Lake Ripley Management District

Aquatic Plant Management Plan

May 2026

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CHAPTER 1- LAKE AND WATERSHED OVERVIEW

1.1 - Location of Lake Ripley and its Watershed

Lake Ripley is located in Township 6 North, Range 13 East, Sections 7-8, Town of Oakland, in western Jefferson County, Wisconsin. It is situated on the eastern edge of the Village of Cambridge (Dane County), and about 25 miles east of Madison. The Lake Ripley watershed covers just over seven square miles of the surrounding landscape. The mostly rural watershed includes the immediate lake area and extends 2.7 miles east of the lake. At its widest points, the watershed stretches four miles along its east-west axis, and three miles along its north-south axis (Figure 1).

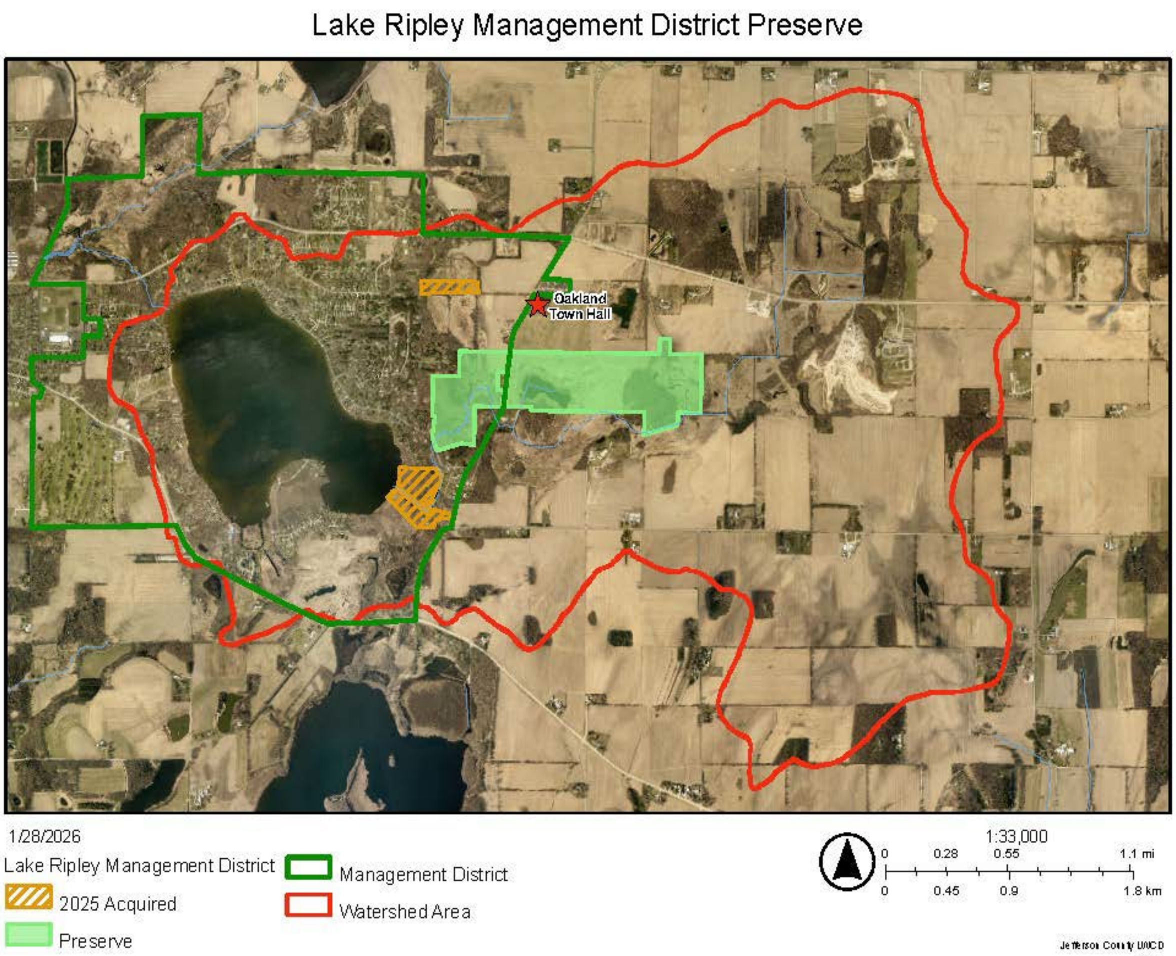


Figure 1: Map of the Lake Ripley Management District, the watershed, and the 245-acre Preserve.

1.2 - Overview of Lake and Watershed Characteristics

Lake Ripley is a natural, glacial kettle lake that formed approximately 12,000 years ago during the retreat of the last ice age. About a seven-square-mile watershed delivers surface water to the lake, predominantly as stream drainage. The lake, in turn, outflows to Koshkonong Creek and is part of the Lower Rock River and Upper Mississippi River Drainage Basins. Lake Ripley is classified as a drainage lake because it is fed by stream flow, groundwater, precipitation and runoff and is drained by a stream. Drainage lakes tend to be high in nutrients compared to other lake types, and their water quality is largely determined by watershed conditions.

Lake Ripley is a nutrient-rich mesotrophic lake. Its healthy diverse native aquatic plant community supports a diverse community of fish and wildlife. The 11:1 ratio of the watershed size to lake-size makes Lake Ripley particularly vulnerable to excess nutrient and sediment loading from its watershed. Lakes with watershed-to-lake size ratios greater than 10:1 more often experience water quality problems when compared to lakes with smaller ratios.

In pre-settlement time, the watershed landscape consisted of upland woodlands and prairies, which absorbed rainfall, above low-lying wetlands, which protected the lake's only inlet stream.

Groundwater provides about 30% of Lake Ripley's water. Groundwater is recharged by rainfall infiltrating the land. The inlet stream provides about 70% of the lake's water. Groundwater buffers the inlet stream, just as wetlands do, maintaining its baseline flow even in times of drought. Precipitation also contributes some water to the lake. Development of residences around the lake has created a landscape dominated by impervious surfaces, preventing groundwater recharge and contributing runoff to the lake. Development of agriculture and the transformation prairies and wetlands into cropland with ditches draining into the inlet stream has increased the nutrient and sediment load the stream carries to the lake.

In summary, in pre-settlement time the entire watershed maintained good water quality in Lake Ripley. Development in the watershed since 1850 has negatively affected the lake's water quality.

PHYSICAL AND HYDROLOGIC DESCRIPTORS	
Lake surface area	423.3 acres (main body); 1.7 acres (Vasby's ditch); 2.5 acres (dredged inlet channel)
Watershed area	4,688 acres (7.3 square miles)
Watershed-to-lake area ratio	11:1
Shoreline length	4.1 miles (main body); 0.57 mile (Vasby's ditch); 0.95 (dredged inlet)
Max. lake depth	44 ft.
Mean (average) depth	18 ft.
Lake volume	7,561 acre-feet (WDNR, 1970)
Water residence time	2.85 years (amount of time water resides in the lake before it is flushed out and replaced with new water)
Inlet stream length	4.25 miles (2.5 miles in 1907, prior to drainage ditching)
Ice-cover period (5-year average)	75 days (2020-2025 average)

Table 1: Summary of lake and watershed characteristics.

CHAPTER 2 - RECREATIONAL LAKE USE

2.1 - Overview

Lake Ripley is a popular and accessible lake enjoyed by local residents and visitors. This small lake offers many recreational activities, including nature watching, fishing, swimming and boating. However, with just 423 acres of surface area, Lake Ripley faces growing and changing lake-use pressures. These pressures can impair lake health as well as diminish the quality of the experience enjoyed by its users.

According to the 2019 Public Opinion Survey, the six most enjoyed activities on Lake Ripley include (from best to least): 1) enjoying peaceful moments, 2) observing wildlife, 3) slow boat rides tied with hiking and biking around the lake, 4) family gatherings, 5) paddling/canoeing, and 6) fishing from a boat.

It follows that the survey respondents chose these as the top four "factors contributing to quality of life" as "very important" (from most to least): 1) safe water quality, 2) healthy aquatic plant community, 3) slow no wake policy tied with rule enforcement, and 4) presence of safety buoys. These would all support their choices of most enjoyed activities.

2.2 - Enjoying Peaceful Moments, Nature Watching, And Slow Boating

These activities can be enjoyed from one's home, while canoeing, kayaking or paddle boarding, especially during the quieter, slow-no-wake hours of 7:30 PM through 11 AM. Of particular interest for these activities will be the undeveloped, habitat-rich Critical Habitat Designation Areas (Figure 9) where beautiful plants and diverse wildlife can be observed in a slow-no-wake zone.

2.3 - Fishing

Fishing is a slow-boat activity that does not diminish other quiet activities. Good fishing depends on good fish habitat and appropriate spawning areas, which our Critical Habitat Areas currently provide.

Fishing boat access is from residents' piers, or at the Town of Oakland's public boat launch and/or the marina. Boats that enter Lake Ripley from the public launch or the marina increase the chance of invasive species entering the lake. Fishing from shore can be done from private shorelines and piers, or at the Town of Oakland public pier on the north shore of the lake. 70% of the respondents to the 2019 Public Opinion Survey thought that public access to fishing was “about right”.

Half of the survey respondents fish from a boat, and 45% find the fishing “fair” (21%) or “good” (24.7%), with no response from 41%. Fish species “liked” included (from most to least): 1) bluegills/sunfish, 2) largemouth bass, 3) walleye, and 4) smallmouth bass.

2.4 - Fast Boating and Carrying Capacity Issues

Carrying capacity is the amount of development and activity a body of water can handle before it starts to deteriorate. Lake Ripley is 423 acres, but when the 200-foot slow-no-wake areas and the Critical Habitat Areas are subtracted, only 378 acres are available for fast boating. This has implications for safely maneuvering at high speeds in hours of high fast boat traffic. These implications are called carrying capacity issues. At its most simple, this means that Lake Ripley can safely accommodate more slow boats than fast boats. Fast boats put more pressures on the lake than any other activity.

There appears to be a trend towards more slow boats owned by lake residents from the 2009 to 2019 survey, but the data is not completely comparable. There were more canoes, kayaks, and sailboats in 2019 than in 2009, and significantly fewer pontoon boats in 2019 than in 2009. The 2009 survey did not distinguish between motorboats with horsepower below or above 25 mph, while the 2019 survey did.

The 2019 survey included 182 slow boats (canoes, kayaks, paddleboards, sailboats), 191 medium-speed boats (pontoons and motorboats less than 25 mph), and 129 speed boats (jet skis and motorboats above 25 mph).

The 2019 Public Opinion Survey shows public concern about the number of boats on the lake; 51% thought there were “too many” boats on the lake on summer weekends after 11 AM, while 51% thought there were “just about right” number of boats on the lake on summer weekends before 11 AM. Speed seems to be a factor of their perception of “too many”.

Fast boating pressures include:

- Increases in boat numbers, size, and horsepower
- Types of speed craft including jet skis and wake boats
- Too many boats on the lake traveling at fast speeds at one time increases the chance or accidents, and reduces the pleasure of all other users

Boats failing to observe the 200-foot slow-no-wake ordinance can:

- Create prop-chop, which is a nuisance to shoreline residents
- Stir up bottom sediment, which reduces water quality
- Create excessive waves near shore, causing erosion problems
- Disturb and uproot aquatic plants

Some rules, ordinances and actions are already in place to help control carrying capacity and related issues. These include:

- The slow-no-wake hours of 7:30 PM to 11 AM
- The slow-no-wake zones for 200-feet from shoreline and Critical Habitat Areas
- Town ordinance to prohibit additional “key-hole” subdivisions
- Town ordinance prohibiting additional piers in Critical Habitat Areas
- Rules, fees, and parking spaces at the Town’s public launch
- Town ordinance prohibiting the use of boats being propelled by motors in the man-made, Vasby’s channel

The District has received concerns about the growing number of wake boats that have been observed on Lake Ripley over the last five years. Residents owning lakeshore property and others who engage in recreational activities on Lake Ripley are increasingly concerned that the large wakes produced by “wake boats” impair the health, safety, and welfare of the general public and are calling for appropriate regulation. Their concerns were centered around the dangerousness of the height, speed, and roguery that artificial wakes can create. Safety for their children and family was their top priority, followed closely by the erosion that these wakes can cause after all of the hard work the District has put in to protect the shoreline of Lake Ripley.

In 2024, the Town of Oakland updated their Ordinance #2 (‘Regulating Traffic, Boating, and Water Sports on Lake Ripley’), to prohibit wake enhancement. You can view the full ordinance here, on the website.

CHAPTER 3- WATER QUALITY

3.1 - Historical Water Quality

How a lake's water quality has changed over time in response to land use changes in the watershed can be determined by examining the lake's sediment. This science is known as paleoecology and is useful because lakes act as partial sediment traps for particles that are created within the lake or delivered from the watershed. The sediments of the lake entomb a selection of fossil remains that are more or less resistant to bacterial decay or chemical dissolution. One of the most useful fossils is the algal group diatoms. The diatoms are especially useful in reconstructing a lake's ecological history because they are highly resistant to degradation and are ecologically diverse. The chemical composition of the sediments may indicate the composition of particles entering the lake as well as the past chemical environment of the lake itself. By collecting an intact sediment core, sectioning it into layers, and utilizing all of the information described above, paleoecologists can reconstruct changes in the lake ecosystem over any period of time since the establishment of the lake.

A sediment core was collected from the deep area in Lake Ripley on August 13, 2007, by Paul Garrison and Gina LaLiberte of the Wisconsin Department of Natural Resources and Paul Dearlove of the Lake Ripley Management District. The complete report can be found in Garrison and Pillsbury (Garrison and Pillsbury, 2009). The length of the core was 72 cm. The core was divided into 1 and 2 cm sections and the diatom community was analyzed to assess changes in nutrient levels and changes in the aquatic plant community. Geochemical elements were examined to determine the causes of changes in the water quality. The timeline of when various sections were deposited was determined using a radioisotope of lead. Changes in the lake's sedimentation rate over time was estimated.

The area around Lake Ripley was surveyed by the General Land Office in 1835. When the township was surveyed in 1835, there were already 15 lots around the lake. The landscape around the lake was diverse prairie, oak savanna and woodlands. Settlement in the area of the lake began in the 1840s as settlers arrived and started farming. One of the earliest settlers was George Dow, an immigrant from Scotland. The lake at that time was known as Lake Dow (Dow and Carpenter 1877). The principal crops at this time were corn, wheat, oats and rye. During the early years, two settlements existed near the lake. One was at the west end near the Village of Cambridge, and the other was south of the lake. During the early part of the twentieth century Lake Ripley became a popular summer resort area. In 1924 there were two large hotels, three smaller ones as well as a number of privately owned cottages (Scott, 1924). Since the 1920s the Lake Ripley area has increased in popularity for summer vacations. The number of resorts has declined, but the number of individual cottages has increased. Nearly all of these early cottages have been replaced by larger homes, and most are now occupied all year. The amount of impervious surface has consequently enlarged and manicured lawns are the norm. Agriculture has also changed in the last century. Following World War II, mechanization greatly increased and the use of synthetic fertilizers became common practice. This has resulted in increased land under cultivation and the application of increased amounts of nutrients onto the landscape. This has resulted in greater soil erosion and increased runoff of nutrients from the land and into the streams and lake.

The sediment core covers the time period of the last 250 years. From the middle of the eighteenth century until the beginning of the twentieth century the sedimentation rate (lake infilling rate) was unchanged and relatively low (Figure 2). With the increased development around the lake and more agriculture in the watershed in the early 1900s, the sedimentation rate began to increase. The highest sedimentation rate occurred around 1940. This likely was the direct result of the channelization of Ripley Creek and the drainage of the wetlands in the watershed, which resulted in a short-term pulse of sediment to the lake. It may have also been linked to conservation practices not yet being widely adopted following the Dust Bowl during the 1930s. For example, during this time a farming technique called moldboard plowing was in high use. The moldboard plowing technique turned the soil over completely, burying all plant material that was left on the ground after harvesting the crop, exposing the valuable topsoil. Leaving the soil surface vulnerable to erosion led to an increased loss of soil and fertilizer resources, subsequently polluting nearby waterbodies. By the late 1950s the sedimentation rate had declined, but remained higher than historical rates. Moldboard plowing was becoming a thing of the past, decreasing from 75-85% use in 1980 to less than 10% use in 1993 (Carter and McKyes 2005). It is likely the higher sedimentation rate was a direct result of increased residential development and agricultural activity in the watershed.

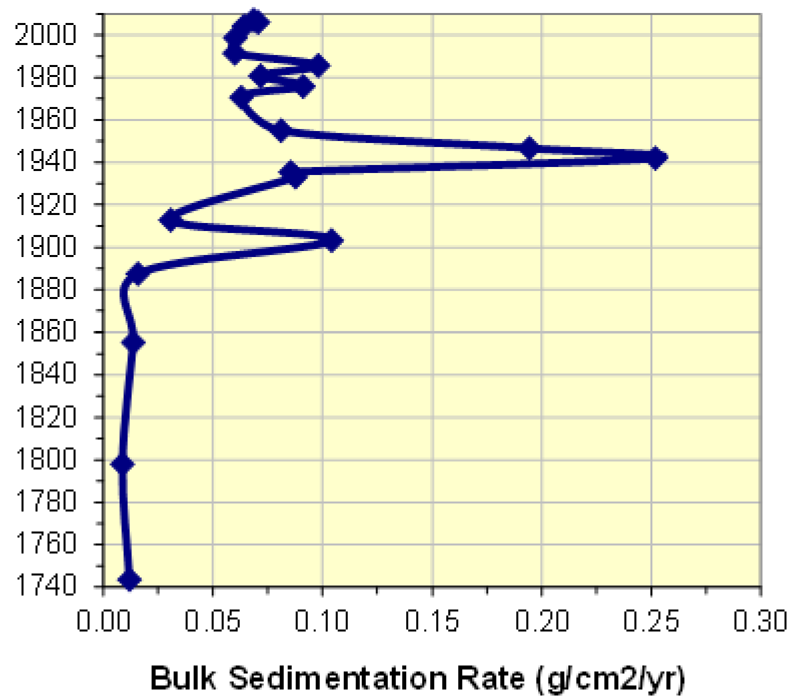


Figure 2: Sediment accumulation rate in Lake Ripley. The peaks around 1900 and 1940 were largely the result of soil erosion from agricultural activities.

In 1993, Lake Ripley and its watershed became part of the Wisconsin Department of Natural Resource's Priority Watershed Program. This provided expertise and financial incentives to reduce sediment and nutrients entering the lake from shoreland development and agricultural activities in the watershed. Improvements included bioengineering to reduce shoreland erosion and nutrient runoff from homes. Improvements in the watershed also included breaking drainage tiles in previously farmed wetlands essentially reducing the export of nutrients from the wetlands. Conservation farming practices such as reduced tillage and no-till were also encouraged to further reduce runoff of sediment and nutrients. Agricultural practices have improved over the last 50 years to protect the soil and the water.

Part of the purpose of the paleoecological study was to determine if these conservation measures improved the lake's water quality. The various sediment reduction measures were successful in reducing the lake's sedimentation rate in the 1990s and the first part of the 2000s, which was confirmed with the sediment core that was extracted in 2007.

Some geochemical parameters were analyzed in the core to determine changes in soil erosion delivery to the lake, nutrient levels, and the primary productivity of the lake. Titanium is a good surrogate for soil erosion as it is only found in soil clay particles. The titanium accumulation rate was very low until the early twentieth century. As with the sedimentation rate, it peaked in the early 1940s (Figure 3) as a result of the channelization of the creek and drainage of the wetlands. Soil erosion declined throughout the 1960s, likely as a result of general conservation practices encouraged by state and federal soil conservation agencies. The reduction in the sedimentation rate beginning in the 1990s was the result of reduced soil erosion.

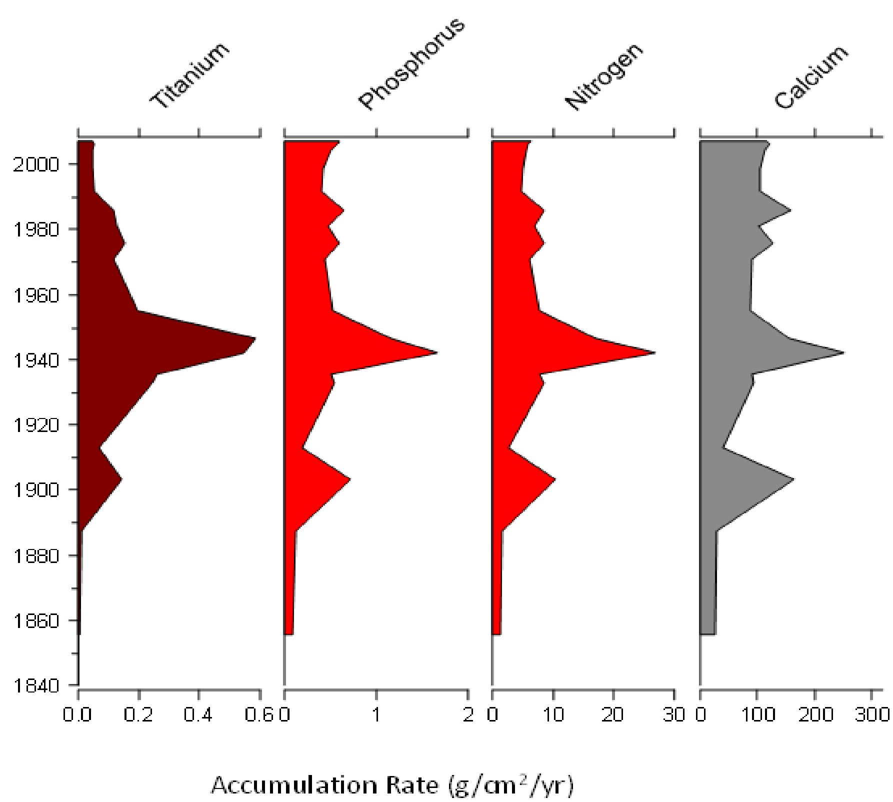


Figure 3: Profiles of the accumulation rate of selected geochemical elements. Titanium is indicative of soil erosion. Phosphorus and nitrogen are essential nutrients for plant growth. Calcium is largely the result of marl formation and is an indication of the lake's productivity.

Although phosphorus and nitrogen accumulation rates during the last 250 years were similar to that of titanium through the first half of the twentieth century, the accumulation rates remained largely unchanged in the second half of the twentieth century. There was a small decrease after the lake became a participant in the priority lake program. The lack of reduction of nutrients since the 1950s is largely the result of increased usage of synthetic fertilizers following the end of World War II. This trend has been documented in a number of other Wisconsin lakes which have significant agriculture in their watersheds.

The calcium profile is mostly the result of calcium carbonate deposition or marl formation. This is very common in a hardwater lake like Lake Ripley. Marl formation increases with increased photosynthetic productivity of the lake. This can be from algae or aquatic plants. The peak calcium deposition in the early 1940s was likely the result of input of marl from the watershed and not in-lake formation of marl. Since 1950, calcium deposition has generally increased even after 1990. This indicates that the lake's productivity has increased. This may be from algal production or from aquatic plants.

The diatom community reflected many of the changes suggested by the sedimentation rate and geochemical profiles. The diatom community was unchanged from the middle of the eighteenth century through the middle of the nineteenth century. The diatom community indicates that the earliest settlers were already impacting the lake in the latter part of the eighteenth century, with changes in the composition of the diatoms even though this was not reflected in geochemistry. The greatest change in the diatom community occurred beginning about 1940 with an increase in diatoms that prefer higher phosphorus concentrations. The diatom community indicates that the highest phosphorus levels occurred during the 1970s.

In recent years, ecologically relevant statistical methods have been developed to infer environmental conditions from diatom assemblages. These methods are based on multivariate ordination and weighted averaging regression and calibration (Birks et al. 1990). Ecological preferences of diatom species are determined by relating modern limnological variables to surface sediment diatom assemblages. The species-environment relationships are then used to infer environmental conditions from fossil diatom assemblages found in the sediment core. The diatom community was used to estimate changes in the summer phosphorus levels throughout the core. Historical phosphorus levels were low, being about 12-13 µg/L (Figure 4). Phosphorus concentrations began increasing after the early episodic sedimentation event around 1900. Phosphorus levels continued to increase and reached their highest levels during 1940-1990. Since the priority watershed project in the 1990s, phosphorus levels have declined, although they are not as low as pre-settlement levels.

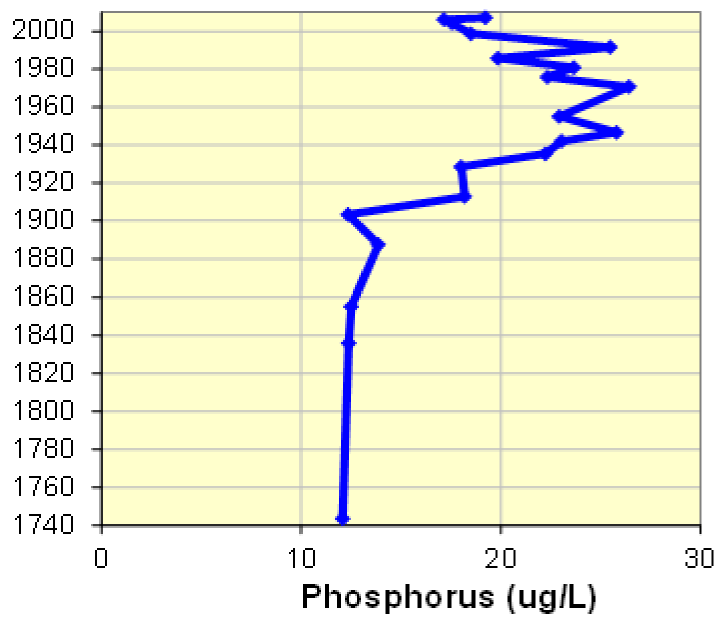


Figure 4: Diatom inferred summer phosphorus concentrations.

3.2 - Phosphorus

Plants need nutrients to grow and the most important nutrients are phosphorus and nitrogen. The nutrient that is in the shortest supply is the one that controls plant growth. Usually this is phosphorus. Phosphorus is also easier to control than nitrogen as the latter has a gaseous component in the biogeochemical cycle. The ratio of nitrogen to phosphorus (N:P) is used to determine which element is limiting. A N:P ratio greater than 15:1 is indicative of phosphorus limitation while a ratio of 10:1 to 15:1 is considered a transition situation. The N:P ratio in Lake Ripley in July 2019 was 25:1 indicating that the lake is phosphorus limited. This is not surprising as in nearly all Wisconsin lakes, phosphorus is the limiting nutrient.

For the period 1986 through 2005, phosphorus concentrations were generally in the excellent range. The unusually high concentration in 1993 reflects the higher than normal rainfall that occurred that year. This resulted in larger than normal streamflow and phosphorus input from the watershed. This elevated value was noted in many other

Wisconsin lakes that year. Since 2006 phosphorus concentrations have been higher, placing the lake in the good category. The average summer phosphorus concentration for the period 1986-2005 was 19 µg/L and for the period 2006-2020 the average summer concentration was higher at 25 µg/L. For the period 2021-2025 the average summer concentration came down measuring at 21 µg/L.

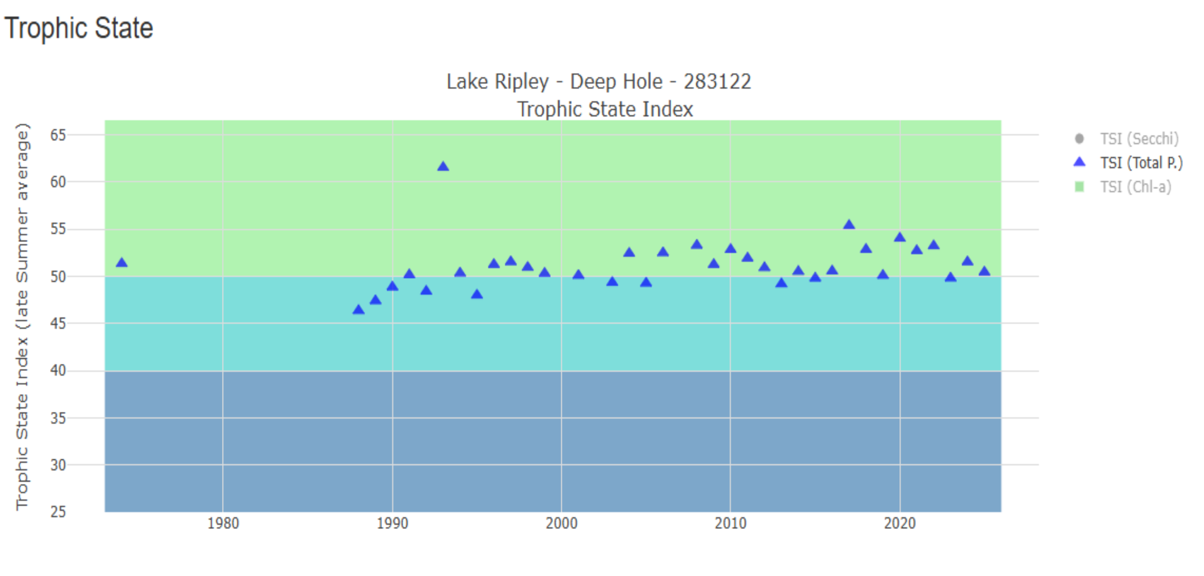


Figure 5: Total phosphorus data from 1975-present. Graphic provided by WDNR.

The average summer phosphorus concentration for the period of record is 21.5 µg/L, which places the lake in the 'good' category. The average phosphorus concentration in Lake Ripley is similar to the median value for other deep lowland drainage lakes, as well as all lake types in the SWTP ecoregion. The Wisconsin Department of Natural Resources has established phosphorus criteria for impairment for lakes, streams, and rivers. The

Table 15. Range of ambient total phosphorus levels for applying combined assessment for total phosphorus, by waterbody type. Unstratified refers to Shallow lakes and stratified refers to Deep lakes.

Waterbody Type	Total Phosphorus Criterion (ug/L)	Combined Approach Range (ug/L ambient total phosphorus)
Stream or its Impounded Flowing Water	75	75 to <150
River or its Impounded Flowing Water	100	100 to <200
Unstratified Reservoirs, Unstratified Drainage or Seepage Lakes	40	40 to <60
Stratified Reservoirs, Stratified Drainage Lakes	30	30 to <45
Stratified Seepage Lakes	20	20 to <30
Two-Story Fishery Lakes	15	15 to <22.5

impairment limit for lakes similar to Lake Ripley is 30 μg/L (Wisconsin State Statutes, 2026).

The 5-year summer total phosphorus average from 2021-2025 is 21.15 μg/L. The District is constantly working towards better water quality for Lake Ripley by continuously testing water quality of the inlet stream and lake, encouraging landowners to use BMPs, and installing conservation practices wherever possible.

During the summer of 2025, the summer total phosphorus averaged at 18.8 μg/L. This is lower than it has been in years. Phosphorus fluctuations are driven by seasonal changes (temperature, water levels, ice cover), internal sediment release, and external inputs (runoff, pollution). During 2025, precipitation in Wisconsin followed a “ping-pong” pattern, with shifts between very dry and very wet months (Mason, et al., 2026). This would have contributed to the lower phosphorus average for 2025.

3.3 - Algae

Chlorophyll-a is the green pigment in plants used during photosynthesis. Chlorophyll-a concentrations are directly related to the abundance of free-floating algae in the lake. Chlorophyll-a values increase during algal blooms.

The chlorophyll-a concentrations in Lake Ripley for the period of record (1986-2020) place the lake in the ‘good’ category. The average summer chlorophyll-a concentrations for the periods 1986-2005 and 2006-2020 were nearly the same at 8.6 and 8.3 μg/L, respectively. The 2021-2025 average concentration is 7.3 μg/L, a 1.0 μg/L drop from the last recorded average. The average summer concentration for the period of record is 8.0 μg/L, which is well below the impairment threshold of 27 μg/L (Wisconsin State Statutes, 2026).

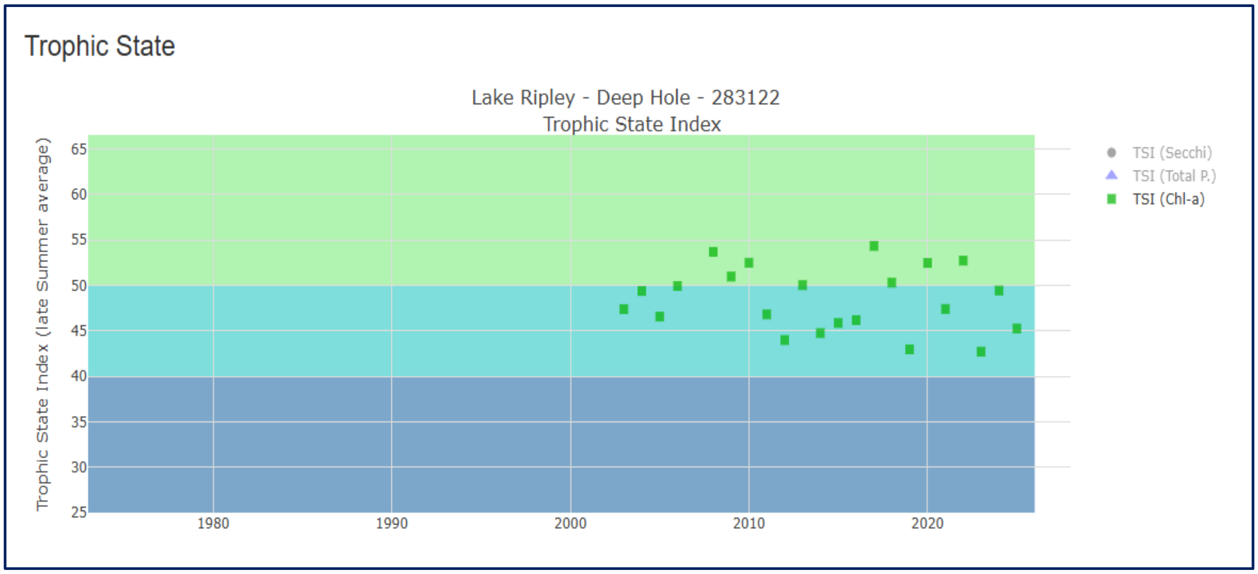


Figure 6: Chlorophyll-a data 1975-present. Graphic provided by the WDNR.

Unlike phosphorus, chlorophyll-a concentrations during the last decade are not higher than the earlier two decades. This may be the result of the arrival of zebra mussels in Lake Ripley around 2005-2007. Zebra mussels (*Dreissena polymorpha*) are small bottom dwelling mussels, native to Europe and Asia, that found their way to the Great Lakes region in the mid-1980s. They are thought to have come into the region through ballast water of ocean-going ships entering the Great Lakes, and they have the capacity to spread rapidly. Zebra mussels are filter feeders; they pass water through their gills and extract particles, especially algae. It has been noted in other lakes that when a lake becomes infested with zebra mussels, phosphorus concentrations increase but algal levels may decline. This is because the mussels remove algae from the lake, but when they defecate they release phosphorus into the water. Green, planktonic algae often declines in the open water areas, but non-palatable cyanobacteria and cladophora can increase, especially as they get blown into shore on hot, calm, sunny days.

3.4 - Water Clarity

Secchi disk transparency is a measurement of water clarity. The measurement is made by lowering a weighted, 20 cm diameter disk that has alternating black and white quadrants into the water and recording the depth just before it disappears from sight.

The Secchi disk transparency for Lake Ripley has been generally in the ‘excellent’ range since 1986 (Figure 7). In most lakes including Lake Ripley, the main determinant of the water clarity is the amount of algae that is present in the water column. For the period of 1987-2004 the average summer Secchi disk depth was 6.1 feet. For the period 2006-2020 water clarity was better with the average being 7.8 feet. For the period 2021-2025 the water clarity was 8.3 feet.

It is likely this improvement is the result of the arrival of zebra mussels. They are very efficient at removing particles from the lake thus improving water clarity. The average summer Secchi disk transparency for the period of record was 7.4 feet, which is not as good as the median value for other deep lowland drainage lakes (8.5 feet) but is better than the median value for all lake types in the SWTP ecoregion (6.6 feet).

3.5 - Trophic State

Trophic state describes the lake's ability to produce plant matter (production) and includes three continuous classifications: 1) oligotrophic lakes are the least productive lakes, 2) eutrophic lakes are the most productive, and 3) mesotrophic lakes fall between these two categories. Secchi depth, total phosphorus and chlorophyll-a are all measures of a lake's trophic state, or the amount of nutrients available. Through the use of a trophic state index (TSI), an index number can be calculated using total phosphorus, chlorophyll-a, and water clarity values that represent the lake's position within the eutrophication process. The TSI was developed by Carlson (Carlson, 1997).

TSI	TSI Description
TSI <30	Classical oligotrophy: clear water, many algal species, oxygen throughout the year in bottom water, cold water, oxygen-sensitive fish species in deep lakes. Excellent water quality
TSI 30-40	Deeper lakes still oligotrophic, but bottom water of some shallower lakes will become oxygen-depleted during the summer.
TSI 40-50	Water moderately clear, but increasing chance of low dissolved oxygen in deep water during the summer.
TSI 50-60	Lakes becoming eutrophic: decreased clarity, fewer algal species, oxygen-depleted bottom waters during the summer, plant overgrowth evident, warm-water fisheries (pike, perch, bass, etc.) only.
TSI 60-70	Blue-green algae become dominant and algal scums are possible, extensive plant overgrowth problems possible.
TSI 70-80	Becoming very eutrophic. Heavy algal blooms possible throughout summer, dense plant beds, but extent limited by light penetration (blue-green algae block sunlight).

TSI >80	Algal scums, summer fishkills, few plants, rough fish dominant. Very poor water quality.

Table 1: Trophic State Index descriptions. Information from WI DNR (https://apps.dnr.wi.gov/lakes/waterquality/Station.aspx?id=283122)

Throughout the period of record, Lake Ripley's trophic state has generally stayed in the mesotrophic-eutrophic range. The degradation of the trophic state at this time emphasizes the importance of agricultural activity in the watershed as an important source of nutrients. The trophic state of the lake does not appear to have been altered with the invasion of zebra mussels in the mid-2000s. The average trophic state in both periods is on the border between mesotrophic and eutrophic. The District's goal is to maintain the status of a mesotrophic lake, by maintaining a TSI between 40-50. This will keep us within the mesotrophic state, with the hope of preventing the lake from reaching a eutrophic state.

The TSI for chlorophyll-a in 2025 was measured at 45.3, and total phosphorus came in at 50.5. The water clarity measurement wasn't available for 2025.

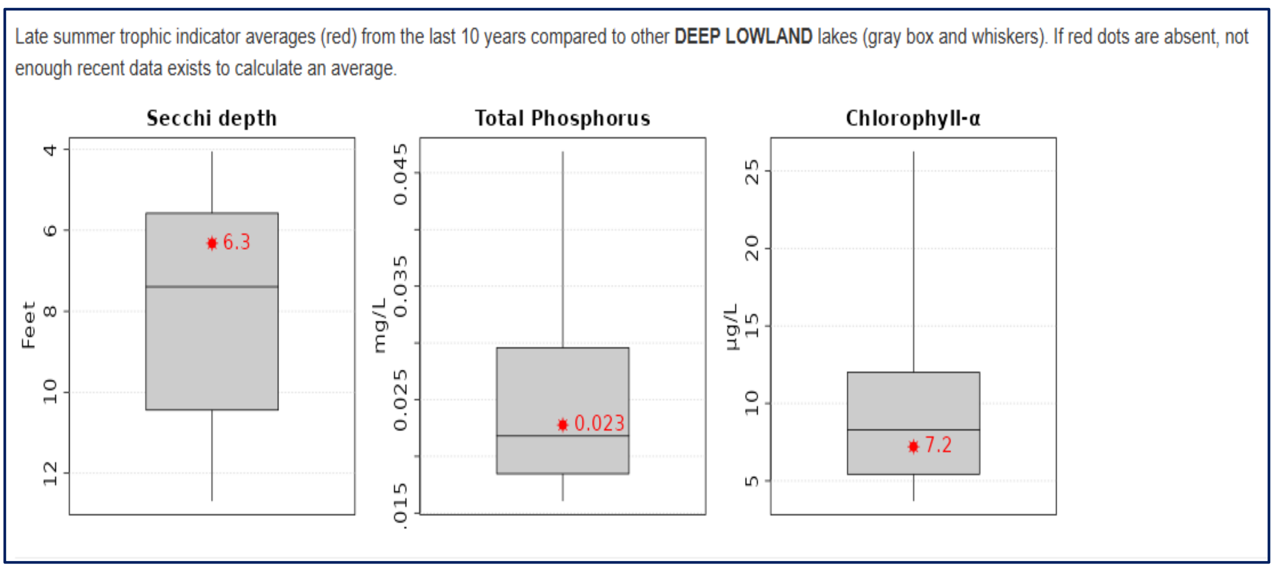


Figure 7: Points plotted in red are this lake's recent late summer average for the specified parameter. Late summer results from at least three of the last ten years must be found in order for the average to be calculated. Box-and-whisker plots show the distribution of the equivalent averages from other Wisconsin lakes in the same natural community. The midline of the box is the median value, the top and bottom of the box are the 25th and 75th percentiles, and the whiskers extend to the 10th and 90th percentiles. Graphic provided by WDNR.

3.6 - Water Quality Monitoring Efforts

The inlet stream has been monitored dating as far back as 1993. Temperature, dissolved oxygen, nitrogen, phosphorus, total suspended solids, conductivity and pH were the main parameters that were monitored. Over time, the parameters being measured changed as the data was analyzed and provided us with important information.

With the District's concerns about the influx of sediment, phosphorus and other nutrients within the stream, water quality monitoring efforts were expanded in 2021 and again in 2025. New sites were added along the inlet stream to provide additional insight as to potential hot-spots, or areas where best-management practices could be installed. All seven sites will be monitored in 2026, with one additional location potentially being added. The data from the last few years has shown that occasionally, the phosphorus levels are decreasing as the inlet stream travels through the surrounding lands, including the District's 245-acre Preserve.

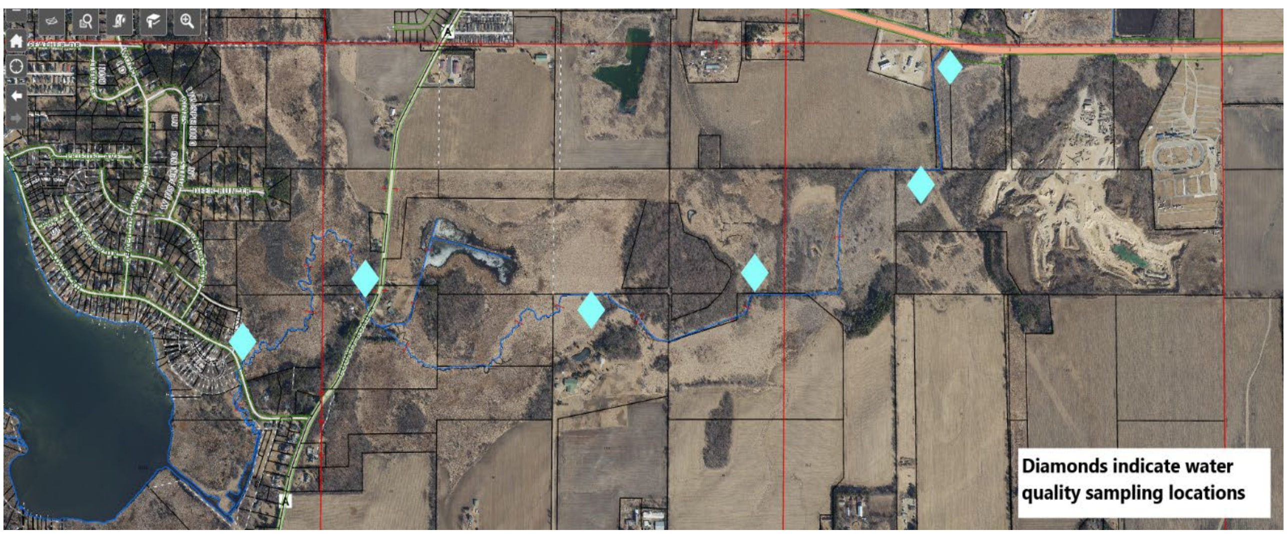


Figure 8: Water quality monitoring sites (2025).

However, there were a few exceptions. During a few of the summer sampling efforts, we observed phosphorus levels increasing after leaving our Preserve and traveling through an extensive wetland system. Testing at the deep hole showed that the phosphorus levels usually decreased once reaching that part of the lake. However, it is unusual to see higher phosphorus levels after moving through relatively undisturbed wetlands. We are currently conducting more research and monitoring within the stream and the lake to better understand the nutrient dynamics.

In 2025, the District partnered with the local engineering firm, Stantec, LLC, to begin work on the ‘Inlet Stream Restoration Project’. Our primary objective of working with Stantec is to enhance long-term water quality in Lake Ripley through targeted watershed interventions aimed at mitigating nutrient and sediment inputs. We completed Phase 1 in 2025. Tasks within Phase 1 included evaluating baseline water quality, performing a stream survey along the inlet stream, and developing a watershed model (Pollutant Load Estimation Tool or PLET) to estimate nonpoint source pollutant loads affecting both the lake and its inlet creek.

We are starting Phase 2 in 2026, which will include evaluating supplemental water quality data, refining the PLET model, working on landowner engagement, and beginning to develop conceptual plans for two best management practices (BMPs). In addition to starting Phase 2 in 2026, the District has started a ‘Streambank Restoration Project’. This project will include clearing 3.5 acres of Preserve that is dominated by boxelder and common buckthorn, leaving a limited understory incapable of holding soils during storm events. Removing the aggressive tree and shrub species and installing native herbaceous vegetation will increase infiltration, reduce runoff, and maintain soil structure during flood events. Ultimately, this project will reduce sedimentation downstream. This project is in an accessible area of the District’s Preserve, and will be able to serve as an example of an easy best management practice to landowners who live along the inlet stream.

CHAPTER 4 - AQUATIC PLANTS

4.1 - The Value and Role of Aquatic Plants

A healthy and diverse native plant community is the foundation of a healthy lake ecosystem. Aquatic plants are essential for maintaining water quality and good habitat for wildlife. Aquatic plants can grow only in the littoral zone of a lake, where sunlight penetrates deeply enough for photosynthesis to occur.

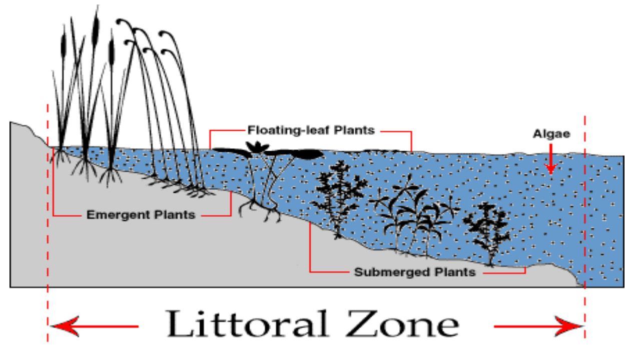
All aquatic plants, and especially native aquatic plants:

- Filter runoff from uplands to protect lake water quality
- Keep algae in check by influencing nutrient dynamics
- Stabilize lake-bottom sediments
- Protect against shoreline erosion
- Oxygenate the water during photosynthesis, providing oxygen for fish and other animals
- Provide cover and spawning sites for fish
- Create shelter for zooplankton (algae grazers)
- Constitute an important part of the lake's food web
- Limit growth of invasive plants
- Build the lake's resiliency to the impacts of nutrient input and climate change

Lake residents do seem to understand the benefits of a healthy plant community. 66.9% of the respondents to our 2019 Public Opinion Survey chose a "healthy aquatic plant community" as "very important" to their quality of life. This was second only to "safe water quality", which was the top pick, at 84.6%.

Lake Ripley has two invasive aquatic plant species: Eurasian watermilfoil and curly-leaf pondweed. The arrival and spread of these aquatic invasive species triggered the creation of the Lake Ripley Management District in 1991. In 1989, 40% of the lake's surface was covered with Eurasian watermilfoil. Our mechanical harvesting program has been successful in reducing this aggressively problematic plant. The weed harvester aids in opening the canopies of Eurasian watermilfoil, allowing for the slower-growing natives to compete for sunlight and have a better chance to establish dominance.

4.2 - The Aquatic Plants of Lake Ripley



Aquatic plants, also called macrophytes, include all macroscopic plants (observable with the naked eye) found in aquatic environments. They are represented by a diverse group of aquatic and wetland plants, including flowering vascular plants, mosses, ferns and macroalgae. Aquatic vegetation is naturally present to some extent in all lakes, and represents an important component of a healthy ecosystem. There are four basic plant types: emergent, free-floating, floating-leaf and submersed.

Emergent plants (e.g. cattail and bulrush) are rooted in water-saturated or submerged soils, but have stems that grow above the water surface. These plants most often grow in shallow water along the lakeshore. Free-floating plants (e.g. duckweed) are not rooted in the lake bottom, but have extensive root systems that hang beneath floating leaves. Floating-leaf plants (e.g. water lilies) have leaves that float on the lake surface with a long-rooted stem anchored to the lake bottom. Submersed plants (e.g. water celery and Illinois pondweed) grow primarily under the water surface in areas where there is sufficient sunlight penetration. They may or may not be rooted to the lake bottom.

Native species are those that were historically found in the surrounding, local area. An invasive species is a species that is often nonnative and was introduced by humans. Some native plants can exhibit aggressive, invasive behavior under certain conditions. The following aquatic plants have been identified in Lake Ripley. Descriptions of each species and their beneficial significance are presented here:

Aquatic Plant	Ecological Significance
Carex aquatilis, water sedge	Excellent source of cover in riparian and wetland communities for birds and small mammals; creates dense sod patches that can hang over streambanks, creating valuable cover and shade for many fish species
Ceratophyllum demersum, coontail	Good habitat for young fish and invertebrates; supports insects and invertebrates that are valuable as food for fish and ducklings; foliage and fruit are eaten by waterfowl; effective at removing phosphorus from the water column

Chara sp., muskgrass	A main source of food for fish, especially bluegill, smallmouth, and largemouth bass; valuable fish habitat; a favorite food for waterfowl; stabilizes bottom sediments; has softening effect on water by removing lime and carbon dioxide
Cicuta maculata, spotted water hemlock	The exposed nectar of the flowers attract primarily insects with short mouthparts, primarily bees, wasps and flies; exceptionally poisonous to most animals
Decodon verticillatus, swamp loosestrife	Seeds are grazed by waterfowl including mallards and wood ducks; a locally important source of food and cover for muskrats
Eleocharis acicularis, needle spikerush	Food for a wide variety of waterfowl as well as muskrats; spawning habitat and shelter for invertebrates
Elodea canadensis, common waterweed	Excellent habitat for fish and invertebrates; valuable food for muskrats and waterfowl
Equisetum laevigatum, smooth horsetail	Provides food for waterfowl, primarily geese
Heteranthera dubia, water star grass	Locally important source of food for geese and ducks; good cover and foraging opportunities for fish
Iris virginica, southern blue flag	Grazed by muskrats; provides food for a variety of waterfowl; provides good cover for wildlife and waterfowl; flower helps ensure cross-pollination by bees
Lemna minor, small duckweed	Rafts of small duckweed provide shade and cover for fish and invertebrates; food source for waterfowl and marsh birds (providing up to 90% of the dietary needs for a variety of ducks and geese); supports insects that are valuable as food for fish; consumed by muskrats, beaver and fish
Lemna trisulca, forked duckweed	Food source for waterfowl, and provides cover for fish and invertebrates
Myriophyllum sibiricum, northern watermilfoil	Provides shelter for fish, roots provide nesting habitat for fish; valuable food producer for fish supporting many insects; leaves and fruit eaten by waterfowl
Myriophyllum spicatum, Eurasian watermilfoil	Invasive; waterfowl eat fruits and leaves to a limited extent; habitat for insects

Najas flexilis, slender naiad	Food for waterfowl, marsh birds, and muskrats; cover for young largemouth bass, northern pike, small bluegills and perch; food for fish
Najas marina, spiny naiad	Provides food and shelter for fish, and is a food source for waterfowl; leaves and seeds are consumed by a wide variety of ducks
Nuphar variegata, spatterdock	Leaves, stems and flowers are eaten by deer; roots eaten by beaver and porcupine; seeds eaten by waterfowl; supports insects that are valuable as food for fish and ducklings; shade and shelter for fish
Nymphaea odorata, white water lily	Shade and shelter for fish; seeds eaten by marsh birds and waterfowl, rootstocks and stalks eaten by muskrat; roots eaten by deer, beaver, moose, and porcupine
Potamogeton crispus, curly-leaf pondweed,	Invasive; food, shelter and shade for some fish; food for waterfowl; habitat for invertebrates
Potamogeton foliosus, leafy pondweed	Fruit can be a locally important food source for geese and a variety of ducks; food for muskrats, deer and beaver; habitat for invertebrates; cover for fish
Potamogeton friesii, Fries' pondweed	Food for ducks and geese; provides fish habitat
Potamogeton gramineus, variable pondweed	Cover for panfish, largemouth bass, and northern pike; bluegills nest near this plant and eat insects on the leaves; supports insects that are valuable as food for fish and ducklings; fruit and tubers eaten by waterfowl
Potamogeton illinoensis, Illinois pondweed	Cover for panfish, largemouth bass, and northern pike; nesting grounds for bluegill; excellent source of shade for fish; large leaves offer good surface area for invertebrates; supports insects that are valuable as food for fish and ducklings; fruit eaten by ducks and geese; source of food for muskrat, deer, beaver and moose
Potamogeton natans, floating-leaf pondweed	Food for waterfowl; fruit eaten by ducks and geese; shade and foraging opportunities for fish
Potamogeton pusillus, small pondweed	Locally important food source for a variety of waterfowl; provides cover for bluegills, perch, northern pike and muskellunge, and good cover for walleyes; supports insects valuable as food for fish and ducklings

Potamogeton strictifolius*,* *stiff pondweed*	Eaten by ducks and geese; provides fish habitat
Potamogeton zosteriformis, flat-stem pondweed	Some cover for bluegills, perch, muskellunge and northern pike; food for waterfowl, muskrat, deer and beaver; supports insects that are valuable food for fish and ducklings
Ranunculus aquatilis White water crowfoot	When fruiting, beds of whitewater crowfoot become choice spots for dabbling ducks; both fruit and foliage are consumed by a variety of waterfowl and upland game birds including ruffed grouse; stems and leaves provide valuable invertebrate habitat; fair producer of food for trout
Sagittaria cuneata, arum-leaved arrowhead	Protects shorelines from wave erosion; provides cover for waterfowl and young fish; spawning areas for northern pike; produces flowers which attracts a variety of insects including honeybees and bumblebees; waterfowl eat their seeds and tubers; muskrats, beaver, turtles and other wildlife feed on the stalk bases, crowns, and tubers
Schoenoplectus acutus, hardstem bulrush	Provides habitat for invertebrates; shelter for young fish, especially northern pike; nutlets consumed by waterfowl, marsh birds and upland birds; stems and rhizomes eaten by waterfowl and muskrats; staple food for muskrats and other small mammals; valuable nesting material and cover for waterfowl, marsh birds, and other shallow marsh wildlife
Schoenoplectus tabernaemontani, softstem bulrush	Habitat for invertebrates and shelter for young fish; nutlets consumed by waterfowl, marsh birds and upland birds; nesting material and cover for waterfowl and muskrats
Schoenoplectus subterminalis, water bulrush	Provides invertebrate habitat and shelter for fish
Solanum dulcamara, climbing/bittersweet nightshade	Songbirds and crows eat fleshy portion; muskrats graze on stems
Spirodela polyrhiza Large duckweed	Good waterfowl food that is consumed by many ducks and geese. Also eaten by muskrat and some fish. Rafts of duckweed offer shade and cover for fish and invertebrates.

Stuckenia pectinata, sago pondweed	Provides limited cover for bluegills, perch, northern pike and muskellunge, and good cover for walleye; supports insects valuable as food for fish and ducklings; a top food producer for waterfowl; fruit and tubers are heavily grazed and considered critical for a variety of migratory waterfowl; provide escape cover for invertebrates
Typha angustifolia/latifolia, narrow-leaf & broad-leaf cattail	Stabilize marshy borders of lakes, protect shorelines from wave erosion; provide spawning sites for northern pike; provide cover and nesting sites for marsh birds and waterfowl; muskrat and beaver eat stalks and roots
Utricularia vulgaris, common bladderwort	Good food and cover for fish; provides needed fish habitat in areas that are not readily colonized by rooted plants; carnivorous plant, utilizes its touch-sensitive bladders to capture macroinvertebrates
Vallisneria americana, water celery	Premier source of food for waterfowl, especially canvasback ducks; all portions of the plant are consumed, including foliage, rhizomes, tubers and fruit; important food source for marsh birds, shore birds and muskrat; good fish habitat providing shade, shelter and feeding opportunities
Wolffia columbiana, watermeal	Good waterfowl food; food for muskrats and some fish; large floating rafts can prevent mosquito larvae from reaching the surface for oxygen
Zannichellia palustris, horned pondweed	Fruit and foliage are grazed by waterfowl; provides food for fish

Table 2: Ecological significance of aquatic plant species present in Lake Ripley. Information obtained from: Borman, Korth, and Temte, 2014 and Skawinski, 2018.

Filamentous algae *(Cladophora, Spirogyra)*: This type of macroalgae consists of single cells that are connected end-to-end. It appears as green-colored thin threads, branched filaments or an interwoven net. Filamentous algae do not have roots, stems or leaves. It begins growing along the shoreline or on the lake bottom, and later buoys to the surface forming green mats that frequently attach to rocks or other plants. Abundant growth identifies lakes polluted with excessive nutrients. Although filamentous algae provide cover for insects valuable as fish food, it is often viewed as an unsightly nuisance.

Preventative actions that reduce the flow of nutrients into the lake are the best means of control.

Planktonic algae: These are microscopic, single-celled organisms that may form multicellular colonies or filaments. Common varieties include green algae, blue-green algae and diatoms. Abundant growth results in “blooms'' that color the water green or brown. Surface scums of blue-green algae may form on the water surface during the summer. Abundant growth identifies lakes polluted with excessive nutrients such as nitrogen and phosphorus. Planktonic algae provide food for zooplankton and some food for fish fry. Preventative actions to reduce the flow of nutrients into the lake are the best means of control.

4.3 - 2025 Plant Inventory Survey

Comprehensive inventories of Lake Ripley’s aquatic plant community have been conducted on the lake since 1976, with the most recent survey being completed during the summer of 2025. Overall, Lake Ripley’s aquatic plant population is healthy and robust.

The following is an abbreviated summary of inventory findings from the 2025 Point-Intercept Survey. (The full PI report can be found here: 2025 Point-Intercept Survey.)
The statistical summary from the 2025 inventory is presented for the aquatic plant species. Statistical measures for each species consist of frequency of occurrence, average density, relative frequency of occurrence, and importance value. Each of these measures is defined below:

Frequency of occurrence: the number of occurrences of a species divided by the number of sampling points within the defined littoral zone. It is the percentage of times a particular species occurred within areas capable of supporting plant growth. This measure is used to describe how widely distributed a particular species is found throughout the lake’s littoral zone.

Relative frequency of occurrence: derived by dividing a particular species’ frequency of occurrence by the sum total frequency of all species inventoried. The sum of the relative frequencies is equal to 100% when all documented species are included. This measure provides an indication of how the plants occur throughout the lake in relation to each other.

Average density: the sum of the density ratings for a species divided by the number of sampling points where vegetation was found. Density ratings are based on 1-3 rake-fullness scale for the point-intercept surveys. This measure provides an indication of how abundant the growth of a particular plant is throughout the lake.

Importance value: the product of the relative frequency and the average density, and is expressed as a percentage. This measure provides an indication of the dominance of a species within a community, and is based on both frequency and density values. It also somewhat addresses the challenge of comparing plants that have different physical statures.

The 2025 survey was completed during the week of July 28 – August 1, providing a snapshot of plant conditions during the lake's season. As curly-leaf pondweed peaks before July, an early-season meander survey was done to gain a better understanding of its current population (see Curly-Leaf Pondweed Meander Survey of Lake Ripley report, 2025).

The total number of plant species found using both the point-intercept and visual survey methods was 30. Of these, 27 species were found using the point-intercept method. The remaining three species, which included cattail species, forked duckweed and floating-leaf pondweed, were recorded as visuals. Plants were found growing in water as deep as 16 feet, and as shallow as less than 1 foot deep. The six most dominant plant species from most to least documented were: sago pondweed (*Stuckenia pectinata*), water celery (*Valisneria americana*), common stonewort (*Chara contraria*), coontail (*Ceratophyllum demersum*) and Fries' pondweed (*Potamogeton friesii*).

Three of the tables below show a variety of different statistics from the 2025 survey. The other three show statistics from the four previous surveys as well as the data from the 2025 surveys. These tables allow you to compare the data over time.

New Species

Four new plants species were found and documented during the 2025 plant survey! Specimens of all four new species were collected, pressed, and sent to the UW-Madison Herbarium for verification. The four species were: globular stonewort, Braun's stonewort, leafy pondweed and a hybrid of white-stem pondweed X curly-leaf pondweed.

Globular stonewort, *Chara globularius*, was predominantly found on the northwest side of Lake Ripley, with some plants scattered along the north and south side of the lake. Chara species are an unusual type of algae that resembles a higher plant (Borman, et. al., 2014). Sometimes referred to as muskgrass, this species is usually found in hard waters, preferring muddy or sandy substrate. Chara is a favorite food for waterfowl! It is also considered valuable fish habitat. Beds of *Chara* offer cover and habitat for fish and macroinvertebrates and are excellent producers of food for these animals.

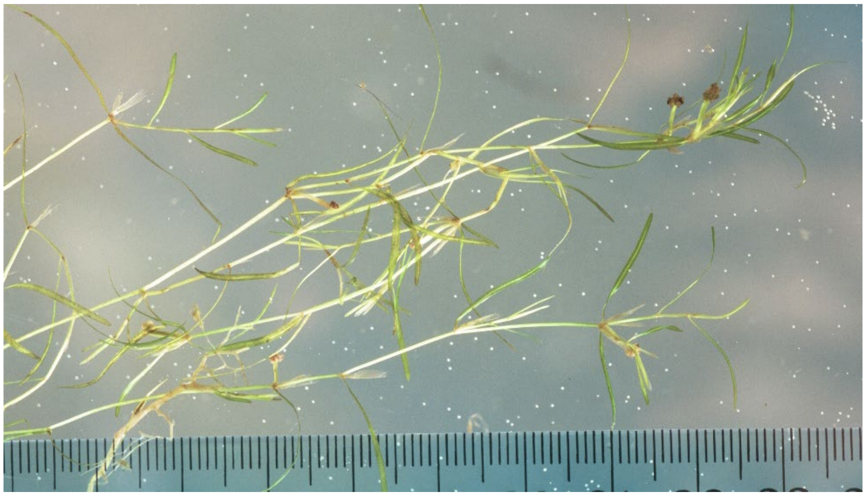
Braun's stonewort, *Chara braunii*, is another species of *Chara* that was found for the first time in Lake Ripley this year. This species was only found on the west side of East Bay, within Critical Habitat Designation #1. Chara species are good at absorbing excess nutrients like phosphorus and nitrogen, which can limit the growth of other algae. Their

Picture 2: The specimen out in the field!

Picture 2: The oogonia are some of the distinguishable features of this plant (seen here). They look like black circles within the whirls of the leaflets.

presence serves as a reliable indicator of healthy water conditions.

Leafy pondweed, *Potamogeton foliosus*, looks very similar to other small pondweeds. It can be identified from other pondweeds as there are no glands present at the leaf nodes. The fruit that this plant produces can be a locally important food source for geese and a variety of ducks (Borman, et.al., 2014). It is particularly useful because it matures before many other aquatic fruits. The bushy form of this pondweed offers good surface area for invertebrates and cover for juvenile fish (Borman, et.al., 2014).



Picture 3 : Leafy pondweed. Photo by Paul Skawinski.

The fourth new plant found was a suspected hybrid between curly-leaf pondweed and white-stem pondweed, *Potamogeton praelongus* X *Potamogeton crispus*. This plant had zig-zagged stems with wavy, serrated-looking leaf edges. Being unable to identify it in the field, the surveyors collected a specimen to press and send to the UW-Herbarium for identification.

Invasive Species

Lake Ripley has been battling Eurasian watermilfoil (*Myriophyllum spicatum*) since the early 1990s. Since then, it has hybridized with northern watermilfoil (*Myriophyllum sibiricum*) creating a hybrid watermilfoil (*Myriophyllum spicatum X sibiricum*). This hybrid shares visual features of Eurasian watermilfoil (EWM) and northern watermilfoil. For example, some of the hybrid stems have the whitish or tan hue of the native but with 10-14 leaflets per leaf, compared to 12-20 leaflets per leaf on EWM. It is impossible to differentiate between hybrid watermilfoil (HWM) and EWM out in the field as it requires genetic analysis to determine which species is which. Therefore, EWM and HWM were combined in the survey data.

Curly-leaf pondweed (CLP) is the second invasive aquatic plant species found in Lake Ripley. Typically, CLP isn't represented well during mid-summer PI surveys due to their early-season life cycle. This invasive actively grows during the winter months, reaching its maximum density in late spring and dying back by mid-summer (Curly-leaf Pondweed, Notre Dame). As curly-leaf pondweed peaks before July, an early-season meander survey was done to gain a better understanding of its current population (see Curly-Leaf Pondweed Meander Survey of Lake Ripley report, 2025).

4.4 - Condition Assessment

During the 2025 survey 374 points were sampled throughout Lake Ripley, which was four less than the 2020 survey. The total number of plants species documented in the lake for the last ten years can be seen in Table 2. The fluctuation of sampled points could be due to an obstacle in the way of the crew getting to the sampling point, the site is no longer accessible, or another field variable. Seasonal variability is expected from season to season; the number of plants has remained fairly consistent over the last ten years, only fluctuating by a few each year. However, compared to the previous survey's data, five additional plants were recorded by being sampled or visually seen including the four species that were discovered this year!

The floristic quality index (FQI) increased slightly, to a value of 26.16. This value helps us assess the overall ecosystem's health and changes over time and will help inform our decisions for management and planning. In general, a higher FQI indicates higher floristic quality and biological integrity and a lower level of disturbance impacts (Bernthal, 2003). In other words, it means that the habitat quality is improving, indicating successful restoration or reduced disturbance, as it reflects an increase in native, conservative (those sensitive to change) plant species.

Over the last five years, the District has been altering our weed-harvesting map to target areas with EWM/CLP while also maintaining recreational navigational lanes. These changes may be one of the reasons why our FQI is increasing. Another reason for an increasing FQI may be due to the eight different Critical Habitat Areas that were designated by the DNR in 2024. These areas are not harvested and have been discussed at a broad level with our residents about their importance.

The mean coefficient of conservatism (Mean C) is the average C-value (conservation value) for all plants found in the survey. This is used in Floristic Quality Assessments to measure habitat health. The species are assigned a value (0-10) representing tolerance to disturbance. The 'Mean C' is calculated by adding all individual species' C-values and dividing by the number of species, indicating a site's quality. A higher 'Mean C' suggests higher integrity in the plant community. The Mean C for 2025 is 5.91, slightly higher than 2020's 5.89 rating.

Summary of the Plant Inventory Survey Results 2025	
[a]Total Number of Points Sampled	374
[b]Number of Points Sampled within Depth Range of Potential Plant Growth (0-16')	372
[c]Number of Points with Vegetation	351
[d]Maximum Depth of Plant Growth	16
[e]Number of Species in Lake	30
[f]Frequency of Occurrence of Vegetation within Range of Plant Growth (0-16')	94.35
[g]Simpson Diversity Index	0.86
[h]Species Richness	27
[i]Species Richness + Visuals	30
[j]Floristic Quality Index (FQI)	26.161995
[k]Mean Coefficient of Conservatism (C)	5.91
Average Number of Species Sampled Per Site (0-16')	2.28
Average Number of Species Sampled Per Site (Veg. Sites Only)	2.44
Average Number of Native Species Sampled Per Site (0-16')	2.21
Average Number of Native Species Sampled Per Site (Veg. Sites Only)	2.38

[a]Does not include sample points in depths beyond 17 ft. where plant growth could not be documented

[b]Includes all sample points within the 0-17-ft. littoral zone that was shown to support plant growth

[c]Includes all sample points where vegetation was found after taking a rake sample

[d]Represents deepest point where vegetation was sampled. This depth will fluctuate from year to year depending on changes in water clarity conditions. Plants may be found at depths of over 20 ft. in clear lakes, but only in a few feet of water in stained or turbid lakes. While some species can tolerate very low light conditions, others are only found near the surface. In general, the diversity of the plant community decreases with increased depth.

[e]Includes plant species documented in the lake and along the zero-depth shoreline margin using both the point-intercept method and a general boat survey.

[f]Percentage of occurrence that vegetation would be sampled within the 0-17-ft. littoral zone

[g]Simpson Diversity Index: One minus the sum of each of the relative frequencies squared ($SDI = 1 - \sum(RFREQ^2)$). The closer the SDI value is to one, the greater the diversity is between communities being compared. The index allows the plant community at one location to be compared to the plant community at another location. It also allows a single location's plant community to be compared over time. The index value (on a scale of 0-1) represents the probability that two individuals (randomly selected) will be different species. The greater the index value, the higher the diversity in a given location. Plant communities with high diversity are usually representative of healthier lakes, and also tend to be more resistant to invasion by exotic species.

[h]Indicates the number of different plant species found in and directly adjacent to the lake (on the waterline). Species richness only counts those plants documented as part of the point-intercept data. It includes filamentous algae, freshwater sponge, and unidentified *Myriophyllum* and *Najas* species. This number does not include the species found during general boat surveys (GS).

[i]Indicates the number of different plant species found in and directly adjacent to the lake (on the waterline). This species richness count includes visuals found in the point-intercept survey. This number does not include the species found during general boat surveys (GS).

[j]Measures the impact of human development on a lake's aquatic plant community. Species in the index are assigned a Coefficient of Conservatism (C), which ranges from 3.0 to 44.6 in Wisconsin. The higher the value, the more likely the plant is negatively influenced by human activities that affect water quality or habitat. Plants with low values are tolerant of human disturbances, and often exploit these impacts to the point where they may crowd out other species. The FQI is calculated by averaging the conservatism value for each species found in the lake, and then multiplying that value by the square root of the number of species ($FQI=meanC\sqrt{N}$). Consequently, a higher index value indicates a healthier macrophyte community.

[k]Mean Coefficient of Conservatism (C) among species documented during point-intercept survey. Does not include species observed during the follow-up boat survey.

Table 3: Statistical descriptions based on all plants inventoried (2025).

This year, plants were found at a maximum depth of 16 feet. The most common depth that plants were found at was 4 feet deep, with 72 different sites being vegetated at 4 feet. The second most common depth was 5 feet deep, followed by 6 feet deep. These results are very similar to the 2020 data.

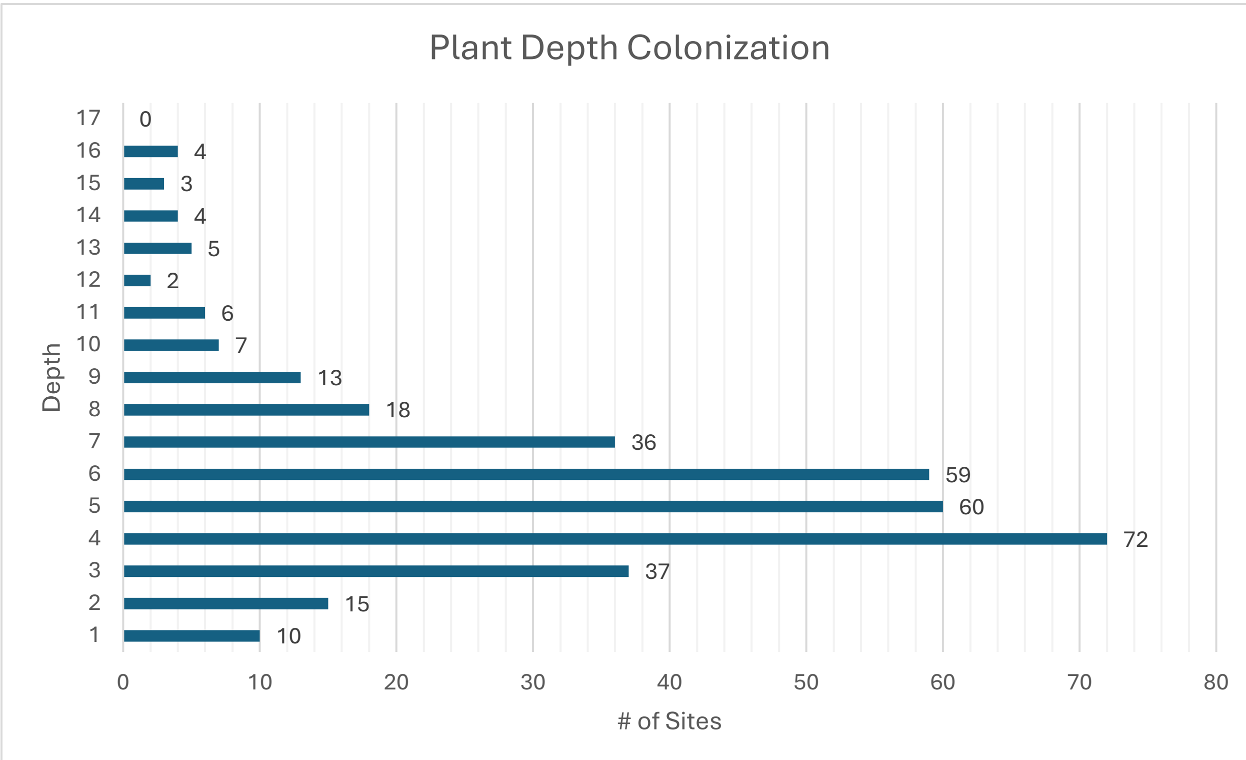


Figure 9: Chart depicting plant depth colonization during the 2025 plant inventory survey.

Lake Ripley has a large littoral zone that is dominated by aquatic plants (Figure 10). These plants are crucial for many ecosystem services including filtering water, stabilizing shorelines and providing habitat for fish, macroinvertebrates and other animals. Residents should expect to encounter plants while boating in the littoral zone. Since most of the plants found in the lake are native, management will focus on maintaining navigational lanes and targeting invasive species.

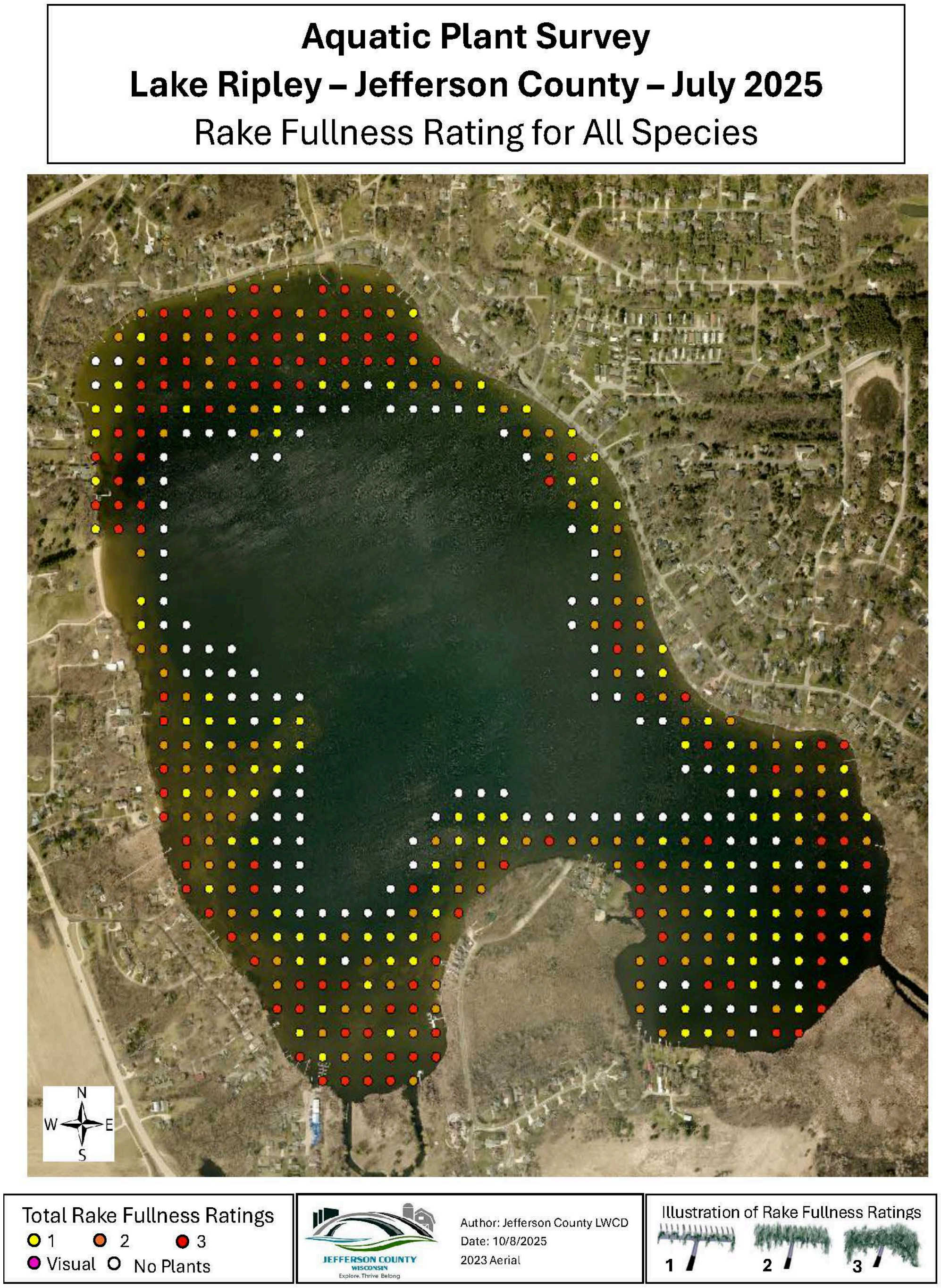


Figure 10: Rake fullness rating for all species found during 2025 plant inventory survey.

Table 3 allows us to compare the statistics collected during each survey. There is some variability, which is common, but overall, there are no drastic changes that cause concern.

Summary of Past and Current PI Surveys					
Species	**Year**				
	2006	**2011**	**2015**	**2020**	**2025**
Total Number of Points Sampled	398	421	369	378	374
Number of Points Sampled Shallower than Maximum Depth of Plants	369	407	359	376	372
Number of Points with Vegetation	318	366	330	362	351
Maximum Depth of Plant Growth	17 ft	21 ft	15 ft	16 ft	16ft
Total Number of Species in Lake (includes visuals and boat survey)	31	28	34	26	30
[a]Species Documented on the Rake	20	21	24	24	27
Frequency of Occurrence at sites shallower than maximum depth of plants	86	90	91	96.28	94.35
Average Rake fullness for all vegetation	--	1.61	2.36	2.10	2.04
Simpson Diversity Index	0.85	0.89	0.86	0.90	0.86
Floristic Quality Index (FQI)	22.75	23.77	25.92	25.47	26.16
Mean Coefficient of Conservatism (C)	5.69	5.76	5.95	5.8	5.91
Average Number of Species Sampled Per Site	1.76	2.33	2.19	2.58	2.28
Average Number of Species Sampled at Sites with Vegetation	2.05	2.60	2.39	2.69	2.44
Average Number of Native Species Sampled Per Site	1.52	2.02	1.79	2.30	2.21
Average Number of Native Species Sampled at Sites with Vegetation	2.00	2.34	1.97	2.41	2.38

[a]Does not include plants seen visually.

Table 3: Statistics for the 2006, 2011, 2015, 2020 and 2025 plant surveys.

Table 4 shows the frequency of occurrence, average density, relative frequency and the importance value data for the 2025 survey (seen in alphabetical order). This table does not include visually observed plant species. The most dominant plant, sago pondweed, had a frequency of occurrence (FOO) of 61.82%, an average density of 1.70, and a relative frequency of (RF) of 25.3%. The second most dominant plant, water celery, had a FOO of 35.90%, an average density of 1.70, and an RF of 14.7%. The third most dominant plant, common stonewort, had a FOO 34.47%, an average density of 1.75, and an RF of 14.1%. The fourth most dominant plant, coontail, had a FOO of 34.19%, an average density of 1.44, and an RF of 14.0%. And the fifth most common plant, Fries' pondweed, had a FOO of 28.21%, an average density of 1.08, and an RF of 11.5%.

The total plant density within the lake is recorded using the average rake fullness value. In 2025 the average rake fullness value measured 2.04, compared to 2.10 in 2020 and 2.36 in

2015. Average rake fullness can fluctuate based on a variety of local pressures including annual variability and shoreland development.

2025 Plant Inventory Survey Data			
Aquatic Plant Species	**Frequency of Occurrence (%)**	**Average Density** (1-3 scale)**	**Relative Frequency**
Stuckenia pectinata (Sago pondweed)	61.82	1.70	25.3
Vallisneria americana (Water celery)	35.90	1.33	14.7
Chara contraria (Common stonewort)	34.47	1.75	14.1
Ceratophyllum demersum (Coontail)	34.19	1.44	14.0
Potamogeton friesii (Fries' pondweed)	28.21	1.08	11.5
Potamogeton gramineus (Variable pondweed)	5.70	1.10	2.3
Chara globularis (Globular stonewort)	5.13	1.00	2.1
Potamogeton praelongus (White-stem pondweed)	5.13	1.56	2.1
Heteranthera dubia (Water star grass)	4.27	1.53	1.7
Lemna minor (Small duckweed)	4.27	1.07	1.7
Najas marina (Spiny naiad)	3.99	1.00	1.6
**Myriophyllum spicatum* (Eurasian watermilfoil)	3.13	1.27	1.3
Nuphar variegata (Spatterdock)	3.13	2.55	1.3
Nymphaea odorata (White water lily)	2.28	2.25	0.9
Najas flexilis (Slender naiad)	1.99	1.00	0.8
Utricularia vulgaris (Common bladderwort)	1.99	1.00	0.8
Potamogeton foliosus (Leafy pondweed)	1.42	1.00	0.6
Potamogeton illinoensis (Illinois pondweed)	1.42	1.00	0.6
Wolffia columbiana (Common watermeal)	1.42	1.00	0.6
Elodea canadensis (Waterweed)	1.14	1.5	0.5
Potamogeton zosteriformis (Flat-stem pondweed)	1.14	1.00	0.5
Ranunculus aquatilis (White water crowfoot)	0.57	1.00	0.2

**Potamogeton crispus* (Curly-leaf pondweed) X *Potamogeton praelongus* (White-stem pondweed) – Hybrid	0.57	1.00	0.2
Chara braunii (Braun's stonewort)	0.28	1.22	0.1
Myriophyllum sibiricum (Northern watermilfoil)	0.28	1.00	0.1
**Potamogeton crispus* (Curly-leaf pondweed)	0.28	1.00	0.1

* = Species not native to Wisconsin

** = Average Densities and corresponding Importance Values are based on a 1-3 rake-fullness scale.

Frequency of Occurrence is the number of sites at which a species was observed divided by the total number of vegetated sites. Frequency of occurrence is sensitive to the number of sample sites included. Including non-vegetated sites will lower the frequency of occurrence.

Average density is the mean rake fullness ratings for each species, ranging from 1-3.

Relative frequency is a proportional value that reflects the degree to which an individual species contributes to the sum total of all species observations. The sum of the relative frequencies of all species is 100%. Relative frequency is not sensitive to whether all sampled sites, including non-vegetated sites, are included. Relative frequency does not take into account aquatic moss, freshwater sponges, filamentous algae, or liverworts.

Table 4: 2025 plant inventory survey data (sorted in descending order to show most common to least common).

Table 5 is similar to Table 4, with a few additional data points (in alphabetical order). This table includes number of sites the species was found at, frequency of occurrence where plants were collected, importance values of species, and coefficient of conservatism. These comparisons allow us to make educated management decisions regarding our aquatic plant population.

2025 Plant Inventory Survey Data							
Aquatic Plant Species	**Number of Sites Found**	**FREQ[a] [0-16'] (%)**	**FREQ[b] [Veg. Sites] (%)**	**RFREQ[c] (%)**	**ADEN[d] (1-3 scale)**	**IV[e]**	**C[f]**
Ceratophyllum demersum (Coontail)	120	34.19	32.26	14.0	1.44	20.16	3
Chara contraria (Common stonewort)	121	34.47	32.53	14.1	1.75	24.67	7

Chara braunii (Braun's stonewort)	1	1.42	1.34	0.6	1.00	0.6	7
Chara globularis (Globular stonewort)	18	5.13	4.84	2.1	1.22	2.56	7
Elodea canadensis (Waterweed)	4	1.14	1.08	0.5	1.50	0.75	3
Heteranthera dubia (Water star grass)	15	4.27	4.03	1.7	1.53	2.6	6
Lemna minor (Small duckweed)	15	4.27	4.03	1.7	1.07	1.82	4
Myriophyllum sibiricum (Northern watermilfoil)	1	0.28	0.27	0.1	1.00	0.1	6
**Myriophyllum spicatum* (Eurasian watermilfoil)	11	3.13	2.96	1.3	1.27	1.65	N/A
Najas flexilis (Slender naiad)	7	1.99	1.88	0.8	1.00	0.8	6
Najas marina (Spiny naiad)	14	3.99	3.76	1.6	1.00	1.6	N/A
Nuphar variegata (Spatterdock)	11	3.13	2.96	1.3	2.55	3.32	6
Nymphaea odorata (White water lily)	8	2.28	2.15	0.9	2.25	2.03	6
**Potamogeton crispus* (Curly-leaf pondweed)	1	0.28	0.27	0.1	1.00	0.1	N/A
Potamogeton foliosus (Leafy pondweed)	5	1.42	1.34	0.6	1.00	0.6	6
Potamogeton friesii (Fries' pondweed)	20	5.70	5.38	2.3	1.10	2.53	8
Potamogeton gramineus (Variable pondweed)	20	5.70	5.38	2.3	1.10	2.53	7
Potamogeton illinoensis (Illinois pondweed)	5	1.42	1.34	0.6	1.00	0.6	6
Potamogeton praelongus (White-stem pondweed)	18	5.13	4.84	2.1	1.56	3.28	8
Potamogeton zosteriformis (Flat-stem pondweed)	4	1.14	1.08	0.5	1.00	0.5	6
Ranunculus aquatilis (White water crowfoot)	2	0.57	0.54	0.2	1.00	0.2	8
Spirodela polyrhiza (Large duckweed)	1	0.28	0.27	0.1	1.00	0.1	5

Stuckenia pectinata (Sago pondweed)	217	61.82	58.33	25.3	1.70	43.01	3
Utricularia vulgaris (Common bladderwort)	7	1.99	1.88	0.8	1.00	0.8	7
Vallisneria americana (Water celery)	126	35.90	33.87	14.7	1.33	19.55	6
Wolffia columbiana (Common watermeal)	5	1.42	1.34	0.6	1.00	0.6	5
**Potamogeton crispus* (Curly-leaf pondweed) X *Potamogeton praelongus* (White-stem pondweed) – Hybrid	2	0.57	0.54	0.2	1.00	0.2	N/A

[a]FREQ [0-16’] = Frequency of Occurrence within depth zone defining extent of plant growth. The number of occurrences of a species divided by the number of sampling points in the 0-16’ depth range.
[b]FREQ [Veg. Sites] = Frequency of Occurrence within sites where plants were collected. The number of occurrences of a species divided by the number of sampling points with documented plant growth.
[c]RFREQ = Relative Frequency of Occurrence.
[d]ADEN = Average Density. The sum of the density ratings for a species (1-3 rake fullness scale) divided by the number of sampling points with vegetation.
[e]IV = Importance Value. The product of the relative frequency (RFREQ) and the average density, expressed as a percentage.
[f]C = Coefficient of Conservatism. Used to compute Floristic Quality Index. Values range from 0-10, with higher values indicative of plant species intolerant of habitat modification or water quality impairment caused by human disturbance.

Table 5: Statistical summary for all plant species documented in the 2025 inventory

Table 6 details what species were found via the rope rake, pole rake or by visual observation during the plant inventory surveys. Fifteen different plants were found in each survey. Those plants include: stonewort species, common waterweed, coontail, curly-leaf pondweed, Eurasian watermilfoil, Frie’s pondweed, Illinois pondweed, northern watermilfoil, sago pondweed, small duckweed, spatterdock, spiny naiad, water celery, water stargrass and white water lily.

Species Documented on Lake Ripley 2006-2025 (Number of Sites Where Species were Found on Pole/Rope Rake)					
	Years				
Species	**2006**	**2011**	**2015**	**2020**	**2025**
Arum-leaved arrowhead	--	--	V	--	--
Cattail	--	--	--	V	V
Chara sp.	196	--	--	--	--

Braun’s stonewort	--	--	--	--	1
Common stonewort	--	202	155	144	121
Common bladderwort	--	11	6	27	7
Common watermeal	--	V	--	3	5
Common waterweed	3	40	2	7	4
Coontail	44	103	98	153	120
*Curly-leaf pondweed	5	36	5	30	1
*Eurasian watermilfoil	25	15	12	65	11
Flat-stem pondweed	--	--	1	--	4
Floating-leaf pondweed	--	V	2	--	V
Forked duckweed	1	--	--	--	V
Fries’ pondweed	27	82	20	136	99
Globular stonewort**	--	--	21	115	18
Hardstem Bulrush	--	--	V	--	--
Horned pondweed	--	1	1	--	--
Hybrid watermilfoil	--	50	10	--	N/A
Illinois pondweed	18	30	3	3	5
Large duckweed	--	--	--	1	1
Leafy pondweed	3	--	--	--	5
Naiad sp.	--	--	--	--	--
Needle spikerush	--	--	--	1	--
Northern watermilfoil	14	100	26	4	1
Potamogeton sp.(Hybrid)	--	--	10	--	1
Sago pondweed	62	133	174	58	217
Softstem bulrush	--	--	--	V	--
Slender naiad	4	8	25	--	7
Small duckweed	4	1	V	3	15
Small pondweed	1	2	3	59	--
Spatterdock	7	7	5	12	11
Spiny naiad	123	76	127	11	14
Stiff pondweed	--	--	1	13	--
Variable pondweed	--	1	4	23	20
Water bulrush	--	--	--	--	--
Water celery	11	43	79	72	126
Water stargrass	16	4	5	14	15
White-stem pondweed	--	--	--	--	18
White water crowfoot	--	--	--	10	2
White water lily	6	5	3	9	8
Total Number of Species Documented:	19	23	28	24	30

*Indicates an invasive species
** Does not include visual sightings
Table 6: Number of littoral-zone sample sites where each species was found (2006-2025)

Frequency of Occurrence (%)

In Table 7 we compare the plants' frequency of occurrence (FOO%) results over the last five surveys. The frequency of occurrence is the number of sites at which a species was observed, divided by the total number of vegetated sites. Frequency of occurrence is sensitive to the number of sample sites included. Including non-vegetated sites in this calculation would lower the frequency of occurrence. Since 2020, 13 species saw an increase in the frequency of occurrence while 16 species saw a decrease.

Without including any of the Chara species, the largest decreases from 2020 to 2025 were 1) Eurasian watermilfoil, 2) Fries' pondweed, 3) coontail, 4) Curly-leaf pondweed, and 5) common bladderwort. The largest increases were: 1) sago pondweed, 2) water celery, 3) white-stem pondweed, 4) small duckweed and 5) Illinois pondweed. Most of the other species saw a small variability in their FOO.

The stoneworts saw the largest differences between species, as we were able to have a Chara species expert on the boat with us during one of the survey days. Paul Skawinski, a statewide educator with UW-Extension, was able to differentiate between the three Chara species found in Lake Ripley: common, Braun's and globular. He was able to identify key features on the plants to show the other biologists, who could then identify it later in the survey. The Chara data prior to 2020 may be slightly off, due to not being able to identify it to the exact species during the previous surveys.

Percent Frequency of Occurrence of Aquatic Plant Species (2006-2025)					
	Years				
Species	2006	2011	2015	2020	2025
Braun's stonewort	--	--	--	--	0.28
Chara sp.	53.1	49.6	43.2	39.8	--
Common bladderwort	--	2.7	1.7	7.5	1.99
Common stonewort	--	--	--	--	34.47

Common watermeal	--	--	--	0.8	1.42
Common waterweed	0.8	9.8	0.6	1.9	1.14
Coontail	12.2	25.3	27.3	42.3	34.19
*Curly-leaf pondweed	1.4	8.9	1.4	8.3	0.28
*Eurasian watermilfoil	6.8	3.7	3.3	17.9	3.13
Flat-stem pondweed	--	--	0.3	--	1.14
Floating-leaf pondweed	--	--	0.6	--	--
Forked duckweed	0.3	--	--	--	--
Fries' pondweed	7.3	20.1	5.6	37.6	28.21
Globular stonewort	--	--	5.9	31.8	5.13
Horned pondweed	--	0.2	0.3	--	--
Hybrid watermilfoil	4.6	12.3	2.8	--	--
Illinois pondweed	--	7.4	0.8	0.8	1.42
Large duckweed	--	--	--	--	0.28
Leafy pondweed	0.8	--	--	--	1.42
Naiad sp.	--	--	--	--	--
Needle spikerush	--	--	--	0.3	--
Northern watermilfoil	3.8	24.6	7.2	1.1	0.28
Potamogeton sp.	--	--	2.8	--	--
Pondweed hybrid (White-stem X Curly-leaf)	--	--	--	--	0.57
Sago pondweed	16.8	32.7	48.5	16.0	61.82
Slender naiad	1.1	2.0	7.0	--	1.99
Small duckweed	1.1	0.2	V	0.8	4.27

Small pondweed	0.3	0.5	0.8	16.3	--
Spatterdock	1.9	1.7	1.4	3.3	3.13
Spiny naiad	33.3	18.7	35.4	3.0	3.99
Stiff pondweed	--	--	0.3	3.6	--
Variable pondweed	--	0.2	1.1	6.4	5.70
Water bulrush	--	--	--	--	--
Water celery	3.0	10.6	22.0	19.9	35.90
Water star grass	4.3	1.0	1.4	3.9	4.27
White-stem pondweed	--	--	--	--	5.13
White water crowfoot	--	--	--	2.8	0.57
White water lily	1.6	1.2	0.8	2.5	2.28

* = Species nonnative to Wisconsin

-- = Species not found during that year's survey

Table 7: Percent frequency of occurrence of aquatic plant species (2006-2025)

Both invasives saw large declines in their frequency of occurrence. The FOO for EWM in 2025 was 3.3%, down 14.6% compared to the 2020 results! The frequency of occurrence for EWM in Lake Ripley has been steadily declining since 2011, with one anomaly in 2020. We believe one of the reasons EWM is steadily declining is due in part to the District's weed harvesting permit program. Since our 2020 survey, we have altered the harvesting map to better encompass areas of the lake with high EWM (and CLP) populations. We target areas of EWM and harvest late into the season to harvest any seeds – potentially preventing them from starting new colonies. Between the 2015 and 2020 surveys, scientists discovered that EWM and hybrid watermilfoil could not be distinguished from one another during a field survey. Therefore, those two species are recorded together as EWM.

In 2020, the FOO for curly-leaf pondweed was 8.29%. During the 2025 survey, that number dropped to 0.28% - a 96.6% decrease! This decrease could have been due to the timing of the survey as well as a reduction in its population. Looking at the data, CLP has been experiencing a 'boom-bust dynamic' – rapid population explosions (booms) followed by sharp declines (busts), driven by factors such as rainfall, nutrient cycles or management changes that can lead to cycles of overgrowth and collapse. This dynamic often occurs in invasive species populations.

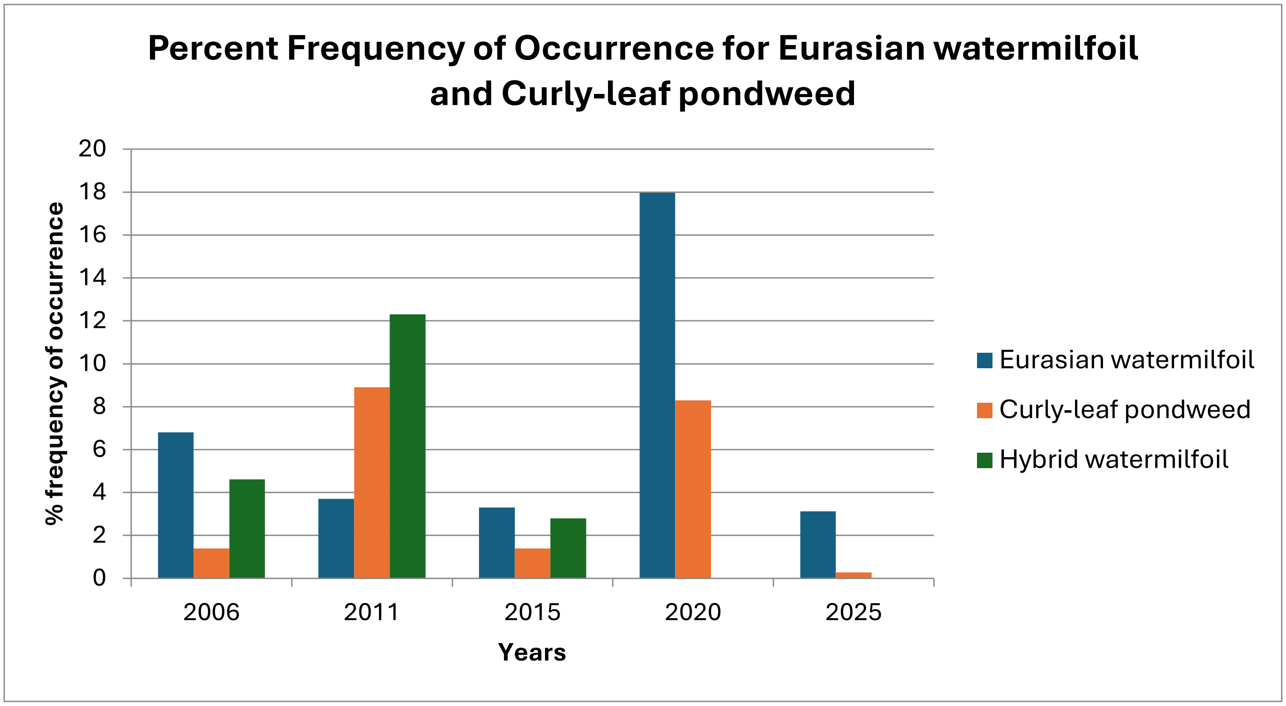


Figure 11: Frequency of Occurrence for Non-Native Aquatic Plant Species Found Among Littoral-Zone Sample Sites (2006-2025).

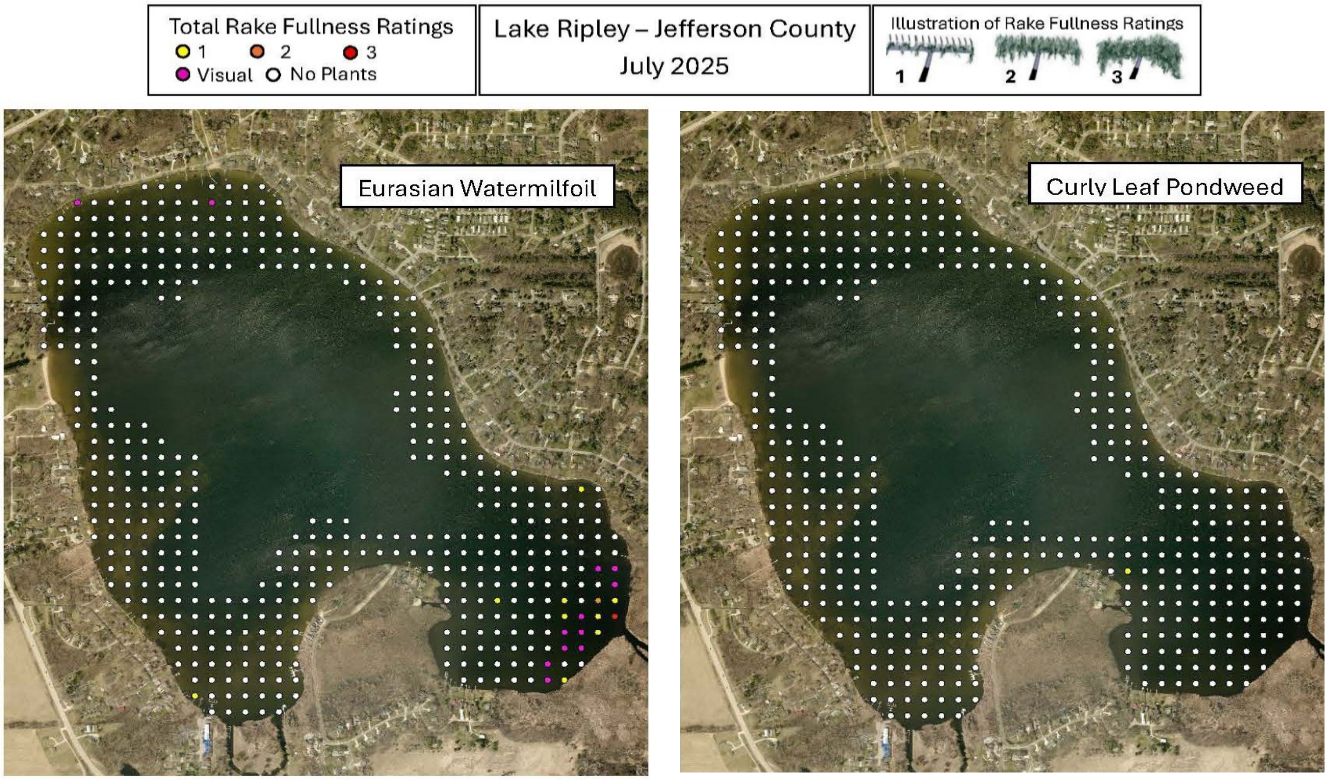


Figure 12: Total rake fullness for CLP and EWM.

4.5 - Critical Habitat Areas

All waterbodies have critical habitat areas; these are the areas that are most important to the overall health of the aquatic plants and animals (WDNR, 2026). In 1989, Wisconsin DNR Administrative Code (NR 107) governing the Aquatic Plant Management Program went into effect. Recognizing that responsible management of aquatic plants and animals can enhance water recreation was only one aspect of the program. NR-107 also emphasized the value of native aquatic plants and animals to water quality and lake ecology, and recognized the need to protect them.

The Wisconsin DNR has the authority to identify ecologically important areas. These Critical Habitat Areas are designed to protect water quality, high-value native aquatic plants, critical fisheries and wildlife habitat, and shorelines susceptible to erosion. Remarkably, 80% of the plants and animals on the state's endangered and threatened species list spend all or part of their life cycle within the near shore zone (WDNR, 2026).

Wisconsin law mandates special protections for these critical habitats. To ensure the long-term health of Lake Ripley, it is important to map these areas so that everyone knows which areas are most vulnerable to impacts from human activity.

On Lake Ripley, Critical Habitat Areas were first designated by Wisconsin DNR and incorporated into a Town pier ordinance in 1995 (Town of Oakland, 1995). They were most often associated with relatively undeveloped shorelines and wetlands within the South and East Bay, and were found to support excellent biodiversity. Water lilies, bulrush stands, and lakeshore wetland plants/biota are among the features that commonly characterize these area designations. These plants help protect the shoreline from erosion, provide habitat for fish and wildlife and protect water quality.

Historically, important near-shore aquatic habitats were abundant around the lake, but have largely disappeared as a consequence of wetland drainage and shoreline development. The few remaining Critical Habitat Areas along Lake Ripley's shoreline are protected, and projects such as herbicide treatments, dredging and sand blankets are prohibited within those locations.

A Town of Oakland ordinance currently prohibits the placement of piers, wharves and swimming rafts within designated "sensitive" areas without a DNR permit (Town of Oakland, 1995). Town ordinance also provides for slow-no-wake buoyed restricted zones in each bay, a 200-feet-from-shore no-wake zone, and a prohibition on motor use of any kind in Vasby's Channel. These ordinances are intended, in part, to better protect Critical Habitat Areas from frequent motorboat disturbance (Town of Oakland, 1995). While mechanical harvesting is allowed in accordance with Wisconsin DNR Administrative Code (NR 109) permit conditions, operations are governed by a harvesting plan that largely targets the invasive milfoil in high-traffic navigational corridors. These sensitive areas are largely avoided in the harvesting program, especially during ecologically significant times (such as fish spawning seasons).

Back in 2024, the DNR with help from the District officially designated eight different Critical Habitat Areas on Lake Ripley. These areas were based on data collected during multiple different surveys completed by the District, DNR, and other state agencies. Five of the designations are classified as Sensitive Area for their aquatic vegetation, association fish, wildlife, and water quality benefits. The other three sites were classified as Other Critical habitats for their natural or screened shoreline and/or fish and wildlife habitat values, such as spawning substrates.

Figure 13: Critical Habitat Areas on Lake Ripley.

4.6 - Management of Aquatic Plants

The state of Wisconsin, through Section 23.24 of the Wisconsin Statutes, encourages the development of aquatic plant management (APM) plans to promote the long-term sustainability of lakes. An approved APM plan is also a prerequisite for obtaining various state grants and permit approvals, including those related to controlling nuisance plant growth through a mechanical harvesting program.

The first step toward implementing a successful aquatic plant management program is to recognize the important functions and values of a healthy plant community. Aquatic plants are essential to the food web and health of the entire lake ecosystem, including good water quality. They may well provide some resilience to challenges associated with climate change such as: intense rainfall events, excessive heat, and few ice-on days.

Lake Ripley's invasive weed-harvesting program is a long-term commitment. Operations may vary from year to year, depending on need. The program involves maintaining equipment, proper permitting, training operators, carrying insurance, and careful recordkeeping to ensure cost-effectiveness. The program strives to minimize damage to native plants while creating reasonable public access and navigational lanes for lake users.

CHAPTER 5 – FISH OF LAKE RIPLEY

5.1 – Value and Role of Fishery

Fish play an important role in maintaining a healthy lake ecosystem. They are an important part of the biological community. Fish are useful as biotic indicators of environmental quality. For example, declines in native fish populations can be an early sign of water quality changes, non-native species introductions, and loss of natural habitat. These ecological disruptions can, in turn, create food-web imbalances and cascading effects that can alter the structure and composition of the entire fishery. With proper protection and management, Lake Ripley's native fish populations have the potential to flourish and continue contributing to a healthy lake.

Fish species composition and behavior can influence a lake's condition, and vice versa. Normal predator-prey dynamics, for example, function to keep populations in check. This controls overcrowding and over-competition that can cause fish stunting and other problems. Changes in plant cover can favor certain species over others, thereby affecting growth rates. For instance, a lake dominated by small bluegill might signify fewer top predators, like bass or walleye.

Excessive gamefish harvests, reduced water clarity, or overly dense plant beds that favor small fish such as bluegill are among the plausible factors that would precipitate such a situation. As a result, bluegills might overgraze on zooplankton (the tiny organisms that feed on algae), depleting the fish's own food stock while eliminating the lake's natural control on algal growth.

Bluegills then become stunted, while algal blooms begin to occur with greater frequency and intensity. Recognizing these types of interrelationships is a critical first step in diagnosing problems and finding solutions, especially in the context of larger management goals. It is also the basis for the following discussion and subsequent recommendations.

5.2 – Fish Habitat Requirements

Fish thrive in suitable habitat. Each fish species has different habitat requirements. Therefore, ideal habitat is that which supports the various life-cycle needs of native fish populations. Important habitat components include water chemistry, clarity, temperature levels, dissolved oxygen concentrations, spawning or foraging substrate, cover from predators, and access to sufficient food resources. If any one of these requirements is found to be in short supply, habitat quality is reduced and the lake's fish community can be negatively affected, beginning with the most sensitive or habitat-specific species.

Lakes with good water quality, well-vegetated shorelines, and thriving native aquatic plant communities are usually best positioned to support healthy fish populations. Alternatively, problems are often quick to develop in lakes with poor water quality, heavily developed watersheds and shorelines, and an absence of quality shoreland and aquatic vegetation. It is well documented that increased shoreline development correlates with decreases in the number of fish species.

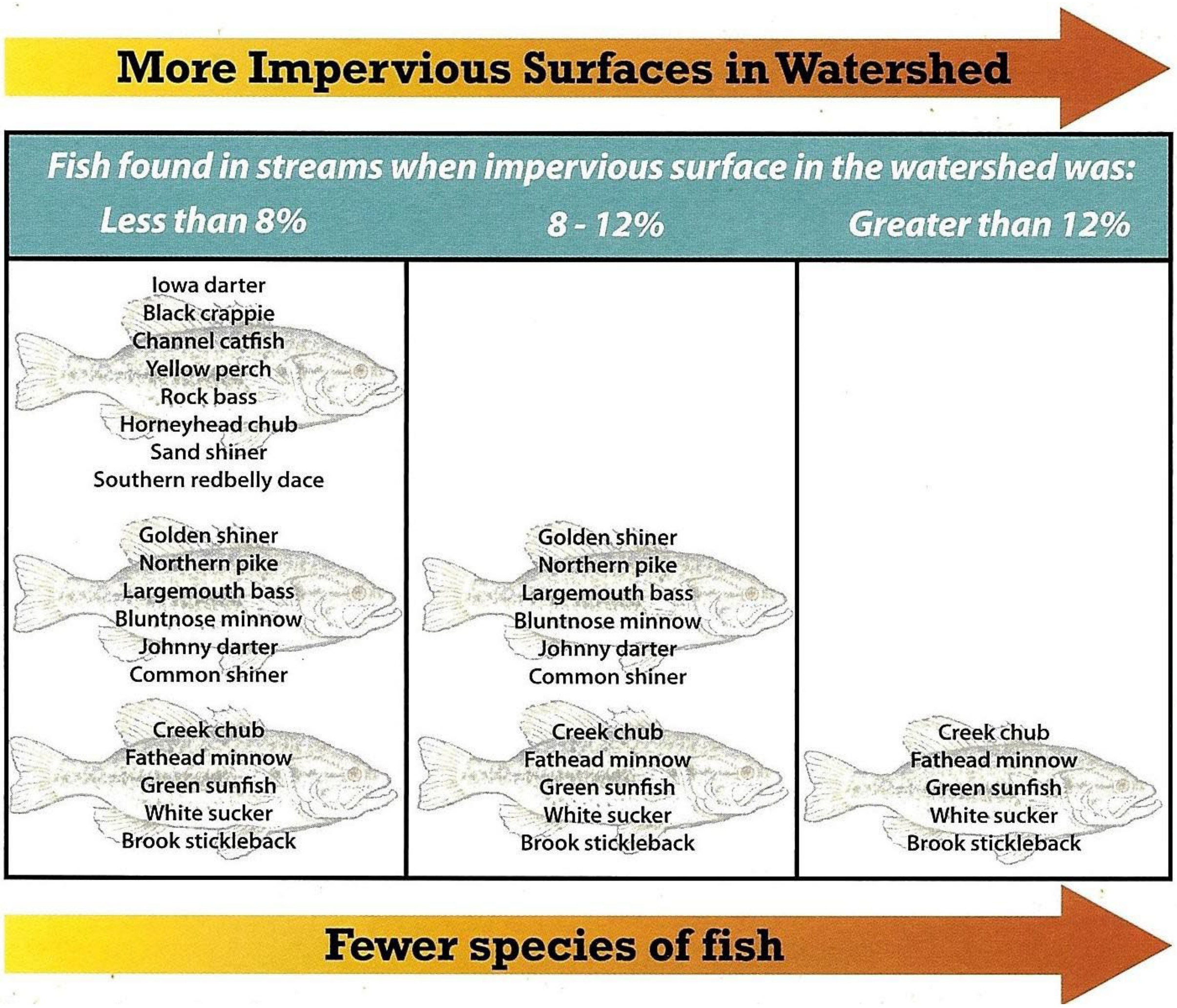


Figure 14: The number of different stream fish species found in streams declines as the effects of impervious surfaces kill off more sensitive species. (Wang et al. 2020)

A 2005 Lake Ripley study found significant shading under piers and a corresponding reduction in aquatic plant abundance, as well as a shift in community composition to one dominated by shade-tolerant species. Shading and the resulting loss of plant habitat under piers translated into a reduction in macroinvertebrates (a source of food for young fish), and declines in the species abundance of a number of small fish species. Results suggest that the proliferation of piers and other near-shore structures may be contributing to the degradation of littoral zone habitat and biological diversity (Cicero et al., 2005).

5.3 – Historical Overview

In 1927, northern pike, walleye, largemouth bass and "calico" (white) bass were all reported to be native to Lake Ripley. Bluegill, sunfish, catfish, yellow perch, bowfin, gar and common carp were thought to have been either introduced or had worked their way up the Koshkonong Creek, and into the lake (Chase and Noland, 1927). It was further reported that extensive stocking of largemouth bass, perch eggs and walleye fry occurred from 1937-1945, in addition to the stocking of 17,000 "walleyed pike" fry in 1929 (Burris, 1971).

Lake Ripley has long been considered one of Wisconsin's finest largemouth bass lakes, and is famous for producing the state record in 1940. A 1946 survey by the former Wisconsin Conservation Department (WCD) showed bluegill, walleye, northern pike, largemouth bass, yellow perch, crappie, and bullhead as major contributors to the sport fishery (Mackenthun and Flakas, 1946). Sunfish, rock bass, longnose gar, bowfin, common sucker, bluntnose minnow, and top minnows were also documented in the lake at this time.

During the 1950s and early 1960s, the WCD removed native bowfin and longnose gar from Lake Ripley as "rough fish", which may have caused long-term impacts on our native fishery. Fisheries managers have since come to appreciate the importance of these native species for maintaining aquatic diversity and controlling slow-growing panfish and young carp (LRMD and WDNR, 1994).

A June 1970 survey obtained similar results as in 1946, except for the absence of the black crappie and a large increase in carp (Druckenmiller, 1970). Rough fish, especially carp, have periodically been considered a problem in Lake Ripley, prompting state crews to periodically come to the lake to physically remove them.

Shoreline fish seining was conducted in 1974 to assess the status of non-game species and juvenile gamefish. A total of 18 native fish species were found. These types of fish inhabit the shallow zones of the lake and can often be missed during fall electrofishing surveys, due to their small size. Declines of small darters and minnows can reveal problems in lakes before gamefish growth rates and abundance are impacted. Seining was conducted again in 2004 with 11 total native fish species found, showing a decline in native species.

A 1982 Wisconsin fish distribution study found Lake Ripley to support as many as 34 fish species. However, several of these species failed to turn up during recent seining surveys, indicating a possible loss in species richness since seining was originally performed in 1974.

Walleye fingerlings have been stocked in Lake Ripley about every two years since 1985 by the Wisconsin DNR. Stocking was not conducted in 2007 or 2008 due to the unavailability of DNR resources as a consequence of emergency VHS testing around the state. The objective of the walleye-stocking program is to supplement any natural reproduction and help control the stunting of the yellow perch population. Recent electrofishing data suggest that perch remain undersized despite this attempt at biomanipulation. It is unclear whether natural reproduction has been positively affected by this program.

Fall electrofishing surveys have been performed by the DNR since 1992. Sampling was limited to water four feet deep or less, and within three sampling areas, comprising 14,000 feet or about 65% of the total lake shore. Areas sampled consisted of Marina Bay (from the scout camp to the marina, and including Vasby's Channel), East Bay (including the inlet), and the lake's northeast shore. Each area was representative of different bottom substrates and degrees of aquatic plant growth.

Between 1992 and 2009, fall electrofishing surveys revealed an average species-richness of 16.9. Species diversity was found to range from a 1993 low of 10 to a 2009 high of 23, but without any clear trends during the period of record. Table 10 lists the different species of fish that were documented during the surveys. The timing and method of capture of these surveys can affect results, leaving a reasonable probability that some species may have been present but overlooked during sampling.

Results reveal the change in status of native, rare and sensitive fish species over the course of the study period. Sensitive species are fish that are more sensitive to environmental changes than popular gamefish. Over the 30-year study period, seining results indicate a possible loss of seven native species (from 18 to 11), and declines in both rare and sensitive species (pugnose shiner, blackchin shiner, blacknose shiner and least darter).

The pugnose shiner (Notropis anogenus), a Wisconsin Threatened Species, and the least darter (Etheostoma microperca), a Wisconsin Species of Special Concern, are among those whose populations have diminished within our lake. Both species are sensitive to turbidity and loss of native aquatic plant habitat. Declines in these sensitive species are thought to be related to the removal or alteration of critical near-shore habitat as a consequence of shoreline development.

For full tables documenting fish-stocking records for Lake Ripley from 1985-2021, documented fish species during fall electrofishing surveys and non-game fish survey results please review our 10-year Lake Management Plan.

5.4 – Recent Trends and Current Status

During 2009-2019 the DNR surveyed Lake Ripley's fish population every year primarily through electrofishing. Electrofishing protocols by the DNR requires that electrofishing is conducted using a large boom shocker boat that allows for the collection of young-of-year walleye and adult bass, both of which are frequently under-sampled by other gear types. In order to standardize fisheries data, total effort in the form of time spent shocking and/or miles of shoreline shocked, is recorded and presented as catch rates or catch-per-unit effort (CPUE) (Stremick-Thompson, 2020).

Fall electrofishing sampling provides an indication of the health of the fishery through estimates of gamefish and panfish relative abundance (catch rate or catch per effort), gamefish population size-structure (size distributions), an index of growth and gamefish recruitment (young-of-year catch per effort). Fall electrofishing survey results are summarized for largemouth bass, smallmouth bass, walleye, northern pike, bluegill, yellow perch, rock bass and pumpkinseed in the Tables found in our 10-year Lake Management Plan. These tables depict minimum, maximum and average lengths found during the 2010-2020 survey period, as well as the number of fish caught per hour of sampling (CPUE or CPE).

Gamefish Species

Largemouth bass, smallmouth bass, walleye and northern pike, have been the most common gamefish species studied during the fall electrofishing surveys since 2010. In 2016, largemouth bass were the most dominant gamefish species present, followed by walleye, northern pike, and smallmouth bass.

In April 2018, the DNR conducted a Spring Electrofishing survey. They took one lap around the lake to look at overwinter survival of the stocked walleye and adult abundance. A fall electrofishing survey was completed in this unstocked year to look at natural reproduction. They managed to capture eight walleyes under 10 inches, five of which were sacrificed for otolith aging. All 5 came back as young of year, indicating limited natural reproduction in the system.

Researchers duplicated this spring and fall electrofishing survey template for 2019. In April 2019 they sampled 4.1 miles and captured one 8.8 inch walleye, which most likely was a holdover naturally reproduced fish. One 12.2 inch fish was caught that researchers suggested came from the 2017 stocking. In fall 2019 they sampled the same 4.1 miles, but with poor results; only nine fish were caught and recorded.

For tables documenting electrofishing results for Lake Ripley from 2010-2020 please review our 10-year Lake Management Plan.

Panfish Species

The panfish community of Lake Ripley is typically comprised of bluegill, yellow perch, rock bass, white bass, pumpkinseed, black crappie and green sunfish. Bluegill is usually the most abundant fish species found. In 2016, bluegill was the most dominant panfish species present, followed by pumpkinseed, rock bass, yellow perch and black crappie.

For tables documenting electrofishing results for Lake Ripley from 2010-2020 please review our 10-year Lake Management Plan.

Non-game Species

Recognition has been growing that freshwater nongame fishes, native fishes not traditionally targeted for recreation or harvest, are vastly understudied and under-conserved (Cooke et al., 2005, 2020; Rypel et al., 2021). While the lake is studied and managed by the DNR for popular game fish species like walleye and bluegill, not as much attention has been given to its diverse assemblage of nongame, nearshore fish species. Without a plan in place to protect these species, declines of their populations can go unnoticed, leading to extirpation or extinction. Recognizing the ecological importance of these often-overlooked species, the District has been conducting nearshore, nongame fish surveys to assess the diversity, abundance, and ecological roles of nearshore, nongame fish in Lake Ripley since 1975. The lake once supported at least 37 different fish species, with 18 of those species being nongame species!

Nongame fish fill important functional roles in lake ecosystems, including: food-web stability, nutrient cycling, ecosystem engineering, and mussel hosting (Naill, et al., 2025). Small cyprinids (minnows and shiners) serve as forage for juvenile game fish, herons, and kingfishers. Darters, suckers and mudminnows contribute to nutrient cycling and the control of aquatic invertebrate populations (Childress et al., 2014; Huson et al., 2023).

During the 35-year period from 1975 to 2010, nearshore habitat declined as shoreline development expanded. Consistent with other lakes, the declines in Lake Ripley coincided with habitat degradation, introduction of aquatic invasive species, habitat fragmentation and environmental pollution, including aquatic herbicide use. In the 1980's, Eurasian watermilfoil (*Myriophyllum spicatum*)(EWM) and Curly-leaf pondweed (*Potamogeton crispus*)(CLP) found their way into Lake Ripley, which the community attempted to control through herbicides. Herbicide use on Lake Ripley was first documented in 1977 and was discontinued by 1990; 2-4-D was one of the herbicides used to target the invasive Eurasian watermilfoil. Dehnert et. al. and Anton et. al., both suggest how aquatic herbicides, specifically 2-4-D, could "act as an endocrine disrupting chemical that alters expression of primary genes regulating hormone receptors, and could present risks to the reproductive health of non-target aquatic species". By targeting EWM with herbicides, the nearshore, nongame fish population could have been severely negatively affected as these fish often seek out vegetation for protection. The District has not used aquatic herbicides since 1990, instead using mechanical harvesting to control EWM.

However, over the last two decades, watershed and shoreline work has been completed by the District improving habitat and water quality and leading to invasive species declines. We have worked hard on restoring habitat and protecting sensitive/critical areas of our lake which has led to habitat improvements, such as the floristic quality index of aquatic plants increasing and native aquatic plant diversity increasing. This has allowed native aquatic plants to flourish, which in turn creates suitable, sustainable habitat for our NSNG fish species.

Lake Ripley supports a diverse non-game fish community including: bowfin, grass pickerel, white sucker, brook silverside, golden, emerald and mimic shiners, bluntnose minnow, fathead minnow, yellow, black and brown bullhead, longnose gar, central mudminnow, blackstripe topminnow, Johnny darter, Iowa darter, bigmouth buffalo and common carp. Historically, Lake Ripley also supported populations of several important fish species, including blackchin shiner, blacknose shiner and western banded killifish. The western banded killifish is also a State Special Concern (SC) species. Lake Ripley also supported two additional SC species, the lake chubsucker and least darter. The pugnose shiner, a Threatened species in Wisconsin, was also found in the lake.

Due to their small body size, large boom shocking gear is not ideal for sampling most of these species during fall electrofishing surveys. However, larger-bodied fish such as the lake chubsucker can be detected more readily using this gear.

In the summer of 2025, the District partnered with Underwater Habitat Investigations, LLC, to complete a near-shore, non-game fish survey. The primary goals were to 1) determine the occurrence and relative abundance of fish species in nearshore areas of the lake, 2) to compare catch results from 1975, 2004, 2012 and 2020 surveys to detect possible trends, 3) to assess the condition of the nearshore habitat, and 4) to evaluate its suitability for possible reintroduction of one of the extirpated nearshore, nongame fish species.

The survey was completed on June 11th, 2025. Starting at 9:00am, the survey lasted roughly 4.5 hours with the crew finishing around 1:35pm, which is faster than usual due to an extra DNR crew assisting us. The weather was sunny and 75°F, with a 12mph southwest wind. Fourteen different nearshore sites were selected around the lake for this survey. These sites were repeated sites from previous surveys and included newly designated Critical Habitat Designation sites (Wisconsin Lakes). The sites were selected as they encompassed different habitat types and shoreline conditions (protected, substrate type, vegetated, etc.).

Compared to the last NSNG fish survey completed in 2020, we found fewer NSNG species and numbers of individuals. The survey results are not encouraging but it is too soon to determine if the differences are the result of weather conditions or a decline in the nearshore fish assemblage. In either case, results from all surveys completed since 1975 demonstrate a significant loss of this important fish assemblage in terms of both biodiversity loss and food-web instability.

Four near-shore nongame fish species were positively identified during the 2025 survey. These species were the 1) bluntnose minnow, 2) brook silverside, 3) fantail darter and 4) mud minnow. No 'environmentally intolerant' species were found, including the 'Special Concern' least darter and the 'Species of Greatest Conservation Need' Iowa darter identified during the 2020 survey.

Fish Species 1975-2025					
Species	**1975**	**2004**	**2012**	**2020**	**2025**
Golden shiner	17	3	255	0	0
Pugnose shiner	17	0	0	0	0
Blackchin shiner	15	0	0	0	0
Blacknose shiner	3	0	0	0	0
Bluntnose minnow	152	1833	10	11	4
Fathead minnow	1	1	11	0	0
Lake chubsucker	18	0	0	0	0
Common carp	0	0	1	0	0
Central mudminnow	0	0	33	4	18
Grass pickerel	1	0	0	0	0
Yellow bullhead	0	0	33	38	33
Tadpole madtom	0	0	1	0	0
Western Banded killifish	45	0	0	0	0
Blackstripe topminnow	0	0	1	0	0
Brook silverside	19	69	0	2	6
Green sunfish	3	0	6	9	0
Hybrid sunfish	0	0	1	0	0
Bluegill	171	324	226	109	89
Pumpkinseed	64	0	4	3	6
Rock bass	1	0	14	3	4
Smallmouth bass	0	44	7	0	0
Largemouth bass	153	783	76	98	2
Black crappie	58	6	0	0	1
Iowa darter	1	25	2	6	0
Least darter	3	0	0	2	0
Johnny darter	2	17	15	2	0
Fantail darter	4	0	15	13	7
Yellow perch	316	89	22	12	1
Total Native Species	**21**	**11**	**16**	**14**	**11**
Total Individuals	**1041**	**3252**	**462**	**312**	**171**

Nongame fish species reported from Lake Ripley throughout the years since 1975.

Western Banded Killifish

The western banded killifish is an important nongame fish species in the food web of many lakes. It became extirpated from Lake Ripley after 1975, likely due to one or more of the factors mentioned above. In 2013, the Lake Ripley Management District completed the first feasibility study to investigate options for restoring extirpated nongame fish species in the lake (Marshall and Dearlove 2013 Lake Planning Grant report). Given the importance of nearshore populations of small nongame fish for lake ecosystems, restoring nongame fishes in the lake is warranted. We have an opportunity to raise the western banded killifish in a nearby fish farm as a conservation aquaculture project.

Western banded killifish prefer areas of sparse aquatic vegetation, making control of non-native and invasive plant species critical for our reintroduction project and the overall ecological health of the fishery.

In western Wisconsin, conservation aquaculture was used successfully to reestablish the state endangered starhead topminnow in Lake Wisconsin (Lyons et al. 2022, Marshall et al. 2021). The starhead topminnow and western banded killifish are members of the Fundulus genus in the Topminnow family (Fundilidae). The successful breeding and reintroduction of the much rarer starhead topminnow is a favorable indicator for western banded killifish in Lake Ripley.

Over the last five years the District has been trying to gain support to reestablish Western Banded Killifish in the lake. The improvements made to the lake indicate that Lake Ripley could support the Western Banded Killifish. A re-introduction effort could bring this species back, improving the biodiversity and resilience of the lake food-web. They are an important NSNG fish species in the food-web of many lakes.

Comprehensive Survey

In 2023, a comprehensive fishery survey was conducted on Lake Ripley using a variety of sampling methods throughout the open water period to sample the major components of the fishery. The objectives of the survey were to 1) assess the status of the northern pike (*Esox lucius*), walleye (*Sander vitreus*), largemouth bass (*Micropterus salmoides*) and panfish populations, 2) attain a population estimate for northern pike and walleye and 3) update management recommendations for the fishery of Lake Ripley. The results of the 2023 survey were compared to lakes with similar characteristics and the prior comprehensive fishery survey the Department of Natural Resources (DNR) conducted on Lake Ripley in 2016. Based on the 2023 survey results, Lake Ripley continues to offer quality fishing opportunities for northern pike, walleye, largemouth bass, pumpkinseed (*Lepomis gibbosus)* and bluegill (*Lepomis macrochirus*).

A total of 13,056 fish from twenty-one different species were sampled during the 2023 comprehensive fishery survey, with the most fish sampled during SNI. Bluegill, pumpkinseed and yellow bullhead were abundant. Walleye, northern pike, largemouth bass, black crappie, yellow perch, rock bass, golden shiner and brown bullhead were common.

Northern pike catch rates between survey years were relatively similar with 0.9 /net night in the 2016 spring fyke netting (SNI) survey, and 1.1 /net night in 2023. These rates are in the 35th and 43rd percentile, respectively, for similar complex, warm, clear lakes. The percent of northern pike measured over the legal size limit of 26.0 inches increased from 12.4% in 2016 to 46.2% in 2023. The average length also increased from 18.0 inches in 2016 to 24.3 inches in 2023. The ratio of female to male northern pike flipped from 31.2% female and 41.2% male in 2016 to 56.3% female and 40.5% male in 2023. The population is self-sustained through natural reproduction as northern pike are not currently stocked into Lake Ripley. Future surveys should continue to closely monitor the population of northern pike as an important gamefish species.

Walleye catch rates were very similar in both survey years. Rates were 3.0/net night in 2016 and 2.9/net night in the 2023 survey. These are in the 56th and 55th percentile, respectively, for similar lakes. The average length of walleye sampled declined slightly from 18.5 inches in 2016 to 17.8 inches in 2023. The percent of walleye over the legal size limit of 15.0 inches also declined from 96.5% in 2016 to 83.2% in 2023. Male to female ratios of walleye in Lake Ripley remained consistent between survey years. In 2016, males accounted for 72.7% and females accounted for 24.9% of the population. In 2023, males accounted for 72.7% and females accounted for 24.5% of the population. Beginning in 2015, Lake Ripley has been stocked by the DNR or private hatcheries in odd years with large fingerling walleye at a rate of 20 per acre. This practice was discontinued due to a lack of reaching targeted goals for walleye adult abundance and young of year (YOY) catch rates, and the last stocking occurred in 2021.

Largemouth bass catch rates decreased slightly during spring electrofishing II (SEII) sampling from 61.3/mile (81st percentile) in 2016 to 44.3/mile (77th percentile) for similar lakes in 2023. The proportional size distribution (PSD), or the proportion of
4 fish sampled above a quality size (12 inches) compared to the stock size (8 inches) for the species decreased slightly from 31 in 2016 to 26 in 2023.

Bluegill catch rates increased slightly between 2016 (44.0/mile) and 2023 (48.0/mile). These rates are in the 21st and 22nd percentile, respectively, compared to similar lakes. PSD for bluegill also increased from 23 in 2016 to 44 in 2023. Future surveys should focus on bluegill growth and catch rates to determine if a more protective regulation on panfish is warranted.

Current DNR sampling protocols do not accurately assess yellow perch (*Perca flavescens*) or black crappie (*Pomoxis nigromaculatus*). Angler concerns about the yellow perch population led to a private stocking of 5,000 yearling perch in both 2018 and 2019. Angler concerns over the populations of these species may warrant more intensive sampling in the next survey to address the potential impacts and develop science-based decisions on their management.

Find the full report here: 2023 Comprehensive Fish Survey Report.

5.5 – Management Of The Fish Of Lake Ripley

One of Lake Ripley's objectives of management is to sustain a healthy largemouth bass population, which is considered the primary gamefish in the lake. Management efforts are also directed toward protecting shoreland wetlands to enhance northern pike spawning. In addition, mechanical harvesting is used by the District to control Eurasian watermilfoil and other invasive plants that threaten to displace native plant beds. Harvesting activities predominantly target dense, monotypic stands of milfoil, and may be used to create edge habitat and fish-cruising lanes in DNR-approved locations.

According to past fishery inventories, the most diverse species assemblage is consistently found in Lake Ripley's Marina Bay area. It is characterized by a relatively diverse native plant community and comparatively less shoreline development than other parts of the lake. It is also largely protected from motorboat disturbance through slow-no-wake and no-motor regulations. The presence of submersed, floating-leaved and emergent vegetation is a key element providing cover, spawning sites and structure for fish. Water lilies are particularly abundant within the bay, with rhizomes providing the firm substrate needed for bass nesting.

Due in part to these unique, high-quality habitat features, most of Marina Bay is designated as a Critical Habitat Area by the Wisconsin Department of Natural Resources. "Attempts to protect the plant community of [Marina Bay] and its attending fishery by limiting development and imposing 'no wake' ordinances etc. are justified. This justification is based on a judgment that a disruption of the fishery community of this bay may upset the balance in the bass population and ultimately change the fishery resource of the entire lake. (Bush, 1994)"

Marina Bay is one of eight Critical Habitat Designations (CHD) in Lake Ripley. The CHD's can be found in East (Inlet) Bay, Milwaukee Bay, the peninsula at the Hoard-Curtis Scout Camp, and along a small stretch of wetland-dominated shoreline on the lake's southwest side. The CHD's in Lake Ripley encompass more than 5,750 feet of shoreline, which is roughly ¼ of our total shoreline! Conversely, Lake Ripley's more developed and sparsely vegetated northeast shore was found to generally support fewer numbers of fish and at lower species' diversity.

The condition of the landscape draining to the lake is another important factor affecting the condition of the fishery. Development and land-use activities have the potential of generating polluted runoff that can bury fish-spawning sites in sediment. Polluted runoff can also supply excess phosphorus to the lake that fuels algal blooms and nuisance plant growth. Studies show that watersheds with a high number of connected impervious surfaces (i.e., roads, parking lots, rooftops, etc.) generally start to experience fish species declines and other problems (Wang et al., 2001). In 2016, the district hired an intern who researched impervious surfaces and their connection to the lake. The results of the study proved that impervious surfaces within Lake Ripley's watershed are correlated with poor land use and contribute to the negative effect on the water quality of Lake Ripley (Whalley, 2016).

Shoreline development often results in the systematic removal of near-shore, aquatic vegetation: the same vegetation for which species like largemouth bass are intimately linked. In fact, the level of shoreline development largely dictates largemouth bass and black crappie nesting success. It also contributes to the proliferation of seawalls, patios, sand beaches, piers, swim rafts and boat-docking stations which can alter, fragment, or eliminate natural fish habitat.

Unlike bass, carp are frequently associated with a relative absence of vegetation. Carp are known to negatively impact water clarity and native aquatic plant growth, namely through their feeding habits that stir up the lake bottom and recycle nutrients for algal growth. As a lake's Trophic State Index (TSI) increases, due in part to carp activity, the total number of species (and particularly fish species sensitive to water quality changes) eventually declines after an initial increase.

The percentage of gamefish also decreases with increasing TSI, while carp abundance increases until the lake becomes hypereutrophic. The occurrence of northern pike, largemouth bass, walleye and yellow perch all decline starting at a TSI of about 50 (Schupp, 1992). These findings are of concern for Lake Ripley, which has a mean summer TSI that is hovering at this exact level. In 2019, the TSI was at 51 which is an improvement since 2009. The highest TSI over the last decade was in 2017, reaching a high of 55. Per the DNR, having a TSI between 50-60 means the lake is becoming eutrophic. This would include decreased water clarity, increased algal species, oxygen-depleted bottom waters during the summer, evident plant overgrowth, and a gradual change to a warm-water fishery (WDNR, 2019).

CHAPTER 6 – MECHANICAL HARVESTING

6.1 The Value and Role of Mechanical Harvesting

Mechanical harvesting should be viewed as a long-term commitment where operational intensity may vary from year to year depending on actual need. An effective harvesting program involves maintaining, storing and deploying multiple pieces of equipment. It also involves: obtaining permits, training and supervising machine operators, carrying appropriate insurance coverage, locating disposal areas for harvested plant material, recordkeeping, and maintaining public relations. Once the capital equipment is acquired and a program is established, significant cost savings and other benefits are generally realized.

One role of a mechanical harvester is to cut and collect invasive or nuisance aquatic vegetation growing within a few feet of the water surface. Root systems remain in place after harvesting, allowing plants to quickly regenerate. About one acre of lake surface can typically be harvested per hour, and relief can last as little as several days or up to three months depending on growing conditions.

There are both selective and non-selective aspects to mechanical harvesting. Non-selectivity is demonstrated by the removal of all plant species that fall within the reach of the cutter bars. Some species selectivity is achieved by targeting monotypic stands of nuisance vegetation, operating at specific times during the growing season, and altering the depth of the cut. It may be possible for harvesting to alter the composition of a plant community by encouraging the success of shorter-growing and disturbance-tolerant species, and by allowing additional sunlight to reach the understory.

6.2 Control Methods

Aquatic plant management measures can be classified into five different groups: 1) physical, 2) biological, 3) mechanical, 4) manual, and 5) chemical. All of these control measures are stringently regulated and may require a State of Wisconsin permit.

Physical Control

Physical control methods can refer to the use of a type of physical barrier including lake bottom blankets, synthetic screens, or a type of rock-substrate. These create a physical barrier between rooted submersed aquatic plants and plant-available sunlight, consequently preventing the plants from growing. For example, physical measures such as lake bottom covers are often used to create swimming beaches and pea gravel is used to create boat launches.

In the case of Lake Ripley, the need to encourage native aquatic plant growth while simultaneously controlling the growth of invasive species, often in the same location, suggests that physical management methods are not warranted. Therefore, physical control methods are not considered viable for Lake Ripley and are not recommended within this plan.

Biological Control

Biological control methods refer to insects, fish and pathogens that are used to decrease the density of invasive plants. These agents are deliberately released into a lake to weaken the invading population by increasing leaf mortality, decreasing plant size, reducing flow and seed production, and decreasing density (UW-Extension, 2022). A local example of biological control is the milfoil weevil. This weevil is a native, small, herbivorous aquatic beetle that has been used in Wisconsin to reduce the density of Eurasian watermilfoil in a lake.

However, given that Lake Ripley has high boat activity and a developed shoreline which limits the existence of leaf-litter habitat preferred by the weevil, the use of the milfoil weevil is not considered viable on Lake Ripley and is not recommended within this plan. No biological control methods are recommended within this plan.

Mechanical Control

Mechanical control methods include aerators, harvesters and suction harvesters among other possible methods. A permit is required for all mechanical control methods. Using a mechanical harvester on a lake requires access to a weed harvester and educated harvester operators. This equipment consists of an adjustable cutting apparatus that cuts plants at selected depths from the surface down to roughly five feet below the water surface and a collection system that gathers most of the cut plant material. Mechanical harvesting can be a practical and efficient means of controlling sedimentation and plant growth, because it removes plant biomass that would otherwise decompose and release nutrients and sediments into a lake.

An advantage of mechanical harvesting is that the harvester, when properly operated, “mows” the tops of aquatic plants which can result in an overall reduction of plant abundance (UW-Extension, 2022). Therefore, this method typically leaves enough living plant material in a lake to provide shelter for aquatic wildlife and to stabilize lake-bottom sediments. Aquatic plant harvesting also has been shown to facilitate growth of native aquatic plants by allowing light to penetrate to the lakebed. This is particularly effective when controlling invasive plant species that commonly grow very early in the season when native plants have not yet emerged or appreciably grown. Finally, harvesting does not kill native plants in the way that other control methods do. Instead, this method simply cuts them back.

Given that mechanical harvesting has been in operation on Lake Ripley for 26 years, and that the District has invested in its own harvesting equipment during that time, and since the District’s mechanical harvesting has demonstrated the ability to provide navigation lanes, control nuisance and invasive species, and prevent sedimentation with minimal damage to the lake ecosystem, harvesting is considered viable and is recommended for Lake Ripley.

Manual Control

Manual control methods can include the use of a rake, manual cutter blade, or pulling of plants by hand. This option can be helpful when targeting a smaller population, or a specific invasive plant species (UW-Extension, 2022). Lakefront property owners are encouraged to collect and remove floating plant debris that washes to shore. Lake plants make ideal compost or mulch around trees, shrubs, flowers and vegetables, or can be composted.

Floating plant debris may include Eurasian watermilfoil fragments that can re-shoot and grow into new plants. Decomposing plant debris also releases phosphorus and other nutrients that can contribute to algal blooms. Do not dispose of plants in a wetland or ditch as this will contribute to increased nutrients in the water. This activity would likely require a DNR permit.

Using manual methods, rooted plants can be removed from swimming/pier areas, without a permit, provided the following conditions are met:

- Eurasian water milfoil and curly-leaf pondweed may be removed if the native plant community is not harmed in the process. Check with the Lake Manager or a DNR Lakes Biologist beforehand in case of any restrictions (including Critical Habitat Designation areas).
- Manual removal is restricted to a 30-foot corridor extending from the shoreline out into the lake.
    - However, an exception applies to this when a property is within a Critical Habitat Designation (CHD) or an Area of Special Natural Resources Interest (ASNRI). In these instances, a permit is required to remove any vegetation (Wisconsin State Statutes – NR109.06(2)(b)).
- Plant materials that drift onto the shoreline may be removed.
- The shoreline is not a designated sensitive area.
- All raked and hand-pulled plant material is removed from the lake.
- No other plant control methods are used.

Chemical Control

Chemical control methods refer to aquatic herbicide use. Applying aquatic herbicides in any lake is strictly regulated by the WDNR through Wisconsin State Statute NR 107. Aquatic herbicides are used in an attempt to reduce the amount of invasive species in a lake, improve navigational access to lakes, and to control nuisance plant and algae growth. Using chemical herbicides is seen as a short-term method to control heavy growths of aquatic plants. They are seen as inexpensive, easy, convenient alternatives to other control options. However, these herbicides can irreversibly negatively affect the lake's ecosystem by drifting from the application area to areas of important native aquatic plant communities.

Herbicides aren't fully effective and do not provide long-term relief. Research has shown that both Eurasian watermilfoil and the hybrid milfoil are not as affected by herbicides as some other more vulnerable plants. Hybrid milfoil has shown resistance to chemical treatments, with research suggesting that certain strains may have higher tolerance to commonly utilized aquatic herbicides. Therefore, the use of aquatic herbicides to help reduce invasive species is not considered a viable option for Lake Ripley.

6.3 Permit Authority

The District carries out its mechanical harvesting program in accordance with an operating permit issued by the Wisconsin Department of Natural Resources. This permit must be renewed every five years and our latest permit expired on 12/31/2025. The permit grants authority to the District to conduct harvesting operations under Section 23.24, Wisconsin Statutes, and Administrative Code NR 109. Harvesting is only allowed in approved locations and using approved methods. Annual reports must be submitted to the Wisconsin DNR by November 1st of each year. At a minimum, these reports should describe hours worked, locations harvested, total acres harvested, amount of plant material removed, and the types and relative amounts of each species harvested.

NOTE: A Wisconsin DNR permit is not currently required for manual cutting and raking if the area of plant removal is kept to a contiguous, maximum width of 30 feet along the shoreline and is not located within a designated sensitive area. Any piers, boat lifts, swim rafts, and other recreational devices must be located within the 30-foot zone. All cut plants must be removed from the water. A permit is presently required if the plant removal area is more than 30 feet wide along the shoreline, or if the area is within a designated sensitive area. Find more information in Wisconsin State Statutes NR109.06.

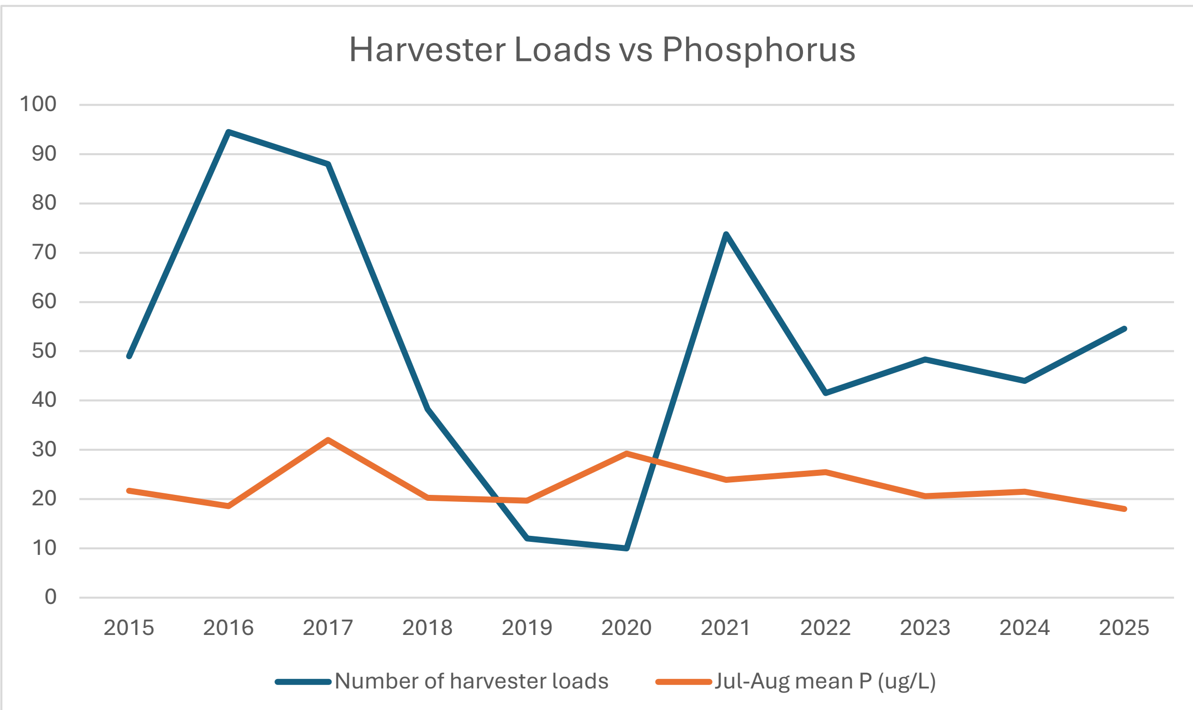
6.4 History of Harvesting

The District began the weed harvesting program in 2001 to decrease the growing populations of the two invasive species found in Lake Ripley: Eurasian watermilfoil and curly-leaf pondweed. The original purpose of the DNR's Mechanized Aquatic Plant Management Program was to focus on controlling known invasive aquatic species, but over the years the program has grown to include nuisance control.

In 2006, the District found a suspected hybrid of Eurasian and northern watermilfoils. By 2012, the hybrid was beginning to show a significant increase in frequency. Two samples were sent to the DNR for identification in 2014, and both samples were verified as hybrid watermilfoil. EWM and its hybrid is a prolific grower, especially when there are nutrients available to support quick growth and disturbance to the lakebed.

Since 2012, the District has focused on reducing the amount of EWM, CLP, and the hybrid milfoil in the lake. The crew focused on specific problem areas within the DNR-approved map, and over the next few years we began to notice a reduction in the amount of loads being harvested. In 2020, the District revised the harvesting map to include areas of nuisance plants, so community navigational lanes could be created for property owners along Lake Ripley. These navigational lanes are created for vessels to easily get in and out of their pier clusters and access the lake without damaging the plant community, resuspending sediment, or creating excessive amounts of prop-chop. However, these navigational lanes were seemingly difficult for homeowners to find and use consistently.

In 2023, the District revised the map again. This map has navigational lanes parallel to the shoreline, with a focus on areas with large pier clusters. This map has significantly reduced the number of complaints the District receives regarding macrophytes during the summer.



6.5 Equipment

The District currently owns and operates a 2015 Aquarius Systems' Model HM-420 mechanical harvester with a 7.0-foot cutting width, 5.5-foot cutting depth, 10.8-19.8" draft, and a 440 cubic feet capacity (10,000 lbs.). It was purchased new for $129,000, with the help of a 50% matching grant through the Wisconsin Waterways Commission.
The harvester is constructed upon a low-draft barge controlled by side-mounted paddle wheels, and is equipped with one horizontal and two vertical cutter bars that can be hydraulically positioned. Hydraulic conveyors built into the harvester hoist cut plant debris

onto the deck of the barge. When full, the plant material can be transported back to shore to be off-loaded into an awaiting dump truck using a shore-conveyor system.

Ancillary equipment presently includes an Aquarius SC-23 28.5-foot shore conveyor, purchased in 2015, a 1992 International dump truck, and a 2015 42-foot Aquarius Systems' TR-23 harvester trailer with a mounted electric winch. A Lowrance HDS12 Gen 3 GPS system was purchased new in 2018 for approximately $3,000 with a 50% matching grant through the WDNR.

At the close of each season, all equipment is cleaned, inspected, lubricated and winterized for storage purposes. The equipment is currently stored in a cold-storage shed located roughly 15 minutes from the District's office. The District rents storage from a local facility, Stor-Mor-Acres. The District has a seasonal lease agreement with the owners for winter/spring storage of the harvester and other equipment.

6.6 Staging Area and Disposal Site

During summer operations (approximately mid-June to late-September), the harvester, shore conveyor and dump truck are parked at the Hoard-Curtis Scout Camp on Lake Ripley. The District currently rents the Camp property during the operating season.
Many farmers are willing to accept aquatic plants as they are used as a source of nutrients (2.5% nitrogen, 0.6% phosphorus, and 2.3% potassium) and can add valuable, seed-free organic matter to the soil. Locating a disposal site in close proximity to the off-loading conveyor station is one of the keys to managing costs and increasing program efficiency. Harvested plant material is currently trucked to the Town of Oakland's compost site, located at N4450 County Road A in Cambridge, for composting. This location is ideal since it is less than three miles from the staging area.

6.7 Staff

Weed-harvesting staff currently consists of operators who are trained and supervised by the District's Lake Manager. All weed harvesting operators annually attend an "Aquatic Weed Harvesting Seminar" organized by Aquarius Systems to stay up to date on safety training, general harvester maintenance and equipment improvements.

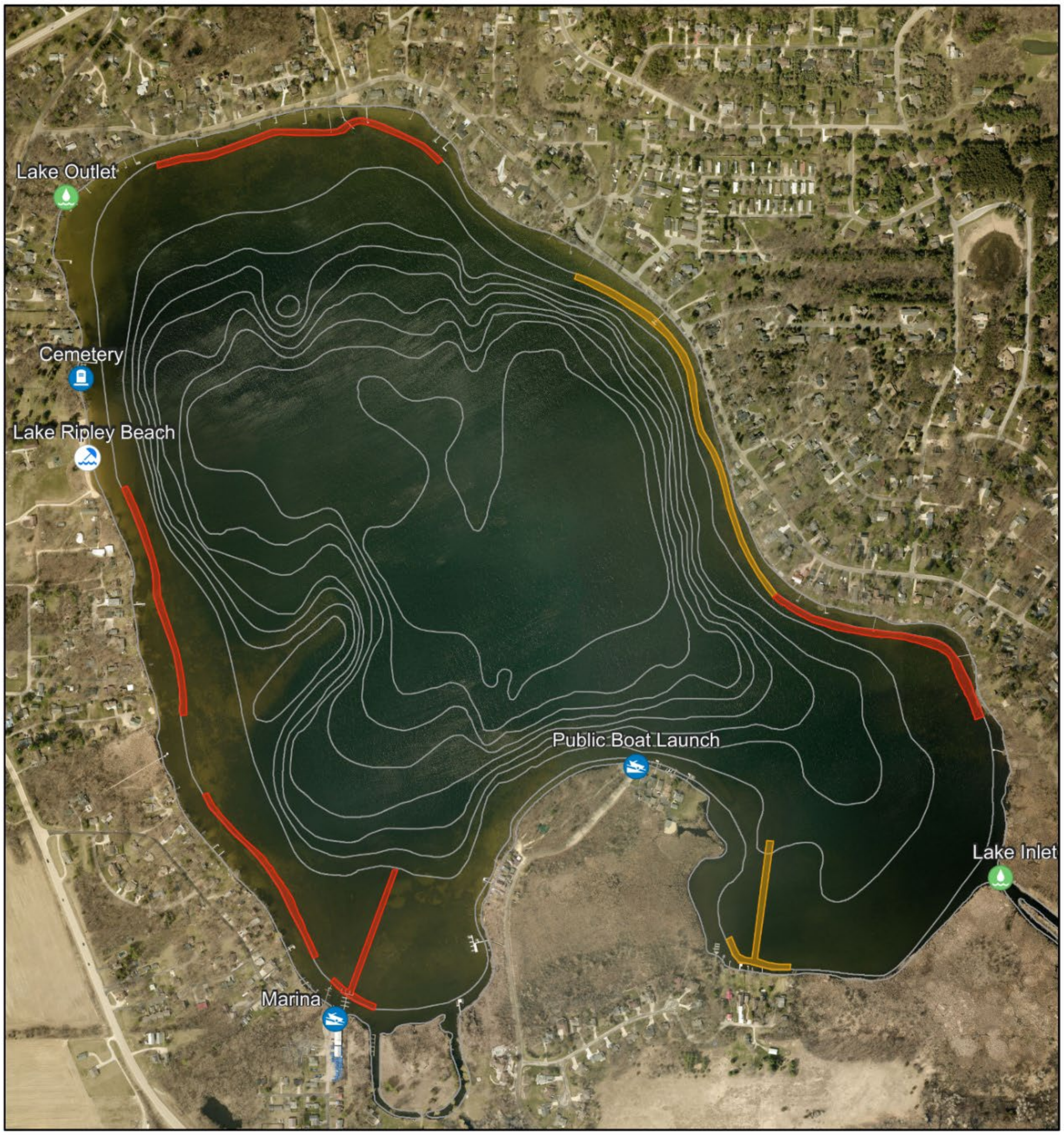
These part-time, seasonal employees are in charge of operating and maintaining the machinery on an as-needed basis. They are paid on an hourly wage basis and are covered by Workers' Compensation Insurance. We offer a competitive wage. Operators are required to comply with a “Weed Harvesting Operations Plan” that was adopted in 2008 and is updated as needed. For more information about this program, please contact the District office.

6.8 Location of Plant Management Activities

Mechanical harvesting should be used to try to control the two known invasive species in Lake Ripley, Eurasian watermilfoil and curly-leaf pondweed, and also to create community navigational lanes for riparian owners to access the main body of the lake. The District’s original weed harvesting map was created in 2006. The map was updated in 2021 with help from the Regional Lakes Biologist and the Fisheries Biologist for the southeast region of Wisconsin.

Our weed harvesting program’s main two goals are, 1) to create accessible navigational lanes that lead to the main body of the lake, and 2) reduce the density of Eurasian watermilfoil and curly-leaf pondweed. The two lanes in the southeast bay are in proposed Critical Habitat Designation areas. The decision to create community navigational lanes within these areas was due to the heavy riparian traffic coming off multiple piers and creating their own access to the lake, consequently creating a large amount of propchop and harming the native plant community. By creating community lanes, the District has been able to reduce the amount of resuspended sediments, prop-chop, and reduce the amount of native plants being harmed.

Lake Ripley Harvesting Lanes 2026



3/10/2026

1:10,000

0 0.07 0.15 0.3 mi
0 0.13 0.25 0.5 km

Legend

Primary Harvesting Lanes: harvested on a regular basis

Secondary Harvesting Lanes: harvested when necessary for navigational access

Depth Contours

JEFFERSON COUNTY
WISCONSIN
Explore. Thrive. Belong.

Jefferson County Land and Water Conservation Department
2026

CHAPTER 7 - MANAGEMENT GOALS AND RECOMMENDATIONS

Watershed Goals

Overall Watershed Goal: Improve the quality of water entering the lake by taking steps to reduce nutrients and total sediment load in the inlet stream and by implementing best management practices where feasible.

Inlet Stream And Wetlands Goal: Restore a functioning partnership between the inlet stream and its wetlands to improve the quality of water entering the lake. Develop and implement any necessary best management practices or other projects to reduce the amount of nutrients and sediments that flow through the inlet stream annually.

Inlet Stream And Wetlands Actions:

- Create a water budget to assess the effects of climate variability and human activities within our watershed.
  - Use water loggers to monitor continuous flow at the inlet and the outlet of Lake Ripley to collect data on phosphorus loading, among other nutrient parameters.
- Investigate the practicality of removing the “spoils” along the inlet stream that prevent the stream water from interacting freely with its wetlands, so that nutrients and sediment can settle out.
- Explore the feasibility and priority of re-meandering the inlet stream to fully restore the partnership of stream and wetlands, to improve water quality in the lake.
- Continue to study the inlet stream to understand how it functions within our watershed.
- Manage the reed canary grass in the wetland, focusing most efforts on where it abuts the prairie. See the 2021-2031 Preserve Management Plan for more information.
- Develop and implement habitat restoration projects that improve the shoreline, nearshore or upland habitat in a way that will improve the ecological condition of surface water or aquatic life.
- Develop and implement nonpoint source control pollution control projects that reduce the loading of nutrients and sediments into the Lake Ripley watershed, including Lake Ripley and its inlet stream.

- Apply for a Wisconsin DNR ‘Management Plan Implementation’ grant to develop and implement a project that will improve and/or protect surface water and Lake Ripley watershed’s aquatic ecosystems.
- Work with an engineering firm to help the District develop projects to enhance long-term water quality in Lake Ripley’s watershed through targeted watershed interventions aimed at mitigating nutrient and sediment inputs.
- Apply for a Wisconsin DNR ‘Management Plan Implementation’ grant to provide funding for implementation and support.
- Work with Jefferson County Land and Water Conservation Department to increase the number of agricultural parcels participating in cover crops, rotational grazing, taking fields out of production, stream bank restoration, and other practices.

Lake Recreational Goals

Recreational Lake Use Goal: Ensure safe and fair multipurpose, low-impact recreational use of the lake while protecting the lake’s health and shorelines.

Recreational Lake Use Actions:

- Protect the full hours of the slow-no-wake ordinance by continuing to support the Oakland Police Department.
- Perform a boat census survey every summer to continue assessing the carrying capacity of the lake.
- Work with the Town of Oakland to pass an ordinance that “gives the lake a break” from speed boats, one day every week, preferably Mondays.
- Continue organizing and participating in a summer and/or fall “Pontoon Classroom” to teach students and adults about lake ecology.
- Conduct a public input survey every 10 years.
- Develop a permanent pier ordinance that restricts permanent piers in Critical Habitat Areas and other areas of Lake Ripley.
- Apply for a Wisconsin DNR ‘Ordinance Development’ grant to create local regulations to benefit Lake Ripley regarding permanent piers.

Fast Boating Goal: Maintain community navigational lanes and safety protocols for our recreational fast boat activities while protecting the lake, the shoreline, and other recreational opportunities.

Water Quality Goals

Water Quality Goal: Maintain or enhance current water quality standards including: phosphorus summer mean concentration as close to 23 ug/L as possible, summer mean chlorophyll-a concentration 7 ug/L, summer Secchi-disk transparency at 7 feet or more, and a TSI average at 50 or below.

Water Quality Actions:

- Create a water budget to assess the effects of climate variability and human activities within our watershed.
    - Use water loggers to monitor continuous flow within Lake Ripley to collect data on phosphorus loading, among other nutrient parameters.
- Work with the Town of Oakland to help address any problems associated with runoff concerns due to the rebuilding of Ripley Road in 2017-18.
- Continue the District's cost-share program, which helps prevent shoreline erosion.
- Continue promoting native plant buffers along shorelines through our native plant sale. The Healthy Lakes Program offers $1,000 per 'best practice' installed on your property. Find more information here: Healthy Lakes and Rivers Program.
- Continue to use Ripples to inform the public about ongoing water quality issues.
- Develop and implement projects that will reduce nutrients in Lake Ripley's inlet stream, in wetlands adjacent to the inlet, and in the Lake Ripley watershed.
- Develop and implement projects that will address nutrient and sediment issues in Lake Ripley's watershed.
- Develop an aerator ordinance related to safety on Lake Ripley.
- Monitor carp population in Lake Ripley through fish surveys or a creel survey.
    - Research and/or develop a solution to reducing the invasive carp population on Lake Ripley.
- Apply for a Wisconsin DNR 'Surface Water Restoration' grant to help implement protection and restoration actions.
- Develop and implement surface water restoration projects such as sediment and water basins, rain gardens, vegetation plantings, streambank and/or shoreline protection, critical area stabilization, filter strips and diversions.
- Develop and implement in-water management projects to improve in-water conditions.

- Apply for a Wisconsin DNR 'Surface Water Planning' grant to help assess surface water quality in the Lake Ripley watershed and to create a plan that outlines future management actions for the benefit of surface water.
- Develop and implement a project that will help identify data gaps, collect new data, identify management challenges, assess historical management and outline planning needs.
- Develop and implement a pre-implementation project that provides a transition between planning and implementation.

Water Quality Sampling Goal: Measure the health of Lake Ripley's watershed with staff and volunteers, utilizing applicable technologies to track trends and identify sources of pollutants.

Water Quality Sampling Actions:

- Continue collecting water quality parameters for the inlet stream to pinpoint any point sources of pollution, and to assess stream and lake health.
- Collect total suspended solids, total phosphorus, temperature, DO, pH, flow, turbidity, and conductivity at four different sites along the inlet stream.
- Perform macroinvertebrate surveys (2x/season) at the inlet and outlet to evaluate the current health of the streams within the watershed.
- Continue participating in the Citizen Lake Monitoring Network program through conducting monthly water quality monitoring at the deep hole, per DNR schedule and protocol. Parameters collected include chlorophyll-A, phosphorus, Secchi disk, temperature, and dissolved oxygen. This data is used to analyze lake trends and identify needs.

Habitat Goals

Aquatic Plants Management Goal: Protect and enhance the existing diverse native aquatic plant community while limiting the spread of invasive species in Lake Ripley.

Aquatic Plant Management Actions:

- Repeat the point-intercept aquatic plant inventory survey for Lake Ripley in 2030 or earlier to keep track of community changes and the appearance or spread of invasive species.
- Complete genetic testing of milfoil from different areas around the lake to better understand the distribution of milfoils.

- Monitor aquatic plants in critical habitat areas annually, per the DNR protocols.
- Repeat a shoreline and shallows survey following DNR protocols in 2030 to track any changes to the shoreline.
- Continue to educate landowners about the value of native aquatic plants and the removal laws. Critical habitat areas require permits for any plant control.
- Continue to use mechanical harvesting to manage invasive plant species in approved locations, per the DNR permit.
    - Build public support by clearly communicating the goals and objectives for the mechanical harvesting program and what is required to achieve desired outcomes.
- Monitor and control aquatic invasive species.
- Create signage or maps of the Critical Habitat Designation areas to be installed at the public boat landing. These signs will share specific and targeted information designed to increase engagement and/or change behavior through understanding the importance of native plants or understanding the importance of sensitive areas.
- Continue educating boaters about invasive species through the Clean Boats, Clean Waters program at the public launch every summer.
- Monitor purple loosestrife in the Lake Ripley watershed and Jefferson County. Partner with the Jefferson County Land and Water Conservation Department to map purple loosestrife plants in the watershed and county.
    - Organize and/or participate in purple loosestrife biocontrol projects with the Rock River Coalition and/or the Jefferson County Land and Water Conservation Department.
- Apply for an ‘Aquatic Invasives Species Control – Early Detection & Response’ grant through the Wisconsin DNR to map, population monitor and control purple loosestrife in the Lake Ripley watershed and Jefferson County. If applicable, partner with the Jefferson County Land and Water Conservation Department on this grant.
    - An additional focus would be on education and pathway prevention.
- Apply for an ‘Surface Water Planning – AIS’ grant through the Wisconsin DNR to map, population monitor and control purple loosestrife in the Lake Ripley watershed and Jefferson County. If applicable, partner with the Jefferson County Land and Water Conservation Department on this grant.
- Develop a project to research the hybrid cattails in the District’s Preserve. Monitoring the population to increase scientific understanding of the ecological implications of this AIS.
- Apply for an ‘Aquatic Invasives Species Control – Large or Small-Scale Population Management’ grant through the Wisconsin DNR to control hybrid cattail in the Preserve’s wetlands.

- Apply for an 'Aquatic Invasives Species Control – Large or Small-Scale Population Management' grant through the Wisconsin DNR to control phragmites in the Preserve's wetlands, private lands, on other public lands and/or areas specified in easements given to the District. If applicable, partner with the Jefferson County Land and Water Conservation Department on this grant.
- Develop a project to control the hybrid cattails in the Preserve's wetlands. Control can include biomanipulation, nutrient management, habitat management, pesticide application, water level manipulation, mechanical removal, and/or other approved methods.
- When applicable, develop a project to control phragmites found in the Preserve's wetlands, on private lands, on other public lands, or in areas specified in easements given to the District. Control can include biomanipulation, nutrient management, habitat management, pesticide application, water level manipulation, mechanical removal, or other approved methods.

Fish Management Goal: Sustain and enhance the habitat and populations of all native fish species in Lake Ripley for the benefit of lake health, biodiversity, and recreation.

Fish Management Actions:

- Look for opportunities to increase fish habitat in Lake Ripley and its watershed.
- Continue using the DNR electrofishing surveys and other methods to track fish recruitment (the number of fish surviving to a certain size/age each year).
    - Evaluate potential causes of variability.
- Complete annual spring electrofishing surveys with the DNR to closely monitor the abundance and size structure of panfish in Lake Ripley, specifically bluegill and black crappie.
- Create and implement a fish reintroduction project focusing on Western Banded Killifish.
- Apply for a Wisconsin DNR 'Management Plan Implementation' grant to successfully raise, breed through natural reproduction, and stock Western Banded Killifish in order to reestablish their population.
- Apply for a Wisconsin DNR 'Surface Water Restoration' grant to develop and implement an in-water management project to protect or improve in-water conditions related to Western Banded Killifish or other native fish.
- Repeat the nearshore, nongame fish survey every 5 years to monitor trends in

nongame fish populations. Next anticipated fish survey is 2029.
    - Recommend that the DNR add a boom-shocking survey that specifically targets smaller, rare fish species by using fine-mesh nets.
- Continue monitoring for and tracking the status of the lake chubsucker (*Erimyzon sucetta*), the pugnose shiner (*Notropis anogenus*), the least darter (*Etheostoma microperca*), and the banded killifish (*Fundulus diaphanous*). Rediscovery of these species could be an early indicator of water quality improvements or successful habitat recovery.
    - Due to the low probability of natural recruitment, investigate the merit and feasibility of reintroducing native non-game fish species using approved conservation aquaculture methods. Develop and implement projects to reintroduce native nongame, nearshore fish species.
- Encourage residents to continue spear-fishing to control the population of carp. This could occur during their spawning season to prevent carp from swimming up the Koshkonong Creek and finding spawning sites in the surrounding wetlands.
- Use multiple media outlets to raise awareness about lake and fishery-related issues, including columnaris which is a naturally occurring bacterium that can lead to fish kills.
    - Encourage lakefront property owners to protect or restore habitat within the nearshore and riparian zones, particularly with respect to aquatic vegetation and coarse woody habitat.
- Utilize public meetings and opinion surveys to assess public perceptions and concerns pertaining to the lake and its fishery.
- Protect the undeveloped Critical Habitat Areas that are valuable fish spawning areas by limiting development in these areas.

Mechanical Harvesting Goals

Mechanical Harvesting Goal: Use mechanical harvesting to manage invasive or nuisance plant growth in approved locations. Mechanical harvesting is recommended as an effective method for removing Eurasian water-milfoil canopies, establishing edge habitat for fish, and opening boating lanes to improve access to open-water areas.

Mechanical Harvesting Actions:

- Selectively control invasive plant beds while minimizing disturbances to native and mixed-species plant communities. Target control efforts in a priority-driven manner that 1) preserves important ecological values of the larger plant community; 2) facilitates reasonable public access and navigation within high-traffic boating lanes, and 3) balances the needs of competing recreational uses.

- Analyze plant inventory data every five years to determine if changes to the weed harvesting map are needed. Inventories are used to track changes in the aquatic plant community over time and to monitor harvesting impacts on species diversity, distribution, and densities within management zones.
- Build public support and cooperation through our Ripples newsletter by clearly communicating the goals and objectives for managing aquatic plants, and the steps required to achieve the desired outcome.
- Public-awareness campaigns should focus on the value of native aquatic plants, how to identify and control problem species, local and state rules related to the protection or control of aquatic plants, and the role and limitations of management programs.
- Encourage public to report observations and concerns as they occur, so concerns can be solved with all due speed.

Public Comment

The 2026 Aquatic Plant Management Plan draft was posted online on the Lake Ripley Management District's website: www.lakeripley.org. The draft was posted on March 13th, 2026, and was available until April 20th, 2026 (38 days). A notice was posted on the District's website on March 13th stating that the plan was available for public comment and to submit any comments to the Lake Manager's email.

Two public comments were received, and both comments had a focus on a goal under "Recreational Lake Use Goals" and "Recreational Lake Actions". The action that was commented on is as follows: "Work with the Town of Oakland to pass an ordinance that "gives the lake a break" from speed boats, one day every week, preferably Mondays." Both constituents did not agree with the language, suggesting the District consider eliminating the language or changing it to a different day.

No changes were made to the plan after public comment.

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