

Table Rock Lake

Ozark Highlands Region

Table Rock Lake is a 43,100-acre Army Corps of Engineers reservoir located in southwest Missouri. This lake is in the White River System and is preceded upstream by Beaver Lake in northwest Arkansas. The lake consists of a long, winding main branch and three major arms. Kings River and Long Creek flow north out of Arkansas to enter Table Rock Lake while the James River flows south from the central Ozark Highlands Region. The majority of the lake's watershed is forested, but development around the lake and urban areas on the lake's tributaries threatens water quality.



Figure 76. Location of Table Rock Lake and sample sites.

- Data were collected at 19 sites in 2003
- Of these sites, eight were in the main lake, four in the James River arm, three in the Kings River arm, and one each in Long Creek, Indian Creek Flat Creek and Roaring River
- Secchi was the only parameter measured at the Viola access of the Kings River arm (“V” on the map)
- See the *Trends* section (page 111) for long-term analyses of Table Rock Lake data

Figure 77. Trophic assessment of sample sites on Table Rock Lake, based on 2003 geometric mean values of chlorophyll, nitrogen and phosphorus (note: these assessments are based on geometric means of *all* samples, not just summer samples)

O = Oligotrophic
M = Mesotrophic
E = Eutrophic
H = Hypereutrophic

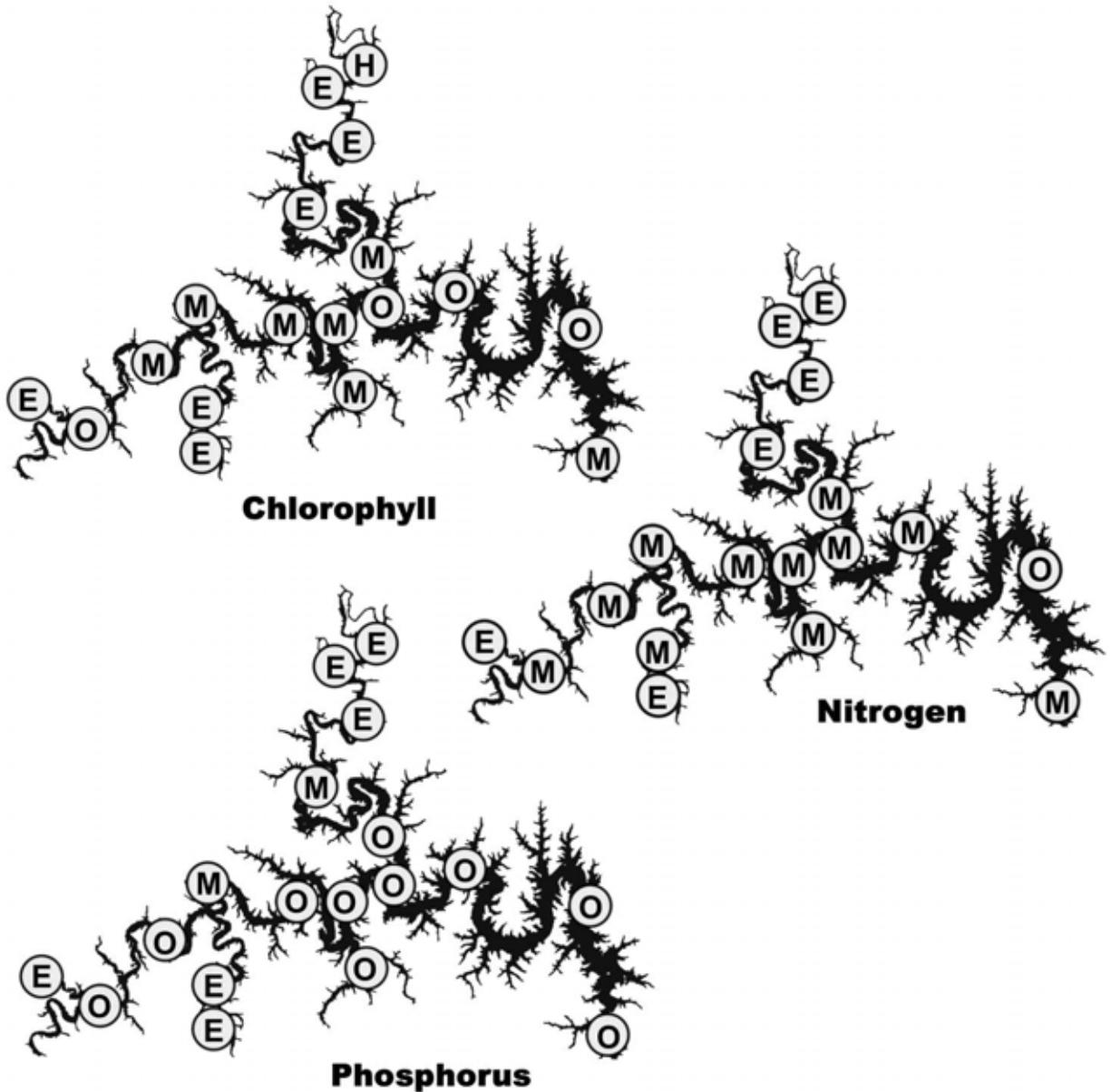


Table 36. Descriptive statistics from the main lake channel sites on Table Rock Lake – 2003.

Parameters		Site 10	Site 18	Site 15	Site 17	Site 14	Site 3	Site 2	Site 1
Secchi Transparency (inches)	# samples	5	7	8	8	8	8	7	7
	median	127	120	132	136	182	242	144	204
	minimum	96	56	97	117	134	147	96	168
	maximum	132	152	143	173	240	262	228	300
	geomean	116	106	126	137	175	208	151	211
Phosphorus (µg/L)	# samples	5	7	8	8	8	8	7	7
	median	8	9	10	8	8	7	5	7
	minimum	6	7	8	6	6	6	4	4
	maximum	10	21	17	13	10	8	8	17
	geomean	8	10	11	9	8	7	5	7
Nitrogen (µg/L)	# samples	5	7	8	8	7	8	7	7
	median	430	300	285	270	500	430	430	280
	minimum	200	240	200	190	210	260	290	200
	maximum	600	550	770	560	560	610	500	530
	geomean	355	338	334	303	370	402	406	286
Chlorophyll (µg/L)	# samples	5	7	8	8	8	8	7	7
	median	1.8	2.7	5.2	3.0	2.6	2.0	2.2	1.9
	minimum	0.7	2.3	2.4	2.2	1.6	0.8	0.2	1.4
	maximum	2.5	11.3	15.9	7.2	4.3	5.2	5.3	4.5
	geomean	1.6	3.6	5.0	3.8	2.5	1.8	1.9	2.1

- Phosphorus concentrations decrease with proximity to the dam. This results in lower chlorophyll concentrations nearer the dam, which means that Secchi transparency values increase nearer the dam
- Geometric mean Secchi transparency values at Sites 1 and 3 were greater than 200 inches
- Geometric mean nutrient and chlorophyll values were lower in 2003 than in 2002 across the main lake
- TN values are consistent across the main lake, with only slight variations in the geomeans

Table 37. Descriptive statistics from the James River Arm of Table Rock Lake – 2003.

Parameters		Site 13	Site 11	Site 5	Site 4.5
Secchi Transparency (inches)	# samples	8	8	7	8
	median	38	44	78	160
	minimum	35	24	60	105
	maximum	48	56	98	290
	geomean	40	42	77	169
Phosphorus (µg/L)	# samples	9	8	7	8
	median	92	39	17	7
	minimum	71	34	12	6
	maximum	118	78	25	8
	geomean	89	44	18	7
Nitrogen (µg/L)	# samples	9	8	7	8
	median	1020	680	520	295
	minimum	180	510	310	220
	maximum	2120	1800	1530	630
	geomean	838	809	657	326
Chlorophyll (µg/L)	# samples	9	8	7	8
	median	69.7	32.6	12.7	4.0
	minimum	16.3	14.8	5.5	1.7
	maximum	111.7	111.1	20.5	6.9
	geomean	53.8	35.2	11.7	4.0

- Clarity at Sites 5 and 4.5 is double that of 2002, while sites 11 and 13 are unchanged
- Nutrient and chlorophyll values decrease with proximity to the main lake, and Secchi transparency values increase due to in-lake processes such as sedimentation
- Nutrient and chlorophyll concentrations are more variable in the up-lake reach of the James River Arm, becoming more stable with proximity to the main lake
- Secchi transparency values are higher and more variable near the main lake, decreasing and becoming less variable in the up-lake reach of the James River Arm

Table 38. Descriptive statistics from the Kings River and other tributary sites on Table Rock Lake – 2003.

Parameters		Kings River Arm			Indian Creek	Long Creek	Flat Creek	Roaring River
		Site 7	Site 6.5	Site Viola	Site 9	Site 8	Site 12	Site 16
Secchi Transparency (inches)	# samples	7	7	5	9	7	8	8
	median	33	50	92	129	138	39	54
	minimum	24	43	83	94	84	30	46
	maximum	34	72	102	210	150	69	60
	geomean	31	52	92	130	121	41	53
Phosphorus ($\mu\text{g/L}$)	# samples	7	7		8	7	9	8
	median	61	33		8	8	60	32
	minimum	54	25		7	6	8	22
	maximum	76	82		11	19	131	52
	geomean	62	38		9	10	42	31
Nitrogen ($\mu\text{g/L}$)	# samples	7	7		8	7	9	8
	median	630	490		425	320	740	670
	minimum	400	260		230	240	320	390
	maximum	940	580		610	440	1460	1720
	geomean	643	429		372	315	798	683
Chlorophyll ($\mu\text{g/L}$)	# samples	7	7		8	7	9	8
	median	33.0	21.5		4.0	5.6	37.2	12.8
	minimum	5.4	10.6		1.7	3.2	.2	7.3
	maximum	62.4	55.8		5.2	12.6	125.4	52.2
	geomean	28.3	20.8		3.3	5.6	12.6	16.0

- Kings River Arm sites show a trend of increasing clarity and decreasing nutrients nearer the main lake. Nitrogen and phosphorus values decrease from Site 7 to Site 6.5, with phosphorus approaching the cut point between mesotrophic and eutrophic
- Chlorophyll values also decrease nearer the main lake
- Secchi transparency at Viola was three times greater than at Site 6.5
- Long Creek and Indian Creek phosphorus values are similar to the main lake
- Nitrogen values are similar among the Flat Creek and Roaring River tributary sites, and are considered eutrophic based on geometric means. Indian Creek and Long Creek have lower nitrogen values than the other sites and are considered mesotrophic based on the geometric means.

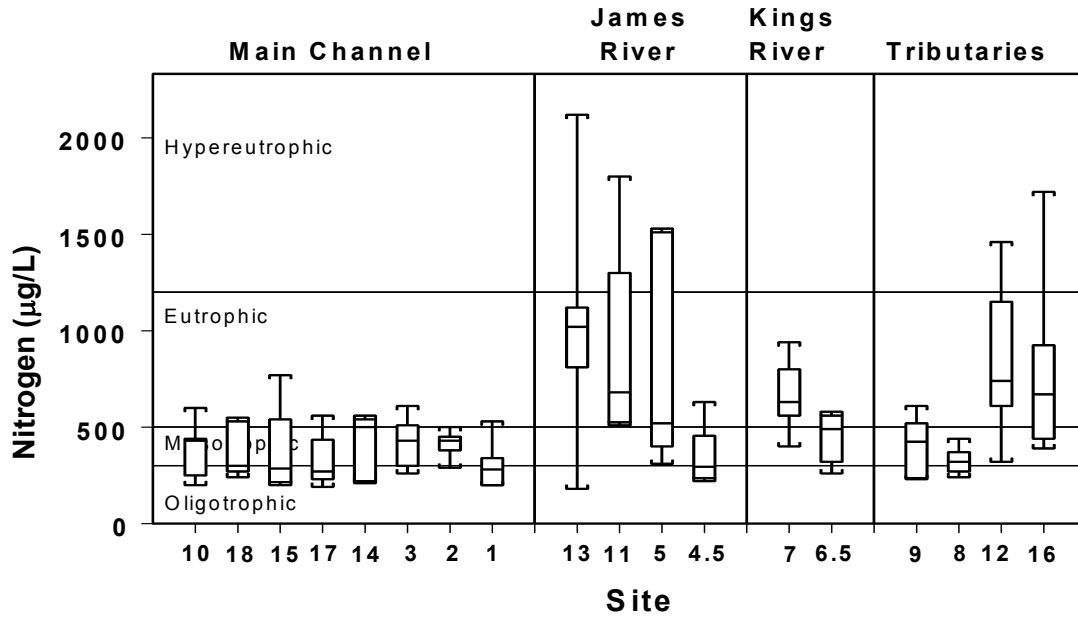


Figure 78. Nitrogen values for Table Rock Lake – 2003.

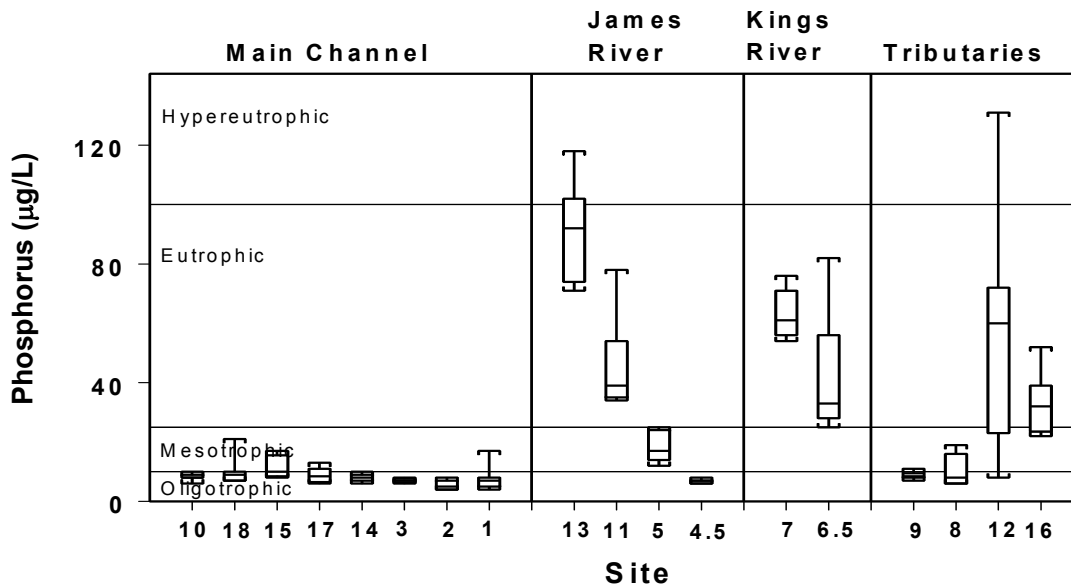


Figure 79. Phosphorus values for Table Rock Lake – 2003.

- Variability in nitrogen concentrations was *extremely* high at Site 13 (James River), ranging from oligotrophic to hypereutrophic
- Variability in phosphorus concentrations was *extremely* high at Site 12 (Flat Creek), ranging from oligotrophic to hypereutrophic
- All main lake sites have similar nitrogen and phosphorus concentrations

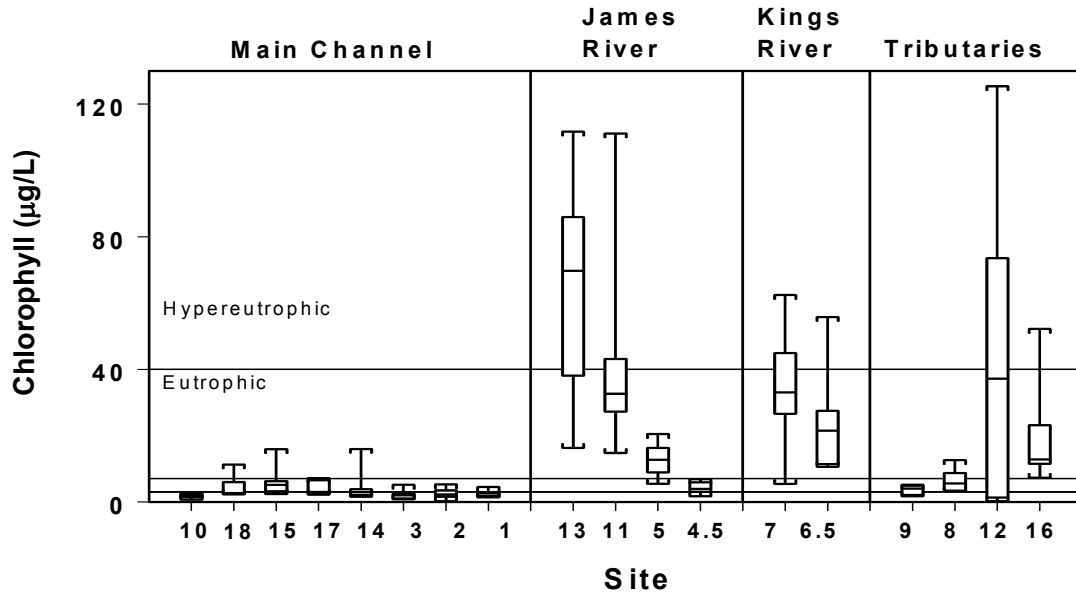


Figure 80. Chlorophyll values for Table Rock Lake – 2003.

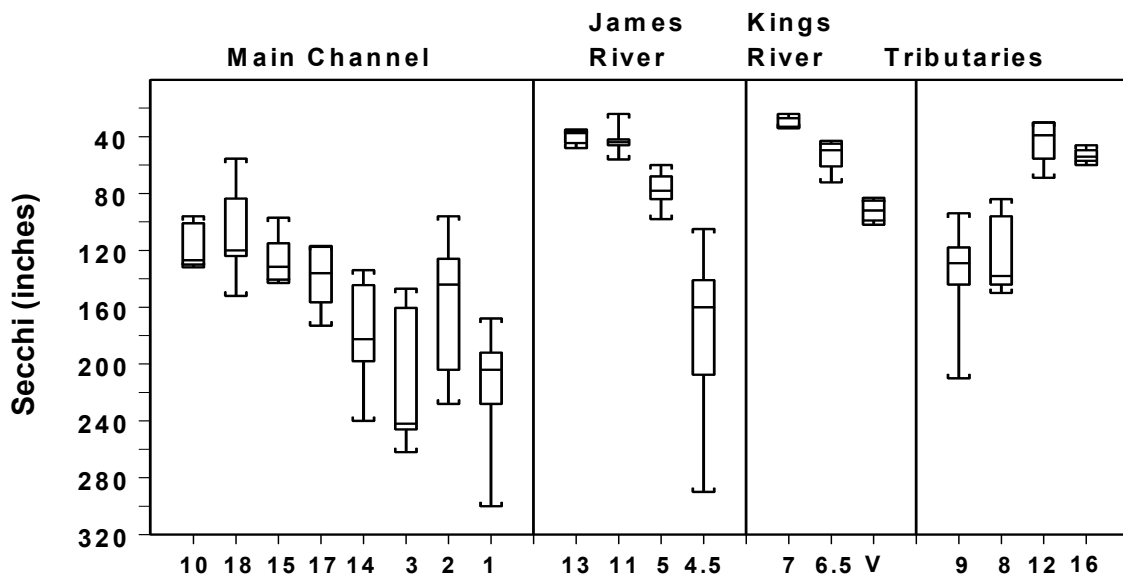


Figure 81. Secchi values for Table Rock Lake – 2003.

- Chlorophyll concentrations varied more than 500-fold at Site 12, ranging from the lowest observed ($0.2 \mu\text{g/L}$) to the second highest observed ($125.4 \mu\text{g/L}$) of all LMVP sites in 2003
- Nutrient concentrations decrease and Secchi transparencies increase at sites that are closer to the dam