Oconto County Lakes Project

UCIL LAKE STUDY

SUMMARY REPORT

2020

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

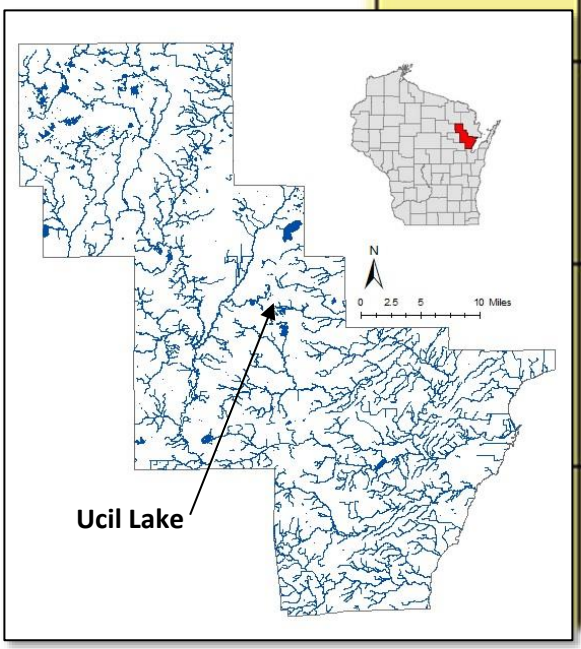
Background

- Ucil Lake is a 78-acre drainage lake in northern Oconto County with a maximum depth of 13 feet.
- Most water enters Ucil Lake via groundwater and leaves via a small outlet stream leading to Wescott Lake with a retention time of 1-2 years. Surface water runoff and direct precipitation also contribute water.
- Visitors have access to the lake from one public boat landing located on the lake's southeast side.
- This report summarizes data collected during the 2018-2019 lake study.

Township of Bagley

Surface Area: 78 acres

Maximum Depth: 13 feet

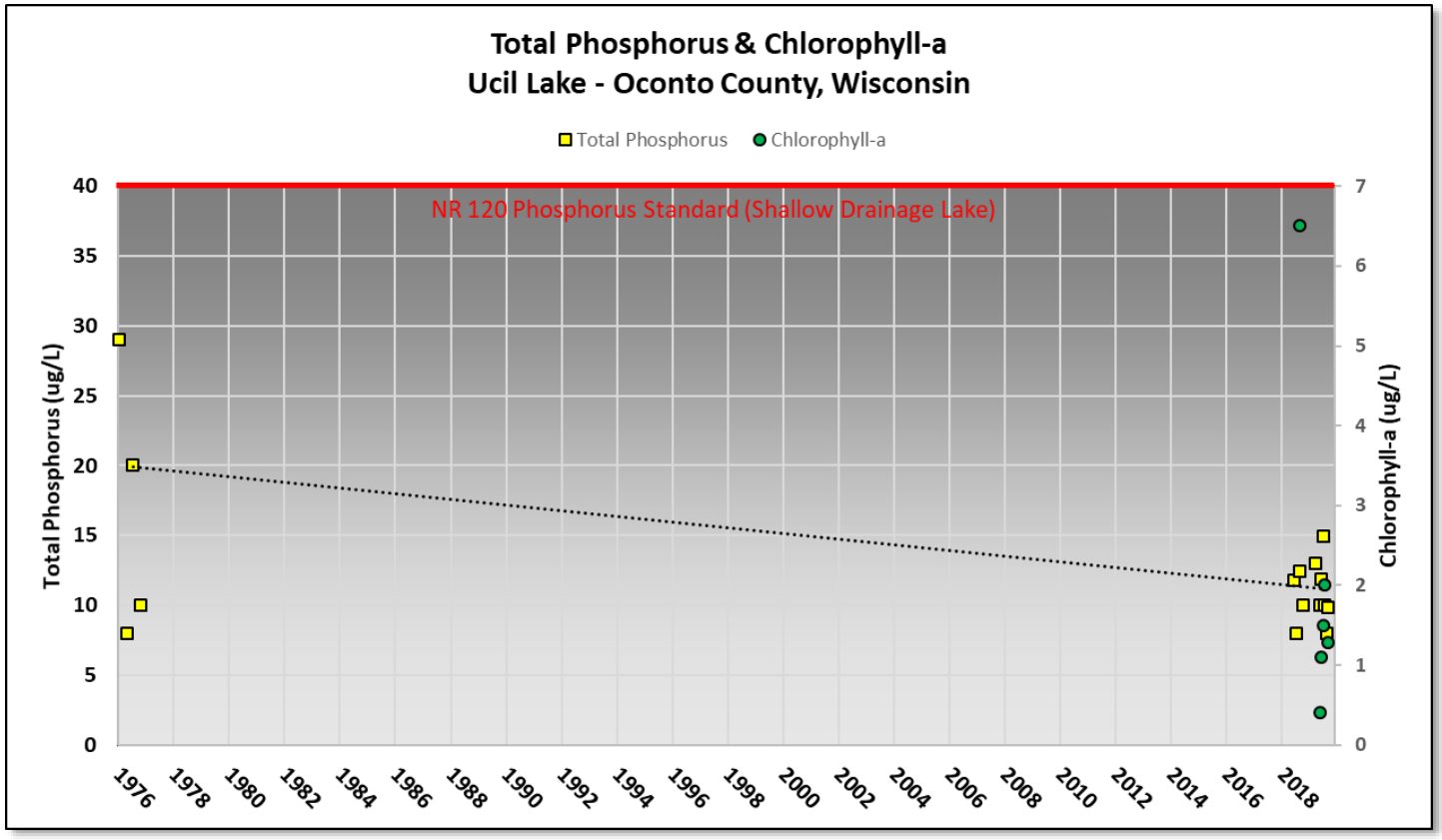


Map created by Brian Zalay, WDNR

Water Quality

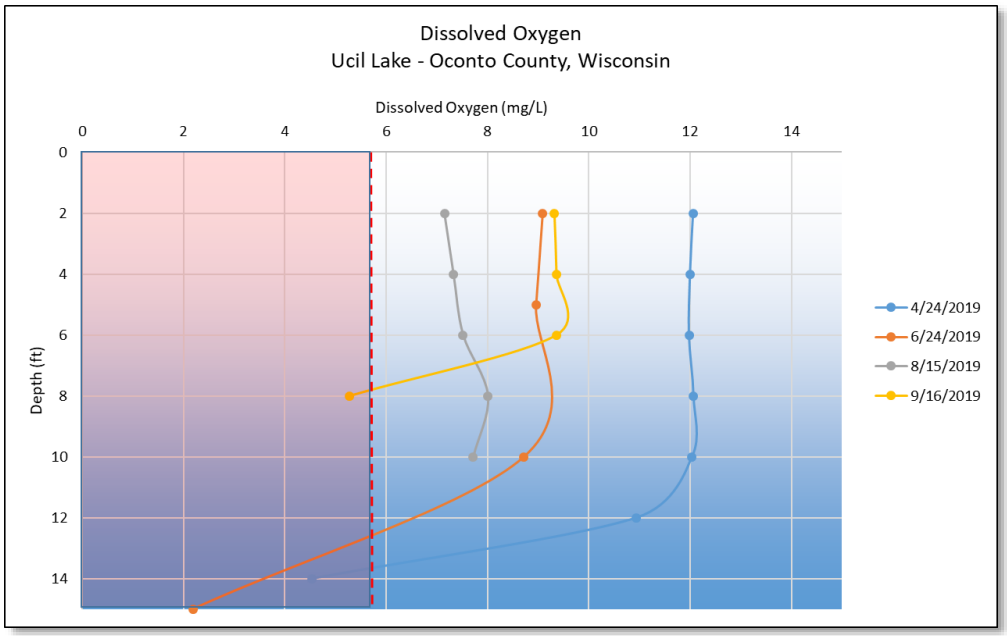
Nutrients such as phosphorus and nitrogen are what feed aquatic plants and algae in a lake. Excessive amounts of nutrients delivered to a lake will result in abundant plant and algae growth. Disturbance within a watershed combined with the landscape's inability to infiltrate and filter runoff is what 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 two-year study. The long-term trend (based on summer samples) suggests a slightly 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, exceeded the threshold of 6 ug/L in one sample. Not enough data is available to determine a trend.



Water Quality

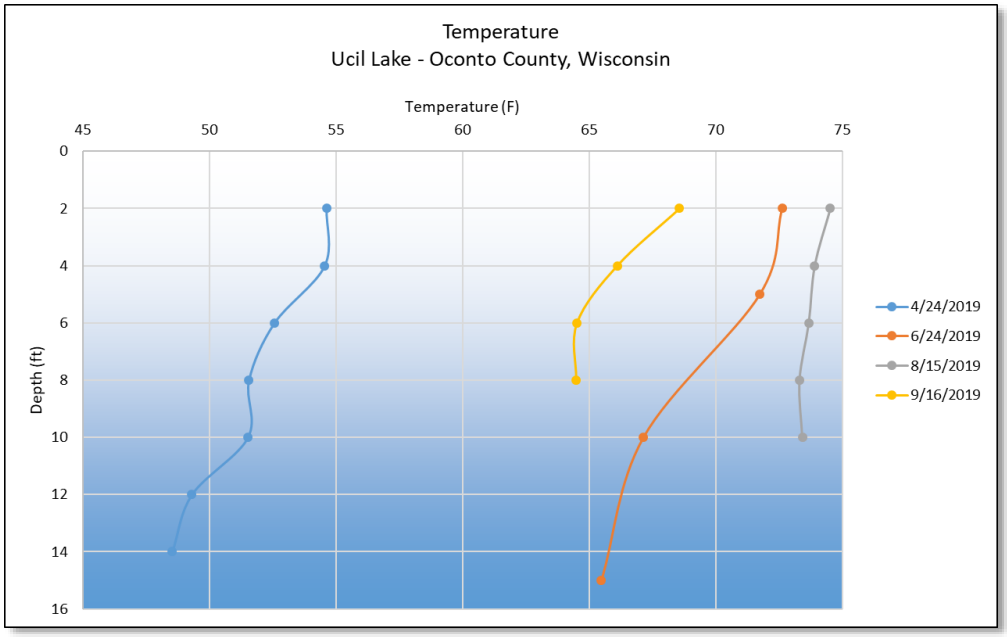
Sufficient **dissolved oxygen** in lake water is essential to the survival of aquatic organisms. The amount of dissolved oxygen present within a lake varies by season and depth. It is determined by the biological activity that consumes or produces oxygen, by water mixing through wind, changes in temperature,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



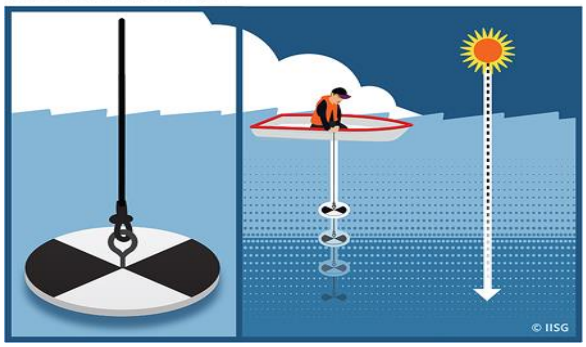
- Sufficient oxygen is available in the water column of Ucil Lake throughout the year. The lowest concentrations were observed in mid-September when only the top 8 feet has enough oxygen to support most fish species.
- No algae blooms are evidenced by the observed oxygen profiles.

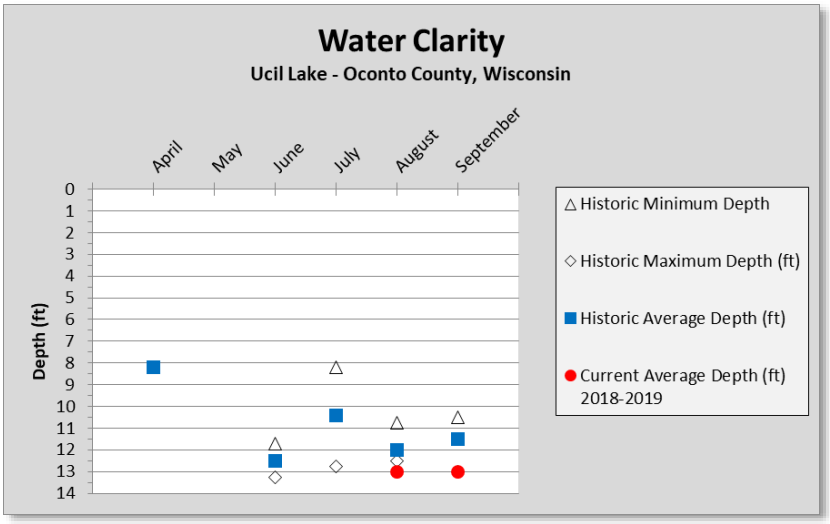
Lake water **temperature** has a significant impact on water chemistry, spatial distribution of fish, microbial growth and oxygen content.

- The temperature gradient in Ucil Lake is relatively straight most of the year, typical of a shallow, mixed lake.



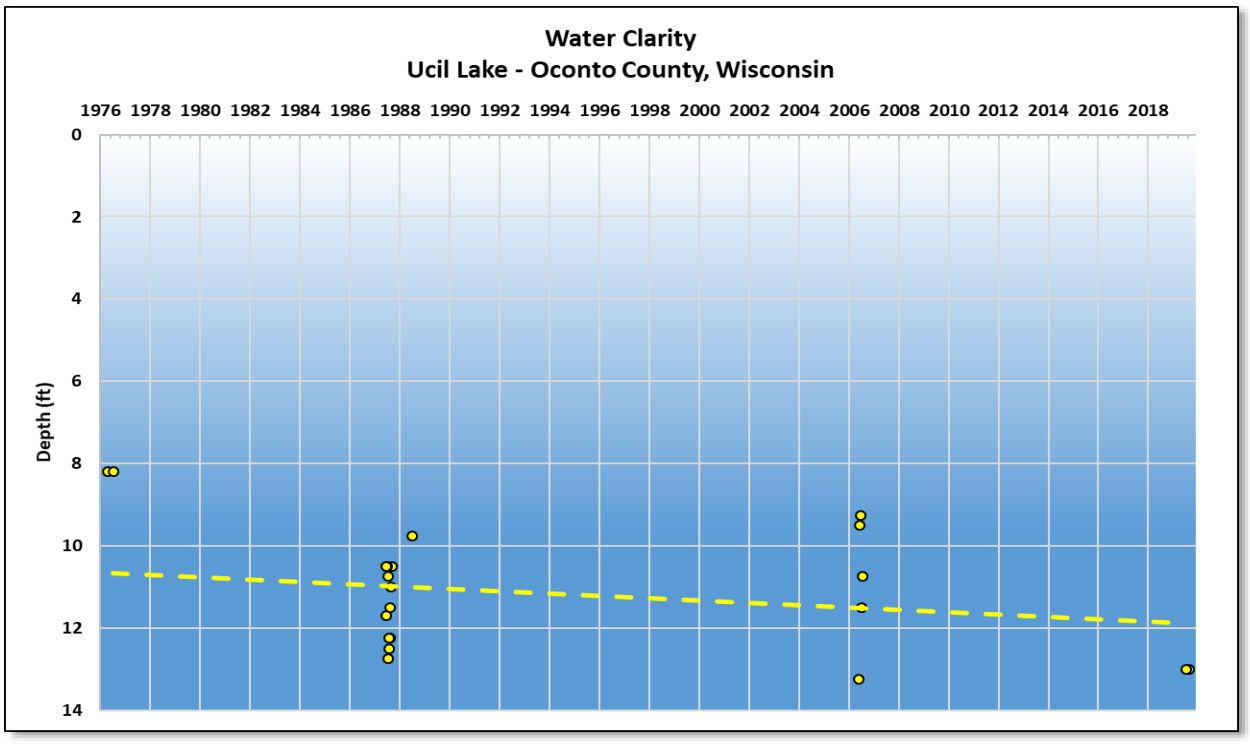
Water Quality





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 November.
- During 2018-19, the average water clarity measurements were consistent with previous observations and demonstrates a slightly increasing trend over the long term.



Water Quality

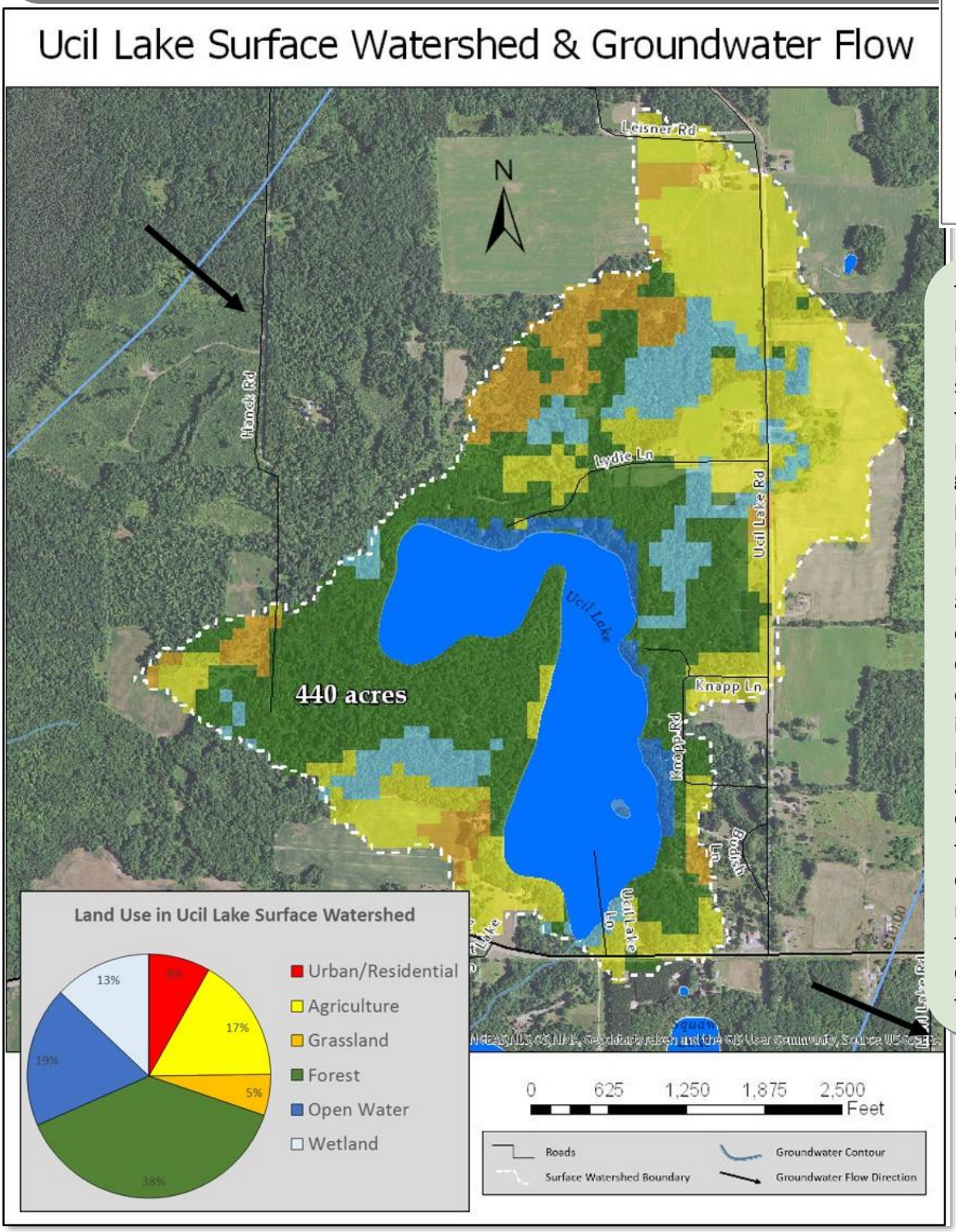
Other chemistry data was collected from lake water samples, such as basic cations, pollutants and acid rain input, and physical parameters. Results of such analyses can provide insights into a variety of other potential impacts to the lake. While concentrations of these compounds in lake water is usually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

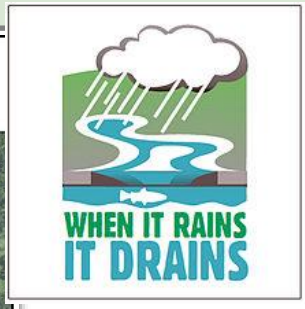
- Concentrations of potassium (1.07 mg/L), chloride (5.7 mg/L) and sodium (3.3 mg/L) were all low. This suggests minimal impact from septic systems, road salt, animal waste and fertilizers.
- DACT, a screening tool to determine if your lake is being impacted by pesticides, was not detected.
- Water in Ucil Lake is hard (123 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 Ucil Lake were surveyed in August 2018. Much of Ucil Lake's shoreland is healthy, but some stretches are in need of restoration.

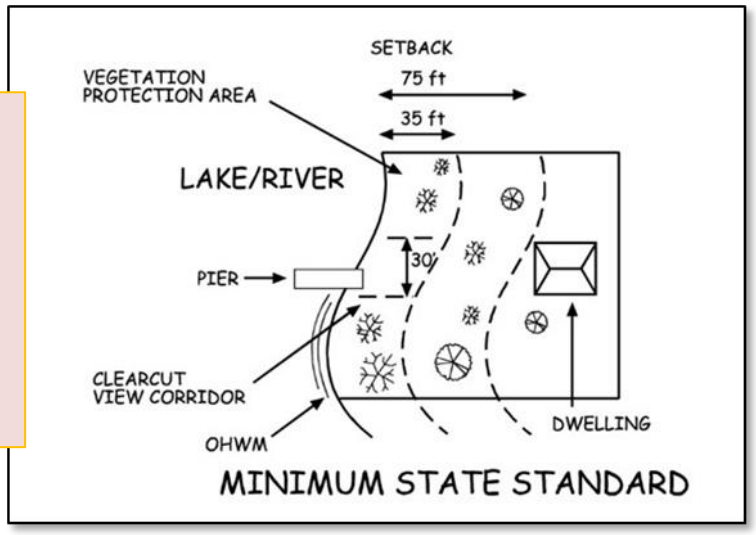
Total lakefront footage	No. Riparian lots	Measured shoreland disturbance (feet)	Measured shoreland disturbance (%)
11,785	47	2,968	25%

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:

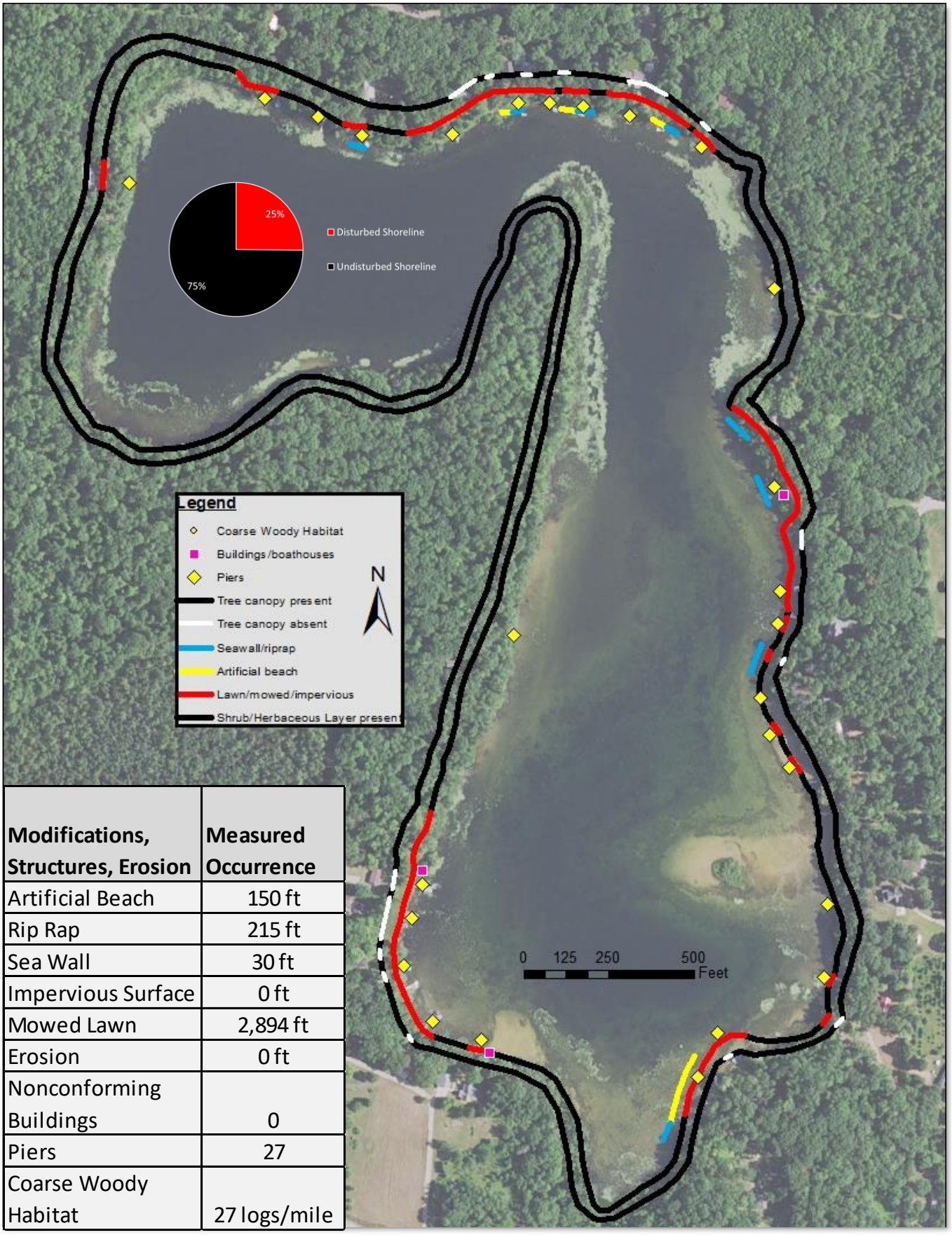
- Up to 30% of shoreline may be removed of shrubs and trees for a view corridor
- A mowed or constructed pedestrian path up to 5 feet wide to access lake



What Can You Do To Help Ucil 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

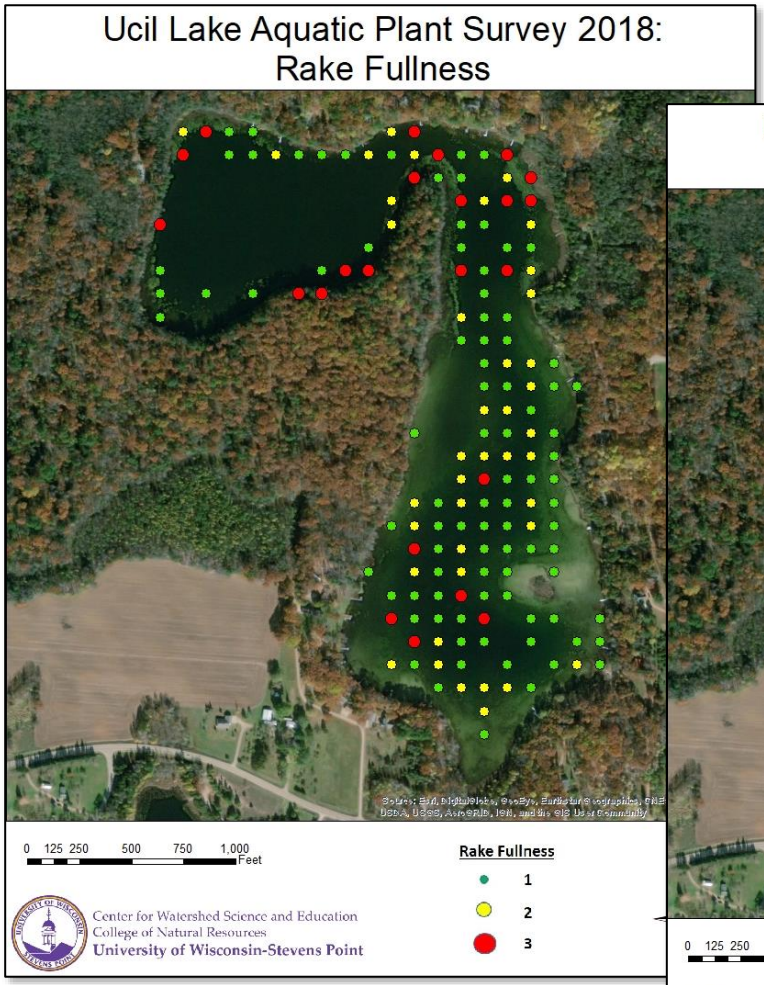


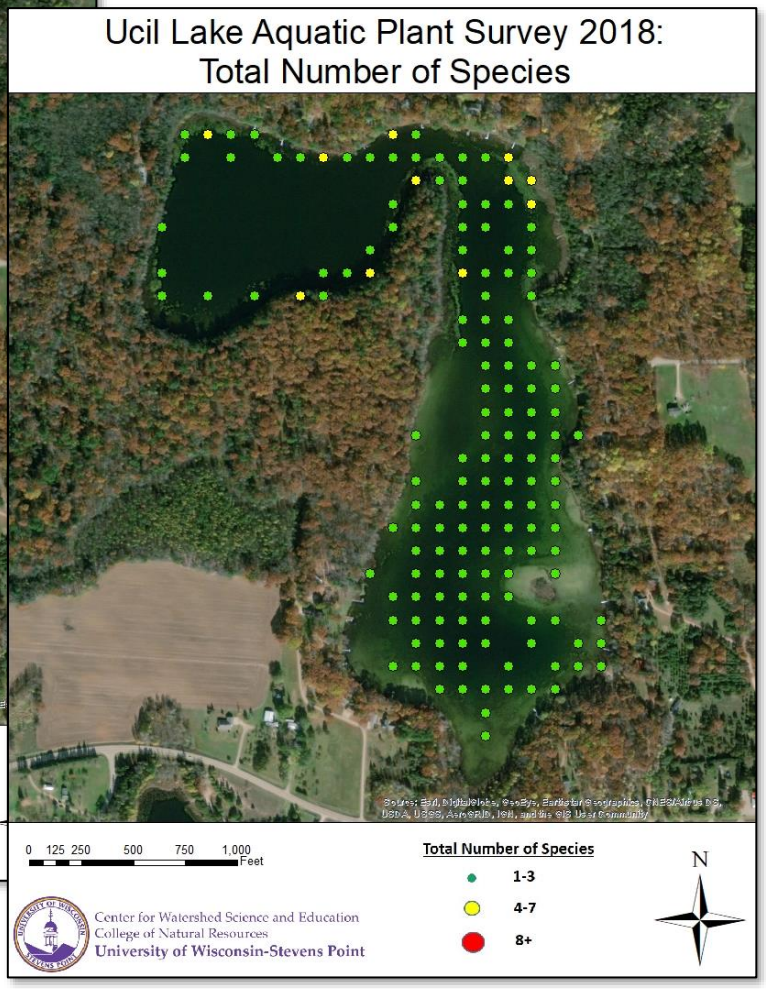
Modifications, Structures, Erosion	Measured Occurrence
Artificial Beach	150 ft
Rip Rap	215 ft
Sea Wall	30 ft
Impervious Surface	0 ft
Mowed Lawn	2,894 ft
Erosion	0 ft
Nonconforming Buildings	0
Piers	27
Coarse Woody Habitat	27 logs/mile

Aquatic Plants

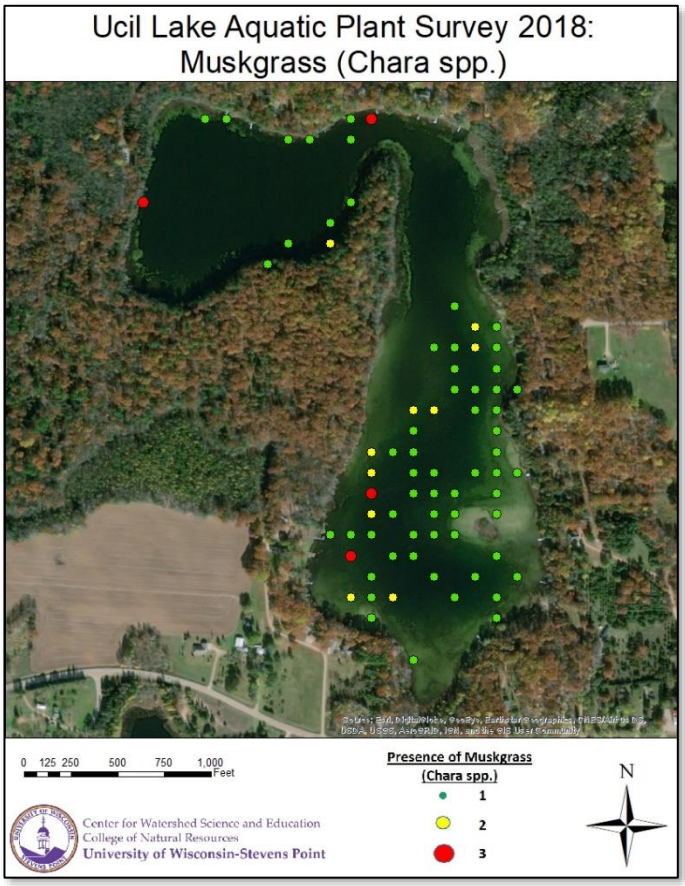
Aquatic plants are the forest landscape within a lake. They provide food and habitat for terrestrial and aquatic creatures such as fish, ducks, turtles, invertebrates and other animals. They increase oxygen levels in the water and utilize nutrients that would otherwise be used by algae. A healthy lake 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 Ucil Lake is characterized by average diversity of plant species when compared to other lakes in the Oconto County Lakes Project, with a total of 20 species in the 2018 survey.
- During the 2018 aquatic plant survey of Ucil Lake, 61% of visited sites had vegetative growth. The maximum depth of vegetation was 15 feet.
- The most frequently encountered plant species were chara (45%), slender naiad (32%) and white-stem pondweed (25%). All three species are native to Wisconsin.
- The invasive species curly-leaf pondweed was observed at one location.

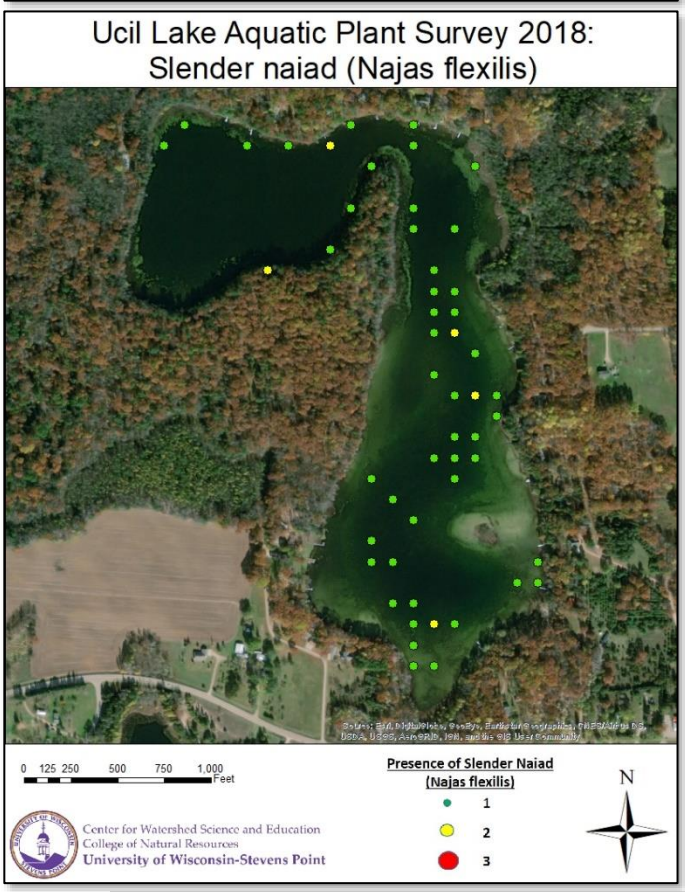




Aquatic Plants

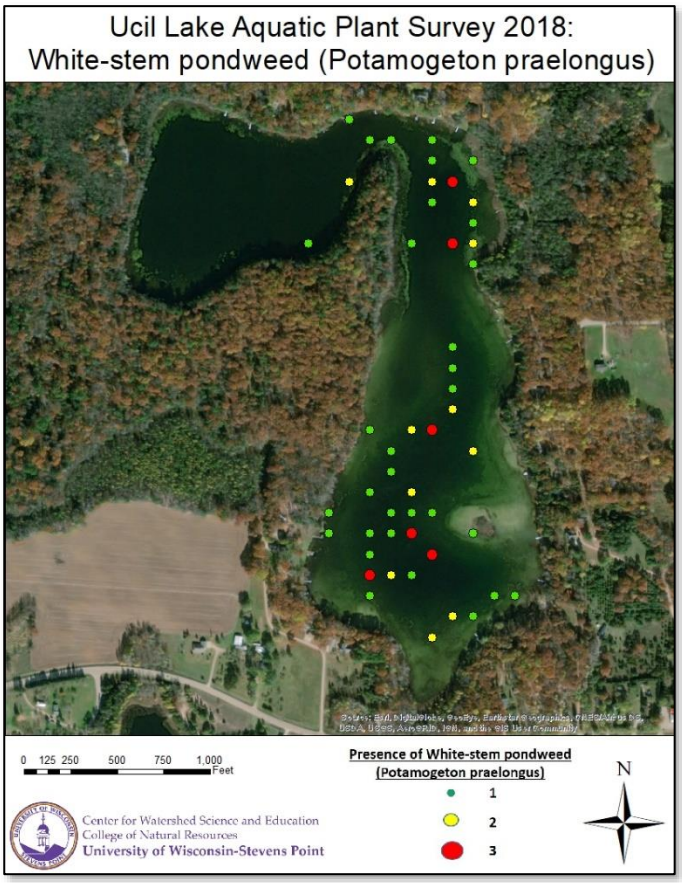


Chara is a type of macro algae that grows attached to muddy lake bottoms and has a musky odor. Muskgrass, as it is known, filters the lake water and is helpful in preventing the establishment of invasive species.

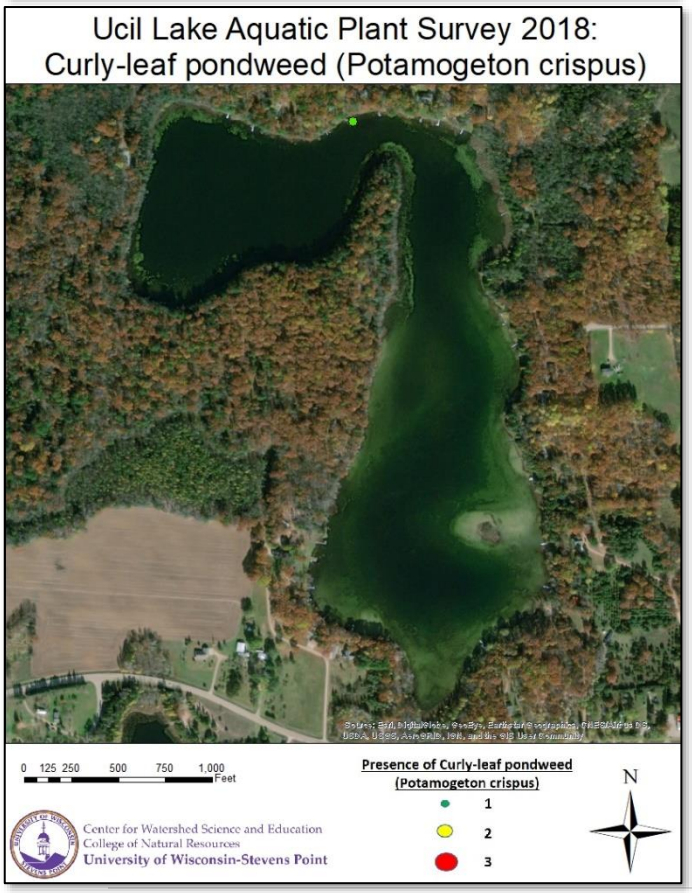


Slender naiad, also called nodding water-nymph, is a primary food source for waterfowl and provides habitat for many invertebrates.

Aquatic Plants



White-stem pondweed is commonly found in northern lakes in soft sediment shallower than 4 meters but does not tolerate turbidity. Its late summer fruits are common forage.



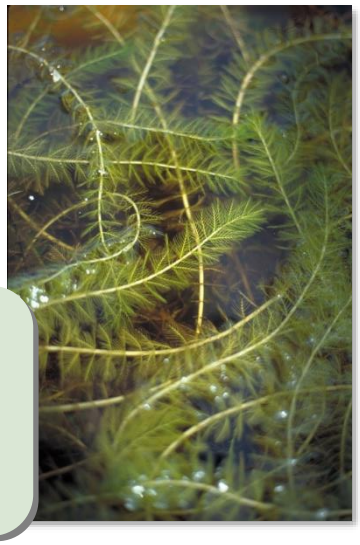
Curly-leaf pondweed invades freshwater lakes and can become dominant due to its tolerance of a variety of habitats. CLP grows primarily during the winter and dies off by June, just was water is warming up which can drastically increase nutrient concentrations.

Invasive Species

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.

- ✓ Curly-leaf pondweed was observed at one location during the 2018 survey.
- ✓ Chinese mystery snail (2011), Eurasian watermilfoil (2018), hybrid watermilfoil (2018) and faucet snail (2018) have been documented in Ucil 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.



Eurasian watermilfoil is one of the most common invasive aquatic plants in Wisconsin. It can from dense mats that choke out native plants and inhibit navigation. New plants can grow from stem fragments that root on contact with the substrate.

Hybrid watermilfoil is a cross between the native northern watermilfoil and the invasive Eurasian. It is known to be more aggressive and can be more tolerant to pesticides.

The **Faucet snail**, native to Europe, is dark-brown to black and up to ½" in length. It spreads by attaching itself to equipment or by ingestion by waterfowl. It is linked to deaths of waterfowl in some areas.

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

We are grateful to our project partners for supporting this project by providing insight, enthusiasm, and funding:

Oconto County Lakes and Waterways Association

Oconto County Land Conservation Department – Ken Dolata

Oconto County Staff and Citizens

UW Extension-Oconto County – Dale Mohr

Wisconsin Department of Natural Resources - Brenda Nordin

Wisconsin Department of Natural Resources Lake Protection Grant Program

UW-Stevens Point Water and Environmental Analysis Lab

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