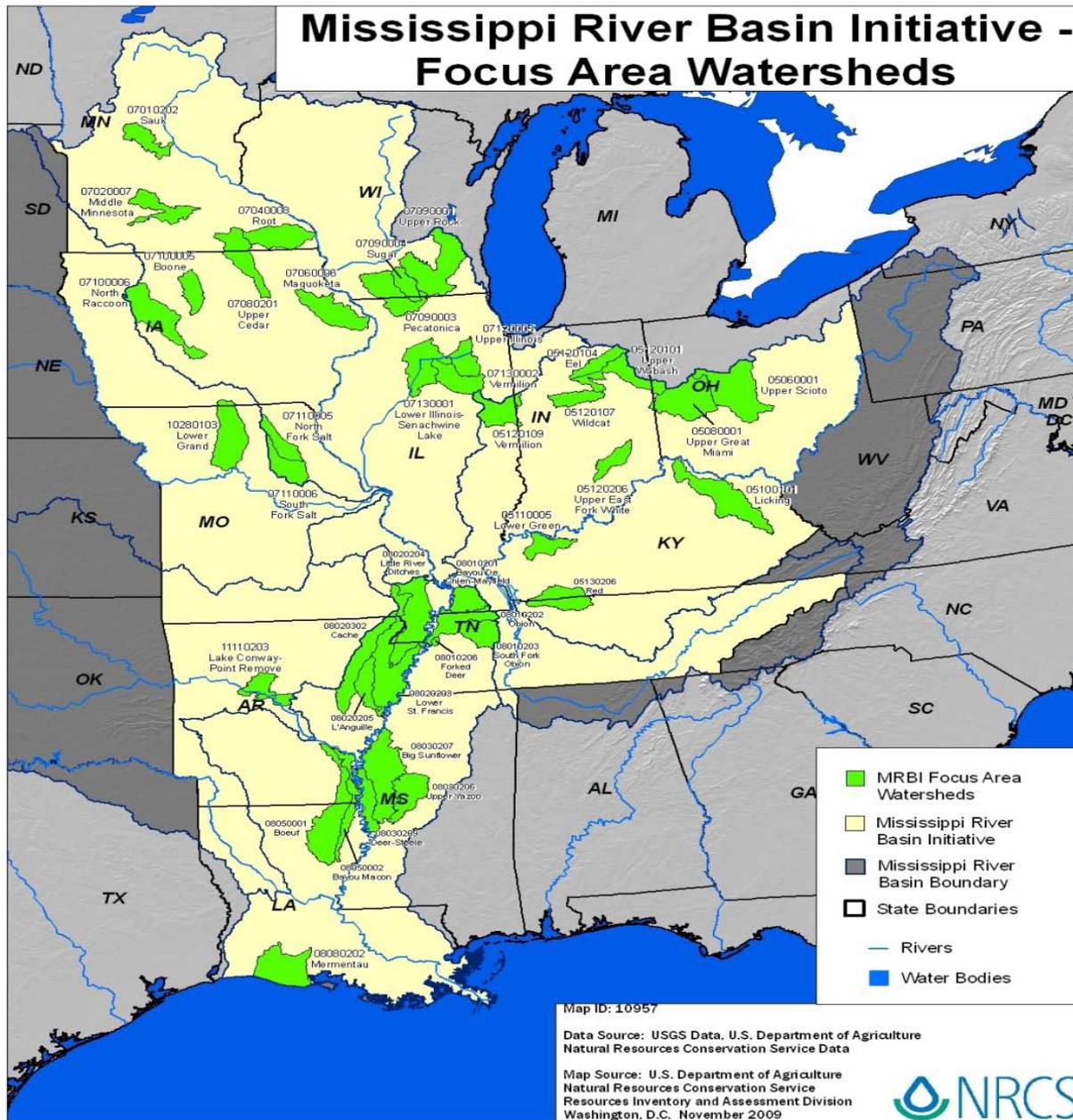




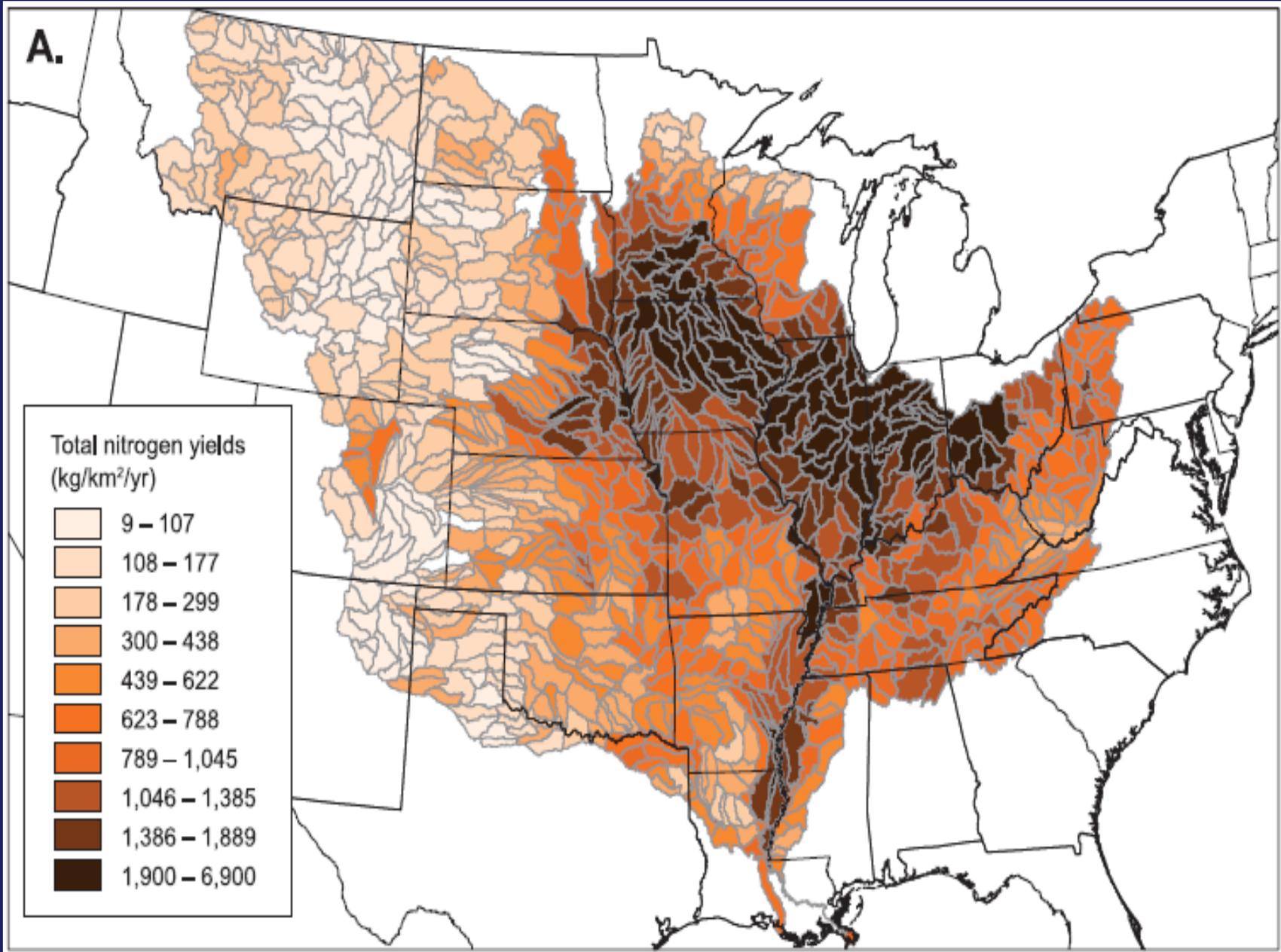
Monitoring Activities To Support Mississippi River Basin Initiative (MRBI) in Louisiana

LOUISIANA DEPARTMENT OF **ENVIRONMENTAL QUALITY**
FOR ALL YOUR ENVIRONMENTS

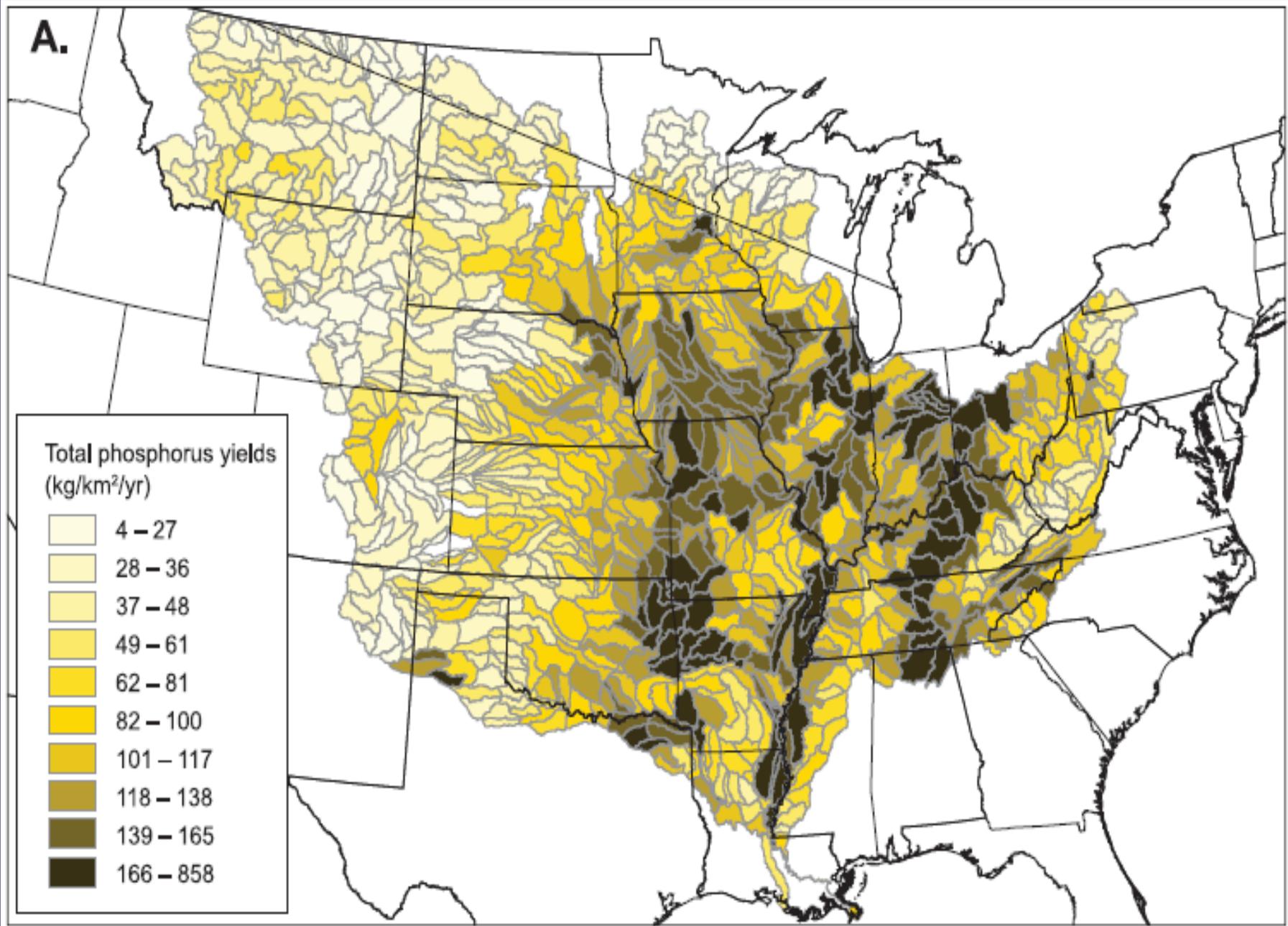
Mississippi River Basin Initiative - Focus Area Watersheds



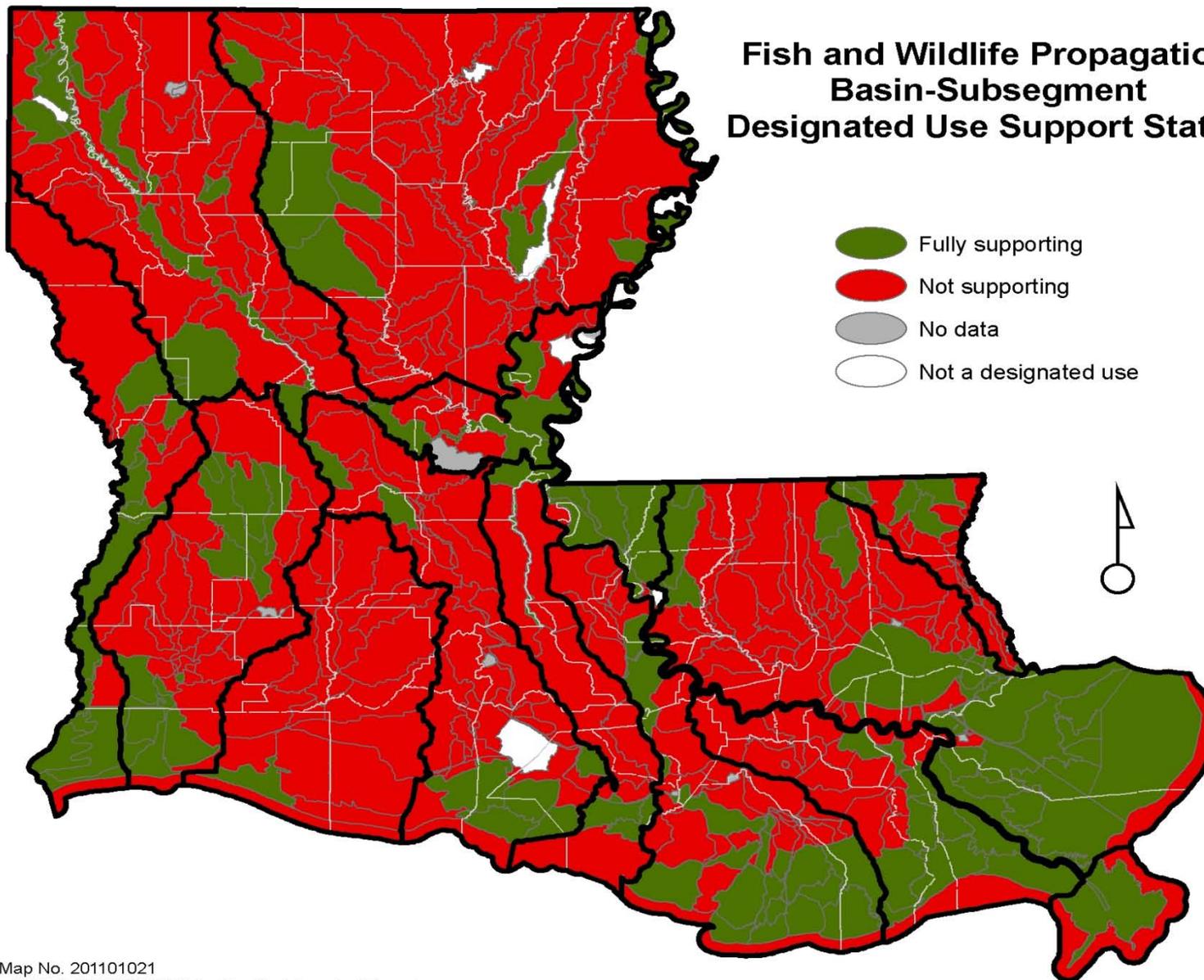
A.

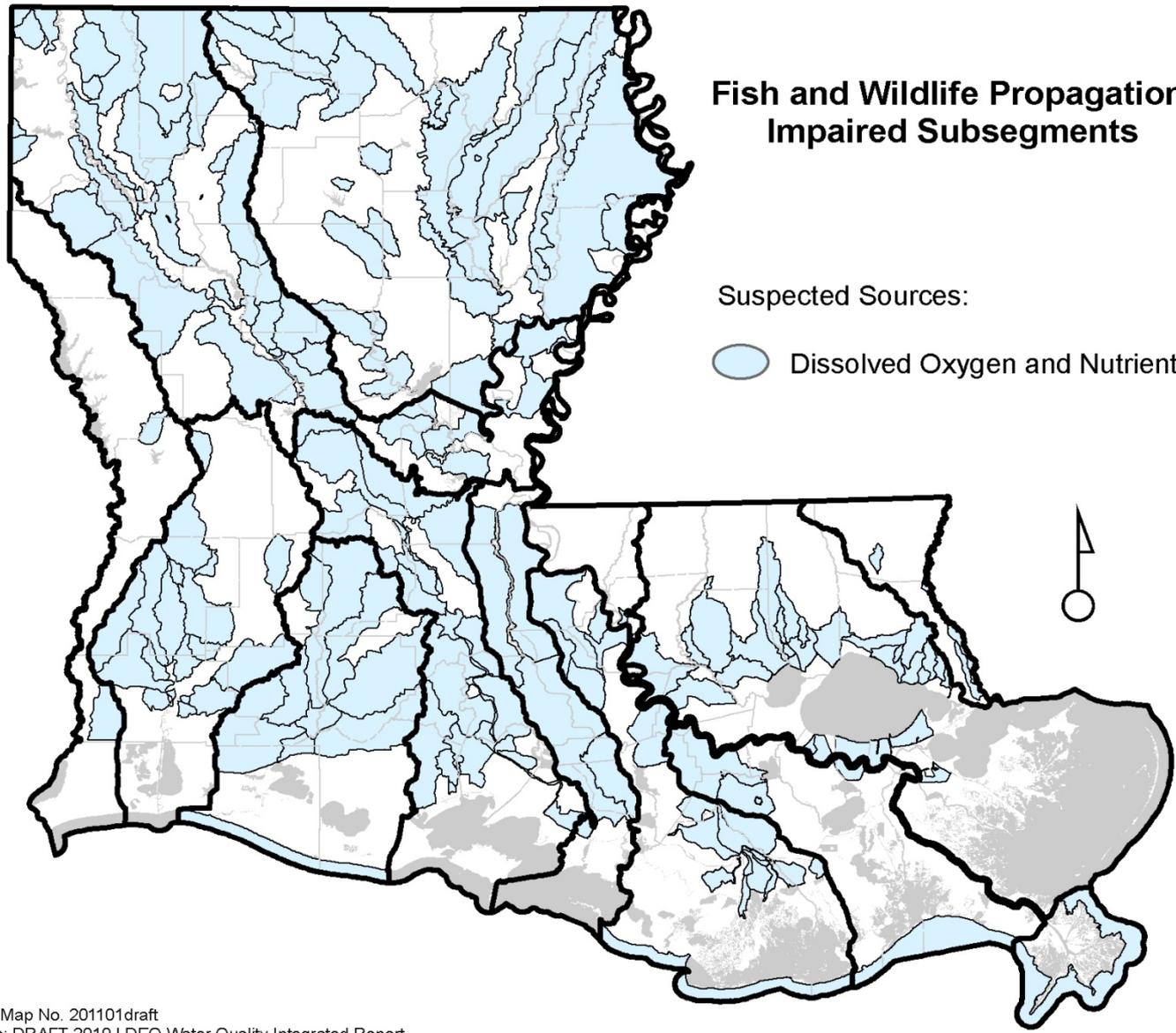


A.



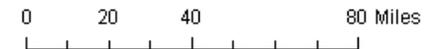
Fish and Wildlife Propagation Basin-Subsegment Designated Use Support Status



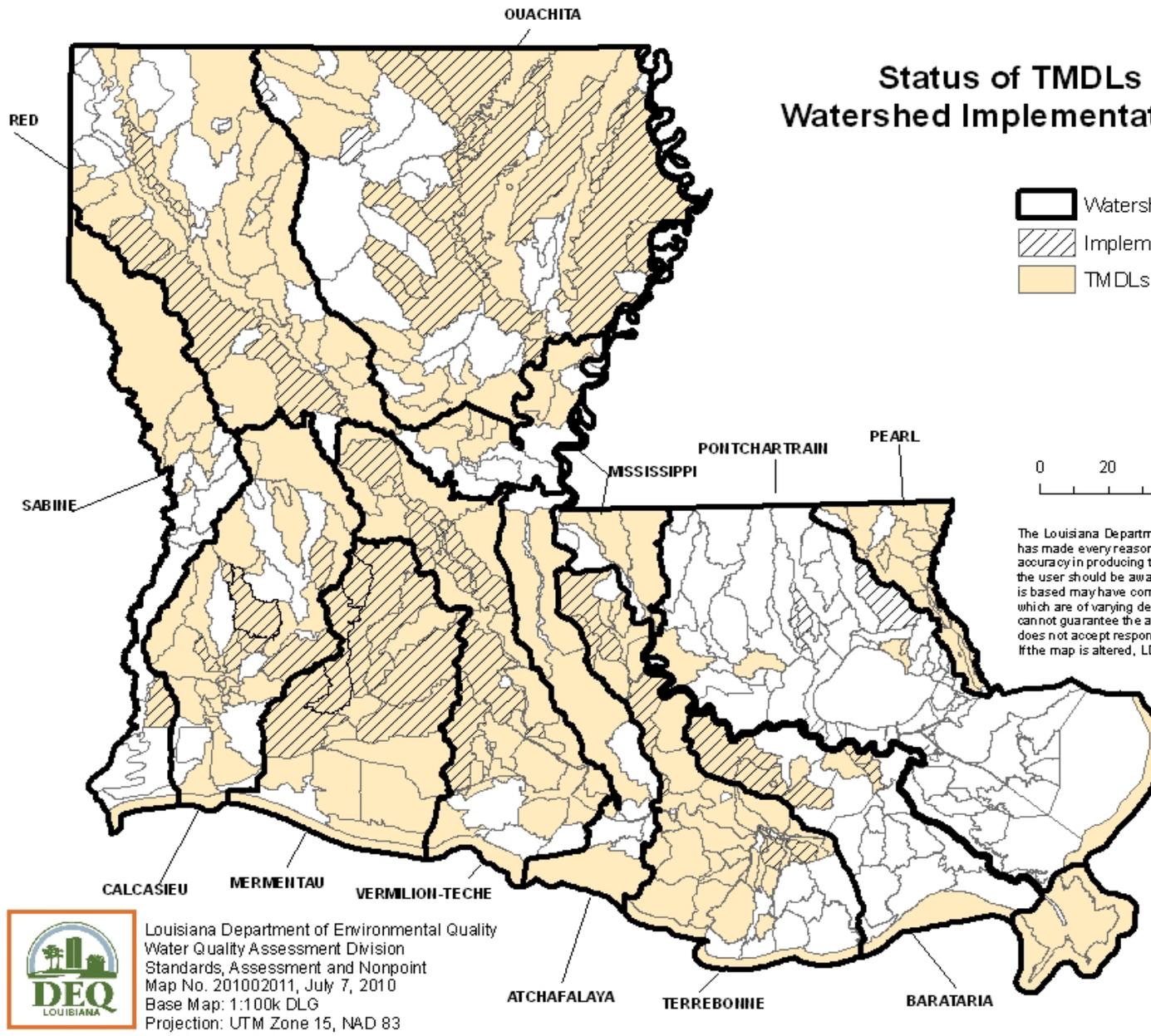


Status of TMDLs and Watershed Implementation Plans

-  Watershed Basin
-  Implementation Plan
-  TMDLs Completed



The Louisiana Department of Environmental Quality (LDEQ) has made every reasonable effort to ensure quality and accuracy in producing this map or data set. Nevertheless, the user should be aware that the information on which it is based may have come from any of a variety of sources, which are of varying degrees of accuracy. Therefore LDEQ cannot guarantee the accuracy of this map or data set, and does not accept responsibility for the consequences of its use. If the map is altered, LDEQ cannot guarantee its accuracy.



Louisiana Department of Environmental Quality
 Water Quality Assessment Division
 Standards, Assessment and Nonpoint
 Map No. 201002011, July 7, 2010
 Base Map: 1:100k DLG
 Projection: UTM Zone 15, NAD 83





Total Maximum Daily Loads

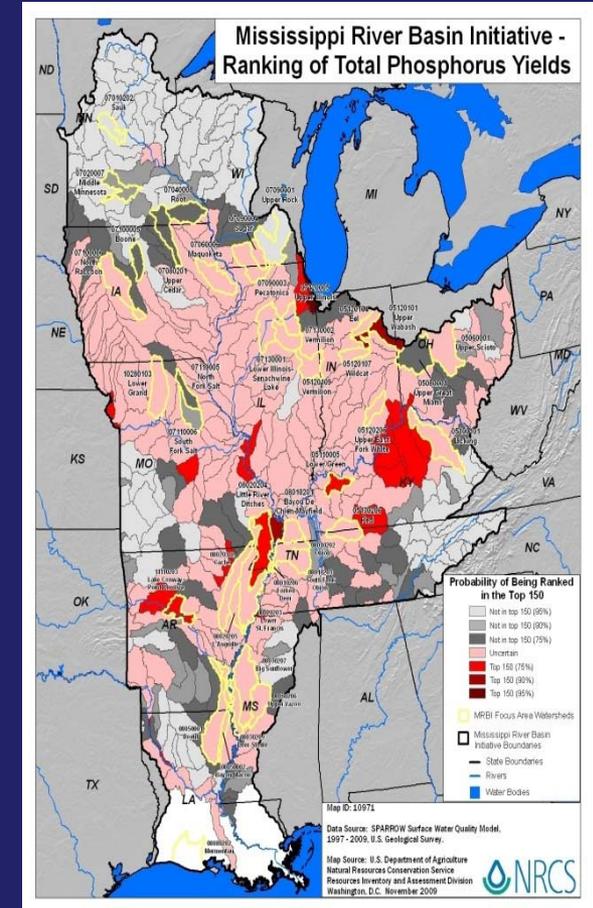
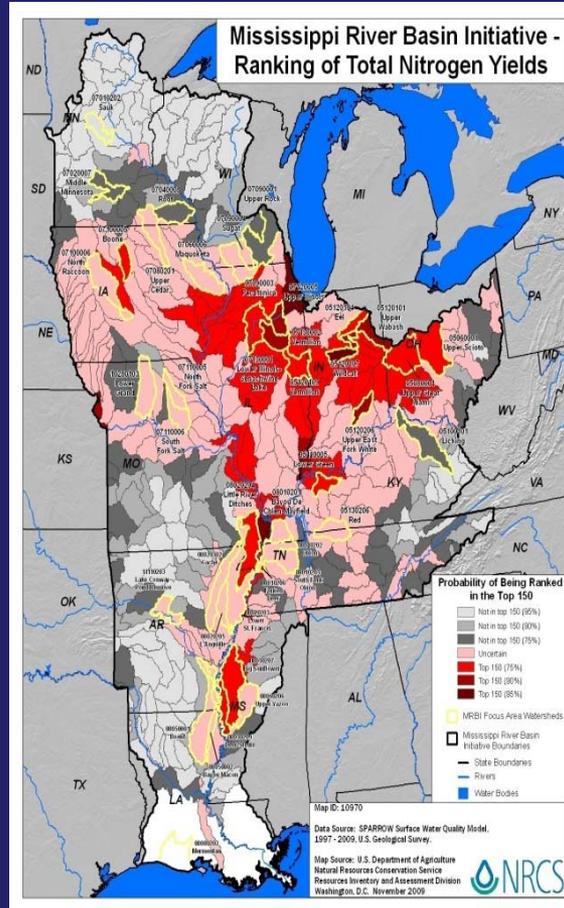
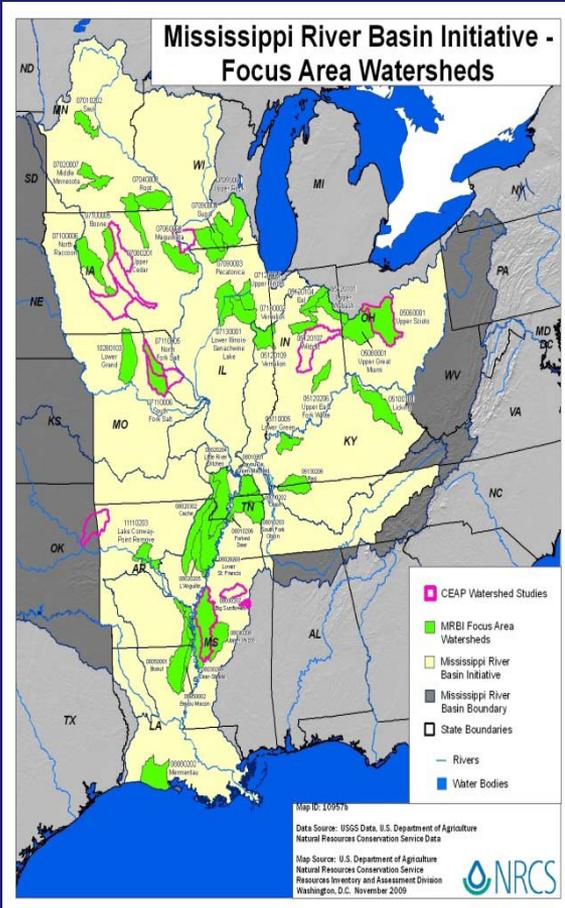
Louisiana and USEPA have completed more than 670 TMDLs since 1998 under court ordered consent decree. Approximately 288 of these relate directly or indirectly to nutrient impairments.



Nonpoint Source Load Reductions

TMDLs that have been completed indicate that from 15-100% of the pollutant load is from nonpoint sources of pollution.

Mississippi River Basin Healthy Watersheds Initiative – 41 Focus Watersheds selected



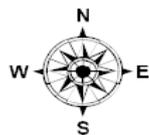
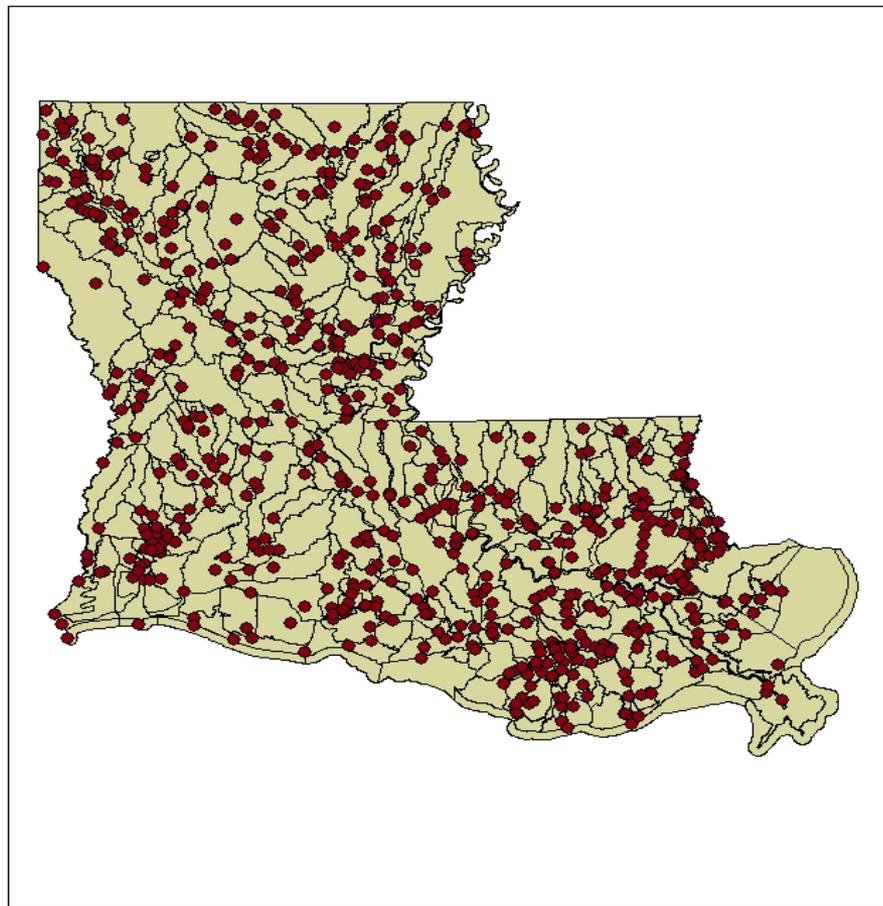


Monitoring and Evaluation

Three-Tiered Approach:

- **Field Scale**
- **Small Watershed Scale
(12-digit HUC)**
- **Large Watershed Scale
(8-digit HUC)**

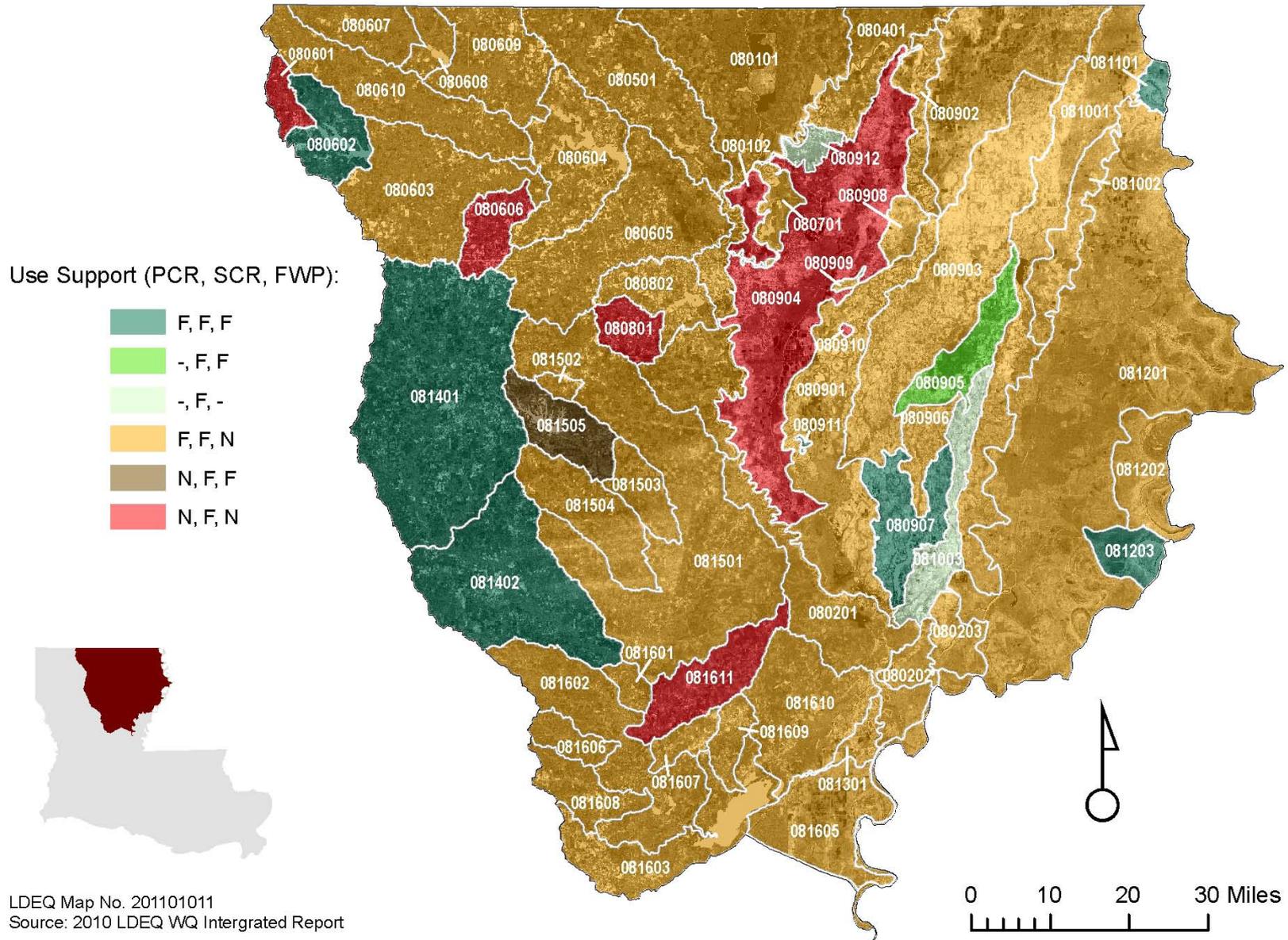
LDEQ Sub-segment Boundaries



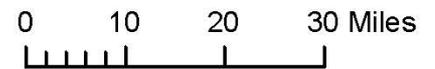
Legend

- LEAU.AMBIENT_WQN_SW_SITES
- VECTOR.Ia_ldeq_subsegments_2006

Ouachita River Basin



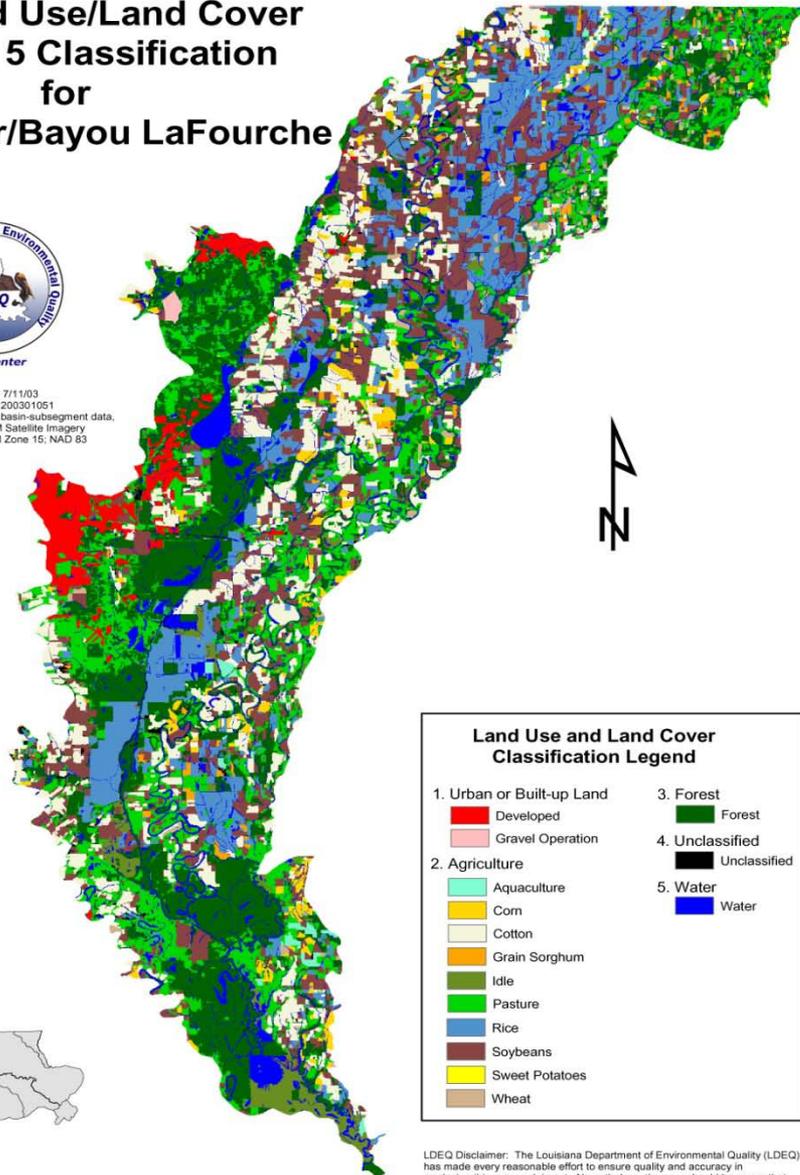
LDEQ Map No. 201101011
Source: 2010 LDEQ WQ Intergrated Report



1999 Land Use/Land Cover Landsat 5 Classification for Boeuf River/Bayou LaFourche



Map Date: 7/11/03
 Map number: 200301051
 Map sources: LDEQ 2002 basin-subsegment data,
 1999 Landsat 5 TM Satellite Imagery
 Map projection: UTM Zone 16; NAD 83



Land Use and Land Cover Classification Legend

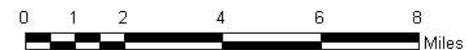
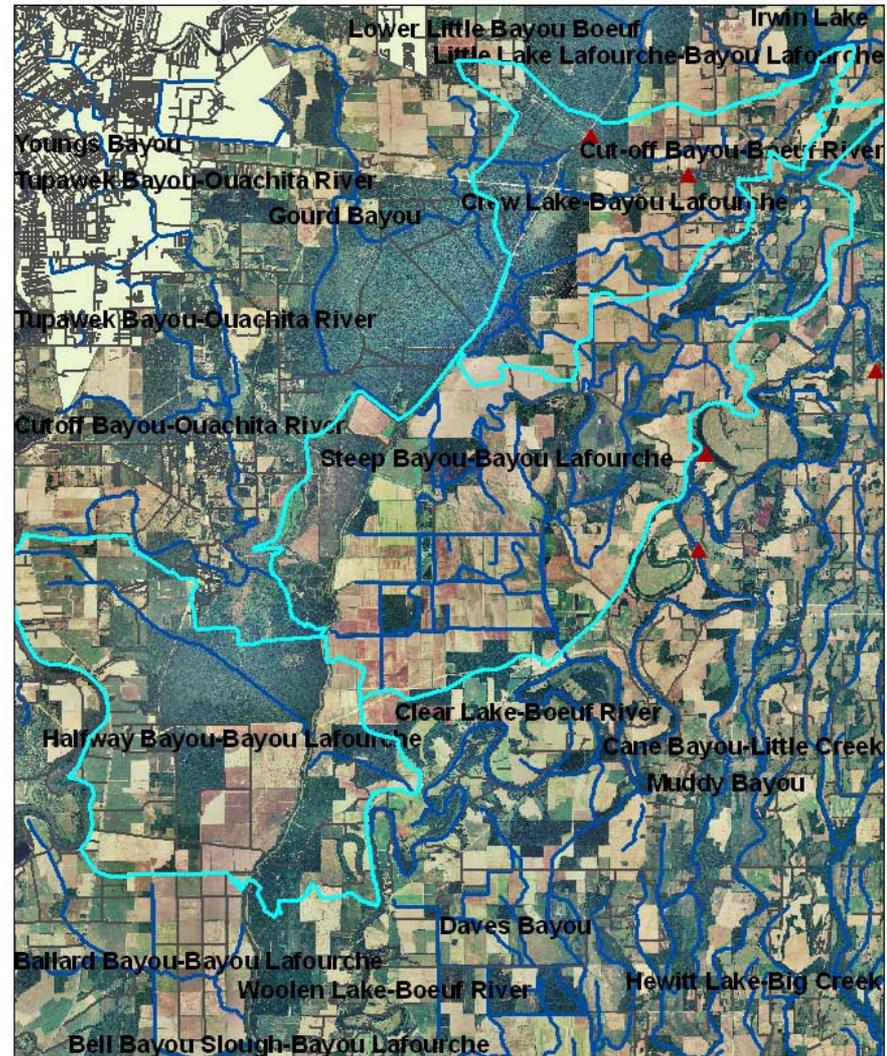
- | | |
|---------------------------|-----------------|
| 1. Urban or Built-up Land | 3. Forest |
| Developed | Forest |
| Gravel Operation | 4. Unclassified |
| 2. Agriculture | Unclassified |
| Aquaculture | 5. Water |
| Corn | Water |
| Cotton | |
| Grain Sorghum | |
| Idle | |
| Pasture | |
| Rice | |
| Soybeans | |
| Sweet Potatoes | |
| Wheat | |

0 2.5 5 10 15 20 Miles

LDEQ Disclaimer: The Louisiana Department of Environmental Quality (LDEQ) has made every reasonable effort to ensure quality and accuracy in producing this map or data set. Nevertheless, the user should be aware that the information on which it is based may have come from any of a variety of sources, which are of varying degrees of map accuracy. Therefore, LDEQ cannot guarantee the accuracy of this data set, and does not accept any responsibility for the consequences of its use.

- Three 12 digit HUCs in the Boeuf River/Bayou Lafourche Watershed where nutrient reduction BMPs will be implemented.

Bayou Lafourche





Section 319 Funds

**Field Parameters and
Water Chemistry on a
Weekly Basis**

**Biological Data 2x a
Year**



Parameters

- **Dissolved Oxygen and BOD**
- **Sediments (TSS, TDS, Turbidity)**
- **Nutrients (TP, NO₂/NO₃, TKN)**
- **Fecal Coliform Bacteria**
- **Macro-invertebrates and Fish**



Locations

- **10-12 Sampling Locations**
- **3-4 sampling locations for each of the 12 digit HUCs**

SPARROW Fact Sheet

- For more information about model concepts:

USGS
science for a changing world

SPARROW MODELING—Enhancing Understanding of the Nation's Water Quality

The information provided here is intended to assist water-resources managers with interpretation of the U.S. Geological Survey (USGS) SPARROW model and its products. SPARROW models can be used to explain spatial patterns in monitored stream-water quality in relation to human activities and natural processes as defined by detailed geospatial information. Previous SPARROW applications have identified the sources and transport of nutrients in the Mississippi River basin, Chesapeake Bay watershed, and other major drainages of the United States. New SPARROW models with improved accuracy and interpretability are now being developed by the USGS National Water Quality Assessment (NAWQA) Program for six major regions of the conterminous United States. These new SPARROW models are based on updated geospatial data and stream-monitoring records from local, State, and other Federal agencies.

Benefits of Integrated Monitoring and Modeling

Successful management of our Nation's water resources requires an integrated approach to environmental assessment that includes both monitoring and modeling. Monitoring provides direct observations, often over time, of water-quality properties and characteristics, whereas models are tools for interpreting those observations. Modeling results can advance understanding of the relation of water quality to human activities and natural processes that affect spatial variations in quality. Specifically, models can be used to (1) establish links between water quality and constituent sources; (2) track the transport of constituents to streams and downstream receiving waters, such as estuaries; (3) assess the natural processes that attenuate constituents as they are

transported from land and downstream; and (4) predict changes in water quality that may result from management actions or changes in land use.

Continued integration of monitoring and modeling is key to our future understanding and management of the Nation's water quality. Modeling results can help in a variety of management decisions, including those related to contaminant-reduction and protection strategies across broad regions and decisions about future monitoring and assessments of streams that are highly vulnerable to environmental degradation. Modeling can help in meeting regulatory requirements, such as those related to nutrient-management strategies and the development of total maximum daily loads (TMDLs). Finally, modeling can help in identifying gaps and priorities in monitoring, including identifying monitoring that might be redundant or unnecessary.

SPARROW Modeling

To support the need for water-quality modeling, USGS scientists developed a model that integrates monitoring data with landscape information. This model, known as SPARROW (SPATIALLY-REFERENCED Regression On Watershed attributes), is watershed based and designed for use in predicting long-term average values of water characteristics, such as concentrations and amounts of selected constituents that are delivered to downstream receiving waters. Statistical methods are used in SPARROW modeling to explain in-stream measurements of water quality (constituent mass or load) in relation to upstream sources and watershed properties (soil characteristics, precipitation amounts, and land cover) that influence the transport of constituents to streams and their delivery to receiving water bodies, including estuaries (fig. 1).

Figure 1. Generalized major land-use features included in the SPARROW watershed model. Statistical methods are used to relate water-quality monitoring data to upstream sources and watershed characteristics that affect the fate and transport of constituents to streams, estuaries, and other receiving water bodies.

US Department of the Interior
US Geological Survey

March 2009

SPARROW home page:
<http://water.usgs.gov/nawqa/sparrow/>

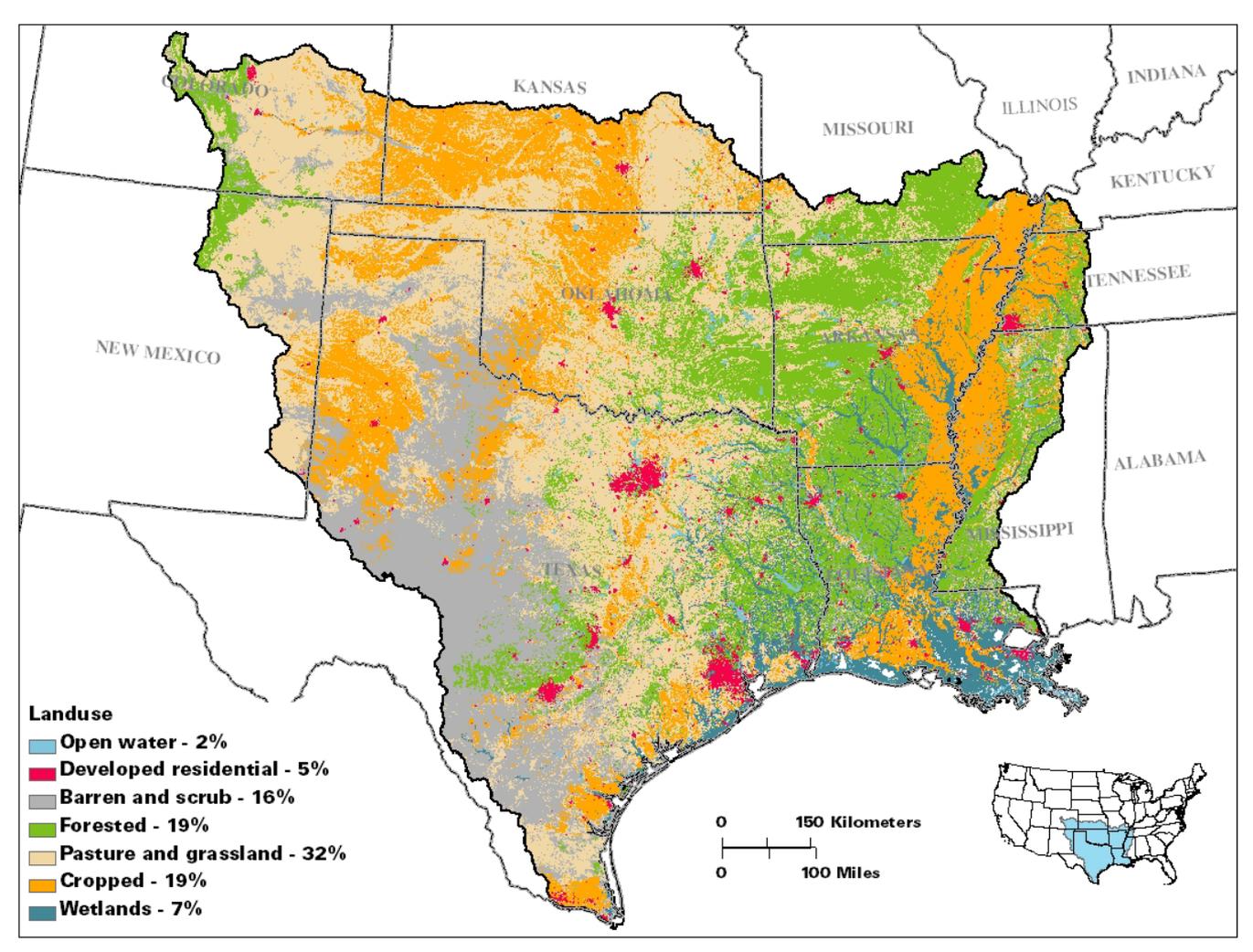
SPARROW fact sheet:
<http://pubs.usgs.gov/fs/2009/3019/>

Study Area

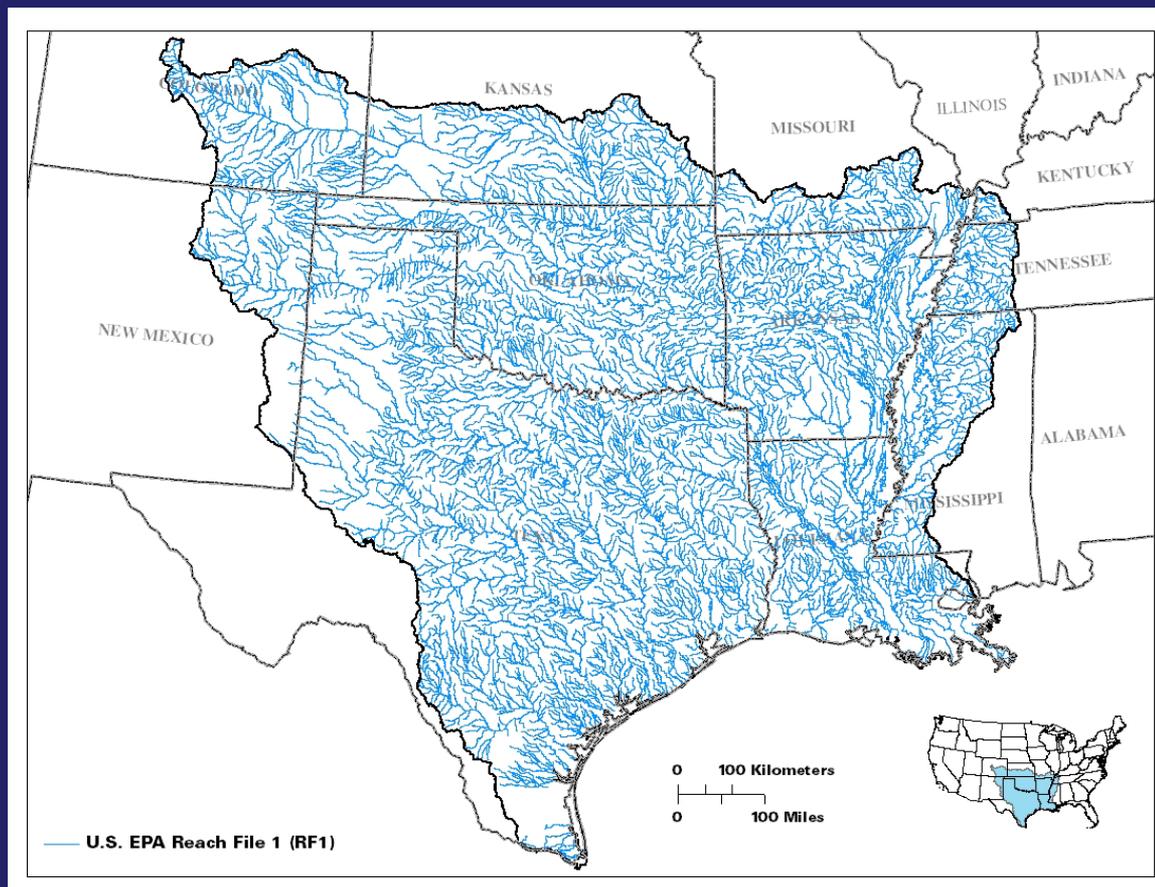
- South-Central United States – Lower Mississippi, Arkansas-White-Red, and Texas-Gulf Basins
- 11 States
- USGS Study Area Team:
 - Richard Rebich, MSWC
 - Natalie Houston, Patty Ging, and Evan Hornig, TWSC
 - Scott Mize, LWSC



Land Use



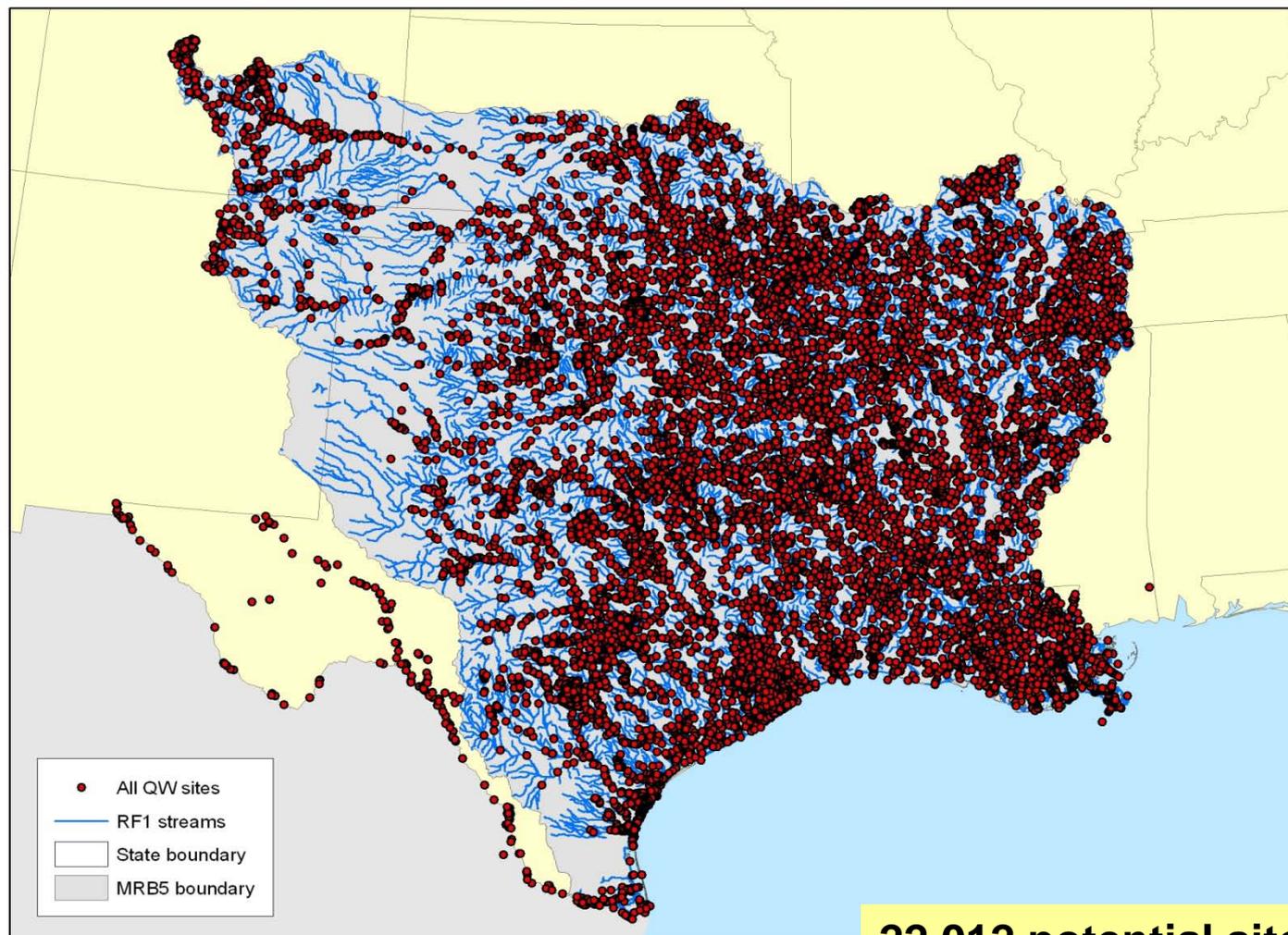
Starts with Reach Network



The E2RF1 digital stream network from the U.S. Environmental Protection Agency was used for this study

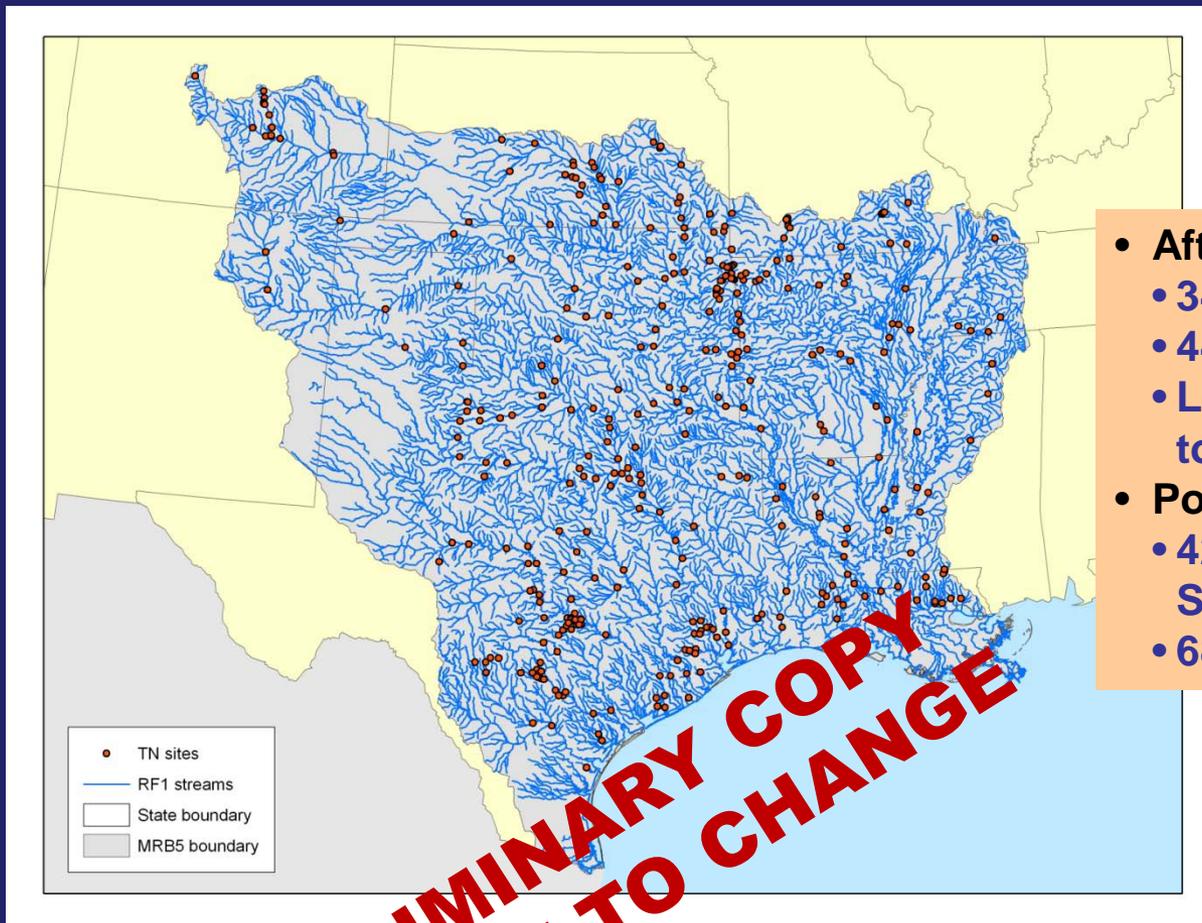
There were 8,375 stream reaches and catchments in the study area

Sites with Water-Quality Data



22,012 potential sites

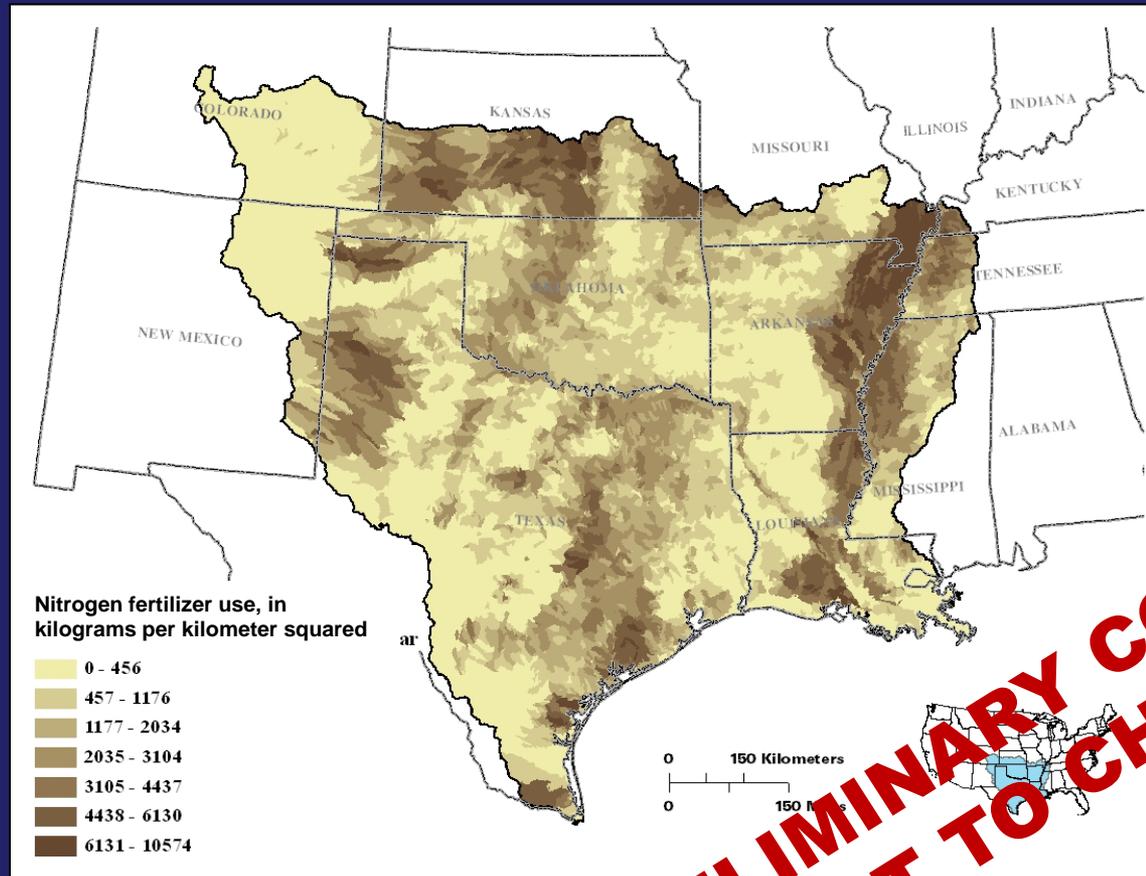
Final Load Sites



- After flow gage match,
 - 344 total nitrogen sites
 - 442 total phosphorus sites
 - Load estimates de-trended to 2002
- Point of reference,
 - 425 total sites in National SPARROW model
 - 68 were in the study area

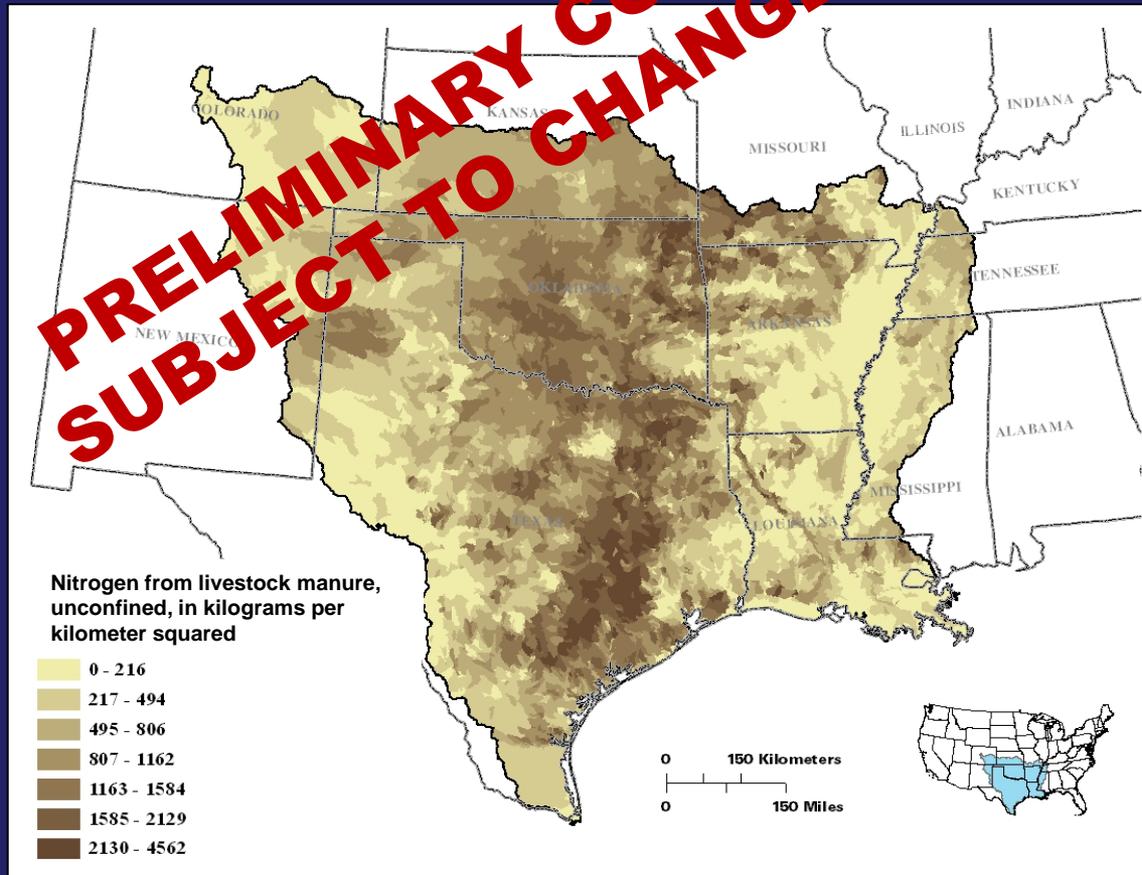
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Fertilizer applied to crops



- Data from USDA NASS service
- County level sales data
- Data are available annually

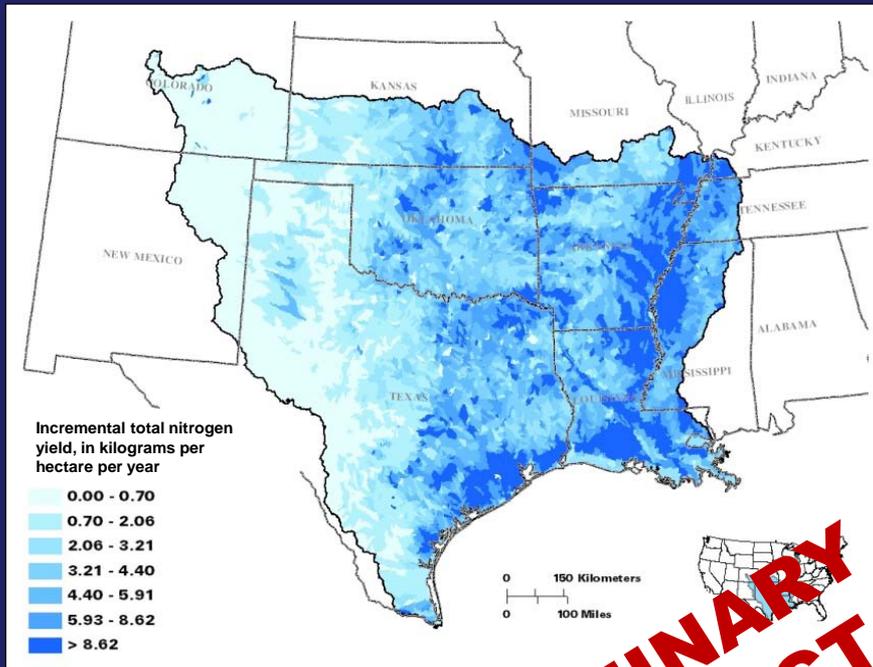
Livestock Manure from Pastures (unconfined)



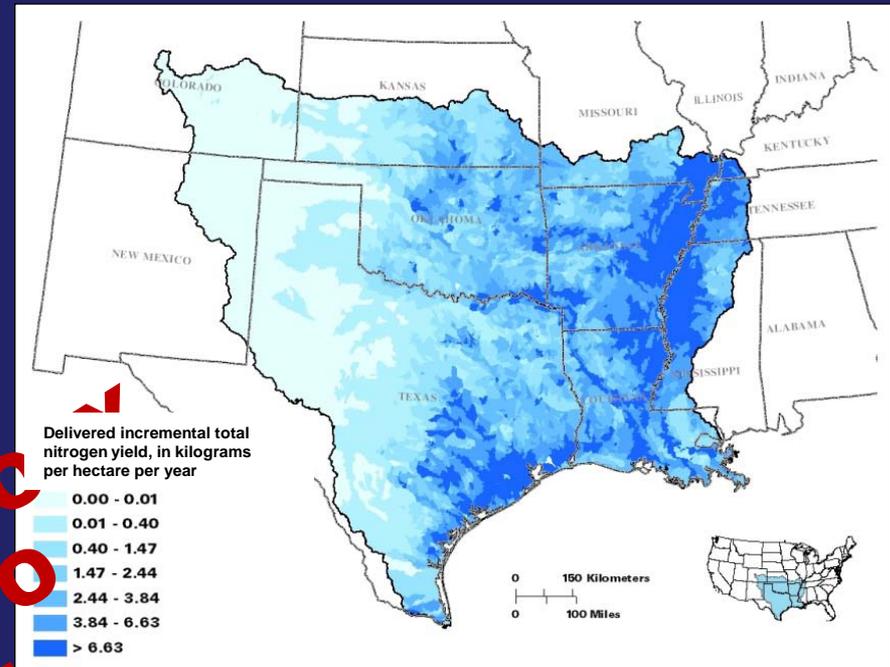
- Data from USDA NASS service
- Livestock manure generated from pastures (unconfined)
- Data are available every 5 years

Total Nitrogen Yield Results

Delivered to local streams

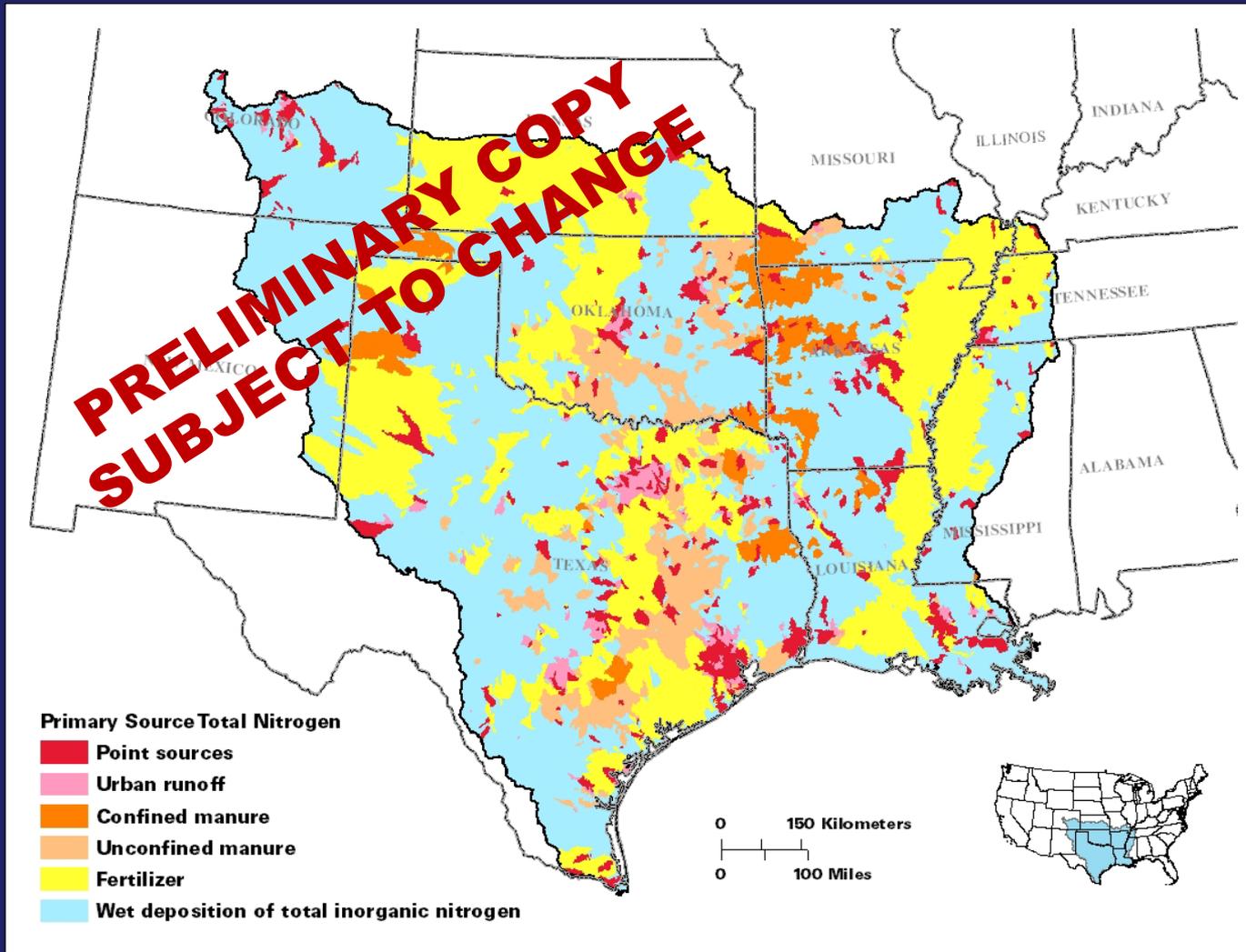


Delivered to the Gulf of Mexico



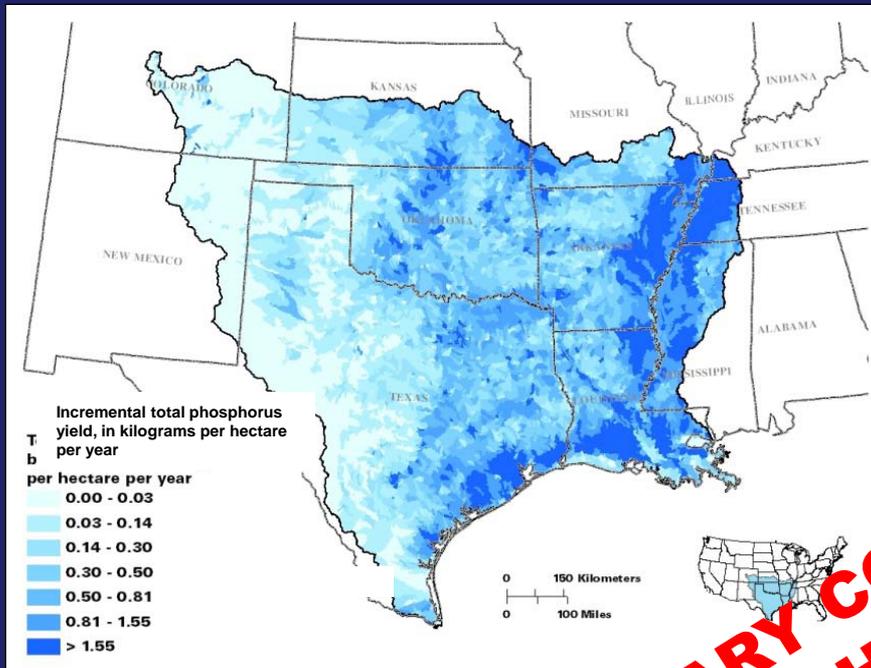
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SUBJECT TO
CHANGE**

Primary Sources of Nitrogen

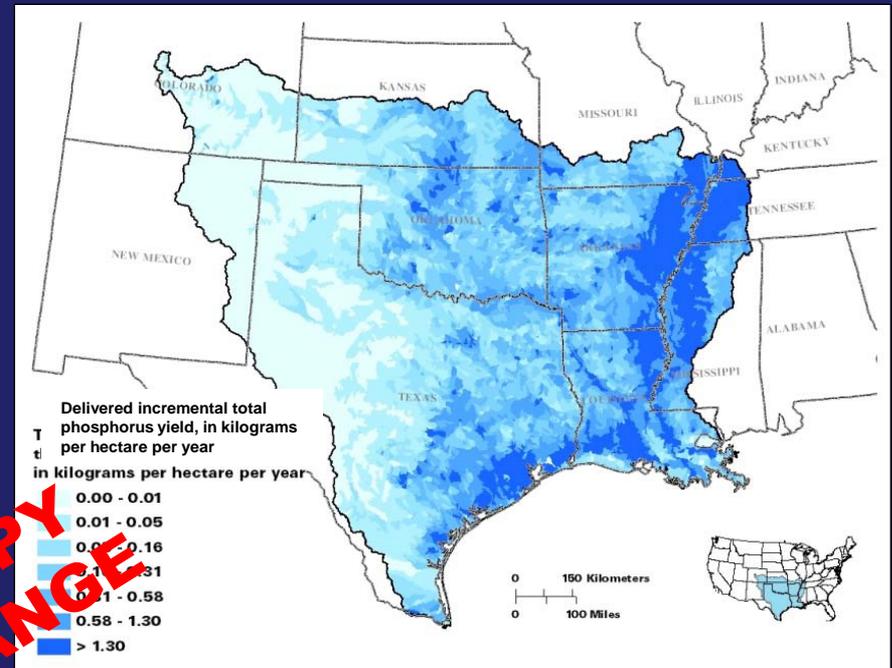


Total phosphorus yield results

Delivered to local streams

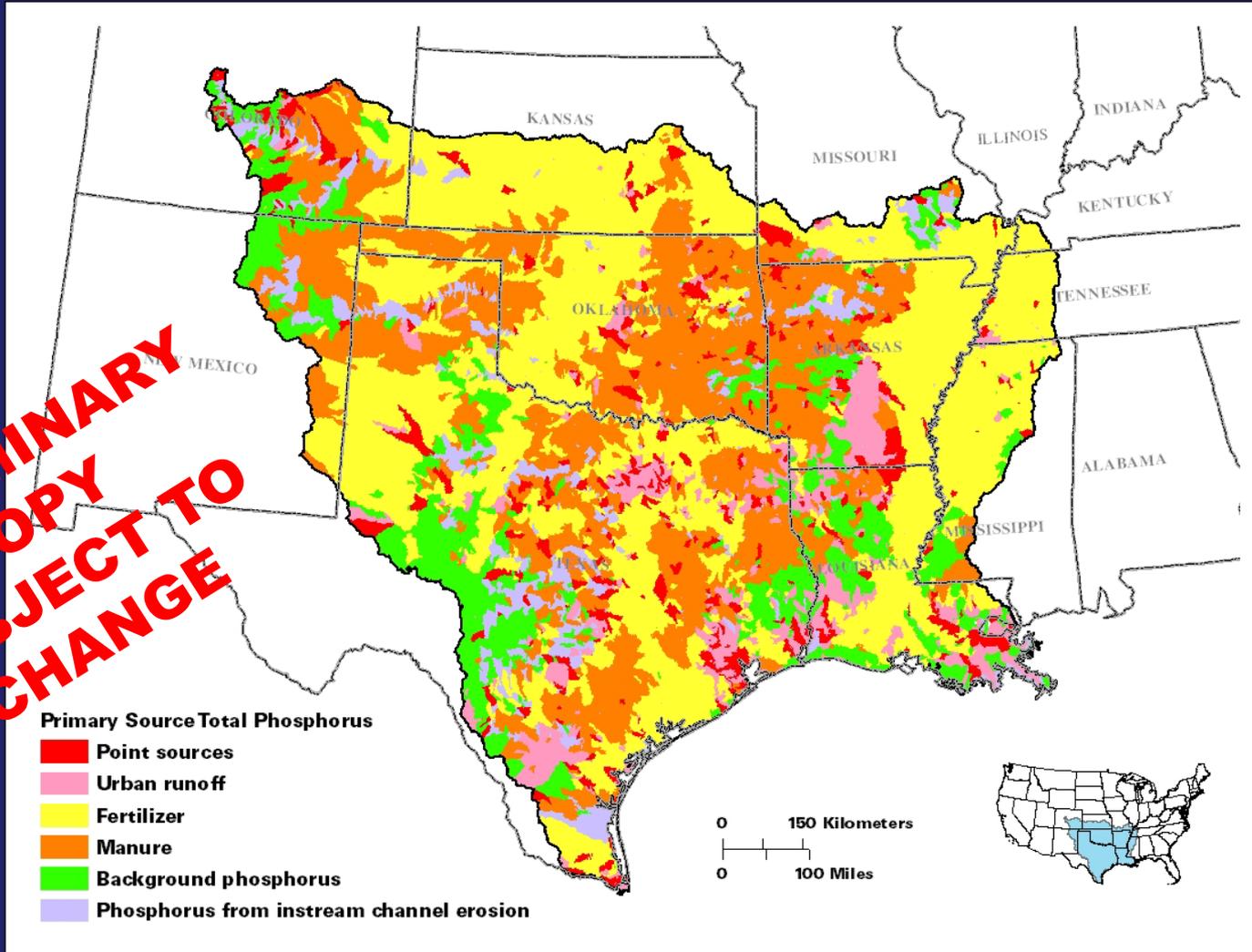


Delivered to the Gulf of Mexico



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Sources of phosphorus



Louisiana Nutrient Reduction Strategy





Why A Nutrient Reduction Strategy?

- **Hypoxic Waters in Gulf of Mexico on Coast of Louisiana;**
- **Many Inland Rivers and Bayous also have Low Oxygen Problems;**
- **Want to Partner with Upriver States to Reduce their Nutrient inputs to Mississippi River and Gulf of Mexico.**



Contact Information

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Office of the Secretary

**Louisiana Department of
Environmental Quality**

jan.boydstun@la.gov