Lake Ripley Management District

LAKE RIPLEY MANAGEMENT PLAN

2021

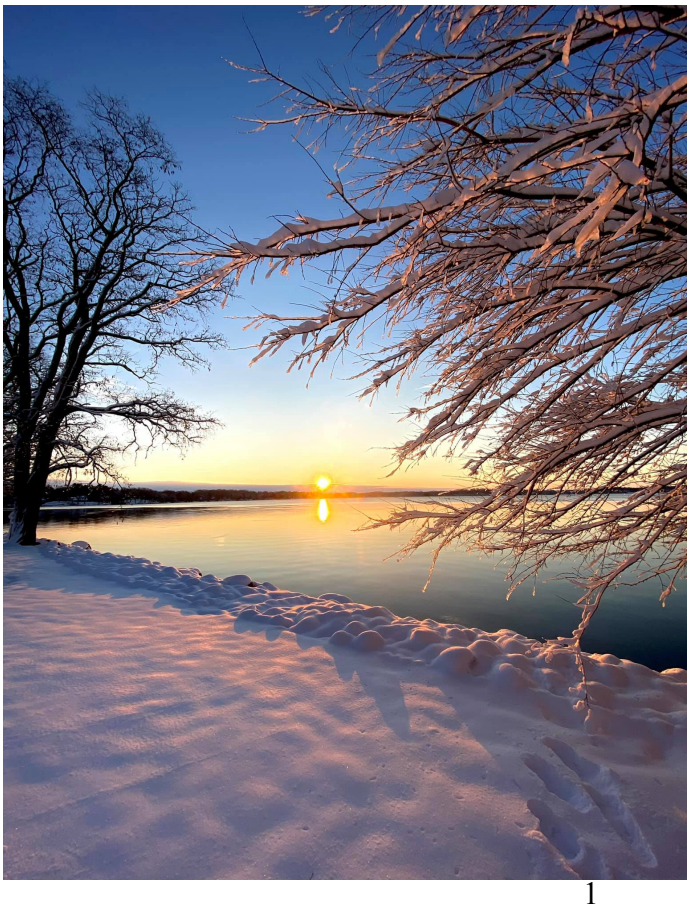


Table of Contents

List of contributors

Lake Ripley Management District Board of Directors
Jimmy DeGidio, Chairperson
Debra Kutz, Treasurer
Georgia Gómez-Ibáñez, Secretary
Craig Kempel
Keith Kolb
Doug Maurer
Walt Christensen

Plan Authors:
Lianna Spencer, Author, Lake Manager, LRMD
Georgia Gomez-Ibanez, Co-author, Editor, Secretary of LRMD
Paul Garrison, Co-author, limnologist for Wisconsin Department of Natural Resources - retired

Other Contributors
Clean Lakes Alliance - Paul Dearlove
Jefferson County Land and Water Conservation Department - Patricia Cicero, Gerry Kokkonen
Town of Oakland - Susan Dascenzo
Wisconsin DNR - Michelle Nault, Susan Graham

Resolution

Lake Ripley Management District

N4450 County Road A, Cambridge WI 53523, ripley@oaklandtown.org 608-423-4537

Large-Scale Lake Planning Grant Authorizing Resolution
Resolution 2019-3

WHEREAS, the Lake Ripley Management District is interested in obtaining a cost-share grant from the Wisconsin Department of Natural Resources for the purpose of updating the Lake Ripley Improvement Plan (Lake Ripley Comprehensive Management Plan.

WHEREAS, the applicant attests to the validity and veracity of the statements and representations contained in the grant application;

WHEREAS, a grant agreement is requested to carry out the project; and

NOW, THEREFORE, BE IT RESOLVED, that the Lake Ripley Management District will meet the financial obligations necessary to fully and satisfactorily complete the project and hereby authorizes and empowers the following officials or employees to submit the following documents to the Wisconsin Department of Natural Resources for financial assistance that may be available:

Task	**Title of Authorized Representative**	**Email address and phone number if alternate is used**
Sign and submit grant application	Lake Manager	ripley@oaklandtown.com 608-423-4537
Enter into grant agreement with the DNR	District Board Chair	ripley@oaklandtown.com 608-423-4537
Submit quarterly/or final reports to the DNR to satisfy the grant agreement, as appropriate	Lake Manager	ripley@oaklandtown.com 608-423-4537
Submit reimbursement request(s) to the DNR no later than the date specified on the grant agreement.	Lake Manager	ripley@oaklandtown.com 608-423-4537
Sign and submit, other documents	Lake Manager	ripley@oaklandtown.com 608-423-4537

BE IT FURTHER RESOLVED that applicant will comply with all local, state and federal rules, regulations and ordinances relating to this project and the cost-share agreement. Adopted on 16th day of November 2019

I hereby certify that the foregoing resolution was duly adopted by Lake Ripley Management District at a legal meeting held on day of 16th of November 2019

by a vote of: 6 in favor Ø against Ø abstain 1 absent

Signature Georgia Gotta Gomez-Ibanez Date Certified 11-16-2019

Title: Lake Ripley Management District Secretary

Foreword

The Lake Ripley Management District has been around for thirty years this year! Starting back in 1991, the Lake District has proven to be an incredible asset to the Oakland and Cambridge communities. The District is responsible for protecting over 200 acres of prairie, wetland, and woodland, researching and collecting data on the lake's only inlet stream, and implementing many different projects over the last three decades to continue protecting the quality of our watershed, and ultimately, our lake!

The District continues to buy land within the watershed that helps the District protect the lake. Back in 2017, the District had the opportunity to purchase 44 acres of land that the Wisconsin Department of Natural Resources was selling. This piece of land is very important because the inlet creek runs directly through this wetland complex and eventually meets up with Ripley Road and out to the lake. The District has installed monitoring wells at multiple sites along the inlet creek and within the lake itself to continue collecting data that will guide us in creating strategic management actions for issues such as nutrient reduction and erosion control. We continue to look for land around the watershed that meets the mission of the District in order to keep our lake healthy and continue to provide recreation into the future.

As we continue to be more proactive within our watershed, the Lake Manager position becomes even more important. With the dedication of the Lake Board and the District's residents, we were able to budget for a field technician position; this position completes critical water quality monitoring work that is necessary for the long-term health of Lake Ripley. With help from our Lake Manager, field technician, weed-harvesting crew, and two interns, we have accomplished many different goals this past year. I can't thank everyone enough for the great work that has been done since I've been Chairman, and we are seeing the results of that work every day. None of this would have been possible without my predecessors creating strong, meaningful programs to protect our lake. As I try to put the pieces in place for the next generation of leaders, we all can be grateful for the work that has already been accomplished!

On a summer afternoon in 2021, I was enjoying a boat ride on Lake Ripley in my pontoon. It was a beautiful, sunny day with very little breeze, and I decided to drift across the lake. I was having lunch with some friends when all at once several three-foot waves smashed into the side of the pontoon, and before any of us could react our lunch was knocked onto the floor! We were all shocked when we saw the rolling waves hit the boat. As we looked around the lake to see what was happening, we witnessed a wake boat with a surfboard riding its waves over in Milwaukee Bay. The wake that this boat was creating was so large that the surfer could stay behind the boat without a tow rope. Since that day, I've seen at least five wake boats on our lake creating these large-wave events.

Wake boats are designed to create a large and specifically shaped wake through the use of ballast tanks and hull design. The larger waves from the wake boats result in accelerated erosion of the

shorelines, creating a major negative impact on lakes. Erosion does occur naturally, but it is a slow process; wake boats accelerate erosion, affecting the natural erosion that accrues in all lakes. Just like in 1988 when Eurasian watermilfoil threatened Lake Ripley and led to the successful weed harvesting program, I truly hope that the Oakland Town Board and the Lake District can come up with a balanced ordinance for this type of boat.

Our hard work continues as we move toward accomplishing our new goals set forth within this 10-year management plan, continuing the great work of the District. We must keep reminding ourselves that we're all in this together – we all want to protect our beautiful and serene Lake Ripley! I hope you can enjoy the beautiful sunsets on the water as I do and take a few minutes to reflect and listen to the lake and what it tells us. The lake has so many voices to share.

-Jimmy DeGidio, Chairman

The 2021 Lake Ripley Management District Board. From left to right: Front row - Debbie Kutz, Georgia Gomez-Ibanez, Jimmy DeGidio, Walt Christensen, Back Row - Doug Maurer, Craig Kempel, Keith Kolb.

Executive Summary

MISSION AND MANAGEMENT PHILOSOPHY

Mission: *To preserve and enhance Lake Ripley's water quality, its fish and wildlife communities, and its overall ecological health, while ensuring public access and use of the lake that is safe, fair and practical.*

The above mission shall be accomplished using a watershed-based, multi-faceted approach that engages all affected groups. This big-picture approach recognizes the complexity and interconnected nature of the larger lake ecosystem and hydrologic cycle.

Management decisions will favor long-term solutions that address the root causes of actual problems, and strive to fairly balance competing interests that are compatible with our mission. Our fiscal responsibility requires cost-effective actions that best serve the lake and the common interests of the local community.

We affirm that a clean, healthy and attractive Lake Ripley not only provides the community with abundant recreational opportunities, but adds value to local properties and businesses by making the area a more desirable place to live, work and visit.

CHAPTER 1- LAKE AND WATERSHED OVERVIEW

"A lake is a landscape's most beautiful and expressive feature. It is earth's eye; looking into which the beholder measures the depth of his own nature" - Henry David Thoreu

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 within Sections 3 to 10 and 15 to 18. 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).

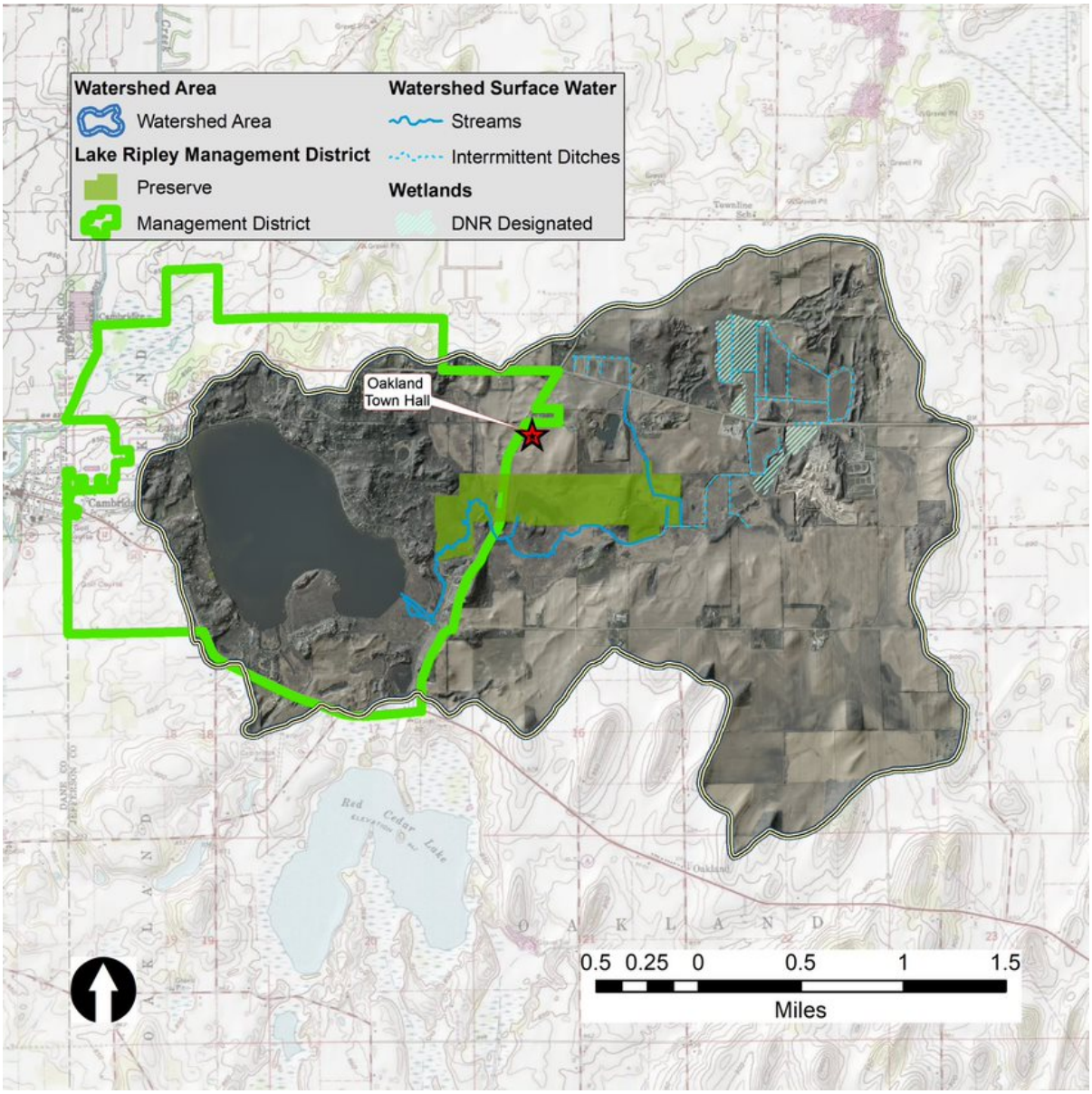


Figure 1: Map of the Lake Ripley Management District, the watershed, and the 207-acre preserve

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, transforming 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.

PHYSICAL AND HYDROLOGIC DESCRIPTORS	
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	102 days (2014-2019 average)

Table 1: Summary of lake and watershed characteristics

CHAPTER 2 - LAND USE IN THE WATERSHED

"The lake can't be understood without understanding its watershed. Problems in the lake can't be solved without solving problems in the watershed."- Georgia Gómez-Ibáñez

2.1 - The Inlet Stream and Wetlands in the Watershed

Most critical to the lake, hydrologically, are its inlet stream and the remaining wetlands in its watershed. The inlet stream provides most of the lake's water. Before settlement, the surrounding wetlands buffered the stream hydrologically and sequestered flood waters and excess nutrients. Development has negatively altered this partnership. The inlet's meanders have been straightened in many places. The "spoils" along its banks create a barrier between the inlet stream and its wetlands, preventing them from sequestering floodwaters, nutrients and sediment. Wetlands were ditched and drained to create cropland and sod farms.

The District realized the strategic value of restoring wetlands adjacent to the inlet stream. In 1998 the Lake District began purchasing cropland, which were former wetlands, through which the inlet stream flowed. Ditches were plugged to restore water to the wetlands. Subsequent purchases of upland cropland allowed the restoration of prairies, to begin the process of groundwater recharge.

These efforts have not solved the problems caused by stream-straightening and the spoils barrier. The inlet stream still delivers excess phosphorus and sediment to the lake. Monitoring of the water quality of the stream at several locations has not yet pinpointed the sources of either phosphorus or sediment.

The District has been performing water quality monitoring at the deep hole of Lake Ripley since

1973, and on the inlet stream since 1993. Phosphorus has been a nutrient that the District has consistently tracked. Monitoring efforts have increased since 2015, with more focus on the inlet stream itself. By focusing on the inlet stream, the District hopes to locate areas that would benefit from the implementation of best management practices.

2.2 - Farmland Conservation Practices in the Watershed

Agriculture occupies about 45% of Lake Ripley's watershed; most of that land is located east of the lake (Figure 2). Drainage in the watershed flows from east to west, towards the lake. When soil conservation practices are in place, the amount of phosphorus and sediment coming from agricultural sources will be reduced, resulting in farmlands contributing fewer problems to a waterbody.

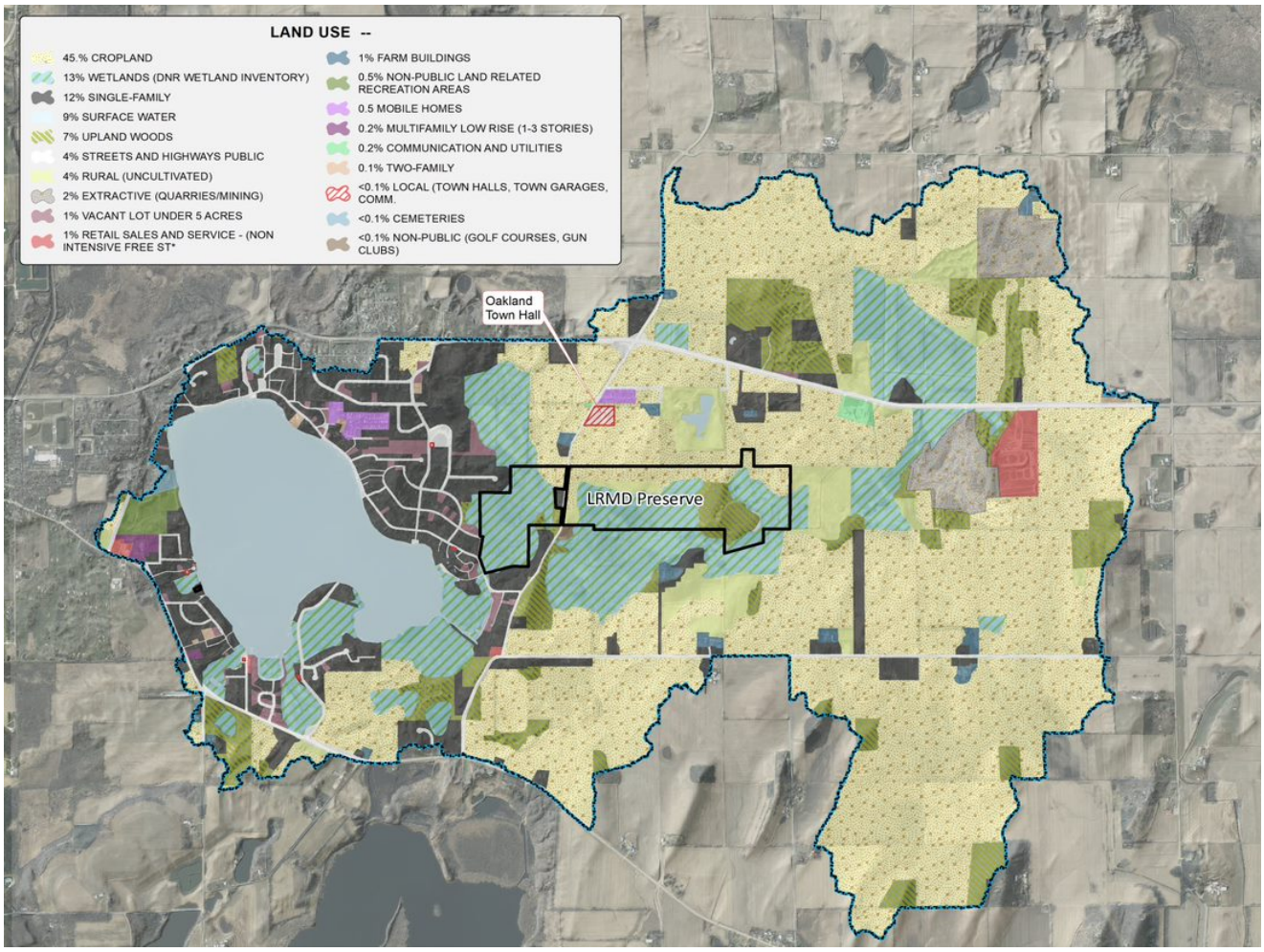


Figure 2: Map of the types of land use in Lake Ripley's watershed

Some agricultural areas and/or practices can result in pollution to the stream. These may include:

- Fertilizer runoff from cropped fields into the stream

- Soil erosion from cropped fields becoming sediment-bearing runoff into the stream
- Steep, unvegetated ditches eroding into the stream
- Manure runoff adding nutrients to the stream
- Overuse of high-capacity wells for irrigation, reducing available groundwater
- Tile drainage that may be high in phosphorus and nitrogen

In our watershed, some conservation practices that can be effective in reducing erosion and pollution include:

- No-till farming, which reduces erosion
- Crop rotation
- Manure injection or incorporation
- Vegetated buffers located next to ditches and streams
- The use of cover crops to reduce erosion and increase infiltration of precipitation
- The “Conservation Reserve Program” (administered by the National Resources Conservation Service - NRCS) removes erosion-prone acres from active cropping and places them under a grassy cover, for which the farmer receives compensation.
- Reconfiguring or plugging agricultural ditches so they can be vegetated and separated from cropland by grassy berms, with NRCS.
- Manure-management plans (DNR) and Nutrient Management Plans (Jefferson County Land and Water Conservation Department)
- Restoring fields too wet to crop to functioning wetlands (DNR, NRCS, Fish and Wildlife Service)
- Grassed waterways which control and prevent gullies in farm fields

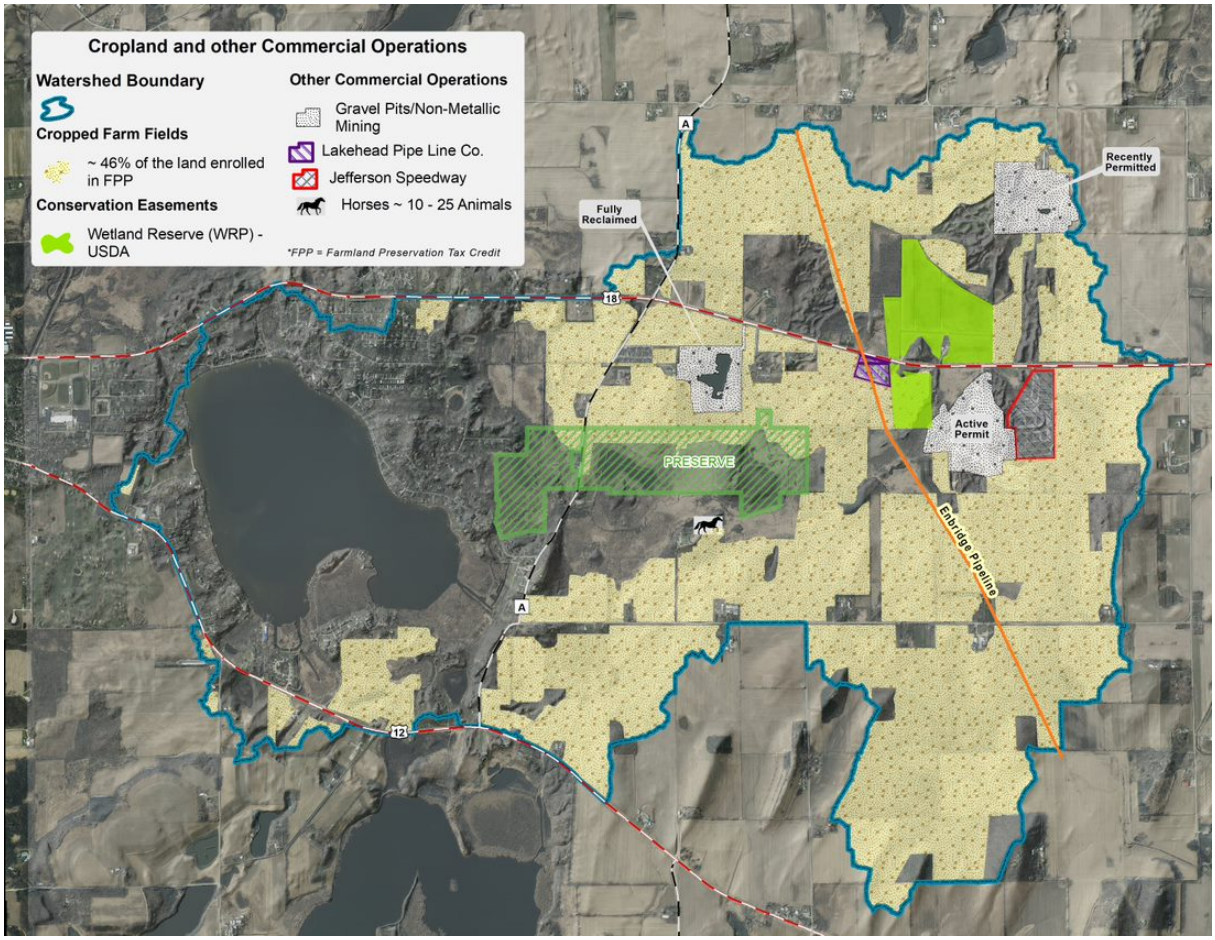


Figure 3: Cropland and other commercial operations in the Lake Ripley watershed

2.3 - Development in the Watershed

Residential development is dense around the lake. This has greatly increased the area covered by impervious surfaces. This increases runoff, which impairs Lake Ripley's water quality.

Impervious surfaces also prevent groundwater recharge, at the same time as more households are using up that precious groundwater resource. Lake residents get their water from private wells. Lawns are not much better than impervious surfaces. Only approximately 40% of rainfall is absorbed by lawns, leaving 60% as runoff. Adding a shoreline buffer or a rain garden to a lawn considerably improves the infiltration of runoff.

In 2020, the District performed a 'Lake Shoreland and Shallows Habitat Monitoring' survey to assess the current conditions of Lake Ripley's shoreland and near-shore shallow areas. The survey is intended to serve as a baseline, so that future changes (improvements or declines) in conditions of the lake's shoreland and shallow areas can be measured. The protocols used were developed by the Wisconsin Department of Natural Resources in 2015. This survey is a good

indicator of how development has, and continues to, impact our lake.

The land adjacent to our lakes and the shallow water next to the land are important areas for many different reasons, and how we manage our shoreland areas impacts our lakes positively or negatively. The data collected from the survey showed that the shrub and herbaceous layer found around the lake had risen 21%, which is a large, positive increase! Impervious surfaces had also increased by 2.2%. The small change in impervious surfaces coupled with the high rise seen in shrubs and herbaceous plants show that the District is making efforts to help protect Lake Ripley' shoreline. It appears that the District's cost-share program has contributed to the successful increase of nearshore shrubs and herbaceous plants. The District will repeat this survey every five years to track and document any changes made to the shoreland and shallow areas. Figure 4: Building density of Lake Ripley's watershed

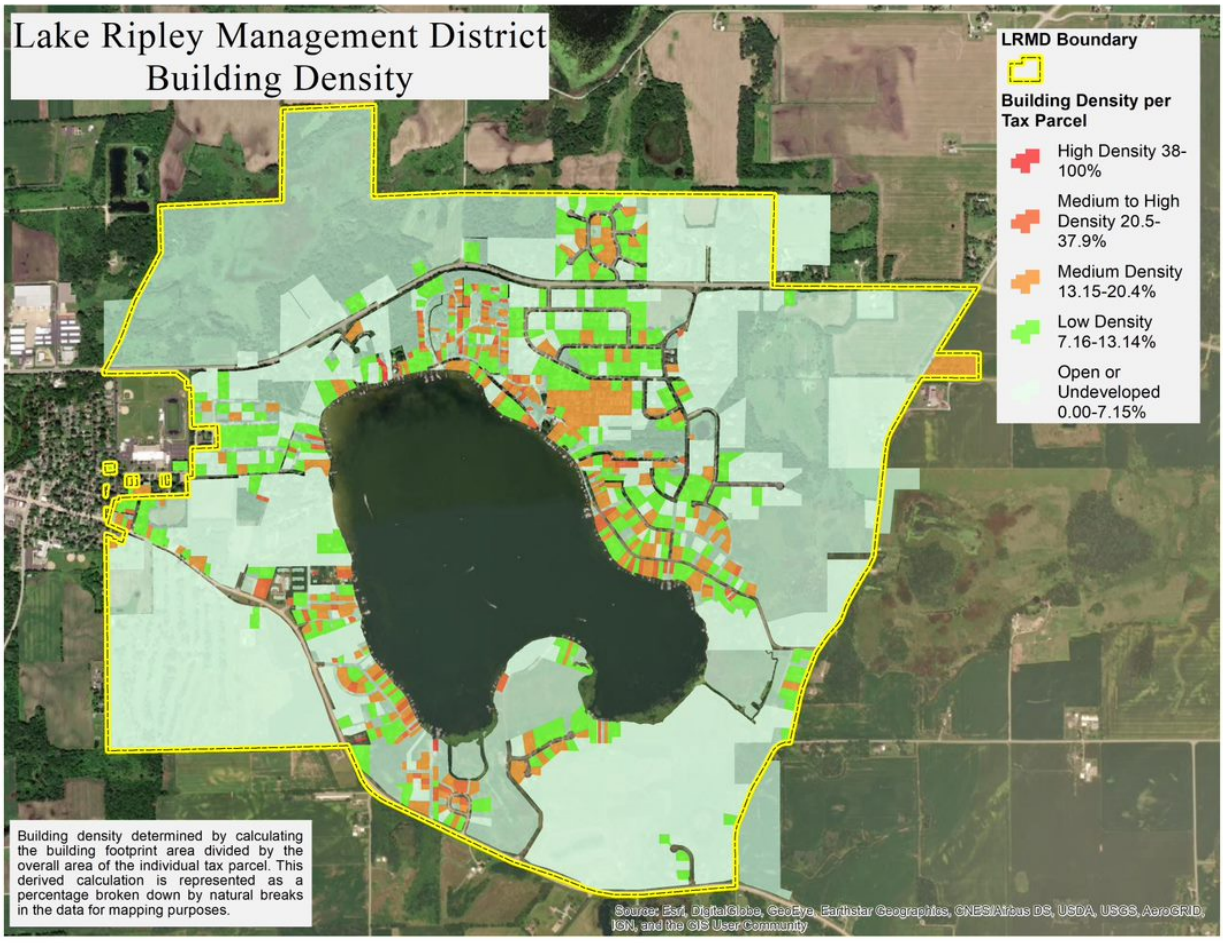


Figure 4: Building density of Lake Ripley's watershed

CHAPTER 3 - RECREATIONAL LAKE USE

"People protect what they love." - Jacques Cousteau

3.1 - 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.

3.2 - 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 PM through 11 AM. Of particular interest for these activities will be the undeveloped, habitat rich Critical Habitat Areas (Figure 12) where beautiful plants and diverse wildlife can be observed in a slow-no-wake zone.

3.3 - 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 responders 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.

3.4 - 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, which are a new type of watercraft
- Too many boats on the lake traveling at fast speeds at one time increases the chance for 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 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

CHAPTER 4- WATER QUALITY

"The water right in front of you is linked to all the water in the world" -Masaru Emoto

4.1 - 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 in 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 3). 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.

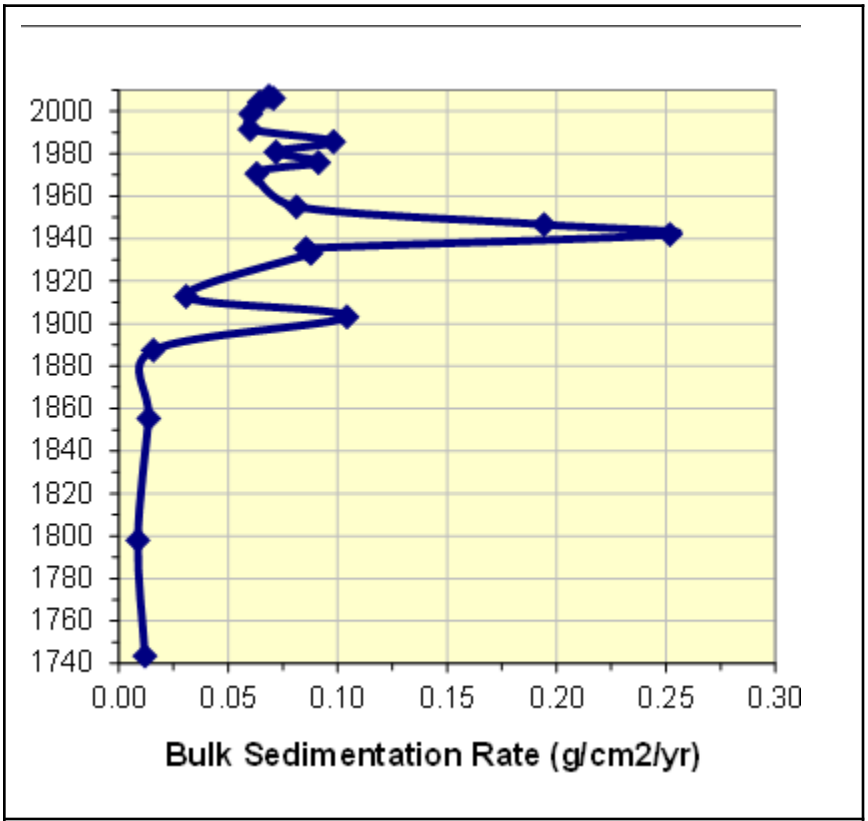


Figure 5 - Sediment accumulation rate in Lake Ripley. The peaks around 1900 and 1940 were largely the result of soil erosion from agricultural activities.

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 4) 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.

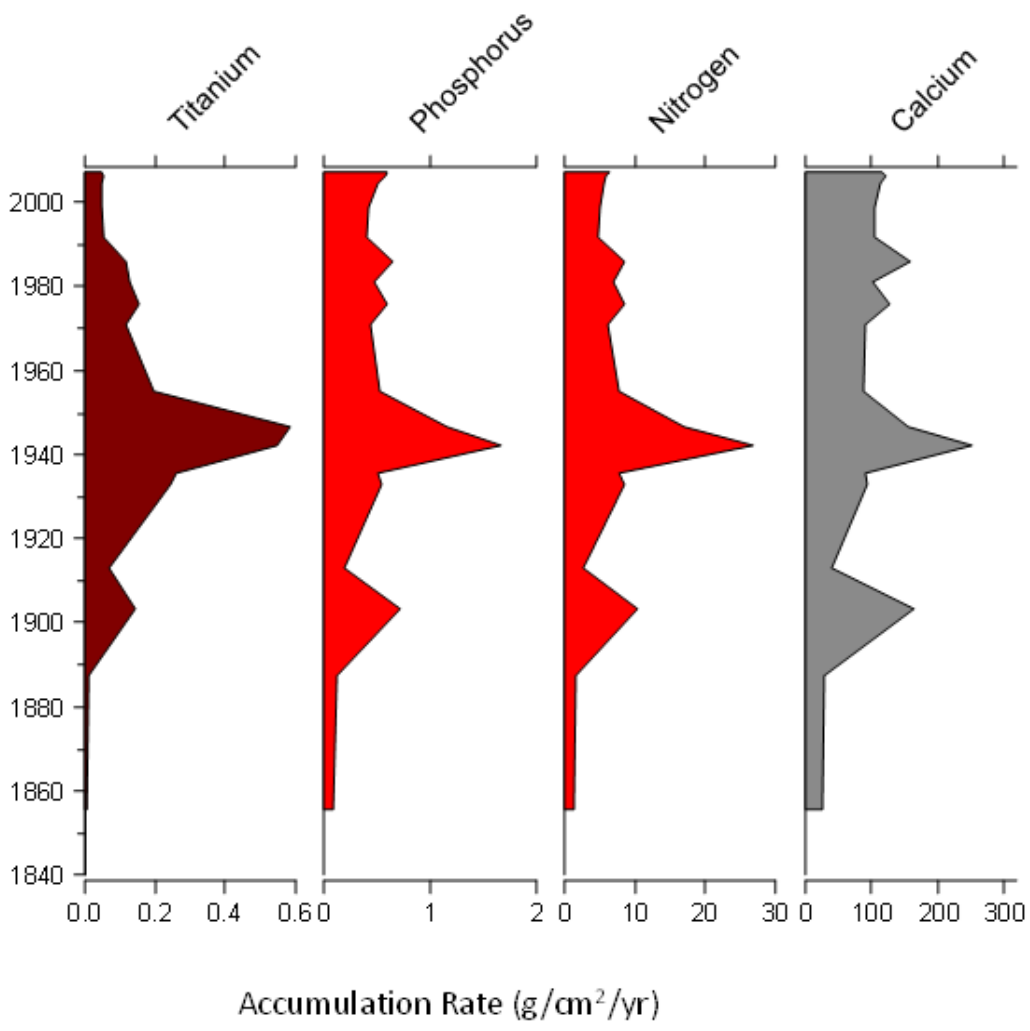


Figure 6 - Profiles of the accumulation rate of selected geochemical elements. Titanium is indicative of soil erosion. Phosphorus and nitrogen are essential nutrients for plant growth. Calcium is largely the result of marl formation and is an indication of the lake's productivity.

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 5). 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.

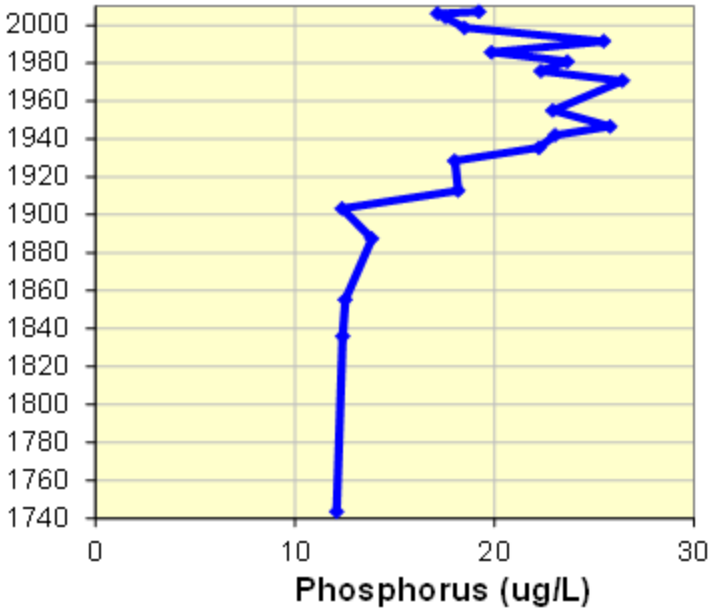


Figure 7- Diatom inferred summer phosphorus concentrations.

4.2 - Phosphorus

Plants need nutrients to grow and the most important nutrients are phosphorus and nitrogen. The nutrient that is in 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.

In order to compare the trophic parameters in Lake Ripley to other similar lakes, information in the Wisconsin 2018 Consolidated Assessment and Listing Methodology was used (Wisconsin Department of Natural Resources, 2017). The Wisconsin Department of Natural Resources classifies lakes into 10 natural communities based upon watershed size, hydrology, and lake depth. For most lakes, there are 6 classifications depending if the lake is a drainage or seepage lake, shallow or deep, and if the watershed is less than or greater than 4 square miles. Lake Ripley is classified as a deep lowland drainage lake because its watershed is greater than 4 square miles, it has an inflowing stream, and its maximum depth is greater than 20 feet. The Wisconsin Consolidated Assessment and Listing Methodology ranks each lake class into

categories ranging from excellent to poor. Also, ecoregions have been delineated throughout the United States by the U.S. EPA based upon similar climate, physiography, hydrology, vegetation and wildlife potential. Wisconsin contains four main ecoregions and Lake Ripley is located within the Southeastern Wisconsin Till Plains (SWTP) ecoregion. State-wide median values for total phosphorus, chlorophyll-a, and Secchi disk transparency have been developed for six of the lake classifications (Garrison et al., 2008). They did not sample sufficient lakes to create median values for each classification within each of the state's ecoregions.

Summer mean phosphorus concentrations for the period 1986-2020 are shown in Figure 8. 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. This increased phosphorus concentration was not noted in the 2010 management plan as it is difficult to detect trends for only a couple of years. The average summer phosphorus concentration for the period of record is nearly 22 µg/L, which places the lake in the "good" category. The average phosphorus concentration in Lake Ripley is very 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 impairment limit for lakes similar to Lake Ripley is 30 µg/L.

The 5-year summer total phosphorus average from 2016-2020 is 24.8 µg/L. The increasing trend in phosphorus over time is concerning. 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 2020, the summer total phosphorus was higher than the impairment threshold, averaging 31.9 µg/L. During the summer of 2021, the District is installing three gaging systems at the inlet, outlet, and in the lake to help us create a water budget. Creating a water budget will help us assess the effects of climate variability and human activities within our watershed.

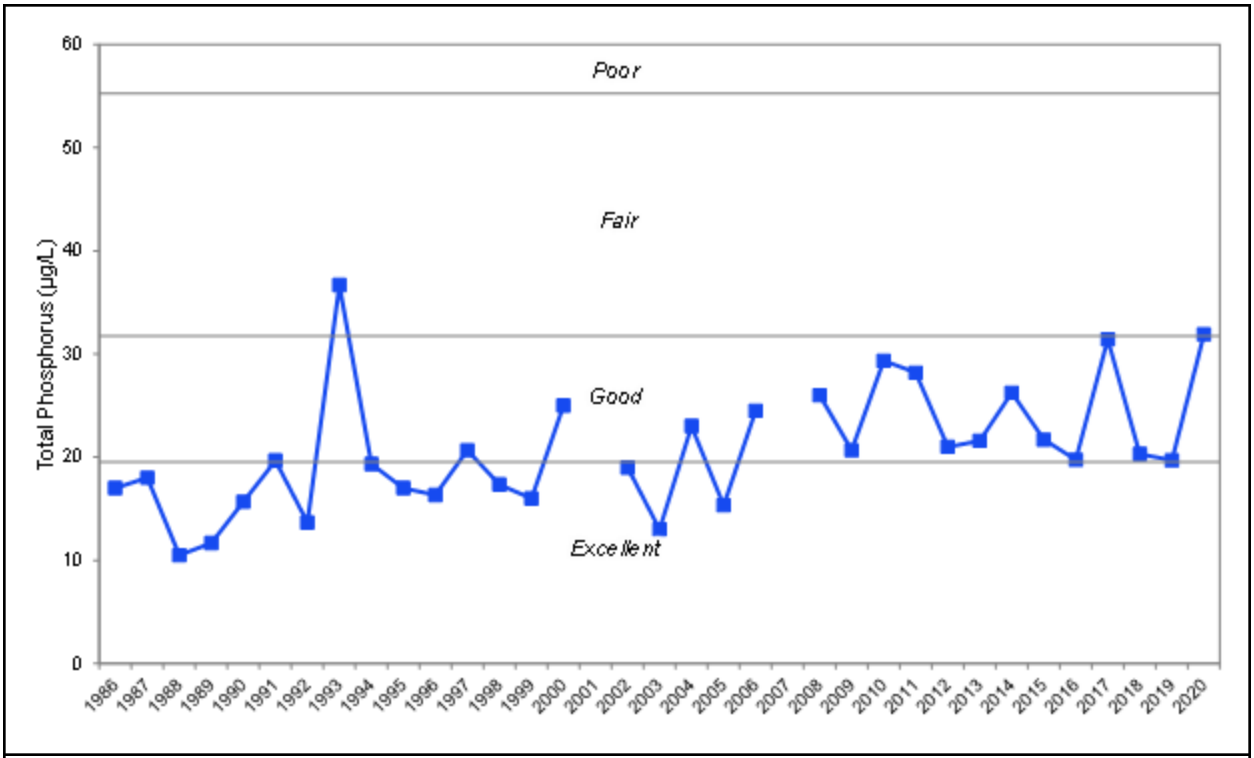


Figure 8 - Summer mean phosphorus concentrations for Lake Ripley for 1986-2020.

4.3 - 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 highest value occurred in 1993 and was the result of higher than normal rainfall which caused high phosphorus runoff from the watershed. 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 average summer concentration for the period of record is 8.5 µg/L, which is well below the impairment threshold of 27 µg/L. The average chlorophyll-a concentration in Lake Ripley is slightly higher than the 7.0 µg/L median value for other lowland drainage lakes and the 5.3 µg/L median value for all lake types in the SWTP ecoregion.

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.

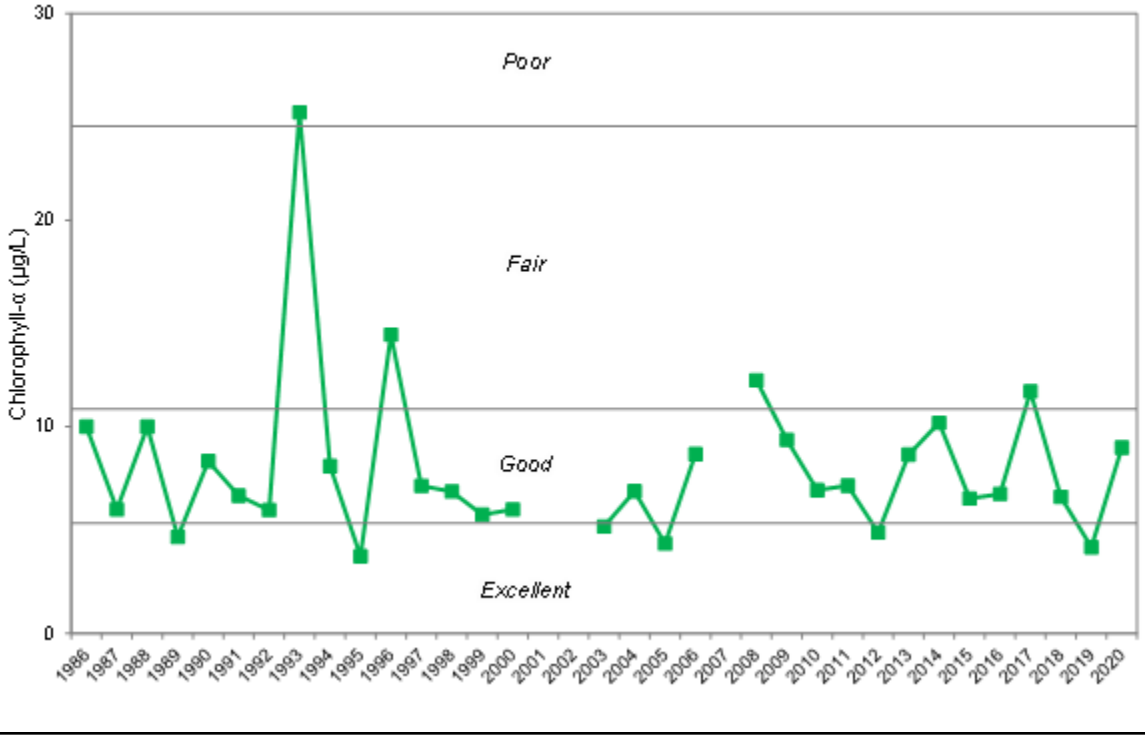


Figure 9 - Summer mean chlorophyll-a concentrations for Lake Ripley for 1986-2020.

4.4 - Water Clarity

Secchi disk transparency is a measurement of water clarity. The measurement is made by lowering a weighted, 20 cm diameter disk with 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 10). 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. 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 exceptional water clarity in 2005 may have been the result of an unusual appearance of the large zooplankton, *Daphnia*. *Daphnia* eat large amounts of algae, contributing to clear water. This was observed in many lakes throughout the Upper Midwest and may have been the result of an unusual occurrence of climate and low juvenile fish populations which feed on these zooplankters. The average summer Secchi disk transparency for the period of record was 7.2 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).

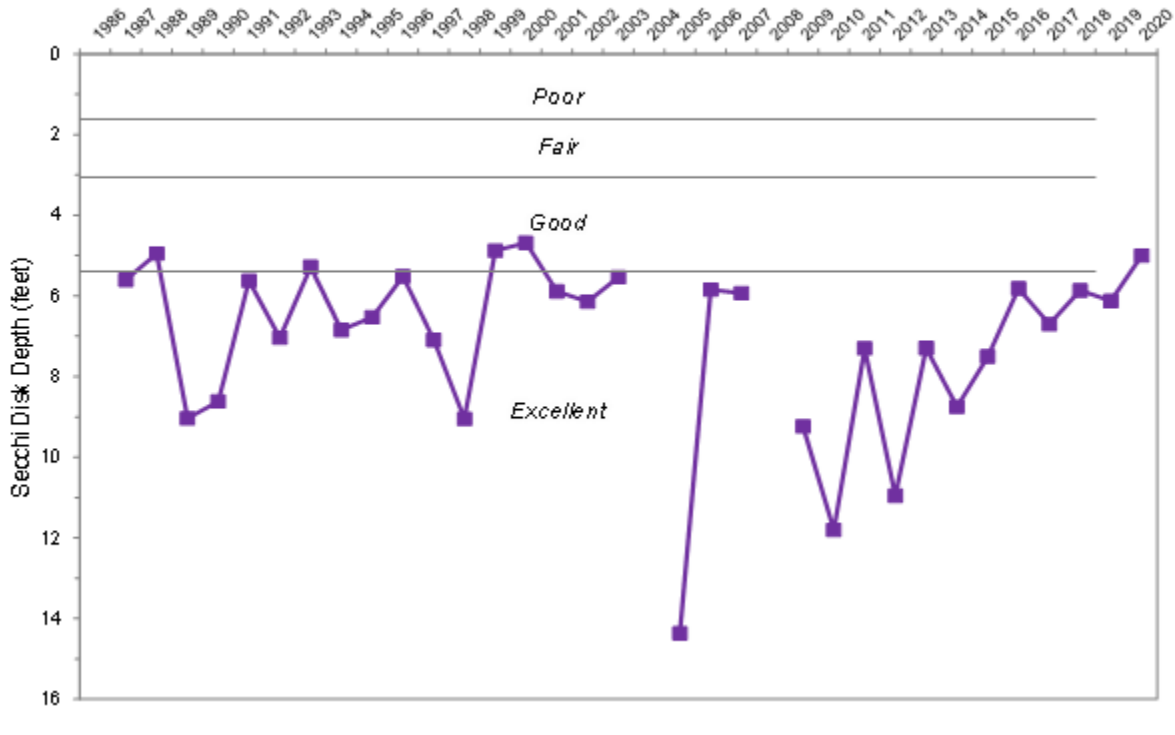


Figure 10 - Summer Secchi disk transparency for Lake Ripley for 1986-2020.

4.5 - 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. Through the use of a trophic state index (TSI), an index number can be calculated using 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).

Throughout the period of record, Lake Ripley's trophic state has generally stayed in the mesotrophic-eutrophic range (Figure 11). The only time it was clearly in the eutrophic range was in 1993, when there was much higher rainfall than normal. 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.

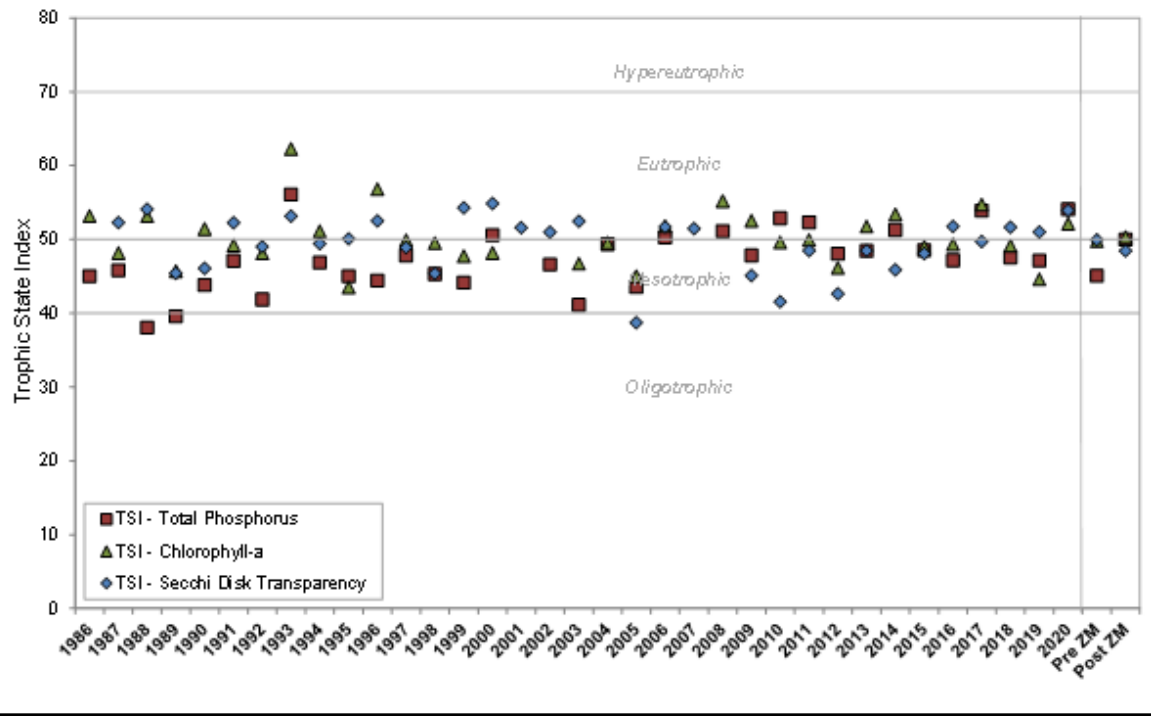


Figure 11 - Trophic State (TSI) for Lake Ripley for 1986-2020.

4.6 - 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.

Starting in 2018, monitoring efforts at four specific sites along the inlet stream became a priority for the District. Concerned about the influx of phosphorus within the stream, the four sites were chosen to provide insight into what was happening within the stream. The four locations are as follows: 1) site one is located at the beginning of the inlet stream off of Highway 18, 2) the second site is nestled within the District's wetlands, 3) the third site is located off of County Road A, where the inlet stream runs underneath the road, 4) and the fourth location is located off of Ripley Road, in the wetlands next to the road. At these four sites, we monitor dissolved oxygen, turbidity, temperature, pH, conductivity, total suspended solids, and total phosphorus. 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 207 acre Preserve.

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.

CHAPTER 5 - AQUATIC PLANTS

"Our goal is not just an environment of clean air and water and scenic beauty. The objective is an environment of decency, quality and mutual respect for all other human beings and all other living creatures." - Gaylord Nelson, former Wisconsin Governor and founder of Earth Day

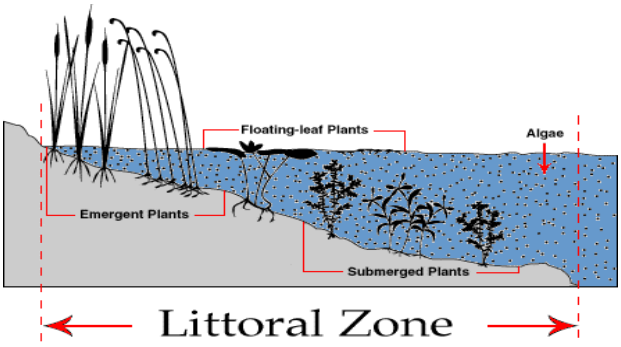
5.1 - The Value and Role of Aquatic Plants

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.

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%.

Aquatic plants can grow only in the littoral zone of a lake, where sunlight penetrates deeply enough for photosynthesis to occur.

Not all aquatic plants are as beneficial as native plants. The arrival and spread of the aquatic invasive species, Eurasian watermilfoil and curly-leaf pondweed, 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.

5.2 - 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.

Emergents (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

Aquatic Plant	Ecological Significance
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

Aquatic Plant	Ecological Significance
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

Aquatic Plant	Ecological Significance
Zannichellia palustris, horned pondweed	Fruit and foliage are grazed by waterfowl; provides food for fish

Information obtained from: (Borman, Korth, and Temte, 2014) and (Skawinski, 2018)

Table 2: Ecological significance of aquatic plant species present in Lake Ripley

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.

5.3 - Results of Past Inventories

Comprehensive inventories of Lake Ripley’s aquatic plant community were conducted in 1976, 1989, 1991, 1996, 2001, 2006, 2011, 2015 and 2020.

Only recent, comparable inventories are presented in this chapter; the 2011 and 2015 surveys are presented as summaries only and the 2020 survey is presented in its full report. The 1976-2015 surveys are available in full on our website (www.lakeripley.org). Please note that the surveys prior to 2006 employed a different methodology and comparisons of results from surveys using different methodologies are not statistically accurate.

The following is an abbreviated summary of inventory findings from recent years. The statistical summary from the 2020 inventory is presented for 23 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.

2011 Plant Inventory Survey

This survey, and each thereafter, employed the point-intercept method in accordance with Wisconsin DNR's standard baseline protocols (Hauxwell et al. 2010). The point-intercept method results in an accurate assessment of species present and their abundance. Based on parameters specific to Lake Ripley, the DNR mapped a 725-point sampling grid over the entire lake. Using GPS, the field crew navigated to each of the predetermined grid points. Of the total 725 points, they sampled the 369 navigable points within the depth range of plant growth. At each of these points a two-sided rake was used to sample approximately 2.5 feet along the bottom to collect a sample. After pulling the plants to the surface, all plant species on the rake as well as any dislodged by the rake and floating were given rake fullness ratings of 1-3 to estimate abundance.

The field crew also recorded visual sightings of species within six feet of the sample point, water depth and sediment type at each point. Any additional species seen at the lake's edge during a general boat survey (noted as GS in the tables below) were recorded separately from the point-intercept data. The collected data are used for statistical analysis. Visuals and boat survey results are provided where applicable.

The inventory was conducted between June 7 and June 28, 2011, with actual sampling dates determined by weather conditions and field crew scheduling. A total of 21 aquatic plant species were found through point-intercept sampling, jumping to 23 when including visuals (common watermeal and floating-leaf pondweed). Plants were found at water depths extending to 21 feet.

The six dominant species in order of most to least documented were: muskgrass (*Chara sp.*), sago pondweed *(Stuckenia pectinata*), coontail *(Ceratophyllum demersum*), northern watermilfoil *(Myriophyllum sibiricum*), Fries' pondweed (*Potamogeton friesii*), and spiny naiad (*Najas marina*). Two native species, Fries' pondweed and northern watermilfoil, moved into the dominant-six-species list for the first time since surveying began in 1976. This survey represents the first time Eurasian watermilfoil was dislodged from the six dominant plant species found during a single survey.

The non-native Eurasian watermilfoil (*Myriophyllum spicatum*) continued its pattern of significant decline with a Relative Frequency of Occurrence of 1.6%, marking an all-time low since its 1989 peak (37.5%). During the point-intercept survey it was found at 15 sites compared to 25 sites in 2006. However, a suspected hybrid of Eurasian and northern watermilfoils was documented in both 2006 and 2011, and has shown an increase in frequency. Two samples were sent to the DNR for identification in 2014. Both of those samples were verified as hybrid watermilfoil (EWM x NWM). While still not gaining a dominant presence, the invasive curly-leaf pondweed appeared to be gaining in prominence, surpassing Eurasian watermilfoil for the first time in terms of Frequency of Occurrence.

Overall, species diversity was marginally higher compared to 2006, but significantly higher in comparison to earlier surveys. However, as stated in 2006, data may not be comparable to earlier surveys, given the change from transect-based to point-intercept based sampling methods.

2015 Plant Inventory Survey

The 2015 survey was completed using the point-intercept sampling method in accordance with protocols approved by the Wisconsin DNR. The inventory was conducted between August 11 and August 20, 2015, with actual sampling dates dictated by weather conditions and field crew scheduling. Total plant species found using point-intercept, visual, and boat survey methods was 34. A total of 24 aquatic plant species were found through point-intercept rake sampling. This number increases to 27 species when including visual observations (bulrush, small duckweed, and arum-leaved arrowhead). Plants were found at water depths extending to 15 feet. The six most dominant species from most to least documented were: sago pondweed (*Stuckenia pectinata*), fetid stonewort (*Chara contraria.),* spiny naiad (*Najas marina*), coontail

(*Ceratophyllum demersum*), wild celery *(Vallisneria americana)* and northern watermilfoil (*Myriophyllum sibiricum*).

Eurasian watermilfoil (*Myriophyllum spicatum*) was still in a state of decline, being found at only 12 sites during this survey compared to 15 sites in 2011. Curly-leaf pondweed, an invasive species, had a frequency of occurrence of 1.4% in 2006, 8.9% in 2011, and 1.4% in 2015. The 2006 and 2011 surveys were performed in June when the curly-leaf pondweed is actively growing. The 2015 inventory was conducted in August when most curly-leaf pondweed plants would have died back and would not be as prevalent as in inventories conducted earlier in the year.

During the 2015 inventory, investigators were able to differentiate between two *Chara* species commonly referred to as muskgrass. This inventory catalogs two separate entries for *Chara: Chara contraria* (fetid stonewort) and *Chara globularis* (globular stonewort). Prior inventories categorized both species as the common stonewort, *Chara vulgaris.* A sample of *Chara globularis* was pressed, dried and submitted to the Wisconsin State Herbarium in Madison, where it was verified.

In prior inventories conducted in 2006 and 2011, a hybrid species of milfoil was recorded though not confirmed. Positive identification by the Wisconsin DNR of a hybrid species using genetic analysis occurred in 2014 and determined it is not reliable to visually distinguish hybrid watermilfoil from either Eurasian or northern watermilfoil. Current scientific knowledge on hybrid watermilfoils and their physical and environmental characteristics is emerging. Physical traits of hybrid plants can vary based on local ecological conditions and can mimic either parent plant (Moody and Les, 2007). It is yet unknown whether Lake Ripley's hybrid watermilfoil populations will display the invasive characteristics of its non-native parent.

2020 Plant Inventory Survey

This survey was completed using the point-intercept sampling method in accordance with protocols approved by the Wisconsin DNR. The inventory was conducted between June 15 and June 18, 2020. Total plant species found using the point-intercept and visual survey methods was 25. A total of 23 aquatic plant species were found through point-intercept rake sampling. Plants were found at water depths extending to 16 feet. The six most dominant plant species from most to least documented were: coontail (*Ceratophyllum demersum*), fetid stonewort (*Chara contraria*), Fries' pondweed (*Potamogeton friesii*), globular stonewort (*Chara globularis*), water celery (*Vallisneria americana*) and small pondweed (*Potamogeton pusillus*). Sago pondweed (*Stuckenia pectinata*) was a close runner-up of small pondweed, being found at only one less site.

Eurasian watermilfoil saw an increase in frequency, being found at 65 sites this year compared to only 12 sites in 2015. This could be due in part because of natural annual variation, seasonal

variation, climate change, plants being transferred via boats/kayaks, increased runoff into the lake, and fragmented EWM colonizing new sites within the lake. Additional disturbances to the lake bottom, such as from shallow water motorboating, can increase the rate of colonization.

When this survey was last completed in 2015, the timing was such that curly-leaf pondweed's known active growing season was over and those specific plants had already begun to die back; only a small number of CLP plants were found at only five sites. In comparison, CLP was found at 30 sites in June 2020 compared to 5 in August 2015, and 36 in June 2011.

The timing of the survey compared to previous years could play a role in the plant species we found. In 2011 the survey took place over 3 weeks; that means the lake's plant composition continued to grow during the survey allowing different plants to flourish within that time. In 2015 the survey was completed in August, meaning some of the early-senescing plants, like CLP, would no longer be present. This can be important because it's possible to miss key plants that need data collection for continued management.

This 2020 survey was completed within a week, providing a snapshot of what the lake looks like at that specific point in time. The annual variation which we observe in plant communities from year to year is much greater than the variation we would have if a survey takes a couple of weeks to complete versus a week.

During the 2020 survey, we were able to find two new species in the lake. The first new species was large duckweed, *Spirodela polyrhiza*, a small, free-floating plant that provides great shade for fish and important food for waterfowl. The large duckweed was found in Marina Bay within the white water lilies and spatterdock lilies. We also found needle spikerush, *Eleocharis acicularis*, on the north end in a shallow, sandy, quiet part of the lake. This plant makes great fish habitat for fish to lay their eggs on. It is very exciting to find undocumented plants in our lake because that increases our species diversity. Increasing species diversity within a lake means the lake is healthy enough to support a wide variety of plants.

Species	Frequency of Occurrence (%)	Average Density** (1-3 scale)	Relative Frequency	Importance Value
Ceratophyllum demersum (coontail)	42.3	1.64	15.7	25.7
Chara contraria (fetid stonewort)	39.8	1.59	14.8	23.5
Chara globularis (globular stonewort)	31.8	1.77	11.8	20.9
Eleocharis acicularis (needle spikerush)	0.3	1.00	0.1	0.1
Elodea canadensis (waterweed)	1.9	1.00	0.7	0.7
Heteranthera dubia (water star grass)	3.9	1.00	1.4	1.4
Lemna minor (small duckweed)	0.8	1.00	0.3	0.3

Species	Frequency of Occurrence (%)	Average Density** (1-3 scale)	Relative Frequency	Importance Value
**Myriophyllum spicatum* (Eurasian watermilfoil)	17.9	1.35	6.7	9.1
Najas marina (spiny naiad)	3.0	1.00	1.1	1.1
Nuphar variegata (spatterdock)	3.3	2.33	1.2	2.8
Nymphaea odorata (white water lily)	2.5	1.33	0.9	1.2
**Potamogeton crispus* (curly-leaf pondweed)	8.3	1.17	3.1	3.6
Potamogeton friesii (Fries' pondweed)	37.8	1.67	14.0	23.4
Potamogeton gramineus (variable pondweed)	6.4	1.13	2.4	2.7
Potamogeton illinoensis (Illinois pondweed)	0.8	1.33	0.3	0.4
Potamogeton pusillus (small pondweed)	16.3	1.36	6.1	8.3
Potamogeton strictifolius (stiff pondweed)	3.6	1.23	1.3	1.6
Ranunculus aquatilis (White water crowfoot)	2.8	1.00	1.0	1.0
Spirodela polyrhiza (Large duckweed)	0.3	3.00	0.1	0.1
Stuckenia pectinata (sago pondweed)	16.0	1.24	6.0	7.4
Utricularia vulgaris (common bladderwort)	7.5	1.15	2.8	3.2
Vallisneria americana (water celery)	19.9	1.08	7.4	8.0
Wolffia columbiana (common watermeal)	0.8	1.00	0.3	0.3
Filamentous algae	63.26	1.62	NA	NA
Freshwater sponge	0.28	1.00	NA	NA

Table 3: 2020 plant inventory findings

* = Species not native to Wisconsin

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

Aquatic Plant	Number of Sites Found	FREQ[a] [0-16'] (%)	FREQ[b] [Veg. Sites] (%)	RFREQ[c] (%)	ADEN[d] (1-3 scale)	IV[e]	C[f]
Coontail *Ceratophyllum demersum*	153	42.27	40.69	15.7	1.64	25.7	3
Fetid Stonewort *Chara contraria*	144	39.78	38.30	14.8	1.59	23.5	NA
Fries' Pondweed *Potamogeton friesii*	136	37.75	36.17	14.0	1.67	23.4	8
Globular Stonewort *Chara globularis*	115	31.77	30.59	11.8	1.77	20.9	3
Water Celery *Vallisneria americana*	72	19.89	19.15	7.4	1.08	8.0	6
*Eurasian watermilfoil *Myriophyllum spicatum*	65	17.96	17.29	6.7	1.35	9.1	0
Small pondweed *Potamogeton pusillus*	59	16.30	15.69	6.1	1.36	8.3	7
Sago pondweed *Stuckenia pectinata*	58	16.02	15.43	6.0	1.24	7.4	3
*Curly-Leaf Pondweed *Potamogeton crispus*	30	8.29	7.98	3.1	1.17	3.6	0

Aquatic Plant	Number of Sites Found	FREQ[a] [0-16'] (%)	FREQ[b] [Veg. Sites] (%)	RFREQ[c] (%)	ADEN[d] (1-3 scale)	IV[e]	C[f]
Common bladderwort *Utricularia vulgaris*	27	7.46	7.18	2.8	1.15	3.2	7
Variable Pondweed *Potamogeton gramineus*	23	6.35	6.12	2.4	1.13	2.7	7
Water Stargrass *Heteranthera dubia*	14	3.87	3.72	1.4	1.0	1.4	6
Stiff Pondweed *Potamogeton strictifolius*	13	3.59	3.46	1.3	1.2	1.6	8
Spatterdock *Nuphar variegata*	12	3.31	3.19	1.2	2.3	2.8	6
Spiny naiad *Najas marina*	11	3.04	2.93	1.1	1.0	1.1	0
White water crowfoot *Ranunculus aquatilis*	10	2.76	2.66	1.0	1.0	1.0	8
White Water Lily *Nymphaea odorata*	9	2.49	2.39	0.9	1.3	1.2	6
Common Waterweed *Elodea canadensis*	7	1.93	1.86	0.7	1.0	0.7	3
Northern watermilfoil *Myriophyllum sibiricum*	4	1.10	1.06	0.4	1.0	0.4	6
Common Watermeal *Wolffia columbiana*	3	0.83	0.80	0.3	1.0	0.3	5
Illinois Pondweed *Potamogeton illinoensis*	3	0.83	0.80	0.3	1.3	0.4	6
Small Duckweed *Lemna minor*	3	0.83	0.80	0.3	1.0	0.3	4
Needle spikerush *Eleocharis acicularis*	1	0.28	0.27	0.1	1.0	0.1	5
Large Duckweed *Spirodela polyrhiza*	1	0.28	0.27	0.1	1.0	0.1	5
Cattails *Typha sp.*	V	V	V	V	V	V	V
Softstem Bulrush *Schoenoplectus tabernaemontani*	V	V	V	V	V	V	V
Filamentous algae	229	NA	NA	NA	NA	NA	NA
Freshwater sponge	1	NA	NA	NA	NA	NA	NA

Table 4: Statistical summary for all plant species documented in the 2020 inventory

* = Species not native to Wisconsin

V = species observed visually during point-intercept survey

[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.

[a]Total Number of Points Sampled	378
[b]Number of Points Sampled within Depth Range of Potential Plant Growth (0-16')	376
[c]Number of Points with Vegetation	362
[d]Maximum Depth of Plant Growth	16
[e]Frequency of Occurrence of Vegetation within Range of Plant Growth (0-16')	96.28
[f]Simpson Diversity Index	0.90
[g]Species Richness	26
[h]Species Richness + Visuals	26
[i]Floristic Quality Index (FQI)	25.47
[j]Mean Coefficient of Conservatism (C)	5.84
Average Number of Species Sampled Per Site (0-16')	2.58
Average Number of Species Sampled Per Site (Veg. Sites Only)	2.69
Average Number of Native Species Sampled Per Site (0-16')	2.30
Average Number of Native Species Sampled Per Site (Veg. Sites Only)	2.41

Table 5: Statistical descriptions based on all plants inventoried (2020)

[a]Does not include sample points in depths beyond 16 ft. where plant growth could not be documented
[b]Includes all sample points within the 0-16-ft. littoral zone that were 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.
[e]Percentage of occurrence that vegetation would be sampled within the 0-16-ft. littoral zone
[f]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.
[g]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).
[h]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).
[i]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 0-10 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.
[j]Mean Coefficient of Conservatism (C) among species documented during point-intercept survey. Does not include species observed during the follow-up boat survey.

Finally, a 44-year comparative analysis for the 1976-2020 monitoring period is provided in Tables 6, 7, and 8 below. During the 44-year period of record, the trend towards an increasing number of documented plant species is not considered significant when comparing 1976 to 2001

results. This is because of the change in point-intercept protocols in 2006. These results may reflect inter-annual variability, improvement in plant identification and sampling technique over time, and the influence of seasonality in plant growth consequent to the time of year during which the surveys were conducted.

Species	Year								
	1976	1989	1991	1996	2001	2006^	2011^	2015^	2020^
Arum-leaved arrowhead	--	--	--	--	--	--	--	V	--
Cattail	--	--	--	--	--	--	--	--	V
Chara sp.	47	7	18	23	45	196	--	--	--
Common bladderwort	6	--	2	2	1	--	11	6	27
Common watermeal	--	--	--	--	--	--	V	--	3
Common waterweed	2	--	2	1	3	3	40	2	7
Coontail	14	3	19	21	5	44	103	98	153
*Curly-leaf pondweed	1	1	--	--	1	5	36	5	30
*Eurasian watermilfoil	19	45	48	53	41	25	15	12	65
Fetid stonewort**	--	--	--	--	--	--	202	155	144
Flat-stem pondweed	--	--	--	--	8	--	--	1	--
Floating-leaf pondweed	10	8	--	--	1	--	V	2	--
Forked duckweed	--	--	--	--	--	1	--	--	--
Fries' pondweed	--	--	--	--	--	27	82	20	136
Globular stonewort**	--	--	--	--	--	--	--	21	115
Hardstem Bulrush	--	--	--	--	--	--	--	V	--
Horned pondweed	--	--	--	--	--	--	1	1	--
Hybrid watermilfoil	--	--	--	--	--	--	50	10	--
Illinois pondweed	--	13	--	1	--	18	30	3	3
Leafy pondweed	--	--	--	--	--	3	--	--	--
Naiad sp.	3	--	--	--	--	--	--	--	--
Needle spikerush	--	--	--	--	--	--	--	--	1
Northern watermilfoil	--	--	2	1	--	14	100	26	4
Potamogeton sp.(Hybrid)	7	--	5	7	--	--	--	10	--
Sago pondweed	12	3	12	18	20	62	133	174	58
Softstem bulrush	--	--	--	--	--	--	--	--	V
Slender naiad	--	7	8	11	13	4	8	25	--
Small duckweed	--	--	--	--	--	4	1	V	3
Small pondweed	--	13	--	--	--	1	2	3	59
Spatterdock	--	--	--	--	--	7	7	5	12
Spiny naiad	--	11	37	46	35	123	76	127	11
Stiff pondweed	--	--	--	--	--	--	--	1	13
Variable pondweed	--	2	--	--	8	--	1	4	23
Water bulrush	--	--	--	--	4	--	--	--	--
Water celery	25	7	7	10	21	11	43	79	72
Water stargrass	--	--	--	--	3	16	4	5	14

Species	Year								
	1976	1989	1991	1996	2001	2006^	2011^	2015^	2020^
White water lily	--	--	--	--	--	6	5	3	9
Total Number of Species Documented:	11	12	11	12	15	19	23	28	24

Table 6: Number of littoral-zone sample sites where each species was found (1976-2020)

^ Surveys have a higher number of sample sites compared to previous years due to use of the point-intercept method

* = Species non-native to Wisconsin

** = 2015 inventory differentiated between *Chara* species

Species	Year								
	1976	1989	1991	1996	2001	2006^	2011^	2015^	2020^
Chara sp.	69.1	11.7	20.0	25.6	50.0	53.1	--	--	--
Common bladderwort	8.8	--	2.2	2.2	1.1	--	2.7	1.7	7.5
Common watermeal	--	--	--	--	--	--	--	--	0.8
Common waterweed	2.9	--	2.2	1.1	3.3	0.8	9.8	0.6	1.9
Coontail	20.6	5.0	21.1	23.3	5.6	12.2	25.3	27.3	42.3
*Curly-leaf pondweed	1.5	1.7	--	--	1.1	1.4	8.9	1.4	8.3
*Eurasian watermilfoil	29.9	75.0	53.3	58.9	45.6	6.8	3.7	3.3	17.9
Fetid stonewort	--	--	--	--	--	--	49.6	43.2	39.8
Flat-stem pondweed	--	--	--	--	8.9	--	--	0.3	--
Floating-leaf pondweed	14.7	13.3	--	--	1.1	--	--	0.6	--
Forked duckweed	--	--	--	--	--	0.3	--	--	--
Fries' pondweed	--	--	--	--	--	7.3	20.1	5.6	37.6
Globular stonewort	--	--	--	--	--	--	--	5.9	31.8
Horned pondweed	--	--	--	--	--	--	0.2	0.3	--
Hybrid watermilfoil	10.3	--	5.6	7.8	--	4.6	12.3	2.8	--
Illinois pondweed	--	21.7	--	1.1	--	--	7.4	0.8	0.8
Leafy pondweed	--	--	--	--	--	0.8	--	--	--
Naiad sp.	4.4	--	--	--	--	--	--	--	--
Needle spikerush	--	--	--	--	--	--	--	--	0.3
Northern watermilfoil	--	--	2.2	1.1	--	3.8	24.6	7.2	1.1
Potamogeton sp.	10.3	--	5.6	7.8	--	--	--	2.8	--
Sago pondweed	17.6	5.0	13.3	20.0	22.2	16.8	32.7	48.5	16.0
Slender naiad	--	11.7	8.9	12.2	14.4	1.1	2.0	7.0	--
Small duckweed	--	--	--	--	--	1.1	0.2	V	0.8
Small pondweed	--	21.7	--	--	--	0.3	0.5	0.8	16.3
Spatterdock	--	--	--	--	--	1.9	1.7	1.4	3.3
Spiny naiad	--	18.3	41.1	51.1	38.9	33.3	18.7	35.4	3.0
Stiff pondweed	--	--	--	--	--	--	--	0.3	3.6
Variable pondweed	--	3.3	--	--	8.9	--	0.2	1.1	6.4
Water bulrush	--	--	--	--	4.4	--	--	--	--
Water celery	36.8	11.7	7.8	11.1	23.3	3.0	10.6	22.0	19.9
Water star grass	--	--	--	--	3.3	4.3	1.0	1.4	3.9
White water crowfoot	--	--	--	--	--	--	--	--	2.8

Species	Year								
	1976	1989	1991	1996	2001	2006^	2011^	2015^	2020^
White water lily	--	--	--	--	--	1.6	1.2	0.8	2.5

Table 7: Percent frequency of occurrence of aquatic plant species (1976-2020)

^ Surveys have a higher number of sample sites compared to previous years due to use of the point-intercept method
* = Species non-native to Wisconsin

Species	Year								
	1976	1989	1991	1996	2001	2006^	2011^	2015^	2020^
Chara sp.	32.2	5.8	11.3	11.9	21.5	30.1	--	--	--
Common bladderwort	4.1	--	1.3	1.0	0.5	--	1.2	0.8	2.8
Common watermeal	--	--	--	--	--	--	--	--	0.3
Common waterweed	1.4	--	1.3	0.5	1.4	0.5	4.2	0.3	0.7
Coontail	9.6	2.5	11.9	10.8	2.4	6.9	10.8	12.4	15.7
*Curly-leaf pondweed	0.7	0.8	--	--	0.5	0.8	3.8	0.6	3.1
*Eurasian watermilfoil	13.0	37.5	30.0	27.3	19.6	3.8	1.6	1.5	6.7
Fetid stonewort	--	--	--	--	0.0	--	21.3	19.7	14.8
Flat-stem pondweed	--	--	--	--	5.7	--	--	0.1	--
Floating-leaf pondweed	6.8	6.7	--	--	0.5	--	0.5	0.3	--
Forked duckweed	--	--	--	--	--	0.2	0.0	--	--
Fries' pondweed	--	--	--	--	--	4.1	8.6	2.5	14.0
Globular stonewort	--	--	--	--	--	--		2.7	11.8
Horned pondweed	--	--	--	--	--	--	0.1	0.1	--
Hybrid watermilfoil	--	--	--	--	--	2.6	5.3	1.3	--
Illinois pondweed	--	10.8	--	0.5	--		3.2	0.4	0.3
Leafy pondweed	--	--	--	--	--	0.5	--	--	--
Naiad sp.	2.1	--	--	--	--	--	--	--	--
Needle spikerush	--	--	--	--	--	--	--	--	0.1
Northern watermilfoil	--	--	1.3	0.5	--	2.2	10.5	3.3	0.4
Potamogeton sp.	4.8	--	3.1	3.6	--	--	--	1.3	--
Sago pondweed	8.2	2.5	7.5	9.3	9.6	9.5	14.0	22.1	6.0
Slender naiad	--	5.8	5.0	5.7	6.2	0.6	0.8	3.2	--
Small duckweed	--	--	--	--	--	0.6	0.1	--	0.3
Small pondweed	--	10.8	--	--	--	0.2	0.2	0.4	6.1
Spatterdock	--	--	--	--	--	1.1	0.7	0.6	1.2
Spiny naiad	--	9.2	23.1	23.7	16.7	18.9	8.0	16.1	1.1
Stiff pondweed	--	--	--	--	--	--	--	0.1	1.3
Variable pondweed	--	1.7	--	--	3.8	--	0.1	0.5	2.4
Water bulrush	--	--	--	--	1.9	--	--	--	--
Water celery	17.1	5.8	4.4	5.2	10.0	1.7	4.5	10.0	7.4
Water stargrass	--	--	--	--	1.4	2.5	0.4	0.6	1.4
White water crowfoot	--	--	--	--	--	--	--	--	1.0
White water lily	--	--	--	--	--	0.9	0.5	0.4	0.9

Table 8: Percent relative frequency of occurrence of aquatic plant species (1976-2020)

^ Surveys have a higher number of sample sites compared to previous years due to use of the point-intercept method
* = Species non-native to Wisconsin

5.4 - Condition Assessment

Lake Ripley's aquatic plants have been studied for over 65 years and overall have depicted a healthy, diverse native plant community. During the 2020 plant survey, field researchers were able to find two new species in the lake, large duckweed (*Spirodela polyrhiza*) and needle spikerush (*Eleocharis acicularis*), increasing our native plant diversity. EWM found its way back into the top six dominant plant species, being found at 65 sites. Even though 65 sites seems like a lot, the percentage of sample sites in which Eurasian watermilfoil was found has decreased from 75% in 1989 to 17.29% in 2020, revealing a precipitous decline in dominance by this non-native species. This may be in part due to the change of WDNR's point-intercept survey protocols. The relative frequency of occurrence for milfoil also decreased from 37.5% in 1989 to 6.7% in 2020.

Over the years, the plants within Lake Ripley have been found growing at different depths. In 2011, 2015, and 2020, plants were found growing at 21, 15, and 16 feet, respectively. The lake levels differed throughout these years, which would affect the depth of which plants were found.

With respect to the Wisconsin Floristic Quality Index, Lake Ripley's computed value of 25.93 (2020) continues to rank above the median for Wisconsin and the larger ecoregion. The Floristic Quality Index (FQI) was developed to help assess lake quality by evaluating the number and types of aquatic plants that live in a lake. The FQI for Wisconsin ranges from 3.0 to 44.6, with a median of 22.2. The FQI is particularly valuable for comparing lakes around the state or looking at a single lake over time. Generally, higher FQI numbers indicate better lake quality that can support more pollution-sensitive plant species. Lake Ripley's 2020 FQI of 25.93 is a marked improvement over prior years when the FQI averaged 18.82.

In terms of plant diversity, the Simpson Diversity Index has ranged from 0.85-0.90 (on a 0-1.00 scale) during the 44-year period of record. This suggests that the plant community has remained somewhat diverse throughout this period, indicating a healthy lake. The Simpson Diversity Index (SDI) is calculated as one minus the sum of each of the relative frequencies squared. The closer the SDI value is to one, the greater the diversity is between communities. The index allows the plant community at one location to be compared to the plant community at another location.

The SDI 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. In 2020 the SDI was 0.90, which was an increase from 0.86 in 2015.

In terms of importance values, coontail (*Ceratophyllum demersum*) and fetid stonewort (*Chara contraria*) were the two species with the highest value. Globular stonewort (*Chara globularis*) and Fries' pondweed (*Potamogeton friesii*) also had relatively high importance values. The overall decline in importance values among the different plant species suggests a shift toward a healthier lake ecosystem, with no one species becoming overly dominant. While the precise reasons for changes in the plant community are unclear, they are most likely related to a combination of factors. These factors include the implementation of aquatic plant management practices, changes in land use that affect nutrient supply and availability, alterations in lake-use patterns and behavior, climatic factors, and natural biological processes contributing to inter-annual variability among plant communities.

Recent inventory results are fairly encouraging, especially with respect to the overall decline in Eurasian watermilfoil dominance. Despite these positive observations, challenges still remain and suggest there is room for improvement. Challenges include the continued presence of nonnative organisms and plants, dominance of pollution/disturbance-tolerant species, and limited overall biodiversity. Expected challenges include increased storm events, increased days of high temperatures, and wave action from changes in recreational vessels.

These conditions are likely to change for the better as recommendations contained within this plan are implemented over time.

5.5 - Critical Habitat Areas

Every waterbody has critical habitat; these are the areas that are most important to the overall health of the aquatic plants and animals (WDNR, 2021). 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, 2021). 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 (see map in Appendix C) (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. However, this designation did not follow modern standards of data collection and public input, so the designation is being re-done.

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. Water celery (*Vallisneria americana*) and several submersed pondweeds (*Potamogeton* sp.) were also identified as deserving protection, but it was noted that these plants occur in low densities and are widely dispersed throughout the lake. Consequently, these species cannot be protected within defined areas.

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 the southern shoreline are protected, and 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 motor boat 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.

The Wisconsin DNR, in partnership with the Lake District, is currently in the process of re-evaluating and re-mapping Critical Habitat Areas on Lake Ripley. When completed, any key findings, re-delineations and recommendations from this effort shall be considered a part of this Lake Management Plan. A draft Critical Habitat Areas map is included as Figure 12.

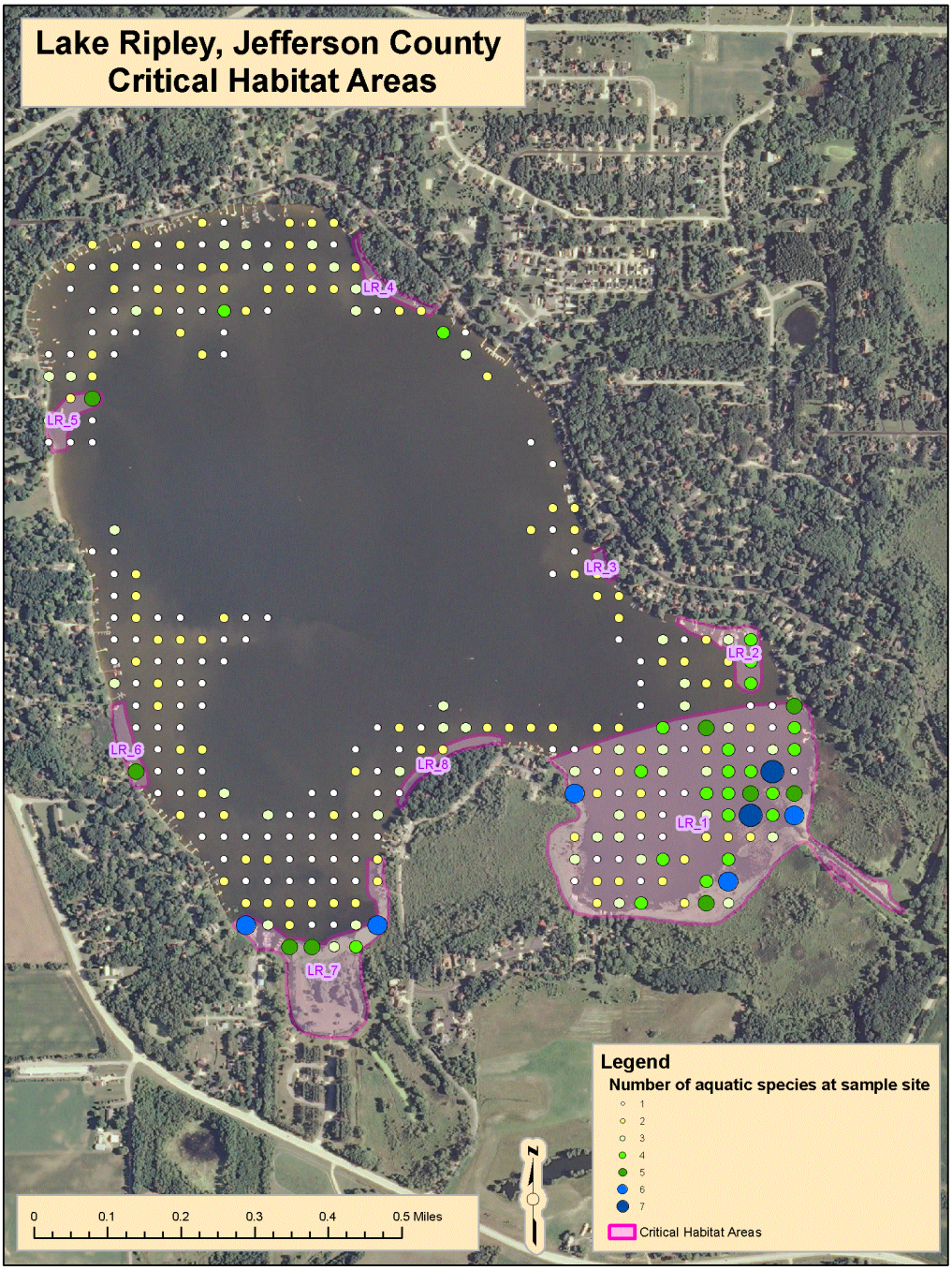


Figure 12: Critical Habitat Areas on Lake Ripley (DRAFT)

5.6 - Management for 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. Best management practices seek to do now what will benefit the lake in the future.

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 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 6 - FISH OF LAKE RIPLEY

6.1 - 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.

6.2 - 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.

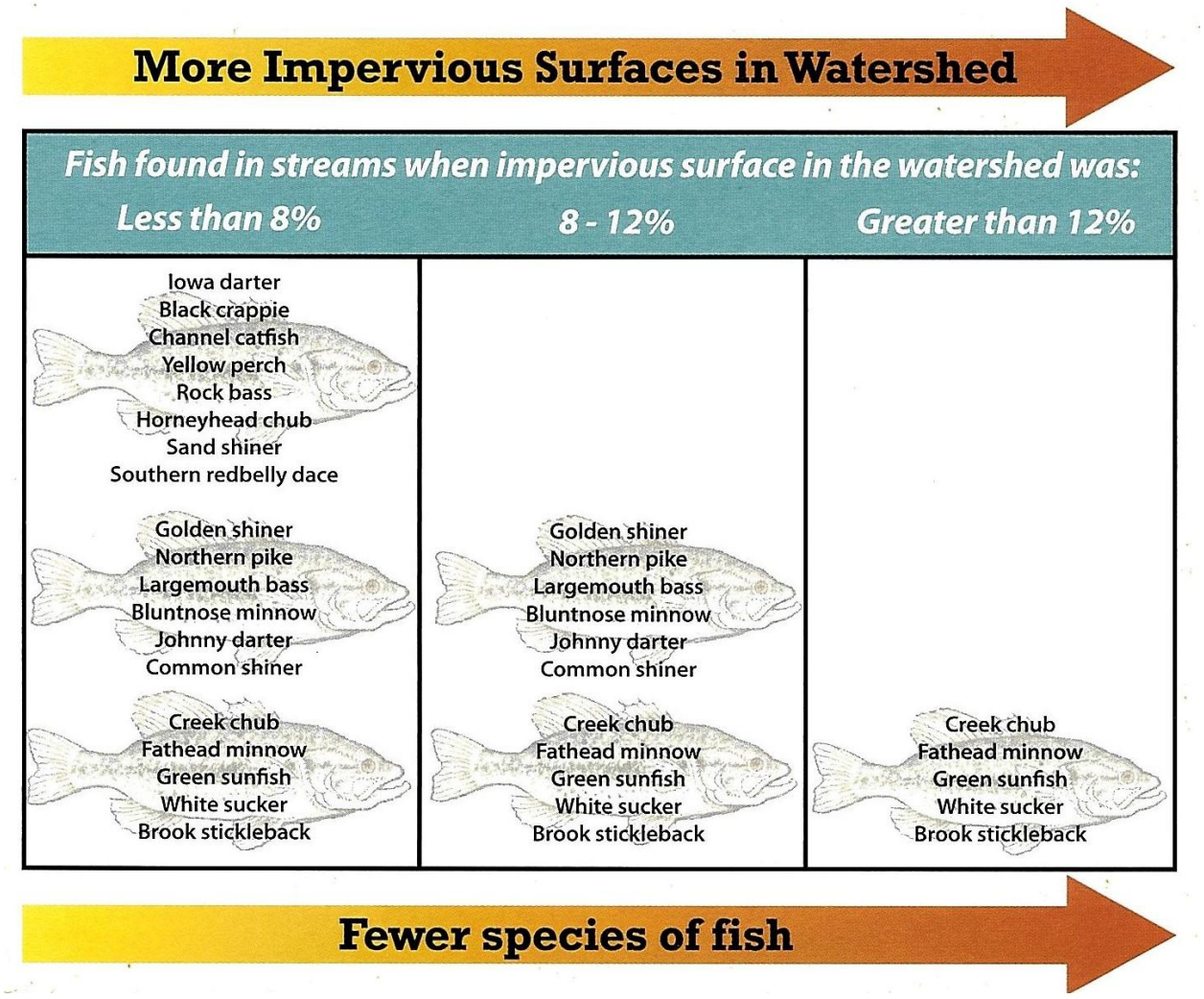


Figure 13: The number of different stream fish species found in streams declines as the effects of impervious surfaces kill off more sensitive species. (Wang et al. 2020)

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).

6.3 - 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 (Table 9). 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.

Year	Species	Strain (Stock)	Age Class	Number Fish Stocked	Average Fish Length (Inches)
1985	SMALLMOUTH BASS	UNSPECIFIED	FINGERLING	8,620	3.00
1985	WALLEYE	UNSPECIFIED	FINGERLING	28,104	2.00
1986	WALLEYE	UNSPECIFIED	FINGERLING	5,917	4.00
1987	WALLEYE	UNSPECIFIED	FINGERLING	63,270	2.00
1989	WALLEYE	UNSPECIFIED	FINGERLING	22,496	2.00
1995	WALLEYE	UNSPECIFIED	FINGERLING	3,808	5.00
1995	WALLEYE	UNSPECIFIED	YEARLING	400	5.60

Year	Species	Strain (Stock)	Age Class	Number Fish Stocked	Average Fish Length (Inches)
1997	WALLEYE	UNSPECIFIED	LARGE FINGERLING	22,874	1.60
1997	WALLEYE	UNSPECIFIED	SMALL FINGERLING	45,748	1.60
1999	WALLEYE	UNSPECIFIED	SMALL FINGERLING	21,000	1.30
2000	WALLEYE	UNSPECIFIED	SMALL FINGERLING	21,000	1.40
2002	WALLEYE	MISSISSIPPI HEADWATERS	SMALL FINGERLING	21,000	1.40
2003	WALLEYE	ROCK-FOX	SMALL FINGERLING	23,784	1.30
2004	WALLEYE	MISSISSIPPI HEADWATERS	SMALL FINGERLING	10,250	1.20
2005	WALLEYE	ROCK-FOX	SMALL FINGERLING	1,350	2.70
2006	WALLEYE	ROCK-FOX	LARGE FINGERLING	4,180	7.70
2009	WALLEYE	ROCK-FOX	SMALL FINGERLING	14,630	1.00
2010	WALLEYE	ROCK-FOX	SMALL FINGERLING	7,524	1.62
2011	WALLEYE	ROCK-FOX	SMALL FINGERLING	14,630	1.47
2013	WALLEYE	ROCK-FOX	SMALL FINGERLING	14,630	1.50
2015	WALLEYE	ROCK-FOX	LARGE FINGERLING	4,519	7.00
2017	WALLEYE	ROCK-FOX	LARGE FINGERLING	8,396	6.67
2018	YELLOW PERCH	UNSPECIFIED	UNKNOWN	5,000	4.0
2019	WALLEYE	ROCK-FOX	LARGE FINGERLING	8,360	7.40
2019	YELLOW PERCH	UNSPECIFIED	UNKNOWN	5,000	4.0
2020	N/A	N/A	N/A	N/A	N.A
2021	WALLEYE	UNSPECIFIED	LARGE FINGERLING	8,360	

Table 9: Wisconsin DNR fish-stocking records for Lake Ripley (1985-2021)

Species	Fall 2010	Fall 2011	Fall 2012	Fall 2013	Fall 2014	Fall 2015	Fall 2016	Fall 2017**	Fall 2018**	Fall 2019**	Fall 2020**
Longnose gar *Lepisosteus osseus*		X		X							
White crappie *Pomoxis annularis*											
White sucker *Catostomus commersoni*		X	X	X	X						
Carp *Cyprinus carpio*		X	X	X			X				
Bigmouth buffalo *Ictiobus cyprinellus*		X	X	X							
Brook silverside *Labidesthes sicculus*		X	X	X	X						

Species	Fall 2010	Fall 2011	Fall 2012	Fall 2013	Fall 2014	Fall 2015	Fall 2016	Fall 2017**	Fall 2018**	Fall 2019**	Fall 2020**
Yellow bullhead *Ameiurus natalis*		X	X	X	X		X				
Golden shiner *Notemigonus crysoleucas*		X	X	X	X		X				
Common shiner *Luxilus cornutus*											
Lake chubsucker* *Erimyzon sucetta*		X									
Green sunfish *Lepomis cyanellus*					X						
Bowfin *Amia calva*		X			X						
Bluntnose minnow *Pimephales notatus*		X	X	X	X		X				
Pumpkinseed sunfish *Lepomis gibbosus*	X	X	X	X	X	X	X				
White bass *Morone chrysops*				X			X				
Black bullhead *Ameiurus melas*											
Brown bullhead *Ameiurus nebulosus*				X							
Grass pickerel *Esox americanus vermiculatus*		X	X	X	X		X				
Rock bass *Ambloplites rupestris*	X	X	X	X	X	X					
Central mudminnow *Umbra limi*											
Johnny darter *Etheostoma nigrum*											
Emerald shiner *Notropis atherinoides*											
Burbot *Lota lota*											
Yellow perch *Perca flavescens*	X	X	X	X	X	X	X				
Black crappie *Pomoxis nigromaculatus*	X	X	X	X	X	X	X				
Bluegill *Lepomis macrochirus*	X	X	X	X	X	X	X				

Species	Fall 2010	Fall 2011	Fall 2012	Fall 2013	Fall 2014	Fall 2015	Fall 2016	Fall 2017**	Fall 2018**	Fall 2019**	Fall 2020**
Northern pike *Esox lucieus*	X	X	X	X	X	X	X				
Walleye *Stizostedion vitreum*	X	X	X	X	X	X	X	X	X	X	X
Largemouth bass *Micropterus salmoides*	X	X	X	X	X	X	X				
Smallmouth bass *Micropterus dolomieu*	X	X	X	X	X	X	X				
Species diversity:	9	20	17	20	17	9	14	1	1	1	1

Table 10: Documented fish species (2010-2020 fall electrofishing surveys)

* = Wisconsin Special Concern Species. This species could become threatened or endangered.
** = Not comprehensive fish surveys. Surveys conducted specifically for walleye.

6.4 - Recent Trends and Current Status

Since 2009, the DNR has continued to survey Lake Ripley's fish population every year primarily through electrofishing. Current 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 11-18 below. 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). Size-frequency distributions were representative of similar lakes found in Southern Wisconsin, and with no unusual trends evident.

Fall electrofishing surveys conducted from 2010-2016 had sampling conducted at two gamefish stations; each station was 1.5 miles long where only gamefish were collected. Two additional stations, each 0.5 miles long, were sampled where all fish species were collected. Length measurements were taken from a subset of fish, except for common carp, and all fish were returned to the lake. Researchers would often record the average water temperature and water clarity while performing these surveys.

During 2010, the District had scuba divers report sightings of the non-native, "restricted" (Ch NR40) round gobies in the lake. A shoreline survey was promptly conducted and there were no gobies found. Data suggests that divers probably mistook the gobies for juvenile common carp.

The last full comprehensive fish survey for Lake Ripley was completed in 2016. Fish biologists from the DNR were able to observe naturally reproducing largemouth and smallmouth bass, and northern pike populations. This is indicative of a healthy diversity of gamefish species within the lake. However, the smallmouth bass population size has been dropping since 1995; 14 were found in 2014 and 3 were found in 2016. Panfish populations weren't as large as the populations of the gamefish, but eight species were found and documented. The non-game fish community was diverse in 2016, with nineteen species found. More detailed results can be found below in Table 19.

The next comprehensive fish survey will be completed in 2022, as Lake Ripley is now a part of the Wisconsin Walleye Initiative and is on a six-year rotation for a full comprehensive fish survey.

Wisconsin Walleye Initiative

In 2017, Lake Ripley became a study lake for the Wisconsin Walleye Initiative. The Wisconsin Walleye Initiative (WWI) was developed by the DNR and Governor Walker's office in 2017 to increase the number of walleyes in state walleye waters. The WWI focuses on evaluating the success of stocking large-fingerling walleye in public waters. Large fingerling walleye have the highest survival rates compared to small fingerling or fry. However, large fingerlings are expensive to raise and require ponds and associated infrastructure.

The WWI financed infrastructure improvements at state fish hatcheries as well as set aside funds to purchase large fingerling walleye from private and tribal fish hatcheries to meet the DNR's needs (WDNR, 2018). Lakes were assigned to different treatment groups and stocked at different stocking rates to determine, with data, which stocking rate most successfully produces year classes of walleye and ultimately, creates a self-sustaining population of walleye.

Becoming a part of the WWI meant a different sampling protocol needed to be used that focuses on walleye. It does not preclude a lake from full fall electrofishing surveys, but shifts the priority to the evaluation of walleye. In 2017 a new protocol saw stocked walleye years (odd years for Lake Ripley) being surveyed. The new protocol is to shock the entire shoreline for walleye only and making one pass to collect them all, with a specific focus on documenting any young-of-the-year walleye. The survey is completed prior to stocking walleye to document the presence of any naturally reproduced walleye.

The DNR performed a pre-stocking electrofishing survey in September 2017, before the large fingerling walleye were stocked. The fingerlings are often stocked at 20 fish per acre during the odd-numbered years.

The new protocol also called for an early spring electrofishing survey to be completed. This survey focuses on documenting the survival of stocked walleye from the previous years. Completing this survey allows the DNR to evaluate the success of the WWI program year by year. Being a part of this initiative means the surveys completed aren't gathering data for the other gamefish, panfish, and non-game species. Lake Ripley is now on a six year rotation for a full comprehensive fish survey, where the DNR will sample throughout the year using multiple gear types.

Even though Lake Ripley is not listed as a naturally reproducing walleye water, it has the habitat required for a potentially successful walleye fishery. The large amount of bass in the lake could play a part in the low numbers of walleye; bass prey on walleye and could be having a significant negative impact on their population. Increasing walleye numbers could help promote a natural fisheries population growth.

Through this program the DNR hopes to provide a walleye fishery for anglers. They want to identify lakes where they can successfully produce walleye fisheries, determine the best stocking rate to do so, and determine the financial costs associated with completing this task.

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. Since the WWI prioritizes walleye, other gamefish species have not been surveyed since 2016.

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 walleye 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.

Largemouth Bass	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Total Catch:	190	273	192	173	180	124	168	N/A	N/A	N/A	N/A
Catch Rate (fish per hour):	67	114	67	58	74	50	74	N/A	N/A	N/A	N/A
Length Range (inches):	2.8-15.2	2.1-18.5	1.8-17.7	2.1-18.6	2.2-18.4	2.7-16.2	3.8-15.8	N/A	N/A	N/A	N/A
Average Length (inches):	8.7	7.9	8.7	8.4	6.7	7.8	7.8	N/A	N/A	N/A	N/A

*Information obtained from: Lake Ripley Fall Electrofishing Summary Reports

Table 11: Largemouth bass survey results

Smallmouth Bass	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Total Catch:	12	12	10	4	14	4	3	N/A	N/A	N/A	N/A
Catch Rate (fish per hour):	4	5	3	1	6	2	1	N/A	N/A	N/A	N/A
Length Range (inches):	5.1-16.3	3.1-14.9	5.3-15.7	7.5-10.9	3.1-15.6	7.6-14.7	9.7-12.6	N/A	N/A	N/A	N/A
Average Length (inches):	10.3	8.7	10.5	9.8	6.9	10.0	11.1	N/A	N/A	N/A	N/A

Table 12: Smallmouth bass survey results

Walleye	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Total Catch:	43	20	23	4	14	46	32	9	31	9	31	33
Catch Rate (fish per hour):	15	8	8	6	5	19	14	2.09	6.4	2.05	13.5	12.7
Length Range (inches):	7.4-19.2	7.5-18.2	12.1-20.6	8.2-22.3	7.7-20.5	6.5-21.5	9.9-21.4	14.5-21.5	7.5-21	11.5-21	9.2-24.2	10.4-22.2
Average Length (inches):	13.1	14.3	15.9	16.8	16.5	10.15	12.9	17.31	14.96	16.42	15.2	13.7

Table 13: Walleye survey results

Northern Pike	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total Catch:	10	3	7	12	22	19	11	N/A	N/A	N/A	N/A
Catch Rate (fish per hour):	4	1	2	4	9	8	5	N/A	N/A	N/A	N/A
Length Range (inches):	11.1-35.0	20.0-20.5	10.8-35.3	10.1-38.3	8.8-29.7	11.2-24.8	16.0-33.1	N/A	N/A	N/A	N/A
Average Length (inches):	23.3	20.3	20.8	26.3	18.2	19.0	23.0	N/A	N/A	N/A	N/A

Table 14: Northern pike survey results

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. The next survey for these panfish species will be conducted in 2022.

Bluegill	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total Catch:	102	285	435	254	240	175	115	N/A	N/A	N/A	N/A
Catch Rate (fish per hour):	123	425	565	348	358	244	183	N/A	N/A	N/A	N/A
Length Range (inches):	1.5-7.7	1.1-8.5	1.1-8.5	1.4-7.8	1.5-8.8	1.2-8.6	1.9-8.1	N/A	N/A	N/A	N/A
Average Length (inches):	4.3	3.7	4.2	4.3	5.6	5.0	4.6	N/A	N/A	N/A	N/A

Table 15: Bluegill survey results

Yellow perch	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total Catch:	24	23	17	9	26	37	17	N/A	N/A	N/A	N/A
Catch Rate (fish per hour):	29	34	22	12	39	52	27	N/A	N/A	N/A	N/A
Length Range (inches):	2.4-6.1	1.9-7.6	2.1-6.4	2.5-5.0	2.3-6.1	2.3-5.2	3.4-8.2	N/A	N/A	N/A	N/A
Average Length (inches):	4.3	4.6	4.3	3.6	3.6	4.1	5.2	N/A	N/A	N/A	N/A

Table 16: Yellow perch survey results

Rock Bass	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total Catch:	9	15	10	15	20	11	18	N/A	N/A	N/A	N/A
Catch Rate (fish per hour):	11	22	13	21	21	15	29	N/A	N/A	N/A	N/A
Length Range (inches):	4.8-9.0	5.4-9.3	3.0-8.6	4.5-9.8	3.3-3.9	4.0-8.6	4.7-9.0	N/A	N/A	N/A	N/A

Rock Bass	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Average Length (inches):	6.9	7.4	5.6	7.0	5.8	7.1	6.5	N/A	N/A	N/A	N/A

Table 17: Rock bass survey results

Pumpkinseed	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total Catch:	1	20	28	26	7	11	21	N/A	N/A	N/A	N/A
Catch Rate (fish per hour):	1	30	36	36	10	15	33	N/A	N/A	N/A	N/A
Length Range (inches):	NA	3.5-7.6	1.9-7.8	3.0-8.0	1.9-7.0	1.7-7.8	2.9-7.4	N/A	N/A	N/A	N/A
Average Length (inches):	NA	5.8	5.1	5.7	5.4	6.2	5.4	5.7	5.1	5.8	NA

Table 18: Pumpkinseed survey results

Non-game 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 banded killifish. The 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 2020, a small non-game fish survey of the lake was conducted. The survey's primary goals consisted of determining the occurrence and relative abundance of fish species in the nearshore areas of the lake and comparing catches with results from the previous surveys to

detect possible trends. Secondary goals of this survey were to assess the condition of the nearshore habitat and to evaluate its suitability for possible re-introduction of one or more of the five extirpated fish species (Lyons and Marshall, 2020).

Two expert fish biologists, John Lyons and Dave Marshall, were accompanied by LRMD's field crew to perform the small non-game fish survey on June 23, 2020. Electroshockers were used at 10 nearshore sites around the lake to sample fish. At each site, a standardized sampling procedure was used to shock 200 feet of shoreline at each site. The shocked fish were collected, identified, counted, and released. After shocking, a visual qualitative habitat assessment focusing on bottom substrate, aquatic vegetation, hiding cover for fish, and shoreline and riparian conditions was conducted.

A total of 14 species and 312 individuals were collected from the 10 sites around the lake. The most common species that was found was Bluegill. Bluegill were found at every site with a total of 109 individuals; no other species was captured at every site. The second most common species was Largemouth bass with 98 individuals. However, these were all very small, recently hatched individuals. The most exciting discovery of the survey was finding two least darters, which were once thought to be extirpated from our lake!

Due to the discovery of the least darter, it has been suggested that we try to reintroduce a similar species, the banded killifish. The banded killifish once thrived in Lake Ripley but has not been found since 1974. This fish has generally declined in population sizes across its range, but it is occasionally found in other southeastern Wisconsin lakes. Reestablishing the banded killifish would be a big step towards the long-term goals of restoring lake biodiversity and ecological balance in Lake Ripley.

Catch Per Year				
Species	**1975**	**2004**	**2012**	**2020**
Golden Shiner (SN)	17	3	55	0
Common Carp	0	0	1	0
Pugnose Shiner (SN)	17	0	0	0
Blackchin Shiner (SN)	15	0	0	0
Blacknose Shiner (SN)	3	0	0	0
Bluntnose Minnow (SN)	152*	1833	10	11

Catch Per Year				
Species	**1975**	**2004**	**2012**	**2020**
Yellow Bullhead	0	0	33	38
Tadpole Madtom (SN)	0	0	1	0
Fathead Minnow (SN)	1	1	0	0
Central Mudminnow (SN)	1	0	11	4
Western Banded Killifish (SN)	45	0	0	0
Blackstripe Topminnow (SN)	0	0	1	0
Brook Silverside (SN)	19	69	0	2
Rock Bass	1	0	13	3
Green Sunfish	3	0	6	9
Pumpkinseed	64	0	0	3
Bluegill	171	324	217	109
Smallmouth Bass	0	44	2	0
Largemouth Bass	153*	783	76	98
Black Crappie	58	66	0	0
Iowa Darter (SN)	0	25	2	6
Fantail Darter (SN)	0	0	15	13
Least Darter (SN)	3	0	0	2
Johnny Darter (SN)	2	17	15	2
Yellow Perch	316*	89	4	12
Total Species	**18**	**11**	**16**	**14**
Total Individuals	**1041***	**3252**	**462**	**312**

Table 19: Comparison of catches in the 1975, 2004, 2012, and 2020 non-game fish surveys of Lake Ripley.

Small non-game species are indicated by “SN”. In 1975 and 2004, eight sites were sampled with a small-mesh seine. In 2012, 14 sites were sampled with either a mini-tow-barge electroshocker or small-mesh seine, and in 2020, 10 sites were sampled with either a mini-tow-barge or backpack electroshocker. In 1975 when the total number of fish of a species at a site exceeded 99 individuals, the count was stopped at 99, leading to an underestimate of the total number of fish captured. An asterisk indicates species for which this occurred.

6.5 - 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. Walleye have also become a priority in Lake Ripley since 2017 since being included in the WDNR's Wisconsin Walleye Initiative. 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 approved locations.

According to past fishery inventories, the most diverse species assemblage is consistently found in Lake Ripley's Marina Bay area. This particular area is also believed to provide the best largemouth bass habitat in the lake (Bush, 1994). 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 nine 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).

During the spring of 2021, the District received the proper permitting to install a temporary aluminum, alloy-mesh barrier over a culvert within the outlet stream to prevent carp from swimming upstream from the Koshkonong Creek and spawning in the wetlands or the lake. Using proactive management to keep the carp population low is important to the health of lake habitat and fishery.

CHAPTER 7 - LAKE DISTRICT PRESERVE

"Health is the capacity of the land for self-renewal. Conservation is our effort to understand and preserve this capacity." - Aldo Leopold

7.1 - The Strategic Value of the Preserve

The pre-settlement landscape of Lake Ripley's watershed was a mix of upland woods and prairies and low-lying wetlands through which a stream meandered on its way to the lake. This landscape worked together to create and protect good water quality in the lake.

Since the 1850's, the watershed landscape has been greatly altered. In 2009 only 500 of the original 1500 wetland acres remained. All of the prairies had been plowed. Only some of the woodlands remained. Even the stream itself had been changed, straightened in some sections. Agricultural ditches now contributed runoff to the stream directly. "Spoils" from the straightening of the stream's channel created barrier berms, effectively separating the stream from its remaining wetlands.

As the District began its work to improve the water quality in the lake, we realized that efforts to improve the lake could not be achieved without making improvements in the watershed. Further, we realized that watershed function could be restored if we owned strategic acres.

The DNR already owned 42 acres of intact wetlands between Highway A and Ripley Road. In 1997, the District purchased its first 99 acres just east of Highway A, which consisted of: 55 acres of farmed wetlands, 40 acres of non-farmed but degraded wetlands, and 4 acres of farmed uplands. In 2008, another contiguous 66 acres were purchased, a mix of woodlands, farmed uplands, and riparian wetlands adjacent to the inlet stream. In 2017, the District purchased the 42 acres of DNR wetlands. The District also purchased conservation easements on many strategic wetland acres.

Results from the 2019 Public Opinion survey showed support for the Lake District Preserve. An overwhelming percentage, 74.69%, "support" maintaining the Lake District Preserve. An additional 65.6% "support" acquisition of conservancy areas.

The vision for these acres, known as "The District Preserve", was to restore as much as possible the working partnership of the original watershed. The farmed uplands would be restored to prairies. These upland prairies and woodlands would prevent erosion, infiltrate rainfall and recharge the groundwater. The low-lying wetlands would once again absorb floodwaters,

sequester nutrients and sediment, and support the inlet stream's baseline flow. In addition to water quality benefits and habitat for wildlife and pollinators, the woodlands, prairies and wetlands also function as important carbon sinks, a good tool to mitigate climate change.

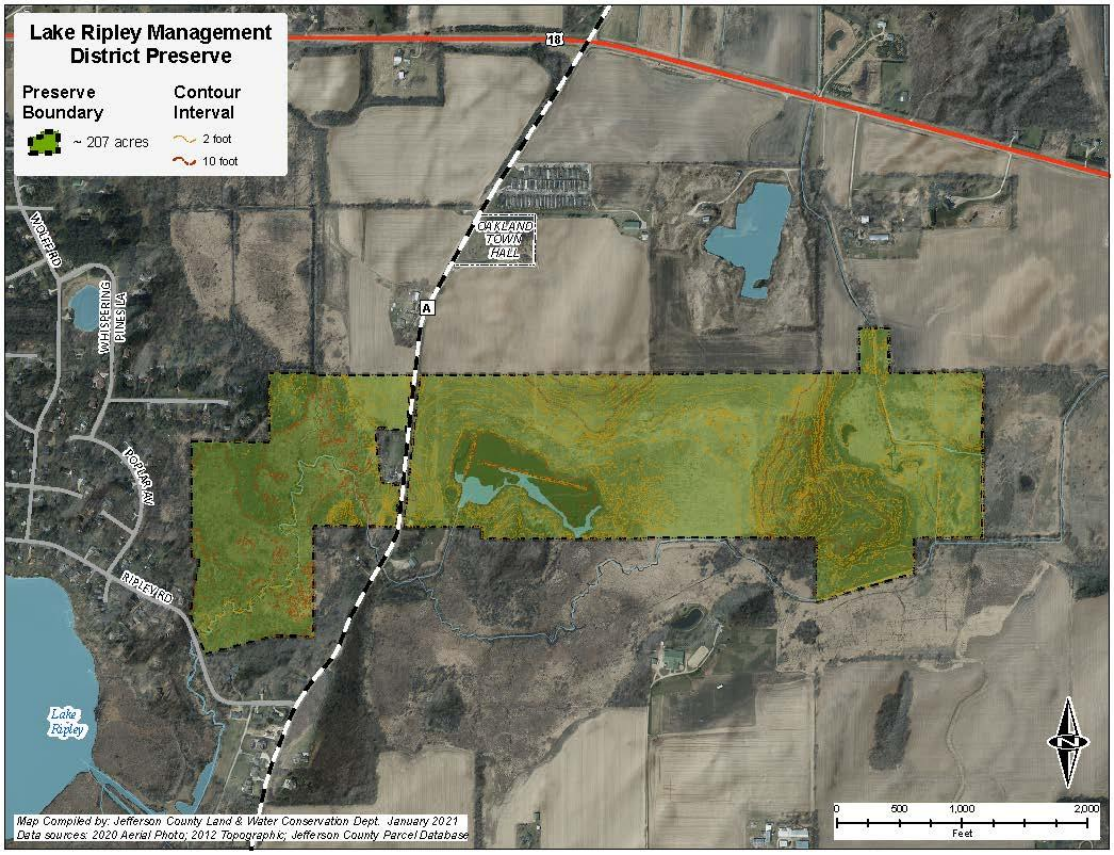


Figure 14: A map of the 207 acres of the Lake Ripley Management District's Preserve.

7.2 - Management Accomplishments 1998-2020

The District began its work soon after acquiring the property in 1998. Two main ditches were plugged, which returned water to the wetlands. Work was done with watershed farmers to reconfigure ditches, so that they did not erode into the stream. The uplands have all been restored to prairie, maintained by prescribed burns every few years. The woodlands have been improved by removing invasive species.

Additionally, the District realized the recreational and educational potential of the Preserve. Plans were made and implemented to create low-impact opportunities for the public. These include a long walking trail with educational kiosks, wood duck nesting boxes, and bluebird nest boxes along it. An observation deck from which the full landscape can be viewed was built on a high point of the trail. A boardwalk over a wetland scrape offers a close encounter with the

wetlands. A welcome sign and informational kiosk were placed in the parking lot.

Hunting is allowed per the requirements of our land-purchase funding grant. It is permitted during legal hunting seasons and with a valid Wisconsin hunting license. Muskrat trapping is also allowed, with only one trapper per year chosen by a lottery system. Trapping is done in water, with dog-excluding traps.

A 20-year management plan for the Preserve was created back in 2012, before the District purchased the additional 42 acres of wetland from the DNR in 2017. In 2021, the plan was updated to include the 42 acres of wetlands and additional management activities deemed necessary for continued management of the land. Please refer to our 2021 Preserve Management Plan for a detailed list of management goals and actions.

CHAPTER 8 - 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.

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.

Farmland Conservation Goal: Facilitate relationships between farmers and government agencies to promote the installation of conservation practices on agricultural lands within the Lake Ripley watershed to prevent soil erosion and protect water quality.

Farmland Conservation Actions:

- Recommend BMP practices to farmers within the watershed; these include cover crops, reduced tillage including no-till, filter strips, and grassed waterways.
    - Connect them with funding and expertise sources like NRCS.
- Find an agriculture leader in the Lake Ripley watershed who is interested in forming a Jefferson County Producer-Led Watershed Protection Group, in collaboration with the Lake Ripley Management District (LRMD), or the Rock Lake Improvement Association (RLIA), or both, to be eligible for funds to prevent and reduce runoff from farm fields.
- Investigate areas identified in the EVAAL and STEPL analyses to determine if erosion control practices are needed. If they are, then contact the landowners and provide available technicals and financial assistance to control the erosion.
- Maintain a collaborative relationship with the Town of Oakland board, especially their planning committee, to ensure that land within our watershed receives proper protection during any type of development or rezoning.
- Create and maintain a collaborative relationship with Asphalt Contractors Inc. and any other local contractors/businesses, to ensure protection from sediment runoff for the lake's watershed.
- Continue monitoring high-capacity well applications in our watershed. Work towards creating an ordinance with the Town of Oakland to better control high-capacity wells.
    - Encourage practices that improve the soil's capacity to retain moisture, reducing the need for irrigation.
- Encourage landowners to disconnect drain tiles, plug ditches, and establish vegetative buffers wherever possible.

Residential Development Goal: Educate and encourage the residents to practice lake-friendly yardscaping and other practices.

Residential Development Actions:

- Continue to use Ripples and our website to educate residents about best practices in their homes and yards to reduce runoff and improve the lake's water quality.
- Continue to publicize the availability of the District's cost-share program, native plant sale, and the Healthy Lakes & Rivers Grant Program to provide information, advice and cost-savings in yard improvement efforts, especially shoreline native plant buffers, upland yard rain gardens and native tree and shrub planting, all of which

reduce runoff, increase infiltration, and provide essential habitat.

- Investigate ditches, drainpipes, culverts and other features connected to the remaking of Ripley Road, to see if any are contributing to impaired water quality in Lake Ripley. Work with the Town of Oakland to address any problems found.
- Work with the Town of Oakland to create an ordinance prohibiting bare soil within 30 feet of the shoreline.
- Work with the Town of Oakland to create an ordinance that states that roads within a half-mile of the lakeshore are no-salting zones.
    - Encourage residents within a half-mile of the lakeshore to use sand instead of salt during the winter.
    - Encourage less road salt and more sand on Ripley Road in the winter. Salt should be placed at stop signs, hills, and curves; sand should be placed on straight road stretches.
- The Town of Oakland should ensure that construction site erosion laws are enforced by either their building inspectors or other officials as required.

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.
- Continue educating boaters about invasive species through the Clean Boats, Clean Waters program at the public launch every summer.
- 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.
- Designate additional Critical Habitat Designations or Sensitive Areas in Lake Ripley.

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 2025 and 2030 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 2025 and 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.
- Update the Aquatic Plant Management plan in 2022.

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.

- Repeat the nearshore fish survey every 5 years to monitor trends in nongame fish populations. Next anticipated fish survey is 2024.
    - 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.
- Annually install the temporary carp barrier during their spawning season to prevent carp from swimming up the Koshkonong Creek and finding spawning sites in the surrounding wetlands.
    - Encourage residents to continue spear-fishing to control the population of carp.
- Since natural reproduction of walleye is minimal, continue the walleye-stocking program sponsored by the DNR.
    - The public should be made aware that long-term fishery health is ultimately dependent on the availability of good habitat and water quality, whereas stocking and harvest regulations are often short-term fixes that fail to address underlying problems.
- 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.

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 slow-no-wake 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.

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

Fast Boating Actions:

- Work with the Town of Oakland to pass an ordinance that restricts artificial wake enhancement on Lake Ripley.

Lake Management Plan Amendments

The District realizes that new issues could emerge during the 10-year time frame of this management plan. Therefore, a process for amending the plan was created.

When a new issues arises that could impact Lake Ripley and its watershed, the District will take the following steps:

- If the issue(s) will have a significant impact on Lake Ripley or its watershed, the District will amend the plan accordingly
- The District will decide if other people/groups/stakeholders should be included in the process to amend the plan.
- The plan will be amended if consensus is reached by the District's board with input from the identified stakeholders.

Costs and Funding

The cost of implementing each of these recommended actions and goals will vary from no cost to expensive. As the implementers start working on the details of each recommendation, the cost will be researched and sources of funding can be pursued.

There are a variety of funding sources depending on the recommendation and the main implementer. The main sources of funding will most likely include:

- District funds - budgeted items, taxes, and donations
- Wisconsin Department of Natural Resources grants
- Department of Agriculture, Trade, and Consumer Protection cost-share funds through the Land and Water Conservation Department

- Local funding sources - Cambridge Community Foundation, Enbridge, etc.
- State funding sources - Ducks Unlimited, Pheasants Forever, Wisconservation, etc.

Appendix A - References

References

1. Birks, H. J., J. M. Line, S. Juggins, A. C. Stevenson, and CJ F. Ter Braak. 1990. "Diatoms and pH Reconstruction." *Biological Sciences* 327 (March). 10.1098/rstb.1990.0062.
2. Borman, Susan, Robert Korth, and Jo Temte. 2014. *Through the Looking Glass: A Field Guide to Aquatic Plants*. Second ed. N.p.: Wisconsin Lakes Partnership.
3. Burris, John E. 1971. "A Study of Man's Effects on Lake Ripley." *Zoology* University of Wisconsin-Madison (518 Report).
4. Bush, Donald M. 1994. "Electrofishing Report: Lake Ripley, Jefferson County, Wisconsin." *Wisconsin Department of Natural Resources*.
5. Carlson, Robert E. 1997. "A trophic state index for lakes." *Limnology and Oceanography* 22, no. 2 (March): 361-369. https://doi.org/10.4319/lo.1977.22.2.0361.
6. Carter, M.R., and E. McKyes. "Cultivation and Tillage." *Encyclopedia of Soils in the Environment*. Elsevier/Academic, 2005.
7. Chase, Wayland J., and Lowell E. Noland. 1927. "The History and Hydrography of Lake Ripley." *Wisconsin Academy of Sciences, Arts and Letters* 23:179-186.
8. Cicero, P., P. Dearlove, P. Garrison, D. Marshall, and L. Stremick-Thompson. 2005. "Effects of Pier Shading on Littoral Zone Habitat." *Wisconsin Department of Natural Resources, Lake Ripley Management District, and Jefferson County Land and Water Conservation Department*.
9. Dow, G., and A. B. Carpenter. 1877. *In Dane County and Surrounding Towns: being a History Guide*. Vol. pp. 336-370. Madison, Wisconsin: Wm. J. Park and Co.
10. Druckenmiller, Howard S. 1970. "Basic Inventory Survey of Lake Ripley." *Wisconsin Department of Natural Resources*.
11. Garrison, P., M. Jennings, A. Mikulyuk, J. Lyons, P. Rasmussen, J. Hauxwell, D. Wong, J. Brandt, and G. Hatzenbeler. 2008. "Implementation and Interpretation of Lakes ASsessment Data for the Upper Midwest." *Bureau of Science Services, Fisheries and Aquatic Sciences Section* PUB-SS-1044 (November): 1-72. https://dnr.wi.gov/files/PDF/pubs/ss/SS1044.pdf.
12. Garrison, Paul J., and R. Pillsbury. 2009. "Paleoecological Study of Lake Ripley." *Wisconsin Department of Natural Resources*, 17. PUB-SS-1062.
13. Hauxwell, J., Knight, S., Wagner, K., Mikulyuk, A., Nault, M., Porzky, M., & Chase, S. (2010, March). *Recommended Baseline Monitoring of Aquatic Plants in Wisconsin: Sample Design, Field and Laboratory Procedures, Data Entry and Analysis, and*

Applications. https://www.uwsp.edu/cnr-ap/UWEXLakes/Documents/ecology/Aquatic%20Plants/PI-Protocol-2010.pdf.
14. Lake Ripley Management District and Wisconsin Department of Natural Resources. 1994. “Lake Ripley Water Resources Appraisal.”
15. Lyons, John, and Dave Marshall. 2020. “Assessment of Small, Nearshore, Non-Game Fish Populations in Lake Ripley, Jefferson County, Wisconsin, June 2020.”
16. Mackenthun, Kenneth M., and Kenneth Flakas. 1946. “A Biological Survey of Lake RIpley.” *Wisconsin Conservation Department* Fisheries Biology Section (Investigative Report No. 580).
17. Moody, Michael, and D. H. Les. 2007. “Geographic distribution and genotypic composition of invasive hybrid watermilfoil (Myriophyllum spicatum × M. sibiricum) populations in North America.” *Biological Invasions* 9 (January): 559-570. 10.1007/s10530-006-9058-9.
18. Nichols, Stanley A. 1999. “Distribution and habitat descriptions of Wisconsin lake plants.” *Wisconsin Geological and Natural History Survey*, no. 96, 1-282. https://wgnhs.wisc.edu/catalog/publication/000120/resource/b096.
19. Schupp, Dennis H. 1992. “An Ecological Classification of Minnesota Lakes with Associated Fish Communities.” *Minnesota Department of Natural Resources, Division of Fisheries* Investigation Report 417.
20. Scott, B. M. 1924. “History of Cambridge, Wisconsin.” *Unpublished manuscript*, 1924, 35.
21. Skawinski, Paul M. 2018. *Aquatic Plants of the Upper Midwest: A photographic field guide to our underwater forests*. Third ed. Wisconsin: n.p.
22. Stremick-Thompson, Laura. 2020. “Lake Ripley Fall Electrofishing Summary Report.” *Wisconsin Department of Natural Resources*.
23. Town of Oakland. 1995. “An Ordinance to Regulate the Location of Piers, Wharves and Swimming Rafts on Lake Ripley.” Ordinance No. 42. https://oaklandtown.com/wp-content/uploads/2015/06/No.-42-Piers-Wharves-Rafts-Ord-03-21-95.pdf.
24. Wang, L., J. Lyons, P. Kanehl, and R. Bannerman. 2001. “Impacts of Urbanization on Stream Habitat and Fish Across Multiple Spatial Scales.” *Springer Series in Environmental Management* 28 (2): 255-266.
25. Welsch, Jeff L. 1988. *Guide to Wisconsin Aquatic Plants*. Madison, Wisconsin: Wisconsin Department of Natural Resources.
26. Whalley, Kyle. 2016. “The Pressure of Society on Water Quality: A Land Use Impact Study of Lake Ripley in Oakland, Wisconsin.” https://commons.lib.niu.edu/bitstream/handle/10843/21233/Whalley_niu_0162M_12600.pdf?sequence=1.

27. Wisconsin Department of Natural Resources. 1970. “Lake Ripley - Jefferson County.” Wisconsin Lake Maps. https://dnr.wi.gov/lakes/maps/DNR/0809600a.pdf.
28. Wisconsin Department of Natural Resources. 2017. “Wisconsin 2018 Consolidated Assessment and Listing Methodology (WisCALM).” Bureau of Water Quality Program Guidance. https://dnr.wisconsin.gov/topic/SurfaceWater/WisCALM.html.
29. Wisconsin Department of Natural Resources. 2018. “Wisconsin Walleye Initiative.” https://dnr.wi.gov/topic/Fishing/Outreach/walleyeInitiative.html.
30. Wisconsin Department of Natural Resources. 2019. “Trophic State Index Graph.” https://dnr.wi.gov/lakes/clmn/reports/tsigraph.aspx?stationid=283122.

Appendix B - Lake District Authority

Lake District Authority
Operating Authority By-Laws

LAKE DISTRICT AUTHORITY, SCOPE AND CAPACITY

WISCONSIN STATUTORY AUTHORITY

The Lake Ripley Management District is a special-purpose, local unit of government representing and acting on behalf of area property owners to protect and manage Lake Ripley. The District was officially formed in December of 1990 by resolution of the Jefferson County Board. It was established as an Inland Lake Protection and Rehabilitation District under Chapter 33 of the Wisconsin Statutes.

JURISDICTIONAL BOUNDARIES

Lake District boundaries approximate those of the Oakland Sanitary District. They extend just past Highway 18 to the north and Highway 12 to the south, and share a boundary with Kreklow Road to the east and the Dane-Jefferson County line to the west. These jurisdictional boundaries overlap with the western third of the watershed, which drains surface water to the lake. The Lake District incorporates about 10% of the Town of Oakland's total land area, and covers approximately 1,800 acres of land around Lake Ripley. It is completely contained within the Town of Oakland in western Jefferson County, Wisconsin.

GOVERNANCE

A seven-member board of commissioners sets policy and authorizes activities carried out by the Lake District. The board consists of five elected property owners within the District (serving staggered, three-year terms), and two appointed commissioners representing Jefferson County and the Town of Oakland. The Board convenes regular business meetings, usually on a monthly basis, that are noticed and open to the public.

The Annual Meeting of the electors (resident voters) and property owners is held each August, at which time a budget for the next fiscal year is approved and elections are conducted. State law authorizes the Lake District to tax up to a maximum rate of 2.5 mills ($2.50 per $1,000 of equalized valuation) for the purpose of financing its programs and operations. However, since its inception, the Lake District had never exceeded a 0.5 mil rate until 2021. In 2021, the mil rate became 0.5167 because of the increase in the certified value of the property. The mil rate

has been kept low because various grants and donations are routinely secured to supplement local tax dollars to increase management capacity.

A full-time lake manager is retained by the Board to manage the affairs of the Lake District, and to direct its programs and activities. The lake manager also supervises seasonal invasive weed-harvesting staff, and grant-funded, limited term or part-time employees, and oversees the work of any volunteers who may be assisting with project-specific activities.

Operating Authority By-Laws

BY-LAWS

LAKE RIPLEY PROTECTION AND REHABILITATION DISTRICT

PREFACE

In keeping with the resolution of the Jefferson County Board that created the Lake Ripley Inland Lake Protection and Rehabilitation District, the electors of the said Lake Ripley Lake District do adopt these By-laws. The purpose of these By-laws is to define and regulate the activities of the Lake District, its officers, and committees. These By-laws shall at all times be interpreted in a manner consistent with the laws of the State of Wisconsin and Chapter 33 of the Wisconsin Statutes under which the District was created and operates. Sections of the Statutes are cited in brackets throughout these By-laws.

Article I - ELECTORS OF THE DISTRICT

Section 1 - RESIDENTS: Every resident of the District who is registered or eligible to vote in general elections shall be an eligible elector of the District. [Sec. 33.30(2)]

Section 2 - NON-RESIDENT PROPERTY OWNERS: Every person whose name appears on the District assessment role prepared for purposes of real property taxation or who has provided proof of title to real property in the district, and who is a U.S. citizen 18 years of age or older, shall be an eligible elector of the District and may vote in accordance with Article II Section 2. [Sec. 33.01(9) (b)] Any corporation, partnership, or association that owns real property in the District may appoint an official representative who shall be an eligible elector of the District. [Sec. 33.285]

Article II - VOTING

Section 1 - MULTIPLE VOTING: Any elector may cast only one vote on any question called to a vote.

Section 2 - NON-RESIDENT MULTIPLE OWNERS: When more than one person owns a parcel of real property, the joint tenants-in-common shall select no more than two of the co-owners who shall represent them and shall each cast one vote. [Sec. 33.30(3)(g)]

Section 3 - CASTING BALLOTS: An elector must be present at the time the vote is called in order to vote. No elector may vote by proxy or absentee ballot or referendum. All votes shall be counted by a show of hands, unless otherwise specified by Statute or these By-laws.

Article III - ANNUAL MEETING AND BUDGET HEARING

Section 1 - TIME AND PLACE: The annual meeting and budget hearing of the District shall be held between May 22 and September 8 at a time and place selected by the District Board of Commissioners, hereinafter referred to as the Board, unless the date has been set by vote of the previous annual meeting. [Sec. 33.30(1) and 65.90(1)]

Section 2 - NOTICE: A written notice of the annual meeting and budget hearing shall be mailed at least 10 days in advance of the meeting to all property owners whose names appear on the tax roll and to the Department of Natural Resources and the University of Wisconsin Extension. The notice shall be published twice in a paper of general circulation in the area. The first insertion shall be at least 15 days before the meeting and the second insertion shall be the following week, at least 7 days before the meeting. The notice shall include a summary of the proposed budget and the place where the detailed budget is available for public inspection; time, place, and agenda of the annual meeting and budget hearing; the names of nominated candidates; and proposed changes in the By-laws; and any consideration of dissolution.

Section 3 - NOMINATION OF COMMISSIONERS: The board shall nominate candidates to fill all vacancies on the Board. If none of the remaining elected commissioners, whose terms do not expire, are resident electors, then the candidates shall be resident electors. [Sec. 33.28(2)] The suggested number of candidates nominated by the board is the number of vacancies plus one. Any three electors may nominate additional candidates by submitting written nomination papers to the secretary at least 45 days prior to the annual meeting. The names of all nominated candidates shall appear on the written and published notices of the annual meeting. Ballots printed for the election shall provide space for write-in candidates.

Section 4 - ELIGIBILITY OF COMMISSIONERS: The annual meeting can elect any elector to the office of commissioner. [Sec. 33.28(2)(c) and 33.285]

Section 5 - ELECTING COMMISSIONERS: At the first annual meeting, the electors shall elect three commissioners to the Board. The candidates receiving the greatest number of votes shall be elected to a three-year term. The candidate receiving the second greatest number of votes shall be elected to a two-year term. The candidate receiving the third greatest number of votes shall be elected to a one-year term. However, if none of the top three candidates is a resident elector, the resident elector with the most votes among the resident elector candidates shall be elected to a one-year term.

At subsequent annual meetings, the electors shall elect one commissioner to fill the expiring

term on the board. [Sec. 33.30(3)(a)] When a commissioner's term of office has expired, a successor shall be elected to a three-year term. [Sec. 33.28(2)(c)] All elections for the office of commissioner shall be conducted by secret, written ballot. Commissioners shall assume their office immediately following the annual meeting at which they are elected.

Section 6 - ANNUAL BUDGET AND TAX : At the annal meeting and budget hearing, the Board shall present a proposed budget and tax for the coming calendar year. The electors of the District shall approve the budget and vote the taxes proposed or modify the budget and change the funding accordingly. The property tax levy of the District shall not exceed the rate of 2.5 mills of equalized valuation. [Sec. 33.30(3)(c)] [Sec. 65.90(2)] The annual meeting may direct the Board to adopt and collect special charges or special assessments. [Sec. 33.32]

Section 7 - PROJECT APPROVAL: Before approval of the annual budget, the annual meeting shall, by a separate vote, approve each proposed project having a cost the District in excess of $5,000. The annual meeting may also authorize the Board, during the succeeding year until the next annual meeting, to approve or disapprove projects having a cost to the District in excess of $5,000, and to enter into contracts accordingly, subject to the limitations provided in the authorizing resolution. [Sec. 33.30(3)(d)] Votes on projects may be taken by secret written ballot at the discretion of the chairman or chairwoman, hereinafter referred to as the chair.

Section 8 - OTHER BUSINESS: The annual meeting shall take up and consider such other business as comes before it. [Sec. 33.20(2)(e)]

Article IV - POWERS OF THE DISTRICT

Section 1 - GENERAL POWERS OF A BODY CORPORATE : The district may sue and be sued; make contracts; accept gifts; purchase, lease, devise or otherwise acquire, hold, maintain, or dispose of real or personal property; disburse money; contract debt; and do such other acts as are necessary to carry out a program of lake protection and rehabilitation. [Sec. 33.22(1)]

Section 2 - SPECIFIC LAKE MANAGEMENT POWERS: The District may conduct studies, adopt a plan, and carry out implementation work including but not limited to aeration, nutrient diversion, nutrient removal or inactivation, erosion control, sediment manipulation including dredging, bottom treatments, weed and algae control, and water level control. [Sec. 33.13-15]

Section 3 - BOATING, SEAPLANE, AND VEHICLE REGULATIONS: Pursuant to the delegation of authority from all towns, villages, and cities with frontage on the lake, the lake district may adopt ordinances to regulate equipment, use, and operation of watercraft, vehicles on ice-bound lakes, and seaplanes.

Article V - DISTRICT BOARD OF COMMISSIONERS

Section 1 - COMPOSITION: The affairs of the District shall be managed by the Board of

Commissioners which shall consist of five persons. Three shall be elected as provided in Article III Section 5, and one each shall be appointed by the County Board and by the local municipality with the largest portion by valuation within the District. [Sec. 33.28(1)(2) and Sec. 33.33(1)]

Section 2 - OPEN MEETINGS: The Board shall meet at least quarterly, and at other times on the call of the chair or the request of three of the commissioners. [Sec. 33.28(6)] Meetings shall be open and proper notice given in accordance with legislation governing meetings of public bodies. [Sec. 10.81-98]

Section 3 - QUORUM: Four commissioners shall constitute a quorum for the transaction of business. [Sec. 33.28(3)] A majority of the commissioners plus one shall be present to borrow money.

Section 4 - VACANCY: Vacancies of the board caused by death or resignation of an elected commissioner shall be filled by the chair. The appointment for the remainder of the unexpired term shall be subject to approval by a majority vote of the board. [Sec. 33.28(7)] The commissioner appointed by the county and the commissioner appointed by the town, village, or city shall serve at the pleasure of those bodies, who are responsible for filling vacancies in those positions.

Section 5 - FUNCTION: The Board shall conduct all business of the District not specifically reserved to the electors of the District, shall carry out the provisions of these By-laws and Chapter 33 of the Wisconsin Statutes, and shall carry out the mandates of the annual meeting and special meetings, if any. [Sec. 33.29(2)]

Section 6 - OFFICERS: At the first Board meeting immediately following each annual meeting of the District, the Board shall elect its chair, secretary, and treasurer from among its members. [Sec. 33.29(3)]

1. The chair shall preside at the annual and special membership meetings, all meetings of the Board and all public hearings held by the Board. [Sec. 33.29(3)(a)]

2. The secretary shall keep minutes of all membership and Board meetings of the District and hearings held by it, shall maintain a file of the names and addresses of electors of the district as defined in Article I, and shall annually provide the University of Wisconsin Extension (College of Natural Resources, UW-Stevens Point 54481) with names and addresses of commissioners, and by copy of said list shall annually notify the Department of Natural Resources (Lake Management Section, Bureau of Water Resources Management, DNR, Box 7921, Madison WI 53707) of the continued existence of the District. [Sec 33.29(3)(b)]

3. The treasurer shall receive and take charge of all moneys of the District and pay out the same only on order of the Board. [Sec. 33.29(3)(c)]

Section 7 - COMPENSATION: The commissioners shall receive no remuneration for their

service in office, but a commissioner shall be paid for actual and necessary expenses incurred while conducting the business of the District. [Sec. 33.28(5)]

Section 8 - POWERS AND DUTIES: The Board shall be responsible for:

1. Initiating and coordinating research and surveys for the purpose of gathering data on the lake, related shorelands, and the drainage basin. [Sec. 33.29(1)(b)]

2. Planning lake rehabilitation projects. [Sec. 3329(1)(b)]

3. Contacting and attempting to secure the cooperation of units of general-purpose government in the area for the purpose of enacting ordinances deemed necessary by the Board to further the objectives of the District. [Sec. 33.29(1)(c)]

4. Adopting and carrying out lake protection plans and obtaining any necessary permits therefor. [Sec. 33.29(1)(d)]

5. Maintaining liaison with those officials of state government involved in lake protection and rehabilitation. [Sec. 33.29(1)(e)]

6. Implementing the decisions of the electors at the annual and special meetings. [Sec. 3329(2)]

The board shall have control over the fiscal matters of the District, subject to the powers and directives of the annual meeting. [Sec. 33.29(2)] Subject to the decisions of the annual meeting, the Board may borrow money or use any other financing method prescribed by law. [Sec. 33.31] The Board may use special assessment or special charges for the purpose of carrying out District protection and rehabilitation projects, or for other lake management activities undertaken by the District. [Sec. 33.32] The Board may exercise its authority to borrow money when in temporary need. [Sec. 33.31(2)]

Article VI - PUBLIC BIDDING

Section 1 - LOW BID: All contracts exceeding $2,500 for work or materials shall be let by the Board to the lowest responsible bidder. [Sec. 33.22(1)] The manner of soliciting bids and the determination of the responsibleness of the bidder shall be at the discretion of the Board. The procedures for public works under Sec. 66.29 shall be utilized to the extent feasible for large-scale projects. If a bid is accepted which exceeds any other bid by more than 20 percent, the Board must provide written justification for its action to the next annual meeting.

Section 2 - SECURITY BOND: The Board shall require that every contracting party in contracts exceeding $5,000 give adequate performance and liability security at the time the party submits his/her bid. [Sec. 33.22(2)]

Section 3 - CONFLICT OF INTEREST: Any commissioners shall abstain from voting on any matter before the Board in which they, as private people, or in which any member of their immediate families (spouse, parent, or child), have a financial interest.

Article VII - COMMITTEES

Section 1 - ELECTIONS: The chair shall appoint three electors who are not running for the office of commissioner to serve as the elections committee. The committee shall distribute, collect, and count the ballots at the annual meeting and report the results to the annual meeting.

Section 2 - AUDITING: The chair shall appoint three electors to serve as the auditing committee. The committee shall examine all financial records of the District and report its conclusions to the annual meeting.

Section 3 - OTHER COMMITTEES: The chair may appoint other committees deemed necessary to further the interests of the District.

Section 4 - REPORTING: All committees shall report to the chair or the Board upon request and to the annual meeting.

Section 5 - COMPENSATION: Committee members shall receive no remuneration for service to the District. With prior approval from the Board, committee members may submit vouchers for actual and necessary expenses incurred while conducting the business of the District.

Section 6 - TERMS OF MEMBERS: All committee members shall serve at the pleasure of the chair and may be replaced on an annual basis.

Article VIII - MISCELLANEOUS PROVISIONS

Section 1 - SPECIAL MEETINGS: Special meetings of the District may be held for the purpose of transacting any lawful business which might be done at the annual meeting except approval of the annual budget, amendment of by-laws, or dissolution of the district. Amendments to the annual budget may be considered. The meetings may be called by a written request to the secretary signed by at least 10 percent of the qualified electors of the District. The annual meeting notice under Article III shall apply and the purpose of the meeting shall be stated. A matter voted upon at any special meeting may not be reconsidered at another special meeting prior to the next annual meeting. [Sec. 33.305]

Section 2 - CONDUCT OF MEETINGS: All meetings of the District shall be conducted

according to Roberts Revised Rules of Order unless contrary to the requirements of these By-laws. The chair, or a person appointed by the chair, shall serve as parliamentarian.

Section 3 - ADOPTION OF BY-LAWS: These By-laws may be adopted at any legal annual meeting of the District providing the proposed adoption was included in the notice. Adoption shall require a two-thirds vote of the voting electors, as defined herein, present at the meeting. The By-laws shall become effective immediately upon passage.

Section 4 - AMENDING BY-LAWS: By-law changes may be proposed by a majority of the commissioners or a majority vote of the previous annual meeting. These By-laws may be amended at any legal annual meeting of the District providing the proposed change was included in the notice. Amendments shall require a two-thirds vote of the electors present and voting at the meeting.

Section 5 - DISSOLUTION: A proposal to dissolve the District under Sec. 33.35 may be made by a unanimous vote of the commissioners or a written notification from an elector at least 90 days prior to the annual meeting indicating an intent to seek dissolution. The proposal for dissolution shall be included in the notice. The petition to the County Board to dissolve the District shall require a two-thirds vote of the electors present and voting at the annual meeting.

CERTIFICATION

These By-laws were adopted by way of a vote at the annual meeting on this 15th day of August, 2020.

BY-LAW AMENDMENTS APPROVED AT ANNUAL MEETINGS:

8-20-94: Expansion of the Board of Commissioners from five to seven members.

8-16-97: Language of Article III, Section 5, paragraph 2 changed to read: “they shall elect commissioners (delete the word “one” and make plural the word “commissioner”) to fill expiring terms on the Board.

8-22-98: Approval of $50/meeting stipend for Board members.

8-17-02: Approval of an additional $100/month stipend for the chairman and treasurer.

8-15-20: Language of Ch. 33.30(4)(c). changed to read: "board commissioners may receive a stipend", deleting the word “shall” and replacing it with “may” to make the choice optional.

8-15-20: Expansion of the Board of Commissioners for a quorum from three to four members.

8-15-20: Approval of adding language to 33.30(5)(f) regarding a tie for a contested seat.The added language will read: “In the event of an exact tie for a contested seat, and after the

procedures for recounts have been either voluntarily forfeited or exhausted, a member of the election committee will flip a coin to determine the winner or the seat. In a tie where there are more than two tied candidates for one seat, a member of the election committee will have the candidates draw straws with long straw winning the seat. If either of these becomes necessary as outlined under this paragraph, the secretary shall note the action in the meeting minutes."

Last updated 10/1/2020

Updated by: L.S.

[Addendum 1: Chapter 33, Wisconsin Statutes and Addendum 2: Wisconsin Open Meetings Laws can be found online on our website: www.lakeripley.org]

Appendix C - Town of Oakland Ordinances

Town of Oakland Ordinances

ORDINANCE NO. 2

AN ORDINANCE TO CONFIRM THE CURRENT STATUS OF THE ORDINANCE REGULATING TRAFFIC, BOATING, AND WATER SPORTS UPON THE WATERS OF LAKE RIPLEY, AND PRESCRIBING PENALTIES FOR VIOLATIONS THEREOF BY COMBINING ALL AMENDMENTS TO DATE IN ONE DOCUMENT

WHEREAS, Ordinance #2 of the Town of Oakland, which regulates traffic, boating and water sports upon the waters of Lake Ripley, currently consists of an Ordinance passed on May 19, 1987, and seven amendments thereto; and

WHEREAS, having the regulations stated in so many different documents makes such regulations confusing and difficult to follow; and

WHEREAS, it is in the interest of the Township and the general public that such regulations be as clear and easy to follow as possible;

WHEREAS, portions of the ordinance had become outdated and needed to be brought up to date with the current Wisconsin statutes;

NOW, THEREFORE, the Town Board of the Town of Oakland hereby passes the following Ordinance, which deletes Section 9.A of the current ordinance relating to public boat launch hours (and renumbers Section 9 thereafter), amends Section 16 thereof to conform to current statutory regulations, and then combines the current Ordinance #2 and all amendments thereto, including current amendments, as of this date into one document.

The Town Board of the Town of Oakland, Jefferson County, Wisconsin, DO ORDAIN as follows:

SECTION 1. INTENT. The intent of this ordinance is to provide safe and healthful conditions for the enjoyment of aquatic recreation consistent with public rights and interest and the capability of the water resource.

SECTION 2. APPLICABILITY AND ENFORCEMENT. The provisions of this ordinance shall apply to the waters of Lake Ripley within the jurisdiction of the Town of Oakland. The provisions of this ordinance shall be enforced by the officers of the Water Safety Patrol or local enforcement officers in the Town of Oakland, Jefferson County, Wisconsin.

SECTION 3. STATE BOATING AND WATER SAFETY LAWS ADOPTED: The statutory provisions describing and defining regulations with respect to water traffic, boats,

boating and related water activities and safety in the following enumerated sections of the Wisconsin Statutes exclusive of any provisions therein relating to the penalties to be imposed or the punishment for violation of said statutes are hereby adopted and by reference made a part of this ordinance (2003-2004 and as later amended).

s. 30.50	Definitions
s. 30.51	Operation of unnumbered boats prohibited; exemptions
s. 30.52	Certificates of number; applications; issuance; renewals
s. 30.523	Identification number to be displayed on boat; certificate to be carried
s. 30.531	Certificate of title; requirements; exemptions
s. 30.541	Transfer of ownership of numbered boat
s. 30.543	Notice of abandonment; destruction of boats; change of address
s. 30.60	Classification of motorboats
s. 30.61	Lighting equipment
s. 30.62	Other equipment
s. 30.63	Sale and use of certain outboard motors restricted
s. 30.635	Motorboat prohibition
s. 30.64	Patrol boats exempt from certain traffic regulations
s. 30.65	Traffic rules
s. 30.66	Speed restrictions
s. 30.67	Accidents and accident reports
s. 30.675	Distress signal flag
s. 30.68	Prohibited operation
s. 30.681	Intoxicated boating
s. 30.682	Preliminary breath screening test
s. 30.683	Implied consent
s. 30.684	Chemical tests
s. 30.686	Report arrest to department
s. 30.687	Officer's action after arrest for violating intoxicated boating law.
s. 30.69	Water skiing
s. 30.70	Skin diving
s. 30.71	Boats equipped with toilet

SECTION 4. DEFINITIONS IN THIS ORDINANCE

A. "Buoyed Restricted Area A." Area A is defined as the surface waters in the Southeast corner of Lake Ripley, with the Northern boundary of the restricted area along a straight

line from point A on the West at approximately the South Line of Parcel #06-13-08-34 where it meets the Lake as described in Vol. 526, Page 14, to point B at approximately the South Line of Parcel #06-13-08-41-013 where it meets the Lake as described in Vol. 334, Page 219, on the East shore of Lake Ripley. The restricted area lies South of this boundary line. (Amended July 17, 1990)

Amn: "Buoyed Restricted Area C". Area C is defined as the surface waters in the south bay of Lake Ripley lying south of an east-west line connecting the point where the south boundary line of parcel 022-0613-0833-001 intersects with Lake Ripley and the point where the south boundary line of Parcel 022-0613-0743-025 intersects with Lake Ripley. (Amended January 17, 2006)

B. "Swimming Zone" means an authorized area marked by regulatory markers to designate a swimming area.

C. "Designated Anchorage" means an area of water established and marked as an anchorage by lawful authority.

D. "Public Access" means any access to the water by means of public property.

E. "Navigation Lane" means an area designated by authorized aids to navigation.

F. "Slow-No-Wake" means the slowest possible speed to as so maintain steerage.

SECTION 5. ADDITIONAL SPEED RESTRICTIONS.

A. No person shall operate a motor boat in a buoyed restricted area at a speed in excess of slow-no-wake speed. (Created July 17, 1990)

B. No person shall operate a motor boat faster than slow-no-wake between the hours of 7:30 p.m. and 11:00 a.m. on Lake Ripley; provided that this provision shall not apply to motor boats participating in duly authorized races over a course laid out and plainly marked and adequately patrolled. (Amended July 17, 1990)

C. No person shall operate a motor boat within two hundred feet (200') of any part of the shoreline of Lake Ripley at a speed in excess of slow-no-wake speed at any time. (Created January 17, 1990)

SECTION 6. ADDITIONAL PROHIBITED OPERATIONS.

Intoxicated Passenger. No person shall permit an individual who is intoxicated or under the influence of an intoxicant or a controlled substance so as to be unable to provide for his own safety to be a passenger in a boat operated by that person except in cases of emergency.

SECTION 7. HOURS OF WATER SKIING. Except as provided in s. 30.69(b), Wis. Stats., no person may engage in water skiing, aquaplane or similar activity at any time from 7:30 p.m. to 11:00 a.m. Central Daylight Saving Time on any date. No personal shall engage in water-skiing, aquaplaning or similar activity without wearing a personal flotation device.

SECTION 8. SWIMMING REGULATIONS.

A. No person shall swim from an unmanned boat.

B. No person shall swim more than 200 feet from the shore unless in a designated swimming zone or when accompanied by a competent person in a boat.

C. No persons shall swim more than 200 feet from the shoreline between sunset and sunrise.

D. Snorkel limitation-it shall be unlawful to swim with a snorkel except in designated swimming areas or when complying with s. 30.70 of the Wisconsin Statutes.

SECTION 9. LAUNCHING AND REMOVAL FEE. [Pursuant to Sec. 30.77(3)(b), Wis. Stats.]

A. Launch fees:

1. No person shall use said public boat launching ramp from May 1 through September 30 without paying the required launching and removal fee as follows:

Daily permit fee:	$ 7.00
Yearly permit fees:	
Oakland Property Owner or Resident	$20.00
Age 65 or Older	$20.00
Non-Resident	$30.00
Replacement Permit	$10.00

(Amended March 30, 2006)

2. All persons shall display a permit sticker evidencing payment of such fees. (Created July 7, 1994)

3. Permit stickers shall be available at locations designated by the Town Board from time to time. (Created July 7, 1994)

4. Penalties. Any person failing to display a valid permit sticker shall pay a forfeiture in the amount of $25.00. (Created July 7, 1994)

B. Power-Loading. No person shall use a motor while loading and unloading boats and personal watercraft from trailers at public boat launch ramp. (Created May 18, 1999)

C. Restrictions and Prohibitions: No person shall use the public boat launching ramp or surrounding area for purposes of fishing or swimming, nor shall any person loiter in said area. (Created April 18, 1995)

SECTION 10. HOUSEBOATS. Anchoring, drifting or mooring of houseboats is prohibited from 12:00 midnight to sunrise. However, unoccupied houseboats may be moored at a buoy authorized by this ordinance or moored to shore during this period with written permission of the property owner or buoy owner. A houseboat is defined as a boat on which a toilet or food preparation exists or on which persons are living, sleeping or camping.

SECTION 11. RAFTS AND PLATFORMS: No person shall place or maintain any raft more than 150 feet from the shore. No person shall place or maintain any raft within the 150 foot line unless it is so anchored that it has at least 6 inches of free board above the waterline, painted white and has attached thereto not less than 12 inches from each corner or projection a red reflector not less than 3 inches in diameter.

SECTION 12. RACES, REGATTAS, SPORTING EVENTS OR EXHIBITIONS.

A. Permit Required. No person shall direct or participate in any boat race, regatta, water ski meet or other water sporting event or exhibition unless such event has been authorized by the Town of Oakland.

B. A permit issued under this section shall specify the course or area of water to be used by participants in such event and the permittees shall be required to place markers, flags, or buoys designating the specified areas. Permits shall be issued only if in the opinion of the Town Board of the Town of Oakland the proposed use of the water can be carried out safely and without danger to or substantial obstruction of other watercraft or persons using the lake.

C. Right of Way Participants. Boats and participants in any such permitted event shall have the right of way on the marked area and no other person shall obstruct such area during the race or event or interfere therewith.

SECTION 13. REGULATION OF PLACEMENT AND NUMBER OF BUOYS.

A. No person shall place a buoy in Lake Ripley without express approval from the Town Board of the Town of Oakland.

B. All buoys placed in the lake shall conform to the State Uniform Marking System as set forth by the DNR.

C. It shall be illegal for anyone to molest or in any way interfere with posted buoys marking any areas.

SECTION 14. OPERATION OF AIRCRAFT PROHIBITED. (Pursuant to authority granted under s. 30.78 Wis. Stats.) No person shall operate an aircraft on or from the surface of Lake Ripley except in case of emergency, or except by special permission of the Town Board of Oakland. Such permission shall not be given for commercial purposes, such as where a charge is made to take passengers up for rides.

SECTION 15. LITTERING WATERS AND ICE PROHIBITED. No person shall deposit, place or throw from shore, any boat, raft, pier, platform or similar structure any cans, bottles, debris, refuse, garbage, solid or liquid waste, sewage or effluent into the water of Lake Ripley or upon the ice when formed.

SECTION 16. PENALTIES. Forfeitures for violations of any boating regulation set forth in the Wisconsin Statutes and adopted by reference in this ordinance shall conform to the forfeiture penalty permitted to be imposed for violations of the comparable Wisconsin Statute, including any variations or increases for subsequent offenses; provided, however, that this section shall not be construed to permit prosecution under this ordinance for any offense described in sections 30.50 through 30.71, Wis. Stats., for which an imprisonment penalty or fine is required to be imposed upon the defendant. In default of payment of the forfeiture and costs of prosecution, the defendant who is eighteen (18) years of age or older may, upon order of the court, be confined to the county jail until such forfeiture and costs are paid, but not to exceed 90 days.

SECTION 17. EACH DAY A SEPARATE VIOLATION. Each day in which a violation of any of the following sections exists shall constitute a separate offense: Section 10, 11, 12, 13 or 16.

SECTION 18. MONEY DEPOSITS: Any officer arresting a person for violation of a provision of the ordinance who is unable to bring the person arrested before the Municipal Judge or a Circuit Court without unnecessary delay shall permit such person to make a money deposit as provided in sec. 800.02, Wis. Stats. Such deposits shall be made to the Town of Oakland Police Headquarters or other designated office.

SECTION 19. REPEAL OF CONFLICTING ORDINANCES. All conflicting ordinances regulating boating, traffic, buoys, or water skiing on Lake Ripley, Town of Oakland, Jefferson County, Wisconsin, heretofore enacted by the Town Board of the Town of Oakland are hereby repealed.

SECTION 20. EFFECTIVE DATE. This Ordinance shall be effective upon passage and publication.

TOWN BOARD, by:

_____
Vernon T. Davis, Town Chairman

Attest:

_____
Veronica Heenan, Town Clerk

Passed: _____

Vote:

Ayes: _____ Noes: _____

Posted: _____

Published: _____, 2006.

ORDINANCE NO. 2

AN ORDINANCE TO AMEND ORDINANCE REGULATING TRAFFICE, BOATING, WATERSPORTS UPON THE WATERS OF LAKE RIPLEY, IN THE TOWN OF OAKLAND

The Town Board of the Town of Oakland, Jefferson County Wisconsin, DO ORDAIN that Ordiance Number 2 of the Town of Oakland is hereby amended to read as follows:

Section 5 D.

During periods of high water that cause conditions threatening public health, safety, welfare and/or property, the Town Chair, or his or her designee, may declare the entire surface area of Lake Ripley as a slow-no-wake zone during periods of abnormally high water that cause conditions threatening public health, safety, welfare and /or safety, welfare and/or property. Such declaration is advised when water levels reach an elevation of 836.78 feet above mean sea level (1.7 on the permanent gauge located at W9073 Ripley Rd.), or at the Town Chair's discretion. The emergency rule shall remain in effect for such time as necessary, and shall be lifted by declaration of the Town Chair, or his or her designee, as soon as threatening conditions pass. Such declaration shall be effective upon the posting thereof at the two boat launches on Lake Ripley, i.e., the public boat launch and the launch at the marina.

Dated this day of September, 2009.

The Town Board DO FURTHER ORDAIN that this Ordinance shall be effective upon adoption, publication and erection of signs as provided by law.

TOWN OF OAKLAND By:

_____

CHAIRMAN

Passed: September 18, 2007

Vote: Ayes: 5 Nayes: 0

Published: September 24, 2009

**AN ORDINANCE TO AMEND SECTIONS 4.A., 4.AMN., AND 5.C.
OF ORDINANCE NO. 2
REGULATING TRAFFIC, BOATING, AND WATER SPORTS
UPON THE WATERS OF LAKE RIPLEY,
AND PRESCRIBING PENALTIES FOR VIOLATIONS THEREOF**

The Town Board of the Town of Oakland, Jefferson County, Wisconsin, DO ORDAIN that Ordinance No. 2 of the Town of Oakland is hereby amended as follows:

FIRST: All references to the "public launching ramp", the "public boat launch ramp" or similar phrases in this Ordinance shall be amended to refer to the "public launching area". In addition, all references to "boats" herein shall include by reference and definition all types of watercraft.

SECOND: Sections 4.A., 4.Amn, and 5.C. of the Ordinance shall be repealed and recreated to read as follows:

.

SECTION 4. DEFINITIONS IN THIS ORDINANCE

A. "East/Milwaukee Bay Buoyed Restricted Area" (formerly referred to in Town Ordinances as "Buoyed Restricted Area A."). "East/Milwaukee Bay Restricted Area" is defined as the surface waters in the Southeast corner of Lake Ripley lying southerly of the boundary line depicted by the white buoys #1-8 on the map attached hereto and incorporated herein by reference as Exhibit A. This area is referred to as "East/Milwaukee Bay" on such map and the GPS coordinates for said white buoys are as follows:

White Buoy 1 – 42.9964, -88.9857
White Buoy 2 – 42.9965, -88.9852
White Buoy 3 – 42.9966, -88.9844
White Buoy 4 – 42.9967, -88.9837
White Buoy 5 – 42.9969, -88.9831
White Buoy 6 – 42.9969, -88.9824
White Buoy 7 – 42.9970, -88.9817
White Buoy 8 – 42.9972, -88.9809

Amn. "South/Marina Bay Buoyed Restricted Area" (formerly referred to in Town Ordinances as "Buoyed Restricted Area C"). "South/Marina Bay Buoyed Restricted Area" is defined as the surface waters in the south bay of Lake Ripley lying southerly of the boundary line depicted by the red buoys #1-6 on the map attached hereto and incorporated herein by reference as Exhibit A. This area is referred to as "South/Marina Bay" on such map and the GPS coordinates for said red buoys are as follows:

Red Buoy 1 – 42.9959, -88.9961
Red Buoy 2 – 42.9959, -88.9953
Red Buoy 3 – 42.9959, -88.9945
Red Buoy 4 – 42.9959, -88.9937
Red Buoy 5 – 42.9958, -88.9930
Red Buoy 6 – 42.9958, -88.9922

SECTION 5. ADDITIONAL SPEED RESTRICTIONS

C. No person shall operate a motorized watercraft within two hundred feet (200') of any part of the shoreline of Lake Ripley at a speed in excess of slow-no-wake speed at any time. The buoys for such two hundred feet (200') limit are shown in yellow (#s 1-6) on the map attached hereto and incorporated herein as Exhibit A. The GPS coordinates for said no wake buoys are as follows:

Yellow Buoy 1 – 42.9984, -88.9879
Yellow Buoy 2 – 42.9986, -88.9982
Yellow Buoy 3 – 43.0073, -88.9994
Yellow Buoy 4 – 43.0062, -88.9908
Yellow Buoy 5 – 43.0020, -88.9866
Yellow Buoy 6 – 42.9996, -88.9828

All other provisions of Ordinance No. 2 not inconsistent herewith shall remain the same.

The Town Board DO FURTHER ORDAIN that this Ordinance shall be effective upon its adoption and publication.

Dated this ____day of _____, 2016.

TOWN OF OAKLAND, By:

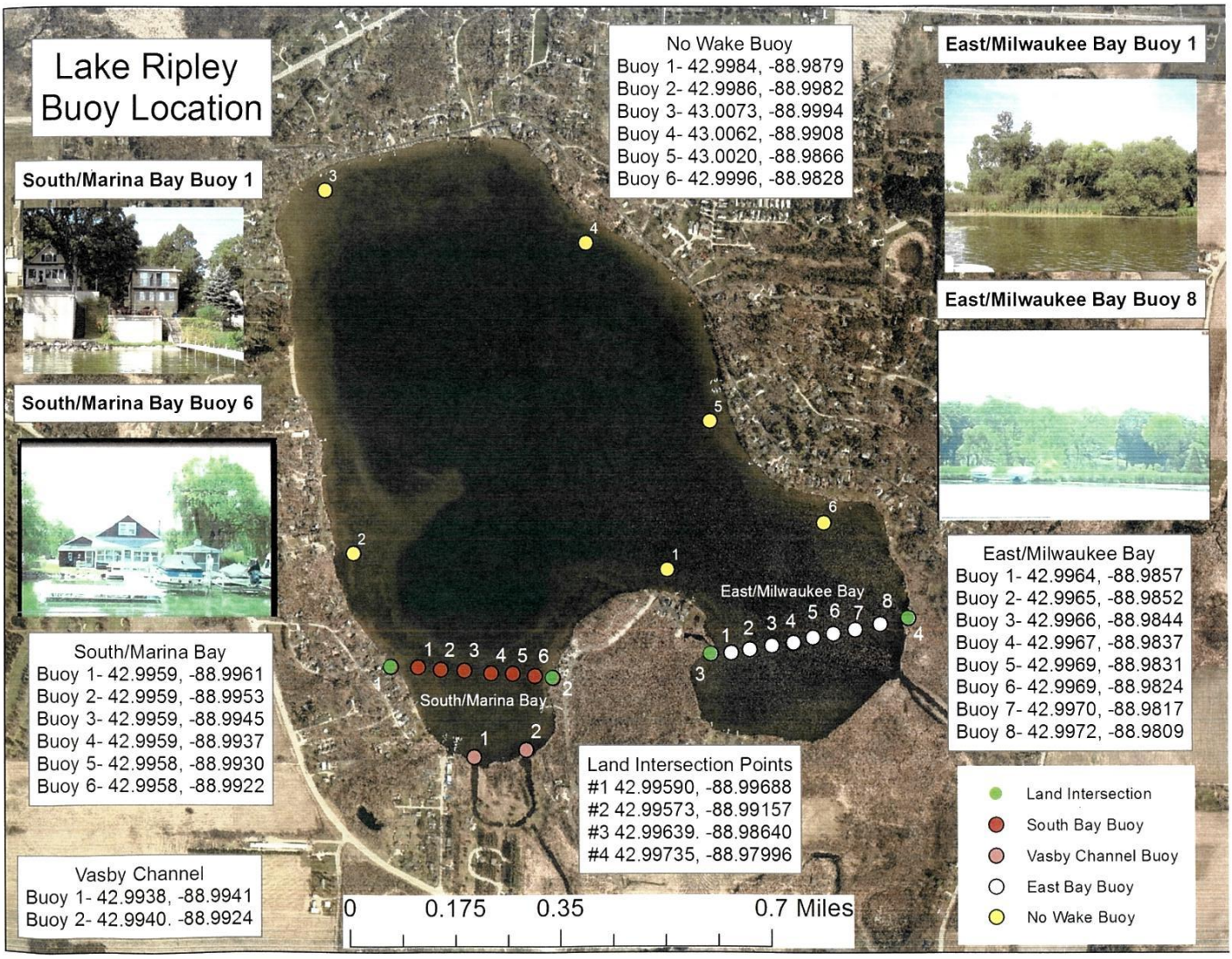
_____
Chairman

Attest:

_____
Town Clerk

Passed: _____
Vote:
Ayes: _____ Nayes:_____

Published:_____


Lake Ripley
Buoy Location
South/Marina Bay Buoy 1
South/Marina Bay Buoy 6
No Wake Buoy
Buoy 1- 42.9984, -88.9879
Buoy 2- 42.9986, -88.9982
Buoy 3- 43.0073, -88.9994
Buoy 4- 43.0062, -88.9908
Buoy 5- 43.0020, -88.9866
Buoy 6- 42.9996, -88.9828
East/Milwaukee Bay Buoy 1
East/Milwaukee Bay Buoy 8
East/Milwaukee Bay
Buoy 1- 42.9964, -88.9857
Buoy 2- 42.9965, -88.9852
Buoy 3- 42.9966, -88.9844
Buoy 4- 42.9967, -88.9837
Buoy 5- 42.9969, -88.9831
Buoy 6- 42.9969, -88.9824
Buoy 7- 42.9970, -88.9817
Buoy 8- 42.9972, -88.9809
South/Marina Bay
Buoy 1- 42.9959, -88.9961
Buoy 2- 42.9959, -88.9953
Buoy 3- 42.9959, -88.9945
Buoy 4- 42.9959, -88.9937
Buoy 5- 42.9958, -88.9930
Buoy 6- 42.9958, -88.9922
Vasby Channel
Buoy 1- 42.9938, -88.9941
Buoy 2- 42.9940. -88.9924
Land Intersection Points
#1 42.99590, -88.99688
#2 42.99573, -88.99157
#3 42.99639. -88.98640
#4 42.99735, -88.97996
East/Milwaukee Bay
South/Marina Bay
Land Intersection
South Bay Buoy
Vasby Channel Buoy
East Bay Buoy
No Wake Buoy
0
0.175
0.35
0.7 Miles

AN ORDINANCE TO AMEND ORDINANCE NO. 3
PROHIBITING THE USE OF BOATS BEING PROPELLED BY MOTORS
IN THE MAN-MADE CHANNEL AREA OF LAKE RIPLEY
AND TO PROHIBIT ENTIRELY THE USE OF MOTORBOATS
ON RED CEDAR LAKE AND HOPE LAKE

The Town Board of the Town of Oakland, Jefferson County, Wisconsin, DO ORDAIN that Ordinance No. 3 of the Town of Oakland is hereby amended as follows:

FIRST, the title of the Ordinance shall be amended to read as follows:

ORDINANCE NO. 3

AN ORDINANCE PROHIBITING THE USE OF WATERCRAFT BEING PROPELLED BY MOTORS IN THE MAN-MADE CHANNEL AREA OF LAKE RIPLEY AND TO PROHIBIT ENTIRELY THE USE OF MOTORIZED WATERCRAFT ON RED CEDAR LAKE AND HOPE LAKE

SECOND, the entire Ordinance shall be amended such that all references to "a boat", "boat", or "boats" in this Ordinance shall be replaced with the word "watercraft". In addition, all references in the Ordinance to "motorboat" or "a motorboat" shall be replaced with the phrase "motorized watercraft".

THIRD, Section 1(B) of said Ordinance shall be repealed entirely and recreated to read as follows:

SECTION 1.

(B) No person shall operate any watercraft while such is being propelled by a motor in the man-made channel of Lake Ripley, commonly known as the Vasby Channel and located in the South/Marina Bay area of such Lake, such channel being located in the Town of Oakland, Jefferson County, Wisconsin, and depicted on the map attached hereto and incorporated herein by reference as Exhibit A. The two buoys at the entrances to such channel are shown in pink on such map and have GPS co-ordinates as follows:

Pink Buoy 1 – 42.9938. -88.9941
Pink Buoy 2 – 42.9940. -88.9924

All other provisions of Ordinance No. 3 not inconsistent herewith shall remain the same.

Signatures and Passage & Publication Information Only

The Town Board DO FURTHER ORDAIN that this Ordinance shall be effective upon its adoption and publication.

Dated this ____day of _____, 2017.

TOWN OF OAKLAND, By:

_____
Chairman

Attest:

_____
Town Clerk

Passed: _____
Vote:
Ayes: _____ Nayes:_____

Published:_____

ORDINANCE NO. 3

AN ORDINANCE AMENDING ORDINANCE NO. 3
TO PROHIBIT THE USE OF BOATS BEING PROPELLED BY MOTORS
IN THE MAN-MADE CHANNEL AREA OF LAKE RIPLEY
AND TO PROHIBIT ENTIRELY THE USE OF MOTORBOATS
ON RED CEDAR LAKE AND HOPE LAKE

The Town Board of the Town of Oakland, Jefferson County, Wisconsin, DO ORDAIN as follows:

The introductory provision and Sections 1 and 2 of Ordinance No. 3 of the Town of Oakland are hereby amended to read as follows:

For the purpose of promoting the public health and safety and to preserve the natural environment, fish life, birds and other wildlife inhabiting the Red Cedar Lake and Hope Lake areas, as well as the area of the man-made channel of Lake Ripley, commonly known as the Vasby Channel and located in the Marina Bay area of such lake, being a part of the SE ¼ of Sec.7, T6N, R13E and the SW ¼ of Sec. 8, T6N, R13E, the Town Board of the Town of Oakland, Jefferson, Wisconsin, DO ORDAIN as follows:

Section 1:

(A) No person shall operate a motorboat on Red Cedar Lake or on Hope Lake, both being located in the Town of Oakland, Jefferson County, Wisconsin.

(1.) It is the intention of this ordinance to prohibit the use of any motorboat on Red Cedar Lake and on Hope Lake, whether it has an inboard or outboard motor, an electric, gasoline or other type motor and also to prohibit air boats or any other motor driven boats on Red Cedar Lake and Hope Lake, and regardless of whether or not the motor is actually in use at the time.

(2.) It is the intention of this ordinance that only boats propelled by persons paddling or rowing them shall be used on Red Cedar Lake and Hope Lake.

(B) No person shall operate a boat while such is being propelled by a motor in the man-made channel of Lake Ripley, commonly known as the Vasby Channel and located in the Marina Bay area of such Lake, such channel being located in the Town of Oakland, Jefferson County, Wisconsin.

(1.) It is the intention of this ordinance to prohibit the use of any boat while such is being propelled by a motor, whether such boat has an inboard or outboard motor or an

electric, gasoline, or other type motor, and also to prohibit air boats or any other boats while being propelled by a motor, in the man-made channel of Lake Ripley, described above.

(2.) It is the intention of this ordinance that only boats propelled by persons paddling or rowing them shall be used in the man-made channel of Lake Ripley, described above. A motorboat with its motor not in use may be operated in such channel.

Section 2:

Each starting of the operation of a motorboat on Red Cedar Lake or Hope Lake, and each operation of a boat while being propelled by a motor in the man-made channel of Lake Ripley, described above, shall be considered a separate offense under this ordinance, and each separate period of time of five minutes duration of continually operating a motorboat on Red Cedar Lake or Hope Lake or of operating a boat while being propelled by a motor in the man-made channel of Lake Ripley, described above, shall be deemed a separate violation of this ordinance.

All other sections of Ordinance No. 3 of the Town of Oakland shall remain the same.

This amendment to Ordinance No. 3 of the Town of Oakland shall take effect and be in force from and after its passage and publication and/or posting.

Dated this 18th day of March, 1996.

TOWN OF OAKLAND, by:

Raymond Hess
Chairman

Attest:

Linda K. Dieckhoff
Town Clerk

Passed: March 18, 1996

Vote:
Ayes: 3 Noes: 0

Published: March 28 1996.

NO 3

ORDINANCE NO. 3

AN ORDINANCE PROHIBITING THE USE OF MOTOR BOATS ON RED CEDAR LAKE AND HOPE LAKE

The Town Board of the Town of Oakland, Jefferson County, Wisconsin, DO ORDAIN as follows:

Ordinance No. 4 of the Town of Oakland is hereby repealed in its entirety. Ordinance No. 3 of the Town of Oakland is hereby repealed and recreated to read as follows:

For the purpose of promoting the public health and safety and to preserve the natural environment, fish life, birds and other wildlife inhabiting the Red Cedar Lake and Hope Lake area, the Town Board of the Town of Oakland, Jefferson County, Wisconsin, DO ORDAIN as follows:

Section 1:

No person shall operate a boat propelled by any motor on Red Cedar Lake or Hope Lake located in the Town of Oakland, Jefferson County, Wisconsin.

revised 3-18-96

(A) It is the intention of this ordinance to prohibit the use of any motor driven boat whether it have an inboard or outboard motor, an electric, gasoline or other type motor and also to prohibit air boats or any other motor driven boat on Red Cedar Lake or Hope Lake.

(B) It is the intention that only boats propelled by persons paddling or rowing them shall be used on Red Cedar Lake or Hope Lake.

Section 2:

revised 3-18-96

Each starting of the operation of a motor driven boat on Red Cedar Lake or Hope Lake shall be considered a separate offense under this ordinance and each separate period of time of five minutes duration of continually operating a motor driven boat on Red Cedar Lake or Hope Lake shall be deemed a separate violation of this ordinance.

Section 3:

Any person, firm, or corporation violating this ordinance shall be subject to a forfeiture of not less than $10 nor more than $50 for the first offense and for the second offense and each subsequent offense thereafter a

forfeiture of not less than $20 nor more than $50 together with the costs of prosecution thereof.

Section 4:

In the event any portion of this ordinance shall be held to be invalid by Judgment or Court Order, it is the intention of this Board to have the other provisions remain in full force and effect. The invalidation of one portion of this ordinance shall, therefore, not affect the validity of the entire ordinance.

Section 5:

This ordinance shall take effect and be in force from and after its passage and publication and/or posting.

Dated this 18th day of April, 1989.

TOWN BOARD, by:

Raymond C. Veeck
Town Chairman

Attest:

Evelyn J. Vreeland
Town Clerk

Passed: 4/18/89

Vote:

Ayes: 3 Noes: 0

Published: April 27, 1989.
Cambridge News

ORDINANCE NO. 4

AN ORDINANCE TO REGULATE FISHING AND HUNTING
IN THE TOWN OF OAKLAND.

The Town Board of the Town of Oakland, Jefferson County, Wisconsin, DO ORDAIN as follows:

SECTION 1. ADOPTION OF PROVISIONS OF CHAPTER 29, WIS. STATS.

The provisions of Chapter 29 of the Wisconsin Statutes, relating to fish and game, are hereby adopted and incorporated by reference so far as applicable and exclusive of penalty except as otherwise lawfully provided by Town Ordinance.

SECTION 2. PENALTY.

Any person violating the provisions of this ordinance shall be punished by a forfeiture not to exceed Five Hundred Dollars ($500.00) plus the costs and surcharges thereon.

SECTION 3. EFFECTIVE DATE.

This ordinance shall take effect and be in force from and after its passage and publication and/or posting.

Dated this 16th day of May, 1989.

TOWN BOARD, by:

Raymond C. Kerwin
Town Chairman

Attest:

Evelyn J. Vesenmeyer
Town Clerk

Passed: 5/16/89

Vote:

Ayes: 3 Noes: 0

Published: May 25, 1989.

AN ORDINANCE TO ESTABLISH THE SHORE LINE OF PART OF LAKE RIPLEY LYING WITHIN GOVERNMENT LOTS 1 AND 2, SECTION 7, TOWNSHIP 6 NORTH OF RANGE 13 EAST.

The Town Board of the Town of Oakland, Jefferson County, being authorized by Section 60.29 (29), Statutes, to cause lake improvements to be made in any lake located in said town, does ordain as follows:

Section 1. The shore line of that part of the northwesterly shore of Lake Ripley lying within Government Lots 1 and 2, Section 7, Township 6 North of Range 13 East, Jefferson County, hereinafter described and more particularly shown by the attached map, is established and determined as set forth in the following description and the attached map, subject to the approval of the Public Service Commission of Wisconsin.

> Beginning at a point 15' E.N.E. of a 1" iron stake in the north line of the property of Fred Mehltretter, thence southerly 340' ± to the northeast corner of the property of Wm. Francisco, thence south 310' ± to a point, thence bearing left along the arc of a circle of 500 feet radius a distance of 235' ± to a point, thence bearing to the right along the arc of a circle of 500 feet radius a distance of 173' ± to a point, thence in a southerly direction tangent to the above curve a distance of 307' ± to a point 25' east of the easterly 3" iron fence post marking the south boundary of the community park. All as particularly laid out in ink on the "map of a portion of the shore of Lake Ripley", dated Jan. 6, 1937, prepared by E. F. Klement and attached hereto.

Section 2. After its passage, this ordinance shall be presented to the Public Service Commission for its approval.

MADE AND SIGNED, this 21st day of June, 1937.

Supervisors of the Town of Oakland, Jefferson County, Wisconsin.

ORDINANCE NO. 15

AN ORDINANCE to establish the shore line of property shown of record in the name of Myron T. Monsen, located at Lake Ripley, Town of Oakland, Jefferson County, Wisconsin, said property being described as follows:

> Commencing at the Meander post on the North line of Section Eight (8), Town Six (6) North, Range Thirteen (13) East; thence South 60° 49' East, 11.3 feet to the West line of the Monsen property; thence South 30° 38' West, 23.4 feet along said West line to an iron pipe stake, 8.5 feet from the Lake Ripley Shore line, which is the point of beginning; thence South 62° 21' East, 149.0 feet along a Meander line to an iron pipe stake on the East line of the Monsen property which is 39.0 feet from said shore line; thence North 30° 45' East, 138.4 feet along said East line to an iron pipe stake in the centerline of a public road; thence North 42° 0' West, 156.0 feet along said centerline of road to a point on said West line; thence South 30° 38' West 192.6 feet to the point of beginning. Also all lands lying between the Meander line South 62° 21' West and said lake shore line.

The Town Board of the Town of Oakland, Jefferson County, being duly authorized under Sections 60.29 (29) and 30.02 (1) of the Wisconsin Statutes, to cause improvements to be made in any lake located in said town, does ordain as follows:

1. That the present shore line of the above described property located on the North shore of Lake Ripley, is more particularly described as follows, to-wit:

> Commencing at the Meander post on the North line of Section Eight (8), Town Six (6) North, Range Thirteen (13) East; thence South 60° 49' East, 11.3 feet to the West line of the Monsen property; thence South 30° 38' West, 23.4 feet along said West line to an iron pipe stake, 8.5 feet from the Lake Ripley Shore line, which is the point of beginning; thence South 30° 38' West 8.5 feet to the point of beginning; thence South 34° 0' East 32.0 feet to a point; thence South 46° 0' East 35.0 feet to a point; thence South 37° 0' East 45.0 feet to a point; thence North 72° 0' East 28.0 feet to a point; thence South 57° 40' East 25.5 feet to a point on the East property line, being 39.0 feet from an iron pipe stake on said East property line.

2. That the proposed shore line of said premises, hereinafter described and more particularly shown by the attached map, is established and determined as set forth in the following described and the attached map, subject to the approval of the Public Service Commission of Wisconsin, namely:

> Commencing at the Meander post on the North line of Section Eight (8), Town Six (6) North, Range Thirteen (13) East; thence South 60° 49' East, 11.3 feet to the West line of the Monsen property; thence South 30° 38' West, 23.4 feet along said West line to an iron pipe stake, 8.5 feet from the Lakr Ripley Shore line, which is the point of beginning; thence South 30° 38' West, 8.5 feet to the point of beginning; thence South 34° 0' East 32.0 feet to a point; thence South 38° 0' East 35.0 feet to a point; thence South 53° 0' East 45.0 feet to a point; thence South 79° 0' East 22.0 feet to a point; thence South 74° 0' East 22.5 feet to a point on the East property line, being 39.0 feet from an iron stake on said East property line.

3. That three certified copies of the Ordinance, together with three true and correct copies of such map, be submitted to the Public Service Commission of Wisconsin for its approval.

4. That upon the return and receipt of such approved maps the same be filed as follows:

> One in the office of the Public Service Commission; One in the office of the Town Clerk of the Town of Oakland, Jefferson County, Wisconsin; and One in the office of the Register of Deeds for and in Jefferson County, Wisconsin.

MADE AND SIGNED this 16 day of December, 1952.

Emery Davis

George Strobel

Supervisors of the Town of Oakland

I, William Scherwitz, town clerk, hereby certify that the above is a true and correct copy of Ordinance No. 3, adopted by the Town Board of the Town of Oakland, Jefferson County, Wisconsin, on December 16, 1952.

Wm. F. Scherwitz
Town Clerk

ORDINANCE NO. 30

AN AMENDMENT TO ORDINANCE NO. 30 TO REGULATE
THE BURNING OF YARD WASTE NEAR LAKE RIPLEY

The Town Board of the Town of Oakland, Jefferson County, Wisconsin, DO ORDAIN as follows:

Ordinance No. 30, SECTION 4. shall be amended to read as follows:

SECTION 4. BURNING OF YARD WASTE NEAR LAKE RIPLEY PROHIBITED.

No person, firm or corporation shall burn yard waste within 25 feet of the Ordinary High Water Mark (OHWM) of Lake Ripley, or within 25 feet of the bank of any drainage channel that continuously conveys surface water to the lake. Said drainage channels include the inlet channel and connecting lateral drainage ditches within the Oakland Sanitary District boundaries.

Burning of yard waste is also prohibited in streets, curbsides or ditches in Town of Oakland right-of-ways located within the Oakland Sanitary District boundaries.

The owner of the premises, or an owner's representative in the case of a firm or corporation, must be on the premises when burning such that the fire is not left unattended. A fire must be extinguished when the owner, or the owner's representative, is not on the premises. In addition, a fire must also be extinguished between the time of sunset each day and the time of sunrise the following day unless the owner, or the owner's representative, is continuously physically present and awake at the fire site.

SECTION 5. shall be amended to read as follows:

SECTION 5. PENALTY. Any person, firm, or corporation violating this ordinance shall be subject to a forfeiture of not less than twenty-five dollars ($25.00) and not more than one-hundred ($100.00).

This amendment shall take effect and be in force from and after its passage and publication and/or posting.

Dated this 20th day of April, 1999.

TOWN OF OAKLAND, by:

Raymond Kuvo

Chairman

Attest:

Linda L. Deckhoff

Town Clerk

Passed: April 20, 1999

Vote:

Ayes: 5 Noes: 0

Posted: April 22, 1999

Published: April 29, 1999

ORDINANCE NO. 42

AN ORDINANCE
TO REGULATE THE LOCATION OF
PIERS, WHARVES AND SWIMMING RAFTS
ON LAKE RIPLEY

WHEREAS, Lake Ripley is a navigable water of the State of Wisconsin and a valuable natural resource providing recreational and environmental benefits to residents and visitors to the Town of Oakland; and

WHEREAS, Lake Ripley has a valuable fishery and provides habitat to numerous plant and animal species dependent on the presence and abundance of native aquatic plant species; and

WHEREAS, a Lake Ripley Aquatic Plant Management Plan, dated September 1992, prepared by the Wisconsin Department of Natural Resources and adopted by the Lake Ripley Management District identifies certain sensitive areas within Lake Ripley where native aquatic plants provide significant habitat for fish and wildlife and recommends the protection of such areas from uses and activities detrimental to such areas; and

WHEREAS, the Nonpoint Source Control Plan for the Lake Ripley Priority Lake Project adopted by the Town of Oakland Board of Supervisors, the Lake Ripley Management District Board of Commissioners and the Jefferson County Board of Supervisors similarly identifies sensitive areas within Lake Ripley where native aquatic plants provide significant habitat for fish and wildlife and recommends the protection of such areas from uses and activities detrimental to such areas; and

WHEREAS, the Town Board of the Town of Oakland desires and intends to implement the recommendations referenced above in order to protect public rights in navigable waters, including fish, wildlife, water quality and the ecological integrity of Lake Ripley.

NOW THEREFORE, the Town Board of the Town of Oakland DO ORDAIN as follows:

I. Purpose and Authority. This ordinance is adopted in order to protect the public welfare including public rights in water, water quality, fish habitat and native aquatic plants in Lake Ripley through regulation of the location of wharves, piers, swimming rafts and related structures pursuant to Section 30.13(2) of the Wisconsin Statutes.

II. Definitions. The definitions as set forth in Section 30.01 of the Wisconsin Statutes, are incorporated herein by reference as though fully set forth herein, except as follows.

A. Pier: A pier includes any structure described in Section 30.01(5), Wis. Stats., and also includes any structure placed on the bed of the lake or on the shore built or maintained for the purpose of providing a berthing or mooring place for watercraft or for loading or unloading of cargo or passengers onto or from watercraft.

B. Ecologically significant area: Ecologically significant area means an area in which native aquatic plants are present in sufficient abundance and density to support significant spawning, seasonal or lifestage habitat for fish or other aquatic life and to protect water quality. Ecologically significant areas typically support several of the following emergent and floating leaf plants, including broad leaf cattails (*Typha latifolia*), swamp loosestrife (*Decodon verticillatus*), arrowhead (*Sagittaria latifolia*), chairmaker's rush (*Scirpus americanus*), spatterdock (*Nuphar adrena*), white water lily (*Nymphaea odorata*) and floating leaf pondweed (*Potamogeton natans*). Ecologically significant areas also support numerous submersed native aquatic plants listed in the Lake Ripley Aquatic Plant Management Plan.

III. Ecologically Significant Areas Map. A map delineating the ecologically significant area is attached to this Ordinance No. 42 and incorporated herein. The delineation of such areas may be amended by an ordinance map amendment adopted by the Town Board, upon motion of the Board.

IV. Placement of Piers, Wharves and Swimming Rafts. No wharf, pier or swimming raft shall be located, built, constructed or maintained in any ecologically significant area, except as provided herein:

A. A lawfully-placed wharf or pier or swimming raft which existed and was regularly used prior to the effective date of this ordinance may be maintained in its present location and general configuration as a permissible preexisting wharf or pier or swimming. The seasonal removal of a wharf, pier or swimming raft does not affect its status as a permissible preexisting wharf, pier or swimming raft.

B. A wharf, pier or swimming raft for which a permit issued by the Wisconsin Department of Natural Resources pursuant to Section 30.12 of the Wisconsin Statutes is in effect.

V. Nonconforming Structures a Nuisance. Any pier, wharf or swimming raft not located in compliance with this ordinance constitutes a public nuisance.

VI. Removal of Unlawful Obstruction. Any pier, wharf or swimming raft not located in compliance with this ordinance constitutes an unlawful obstruction of navigable waters and may be removed by the Town pursuant to Section 66.0495 of the Wisconsin Statutes.

VII. Penalties for Violation of This Ordinance. Any person who shall violate any of the provisions of this ordinance or who shall fail to perform any duty imposed hereunder or who shall commit any act prohibited hereby shall upon conviction thereof forfeit not more than $100.00 together with the costs of prosecution. Each day of violation of any provision of this ordinance shall be deemed to constitute a separate offense.

The Town Board DO FURTHER ORDAIN that this Ordinance shall be effective following its adoption and publication or posting.

Dated this 21st day of March, 1995.

TOWN OF OAKLAND

BY: Raymond Kisow
Raymond Kisow, Chairman

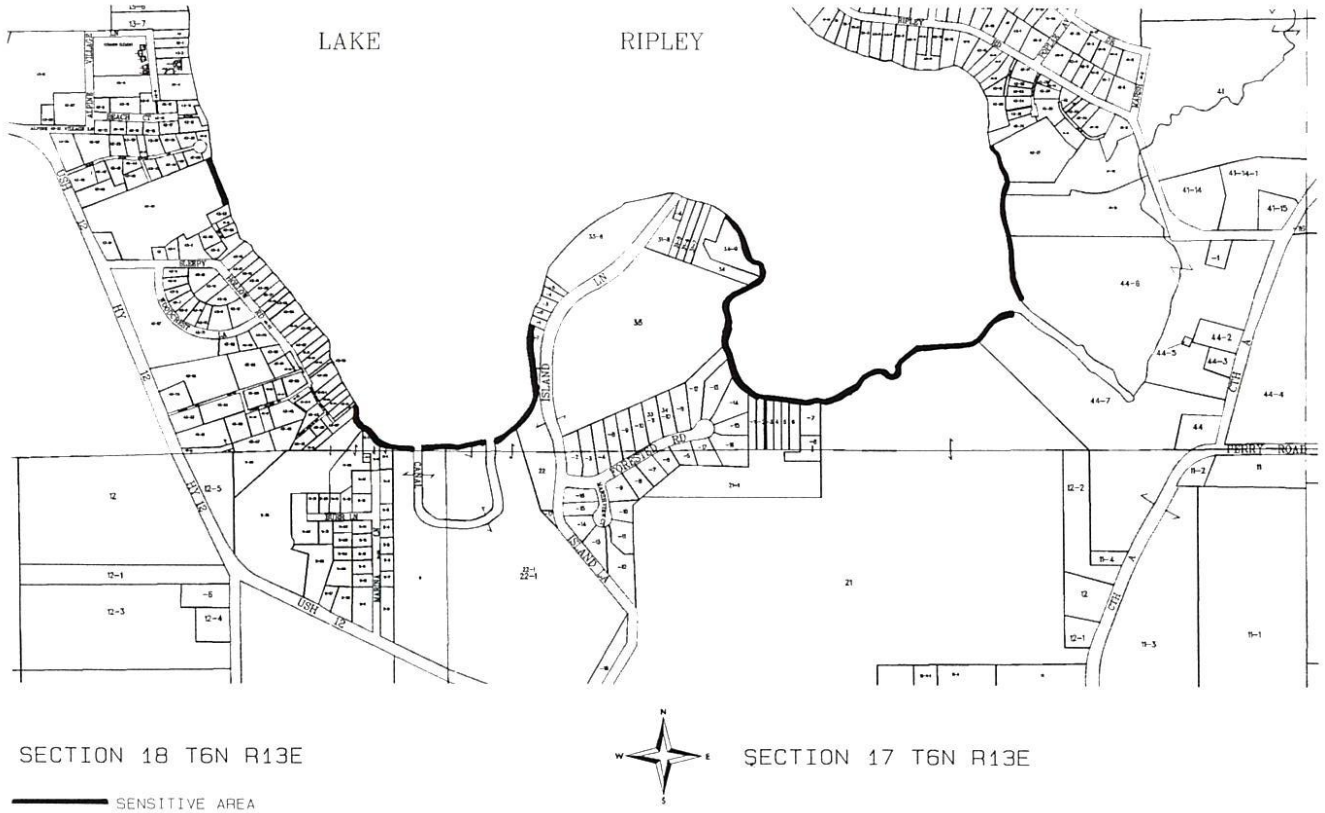
ATTEST: Linda K. Dieckhoff
Linda Dieckhoff, Clerk

Passed: March 21, 1995

Vote:
Ayes: 3 Noes: 0

Published: March 30, 1995.
Posted: March 22, 1995.

LAKE RIPLEY PIER ORDINANCE



ORDINANCE NO. 51

AN ORDINANCE TO PROHIBIT THE INTENTIONAL FEEDING OF GEESE AND OTHER WATERFOWL ON OR ADJACENT TO LAKE RIPLEY

WHEREAS, Lake Ripley's resident goose and waterfowl population appears to be growing prolifically, and is rapidly becoming an impediment to the public's use and enjoyment of the lake; and

WHEREAS, excessive numbers of geese can damage shorelines, pollute the water via defecation, spread diseases, displace other wildlife, and introduce parasites that cause Swimmers Itch; and

WHEREAS, feeding of geese and waterfowl entices birds into delaying their migration and often into becoming permanent residents; and

WHEREAS, feeding can eventually cause the birds to become dependent on these "junk food" handouts, which do little to satisfy their nutritional needs for survival; and

WHEREAS, feeding encourages large numbers of birds to congregate and compete for very limited food supplies in small, concentrated areas; and

WHEREAS, feeding leads to overcrowding and poor nourishment, increasing waterfowl susceptibility to life threatening diseases.

NOW THEREFORE, the Town Board of the Town of Oakland, Jefferson County, Wisconsin, DOES ORDAIN as follows:

1. PURPOSE AND AUTHORITY. This ordinance is adopted for the purpose of promoting the public health and welfare, and to preserve the natural environment that supports a diversity of wildlife on Lake Ripley, through the regulation of activities related to the direct feeding of geese and other waterfowl.

2. REGULATORY PROVISIONS. No person shall intentionally feed by hand or stationary feeding system any species of goose, duck or other waterfowl on the waters of Lake Ripley or within the lake's shoreland zone (1,000 feet from the Ordinary High Water Mark).

3. PENALTIES FOR VIOLATION. Any person, firm or corporation violating this ordinance shall be subject to a forfeiture of not less than $25 and not more than $100. Each day of violation of any provision of this ordinance shall be deemed to constitute a separate offense.

4. EFFECTIVE DATE. This Ordinance shall be effective following its adoption, posting and/or publication as provided by law.

Dated this 15th day of May, 2001.

TOWN OF OAKLAND, by:

Raymond Kuhr

Chairman

Attest:

Linda L. Deckhoff

Town Clerk

Passed: May 15, 2001

Vote:

Ayes: 4 Nays: 0

Posted: May 16, 2001

Published: May 24, 2001

Appendix D - Public Opinion Findings

2019 Public Opinion Findings

Purpose

Lakes cannot be all things to all people all the time, so finding ways to build a community of lake users that respects and makes space for each others' preferences is important work shared by each of us. Opinion surveys have long been used by the Lake District to help evaluate public perceptions and priorities about lake use, as well as attitudes about general resource conditions, problems, and possible management solutions. Prioritization allows for the allocation of resources so that the benefits of management intervention out-weigh costs, the results are measurable, and the work is supported by the public. Surveys also facilitate public involvement and can help educate residents and users about the lake ecosystem. It is believed that a greater understanding and awareness of Lake Ripley and its problems will generally lead to increased cooperation and a greater likelihood of program success.

Survey Style and Response Rate

The 2019 survey questions and format were subject to review by social scientists at the WDNR to assure clarity, comprehension and lack of bias in the questions, before being mailed. This is a new requirement for grant-funded work that had not existed in prior surveying done by the District. The survey was sent to approximately 1200 households in October of 2019. 277 surveys were completed and returned to the District by year end for a response rate of 23%. This rate of return was identical to the 2007 survey and in line with all previous surveys. Some surveys represented views of residences that have up to 59 shared owners. The average household ownership/usage was listed as 4.6, indicating that responses may represent a higher number of viewpoints than 277.

These surveys were disseminated to area property owners to gauge general attitudes on a wide range of lake topics. Respondents were asked to share their opinions regarding the condition of Lake Ripley, the effectiveness of current management policies and programs, and what actions were believed to be needed to improve overall lake health

Demographics

Most respondents reported living within one-quarter mile of the lake, with 28.8% of survey respondents owning lakefront property and an additional 33.7% having property-deeded lake access. Of all residential homeowners, 68% identified themselves as full-time residents and 27% as part-time residents. Full-time residence has increased by 11% since a 2007 survey. Reporting of part-time homeownership in the District fell 16% from 43% in '07. Almost 3% of the respondents to the 2019 identified themselves as owning agricultural land in the watershed, similar to the 2.6% that identified as such in 2007. How many years had passed since respondents first visited Lake Ripley varied from as much as 82 years to as little as under 1 year ago, with the average time being 34.37 years ago. The above demographics patterns appear to be

consistent with those identified in earlier surveys.

Survey-Identified Quality of Life Issues

These lake features were identified as contributing the most to respondents' quality of life:

Safe water quality – a whopping 85% of people said this was very important, and less than 1% said it was not important. If you added those that said it was of "some importance" safe water quality was considered important by 93% of respondents.

When asked about change to water quality since their first visit to the lake, responses were across the board. Approximately a quarter felt water quality is improving (24.3%), remaining the same (23.9%), was degrading (20.7%) or were unsure (22.1%). Most people based that determination on water clarity and algae.

A healthy aquatic plant community was rated second with 67% marking that as very important and less than 3% saying it was not important. Adding those that thought a healthy aquatic plant community was of "some importance" brought the number of those thinking it was important to 89%.

Lake plants are perceived as good or too scarce by approximately 24% of respondents, but too many by 53%. The above perceptions are consistent with those documented in previous surveys.

Rule enforcement, and Slow-no-wake policies, came in tied at approx. 57% as the next items respondents agreed were "very important." If you added those that said these were of "some importance" those numbers jump to 92% for enforcement, and 81% for slow-no-wake. Less than 3% of the people rated rule enforcement as "not important" but that number jumped to nearly 10% when it came to slow-no-wake.

The presence of safety buoys was considered of some or very much importance for 85% of respondents, with only 7% saying they were not important.

When asked about how quality of life is affected by living on or owning property on or near Lake Ripley, 75% said it was positively affected, 16.5% said it had a neutral affect, and 2.2% were feeling negative about it. The rest were unsure or didn't answer.

2019 Concerns that Rose to the Top of the list

Invasive Lake Weeds were pointed to as limiting enjoyment of the lake at a level of "somewhat" or "a great deal" by 51% of respondents. In a related question **Invasive Species** were again identified as being of "big time concern" for 66% of respondents. If one added the response of "some concern" the number rose to 90%.

Loss of Bird/Fish Habitat was a "big time concern" by 64% of respondents. If one added "some concern" the number rose to 90%.

Overuse of Lawn Fertilizers/Pesticides and **Overuse of Agricultural Fertilizers/Pesticides** ranked as nearly identical high concerns for people at 87% and 86% as either "big time concern" added with "some concern".

The next most offending features of our lake was **Algae** with 43% saying that it limits the enjoyment of the lake "somewhat" or "a great deal."

Canada Geese were also limiting the enjoyment of the lake "somewhat" or "a great deal" for 33% of the respondents.

Boat crowding was "somewhat" or "a great deal" of concern for 32% of respondents. In all of the previous surveys, boat crowding was listed more often and more intensely as a concern. Since the questions were not asked in the exact way, an exact comparison can not be made.

Native Lake Plants limited the enjoyment of lake users "somewhat" or "a great deal" for 29% of respondents. It cannot be determined if many of the same people who were bothered by invasive lake weeds were also those that could not warm to native lake plants, but it seems likely.

The choices that did **not** seem to be as much of a concern included:

Litter, lake rules, quality of the fishing, conflicts with other users, carp, access to the lake, water levels, lake level fluctuation, climate change, and noise. The number of people saying that conflicts with other users, pier-related issues, and noise were all near 2% as limiting enjoyment "a great deal", which could mean that if you checked one, you were likely to check the others.

The top concerns from the 2007 survey were invasive species, polluted run-off, development and overcrowding on the lake. The top concerns from the 2005 survey were invasive species, development pressures, misuse of lawn chemicals. The top concerns from the 1999 survey were motorboat and jet ski crowding, fertilizer and pesticide use, and polluted runoff.

Top Four Activities that were enjoyed by the largest number of respondents in 2019.

(Those saying it was "of some importance" or "very important" for them)

1. Enjoying peaceful, tranquil moments
2. Observing wildlife
3. Slow boat rides
4. Walking/biking around the lake

These activities were listed as favorites in earlier surveys, along with swimming, fishing, and motorboat rides.

Kids Likes and Dislikes

The 2019 Public Opinion Survey was the first to seek the input of children 12 and under. We discovered that swimming is the most popular activity with 92% of respondents saying that they partake. Boating is not far behind at 89%, and fishing is also well-represented at 69%. Among

animal catching and releasing, frogs ranked first in desirability, with 48 votes. Bird-watching beat out watching the sky and watching boats with votes of 37, 29 and 25 votes respectively. Of 75 respondents, 15 also indicated a love for drawing and writing about the lake. See some of their comments below.

Facilities for People with Disabilities

Another pair of new questions in the 2019 Survey asked for input about improving the public pier or other facilities to make them universally accessible. Respondents replied "Yes" at a rate of 31% that improvements are needed, "No" got 28%, and those not answering or "Unsure" equaled 50%. A follow-up question asked if a respondent or anyone in their household was limited in participating in lake activities due to a physical disability. 5.5% of respondents answered "Yes", 90% answered "No," and the remaining were "Unsure". Note: The Town of Oakland owns both the Public Launch and the Public Pier; therefore this information will be shared with them.

Types of Boats Respondents Own

When asked about types of boats people owned in 2019, the category that was owned by the largest number of respondents was kayak/canoe/SUP, with 44%. Pontoons were the next most listed at 35%. Motorboats that can exceed 25 mph were the next (34%). About 14% of respondents listed owning no boat.

Note: Interestingly, kayaks and paddleboards were not even options to be checked in any of the earlier surveys. However there is some evidence that the use of people-powered boats is on the uptick.

Anglers' Input

What people fish for in the lake today has not changed much from their choices in previous surveys:

Thirty years ago, 1999, the most desired fish to catch was a largemouth bass, with walleye and bluegill/sunfish following.

In 2005 the order changed to largemouth bass, bluegill/sunfish and then walleye.

In 2019, respondents said they fished for bluegill/sunfish, largemouth bass, and walleye.

Since 2017 the Lake has been part of The Wisconsin Walleye Initiative, stocking large-fingerling walleye in the lake annually, and to evaluate their success of growing to maturity and self-perpetuating. So far, it appears that we are not supporting a reproducing population of walleye successfully.

How did anglers feel about the lake's fishing?

In 2019 less than 2% called it excellent, but nearly 46% said it was good or fair. 5% called it

"poor" or "very poor."

Thirty years earlier, 0% called it excellent, nearly 41% called it good or fair, and 12.7% called it poor.

How Informed Do Respondents Feel about Issues?

2019 – 32% feel well-informed, 60% feel somewhat informed, 5% not at all informed

2007 – On a scale of 1 – 6, with six being well informed and 1 being not at all informed, the average response was 4.5

2005 – 90% felt "reasonably informed" and 10% felt they were "not reasonably informed."

1999 – 45% felt "reasonably informed" and 39% felt they were "not reasonably informed."

How do respondents get information about Lake Ripley?

2019 – First source for information – Ripples Newsletter, second – friends & family, third – Cambridge Newspaper

2007 – First source for information – Ripples, second – Cambridge TV, third – attending meetings

2005 – First source for information – Ripples, second – Cambridge News, third – friends & family

1999 – First source for information – Newsletters (note: Ripples began in XXXX), second – special mailers, third – local newspaper articles

Note: website and social media ranked 4th and 5th in 2019, did not appear as options in any of the earlier surveys.

Support for District Efforts 2019

How do you feel about the following Lake Ripley Management District efforts?						
Scale	A. Landowner cost sharing for eligible projects	B.Landowner project design help	C. Mechanical weed harvesting	D. Water quality monitoring	E. Control of invasive species	F. Maintaining lake dist. Preserve
Oppose	6.2	4.3	1.1	0.4	0.4	2.9
Neutral	17.4	18.8	4.7	4.0	2.9	9.1

Support	54.7	56.5	81.9	85.5	87.0	74.6
Unsure	14.1	12.3	5.4	4.0	4.0	5.8
No Answer	7.6	8.0	6.9	6.2	5.8	7.6
How do you feel about the following efforts?						
Scale	G. Clean boats/water edu.	H. Pursuing funding/grants	I. Acquisition of conservancy areas	J. Lake research to diagnose problems	K. Lobbying for lake-protection policies	L. Holding public meetings
Oppose	0.0	1.1	6.9	1.1	4.3	0.4
Neutral	6.2	4.7	12.3	6.5	14.1	12.3
Support	81.9	82.6	65.6	79.3	67.4	73.2
Unsure	4.7	4.7	8.7	5.1	7.2	6.9
No Answer	7.2	6.9	6.5	8.0	6.9	7.2

There was strong support for the various Lake District efforts employed to protect and improve Lake Ripley. Controlling invasive species enjoyed 87% support. Water quality monitoring enjoyed 85.5% support. Pursuing grants had the support of 82.6% of respondents, while the Clean Boats, Clean Waters educational campaign and Mechanical weed harvesting each enjoyed 81.9% support. Opposition to any single program never reached above 6.9%.

A special question was asked to gauge homeowner awareness of the District's 50% cost share and technical assistance program for projects that benefit Lake Ripley (rain barrels, shoreline restoration, native plantings, etc.) Approximately 40% of respondents answered "Yes" they were aware, 44% answered "No" and 16% "Maybe."

Budget and Donation Responses

Three questions of the 2019 survey were about District funding and donations. These were not asked in earlier surveys. When asked how they felt about the portion of the tax bill that finances the protection and management of Lake Ripley ($0.55 per $1,000 of assessed value) responses were as follows:

6.2%:	Insufficient
58.3%:	Fair
10.5%:	Excessive
13.4%:	Unsure
5.1%:	Property Not in Lake District
6.5%:	No Answer

The next question asked how much additional property taxes would they consider paying to be exclusively used to purchase and maintain property considered important to improving the water quality of Lake Ripley. Responses broke down in this manner:

24.6%:	$0
9.8%:	$10
11.6%:	$25
13.8%:	$50
2.9%:	$75
14.1%:	$100
10.5%:	More than $100
12.7%:	No Answer

Finally: How likely is it in the next few years that they will make a tax-deductible donation for improving and maintaining Lake Ripley?

19.2%:	Not At All Likely
14.5%:	Not Too Likely
36.2%:	Unsure, Need More Information
13.1%:	Fairly Likely
11.2%:	Very Likely
5.8%:	No Answer

Kids Under 12 - Comments

“I like going fast in the boat.” – age 6

“The scenery and how peaceful it is.”

“I like living next to the lake because I get to go swimming a lot with my family and friends.”

“I like playing with my friends in the sandy corner.”

“I like jumping off the raft and fishing.”

“The lake is perfect to be on. The water is clean and blue. The water is not too deep, and me and my family love going out there!”

“We love Lake Ripley for the waterskiing and spending time on the water.”

“Swimming in clear water at Shore Place where I can touch and collecting shells.”

“Going tubing, swimming with friends, hanging out, we like to use the paddleboat, hanging out on the boat.”

“Being near or on the water. Really enjoy how quiet the lake is during the week, especially with boating. Gets a little crowded on a nice weekend, and especially on a holiday, but usually during the week the boat traffic is pretty light. Great for tubing, kneeboarding, and just cruising around the lake.”

“I like swimming with friends and catching toads.”