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U.S. Department of the Interior U.S. Geological Survey Nutrient Loads to the Gulf of Mexico

Mike Woodside

USGS
science for a changing world

Nutrient Loads to the Gulf of Mexico

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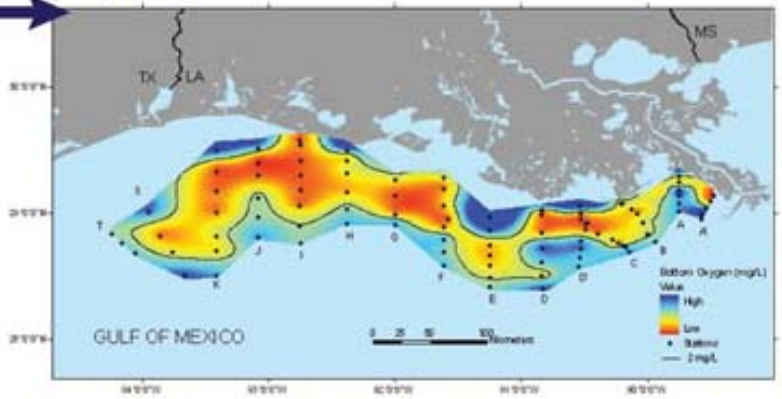
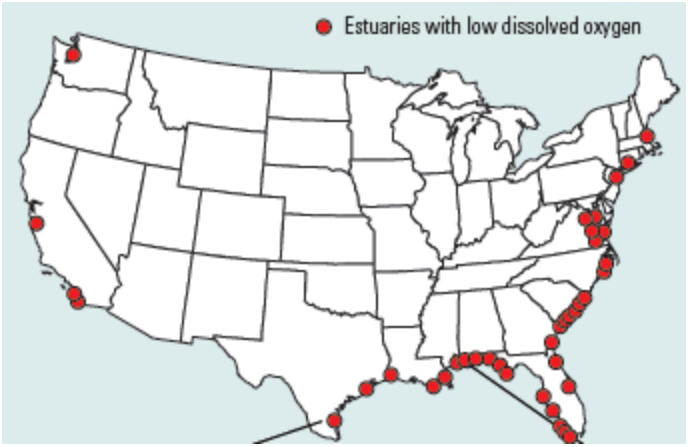
U.S. Geological Survey

What is hypoxia?

Hypoxic Zone in Northern Gulf of Mexico July 2007



From Rabalais and others: http://www.gulfhypoxia.net/shelfwide07



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What causes hypoxia?

Photo Courtesy of N. Rabalais, Louisiana Universities Marine Consortium

Excess nutrient loading to the Gulf of Mexico

Seasonal Stratification of Gulf Waters

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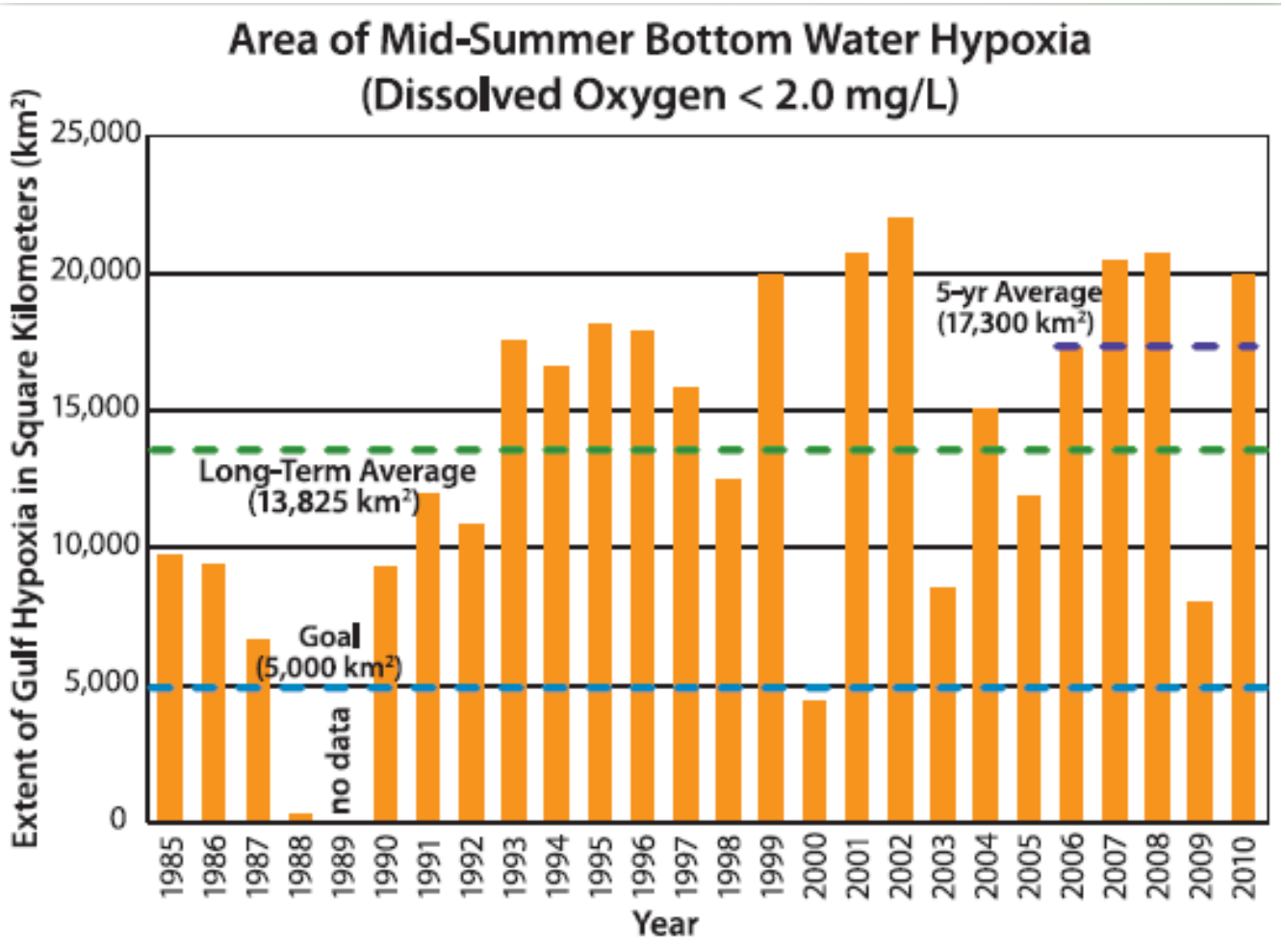
Is Hypoxia in the northern Gulf of Mexico getting better or worse?



Source: Nancy N. Rabalais, Louisiana Universities Marine Consortium, and R. Eugene Turner, Louisiana State University; Funding: NOAA, Center for Sponsored Coastal Ocean Research

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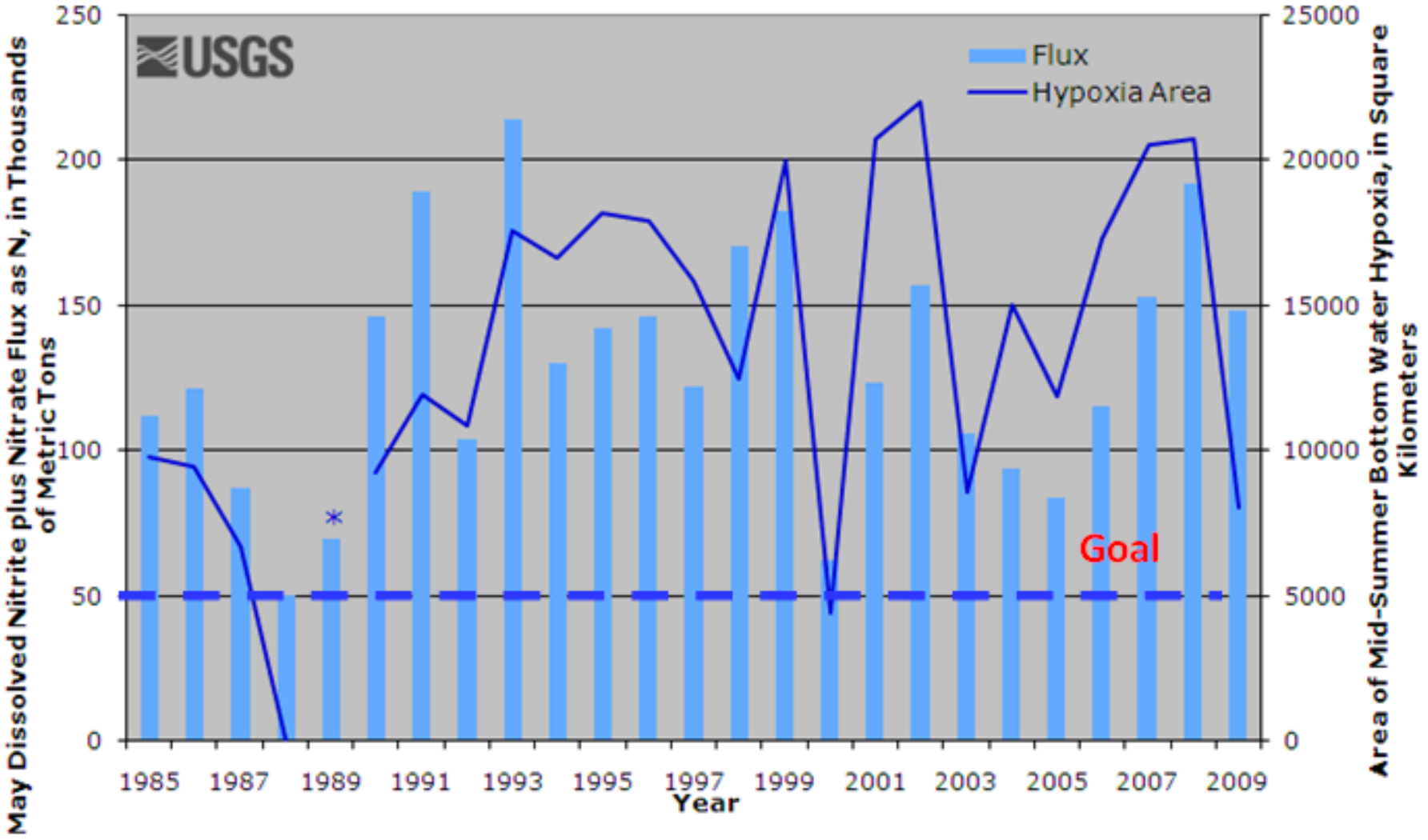
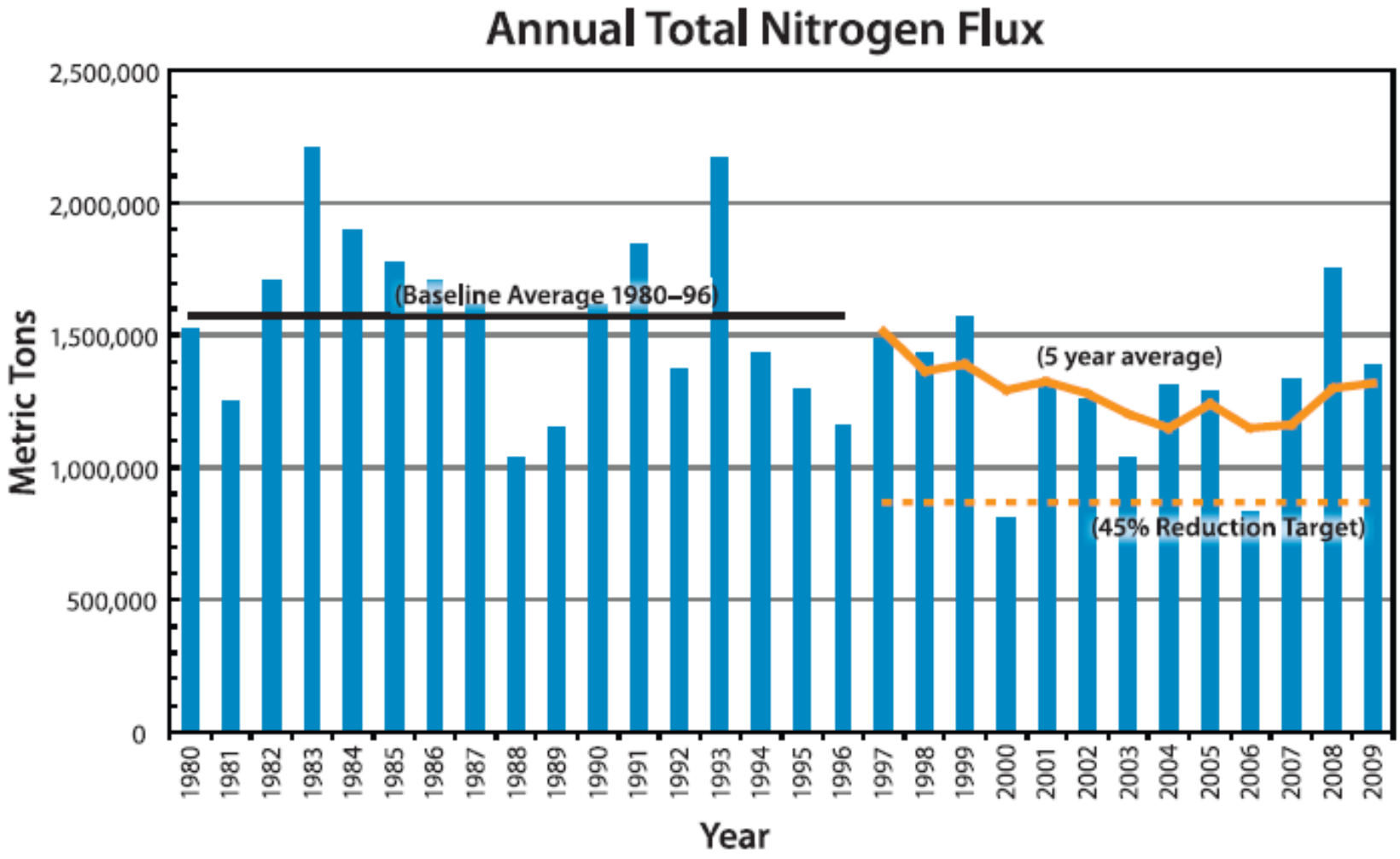
Spring Nutrient Loads Are Used to Estimate the Size of the Hypoxic Zone



Mississippi/Atchafalaya River Basin Nitrogen Loads



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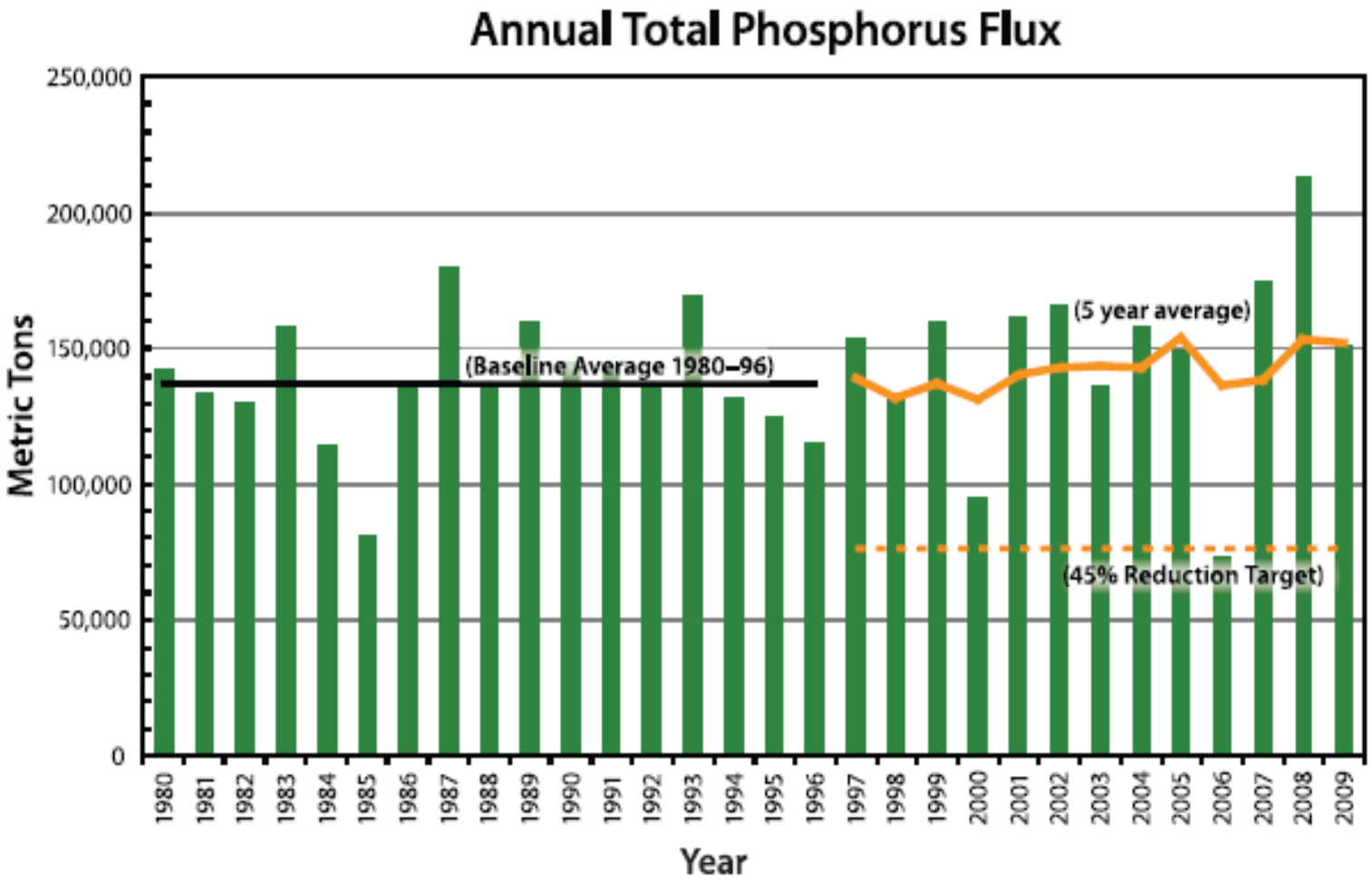
Source: USGS: Aulenbach and others, 2010

Mississippi/Atchafalaya River Basin Phosphorus Loads

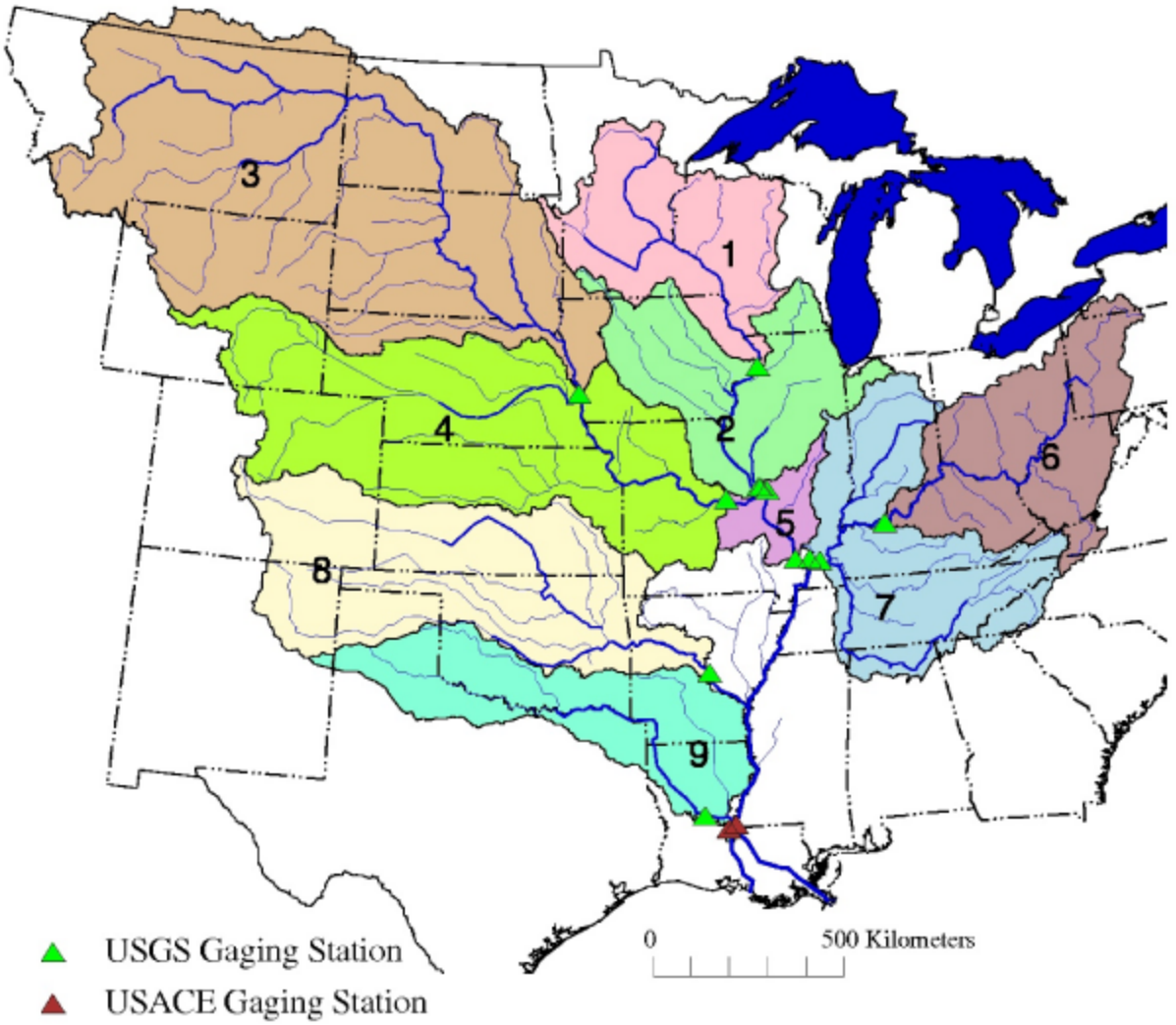


USGS

Source: USGS: Aulenbach and others, 2010

USGS Releases Nutrient Load Estimates Online each year for Mainstem sites and Nine Major Tributaries

1. MRB Clinton, IA
2. MRB Alton, IL
3. Missouri River at Omaha, NE
4. Missouri River at Herman, MO
5. MRB at Thebes, IL
6. Ohio River at Cannelton, IN
7. Ohio River at Grand Chain, IL
8. Arkansas River below Little Rock, AR
9. Red River at Simmesport, LA



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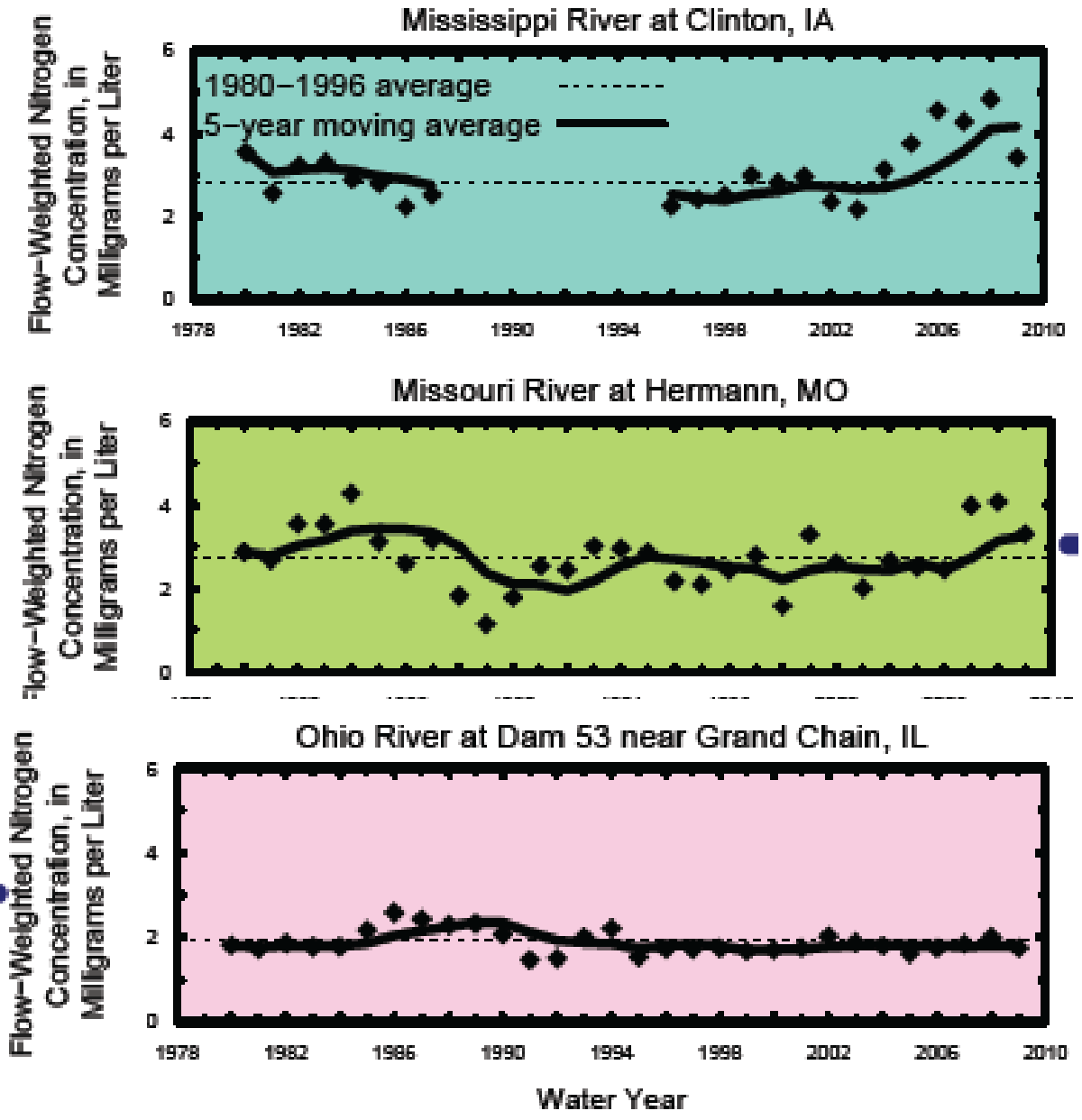
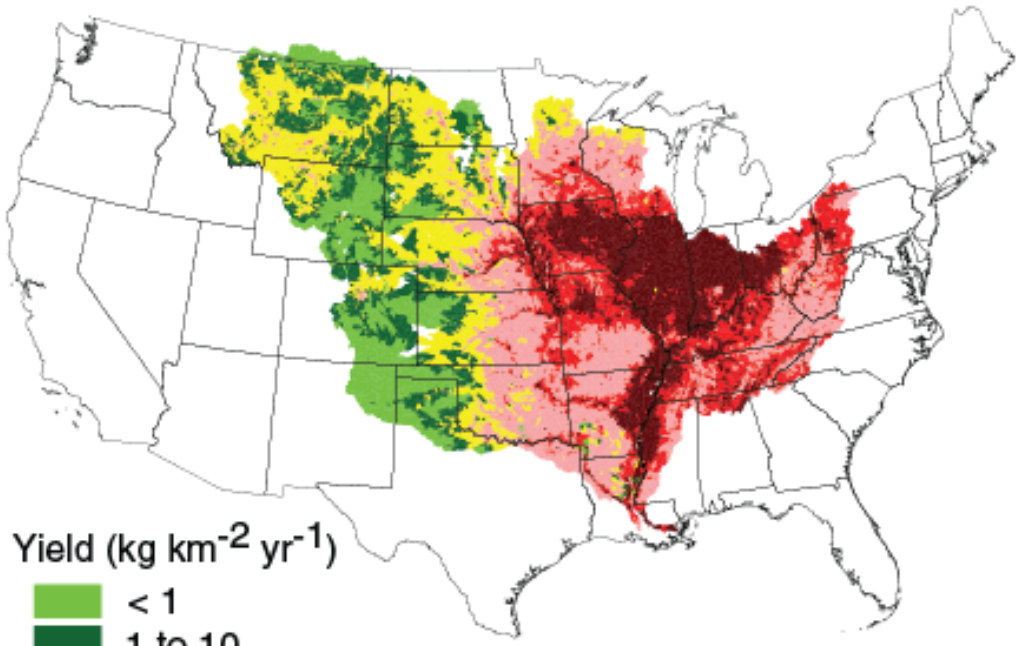
http://water.usgs.gov/nasqan/


Mississippi River at Clinton, IA
1980–1996 average
5–year moving average
Flow–Weighted Nitrogen Concentration, in Milligrams per Liter
0
2
4
6
1978
1982
1986
1990
1994
1998
2002
2006
2010
Missouri River at Hermann, MO
Flow–Weighted Nitrogen Concentration, in Milligrams per Liter
Ohio River at Dam 53 near Grand Chain, IL
Flow–Weighted Nitrogen Concentration, in Milligrams per Liter
Water Year

USGS

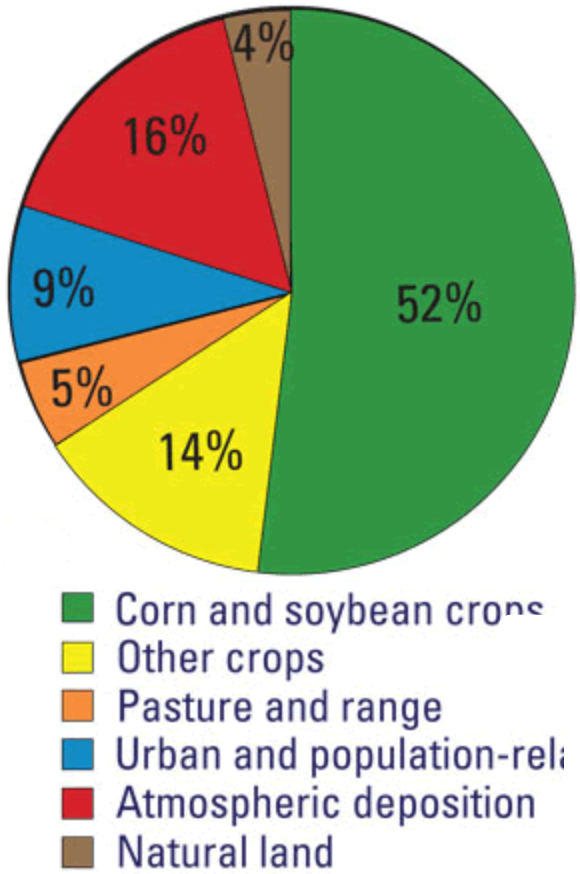
Nutrient Delivery and Sources

Areas with Highest Delivered Yields of Nitrogen to the Gulf of Mexico

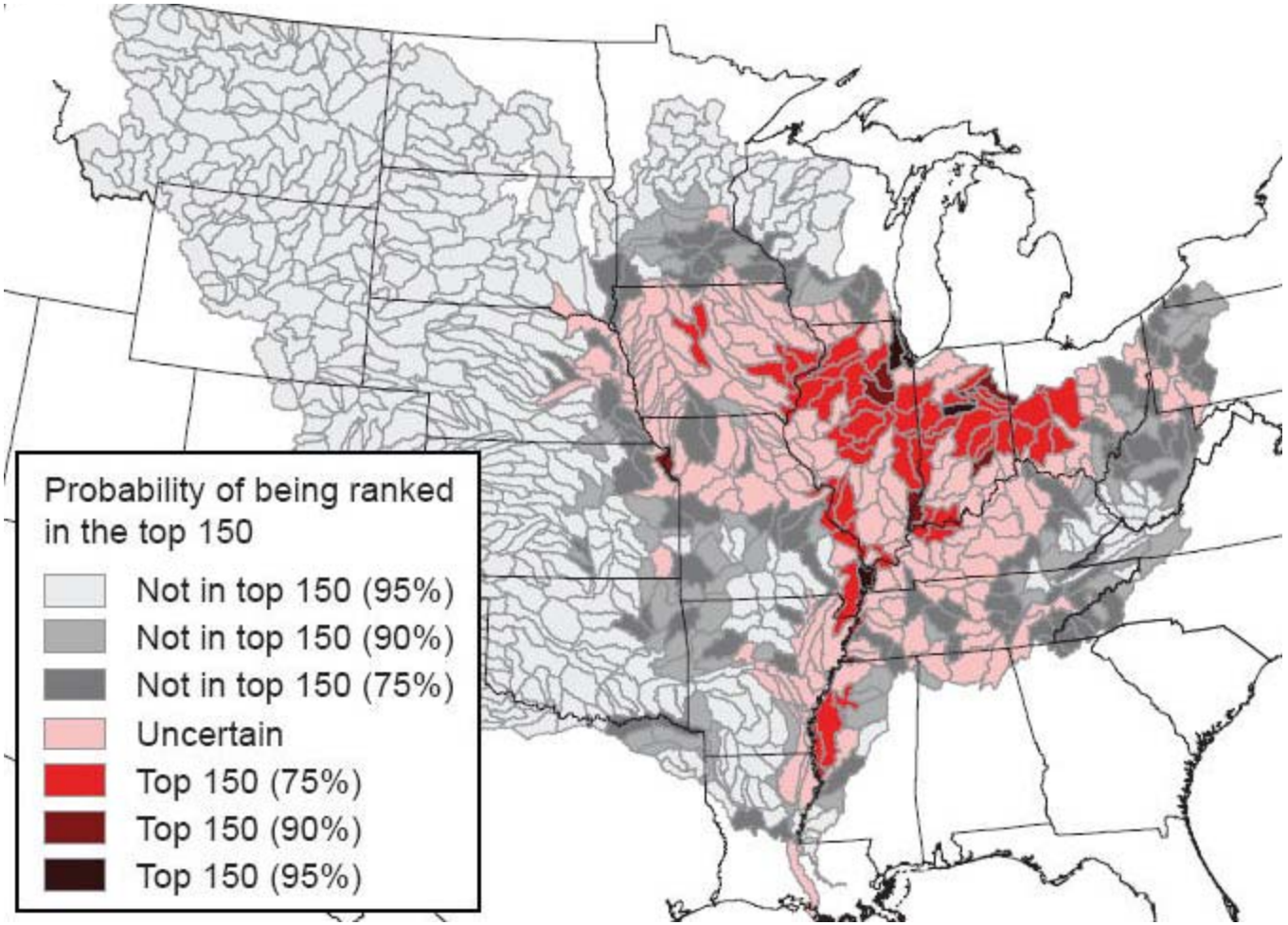


Alexander and others, 2008

Sources of Nitrogen Delivered To the Gulf of Mexico



Rankings and the uncertainties of these rankings for 818 watersheds in the Mississippi/Atchafalaya River Basin



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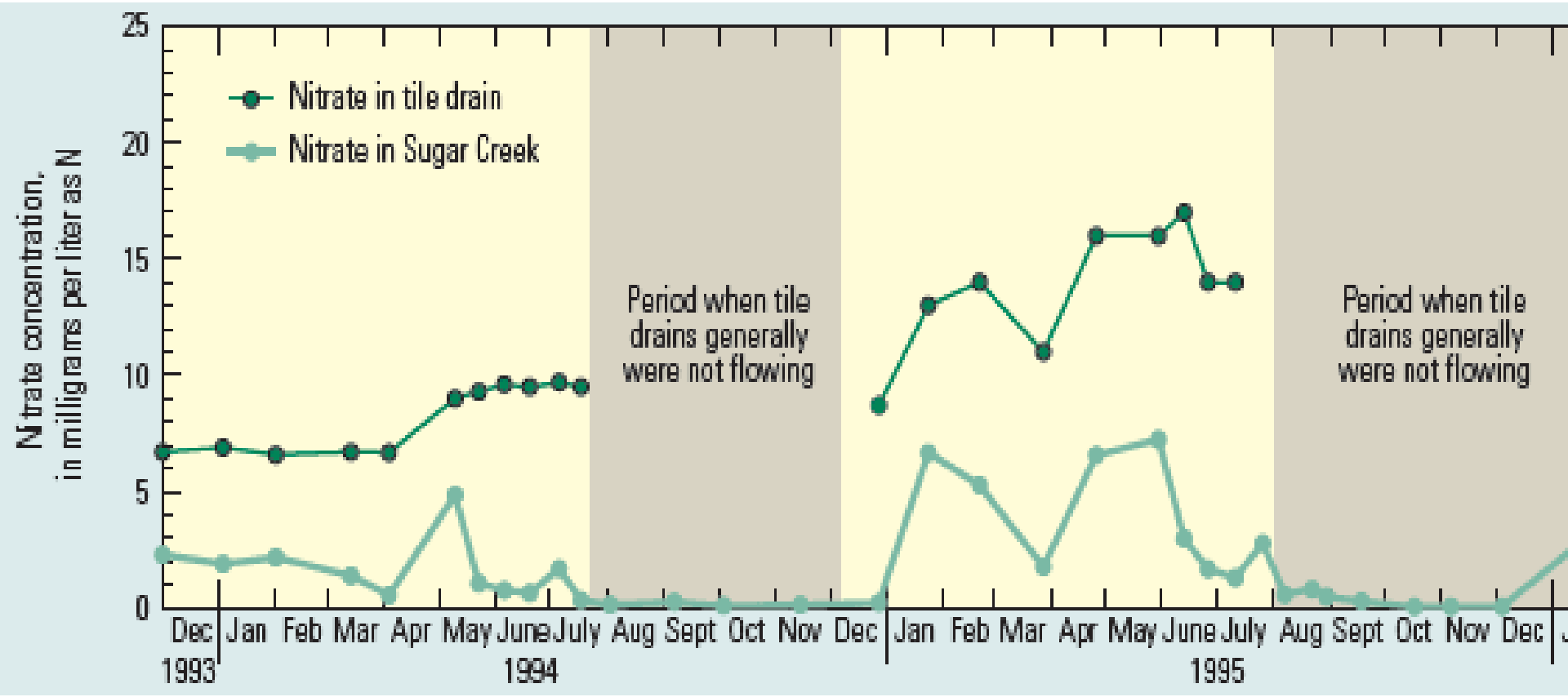
Robertson and others, 2009

Importance of Groundwater Nutrient Contributions



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Fenelon, 1998

Elevated nutrient levels can also affect the quality of drinking water resources

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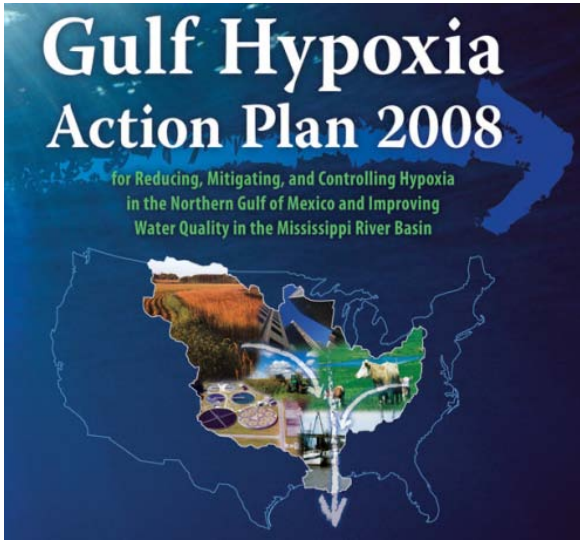
Mississippi River Gulf of Mexico Watershed Nutrient Task Force

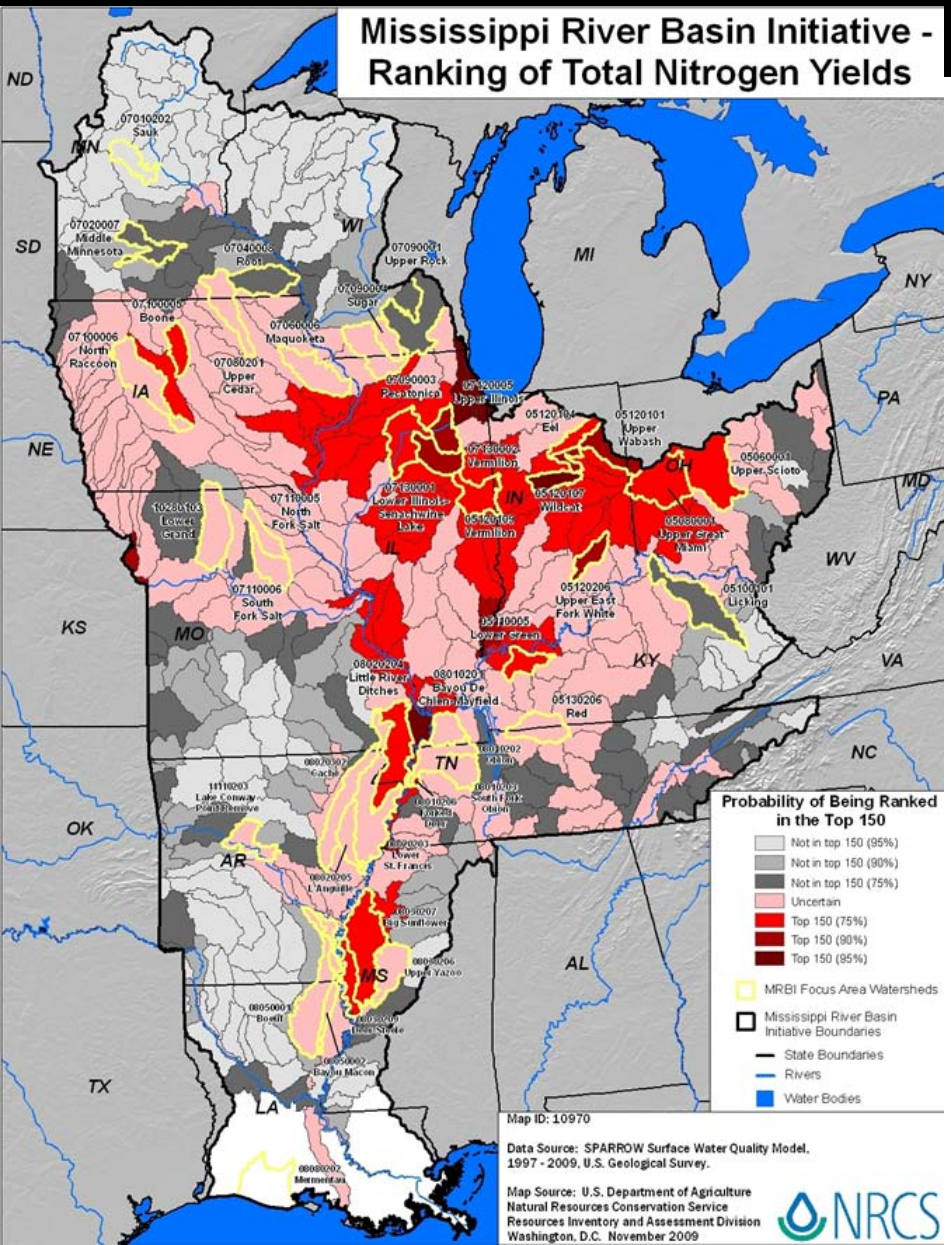
Comprised of:

- **Federal Agencies: EPA, NOAA, USDA, USACE, DOI**
- **States: AR, IL, IA, IN, KY, LA, MN, MS, MO, OH, TN, WI**

Goal: Strive to reduce or make significant progress towards reducing the five-year running average areal extent of the hypoxic zone to less than 5,000 square kilometers by the year 2015



Nutrient Reduction Actions in the Basin



Challenges/Needs

- Long-term Surface and Groundwater Quality Monitoring
- Enhance Nutrient Source Accounting
- Location and Quantification of Nutrient Reductions from Conservation Practices
- Suite of water quality models and online decision support tools to evaluate management alternatives

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BBQ and Shrimp

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