

November 2020

## Balta Dam

(48.15975 N, -100.05238 W)

### Pierce County

- Balta Dam is a small reservoir in north-central North Dakota (Figure 1). See map at (<https://gf.nd.gov/gnf/maps/fishing/lakecontours/balta2008.pdf>).
- There are two public, paved boat ramps on Balta Dam, one on each side of the dissecting road (27th Avenue Northeast).
- The Balta Dam watershed is about 50,000 acres of mostly agriculture. Agricultural production in the watershed is dominated by spring wheat, soybeans and corn (Table 1).
- Balta Dam is a Class III, warm-water fishery, which are “capable of supporting natural reproduction and growth of warm water fishes (e.g., largemouth bass and bluegill) and associated aquatic biota.”
- Balta Dam is managed for northern pike, with fingerlings stocked annually prior to 2020. No fish were captured during the last sample by the ND Game and Fish in 2018.
- Balta Dam was previously assessed in 2005-2006.

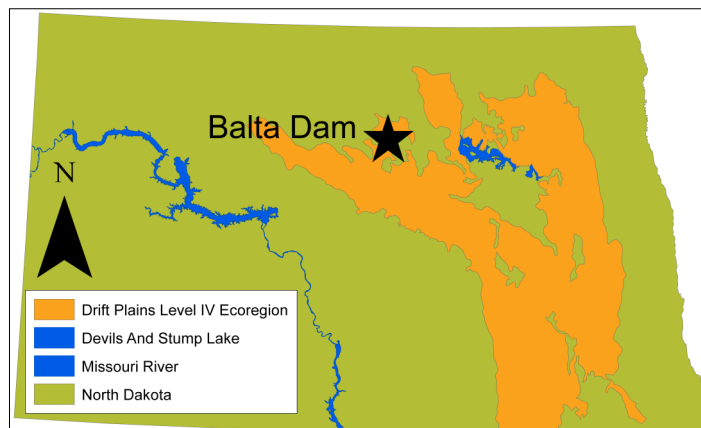


Figure 1. Location of Balta Dam within the state

Table 1. Percentage of land cover in the watershed and near the lake (NASS, 2019). Value listed of crop type represents percentage of total production

Land Cover Type	% in Watershed	% within 500 meters
Agriculture	68.2%	53.2%
Spring Wheat	43.7%	40.5%
Soybeans	38.8%	54.3%
Corn	5.4%	0.3%
Grassland/Pasture	11.2%	24.9%
Open Water	8.6%	2.2%
Wetlands	8.2%	11.0%
Developed	3.6%	8.6%
Forest	< 0.1%	NA
Barren	< 0.1%	NA

## Temperature and Dissolved Oxygen

- Balta Dam will stratify in the summer.
- Thermal stratification was recorded in July 2020. Top-to-bottom temperature changes of 0.3°C, 0.3°C, 5.5°C and 0.1°C were recorded in May, June, July and September, respectively.
- Dissolved oxygen concentrations were relatively high throughout the water column during all samples, but did decline sharply in the hypolimnion in July.

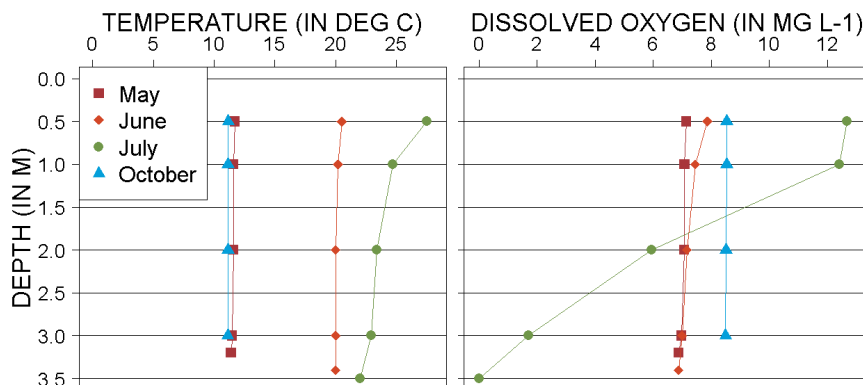


Figure 2. 2020 profiles of temperature (left) and dissolved oxygen (right) in milligrams per liter ( $\text{mg L}^{-1}$ )

## 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.
- Balta Dam is a eutrophic lake (Figure 3) that has high nutrient concentrations but moderate algal growth.
- Current trophic state has improved compared to historical data.
- There have been no confirmed **harmful** algal (cyanobacteria) blooms at Balta Dam as of 2020.

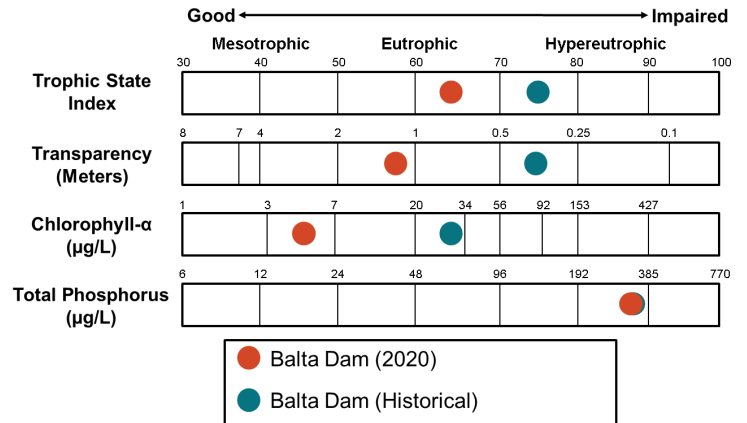


Figure 3. Trophic state indices for 2020 and historical samples

## Nutrients

- Median concentration of total nitrogen (TN) in 2020 was less than the historical median for the lake but greater than the median for the Drift Plains Level IV Ecoregion (hereafter, Ecoregion) where Balta Dam is located (Figure 4).
- Median concentration of dissolved TN was less than TN.
- Median total phosphorus (TP) concentration in 2020 was similar to the median for the lake but greater than the median for the Ecoregion (Figure 4).
- Median concentration of dissolved phosphorus was slightly less than TP.
- Ammonia and nitrate-plus-nitrite were detected at Balta Dam in 2020 in half of the samples collected.

### Nutrient Concentrations (in mg L<sup>-1</sup>) in Balta Dam

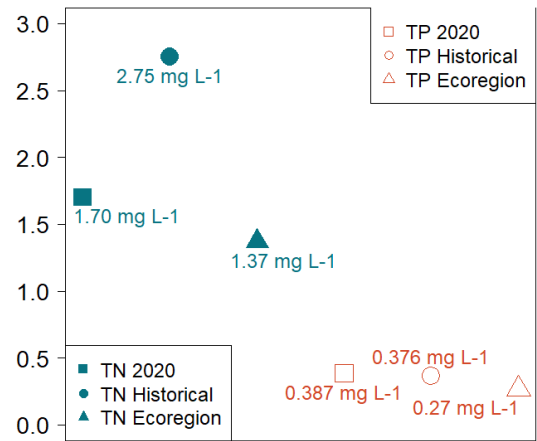


Figure 4. Median concentrations of TN and TP in mg L<sup>-1</sup> compared to regional medians

## Water Chemistry

**Table 2.** Median concentrations of selected constituents for 2020 and historical samples and from all Ecoregion reservoirs.

Measure	2020 Median	Historical Median	Ecoregion Median
Alkalinity	482 mg L <sup>-1</sup>	636 mg L <sup>-1</sup>	328 mg L <sup>-1</sup>
Bicarbonate (HCO <sub>3</sub> <sup>-</sup> )	554.5 mg L <sup>-1</sup>	654 mg L <sup>-1</sup>	364 mg L <sup>-1</sup>
Calcium (Ca <sup>2+</sup> )	39.7 mg L <sup>-1</sup>	33.4 mg L <sup>-1</sup>	73 mg L <sup>-1</sup>
Carbonate (CO <sub>3</sub> <sup>2-</sup> )	28.5 mg L <sup>-1</sup>	57 mg L <sup>-1</sup>	16 mg L <sup>-1</sup>
Conductivity	1,380 µS cm <sup>-1</sup>	1,810 µS cm <sup>-1</sup>	1,180 µS cm <sup>-1</sup>
Dissolved Solids	866.5 mg L <sup>-1</sup>	1,190 mg L <sup>-1</sup>	788.5 mg L <sup>-1</sup>
Magnesium (Mg <sup>2+</sup> )	40.9 mg L <sup>-1</sup>	40.5 mg L <sup>-1</sup>	53.7 mg L <sup>-1</sup>
Sodium (Na <sup>+</sup> )	219.5 mg L <sup>-1</sup>	353 mg L <sup>-1</sup>	114 mg L <sup>-1</sup>
Sulfate (SO <sub>4</sub> <sup>2-</sup> )	249 mg L <sup>-1</sup>	346 mg L <sup>-1</sup>	292 mg L <sup>-1</sup>

- Bicarbonate is the dominant anion in Balta Dam, while sodium is the dominant cation (Figure 5).
- Median concentrations of most cations and anions are less than the historical median for the lake but greater than the median for the Ecoregion.

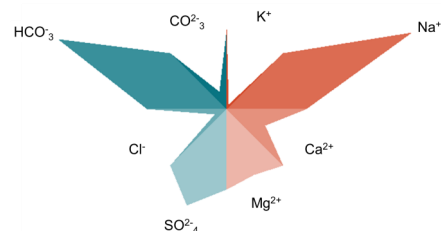


Figure 5. Maucha diagram showing ionic balance based on 2020 data