

Table Rock Lake - 2001 Data

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 threaten water quality.

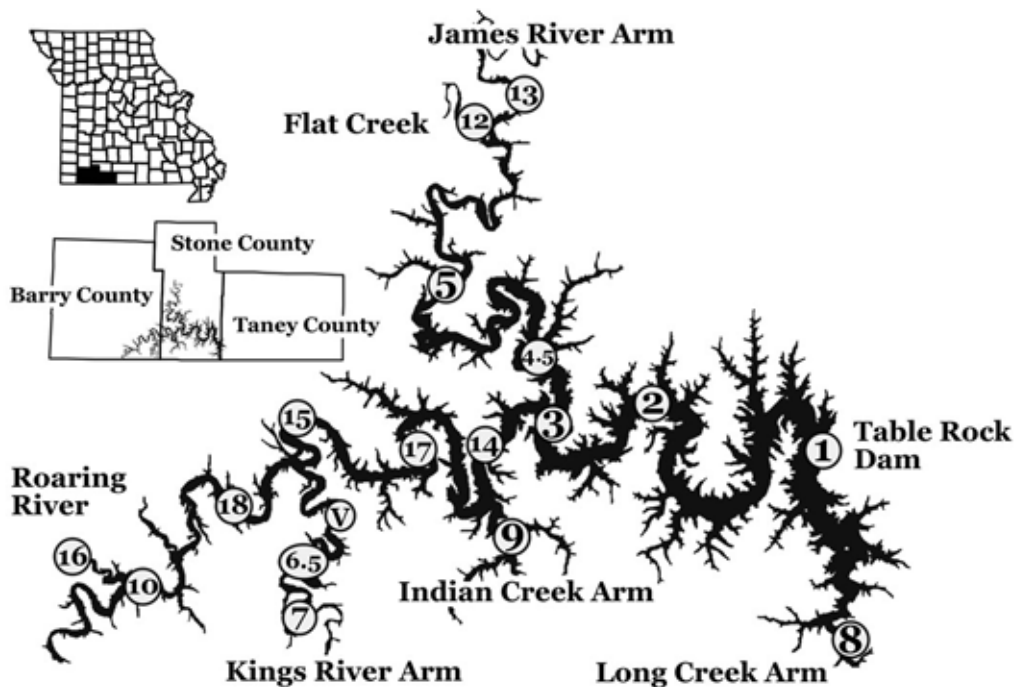


Figure 50. Location of Table Rock Lake and sample sites.

- Data were collected at 18 sites in 2001.
- Of these 18 sites, 8 were in the main channel, 3 each in the James River Arm and the King's River Arm, 1 each on Long Creek, Indian Creek, Flat Creek, and Roaring River.
- Only Secchi values were collected at Viola Access ("V" on the map).

Table 24. Trophic assessment of sample sites on Table Rock Lake, based on geometric mean values (note: these assessments are based on geometric means of *all* samples, not just summer samples)

Main Lake	Sample Sites								
	1	2	3	14	17	15	18	10	
Nitrogen	M	M	M	M	M	M	M	M	
Phosphorus	O	O	O	O	O	O	O	O	
Chlorophyll	O	O	O	O	O	O	O	O	

James River and Kings River	Sample Sites				
	13	5	4.5	7	6.5
Nitrogen	E	E	M	M	M
Phosphorus	E	M	O	E	E
Chlorophyll	H	E	O	E	E

Tributaries	Sample Sites			
	9	8	12	16
Nitrogen	M	M	E	E
Phosphorus	O	O	E	M
Chlorophyll	M	M	E	E

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

Summary of Results for Table Rock Lake

Table 25. Descriptive statistics from the main lake channel sites on Table Rock Lake – 2001.

Parameters		Site 10	Site 18	Site 15	Site 17	Site 14	Site 3	Site 2	Site 1
Secchi Transparency (inches)	# samples	6	6	9	8	8	9	7	8
	geomean	130	163	159	177	172	233	206	235
	median	136	158	162	176	156	203	170	234
	minimum	110	141	93	142	123	175	147	192
	maximum	143	192	229	272	360	346	393	310
Phosphorus (mg/L)	# samples	6	6	8	8	5	9	7	8
	geomean	6	5	6	6	5	5	6	7
	median	7	6	6	6	5	6	6	5
	minimum	4	3	5	3	4	3	4	3
	maximum	9	8	9	12	8	7	8	24
Nitrogen (mg/L)	# samples	6	6	7	8	5	8	7	8
	geomean	312	348	360	432	333	327	392	337
	median	340	355	320	435	320	370	370	360
	minimum	160	230	190	220	220	120	240	160
	maximum	400	520	610	920	510	790	650	550
Chlorophyll (mg/L)	# samples	6	6	7	8	7	9	7	8
	geomean	2.3	2.2	2.6	3.4	2.5	1.3	1.7	1.9
	median	2.3	2.3	2.6	3.3	3.1	1.1	2.7	1.9
	minimum	1.7	1.4	1.5	2.1	0.9	0.5	0.2	1.3
	maximum	3.6	3.3	4.0	4.7	5.6	5.2	3.5	2.8

- Geometric mean nitrogen concentrations only varied between 312 and 432 µg/L, all mesotrophic values (Figure 51).
- Geometric mean phosphorus concentrations in the main lake varied between 5 and 7 µg/L, all oligotrophic values. Variability was low at all sites (range 3 – 12 µg/L) except Site 1, where values ranged from 3 – 24 µg/L (Figure 52).
- Geometric mean chlorophyll concentrations varied from 1.3 to 3.4 µg/L in the main lake. All sites except site 17 (concentration = 3.4 µg/L) were in the oligotrophic range for chlorophyll (Figure 53).
- Sample sites nearest the dam had higher Secchi values (Figure 54).
- At low concentrations of chlorophyll, a small decrease results in a large increase in Secchi transparency (see figures 95 and 96 in trends section)

Table 26. Descriptive statistics from the James River Arm of Table Rock Lake – 2001.

Parameters		Site 13	Site 5	Site 4.5
	# samples	8	8	8
Secchi Transparency (inches)	geomean	39	76	179
	median	40	78	164
	minimum	32	51	125
	maximum	47	123	265
	# samples	7	8	8
Phosphorus (µg/L)	geomean	87	12	5
	median	80	11	5
	minimum	67	7	2
	maximum	122	19	14
	# samples	8	8	8
Nitrogen (µg/L)	geomean	956	641	421
	median	885	690	415
	minimum	670	220	140
	maximum	1650	1760	1230
	# samples	8	8	8
Chlorophyll (µg/L)	geomean	49.0	9.9	2.9
	median	54.7	10.6	3.0
	minimum	26.6	4.5	1.0
	maximum	100.0	17.1	6.7

- Geometric mean phosphorus and chlorophyll values decreased by more than 16-fold from the site farthest upstream to the site closest to the main lake. Phosphorus and chlorophyll showed increasing variability with increasing distance from the main channel (Figures 52 and 53).
- Geometric means for phosphorus, chlorophyll and Secchi at site 4.5 were within the range of geometric means found in the main lake.
- Secchi values (and variability) decreased with increasing distance from the main lake channel, ranging from a geometric mean of 179 inches at site 4.5 to 39 inches at site 13 (Figure 54).

Table 27. Descriptive statistics from the Kings River and other tributary sites on Table Rock Lake – 2001.

Parameters		King's 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	8	8	8	7	8	8	8
	geomean	33	58	97	137	160	52	60
	median	34	53	92	135	153	46	64
	minimum	22	44	76	104	120	36	42
	maximum	42	95	147	220	252	157	75
Phosphorus ($\mu\text{g/L}$)	# samples	8	8	0	6	8	8	8
	geomean	77	26	X	6	8	27	24
	median	72	26	X	6	10	33	26
	minimum	61	17	X	3	2	4	8
	maximum	106	46	X	8	20	64	42
Nitrogen ($\mu\text{g/L}$)	# samples	8	8	0	6	8	8	7
	geomean	470	357	X	316	335	663	756
	median	460	335	X	265	365	615	755
	minimum	260	260	X	200	130	300	390
	maximum	870	770	X	700	640	1230	1590
Chlorophyll ($\mu\text{g/L}$)	# samples	8	8	0	6	8	8	8
	geomean	28.2	13.2	X	4.1	3.1	9.9	16.9
	median	27.8	13.0	X	4.5	3.5	18.0	16.4
	minimum	18.5	7.3	X	2.6	1.5	0.4	8.3
	maximum	49.1	33.3	X	6.1	5.1	42.8	37.6

- Geometric mean Secchi values in the King's River decreased threefold from the Viola access site (97 inches) to site 7 upstream (33 inches). There were no nutrient or chlorophyll samples taken from the Viola site, but the trend of decreasing Secchi and increasing nutrients with increasing distance upstream is seen between sites 6.5 and 7.
- The Flat Creek and Roaring River sites had 2 – 3 times higher geometric mean values for nutrients and chlorophyll than the Indian Creek and Long Creek sites.
- The Flat Creek and Roaring River sites had less than half of the geometric mean Secchi values of the Indian Creek and Long Creek sites.
- Indian Creek (site 9) and Long Creek (site 8) had geometric mean values similar to the main lake channel values. Flat Creek and Roaring River were more similar to the Kings River and James River sites.

Table 28. Trophic Assessment of sites on Table Rock Lake based on average chlorophyll values.

Site	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
1		M	M	E	O	M	M	M	M	O
2		M	E	E	M	M	M	E	M	O
3	E	E	E	E	M	M	M	E	M	O
4.5				E	M	M	E	E	M	M
5	E	E		E	E	E	E		E	E
6.5					E	E	E	E	E	E
7					E	E	E	E	E	E
8		M	E	E	M	M	E	E	M	M
9			E	E	M	M	M	E	M	M
10			M	E	M	M	M	E	M	O
11				E	E	E	E			
12				H	E	E	H	H	E	E
13				H	H	H	H	E	H	H
14								E	O	O
15								E	M	M
16									E	E
17									M	M
18									M	O

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

- 2001 was the first year with more than one oligotrophic site. All oligotrophic sites were in the main lake.
- 1995 and 1999 were the most productive years, with eutrophic conditions across most of the lake.
- 12 of the 18 sites sampled at Table Rock lake have changed trophic state (based on chlorophyll averages) at least once in the last 3 years.
- None of the sites display a trend of changing conditions over time.

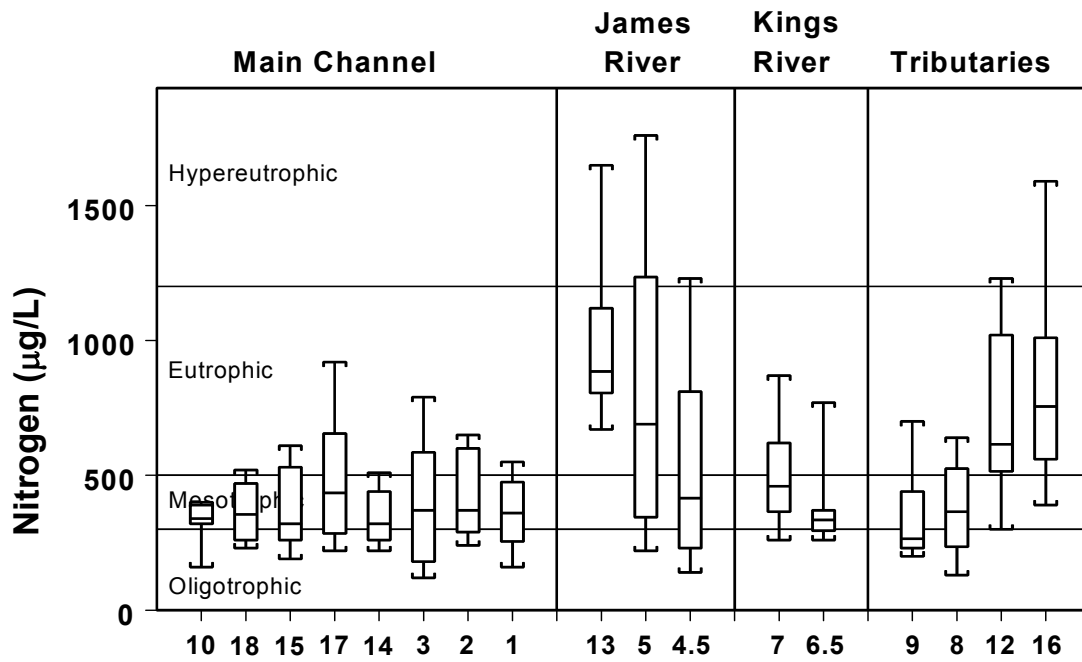


Figure 51. Nitrogen values for Table Rock Lake – 2001.

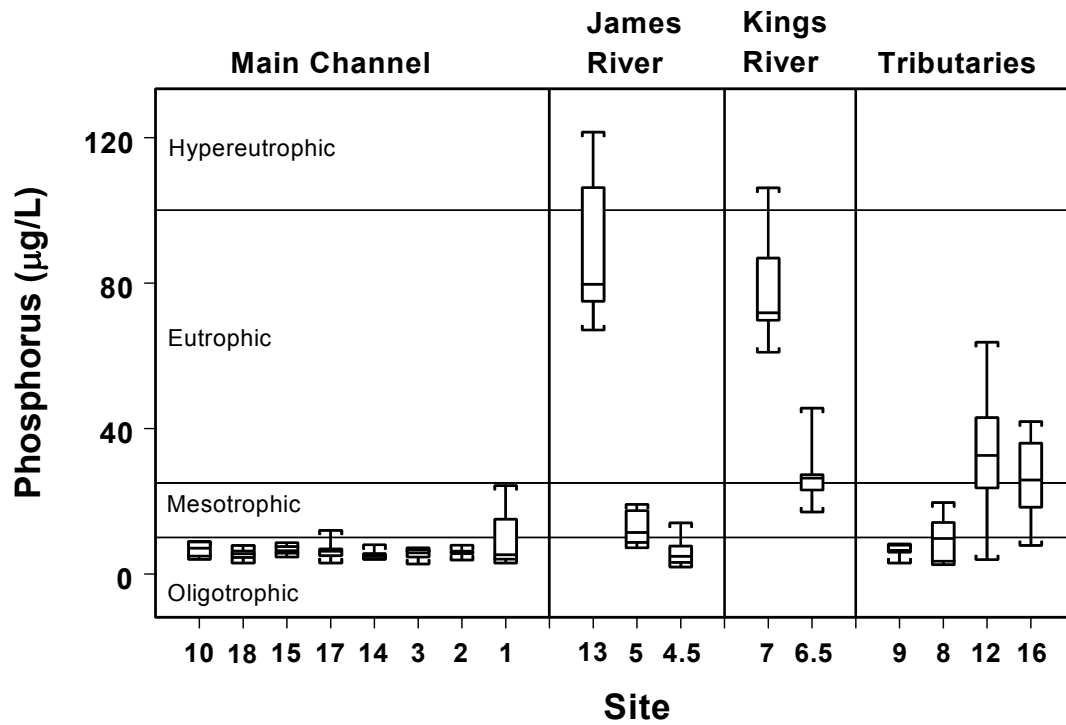


Figure 52. Phosphorus values for Table Rock Lake – 2001.

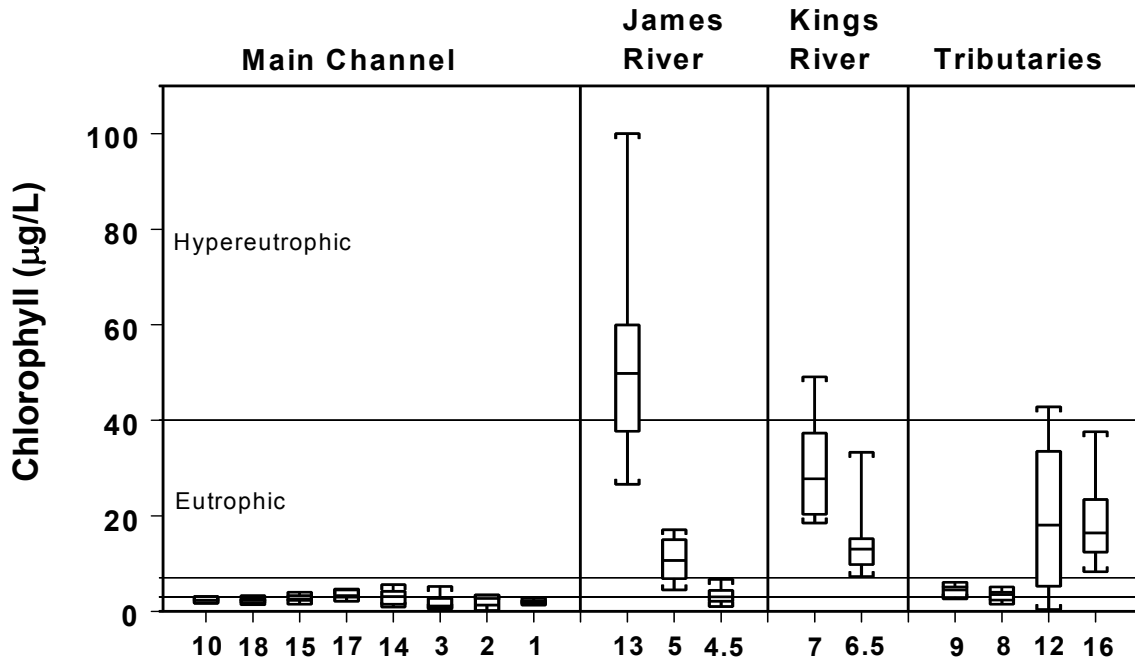


Figure 53. Chlorophyll values for Table Rock Lake – 2001.

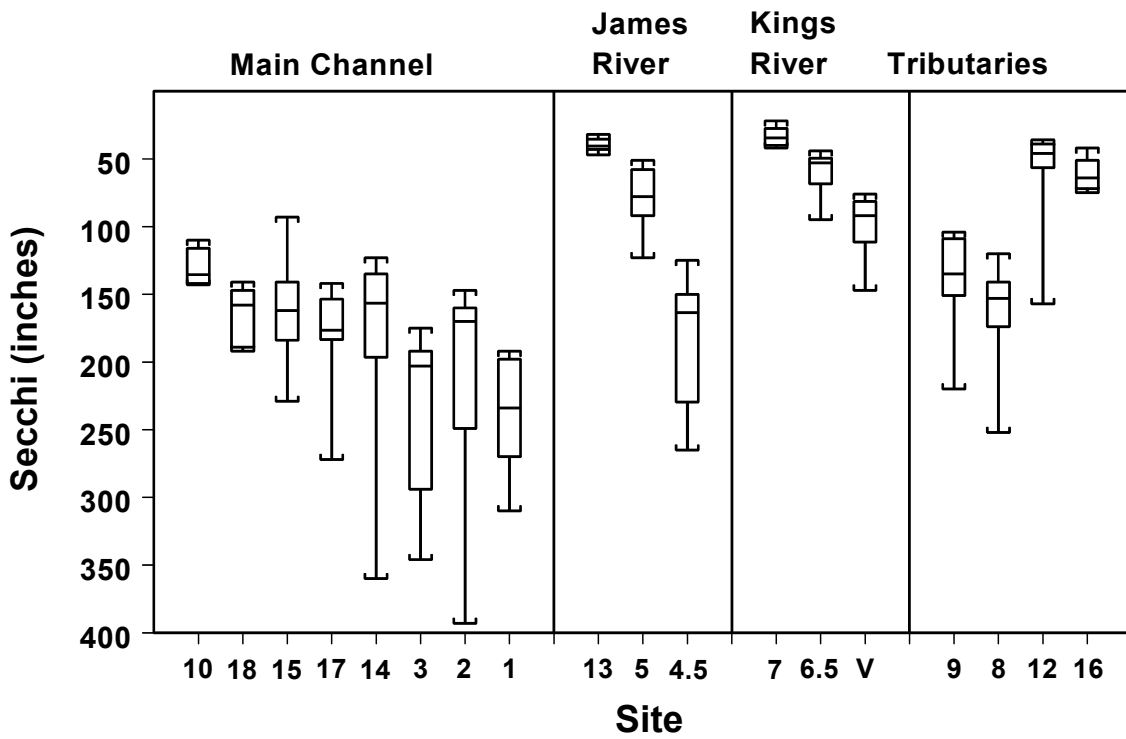


Figure 54. Secchi values for Table Rock Lake – 2001.