

Sykeston Dam

(47.478754 N, -99.399805 W)

Wells County

- Sykeston Dam is a long, narrow reservoir in eastern North Dakota (Figure 1). See map at (<https://gf.nd.gov/gnf/maps/fishing/lakecontours/sykston2003.pdf>).
- There is one public boat ramp on the east side of Sykeston Dam, adjacent to the dam.
- The Sykeston Dam watershed is about 122,000 acres of mostly agricultural land and grassland/pasture. The most common crops grown are spring wheat, corn and soybeans (Table 1).
- Sykeston Dam is a Class IV fishery, which are “capable of supporting a fishery on a short-term or seasonal basis (generally a “put and take” fishery).”
- Sykeston Dam is managed for northern pike, with fingerlings stocked annually. Black bullhead, yellow perch and northern pike were found during the last sample by the Game and Fish.
- Sykeston Dam has not been assessed previously.



Figure 1. Location of Sykeston Dam within the state

Table 1. Percentage of land cover in the watershed and near the lake (NASS, 2015). Value listed of crop type represents percentage of total production

Land Cover Type	% in Watershed	% within 500 meters
Agriculture	66.1%	53.2%
Soybeans	45.4%	32.8%
Spring Wheat	23.8%	53.5%
Corn	15.8%	4.4%
Grassland/Pasture	17.1%	19.6%
Open Water	6.5%	0.8%
Wetlands	6.0%	8.5%
Developed	4.1%	17.1%
Forest	0.2%	0.8%

Temperature and Dissolved Oxygen

- Sykeston Dam 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 in May 2016. Temperature change in the water column in 2016 was 3.27 degrees Celsius (°C), 2.00°C and 0.47°C in May, July and September, respectively.
- Dissolved oxygen concentration was relatively high during most samples, though slight thermal stratification caused oxygen depletion in July.

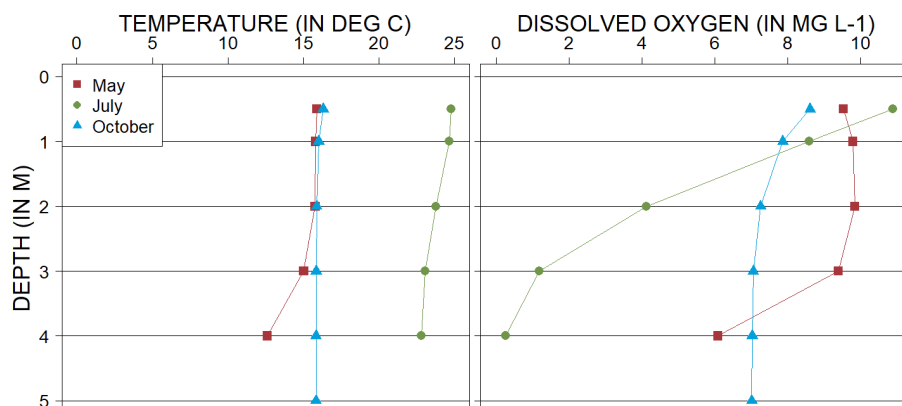


Figure 2. 2016 profiles of temperature (left) and dissolved oxygen (right) in milligrams per liter ($mg\ L^{-1}$)

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.
- Sykeston Dam is a highly eutrophic reservoir (Figure 3) that has high nutrient concentrations and dense algal growth.
- There is no historical data for trophic state.
- There have been no confirmed **harmful** algal (cyanobacteria) blooms at Sykeston Dam.

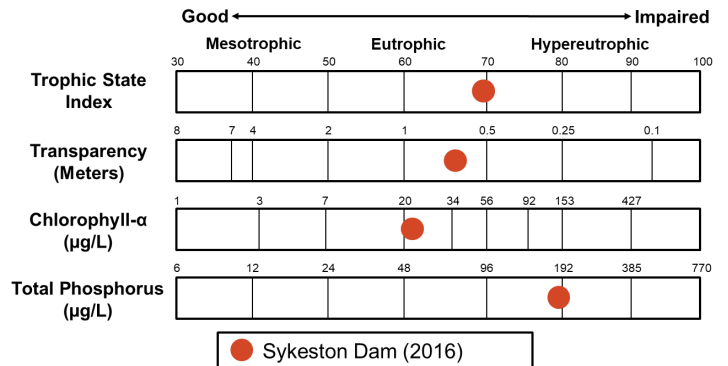


Figure 3. Trophic state indices for 2016

Nutrients

- Median concentration of total nitrogen (TN) in 2016 was greater than the median for the Drift Plains Level IV Ecoregion (hereafter, Drift Plains) where Sykeston Dam is located (Figure 4).
- Median concentration of dissolved TN was slightly less than TN.
- Median TP concentration in 2016 was less than the median for the Drift Plains (Figure 4).
- Median concentration of dissolved phosphorus was similar to TP.
- Ammonia was detected in all samples at Sykeston Dam in 2016, while there were no detections of nitrate plus nitrite.

Nutrient Concentrations (in mg L⁻¹)
in Sykeston Dam

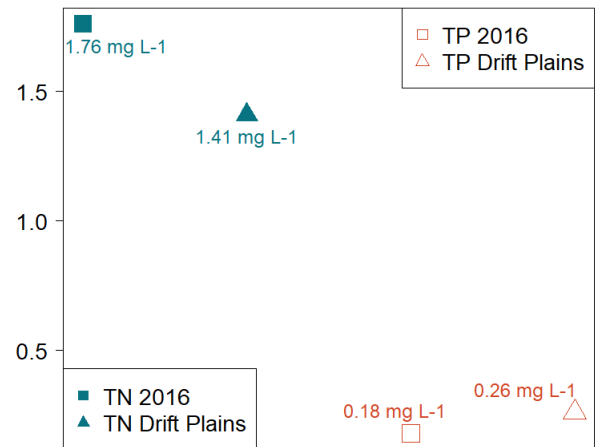


Figure 4. Median concentrations of TN and TP in mg L⁻¹ compared to regional medians

Water Chemistry

Table 2. Median concentrations of selected constituents for 2016 from all Drift Plains reservoirs.

Measure	2016 Median	Ecoregion Median
Alkalinity	248 mg L ⁻¹	311 mg L ⁻¹
Bicarbonate (HCO ₃ ⁻)	256 mg L ⁻¹	341 mg L ⁻¹
Calcium (Ca ²⁺)	106 mg L ⁻¹	73.8 mg L ⁻¹
Carbonate (CO ₃ ²⁻)	3 mg L ⁻¹	14 mg L ⁻¹
Conductivity	2,240 µS cm ⁻¹	1,081 µS cm ⁻¹
Dissolved Solids	1,680 mg L ⁻¹	713 mg L ⁻¹
Magnesium (Mg ²⁺)	136 mg L ⁻¹	52.5 mg L ⁻¹
Sodium (Na ⁺)	244 mg L ⁻¹	106 mg L ⁻¹
Sulfate (SO ₄ ²⁻)	962 mg L ⁻¹	271 mg L ⁻¹

- Sulfate is the dominant anion in Sykeston Dam, while sodium and magnesium are co-dominant cations (Figure 5).
- Median concentrations of most cations and anions are much greater than the median for the Drift Plains.

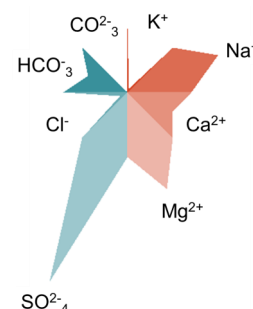


Figure 5. Maucha diagram showing ionic balance based on 2016 data