

Long Lake—Bradford Township

Monitoring Report 2019

What: Volunteers collected Total Phosphorus (TP), chlorophyll-a, and transparency information every month from May through September at the deepest part of the lake (see map). SWCD staff provided training, equipment and coordinated lab testing.

Why: The data is important because it provides us with an understanding of the lake's health and water quality trends; assists with targeting and placement of projects that will improve lake health (i.e. lakeshore restorations, rain gardens, wetland restorations, etc...), and helps track effectiveness of those projects.

Since the onset of regular lake monitoring in 2007, Long Lake water has not met state water health goals.

Lake Data for Long Lake—Bradford Township	
Township	Bradford
MN Lake ID	30-0072-00
# of Public Boat Access	2
Aquatic Invasive Species	Curly Leaf Pondweed Eurasian Water Milfoil
Surface Area	362 acres
Maximum Depth	11ft
Does the lake meet Clean Water Goals?	Total Phosphorus: No
	Chlorophyll-a: No
	Secchi Transparency: No



Monitoring Location

	GRADE
2007	D
2008	D
2009	D
2010	D
2011	D
2012	D
2013	D
2014	D
2015	D
2016	D
2017	D
2018	D
2019	D

Grades are based on the Met Council lake grading system which creates an easy to understand way to communicate lake health.

Total Phosphorus (TP): An essential plant nutrient in which an excess can cause severe algae blooms.

Chlorophyll-a (Chl-a): A pigment found in green plants, used to estimate quantity of algae in a lake.

Secchi Transparency: A measure of light penetration in water, an indication to the amount of algae in the water.

Nutrients in the lake come from: 1) **Upland**— this includes nutrients that enter the lake from rainfall that runs off of properties close the lake and its inlets. This includes both residential and cropland areas as well as degraded wetlands and; 2) **Internal**— this is nutrients being recycled form within the lake itself. Internal loading happens when nutrients sitting on the lake bottom are mixed into the water column due to wind, boat propeller activity, and rough fish. Note: soils around and within this lake are naturally high in phosphorus.

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Thanks to the LLID members who have assisted with lake and stream monitoring, especially Don Hansen!

Long Lake Monitoring Results 2019

MN Clean Water Goals for Shallow Lakes

Total Phosphorus (TP): $\leq 60 \mu\text{g/L}$

Chlorophyll-a: $\leq 20 \text{ mg/L}$

Secchi Depth: $\geq 3.28 \text{ feet}$

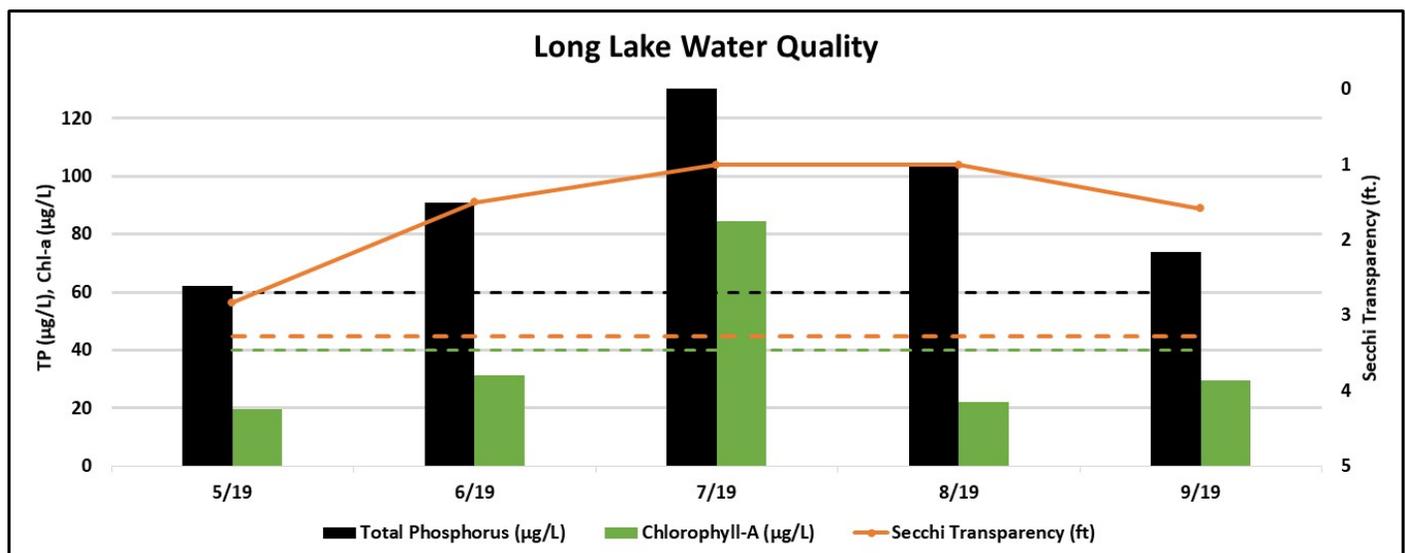
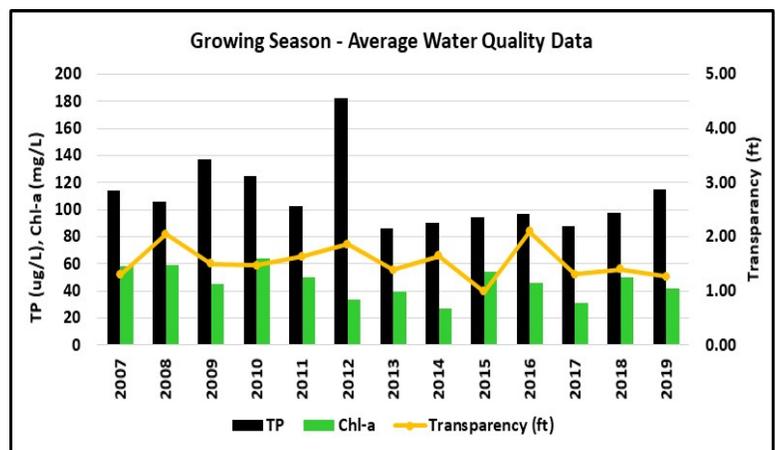
Growing season average (June-September)	114.5 $\mu\text{g/L}$	41.85 mg/L	1.27 ft
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Data Summary:

- Based on data collected over the last 13 years, TP and chl-a have a slight declining trend– this is good.
- The physical appearance of the lake was rated as “medium” to “low algae” all summer with the exception of July when it was rated as having “high algae”.
- The recreational suitability of the lake was rated as “good” to “fair” all summer with the exception of July when it was rated as “poor”.
- Similar to previous years, nutrients were highest mid-summer. This is typical in shallow lakes and is due to high winds mixing warm water all the way down to the lakes bottom.
- The LLID/LLIA Lakeshore restoration program plays a critical role in reducing the amount of nutrients entering the lake from the land. The program should be paired with the implementation of projects identified in the Subwatershed Assessment (SWA) the SWCD recently completed.

2020 MONITORING OPTIONS

- Option 1:** monitor as usual. Consider adding monthly dissolved oxygen and temperature profiles. \$1,680 w/profiles; \$1,050 w/out.
- Option 2:** No monitoring. 13 years of data has been collected, consider monitoring every other year.



Long Lake Tributary Monitoring 2019

What: In 2019 nine sampling events were targeted at two inlets: German Lake and Englund Ditch. We targeted five samples after rain events and four during base flow. Samples were lab-tested for total phosphorus (TP), ortho-phosphorus and total suspended solids (TSS). Water temperature, pH, transparency, stream condition and stream depth were recorded in the field. In addition to water quality, water levels were continually tracked using in-stream data loggers.

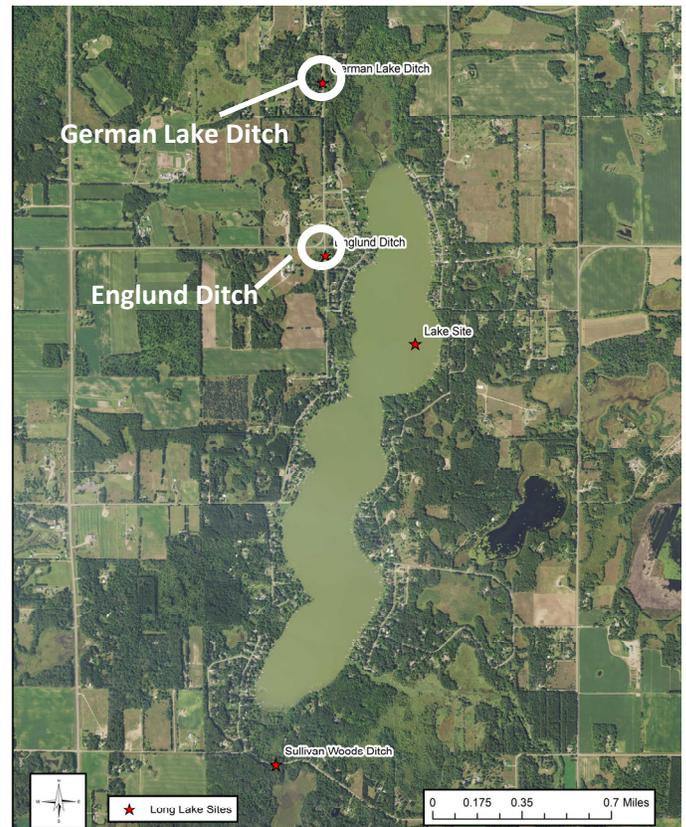
Why: The information collected helps us focus future lake water quality improvement projects at the best places on the landscape. In other words, near the streams that deliver the most nutrients to the lake. Additionally, this information will be used to track trends and to determine how well water quality improvement projects are working.

2019 Rainfall

2019 was a wet year; 7.4 more inches of rain fell over the growing season (May-September) than in 2018.

Flood forecasting data for the Rum River, compiled by the National Weather Service, indicated that high water levels were sustained throughout the season. According to data from the US Geological Survey, which operates the Rum River level gauge in Anoka County, over the last 86 years the median daily river flow only exceeded 1,000 cubic feet per second for a month in the spring. By comparison, in 2019 the river flows were above that level for six of eight open water months. While the data is compiled specifically for the Rum River, it is representative of conditions in the area.

Water level graphs for the Rum River, and flood forecasts, are available on the National Weather Service website at: <https://water.weather.gov/ahps>. Forecasts are only done when water is anticipated to approach critical levels.



Definitions:

Total Phosphorus: An essential plant nutrient in which an excess can cause severe algal blooms.

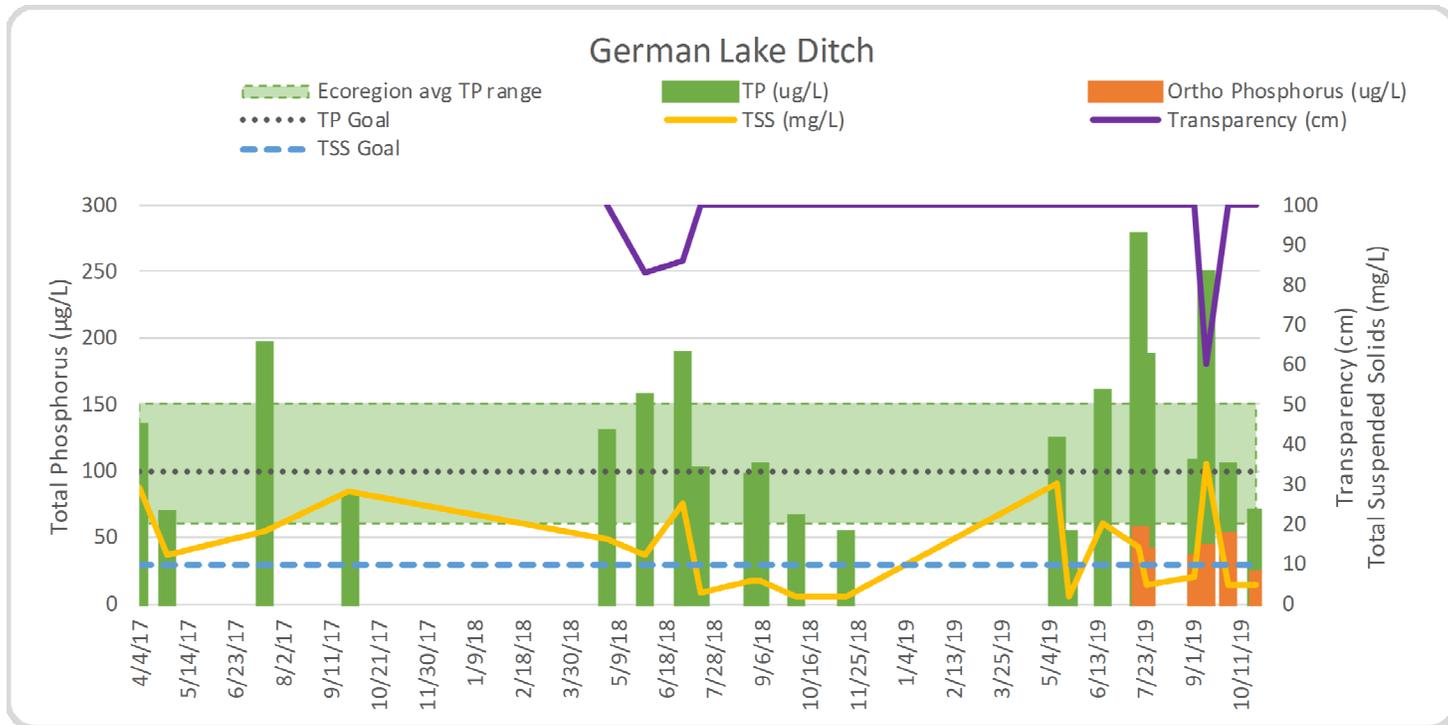
Orthophosphate: The amount of phosphorus that is immediately available for algae and plant growth.

Total Suspended Solids: Tiny particles of soil and other matter that remain suspended in water making it cloudy. Particles include sediment and organic matter.

Transparency: An indirect measure of suspended and dissolved materials (soil particles and tea color caused by organic materials) in the water.

2019 Tributary Monitoring Results

Total Suspended Solids, Total Phosphorus and Transparency Tube



- Based on data collected over the last three years, the water flowing into Long Lake is somewhat unhealthy here.
- 2019 average TP was 144 µg/L. The average TP range from 2016-2018 was 71-116 µg/L.
- 2019 average TSS was 14 mg/L. The average TSS range from 2017-2018 was 9-22 mg/L.
- 2019 average transparency was 96 cm. The average transparency range from 2017-2018 was 90-96 cm.
- Based on measured flow and TP concentrations, German Lake Ditch contributes the most TP to Long Lake.
- No monitoring is recommended in 2020. Consider monitoring bi-annually or after projects have been installed to track effectiveness.

Water Quality Management Focus— Priority Area 1

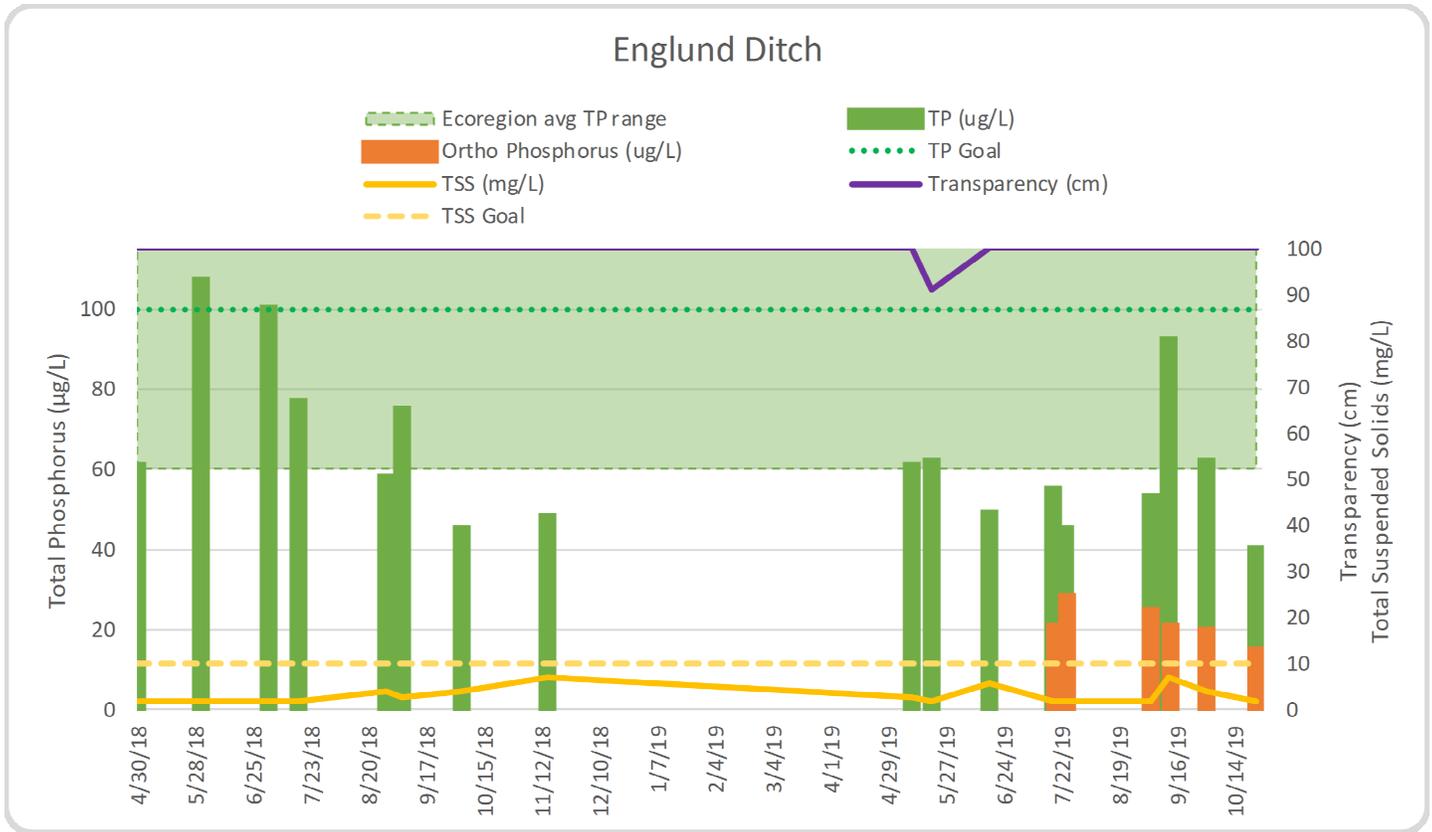
Land use in this drainage area is dominated by ditched wetlands that are surrounded by agriculture (corn-soybean-hay rotations).

Efforts should be focused on water quality restoration (follow rural subwatershed assessment recommendations)

- Wetland Restorations
- Cover Crops
- Buffers
- Perennial crops

2019 Tributary Monitoring Results

Total Suspended Solids, Total Phosphorus and Transparency Tube



- Based on data collected over the last two years, the health of this inlet is good.
- 2019 average TP was 57 µg/L. The average TP in 2018 was 70 µg/L.
- 2019 average TSS was 3.3 mg/L. The average TSS in 2018 was also 3.3 mg/L.
- 2019 average transparency was 99 cm. The average transparency in 2018 and 2017 was 100cm and 74 cm, respectively.
- Based on measured flow and TP concentrations, Englund ditch contributes the least TP to Long Lake.
- No monitoring is recommended in 2020. Consider monitoring bi-annually or after projects have been installed to track effectiveness.

Water Quality Management Focus— Priority Area 2

Land use in this drainage area is dominated by agriculture; however, most of the area is currently in the Conservation Reserve Program (CRP). A small portion is currently in a corn and soybean rotation.

Efforts should be focused on water quality protection.

- Enhance buffers
- Perennial crops
- Cover crops