

November 2019

Blacktail Dam

(48.432557 N, -103.733257 W)

Williams County

- Blacktail Dam is a small reservoir in northwest North Dakota (Figure 1). See map at (<https://gf.nd.gov/gnf/maps/fishing/lakecontours/blacktail2003.pdf>).
- There is one public, paved boat ramp on Blacktail Dam on the south side of the lake.
- The Blacktail Dam watershed is about 17,500 acres of mostly agriculture and grassland/pasture. The most common crops grown are durum wheat, peas and lentils (Table 1).
- Blacktail 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.”
- Blacktail Dam is managed walleye, with fingerlings stocked most years. Yellow perch, walleye, white sucker, northern pike and bluegill were captured during the last sample by the ND Game and Fish.
- Blacktail Dam was previously assessed in 1991-1992 and 2003-2004.

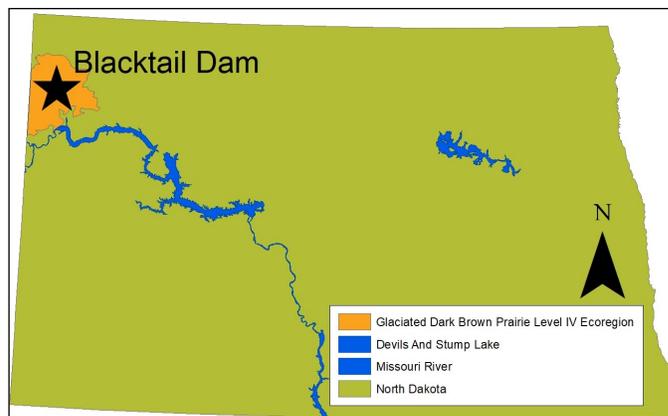


Figure 1. Location of Blacktail Dam within the state

Table 1. Percentage of land cover in the watershed and near the lake (NASS, 2013). Value listed of crop type represents percentage of total production

| Land Cover Type | % in Watershed | % within 500 meters |
|--------------------|----------------|---------------------|
| Agriculture | 69.0% | 15.8% |
| <i>Durum Wheat</i> | 36.5% | 48.3% |
| <i>Peas</i> | 10.4% | 2.4% |
| <i>Lentils</i> | 8.0% | 4.6% |
| Grassland/Pasture | 26.0% | 67.2% |
| Developed | 3.4% | 11.2% |
| Open Water | 0.8% | 1.4% |
| Wetlands | 0.3% | 1.3% |
| Forest | 0.2% | 2.4% |
| Shrubland | 0.2% | 0.5% |

Temperature and Dissolved Oxygen

- Blacktail 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 at Blacktail Dam in summer 2014. Temperature change in the water column was 0.1 degrees Celsius (°C), 8.3°C and 0.1°C in May, July and September, respectively.
- Dissolved oxygen concentrations high during all samples, but declined quickly during thermal stratification.

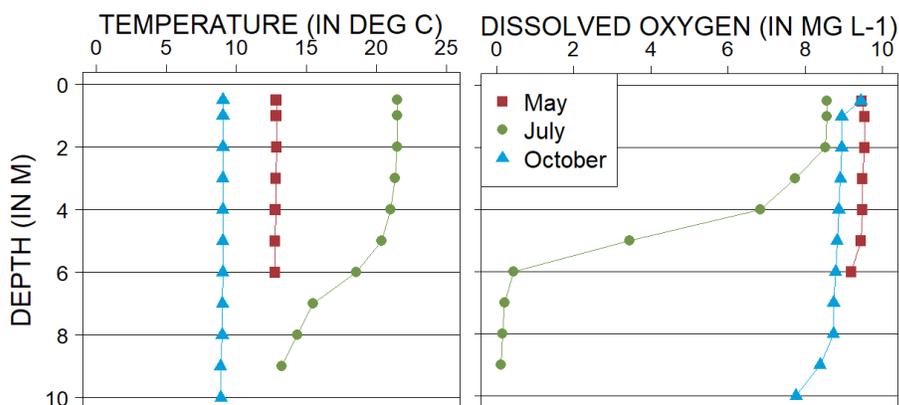


Figure 2. 2014 profiles of temperature (left) and dissolved oxygen (right) in milligrams per liter ($mg L^{-1}$)

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.
- Blacktail Dam is a eutrophic lake (Figure 3) that has moderate nutrient concentrations and moderate algal growth.
- Current trophic state is similar to historical indices.
- Blacktail Dam has had reported but not confirmed **harmful** algal (cyanobacteria) blooms.

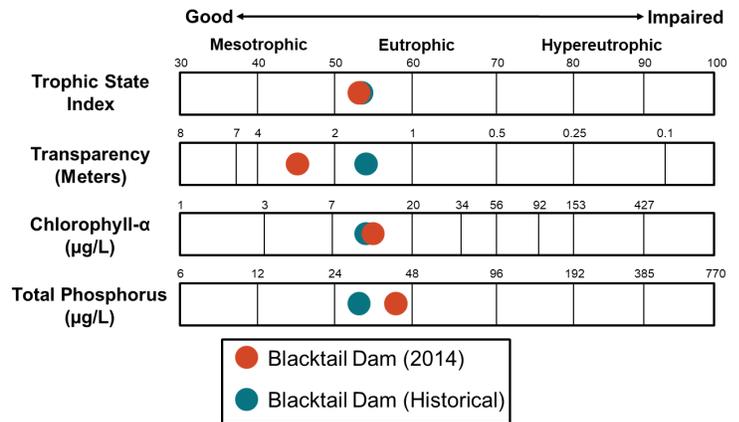


Figure 3. Trophic state indices for 2014 and historical samples

Nutrients

- Median concentration of total nitrogen (TN) in 2014 was greater than the historical median for the lake. There is no historical data for the Glaciated Dark Brown Prairie Level IV Ecoregion, as Blacktail Dam is the only reservoir monitored in the Ecoregion.
- Median concentration of dissolved TN was similar to TN.
- Median TP concentration in 2014 was greater than the median for the lake (Figure 4).
- Median concentration of dissolved phosphorus was slightly less than TP.
- Ammonia was detected in low to moderate concentrations at all samples in 2014 at Blacktail Dam, while nitrate-plus-nitrite was not detected.

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

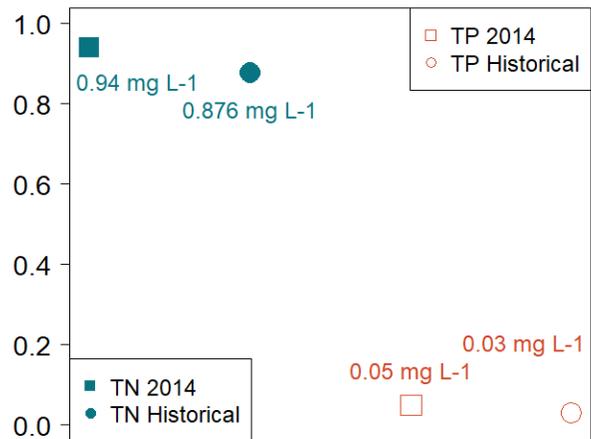


Figure 4. Median concentrations of TN and TP in mg L⁻¹ compared to regional medians

Water Chemistry

Table 2. Median concentrations of selected constituents for 2014 and historical samples from the lake

| Measure | 2014 Median | Historical Median |
|--|---------------------------|---------------------------|
| Alkalinity | 244 mg L ⁻¹ | 270.5 mg L ⁻¹ |
| Bicarbonate (HCO ₃ ⁻) | 283 mg L ⁻¹ | 301 mg L ⁻¹ |
| Calcium (Ca ²⁺) | 115 mg L ⁻¹ | 86.3 mg L ⁻¹ |
| Carbonate (CO ₃ ²⁻) | 6 mg L ⁻¹ | 13.5 mg L ⁻¹ |
| Conductivity | 1,840 µS cm ⁻¹ | 1,770 µS cm ⁻¹ |
| Dissolved Solids | 1,390 mg L ⁻¹ | 1,285 mg L ⁻¹ |
| Magnesium (Mg ²⁺) | 119 mg L ⁻¹ | 97 mg L ⁻¹ |
| Sodium (Na ⁺) | 150 mg L ⁻¹ | 178.5 mg L ⁻¹ |
| Sulfate (SO ₄ ²⁻) | 826 mg L ⁻¹ | 720 mg L ⁻¹ |

- Sulfate is the dominant anion in Blacktail Dam, while sodium, calcium and magnesium are the dominant cations (Figure 5).
- Median concentrations of most cations and anions are comparable to the historical median for the lake.

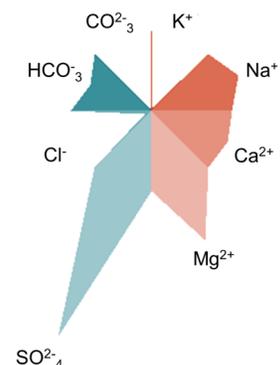


Figure 5. Maucha diagram showing ionic balance based on 2014 data