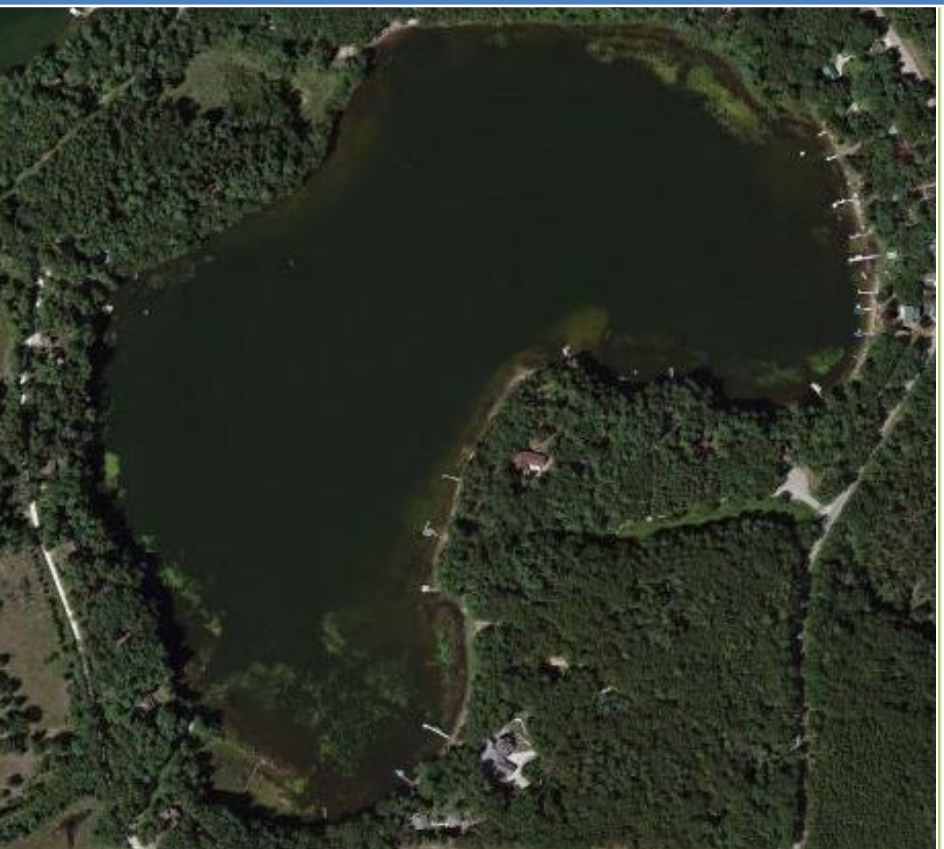
2015

Lake Napowan, Waushara County, Wisconsin
Lake Management Plan



Prepared by staff from the Center for Watershed Science and Education
University of Wisconsin-Stevens Point

Center for Watershed Science and Education
College of Natural Resources
University of Wisconsin-Stevens Point

Lake Management Plan for Lake Napowan, Waushara County, Wisconsin

The Lake Napowan Lake Management Plan was developed with input from residents and lake users at a series of four public planning sessions held at the Waushara County Courthouse, Wild Rose Community Center, and Wautoma Public Library in Wild Rose, Wisconsin during April-August 2014. The inclusive community sessions were designed to identify key community concerns, assets, opportunities and priorities. Representatives of state and local agencies, as well as nonprofit organizations, also attended the planning sessions to offer their assistance to the group in developing a strategic lake management plan (LMP).

The plan was adopted by the Lake Napowan Lake Association on: September 8, 2015.
Date

The plan was adopted by the Town of Mt. Morris on: _____.
Date

The plan was adopted by Waushara County on: January 6, 2016.
Date

The plan was approved by the Wisconsin Department of Natural Resources on: March 22, 2016.
Date

A special thanks to all who helped to create the Lake Napowan Management Plan and provided guidance during the plan's development.

Lake Napowan Management Planning Committee Members and Resources

Planning Committee

Bob Kodbres
Judy Kodbres
Mary Lynn Crisco
David Erickson
Donald Mayer
Jon Fenrich
Dave Mathison
Jane Erickson
Becky Sattler
Karen Mayer
Rich Scamebrora
Jeff Crisco
David Klabak
Susan Klabak

Waushara County

County Conservationist – Ed Hernandez
Land Conservation Department
Community, Natural Resources and Economic Development Agent – Patrick Nehring, University of Wisconsin-Extension

University of Wisconsin-Stevens Point
Center for Watershed Science and Education

Water Resources Specialists – Ryan Haney and Danielle Rupp
Water Resources Scientist – Nancy Turyk

Wisconsin Department of Natural Resources

Water Resources Management Specialist – Ted Johnson
Fisheries Biologists – Dave Bartz and Scott Bunde

Golden Sands Resource Conservation & Development Council, Inc.

Regional Aquatic Invasive Species Education Specialist – Paul Skawinski
Regional Aquatic Invasive Species Specialist – Kaycie Stushek

We are grateful to many for providing funding, support and insight to this planning process:

Waushara County Watershed Lakes Council
Waushara County Staff and Citizens
Wisconsin Department of Natural Resources Lake Manager, Ted Johnson
Wisconsin Department of Natural Resources Lake Protection Grant Program

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Overarching Vision for Lake Napowan

Lake Napowan will be a peaceful lake surrounded by those passionate about its health. The vegetated shorelines of the lake will be maintained and decisions will be made to benefit water quality, wildlife, fish and people alike. Community members will collaborate to protect the lake from threats to lake health, including aquatic invasive species and pollutants.

Introduction

Lake Napowan is a 52-acre seepage lake with a maximum depth of 21 feet located in northeastern Waushara County. Residences border much of its shoreline, and the Camp Napowan Boy Scout Camp and its surrounding land are largely undeveloped on the northern end of the lake. The scout camp is a draw to the lake, and residents from surrounding counties remember their experiences at the camp as children and young adults. The people of Lake Napowan value the natural beauty of the lake, the peace they find there, the minimal boat traffic, and the opportunities to observe wildlife. These values, along with many others, inspired a small group of Lake Napowan community members to come together in partnership with local professionals and experts to develop this lake management plan (LMP).

The purpose of this plan is to provide a framework for the protection and improvement of Lake Napowan. Implementing the content of this LMP will enable citizens and other supporters to achieve the vision for Lake Napowan now and in the years to come. The plan was developed by community members who learned about the lake and identified features important to the Lake Napowan community to help guide the fate of the lake. It is a dynamic document that identifies goals and action items for the purpose of maintaining, protecting and/or creating desired conditions in a 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.

Who can use the Lake Napowan Lake Management Plan, and how can it be used?

- **Individuals**: Individuals can use this plan to learn about the lake they love and their connection to it. People living near Lake Napowan can have the greatest influence on the lake by understanding and choosing lake-friendly options to manage their land and the lake.
- **Lake Napowan Lake Association:** This plan provides the Association with a well thought-out plan for the whole lake and lists options that can easily be prioritized. Annual review of the plan will also help the Association to recognize its accomplishments. Resources and funding

opportunities for management activities are more accessible by placement of goals into the lake management plan, and the Association can identify partners to help achieve their goals for Lake Napowan.

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

Background

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 lake conditions. This was done alongside 32 other lakes as part of the Waushara County Lakes Project. The Waushara County Lakes Project was initiated by citizens in the Waushara County Watershed Lakes Council who encouraged Waushara County to work in partnership with personnel from UW-Stevens Point to assess 33 lakes in the county. This effort received funding from the Wisconsin Department of Natural Resources 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 and the Waushara County Land Conservation Department conducted the Waushara County Lakes Study and interpreted data for use in the development of lake management plans. Data collected by citizens, consultants and Wisconsin Department of Natural Resources professionals were also incorporated into the planning process, helping to create a robust set of information from which informed decisions could be made. Sources of information used in the planning process are listed at the end of this document.

Several reports from the Lake Napowan Study and the materials associated with the planning process and reports can be found on the Waushara County website: http://www.co.waushara.wi.us/ (select "Departments", "Zoning and Land Conservation", "Land Conservation", and "Lake Management Planning"). Unless otherwise noted, data used in the development of this plan were detailed in the report *Waushara County Lakes Study – Lake Napowan 2010-2012*, University of Wisconsin-Stevens Point.

The Planning Process

The planning process included a series of four public planning sessions held between April and August 2014 at the Waushara County Courthouse, Wild Rose Community Center, and Wautoma Public Library. Planning session participants formed the planning committee, which included area residents, Lake Napowan Lake Association members, lake users, and local municipal representatives. Technical assistance during the planning process was provided by the Waushara County Conservationist, the Waushara County Community, Natural Resources and Economic Development Extension Agent, and professionals from the Wisconsin Department of Natural Resources (WDNR), Golden Sands Resource Conservation & Development Council, Inc. (RC&D), University of Wisconsin-Extension (UWEX), and the University of Wisconsin-Stevens Point Center for Watershed Science and Education (CWSE).

Participation in the planning process was open to everyone and was encouraged by letters sent directly to Lake Napowan waterfront property owners and by press releases in local newspapers. In addition, planning committee members were provided with emails about upcoming meetings which could be forwarded to others. To involve and collect input from as many people as possible, a topic-specific survey related to the subject of each upcoming planning session was made available prior to each planning session. Property owners and interested lake users were notified about the surveys and how to access them (via postcards mailed to waterfront property owners 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 Appendix E. Lake User Survey .

Guest experts and professionals attended the planning sessions. They presented information and participated in discussions with participants to provide context, insight and recommendations for the lake management plan, including environmental and regulatory considerations. This information was organized with the survey results into discussion topics, which included: the fishery and recreation; the aquatic plant community; water quality and land use; shoreland health; and, communication. After learning about the current conditions of each topic, planning committee members identified goals, objectives and actions for the lake management plan that were then recorded by professionals from UW-Stevens Point. Planning session notes and presentations are available on the Waushara County website.

Implementing the content of this lake management plan will enable citizens and other supporters to achieve the vision for Lake Napowan now and in the years to come.

Goals, Objectives and Actions

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

Although each lake is different, the Wisconsin Department of Natural Resources requires that each comprehensive lake management plan address a specific list of topics affecting the character of a lake, whether each topic has been identified as a priority or as simply something to preserve. In this way, every lake management plan considers the many aspects associated with lakes. These 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 and Quantity—water chemistry, clarity, contaminants, lake levels
Shorelands—habitat, erosion, contaminant filtering, water quality, vegetation, access
Watershed Land Use—land use, management practices, conservation programs

People and the Lake

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

List of Goals

Goal 1. Improve fish habitat in and around the lake.

Goal 2. Improve largemouth bass (LMB) size structure and maintain bluegill abundance.

Goal 3. Preserve the native plant community in Lake Napowan.

Goal 4. Sustainably control or eliminate aquatic invasive species in Lake Napowan.

Goal 5. Preserve and increase high quality habitat for fish and wildlife.

Goal 6. Maintain summer median phosphorus concentrations below 20 ppb.

Goal 7. Collect long term data on Lake Napowan to monitor trends, declines, and improvements over time.

Goal 8. Protect Lake Napowan during times of low water.

Goal 9. Shorelands will be healthy and provide habitat and improve water quality.

Goal 10. Support water quality based best management practices in the watershed.

Goal 11. Maintain the peaceful nature of Lake Napowan.

Goal 12. Increase participation in lake management stewardship.

Goal 13. Review plan annually and update as needed.

The following goals were identified as 'high priority':

Goal 4. Sustainably control or eliminate aquatic invasive species in Lake Napowan. (Aquatic Invasive Species (AIS)**)**

Objective 4.1. Monitor and eliminate populations of invasive species in and around Lake Napowan.

Protect the native aquatic plant community, coordinate field training in AIS identification/monitoring by Golden Sands Resource Conservation & Development Council, Inc., obtain grant to hire divers for mapping and removal, be vigilant about preventing the introduction of additional AIS, work with Golden Sands RC&D to eliminate shoreland invasives including purple loosestrife and phragmites.

Goal 6. Maintain summer median phosphorus concentrations below 20 ppb. (Water Quality and Quantity**)**

Objective 5.1. Decrease runoff from shoreland properties and the watershed entering the lake**.**

Support increased shoreland vegetation and encourage shoreland restoration where necessary, minimize impervious surfaces around the lake and in the watershed, encourage the use of rain barrels, rain gardens and other storm water runoff management practices.

Goal 7. Collect long term data on Lake Napowan to monitor trends, declines, and improvements over time. (Water Quality and Quantity**)**

Objective 6.1. Monitor water quality parameters in Lake Napowan.

Begin a lake monitoring regime to include water clarity, phosphorus, chlorophyll-*a*, and inorganic nitrogen. Work with County to install lake level monitoring well, and begin Ice-on and Ice-off reporting.

Lead persons and resources are given under each objective of this plan. These individuals and organizations are able to provide information, suggestions or services to accomplish objectives and 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.

Resource	Acronym
WDNR Citizen Lake Monitoring Network	CLMN
UWSP Center for Watershed Science and Education	CWSE
Wisconsin Department of Agriculture, Trade and Consumer Protection	DATCP
Lake Napowan Lake Association	LNLA
North Central Conservancy Trust	NCCT
USDA Natural Resources Conservation Service	NRCS
Golden Sands Resource Conservation & Development Council, Inc.	RC&D
University of Wisconsin Extension	UWEX
UW Extension	UWEX
University of Wisconsin-Stevens Point	UWSP
Waushara County Land Conservation Department	WCLCD
Waushara County Watershed Lakes Council	WCWLC
Wisconsin Department of Natural Resources	WDNR
Wisconsin Department of Transportation	WDOT
UWSP Wisconsin Environmental Analysis Laboratory	WEAL

Contact information for organizations and individuals who support lake management in Waushara County can be found in Appendix A. Waushara County Lake Information Directory.

In-Lake Habitat and a Healthy Lake

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

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

Fish Community

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

People are an important part of a balanced fish community; their actions on the landscape and the numbers and sizes of fish added to or removed from 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 also be adjusted as the fish community changes, and can provide for excellent fishing.

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

Survey respondents indicated the fishing on Lake Napowan is generally good, with mostly bass caught; however, respondents believed the quality of fishing had declined in past years with too many bass dominating the fishery. Planning session discussions also suggested the 12-inch size limit, combined with overfishing (particularly during spawning season), had contributed to upsetting the size structure.

The Wisconsin Department of Natural Resources (WDNR) sampled Lake Napowan in spring 2010 using an electrofishing technique. An overabundance of largemouth bass with poor size structure was observed with growth rates below average, likely due to competition for food and habitat. More than 353 fish were caught per hour. Approximately 150 per hour would be desirable. It is estimated it takes largemouth bass 7 years to reach 14 inches in Lake Napowan. Three to four years would be more preferable to reach that size.

The lake is unable to support fish such as northern pike, a species that will predate the bass and help reduce the largemouth bass population. According to WDNR records, northern pike fingerlings were stocked in Lake Napowan throughout the 1980s, but recent surveys indicated they have not successfully established on their own. Bluegill, in contrast, had an above average growth rate, good size structure and average abundance. The fisheries biologist who conducted the survey recommended continued expansion of fish habitat, particularly near-shore woody structure, and the possible removal of the 14-inch size limit for largemouth bass, as the best strategies for improving the size structure and problems associated with overabundance (Bartz, 2014). Several permitted tree drops along the northern shore of the lake adjacent to the scout camp were conducted by the We Really Kare, Inc. fishing club in March 2014 to enhance near-shore fish habitat. Bartz felt this was a good start, but suggested more would be desirable.

Guiding Vision for the Fish Community

Lake Napowan will have a healthy, well balanced fish community.

Goal 1. Improve fish habitat in and around the lake.

Objective 1.1. Protect native aquatic and shoreland vegetation, woody habitat, and other important habitat.

Actions	Lead person/group	Resources	Timeline
Include information about the importance of native aquatic plants and woody habitat to the fish community in a welcome packet to new (and/or existing) shoreland owners. Encourage leaving woody habitat in the water near shore if not impeding recreation.	Waushara County	WCWLC UWEX Lakes	Ongoing
Communicate with WDNR Fisheries Biologist to explore permitting additional supplemental woody habitat such as tree drops and fish sticks.	LNLA	WDNR Fisheries Biologist We Really Kare, Inc. fishing club	
Leave existing woody habitat (trees, stumps, branches, etc.) in the lake, especially in near-shore (littoral) areas.	Shoreland property owners	WDNR Fishery Biologist	Ongoing

Goal 2. Improve largemouth bass (LMB) size structure and maintain bluegill abundance.

Objective 2.2. Pursue removal of largemouth bass size limit and adjustment of the panfish bag limit, particularly during winter and spawning seasons.

Actions	Lead person/group	Resources	Timeline
Post a sign at the boat launch asking fishermen to consider a smaller bag for panfish during winter and spawning season.	LNLA	Town of Mt. Morris We Really Kare, Inc. fishing club	
Explore options for improving LMB community (i.e. remove size limit).	LNLA	WDNR Fisheries Biologist We Really Kare, Inc. fishing club	
Work with WDNR Fisheries Biologist to develop and pass a resolution in the Wisconsin Conservation Congress adjusting bag limit on panfish and size limit on LMB.	LNLA	WDNR Fisheries Biologist We Really Kare, Inc. fishing club WC Conservation Congress Rep.	
Coordinate with WDNR Fisheries Biologist to receive updates on any fish surveys completed in Lake Napowan.	LNLA	WDNR Fisheries Biologist	Ongoing
Reduce growth of aquatic invasive plants to improve visibility for largemouth bass, increasing ability to feed and their growth rate.	LNLA	WDNR Lake Manager	Annually

Aquatic Plant Community

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

Aquatic plants near shore 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 shoreland and lake.

An aquatic plant survey was conducted on Lake Napowan in August 2013 by Golden Sands Resource Conservation & Development Council, Inc. (RC&D). Ninety-six percent of the sites visited had vegetative growth, with the deepest plant growth observed at 19.7 feet. Twenty species of aquatic plants were found in Lake Napowan, with an additional five species observed visually. This is above average compared to the other 31 lakes that had plant surveys conducted as part of the Waushara County Lakes Study.

The dominant plant species found in Lake Napowan was coontail, followed by southern naiad and common waterweed. Coontail offers an important food source to a wide range of waterfowl species. A number of invertebrate and fish species use the bushy stems and stiff whorls of the leaves of the coontail plant as habitat, especially in the winter when other aquatic plants have died back. Southern naiad also provides food to waterfowl, and both shelter and food to fish. Common waterweed is a food source for muskrats and waterfowl, and also provides shelter and grazing opportunities for fish (Borman et al., 2001). Overall, Lake Napowan has a healthy native plant community with some invasive species. Care should be taken to minimize impacts to the existing native plant community

Two aquatic invasive species, Eurasian watermilfoil (EWM) and curly-leaf pondweed (CLP) have been identified in Lake Napowan. CLP was not encountered during the August 2013 survey. More information about aquatic invasive species and their management can be found in the following section, the Lake Napowan Aquatic Plant Report, the Lake Napowan 2010-2012 Lake Study Report, and Appendix B. Aquatic Plants.

Guiding Vision for Aquatic Plants in Lake Napowan

Lake Napowan will have a healthy and diverse native plant community with minimal disturbance by invasive species.

Goal 3. Preserve the native plant community in Lake Napowan.

Objective 3.1. Ensure the health and sustainability of existing native plants.

Actions	Lead person/group	Resources	Timeline
Refrain from removing native vegetation in and around the lake. Use manual techniques only if done.	Shoreland property owners	UWEX Lakes	Ongoing

Aquatic Invasive Species (AIS)

Aquatic invasives species are non-native aquatic plants and animals that are most often unintentionally introduced into lakes by lake users. Eurasian watermilfoil (EWM) was first identified in Lake Napowan in 1993 and observed during the 2013 survey. According to the WDNR website, EWM has hybridized with northern milfoil. Hybrid forms (HWM) tend to be more resistant to chemical treatment. The locations of EWM populations in 2013 are displayed in the map in Appendix B. Aquatic Plants. In some lakes, EWM can exist as a part of the plant community, while in others EWM can create dense beds that can damage boat motors, make areas non-navigable, and inhibit activities like swimming and fishing. This plant can produce viable

seed; however, it often spreads by fragmentation. Just a small fragment of the stem is enough to start a new plant, so spread can occur quickly if plants are located near points of activity such as beaches and boat launches.

Curly-leaf pondweed (CLP)

Curly-leaf pondweed (CLP) was reported in Lake Napowan in 1994, but its presence has not been confirmed with a voucher specimen. It was not observed during the 2013 survey; however, the 2013 survey took place in August so results for CLP may not be representative due to the unique life cycle of the plant. This plant can live in harmony with the rest of the aquatic plant community or it may become invasive. The die-off of large beds of CLP in June can contribute to nuisance algae blooms throughout the summer.

Summary of Aquatic Plant Management Planning Session Discussion – July 8, 2014.

The Water Resources Management Specialist from the WDNR attended the aquatic plant management session for Lake Napowan, and spoke with planning participants about their aquatic plant community. Alongside a professional from Golden Sands Resource Conservation & Development Council, Inc. (RC&D), recommendations were given to the group regarding Lake Napowan's aquatic invasive species. The following management strategies were determined to be the most practical and effective options to minimize impacts to the lake as a whole:

Hand Pulling by trained citizens and divers

Citizens who have learned proper techniques to remove EWM/HWM can remove plants by hand pulling at any time. **The recommended option by professionals from the WDNR and RC&D was to hire trained divers to hand pull EWM and/or other invasive plants, especially at depths requiring scuba gear.** Grants are available to support this effort and it was recommended that the Lake Napowan Lake Association work with other area lake groups to jointly apply for a grant. Assistance with this effort can be provided by RC&D or private consultants. **This option was most preferred by the meeting planning participants** in attendance at the July 8 meeting.

No action

Because of the relatively small population of EWM/HWM in Lake Napowan, waiting and seeing how EWM/HWM populations respond to no action over time is an option. In some cases, EWM/HWM has been observed to establish itself as a population that remains small and becomes a component of the ecosystem. If this option is chosen, routine monitoring should take place to ensure that EWM/HWM does not reach nuisance levels.

Chemical spot treatment

Chemical spot treatment may be another option for Lake Napowan; however, care should be taken to minimize impacts to the native plant community. Chemically treating aquatic invasive plants kills, but does not remove, the plants from the water. The decaying plants can cause conditions ideal for algae blooms and other water quality problems. In scenarios involving larger localized populations of invasive species, a combination of chemical spot treatments and hand pulling may prove effective while minimizing harmful impacts to the lake. **Since HWM has been confirmed in Lake Napowan, samples of the plant tissue should be submitted to a lab for challenge testing to determine which combination of chemicals would be appropriate.** All chemical treatments in the lake require a permit from the WDNR. See the directory in Appendix A. Waushara County Lake Information Directory for contact information regarding permitting.

Guiding Vision for Aquatic Invasive Species

The waters and shorelands of Lake Napowan will contain a variety of native species with few or no invasive species.

Goal 4. Sustainably control or eliminate aquatic invasive species in Lake Napowan.

Objective 4.1. Monitor and eliminate populations of invasive species in and around Lake Napowan.

Actions	Lead person/group	Resources	Timeline
Protect the native aquatic plant community and refrain from removing native vegetation in and around the lake.	Shoreland property owners		Ongoing
Learn to identify and monitor routinely for AIS.	LNLA	RC&D	Ongoing
Learn to properly hand pull EWM/HWM and remove routinely.		RC&D	Spring - Summer
Apply for a grant to hire trained divers to hand pull aquatic invasive plants, particularly EWM/HWM. Work with other lake groups and organizations to combine efforts to increase competitiveness for funding.	LNLA	WDNR Aquatic Plant Specialist RC&D Consultants	As needed
If populations of EWM/HWM expand beyond 1 acre and chemical treatment is considered, conduct challenge test of plant samples to determine appropriate chemical cocktail.	LNLA	WDNR Aquatic Plant Specialist RC&D	As needed
Consider individual installation of zebra mussel monitoring plates under private docks for preventative early detection of invasive mussels.	Individuals	RC&D WDNR Lake Manager	
Check for CLP in late May/early June. If CLP is encountered, collect a specimen to turn in as a voucher to RC&D.			

If a new AIS is suspected, follow the steps in the Rapid Response plan, located in the appendices.		WDNR Aquatic Plant Specialist RC&D	Ongoing

Objective 4.2. Educate visitors to Lake Napowan about invasive species.

Actions	Lead person/group	Resources	Timeline
Include information about AIS in a welcome packet distributed to new and/or existing property owners.	Waushara County	UWEX Lakes	Ongoing
Pursue participation in Clean Boats, Clean Waters; explore volunteer training and/or funding options with local organizations. Consider working with other lake groups to obtain a grant to support efforts.	LNLA	RC&D	

Objective 4.3. Eliminate invasive plants from the shoreland.

Actions	Lead person/group	Resources	Timeline
Use bio-control options for purple loosestrife outbreaks around Lake Napowan.	LNLA	RC&D Local schools	
Monitor populations of *Phragmites* (giant/common reed) around Lake Napowan, and become trained in proper removal of the invasive.	Individuals	RC&D	

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. Lake Napowan does not currently have any officially designated critical habitat areas, although large portions of the lake remain undeveloped due to the presence of Camp Napowan, a Boy Scout camp on the northern side of the lake.

Guiding Vision for Lake Napowan's Critical Habitat

Sensitive areas on Lake Napowan will be recognized, enhanced, and protected from degradation.

Goal 5. Preserve and increase high quality habitat for fish and wildlife.

Objective 5.1. Protect special areas on Lake Napowan.

Actions	Lead person/group	Resources	Timeline
Request a Critical Habitat Designation from WDNR or hire a consultant to identify special areas.		WDNR Lake Specialist WDNR Fisheries Biologist Consultant	
Support landowners around the lake who express interest in placing undeveloped land into a conservation program (Conservation Easements, Purchase of Development Rights, etc.).		NCCT Gathering Waters NRCS WDNR Lake Protection grant Knowles-Nelson Stewardship Fund	
Support landowners around the lake who express interest in selling land for protection.		WDNR Lake Protection grant Knowles-Nelson Stewardship Fund	

Landscapes and the Lake

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

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

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

Water Quality and Quantity

Water quality was assessed during the 2010-2012 lake study and involved a number of measures including temperature, dissolved oxygen, and water chemistry. Each of these interrelated measures plays a part in the lake's overall water quality. Citizen survey respondents indicated water quality in Lake Napowan has a major impact on their personal enjoyment of the lake and the economic value of the lake.

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

throughout most of the lake, with the exception of the February 2012 measurement when dissolved oxygen concentrations fell below 5 mg/L throughout the water column. During the summer, dissolved oxygen concentrations in Lake Napowan were higher in the shallow water and dropped off with depth. The lower concentrations towards the bottom are typical and are due to the consumption of oxygen during the decomposition of materials at the bottom of the lake.

Chloride, sodium, and potassium 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. Lake Napowan had slightly elevated chloride and sodium concentrations and a low average sodium concentration over the monitoring period. These concentrations are not harmful to aquatic organisms, but indicate that pollutants are entering the lake. Chloride and sodium sources include animal waste, septic systems, fertilizer, and road-salting chemicals. Atrazine (DACT), an herbicide commonly used on corn, was found in low concentrations in Lake Napowan (0.10 ug/L); however, some toxicity studies have indicated that reproductive system abnormalities can occur in frogs at these levels (Hayes et al., 2003). The presence of this chemical suggests that agricultural activities in the surrounding landscape may be impacting the lake.

Phosphorus is an element that is essential in trace amounts to most living organisms, including aquatic plants and algae. Sources of phosphorus can include naturally-occurring phosphorus in soils and wetlands, and in 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 gets 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 entering a lake can result in up to 500 pounds of algal growth! (Vallentyne, 1974)

During the study, total phosphorus concentrations for Lake Napowan ranged from a high of 31 ug/L in April 2011 to a low of 12 ug/L in August 2012. The summer median total phosphorus was 18.5 ug/L and 16 ug/L in 2011 and 2012, respectively. This is below Wisconsin's phosphorus standard of 40 ug/L for a shallow seepage lake such as Lake Napowan, but above the proposed flag value of 15 ug/L. The water clarity measured in Lake Napowan during the study was considered good. For Lake Napowan, water clarity ranged from 6.5 feet to 19 feet.

Managing phosphorus and soil erosion throughout the Lake Napowan 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 impervious surfaces. Phosphorus inputs to Lake Napowan can be controlled by using lake-friendly land management decisions, such as the restoration of shoreland vegetation, elimination/reduction of fertilizers, and the use of water quality-based best management practices (BMPs).

During the planning process, planning participants expressed concern regarding perceived low water levels in Lake Napowan. Fluctuating water levels in lakes are natural responses to changes in climate and weather patterns. In Waushara County, some of the lakes have historically experienced fluctuations in water levels and some of the plant life in these lakes have adapted to and even depend on these fluctuations for survival. Excess withdrawal of groundwater can potentially add to these natural fluctuations, affecting the extent and duration of low water levels, which in turn can affect water quality and the aquatic ecosystem.

Guiding Vision for Water Quality in Lake Napowan

Lake Napowan will be a lake known for its clean water that provides superb swimming and excellent fishing.

Goal 6. Maintain summer median phosphorus concentrations below 20 ppb.

Objective 6.1. Decrease runoff from shoreland properties and the watershed entering the lake.

Actions	Lead person/group	Resources	Timeline
Encourage the restoration of shoreland vegetation around the lake to slow water and filter out sediment and nutrients. Include information in welcome packets.	Waushara County	WCLCD UWEX Lakes (educational information) WDNR Healthy Lakes grants	Ongoing
Encourage the installation of rain barrels, rain gardens, and other lake-friendly storm water runoff management practices. Include information in welcome packets.		WCLCD WCWLA WDNR Healthy Lakes grants	Ongoing
Minimize impervious surfaces directly around the lake.	Shoreland property owners	WCLCD	

Objective 6.2. Minimize impacts to Lake Napowan from septic systems.

Actions	Lead person/group	Resources	Timeline
Encourage lake residents to pump their septic tanks and have their system inspected every three years.	Waushara County	Private septic pumping companies	Ongoing
Maintain and replace septic systems, as needed.	Shoreland property owners	Plumbers	Ongoing
Refrain from dumping hazardous chemicals or cleaning products (cleaning products, paints, motor oil, pesticides, etc.) down the drain.	Shoreland property owners		Ongoing

Goal 7. Collect long term data on Lake Napowan to monitor trends, declines, and improvements over time.

Objective 7.1. Monitor water quality parameters in Lake Napowan.

Actions	Lead person/group	Resources	Timeline
Monitor water clarity approximately 5 times each summer. Receive training from the Citizen Lake Monitoring Network (CLMN) Coordinator for Waushara Co.	LNLA	Waushara County CLMN Coordinator	Summer each year
Begin monitoring water chemistry (total phosphorus, inorganic nitrogen) during spring/fall.	LNLA	Waushara County CLMN Coordinator UWSP WEAL	Spring/fall overturn
Begin ice-on/ice-off monitoring.	LNLA	WDNR website	Ongoing in Spring and fall
Submit any monitored/collected data to WDNR for storage and access.	Monitors	WDNR	Ongoing
Work with County to install a lake level monitoring well near Lake Napowan and provide training to collect data over time.	LNLA	WCLCD	Ongoing – year round

Goal 8. Protect Lake Napowan during times of low water.

Objective 8.1. Minimize impacts to Lake Napowan during times of low water levels.

Actions	Lead person/group	Resources	Timeline
Refrain from the removal and disturbance of exposed vegetation and/or woody habitat (sticks, logs, etc.) during times of low water.	Shoreland property owners Lake users	UWEX Lakes (information)	As needed
Minimize disturbance to the lake bed during times of low water.	Shoreland property owners Lake users	UWEX Lakes (information)	As needed
Connect with other lake groups and organizations in the area focused on water level/groundwater issues in Central Wisconsin.	Shoreland property owners Lake users	WCWLC Friends of Central Sands	Ongoing

Shorelands

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

To better understand the health of the Waushara County lakes, shorelands were evaluated. The survey inventoried the type and extent of shoreland vegetation. Areas with erosion, rip-rap, barren ground, sea walls, structures and docks were also inventoried (Figure 1). A scoring system was developed for the collected data to provide a more holistic assessment. Areas that are healthy will need strategies to keep them healthy, and areas with potential problem areas and where management and conservation may be warranted may need strategies for improvement. The scoring system is based on the presence/absence and abundance of shoreline features, as well as their proximity to the water's edge. Values were tallied for each shoreline category and then summed to produce an overall score. Higher scores denote a healthier shoreline with good land management practices. These are areas where protection and/or conservation should be targeted. On the other hand, lower scores signify an ecologically unhealthy shoreline. These are areas where management and/or mitigation practices may be desirable for improving water quality and habitat.

The summary of scores for shorelands around Lake Napowan is displayed on the map in Appendix C. Shoreland Survey – 2010. Large stretches of Lake Napowan's shorelands are in good to moderately-good shape, but a few portions have challenges that should be addressed. One segment along the northeastern shore was ranked as poor.

In 1966, shoreland ordinances were enacted to improve water quality and habitat and to protect our lakes. County and state (NR 115) shoreland ordinances stated unmowed vegetation should extend at least 35 feet inland from the water's edge, with the exception of an optional 30 foot access corridor for each shoreland parcel. Given the number of parcels (31) on Lake Napowan, 930 feet is the total *allowable* for access corridors. The 2010 shoreland survey indicated that 2,392 feet of shoreline were mowed within 15 feet of the water's edge, meaning approximately 1,462 feet of Lake Napowan's shoreline is in need of restoration to achieve minimum recommendations. Although some properties have been grandfathered in under the 1966 ordinance, following this guidance would benefit the health of the lake and its inhabitants.

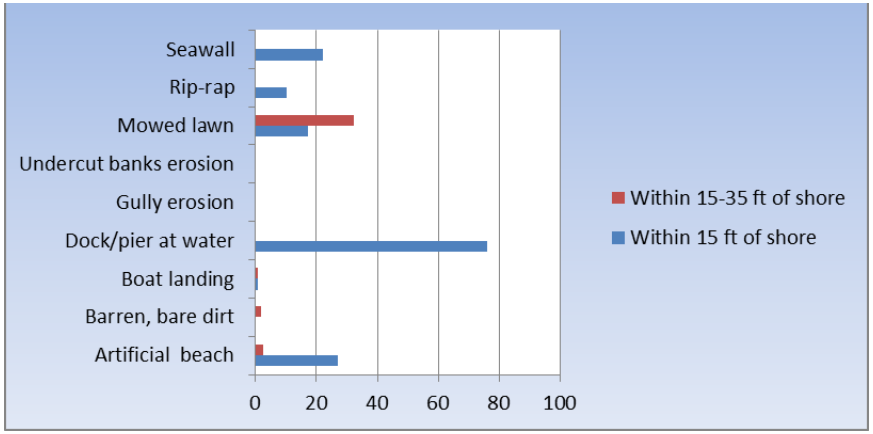

Figure 1. Land management practices by percentage of shoreline, 2010.

Guiding Vision for Lake Napowan's Shorelands

Lake Napowan will have a shoreland that provides aesthetic beauty, water quality benefits, and habitat.

Goal 9. Shorelands will be healthy and provide habitat and improve water quality.

Over the next 5 years, restore at least 334 feet of the shoreline with shoreland vegetation that extends at least 35 feet from the water's edge.

Objective 9.1. Encourage and foster interest in shoreland restoration, and provide educational opportunities about shoreland restoration to those living around the lake.

Actions	Lead person/group	Resources	Timeline
Restore and showcase a "demonstration site" with a sign at the water's edge about shoreland restoration, and/or host a "shoreland tour".	LNLA	WCLCD WDNR Healthy Lakes grants	
Host a speaker/demonstration: "Ways to restore your shoreline."	LNLA	WCLCD WCWLC UWEX Lakes – Patrick Goggin	
Encourage those interested in shoreland restorations to contact the WCLCD for information, advice, and/or cost share.	LNLA	WCLCD WDNR Healthy Lakes grants	

Watershed Land Use

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

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

A variety of land management practices can be put in place to help reduce impacts to our lakes. Some practices are designed to reduce runoff. These include protecting/restoring wetlands, installing rain gardens, swales, rain barrels, and routing drainage from pavement and roofs away from the lake. Some practices are used to help reduce nutrients from moving across the landscape towards the lake. Examples include manure management practices, eliminating/reducing the use of fertilizers, increasing the distance between the lake and a septic drainfield, protecting/restoring native vegetation in the shoreland, and using erosion control practices.

The surface watershed of Lake Napowan approximately 1,239 acres. Primary land uses are forest, developed land and agriculture (Figure 2). The lake's shoreland is comprised primarily of residential development, forests, and wetlands. In general, the land closest to the lake has the greatest immediate impact on water quality.

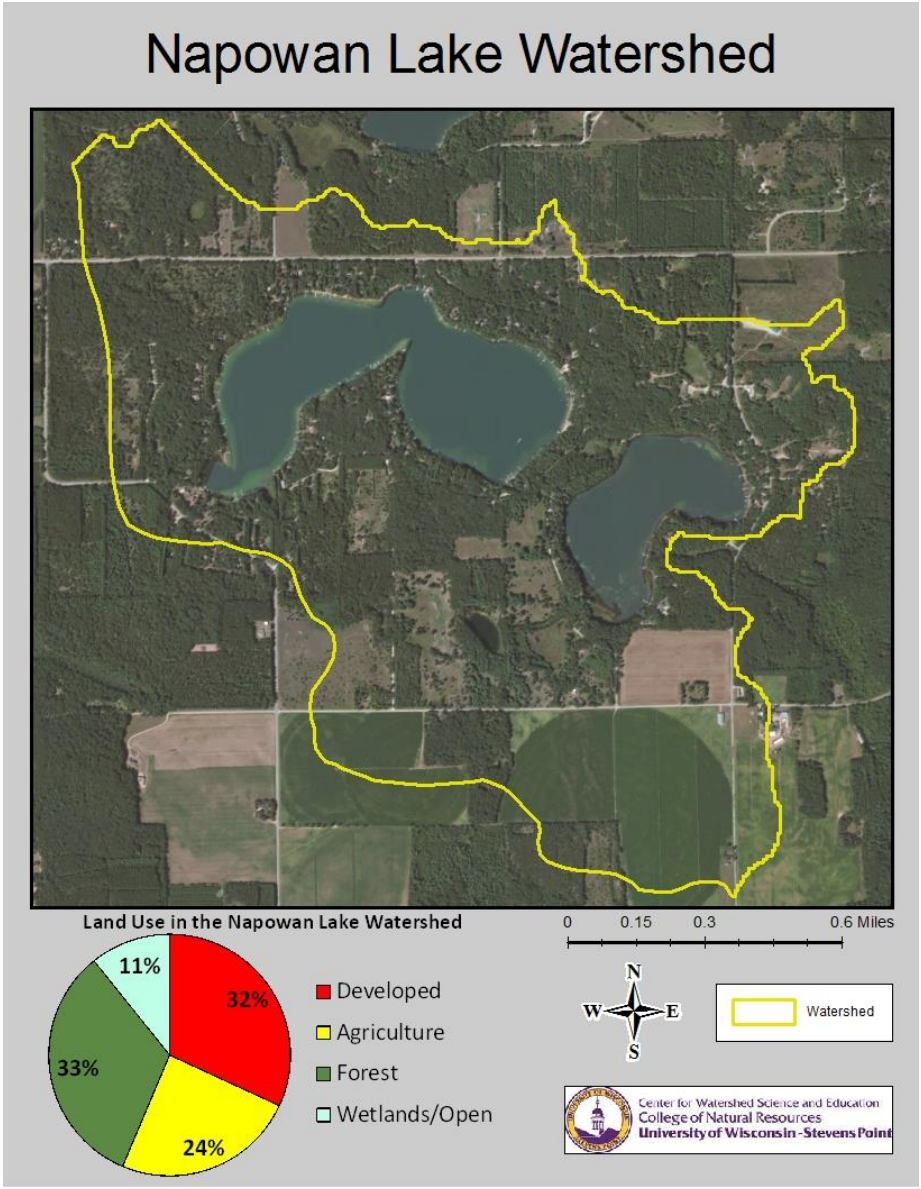

Figure 2. Surface watershed of Lake Napowan.

Guiding Vision for Lake Napowan's Watershed

Land management practices in Lake Napowan's watershed will benefit water quality.

Goal 10. Support water quality based best management practices in the watershed.

Objective 10.1. Work with the county to encourage land management beneficial to the lake within the watershed.

Actions	Lead person/group	Resources	Timeline
Waushara County will support property owners with water quality based best management practices.	Waushara County	DATCP WDNR Lake Protection grants NRCS Consultants	Ongoing
Support the County in high residue management activities, work with no-till practices, and utilize funding available for other best management practices.	Waushara County	DATCP WDNR Lake Protection grants NRCS Consultants	Ongoing
Encourage the County to work with the Highway Department and Towns to put runoff management practices such as swales in place when reconstructing roads.	WCLCD	Town of Mt. Morris WDOT	Ongoing

Objective 10.2. Work with landowners surrounding the lake to improve management practices (see also "Shorelands").

Actions	Lead person/group	Resources	Timeline
Encourage soil testing for shoreland residents.	LNLA	WC UWEX WCLCD	
Support property owners within the watershed who are interested in placing land in conservation programs such as conservation easements, purchase of development rights, etc.	LNLA	NCCT Gathering Waters NRCS WDNR Lake Protection grants Knowles-Nelson Stewardship Fund	As needed
In the case of future developments around the lake, support the County/Town/developer in considering mindful development practices such as conservation design or density bonus.	LNLA	Town of Mt. Morris Waushara County Planning and Zoning WCLCD	As needed

People and the Lake

The people that interact with the lake are a key component of the lake and its management. In essence, a lake management plan is a venue by which people decide how they would like people to positively impact the lake. The plan summarizes the decisions of the people to take proactive steps to improve their lake and their community. Individual decisions by lake residents and visitors can have 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 a lake association, community, and suite of lake users are essential to maximize the effects of plan implementation.

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

Recreation

Lake Napowan is enjoyed by people who swim, boat, fish, and appreciate its beauty. Boating hours are between 10 a.m. and 4:30 p.m. No wake is allowed outside of those times. Residents present at the meeting do not feel that major conflicts currently exist with this arrangement. They would, however, like to see more respectful use of some of the motorized watercraft (particularly jet skis).

Guiding Vision for Recreation

Lake Napowan will be a peaceful place for family recreation and relaxation including the harmonious use of motorized and non-motorized watercraft.

Goal 11. Maintain the peaceful nature of Lake Napowan.

Objective 11.1. Work with local municipalities to protect Lake Napowan.

Actions	Lead person/group	Resources	Timeline
Install a descriptive sign at the boat launchs highlighting the beauty and value of the lake and asking visitors to respect it a recreate responsibly.		Town of Mt Morris	

Communication and Organization

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

The Lake Napowan Lake Association currently holds an annual meeting and hosts a website to communicate with lake residents and Association members. Among the participants in attendance at lake planning sessions, concerns were voiced regarding participation in any lake management initiatives such as shoreland restoration and involvement in the Association. Interest in expanding communication among the lake community and/or developing means of informing residents of stewardship practices was expressed in the August 12, 2014 planning session.

Guiding Vision for Communication

The Lake Napowan Community will be connected and informed in lake stewardship.

Goal 12. Increase participation in lake management stewardship.

Objective 12.1. Develop opportunities for education and outreach among full-time and part-time residents.

Actions	Lead person/group	Resources	Timeline
Mail welcome packets to shoreland owners with stewardship information (aquatic invasive species, impacts of fertilizers, shoreland restoration, etc.) and calendar of scheduled Association events or get-togethers.	Waushara County	UWEX Lakes	Ongoing
Consider planning a social event(s) and inviting a speaker or hosting a demonstration (for example, how to restore a shoreline).	LNLA	WCLCD UWEX Lakes RC&D WDNR Lake professionals	
Host annual meeting to encourage discussions about Lake Napowan and prioritize actions from this plan.	LNLA		Annually
Communicate with other groups in Waushara County by sending a representative to WCWLC quarterly meetings	LNLA	WCWLC WC UWEX	Ongoing
Communicate with statewide lake stewards by encouraging Association members to participate in annual Wisconsin Lakes Convention and Lake Leaders Institute.		UWEX Lakes	Annually Semi-annually

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.

Guiding Vision for Updates and Revisions

Lake Napowan will have an up-to-date, accurate and comprehensive lake management plan that is reviewed annually and documents all management activities and effects.

Goal 13. Review plan annually and update as needed.

Objective 13.1. Communicate updates with community members and members of the Association.

Actions	Lead person/group	Resources	Timeline
Review plan at Annual meeting to celebrate what has been accomplished and prioritize activities for upcoming year.	LNLA		Annually
Update plan every 5 years.	LNLA	WCWLC WCLCD Consultant	2019

Governance

Written by Patrick Nehring, Community Agent, UW-Extension Waushara County.

Lake Management Plan Approval

The draft lake management plan will be completed by the lake association/district board, a committee, or a committee of the whole. The final draft of the lake management plan will be approved through a vote of the lake association/district membership or board. The final draft will be approved by the Wisconsin Department of Natural Resources (DNR) to have met the lake management plan requirements and grant requirements. If the DNR requires modifications or additional information before approving the plan, the plan will be changed to meet DNR requirements that are acceptable to the lake association/district. The completed plan that has been approved by the lake association/district and the DNR will be presented to the municipalities containing the lake and Waushara County. The municipality may reference the lake management plan or parts of the plan in their comprehensive plan to guide municipal or county decisions.

Lake Assistance

The lake management plan will enhance the ability of the lake to apply for financial assistance. The lake management plan will be considered as part of the application for grants through the Wisconsin Department of Natural Resources. Current listings of grants available from the DNR can be found at http://dnr.wi.gov/aid/. Waushara County offers technical and financial assistance through the Land Conservation and Zoning Department and University of Wisconsin-Extension Department. Additional assistance may be available from other agencies and organizations, including DNR, UW-Extension Lakes Program, Golden Sands RC&D, Wisconsin Wetlands Association, and Wisconsin Trout Unlimited.

Lake Regulations

The lake management plan is superseded by federal, state, county, and municipal laws and court rulings. However, the lake management plan may influence county and municipal ordinances and enforcement, which is why the lake management plan will be reviewed and included or referenced in the county and related municipal comprehensive plans. Federal laws contain regulations related to water quality, wetlands, dredging, and filling. State laws contain regulations related to water quality, water and lake use, aquatic plants and animals, shoreline vegetation, safety, and development. County laws contain regulations related to development, safety, use, and aquatic plants and animals. Municipal laws contain regulation of use and safety. The court system interprets these rules and regulations. The rules and regulations are primarily enforced by the US Army Corps of Engineers, the Wisconsin Department of Natural Resources, the Waushara County Sheriff Department, and the Waushara County Land Conservation and Zoning Office. If considering development near or on a lake, addressing problem plants or animals, or changing the lake bottom contact the Waushara County Land Conservation & Zoning Department at the Waushara County Courthouse (920) 787-0443 and/or the Wisconsin Department of Natural Resources (888) 936-7463.

Comprehensive Plans

The lake management plan and changes to the plan will be presented to the County and the Municipality for review and possible incorporation into their comprehensive plans. The comprehensive plan is intended to be used to guide future decision. Zoning, subdivision, and official mapping decisions must be consistent with the comprehensive plan.

Process for Inclusion in the Municipal Comprehensive Plan

The Municipal Plan Commission will review the lake management plan to determine if it is consistent with the municipality's comprehensive plan. If the lake management plan is found by the Municipal Plan Commission to not be consistent with the municipality's comprehensive plan, the plan commission may (a) recommend changes to the comprehensive plan or (b) ask that an aspect of the lake management plan be revisited. When the Municipal Plan Commission has reached a consensus that the lake management plan aligns with the municipality's vision, the Municipal Plan Commission will develop an amendment to the comprehensive plan referencing the lake management plan. This could include a reference to the lake management plan under local policies in the agricultural, natural and cultural resources background information and the addition of a recommendation to support the lake management plan and to implement the applicable recommendations contained in the lake management. The Municipal Plan Commission will recommend by resolution that the amendment to the comprehensive plan be adopted by the Municipal Board. A public hearing on the changes to the comprehensive plan will be held with a thirty-day class one notice. The Municipal Board will consider the recommendations from the Municipal Plan Commission. The Municipal Board may (a) adopt the recommendations to the comprehensive plan by ordinance, (b) adopt by ordinance the recommendations with changes, or (c) request the plan commission revisit the changes to the comprehensive plan.

Process for Inclusion in the County Comprehensive Plan

Waushara County Land Use Committee will review the updates to the municipality's comprehensive plan and the lake management plan as referenced by the municipality's comprehensive plan to determine if they are consistent with the County's comprehensive plan. If they are found by the land use committee to not be consistent with the municipality's comprehensive plan, the land use committee may (a) recommend changes to the County's comprehensive plan or (b) ask that an aspect of the lake management plan or municipality's comprehensive plan be revisited. When the Land Use Committee has reached a consensus that the updates to the municipality's comprehensive plan and the lake management plan aligns with the county's vision, and if it is not already consistent, it will develop an amendment to the County's comprehensive plan. The amendment may be include a reference to the lake management plan under local policies in the agricultural, natural and cultural resources background information and the addition of a recommendation to support the lake management plan and to implement the applicable recommendations contained in the lake management. The Land Use Committee will recommend the amendment to the comprehensive plan to the Land, Water, and Education Committee.

The Land, Water, and Education Committee will review the amendment and if it concurs with the recommendation from the Land Use Committee, it will make a recommendation to the Planning & Zoning Committee. The Planning & Zoning Committee will hold a public hearing with a thirty-day class one notice. The Planning & Zoning Committee will recommend by resolution the amendment to the comprehensive plan or the amendment with changes be adopted by the County Board.

The County Board will consider the recommendations from the Planning & Zoning Committee. The County Board may (a) adopt the amendment to the comprehensive plan by ordinance, (b) adopt the amendment with changes, or (c) request the Land Use Committee or Planning & Zoning Committee revisit the changes to the comprehensive plan.

Use of the Comprehensive Plan

The lake management plans as referenced in the comprehensive plans will be used by the County and the Municipality to consider certain actions or in the implementation of zoning and other applicable regulations. The County Board of Adjustments and the County Planning and Zoning Committee may reference the lake management plans as referenced in the comprehensive plan when considering zone changes, variances, conditional uses, and suitable mitigation measures. The Municipality and County may take action as called for in the lake management plan as referenced in the comprehensive plan, including changes to zoning and other applicable regulations, shortly after the County's comprehensive plan has been updated or may take action as needed.

The lake organization, lake residents, riparian property owners, or other citizens may request that the Municipality or County take a specific action to implement aspects of the lake management plan as referenced in the comprehensive plan. The lake organization lake residents, riparian property owners, or other citizens may provide written or oral support to encourage the Municipality and County to reference the lake management plan when considering regulation or action that may impact the lake. The lake organization will inform the Municipality and the County when the lake management plan is updated and allow the Municipality and County an opportunity to participate in the update process.

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Appendices

Appendix A. Waushara County Lake Information Directory

Algae - Blue-Green

Contact: Ted Johnson
Wisconsin Department of Natural Resources
Phone: 920-424-2104
E-mail: TedM.Johnson@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
http://www.dhs.wisconsin.gov/eh/bluegreenalgae/contactus.htm

Aquatic Invasive Species/Clean Boats Clean Water

Contact: Golden Sands RC&D
1100 Main St., Suite 150, Stevens Point, WI 54481
Phone: 715-343-6215
Websites: www.goldensandsrcd.org and
http://dnr.wi.gov/invasives/

Aquatic Plant Management (Native and Invasive)

Contact: Ted Johnson
Wisconsin Department of Natural Resources
Phone: 920-424-2104
E-mail: TedM.Johnson@wisconsin.gov
Website: http://dnr.wi.gov/lakes/plants/

Aquatic Plant Identification

Contact: Golden Sands RC&D
1100 Main St., Suite 150, Stevens Point, WI 54481
Phone: 715-343-6215
Website: www.goldensandsrcd.org

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: Ted Johnson
Wisconsin Department of Natural Resources
Phone: 920-424-2104
E-mail: TedM.Johnson@wisconsin.gov

Aquatic Plant Surveys/Management

Contact: Ted Johnson
Wisconsin Department of Natural Resources
Phone: 920-424-2104
E-mail: TedM.Johnson@wisconsin.gov
Website: http://dnr.wi.gov/lakes/plants/

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

Contact: Ed Hernandez
Waushara County Land Conservation Department
PO Box 1109, Wautoma, WI 54982
Phone: 920-787-0453
E-mail: lcdzoning.courthouse@co.waushara.wi.us
Website:
http://www.co.waushara.wi.us/zoning.htm

Boat Landings, Signage, Permissions (County)

Contact: Scott Schuman
Waushara County Parks
PO Box 300, Wautoma, WI 54982
Phone: 920-787-7037
E-mail: wcparks.parks@co.waushara.wi.us
Website: http://www.co.waushara.wi.us/parks.htm

Boat Landings (State)

Contact: Dave Bartz
Wisconsin Department of Natural Resources
Hwy 22N, Box 430, Montello, WI 53949
Phone: 608-635-4989
E-mail: David.Bartz@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/

Conservation Easements (cont'd)

Contact: Ted Johnson
Wisconsin Department of Natural Resources
Phone: 920-424-2104
E-mail: TedM.Johnson@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: North Central Conservancy Trust
PO Box 124, Stevens Point, WI 54481
Phone: 715-344-1910
E-mail: info@ncctwi.org
Website: http://www.ncctwi.org/

Contact: NRCS Stevens Point Service Center
1462 Strongs Ave., Stevens Point, WI 54481
Phone: 715-346-1325

Critical Habitat and Sensitive Areas

Contact: Ted Johnson
Wisconsin Department of Natural Resources
Phone: 920-424-2104
E-mail: TedM.Johnson@wisconsin.gov
Website: http://dnr.wi.gov/lakes/criticalhabitat/

Dams

Contact: Joe Behlen
Wisconsin Department of Natural Resources
473 Griffith Ave., Wisconsin Rapids, WI 54494
Phone: 715-421-9940
E-mail: joseph.behlen@wisconsin.gov
Website:
http://dnr.wi.gov/org/water/wm/dsfm/dams/

Fertilizers/Soil Testing

Contact: Ken Williams
Waushara County UW-Extension
209 S St. Marie Street, PO Box 487, Wautoma, WI 54982
Phone: 920-787-0416
E-mail: ken.williams@ces.uwex.edu
Website:
http://waushara.uwex.edu/agriculture/services

Fisheries Biologist (management, habitat)

Contact: Dave Bartz
Wisconsin Department of Natural Resources
Hwy 22N, Box 430, Montello, WI 53949
Phone: 608-635-4989
E-mail: David.Bartz@wisconsin.gov
Website: http://dnr.wi.gov/fish/

Frog Monitoring—Citizen Based
Contact: Andrew Badje
Wisconsin Department of Natural Resources
Phone: 608-266-3336
E-mail: Andrew.badje@wisconsin.gov
E-mail: WFTS@wisconsin.gov

Grants

Contact: Ted Johnson
Wisconsin Department of Natural Resources
Phone: 920-424-2104
E-mail: TedM.Johnson@wisconsin.gov
Website: http://dnr.wi.gov/Aid/Grants.html#tabx8

Contact: Ed Hernandez
Waushara County Land Conservation Department
PO Box 1109, Wautoma, WI 54982
Phone: 920-787-0453
E-mail: lcdzoning.courthouse@co.waushara.wi.us
Website:
http://www.co.waushara.wi.us/zoning.htm

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: Ed Hernandez
Waushara County Land Conservation Department
Address: PO Box 1109 Wautoma, WI 54982
Phone: 920-787-0453
E-mail: lcdzoning.courthouse@co.waushara.wi.us

Groundwater Levels/Quantity (cont'd)

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

Contact: Scott Provost
Wisconsin Department of Natural Resources
473 Griffith Ave., Wisconsin Rapids, WI 54494
Phone: 715-421-7881
E-mail: scott.provost@wisconsin.gov
Website:
http://prodoasext.dnr.wi.gov/inter1/hicap$.startup

Informational Packets

Contact: UWSP Center for Watershed Science & Education
TNR 224, 800 Reserve St. Stevens Point, WI 54481
Phone: 715-346-2497
E-mail: pclakes@uwsp.edu

Lake Groups – Friends, Associations, Districts

Contact: Patrick Nehring
UWEX Economic Resource Development Agent
PO Box 487, Wautoma, WI 54982
Phone: 920-787-0416
E-mail: Patrick.nehring@ces.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/

Lake Groups (cont'd)

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/

Land Use Plans and Zoning Ordinances

Contact: Terri Dopp-Paukstat
Waushara County Planning and Zoning
PO Box 1109, Wautoma, WI 54982
Phone: 920-787-0453
E-mail: lcdzoning.courthouse@co.waushara.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: Ed Hernandez
Waushara County Land Conservation Department
PO Box 1109, Wautoma, WI 54982
Phone: 920-787-0453
E-mail: lcdzoning.courthouse@co.waushara.wi.us
Website:
http://www.co.waushara.wi.us/zoning.htm

Contact: NRCS Stevens Point Service Center
1462 Strongs Ave., Stevens Point, WI 54481
Phone: 715-346-1325

Parks (County)

Contact: Scott Schuman
Waushara County Parks
PO Box 300, Wautoma, WI 54982
Phone: 920-787-7037
E-mail: wcparks.parks@co.waushara.wi.us
Website: http://www.co.waushara.wi.us/parks.htm

Purchase of Development Rights

Contact: North Central Conservancy Trust
PO Box 124, Stevens Point, WI 54481
Phone: 715-341-7741
E-mail: info@ncctwi.org
Website: http://www.ncctwi.org/

Purchase of Land

Contact: Ted Johnson
Wisconsin Department of Natural Resources
Phone: 920-424-2104
E-mail: TedM.Johnson@wisconsin.gov
Website: http://dnr.wi.gov/topic/stewardship/

Rain Barrels – Order

Contact: Golden Sands RC&D
1100 Main St., Suite 150, Stevens Point, WI 54481
Phone: 715-343-6215
Website: http://www.goldensandsrcd.org/store

Rain Gardens and Stormwater Runoff

Contact: Ed Hernandez
Waushara County Land Conservation Department
PO Box 1109, Wautoma, WI 54982
Phone: 920-787-0453
E-mail: lcdzoning.courthouse@co.waushara.wi.us
Website:
http://www.co.waushara.wi.us/zoning.htm

Septic Systems/Onsite Waste

Contact: Terri Dopp-Paukstat
Waushara County Planning and Zoning
PO Box 1109, Wautoma, WI 54982
Phone: 920-787-0453
E-mail: lcdzoning.courthouse@co.waushara.wi.us
Website:
http://www.co.waushara.wi.us/zoning.htm

Shoreland Management

Contact: Ed Hernandez
Waushara County Land Conservation Department
PO Box 1109, Wautoma, WI 54982
Phone: 920-787-0453
E-mail: lcdzoning.courthouse@co.waushara.wi.us
Website:
http://www.co.waushara.wi.us/zoning.htm

Shoreland Vegetation

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

Shoreland Zoning Ordinances

See: Land Use Plans and Zoning Ordinances

Soil Fertility Testing

Contact: Ken Williams
Waushara County UW-Extension
209 S St. Marie Street, PO Box 487, Wautoma, WI 54982
Phone: 920-787-0416
E-mail: Ken.williams@ces.uwex.edu
Website: http://waushara.uwex.edu/index.html

Water Quality Monitoring

Contact: Ted Johnson
Wisconsin Department of Natural Resources
Phone: 920-424-2104
E-mail: TedM.Johnson@wisconsin.gov

Contact: UWSP Wisconsin Environmental Analysis Laboratory
TNR 200, 800 Reserve St., Stevens Point, WI 54481
Stevens Point, WI 54481
Phone: 715-346-3209
E-mail: weal@uwsp.edu
Website: http://www.uwsp.edu/cnr-ap/weal/Pages/default.aspx

Water Quality Problems

Contact: Ted Johnson
Wisconsin Department of Natural Resources
Phone: 920-424-2104
E-mail: TedM.Johnson@wisconsin.gov

Water Quality Problems (cont'd)

Contact: Nancy Turyk
UWSP Center for Watershed Science and Education
TNR 216, 800 Reserve St., Stevens Point, WI 54481
Phone: 715-346-4155
E-mail: nturyk@uwsp.edu

Wetlands

Contact: Keith Patrick
Wisconsin Department of Natural Resources
5301 Rib Mountain Drive, Wausau, WI 54401
Phone: 715-241-7502
E-mail: keith.patrick@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: Dave Bartz
Wisconsin Department of Natural Resources
Phone: 608-635-4989
Address: Hwy 22N Box 430, Montello, WI 53949
E-mail: David.Bartz@wisconsin.gov

If you are looking for any information that is not listed in this directory, please contact:
Ryan Haney (wclakes@uwsp.edu)
UWSP Center for Watershed Science and Education
TNR 224, 800 Reserve St., Stevens Point, WI 54481
Phone: 715-346-2497

Appendix B. Aquatic Plants

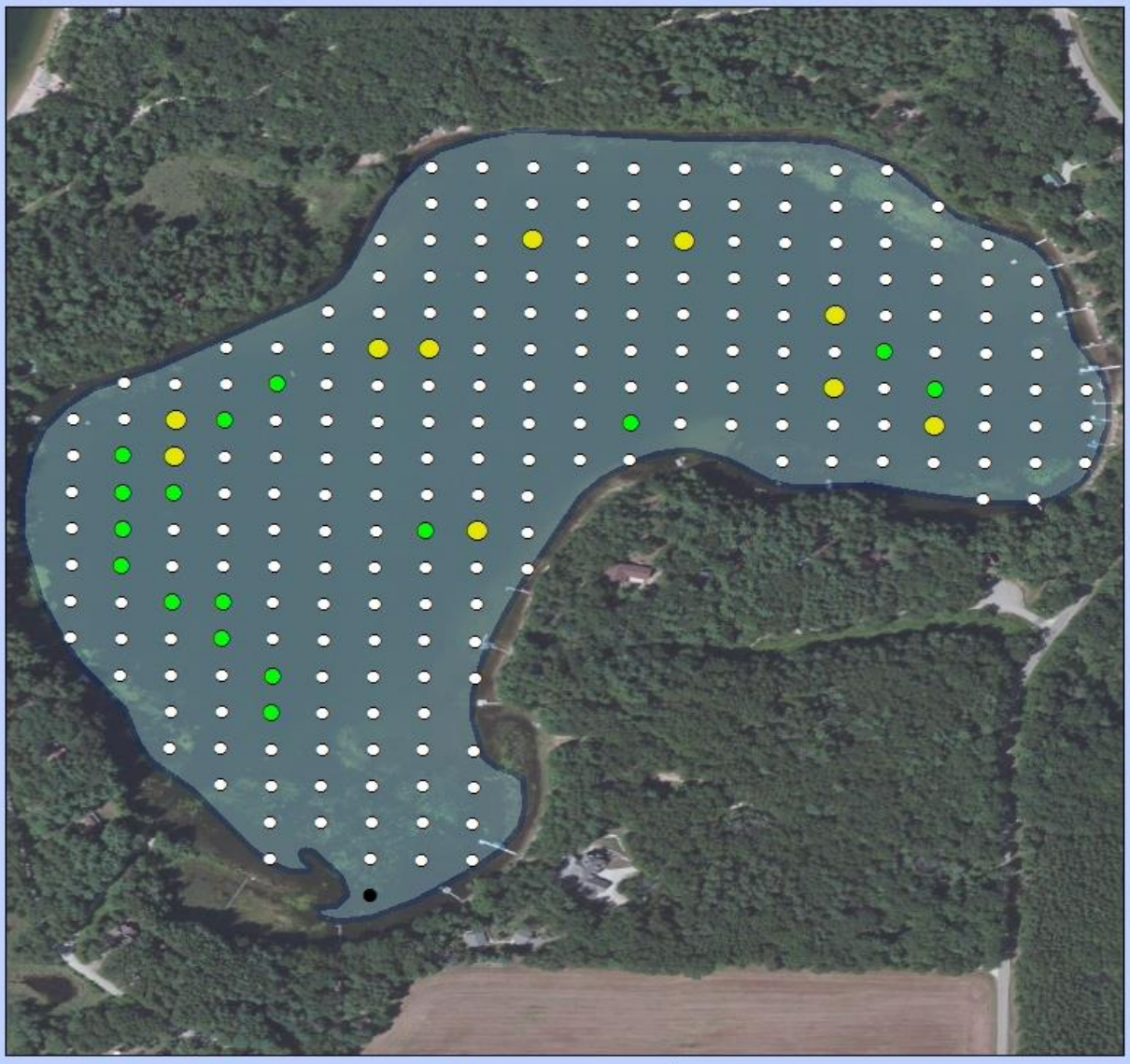
Lake Napowan aquatic plant survey summary, 2013.

	Lake Average	Statewide Average	North Central Hardwood Forests Ecoregion Average
Littoral Frequency of Occurrence (%)	96.48	74.3	76
Maximum Depth of Plant Growth (ft)	19.75	15.3	15.9
Species Richness (Including visuals)	25	16.8	16.2
Floristic Quality Index (FQI)	26.63	24.1	23.3

Frequency of occurrence of aquatic plant species observed in Lake Napowan, 2013.

Scientific Name	Common Name	Coefficient of Conservatism Value (C Value)	2013 % Frequency of Occurrence
Emergent Species			
Sagittaria	Arrowhead	7	1.83
Floating-leaf Species			
Brasenia schreberi	Watershield	6	1.83
Nymphaea odorata	White water lily	6	3.2
Submergent Species			
Ceratophyllum demersum	Coontail	3	27.85
Najas guadalupensis	Southern naiad	8	27.4
Elodea canadensis	Common waterweed	3	24.2
Potamogeton gramineus	Variable pondweed	7	22.37
Chara	Muskgrasses	7	21.92
Vallisneria americana	Wild celery	6	21
Potamogeton zosteriformis	Flat-stem pondweed	6	18.26
Myriophyllum spicatum	Eurasian watermilfoil	0	11.87
Potamogeton amplifolius	Large-leaf pondweed	7	10.96
Nitella	Nitella	7	9.13
Najas flexilis	Slender naiad	6	8.22
Potamogeton pusillus	Small pondweed	7	8.22
Potamogeton illinoensis	Illinois pondweed	6	5.94
Potamogeton praelongus	White-stem pondweed	8	5.94
Potamogeton natans	Floating-leaf pondweed	5	2.74
Nelumbo lutea	American lotus	7	0.46
Potamogeton friesii	Fries' pondweed	8	0.46

Lake Napowan Aquatic Plant Survey 2013:
Presence of Eurasian Water-Milfoil (*Myriophyllum spicatum*)



0 285 570 1,140 Feet

N
W E
S

Relative Species Abundance Ranking

- 0
- 1
- 2
- 3
- Visual

Center for Watershed Science and Education
College of Natural Resources
University of Wisconsin-Stevens Point

Aquatic Plant Management Strategies

General recommendations:

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

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

The following options were discussed as options for Lake Napowan at the Aquatic Plant Planning Session which took place on July 8, 2014:

No Action

ADVANTAGES

- No associated cost.
- Least disruptive to lake ecosystem.

LIMITATIONS

- May not be effective in achieving aquatic plant management objectives.

Hand Pulling

ADVANTAGES

- Can be used for thinning aquatic plants around docks.
- Can target specific plants - with proper training.
- Can be effective in controlling small infestations of aquatic invasive species.
- No associated cost.

LIMITATIONS

- Removes near-shore wildlife and fish habitat.
- Opens up areas where invasives can become established.
- If aquatic invasive species are not pulled properly, could worsen the problem.

Hand Pulling Using Suction

ADVANTAGES

- Can be used for thinning plants around docks.
- Can be used in deeper areas (with divers).
- Can target specific plants with proper training.
- Can be effective in controlling small infestations of aquatic invasive species.
- May be useful in helping to remove upper root mass of aquatic invasive species.

LIMITATIONS

- Costs associated with hiring a diver may be comparable to chemical treatment expenses.
- Currently an experimental treatment – not readily available.
- If aquatic invasive species are not pulled properly, could worsen the problem.

Chemical Treatment: Spot

ADVANTAGES

- May be less destructive to lake ecosystem than lake-wide treatment.

LIMITATIONS

- Only considered in lakes with aquatic invasive plants.
- Usually not fully effective in eradicating target species.
- Contaminants may remain in sediment.
- Effects on lake ecosystem not fully understood.
- Does not remove dead vegetation, which depletes oxygen and releases nutrients, adds to build-up of muck.
- Extra nutrients may spur additional aquatic plant and algae growth.

The following options were not chosen or discussed for Lake Napowan:

Mechanical Harvesting

ADVANTAGES

- Removes plant material and nutrients.
- Can target specific locations.
- Used to manage larger areas for recreational access or fishery management.

LIMITATIONS

- Not used in water depths less than 3 feet.
- Some harm to aquatic organisms.
- Is a temporary control.
- Risk of introduction of new aquatic invasive species (on a hired harvester) or spread of some existing invasive species.
- Hired cost at least $150/hr.

Water Level Manipulation

ADVANTAGES

- Controls aquatic plants in shallower, near-shore areas.
- Can be low cost.

LIMITATIONS

- Requires a controlling structure on the lake.
- May cause undesired stress on ecosystem.
- Cannot be used frequently.

Milfoil Weevils

ADVANTAGES

- Natural, native maintenance of native and exotic milfoils.
- Prefers the aquatic invasive Eurasian Watermilfoil.
- Some lakes may already have a native populations; need a professional stem count and assessment of shoreland health, structure of fishery, etc.
- Doesn't harm lake ecosystem.

LIMITATIONS

- Require healthy shoreline habitat for overwintering.
- Cannot survive in areas of mechanical harvesting or herbicide application.
- Effectiveness highly variable between lakes (only works well for some lakes).
- Limited access to weevils for purchase in WI.
- Still considered experimental.

Chemical Treatment: Lake-wide

ADVANTAGES

- May reduce aquatic invasives for a time.
- Treatment not needed as frequently.

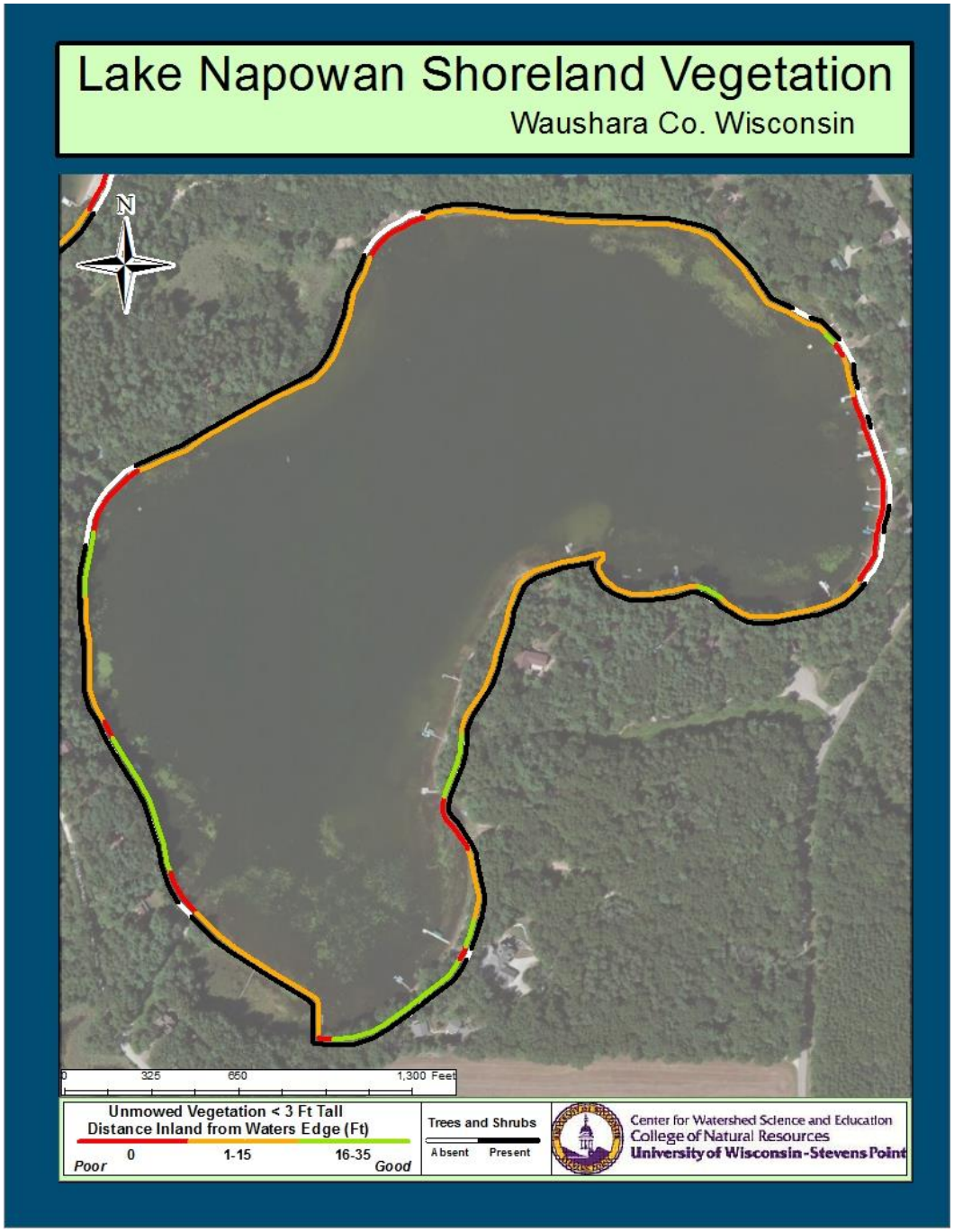
LIMITATIONS

- Only considered in lakes with aquatic invasive plants.
- Usually not fully effective in eradicating target species.
- Contaminants may remain in sediment.
- Does not remove dead vegetation, which depletes oxygen and releases nutrients, adds to build-up of muck.
- Extra nutrients may spur additional aquatic plant and algae growth.
- Negatively affects native vegetation.
- Effects on lake ecosystem not fully understood.
- Opens up space once taken up by natives for invasive species to colonize once again.
- ~$4000 per 5 acres.

Appendix C. Shoreland Survey – 2010

A scoring system was developed for the collected data to provide a more holistic assessment. Areas that are healthy will need strategies to keep them healthy, and areas with potential problem areas and where management and conservation may be warranted may need a different set of strategies for improvement. The scoring system is based on the presence/absence and abundance of shoreline features, as well as their proximity to the water's edge. Values were tallied for each shoreline category and then summed to produce an overall score. Higher scores denote a healthier shoreline with good land management practices. These are areas where protection and/or conservation should be targeted. On the other hand, lower scores signify an ecologically unhealthy shoreline. These are areas where management and/or mitigation practices may be desirable for improving water quality.

The summary of scores for shorelands around Lake Napowan are displayed in the figure on the next page. The shorelands were color-coded to show their overall health based on natural and physical characteristics. Blue shorelands identify healthy shorelands with sufficient vegetation and few disturbances. Red shorelands indicate locations where changes in management or mitigation may be warranted. Large stretches of Lake Napowan's shorelands are in good to moderately-good shape, but a few portions have challenges that should be addressed. One segment along the northeastern shore was ranked as poor. For a more complete understanding of the ranking, an interactive map showing results of the shoreland surveys can be found on Waushara County's website at http://gis.co.waushara.wi.us/ShorelineViewer/.


Lake Napowan Shoreland Vegetation
Waushara Co. Wisconsin
N
0
325
650
1,300 Feet
Unmowed Vegetation < 3 Ft Tall
Distance Inland from Waters Edge (Ft)
Poor
0
1-15
16-35
Good
Trees and Shrubs
Absent
Present
Center for Watershed Science and Education
College of Natural Resources
University of Wisconsin-Stevens Point

Appendix D. Rapid Response Plan

SURVEY/MONITOR

1. Learn how to survey/monitor the lake.	**Contacts:** **Water Resource Management Specialist** Wisconsin Department of Natural Resources Phone: E-Mail: **Regional Aquatic Invasive Species (AIS) Coordinator** Golden Sands RC&D 1100 Main St., Suite #150 Stevens Point, WI 54481 Phone: 715-343-6278 E-Mail: info@goldensandsrcd.org
2. Survey/monitor the lake monthly/seasonally/annually.	If you find a suspected invasive species, report it as soon as possible using the procedure below.

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. You can use TopoZone.com to find the precise location on a digital topographic map. Click the cursor on the exact collection site and note the coordinates (choose UTM or Latitude/Longitude).	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 (Latitude/Longitude or UTM preferred, or Township/Range/Section) • Plant name (common or scientific) • Land ownership (if known) • Population description (estimated number of plants and area covered) • Habitat type(s) 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** 427 E. Tower Drive, Suite 100 Wautoma, WI 54982 Phone: (920) 787-4686 **Regional AIS Coordinator** Golden Sands RC&D 1100 Main St., Suite #150 Stevens Point, WI 54481 Phone: 715-343-6214 E-Mail : info@goldensandsrcd.org **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
5. Once the specimen is dropped off or sent for positive identification, be sure to contact:	**Regional AIS Coordinator** Golden Sands RC&D 1100 Main St., Suite #150 Stevens Point, WI 54481 Phone: 715-343-6214 E-Mail : info@goldensandsrcd.org

If an invasive species is confirmed, the Regional AIS Coordinator will make the following public information contacts:

- **Wisconsin Department of Natural Resources**
  427 E. Tower Drive, Suite 100
  Wautoma, WI 54982
  Phone: (920) 787-4686

  The town board(s) in which the water body is located

  Town of: Wautoma

  Town of: Dakota

- **The Lake District/Association** in which the waterbody is located.
  Contact:
  Phone:

- **University of Wisconsin-Stevens Point**
  Water Resource Scientist
  Nancy Turyk
  Trainer Natural Resources Building
  800 Reserve Street
  Stevens Point, WI 54481Telephone: 715-346-4155
  E-mail: nturyk@uwsp.edu

- **Local Residents**

If an invasive species is confirmed _____ of the _____will make the following public information contacts:

- **Newspapers**:

Contact the WDNR to post notice(s) at the access point(s) to the water body.

Appendix E. Lake User Survey Results

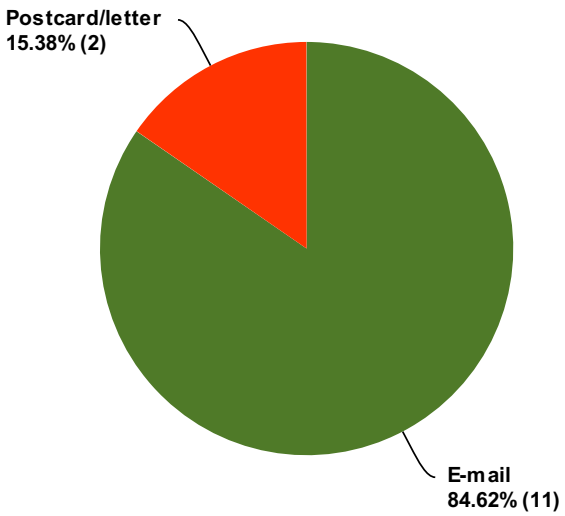
Q1 What is your Waushara County Lakes Survey ID?

Answered: 14 Skipped: 0

#	Responses	Date
1	[redacted]	6/10/2014 5:27 AM
2	[redacted]	5/28/2014 5:17 PM
3	[redacted]	5/14/2014 6:29 PM
4	[redacted]	5/13/2014 1:56 PM
5	[redacted]	5/13/2014 11:23 AM
6	[redacted]	5/12/2014 8:04 PM
7	[redacted]	4/7/2014 7:17 PM
8	[redacted]	4/4/2014 3:26 PM
9	[redacted]	3/30/2014 8:20 AM
10	[redacted]	3/27/2014 4:36 PM
11	[redacted]	3/24/2014 8:35 PM
12	[redacted]	3/21/2014 5:11 AM
13	[redacted]	3/20/2014 6:10 PM
14	[redacted]	3/5/2014 7:49 AM

Q2 How did you hear about this survey?

Answered: 13 Skipped: 1

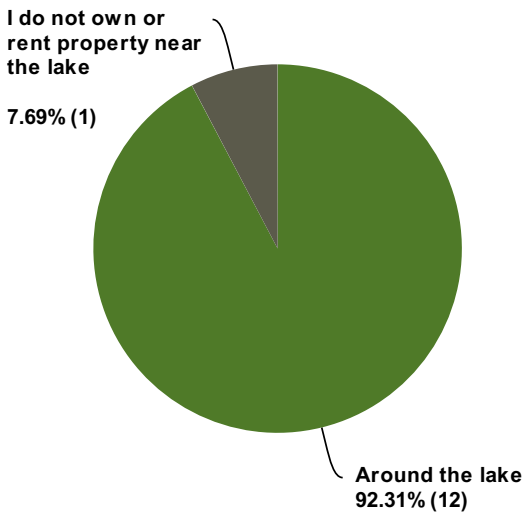


Answer Choices	Responses	
E-mail	84.62%	11
Newspaper	0.00%	0
Postcard/letter	15.38%	2
Facebook	0.00%	0
Radio	0.00%	0
Total		13

#	Other (please specify)	Date
	There are no responses.	

Q3 Do you own or rent property...

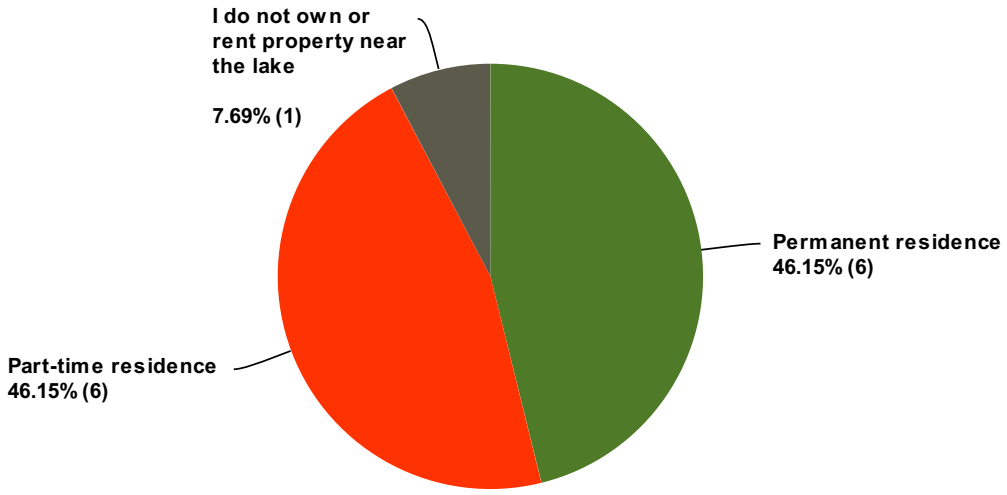
Answered: 13 Skipped: 1



Answer Choices	Responses	
Around the lake	**92.31%**	12
Less than 1/2 mile from the lake	**0.00%**	0
1/2 mile to 1 mile of the lake	**0.00%**	0
More than 1 mile from the lake	**0.00%**	0
I do not own or rent property near the lake	**7.69%**	1
Total		**13**

Q4 If you own or rent property near the lake, is this property your permanent residence, a part-time residence (such as a vacation home, rental, etc.), or other?

Answered: 13 Skipped: 1

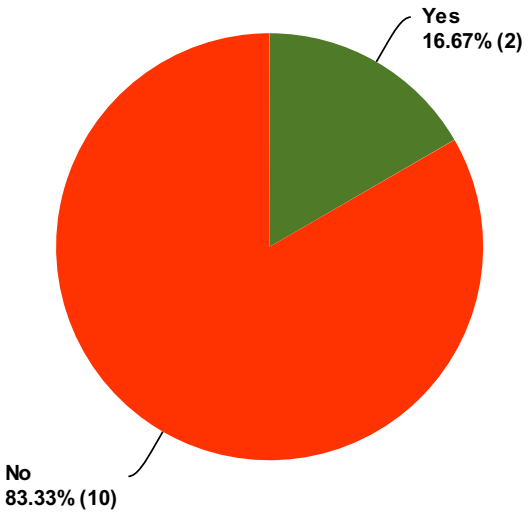


Answer Choices	Responses	
Permanent residence	46.15%	6
Part-time residence	46.15%	6
I do not own or rent property near the lake	7.69%	1
Total		13

#	Other (please specify)	Date
	There are no responses.	

Q5 I own property on or near the lake because I inherited it.

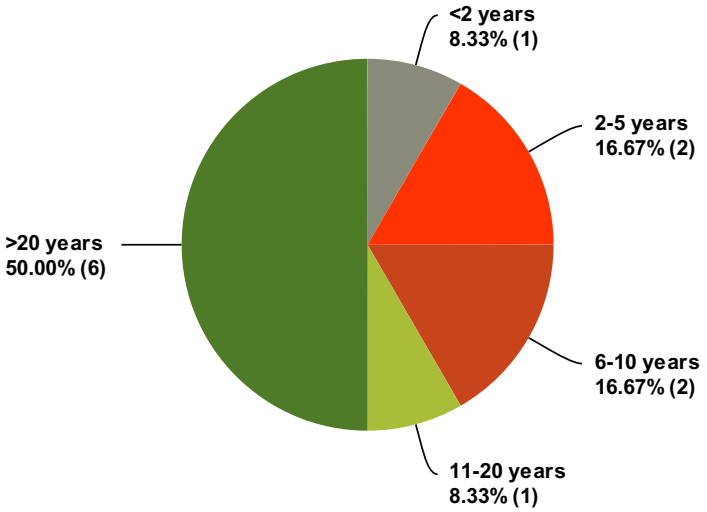
Answered: 12 Skipped: 2



Answer Choices	Responses	
Yes	16.67%	2
No	83.33%	10
Total		12

Q6 How long have you lived on, visited or recreated on the lake?

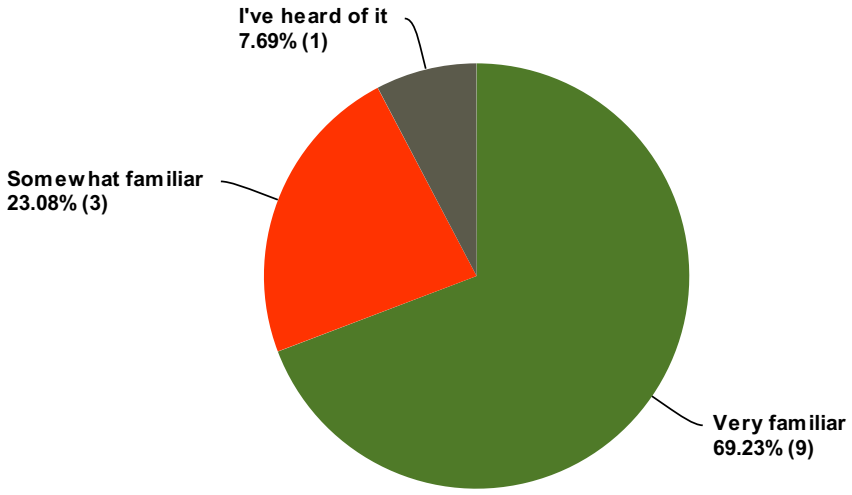
Answered: 12 Skipped: 2



Answer Choices	Responses	
<2 years	8.33%	1
2-5 years	16.67%	2
6-10 years	16.67%	2
11-20 years	8.33%	1
>20 years	50.00%	6
Total		12

Q7 Are you familiar with the Lake Napowan Association?

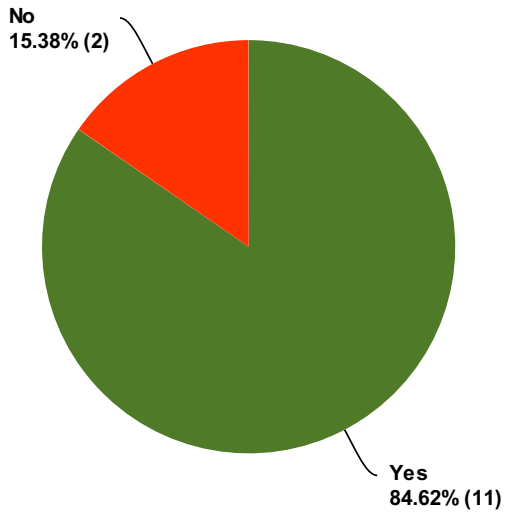
Answered: 13 Skipped: 1



Answer Choices	Responses	
Very familiar	69.23%	9
Somewhat familiar	23.08%	3
I've heard of it	7.69%	1
Never heard of it	0.00%	0
Total		13

Q8 Are you a member of the Lake Napowan Association?

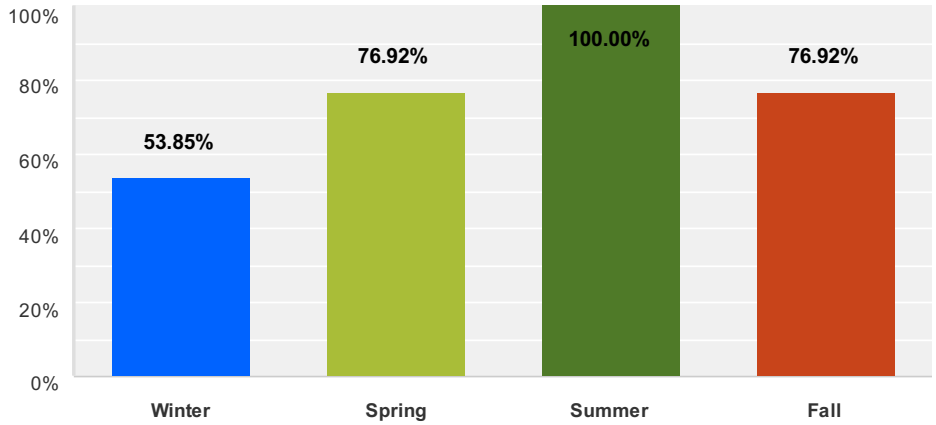
Answered: 13 Skipped: 1



Answer Choices	Responses	
Yes	84.62%	11
No	15.38%	2
I don't know	0.00%	0
Total		13

Q9 What time of year do you generally use the lake? Select all that apply.

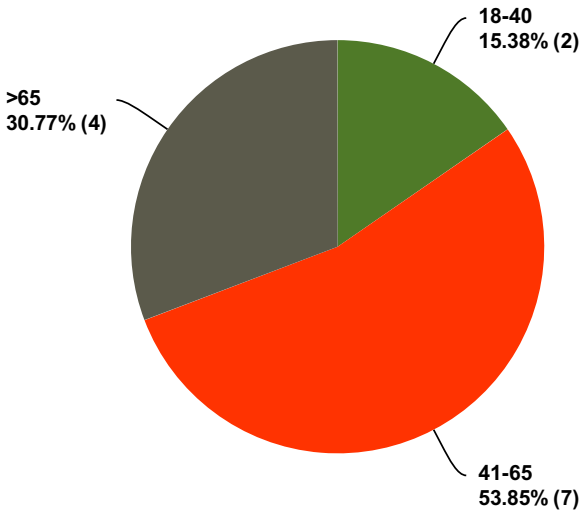
Answered: 13 Skipped: 1



Answer Choices	Responses	
Winter	53.85%	7
Spring	76.92%	10
Summer	100.00%	13
Fall	76.92%	10
Total Respondents: 13		

Q10 Which category below includes your age?

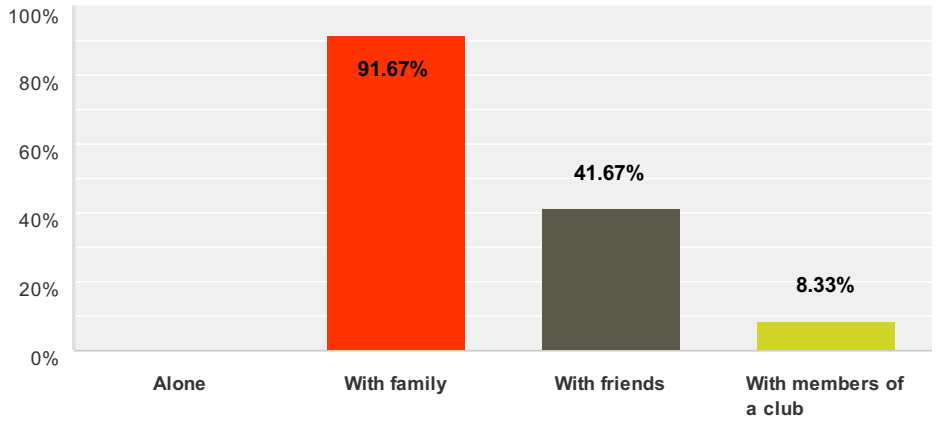
Answered: 13 Skipped: 1



Answer Choices	Responses	
Under 18	0.00%	0
18-40	15.38%	2
41-65	53.85%	7
>65	30.77%	4
Total		13

Q11 When you visit Lake Napowan, are you typically...(check all that apply)

Answered: 12 Skipped: 2

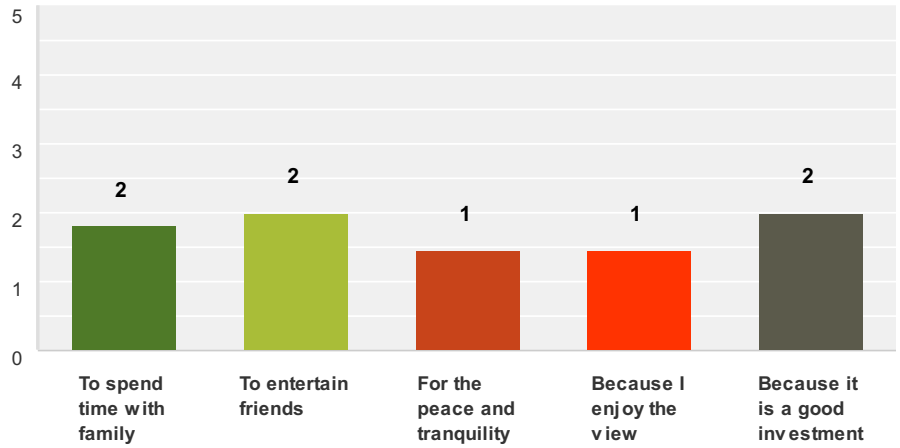


Answer Choices	Responses	
Alone	0.00%	0
With family	91.67%	11
With friends	41.67%	5
With members of a club	8.33%	1
Total Respondents: 12		

#	Other (please specify)	Date
1	live on the lake	5/12/2014 8:16 PM
2	Boy Scouts of America	3/27/2014 4:38 PM

Q12 I live on or near the lake...

Answered: 13 Skipped: 1



	Strongly Agree	Agree	Disagree	Strongly Disagree	I do not live on or near the lake	Total
To spend time with family	**41.67%** 5	**50.00%** 6	**0.00%** 0	**0.00%** 0	**8.33%** 1	12
To entertain friends	**33.33%** 4	**50.00%** 6	**8.33%** 1	**0.00%** 0	**8.33%** 1	12
For the peace and tranquility	**76.92%** 10	**15.38%** 2	**0.00%** 0	**0.00%** 0	**7.69%** 1	13
Because I enjoy the view	**76.92%** 10	**15.38%** 2	**0.00%** 0	**0.00%** 0	**7.69%** 1	13
Because it is a good investment	**38.46%** 5	**38.46%** 5	**15.38%** 2	**0.00%** 0	**7.69%** 1	13

Q13 What do you value most about Lake Napowan?

Answered: 12 Skipped: 2

#	Responses	Date
1	Natural Beauty	6/10/2014 5:29 AM
2	peace tranquility	5/14/2014 6:50 PM
3	water sports, fishing, sandy frontage	5/13/2014 1:58 PM
4	The fact that a lrge portion of the shore is undeveloped.	5/13/2014 11:27 AM
5	I just like to watch the lake as the seasons change. I also like the birds and the small animals that live here.	5/12/2014 8:16 PM
6	Beauty, Nature, Peace and Quiet.	4/7/2014 7:53 PM
7	Its relaxing atmosphere	4/4/2014 3:28 PM
8	Minimal boat traffic, good fishing.	3/30/2014 8:23 AM
9	We are the Boy Scout Camp on the property, and it is incredible the growth that Scouts go through because of their experience with the Lake.	3/27/2014 4:38 PM
10	The peace and quiet, along with the beauty of the lake, also the sunsets.	3/24/2014 8:39 PM
11	tranquility-view-all rec. lake	3/21/2014 5:18 AM
12	peace & quiet	3/20/2014 6:13 PM

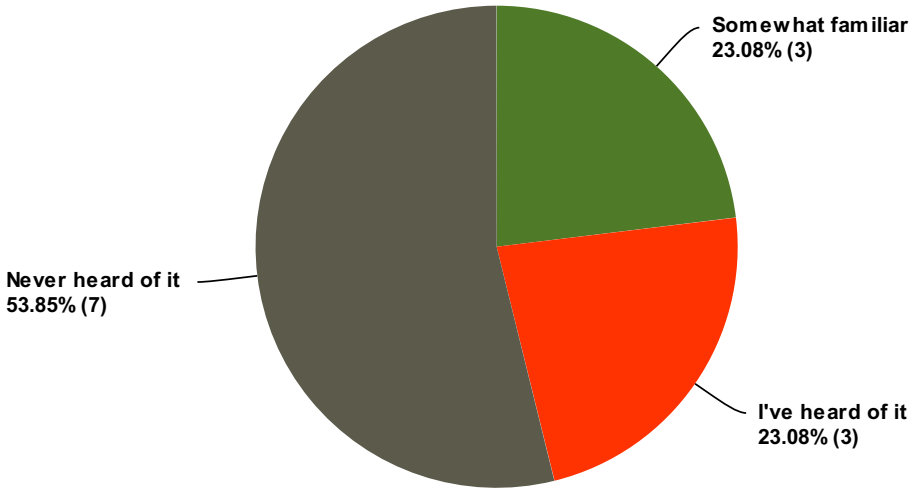
Q14 In your opinion, what should be done to restore, maintain, or improve Lake Napowan?

Answered: 13 Skipped: 1

#	Responses	Date
1	Work on controlling invasive species	6/10/2014 5:29 AM
2	BAN JET SKIIS. Lake to small for them. (SOME)Don't obey boating rules and maintain distance from people, piers and other boats. SOME boaters and jet skiers are spoiling it for the ones that obey rules.	5/14/2014 6:50 PM
3	too many weeds, milfoil ect., makes it hard for skiing tubing, boats.	5/13/2014 1:58 PM
4	Make owners more aware of the value of a buffer between the lake and a cottage.	5/13/2014 11:27 AM
5	maintain weed/invasive species control - both invasive and indigenous species that are overgrowing. Also attention given to deep water wells so overuse does not decrease the lake level	5/12/2014 8:16 PM
6	Make this small, shallow lake no wake all the time. Speedboats and PWCs stir up sediment and encourage growth of aquatic invasive species plus disturb the peace and quiet.	4/7/2014 7:53 PM
7	More fishing habitats. A better way to enforce fishing regulations	4/4/2014 3:28 PM
8	Treat invasive species, more DNR monitoring	3/30/2014 8:23 AM
9	Very murky, get rid of seaweed and other plants on the bottom of the Lake. Also, very hard to fish in during the summer, would recommend a re-population.	3/27/2014 4:38 PM
10	More should be done to control weed growth.	3/24/2014 8:39 PM
11	removal of muck	3/21/2014 5:18 AM
12	Get rid of some of the weeds; don't encourage too much fishing or boating; it's a small lake & doesn't need overuse	3/20/2014 6:13 PM
13	The launch	3/5/2014 7:50 AM

Q15 How familiar are you with Wisconsin's Public Trust Doctrine?

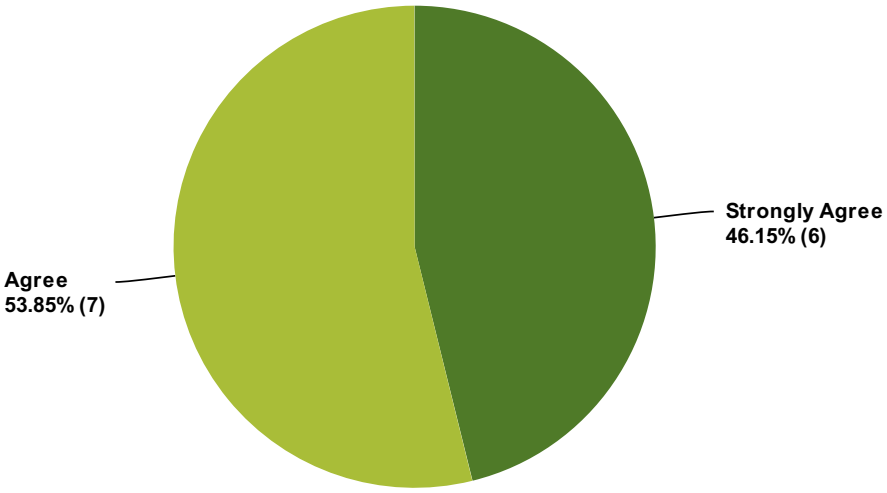
Answered: 13 Skipped: 1



Answer Choices	Responses	
Very familiar	0.00%	0
Somewhat familiar	23.08%	3
I've heard of it	23.08%	3
Never heard of it	53.85%	7
Total		13

Q16 How I recreate in and around the lake can affect other lake users.

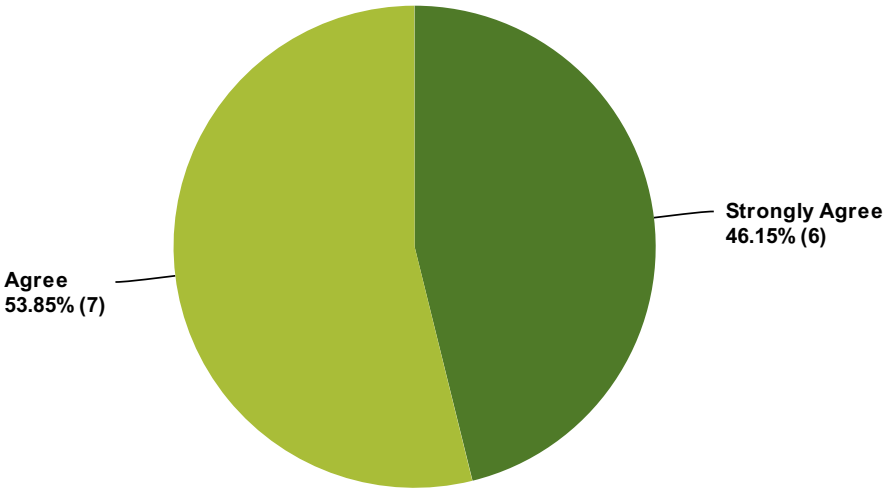
Answered: 13 Skipped: 1



Answer Choices	Responses	
Strongly Agree	46.15%	6
Agree	53.85%	7
Disagree	0.00%	0
Strongly Disagree	0.00%	0
Total		13

Q17 How I manage my land can affect other lake users.

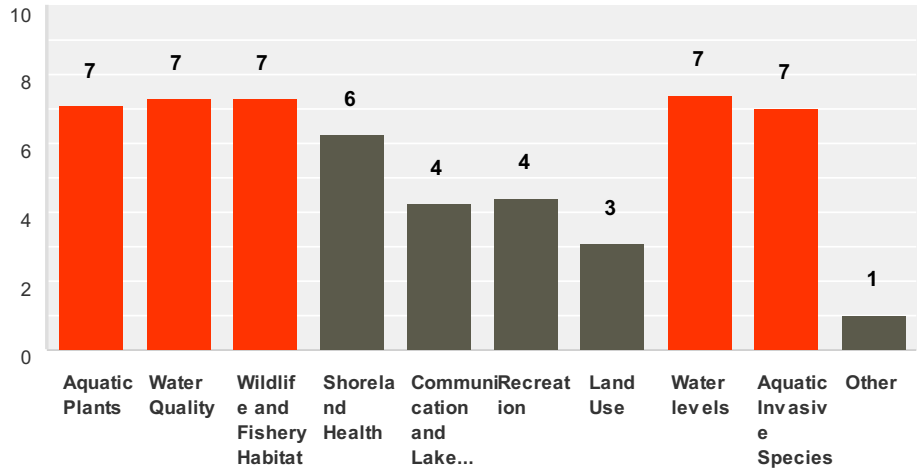
Answered: 13 Skipped: 1



Answer Choices	Responses	
Strongly Agree	46.15%	6
Agree	53.85%	7
Disagree	0.00%	0
Strongly Disagree	0.00%	0
Total		13

Q18 Which of the following meeting topics, in your opinion, are the most important to talk about regarding Lake Napowan? (Please rank at least your top three.)

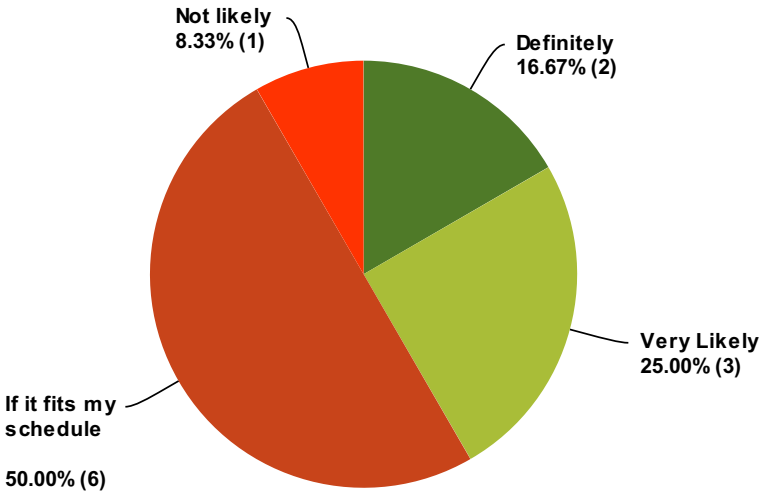
Answered: 13 Skipped: 1



	1	2	3	4	5	6	7	8	9	10	Total	Average Ranking
Aquatic Plants	23.08% 3	15.38% 2	15.38% 2	7.69% 1	7.69% 1	7.69% 1	7.69% 1	15.38% 2	0.00% 0	0.00% 0	13	7.08
Water Quality	7.69% 1	30.77% 4	0.00% 0	23.08% 3	23.08% 3	15.38% 2	0.00% 0	0.00% 0	0.00% 0	0.00% 0	13	7.31
Wildlife and Fishery Habitat	7.69% 1	15.38% 2	30.77% 4	15.38% 2	15.38% 2	7.69% 1	7.69% 1	0.00% 0	0.00% 0	0.00% 0	13	7.31
Shoreland Health	0.00% 0	7.69% 1	30.77% 4	7.69% 1	7.69% 1	30.77% 4	7.69% 1	7.69% 1	0.00% 0	0.00% 0	13	6.23
Communication and Lake Group Support	7.69% 1	0.00% 0	0.00% 0	0.00% 0	15.38% 2	0.00% 0	38.46% 5	23.08% 3	15.38% 2	0.00% 0	13	4.23
Recreation	7.69% 1	0.00% 0	0.00% 0	7.69% 1	7.69% 1	23.08% 3	7.69% 1	23.08% 3	23.08% 3	0.00% 0	13	4.38
Land Use	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	7.69% 1	30.77% 4	23.08% 3	38.46% 5	0.00% 0	13	3.08
Water levels	30.77% 4	15.38% 2	0.00% 0	23.08% 3	15.38% 2	0.00% 0	0.00% 0	7.69% 1	7.69% 1	0.00% 0	13	7.38
Aquatic Invasive Species	15.38% 2	15.38% 2	23.08% 3	15.38% 2	7.69% 1	7.69% 1	0.00% 0	0.00% 0	15.38% 2	0.00% 0	13	7.00
Other	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	100.00% 13	13	1.00

Q19 Many of the decisions determining the final lake management plan will be made at the planning sessions. Sessions will typically take place monthly on weeknights. How likely is it that you will attend one or more of the planning sessions?

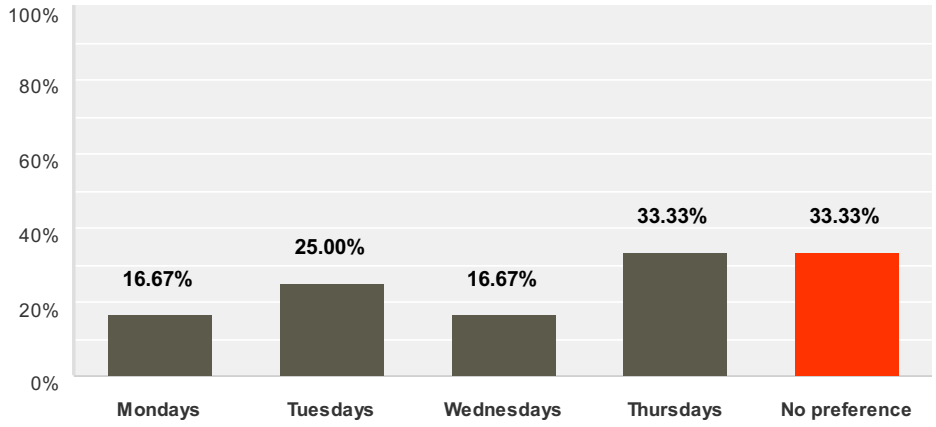
Answered: 12 Skipped: 2



Answer Choices	Responses	
Definitely	16.67%	2
Very Likely	25.00%	3
If it fits my schedule	50.00%	6
Not likely	8.33%	1
I won't attend any	0.00%	0
Total		12

Q20 Previous experience has shown that weekday evenings work best for most people. If you will attend the planning sessions, which weeknights do you prefer?

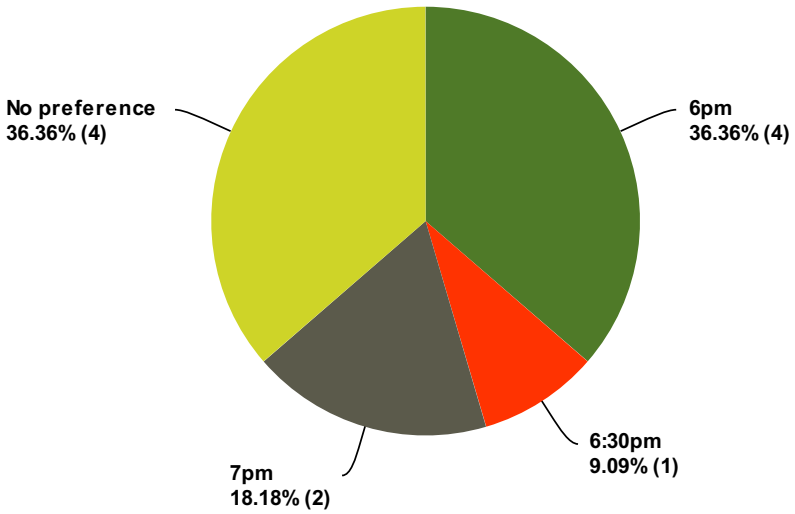
Answered: 12 Skipped: 2



Answer Choices	Responses	
Mondays	16.67%	2
Tuesdays	25.00%	3
Wednesdays	16.67%	2
Thursdays	33.33%	4
No preference	33.33%	4
Total Respondents: 12		

Q21 Most sessions will last around 2 hours. If you will attend the planning sessions, which times do you prefer to start?

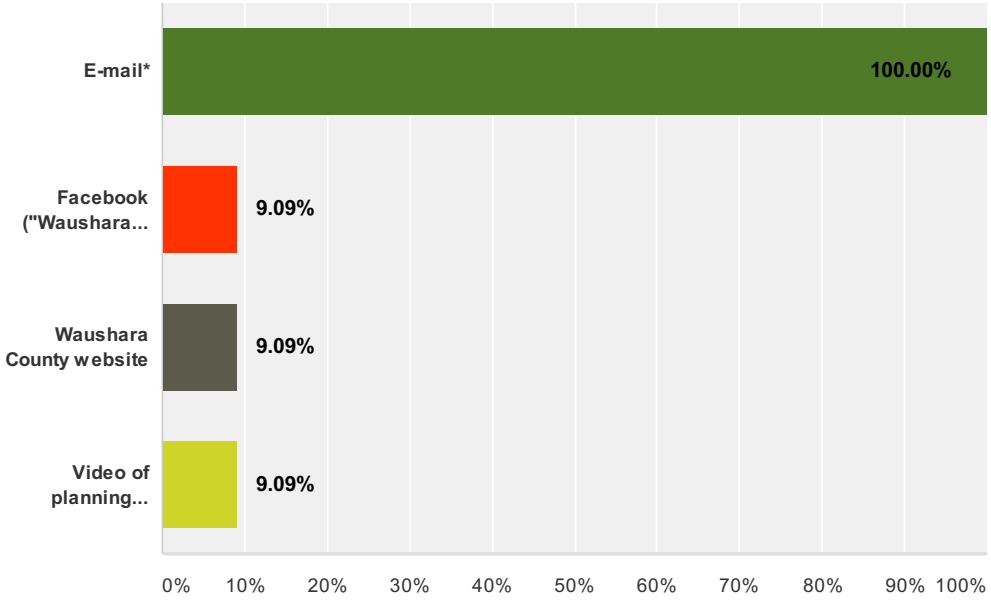
Answered: 11 Skipped: 3



Answer Choices	Responses	
6pm	36.36%	4
6:30pm	9.09%	1
7pm	18.18%	2
7:30pm	0.00%	0
No preference	36.36%	4
Total		11

Q22 How would you like to receive information about meetings (agendas, minutes), the planning process, and updates? (Select all that apply)

Answered: 11 Skipped: 3



Answer Choices	Responses	
E-mail*	**100.00%**	11
Facebook ("Waushara County Lakes Project")	**9.09%**	1
Waushara County website	**9.09%**	1
Video of planning meeting posted on the web	**9.09%**	1
Total Respondents: 11		

#	Other (please specify)	Date
	There are no responses.	

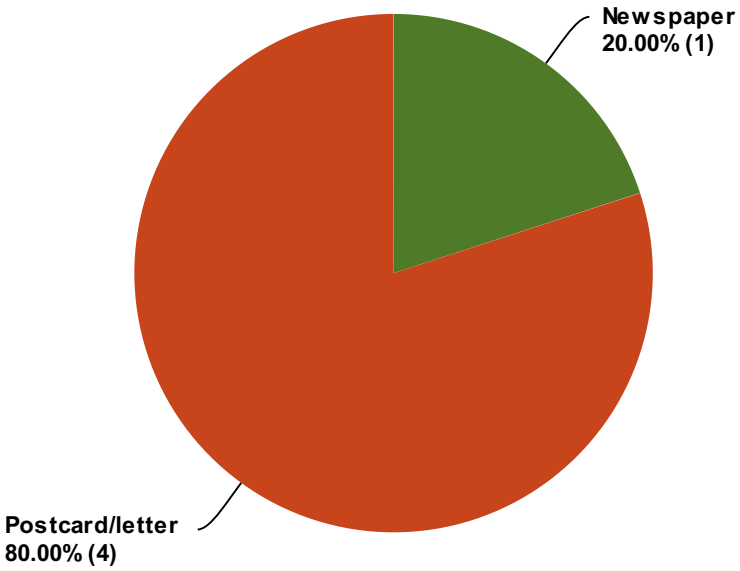
Q1 Enter your Waushara County Lakes Survey ID. Your survey cannot be processed without this information. If you've forgotten your ID or haven't created one yet, follow the instructions below.

Answered: 6 Skipped: 0

#	Responses	Date
1	[redacted]	6/4/2014 1:46 PM
2	[redacted]	6/2/2014 3:13 PM
3	[redacted]	5/28/2014 5:41 PM
4	[redacted]	5/28/2014 5:36 PM
5	[redacted]	5/28/2014 5:31 PM
6	[redacted]	5/28/2014 5:27 PM

Q2 How did you hear about this survey?

Answered: 5 Skipped: 1

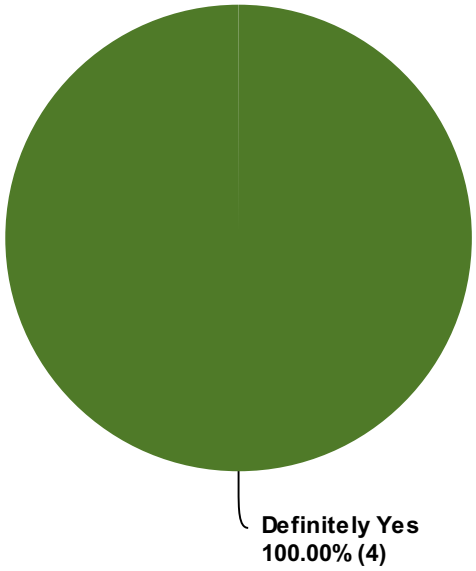


Answer Choices	Responses	
E-mail	0.00%	0
Newspaper	20.00%	1
Postcard/letter	80.00%	4
Facebook	0.00%	0
Radio	0.00%	0
Total		5

#	Other (please specify)	Date
	There are no responses.	

Q3 Does a desire to provide better habitat for fish and wildlife motivate you to support (morally) efforts to improve Lake Napowan?

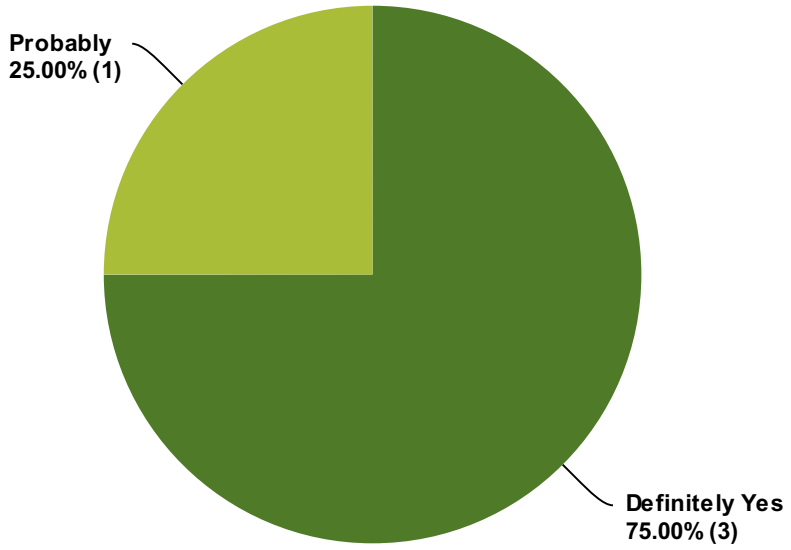
Answered: 4 Skipped: 2



Answer Choices	Responses	
Definitely Yes	100.00%	4
Probably	0.00%	0
Not Likely	0.00%	0
Definitely No	0.00%	0
Unsure	0.00%	0
Total		4

Q4 Does a desire to provide better habitat for fish and wildlife motivate you to support (by direct action) efforts to improve Lake Napowan?

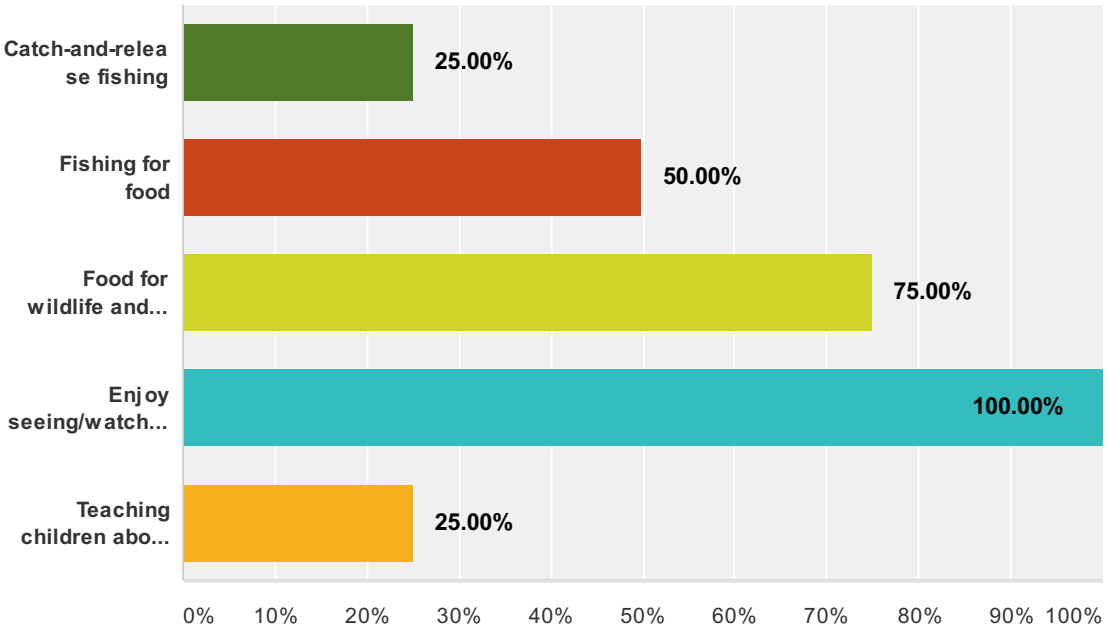
Answered: 4 Skipped: 2



Answer Choices	Responses	
Definitely Yes	75.00%	3
Probably	25.00%	1
Not Likely	0.00%	0
Definitely No	0.00%	0
Unsure	0.00%	0
Total		4

Q5 For what purposes do you value the fishery in Lake Napowan? (Check all that apply.)

Answered: 4 Skipped: 2

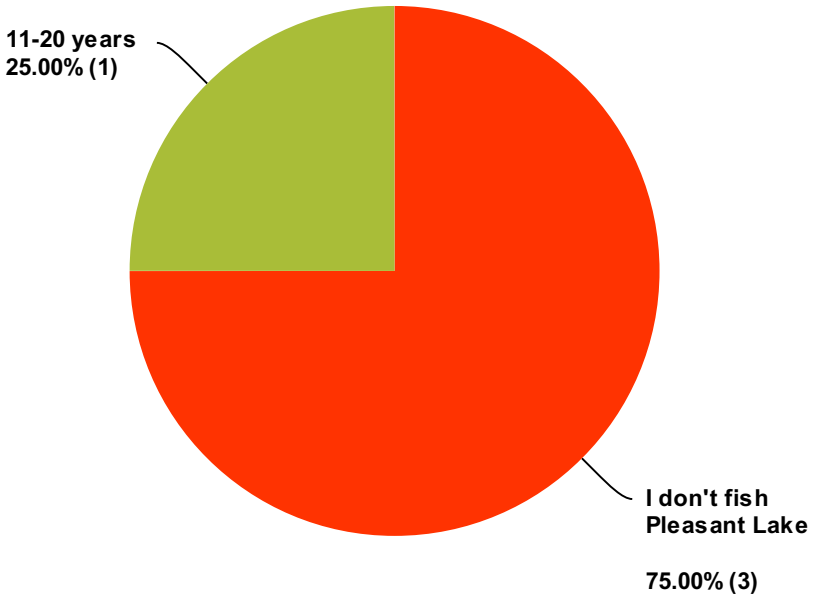


Answer Choices	Responses	
Catch-and-release fishing	25.00%	1
Fishing for food	50.00%	2
Food for wildlife and birds	75.00%	3
Enjoy seeing/watching fish	100.00%	4
Teaching children about fishing/lakes	25.00%	1
Total Respondents: 4		

#	Other (please specify)	Date
	There are no responses.	

Q6 How many years of fishing experience do you have on Lake Napowan?

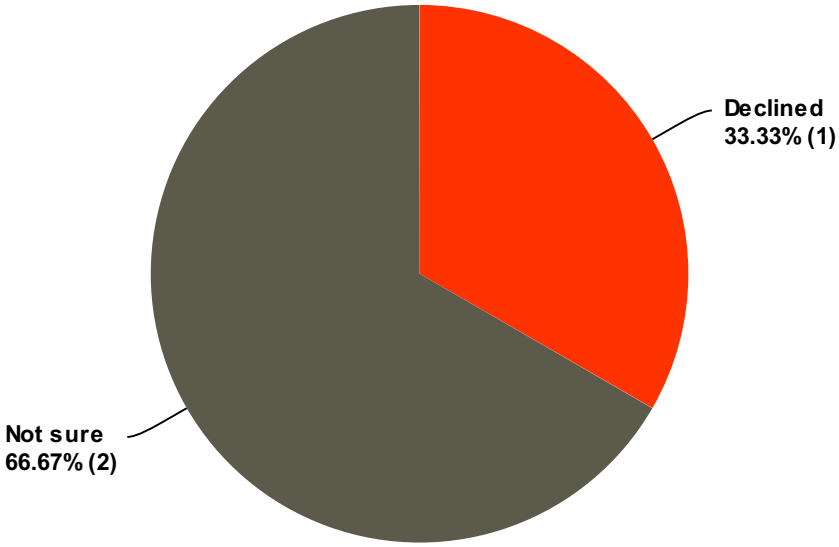
Answered: 4 Skipped: 2



Answer Choices	Responses	
I don't fish Pleasant Lake	**75.00%**	3
1-5 years	**0.00%**	0
6-10 years	**0.00%**	0
11-20 years	**25.00%**	1
More than 20 years	**0.00%**	0
Total		**4**

Q7 In the years you have been fishing Lake Napowan, would you say the quality of fishing has...

Answered: 3 Skipped: 3



Answer Choices	Responses	
Improved	0.00%	0
Stayed the same	0.00%	0
Declined	33.33%	1
Not sure	66.67%	2
Total		3

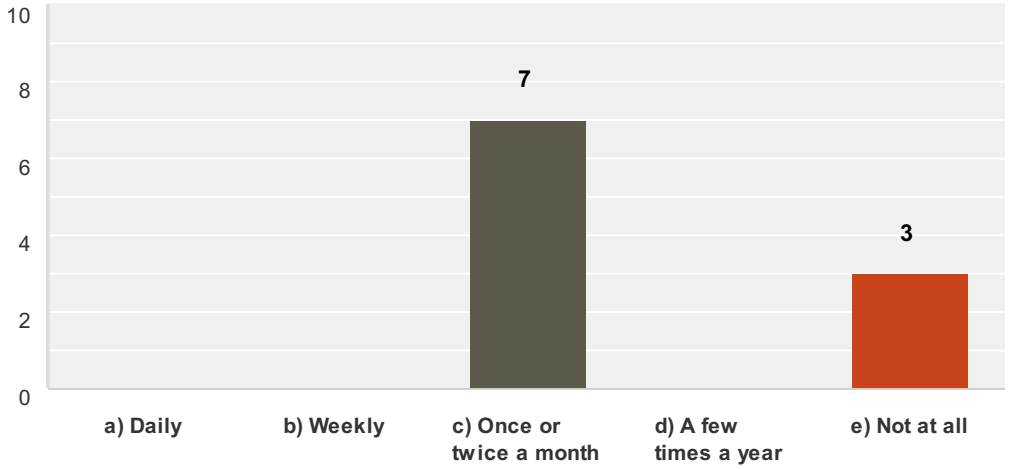
Q8 What factors do you feel have contributed to the change in fishing?

Answered: 2 Skipped: 4

#	Responses	Date
1	I don't fish	6/2/2014 3:14 PM
2	Over ice fishing and general fishing. To many fisherman for a small lake.	5/28/2014 5:30 PM

Q9 When and how often do you typically fish Lake Napowan? (Please answer a-e)

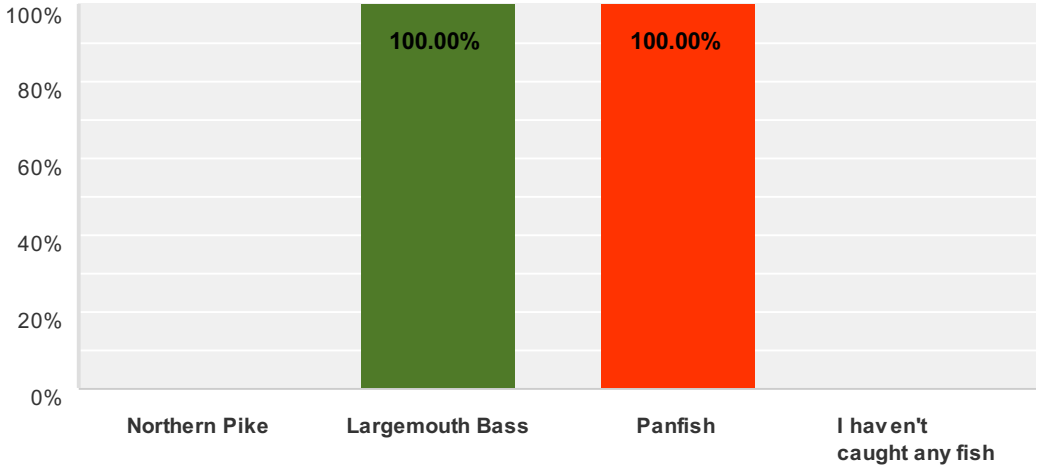
Answered: 1 Skipped: 5



	Winter	Spring	Summer	Fall	Total Respondents
a) Daily	**0.00%** 0	**0.00%** 0	**0.00%** 0	**0.00%** 0	0
b) Weekly	**0.00%** 0	**0.00%** 0	**0.00%** 0	**0.00%** 0	0
c) Once or twice a month	**0.00%** 0	**0.00%** 0	**100.00%** 1	**100.00%** 1	1
d) A few times a year	**0.00%** 0	**0.00%** 0	**0.00%** 0	**0.00%** 0	0
e) Not at all	**100.00%** 1	**100.00%** 1	**0.00%** 0	**0.00%** 0	1

Q10 What fish do you typically catch at Lake Napowan? Check all that apply.

Answered: 1 Skipped: 5

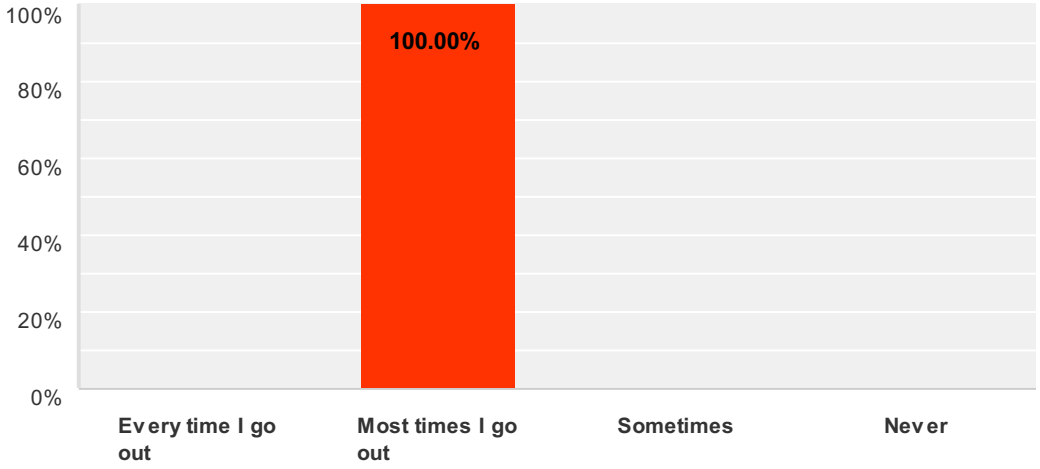


Answer Choices	Responses	
Northern Pike	0.00%	0
Largemouth Bass	100.00%	1
Panfish	100.00%	1
I haven't caught any fish	0.00%	0
Total Respondents: 1		

#	Other (please specify)	Date
	There are no responses.	

Q11 In general, how often do you catch fish on Lake Napowan?

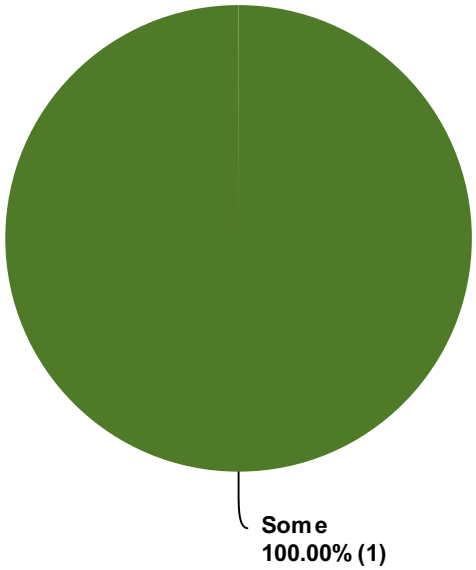
Answered: 1 Skipped: 5



Answer Choices	Responses	
Every time I go out	0.00%	0
Most times I go out	100.00%	1
Sometimes	0.00%	0
Never	0.00%	0
Total Respondents: 1		

Q12 In general, how many of the fish you catch are big enough to keep?

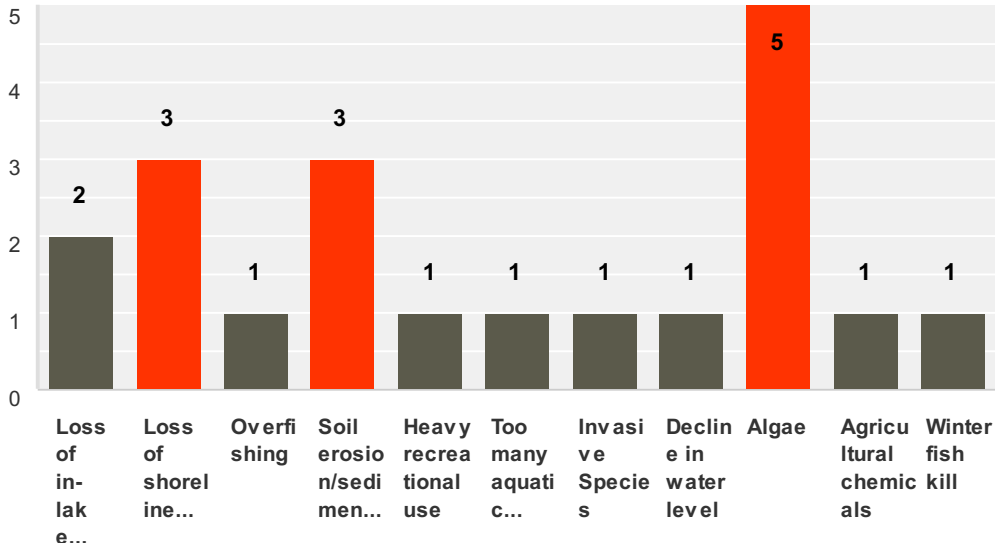
Answered: 1 Skipped: 5



Answer Choices	Responses	
All	0.00%	0
Most	0.00%	0
Some	100.00%	1
None	0.00%	0
Total		1

Q13 What do you believe is the greatest threat to the fishery in Lake Napowan in the next 10 years?

Answered: 1 Skipped: 5

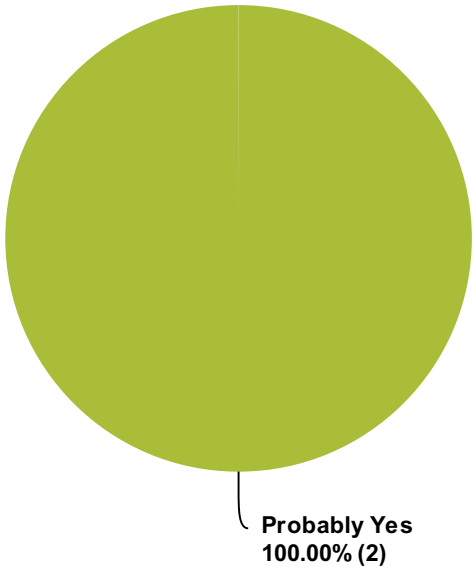


	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't Know	Total Respondents
Loss of in-lake habitat	0.00% 0	100.00% 1	0.00% 0	0.00% 0	0.00% 0	1
Loss of shoreline habitat	0.00% 0	0.00% 0	100.00% 1	0.00% 0	0.00% 0	1
Overfishing	100.00% 1	0.00% 0	0.00% 0	0.00% 0	0.00% 0	1
Soil erosion/sedimentation	0.00% 0	0.00% 0	100.00% 1	0.00% 0	0.00% 0	1
Heavy recreational use	100.00% 1	0.00% 0	0.00% 0	0.00% 0	0.00% 0	1
Too many aquatic plants	100.00% 1	0.00% 0	0.00% 0	0.00% 0	0.00% 0	1
Invasive Species	100.00% 1	0.00% 0	0.00% 0	0.00% 0	0.00% 0	1
Decline in water level	100.00% 1	0.00% 0	0.00% 0	0.00% 0	0.00% 0	1
Algae	0.00% 0	0.00% 0	0.00% 0	0.00% 0	100.00% 1	1
Agricultural chemicals	100.00% 1	0.00% 0	0.00% 0	0.00% 0	0.00% 0	1
Winter fish kill	100.00% 1	0.00% 0	0.00% 0	0.00% 0	0.00% 0	1

#	Other (please specify)	Date
1	Over fished in summer	5/28/2014 5:33 PM

Q14 Do you believe fish from Lake Napowan are safe to eat?

Answered: 2 Skipped: 4



Answer Choices	Responses	
Definitely Yes	0.00%	0
Probably Yes	100.00%	2
Probably No	0.00%	0
Definitely No	0.00%	0
Unsure	0.00%	0
Total		**2**

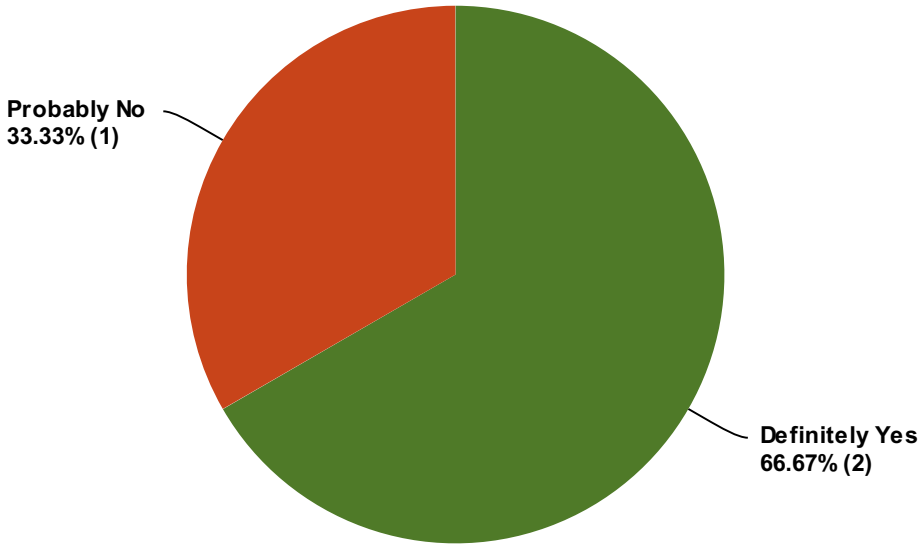
Q15 Do you have any additional comments regarding the fishery in Lake Napowan?

Answered: 1 Skipped: 5

#	Responses	Date
1	Needs to be stocked more often	5/28/2014 5:33 PM

Q16 The "No Wake" hours on Lake Napowan are 4:30 pm to 10:00 am. Do you like the current "No Wake" hours as they are?

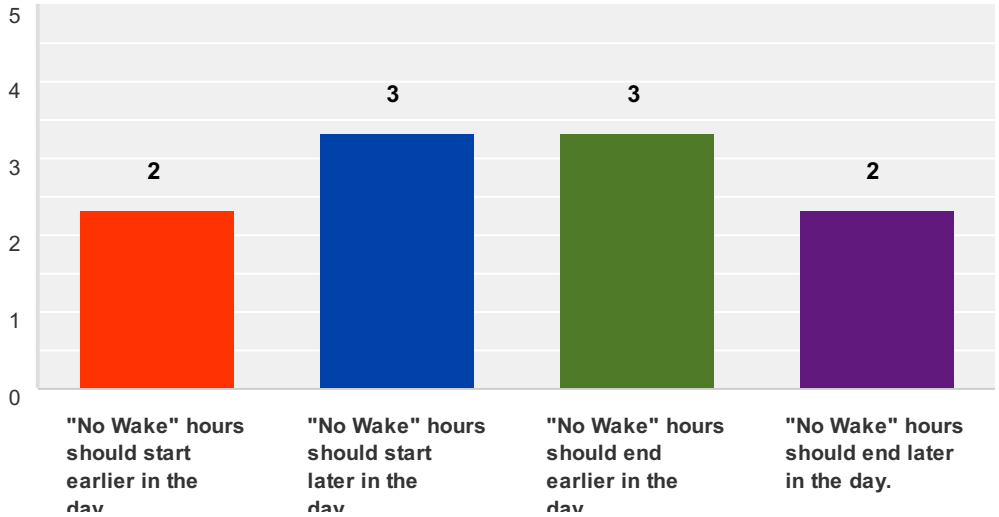
Answered: 3 Skipped: 3



Answer Choices	Responses	
Definitely Yes	66.67%	2
Probably Yes	0.00%	0
Probably No	33.33%	1
Definitely No	0.00%	0
Unsure	0.00%	0
Total		3

Q17 If you think the "No Wake" hours should be adjusted...in what way?

Answered: 3 Skipped: 3

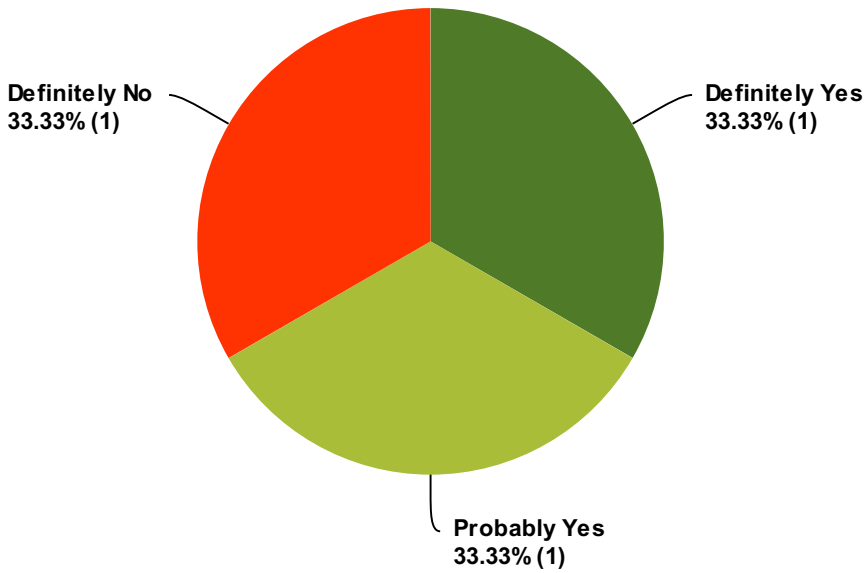


	Strongly Agree	Agree	Disagree	Strongly Disagree	Total Respondents
"No Wake" hours should start earlier in the day.	**33.33%** 1	**0.00%** 0	**66.67%** 2	**0.00%** 0	3
"No Wake" hours should start later in the day.	**0.00%** 0	**0.00%** 0	**66.67%** 2	**33.33%** 1	3
"No Wake" hours should end earlier in the day.	**0.00%** 0	**0.00%** 0	**66.67%** 2	**33.33%** 1	3
"No Wake" hours should end later in the day.	**33.33%** 1	**0.00%** 0	**66.67%** 2	**0.00%** 0	3

#	Other (please specify)	Date
1	Lake should be no wake all the time since it is so small and shallow, but failing that, I would like to see the no wake hours increased, meaning speed boating hours would be reduced.	5/28/2014 6:10 PM

Q18 Do you think there should be a boating speed limit on Lake Napowan?

Answered: 3 Skipped: 3



Answer Choices	Responses	
Definitely Yes	33.33%	1
Probably Yes	33.33%	1
Probably No	0.00%	0
Definitely No	33.33%	1
Unsure	0.00%	0
Total		**3**

Q19 What could be done to improve your recreation experience on Lake Napowan?

Answered: 2 Skipped: 4

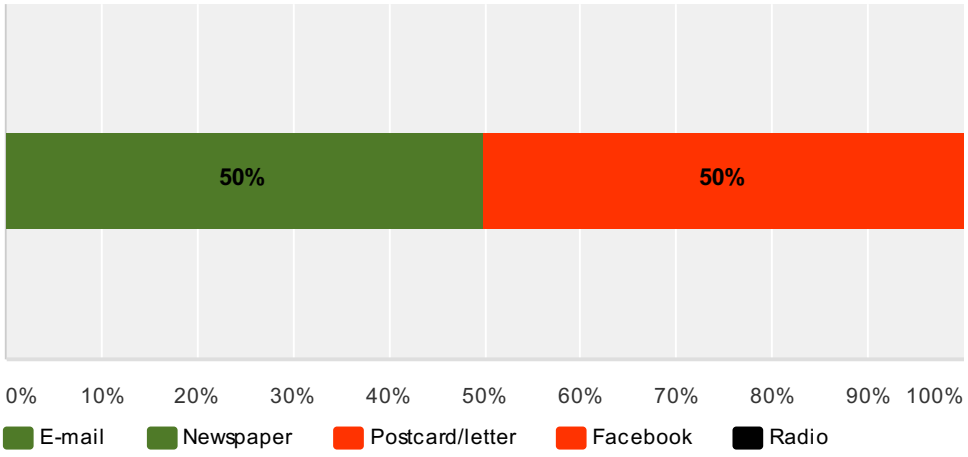
#	Responses	Date
1	Make Lake Napowan a no-wake lake. Or, failing that, limit the lake to electric motors, or at least to small engines and ban PWCs. Or increase the no wake hours and decrease the speed boating hours. The lake is small and shallow. Educate people so that they stop driving their watercraft too fast in shallow areas, since the turbulence churns up nutrients that the WI Association of Lakes people say are unhealthy for small, shallow lakes.	5/28/2014 6:10 PM
2	No public boat access	5/28/2014 5:35 PM

Q1 Enter your Waushara County Lakes Survey ID. If you've forgotten your ID or haven't created one yet, follow the instructions below.

Answered: 6 Skipped: 0

Q2 How did you hear about this survey?

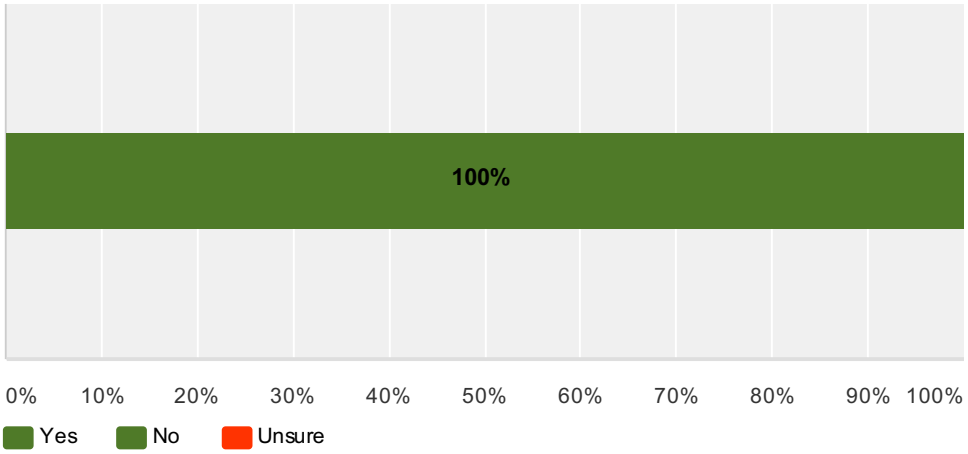
Answered: 6 Skipped: 0



Answer Choices	Responses	
E-mail	**50%**	3
Newspaper	**0%**	0
Postcard/letter	**50%**	3
Facebook	**0%**	0
Radio	**0%**	0
Total		**6**

Q3 Were you aware of the importance of aquatic plants?

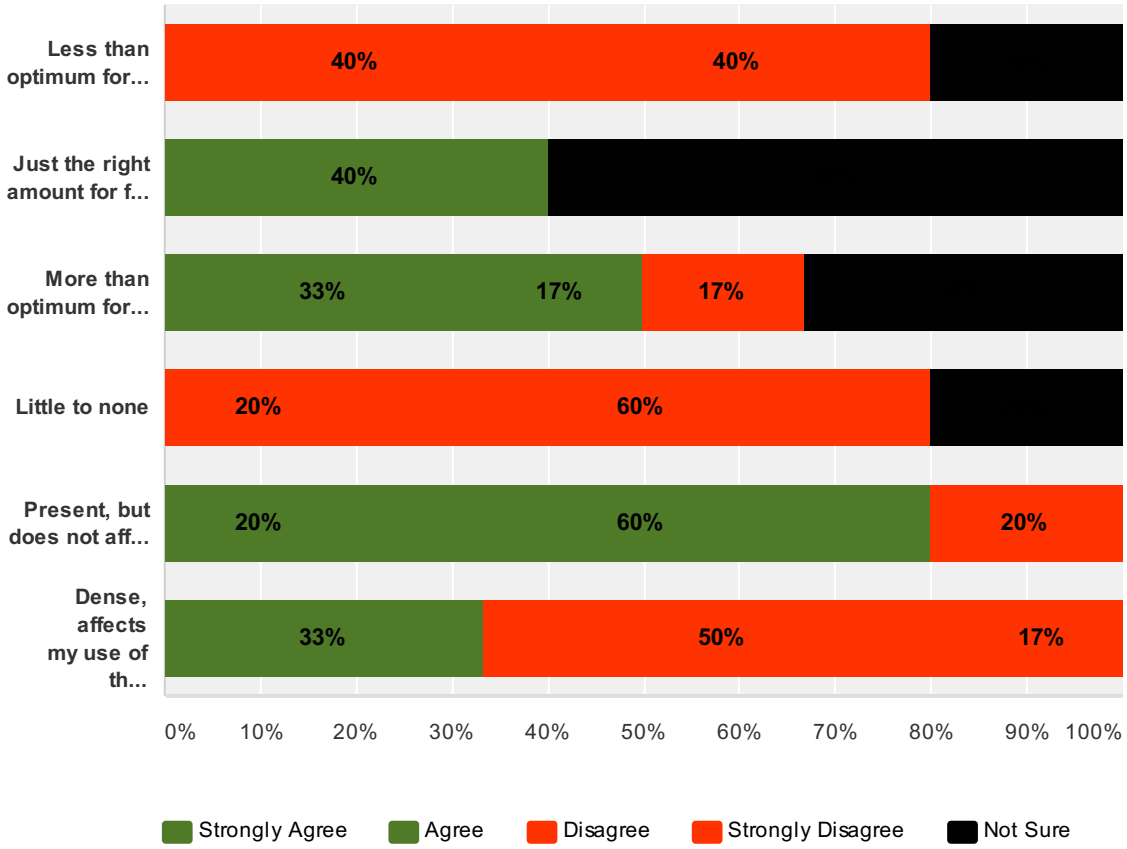
Answered: 6 Skipped: 0



Answer Choices	Responses	
Yes	**100%**	6
No	**0%**	0
Unsure	**0%**	0
Total		**6**

Q4 In your opinion, which statement best describes the amount of aquatic plant growth in Lake Napowan?

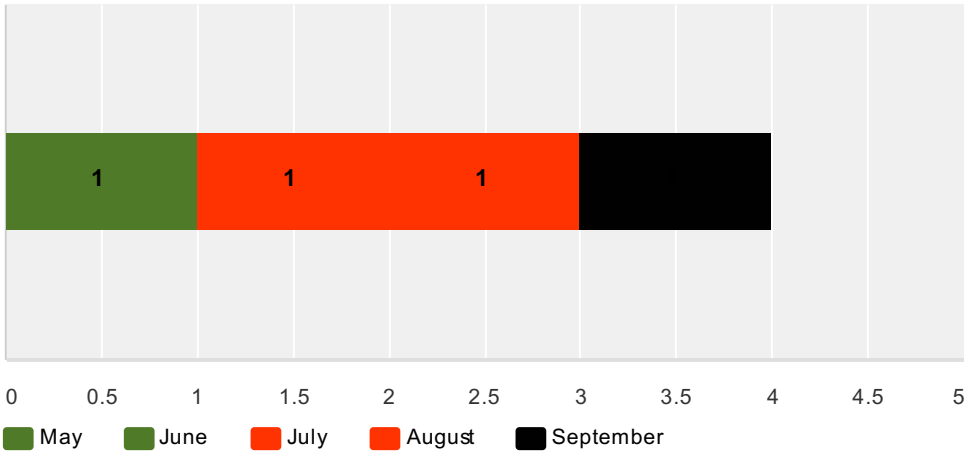
Answered: 6 Skipped: 0



	Strongly Agree	Agree	Disagree	Strongly Disagree	Not Sure	Total
Less than optimum for fish and wildlife	0% 0	0% 0	40% 2	40% 2	20% 1	5
Just the right amount for fish and wildlife	0% 0	40% 2	0% 0	0% 0	60% 3	5
More than optimum for fish and wildlife	33% 2	17% 1	17% 1	0% 0	33% 2	6
Little to none	0% 0	0% 0	20% 1	60% 3	20% 1	5
Present, but does not affect my use of the lake	20% 1	60% 3	0% 0	20% 1	0% 0	5
Dense, affects my use of the lake	0% 0	33% 2	50% 3	17% 1	0% 0	6

Q5 If you selected dense or choked, what month(s) do the problems occur? Check all that apply.

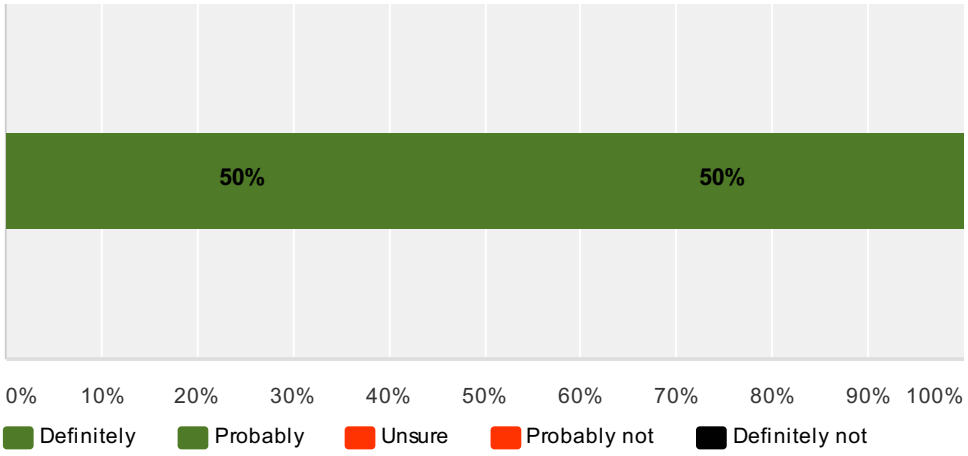
Answered: 2 Skipped: 4



Answer Choices	Responses	
May	0%	0
June	50%	1
July	50%	1
August	50%	1
September	50%	1
Total Respondents: 2		

Q6 Do you believe aquatic plant control is needed on Lake Napowan?

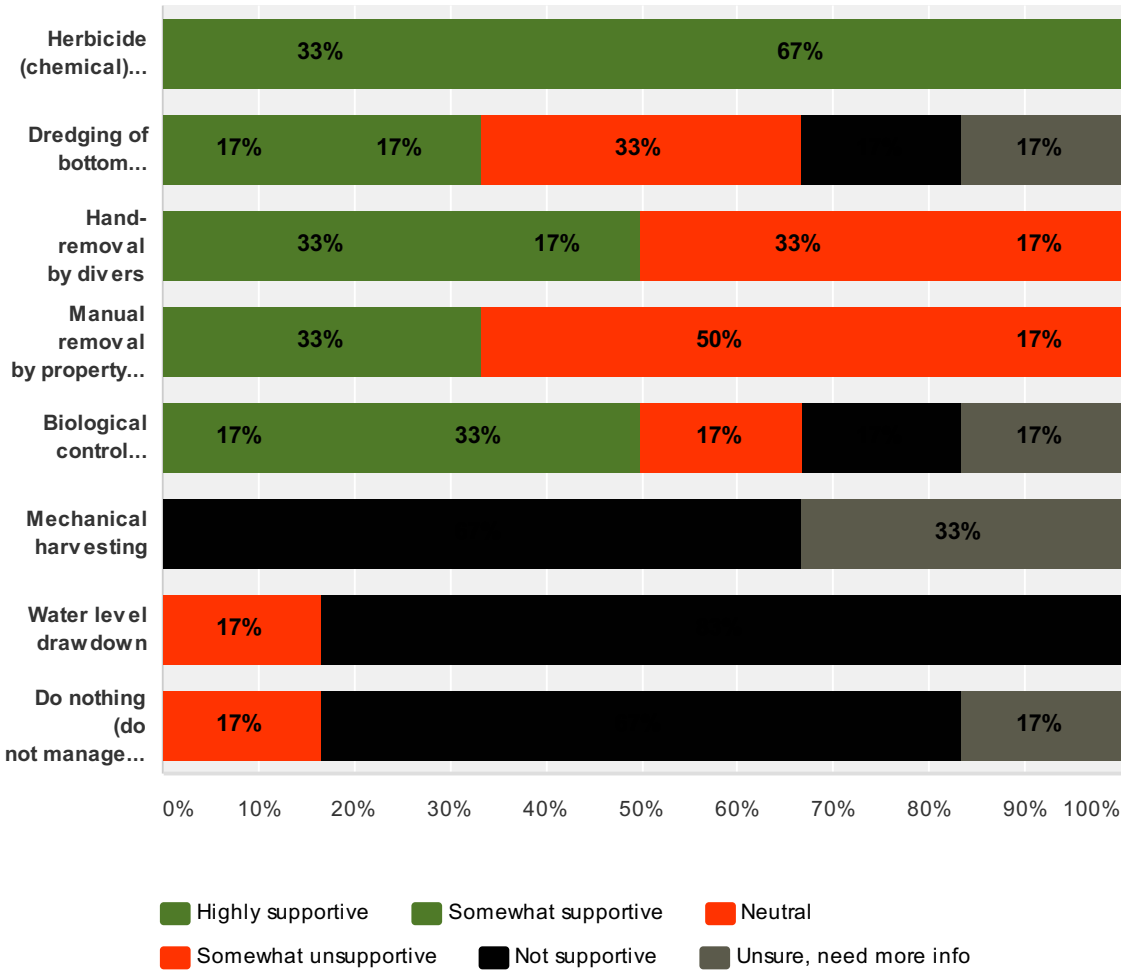
Answered: 6 Skipped: 0



Answer Choices	Responses	
Definitely	50%	3
Probably	50%	3
Unsure	0%	0
Probably not	0%	0
Definitely not	0%	0
Total		6

Q7 What is your level of support for the responsible use of the following techniques TO MANAGE AQUATIC PLANTS on Lake Napowan?

Answered: 6 Skipped: 0

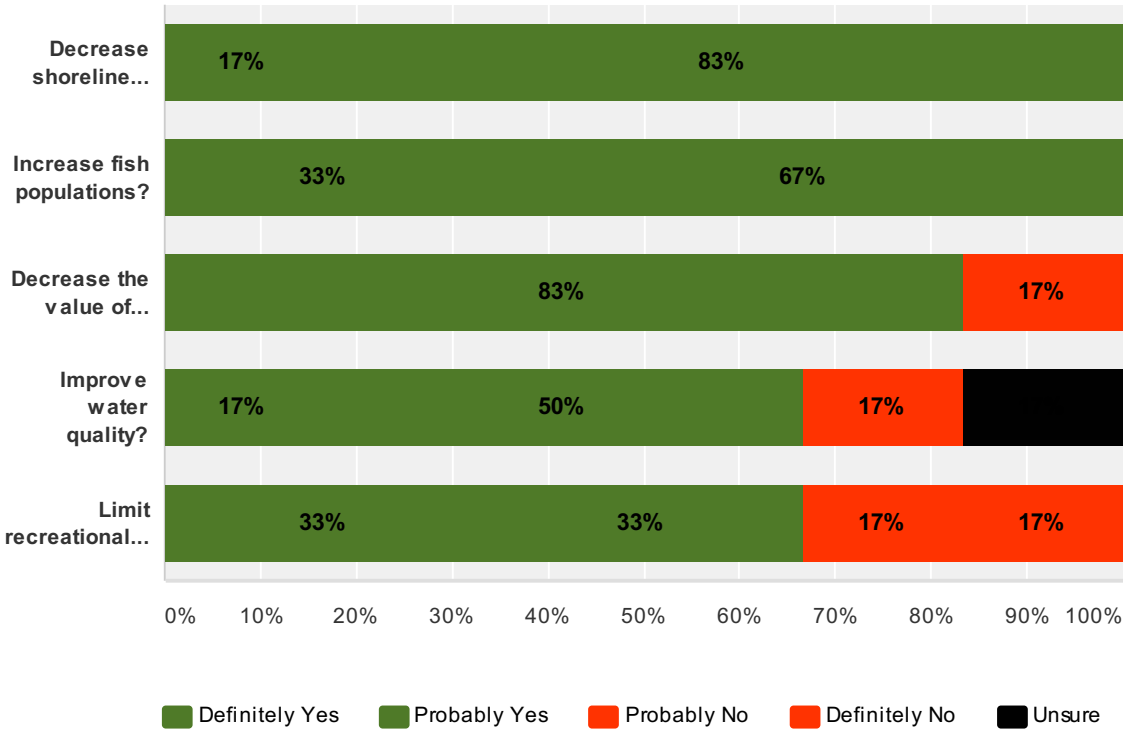


	Highly supportive	Somewhat supportive	Neutral	Somewhat unsupportive	Not supportive	Unsure, need more info	Total	Average Rating
Herbicide (chemical) control	33% 2	67% 4	0% 0	0% 0	0% 0	0% 0	6	1.67
Dredging of bottom sediments	17% 1	17% 1	0% 0	33% 2	17% 1	17% 1	6	2.67
Hand-removal by divers	33% 2	17% 1	33% 2	17% 1	0% 0	0% 0	6	2.33
Manual removal by property owners	33% 2	0% 0	50% 3	17% 1	0% 0	0% 0	6	2.50
Biological control (milfoil weevil, loosestrife beetle, etc.)	17% 1	33% 2	0% 0	17% 1	17% 1	17% 1	6	2.33
Mechanical harvesting	0%	0%	0%	0%	67%	33%		

Mechanical harvesting	**0%** 0	**0%** 0	**0%** 0	**0%** 0	**67%** 4	**33%** 2	6	3.33
Water level drawdown	**0%** 0	**0%** 0	**0%** 0	**17%** 1	**83%** 5	**0%** 0	6	4.83
Do nothing (do not manage plants)	**0%** 0	**0%** 0	**0%** 0	**17%** 1	**67%** 4	**17%** 1	6	4.00

Q8 In your opinion, does establishing or maintaining native vegetation IN THE WATER in the near-shore area...

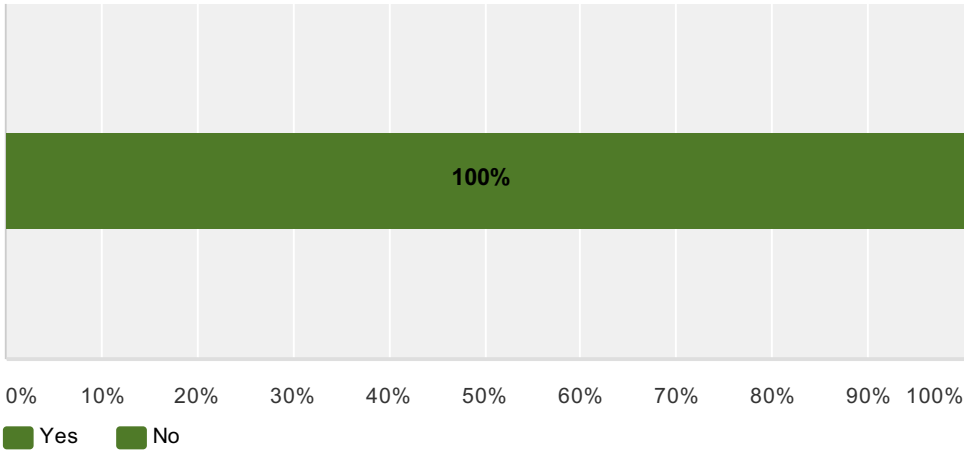
Answered: 6 Skipped: 0



	Definitely Yes	Probably Yes	Probably No	Definitely No	Unsure	Total
Decrease shoreline erosion?	17% 1	83% 5	0% 0	0% 0	0% 0	6
Increase fish populations?	33% 2	67% 4	0% 0	0% 0	0% 0	6
Decrease the value of shoreline property?	0% 0	83% 5	0% 0	17% 1	0% 0	6
Improve water quality?	17% 1	50% 3	17% 1	0% 0	17% 1	6
Limit recreational enjoyment?	33% 2	33% 2	17% 1	17% 1	0% 0	6

Q9 Have you ever heard of aquatic invasive species?

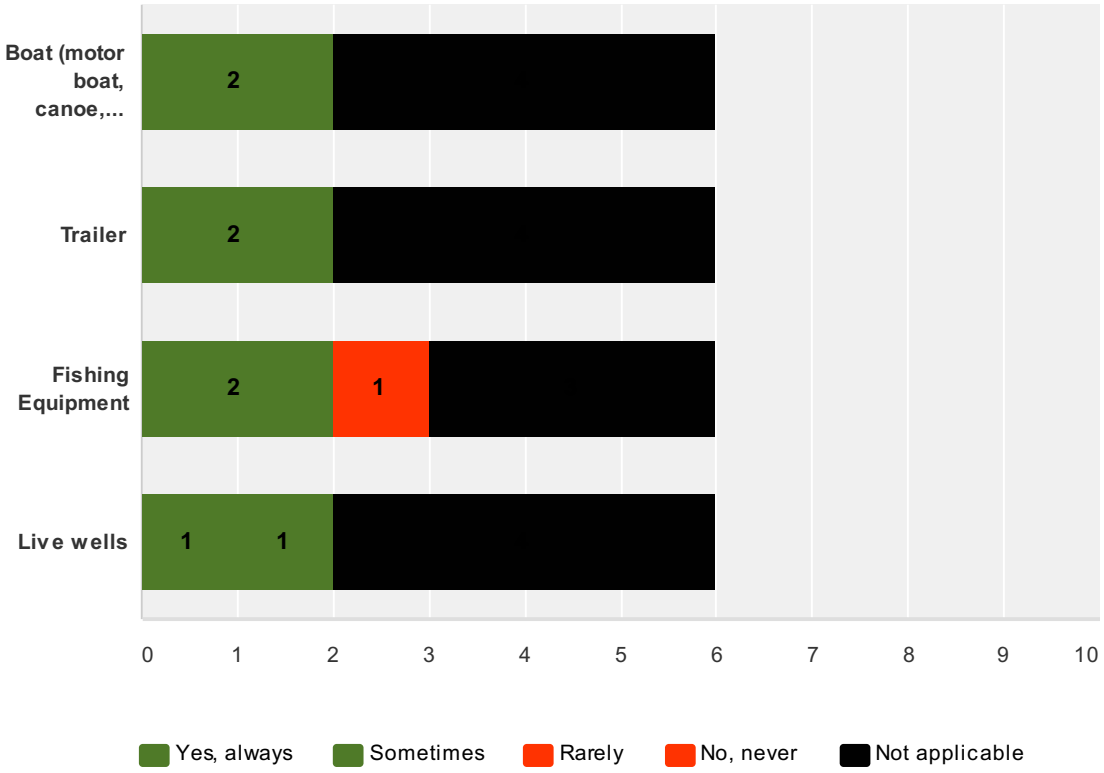
Answered: 6 Skipped: 0



Answer Choices	Responses	
Yes	**100%**	6
No	**0%**	0
Total		**6**

Q10 After you have been to another lake, do you clean your ... before bringing it back to Lake Napowan?

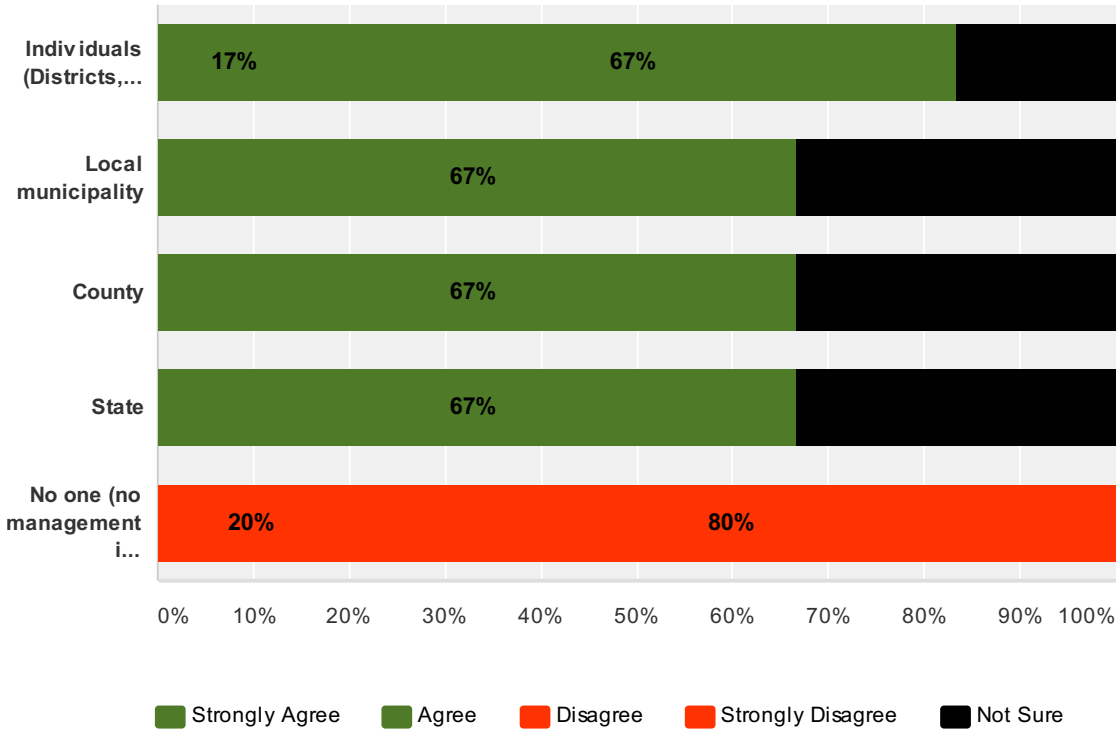
Answered: 6 Skipped: 0



	Yes, always	Sometimes	Rarely	No, never	Not applicable	Total Respondents
Boat (motor boat, canoe, kayak, etc.)	**33%** 2	**0%** 0	**0%** 0	**0%** 0	**67%** 4	6
Trailer	**33%** 2	**0%** 0	**0%** 0	**0%** 0	**67%** 4	6
Fishing Equipment	**33%** 2	**0%** 0	**17%** 1	**0%** 0	**50%** 3	6
Live wells	**17%** 1	**17%** 1	**0%** 0	**0%** 0	**67%** 4	6

Q11 Who should pay for the cost of managing invasive aquatic plants? Check all that apply.

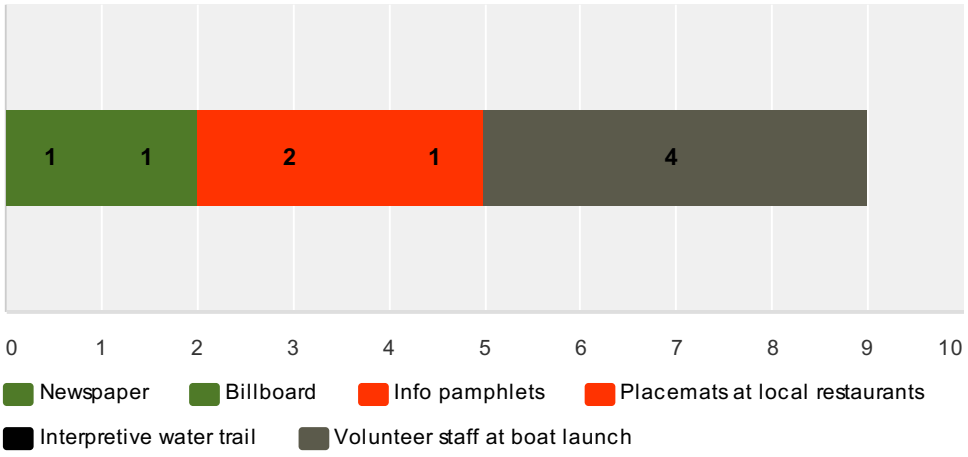
Answered: 6 Skipped: 0



	Strongly Agree	Agree	Disagree	Strongly Disagree	Not Sure	Total
Individuals (Districts, associations, lakefront property owners)	**17%** 1	**67%** 4	**0%** 0	**0%** 0	**17%** 1	6
Local municipality	**0%** 0	**67%** 4	**0%** 0	**0%** 0	**33%** 2	6
County	**0%** 0	**67%** 4	**0%** 0	**0%** 0	**33%** 2	6
State	**0%** 0	**67%** 4	**0%** 0	**0%** 0	**33%** 2	6
No one (no management is undertaken)	**0%** 0	**0%** 0	**20%** 1	**80%** 4	**0%** 0	5

Q12 What is the most effective way to inform others about aquatic invasive species?

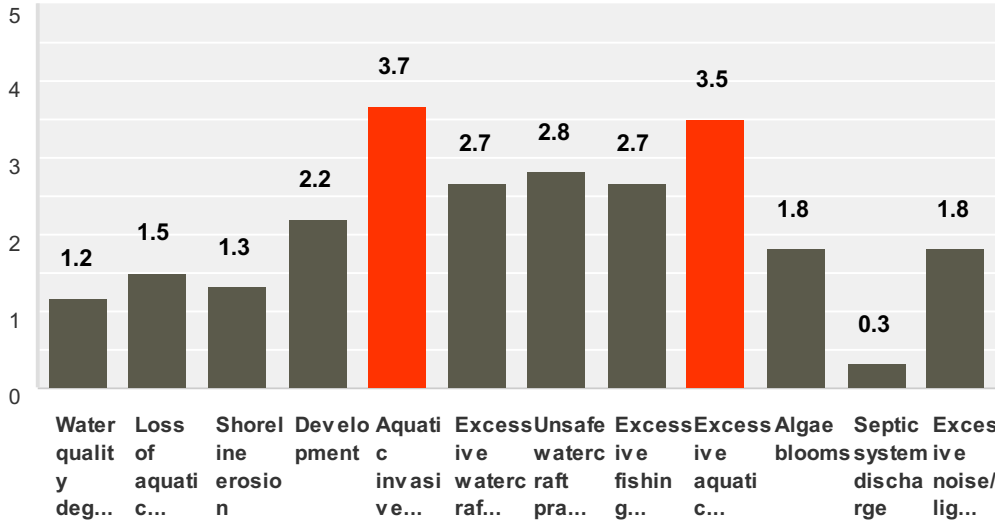
Answered: 6 Skipped: 0



Answer Choices	Responses	
Newspaper	17%	1
Billboard	17%	1
Info pamphlets	33%	2
Placemats at local restaurants	17%	1
Interpretive water trail	0%	0
Volunteer staff at boat launch	67%	4
Total Respondents: 6		

Q13 Below is a list of possible negative impacts commonly found in Wisconsin lakes. To what level do you believe each of the following factors may be impacting Lake Napowan? (Please rate 0 - 5) * Not Present means that you believe the issue does not exist on Lake Napowan. **No Impact means that the issue may exist on Lake Napowan but it is not negatively impacting the lake.

Answered: 6 Skipped: 0

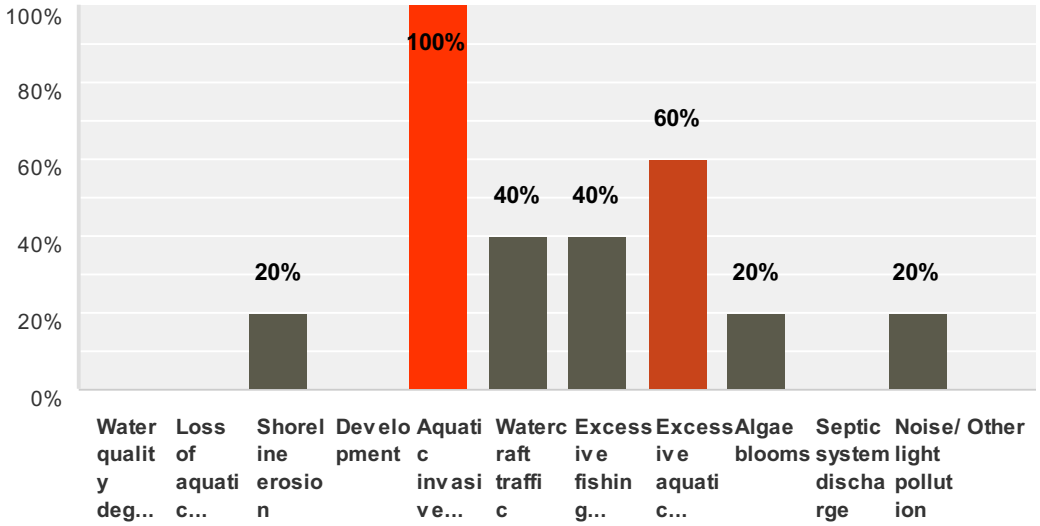


	*Not present 0	**No Impact 1	2	Moderately negative impact 3	4	Great negative impact 5	Unsure - need more info	Total	Average Rating
Water quality degradation	0% 0.0	50% 3.0	33% 2.0	0% 0.0	0% 0.0	0% 0.0	17% 1.0	6	1.17
Loss of aquatic habitat	17% 1.0	33% 2.0	33% 2.0	17% 1.0	0% 0.0	0% 0.0	0% 0.0	6	1.50
Shoreline erosion	0% 0.0	33% 2.0	17% 1.0	0% 0.0	17% 1.0	0% 0.0	33% 2.0	6	1.33
Development	0% 0.0	40% 2.0	0% 0.0	60% 3.0	0% 0.0	0% 0.0	0% 0.0	5	2.20
Aquatic invasive species introduction	0% 0.0	0% 0.0	0% 0.0	50% 3.0	33% 2.0	17% 1.0	0% 0.0	6	3.67
Excessive watercraft traffic	17% 1.0	33% 2.0	0% 0.0	0% 0.0	17% 1.0	33% 2.0	0% 0.0	6	2.67
Unsafe watercraft practices	17% 1.0	17% 1.0	17% 1.0	0% 0.0	17% 1.0	33% 2.0	0% 0.0	6	2.83
Excessive fishing pressure	0% 0.0	0% 0.0	0% 0.0	33% 2.0	0% 0.0	33% 2.0	33% 2.0	6	2.67
Excessive aquatic plant	0%	0%	0%	50%	50%	0%	0%		

Excessive aquatic plant growth (excluding algae)	**0%** 0.0	**0%** 0.0	**0%** 0.0	**50%** 3.0	**50%** 3.0	**0%** 0.0	**0%** 0.0	6	3.50
Algae blooms	**0%** 0.0	**33%** 2.0	**0%** 0.0	**50%** 3.0	**0%** 0.0	**0%** 0.0	**17%** 1.0	6	1.83
Septic system discharge	**0%** 0.0	**33%** 2.0	**0%** 0.0	**0%** 0.0	**0%** 0.0	**0%** 0.0	**67%** 4.0	6	0.33
Excessive noise/light pollution	**17%** 1.0	**33%** 2.0	**33%** 2.0	**0%** 0.0	**0%** 0.0	**17%** 1.0	**0%** 0.0	6	1.83

Q14 From the list below, please mark your top three concerns regarding Lake Napowan.

Answered: 5 Skipped: 1



Answer Choices	Responses	
Water quality degradation	0%	0
Loss of aquatic habitat	0%	0
Shoreline erosion	20%	1
Development	0%	0
Aquatic invasive species introduction	100%	5
Watercraft traffic	40%	2
Excessive fishing pressure	40%	2
Excessive aquatic plant growth (excluding algae)	60%	3
Algae blooms	20%	1
Septic system discharge	0%	0
Noise/light pollution	20%	1
Other	0%	0
Total Respondents: 5		

Lake Napowan Survey #4

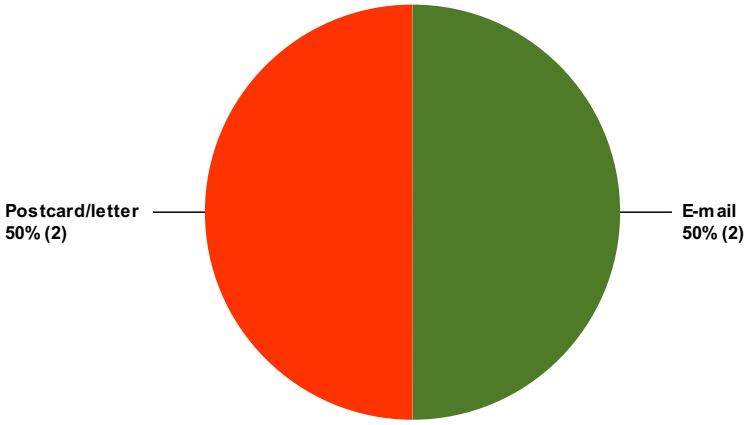
Q1 What is your Waushara County Lakes Study ID?

Answered: 4 Skipped: 0

#	Responses	Date
1	[redacted]	8/12/2014 5:52 AM
2	[redacted]	8/10/2014 1:15 PM
3	[redacted]	8/6/2014 6:29 PM
4	[redacted]	7/19/2014 10:33 AM

Q2 How did you hear about this survey?

Answered: 4 Skipped: 0

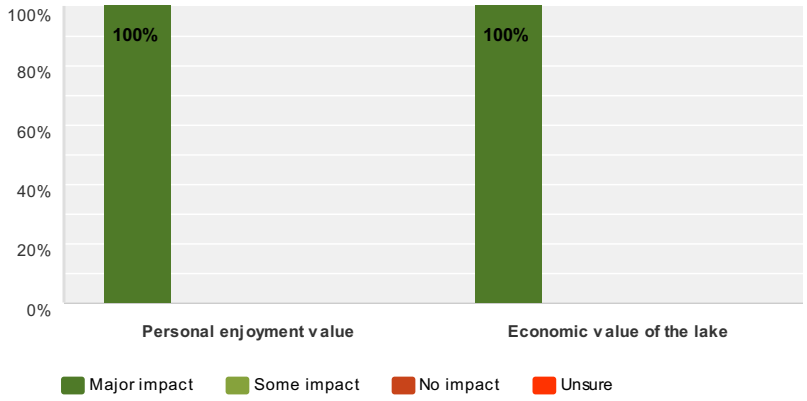


Answer Choices	Responses	
E-mail	50%	2
Newspaper	0%	0
Postcard/letter	50%	2
Facebook	0%	0
Radio	0%	0
Word of mouth	0%	0
Total		4

#	Other (please specify)	Date
	There are no responses.	

Q3 How much impact does the water quality of Lake Napowan have on the following?

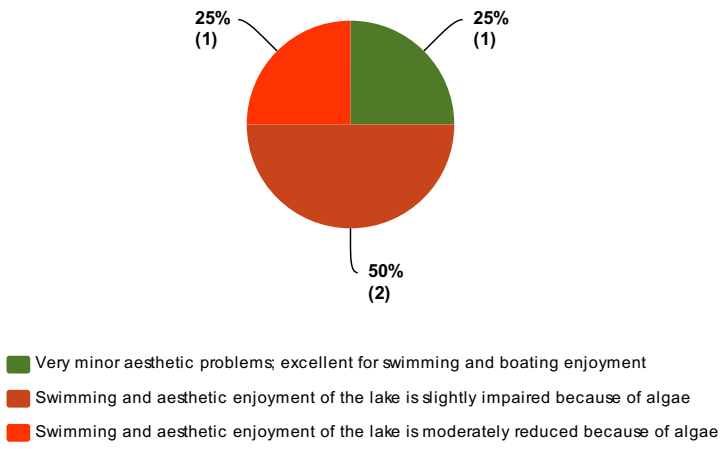
Answered: 3 Skipped: 1



	Major impact	Some impact	No impact	Unsure	Total
Personal enjoyment value	**100%** 3	**0%** 0	**0%** 0	**0%** 0	3
Economic value of the lake	**100%** 3	**0%** 0	**0%** 0	**0%** 0	3

Q4 Which statement best describes water clarity during the times you spend most on the lake?

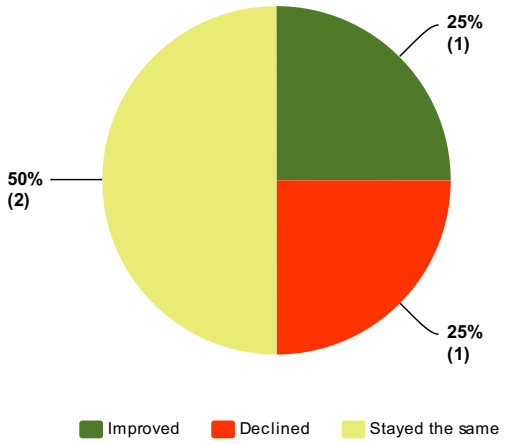
Answered: 4 Skipped: 0



Answer Choices	Responses	
Beautiful, could not be any nicer	0%	0
Very minor aesthetic problems; excellent for swimming and boating enjoyment	25%	1
Swimming and aesthetic enjoyment of the lake is slightly impaired because of algae	50%	2
Swimming and aesthetic enjoyment of the lake is moderately reduced because of algae	25%	1
Swimming and aesthetic enjoyment of the lake is substantially reduced because of algae	0%	0
None of the above	0%	0
Unsure	0%	0
Total		**4**

Q5 During the time that you have lived on, visited, or recreated on the lake, how would you say the water quality has changed?

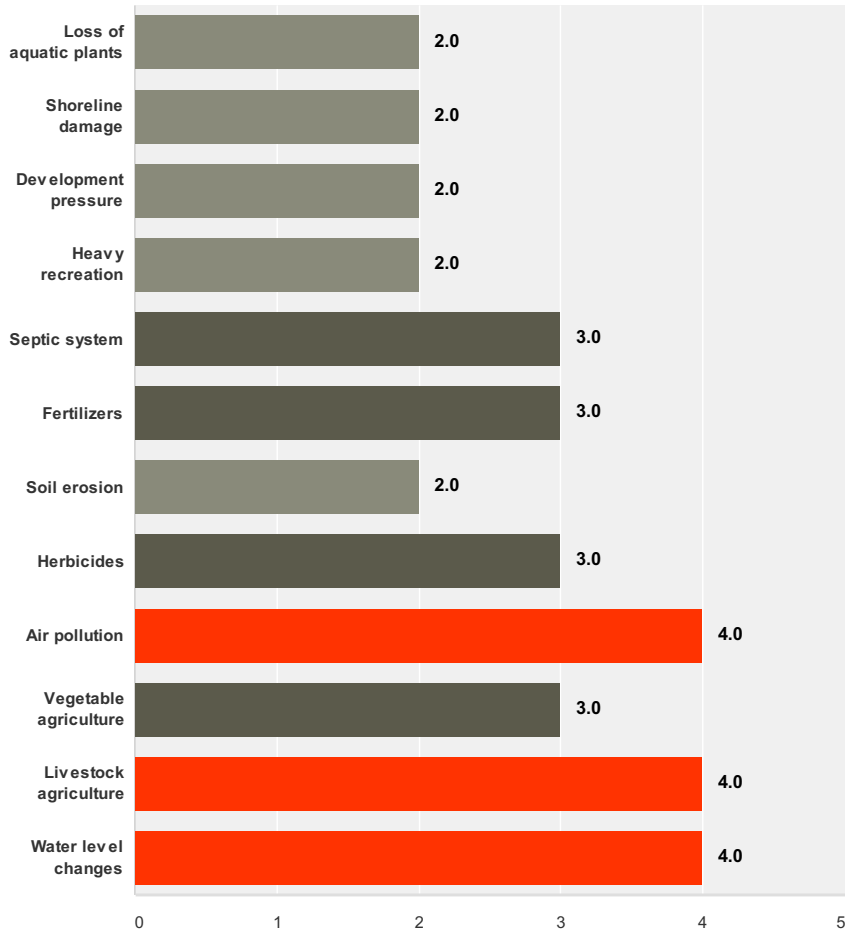
Answered: 4 Skipped: 0



Answer Choices	Responses	
Improved	25%	1
Declined	25%	1
Stayed the same	50%	2
Unsure	0%	0
Total		4

Q6 If it has declined, in your opinion, what are the primary causes?

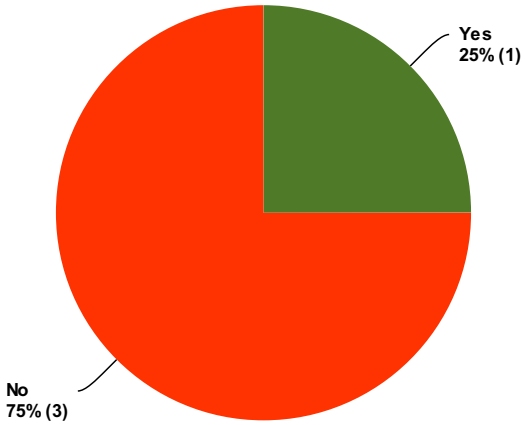
Answered: 1 Skipped: 3



	Strongly Agree	Agree	Disagree	Strongly Disagree	Unsure	Total Respondents
Loss of aquatic plants	0% 0.0	100% 1.0	0% 0.0	0% 0.0	0% 0.0	1
Shoreline damage	0% 0.0	100% 1.0	0% 0.0	0% 0.0	0% 0.0	1
Development pressure	0% 0.0	100% 1.0	0% 0.0	0% 0.0	0% 0.0	1
Heavy recreation	0% 0.0	100% 1.0	0% 0.0	0% 0.0	0% 0.0	1
Septic system	0% 0.0	0% 0.0	100% 1.0	0% 0.0	0% 0.0	1
Fertilizers	0% 0.0	0% 0.0	100% 1.0	0% 0.0	0% 0.0	1
Soil erosion	0% 0.0	100% 1.0	0% 0.0	0% 0.0	0% 0.0	1
Herbicides	0% 0.0	0% 0.0	100% 1.0	0% 0.0	0% 0.0	1
Air pollution	0% 0.0	0% 0.0	0% 0.0	100% 1.0	0% 0.0	1
Vegetable agriculture	0% 0.0	0% 0.0	100% 1.0	0% 0.0	0% 0.0	1
Livestock agriculture	0% 0.0	0% 0.0	0% 0.0	100% 1.0	0% 0.0	1
Water level changes	0% 0.0	0% 0.0	0% 0.0	100% 1.0	0% 0.0	1

Q7 Do you use herbicides or pesticides (i.e. "weed and feed") on your land?

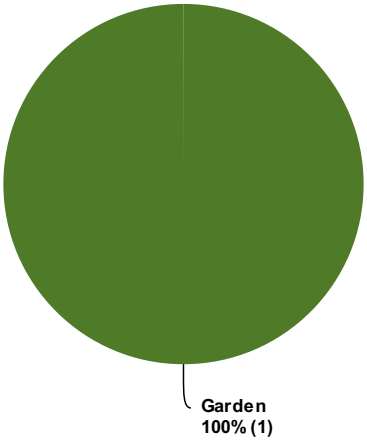
Answered: 4 Skipped: 0



Answer Choices	Responses	
Yes	25%	1
No	75%	3
Total		4

Q8 Where do you apply herbicides and/or pesticides?

Answered: 1 Skipped: 3

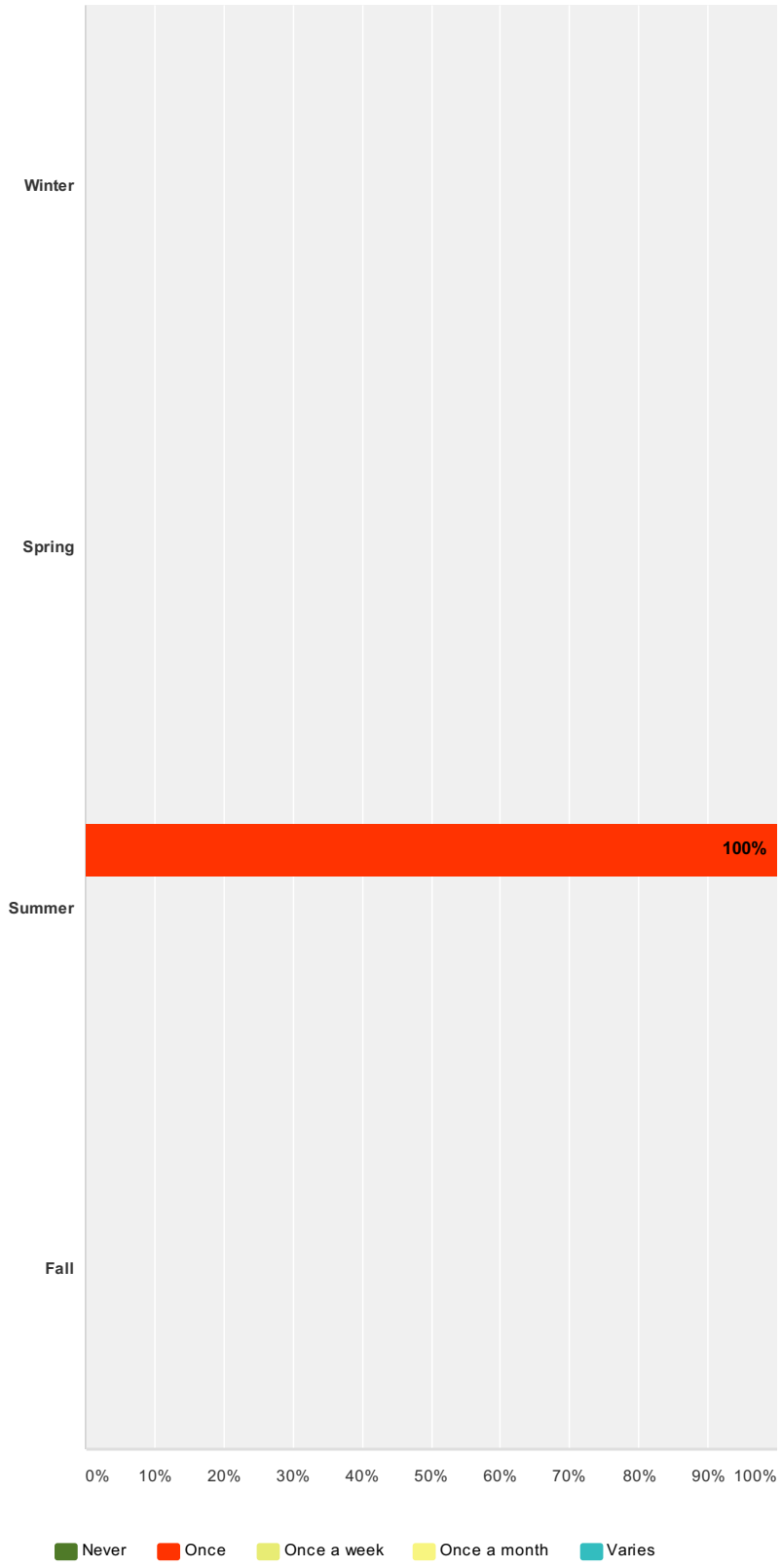


Answer Choices	Responses	
Agricultural fields	0%	0
Garden	100%	1
Lawn	0%	0
Total		1

#	Other (please specify)	Date
	There are no responses.	

Q9 In a typical year, how often do you apply herbicides and/or pesticides?

Answered: 1 Skipped: 3

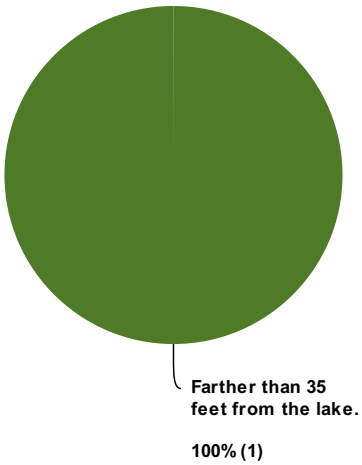


	Never	Once	Once a week	Once a month	Varies	Total Respondents
Winter	0% 0	0% 0	0% 0	0% 0	0% 0	0

Spring	**0%** 0	**0%** 0	**0%** 0	**0%** 0	**0%** 0	0
Summer	**0%** 0	**100%** 1	**0%** 0	**0%** 0	**0%** 0	1
Fall	**0%** 0	**0%** 0	**0%** 0	**0%** 0	**0%** 0	0

Q10 If you apply herbicides and/or pesticides on lakefront property, how close to the lake are they applied (select the closest distance to the lake where herbicides/pesticides are applied)?

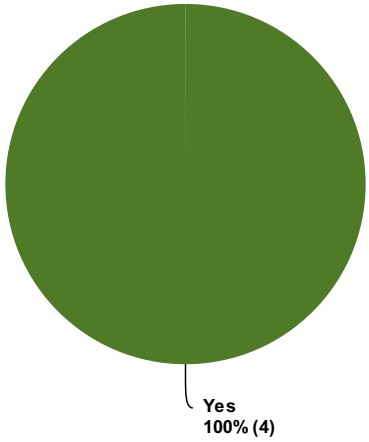
Answered: 1 Skipped: 3



Answer Choices	Responses	
I do not apply herbicides/pesticides on lakefront property	0%	0
Up to the lake	0%	0
Within 35 feet of the lake	0%	0
Farther than 35 feet from the lake.	100%	1
Total		1

Q11 Do you have your septic tank pumped at least every 3 years?

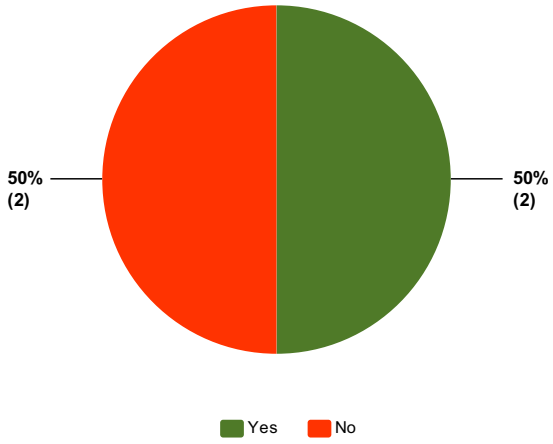
Answered: 4 Skipped: 0



Answer Choices	Responses	
Yes	100%	4
No	0%	0
I don't have a septic tank	0%	0
Total		4

Q12 Do you use fertilizer on your land?

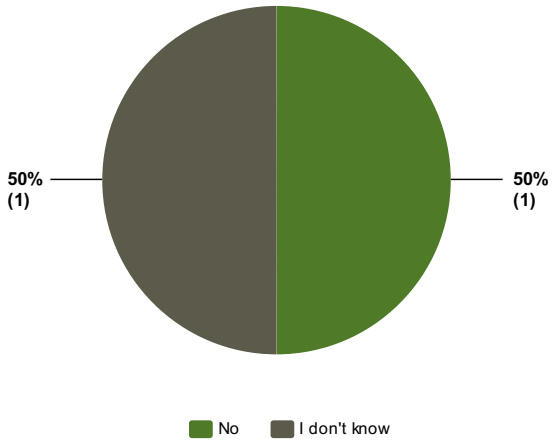
Answered: 4 Skipped: 0



Answer Choices	Responses	
Yes	50%	2
No	50%	2
Total		4

Q13 Do you use fertilizer which contains phosphorus?

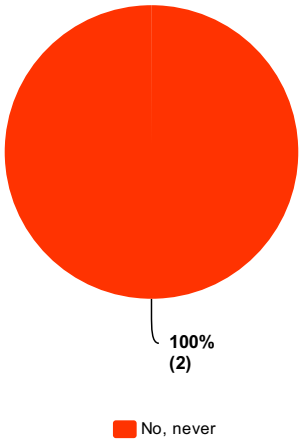
Answered: 2 Skipped: 2



Answer Choices	Responses	
Yes	0%	0
No	50%	1
I don't know	50%	1
Total		2

Q14 Do you have your soil tested before applying fertilizer?

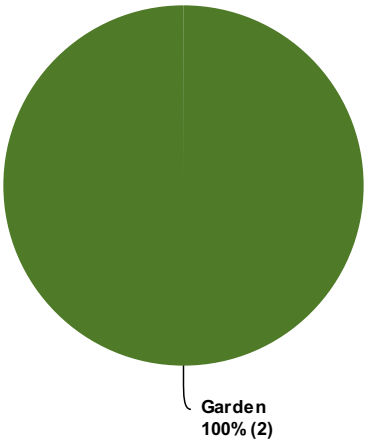
Answered: 2 Skipped: 2



Answer Choices	Responses	
Yes, all of the time	0%	0
Yes, some of the time	0%	0
No, never	100%	2
Total		2

Q15 Where do you apply fertilizer?

Answered: 2 Skipped: 2

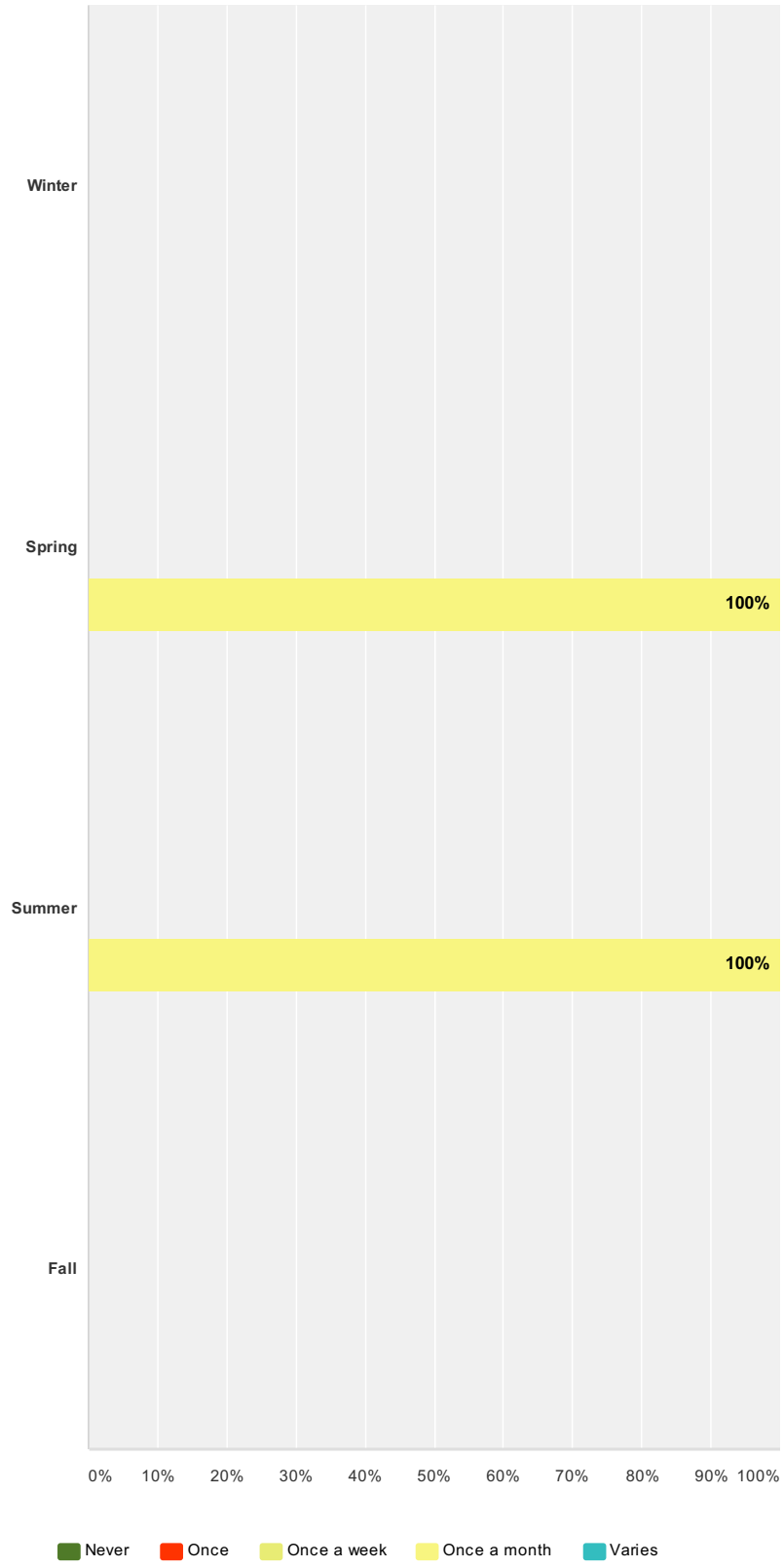


Answer Choices	Responses	
Agricultural fields	0%	0
Garden	100%	2
Lawn	0%	0
Total		2

#	Other (please specify)	Date
	There are no responses.	

Q16 In a typical year, how often do you apply fertilizer?

Answered: 2 Skipped: 2

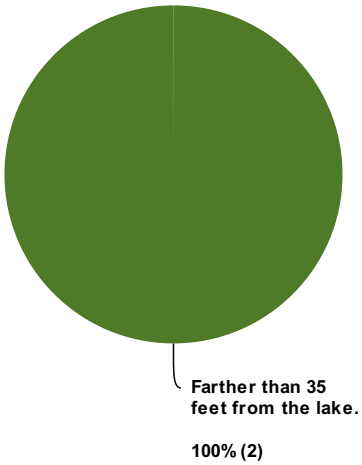


	Never	Once	Once a week	Once a month	Varies	Total Respondents
Winter	0% 0	0% 0	0% 0	0% 0	0% 0	0

Spring	**0%** 0	**0%** 0	**0%** 0	**100%** 1	**0%** 0	1
Summer	**0%** 0	**0%** 0	**0%** 0	**100%** 2	**0%** 0	2
Fall	**0%** 0	**0%** 0	**0%** 0	**0%** 0	**0%** 0	0

Q17 If you apply fertilzer on lakefront property, how close to the lake is it applied (select the closest distance to the lake where fertilzer is applied)?

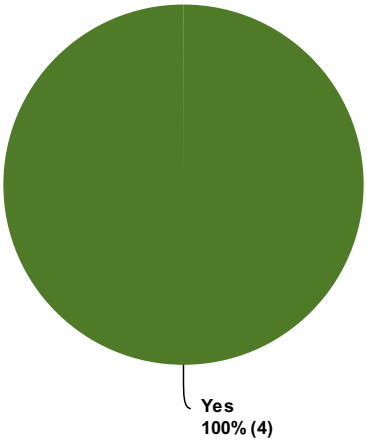
Answered: 2 Skipped: 2



Answer Choices	Responses	
I do not apply fertilizer on lakefront property	0%	0
Up to the lake	0%	0
Within 35 feet of the lake	0%	0
Farther than 35 feet from the lake.	100%	2
Total		2

Q18 Before reading the previous paragraph, did you know about the effects of phosphorus on lakes?

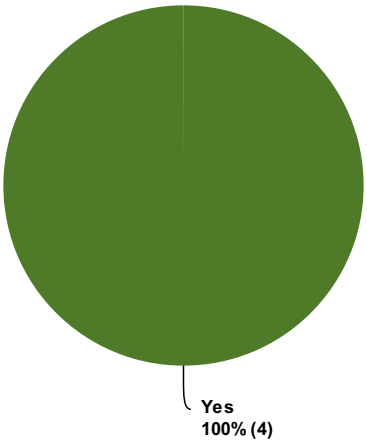
Answered: 4 Skipped: 0



Answer Choices	Responses	
Yes	100%	4
No	0%	0
Unsure	0%	0
Total		4

Q19 Do you own shoreland property?

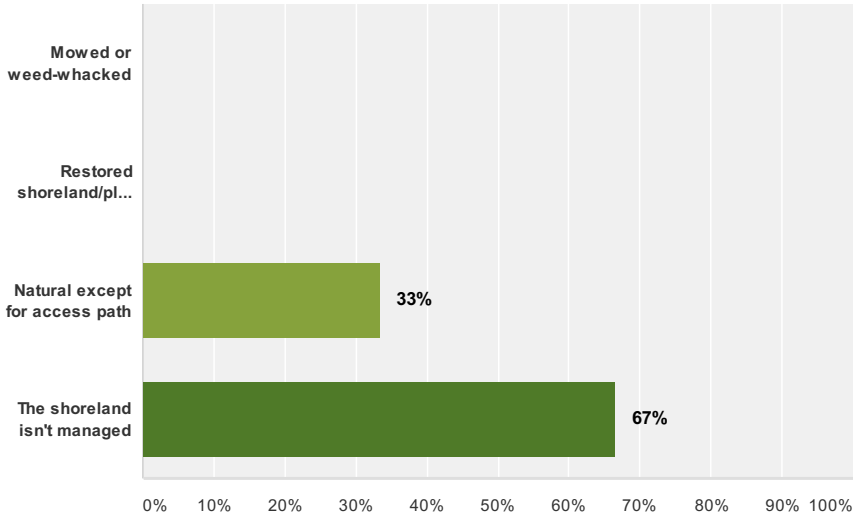
Answered: 4 Skipped: 0



Answer Choices	Responses	
Yes	100%	4
No	0%	0
Total		4

Q20 How do you currently manage the majority of your property within 35 feet of the lake? Check all that apply.

Answered: 3 Skipped: 1

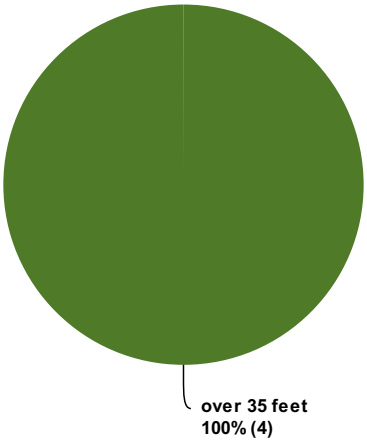


Answer Choices	Responses	
Mowed or weed-whacked	0%	0
Restored shoreland/planted	0%	0
Natural except for access path	33%	1
The shoreland isn't managed	67%	2
Total Respondents: 3		

#	Other (please specify)	Date
1	Part restored, part mowed	8/12/2014 5:54 AM

Q21 If you have unmowed shoreland vegetation, how far inland from the water's edge does it extend?

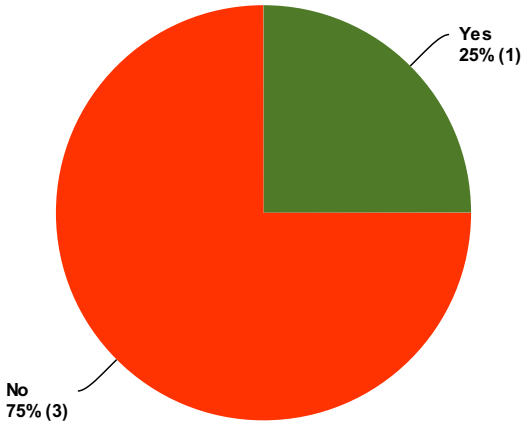
Answered: 4 Skipped: 0



Answer Choices	Responses	
I do not have unmowed shoreland vegetation	0%	0
1-15 feet	0%	0
16-35 feet	0%	0
over 35 feet	100%	4
Total		4

Q22 Have you observed erosion from your path to the lake?

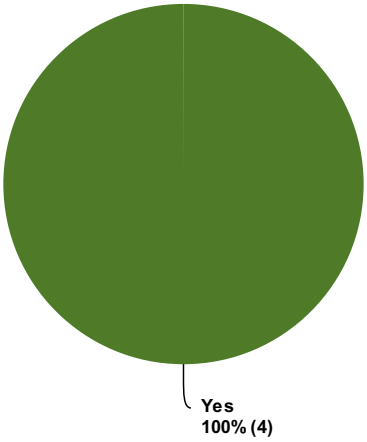
Answered: 4 Skipped: 0



Answer Choices	Responses	
I have no path	0%	0
Yes	25%	1
No	75%	3
Unsure	0%	0
Total		**4**

Q23 Did you understand the importance of shoreland vegetation before reading this?

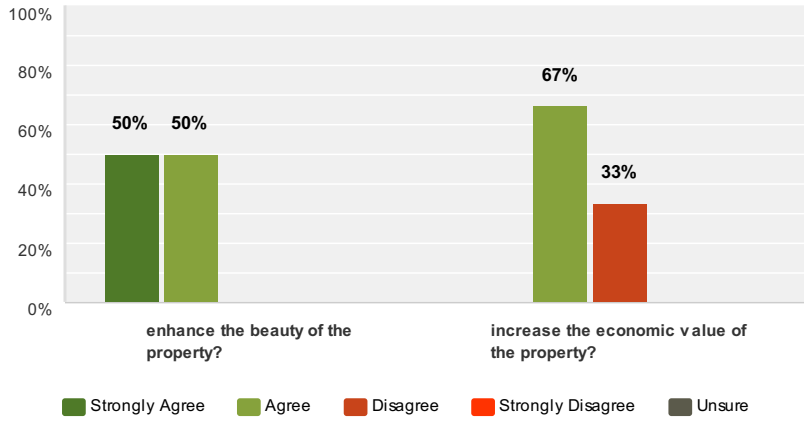
Answered: 4 Skipped: 0



Answer Choices	Responses	
Yes	100%	4
No	0%	0
Unsure	0%	0
Total		4

Q24 In your opinion, does shoreland vegetation...

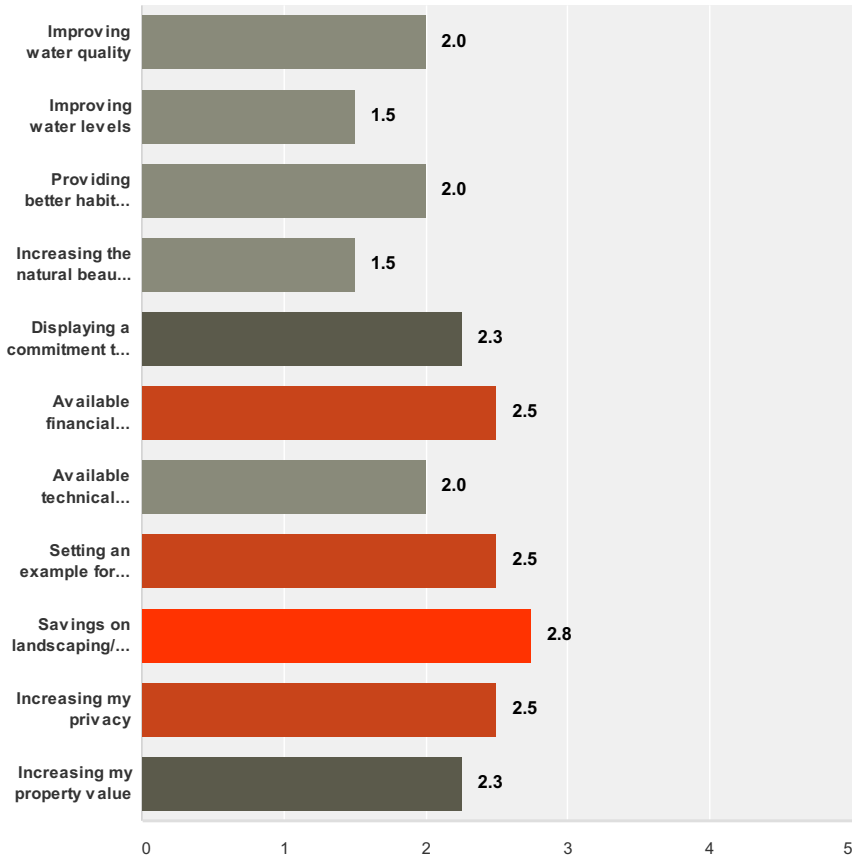
Answered: 4 Skipped: 0



	Strongly Agree	Agree	Disagree	Strongly Disagree	Unsure	Total
enhance the beauty of the property?	50% 2	50% 2	0% 0	0% 0	0% 0	4
increase the economic value of the property?	0% 0	67% 2	33% 1	0% 0	0% 0	3

Q25 What might motivate you to change how you manage your land?

Answered: 4 Skipped: 0



	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't know	Total
Improving water quality	25% 1.0	50% 2.0	25% 1.0	0% 0.0	0% 0.0	4
Improving water levels	50% 2.0	50% 2.0	0% 0.0	0% 0.0	0% 0.0	4
Providing better habitat for fish and wildlife	25% 1.0	50% 2.0	25% 1.0	0% 0.0	0% 0.0	4
Increasing the natural beauty of my property	50% 2.0	50% 2.0	0% 0.0	0% 0.0	0% 0.0	4
Displaying a commitment to the environment	25% 1.0	25% 1.0	50% 2.0	0% 0.0	0% 0.0	4
Available financial assistance	0% 0.0	50% 2.0	50% 2.0	0% 0.0	0% 0.0	4
Available technical assistance	25% 1.0	50% 2.0	25% 1.0	0% 0.0	0% 0.0	4
Setting an example for community members	0% 0.0	50% 2.0	50% 2.0	0% 0.0	0% 0.0	4
Savings on landscaping/maintenance costs	0% 0.0	25% 1.0	75% 3.0	0% 0.0	0% 0.0	4
Increasing my privacy	0% 0.0	50% 2.0	50% 2.0	0% 0.0	0% 0.0	4
Increasing my property value	0% 0.0	75% 3.0	25% 1.0	0% 0.0	0% 0.0	4

#	Other (please specify)	Date
	There are no responses.	