NORTH Dakota | Environmental Quality

Be Legendary.™

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December 2019

Lake Hoskins

(46.038989 N, -99.451368 W)

McIntosh County

- Lake Hoskins is a large, shallow natural lake in south-central North Dakota (Figure 1). See map at (https://gf.nd.gov/gnf/maps/fishing/lakecontours/hoskins2005.pdf).
- There is one public, paved boat ramp on Lake Hoskins on the northeast side of the lake.
- The Lake Hoskins watershed is about 23,000 acres of mostly agriculture and grassland/ pasture. The most common crops grown are soybeans, corn and spring wheat (Table 1).
- Lake Hoskins 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."
- Lake Hoskins is managed for walleye and northern pike, with fingerlings of each stocked intermittently. Walleye, yellow perch, black bullhead and northern pike were captured during the last sample by the ND Game and Fish.
- Lake Hoskins was previously assessed in 1991-1992, 2003-2004 and 2009.

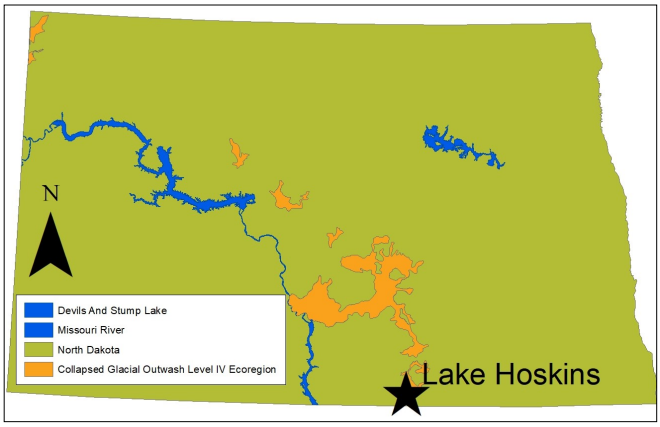

Figure 1. *Location of Lake Hoskins within the state*

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
Agriculture	51.4%	33.4%
Soybeans	*47.2%*	*18.2%*
Corn	*24.2%*	*53.7%*
Spring Wheat	*11.2%*	*21.8%*
Grassland/Pasture	38.9%	50.5%
Developed	4.4%	7.3%
Open Water	3.4%	4.7%
Shrubland	1.0%	0.8%
Wetlands	0.8%	2.1%
Forest	0.2%	1.3%

Temperature and Dissolved Oxygen

- Lake Hoskins 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 no thermal stratification recorded in 2019. Temperature change in the water column was 0.1 degrees Celsius (ºC), 0.7ºC and 0.6ºC in May, July and September, respectively.
- Dissolved oxygen concentrations were relatively high throughout the water column during all samples.

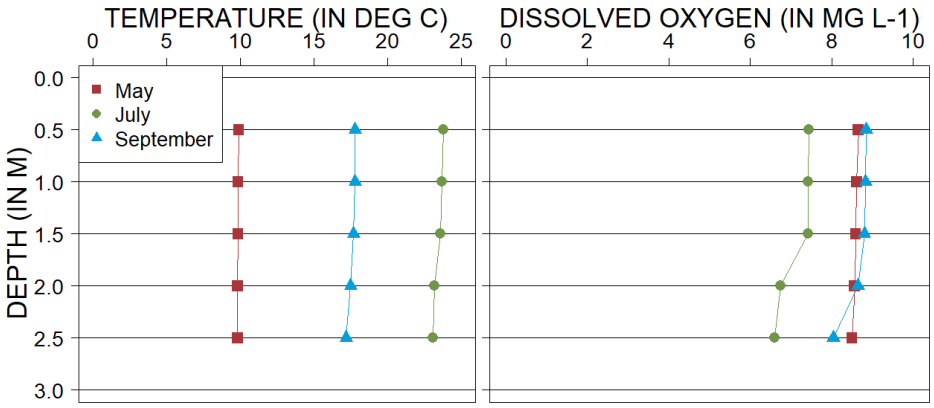

Figure 2. *2019 profiles of temperature (left) and dissolved oxygen (right) in milligrams per liter (mg L^{-1})*

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.
- Lake Hoskins is a hypereutrophic lake (Figure 3) that has high nutrient concentrations but moderate algal growth.
- Current trophic state has improved compared to historical data, but total phosphorus remains very high.
- There have no been confirmed ***harmful*** algal (cyanobacteria) blooms at Lake Hoskins.

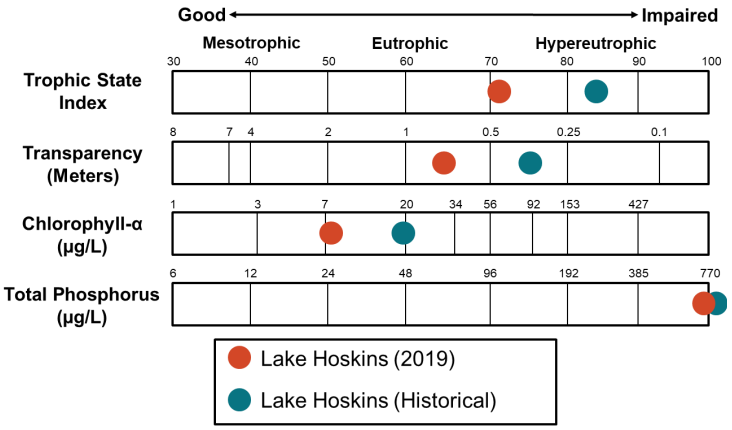

Figure 3. *Trophic state indices for 2019 and historical samples*

Nutrients

- Median concentration of total nitrogen (TN) in 2019 was less than the historical median for the lake and less than the median for the Collapsed Glacial Outwash Level IV Ecoregion (hereafter, Ecoregion) where Lake Hoskins is located (Figure 4).
- Median concentration of dissolved TN was slightly less than TN.
- Median TP concentration in 2019 was similar to the median for the lake but 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 not detected at Lake Hoskins in 2019.

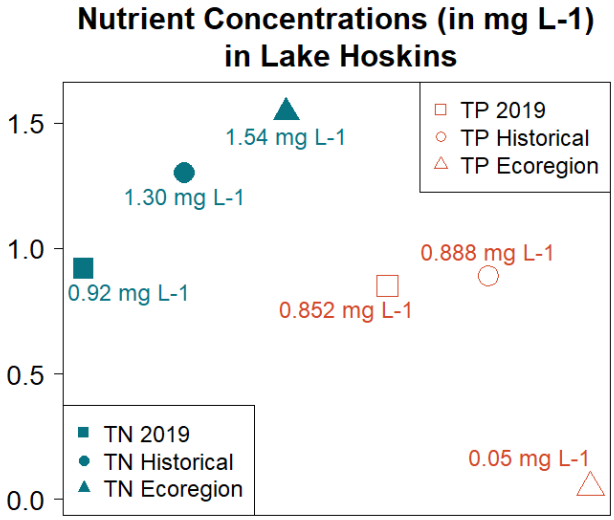

Figure 4. *Median concentrations of TN and TP in mg L^{-1} compared to regional medians*

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	217 mg L^{-1}	300 mg L^{-1}	464 mg L^{-1}
Bicarbonate (HCO^-_3)	252 mg L^{-1}	302 mg L^{-1}	463 mg L^{-1}
Calcium (Ca^{2+})	76.8 mg L^{-1}	97.7 mg L^{-1}	26.1 mg L^{-1}
Carbonate (CO^{2-}_3)	3 mg L^{-1}	28 mg L^{-1}	56 mg L^{-1}
Conductivity	1,350 µS cm^{-1}	1,620 µS cm^{-1}	1,760 µS cm^{-1}
Dissolved Solids	924 mg L^{-1}	1,140 mg L^{-1}	1,240 mg L^{-1}
Magnesium (Mg^{2+})	63.9 mg L^{-1}	72 mg L^{-1}	86.7 mg L^{-1}
Sodium (Na^+)	116 mg L^{-1}	153.5 mg L^{-1}	164 mg L^{-1}
Sulfate (SO^{2-}_4)	471 mg L^{-1}	581.5 mg L^{-1}	547 mg L^{-1}

- Sulfate is the dominant anion in Lake Hoskins, while sodium, magnesium and calcium are the co-dominant cations (Figure 5).
- Median concentrations of most cations and anions are less than the historical median for the lake and less than the median for the Ecoregion.

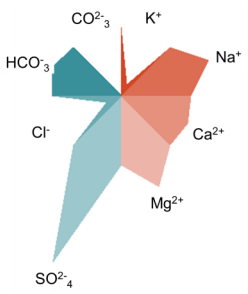

Figure 5. *Maucha diagram showing ionic balance based on 2019 data*