

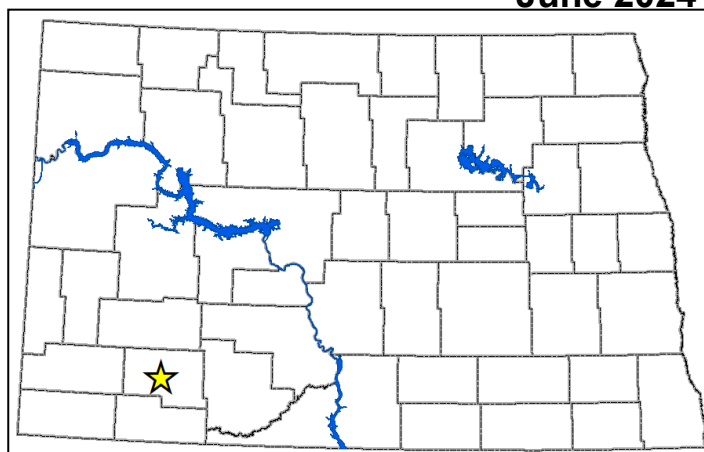
**June 2024**

## Larson Lake

(46.42748 N, -102.51295 W)

### Hettinger County

- Larson Lake is a Lake in southwestern North Dakota (Figure 1). See map at (<https://gf.nd.gov/gnf/maps/fishing/lakecontours/larsonhettinger2023.pdf>)
- There is one public boat ramp on Larson Lake on the north end of the lake off of 68th St SW.
- The Larson Lake watershed drains about 26,000 acres. Land cover in the watershed is mostly agricultural mixed with smaller sections of rangeland. Agriculture is dominated by wheat, canola and corn (Table 1).
- Larson 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.”
- Larson Lake is managed for northern pike and yellow perch. The lake was last stocked in 2023 with northern pike and yellow perch. There is no ND Game and Fish survey data available.
- Larson Lake was last sampled in 2014.



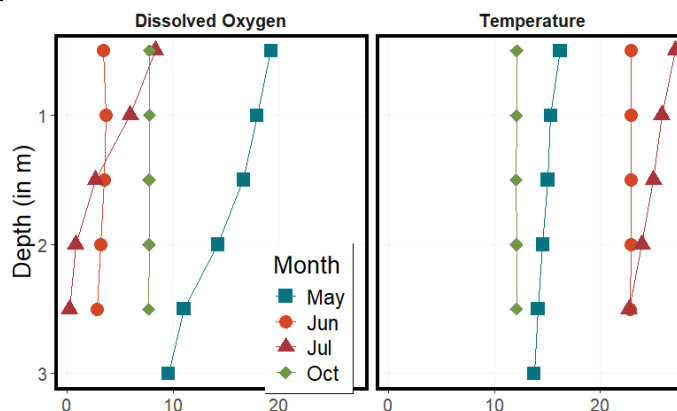
**Figure 1.** Location of Larson Lake within the state

**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	59.2%	44.4%
Wheat	37.5%	3.7%
Canola	8.8%	10.1%
Corn	3.7%	5.5%
Trees	2.8%	20.4%
Rangeland	20.9%	10.9%
Water	2.3%	15.5%
Developed/Bare	3.3%	8.8%

## Temperature and Dissolved Oxygen

- Larson Lake stayed mixed throughout most of the sampling with stratification taking place in two out of the four months.
- Thermal stratification took place in May and July. The greatest temperature change in the water column during these months was 1.2 degrees Celsius (°C) and 2.3°C (Figure 2).
- Dissolved oxygen (DO) concentrations were high throughout the water column except for the month of July, where there were anoxic conditions near the substrate (Figure 2).



**Figure 2.** 2023 profiles of dissolved oxygen (left) in milligrams per liter ( $\text{mg L}^{-1}$ ) 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.
- Larson Lake is a eutrophic lake (Figure 3) that has high nutrient concentrations and high to moderate algal and plant growth.
- Trophic state in 2023 was less than the historical condition.

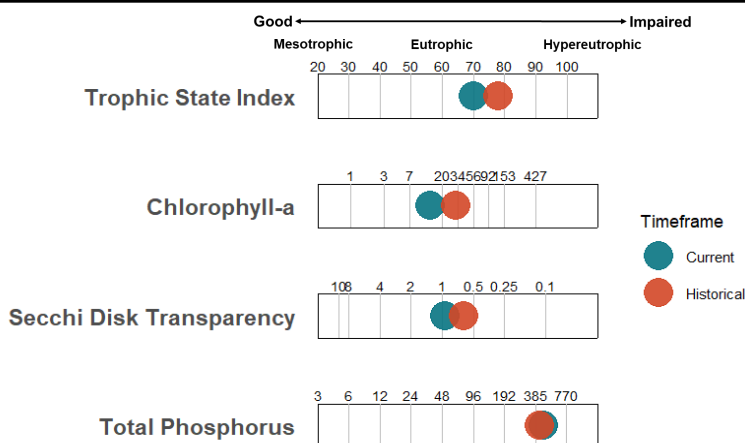


Figure 3. Trophic state indices for 2023 and historical samples

## Nutrients

- Median concentration of total nitrogen (TN) in 2023 was greater than the historical median and the Missouri Plateau Level IV Ecoregion median where Larson Lake is located (Figure 4).
- Median concentration of dissolved TN was less than TN.
- Median TP concentration in 2023 was less than the historical median and greater than the ecoregion median (Figure 4).
- 2023 median concentration of dissolved phosphorus was less than TP.
- Ammonia was detected in 3 of 4 samples and Nitrate + Nitrate was detected in one sample, both were found above the detection limit of 0.03 mg/L during the 2023 sampling season.

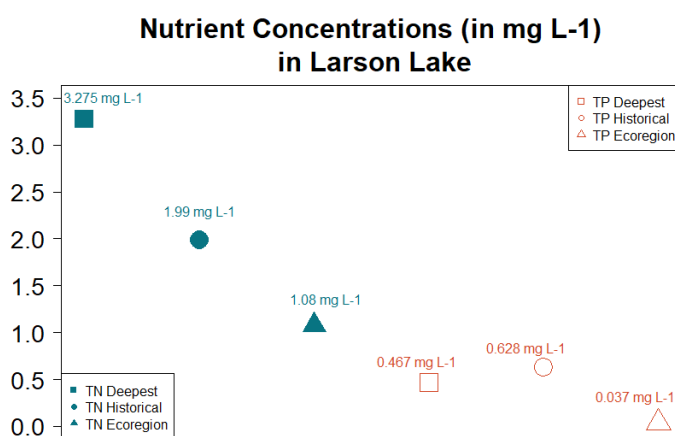


Figure 4. Median concentrations of TN and TP in mg L<sup>-1</sup> compared to regional medians

## 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	412 mg L <sup>-1</sup>	440 mg L <sup>-1</sup>	201 mg L <sup>-1</sup>
Bicarbonate (HCO <sub>3</sub> <sup>-</sup> )	476.5 mg L <sup>-1</sup>	469 mg L <sup>-1</sup>	217 mg L <sup>-1</sup>
Calcium (Ca <sup>2+</sup> )	44.65 mg L <sup>-1</sup>	41.4 mg L <sup>-1</sup>	47.5 mg L <sup>-1</sup>
Carbonate (CO <sub>3</sub> <sup>2-</sup> )	18.5 mg L <sup>-1</sup>	57 mg L <sup>-1</sup>	11 mg L <sup>-1</sup>
Conductivity	1840 µS cm <sup>-1</sup>	1810 µS cm <sup>-1</sup>	823.5 µS cm <sup>-1</sup>
Dissolved Solids	1250 mg L <sup>-1</sup>	1230 mg L <sup>-1</sup>	521.5 mg L <sup>-1</sup>
Magnesium (Mg <sup>2+</sup> )	71.15 mg L <sup>-1</sup>	59.1 mg L <sup>-1</sup>	24.7 mg L <sup>-1</sup>
Sodium (Na <sup>+</sup> )	297.5 mg L <sup>-1</sup>	304 mg L <sup>-1</sup>	94.4 mg L <sup>-1</sup>
Sulfate (SO <sub>4</sub> <sup>2-</sup> )	548.5 mg L <sup>-1</sup>	520 mg L <sup>-1</sup>	206 mg L <sup>-1</sup>

- Sulfate and bicarbonate are co-dominant anions in Larson Lake, while calcium is the dominant cation (Table 2).
- 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).