# Nutrient pollution in US Estuaries

NOAA's
National Estuarine Eutrophication Assessment

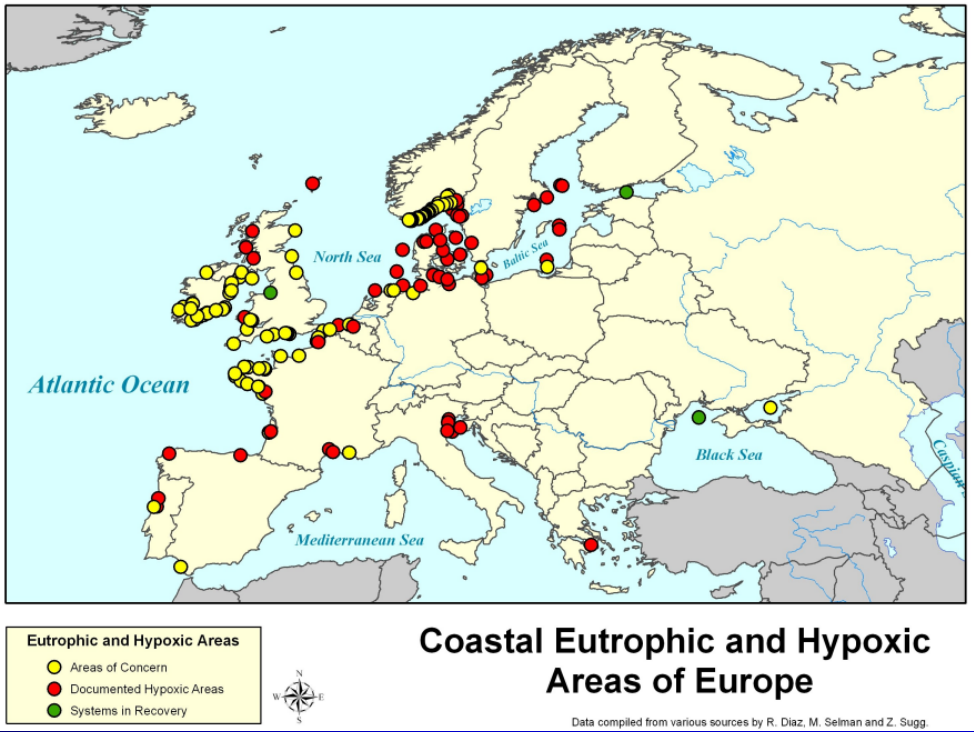
informs nutrient management

S.B. Bricker

# Global Context and Guiding Legislation: Nutrients

- **US** Clean Water Act of 1972, US Harmful Algal Bloom and Hypoxia Research and Control Act of 1998

- **EU** Water Framework Directive, Urban WasteWater Treatment Directive, Marine Strategy Framework Directive

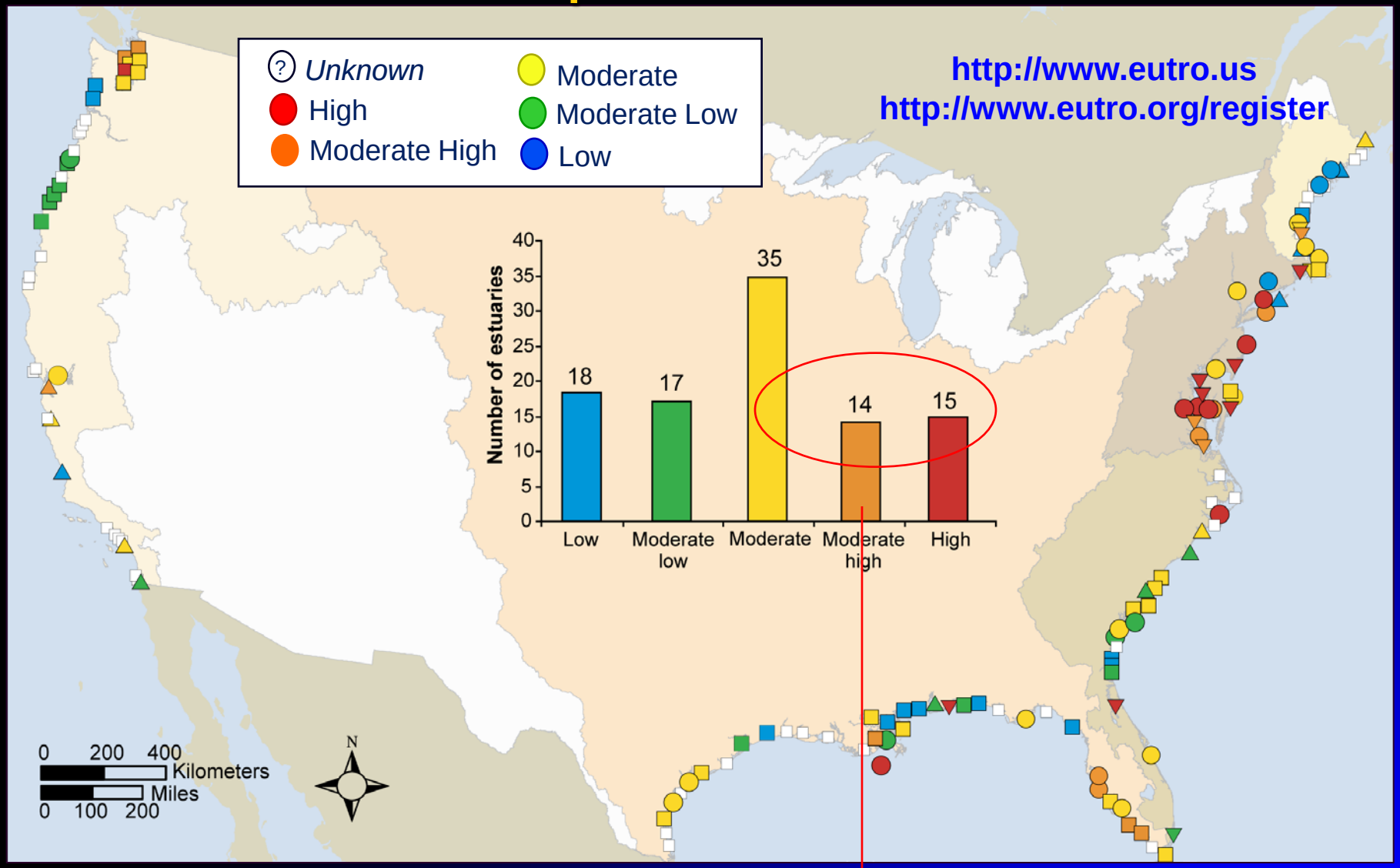



Diaz, R.J. and R. Rosenberg. 2008. Spreading dead zones and consequences for marine ecosystems. Science 321:926-928

- **Eutrophication** is a significant problem worldwide (US, EU, China, Japan, Australia and elsewhere)

# What does eutrophication look like? Where is it?

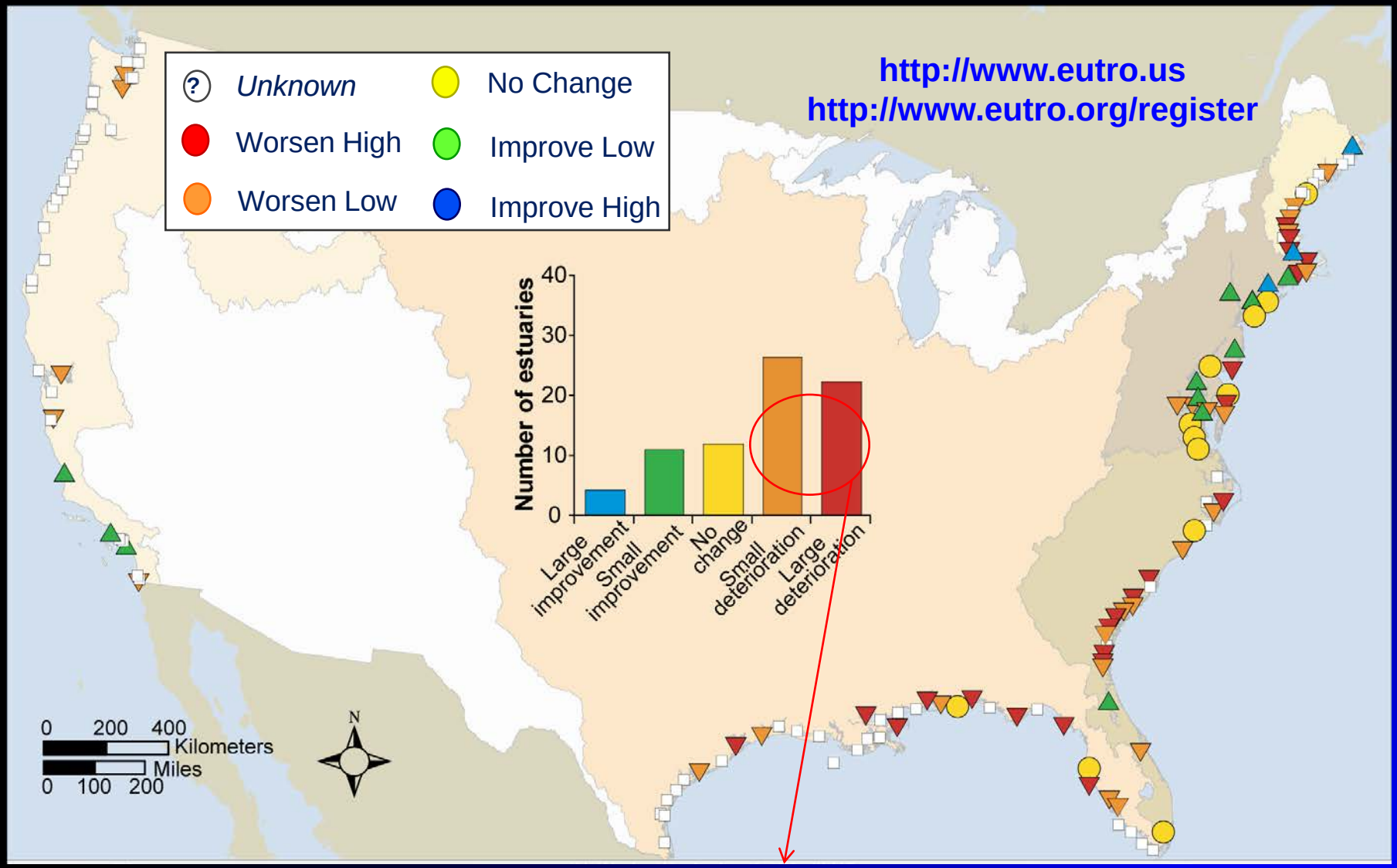
# Eutrophic Condition




1990s – 69% assessed systems M to H

2000s – 65% assessed systems M to H

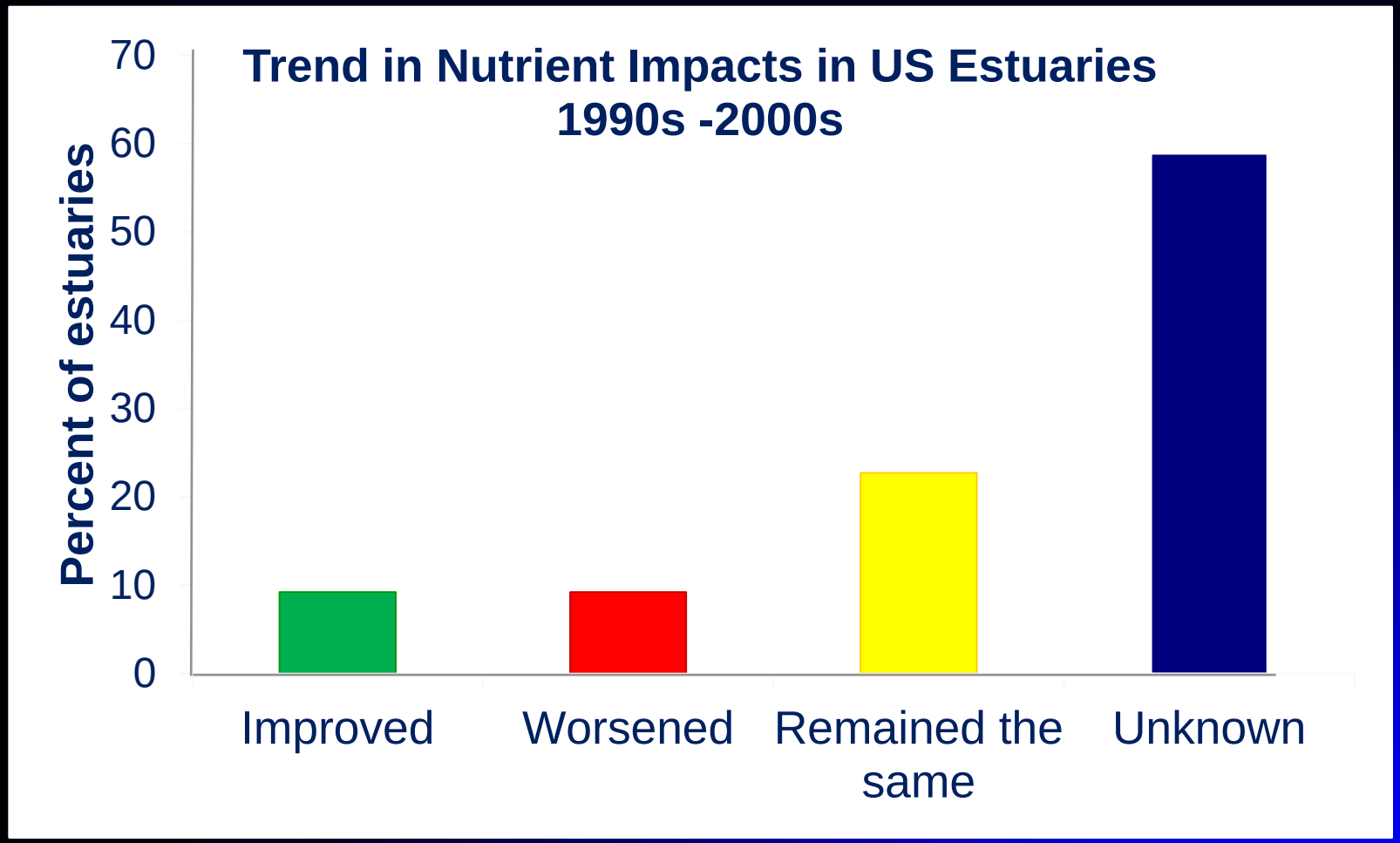
# Future Outlook




| | |
|---|---|
| 1990s – 71% assessed systems – worsen<br>7% assessed systems – improve | 2000s – 65% assessed systems – worsen<br>20% assessed systems – improve |

# Changes 1990s – 2000s

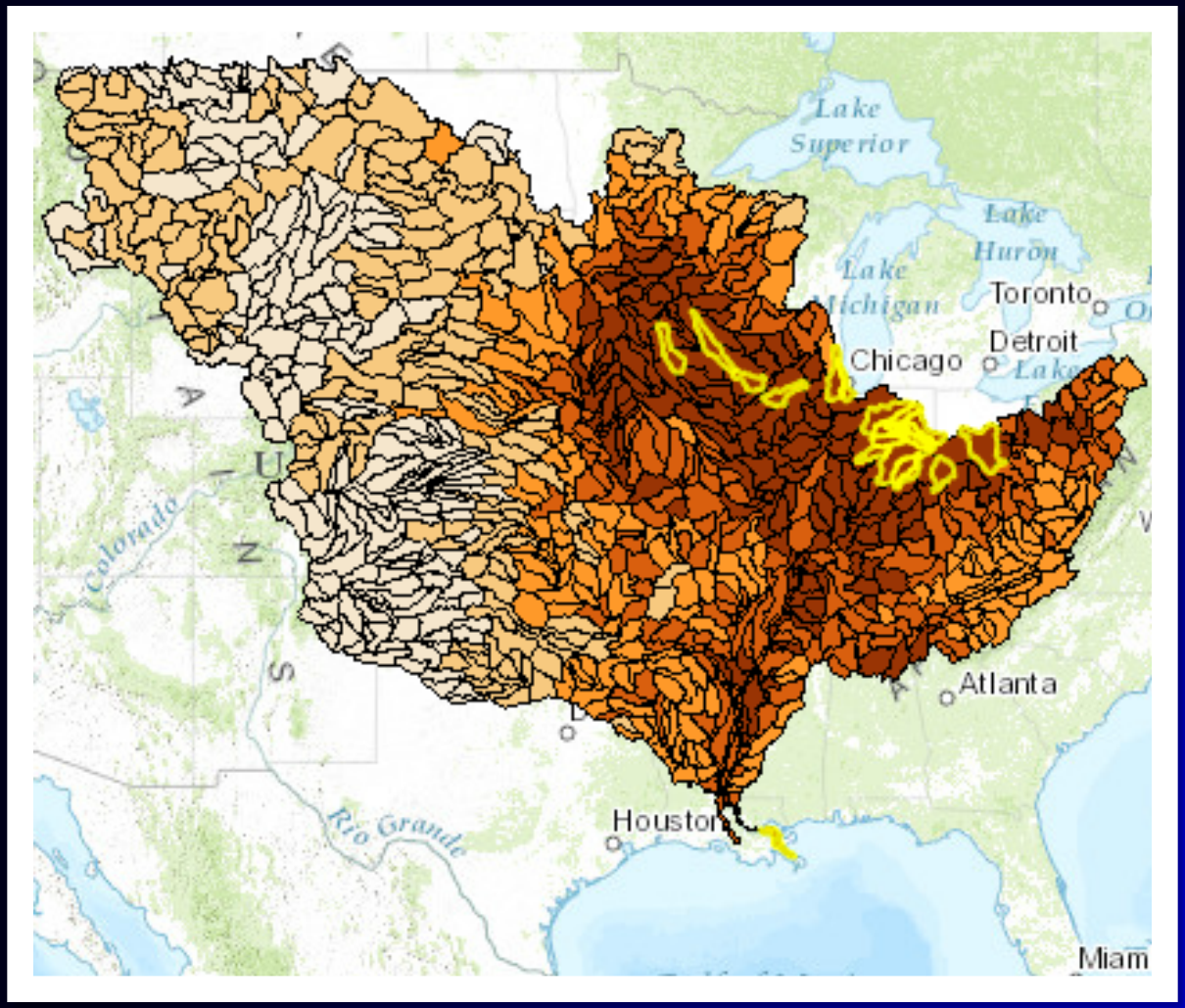
Analysis was possible for 58 of 141 systems



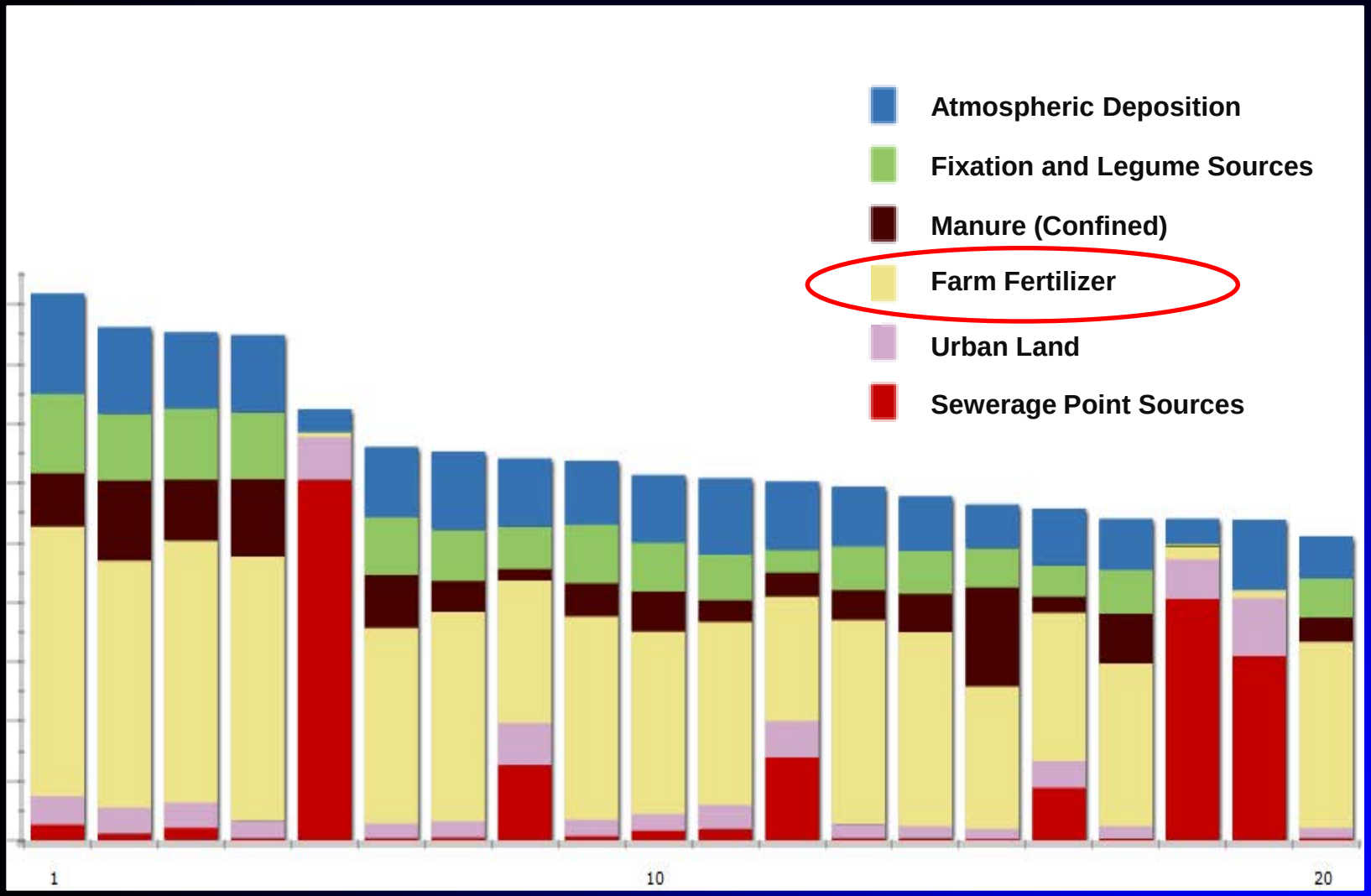

*Improved due to management efforts, primarily point source*

*Worsened due to population increase and associated activities*

# Top 20 Mississippi River Basin Watersheds Contributing the Largest Amounts of Total Nitrogen to the Gulf of Mexico



# Sources of Nitrogen: Top 20 watersheds Contributing the Largest Amount of Total Nitrogen to the Gulf of Mexico



# Tampa Bay – A management success

Nutrient impact: Loss of seagrass 1950-1990

<u>3 major actions since 1980:</u>

1. WWTP improved treatment (90%↓ N from this source)
2. Stormwater treatment regulations reduced N loads
3. Phosphate industry Best Management Practices (BMPs) reduced spills of N and P at docks

(cost: $28.7 million / year for projects and actions)

60% reduction N loading since 1980
Significant increase in seagrass acreage

# Summary

- Moderate - high level nutrient impact in 65% of US estuaries
- Improvements are possible, have been observed
- Worsening is seen in an equal number of systems
- Overall, little change early 1990s – early 2000s
- Continued management is needed
- Innovative management measures are being explored such as nutrient removal through shellfish aquaculture
- USGS nutrient monitoring/modeling results critical to this work

---

Try the ASSETS model yourself: www.eutro.org/register

For more information contact: Suzanne.Bricker@noaa.gov
Websites: http://www.eutro.org, http://www.eutro.us