



Lake Emily

DNR ID: 18-0203

Vitals

MN Lake ID:	18-0203-00
Zoning Authority:	City of Emily, Crow Wing County
Lake Classification:	General Development (RD)
Major Drainage Basin:	Pine River Watershed
Latitude/Longitude:	46.733821 / -93.941818
Water Body Type:	Public
Invasive Species	None

Physical Characteristics

Surface area (acres):	720
Littoral area (acres):	720
% Littoral area:	100%
Max depth (ft):	13 (m): 3.96
Mean depth (ft):	N/A
Inlets / Outlets / Accesses:	2 / 1 / 1
Lakeshed to lake area ratio:	2:1

Total Phosphorus

Lake Emily is phosphorus limited, which means that algae and aquatic plant growth is dependent upon available phosphorus. Total phosphorus was evaluated in Lake Emily in 2003-2005, 2007-2010. The data do not indicate much seasonal variability. The majority of the data points fall into the eutrophic range.

Chlorophyll *a*

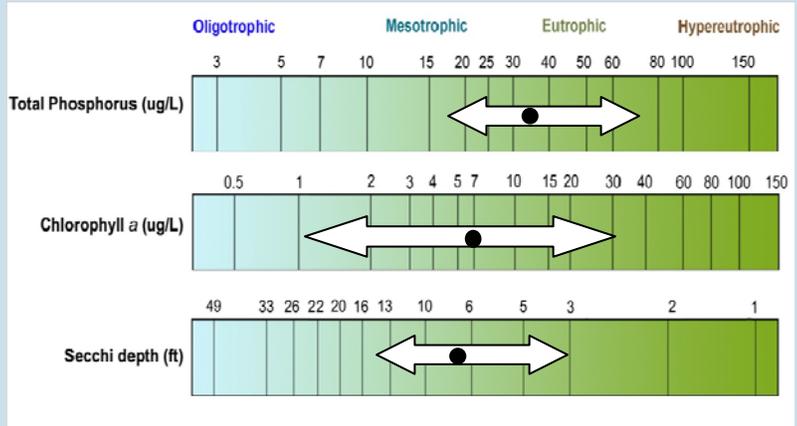
Chlorophyll *a* is the pigment that makes plants and algae green. Chlorophyll *a* is tested in lakes to determine the algae concentration or how "green" the water is. Chlorophyll *a* was evaluated in Lake Emily in 2003-2005, 2007-2010. Chlorophyll *a* concentrations reached 10 ug/L in 2003, 2005, 2008 & 2010, indicating minor algae blooms.

Transparency (Secchi Depth)

Transparency is how easily light can pass through a substance. In lakes, it is how deep sunlight penetrates through the water. Plants and algae need sunlight to grow, so they are only able to grow in areas of lakes where the sun penetrates. Water transparency depends on the amount of particles in the water. The annual mean transparency ranges from 2.4 to 11.4 feet. Overall, Lake Emily shows a significant declining trend in transparency in the last decade. Over this time, the transparency decreased approximately 2.5 feet per decade.

Trophic State Index (TSI)

Phosphorus (nutrients), chlorophyll *a* (algae concentration) and Secchi depth (transparency) are related. As phosphorus increases, there is more food available for algae, resulting in increased algal concentrations. When algal concentrations increase, the water becomes less transparent and the Secchi depth decreases. The results from these three measurements cover different units and ranges and thus cannot be directly compared to each other or averaged. In order to standardize these three measurements, we convert them to a trophic state index (TSI). The mean TSI for Lake Emily falls in the eutrophic range. Eutrophic lakes (TSI 50-70) are characteristic of "green" water most of the summer. "Eu" means true and the root "troph" means nutrients therefore, eutrophic literally means true nutrients or truly nutrient rich (phosphorus). Eutrophic lakes are usually shallow, and are found where the soils are fertile. Eutrophic lakes usually have abundant aquatic plants and algae.



Lake Emily total phosphorus, chlorophyll *a* and transparency historical ranges. The arrow represents the range and the black dot represents the historical mean (Primary Site 202). Figure adapted after Moore and Thornton, [Ed.], 1988. Lake and Reservoir Restoration Guidance Manual. (Doc. No. EPA 440/5-88-002)

