2022 Summary Report

Goals of In-House Stream Monitoring:

1. *Increase the number of sites sampled*
2. *Increase the number of times sampled*
3. *Engage with more volunteers through this citizen science project*
4. *Monitor for trends in water quality and be more reactive to changes*
5. *Collect data and present annually in an easy-to-read format*
6. *Reduce the amount of money spent on water sampling but still track what is happening*

- 6 sites were selected based on historical testing sites (map attached). Site #1 was abandoned due to no flow – even after heavy rain events.
    - Site #1 – North Tributary – NO DATA
    - Site #2 – Rowing Center (Wilson) - ***Volunteer: Madeleine Slykas***
    - Site #3 – 18B (Maxinkuckee Landing) - ***Volunteer: Madeleine Slykas***
    - Site #4 - Country Club Golf Course (Curtis**) - *Volunteer: Gene Tardy***
    - Site #5 – Kline Levee **- *Volunteers: Scott Holaday and Ginny Hahn***
    - Site #6 – South Shore Tributary - ***Volunteer: Karl Swedlund***

  Recruited new volunteer in November – Ed Brown, replacing Rebecca Sam (moved away) at Site #2

- Each site is monitored for (data collection sheet attached):
    - Air Temperature (F)
    - Water Temperature (C)
    - pH
    - Conductivity
    - Phosphorous
    - Dissolved Oxygen
    - Nitrate
    - E.coli – in 2022 we concentrated efforts at 18B

- Volunteers were assigned a site and responsible for that site all season. They collected samples according to their schedules; therefore, sampling dates are different. The goal was to collect samples 2x/month May – September and 1x per month October – April.

- Program began in June 2021, so this is the first full year of data.

- "0" entry means the value was zero, no entry means no data collected

We are primarily interested in nitrate, phosphate and e. coli data as those inputs can be controlled/minimized by land use practices upstream in the watershed. I have only included the charts for nitrate and phosphate in this report. pH and Dissolved Oxygen readings were within acceptable ranges at all sites. Temperature and Conductivity data are recorded.

***In talking with John Richardson at Cardno, he recommended that we also begin recording Total Suspended Solids. This would tell us what kind of sediment loading is happening. I will look into what equipment is needed for that and whether or not it is feasible.**

Too much nitrogen and phosphorus in the water causes algae to grow faster than ecosystems can handle. Significant increases in algae harm water quality, food resources and habitats, and decrease the oxygen that fish and other aquatic life need to survive. Large growths of algae (algal blooms) can severely reduce or eliminate oxygen in the water at night, leading to sick and dead fish. Some algal blooms are harmful to humans because they produce elevated toxins and bacterial growth that can make people sick and can be fatal to dogs if they come in contact with the polluted water.

The primary sources of excess nitrogen and phosphorus are:
Sources and Solutions | US EPA

- **Agriculture:** The nitrogen and phosphorus in animal manure and chemical fertilizers are necessary to grow crops. However, when these nutrients are not fully utilized by plants, they can be lost from the farm fields and negatively impact air and downstream water quality.
- **Stormwater**: When precipitation falls on our cities and towns it runs across hard surfaces – such as rooftops, sidewalks and roads - and carries pollutants, including nitrogen and phosphorus, into local waterways.
- **Wastewater:** Our sewer and septic systems are responsible for treating large quantities of waste, and these systems do not always operate properly or remove enough nitrogen and phosphorus before discharging into waterways.
- **Fossil Fuels:** Electric power generation, industry, transportation, and agriculture have increased the amount of nitrogen in the air through use of fossil fuels.
- **In and Around the Home**: Fertilizers, yard and pet waste and certain soaps and detergents contain nitrogen and phosphorus and can contribute to nutrient pollution if not properly used or disposed. The extent of hard surfaces and type of landscaping can also increase the runoff of nitrogen and phosphorus during wet weather.

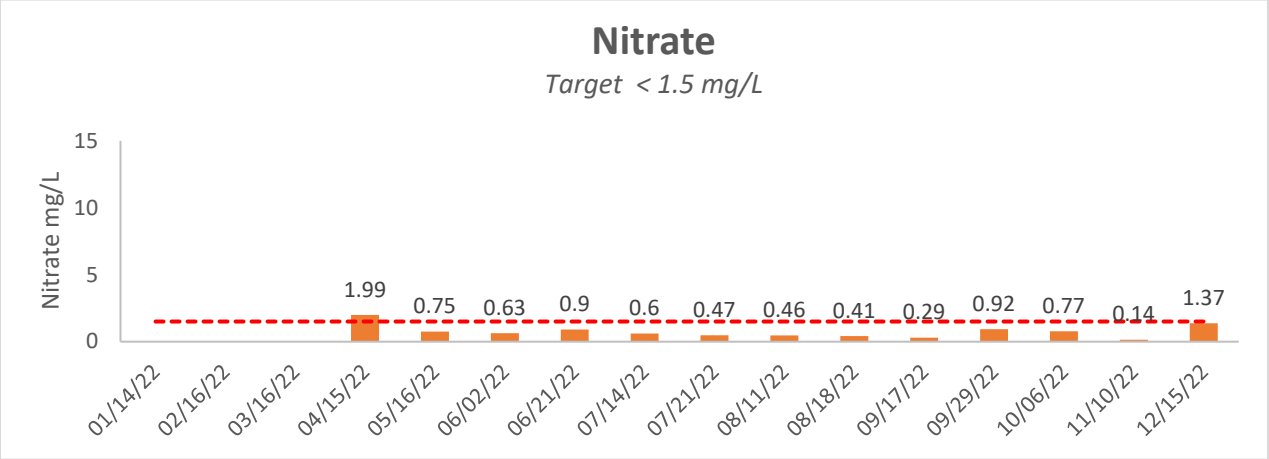
Keep in mind, this is data collected by volunteers using good equipment, but not certified lab quality. We are monitoring. The real value will come when we have multiple years' worth of data and can begin to see trends.

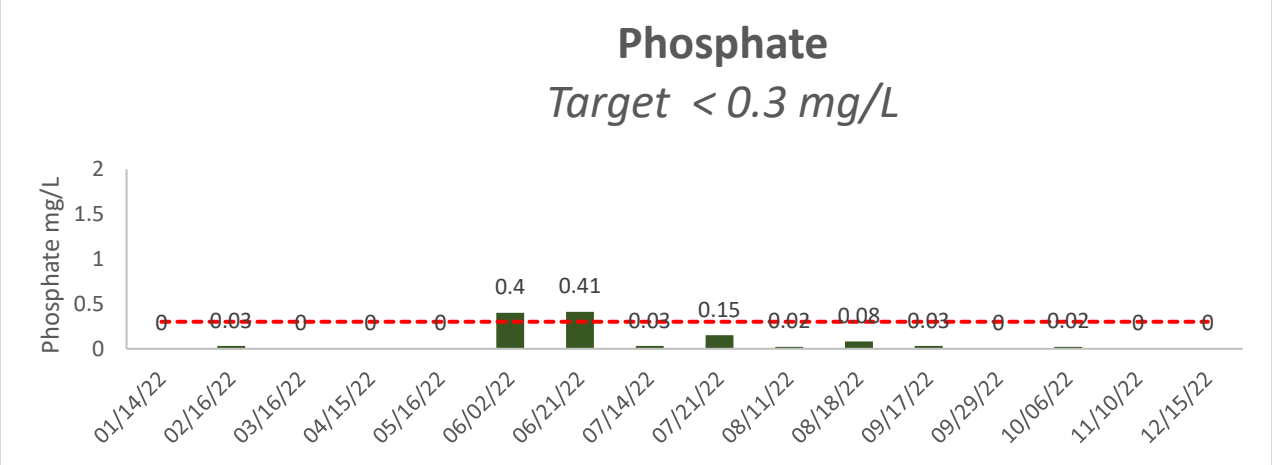
This data has been shared with Cardno for the Hot Spots study and supports the scientific data from the Sweeten Study at the Kline Wetland.

All sites show elevated nitrate in the fall. This is to be expected as vegetation dies and discontinues the uptake of nitrogen, therefore more is lost in runoff. There are also some agricultural practices that may contribute to this.

There was a learning curve to equipment maintenance. Sensors on the probes are only good for about 12 months – I was unaware of that. And some user error caused some damage.

Site #2 – Rowing Center (Wilson Wetland upstream)



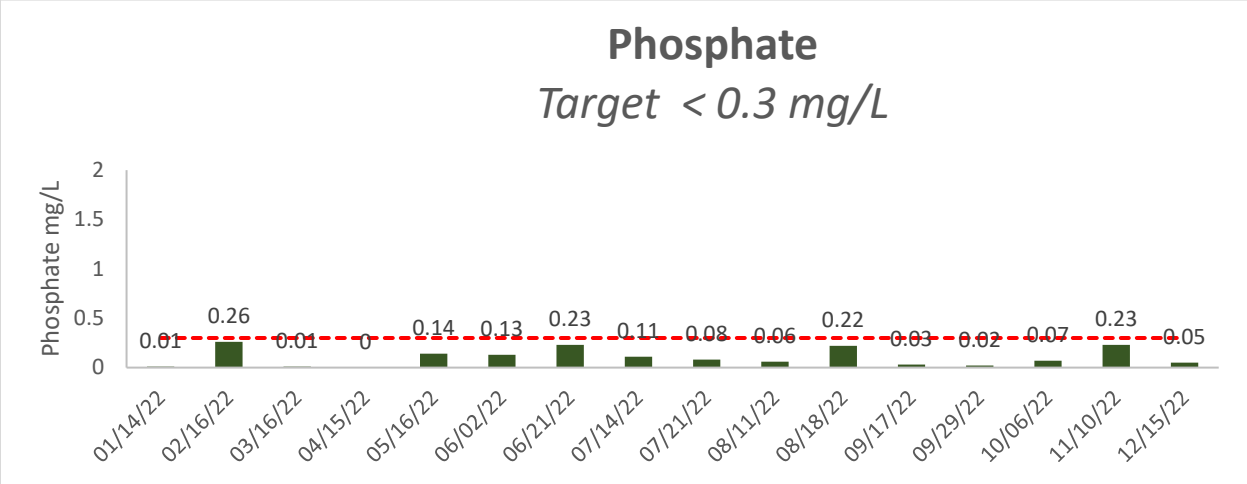


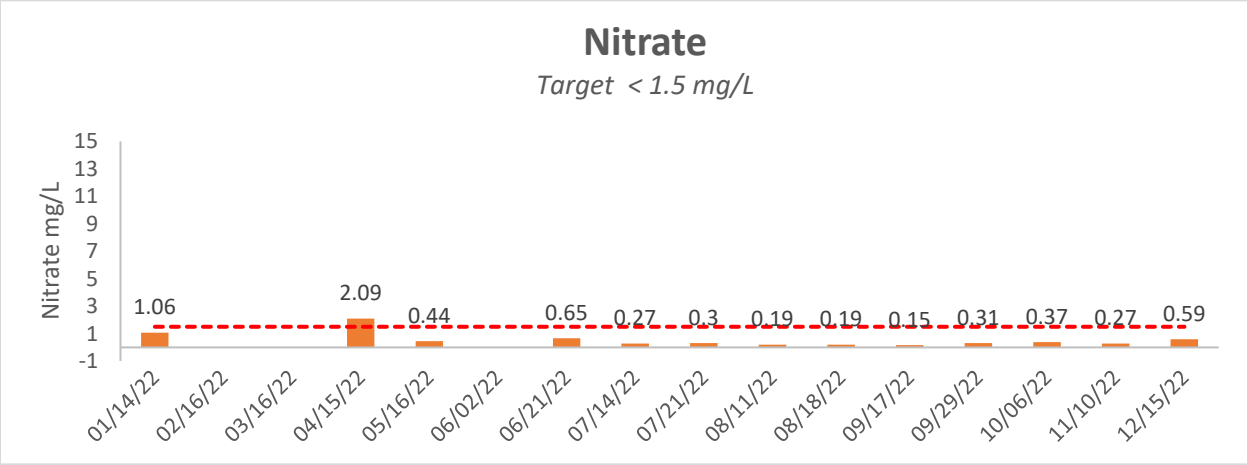
Conclusion: 2022 numbers would not indicate that there is a problem at this site. However, the Hot Spots study revealed significant erosion upstream, there is beaver activity at the Wilson Wetland that needs to be addressed, and this area was closed by Culver Academies in the summer due to elevated E. coli levels.

A discussion with the facilities manager at Culver Academies included the sedimentation at the mouth of this tributary causing issues with launching the Ledbetter.

Definitely an area of concern.

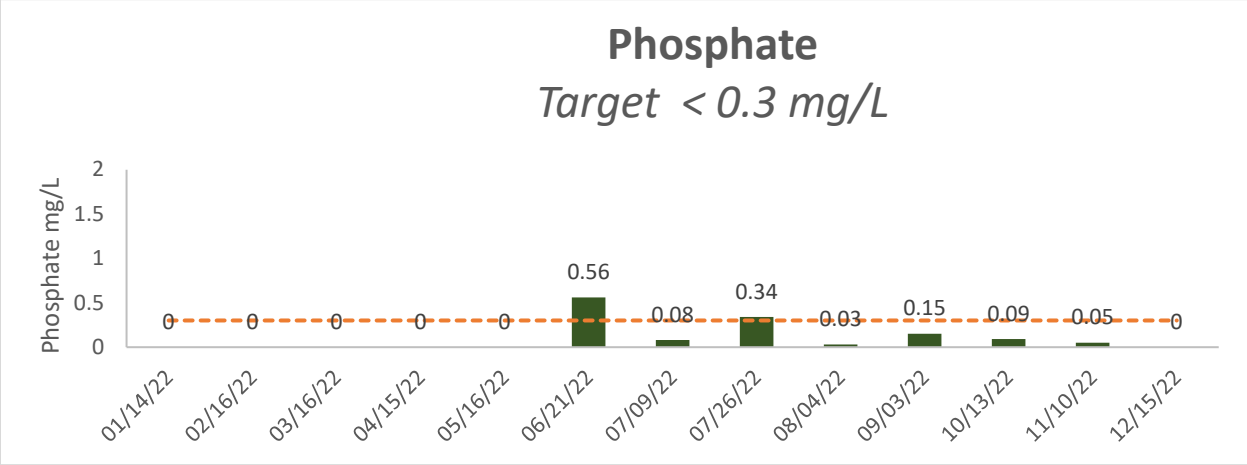
Site #3 – 18B (Maxinkuckee Landing)

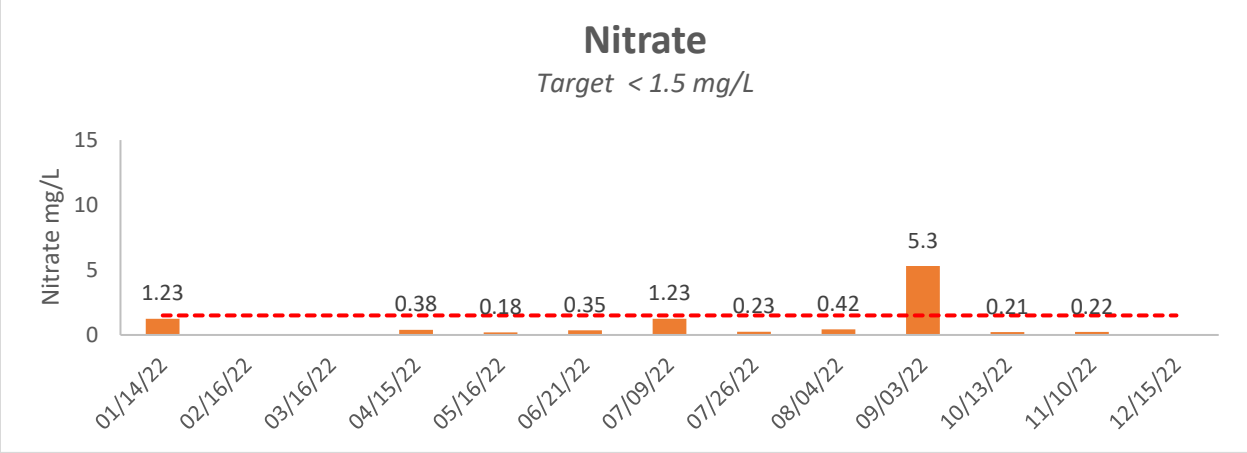




Conclusion: Elevated E. coli readings have been an ongoing concern for several years. As previously discussed, two houses along 18B were connected to the sewer district in summer 2022. Subsequent water samples indicate the issue has been resolved. I will continue to monitor E. coli in 2023 for verification. Phosphate and Nitrate readings at this site indicate good land use practices upstream.

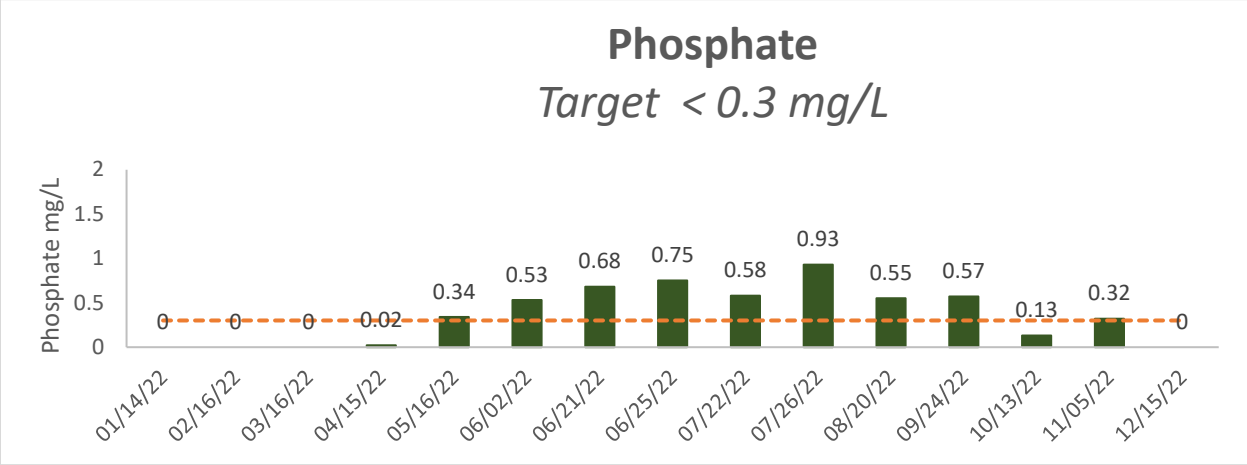
Site #4 – Country Club (Curtis Wetland upstream)

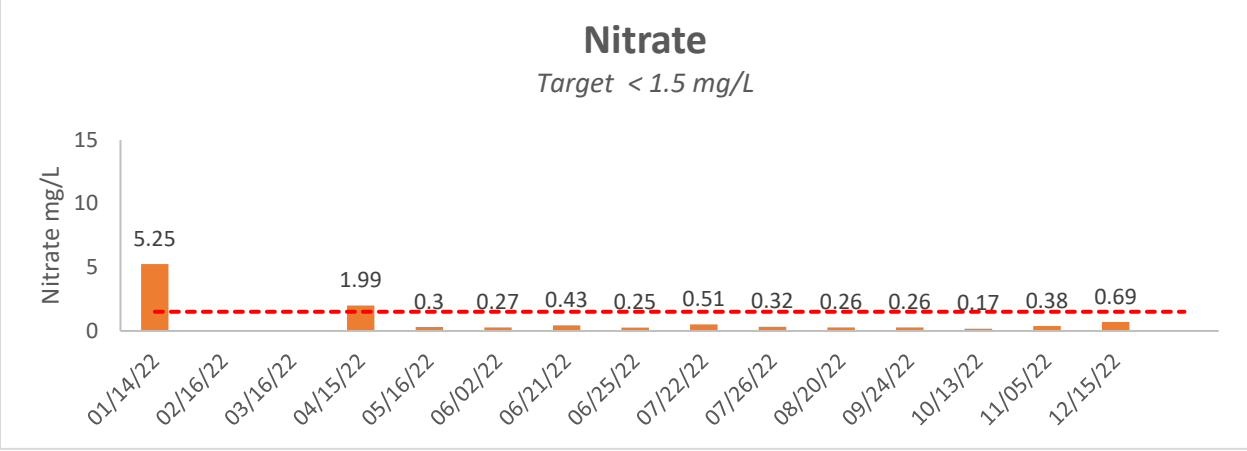




Conclusion: This data indicates that the Curtis wetland is doing it's job and the Country Club is not adding to the pollutant load between the wetland and the lake. The Hot Spots will support this conclusion. I would classify this as a low priority stream for upstream mitigation projects.

Site #5 – Kline

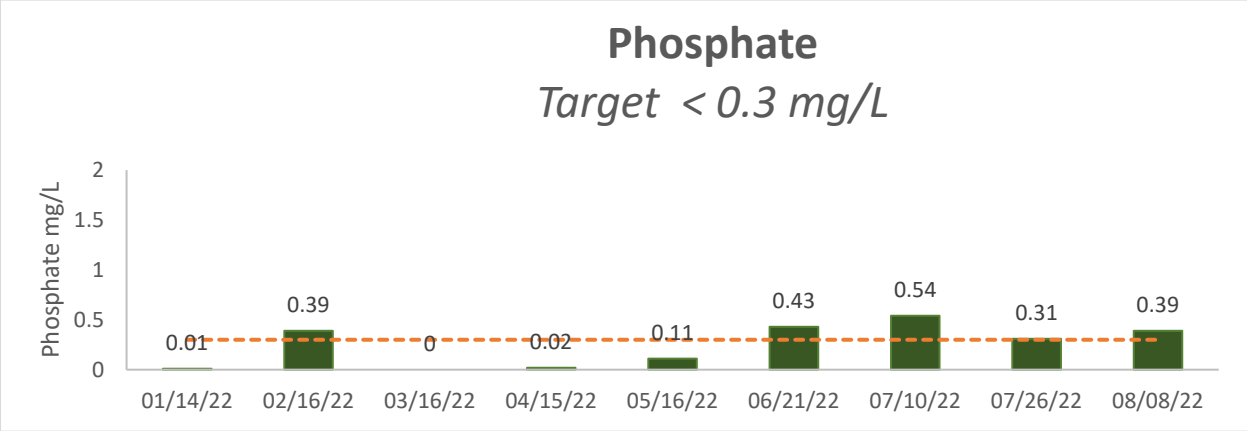


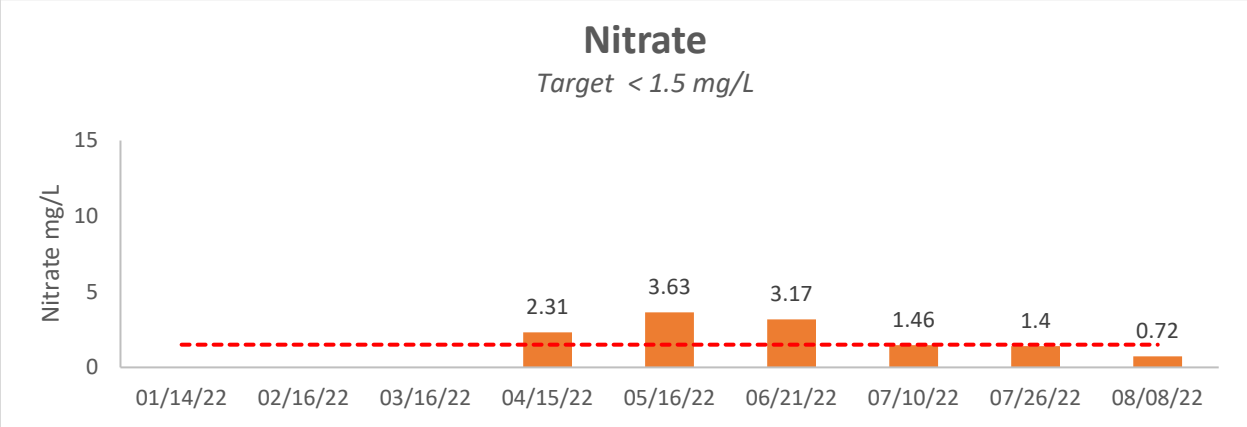


Conclusion: This data indicates that the Kline wetland is doing it's job as far at Nitrates are concerned, but is not capturing Phosphorous. Sweeten's study, which is much more detailed, supports this information.

This is a good example of our monitoring identifying potential issue, then consulting with the experts for more detailed analysis.

Site #6 – South Shore





Conclusion: This data looks scary with the elevated numbers, but it is a minor stream, sometimes with no flow at all. For that reason, I would classify this stream as low priority, even with the elevated nutrient inputs. There may be opportunities for upstream projects, however the impact to the lake would probably be relatively low.

There are some potential upstream projects that will be implemented by a private landowner (still in the discussion phase). It will be interesting to monitor this stream to see if those projects benefit the water quality in this stream. Great example of why data collection is important.


Tributary Testing Sites
Write a description for your map.
Site #2 - Academy Rowing
Site #1 - Academy
Site #3 - 18 B
Site #4 - Golf Course
Lake Maxinkuckee
Lost Lake
Site #6 - South Shore
Site #5 - Kline Levee Outflow
Legend
Kline Levee
Lake Maxinkuckee
Site
Google Earth
N
1 mi