

Long Lake Water Quality 2009

For many decades Long Lake has been a major destination for Becker County visitors. Though a small lake (407 acres) relative to others which attract a large clientele, its elongated shape gives it a shoreline length that is exceeded in the District only by Big Detroit and Melissa; only Melissa has more residential structures along its shores.

Given the general trend towards more intensive development of shoreline lots, and several undeveloped tracts found along its shores, it is reasonable to expect further shoreline development pressures. More second tier development is likely, stimulated in part by annexation of much of the LWQMA into the City of Detroit Lakes.



Long is a deep lake, and much of its shoreline slopes steeply towards the lake. The natural shoreline has been greatly modified, and based upon District shoreline monitoring is continuing at a rapid pace.

With relatively intensive shoreline development, recreational pressure on the lake is very high. Boat traffic and noise issues have sometimes emerged as a problem.

Most of Long's water comes from underground sources, though there is some surface flow from the immediate basin area, and especially through wetlands to the north and northwest. Long Lake drains through a small outlet into Lake St. Clair.

Aside from some large wetland areas, the natural condition of most of the land in this LWQMA has been greatly altered. Gravel mining has been active in the area, and highways have influence drainage. Just under 9% of the land area is covered with impervious surfaces.

Goals for the Long Lake Water Quality Management Area are:

1. Advocate for stricter shoreline development standards.
2. Explore options for providing special incentives for improved shoreline BMPs
3. Investigate, mitigating where possible, surface and groundwater quality impacts from Highway 10, individual sewage treatment systems, the airport, spray irrigation and gravel operations within the area.



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The PRWD Monitoring Program

The PRWD monitoring program is focused on lakes and streams. Measurements on some District lakes are taken monthly during the growing season, others on a biweekly basis. Data collected on lakes include samples tested for phosphorus, ortho-phosphorus, chlorophyll-a and readings of clarity, pH, and conductivity. Temperature and dissolved oxygen observations are made at one-meter intervals from the surface to the lake's bottom.

Baseline data has been collected on District lakes since 1995. Starting in 2005 more lakes were sampled, but lakes for which water quality is well understood have been sampled less frequently. More volunteers have been recruited to assist in the District's monitoring, and there is coordination with Becker County COLA's monitoring efforts.

Few District lakes exhibit limitations for swimming or boating as defined by the Minnesota Pollution Control Agency, and only one, Lake St. Clair has been designated as "Impaired". Nevertheless, the District holds its lakes to higher standards. Lake specific goals call for water quality improvements, or at least protection on all lakes. Such goals are to be accomplished by implementing best-management practices, especially shoreline protection, stormwater runoff controls, or other means.

A routine component of the District's monitoring program involves surveys of shoreline conditions around district lakes. The object is to provide current data on shoreline, and to assist in the District's rule-enforcement efforts. Shoreline surveys are repeated for main district lakes on a 5-year schedule.

Stream observations and sampling also are conducted on a biweekly or monthly basis, depending on the season and the site. Protocols for storm-event sampling are also in place. Samples are analyzed for phosphorus and sediments. Gage readings provide important information on stream flow which determine patterns of nutrient and sediment inputs to lakes.

Results from nutrient and sediment samples are provided by RMB Environmental Laboratories. Together with other monitoring data, lake and stream conditions are described and summarized by PRWD staff. Trends are identified, as are any special problems on specific lakes or stream segments. Results of these data are reported to state and federal agencies. The District's website contains records of lake levels, water quality data and interpretations, ice-in and ice-out information, climate data, stream flows and loading, and others. See www.PRWD.org

Program Costs

The District's monitoring program derives from the need to understand and address water quality problems for lakes. About \$25,000 is expended each year for staff and student intern wages, chemical analysis, equipment and transportation costs

Describing and Summarizing Water Quality

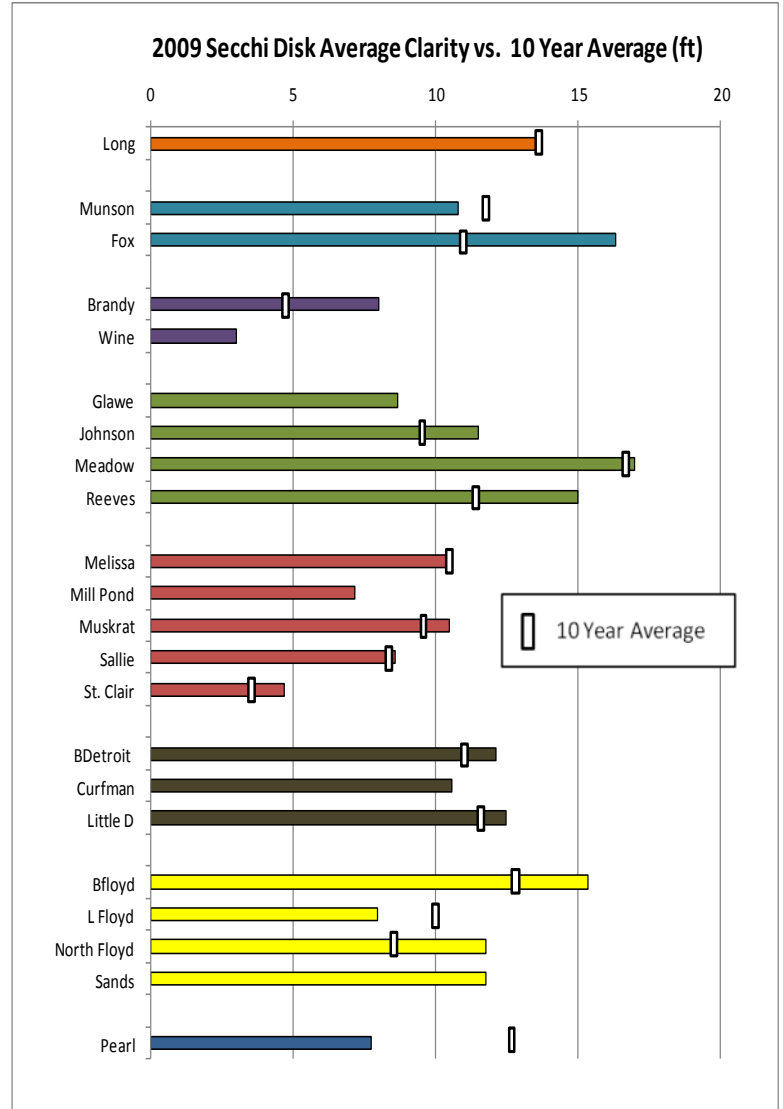
In 2009 the District made slight modifications in its approach to summarizing water quality data for lakes. Previously the three main indicators, clarity, total phosphorus and chlorophyll-a results were indexed in order to characterize a lake's water quality, and to facilitate trend analysis and comparisons among lakes. The so-called Trophic Status Index (TSI) assumes that there is a high degree of correlation among the three indicator variables, and it is common to use the resultant scaled variables interchangeably or to average them. However, District data shows that the three variables are not always closely related, and that averaging the three disguises some important differences. Henceforth in characterizing lake water quality, the District will look at the variables independently. The District's monitoring program derives from the need to understand and address water quality problems for lakes. About \$25,000 is expended each year for staff and student intern wages, chemical analysis, equipment and transportation costs.

2009 Water Quality Overview

2009 - Lake Water Quality

2009 was an outstanding water quality year — nearly all lakes with a substantial monitoring history showed near- or better-than record conditions. This is the second year in a row that results have been very good. Once again weather conditions are believed to have helped. The spring ice-out date April 23rd, came a few days later than the long-term average, and summer high temperatures were noticeably below the long-term average. Both of these are conditions which help to curtail nuisance algae blooms.

Adding to the favorable conditions, the incidence of runoff events capable of carrying large amounts of nutrients to the lakes were somewhat below average and most of those occurred outside the growing season. The graph indicates that all but three lakes (Pearl, Munson and Little Floyd) exhibited better-than-average clarity. Phosphorus and chlorophyll-a measures generally showed similar better-than-average patterns.



PRWD 2009 Lake and Stream Sampling			
Lakes Sampled	22		
Streams Sampled	17		
Shoreline Surveys	Pearl, Munson, Big Floyd, North Floyd and Little Floyd.		
Lake Secchi Readings	216		
Parameter	Lake	Stream	Total
Total Phosphorus	147	134	281
Ortho Phosphorus	114		114
Chlorophyll A	114		114
Suspended Solids		29	29
Gage Readings		341	341

Thanks to 2009 Monitoring Volunteers

- Curfman:** Ed Welke
- Big Floyd:** Mark Geihl, Les Froiland
- North Floyd:** Mark Geihl, James McGough
- Little Floyd:** Arnold Hilde,
- Big/Little Detroit:** Dick Hecock
- Fox:** Sue Portilla
- Long:** Curt Noyes, Shirley Fihn
- Pearl:** Ryan Kalberer
- Melissa:** Clayton Jenson
- Sallie:** John McLaughlin

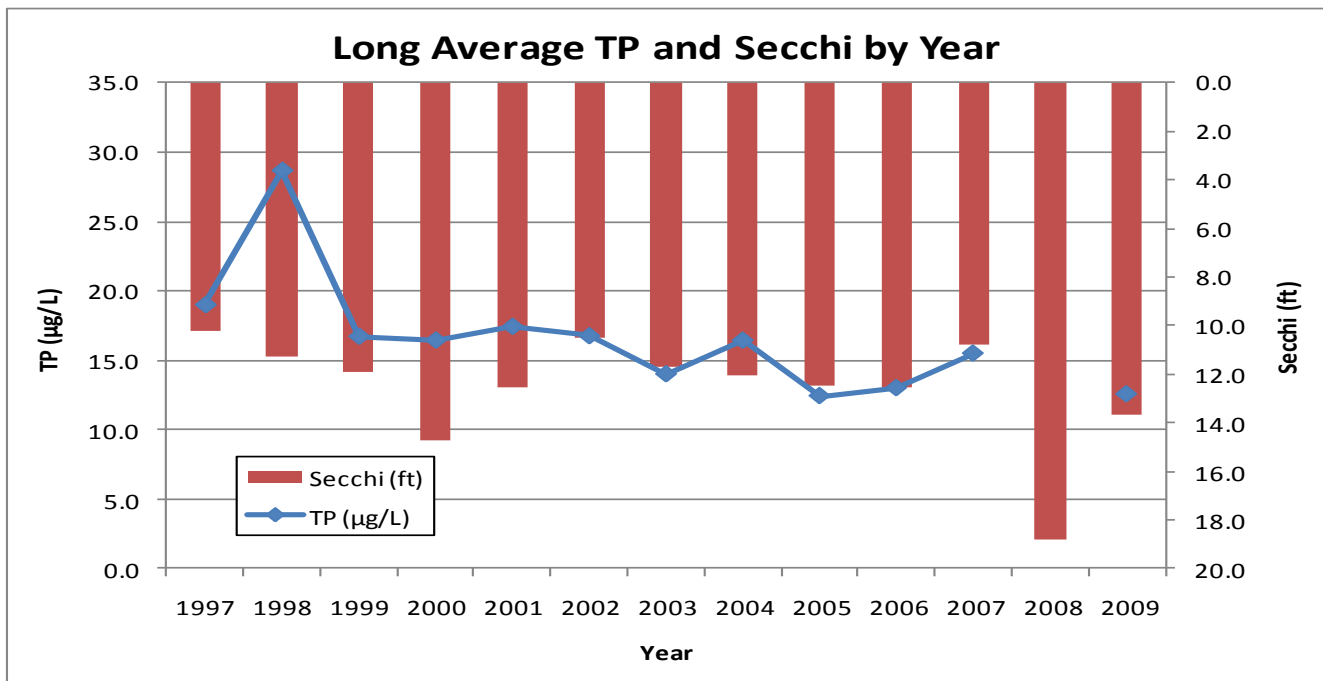
Long Lake Water Quality 2009

The water quality in Long Lake is very good. Residents have complained of shoreline erosion and other water quality issues resulting from boat traffic, but a District study could detect no impact of boating on turbidity or phosphorus levels.

It seems reasonable to conclude that whatever water quality risks face Long Lake, the most important causes are associated with current and future intensive shoreline and second-tier development. Near-shore activities, including increased imperviousness, drainage alterations, and the removal of native shoreline vegetation tend to promote nutrient runoff.

In 2009 the City began bringing its sewer system to residents around Long Lake. It is planned that all Long Lake residents will be served by City sewer and water facilities.

Due to the fact that Long lake water quality is very good, investigations into other nutrient sources have not taken place. The District will continue to be vigilant for changes within the watershed that might lead to potential impacts on the water quality of the lake in order to maintain current conditions.



Water Quality Trends:

Long has a good data base for estimating water quality. Over the years there have been some pronounced episodes of poor conditions. However, the overall picture is that there is little evidence to suggest much long-term change in Long water quality conditions.

The phosphorus levels in Long Lake are encouraging. Overall in the past 12 years they have remained quite low relative the MPCA impairment standard of 40µg/L, and the regional average for similar types of lakes. There even be a small decrease in phosphorus over this time.

Long Lake generally exhibits good clarity throughout the year. Long-term seasonal clarity averages almost 14 feet, which exceeds most lakes within the District. Twice in the last ten years (2000 and 2008), clarity has been better than in any of the previous 25 years of record.