NORTH Dakota | Environmental Quality

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June 2024

Indian Creek Dam

(46.33822 N, -102.62731 W)

Hettinger County

- Indian Creek Dam is a lake in southwestern North Dakota(Figure 1). See map at (https://gf.nd.gov/gnf/maps/fishing/lakecontours/indiancreek2021.pdf)
- There is one public boat ramp on Indian Creek Dam on the north end of the lake.
- The Indian Creek Dam watershed drains about 18,300 acres. Land cover in the watershed is largely agricultural. Agriculture is dominated by wheat, soybeans, and canola (Table 1).
- Indian 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."
- Indian Creek Dam is managed for walleye and bluegill. The lake was last stocked in 2022 with these two species. Walleye, bluegill, and smallmouth bass were found during the last survey by the ND Game and Fish (2023).
- Indian Creek Dam was last sampled in 2006.

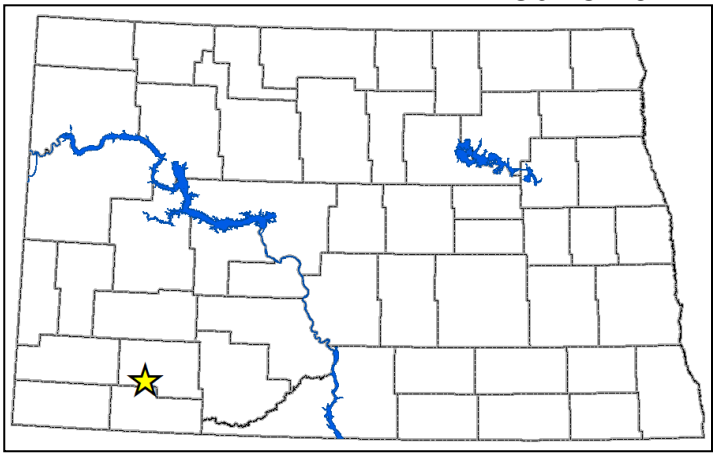

Figure 1. *Location of Indian Creek Dam within the state*

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	80.7%	30.5%
Wheat	*58.0%*	*22.3%*
Soybeans	*6.0%*	*<1%*
Canola	*11.7%*	*6.0%*
Trees	3.0%	15.7%
Rangeland	11.6%	45.5%
Water	2.4%	8.6%
Bare	2.3%	<1%

Temperature and Dissolved Oxygen

- Indian 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 July. The greatest temperature change in the water column during these months was 4.1 degrees Celsius (ºC), 6.5ºC, and 2.2ºC (Figure 2).
- Dissolved oxygen concentrations were relatively high at the surface, but there was some anoxic conditions near the bottom (Figure 2).

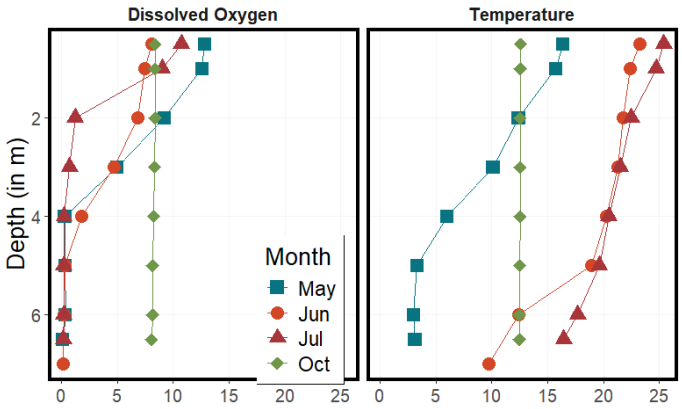

Figure 2. *2023 profiles of dissolved oxygen (left) in milligrams per liter (mg L^{-1}) and temperature (right) in degrees Celsius.*

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.
- Indian Creek 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 condition.

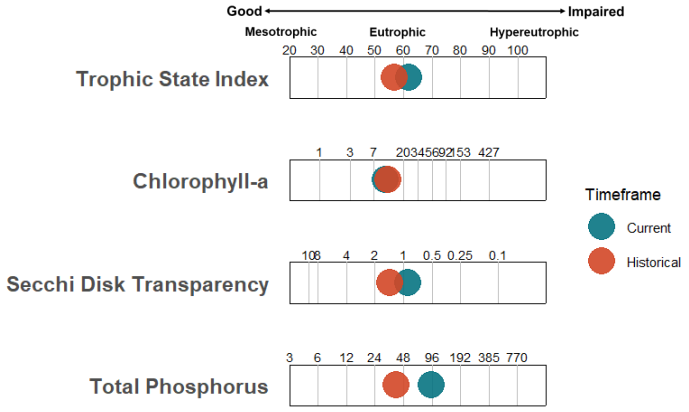

Figure 3. *Trophic state indices for 2023 and historical samples*

Nutrients

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

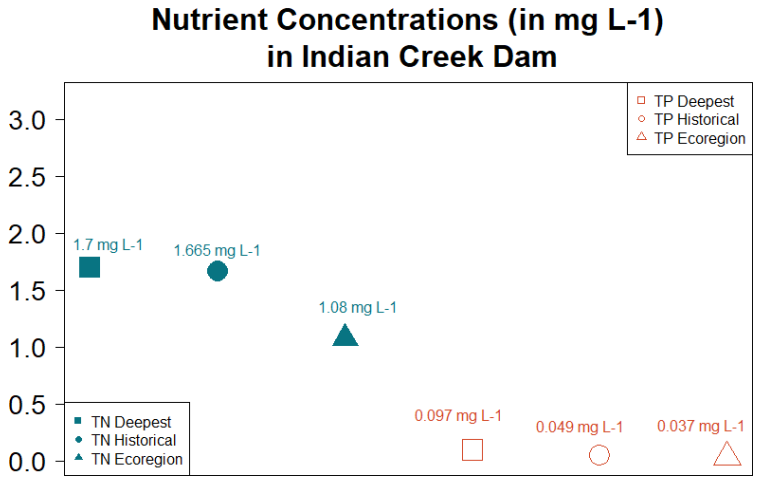

Figure 4. *Median concentrations of TN and TP in mg L^{-1} compared to regional medians*

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	253 mg L^{-1}	296 mg L^{-1}	201 mg L^{-1}
Bicarbonate (HCO^{-}_{3})	290.5 mg L^{-1}	292 mg L^{-1}	217 mg L^{-1}
Calcium (Ca^{2+})	62.4 mg L^{-1}	57.9 mg L^{-1}	47.5 mg L^{-1}
Carbonate (CO^{2-}_{3})	11 mg L^{-1}	28 mg L^{-1}	11 mg L^{-1}
Conductivity	2605 µS cm^{-1}	2810 µS cm^{-1}	823.5 µS cm^{-1}
Dissolved Solids	1885 mg L^{-1}	2130 mg L^{-1}	521.5 mg L^{-1}
Magnesium (Mg^{2+})	98.55 mg L^{-1}	103 mg L^{-1}	24.7 mg L^{-1}
Sodium (Na^{+})	433 mg L^{-1}	478 mg L^{-1}	94.4 mg L^{-1}
Sulfate (SO^{2-}_{4})	1110 mg L^{-1}	1290 mg L^{-1}	206 mg L^{-1}

- Sulfate is the dominant anion in Indian Creek Dam, while sodium is the dominant cation (Table 2).
- Median concentrations of most cations and anions are similar to the historical medians for the lake and less than the ecoregion medians (Table 2).

Figure 5. *Photo of Indian Creek Dam in July of 2023. Photo taken by Emily Brazil.*