Assessing Runoff along Major Waterways in Louisiana

The Dead Zone

Background Information

The Gulf of Mexico's "dead zone" is an annual occurrence off the coast of Texas to Louisiana that refers to a large oxygen depleted or hypoxic area measuring anywhere from 5,000 to 8,0000 square miles. These conditions arise each spring and continue throughout the summer due to huge amounts of agricultural and pollutant runoff within the Mississippi River Basin that are deposited into the Gulf at the Mississippi's river mouth.
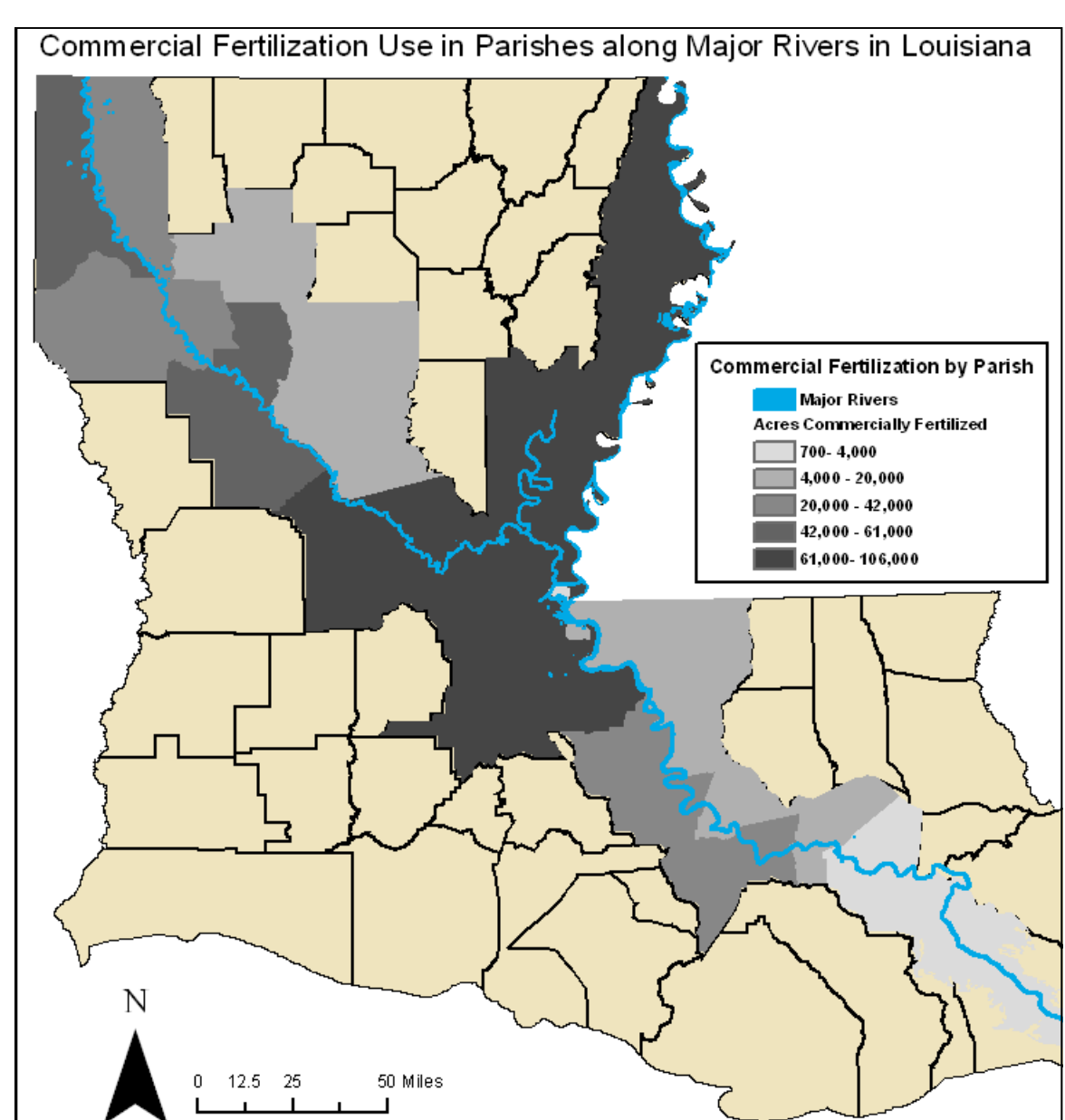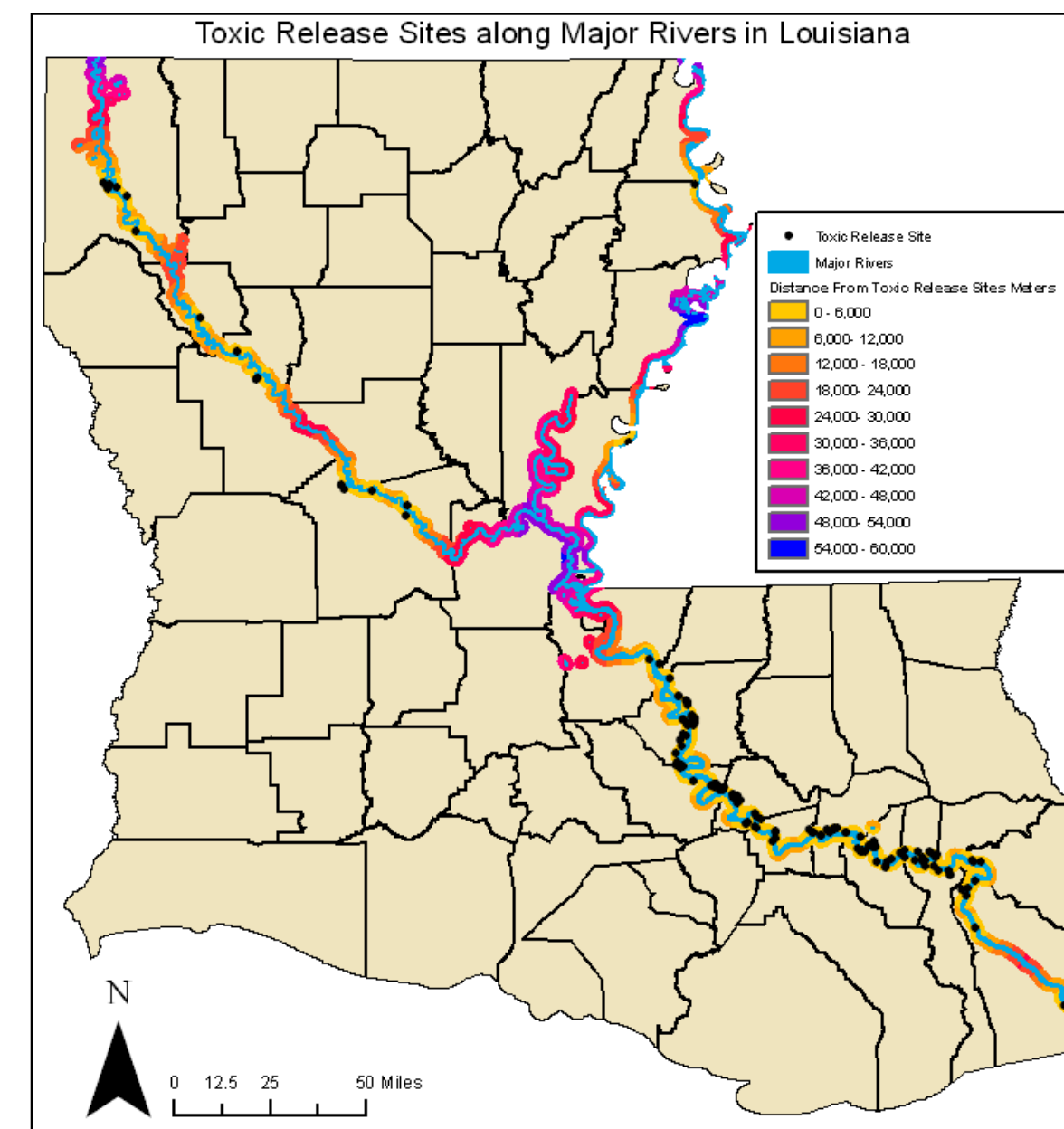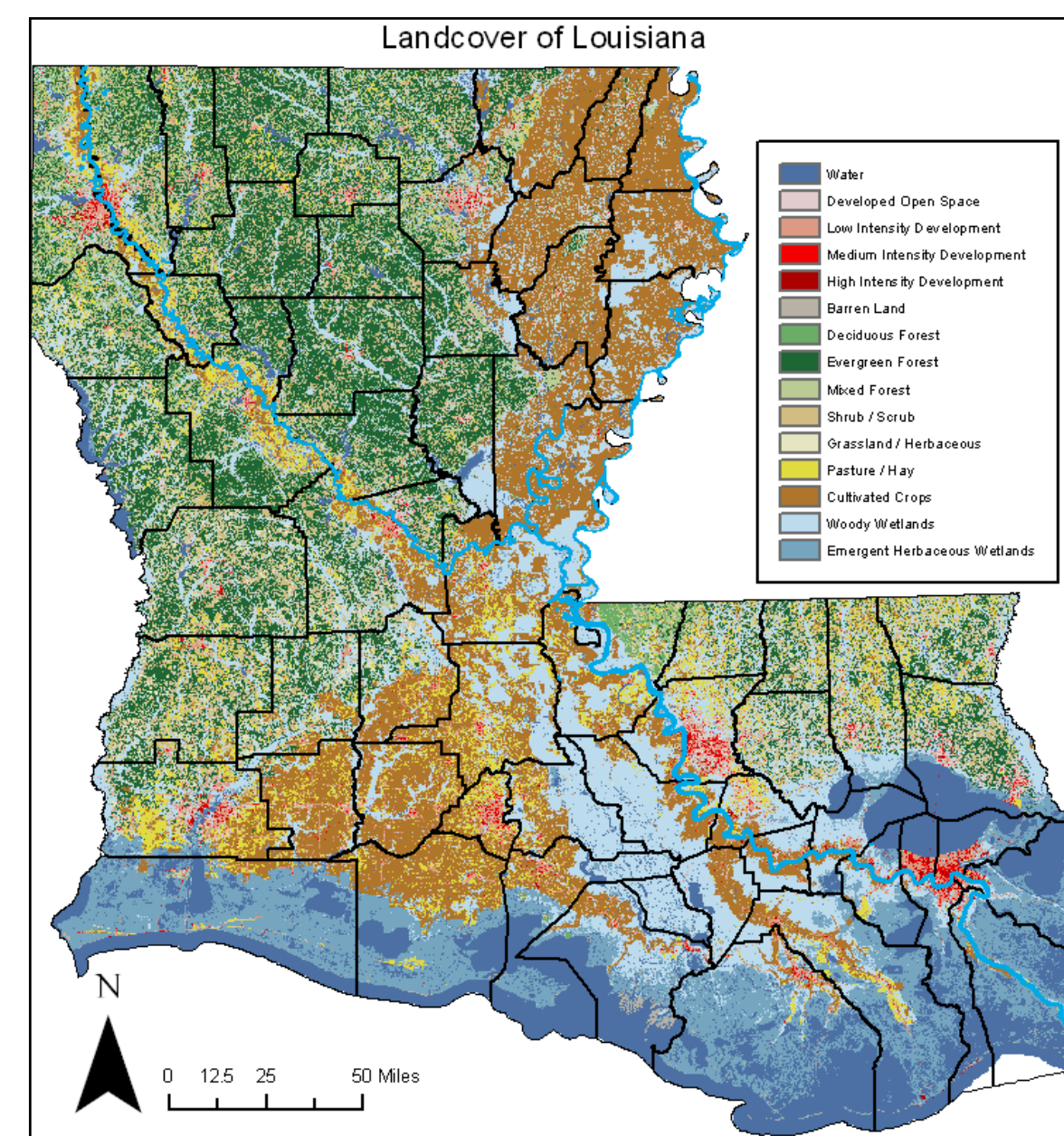
These high concentrations of fertilizers, containing nitrogen and phosphorous, stimulate algal growth at the base of the Mississippi River . These organic structures die and sink to the bottom of the ocean where they are decomposed by oxygen-utilizing bacteria. This utilization of oxygen causes the water to become hypoxic, meaning the water has less than 20% oxygen saturation. These conditions are uninhabitable for bottom dwelling life, which either flee or die. Dead Zone conditions have devastating effects on the ecosystem as well as agriculture, the fishing industry, and tourism.

This project is designed to show likely areas along the Mississippi, Black, and Red Rivers within Louisiana that are probable spots of high nutrient and pollutant run off. Nutrient contamination and the dead zone are problems that need to be addressed on a national level. Proper regulation of agricultural practices and development along waterways within the Mississippi Watershed are necessary to provide a viable lasting solution to the dead zone. This project hopes to pin point areas that could be addressed in the short term as potentially hazardous run off sites as well as wetland and forest areas that can act as a buffer to nutrient contamination.

Sources:
USGS: The Gulf of Mexico Hypoxic Zone
Website:
http://toxics.usgs.gov/hypoxiahypoxic_zone.html

Input Maps

Landcover of Louisiana

Toxic Release Sites along Major Rivers in Louisiana

Commercial Fertilization Use in Parishes along Major Rivers in Louisiana


Methods:

1. Gathered land cover, fertilizer use, and toxic release site data within a 8,000m buffer of the Black, Red, and Mississippi Rivers in Louisiana.
2. Gave values of 1-7 for land cover data layer from 2001. Lower numbers were land cover not prone to causing nutrient runoff such as forested or wetland areas. High numbers were areas of intense development and agricultural or pasture.
3. Used the location of EPA toxic release sites from 2000 and calculated the distance from each site. Values of 1-7 were given to these areas as well. Areas near a toxic release site were given higher values than those farther away.
4. Used data from 1994 for the number of acres using commercial fertilizers in Parishes along major rivers in Louisiana and valued those acres 1-7 where Parishes with a high number of acres using commercial fertilizers having high numbers and those with a lower number of acres having a smaller number.
5. Combined these data layers to show areas where nutrient contamination was most likely to be high along the selected rivers.

Possible Areas of Nutrient Contamination along Major Rivers in Louisiana
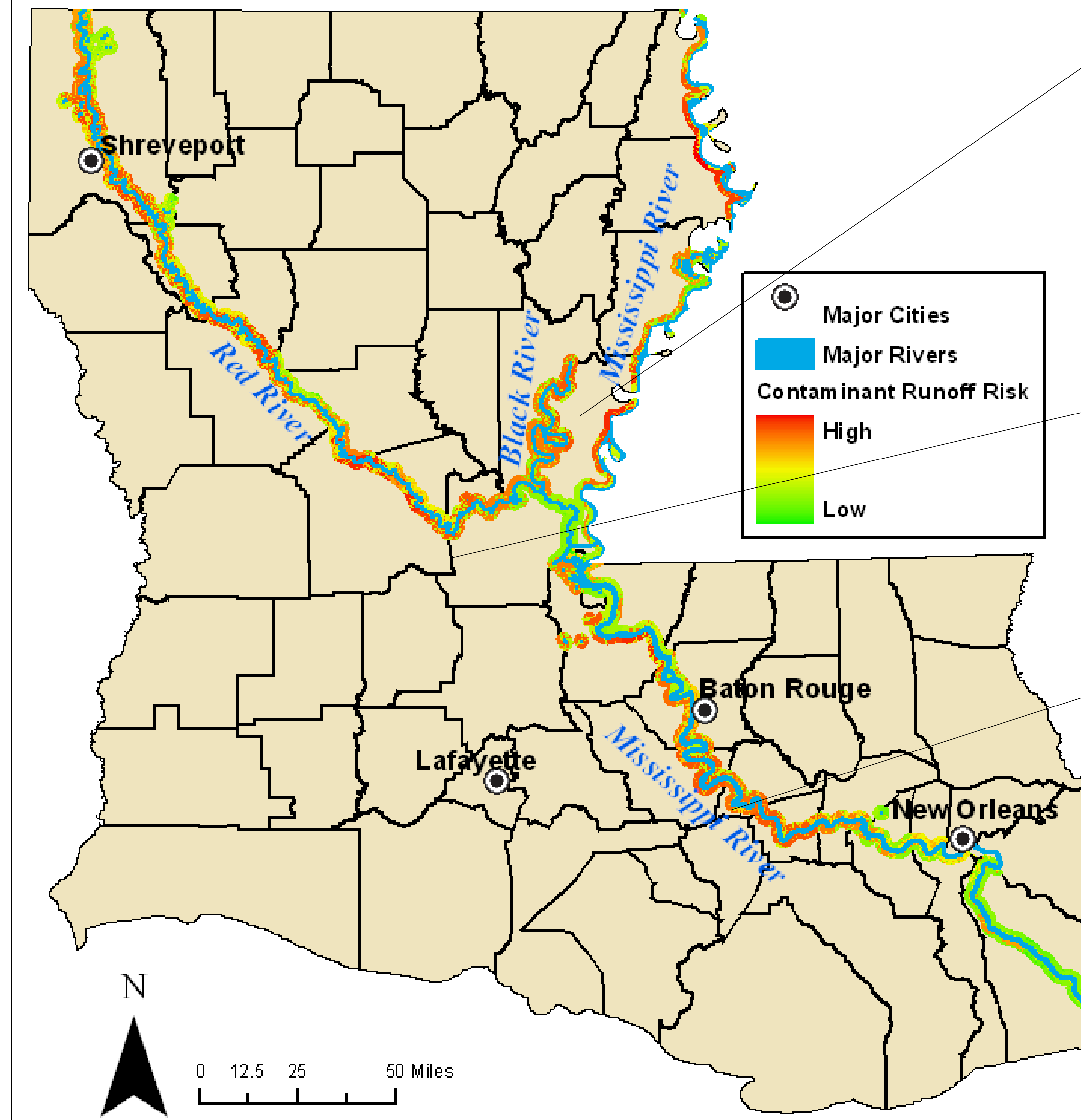
Areas of Concern
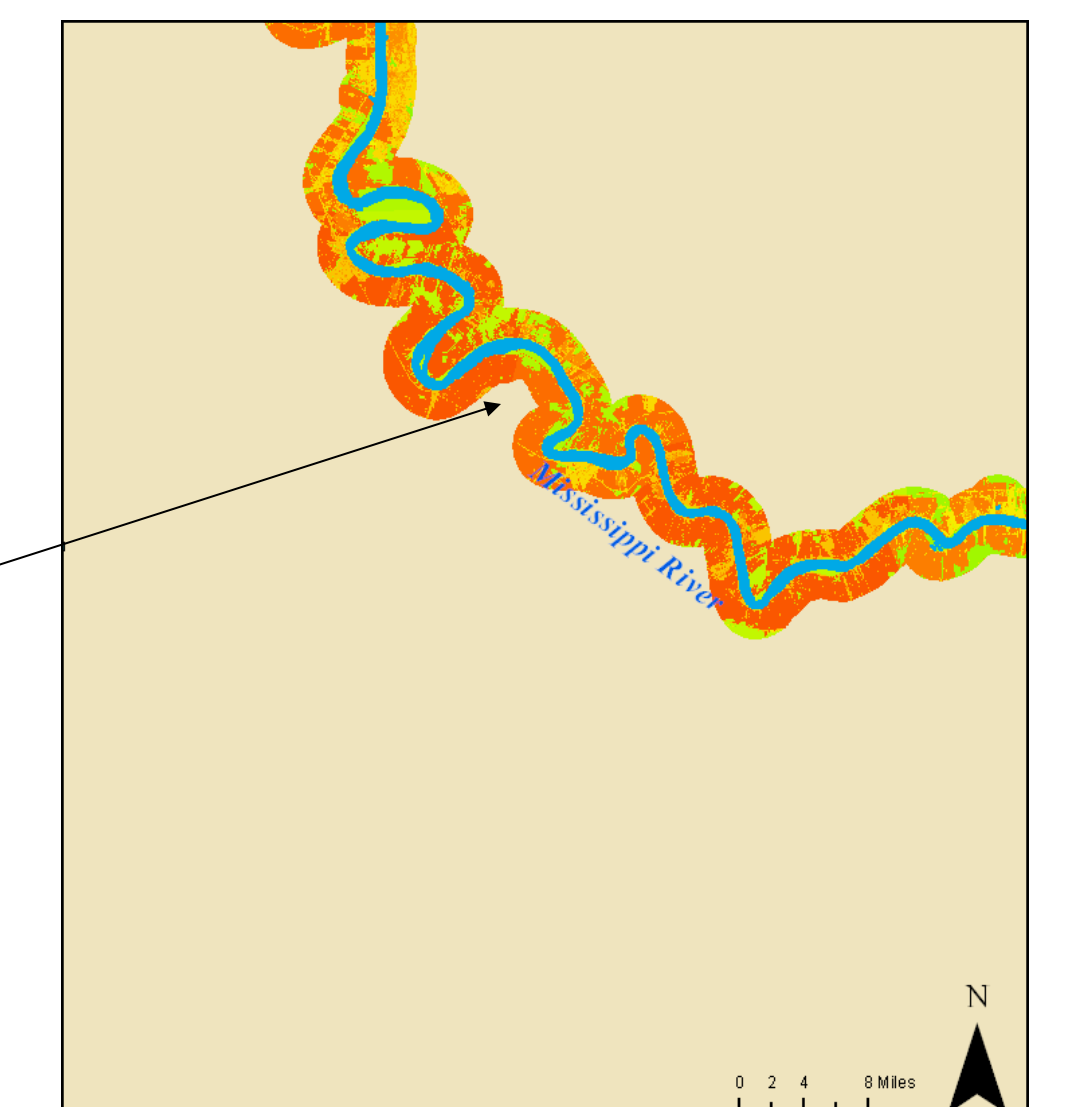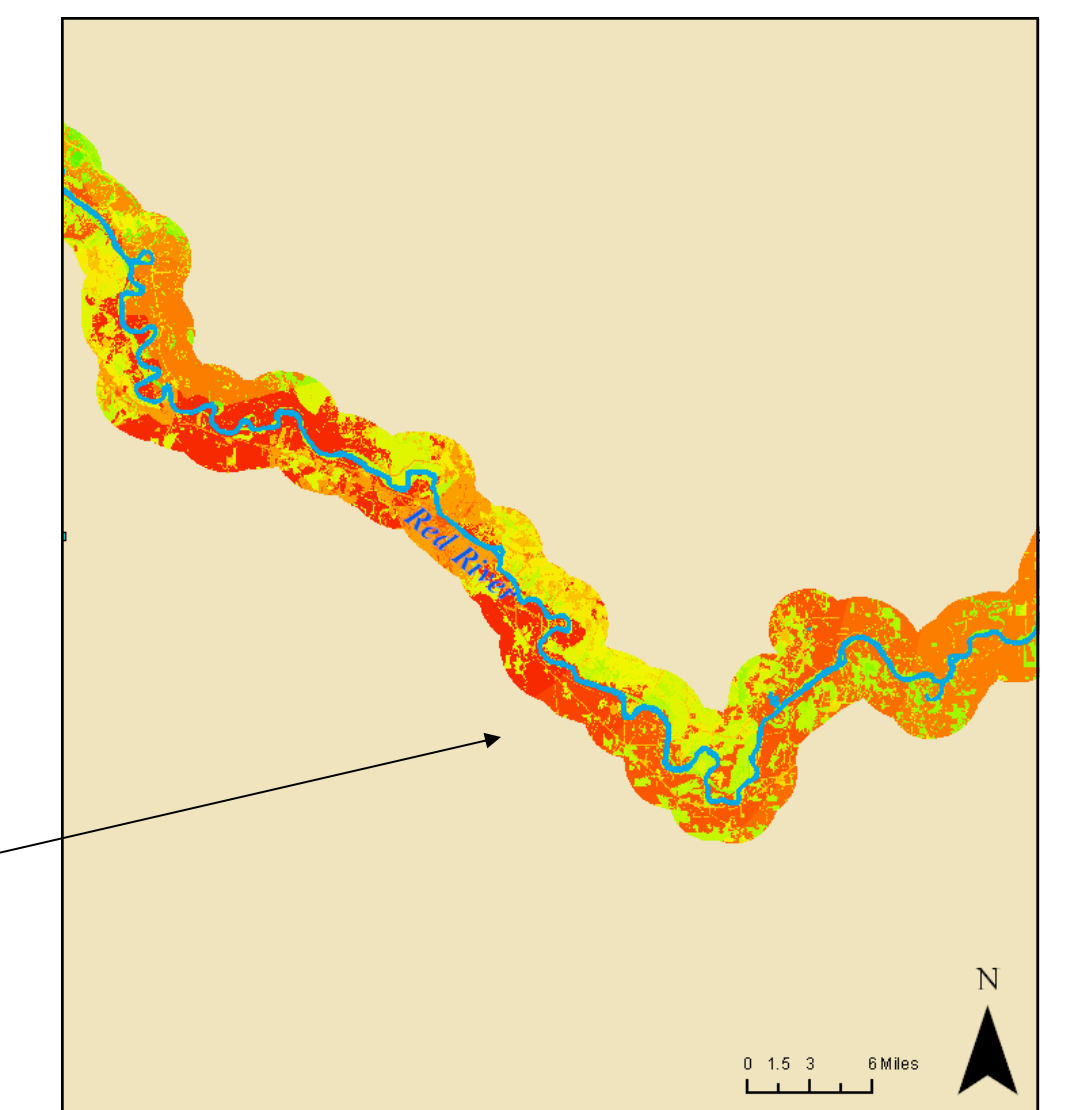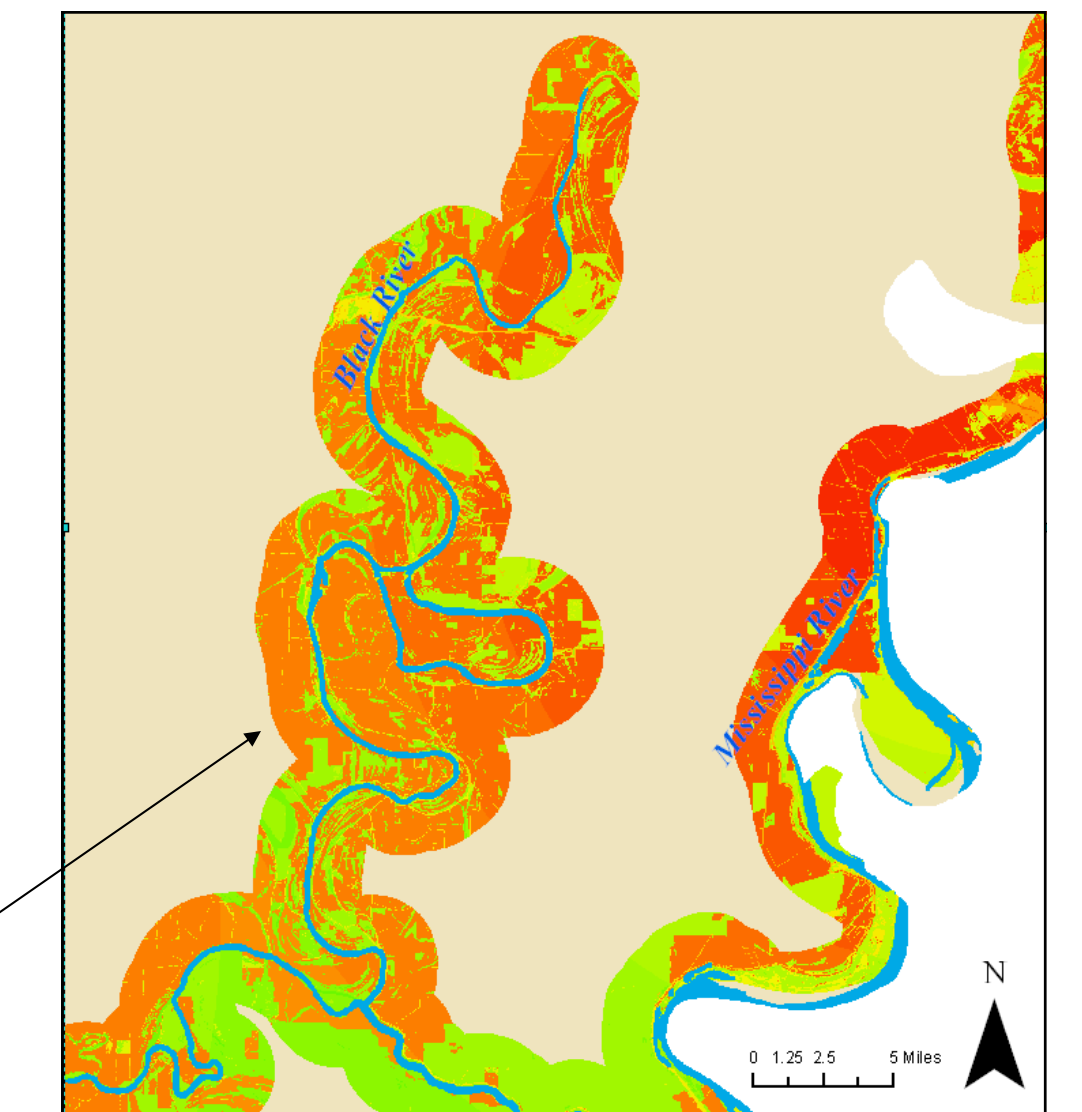
Conclusion:
Those areas that contained land used for agriculture, pasture, or high intensity development were located near toxic release sites and were found in Parishes with a large number of acres used for commercial fertilizer were found densely clustered in the three areas shown

Limitations:
The commercial fertilizer use layer contained data for an entire Parish along one of the three major rivers. Therefore, although fertilizer is used in some Parishes as opposed to others it doesn't necessarily mean that those acres are found along the rivers studied. Also not all of the data layers used are current to date.

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