

December 2019

Mundt Lake

(46.323426 N, -99.266429 W)

Logan County

- Mundt Lake is a small natural lake in southeastern North Dakota (Figure 1). See map at (<https://gf.nd.gov/gnf/maps/fishing/lakecontours/mundt2005.pdf>).
- There is one public boat ramp on Mundt Lake on the north side of the lake.
- The Mundt Lake watershed is about 2,700 acres of mostly grassland/pasture and agriculture. The most common crops grown are other hay/non-alfalfa, spring wheat and corn (Table 1).
- Mundt Lake 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.”
- Mundt Lake is managed for walleye, with fingerlings stocked annually. Adult smallmouth bass have been stocked annually since 2014. Walleye, yellow perch and smallmouth bass were captured during the last sample by the ND Game and Fish.
- Mundt Lake was previously assessed in 2010.

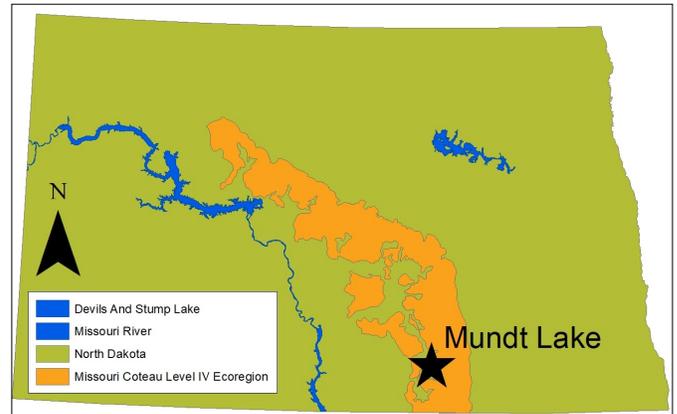


Figure 1. Location of Mundt Lake within the state

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	45.6%	33.5%
Agriculture	34.0%	52.8%
Other Hay/Non-Alfalfa	52.3%	53.7%
Spring Wheat	20.4%	11.6%
Corn	12.3%	6.4%
Open Water	15.3%	8.8%
Developed	2.4%	3.8%
Wetlands	1.1%	0.8%
Shrubland	0.3%	0.2%
Forest	< 0.1%	NA

Temperature and Dissolved Oxygen

- Mundt Lake can stratify 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 some thermal stratification recorded in September 2019 near the bottom. Temperature change in the water column was 0.1 degrees Celsius (°C), 0.8°C and 1.8°C in May, July and September, respectively.
- Dissolved oxygen concentrations were relatively high throughout the water column during all samples.

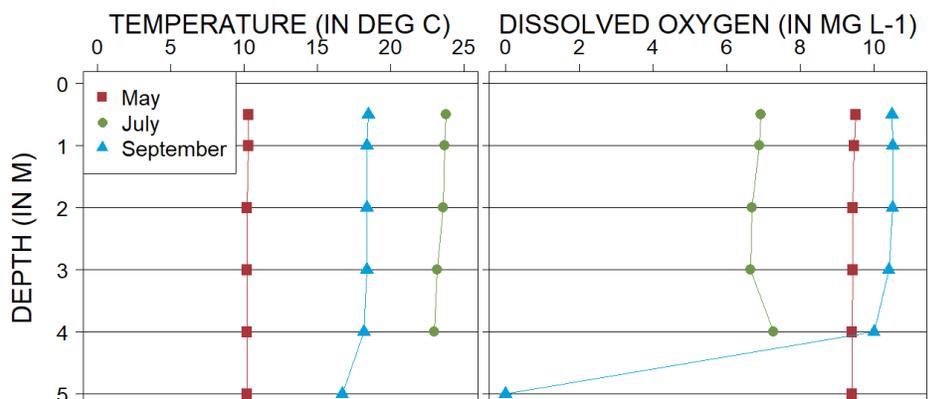


Figure 2. 2019 profiles of temperature (left) and dissolved oxygen (right) in milligrams per liter (mg L⁻¹)

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.
- Mundt Lake is a eutrophic lake (Figure 3) that has high nutrient concentrations but moderate algal growth.
- Current trophic state has improved compared to historical indices.
- There have been no confirmed **harmful** algal (cyanobacteria) blooms at Mundt Lake.

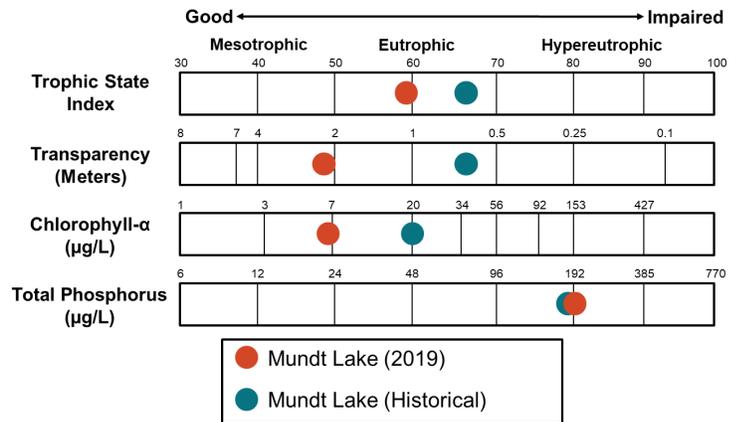


Figure 3. Trophic state indices for 2019 and historical samples

Nutrients

- Median concentration of total nitrogen (TN) in 2019 was less than the historical median for the lake but greater than the median for the Missouri Coteau Level IV Ecoregion (hereafter, Ecoregion) where Mundt Lake is located (Figure 4).
- Median concentration of dissolved TN was similar to TN.
- Median TP concentration in 2019 was greater than the median for the lake and much greater than the median for the Ecoregion (Figure 4).
- Median concentration of dissolved phosphorus was slightly less than TP.
- Ammonia and nitrate-plus-nitrite were each found in two samples at Mundt Lake in 2019, but at low concentrations.

Nutrient Concentrations (in mg L⁻¹) in Mundt Lake

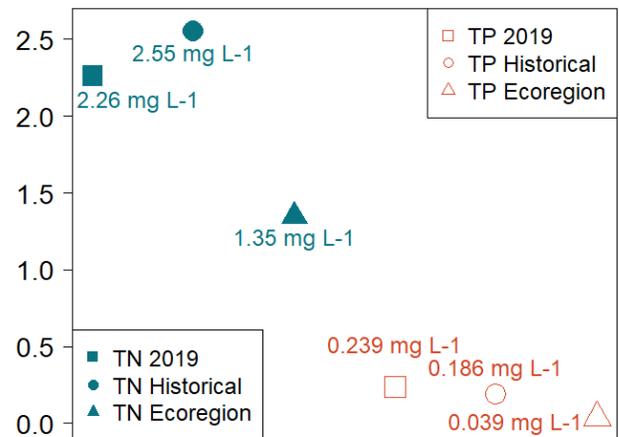


Figure 4. Median concentrations of TN and TP in mg L⁻¹ compared to regional medians

Water Chemistry

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

Measure	2019 Median	Historical Median	Ecoregion Median
Alkalinity	489 mg L ⁻¹	444 mg L ⁻¹	312 mg L ⁻¹
Bicarbonate (HCO ₃ ⁻)	511 mg L ⁻¹	453 mg L ⁻¹	328 mg L ⁻¹
Calcium (Ca ²⁺)	31.8 mg L ⁻¹	42.5 mg L ⁻¹	38.8 mg L ⁻¹
Carbonate (CO ₃ ²⁻)	45 mg L ⁻¹	41 mg L ⁻¹	26 mg L ⁻¹
Conductivity	1,770 µS cm ⁻¹	1,400 µS cm ⁻¹	1,180 µS cm ⁻¹
Dissolved Solids	1,190 mg L ⁻¹	916 mg L ⁻¹	784 mg L ⁻¹
Magnesium (Mg ²⁺)	154 mg L ⁻¹	119 mg L ⁻¹	81.9 mg L ⁻¹
Sodium (Na ⁺)	126 mg L ⁻¹	93.7 mg L ⁻¹	118 mg L ⁻¹
Sulfate (SO ₄ ²⁻)	432 mg L ⁻¹	300 mg L ⁻¹	364 mg L ⁻¹

- Sulfate and bicarbonate are the dominant anions in Mundt Lake, while magnesium 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.

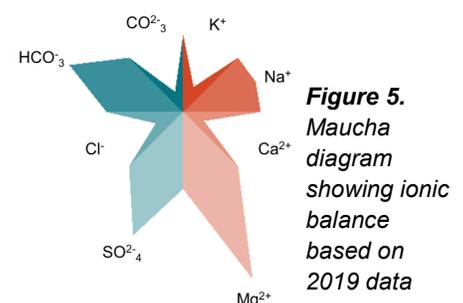


Figure 5. Maucha diagram showing ionic balance based on 2019 data