

# Lake Springfield



Figure 92. Location of Lake Springfield and its sample sites

Lake Springfield is used as a source of cooling water for the James River Power Plant. This 206 acre lake has a 165,000 acre watershed that is 34% forest, 9% cropland, 54% grassland and 3% urban. Construction on Lake Springfield was completed in 1956.

## 2004 Results

Figures 93 and 94 show how the parameters nitrogen, phosphorus, algal chlorophyll, inorganic suspended solids and Secchi transparency varied Lake Springfield during 2004. The descriptive statistics appear in Tables 37 and 38. A brief description of the results:

- Secchi transparency at Site 1 (dam) is half that of Site 2 due to much higher chlorophyll and ISS concentrations.
- Phosphorus concentrations were 55% higher and ISS concentrations were higher by ~three-fold at the dam compared to the up-lake site.
- Nitrogen concentrations at both sites vary more than 2.5 times throughout the 2004 sampling season. Chlorophyll concentrations vary greatly as well, from 0.7 to 26.0 ug/L at Site 2 (37 fold), and from 2.6 to 47.9 ug/L at Site 1 (18 fold).
- High ISS concentrations at the dam don't appear to shade out algae, as would be expected. It's possible that turbulent mixing at the dam (due to power plant outflow) exposes algae to light while simultaneously keeping sediments in suspension.

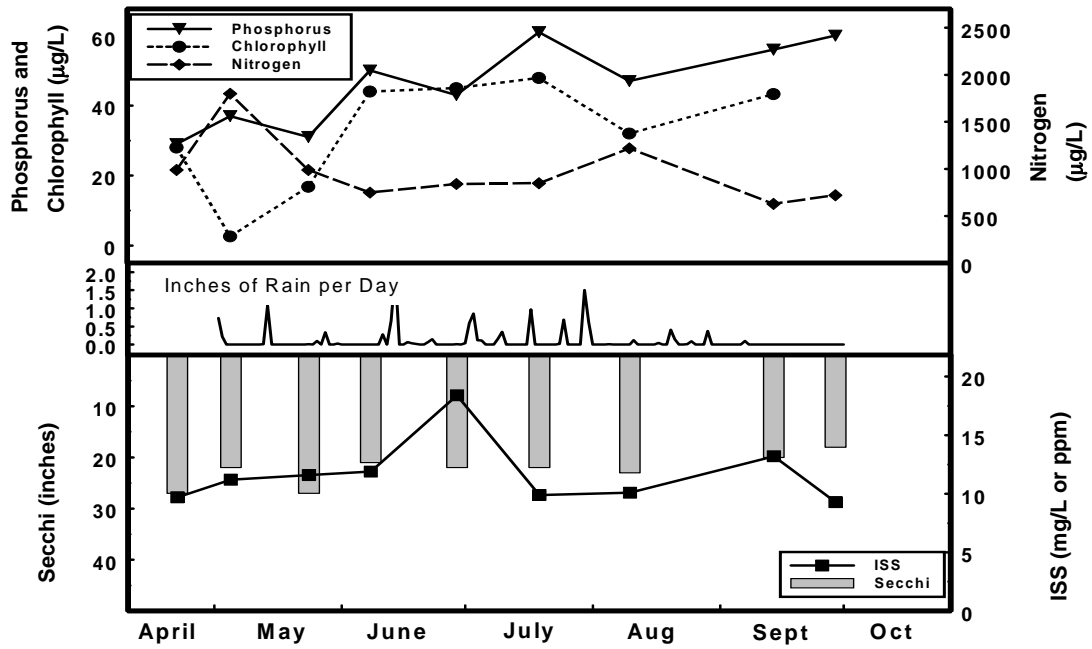


Figure 93. Seasonal fluctuations of parameters for Lake Springfield, Site 1 – 2004

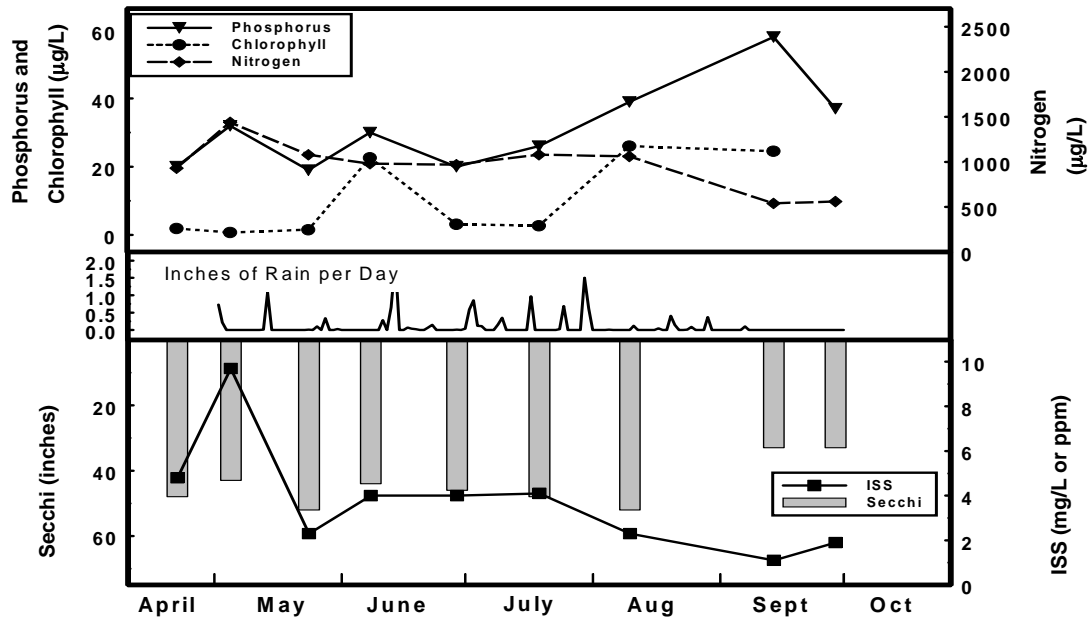


Figure 94. Seasonal fluctuations of parameters for Lake Springfield, Site 2 – 2004

Table 37. Descriptive statistics for Lake Springfield, Site 1 – 2004

|                          | <b>Secchi<br/>(inches)</b> | <b>TP<br/>(ug/L)</b> | <b>TN<br/>(ug/L)</b> | <b>CHL<br/>(ug/L)</b> | <b>ISS<br/>(mg/L)</b> |
|--------------------------|----------------------------|----------------------|----------------------|-----------------------|-----------------------|
| <b>Geometric Mean</b>    | 22                         | 45                   | 930                  | 25.2                  | 11.5                  |
| <b>Minimum</b>           | 18                         | 29                   | 630                  | 2.6                   | 9.3                   |
| <b>Maximum</b>           | 27                         | 61                   | 1800                 | 47.9                  | 18.4                  |
| <b>Number of Samples</b> | 9                          | 9                    | 9                    | 8                     | 9                     |

Table 38. Descriptive statistics for Lake Springfield, Site 2 – 2004

|                          | <b>Secchi<br/>(inches)</b> | <b>TP<br/>(ug/L)</b> | <b>TN<br/>(ug/L)</b> | <b>CHL<br/>(ug/L)</b> | <b>ISS<br/>(mg/L)</b> |
|--------------------------|----------------------------|----------------------|----------------------|-----------------------|-----------------------|
| <b>Geometric Mean</b>    | 44                         | 29                   | 921                  | 4.7                   | 3.2                   |
| <b>Minimum</b>           | 33                         | 19                   | 540                  | 0.7                   | 1.1                   |
| <b>Maximum</b>           | 52                         | 58                   | 1440                 | 26.0                  | 9.7                   |
| <b>Number of Samples</b> | 9                          | 9                    | 9                    | 8                     | 9                     |

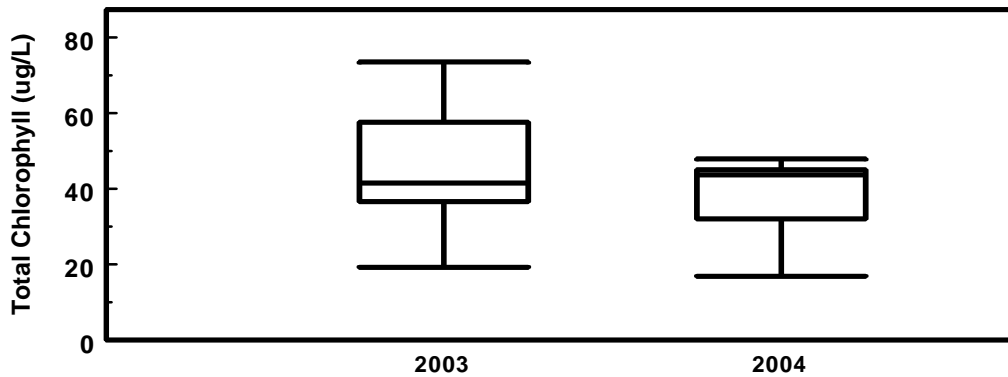


Figure 95. Chlorophyll trends in Lake Springfield, Site 1. With only 2 years of data at this site, it is too early to speculate on trends. 2004 was quite similar to 2003.

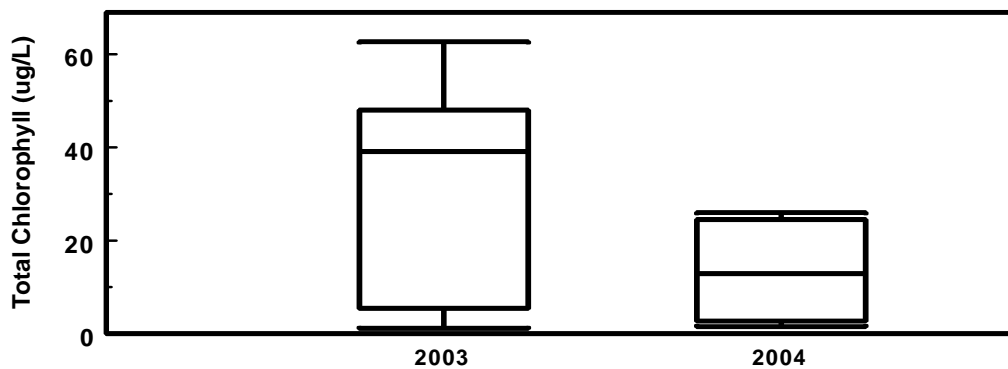


Figure 96. Chlorophyll trends in Lake Springfield, Site 2. With only 2 years of data at this site, it is too early to speculate on trends. 2004 median concentration was lower than 2003