Wetland Values and the Environmental State

THE WETLANDS INITIATIVE

The simple logic of environmental management:

- The state of our environment is a matter of land use
- Land use is a matter of economics
- Therefore, economics control the environment

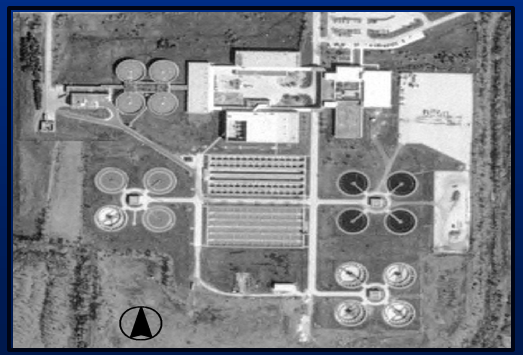
What are the aquatic environmental problems?

- Flood damage
- Degraded water quality
- Reduced wildlife
- Limited biodiversity

Wetlands are a solution!

Pre-settlement: Wetlands

Settlement: Drainage



Today: Concrete and Steel

Of the nitrogen loads reaching the Gulf of Mexico, the Illinois River contributes more than its fare share.

- The Illinois River contributes 3% of the flow but 12% (126,000 tons) of the total yearly NO_3-N load
- To reach pre-1970's NO_3-N loads to the Gulf of Mexico (350,000 tons/year) requires a load reduction of 700,000 tons/year in the Mississippi River and 100,000 tons/year in the Illinois River
- For the Illinois River, the solution requires 10 percent of drained wetlands to be restored, which would occupy 32 percent of the FEMA floodplain

	Acres	% Watershed
Wetlands required	407,000	2.0
Wetlands drained	4,170,000	20.0
FEMA Floodplain	1,280,000	6.3

Financing Restoration

Water Quality/Nutrient Trading

Nutrient Farming

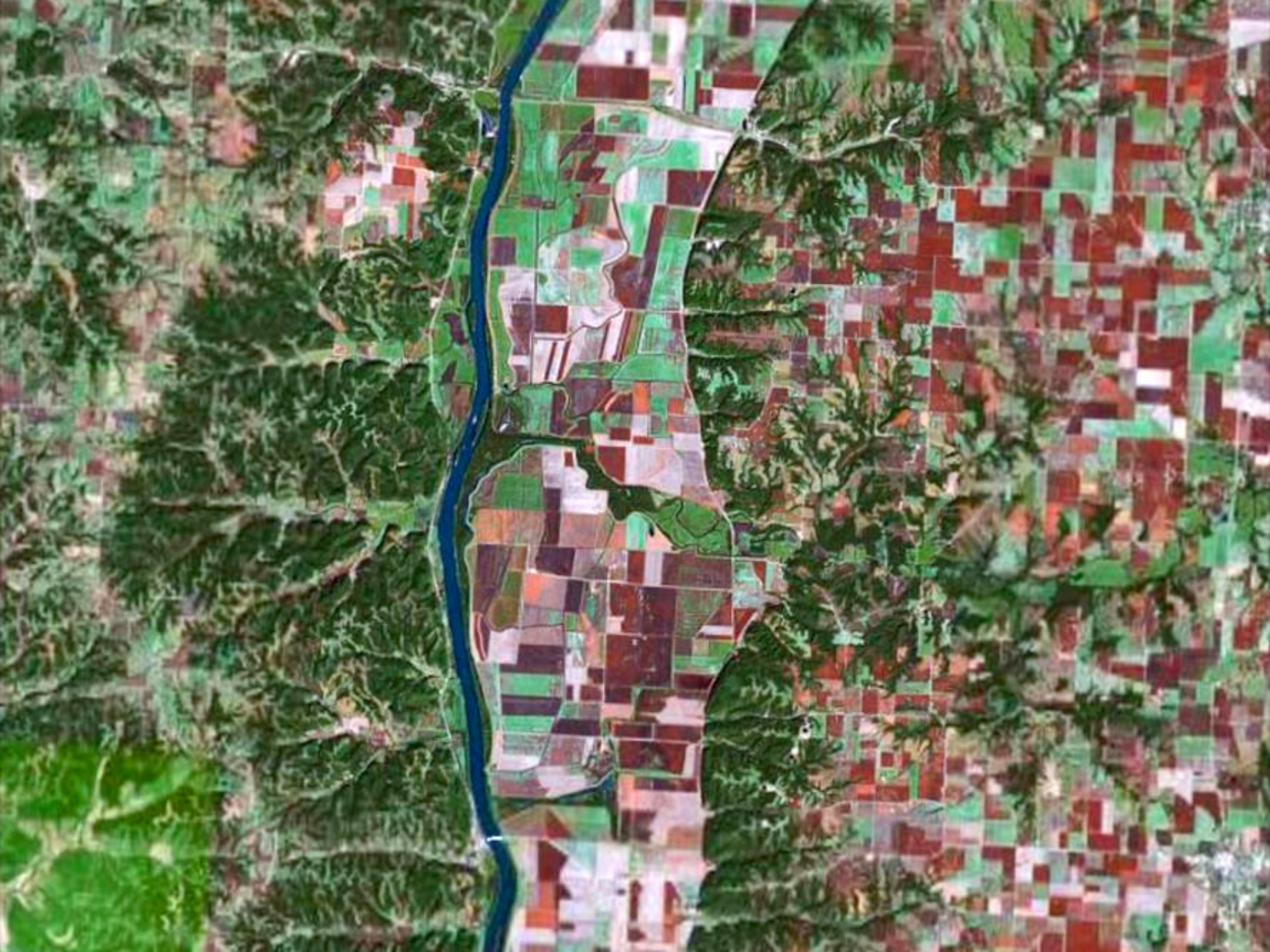
- Cost Comparison
- Market Structure

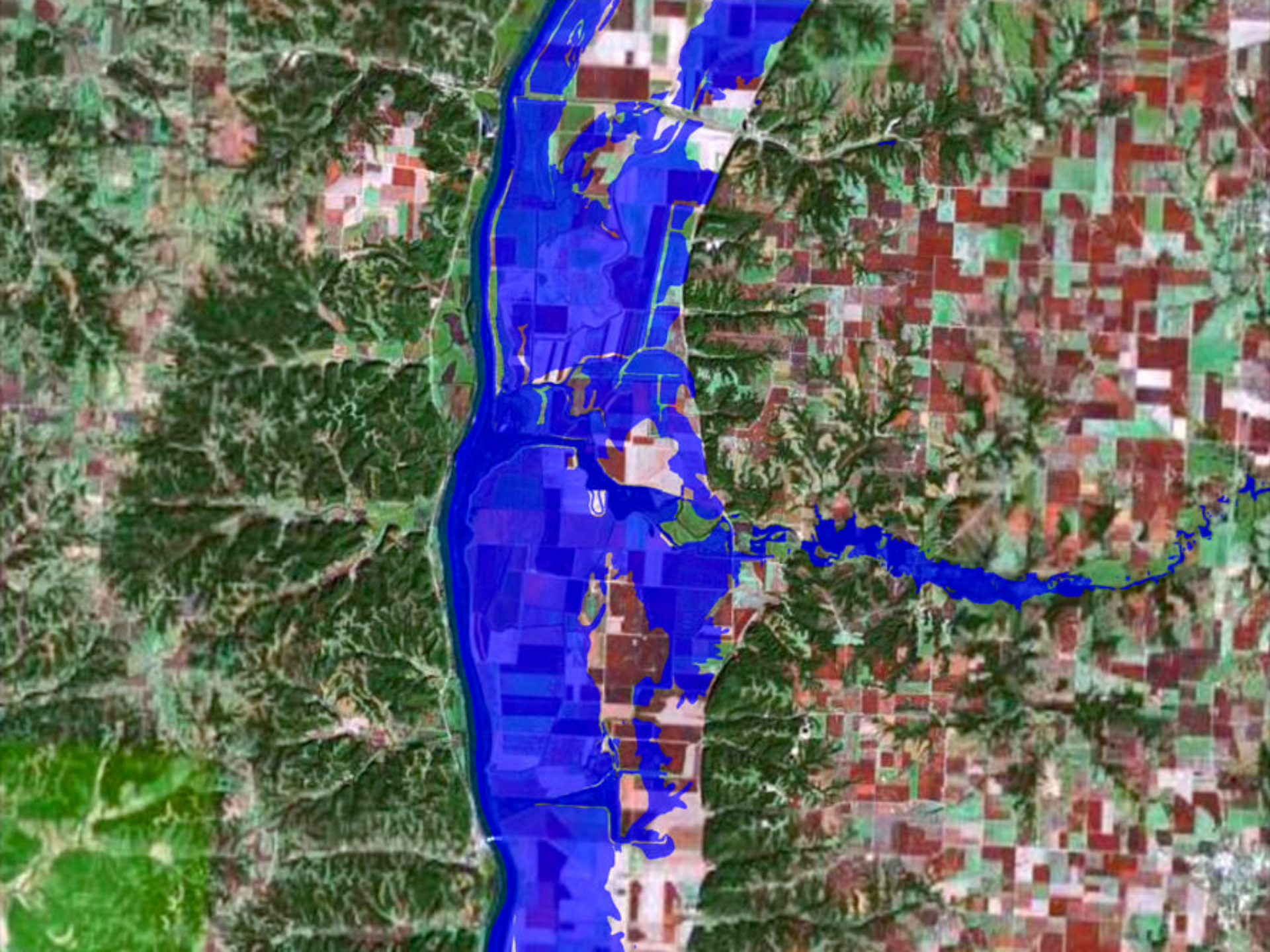
Nutrient Farming

A strategy that:

- utilizes created and restored wetlands to naturally remove nitrogen and phosphorous from surface waters and CO_2 from the air

- is a business enterprise based on the sale of nutrient reduction credits





“Credits” will be sold to dischargers who need to meet water quality standards.

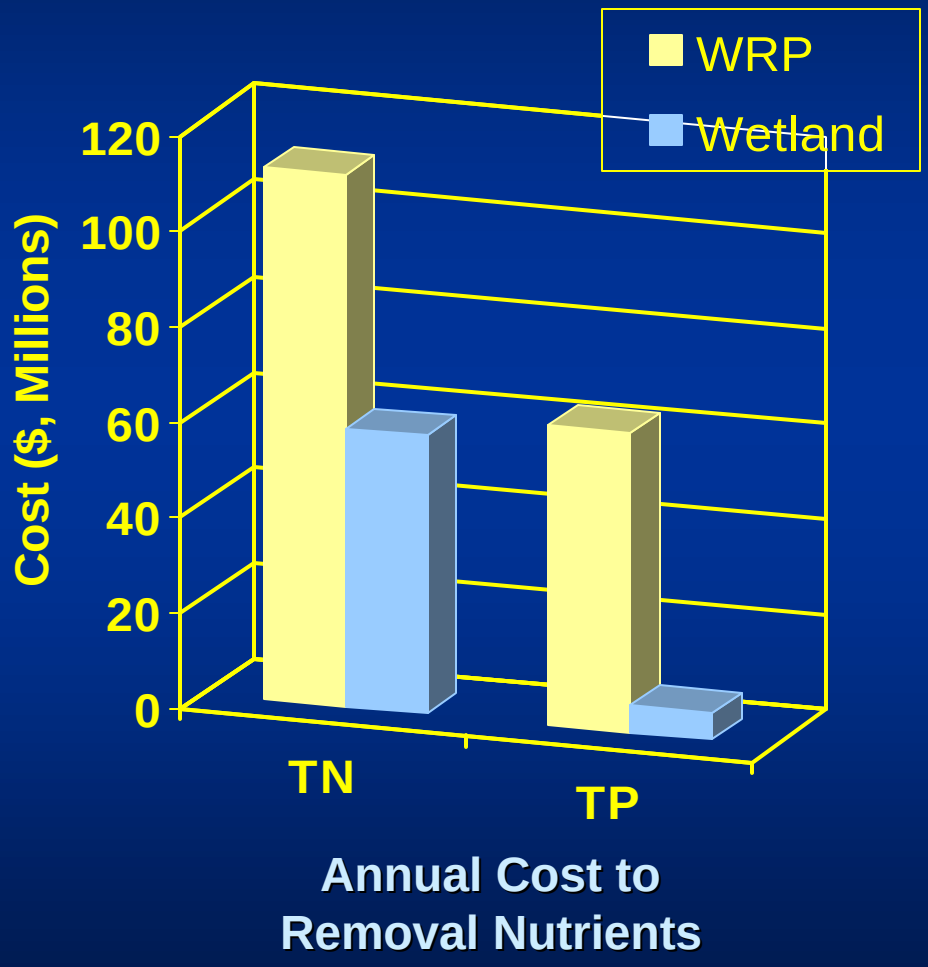
Comparison of Treatment Systems

WERF economic analysis:

- Upgrades at 7 Chicago WRPs
- TN and TP removal based on future effluent limits

Wetland Nutrient Farms

- $110,000,000 savings/year
- 189,000 acres of land required



http://www.wetlands-initiative.org/images/03WSM6COweb.pdf

WERF Economic Comparison

Effluent Limit (mg/L)	Wetland Size (acres)	Total Nitrogen		
		Savings*	50% split of savings	Net Profit/acre
3.0 TN, 1.0 TP	189,000	74,000,000	37,000,000	196
2.18 TN, 0.5 TP	322,000	76,000,000	38,000,000	118

Effluent Limit (mg/L)	Wetland Size (acres)	Total Phosphorous		
		Savings*	50% split of savings	Net Profit/acre
3.0 TN, 1.0 TP	189,000	59,400,000	29,700,000	157
2.18 TN, 0.5 TP	322,000	88,400,000	44,200,000	137

Total annual MWRDGC cost savings: $66,700,000-$82,200,000

Total annual Nutrient Farmer net profit: $255-$353/acre

* includes sale of extra credits

Kinship Market Analyses

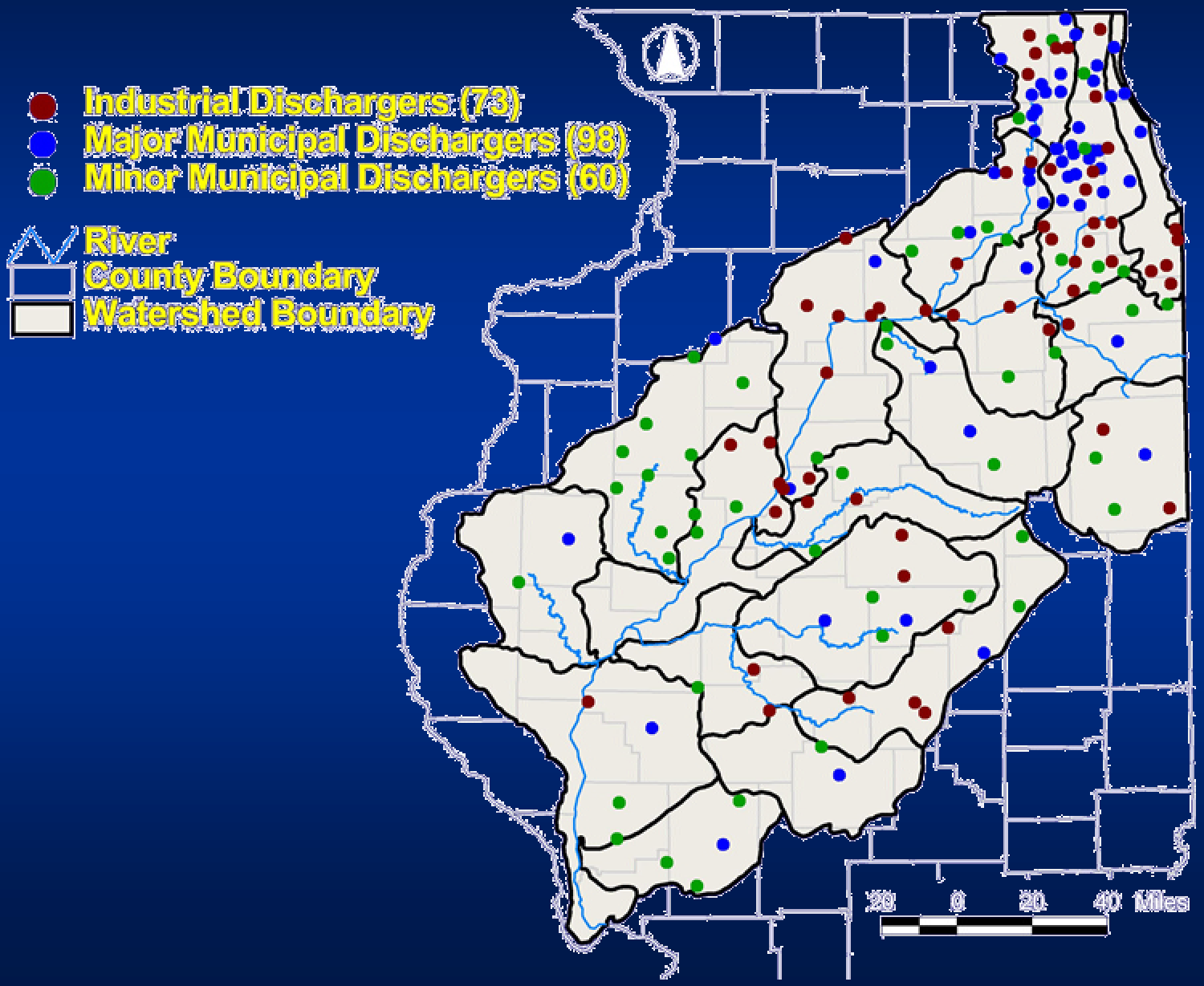
MARKET STRUCTURE:

- Removal of TN load from the Illinois River Watersheds
- Competitive market structure
- Linear programming model
  - Minimize cost for wetland TN removal
  - Optimize allocation of credits among watersheds

MARKET COMPONENTS:

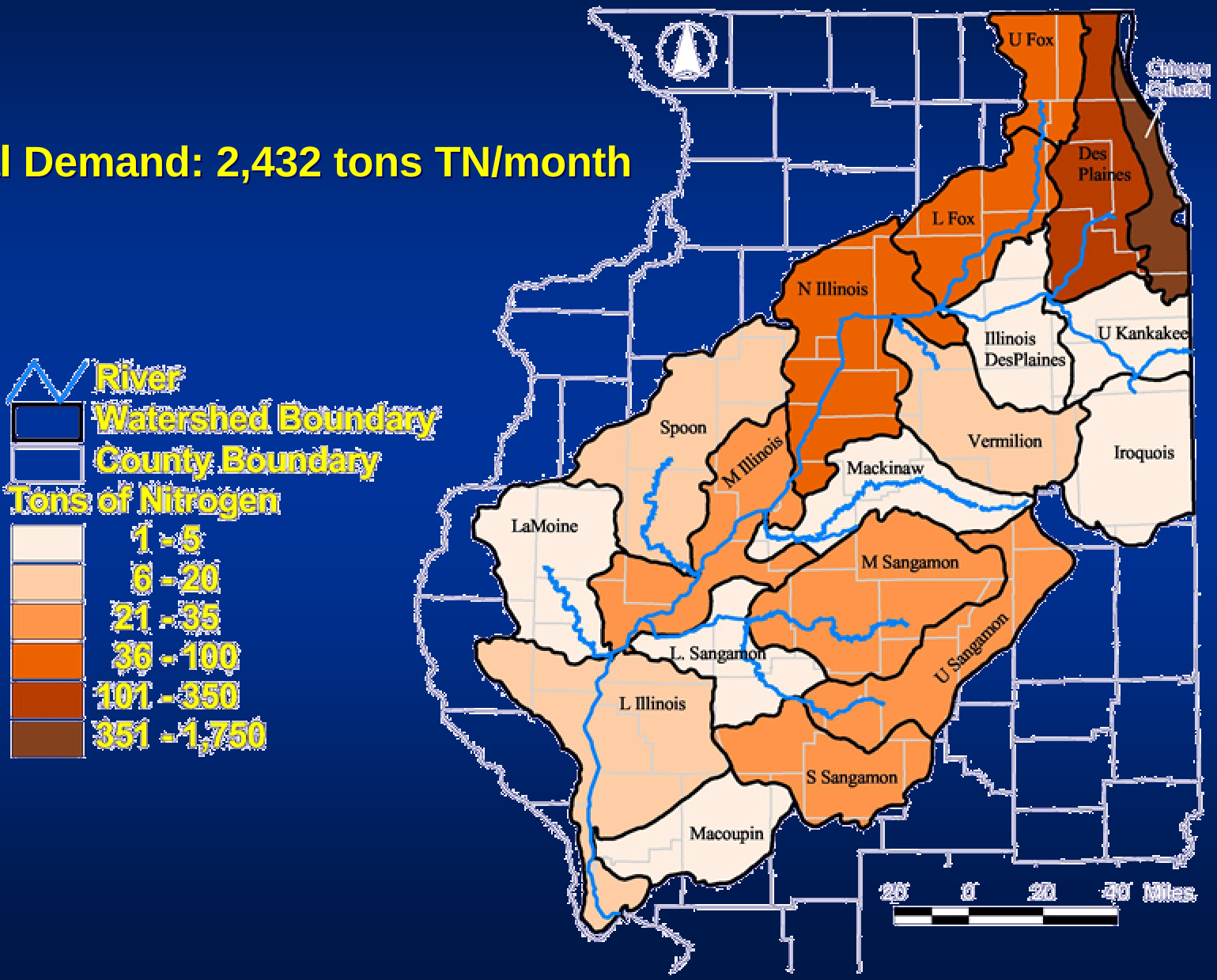
- Demand
- Supply
- Marginal Cost/Total Cost

TN Credit Demand



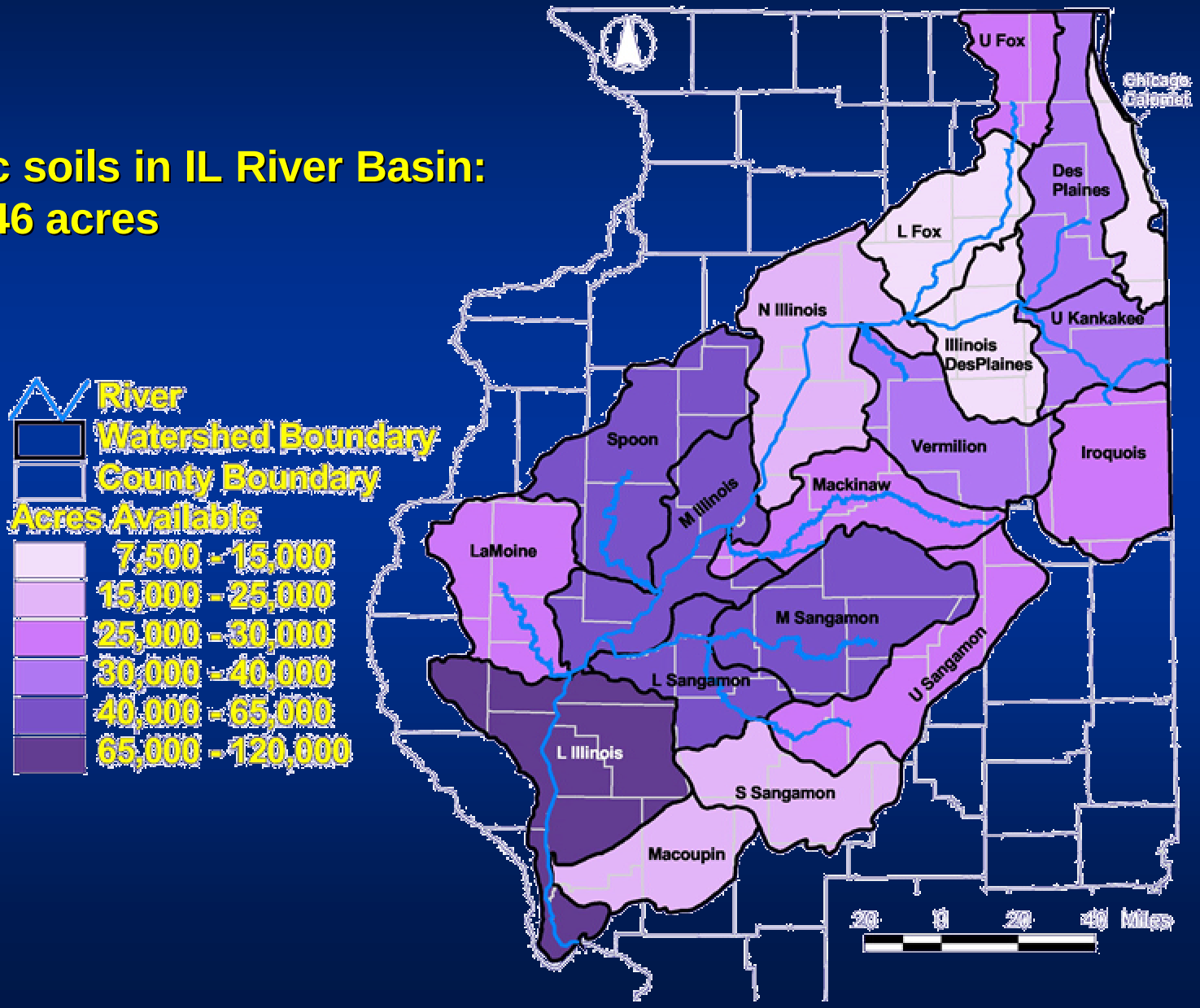
TN Credit Demand

Total Demand: 2,432 tons TN/month



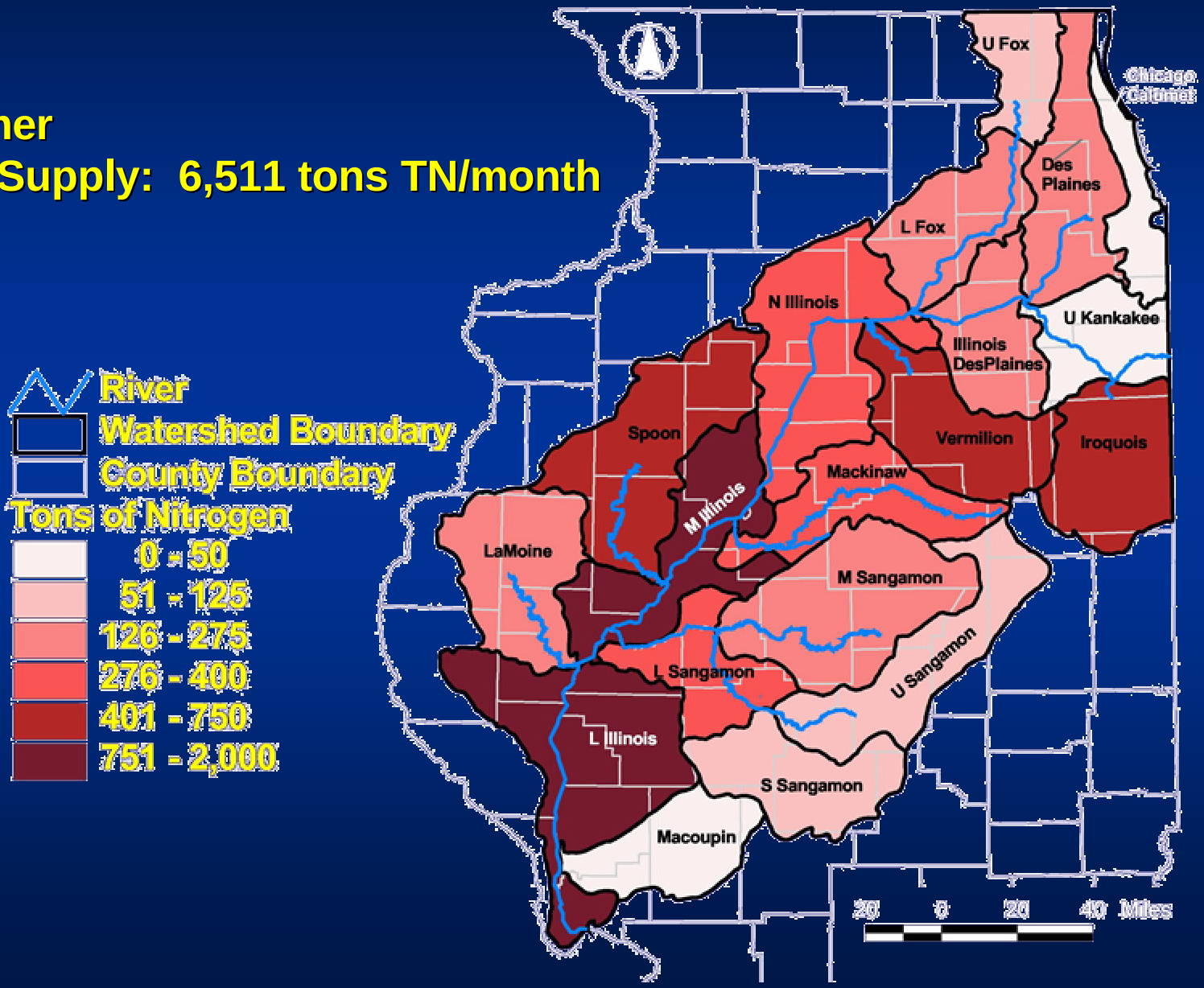
TN Credit Supply: Land

Hydric soils in IL River Basin:
655,146 acres



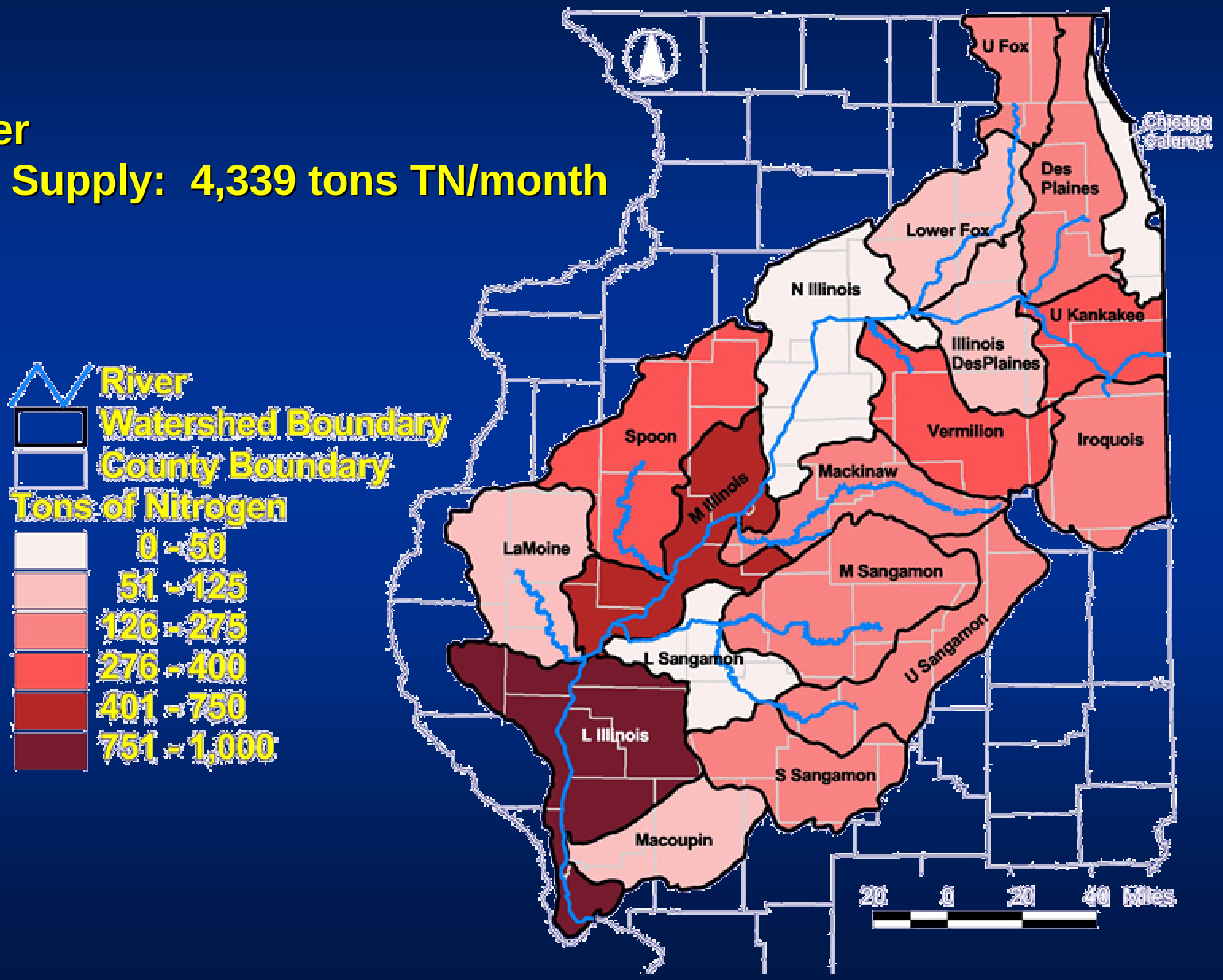
TN Credit Supply: Load

Summer
Total Supply: 6,511 tons TN/month



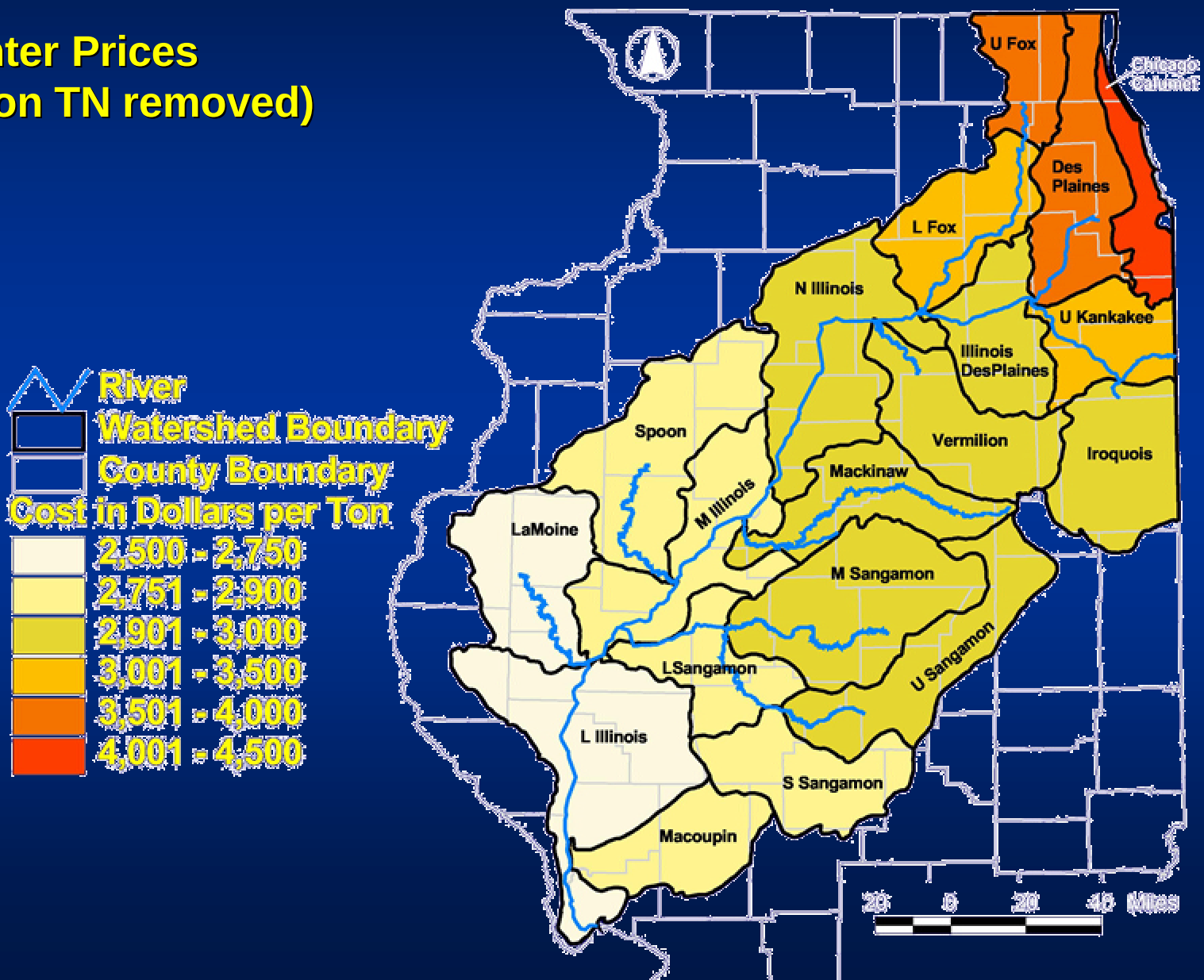
TN Credit Supply: Load

Winter
Total Supply: 4,339 tons TN/month



TN Credit Cost

Winter Prices
($/ton TN removed)

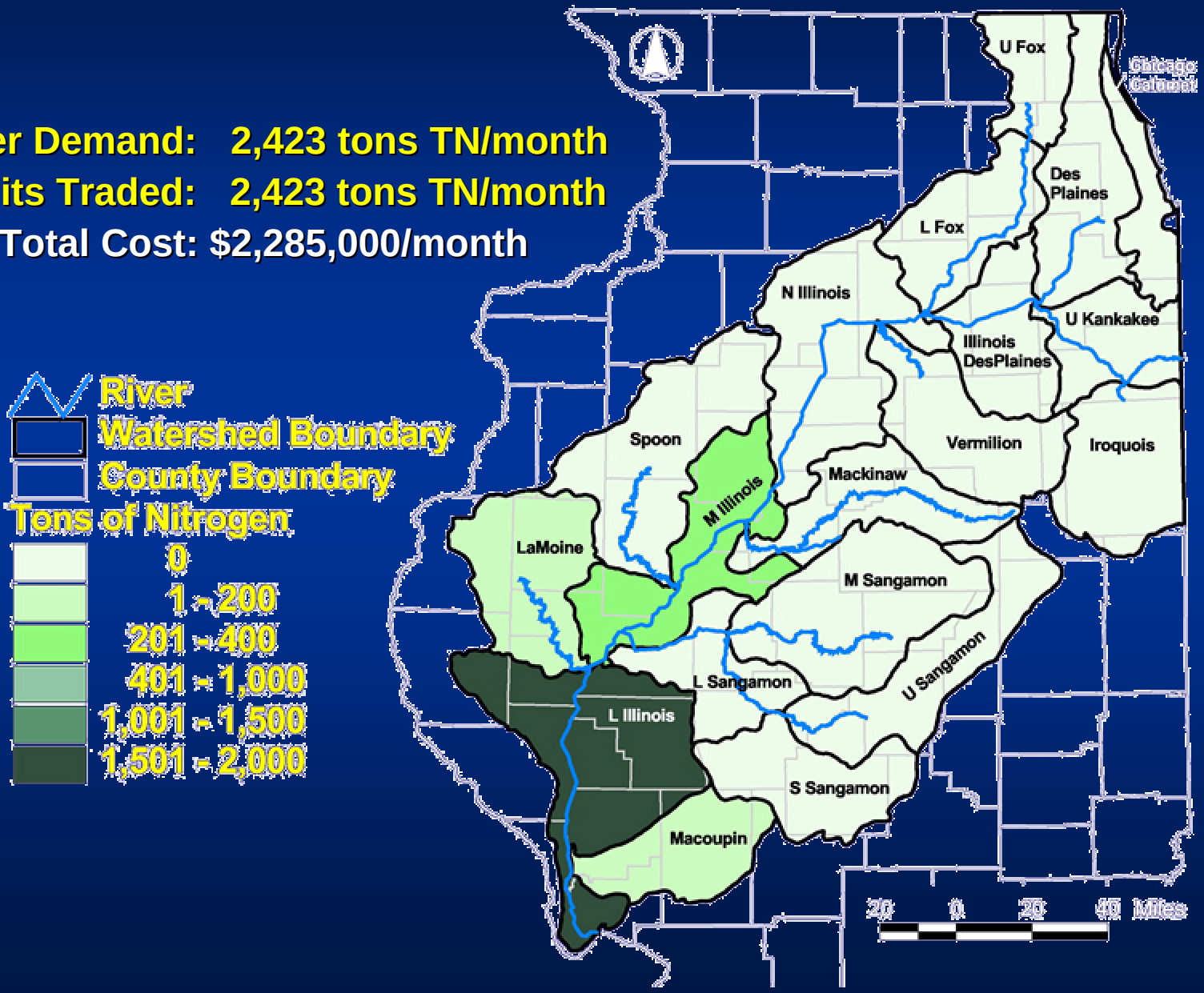


Trade Scenario: No Restriction

Summer Demand: 2,423 tons TN/month

Credits Traded: 2,423 tons TN/month

Total Cost: $2,285,000/month

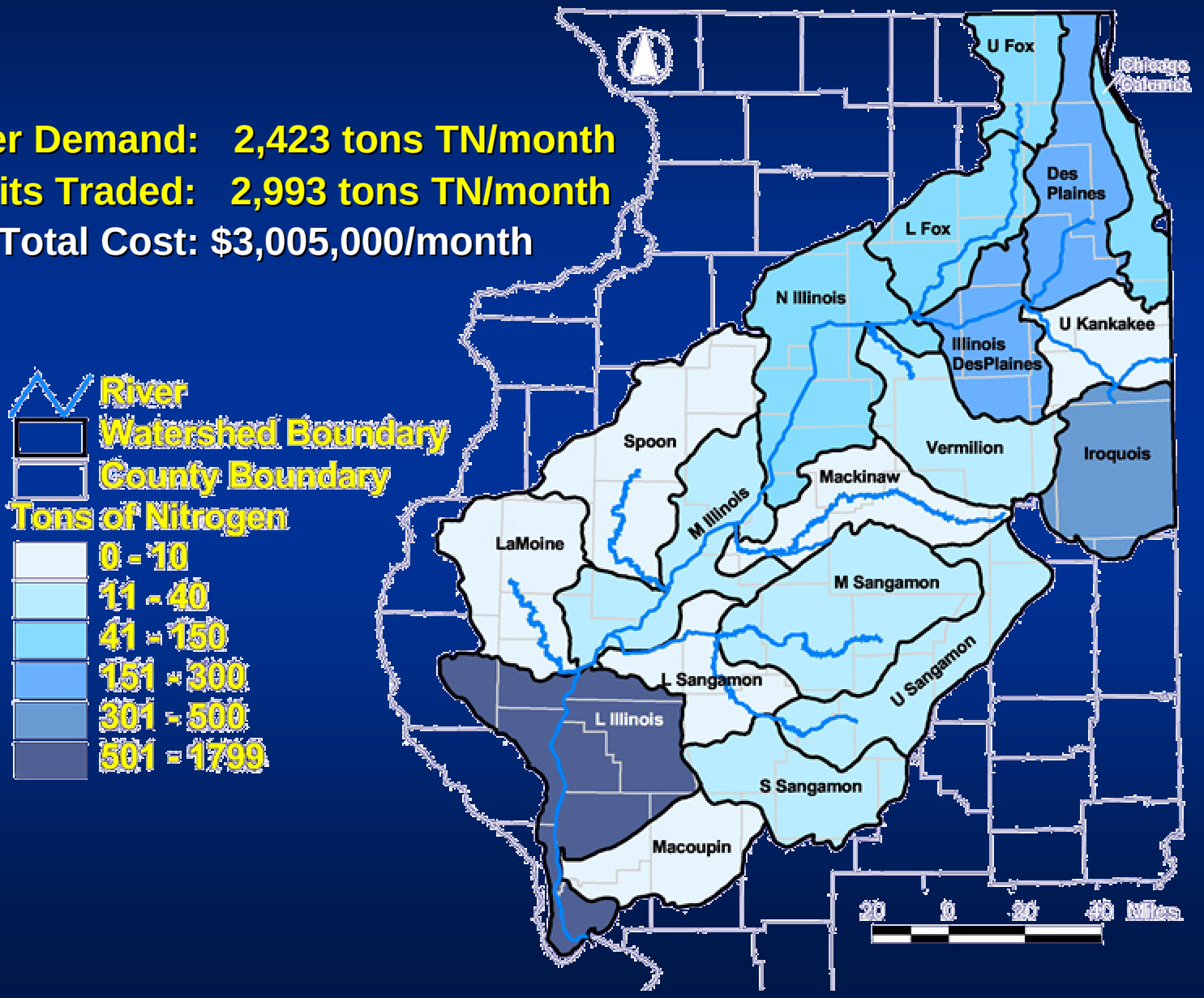


Trade Scenario: 10% Accrued

Summer Demand: 2,423 tons TN/month

Credits Traded: 2,993 tons TN/month

Total Cost: $3,005,000/month



Trade Scenario Comparison

Parameter	Unrestricted	Restricted Intra-watershed	Accrued 10% Penalty
Max. Land (acres)	298,770	298,770	365,110
Credit Price ($/ton TN)	$2,405	$3,424	$3,394
Annual Costs	$63,260,000	$66,190,000	$83,290,000
Annual Profits	$6,670,000	$33,380,000	$38,170,000
Rate of Return (%) (avg. watershed)	8%	48%	50%

- Self-sustaining method of reducing N&P loads
- Point and non-point nutrient control
- Income and profit generation
- Efficient and fare

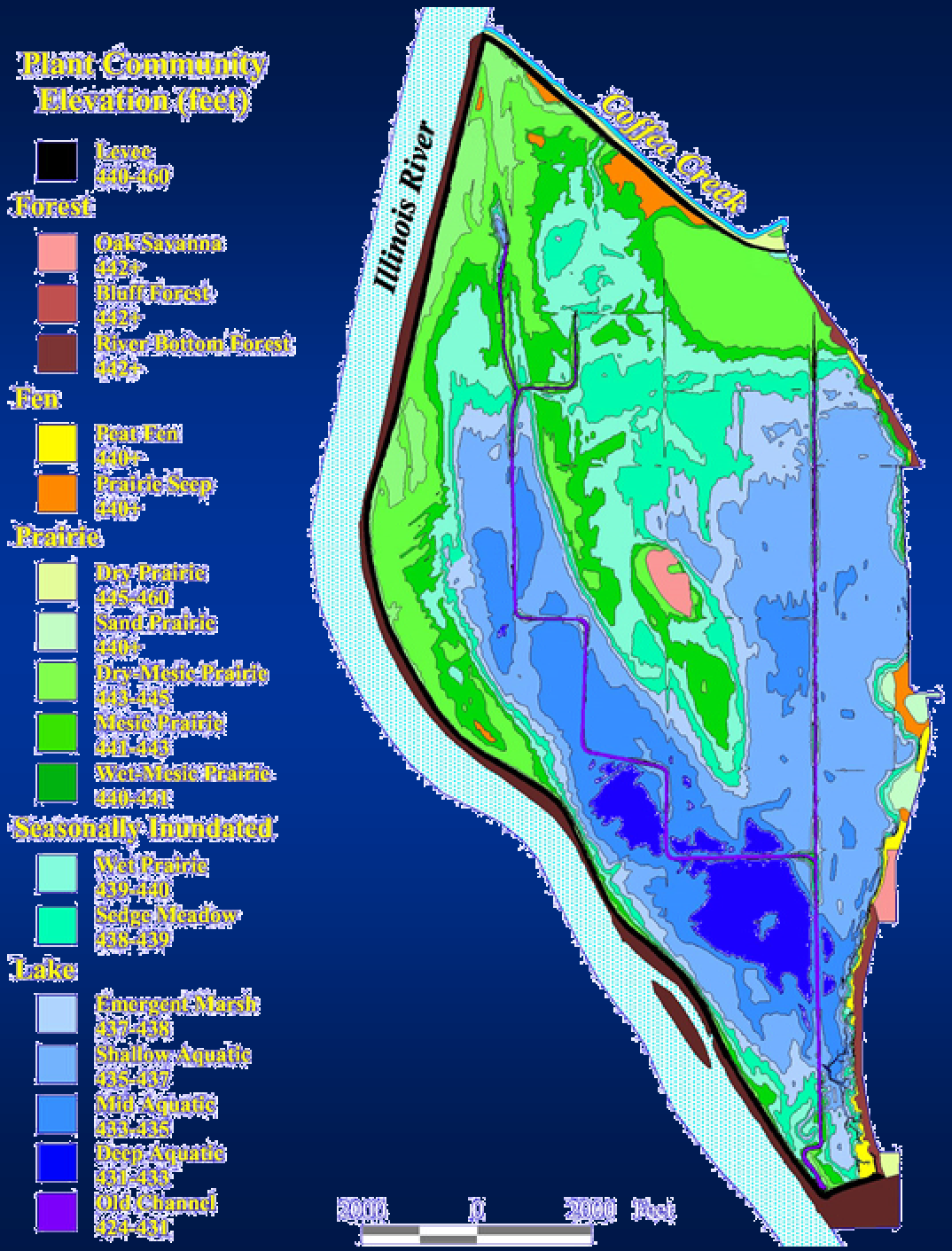
OTHER REASONS FOR NUTRIENT FARMING:

- flood storage
- sediment control
- biodiversity
- wildlife habitat
- recreational opportunities
- aesthetics

Hennepin & Hopper Lakes Restoration Project begun 2001

Hennepin & Hopper Lakes Restoration Project

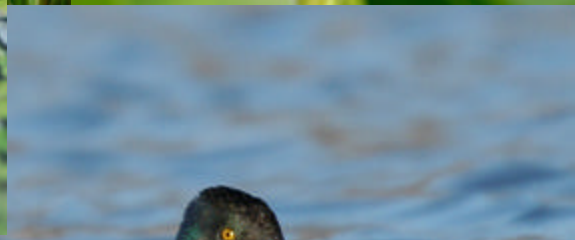
Target Plant Communities

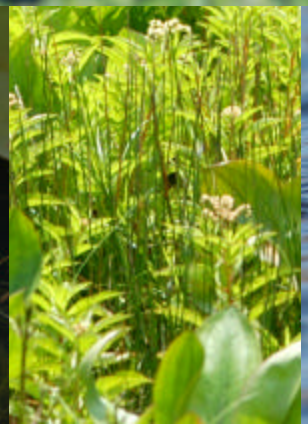


Hennepin & Hopper Lakes Restoration Project 2004







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