

February 2019

East Park Lake

(47.35986 N, -100.73270 W)

McLean County

- East Park Lake is a small canal lake in central North Dakota (Figure 1). See map at (<https://gf.nd.gov/gnf/maps/fishing/lakecontours/eastpark2003.pdf>).
- East Park Lake is accessible by one public boat ramp on the east side of the lake. All canal lakes are also accessible by launching anywhere along the canal.
- Land cover near the lake is mostly agricultural land, grassland/pasture and developed land. The most common crops grown are spring wheat, soybeans and non-alfalfa hay (Table 1).
- East Park Lake is a Class II fishery, which means it is “capable of supporting natural reproduction and growth of cool water fishes (e.g., northern pike and walleye) and associated aquatic biota.”
- The lake is primarily managed for muskellunge and walleye, with fingerlings most years. Yellow perch and white sucker are also found in the lake.
- East Park Lake was previously assessed in 1993-1994 and 2005-2006.



Figure 1. Location of East Park Lake within the state

Table 1. Percentage of land cover near the lake (NASS, 2017). Value listed of crop type represents percentage of total production.

Land Cover Type	% within 500 meters
Agriculture	42.5%
Spring Wheat	48.3%
Soybeans	27.5%
Other Hay/Non-Alfalfa	7.9%
Grassland/Pasture	35.0%
Developed	10.3%
Open Water	6.2%
Wetlands	6.1%

Temperature and Dissolved Oxygen

- East Park Lake rarely stratifies in the summer, with the majority of the water column typically well-oxygenated
- There was thermal stratification in May of 2018, likely related to a rapid increase in surface temperature following ice-off. Temperature change in the water column was 3.61 degrees Celsius (°C) in May, but only 0.91°C and 0.11°C in July and September, respectively (Figure 2).
- All samples in 2018 showed the lake as well-oxygenated, except right at the bottom in May and July.

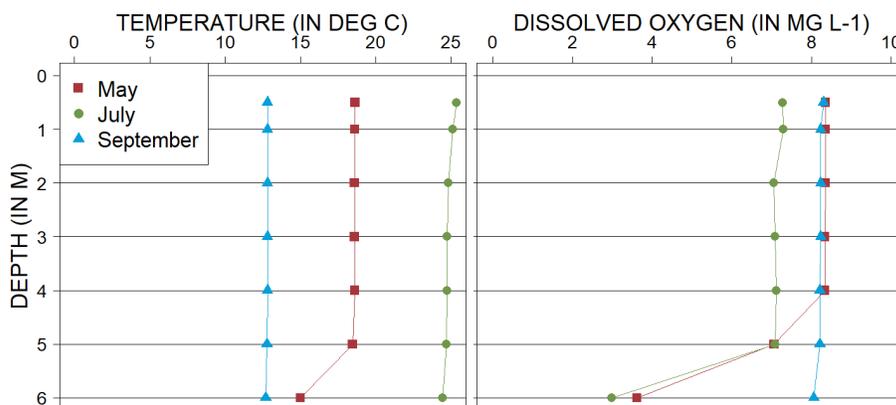


Figure 2. 2018 profiles of temperature (left) and dissolved oxygen (right) in milligrams per liter (mg L⁻¹)

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.
- East Park Lake is a eutrophic lake (Figure 3) that has moderate nutrient concentrations and moderate algal growth.
- Trophic state has declined compared to historical indices.
- There have been no confirmed **harmful** algal (cyanobacteria) blooms at East Park Lake.

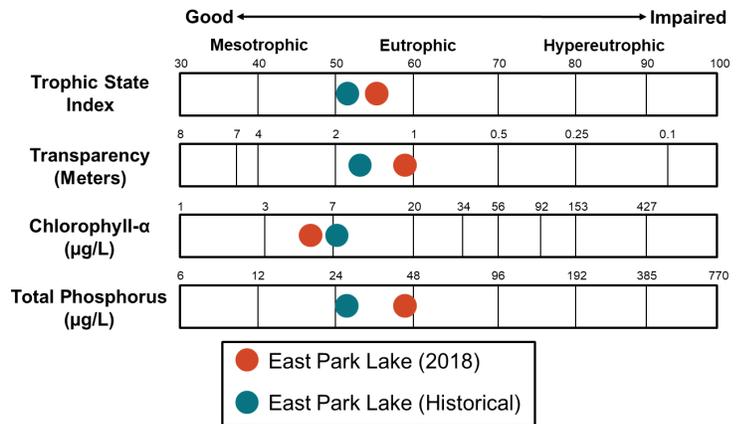


Figure 3. Trophic state indices for 2018 and historical samples

Nutrients

- Median concentration of total nitrogen (TN) was lower in 2018 compared to the historical median and the median for the Missouri Coteau Level IV Ecoregion (hereafter, Missouri Coteau) where East Park Lake is located (Figure 4).
- Median concentration of dissolved TN was slightly less than TN.
- Median TP concentration was greater in 2018 than historical concentrations but less than the median for the Missouri Coteau (Figure 4).
- Median concentration of dissolved phosphorus was slightly less than TP.
- Ammonia was detected in all three samples in 2018 in East Park Lake, while nitrate plus nitrite was only detected once.

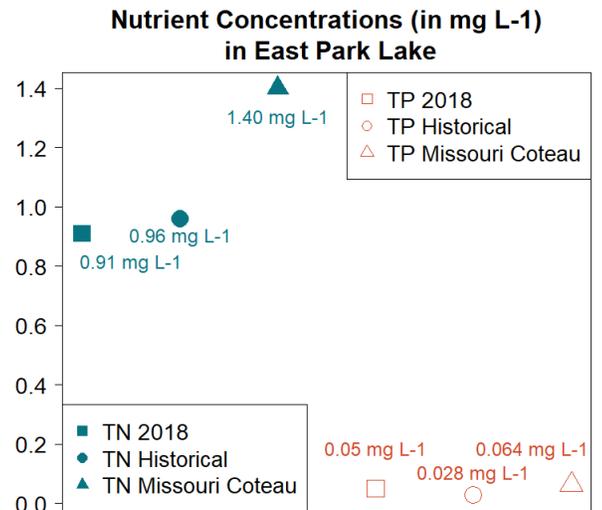


Figure 4. Median concentrations of TN and TP in mg L⁻¹ compared to regional medians

Water Chemistry

Table 2. Median concentrations of selected constituents for 2018 and historical samples and from all Missouri Coteau lakes.

Measure	2018 Median	Historical Median	Ecoregion Median
Alkalinity	245 mg L ⁻¹	250 mg L ⁻¹	274 mg L ⁻¹
Bicarbonate (HCO ₃ ⁻)	278 mg L ⁻¹	291 mg L ⁻¹	289 mg L ⁻¹
Calcium (Ca ²⁺)	57.3 mg L ⁻¹	52.8 mg L ⁻¹	39.8 mg L ⁻¹
Carbonate (CO ₃ ²⁻)	14 mg L ⁻¹	11 mg L ⁻¹	21 mg L ⁻¹
Conductivity	1,340 µS cm ⁻¹	1,260 µS cm ⁻¹	1,010 µS cm ⁻¹
Dissolved Solids	917 mg L ⁻¹	840 mg L ⁻¹	642 mg L ⁻¹
Magnesium (Mg ²⁺)	68.6 mg L ⁻¹	59.1 mg L ⁻¹	72.4 mg L ⁻¹
Sodium (Na ⁺)	148 mg L ⁻¹	144 mg L ⁻¹	62 mg L ⁻¹
Sulfate (SO ₄ ²⁻)	465 mg L ⁻¹	404 mg L ⁻¹	239 mg L ⁻¹

- Sulfate is the dominant anion in East Park Lake (although bicarbonate is relatively high), while magnesium and sodium are co-dominant cations (Figure 5).
- Median concentrations of most cations and anions are greater than the historical median for the lake and for the Missouri Coteau.

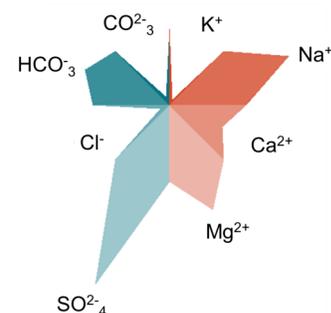


Figure 5. Maucha diagram showing ionic balance based on 2018 data