

The background of the slide is a deep blue underwater scene. Sunlight rays penetrate from the top right, creating a shimmering effect. In the upper center, there is a faint, ethereal image of a large marine animal, possibly a whale, swimming towards the viewer. The overall atmosphere is serene and aquatic.

**Relating Efforts to Reduce
Hypoxia in the Northern Gulf
of Mexico to the Ohio River
Basin and States**



Moving Forward on Gulf Hypoxia

Webcast Sponsored by EPA's Watershed Academy

Tuesday, October 7, 2008 1-3 pm Eastern

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Darrell Brown, US EPA

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Gulf Hypoxia Action Plan 2008

for Reducing, Mitigating, and Controlling Hypoxia
in the Northern Gulf of Mexico and Improving
Water Quality in the Mississippi River Basin



www.epa.gov/msbasin

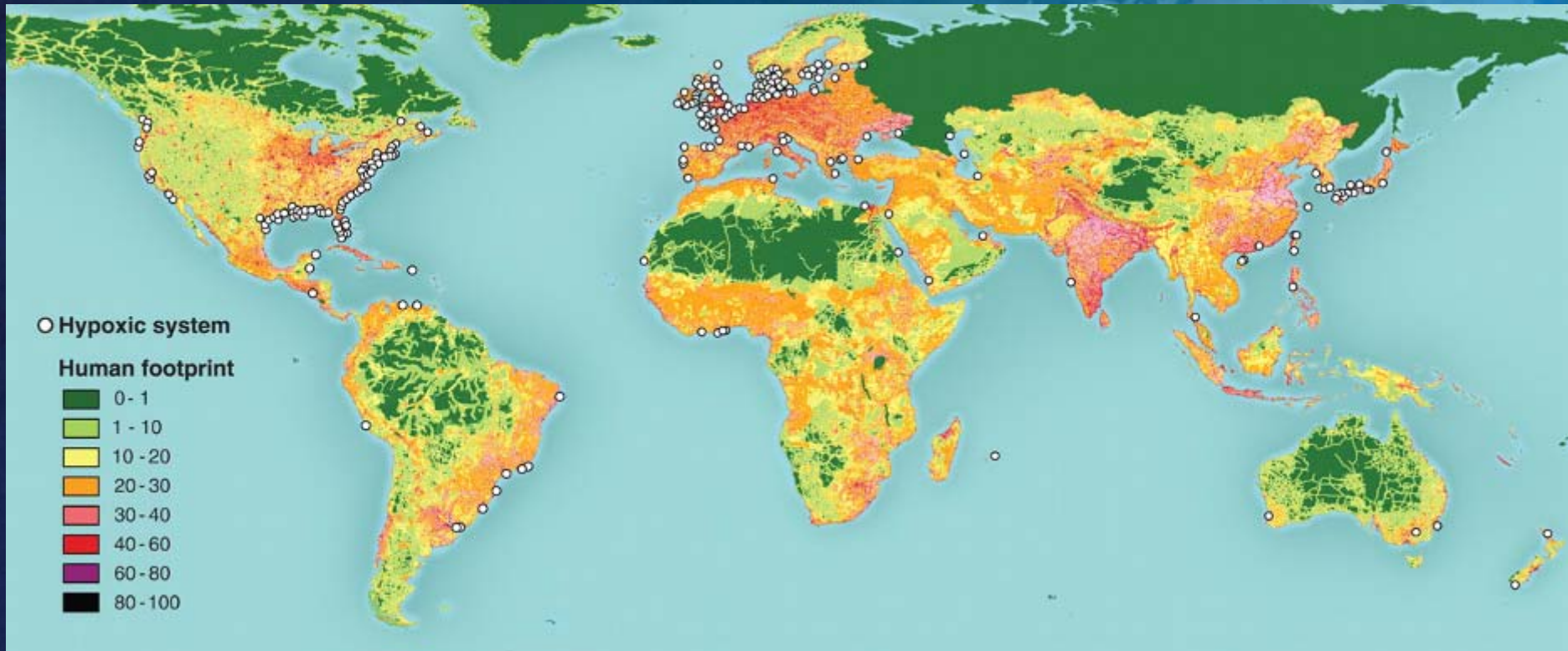


Mississippi River
Gulf of Mexico
Watershed Nutrient
Task Force

What is hypoxia?

- ▶ A large area of low oxygen that cannot sustain marine life.
- ▶ Hypoxia is a worldwide problem but is found in the Gulf of Mexico and a result of nutrients, originating from the great productivity of Middle American cities, farms, and industries, that travel down the Mississippi River.
- ▶ Hypoxia forms in the Gulf during periods in the summer off the coasts of Louisiana and Texas and threatens to change the biology of the region.

Hypoxic Zones are Spreading



Diaz & Rosenberg, *Science*, 2008



Mississippi River Gulf of Mexico Watershed Nutrient Task Force

Comprised of:

- ▶ Federal Agencies (EPA, NOAA, USDA, USACE, USGS, DOI)
- ▶ States represented by Agriculture or Environment Departments (AR, IL, IA, LA, MN, MS, MO, OH, TN, WI)

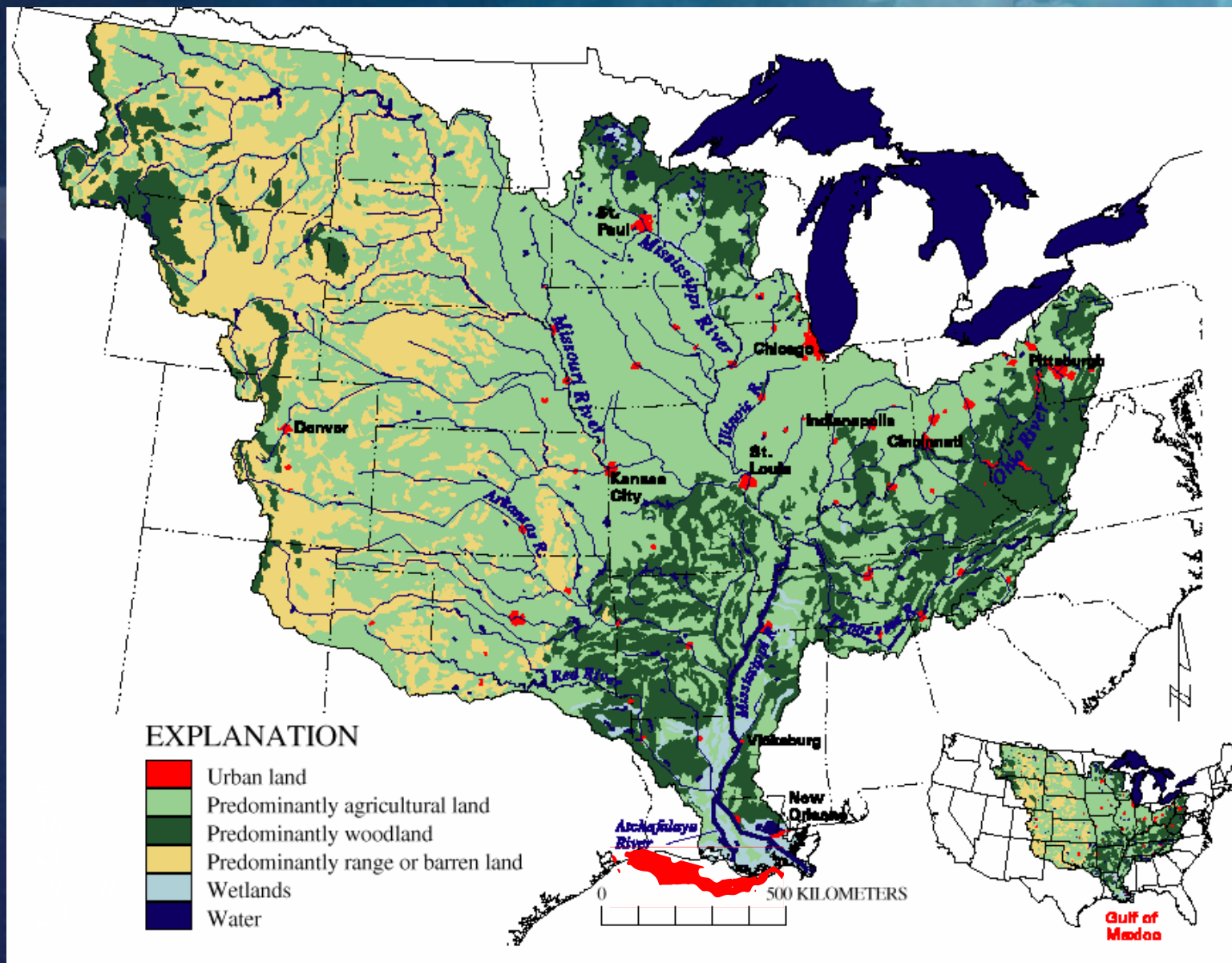
Goals:

- ▶ Examines complex science and policy issues surrounding Gulf Hypoxia
- ▶ Takes collaborative actions to improve water quality

Gulf Hypoxia Action Plan 2008

- ▶ Final product of 4-year reassessment of the 2001 Action Plan
 - 4 science symposia (2005-2006)
 - EPA SAB Hypoxia Advisory Panel Report, December 2007
 - 6 Task Force Meetings
 - Over 750 public comments

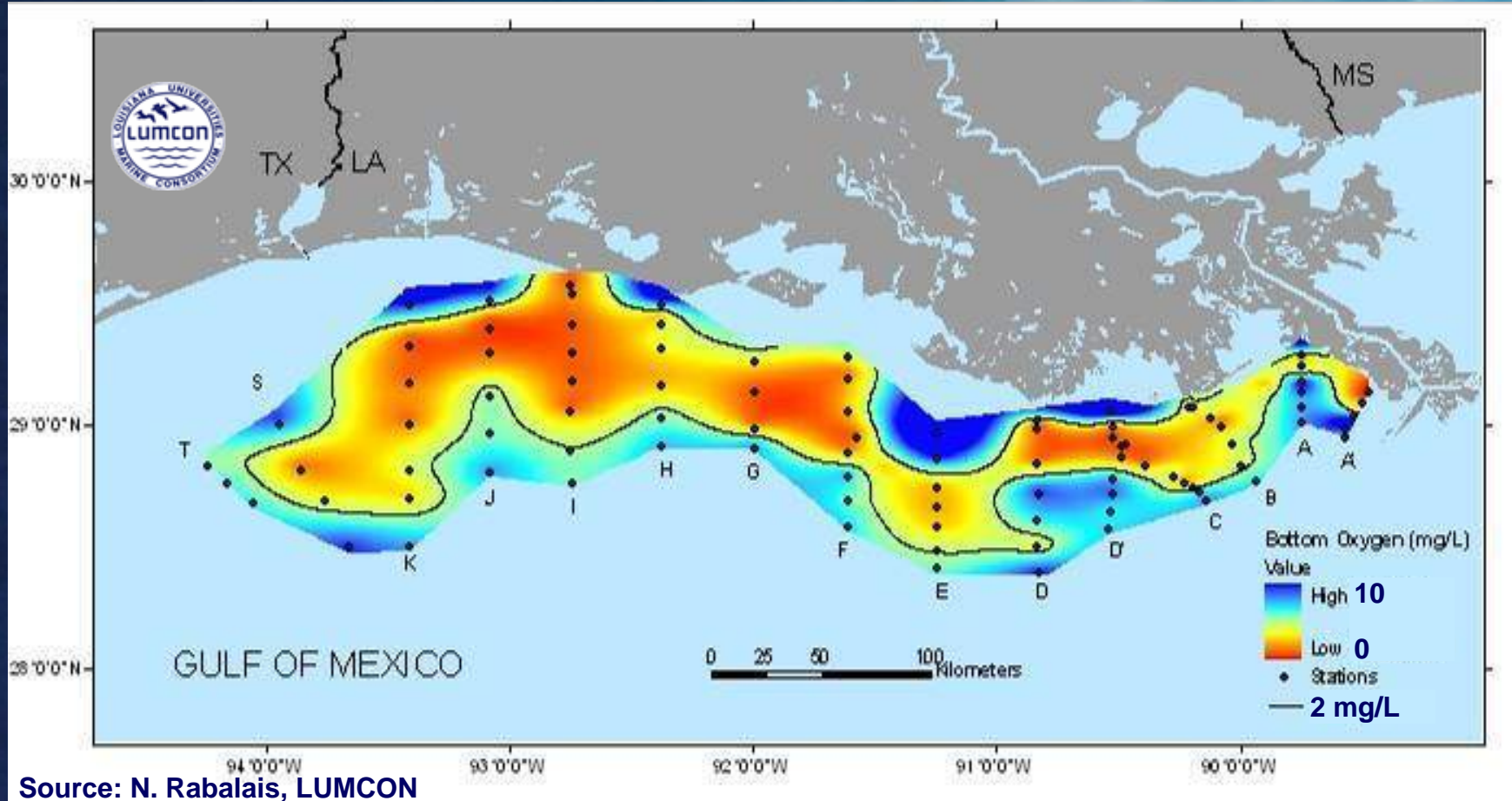
Huge Watershed, Huge Problem



Goolsby et al. 1999, Rabalais 2002



21 – 28 July 2007 Bottom-Water Hypoxia

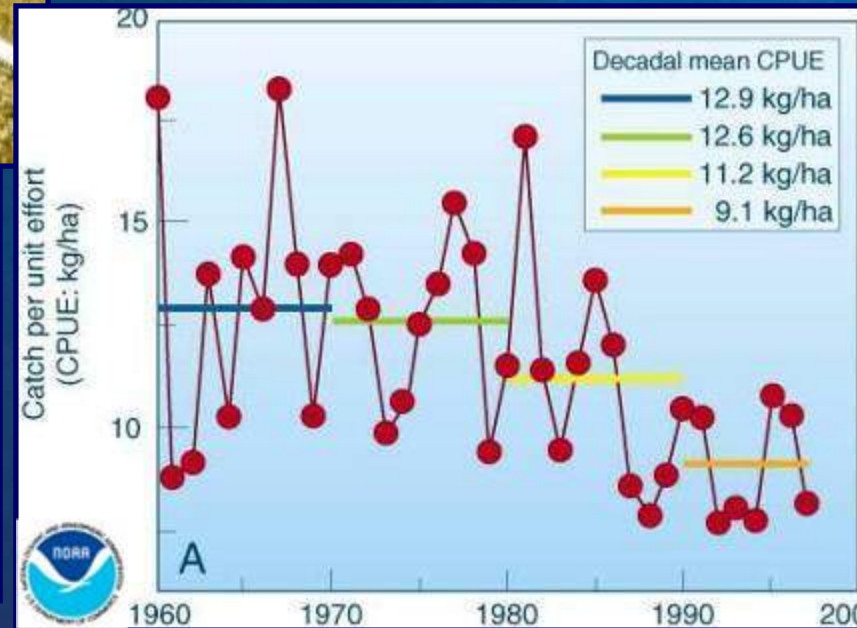


- ▶ up to 22,000 km²
- ▶ 4 - 5 m nearshore to 35 - 45 m offshore
- ▶ 0.5 km nearshore to 100+ km offshore
- ▶ widespread and severe in May – Sep

The 'Dead Zone' is not completely 'dead.'

- ▶ Significant fisheries resources at risk
- ▶ Reduced habitat
- ▶ Altered migration
- ▶ Changes in food resources
- ▶ Susceptibility of early life stages
- ▶ Growth and reproduction

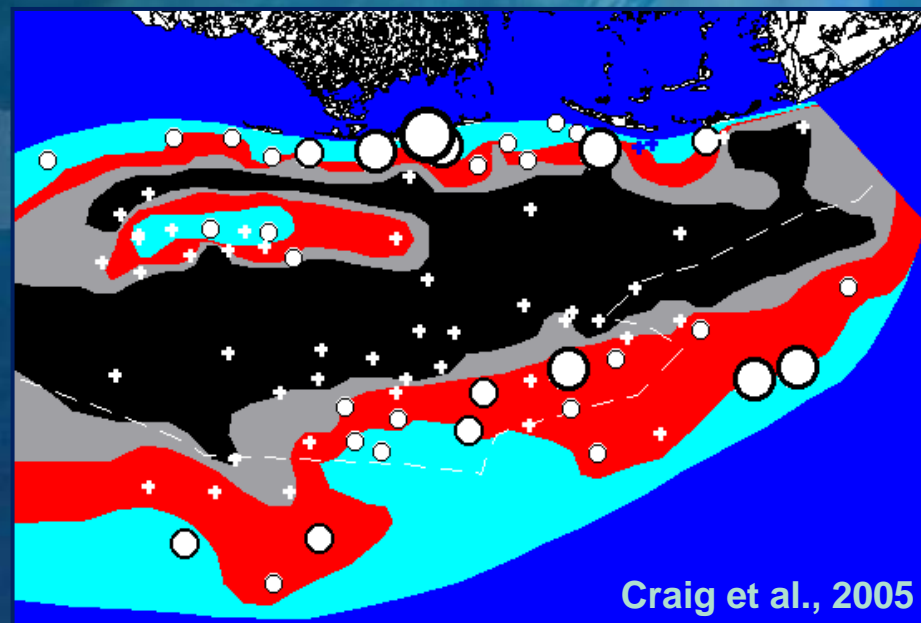
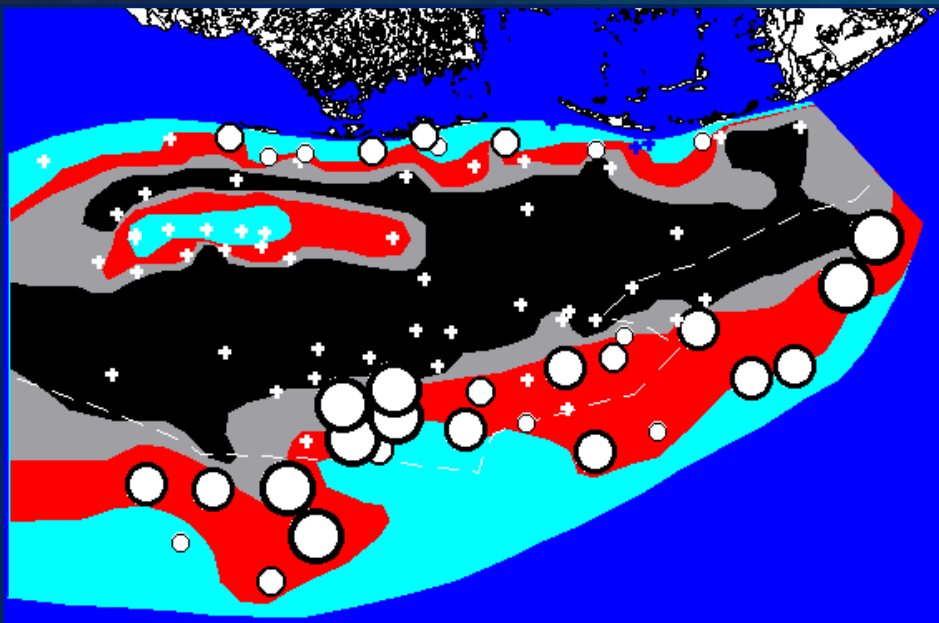
$O_2 > 2 \text{ mg/l}$



NGOMEX 2002 Cruise

Atlantic croaker

Brown shrimp

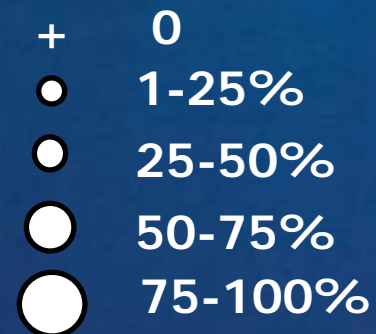


Craig et al., 2005

Dissolved oxygen (mg/l)

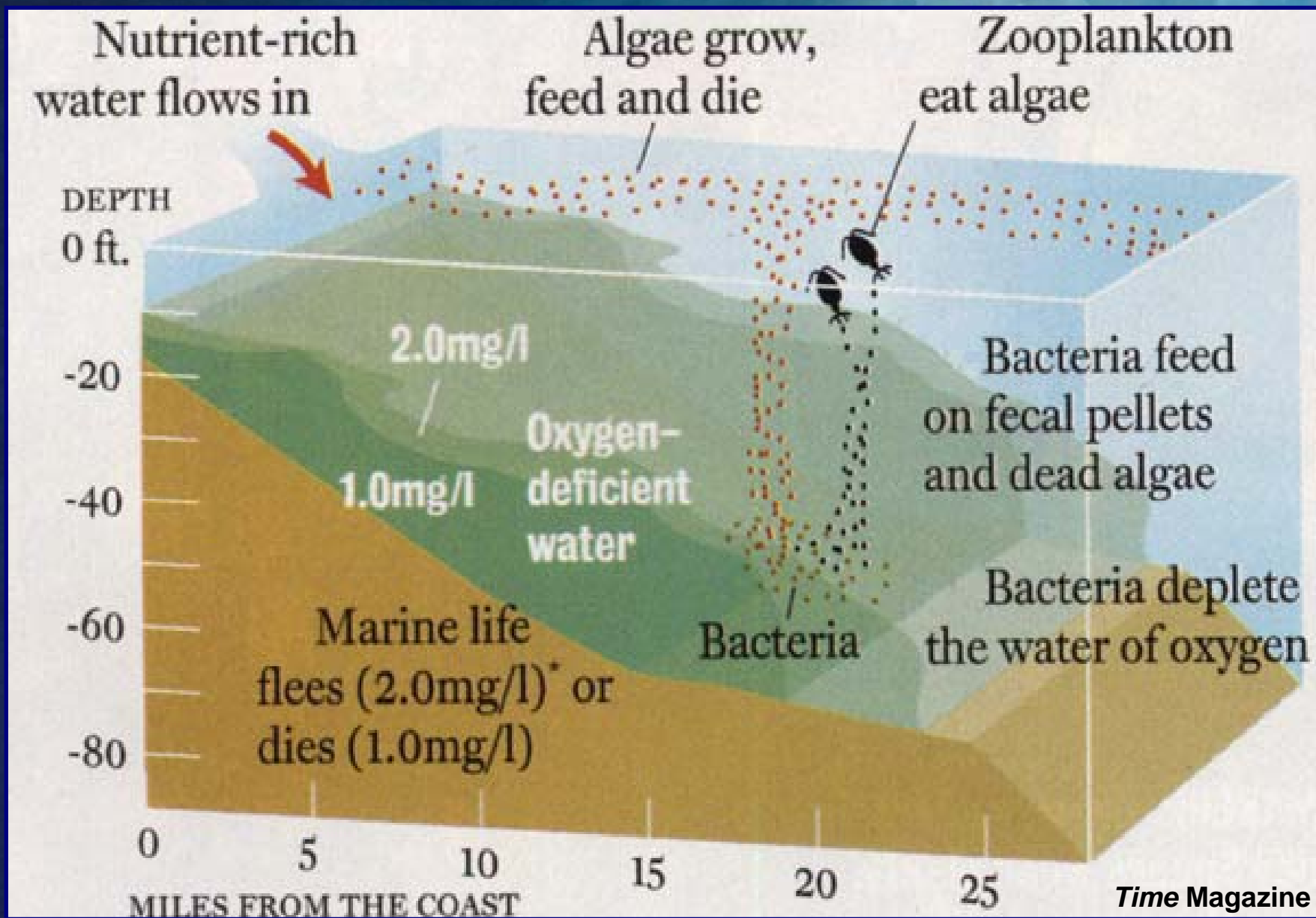


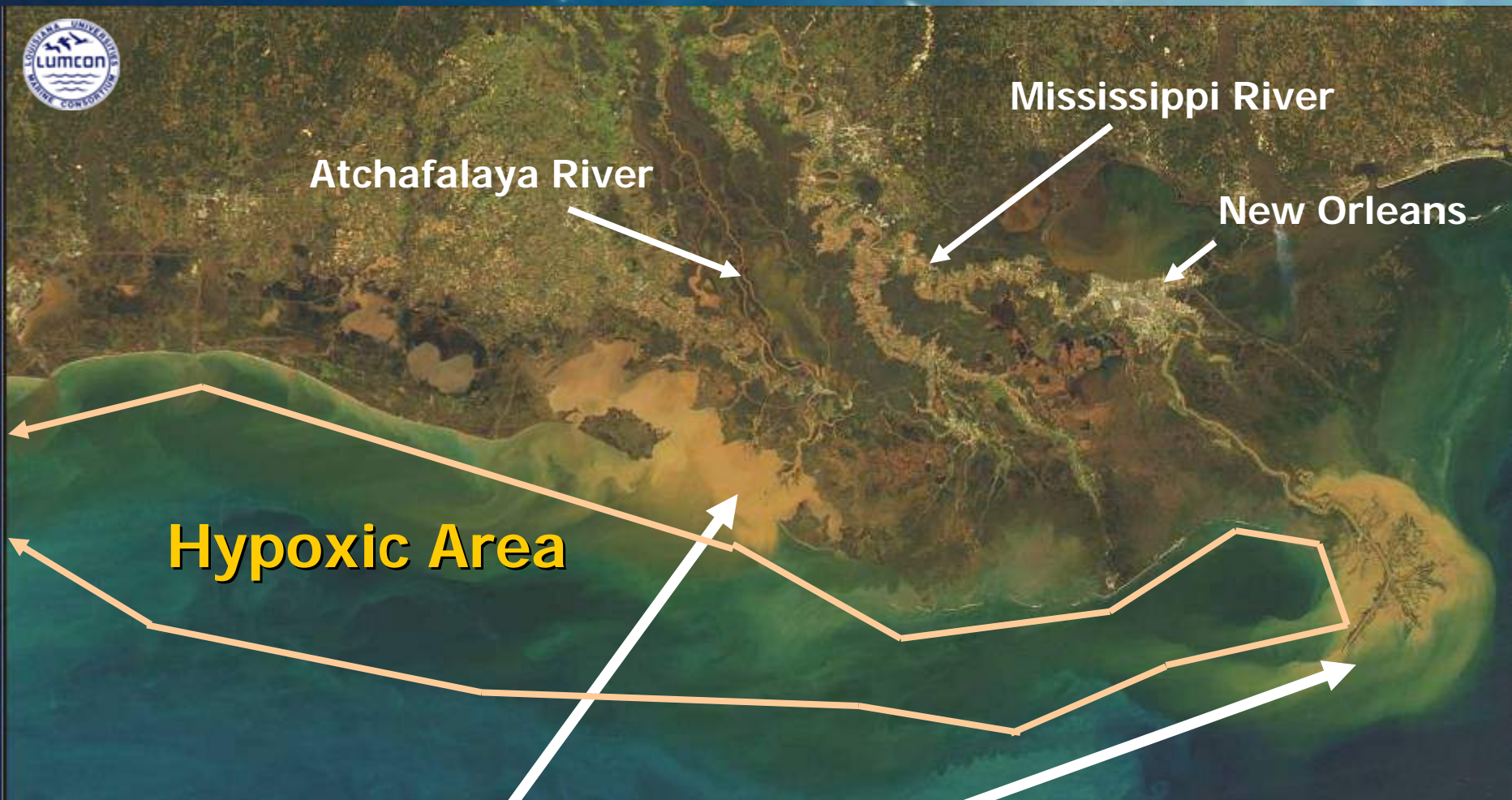
Catch percentiles





Nutrients, Increased Growth, Low Oxygen





Atchafalaya River

Mississippi River

New Orleans

Hypoxic Area

Effects are more far reaching than suspended sediment plume, esp. N but also P

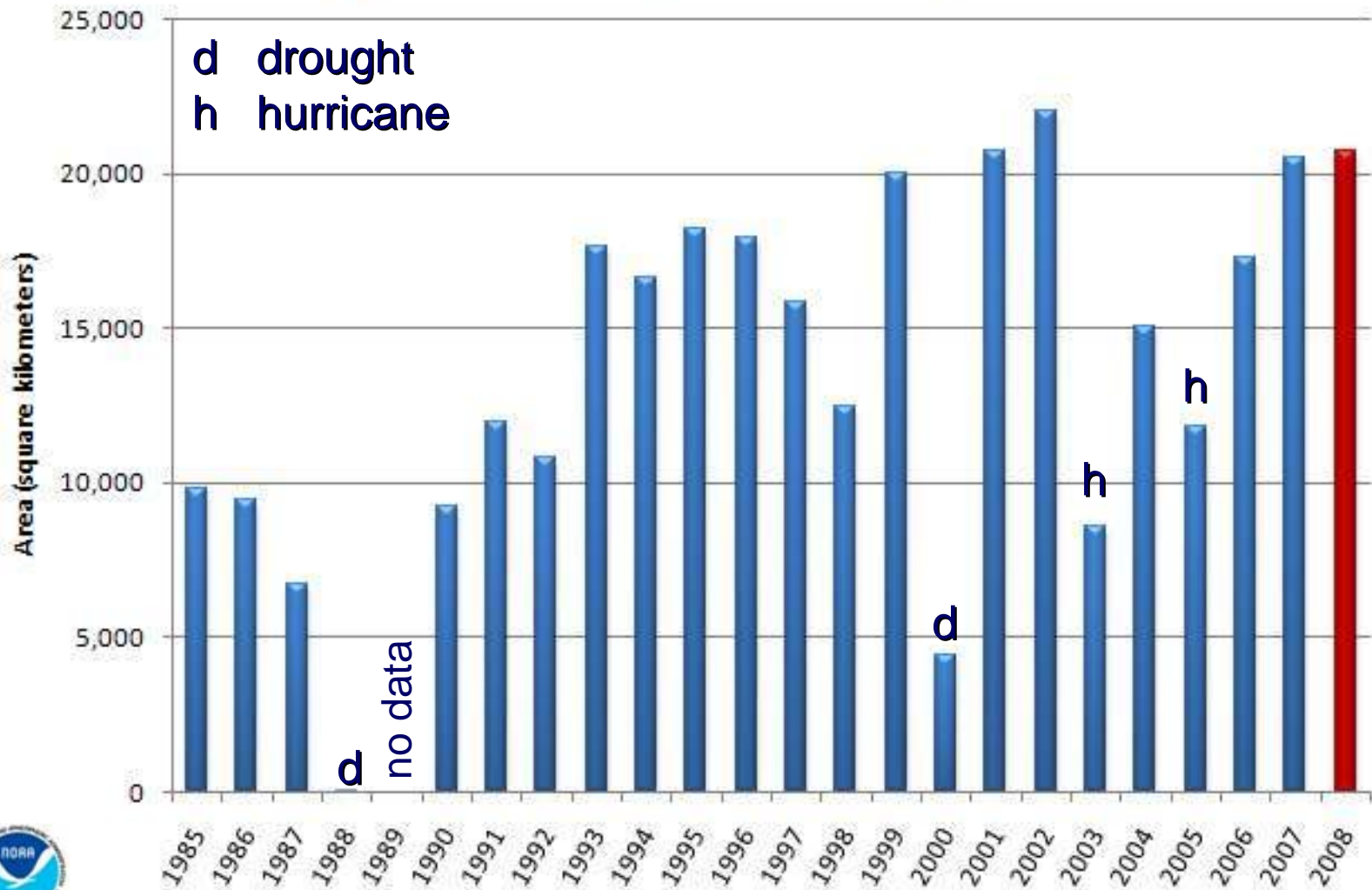
dominant wind direction



River N load is main long-term driver of hypoxia



Area of Mid-Summer Bottom Water Hypoxia (Dissolved Oxygen < 2.0 mg/L)

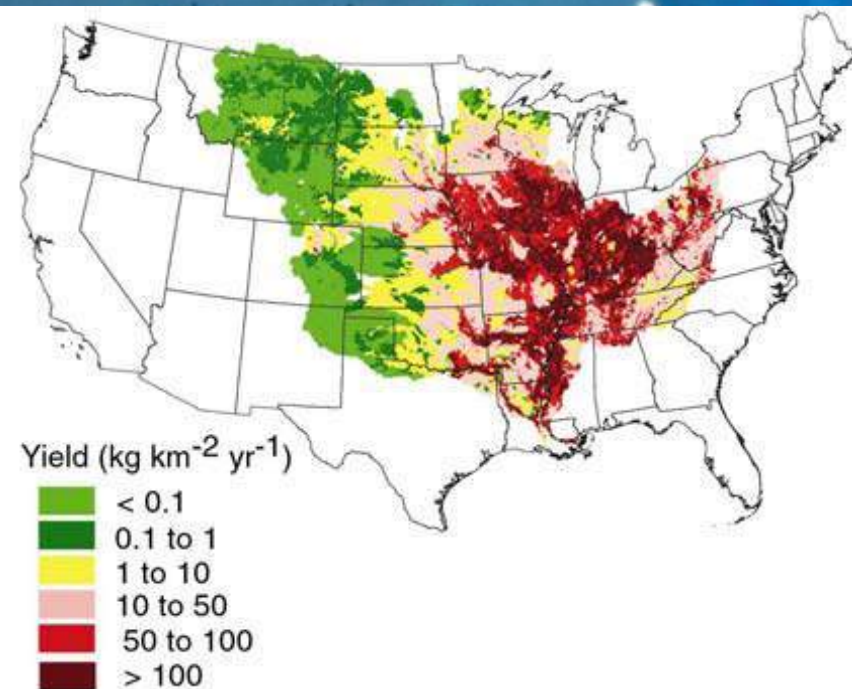
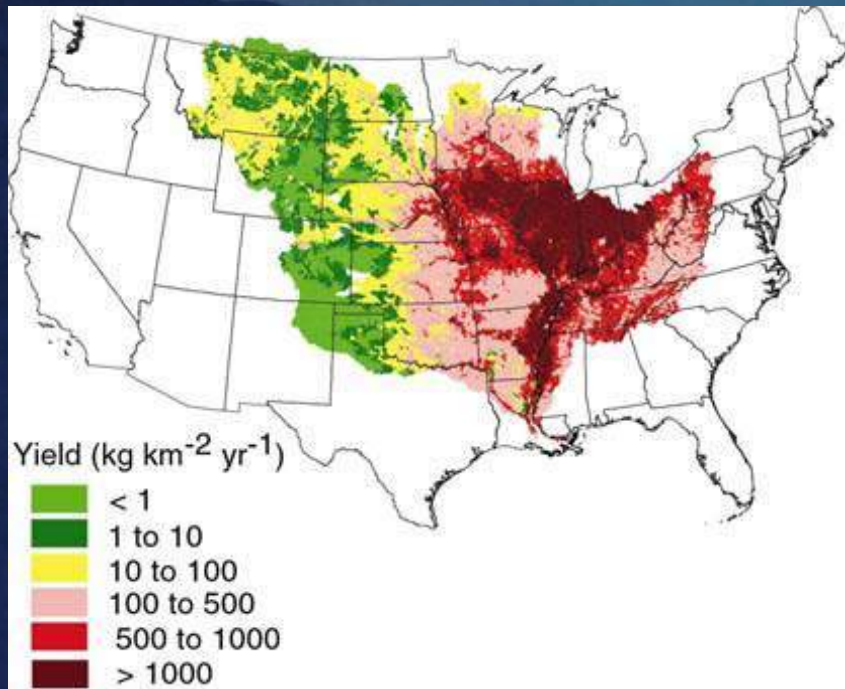


2008 Action Plan & FY 2008 Annual Operating Plan

Nutrient Delivery to the Gulf of Mexico

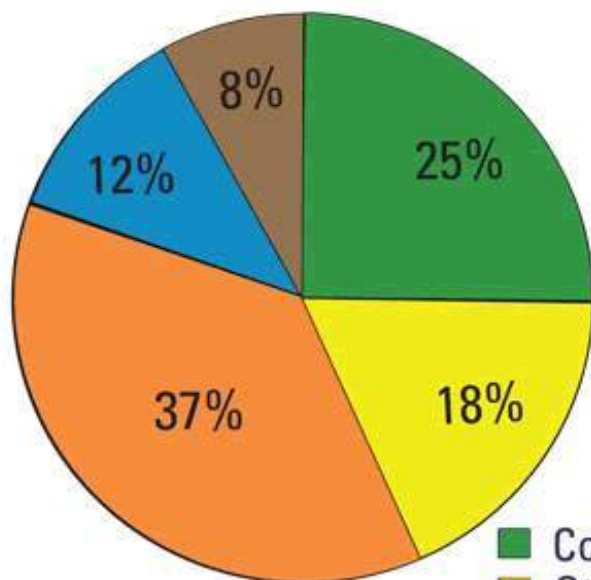
(A) Total Nitrogen

(B) Total Phosphorus

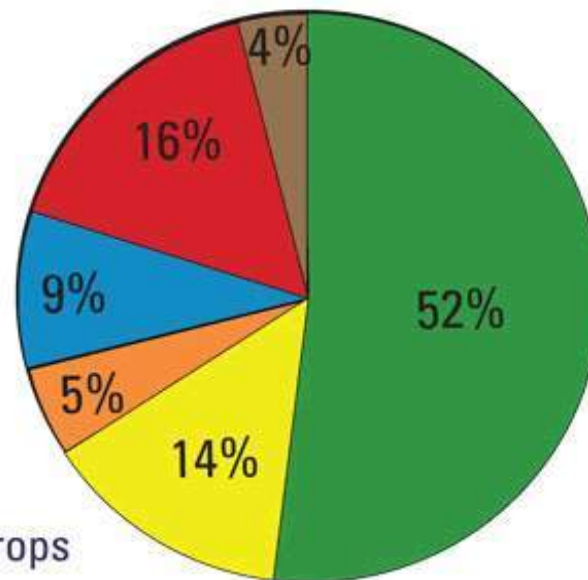


Sources of nutrients delivered to the Gulf of Mexico

PHOSPHORUS



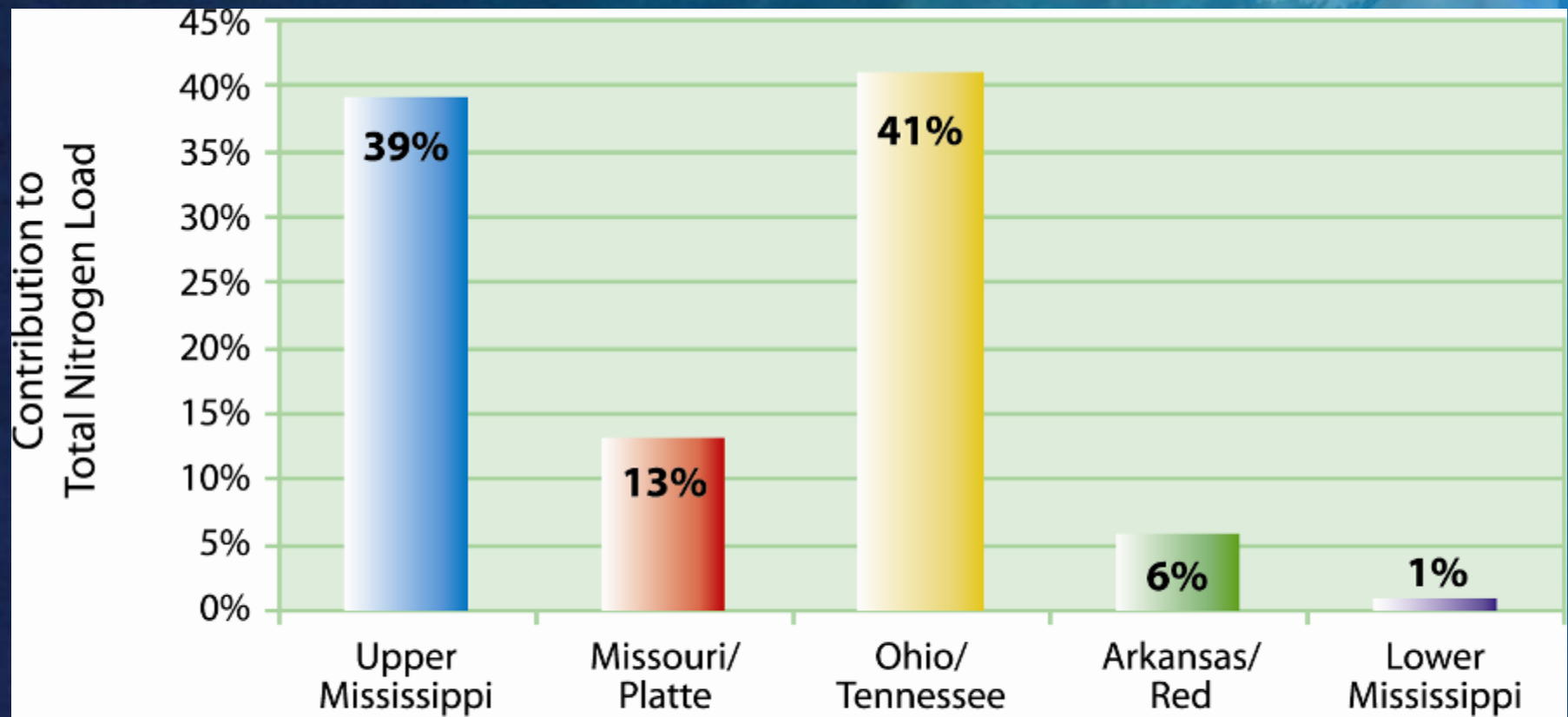
NITROGEN



Sources

- Corn and soybean crops
- Other crops
- Pasture and range
- Urban and population-related sources
- Atmospheric deposition
- Natural land

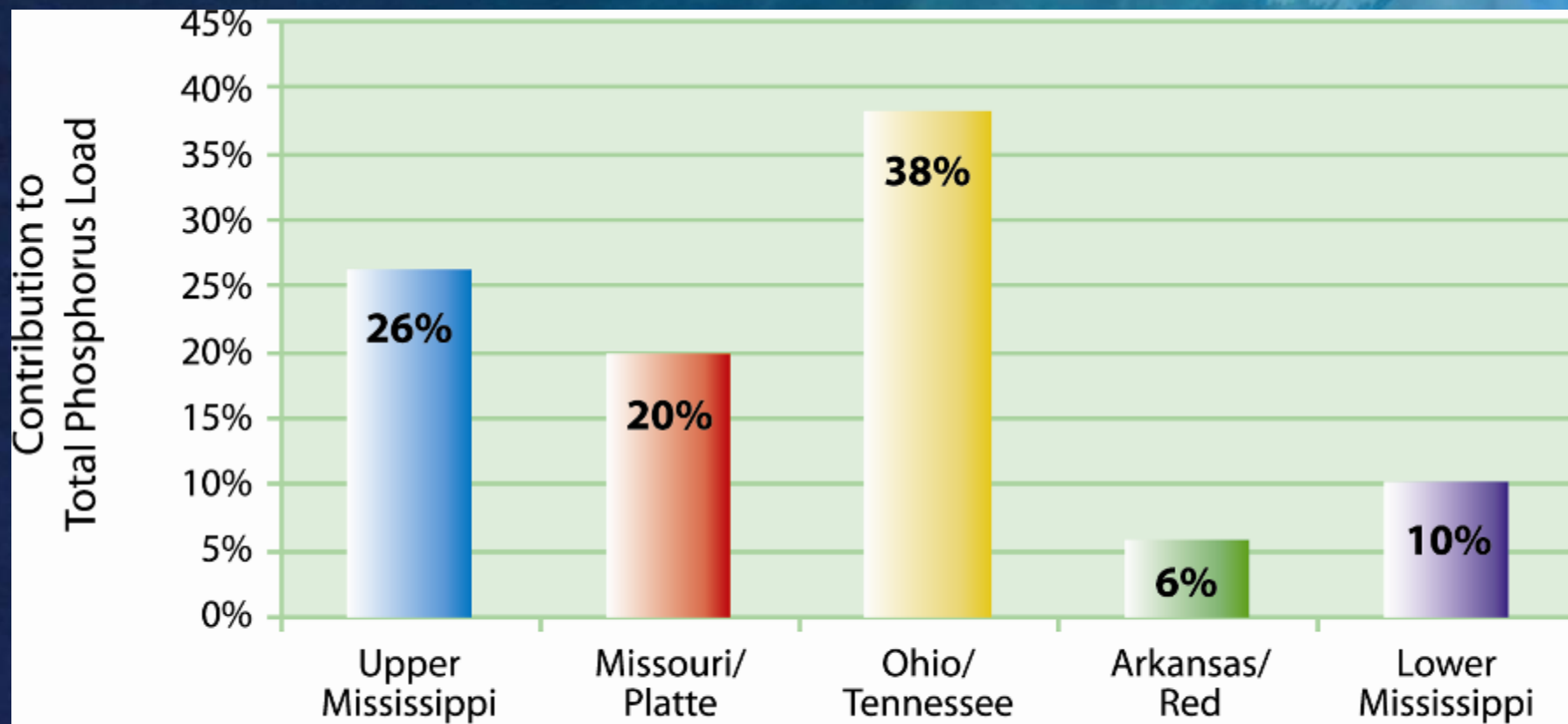
Sub-basin Nitrogen Contribution



Major Mississippi River Sub-basins

Data courtesy USGS Open-File Report 2007-1080.

Sub-basin Phosphorus Contribution



Major Mississippi River Sub-basins

Data courtesy USGS Open-File Report 2007-1080.

Goals of the 2008 Action Plan

Coastal

- Reduce or make significant progress towards reducing the five-year average areal extent of the hypoxic zone to 5,000 square kilometers

Within Basin

- Restore and protect the waters of the 31 states within the MARB

Quality of Life

- Improve communities and economic conditions across the MARB

Next Steps: Getting Results

Actions 1-3

- ▶ Actions are the “heart” of the plan
- ▶ Three “Actions to Accelerate the Reduction of Nitrogen and Phosphorus” will have the most direct effect on the size of the zone
 - Focus on State nutrient strategies
 - Introduce complementary Federal strategies
 - Utilize existing programs to enhance protection of Gulf and local water quality

Actions 4-11

- ▶ Actions to Advance the Science, Track Progress, and Raise Awareness
 - Build on the adaptive management approach *“continual feedback between the interpretation of new information and improved management actions” (2001 Action Plan)*
 - Emphasize tracking progress, filling the still existing gaps in the science, and engaging our stakeholders

Moving Forward: Implementation

- ▶ State nitrogen and phosphorus reduction strategies
- ▶ Federal nitrogen and phosphorus reduction strategies
- ▶ Annual Operating Plans
- ▶ Annual Report







**For more information
or to read the Action Plan visit:**
www.epa.gov/msbasin

For hard copies email:
ow-hypoxia@epa.gov

Ohio River Basin Team

*A partnership helping to protect and restore local
waters and
the Gulf of Mexico*

John Kessler, Ohio DNR

Ohio River Basin Steering Committee Members

- ▶ Illinois Dept of Agriculture
- ▶ Indiana Dept of Environmental Management
- ▶ Kentucky Dept of Environmental Protection
- ▶ Kentucky Division of Conservation
- ▶ Ohio Dept of Natural Resources
- ▶ Ohio EPA
- ▶ Pennsylvania Conservation Commission
- ▶ Tennessee Dept of Environmental Cons
- ▶ West Virginia Conservation Agency
- ▶ West Virginia Dept of Agriculture
- ▶ West Virginia Dept of Environmental Protection
- ▶ ORSANCO

The Ohio River Basin



Accomplishments

- ▶ Phase 1 of basin nutrient reduction strategy (framework) complete
- ▶ Some implementation underway (e.g., Scioto CREP, Great Miami WQ Trading)
- ▶ Supported revised Action and Operating Plans
- ▶ Hosted 15th Task Force Meeting (Cincinnati)

Next Steps

- ▶ ORB partners met in Sept. 08
- ▶ State led (ORB Basin) nutrient reduction strategies build on phase 1
- ▶ Further/concurrent implementation
 - (e.g., Little Miami CREP application, Grand Lake, Wabash R.)
- ▶ Point source workshop on advanced nutrient treatment – Nov. 2008
- ▶ Expand stakeholder involvement

Biggest Challenges

- ▶ Absence of drivers (but this may change)
 - Financial (some funds shifted)
 - Regulatory (nutrient criteria, TMDLs?)
 - Public Opinion (climate change, energy)



▶ Program Integration and
Implementation Examples
from Ohio

Typical Eastern Corn Belt Field with Conservation Tillage



Combinations of Practices



Rural Drainage



Rural Drainage



Urban Stormwater BMP



Scioto CREP practice



Scioto CREP practice



WQ Trading Example (holding pond and plan needed)



Urban CSO



Urban CSO



Public Treatment Works



Nutrient Load Reductions 2006 Examples

▶ Scioto Watershed CREP

- 57,000 out of 70,000 acres enrolled
- 36,000 lb. P/yr
- 73,000 lb. N/yr

▶ Great Miami Trading

- 68,000 lb. P over 5 to 20 years
- 176,000 lb. N over 5 to 20 years



▶ Thank You

▶ Any questions?