Nutrient Efforts in Missouri

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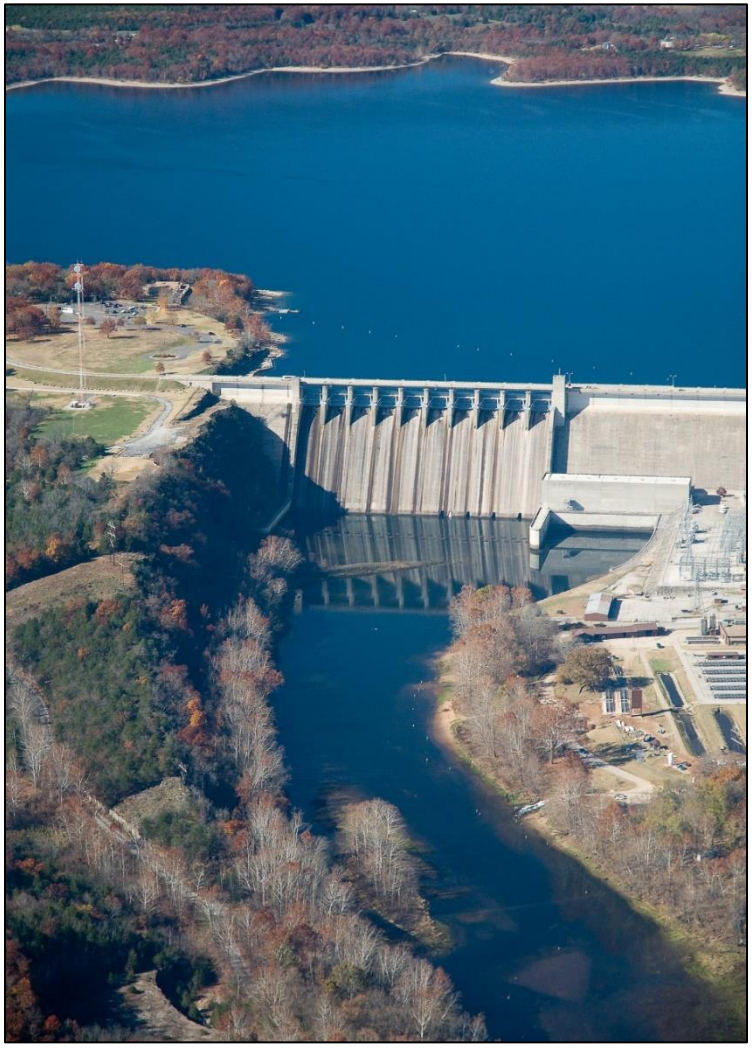
ACWA Nutrients Permitting Workshop May 2023

Nutrient Efforts in Missouri

- Total Phosphorus in Table Rock Lake and Lake Taneycomo
- Lake Numeric Nutrient Criteria
- James River Watershed Permit – Total Nitrogen
- Nutrient trading
- Other efforts

Table Rock Lake and Lake Taneycomo



- Total phosphorus effluent limit of 0.5 mg/L or monitoring required in the Table Rock Lake and Lake Taneycomo watersheds
  - ❖ 10 CSR 20-7.015(3)(E),(F), and (G)
  - ❖ Established in 1999/2000
  - ❖ Currently impacts approximately 180 domestic wastewater facilities

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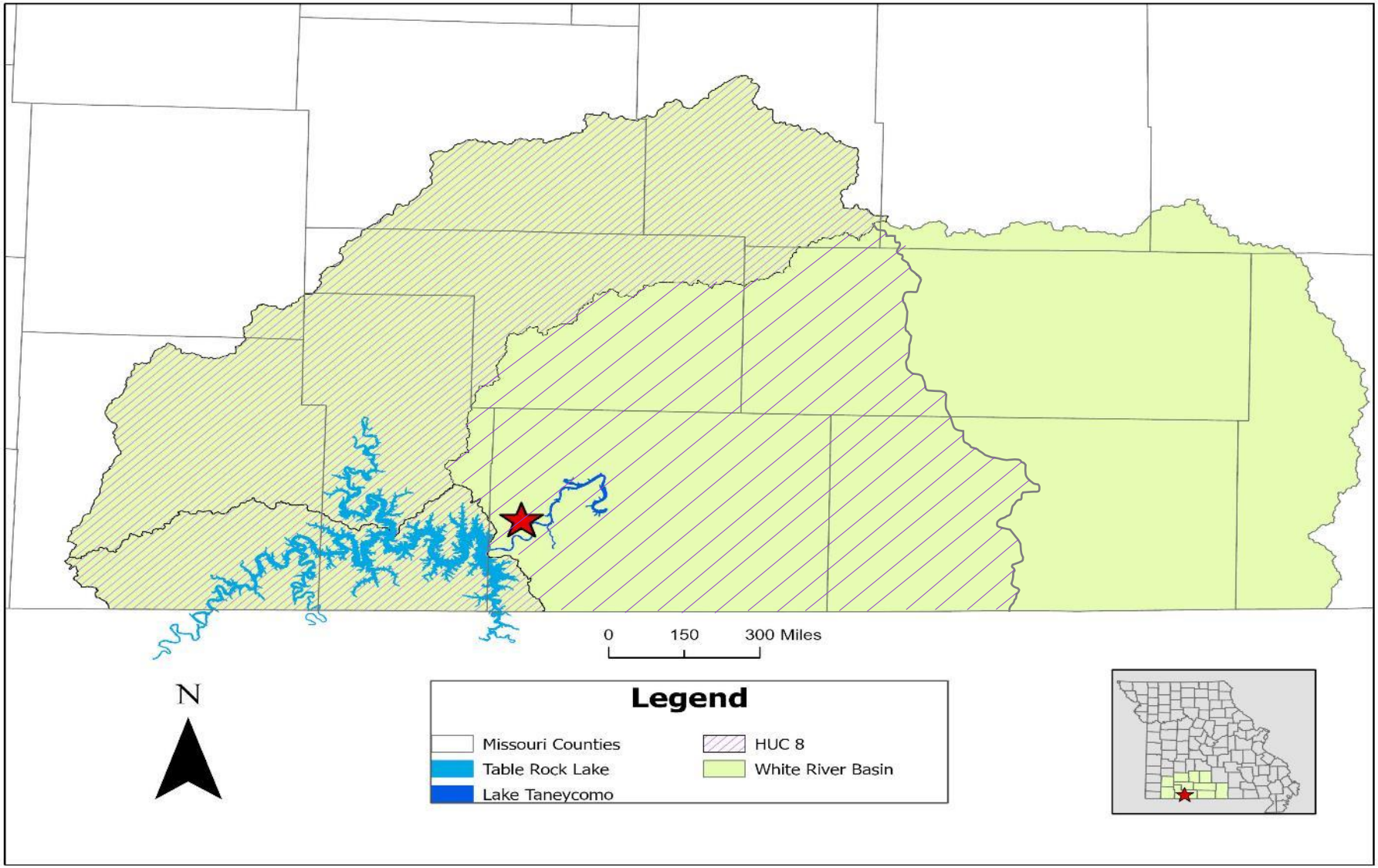

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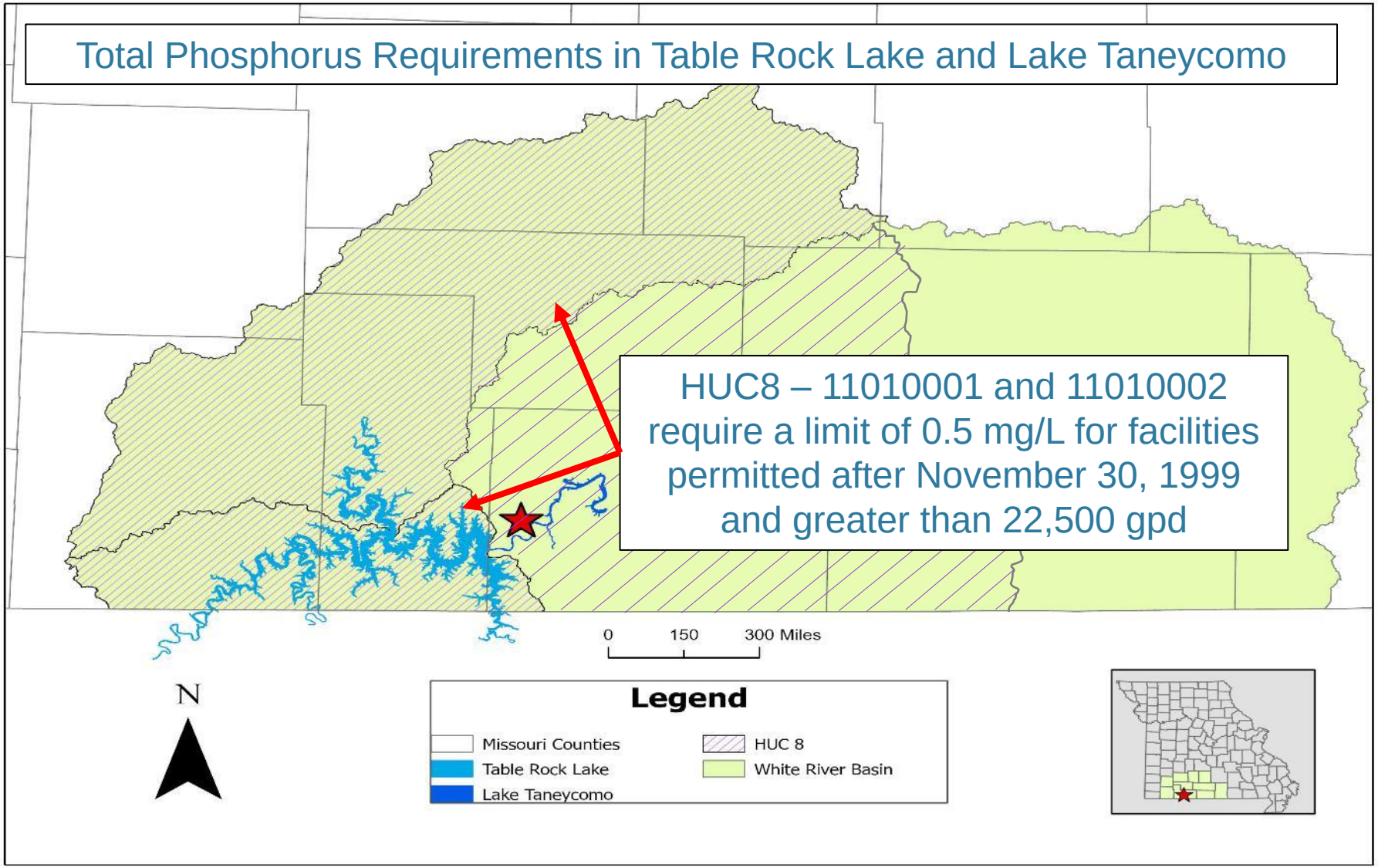
Total Phosphorus Requirements in Table Rock Lake and Lake Taneycomo



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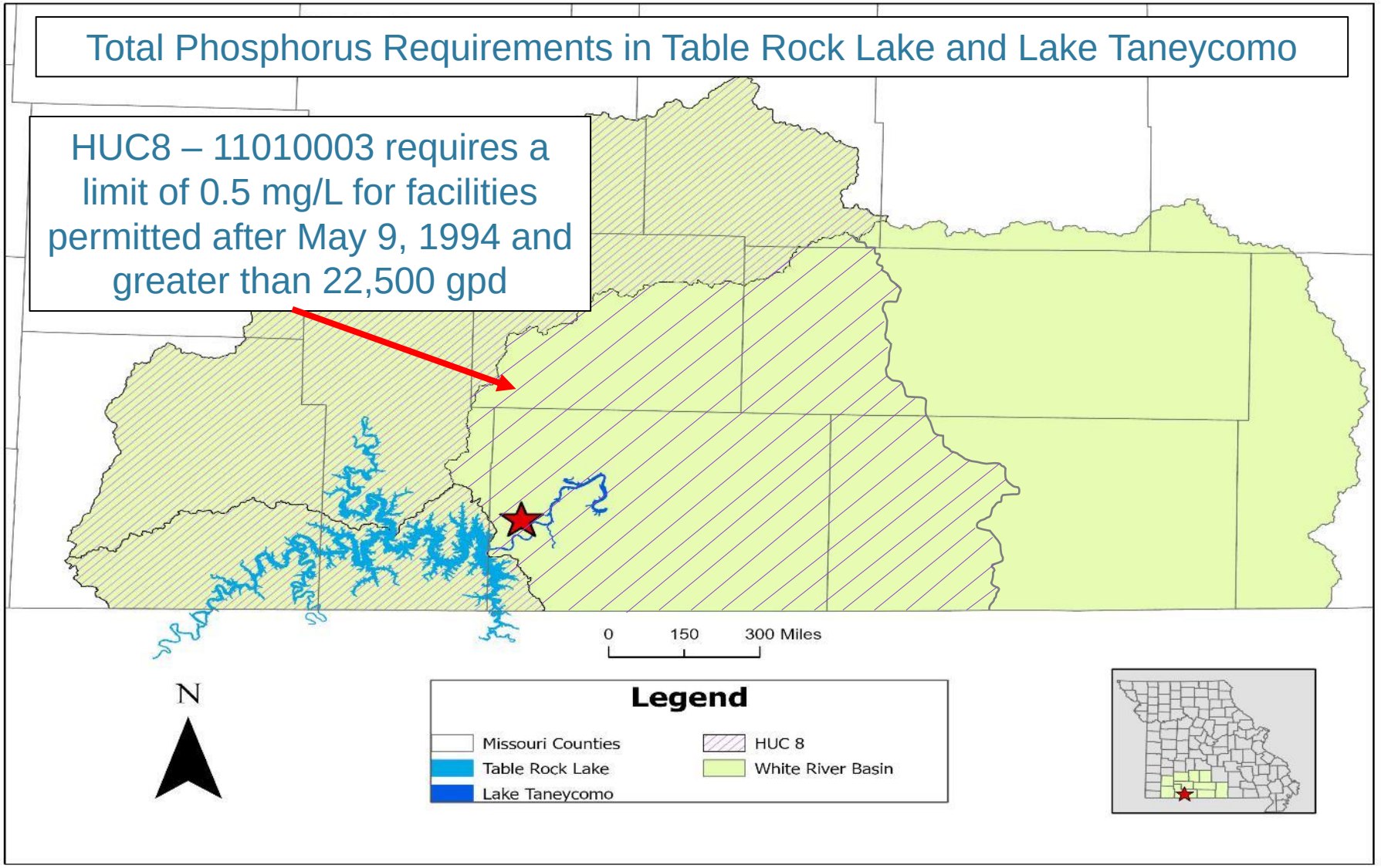
Total Phosphorus Requirements in Table Rock Lake and Lake Taneycomo

HUC8 – 11010003 requires a limit of 0.5 mg/L for facilities permitted after May 9, 1994 and greater than 22,500 gpd



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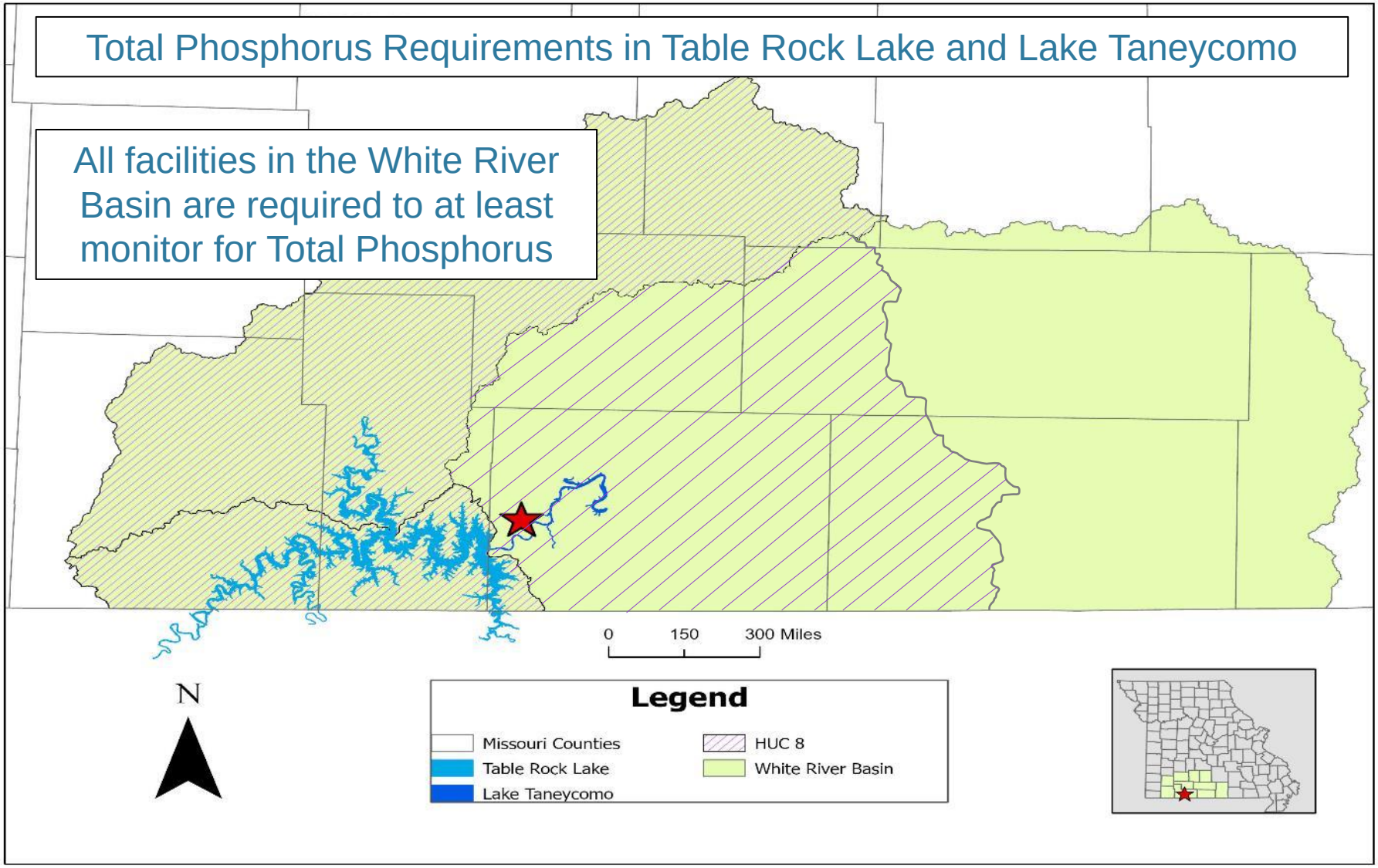
Total Phosphorus Requirements in Table Rock Lake and Lake Taneycomo

All facilities in the White River Basin are required to at least monitor for Total Phosphorus



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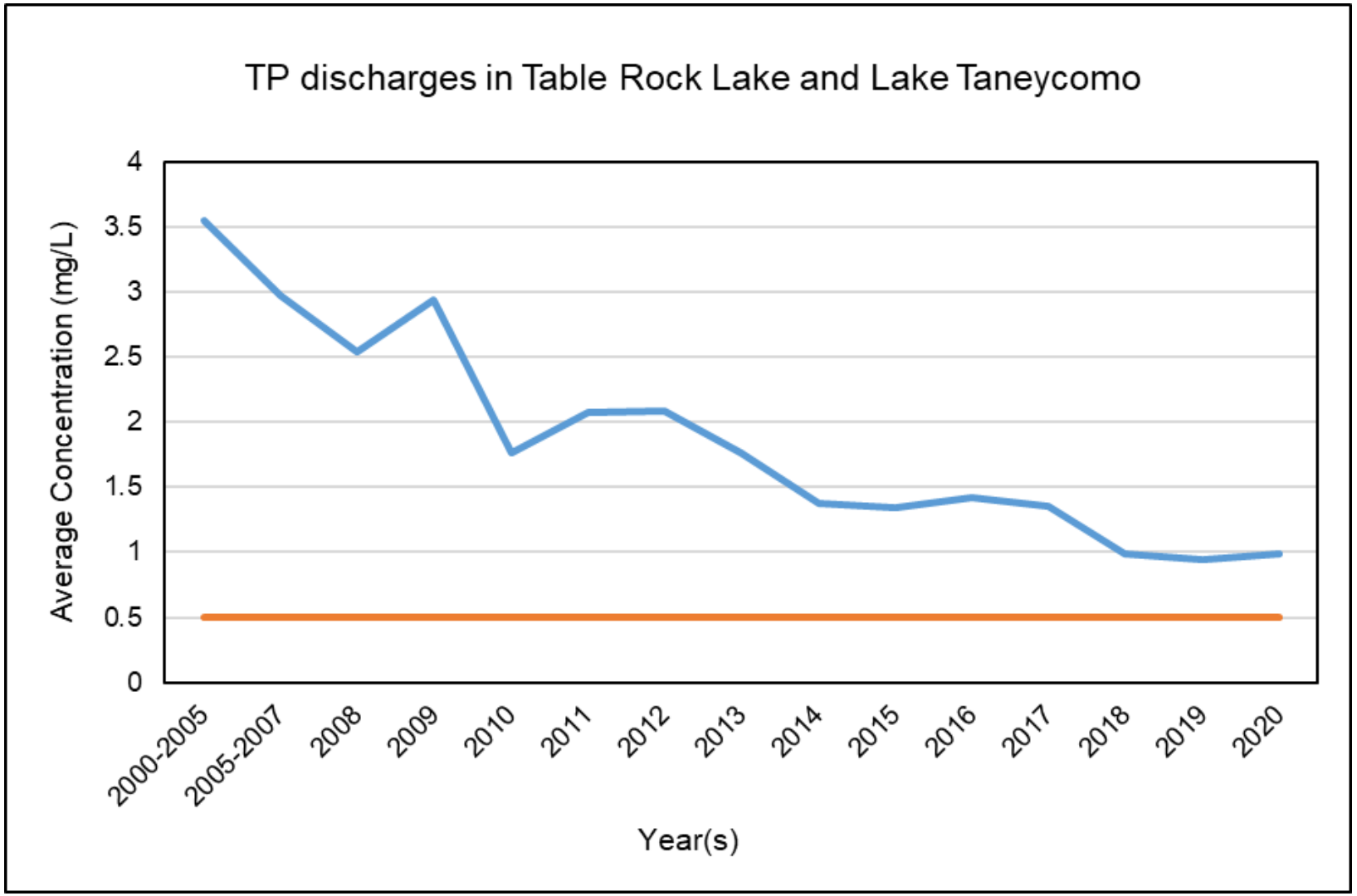

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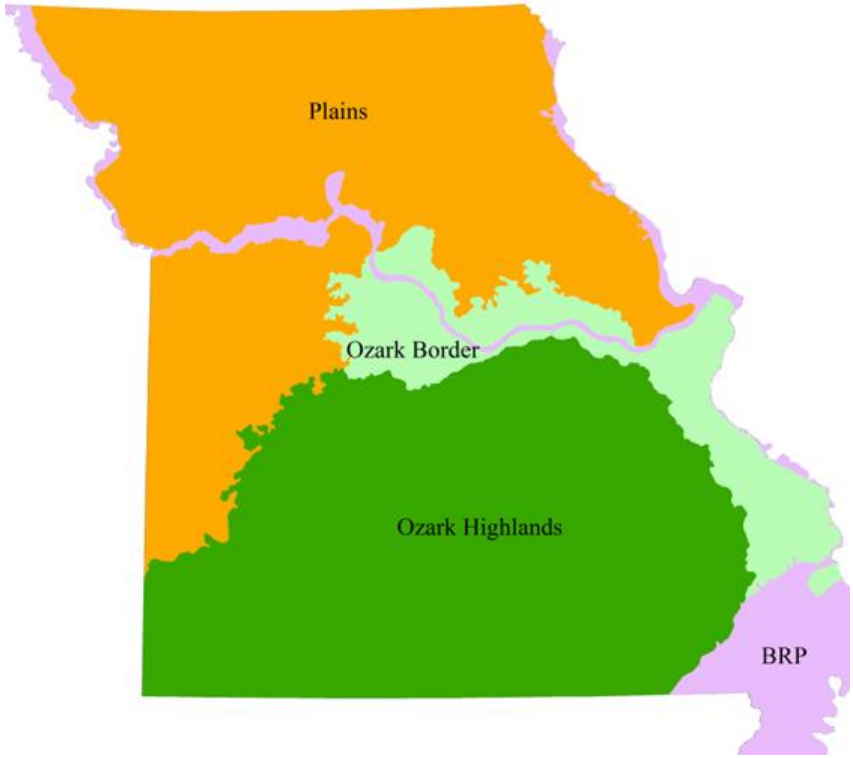
Lake Numeric Nutrient Criteria

- 2011 – EPA approved site-specific criteria for TP, TN, and Chl-a in 25 lakes; disapproved proposed statewide lake NNC
- 2019 – EPA approved MoDNR's statewide proposed lake NNC for Chl-a, with screening thresholds for TP, TN, and Chl-a
- 2019 – Missouri Coalition for the Environment v. EPA
- 2021 – 8th Circuit court ruled in favor of EPA, upholding MO's lake NNC

Table N: Site-Specific Nutrient Criteria

Lake Ecoregion	Lake	County	Site-Specific Criteria (µg/L)		
			TP	TN	Chl-a
Plains	Bowling Green Lake	Pike	21	502	6.5
	Bowling Green Lake (old)	Pike	31	506	5.0
	Forest Lake	Adair	21	412	4.3
	Fox Valley Lake	Clark	17	581	6.3
	Hazel Creek Lake	Adair	27	616	6.9
	Lincoln Lake – Cuivre River State Park	Lincoln	16	413	4.3
	Marie, Lake	Mercer	14	444	3.6
	Nehai Tonkaia Lake	Chariton	15	418	2.7
	Viking, Lake	Daviess	25	509	7.8
	Waukomis Lake	Platte	25	553	11.0
	Weatherby Lake	Platte	16	363	5.1
Ozark Border	Goose Creek Lake	St Francois	12	383	3.2
	Wauwanoka, Lake	Jefferson	12	384	6.1
Ozark Highland	Clearwater Lake	Wayne-Reynolds	13	220	2.6
	Council Bluff Lake	Iron	7	229	2.1
	Crane Lake	Iron	9	240	2.6
	Fourche Lake	Ripley	9	236	2.1
	Loggers Lake	Shannon	9	200	2.6
	Lower Taum Sauk Lake	Reynolds	9	203	2.6
	Noblett Lake	Douglas	9	211	2.0
	St. Joe State Park Lakes	St Francois	9	253	2.0
	Sunnen Lake	Washington	9	274	2.6
	Table Rock Lake	Stone	9	253	2.6
	Terre du Lac Lakes	St Francois	9	284	1.7
	Timberline Lakes	St Francois	8	276	1.5

Lake Ecoregion	Chl-a Criteria (Response Impairment Thresholds)	Nutrient Screening Thresholds		
		TP	TN	Chl-a
Plains	30	49	843	18
Ozark Border	22	40	733	13
Ozark Highlands	15	16	401	6



- Eutrophication Factors
  - ❖ Eutrophication related mortality
  - ❖ Excursions of DO or pH criteria
  - ❖ Cyanobacteria > 100,000 cells/mL
  - ❖ Shift in aquatic diversity
  - ❖ Excessive mineral turbidity

- Lakes are determined impaired if the:
  - ❖ geometric mean of samples taken May – September exceeds the Chl-a criteria more than once in three years, or
  - ❖ lake exceeds a nutrient screening threshold value and any of the five eutrophication factors are also identified.

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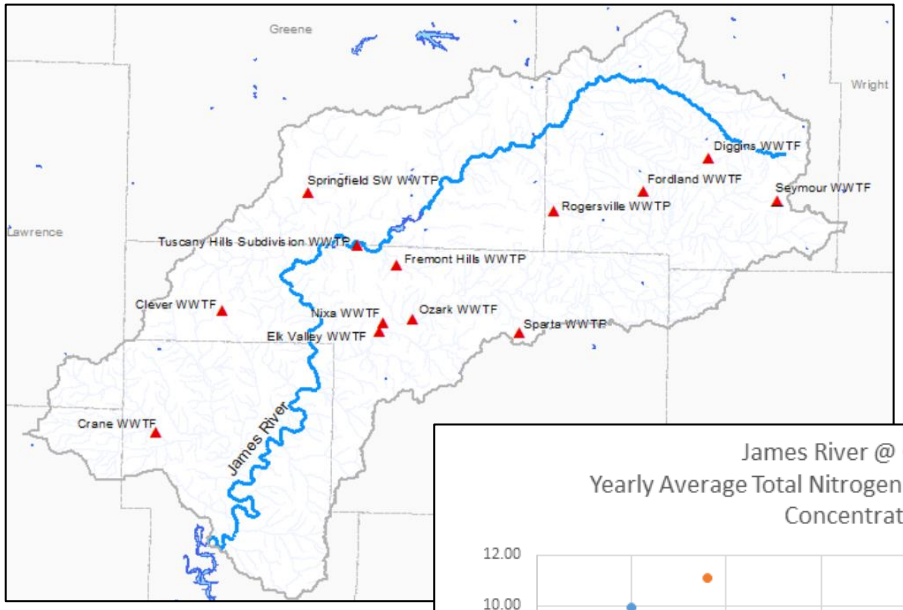
James River TMDL – Total Nitrogen

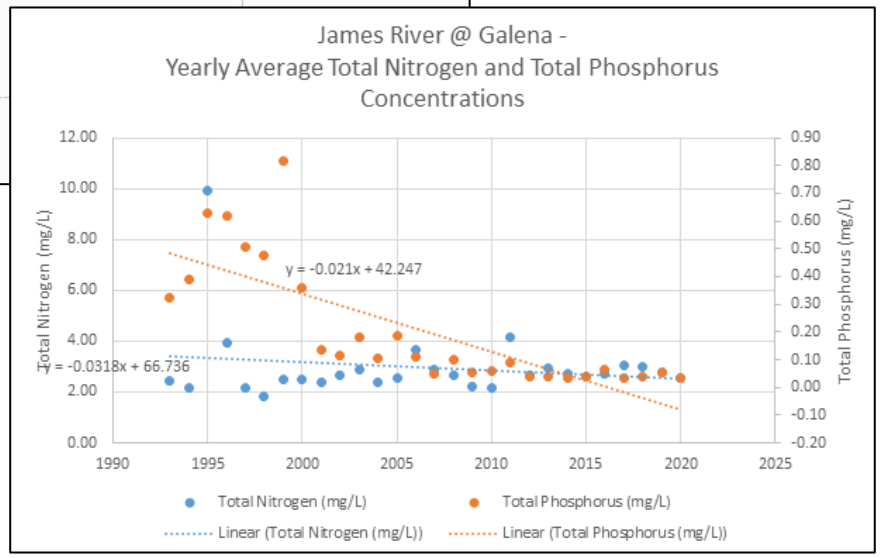
Watershed-based TMDL Implementation



James River TMDL approved May 2001

TMDL Targets @ Galena, Mo (USGS 07052500)

- TP = 0.075 mg/L
- TN = 1.5 mg/L



DF > 100,000 gpd

Captures 99.4% of TN

TN WLA Equity

Optimization, Trading

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James River TN – Permitting Approach

- Watershed-based permitting framework
- Potential Nutrient Trading
- Framework establishes:
  - Applicable Facilities
  - TN Limitations and Monitoring
  - TN Allocations
  - Schedule of Compliance
  - TN Trading
  - Reporting

James River TN – Permitting Approach

Limits

- Annual Total
- Mass-based (lbs/yr)
- Weekly Sampling
- Monthly Total =

  (Monthly Ave. mg/L)(monthly flow MG)(8.34)
- Annual Total =

  Sum of the 12 calendar months
- Aggregate assessment (i.e. multiple facilities owned by single entity)

Goals

- Annual Average
- Concentration (10 mg/L)
- Weekly Sampling
- Monthly Total

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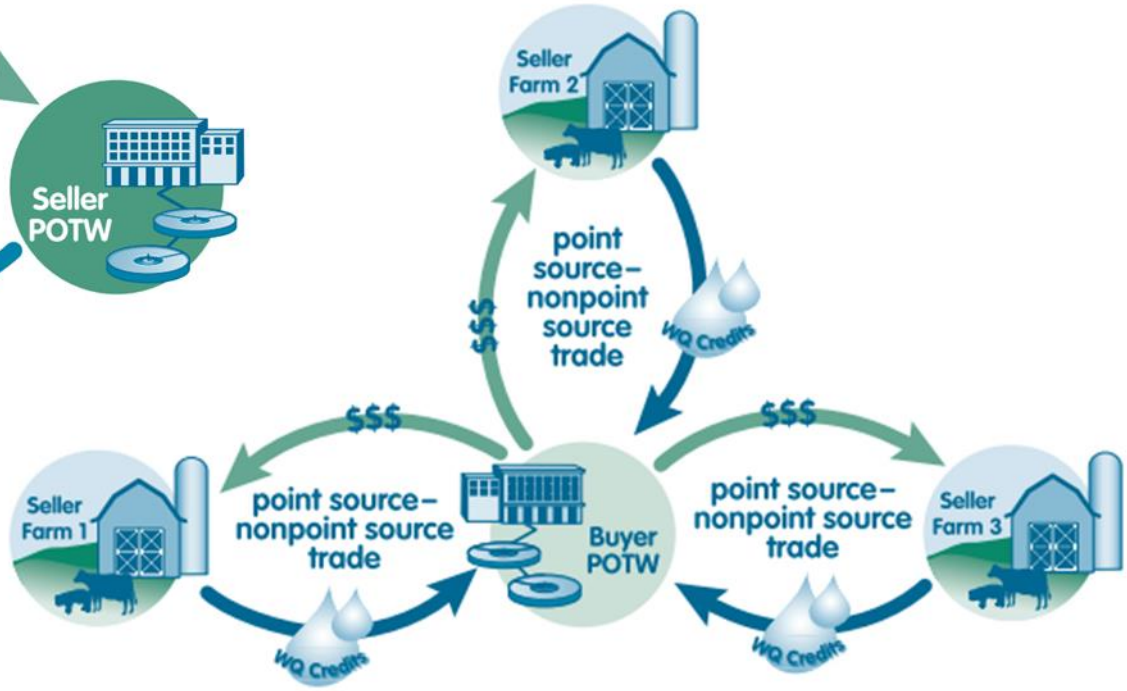
Types of Trading

Point Source to Point Source

Point Source to Nonpoint Source



Graphics Courtesy of EPA's Water Quality Trading Toolkit for Permit Writers, 2007

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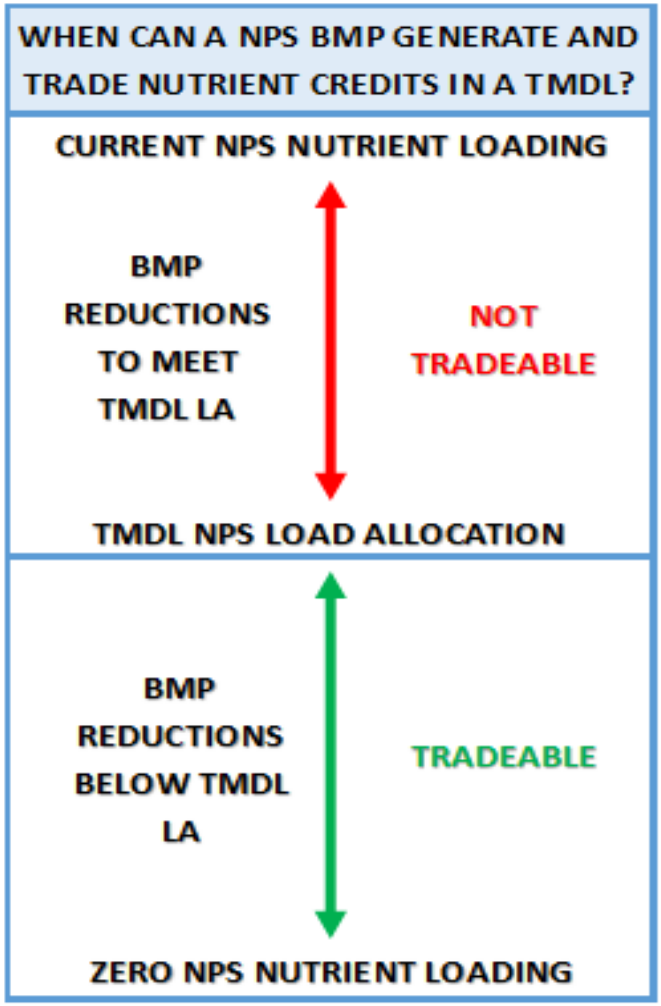
Nonpoint Source Load Allocation

- NPS practices must first achieve load allocations according to their respective land use category before generating credits.
- The ability of established nonpoint source Best Management Practices (BMPs) to generate nutrient reductions will be determined on a per-treated acre or per field basis.
- Only reductions achieved below the NPS load allocation (represented in annual average pounds per acre) will be eligible for trading .



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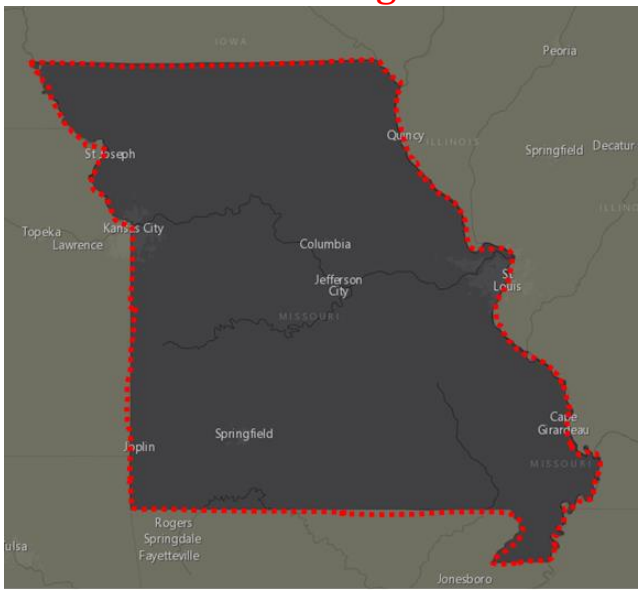
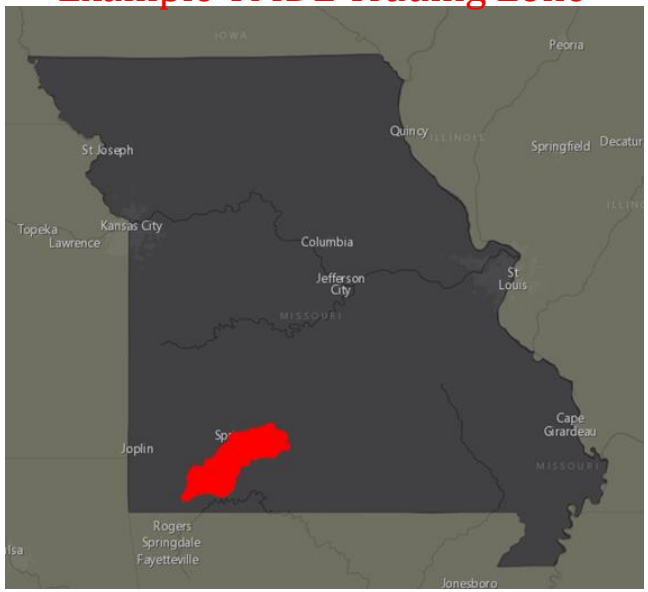
What is a Trading Zone?

A defined geographical area (most often a watershed) within which pollutant credits can be bought and sold, and which permittees are authorized to use credits to meet mass-based permitted effluent limits. Trading zones are designated or subject to approval by the department's Water Protection Program and identified in permits that are utilizing trading.

7.015 Trading Zone



Example TMDL Trading Zone



Restricted Trading Zones: Areas or watersheds with TMDLs or other WQBELs may be subject to additional trading limitations in order to ensure consistency with their specific TMDL/WQ requirements.

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Time Terms for Credit Use

A credit may only be applied towards the load of a single year (single use). Unused credits expire after 2 years.

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Tentative Permitting Timeline

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Other Nutrient-Related Efforts

- Statewide trading program
- Total Phosphorus Target Reduction Level
  - ❖ Major POTWs and major industrial users – accounts for ~92% of wastewater flows (141 facilities)
  - ❖ Compliance options: 1.0 mg/L concentration, mass-based equivalent of 1.0 at DF, 75% reduction from influent to effluent, or 75% reduction from effluent to effluent

Pending Clean Water Commission approval

- Gulf Hypoxia funding. Projects include:
  - ❖ MO Nutrient reduction progress tracking dashboard
  - ❖ Expansion of MO's ambient nutrient monitoring
  - ❖ MO municipal wastewater nutrient optimization pilot
  - ❖ Gulf hypoxia outreach and education exhibit
  - ❖ Refining nutrient reduction models with subsurface nutrient transport measurement

https://dnr.mo.gov/water/what-were-doing/water-planning/nutrient-loss-reduction-strategy

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Lake Wappapello State Park