State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
1300 W. Clairemont Ave.
Eau Claire WI 54701

Tony Evers, Governor

Telephone 608-266-2621
Toll Free 1-888-936-7463
TTY Access via relay - 711

WISCONSIN
DEPT. OF NATURAL RESOURCES

August 1, 2024

Tracy Arnold
Portage County LWCD
1462 Strongs Avenue
3rd Floor
Stevens Point WI 54481

Subject: Approval of lake management plans

Dear Tracy:

After review of the six lake management plans, being duly noticed to the public, approved by the local government, lake associations/districts, and the LWCD as described below, the Department has approved the following plans:

McDill Pond

- *Updated plan approved by McDill Inland Lake Protection and Rehabilitation District -February 23, 2023*
- *Village of Whiting acknowledges receipt of 2023 Updated plan -June 13, 2023*
- *Updated plan approved by City of Stevens Point-April 3, 2023*
- *Updated plan approved by Portage County Land Conservation-February 24, 2023*
- *Updated plan submitted to WI DNR- February 24, 2023*

Sunset Lake

- *Updated plan approved by Sunset Lake Association-April 12, 2023*
- *Updated plan approved by Town of New Hope-April 19, 2023*
- *Updated plan approved by Portage County Land Conservation-May 30, 2023*
- *Updated plan submitted to WI DNR- May 30, 2023*

Springville Pond

- *Updated plan approved by Springville Pond Management Committee-July 12, 2023*
- *Updated plan approved by Village of Plover-July 12, 2023*
- *Updated plan approved by Portage County Land Conservation-July 14, 2023*
- *Updated plan submitted to WI DNR- July 14, 2023*

Lake Jacqueline

- *Updated plan approved by Lake Jacqueline Protection and Rehabilitation District-August 20, 2023*
- *Updated plan approved by Town of Sharon-October 10, 2023*
- *Updated plan approved by Portage County Land Conservation-October 11, 2023*
- *Updated plan submitted to WI DNR- October 11, 2023*

Tree Lake

- *Updated plan approved by Tree Lake Association-July 30, 2023*
- *Updated plan approved by Town of Alban-August 7, 2023*
- *Updated plan approved by Portage County Land Conservation-August 10, 2023*

- *Updated plan submitted to WI DNR- August 10, 2023*

Lake Helen

- *Updated plan approved by Lake Helen Protection and Rehabilitation District-July 26, 2023*
- *Updated plan approved by Town of Alban-August 7, 2023*
- *Updated plan approved by Portage County Land Conservation-August 10, 2023*
- *Updated plan submitted to WI DNR- August 10, 2023*

It is important to understand that although a lake management plan has been approved, permits may be required for any of the recommended management options described. It is also important to remember that proposed management options, that are not specifically mentioned in the aforementioned plans, would need plan approval before submitting a Surface Water Grant - Implementation (SWGI) application(s). Implementation grants can be very helpful to applicants provided the management proposals are well described in an approved plan and show a high likelihood of success.

Your work with this endeavor was superb. I commend you and others' efforts to the commitment of sound watershed ecosystem management planning and look forward to assisting with implementation opportunities.

A sincere thank you,
Scott Provost

Scott Provost, P.S.S.
Water Quality Expert
WDNR
Wisconsin Rapids, WI
715.315.0329

cc: Anna Mares – Eau Claire; Jennifer Jefferson – Central Office (via email)

2023 Update

Tree Lake Management Plan

Portage County, Wisconsin

Tree Lake Management Planning Committee created:	January 2011
Plan prepared by UW-Stevens Point Center for Watershed Science and Education	
Plan approved by Tree Lake Management Planning Committee:	January 2011
Plan approved by Wisconsin Department of Natural Resources:	
Plan approved by Portage County:	
Plan updated by Tree Lake management plan update participants:	December 2014
Plan Update approved by Tree Lake Association	July 30, 2023
Plan Update approved by Town of Alban	August 7, 2023
Plan Update approved by Portage County Land Conservation	August 10, 2023
Plan Update approved by Wisconsin Department of Natural Resources	Submitted to WI DNR August 10, 2023
	Approved by WI DNR August 1, 2024

A special thanks to all who helped to create the Tree Lake Management Plan and provided the necessary data in the Portage County Lakes Study.

Tree Lake Management Plan Update Participants -
Wisconsin Lions Camp, December 1, 2014

Tree Lake Plan Update Participants
Michael Omernik
Allan and Jan Kraetsch
Laurette Poltzer

University of Wisconsin –Stevens Point
Nancy Turyk – Center for Watershed Science and Education
Sarah Hull – Center for Watershed Science and Education
Ryan Haney – Center for Watershed Science and Education

Portage County
Randy Slagg – Conservation Technician

Tree Lake Management Planning Committee Members and Resources

Tree Lake Association Members
Michael Omernik
Ron Knorr
Joe Schultz
Cary Farah
Judy Ritger
John Omernik

University of Wisconsin–Stevens Point
Nancy Turyk – Center for Watershed Science and Education
Jen McNelly – Center for Watershed Science and Education
Dr. Robert Freckmann – Botany Professor Emeritus

Portage County
Steve Bradley – County Conservationist Gary Speckmann – Portage County Parks

Wisconsin Department of Natural Resources
Patrick "Buzz" Sorge – Lake Management Specialist
Scott Provost – Water Resources Management Specialist
Tom Meronek – Fisheries Biologist
Deb Konkel – Water Resources Management Specialist

Portage County Lake Study Researchers/Authors

Becky Cook Water Quality/Watersheds
Dr. Paul McGinley – Water Quality/Watersheds
Dr. Byron Shaw – Water Quality/Watersheds and Upland Sensitive Areas
Dick Stephens – Water Quality/Watersheds and Upland Sensitive Areas
Nancy Turyk – Water Quality/Watersheds/Final Report
Dr. Glenn Bowles – Near Shore Summary
Dr. Alan Haney – Upland Sensitive Areas
Dr. Vince Heig – Upland Sensitive Areas
Dr. Kent Hall Upland Sensitive Areas

Dr. Bob Bell - Algae
Dr. Robert Freckmann – Aquatic Plants and Upland Sensitive Areas
Dr. Tim Ginnett – Birds
Brad Bulin (Graduate Student) – Birds
Dr. Ron Crunkilton – Fish
Steve Bradley (Portage County Conservationist) – Land Use Coverages/Watersheds
Lynn Markham – Planning Assistance
Mike Hansen – Portage County Planning Assistance
Dr. Erik Wild – Reptiles and Amphibians/Near Shore Habitat
Rori Paloski (Graduate Student) – Reptiles and Amphibians/Near Shore Habitat

Tree Lake Management Plan 2023 Update Participants

Tree Lake Residents
Deb Omernik

Portage County
Tracy Arnold-Conservation Technician
Jen McNelly-Water Resource Specialist

Golden Sands
Chris Hamerla, Regional AIS Coordinator
Colton Wolosek, Regional AIS Coordinator

Wisconsin Department of Natural Resources
Scott Provost-Water Resources Mgmt
Colton Hutchinson-Water Resources Mgmt
Lucas Koenig-Fisheries Biologist

TABLE OF CONTENTS

Glossary: https://www.co.portage.wi.gov/DocumentCenter/View/3943/Lake-Management-Plans-Glossary

Staff Resource Directory: https://www.co.portage.wi.gov/DocumentCenter/View/3942/Lake-Management-Plans-Directory

List of Goals

Goal 1. Improve the in-lake habitat along with the size and quality of the fishery through sustainable management practices.

Goal 2. Maintain the diversity and quality of a healthy lake ecosystem in Tree Lake through native aquatic plants.

Goal 3. Work to control and suppress aquatic invasive species (AIS) in Tree Lake so as to not become overly abundant.

Goal 4. Identify, protect and enhance the sensitive habitats in and around Tree Lake.

Goal 5. Monitor water quality and clarity in Tree Lake, review data with natural resource professionals and educate residents in the watershed on conservation practices to improve water quality and clarity in Tree Lake. This goal will be achieved when monitoring in Tree Lake indicates median summer (5 samples/summer) total phosphorus levels are below 20 ug/L for 3 consecutive years and inorganic nitrogen concentrations are less than 0.3 mg/L during spring turnover.

Goal 6. Identify and educate residents about the quality of private well water around Tree Lake. All private wells will have concentrations of nitrate-N that are less than 10 mg/L.

Goal 7. Create, restore, and protect healthy, stable shoreland habitats near and around Tree Lake. This goal will be achieved when 65% of the shoreline is vegetated.

Goal 8. Maintain and enhance activities on Tree Lake that allow all users to enjoy the lake.

Goal 9. Landowners and lake users will communicate with one another about topics related to Tree Lake.

Goal 10. Keep the information and resources within the Tree Lake Management Plan current and up to date.

Introduction

Tree Lake is a hard water drainage lake located in northeastern Portage County, Wisconsin. The lake covers 71.3 acres and has a maximum depth of 34 feet. Tree Lake has two inlets: the smaller inlet flows from Mud Lake and enters on the northwestern side of Tree Lake, while the larger inlet is a cold water stream (Klondike Creek) that provides good habitat for brook trout. There is a small county park on the northeastern side of the lake, and a public access on the southwestern side. Those who use and enjoy the lake value it for its good water quality, natural beauty, peace and tranquility, quality fishing, and recreational opportunities.

In 2007, the Tree Lake Association partnered with UW-Stevens Point to develop a lake management plan. The purpose of lake management plans is to provide guidance to prevent or solve problems that may harm lake ecosystems. The development of lake management plans for Tree Lake and 28 other Portage County lakes was the second phase of the Portage County Lakes Study. During the first phase, data collection was completed for the 29 lakes. Researchers focused on data related to topics affecting lake health, including water quality, shoreline development, amphibian habitat, fisheries, and aquatic plants. A summary of the study result can be found in the Background Information section of this document.

The purpose of this lake management plan is to provide guidance to prevent or solve problems that may harm Tree Lake and its watershed.

As important as data collection is to any management plan, the success of the plan depends upon citizen involvement. The Tree Lake management plan was developed by a committee of Tree Lake Association members and professionals who applied the data while actively gathering additional citizen input. A citizen survey was conducted to learn about values, opinions, and any perceived issues with Tree Lake. The survey was sent to Association members and the results were used throughout the planning process.

Who can use this plan, and how can it be used?

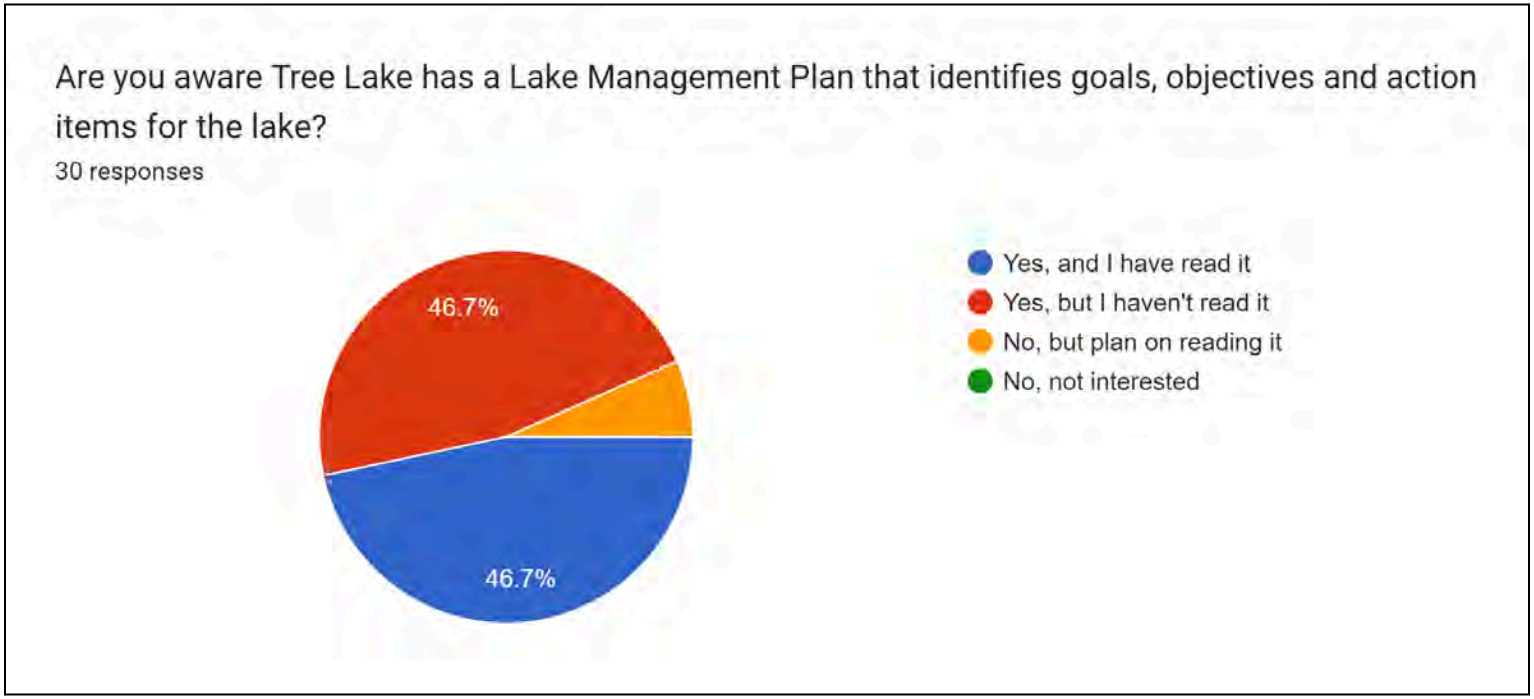
- **Individuals**: Individuals can use this plan to learn about the lake they love and their connection to it. People living near Tree Lake can have the greatest influence on the lake by understanding and choosing lake-friendly options to manage their land and the lake.
- **Tree Lake Association:** This plan provides citizens with a well thought-out plan for the lake and lists options that can easily be prioritized. Annual review of the plan will also help members to realize their accomplishments. Resources and funding opportunities for lake management activities are made more available by placement of goals into the lake management plan, and the organization can identify partners to help achieve their goals for Tree Lake.

- **Neighboring lake groups, sporting and conservation clubs**: Neighboring groups with similar goals for lake stewardship can combine their efforts and provide each other with support, improve competitiveness for funding opportunities, and make efforts more enjoyable.
- **Nearby municipalities**: Municipalities can consider the visions, wishes, and goals documented in this lake management plan when considering municipal-level management planning or decisions within the watershed that may affect the lake.
- **Portage County:** County professionals will better know how to identify needs, provide support, base decisions, and allocate resources to assist in lake-related efforts documented in this plan. This plan can also inform county board supervisors in decisions related to Portage County lakes, streams, wetlands and groundwater.
- **Wisconsin Department of Natural Resources**: Professionals working with lakes in Portage County can use this plan as guidance for management activities and decisions related to the management of the resource, including the fishery, and invasive species. Lake management plans help the Wisconsin Department of Natural Resources to identify and prioritize needs within Wisconsin's lake community, and decide where to apply resources and funding. A well thought-out lake management plan increases an application's competitiveness for state funding– if multiple Portage County lakes have similar goals in their lake management plans, they can join together when seeking grant support to increase competitiveness for statewide resources.

2023 UPDATE

A resident survey was conducted in 2023. This survey was approved by the WI DNR prior to sending it out. Tree Lake Association took the lead on sending the resident survey. The resident survey was hybrid, being available both electronically and hardcopy if requested. All results from the resident survey were put into a document and shared with the Tree Lake residents. The results will also be shared throughout this lake management plan update. For a full copy please visit: Deb Omernik, Tree Lake resident at deb@riversidefuels.com or Tracy Arnold, Portage County Land and Water Conservation Department at arnoldt@co.portage.wi.gov.

Results from the 2023 Resident Survey



Goals, Objectives and Actions

The following goals, objectives, and associated actions were derived from the values and concerns of citizens and members of the Tree Lake Management Planning Committee, and the known science about Tree Lake, its ecosystem and the landscape within its watershed. Implementing and regularly updating the goals and actions in the Tree Lake Management Plan will ensure that the vision is supported and that changes or new challenges are incorporated into the plan. A management plan is a living document that changes over time to meet the current needs, challenges and desires of the lake and its community. **The goals, objectives and actions listed in this plan should be reviewed annually and updated with any necessary changes.**

Although each lake is different, to ensure a lake management plan considers the many aspects associated with a lake, the Wisconsin Department of Natural Resources requires that a comprehensive lake management plan address, at a minimum, a list of topics that affect the character of a lake, whether each topic has been identified as a priority or as simply something to preserve. These topics comprise the chapters in this plan. For the purposes of this plan, the chapters have been grouped as follows:

In-Lake Habitat and a Healthy Lake

Fish Community—fish species, abundance, size, important habitat and other needs
Aquatic Plant Community—habitat, food, health, native species, and invasive species
Critical Habitat—areas of special importance to the wildlife, fish, water quality, and aesthetics of the lake

Landscapes and the Lake

Water Quality and Quantity—water chemistry, clarity, contaminants, lake levels
Shorelands—habitat, erosion, contaminant filtering, water quality, vegetation, access
Watershed Land Use—land use, management practices, conservation programs

People and the Lake

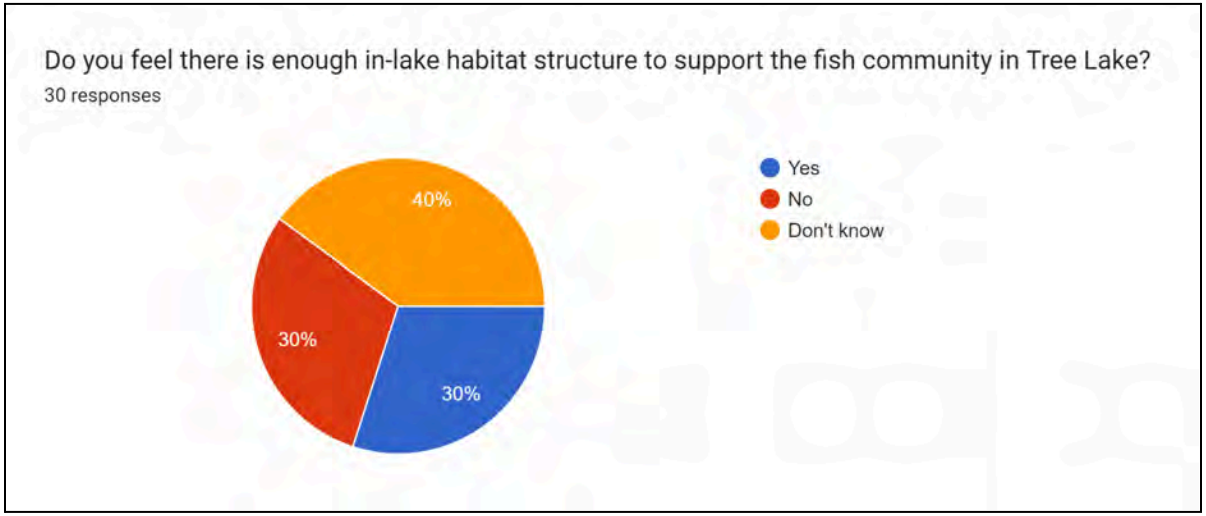
Recreation—access, sharing the lake, informing lake users, rules
Communication and Organization—maintaining connections for partnerships, implementation, community involvement
Updates and Revisions—continuing the process
Governance—protection of the lake, constitution, state, county, local municipalities

In-Lake Habitat and a Healthy Lake

Many lake users value Tree Lake for its fishing, wildlife, and good water quality. These attributes are all interrelated; the health of one part of the lake system affects the health of the rest of the plant and animal community, the experiences of the people seeking pleasure at the lake, and the quality and quantity of water in the lake. Habitat is the structure for a healthy fishery and wildlife community. It can provide shelter for some animals and food for others.

Lake habitat occurs within the lake, along all of its shorelands, and even extends into its watershed for some species. Many animals that live in and near the lake are only successful if their needs – food, a healthy environment, and shelter – are met. Native vegetation including wetlands along the shoreline and adjacent to the lake provides habitat for safety, reproduction, and food, and can improve water quality and balance water quantity. Some lake visitors such as birds, frogs, and turtles use limbs from trees that are sticking out of the water for perches or to warm themselves in the sun. Aquatic plants infuse oxygen into the water and provide food and shelter for waterfowl, small mammals, and people. The types and abundance of plants and animals that comprise the lake community also vary based on the water quality, and the health and characteristics of the shoreland and watershed. Healthy habitat in Tree Lake includes the aquatic plants, branches, and tree limbs above and below the water.

Results from the 2023 Resident Survey



The Fish Community

A balanced fish community has a mix of predator and prey species, each with different food, habitat, nesting substrate, and water quality needs in order to flourish. Activities in and around a lake that can affect a fishery may involve disturbances to the native aquatic plant community or substrate, excessive additions of nutrients or harmful chemicals, removal of woody habitat, shoreline alterations, and/or an imbalance in the fishery. Shoreland erosion can cause sediment to settle onto the substrate, causing the deterioration of spawning habitat. Habitat can be improved by allowing shoreland vegetation to grow, minimizing the removal of aquatic plants, providing fallen trees or limbs in suitable areas, and protecting wetlands and other areas of critical habitat.

People are an important part of a sustainable fish community; their actions on the landscape and the numbers and sizes of fish taken out of the lake can influence the entire lake ecosystem. Putting appropriate fishing regulations in place and adhering to them can help to balance the fishery with healthy prey and predatory species, can be adjusted as the fish community changes, and can provide for excellent fishing.

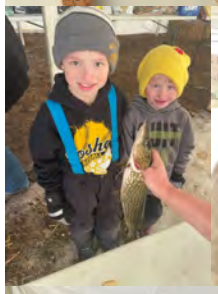
Managing a lake for a balanced fishery can result in fewer expenses to lake stewards and the public. While some efforts may be needed to provide a more suitable environment to meet the needs of the fish, they usually do not have to be repeated on a frequently reoccurring basis. Protecting existing habitat such as emergent, aquatic, and shoreland vegetation, and allowing trees that naturally fall into the lake to remain in the lake are free of cost. Alternatively, restoring habitat in and around a lake can have an up-front cost, but the effects will often continue for decades. Costs in time, travel, and other expenses are associated with routine efforts such as fish stocking and aeration. Ideally, a lake contains the habitat, water quality, and food necessary to support the fish communities that are present within the lake and provide fishing opportunities for people without a lot of supplemental effort and associated expenses to maintain these conditions.

Fish communities are an important part of any healthy lake ecosystem and are a source of pleasure for many. According to survey respondents fishing is the most popular activity on Tree Lake. Respondents also felt that fishing on Tree Lake is currently average or fair, but that quality has declined. These users feel that the fisheries of Tree Lake need quality habitat, vegetative cover, and good water quality in order to improve fisheries in Tree Lake.

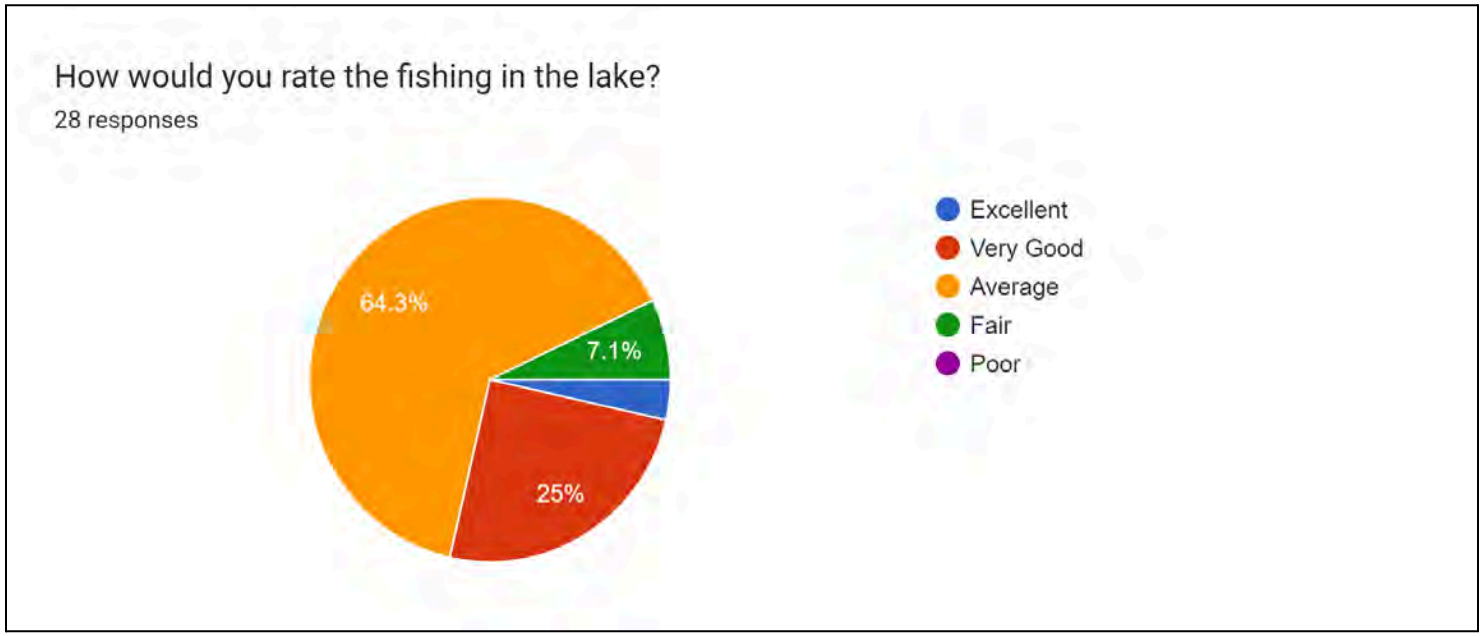
2014 Updates: No issues were reported by the Tree Lake update session. In 2012, the Wisconsin Department of Natural Resources surveyed the fish community of Tree Lake using fyke nets. Additionally, northern pike regulation evaluation is currently underway statewide.

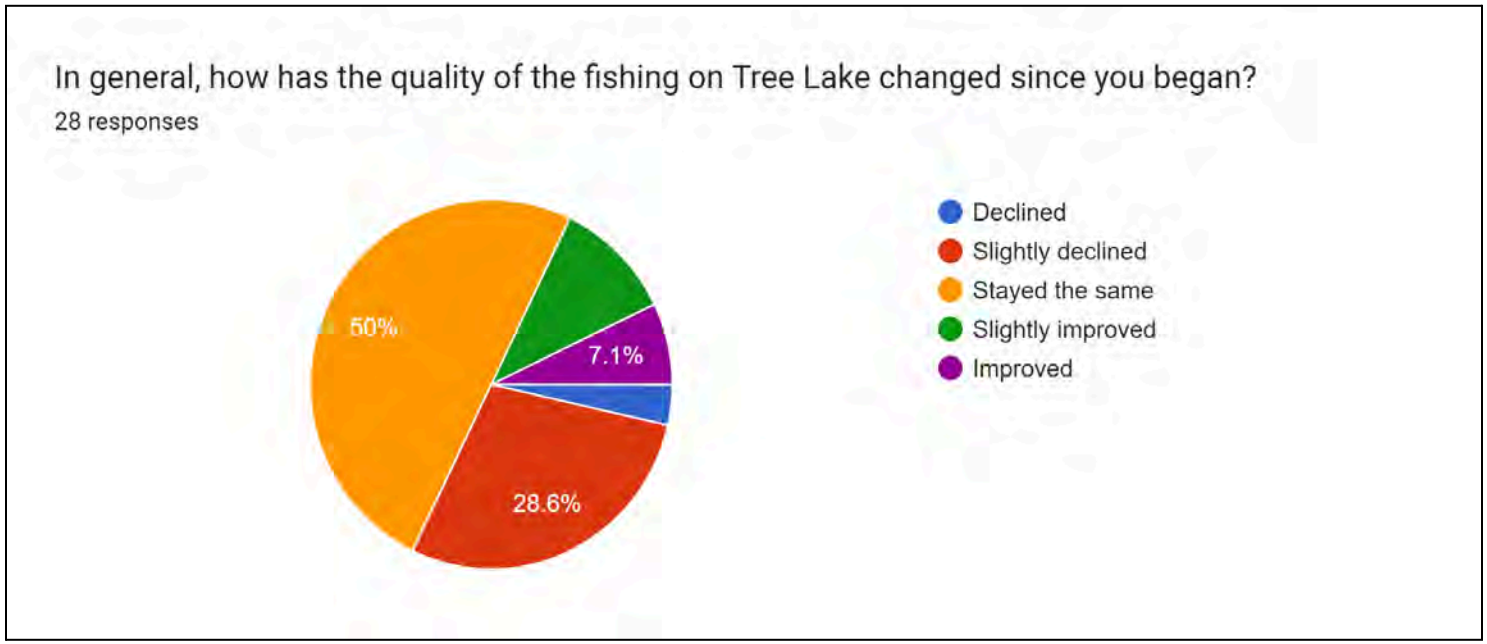
2023 Update: WI DNR Fisheries Biologist, Lucas Koenig, provided the data from the late spring electrofishing survey in 2018 and 2021. Please note CPE represents “catch per effort”. Lucas also provided data on the previous Tree Lake stocking efforts, including species, age class, number stocked and average length (in.). The next survey is scheduled for 2033. Scheduled surveys may be moved up and happen sooner if needed.

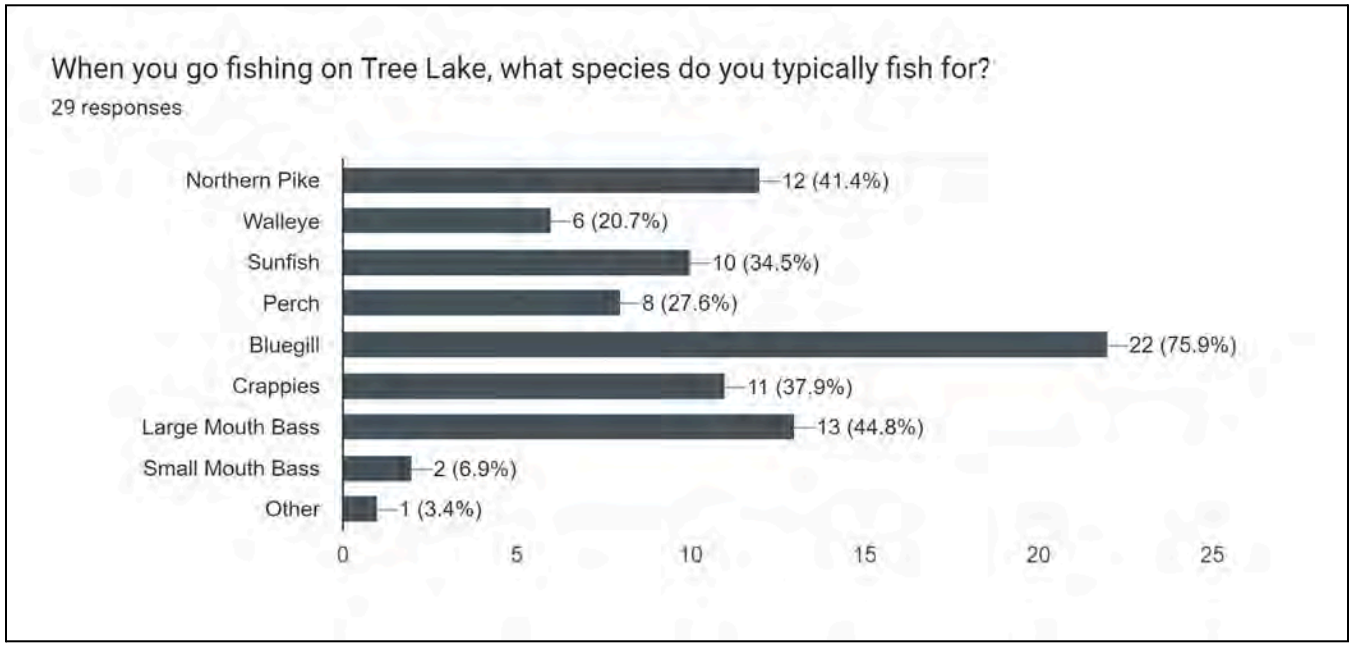
Tree Lake Association hosts a very successful Fisheree and Raffle every year in February. This event is a lake wide effort to raise money to cover the costs of weed harvesting and fish stocking to benefit not only the waterbody but the recreational opportunities for all residents.

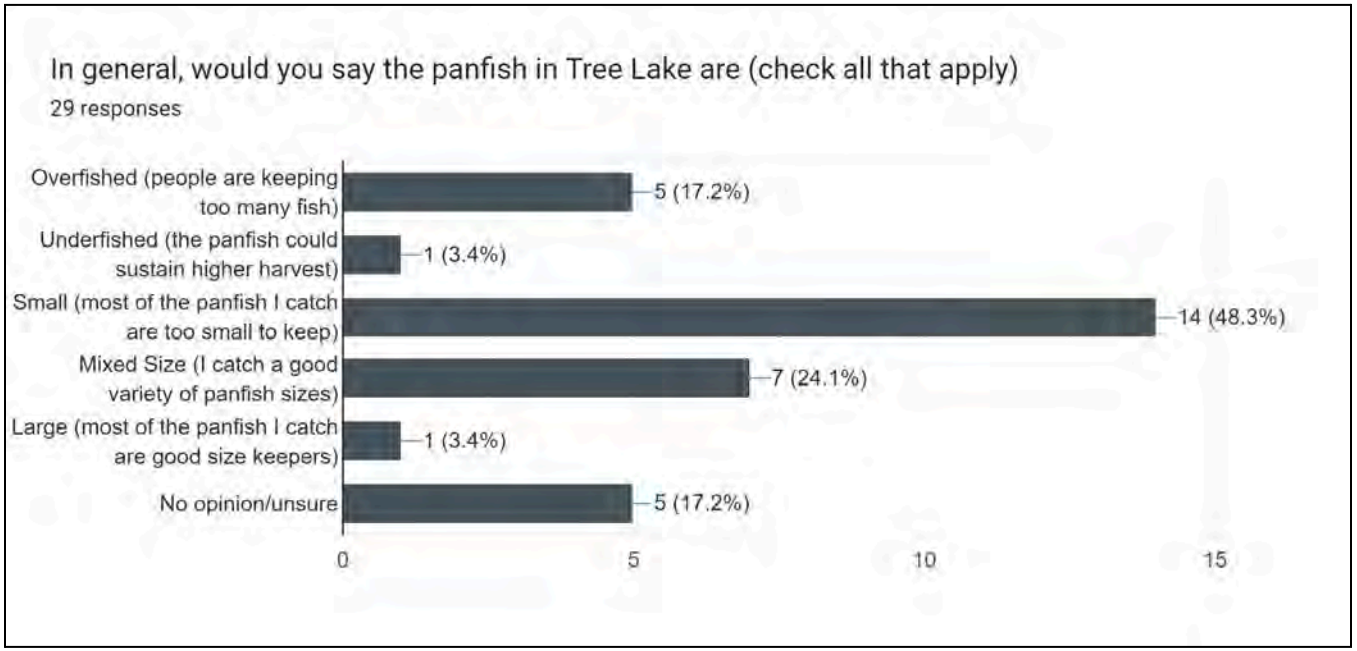


Results from the 2023 Resident Survey

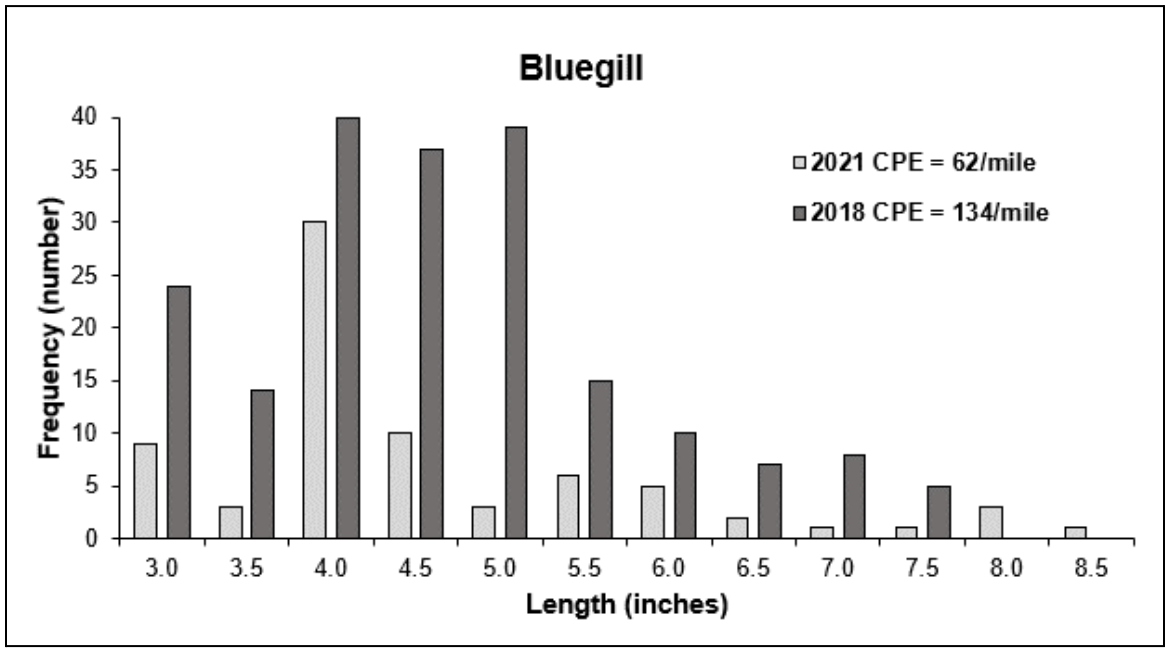


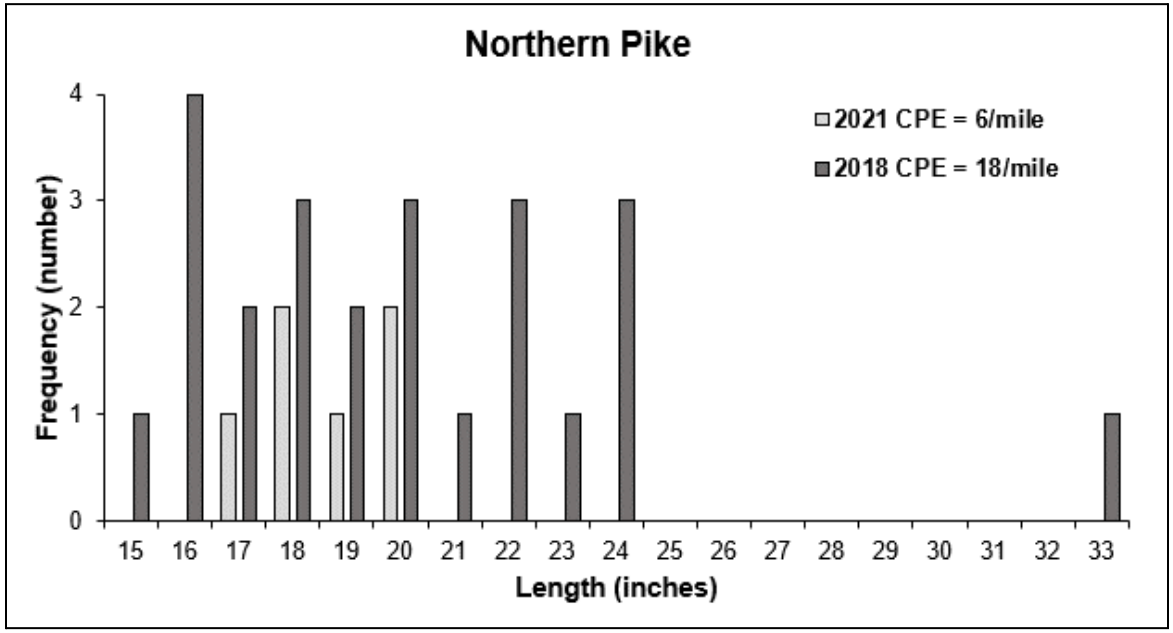



When you go fishing on Tree Lake, what species do you typically fish for?
29 responses
Northern Pike
12 (41.4%)
Walleye
6 (20.7%)
Sunfish
10 (34.5%)
Perch
8 (27.6%)
Bluegill
22 (75.9%)
Crappies
11 (37.9%)
Large Mouth Bass
13 (44.8%)
Small Mouth Bass
2 (6.9%)
Other
1 (3.4%)
0
5
10
15
20
25


In general, would you say the panfish in Tree Lake are (check all that apply)
29 responses
Overfished (people are keeping too many fish)
5 (17.2%)
Underfished (the panfish could sustain higher harvest)
1 (3.4%)
Small (most of the panfish I catch are too small to keep)
14 (48.3%)
Mixed Size (I catch a good variety of panfish sizes)
7 (24.1%)
Large (most of the panfish I catch are good size keepers)
1 (3.4%)
No opinion/unsure
5 (17.2%)
0
5
10
15

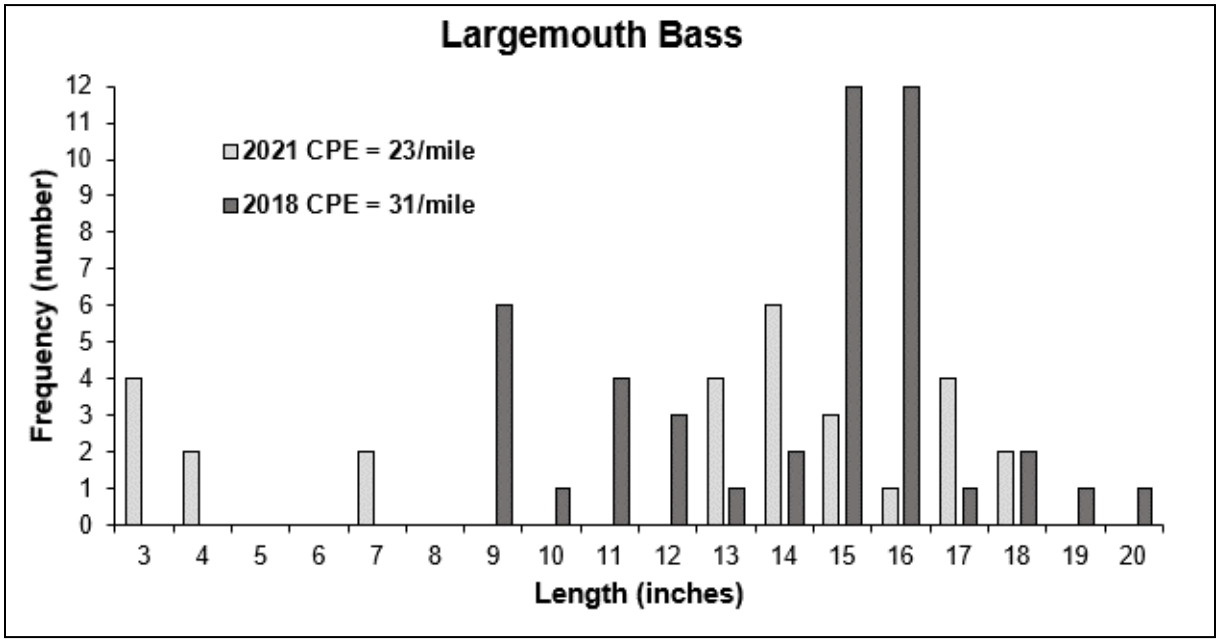
Data from the WI DNR Fisheries Biologist from 2018 and 2021
(Note: CPE is catch per effort)

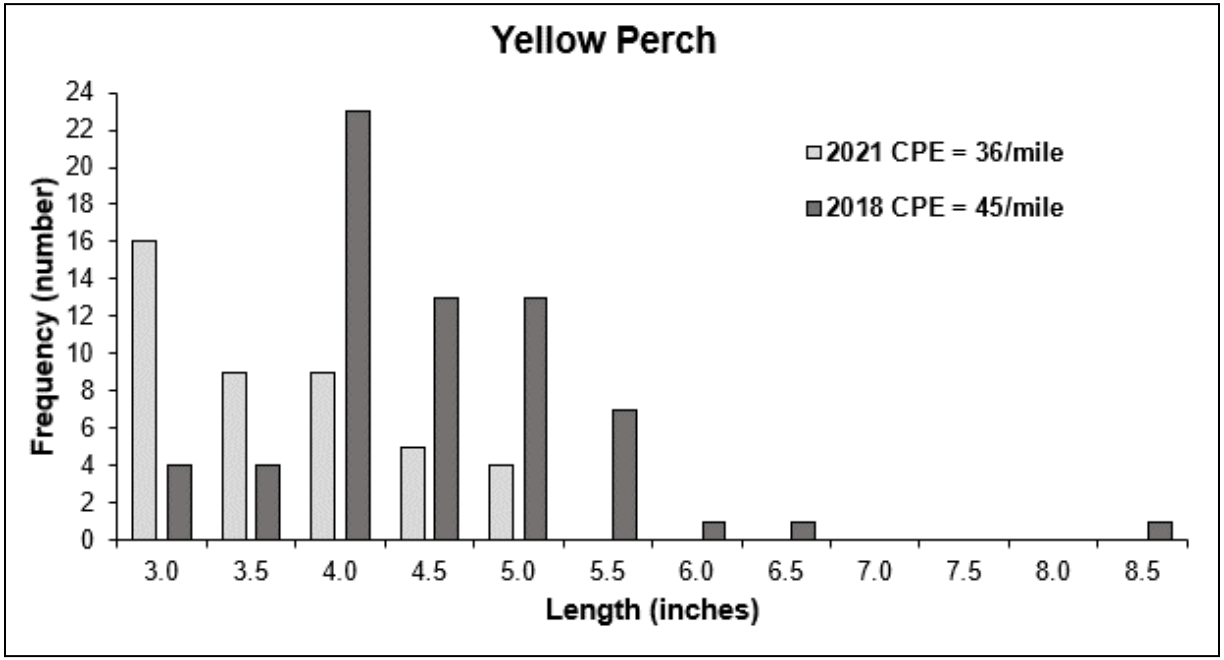




Data from the WI DNR Fisheries Biologist from 2018 and 2021

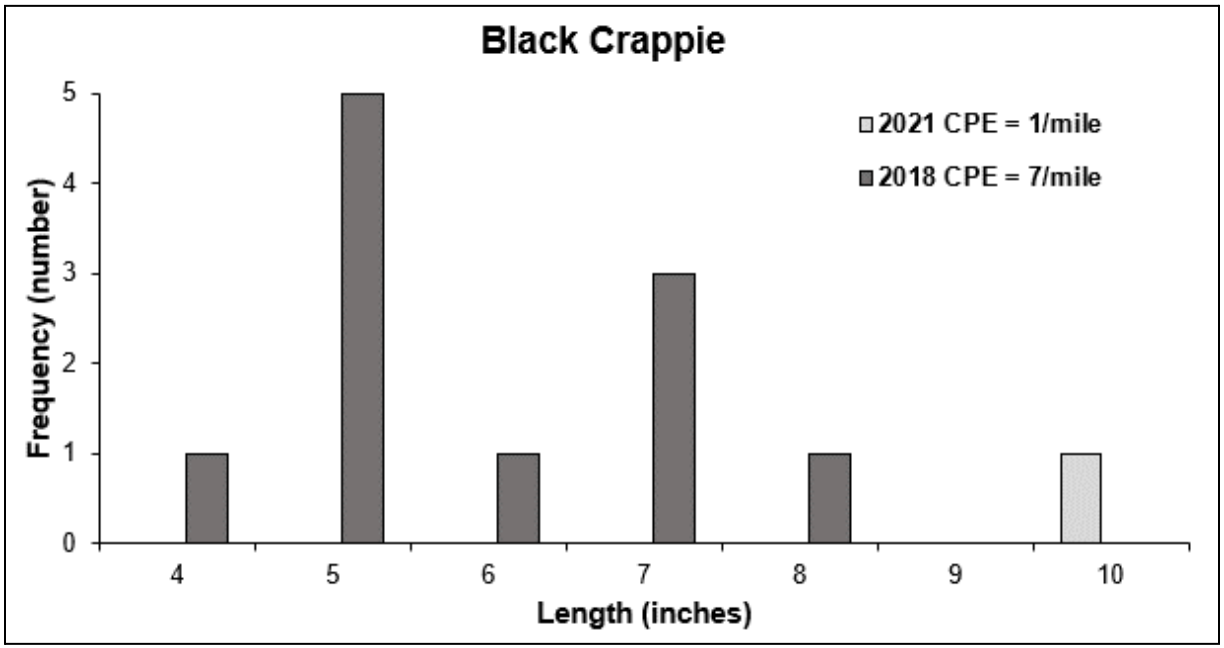
(Note: CPE is catch per effort)





Data from the WI DNR Fisheries Biologist from 2018 and 2021

(Note: CPE is catch per effort)



Tree Lake Stocking Data from the WI DNR Fisheries Biologist from 1996-2021

YEAR	SPECIES	AGE CLASS	NUMBER STOCKED	AVG LENGTH (in.)
2021	WALLEYE	YEARLING	349	9
2019	WALLEYE	LARGE FINGERLING	500	7
2018	WALLEYE	LARGE FINGERLING	477	7
2017	WALLEYE	LARGE FINGERLING	500	7
2012	WALLEYE	LARGE FINGERLING	500	7
2012	YELLOW PERCH	ADULT	200	9
2012	BLUEGILL	ADULT	50	8
2009	WALLEYE	LARGE FINGERLING	2000	4.5
2009	YELLOW PERCH	LARGE FINGERLING	1300	4
2006	WALLEYE	SMALL FINGERLING	200	5
2005	WALLEYE	SMALL FINGERLING	300	5
2004	YELLOW PERCH	LARGE FINGERLING	100	3
2004	WALLEYE	LARGE FINGERLING	200	
2004	SMALLMOUTH BASS	LARGE FINGERLING	100	3
1996	LARGEMOUTH BASS	FINGERLING	6000	2.3

Guiding Vision for the Fishery

Tree Lake will have a healthy fish community that provides recreational opportunities.

Goal 1

Improve the habitat along with the size and quality of the fishery through sustainable management practices.

Objective 1.1. Work with the WI DNR fisheries biologist to determine lake specific fisheries goals.

Actions	Lead person/group	Start/end dates	Resources
Invite the WI DNR fisheries biologist to a Tree Lake Association meeting to discuss survey results and management goals.	Tree Lake Association	Annually	WI DNR Fisheries Biologist
Maintain the size and catch limit for fish that is posted at the boat landing.	Tree Lake Association	Ongoing	WI DNR Fisheries Biologist
WI DNR will conduct a fish survey on Tree Lake. Scheduled surveys may be moved up and happen sooner if needed.	WI DNR	2033	WI DNR Fisheries Biologist

Objective 1.2. Educate residents about the importance of in-lake habitat structure and encourage them to participate in Healthy Lakes and Rivers Grant practices.

Actions	Lead person/group	Start/end dates	Resources
Provide information to shoreland property owners about the benefits to fish, turtles, and birds from woody habitat in lake. Recommend that it be left in place. Included in the welcome packet.	Tree Lake Association	Ongoing	Portage County Land and Water Conservation Department WI DNR Fisheries Biologist Healthy Lakes and River Grants Extension Lakes
Protect and enhance spawning habitat by protecting submerged plant beds through information and education.	Tree Lake Association	Ongoing	Extension Lakes WI DNR Fisheries Biologist Portage County Land and Water Conservation Department
Encourage residents to participate in the Healthy Lakes and Rivers Grant through Portage County Land and Water Conservation Department and to install “fish stick” practices.	Tree Lake Association Portage County Land and Water Conservation Department	Ongoing	Portage County Land and Water Conservation Department WI DNR Fisheries Biologist Healthy Lakes and River Grants Extension Lakes

The Aquatic Plant Community

Aquatic plants provide the forested landscape within Tree Lake. They provide food and habitat for spawning, breeding, and survival for a wide range of inhabitants and lake visitors including fish, waterfowl, turtles, amphibians, as well as invertebrates and other animals. They improve water quality by releasing oxygen into the water and utilizing nutrients that would otherwise be used by algae. A healthy lake typically has a variety of aquatic plant species which creates diversity that makes the aquatic plant community more resilient and can help to prevent the establishment of non-native aquatic species.

Aquatic plants near shore and in shallows provide food, shelter and nesting material for shoreland mammals, shorebirds and waterfowl. It is not unusual for otters, beavers, muskrats, weasels, and deer to be seen along a shoreline in their search for food, water, or nesting material.

Healthy native aquatic plant communities are an essential part of a lake ecosystem. Fish and other aquatic and terrestrial life depend on aquatic plants for habitat, food, and spawning areas. Aquatic plants also provide protection for a lake by preventing the establishment of invasive aquatic species and protecting sediment from wind and boating disturbance. Tree Lake residents and lake users value native aquatic vegetation for these benefits. In a citizen survey of Tree Lake residents and users, respondents indicated interest in learning more about native aquatic vegetation and their benefits. A healthy community of aquatic plants within Tree Lake will be maintained through information opportunities and sustainable lake management practices.

2014 Updates: During a 2012 visual survey of aquatic plants in Tree Lake, twin-stem bladderwort (*Utricularia geminiscapa*) was identified in a wetland on the northern shore that appeared to be healthy with diverse native plants. This is a Species of Special Concern in Wisconsin. The survey was conducted by staff from Golden Sands Resource Conservation & Development Council, Inc. (Golden Sands RC&D).

During the visual survey, invasive curly-leaf pondweed (CLP) plants were observed. The plants found were small or at the end of their life cycle for the year. A survey earlier in the summer may reveal a larger population; a few beds were still found late in the summer. A few floating turions (seed casings) that were sprouting new CLP were also found. The CLP was found by the boat landing and along the western and northwestern shores, in water depths of 3-5 feet. In the shallow areas, CLP was not present where native species of muskgrass and water lilies were present. The Tree Lake Association hires a harvester to cut some of the CLP. If this is done prior to formation of turions (seed-like structures), typically early June, the seed bank may slowly be reduced.

2023 update: Golden Sands RC&D is contracted to complete a 2023 Point Intercept survey of Tree Lake. Point intercept (PI) surveys are completed by traveling to predetermined GPS points across the lake. Each PI lake map is based on the area and depth specific to that lake. The maps with GPS coordinates are obtained through the WDNR. Pearl Lake contains 423 sample points. Using a GPS, staff traveled by boat to each of the GPS points. At each point a two-sided rake was used to sample roughly a one foot area of the lake bottom. Sediment type (sand, rock or muck), water depth in half foot increments and the aquatic plant community was recorded. Once the rake is brought to the surface the amount of plant material on the rake is assessed and recorded. The overall fullness of plants on the rake is rated a one, two or three (see illustration). Then the individual species are ranked using one, two or three. All data is recorded on the PI worksheet. Plants seen within six feet of the sample point are recorded as a “visual”. Other plants seen on the lake are recorded as a “boat survey”.The current data will be added to this plan.

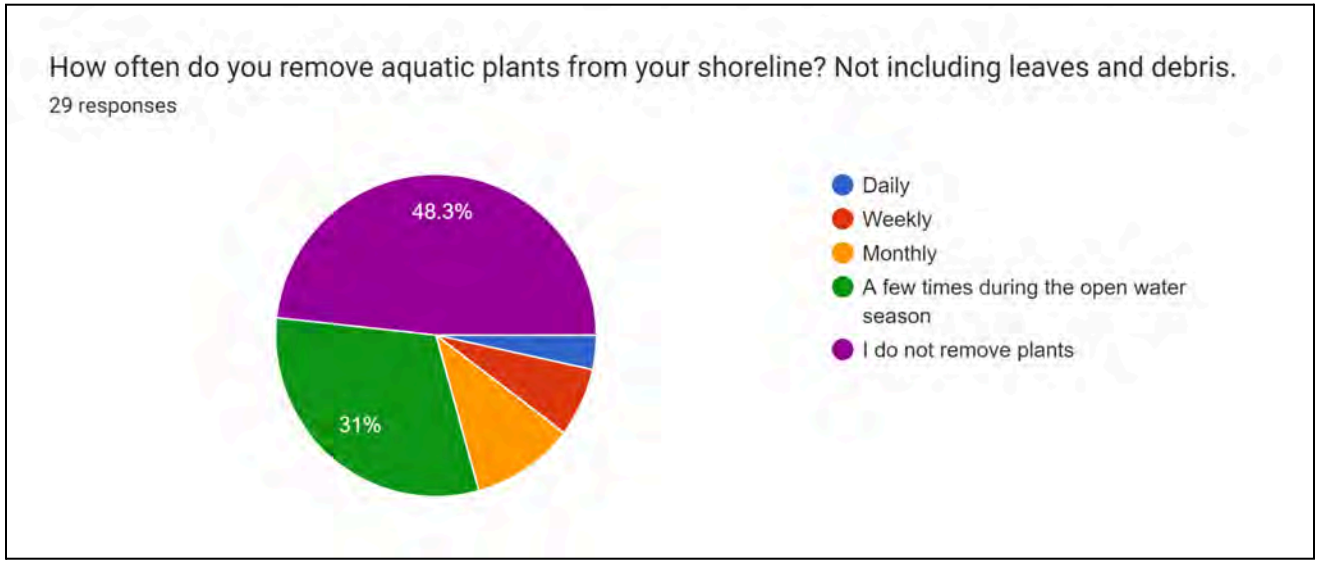
Native Aquatic Plant Management

Periodically, portions of Tree Lake have an abundance of native aquatic plants that can impede navigation to areas of open water. This is primarily due to the accumulation of several species of unrooted aquatic plants that are blown by the wind into an area of the lake (filamentous algae, coontail (*Ceratophyllum demersum*), and water celery (*Vallisneria americana*) in the fall). There are additional areas in the lake with heavy aquatic plant beds that restrict navigation and could limit the feeding success of predatory fish. The following aquatic plant management strategies were determined to be the most practical and effective options to minimize impacts to Tree Lake as a whole:

Skimming: The mechanical removal method would target unrooted aquatic plants that have accumulated in parts of Tree Lake. The surface of the lake is skimmed to collect plant material for removal from the lake. When skimming with a harvester, the aquatic plants are not cut.

Mechanical Harvesting: Harvesting must be conducted in areas with depths of water greater than 3 feet to avoid the disturbance of sediment and habitat. Allowable harvesting of native plants in Tree Lake provides access lanes between docks and naturally occurring open water, and reduces the extent of dense aquatic plant beds in the northeastern part of the lake. Harvesting may occur in three to five foot depths of water. See **Tree Lake Harvesting Map** *(provided by Tree Lake Association)* for details on approved harvesting areas.

Results from the 2023 Resident Survey



Guiding Vision for the Native Aquatic Plant Community

Tree Lake will have a healthy native aquatic plant community. Nuisance level native plants will be managed.

Goal 2

Maintain the diversity and quality of a healthy lake ecosystem in Tree Lake through native aquatic plants.

Objective 2.1. Provide diverse informational opportunities for landowners to learn about aquatic plants, current laws, and realistic expectations based on the type of lake.

Actions	Lead person/group	Start/end dates	Resources
Continue to provide informational materials about aquatic plants and current laws in welcome packets and quarterly newsletter that are distributed to any new landowners.	Tree Lake Association	Ongoing	Extension Lakes WI DNR Portage County Land and Water Conservation Department
Host a presentation or education event about plants in Tree Lake.	Tree Lake Association	Ongoing	Golden Sands RC&D Extension Lakes WI DNR Water Quality Specialist
Explore creating a Tree Lake website.	Tree Lake Association	Ongoing	Extension Lakes WI DNR Water Quality Specialist
Encourage citizen monitoring of aquatic vegetation.	Tree Lake Association	Ongoing	WI DNR Water Quality Specialist Golden Sands RC&D
Conduct a point-intercept (P.I.) survey of the aquatic plant community every 5 years unless a management change is warranted. A P.I. survey is required to obtain a permit for chemical treatment of EWM/HWM and helps quantify changes over time.	Tree Lake Association	*P.I. Survey:* Every 5 years Next: 2023	WI DNR Water Resource Specialist Golden Sands RC&D Consultant
Conduct visual aquatic plant surveys in years between P.I. surveys. Review survey information and adjust strategies for the upcoming year.	Tree Lake Association	Annually	WI DNR Water Resource Specialist Golden Sands RC&D Consultant
Encourage Tree Lake residents to eliminate the use of fertilizer near Tree Lake to reduce the growth of aquatic plants.	Shoreland property owners	Ongoing	Extension Lakes WI DNR Portage County Land and Water Conservation Department

Objective 2.2. Utilize a plan for the sustainable management of native and invasive aquatic vegetation. See Aquatic Plant Management Strategies for more information.

Actions	Lead person/group	Start/end dates	Resources
Annually review results of the previous year management and monitoring results to determine the management strategies for the next year. This can be done during annual Tree Lake Association meetings.	Tree Lake Association	Annually at each lake association meeting	WI DNR Water Quality Specialist Golden Sands RC&D
Mechanically harvest aquatic plants to remove plant material (nutrients) from Tree Lake. Refer to the Tree Lake Harvesting Map and coordinate with WI DNR Water Resource Specialists.	Tree Lake Association	Late May/early June	WI DNR Water Resource Specialist Harvesting consultant

Tree Lake Harvesting Map ***(provided by Ed Walder, Lake Renewal Company, 2022)***

Event Details	
Client Name	Tree Lake Association
Permit No	WC-2017-50-123M
Field Name	TREE LAKE_EZ32321
Event Name	Event_072622_0001_EZ32321
Operator	Ed Walder
Applied Material	
Event Created	
Summary Created	
Field Area	N/A
Productive Area	N/A
Field Latitude/Longitude	
Total Time	25h 09m 16.0s
Operator EPA license	
Harvest Year	2022
Farm Location	Rosholt
Harvester Loads	33
Weight per load	3200
Total pounds removed	105,600 pounds

Coverage	
Start Time	07 26 16:26:26 2022
End Time	07 28 17:32:34 2022
Coverage Time	22h 05m 53.44s
Coverage Area	13.0573 a
Applied Volume	N/A

Equipment	
Vehicle	Aquatic plant harvester
Implement	
Implement Width	7' 00"
Number of Sections	N/A

Crop	
49%	Chara
49%	Wild Celery
2%	Lily Pads

Overlap

Aquatic Plant Management Strategies

General recommendations:

* Reduce nutrients traveling to the lake from the landscape
* Avoid increasing algal blooms by maintaining a healthy amount of aquatic plants
* Don't denude the lakebed
    * Increases potential for aquatic invasive species establishment
    * Sediments can add phosphorus to the water which may lead to increased algal growth
* Choose options that are appropriate for your lake's situation
* Monitor and adjust your strategies if you are not making headway!

List of Aquatic Plant Management Options (selection of options varies with situation):

No Action	
ADVANTAGES	LIMITATIONS
No associated cost	May not be effective in obtaining aquatic plant management objectives
Least disruptive to lake ecosystem	

Manual Removal-training is recommended-Permit is not required	
ADVANTAGES	LIMITATIONS
Can target specific plants-with proper training	Removes near-shore wildlife and fish habitat
Can be effective in controlling small EWM/HWM infestations	Opens up areas where other AIS can become established
No associated cost	If EWM/HWM are not removed properly, could worsen the problem
	Training required for proper identification/removal methods

Manual Removal, Diver-Assisted (With or Without Suction)-training is recommended-permit is not required	
ADVANTAGES	LIMITATIONS
Can be used in deeper areas	Costs associated with hiring a diver may be comparable to chemical treatment expenses
Can target specific plants with proper training	Currently an experimental treatment-not readily available
Can be effective in controlling small EWM/HWM infestations	If EWM/HWM are not pulled properly, could worsen the problem
May be useful in helping to remove upper root mass	

Chemical Treatment with Contact Herbicide (Early Season) – Permit required	
ADVANTAGES	LIMITATIONS
May reduce EWM/HWM for a time	Usually not fully effective in eradicating target species
Treatment not needed as frequently	Contaminants may remain in sediment
	Does not remove dead vegetation, which depletes oxygen and releases nutrients, adds to build-up of muck
	Extra nutrients may spur additional aquatic plant and algae growth
	May negatively affect native vegetation
	Effects on lake ecosystem not fully understood
	Can open up areas once taken up by natives for AIS to colonize again
	Can be costly

Water Level Manipulation-Permit required	
ADVANTAGES	LIMITATIONS
Controls aquatic plants in shallower, near-shore areas	Requires a controlling structure on the lake
Can be low cost	May cause undesired stress on ecosystem
	Cannot be used frequently

Milfoil Weevils - EWM - *(Note: Not viable if chemical treatment options are being pursued.)*	
ADVANTAGES	LIMITATIONS
Natural, native maintenance of native and exotic milfoils	Require healthy shoreline habitat for overwintering
Prefers the aquatic invasive Eurasian Watermilfoil	Cannot survive in areas of mechanical harvesting or herbicide application
Some lakes may already have a native populations.	Effectiveness highly variable between lakes (works well for some lakes)
Doesn't harm lake ecosystem	Limited access to weevils for purchase in WI
	Still considered experimental
	Requires unmowed/natural shorelines for weevil habitat
	Too many panfish may prevent weevil population growth

Photos provided by WI DNR

Chemical Treatment with Contact Herbicide (Early Season) – Permit required	
ADVANTAGES	LIMITATIONS
May reduce EWM/HWM for a time	Usually not fully effective in eradicating target species
Treatment not needed as frequently	Contaminants may remain in sediment
	Does not remove dead vegetation, which depletes oxygen and releases nutrients, adds to build-up of muck
	Extra nutrients may spur additional aquatic plant and algae growth
	May negatively affect native vegetation
	Effects on lake ecosystem not fully understood
	Can open up areas once taken up by natives for AIS to colonize again
	Can be costly

Aquatic Invasive Species (AIS)

Aquatic invasive species are non-native aquatic plants and animals that are most often unintentionally introduced into lakes by lake users. This most commonly occurs on trailers, boats, equipment, and from the release of bait. In some lakes, aquatic invasive plant species can exist as a part of the plant community, while in other lakes populations explode, creating dense beds that can damage boat motors, make areas non-navigable, inhibit activities like swimming and fishing, and disrupt the lakes' ecosystems. Learning how to identify AIS, monitoring, and quick removal can help to prevent new AIS from becoming established in Tree Lake.

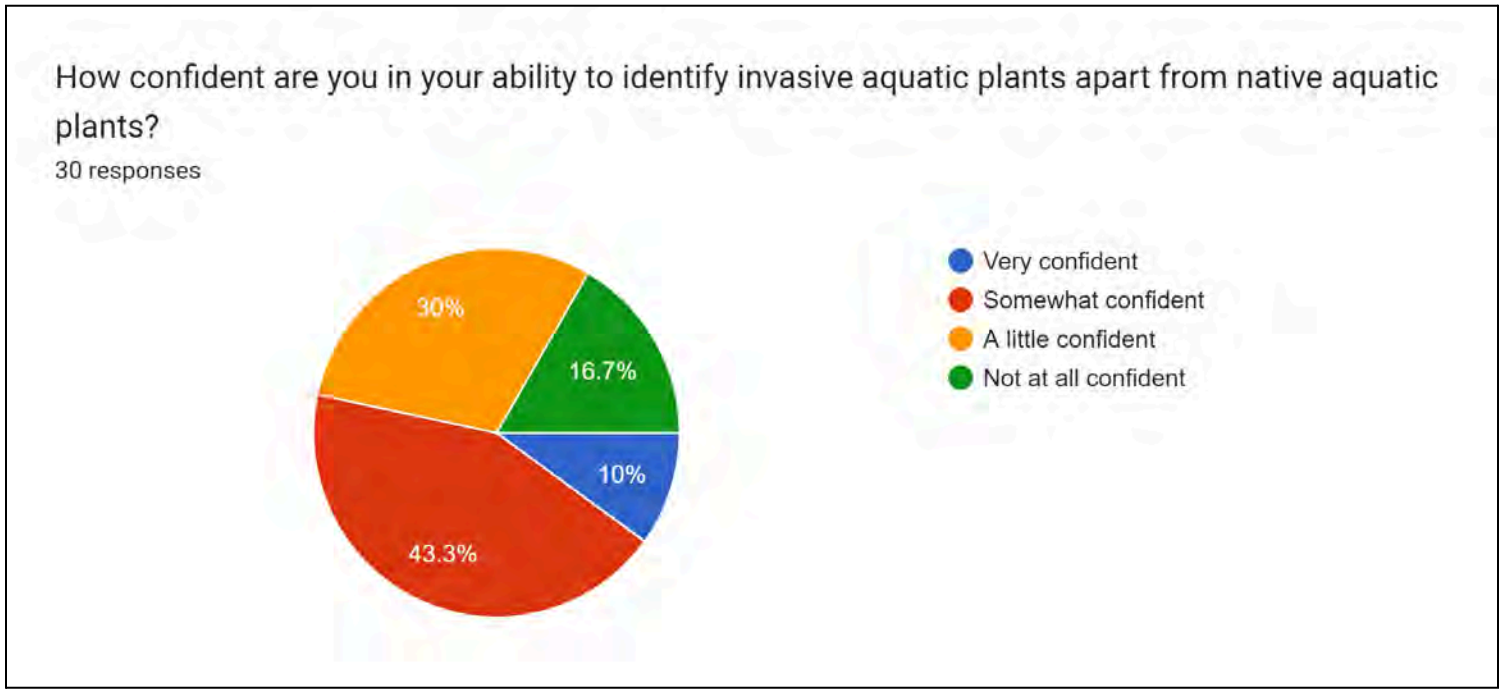
Invasive species currently present in Tree Lake include curly-leaf pondweed (CLP) since 2006. Zebra mussels were discovered in 2022 by residents, confirmed by Golden Sands RC&D and Portage County and reported to WI DNR. Also present are Banded Mystery Snail and Chinese Mystery Snail. See the Aquatic Invasive Species Rapid Response Plan and the Aquatic Plant Management Strategies section for goals, objectives and actions relating to management of this invasive plant species.

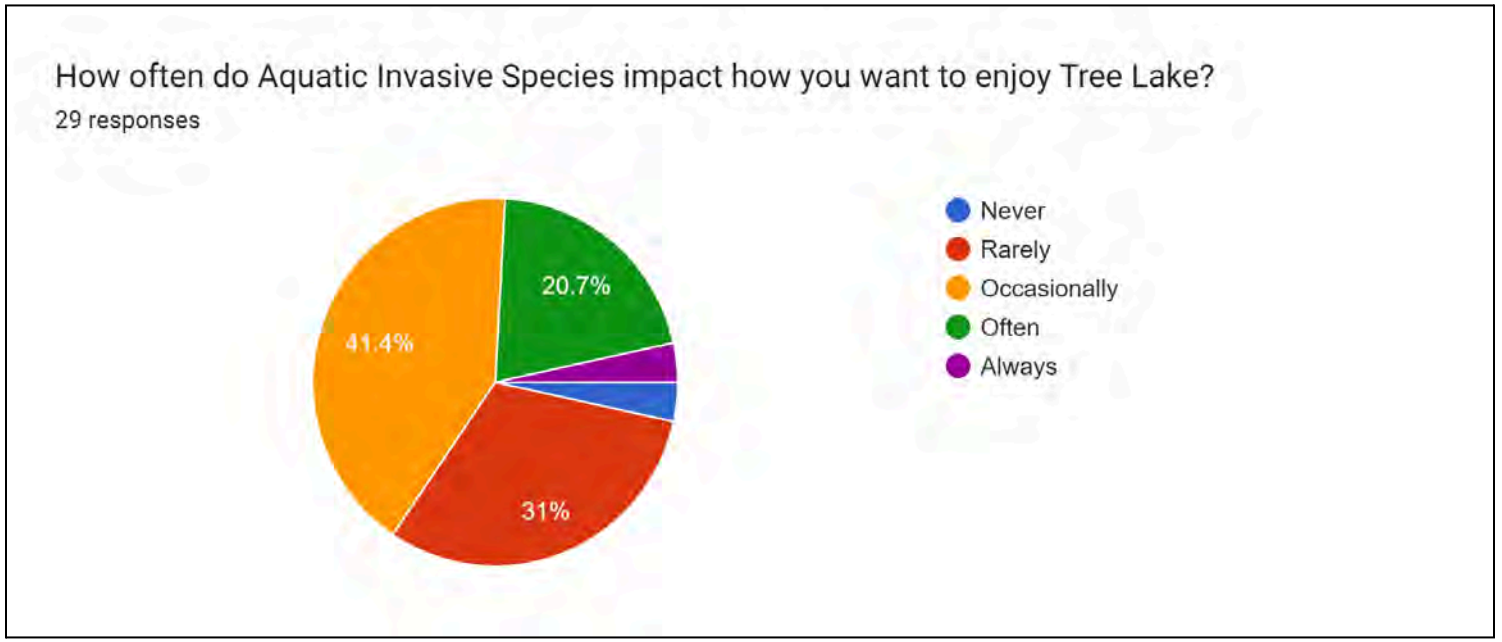
General recommendations for managing and preventing the spread of AIS:

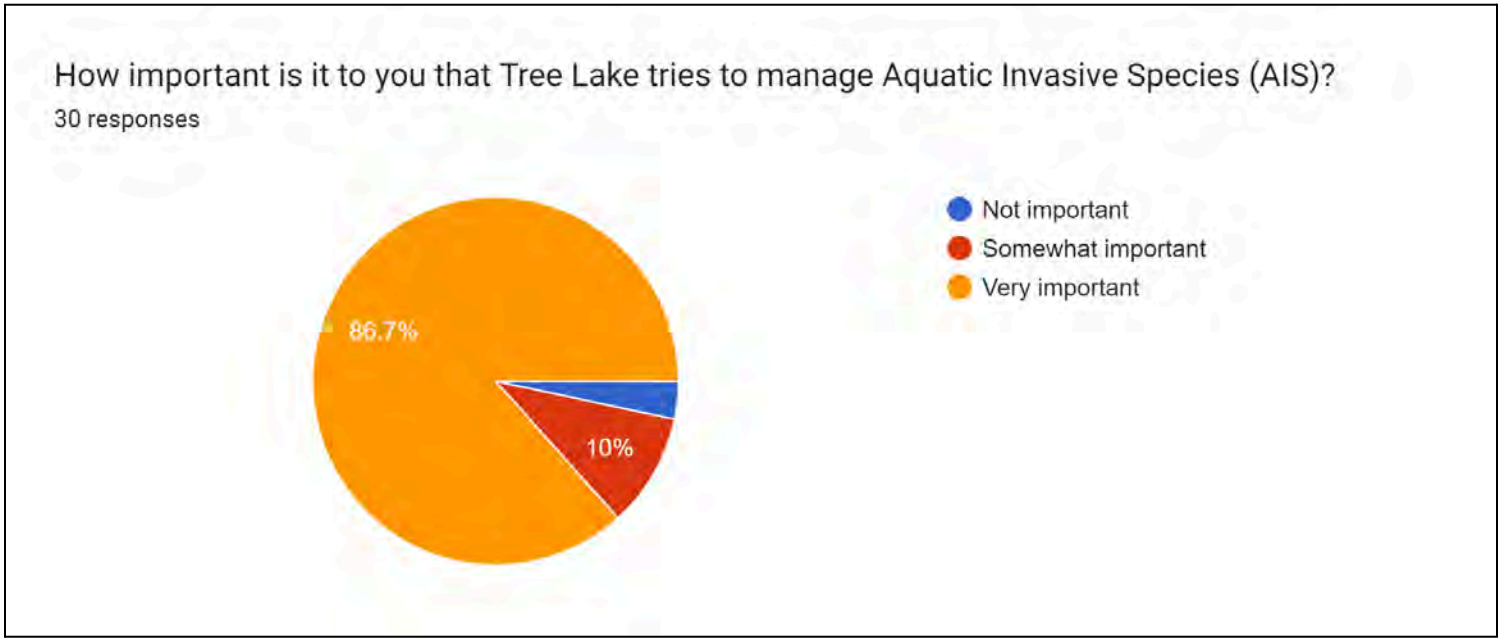
Reducing nutrients that travel across the landscape and into the lake can help lessen excessive plant growth. Algal blooms can be avoided by maintaining a healthy amount of native aquatic plants. Denuding the lakebed can increase potential for AIS establishment, while sediment can add phosphorus to the water which may lead to increased algal growth.

AIS can be better managed if routine monitoring is done annually (or more frequently) by volunteers trained in AIS identification and proper removal methods. If other AIS are found or suspected, lake users/residents can refer to the AIS Rapid Response Plan for instructions. Monitoring efforts can be coordinated with the Tree Lake Association, local lake citizens, Golden Sands RC&D and WDNR aquatic plant biologists.

2023 Update: Zebra Mussels were discovered in September 2020. A resident called the Portage County Land and Water Conservation Department and Golden Sands RC&D to report what they thought were zebra mussels. Both the Portage County Land and Water Conservation Department and Golden Sands RC&D went out to investigate and confirm it was zebra mussels. It was reported to WI DNR and the Tree Lake Association. Photos of zebra mussels in Tree Lake provided by Tracy Arnold, Portage County Land and Water Conservation Department.


How confident are you in your ability to identify invasive aquatic plants apart from native aquatic plants?
30 responses
30%
16.7%
10%
43.3%
Very confident
Somewhat confident
A little confident
Not at all confident


How often do Aquatic Invasive Species impact how you want to enjoy Tree Lake?
29 responses
20.7%
41.4%
31%
Never
Rarely
Occasionally
Often
Always


How important is it to you that Tree Lake tries to manage Aquatic Invasive Species (AIS)?
30 responses
86.7%
10%
Not important
Somewhat important
Very important


CLEAN BOATS
CLEAN WATERS

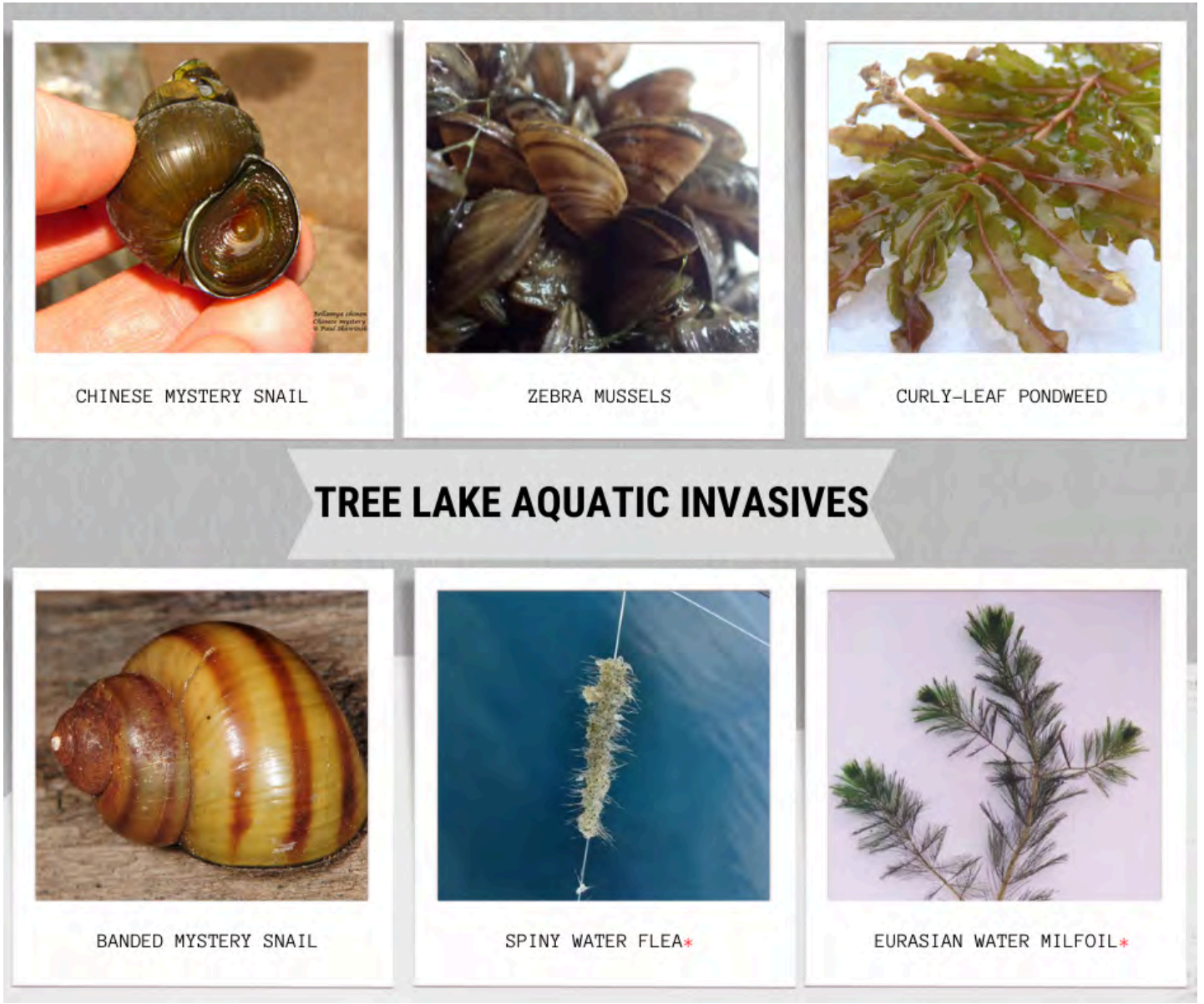
Tree Lake, Portage County AIS survey results
July 11nd, 2012
Conducted by Kaycie Stushek, Golden Sands RC&D
During the course of the survey, observed native aquatic plants were also recorded.

AIS & Aquatic Plant List (AIS highlighted in red and marked with an asterisk*)
White water lily
Arrowhead
Floating leaf pondweed
Large leaf pondweed
Bullhead pond lily
Coontail
Slender Naiad
Southern Naiad
Common Waterweed
White Water crowfoot
Northern Watermilfoil
Sago Pondweed
Water Celery
Flat Stemmed Pondweed
Chara
Leafy Pondweed
Illinois Pondweed
Water Marigold
Twin-Stemmed Bladderwort - Species of Special Concern
*Curly Leaf Pondweed
*Banded Mystery Snail
*Chinese Mystery Snail

Notes:
Curly Leaf Pondweed (CLP) was known to be present on the lake, but had not been mapped in recent years. The plants found were small, or toward the end of their life cycle for the year. A survey earlier in the summer may reveal a larger population, but a few beds were still found, even this late in the summer. A few floating turions (seed casings) that were sprouting new CLP were also found.
The CLP was found by the boat landing, as well as along the western and north western shores, where the water changed from 3 feet in depth to 5 feet in depth. In the shallow areas, the native chara and native water lilies seemed to keep the curly leaf pondweed at bay. Where the chara/water lilies ended, the CLP began.

Banded mystery snails and Chinese mystery snails were abundant throughout the lake. There was also a large native snail population as well.

The lake was very nutrient rich, and supported a large native plant population, as well as a large population of algae. There is a wetland on the north shore that appeared to be healthy and diverse with native plants. Twin-stemmed bladderwort is a species of special concern and is located in the wetland area.



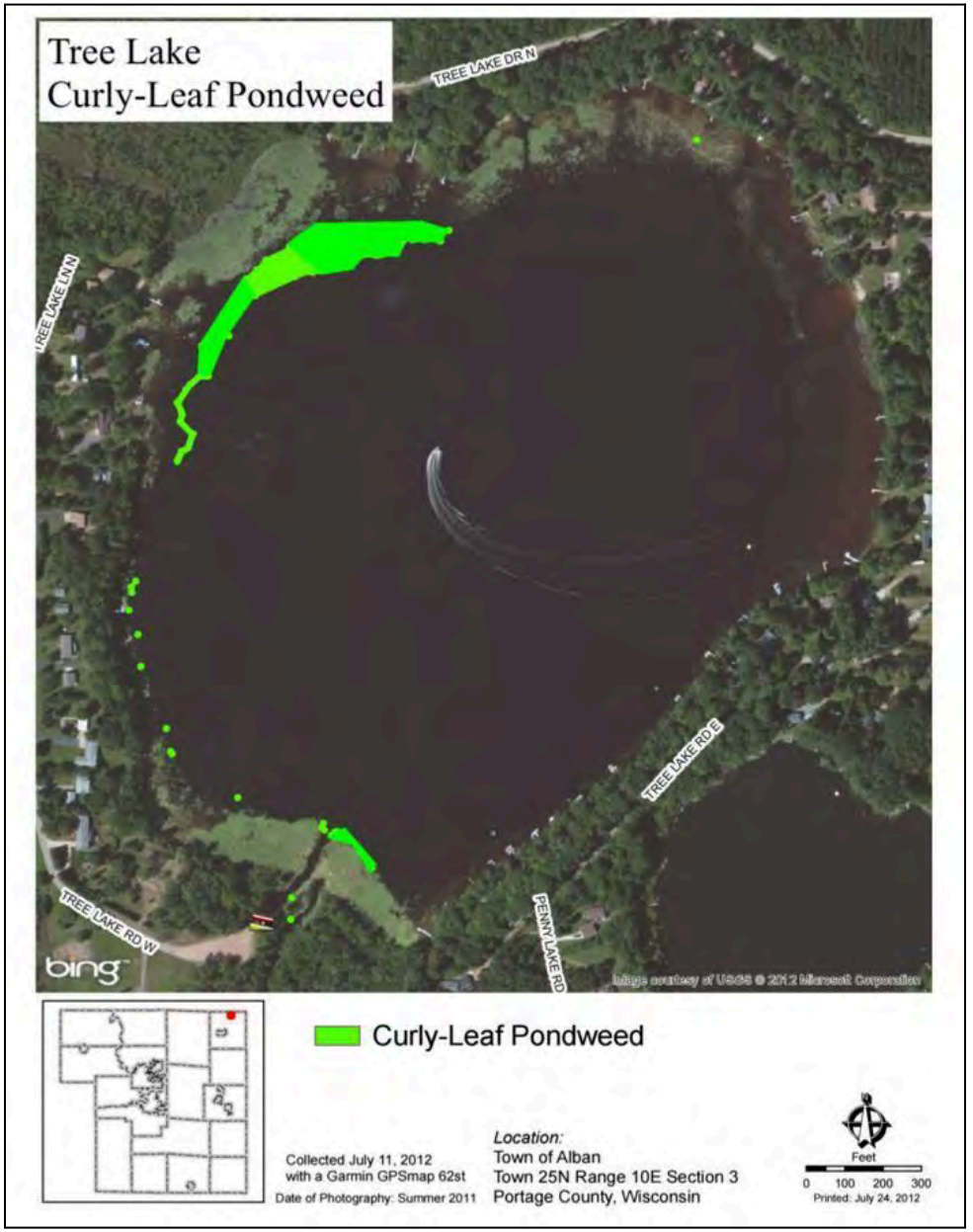
(*)not currently in Tree Lake but in nearby water bodies

Curly-Leaf Pondweed in Tree Lake 2012

Curly-Leaf Pondweed (CLP)

Curly-leaf pondweed (*Potamogeton crispus*) has been known to be present in Tree Lake since 2006. In some lakes, CLP can grow as a member of the aquatic plant community; however, it can also become invasive. CLP has a unique lifecycle, reaching maturity and dying off by mid-June. This can be problematic because the decaying plant tissue releases nutrients that can fuel filamentous algal blooms throughout the summer. The populations of CLP in Tree Lake should be mapped in early June to evaluate if they are stable or expanding.

Curly-leaf pondweed (*Potamogeton crispus*)



Guiding Vision for the Aquatic Invasive Species (AIS)

Tree Lake will monitor and work to control existing aquatic invasive species (AIS), through partnerships with residents and natural resource professionals. Tree Lake will also continue educational efforts to assist in preventing new aquatic invasive species (AIS) from entering and becoming established in and around Tree Lake.

Goal 3

Work to control and suppress aquatic invasive species (AIS) in Tree Lake so as to not become overly abundant.

Objective 3.1. Monitor and work on control and/or suppression of infestations of new and existing AIS into Tree Lake.

Action	Lead person/group	Start/end dates	Resources
Continue education about AIS through newsletters, and meetings.	Tree Lake Association Newsletter editor	Ongoing	Golden Sands RC&D WI DNR Clean Boats Clean Waters
Encourage Clean Boats, Clean Waters (CBCW) program.	Tree Lake Association	Ongoing	CBCW Program Coordinator Golden Sands RC&D
Add "It's the law" to the boat landing sign.	Portage County Parks Department	2016	Portage County Parks Department Golden Sands RC&D
Encourage Tree Lake residents to monitor and report Aquatic Invasive Species to Golden Sands RC&D or Portage County Land and Water Conservation.	Tree Lake Residents	Ongoing	Golden Sands RC&D Portage County Land and Water Conservation Department
Volunteers should learn to identify and monitor Aquatic Invasive Species (AIS)	Tree Lake Association Golden Sands RC&D	Annually	Golden Sands RC&D WI DNR Water Resource Specialist
If AIS is found or suspected, follow guidance in the Rapid Response Plan.	Tree Lake Association	Annually	Portage County Land and Water Conservation Department
Review and update Rapid Response Plan annually.	Tree Lake Association	Annually	Portage County Land and Water Conservation Department Golden Sands RC&D

Aquatic Invasive Species Rapid Response Plan

Survey/Monitor

Learn to survey/monitor the lake from:

Water Resources Management Specialist	Portage County Aquatic Invasive Species (AIS) Coordinator
WDNR-Scott Provost or Colton Hutchinson	Golden Sands RC & D- Chris Hamerla
473 Griffith Ave, Wisconsin Rapids, WI 54494	1100 Main St, Suite #150, Stevens Point, WI 54481
715-421-7881	715-343-6215
Scott.Provost@wisconsin.gov or colton.hutchinson@wisconsin.gov	info@goldensandrcd.org or Chris.Hamerla@goldensandsrcd.org

1. Collect Specimens or Take Pictures

- Collect, press, and dry a complete sample. This method is best because a plant expert can then examine the specimen

Or –

- Collect a fresh sample. Enclose in a plastic bag with a moist paper towel and refrigerate.

Or –

- Take detailed photos (digital or film) and send them by mail or email.

Regardless of method used, provide as much information as possible. Try to include flowers, seeds or fruit, buds, full leaves, stems, roots and other distinctive features. In photos, place a coin, pencil, or ruler for scale. Deliver or send specimens ASAP.

Note Location (Provide one or more of the following)

- Latitude & Longitude
- UTM (Universal Transverse Mercator) coordinates
- County, Township, Range, Section, Part-section
- Precise written site description, noting nearest city & road names, landmarks, local topography

If possible, give the exact geographic location using a GPS (global positioning system) unit, topographic map, or the Wisconsin Gazetteer map book. If using a map, include a photocopy with a dot showing the plant's location. You can use TopoZone.com to find the precise location on a digital topographic map. Click the cursor on the exact collection site and note the coordinates (choose UTM or Latitude/Longitude).

and note the coordinates (choose UTM or Latitude/Longitude).

2. To positively I.D. the species, send or bring specimen and additional information:

- Collection date & county
- Your name, address, phone, email
- Exact location (Latitude/Longitude or UTM preferred, or Township/Range/Section)
- Plant name (common or scientific)
- Land ownership (if known)
- Population description (estimate number of plants, area covered)
- Habitat type(s) where found (forest, field, prairie, wetland, open water)

Send or bring specimen to:

Portage County AIS Coordinator
Golden Sands RC&D
Address: 1100 Main St, Suite #150
Stevens Point, WI 54481
Phone: 715-343-6215
E-Mail : info@goldensandsrcd.org

UW-Stevens Point Herbarium
Stephanie Lyon, Curator
301 Daniel O. Trainer Natural Resources Building
Stevens Point, WI 54481
Phone: 715-346-4248
E-Mail: slyon@uwsp.edu

Wisconsin Dept. Natural Resources
AIS Program Coordinator
WI Dept. of Natural Resources, P.O. Box 7921, Madison, WI 53707-7921
Phone: 920-838-2597, E-Mail: amy.kretlow@wisconsin.gov

Once the specimen is dropped off or sent for confirmation, make sure to contact:

Portage County AIS Coordinator
Golden Sands RC&D
Address: 1100 Main St, Suite #150
Stevens Point, WI 54481
Phone: 715-343-6215
E-Mail : info@goldensandsrcd.org

3. If an invasive species is confirmed, the Portage County AIS Coordinator will post notice at the access points to the waterbody and contact the following:

Wisconsin Department of Natural Resources
Water Resources Management Specialist
Contact: Scott Provost and/or Colton Hutchinson
473 Griffith Ave., Wisconsin Rapids, WI 54494
Phone: 715-421-7881
E-Mail: Scott.Provost@wisconsin.gov and/or colton.hutchinson@wisconsin.gov

Tree Lake Association President
Contact: Michael Omernik
Address: 3121 Tommy's Turnpike Plover, WI 54467
Phone: 715-341-9036
E-mail: mike@accounting-offices.com

Town of Alban
Contact: Ray Oksuita
Address: PO Box 303, Rosholt, WI 54473
Phone: 715-570-5175 (Clerk)

Email: clerk@townofaLBAN.WI.GOV

Critical Habitat

Special areas harbor habitat that is essential to the health of a lake and its inhabitants. In Wisconsin, critical habitat areas are identified by biologists and other lake professionals from the Wisconsin Department of Natural Resources in order to protect features that are important to the overall health and integrity of the lake, including aquatic plants and animals. While every lake contains important natural features, not all lakes have official critical habitat designations. Designating areas of the lake as critical habitat enables these areas to be located on maps and information about their importance to be shared. Having a critical habitat designation on a lake can help lake groups and landowners plan waterfront projects that will minimize impact to important habitat, ultimately helping to ensure the long-term health of the lake.

Critical habitat sites are sensitive and fragile areas that support fish and wildlife habitat, provide mechanisms that protect water quality, and harbor quality plant communities. Protection of these areas within Tree Lake is important because they exemplify the character and qualities of the lake and ensure the long-term health of Tree Lake. The sensitive areas that were identified by researchers in the lake study can be found in the Sensitive Areas. Critical habitat areas around Tree Lake have been identified by biologists with the WDNR but no formal designation has occurred. A map of the areas that were identified can be found in the appendix. More details about critical habitat areas are available online at: http://dnr.wi.gov/lakes/criticalhabitat/ .

Critical Habitat Areas

Four critical habitat areas were identified by the Wisconsin Department of Natural Resources in its 2008 Tree Lake Critical Habitat Survey. Each critical habitat designation (CHD) was chosen for a different reason. See the appendices for the location of each of the four CHD areas on Tree Lake.

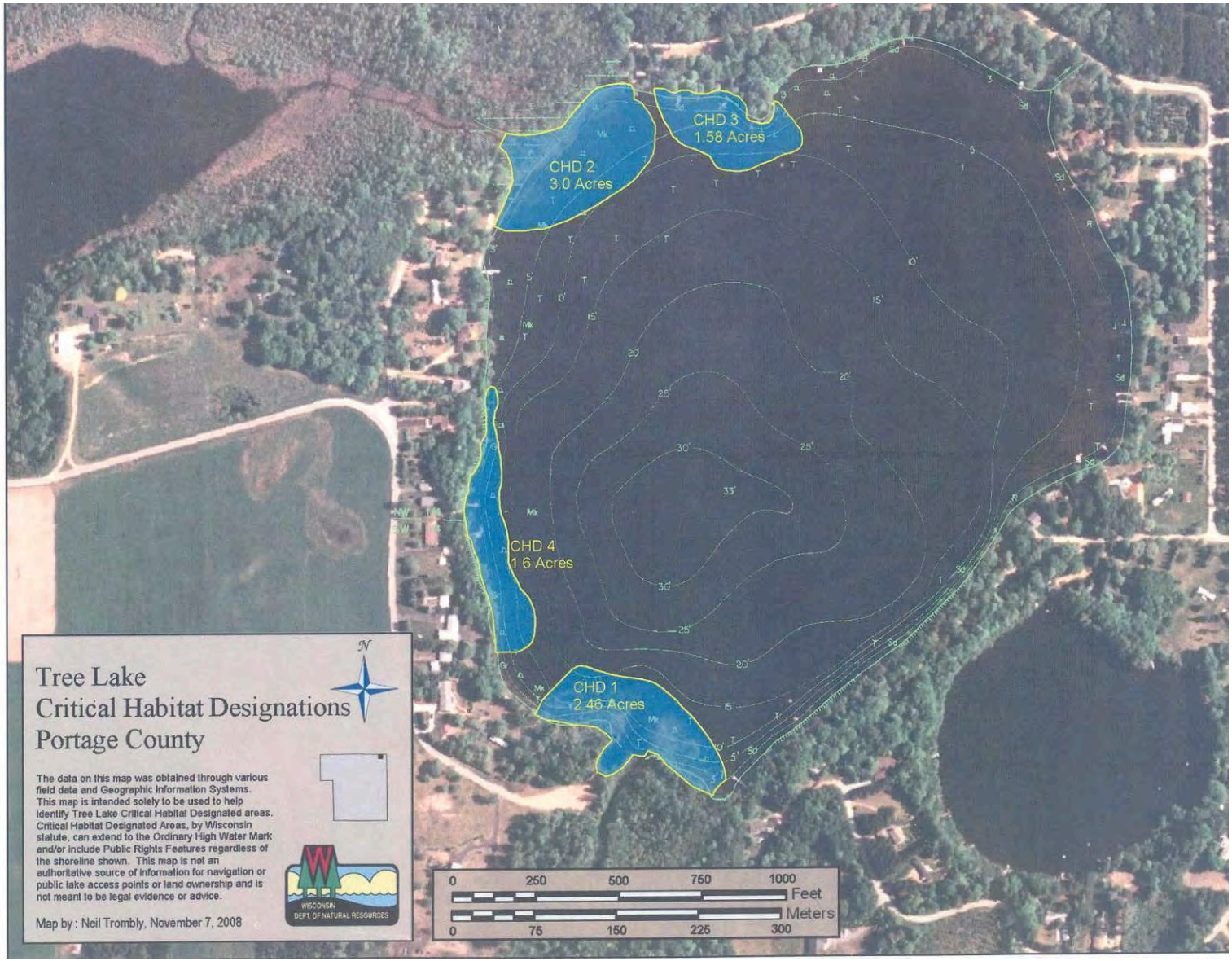
CHD 1 was designated as critical habitat for the emergent and floating leaf vegetation found in this area. This type of vegetation provides good cover for fish, while still allowing them to move between and below the plants.

CHD 2 had a diverse aquatic plant community, including a bog. The aquatic plant species found in this area are good for fish and wildlife habitat. This habitat includes healthy bulrush beds and good landward vegetation.

CHD 3 was also identified because of good habitat and bulrush beds.

CHD 4 was identified because it has good natural shoreline and aquatic vegetation. This site is a particularly good candidate for improvement by adding additional woody habitat.

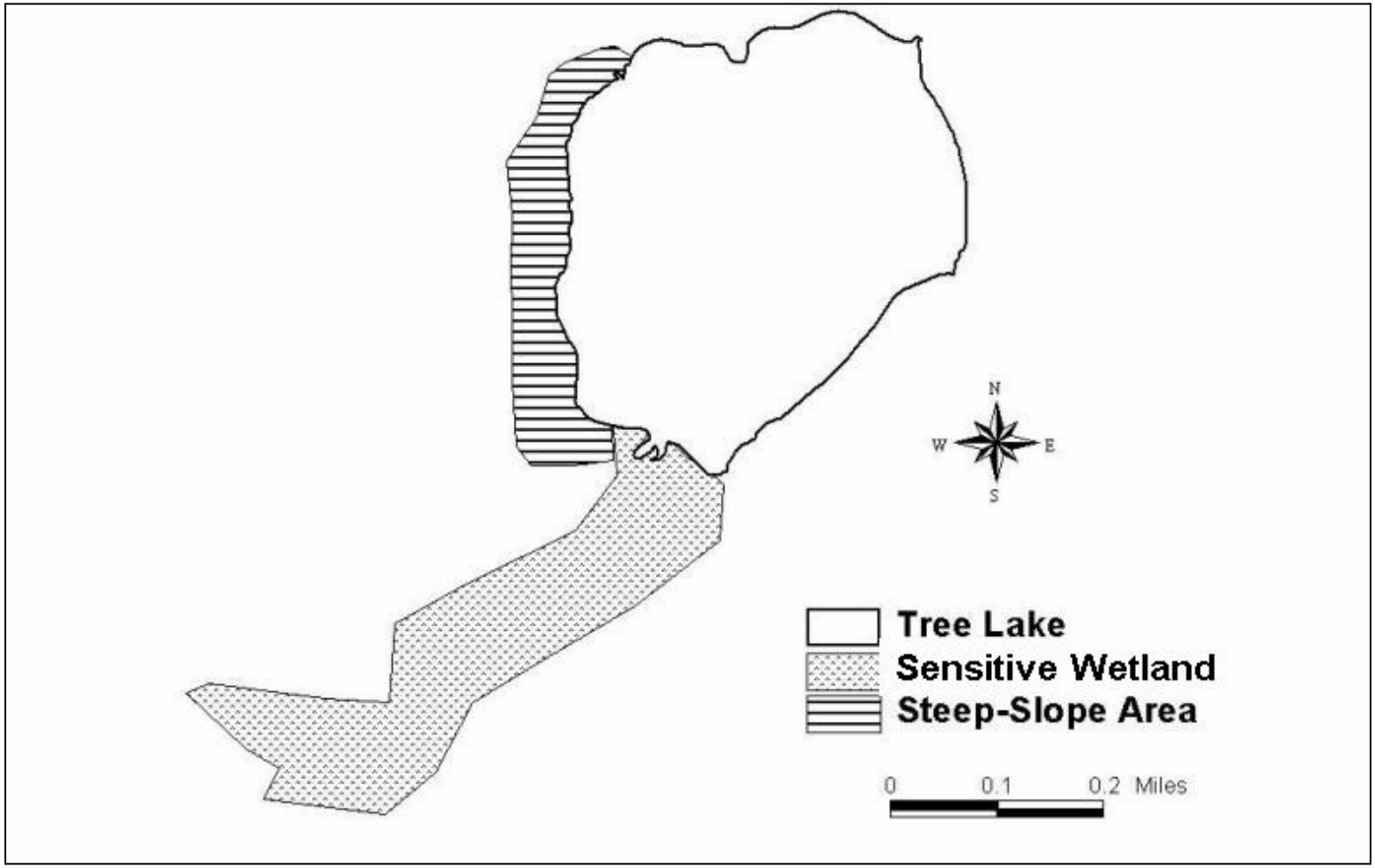
Critical Habitat Areas (WI DNR, 2008)



Sensitive Areas

From: UWSP Portage County Lake Study, 2003.

Sensitive areas associated with Tree Lake are defined by lands adjacent to the water that are particularly valuable to the lake's ecosystem or would be significantly impacted by disturbances or development. Two sensitive areas were identified on Tree Lake. The first was a long, finger- like wetland extending southwest from the southern shore of the lake. Wetlands filter pollutants, provide varied habitat for wildlife and birds, and store floodwaters. The second sensitive area was the steeply-sloped shoreland on the western side of the lake that is extremely susceptible to erosion and runoff to the lake if disturbed.



Amphibian and Reptile Habitat Map

From: Paloski and Wild, UWSP Portage County Lake Study, 2003.

Guiding Vision for the Sensitive Habitats

Tree Lake will identify, protect and enhance sensitive habitats around the lake through partnerships with residents and natural resource professionals.

Goal 4

Identify, protect and enhance the sensitive habitats in and around Tree Lake.

Objective 4.1. Protect current areas of critical habitat identified in the WI DNR Critical Habitat Report.

Actions	Lead person/group	Start/end dates	Resources
Review WI DNR Critical Habitat Report as needed.	Tree Lake Association	As needed	WI DNR Lake Manager
Restore shoreland in the WI DNR Critical Habitat Report or other areas.	Tree Lake Association	Ongoing	Portage County Land and Water Conservation Department UWEX Lakes Shoreland Specialist WI DNR Healthy Lakes Grants
Encourage woody habitat in the WI DNR Critical Habitat Report or other areas.	Tree Lake Association	2015	WI DNR Fisheries Biologist Portage County Land and Water Conservation Department WI DNR Healthy Lakes Grant
Continue to protect sensitive areas identified in Portage County Lakes Study.	Shoreland property owners	Ongoing	WI DNR Lake Managers and Biologists Portage County Land and Water Conservation Department
Encourage Portage County Parks to add woody habitat on County property and encourage the County Park to continue leaving current woody habitat.	Portage County Parks Department Portage County Land and Water Conservation Department	Ongoing	WI DNR Healthy Lakes Grant Portage County Parks Department Portage County Land and Water Conservation Department

Landscapes and the Lake

Land use and land management practices within a lake's watershed can affect both its water quantity and quality. While forests, grasslands, and wetlands allow a fair amount of precipitation to soak into the ground, resulting in more groundwater and good water quality, other types of land uses may result in increased runoff and less groundwater recharge, and may also be sources of pollutants that can impact the lake and its inhabitants. Areas of land with exposed soil can produce soil erosion. Soil entering the lake can make the water cloudy and cover fish spawning beds. Soil also contains nutrients that increase the growth of algae and aquatic plants. Development on the land may result in changes to natural drainage patterns and alterations to vegetation on the landscape, and may be a source of pollutants. Impervious (hard) surfaces such as roads, rooftops, and compacted soil prevent rainfall from soaking into the ground, which may result in more runoff that carries pollutants to the lake. Wastewater, animal waste, and fertilizers used on lawns, gardens and crops can contribute nutrients that enhance the growth of algae and aquatic plants in our lakes. Land management practices can be put into place that better mimic some of the natural processes, and reduction or elimination of nutrients added to the landscape will help prevent the nutrients from reaching the water. In general, the land nearest the lake has the greatest impact on the lake water quality and habitat.

Shoreland vegetation is critical to a healthy lake's ecosystem. It helps improve the quality of the runoff that is flowing across the landscape towards the lake. It also provides habitat for many aquatic and terrestrial animals including birds, frogs, turtles, and many small and large mammals. Healthy shoreland vegetation includes a mix of tall grasses/flowers, shrubs, and trees which extend at least 35 feet landward from the water's edge. Shorelands include adjacent wetlands, which also serve the lake by allowing contaminants to settle out, providing shelter for fish and wildlife, and decreasing the hazard of shoreline erosion by providing a shoreland barrier from waves and wind.

The water quality in Tree Lake is the result of many factors, including the underlying geology, the climate, and land management practices. Since we have little control over the climate and cannot change the geology, changes to land management practices are the primary actions that can have positive impacts on the lake's water quality. The water quality in Tree Lake was assessed by measuring different characteristics including temperature, dissolved oxygen, water clarity, water chemistry, and algae. All of these factors were taken into consideration when management planning decisions were made.

Water Quality and Watershed Land Use

A variety of water chemistry measurements were used to characterize the water quality in Tree Lake. Water quality was assessed during the 2002-2003 lake study and involved a number of measures including temperature, dissolved oxygen, water chemistry, and nutrients (phosphorus and nitrogen). Nutrients are important measures of water quality in lakes because they are used for growth by algae and aquatic plants. Each of these interrelated measures plays a part in the lake's overall water quality. In addition, water quality data collected in past years was also reviewed to determine trends in Tree Lake's water quality.

Tree Lake is host to a wide variety of plants, insects, fish, amphibians, and a variety of other animals that all depend on good water quality in the Lake. The majority of residents on Tree Lake felt that the water quality in Tree Lake was good or fair, but that it declined over the years. Data shows that while water quality has improved slightly from historic levels, there are still concerns over high phosphorus and nitrogen levels in the lake. Although the average concentrations (presented earlier in the plan) are less than the proposed DNR phosphorus standards, concentrations in Tree Lake are often well above this level and therefore; reduction is recommended. Protecting and improving water quality goals will be met through increasing infiltration and reducing runoff to the lake, which will help to reduce phosphorus and nitrogen inputs and concentrations in the lake. Reducing phosphorus and nitrogen in the lake will limit algae blooms and improve water clarity.

It is important to understand where Tree Lake's water originates in order to understand the lake's health. During snowmelt or rainstorms, water moves across the surface of the landscape (runoff) towards lower elevations such as lakes, streams, and wetlands. The land area that contributes runoff to a lake is called the surface watershed. Groundwater also feeds Tree Lake; its land area may be slightly different than the surface watershed.

The capacity of the landscape to shed or hold water and contribute or filter particles determines the amount of erosion that may occur, the amount of groundwater feeding a lake, and ultimately, the lake's water quality and quantity. Essentially, landscapes with greater capacities to hold water during rain events and snowmelt slow the delivery of the water to the lake. Less runoff is desirable because it allows more water to recharge the groundwater, which feeds the lake year-round - even during dry periods or when the lake is covered with ice. A variety of land management practices can be put in place to help reduce impacts to our lakes. Some practices are designed to reduce runoff. These include protecting/restoring wetlands, installing rain gardens, swales, rain barrels, and routing drainage from pavement and roofs away from the lake. Some practices are used to help reduce nutrients from moving across the landscape towards the lake. Examples include manure management practices, eliminating/reducing the use of fertilizers, increasing the distance between the lake and a septic drainfield, protecting/restoring wetlands and native vegetation in the shoreland, and using erosion control practices. Land use and land management practices within the Tree Lake watershed play a large role in the amount of sediment, nutrients, and other pollutants entering the lake. Although it may not be reasonable to change land uses, management practices on the landscape can result in water quality improvements. Thoughtful decisions that are made when land is developed may actually improve water quality or at least minimize disturbances.

During the 2002-2003 study, inorganic nitrogen concentrations were very high, with average spring concentrations of 0.95 mg/L. Concentrations above 0.3 mg/L are sufficient to produce algal blooms throughout the summer and can enhance the growth of aquatic plants. Concentrations of nitrogen in a lake are

diluted compared with concentrations in groundwater. This is because the water in Tree Lake is a mixture of water entering through the inflow stream and contaminated and uncontaminated groundwater. Therefore, it is likely that private wells in the path of the contaminant plume may have nitrate concentrations that exceed the drinking water standard. Excess nitrogen results from over-application of fertilizers or manure. Septic systems are another source of nitrogen; however, based on the very high concentrations in Tree Lake it is highly unlikely they are the sole source to the lake.

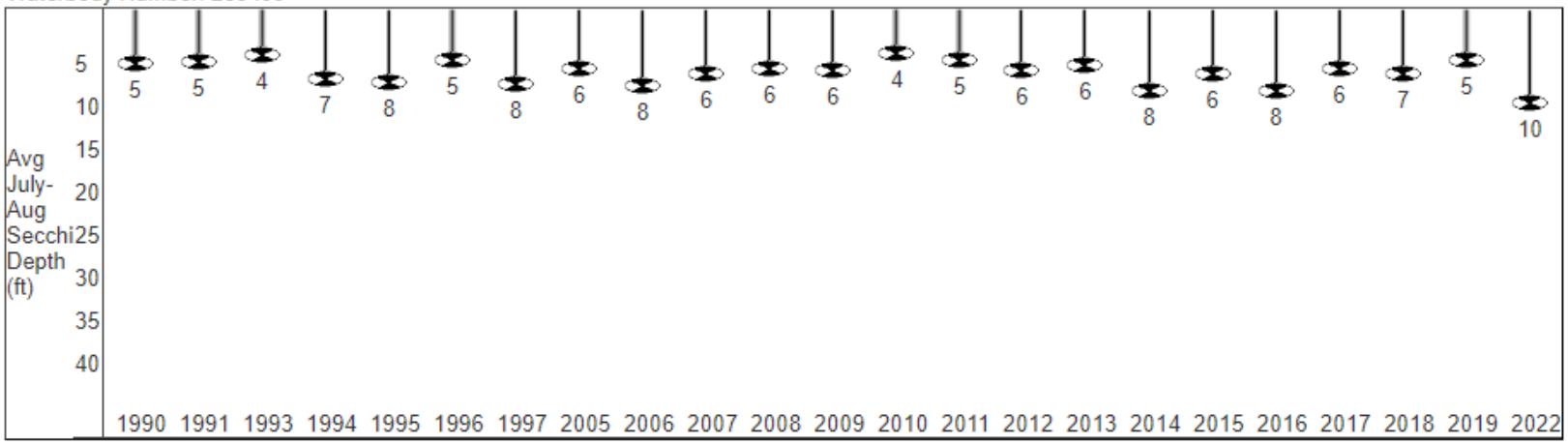
The algal community considered relative to the chlorophyll a, phosphorus, and nitrogen values for Tree Lake presented a picture of a very mesotrophic lake. Water clarity in Tree Lake was generally good during all algal sampling periods, which seems to conflict with the high chlorophyll a values, heavy algal densities, and water chemistry data; however, this is not uncommon in stratified lakes such as Tree Lake. More details from the 2002-2003 water quality study can be found in the **Background Information (from 2002-2003 study)** section of this document.

2014 Updates: Water clarity measurements were measured in Tree Lake between 1975 and 2013. In recent years, samples have been collected by Richard Heegeman. Between 2005 and 2013, data was rounded to the nearest foot; measurements to the nearest tenth of a foot would improve the ability to interpret the data. In general, water clarity has somewhat improved over time, but remains fair during late summer. In late summer 2011, water clarity measurements were noticeably degraded.

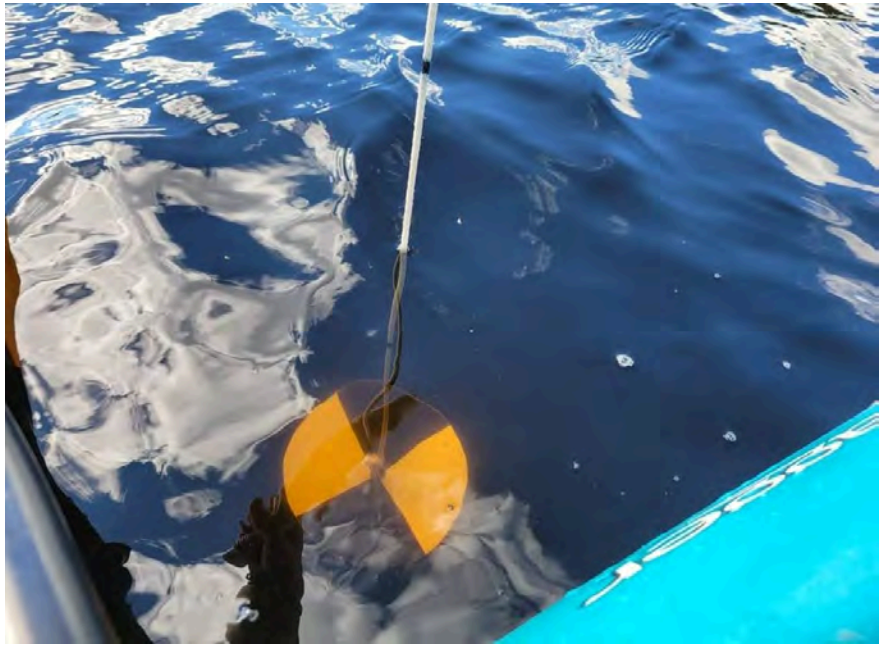
2023 Updates: Tree Lake actively participates in the Citizen Lake Monitoring Network. Water quality data collected include: Chlorophyll A, Phosphorus Total, Temperature profiles, Nitrogen Total, Dissolved Oxygen and Secchi Disk. All data is entered in the Surface Water integrated Monitoring System (SWIMS) database and can be viewed on the Surface Water Data Viewer https://dnr.wisconsin.gov/topic/SurfaceWater/swdv

One aspect of CLMN that is monitored on Tree Lake is water clarity. Water clarity monitoring is a process in which the volunteer lowers an 8" diameter, black & white disc ("Secchi disc") into the deepest part of the lake to determine how far down they can see the disc as it is lowered. Water clarity monitoring is done every 10-14 days throughout the open-water season. Water clarity is a quick way to estimate lake health, and it plays an important role in determining the types of plants and animals that a water body can support. This graph below shows Secchi readings by year for Tree Lake. Secchi disk readings have remained relatively steady over the time period.

Tree Lake
Portage County
Waterbody Number: 289400



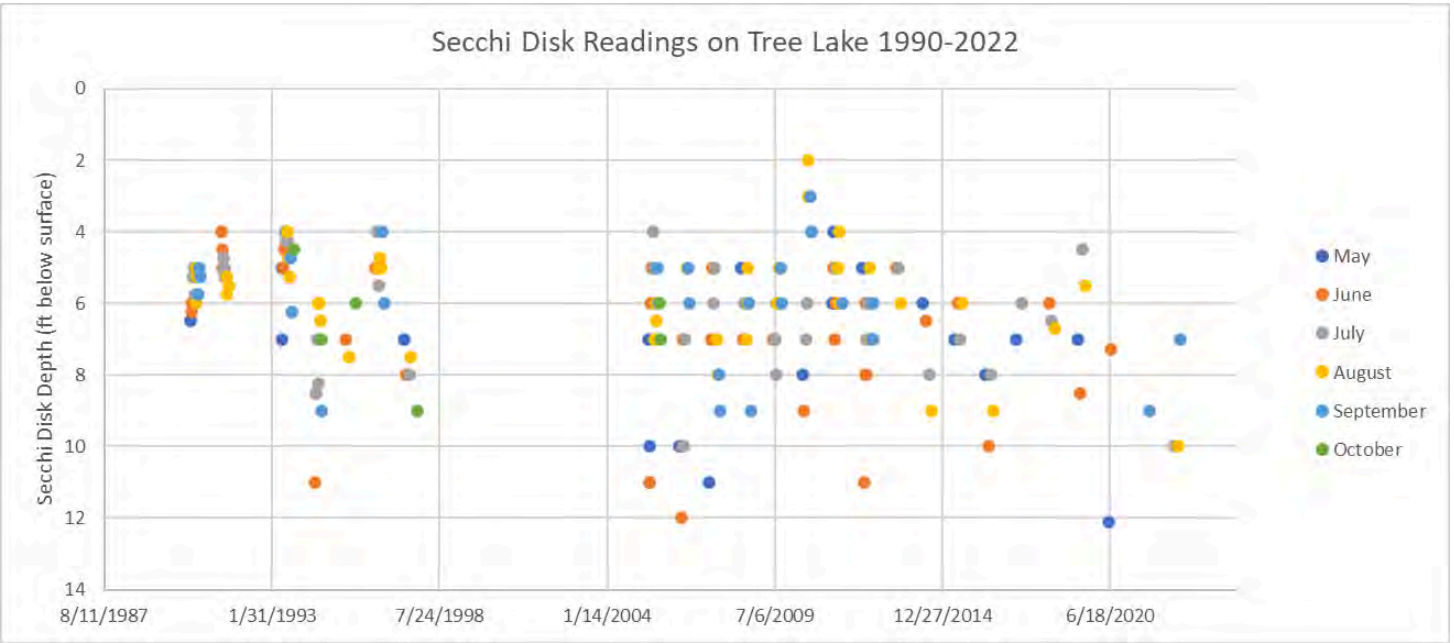
Past secchi averages in feet (July and August only).



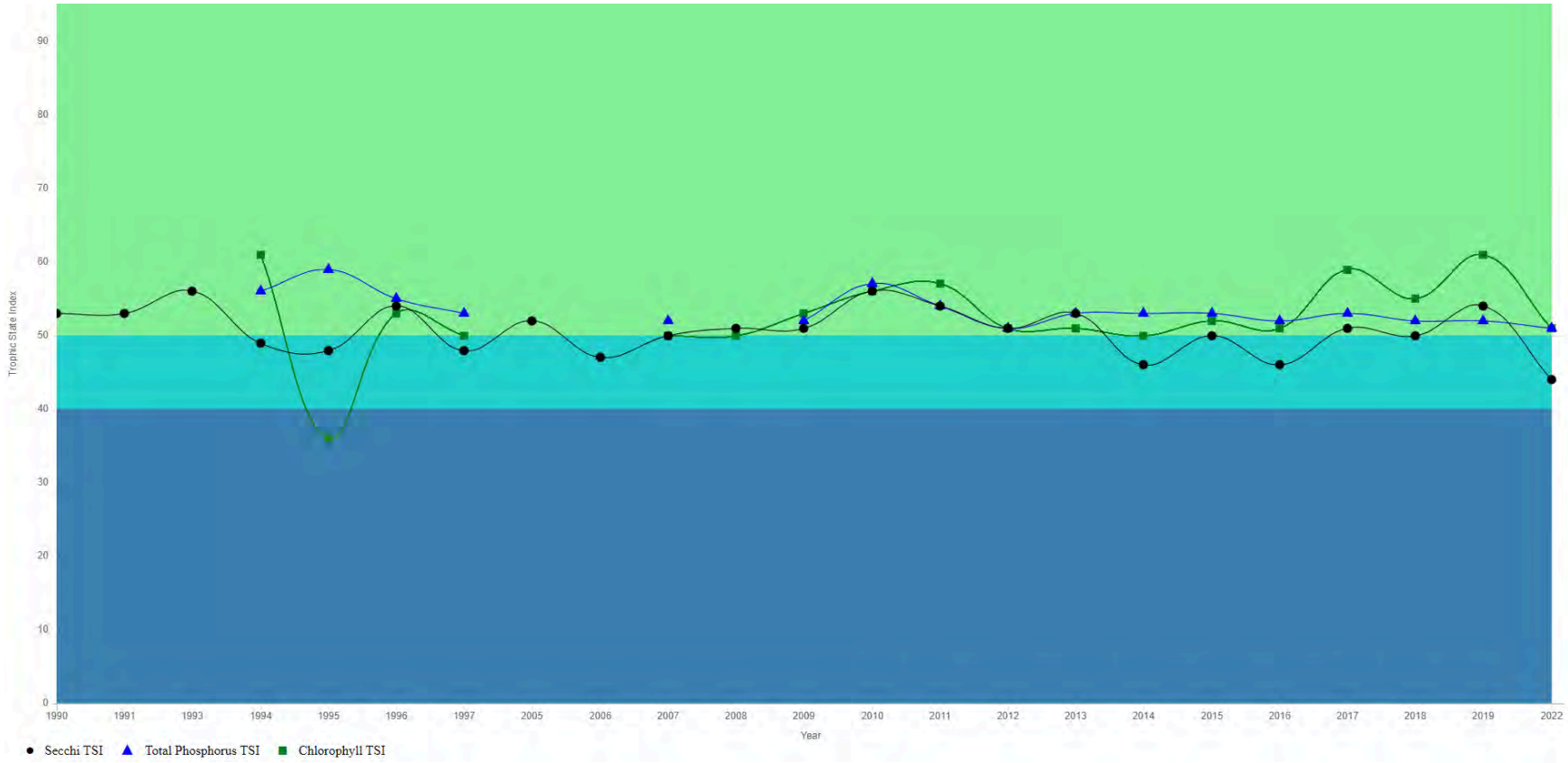
Year	Secchi Mean	Secchi Min	Secchi Max	Secchi Count
1990	5.38	5	6	6
1991	5.21	4.75	5.75	7
1993	4.34	4	5.25	8
1994	7.25	6	8.5	7
1995	7.5	7.5	7.5	1
1996	4.96	4	5.5	7
1997	7.75	7.5	8	2
2005	5.92	4	7	6
2006	8	5	10	4
2007	6.5	5	8	4
2008	6	5	7	6
2009	6.29	5	8	7
2010	4.2	2	7	5
2011	5	4	6	5
2012	6.2	5	7	5
2013	5.5	5	6	2
2014	8.5	8	9	2
2015	6.5	6	7	2
2016	8.5	8	9	2
2017	6	6	6	1
2018	6.6	6.5	6.7	2
2019	5	4.5	5.5	2
2022	10	10	10	2

Report Generated: 06/07/2023

Secchi disk readings on Tree Lake from 1990-2022 (based on submitted data)



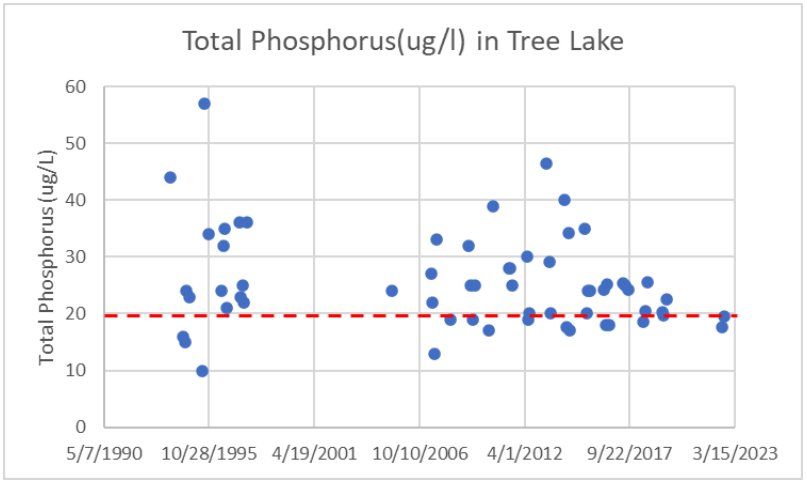
Trophic State Index Graph: Tree Lake-Deepest Spot-Portage County



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

Phosphorus

Nutrients (phosphorus and nitrogen) are used by algae and aquatic plants for growth much like house plants or crops. Phosphorus is present naturally throughout the watershed in soil, plants, animals and wetlands. Common sources from human activities include soil erosion, animal waste, fertilizers and septic systems. The most common mechanism for the transport of phosphorus from the land to the water is through surface runoff, but it can also travel to the lake in groundwater. Once in a lake, a portion of the phosphorus becomes part of the aquatic system in the form of plant tissue, animal tissue and sediment. The phosphorus can continue to cycle within the lake for many years.

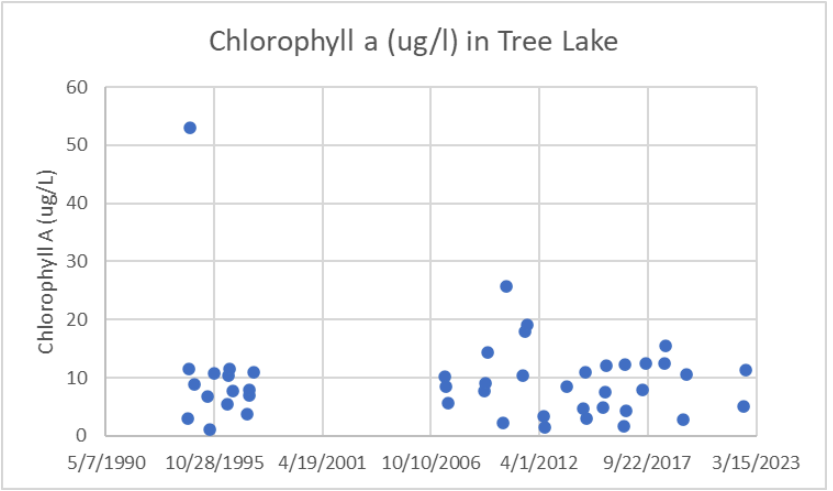


In Tree Lake, total phosphorus concentrations have been at or above the Wisconsin phosphorus standard of 20 ug/L for drainage lakes. These concentrations can fuel the growth of algae and aquatic plants and can result in changes to the fish community.

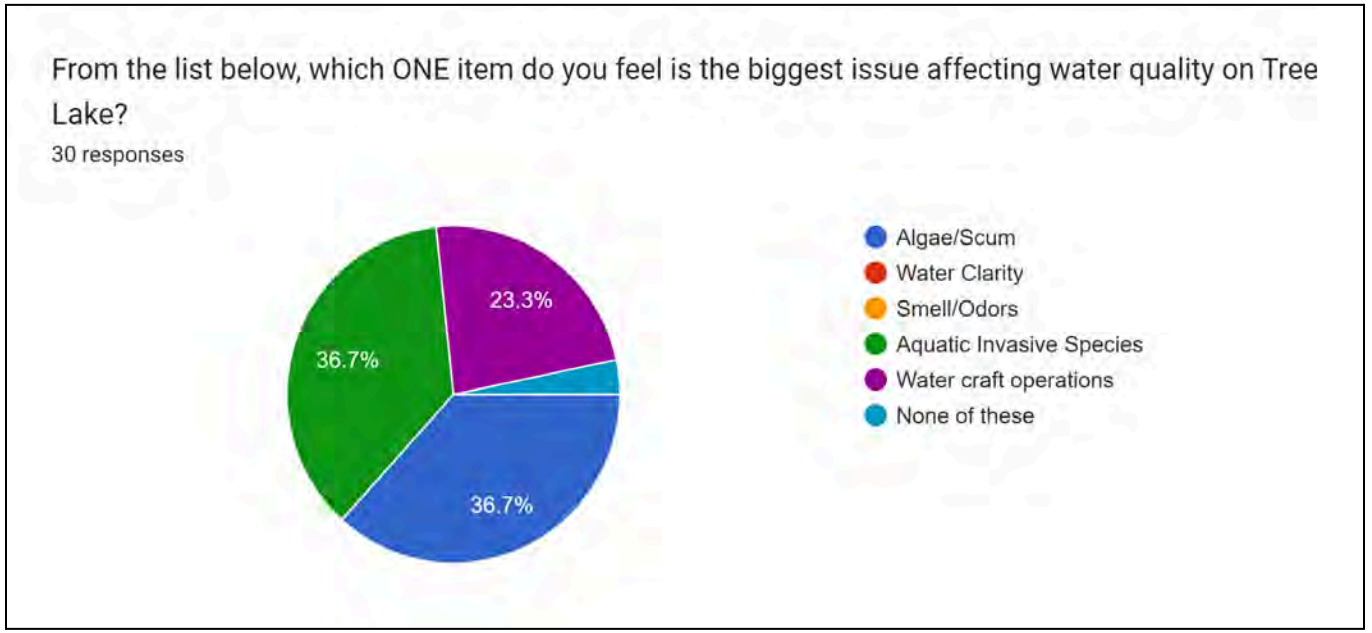
Efforts should be made to reduce phosphorus inputs to Tree Lake from near shore and the watershed. Shoreland property owners can contribute to reductions by eliminating the use of fertilizers, restoring/protecting shoreland vegetative buffers, and managing the runoff from impervious surfaces. Phosphorus concentrations should be monitored routinely in Tree Lake. In 2014, Tree Lake was added to Wisconsin's 303d list of Impaired Waterbodies for excessive algal growth.

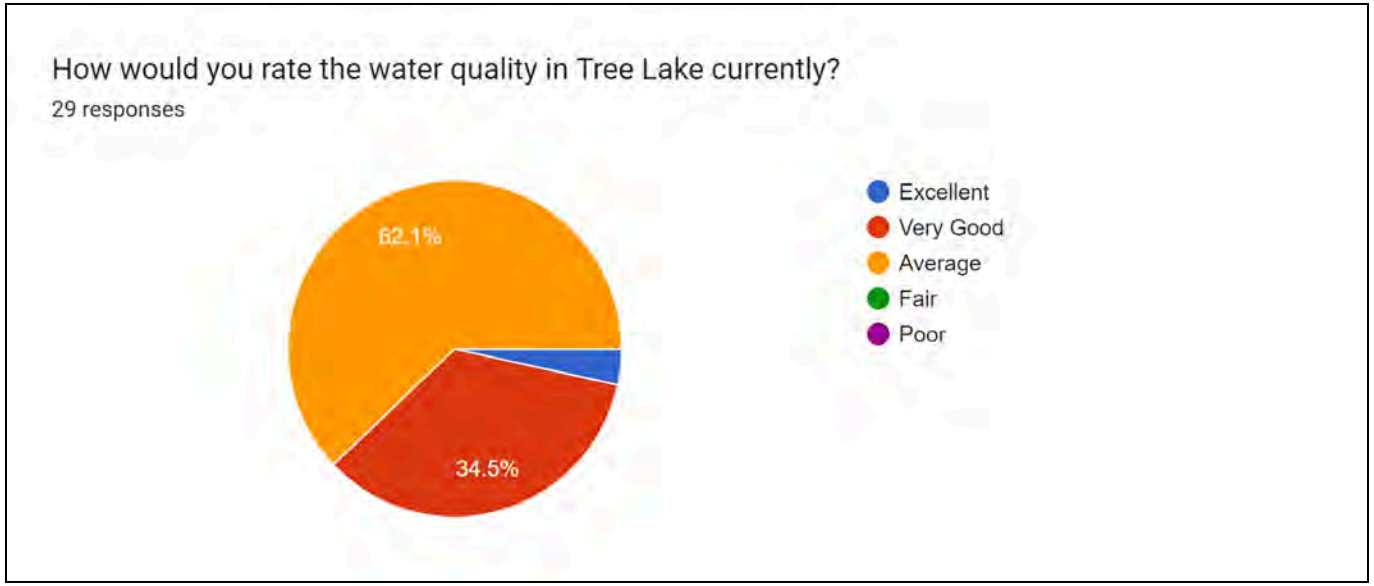
Chlorophyll-*a*,

Chlorophyll-*a* is a measurement of algae in the water and is used to calculate a lakes trophic status. Concentrations greater than 20 µg/L are perceived by many as problem blooms. According to the World Health Organization, concentrations greater than 10 µg/L of chlorophyll-*a* result in a moderate increase in risk to health due to the increased growth of blue-green algae. Monitoring results in recent years indicate that chlorophyll-*a* concentrations in Tree Lake have varied from below 10 µg/L to above 10 µg/L. These variations may be due to seasonal variations when the measurements were collected. However, it would be good to continue to monitor the Chlorophyll-*a* and algae in the lake to ensure that algal blooms are not increasing.

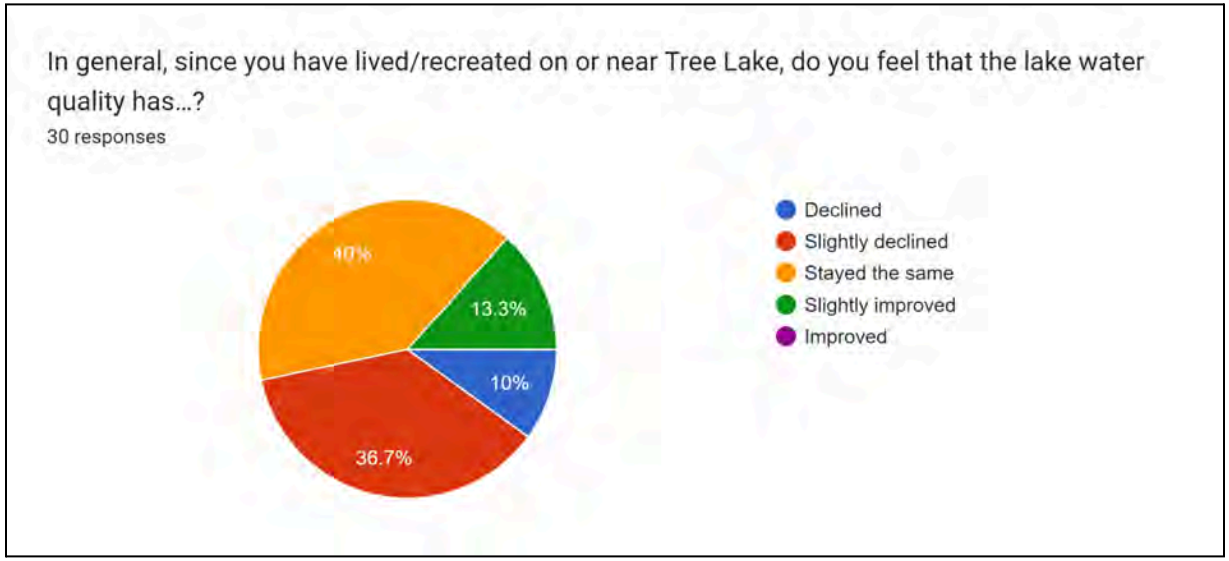


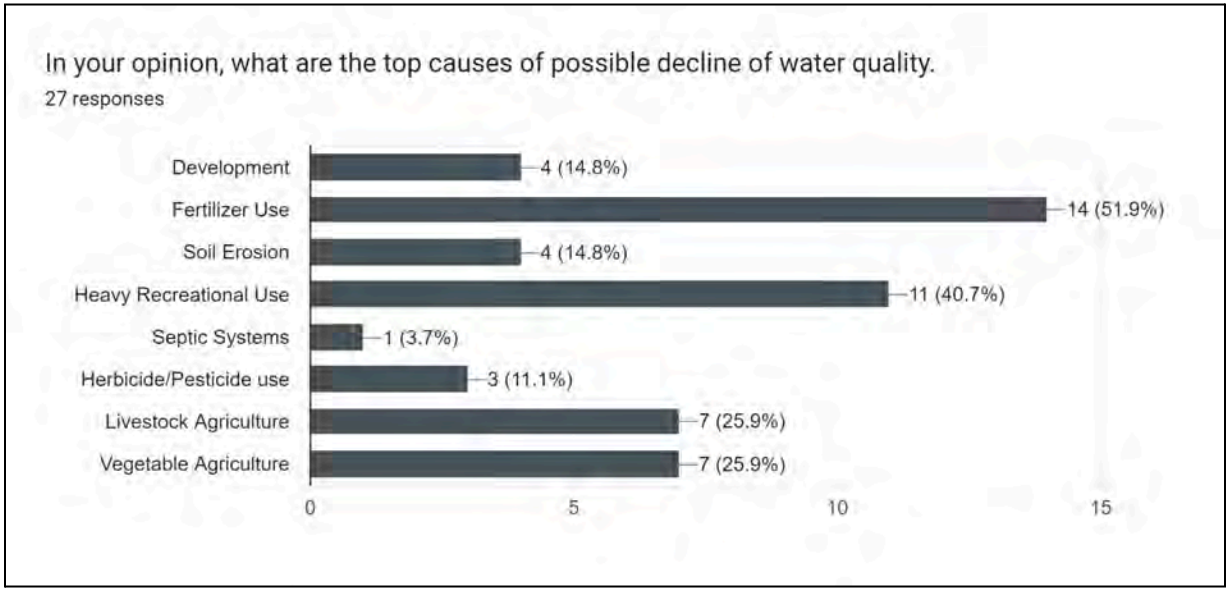
Results from the 2023 Resident Survey



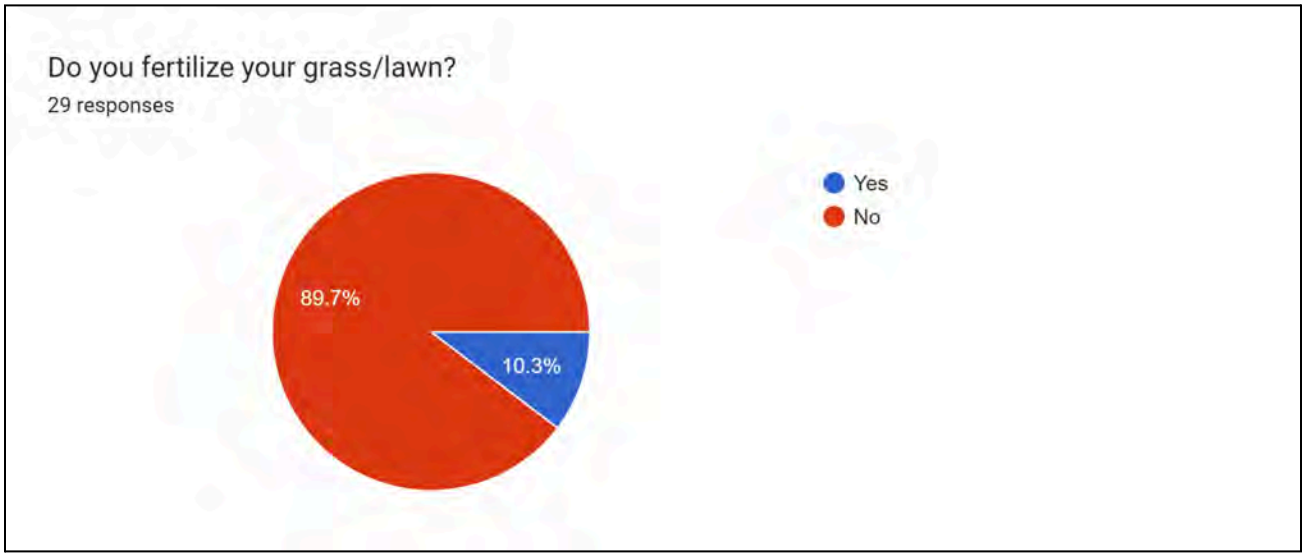


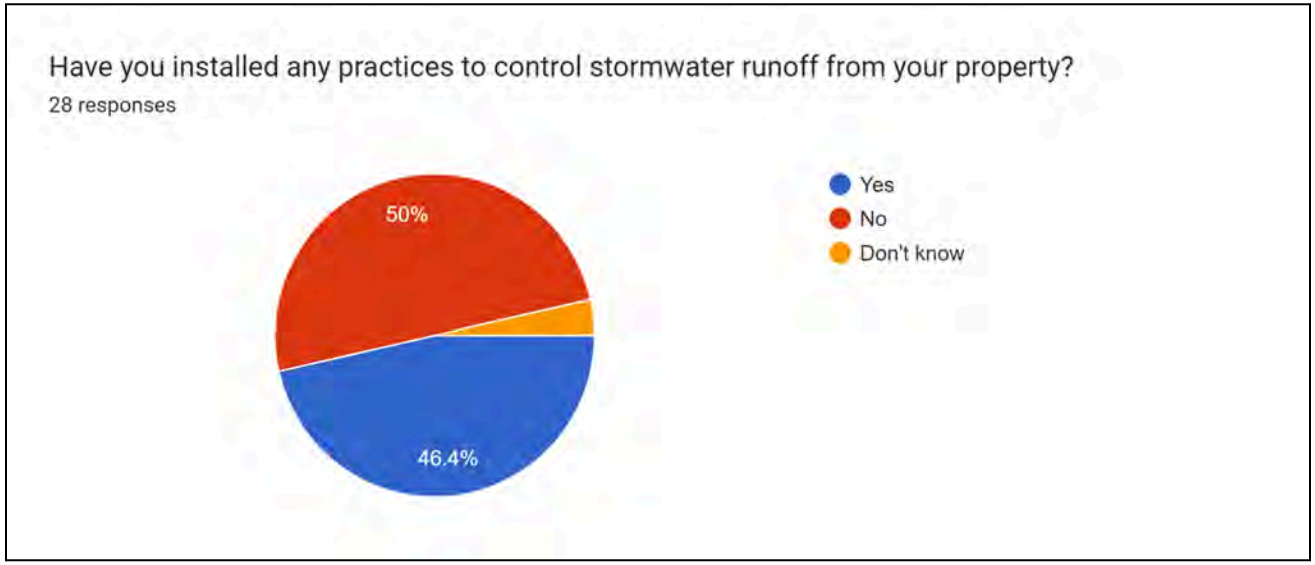
Results from the 2023 Resident Survey





Results from the 2023 Resident Survey





Guiding Vision for Water Quality

Tree Lake will have good water quality with minimal impacts from residential and agricultural lands in its watershed.

Goal 5

Monitor water quality and clarity in Tree Lake, review data with natural resource professionals and educate residents in the watershed on conservation practices to improve water quality and clarity in Tree Lake. This goal will be achieved when monitoring in Tree Lake indicates median summer (5 samples/summer) total phosphorus levels are below 20 ug/L for 3 consecutive years and inorganic nitrogen concentrations are less than 0.3 mg/L during spring turnover.

Objective 5.1. Continue monitoring efforts and provide diverse informational opportunities for residents and users of Tree Lake to learn current water quality about practices that improve water quality.

Action	Lead person/group	Start/end dates	Resources
Continue to encourage a citizen water quality monitoring program and expand to include total phosphorus during the summer.	Tree Lake Residents	Ongoing – May – Sept.	WI DNR CLMN program Portage County Land and Water Conservation Department
Collect samples for lab analysis of nitrogen and phosphorus during spring and fall overturn. Identify a funding source for the analyses.	Tree Lake Residents	Ongoing in spring and fall	UWSP Water & Environmental Analysis Lab Portage County Land and Water Conservation Department
Continue providing information and education to shoreland residents about eliminating and/or significantly reducing fertilizer use on lawns and agricultural land around the lake to reduce nitrogen and phosphorus inputs to Tree Lake.	Tree Lake Association	Ongoing	Portage County Land and Water Conservation Department
Provide information and education about testing their septic system.	Tree Lake Association	Ongoing	Portage County Planning & Zoning
Per State Statute all septic systems need to be pumped and inspected every 3 years. Holding tanks need to be pumped and inspected at least once a year. Failing systems need to be replaced with a code compliant system.	Portage County Planning & Zoning	Ongoing	Tree Lake Association Portage County Land and Water Conservation Department

Objective 5.2. Reduce phosphorus and nitrogen inputs to Tree Lake from near shore and watershed land use practices.

Actions	Lead person/group	Start/end dates	Resources
Restore natural shorelands on properties around Tree Lake. Funding may be available, through Healthy Lakes and Rivers Grant.	Shoreland property owners Tree Lake Association	Ongoing	Portage County Land and Water Conservation Department Extension Lakes Shoreland Specialist WI DNR Healthy Lakes grants Landscaping companies
Continue to provide information and education about the benefits of identifying and limiting disturbances to prevent erosion and direct runoff in steep shore areas.	Tree Lake Association	Ongoing	Portage County Land and Water Conservation Department Landscaping companies WI DNR Healthy Lakes grants
Control runoff to the lake. Install rain gardens between homes and the lake and rain barrels to reduce runoff. Funding may be available, through Healthy Lakes and Rivers Grant.	Shoreland property owners Tree Lake Association	Ongoing	Portage County Land and Water Conservation Department Extension Lakes Shoreland Specialist WI DNR Healthy Lakes grants Landscaping companies
Continue to provide information and education to people about the values of native vegetation near the lake.	Tree Lake Association	Ongoing	Portage County Land and Water Conservation Department Extension Lakes Shoreland Specialist
The County and the USDA Natural Resources Conservation Service (NRCS) will provide information and support to agricultural producers in the watershed about quality-based Best Management Practices (BMPs) within the watershed.	Portage County Land and Water Conservation Department NRCS	Ongoing	DATCP grants WI DNR Lake Protection grants

Guiding Vision for Water Quality in Residential Wells

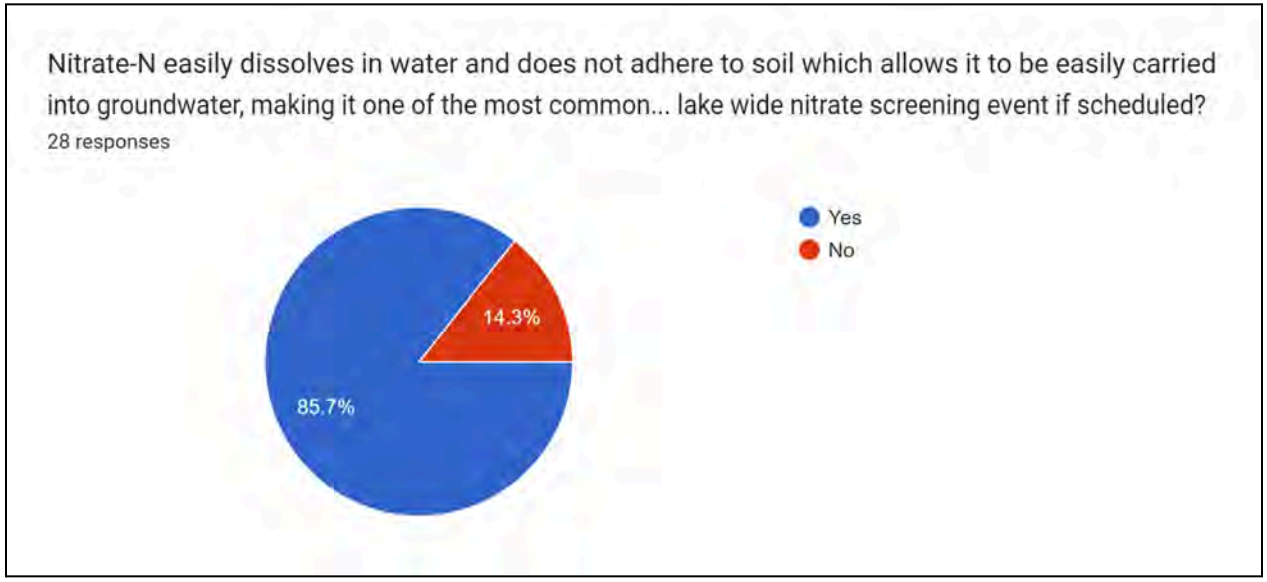
Tree Lake will have good water quality with minimal impacts from residential and agricultural lands in its watershed.

Goal 6

Identify and educate residents about the quality of private well water around Tree Lake. All private wells will have concentrations of nitrate-N that are less than 10 mg/L.

Actions	Lead Person/Group	Start/End dates	Resources
Offer a lake wide nitrate screening through Portage County.	Tree Lake Association	Annually	Portage County Water Quality Specialist

Results from the 2023 Resident Survey



Shorelands

Shoreland vegetation is critical to a healthy lake ecosystem. It provides habitat for many aquatic and terrestrial animals including birds, frogs, turtles, and small and large mammals. It also helps to improve the quality of the runoff that is flowing across the landscape towards the lake. Healthy shoreland vegetation includes a mix of unmowed grasses/flowers, shrubs, trees, and wetlands which extends at least 35 feet landward from the water's edge.

Shoreline areas, on land and into the shallow water, provide essential habitat for fish and wildlife that live in or near Tree Lake. Overdeveloped shorelands can't support the fish, wildlife, and clean water that are important to the users and residents of Tree Lake. The majority of survey respondents realize that the removal of native shoreland plants increased erosion and the presence of vegetative buffers reduced runoff and removed sediments. Therefore, residents may be willing to restore buffers and protect shoreland plants.

2014 Updates: Many Tree Lake residents participated in the Portage County Free Tree and Shrub Program in 2013 as part of an ongoing effort to improve shoreland habitat.

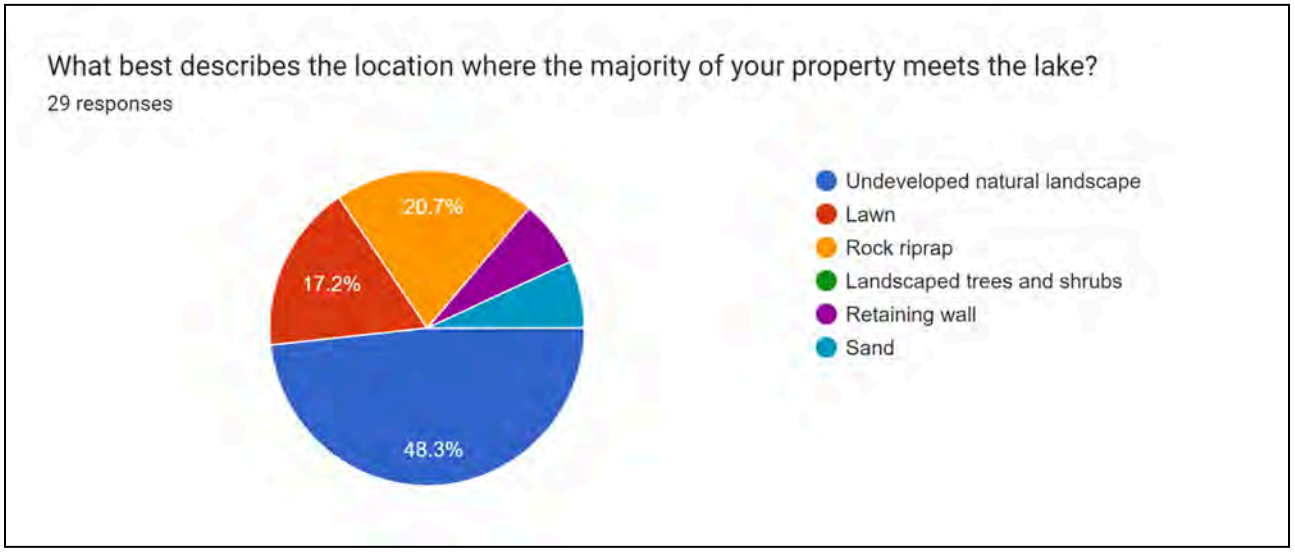
Since 2002, approximately 1,200 feet of shoreline have improved. Additional improvements could include increasing the extent healthy shoreland vegetation extends from the water's edge inland. Increasing the depth to 35 feet would provide habitat, improve water quality, and bring the vegetation depth into compliance with county and state shoreland standards.

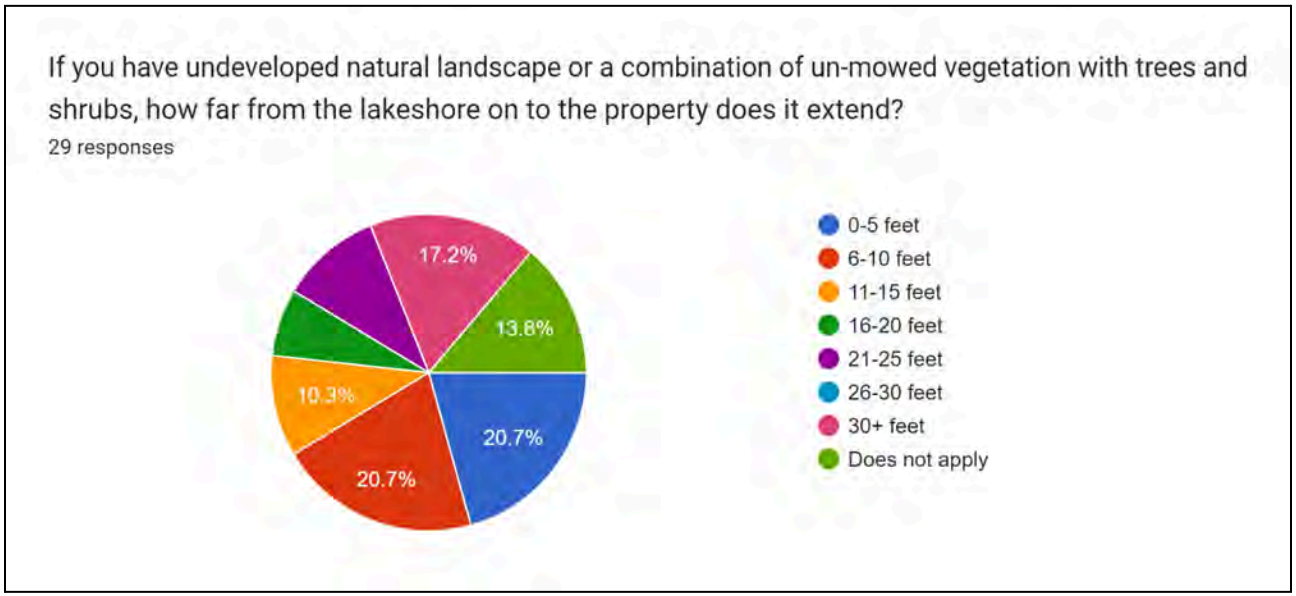
In 2012, 48 disturbances were identified around Tree Lake. Most of the sites were docks/piers. One seawall and one artificial beach were also identified, which provide little to no habitat. It would be beneficial to replace the seawall with a bio-log and native shoreland vegetation. If erosion from waves is a concern, aquatic plants such as water lilies may be used near shore to help baffle waves.

Structures such as seawalls, rip-rap (rocked shoreline), and artificial beaches result in habitat loss. Erosion contributes sediment to the lake, which can alter spawning habitat and carry nutrients into the lake.
Unmanaged runoff from rooftops of structures also contributes runoff to the lake, often delivering more sediment to the lake. Docks result in altered in-lake habitat. Denuded lake beds adjacent to docks provide opportunities for invasive species to become established and reduce habitat that is important to fish and other lake inhabitants.

2023 updates: 1 HLHR planting in 2022 Portage County Land and Water Conservation Department has been working with Tree Lake Association residents to utilize the WDNR Healthy Lakes and Rivers program. https://healthylakeswi.com/. Healthy Lakes & Rivers includes 5 simple and inexpensive best practices that improve habitat and water quality on your shoreland property. These include: 350 sq ft native planting, fish sticks, rock infiltration, diversion and rain gardens. These conservation practices not only improve the properties around Tree Lake but also the waterbody itself. In 2021 and 2022, we had 1 resident receive Healthy Lakes and Rivers grant funding on Tree Lake. We have 2 residents on the 2023 Healthy Lakes and Rivers grant application. Portage County Land and Water Conservation Department plans to keep applying for the Healthy Lakes and Rivers available to all Portage County waterfront property owners in order to protect both land and water resources in the County.

Results from the 2023 Resident Survey





Tree Lake Shoreland Inventory

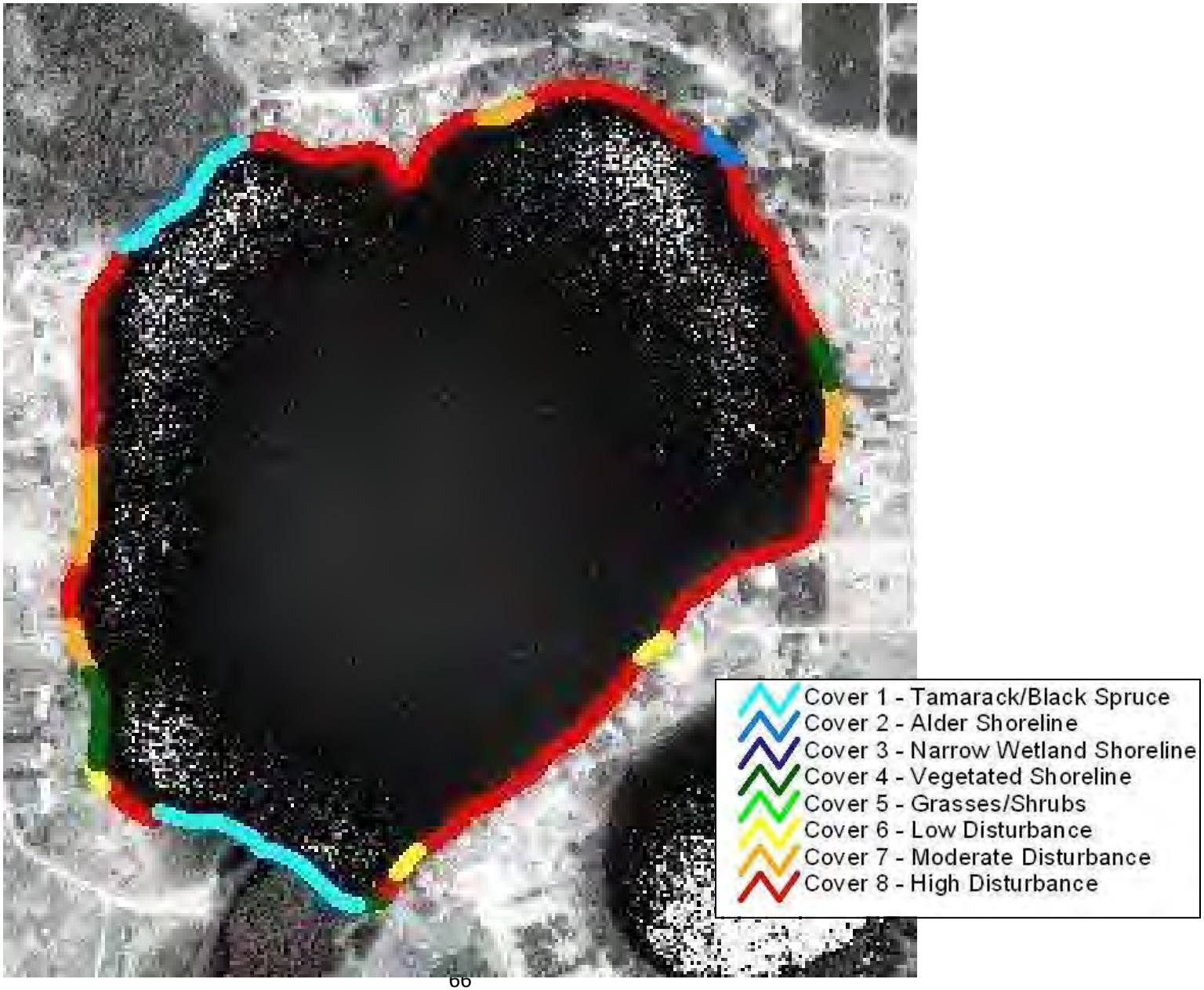
Shoreland vegetation is critical to a healthy ecosystem in and around Tree Lake. It provides habitat for many aquatic and terrestrial animals including birds, frogs, turtles, and many small and large mammals. It also helps to improve the quality of the runoff that is flowing across the landscape towards the lake. Healthy shoreland vegetation includes a mix of tall grasses/flowers, shrubs and trees.

The results of the 2012 survey of Tree Lake's shoreland are shown in the figure below. The ring nearest the lake depicts the shoreland vegetation depth inland from the water's edge for the 0.5 to 3 foot tall vegetation (forbs and grasses), the middle ring depicts the depth of the vegetation that is 3 to 5 feet tall (shrubs), and the outer ring depicts the depth of the vegetation that is greater than 15 feet in height (trees). Since 2002 (Figure), approximately 1,200 feet of shoreline have improved. Additional improvements could be made to increase how far the shorter vegetative layer (0.5-3 ft high) extends from the water's edge inland. Increasing this to 35 feet would provide habitat, improve water quality, and bring the vegetation depth into compliance with county and state shoreland standards.

2002-2003 Portage County Shoreland Inventory

A shoreland survey was conducted in 2002-2003 during the Portage County Lakes Study. The survey categories differed from those in the 2012 survey, but some comparisons can be made. Survey classifications for the 2002- 2003 survey are described in the table below. There has been significant improvement in the length of undisturbed shoreline for Tree Lake from 2002 to 2012.

Shoreland vegetation survey around Tree Lake, 2002-2003

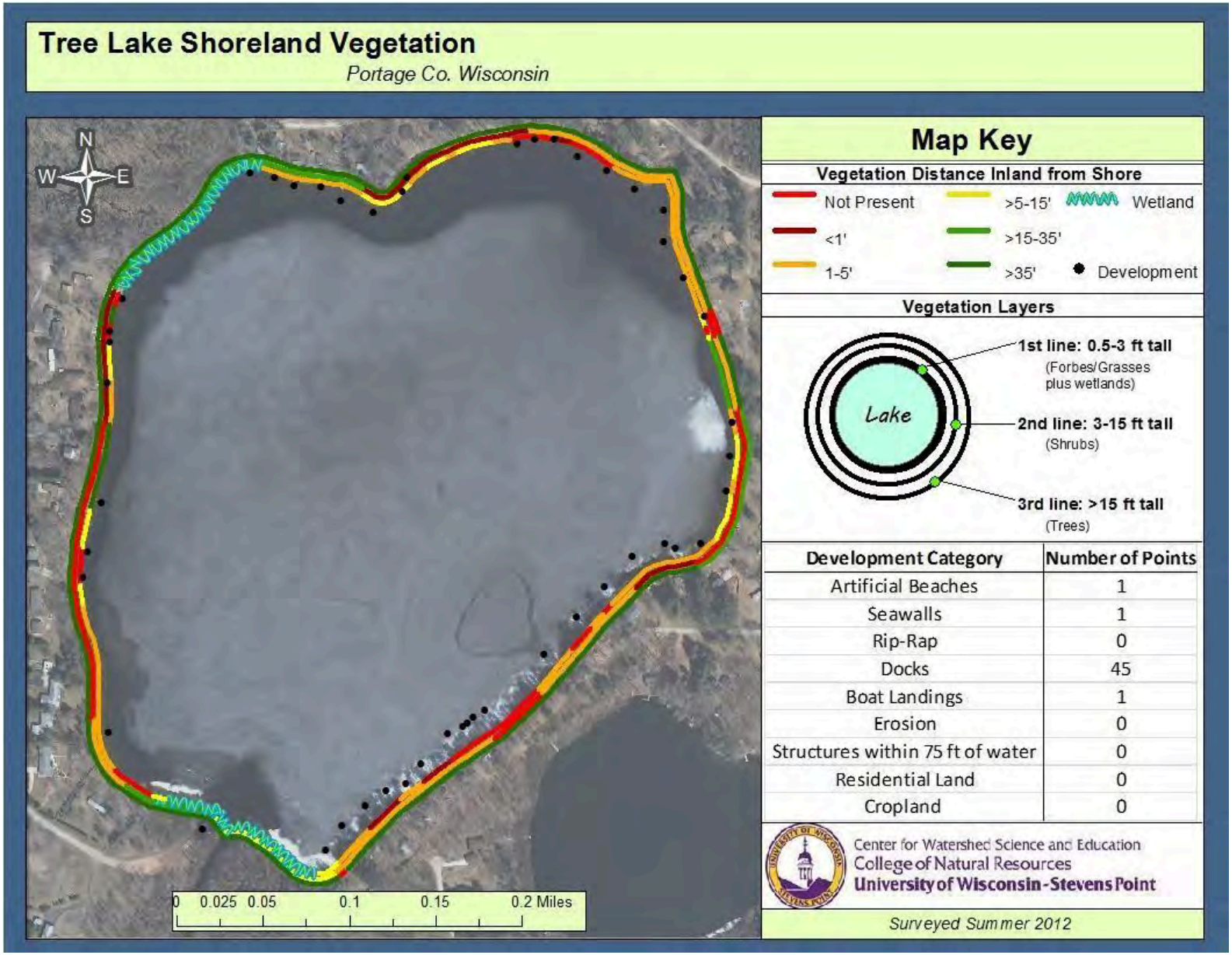


Shoreland vegetation survey around Tree Lake, 2002-2003

Categories applied during the 2002-2003 shoreland survey of Portage County lakes.

Category Code and Cover-type Description	
Wetlands	
Cover 1	All wetland shore zone with a sweet gale or leather leaf shrub layer associated with tamarack or black spruce.
Cover 2	All wetland shore zone with an alder shrub layer.
Cover 3	Narrow wetland shore zone (< 5 m) with an adjacent upland component that was not developed.
Upland with No Development	
Cover 4	Upland shore zone with a densely vegetated shoreline component (i.e., tall grasses or dense shrub component adjacent to the water). Also has a non-rocky substrate within the water zone area.
Cover 5	Upland shore zone that lacked dense shoreline grasses or shrubs, or a water zone area with a rocky substrate.
Development Categories	
Cover 6	Low level of vegetation disturbance: Unaltered shore zone except for pier access.
Cover 7	Moderate level of vegetation disturbance: Shore zone area containing mowed lawn but having intact overstory.
Cover 8	High level of vegetation disturbance: Highly disturbed cover including shorelands that were mowed to the water line (e.g., beach, rip-rap, or seawall).

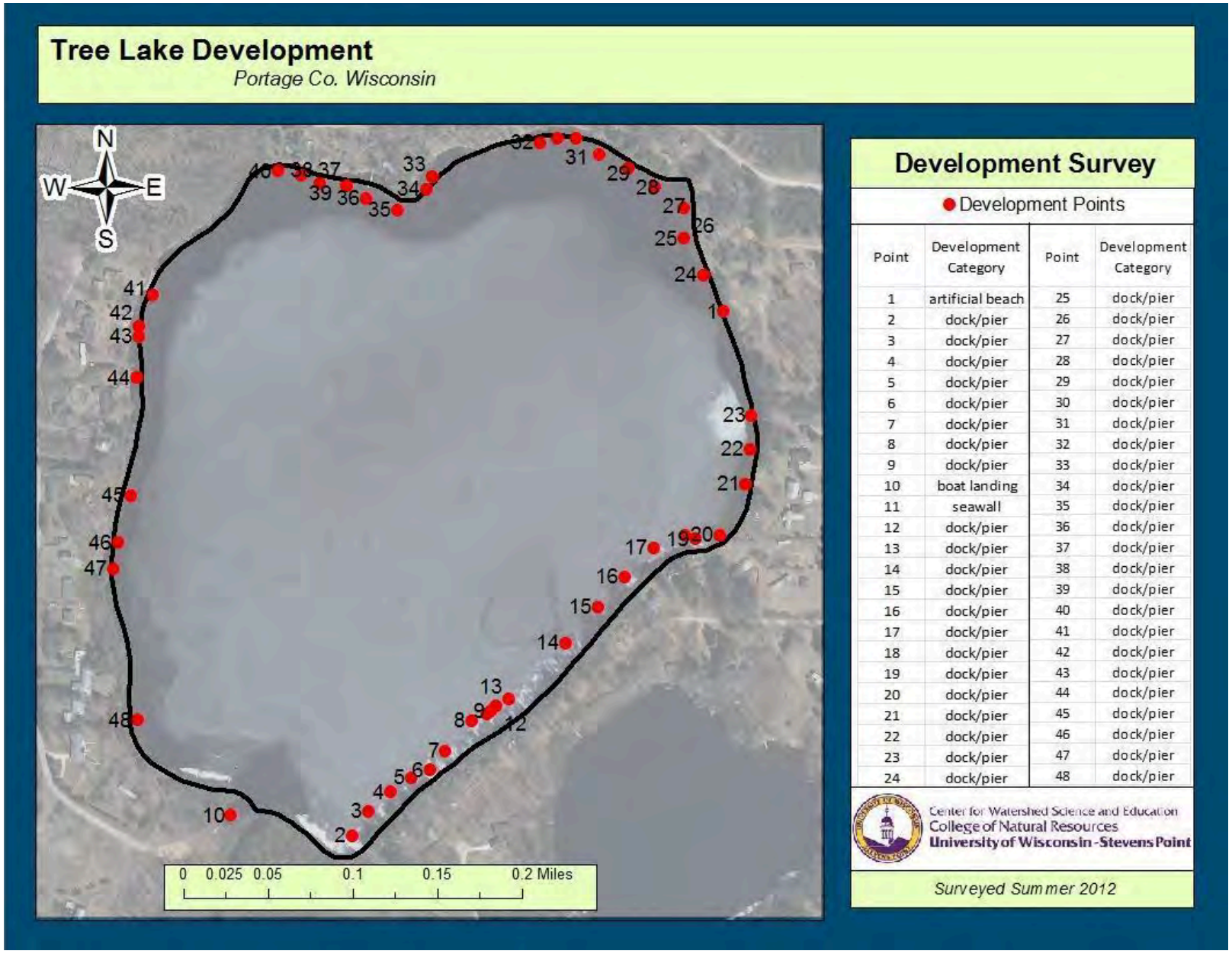
Shoreland vegetation survey around Tree Lake, Summer 2012



Development Category	Number of Points
Artificial Beaches	1
Seawalls	1
Rip-Rap	0
Docks	45
Boat Landings	1
Erosion	0
Structures within 75 ft of water	0
Residential Land	0
Cropland	0

During the 2012 survey, an assessment of human influence features was also conducted around Tree Lake. These inventoried features included artificial beaches, docks, rip-rap, seawalls, erosion, and structures built near the water's edge. Structures such as seawalls, rip-rap (rocked shoreline), and artificial beach result in reduction of habitat which directly impacts the fishery and wildlife. Docks and artificial beaches can result in altered in-lake habitat, and denuded lake beds provide opportunities for invasive species to become established and reduce habitat that is important to fish and other lake inhabitants. Erosion can contribute sediment to the lake, which can alter spawning habitat and carry nutrients into the lake. Unmanaged runoff from the rooftops of structures located near shore can also contribute more sediment to the lake. Each human-made feature by itself may not result in a large impact to the lake, but when these features occur more frequently around the lake, the cumulative impact can be a problem for habitat and water quality. In 2012, 48 sites were identified around Tree Lake. Most of the sites were docks/piers. One seawall and one artificial beach were also identified, which provide little to no habitat. The seawall should be replaced with a bio-log and native shoreland vegetation. If erosion from waves is a concern, aquatic plants such as water lilies may be used near shore to help baffle waves.

Features of human influence around Tree Lake, summer 2012



Point	Development Category	Point	Development Category
1	artificial beach	25	dock/pier
2	dock/pier	26	dock/pier
3	dock/pier	27	dock/pier
4	dock/pier	28	dock/pier
5	dock/pier	29	dock/pier
6	dock/pier	30	dock/pier
7	dock/pier	31	dock/pier
8	dock/pier	32	dock/pier
9	dock/pier	33	dock/pier
10	boat landing	34	dock/pier
11	seawall	35	dock/pier
12	dock/pier	36	dock/pier
13	dock/pier	37	dock/pier
14	dock/pier	38	dock/pier
15	dock/pier	39	dock/pier
16	dock/pier	40	dock/pier
17	dock/pier	41	dock/pier
18	dock/pier	42	dock/pier
19	dock/pier	43	dock/pier
20	dock/pier	44	dock/pier
21	dock/pier	45	dock/pier
22	dock/pier	46	dock/pier
23	dock/pier	47	dock/pier
24	dock/pier	48	dock/pier

Guiding Vision for Shoreland

Encourage residents owning property on Tree Lake to have natural shorelines that benefit the health of the lake, provide habitat for wildlife and protect their property.

Goal 7

Create, restore, and protect healthy, stable shoreland habitats near and around Tree Lake. This goal will be achieved when 65% of the shoreline is vegetated.

Objective 7.1. Educate and encourage lake shore residents to establish a native buffer to protect their shoreland, provide habitat and prevent runoff.

Action	Lead person/group	Start/end dates	Resources
Continue to provide information about the benefits of natural shorelines in the newsletter.	Tree Lake Association	Ongoing	Portage County Land and Water Conservation Department Extension Lakes
Explore hosting a shoreline restoration workshop.	Tree Lake Association	Ongoing	Portage County Land and Water Conservation Department
Provide information to shoreland property owners about the updated rules for shoreland zoning through the newsletter.	Tree Lake Association	Ongoing	Portage Co. Planning & Zoning
Participate in the Healthy Lakes and Rivers Grant Program. https://healthylakeswi.com/	Shoreland property owners Tree Lake Association	Ongoing	Portage County Land and Water Conservation Department WI DNR Healthy Lakes grants Landscaping consultants
Continue to provide information and education about the benefits of identifying and limiting disturbances to prevent erosion and direct runoff in steep shore areas through newsletter.	Tree Lake Association	Ongoing	Portage County Land and Water Conservation Department Extension Lakes

Hire a professional to conduct a shoreline plant/habitat survey as a follow up to the Portage County Lakes Study and every two or three years.	Tree Lake Association	Every 2-3 years Most recent survey was completed in 2012 Next survey 2024	UWSP Center for Watershed Science & Education Portage County Land and Water Conservation Department WI DNR Lake Planning grants
Have a representative from the Portage County Land and Water Conservation Department come to a meeting to discuss programs, grants, ordinances.	Tree Lake Association	Annually	Portage County Land and Water Conservation Department

People and the Lake

The people that interact with the lake are a key component of the lake and its management. In essence, a lake management plan is a venue by which people decide how they would like people to positively impact the lake. The plan summarizes the decisions of the people to take proactive steps to improve their lake and their community. Individual decisions by lake residents and visitors can have a positive impact on the lake and on those who enjoy this common resource. Collaborative efforts may have a bigger positive impact; therefore, communication and cooperation between a lake association, community, and suite of lake users are essential to maximize the effects of plan implementation.

Boating hours, regulations, and fishing limits are examples of principles that are put into place to minimize conflicts between lake users and balance human activities with environmental considerations for the lake.

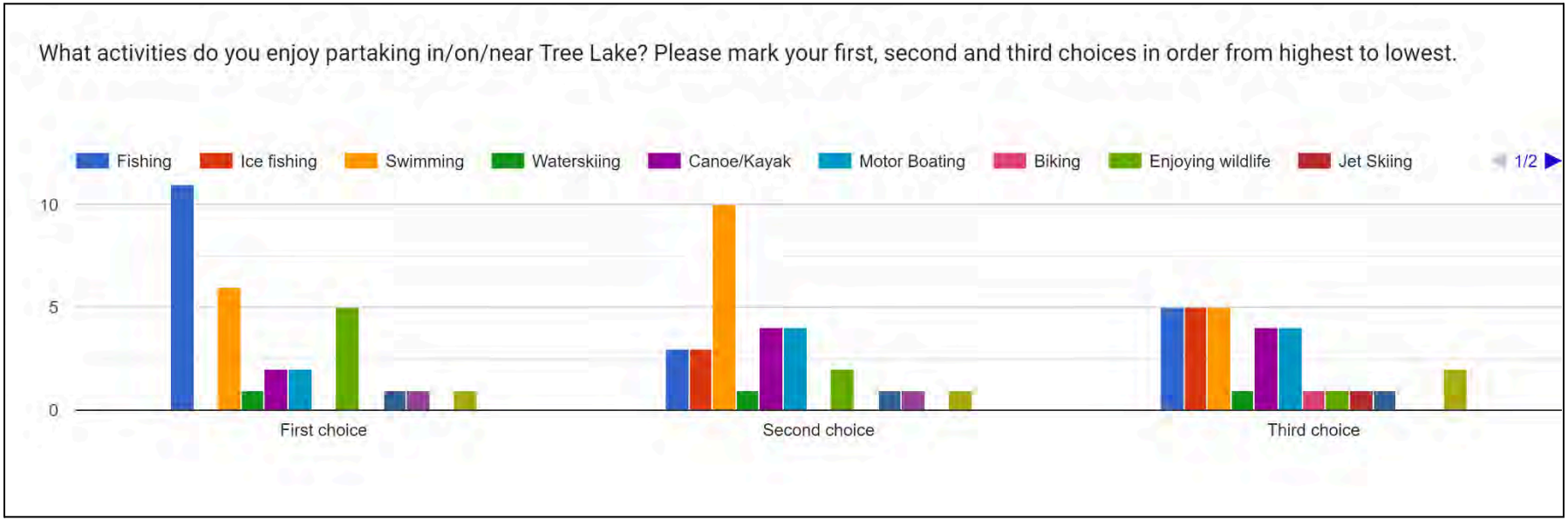
Recreation

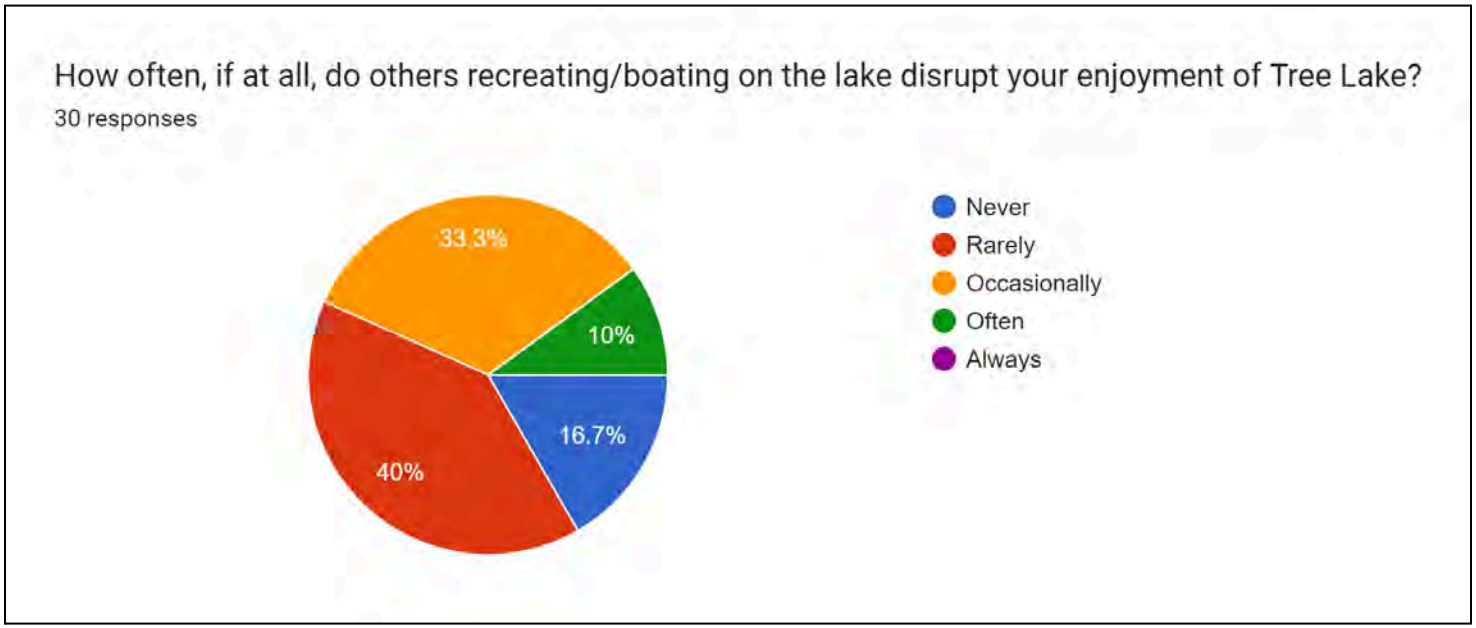
Peterson Park, a four-acre county park, is located on the eastern shore of Tree Lake. The park provides public access for those who would like to picnic or enjoy the beach. Information about the county park can be found at http://www.co.portage.wi.us/parks/parkMaps.shtm. A boat launch, also owned by Portage County Parks, is located on the southern end of Tree Lake. The lake has no-wake boating hours from 4 pm to 10 am.

Tree Lake users and residents enjoy many different recreational opportunities. The most popular recreational activities on Tree Lake are fishing, enjoying scenery, and solitude. Recreational needs and uses on the lake will likely continue to increase as populations and development in the area increase. It is important to provide safe recreational opportunities while still protecting water quality and lake habitats and minimizing conflicts between uses.

2014 Updates: Citizens who attended the Tree Lake updates session did not report any notable user conflicts associated with recreation on Tree Lake.

Results from the Resident Survey 2023

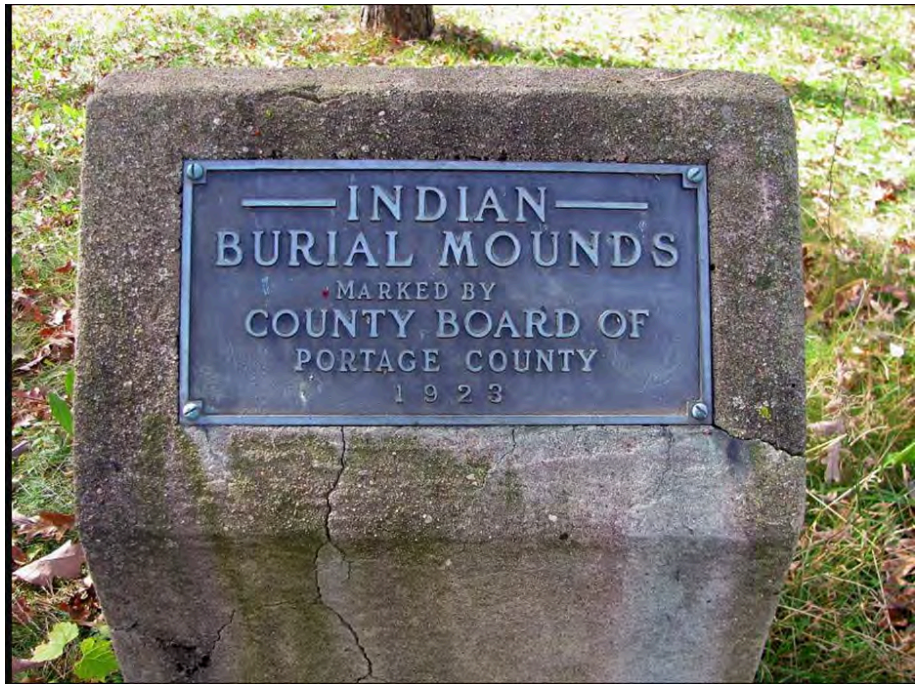




Cultural Resource Management

Native peoples have lived in Portage County and Central Wisconsin for thousands of years. They fished in post-glacial lakes and rivers, hunted mammoth, mastodon and other megafauna along the edges of continental glaciers. They burned and cleared areas of the land and they raised crops. They built camps and villages. And they buried their dead, typically on ridges above lakes, streams and rivers.. Today we are stewards of those lakes and resources, along with those sites of previous occupation and burial. Lands still held sacred by Wisconsin Tribes. Such properties should be appropriately cared for, and merit respect and recognition.

Native burial mounds are by far the most obvious and numerous burial features occurring adjacent to surface waters in Portage County. More mounds were built by ancestral Native American communities in Wisconsin than in any other region of North America. Prior to Euromerican settlement, there may have been 20,000-25,000 mounds across the state. Estimates are that perhaps 4,000 of these remain today.
The earliest mounds, dating as far back as 500 BC were round or “conical” in shape. By about AD 800, communities began to build mounds in other forms, including linear-shaped, and “effigy” mounds made in the shape of birds, turtles, bears, panthers and other animals (more effigy mounds occur in Wisconsin than anywhere else in the world). Mounds may exist singly, or as “mound groups” of several to over 100 individual mounds, sometimes clustered as “sub-groups” within a larger group.



All of these sites are protected from disturbance under the State's burial sites law (Wisconsin Statutes s.157.70). An important feature of WS 157.70 stipulates that there may be no disturbance of the burial or within (a minimum of) five feet from the perimeter or base of a mound or other defined burial area. A buffer greater than 15 feet or greater is preferred, and is the DNR standard (exceptions considered in consultation with the Wisconsin Historical Society).

The link below provides standards that should apply to human burial sites of all forms – including non-mound burials; conical, linear, effigy and platform mounds; and other types of burial sites. This policy and standards do not apply to areas where cremated human remains have been recently deposited or dispersed. The following policies and plan components apply to all DNR properties, but are consistent and applicable to private, county, town, and village properties. Note: Submerged burials require additional considerations; please consult with the Departmental Archaeologist for further guidance.

For management purposes, it may be useful to think of burial areas as "preserves" which occur within a larger setting, and which have different management needs than other areas within a lake management plan area.

Cultural Resources Best Management Practices: **https://www.co.portage.wi.us/home/showpublisheddocument/38943**

Guiding Vision for Recreation

Tree Lake will provide recreational opportunities for shoreland property owners and visitors. Recreation will be in balance with the needs of the lake and its ecosystem.

Goal 8

Maintain and enhance activities on Tree Lake that allow all users to enjoy the lake.

Objective 8.1. Encourage different uses and promote a sense of community.

Action	Lead person/group	Start/end dates	Resources
Continue to provide information and education about the current no-wake rule on Tree lake, through the newsletter.	Tree Lake Association	Ongoing	WI DNR Portage County Land and Water Conservation Department
Maintain signage at boat launch regarding boating hours on Tree Lake.	Portage County Parks Department	Ongoing	Portage County Land and Water Conservation Department

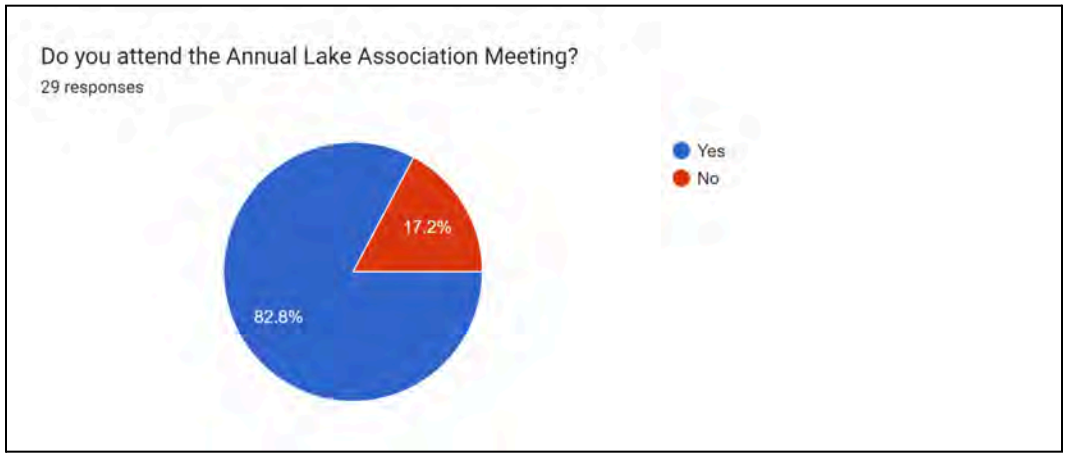
Boating Ordinances

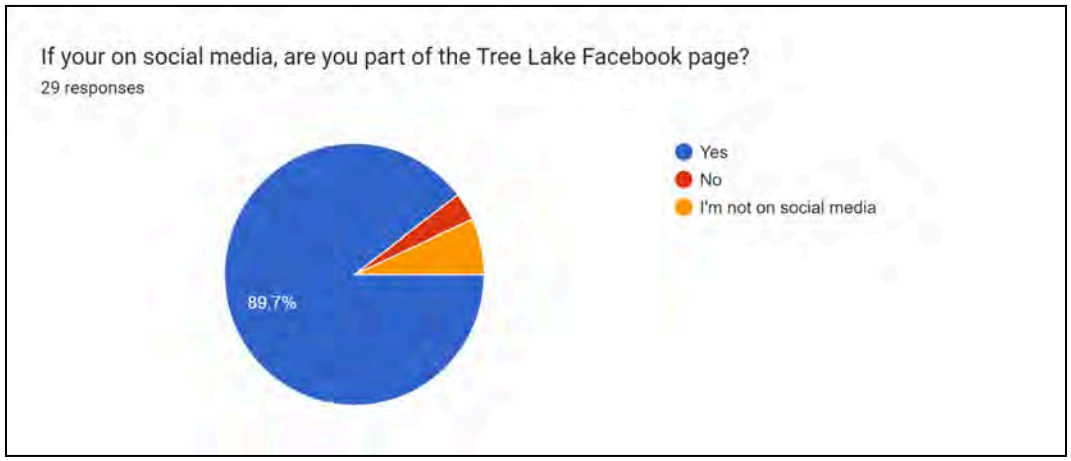
https://dnr.wi.gov/lakes/lakepages/LakeDetail.aspx?wbic=289400&page=ordinances

Communication and Organization

Many of the goals outlined in this plan are focused on disseminating information to lake and watershed residents and lake users, ultimately to help them make informed decisions that will result in a healthy ecosystem in Tree Lake that is enjoyed by many people. There is no single best way to distribute information to those that enjoy and/or affect Tree Lake so the planning committee has identified a variety of options to communicate with one another and in the community. Working together on common values will help to achieve the goals that have been outlined in this plan. Tree Lake Association is the lake stewardship group. No website was identified; however, contact names for the group's president and treasurer can be found at http://www.uwsp.edu/cnr-ap/UWEXLakes/Pages/organizations/lakelist/default.aspx.

Results from the 2023 Resident Survey





Guiding Vision for Communication

Tree Lake Association will provide opportunities for shoreland property owners and visitors to communicate about concerns and successes involving the health of Tree Lake and its residents.

Goal 9

Landowners and lake users will communicate with one another about topics related to Tree Lake.

Objective 9.1. Provide information to landowners and lake users that will allow them to make informed decisions.

Action	Lead person/group	Start/end dates	Resources
Create and maintain an email list of Tree Lake Association members. Recruit new members	Tree Lake Association	Ongoing	Extension Lakes
Encourage the creation of an informational website for Tree Lake.	Tree Lake Association	Ongoing	Extension Lakes
Continue to hold an annual Tree Lake Association Meeting. Recognize those that have helped the lake over the year.	Tree Lake Association	Annually	Portage County Land and Water Conservation Department Extension Lakes
Explore the benefits of a Tree Lake Association versus a Lake District.	Tree Lake Association	Ongoing	Extension Lakes Portage County Land and Water Conservation Department
Assemble and disseminate informational welcome packets for all new Tree Lake shoreland property owners.	Tree Lake Association	Ongoing	Extension Lakes

Objective 9.2. Shoreland property owners will communicate with other lake stewards and keep informed about lake-related topics.

Action	Lead person/group	Start/end dates	Resources
Encourage shoreland property owners and lake stewards to obtain "Lake Tides" a quarterly newsletter about Wisconsin lakes.	Tree Lake Association	Ongoing	Extension Lakes
"Like" the Portage Co. Lakes and Rivers Facebook pages. Add names to the Portage Co. Lakes and Rivers listserv by sending an email to arnoldt@co.portage.wi.gov.	Individuals Tree Lake Association		Portage County Land and Water Conservation Department
Have Tree Lake Association members attend the Wisconsin Lakes Convention.	Tree Lake Association Individuals	Annually in spring	Extension Lakes
Encourage shoreland property owners and to participate in Lake Leaders Institute.	Tree Lake Association Individuals	Even calendar years - fall	Extension Lakes

Guiding Vision for Updates

Tree Lake Association will review and make updates as needed to the Lake Management Plan in order to keep information current for residents, natural resources professionals and the waterbody.

Objective 10.1 A management plan is a living document that changes over time to meet the current needs, challenges and desires of the lake and its community. The goals, objectives and actions listed in this plan should be reviewed annually and updated with any necessary changes.

Action	Lead person/group	Start/end dates	Resources
Annually review the Tree Lake Management Plan with new or revised areas of concern, action items, dates, lead person/group, and resources.	Tree Lake Association	Annually review	Portage County Land & Water Conservation Dept Golden Sands RC&D Extension Lakes
Connect with partners listed in the plan for updates to their efforts. Share everyone's updates with all partners.	Tree Lake Association	Annually	Partners listed in the plan
If situations warrant, revisions to this plan may be made at any time. Barring this need, this plan should be updated every 5 years.	Tree Lake Association	Next update 2028	Portage County Land & Water Conservation Dept Golden Sands RC&D Extension Lakes

Understanding and planning for how our actions affect others is a key step in battling to protect and conserve Tree Lake as a valuable natural resource.

We would also like to thank all who participated in the planning process and gave freely of their time and expertise in order to create this plan.

Background Information (from 2002-2003 study)

A lake is the reflection of the health and activities that occur in the lake, near its shore, and in the surrounding watershed. A healthy lake ecosystem consists of components that support aquatic plants, fish, wildlife and more – not only in the lake, but also in the surrounding landscape.

Data collected during the first phase of the Portage County Lakes Study are summarized in this section. For more detail, see the complete study reports. These reports, as well as citizen survey results collected during plan development, can be found at:
https://www.co.portage.wi.us/department/planning-zoning/land-and-water-conservation/lakes-study

Description

Updated information is located in each section of this plan and when available, is appended to this plan. More information about Tree Lake can be found at https://dnr.wi.gov/lakes/lakepages/LakeDetail.aspx?wbic=289400

Tree Lake is a hard water drainage lake located in northeastern Portage County, Wisconsin. The lake covers 71.3 acres and has a maximum depth of 34 feet. Tree Lake has two inlets: the smaller inlet flows from Mud Lake and enters on the northwestern side of Tree Lake, while the larger inlet is a cold water stream (Klondike Creek) that provides good habitat for brook trout. There is a small county park on the northeastern side of the lake, and a public access on the southwestern side.

Watersheds

Tree Lake's surface watershed, the land area where surface water from higher elevations drains towards the lake, is approximately 2,524 acres. This is one of the largest in the county. Relatively flat land allows the watershed to extend north into Marathon County (Figure 1).

The groundwater watershed is similar to the surface watershed, except it is the land area where groundwater, instead of surface water, drains towards the lake. Surface watersheds and groundwater watersheds often do not match each other, which is the case with Tree Lake. At 825 acres, Tree Lake's groundwater watershed lies entirely within Portage County.

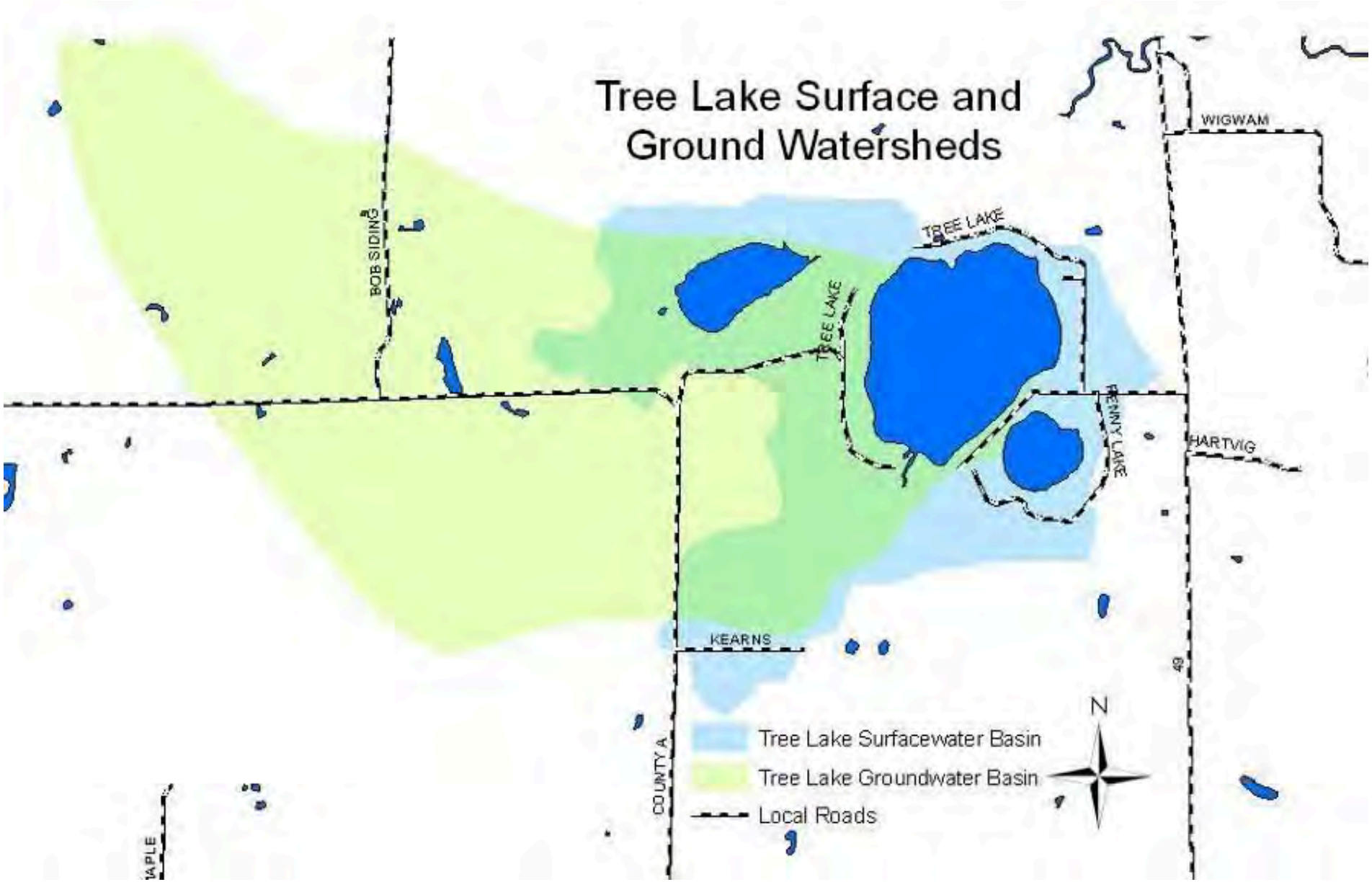


Figure 1. Tree Lake groundwater and surface watersheds.

Shoreline

Vegetated shorelines act as buffers for runoff from surfaces such as roofs, driveways, roads, patios and compacted soils. Runoff that enters the lake can carry a variety of pollutants. Negative impacts to lakes due to increased runoff include the introduction of more nutrients (such as phosphorus), which can cause algae blooms and excessive plant growth, and an increased amount of sediment, which can create cloudy or turbid water and bury fish spawning areas and other critical habitat. Sediment can also transport additional contaminants to the lake, such as bacteria, debris, metals and pesticides.

Seventy-eight percent of Tree Lake's shoreline was considered disturbed: 3.2% was considered to be low disturbance, where the shoreline is vegetated except for pier access; 11% was considered to be moderate disturbance, where there may be a mowed lawn, but there is still an intact overstory; and the remaining 63.5% was considered to be highly disturbed, where beaches, rip-rap, seawall, and/or lawns mowed to the waterline are present (appendices).

The 22% of the shoreline considered undisturbed was broken into different vegetation types. Black spruce and tamarack wetlands covered 15.1% the shoreline, alder was the predominant vegetation type for 1.2%, and the remaining 6.1% was simply termed vegetated (appendices).

The large areas of disturbed shoreline surrounding Tree Lake are cause for concern due to their lack of habitat and inability to control runoff. Issues related with runoff were identified by survey respondents as the most pressing water quality issues; however, 56% of respondents have not installed stormwater control methods on their properties and 40% of the respondents mowed 70% or more of their lawns. There were varying degrees of understanding the benefits of shoreline vegetation: 61% of respondents agreed removal of native shoreline increases shoreline erosion and 50% agreed vegetative buffers help reduce runoff. More informational opportunities may be beneficial, as 72% of respondents said they would like more information about shoreline vegetation and its impact on water quality.

Aquatic Plants

Aquatic plants play many important roles in aquatic ecosystems. They provide habitat for aquatic and semi-aquatic organisms, and food for fish, waterfowl, and other animals. Aquatic plants take up nutrients that would otherwise be used by algae, and moderate water temperatures on hot days.

Thirty-seven species of aquatic macrophytes, or aquatic plants, have been identified in Tree Lake or on the wet areas of shore. This is below average compared to the other Portage County lakes, but it should be noted that this plant survey did not include the wetlands along the northwestern shore and along Klondike Creek to the southeast of the lake.

The Wisconsin Department of Natural Resources Aquatic Plant Survey of Tree Lake identified American wild celery (*Vallisneria americana)* as the dominant plant species within the plant community, especially within the 1.5 – 10 feet depth zone. Coontail (*Ceratophyllum demersum)* and nodding water nymph (*Najas flexilis*) were identified as sub-dominant species.

Tree Lake's aquatic plant community is comprised of plant species that are fairly typical of hard water lakes; however, curly-leaf pondweed and reed canary

grass are two invasive species that have also been found in Tree Lake. Currently, these plants are located in small patches throughout the lake and are not exhibiting signs of aggressive growth (appendices). Lake residents and users should monitor these plant communities for changes in growth and for other aquatic invasive species that have been found in nearby lakes.

According to a survey of lake residents and users 56% of respondents agreed that native aquatic plants contribute to better water quality. However, a vast majority of respondents (87%) felt that the amount of aquatic plant growth was at best excessive and only 24% of respondents agreed that native aquatic plants add scenic beauty.

Water Quality and Land Use

Land use types and associated management practices can have significant impacts on water quality. Dominant land uses within Tree Lake's surface watershed are agriculture and forested wetlands. Forests, grasslands, and wetlands are other major land uses within the watershed.

The groundwater watershed is primarily comprised of forested lands, followed by non-irrigated agriculture. Between 1968 and 1990, land uses shifted from non-irrigated cropland to irrigated cropland. During this same time, forestland increased, shrub vegetation decreased, and residential and transportation development occurred.

Although land uses may not easily be changed, land management practices can be modified to improve water quality.

Survey respondents felt Tree Lake's water quality had either stayed the same or declined over the years. Aquatic plants and algae were identified as the two major water quality issues. Approximately one- half of the respondents felt fertilizers were responsible for any decline in water quality, while roughly 30% felt septic systems, livestock agriculture, herbicides, development or heavy recreational use were responsible. Assessing a lake's water quality involves a number of measures, including temperature, dissolved oxygen, water chemistry, chlorophyll *a*, and algae. Each of these measures plays a part in the lake's overall water quality.

Chloride concentrations, and to lesser degrees sodium and potassium concentrations, are commonly used as indicators of how strongly a lake is being impacted by human activity. Potassium levels in Tree Lake were low, but chloride and sodium levels were somewhat elevated. Although these nutrients are not detrimental to the aquatic ecosystem, they indicated that sources of contaminants (road salt, fertilizer, animal waste, and/or septic system effluent) may be entering the lake from surface runoff and/or groundwater.

Atrazine, an agricultural herbicide, was found in low concentrations in Tree Lake (0.11ppb and <0.05 ppb). The presence of atrazine indicated other agri-chemicals may also be entering the lake.

The temperature in Tree Lake follows the mixed and stratified cycles typical of many Wisconsin lakes. Temperatures are generally stratified during the summer and winter months, and mixed from top to bottom during the spring and fall. Due to the cycle of stratification and mixing in the lake, dissolved oxygen

concentrations remain high enough to support a variety of fish and aquatic biota.

Water clarity is a measure of how deep light can penetrate the water. It is an aesthetic measure and is related to the depth that rooted aquatic plants can grow. Overall, water clarity in Tree Lake is considered fair; however, it is considered below average when compared to other Portage County lakes. Tree Lake is currently experiencing better water clarity than historically. The best water clarity occurs in September and the poorest in May. Fluctuations throughout the summer are normal, as algae and aquatic plant populations and sedimentation increase and decrease. Disturbance of sediment by wind or boating activity can also influence water clarity in shallow areas of the lake.

The 33 genera of algae identified during the sample periods were relatively common and none of the dominant genera in the sample counts are associated with toxins or health issues. The algal community considered relative to the chlorophyll *a*, phosphorus, and nitrogen values for Tree Lake presented a picture of a very mesotrophic lake. Water clarity in Tree Lake was generally good during all algal sampling periods, which seems to conflict with the high chlorophyll *a* values, heavy algal densities, and water chemistry data; however, this is not uncommon in stratified lakes such as Tree Lake.

Nutrients

Nutrients (phosphorus and nitrogen) are important measures of water quality in lakes because they are used for growth by algae and aquatic plants.

Inorganic nitrogen concentrations were very high, with average spring concentrations of 0.95 mg/L. Concentrations above 0.3 mg/L are sufficient to produce algal blooms throughout the summer and can enhance the growth of aquatic plants.

In Tree Lake, total phosphorus levels ranged from 13 mg/L to 43 mg/L and were variable throughout the year. When averaged by season, levels were relatively low. Nitrogen concentrations were quite high and consistently above concentrations needed for excessive algae growth.

Phosphorus is an element that is essential to most living organisms in trace amounts, including plants. Sources of phosphorus can include naturally occurring phosphorus in soils, wetlands and groundwater. Sources from human influence include agricultural runoff, urban runoff, domestic and industrial sewage, septic systems, and animal waste.

In Tree Lake, the aquatic plant growth is highly responsive to phosphorus due to its short supply relative to other substances necessary for growth. Small increases in phosphorus result in increased growth rates and abundance of aquatic plants and algae.

Phosphorus concentrations in Tree Lake were variable throughout the year. The Wisconsin Department of Natural Resources has proposed phosphorus criteria values for lakes in Wisconsin. Average total phosphorus for 2002-2003 was 23.4 ug/L, which falls below the proposed criteria value of 30 ug/L. Concentrations over 30 ug/L can contribute to or cause algae blooms in the lake. The spring average for total phosphorus was 26.3 ug/L, the summer average was 22.1 ug/L, the fall average was 30.0 ug/L, and the winter average was 20.7 ug/L. Although the average concentrations were below problem thresholds, they have been slowly increasing over time and individual readings during fall and spring turnover have exceeded 30 ug/L. Readings as high as 43 ug/L were taken during the

summer. It is important to reduce phosphorus before it reaches problem levels.

Estimates of phosphorus from the landscape can help to understand the phosphorus sources to Tree Lake. Land use in the surface watershed was evaluated and used to populate the Wisconsin Lakes Modeling Suite (WILMS) model. In general, each type of land use contributes different amounts of phosphorus in runoff and through groundwater. The types of land management practices that are used and their distances from the lake also affect the contributions to the lake from a parcel of land. Based on modeling results, non-irrigated agriculture and residential land practices had the greatest percentages of phosphorus contributions from the watershed to Tree Lake (Figure 2).

Managing phosphorus in the Tree Lake watershed is key to protecting the lake itself. Positive changes in land use and management practices can result in improved water quality. Phosphorus inputs can be controlled through the use of best management practices (BMPs) that minimize the movement of runoff to the lake.

Figure 3 shows how different land management strategies may affect phosphorus concentrations, which in turn affect the frequency of algae blooms (chlorophyll *a*) in Tree Lake. The current conditions in Tree Lake are highlighted. The frequency of blooms can be decreased by the implementation of best management practices on the current landscape. Conversely, changes in land uses and/or land use practices may readily increase the frequency of algae blooms that occur between May and September.

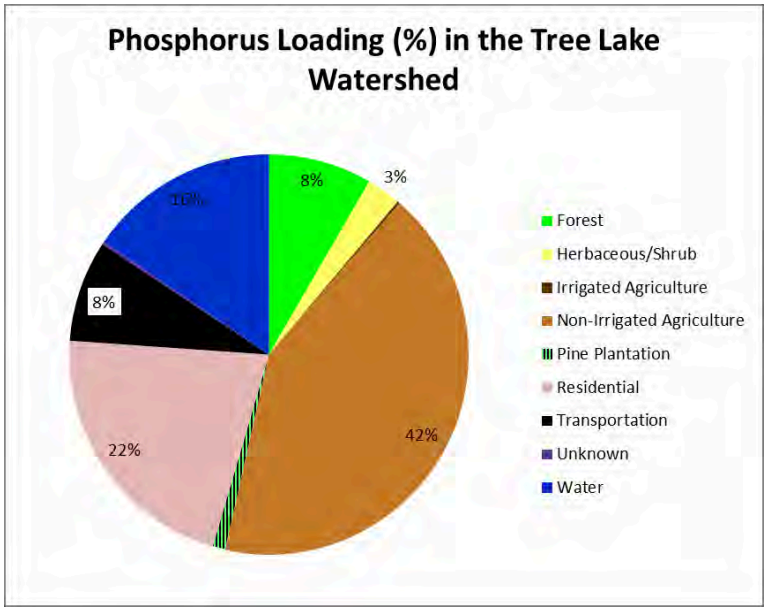


Figure 2. WILMS modeling results for Tree Lake. McGinley, 2008.

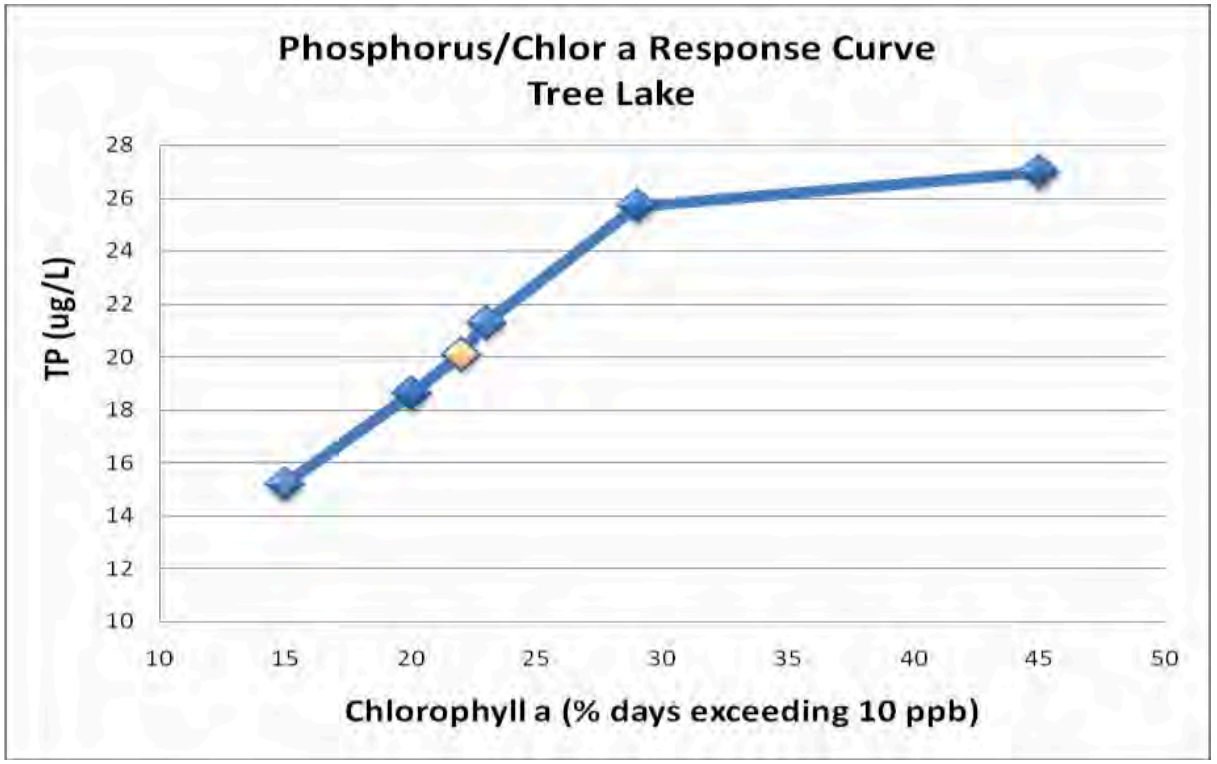


Figure 3. Phosphorus/chlorophyll-*a* response curve.

Recreation

According to survey results, the top three recreational activities on Tree Lake were fishing, enjoying scenery, and solitude. Other popular activities included enjoying wildlife, walking, motor boating, and swimming.

There is some conflict between lake users. Approximately 43% of survey respondents indicated they were moderately disturbed by noise and activities of others on the lake.

Fishing is the most popular recreational activity on Tree Lake. A majority of survey respondents ranked fishing on Tree Lake as average to fair, with bluegill, crappies, and northern pike being the primary fish caught. A majority of respondents noted a decline in the quality of fishing over time.

Governance

There are a variety of management plans, regulations and ordinances that provide guidance for the development, use and protection of natural resources in and around Tree Lake. They can serve as tools to help achieve the goals, objectives and actions outlined in the Tree Lake Management Plans.

Land management plans that influence the land uses around Tree Lake and in its watersheds include:

- Wolf River DNR Basin Plan that covers a regional area: http://dnr.wi.gov/water/basin/wolf/wolf_final_801.pdf
- Portage County Comprehensive Plan: https://www.co.portage.wi.us/department/planning-zoning/planning-section/comprehensive-planning/portage-county
- Portage County Land and Water Conservation Plan: https://www.co.portage.wi.us/home/showpublisheddocument/27502/637164123499230000
- Town of Alban Comprehensive Plan: http://www.co.portage.wi.us/Comprehensive%20Plan/Planning%20Program/Alban/Alban.html

Portage County has eight ordinances that may impact the water quality of Tree Lake: the Zoning Ordinance, Shoreland Zoning Ordinance, Wellhead Protection Zone Ordinance, Subdivision Ordinance, Open Space Design Ordinance, Floodplain Zoning Ordinance, Private Sewage Septic System Ordinance, and Animal Manure Storage and Nutrient Management Plan Ordinance. These ordinances can be found at: https://www.co.portage.wi.us/government/code-of-ordinances

In addition to these county ordinances, there are several state regulations that have a direct impact on water quality in Tree Lake. These regulations include:

- Agricultural Runoff Regulation: http://dnr.wi.gov/topic/nonpoint/AgPerformanceStandards.html
- Storm Water Runoff Regulation – including NR 151, 152, 153, 155, 216, 243, and ATCP 50: http://dnr.wi.gov/topic/stormwater/learn_more/regulations.html
- Shoreland-Wetland Zoning Regulations: https://dnr.wisconsin.gov/topic/ShorelandZoning
- Critical Habitat Areas Regulations: http://dnr.wi.gov/lakes/criticalhabitat/
- Pesticide prohibitions and use restrictions including ATCP 30 which regulates atrazine applications: https://docs.legis.wisconsin.gov/code/admin_code/atcp/020/30.pdf

In addition to pieces of governance that will assist with the goals, objectives and actions outlined in this plan, there are a number of community groups and organizations that can provide support and assistance. These include citizen and professional organizations, UW- Extension, and others. Please see the appendices for a list of resources and contact information.

References

Fassbender, R.L., and L.M. Nelson. 1971. Surface Water Resources of Portage County. Wisconsin Department of Natural Resources, Madison, Wisconsin.

Turyk, N, R. Bell, R. Cook, T. Ginnett, R. Crunkilton, L. Markham, P. McGinley, B. Shaw, and E. Wild. 2006. Final report to Portage County and Wisconsin DNR. http://www.co.portage.wi.us/plzo/lakes.html

Wisconsin Department of Natural Resources. 2005. The Aquatic Plant Community of Tree Lake, Portage County, Wisconsin 2004. Wisconsin Department of Natural Resources West-Central Region Eau Claire, WI

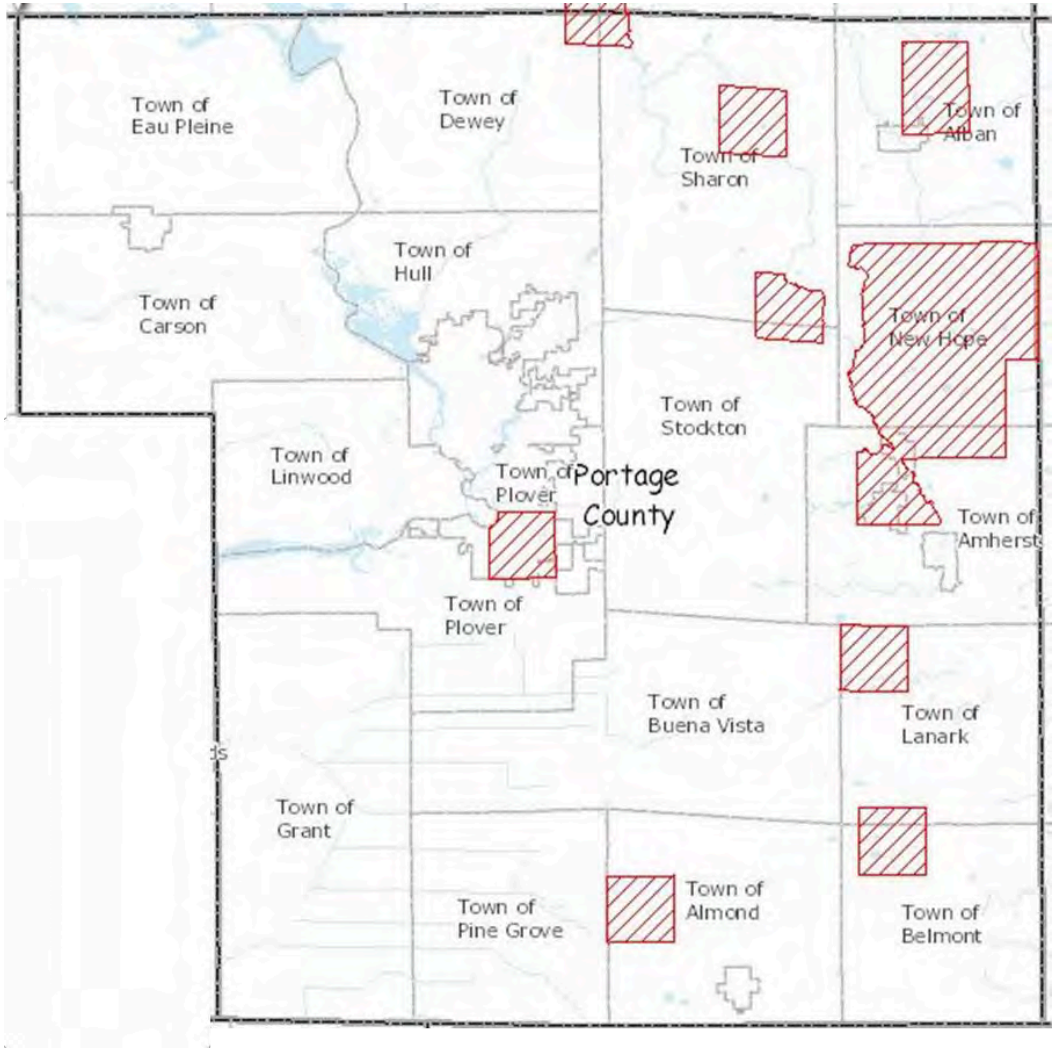
Atrazine Prohibition Areas for Portage County

https://datcpgis.wi.gov/maps/?viewer=pa

45,527 acres of land within Portage County are in atrazine prohibition areas.

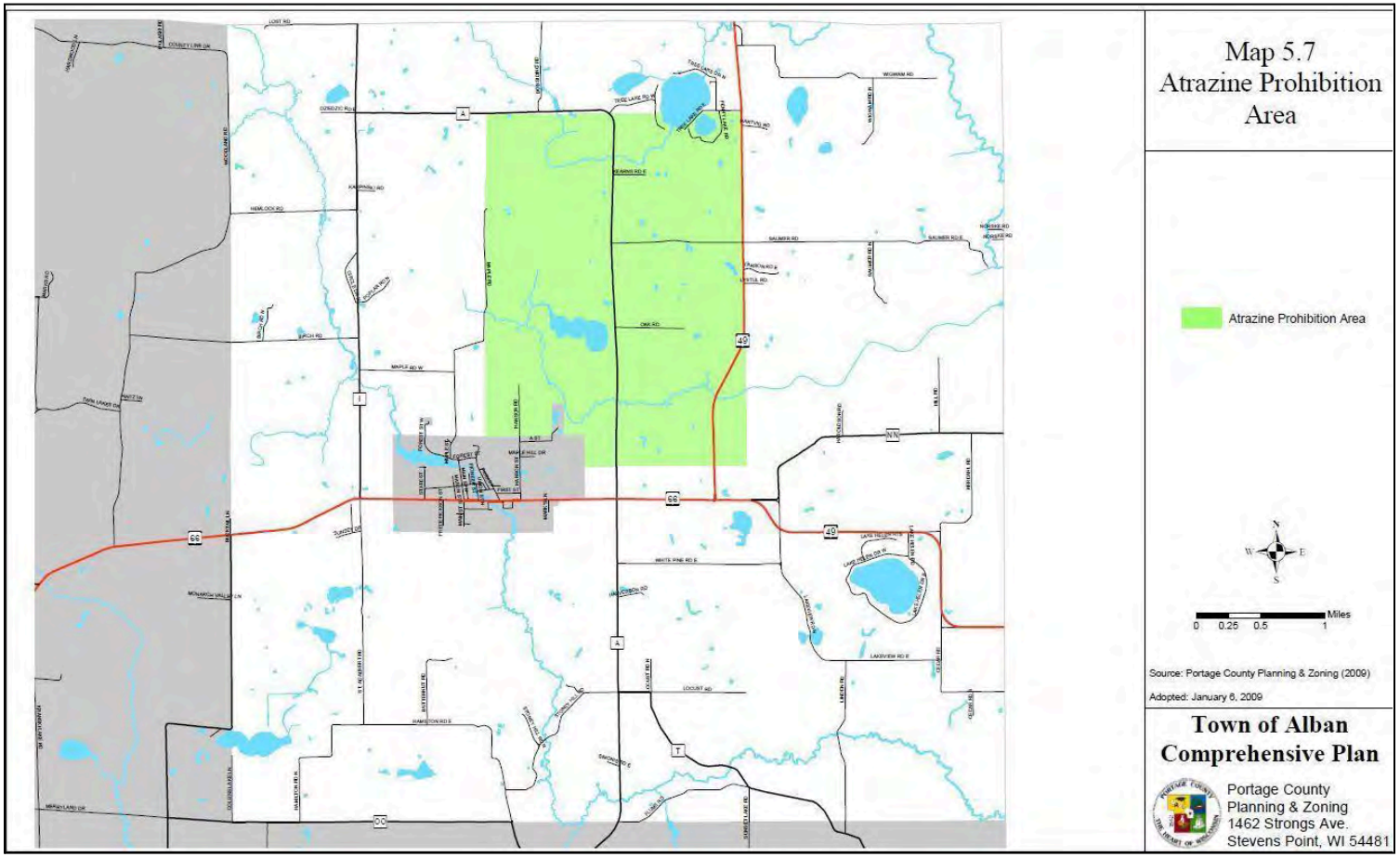
Atrazine is a popular corn herbicide that is used to control weeds in corn fields and has been used in Wisconsin for over 25 years. Atrazine may have entered Wisconsin's groundwater as a result of its use on farm fields. In some cases it may be the result of a spill or improper disposal of unwanted or unused product. As of 2006, there are 102 atrazine prohibition areas in Wisconsin, covering about 1.2 million acres. An atrazine prohibition area is an area of land where all uses of atrazine are prohibited.

http://wi.water.usgs.gov/gwcomp/find/portage/atrazine.html



Atrazine Prohibition Areas for Town of Alban

https://www.co.portage.wi.us/home/showpublisheddocument/1518/636077360008600000



United States Geological Survey:

45,527 acres of land within Portage County are in atrazine prohibition areas.

Atrazine is a popular corn herbicide that is used to control weeds in corn fields and has been used in Wisconsin for over 25 years. Atrazine may have entered Wisconsin's groundwater as a result of its use on farm fields. In some cases it may be the result of a spill or improper disposal of unwanted or unused product. As of 2006, there are 102 atrazine prohibition areas in Wisconsin, covering about 1.2 million acres. An atrazine prohibition area is an area of land where all uses of atrazine are prohibited. http://wi.water.usgs.gov/gwcomp/find/portage/atrazine.html