

Lake Francis Tributary Monitoring 2018



Sept 5, 2018—Upstream of Inlet



2018 was the second year the Lake Francis Improvement Association partnered with the Isanti Soil and Water Conservation District (SWCD) to monitor the health of the North West Inlet that empties into Lake Francis.

This report describes the results of monitoring that occurred in 2018 as well as comparisons to previous years.

General Definitions:

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

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.

Lake Francis

Tributary Monitoring 2018



Nov 15, 2018—Upstream of Inlet

2018 Rainfall

The area was largely missed by heavy rains throughout the year. The majority of rain events occurred during the growing season (vegetation was growing and available to take up water) and nearly all events were under two inches. As a result, less sediment and phosphorus made its way into surface waters and water levels and flow were lower than usual across the county. Consistent (though still small) rain events and cooler than average temperatures in the fall led to a slight rebound in stream levels late in the season.

Water Health Comparisons:

- TP measurements for this ecoregion typically range between 60 and 150 $\mu\text{g/L}$.
- The State goal or standard for TP in streams is 100 $\mu\text{g/L}$ (i.e. we would like to see TP stay below this number).
- TSS measurements for this area typically range between 4.8 and 16 mg/L . We would like to see TSS stay below 30 mg/L .

Tributary Monitoring

What: In 2018 eight sampling events were conducted at the northwest (NW) inlet targeting four samples during rain events and four during base flow. The NW Inlet runs from west to east and is the only inflow to the lake. Its land draining to the inlet is nearly 6,500 acres and is dominated by agricultural land use; however, the inlet itself is bordered by a complex of wetlands.

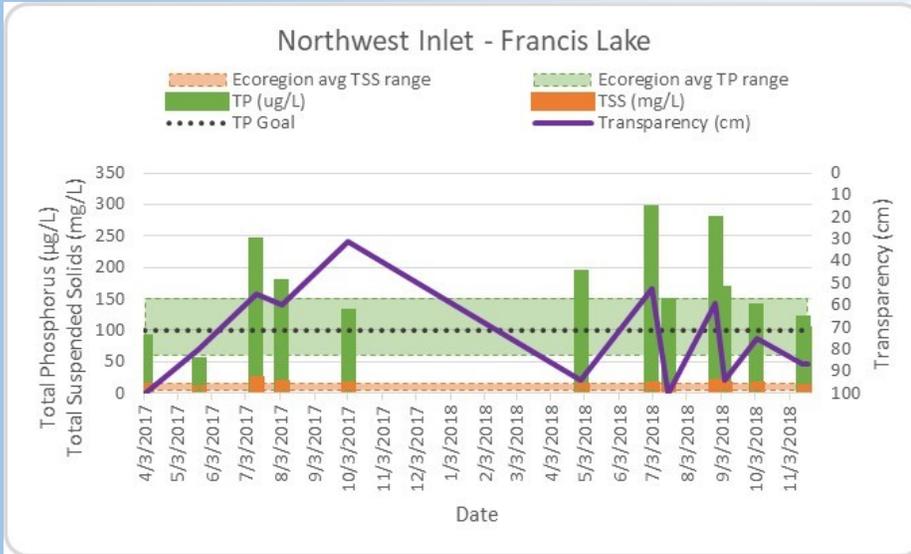
The samples were lab-tested for total phosphorus (TP) and total suspended solids (TSS). Water transparency, Dissolved oxygen, temperature, conductivity, pH and water flow were measured in the field.

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 can be used to track trends and to determine how well water quality improvement projects are working.

2018 Tributary Monitoring Results

Total Suspended Solids, Total Phosphorus and Transparency Tube

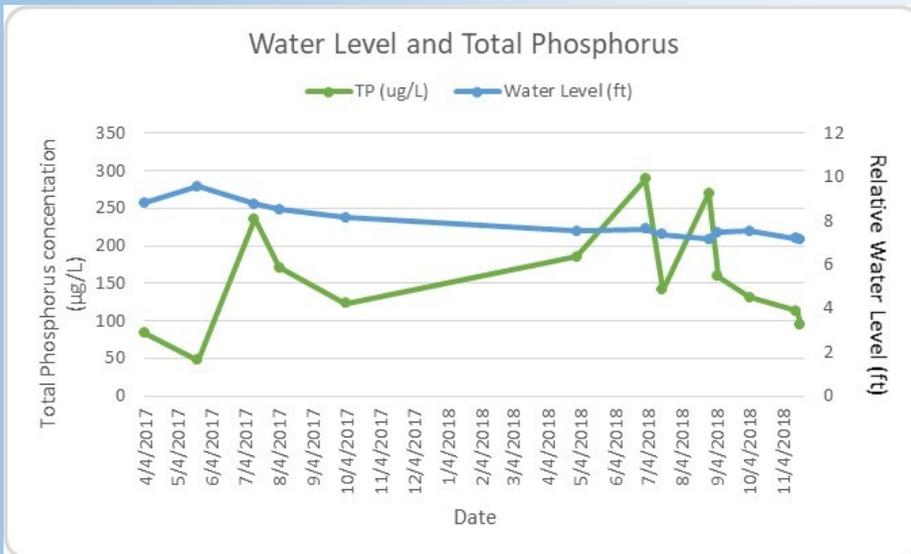
Northwest Inlet



- In 2017 the average TP was 132 µg/L. In 2018 the average TP was 173 µg/L.

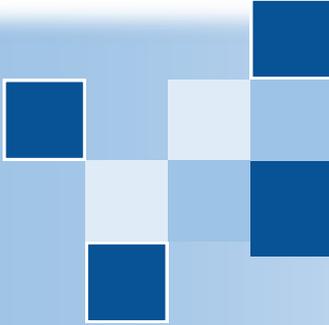
- While TP concentrations were higher in 2018, water levels and flow were lower. As a result, the overall impact of the inlet on the lake was less in 2018. These results are most likely due to a combination of the aforementioned annual rainfall characteristics and the upstream beaver dam.

- In 2017 the average TSS was 8.0 mg/L. In 2018 the average TSS was 6.1 mg/L. Both years TSS were low compared to the MN river standard (maximum) which is 30mg/L.



- In 2017 transparency averaged 65.2 cm. In 2018 transparency average 81.1 cm. Water clarity varied more from sample to sample in 2018—reasons are unclear but may have to do with the natural tannins discharged from the upstream wetland.

- Sampling data suggests the inlet does have a negative impact on lake health; however, the impact varies from year to year.



2018 Results and Recommendations

Summary:

While it is difficult to draw definite conclusions from only two years of data, it is clear that the health of the inlet does have the potential to impact lake health. Opportunities to improve inlet health may include: land management projects such as filter strips, cover crops and buffers and/or a wetland restoration (similar to the beaver dam). The SWCD is currently working on a wetland restoration at an inlet on Blue Lake; we will use the restoration as a demonstration project before initiating additional wetland restorations.

It is important to note that cleaning the inlet water in itself is not the only path to improved lake health. Past research completed by the Minnesota Pollution Control Agency (MCPA) indicated that lake health is impacted by a combination of things including: 1) inflow from the ditched inlet; 2) phosphorus recycled from the lake bottom (Internal loading); 3) groundwater (includes septic systems); and 4) to a lesser extent lakeshore runoff. NOTE: Improved lake health would lead to an increase in aquatic plants.

Lake Management Considerations:

- Discuss what Francis Lake would look like in a “perfect world”. Would it have clear water? Would it have aquatic plants? Would it have no aquatic plants? Your answers will help guide management efforts.
- Identify contributing land and identify project locations in NW Inlet watershed. (future)
- Discuss whether or not addressing failing septic systems is favored. There is a grant program to help identify failing systems.
- Focus on managing aquatic invasive species (curlyleaf pondweed).

Past Lake Management Considerations Discussed:

- There was a discussion in 2017 about the feasibility of a lake drawdown to reduce nutrients and improve aquatic plant health– there seemed to be a minimal amount of support for investigating the feasibility of this option.

2019 Monitoring

- No inlet monitoring in 2019: While more data is always helpful, funds to do it are limited. At this point we have enough information to verify that the inlet does contribute to lake health.
- Initiate in-lake water quality monitoring per plans.

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