

December 2021

Pheasant Lake

(46.004548 N, -98.672856 W)

Dickey County

- Pheasant Lake is a reservoir in southeast North Dakota (Figure 1). See map at (<https://gf.nd.gov/gnf/maps/fishing/lakecontours/pheasant2003.pdf>).
- There is one paved, public boat ramp on the southeast near the impoundment.
- The Pheasant Lake watershed is about 71,000 acres of mostly agriculture. The most common crops grown are soybeans and corn, though there is a substantial amount of fallow/idle cropland (Table 1).
- Pheasant Lake 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.”
- Pheasant Lake is managed by the NDGF and has been stocked with multiple species in recent years. Bullheads, yellow perch, bluegill, channel catfish, northern pike, crappie and largemouth bass were captured in the last sample by the NDGF in 2020.
- Pheasant Lake was last sampled in 1991, 1994, 2001, and 2007 by the NDDEQ.

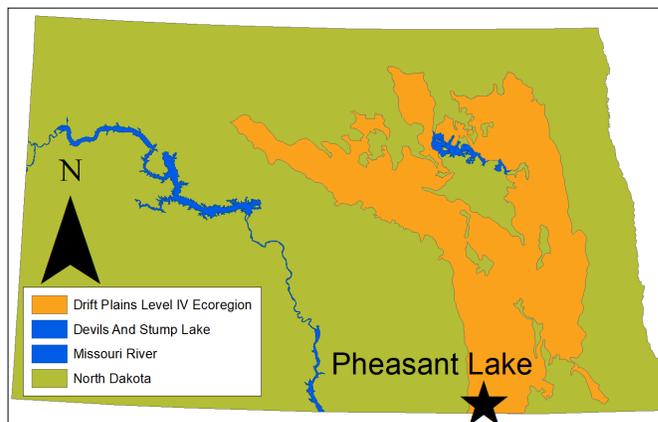


Figure 1. Location of Pheasant Lake within the state

Table 1. Percentage of land cover in the watershed and near the lake (NASS, 2020). Value listed of crop type represents percentage of total production

| Land Cover Type | % in Watershed | % within 500 meters |
|----------------------|----------------|---------------------|
| Agriculture | 50.7% | 47.1% |
| Fallow/Idle Cropland | 41.9% | 35.6% |
| Soybeans | 26.4% | 7.0% |
| Corn | 14.1% | 34.8% |
| Grassland/Pasture | 39.4% | 39.3% |
| Developed | 3.0% | 4.6% |
| Wetlands | 2.9% | 5.1% |
| Open Water | 2.8% | 3.1% |
| Shrubland | 0.8% | 0.1% |
| Forest | 0.4% | 0.6% |

Temperature and Dissolved Oxygen

- Pheasant Lake commonly stratifies in the summer, with cooler, low-oxygen water in the hypolimnion.
- Thermal stratification was recorded in June 2021. Temperature change in the water column was 0.3 degrees Celsius (°C), 4.0°C, 0.2°C, and 0.6°C in May, June, August and October, respectively.
- Dissolved oxygen concentrations were depleted during thermal stratification, especially during strong stratification in July.

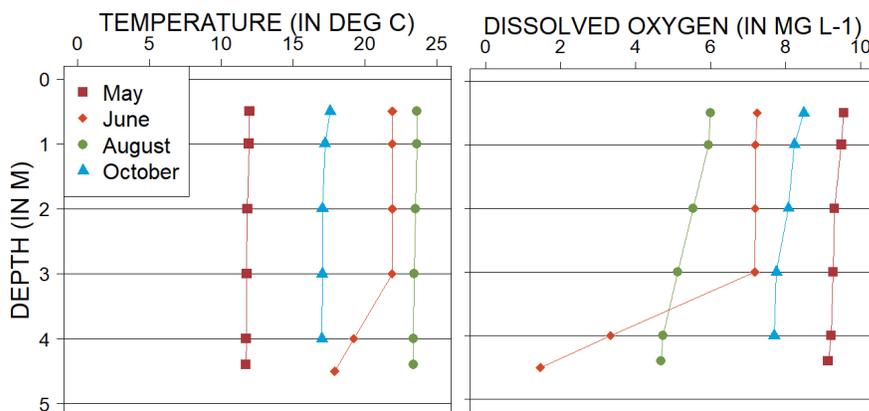


Figure 2. 2021 profiles of temperature (left) and dissolved oxygen (right) in milligrams per liter (mg L⁻¹)

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.
- Pheasant Lake is a eutrophic reservoir (Figure 3) with relatively high nutrient concentrations, but moderate algal growth and moderate transparency.
- Trophic state in 2021 was improved compared to historical indices.
- Pheasant Lake has been listed for confirmed **harmful** algal (cyanobacteria) blooms in the past.

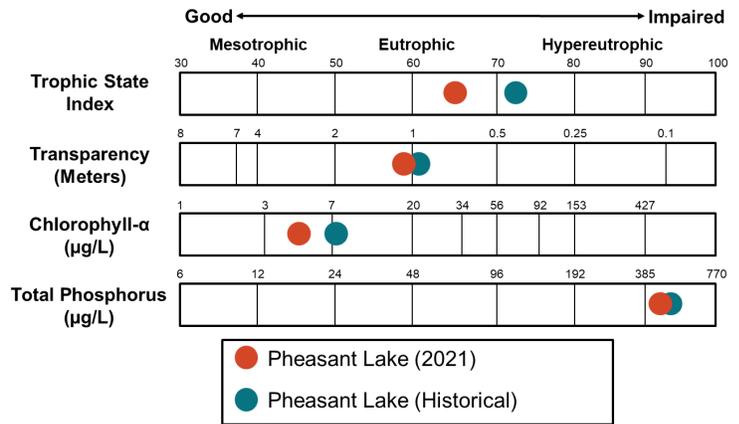


Figure 3. Trophic state indices for 2021 and historical samples

Nutrients

- Median concentration of total nitrogen (TN) at Pheasant Lake in 2021 was similar to the historical median for the lake and greater than the median for reservoirs in the Drift Plains Level IV Ecoregion (hereafter, Ecoregion) (Figure 4).
- Median TP concentration in 2021 was similar to the median for the lake but much greater than the median for the Ecoregion (Figure 4).
- Median concentrations of dissolved nutrients at Pheasant Lake in 2021 were comparable to concentrations of total nutrients.
- Ammonia and nitrate-plus-nitrite were rarely detected at Pheasant Lake during 2021 sampling.

Nutrient Concentrations (in mg L⁻¹) in Pheasant Lake

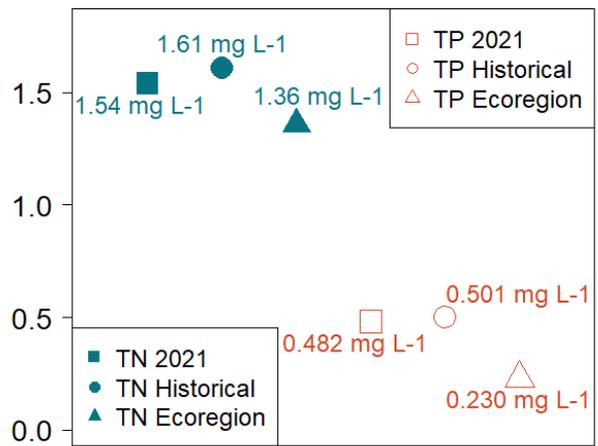


Figure 4. Median concentrations of TN and TP in mg L⁻¹ compared to regional medians

Water Chemistry

Table 2. Median concentrations of selected constituents for 2021 and historical samples and from all Ecoregion reservoirs.

| Measure | 2021 Median | Historical Median | Ecoregion Median |
|--|---------------------------|-------------------------|---------------------------|
| Alkalinity | 311 mg L ⁻¹ | 143 mg L ⁻¹ | 329.5 mg L ⁻¹ |
| Bicarbonate (HCO ₃ ⁻) | 364 mg L ⁻¹ | 175 mg L ⁻¹ | 365 mg L ⁻¹ |
| Calcium (Ca ²⁺) | 97.4 mg L ⁻¹ | 33.0 mg L ⁻¹ | 73.6 mg L ⁻¹ |
| Carbonate (CO ₃ ²⁻) | 9.5 mg L ⁻¹ | < 1 mg L ⁻¹ | 16 mg L ⁻¹ |
| Conductivity | 2,075 µS cm ⁻¹ | 593 µS cm ⁻¹ | 1,200 µS cm ⁻¹ |
| Dissolved Solids | 1,435 mg L ⁻¹ | 347 mg L ⁻¹ | 809 mg L ⁻¹ |
| Magnesium (Mg ²⁺) | 85.4 mg L ⁻¹ | 16.6 mg L ⁻¹ | 55.2 mg L ⁻¹ |
| Sodium (Na ⁺) | 253 mg L ⁻¹ | 50.2 mg L ⁻¹ | 114 mg L ⁻¹ |
| Sulfate (SO ₄ ²⁻) | 712 mg L ⁻¹ | 117 mg L ⁻¹ | 303 mg L ⁻¹ |

- Sulfate is the dominant anion in Pheasant Lake, while sodium is the dominant cation (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.

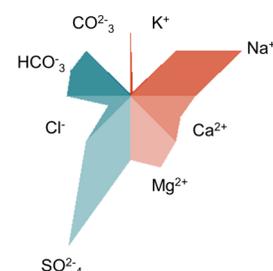


Figure 5. Maucha diagram showing ionic balance based on 2021 data