

June 2024

Sheep Creek Dam

(46.34096 N, -101.84853 W)

Grant County

- Sheep Creek Dam is a Dam in southern North Dakota (Figure 1). See map at (<https://gf.nd.gov/gnf/maps/fishing/lakecontours/sheepcreek2020.pdf>)
- There is one public boat ramp on Sheep Creek Dam on the north-east end of the lake.
- The Sheep Creek Dam watershed drains about 38,700 acres. Land cover in the watershed is largely agriculture and rangeland. Agriculture is dominated by wheat, sunflower, and alfalfa (Table 1).
- Sheep Creek Dam is a Class II, cool-water fishery, which are “capable of supporting natural reproduction and growth of cool water fishes (e.g., walleye and northern pike) and associated aquatic biota.”
- Sheep Creek Dam is managed for brown trout, rainbow trout, and walleye. The lake was last stocked with brown and rainbow trout in 2021. Bluegill, black crappie, green sunfish, and largemouth bass were found during the last survey by the ND Game and Fish (2023).
- Sheep Creek Dam was last sampled in 2012.

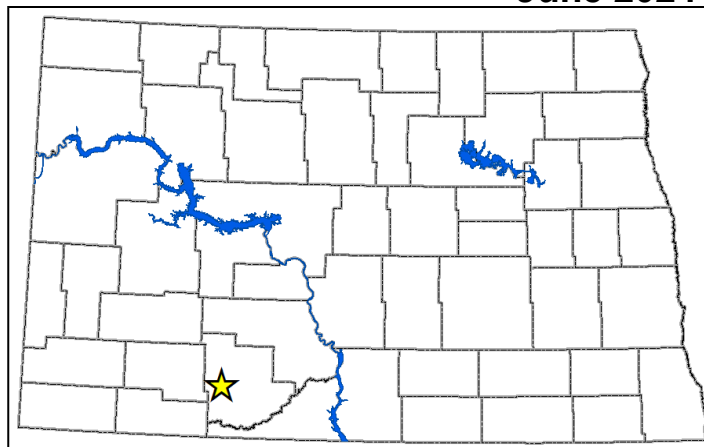


Figure 1. Location of Sheep Creek Dam within the state

Table 1. Percentage of land cover in the watershed and near the lake (NASSCDL, 2021). Value listed of crop type represents percentage of total production

Land Cover Type	% in Watershed	% within 500 meters
Agriculture	47.2%	21.1%
Wheat	17.9%	0.0%
Sunflower	6.1%	0.0%
Alfalfa	4.1%	38.5%
Trees	<1.0%	2.4%
Rangeland	48.0%	64.8%
Water	1.6%	3.9%
Bare	2.8%	7.9%

Temperature and Dissolved Oxygen

- Sheep Creek Dam stayed stratified throughout most of 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 5.5 degrees Celsius (°C), 7.1°C, and 5.0°C (Figure 2).
- Dissolved oxygen concentrations were relatively high at the surface, but there was some anoxic conditions near the bottom (Figure 2).

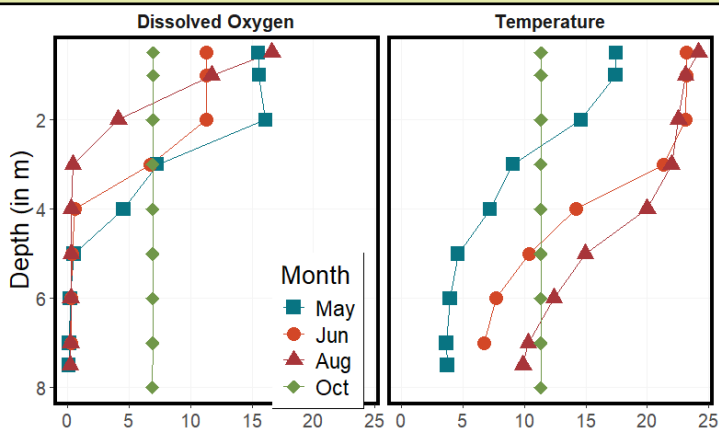


Figure 2. 2023 profiles of dissolved oxygen (left) in milligrams per liter (mg L^{-1}) and temperature (right) in degrees Celsius.

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.
- Sheep Creek Dam is a eutrophic lake (Figure 3) that has high nutrient concentrations and high to moderate algal and plant growth.
- Trophic state in 2023 was relatively similar to historical condition.

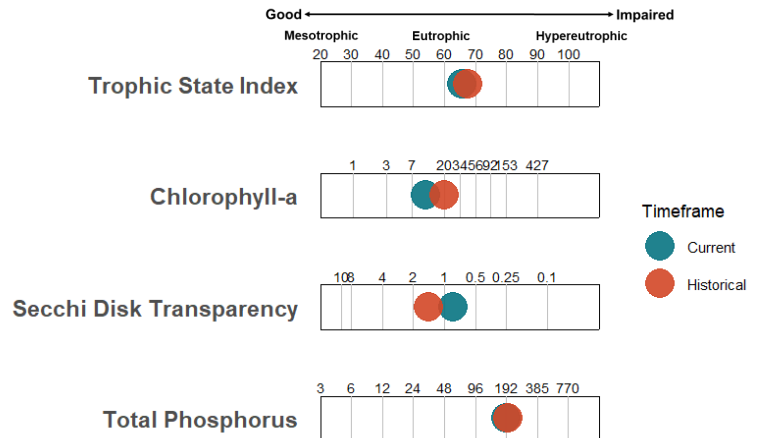


Figure 3. Trophic state indices for 2023 and historical samples

Nutrients

- Median concentration of total nitrogen (TN) in 2023 was greater than the historical median and the Missouri Plateau IV Ecoregion where Sheep Creek Dam is Located (Figure 4).
- 2023 median concentration of dissolved TN was less than TN.
- Median TP concentration in 2023 was equal to the historical median and greater than the ecoregion median (Figure 4).
- 2023 median concentration of dissolved phosphorus was less than TP.
- Ammonia was found above the detection limit of 0.03 mg/L in one of four samples during the 2023 season.

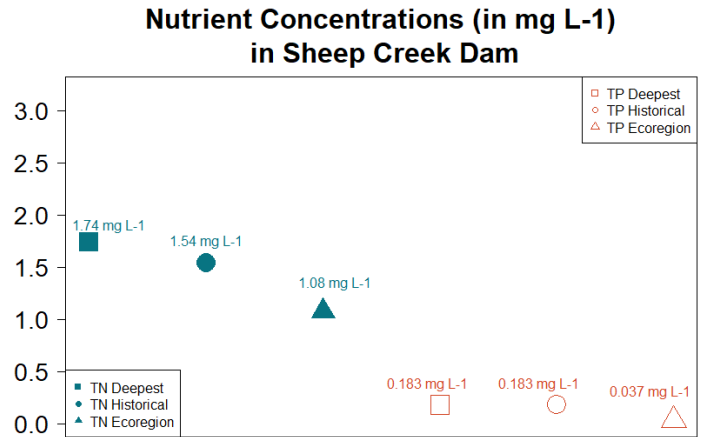


Figure 4. Median concentrations of TN and TP in mg L⁻¹ compared to regional medians

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	260 mg L ⁻¹	288 mg L ⁻¹	201 mg L ⁻¹
Bicarbonate (HCO ₃ ⁻)	260 mg L ⁻¹	276 mg L ⁻¹	217 mg L ⁻¹
Calcium (Ca ²⁺)	75 mg L ⁻¹	49.7 mg L ⁻¹	47.5 mg L ⁻¹
Carbonate (CO ₃ ²⁻)	28 mg L ⁻¹	29 mg L ⁻¹	11 mg L ⁻¹
Conductivity	1850 µS cm ⁻¹	1755 µS cm ⁻¹	823.5 µS cm ⁻¹
Dissolved Solids	1310 mg L ⁻¹	1225 mg L ⁻¹	521.5 mg L ⁻¹
Magnesium (Mg ²⁺)	79.65 mg L ⁻¹	64 mg L ⁻¹	24.7 mg L ⁻¹
Sodium (Na ⁺)	252.5 mg L ⁻¹	265 mg L ⁻¹	94.4 mg L ⁻¹
Sulfate (SO ₄ ²⁻)	724.5 mg L ⁻¹	656.5 mg L ⁻¹	206 mg L ⁻¹

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