



Missouri
Department of
Natural Resources

7.031(4) Specific Criteria

(N) Nutrients and chlorophyll- α

1. Definitions

A. For the purposes of this rule, all lakes and reservoirs shall be referred to as “lakes”.

B. Lake Ecoregions – Due to differences in topography, soils and geology, nutrient criteria for lakes and reservoirs are classified by ecoregion. These regions were delineated by grouping the ecological subsections described in Nigh and Schroeder, 2002, Atlas of Missouri Ecoregions, Missouri Dept of Conservation as follows:

- (I) Plains: OP1 – Scarped Osage Plains; OP2 – Cherokee Plains; TP2 – Deep Loess Hills; TP3 – Loess Hills; TP4 – Grand River Hills; TP5 – Chariton River Hills; TP6 – Claypan Till Plains; TP7 – Wyaconda River Dissected Till Plains; TP8 – Mississippi River Hills;
- (II) **Ozark Border: MB2a – Crowley’s Ridge Loess Woodland/Forest Hills; OZ11 – Prairie Ozark Border; OZ12 – Outer Ozark Border; OZ13 – Inner Ozark Border;**
- (III) Ozark Highlands: OZ1 – Springfield Plain; OZ2 – Springfield Plateau; OZ3 – Elk River Hills; OZ4 – White River Hills; OZ5 – Central Plateau; OZ6 – Osage River Hills; OZ7 – Gasconade River Hills; OZ8 – Meramec River Hills; OZ9 – Current River Hills; OZ10 – St Francois Knobs and Basins; OZ14 – Black River Ozark Border;
- (IV) Big River Floodplain: MB1 – Black River Alluvial Plain; MB2b – Crowley’s Ridge Footslopes and Alluvial Plains; MB3 – St. Francis River Alluvial Plain; MB4, OZ16, TP9 – Mississippi River Alluvial Plain; OZ15, TP1 – Missouri River Alluvial Plain.

C. Criteria Values

- (I) General Ecoregional Criteria – Limits for Total Phosphorus (TP), Total Nitrogen (TN) and Chlorophyll- α (Chl- α), in micrograms per liter ($\mu\text{g/L}$), for lakes within a lake ecoregion that have not been assigned a site specific value.
- (II) **Alternative Ecoregional Criteria – A range of limits for TP and TN for lakes that have been in compliance with the general ecoregional criteria for Chl- α for at least the most recent three consecutive years.**
- (II) **Site Specific Criteria – Criteria for TP, TN, and Chl- α for certain lakes that are more restrictive than ecoregional nutrient standards.**

- D. Tributary Arm – A substantial segment of an L2 lake that is primarily recharged by a source or sources other than the main channel of the lake.
2. This rule applies to all lakes that are waters of the State and that are outside the Big River Floodplain ecoregion and have an area of at least ten (10) acres during normal pool.
 3. Lake ecoregional criteria for TP, TN, and Chl- α are listed in Table L. Site specific criteria for TP, TN, and Chl- α are listed in **Table M**.
 4. All TP, TN, and Chl- α concentrations must be calculated as the geometric mean of a minimum of three (3) representative samples per year for three (3) years that are not necessarily consecutive. All samples must be collected from the surface, near the outflow end of the lake, or at locations within tributary arms as described in Table N, and during the period May 1 - August 31.

Table L: General Ecoregional nutrient criteria ($\mu\text{g/L}$) [Alternative Criteria in Brackets]

Lake Ecoregion	Lake Class	Chl- α	TP	TN
Plains	L1	10.0	20 [20-34]	490 [490-660]
	L2	12.0	29 [29-45]	600 [600-900]
	L3	30.0	58 [58-101]	900 [900-1400]
Ozark Border	L1	10.0	20 [20-34]	490 [490-660]
	L3	22.0	42 [42-76]	700 [700-1100]
Ozark Highlands	L1 & L2	6.0	13 [13-21]	370 [370-500]
	L3	15.0	29 [29-50]	550 [550-850]

Table M: Lakes with site specific criteria.

Lake Ecoregion	Lake	County	Site specific criteria ($\mu\text{g/L}$)		
			TP	TN	Chl- α
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
Ozarks	Council Bluff Lake	Iron	7	229	2.1
	Crane Lake	Iron	9	240	2.6
	Fourche Lake	Ripley	9	236	2.1
	Goose Creek Lake	St Francois	12	383	3.2
	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 (Monsanto)	St Francois	9	374	2.0
	Sunnen Lake	Washington	9	274	2.6
	Table Rock Lake	Stone	9	253	2.6
	Terre du Lac Lakes	St Francois			
	- Capri		6	284	1.3
	- Carmel		8	319	1.7
	- Marseilles		9	330	1.6
Timberline Lake	St Francois	8	276	1.5	
Wauwanoka, Lake	Jefferson	12	384	6.1	

Table N: Total Phosphorus Criteria in tributary arms of major reservoirs

Reservoir	Tributary Arm	Sample Site (dec. deg.)		TP ($\mu\text{g/L}$)
		Latitude	Longitude	
Ozarks, Lake of the	Grand Glaize	38.11	-92.664	26
	Gravois	38.245	-92.745	26
	Niangua	38.071	-92.822	26
Table Rock Lake	James River	36.678	-93.535	16
	Kings River	36.576	-93.596	18
	Long Creek	36.557	-93.294	12