

2004 Lake Monitoring Program

Three Rivers Park District Annual Lake Monitoring Report

Lake Independence

The Three Rivers Park District established an in-lake phosphorus concentration goal for Lake Independence of 36 µg/L to support direct contact recreational use. Total phosphorus concentrations decreased from 82 µg/L in 1995 to 35 µg/L in 2001. Lake Independence achieved the in-lake water quality goal in 2001 for the first time since 1988. However, water quality conditions degraded from 2001 through 2004. The mean phosphorus concentration increased from 56 µg/L in 2002 to 83 µg/L in 2004. The phosphorus concentration for 2004 was the highest reported value since the implementation of the monitoring program. These high phosphorus concentrations were conducive for the development of algae blooms. Chlorophyll-a concentrations increased from 22 µg/L in 2002 to 40 µg/L in 2004. Consequently, the average water clarity conditions also degraded in which secchi depth decreased to 1.7 m in 2004.

The increase in phosphorus concentration in 2004 was due to excessive rainfall that produced increased phosphorus loading from the watershed. The amount of precipitation received in May and June was approximately 40% of the annual total precipitation. The large amount of watershed phosphorus loading due to the excessive amount of precipitation may have contributed to above average phosphorus concentrations in the spring. Typically, the phosphorus concentrations in the spring are further impacted by the senescence of curlyleaf pondweed that occurs at the end of June or beginning of July. There was an increase in chlorophyll-a concentration with a decrease in water clarity that corresponded to the time period of curlyleaf pondweed senescence. However, there was no corresponding increase in phosphorus concentration at this particular time period suggesting that curlyleaf pondweed senescence did not significantly impact water quality in 2004. The decrease in water quality conditions in the spring and summer were due to excess lake nutrients and weather conditions that were conducive for algal blooms. The phosphorus concentrations did not increase until mid-August as a consequence of internal loading and an increase in precipitation.

Spurzem Lake

Spurzem Lake was identified in the Lake Independence Diagnostic Feasibility Study as a potential source of nutrients that may impact the Lake Independence water quality. Spurzem Lake has excessive nutrients that contribute to poor water quality conditions. The water clarity conditions in 2003 were significantly poorer in comparison to previous years due to excessive algae blooms during the summer. These severe algae blooms in 2003 were partially attributed to high phosphorus concentrations. The average phosphorus concentration in 2004 was 116 µg/L, which was considerably higher than the average phosphorus concentration reported for 2003 (93 µg/L). Despite a higher phosphorus concentration in 2004, the water quality conditions were better than conditions reported for 2003. The average chlorophyll-a concentration in 2004 was 35 µg/L, which ranged between 14 µg/L to 65 µg/L throughout the summer. Consequently, the water clarity conditions were slightly improved with an average secchi depth of 1.58 m. It appears that the water quality impacts from nutrient release of curlyleaf pondweed senescence was not as significant in comparison to 2003. The phosphorus increase that typically coincides with curlyleaf pondweed senescence appears to have occurred earlier in June when conditions were not as conducive for the development of algae blooms. Consequently, algae blooms developed later in the summer around mid-July.

The Three Rivers Park District has established water quality goals for Spurzem Lake to support indirect contact recreational use. Currently, the water quality conditions are considerably higher than these water quality goals. The excess nutrients in Spurzem Lake have caused poor water quality conditions that potentially inhibit recreational use. The water quality conditions in 2004 are considerably poorer in comparison to previous years that were monitored. Consequently, it becomes important to improve the water quality of Spurzem Lake to improve recreational use, and reduce potential downstream impacts to Lake Independence. The Lake Independence Diagnostic Feasibility Study identifies potential sources that impact the water quality for Spurzem Lake, and should be considered relative to implementing best management practices to improve water quality.

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Lake Sarah

The Three Rivers Park District established an in-lake phosphorus concentration goal for Lake Sarah of 36 µg/L to support direct contact recreational use. The average phosphorus concentration has never achieved the in-lake goal. The average phosphorus concentration has gradually increased from 74 µg/L in 2000 to 138 µg/L in 2004. The excess phosphorus concentration is partially attributed to watershed run-off from an increase in precipitation in 2004. The high phosphorus concentrations are conducive for algae blooms, in which the average chlorophyll-a concentration was 62 µg/L in 2004. These concentrations are the highest reported since implementation of the monitoring program. Despite the high phosphorus and chlorophyll-a concentrations, the water clarity conditions were not as significantly impaired. The average secchi depth transparency for 2004 was 1.53 m, which was relatively high in comparison to previous years. This value was relatively high because of a clear water phase that occurred in early May and contributed to a secchi depth of 4.2 m. The remaining secchi depth measurements ranged between 0.59 m to 2.77 m with the majority of the values below 1 m.

The water clarity conditions and chlorophyll-a concentrations became significantly impaired in mid-June, which coincides with the senescence of curlyleaf pondweed. Lake Sarah has high densities of curlyleaf pondweed that inhibits the potential recreational use of the lake. After the senescence of curlyleaf pondweed in 2004, the phosphorus concentration increased from 78 µg/L to 142 µg/L. These excess nutrients can have dramatic effects on seasonal variations in water quality conditions.

Little Long Lake

There has not been a significant amount of water quality data collected for Little Long Lake to determine the historic trophic status of the lake. Little Long Lake satisfies the criteria to be considered a lake that supports direct contact recreational use. The lake has excellent water quality conditions in comparison to other lakes within the ecoregion. The average phosphorus concentration was 17 µg/L in 2004, in which phosphorus concentrations ranged between 9 µg/L to 23 µg/L. Since phosphorus concentrations are low, Little Long Lake does not have severe algae blooms. The chlorophyll-a concentrations in 2004 remained relatively consistent throughout the summer ranging between 3.3 µg/L to 7.5 µg/L. Consequently, water clarity conditions were excellent in which secchi depth measurements ranged from 3.98 to 5.15 m in 2004. These water quality conditions have remained relatively consistent since the implementation of the monitoring program in 1997.

The in-lake water quality for Little Long Lake currently meets the criteria to support full recreational use. The current water quality conditions that support full recreational use would suggest that Little Long Lake does not have any water quality problems. However, Little Long Lake has two exotic plant species, Eurasian watermilfoil and curlyleaf pondweed, that have the potential to significantly impact long-term water quality conditions. The dense growth of Eurasian watermilfoil has become more prevalent the past several years. In addition, Little Long Lake has recently become invested with curlyleaf pondweed. If densities of curlyleaf pondweed become more prevalent, then water quality conditions may degrade due to the senescence process. A change in the plant community from native species to predominately exotic species could have potential water quality implications that would inhibit potential recreational use.