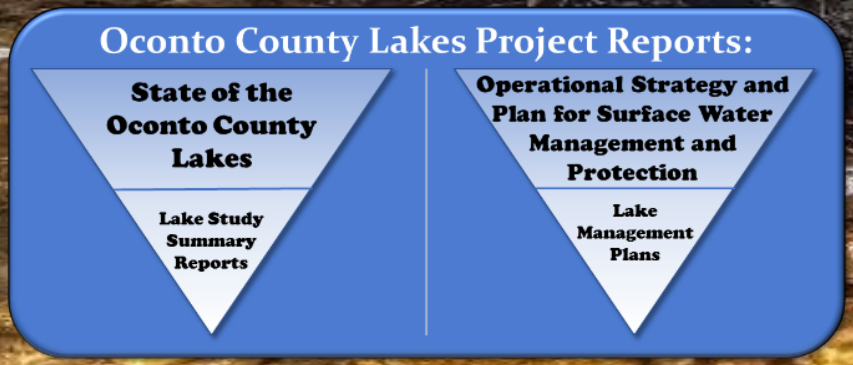
Oconto County Lakes Project

MAIDEN LAKE MANAGEMENT PLAN

2018



VISION

Maiden Lake will remain everyone's favorite 'up-north' lake with exceptional water clarity, excellent fishing and boating, free of invasive species with a friendly and mindful lake community that works together to preserve their legacy.

Maiden Lake Management Plan

The authors would like to acknowledge the commitment and enthusiasm of the Maiden Lake Association, Oconto County Lakes & Waterways Association, Oconto County Land and Water Conservation Department, UW Extension – Oconto County, Wisconsin Department of Natural Resources, UW-Stevens Point Water and Environmental Analysis Laboratory, landowners in the Maiden Lake watershed, and participants in the Oconto County Lakes Project.

This plan was prepared by the Center for Watershed Science and Education at University of Wisconsin – Stevens Point.

Along with the Oconto County Lakes Project participants, the following individuals and organizations contributed to the content of this plan.

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This version of the Maiden Lake Management Plan was unanimously approved by the Maiden Lake Association board on October 11, 2018.

Table of Contents

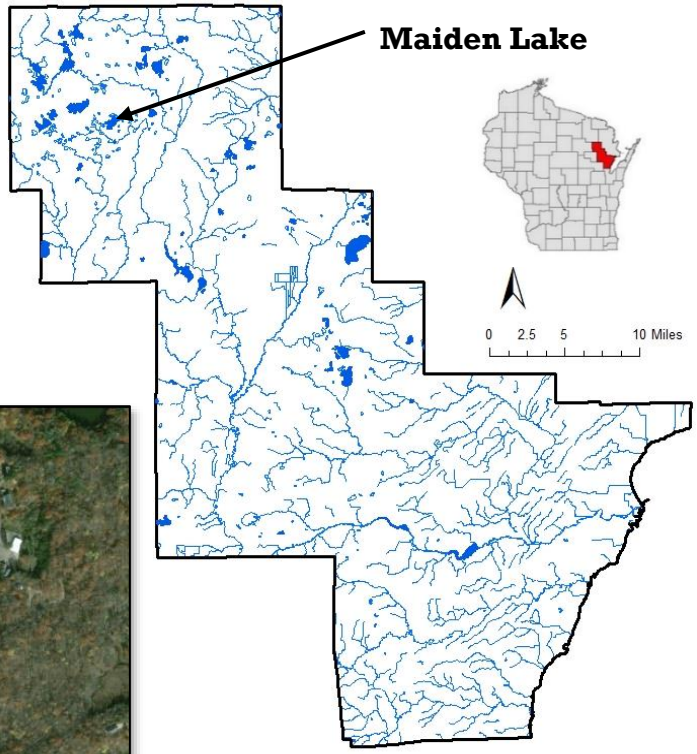
TABLE OF CONTENTS

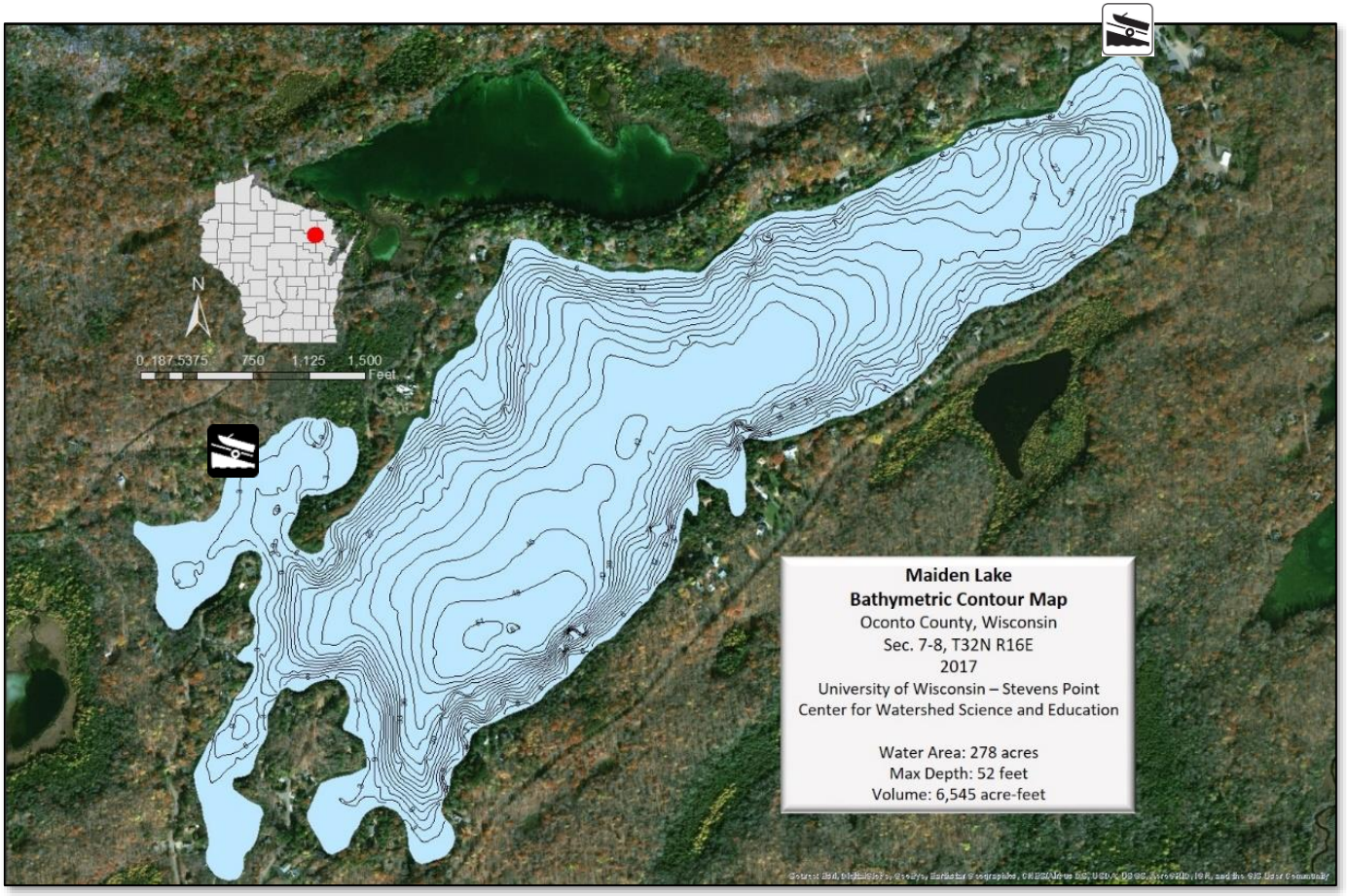
Resource	Acronym or Truncated Name
Citizen Lake Monitoring Network	CLMN
Clean Boats Clean Waters	CBCW
Lumberjack Resource Conservation & Development Council	LRCD
Maiden Lake Association	MLA
Oconto County Land Conservation Dept.	OC LCD
Oconto County Board of Supervisors	OC Board
Oconto County Lakes and Waterways Association	OCLAWA
Town of Riverview	TOR
University of Wisconsin - Extension	UWEX
UWSP Water & Environmental Analysis Laboratory	WEAL
UWSP Center for Watershed Science and Education	CWSE
USDA Natural Resources Conservation Service	NRCS
Wisconsin Department of Natural Resources	WDNR
Wisconsin Department of Transportation	WDOT

Background

ABOUT MAIDEN LAKE

Maiden Lake is located in the Town of Riverview, in the Chequamegon-Nicolet National Forest. This 278-acre drainage lake has a maximum depth of 52 feet with very clear water. Though technically a drainage lake (inlet and outlet are located off the western bay), most of the lake behaves like a (deep) seepage lake. Its bottom sediments are primarily marl/muck, sand and rock. Visitors have access to the lake from one public boat landing located on Maiden Lake which is owned by the Town of Riverview. A second, private boat landing is located at Crystal Waters Condominiums on the far northeast end. Water enters Maiden Lake from a small tributary leading from Little Maiden Lake and leaves via a small stream leading to Camp Lake.





What Is A Lake Management Plan?

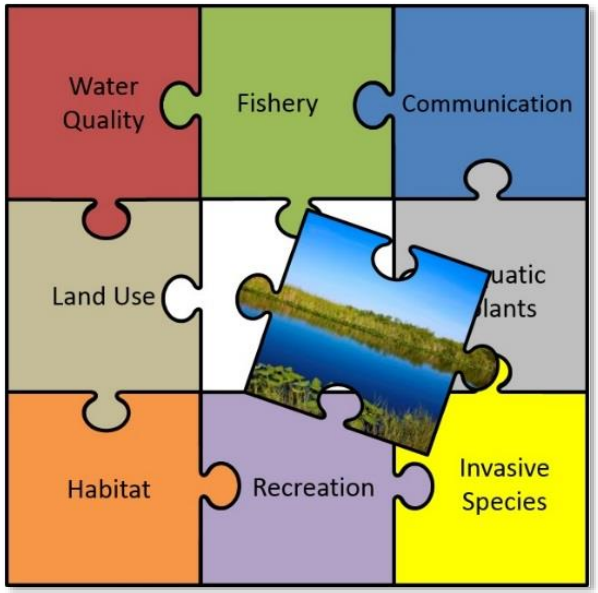
LAKE MANAGEMENT PLANS (LMP)

What is an LMP?

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. Although each lake is different, the WDNR requires that each comprehensive lake management plan address a specific list of topics affecting the character of the lake, whether each topic has been identified as a priority, or as simply something to consider. In this way, every LMP considers the many aspects associated with lakes.

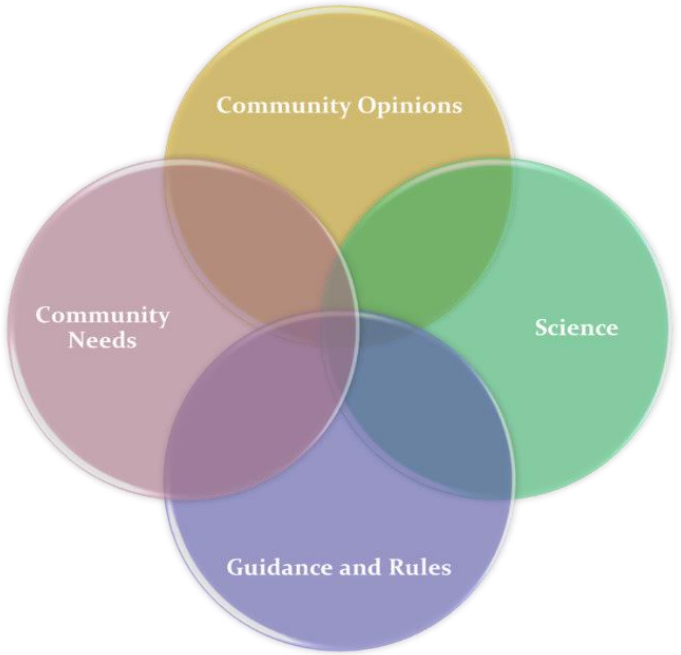
What is the purpose of this LMP?

This plan was created to ensure that Maiden Lake is healthy now and for future generations. It was designed to learn about Maiden Lake and identify features important to the Maiden Lake community, in order to provide a framework for the protection and improvement of the lake.



Implementing the content of this LMP will enable citizens and others to work together to achieve the vision for Maiden Lake now and in the years to come. It is a dynamic document that identifies goals and action items for the purpose of maintaining, protecting and/or creating desired conditions in the lake and identifies steps to correct past problems, improve on current conditions, and provide guidance for future boards, lake users, and technical experts.

Because many entities are involved in lake and land management, it can be challenging to navigate the roles, partnerships and resources that are available. The planning process and content of this plan have been designed to identify where some key assistance exists. The actions identified in this LMP can serve as a gateway for obtaining grant funding and other resources to help implement activities outlined in the plan.



How Was This Plan Created?

ABOUT THIS PLAN

One of the first steps in creating this plan was to gather and compile data about the lake and its ecosystem to understand past and current conditions. This was done in 2016-2017 alongside 8 other lakes as part of the Oconto County Lakes Project. The project was initiated by citizens in the Oconto County Lakes and Waterways Association who encouraged Oconto County to prioritize lake interests. This effort led to funding from the WDNR Lake Protection Grant Program. There was insufficient data available for many of the lakes to evaluate current water quality, aquatic plant communities, invasive species, and shorelands. The data that were available had been collected at differing frequencies or periods of time, making it difficult to compare lake conditions. Professionals and students from UW-Stevens Point, Oconto County Land Conservation Department, UW Extension, Oconto County citizens and WDNR staff collected the data for use in the development of lake management plans. Sources of information used in the planning process are listed at the end of this document.

Reports from the Maiden Lake Study and the materials associated with the planning process and reports can be found on the Oconto County website: **www.co.oconto.wi.us** and navigating to Departments>Land Conservation>County Waterways>County-wide Lake Study.

THE PLANNING PROCESS

Who created the strategic plan?

This plan is the result of a stakeholder-driven effort which involved many partners combining insight, knowledge, and expertise throughout the process. Members of the lake association, area residents, lake users, and representatives of local municipalities gathered at a public meeting held on August 25, 2018 at the Lakewood Community Center to learn from one another and make decisions about the fishery, water quality, habitat, and land management in the Maiden Lake watershed. Technical assistance during the planning process was provided by staff from OCLCD, UWEX, WDNR, and the CWSE.

How were various opinions incorporated?

Participation in the planning process was open to everyone and was encouraged by letters mailed to Maiden Lake waterfront property owners and by press releases in local newspapers. In addition, those individuals and organizations who provided their information were provided with emails about upcoming meetings, which could be forwarded to additional contact lists. To involve and collect input from as many people as possible, including those who might not be able to attend the public meetings, an online survey was conducted. Property owners and interested lake users were notified about the survey and how to access it via direct mailings to waterfront property owners and associated lake organizations and press releases in local newspapers. The surveys could be filled out anonymously online, or paper copies were available upon request. Survey questions and responses were shared at the planning sessions and can be found in the Appendix.

August 25, 2018 Planning Meeting
Lakewood Community Center

How Is This Management Plan Used?

Who will use this plan?

- **Individuals:** Individuals can use this plan to learn about the lake they love and their connection to it. People living near Maiden Lake can have the greatest influence on the lake by understanding and choosing lake-friendly options to manage their land and the lake.
- **Maiden Lake Association:** This plan provides the Association with guidance for the whole lake and lists options that can easily be prioritized. Resources and funding opportunities for lake management activities are made more available by placement of goals into the lake management plan, and the Association can identify partners to help achieve their goals for the lake.
- **Neighboring lake groups, sporting and conservation clubs:** 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 fun.
- **The Town of Riverview:** Municipalities can utilize the visions, objectives, and goals documented in this lake management plan when considering town-level planning or decisions within the watershed that may affect the lake.
- **Oconto 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 Oconto County lakes, streams, wetlands, and groundwater.
- **Wisconsin Department of Natural Resources (WDNR):** Professionals working with lakes in Oconto 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. LMPs help them to identify and prioritize needs, and where to apply resources. A well thought out lake management plan increases an application's competitiveness for funding from the State.

Who can help implement this plan?

Lead persons and resources are identified under each action in this plan. These individuals and organizations are able to provide information, suggestions, or services to achieve goals. The following table lists organization names and their common acronyms used in this plan. This list should not be considered all-inclusive – assistance may also be provided by other entities, consultants, and organizations.

Management Plan Structure

GOALS FOR MAIDEN LAKE

The foundation of any effective strategic plan is clear identification of goals and the steps needed to achieve the goals. The selected goals should achieve the overall vision for Maiden Lake. This plan also identifies available resources within each objective.

The topics comprise the chapters in this plan and 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—water chemistry, clarity, contaminants, lake levels

Shorelands—habitat, erosion, contaminant filtering, water quality, vegetation, access

Watershed—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 & Revisions—plan for maintaining a living document

Maiden Lake Management Plan Goals

Goals for Maiden Lake

The following goals and actions were derived from the values and concerns of citizens interested in Maiden Lake and members of the planning committee, as well as the known science about Maiden Lake, its ecosystem and the landscape within its watershed.

Implementing and regularly updating the goals and actions in this plan will ensure that the vision is supported and that changes are incorporated into the plan.

LIST OF GOALS

Goal 1	**Maiden Lake will maintain a healthy, self-sustaining fishery.**
Goal 2	**Maintain a healthy and diverse aquatic plant community free of invasive species.**
Goal 3	**Sensitive areas in Maiden Lake, those that provide essential habitat and/or water quality benefits, will be protected.**
Goal 4	**Watershed and shoreland property owners will understand their connection to the lake and will know about/utilize resources for healthy land management practices.**
Goal 5	**Maiden Lake will have healthy shorelands that protect water quality and provide essential habitat.**
Goal 6	**Maintain or improve water quality in Maiden Lake.**
Goal 7	**Lake users will be informed about and be respectful of Maiden Lake.**
Goal 8	**Optimize conditions for safe and responsible recreational use.**
Goal 9	**Increase participation in lake stewardship.**
Goal 10	**Review plan annually and update as needed.**

Fish Community

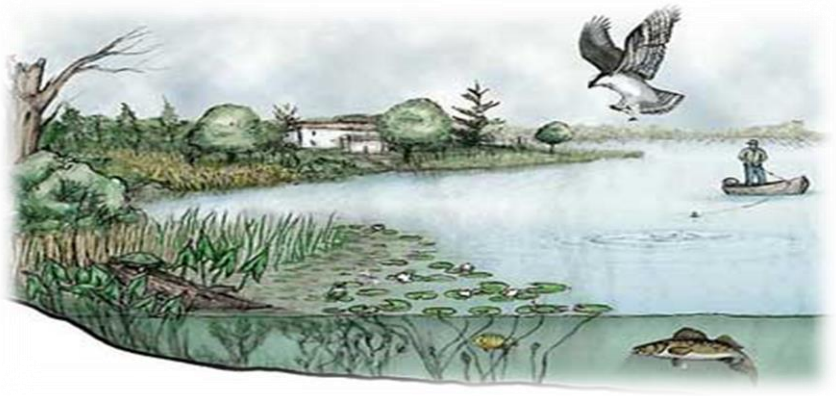
IN-LAKE HABITAT AND A HEALTHY LAKE

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. Many animals that live in and near the lake are only successful if their habitat needs are met.

What is lake-habitat?

Healthy lake-habitat in Maiden Lake includes native aquatic plants and shoreland vegetation, as well as tree branches/limbs above and below the water.

Habitat exists within the lake, along the shoreland, and even extends into its watershed for some wildlife species. Native vegetation (including wetlands) along the shoreline and connected to the lake provides shelter and food for waterfowl, small mammals, turtles, frogs, and fish. Native plants in and near the lake can also improve water quality and balance water quantity. Aquatic plants infuse oxygen into the water, which is essential for the fish community. 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. 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.

What People Value about Maiden Lake

Water quality, water clarity.
Long history with lake, second home.
Neighbors, property owners working to maintain the lake.
Fishing, boating, snowmobiling.
Areas with natural shoreline (few manicured lawns).

Habitat provides shelter and food for fish and wildlife.

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 to flourish.

What can affect the fishery?

Activities in and around a lake that can affect a fishery include:

- disturbances to the native aquatic plant community or substrate,
- excessive additions of nutrients or harmful chemicals,
- removal of woody habitat,
- shoreline alterations,
- shoreland erosion can cause sediment to settle onto the substrate, causing the degradation of spawning habitat.

Fish Community

Because Maiden Lake is low in nutrients and has a relatively low abundance of plants, it is natural for it to have a similarly low abundance in fish.

Can the fishery be improved?

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.

Managing a lake for a balanced fishery can result in fewer expenses to lake stewards and the public. While some efforts may be required to provide a more suitable environment to meet the needs of the fish, they usually do not have to be repeated on a frequent basis. Ideally, a lake contains the habitat, water quality, and food necessary to support the fish communities present within the lake and provide fishing opportunities for people without a lot of supplemental effort and associated expenses to maintain these conditions.

- 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.
- 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.

Stocking Date	Species	# Stocked	Avg. Length (in)
1995	Walleye	2100	6
1998	Walleye	2150	
2001	Walleye	12000	2
2013	Walleye	1496	7
2014	Walleye	2779	6.6
2016	Walleye	2796	7.9

Maiden Lake 2015 Fish Survey Summary

- ✓ Previous surveys were conducted in 1992 and 2005-06.
- ✓ The five most abundant species were walleye, rock bass, smallmouth bass, largemouth bass and bluegill. Some evidence that panfish are declining.
- ✓ The rock bass population is well balanced in terms of size and age.
- ✓ 25% of smallmouth bass were over the minimum length limit and were more abundant than largemouth.
- ✓ 44% of largemouth bass were over the minimum length limit and were more abundant than smallmouth in 2006. Changes to black bass regulations are not recommended.
- ✓ The survey indicated that bluegill population was not balanced.
- ✓ Successful reproduction and recruitment of yellow perch was evident.
- ✓ Walleye densities have fluctuated since the early 1990s. In 1992 it was 2.4/acre but by 2006 it had declined to 1.7/acre. The 2015 survey indicated 2.9/acre even though recreational harvest is marginal. Fishing pressure was 45.8 hrs/acre which is lower than the Oconto County average of 70.6 but higher than the statewide average of 33.6.
- ✓ In 2015, the minimum length for walleye was increased to 18in and 3-bag allowing mature adults an increased opportunity to spawn. Future stocking should continue as fingerlings at 3/acre but be closely monitored.
- ✓ The next fish survey is scheduled for 2023.

Fish Community

Fish cribs are good cover for small fish, but near shore habitat is essential for reproduction of most species.

Maiden Lake is valued for, among other things, its healthy fishery with an excellent walleye population. This is due in a large part to active participation by citizens, the MLA, and WDNR to continue stocking efforts along with habitat improvements. There are reportedly more than 100 fish cribs in Maiden Lake and in 2018, six fish stick clusters were installed along one property on the southeast shore. At least 10% of properties with fish stick clusters (or at least 250 logs/mile) is recommended for a healthy fishery. Though there are many logs in the water around the lake, it is logs that reach up on to shore from the water that offer the best habitat, not only for fish, but for wildlife such as loons as well.

Goal 1. Maiden Lake will maintain a healthy, self-sustaining fishery.

Objective 1.1 Continue to enhance fish habitat in Maiden Lake. 20 fish stick clusters will be installed over the next 4 years.

Actions	Lead person/group	Resources	Timeline
Continue to identify willing property owners for fish stick installations. Track and map these installations as they occur. Also identify properties seeking tree removal (>35 feet from water's edge) as a source of material.	MLA	WDNR-Chip Long	2019-2024
Explore installation of spawning bed projects to increase natural walleye reproduction. Will need to identify willing property owners with appropriate littoral area and aspect.	MLA	WDNR-Chip Long	2019
Educate property owners about healthy shoreland habitat and its importance to having a healthy fishery. See **Shorelands** section.	MLA		Ongoing

Objective 1.1 Continue to augment fish populations as appropriate.

Actions	Lead person/group	Resources	Timeline
Continue stocking walleye fingerlings.	MLA	WDNR-Chip Long	Ongoing

Aquatic Plant Community

Native plants provide essential food and habitat for fish and wildlife.

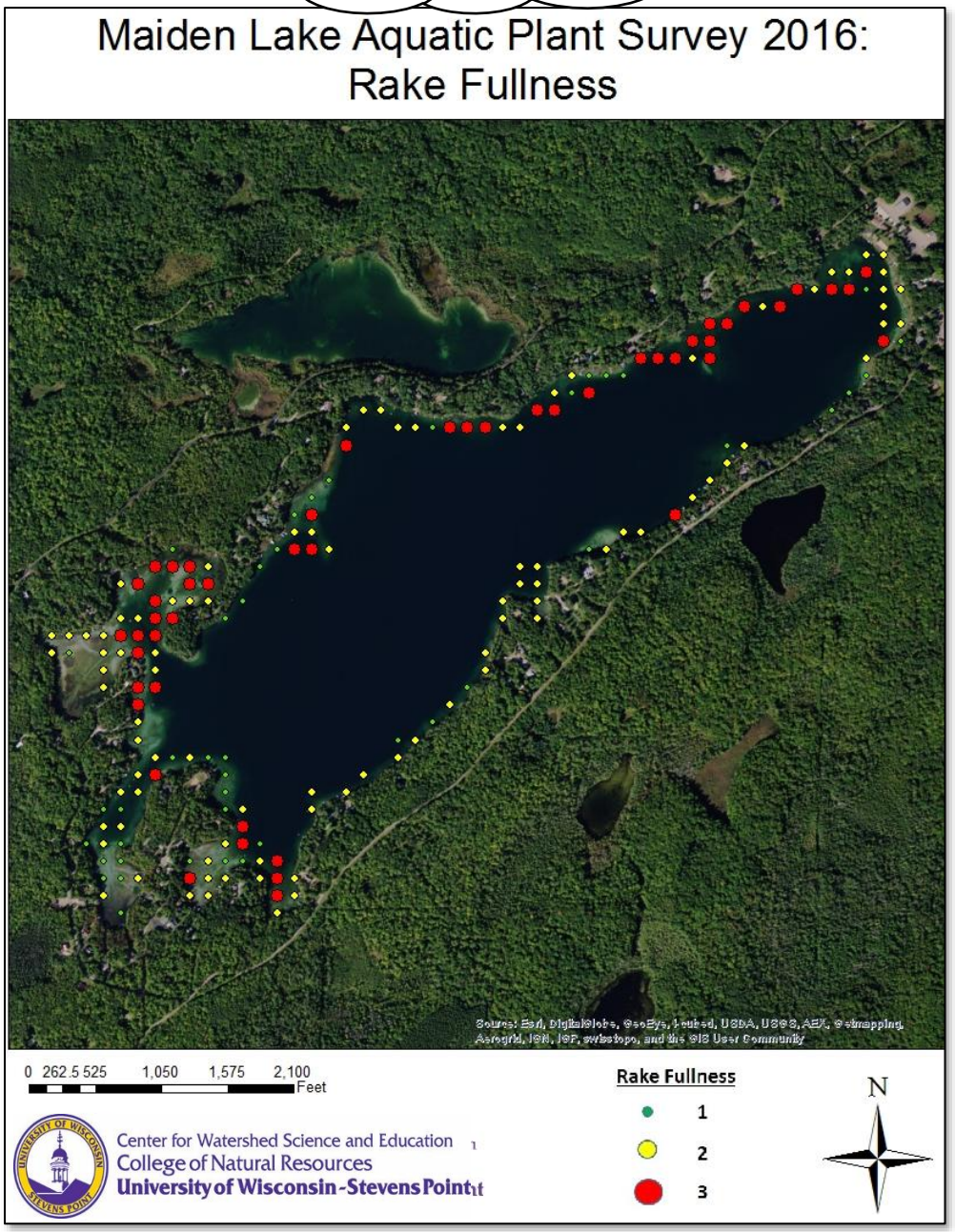
Aquatic Plants

Aquatic plants provide the forested landscape within Maiden 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 makes the aquatic plant community more resilient and can help to prevent the establishment of non-native aquatic species. Additionally, they stabilize the bottom sediment and help filter out the suspended sediment from the water column.

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. Aquatic plants also serve as indicator species for environmental stressors that could be occurring in a lake or river, such as a runoff event.

Maiden Lake 2016 Aquatic Plant Survey Highlights

- ✓ 30% (190 of 639) of the sites visited had vegetative growth.
- ✓ Greatest depth aquatic plants were found was 23 feet.
- ✓ 34 species of aquatic plants were identified. This is above the North Central Hardwood average of 16.2.
- ✓ The three most dominate species were chara (95.79%), Nitella sp. (12.11%), and Najas flexilis (6.84%).
- ✓ The Floristic Quality Index (FQI) was 27.71. The North Central Hardwood average is 23.3.
- ✓ Eurasian water-milfoil was observed in one location.



Aquatic Plant Community

Chara is a type of macro-algae that grows attached to muddy lake bottoms and has a musky odor. Muskgrass, as it is known, filters the lake water, helps prevent the establishment of invasive species, and provides excellent habitat for small fish and other organisms.

Nitella, or stonewort, is similar to chara in that it is a type of algae that looks like a plant. The branches are arranged in whorls around the stem, but unlike chara, are smooth and translucent green. Nitella also lacks the skunky smell of chara.

Najas flexilis, or slender naiad, is important forage and cover for aquatic animals and an important food source for waterfowl.

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 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.

Eurasian water-milfoil

Eurasian water-milfoil (EWM) is one of the most common invasive aquatic plants in Wisconsin. It can from dense mats that choke out native plants and inhibit navigation. New plants can grow from stem fragments that root on contact with the substrate. EWM was first documented on Maiden Lake in 2008 and continues to show up in isolated populations in several areas (see Appendix D). Some residents on Maiden Lake have been vigilant since its discovery on looking for and removing any new populations, but it is still occasionally found. The MLA has been spending about $6,000/year on EWM management in recent years which has included professional hand pulling starting in 2016, DASH and professional hand pulling in 2017 and 2018.

A point-intercept survey per the DNR protocol is recommended every 5 years to detect changes in the plant community and detect any additional AIS. If new areas of Eurasian watermilfoil are found and the lake chooses to address it with chemicals, it is important to separate the surveyor from the herbicide applicator or the firm who is doing the control work. This eliminates the "fox guarding the henhouse" factor. AIS control projects that implement this strategy tend to be more successful.

Aquatic Plant Community

Aquatic Plant Management in Maiden Lake

Management strategies in Maiden Lake were designed to achieve a balance between healthy aquatic habitat, good water quality, and eradication of invasive species.

Management Options for Invasive Species or Nuisance Native Aquatic Plants

Management options that offer the most practical and effective approaches for managing EWM (or other invasive species), while minimizing impacts to Maiden Lake as a whole, have been identified. Depending upon conditions, the following options may be used alone or in combination with others.

Hand-pulling. No permit required.

Hand-pulling is the preferred method for removing EWM. Additionally, lakefront property owners are allowed to manually remove native aquatic plants from an area up to 30 feet wide without a permit for swimming and boat access (this does not include the excavation or removal of any bottom sediments). Any denuded lakebed is prime real estate for invasive species, however, and close monitoring is necessary to ensure no populations are established.

Eurasian water-milfoil has been observed in Maiden Lake typically as a few isolated plants (see **Appendix D** for 2018 EWM survey results). Vigilance is required to discover these populations while they are still small. Hand -pulling in these situations is the best approach (chemicals are reserved for large beds or lake-wide infestations). The plant spreads through fragmentation, so care to remove the entire plant, roots and all, is necessary. Dispose of away from the water's edge.

Diver Assisted Suction Harvesting (DASH). Permit required.

Some populations may be in areas of a lake (deep) that are problematic for hand pulling. DASH, a method where divers guide target plants into a suction device that is filtered on the other end, is an efficient way to access these areas while still thoroughly removing all plant fragments. A DASH operation conducted on Maiden Lake in summer 2018 removed over 60 cubic feet of EWM along the north shore and Finger Bay. Divers reportedly had trouble removing EWM from within and around existing fish cribs and downed trees. Future fish crib placement should consider EWM populations in their placement. Two DASH sessions are currently scheduled for 2019.

Aquatic Plant Management Plan Review

A good aquatic plant management plan strategy should reduce the amount of management activity needed as time goes on. In Maiden Lake, a series of successful strategies (integrated plant management) should lead to a balance between healthy aquatic habitat, water quality, and recreation with minimal annual management.

Aquatic Plant Community

Goal 2. Maintain a healthy and diverse aquatic plant community free of invasive species.

Objective 2.1 Eradicate Eurasian water-milfoil from Maiden lake. Ensure no new populations are introduced.

Actions	**Lead person/group**	**Resources**	**Timeline**
Encourage/host training, post signage at boat landing, develop coasters or placemats for area businesses, provide brochures for rental properties, etc. on how to identify and properly remove invasive species, particularly EWM. The more people who know how to recognize EWM, the more eyes there are on the lake.	MLA	WDNR LRCD	Summer 2019
Educate lake users on importance of native aquatic plants for preventing AIS. Bring in speaker for annual meeting, mail literature to property owners, include information in a newsletter, etc.	MLA	WDNR UWEX-Lakes LRCD	Ongoing, Summer 2019
Participate in Clean Boats Clean Waters program. Identify volunteers or consider paying someone to staff the boat launch on busy days.	MLA	CBCW	Ongoing, in summer
Continue to support volunteer crews (“milfoil mafia”) in monitoring for and removing new populations of EWM. Map and track these observations.	MLA	WNDR	Ongoing
Hire professionals for EWM survey/removal annually (or as needed) to assess EWM population and identify new populations.	MLA	Consultants WDNR	Annually
Hire DASH contractors (and/or volunteers) to identify deeper populations of EWM and remove these plants, as necessary. Seek cost-share and grant funding for these activities where available.	MLA	WDNR grants OCLCD cost share	Annually
If ever considering chemical spot treatment on a large bed of EWM, have a sample tested for hybrid water-milfoil (HWM) prior to application. Some HWM strains have been shown to have resistance to traditional chemicals (2,4-D).	MLA	WDNR	As needed
If a new AIS is suspected or observed, follow the guidance in **Appendix B**.	MLA Lake users	WDNR	Ongoing
Consider applying for AEPP grant to obtain an Aquatic Plant Management plan (a blueprint that is more detailed and specific to aquatic plant management than the comprehensive management plan).	MLA	WDNR-Brenda Nordin	2019

Aquatic Plant Community

Objective 2.1 Minimize disturbance to native aquatic plants.

Actions	**Lead person/group**	**Resources**	**Timeline**
Inform property owners of the importance of native aquatic vegetation to impede the establishment of additional AIS, provide food and habitat for wildlife, and protect the shoreline via educational materials provided at the annual meeting, direct mailings and in a newsletter.	MLA	WNDR-Brenda Nordin	Ongoing
Encourage landowners to limit plant removal to invasive species or skimming off those that have become unrooted and free-floating. If plants severely impede recreation, consider hand-pulling small areas around private docks (within WDNR guidelines). Cleared lakebed is ideal habitat for AIS to become established, so be vigilant about watching for AIS in these areas.	MLA	WDNR-Brenda Nordin	Ongoing
Regularly monitor aquatic plant community to detect any changes in lake conditions and ensure stable populations. A point-intercept survey is recommended.	MLA	WDNR-Brenda Nordin Consultants	Every 5-10 years.
Reduce nutrient and sediment loading to lake by improving shoreland buffers (see **Shorelands** section) and implementing BMPs in the watershed (see **Watershed** section).	MLA	WDNR-Brenda Nordin OCLCD	Ongoing

Critical Habitat

Every waterbody has areas that are most important to the overall health of the lake.

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 WDNR 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.

Although Maiden Lake does not have an official critical habitat area designation, there are areas within Maiden Lake that are important for fish and wildlife. Natural, minimally-impacted areas with woody habitat such as logs, branches, and stumps; areas with emergent and other forms of aquatic vegetation; areas with overhanging vegetation; and wetlands are elements of good quality habitat. Identifying other important areas around the lake that are important habitat and informing lake users of their value can help raise awareness for the protection of these areas.

Goal 3. Sensitive areas in Maiden Lake, those that provide essential habitat and/or water quality benefits, will be protected.

Objective 3.1 Identify and inform others of quality habitat areas in and around Maiden Lake.

Actions	Lead person/group	Resources	Timeline
Request a Critical Habitat Designation from WDNR.	MLA	WDNR-Brenda Nordin	2019
If critical habitat is designated on Maiden Lake, communicate to property owners, visitors, and Town Board as to why these areas are important.	MLA		TBD
Support landowners (particularly those with large stretches of natural shoreline such as the southeast side) interested in preserving natural and sensitive areas around the lake.	MLA	WDNR UWEX Northeast Wisconsin Land Trust	As available.

Watershed

LANDSCAPES AND THE LAKE

Maiden Lake Watershed

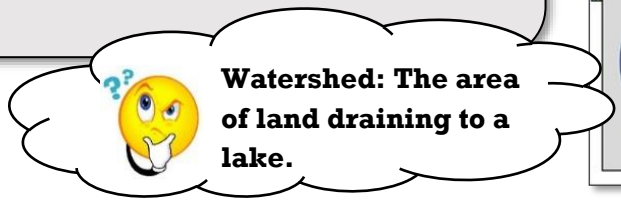
A Lake is a Reflection of its Watershed…

Understanding where Maiden Lake's water originates is important to understanding lake health. During snowmelt or rainstorms, water moves across the surface of the landscape (runoff) towards lower elevations such as lakes, streams, and wetlands. This area is called the watershed. Groundwater also feeds Maiden Lake; its land area may be slightly different than the surface watershed.

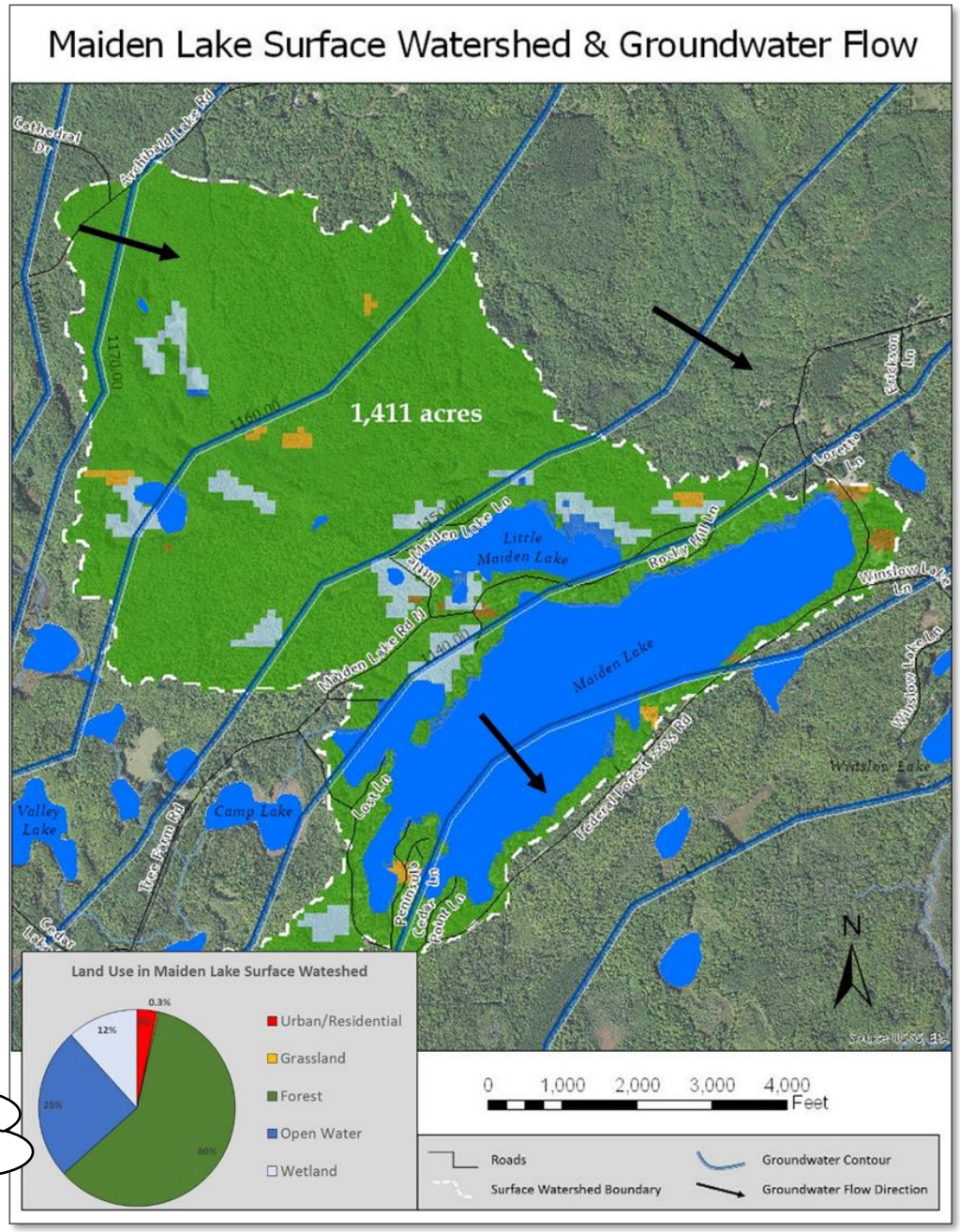
Less runoff is desirable because it allows more water to recharge the groundwater, which feeds the lake year-round - even during dry periods or when the lake is covered with ice. The capacity of the landscape to shed or hold water and contribute or filter particles determines the amount of erosion that may occur, the amount of groundwater feeding a lake, and the lake's water quality and quantity. Landscapes with greater capacities to hold water during rain events and snowmelt slow the delivery of the water to the lake.

Maiden Lake's Watershed

The Maiden Lake watershed is 1,411 acres. Primary land use is forest. The lake's shoreland is surrounded primarily by developed residential lots. In general, the land closest to the lake has the greatest immediate impact on water quality.



Watershed: The area of land draining to a lake.



Watershed

Why does land matter?

Land use and land management practices within the 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.

Soil and Erosion

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

Development on the land may result in changes to natural drainage patterns, 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.

What can be done?

Land management practices can be put into place that 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 and is often the easiest to manage (own property, no politics, etc.).

Be Part of the Solution!

Practices designed to reduce runoff include:

- protecting/restoring wetlands,
- installing rain gardens, swales, rain barrels, and other practices that increase infiltration
- routing drainage from pavement and roofs away from the lake
- meandering lake access paths to minimize direct flow to the lake.

Practices used to help reduce nutrients from moving across the landscape towards the lake include:

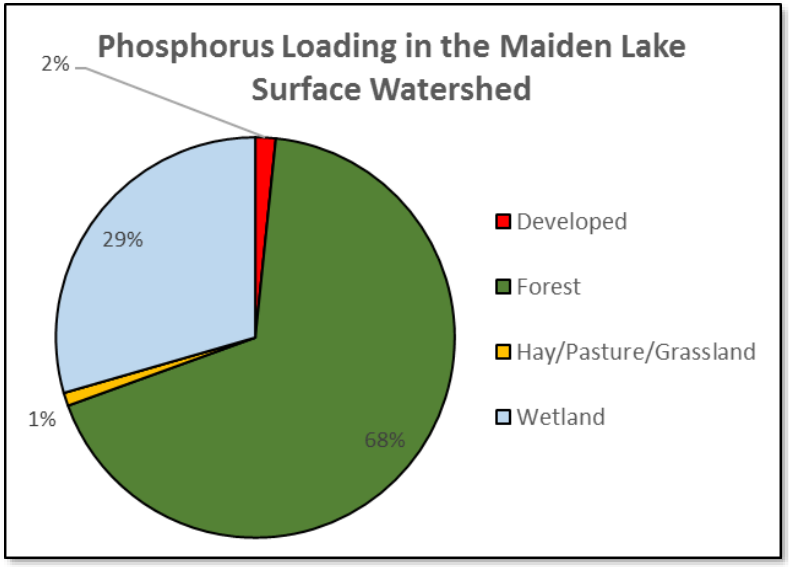
- eliminating/reducing the use of fertilizers,
- increasing the distance between the lake and a septic drainfield,
- protecting/restoring wetlands and native vegetation in the shoreland,
- controlling erosion,
- manure management and cropping practices.

Most of these activities are eligible for cost share and grant assistance!

Watershed

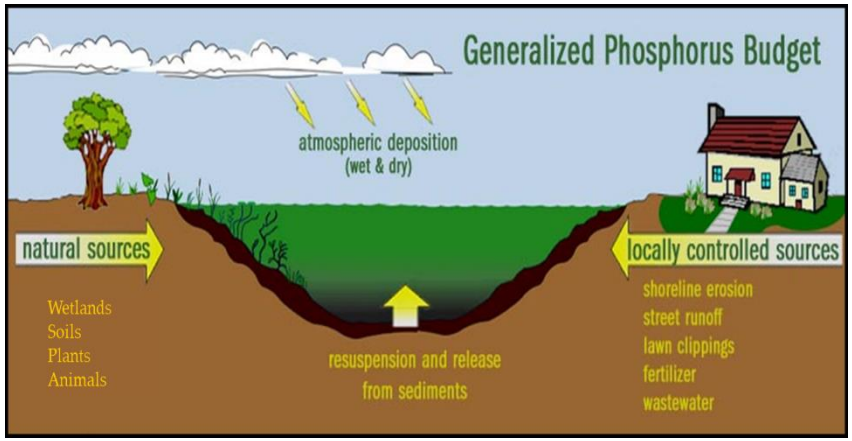
Phosphorus Modeling

Estimates of phosphorus from the landscape can help to understand the phosphorus sources to Maiden 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 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. The phosphorus contributions by land use category, called phosphorus export coefficients, have been obtained from studies throughout Wisconsin (Panuska and Lillie, 1995). In the Maiden Lake watershed, the vast majority of these sources are natural and cannot be changed.



Phosphorus Loading in Maiden Lake Watershed

Based on modeling results, wetlands and forest had the greatest percentage of phosphorus contributions from the watershed. Though a smaller piece of the pie, efforts to reduce nutrient inputs to the lake must be focused on land uses that we have some control over such as agriculture and developed areas.



Goal 4. Watershed and shoreland property owners will understand their connection to the lake and will know about/utilize resources for healthy land management practices.

Objective 4.1 Support healthy land management practices in the Maiden Lake watershed to reduce sediment and nutrient loading.

Actions	Lead person/group	Resources	Timeline
Encourage the County to support and follow-up with water quality-based best management practices (BMPs) within the watershed.	MLA	OCLCD County Board Supervisors	Ongoing
Support landowners (consider financial support) interested in the protection of their land via a land conservation program (i.e. Conservation Easement, Purchase of Development Rights, or sale of land for protection).	MLA	WDNR Lake Protection Grants Knowles-Nelson Stewardship Fund Northeast WI Land Trust	As needed
Encourage any new developments to manage runoff on site and consider ways to minimize impacts from septic systems.	MLA	Town of Riverview Developers/Builders	As needed
Protect wetlands to maintain the water budget of Maiden Lake. Any altered wetlands should be mitigated within the lake's watershed.	MLA	WDNR	As needed
Encourage design of road and construction projects that will minimize impacts to the lakes.	MLA	Town of Riverview OC Highway Department/WDOT	As needed
Work with town to address and remediate erosion occurring at the quasi boat landing near intersection of North Maiden Lake Road and Little Maiden Lake Road, immediately west of Little Maiden outlet creek, to minimize sediment (and phosphorus) transport to big Maiden Lake.	MLA	Town of Riverview WDNR	2019

Shorelands

90% of lake life spends all or part of their life in the near shore zone.

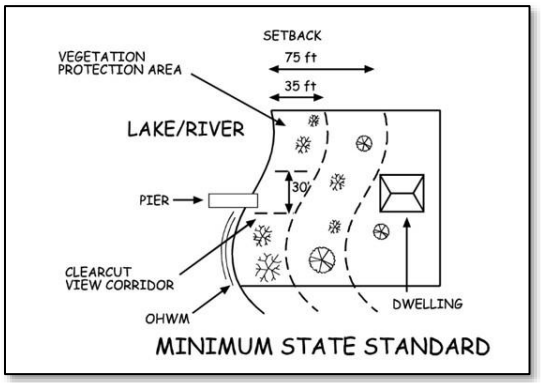
Shorelands

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.

Shoreland ordinances have been in place since 1964 to improve water quality and habitat, and to protect our lakes. To protect our lakes, county and state (NR 115) shoreland ordinances state that vegetation should extend at least 35 feet inland from the water's edge, with the exception of an optional 30-foot wide view corridor for each shoreland lot. Although some properties were grandfathered in when the ordinance was initiated in 1966, following this guidance will benefit the health of the lake and its inhabitants.

Disturbed shoreland is measured as any shoreline without a shrub or herbaceous layer at the water's edge, regardless of buffer thickness. This may be a result of mowed lawn, artificial beach, etc.



Be Part of the Solution!

Follow Healthy Shoreland Practices

- Mow Less: The simplest, most affordable way to improve your shoreland is to reduce mowing near shore. Native vegetation will re-establish itself over time.
- Leave natural shoreland vegetation in place.
- Restore native shoreland vegetation where it is lacking.
- Plant attractive native species of grasses/flowers, shrubs and trees that will add interest and beauty to your property.
- Don't use fertilizers or herbicides, they may run into the lake. Test your soil to determine if fertilizer is warranted.
- Add or leave woody habitat near the shore. Turtles, birds, and fish love it!
- Never transplant water garden plants or aquarium plants into lakes, streams, or wetlands.
- Visit **www.healthylakeswi.com** for additional resources.

State Shoreland Zoning Ordinance

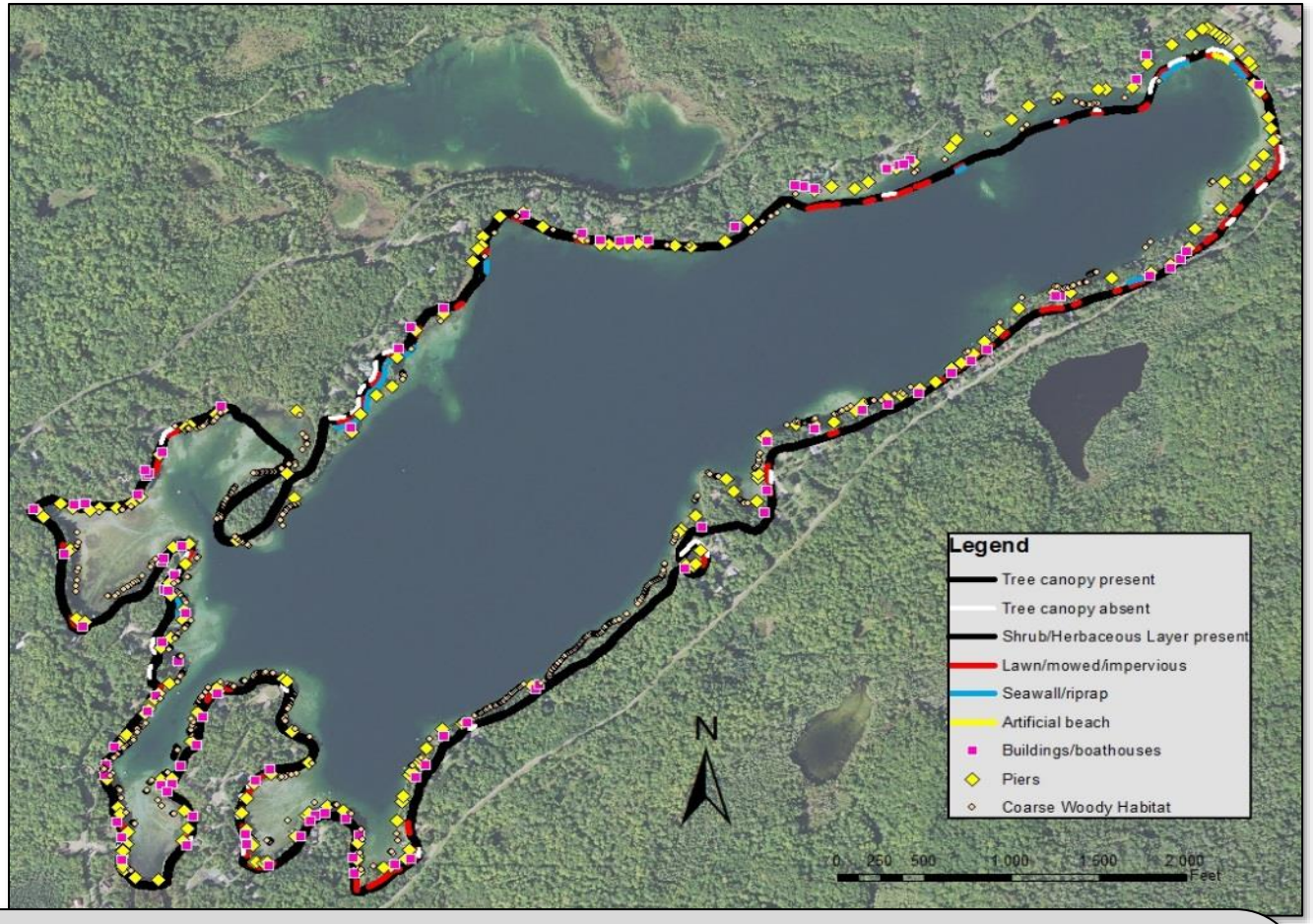
NR 115 Wisc. Adm. Code for Unincorporated Municipalities

No vegetation within 35 feet of the lake's edge shall be removed except for:

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

Shorelands

Modifications, Structures, Erosion	Measured Occurrence
Artificial Beach	205 ft
Rip Rap	8,052 ft
Sea Wall	445 ft
Impervious Surface	281 ft
Mowed Lawn	4,980 ft
Erosion	38 ft
Nonconforming Buildings	109
Piers	199
Coarse Woody Habitat	145 logs/mile



Maiden Lake's Shorelands

To better understand the health of Maiden Lake, shorelands were evaluated. The survey inventoried shoreland vegetation, erosion, riprap, barren ground, seawalls, structures, and docks. The majority of the 5.2 miles of shoreline is developed as homes and seasonal cottages. A total of 199 piers were counted during the survey (1/136 ft).

- With 168 lakefront lots, 5040 feet (19%) of disturbed shoreland is permitted. Based on the 2017 shoreland inventory, 35% (9517 feet) of Maiden Lake's shoreland was disturbed. Coarse woody habitat was measured at 145 logs/mile (250 logs/mile recommended.)
- As a whole, Maiden Lake had average shoreland health compared to other lakes in the study. Some stretches of Maiden Lake's shorelands are in good shape, but many portions have challenges that should be addressed.

Shorelands

Maiden Lake 2017 Shoreland Survey Results			
Total lakefront footage	**# Riparian lots**	**Total allowable (NR115) disturbed shoreland**	**Measured disturbed shoreland**
27,187 feet	168	5,040 feet or 19%	9,517 feet or 35%

Goal 5. Maiden Lake will have healthy shorelands that protect water quality and provide essential habitat.

Objective 5.1 Shoreland property owners will be knowledgeable about and make good decisions regarding their shoreland practices that result in good water quality and habitat. Over the next 10 years, 4,500 feet of disturbed shoreland will be restored.

Actions	Lead person/group	Resources	Timeline
Provide informational materials to all shoreland property owners about basic lake stewardship including healthy shorelands and their composition (wildflowers, shrubs, trees, etc.). Include information on cost share programs.	MLA	OCLWA UWEX Lakes WDNR Healthy Lakes grants	Ongoing
Encourage and support shoreland owners interested in shoreland restoration (including rain gardens, diversion practices, infiltration practices, native plantings, no mow, or fish sticks). Include information on how and why to create healthy shorelands in a welcome packet to new property owners.	MLA	UWEX Lakes OCLCD WDNR Healthy Lakes Grants	Ongoing
Encourage those interested in shoreland restorations to contact the OCLCD for available resources.	MLA	OCLCD WDNR Healthy Lakes Grants	Ongoing
Host a speaker/demonstration: "How to restore your shoreline."	MLA	UWEX Lakes-Pat Goggin	2019
Consider restoring and showcasing a "demonstration site" with a sign at the water's edge about shoreland restoration (perhaps at the boat launch or on one of the commercial properties).	MLA	OCLCD UWEX Lakes-Pat Goggin WDNR Healthy Lakes Grants	2019
Explore purchase of undeveloped shoreland property.	MLA	UWEX Lakes Knowles-Nelson Stewardship Fund	As available
Work with town (public launch) and property owner (private launch) to design and install a water diversion structure at the boat ramps to keep runoff from flowing directly into lake.	MLA	TOR WDNR	2019

Water Quality

Water Quality

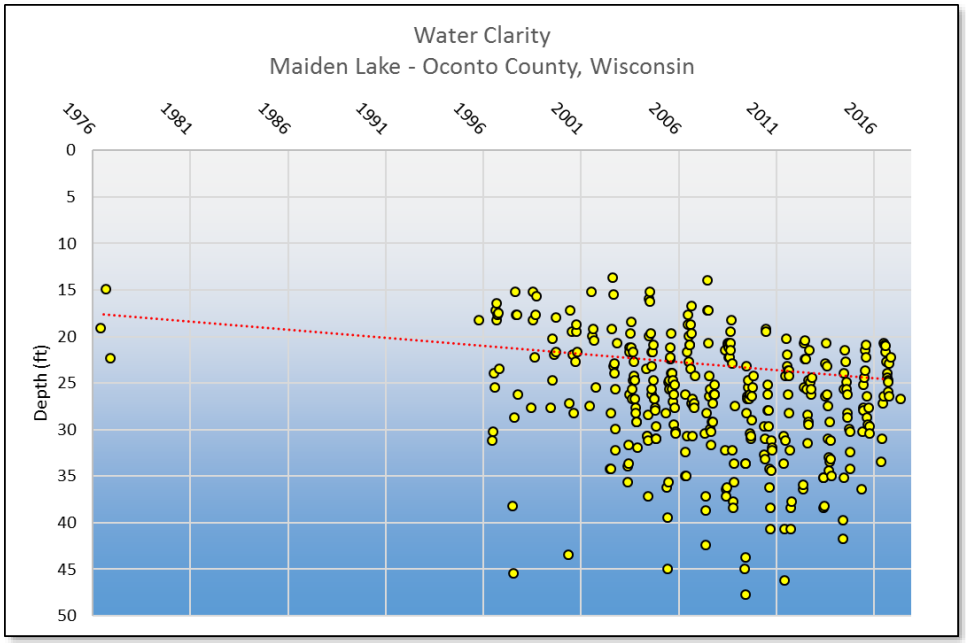
A variety of water chemistry measurements were used to characterize the water quality in Maiden Lake. Water quality was assessed during the 2016-2017 lake study and involved a number of measures including temperature, dissolved oxygen, water chemistry, and nutrients (phosphorus and nitrogen). Nutrients are important measures of water quality in lakes because they contribute to algae and aquatic plant growth. 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 Maiden Lake's water quality.

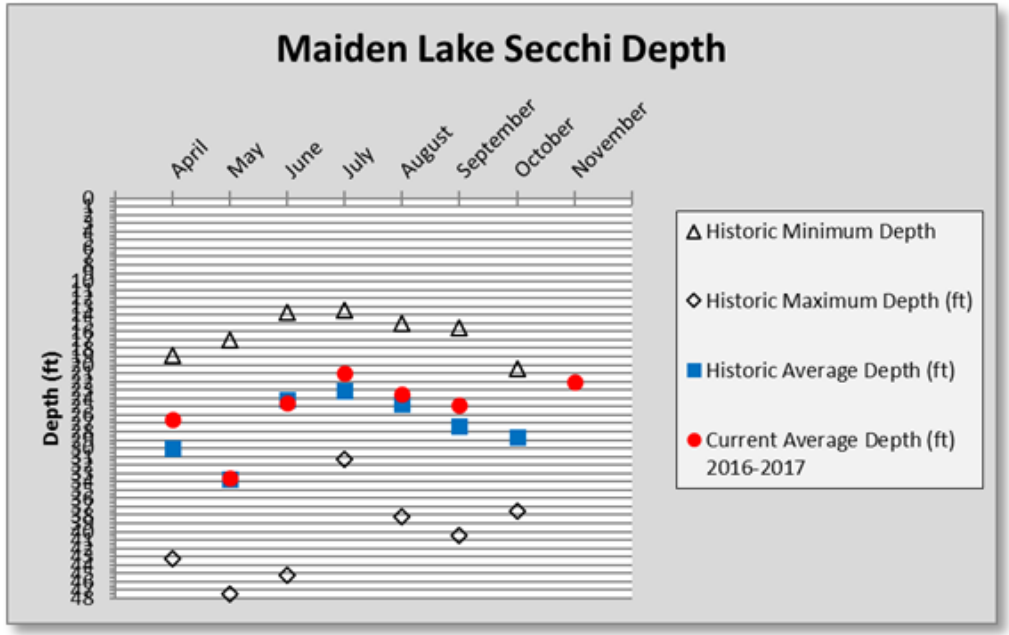
Water Clarity

Water clarity is a measure of how deep light can penetrate (Secchi depth). Clarity is affected by water color, turbidity, and algae and helps determine where rooted aquatic plants grow.

Maiden Lake's Water Quality Summary

- ✓ **Water clarity** ranged from 20.5-33.25 feet (considered very good), which is consistent with historic measurements.
- ✓ Sufficient **dissolved oxygen** was present in at least the upper 25-30 feet of water at all times during the study.
- ✓ Slightly elevated concentrations of **contaminants** were measured during the study. Atrazine was not detected.
- ✓ **Phosphorus** concentrations remained below the standard of 30 ug/L throughout the study. Inorganic nitrogen remained well below concentrations that spur algal blooms.
- ✓ Water in the lake is calcium-rich (hard), which helps reduce the impacts of phosphorus.

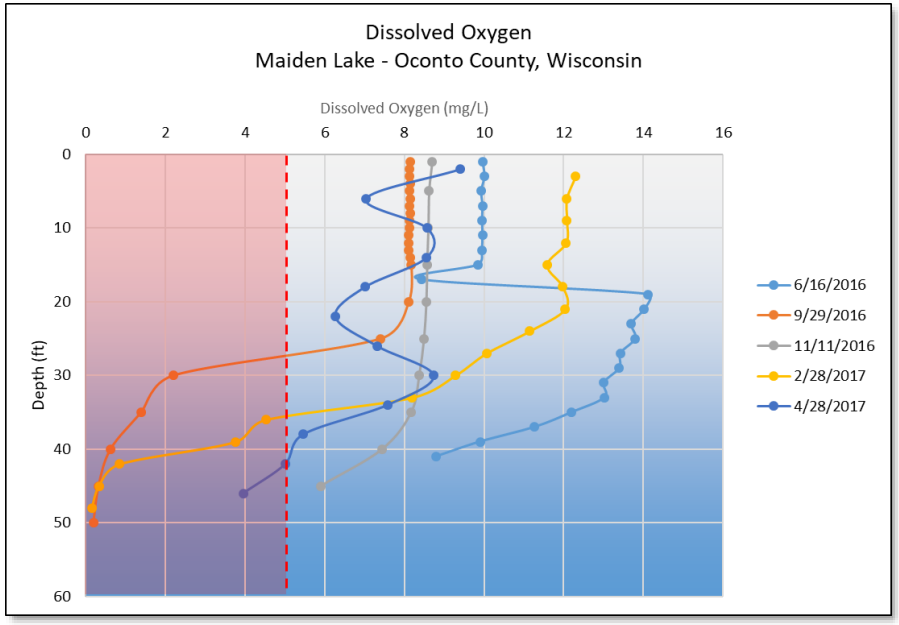




Water Quality

Dissolved oxygen

Dissolved oxygen is an important measure in Maiden Lake because a majority of organisms in the water depend on oxygen to survive. Oxygen is dissolved into the water from contact with air, which is increased by wind and wave action. Algae and aquatic plants also produce oxygen when sunlight enters the water, but the decomposition of dead plants and algae reduces oxygen in the lake.



Dissolved oxygen concentrations decline with depth as access to sources such as the atmosphere and growing plants is decreased. Oxygen levels in Maiden Lake are sufficient to depths of 30 feet throughout the year. Increases to oxygen concentrations such as that seen in the June 2016 profile are indicative of algae blooms at depth.

Contaminants

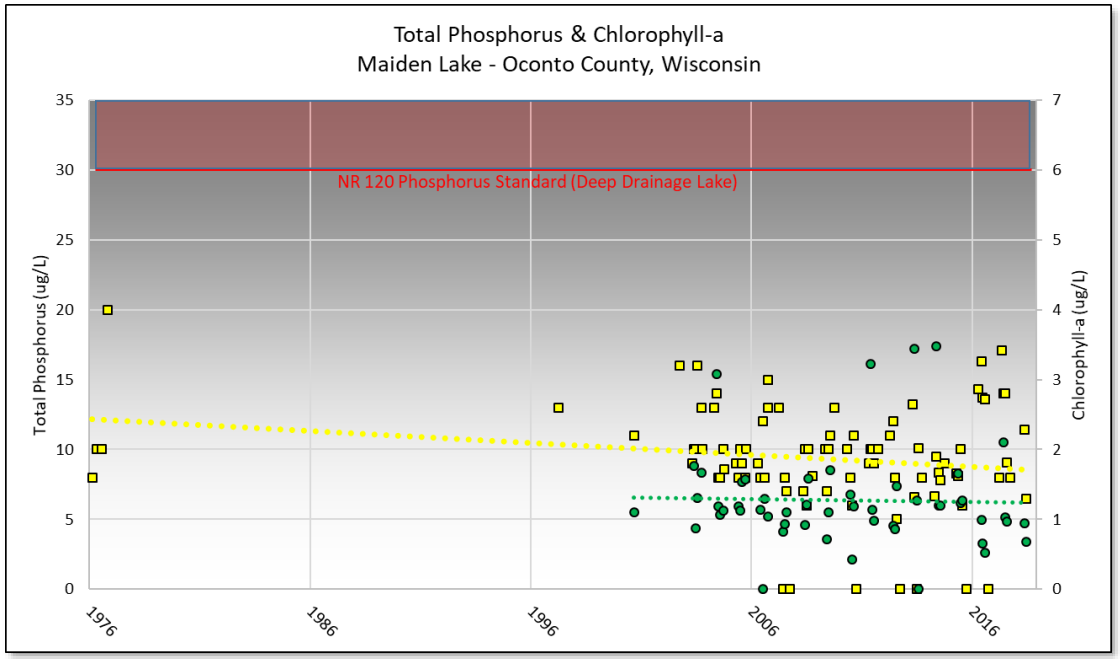
Chloride, sodium and potassium concentrations are commonly used as indicators of how a lake is being impacted by human activity. The presence of these compounds where they do not naturally occur indicates sources of water contaminants. Although these elements are not detrimental to the aquatic ecosystem, they indicate that sources of contaminants such as road salt, fertilizer, animal waste and/or septic system effluent may be entering the lake from either surface runoff or via groundwater. Measurements of contaminants were low.

Nutrients

Phosphorus is an element that is essential in trace amounts to most living organisms, including aquatic plants and algae. Naturally-occurring sources of phosphorus include soils and wetlands, and groundwater. Common sources from human activities include soil erosion, animal waste, fertilizers, and septic systems. Although a variety of compounds are important to biological growth, phosphorus receives so much attention because it is commonly the "limiting nutrient" in many Wisconsin lakes. Due to its relatively short supply compared to other substances necessary for growth, relatively small increases in phosphorus result in significant increases in aquatic plants and algae. NR 120, Wisconsin Administrative Code lists phosphorus limits for different lake types. Deep drainage lakes such as Maiden have a standard of 30 ug/L they must remain stay to remain healthy. The very limited data available show concentrations in Maiden to be well below this standard. Continued monitoring is necessary to verify this and establish and trends. Concentrations of 0.3 mg/L inorganic nitrogen in spring are sufficient to fuel algal blooms throughout the summer. Sources of inorganic nitrogen include animal waste, septic systems/waste treatment effluent, and fertilizers.

Water Quality

In Maiden Lake, phosphorus concentrations remained well below the threshold of 30 ug/L throughout the study. Likewise, no historical measurements were above the 30 ug/L threshold , either. The long-term trend is stable.



Be part of the solution!

Managing nitrogen, phosphorus and soil erosion throughout the Maiden Lake watershed is one of the keys to protecting the lake itself. Near shore activities that may increase the input of phosphorus to the lake include applying fertilizer, removing native vegetation (trees, bushes and grasses), mowing vegetation, and increasing the amount of exposed soil. Nitrogen inputs to a lake can be controlled by using lake-friendly land management decisions, such as the restoration of shoreland vegetation, elimination/reduction of fertilizers, proper management of animal waste and septic systems, and the use of water quality-based management practices.

Goal 6. Maintain or improve water quality in Maiden Lake.

Objective 6.1 Maintain median summer phosphorus concentrations below 20 ug/L and fall inorganic nitrogen concentrations below 0.3 mg/L.

Actions	Lead person/group	Resources	Timeline
Inform others around the lake about the impact of nutrients and land management on water quality through the distribution of an Association newsletter and/or hosting a guest speaker at the annual meeting.	MLA	OCLWA WNDR UWEX Lakes	Ongoing, 2019
Refrain from the use of fertilizers. Encourage soil testing to determine if fertilizer is necessary.	MLA	OC UWEX	Ongoing
Encourage the restoration of unmowed vegetation to slow and absorb runoff and pollutants.	MLA	UWEX Lakes	Ongoing

Objective 6.2 Continue the robust water quality dataset for Maiden Lake to monitor trends, declines and improvements over time.

Actions	Lead person/group	Resources	Timeline
Continue participation in CLMN and support volunteers collecting total phosphorus and chlorophyll-a data.	MLA Trained volunteer	CLMN	3+ times annually-summer
Continue annual overturn sampling in fall.	MLA Trained volunteer	Northern Lake Service	Annually-fall
Submit all collected data to WDNR for archival and use by scientists and resource managers.	MLA Trained volunteer	WDNR	Ongoing

PEOPLE AND THE LAKE

The people who 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 positive impacts on the lake and on those who enjoy this common resource. Collaborative efforts may have bigger positive impacts; therefore, communication and cooperation between the 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

According to survey responses, the lake is enjoyed for its scenery, wildlife, boating and fishing. There is one public boat launch located in the west bay of Maiden Lake which is owned by the Town of Riverview. A private boat launch is also located at the Crystal Waters Condominiums at the northeast end of the lake. No Wake is allowed between 4pm and 10am.

Planning participants indicated that although most lake users are respectful, there are regularly users that don't obey posted wake hours or do not abide by state law requiring No Wake within 100 feet of shore, etc.

Goal 7. Lake users will be informed about and be respectful of Maiden Lake.

Objective 7.1 Foster an environment of compliance amongst lake users.

Actions	Lead person/group	Resources	Timeline
Work with other lake groups and towns to support a recreational officer and municipal court for enforcement of regulations, including 'No Wake' and safe boat operation.	MLA	TOR OCLWA OC UWEX	Ongoing
Inform residents and consider posting signage of "DNR Hotline" to report unlawful behavior. (1-800-TIP-WDNR)	MLA	WDNR	Ongoing
Create and install signage at boat landing regarding 'No Wake' zones (each bay in Maiden lake and within 100 feet of shore). Landowners can install a swim dock up to 200 feet from shore to help protect this zone.	MLA	TOR WDNR	2019
Ensure signage is up-to-date and clear. Consider updating sign board/kiosk with basic information on regulations and expectations. This	MLA	TOR UWEX Lakes	Ongoing

can convey to lake users that there is an active and watchful group on the lake.			

Goal 8. Optimize conditions for safe and responsible recreational use.

Objective 8.1 Maintain structures that support lake access.

Actions	Lead person/group	Resources	Timeline
Work with Town to upkeep boat ramp. This may include a water diversion structure to keep runoff from flowing directly to lake. Boat ramps in disrepair can be unhealthy to the lake if it results in spinning tires, power loading, loose sediment and debris, etc.	MLA	TOR	2019, as needed

Communication & Organization

Communication and Organization

Working together on common values will help to achieve the goals outlined in this plan. This will involve communication between individuals, the Association, the Town of Riverview, Oconto County, resource managers, and elected officials. In addition, staying informed about lake- and groundwater-related topics will be essential to achieving the goals laid out in this plan. See the Oconto County Lake Information Directory in the Appendices for contact information.

Many of the goals outlined in this plan focus on distributing information to lake and watershed residents and lake users in order to help them make informed decisions that will result in a healthy Maiden Lake ecosystem that is enjoyed by many people. Working together on common values will help to achieve the goals that are outlined in this plan.

Goal 9. Increase participation in lake stewardship.

Objective 9.1 Develop opportunities and incentives for active participation in the management of Maiden Lake.

Actions	Lead person/group	Resources	Timeline
Maintain a MLA website to provide a common source of communication.	MLA	LakeKit.net OC UWEX	Ongoing
Maintain an email list of shoreland property owners and others interested in Maiden Lake.	MLA	OC UWEX	Ongoing
Share minutes (or meeting notes) from annual meeting on website and/or newsletter.	MLA		As needed
Distribute a welcome packet/mailing to all new shoreland property owners with basic lake stewardship information/brochures. WDNR small-scale planning grants can pay for this.	MLA	OC UWEX OC Zoning Dept. OCLCD	Ongoing
Communicate updates to lake management plan and management activities to residents and users of the lake via email list and/or newsletter (and to WDNR).	MLA		Ongoing
Host an annual meeting to discuss lake management and opportunities for shoreland property owners.	MLA		Annually
Host gatherings to learn about topics identified in this plan. Invite speakers or conduct demonstrations.	MLA	UWEX Lakes WDNR OCLCD	As needed
Identify ways to recruit 'next generation' of water quality monitors and AIS removers. Support interested persons in Lake Leaders Institute and/or Wisconsin Lakes Convention.	MLA	UWEX Lakes Lake Leaders	Ongoing

Communication & Organization

Objective 9.2 Maintain good, clear communication between MLA, its residents, clubs, municipalities, agency staff, elected officials and organizations interested in Maiden Lake.

Actions	Lead person/group	Resources	Timeline
Network with other lake groups in Oconto County by having Maiden Lake represented at OCLWA.	MLA	OC UWEX	Quarterly
Network with other lakes in the state to learn lake management strategies, etc. by having a representative attend the Wisconsin Lakes Convention.	MLA	UWEX Lakes	Annually in April
Consider nominating an individual from Maiden Lake for the Lake Leaders Institute. Encourage members of OCLWA to attend Lake Leaders Institute.	MLA	UWEX Lakes	2020

Updates and Revisions

Updates and Revisions

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. Partners listed in the plan should be contacted annually, and updated information complied. A list of changes/updates to the plan should be documented. To ensure that everyone is informed about changes, appropriate approval for changes should be acquired by all partners signing on to this plan.

Goal 10. Review plan annually and update as needed.

Objective 10.1 Maintain an up-to-date and relevant lake management plan and communicate updates to the lake community, Oconto County and WDNR.

Actions	Lead person/group	Resources	Timeline
Review plan at annual meeting and discuss accomplishments and identification of goals/objectives/actions for coming year.	MLA		Annually
Formally update this plan every 5 years.	MLA	OC UWEX UWEX Lakes WDNR	2023

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APPENDICES

Appendix A

Appendix A. Oconto County Lake Information Directory

Algae - Blue-Green

Contact: Brenda Nordin
Wisconsin Department of Natural Resources
Phone: 920-360-3167
E-mail: brenda.nordin@wisconsin.gov
Website: http://dnr.wi.gov/lakes/bluegreenalgae

Contact: Wisconsin Department of Health Services
1 West Wilson Street, Madison, WI 53703
Phone: 608-267-3242
Website:
www.dhs.wisconsin.gov/eh/bluegreenalgae/contactus.htm

Aquatic Invasive Species/Clean Boats Clean Water

Contact: Brenda Nordin
Wisconsin Department of Natural Resources
Phone: 920-360-3167
E-mail: brenda.nordin@wisconsin.gov
Website: http://dnr.wi.gov/topic/Invasives/

Aquatic Plant Management

(Native and Invasive)

Contact: Brenda Nordin
Wisconsin Department of Natural Resources
Phone: 920-360-3167
E-mail: brenda.nordin@wisconsin.gov
Website: http://dnr.wi.gov/lakes/plants/

Aquatic Plant Identification

Contact: Dr. Emmet Judziewicz
UWSP Freckmann Herbarium
TNR 301, 800 Reserve St., Stevens Point, WI 54481
Phone: 715-346-4248
E-mail: ejudziew@uwsp.edu

Contact: Brenda Nordin
Wisconsin Department of Natural Resources
Phone: 920-360-3167
E-mail: brenda.nordin@wisconsin.gov

Aquatic Plant Surveys/Management

Contact: Brenda Nordin
Wisconsin Department of Natural Resources
Phone: 920-360-3167
E-mail: brenda.nordin@wisconsin.gov
Website: http://dnr.wi.gov/lakes/plants/

Best Management Practices (rain gardens, shoreland buffers, agricultural practices, runoff controls)

Contact: Ken Dolata
Oconto County Land Conservation Department
410 ½ East Main Street, Lena, WI 54139
Phone: 920-834-7152
E-mail: ken.dolata@co.oconto.wi.us
Website: http://www.co.oconto.wi.us/departments/

Boat Landings, Signage, Permissions (County)

Contact: Monty Brink
Oconto County Forestry/Park/Recreation
301 Washington Street, Oconto, WI 54153
Phone: 920-834-6995
E-mail: monty.brink@co.oconto.wi.us
Website: http://www.co.oconto.wi.us/departments/

Boat Landings (State)

Contact: Chip Long
Wisconsin Department of Natural Resources
101 N. Ogden Road, Peshtigo, WI 54157
Phone: 715-582-5017
E-mail: Christopher.Long@wisconsin.gov
Website: http://dnr.wi.gov/org/land/facilities/boataccess/

Appendix A

Boat Landings (Town)

Contact the clerk for the specific town/village in which the boat landing is located.

Conservation Easements

Contact: Gathering Waters Conservancy
211 S. Paterson St., Suite 270, Madison, WI 53703
Phone: 608-251-9131
E-mail: info@gatheringwaters.org
Website: http://gatheringwaters.org/

Contact: Brenda Nordin
Wisconsin Department of Natural Resources
Phone: 920-360-3167
E-mail: brenda.nordin@wisconsin.gov

Contact: Patrick Sorge
Wisconsin Department of Natural Resources
PO Box 4001, Eau Claire, WI 54702
Phone: 715-839-3794
E-mail: Patrick.Sorge@wisconsin.gov

Contact: Northeast Wisconsin Land Trust
14 Tri-Park Way, Suite 1, Appleton, WI 54914
Phone: 920-738-7265
E-mail: newlt@newlt.org
Website: www.newlt.org

Contact: NRCS Lena Service Center
410 ½ East Main Street, Lena, WI 54139
Phone: 920-829-5406

Critical Habitat and Sensitive Areas

Contact: Brenda Nordin
Wisconsin Department of Natural Resources
Phone: 920-360-3167
E-mail: brenda.nordin@wisconsin.gov
Website: http://dnr.wi.gov/lakes/criticalhabitat/

Dams

Contact: Meg Galloway
Wisconsin Department of Natural Resources
PO Box 7921, Madison, WI 53707
Phone: 608-266-7014
E-mail: meg.galloway@wisconsin.gov
Website: http://dnr.wi.gov/org/water/wm/dsfm/dams/

Fertilizers/Soil Testing

Contact: Dale Mohr
Oconto County UW- Extension
301 Washington Street, Oconto, WI 54153
Phone: 920-835-6845
E-mail: dale.mohr@co.oconto.wi.us
Website: http://oconto.uwex.edu

Fisheries Biologist (management, habitat)

Contact: Chip Long
Wisconsin Department of Natural Resources
101 N. Ogden Road, Peshtigo, WI 54157
Phone: 715-582-5017
E-mail: Christopher.Long@wisconsin.gov
Website: http://dnr.wi.gov/fish/

Frog Monitoring—Citizen Based

Contact: Andrew Badje
Wisconsin Department of Natural Resources
Phone: 608-785-9472
E-mail: Andrew.badje@wisconsin.gov
Website: WFTS@wisconsin.gov

Grants

Contact: Brenda Nordin
Wisconsin Department of Natural Resources
Phone: 920-360-3167
E-mail: brenda.nordin@wisconsin.gov
Website: http://dnr.wi.gov/Aid/Grants.html

Contact: Ken Dolata
Oconto County Land Conservation Department
410 ½ East Main Street, Lena, WI 54139
Phone: 920-834-7152
E-mail: ken.dolata@co.oconto.wi.us
Website: http://www.co.oconto.wi.us/departments/

Groundwater Quality

Contact: Kevin Masarik
UWSP Center for Watershed Science & Education
TNR 224, 800 Reserve St., Stevens Point, WI 54481
Phone: 715-346-4276
E-mail: kmasarik@uwsp.edu
Website: http://www.uwsp.edu/cnr/watersheds/

Groundwater Levels/Quantity

Contact: Ken Dolata
Oconto County Land Conservation Department
410 ½ East Main Street, Lena, WI 54139
Phone: 920-834-7152
E-mail: ken.dolata@co.oconto.wi.us
Website: http://www.co.oconto.wi.us/departments/

Contact: George Kraft
UWSP Center for Watershed Science & Education
TNR 224, 800 Reserve St., Stevens Point, WI 54481
Phone: 715-346-2984
E-mail: george.kraft@uwsp.edu

Informational Packets

Contact: UW Extension - Lakes
TNR 224, 800 Reserve St. Stevens Point, WI 54481
Phone: 715-346-2116
E-mail: uwexlakes@uwsp.edu

Lake Groups – Friends, Associations, Districts

Contact: Dale Mohr
Oconto County UW- Extension
301 Washington Street, Oconto, WI 54153
Phone: 920-835-6845
E-mail: dale.mohr@co.oconto.wi.us
Website: http://oconto.uwex.edu

Contact: Patrick Goggin
UWEX Lakes
TNR 203, 800 Reserve St., Stevens Point, WI 54481
Phone: 715-365-8943
E-mail: pgoggin@uwsp.edu
Website: http://www.uwsp.edu/cnr/uwexlakes/organizations/

Contact: Eric Olson
UWEX Lakes
TNR 206, 800 Reserve St., Stevens Point, WI 54481
Phone: 715-346-2192
E-mail: eolson@uwsp.edu
Website: http://www.uwsp.edu/cnr/uwexlakes/organizations/

Contact: Susan Tesarik
Wisconsin Lakes
4513 Vernon Blvd., Suite 101, Madison, WI 53705
Phone: 1-800-542-5253
E-mail: lakeinfo@wisconsinlakes.org
Website: http://wisconsinlakes.org/

Lake Levels

See: Groundwater

Lake-Related Law Enforcement (no-wake, transporting invasives, etc.)

Contact: Ben Mott
State Conservation Warden
Wisconsin Department of Natural Resources
427 E. Tower Drive, Suite 100, Wautoma, WI 54982
Phone: 920-896-3383
Website: http://www.wigamewarden.com/

Appendix A

Land Use Plans and Zoning Ordinances

Contact: Patrick Virtues
Oconto County Planning/Zoning/Solid Waste
301 Washington Street, Oconto, WI 54153
Phone: 920-834-6827
E-mail: Patrick.virtues@co.oconto.wi.us
Website: http://www.co.waushara.wi.us/zoning.htm

Contact: UWSP Center for Land Use Education
TNR 208, 800 Reserve St., Stevens Point, WI 54481
Phone: 715-346-3783
E-mail: Center.for.Land.Use.Education@uwsp.edu
Website: http://www.uwsp.edu/cnr/landcenter/

Nutrient Management Plans

Contact: Ken Dolata
Oconto County Land Conservation Department
410 ½ East Main Street, Lena, WI 54139
Phone: 920-834-7152
E-mail: ken.dolata@co.oconto.wi.us
Website: http://www.co.oconto.wi.us/departments/

Contact: NRCS Lena Service Center
410 ½ East Main Street, Lena, WI 54139
Phone: 920-829-5406

Parks (County)

Contact: Monty Brink
Oconto County Forestry/Park/Recreation
301 Washington Street, Oconto, WI 54153
Phone: 920-834-6995
E-mail: monty.brink@co.oconto.wi.us
Website: http://www.co.oconto.wi.us/departments/

Purchase of Development Rights

Contact: Northeast Wisconsin Land Trust
14 Tri-Park Way, Suite 1, Appleton, WI 54914
Phone: 920-738-7265
E-mail: newlt@newlt.org
Website: www.newlt.org

Purchase of Land

Contact: Brenda Nordin
Wisconsin Department of Natural Resources
Phone: 920-360-3167
E-mail: brenda.nordin@wisconsin.gov
Website: http://dnr.wi.gov/topic/stewardship/

Rain Gardens and Stormwater Runoff

Contact: Ken Dolata
Oconto County Land Conservation Department
410 ½ East Main Street, Lena, WI 54139
Phone: 920-834-7152
E-mail: ken.dolata@co.oconto.wi.us
Website: http://www.co.oconto.wi.us/departments/

Septic Systems/Onsite Waste

Contact: Patrick Virtues
Oconto County Planning/Zoning/Solid Waste
301 Washington Street, Oconto, WI 54153
Phone: 920-834-6827
E-mail: Patrick.virtues@co.oconto.wi.us
Website: http://www.co.waushara.wi.us/zoning.htm

Shoreland Management

Contact: Ken Dolata
Oconto County Land Conservation Department
410 ½ East Main Street, Lena, WI 54139
Phone: 920-834-7152
E-mail: ken.dolata@co.oconto.wi.us
Website: http://www.co.oconto.wi.us/departments/

Shoreland Vegetation

http://dnr.wi.gov/topic/ShorelandZoning/

Shoreland Zoning Ordinances

See: Land Use Plans and Zoning Ordinances

Appendix A

Soil Fertility Testing
Contact: Dale Mohr
Oconto County UW- Extension
301 Washington Street, Oconto, WI 54153
Phone: 920-835-6845
E-mail: dale.mohr@co.oconto.wi.us
Website: http://oconto.uwex.edu

Water Quality Monitoring
Contact: Brenda Nordin
Wisconsin Department of Natural Resources
Phone: 920-360-3167
E-mail: brenda.nordin@wisconsin.gov

Water Quality Problems
Contact: Brenda Nordin
Wisconsin Department of Natural Resources
Phone: 920-360-3167
E-mail: brenda.nordin@wisconsin.gov

Wetlands
Contact: Jason Fleener
Wisconsin Department of Natural Resources
GEF2 DNR Central Office, Madison, WI 53707
Phone: 608-266-7408
E-mail: Jason.fleener@wisconsin.gov
Website: http://dnr.wi.gov/wetlands/

Contact: Wisconsin Wetlands Association
214 N. Hamilton Street, #201, Madison, WI 53703
Phone: 608-250-9971
Email: info@wisconsinwetlands.org

Wetland Inventory
Contact: Dr. Emmet Judziewicz
UWSP Freckmann Herbarium
TNR 301, 800 Reserve St., Stevens Point, WI 54481
Phone: 715-346-4248
E-mail: ejudziew@uwsp.edu

Woody Habitat
Contact: Chip Long
Wisconsin Department of Natural Resources
101 N. Ogden Road, Peshtigo, WI 54157
Phone: 715-582-5017
E-mail: Christopher.Long@wisconsin.gov

Appendix B. Rapid Response Plan

REPORTING A SUSPECTED INVASIVE SPECIES

1. Collect specimens or take photos.

Regardless of the 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 specimen ASAP.

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).

2. Note the location where the specimen was found.

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.

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

3. Gather information to aid in positive species identification.

- Collection date and county
- Your name, address, phone, email
- Exact location (lat/long or UTM, Township/Range)
- Plant name
- Land ownership (if known/applicable)
- Population description (estimated # plants, area covered)
- Habitat type where found (forest, field, prairie, wetland, open water)

Appendix B

4. **Mail or bring specimens and information to any of the following locations (digital photos may be emailed):**

Wisconsin Dept. Natural Resources
2984 Shawano Avenue,
Green Bay, WI 54313
Phone: (920) 662-5100

UW-Stevens Point Herbarium
301 Trainer Natural Resources Building
800 Reserve Street
Stevens Point, WI 54481
Phone: 715-346-4248
E-Mail: ejudziew@uwsp.edu

Wisconsin Invasive Plants Reporting & Prevention Project
Herbarium-UW-Madison
430 Lincoln Drive
Madison, WI 53706
Phone: (608) 267-7612
E-Mail: invasiveplants@mailplus.wisc.edu

Appendix C

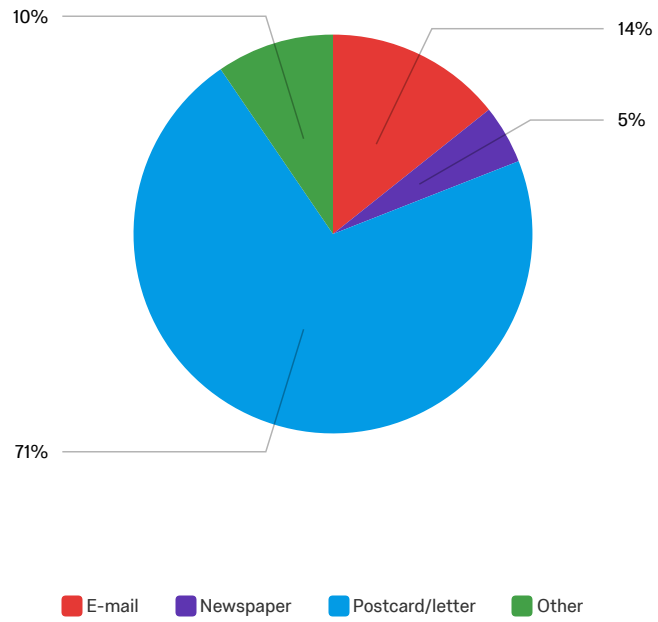
Appendix C. Lake User Survey Results

Default Report

Maiden Lake Survey - Oconto County Lakes Project

October 2, 2018 2:11 PM MDT

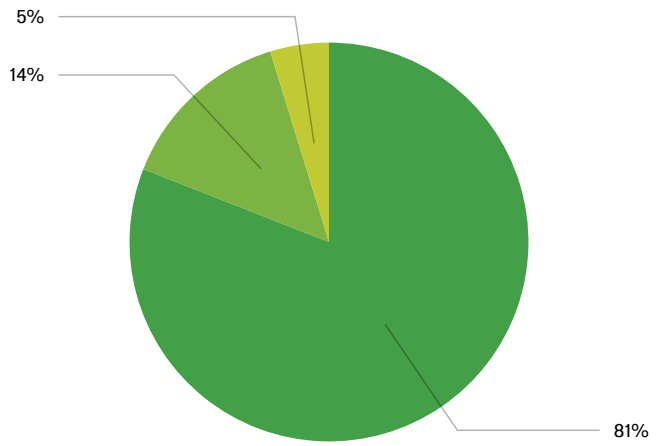
Q2 - How did you hear about this survey?



#	Field	Choice Count	
1	E-mail	14.29%	3
2	Newspaper	4.76%	1
3	Postcard/letter	71.43%	15
4	Other	9.52%	2
			21

Showing Rows: 1 - 5 Of 5

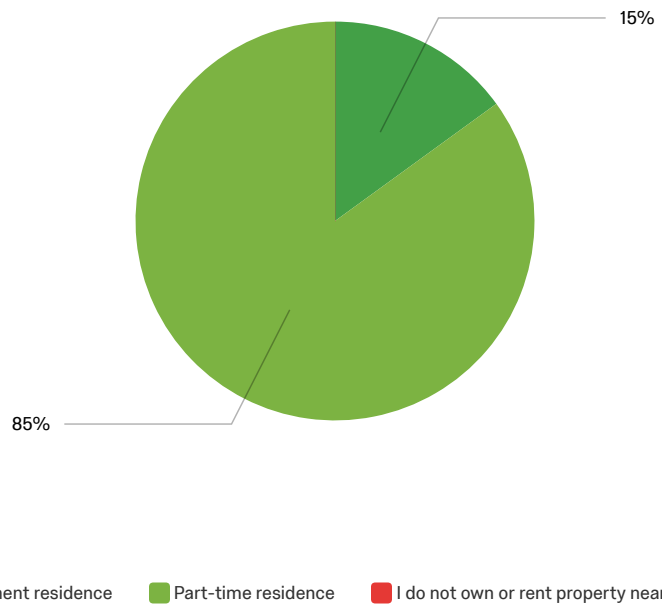
Q3 - Do you own or rent property...



#	Field		Choice Count
1	Around the lake	80.95%	17
2	Less than 1/2 mile from the lake	14.29%	3
3	Near the lake, but more than 1/2 mile away	4.76%	1
4	I do not own or rent property near the lake	0.00%	0
			21

Showing Rows: 1 - 5 Of 5

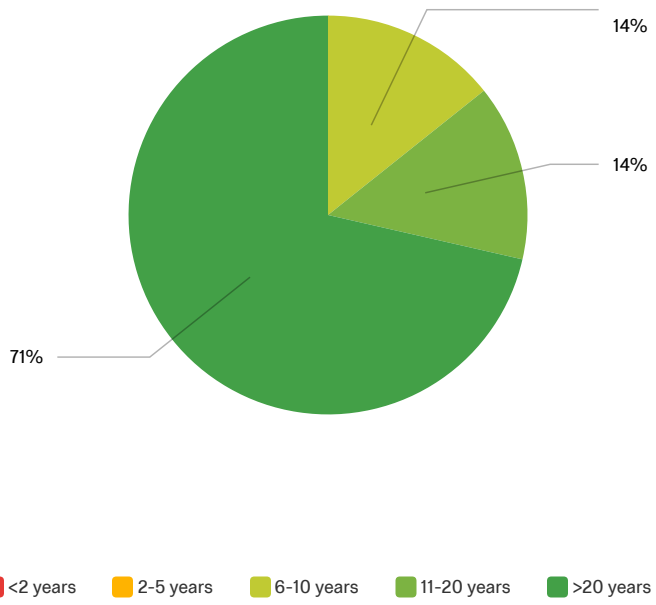
Q4 - If you own or rent property near the lake, is this property your...



#	Field	Choice Count	
1	Permanent residence	15.00%	3
2	Part-time residence	85.00%	17
3	I do not own or rent property near the lake	0.00%	0
			20

Showing Rows: 1 - 4 Of 4

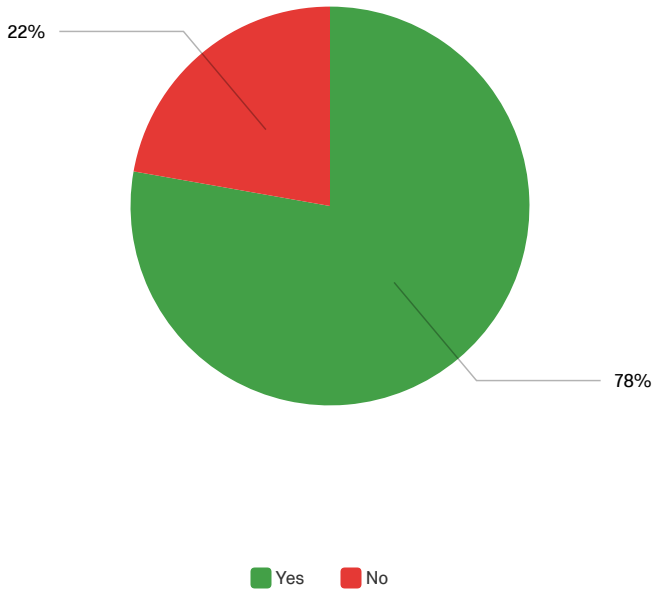
Q5 - How long have you lived on, visited or recreated on the lake?



#	Field	Choice Count
1	<2 years	0.00% 0
2	2-5 years	0.00% 0
3	6-10 years	14.29% 3
4	11-20 years	14.29% 3
5	>20 years	71.43% 15
		21

Showing Rows: 1 - 6 Of 6

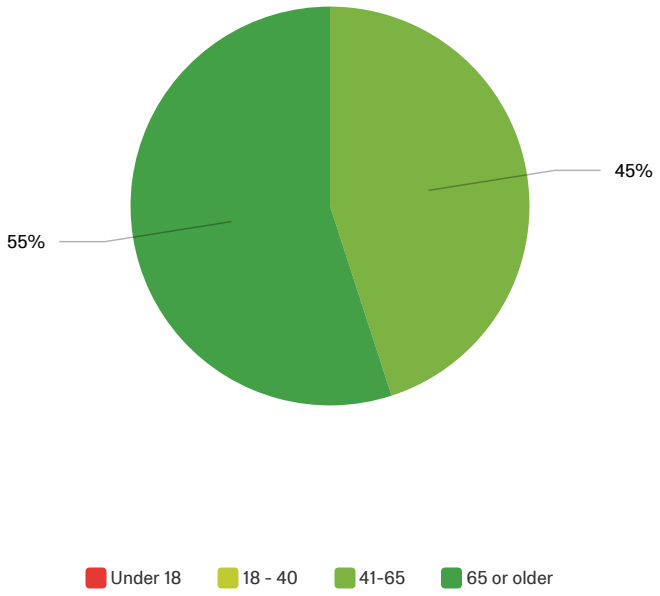
Q6 - Are you a member of the Maiden Lake Association?



#	Field	Choice Count	
1	Yes	77.78%	14
2	No	22.22%	4
			18

Showing Rows: 1 - 3 Of 3

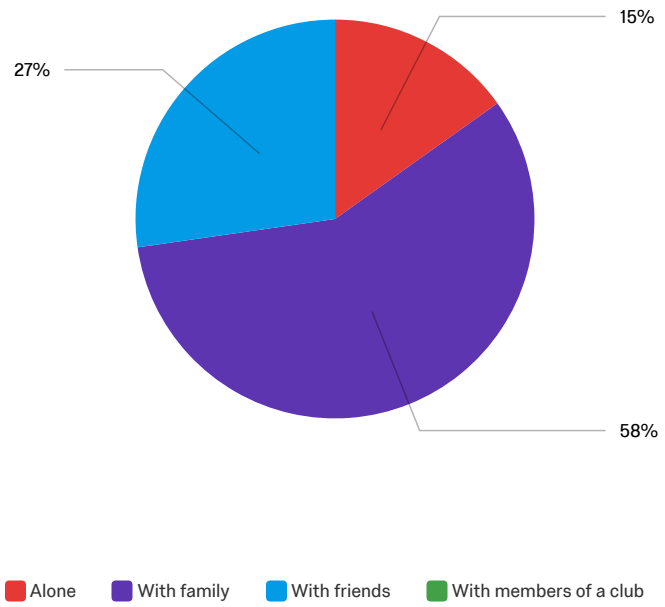
Q8 - Which category below includes your age?



#	Field		Choice Count
1	Under 18	0.00%	0
2	18 - 40	0.00%	0
3	41-65	45.00%	9
4	65 or older	55.00%	11
			20

Showing Rows: 1 - 5 Of 5

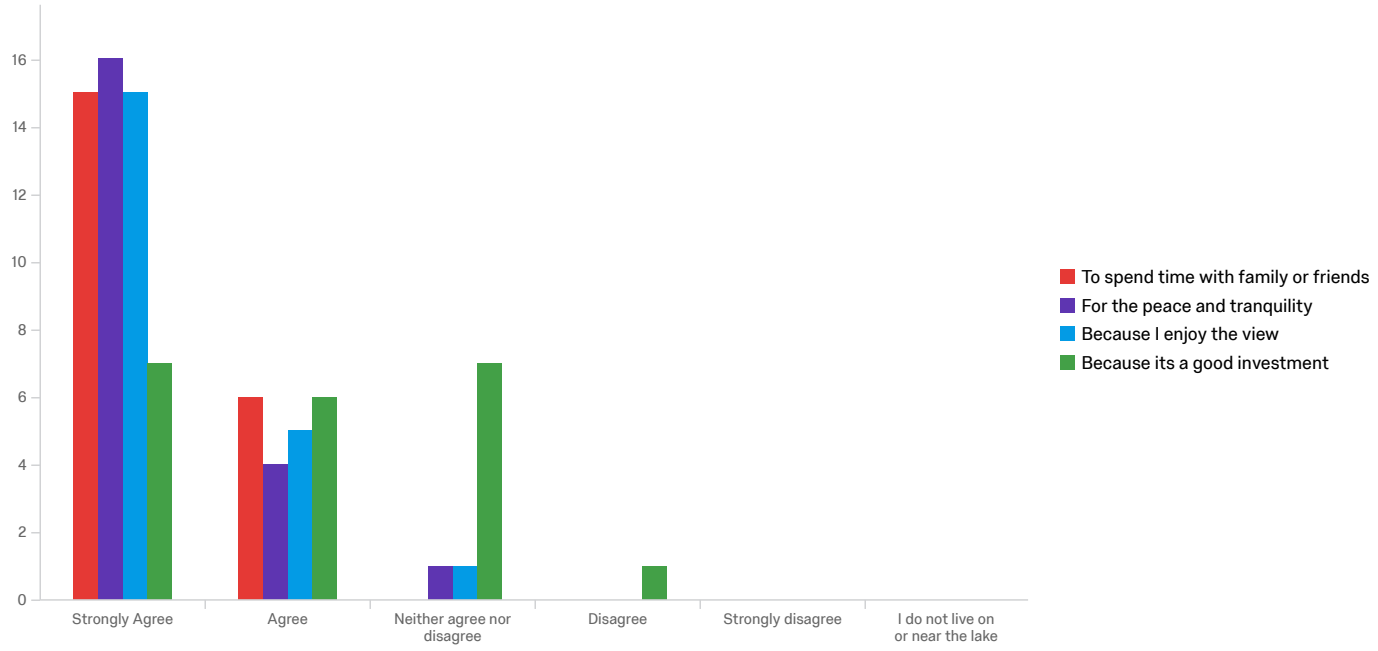
Q9 - When you visit Maiden Lake, are you typically ...(check all that apply)



#	Field	Choice Count	
1	Alone	15.15%	5
2	With family	57.58%	19
3	With friends	27.27%	9
4	With members of a club	0.00%	0
			33

Showing Rows: 1 - 5 Of 5

Q10 - I live on or near the lake...



#	Field	Strongly Agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	I do not live on or near the lake	Total
1	To spend time with family or friends	71.43% 15	28.57% 6	0.00% 0	0.00% 0	0.00% 0	0.00% 0	21
2	For the peace and tranquility	76.19% 16	19.05% 4	4.76% 1	0.00% 0	0.00% 0	0.00% 0	21
3	Because I enjoy the view	71.43% 15	23.81% 5	4.76% 1	0.00% 0	0.00% 0	0.00% 0	21
4	Because its a good investment	33.33% 7	28.57% 6	33.33% 7	4.76% 1	0.00% 0	0.00% 0	21

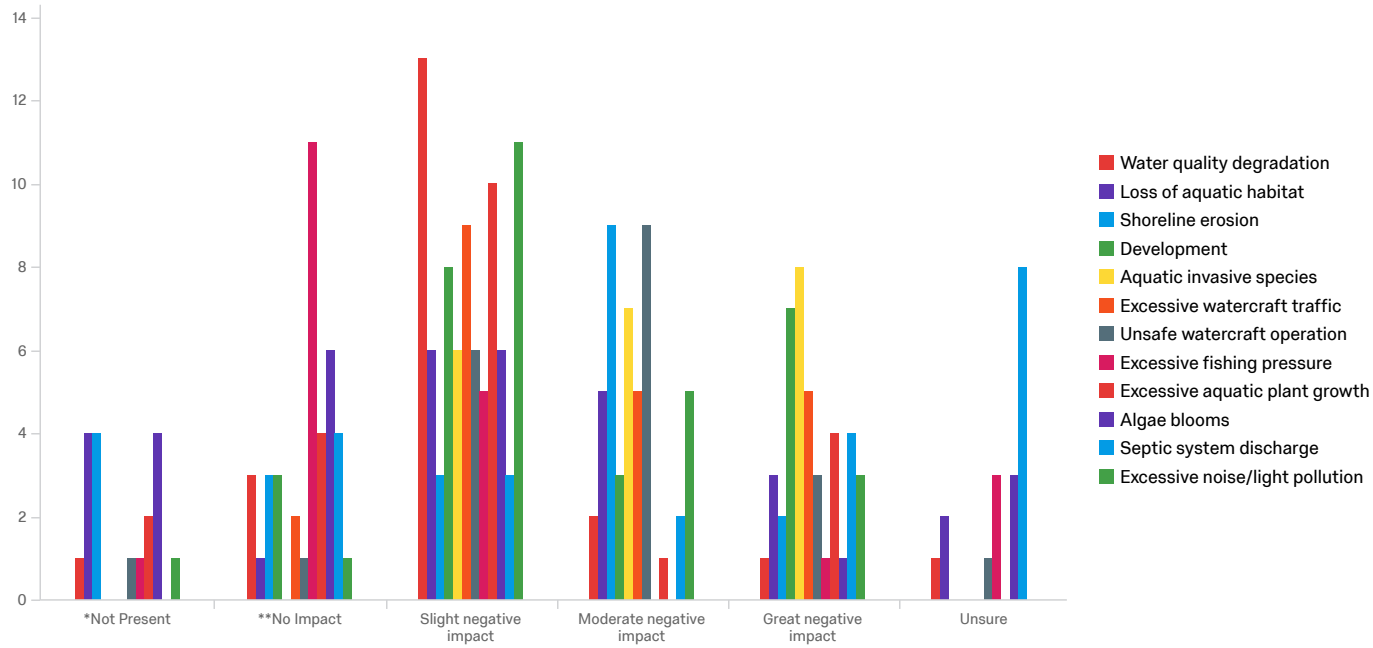
Showing Rows: 1 - 4 Of 4

Q11 - What do you value most about Maiden Lake?

What do you value most about Maiden Lake?
Beauty, clear lake
Water quaility, neighbors, nature, fishing, snowmobiling, boating
Pristine and serene lake that the majority of owners work diligently to maintain.
Clarity and mostly natural shoreline. (Few manicured lawns). I've been visiting Maiden yearly for 86 years!!
It's been my second home all my life, family has been on the lake since the late 1920's. Had a resort "Joes's Place" a tavern and a little store "Maiden lake Grocery".
I live on Little Maiden Lake which is the head waters for 7 area lakes. Little Maiden like Big Maiden is spring fed lake with excellent water quality. Hoping the fishery remains abundant and lake stays clear of invasive species. I would value you your input on Little Maiden Lake due to the large stream running off and into Big Maiden.
It's clarity. It's clean and great to swim in, and not overgrown with weeds.
It's clarity, opportunity for small bass fishing, for family to water ski
Peace, beauty, wildlife and calming atmosphere of being on the water.
Water clarity and ability to water ski on the lake.
I value the water clarity, it's long expanse for water skiing and boating, and its narrow shallow bays for exploring and fishing.
Water quality, presence of 'no wake' hours, limited public access, peace and quiet
The clean, clear water.
Peace and tranquility, water quality
beauty of the lake
The water is crystal clear. Residents care about the lake. We have an active lake association.
It's clarity
How the majority of owners and renters obey the 4PM to 10AM no wake rule.

Showing records 1 - 18 of 18

Q42 - Below is a list of negative impacts commonly found in Wisconsin lakes. To what level do you believe each of the following factors may be impacting Maiden Lake? *Not Present means that you believe the issue does not exist on Maiden Lake**No Impact means that the issue may exist, but is not negatively impacting Maiden Lake

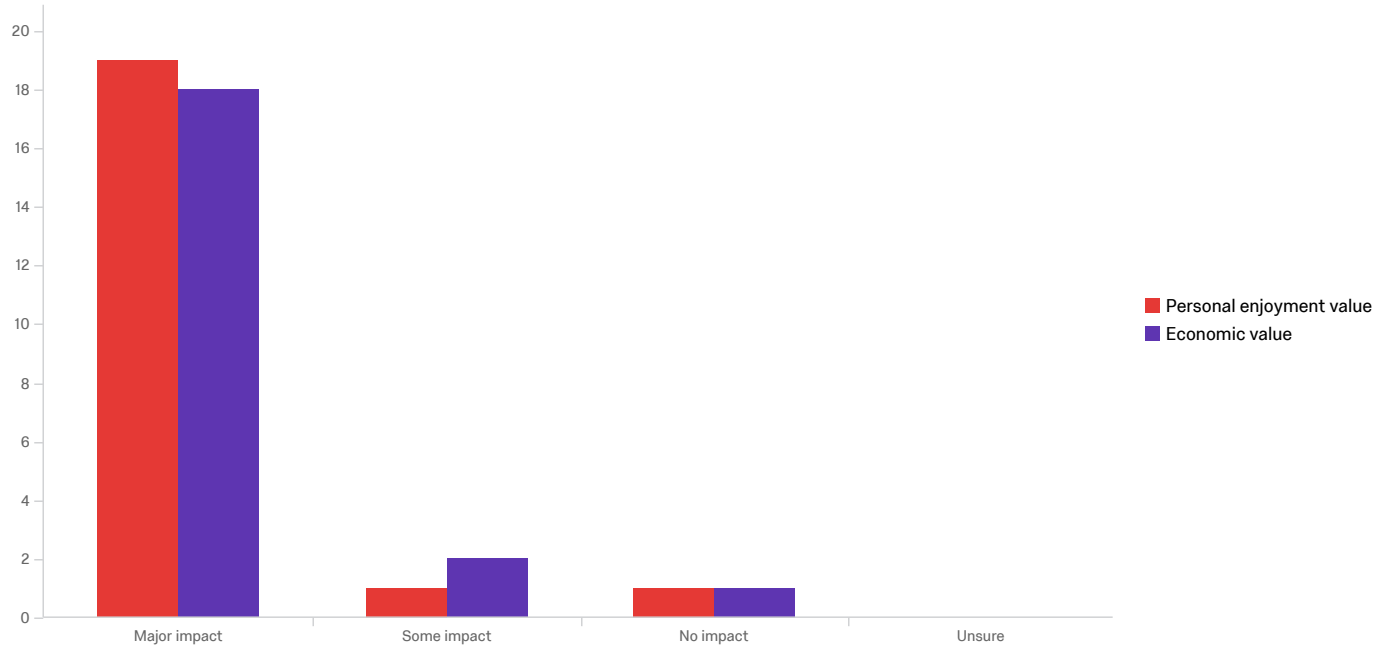


#	Field	*Not Present	**No Impact	Slight negative impact	Moderate negative impact	Great negative impact	Unsure	Total
1	Water quality degradation	4.76% 1	14.29% 3	61.90% 13	9.52% 2	4.76% 1	4.76% 1	21
2	Loss of aquatic habitat	19.05% 4	4.76% 1	28.57% 6	23.81% 5	14.29% 3	9.52% 2	21
3	Shoreline erosion	19.05% 4	14.29% 3	14.29% 3	42.86% 9	9.52% 2	0.00% 0	21
4	Development	0.00% 0	14.29% 3	38.10% 8	14.29% 3	33.33% 7	0.00% 0	21
5	Aquatic invasive species	0.00% 0	0.00% 0	28.57% 6	33.33% 7	38.10% 8	0.00% 0	21
6	Excessive watercraft traffic	0.00% 0	9.52% 2	42.86% 9	23.81% 5	23.81% 5	0.00% 0	21
7	Unsafe watercraft operation	4.76% 1	4.76% 1	28.57% 6	42.86% 9	14.29% 3	4.76% 1	21
8	Excessive fishing pressure	4.76% 1	52.38% 11	23.81% 5	0.00% 0	4.76% 1	14.29% 3	21

9	Excessive aquatic plant growth	9.52%	2	19.05%	4	47.62%	10	4.76%	1	19.05%	4	0.00%	0	21
10	Algae blooms	20.00%	4	30.00%	6	30.00%	6	0.00%	0	5.00%	1	15.00%	3	20
11	Septic system discharge	0.00%	0	19.05%	4	14.29%	3	9.52%	2	19.05%	4	38.10%	8	21
12	Excessive noise/light pollution	4.76%	1	4.76%	1	52.38%	11	23.81%	5	14.29%	3	0.00%	0	21

Showing Rows: 1 - 12 Of 12

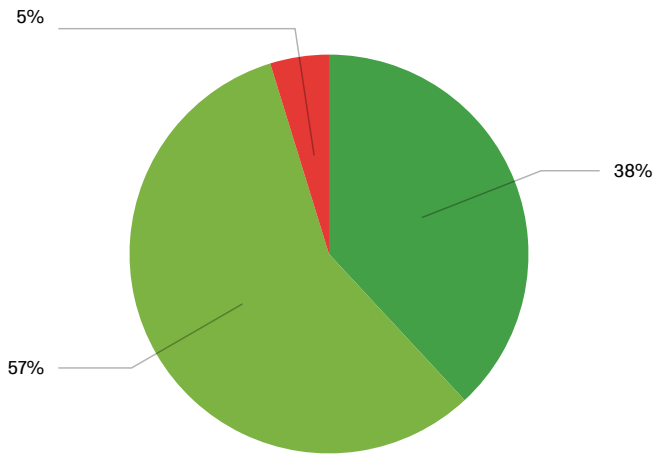
Q16 - How much impact does the water quality of Maiden Lake have on the following?

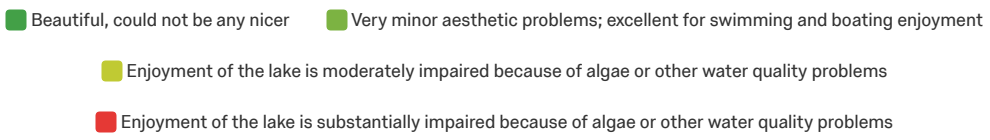


#	Field	Major impact	Some impact	No impact	Unsure	Total
1	Personal enjoyment value	90.48% 19	4.76% 1	4.76% 1	0.00% 0	21
2	Economic value	85.71% 18	9.52% 2	4.76% 1	0.00% 0	21

Showing Rows: 1 - 2 Of 2

Q17 - Which statement best describes water clarity during the times you spend most on the lake?

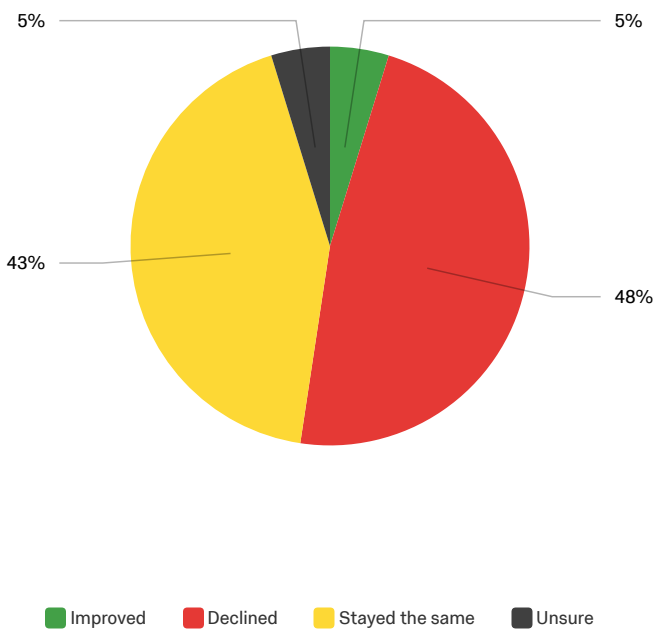




#	Field		Choice Count
1	Beautiful, could not be any nicer	38.10%	8
2	Very minor aesthetic problems; excellent for swimming and boating enjoyment	57.14%	12
3	Enjoyment of the lake is moderately impaired because of algae or other water quality problems	0.00%	0
4	Enjoyment of the lake is substantially impaired because of algae or other water quality problems	4.76%	1
			21

Showing Rows: 1 - 5 Of 5

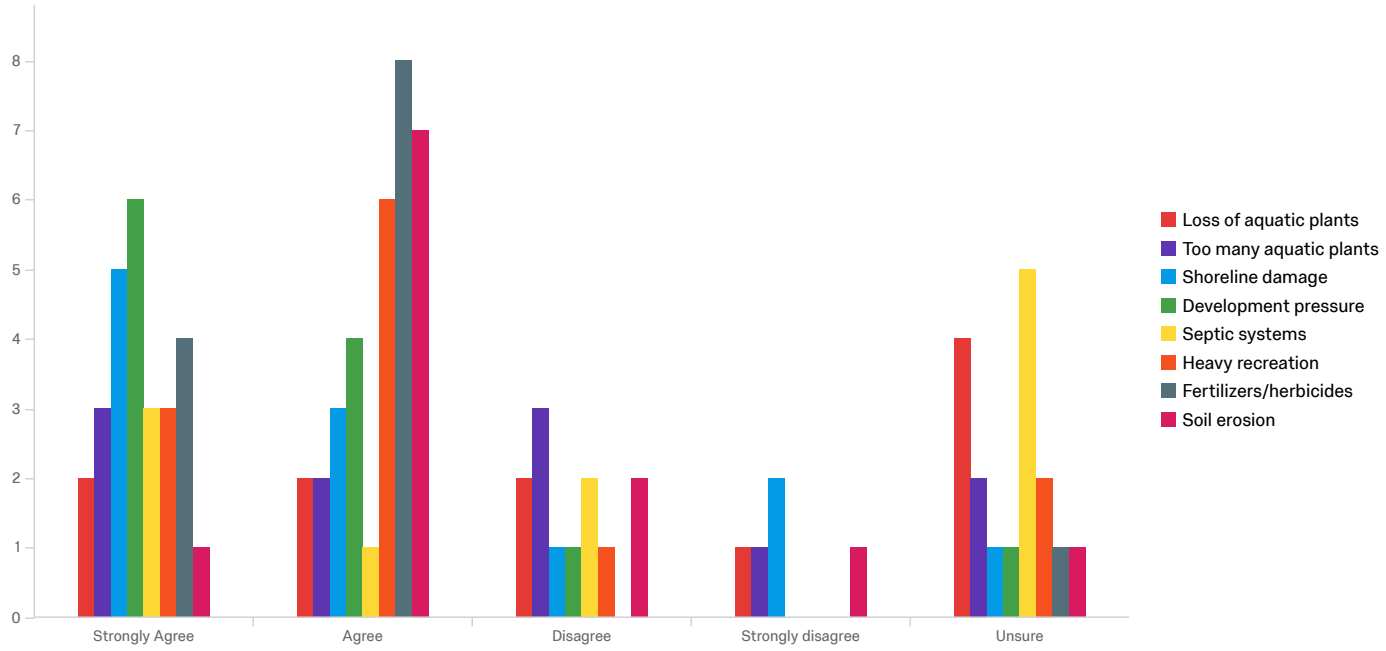
Q18 - During the time that you have lived on, visited or recreated on the lake, how would you say the water quality has changed?



#	Field	Choice Count	
1	Improved	4.76%	1
2	Declined	47.62%	10
3	Stayed the same	42.86%	9
4	Unsure	4.76%	1
			21

Showing Rows: 1 - 5 Of 5

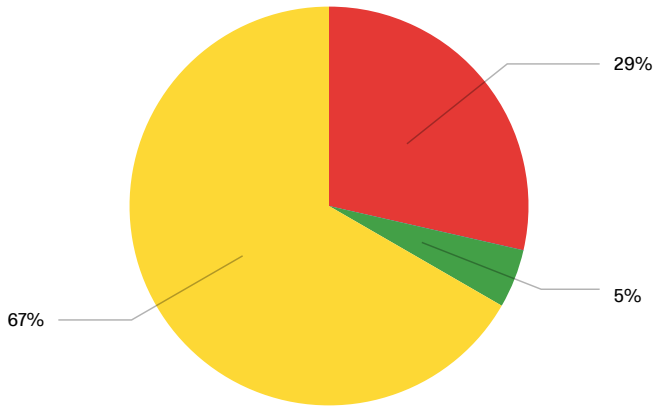
Q19 - If you think it has declined, what, in your opinion, are the primary causes?



#	Field	Strongly Agree	Agree	Disagree	Strongly disagree	Unsure	Total
1	Loss of aquatic plants	18.18% 2	18.18% 2	18.18% 2	9.09% 1	36.36% 4	11
2	Too many aquatic plants	27.27% 3	18.18% 2	27.27% 3	9.09% 1	18.18% 2	11
3	Shoreline damage	41.67% 5	25.00% 3	8.33% 1	16.67% 2	8.33% 1	12
4	Development pressure	50.00% 6	33.33% 4	8.33% 1	0.00% 0	8.33% 1	12
5	Septic systems	27.27% 3	9.09% 1	18.18% 2	0.00% 0	45.45% 5	11
6	Heavy recreation	25.00% 3	50.00% 6	8.33% 1	0.00% 0	16.67% 2	12
7	Fertilizers/herbicides	30.77% 4	61.54% 8	0.00% 0	0.00% 0	7.69% 1	13
8	Soil erosion	8.33% 1	58.33% 7	16.67% 2	8.33% 1	8.33% 1	12

Showing Rows: 1 - 8 Of 8

Q20 - If you use fertilizers or herbicides on your land, where are they applied?

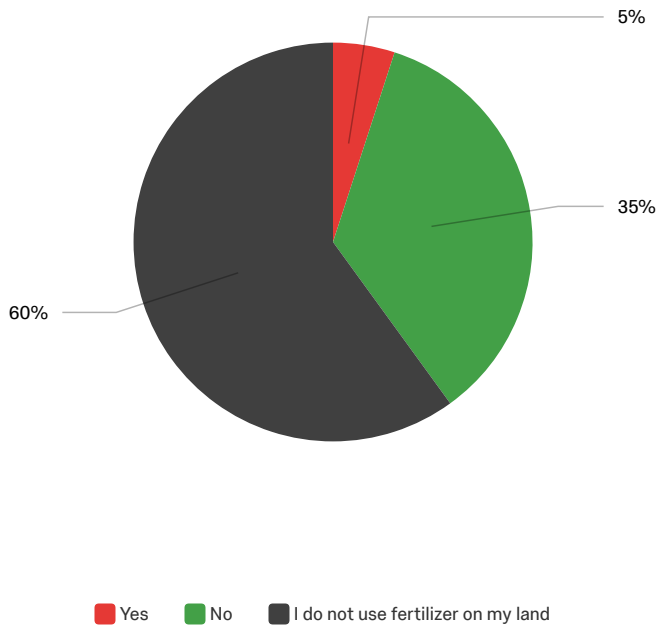


Lawn Garden Agricultural fields Other I do not use fertilizers or herbicides on my land

#	Field	Choice Count	
1	Lawn	28.57%	6
2	Garden	0.00%	0
3	Agricultural fields	0.00%	0
4	Other	4.76%	1
5	I do not use fertilizers or herbicides on my land	66.67%	14
			21

Showing Rows: 1 - 6 Of 6

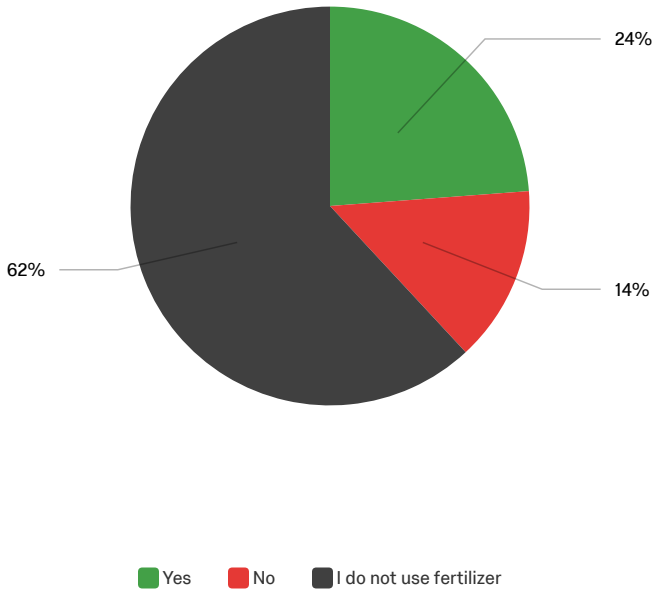
Q21 - Do you use fertilizer that contains phosphorus?



#	Field	Choice Count	
1	Yes	5.00%	1
2	No	35.00%	7
4	I do not use fertilizer on my land	60.00%	12
			20

Showing Rows: 1 - 4 Of 4

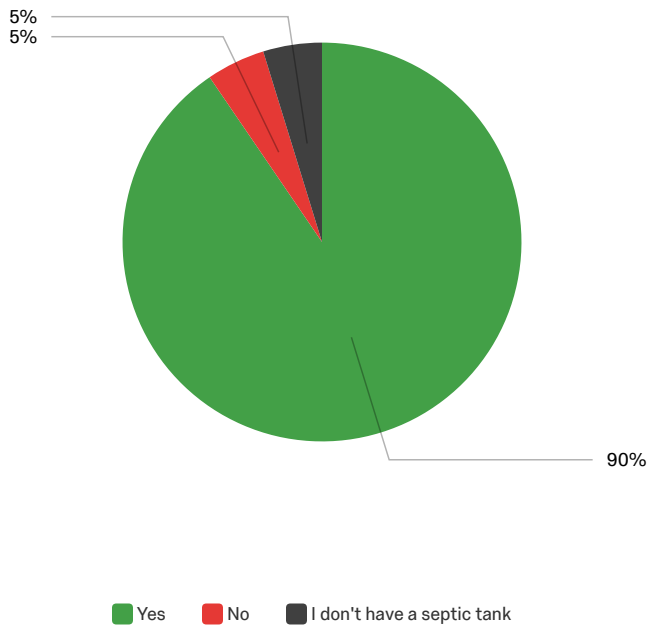
Q23 - Have you had your soil tested before using fertilizer?



#	Field	Choice Count
1	Yes	23.81% 5
2	No	14.29% 3
3	I do not use fertilizer	61.90% 13
		21

Showing Rows: 1 - 4 Of 4

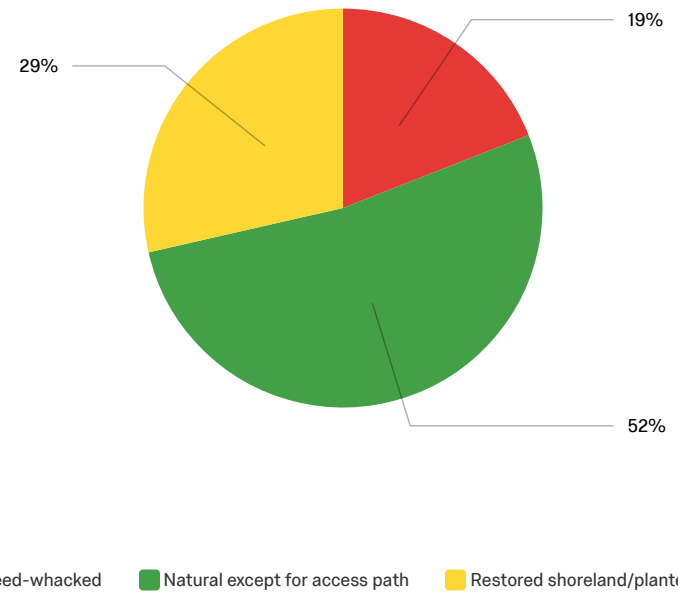
Q22 - Do you have your septic tank pumped regularly (at least every 3 years)?



#	Field		Choice Count
1	Yes	90.48%	19
2	No	4.76%	1
3	I don't have a septic tank	4.76%	1
			21

Showing Rows: 1 - 4 Of 4

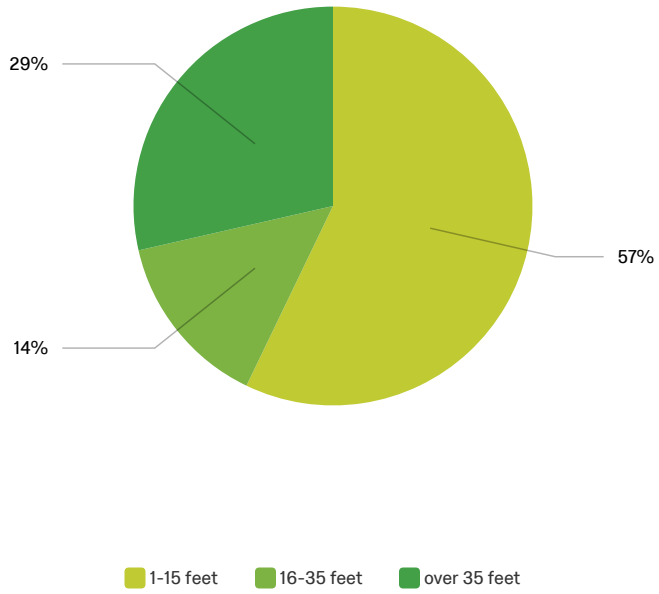
Q25 - How do you currently manage the majority of your property within 35 feet of the lake?



#	Field		Choice Count
1	Mowed or weed-whacked	19.05%	4
2	Natural except for access path	52.38%	11
3	Restored shoreland/planted/landscaped	28.57%	6
			21

Showing Rows: 1 - 4 Of 4

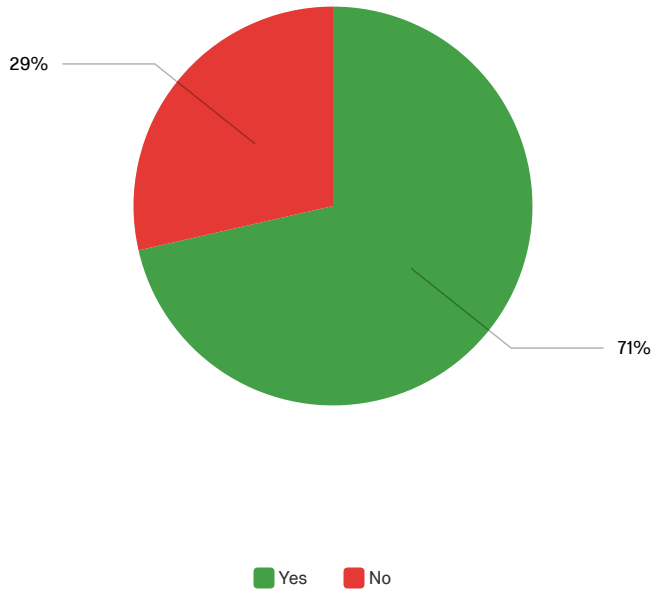
Q26 - If you have unmowed shoreland vegetation, how far inland from the water's edge does it extend?



#	Field	Choice Count	
1	1-15 feet	57.14%	12
2	16-35 feet	14.29%	3
3	over 35 feet	28.57%	6
			21

Showing Rows: 1 - 4 Of 4

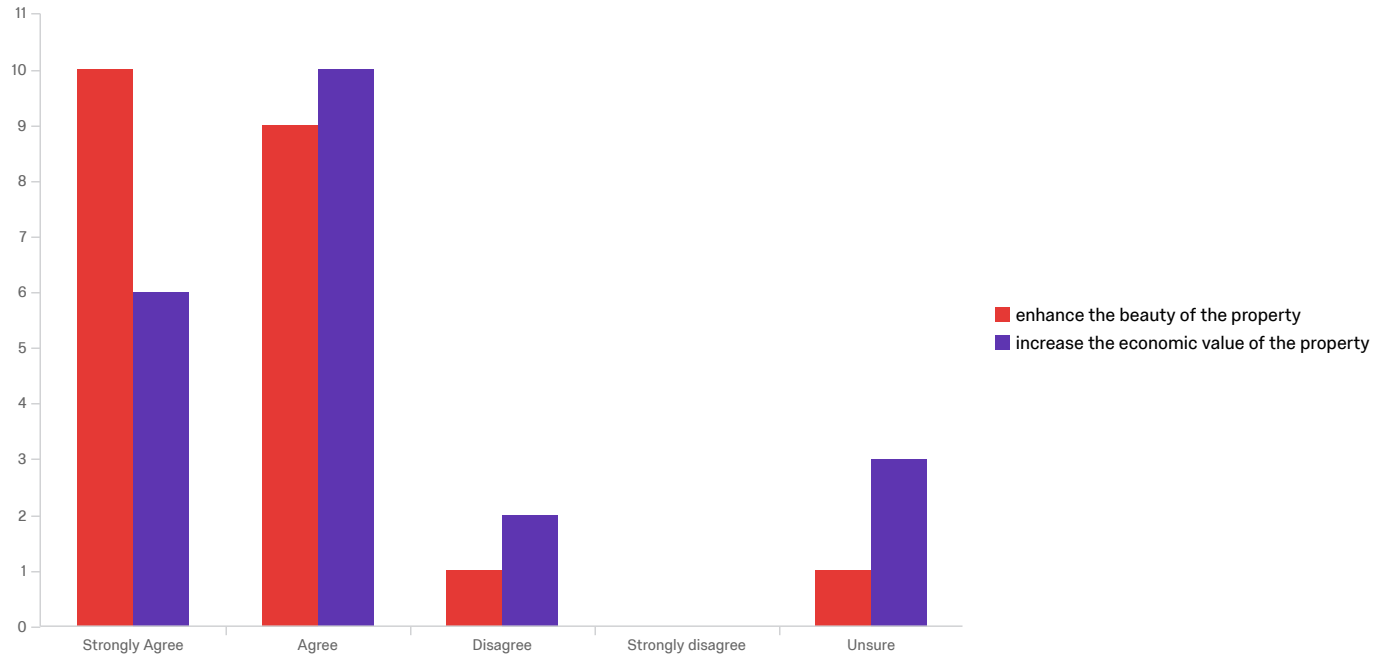
Q31 - Do you have woody structure such as fallen trees or large branches in the shallow water along your property?



#	Field	Choice Count
1	Yes	71.43% 15
2	No	28.57% 6
		21

Showing Rows: 1 - 3 Of 3

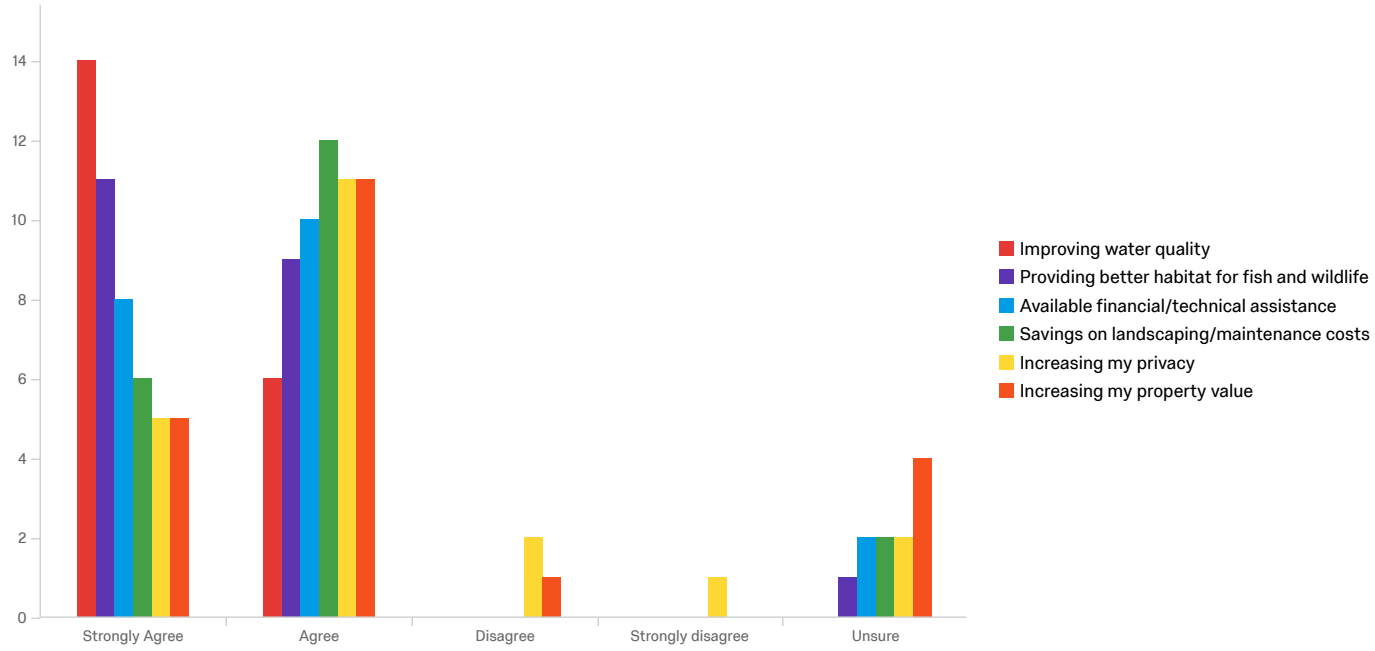
Q27 - In your opinion, does shoreland vegetation...



#	Field	Strongly Agree	Agree	Disagree	Strongly disagree	Unsure	Total
1	enhance the beauty of the property	47.62% 10	42.86% 9	4.76% 1	0.00% 0	4.76% 1	21
2	increase the economic value of the property	28.57% 6	47.62% 10	9.52% 2	0.00% 0	14.29% 3	21

Showing Rows: 1 - 2 Of 2

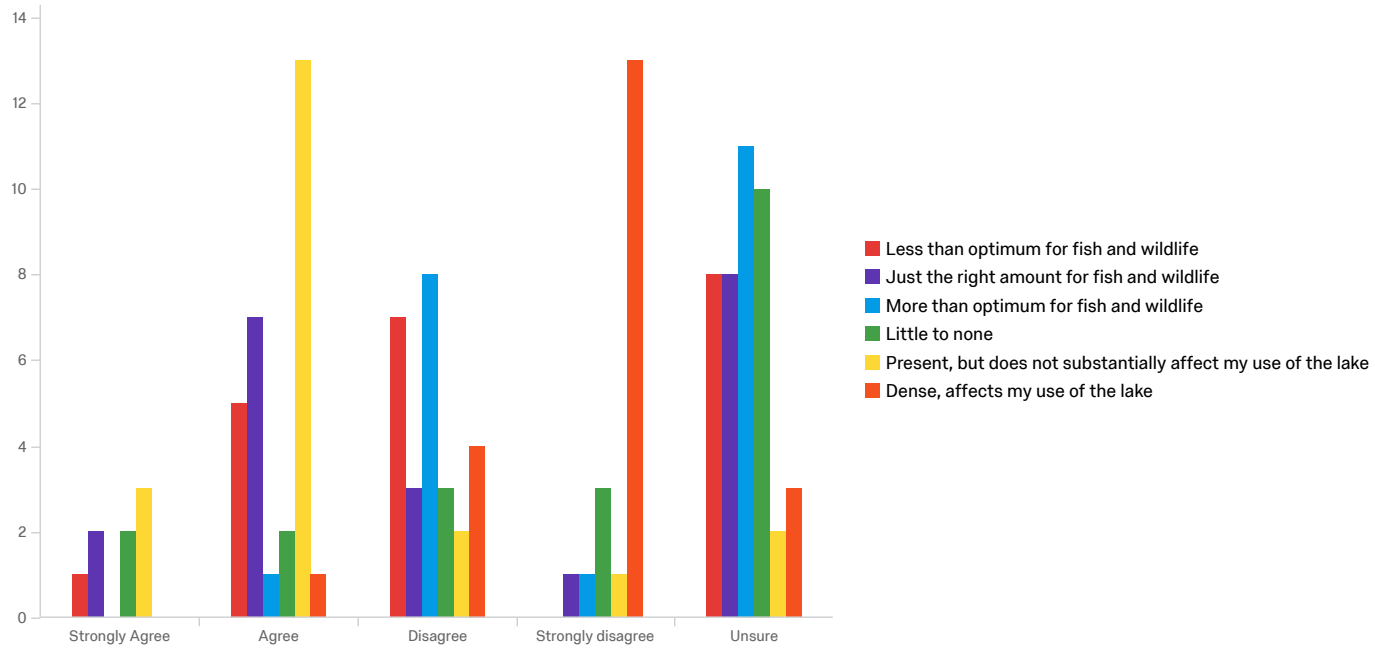
Q28 - What might motivate you to change how you manage your shoreland?



#	Field	Strongly Agree	Agree	Disagree	Strongly disagree	Unsure	Total
1	Improving water quality	70.00% 14	30.00% 6	0.00% 0	0.00% 0	0.00% 0	20
2	Providing better habitat for fish and wildlife	52.38% 11	42.86% 9	0.00% 0	0.00% 0	4.76% 1	21
3	Available financial/technical assistance	40.00% 8	50.00% 10	0.00% 0	0.00% 0	10.00% 2	20
4	Savings on landscaping/maintenance costs	30.00% 6	60.00% 12	0.00% 0	0.00% 0	10.00% 2	20
5	Increasing my privacy	23.81% 5	52.38% 11	9.52% 2	4.76% 1	9.52% 2	21
6	Increasing my property value	23.81% 5	52.38% 11	4.76% 1	0.00% 0	19.05% 4	21

Showing Rows: 1 - 6 Of 6

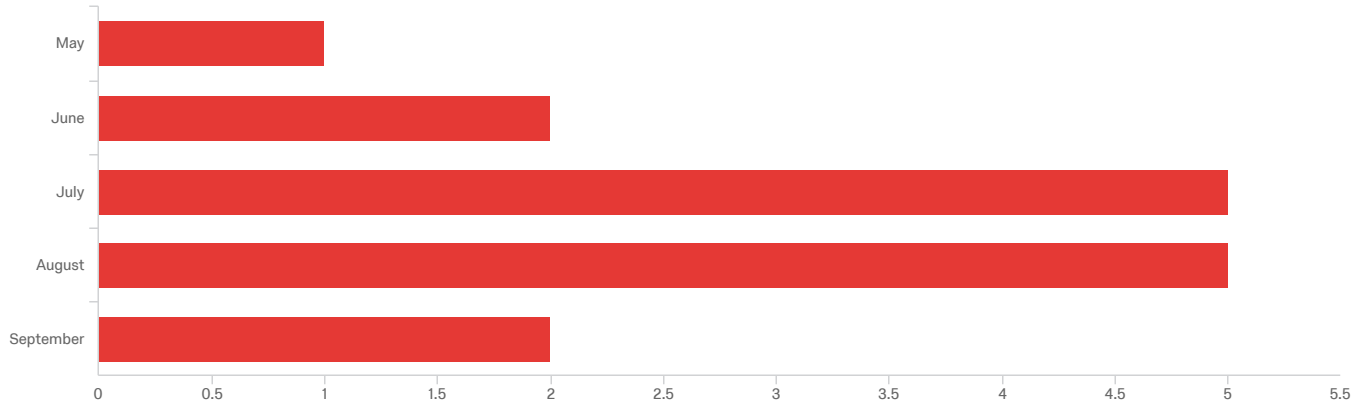
Q32 - In your opinion, which statement best describes the amount of aquatic plant growth in Maiden Lake?



#	Field	Strongly Agree	Agree	Disagree	Strongly disagree	Unsure	Total
1	Less than optimum for fish and wildlife	4.76% 1	23.81% 5	33.33% 7	0.00% 0	38.10% 8	21
2	Just the right amount for fish and wildlife	9.52% 2	33.33% 7	14.29% 3	4.76% 1	38.10% 8	21
3	More than optimum for fish and wildlife	0.00% 0	4.76% 1	38.10% 8	4.76% 1	52.38% 11	21
4	Little to none	10.00% 2	10.00% 2	15.00% 3	15.00% 3	50.00% 10	20
5	Present, but does not substantially affect my use of the lake	14.29% 3	61.90% 13	9.52% 2	4.76% 1	9.52% 2	21
6	Dense, affects my use of the lake	0.00% 0	4.76% 1	19.05% 4	61.90% 13	14.29% 3	21

Showing Rows: 1 - 6 Of 6

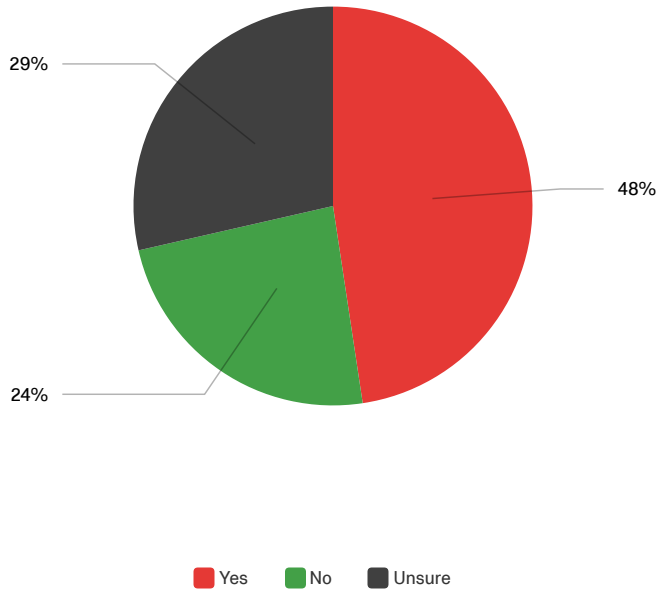
Q33 - If you think the plant growth in Maiden Lake is dense, what month(s) do the problems occur? Check all that apply.



#	Field		Choice Count
1	May	6.67%	1
2	June	13.33%	2
3	July	33.33%	5
4	August	33.33%	5
5	September	13.33%	2
			15

Showing Rows: 1 - 6 Of 6

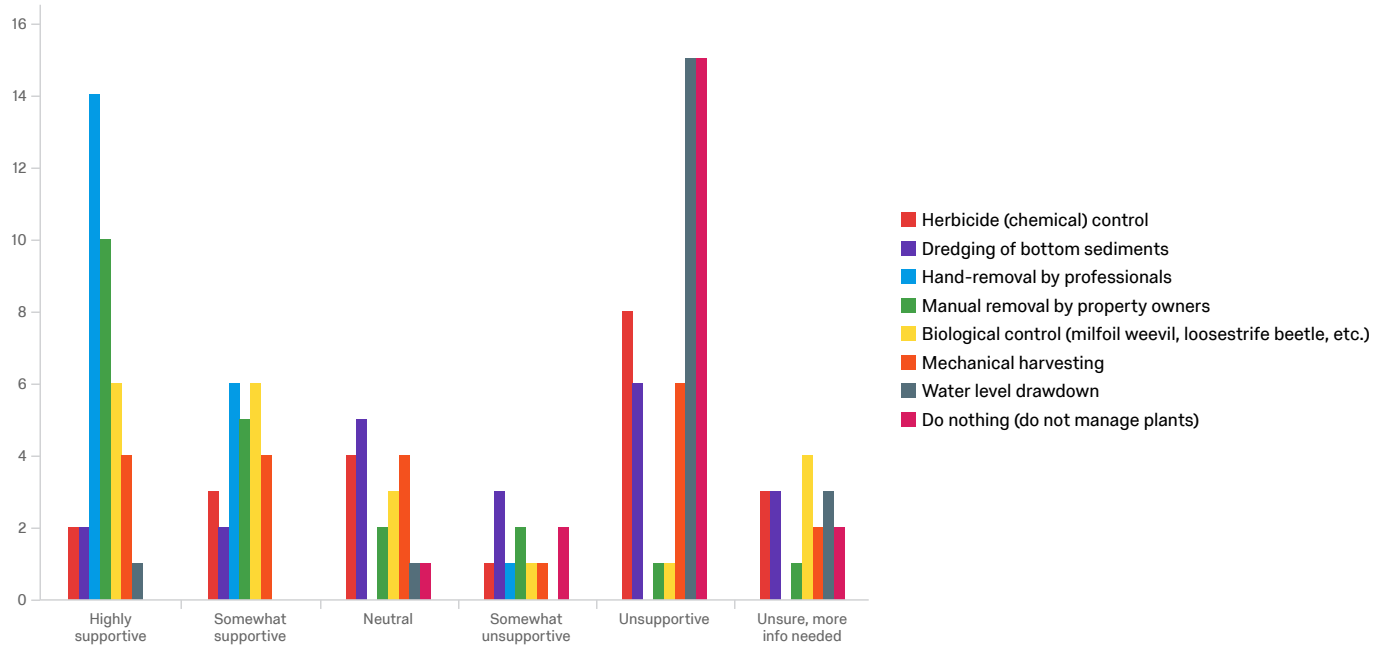
Q34 - Do you believe aquatic plant control is needed on Maiden Lake?



#	Field	Choice Count
1	Yes	47.62% 10
2	No	23.81% 5
3	Unsure	28.57% 6
		21

Showing Rows: 1 - 4 Of 4

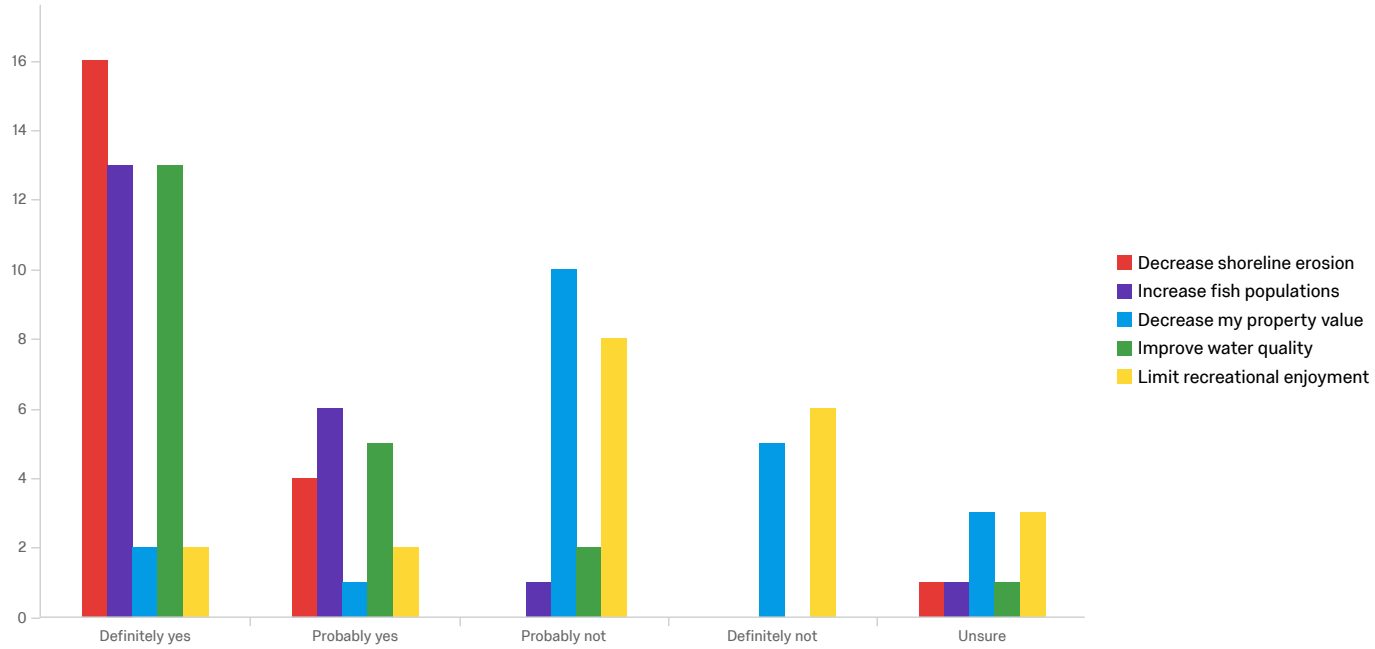
Q35 - What is your level of support for the responsible use of the following techniques to manage aquatic plants on Maiden Lake?



#	Field	Highly supportive	Somewhat supportive	Neutral	Somewhat unsupportive	Unsupportive	Unsure, more info needed	Total
1	Herbicide (chemical) control	9.52% 2	14.29% 3	19.05% 4	4.76% 1	38.10% 8	14.29% 3	21
2	Dredging of bottom sediments	9.52% 2	9.52% 2	23.81% 5	14.29% 3	28.57% 6	14.29% 3	21
3	Hand-removal by professionals	66.67% 14	28.57% 6	0.00% 0	4.76% 1	0.00% 0	0.00% 0	21
4	Manual removal by property owners	47.62% 10	23.81% 5	9.52% 2	9.52% 2	4.76% 1	4.76% 1	21
5	Biological control (milfoil weevil, loosestrife beetle, etc.)	28.57% 6	28.57% 6	14.29% 3	4.76% 1	4.76% 1	19.05% 4	21
6	Mechanical harvesting	19.05% 4	19.05% 4	19.05% 4	4.76% 1	28.57% 6	9.52% 2	21
7	Water level drawdown	5.00% 1	0.00% 0	5.00% 1	0.00% 0	75.00% 15	15.00% 3	20
8	Do nothing (do not manage plants)	0.00% 0	0.00% 0	5.00% 1	10.00% 2	75.00% 15	10.00% 2	20

Showing Rows: 1 - 8 Of 8

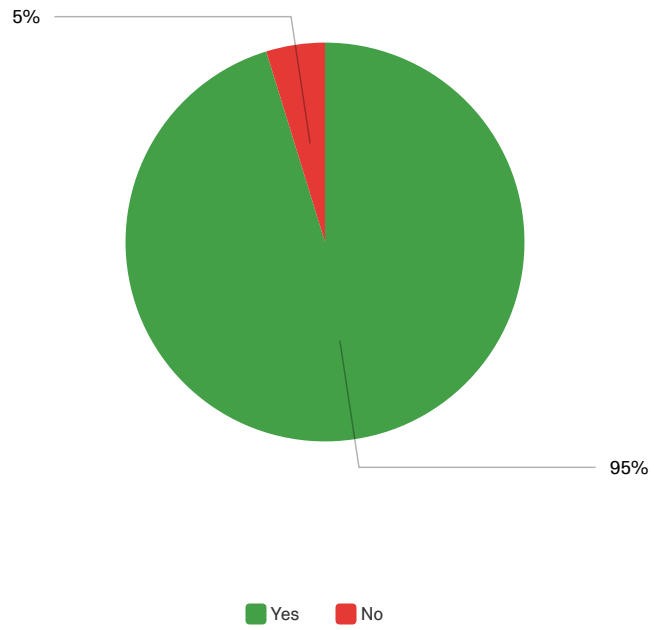
Q36 - In your opinion, does establishing or maintaining native vegetation in the water in the near-shore area...



#	Field	Definitely yes	Probably yes	Probably not	Definitely not	Unsure	Total
1	Decrease shoreline erosion	76.19% 16	19.05% 4	0.00% 0	0.00% 0	4.76% 1	21
2	Increase fish populations	61.90% 13	28.57% 6	4.76% 1	0.00% 0	4.76% 1	21
3	Decrease my property value	9.52% 2	4.76% 1	47.62% 10	23.81% 5	14.29% 3	21
4	Improve water quality	61.90% 13	23.81% 5	9.52% 2	0.00% 0	4.76% 1	21
5	Limit recreational enjoyment	9.52% 2	9.52% 2	38.10% 8	28.57% 6	14.29% 3	21

Showing Rows: 1 - 5 Of 5

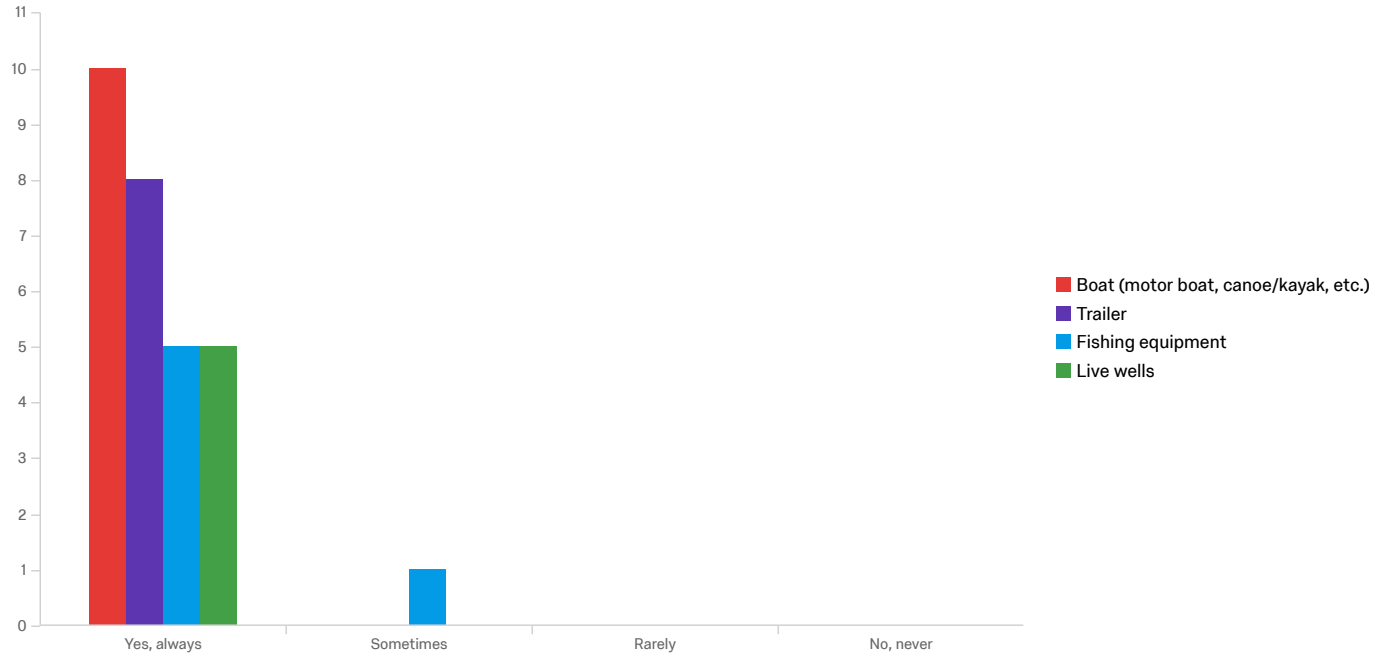
Q37 - Are you aware of invasive species (in general)?



#	Field		Choice Count
1	Yes	95.24%	20
2	No	4.76%	1
			21

Showing Rows: 1 - 3 Of 3

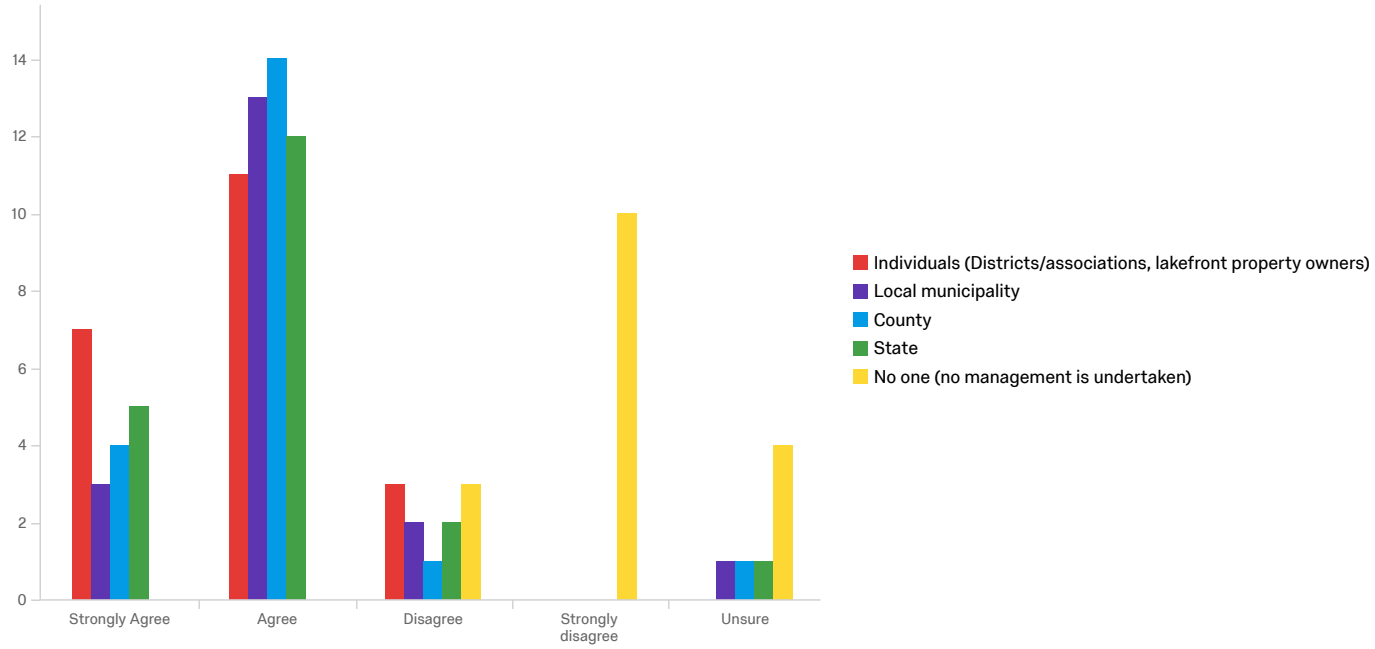
Q39 - After you have been to another lake, do you clean your.... before bringing it back to Maiden Lake?



#	Field	Yes, always	Sometimes	Rarely	No, never	Total
1	Boat (motor boat, canoe/kayak, etc.)	100.00% 10	0.00% 0	0.00% 0	0.00% 0	10
2	Trailer	100.00% 8	0.00% 0	0.00% 0	0.00% 0	8
3	Fishing equipment	83.33% 5	16.67% 1	0.00% 0	0.00% 0	6
4	Live wells	100.00% 5	0.00% 0	0.00% 0	0.00% 0	5

Showing Rows: 1 - 4 Of 4

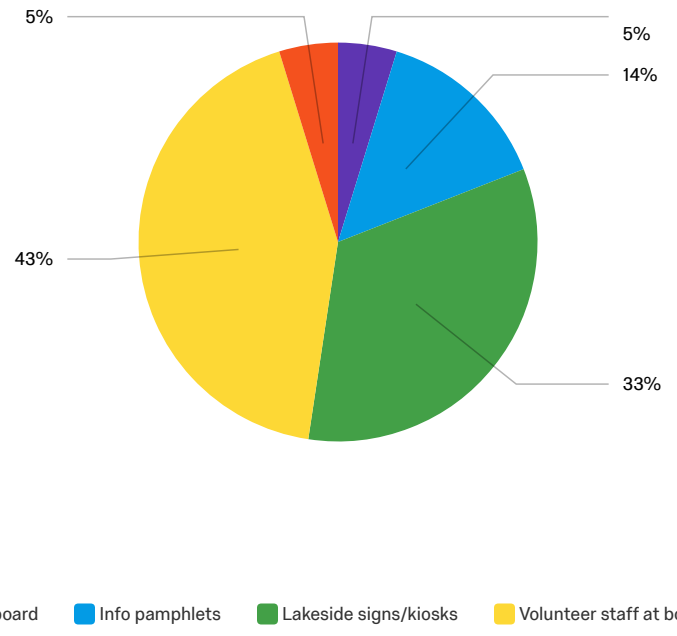
Q40 - Who should pay the cost of managing invasive aquatic plants?



#	Field	Strongly Agree	Agree	Disagree	Strongly disagree	Unsure	Total
1	Individuals (Districts/associations, lakefront property owners)	33.33% 7	52.38% 11	14.29% 3	0.00% 0	0.00% 0	21
2	Local municipality	15.79% 3	68.42% 13	10.53% 2	0.00% 0	5.26% 1	19
3	County	20.00% 4	70.00% 14	5.00% 1	0.00% 0	5.00% 1	20
4	State	25.00% 5	60.00% 12	10.00% 2	0.00% 0	5.00% 1	20
5	No one (no management is undertaken)	0.00% 0	0.00% 0	17.65% 3	58.82% 10	23.53% 4	17

Showing Rows: 1 - 5 Of 5

Q41 - What is the most effective way to inform others about aquatic invasive species?



#	Field	Choice Count	
1	Newspaper	0.00%	0
2	Billboard	4.76%	1
3	Info pamphlets	14.29%	3
4	Lakeside signs/kiosks	33.33%	7
5	Volunteer staff at boat launch	42.86%	9
6	Other	4.76%	1
			21

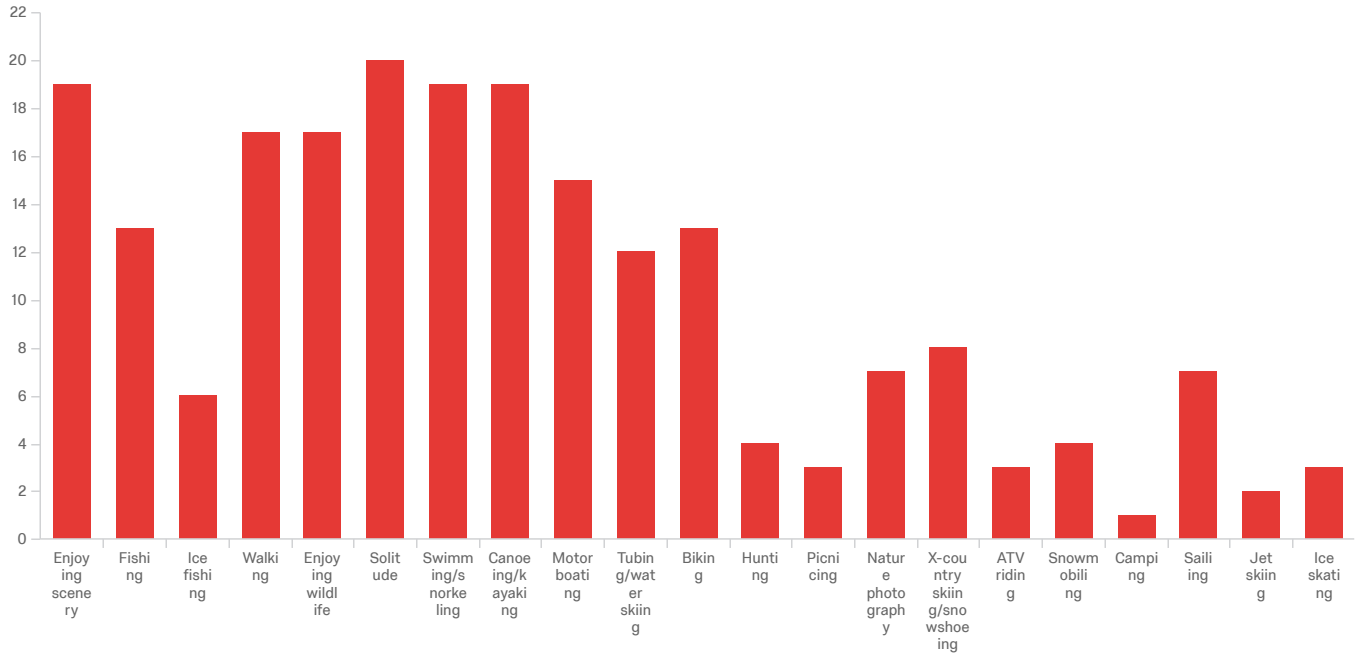
Showing Rows: 1 - 7 Of 7

Q12 - In your opinion, what should be done to restore, maintain or improve Maiden Lake?

In your opinion, what should be done to restore, maintain or improve Bear L...
Less mowed lawn by shore, maintain fish habitat, keep on top of the Eurasian milfoil problem, DO NOT improve the boat landing or parking
Raising public awareness of problems and how to improve them.,
Property owners need to take responsability for monitoring and removing EWM from their lakefront.
Restore the shoreland.
Improve boat launch for safety purposes, restrict shoreline development, encourage buffer zones
Contact the property owners (individually) who make their lawns look like golf courses and disregard the shoreline vegetation. If they knew the harm they were doing, perhaps they'd use better methods to keep the lake clean. Same with non-compliant septic owners. Enforce building cods. KEEP the undeveloped shoreline that is left, undeveloped.
Better education and understanding of property owners and lake users > While my property is on Little Maiden Lake, the runoff from our lake greatly effects the quality of Big Maiden. Our family owns more than 2,700 feet of shoreline, and we do our best to keep the lake quality as it was when we came some 60 years ago. We have buffer plantings, allow trees to fall into the lake for habitat and do not fertilize.
EWM must be monitored and removed either professionally or individually, a system must be in place for this continued management. Shoreline should not be disturbed especially by new homes, should be left as natural as possible and no lawns going right down to the lake.
Improve the current public boat launch so that boaters have access to fresh water to clean boats after use, add boat trailer parking and turn around and install new launch pad area. Establish a recreational lake use fee to cover water quality and fish habitat improvements. Tax homeowners on lake with a lake district fee. Provide tax break for those who follow best practices for shoreline management.
Educate property owners on issues such as shoreline erosion and its effects, and point out the risks of and how to manage / prevent aquatic invasive plants.
contain EWM with regular pulling, harvest weedy areas impacting swimming, ban herbicide/P-containing fertilizer, encourage natural shoreline/rain garden, etc
Milfoil abatement.
Milfoil control
pro. removal of invasive plants.
Keep removing the milfoil, but make boaters from the area also pay for it. Right now, only Association me,beers are paying for DASH removal of our milfoil, and we are not the main cause of its presence.
limit building close to lake...limit boats speeding ... limit landscaping so close to lake
Eliminate day trippers
Limit the volume of rental days an owner can rent their property, renters are more likly to harm the lake. or have a tutorial that would be mandtory for the principal owner and renter must attend before renting.

Showing records 1 - 18 of 18

Q45 - What recreational activities do you partake in on Maiden Lake (check all that apply)?



#	Field	Choice Count	
1	Enjoying scenery	8.96%	19
2	Fishing	6.13%	13
3	Ice fishing	2.83%	6
4	Walking	8.02%	17
5	Enjoying wildlife	8.02%	17
6	Solitude	9.43%	20
7	Swimming/snorkeling	8.96%	19
8	Canoeing/kayaking	8.96%	19
9	Motor boating	7.08%	15
10	Tubing/water skiing	5.66%	12
11	Biking	6.13%	13
12	Hunting	1.89%	4
13	Picnicing	1.42%	3

14	Nature photography	3.30%	7
15	X-country skiing/snowshoeing	3.77%	8
16	ATV riding	1.42%	3
17	Snowmobiling	1.89%	4
18	Camping	0.47%	1
19	Sailiing	3.30%	7
20	Jet skiing	0.94%	2
21	Ice skating	1.42%	3
			212

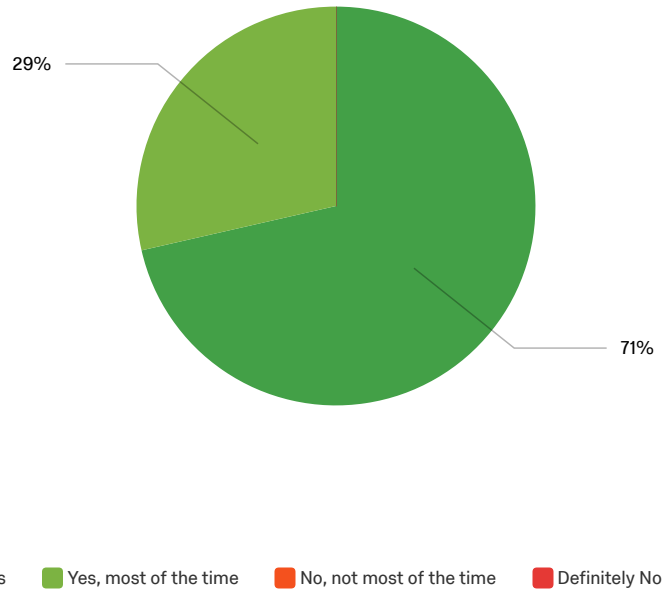
Showing Rows: 1 - 22 Of 22

Q46 - Other recreational activities not included above:

Other recreational activities not included above:
Watching the loons that nest annually on Maiden Lake.
Making maple syrup on our property in the spring.
Stand up paddleboard, Hydrobike
Swimming with friends. Floating.
Entertaining friends and family

Showing records 1 - 5 of 5

Q47 - "No Wake" is allowed on Maiden Lake between 4pm and 10am. Do you like the current "No Wake" rules as they are?



#	Field	Choice Count	
1	Definitely Yes	71.43%	15
2	Yes, most of the time	28.57%	6
3	No, not most of the time	0.00%	0
4	Definitely No	0.00%	0
5	Unsure	0.00%	0
			21

Showing Rows: 1 - 6 Of 6

Q48 - If you think the "No Wake" rules should be adjusted...in what way?

If you think the "No Wake" rules should be adjusted...in what way?
I would like to see the hour from 9-10 am be a WATERSKIING ONLY WAKE TIME. Once the jet skis and tubers come out it's to rough and wavy to ski and enjoy the sport
Possibly extend the hours to five on certain days of the week.
Extend "no wake" from 10 a.m. to 5 p.m.
I would like to see the start of the wake allowed period to move up to 9:30 a.m. and end later at 4:30 p.m.
No. Strikes a good balance between all lake users
It should be 5:00 PM - 10:00 AM.
no
shorten
No adjustment should be made, lakes with variable times have less adhearance to the times. They plead that its confusing and they misunderstood the day/hours

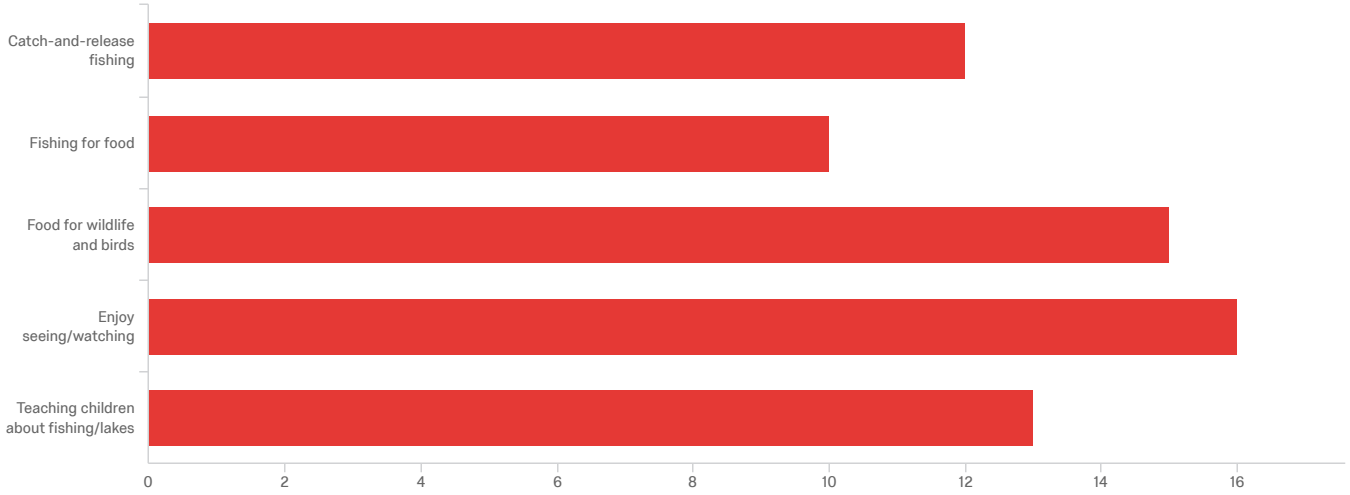
Showing records 1 - 9 of 9

Q49 - What could be done to improve your recreation experience on Maiden Lake?

What could be done to improve your recreation experience on Bear Lake?
Quiet down jet skis.
Nothing, as long No Wake rules are not changed.
Control of jet skis.
Fewer people, boats and motors.
Been there over 45 years always great when I utilize the lake.
Limit the amount of boat traffic from boaters who put their pontoons (or motor boats) in, who don't have property or are not renting on the lake. What do they do with their trash? Where do they go to the bathroom
A sense that all property owners share a common goal and impress that on visitors as well. Again, while this survey is filled out by a non Big Maiden land owner, our more the 87 acres of woodland, marshland and as a feeder lake to Big Maiden makes us strongly supportive of wise use and good conservation practices.
Having a management plan for the control of EWM would ease my mind and to know the younger generation was actively involved in this endeavor.
Improve the public boat launch. Parking is terrible as is the ramp into the lake for boat launching. Also, it would be nice to include a bike/walking lane to the road around Maiden Lake. There are several blind corners that make it dangerous to walk/bike on the road as there is no shoulder in some areas.
Ensure that aquatic invasive education and management programs are in place and being funded and actively managed.
Decrease aquatic weeds in swimming areas, Decrease noise from motors, contain EWM
fine as is
Renters of lake properties should obey all boating laws.
access to the lake from the lagoon we live on
eliminate wake board boats from lake due to erosion
Limit the volume of rentals, renters will activly use the lake for the entire time of their rental where owners provide far less daily pressure since they can use it any time

Showing records 1 - 16 of 16

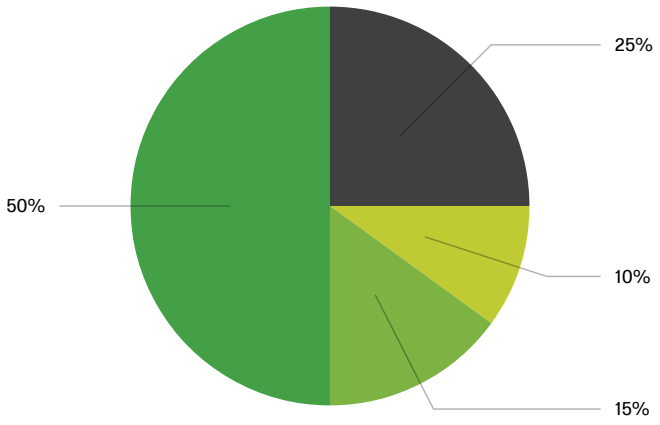
Q51 - For what purposes do you value the fishery in Maiden Lake? (Check all that apply)

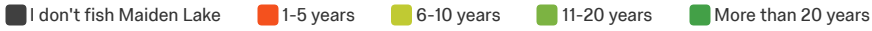


#	Field	Choice Count	
1	Catch-and-release fishing	18.18%	12
2	Fishing for food	15.15%	10
3	Food for wildlife and birds	22.73%	15
4	Enjoy seeing/watching	24.24%	16
5	Teaching children about fishing/lakes	19.70%	13
			66

Showing Rows: 1 - 6 Of 6

Q52 - How many years experience do you have fishing Maiden Lake?

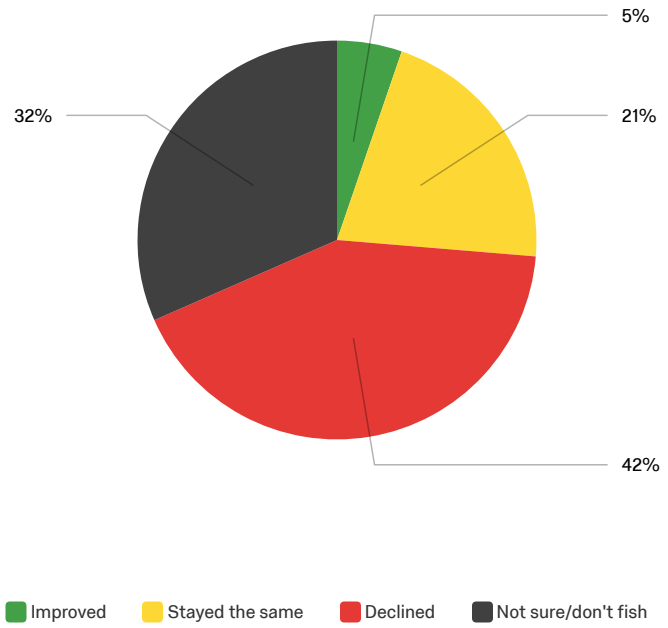




#	Field	Choice Count	
1	I don't fish Maiden Lake	25.00%	5
2	1-5 years	0.00%	0
3	6-10 years	10.00%	2
4	11-20 years	15.00%	3
5	More than 20 years	50.00%	10
			20

Showing Rows: 1 - 6 Of 6

Q53 - In the time you have been fishing Maiden Lake, would you say the quality of fishing has...



#	Field	Choice Count	
1	Improved	5.26%	1
2	Stayed the same	21.05%	4
3	Declined	42.11%	8
4	Not sure/don't fish	31.58%	6
			19

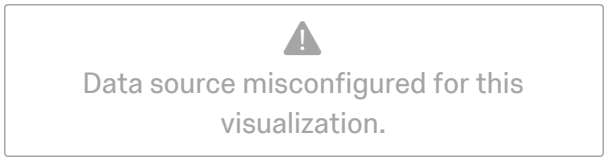
Showing Rows: 1 - 5 Of 5

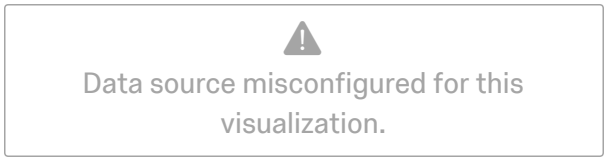
Q54 - What do you think has contributed to the change in fishing?

What do you think has contributed to the change in fishing?
Habitat and shore development.
People, boats, motors, loss of habitat.
Fish Little Maiden Lake for over 45 years. Bass population has increased, crappie population signficantly lower, some nice Northern in lake, perch population undersized.
Not sure ....over fished? No perch left. Northerns eating too many little ones?
Climate change and the evolution of the lake over time due to development and recreation.
Walleye fishing has declined since bass were protected by reg. changes allowing "catch and release" only during their spawning, allowing their numbers to increase and outnumber walleyes.
Planting walleye.
over fishing
bag limit too high for panfish and walleye overharvest
Too many bass
The significant increase in the lage mouth bass population

Showing records 1 - 11 of 11

Q55 - When and how often do you fish Maiden Lake?



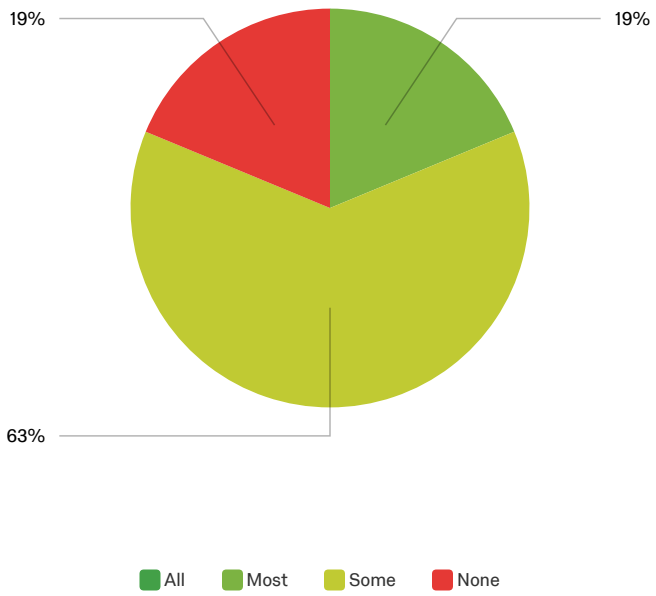


Q56 - What type of fish do you catch on Maiden Lake?

What type of fish do you catch on Bear Lake?
Large mouth bass, northern, rock bass, a few walleye and a few small mouth bass, an occasional perch in winter, blue gills off the dock
Sun fish
Bass, perch, walleye, pan fish.
Now bluegills and bass. Walleyes are seldom.
Perch, rock bass, northern, blue gill, bass, walleye tough to catch.
Walleye, rock bass, blue gills, bass, sunfish or pumpkin seeds, northern.
small mouth bass since Little Maiden has no small mouth environment
Bass, perch, Northern
I did not answer the fishing questions because I do all of my fishing on Little Maiden.
primarily bass
Bass, northern, bluegills
pan fish and bass
panfish bass walleye and northern pike
Walleye pan fish
Walleye

Showing records 1 - 15 of 15

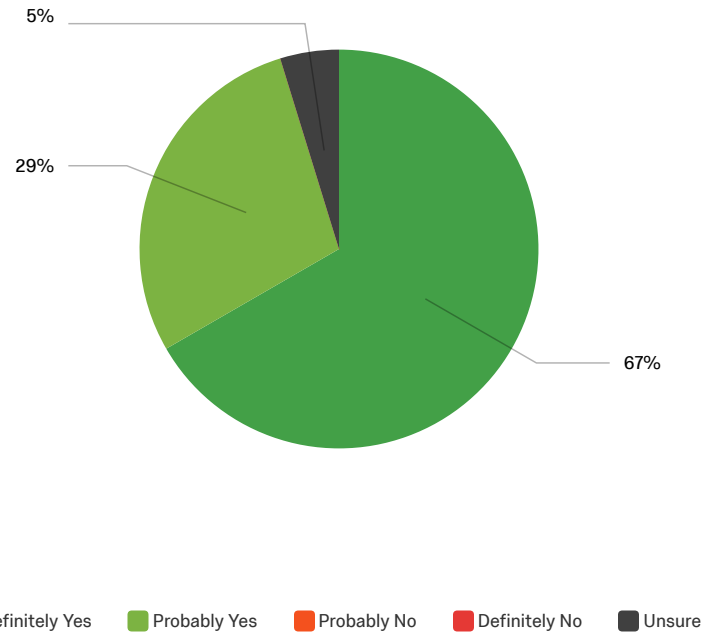
Q57 - In general, how many of the fish you catch are big enough to keep?



#	Field		Choice Count
1	All	0.00%	0
2	Most	18.75%	3
3	Some	62.50%	10
4	None	18.75%	3
			16

Showing Rows: 1 - 5 Of 5

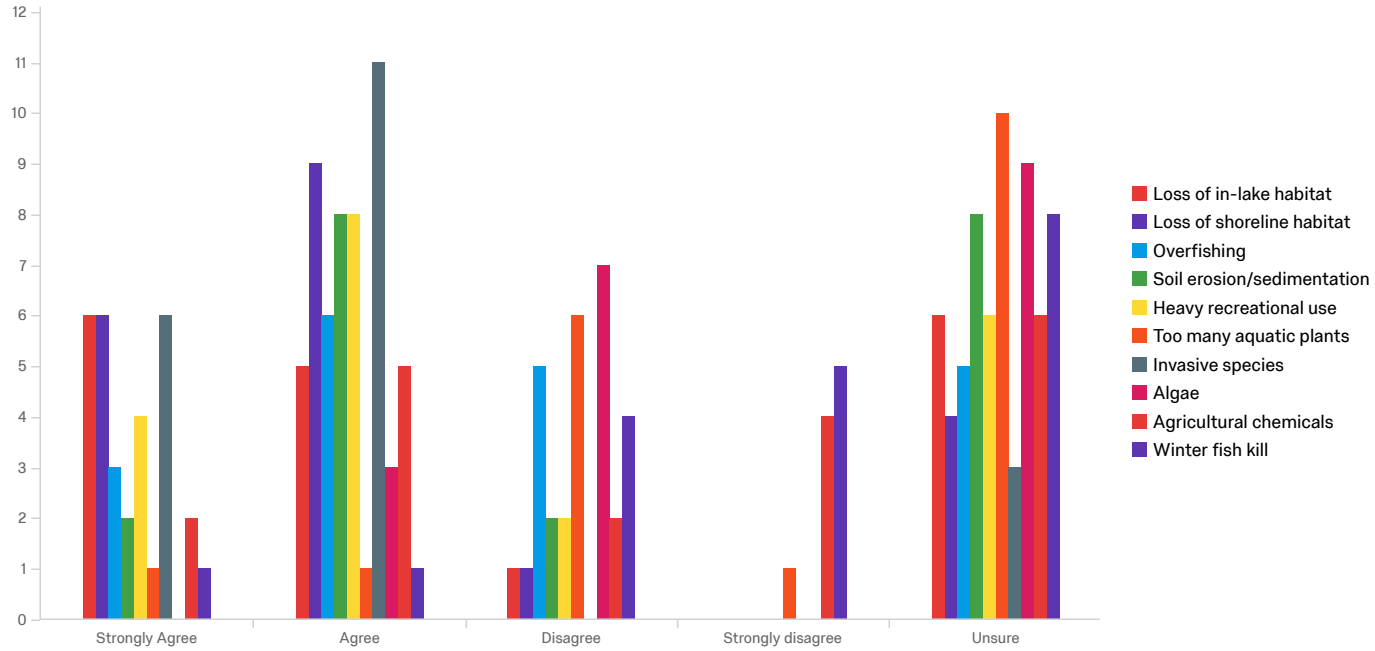
Q58 - Do you believe fish from Maiden Lake are safe to eat?



#	Field	Choice Count	
1	Definitely Yes	66.67%	14
2	Probably Yes	28.57%	6
3	Probably No	0.00%	0
4	Definitely No	0.00%	0
5	Unsure	4.76%	1
			21

Showing Rows: 1 - 6 Of 6

Q59 - What do you think is the greatest threat to the fishery in Maiden Lake in the next 10 years?



#	Field	Strongly Agree		Agree		Disagree		Strongly disagree		Unsure		Total
1	Loss of in-lake habitat	33.33%	6	27.78%	5	5.56%	1	0.00%	0	33.33%	6	18
2	Loss of shoreline habitat	30.00%	6	45.00%	9	5.00%	1	0.00%	0	20.00%	4	20
3	Overfishing	15.79%	3	31.58%	6	26.32%	5	0.00%	0	26.32%	5	19
4	Soil erosion/sedimentation	10.00%	2	40.00%	8	10.00%	2	0.00%	0	40.00%	8	20
5	Heavy recreational use	20.00%	4	40.00%	8	10.00%	2	0.00%	0	30.00%	6	20
6	Too many aquatic plants	5.26%	1	5.26%	1	31.58%	6	5.26%	1	52.63%	10	19
7	Invasive species	30.00%	6	55.00%	11	0.00%	0	0.00%	0	15.00%	3	20
8	Algae	0.00%	0	15.79%	3	36.84%	7	0.00%	0	47.37%	9	19
9	Agricultural chemicals	10.53%	2	26.32%	5	10.53%	2	21.05%	4	31.58%	6	19
10	Winter fish kill	5.26%	1	5.26%	1	21.05%	4	26.32%	5	42.11%	8	19

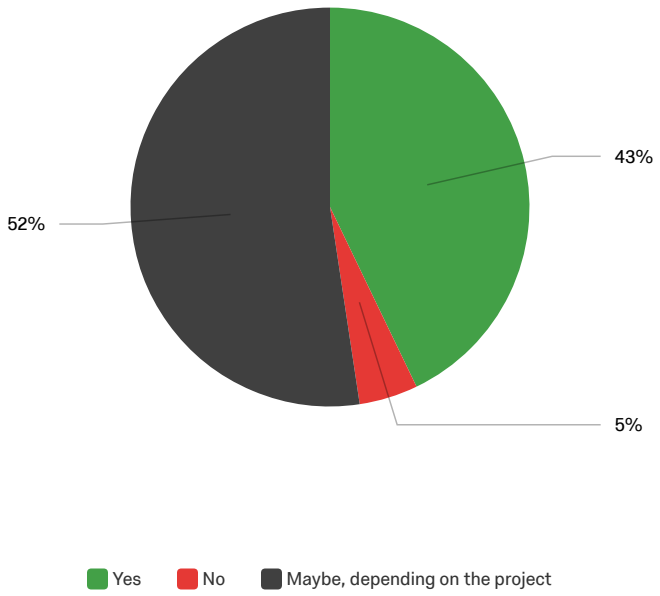
Showing Rows: 1 - 10 Of 10

Q61 - Do you have any additional comments regarding Maiden Lake?

Do you have any additional comments regarding Maiden Lake?
Maiden Lake the joy of my life for 86 years. My son and daughter are involved in eurasian milfoil removal.
I do water test over 15 years.
I love it....I hope we can keep it as pristine as it has been since we've been coming up (1962)
I respond to this survey by background with the UW coverts membership, volunteer with the Northeast Wisconsin Land Trust, a wife who has background in native plants and by herself planting of native and "deer proof" flowering species to limit the use of beauty that can become "deer feed"
I am very involved with EWM management and that is my main concern. Thanks for doing these lake studies.
Make sure that you include / keep property owners on Little Maiden Lake informed of your efforts because as a headwater lake that feeds Maiden Lake, water quality on Little Maiden can directly affect Maiden Lake.
Lucky to be a part of it.
Probably the most pristine in oconto county

Showing records 1 - 8 of 8

Q63 - Would you be interested in volunteering on a project at your lake (such as shoreland restoration planting, invasive species monitoring/removal, water quality monitoring, highway cleanup, etc.)?



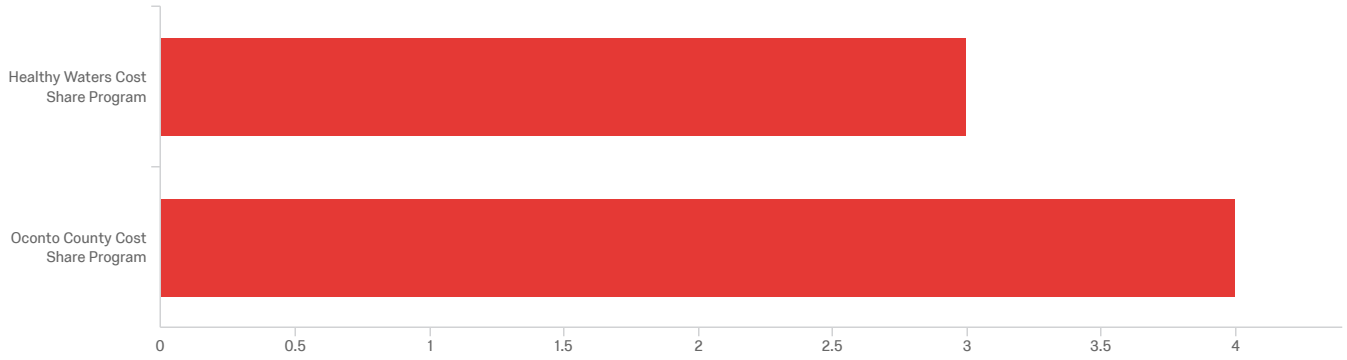
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Would you be interested in volunteering on a project at your lake (such as shoreland restoration planting, invasive species monitoring/removal, water quality monitoring, highway cleanup, etc.)?	1.00	3.00	2.10	0.97	0.94	21

#	Field		Choice Count
1	Yes	42.86%	9
2	No	4.76%	1
3	Maybe, depending on the project	52.38%	11
			21

Showing Rows: 1 - 4 Of 4

Q64 - Are you aware of the following programs available to you from Oconto County?

(Check all that apply)



#	Field		Choice Count
1	Healthy Waters Cost Share Program	42.86%	3
2	Oconto County Cost Share Program	57.14%	4
			7

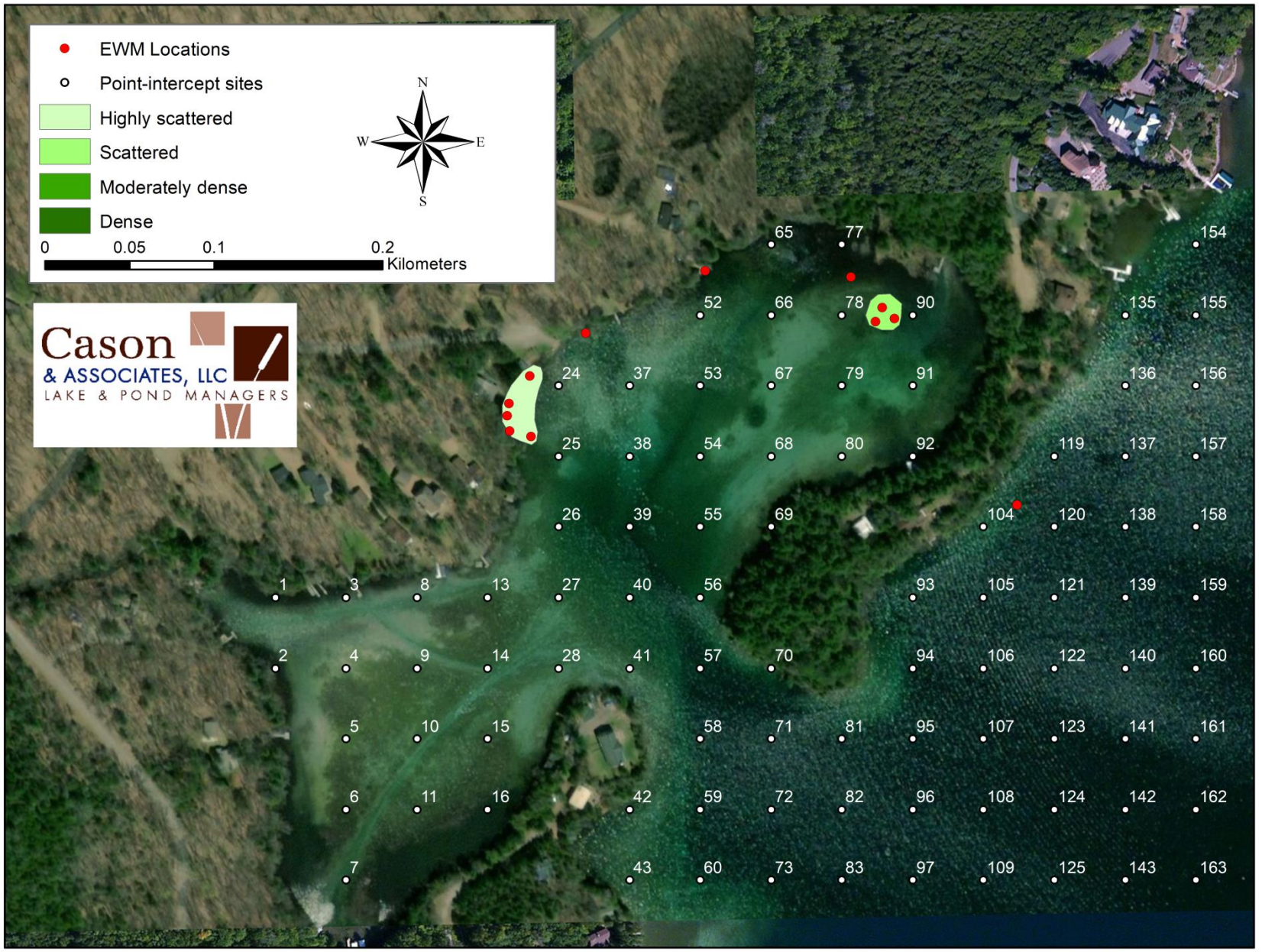
Showing Rows: 1 - 3 Of 3

End of Report

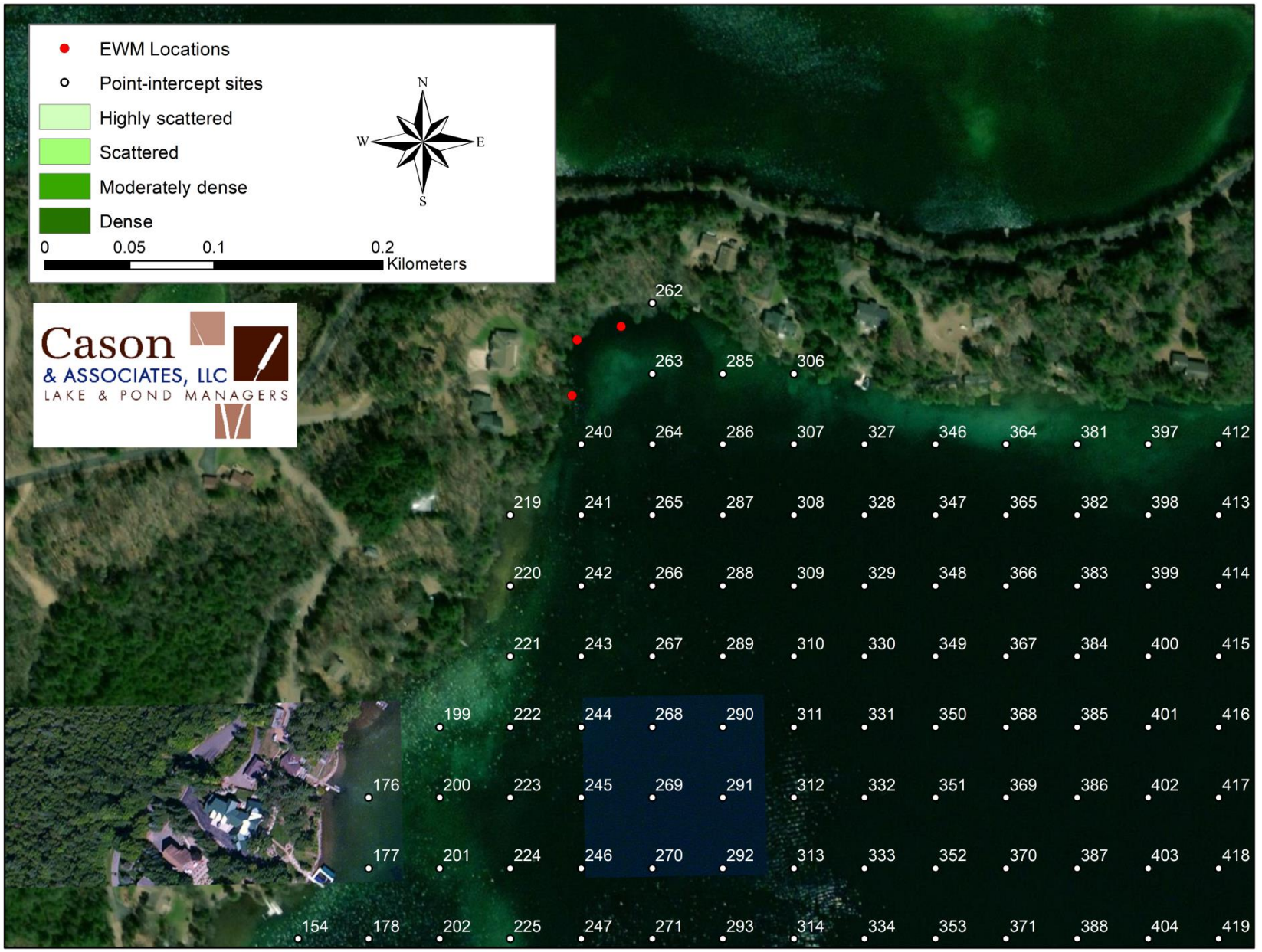
Appendix D

Appendix D. 2018 EWM Special Survey Results

Locations of Eurasian watermilfoil (*Myriophyllum spicatum*) found on June 20, 2018 on Maiden Lake, Oconto County, Wisconsin.



Locations of Eurasian watermilfoil (*Myriophyllum spicatum*) found on June 20, 2018 on Maiden Lake, Oconto County, Wisconsin.



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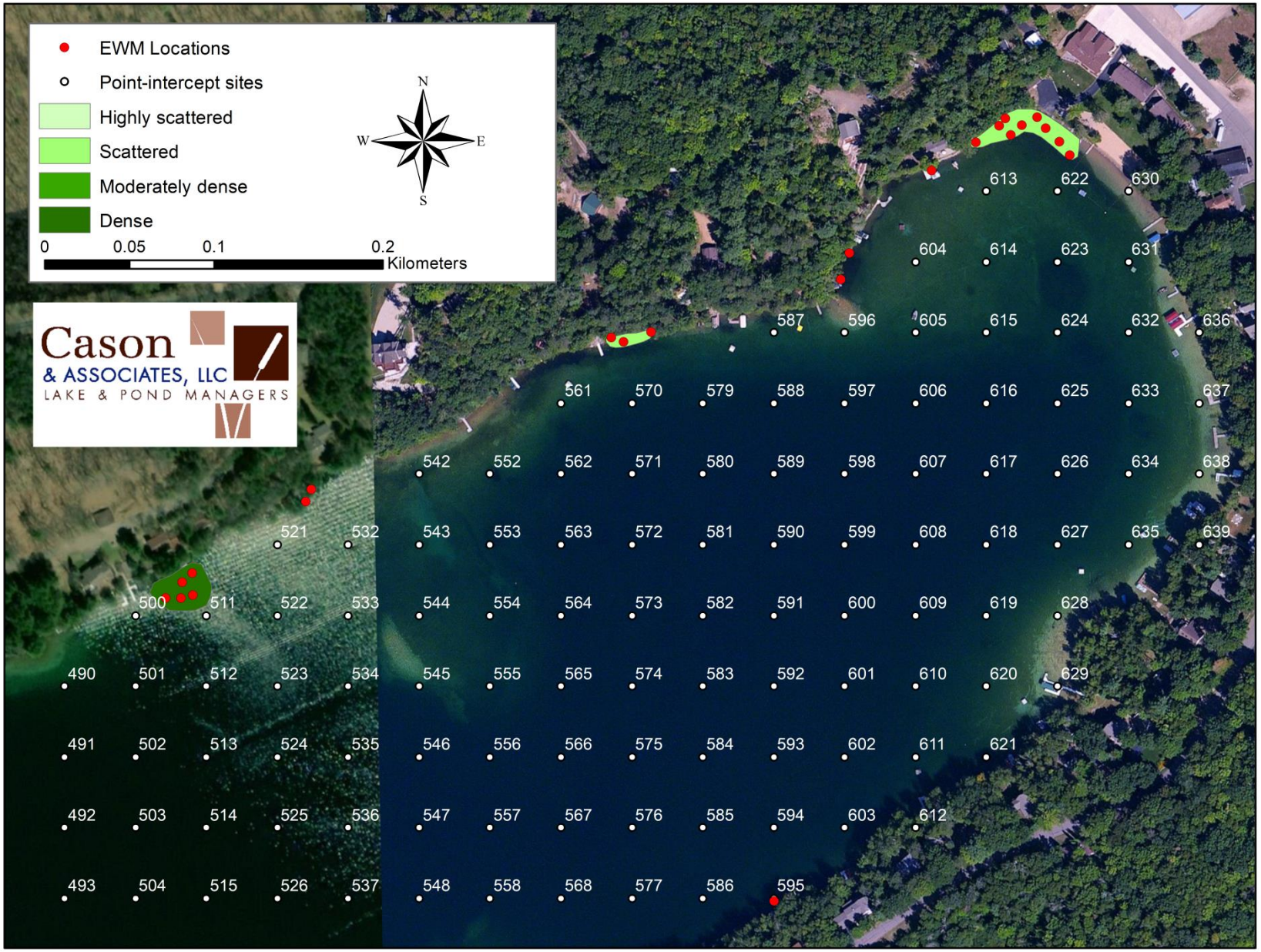

Locations of Eurasian watermilfoil (*Myriophyllum spicatum*) found on June 20, 2018 on Maiden Lake, Oconto County, Wisconsin.