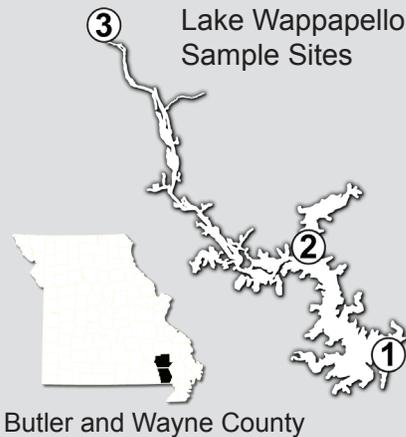


Lake Wappapello



Water quality at sites 1 and 2 showed similar patterns, with lower nutrient, chlorophyll and suspended sediment values during the first few samples and higher values as the season progressed. As expected, increased suspended sediment and algal levels led to shallower Secchi transparency readings during the second half of the season. Normally higher suspended sediment concentrations lead to decreased chlorophyll as the sediment limits available light for photosynthesis. At sites 1 and 2 the September chlorophyll values were more than 10 times higher than the June values even though the suspended sediment concentrations were 4 to 5 times greater in September.

Site 1

Latitude: 36.9337 Longitude: -90.2833

Date	X	X	6/8	7/1	7/22	8/9	9/1	X	Mean
Secchi (inches)			66	48	36	19	18		33
TP (µg/L)			16	24	23	49	61		31
TN (µg/L)			200	200	330	760	990		398
CHL (µg/L)			5.5	7.7	13.5	44.4	74.3		18.0
ISS (mg/L)			1.2	1.8	3.0	7.4	4.8		3.0

Site 2

Latitude: 36.9888 Longitude: -90.3351

Date	X	X	6/8	7/1	7/22	8/9	9/1	X	Mean
Secchi (inches)			66	40	36	19	13		30
TP (µg/L)			25	28	47	64	77		44
TN (µg/L)			280	240	360	610	930		424
CHL (µg/L)			5.9	11.2	23.2	48.3	62.9		21.6
ISS (mg/L)			1.6	4.5	9.4	12.6	7.8		5.8

Site 3

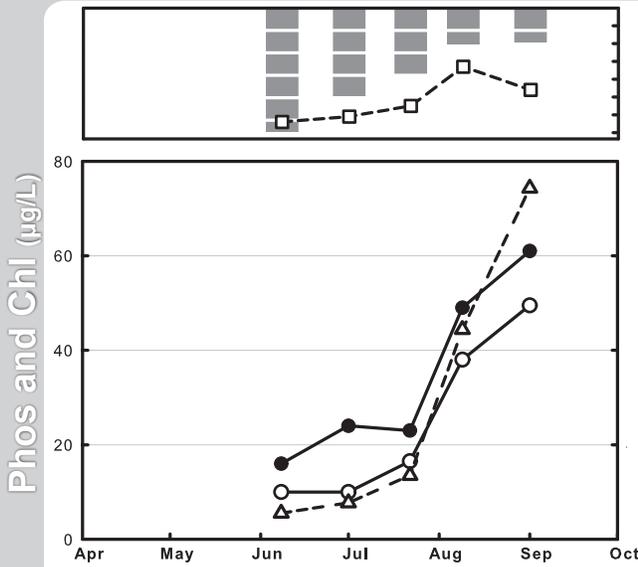
Latitude: 37.1945 Longitude: -90.5037

Date	X	X	6/8	7/1	7/22	8/9	9/1	X	Mean
Secchi (inches)			27		30		24		27
TP (µg/L)			24	30	17	18	16		20
TN (µg/L)			220	130	180	190	240		188
CHL (µg/L)			11.4	10.7	5.4	6.0	5.7		7.4
ISS (mg/L)			6.2	3.7	5.8	3.0	3.8		4.3

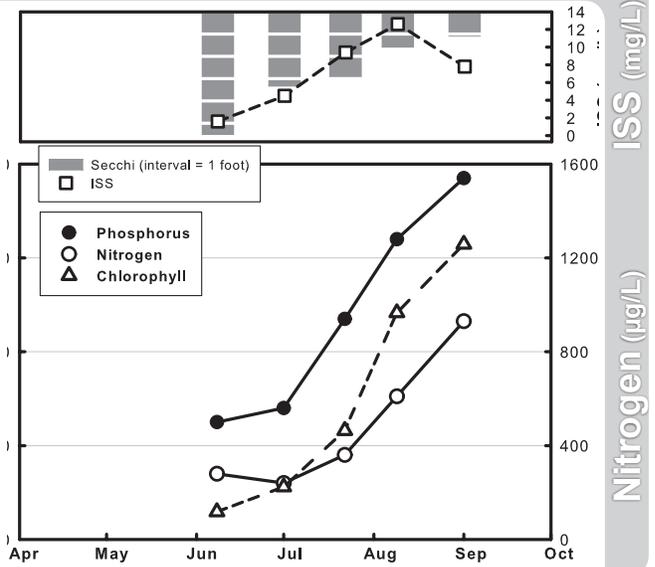
Lake Wappapello - Sites 1 and 2

2011 GRAPHS

Site 1 - 2011 Data



Site 2 - 2011 Data

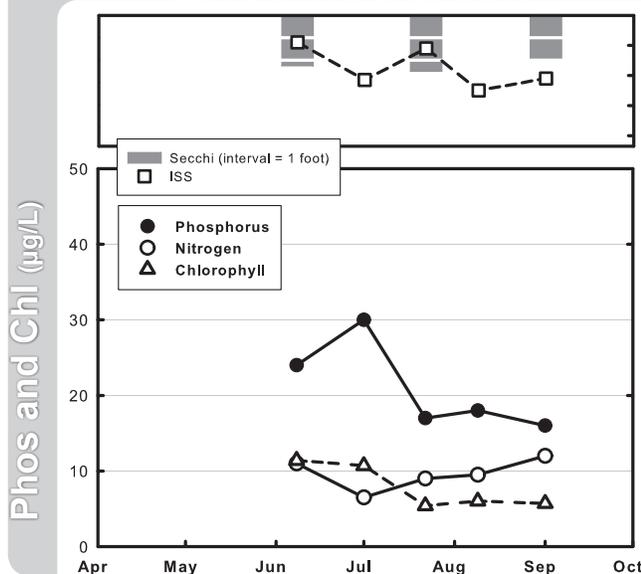


Lake Wappapello Site 3

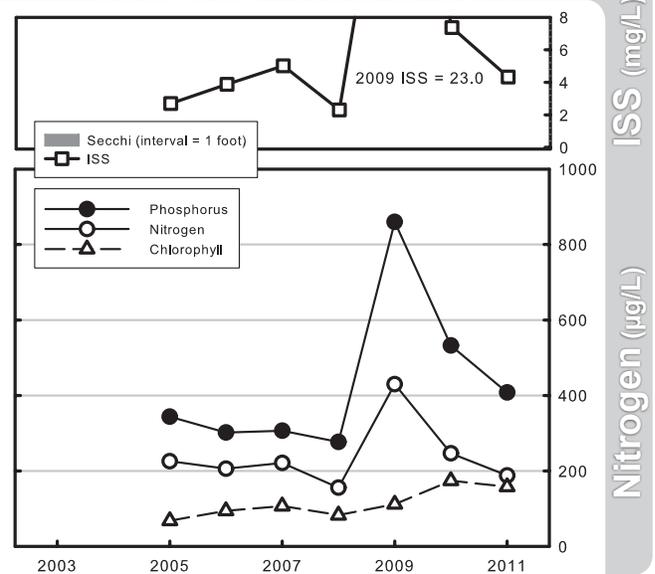
Site 3 differed from the other two sites in that there was not a distinct seasonal pattern of change in water quality. This site is located far enough upstream that water quality reflects

inputs coming into Lake Wappapello, while sites 1 and 2 are truly lake sites that react to in-lake processes such as internal loading and frequent mixing.

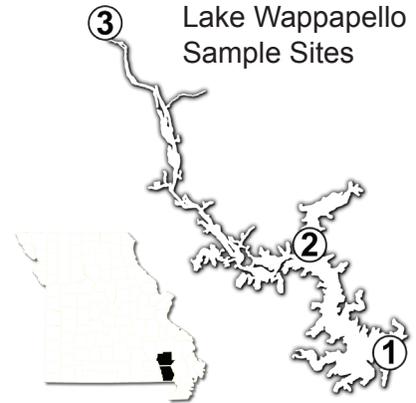
2011 GRAPHS



TREND GRAPHS



Lake Wappapello - Trend Discussion

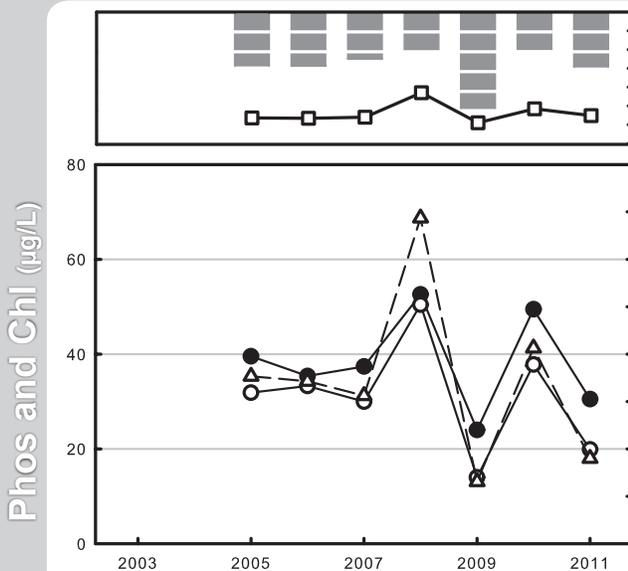


Water quality at Sites 1 and 2 was stable during the first three years of monitoring (2005-07) with only minor differences in summertime mean values from one year to the next. In contrast, the last four summers have exhibited much more year-to-year variation in water quality. These recent fluctuations are normal for Missouri reservoirs. None of the parameters display a trend of increasing or decreasing values at the current time.

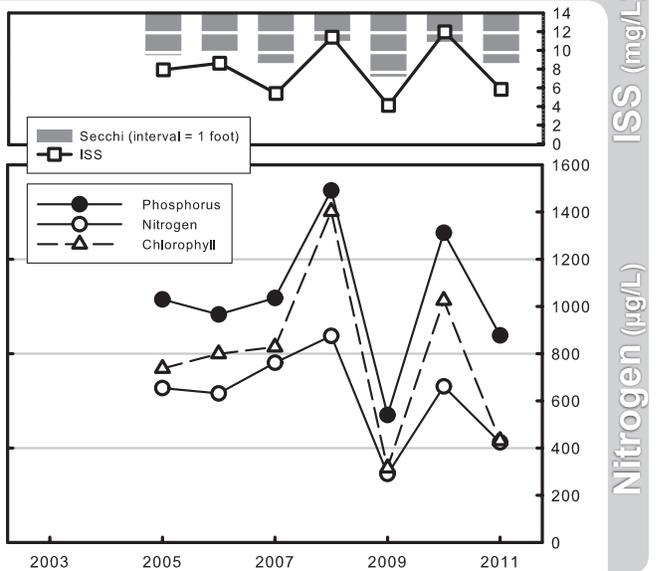
The long term trends in water quality at Site 3 show the last three summers have had higher phosphorus levels that the first four summers of sampling. Increased phosphorus resulted in slightly higher chlorophyll values. While nitrogen was notably higher in 2009, the last two summers have not differed from previous values. Because Site 3 is located fairly far up the St. Francois River Arm, sample results are very dependent on the timing of sample collections relative to rain events in the watershed. Because of the expected variability at this site, it is hard to know if phosphorus is truly trending up or if the results are a function of sample timing.

TREND GRAPHS

Site 1 - Long-Term Trends



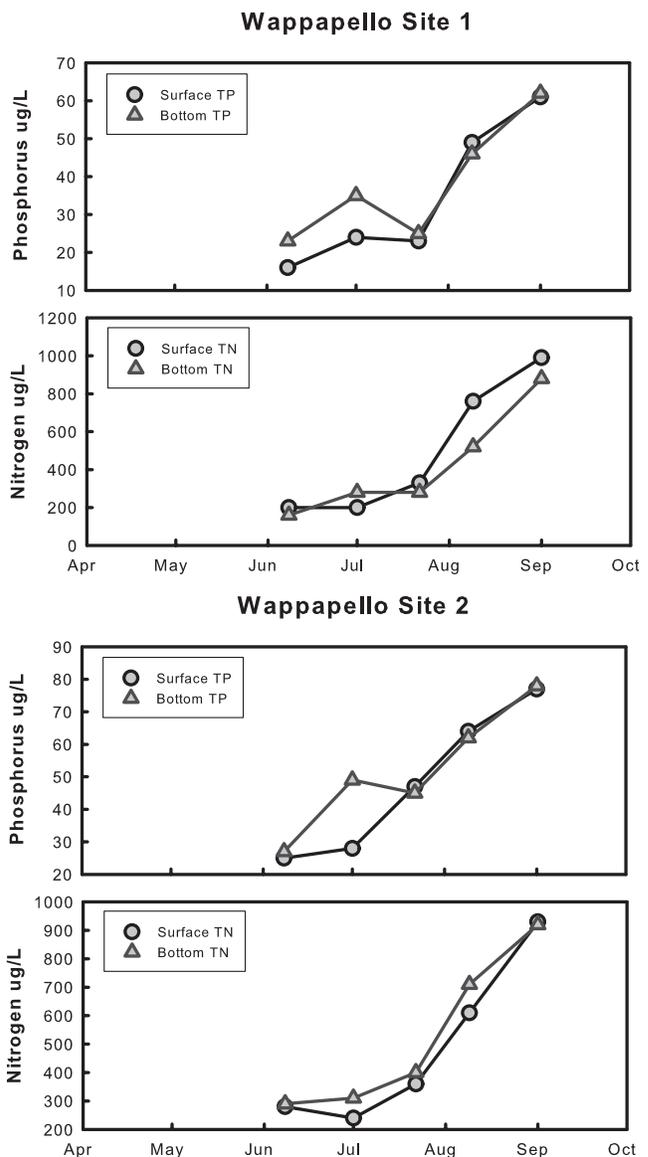
Site 2 - Long-Term Trends



Lake Wappapello Bottom to surface comparison

During the 2011 season samples were also collect near the bottom of the lake at sites 1 and 2 in order to gauge the influence of internal loading in Lake Wappapello. Comparisons of surface and bottom water quality varied from one sample to the next. During the first and second samples the bottom water generally had more phosphorus, chlorophyll and inorganic suspended sediment than the surface water (nitrogen showed minimal differences). This changed by late July when water quality at both sites was virtually the same in top and bottom waters. Samples collected in August and September had mixed results, with phosphorus remaining equal top to bottom at both sites, while chlorophyll was slightly higher in the bottom samples at both sites. Nitrogen was puzzling with the surface value being higher than the bottom value at site 1 in August, while Site 2 had higher nitrogen values in the bottom sample on the same date.

The results of the surface-bottom comparisons suggest that during the first part of the season there was thermal stratification with differences in water quality between the top and bottom layer of the lake. The third sample would seemed to have been collected while the lake water was actively mixing, thus the similarity in water quality top to bottom. The last two samples did show some differences between surface and bottom samples for some parameters. These samples may have been collected long enough after a mixing event that differences between surface and bottom waters were starting to develop.



Site 1 - Bottom Sample

Date	X	X	6/8	7/1	7/22	8/9	9/1	X	Mean
TP (µg/L)			23	35	25	46	62		36
TN (µg/L)			160	280	280	520	880		356
CHL (µg/L)			10.6	17.4	14	52.1	78.1		25.4
ISS (mg/L)			2.4	7.2	3.6	7.2	9.6		5.3

Site 2 - Bottom Sample

Date	X	X	6/8	7/1	7/22	8/9	9/1	X	Mean
TP (µg/L)			27	49	45	62	78		49
TN (µg/L)			290	310	400	710	920		472
CHL (µg/L)			13.1	20.7	24.1	57.1	78.5		31.1
ISS (mg/L)			2.4	14	8.8	11.6	10		8.1