NORTH Dakota | Environmental Quality
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December 2020

Dead Colt Creek Dam
(46.37119 N, -97.61471 W)

Ransom County

- Dead Colt Creek Dam is a small reservoir in southeast North Dakota (Figure 1). See map at (https://gf.nd.gov/gnf/maps/fishing/lakecontours/deadcoltcreek2004.pdf).

- There are two public, paved boat ramps on Dead Colt Creek Dam, one on the north side and one on the south side of the lake.

- The Dead Colt Creek Dam watershed is nearly 40,000 acres of mostly agriculture. Agricultural production in the watershed is dominated by soybeans and corn (Table 1).

- Dead Colt Creek 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."

- There is minimal fish management at the lake, with only walleye and muskellunge stocked once since 2012. Bluegill and largemouth bass were captured during the last sample by the ND Game and Fish.

- Dead Colt Creek Dam was previously assessed in 1992-1993, 2002-2003, 2009-2010 and 2012-2013.
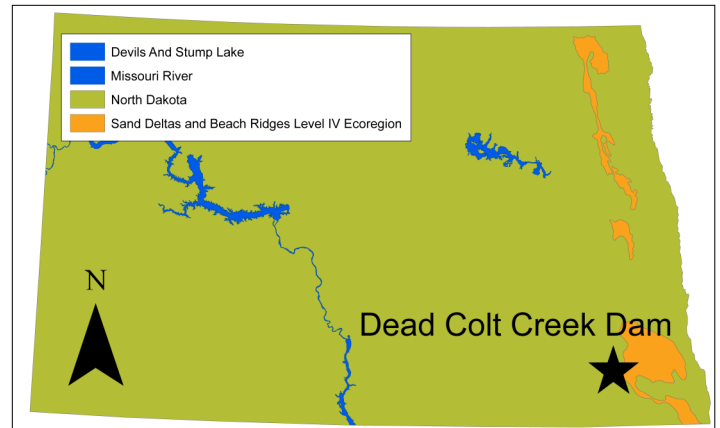

Figure 1. *Location of Dead Colt Creek Dam within the state*

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	71.6%	40.0%
Soybeans	41.1%	14.8%
Corn	39.0%	25.8%
Fallow/Idle Cropland	8.3%	0.8%
Wetlands	14.4%	12.4%
Grassland/Pasture	9.0%	38.5%
Developed	3.2%	5.1%
Forest	0.9%	2.8%
Open Water	0.8%	0.9%
Barren	< 0.1%	0.2%

Temperature and Dissolved Oxygen

- Dead Colt Creek Dam regularly stratifies in the summer.

- Thermal stratification was recorded throughout most of 2020. Top-to-bottom temperature changes of 5.6ºC, 12.9ºC, 11.0ºC and 0.6ºC were recorded in May, June, July and October, respectively.

- Dissolved oxygen concentrations were relatively high at the surface during all samples, but did decline sharply in the hypolimnion in September.
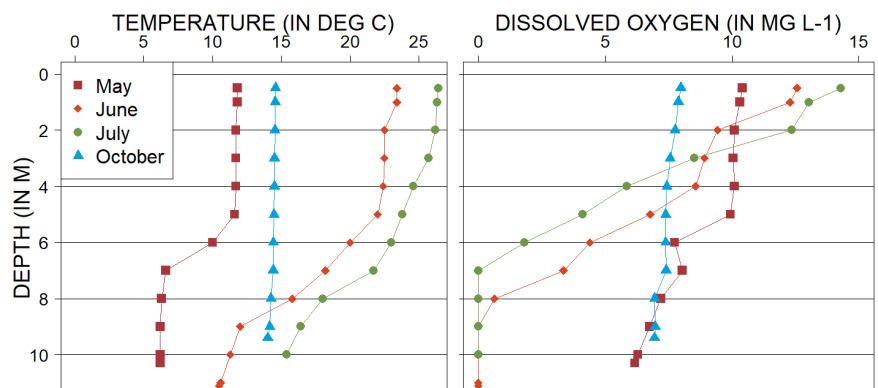

Figure 2. *2020 profiles of temperature (left) and dissolved oxygen (right) in milligrams per liter (mg L^{-1})*

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.

- Dead Colt Creek Dam is a highly eutrophic lake (Figure 3) that has high nutrient concentrations and moderate algal growth.

- Current trophic state has declined compared to historical data.

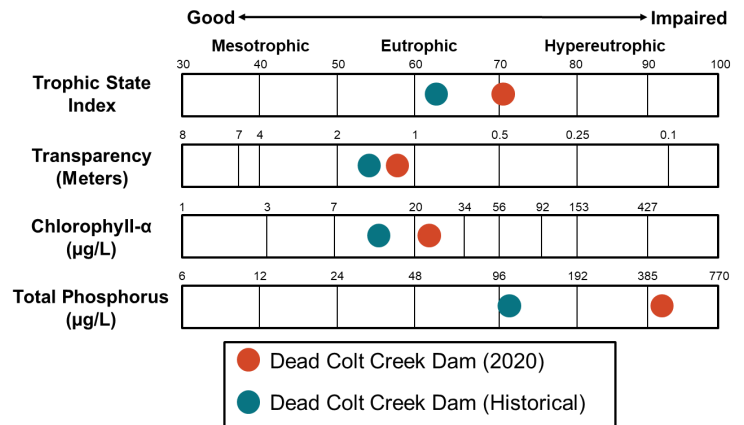- Dead Colt Creek Dam was on the state's *advisory* list for harmful cyanobacteria blooms in 2019.

Figure 3. Trophic state indices for 2020 and historical samples

Nutrients

- Median concentration of total nitrogen (TN) in 2020 was much greater than the historical median for the lake and much greater than the median for the Sand Deltas and Beach Ridges Level IV Ecoregion (hereafter, Ecoregion) where Dead Colt Creek Dam is located (Figure 4).

- Median concentration of dissolved TN was similar to TN.

- Median total phosphorus (TP) concentration in 2020 was much greater than the median for the lake and much greater than the median for the Ecoregion (Figure 4).

- Median concentration of dissolved phosphorus was similar to TP.

- Ammonia and nitrate-plus-nitrite were detected during multiple sampling trips at Dead Colt Creek Dam in 2020, with some very high concentrations.
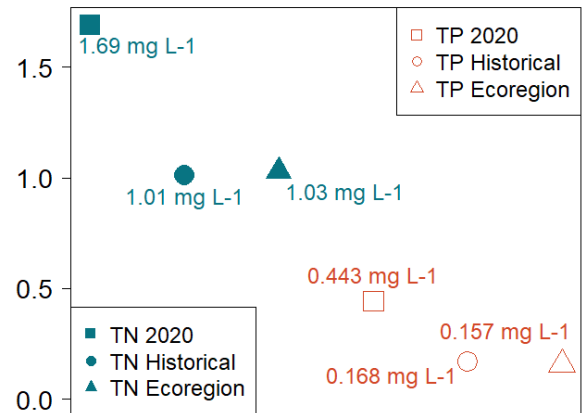

Figure 4. Median concentrations of TN and TP in mg L^{-1} compared to regional medians

Water Chemistry

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

Measure	2020 Median	Historical Median	Ecoregion Median
Alkalinity	216.5 mg L^{-1}	148 mg L^{-1}	217.5 mg L^{-1}
Bicarbonate (HCO_3^-)	245.5 mg L^{-1}	179.5 mg L^{-1}	254.5 mg L^{-1}
Calcium (Ca^{2+})	127.5 mg L^{-1}	70.9 mg L^{-1}	88.5 mg L^{-1}
Carbonate (CO_3^{2-})	< 1 mg L^{-1}	2 mg L^{-1}	4 mg L^{-1}
Conductivity	1,355 µS cm^{-1}	937 µS cm^{-1}	988 µS cm^{-1}
Dissolved Solids	985 mg L^{-1}	620.5 mg L^{-1}	655 mg L^{-1}
Magnesium (Mg^{2+})	90.2 mg L^{-1}	55.3 mg L^{-1}	48.8 mg L^{-1}
Sodium (Na^+)	49 mg L^{-1}	43.6 mg L^{-1}	63.6 mg L^{-1}
Sulfate (SO_4^{2-})	553.5 mg L^{-1}	340 mg L^{-1}	325 mg L^{-1}

- Sulfate is the dominant anion in Dead Colt Creek Dam, while calcium and magnesium are the dominant cations (Figure 5).

- Median concentrations of most cations and anions are greater than the historical median for the lake and greater than the median for the Ecoregion.
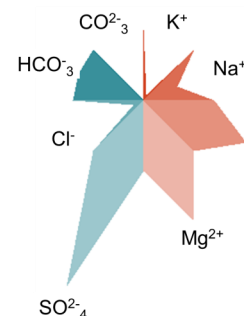

Figure 5. Maucha diagram showing ionic balance based on 2020 data