Environmental Services
CROW WING COUNTY
BRAINERD, MINNESOTA 56401

Crow Wing County Water Quality Factsheet Series

Gilbert Lake

DNR ID: 18-0320

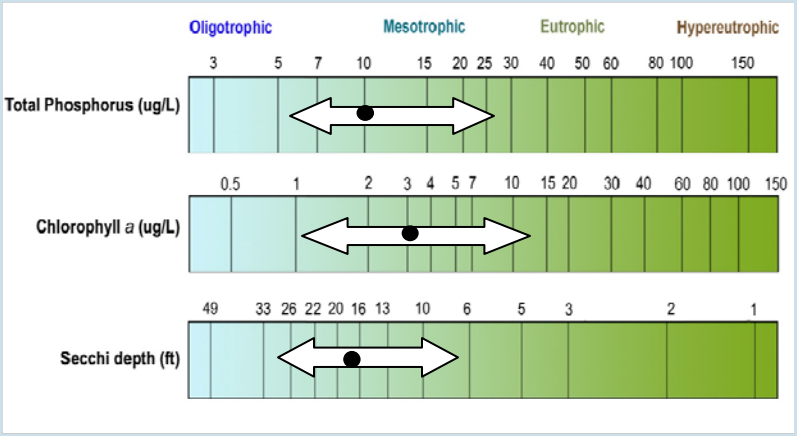
Vitals		Physical Characteristics	
MN Lake ID:	18-0320-00	Surface area (acres):	397
County:	Crow Wing	Littoral area (acres):	226
Lake Classification:	General Development (GD)	% Littoral area:	57%
Major Drainage Basin:	Upper Mississippi River	Max depth (ft):	45 (m): 13.7
Latitude/Longitude:	46.38888889 / -94.18722222	Mean depth (ft):	N/A
Water Body Type:	Public	Inlets / Outlets / Accesses	1 / 0 / 1
Invasive Species	None	Lakeshed : lake area ratio	10:1

Total Phosphorus

Gilbert Lake is phosphorus limited, which means that algae and aquatic plant growth is dependent upon available phosphorus. Total phosphorus was evaluated in Gilbert Lake from 1999-2011. The data indicate that phosphorus concentrations remain fairly consistent throughout the summer and fall within the oligotrophic 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 Gilbert Lake in 1999-2011. Chlorophyll *a* concentrations remained below 10 ug/L except for one sample day, indicating clear water most of the summer. The highest chlorophyll-a concentrations were in the spring and fall, which correlate with phosphorus concentrations and could be due to spring / fall turnover.



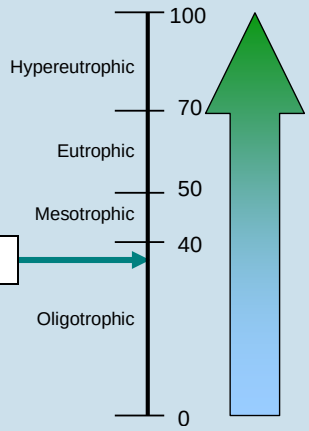
Gilbert Lake total phosphorus, chlorophyll *a* and transparency historical ranges. The arrow represents the range and the black dot represents the historical mean (Primary Site 203). Figure adapted after Moore and Thornton, [Ed.]. 1988. Lake and Reservoir Restoration Guidance Manual. (Doc. No. EPA 440/5-88-002)

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. Gilbert Lake transparency ranges from 9.2 to 20.8 feet on average throughout the summer, with lower readings at the shallower sampling point 204 in the SW part of the lake.

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 Gilbert Lake is in the oligotrophic range (< 40). The southern shallow basin falls in the mesotrophic range. Oligotrophic lakes (TSI 0-39) are characteristic of extremely clear water throughout the summer and sandy or rocky shores. Mesotrophic lakes are characterized by moderately clear water for most of the summer with some algal blooms in late summer.



Local association info: Gilbert Lake Association, http://gilbertlake.org