NORTH Dakota | Environmental Quality
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December 2019

Fish Creek Dam

(46.725316 N, -101.229136 W)

Morton County

- Fish Creek Dam is a small reservoir in southwestern North Dakota (Figure 1). See map at (https://gf.nd.gov/gnf/maps/fishing/lakecontours/fishcreek2004.pdf).
- There is one boat ramp on Fish Creek Dam on the west side of the lake.
- The Fish Creek Dam watershed is about 7,300 acres of mostly grassland/pasture and agriculture. The most common crops grown are soybeans, corn and spring wheat (Table 1).
- Fish Creek Dam is a Class I fishery, which are "capable of supporting growth of cold water fish species (e.g., salmonids) and associated aquatic biota."
- The North Dakota Game and Fish stocks Fish Creek Dam annually with catchable rainbow trout and brown trout. Largemouth bass, bluegill, black crappie and smallmouth bass were captured in the last sample by the NDGF.
- Fish Creek Dam was previously assessed in 1993-1994 and 2005-2006.

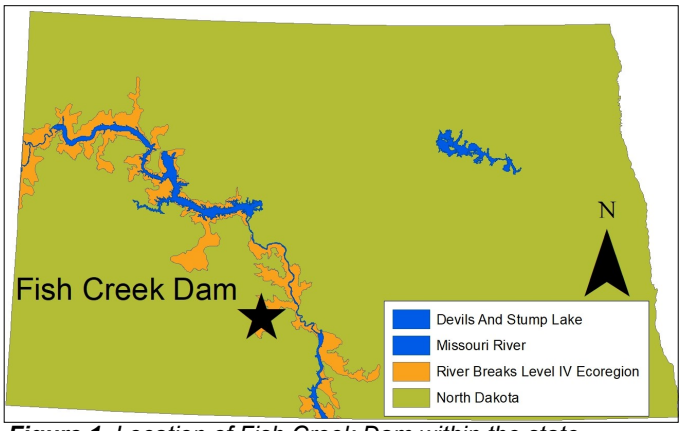

Figure 1. *Location of Fish Creek Dam within the state*

Table 1. *Percentage of land cover in the watershed and near the lake (NASS, 2018). Value listed of crop type represents percentage of total production*

Land Cover Type	% in Watershed	% within 500 meters
Grassland/Pasture	61.6%	83.5%
Agriculture	31.7%	NA
Soybeans	*40.7%*	*NA*
Corn	*22.6%*	*NA*
Spring Wheat	*20.1%*	*NA*
Developed	3.2%	1.7%
Forest	1.7%	8.4%
Wetlands	1.0%	3.1%
Open Water	0.8%	3.2%
Barren	< 0.1%	NA

Temperature and Dissolved Oxygen

- Fish Creek Dam commonly stratifies in the summer, with warm, well-oxygenated water at the top of the water column, and cold, low-oxygen water near the bottom.
- There was thermal stratification recorded at most visits in 2019. Temperature change in the water column was 6.3 degrees Celsius (ºC), 9.2ºC, 16.6ºC, 19.4ºC, 15.9ºC and 0.1ºC from April through October.
- Dissolved oxygen concentrations were relatively high near the surface, but anoxic conditions were common under thermal stratification.

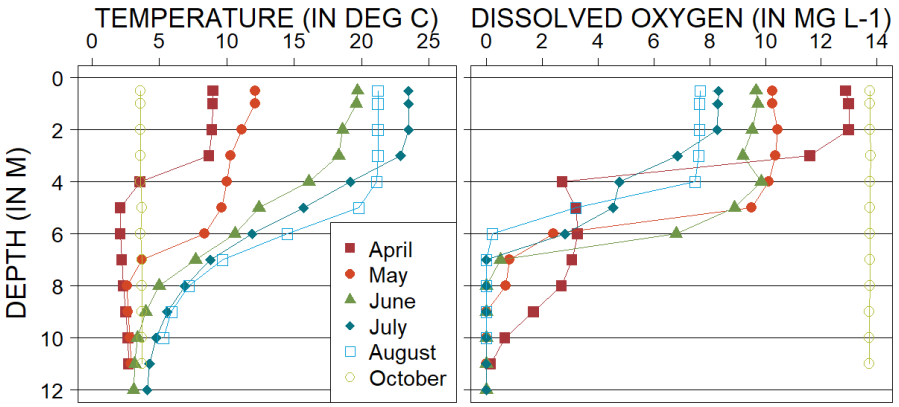

Figure 2. *2019 profiles of temperature (left) and dissolved oxygen (right) in milligrams per liter (mg L^{-1})*

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.
- Fish Creek Dam is a eutrophic reservoir (Figure 3) that has low to moderate nutrient concentrations and low algal growth. The lake does have dense plant growth at the upstream end.
- Trophic state in 2019 improved compared to historical indices.
- Fish Creek Dam has not had any confirmed ***harmful*** algal (cyanobacteria) blooms.

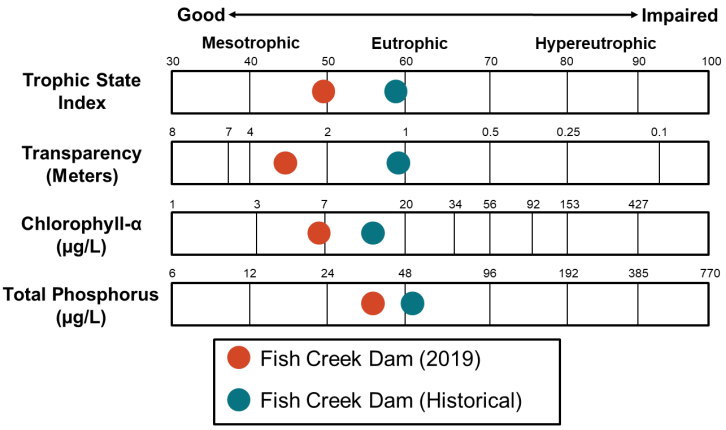

Figure 3. *Trophic state indices for 2019 and historical samples*

Nutrients

- Median concentration of total nitrogen (TN) in 2019 was much less than the historical median for the lake and much less than the median for reservoirs in the River Breaks Level IV Ecoregion (hereafter, Ecoregion) where Fish Creek Dam is located (Figure 4).
- Dissolved nitrogen concentrations were similar to concentrations of TN
- Median total phosphorus (TP) concentration in 2019 was less than the median for the lake and less than the median for the Ecoregion (Figure 4).
- Dissolved phosphorus concentrations were much less than concentrations of TP.
- Neither ammonia nor nitrate-plus-nitrite were detected at Fish Creek Dam in 2019.

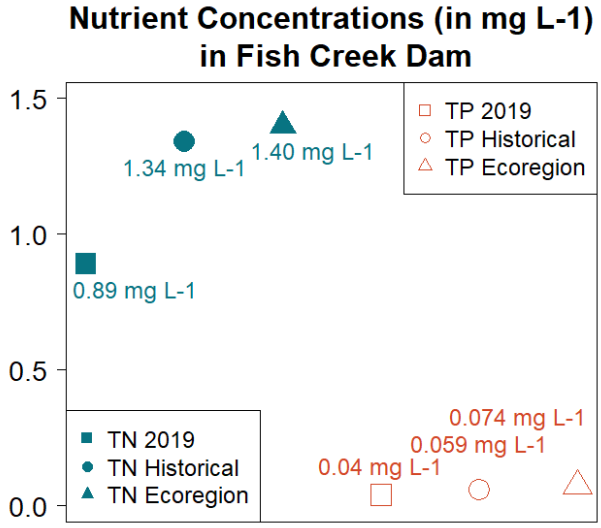

Figure 4. *Median concentrations of TN and TP in mg L^{-1} compared to regional medians*

Water Chemistry

Table 2. *Median concentrations of selected constituents for 2019 and historical samples and from all Ecoregion reservoirs.*

Measure	2019 Median	Historical Median	Ecoregion Median
Alkalinity	379 mg L^{-1}	303 mg L^{-1}	376 mg L^{-1}
Bicarbonate (HCO^-_3)	423 mg L^{-1}	288 mg L^{-1}	412 mg L^{-1}
Calcium (Ca^{2+})	41.6 mg L^{-1}	29.2 mg L^{-1}	47.3 mg L^{-1}
Carbonate (CO^{2-}_3)	19 mg L^{-1}	15 mg L^{-1}	19 mg L^{-1}
Conductivity	1,720 µS cm^{-1}	1,290 µS cm^{-1}	1,680 µS cm^{-1}
Dissolved Solids	1,180 mg L^{-1}	849 mg L^{-1}	1,150 mg L^{-1}
Magnesium (Mg^{2+})	64.4 mg L^{-1}	37.5 mg L^{-1}	64.7 mg L^{-1}
Sodium (Na^+)	274 mg L^{-1}	207 mg L^{-1}	262.5 mg L^{-1}
Sulfate (SO^{2-}_4)	542 mg L^{-1}	376 mg L^{-1}	483 mg L^{-1}

- Sulfate and bicarbonate are the dominant anions in Fish 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 but similar to the median for the Ecoregion.

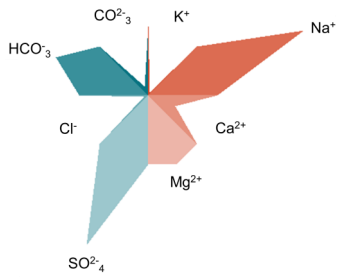

Figure 5. *Maucha diagram showing ionic balance based on 2019 data*