NORTH Dakota | Environmental Quality

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Contact: Watershed Management Program

Phone: 701-328-5210

June 2024

Harmony Lake

(47.383092 N, -101.649399 W)

Mercer County

- Harmony Lake is a lake in west-central North Dakota (Figure 1). See map at (https://gf.nd.gov/gnf/maps/fishing/lakecontours/harmony2023.pdf)
- There is one public boat ramp located on the north side of Harmony Lake.
- The Harmony Lake watershed drains about 26,000 acres. Land cover in the watershed is mostly agricultural land and rangeland. Agriculture is dominated by wheat, soybeans, and corn (Table 1).
- Harmony Lake 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."
- Harmony Lake is managed for rainbow trout and bluegill. The lake was last stocked in 2023 with rainbow trout. Northern pike, black crappie, bluegill, and black bullhead were found during the last survey by the ND Game and Fish (2023).
- Harmony lake was last sampled in 2008.

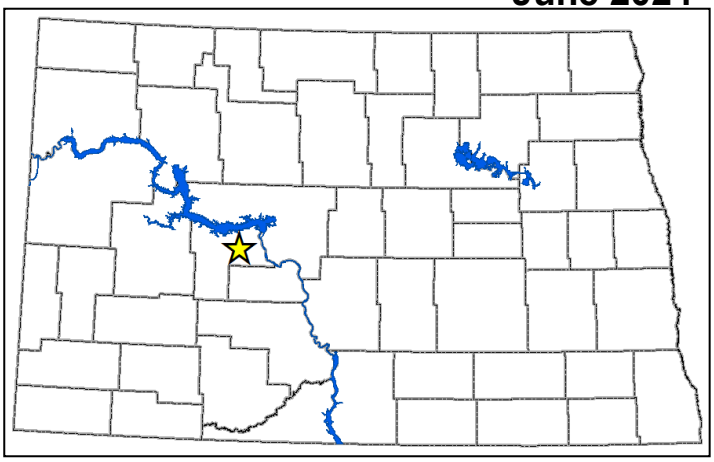

Figure 1. *Location of Harmony Lake within the state*

Table 1. *Percentage of land cover in the watershed and near the lake (NASSCDL, 2021). Value listed of crop type represents percentage of total production*

Land Cover Type	% in Watershed	% within 500 meters
Agriculture	52.4%	23.0%
Wheat	*22.1%*	*16.5%*
Soybeans	*12.7%*	*<1%*
Corn	*5.4%*	*5.3%*
Trees	3.1%	5.9%
Rangeland	35.0%	58.1%
Water	3.1%	10.8%
Bare	6.5%	2.3%

Temperature and Dissolved Oxygen

- Harmony Lake stayed stratified throughout most of the sampling season.
- Thermal stratification took place in May, June, and August. The greatest temperature change in the water column during these months was 5.2 degrees Celsius (ºC), 5.7ºC, and 5ºC (Figure 2).
- Dissolved oxygen (DO) concentrations were relatively high at the surface and low towards the bottom. There were low DO concentrations throughout the water column in August and high DO concentrations throughout the water column in October (Figure 2).

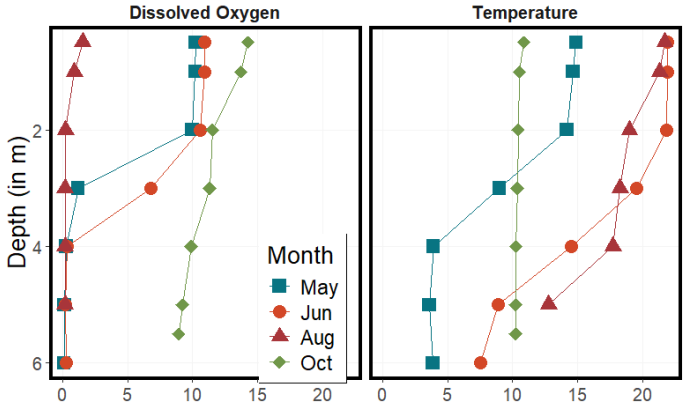

Figure 2. *2023 profiles of dissolved oxygen (left) in milligrams per liter (mg L^{-1}) and temperature (right) in degrees Celsius.*

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.
- Harmony Lake is a eutrophic reservoir (Figure 3) that has high nutrient concentrations and moderate algal and plant growth.
- The trophic state in 2023 was higher than the historical conditions.

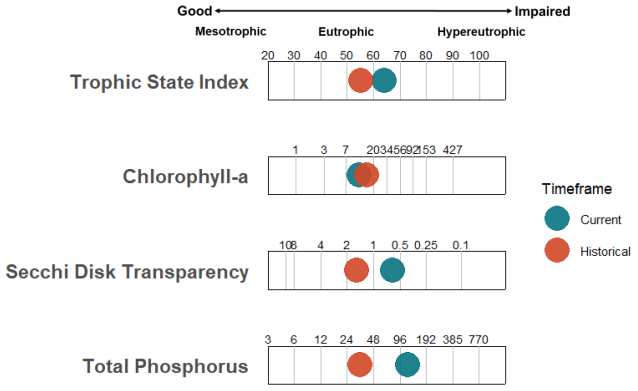

Figure 3. *Trophic state indices for 2023 and historical samples*

Nutrients

- Median concentration of total nitrogen (TN) in 2023 was greater than the historical median and the median for the Missouri Plateau Level IV Ecoregion where Harmony Lake is located (Figure 4).
- 2023 median concentrations of dissolved TN was less than TN.
- Median TP concentration in 2023 was greater than the historical and ecoregion medians (Figure 4).
- 2023 median concentration of dissolved phosphorus was less than TP.
- Ammonia was detected in 3 of 4 samples above the detection limit of 0.03 mg/L and nitrate + nitrate were found above their detection limit of 0.03 mg/L in 2 of 4 samples during the 2023 sampling season.

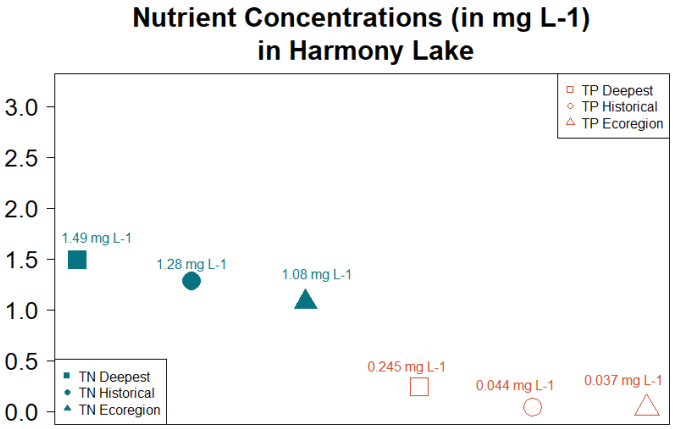

Figure 4. *Median concentrations of TN and TP in mg L^{-1} compared to regional medians*

Water Chemistry

Table 2. *Median concentrations of selected constituents for 2023 and historical samples and from all Ecoregion natural lakes and reservoirs.*

Measure	2023 Median	Historical Median	Ecoregion Median
Alkalinity	224 mg L^{-1}	224 mg L^{-1}	201 mg L^{-1}
Bicarbonate (HCO^{-}_{3})	273 mg L^{-1}	273 mg L^{-1}	217 mg L^{-1}
Calcium (Ca^{2+})	101 mg L^{-1}	90.1 mg L^{-1}	47.5 mg L^{-1}
Carbonate (CO^{2-}_{3})	0.5 mg L^{-1}	4 mg L^{-1}	11 mg L^{-1}
Conductivity	1950 µS cm^{-1}	1460 µS cm-1	823.5 µS cm^{-1}
Dissolved Solids	1390 mg L^{-1}	1010 mg L^{-1}	521.5 mg L^{-1}
Magnesium (Mg^{2+})	95.9 mg L^{-1}	81.85 mg L^{-1}	24.7 mg L^{-1}
Sodium (Na^{+})	229.5 mg L^{-1}	194 mg L^{-1}	94.4 mg L^{-1}
Sulfate (SO^{2-}_{4})	794 mg L^{-1}	545 mg L^{-1}	206 mg L^{-1}

- Sulfate is the dominant anion in Harmony Lake, while sodium is the dominant cation (Figure 5).
- Median concentrations of most cations and anions are similar to the historical medians for the lake and greater than the ecoregion medians.