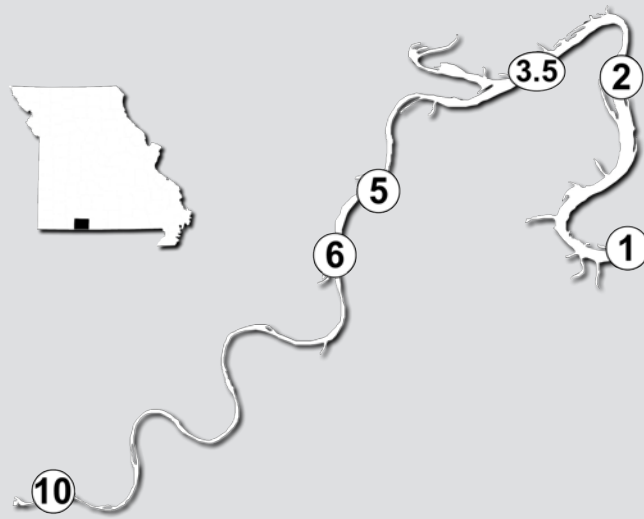


# Lake Taneycomo

Taney County

SITES AND SUMMARY

Water quality patterns across the six monitored Lake Taneycomo sites during 2008 were similar to past findings. Phosphorus concentrations were fairly comparable from one end of the lake to the other. Nitrogen values on the other hand displayed differences across the lake. Nitrogen levels at Site 10 are largely influenced by the water source, which is 'hypolimnetic' water from Table Rock. This means that the water comes from the layer near the bottom of Table Rock and tends to have a build-up of nitrogen (as well as phosphorus). The location of the trout hatchery may also contribute to the higher nitrogen values measured up-lake. More nitrogen is added to the lake at the Branson Sewage Treatment Plant, which is why the highest nitrogen values measured in the lake occur at Site 5, downstream for the plant. Nitrogen concentrations decrease moving down-lake towards Powersite Dam. This probably reflects loss of nitrogen through sedimentation and de-nitrification (loss of nitrogen as a gas from the lake water). Algal chlorophyll levels tend to be low in up- and mid-lake sites, with increases at down-lake sites. In response to this increase in algal biomass, we find the shallowest Secchi reading at the down-lake sites.



2008 DATA

Parameter		1	2	3.5	5	6	10
# of samples		7	7	6	6	6	8
Secchi (inches)	Mean	57	58	70	123	118	*
	Minimum	39	41	25	65	65	*
	Maximum	77	77	159	168	192	*
Phosphorus (µg/L)	Mean	27	26	22	26	25	33
	Minimum	20	21	17	17	20	21
	Maximum	38	41	30	54	33	50
Nitrogen (µg/L)	Mean	693	698	925	1075	960	860
	Minimum	560	540	710	950	780	690
	Maximum	910	940	1220	1210	1330	1210
Chlorophyll (µg/L)	Mean	4.4	4.5	1.0	0.7	0.9	0.9
	Minimum	1	1	0.4	0.4	0.4	0.2
	Maximum	15.1	16.3	3.7	1.2	1.3	9.3

\* Secchi touched bottom

# Lake Taneycomo

Taney County

## 2008 Seasonal Trends

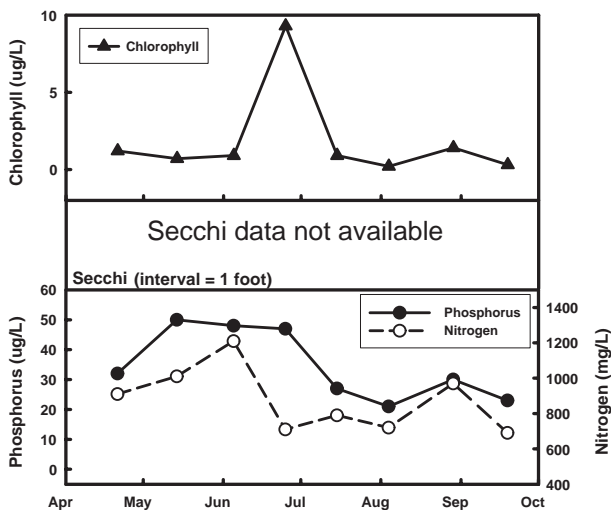
High levels of flow from Table Rock Lake through Lake Taneycomo during 2008 influenced water quality findings. Nutrient levels were highest at Site 10 (below Table Rock Dam) during the first half of the season. This pattern was not obvious at Sites 6, 5 and 3.5 due to limited sample collection during this period. Down-lake sites (2 and 1) displayed steadily decreasing nutrient concentrations through the season.

Chlorophyll levels in most of the lake were generally low ( $\approx 1\mu\text{g/L}$ ) throughout the season. The exceptions were Sites 1 and 2 during the second half of the sample season, when chlorophyll concentrations were elevated ( $>10\mu\text{g/L}$ ). The higher chlorophyll

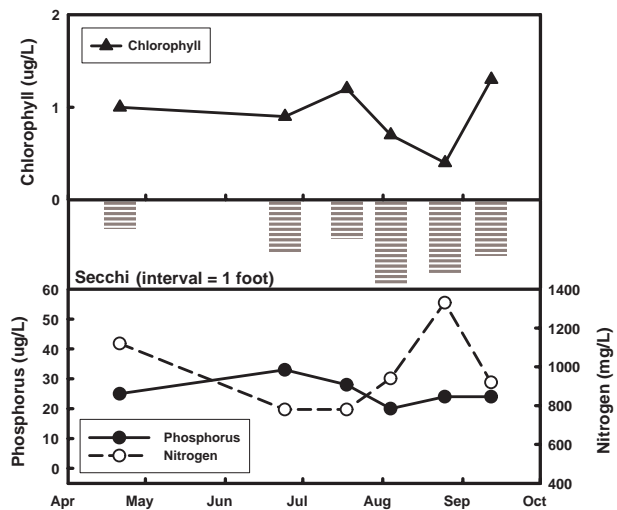
readings occurred even though nutrient levels were on the decline at these sites. Higher chlorophyll concentrations are likely related to slower movement of water through the lake and lower levels of inorganic suspended solids (turbidity), which often reduce the amount of light available for photosynthesis.

The influence of inorganic suspended solids on water clarity can be seen in up-lake sites, where Secchi transparency values were lower in the first half of the season even though chlorophyll concentrations were stable throughout the season.

### Site 10



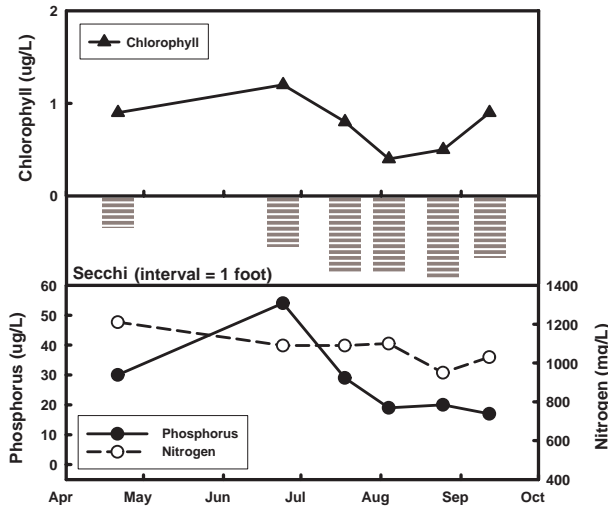
### Site 6



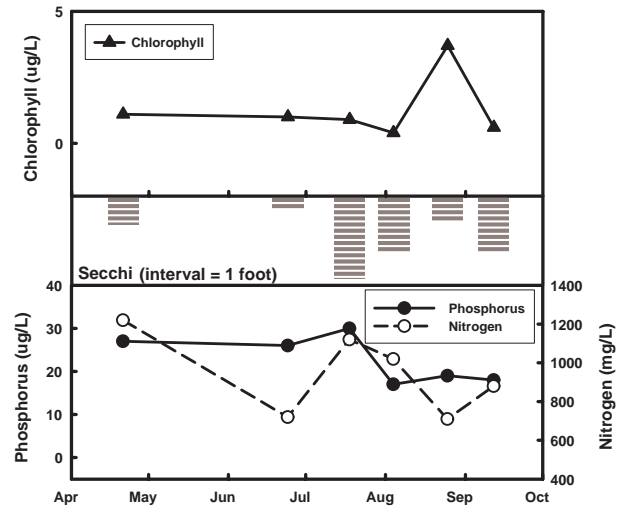
# Lake Taneycomo

Taney County

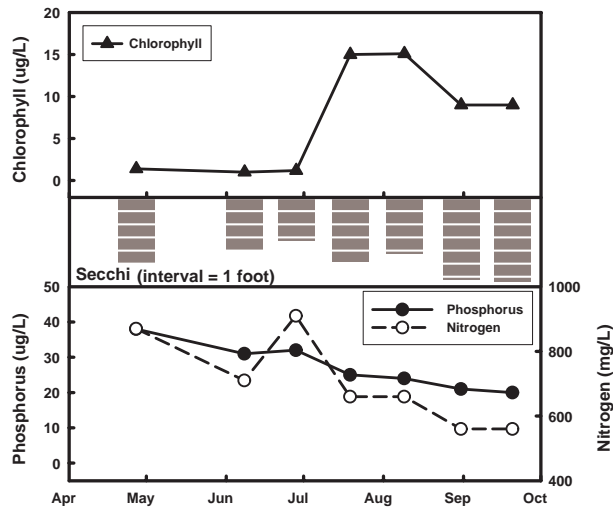
## Site 5



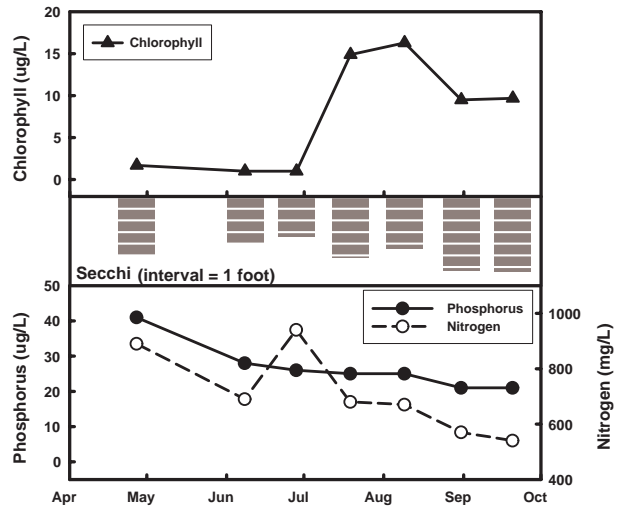
## Site 3-5



## Site 1



## Site 2



# Lake Taneycomo

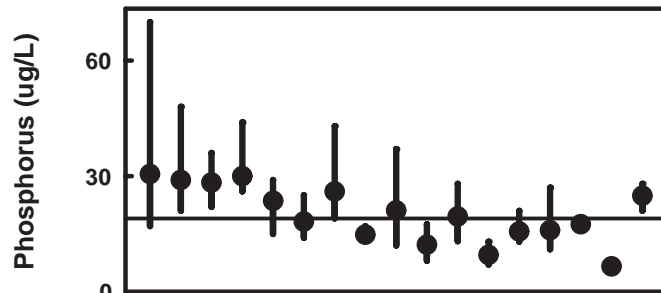
Taney County

## Phosphorus

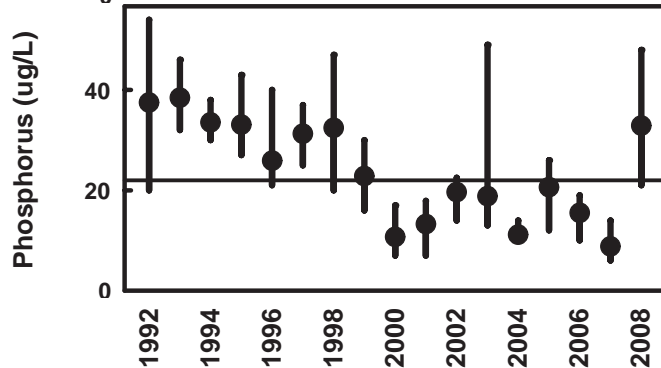
All sites in Lake Taneycomo show the trend of decreased phosphorus over time. In down-lake sites, such as Site 2, the trend started in the mid 1990s when the Branson Treatment Plant started to remove phosphorus from effluent inputs into Lake Taneycomo. The long-

term trend at Site 10 shows how reductions in phosphorus inputs into Table Rock Lake have benefited Lake Taneycomo. The overall average phosphorus concentration at Site 10 for summers of 1992-1999 was 31µg/L, while the average since 2000 is 16µg/L.

Site 2



Site 10

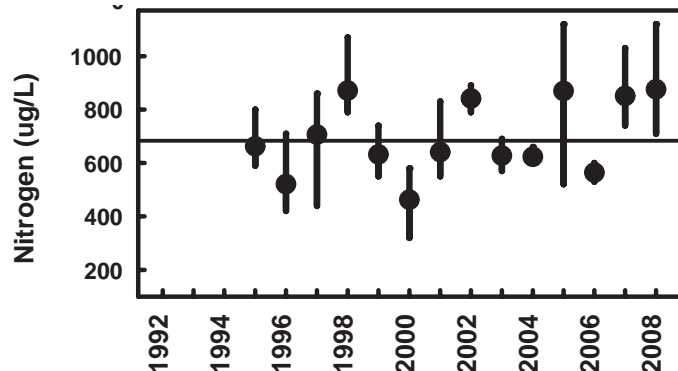


## Nitrogen

None of the sites in Lake Taneycomo display a trend of changing nitrogen concentrations over the long-term. As the graph for Site 3.5 indicates, there are differences from one

year to the next in terms of both geometric mean nitrogen level as well as the range of nitrogen values measured within individual summers.

Site 3.5



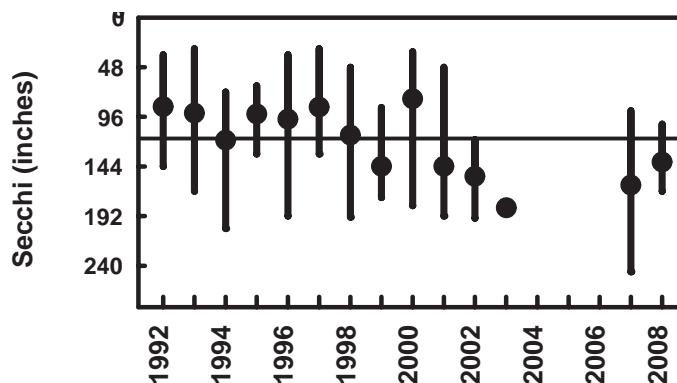
## Secchi Transparency

With the small decreases in algal chlorophyll there has been an increase in water clarity in the mid-lake region as seen at Site 5. The overall mean summertime chlorophyll value for the years 1992-2000 was 2.1µg/L. For the five years since 2000 that this site was monitored the overall chlorophyll value is 1.1µg/L. This represents a very small decline in the actual algal chlorophyll measured at this site. Because the relationship between water clarity and algal chlorophyll is not linear, small changes in chlorophyll when values are low translate to large increases in

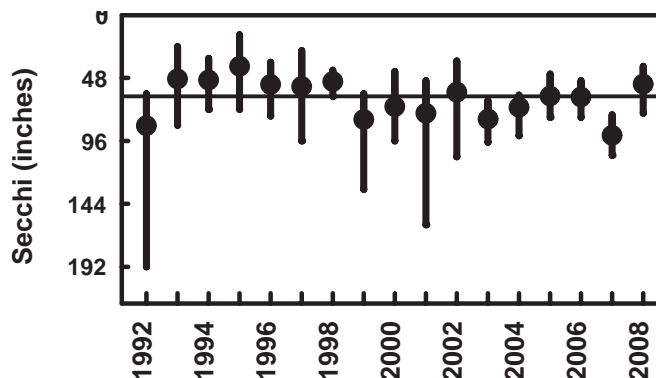
water clarity. The overall Secchi transparency values for the 1992-2000 and 2001-2008 periods are 100 and 158 inches, respectively.

This same trend is not as obvious at down lake sites because the chlorophyll levels are a little higher and the relationship between chlorophyll and water clarity is not as sensitive to changes in chlorophyll. Secchi transparency has been a little deeper in recent years, but not near the ≈60 inch improvement witnessed mid lake.

Site 5



Site 1



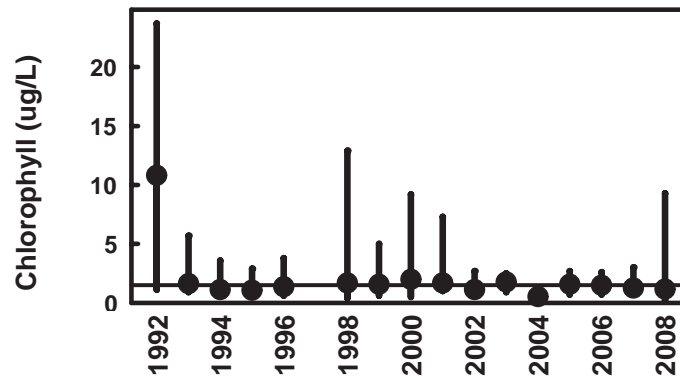
## Chlorophyll

Overall, the geometric mean chlorophyll values at Site 10 have not responded to decreased phosphorus because these values were low to begin with. At this site nutrients are not the limiting factor to algal growth. Instead, the low levels of algae in the water coming out of Table Rock Lake (from deep water strata) combined with fairly rapid flow keep most algal chlorophyll measurements low relative to nutrients. There have been a few years when the maximum chlorophyll value at this site during the summer was notably higher than normal. These values probably reflect those rare occasions when algal chlorophyll levels at this site are able to elevate above a few micrograms per liter

due to low flow. Or there is the possibility that these elevated values at Site 10 represent sub-surface algal peaks in Table Rock Lake that are making their way through the dam and being measured in samples collected at Site 10.

The other sites on Lake Taneycomo display trends in chlorophyll like that seen at Site 1. The summertime geometric mean values have decreased, but minimally. The most dramatic change associated with lower phosphorus levels is the reduction in chlorophyll maxima. Extreme algal blooms that plagued the lake prior to phosphorus reductions do not seem to be a problem any longer.

Site 10



Site 1

