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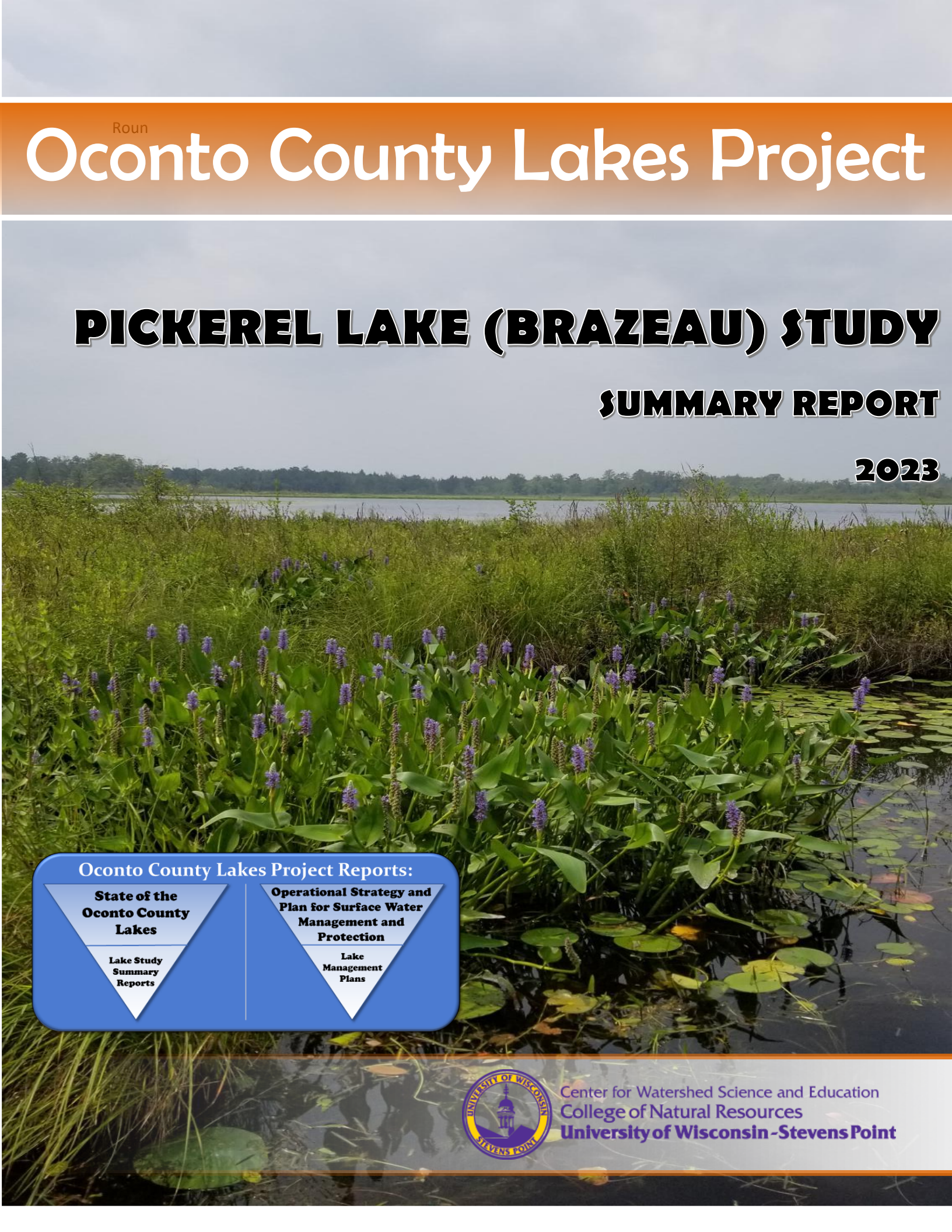
Oconto County Lakes Project

PICKEREL LAKE (BRAZEAU) STUDY

SUMMARY REPORT

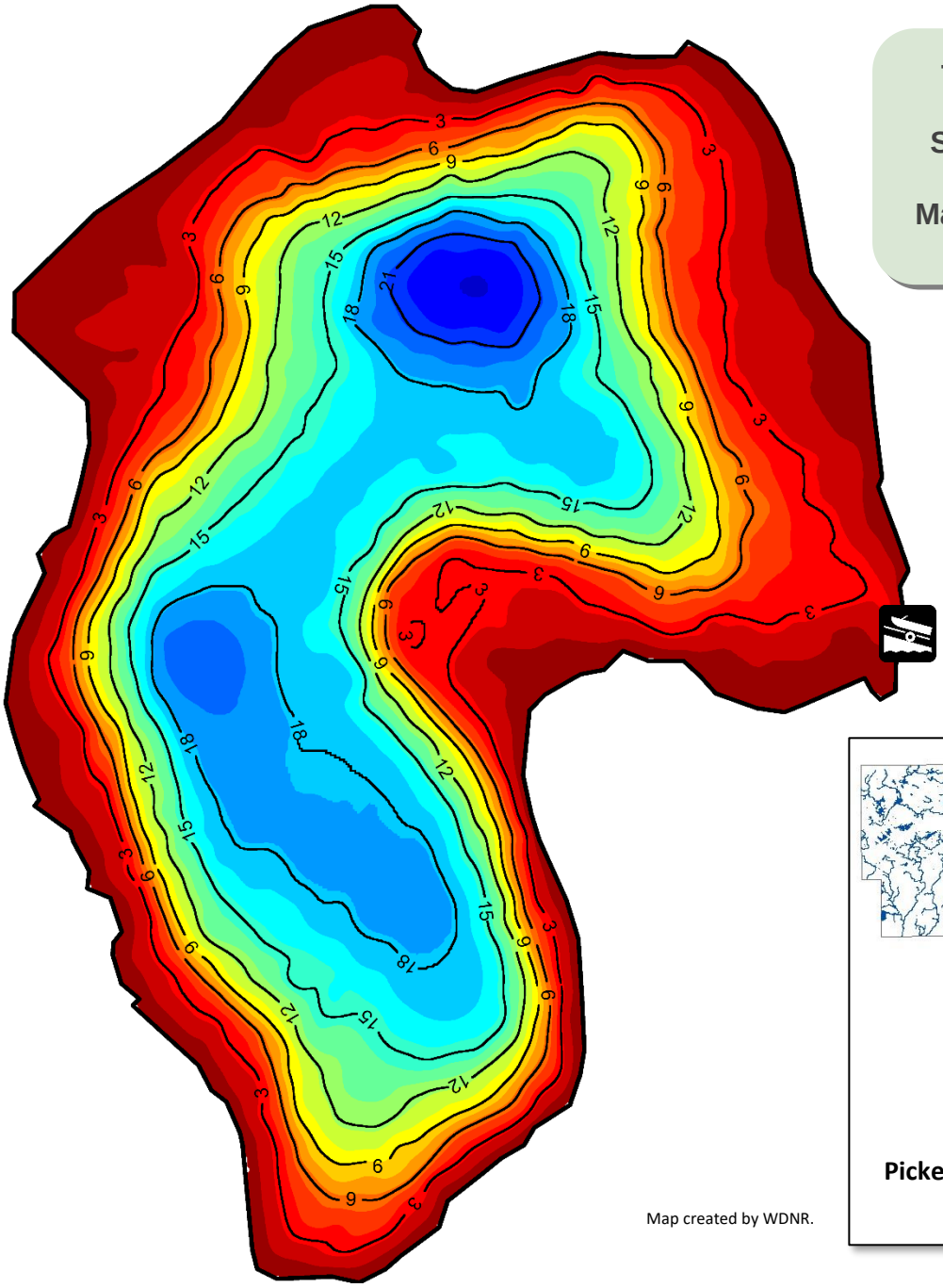
2023



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

Background

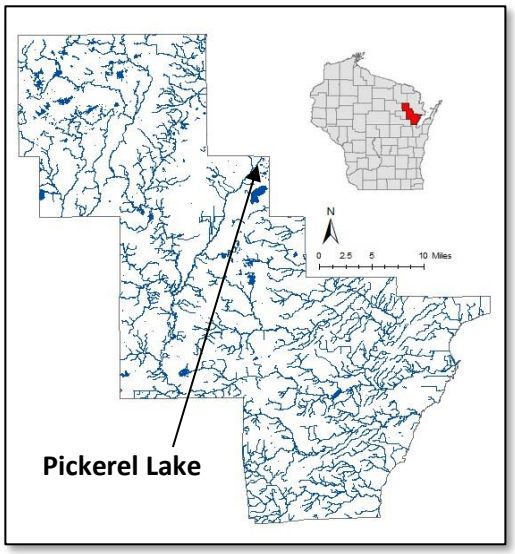
- Pickerel Lake is a 36-acre drainage lake in northeast Oconto County with a maximum depth of 18 feet.
- Most water enters Pickerel Lake via groundwater and leaves via a small channel on the west side leading to Little Pickerel Lake and the North Branch Peshtigo Brook. Groundwater, surface water runoff and direct precipitation also contribute water.
- Visitors have access to the lake from one public boat launch located on the lake's east side.
- This report summarizes data collected during the 2021-2022 lake study.



Township of Brazeau

Surface Area: 36 acres

Maximum Depth: 18 feet

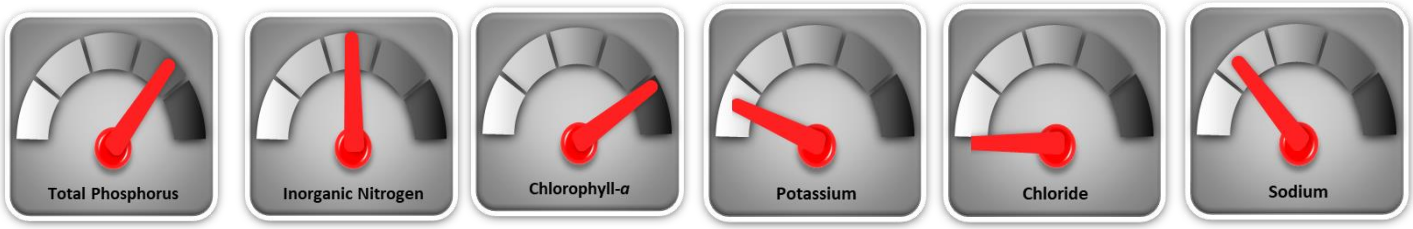


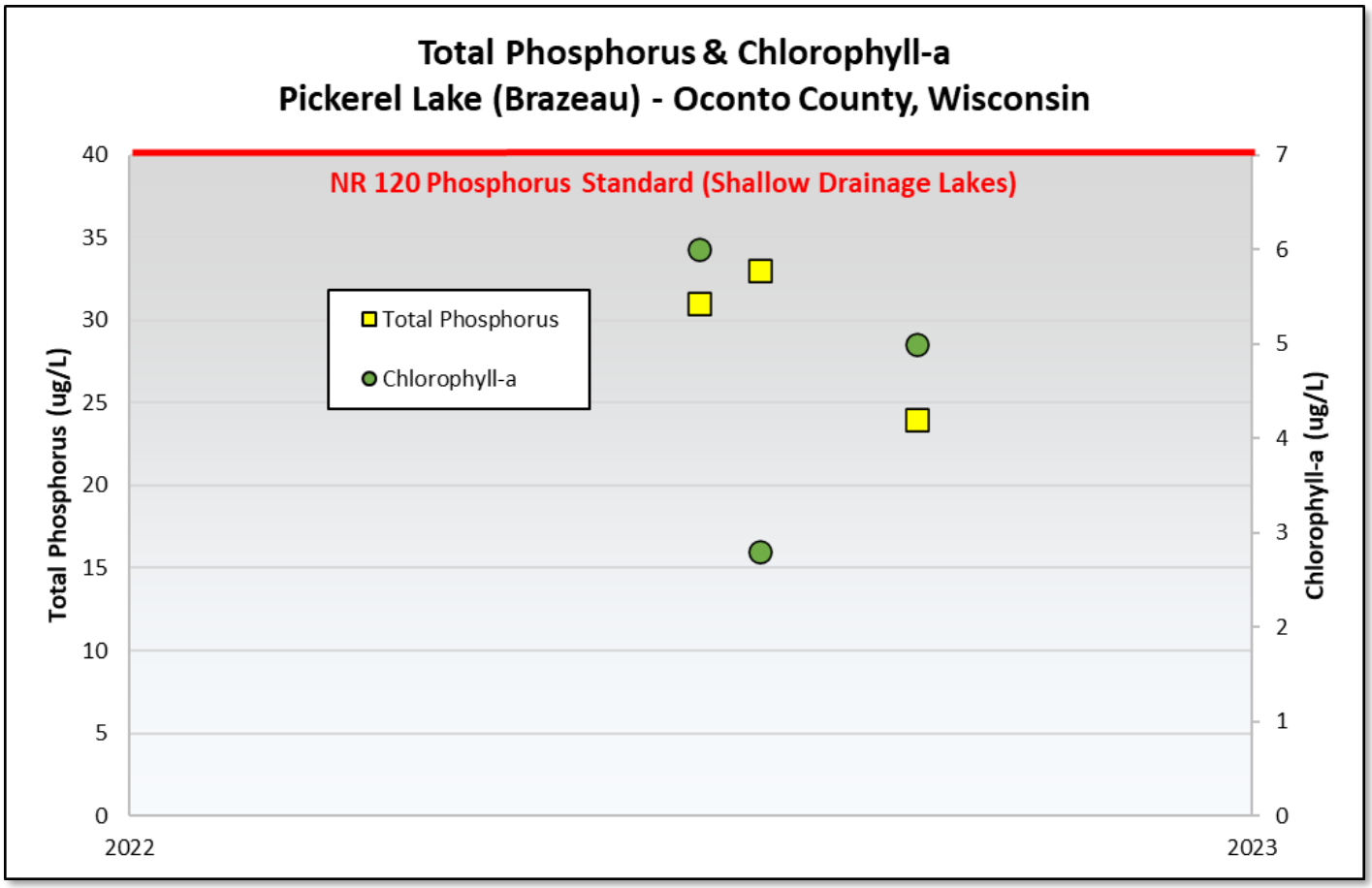
Map created by WDNR.

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.

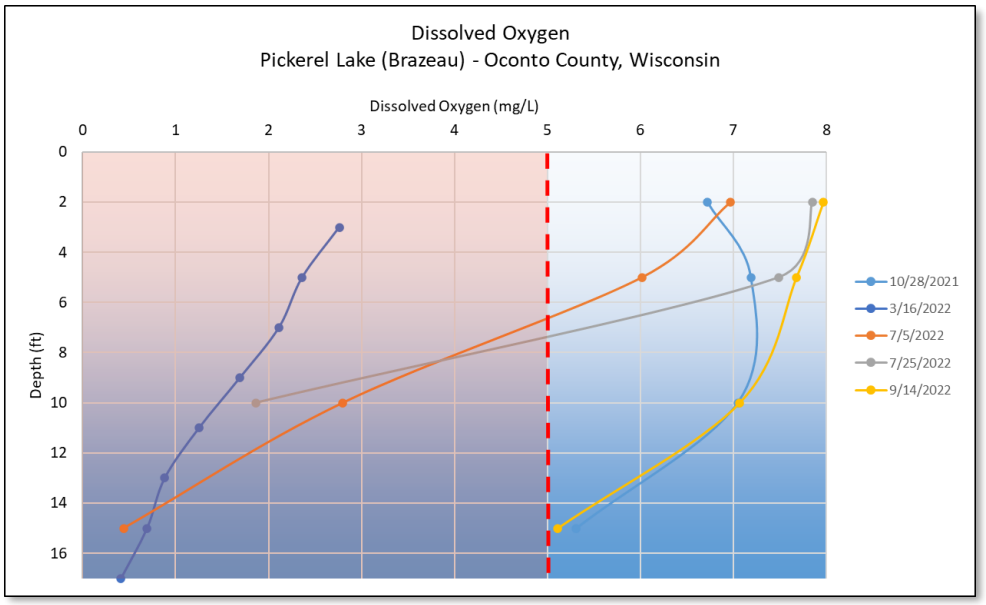
- Total Phosphorus was consistently below the Wisconsin state standard of 40 ug/L for shallow drainage lakes during the study. The limited dataset does not indicate a clear trend.
- Inorganic nitrogen remained below the threshold of 0.3 mg/L when algal blooms increase.
- Chlorophyll-a, an indirect measure of algae, remained below the threshold of 6 ug/L throughout the study.





Water Quality

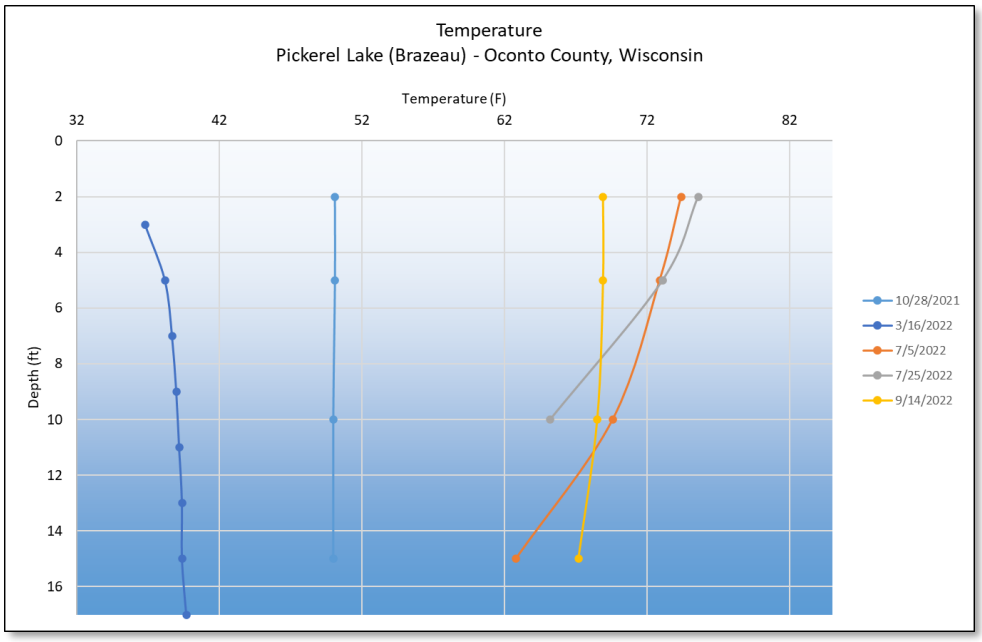
Sufficient **dissolved oxygen** in lake water is essential to the survival of aquatic organisms. The amount of dissolved oxygen present within a lake varies by season and depth. It is determined by the biological activity that consumes or produces oxygen, by water mixing through wind, changes in temperature,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



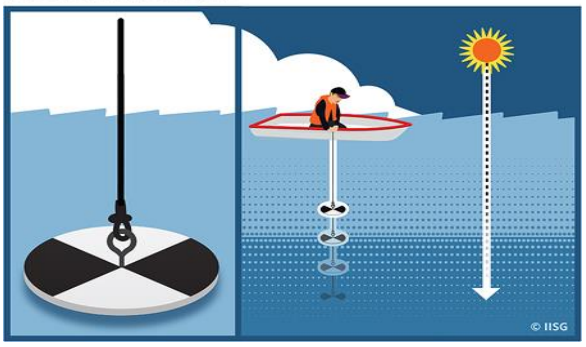
- Sufficient oxygen is only available in the top 6-8 feet of water column of Pickerel Lake late in the growing season. In late winter, most of the water column can become anoxic and may be susceptible to a winter kill.

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

- Temperature profiles in Pickerel Lake show consistent temperature with depth, typical of a shallow lake where water near the surface regularly mixes with deeper water.

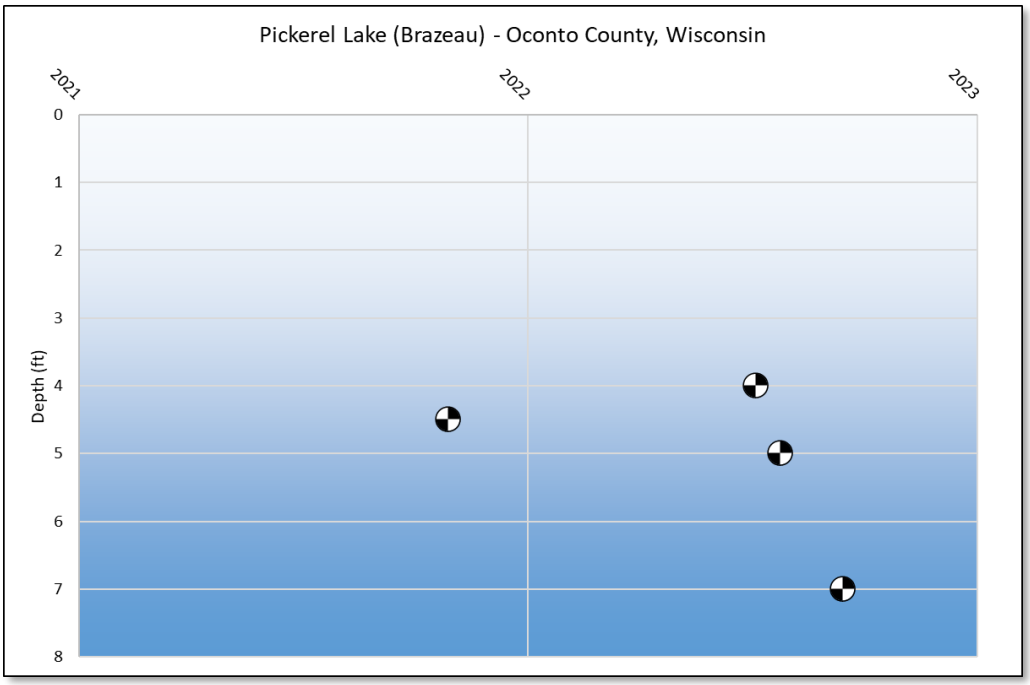


Water Quality



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 May and November.
- Limited data suggests and average water clarity of 5 feet which is considered poor.

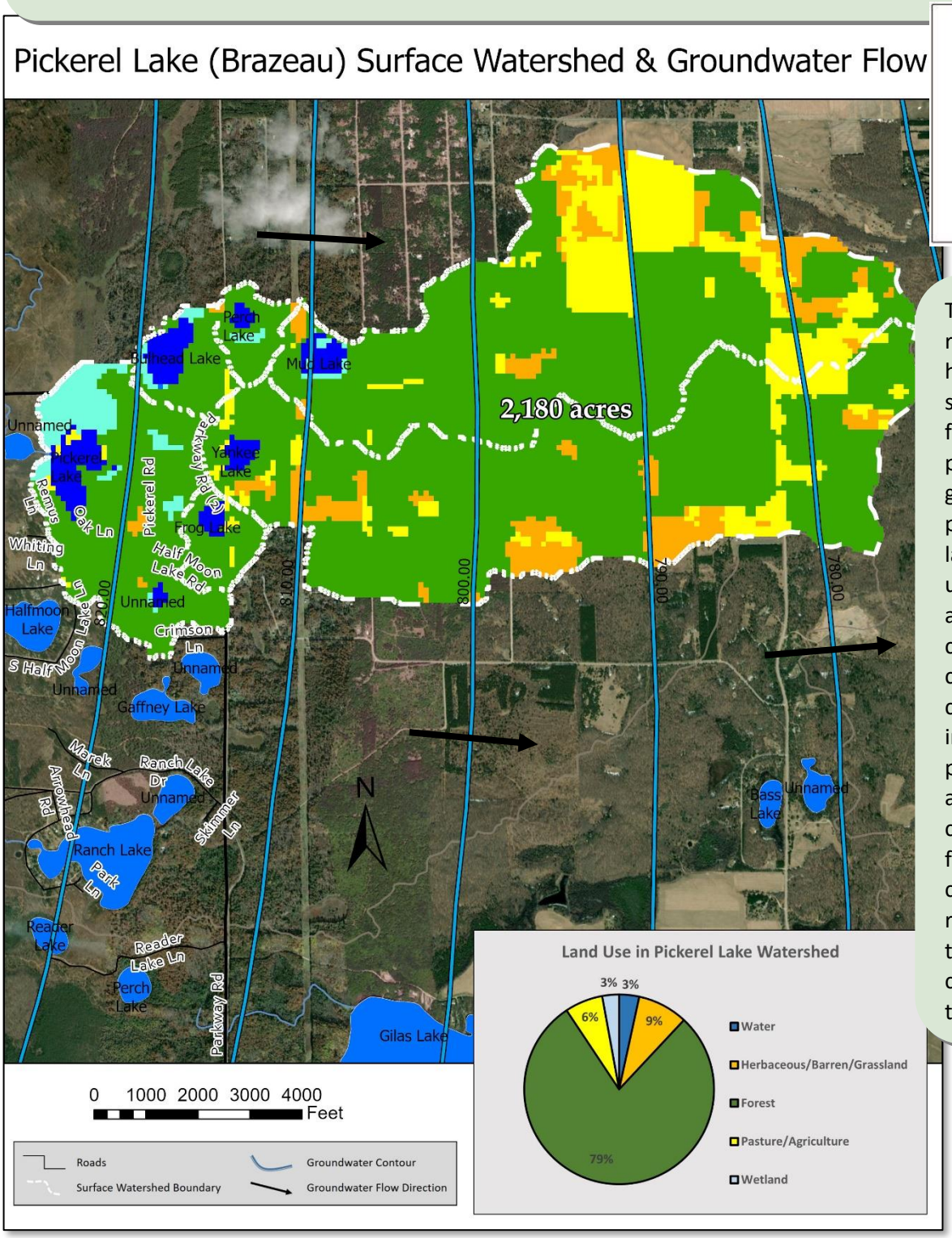


Other chemistry data was collected from lake water samples, such as basic cations, pollutants and acid rain input, and physical parameters. Results of such analyses can provide insights into a variety of other potential impacts to the lake. While concentrations of these compounds in lake water is usually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

- Concentrations of potassium (0.55 mg/L), chloride (not detected) and sodium (1.24 mg/L) were all low. This suggests minimal impact from septic systems, road salt, animal waste and fertilizers.
- DACT, a screening tool to determine if your lake is being impacted by pesticides, was not detected.
- Water in Pickerel Lake is soft (55 mg/L CaCO3), having a low level of dissolved minerals. Water low in these minerals has less capacity to 'buffer' the effects of nutrients such as phosphorus making it vulnerable to algae blooms.

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.



WHEN IT RAINS IT DRAINS

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.

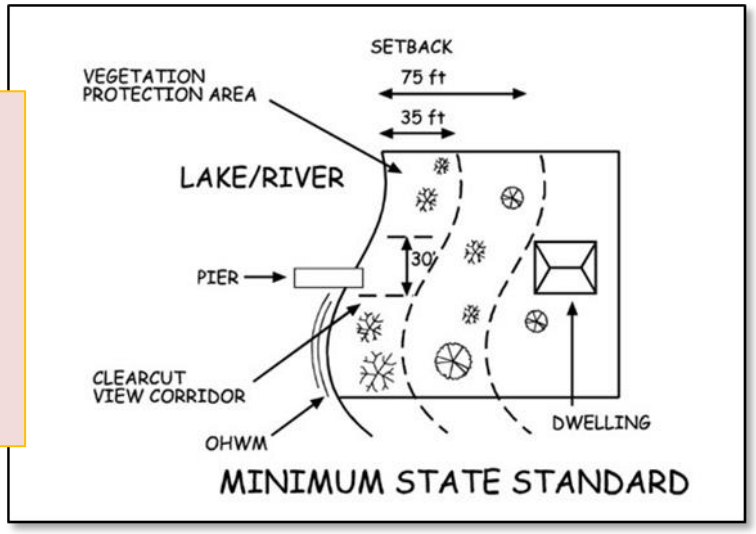
- Shorelands around Pickerel Lake were surveyed in July 2021. Many shoreland areas are healthy, but some stretches are in need of restoration.

Total lakefront footage	No. Riparian lots	Measured shoreland disturbance (feet)	Measured shoreland disturbance (%)
5,737	21	1,182	21%

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:

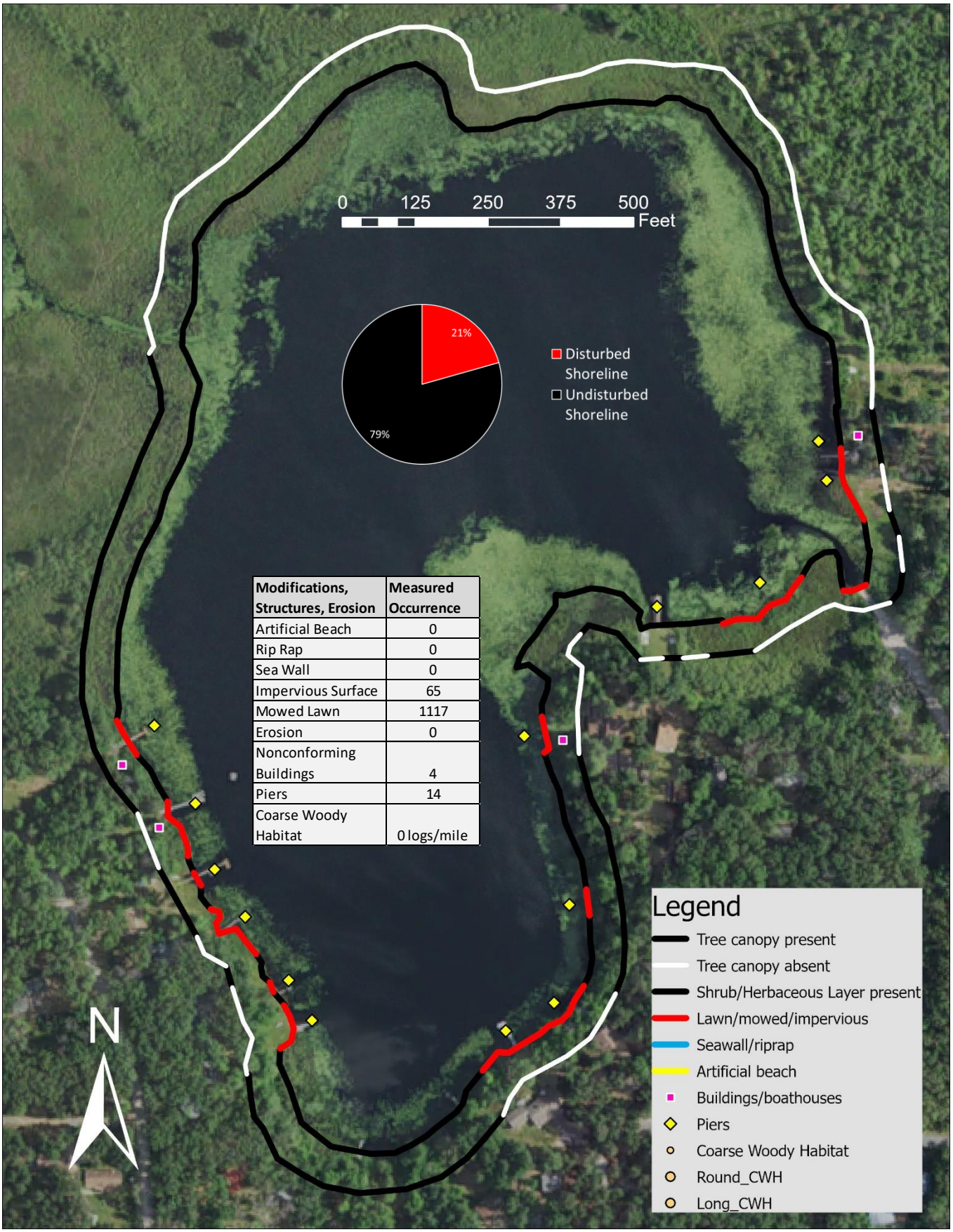
- Up to 30% of shoreline may be removed of shrubs and trees for a view corridor
- A mowed or constructed pedestrian path up to 5 feet wide to access lake



What Can You Do To Help 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

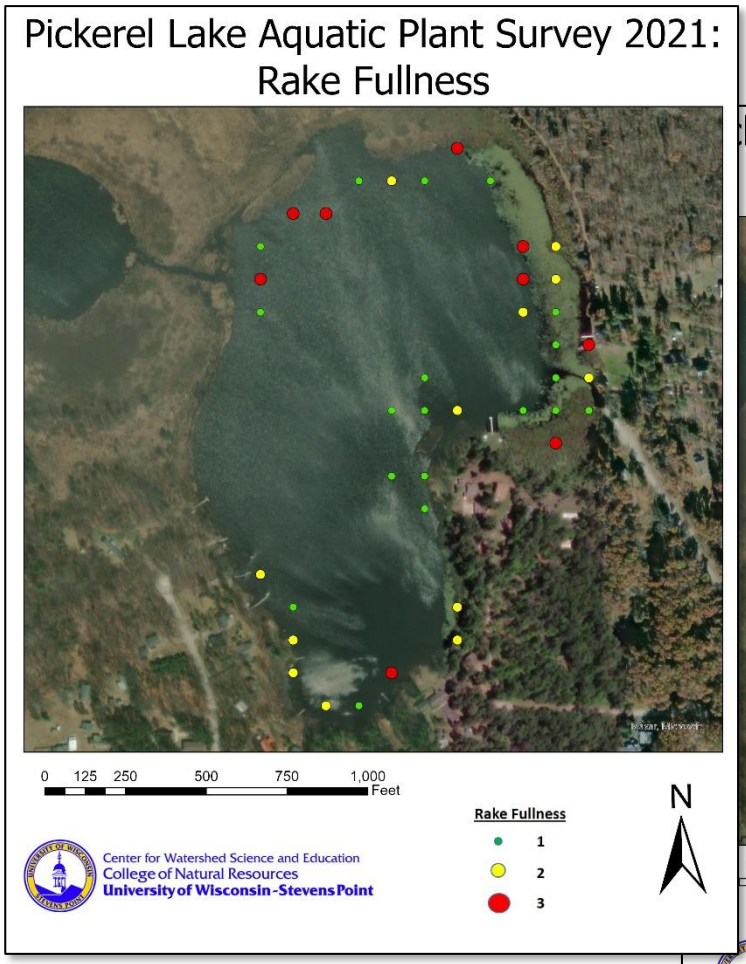


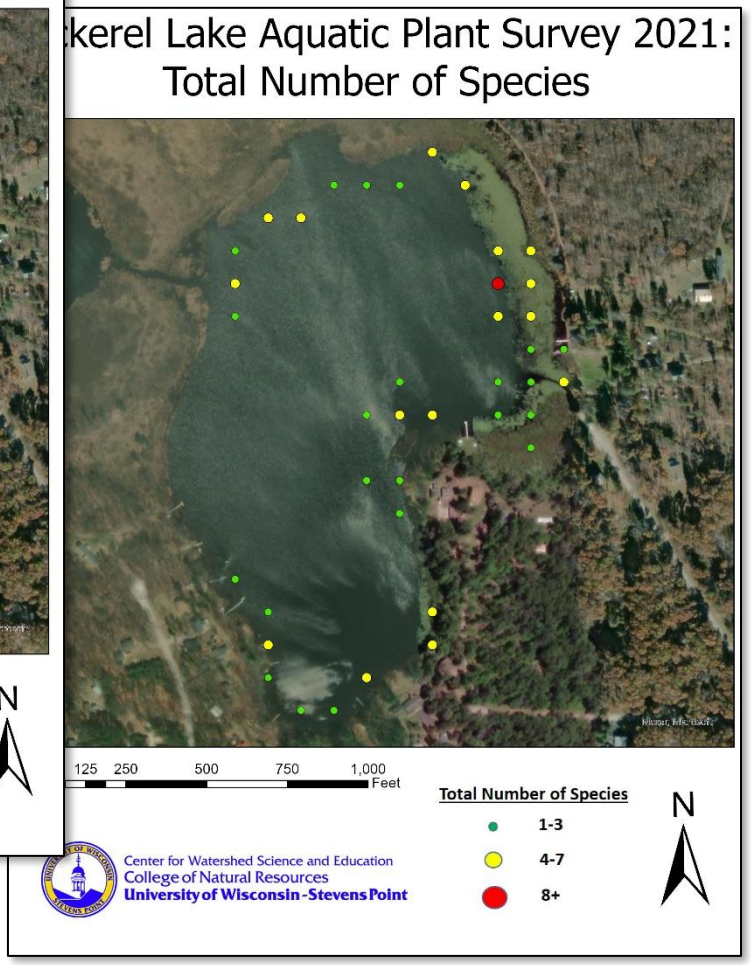
Modifications, Structures, Erosion	Measured Occurrence
Artificial Beach	0
Rip Rap	0
Sea Wall	0
Impervious Surface	65
Mowed Lawn	1117
Erosion	0
Nonconforming Buildings	4
Piers	14
Coarse Woody Habitat	0 logs/mile

Aquatic Plants

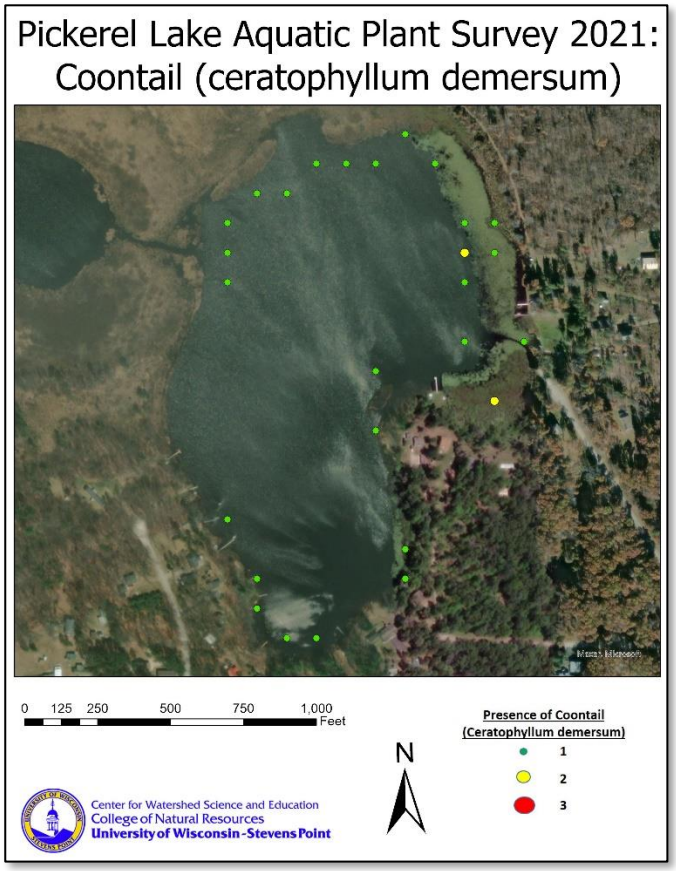
Aquatic plants are the forest landscape within a lake. They provide food and habitat for terrestrial and aquatic creatures such as fish, ducks, turtles, invertebrates and other animals. They increase oxygen levels in the water and utilize nutrients that would otherwise be used by algae. A healthy lake 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 Pickerel Lake is characterized by average diversity of plant species when compared to other lakes in the Oconto County Lakes Project, with a total of 19 species in the 2021 survey.
- During the 2021 aquatic plant survey of Pickerel Lake, 83% of visited sites had vegetative growth. The maximum depth of vegetation was 9.5 feet and the Floristic Quality Assessment (FQI) was 30.5.
- The most frequently encountered plant species were coontail (67%), watershield (50%), chara (33%), and white water lily (50%).
- No invasive species were observed.

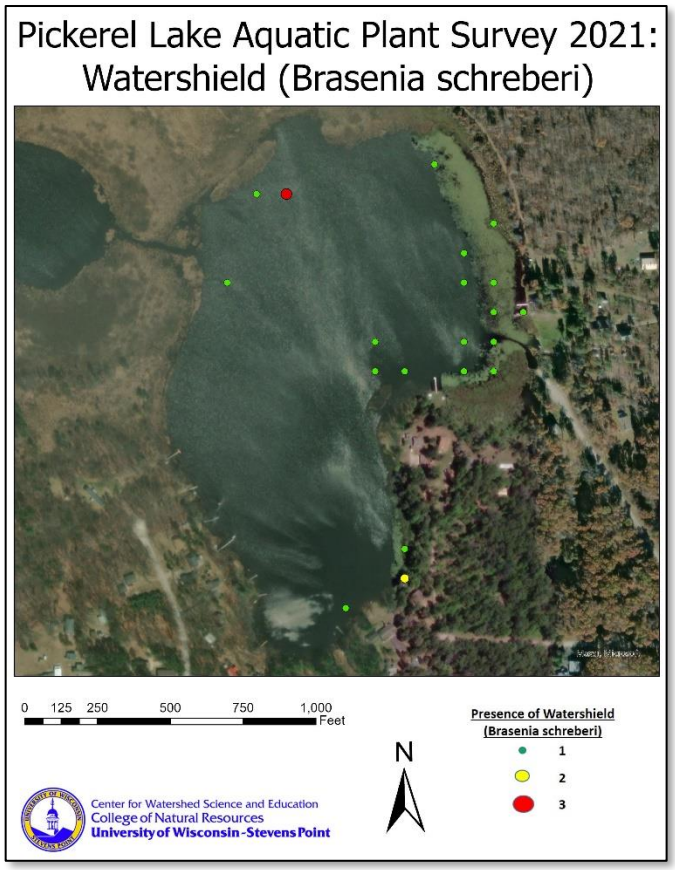




Aquatic Plants

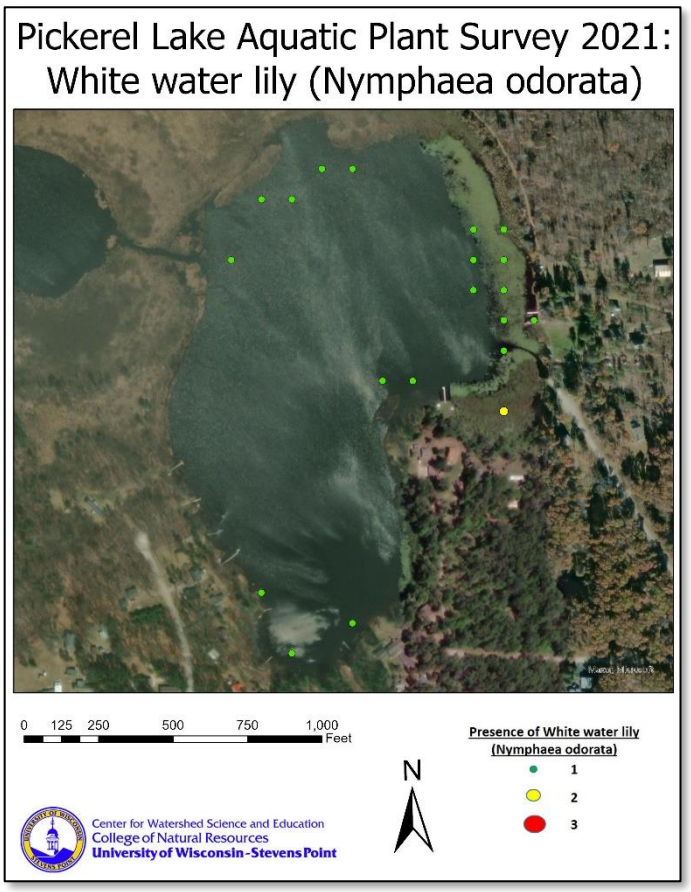


Coontail lacks roots and can form dense mats just below the surface. It is usually in calm, nutrient-rich water and provides habitat for young fish and other aquatic animals. Waterfowl will eat the seeds and foliage.



Watershield has floating leaves with their distinctive jelly-like slime on the undersides and stems. While providing shade and shelter for aquatic animals and food for waterfowl, the plants secrete a number of chemicals that kill or inhibit growth of bacteria, algae, and other plants. Native Americans reportedly ate its tuberous roots.

Aquatic Plants



White water lily has round stalks that grow up from a rhizome in the sediment connecting to large round floating leaves. By mid-summer, white flowers also float at the surface. Lilies are important cover for fish, are food by many species, and help prevent erosion by slowing wave action.

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 2021 aquatic plant survey; however, Chinese mystery snail (2006) and purple loosestrife (2017) have been previously documented in Pickerel Lake.

Chinese mystery snails have the potential to be a vector for the transmission of parasites and disease and have also been known to clog the screens of water intake pipes.

Purple loosestrife prefers moist areas where it crowds out native species and habitat.

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.

Primary Authors

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

Acknowledgments

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