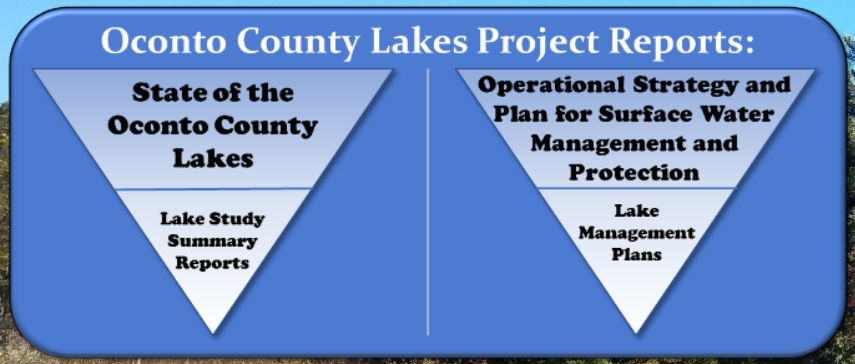
Oconto County Lakes Project

MACHICKANEE FLOWAGE MANAGEMENT PLAN

2018



VISION

Machickanee Flowage will remain a great place for backyard boating and fishing, with little traffic, clean water, and friendly neighbors.

Machickanee Flowage Management Plan

The authors would like to acknowledge the support and enthusiasm of the Machickanee Advancement 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 Machickanee Flowage 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.

The following individuals and organizations contributed to the content of this plan.

Machickanee Flowage Planning Participants
Daniel Alaniva
Tony & Dorothy Brice
Devin Clark
Tom Clark
James Damp
Steve Dupuis
Tom & Vicki Glasnovich
Don & Sue Grieling
Carl & Diane Magunson
Jim Pawlak
Julie Payette
Danny Rasmussen
Robert & Lois Rodich
Ed & Anne Russell
Sharon Seidel
Jason Sinclair
Susan Sweetman
Walter Taylor
Nick Theisen
Ken & Sandy Wendt
Penny Zander

Technical Contributors to the Planning Process
Dale Mohr, UW-Extension -Oconto County
Ken Dolata, Oconto County Land Conservation Department
Brenda Nordin, Wisconsin Department of Natural Resources
Brian Zalay, Wisconsin Department of Natural Resources
Tammie Paoli, Wisconsin Department of Natural Resources
Ryan Haney, UW Stevens Point Center for Watershed Science and Education
Sarah Hull, UW Stevens Point Center for Watershed Science and Education
Paul McGinley, UW Stevens Point Center for Watershed Science and Education

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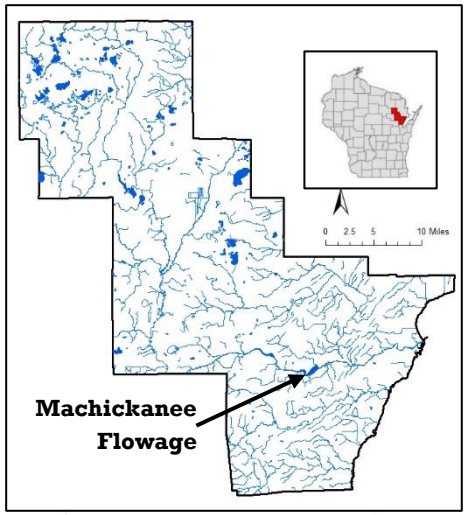
Resource	Acronym or Truncated Name
Citizen Lake Monitoring Network	CLMN
Clean Boats Clean Waters	CBCW
Lumberjack Resource Conservation & Development	LRCD
Machickanee Advancement Association	MAA
Oconto County Land Conservation Dept.	OC LCD
Oconto County Board of Supervisors	OC Board
Oconto County Lakes and Waterways Association	OCLAWA
Northeast Wisconsin Land Trust	NWLT
Town of Stiles	TOS
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

Background

ABOUT MACHICKANEE FLOWAGE

Machickanee Flowage is located in the Town of Stiles. This 436-acre impoundment has a maximum depth of 21 feet. Its bottom sediments are primarily muck and sand. Visitors have access to the lake from one public boat landing and two walk-in locations on Machickanee Flowage owned by Oconto County.

Water enters Machickanee Flowage from the Oconto River and leaves via a dam on the east side.



Map created by Brian Zalay, WDNR.

What Is A Lake Management Plan?

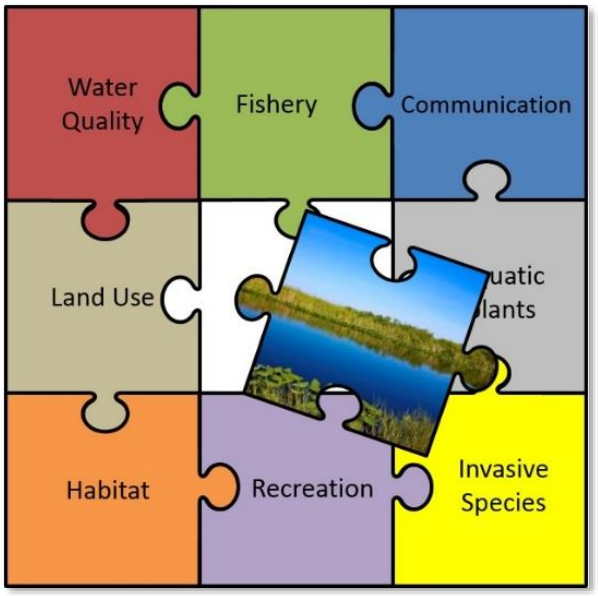
LAKE MANAGEMENT PLANS (LMP)

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 LMP 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.

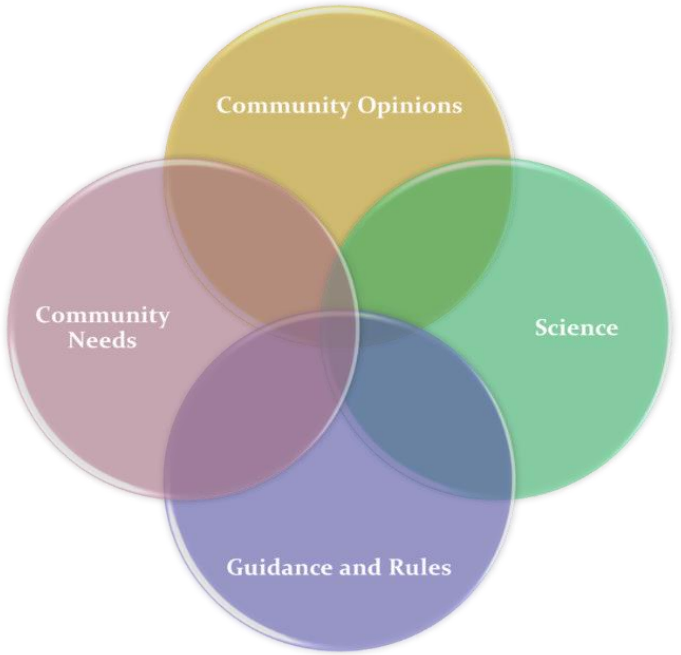
What is the purpose of this LMP?

This plan was created to ensure that Machickanee Flowage is healthy now and for future generations. It was designed to learn about the Machickanee Flowage and identify features important to the lake community to provide a framework for the protection and improvement of the lakes.



Implementing the content of this LMP will enable citizens and others to work together to achieve the vision for Machickanee Flowage 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 Machickanee Flowage 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 August 23, 2018 at the Oconto Falls Senior Center to learn from one another and make decisions about the fishery, water quality, habitat, and land management in the Machickanee Flowage watershed. Technical assistance during the planning process was provided by the Oconto County Conservationist, and staff from WDNR, UWEX, and the CWSE.

How were various opinions incorporated?

Participation in the planning process was open to everyone and was encouraged by letters mailed to Machickanee Flowage 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.

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 Machickanee Flowage can have the greatest influence on the lake by understanding and choosing lake-friendly options to manage their land and the lakes.
- **Machickanee Advancement 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 group 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 Stiles:** 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 lakes.
- **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 MACHICKANEE FLOWAGE

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 Machickanee Flowage. 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

Machickanee Flowage Goals

Goals for Machickanee Flowage

The following goals and actions were derived from the values and concerns of citizens interested in the Machickanee Flowage and members of the planning committee, as well as the known science about the lakes, their ecosystems and the landscape within their 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	**Machickanee Flowage will have a well-structured, thriving fish population.**
Goal 2	**Maintain a healthy and diverse aquatic plant community.**
Goal 3	**Sensitive areas in and around Machickanee Flowage that offer 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 and utilize resources for healthy land management practices.**
Goal 5	**Machickanee Flowage will have healthy shorelands that protect water quality and provide essential habitat.**
Goal 6	**Continue to improve water quality in the Machickanee Flowage.**
Goal 7	**Lake users will be informed and respectful of Machickanee Flowage.**
Goal 8	**Increase participation in lake stewardship.**
Goal 9	**Review plan annually and update as needed.**

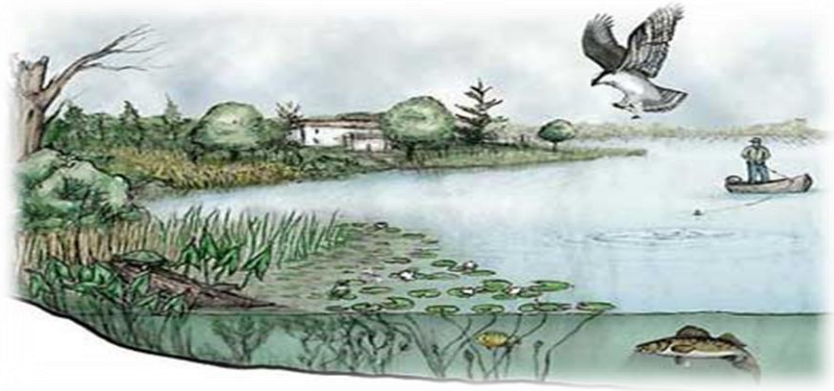
Fish Community

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 Machickanee Flowage 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 Machickanee Flowage

Boating, fishing, views, swimming
Solitude
Not over-populated, low boat traffic
Recreational opportunities
Close to home with 'up north' feel
Wildlife, birding, clean water
Fishing, swimming, few people on the water
Duck hunting, view

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.

Habitat provides shelter and food for fish and wildlife.

Fish Community

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.

Machickanee Flowage 2017 Fish Survey Highlights

- ✓ Most recent previous comprehensive surveys were conducted in 1995 and 2003.
- ✓ The flowage supports a diverse fishery with adequate natural reproduction. It is the only inland waterbody in Oconto County that was recently identified as providing quality northern pike.
- ✓ The most abundant gamefish are largemouth bass and northern pike. The most abundant panfish are bluegill, yellow perch and black crappie.
- ✓ Bluegill averaged 5.8" with fair size structure and average growth rate.
- ✓ Yellow perch averaged 7.4" with good size structure and slow growth.
- ✓ Northern pike averaged 22.1" with excellent size structure and average growth rate. Abundance is estimated at 1.6/acre.
- ✓ Black crappie averaged 7" in length and average growth rate.
- ✓ Largemouth bass averaged 11.5" with fair size structure and slow growth rate.
- ✓ No changes to current fishing regulations is recommended.
- ✓ Yellow perch and bluegill were more abundant in 2017.
- ✓ The next comprehensive fish survey is scheduled for 2027.

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

Managing a lake for a balanced fishery can result in fewer expenses to lake stewards and the public. While some efforts may be 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.

In the 1970s, Scott Paper Company operated an ammonia-based sulfite paper mill on the Oconto River about six miles upstream of the Flowage. Organic loading from the mill created unsuitable instream conditions for most fish species and low dissolved-oxygen related fish kills were common.

The mill was cited for wastewater discharge violations in 1977 resulting in about $600,000 being allocated to restore health on the Oconto River. A subsequent restoration program began in 1981 and included a 3-month drawdown of the Flowage, chemical

treatment for rough fish (carp) control and repopulations of fish in the Flowage.

Stocking Date	Species	# Stocked	Avg. Length (in)
1981	Rainbow Trout	5,000	7
1982	Bluegill (male)	4,000	Adult
1982	Walleye	2,000,000	1
1982	Walleye	46,500	3
1982	Fathead Minnow	750 lbs	Adult
1982	Rainbow Trout	5,000	7
1982	Smallmouth Bass	18,000	Fingerling
1982	Largemouth Bass	12,000	Fingerling
1983	Walleye	46,500	Fingerling
1983	Rainbow Trout	5,000	7
1983	Smallmouth Bass	600	Fingerling
1983	Largemouth Bass	18,000	Fingerling

Goal 1. Machickanee Flowage will have a well-structured, thriving fish population.

Objective 1.1 Continue to enhance fish and wildlife habitat in and around the lake. 50 more fish stick clusters will be installed in the next 10 years (Machickanee currently has 24 logs/mile. At least 250 logs/mile is recommended, but any additions are helpful).

Actions	Lead person/group	Resources	Timeline
Identify landowners for fish stick installations (at least 10% of properties with fish sticks is recommended). Trees can be sourced by identifying other landowners who need a tree removed or purchased using grant funds.	MAA	WDNR-Tammie Paoli	Ongoing
Educate and encourage landowners to leave logs, tree branches and limbs in place in the water, whenever possible.	MAA	WDNR-Tammie Paoli UWEX-Pat Goggin	Ongoing
Continue to protect and restore shoreland areas and avoid shoreland alterations to improve fish habitat.	MAA	Shoreland property owners	Ongoing

Fish Sticks are large woody habitat structures using single or clustered trees that are anchored to shore and partially or fully submerged in shallow water. These structures provide shelter and feeding areas for fish and essential nesting and sunning areas for birds, turtles, and other animals.

Aquatic Plant Community

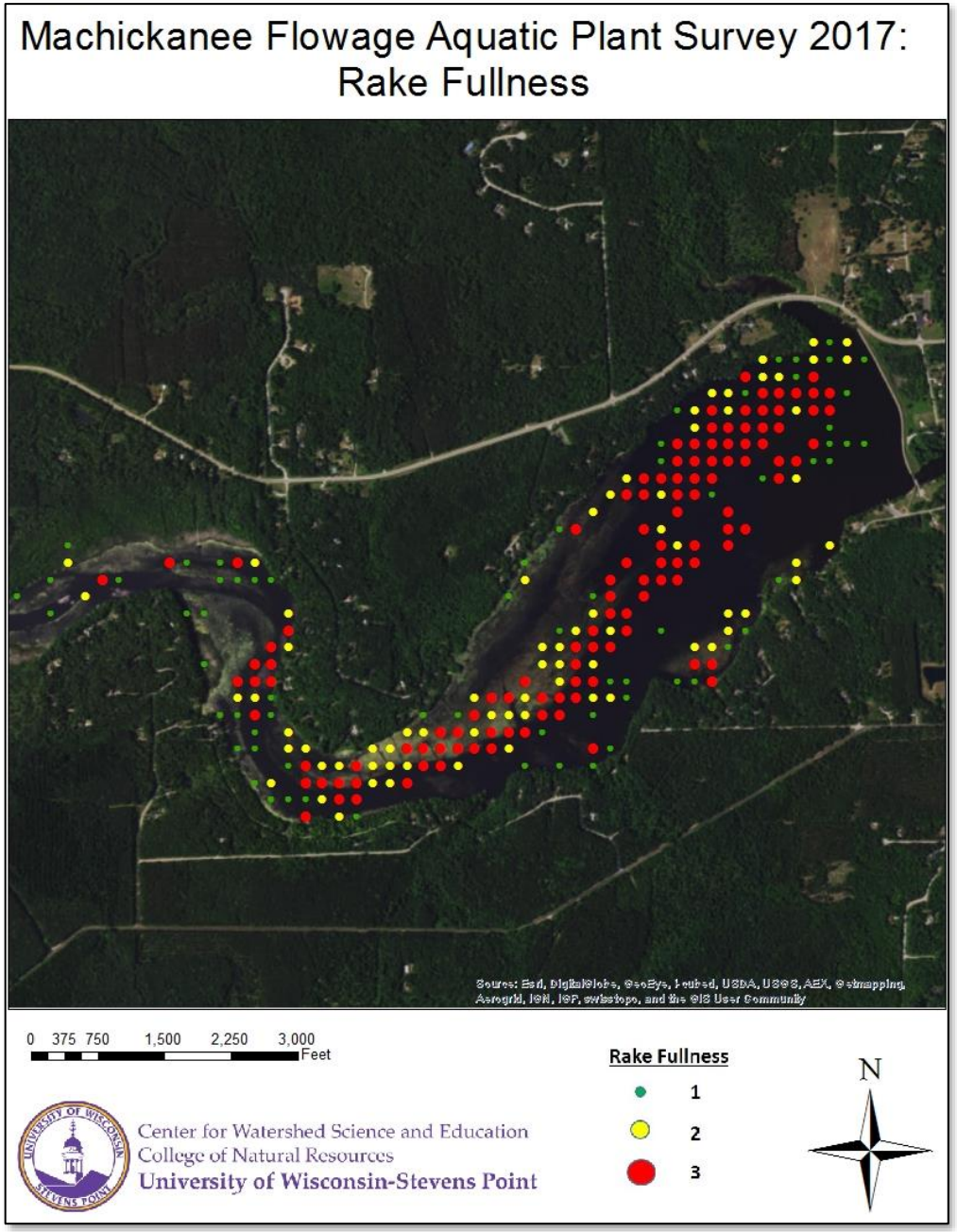
Aquatic Plants

Aquatic plants provide the forested landscape within a 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 sediments 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. The aquatic plants that attract the animals to these areas contribute to the beauty of the lake. Aquatic plants also serve as indicator species for environmental stressors that could be occurring in a lake or river, such as a runoff event.

Machickanee Flowage 2017 Aquatic Plant Survey Highlights

- ✓ 50% (261 of 525) of the sites visited had vegetative growth.
- ✓ Greatest depth aquatic plants were found was 13 feet.
- ✓ 20 species of aquatic plants were identified. This is above the North Central Hardwood average of 16.2.
- ✓ The three most dominate species were coontail (88%), flat-stem pondweed (46%), and Northern water-milfoil (25%).
- ✓ The Floristic Quality Index (FQI) was 23.5. The North Central Hardwood average is 23.3.



Aquatic Plant Community

Coontail lacks roots can form dense mats just below the surface. It is usually in calm, nutrient-rich water and provides habitat for young fish and other aquatic animals. Waterfowl will eat the seeds and foliage.

Slender naiad has glossy, finely toothed leaves appearing as whorls near the end of stems. Also known as the water-nymph, the whole plant is eaten by waterfowl and provides shelter for small fish and insects.

Northern water-milfoil 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, AIS 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.

During the 2017 aquatic plant survey, **Common reed** (*Phragmites australis)* was found along the shoreline in two places. Invading moist habitats, it alters hydrology and wildlife habitat, increases fire potential and shades native species.

Eurasian water-milfoil (EWM) was documented in Machickanee Flowage in 1994 and **curly-leaf pondweed** (CLP) was documented in 2009. Both were observed during the 2017 survey. Due to the low retention time of water in the flowage, chemical treatment of EWM is not practical. A point-intercept survey per WDNR protocol is recommended every 5 years to detect changes in the plant community and detect AIS.

Aquatic Plant Management in Machickanee Flowage

Management strategies in Machickanee Flowage were designed to achieve a balance between healthy aquatic habitat, good water quality, and recreation. A variety of management options were discussed during the development of this plan.

Management Options for Excessive Native Aquatic Plants

Planning session participants identified management options that offer the most practical and effective approaches for managing native plants, while minimizing impacts to the lake as a whole. Depending upon conditions, the following options may be used alone or in combination with others.

Hand-pulling. No permit required.

Lakefront property owners are allowed to manually remove aquatic plants from an area no more than 30 feet wide without a permit for swimming and boat access. Any denuded lakebed is prime real estate for invasive species, however, and close monitoring is necessary to ensure no populations are established.

Mechanical Harvesting. Permit required.

While harvesting, operators should take care (by raising and lowering the harvesting bar) to minimize the impact on habitat and to reduce sediment disturbance. Harvesting in depths less than 3 feet should be avoided but may be done with care in accordance with WDNR guidance, keeping in mind sediment resuspension can lead to additional plant growth and algae blooms. A second pass should be made on harvested areas to remove plant fragments and floaters. **Areas with EWM should be avoided to prevent its fragmentation and spread** unless it is specified in the plan. In some lakes the EWM can't be targeted for chemical control due to flow or location. This is when the harvester is recommended. It is another tool in the toolbox and works when used properly.

Mechanical Harvesting Plan for Navigation: Harvesting of dense plant beds that are not comprised of EWM/HWM may be conducted as needed to provide navigation. Paths from piers to open water may be cut to improve navigation and the fishery. Lanes should be no wider than 15 yards. To minimize disturbances to sediment and important fish habitat, harvesting should be avoided in water depths less than 3 feet. A depth finder on the cutter end of the harvester can aid in evaluating water depths.

Skimming, target: dense floating plant material, filamentous algae. Permit required.

This mechanical removal method would be applied when targeting uprooted aquatic plants that have accumulated in parts of Machickanee Flowage. Skimming of floating plant material can be conducted by mechanical or non-mechanical means in areas where sediment and emergent plants would not be disturbed by this activity. The surface of the lake is skimmed to collect plant material for removal from the lake. When skimming with a harvester, aquatic plants are not cut. It is important to coordinate and work with the dam owner and FERC liaison during such endeavors as they are critical partners in management of the flowage.

Water level manipulation (drawdown), target species: EWM/HWM, CLP. Permit required.

Temporary reduction of the water levels in Machickanee Flowage can be used to reduce AIS populations and has the added benefit of compacting sediment. This technique has the greatest effect on vegetation located in the shallows. If done during late fall and winter, the exposed crowns of plants will desiccate, killing them. Consultation with WDNR lake and fisheries biologists and the dam owner is essential to determine the appropriate timing and duration needed for current conditions.

Aquatic Plant Management Plan Review

A good aquatic plant management strategy should reduce the amount of management activity needed as time goes on. In Machickanee Flowage, a series of successful strategies should lead to a balance between healthy aquatic habitat, water quality,

and recreation with minimal annual management. To evaluate if management strategies are succeeding, updates to aquatic plant point-intercept surveys should be conducted at least every five years. Assistance in updating surveys can be provided by the WDNR Aquatic Plant Specialist and/or consultants.

Goal 2. Maintain a healthy and diverse aquatic plant community.

Objective 2.1 Control EWM and CLP populations in Machickanee Flowage. Ensure no new AIS are introduced.

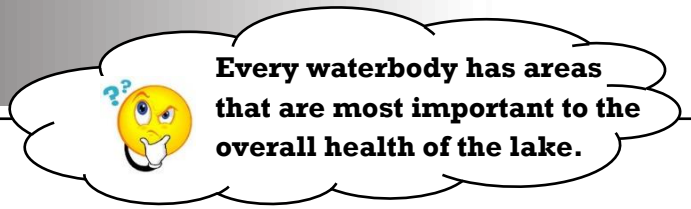
Actions	Lead person/group	Resources	Timeline
Work with Oconto Electric (dam owners) to coordinate a winter drawdown to manage EWM/excessive plants (particularly on the north, shallow shore) and compact bottom sediments. Perhaps incorporate this into the dam's FERC license renewal. WDNR grant funding may be available to offset costs.	MAA	WDNR-Brenda Nordin WDNR-FERC Liason	To be determined.
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.	MAA	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.	MAA	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.	MAA	CBCW	Ongoing, in summer
Consider hiring professionals for EWM survey/removal annually (or as needed) to assess EWM population and identify new populations.	MAA	Consultants WDNR	Annually

Objective 2.2 Minimize disturbance to native aquatic plants while maintaining access and navigation.

Actions	Lead person/group	Resources	Timeline
Consider applying for an 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).	MAA	WNDR-Brenda Nordin Consultants	2019

Consider contracting a mechanical harvester to open navigational lanes during times of thick vegetation. Careful mapping/navigating of stumps and other submerged obstacles would be required.	MAA		
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.	MAA	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.	MAA	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.	MAA	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).	MAA	WDNR-Brenda Nordin OCLCD	Ongoing

Critical Habitat



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 Machickanee Flowage does not have an official critical habitat area designation, there are areas within the 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 examples 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 and around Machickanee Flowage that offer essential habitat and/or water quality benefits, will be protected.

Objective 3.1 Identify and inform others of quality habitat areas in and around Machickanee Flowage.

Actions	Lead person/group	Resources	Timeline
Request a Critical Habitat Designation from WDNR.	MAA	WDNR-Brenda Nordin	2019
If critical habitat is designated on Machickanee Flowage, communicate to property owners, visitors, and Town Board as to why these areas are important.	MAA		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.	MAA	WDNR UWEX Northeast Wisconsin Land Trust	As available.

Watershed

LANDSCAPES AND THE LAKE

Machickanee Flowage Watershed

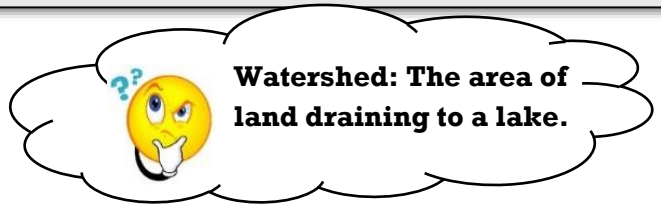
A Lake is a Reflection of its Watershed…

Understanding where a 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 Machickanee Flowage; the ground watershed may be slightly different than the surface watershed.

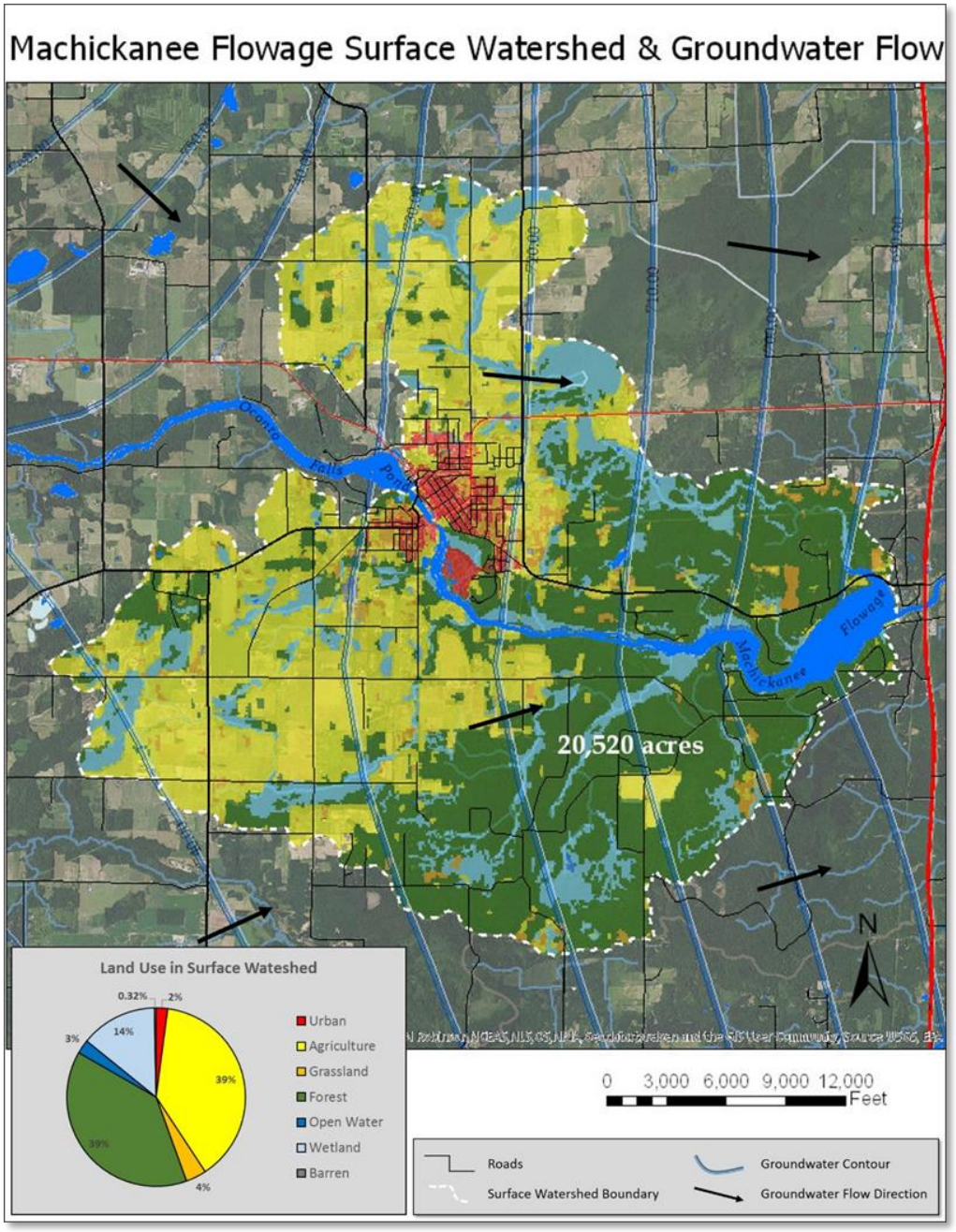
Less runoff is desirable because it allows more water to infiltrate the soils and recharge the groundwater. Groundwater then feeds the lake steadily, year-round (even during dry periods or when the lake is covered with ice). The capacity of the landscape to hold (or shed) water and filter (or contribute) particles determines the amount of erosion that may occur and the amount of groundwater feeding a lake, and, thus, the lake's water quality and quantity.

Machickanee Flowage's Watershed

The Machickanee Flowage watershed is 20,520 acres. Primary land use is forest and agriculture. The lakes' 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 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.

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:

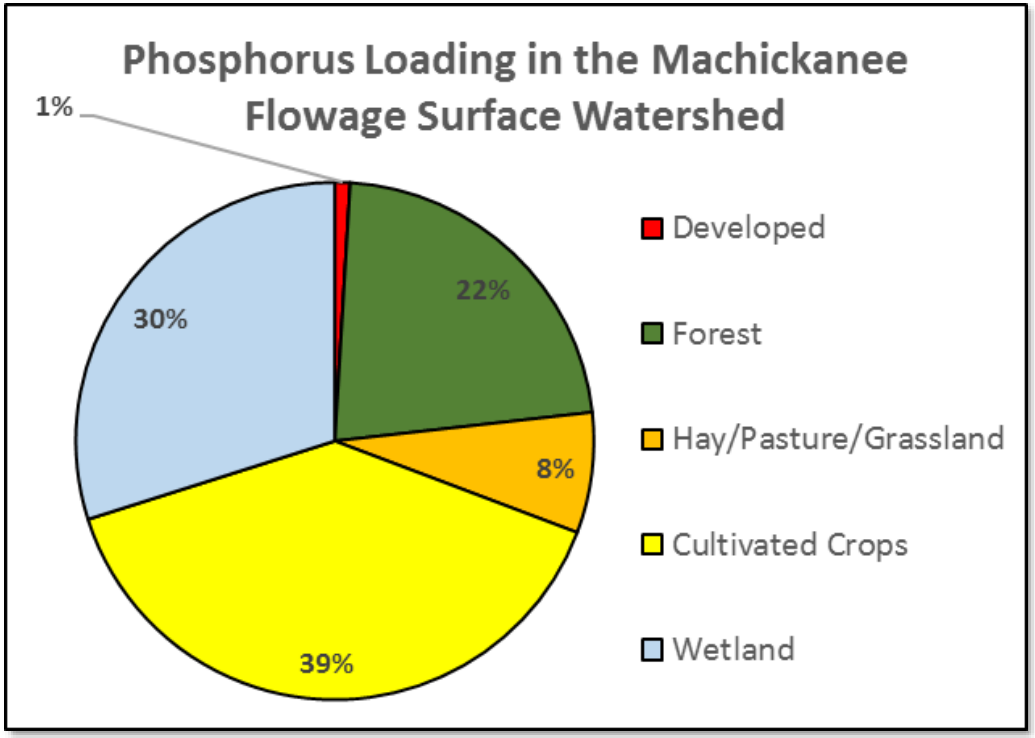
- eliminating/reducing the use of fertilizers,
- increasing the distance between the lake and a septic drainfield,
- protecting/restoring wetlands and native vegetation in the shoreland,
- controlling erosion,

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 Machickanee Flowage. 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).



Phosphorus Loading in Machickanee Flowage Watershed

Based on modeling results, agriculture had the greatest percentage of phosphorus contributions from the watershed. Though forest and wetland also comprise a good chunk 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 and utilize resources for healthy land management practices.

Objective 4.1 Support healthy land management practices in the Machickanee Flowage watershed and 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.	MAA	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).	MAA	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.	MAA	Town of Stiles Developers/Builders	As needed
Encourage design of road and construction projects that will minimize impacts to the lakes.	MAA	Town of Stiles OC Highway Department/WDOT	As needed

Shorelands

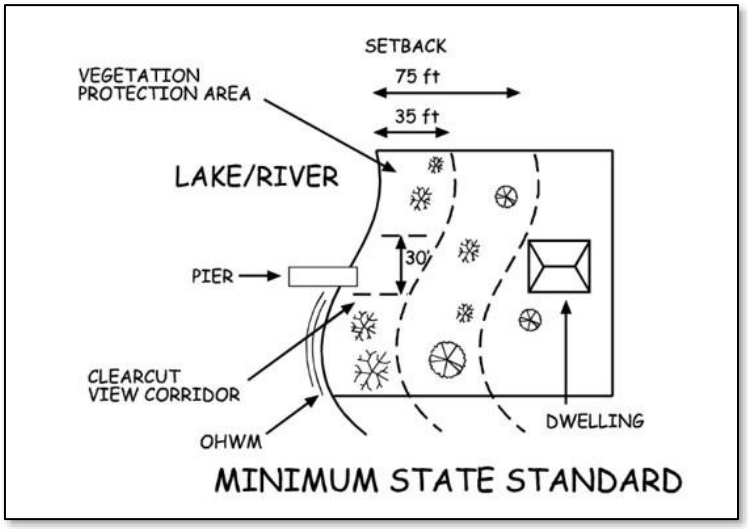
90% of lake life spends all or part of their life in the near shore zone.

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 protect and improve lake water quality and habitat. To protect our lakes, county and state shoreland ordinances (NR 115) 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.



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.

State Shoreland Zoning Ordinance

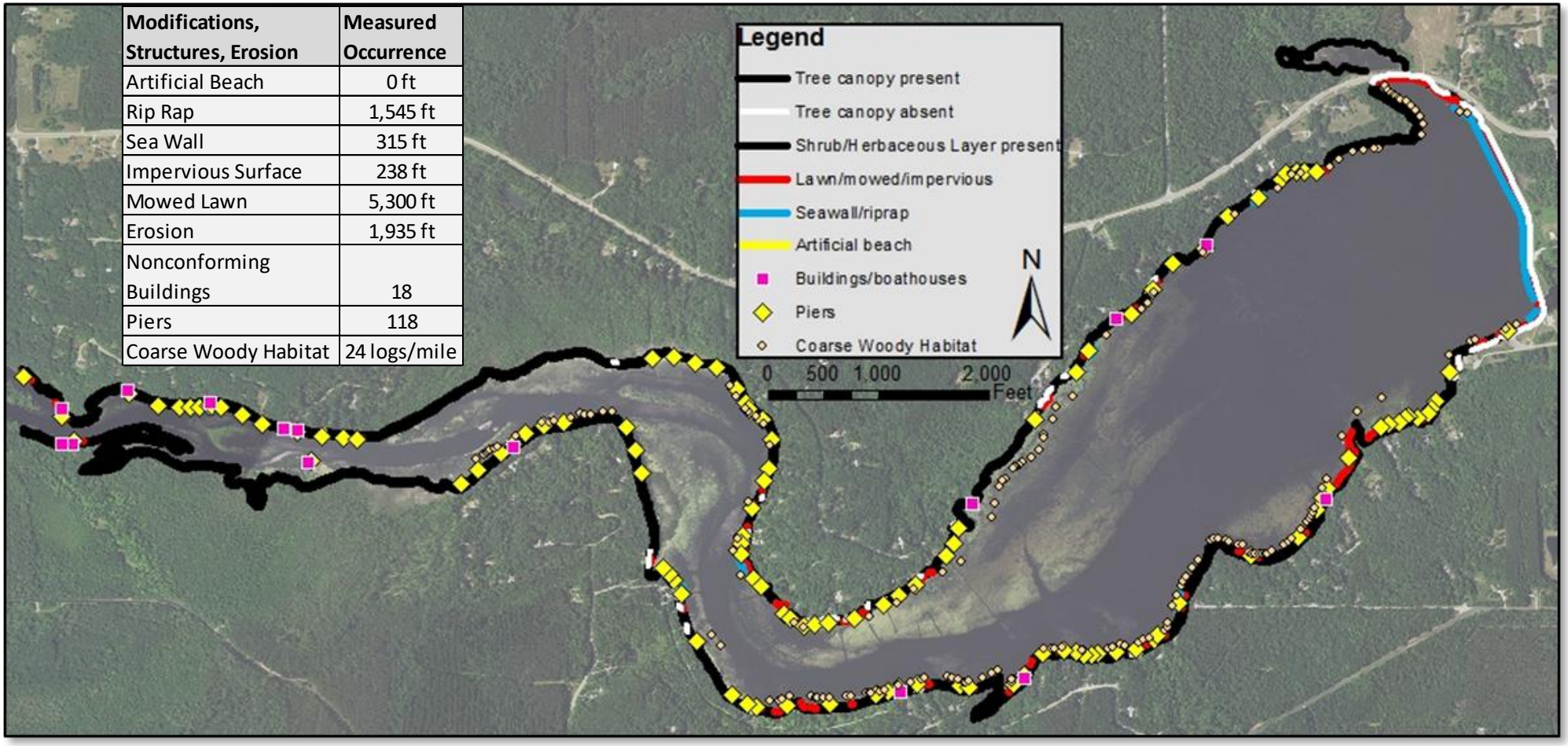
NR 115 Wisc. Adm. Code for Unincorporated Municipalities

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	0 ft
Rip Rap	1,545 ft
Sea Wall	315 ft
Impervious Surface	238 ft
Mowed Lawn	5,300 ft
Erosion	1,935 ft
Nonconforming Buildings	18
Piers	118
Coarse Woody Habitat	24 logs/mile



Machickanee Flowage Shorelands

To better understand the health of Machickanee Flowage, shorelands were evaluated in August 2017. The survey inventoried shoreland vegetation, erosion, riprap, barren ground, seawalls, structures, and docks.

- With 221 lakefront lots, 6,630 feet (17%) of disturbed shoreland is permitted. Based on the 2017 shoreland inventory, 26% (9,964 feet) of Machickanee Flowage's shoreland was disturbed (however, much of this is associated with the dam).
- Machickanee Flowage had average shoreland health compared to other lakes in the study. Some stretches of shoreland are in good shape, but many portions have challenges that should be addressed.

Shorelands

Machickanee Flowage 2017 Shoreland Survey Results			
Total lakefront footage	**# Riparian Lots**	**Total allowable (NR115) disturbed shoreline**	**Measured disturbed shoreline**
38,794 ft	221	6,630 feet or 17%	9,964 feet or 26%

Goal 5. Machickanee Flowage 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, 1,000 feet of disturbed shoreland (about 15 properties) will be restored and 50 fish stick clusters will be installed.

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.	MAA	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.	MAA	UWEX Lakes OCLCD WDNR Healthy Lakes Grants	Ongoing
Encourage those interested in shoreland restorations to contact the OCLCD for available resources.	MAA	OCLCD WDNR Healthy Lakes Grants	Ongoing
Host a speaker/demonstration: "How to restore your shoreline."	MAA	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).	MAA	OCLCD UWEX Lakes-Pat Goggin WDNR Healthy Lakes Grants	2019
Explore purchase of undeveloped shoreland property.	MAA	UWEX Lakes	As available

		Knowles-Nelson Stewardship Fund	
Work with County to design and install a water diversion structure at the boat ramp to keep runoff from flowing directly into lake.	MAA	Oconto County WDNR	2019
Identify landowners for fish stick installations (at least 10% of properties with fish sticks is recommended). Trees can be sourced by identifying other landowners who need a tree removed or purchased using grant funds.	MAA	WDNR-Tammie Paoli	Ongoing

Water Quality

Water Quality

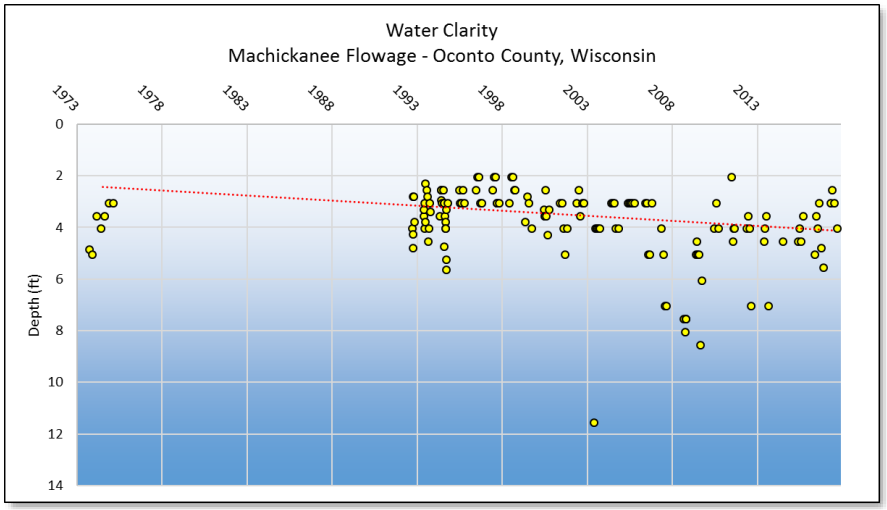
A variety of water chemistry measurements were used to characterize the water quality in Machickanee Flowage. Water quality was assessed during the 2016-2017 lake study and involved a number of measures including temperature, dissolved oxygen, water chemistry, and nutrients (phosphorus and nitrogen). 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 Machickanee Flowage's water quality.

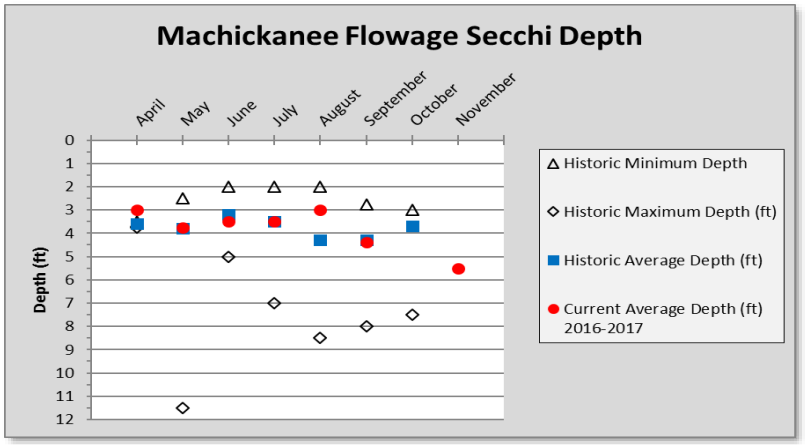
Machickanee Flowage's Water Quality Summary

- ✓ Sufficient **dissolved oxygen** was present in at least the upper 8 feet of water at all times during the study.
- ✓ **Water clarity** ranged from 2.5-5.5 feet (considered poor), which is consistent with historic measurements.
- ✓ Slightly elevated concentrations of **contaminants** were measured during the study. Atrazine was not detected.
- ✓ **Phosphorus** concentrations remained below the Wisconsin state standard of 40 ug/L for shallow drainage lakes throughout the study. Inorganic nitrogen remained well below concentrations that spur algal blooms.

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. Machickanee Flowage has fair to poor water clarity throughout the growing season with the best clarity in the fall. Measurements made during the two-year study were consistent with historic observations and demonstrates a slight increase in clarity over the long term.



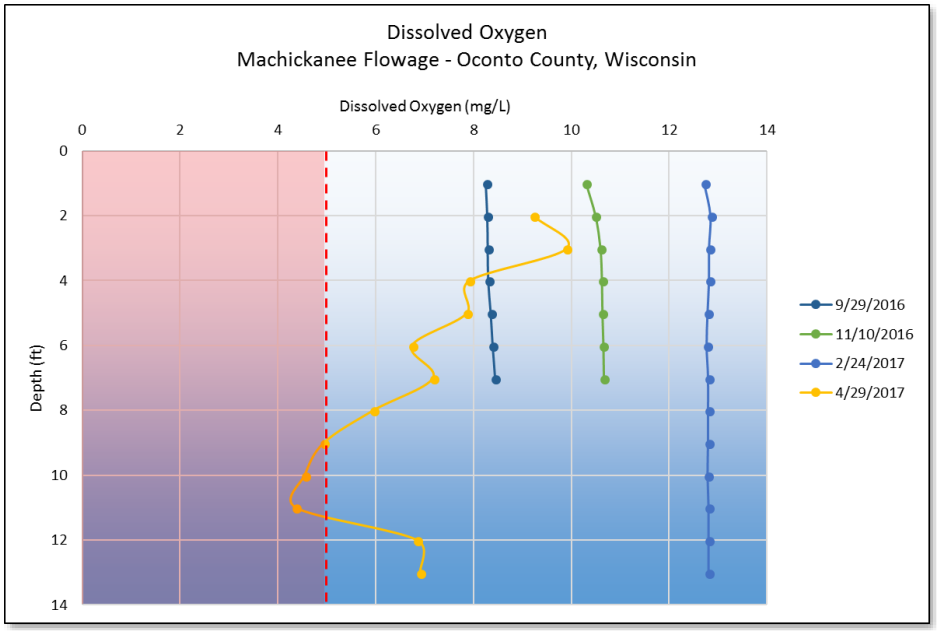


Water Quality

Dissolved Oxygen

Dissolved oxygen is an important measure because most 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, but the decomposition of excessive amounts of dead plants and algae reduces oxygen in the lake.

Machickanee Flowage shows sufficient oxygen to depths of about 8 feet throughout the year. Typical of a shallow, mixed lake, oxygen concentrations are similar with depth.

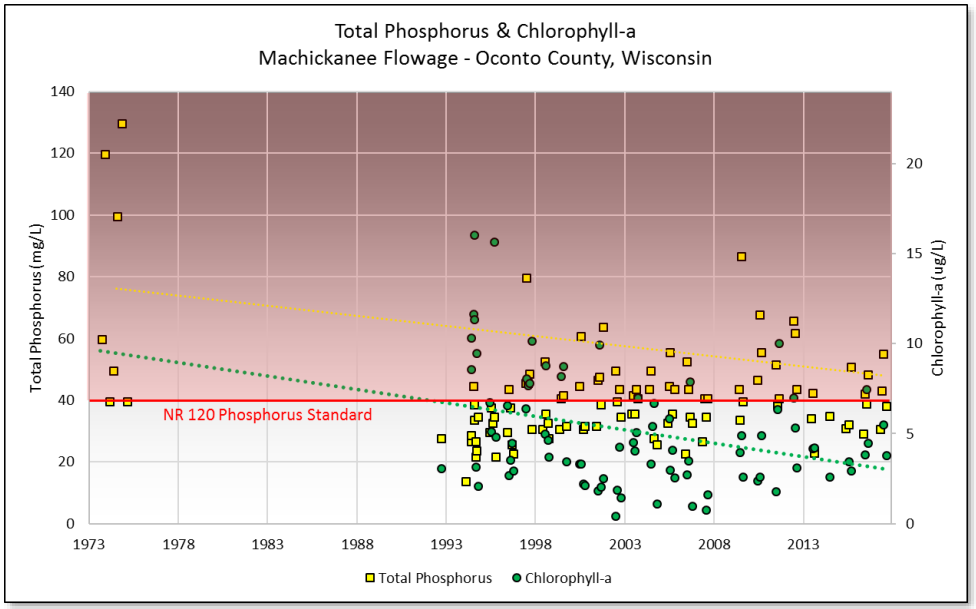


Contaminants

Chloride, sodium, potassium and atrazine 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 usually not detrimental to the aquatic ecosystem, they indicate that sources of contaminants such as road salt, fertilizer, animal waste, septic system or pesticides effluent may be entering the lake from either surface runoff or via groundwater. Measurements of contaminants during the study were considered low or not detected.

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. One pound of



phosphorus can produce up to 500 pounds of algae. NR 120, Wisconsin Administrative Code lists phosphorus limits for different lake types. Shallow drainage lakes such as Machickanee Flowage have a standard of 40 ug/L they must stay below to remain healthy. Phosphorus was routinely above this threshold during the study.

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. The concentration in Machickanee Flowage was 0.5 mg/L in 2017, above this threshold.

Be part of the solution!

Managing nitrogen, phosphorus and soil erosion throughout the Machickanee Flowage 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. Continue to improve water quality in the Machickanee Flowage.

Objective 6.1 Maintain median phosphorus concentrations below 40 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.	MAA	OCLWA WDNR UWEX Lakes	Ongoing, 2019
Refrain from the use of fertilizers. Encourage soil testing to determine if fertilizer is necessary.	MAA	OC UWEX	Ongoing
Encourage the restoration of unmowed vegetation to slow and absorb runoff and pollutants.	MAA	UWEX Lakes	Ongoing
Support the County in its efforts to implement best management practices throughout the watershed to reduce runoff and control erosion.		OCLCD	

Water Quality

Objective 6.1 Continue to track and document water quality in Machickanee Flowage 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.	MAA Trained volunteer	CLMN	3+ times annually-summer
Submit all collected data to WDNR for archival and use by scientists and resource managers.	MAA 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 district, 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 bala… considerations for the lake.

Recreation

According to survey responses, the lake is enjoyed for its scenery, wildlife, (non-motorized) boating and fishing. There is one public boat launch located on the south side of the dam that is owned by Oconto County. Two walk-in access locations are owned by Oconto County and are located off Machickanee Lane and Birchwood Shores Lane on the north side of the flowage.

Dam

The existing Stiles Dam was constructed in 1949, has a head of 19 feet, and is owned by the Oconto Electric Cooperative.

Goal 7. Lake users will be informed and respectful of Machickanee Flowage.

Objective 7.1 Foster and 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.	MAA	TOS OCLWA OC UWEX	Ongoing
Inform residents and consider posting signage of "DNR Hotline" to report unlawful behavior. (1-800-TIP-WDNR)	MAA	WDNR	Ongoing
Create and install signage at boat landing regarding 'No Wake' zones (within 100 feet of shore). Landowners can install a swim dock up to 200 feet from shore to help protect this zone.	MAA	TOS WDNR	2019
Ensure signage is up-to-date and clear. Consider updating sign board/kiosk with basic information on regulations and expectations. This can convey to lake users that there is an active and watchful group on the lake.	MAA	TOS UWEX Lakes	Ongoing

Communication & Organization

LakeKit.net is a network of lake groups helping others to build and maintain websites.

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 lake association, the Town of Stiles, 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 to help them make informed decisions that will result in a healthy Machickanee Flowage 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 8. Increase participation in lake stewardship.

Objective 8.1 Develop opportunities and incentives for active participation in the management of Machickanee Flowage.

Actions	Lead person/group	Resources	Timeline
Maintain a MAA website to provide a common source of communication.	MAA	LakeKit.net OC UWEX	Ongoing
Maintain an email list of shoreland property owners and others interested in Machickanee Flowage.	MAA	OC UWEX	Ongoing
Share minutes (or meeting notes) from annual meeting on website and/or newsletter.	MAA		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.	MAA	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).	MAA		Ongoing
Host an annual meeting to discuss lake management and opportunities for shoreland property owners.	MAA		Annually
Host gatherings to learn about topics identified in this plan. Invite speakers or conduct demonstrations.	MAA	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.	MAA	UWEX Lakes Lake Leaders	Ongoing

Objective 8.2 Maintain good, clear communication between MAA, its residents, clubs, municipalities, agency staff, elected officials and organizations interested in Machickanee Flowage.

Actions	**Lead person/group**	**Resources**	**Timeline**
Network with other lake groups in Oconto County by having Machickanee Flowage represented at OCLWA.	MAA	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.	MAA	UWEX Lakes	Annually in April
Consider nominating an individual from Machickanee Flowage for the Lake Leaders Institute. Encourage members of OCLWA to attend Lake Leaders Institute.	MAA	UWEX Lakes	2020

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 9. Review plan annually and update as needed.

Objective 9.1 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.	MAA		Annually
Formally update this plan every 5 years.	MAA	OC UWEX UWEX Lakes WDNR	2023

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APPENDICES

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: Tammie Paoli
Wisconsin Department of Natural Resources
101 N. Ogden Road, Peshtigo, WI 54157
Phone: 715-582-5052
E-mail: Tammie.Paoli@wisconsin.gov

Website: http://dnr.wi.gov/org/land/facilities/boataccess/

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

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: Tammie Paoli
Wisconsin Department of Natural Resources
101 N. Ogden Road, Peshtigo, WI 54157
Phone: 715-582-5052
E-mail: Tammie.Paoli@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/

Appendices-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

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: Tammie Paoli
Wisconsin Department of Natural Resources
101 N. Ogden Road, Peshtigo, WI 54157
Phone: 715-582-5052
E-mail: Tammie.Paoli@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)

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

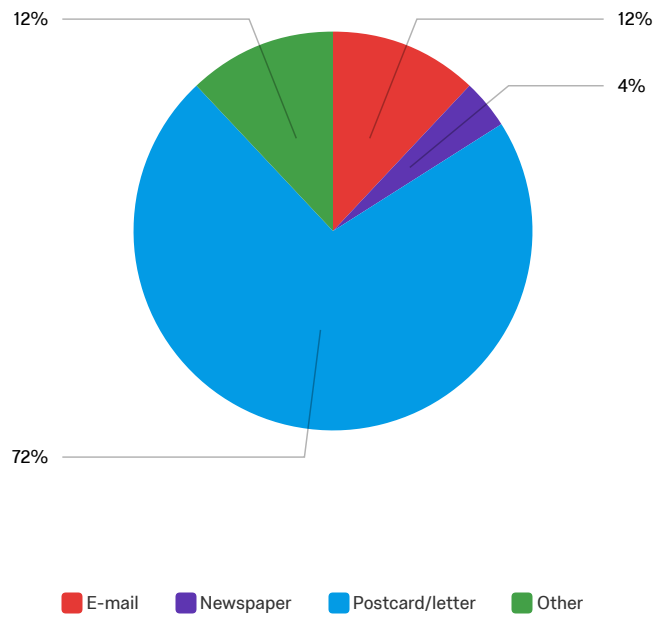
Appendix C. Lake User Survey Results

Default Report

Machickanee Flowage Survey - Oconto County Lakes Project

October 4, 2018 8:29 AM MDT

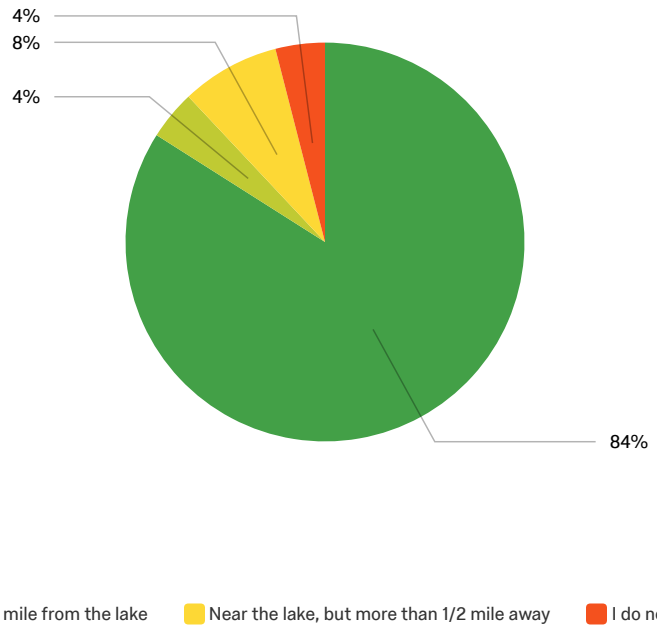
Q2 - How did you hear about this survey?



#	Field		Choice Count
1	E-mail	12.00%	3
2	Newspaper	4.00%	1
3	Postcard/letter	72.00%	18
4	Other	12.00%	3
			25

Showing Rows: 1 - 5 Of 5

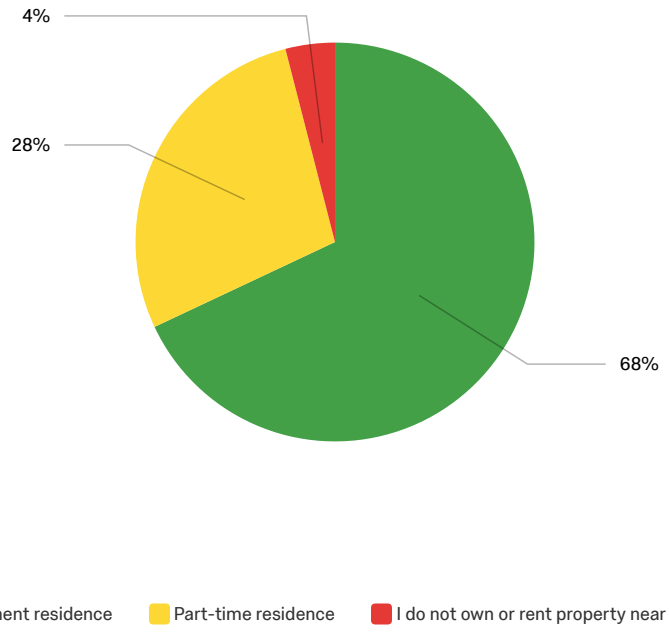
Q3 - Do you own or rent property...



#	Field		Choice Count
1	Around the lake	84.00%	21
2	Less than 1/2 mile from the lake	4.00%	1
3	Near the lake, but more than 1/2 mile away	8.00%	2
4	I do not own or rent property near the lake	4.00%	1
			25

Showing Rows: 1 - 5 Of 5

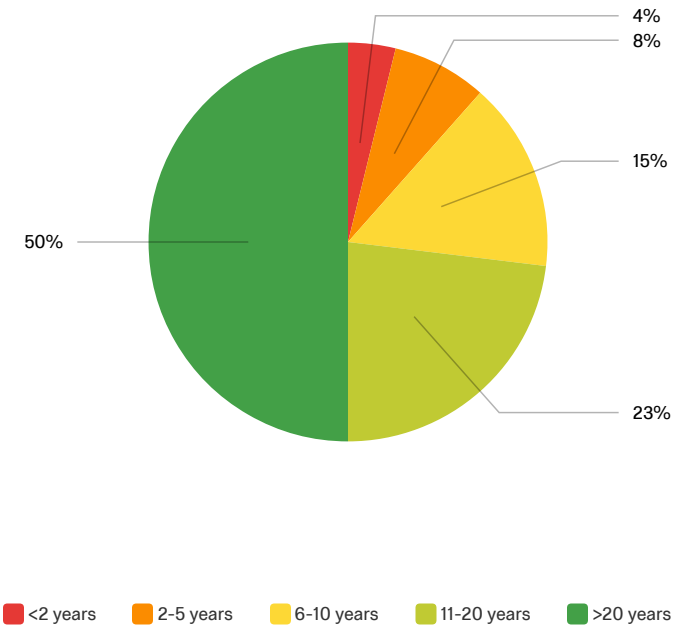
Q4 - If you own or rent property near the lake, is this property your...



#	Field	Choice Count	
1	Permanent residence	68.00%	17
2	Part-time residence	28.00%	7
3	I do not own or rent property near the lake	4.00%	1
			25

Showing Rows: 1 - 4 Of 4

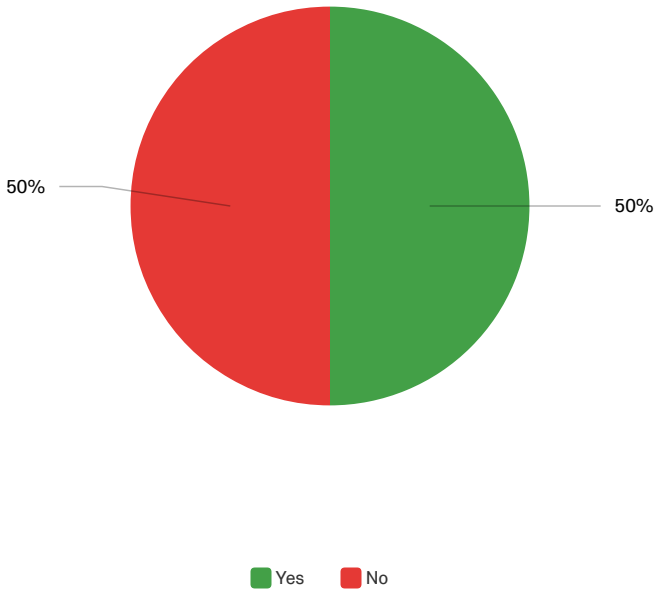
Q5 - How long have you lived on, visited or recreated on the lake?



#	Field	Choice Count	
1	<2 years	3.85%	1
2	2-5 years	7.69%	2
3	6-10 years	15.38%	4
4	11-20 years	23.08%	6
5	>20 years	50.00%	13
			26

Showing Rows: 1 - 6 Of 6

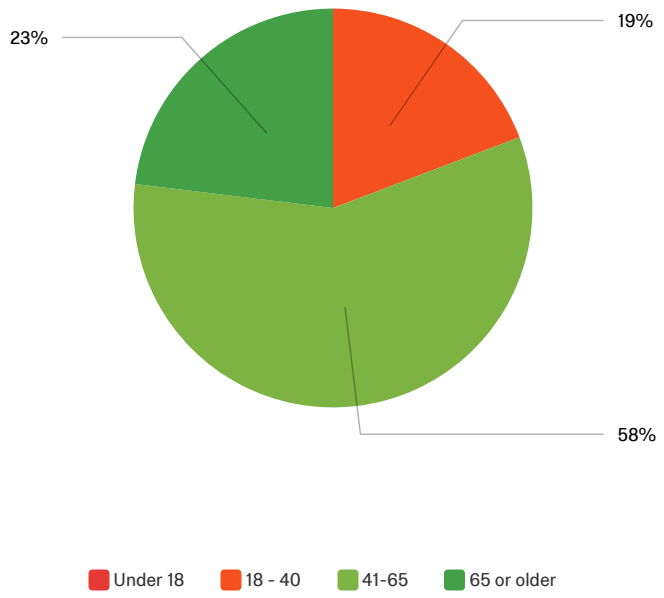
Q6 - Are you a member of the Machickanee Advancement Association?



#	Field	Choice Count
1	Yes	50.00% 12
2	No	50.00% 12
		24

Showing Rows: 1 - 3 Of 3

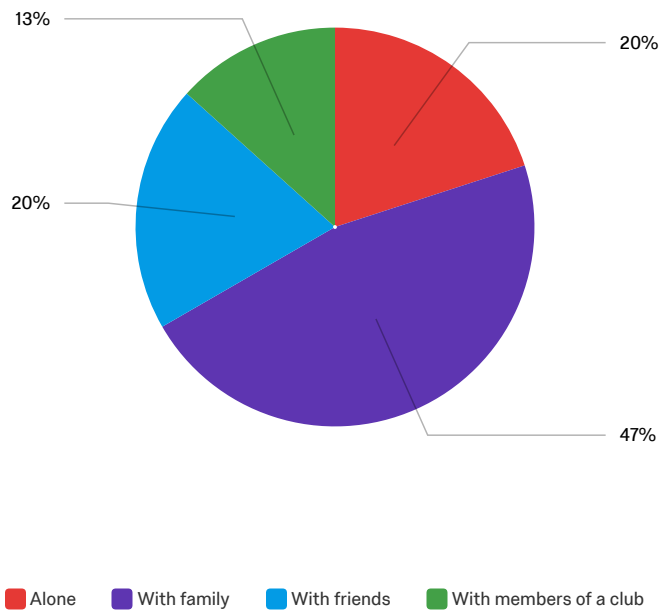
Q8 - Which category below includes your age?



#	Field		Choice Count
1	Under 18	0.00%	0
2	18 - 40	19.23%	5
3	41-65	57.69%	15
4	65 or older	23.08%	6
			26

Showing Rows: 1 - 5 Of 5

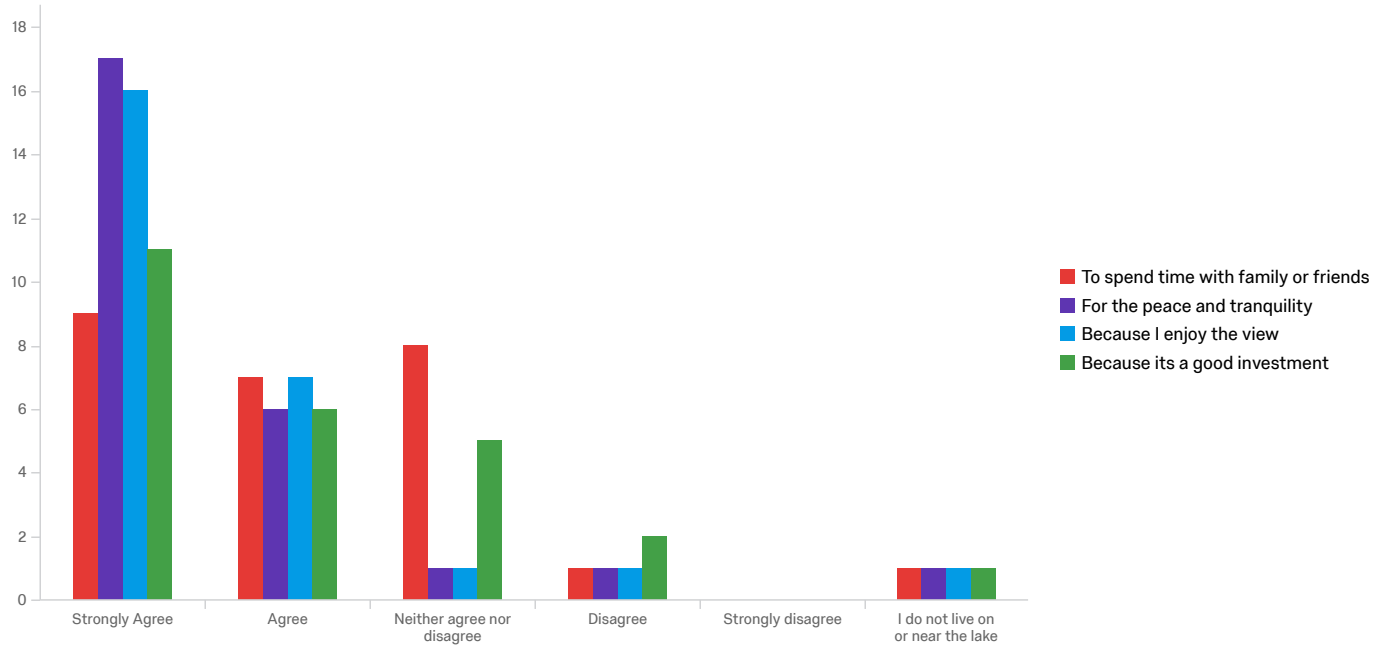
Q9 - When you visit Machickanee Flowage, are you typically ...(check all that apply)



#	Field	Choice Count	
1	Alone	20.00%	9
2	With family	46.67%	21
3	With friends	20.00%	9
4	With members of a club	13.33%	6
			45

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	34.62% 9	26.92% 7	30.77% 8	3.85% 1	0.00% 0	3.85% 1	26
2	For the peace and tranquility	65.38% 17	23.08% 6	3.85% 1	3.85% 1	0.00% 0	3.85% 1	26
3	Because I enjoy the view	61.54% 16	26.92% 7	3.85% 1	3.85% 1	0.00% 0	3.85% 1	26
4	Because its a good investment	44.00% 11	24.00% 6	20.00% 5	8.00% 2	0.00% 0	4.00% 1	25

Showing Rows: 1 - 4 Of 4

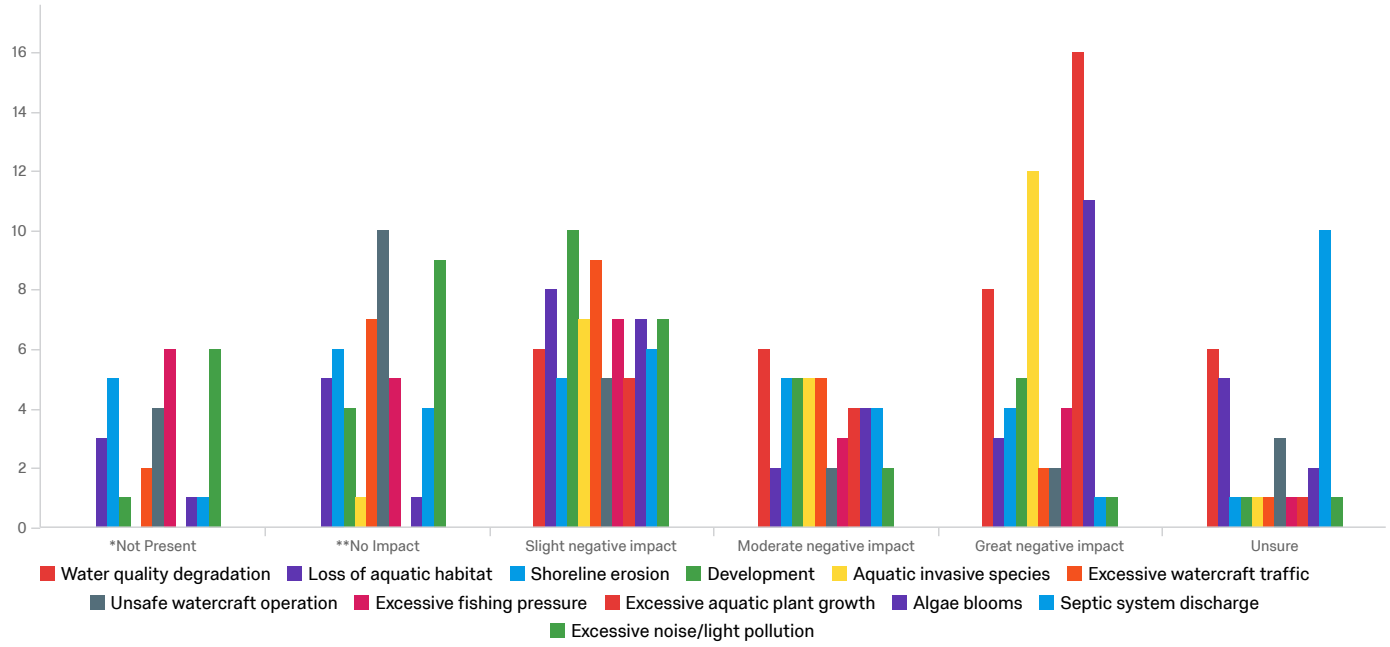
Q11 - What do you value most about Machickanee Flowage?

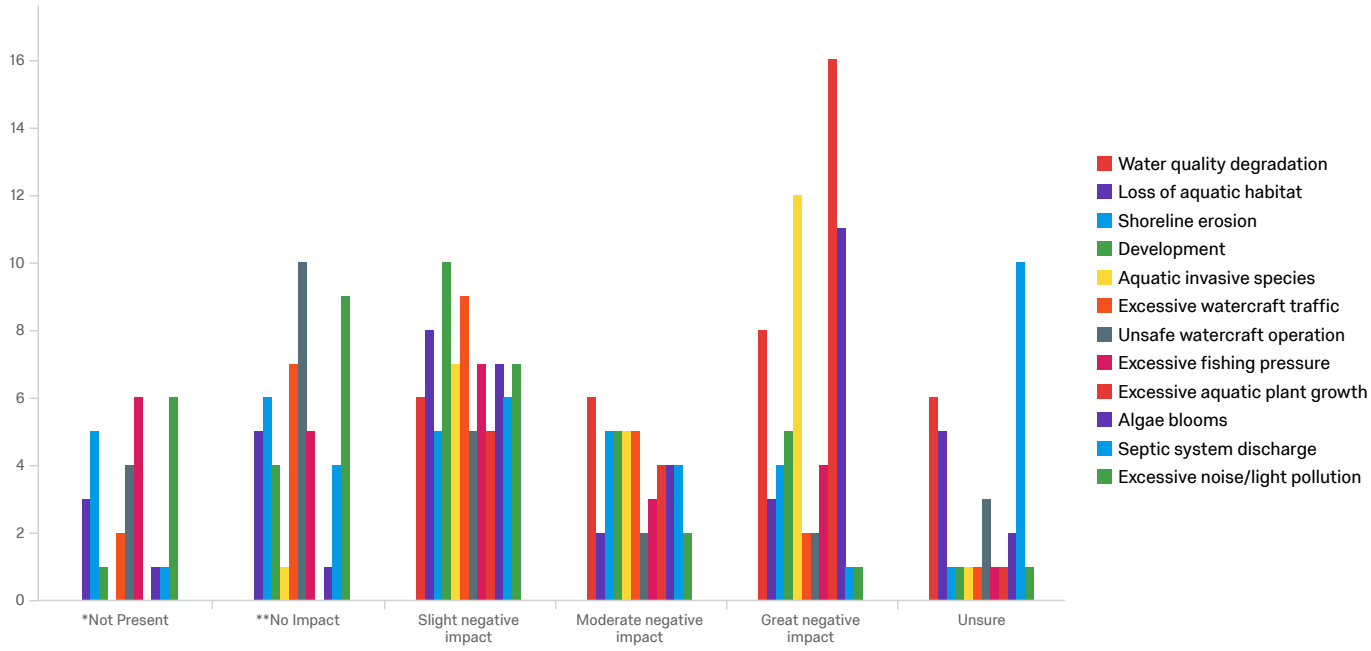
What do you value most about Machickanee Flowage?
Duck hunting, watch the wildlife, view
Boating and fishing in my back yard. Excellent views and some good swimming hole.
Close to our main residence in Green Bay with up north atmosphere.
Close proximity to Green Bay.
The water.
The beauty when it is not full of weeds and stinky algae.
Fairly quiet as far as boat traffic. Beautiful for fishing, swimming, birdwatching, etc. Shore are clean of garbage.
Fishing, boating, lakeshore, live duch habitat.
Close to Green Bay
Good fishing after the clean-up of the water from the paper mill
Solitude
It is not over-populated and often very few people on the water.
Fishing
Its close to home.
Clean water
Low water traffic
Some of the above, more natural, quite habitat, can see wildlife, can relax, joy to live in this kind of environment despite the mosquitoes & biting flies:-)
It is a nice waterway close to home (Appleton).
Recreational opportunities

Showing records 1 - 19 of 19

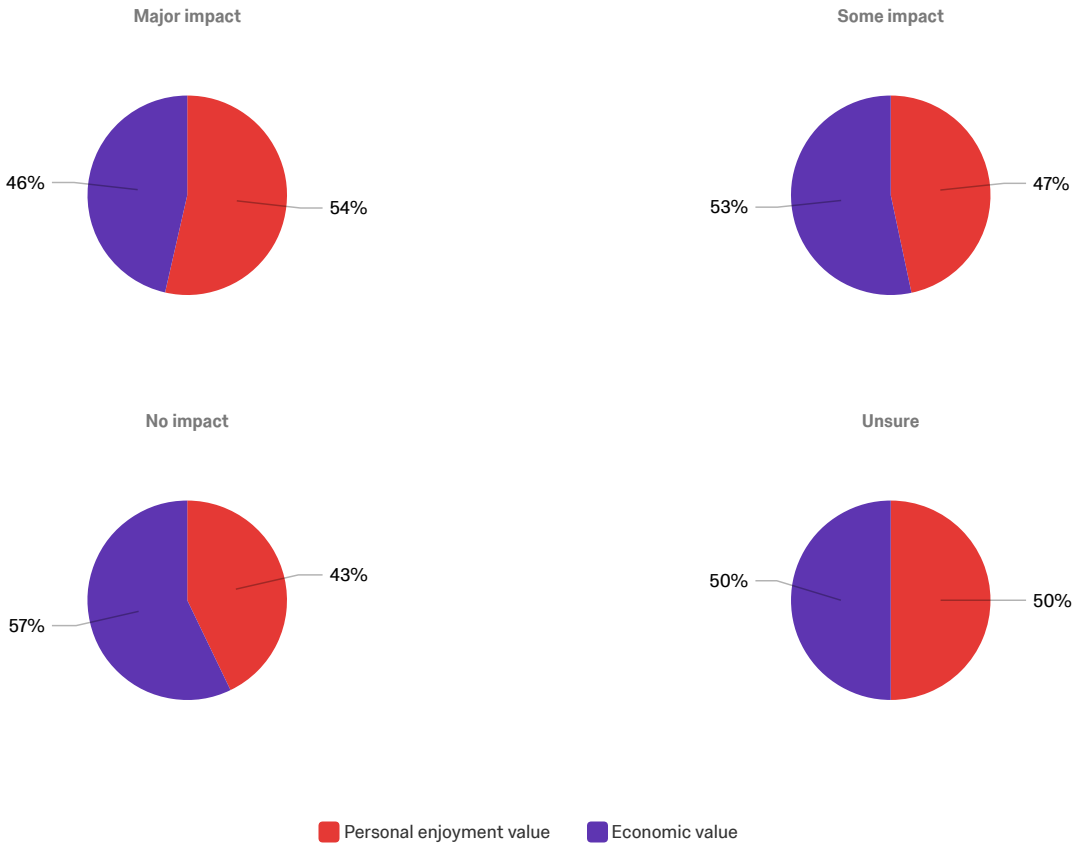
Q42 - Below is a list of negative impacts commonly found in Wisconsin lakes. To what level do you believe each of the following factors may be impacting Machickanee Flowage?

*Not Present means that you believe the issue does not exist on Machickanee Flowage**No Impact means that the issue may exist, but is not negatively impacting Machickanee Flowage




16
14
12
10
8
6
4
2
0
*Not Present
**No Impact
Slight negative impact
Moderate negative impact
Great negative impact
Unsure
Water quality degradation
Loss of aquatic habitat
Shoreline erosion
Development
Aquatic invasive species
Excessive watercraft traffic
Unsafe watercraft operation
Excessive fishing pressure
Excessive aquatic plant growth
Algae blooms
Septic system discharge
Excessive noise/light pollution

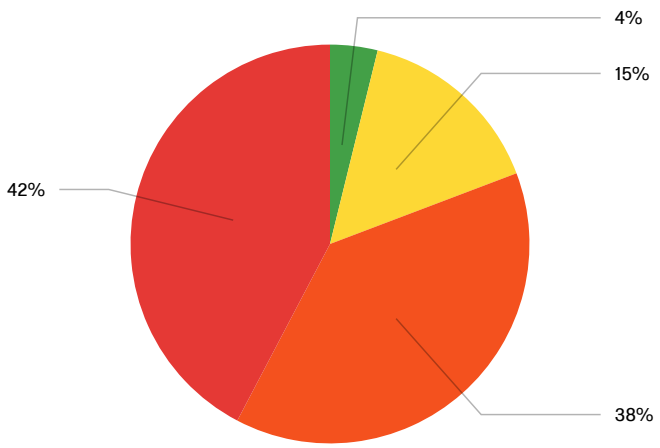
Q16 - How much impact does the water quality of Machickanee Flowage have on the following?

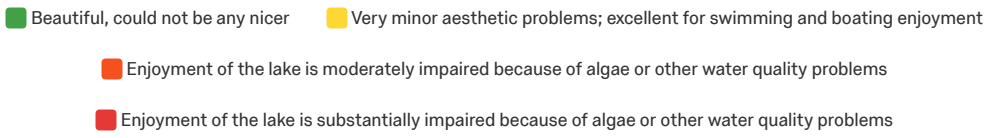


#	Field	Major impact	Some impact	No impact	Unsure	Total
1	Personal enjoyment value	57.69% 15	26.92% 7	11.54% 3	3.85% 1	26
2	Economic value	50.00% 13	30.77% 8	15.38% 4	3.85% 1	26

Showing Rows: 1 - 2 Of 2

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

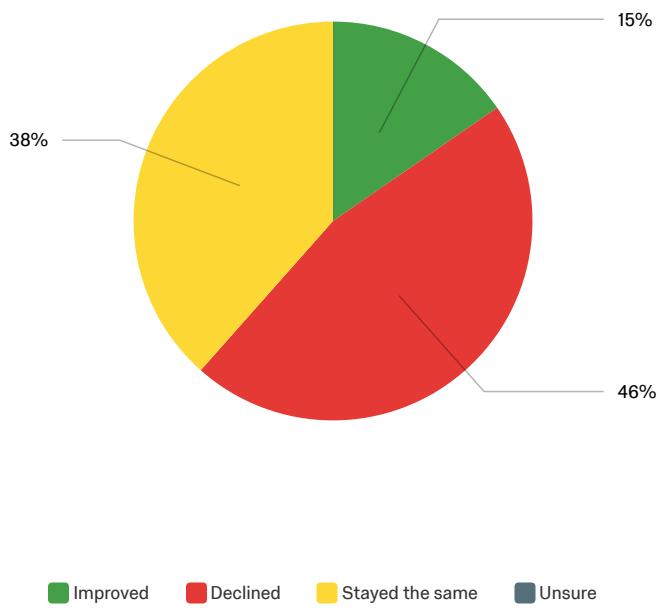




#	Field	Choice Count	
1	Beautiful, could not be any nicer	3.85%	1
2	Very minor aesthetic problems; excellent for swimming and boating enjoyment	15.38%	4
3	Enjoyment of the lake is moderately impaired because of algae or other water quality problems	38.46%	10
4	Enjoyment of the lake is substantially impaired because of algae or other water quality problems	42.31%	11
			26

Showing Rows: 1 - 5 Of 5

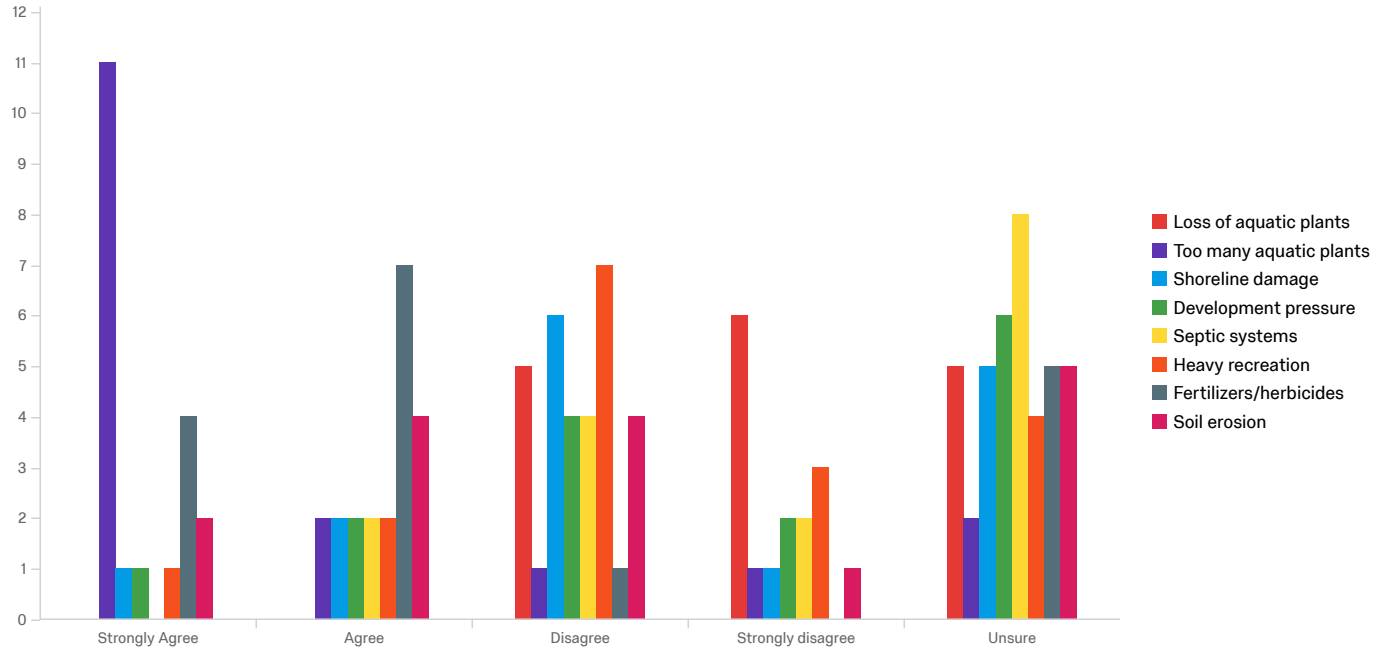
Q18 - During the time that you have lived on, visited or recreated on the lake, how would you say the water quality has changed?



#	Field	Choice Count	
1	Improved	15.38%	4
2	Declined	46.15%	12
3	Stayed the same	38.46%	10
4	Unsure	0.00%	0
			26

Showing Rows: 1 - 5 Of 5

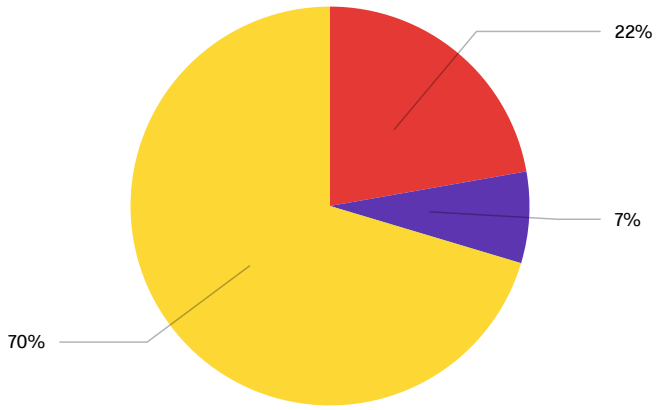
Q19 - If you think it has declined, what, in your opinion, are the primary causes?



#	Field	Strongly Agree	Agree	Disagree	Strongly disagree	Unsure	Total
1	Loss of aquatic plants	0.00% 0	0.00% 0	31.25% 5	37.50% 6	31.25% 5	16
2	Too many aquatic plants	64.71% 11	11.76% 2	5.88% 1	5.88% 1	11.76% 2	17
3	Shoreline damage	6.67% 1	13.33% 2	40.00% 6	6.67% 1	33.33% 5	15
4	Development pressure	6.67% 1	13.33% 2	26.67% 4	13.33% 2	40.00% 6	15
5	Septic systems	0.00% 0	12.50% 2	25.00% 4	12.50% 2	50.00% 8	16
6	Heavy recreation	5.88% 1	11.76% 2	41.18% 7	17.65% 3	23.53% 4	17
7	Fertilizers/herbicides	23.53% 4	41.18% 7	5.88% 1	0.00% 0	29.41% 5	17
8	Soil erosion	12.50% 2	25.00% 4	25.00% 4	6.25% 1	31.25% 5	16

Showing Rows: 1 - 8 Of 8

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

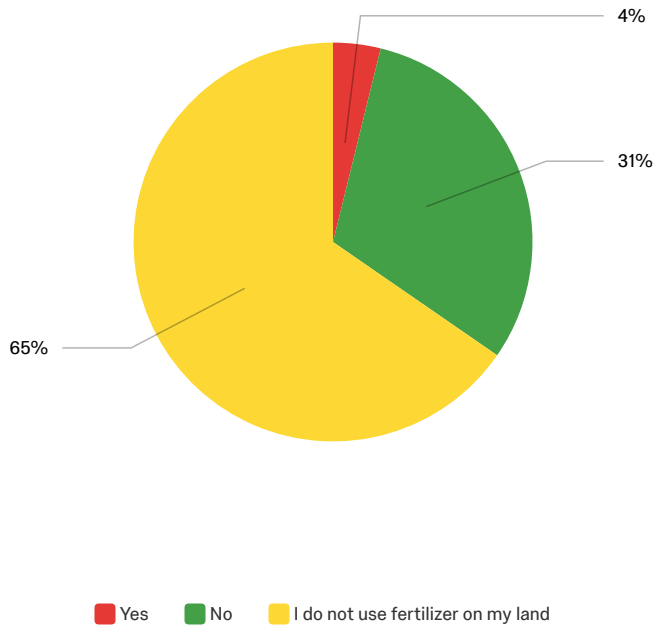


Lawn Garden Agricultural fields Other I do not use fertilizers or herbicides on my land

#	Field	Choice Count	
1	Lawn	22.22%	6
2	Garden	7.41%	2
3	Agricultural fields	0.00%	0
4	Other	0.00%	0
5	I do not use fertilizers or herbicides on my land	70.37%	19
			27

Showing Rows: 1 - 6 Of 6

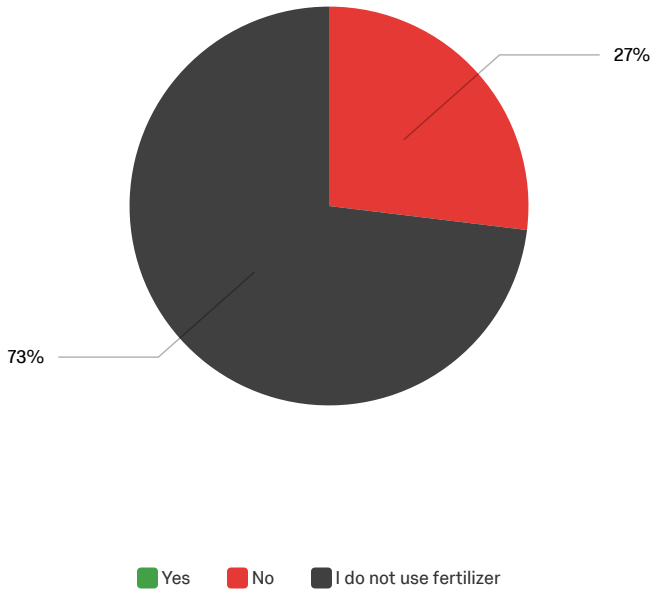
Q21 - Do you use fertilizer that contains phosphorus?



#	Field	Choice Count	
1	Yes	3.85%	1
2	No	30.77%	8
3	I do not use fertilizer on my land	65.38%	17
			26

Showing Rows: 1 - 4 Of 4

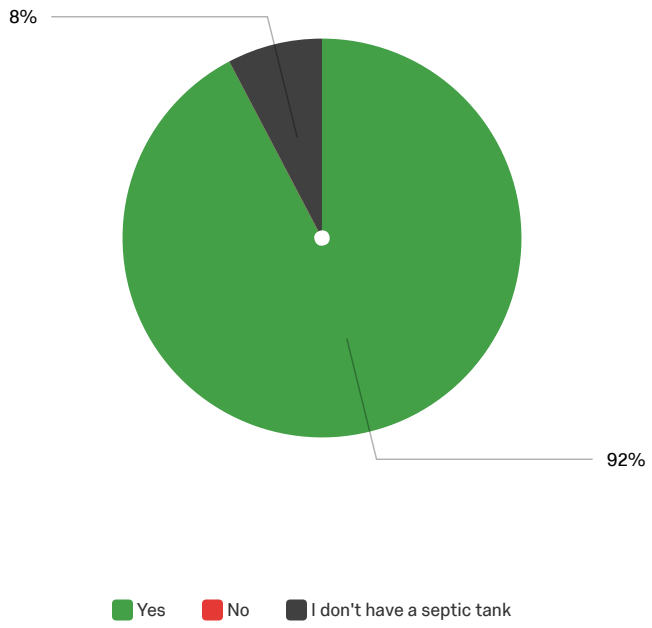
Q23 - Have you had your soil tested before using fertilizer?



#	Field	Choice Count	
1	Yes	0.00%	0
2	No	26.92%	7
3	I do not use fertilizer	73.08%	19
			26

Showing Rows: 1 - 4 Of 4

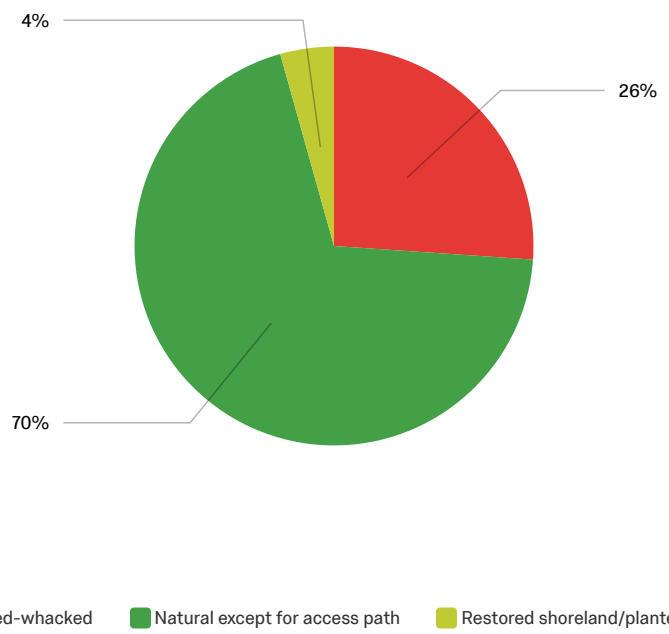
Q22 - Do you have your septic tank pumped regularly (at least every 3 years)?



#	Field		Choice Count
1	Yes	92.31%	24
2	No	0.00%	0
3	I don't have a septic tank	7.69%	2
			26

Showing Rows: 1 - 4 Of 4

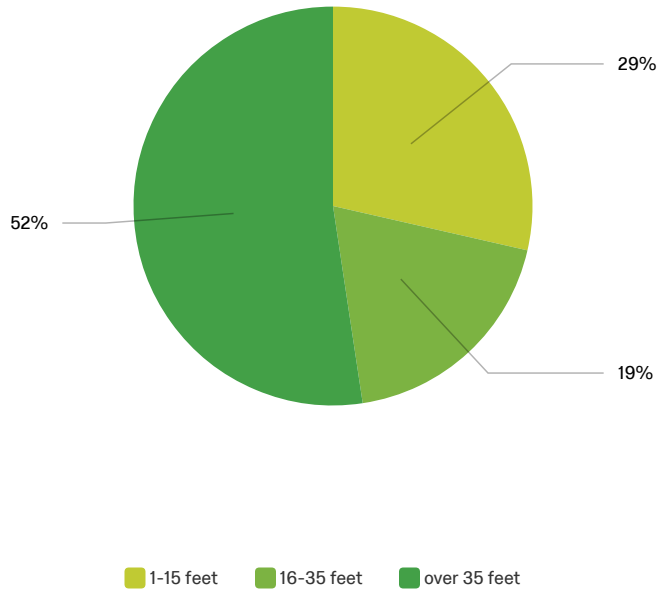
Q25 - How do you currently manage the majority of your property within 35 feet of the lake?



#	Field		Choice Count
1	Mowed or weed-whacked	26.09%	6
2	Natural except for access path	69.57%	16
3	Restored shoreland/planted/landscaped	4.35%	1
			23

Showing Rows: 1 - 4 Of 4

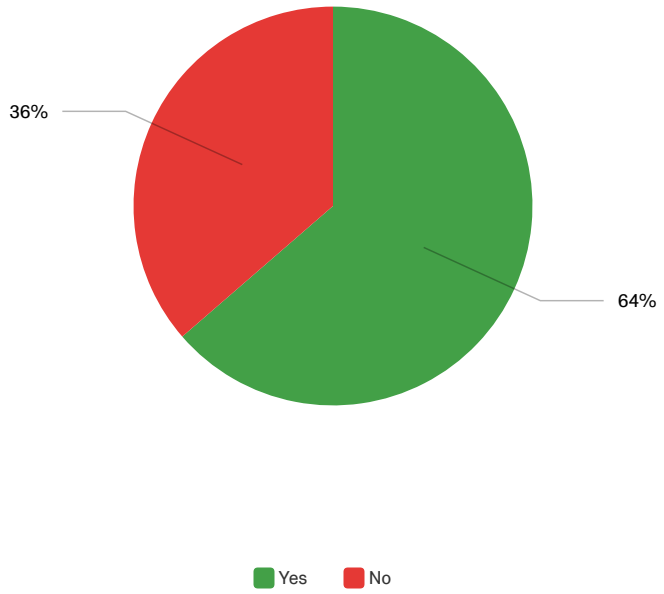
Q26 - If you have unmowed shoreland vegetation, how far inland from the water's edge does it extend?



#	Field	Choice Count	
1	1-15 feet	28.57%	6
2	16-35 feet	19.05%	4
3	over 35 feet	52.38%	11
			21

Showing Rows: 1 - 4 Of 4

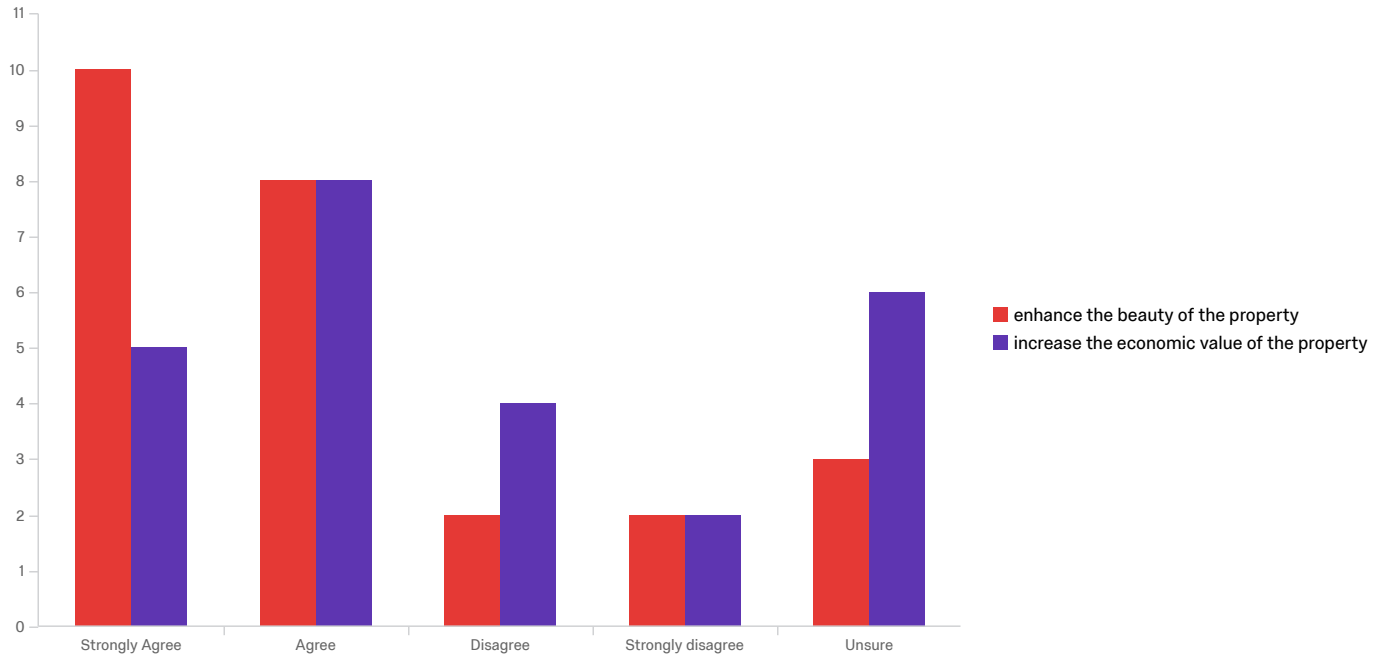
Q31 - Do you have woody structure such as fallen trees or large branches at the water's edge along your property?



#	Field	Choice Count
1	Yes	63.64% 14
2	No	36.36% 8
		22

Showing Rows: 1 - 3 Of 3

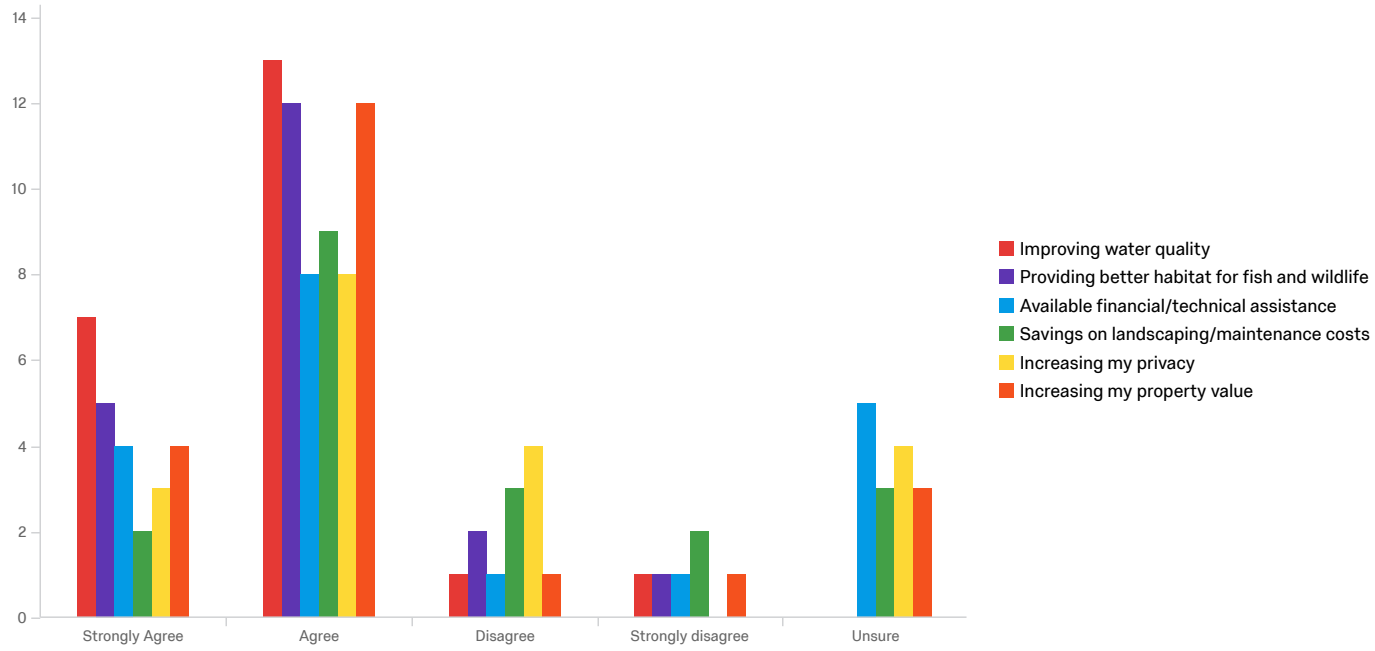
Q27 - In your opinion, does shoreland vegetation...



#	Field	Strongly Agree	Agree	Disagree	Strongly disagree	Unsure	Total
1	enhance the beauty of the property	40.00% 10	32.00% 8	8.00% 2	8.00% 2	12.00% 3	25
2	increase the economic value of the property	20.00% 5	32.00% 8	16.00% 4	8.00% 2	24.00% 6	25

Showing Rows: 1 - 2 Of 2

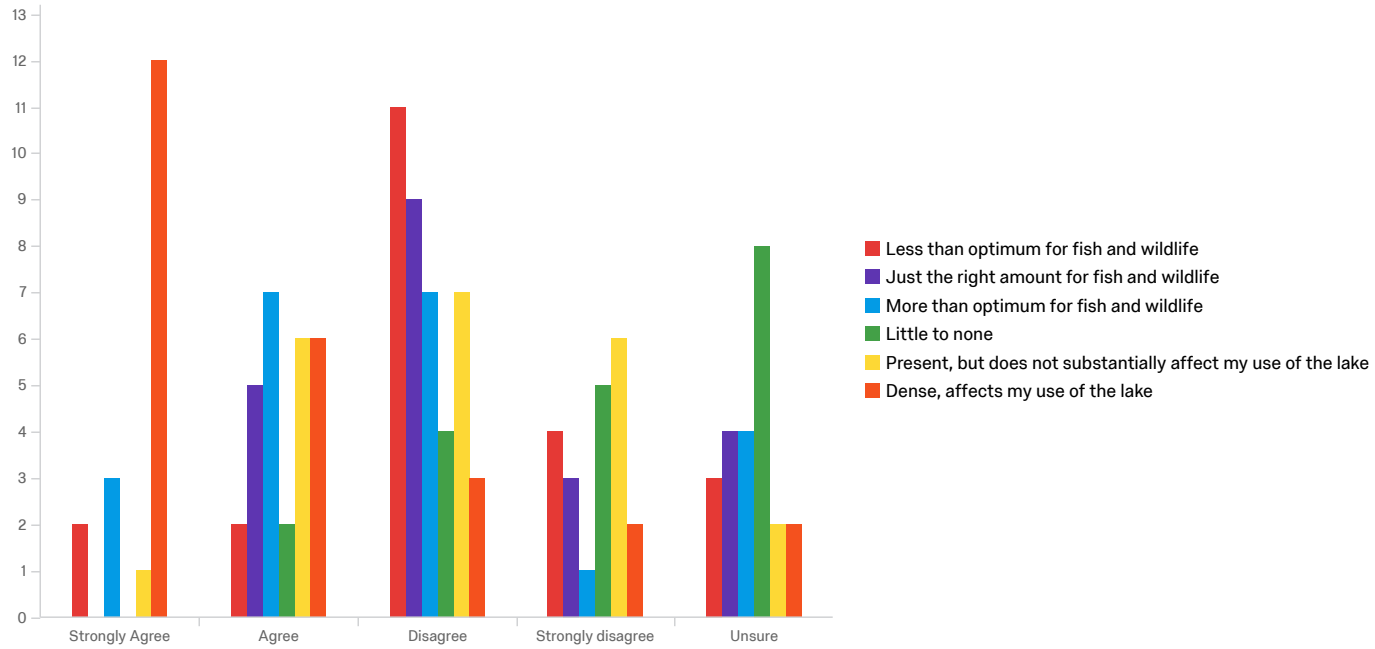
Q28 - What might motivate you to change how you manage your shoreland?



#	Field	Strongly Agree	Agree	Disagree	Strongly disagree	Unsure	Total
1	Improving water quality	31.82% 7	59.09% 13	4.55% 1	4.55% 1	0.00% 0	22
2	Providing better habitat for fish and wildlife	25.00% 5	60.00% 12	10.00% 2	5.00% 1	0.00% 0	20
3	Available financial/technical assistance	21.05% 4	42.11% 8	5.26% 1	5.26% 1	26.32% 5	19
4	Savings on landscaping/maintenance costs	10.53% 2	47.37% 9	15.79% 3	10.53% 2	15.79% 3	19
5	Increasing my privacy	15.79% 3	42.11% 8	21.05% 4	0.00% 0	21.05% 4	19
6	Increasing my property value	19.05% 4	57.14% 12	4.76% 1	4.76% 1	14.29% 3	21

Showing Rows: 1 - 6 Of 6

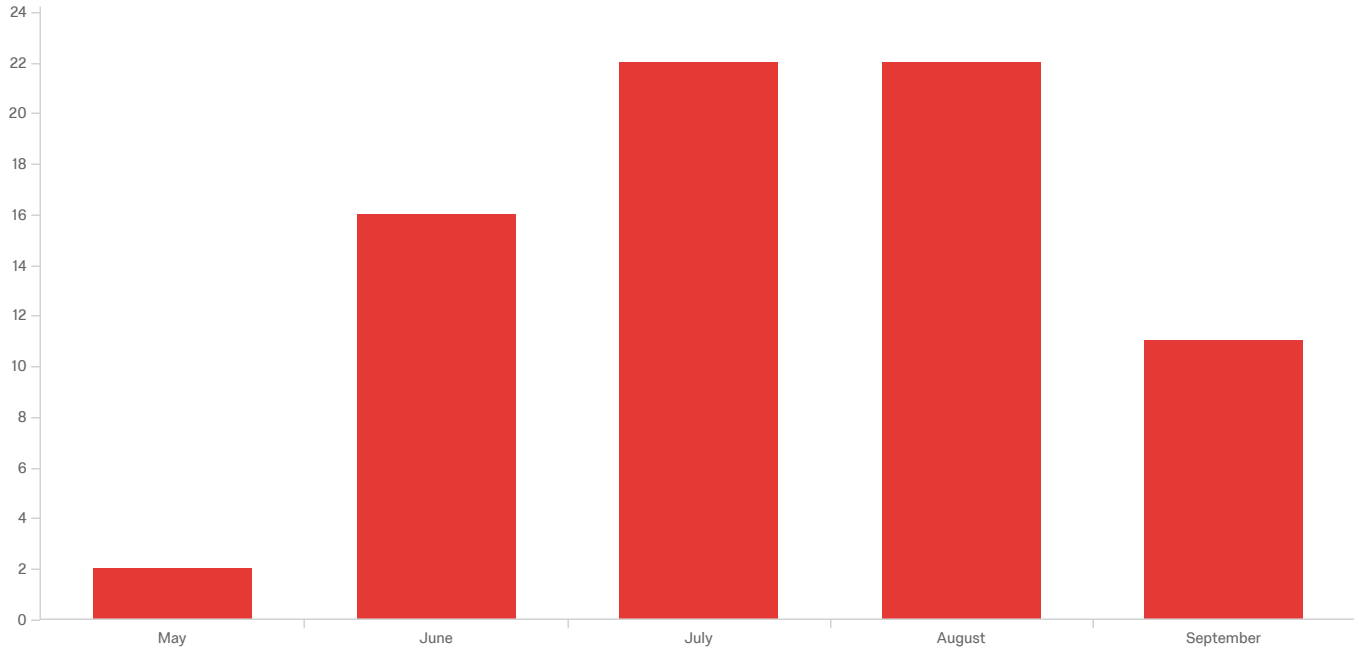
Q32 - In your opinion, which statement best describes the amount of aquatic plant growth in Machickanee Flowage?



#	Field	Strongly Agree	Agree	Disagree	Strongly disagree	Unsure	Total
1	Less than optimum for fish and wildlife	9.09% 2	9.09% 2	50.00% 11	18.18% 4	13.64% 3	22
2	Just the right amount for fish and wildlife	0.00% 0	23.81% 5	42.86% 9	14.29% 3	19.05% 4	21
3	More than optimum for fish and wildlife	13.64% 3	31.82% 7	31.82% 7	4.55% 1	18.18% 4	22
4	Little to none	0.00% 0	10.53% 2	21.05% 4	26.32% 5	42.11% 8	19
5	Present, but does not substantially affect my use of the lake	4.55% 1	27.27% 6	31.82% 7	27.27% 6	9.09% 2	22
6	Dense, affects my use of the lake	48.00% 12	24.00% 6	12.00% 3	8.00% 2	8.00% 2	25

Showing Rows: 1 - 6 Of 6

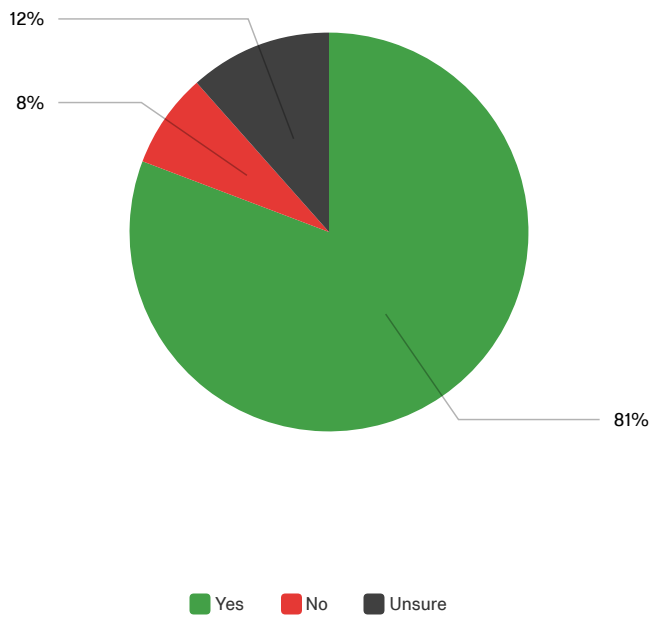
Q33 - If you think the plant growth in Machickanee Flowage is dense, what month(s) do the problems occur? Check all that apply.



#	Field	Choice Count	
1	May	2.74%	2
2	June	21.92%	16
3	July	30.14%	22
4	August	30.14%	22
5	September	15.07%	11
			73

Showing Rows: 1 - 6 Of 6

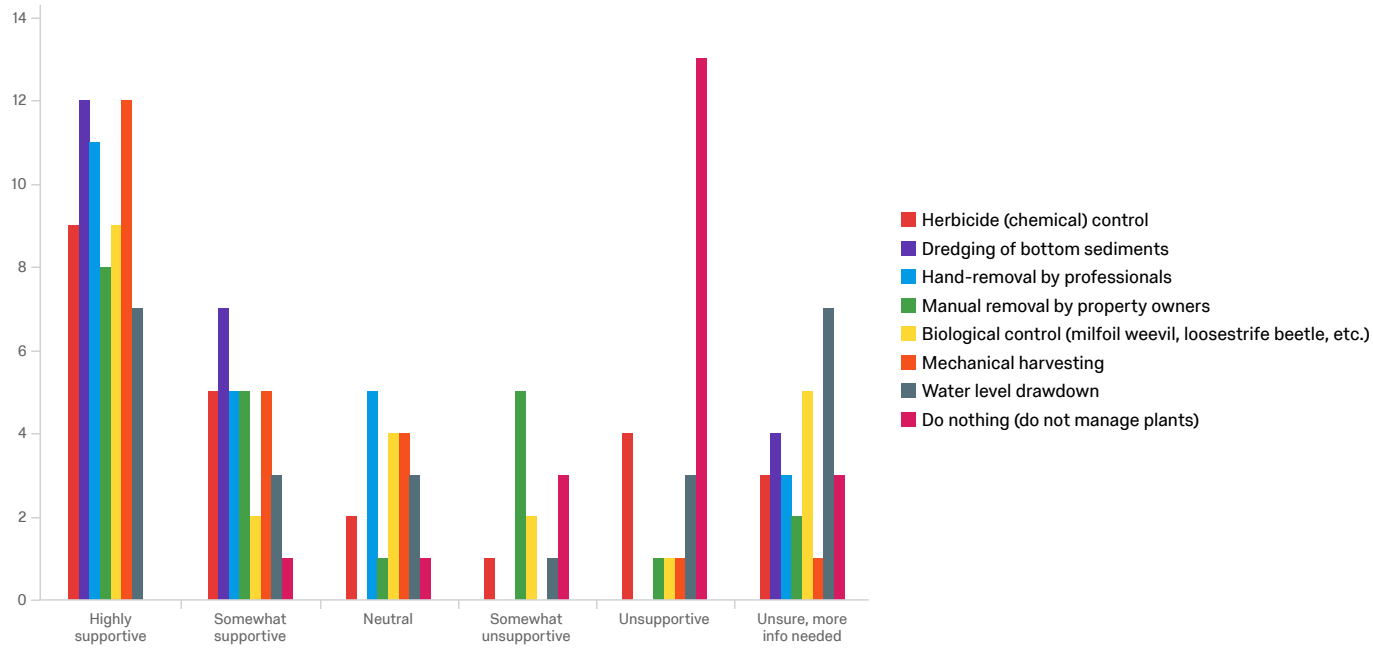
Q34 - Do you believe aquatic plant control is needed on Machickanee Flowage?



#	Field	Choice Count	
1	Yes	80.77%	21
2	No	7.69%	2
3	Unsure	11.54%	3
			26

Showing Rows: 1 - 4 Of 4

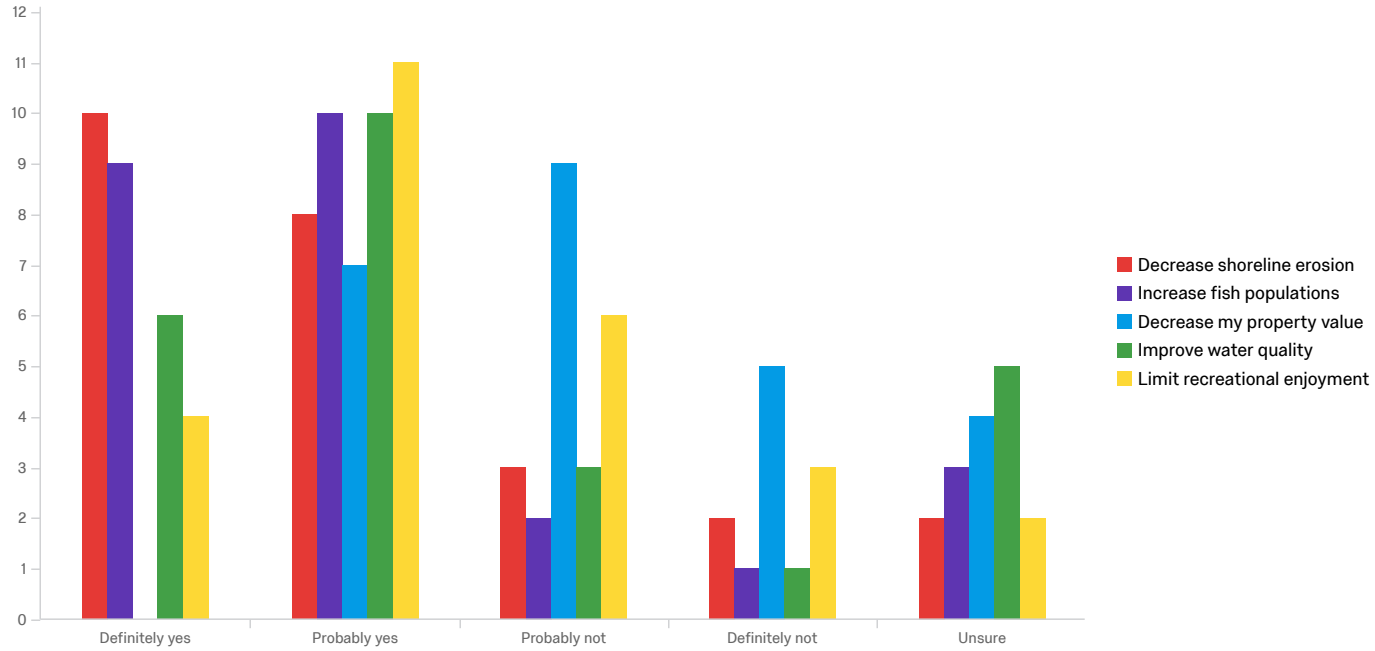
Q35 - What is your level of support for the responsible use of the following techniques to manage aquatic plants on Machickanee Flowage?



#	Field	Highly supportive	Somewhat supportive	Neutral	Somewhat unsupportive	Unsupportive	Unsure, more info needed	Total
1	Herbicide (chemical) control	37.50% 9	20.83% 5	8.33% 2	4.17% 1	16.67% 4	12.50% 3	24
2	Dredging of bottom sediments	52.17% 12	30.43% 7	0.00% 0	0.00% 0	0.00% 0	17.39% 4	23
3	Hand-removal by professionals	45.83% 11	20.83% 5	20.83% 5	0.00% 0	0.00% 0	12.50% 3	24
4	Manual removal by property owners	36.36% 8	22.73% 5	4.55% 1	22.73% 5	4.55% 1	9.09% 2	22
5	Biological control (milfoil weevil, loosestrife beetle, etc.)	39.13% 9	8.70% 2	17.39% 4	8.70% 2	4.35% 1	21.74% 5	23
6	Mechanical harvesting	52.17% 12	21.74% 5	17.39% 4	0.00% 0	4.35% 1	4.35% 1	23
7	Water level drawdown	29.17% 7	12.50% 3	12.50% 3	4.17% 1	12.50% 3	29.17% 7	24
8	Do nothing (do not manage plants)	0.00% 0	4.76% 1	4.76% 1	14.29% 3	61.90% 13	14.29% 3	21

Showing Rows: 1 - 8 Of 8

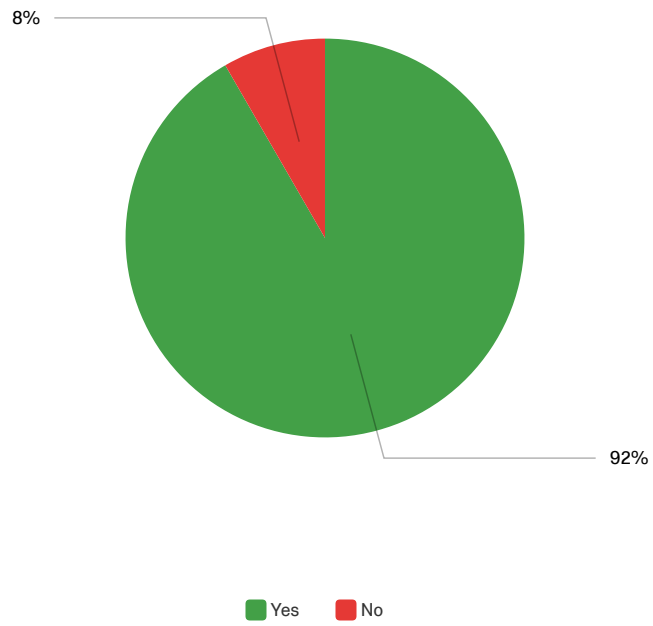
Q36 - In your opinion, does establishing or maintaining native vegetation in the water in the near-shore area...



#	Field	Definitely yes	Probably yes	Probably not	Definitely not	Unsure	Total
1	Decrease shoreline erosion	40.00% 10	32.00% 8	12.00% 3	8.00% 2	8.00% 2	25
2	Increase fish populations	36.00% 9	40.00% 10	8.00% 2	4.00% 1	12.00% 3	25
3	Decrease my property value	0.00% 0	28.00% 7	36.00% 9	20.00% 5	16.00% 4	25
4	Improve water quality	24.00% 6	40.00% 10	12.00% 3	4.00% 1	20.00% 5	25
5	Limit recreational enjoyment	15.38% 4	42.31% 11	23.08% 6	11.54% 3	7.69% 2	26

Showing Rows: 1 - 5 Of 5

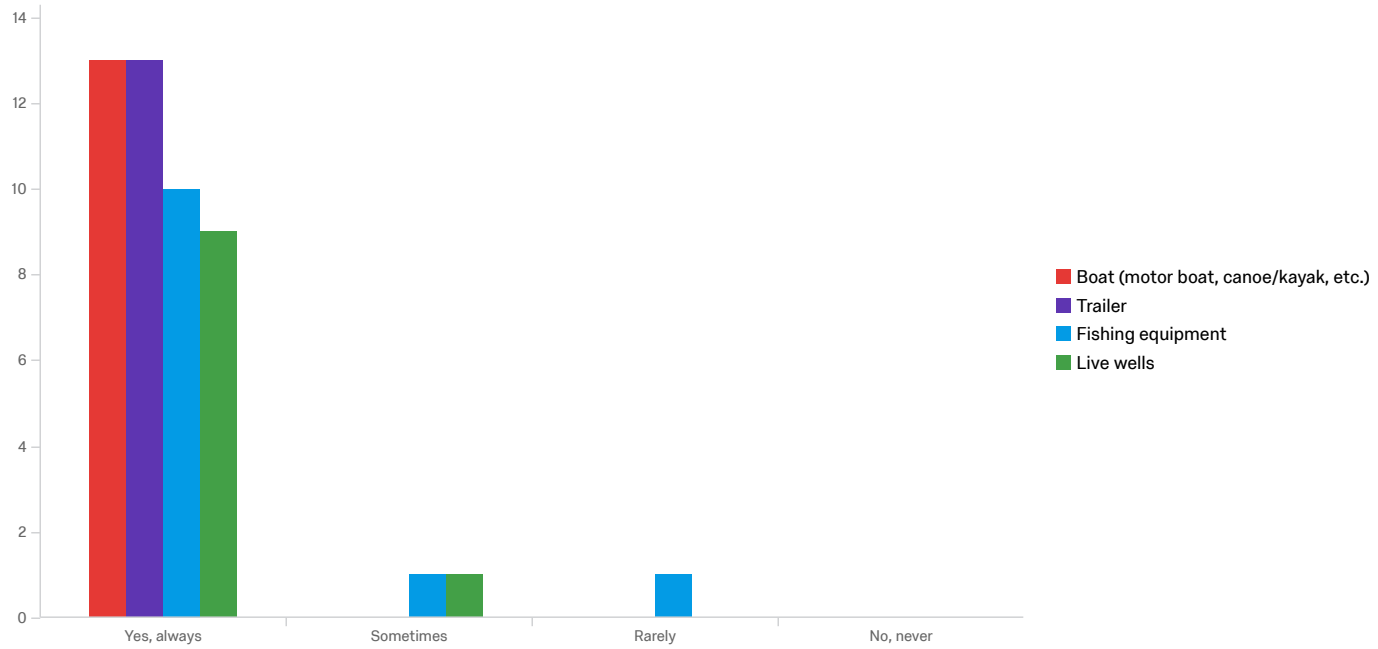
Q37 - Are you aware of invasive species (in general)?



#	Field	Choice Count	
1	Yes	91.67%	22
2	No	8.33%	2
			24

Showing Rows: 1 - 3 Of 3

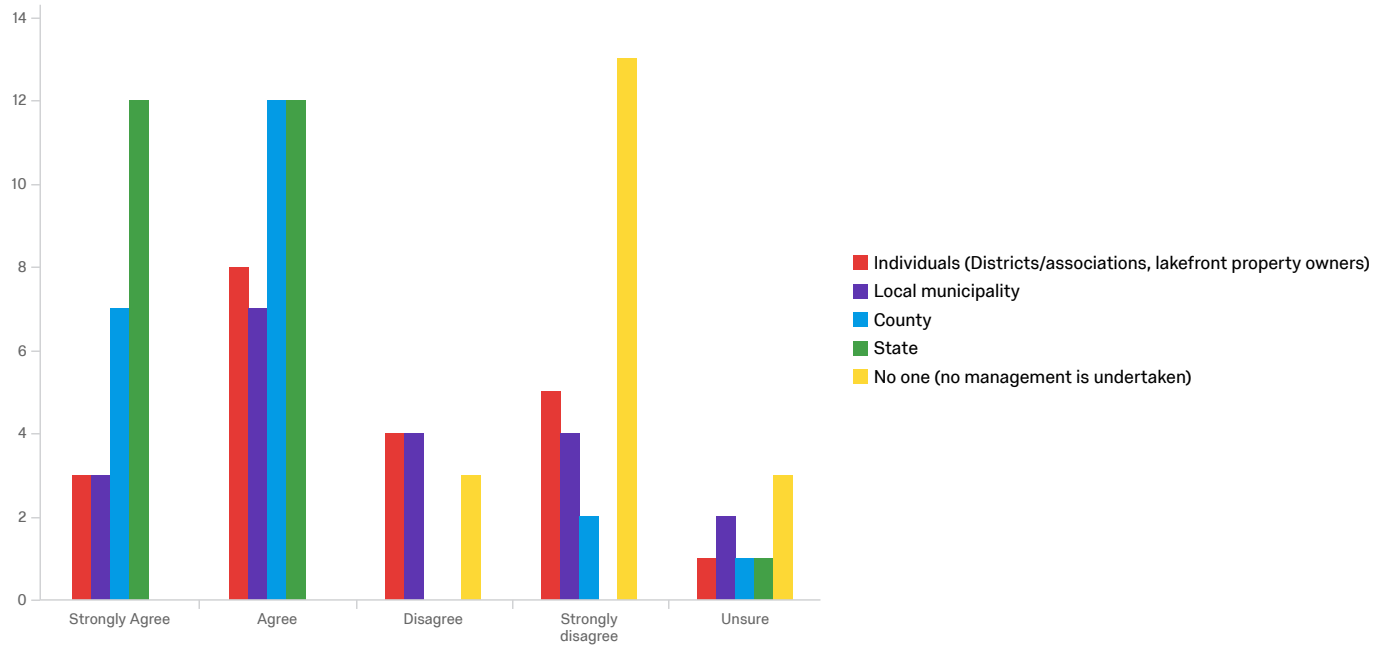
Q39 - After you have been to another lake, do you clean your.... before bringing it back to Machickanee Flowage?



#	Field	Yes, always	Sometimes	Rarely	No, never	Total
1	Boat (motor boat, canoe/kayak, etc.)	100.00% 13	0.00% 0	0.00% 0	0.00% 0	13
2	Trailer	100.00% 13	0.00% 0	0.00% 0	0.00% 0	13
3	Fishing equipment	83.33% 10	8.33% 1	8.33% 1	0.00% 0	12
4	Live wells	90.00% 9	10.00% 1	0.00% 0	0.00% 0	10

Showing Rows: 1 - 4 Of 4

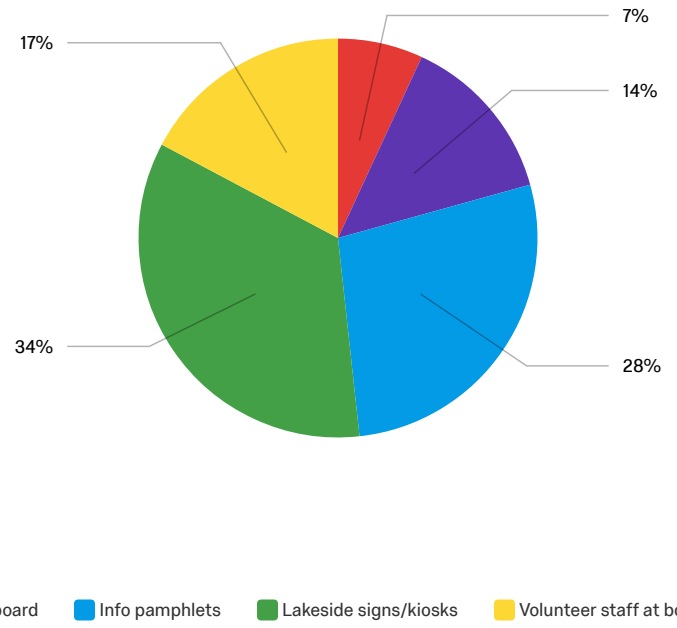
Q40 - Who should pay the cost of managing invasive aquatic plants?



#	Field	Strongly Agree	Agree	Disagree	Strongly disagree	Unsure	Total
1	Individuals (Districts/associations, lakefront property owners)	14.29% 3	38.10% 8	19.05% 4	23.81% 5	4.76% 1	21
2	Local municipality	15.00% 3	35.00% 7	20.00% 4	20.00% 4	10.00% 2	20
3	County	31.82% 7	54.55% 12	0.00% 0	9.09% 2	4.55% 1	22
4	State	48.00% 12	48.00% 12	0.00% 0	0.00% 0	4.00% 1	25
5	No one (no management is undertaken)	0.00% 0	0.00% 0	15.79% 3	68.42% 13	15.79% 3	19

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	6.90%	2
2	Billboard	13.79%	4
3	Info pamphlets	27.59%	8
4	Lakeside signs/kiosks	34.48%	10
5	Volunteer staff at boat launch	17.24%	5
6	Other	0.00%	0
			29

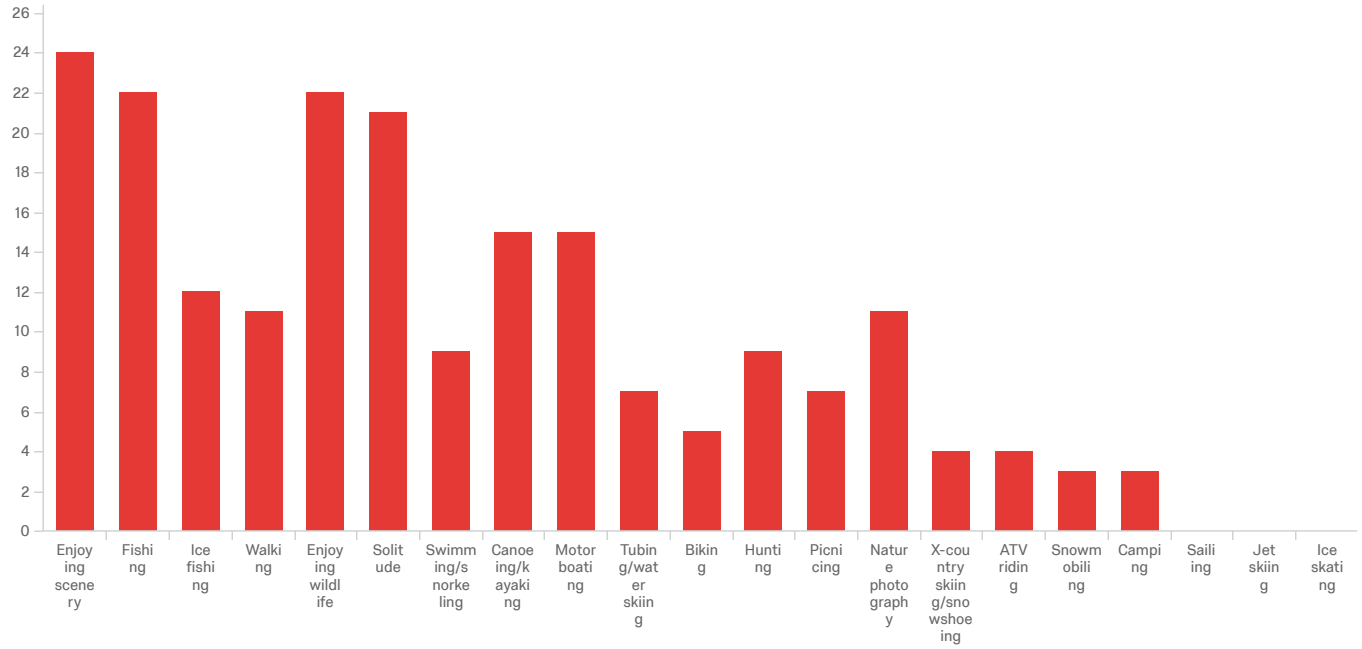
Showing Rows: 1 - 7 Of 7

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

In your opinion, what should be done to restore, maintain or improve Machic...
Less development to the shoreline.
Milfoil removal.
Stop the upstream farmer from polluting with his cows-figure out a way to clean up more AIS and algae.
Manage weeds.
weed and muck control
limit motor active and have DNR manage plants
Decrease agressive surface aquatic plants/scum that dominates the water in summer
Better weed control specifically in the channel and where people have docks
Try to remove some weeds and install fish cribs
Remove the abundance of weeds
Slow no wake speed and better winter enforcment of slow speed of ATV and snow mobiles
get rid of milfoil
Complete draw down
There is no one method that would be effective over all others, it will take continued education, partnership and education of our neighbors & surrounding communities
I think a regular drawdown would get rid of excessive and invasive aquadic plants, and possibly compact the muck bottom.
Hire someone to remove invasive plant growth on a regular schedule si,iliar to what Shawano Lake does and limit emissions from STPaper

Showing records 1 - 16 of 16

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



#	Field	Choice Count	
1	Enjoying scenery	11.76%	24
2	Fishing	10.78%	22
3	Ice fishing	5.88%	12
4	Walking	5.39%	11
5	Enjoying wildlife	10.78%	22
6	Solitude	10.29%	21
7	Swimming/snorkeling	4.41%	9
8	Canoeing/kayaking	7.35%	15
9	Motor boating	7.35%	15
10	Tubing/water skiing	3.43%	7
11	Biking	2.45%	5
12	Hunting	4.41%	9
13	Picnicing	3.43%	7
14	Nature photography	5.39%	11

15	X-country skiing/snowshoeing	1.96%	4
16	ATV riding	1.96%	4
17	Snowmobiling	1.47%	3
18	Camping	1.47%	3
19	Sailiing	0.00%	0
20	Jet skiing	0.00%	0
21	Ice skating	0.00%	0
			204

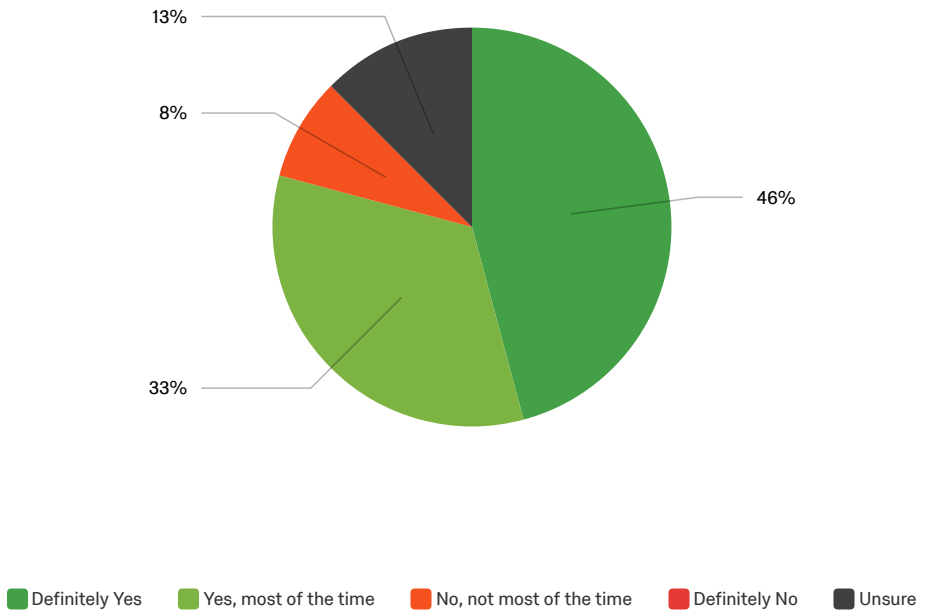
Showing Rows: 1 - 22 Of 22

Q46 - Other recreational activities not included above:

Other recreational activities not included above:
camp fires at night

Showing records 1 - 1 of 1

Q47 - "No Wake" is allowed on Machickanee Flowage at any time. Do you like the current "No Wake" rules as they are?



#	Field	Choice Count	
1	Definitely Yes	45.83%	11
2	Yes, most of the time	33.33%	8
3	No, not most of the time	8.33%	2
4	Definitely No	0.00%	0
5	Unsure	12.50%	3
			24

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?
Make it the whole lake.
Not an issue.
Enforce!
sometimes the bouys seem to move around creating confusion. Were they intentially moved or did someone mess with them?
limit speed on water
No one follows no wake speed, some boats are traveling 50mph.
not sure I understand, is it no wake at all times?

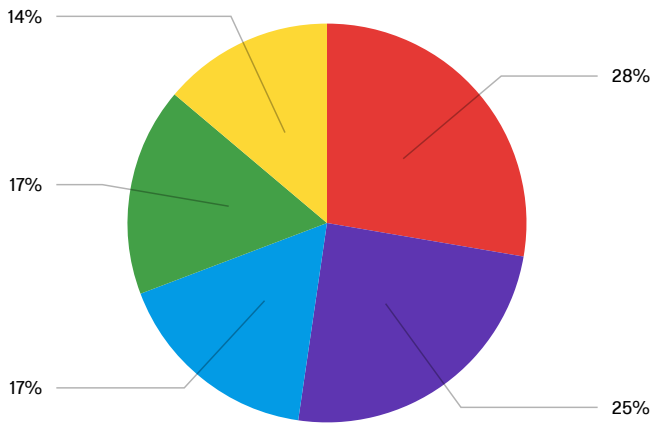
Showing records 1 - 7 of 7

Q49 - What could be done to improve your recreation experience on Machickanee Flowage?

What could be done to improve your recreation experience on Bear Lake?
Dredge some of the mud flats and add cribs.
Reduce the overall vegetation.
Cleanup the milfoil and invasive species.
Clean the water!
Floating logs removed in spring. Difficult task!
Less weeds and more fish
weed control so boat prop doesn't foul so often
get rid of milfoil
Put markers in water to state where the channel is for those boaters new to this waterway

Showing records 1 - 9 of 9

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

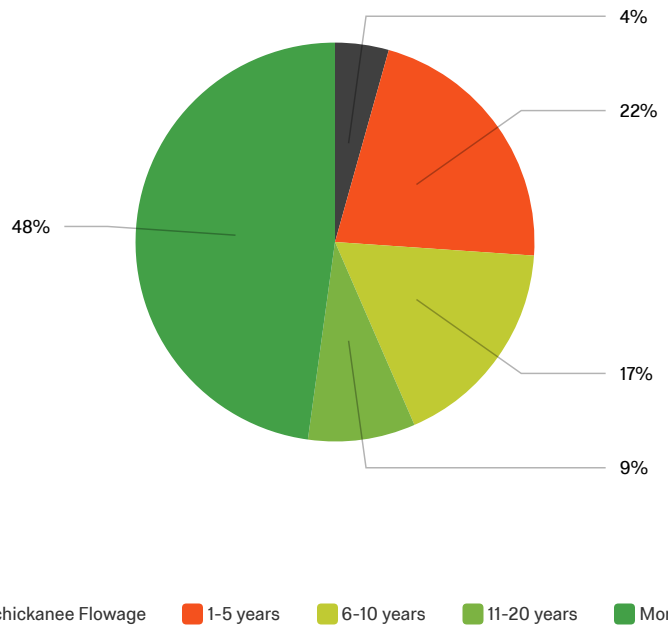


Catch-and-release fishing | Fishing for food | Food for wildlife and birds | Enjoy seeing/watching | Teaching children about fishing/lakes

#	Field		Choice Count
1	Catch-and-release fishing	27.69%	18
2	Fishing for food	24.62%	16
3	Food for wildlife and birds	16.92%	11
4	Enjoy seeing/watching	16.92%	11
5	Teaching children about fishing/lakes	13.85%	9
			65

Showing Rows: 1 - 6 Of 6

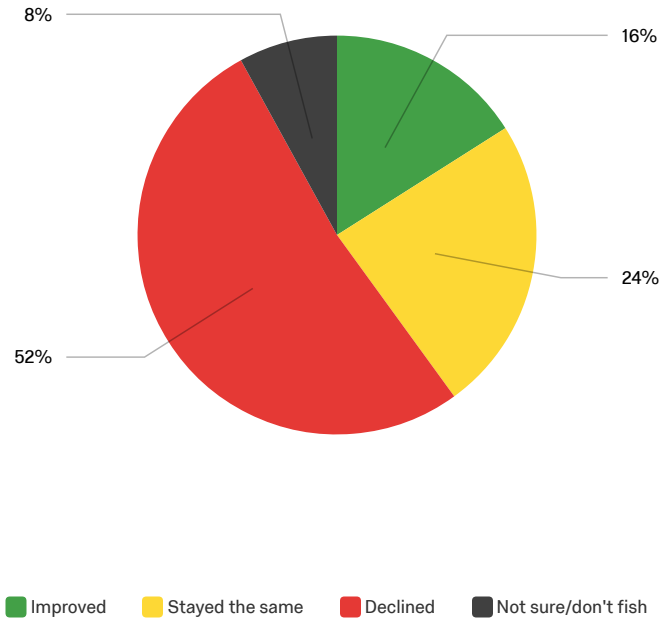
Q52 - How many years experience do you have fishing Machickanee Flowage?



#	Field	Choice Count	
1	I don't fish Machickanee Flowage	4.35%	1
2	1-5 years	21.74%	5
3	6-10 years	17.39%	4
4	11-20 years	8.70%	2
5	More than 20 years	47.83%	11
			23

Showing Rows: 1 - 6 Of 6

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



#	Field	Choice Count	
1	Improved	16.00%	4
2	Stayed the same	24.00%	6
3	Declined	52.00%	13
4	Not sure/don't fish	8.00%	2
			25

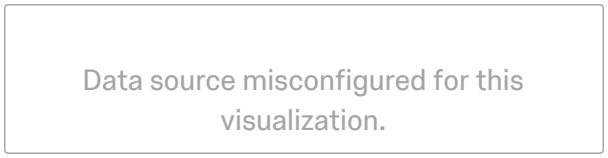
Showing Rows: 1 - 5 Of 5

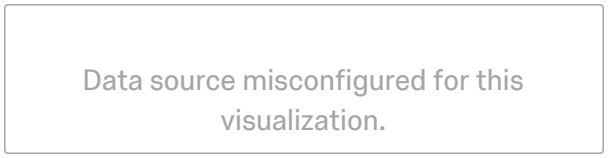
Q54 - What do you think has contributed to the change in fishing?

What do you think has contributed to the change in fishing?
Fishing pressure.
Excessive bass tournaments that are unmanaged and poorly planned.
Bass tournaments.
Too many AIS and too much algae.
Fishing pressure and water quality
closing the paper mill
don't know
fishing pressure
Water quality and too many weedbeds
closing the paper mill
don't know
Too hard with all the weeds
?
High concentrations of aquatic plants

Showing records 1 - 14 of 14

Q55 - When and how often do you fish Machickanee Flowage?



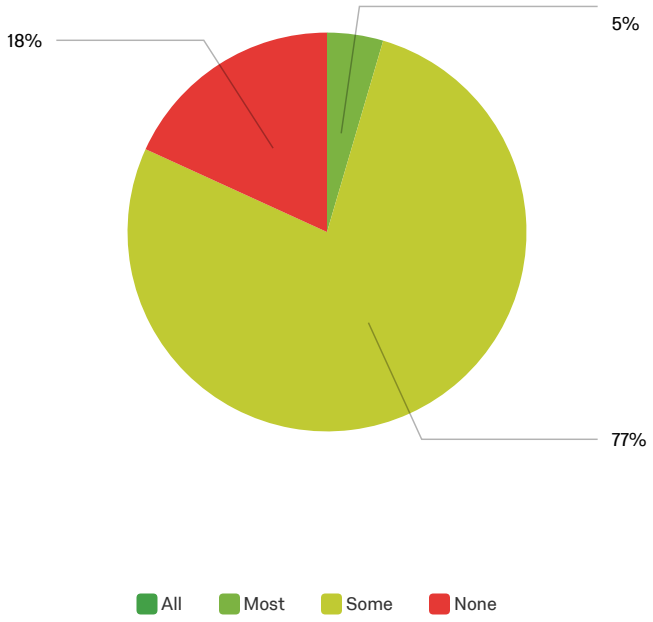


Q56 - What type of fish do you catch on Machickanee Flowage?

What type of fish do you catch on Bear Lake?
Panfish and bass, northern
Bluegill, bass
Largemouth bass, bluegills, perch
Northern, bluegill, largemouth bass, smallmouth bass.
Bass,northern, panfish
Panfish
Bluegill, small perch, smallmouth bass.
Gills, crappies, largemouth, pike
Bass
perch, bluegill, bass
perch and bass
Panfish, pike
bluegills, crappie, perch, largemouth bass, smallmouth bass, northern pike, golden shiners
bluegills
Bass
bass
Crappies perch bass bluegill pike
panfish

Showing records 1 - 18 of 18

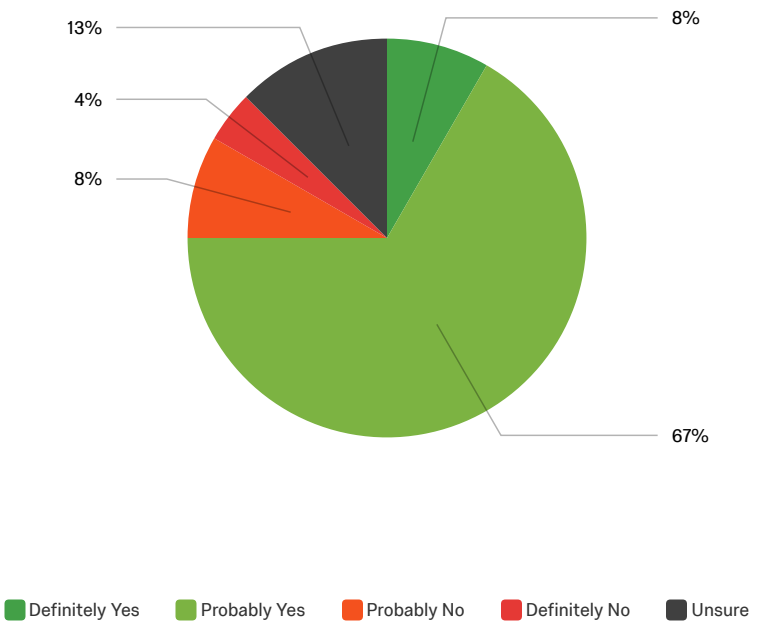
Q57 - In general, how many of the fish you catch are big enough to keep?



#	Field	Choice Count	
1	All	0.00%	0
2	Most	4.55%	1
3	Some	77.27%	17
4	None	18.18%	4
			22

Showing Rows: 1 - 5 Of 5

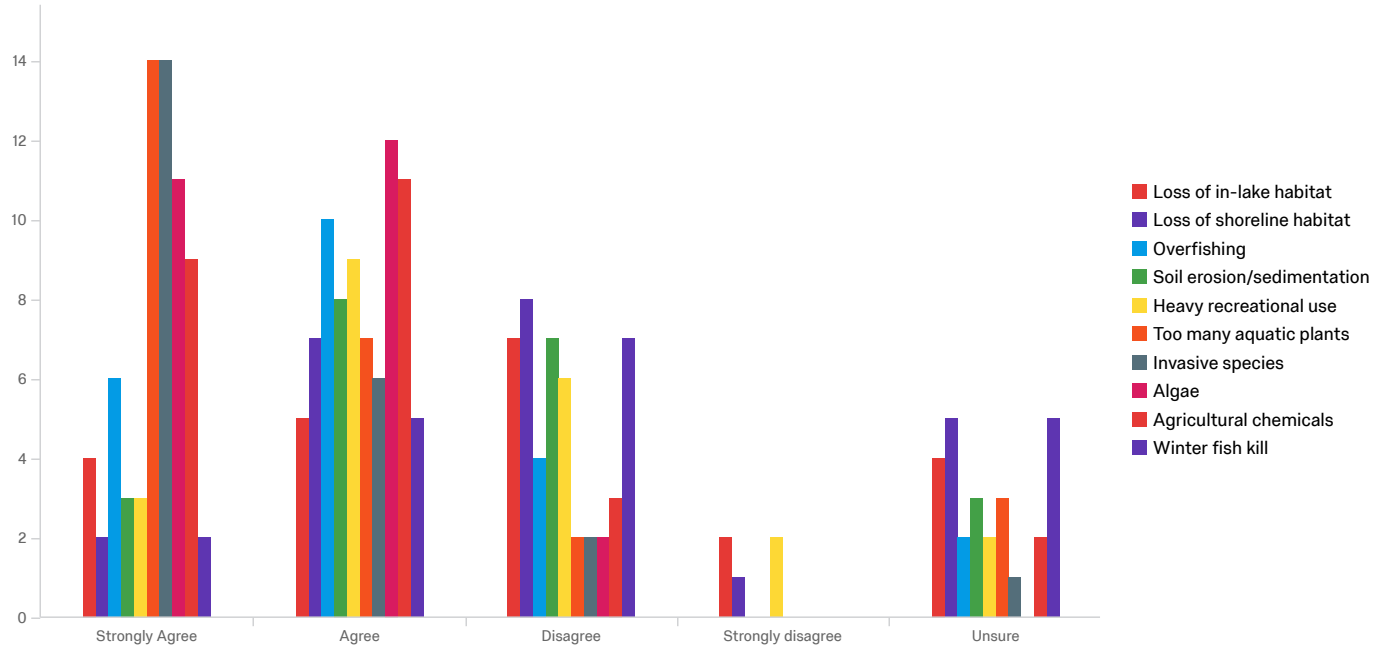
Q58 - Do you believe fish from Machickanee Flowage are safe to eat?



#	Field	Choice Count	
1	Definitely Yes	8.33%	2
2	Probably Yes	66.67%	16
3	Probably No	8.33%	2
4	Definitely No	4.17%	1
5	Unsure	12.50%	3
			24

Showing Rows: 1 - 6 Of 6

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



#	Field	Strongly Agree	Agree	Disagree	Strongly disagree	Unsure	Total
1	Loss of in-lake habitat	18.18% 4	22.73% 5	31.82% 7	9.09% 2	18.18% 4	22
2	Loss of shoreline habitat	8.70% 2	30.43% 7	34.78% 8	4.35% 1	21.74% 5	23
3	Overfishing	27.27% 6	45.45% 10	18.18% 4	0.00% 0	9.09% 2	22
4	Soil erosion/sedimentation	14.29% 3	38.10% 8	33.33% 7	0.00% 0	14.29% 3	21
5	Heavy recreational use	13.64% 3	40.91% 9	27.27% 6	9.09% 2	9.09% 2	22
6	Too many aquatic plants	53.85% 14	26.92% 7	7.69% 2	0.00% 0	11.54% 3	26
7	Invasive species	60.87% 14	26.09% 6	8.70% 2	0.00% 0	4.35% 1	23
8	Algae	44.00% 11	48.00% 12	8.00% 2	0.00% 0	0.00% 0	25
9	Agricultural chemicals	36.00% 9	44.00% 11	12.00% 3	0.00% 0	8.00% 2	25
10	Winter fish kill	10.53% 2	26.32% 5	36.84% 7	0.00% 0	26.32% 5	19

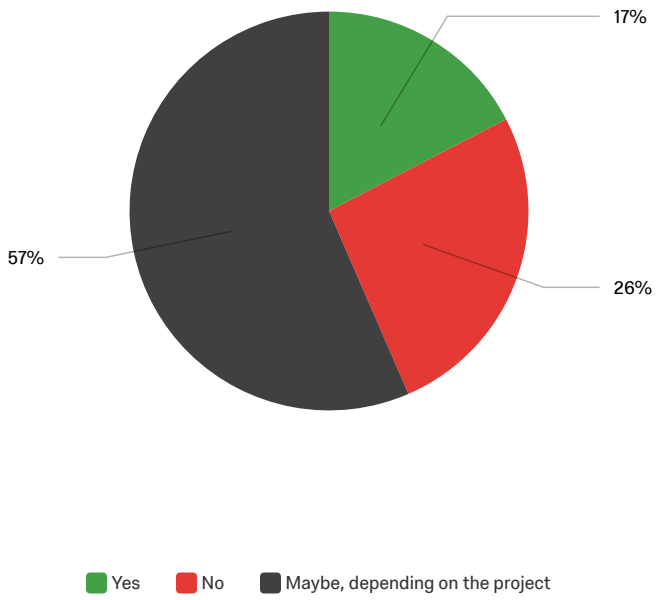
Showing Rows: 1 - 10 Of 10

Q61 - Do you have any additional comments regarding Machickanee Flowage?

Do you have any additional comments regarding Bear Lake?
The flowage is a beautiful place to live on when you can't see the weeds and algae. We live on then orth (shallow) side of the flowage and it gets really bad.
Good balance of natural shoreline with residential access. Not over-populated. Would like to see some damaged and unused docks removed.
Need to do something sooner rather than later

Showing records 1 - 3 of 3

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.)?



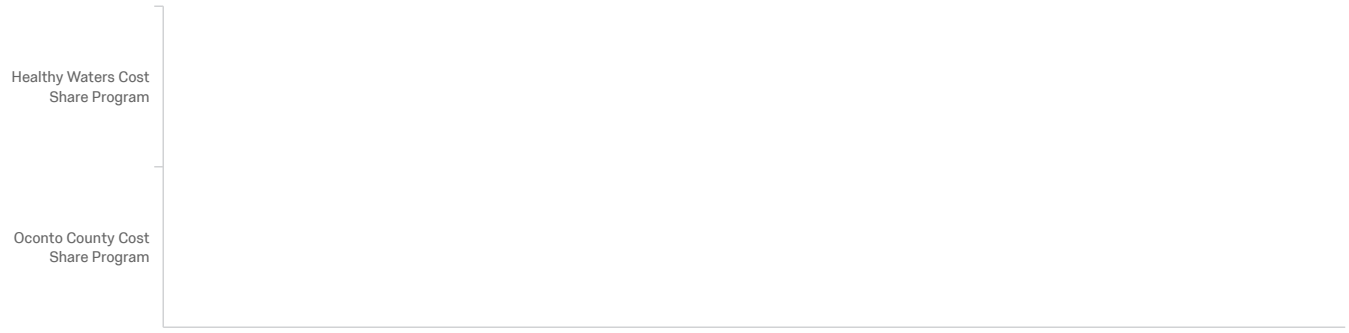
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Would you be interested in volunteering on a project at your lake (such as shoreland restoration planting, invasive species monitoring/removal, water quality monitoring, highway cleanup, etc.)?	1.00	3.00	2.39	0.77	0.59	23

#	Field		Choice Count
1	Yes	17.39%	4
2	No	26.09%	6
3	Maybe, depending on the project	56.52%	13
			23

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	0.00%	0
2	Oconto County Cost Share Program	0.00%	0
			0

Showing Rows: 1 - 3 Of 3

End of Report