NORTH Dakota | Environmental Quality

Be Legendary.™

Contact: Watershed Management Program

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April 2019

Round Lake

(47.14647 N, -99.48685 W)

Kidder County

- Round Lake is a popular fishing lake in central North Dakota (Figure 1). See map at (https://gf.nd.gov/gnf/maps/fishing/lakecontours/roundkidder2005.pdf).
- There is one primitive boat/winter access on the south side of Round Lake, just off Highway 36.
- The Round Lake watershed is about 9,000 acres of mostly grassland/pasture and agricultural land. The most common crops grown are soybeans, spring wheat and non-alfalfa hay (Table 1).
- Round Lake is a Class II fishery, which are "capable of supporting natural reproduction and growth of cool water fishes (e.g., northern pike and walleye) and associated aquatic biota."
- Round Lake is managed for walleye, with fingerlings stocked annually. Yellow perch and northern pike were also found during the last sample by the ND Game and Fish. The Game and Fish reported a fish kill in the winter of 2017 -2018, mostly impacting walleye.
- There is no historical data for Round Lake.

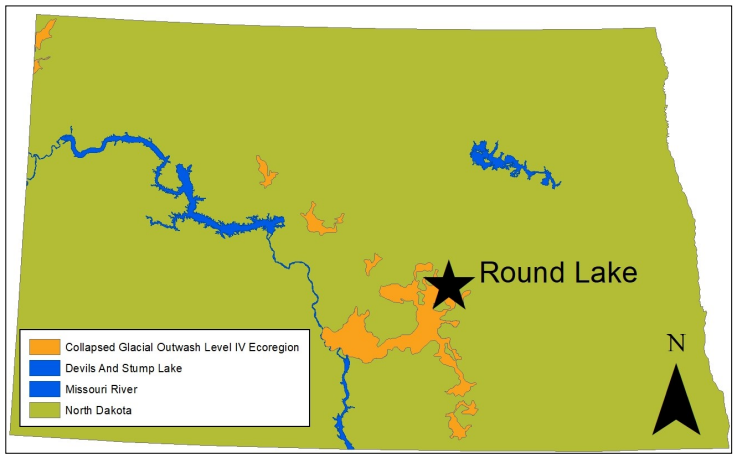

Figure 1. *Location of Round Lake within the state*

Table 1. *Percentage of land cover in the watershed and near the lake (NASS, 2015). Value listed of crop type represents percentage of total production.*

Land Cover Type	% in Watershed	% within 500 meters
Grassland/Pasture	65.2%	51.4%
Agriculture	18.9%	32.4%
Spring Wheat	*32.5%*	*21.1%*
Other Hay/Non-Alfalfa	*26.6%*	*13.3%*
Soybeans	*19.1%*	*13.5%*
Open Water	9.9%	6.1%
Wetlands	3.7%	3.5%
Developed	2.3%	6.7%
Forest	< 0.1%	NA

Temperature and Dissolved Oxygen

- Round Lake occasionally 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 no thermal stratification in 2016. Temperature change in the water column was 0.52 degrees Celsius (ºC), 0.40ºC and 0.17ºC in May, July and September, respectively.
- All samples showed most of the lake as well-oxygenated.

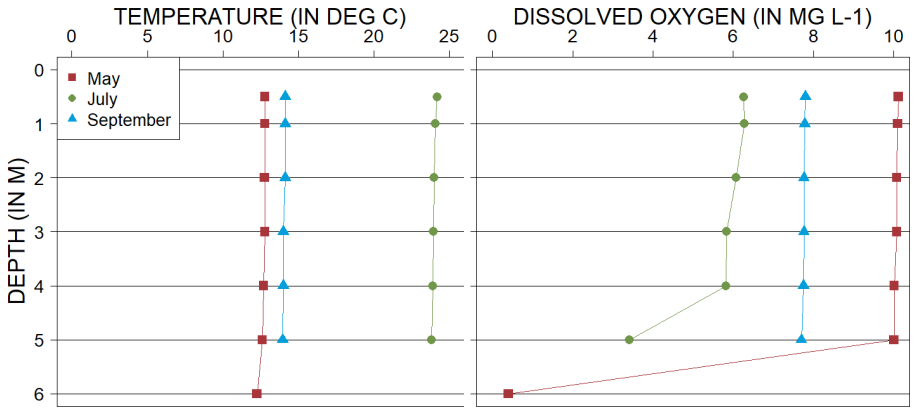

Figure 2. *2016 profiles of temperature (left) and dissolved oxygen (right) in milligrams per liter (mg L^{-1})*

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.
- Round Lake is a eutrophic lake (Figure 3) that has moderate nutrient concentrations and moderate algal growth.
- There is no historical trophic status for comparison.
- There have been confirmed ***harmful*** algal (cyanobacteria) blooms at Round Lake (last in 2016).

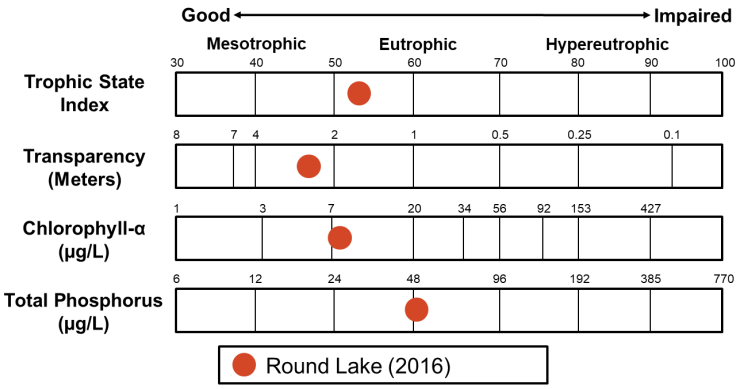

Figure 3. *Trophic state indices for 2016 and historical samples*

Nutrients

- Median concentration of total nitrogen (TN) in 2016 was similar to the median for the Collapsed Glacial Outwash Level IV Ecoregion (hereafter, Glacial Outwash) where Round Lake is located (Figure 4).
- Median concentration of dissolved TN was similar to TN.
- Median TP concentration in 2016 was similar to the median for the Glacial Outwash (Figure 4).
- Median concentration of dissolved phosphorus was slightly less than TP.
- Ammonia was detected once at Round Lake in 2016, while there were no detections of nitrate plus nitrite.

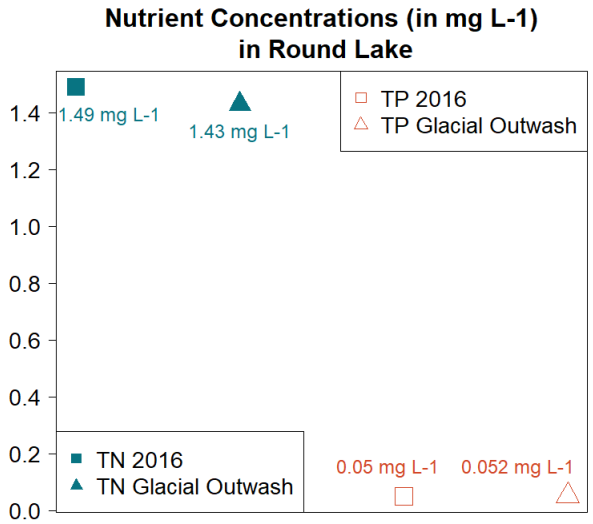

Figure 4. *Median concentrations of TN and TP in mg L^{-1} compared to regional medians*

Water Chemistry

Table 2. *Median concentrations of selected constituents for 2016 and historical samples and from all Glacial Outwash lakes.*

Measure	2016 Median	Ecoregion Median
Alkalinity	383 mg L^{-1}	466 mg L^{-1}
Bicarbonate (HCO^-_3)	425 mg L^{-1}	464 mg L^{-1}
Calcium (Ca^{2+})	21.0 mg L^{-1}	25.3 mg L^{-1}
Carbonate (CO^{2-}_3)	20 mg L^{-1}	58 mg L^{-1}
Conductivity	828 µS cm^{-1}	1,770 µS cm^{-1}
Dissolved Solids	484 mg L^{-1}	1,240 mg L^{-1}
Magnesium (Mg^{2+})	84.8 mg L^{-1}	88 mg L^{-1}
Sodium (Na^+)	34 mg L^{-1}	163 mg L^{-1}
Sulfate (SO^{2-}_4)	67.1 mg L^{-1}	554 mg L^{-1}

- Bicarbonate is the dominant anion in Round Lake, while magnesium is the dominant cation (Figure 5).
- Median concentrations of most cations and anions are less than the median for the Glacial Outwash.

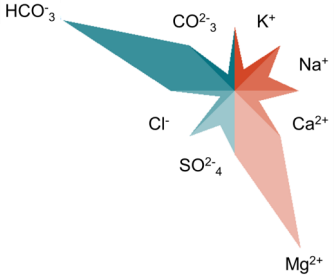

Figure 5. *Maucha diagram showing ionic balance based on 2016 data*