NORTH Dakota | Environmental Quality

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June 2024

Lutz Dam

(46.188432 N, -103.578401 W)

Bowman County

- Lutz Dam is a Dam in southwestern North Dakota (Figure 1). See map at (https://gf.nd.gov/gnf/maps/fishing/lakecontours/lutz2004.pdf)
- There are no public boat ramps on Lutz Dam but there are 2 public access points on the north and south ends of the lake.
- The Lutz Dam watershed drains about 25,000 acres. Land cover in the watershed consistly mainly of rangeland, trees and agriculture, with smaller amounts of water and developed/barren spaces. Agriculture is dominated by wheat, alfalfa and corn (Table 1).
- Lutz Dam is a Class II, cool-water fishery, which are "capable of supporting natural reproduction and growth of cool water fishes (e.g., walleye and northern pike) and associated aquatic biota."
- Lutz Dam is managed for rainbow trout and yellow perch. The lake was last stocked in 2021 with catchable rainbow trout. No ND Game and Fish survey data is available.
- Lutz Dam was last sampled in 2009.

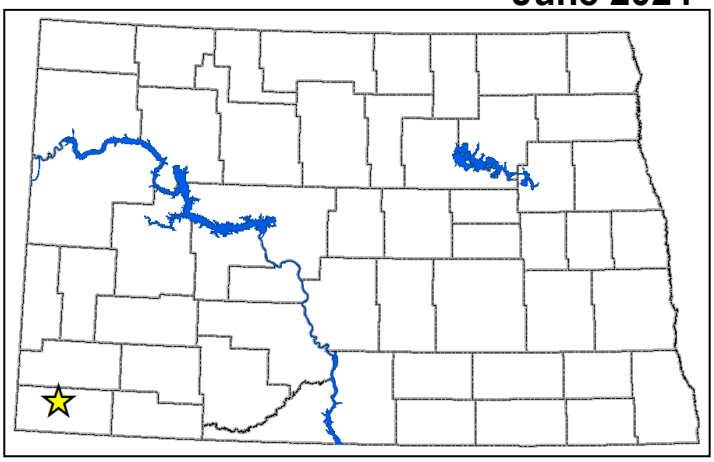

Figure 1. *Location of Lutz Dam within the state*

Table 1. *Percentage of land cover in the watershed and near the lake (NASSCDL, 2021). Value listed of crop type represents percentage of total production*

Land Cover Type	% in Watershed	% within 500 meters
Agriculture	25.6%	4.93%
Wheat	*12.26%*	*<1%*
Alfalfa	*6.29%*	*3.78%*
Corn	*3.31%*	*<1%*
Trees	30.48%	28.3%
Rangeland	39.88%	60.37%
Water	1.02%	2.93%
Developed/Bare	3.03%	3.47%

Temperature and Dissolved Oxygen

- Lutz Dam stayed mixed throughout the sampling season with thermal stratification taking place in one of the four months sampled.
- Thermal stratification took place in May. The greatest temperature change in the water column during this month was 3.7 degrees Celsius (ºC) (Figure 2).
- Dissolved oxygen (DO) concentrations were relatively high at the surface, but there were some anoxic conditions near the bottom. The month of October showed high DO levels throughout the water column (Figure 2).

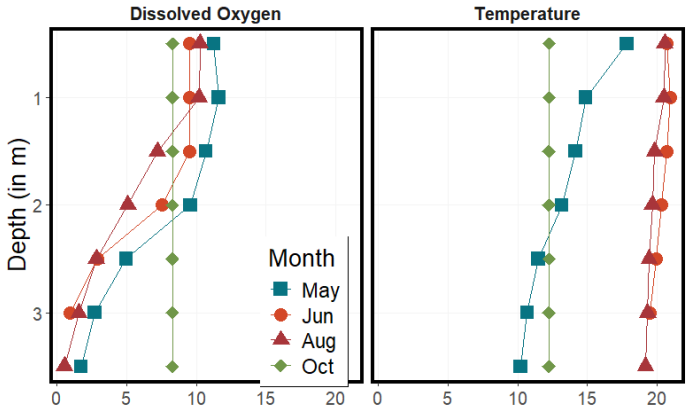

Figure 2. *2023 profiles of dissolved oxygen (left) in milligrams per liter (mg L^{-1}) and temperature (right) in degrees Celsius.*

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.
- Lutz Dam is a eutrophic reservoir (Figure 3) that has high nutrient concentrations and moderate algal and plant growth.
- Trophic state in 2023 was similar to historical condition.

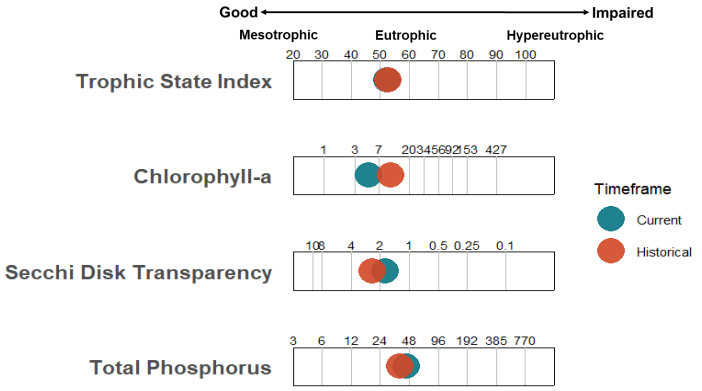

Figure 3. *Trophic state indices for 2023 and historical samples*

Nutrients

- Median concentration of total nitrogen (TN) in 2023 was greater than the historical median and the Missouri Plateau Level IV Ecoregion median where Lutz Dam is located (Figure 4).
- 2023 median concentration of dissolved TN was less than TN.
- Median TP concentration in 2023 was greater than the historical and ecoregion medians (Figure 4).
- 2023 median concentration of dissolved phosphorus was less than TP.
- Ammonia and nitrate + nitrate were found above their detection limit of 0.03 mg/L during the October sampling event.

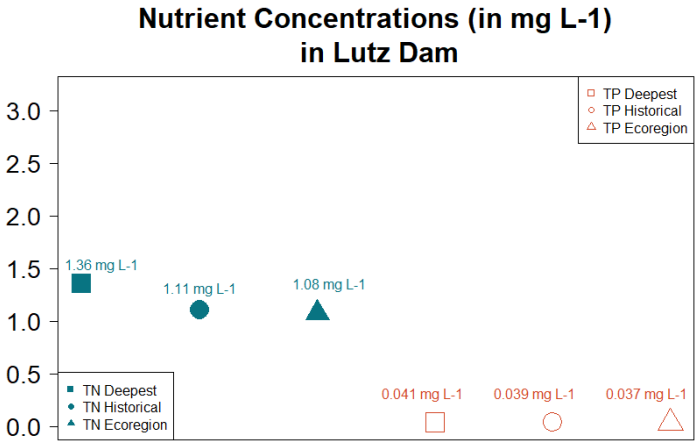

Figure 4. *Median concentrations of TN and TP in mg L^{-1} compared to regional medians*

Water Chemistry

Table 2. *Median concentrations of selected constituents for 2023 and historical samples and from all Ecoregion natural lakes and reservoirs.*

Measure	2023 Median	Historical Median	Ecoregion Median
Alkalinity	218.5 mg L^{-1}	215 mg L^{-1}	201 mg L^{-1}
Bicarbonate (HCO^-_3)	207 mg L^{-1}	196 mg L^{-1}	217 mg L^{-1}
Calcium (Ca^{2+})	22.95 mg L^{-1}	22.2 mg L^{-1}	47.5 mg L^{-1}
Carbonate (CO^{2-}_3)	29.5 mg L^{-1}	33 mg L^{-1}	11 mg L^{-1}
Conductivity	543 µS cm^{-1}	540 µS cm^{-1}	823.5 µS cm^{-1}
Dissolved Solids	324.5 mg L^{-1}	320 mg L^{-1}	521.5 mg L^{-1}
Magnesium (Mg^{2+})	51.3 mg L^{-1}	51.1 mg L^{-1}	24.7 mg L^{-1}
Sodium (Na^+)	20.8 mg L^{-1}	19.7 mg L^{-1}	94.4 mg L^{-1}
Sulfate (SO^{2-}_4)	84.1 mg L^{-1}	82.1 mg L^{-1}	206 mg L^{-1}

- Bicarbonate is the dominant anion in Lutz Dam, while magnesium is the dominant cation (Table 2).
- 2023 median concentrations of most cations and anions are similar to historical medians for the lake and less than the ecoregion medians (Table 2).

Figure 5. *Photo of Lutz Dam in July of 2023. Taken by Emily Brazil.*