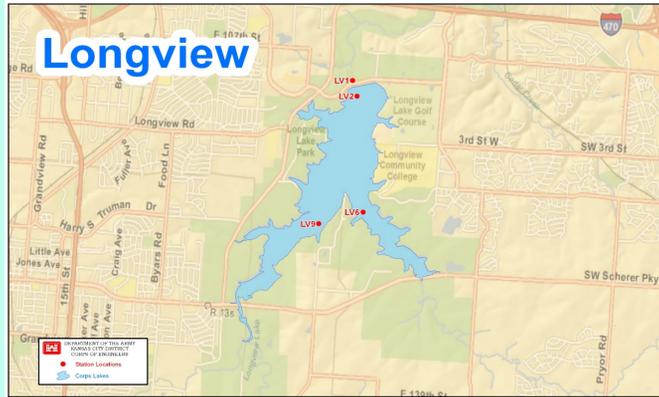


Longview Lake Water Quality Summary

2009-2018



Longview Lake

- Built on Little Blue River reaching full pool in 1986.
- **Watershed** = 50.3 square miles / 32,192 Surface Acres (SA)
- **Capacity:**
 - Flood Control: 24,810 Acre-feet (AF): 1,964 SA
 - Multipurpose: 13,579 AF; 927 SA; 24 miles of shoreline
 - Avg. annual inflow (2009-2018) =34,092 AF; 2018 inflow=35,251 AF
- **Operating project purposes:** flood control, water quality, recreation, fish and wildlife
- **Water Quality (WQ)** at Longview Lake in 2018 was beneficial for operating purposes listed above and did not exceed Missouri State WQ Standards for designated uses. Water quality improves as nutrients, herbicides and sediments are removed by settling, dilution, and biological processes as water moves from inflow streams toward the dam.

Nutrient Enrichment

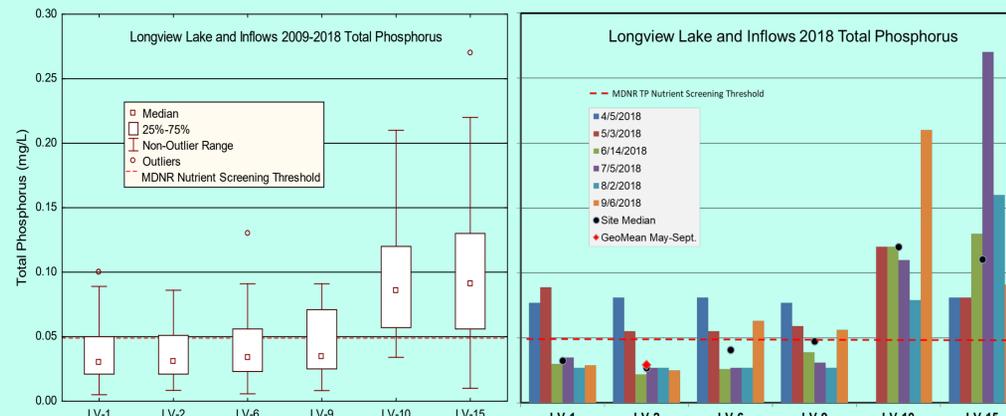
Nutrients (i.e. phosphorus and nitrogen) are essential for aquatic life and are the primary factor driving fish and aquatic plant growth rates and productivity. Excess nutrients from urban, agricultural or natural sources increase the natural aging, or eutrophication, process in lakes. This can alter plant and aquatic life in lakes and water bodies, cause algal blooms, create low dissolved oxygen that affects fish survival, and lead to taste and odor issues in drinking water. Despite urban influences, nutrient concentrations at Longview Lake are typically stable and measure at moderate levels. Missouri Department of Natural Resources (MDNR) led a multi-agency work group to establish Missouri Numeric Nutrient Criteria for Lakes to minimize and eliminate adverse effects of nutrient enrichment to aquatic life in Missouri lakes. In 2018, Longview Lake total nitrogen and total phosphorus at the dam slightly exceeded U.S. Environmental Protection Agency (EPA) Ecoregion Recommended Criteria. Summer total phosphorus ($\mu=0.039$ mg/L) and secchi disk ($\mu=1.1$ m) measurements, but not chlorophyll-*a* concentration ($\mu=9.6$ ug/L), indicate that Longview Lake is eutrophic according to the Carlson TSI index (Carlson, 1977).

The **US Army Corps of Engineers (USACE)** Water Quality Program collects monthly water samples at Longview Lake* from April through September. These figures present data collected between 2009-2018 from inflow streams (LV-10 and LV-15), lake sites LV-2, LV-6, LV-9), and the outflow (LV-1) below the dam. Thirty-four chemical, physical and biological parameters are measured to evaluate water quality. USACE uses this data to describe conditions and changes from the inflow streams, within the main lake, and outflow focusing on eutrophication, nutrients, sediment, herbicides, metals, and contaminants.

*Note: The term "lake" is substituted for technically correct "reservoir" throughout this document for consistency.

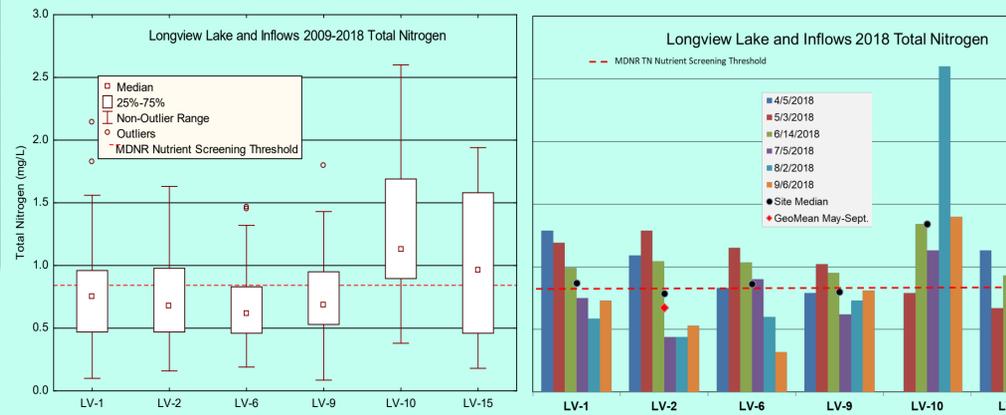
Total Phosphorus

Median total phosphorus (TP) concentrations from all Blue Springs Lake sites in 2018 were within the 50% quartile of 2009-2018 phosphorus data. Inflows had very elevated total phosphorus in July through September with several sample results exceeding the 75% quartile of the 10-year data range. MDNR Numeric Nutrient Criteria can be used to highlight nutrient impairment in Missouri lakes as outlined in state regulations (10 CSR 20-7). May-Sept TP geometric mean from site near dam (LV-2) did not exceed Nutrient Screening Threshold (0.049 mg/L). Total phosphorus at all Longview Lake sites are in the range of moderate-high biological productivity. Higher TP concentrations and a wider range of phosphorus data are found in the inflow streams and upper lake sites due to mobilized nutrients in algae and bound to sediment particles transported in moving water. Biological uptake or attenuation of phosphorus as well as settling of phosphorus bound to sediment particles typically results in decreasing concentrations as water moves through the lake.



Total Nitrogen

Nitrogen is an important nutrient for plant and algae growth. Sources of nitrogen range from fertilizer and animal/septic wastes, to groundwater, air and rainfall. Nitrogen concentrations measured in 2018 were very similar, within 25-75% quartile, to the 10-year as data set when comparing the two graphs below. May-Sept TN geometric mean from site LV-2 near the dam did not exceed the MDNR Nutrient Screening Threshold (0.843 mg/L). Higher concentrations of total nitrogen are typically found in the inflows and outflow of Longview Lake associated with moving water and discharge of nitrogen from the bottom of the lake at the dam.

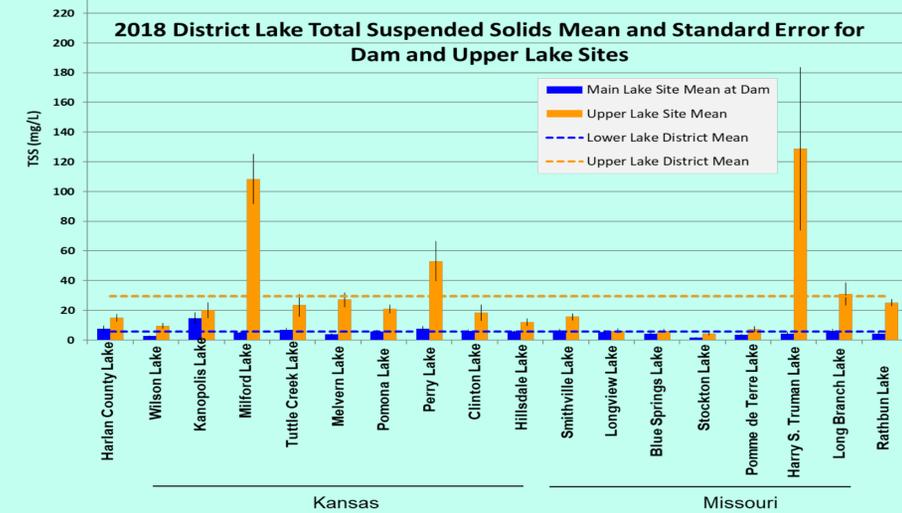


Dissolved Oxygen

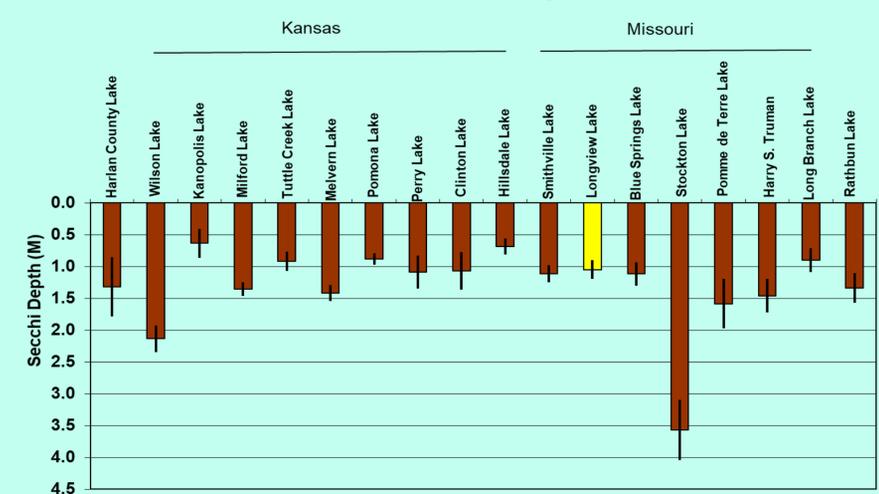
Dissolved oxygen is important to aquatic species location, growth, and survival in lakes. Longview Lake stratifies for a short period of the summer, but adequate (5 mg/L) dissolved oxygen is typically available. During the 2018 sampling season, the top 5 meters of Longview Lake were well oxygenated at all sites for fish and aquatic life throughout the summer.

Total Suspended Solids

Total Suspended Solids (TSS) is a measurement related to erosion in river basins, sedimentation or filling rates of downstream reservoirs. TSS is also closely linked to nutrient and contaminant transport through river systems. In 2018, below average inflow and reduced runoff led to exceptional water clarity in Longview Lake. TSS values were below the district average for lower and upper sites. Secchi depth measurement was greatly improved as illustrated in second graph. Typically, Longview Lake low secchi measurements rank in the bottom third of district lakes for water clarity.



2018 District Lake Mean Secchi Depth At Dam Site



Water Quality Concerns:

- Eutrophication
- Nutrients

