Environmental Services
CROW WING COUNTY
BRAINERD, MINNESOTA 56401

Crow Wing County Water Quality Factsheet Series

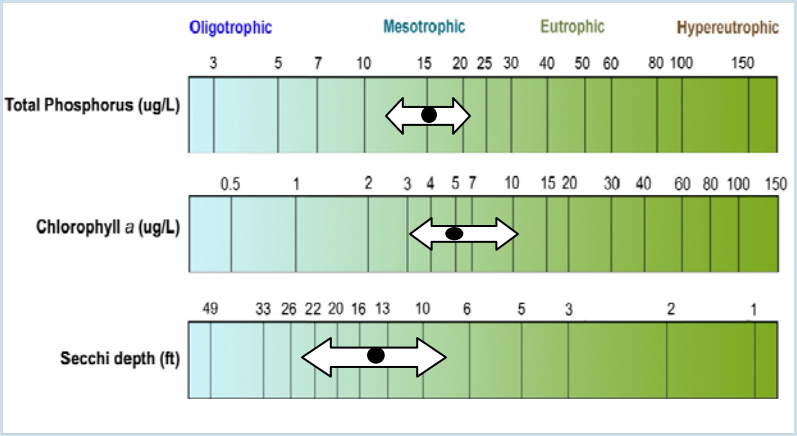
Clearwater Lake

DNR ID: 18-0038

Vitals		Physical Characteristics	
MN Lake ID:	18-0038-00	Surface area (acres):	907
Zoning Authority:	Crow Wing County	Littoral area (acres):	338
Lake Classification:	Recreational Development (RD)	% Littoral area:	37%
Major Drainage Basin:	Upper Mississippi River	Max depth (ft):	54 (m): 16.4
Latitude/Longitude:	46.39080048 / -93.91419983	Mean depth (ft):	N/A
Water Body Type:	Public	Inlets / Outlets / Accesses:	0 / 1 / 1
Invasive Species	Eurasion watermilfoil	Lakeshed to lake area ratio:	3:1

Total Phosphorus
Clearwater Lake is phosphorus limited, which means that algae and aquatic plant growth is dependent upon available phosphorus. Total phosphorus was evaluated in Clearwater Lake in 2007-2008. The data do not indicate much seasonal variability. The majority of the data points fall into the mesotrophic range.

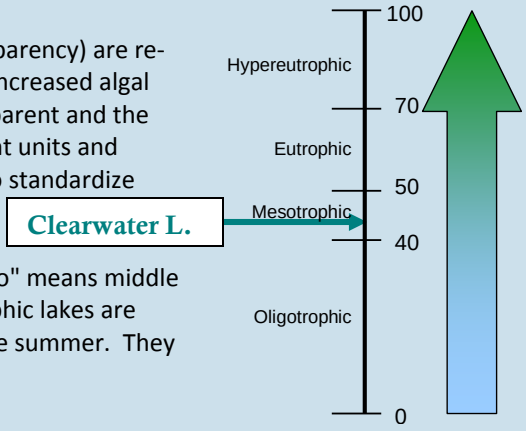
Chlorophyll *a*
Chlorophyll a is the pigment that makes plants and algae green. Chlorophyll *a* is tested in lakes to determine the algae concentration or how "green" the water is. Chlorophyll *a* was evaluated in Clearwater Lake in 2007-2008. Chlorophyll *a* concentrations for all dates except one remained below 10 ug/L, indicating clear water most of the summer.



Clearwater Lake 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)

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. An increase in particulates results in a decrease in transparency. The mean transparency for Clearwater Lake ranges from 10.2 to 15.4 feet. Overall, Clearwater Lake shows no detectable trend in transparency, meaning that transparency is stable.

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 Clearwater Lake falls in the mesotrophic range. Mesotrophic lakes (TSI 40-50) are characterized by moderately clear water most of the summer. "Meso" means middle or mid; therefore, mesotrophic means a medium amount of productivity. Mesotrophic lakes are commonly found in central Minnesota and have clear water with algal blooms in late summer. They are also good for walleye fishing.



Local association info: Clearwater Lake Association, find them on Facebook