NORTH Dakota | Environmental Quality

Be Legendary.™

Contact: Watershed Management Program

Phone: 701-328-5210

February 2019

School Section Lake

(48.94552 N, -99.99568 W)

Rolette County

- School Section Lake is a large, natural lake in northern North Dakota (https://gf.nd.gov/gnf/maps/fishing/lakecontours/schoolsection2005.pdf).
- School Section Lake is accessible by one public boat ramp on the northwest side of the lake.
- The School Section Lake watershed is about 2,700 acres of mostly deciduous forest, open water, and agricultural land (Table 1). The most common crops are alfalfa, non-alfalfa hay, and canola (Table 1).
- School Section 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."
- The lake is primarily managed for northern pike and yellow perch, with fingerlings of the former and adults of the latter stocked sporadically. There are no recent catch records from the ND Game and Fish.
- School Section Lake was previously sampled in 1995-1996.

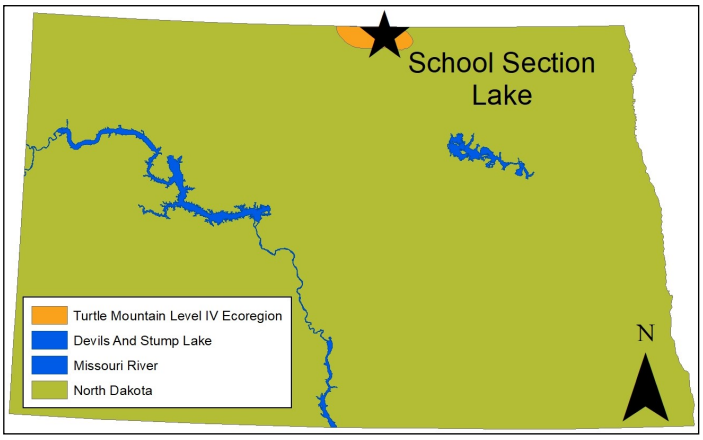

Figure 1. *Location of School Section Lake within the state*

Table 1. *Percentage of land cover in the watershed and near the lake (NASS, 2014). Value listed of crop type represents percentage of total production*

Land Cover Type	% in Watershed	% within 500 meters
Deciduous Forest	41.3%	66.5%
Open Water	24.3%	7.0%
Agriculture	19.4%	11.7%
Alfalfa	*45.5%*	*55.8%*
Other Hay/Non-Alfalfa	*28.5%*	*17.5%*
Canola	*13.3%*	*NA*
Grasslands/Pasture	10.9%	7.3%
Developed	3.4%	6.5%
Wetlands	0.7%	0.9%

Temperature and Dissolved Oxygen

- School Section Lake rarely stratifies in the summer, with a well-oxygenated water column from top-to-bottom.
- There was no thermal stratification observed in 2015, with temperature changes of 0.06 degrees Celsius (ºC), 0.67ºC, and 0.27ºC in May, July and September, respectively (Figure 2).
- All samples showed the lake as well-oxygenated.

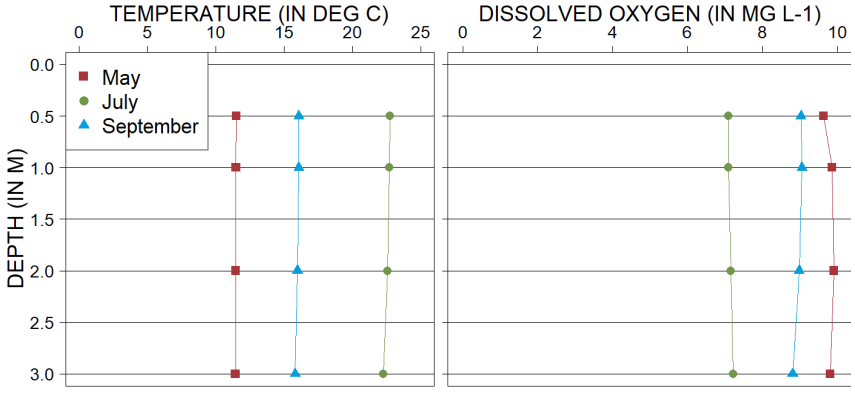

Figure 2. *2015 profiles of temperature (left) and dissolved oxygen (right) in milligrams per liter (mg L^{-1})*

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.
- School Section Lake is a borderline mesotrophic -eutrophic lake (Figure 3) that has relatively low nutrient concentrations and low algal growth.
- Trophic state has improved compared to historical indices.
- There have been no confirmed ***harmful*** algal (cyanobacteria) blooms at School Section Lake.

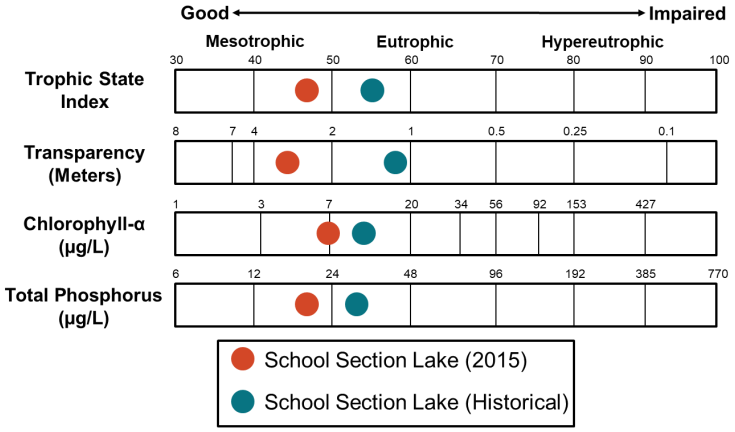

Figure 3. *Trophic state indices for 2015 and historical samples*

Nutrients

- Median concentration of total nitrogen (TN) was lower in 2015 compared to the historical median and the median for the Turtle Mountains Level IV Ecoregion (Figure 1; hereafter, Turtle Mountains) where School Section Lake is located (Figure 4).
- Median concentration of dissolved TN was similar to TN.
- Median TP concentration was less in 2015 than historical concentrations and less than the median for the Turtle Mountains (Figure 4).
- Median concentration of dissolved phosphorus were similar to TP.
- Ammonia and nitrate plus nitrite were not detected above detection limits in School Section Lake in 2015.

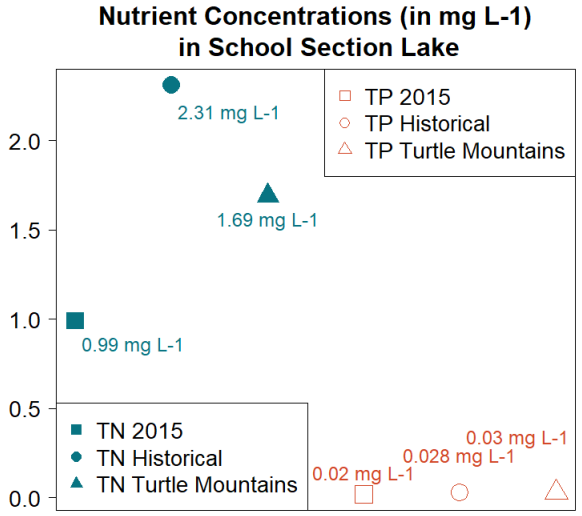

Figure 4. *Median concentrations of TN and TP in mg L^{-1} compared to regional medians*

Water Chemistry

Table 2. *Median concentrations of selected constituents for 2015 and historical samples and from all Turtle Mountain natural lakes.*

Measure	2015 Median	Historical Median	Ecoregion Median
Alkalinity	216 mg L^{-1}	295 mg L^{-1}	290 mg L^{-1}
Bicarbonate (HCO^-_3)	248 mg L^{-1}	321 mg L^{-1}	325 mg L^{-1}
Calcium (Ca^{2+})	25.2 mg L^{-1}	40.6 mg L^{-1}	32.4 mg L^{-1}
Carbonate (CO^{2-}_3)	9 mg L^{-1}	13 mg L^{-1}	12 mg L^{-1}
Conductivity	485 µS cm^{-1}	709 µS cm^{-1}	685 µS cm^{-1}
Dissolved Solids	265 mg L^{-1}	397 mg L^{-1}	382 mg L^{-1}
Magnesium (Mg^{2+})	46.7 mg L^{-1}	65.8 mg L^{-1}	61.9 mg L^{-1}
Sodium (Na^+)	5.0 mg L^{-1}	7.6 mg L^{-1}	8.9 mg L^{-1}
Sulfate (SO^{2-}_4)	47.5 mg L^{-1}	97 mg L^{-1}	60 mg L^{-1}

- Bicarbonate is the dominant anion in School Section Lake, while magnesium is the dominant cation (Figure 5).
- Median concentrations of most cations and anions are lower than the historical median for the lake and for the Turtle Mountains.

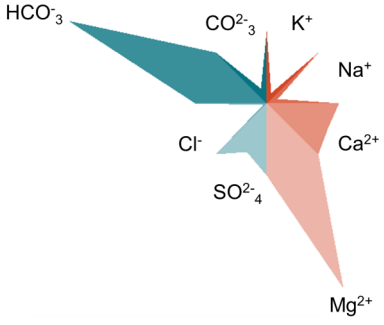

Figure 5. *Maucha diagram showing ionic balance based on 2015 data*