

Kanopolis Lake Water Quality Data

2001 - 2011

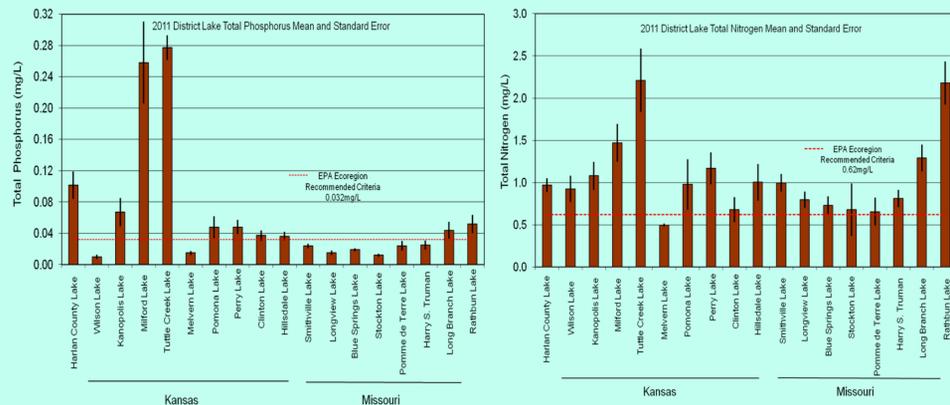


Kanopolis Lake:

- Built on Smoke Hill River reaching full pool in 1946.
- Watershed = 5,365 square miles/ 3,433,600 Surface Acres (SA)
- Capacity: Flood Control: 191,890 A-F / 10,790 surface acres
 - Multipurpose: 143,878 A-F / 3,406 surface acres / 41 miles of shoreline
- Operating project purposes: flood control, water quality, recreation, fish and wildlife, and water supply.
- Ave annual inflow = 127,300 acre-feet

Nutrient enrichment

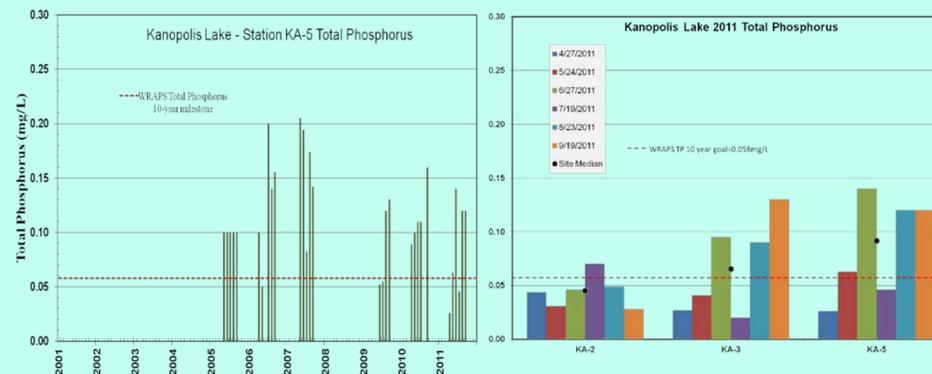
Nutrients (i.e. phosphorus and nitrogen) are essential for aquatic life and are the primary factor driving fish and aquatic plant growth rates and productivity. Excess nutrients from urban, agricultural or natural sources increases the natural aging or eutrophication process in lakes. This can alter plant and aquatic life in lakes and water bodies, cause algal blooms, create low dissolved oxygen that affect fish survival, and lead to taste and odor issues in drinking water. Kanopolis Lake has been listed as "impaired" on the 2010 Kansas 303(d) list due to accelerated eutrophication. This impairment is usually quantified and described by measuring multiple variables including total phosphorus, chlorophyll concentrations, and water transparency. KDHE and EPA are working with water quality partners, landowners and an active Kanopolis Watershed Restoration and Protection Strategy (WRAPS) group. Together they provide recommended best management practices to meet long term nutrient reduction goals for the watershed. Working in the watershed to reduce nutrient and sediment runoff will slow the eutrophication process improving water quality to meet operating purposes of Kanopolis Lake. In 2011, nutrient concentrations at Kanopolis Lake were above District lake averages for total phosphorus (0.06 mg/L) and total nitrogen (1.0 mg/L) and EPA Ecoregion recommended criteria measured at the site nearest the dam. Standard error bars in the graphs below illustrate the variation in sample results from each site in 2011.



The US Army Corps of Engineers (COE) Water Quality Program collects monthly water samples (April – September) at Kanopolis Lake. These figures present data collected between 2001-2011 from up to 3 sites. The sites two lake sites (#3, 5), and the outflow (#2). Thirty-four chemical, physical and biological parameters are measured to evaluate water quality. COE use this data to describe conditions and changes from the inflow, lake, and outflow focusing on eutrophication, nutrients, sediment, herbicides, metals, and contaminants.

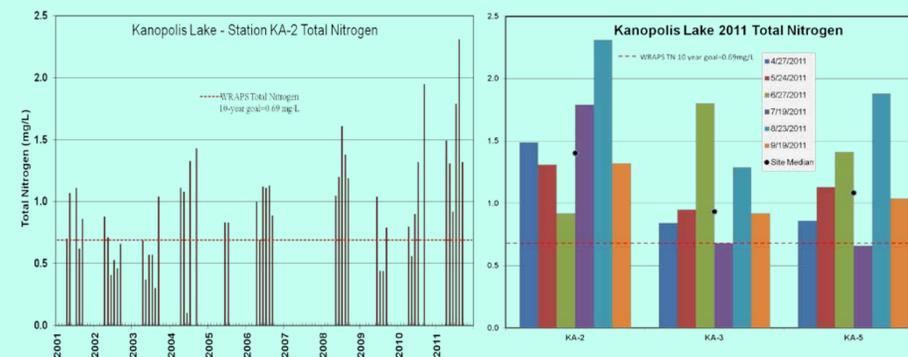
Total Phosphorus

Median total phosphorus (TP) concentrations from 2011 Kanopolis Lake samples were higher than EPA Ecoregion recommended criteria (0.032 mg/L) and WRAPS 10 year goals except at the outflow (KA2). Median TP at all Kanopolis Lake sites are in the range of high biological productivity leading to high algae populations and rapid fish growth as indicated by eutrophic class designation. In 2011, Kanopolis TP concentrations were similar to long term averages and trends with phosphorus concentrations highest in spring and fall months. Similar to most impoundments, higher TP concentrations and a wider range of data is usually found in the upper lake sites and inflows due to mobilized nutrients bound to silt particles in moving water the inflows and biological uptake or decline of TP as the water moves through the lake.



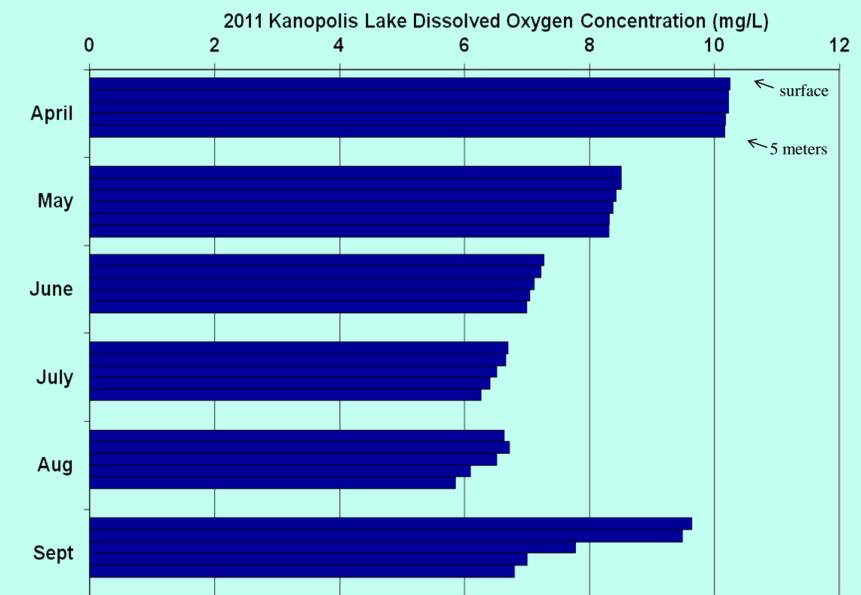
Total Nitrogen

In 2011, total nitrogen concentrations exceeded EPA Ecoregion recommended criteria of 0.62 mg/L and District Lake average (1.0 mg/L). WRAPS 10-year goals were exceeded at all sites in 2011. The highest concentrations were found below the dam in the outflow (KA2). Total nitrogen concentrations are highly variable between sites and years and most related to inflow levels and watershed factors (i.e. soil type, farming and livestock practices).



Dissolved Oxygen

Dissolved oxygen (D.O.) is an important factor in aquatic species location, growth, and ultimately survival in lakes. The figure below shows dissolved oxygen measured in the water column at one-meter intervals (e.g. each row in each month represents one meter of depth) from April-September at the dam (KA3). Kanopolis Lake does not typically stratify during summer months. Low dissolved oxygen (i.e less than 5 mg/L) can be a concern due to the shallow average depth of Kanopolis. In 2011, water quality profiles revealed both lake sites had sufficient oxygen during the water quality sample season.



Water Quality Concerns:

- Sediment inputs
- Eutrophication
- Dissolved Oxygen



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