



## Crow Wing County Water Quality Factsheet Series



# Gilbert Lake

DNR ID: 18-0320

### Vitals

MN Lake ID:	18-0320-00
Zoning Authority:	Crow Wing County, City of Brainerd
Lake Classification:	General Development (GD)
Major Drainage Basin:	Upper Mississippi River
Latitude/Longitude:	46.38888889 / -94.18722222
Water Body Type:	Public
Invasive Species:	None

### Physical Characteristics

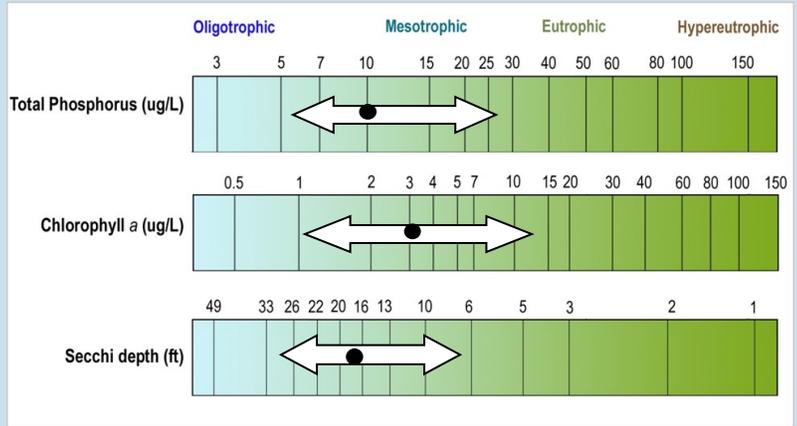
Surface area (acres):	397
Littoral area (acres):	226
% Littoral area:	57%
Max depth (ft):	45 (m): 13.7
Mean depth (ft):	N/A
Inlets / Outlets / Accesses:	1 / 0 / 1
Lakeshed to lake area ratio:	10:1

### 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. The water quality trend 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 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.

Gilbert L.

