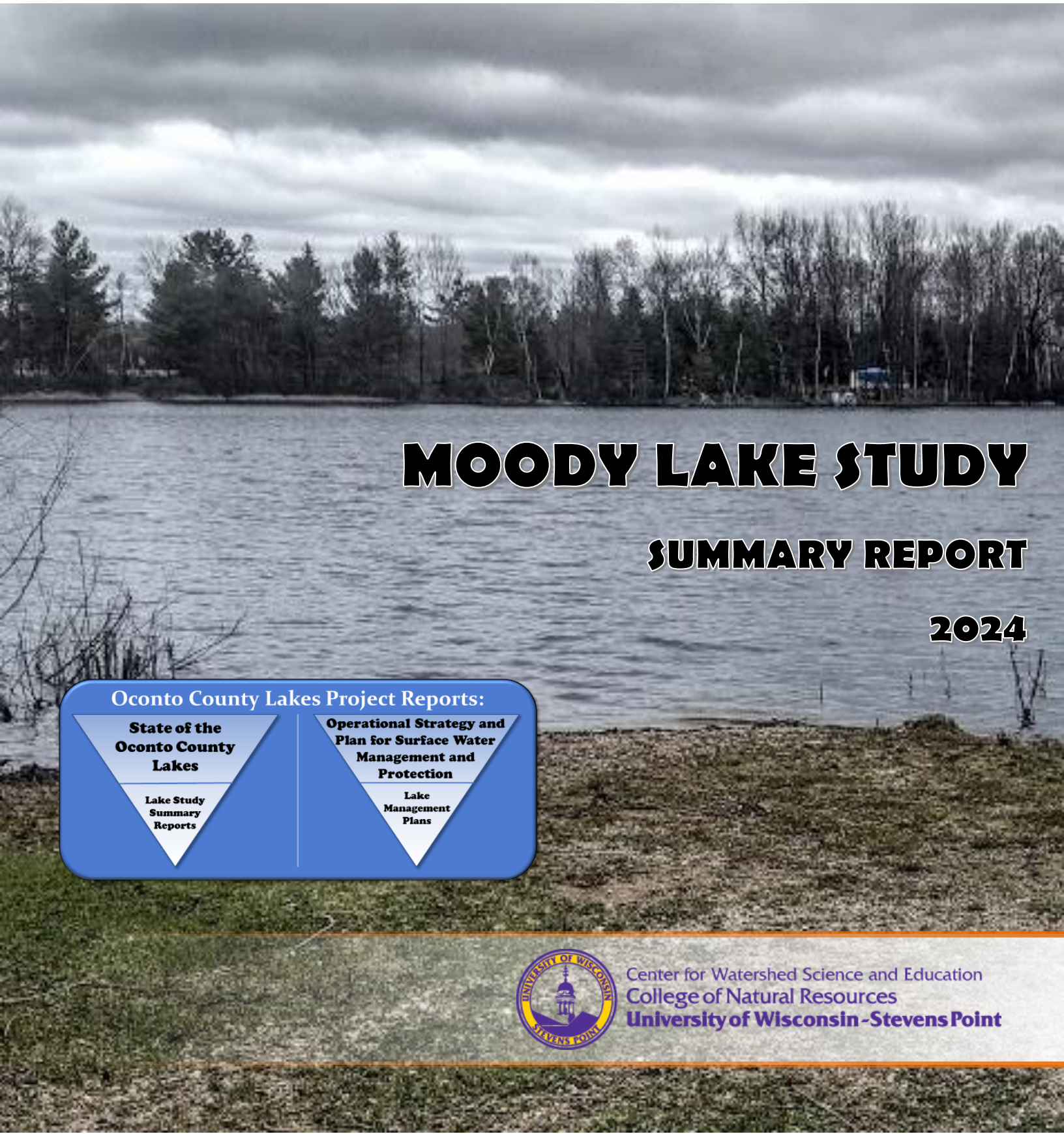
Oconto County Lakes Project



MOODY LAKE STUDY

SUMMARY REPORT

2024

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

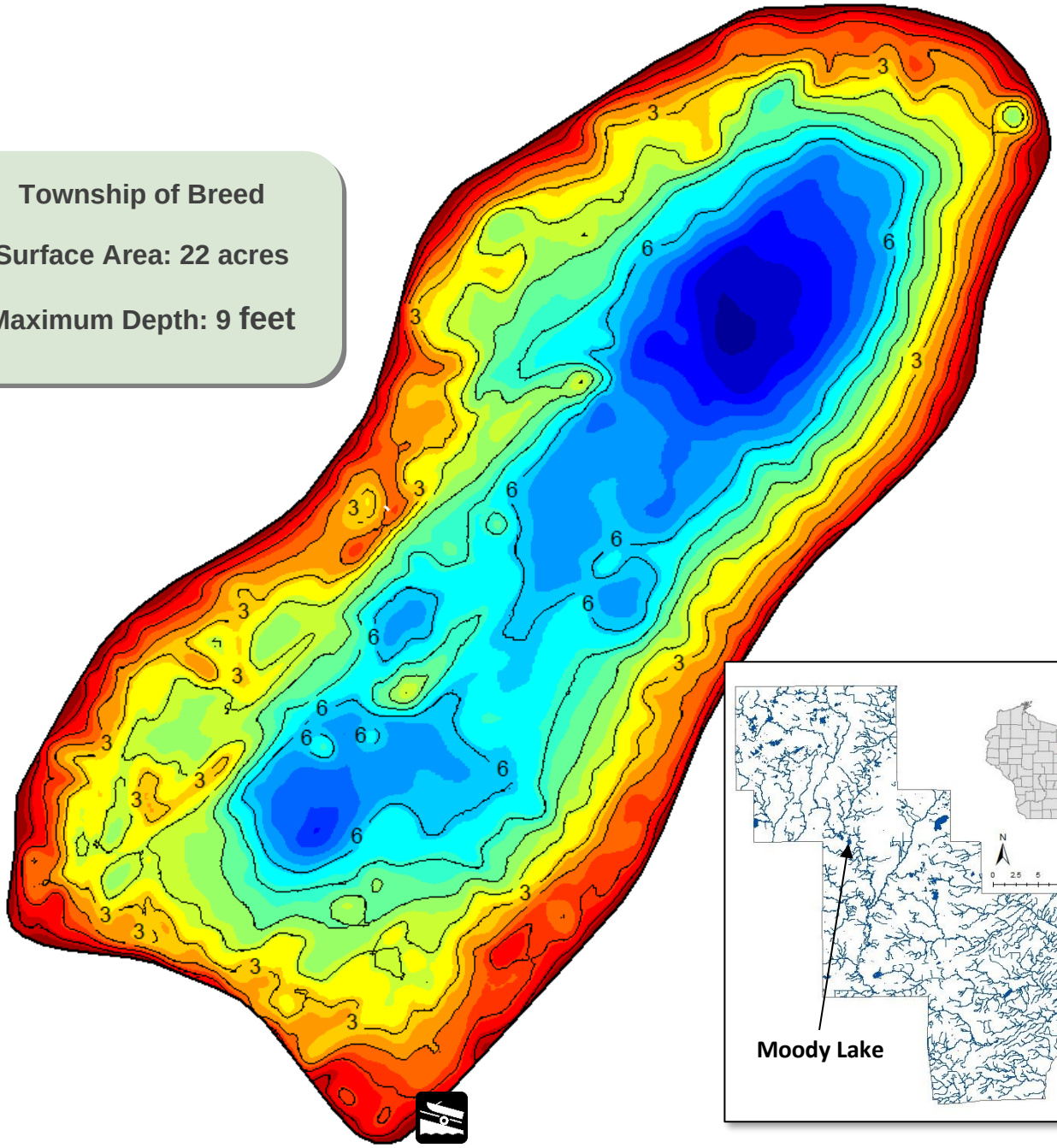
Background

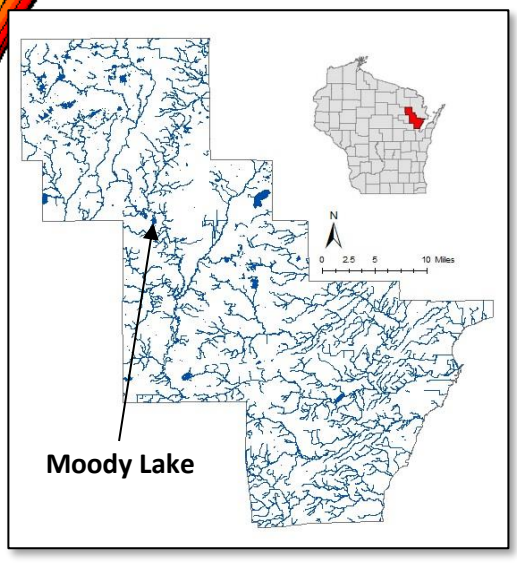
- Moody Lake is a 22-acre seepage lake in central Oconto County with a maximum depth of 9 feet.
- Most water enters and leaves Moody Lake through groundwater. Direct precipitation and surface runoff also contribute water.
- Visitors have access to the lake from one public boat launch located on the lake's south side.
- This report summarizes data collected during the 2022-2023 lake study.

Township of Breed

Surface Area: 22 acres

Maximum Depth: 9 feet

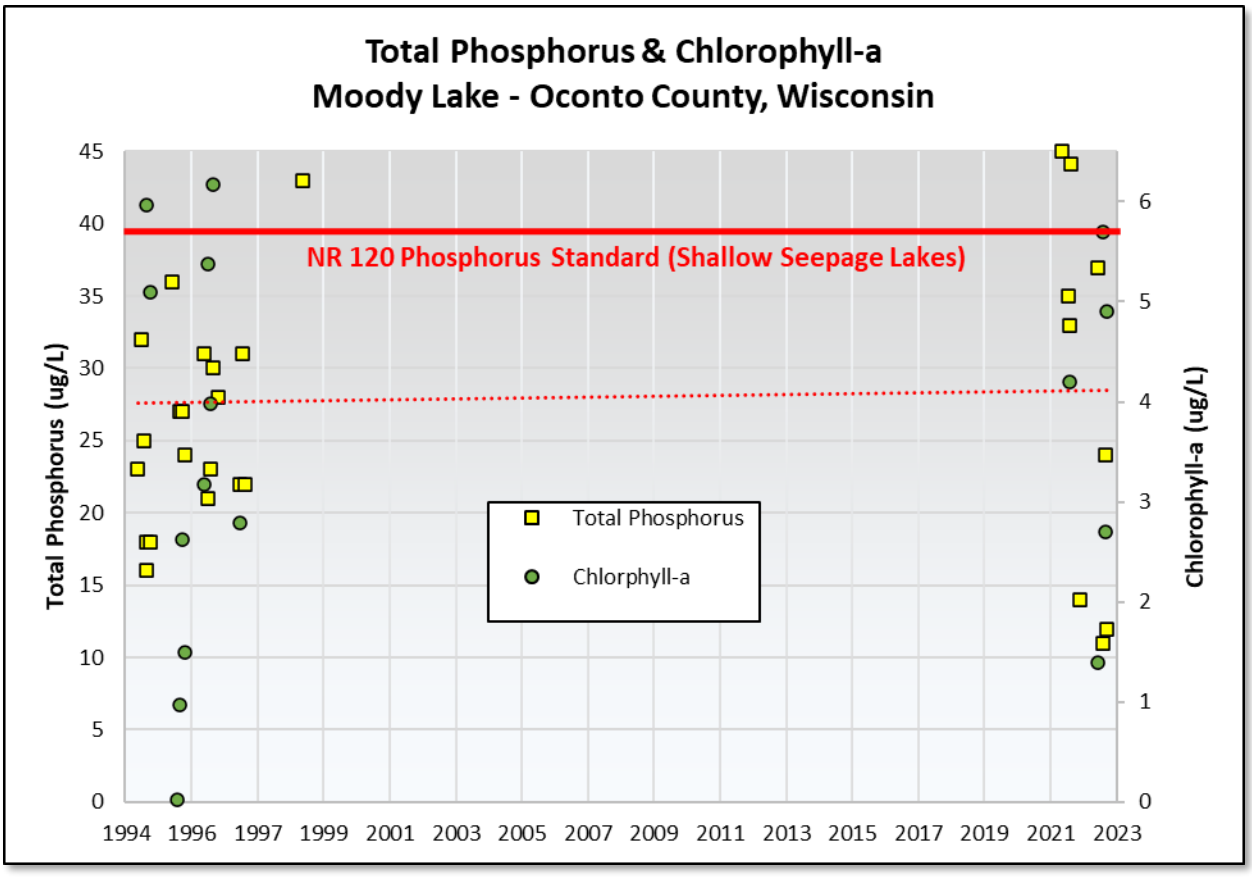




Water Quality

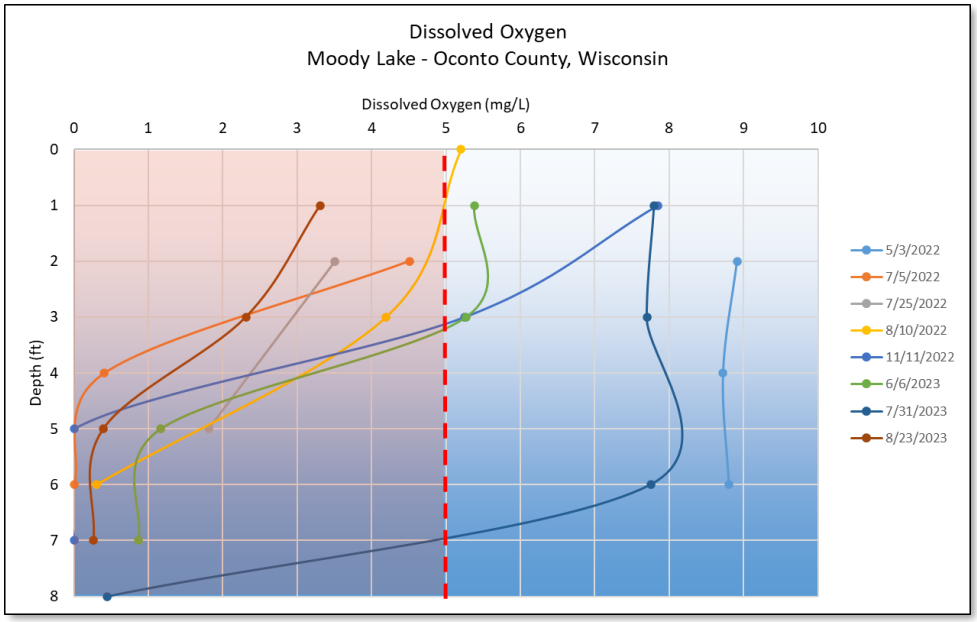
Nutrients such as phosphorus and nitrogen are what feed aquatic plants and algae in a lake. Excessive amounts of nutrients delivered to a lake will result in abundant plant and algae growth. Disturbance within a watershed combined with the landscape's inability to infiltrate and filter runoff is what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

- Total Phosphorus was periodically above the Wisconsin state standard of 40 ug/L for shallow seepage lakes during the two-year study. The long-term trend suggests this average concentration is increasing slightly.
- 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.



Water Quality

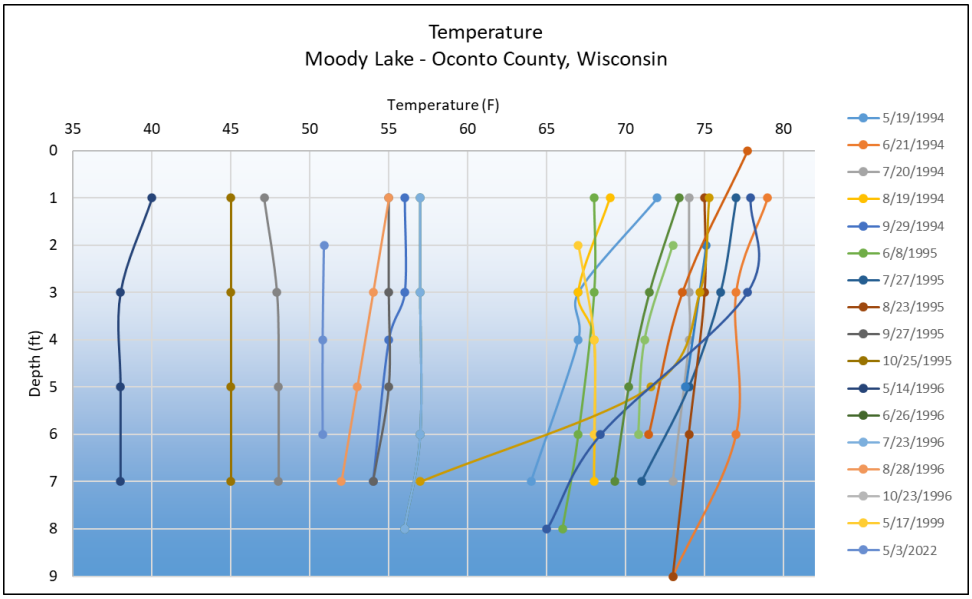
Sufficient **dissolved oxygen** in lake water is essential to the survival of aquatic organisms. The amount of dissolved oxygen present within a lake varies by season and depth. It is determined by the biological activity that consumes or produces oxygen, by water mixing through wind, changes in temperature,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



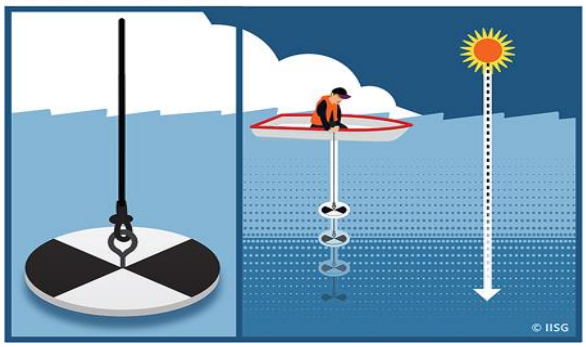
- Moody Lake becomes anoxic in late summer, likely due to decomposition of large biomass. Other times of the year, the water column is mixed with sufficient oxygen concentrations through most of the water column.

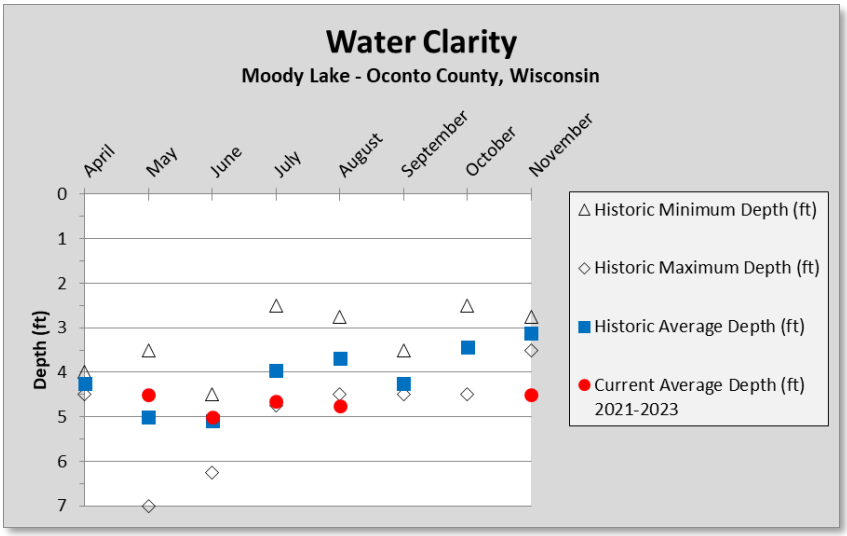
Lake water **temperature** has a significant impact on water chemistry, spatial distribution of fish, microbial growth and oxygen content.

- Temperature profiles in Moody Lake are typical of a shallow, mixed lake with similar temperatures with depth.



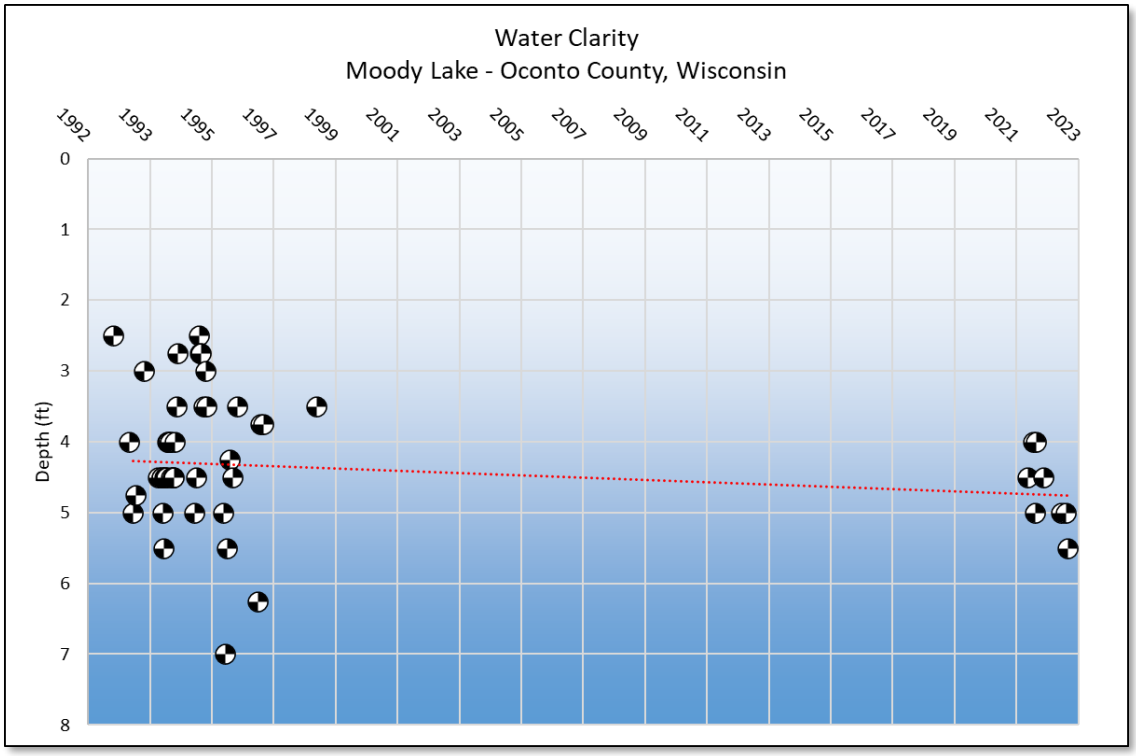
Water Quality





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 graphs below show water clarity measurements taken between April and November.
- During 2022-23, water clarity was best in June and worst in fall.
- The long-term trend in water clarity suggests slightly increasing clarity over the last 30 years.



Water Quality

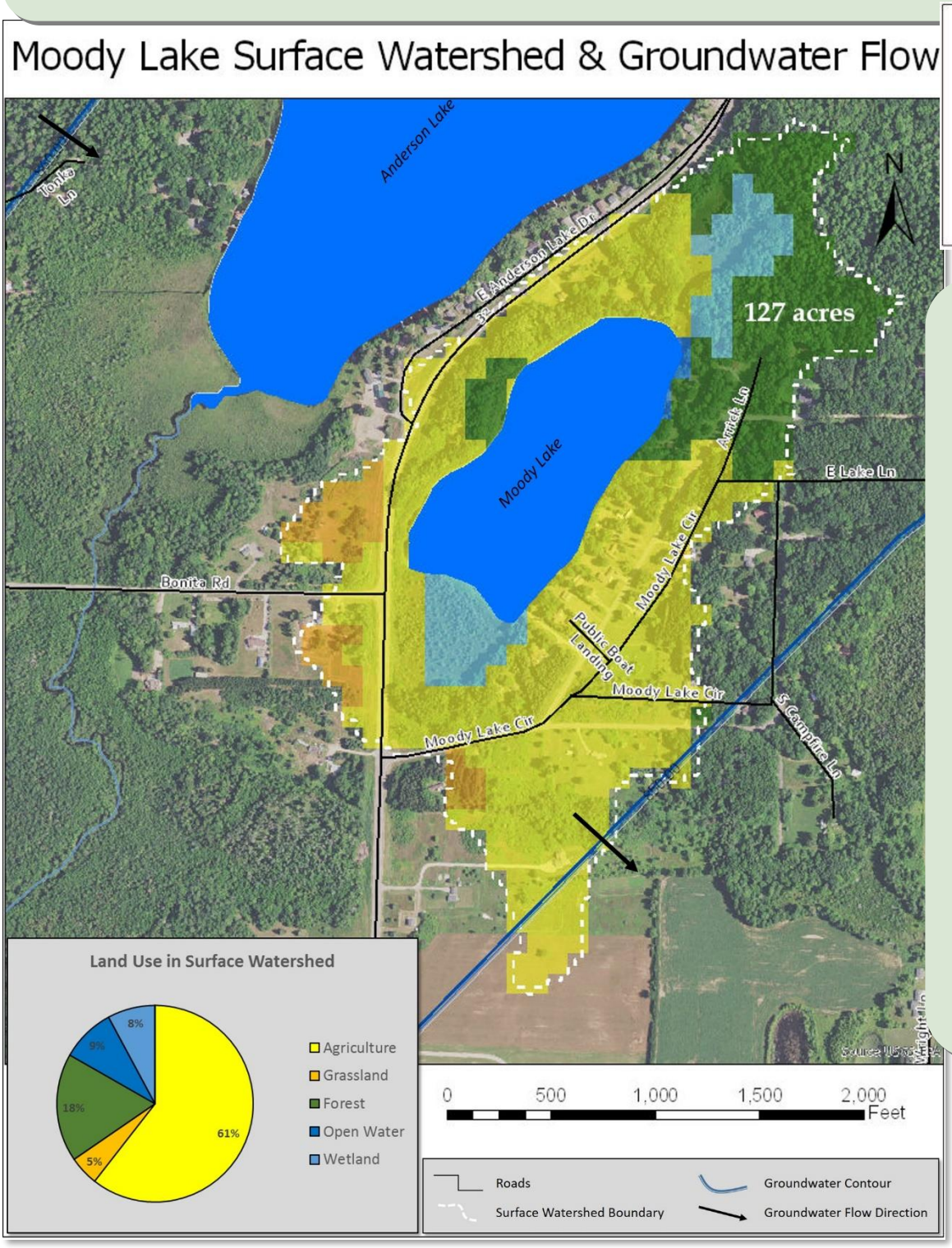
Other chemistry data was collected from lake water samples, such as basic cations, pollutants and acid rain input, and physical parameters. Results of such analyses can provide insights into a variety of other potential impacts to the lake. While concentrations of these compounds in lake water is usually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

- Concentrations of potassium (0.871 mg/L), chloride (2.5 mg/L) and sodium (2.5 mg/L) were low. This suggests minimal impacts from human activity such as 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 Moody Lake is soft (10 mg/L CaCO3), having a low level of dissolved minerals. These are minerals tend to bind with ions like phosphorus making it unavailable. As a result, Moody Lake has a low tolerance for excess nutrients.

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.

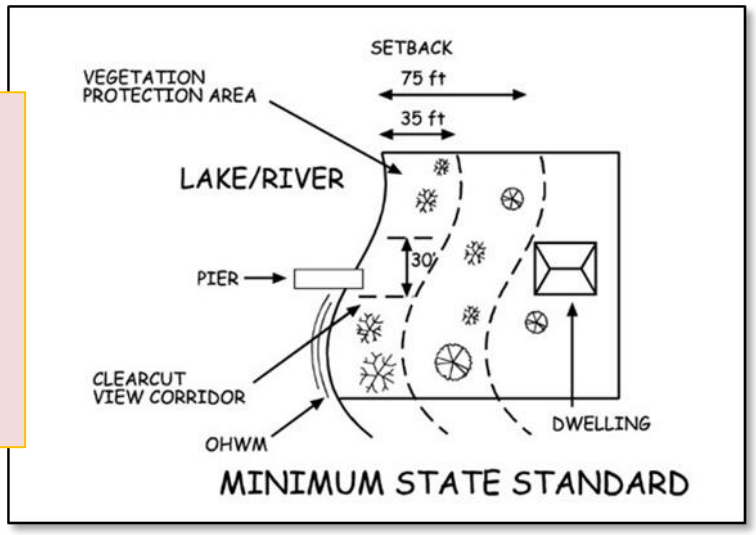
- Shorelands around Moody Lake were surveyed in August 2022. Much of Moody Lake's shoreland is healthy, but some sections are in need of restoration.

Total lakefront footage	No. Riparian lots	Measured shoreland disturbance (feet)	Measured shoreland disturbance (%)
1,324	23	446	34%

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:

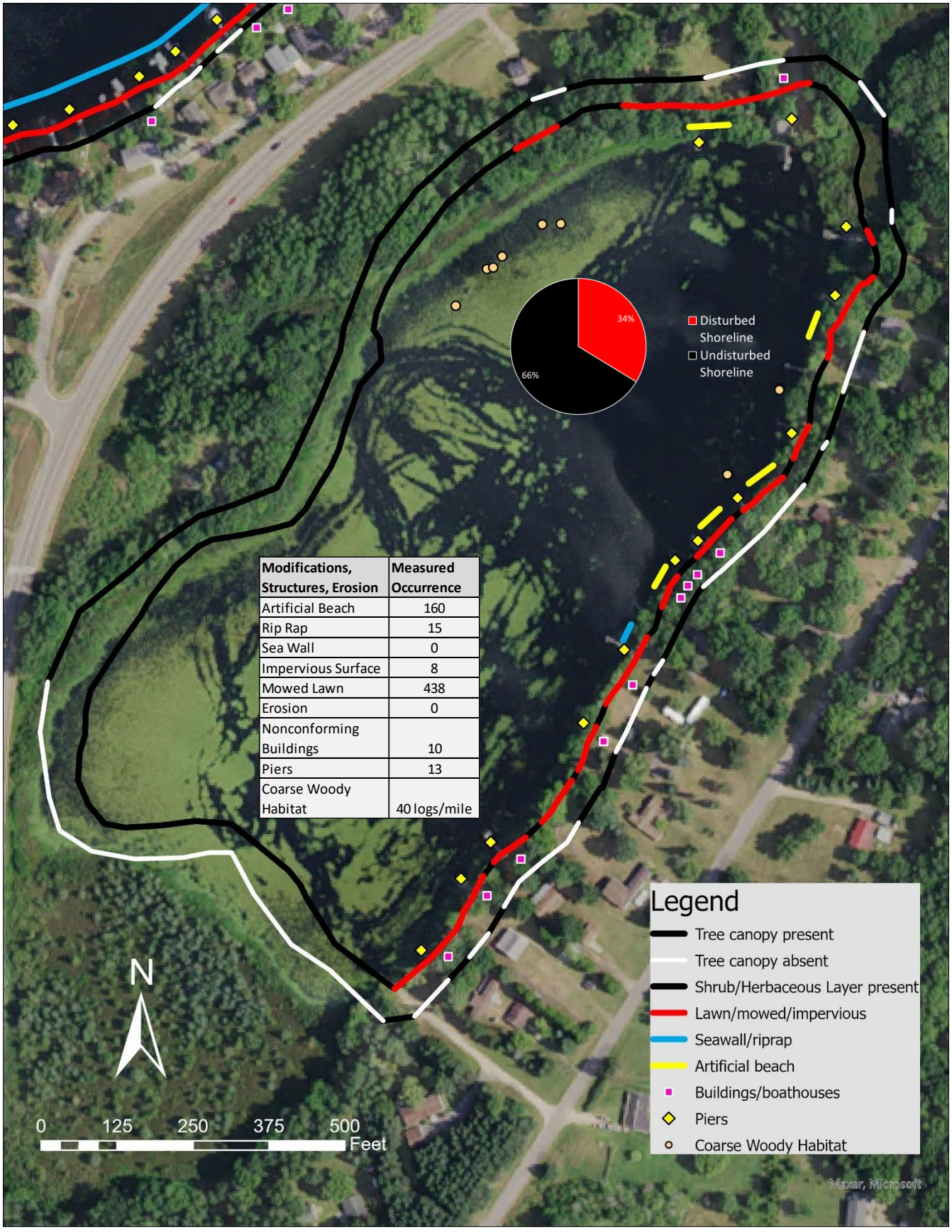
- Up to 30% of shoreline may be removed of shrubs and trees for a view corridor
- A mowed or constructed pedestrian path up to 5 feet wide to access lake



What Can You Do To Help Moody 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


34%
66%
Disturbed Shoreline
Undisturbed Shoreline
Modifications, Structures, Erosion | Measured Occurrence
Artificial Beach | 160
Rip Rap | 15
Sea Wall | 0
Impervious Surface | 8
Mowed Lawn | 438
Erosion | 0
Nonconforming Buildings | 10
Piers | 13
Coarse Woody Habitat | 40 logs/mile
Legend
Tree canopy present
Tree canopy absent
Shrub/Herbaceous Layer present
Lawn/mowed/impervious
Seawall/riprap
Artificial beach
Buildings/boathouses
Piers
Coarse Woody Habitat
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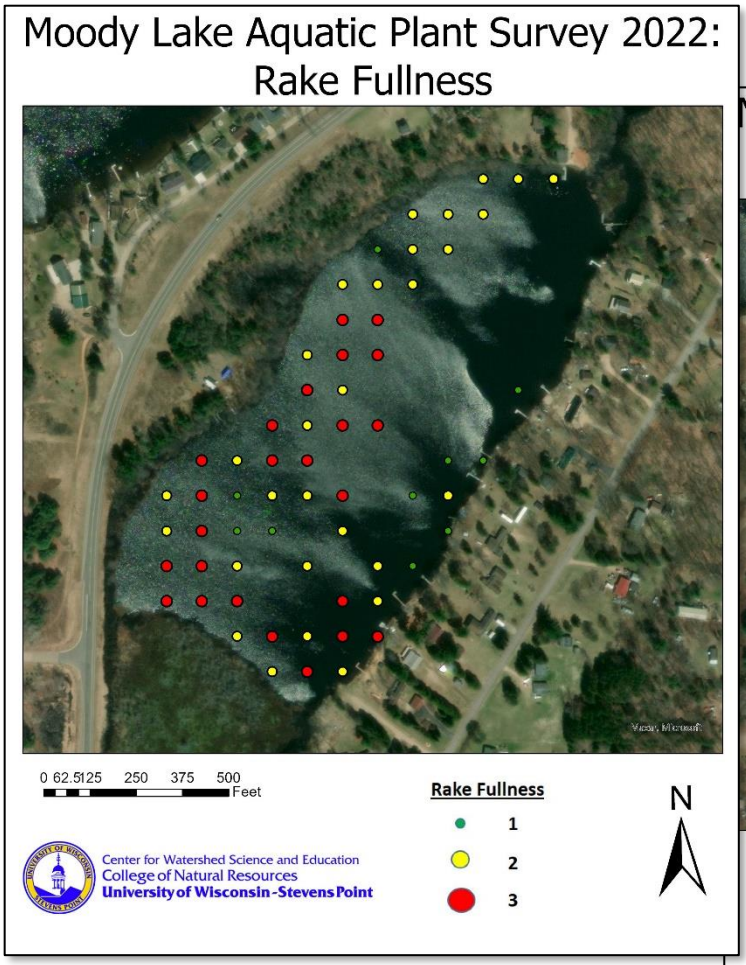
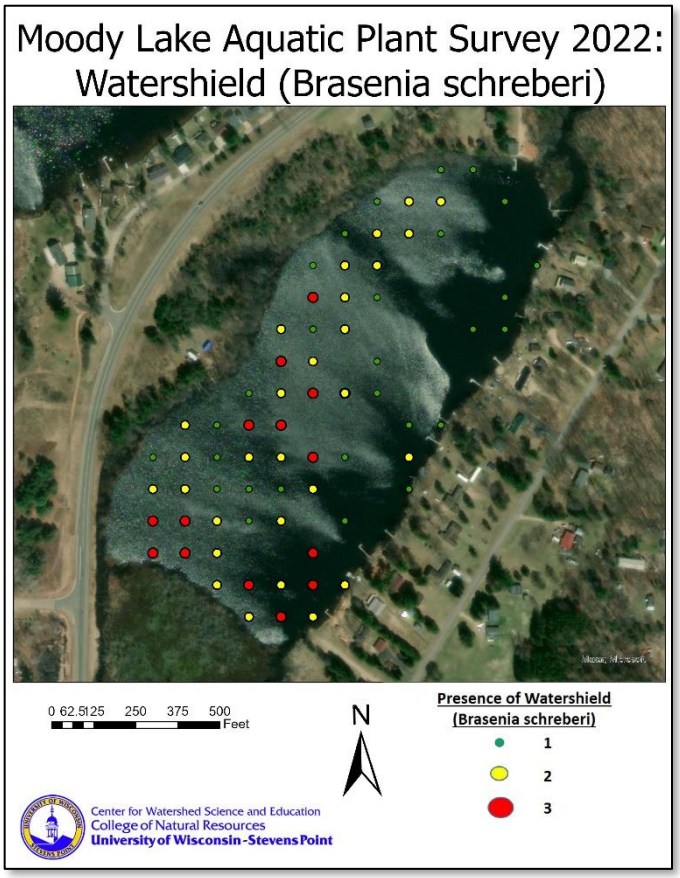
Aquatic Plants

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.

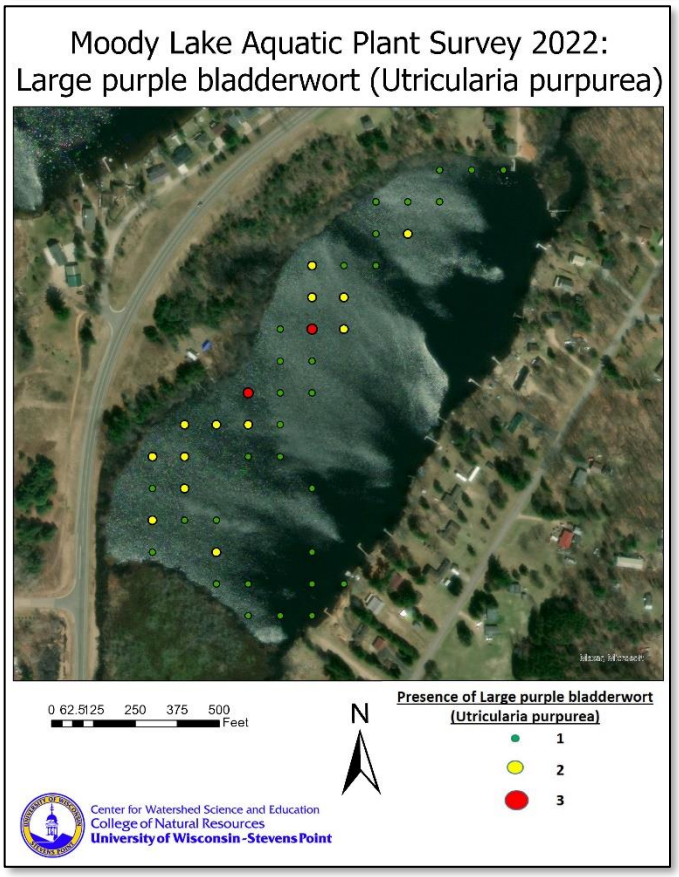
- The aquatic plant community in Moody Lake is characterized by below average diversity of plant species when compared to other lakes in the Oconto County Lakes Project, with a total of 6 species in the 2022 survey.
- During the 2022 aquatic plant survey of Moody Lake, 61% of visited sites had vegetative growth. The maximum depth of vegetation was 8 feet and the Floristic Quality Assessment (FQI) was 16.3.
- The most frequently encountered plant species were watershield (89%) and large purple bladderwort (71%).
- No invasive species were observed.



Aquatic Plants



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.



Large purple bladderwort is a carnivorous plant that forms tiny bladder-like traps capable of capturing small organisms. Primarily a submergent, it occurs in soft, quiet waters with small emergent purple flowers in late summer.

Aquatic Plants

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.

- Chinese mystery snails (2016) have previously been documented in Moody 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.

*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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Acknowledgments

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