



Drivers and Flexibilities for Permitting Nutrients in Missouri

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What drives Missouri to explore flexibilities for permitting nutrients?



TMDLs

**Regulations and
Effluent Limits**

**Numeric Nutrient
Criteria for Lakes**

Cost

Driver: WLAs from TMDLs

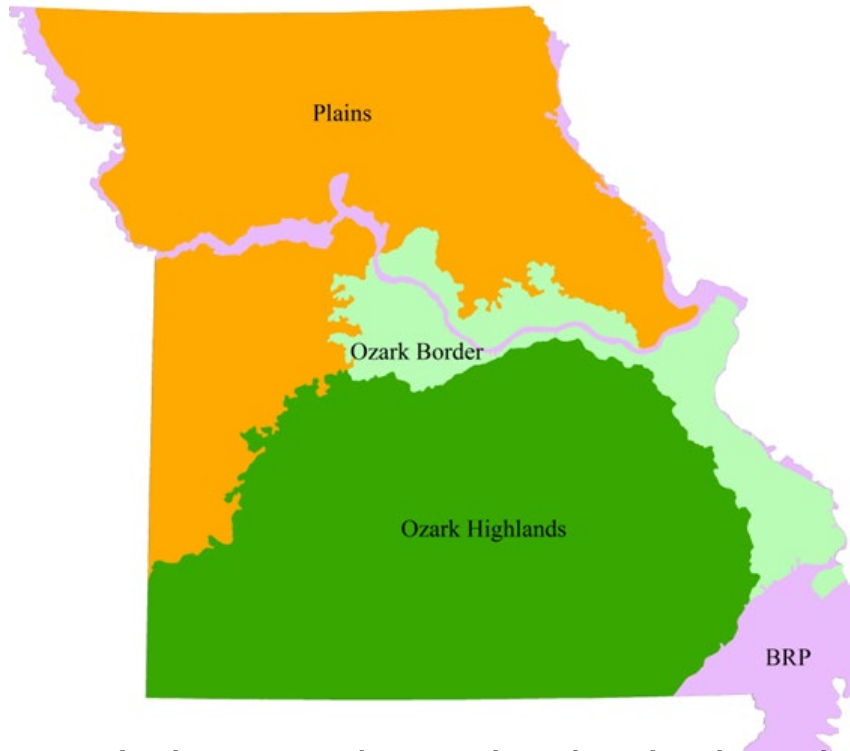
- In 1998, a lawsuit was filed against the EPA regarding Missouri's TMDL program.
- A consent decree was issued in 2001 which included milestones for Missouri to issue TMDLs.
- Flaws in the methodology led to very stringent WLAs.
- Example: Stinson Creek TMDL (2010)



Table 10. Waste Load Allocations for Fulton Wastewater Treatment Plant

Pollutant	Concentration Limits	WLA at Design Flow (4.54 cfs)
TN	0.855 mg/L	20.95 lbs/day
TP	0.092 mg/L	2.25 lbs/day
TSS	5 mg/L	122.51 lbs/day
CBOD ₅	9 mg/L	220 lbs/day

Driver: Numeric Nutrient Criteria for Lakes



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

- Lakes are determined to be 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.
- Eutrophication Factors
 - Eutrophication related mortality
 - Excursions of DO or pH criteria
 - Cyanobacteria > 100,000 cells/mL
 - Shift in aquatic diversity
 - Excessive mineral turbidity

Driver: Regulations and Effluent Limits

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	

Driver: Cost

- In 2012, the Missouri state legislature passed the Affordability Statute (Section 644.145, RSMo) which requires the MoDNR to make a “finding of affordability” when issuing a permit to a POTW and the permit includes new requirements that will incur a cost to ratepayers.

New Sampling Requirements

Technology Upgrades

- The Department developed the Cost Analysis for Compliance (CAFCom) to meet the requirements of 644.145 RSMo.
- Resources for CAFComs include census and socioeconomic data, CapdetWorks, land and laboratory cost, permittee financial information



Driver: Cost

Schedules based on the Financial Capability Matrix in the CAFCom:

Financial Capability Indicator	Residential Indicator		
	Low (Below 1%)	Mid-Range (1.0% to 2.0%)	High (Above 2.0%)
Weak (below 1.5)	Medium Burden (6yr)	High Burden (9yr)	High Burden (10+yr)
Mid-Range (1.5 – 2.5)	Low Burden (5yr)	Medium Burden (8yr)	High Burden (10+yr)
Strong (above 2.5)	Low Burden (5yr)	Medium Burden (7yr)	High Burden (9yr)

- CAFComs often result in a schedule of compliance and allows for the permittee to obtain the necessary funding.
- Prior to the Affordability Statute, state regulations limited SOC's to a maximum of 3 years. The statute allowed for the possibility of longer schedules.

Flexibility!

Permit Flexibilities

Variances

**Water Quality
Trading**

**Integrated
Management Plans**

Flexibility: Variances

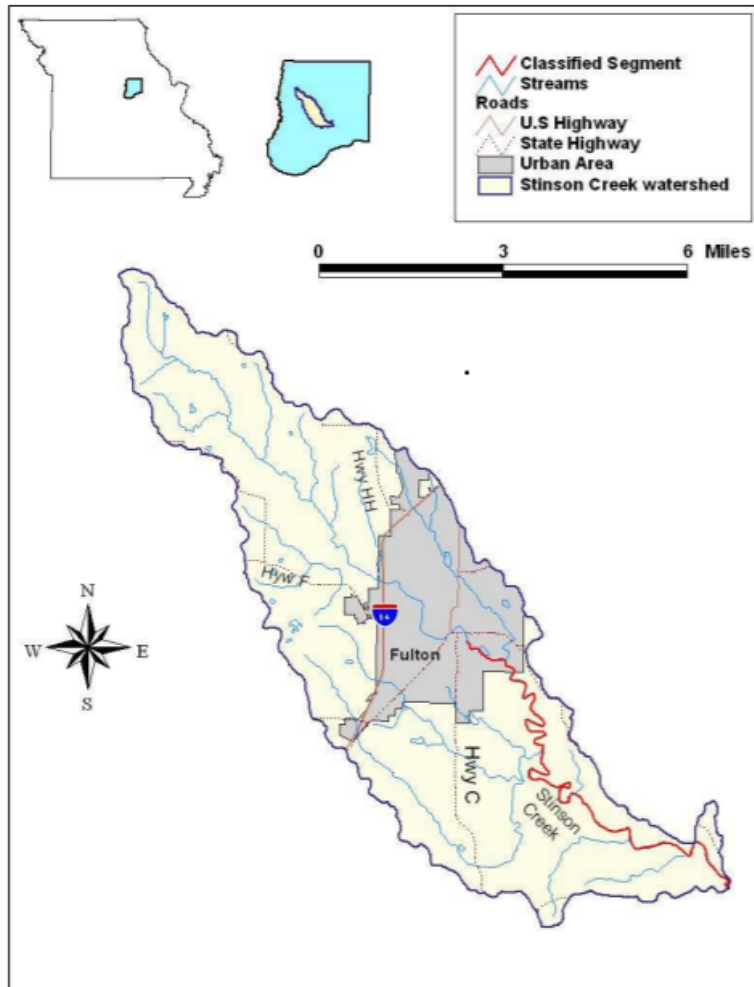


Figure 1. Location of Stinson Creek watershed, Callaway County.

- MoDNR has one facility with an approved variance (Fulton) and an additional variance (Kirksville) incorporated into our WQS, but it has not been approved by EPA. We have two variances (Bolivar, Salem) going through the current WQS rule process.
- The City of Fulton has an approved variance from MO WQS. WQS utilized the development of the wasteload allocations for the Stinson Creek TMDL for total Nitrogen, total Phosphorus, carbonaceous Biochemical Oxygen Demand and Total Suspended Solids.

Flexibility: Water Quality Trading

- MoDNR is currently in the process of developing a Water Quality Trading program.
- **Phase One** of achieving Water Quality Trading in Missouri was fulfilled by the development and adoption of the department's Water Quality Trading Framework.
- **Phase Two** is comprised of a research project to determine how effective agricultural best management practices have been in preventing nutrient loss in Missouri. The department and Environmental Improvement and Energy Resources Authority have engaged a contractor to fulfill this project's objectives. The results of this project will play a critical role in defining the price of nutrient credits for a market-based compliance program with the overall goal of improving water quality by reducing nonpoint source pollution.

Flexibility: Integrated Management Plan

- Integrated Management Planning allows municipalities to identify and prioritize implantation requirements of their existing and future wastewater and stormwater investments in a manner that is affordable to ratepayers.

Elements of a Plan:

- A description of the regulatory issues that need addressed
 - A description of existing systems current performance
 - A process identifying, evaluating and selecting alternatives and proposing implantation schedules.
 - Monitoring and Modifications schedules
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- Missouri has three municipalities with an Integrated Management Plan.
 - Columbia, Rolla, and Springfield



Case Study: City of Fulton WWTF

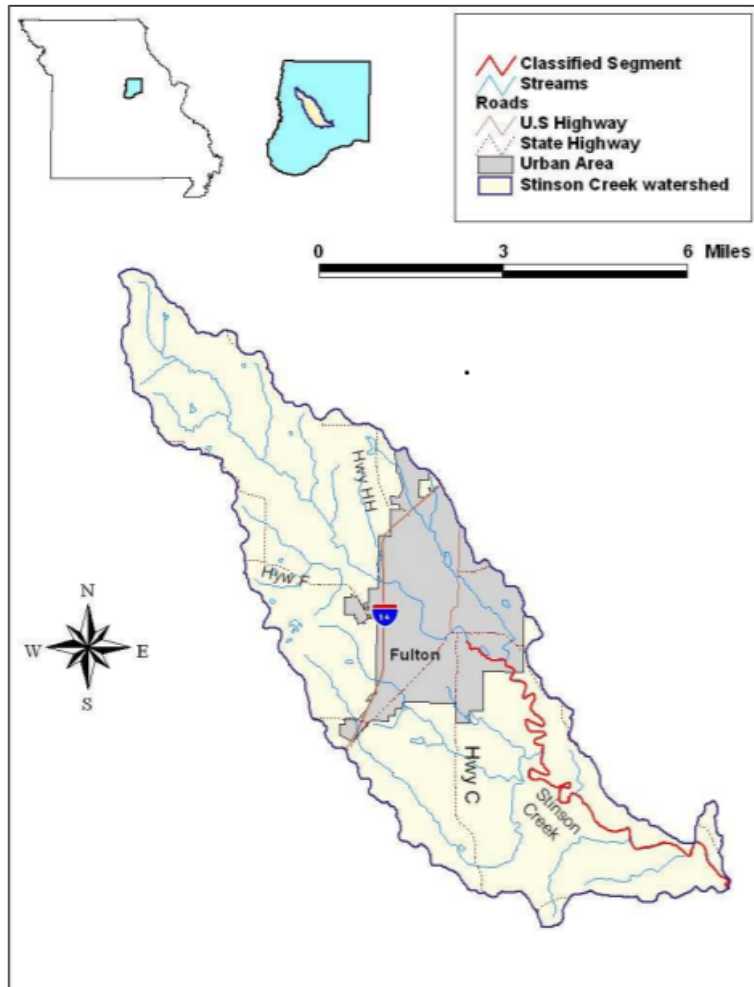


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- Initial TMDL issued for Stinson Creek in 2010 for Low DO and Organic Sediment.
- Revised TMDL pending EPA approval.
- **Driver:** TMDL WLA
- **Flexibility:** WQS Variance, 2 Tier SOC until 2035

Case Study: City of Wright City WWTF

- **Driver:** NNC for Lakes
- **Flexibility:** Five year SOC for a lagoon retrofit and chemical addition for Phosphorus removal

Total Phosphorus and Total Nitrogen. A reasonable potential analysis has determined that discharges from the Wright City South Wastewater Treatment Facility (MO-0023191) have reasonable potential to cause or contribute to the Chl-a impairment of Lake St. Louis. See **APPENDIX: LAKE ST. LOUIS REASONABLE POTENTIAL ANALYSIS FOR MORE INFORMATION.** Modeling results indicate that limiting nutrient discharges from the Wright City South facility to no greater than 10 milligrams per liter (mg/L) total nitrogen (TN) and 3 mg/L total phosphorus (TP) will promote attainment of water quality standards in Lake St. Louis; however, chemical addition for phosphorus removal technology is capable of treating to 1 mg/L TP or lower. Using best professional judgement, the permit writer has established a 1.0 mg/L TP limit based on the capability of this specific treatment process. Taking the lower TP limit into account, updated modeling shows that the TN limit can be raised to 11 mg/L and still be protective of water quality in Lake St. Louis; therefore, final effluent limits for TN and TP are set at 11 mg/L and 1 mg/L respectively. According to 40 CFR Part 122.45(d)(2) permit effluent limitations shall be stated as average weekly and average monthly discharge limitations for POTWs unless impractical. The models used to derive these limits use monthly average values to determine the effect of annual loading of total phosphorus and total nitrogen on Chl-a growth; therefore, these limits are to be applied as monthly averages and a shorter term limit is not appropriate.

Thank you!

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