

June 2024

Sweetbriar Dam

(46.86506 N, -101.25895 W)

Morton County

- Sweetbriar Dam is a Dam in central North Dakota (Figure 1). See map at (<https://gf.nd.gov/gnf/maps/fishing/lakecontours/sweetbriar2020.pdf>)
- There are two public boat ramps, one floating fishing pier, and multiple public shore access locations on Sweetbriar Dam.
- The Sweet Briar Dam watershed drains about 36,000 acres. Land cover in the watershed is majority agriculture with a large amount rangeland. Agriculture is dominated by wheat, soybeans, and corn (Table 1).
- Sweetbriar 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.”
- Sweetbriar Dam is managed for walleye, channel catfish, largemouth bass, and yellow perch. The lake was last stocked in 2022 with walleye. Northern Pike, bluegill, black crappie, yellow perch, walleye, and channel catfish were the game fish found during the last survey by the ND Game and Fish (2023).
- Sweetbriar Dam was last sampled in 2022.

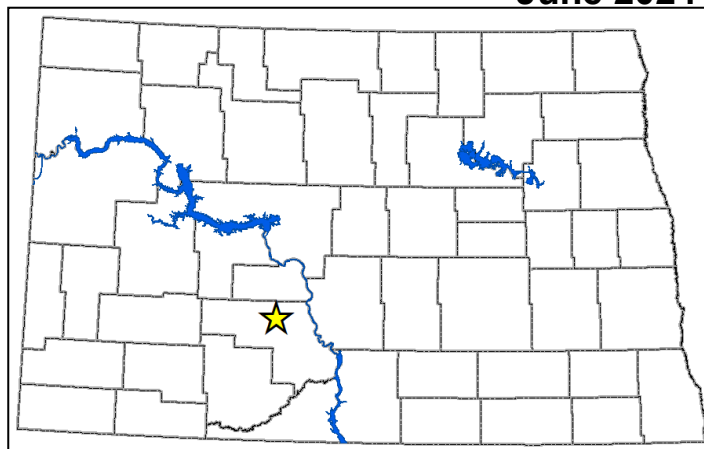


Figure 1. Location of Sweetbriar Dam within the state

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	58.0%	25.1%
Wheat	19.8%	6.5%
Soybeans	96.3%	2.7%
Corn	10.0%	6.1%
Trees	<1.0%	6.0%
Rangeland	36.5%	48.8%
Water	1.9%	9.2%
Bare	3.2%	10.9%

Temperature and Dissolved Oxygen

- Sweetbriar 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 July. The greatest temperature change in the water column during these months was 4.3 degrees Celsius (°C), 2.3°C, and 2.5°C (Figure 2).
- Dissolved oxygen concentrations were relatively high at the surface, but there were anoxic conditions near the bottom (Figure 2).

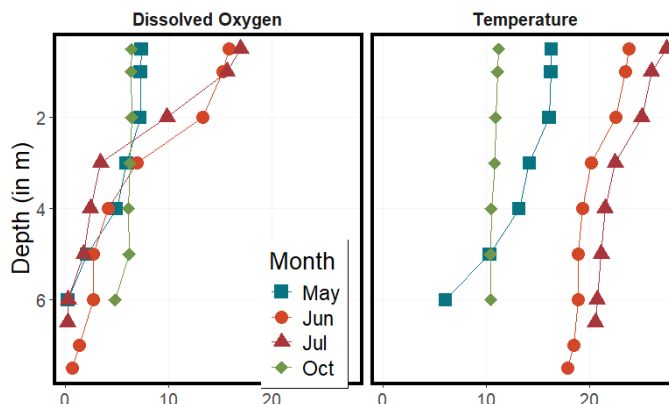


Figure 2. 2023 profiles of dissolved oxygen (left) in milligrams per liter (mg L^{-1}) and temperature (right) in degrees Celsius.

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.
- Sweetbriar 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.

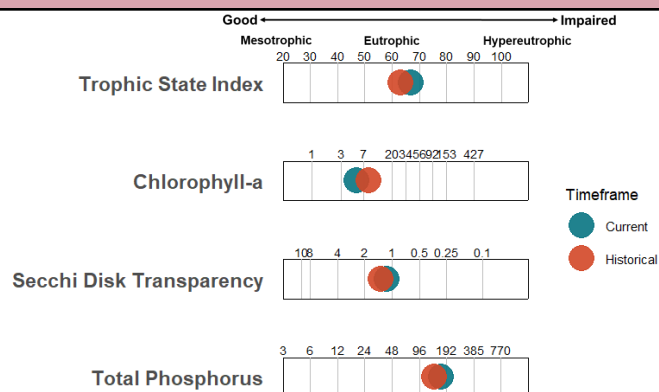


Figure 3. Trophic state indices for 2023 and historical samples

Nutrients

- Median concentration of total nitrogen (TN) in 2023 was greater than the historical median and the Missouri Plateau Level IV Ecoregion median where Sweet Briar 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).
- 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 during the 2023 sampling season.

Nutrient Concentrations (in mg L⁻¹) in Sweetbriar Dam

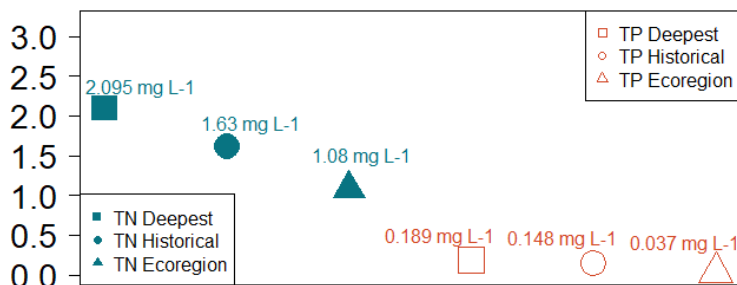


Figure 4. Median concentrations of TN and TP in mg L⁻¹ compared to regional medians

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	257 mg L ⁻¹	330 mg L ⁻¹	201 mg L ⁻¹
Bicarbonate (HCO ₃ ⁻)	285 mg L ⁻¹	347 mg L ⁻¹	217 mg L ⁻¹
Calcium (Ca ²⁺)	78.05 mg L ⁻¹	75.5 mg L ⁻¹	47.5 mg L ⁻¹
Carbonate (CO ₃ ²⁻)	1.75 mg L ⁻¹	11 mg L ⁻¹	11 mg L ⁻¹
Conductivity	1705 µS cm ⁻¹	1730 µS cm ⁻¹	823.5 µS cm ⁻¹
Dissolved Solids	1185 mg L ⁻¹	1185 mg L ⁻¹	521.5 mg L ⁻¹
Magnesium (Mg ²⁺)	61.45 mg L ⁻¹	62.7 mg L ⁻¹	24.7 mg L ⁻¹
Sodium (Na ⁺)	229.5 mg L ⁻¹	283 mg L ⁻¹	94.4 mg L ⁻¹
Sulfate (SO ₄ ²⁻)	636.5 mg L ⁻¹	636.5 mg L ⁻¹	206 mg L ⁻¹

- Sulfate is the dominant anion in Sweetbriar 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).