

June 2024

Cedar Lake

(46.29039 N, -102.96636 W)

Slope County

- Cedar Lake is a Lake in southwestern North Dakota (Figure 1). See map at (<https://gf.nd.gov/gnf/maps/fishing/lakecontours/cedar2023.pdf>)
- There is one public boat ramp on Cedar Lake on the east side of the lake.
- The Cedar Lake catchment drains about 27,000 acres. Land cover in the catchment is majority agricultural land and rangeland. Agriculture is dominated by wheat, corn, and flaxseed (Table 1).
- Cedar Lake 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.”
- Cedar Lake is managed for northern pike, yellow perch, channel catfish, and walleye. The lake was last stocked in 2023 with walleye and yellow perch. Northern pike, yellow perch, and black bullhead were found during the last survey by the ND Game and Fish (2023).
- Cedar Lake was last sampled in 2006.

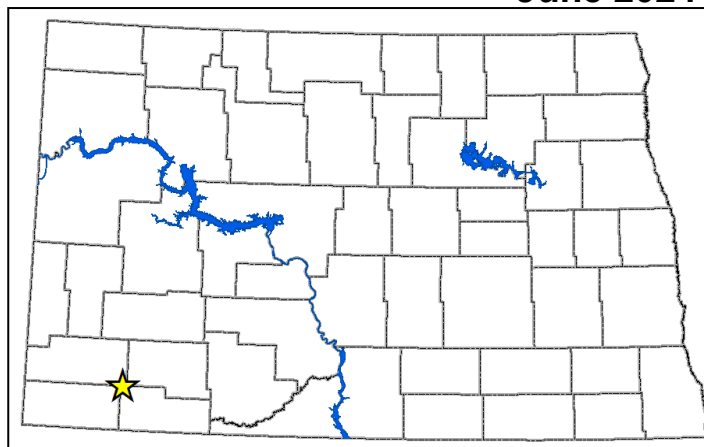


Figure 1. Location of Cedar Lake within the state

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	67.0%	25.3%
Wheat	46.5%	18.2%
Corn	4.4%	0.3%
Flaxseed	4.4%	0.04%
Trees	6.5%	15.5%
Rangeland	21.9%	44.9%
Water	1.7%	8.9%
Bare	2.8%	5.4%

Temperature and Dissolved Oxygen

- Cedar Lake stayed thermally stratified throughout most the sampling season.
- Thermal stratification took place in May, June, and July. The greatest temperature change in the water column during these months was 1.8 degrees Celsius, 1.5°C, and 3.5°C (Figure 2).
- Dissolved oxygen concentrations were relatively high throughout the water column except for the month of July, where it was low at the bottom of the water column (Figure 2).

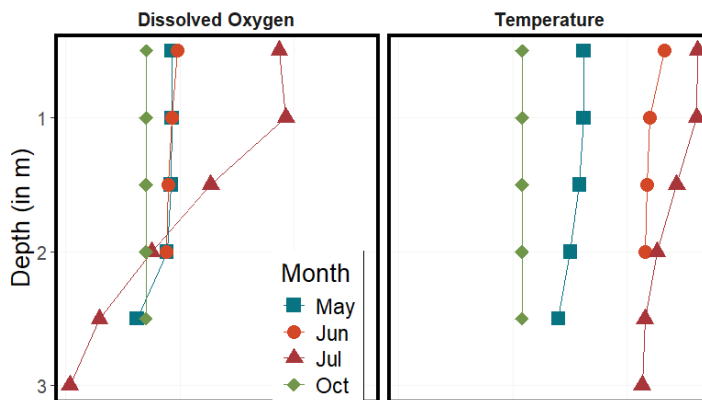


Figure 2. 2023 profiles of dissolved oxygen (left) in milligrams per liter (mg L^{-1}) and temperature (right) in degrees Celsius.

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.
- Cedar Lake is a eutrophic lake that has high nutrient concentrations and moderate algal and plant growth (Figure 3).
- Trophic state in 2023 was relatively similar to historical condition.
- There have been confirmed **harmful** algal (cyanobacteria) blooms at Cedar Lake.

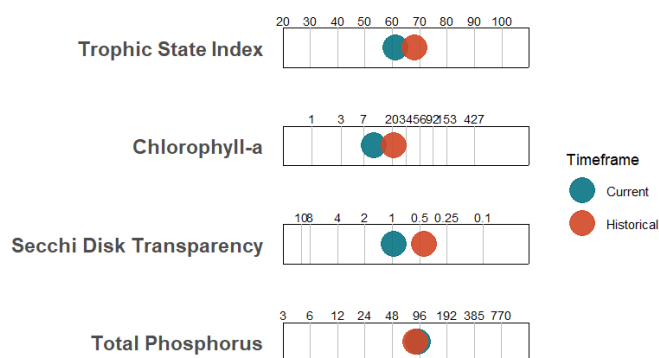


Figure 3. Trophic state indices for 2023 and historical samples

Nutrients

- Median concentration of total nitrogen (TN) in 2023 was greater than the historical median and the Missouri Plateau Level IV Ecoregion median where Cedar Lake is located (Figure 4).
- 2023 median concentration of dissolved TN was less than TN.
- Median TP concentration in 2023 was less than the historical median 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 Cedar Lake during the 2023 sampling season.

Nutrient Concentrations (in mg L⁻¹) in Cedar Lake

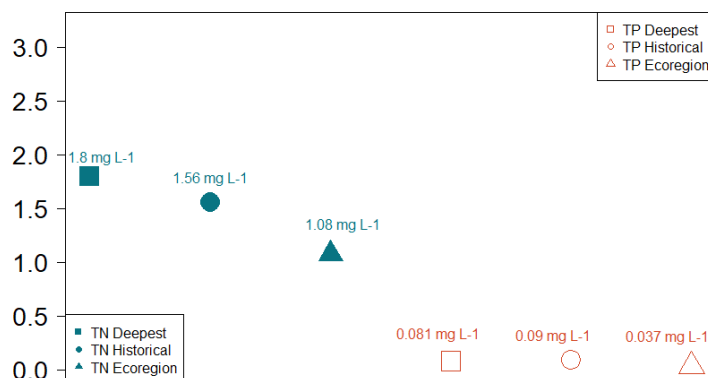


Figure 4. Median concentrations of TN and TP in mg L⁻¹ compared to regional medians

Water Chemistry

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

Measure	2023 Median	Historical Median	Ecoregion Median
Alkalinity	296 mg L ⁻¹	339 mg L ⁻¹	201 mg L ⁻¹
Bicarbonate (HCO ₃ ⁻)	325 mg L ⁻¹	407 mg L ⁻¹	217 mg L ⁻¹
Calcium (Ca ²⁺)	123 mg L ⁻¹	116 mg L ⁻¹	47.5 mg L ⁻¹
Carbonate (CO ₃ ²⁻)	11.5 mg L ⁻¹	22 mg L ⁻¹	11 mg L ⁻¹
Conductivity	2935 μS cm ⁻¹	3280 μS cm ⁻¹	823.5 μS cm ⁻¹
Dissolved Solids	2250 mg L ⁻¹	2530 mg L ⁻¹	521.5 mg L ⁻¹
Magnesium (Mg ²⁺)	130 mg L ⁻¹	121 mg L ⁻¹	24.7 mg L ⁻¹
Sodium (Na ⁺)	466 mg L ⁻¹	545 mg L ⁻¹	94.4 mg L ⁻¹
Sulfate (SO ₄ ²⁻)	1325 mg L ⁻¹	1460 mg L ⁻¹	206 mg L ⁻¹

- Sulfate is the dominant anion in Cedar Lake, while sodium is the dominant cation (Figure 2).
- 2023 median concentrations of most cations and anions are a bit less than the historical medians for the lake and greater than the ecoregion medians (Table 2).