Pomona Lake Water Quality Data

2005 - 2014

Pomona Lake:

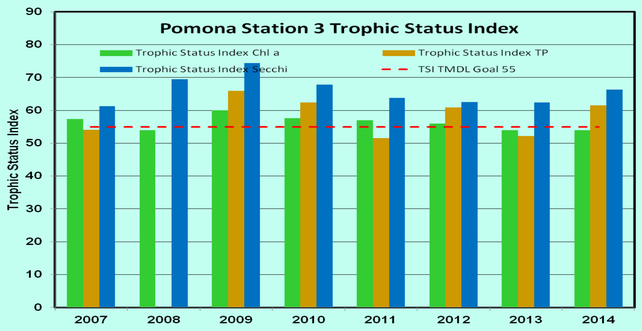
- Built on 110 Mile Creek reaching full pool in 1965.
- **Watershed** = 322 sq miles / 206,080 Surface Acres (SA)
- **Capacity:**
  - Flood Control: 176,123 Acre Feet (AF); 8,522 SA
  - Multipurpose: 64,208 AF; 3,865 SA/ 52 miles of shoreline
- **Operating project purposes**: flood control, water quality, recreation, fish and wildlife, and water supply.
- **Avg. annual inflow** (2005-2014)=130,588 AF; **2014 inflow** = 48,512AF
- **Water Quality** at Pomona Lake in 2014 was beneficial to operating purposes listed above and did not exceed KS State WQ Standards for designated uses. Reduced inflows (-63%) resulted in decreased nutrient and sediment input in 2014.

The US Army Corps of Engineers (USACE) Water Quality Program collects monthly water samples at Pomona Lake* from April through September. These figures present data collected between 2005-2014 from the inflow site #11, lake sites #3, 7, 12, 14, and the outflow site #2 below the dam. Thirty-four chemical, physical and biological parameters are measured to evaluate water quality. USACE uses this data to describe water quality history, 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.

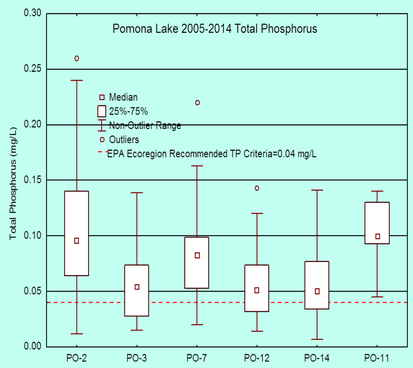
Trophic Status Index

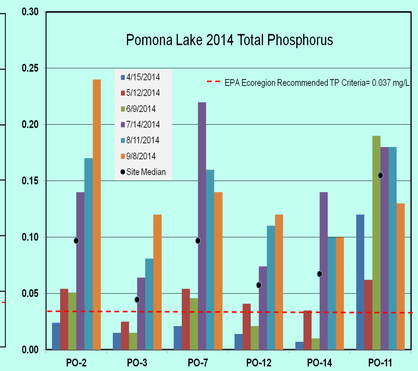
Trophic Status Index (TSI) is a calculation which can be based on average summer chlorophyll a, total phosphorous, or secchi measurements. TSI is used to describe the eutrophication process in numeric terms which is used to compare changes and effects over time. EPA has worked with water quality partners and Pomona Lake Watershed Restoration and Protective Strategy (WRAPS) group to develop total maximum daily loads (TMDL) for eutrophication and siltation to regulate nutrient enrichment to keep Pomona Lake water quality acceptable for recreational, aquatic life, drinking water, and industrial needs. TSI values of less than 55 is the goal. The figure below indicates chlorophyll a from algae meet are near the goal while total phosphorus and secchi values or water transparency needs the most improvement most likely due to influences from silt or inorganic components.



Total Phosphorus

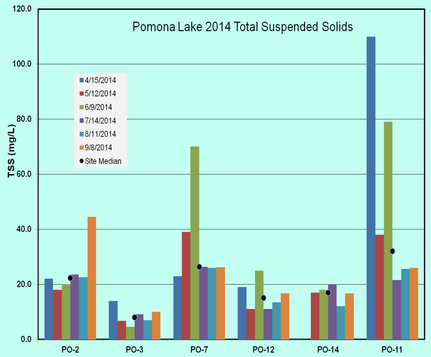
Total phosphorus (TP) median concentrations from 2014 Pomona Lake samples were in similar (i.e. between 25% and 75% quartiles of 10-year data) to the 2004-2014 medians, except it was higher at PO-11 from Dragoon Creek. Samples. Median TP at all Pomona Lake sites are in the range of high biological productivity leading to high algae populations and rapid fish growth as indicated by eutrophic designation. 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 transported in moving water near the inflows and biological uptake or decline of TP as the water moves through the lake. Significant internal phosphorus loading was observed in 2014 as monthly TP values increased from May-September without significant inflow.

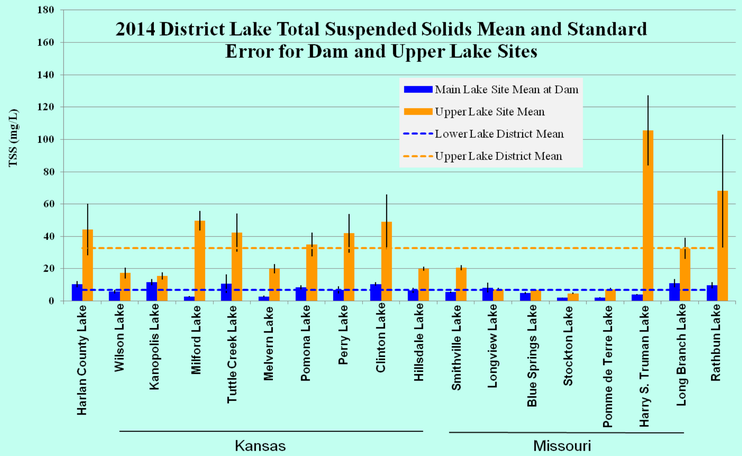




Total Suspended Solids

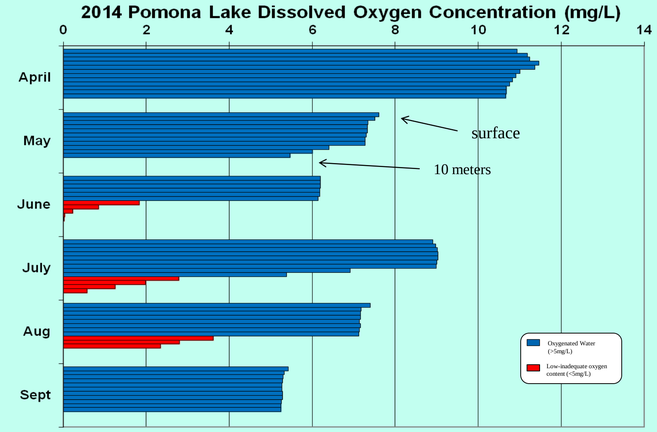
Total Suspended Solids (TSS) is a measure of filtered organic matter and sediment which relates to erosion in river basins, sedimentation rates of downstream reservoirs and water clarity. TSS is also closely linked to nutrient and contaminant transport through river systems. Pomona Lake TSS values at the upper and lower sites were above average for District lakes with 69% of TSS settled out as water moved from the upper lake to the dam. Small particle size of sediments and short travel distance/time from inflows to dam influence TSS settling rate.





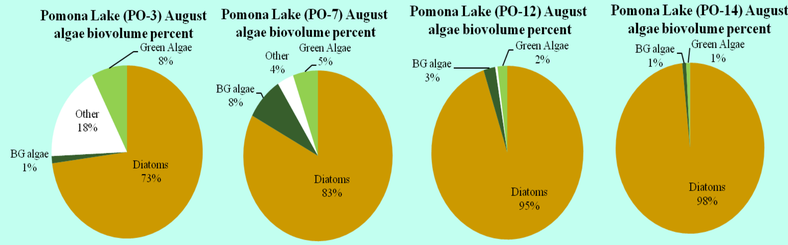
Dissolved Oxygen

Dissolved oxygen is a key factor in aquatic species location, growth, and ultimately survival in lakes. Some lakes undergo a process called stratification or develop layers based on temperature and oxygen. This process begins in late spring, remains throughout the summer, and breaks apart (de-stratifies or ‘turns over’) in the fall. The figure below shows dissolved oxygen measured in the water column in one-meter intervals (e.g. each row in each month represents one meter of depth) from April through September. Pomona Lake experiences weak stratification near the dam in summer, however adequate (>5 mg/L blue) dissolved oxygen exists in all but the bottom 3-4 meters of the water column as illustrated by the red bars (<5 mg/L red) in the graph below. Reduced nutrients and siltation from watershed conservation efforts could help reduce biological oxygen demand and low dissolved oxygen periods caused from fluctuations in algae populations.



Algae

Algae and green plants are the base of the food chain in a lake and function to convert nutrients and CO_2 via photosynthesis into biomass for all aquatic life. In Pomona Lake, the algae community is repressed from lack of sunlight penetration due to turbid water and suspended sediment. August and Sept. phytoplankton sampling indicated that 70-98% of the algae population was diatoms with 8% or less blue green algae. Algal cell counts were very low with maximum count of 3075 cells/mL in August PO-7 sample. USACE toxin samples collected in July-Sept did not detect any algal toxins.



Water Quality Concerns:

- Sediment inputs
- Eutrophication
- DO (shallow depth of stratification)

US Army Corps of Engineers
Environmental Resources Section
Kansas City, MO