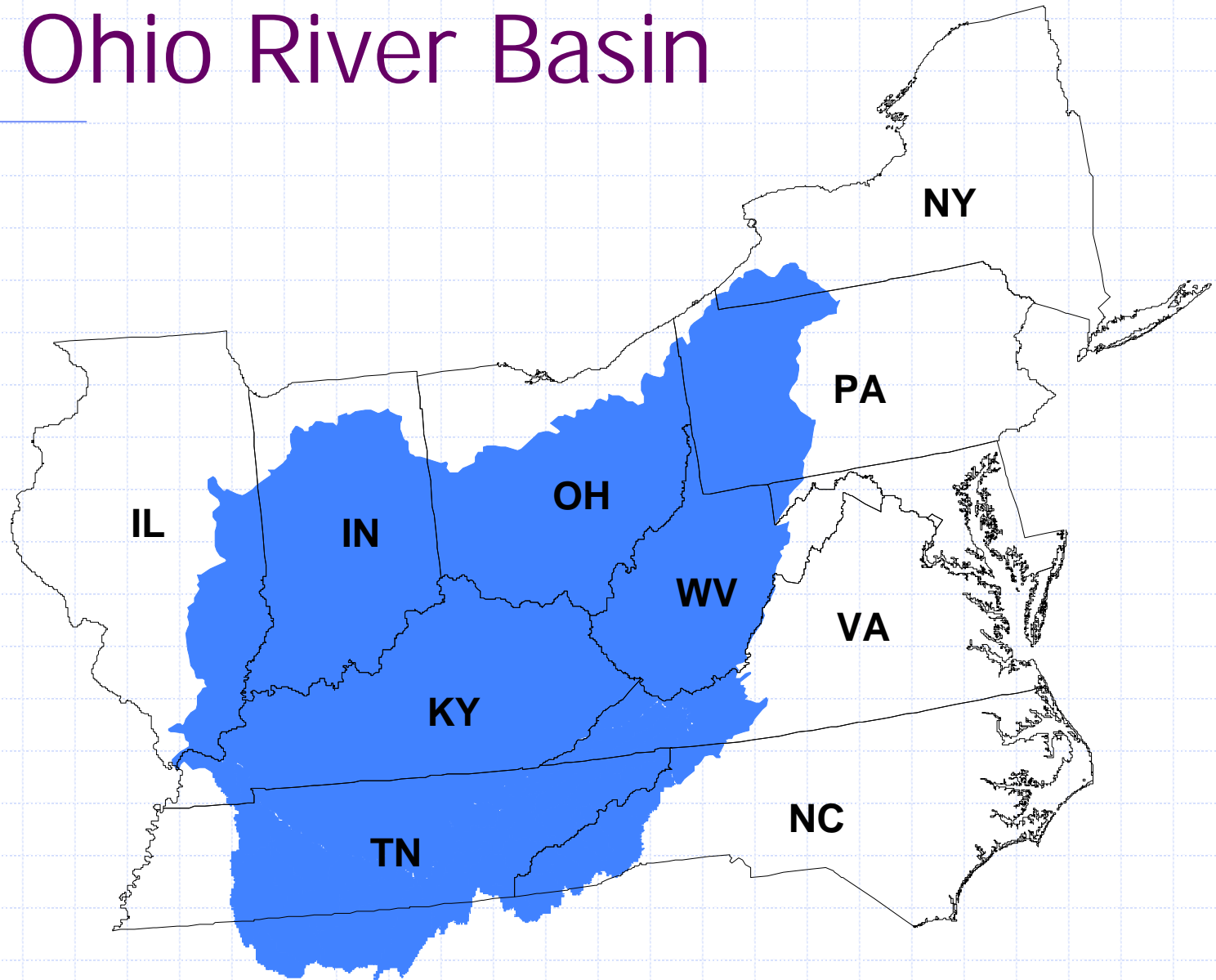


Nutrient Trading in the Ohio River Valley

-Are we ready for this?



The Ohio River Basin



What do we need to make trading work?

- ◆ Clear regulatory objectives.
- ◆ Buy in from stakeholders- Federal, State, Local, Private interests.
- ◆ Workable mechanism.
- ◆ Patience.

Possible Nutrient “Drivers”

- ◆ Local, site-specific criteria
- ◆ Numerical Criteria for the Ohio River
- ◆ Numerical Criteria for the Mississippi River
- ◆ Nutrient Reduction Goals to Reduce Gulf Hypoxia

Status of Criteria Development in the Ohio River Basin

- ◆ WV – 2009
- ◆ OH – 2008
- ◆ KY – 2007
- ◆ PA - 2009
- ◆ IN – 2009
- ◆ IL – 2008
- ◆ ORSANCO - 2006

ORSANCO Sampling Program

- ◆ Samples collected twice monthly from 10 drinking water utilities
- ◆ Algae identified to genus level (114 genera) and Chlorophyll *a*
- ◆ Nutrient Analysis includes Ammonia-N, TKN, Nitrate/Nitrite-N, and TP
- ◆ Physical parameters include pH, turbidity and Temperature

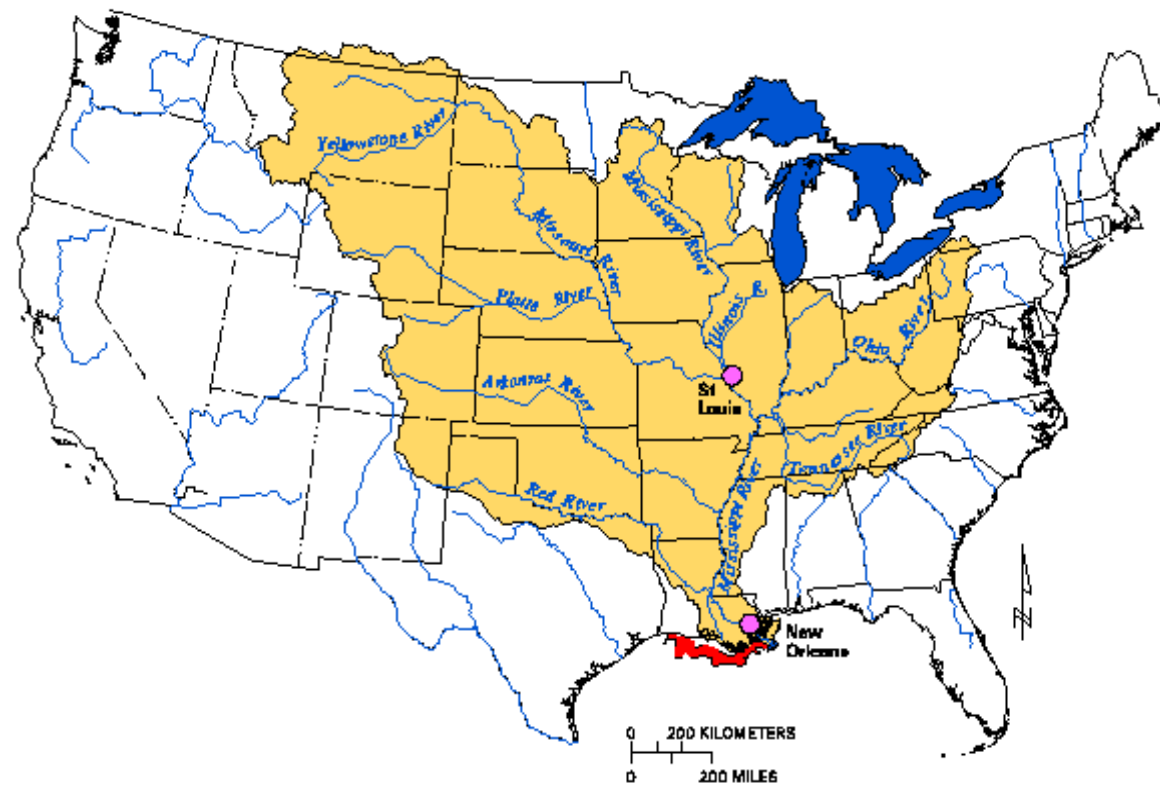
Data Analysis

- ◆ Chlorophyll *a* concentrations have a seasonally negative relationship with nutrients
- ◆ Nutrient/Chlorophyll *a* relationship appears masked by flow
- ◆ Literature review suggests light (regulated by flow) is controlling factor

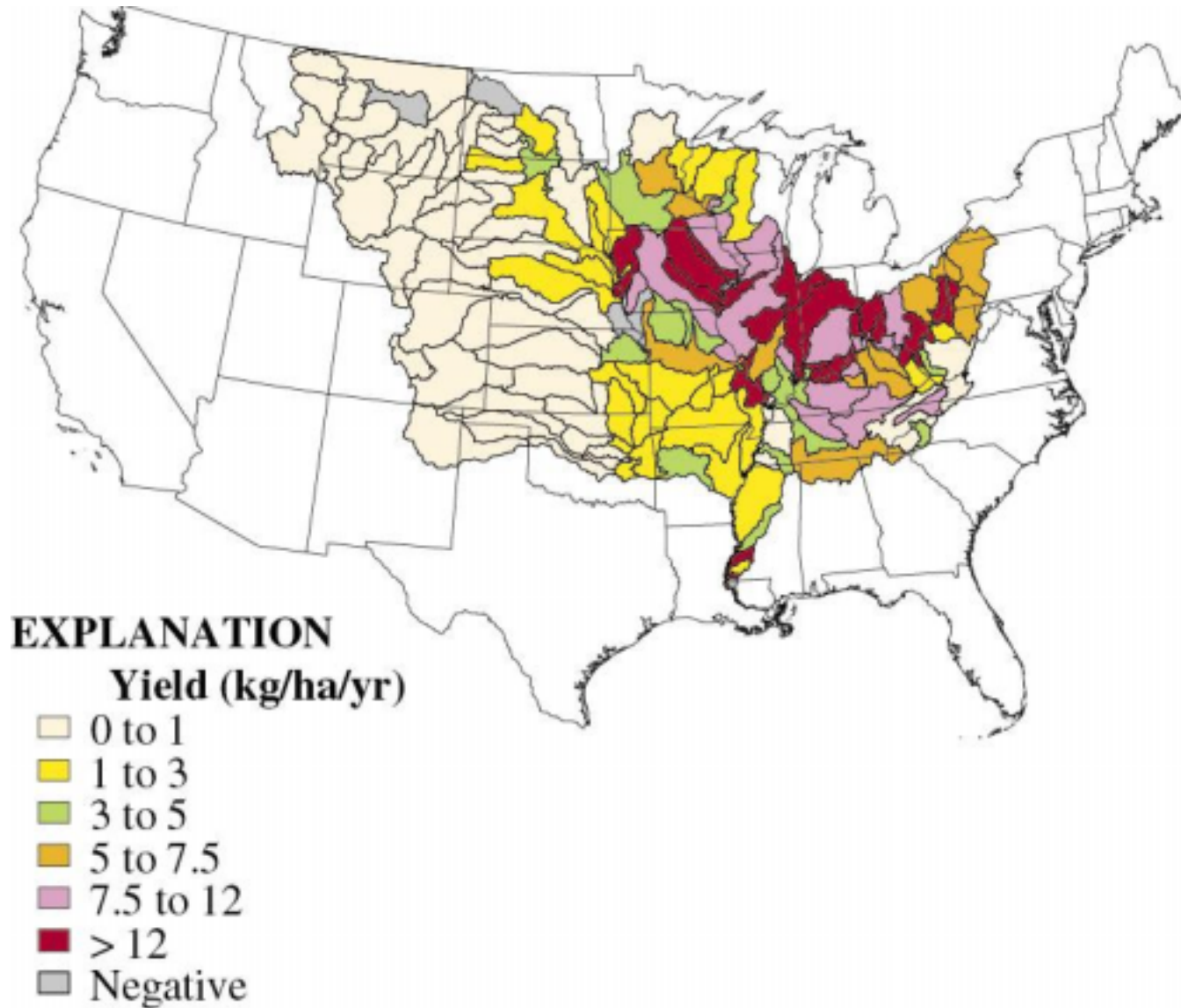
Conclusion

- ◆ Criteria development in 2006 is highly unlikely.
- ◆ No comparable data collection is underway on the Mississippi River; numerical criteria unlikely in the near future.

MISSISSIPPI - ATCHAFALAYA RIVER BASIN



Total N Yield Delivered to the Gulf



Alexander et al. 2000, *Nature*, v. 403

Action Plan Goals for the Gulf and the Basin:

- ◆ Coastal Goal: By 2015, reduce the average zone to $< 5,000 \text{ Km}^2$
- ◆ Within Basin Goal: To restore and protect the waters of the 31 States and 77 Tribes in the Basin
- ◆ Quality of Life Goal: Improve the communities and economic conditions across the Mississippi Basin

Plan lists 11 Actions

- #1 December, 2000, integrated budget proposal for additional funds
- #2 Summer, 2001, **establish Sub-basin Committees**
- #3 Fall, 2001, develop a Hypoxia Research Strategy
- #4 Spring, 2002, expand the long-term monitoring for the zone
- #5 Spring, 2002, expand the monitoring within the Basin

11 Actions (Continued)

#6 Fall, 2002, **develop strategies for nutrient reduction for each sub-basin**

#7 December, 2002, Corps of Engineers (COE) study of nutrient reduction from COE projects or operations

#8 January, 2003, **reduce loadings from point sources**

11 Actions (Continued)

- #9 Spring 2003, increase assistance to landowners for voluntary actions to restore or create wetlands and forested buffers
- #10 **Spring 2003, increase assistance to agricultural producers/ businesses for implementation of best management practices**
- #11 December 2005 and every five years thereafter, the Task Force will assess results

Proposed Sub-Basin Committees

- ◆ Lower Mississippi River
- ◆ Upper Mississippi River
- ◆ Arkansas & Red Rivers
- ◆ Missouri River
- ◆ Ohio River

Estimated peak season total nitrogen loads on selected tributaries (lbs/day/sq.mi.)



Tributary Nutrient Loads

(lbs/ sq mi)

River	Drain. Area	% Ag Use	Ttl N Load	Ttl P Load
Scioto	6510	63	25.8	1.5
Licking	3670	45	12.4	0.5
Gt Miami	5400	71	43.6	3.0
Green	9230	56	19.2	2.0
Wabash	33,100	73	49.2	4.0
Cumber.	17,920	37	18.0	0.7
Tenn.	40,910	36	9.9	0.6

Current Status of Action Plan

- ◆ Implementation of Actions is several years behind schedule.
- ◆ Reassessment of the Plan and its supporting science is currently underway.
- ◆ Reassessment is scheduled to be completed in 2007.

Conclusions

- ◆ No single driver for nutrient reduction is anticipated in the near future.
- ◆ The Miami Conservancy District program is very important to the overall nutrient reduction effort for the Ohio River Basin.