Environmental Services
CROW WING COUNTY
BRAINERD, MINNESOTA 56401

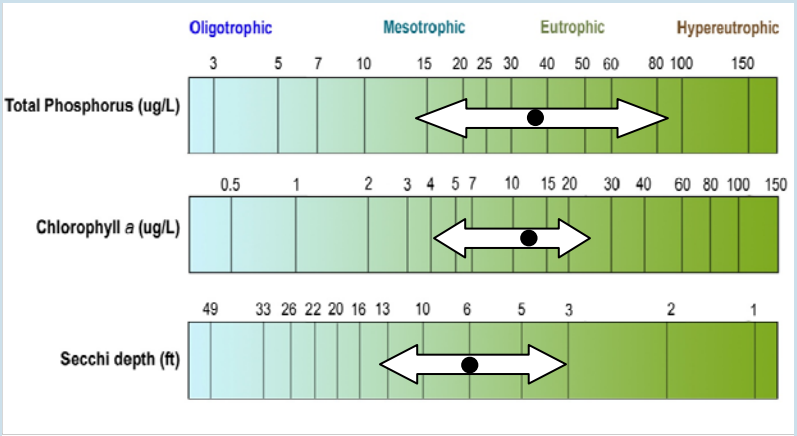
Crow Wing County Water Quality Factsheet Series

Lower South Long Lake DNR ID: 18-0136

Vitals		Physical Characteristics		
MN Lake ID:	18-0136-00	Surface area (acres):	1,295	
Zoning Authority:	Crow Wing County	Littoral area (acres):	461	
Lake Classification:	General Development (GD)	% Littoral area:	36%	
Major Watershed:	Mississippi River—Brainerd	Max depth (ft):	47	(m): 14.3
Latitude/Longitude:	46.29166667/-94.08361111	Lakeshed size (acres):	9,464	
Water Body Type:	Public	Lakeshed : lake area ratio	7.3:1	
Invasive Species	Curly-leaf pondweed	Inlets / Outlets / Accesses	7 / 1 / 1	

Total Phosphorus

Lower South Long Lake is phosphorus limited, which means that algae and aquatic plant growth is dependent upon available phosphorus. Total phosphorus was evaluated in Lower South Long Lake in 1979-1980 and 2003-2006. The phosphorus levels increase as the summer progresses. This pattern could be due to internal loading. The majority of the data points fall in the eutrophic range.



Lower South Long Lake total phosphorus, chlorophyll *a* and transparency historical ranges. The arrow represents the range and the black dot represents the historical mean (Primary Site 201). Figure adapted after Moore and Thornton, [Ed.]. 1988. Lake and Reservoir Restoration Guidance Manual. (Doc. No. EPA 440/5-88-002)

Chlorophyll *a*

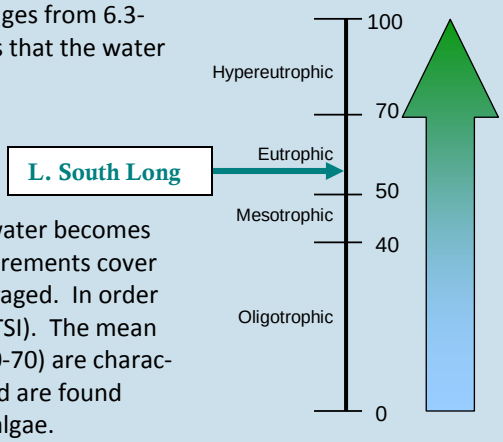
Chlorophyll a is the pigment that makes plants and algae green. Chlorophyll *a* is tested in lakes to determine the algae concentration or how "green" the water is. Chlorophyll a was evaluated in Lower South Long Lake at site 201 from 2003-2006. Chlorophyll a concentrations remained at or above 10 ug/L on over half of all sample dates, indicating a minor algae bloom. Three sampling events had result of 20 ug/L or higher and are classified as being nuisance algae blooms. The chlorophyll a increased throughout the summer, which is consistent with the phosphorus rising.

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 annual mean transparency for Lower South Long Lake ranges from 6.3-9.2 ft. Lower South Long Lake shows no evidence of water quality trends. That means that the water quality 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 (54) for Lower South Long Lake falls in the eutrophic range. Eutrophic lakes (TSI 50-70) are characterized by "green" water most of the summer. Eutrophic lakes are usually shallow, and are found where the soils are fertile. Eutrophic lakes usually have abundant aquatic plants and algae.



Local association info: Lower South Long Lake Improvement Association http://www.lowersouthlonglake.com