

November 2020

Mooreton Pond

(46.26648 N, -96.84040 W)

Richland County

- Mooreton Pond is a small man-made lake in southeast North Dakota (Figure 1). See map at (<https://gf.nd.gov/gnf/maps/fishing/lakecontours/mooreton2004.pdf>).
- There is one public, paved boat ramp on Mooreton Pond on the west side of the lake.
- The Mooreton Pond watershed is difficult to delineate with the nature of the lake. Land cover near the lake is dominated by agriculture, most of which being corn and soybeans (Table 1).
- Mooreton Pond is a Class III, warm-water fishery, which are “capable of supporting natural reproduction and growth of warm water fishes (e.g., largemouth bass and bluegill) and associated aquatic biota.”
- Mooreton Pond is managed for trout, with fingerlings stocked trout, though walleye fingerlings were stocked for the first time in 2018 and 2020. Walleye, smallmouth bass, black crappie, common carp, bluegill and yellow perch were captured during the last sample by the ND Game and Fish in 2019.
- Mooreton Pond was previously assessed in 2002-2005 and 2012-2014.



Figure 1. Location of Mooreton Pond within the state

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

Land Cover Type	% within 500 meters
Agriculture	64.7%
Corn	34.0%
Soybeans	28.8%
Fallow/Idle Cropland	19.9%
Developed	21.2%
Wetlands	10.8%
Forest	1.3%
Grassland/Pasture	0.9%
Barren	0.7%
Open Water	0.4%

Temperature and Dissolved Oxygen

- Mooreton Pond can stratify in the summer but is generally well-mixed.
- Thermal stratification was recorded in July 2020. Top-to-bottom temperature changes of 1.2°C, 0.0°C, 3.2°C and 0.3°C 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 in July.

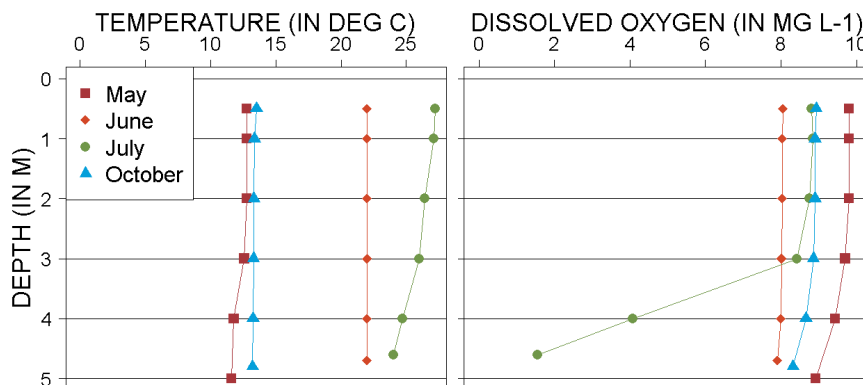


Figure 2. 2020 profiles of temperature (left) and dissolved oxygen (right) in milligrams per liter ($mg\ L^{-1}$)

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

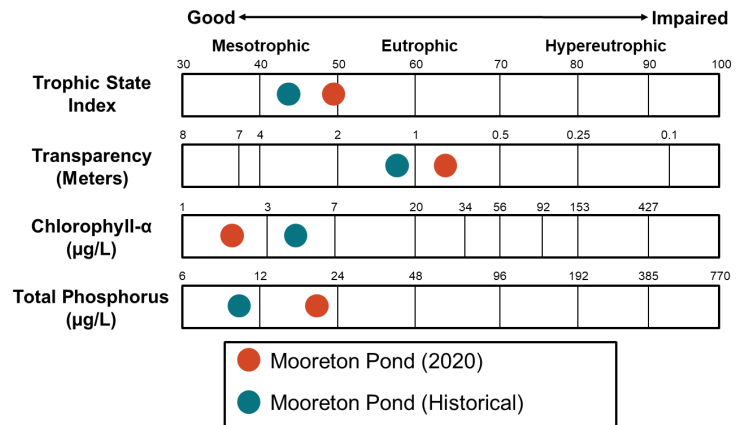


Figure 3. Trophic state indices for 2020 and historical samples

Nutrients

- Median concentration of total nitrogen (TN) in 2020 was similar to the historical median for the lake but less than the median for the Glacial Lake Agassiz Basin Level IV Ecoregion (hereafter, Ecoregion) where Mooreton Pond is located (Figure 4).
- Median concentration of dissolved TN was similar to TN.
- Median total phosphorus (TP) concentration in 2020 was similar to the median for the lake and less than the median for the Ecoregion (Figure 4).
- Median concentration of dissolved phosphorus was similar to TP.
- Ammonia and nitrate-plus-nitrite were detected once in June at Mooreton Pond in 2020, but were not detected for any other sample.

Nutrient Concentrations (in mg L⁻¹) in Mooreton Pond

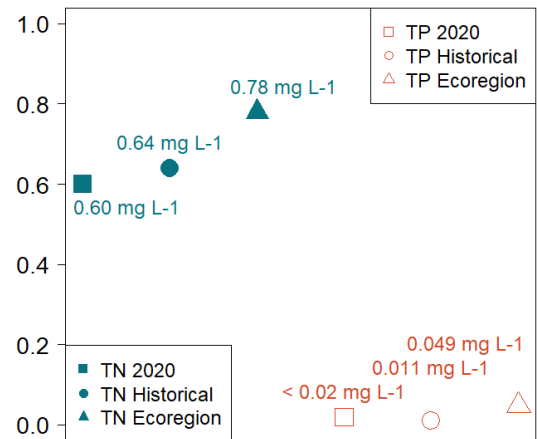


Figure 4. Median concentrations of TN and TP in mg L⁻¹ compared to regional medians

Water Chemistry

Table 2. Median concentrations of selected constituents for 2020 and historical samples and from all Ecoregion man-made lakes.

Measure	2020 Median	Historical Median	Ecoregion Median
Alkalinity	251 mg L ⁻¹	242 mg L ⁻¹	223.5 mg L ⁻¹
Bicarbonate (HCO ₃ ⁻)	291.5 mg L ⁻¹	276.5 mg L ⁻¹	260.5 mg L ⁻¹
Calcium (Ca ²⁺)	70.6 mg L ⁻¹	74.6 mg L ⁻¹	72.3 mg L ⁻¹
Carbonate (CO ₃ ²⁻)	7.5 mg L ⁻¹	11 mg L ⁻¹	8 mg L ⁻¹
Conductivity	3,970 µS cm ⁻¹	3,845 µS cm ⁻¹	855 µS cm ⁻¹
Dissolved Solids	2,730 mg L ⁻¹	2,735 mg L ⁻¹	513.5 mg L ⁻¹
Magnesium (Mg ²⁺)	76.3 mg L ⁻¹	78.7 mg L ⁻¹	35.5 mg L ⁻¹
Sodium (Na ⁺)	744.5 mg L ⁻¹	751.5 mg L ⁻¹	45.1 mg L ⁻¹
Sulfate (SO ₄ ²⁻)	1,350 mg L ⁻¹	1,385 mg L ⁻¹	190.5 mg L ⁻¹

- Sulfate is the dominant anion in Mooreton Pond, while sodium is the dominant cation (Figure 5).
- Median concentrations of most cations and anions are similar to the historical median for the lake but much greater than the median for the Ecoregion.

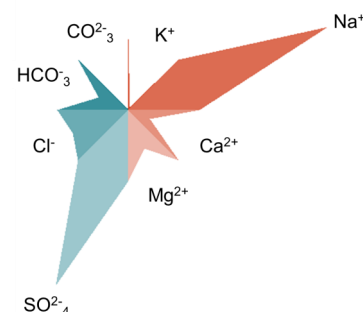


Figure 5. Maucha diagram showing ionic balance based on 2020 data