

2015

Lake Lucerne, 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 Lucerne, Waushara County, Wisconsin

The Lake Lucerne 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 in Wautoma, Wisconsin January through May, 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 lake planning participants on:

August 26, 2015 .
Date

The plan was adopted by the Town of Marion 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

There are only 5 riparian properties on Lake Lucerne: the Methodist camp; the boat landing owned by the Town; two private properties owned by the Kehl and McNeil households; and, a single parcel owned by the "Lucerne Lake Wood Property Owners Association." The "Lucerne Lake Wood Property Owners Association" does not resemble what is commonly referred to as a lake association or district in the lake management planning process. The "Lucerne Lake Wood Property Owners Association" is a single corporate entity comprised of more than a dozen families who share a single parcel. Very few live anywhere near the lake and although they were repeatedly contacted, no one from this corporation participated in the lake management plan development process.

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

Lake Lucerne Management Planning Committee Members and Resources

Planning Committee

Mark McNiel
Chip Hutler
Laura Hutler
Bill Kehl
Trish Beckett

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

Waushara County

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

UW – Stevens Point

Center for Watershed Science and Education

Water Resource Specialists – Ryan Haney and Danielle Rupp
Water Resource 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

Lake Lucerne photos courtesy of Mark McNiel. Thank you!

Contents

Introduction.....	7
Background.....	9
The Planning Process.....	9
Goals, Objectives and Actions	11
List of Goals	12
In-Lake Habitat and a Healthy Lake	15
The Fish Community.....	15
Aquatic Plants.....	17
Aquatic Invasive Species (AIS)	18
Critical Habitat.....	21
Landscapes and the Lake.....	22
Water Quality	23
Shorelands.....	25
Watershed Land Use	27
People and the Lake	29
Recreation	29
Communication and Organization.....	31
Updates and Revisions	32
Governance	33
References.....	36
Appendices.....	38
Appendix A. Waushara County Lake Information Directory	39
Appendix B. Invasive Species Rapid Response Plan 2015	44

Appendix C. Aquatic Plants.....47
Appendix D. Shoreland Survey – 201052
Appendix E. Lake User Survey Results54

Overarching Vision for Lake Lucerne

Lake Lucerne will retain its pristine nature with maintained and preserved shorelands. Community appreciation for the preservation of the lake will grow with educational opportunities, citizen action, mindful decision-making within the watershed, and balanced use of the lake. Lake Lucerne will boast quality native habitat in and around the lake.

Introduction

Lake Lucerne is located amidst the morainal hills and marshes of central Waushara County, Wisconsin. Land in the town of Marion is included in the Lucerne Lake watershed. The 42-acre lake just outside of the City of Wautoma is relatively undeveloped and provides quiet respite from the larger, more active lakes where residents and visitors can relax. The lake is also a beautiful setting for Lake Lucerne Camp, a youth camp which includes much of the land around the lake. Lake Lucerne residents strongly value the wildlife that inhabits the lake and the quality of water it contains. In 2014, these values inspired community members of Lake Lucerne to come together in partnership with Waushara County and technical professionals to develop this lake management plan (LMP).

The purpose of this plan is to provide a framework for the protection and improvement of Lake Lucerne. Implementing the content of this LMP will enable citizens and other supporters to achieve the vision for Lake Lucerne 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 Lucerne 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 Lucerne Lake Management Plan, and how can it be used?

- **Individuals:** Can use this plan to learn about the lake they love and their connection to it. People living near Lake Lucerne can have the greatest influence on Lake Lucerne by understanding and choosing lake-friendly options to manage their land and the lake.
- **Lucerne Lake Association:** This plan provides the Association with a list of options that can easily be prioritized. Annual review of the plan will also help the Association to realize its accomplishments. Resources and funding opportunities for Association management activities are made more available by placement of goals into the lake management plan, and the Association can identify partners to help achieve their goals for Lake Lucerne.
- **Lake Lucerne Camp:** This plan can help to guide stewardship of Lake Lucerne and camp programming. Often, camps provide places for local citizens to meet and discuss the lake and any problems it may be experiencing.
- **Neighboring lake groups, conservation clubs, and sporting 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 fun.
- **The Town of Marion:** The Town can utilize 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. The Town can work with requests by individuals or developers to best represent the documented wishes of the lake community.
- **Waushara County:** County professionals can identify needs, provide support, base decisions, and allocate resources to assist with some of the lake-related actions 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, the fishery, and invasive species. Lake management plans help the WDNR identify and prioritize needs within Wisconsin's lake community, and decide where to best apply resources and funding. A lake management plan (LMP) increases an application's competitiveness for funding from the State – 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 the 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 WDNR Lake Protection Grant Program. There was insufficient data available for many of the lakes to evaluate current water quality, aquatic plant communities, invasive species, and shorelands. The data that were available had been collected at differing frequencies or periods of time, making it difficult to compare lake conditions. Professionals and students from UW-Stevens Point 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 professionals at the Wisconsin Department of Natural Resources were also incorporated into the planning process to provide 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 Beans Lake 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, the data used in the development of this plan were detailed in the report *Waushara County Lakes Study – Lucerne Lake 2010-2012*, University of Wisconsin-Stevens Point.

The Planning Process

The planning process included a series of four planning sessions held between January and May 2014 at the Waushara County Courthouse. The Lake Lucerne Planning Committee consisted of property owners, Lake Lucerne camp directors, and recreational users of the lake. Technical assistance during the planning process was provided by the Waushara County Conservationist, the Waushara County Community, the 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 Lucerne waterfront property owners and by press



releases in local newspapers. In addition, members of the planning committee 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 Results. Response rates were very low for Lake Lucerne.

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 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 Lucerne now and in the years to come.

Goals, Objectives and Actions

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

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

In-Lake Habitat and a Healthy Lake

Fish Community—fish species, abundance, size, important habitat and other needs

Aquatic Plant Community—habitat, food, health, native species, and invasive species

Critical Habitat—areas of special importance to the wildlife, fish, water quality, and aesthetics of the lake

Landscapes and the Lake

Water Quality and Quantity—water chemistry, clarity, contaminants, lake levels

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

Watershed Land Use—land use, management practices, conservation programs

People and the Lake

Recreation—access, sharing the lake, informing lake users, rules

Communication and Organization—maintaining connections for partnerships, implementation, community involvement

Updates and Revisions—continuing the process

Governance—protection of the lake, constitution, state, county, local municipalities, Lake Association

List of Goals

- Goal 1. Improve largemouth bass size structure and maintain bluegill abundance.
- Goal 2. Preserve the native plant community in Lake Lucerne for lake health and to limit the establishment of aquatic invasive species (AIS).
- Goal 3. Identify and diminish populations of invasive plants in and around Lake Lucerne.
- Goal 4. Preserve high quality habitat for fish and wildlife.
- Goal 5. Maintain current water quality conditions and identify any changes early, with monitoring.
- Goal 6. Protect healthy shorelands and restore shoreland vegetation where needed.
- Goal 7. Support local land management practices that can protect lake health.
- Goal 8. Maintain secluded, quiet nature of recreation on the lake.
- Goal 9. Build community appreciation for the beauty and protection of Lake Lucerne.
- Goal 10. Review plan annually and update as needed.

The following goals have been identified as ‘high priority’:

Goal 3. Identify and diminish populations of invasive plants in and around Lake Lucerne.

Objective 3.1. Monitor and diminish (100%) populations of EWM in Lake Lucerne.

Coordinate hand-pulling of EWM, work with other lakes to apply for grant to hire divers for hand pulling, consider no action, test EWM for hybrid variety.

Goal 5. Maintain current water quality conditions and identify any changes early, with monitoring.

Objective 5.1. Build an ongoing, continuous dataset of water quality measurements to track changes/improvements/declines over time.

Initiate a water quality monitoring program that includes water clarity, phosphorus and chlorophyll-*a* consistent with WisCALM guidance, begin ice-off/ice-on monitoring.

Goal 7. Support local land management practices that can protect lake health.

Objective 7.1. Encourage involvement in local decision making activities that affect the lake.

Encourage County to work with landowners to implement BMPs for water quality, inform residents in the watershed about their connection to the lake, participate in comprehensive planning activities, support property owners interested in conservation programs.

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 organizations 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
Clean Boats, Clean Waters	CBCW
WDNR Citizen Lake Monitoring Network	CLMN
UWSP Center for Watershed Science and Education	CWSE
Lucerne Lake Association	LLA
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
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 Water and Environmental Analysis Lab	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 Lucerne for its 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 they have a place to hide from predators. Wetlands along the shoreline and adjacent to the lake provide habitat for safety, reproduction, 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 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, shoreland health, and characteristics of the watershed. Healthy habitat in Lake Lucerne includes the aquatic plants, branches, and tree limbs above and below the water.

The Fish Community

A balanced fish community has a mix of predator and prey species, each with different food, habitat, nesting substrate, and water quality needs in order to flourish. A sustainable fishery seeks to be in balance with the lake's natural ability to support the fish community, and is one in which populations do not noticeably decline over time because of fishing practices or other human activity. Activities in and around a lake that can affect a fishery may involve



disturbances to the native aquatic plant community or substrate, excessive additions of nutrients or harmful chemicals, removal of woody habitat, shoreline alterations, and/or an imbalance in the fishery. Shoreland erosion can cause sediment to settle onto the substrate, causing the deterioration of spawning habitat. Habitat can be improved by allowing shoreland vegetation to grow, minimizing the removal of aquatic plants, providing fallen trees or limbs in suitable areas, and protecting wetlands and other areas of critical habitat.

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

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

In the spring of 2011, the Wisconsin Department of Natural Resources (WDNR) conducted an electrofishing survey of Lake Lucerne. The survey showed a fairly high abundance of largemouth bass with below average size structure and a good abundance of bluegill with good size structure. Recommendations from the WDNR Fisheries Biologist included protecting the high quality in-lake and shoreland habitat presently available. Lake Lucerne was ranked as having high quality, intact shoreland, which is excellent for fish and wildlife. Leaving woody habitat such as logs, sticks, and stumps in the water as fish habitat is important. The Fisheries Biologist also recommended continued monitoring for invasive species.

Guiding Vision for the Fish Community

Lake Lucerne will have a healthy, well-balanced fish community.

Goal 1. Improve largemouth bass size structure and maintain bluegill abundance.

Objective 1.1. Educate visitors about the fish community in Lake Lucerne.

Actions	Lead person/group	Resources	Timeline
Create and maintain boat landing signage with information about the fish community.	Town of Marion	UWEX Lakes	2016

Objective 1.2. Improve fish habitat.

Actions	Lead person/group	Resources	Timeline
Leave existing woody habitat (branches, logs, stumps) in the lake.	Shoreland property owners	WDNR Fisheries Biologist	Ongoing
Consider applying for a permit and/or grant application with the WDNR for tree drops and/or fish cribs.	Shoreland property owners	WDNR Fisheries Biologist	2016

Aquatic Plants

Aquatic plants provide the forested landscape within Lake Lucerne. 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.

Eleven species of aquatic plants were found in Lake Lucerne during the 2011 survey. The greatest plant diversity was found on the northern and southern sides of the lake in the shallows. The dominant plant species in the survey was muskgrass (*Chara* spp.), followed by slender naiad (*Najas flexilis*) and Fries' pondweed (*Potamogeton friesii*). Muskgrass is a favorite food source for a wide variety of waterfowl, and muskgrass beds offer cover and food to fish, especially young trout, largemouth bass, and smallmouth bass. The stems, leaves, and seeds of slender naiad provide food for waterfowl and marsh birds, and this common aquatic plant species also provides habitat for fish. Fries' pondweed is also an important food source for a variety of waterfowl, and this submersed plant species offers shade and cover for fish, and habitat for invertebrates (Borman et al., 2001).

Overall, the aquatic plant community in Lake Lucerne can be characterized as having below average diversity when compared to all of the other lakes in the Waushara County Lakes Study, with several species that are typically found in relatively undisturbed systems. The identification of CLP within the lake is cause for concern and the lake should be routinely monitored for CLP in early June.

More detailed information can be found in the Lake Lucerne Aquatic Plant Report, the Lake Lucerne 2010-2012 Lake Study Report, and Appendix C. Aquatic Plants.

Guiding Vision for Aquatic Plants in Lake Lucerne

Lake Lucerne will have a healthy native plant community with minimal disturbance by invasive species.

Goal 2. Preserve the native plant community in Lake Lucerne for lake health and to limit the establishment of aquatic invasive species (AIS).

Objective 2.1. The disturbance of native plants will be minimized by shoreland property owners, lake users, and treatment of AIS.

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	UWEX Lakes – informational materials RC&D can do some hands-on plant ID with locals	Ongoing
Create a collection of pressed plants for use by or display at Lake Lucerne Camp.	RC&D	Lake Lucerne Camp	2016

Aquatic Invasive Species (AIS)

Aquatic invasives species are non-native aquatic plants and animals that are most often unintentionally introduced into lakes via lake users. This most commonly occurs on trailers, boats, equipment, and from the release of bait.

Eurasian watermilfoil (EWM) was identified in Lake Lucerne in 2009. In 2013, another survey was conducted by Golden Sands Resource Conservation & Development Council, Inc. (RC&D) and again, EWM was found in small patches on the western side of the lake (see Appendix C. 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.

Each lake is different and the response to EWM control may vary from lake to lake. No single approach will be appropriate for all lakes. Often multiple approaches and adaptive year-to-year changes in approach are most successful. The EWM population should be evaluated using a ‘point-intercept’ method (accompanied by more thorough observations) before and after treatments to determine the effectiveness of an approach for a given year. Strategies for the subsequent year should be adjusted accordingly. EWM management involves evolving scientific knowledge; therefore, the management strategies for EWM in Lake Lucerne should be adapted as EWM populations in the lake change and as new information becomes available.



Hybrid watermilfoil (HWM) results from a hybridization of native milfoil species with Eurasian watermilfoil. HWM tends to be more resilient and less affected by chemical treatment. HWM may be suspect in a lake if 1) the plants appearance is different than EWM; 2) management with chemicals becomes difficult or ineffective; and, 3) the lake is near other lakes with HWM. If these criteria are met, plant samples should be submitted to a lab for confirmation. Once HWM is confirmed, a *challenge test* should be conducted to determine which combination of chemicals will be effective in controlling that particular strain of HWM. Over 13 combinations of chemicals can potentially be used to treat HWM. The only way to know the appropriate combination is by sending samples to be challenge tested. Treating HWM without knowing the appropriate combination of chemicals can result in an even more resilient strain in the lake, damage to the native aquatic plant population, and a waste of time and money.

Because curly-leaf pondweed (CLP) was confirmed in Lake Lucerne by biologists with the WDNR, a special survey was conducted in early June 2012. Curly-leaf pondweed, a non-native species, can have an impact on a lake's ecosystem because of its life cycle. This plant can live in harmony with the rest of the aquatic plant community but may become invasive. The die-off of large beds of CLP in June can contribute to nuisance algae blooms throughout the summer. CLP grows under the ice during late winter/early spring and starts to die back in late June to early July. This die back causes the release of phosphorus into the water just as new plants and algae are beginning to grow, helping to fuel algae blooms and excessive plant growth. CLP was not found in Lake Lucerne during the 2012 survey, but the lake should continue to be monitored for signs of CLP in the future.

Summary of Aquatic Plant Management Planning Session Discussion – April 17, 2014

Management options will change depending upon the amount of EWM and CLP in Lake Lucerne; therefore, routine annual monitoring of these species is essential. The presence of AIS will also define the type of aquatic plant management to be conducted to address recreational impediments. The following aquatic plant management strategies were determined by the committee to be the most practical and effective options to minimize impacts to Lake Lucerne as a whole.

- **Manual removal. (Native plants, EWM or CLP)** Property owners are permitted to clear an area up to 30 feet around their dock for boat and swimming access to open water. Minimizing the size of this area and/or avoiding disturbance will help to limit the spread of invasive species. Additionally, those trained to properly identify and remove EWM and other aquatic invasive species can remove those plants manually anywhere in Lake Lucerne at any time of year without a permit. Trained divers can be hired to manually remove AIS in deeper parts of the lake. **With the small populations of EWM currently in Lake Lucerne, this is the preferred approach for removal.**
- **Milfoil weevils. (EWM)** This option could be considered in areas of the lake with native or restored shorelines. Milfoil weevils are commercially available but are expensive, so obtaining a starter population and rearing them in predator-free conditions can be desirable from a financial standpoint. Professional assistance should be sought if stocking or rearing is pursued. **Lake Lucerne may be a good candidate for this option, with healthy shorelands and small EWM populations; however, the panfish population may limit its success.**

- **Do nothing. No Action.** Waiting and seeing how EWM and CLP populations respond to no action over time is an option. In some cases, EWM and CLP have been observed to establish as small populations that remain small and are a nondestructive component of the ecosystem.
- Techniques applied within the watershed and on shoreland property can reduce the nutrient loading responsible for aquatic plant growth in the lake. This is discussed further in the Shoreland and Watershed sections.

Goal 3. Identify and diminish populations of invasive plants in and around Lake Lucerne.

Objective 3.1. Monitor and diminish (100%) populations of EWM in Lake Lucerne.

Actions	Lead person/group	Resources	Timeline
Coordinate field training for residents with RC&D.	Interested citizen	RC&D	2016
Continue hand-pulling of EWM.	Trained individuals	RC&D	Ongoing
Work with nearby lakes to apply for a grant (held by RC&D) to hire divers to confirm no deep populations of EWM, hand pull deep EWM if found.	Interested citizen	RC&D WDNR Lake Specialist	2016
Consider no action if EWM is not degrading aquatic plant community.		WDNR Lake Specialist	Ongoing
Prior to considering chemical treatment, test existing EWM for hybrid watermilfoil (HWM). An update to the plan would be required.		RC&D	Prior to chemical treatment

Objective 3.2. Inform visitors to Lake Lucerne about AIS.

Actions	Lead person/group	Resources	Timeline
Work with RC&D to explore Clean Boats, Clean Waters (CBCW) volunteer monitoring program. CBCW volunteers should monitor boat launches on busier weekend/days.	Interested citizens	RC&D CBCW	2016
Boat launches and visitor access sites should have signage and/or information about AIS.	Lake Lucerne Camp Town of Marion	RC&D WDNR Lake Specialist	Ongoing

Objective 3.3. Eliminate invasive terrestrial plants (*Phragmites* and Japanese knotweed) around Lake Lucerne.

Actions	Lead person/group	Resources	Timeline
Work with RC&D to learn how to remove <i>Phragmites</i> from west end of the lake.	Individuals	RC&D	2016
Work with RC&D to eliminate Japanese knotweed near Lake Lucerne Camp.	Individuals, camp staff	RC&D	2016

Critical Habitat

Critical habitat areas are designated by the WDNR to protect features in a lake that are important to the overall health of the aquatic plants, animals, and lake itself. Every lake contains important natural features, but not all lakes have official critical habitat designations. Designating areas of the lake in this way results in special protections for these areas, and recognizes these areas by mapping and sharing information about them so many can know the locations and importance of areas that could be vulnerable to damage by human activity. Having a critical habitat designation on a lake can help lake groups and landowners plan waterfront projects to avoid and protect habitat and help ensure long-term health of the lake. Lake Lucerne does not currently have any officially designated critical habitat areas.

Guiding Vision for Lake Lucerne's Critical Habitat

Sensitive areas in Lake Lucerne will be enhanced and protected from degradation.

Goal 4. Preserve high quality habitat for fish and wildlife.

Objective 4.1. Identify potentially critical habitat on Lake Lucerne.

Actions	Lead person/group	Resources	Timeline
Request critical habitat designation from WDNR.	Lake Lucerne Camp	WDNR Lake managers consultants	2016

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 Lucerne 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 Lucerne 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

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

Dissolved oxygen is an important measure in Lake Lucerne 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. Temperature and dissolved oxygen profiles indicate very typical thermal stratification in Lake Lucerne that is developed by June each year, limiting mixing of shallower and deeper water. Due to its depth and seasonal overturn mixing, oxygen depletion is not typically a problem in Lake Lucerne during the winter.

The water clarity measured in Lake Lucerne was considered good. For Lake Lucerne, the average water clarity was best during August and poorest during September. The measurements ranged from depths of 7 feet to 24 feet over the two-year monitoring period.

Chloride, sodium and potassium concentrations are commonly used as indicators of how a lake is being impacted by human activity. Lake Lucerne had low average chloride, potassium, and sodium concentrations over the monitoring period.

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 receives 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)

Total phosphorus concentrations in Lake Lucerne ranged from a high of 22 µg/L in June 2012 to a low of 3 µg/L in August 2012, with median growing season concentrations of 15 µg/L and 12 µg/L in 2011 and 2012, respectively. This is below Wisconsin’s phosphorus standard of 20 µg/L for deep seepage lakes and is down from measurements taken in the early 1980s, which averaged 20 µg/L. The median concentration measured in 2011 is at the flag value of 15 µg/L proposed by the WDNR for deep seepage lakes.

The hardness of the water in Lake Lucerne (from calcium in groundwater) helps to reduce the availability of phosphorus for use by algae and aquatic plants. If increased development, agriculture, and/or other land uses occur in the watershed that lead to more nutrient loading, it is possible for a lake to receive more phosphorus than the hardness can control. Managing nitrogen, phosphorus and soil erosion throughout the Lake Lucerne watershed is one of the keys to protecting the lake itself. Near shore activities that may increase the input of phosphorus to the lake include applying fertilizer, removing native vegetation (trees, bushes and grasses), mowing vegetation, and increasing the amount of exposed soil. Nitrogen inputs to Lake Lucerne can be controlled by using lake-friendly land management decisions, such as the restoration of shoreland vegetation, elimination/reduction of fertilizers, proper management of animal waste and septic systems, and the use of water quality-based management practices.

Guiding Vision for Water Quality in Lake Lucerne

Lake Lucerne will continue to hold water that is measurably clear and clean for generations to come.

Goal 5. Maintain current water quality conditions and identify any changes early, with monitoring.

Objective 5.1. Build an ongoing, continuous dataset of water quality measurements to track changes/improvements/declines over time.

Actions	Lead person/group	Resources	Timeline
Begin Ice on/off monitoring.	Interested individual, Lake Lucerne Camp	Regional CLMN Coordinator	Early and late winter
Begin water clarity monitoring during open water season. Submit data to WDNR database for storage.	Interested individual, Lake Lucerne Camp	Regional CLMN Coordinator	5 times June-Sept
Begin periodic collection of water samples for analysis to track changes in nutrients over time.	Interested individual, Lake Lucerne Camp	WEAL or other certified lab	Spring or fall

Objective 5.2. Maintain current median summer phosphorus concentrations (around 13.5 ppb) and reduce inorganic nitrogen concentrations (0.17 ppm during 2010-2012 study period).

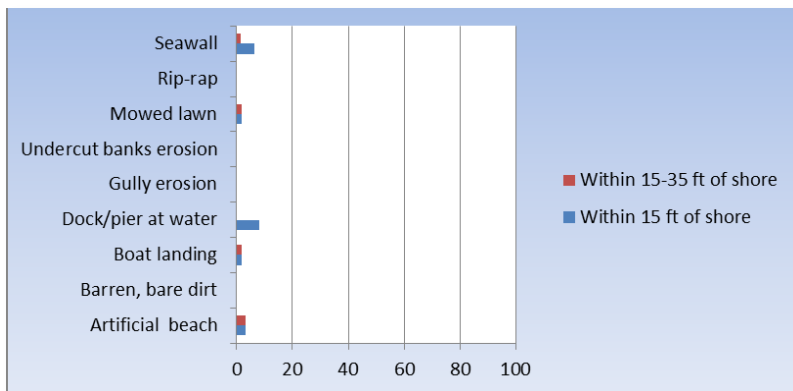
Actions	Lead person/group	Resources	Timeline
County staff will assist shoreland and watershed property owners in efforts to reduce excess applications of nitrogen (fertilizer, manure, etc.).	WCLCD	Funding from County, DATCP, and grants NRCS	Ongoing

Shorelands

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

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. 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.



Land management practices by percentage of shoreline, 2010.

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 Lucerne is displayed on the map in Appendix D. Shoreland Survey – 2010. The majority of Lake Lucerne’s shorelands are in good shape; only three short segments indicated areas that could benefit from improvement/restoration for lake health. There were no stretches of Lake Lucerne shoreland that ranked as poor.

Shoreland ordinances were enacted to improve water quality and habitat, and to protect our lakes. The state (NR 115) shoreland ordinance states that 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 lot. With a total of six lakefront lots, 180 feet (3%) of disturbed shoreland would be permitted. Based on the 2010 shoreland inventory, only 2% (101 feet) of Lake Lucerne’s shoreland was mowed lawn, which is excellent. Efforts should be made to reach new property owners before they alter the shoreland.

Guiding Vision for Lake Lucerne’s Shorelands

Lake Lucerne will have a healthy, vegetated shoreland around the entire lake.

Goal 6. Protect healthy shorelands and restore shoreland vegetation where needed.

Objective 6.1. Restore the degraded area around Lake Lucerne’s boat launch.

Actions	Lead person/group	Resources	Timeline
Inform shoreland property owners about the benefits of healthy shorelands.	WC	UWEX Lakes – informational materials	
Support the voluntary use of conservation easements and deed restrictions to protect Lake Lucerne’s shorelands.	Interested property owners	NCCT WDNR Lake Protection grants Knowles-Nelson Stewardship funds	As needed

Objective 6.2. Restore the degraded area around Lake Lucerne’s boat launch.

Actions	Lead person/group	Resources	Timeline
Restore the shoreland near the boat launch and correct erosion issues.	Town of Marion	WCLCD	

Watershed Land Use

It is important to understand where Lake Lucerne'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 Lucerne; its land area may be slightly different than the surface watershed.

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

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

The surface watershed of Lake Lucerne is 232 acres. Primary land use is forested land with development and agriculture mixed throughout (Figure 1). The lake's shoreland is comprised primarily of forest and wetlands. In general, the land closest to the lake has the greatest immediate impact on water quality.

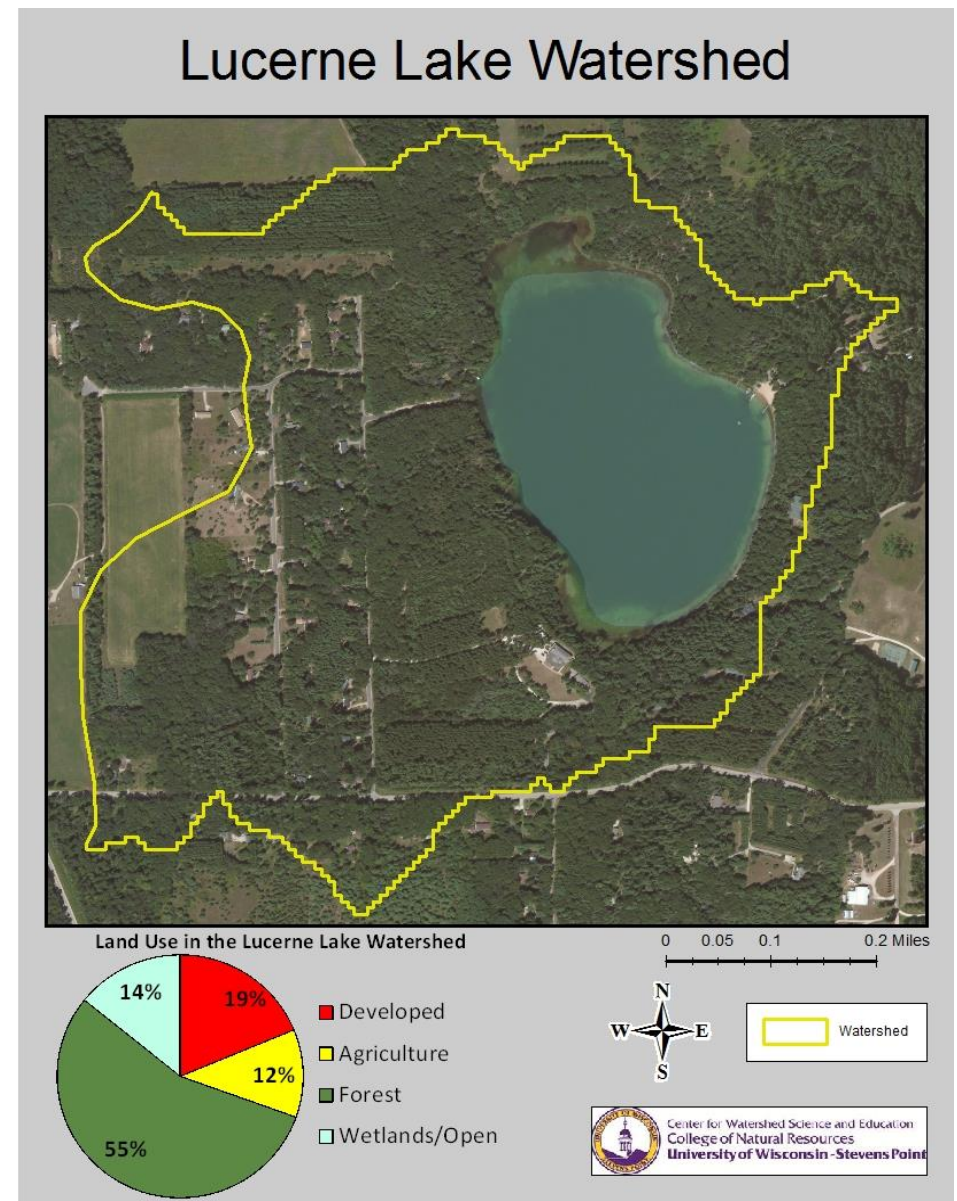
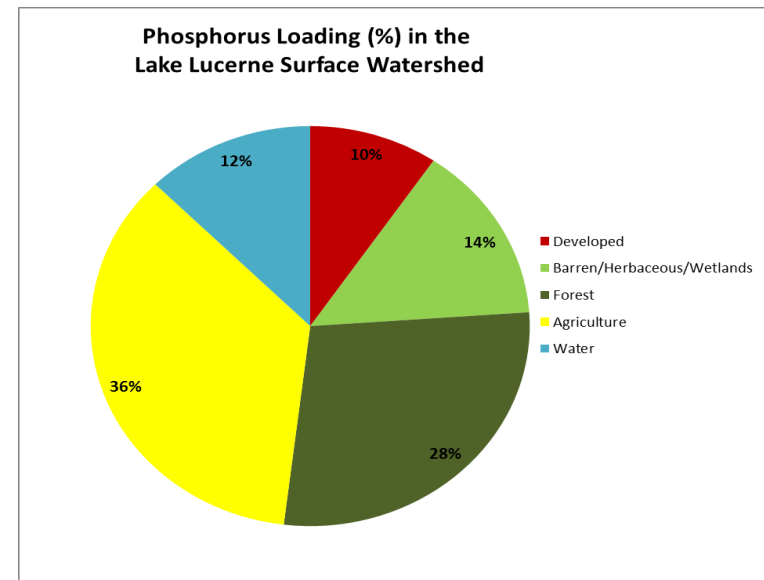


Figure 1. Surface watershed of Lake Lucerne.

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



Guiding Vision for Lake Lucerne’s Watershed

Lake Lucerne will continue to be situated in a pristine setting with a minimally developed watershed.

Goal 7. Support local land management practices that can protect lake health.

Objective 7.1. Encourage involvement in local decision making activities that affect the lake.

Actions	Lead person/group	Resources	Timeline
County staff will work with landowners to install and maintain water quality-based best management practices (BMPs).	WCLCD	Funding from County, DATCP, and grants NRCS	Ongoing
Inform residents of the watershed about land practices to support a healthy lake.	WCLCD		Ongoing
Research local zoning ordinances and participate in comprehensive planning activities to better support lake health.	Shoreland property owners	WC Planning and Zoning	Ongoing
Support property owners interested in conservation programs such as conservation easements, sale of land for protection, purchase of development rights, etc.	Interested property owners	NCCT WDNR Lake Protection grants Knowles-Nelson Stewardship funds	As needed

People and the Lake

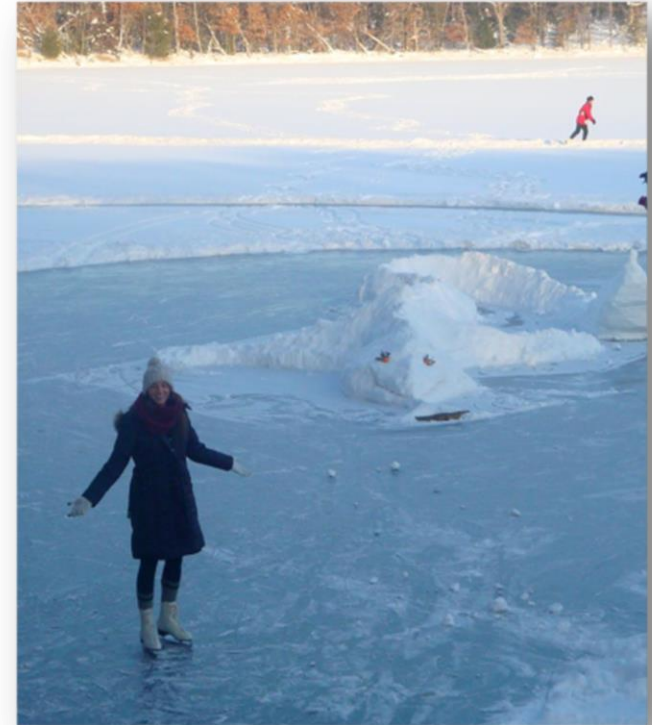
The people that interact with the lake are a key component of the lake and its management. In essence, a lake management plan is a venue by which people decide how they would like people to positively impact the lake. The plan summarizes the decisions of the people to take proactive steps to improve 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, professionals, and 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. The Town of Marion boating ordinance for Lake Lucerne reads as follows: “No person shall operate a boat of any nature on the waters of Lake Lucerne unless it is powered by nature or a manual device. It is explicitly understood that electric engines, as well as combustible engines of any nature whatsoever, are prohibited at all times.” Plan committee members and survey respondents concurred that this ordinance fits Lake Lucerne.

Recreation

Lake Lucerne has one public boat landing with 1-5 parking stalls on the western side. Lake Lucerne is a no-wake lake. The lake is enjoyed by people who swim, boat, fish, and appreciate its natural beauty and quiet.

Lake Lucerne Camp and Retreat Center is located on the southeastern shore. The camp was founded in 1947. It is used year-round by retreat and summer camp visitors of all ages.



Guiding Vision for Recreation

Lake Lucerne will be a peaceful place for quiet recreation and relaxation.

Goal 8. Maintain secluded, quiet nature of recreation on the lake.

Objective 8.1. Work with local municipality to protect the lake.

Actions	Lead person/group	Resources	Timeline
Install a descriptive sign at the boat launch highlighting the beauty and value of the lake and asking visitors to respect it and recreate responsibly.	Lake Lucerne Camp Individuals	Town of Marion UWSP	2016
Explore banning snowmobiles and other motors that interfere with the quiet nature of Lake Lucerne.	Individuals	WDNR	2016



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 Lucerne enjoyed by many people now and for future generations. Working together on common values will help to achieve the goals that are outlined in this plan.

Guiding Vision for Communication

Lake Lucerne will host respectful, informed and appreciative visitors and community members.

Goal 9. Build community appreciation for the beauty and protection of Lake Lucerne.

Objective 9.1. Inform new property owners and association members about important lake information and healthy land and lake management practices.

Actions	Lead person/group	Resources	Timeline
Provide welcome packets to new property owners containing important information about the lake and its watershed.	WCWLC	WCWLC UWEX Lakes – informational materials WDNR small scale lake grant	
Encourage shoreland property owners to connect with other lake groups via the WCWLC, “Lake Tides” newsletter, Wisconsin Lakes Convention, Lake Leaders Institute, etc.	WCWLC	WCWLC UWEX Lakes – informational materials Wisconsin Lakes	Ongoing
Attend the annual Lucerne Lake Association meeting to meet with neighbors and communicate lake happenings to year-round and part-time residents.	Shoreland property owners Individuals Lake Lucerne Camp staff	LLA	

Objective 9.2. Inform visitors about the special nature of Lake Lucerne and responsible recreation.

Actions	Lead person/group	Resources	Timeline
Install a descriptive sign at the boat launch highlighting the beauty and value of the lake and asking visitors to respect it and recreate responsibly: “The lake is the gift of a glacier...” Explore working with UWSP professor on design of a sign and/or brochure.	Individuals	UWSP Lakes CWSE	2016
Assist camp with obtaining information about the lake for visitors. Content similar to above.	Individuals	Lake Lucerne Camp	Ongoing

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 updates with any necessary changes should take place every 5 years.

Guiding Vision for Updates and Revisions

Lake Lucerne's lake management plan will be a living document, updated and revisited as necessary so that proactive actions are taken to protect the lake and its natural environment.

Goal 10. Review plan annually and update as needed.

Objective 10.1. Communicate updates with community members and others identified in this plan.

Actions	Lead person/group	Resources	Timeline
Communicate any important updates or changes to the lake management plan with the Lucerne Lake Association at the annual meeting.	Individuals	Lake Lucerne Camp WDNR Lake Specialist WCLCD	Annually

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 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.

References

- Bartz, David. 2014. The Fishery in Deer, Lucerne, and Spring Lakes. Presentation. Unpublished data. Given March 6, 2014 at the Waushara County Courthouse.
- Boat Ed, 2013. The Handbook of Wisconsin Boating Laws and Responsibilities. Approved by Wisconsin Department of Natural Resources. www.boat-ed.com
- Borman, Susan, Robert Korth, and Jo Temte, 2001. Through the looking glass, a field guide to aquatic plants. Reindl Printing, Inc. Merrill, Wisconsin.
- Haney, Ryan. 2014. Water Quality in Deer, Lucerne and Spring Lakes. Presentation. Unpublished data. Given May 8, 2014 at the Waushara County Courthouse.
- Johnson, Ted. 2014. Aquatic Plant Management Strategies. Presentation. Given April 17, 2014.
- Lake Lucerne 2010-2012 Study Report. Center for Watershed Science and Education. UW-Stevens Point.
- Lake Lucerne 2010-2012 Study Mini-Report. Center for Watershed Science and Education. UW-Stevens Point
- Panuska and Lillie, 1995. Phosphorus Loadings from Wisconsin Watershed: Recommended Phosphorus Export Coefficients for Agricultural and Forested Watersheds. Bulletin Number 38, Bureau of Research, Wisconsin Department of Natural Resources.
- Shaw, B., C. Mechenich, and L. Klessig, 2000. *Understanding Lake Data*. University of Wisconsin-Extension, Stevens Point. 20 pp.
- Skawinski, Paul; Stushek, Kaycie. 2014. Aquatic Invasive Species in Deer, Lucerne and Spring Lakes. Presentation. Unpublished data. Given April 17, 2014 at the Waushara County Courthouse.
- Turyk, Nancy. 2014. The Aquatic Plant Community in Deer, Lucerne and Spring Lakes. Presentation. Unpublished data. Given April 17, 2014 at the Waushara County Courthouse.
- Turyk, Nancy. 2014. Land Management Practices to Improve Water Quality. Presentation. Unpublished data. Given May 8, 2014 at the Waushara County Courthouse
- UW-Stevens Point Center for Watershed Science and Education, 2014. Waushara County Lake Study - Lake Lucerne 2010-2012. Final Report to Waushara County and Wisconsin Department of Natural Resources.

UW-Stevens Point Center for Watershed Science and Education, 2013. Waushara County Lake Study - Lake Lucerne 2010-2012 Mini-Report. Report to Waushara County and Wisconsin Department of Natural Resources. Planning Meeting Presentations

Vallentyne, J.R., 1974. The Algal Bowl-Lakes and Man. Ottawa Department of the Environment.

Wetzel, R.G., 2001. Limnology, Lake and River Ecosystems, Third Edition. Academic Press. San Diego, California.

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
Website:
<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
<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.

Citizen Lake Monitoring Network

Contact: Brenda Nordin
Wisconsin Department of Natural Resources
Phone: 920-662-5141
E-mail: brenda.nordin@wisconsin.gov

Conservation Easements

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

Contact: 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 St, PO Box 487, Wautoma, WI 54982
Phone: 920-787-0416
E-mail: ken.williams@ces.uwex.edu
<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

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

Groundwater Levels/Quantity (cont'd)

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
[http://prodoasext.dnr.wi.gov/inter1/hicap\\$.st artup](http://prodoasext.dnr.wi.gov/inter1/hicap$.st artup)

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/>

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

Water Quality Problems

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

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
224 TNR UWSP 800 Reserve St. Stevens Point, WI 54481
Phone: 715-346-2497

Appendix B. Invasive Species Rapid Response Plan 2015

SURVEY/MONITOR

1. Learn how to survey/monitor the lake.

Contacts:

Water Resource Management Specialist

Wisconsin Department of Natural Resources

Phone: 920-424-2104

E-Mail: TedM.Johnson@wisconsin.gov

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: ejudziejew@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
- **Lucerne Lake Association**
- **The town** in which the waterbody is located.
Town of: Marion
- **University of Wisconsin-Stevens Point**
Water Resource Scientist
Nancy Turyk
Trainer Natural Resources Building
800 Reserve Street
Stevens Point, WI 54481 Telephone: 715-346-4155
E-mail: nturyk@uwsp.edu
- **Local Residents**

If an invasive species is confirmed, the County Conservationist will make the following public information contacts:

- **Newspapers:** The Argus

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

Appendix C. Aquatic Plants

Lake Lucerne aquatic plant survey summary, 2011.

	Lake Average	Statewide Average	North Central Hardwood Forests Ecoregion Average
Littoral Frequency of Occurrence (%)	88.79	74.3	76
Maximum Depth of Plant Growth (ft)	28	15.3	15.9
Species Richness (Including visuals)	11	16.8	16.2
Floristic Quality Index (FQI)	19	24.1	23.3

Frequency of occurrence of aquatic plant species observed in Lake Lucerne, 2011.

Scientific Name	Common Name	Coefficient of Conservatism Value (C Value)	2011 % Frequency of Occurrence
Floating-leaf Species			
<i>Nymphaea odorata</i>	White water lily	6	1.05
Submergent Species			
<i>Chara</i>	Muskgrasses	7	90.53
<i>Najas flexilis</i>	Slender naiad	6	27.37
<i>Potamogeton friesii</i>	Fries' pondweed	8	27.37
<i>Potamogeton illinoensis</i>	Illinois pondweed	6	14.74
<i>Potamogeton foliosus</i>	Leafy pondweed	6	6.32
<i>Potamogeton natans</i>	Floating-leaf pondweed	5	6.32
<i>Potamogeton zosteriformis</i>	Flat-stem pondweed	6	4.21
<i>Vallisneria americana</i>	Wild celery	6	4.21
<i>Schoenoplectus tabernaemontani</i>	Softstem bulrush	4	2.11
<i>Ceratophyllum demersum</i>	Coontail	3	1.05
<i>Potamogeton crispus</i> (2012 survey)	curly-leaf pondweed	0	---



Locations of Eurasian watermilfoil in Lake Lucerne, 2013 (Golden Sands Resource Conservation & Development Council, Inc.).

Aquatic Plants - 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:

The following options were selected as the most favorable aquatic plant/aquatic invasive species management options for Lake Lucerne to minimize disturbance and harm to the native plant community:

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 to 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.

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.

The following options were discussed, but not selected during the planning process. Some of the following are not optional for Lake Lucerne due to lake size and/or structure.

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.

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.

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.

Waushara County Shoreline Assessment *LAKE LUCERNE*

Map Date -- July, 2011
Aerial Date -- April, 2010

Appendix D. 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 Lucerne is displayed in to the right. 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 human disturbances. The majority of Lake Lucerne's shorelands are in good shape; only three short segments indicate areas that could benefit from improvement/restoration for lake health. There were no stretches of Lake Lucerne shoreland that ranked as poor.



Summary

Shorelines are color-coded to show their overall health based on natural and physical characteristics. For example, shorelines shown in red indicate locations where management or mitigation may be warranted. Blue shorelines mark healthy riparian areas with natural vegetation and few human influences.

Calculating Shoreline Scores

Scores are based on the presence/absence of:

- + Natural vegetation
- + Human influences (docks, boathouses, etc)
- + Erosion
- + Structures



Map created by Dan McFarlane
Center for Land Use Education

Scoring for Lake Lucerne's shoreland health, 2010 Shoreland Survey.

Lake Lucerne Shoreland Vegetation

Waushara Co. Wisconsin



Appendix E. Lake User Survey Results

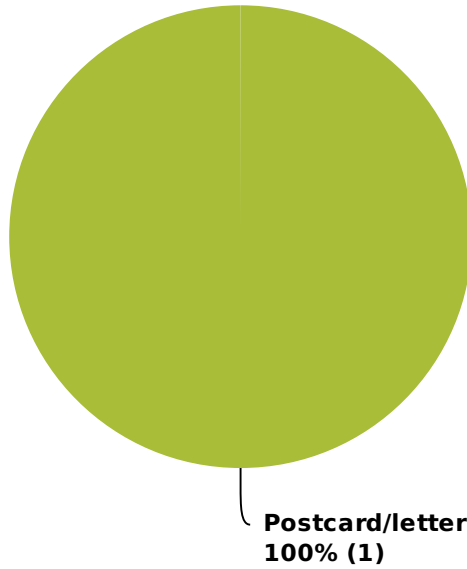
Q1 What is your Waushara County Lakes Survey ID?

Answered: 3 Skipped: 0

#	Responses	Date
1	[REDACTED]	2/11/2014 1:49 PM
2	[REDACTED]	2/11/2014 1:09 PM
3	[REDACTED]	2/10/2014 2:38 PM

Q2 How did you hear about this survey?

Answered: 1 Skipped: 2

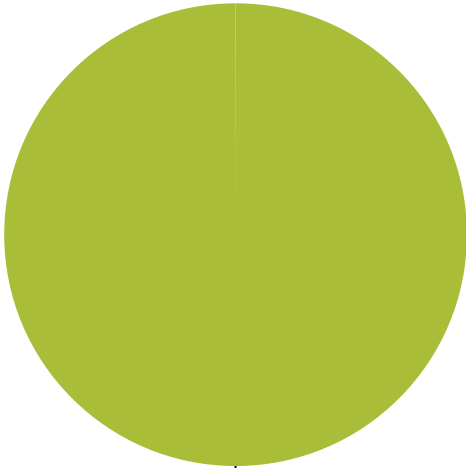


Answer Choices	Responses
E-mail	0% 0
Newspaper	0% 0
Postcard/letter	100% 1
Facebook	0% 0
Radio	0% 0
Total	1

#	Other (please specify)	Date
1	meeting :)	2/11/2014 1:49 PM
2	Neighbor	2/10/2014 2:38 PM

Q3 Do you own or rent property...

Answered: 3 Skipped: 0

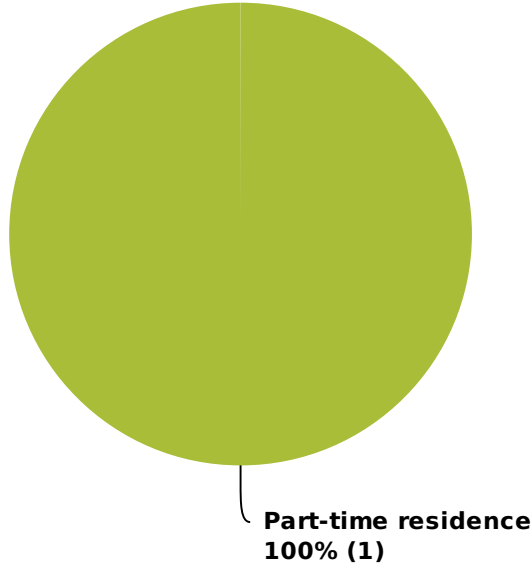


**Around the lake
100% (3)**

Answer Choices	Responses	
Around the lake	100%	3
Less than 1/2 mile from the lake	0%	0
1/2 mile to 1 mile of the lake	0%	0
More than 1 mile from the lake	0%	0
I do not own or rent property near the lake	0%	0
Total		3

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: 1 Skipped: 2

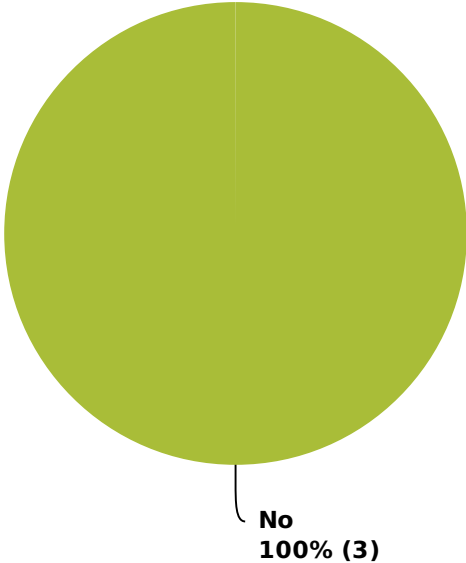


Answer Choices	Responses
Permanent residence	0% 0
Part-time residence	100% 1
I do not own or rent property near the lake	0% 0
Total	1

#	Other (please specify)	Date
1	live on property because of our job with the camp	2/11/2014 1:50 PM
2	Church Camp	2/11/2014 1:10 PM

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

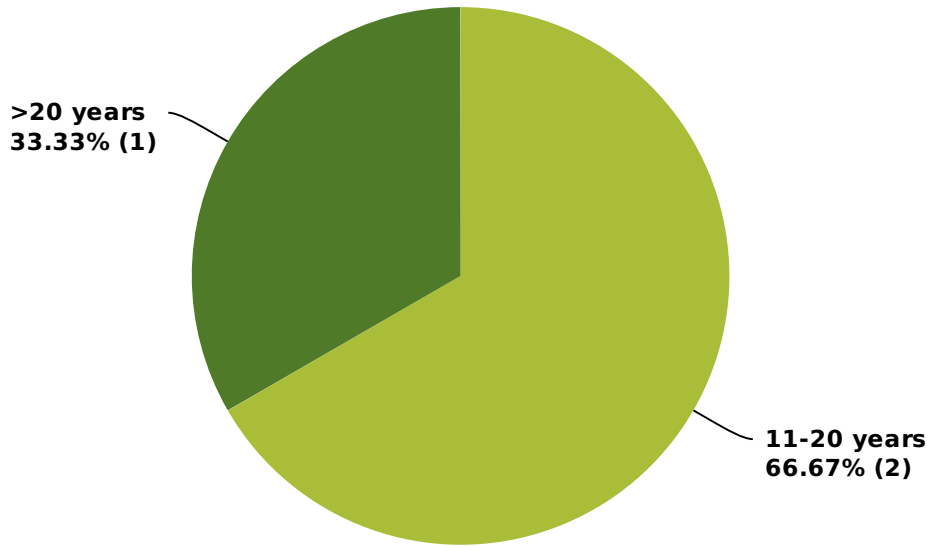
Answered: 3 Skipped: 0



Answer Choices	Responses
Yes	0% 0
No	100% 3
Total	3

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

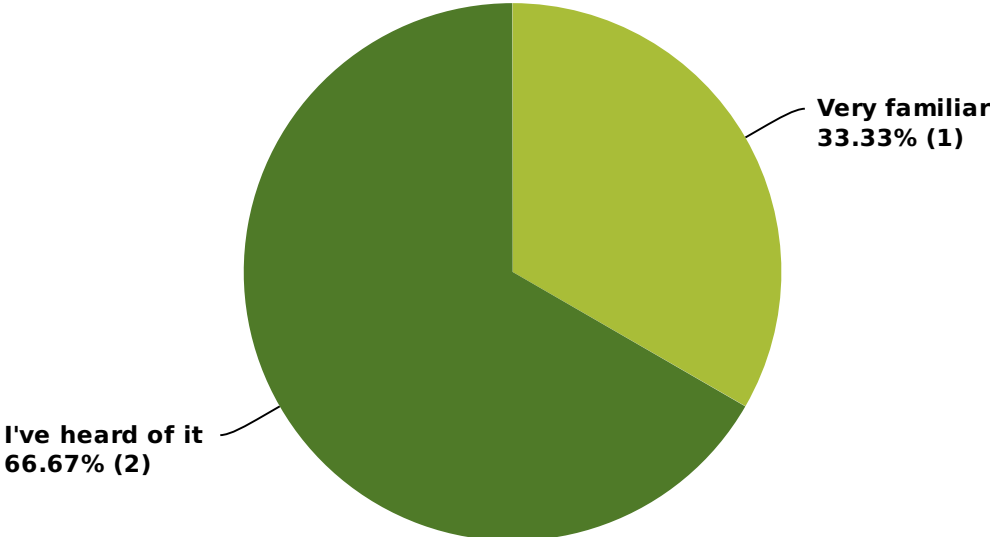
Answered: 3 Skipped: 0



Answer Choices	Responses
<2 years	0% 0
2-5 years	0% 0
6-10 years	0% 0
11-20 years	66.67% 2
>20 years	33.33% 1
Total	3

Q7 Are you familiar with the Lucerne Lake Association?

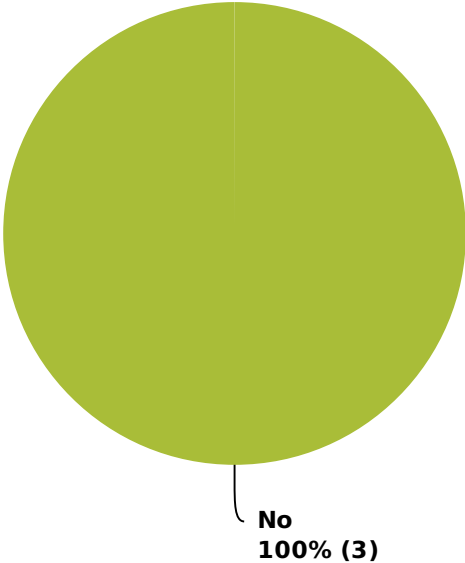
Answered: 3 Skipped: 0



Answer Choices	Responses	
Very familiar	33.33%	1
Somewhat familiar	0%	0
I've heard of it	66.67%	2
Never heard of it	0%	0
Total		3

Q8 Are you a member of the Lucerne Lake Association?

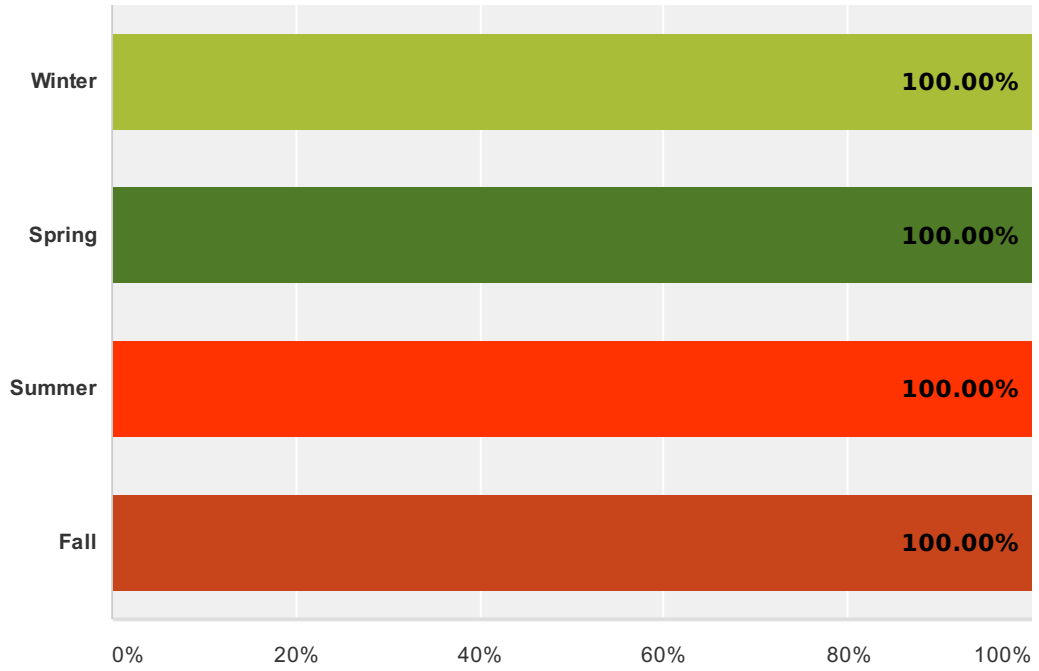
Answered: 3 Skipped: 0



Answer Choices	Responses
Yes	0% 0
No	100% 3
I don't know	0% 0
Total	3

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

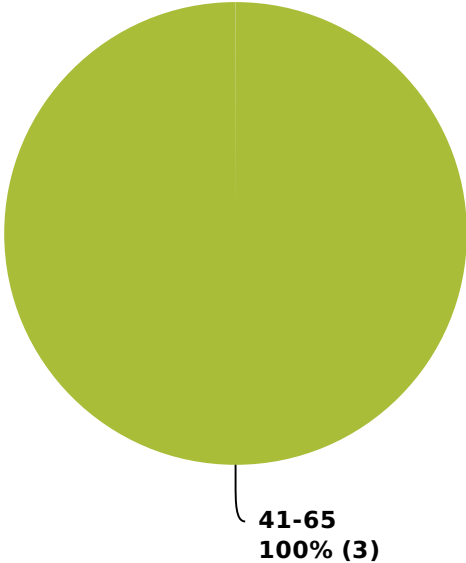
Answered: 3 Skipped: 0



Answer Choices	Responses
Winter	100% 3
Spring	100% 3
Summer	100% 3
Fall	100% 3
Total Respondents: 3	

Q10 Which category below includes your age?

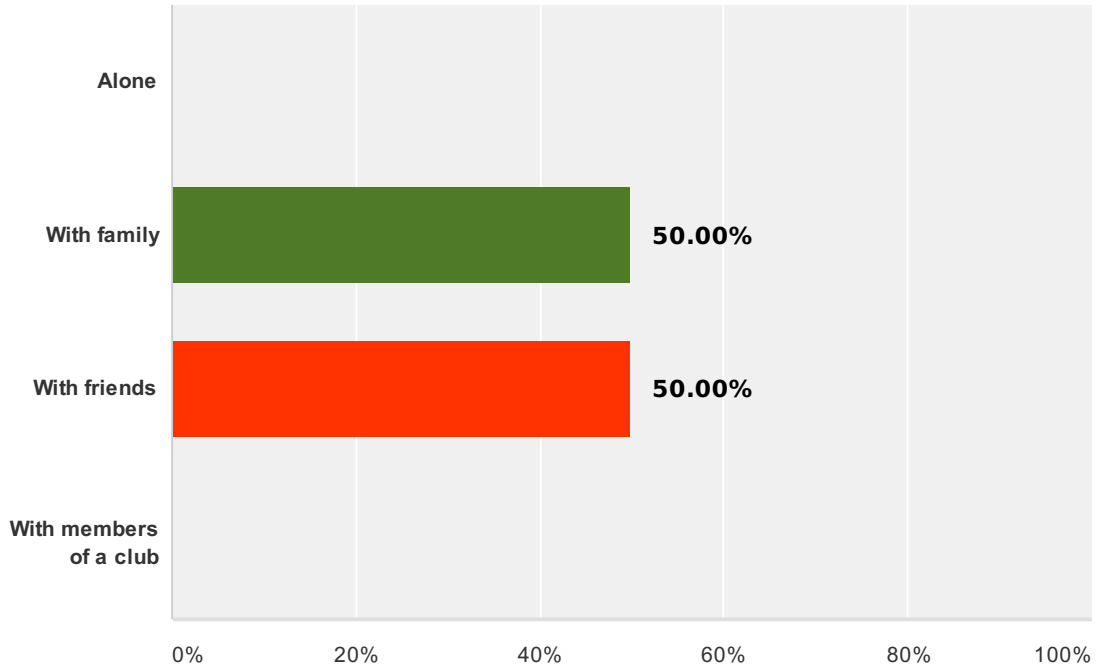
Answered: 3 Skipped: 0



Answer Choices	Responses
Under 18	0% 0
18-40	0% 0
41-65	100% 3
>65	0% 0
Total	3

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

Answered: 2 Skipped: 1

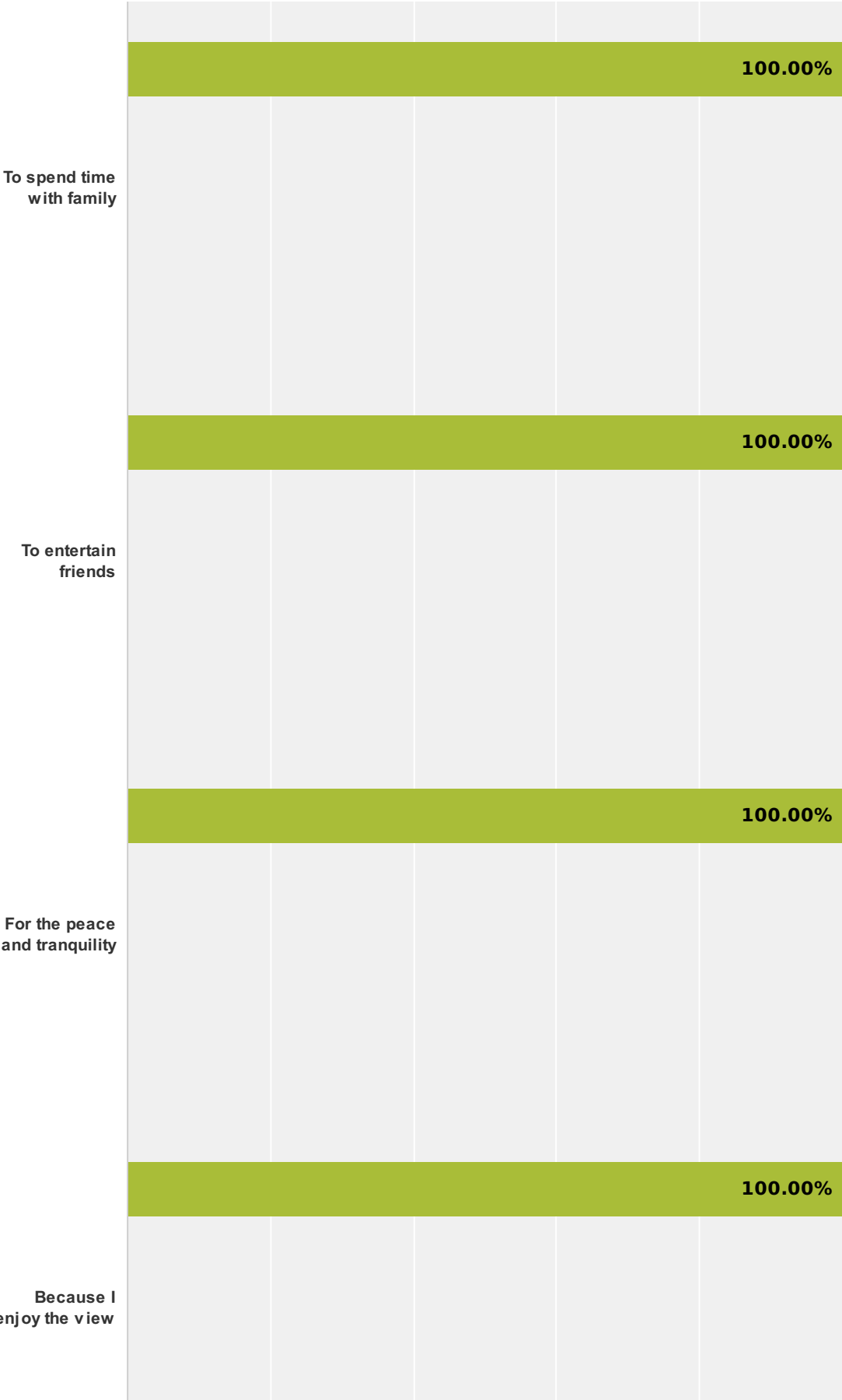


Answer Choices	Responses
Alone	0% 0
With family	50% 1
With friends	50% 1
With members of a club	0% 0
Total Respondents: 2	

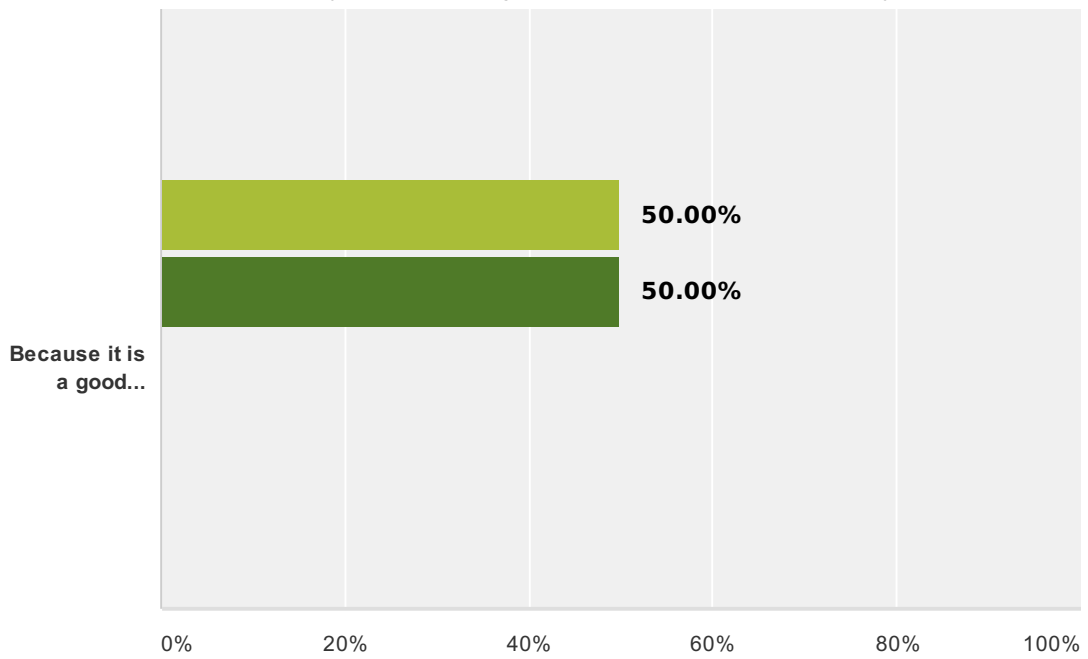
#	Other (please specify)	Date
1	Working	2/11/2014 1:52 PM

Q12 I live on or near the lake...

Answered: 3 Skipped: 0



Waushara County Lakes Project - Lake Lucerne Survey #1



■ Strongly Agree
 ■ Agree
 ■ Disagree
 ■ Strongly Disagree
■ I do not live on or near the lake

	Strongly Agree	Agree	Disagree	Strongly Disagree	I do not live on or near the lake	Total
To spend time with family	100% 2	0% 0	0% 0	0% 0	0% 0	2
To entertain friends	100% 2	0% 0	0% 0	0% 0	0% 0	2
For the peace and tranquility	100% 3	0% 0	0% 0	0% 0	0% 0	3
Because I enjoy the view	100% 3	0% 0	0% 0	0% 0	0% 0	3
Because it is a good investment	50% 1	50% 1	0% 0	0% 0	0% 0	2

Q13 What do you value most about Lake Lucerne?

Answered: 3 Skipped: 0

#	Responses	Date
1	quiet, clean, variety of wildlife,	2/11/2014 1:52 PM
2	The relatively unspoiled nature of the lake and minimal developement.	2/11/2014 1:13 PM
3	Quiet peaceful clean environment	2/10/2014 2:41 PM

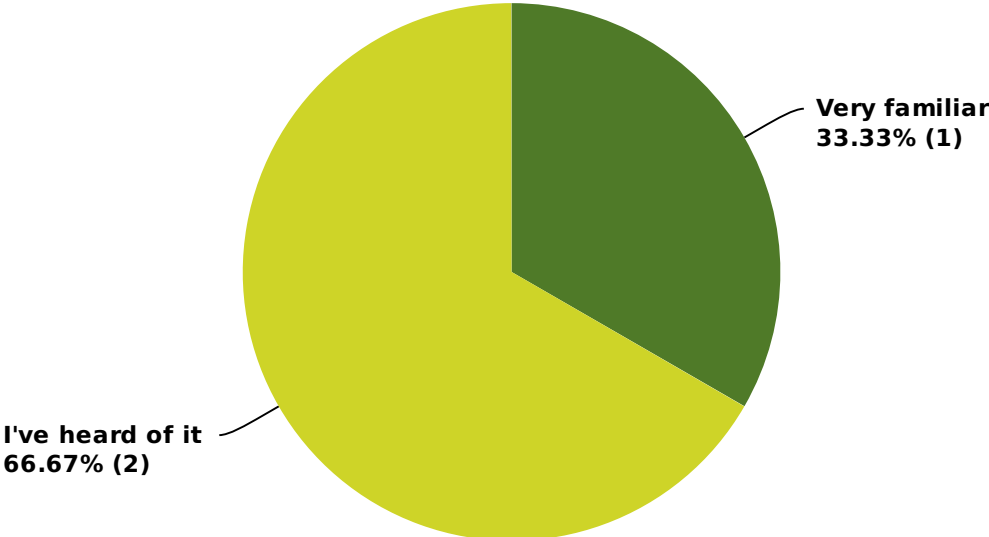
Q14 In your opinion, what should be done to restore, maintain, or improve Lake Lucerne?

Answered: 3 Skipped: 0

#	Responses	Date
1	Maintain the integrity of the quiet, clean and natural ecosystem	2/11/2014 1:52 PM
2	Maintain as no wake lake, educate those using the public landing and property owners about the value in caring for the lake and surrounding property, maintain healthy lake, curb invasives.	2/11/2014 1:13 PM
3	Maintain clean water	2/10/2014 2:41 PM

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

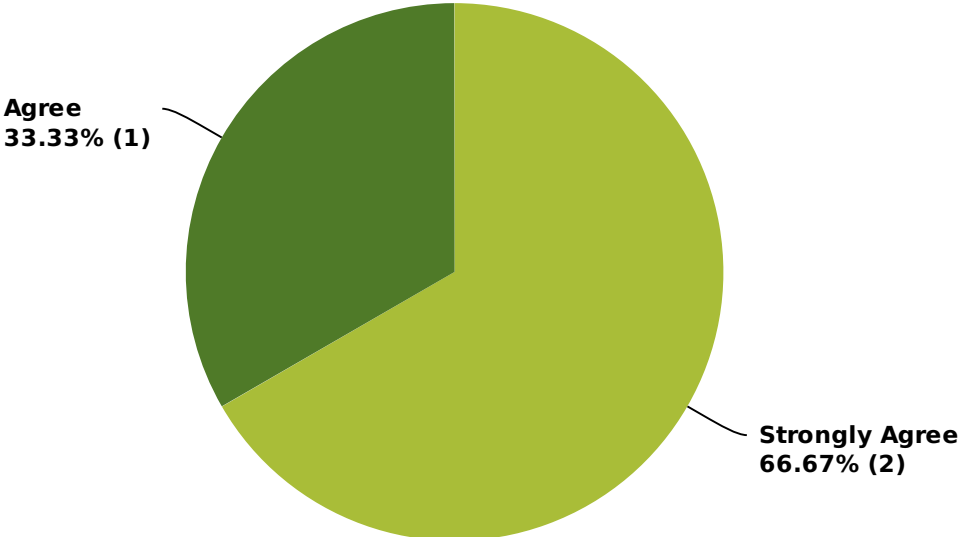
Answered: 3 Skipped: 0



Answer Choices	Responses	
Very familiar	33.33%	1
Somewhat familiar	0%	0
I've heard of it	66.67%	2
Never heard of it	0%	0
Total		3

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

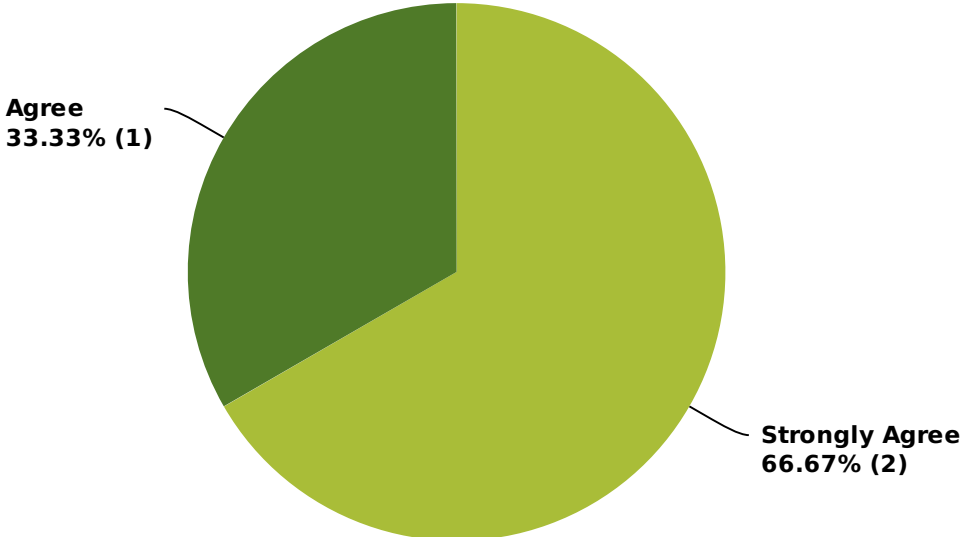
Answered: 3 Skipped: 0



Answer Choices	Responses	
Strongly Agree	66.67%	2
Agree	33.33%	1
Disagree	0%	0
Strongly Disagree	0%	0
Total		3

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

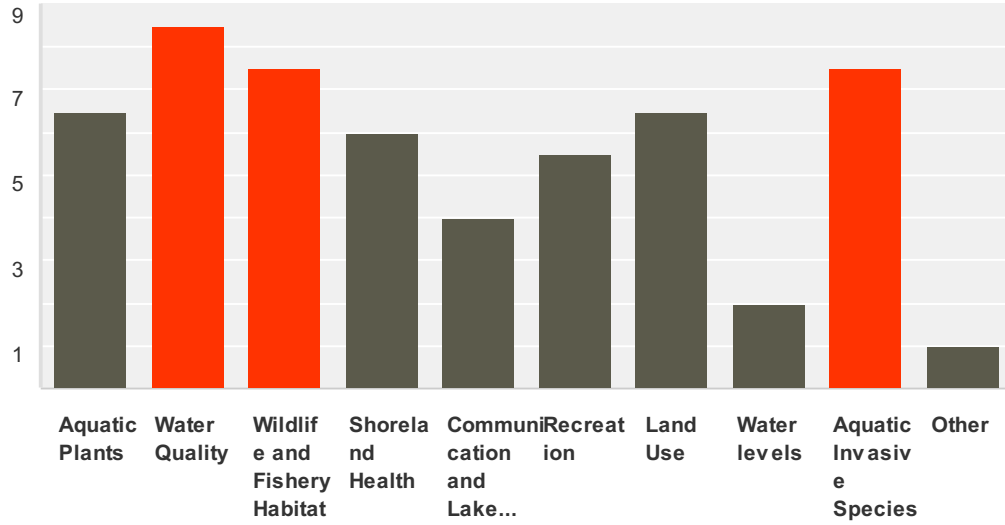
Answered: 3 Skipped: 0



Answer Choices	Responses
Strongly Agree	66.67% 2
Agree	33.33% 1
Disagree	0% 0
Strongly Disagree	0% 0
Total	3

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

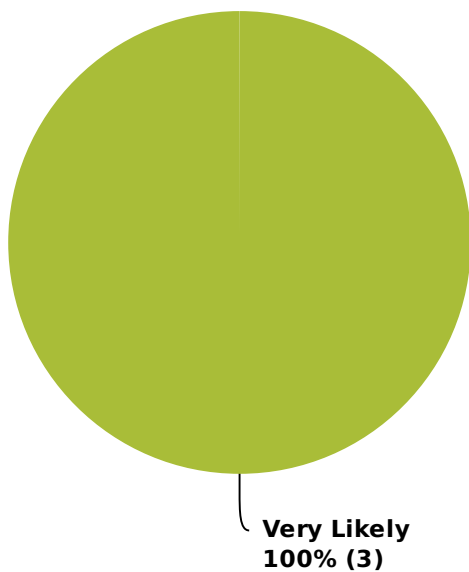
Answered: 2 Skipped: 1



	1	2	3	4	5	6	7	8	9	10	Total	Average Ranking
Aquatic Plants	0% 0	50% 1	0% 0	0% 0	0% 0	0% 0	50% 1	0% 0	0% 0	0% 0	2	6.50
Water Quality	0% 0	50% 1	50% 1	0% 0	0% 0	0% 0	0% 0	0% 0	0% 0	0% 0	2	8.50
Wildlife and Fishery Habitat	0% 0	0% 0	50% 1	50% 1	0% 0	0% 0	0% 0	0% 0	0% 0	0% 0	2	7.50
Shoreland Health	0% 0	0% 0	0% 0	0% 0	100% 2	0% 0	0% 0	0% 0	0% 0	0% 0	2	6.00
Communication and Lake Group Support	0% 0	0% 0	0% 0	0% 0	0% 0	50% 1	0% 0	50% 1	0% 0	0% 0	2	4.00
Recreation	0% 0	0% 0	0% 0	50% 1	0% 0	0% 0	50% 1	0% 0	0% 0	0% 0	2	5.50
Land Use	50% 1	0% 0	0% 0	0% 0	0% 0	0% 0	0% 0	50% 1	0% 0	0% 0	2	6.50
Water levels	0% 0	0% 0	0% 0	0% 0	0% 0	0% 0	0% 0	0% 0	100% 2	0% 0	2	2.00
Aquatic Invasive Species	50% 1	0% 0	0% 0	0% 0	0% 0	50% 1	0% 0	0% 0	0% 0	0% 0	2	7.50
Other	0% 0	0% 0	0% 0	0% 0	0% 0	0% 0	0% 0	0% 0	0% 0	100% 2	2	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?

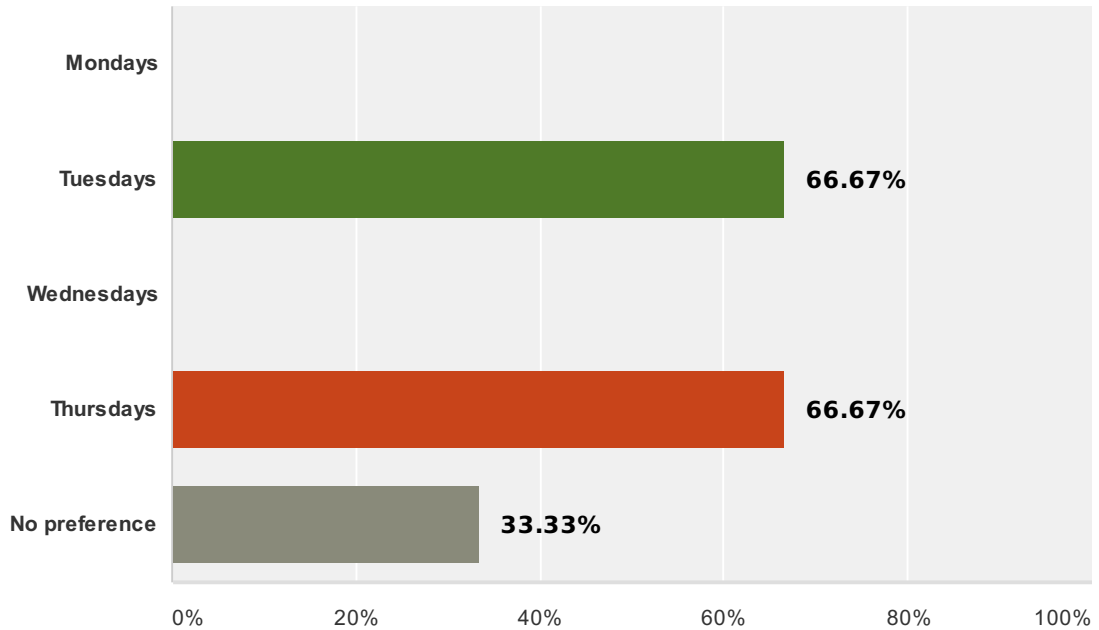
Answered: 3 Skipped: 0



Answer Choices	Responses
Definitely	0% 0
Very Likely	100% 3
If it fits my schedule	0% 0
Not likely	0% 0
I won't attend any	0% 0
Total	3

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?

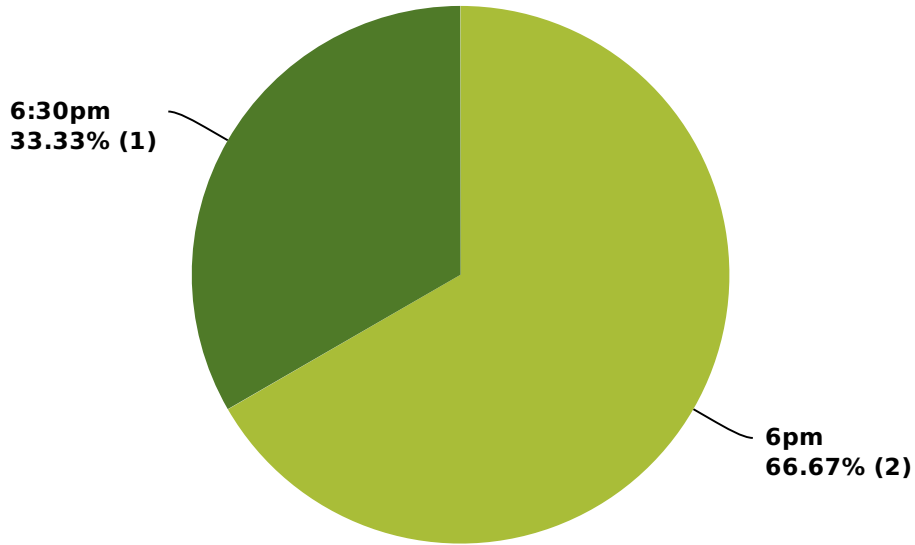
Answered: 3 Skipped: 0



Answer Choices	Responses
Mondays	0% 0
Tuesdays	66.67% 2
Wednesdays	0% 0
Thursdays	66.67% 2
No preference	33.33% 1
Total Respondents: 3	

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

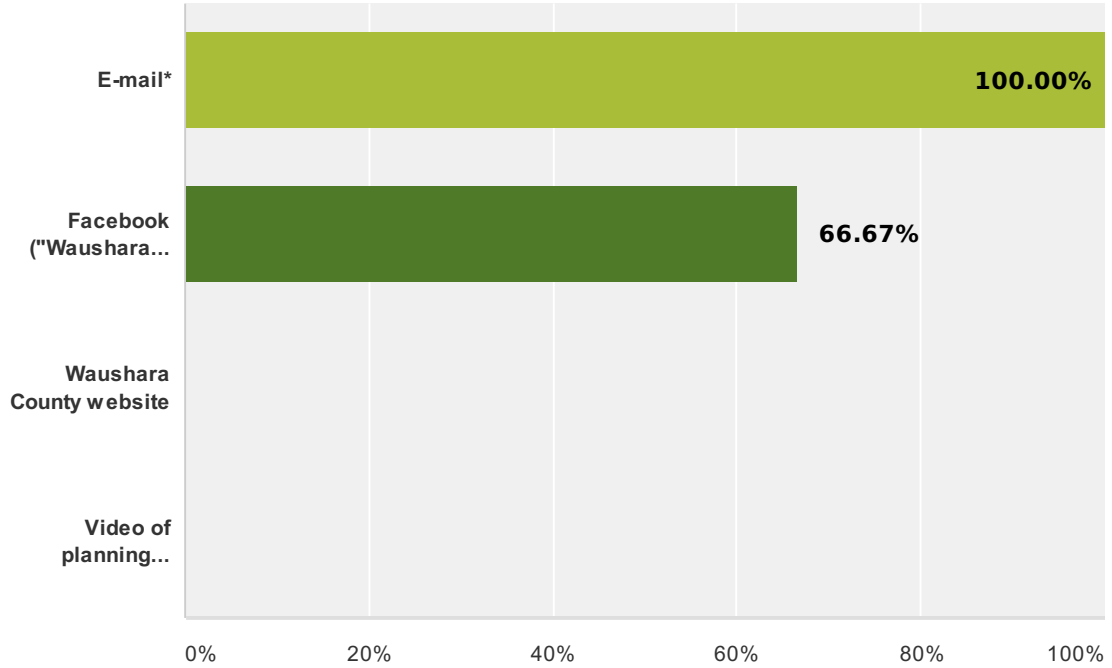
Answered: 3 Skipped: 0



Answer Choices	Responses
6pm	66.67% 2
6:30pm	33.33% 1
7pm	0% 0
7:30pm	0% 0
No preference	0% 0
Total	3

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

Answered: 3 Skipped: 0



Answer Choices	Responses
E-mail*	100% 3
Facebook ("Waushara County Lakes Project")	66.67% 2
Waushara County website	0% 0
Video of planning meeting posted on the web	0% 0
Total Respondents: 3	

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

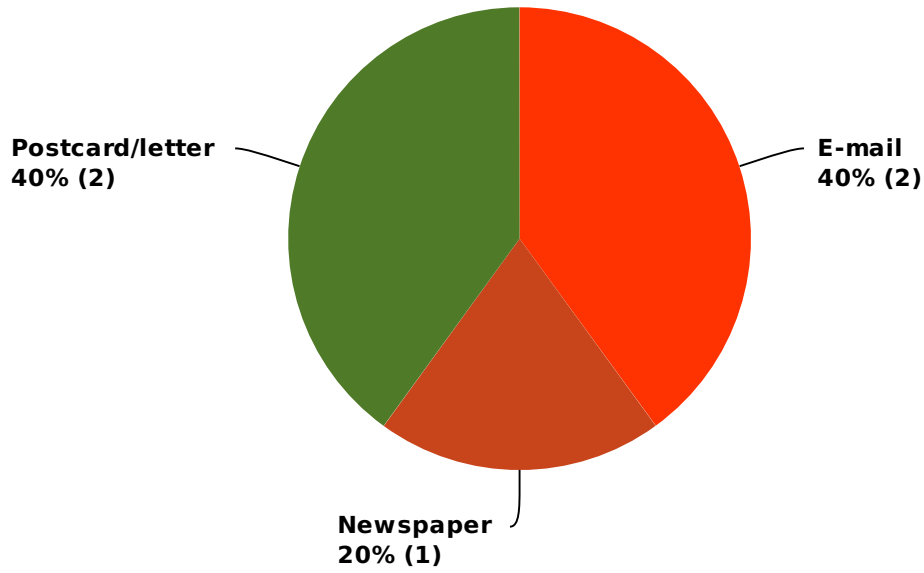
Q1 Enter your Waushara County Lakes Survey ID. If you've forgotten your ID or haven't created one yet, follow the instructions below.

Answered: 5 Skipped: 0

#	Responses	Date
1	██████	3/4/2014 1:44 PM
2	██████	3/4/2014 11:15 AM
3	██████	2/27/2014 11:36 AM
4	██████	2/27/2014 11:19 AM
5	██████	2/19/2014 12:49 PM

Q2 How did you hear about this survey?

Answered: 5 Skipped: 0

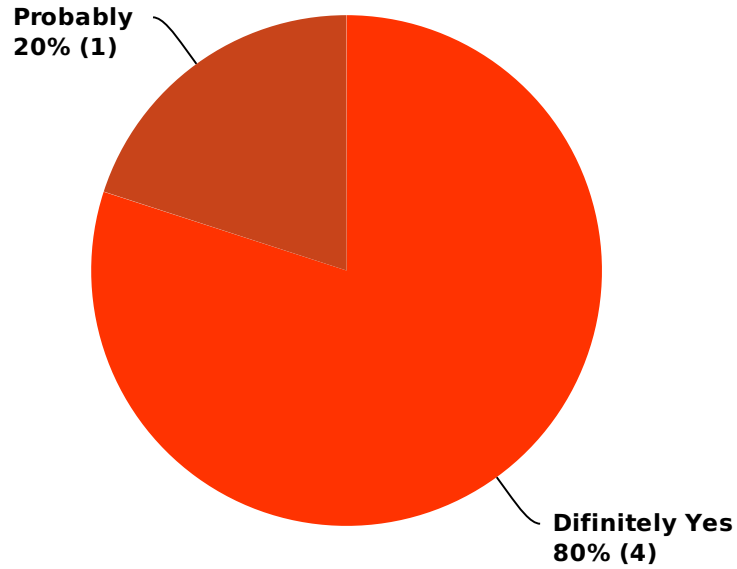


Answer Choices	Responses
E-mail	40% 2
Newspaper	20% 1
Postcard/letter	40% 2
Facebook	0% 0
Radio	0% 0
Total	5

#	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 Lucerne?

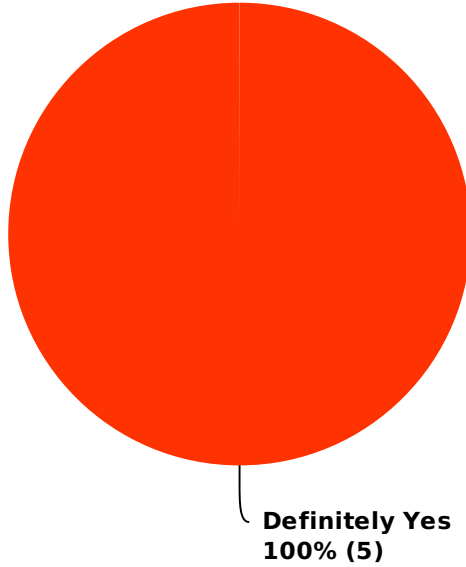
Answered: 5 Skipped: 0



Answer Choices	Responses
Difinitely Yes	80% 4
Probably	20% 1
Not Likely	0% 0
Difinitely No	0% 0
Unsure	0% 0
Total	5

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

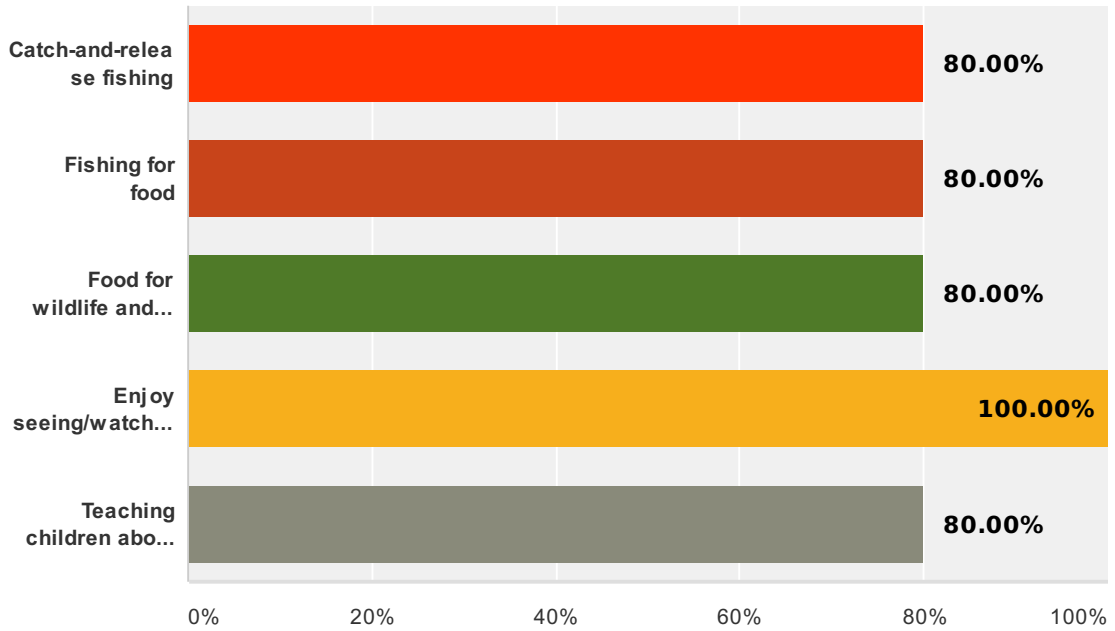
Answered: 5 Skipped: 0



Answer Choices	Responses
Definitely Yes	100% 5
Probably	0% 0
Not Likely	0% 0
Definitely No	0% 0
Unsure	0% 0
Total	5

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

Answered: 5 Skipped: 0

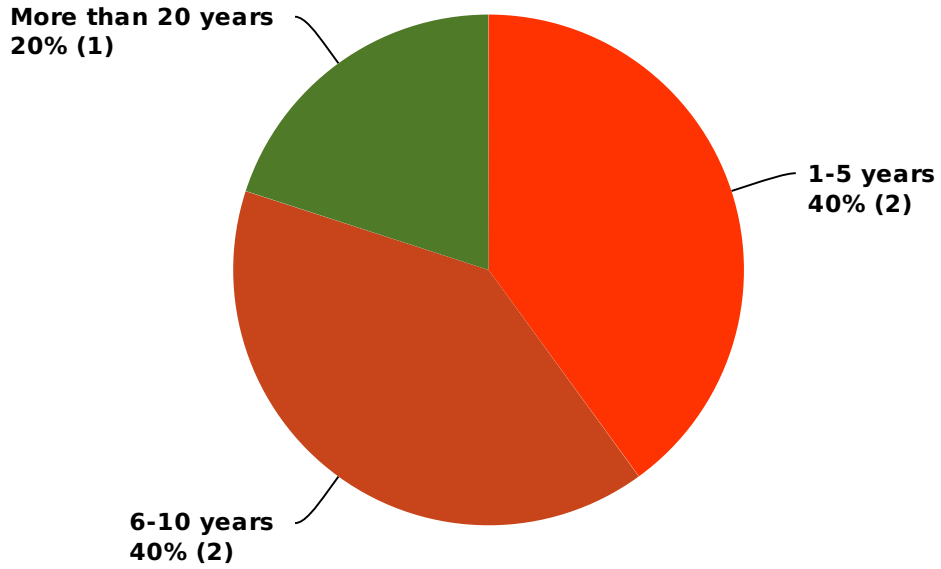


Answer Choices	Responses
Catch-and-release fishing	80% 4
Fishing for food	80% 4
Food for wildlife and birds	80% 4
Enjoy seeing/watching fish	100% 5
Teaching children about fishing/lakes	80% 4
Total Respondents: 5	

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

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

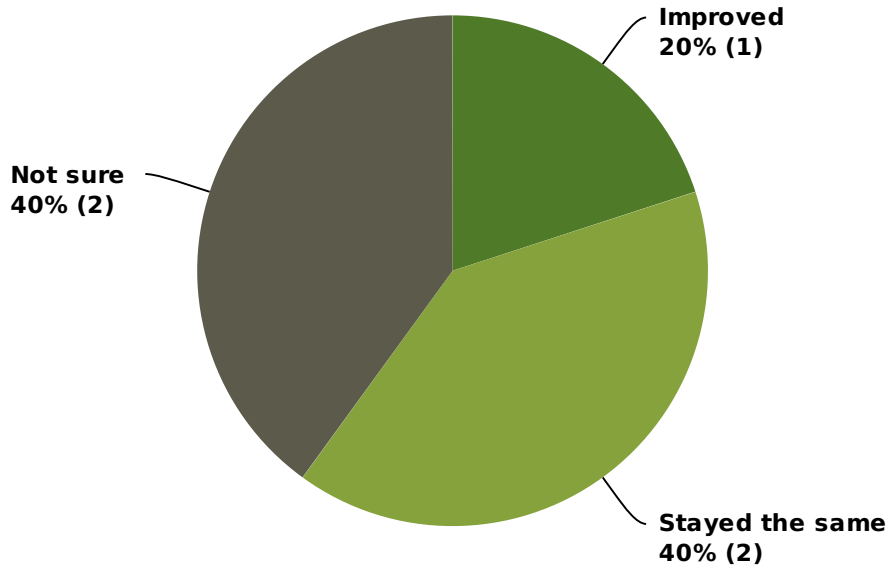
Answered: 5 Skipped: 0



Answer Choices	Responses	Count
I don't fish Lake Lucerne	0%	0
1-5 years	40%	2
6-10 years	40%	2
11-20 years	0%	0
More than 20 years	20%	1
Total		5

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

Answered: 5 Skipped: 0



Answer Choices	Responses	
Improved	20%	1
Stayed the same	40%	2
Declined	0%	0
Not sure	40%	2
Total		5

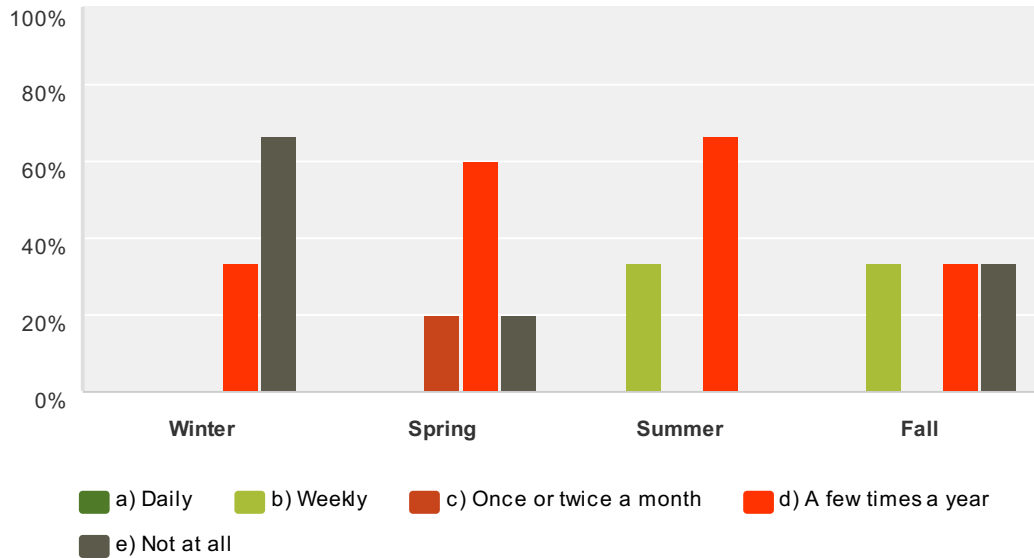
Q8 What factors do you feel have contributed to the change in fishing?

Answered: 0 Skipped: 5

#	Responses	Date
	There are no responses.	

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

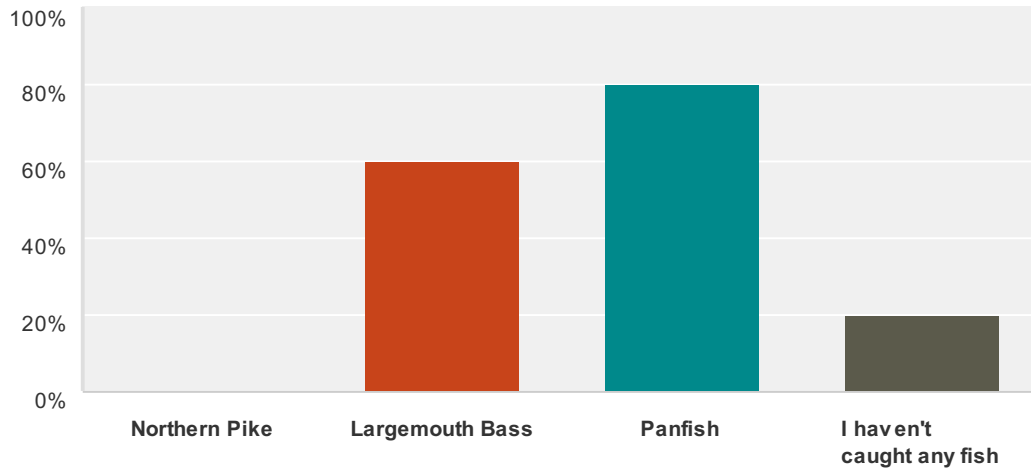
Answered: 5 Skipped: 0



	a) Daily	b) Weekly	c) Once or twice a month	d) A few times a year	e) Not at all	Total Respondents
Winter	0% 0	0% 0	0% 0	33.33% 1	66.67% 2	3
Spring	0% 0	0% 0	20% 1	60% 3	20% 1	5
Summer	0% 0	33.33% 1	0% 0	66.67% 2	0% 0	3
Fall	0% 0	33.33% 1	0% 0	33.33% 1	33.33% 1	3

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

Answered: 5 Skipped: 0

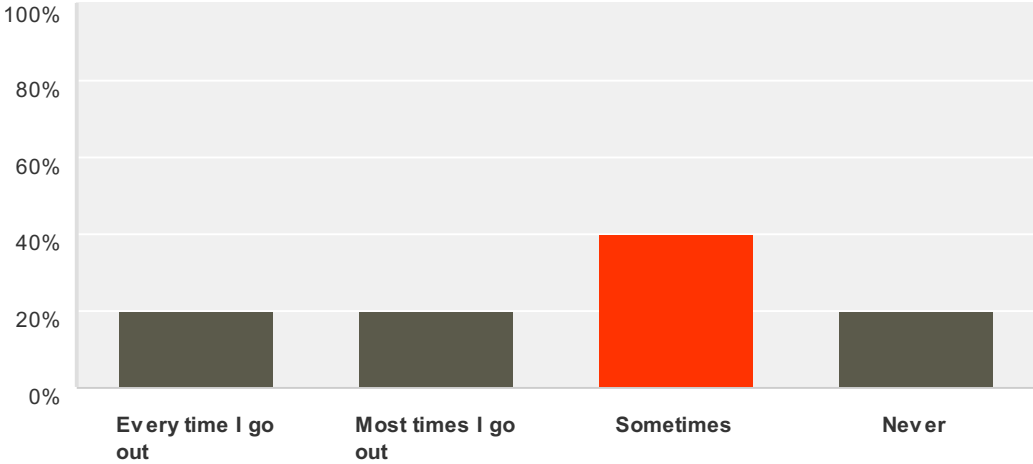


Answer Choices	Responses
Northern Pike	0% 0
Largemouth Bass	60% 3
Panfish	80% 4
I haven't caught any fish	20% 1
Total Respondents: 5	

#	Other (please specify)	Date
1	crappie few perch	2/27/2014 11:24 AM

Q11 In general, how often do you catch fish at Lake Lucerne?

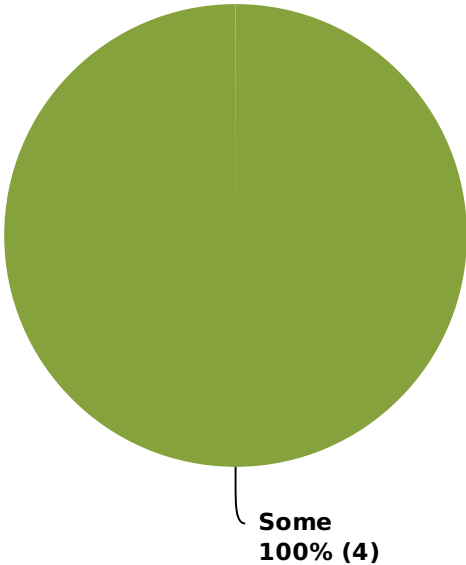
Answered: 5 Skipped: 0



Answer Choices	Responses
Every time I go out	20% 1
Most times I go out	20% 1
Sometimes	40% 2
Never	20% 1
Total Respondents: 5	

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

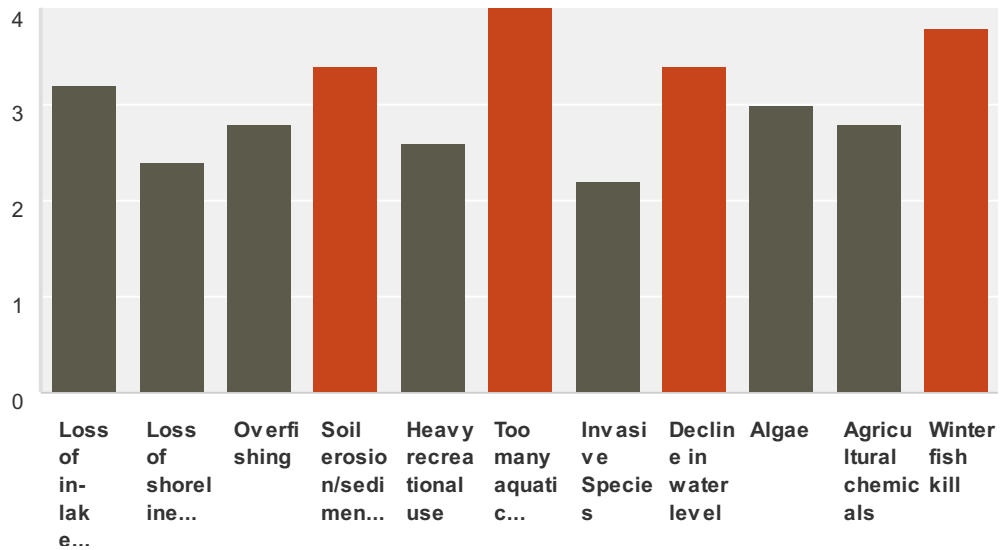
Answered: 4 Skipped: 1



Answer Choices	Responses
All	0% 0
Most	0% 0
Some	100% 4
None	0% 0
Total	4

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

Answered: 5 Skipped: 0

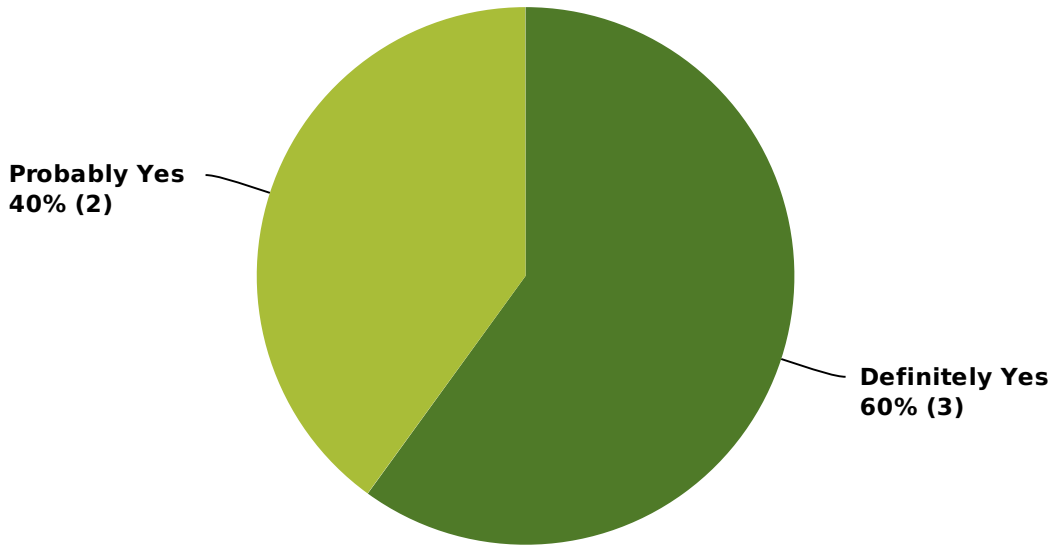


	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't Know	Total Respondents
Loss of in-lake habitat	0% 0	60% 3	0% 0	0% 0	40% 2	5
Loss of shoreline habitat	20% 1	60% 3	0% 0	0% 0	20% 1	5
Overfishing	0% 0	20% 1	80% 4	0% 0	0% 0	5
Soil erosion/sedimentation	0% 0	20% 1	40% 2	20% 1	20% 1	5
Heavy recreational use	0% 0	40% 2	60% 3	0% 0	0% 0	5
Too many aquatic plants	0% 0	0% 0	40% 2	20% 1	40% 2	5
Invasive Species	40% 2	40% 2	0% 0	0% 0	20% 1	5
Decline in water level	0% 0	60% 3	40% 2	0% 0	20% 1	5
Algae	0% 0	40% 2	40% 2	0% 0	20% 1	5
Agricultural chemicals	0% 0	60% 3	20% 1	0% 0	20% 1	5
Winter fish kill	0% 0	0% 0	40% 2	40% 2	20% 1	5

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

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

Answered: 5 Skipped: 0



Answer Choices	Responses	
Definitely Yes	60%	3
Probably Yes	40%	2
Probably No	0%	0
Definitely No	0%	0
Unsure	0%	0
Total		5

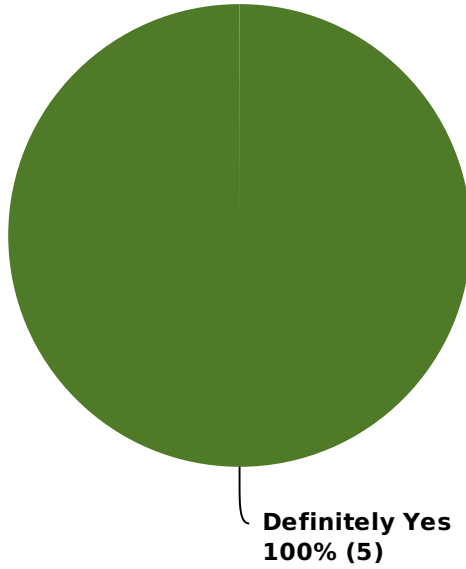
Q15 Do you have any additional comments regarding the fishery in Lake Lucerne?

Answered: 2 Skipped: 3

#	Responses	Date
1	I have observed fishermen keeping undersized fish... would like to see a bit more DNR presence of the lake from time to time.	2/27/2014 11:39 AM
2	The only thing is I have fish there all my life over 50 years would like to see more perch they have decline need to do something about that Thank you	2/27/2014 11:30 AM

Q16 Lake Lucerne is a 'No Wake' lake. Do you like this rule?

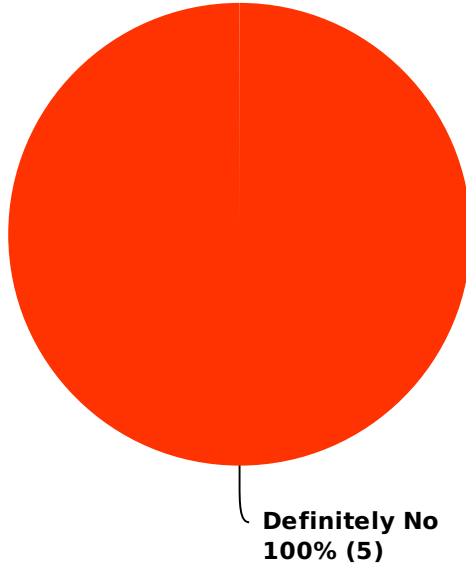
Answered: 5 Skipped: 0



Answer Choices	Responses
Definitely Yes	100% 5
Yes, mostly	0% 0
Not most of the time	0% 0
Definitely No	0% 0
Unsure	0% 0
Total	5

Q17 Do you think there should be times when a wake is permitted on Lake Lucerne?

Answered: 5 Skipped: 0



Answer Choices	Responses
Definitely Yes	0% 0
Probably Yes	0% 0
Probably No	0% 0
Definitely No	100% 5
Unsure	0% 0
Total	5

Q18 What could be done to improve your recreation experience on Lake Lucerne?

Answered: 2 Skipped: 3

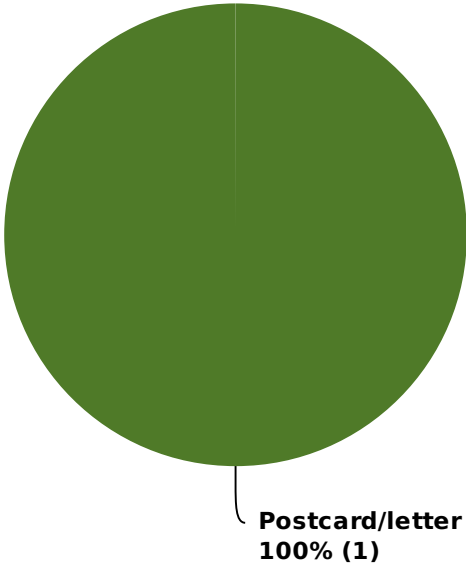
#	Responses	Date
1	A bit higher visibility of DNR/law enforcement so that people using the lake do not believe that 'anything goes' regarding usage.	2/27/2014 11:41 AM
2	I like the way it is	2/27/2014 11:32 AM

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: 1 Skipped: 0

Q2 How did you hear about this survey?

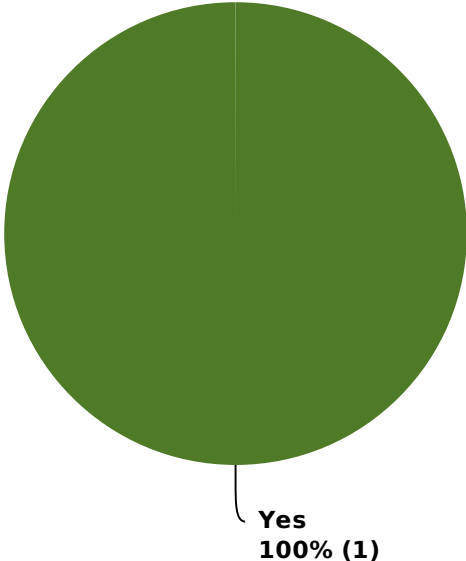
Answered: 1 Skipped: 0



Answer Choices	Responses
E-mail	0% 0
Newspaper	0% 0
Postcard/letter	100% 1
Facebook	0% 0
Radio	0% 0
Total	1

Q3 Were you aware of the importance of aquatic plants?

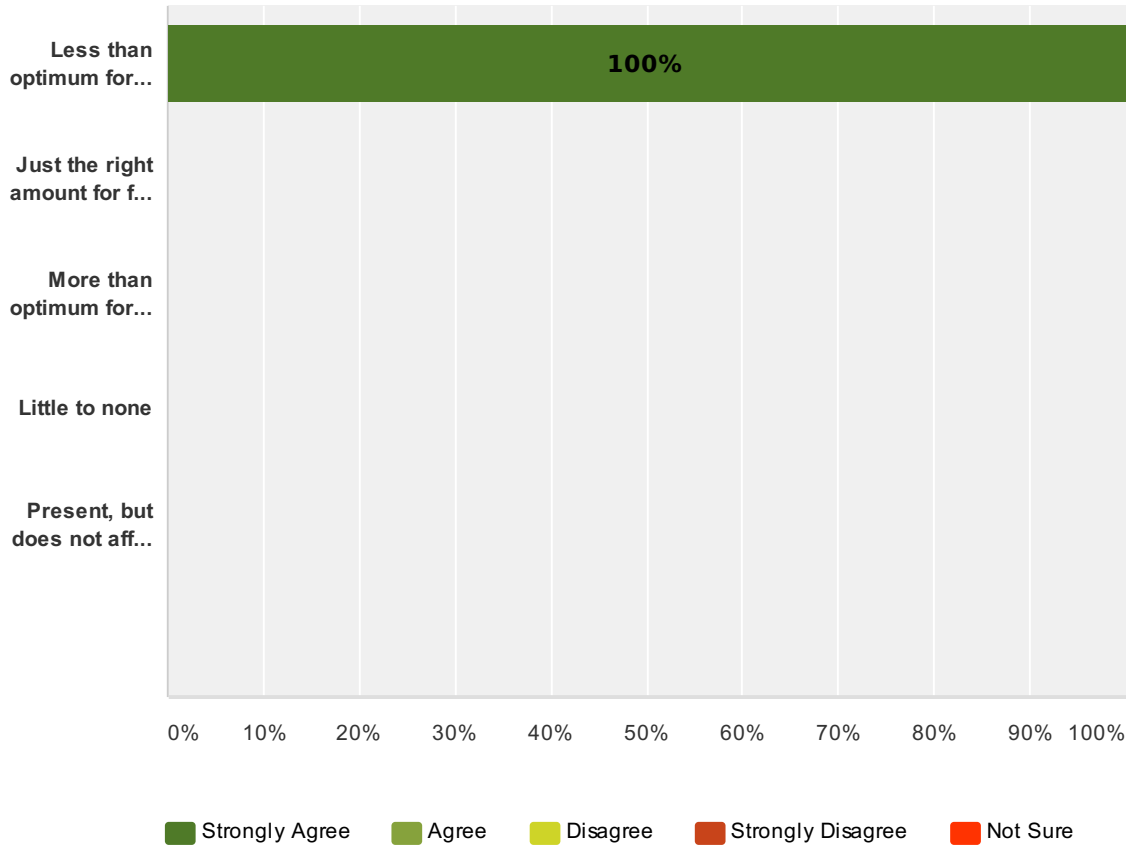
Answered: 1 Skipped: 0



Answer Choices	Responses
Yes	100% 1
No	0% 0
Unsure	0% 0
Total	1

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

Answered: 1 Skipped: 0



	Strongly Agree	Agree	Disagree	Strongly Disagree	Not Sure	Total
Less than optimum for fish and wildlife	100% 1	0% 0	0% 0	0% 0	0% 0	1
Just the right amount for fish and wildlife	0% 0	0% 0	0% 0	0% 0	0% 0	0
More than optimum for fish and wildlife	0% 0	0% 0	0% 0	0% 0	0% 0	0
Little to none	0% 0	0% 0	0% 0	0% 0	0% 0	0
Present, but does not affect my use of the lake	0% 0	0% 0	0% 0	0% 0	0% 0	0
Dense, affects my use of the lake	0% 0	0% 0	0% 0	0% 0	0% 0	0

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

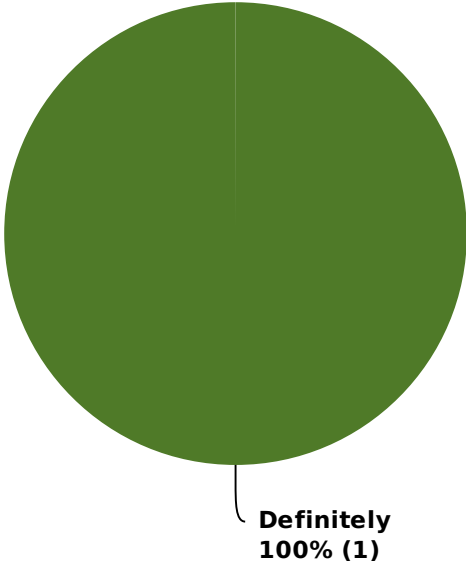
Answered: 0 Skipped: 1

! No matching responses.

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

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

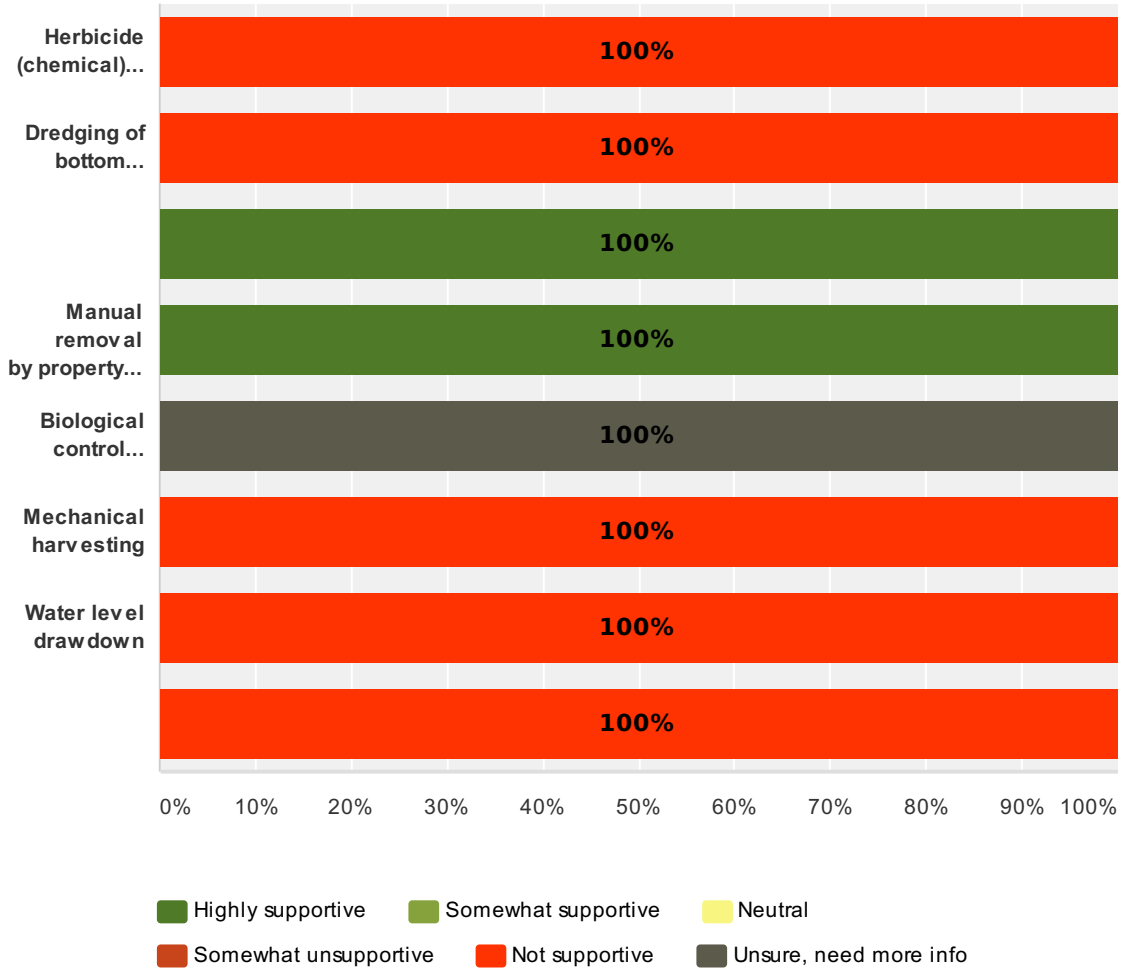
Answered: 1 Skipped: 0



Answer Choices	Responses	
Definitely	100%	1
Probably	0%	0
Unsure	0%	0
Probably not	0%	0
Definitely not	0%	0
Total		1

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

Answered: 1 Skipped: 0



	Highly supportive	Somewhat supportive	Neutral	Somewhat unresponsive	Not supportive	Unsure, need more info	Total	Average Rating
Herbicide (chemical) control	0%	0%	0%	0%	100%	0%	1	5.00
Dredging of bottom sediments	0%	0%	0%	0%	100%	0%	1	5.00
Hand-removal by divers	100%	0%	0%	0%	0%	0%	1	1.00
Manual removal by property owners	100%	0%	0%	0%	0%	0%	1	1.00
Biological control (milfoil weevil, loosestrife beetle, etc.)	0%	0%	0%	0%	0%	100%	1	0.00

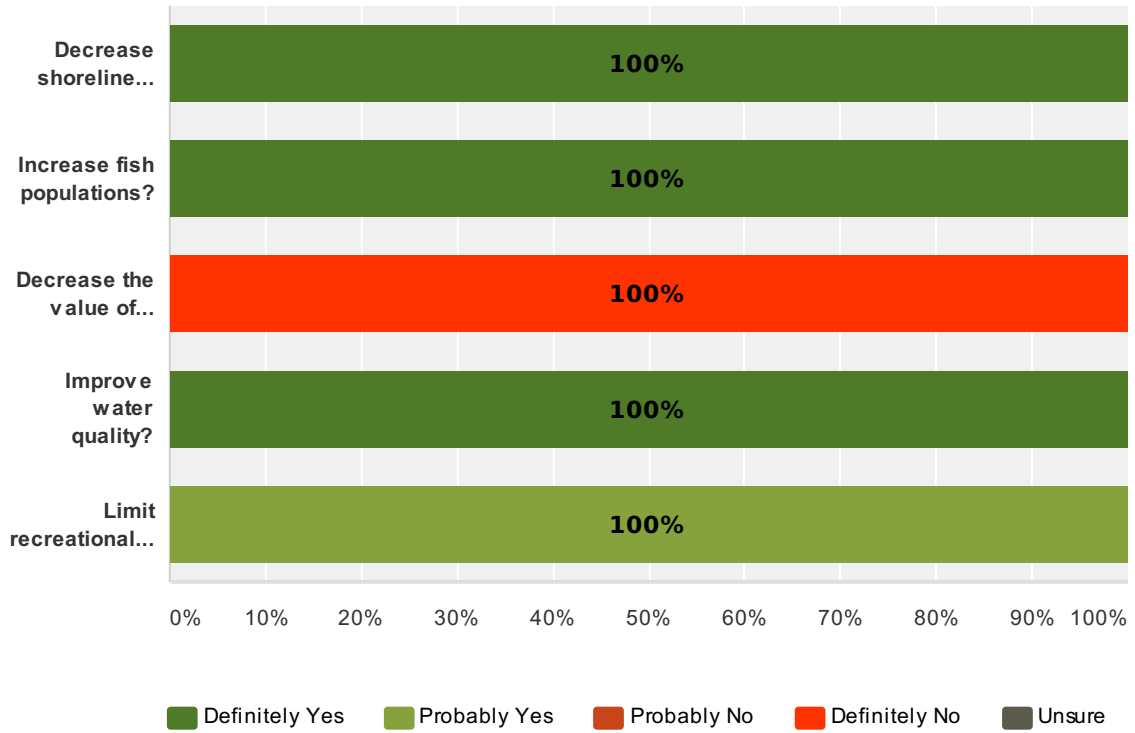
Mechanical harvesting	0%	0%	0%	0%	100%	0%		
-----------------------	----	----	----	----	------	----	--	--

Waushara County Lakes Project - Lake Lucerne Survey #3

mechanical harvesting	0%	0%	0%	0%	100%	0%	1	5.00
	0	0	0	0	1	0		
Water level drawdown	0%	0%	0%	0%	100%	0%	1	5.00
	0	0	0	0	1	0		
Do nothing (do not manage plants)	0%	0%	0%	0%	100%	0%	1	5.00
	0	0	0	0	1	0		

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

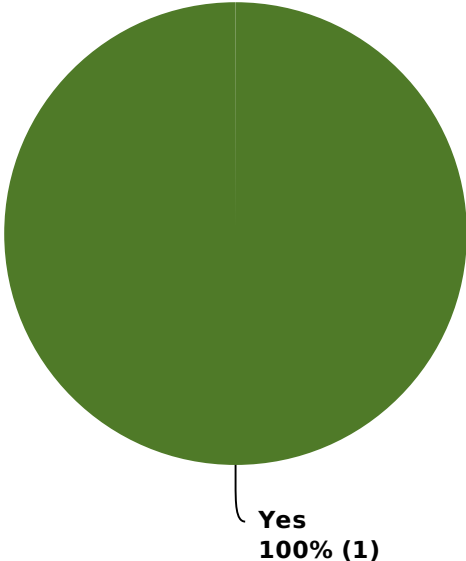
Answered: 1 Skipped: 0



	Definitely Yes	Probably Yes	Probably No	Definitely No	Unsure	Total
Decrease shoreline erosion?	100% 1	0% 0	0% 0	0% 0	0% 0	1
Increase fish populations?	100% 1	0% 0	0% 0	0% 0	0% 0	1
Decrease the value of shoreline property?	0% 0	0% 0	0% 0	100% 1	0% 0	1
Improve water quality?	100% 1	0% 0	0% 0	0% 0	0% 0	1
Limit recreational enjoyment?	0% 0	100% 1	0% 0	0% 0	0% 0	1

Q9 Have you ever heard of aquatic invasive species?

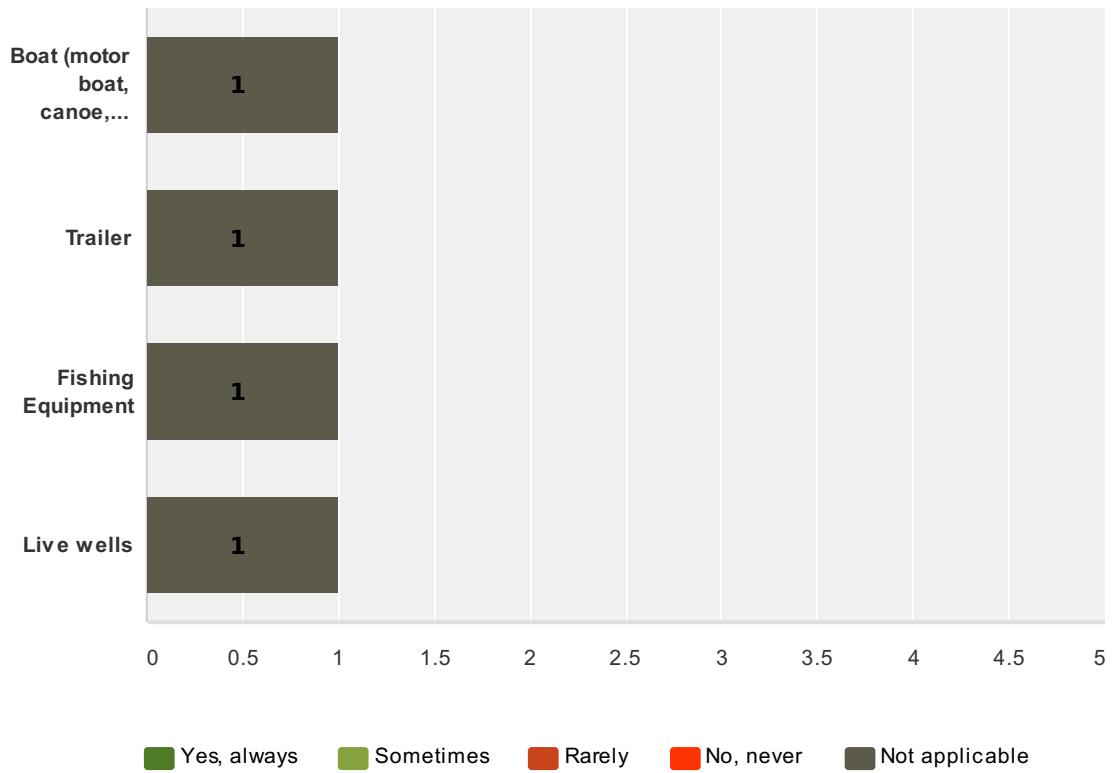
Answered: 1 Skipped: 0



Answer Choices	Responses
Yes	100% 1
No	0% 0
Total	1

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

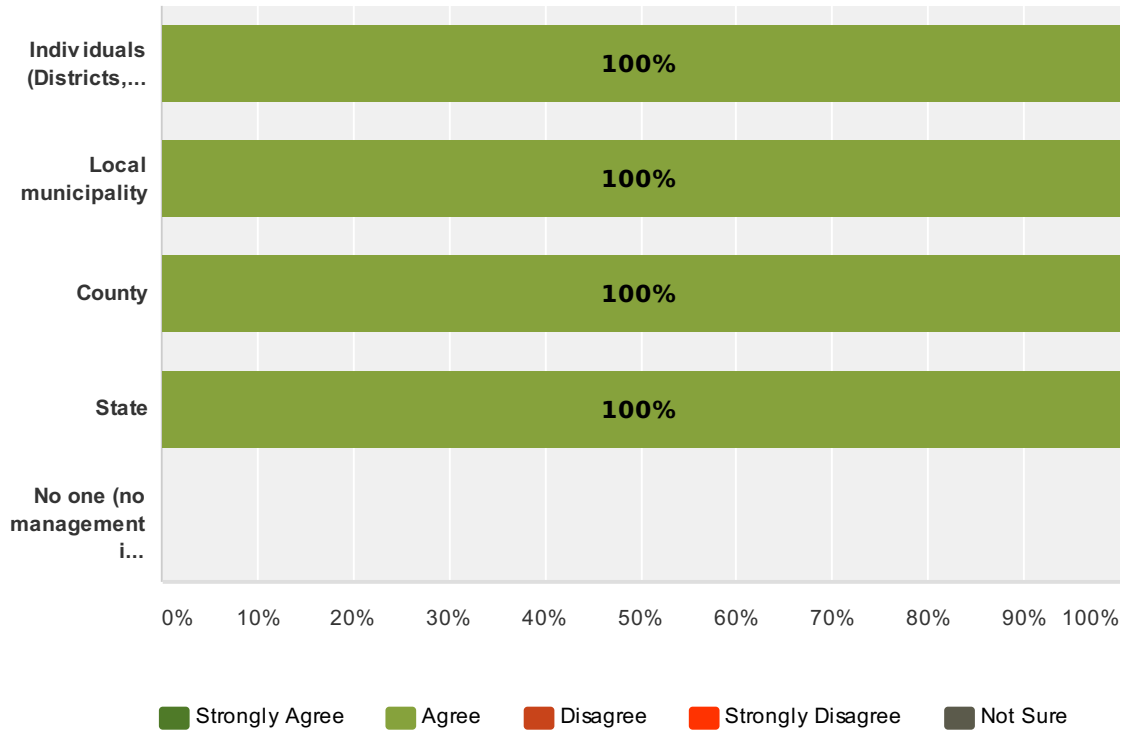
Answered: 1 Skipped: 0



	Yes, always	Sometimes	Rarely	No, never	Not applicable	Total Respondents
Boat (motor boat, canoe, kayak, etc.)	0% 0	0% 0	0% 0	0% 0	100% 1	1
Trailer	0% 0	0% 0	0% 0	0% 0	100% 1	1
Fishing Equipment	0% 0	0% 0	0% 0	0% 0	100% 1	1
Live wells	0% 0	0% 0	0% 0	0% 0	100% 1	1

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

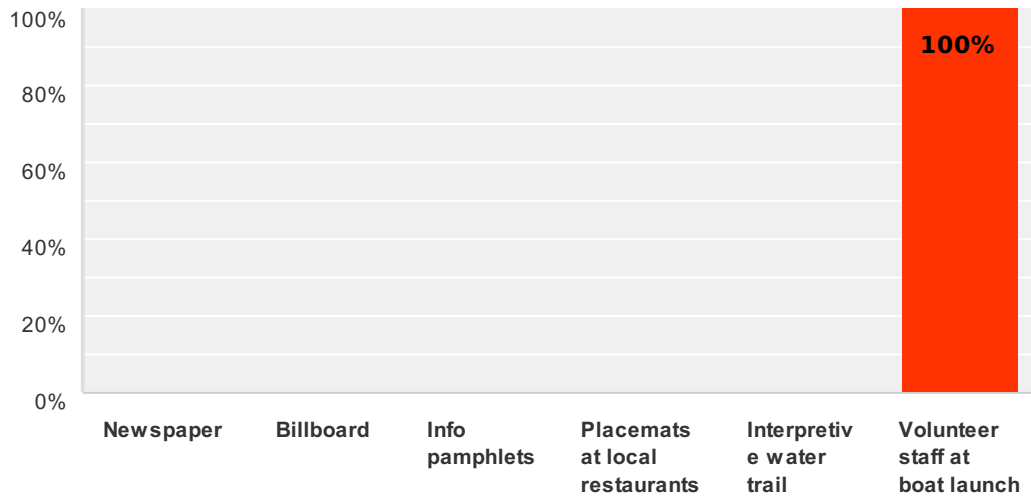
Answered: 1 Skipped: 0



	Strongly Agree	Agree	Disagree	Strongly Disagree	Not Sure	Total
Individuals (Districts, associations, lakefront property owners)	0% 0	100% 1	0% 0	0% 0	0% 0	1
Local municipality	0% 0	100% 1	0% 0	0% 0	0% 0	1
County	0% 0	100% 1	0% 0	0% 0	0% 0	1
State	0% 0	100% 1	0% 0	0% 0	0% 0	1
No one (no management is undertaken)	0% 0	0% 0	0% 0	0% 0	0% 0	0

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

Answered: 1 Skipped: 0

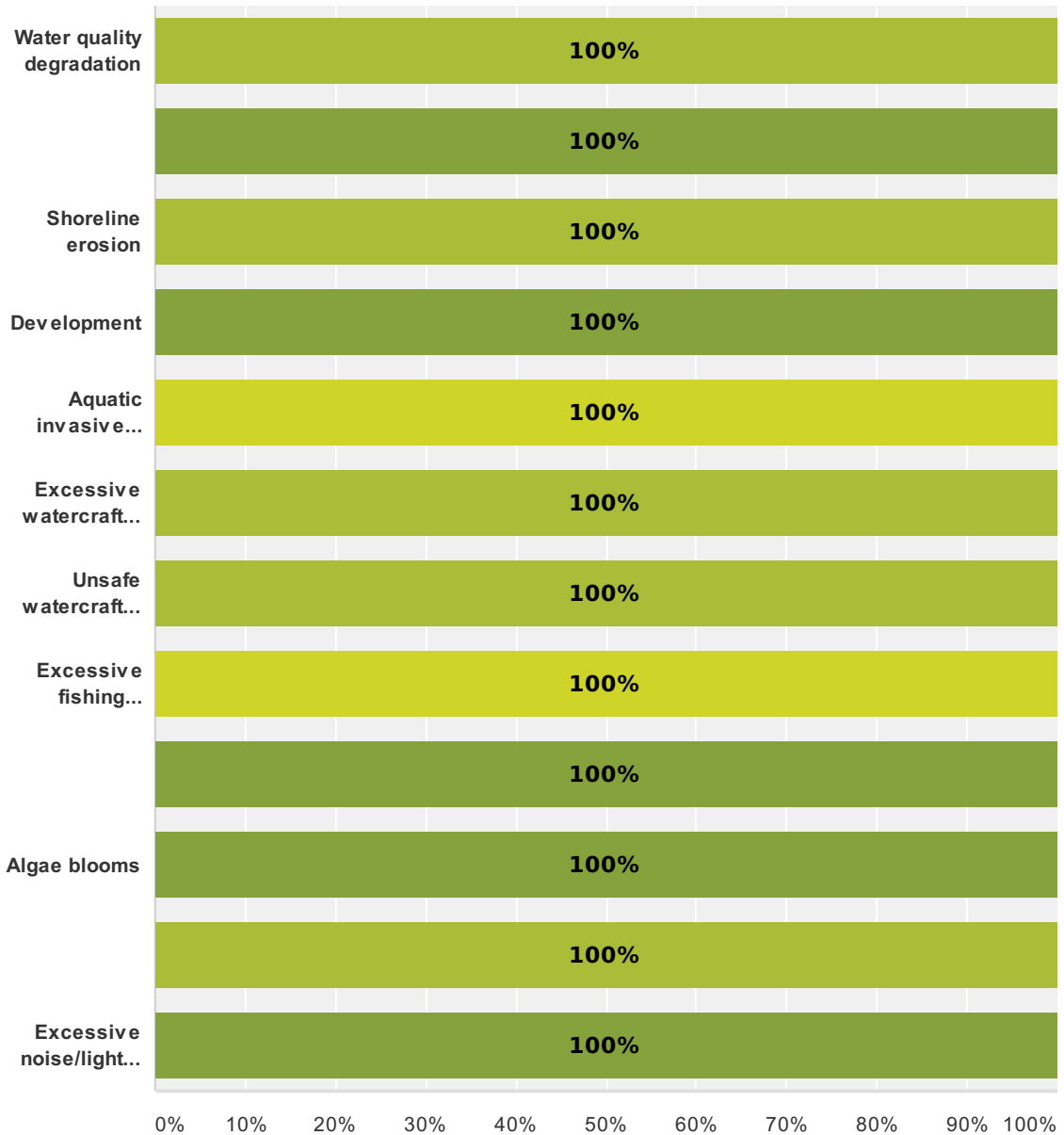


Answer Choices	Responses
Newspaper	0% 0
Billboard	0% 0
Info pamphlets	0% 0
Placemats at local restaurants	0% 0
Interpretive water trail	0% 0
Volunteer staff at boat launch	100% 1
Total Respondents: 1	

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 Lucerne? (Please rate 0 - 5) * Not Present means that you believe the issue does not exist on Lake Lucerne. **No Impact means that the issue may exist on Lake Lucerne but it is not negatively impacting the lake.

Answered: 1 Skipped: 0

Waushara County Lakes Project - Lake Lucerne Survey #3



■ *Not present 0
 ■ **No Impact 1
 ■ 2
 ■ Moderately negative impact 3
■ 4
 ■ Great negative impact 5
 ■ Unsure - need more info

	*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%	100%	0%	0%	0%	0%	1	2.00
Loss of aquatic habitat	0%	100%	0%	0%	0%	0%	0%	1	1.00
Shoreline erosion	0%	0%	100%	0%	0%	0%	0%	1	2.00
Development	0%	100%	0%	0%	0%	0%	0%	1	1.00

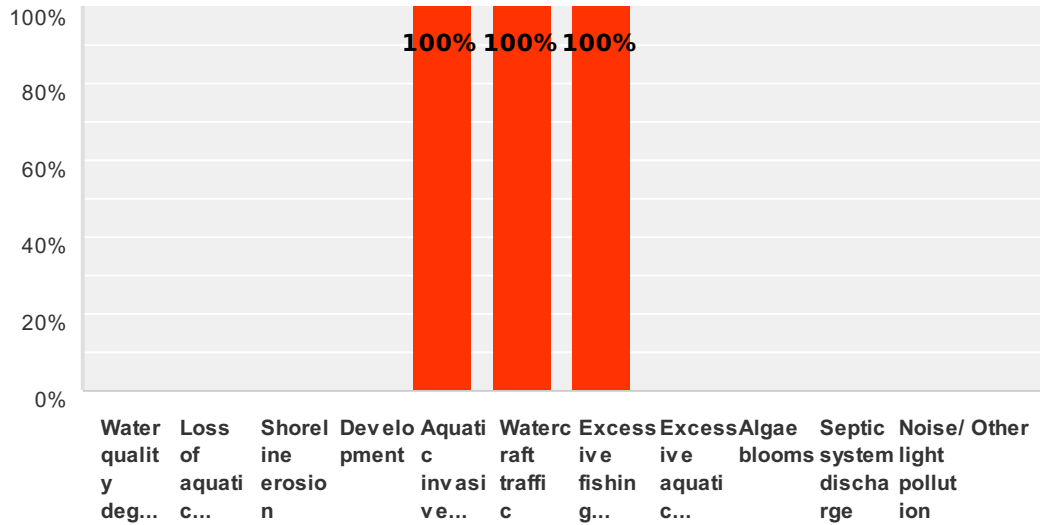
Aquatic invasive species	0%	0%	0%	100%	0%	0%	0%		
--------------------------	----	----	----	------	----	----	----	--	--

Waushara County Lakes Project - Lake Lucerne Survey #3

Aquatic invasive species introduction	0%	0%	0%	100%	0%	0%	0%	0%	1	3.00
Excessive watercraft traffic	0%	0%	100%	0%	0%	0%	0%	0%	1	2.00
Unsafe watercraft practices	0%	0%	100%	0%	0%	0%	0%	0%	1	2.00
Excessive fishing pressure	0%	0%	0%	100%	0%	0%	0%	0%	1	3.00
Excessive aquatic plant growth (excluding algae)	0%	100%	0%	0%	0%	0%	0%	0%	1	1.00
Algae blooms	0%	100%	0%	0%	0%	0%	0%	0%	1	1.00
Septic system discharge	0%	0%	100%	0%	0%	0%	0%	0%	1	2.00
Excessive noise/light pollution	0%	100%	0%	0%	0%	0%	0%	0%	1	1.00

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

Answered: 1 Skipped: 0



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

Lake Lucerne Survey #4

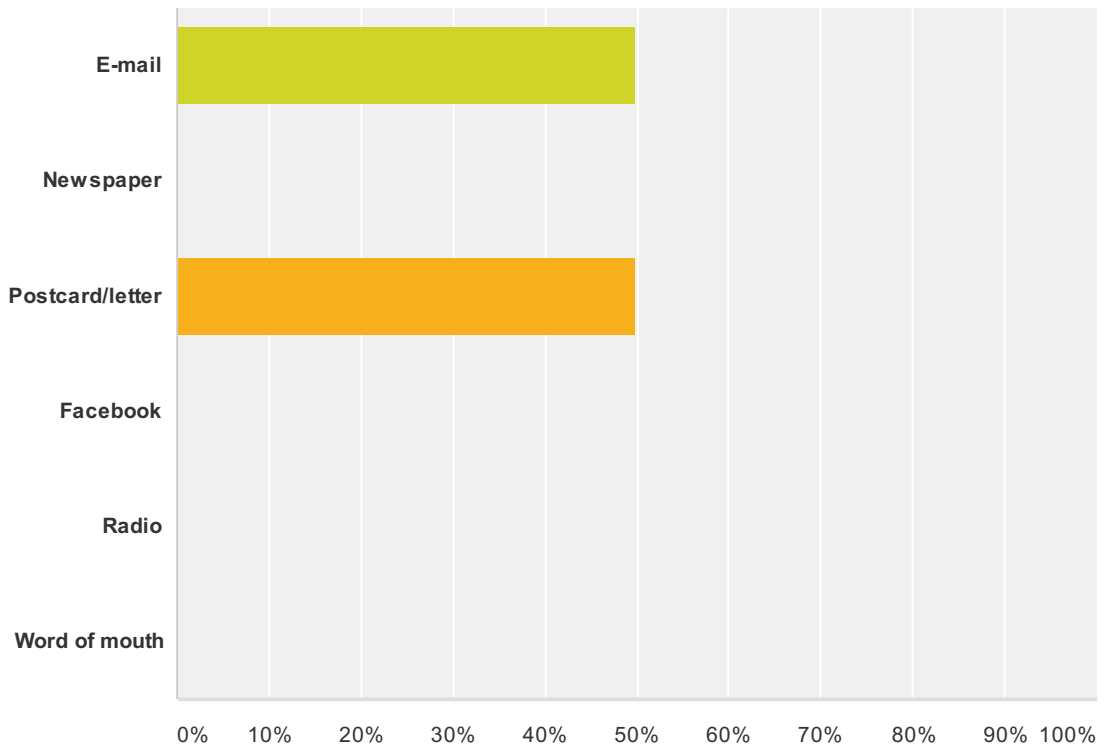
Q1 What is your Waushara County Lakes Study ID?

Answered: 2 Skipped: 0

#	Responses	Date
1	[REDACTED]	5/8/2014 3:03 PM
2	[REDACTED]	4/30/2014 5:56 PM

Q2 How did you hear about this survey?

Answered: 2 Skipped: 0

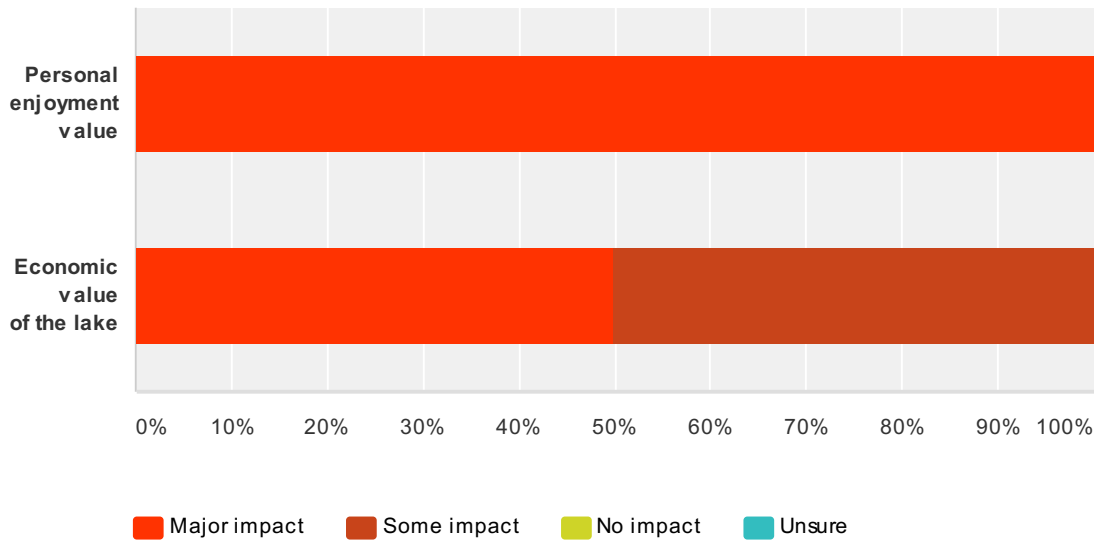


Answer Choices	Responses
E-mail	50.00% 1
Newspaper	0.00% 0
Postcard/letter	50.00% 1
Facebook	0.00% 0
Radio	0.00% 0
Word of mouth	0.00% 0
Total	2

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

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

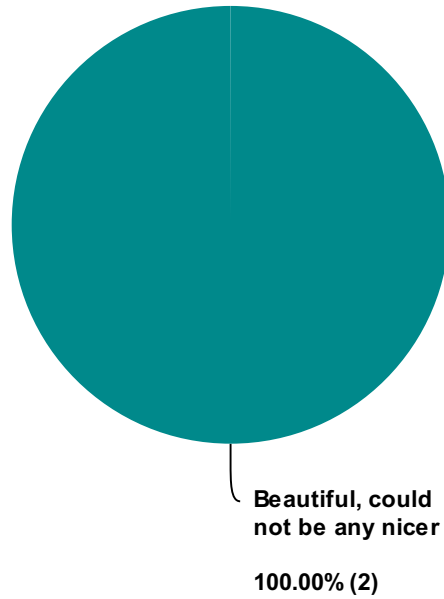
Answered: 2 Skipped: 0



	Major impact	Some impact	No impact	Unsure	Total
Personal enjoyment value	100.00% 2	0.00% 0	0.00% 0	0.00% 0	2
Economic value of the lake	50.00% 1	50.00% 1	0.00% 0	0.00% 0	2

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

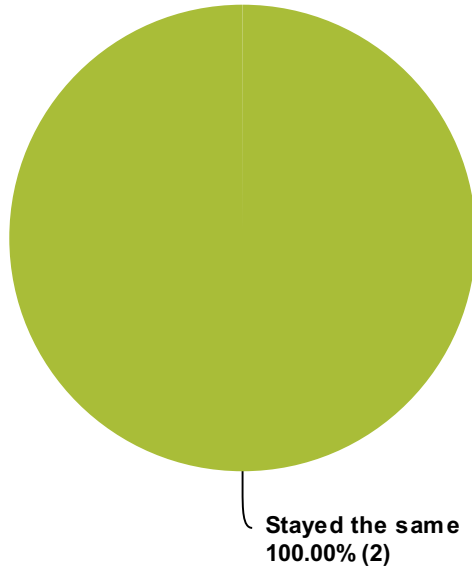
Answered: 2 Skipped: 0



Answer Choices	Responses	
Beautiful, could not be any nicer	100.00%	2
Very minor aesthetic problems; excellent for swimming and boating enjoyment	0.00%	0
Swimming and aesthetic enjoyment of the lake is slightly impaired because of algae	0.00%	0
Swimming and aesthetic enjoyment of the lake is moderately reduced because of algae	0.00%	0
Swimming and aesthetic enjoyment of the lake is substantially reduced because of algae	0.00%	0
None of the above	0.00%	0
Unsure	0.00%	0
Total		2

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: 2 Skipped: 0



Answer Choices	Responses
Improved	0.00% 0
Declined	0.00% 0
Stayed the same	100.00% 2
Unsure	0.00% 0
Total	2

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

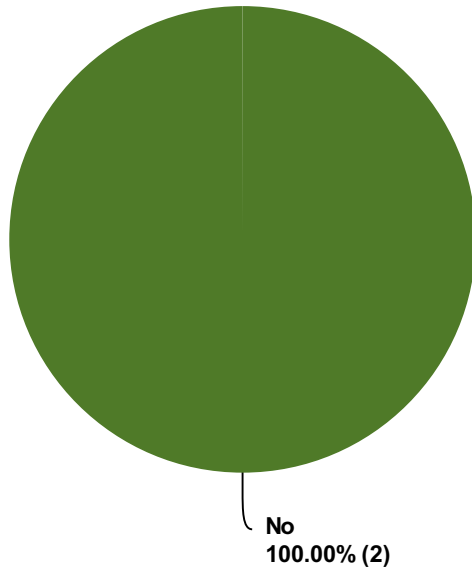
Answered: 0 Skipped: 2

! No matching responses.

	Strongly Agree	Agree	Disagree	Strongly Disagree	Unsure	Total Respondents
Loss of aquatic plants	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0
Shoreline damage	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0
Development pressure	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0
Heavy recreation	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0
Septic system	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0
Fertilizers	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0
Soil erosion	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0
Herbicides	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0
Air pollution	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0
Vegetable agriculture	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0
Livestock agriculture	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0
Water level changes	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0

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

Answered: 2 Skipped: 0



Answer Choices	Responses
Yes	0.00% 0
No	100.00% 2
Total	2

Q8 Where do you apply herbicides and/or pesticides?

Answered: 0 Skipped: 2

! No matching responses.

Answer Choices	Responses
Agricultural fields	0.00% 0
Garden	0.00% 0
Lawn	0.00% 0
Total	0

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

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

Answered: 0 Skipped: 2

! No matching responses.

	Never	Once	Once a week	Once a month	Varies	Total Respondents
Winter	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0
Spring	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0
Summer	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0
Fall	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 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)?

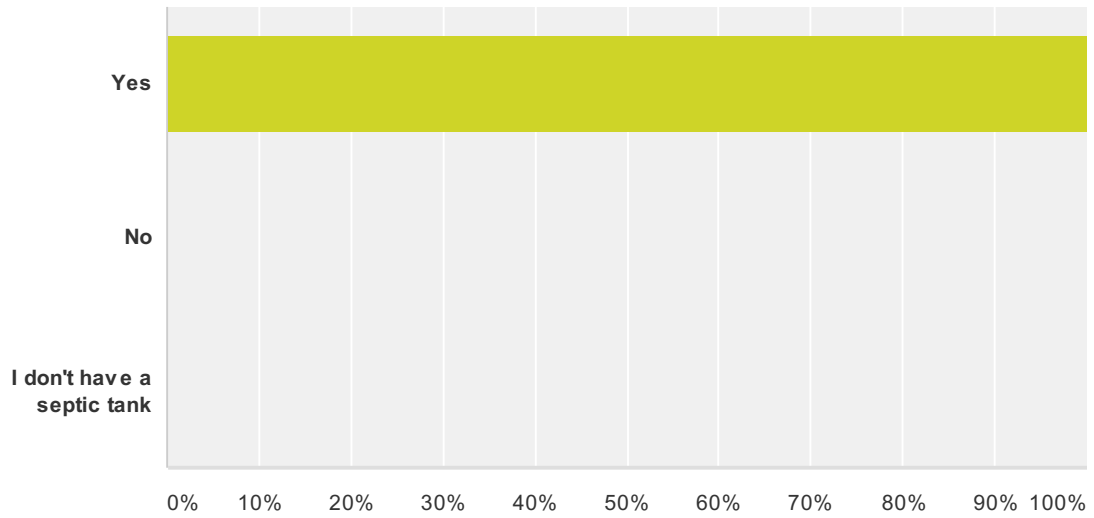
Answered: 0 Skipped: 2

! No matching responses.

Answer Choices	Responses	
I do not apply herbicides/pesticides on lakefront property	0.00%	0
Up to the lake	0.00%	0
Within 35 feet of the lake	0.00%	0
Farther than 35 feet from the lake.	0.00%	0
Total		0

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

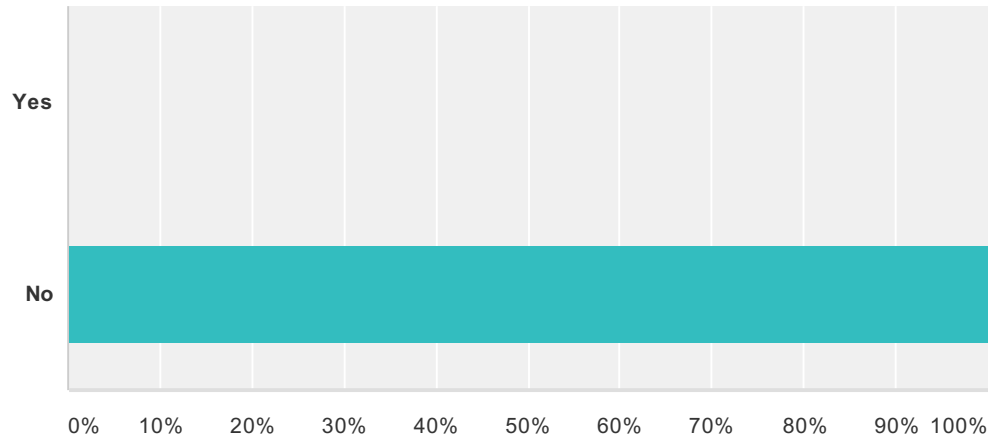
Answered: 2 Skipped: 0



Answer Choices	Responses
Yes	100.00% 2
No	0.00% 0
I don't have a septic tank	0.00% 0
Total	2

Q12 Do you use fertilizer on your land?

Answered: 2 Skipped: 0



Answer Choices	Responses	
Yes	0.00%	0
No	100.00%	2
Total		2

Q13 Do you use fertilizer which contains phosphorus?

Answered: 0 Skipped: 2

! No matching responses.

Answer Choices	Responses
Yes	0.00% 0
No	0.00% 0
I don't know	0.00% 0
Total	0

Q14 Do you have your soil tested before applying fertilizer?

Answered: 0 Skipped: 2

! No matching responses.

Answer Choices	Responses
Yes, all of the time	0.00% 0
Yes, some of the time	0.00% 0
No, never	0.00% 0
Total	0

Q15 Where do you apply fertilizer?

Answered: 0 Skipped: 2

! No matching responses.

Answer Choices	Responses
Agricultural fields	0.00% 0
Garden	0.00% 0
Lawn	0.00% 0
Total	0

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

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

Answered: 0 Skipped: 2

! No matching responses.

	Never	Once	Once a week	Once a month	Varies	Total Respondents
Winter	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0
Spring	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0
Summer	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0
Fall	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0

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

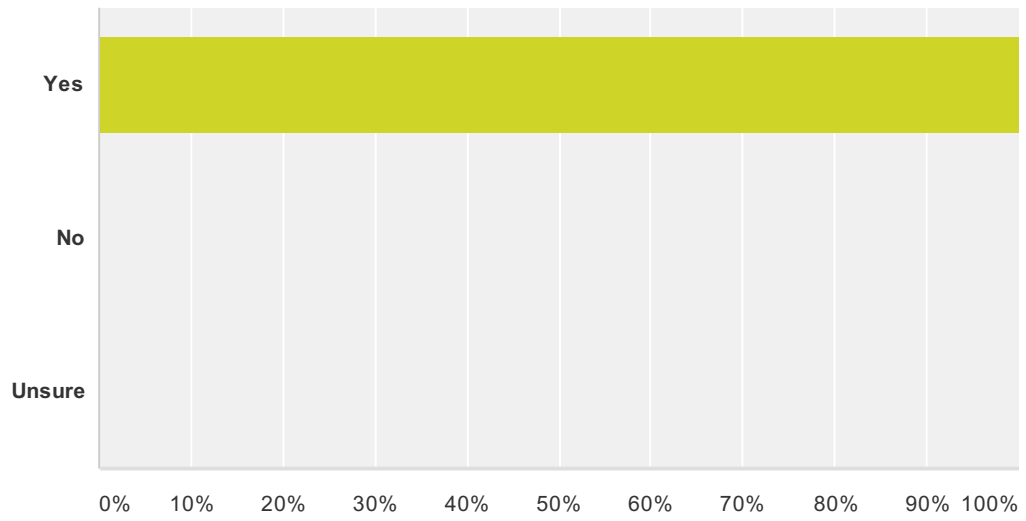
Answered: 0 Skipped: 2

! No matching responses.

Answer Choices	Responses
I do not apply fertilizer on lakefront property	0.00% 0
Up to the lake	0.00% 0
Within 35 feet of the lake	0.00% 0
Farther than 35 feet from the lake.	0.00% 0
Total	0

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

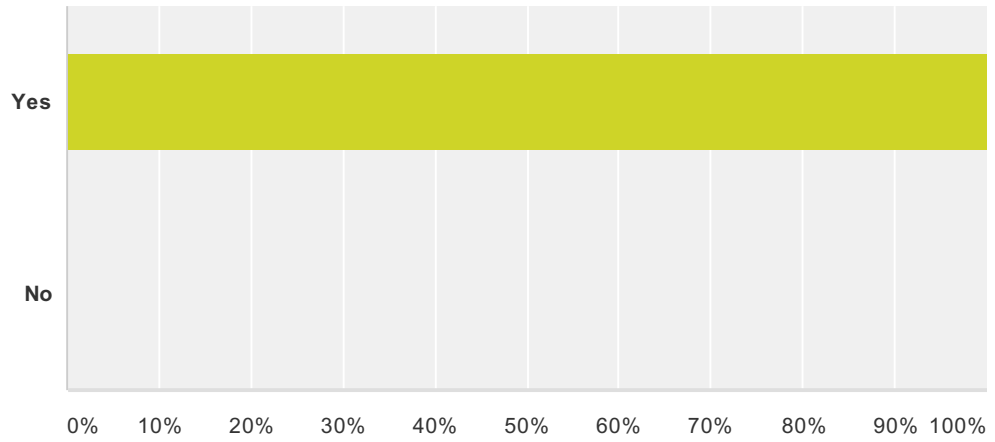
Answered: 2 Skipped: 0



Answer Choices	Responses	Count
Yes	100.00%	2
No	0.00%	0
Unsure	0.00%	0
Total		2

Q19 Do you own shoreland property?

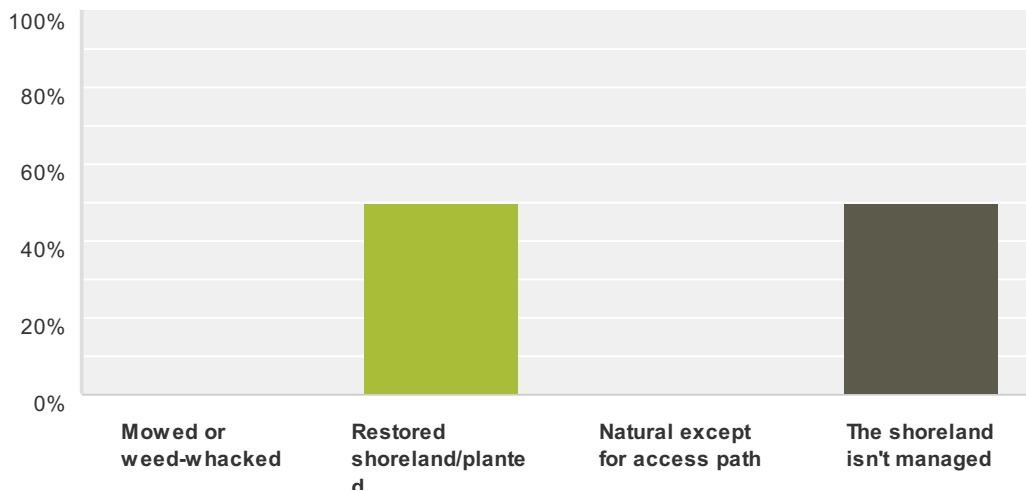
Answered: 2 Skipped: 0



Answer Choices	Responses
Yes	100.00% 2
No	0.00% 0
Total	2

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

Answered: 2 Skipped: 0

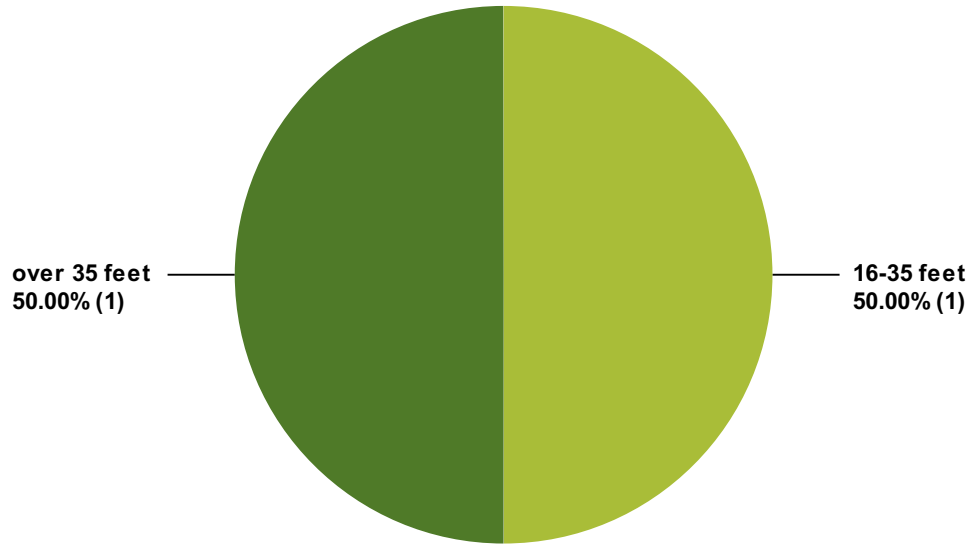


Answer Choices	Responses
Mowed or weed-whacked	0.00% 0
Restored shoreland/planted	50.00% 1
Natural except for access path	0.00% 0
The shoreland isn't managed	50.00% 1
Total Respondents: 2	

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

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

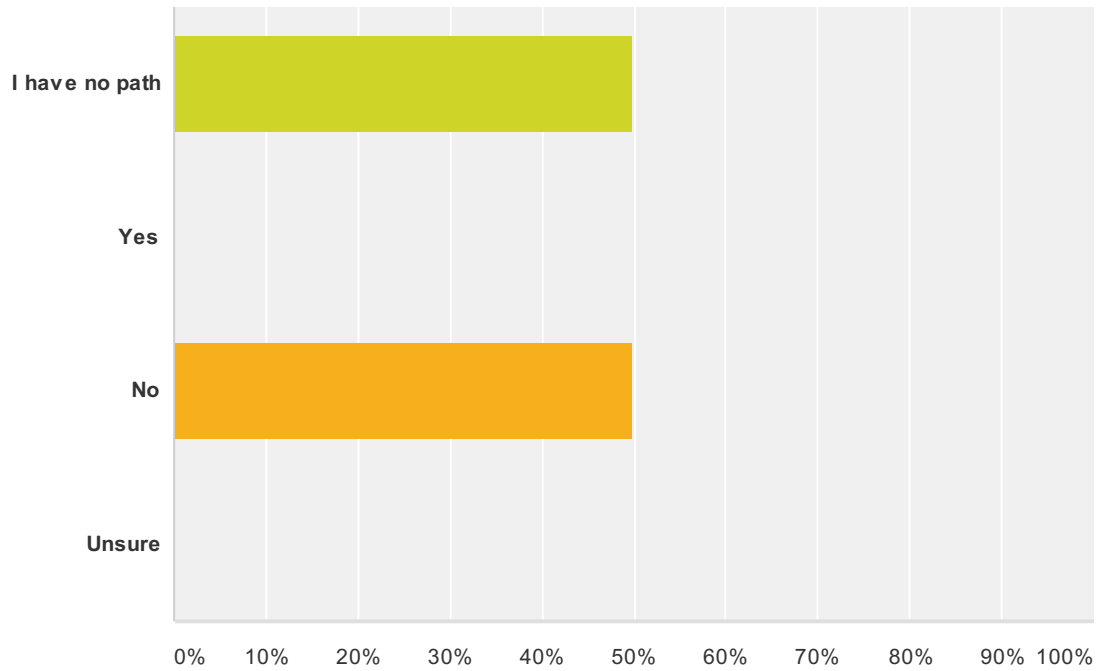
Answered: 2 Skipped: 0



Answer Choices	Responses
I do not have unmowed shoreland vegetation	0.00% 0
1-15 feet	0.00% 0
16-35 feet	50.00% 1
over 35 feet	50.00% 1
Total	2

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

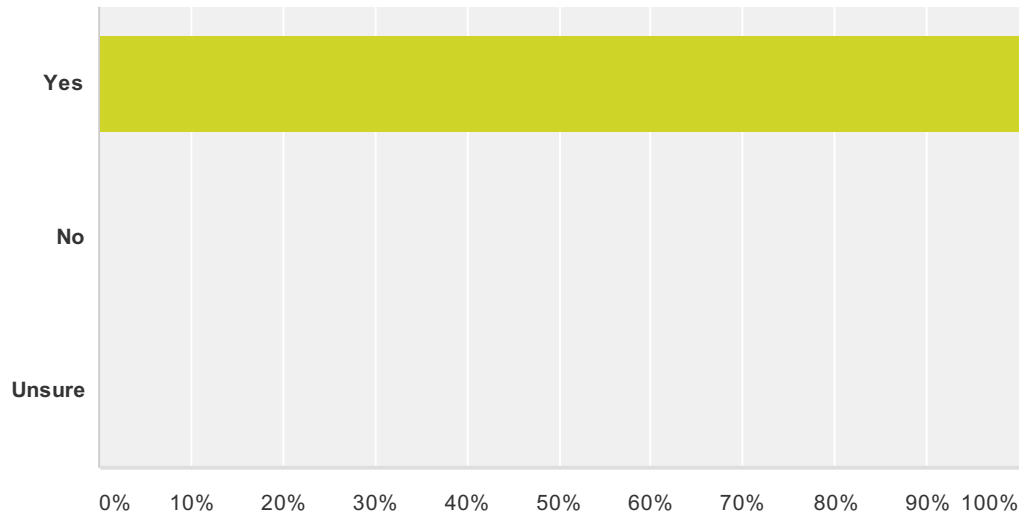
Answered: 2 Skipped: 0



Answer Choices	Responses
I have no path	50.00% 1
Yes	0.00% 0
No	50.00% 1
Unsure	0.00% 0
Total	2

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

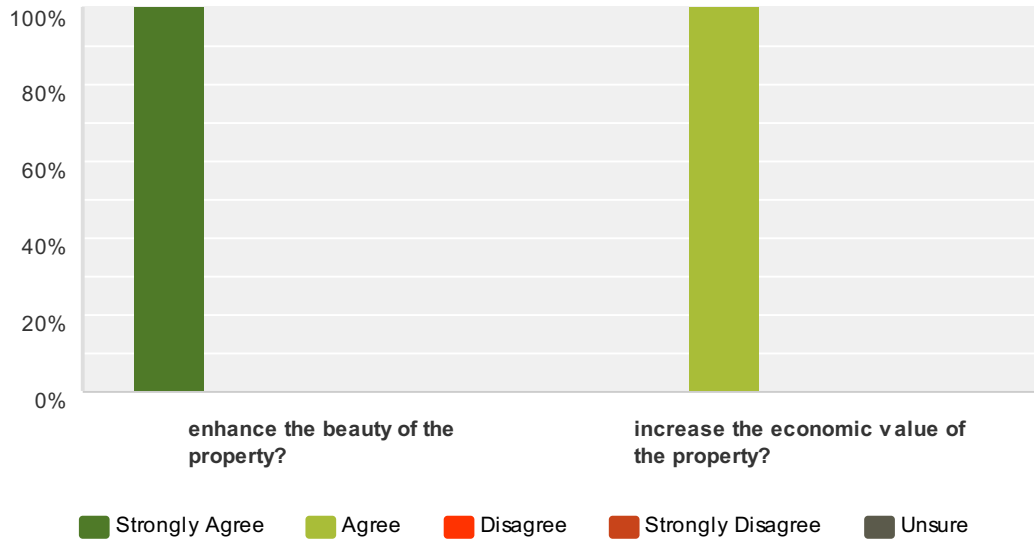
Answered: 2 Skipped: 0



Answer Choices	Responses	Count
Yes	100.00%	2
No	0.00%	0
Unsure	0.00%	0
Total		2

Q24 In your opinion, does shoreland vegetation...

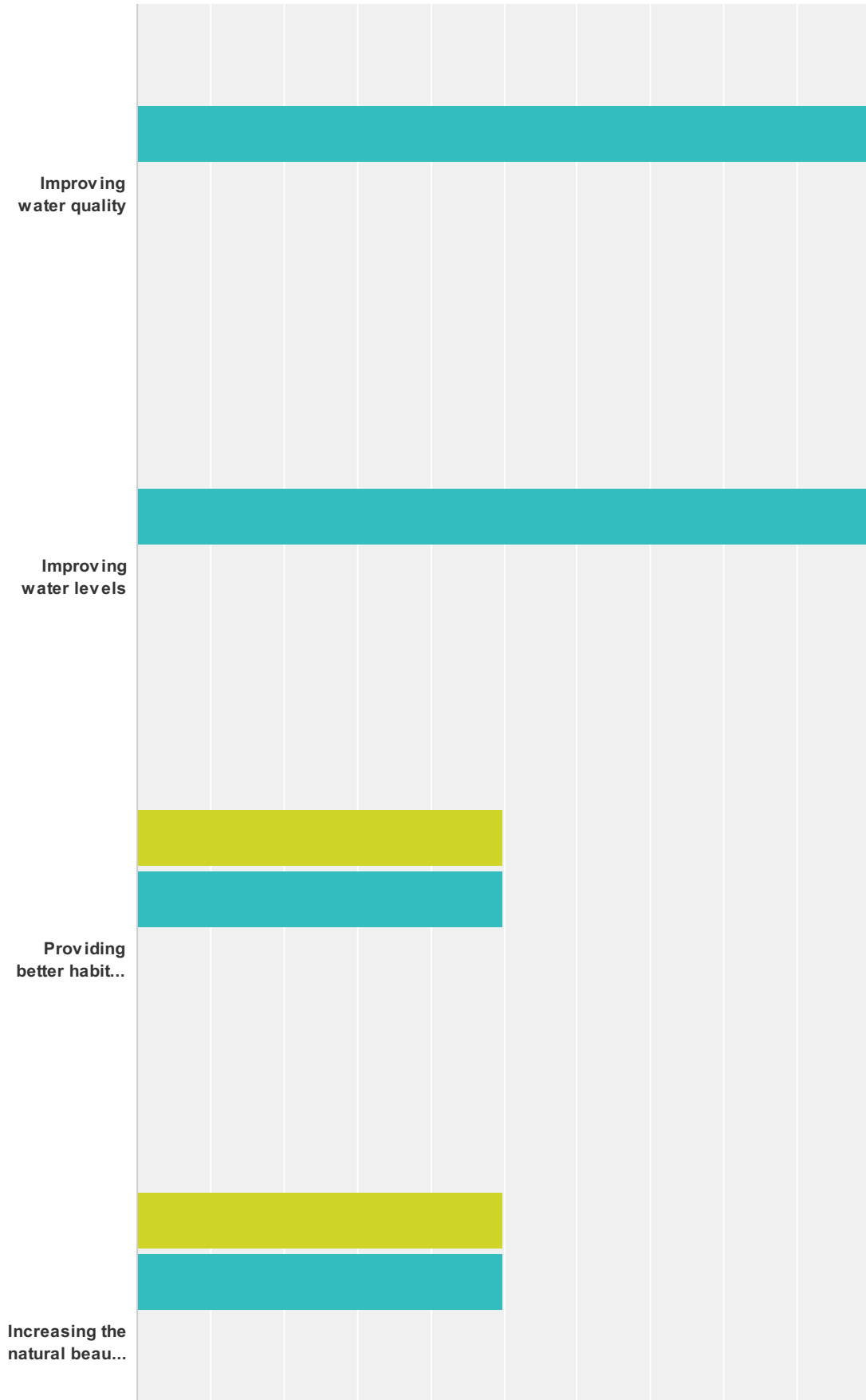
Answered: 2 Skipped: 0



	Strongly Agree	Agree	Disagree	Strongly Disagree	Unsure	Total
enhance the beauty of the property?	100.00% 2	0.00% 0	0.00% 0	0.00% 0	0.00% 0	2
increase the economic value of the property?	0.00% 0	100.00% 2	0.00% 0	0.00% 0	0.00% 0	2

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

Answered: 2 Skipped: 0



Lake Lucerne Survey #4

Displaying a
commitment t...



Available
financial...



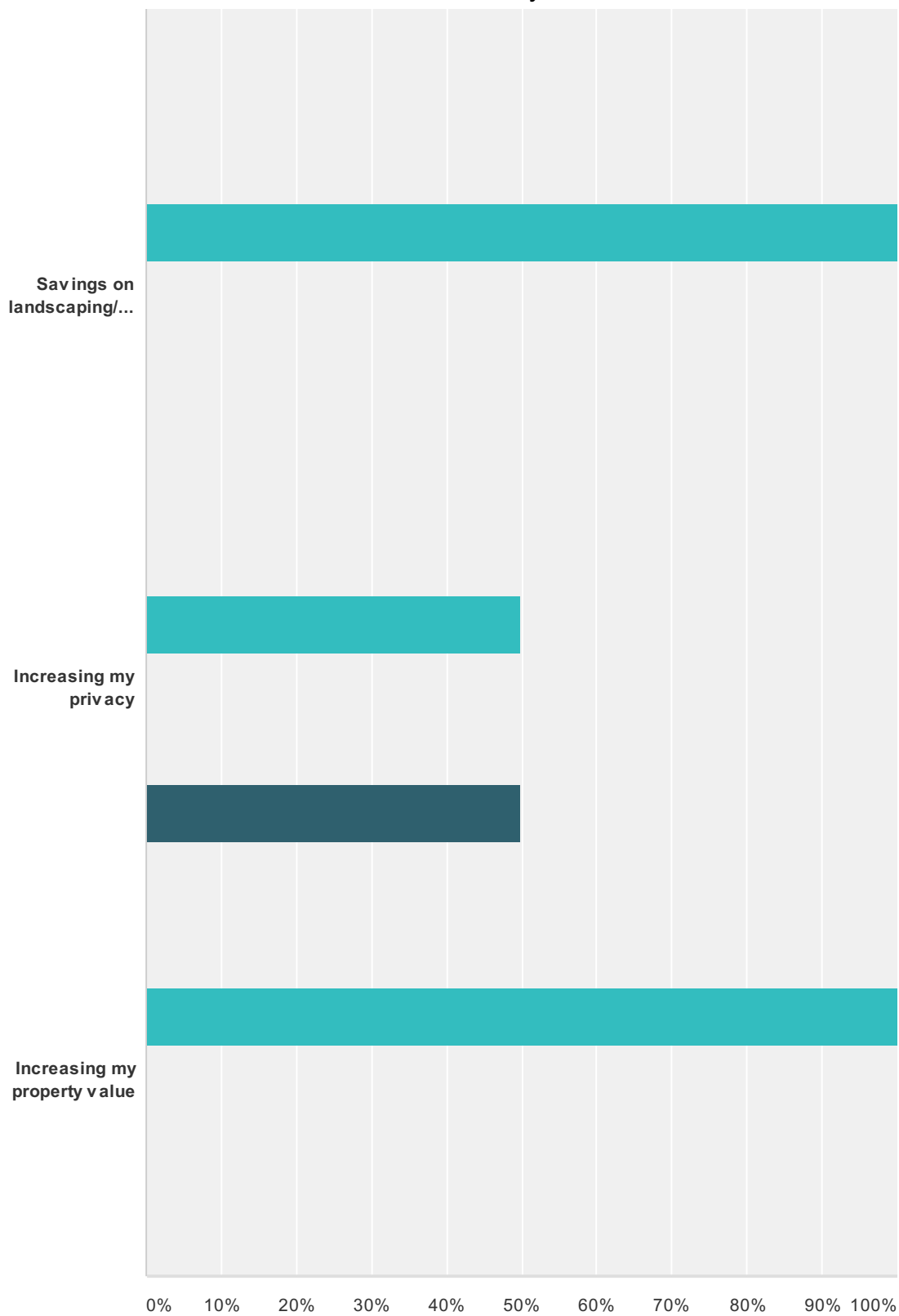
Available
technical...



Setting an
example for...



Lake Lucerne Survey #4



■ Strongly Agree
 ■ Agree
 ■ Disagree
 ■ Strongly Disagree
 ■ Don't know

	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't know	Total
Improving water quality	0.00% 0	100.00% 2	0.00% 0	0.00% 0	0.00% 0	2

Improving water levels	0.00%	100.00%	0.00%	0.00%	0.00%	
------------------------	-------	---------	-------	-------	-------	--

Lake Lucerne Survey #4

improving water levels	0.00% 0	100.00% 2	0.00% 0	0.00% 0	0.00% 0	2
Providing better habitat for fish and wildlife	50.00% 1	50.00% 1	0.00% 0	0.00% 0	0.00% 0	2
Increasing the natural beauty of my property	50.00% 1	50.00% 1	0.00% 0	0.00% 0	0.00% 0	2
Displaying a commitment to the environment	50.00% 1	50.00% 1	0.00% 0	0.00% 0	0.00% 0	2
Available financial assistance	50.00% 1	0.00% 0	0.00% 0	0.00% 0	50.00% 1	2
Available technical assistance	0.00% 0	100.00% 2	0.00% 0	0.00% 0	0.00% 0	2
Setting an example for community members	0.00% 0	100.00% 2	0.00% 0	0.00% 0	0.00% 0	2
Savings on landscaping/maintenance costs	0.00% 0	100.00% 2	0.00% 0	0.00% 0	0.00% 0	2
Increasing my privacy	0.00% 0	50.00% 1	0.00% 0	0.00% 0	50.00% 1	2
Increasing my property value	0.00% 0	100.00% 2	0.00% 0	0.00% 0	0.00% 0	2

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