

# Lake Monitoring Report

## Elm Creek Watershed Management Commission 2004 Lake Water Quality Summaries

### Fish Lake

The Three Rivers Park District established an in-lake phosphorus concentration goal for Fish Lake of 36 µg/L to support direct contact recreational use. The average phosphorus concentration for Fish Lake was 47 µg/L in 2004 with values ranging between 36 µg/L to 82 µg/L. These high phosphorus concentrations were partially due to the excessive amount of precipitation that contributed to increased watershed loading. The excess in-lake phosphorus was conducive for the development of algae blooms. Consequently, the average chlorophyll-a concentration was 28.8 µg/L. These phosphorus and chlorophyll-a concentrations are similar to those conditions observed in 2002 and 2003. Despite the high phosphorus and chlorophyll-a concentrations, the water clarity conditions were not as significantly impaired. The average secchi depth transparency was 2.37 m in 2004, which is relatively high in comparison to 2002 and 2003. This value was relatively high because of a clear water phase that occurred in early May that contributed to a secchi depth measurements of 6.7 m and 4.2 m. The remaining secchi depth measurements ranged between 0.9 and 2.9 m. The total phosphorus and chlorophyll-a concentrations became significantly impaired in mid-June, which coincides with the senescence of curlyleaf pondweed. Although Fish Lake does not have an excessive curlyleaf pondweed problem in comparison to similar lakes within the eco-region, the senescence process can result in a substantial amount of internal nutrient loading. After the senescence of curlyleaf pondweed, phosphorus concentrations increased from 36 µg/L to 57 µg/L. The released nutrients from curlyleaf pondweed became available for algae up-take, and resulted in algae blooms that persisted throughout the summer. These excess nutrients can have dramatic effects on seasonal variation in water quality conditions.

### Weaver Lake

Weaver Lake has water quality conditions that potentially inhibit recreational use. The water quality conditions for Weaver Lake have gradually declined since 2002. The average phosphorus concentrations have increased from 43 µg/L in 2002 to 51 µg/L in 2003. The excessive in-lake phosphorus was conducive for the development of algae blooms. The average chlorophyll-a concentration increased from 22 µg/L in 2002 to 40 µg/L in 2004. The average phosphorus and chlorophyll-a concentrations in 2004 were the highest observed since the implementation of the monitoring program in 1991. Despite relatively high phosphorus and chlorophyll-a concentrations, the water clarity conditions were excellent in which the average secchi depth measurement was 2.7 m. This was the highest average secchi depth measurement reported since 1993. This value was relatively high because of a clear water phase that occurred in May that contributed to secchi depth measurements of 7.6 and 6.2 m. The remaining secchi depth measurements ranged between 0.4 to 3.3 m. The water quality conditions began to degrade after 6.5 inches of rainfall occurred in early June. The increased watershed nutrient loading caused an increase in total phosphorus concentration from 32 µg/L to 73 µg/L. Another increase in phosphorus concentration occurred from mid-June through early July due to the senescence of curlyleaf pondweed. Weaver Lake has dense mats of curlyleaf pondweed that frequently grow to the surface. Consequently, there was a substantial amount of internal loading due to the plant senescence. The in-lake phosphorus concentration increased from 44 µg/L to 96 µg/L after the senescence of curlyleaf pondweed. The released nutrients from curlyleaf pondweed senescence contributed to a substantial algae bloom. Chlorophyll-a concentrations increased from 10 µg/L to 71 µg/L. After the senescence of curlyleaf pondweed, the algae blooms persisted throughout the summer in which water clarity conditions did not improve considerably until the end of September.



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## Diamond Lake

Diamond Lake has impaired water quality conditions that inhibit recreational use. The lake is extremely eutrophic with phosphorus concentrations consistently above 100 µg/L. The average phosphorus concentration in 2004 was 189 µg/L with values ranging between 109 µg/L to 331 µg/L. The excessive amount of phosphorus in the lake is conducive for severe algae blooms. The average chlorophyll-a concentration was 58 µg/L in 2004. Seasonal variation in chlorophyll-a concentrations ranged between 37 µg/L to 82 µg/L. Consequently, water clarity conditions were extremely poor in which secchi depth measurements ranged between 0.2 to 1.2 m. The severe algae blooms provide a shading effect that inhibits the development of aquatic macrophytes. The poor water quality conditions are partially due to large amounts of watershed nutrient loading from surrounding agricultural areas. In addition, the shallow morphology of the lake is extremely conducive for internal loading of nutrients that are re-suspended from the sediments. The lake is frequently vulnerable to winter and summer fish kills due to the extreme eutrophic conditions.

