

June 2024

Nygren Dam

(46.58779 N, -101.20874 W)

Morton County

- Nygren Dam is a Dam in south-central North Dakota (Figure 1). See map at (<https://gf.nd.gov/gnf/maps/fishing/lakecontours/nygrendam2023.pdf>)
- There is one public boat ramp on Nygren Dam on the south end of the lake.
- The Nygren Dam watershed drains about 34,300 acres. Land cover in the watershed is majority rangeland. Agriculture is dominated by wheat, corn, and alfalfa (Table 1).
- Nygren 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.”
- Nygren Dam is managed for Rainbow trout, brown trout, cutthroat trout, largemouth bass, and bluegill. The lake was last stocked in 2020. There is no ND Game and Fish survey data available.
- Nygren Dam was last sampled in 2022.

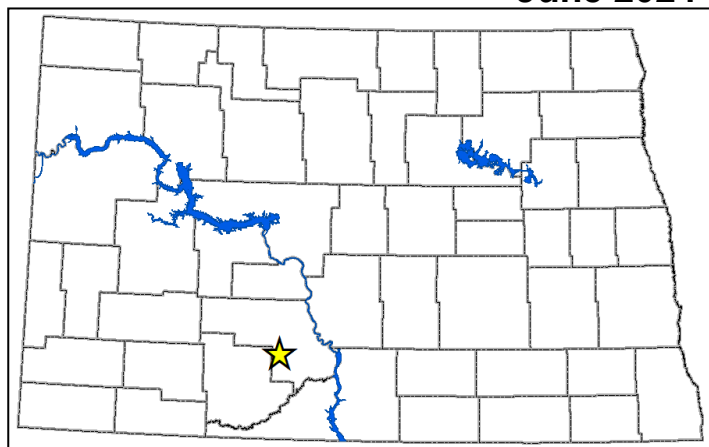


Figure 1. Location of Nygren Dam within the state

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	16.5%	1.1%
Wheat	7.4%	1.1%
Corn	3.2%	0%
Alfalfa	2.3%	0%
Trees	6.2%	6.5%
Rangeland	74.0%	85.4%
Water	1.8%	2.9%
Bare	1.5%	4.1%

Temperature and Dissolved Oxygen

- Nygren 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 4.6 degrees Celsius (°C), 7.2°C, and 4.8°C (Figure 2).
- Dissolved oxygen concentrations were relatively high at the surface, but there anoxic conditions near the bottom (Figure 2).

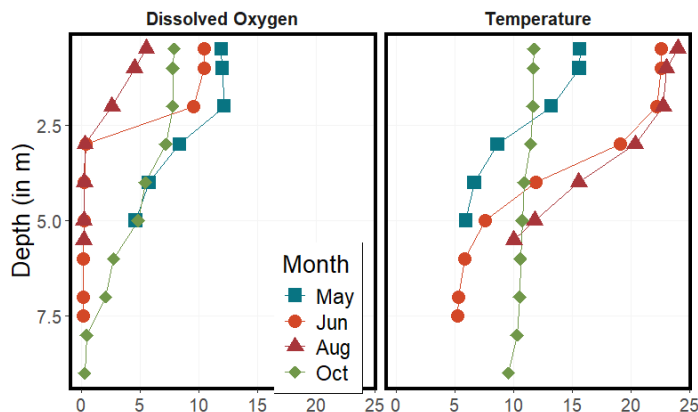


Figure 2. 2023 profiles of dissolved oxygen (left) in milligrams per liter (mg L^{-1}) and temperature (right) in degrees Celsius.

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.
- Nygren 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 a bit higher than the historical condition.

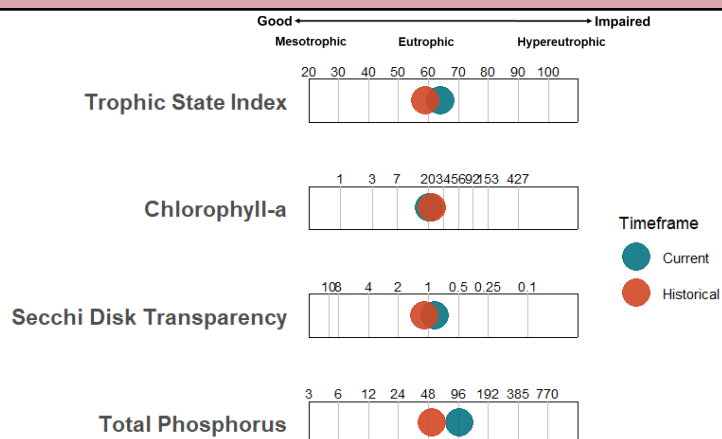


Figure 3. Trophic state indices for 2023 and historical samples

Nutrients

- Median concentration of total nitrogen (TN) in 2023 was greater than the median for the lake and the Missouri Plateau Level IV Ecoregion where Nygren Dam 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 for the lake and greater than the ecoregion median (Figure 4).
- Median concentration of dissolved phosphorus was less than TP.
- Ammonia was found above the detection limit of 0.03 mg/L in Nygren Dam during the 2023 sampling season.

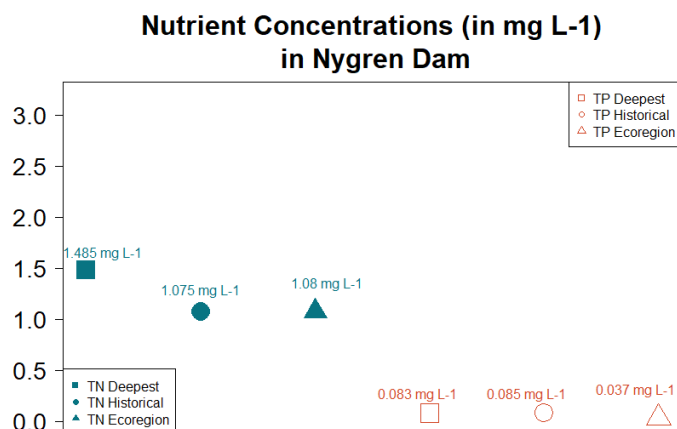


Figure 4. Median concentrations of TN and TP in mg L⁻¹ compared to regional medians

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	255.5 mg L ⁻¹	255 mg L ⁻¹	201 mg L ⁻¹
Bicarbonate (HCO ₃ ⁻)	269.5 mg L ⁻¹	278.5 mg L ⁻¹	217 mg L ⁻¹
Calcium (Ca ²⁺)	27.1 mg L ⁻¹	25.15 mg L ⁻¹	47.5 mg L ⁻¹
Carbonate (CO ₃ ²⁻)	15.5 mg L ⁻¹	13 mg L ⁻¹	11 mg L ⁻¹
Conductivity	633 μS cm ⁻¹	613 μS cm ⁻¹	823.5 μS cm ⁻¹
Dissolved Solids	379.5 mg L ⁻¹	366.5 mg L ⁻¹	521.5 mg L ⁻¹
Magnesium (Mg ²⁺)	28.35 mg L ⁻¹	27.5 mg L ⁻¹	24.7 mg L ⁻¹
Sodium (Na ⁺)	73.85 mg L ⁻¹	72.4 mg L ⁻¹	94.4 mg L ⁻¹
Sulfate (SO ₄ ²⁻)	79.15 mg L ⁻¹	73.05 mg L ⁻¹	206 mg L ⁻¹

- Bicarbonate is the dominant anion in Nygren 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 differ slightly from the ecoregion medians (Table 2).