

December 2021

## Round Lake

(48.031498 N, -100.275283 W)

### McHenry County

- Round Lake is a large natural lake in northern North Dakota (Figure 1). See map at (<https://gf.nd.gov/gnf/maps/fishing/lakecontours/roundmchenry2020.pdf>).
- There is one paved, public boat ramp on the south side of the lake.
- The Round Lake watershed is about 23,000 acres of mostly agriculture and grassland/pasture. The most common crops grown are soybeans, spring wheat and corn (Table 1).
- Round 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.”
- Round Lake is managed by the NDGF as a walleye fishery, with fingerlings stocked annually. Only walleye and northern pike were captured in the last sample by the NDGF in 2020.
- Round Lake was last sampled in 2010 by the NDDEQ.



Figure 1. Location of Round Lake within the state

Table 1. Percentage of land cover in the watershed and near the lake (NASS, 2020). Value listed of crop type represents percentage of total production

Land Cover Type	% in Watershed	% within 500 meters
Agriculture	43.1%	25.0%
Soybeans	28.7%	2.1%
Spring Wheat	26.9%	7.4%
Corn	11.3%	20.6%
Grassland/Pasture	31.8%	33.9%
Wetlands	11.2%	32.1%
Open Water	8.7%	3.0%
Developed	3.5%	5.8%
Forest	0.7%	< 0.1%
Shrubland	< 0.1%	< 0.1%

## Temperature and Dissolved Oxygen

- Round Lake does stratify in the summer, with cooler, lower-oxygen water in the hypolimnion.
- Thermal stratification was recorded in June 2021. Temperature change in the water column was 4.0 degrees Celsius (°C), 1.7°C and 0.8°C in June, August and October, respectively.
- Dissolved oxygen concentrations remained high at Round Lake throughout all samples.

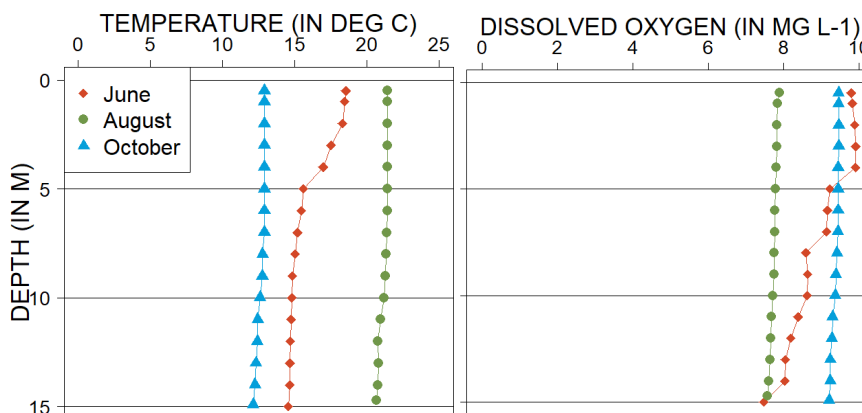


Figure 2. 2021 profiles of temperature (left) and dissolved oxygen (right) in milligrams per liter (mg L<sup>-1</sup>)

## 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 mesotrophic reservoir (Figure 3) with relatively low nutrient concentrations, low algal growth and moderate transparency.
- Trophic state in 2021 was improved compared to historical indices.
- Round Lake has not been listed for confirmed **harmful** algal (cyanobacteria) blooms in the past.

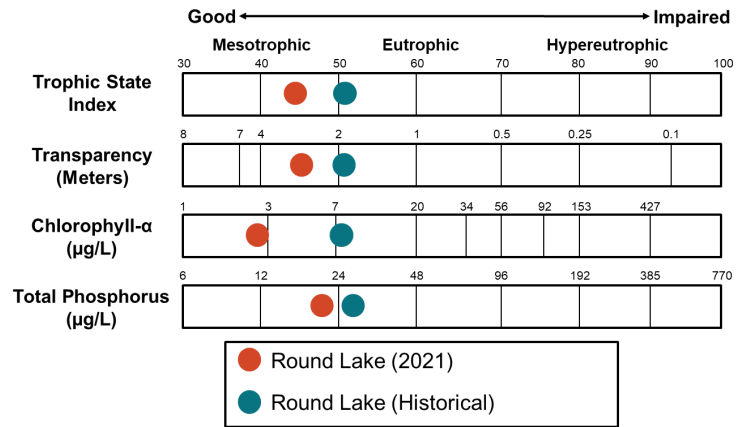


Figure 3. Trophic state indices for 2021 and historical samples

## Nutrients

- Median concentration of total nitrogen (TN) at Round Lake in 2021 was similar to the historical median for the lake and the median for natural lakes in the Glacial Lake Deltas Level IV Ecoregion (hereafter, Ecoregion) (Figure 4).
- Median TP concentration in 2021 was less than the median for the lake and less than the median for the Ecoregion (Figure 4).
- Median concentrations of dissolved nutrients were comparable to concentrations of total nutrients.
- Ammonia and nitrate-plus-nitrite were only detected during the final two samples of 2021 at low concentrations, while there were no detections in May or June.

### Nutrient Concentrations (in mg L<sup>-1</sup>) in Round Lake

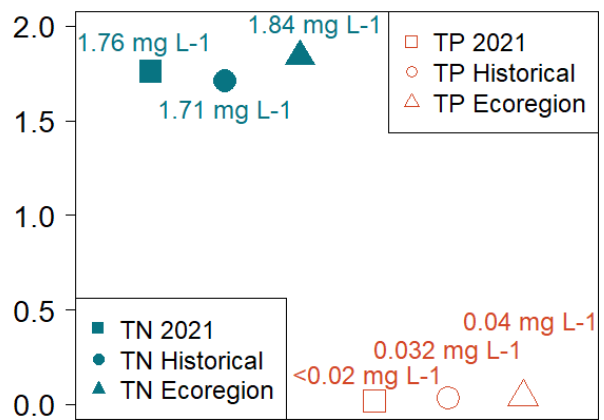


Figure 4. Median concentrations of TN and TP in mg L<sup>-1</sup> compared to regional medians

## Water Chemistry

**Table 2.** Median concentrations of selected constituents for 2021 and historical samples and from all Ecoregion reservoirs.

Measure	2021 Median	Historical Median	Ecoregion Median
Alkalinity	863.5 mg L <sup>-1</sup>	790 mg L <sup>-1</sup>	444 mg L <sup>-1</sup>
Bicarbonate (HCO <sub>3</sub> <sup>-</sup> )	815 mg L <sup>-1</sup>	721 mg L <sup>-1</sup>	483 mg L <sup>-1</sup>
Calcium (Ca <sup>2+</sup> )	7.2 mg L <sup>-1</sup>	13.4 mg L <sup>-1</sup>	25.4 mg L <sup>-1</sup>
Carbonate (CO <sub>3</sub> <sup>2-</sup> )	119.5 mg L <sup>-1</sup>	119 mg L <sup>-1</sup>	32 mg L <sup>-1</sup>
Conductivity	1,895 µS cm <sup>-1</sup>	1,820 µS cm <sup>-1</sup>	1,510 µS cm <sup>-1</sup>
Dissolved Solids	1,235 mg L <sup>-1</sup>	1,160 mg L <sup>-1</sup>	993 mg L <sup>-1</sup>
Magnesium (Mg <sup>2+</sup> )	95.3 mg L <sup>-1</sup>	75.0 mg L <sup>-1</sup>	84.6 mg L <sup>-1</sup>
Sodium (Na <sup>+</sup> )	304.5 mg L <sup>-1</sup>	320 mg L <sup>-1</sup>	176 mg L <sup>-1</sup>
Sulfate (SO <sub>4</sub> <sup>2-</sup> )	236.5 mg L <sup>-1</sup>	217 mg L <sup>-1</sup>	224 mg L <sup>-1</sup>

- Bicarbonate is the dominant anion in Round Lake, while sodium 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.

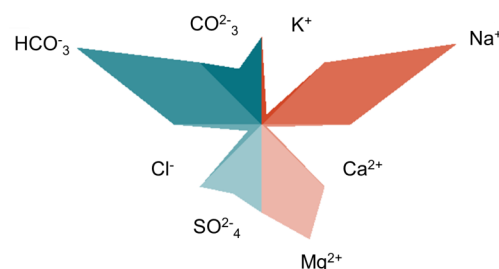


Figure 5. Maucha diagram showing ionic balance based on 2021 data