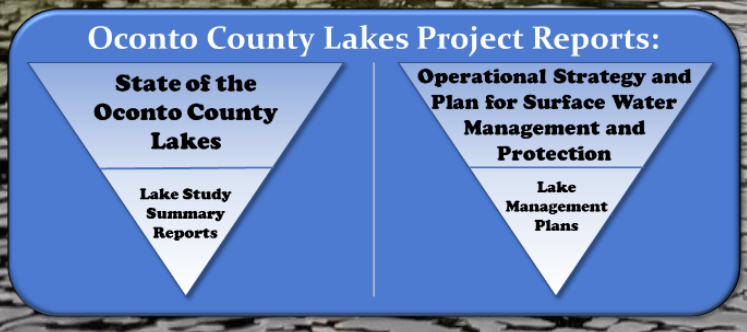
Oconto County Lakes Project

LITTLE PICKEREL LAKE STUDY

SUMMARY REPORT

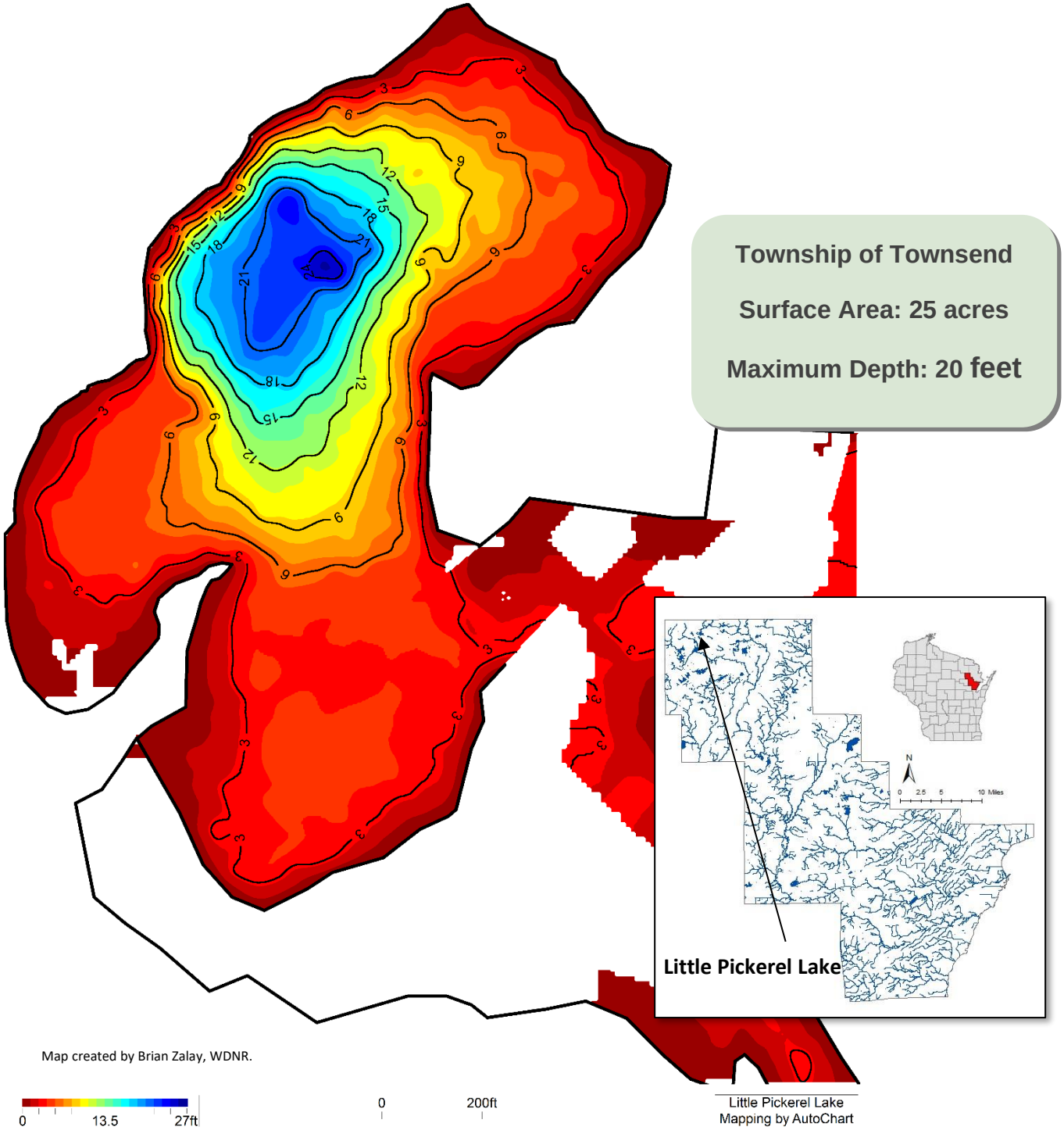
2022



Center for Watershed Science and Education
College of Natural Resources
University of Wisconsin-Stevens Point

Background

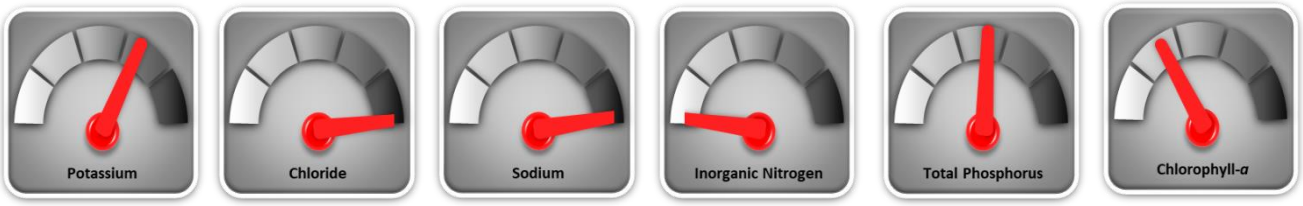
- Little Pickerel Lake is a 25-acre spring lake in northern Oconto County with a maximum depth of 20 feet.
- Most water enters Little Pickerel Lake via groundwater. Most water leaves via a small outlet stream that leads to Pickerel Lake to the east. Surface water runoff and direct precipitation also contribute water.
- Visitors have access to the lake through the outlet stream from Pickerel Lake.
- This report summarizes data collected during the 2020-2021 lake study.

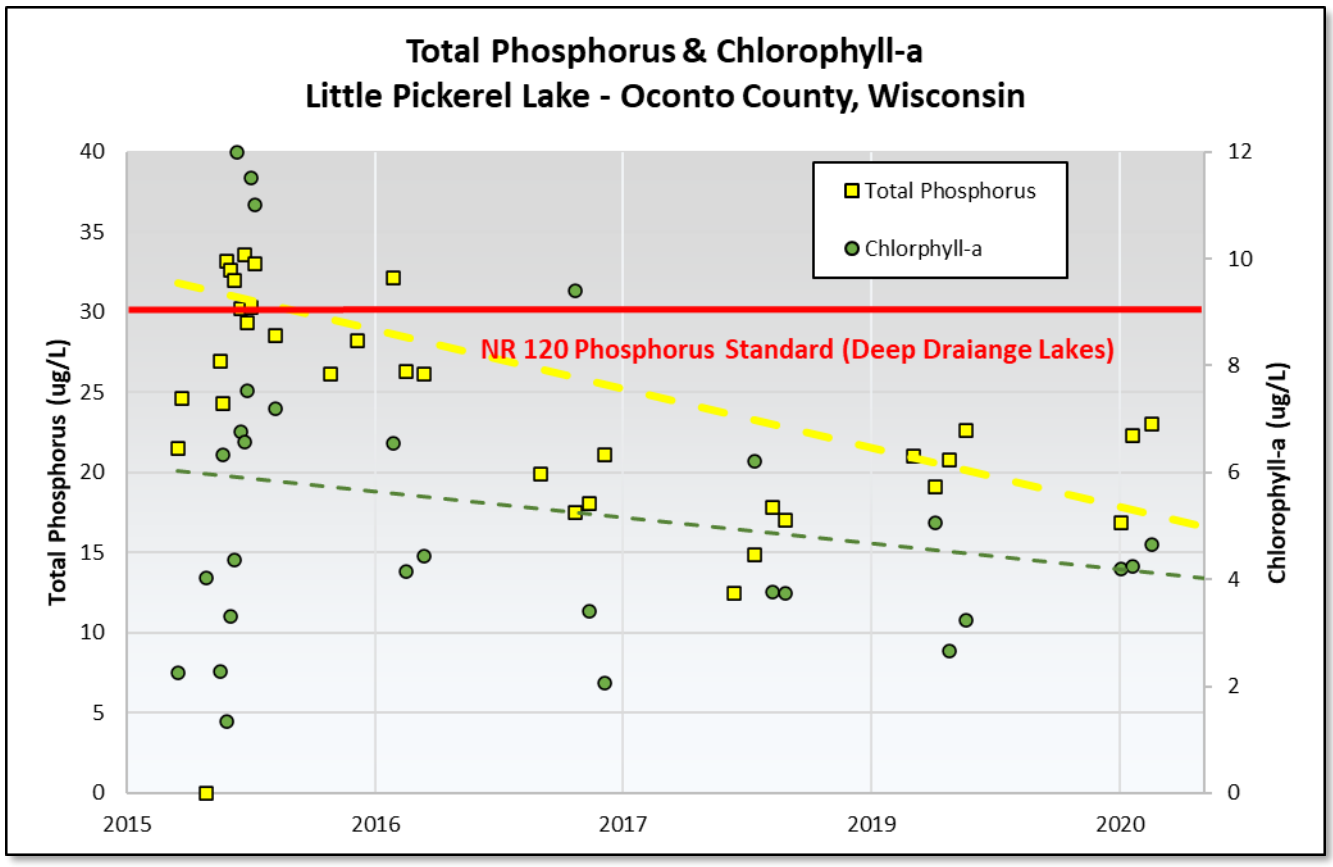


Water Quality

Nutrients such as phosphorus and nitrogen are what feed aquatic plants and algae in a lake. Excessive amounts of nutrients delivered to a lake will result in abundant plant and algae growth. Disturbance within a watershed combined with the landscape's inability to infiltrate and filter runoff is what primarily delivers nutrients to a lake.

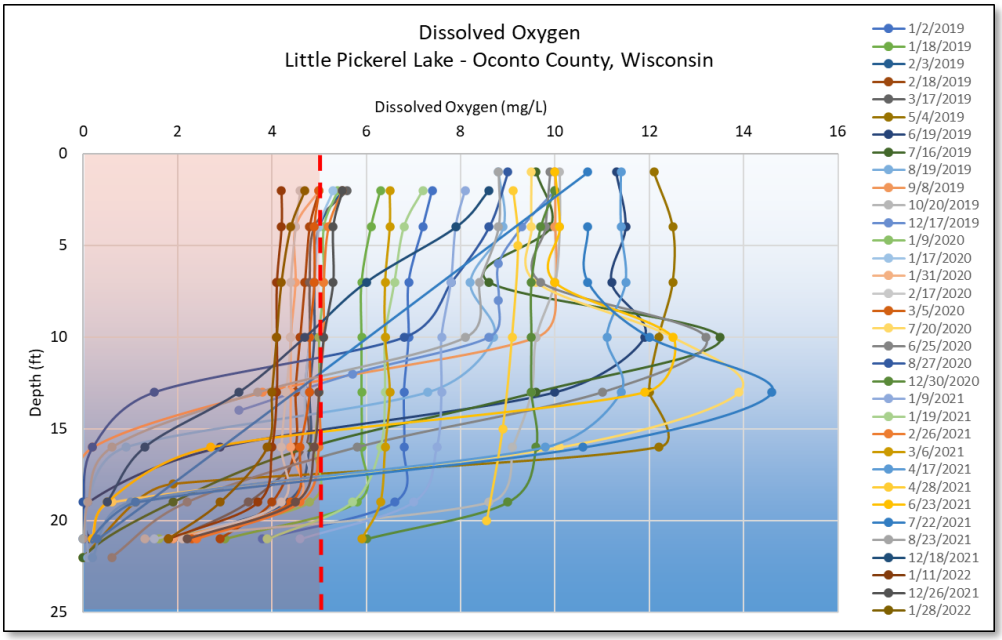
- Total Phosphorus was consistently below the Wisconsin state standard of 30 ug/L for deep drainage lakes during the two-year study. The long-term trend (based on summer samples) suggests a decreasing average concentration.
- Inorganic nitrogen remained below the threshold of 0.3 mg/L when algal blooms increase.
- Chlorophyll-a, an indirect measure of algae, remained below the threshold of 6 ug/L during the study period. Comparison to historic data suggests a decreasing trend.





Water Quality

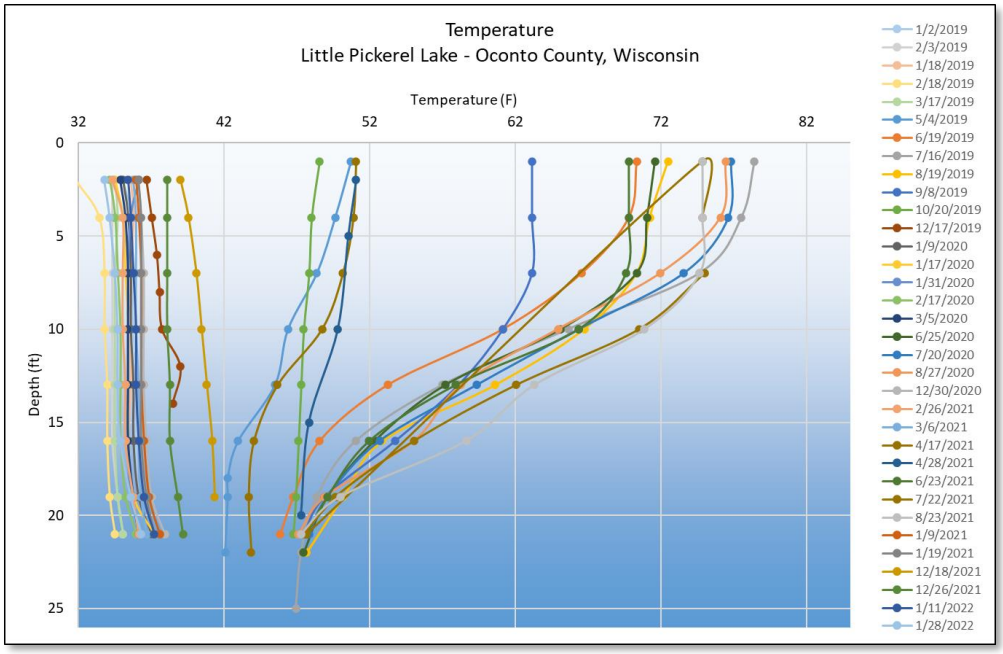
Sufficient **dissolved oxygen** in lake water is essential to the survival of aquatic organisms. The amount of dissolved oxygen present within a lake varies by season and depth. It is determined by the biological activity that consumes or produces oxygen, by water mixing through wind, changes in temperature, and inputs of surface and groundwater. Generally, at least 5 mg/L oxygen is required for fish.



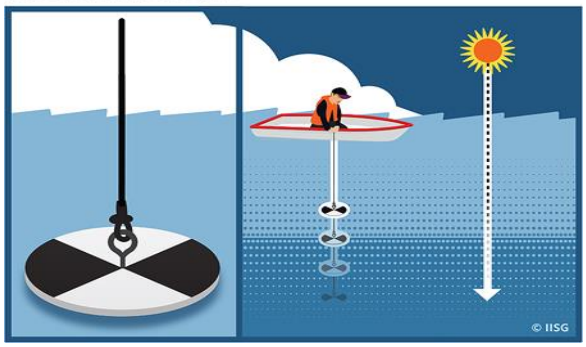
- Oxygen levels routinely fall below 5 mg/L in late winter in Little Pickerel Lake to levels that stress many fish species.
- Algae blooms at depth (indicated by bumps in dissolved oxygen concentrations between 10 and 15 feet) are common in late summer which consumes additional oxygen.

Lake water **temperature** has a significant impact on water chemistry, spatial distribution of fish, microbial growth and oxygen content.

- The temperature gradient in Little Pickerel Lake indicates stratification during much of the summer making this a 'deep' lake.

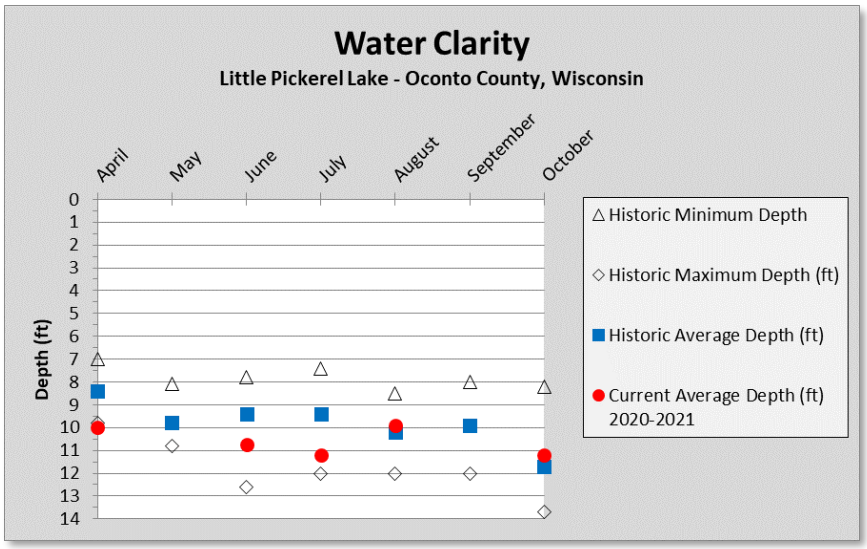


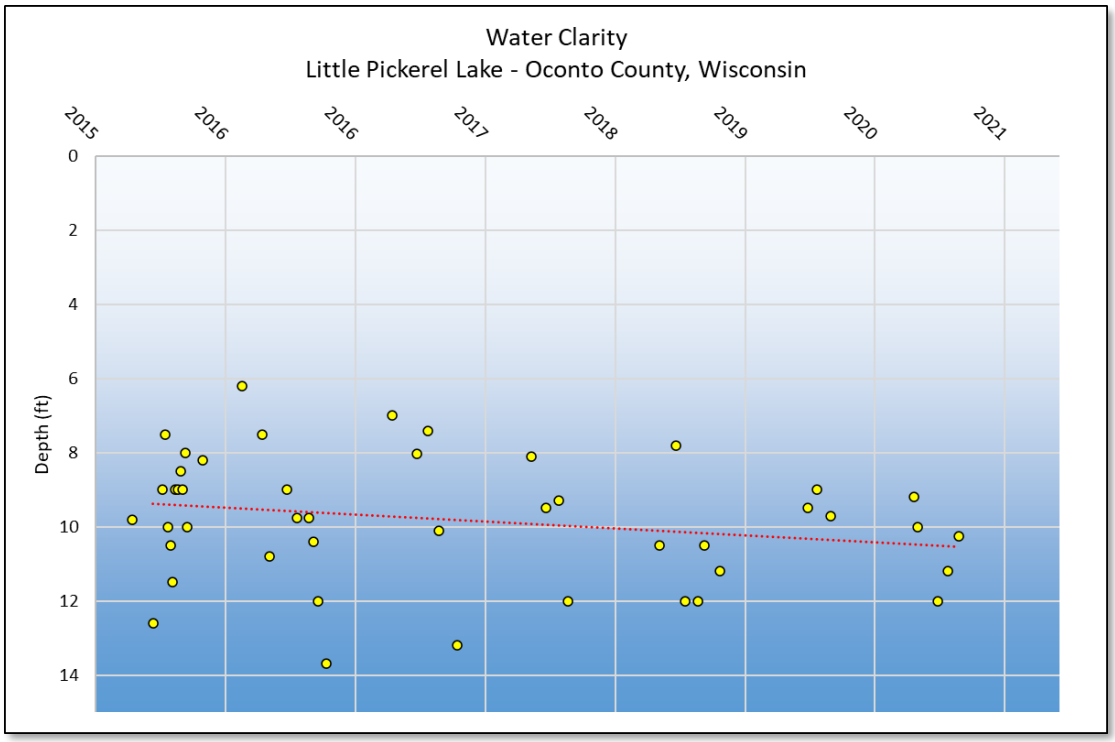
Water Quality



Water clarity is a measure of how deep light can penetrate (Secchi depth). Clarity is affected by water color, turbidity (suspended sediment), and algae. Water clarity helps determine where rooted aquatic plants can grow. It is typical for water clarity to vary throughout the year.

- The graph below shows water clarity measurements taken between April and October.
- During 2020-21, water clarity was consistently good with the poorest quality being in August and the best in October.





Water Quality

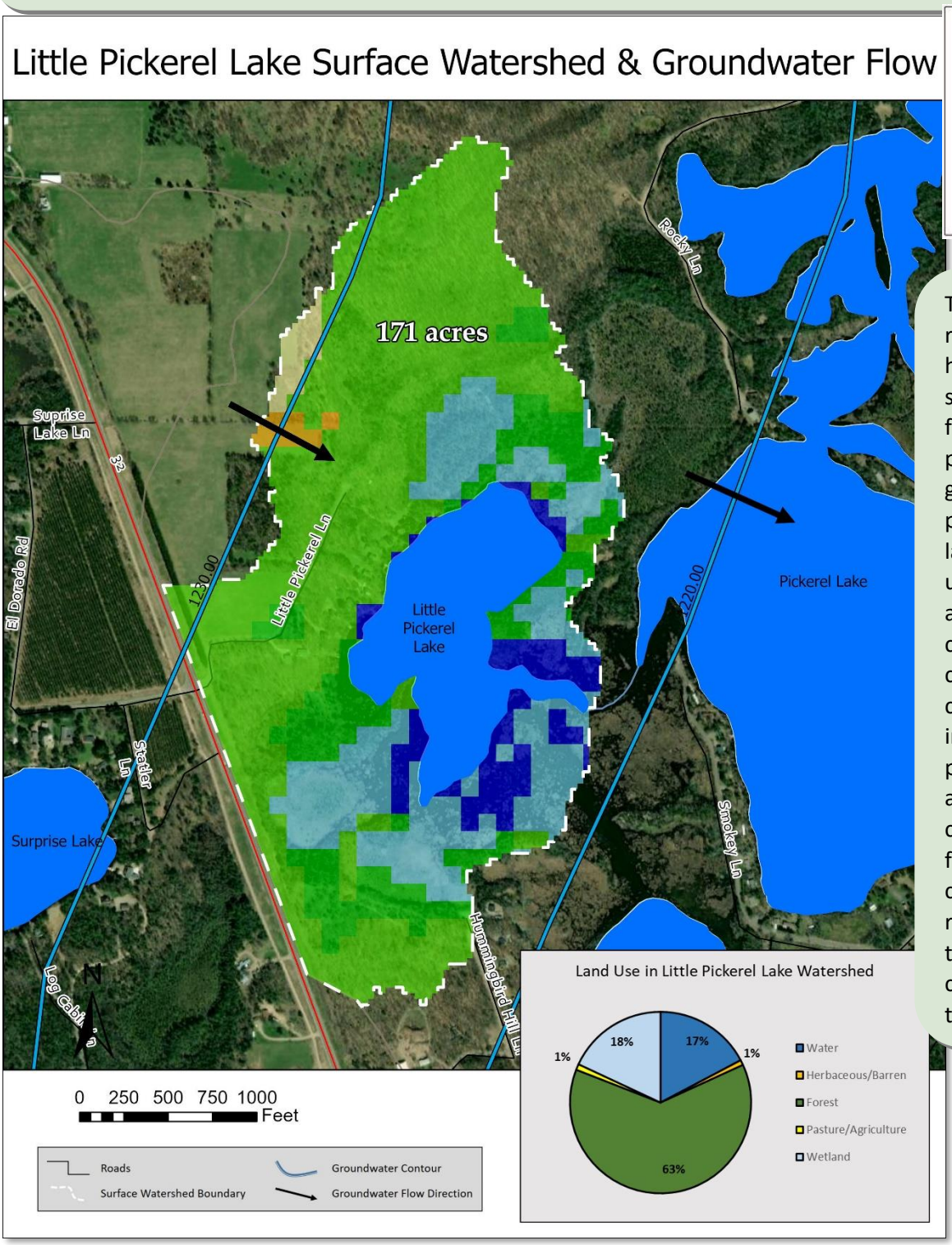
Other chemistry data was collected from lake water samples, such as basic cations, pollutants and acid rain input, and physical parameters. Results of such analyses can provide insights into a variety of other potential impacts to the lake. While concentrations of these compounds in lake water is usually low, higher concentrations can be indicators of other potential issues.

- Concentrations of potassium (1.49 mg/L), chloride (16.5 mg/L) and sodium (6.7 mg/L) were all elevated. These 'indicators' suggest some degree of impact from septic systems, road salt, animal waste and/or fertilizers.
- DACT, a screening tool to determine if your lake is being impacted by pesticides, was not detected.
- Water in Little Pickerel Lake is hard (162 mg/L CaCO3), having an elevated level of dissolved minerals. These minerals tend to bind with phosphorus making it unavailable to algae blooms.

For more information on how to interpret your lake's water quality data, please refer to the "State of the Oconto County Lakes Report" that is on file with Oconto County.

Watershed

Groundwater provides water to lakes in Oconto County throughout the entire year. Hard surfaces on the landscape prevent water from soaking into the ground and becoming groundwater. This results in less water flowing to the lake during snowmelt and rain events. Water that does not infiltrate to groundwater becomes **surface runoff** flowing across the surface of the landscape where it can move sediment and contaminants to the lake from within its watershed.



The quality of lake water reflects what is happening on the land surface. Precipitation falling on forests produces clean groundwater, whereas precipitation falling on land that has chemical use can produce runoff and groundwater that contains these chemicals. Groundwater contamination may include nitrogen, pesticides, herbicides and other soluble chemicals originating from septic systems, crops, barnyards, and road de-icing. Once in the groundwater, these chemicals move slowly towards a lake or river.

Shorelands

Shoreland vegetation is critical to a healthy lake's ecosystem. It provides habitat for many aquatic and terrestrial animals including birds, frogs, turtles, and many small and large mammals. It also helps to improve the quality and quantity of the runoff that flows across the landscape towards the lake. Healthy shoreland vegetation includes a mix of tall, native grasses/flowers, shrubs and trees.

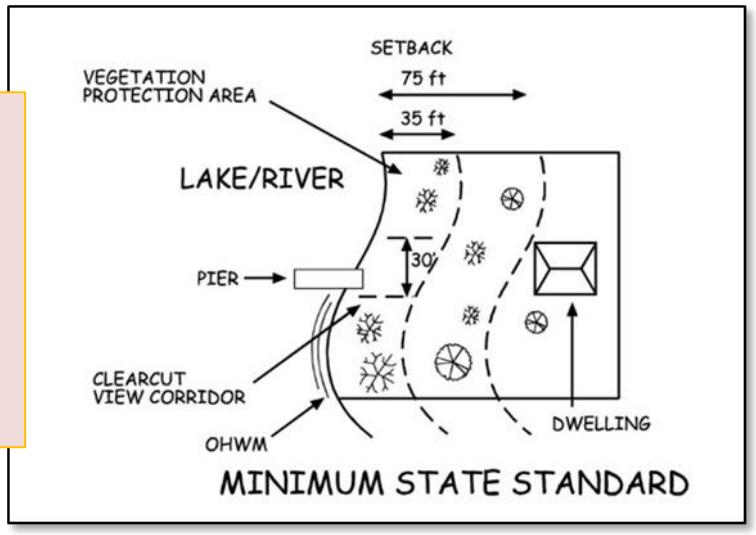
- Shorelands around Little Pickerel Lake were surveyed in July 2020. Most of Little Pickerel Lake's shoreland is healthy, but a few stretches are in need of restoration.

Total lakefront footage	No. Riparian lots	Measured shoreland disturbance (feet)	Measured shoreland disturbance (%)
9,251	16	1,341	14%

State Shoreland Zoning Ordinance
NR 115 Wisc. Adm. Code for Unincorporated Municipalities

No vegetation within 35 feet of the lake's edge shall be removed except for:

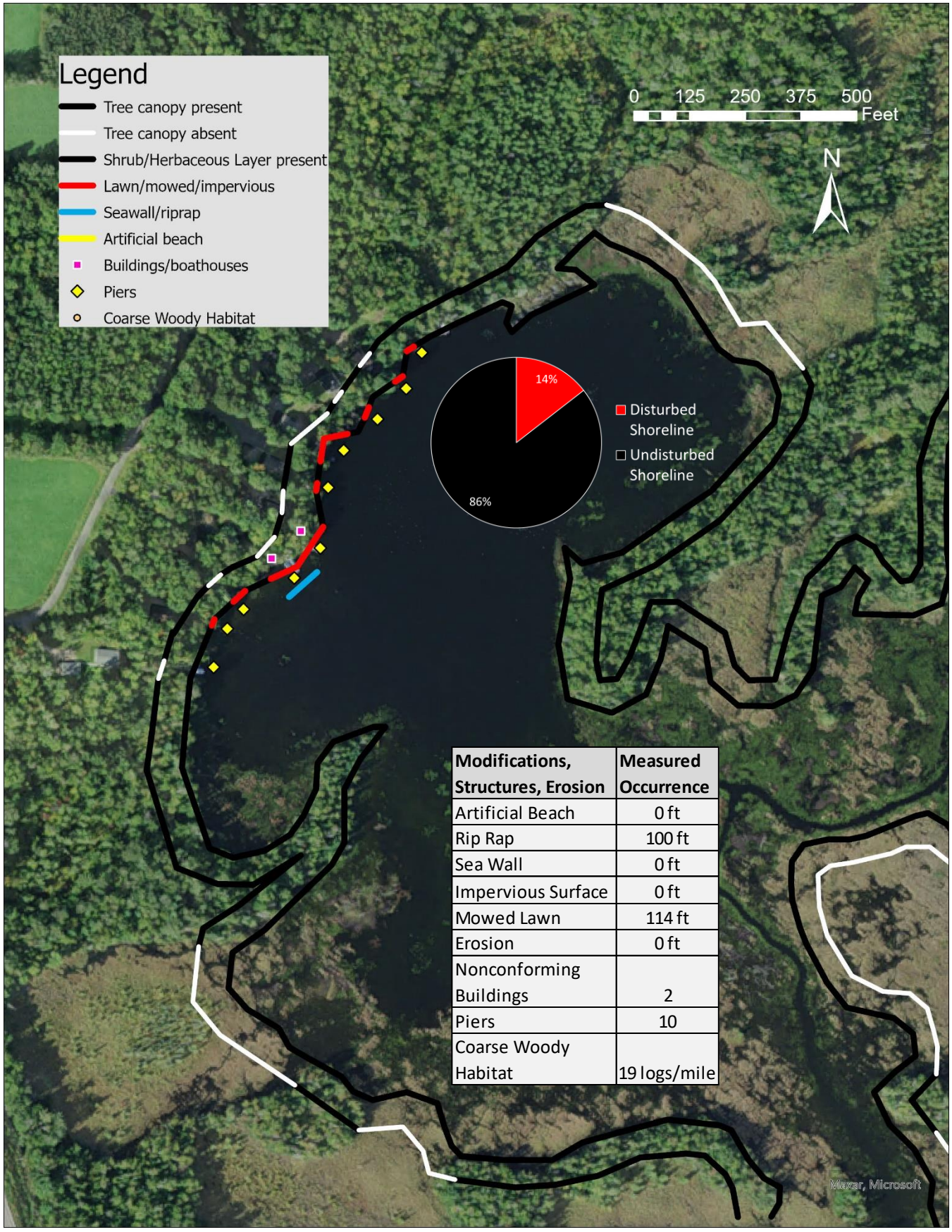
- Up to 30% of shoreline may be removed of shrubs and trees for a view corridor
- A mowed or constructed pedestrian path up to 5 feet wide to access lake



What Can You Do To Help Little Pickerel Lake?

- ✓ Leave natural shoreland vegetation in place or restore if it has been removed.
- ✓ Learn to identify and look for invasive plants and animals and know who to contact if found.
- ✓ Do not purchase prohibited and restricted species. Purchase native plants when possible.
- ✓ Never transplant water garden or aquarium plants into lakes, streams or wetlands. Properly dispose of them.
- ✓ Remove invasive exotic plants from your landscape and replace them with native plants or non-invasive exotics. Scout regularly for new invasive plants.
- ✓ Avoid using garden plants from other regions whose invasive potential is poorly understood.

Shorelands

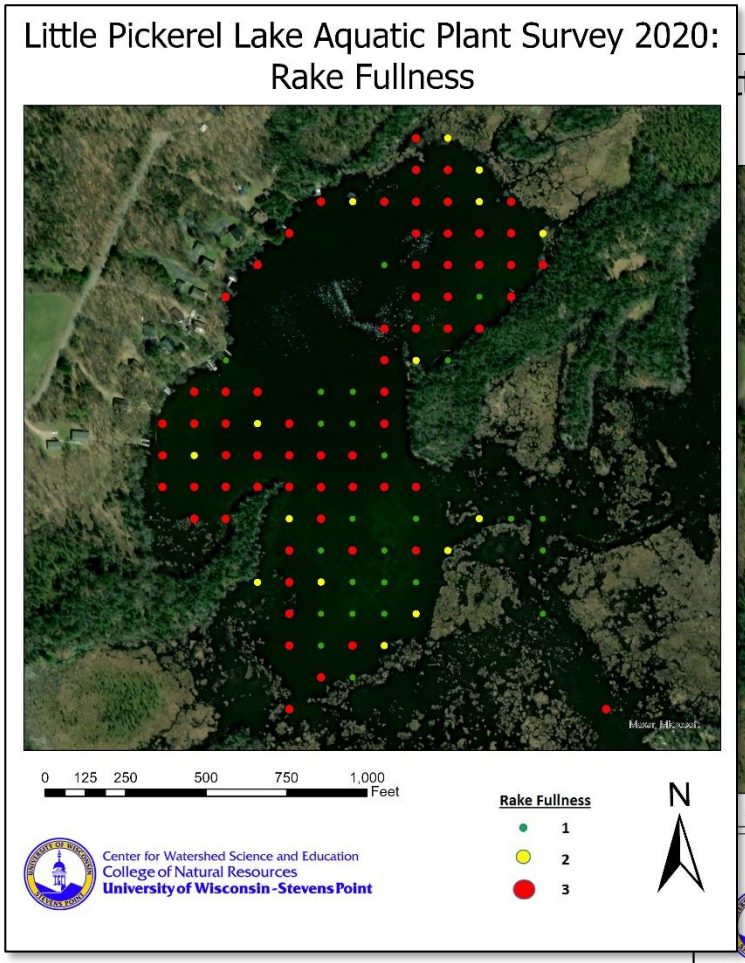


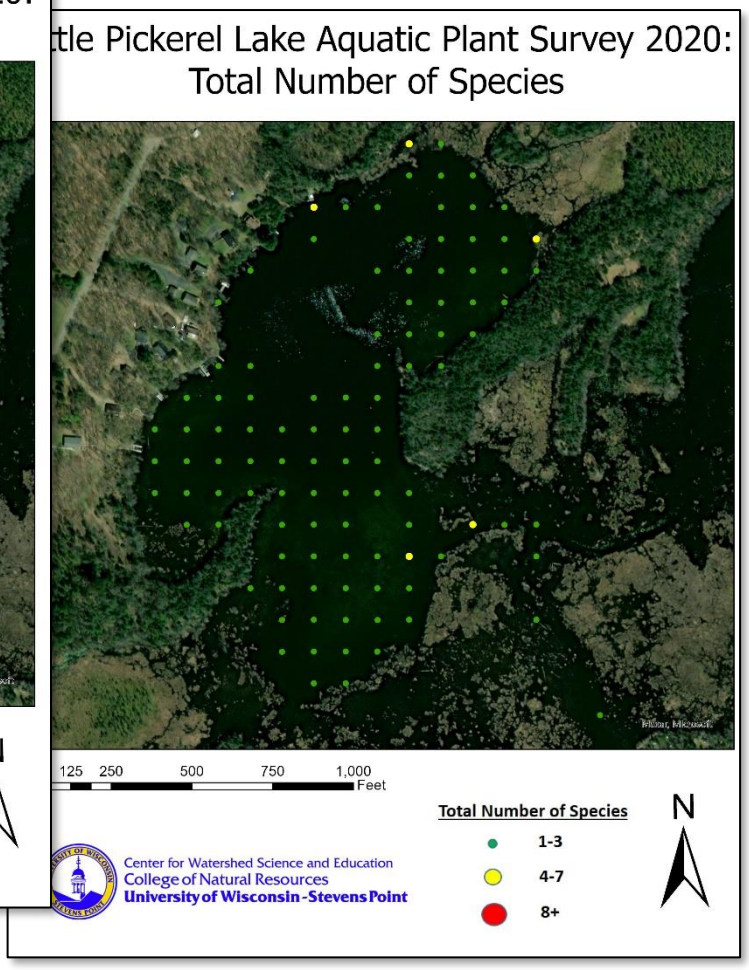
Modifications, Structures, Erosion	Measured Occurrence
Artificial Beach	0 ft
Rip Rap	100 ft
Sea Wall	0 ft
Impervious Surface	0 ft
Mowed Lawn	114 ft
Erosion	0 ft
Nonconforming Buildings	2
Piers	10
Coarse Woody Habitat	19 logs/mile

Aquatic Plants

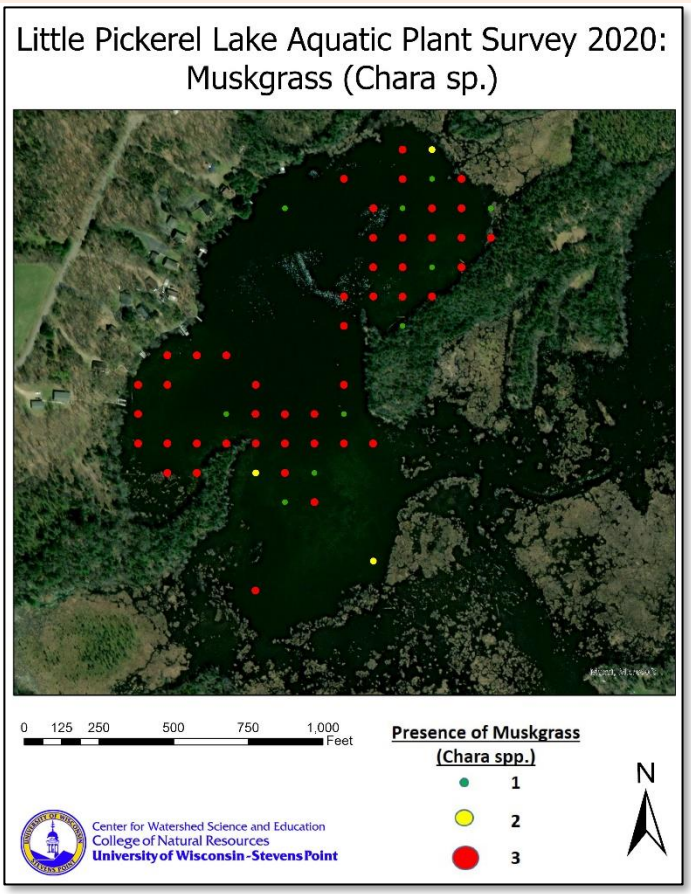
Aquatic plants are the forest landscape within a lake. They provide food and habitat for terrestrial and aquatic creatures such as fish, ducks, turtles, invertebrates and other animals. They increase oxygen levels in the water and utilize nutrients that would otherwise be used by algae. A healthy lake typically has a variety of aquatic plant species creating diversity that can help to prevent the establishment of aquatic invasive species.

- The aquatic plant community in Little Pickerel Lake is characterized by above average diversity of plant species when compared to other lakes in the Oconto County Lakes Project, with a total of 23 species in the 2020 survey.
- During the 2020 aquatic plant survey of Little Pickerel Lake, 84% of visited sites had vegetative growth. The maximum depth of vegetation was 16 feet and the Floristic Quality Assessment (FQI) was 29.6.
- The most frequently encountered plant species were chara (55%), slender naiad (21%) and coontail (18%). All three species are native to Wisconsin.

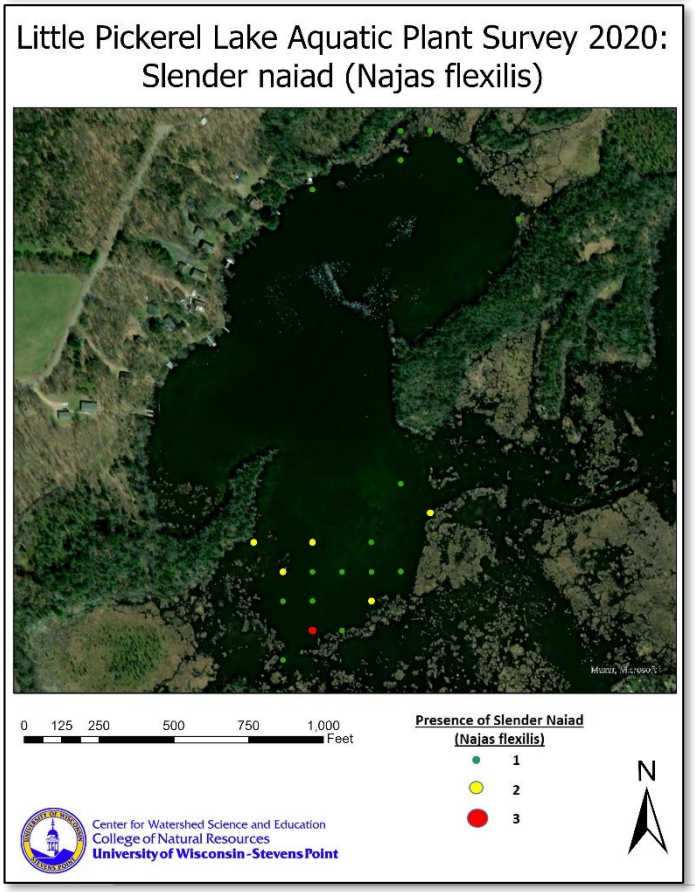




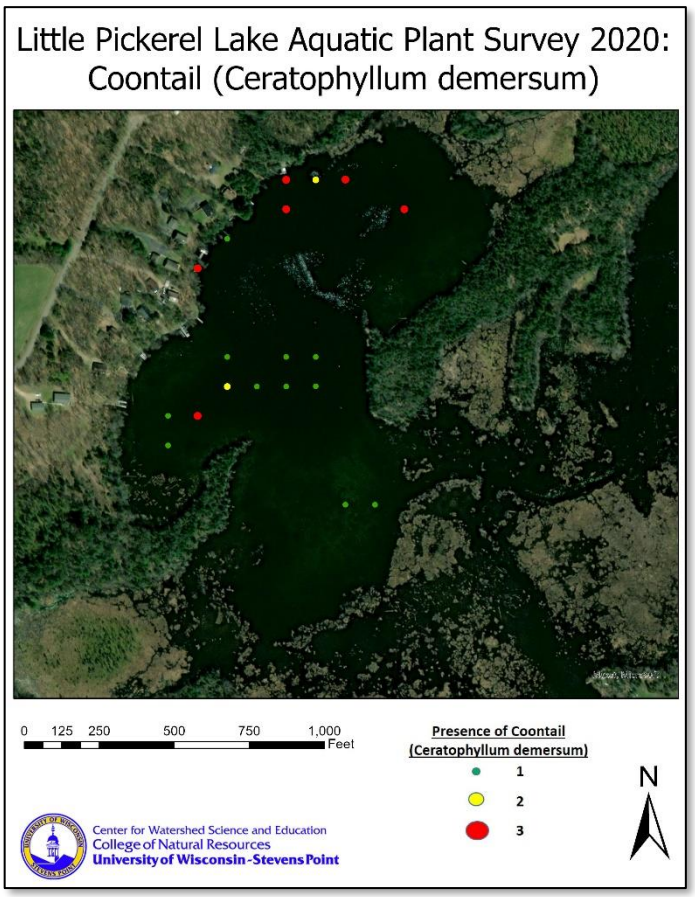
Aquatic Plants



Chara is a type of macro algae that grows attached to muddy lake bottoms and has a musky odor. Muskgrass, as it is known, filters the lake water and is helpful in preventing the establishment of invasive species.



Slender naiad, also called nodding water-nymph, is a primary food source for waterfowl and provides habitat for many invertebrates.



Coontail lacks roots and can form dense mats just below the surface. It is usually in calm, nutrient-rich water and provides habitat for young fish and other aquatic animals. Waterfowl will eat the seeds and foliage.

Aquatic **invasive species** are non-native aquatic plants and animals that are most often unintentionally introduced into lakes by lake users. In some lakes, aquatic invasive plant species can exist as a part of the plant community, while in other lakes populations explode, creating dense beds that can damage boat motors, make areas non-navigable, inhibit activities like swimming and fishing, and disrupt the lakes' ecosystems.

- No invasive species were observed during the 2020 aquatic plant survey.

Acknowledgments

This report was prepared as an appendix to the **Oconto County State of the Lakes Report**, which is on file with the Oconto County Land Conservation Department.
Written and prepared by the Center for Watershed Science and Education at the University of Wisconsin-Stevens Point.

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Acknowledgments

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