NORTH Dakota | Environmental Quality

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June 2024

Odland Dam

(47.03966 N, -104.01318 W)

Golden Valley County

- Odland Dam is a Dam in western North Dakota (Figure 1). See map at (https://gf.nd.gov/gnf/maps/fishing/lakecontours/odland2021.pdf)
- There is one public boat ramp on Odland Dam on the north end of the lake.
- The Odland Dam watershed drains about 17,800 acres. Land cover in the watershed is largely agriculture and rangeland. Agriculture is dominated by wheat, legumes, and alfalfa (Table 1).
- Odland Dam is a Class III, warm-water fishery, which are "capable of supporting natural reproduction and growth of warm fishes (e.g., largemouth bass and bluegill) and associated aquatic biota."
- Odland Dam is managed for walleye, bluegill, and yellow perch. The lake was last stocked in 2020 with walleye. Yellow perch and bluegill were found during the last survey by the ND Game and Fish (2023).
- Odland Dam was last sampled in 2009.

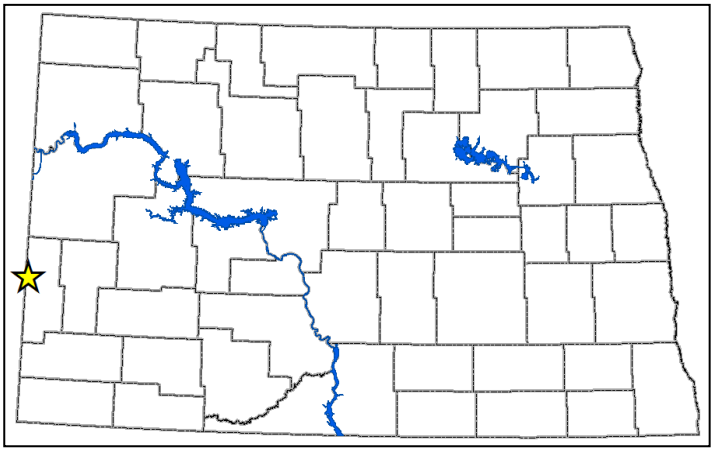

Figure 1. *Location of Odland Dam within the state*

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	54.4%	13.9%
Wheat	*31.9%*	*7.9%*
Legumes	*10.7%*	*<1.0%*
Alfalfa	*4.0%*	*4.3%*
Trees	7.6%	20.3%
Rangeland	33.8%	57.0%
Water	<1.0%	2.6%
Bare	3.2%	6.1%

Temperature and Dissolved Oxygen

- Odland Dam stayed stratified throughout the sampling season, with warm, well-oxygenated water at the top of the water column, and cold, low-oxygen water near the bottom.
- Thermal stratification took place in May, June, and July. The greatest temperature change in the water column during these months was 1.1 degrees Celsius (ºC), 6.4ºC, and 3.0ºC (Figure 2).
- Dissolved oxygen concentrations were relatively high at the surface, but anoxic conditions were present near the bottom (Figure 2).

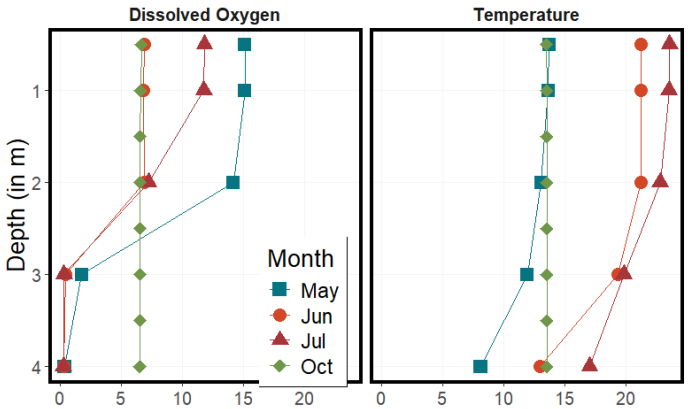

Figure 2. *2023 profiles of dissolved oxygen (left) in milligrams per liter (mg L^{-1}) and temperature (right) in degrees Celsius.*

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

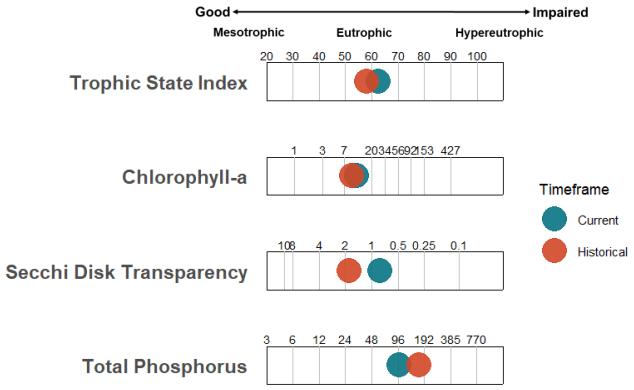

Figure 3. *Trophic state indices for 2023 and historical samples*

Nutrients

- Median concentration of total nitrogen (TN) in 2023 was less than the historical median for the lake but greater than the median for the Missouri Plateau Level IV Ecoregion where Odland Dam is located (Figure 4).
- 2023 median concentration of dissolved TN was less than TN.
- Median TP concentration in 2023 was less than the historical median but greater than the median for the ecoregion (Figure 4).
- 2023 median concentration of dissolved phosphorus was less than TP.
- Ammonia was found above the detection limit of 0.03 mg/L in Odland Dam during the 2023 sampling season.

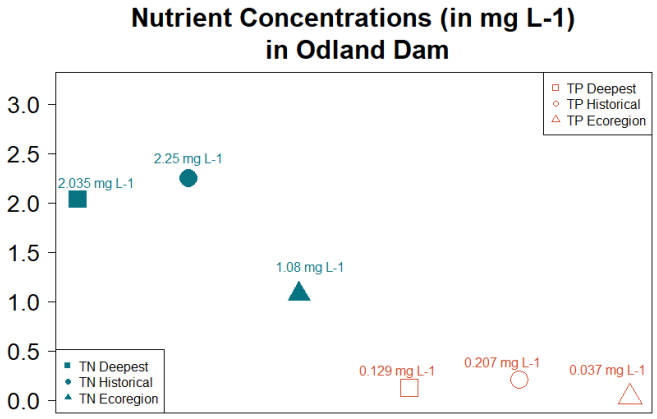

Figure 4. *Median concentrations of TN and TP in mg L^{-1} compared to regional medians*

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	268 mg L^{-1}	281 mg L^{-1}	201 mg L^{-1}
Bicarbonate (HCO^{-}_3)	298.5 mg L^{-1}	343 mg L^{-1}	217 mg L^{-1}
Calcium (Ca^{2+})	164 mg L^{-1}	163 mg L^{-1}	47.5 mg L^{-1}
Carbonate (CO^{2-}_3)	4.75 mg L^{-1}	9 mg L^{-1}	11 mg L^{-1}
Conductivity	3505 µS cm^{-1}	4080 µS cm-1	823.5 µS cm^{-1}
Dissolved Solids	2845 mg L^{-1}	3400 mg L^{-1}	521.5 mg L^{-1}
Magnesium (Mg^{2+})	256.5 mg L^{-1}	296 mg L^{-1}	24.7 mg L^{-1}
Sodium (Na^{+})	392 mg L^{-1}	443 mg L^{-1}	94.4 mg L^{-1}
Sulfate (SO^{2-}_4)	1815 mg L^{-1}	2230 mg L^{-1}	206 mg L^{-1}

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

Figure 5. *Photo of Odland Dam in June, 2023. Photo taken by Emily Brazil.*