

November 2019

# Heinrich-Martin Dam

(46.592807 N, -98.536170 W)

## Lamoure County

- Heinrich-Martin Dam is a small reservoir in southeast North Dakota (Figure 1). See map at (<https://gf.nd.gov/gnf/maps/fishing/lakecontours/heinrichmartin2003.pdf>).
- There is one boat ramp on Heinrich-Martin Dam on the north side of the lake.
- The Heinrich-Martin Dam watershed is about 2,900 acres of mostly agriculture. The most common crops grown are soybeans and corn (Table 1).
- Heinrich-Martin Dam 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.”
- Heinrich-Martin Dam has not been stocked in recent years. Largemouth bass and bluegill were captured during the last sample by the ND Game and Fish, but some black crappie, yellow perch and northern pike can be found.
- Heinrich-Martin Dam was previously assessed in 1992-1993 and 2006-2008.

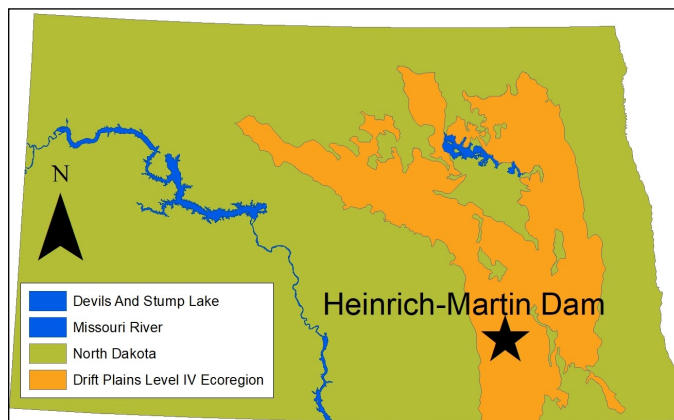


Figure 1. Location of Heinrich-Martin Dam within the state

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	74.2%	57.0%
Soybeans	70.7%	78.3%
Corn	20.5%	0.2%
Spring Wheat	4.6%	20.0%
Grassland/Pasture	17.3%	31.1%
Developed	4.8%	2.9%
Wetlands	2.4%	5.2%
Open Water	0.7%	0.9%
Forest	0.5%	2.9%
Shrubland	< 0.1%	< 0.1%

## Temperature and Dissolved Oxygen

- Heinrich-Martin Dam commonly 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 recorded in 2019. Temperature change in the water column was 0.5 degrees Celsius (°C), 2.0°C and 1.3°C in May, July and September, respectively.
- Dissolved oxygen concentrations declined quickly even during weak stratification in the summer.

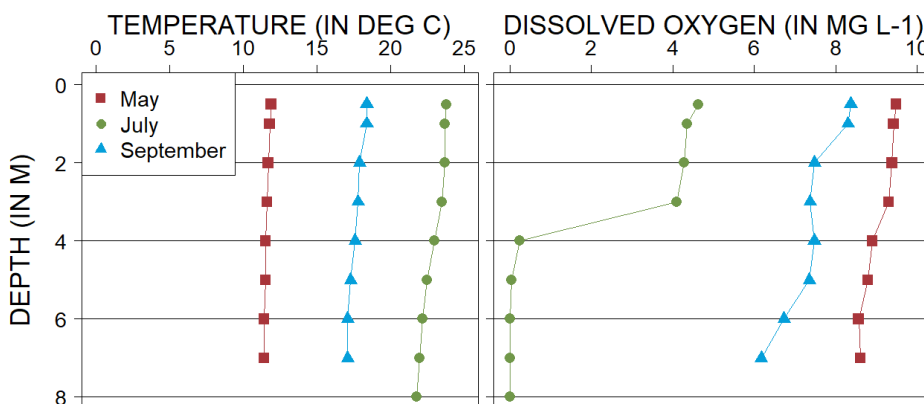


Figure 2. 2019 profiles of temperature (left) and dissolved oxygen (right) in milligrams per liter (mg L<sup>-1</sup>)

## 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.
- Heinrich-Martin Dam is a eutrophic reservoir (Figure 3) that has high nutrient concentrations but moderate algal growth.
- Current trophic state is similar to historical indices.
- Heinrich-Martin Dam has not had any confirmed **harmful** algal (cyanobacteria) blooms.

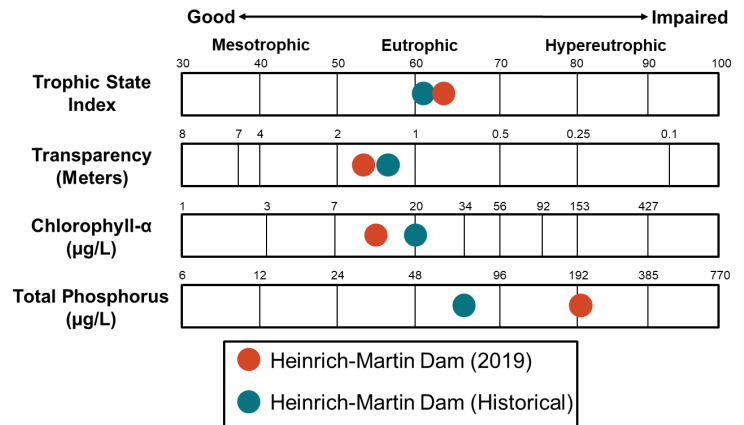


Figure 3. Trophic state indices for 2019 and historical samples

## Nutrients

- Median concentration of total nitrogen (TN) in 2019 was less than the historical median for the lake and less than the median for reservoirs in the Drift Plains Level IV Ecoregion (hereafter, Ecoregion) where Heinrich-Martin Dam is located (Figure 4).
- Median concentration of dissolved TN was similar to TN.
- Median TP concentration in 2019 was greater than the median for the lake but less than the median for the Ecoregion (Figure 4).
- Median concentration of dissolved phosphorus was less than TP.
- Ammonia and nitrate-plus-nitrite were not detected in 2019 at Heinrich-Martin Dam.

### Nutrient Concentrations (in mg L<sup>-1</sup>) in Heinrich-Martin Dam

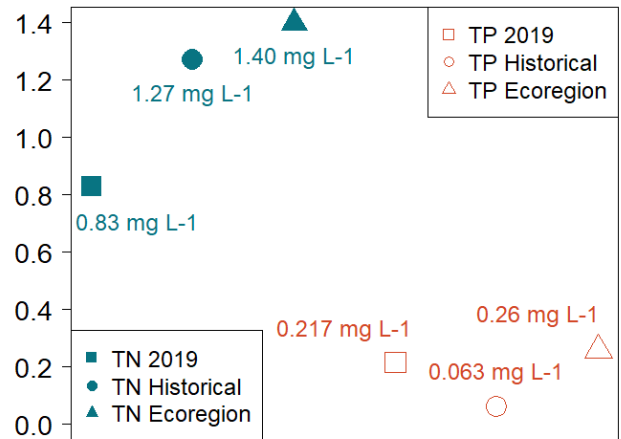


Figure 4. Median concentrations of TN and TP in mg L<sup>-1</sup> compared to regional medians

## Water Chemistry

**Table 2.** Median concentrations of selected constituents for 2019 and historical samples and from all Ecoregion reservoirs.

Measure	2019 Median	Historical Median	Ecoregion Median
Alkalinity	166 mg L <sup>-1</sup>	167 mg L <sup>-1</sup>	311 mg L <sup>-1</sup>
Bicarbonate (HCO <sub>3</sub> <sup>-</sup> )	203 mg L <sup>-1</sup>	201.5 mg L <sup>-1</sup>	343 mg L <sup>-1</sup>
Calcium (Ca <sup>2+</sup> )	126 mg L <sup>-1</sup>	63.1 mg L <sup>-1</sup>	74.6 mg L <sup>-1</sup>
Carbonate (CO <sub>3</sub> <sup>2-</sup> )	< 1 mg L <sup>-1</sup>	< 1 mg L <sup>-1</sup>	14 mg L <sup>-1</sup>
Conductivity	1,130 µS cm <sup>-1</sup>	686 µS cm <sup>-1</sup>	1,100 µS cm <sup>-1</sup>
Dissolved Solids	802 mg L <sup>-1</sup>	414.5 mg L <sup>-1</sup>	734 mg L <sup>-1</sup>
Magnesium (Mg <sup>2+</sup> )	68.4 mg L <sup>-1</sup>	39.8 mg L <sup>-1</sup>	52.9 mg L <sup>-1</sup>
Sodium (Na <sup>+</sup> )	13.6 mg L <sup>-1</sup>	8.0 mg L <sup>-1</sup>	106.5 mg L <sup>-1</sup>
Sulfate (SO <sub>4</sub> <sup>2-</sup> )	451 mg L <sup>-1</sup>	176 mg L <sup>-1</sup>	275 mg L <sup>-1</sup>

- Sulfate is the dominant anion in Heinrich-Martin Dam, while calcium and magnesium are the dominant cations (Figure 5).
- Median concentrations of most cations and anions are much greater than the historical median for the lake and greater than the median for the Ecoregion.

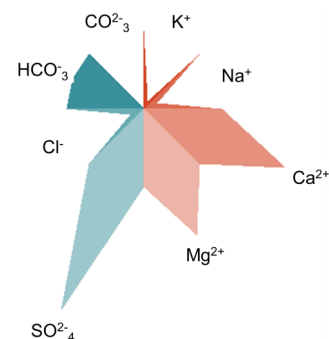


Figure 5. Maucha diagram showing ionic balance based on 2019 data