NORTH Dakota | Environmental Quality

Be Legendary.™

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December 2020

Fordville Dam

(48.17849 N, -97.76008 W)

Grand Forks County

- Fordville Dam is a small reservoir in northeast North Dakota (Figure 1). See map at (https://gf.nd.gov/gnf/maps/fishing/lakecontours/fordville2003.pdf).
- There is one public, paved boat ramp on Fordville Dam on the north side of the lake.
- The Fordville Dam watershed is nearly 30,000 acres of mostly agriculture. Agricultural production in the watershed is dominated by spring wheat, dry beans and soybeans (Table 1).
- Fordville Dam is a Class II, cool-water fishery, which are "capable of supporting natural reproduction and growth of cool water fishes (e.g., northern pike and walleye) and associated aquatic biota."
- Fordville Dam is managed for walleye and northern pike, with fingerlings stocked most years. White sucker, walleye, northern pike, black bullhead, yellow perch and black crappie were captured during the last sample by the ND Game and Fish.
- Fordville Dam was previously assessed in 1992-1993 and 2009-2010.

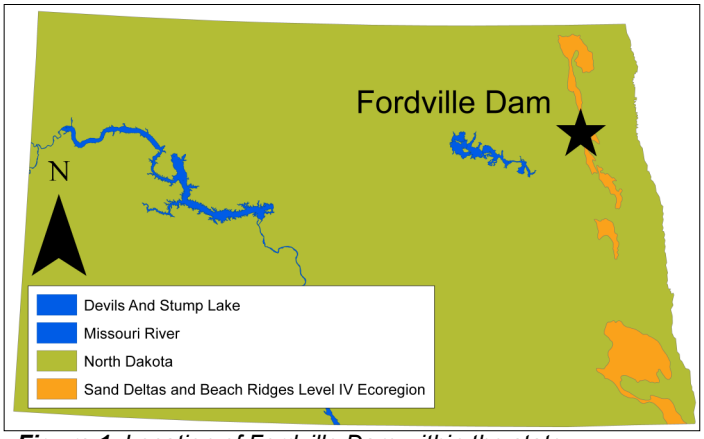

Figure 1. *Location of Fordville Dam within the state*

Table 1. *Percentage of land cover in the watershed and near the lake (NASS, 2019). Value listed of crop type represents percentage of total production*

Land Cover Type	% in Watershed	% within 500 meters
Agriculture	75.2%	42.0%
Spring Wheat	37.3%	31.3%
Dry Beans	17.9%	46.6%
Soybeans	16.4%	3.0%
Grassland/Pasture	12.1%	28.4%
Wetlands	5.1%	13.5%
Developed	4.1%	6.5%
Forest	2.5%	6.9%
Open Water	0.9%	2.6%
Shrubland	< 0.1%	< 0.1%

Temperature and Dissolved Oxygen

- Fordville Dam regularly stratifies in the summer.
- Thermal stratification was recorded during both summer samples in 2020. Top-to-bottom temperature changes of 0.6ºC, 7.9ºC, 7.9ºC and 0.0ºC were recorded in May, June, July and October, respectively.
- Dissolved oxygen concentrations were relatively high throughout the water column during all samples, but did decline sharply in the hypolimnion during thermal stratification.

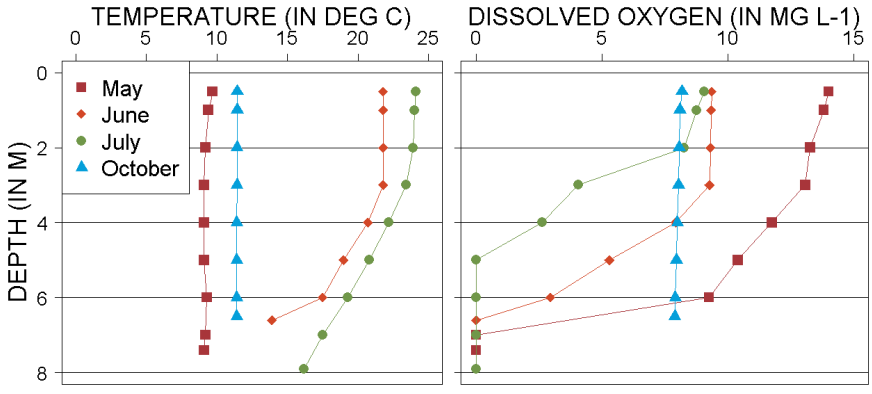

Figure 2. *2020 profiles of temperature (left) and dissolved oxygen (right) in milligrams per liter (mg L^{-1})*

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.
- Fordville Dam is a eutrophic lake (Figure 3) that has high nutrient concentrations and moderate algal growth.
- Current trophic state is similar to historical data.
- There have been no confirmed ***harmful*** algal (cyanobacteria) blooms at Fordville Dam as of 2020.

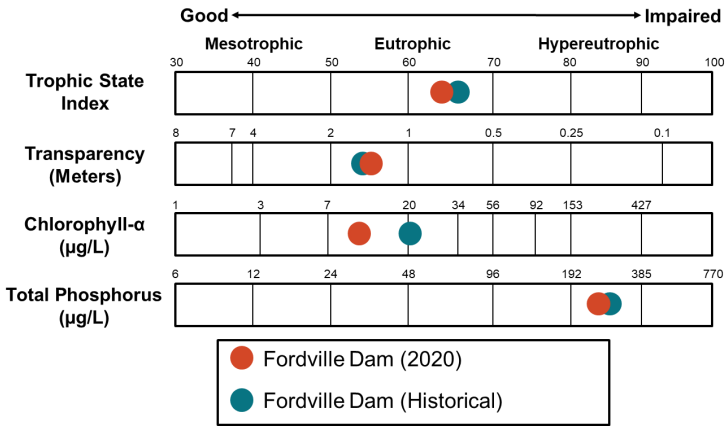

Figure 3. *Trophic state indices for 2020 and historical samples*

Nutrients

- Median concentration of total nitrogen (TN) in 2020 was less than the historical median for the lake but greater than the median for the Sand Deltas and Beach Ridges Level IV Ecoregion (hereafter, Ecoregion) where Fordville Dam is located (Figure 4).
- Median concentration of dissolved TN was less than TN.
- Median total phosphorus (TP) concentration in 2020 was similar to the median for the lake but greater than the median for the Ecoregion (Figure 4).
- Median concentration of dissolved phosphorus was less than TP.
- Ammonia and nitrate-plus-nitrite were detected only once at Fordville Dam in 2020 (in October) at relatively high concentrations, but were not detected in other samples.

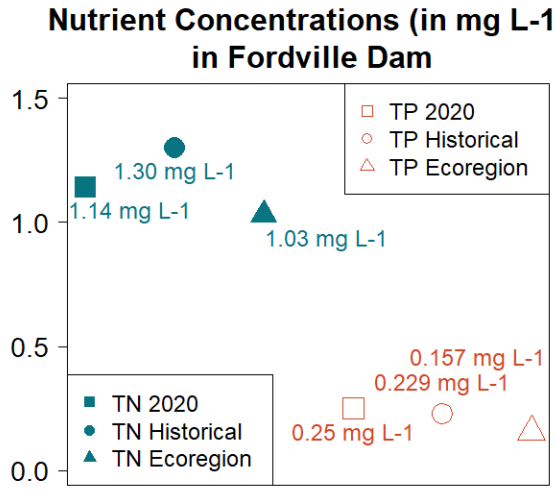

Figure 4. *Median concentrations of TN and TP in mg L^{-1} compared to regional medians*

Water Chemistry

Table 2. *Median concentrations of selected constituents for 2020 and historical samples and from all Ecoregion natural lakes and reservoirs.*

Measure	2020 Median	Historical Median	Ecoregion Median
Alkalinity	256 mg L^{-1}	249 mg L^{-1}	217.5 mg L^{-1}
Bicarbonate (HCO^-_3)	288 mg L^{-1}	267 mg L^{-1}	254.5 mg L^{-1}
Calcium (Ca^{2+})	97.5 mg L^{-1}	102 mg L^{-1}	88.5 mg L^{-1}
Carbonate (CO^{2-}_3)	11.5 mg L^{-1}	< 1 mg L^{-1}	4 mg L^{-1}
Conductivity	1,175 µS cm^{-1}	1,080 µS cm^{-1}	988 µS cm^{-1}
Dissolved Solids	798.5 mg L^{-1}	708 mg L^{-1}	655 mg L^{-1}
Magnesium (Mg^{2+})	50.5 mg L^{-1}	43.1 mg L^{-1}	48.8 mg L^{-1}
Sodium (Na^+)	95.2 mg L^{-1}	94.2 mg L^{-1}	63.6 mg L^{-1}
Sulfate (SO^{2-}_4)	364.5 mg L^{-1}	325 mg L^{-1}	325 mg L^{-1}

- Sulfate and bicarbonate are the dominant anions in Fordville Dam, while calcium, magnesium and sodium are the dominant cations (Figure 5).
- Median concentrations of most cations and anions are similar to the historical median for the lake but greater than the median for the Ecoregion.

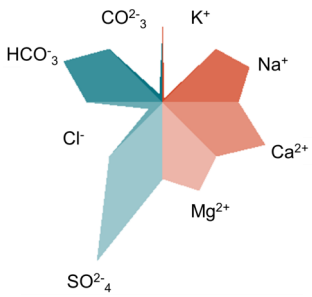

Figure 5. *Maucha diagram showing ionic balance based on 2020 data*