

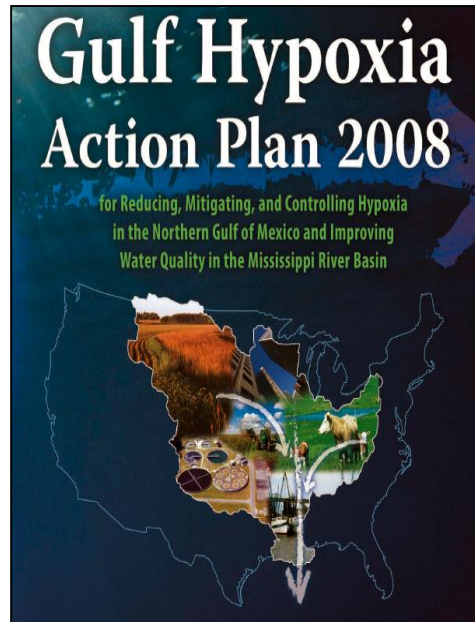


Gulf Hypoxia and Mississippi River Nutrient Management



Alan Lewitus

**Center for Sponsored Coastal Ocean Research
NOAA/NOS/NCCOS**



**5th Annual NOAA/NGI Gulf Hypoxia Research Coordination Workshop
14 July 2014; Stennis Space Station, MS**

Action Plan Coastal Goal

“Reduce the 5-year running average of the hypoxic zone areal extent to less than 5000 sq km (1928 sq mi) by the year 2015...

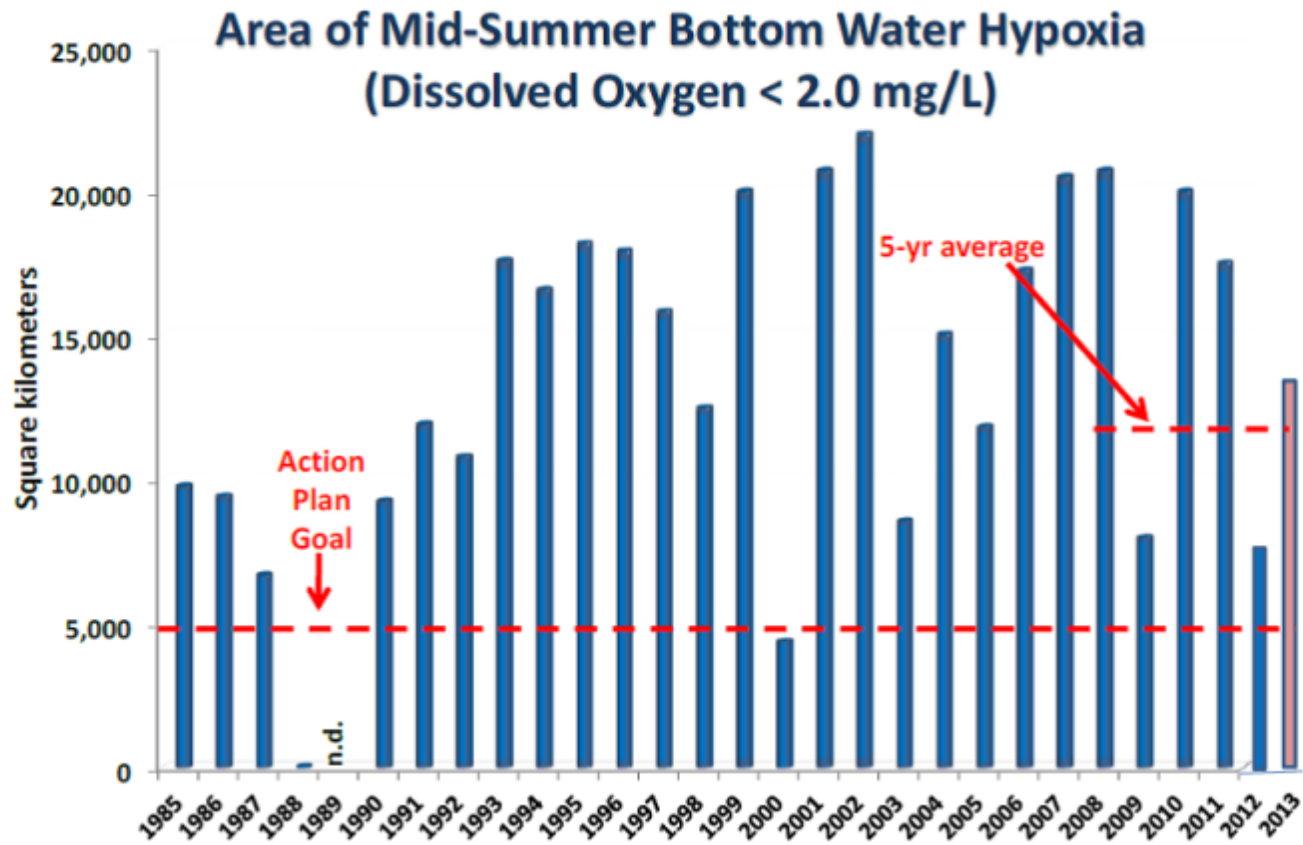
...(by reducing) the annual discharge of nitrogen into the Gulf. [2001 *Action Plan*]

...(by reducing) the annual discharge of nitrogen and phosphorus into the Gulf. [2008 *Action Plan*]



Long-Term Monitoring

Maximum annual areal extent of hypoxic zone – metric to assess progress toward Hypoxia Task Force Action Plan Goal



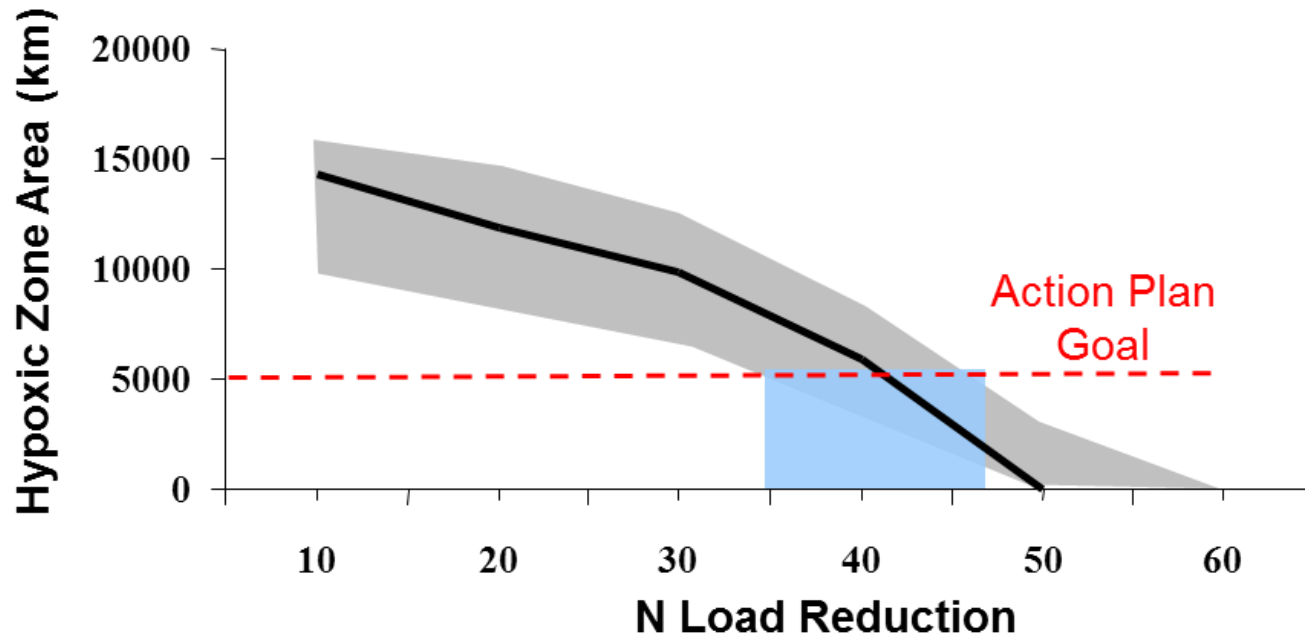
From Nancy Rabalais (LUMCON)

Setting Nutrient Reduction Targets

To inform 2008 Action Plan, EPA Science Advisory Board recommended 45% N reduction based on:

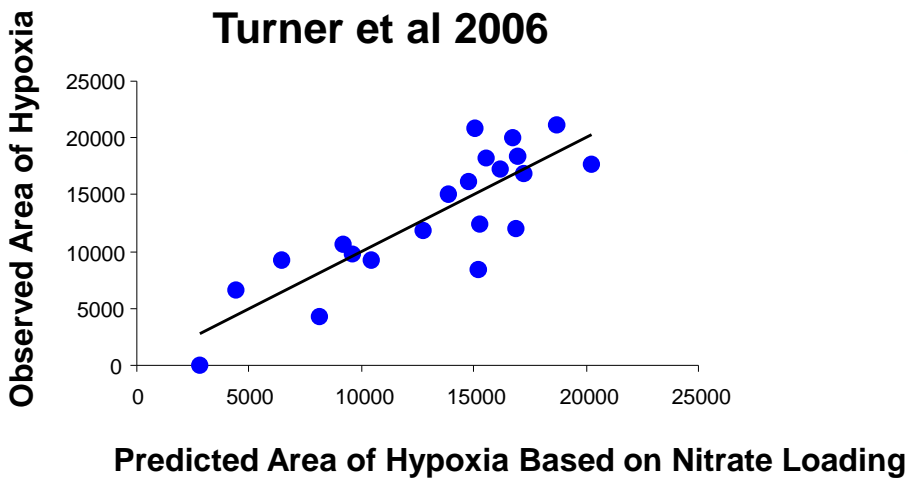
-- Scavia et al. 2004: ensemble of models (Scavia, Bierman, Justic) suggested a 40-45% reduction in N loading needed to meet Coastal Goal;

-- Scavia and Donnelly 2007: update model results using new USGS loading data

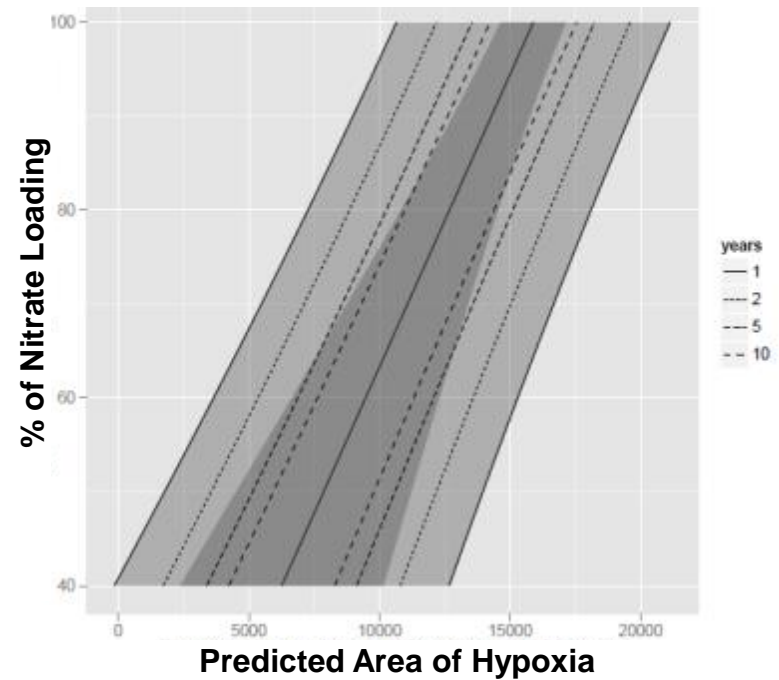


Reassessing Coastal Goal and Nutrient Reduction Targets

**Hypoxia Task Force Goals
Committee reassessing Goal and
nutrient reduction targets using
ensemble of models (Scavia,
Turner, Forrest, Laurent & Fennel)**



David Forrest, unpub



Bars: May Nitrate + Nitrite flux

Lines: Hypoxic zone areal extent

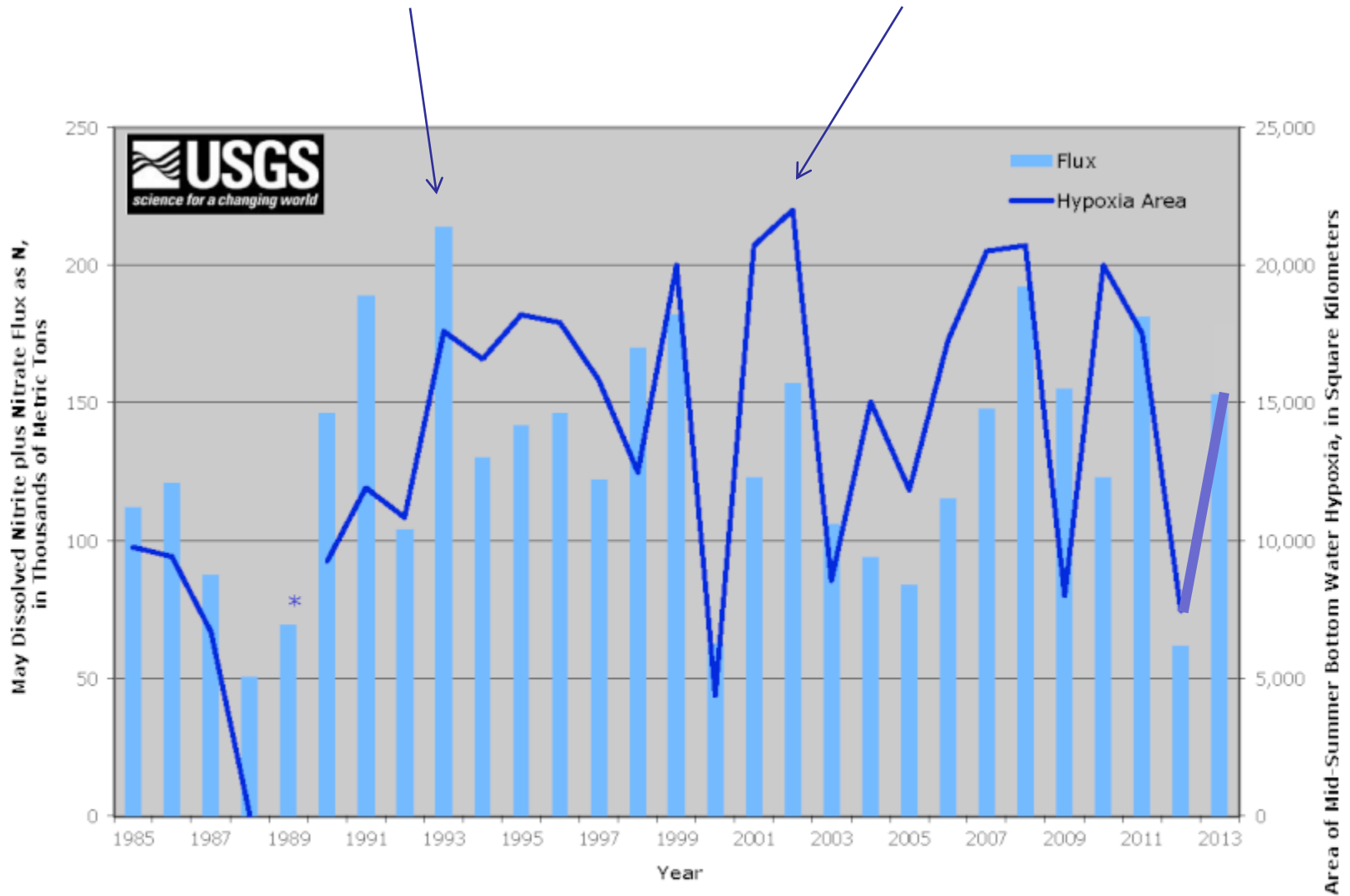
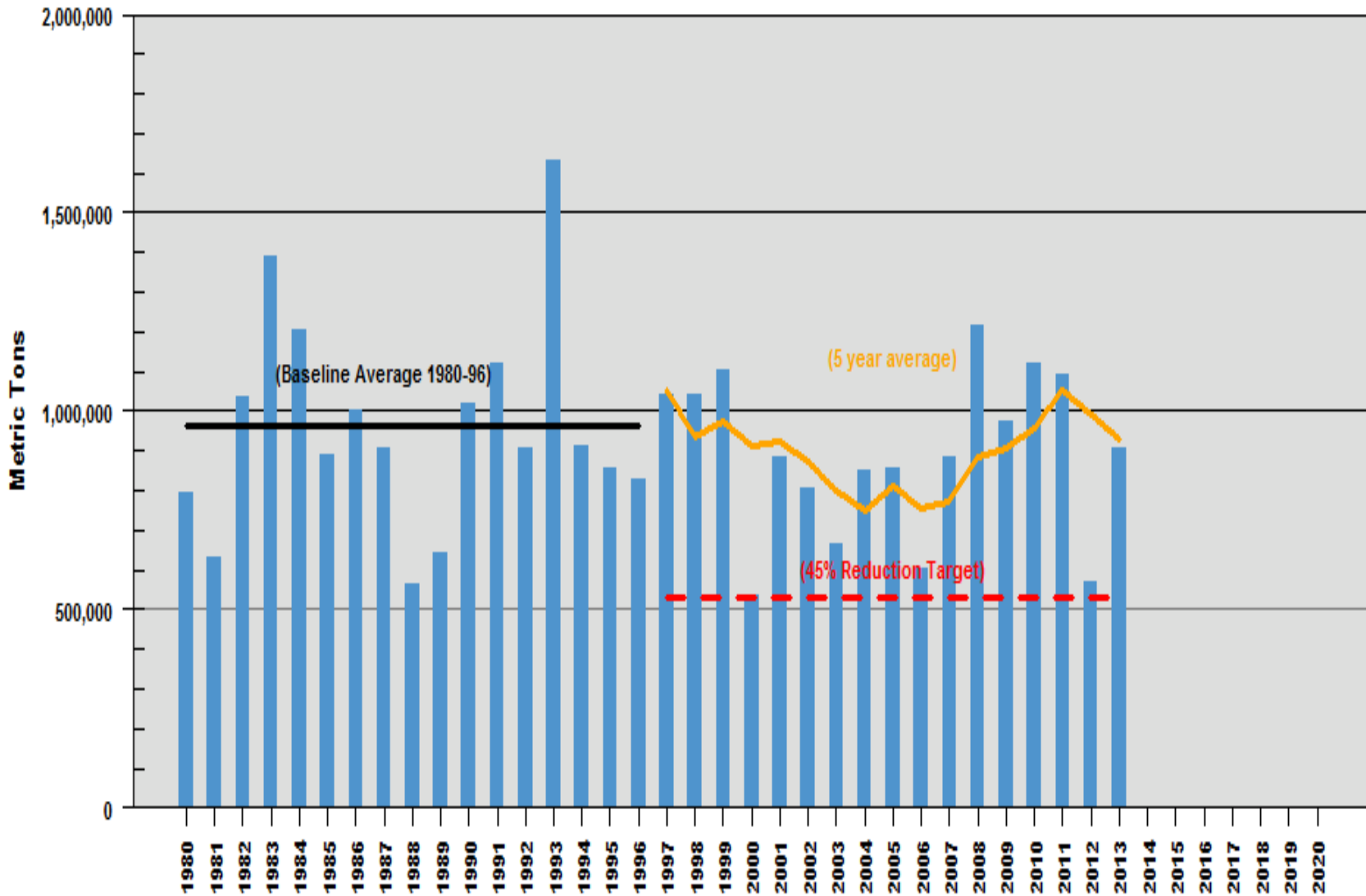


Figure 1. May dissolved nitrite plus nitrate flux to the Gulf of Mexico and area of mid-summer bottom water hypoxia (dissolved oxygen concentrations of less than 2 milligrams per liter) in the northern Gulf of Mexico. Hypoxia area data from Nancy N. Rabalais, Louisiana Universities Marine Consortium. *No hypoxia area data for 1989.

Annual Dissolved Nitrate plus Nitrite Flux



Data from Mike Woodside, USGS

Nutrient Reduction Initiatives

Hypoxia Task Force Federal Nutrient Reduction Initiatives

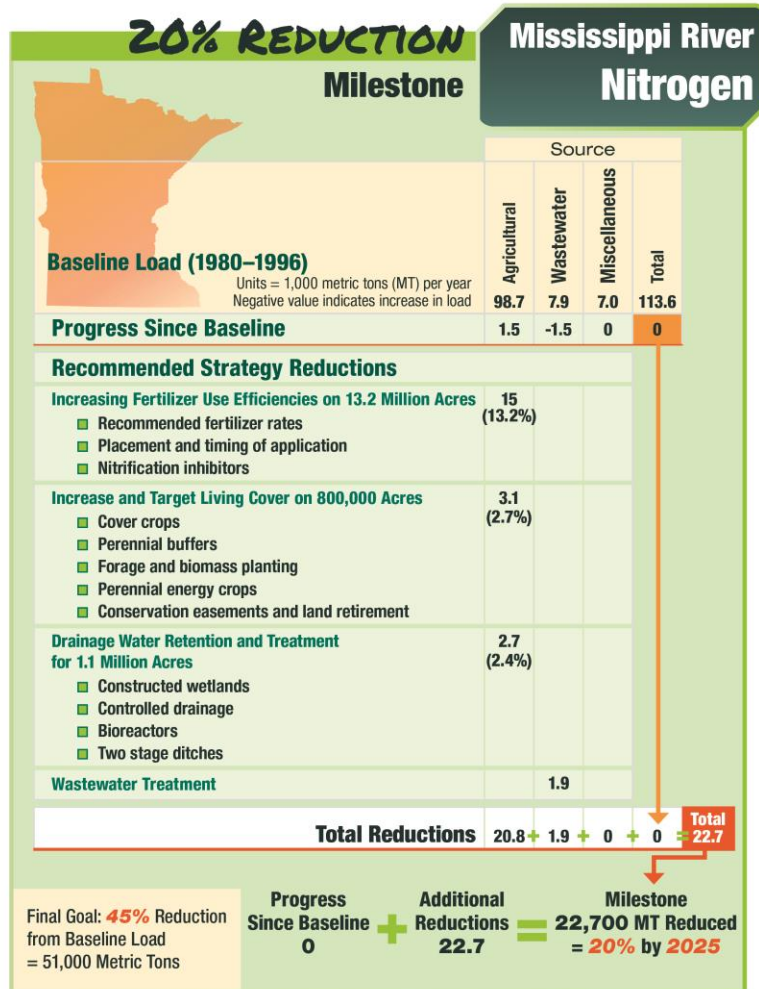


NRCS Mississippi River Healthy Watersheds Initiative (MRBI)

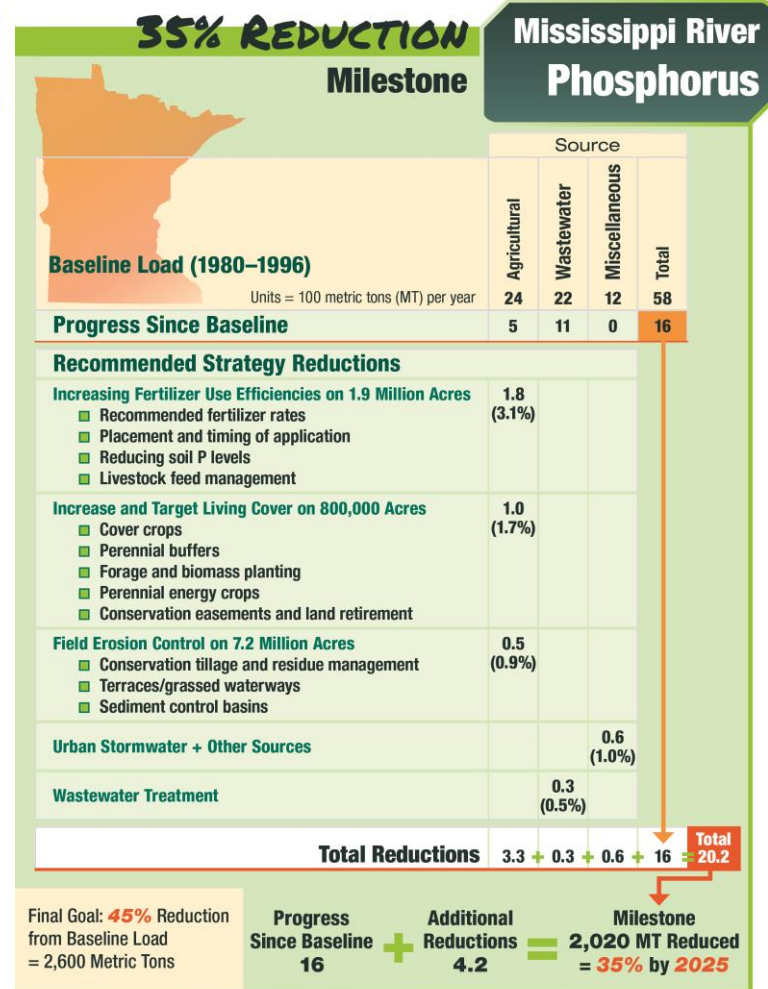
- Emphasizes producer partnership to implement comprehensive conservation systems in high priority watersheds
- NRCS dedicating \$80 million in financial assistance each fiscal year, plus associated technical assistance

Nutrient Reduction Initiatives

Hypoxia Task Force States' Nutrient Reduction Strategies

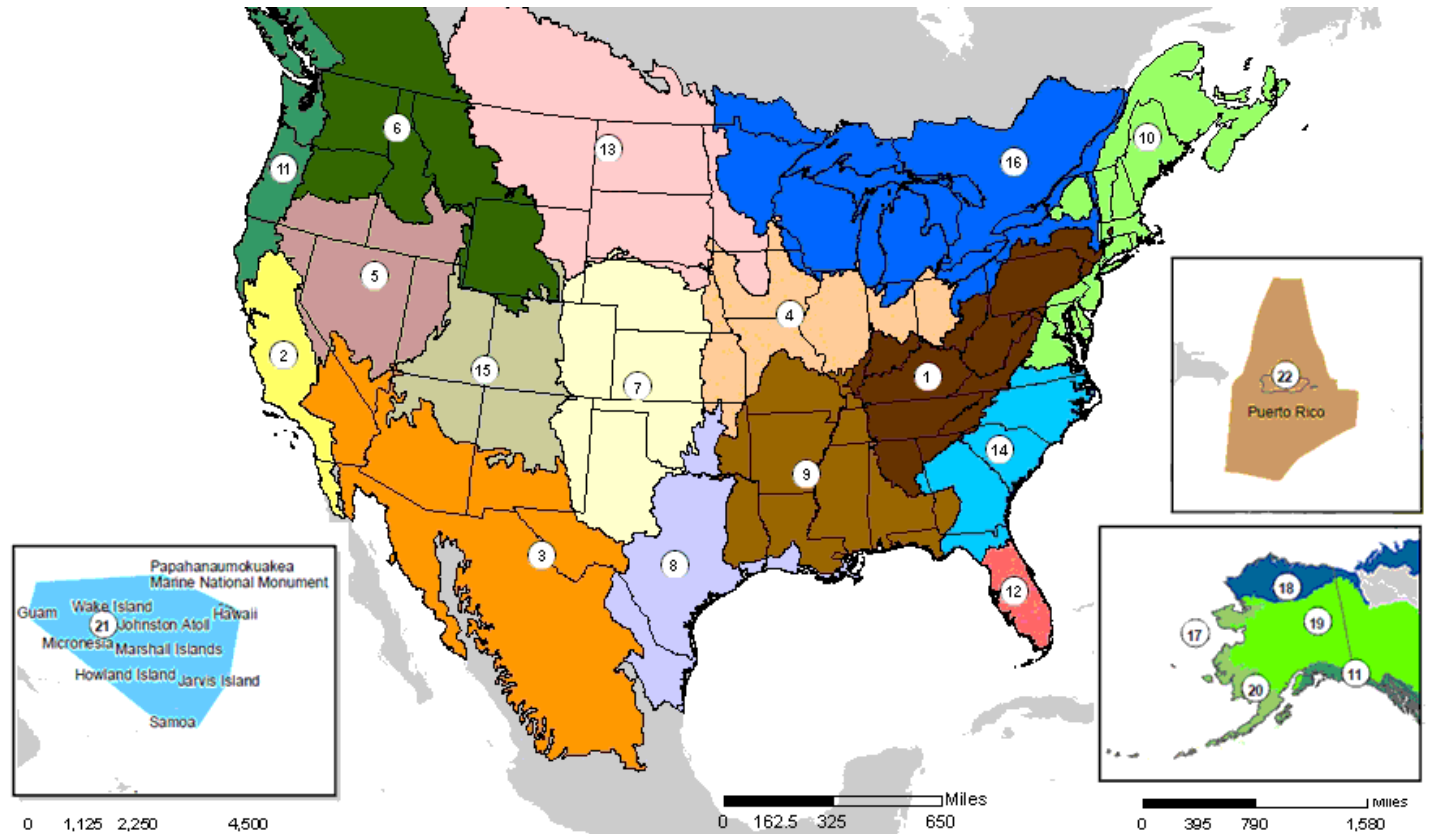


1,000 kg = 1 MT



1,000 kg = 1 MT

Landscape Conservation Cooperatives



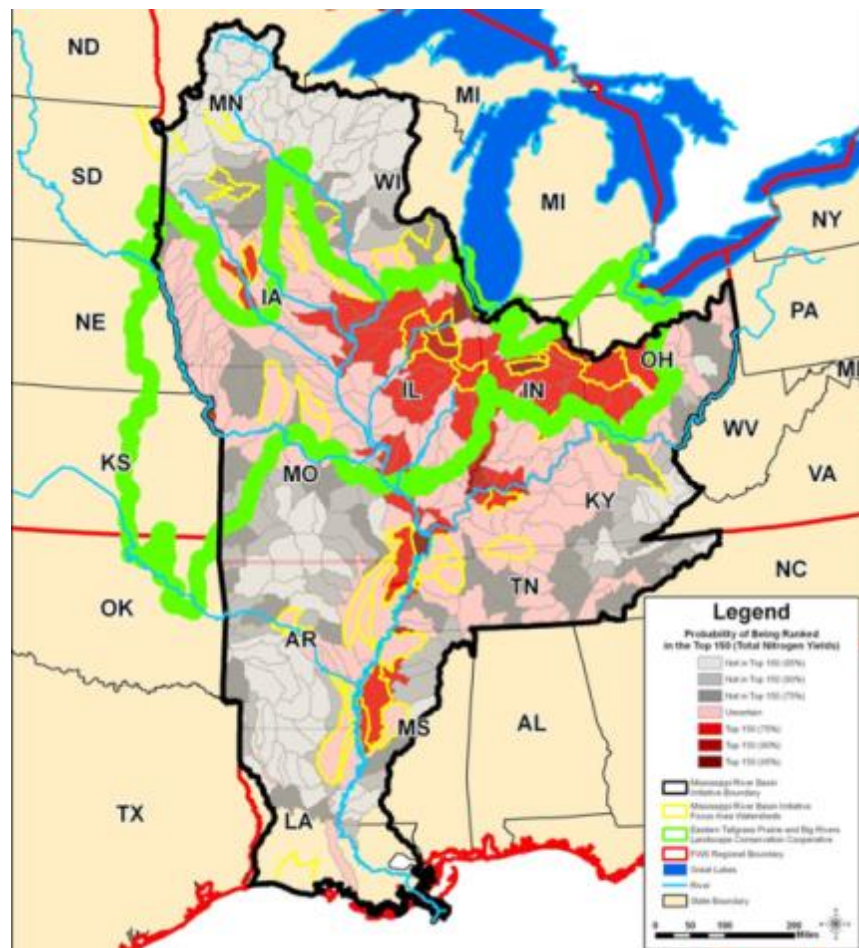
- (4) Eastern Tallgrass Prairie and Big Rivers LCC**
- (13) Plains and Prairie Potholes LCC**
- (16) Upper Midwest and Great Lakes LCC**
- (9) Gulf Coastal Plains and Ozarks LCC**
- (1) Appalachian LCC**
- (8) Gulf Coast Prairie LCC**

Mississippi River/Gulf Hypoxia Corridor Structured Decision Making (SDM) Workshop

12-14 August 2014, Memphis

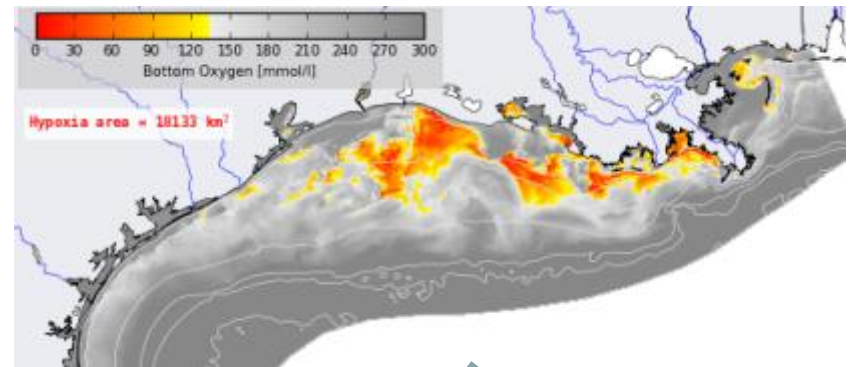
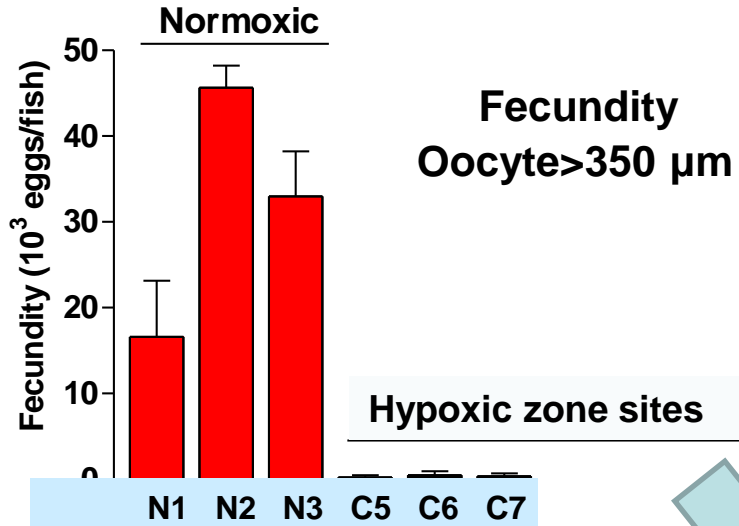
Multi-LCC workshop to develop a plan for prioritizing agricultural conservation areas by mapping the most cost-effective and receptive places for implementing practices with multiple benefits:

- Gulf water quality (reduced hypoxia)
- Local water quality
- Habitat conservation

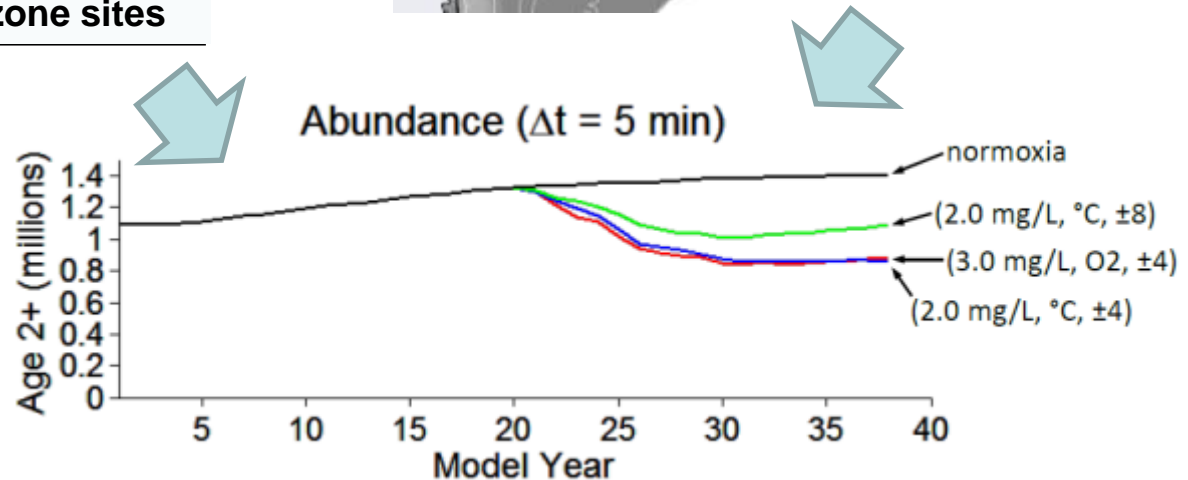


Ecological Modeling

Ecological models developed to predict fisheries responses to hypoxia at population and ecosystem levels

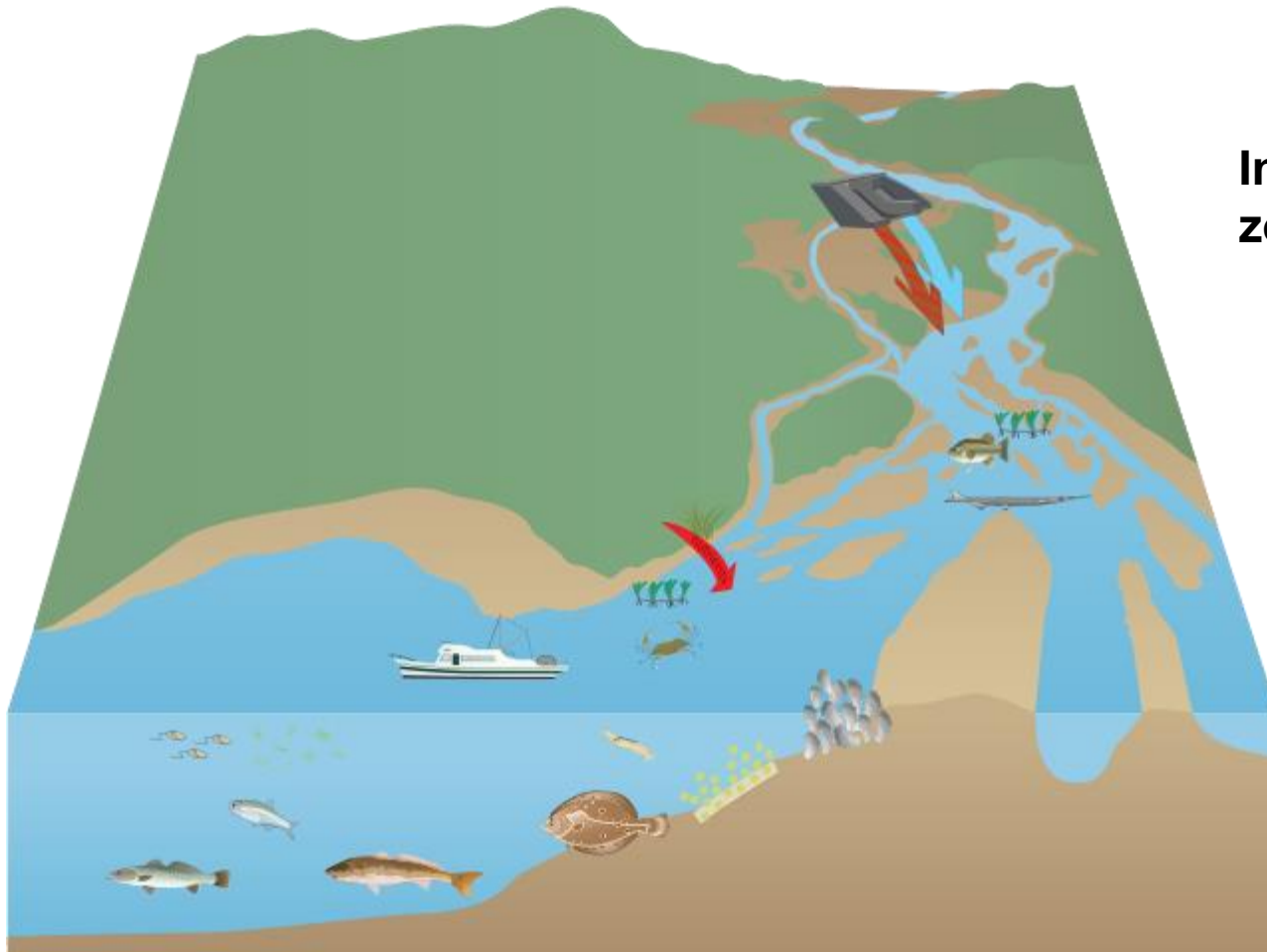


Atlantic Croaker Population
Trend Scenarios



Mississippi River Diversions

Diversions projects will alter the flow (both spatially and temporally) of sediments, nutrients and freshwater to coastal and marine systems



Influence on hypoxic zone?

From Howard Townsend,
NOAA NMFS