

June 2024

Kalina Dam

(46.147627 N, -103.475268 W)

Bowman County

- Kalina Dam is a Dam in southwestern North Dakota (Figure 1). There is no contour map available.
- There are no public boat ramps on Kalina Dam but there is a public access point on the east side of the lake.
- The Kalina Dam watershed drains about 30,000 acres. Land cover in the watershed is mostly agriculture, and rangeland. Agriculture is dominated by wheat, alfalfa and corn (Table 1).
- Kalina Dam is a Class III, warm-water fishery, which are “capable of supporting natural reproduction and growth of warm water fishes (e.g., largemouth bass and bluegill) and associated aquatic biota.”
- Kalina Dam is managed for black crappie, bluegill, and yellow perch. The lake was last stocked in 2023 with bluegill and yellow perch. Northern pike, yellow perch, and channel catfish were found during the last survey by the ND Game and Fish (2023).
- Kalina Dam was last sampled in 2009.

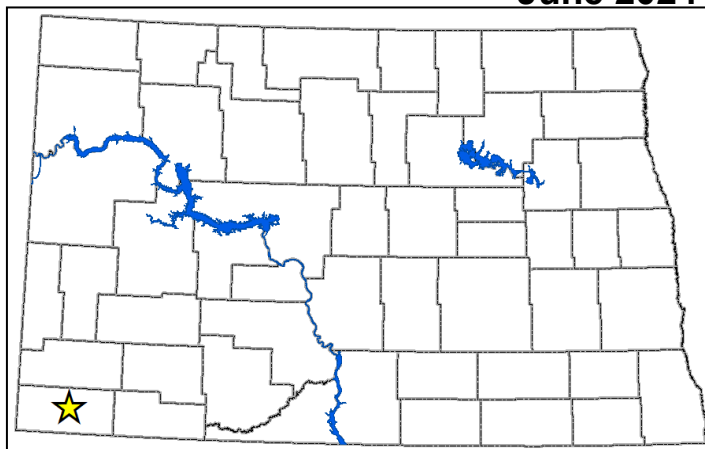


Figure 1. Location of Kalina Dam within the state

Table 1. Percentage of land cover in the watershed and near the lake (NASSCDL, 2023). Value listed of crop type represents percentage of total production

| Land Cover Type | % in Watershed | % within 500 meters |
|-----------------|----------------|---------------------|
| Agriculture | 32.08% | 7.26% |
| Wheat | 16.88% | 5.41% |
| Alfalfa | 6.28% | <1% |
| Corn | 2.93% | <1% |
| Trees | 28.25% | 12.52% |
| Rangeland | 32.16% | 75.65% |
| Water | 1.53% | 2.40% |
| Developed/Bare | 5.98% | 2.17% |

Temperature and Dissolved Oxygen

- Kalina Dam stayed stratified throughout the sampling season, with warm, well-oxygenated water at the top of the water column, and cold, low-oxygen water near the bottom.
- Thermal stratification took place in May, June, and August. The greatest temperature change in the water column during these months was 3.9 degrees Celsius (°C), 2.1°C, and 1.7°C (Figure 2).
- Dissolved oxygen concentrations were relatively high at the surface, but there was some anoxic conditions near the bottom (Figure 2).

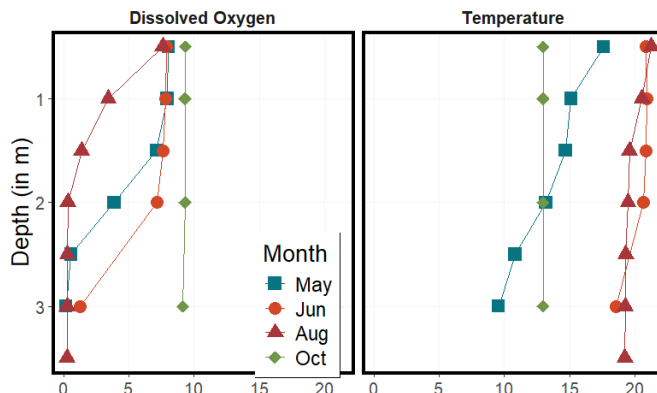


Figure 2. 2023 profiles of dissolved oxygen (left) in milligrams per liter (mg L^{-1}) and temperature (right) in degrees Celsius.

Trophic State Indices

- Trophic state is a measure used by scientists to assess the condition (where lower scores indicate better water quality) of a lake using three common measures: total phosphorus (TP), Secchi disk transparency and chlorophyll-a concentration.
- Kalina Dam is a eutrophic lake (Figure 3) that has high nutrient concentrations and moderate algal and plant growth.
- Trophic state in 2023 was relatively similar to historical conditions.

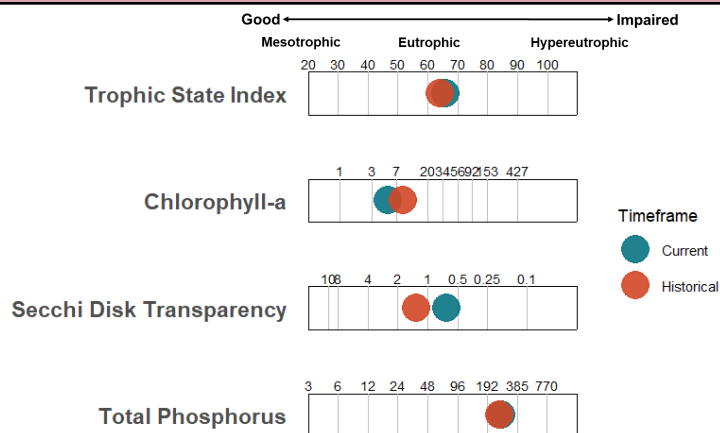


Figure 3. Trophic state indices for 2023 and historical samples

Nutrients

- Median concentration of total nitrogen (TN) in 2023 was greater than the historical median and the median for the Missouri Plateau Level IV Ecoregion where Kalina Dam is located (Figure 4).
- 2023 median concentration of dissolved TN was equal to TN.
- Median TP concentration in 2023 was less than the historical median for the lake but greater than the ecoregion median (Figure 4).
- 2023 median concentration of dissolved phosphorus was less than TP.
- Ammonia and nitrate + nitrate were found above their detection limit of 0.03 mg/L in Kalina Dam during the 2023 sampling season.

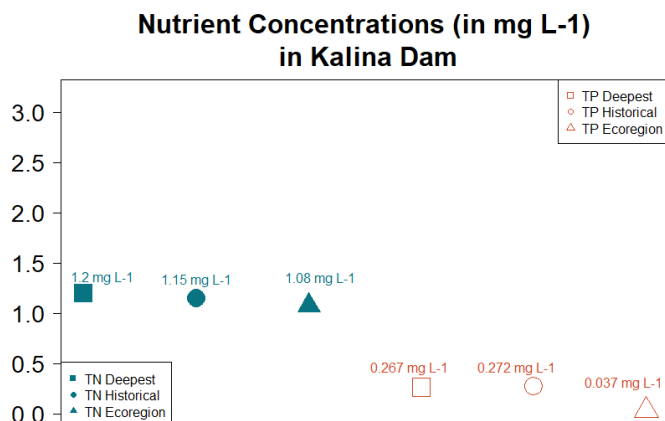


Figure 4. Median concentrations of TN and TP in mg L⁻¹ compared to regional medians

Water Chemistry

Table 2. Median concentrations of selected constituents for 2023 and historical samples and from all Ecoregion natural lakes and reservoirs.

| Measure | 2023 Median | Historical Median | Ecoregion Median |
|--|--------------------------|--------------------------|---------------------------|
| Alkalinity | 239.5 mg L ⁻¹ | 215 mg L ⁻¹ | 201 mg L ⁻¹ |
| Bicarbonate (HCO ₃ ⁻) | 281 mg L ⁻¹ | 262 mg L ⁻¹ | 217 mg L ⁻¹ |
| Calcium (Ca ²⁺) | 26.15 mg L ⁻¹ | 21.7 mg L ⁻¹ | 47.5 mg L ⁻¹ |
| Carbonate (CO ₃ ²⁻) | 1.75 mg L ⁻¹ | 0.5 mg L ⁻¹ | 11 mg L ⁻¹ |
| Conductivity | 1430 μS cm ⁻¹ | 1210 μS cm ⁻¹ | 823.5 μS cm ⁻¹ |
| Dissolved Solids | 941 mg L ⁻¹ | 754 mg L ⁻¹ | 521.5 mg L ⁻¹ |
| Magnesium (Mg ²⁺) | 21.2 mg L ⁻¹ | 17.8 mg L ⁻¹ | 24.7 mg L ⁻¹ |
| Sodium (Na ⁺) | 266.5 mg L ⁻¹ | 217 mg L ⁻¹ | 94.4 mg L ⁻¹ |
| Sulfate (SO ₄ ²⁻) | 446 mg L ⁻¹ | 353 mg L ⁻¹ | 206 mg L ⁻¹ |

- Sulfate is the dominant anion in Kalina Dam, while sodium is the dominant cation (Figure 5).
- 2023 median concentrations of most cations and anions are similar to the historical medians for the lake and greater than the ecoregion medians (Table 2).



Figure 5. Photo of Kalina Dam in June of 2023. Photo taken by Emily Brazil.