

December 2021

Short Creek Dam

(48.992094 N, -102.784795 W)

Burke County

- Short Creek Dam is a small reservoir in northwest North Dakota (Figure 1). See map at (<https://gf.nd.gov/gnf/maps/fishing/lakecontours/shortcreek2004.pdf>).
- There is one paved, public boat ramp on the south side of the lake.
- The Short Creek Dam watershed is about 120,000 acres of mostly agriculture and grassland/pasture. The most common crops grown are spring wheat, canola and soybeans (Table 1).
- Short Creek Dam is a Class II fishery, which are “capable of supporting natural reproduction and growth of cool water fishes (e.g., walleye and northern pike) and associated aquatic biota.”
- Short Creek Dam is managed by the NDGF as a walleye fishery, with fingerlings stocked annually. Yellow perch, walleye and northern pike were captured in the last sample by the NDGF in 2020.
- Short Creek Dam was last sampled in 1991-1992, 2004-2005 and 2010-2012 by the NDDEQ.

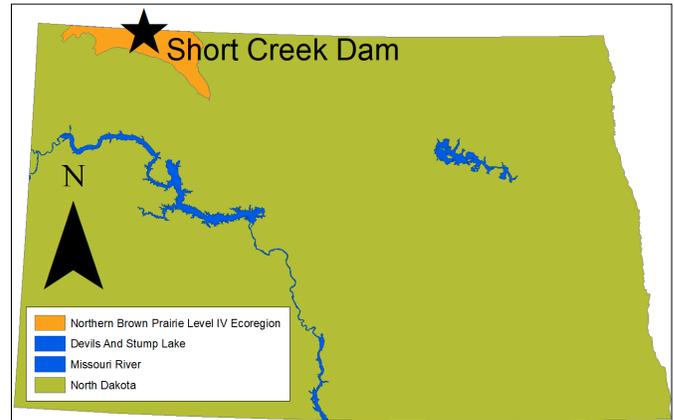


Figure 1. Location of Short Creek Dam within the state

Table 1. Percentage of land cover in the watershed and near the lake (NASS, 2020). Value listed of crop type represents percentage of total production

Land Cover Type	% in Watershed	% within 500 meters
Agriculture	55.2%	80.3%
Spring Wheat	37.5%	41.7%
Canola	16.1%	20.7%
Soybeans	12.0%	9.3%
Grassland/Pasture	30.0%	7.7%
Wetlands	7.2%	4.4%
Developed	3.4%	4.8%
Open Water	3.1%	3.2%
Forest	0.8%	< 0.1%
Barren	0.2%	< 0.1%

Temperature and Dissolved Oxygen

- Short Creek Dam commonly stratifies in the summer, with cooler, low-oxygen water in the hypolimnion.
- Thermal stratification was recorded in June 2021. Temperature change in the water column was 0.8 degrees Celsius (°C), 1.1°C, 8.2°C and 0.0°C in May, June, July and October, respectively.
- Dissolved oxygen concentrations were depleted quickly at Short Creek Dam, especially during thermal stratification.

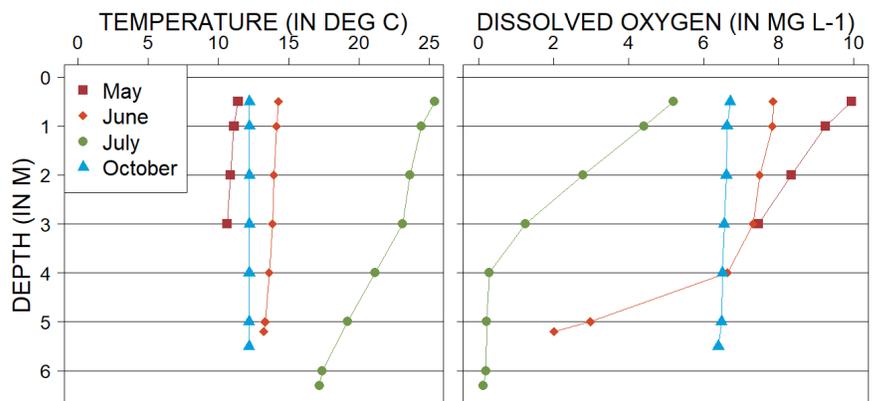


Figure 2. 2021 profiles of temperature (left) and dissolved oxygen (right) in milligrams per liter (mg L⁻¹)

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.
- Short Creek Dam is a highly eutrophic reservoir (Figure 3) with high nutrient concentrations, low algal growth and moderate transparency.
- Trophic state in 2021 was improved compared to historical indices.
- Short Creek Dam has not been listed for confirmed **harmful** algal (cyanobacteria) blooms in the past.

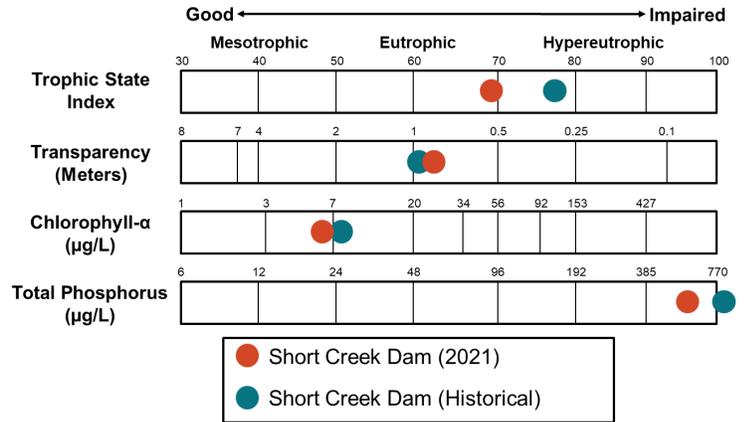


Figure 3. Trophic state indices for 2021 and historical samples

Nutrients

- Median concentration of total nitrogen (TN) at Short Creek Dam in 2021 was greater than the historical median for the lake and greater than the median for reservoirs in the Northern Dark Brown Prairie Level IV Ecoregion (hereafter, Ecoregion) (Figure 4).
- Median TP concentration at Short Creek Dam in 2021 was much less than the median for the lake but much greater than the median for the Ecoregion (Figure 4).
- Median concentrations of dissolved nutrients at Short Creek Dam in 2021 were much less than concentrations of total nutrients.
- Ammonia and nitrate-plus-nitrite was detected in about half of samples at Short Creek Dam in 2021, with most detections being low to moderate concentrations.

Nutrient Concentrations (in mg L⁻¹) in Short Creek Dam

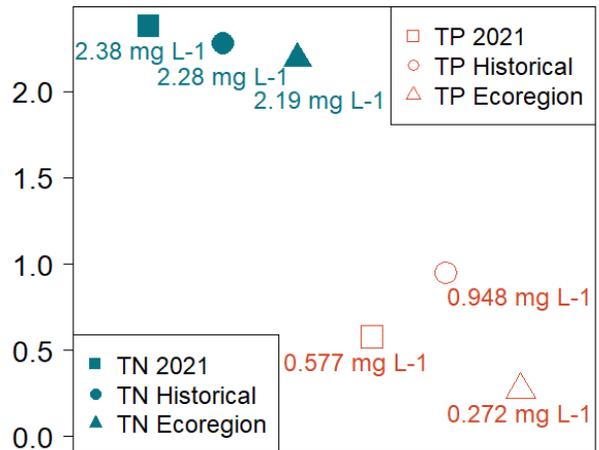


Figure 4. Median concentrations of TN and TP in mg L⁻¹ compared to regional medians

Water Chemistry

Table 2. Median concentrations of selected constituents for 2021 and historical samples and from all Ecoregion reservoirs.

Measure	2021 Median	Historical Median	Ecoregion Median
Alkalinity	421 mg L ⁻¹	336 mg L ⁻¹	299.5 mg L ⁻¹
Bicarbonate (HCO ₃ ⁻)	479 mg L ⁻¹	373.5 mg L ⁻¹	346 mg L ⁻¹
Calcium (Ca ²⁺)	86.7 mg L ⁻¹	63.7 mg L ⁻¹	56.8 mg L ⁻¹
Carbonate (CO ₃ ²⁻)	17.5 mg L ⁻¹	3 mg L ⁻¹	5 mg L ⁻¹
Conductivity	2,830 µS cm ⁻¹	1,575 µS cm ⁻¹	1,460 µS cm ⁻¹
Dissolved Solids	2,080 mg L ⁻¹	1,090 mg L ⁻¹	998.5 mg L ⁻¹
Magnesium (Mg ²⁺)	93.9 mg L ⁻¹	53.6 mg L ⁻¹	49.7 mg L ⁻¹
Sodium (Na ⁺)	439 mg L ⁻¹	241 mg L ⁻¹	197 mg L ⁻¹
Sulfate (SO ₄ ²⁻)	1,110 mg L ⁻¹	488.5 mg L ⁻¹	440 mg L ⁻¹

- Sulfate is the dominant anion in Short Creek Dam, while sodium is the dominant cation (Figure 5).
- Median concentrations of most cations and anions are greater than the historical median for the lake and greater than the median for the Ecoregion.

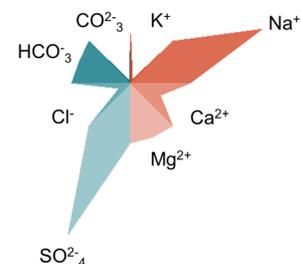


Figure 5. Maucha diagram showing ionic balance based on 2021 data