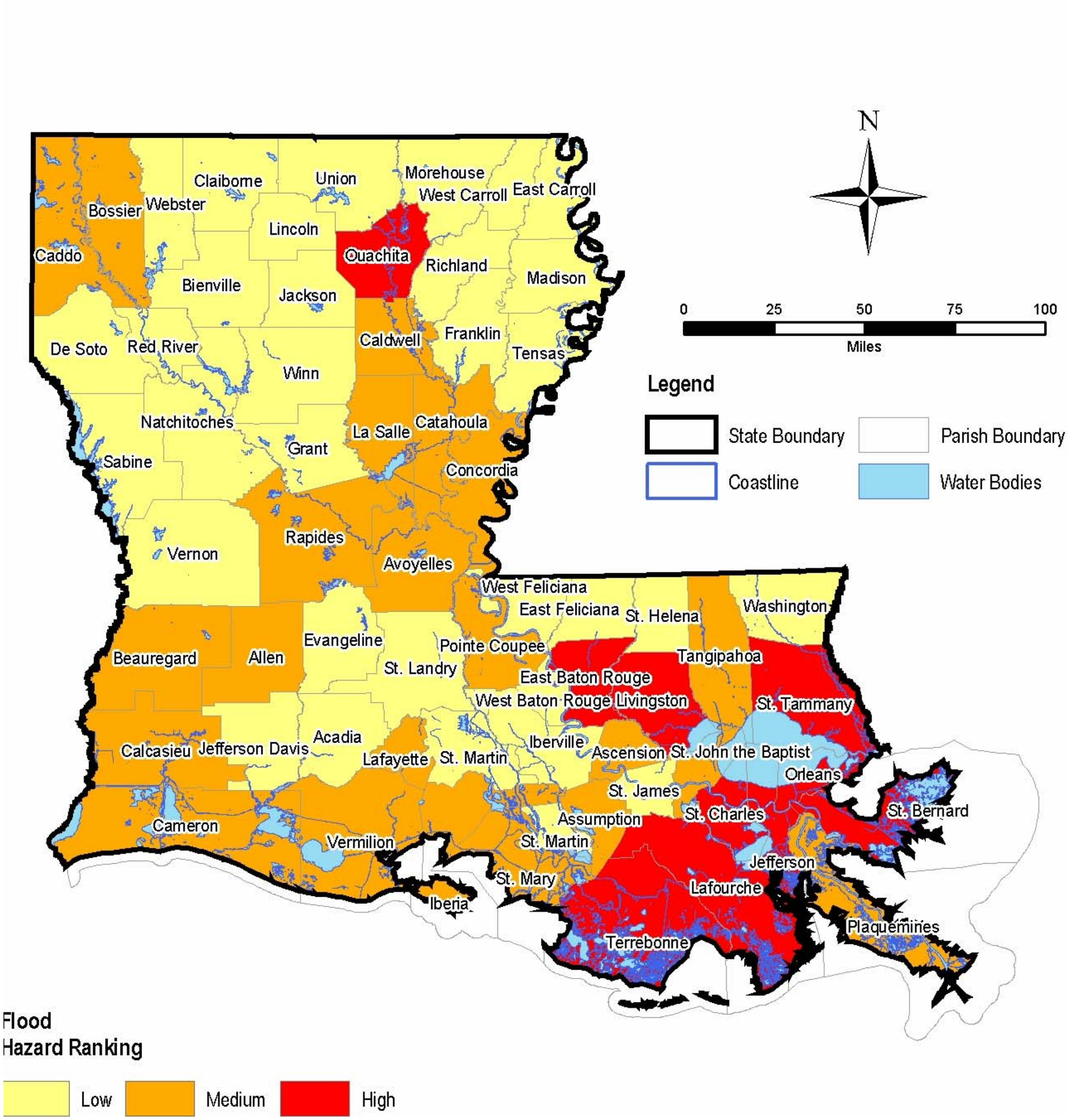
Ranking	Parish	Average Annual Losses (NFIP)	Hazard Ranking
1	Jefferson	$16,636,089	High
2	Orleans	$9,917,720	High
3	St. Tammany	$4,917,265	High
4	Terrebonne	$2,760,739	High
5	East Baton Rouge	$2,574,404	High
6	St. Charles	$2,503,167	High
7	Livingston	$1,770,670	High
8	Ouachita	$1,337,105	High
9	St. Bernard	$1,159,775	High
10	Lafourche	$1,057,647	High

Source: NFIP

Volume II, Appendix E-4 explains the methodology used to derive these rankings in more detail. Appendix E-4 also shows the results of additional analyses regarding the past and potential effects of flooding in Louisiana including:

- the number of NFIP claims (losses) and the number of repetitive losses;
- population exposure based on US Census 2000 and Q3 data; and
- general building stock, critical facilities and transportation exposure based on HAZUS-MH and Q3 flood data.

Map 5-1: Flood Hazard Ranking (Average Annual Losses)



5.5 High Wind - Hurricane

The hurricane hazard ranking was based on the Annual Estimated Losses (AEL) as determined from NOAA historical hurricane events data and HAZUS-MH general building stock data. Based on the windspeed, recurrence interval and building characteristics, damage functions for general building stock were used to determine the Annual Estimated Losses. The total of the Annual Estimated Losses for all the parishes is $831,212,090.

The high / medium / low rankings for each parish were developed by:

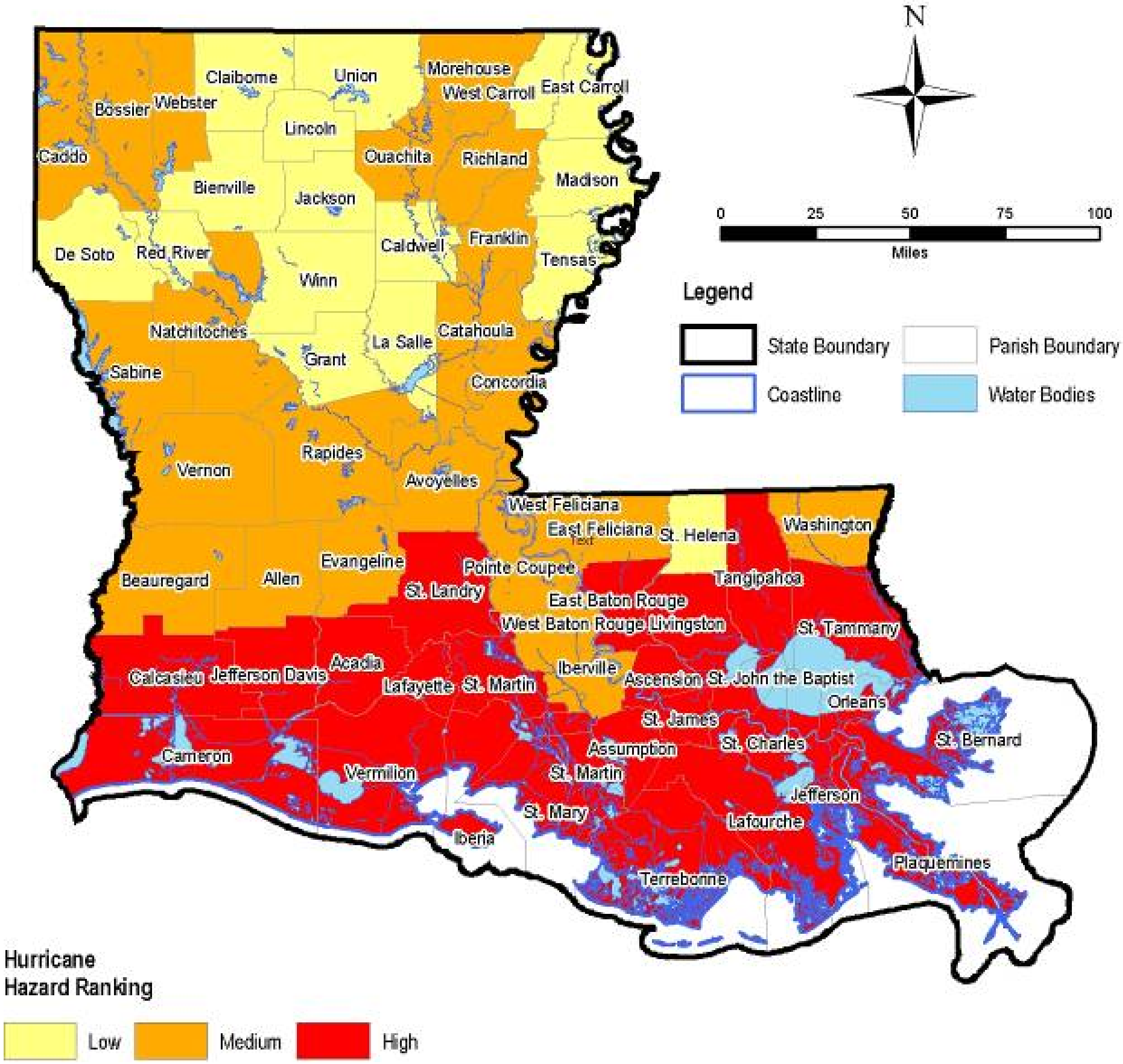
- Obtaining the Annual Estimated Loss data;
- Sorting the list by parish from highest to lowest losses;
- Assigning the high rank to parishes with losses greater than or equal to $5 million;
- Assigning the medium rank to parishes where losses are less than $5 million but greater than or equal to $400 thousand; and
- Assigning the low rank to parishes with losses less than $400 thousand.

The resulting ranked parishes are shown in Table 5-4. Map 5-2 presents the ranking of all the parishes with high, medium and low risk to hurricanes.

Table 5-4: Ten Parishes with Highest Annual Estimated Losses for Hurricane High Winds

Ranking	Parish	Hurricane AEL ($)	Risk Zone
1	Jefferson	161,599,591	High
2	Orleans	154,930,281	High
3	Terrebonne	52,031,364	High
4	St. Tammany	51,423,712	High
5	Lafayette	45,016,111	High
6	Lafourche	42,934,840	High
7	East Baton Rouge	35,809,790	High
8	Calcasieu	35,179,561	High
9	St. Bernard	22,006,253	High
10	Vermilion	20,722,955	High

Map 5-2: Hurricane High Wind Hazard Ranking (Annual Estimated Losses)



5.6 High Wind - Tornado

The tornado hazard ranking was based on the Annual Estimated Losses (AEL) as determined from NOAA historical tornado incidents data. The Annual Estimated Losses are calculated by analyzing the number of historical incidents and losses. The total of the Annual Estimated Losses for all the parishes is $17,642,904.

The high / medium / low rankings for each parish were developed by:

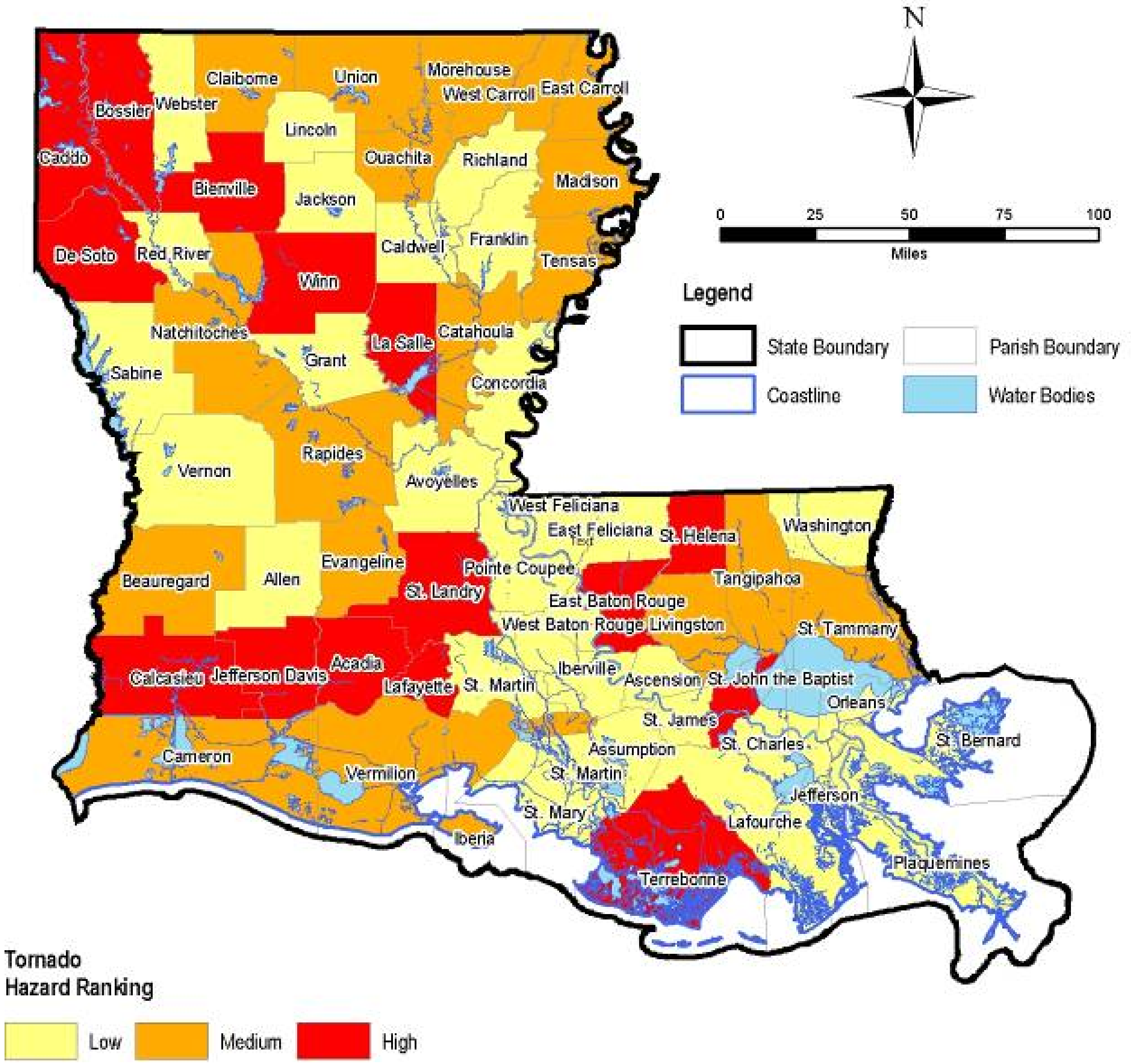
- Obtaining the Annual Estimated Loss data;
- Sorting the list by parish from highest to lowest losses;
- Assigning the high rank to parishes with losses greater than or equal to $200 thousand;
- Assigning the medium rank to parishes where losses are less than $200 thousand but greater than or equal to $75 thousand; and
- Assigning the low rank to parishes with losses less than $75 thousand.

The resulting ranked parishes are shown in Table 5-5. Map 5-3 presents the ranking of all the parishes with high, medium and low risk to tornadoes.

Table 5-5: Ten Parishes with Highest Annual Estimated Losses for Tornado High Winds

Rank	Parish	Tornado AEL ($)	Risk Zone
1	Bossier	6,330,068	High
2	St. John the Baptist	1,143,463	High
3	Caddo	1,067,068	High
4	Lafayette	840,788	High
5	Bienville	797,637	High
6	St. Helena	633,386	High
7	Acadia	527,131	High
8	De Soto	497,587	High
9	La Salle	365,423	High
10	Calcasieu	358,054	High

Map 5-3: Tornado Hazard Ranking (Annual Estimated Losses)



5.7 Ice Storm

The ice storm hazard ranking was based on parish-wide vulnerability. The level of vulnerability was based on the total number of historical incidents reported in the NOAA data, by parish. In establishing the hazards ranking, all incidents were assumed to have equal impacts, since the level of severity could not be determined from the existing data.

The high / medium / low rankings for each parish were developed by:

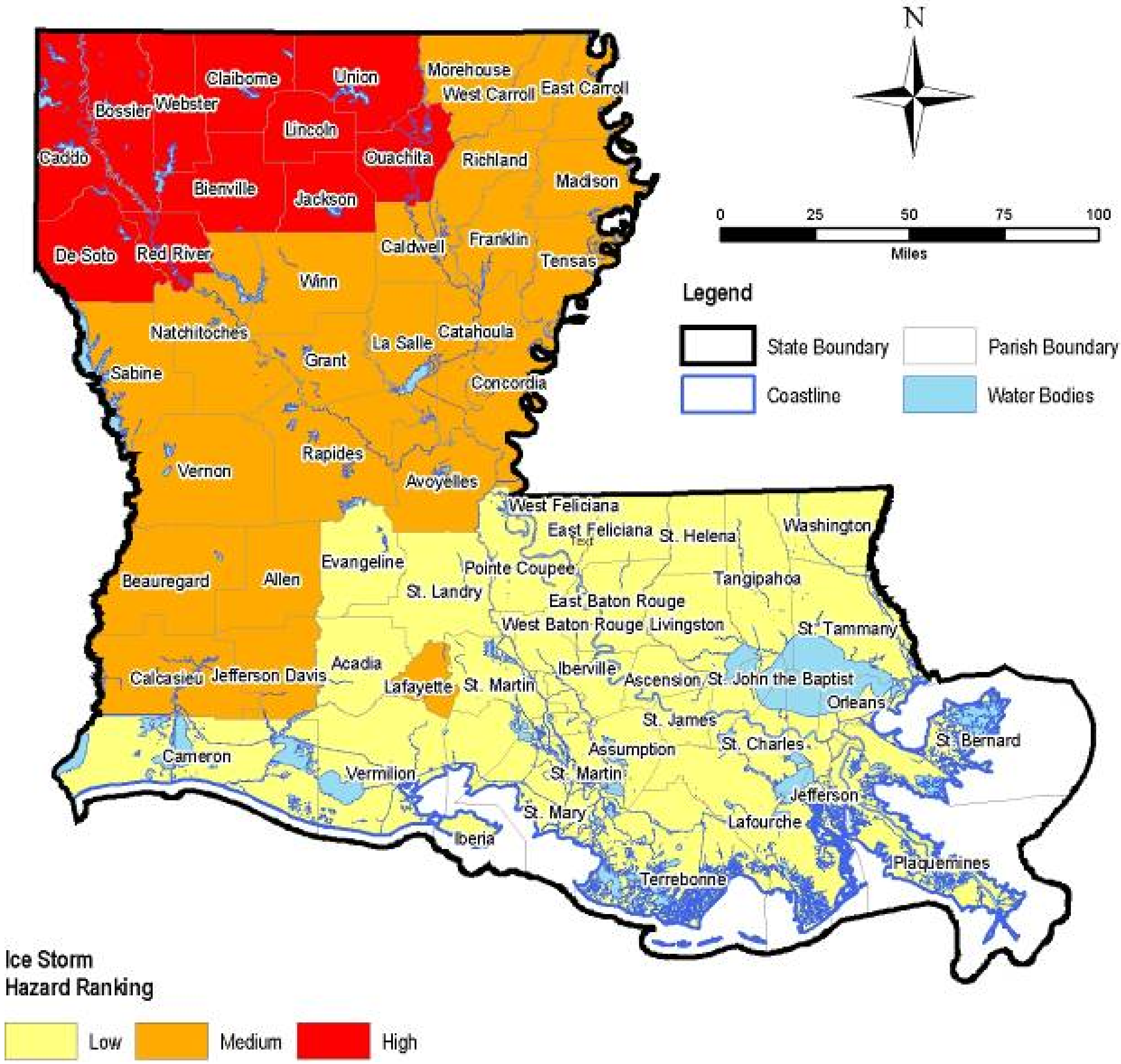
- Obtaining the NOAA data by parish;
- Sorting the list by parish from highest to lowest losses;
- Establishing breaks to rank each parish with a high, medium or low classification;
- Assigning the high rank to parishes with more than four historical incidents;
- Assigning the medium rank to parishes where historical incidents are equal to four but greater than or equal to one; and
- Assigning the low rank to parishes with no historical incidents.

The parishes with "high" hazard rankings are shown in Table 5-6. Map 5-4 presents the ranking of all the parishes with high, medium and low risk to ice storms.

Table 5-6: Parishes with High Ice Storm Hazard Ranking

Parishes	Number of Incidents	Hazard Rankings
Caddo	10	High
Bienville	8	High
Bossier	8	High
Claiborne	8	High
Lincoln	8	High
Ouachita	8	High
Union	8	High
Webster	8	High
Desoto	7	High
Red River	7	High
Jackson	6	High

Map 5-4: Ice Storm Hazard Ranking (Number of Ice Storms)



5.8 Storm Surge

The storm surge hazard ranking was based on the Annual Estimated Losses (AEL) as determined from HAZUS-MH general building stock data. Based on the flood depth and building characteristics, the damage functions for the general building stock were used to determine the AEL for each parish. The total of the Annual Estimated Losses for all the parishes is $47,714,074.

The high / medium / low rankings for each parish were developed by:

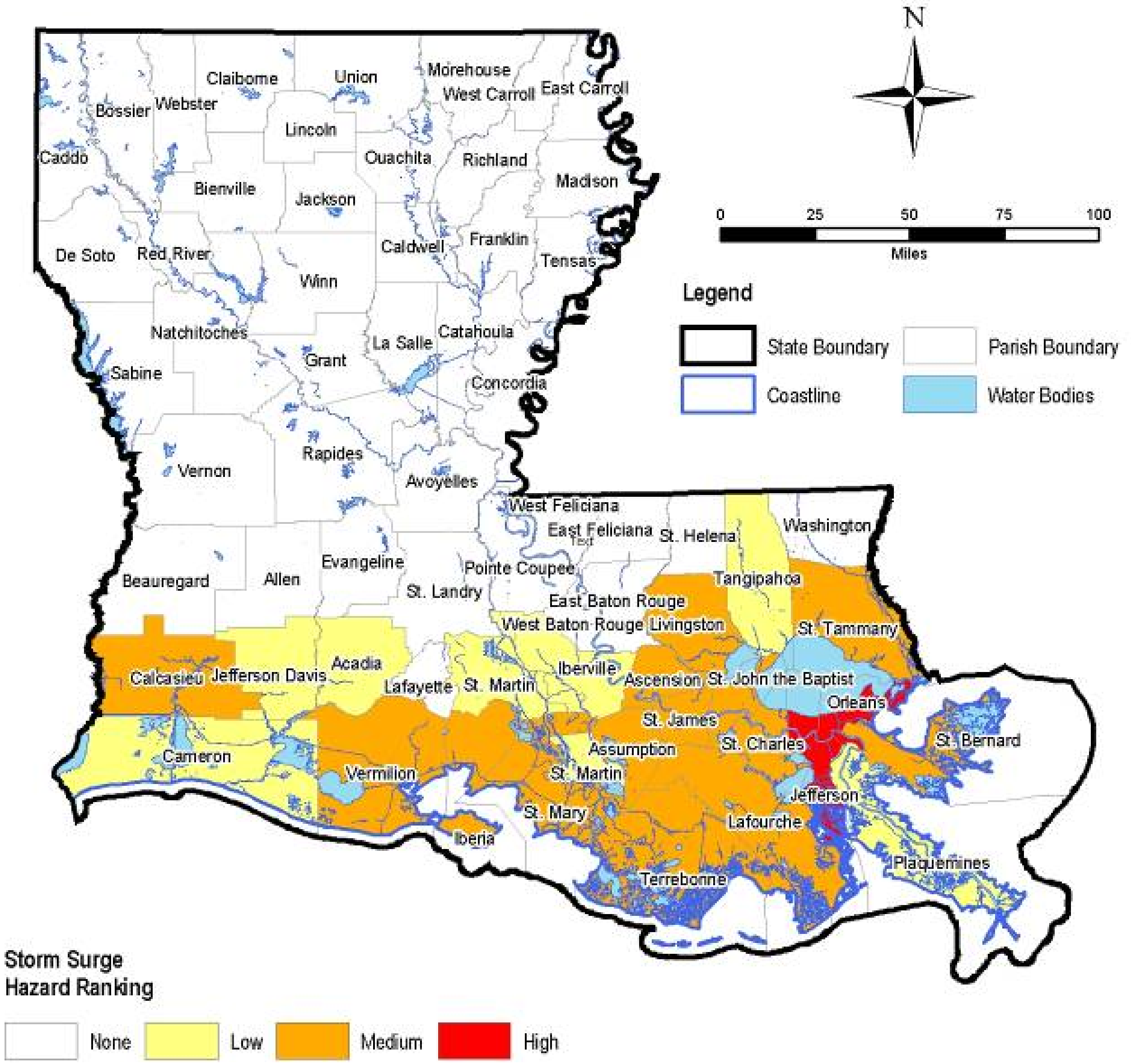
- Obtaining the Annual Estimated Loss data;
- Sorting the list by parish from highest to lowest losses;
- Assigning the high rank to parishes with losses greater than or equal to $15 billion;
- Assigning the medium rank to parishes where losses are less than $15 billion but greater than or equal to $250 million; and
- Assigning the low rank to parishes with losses less than $250 million.

The resulting ranked parishes are shown in Table 5-7. Map 5-5 presents the ranking of all the parishes with high, medium and low risk to storm surge.

Table 5-7: Category 3 Storm Surge Annual Estimated Losses and Hazard Ranking

Rank	Parish	Surge AEL ($1,000)	Hazard Ranking
1	Orleans	16,382,746	High
2	Jefferson	15,978,467	High
3	Terrebonne	2,106,954	Medium
4	St. Bernard	1,840,364	Medium
5	Iberia	1,423,129	Medium
6	St. Mary	1,398,657	Medium
7	Ascension	1,362,926	Medium
8	Lafourche	1,282,189	Medium
9	St. Tammany	1,139,500	Medium
10	St. Charles	918,117	Medium
11	Vermilion	888,637	Medium
12	Calcasieu	668,918	Medium
13	St. John the Baptist	578,880	Medium
14	Livingston	371,485	Medium
15	St. James	352,528	Medium
16	Assumption	319,941	Medium
17	Cameron	239,099	Low
18	Plaquemines	140,309	Low
19	St. Martin	136,884	Low
20	Jefferson Davis	67,019	Low
21	Iberville	55,898	Low
22	Tangipahoa	36,671	Low
23	Acadia	24,756	Low
	Total	47,714,074	

Map 5-5: Category 3 Storm Surge Hazard Ranking (Annual Estimated Losses)



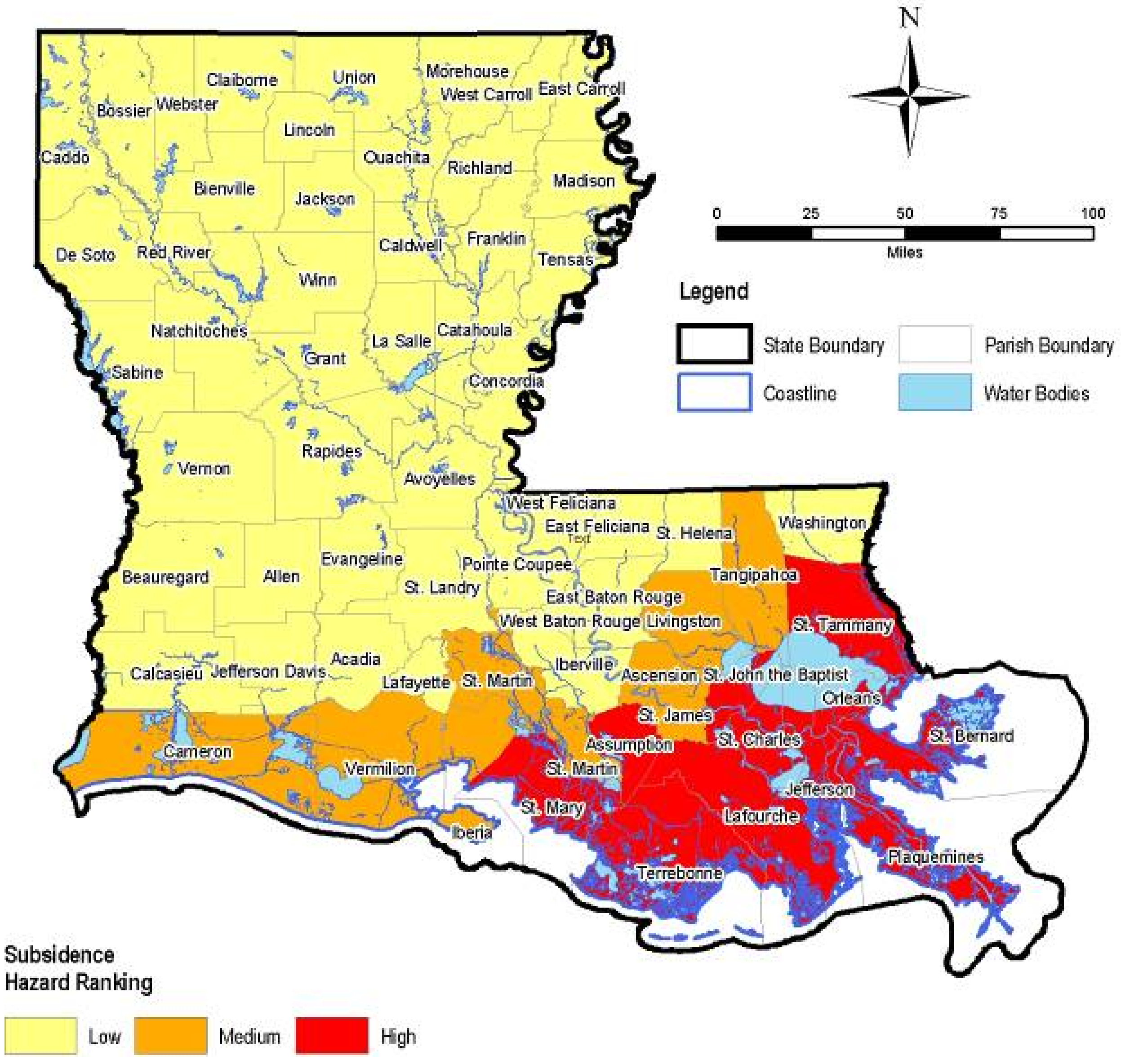
5.9 Subsidence (Land Loss)

The four land loss rates did not play a role in the vulnerability analysis, but were taken into consideration in creating the hazard ranking. The subsidence hazard ranking was developed by weighting the building exposure values by the absolute value of the USGS land loss rates. The value inside each area is the projected rate of loss expressed in the anticipated average number of square miles that will be lost per year between 2000 and 2050. The land loss rates (–0.7, -1.2, -3.7 and –4.6) were converted to absolute values. This weighting was performed to account for areas with higher vulnerability to subsidence (i.e., the area with a –4.6 rate is more vulnerable than the area with a –0.7 rate). The results are provided in Table 5-8 and Map 5-6.

Table 5-8: Subsidence Hazard Ranking

Rank	Parish	Hazard Ranking
1	Jefferson	High
2	Orleans	High
3	Terrebonne	High
4	Lafourche	High
5	St. Tammany	High
6	St. Charles	High
7	St. Mary	High
8	Plaquemines	High
9	St. Bernard	High
10	Assumption	High
11	St. John the Baptist	High
12	St. James	Medium
13	Livingston	Medium
14	Tangipahoa	Medium
15	Ascension	Medium
16	St. Martin	Medium
17	Cameron	Medium
18	Iberia	Medium
19	Vermilion	Medium

Map 5-6: Subsidence Hazard Ranking (Land Loss Rates)



5.10 Wildfire

The wildfire hazard rankings were based on a compilation of USGS National Land Cover data (1991 – 2000), since it was available for all 64 parishes. Information on the acres burned from 1991-2000 was analyzed to determine the average acreage per parish burned over the past ten years. The assumption was made that this time period is representative of wildfire risk.
The high / medium / low rankings for each parish were developed by:

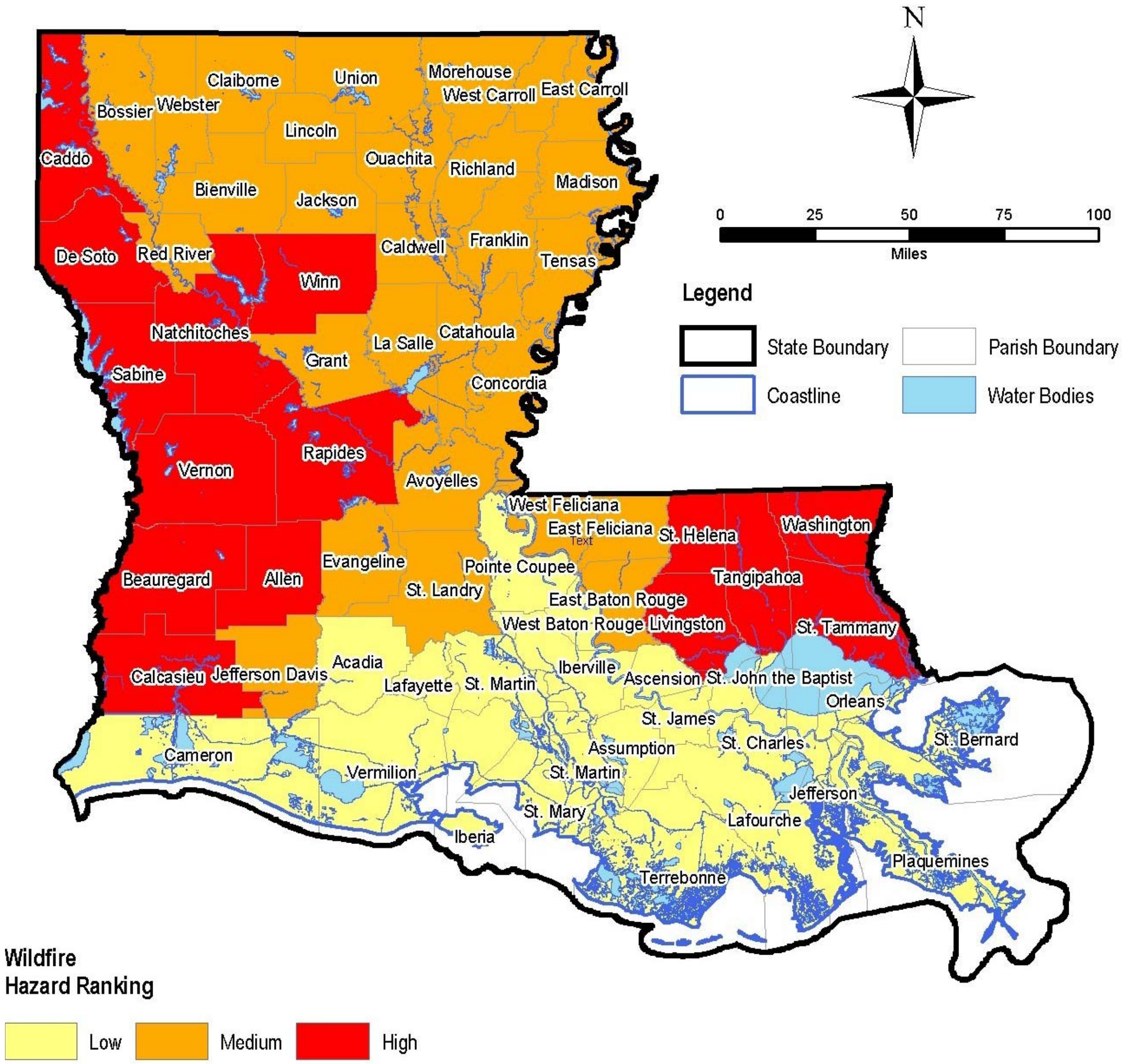
- Obtaining the USGS National Land Cover data;
- Sorting the list by parish from highest to lowest losses;
- Assigning the high rank to parishes with greater than or equal to one thousand acres burned;
- Assigning the medium rank to parishes where the number of acres burned are less than one thousand but greater than zero; and
- Assigning the low rank to parishes with no acres burned.

The parishes with “high” hazard rankings are shown in Table 5-9, listed in order according to the average number of acres burned. Map 5-7 presents the ranking of all the parishes with high, medium and low risk to wildfire.

Table 5-9: Parishes with High Wildfire Hazard Ranking

Rank	Parishes	Hazard Ranking
1	Beauregard	High
2	Allen	High
3	Vernon	High
4	St. Tammany	High
5	Rapides	High
6	Tangipahoa	High
7	Winn	High
8	Calcasieu	High
9	St. Helena	High
10	Natchitoches	High
11	Livingston	High
12	De Soto	High
13	Washington	High
14	Caddo	High
15	Sabine	High

Map 5-7: Wildfire Hazard Ranking (Average Burnt Acreage)



5.11 Dam Failure

The dam hazard ranking was based on the National Inventory of Dams classification of dams located in each parish. The National Inventory ranks dams according to the potential for loss of life as well as the potential impacts on economic, environmental and important community lifelines.

The high / medium / low rankings for each parish were developed by:

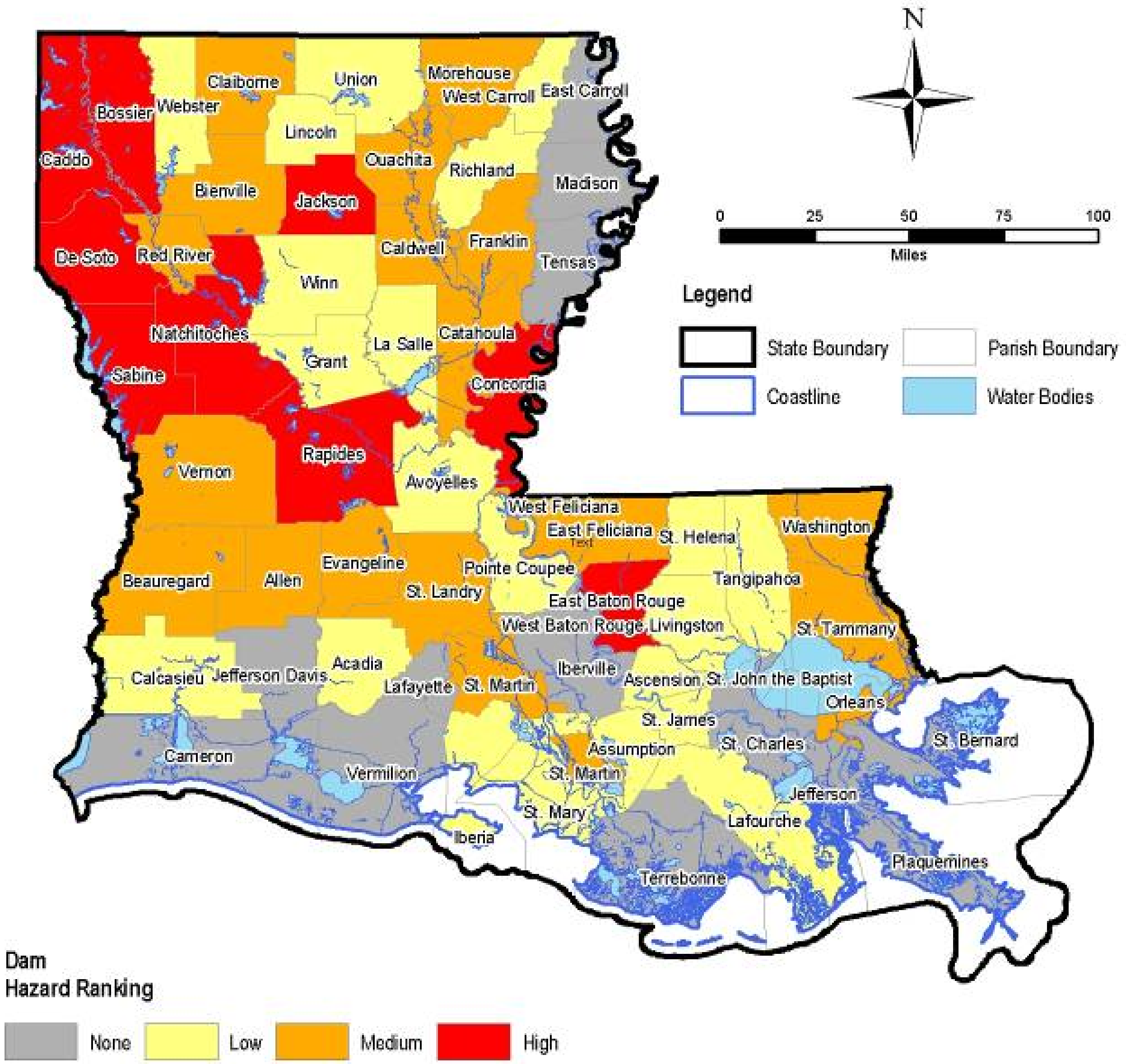
- Obtaining the National Inventory of Dams data;
- Sorting the list by parish by high to low dam classification;
- Assigning the high rank to parishes with one or more high hazard dams;
- Assigning the medium rank to parishes with one or more significant hazard dams;
- Assigning the low rank to parishes with one or more low hazard dams; and
- Assigning no rank to parishes with no dams with a high, significant or low classification.

The resulting ranked parishes are shown in Table 5-10. Map 5-8 presents the ranking of all the parishes with high, medium, low and no risk to dams.

Table 5-10: Parishes with One or More High Hazard Dams

Parishes (listed alphabetically)	Dam Failure Hazard Level
Bossier	High
Caddo	High
Concordia	High
Desoto	High
East Baton Rouge	High
Jackson	High
Natchitoches	High
Rapides	High
Sabine	High

Map 5-8: Dam Failure Hazard Ranking (Number of High, Medium and Low Hazard Dams)



Source: USACE

Levee Failure

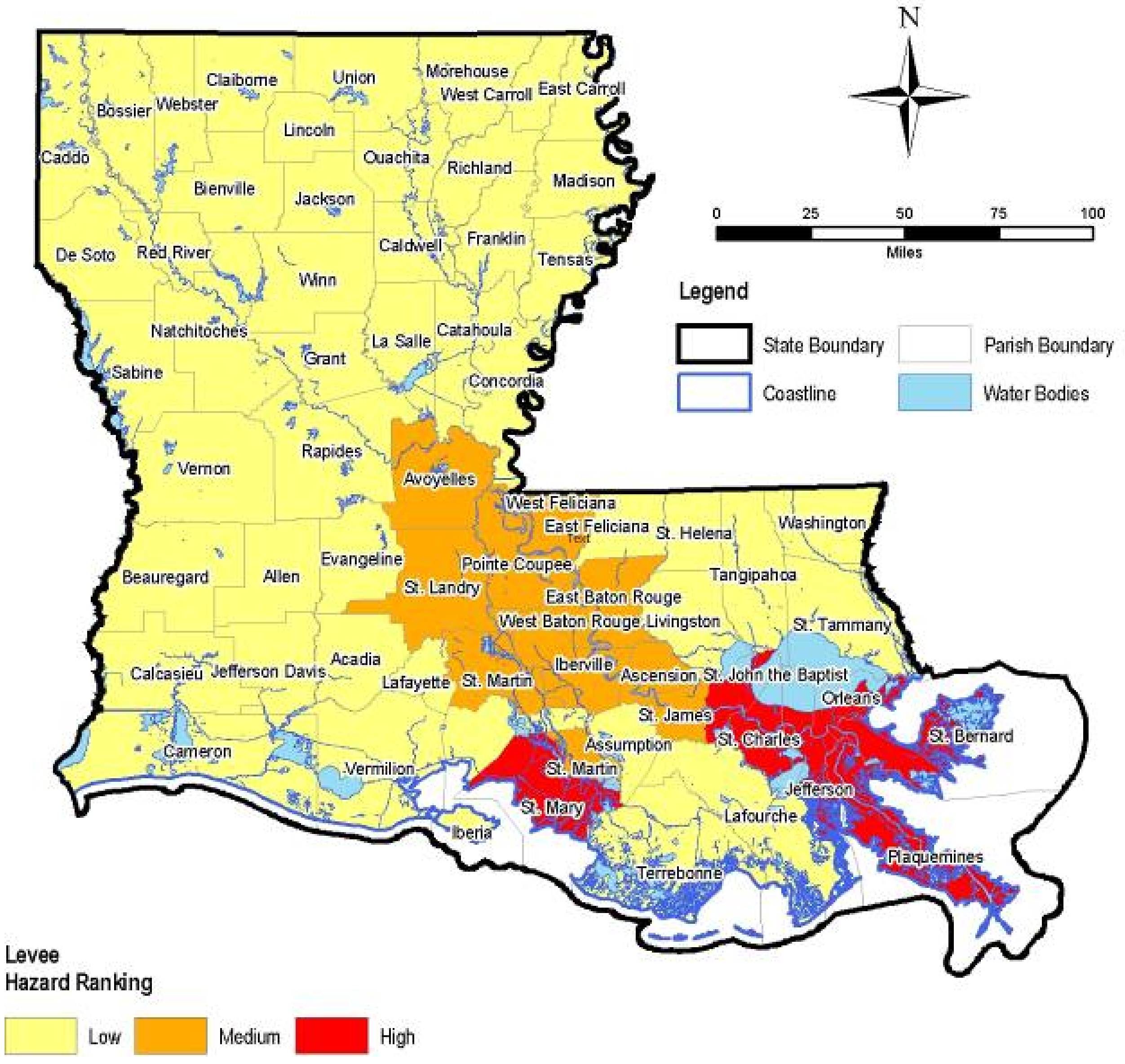
The levee hazard ranking was based on the parishes that have the highest population exposure to levee failure[17]. For the levee analysis, it was assumed that any area adjacent to the levee could be flooded, since inundation maps were not provided for this analysis. The parishes ranked according to population exposure are reported in Table 5-11 and Map 5-9.

Table 5-11: Ten Parishes with Highest Levee Failure Hazard Ranking

Rank	Parish	Population
1	Orleans	112,739
2	Jefferson	103,608
3	Plaquemines	23,334
4	St. Bernard	22,754
5	St. Charles	20,484
6	St. Mary	17,456
7	St. John the Baptist	11,832
8	Iberville	9,129
9	St. James	8,366
10	West Baton Rouge	7,068

[17] Note: This analysis was limited to levees controlled by the New Orleans District of the USACE. As noted in Section Four, information for levees in other parts of the State was not available at the time of this analysis.

Map 5-9: Levee Failure Hazard Ranking (Affected Population)



5.12 Hazardous Materials Incident

The hazardous materials incident hazard ranking was developed by sorting the general population exposure results from highest to lowest vulnerability (proximity to hazardous materials facility). Populations were counted more than once where radii that surround a hazardous materials facility overlap, indicating that these populations are exposed to more than one facility.

The high / medium / low rankings for each parish were developed by:

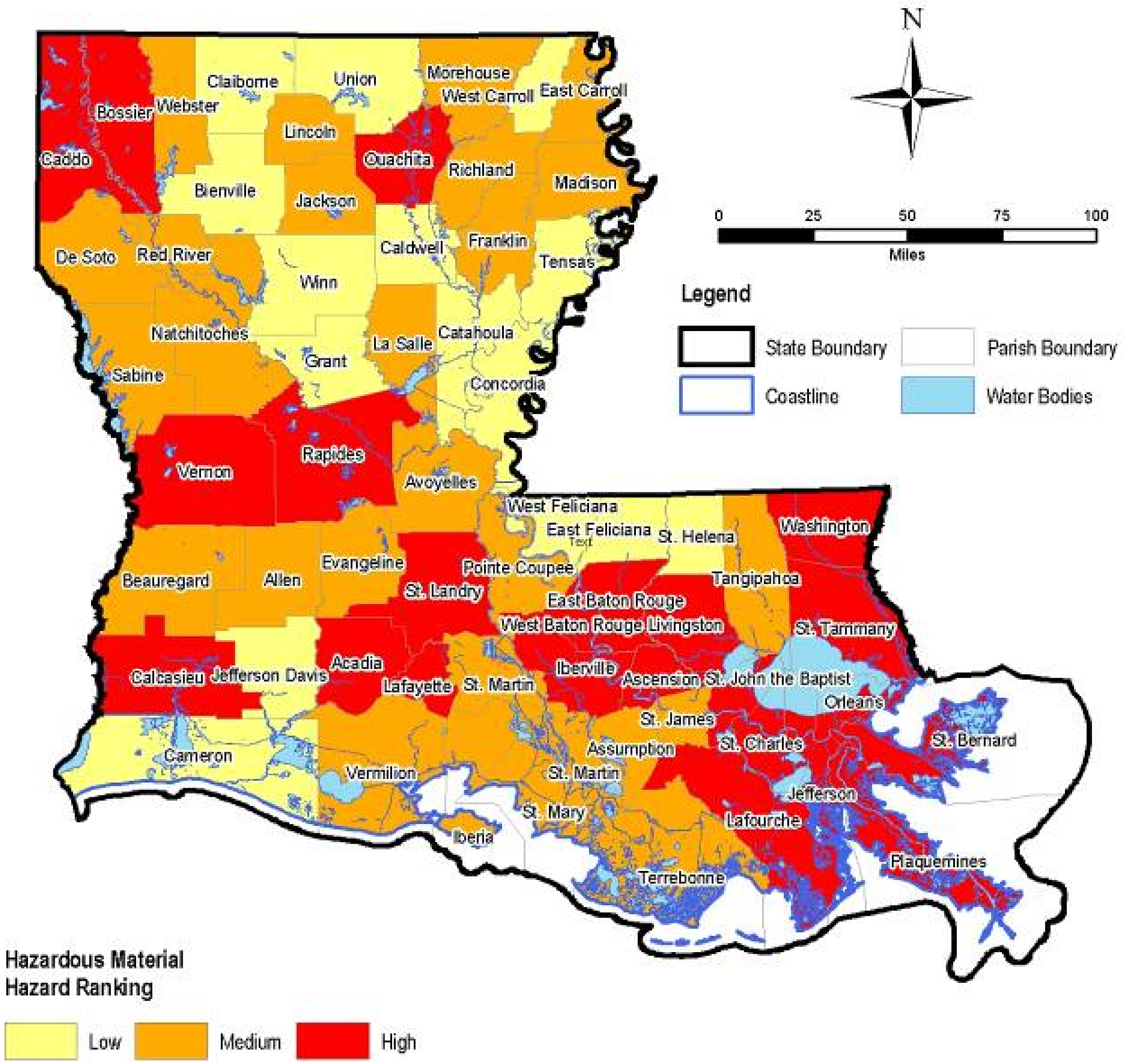
- Obtaining population exposure data within one mile radius of hazardous materials facilities;
- Sorting the list by parish from highest to lowest number of affected population;
- Assigning the high rank to parishes with affected population of greater than or equal to one thousand;
- Assigning the medium rank to parishes where the affected population is less than one thousand but greater than or equal to ninety; and
- Assigning the low rank to parishes with losses less than ninety.

The resulting ranked parishes are shown in Table 5-12. Map 5-10 presents the ranking of all the parishes with high, medium and low risk to hazardous materials incidents.

Table 5-12: Ten Parishes with Highest Hazardous Materials Incident Hazard Ranking

Rank	Parish	Population Within 1 Mile Radius (High)
1	Jefferson	21,712
2	Caddo	12,274
3	East Baton Rouge	9,450
4	St. Charles	6,442
5	Ouachita	4,412
6	Orleans	4,073
7	Lafayette	3,788
8	Calcasieu	3,649
9	St. Tammany	3,634
10	Rapides	3,567

Map 5-10: Hazardous Material Incidents Hazard Ranking (Affected Population)



5.13 Summary

Risk and vulnerability assessments are best conducted on an asset-specific basis, something that is not possible given the scope of the Plan. Due to this, the results of the risk assessments should be considered general in nature, and most accurate relative to each other.

The preceding general discussion and the more detailed treatments in Volume II, Appendix E indicate common limitations in this study due to the quality and availability of data. For example, there are a number of specific deficiencies that are cited in these materials including:

- lack of data on recurrence intervals for wildfire;
- lack of detailed information on elevations for dam and levee failure, and
- lack of data availability regarding the number of hazardous materials incidents that have occurred over a period of time to establish recurrence rates by parish in time to include with this Plan.

The various hazard analyses that comprise this risk assessment used different bases and focused on available information to try to draw useful conclusions. The main consequence of these limitations is the inability to compare the impact of different hazards on the parishes of Louisiana. Section Eight includes a program of improving data at the local and State level that over time can provide results that are more comparable hazard to hazard.

For the immediate future though, there is an important point to emphasize. The major hazards in the State, in the opinion and experience of OHSEP and the SHMPC are flooding and high winds (usually due to hurricanes and tropical storms). While the results of these analyses provide useful insights into the potential for damages due to the other hazards, nothing in the results changes the standing priority of the State to address the numbers of repetitive loss properties and to limit the damaging affects of tropical storm events.