

November 2019

Limesand-Seefeldt Dam

(46.484620 N, -98.383725 W)

Lamoure County

- Limesand-Seefeldt Dam is a small reservoir in southeast North Dakota (Figure 1). See map at (<https://gf.nd.gov/gnf/maps/fishing/lakecontours/limesandseefeldt2008.pdf>).
- There is one boat ramp on Limesand-Seefeldt Dam on the east side of the lake.
- The Limesand-Seefeldt Dam watershed is about 2,600 acres of mostly agriculture. The most common crops grown are soybeans and corn (Table 1).
- Limesand-Seefeldt 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.”
- Limesand-Seefeldt Dam has most recently been managed for largemouth bass, though northern pike are most abundant in the lake. Northern pike, yellow perch and black crappie were captured during the last sample by the ND Game and Fish.
- Limesand-Seefeldt Dam was previously assessed in 2010.

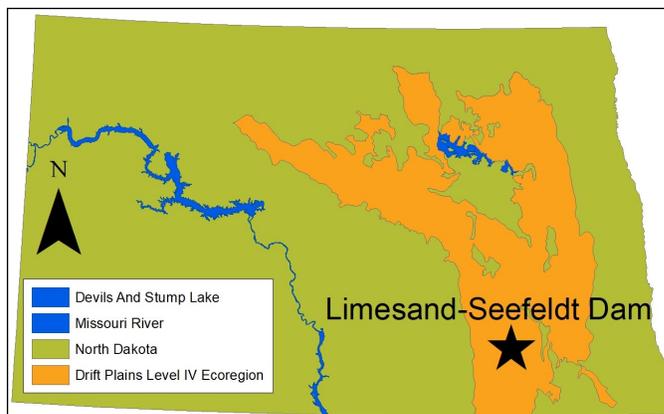


Figure 1. Location of Limesand-Seefeldt Dam within the state

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	83.9%	40.5%
Soybeans	85.4%	51.5%
Corn	11.5%	46.4%
Alfalfa	1.9%	1.8%
Grassland/Pasture	9.2%	54.3%
Developed	4.0%	3.2%
Wetlands	2.3%	1.1%
Open Water	0.5%	0.8%
Forest	0.2%	< 0.1%

Temperature and Dissolved Oxygen

- Limesand-Seefeldt 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 thermal stratification recorded during all samples in 2019. Temperature change in the water column was 6.2 degrees Celsius (°C), 11.0°C and 4.9°C in May, July and September, respectively.
- Dissolved oxygen concentrations declined quickly during thermal stratification.

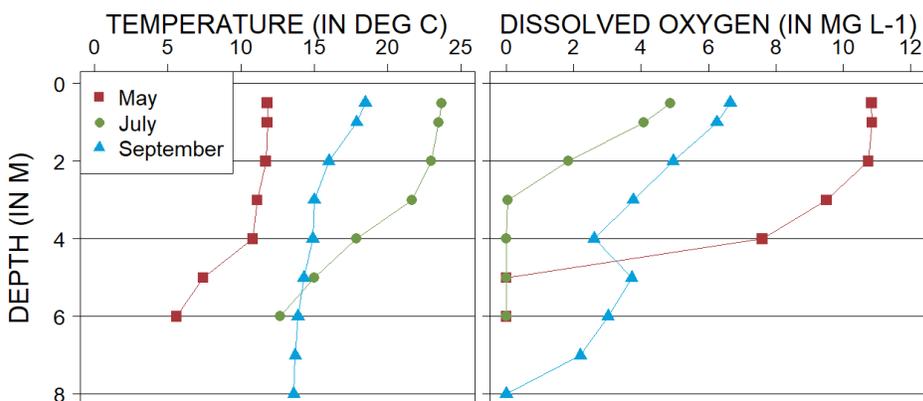


Figure 2. 2019 profiles of temperature (left) and dissolved oxygen (right) in milligrams per liter ($mg L^{-1}$)

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.
- Limesand-Seefeldt Dam is a hypereutrophic reservoir (Figure 3) that has high nutrient concentrations and moderate to dense algal growth.
- Current trophic state is similar to historical indices.
- Limesand-Seefeldt Dam has not had any confirmed **harmful** algal (cyanobacteria) blooms.

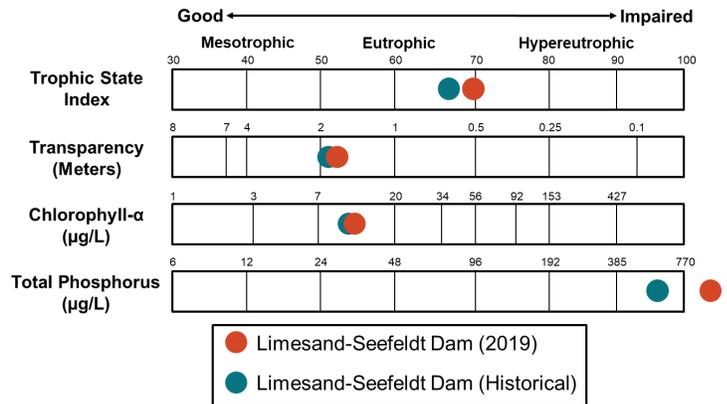


Figure 3. Trophic state indices for 2019 and historical samples

Nutrients

- Median concentration of total nitrogen (TN) in 2019 was greater than the historical median for the lake and much greater than the median for reservoirs in the Drift Plains Level IV Ecoregion (hereafter, Ecoregion) where Limesand-Seefeldt Dam is located (Figure 4).
- Median concentration of dissolved TN was similar to TN, but much less than TN in the spring.
- Median TP concentration in 2019 was much greater than the median for the lake and much greater than the median for the Ecoregion (Figure 4).
- Median concentration of dissolved phosphorus was less than TP, more so in the spring.
- Ammonia was detected during all samples in 2019 at Limesand-Seefeldt Dam, while nitrate-plus-nitrite was detected in high concentrations in the summer and fall.

Nutrient Concentrations (in mg L⁻¹) in Limesand-Seefeldt Dam

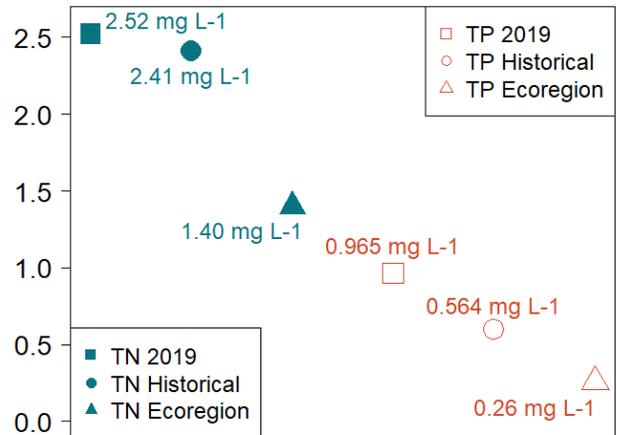


Figure 4. Median concentrations of TN and TP in mg L⁻¹ compared to regional medians

Water Chemistry

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

Measure	2019 Median	Historical Median	Ecoregion Median
Alkalinity	277 mg L ⁻¹	259 mg L ⁻¹	311 mg L ⁻¹
Bicarbonate (HCO ₃ ⁻)	338 mg L ⁻¹	315 mg L ⁻¹	343 mg L ⁻¹
Calcium (Ca ²⁺)	118 mg L ⁻¹	122 mg L ⁻¹	74.6 mg L ⁻¹
Carbonate (CO ₃ ²⁻)	< 1 mg L ⁻¹	< 1 mg L ⁻¹	14 mg L ⁻¹
Conductivity	1,520 µS cm ⁻¹	1,350 µS cm ⁻¹	1,100 µS cm ⁻¹
Dissolved Solids	1,080 mg L ⁻¹	955 mg L ⁻¹	734 mg L ⁻¹
Magnesium (Mg ²⁺)	101 mg L ⁻¹	83.5 mg L ⁻¹	52.9 mg L ⁻¹
Sodium (Na ⁺)	76.5 mg L ⁻¹	61.6 mg L ⁻¹	106.5 mg L ⁻¹
Sulfate (SO ₄ ²⁻)	547 mg L ⁻¹	476 mg L ⁻¹	275 mg L ⁻¹

- Sulfate is the dominant anion in Limesand-Seefeldt Dam, while calcium and magnesium are the dominant cations (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.

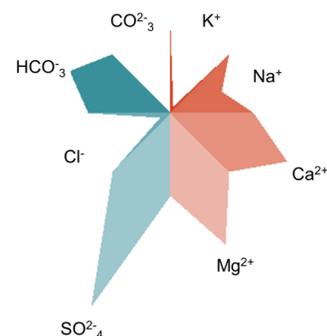


Figure 5. Maucha diagram showing ionic balance based on 2019 data