

Niagara Dam

(47.99919 N, -97.86192 W)

Grand Forks County

- Niagara Dam is a small reservoir in northeast North Dakota (Figure 1).
- There is one public boat ramp on the southeast side Niagara Dam.
- The Niagara Dam watershed is about 3,900 acres of mostly agricultural land and wetlands. The most common crops grown are spring wheat, dry beans and soybeans (Table 1).
- Niagara Dam is a Class III fishery, which are “capable of supporting natural reproduction and growth of warm water fishes (e.g., largemouth bass and bluegill) and associated aquatic biota.”
- Niagara Dam is managed for northern pike, with fingerlings stocked intermittently. There is no recent fishery information from the ND Game and Fish.
- Niagara Dam was previously assessed in 1996-1997.

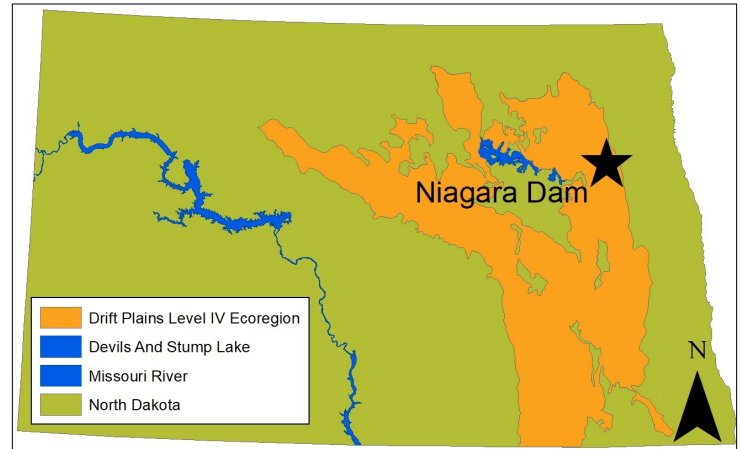


Figure 1. Location of Niagara Dam within the state

Table 1. Percentage of land cover in the watershed and near the lake (NASS, 2014). Value listed of crop type represents percentage of total production

Land Cover Type	% in Watershed	% within 500 meters
Agriculture	68.5%	61.6%
Spring Wheat	45.9%	35.9%
Soybeans	22.9%	12.0%
Dry Beans	19.6%	NA
Wetlands	16.6%	12.0%
Grassland/Pasture	6.2%	13.3%
Developed	6.2%	14.4%
Open Water	2.1%	2.1%
Forest	0.5%	5.9%

Temperature and Dissolved Oxygen

- Niagara Dam regularly 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 in May and July 2015. Temperature change in the water column was 6.34 degrees Celsius (°C), 11.58°C and 0.20°C in May, July and September, respectively.
- Dissolved oxygen concentration was relatively low in Niagara Dam, especially during thermal stratification.

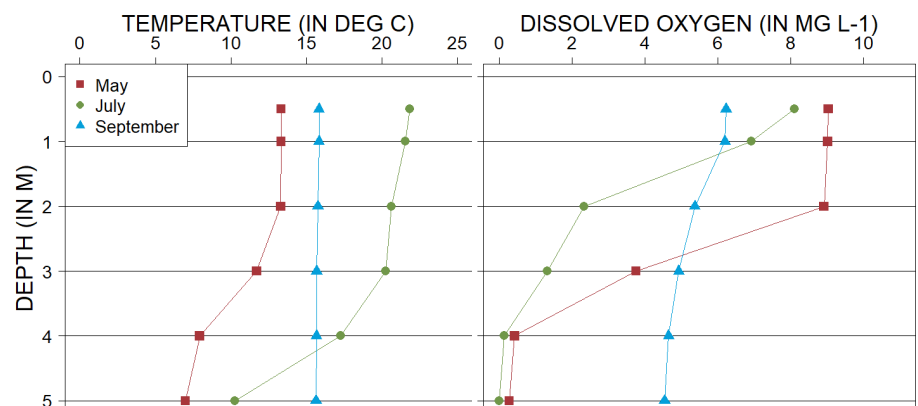


Figure 2. 2015 profiles of temperature (left) and dissolved oxygen (right) in milligrams per liter ($mg\ L^{-1}$)

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.
- Niagara Dam is a hypereutrophic reservoir (Figure 3) that has high nutrient concentrations and high algal growth.
- Current trophic state has declined compared to historical indices.
- There have been no confirmed **harmful** algal (cyanobacteria) blooms at Niagara Dam.

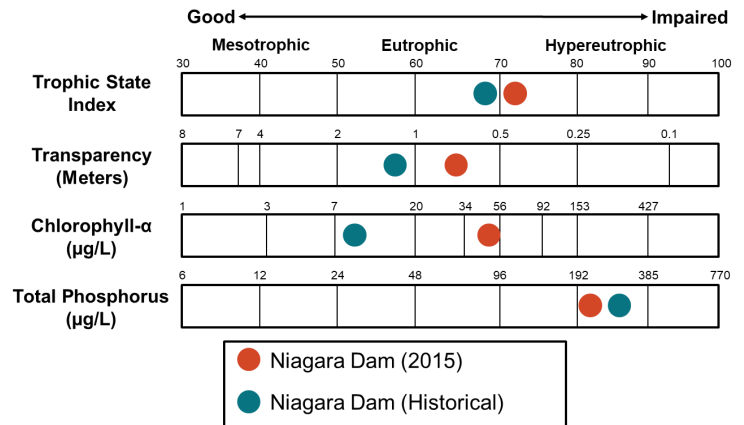


Figure 3. Trophic state indices for 2015 and historical samples

Nutrients

- Median concentration of total nitrogen (TN) in 2015 was less than the historical median for the lake but similar to the median for the Drift Plains Level IV Ecoregion (hereafter, Drift Plains) where Niagara Dam is located (Figure 4).
- Median concentration of dissolved TN was slightly less than TN.
- Median TP concentration in 2015 was greater than the median for the lake and greater than the median for the Drift Plains (Figure 4).
- Median concentration of dissolved phosphorus was less than TP.
- Ammonia was detected at low concentrations in two samples at Niagara Dam in 2015, while there were no detections of nitrate plus nitrite.

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

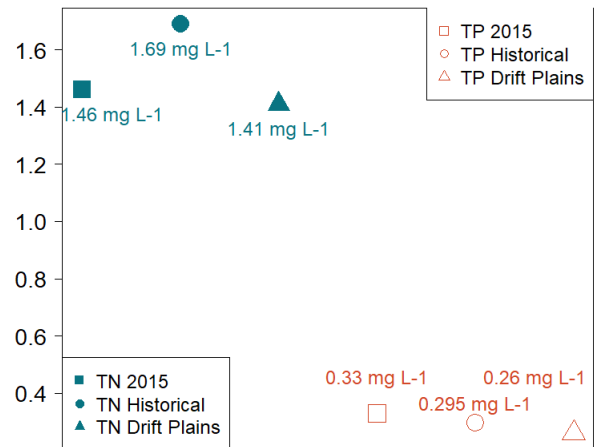


Figure 4. Median concentrations of TN and TP in mg L⁻¹ compared to regional medians

Water Chemistry

Table 2. Median concentrations of selected constituents for 2015 and historical samples and from all Drift Plains reservoirs.

Measure	2015 Median	Historical Median	Ecoregion Median
Alkalinity	285 mg L ⁻¹	330 mg L ⁻¹	311 mg L ⁻¹
Bicarbonate (HCO ₃ ⁻)	334 mg L ⁻¹	403 mg L ⁻¹	341 mg L ⁻¹
Calcium (Ca ²⁺)	95.3 mg L ⁻¹	101 mg L ⁻¹	73.8 mg L ⁻¹
Carbonate (CO ₃ ²⁻)	< 1 mg L ⁻¹	< 1 mg L ⁻¹	14 mg L ⁻¹
Conductivity	1,630 µS cm ⁻¹	1,720 µS cm ⁻¹	1,081 µS cm ⁻¹
Dissolved Solids	1,120 mg L ⁻¹	1,160 mg L ⁻¹	713 mg L ⁻¹
Magnesium (Mg ²⁺)	70.0 mg L ⁻¹	74.5 mg L ⁻¹	52.5 mg L ⁻¹
Sodium (Na ⁺)	161 mg L ⁻¹	163 mg L ⁻¹	106 mg L ⁻¹
Sulfate (SO ₄ ²⁻)	567 mg L ⁻¹	589 mg L ⁻¹	271 mg L ⁻¹

- Sulfate is the dominant anion in Niagara Dam, while magnesium, calcium and sodium are co-dominant cations (Figure 5).
- Median concentrations of most cations and anions are much greater than the historical median for the lake and greater than the median for the Drift Plains.

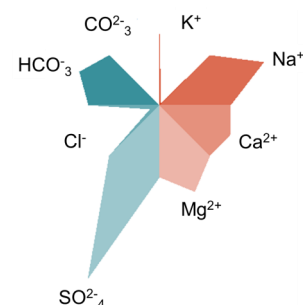


Figure 5. Maucha diagram showing ionic balance based on 2015 data