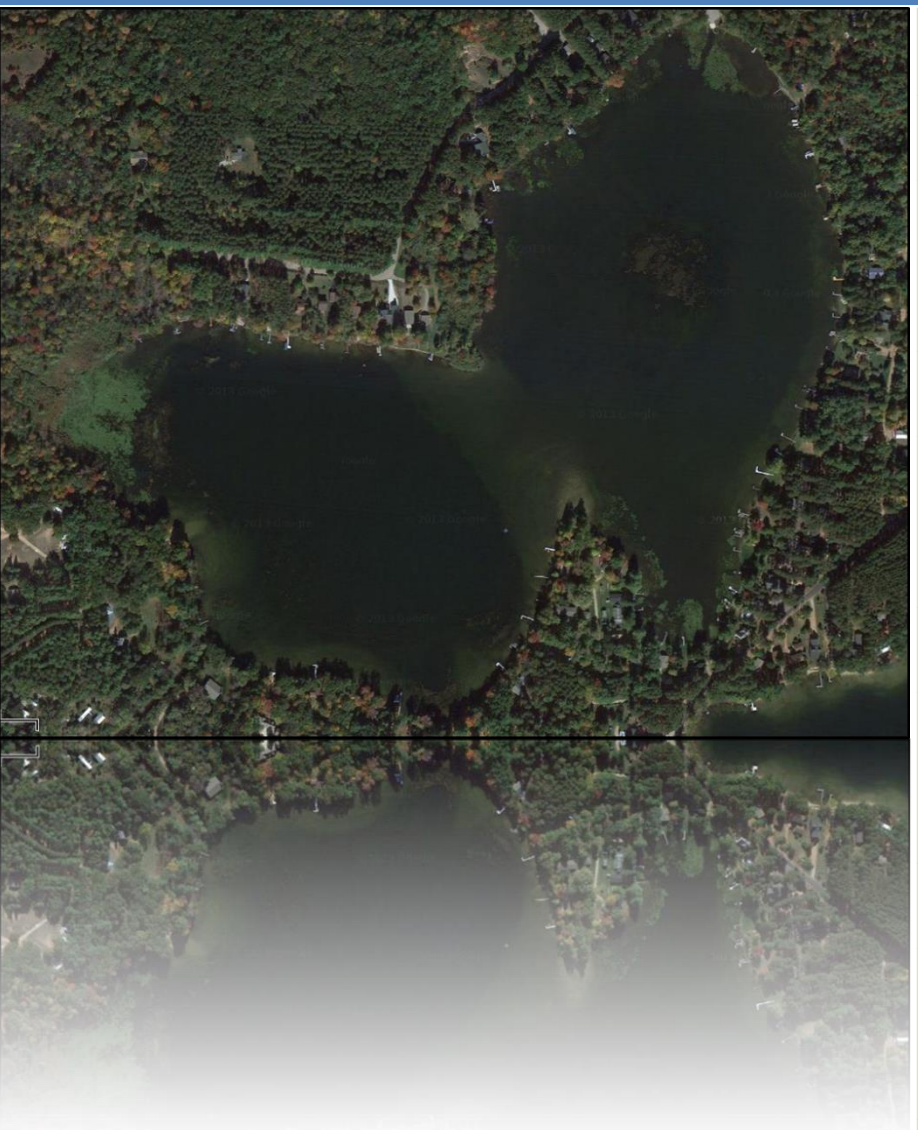
2015

Wilson Lake Management Plan



Prepared by staff from the Center for Watershed Science and Education
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Wilson Lake Management Plan

The Wilson Lake Management Plan was developed with input from residents and lake users at a series of four public planning sessions held at the Wild Rose Community Center in Wild Rose, Wisconsin in February-May 2015. The inclusive community sessions were designed to learn about and identify key community opportunities, assets, concerns, and priorities. Representatives of state and local agencies, as well as nonprofit organizations, also attended the planning sessions to offer their assistance to the group in developing a strategic lake management plan (LMP).

The plan was adopted by the Kusel/Wilson/Round Lakes Protection & Rehabilitation District on: November 18, 2015.
Date

The plan was accepted by the Town of Springwater on: _____.
Date

The plan was accepted by Waushara County on: _____.
Date

The plan was approved by the Wisconsin Department of Natural Resources on: _____.
Date

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

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Contents

Overarching Vision for Wilson Lake

Wilson Lake will be a place for great swimming, boating, and excellent fishing amongst good neighbors that value their lake and property; a balance motorized and non-motorized recreation make Wilson Lake ideal for friends and family gatherings as well as a place to call home.

Introduction

Wilson Lake is a 75-acre seepage lake located in the township of Springwater, east of Wild Rose and south of County Highway A. Its maximum depth is 14 feet, and its bottom sediments are mostly muck, with some sand found in the southeastern bay. Public access is made possible by the two public boat launches located on the southern and northeastern shores. The residents of Wilson Lake have a long history of active management and lake stewardship. Previous management activities on the lake have included:

- 1975 Feasibility Study Results and Management Alternatives
- 1977 Environmental Resource Assessment
- 1980 Lake Management Plan
- 1988 Air Injection System Installed
- 2002 Aquatic Plant Survey and Water Quality Monitoring Results
- 2003 Aquatic Plant Survey
- 2004 Post-Treatment Survey Results and Management Update
- 2001-2006 Management of Aquatic Plants
- 2007 Wilson Lake volunteers were trained in AIS identification and water quality parameters
- 2008 Aquatic Plant Management Plan

In 2015, community members around Wilson Lake came together in partnership with Waushara County and technical professionals to develop this lake management plan.

The purpose of this plan is to provide a framework for the protection and improvement of West Branch Mill Pond. Implementing the content of this lake management plan (LMP) will enable citizens and other supporters to achieve the vision for West Branch Mill Pond 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 West Branch Mill Pond 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 Wilson Lake Management Plan, and how can it be used?

- **Individuals**: Individuals can use this plan to learn about the lake they love and their connection to it. People living near Wilson Lake can have the greatest influence on the lake by understanding and choosing lake-friendly options to manage their land and the lake.
- **Kusel/Wilson/Round Lakes Protection & Rehabilitation District:** This plan provides the District with a well thought-out plan for the whole lake and lists options that can easily be prioritized. Annual review of the plan will also help the District to realize its accomplishments. Resources and funding opportunities for District management activities are made more available by placement of goals into the lake management plan, and the District can identify partners to help achieve their goals for Wilson Lake.
- **Neighboring lake groups, sporting and conservation clubs**: Neighboring groups with similar goals for lake stewardship can combine their efforts and provide each other with support, improve competitiveness for funding opportunities, and make efforts more enjoyable.
- **The Towns of Springwater:** 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.
- **Waushara County:** County professionals will better know how to identify needs, provide support, base decisions, and allocate resources to assist in lake-related efforts documented in this plan. This plan can also inform county board supervisors in decisions related to Waushara County lakes, streams, wetlands, and groundwater.
- **Wisconsin Department of Natural Resources**: Professionals working with lakes in Waushara County can use this plan as guidance for management activities and decisions related to the management of the resource, including the fishery, and invasive species. Lake management plans help the Wisconsin Department of Natural Resources to identify and prioritize needs within Wisconsin's lake community, and decide where to apply resources and funding. A well thought-out lake management plan increases an application's competitiveness for 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 this plan was to gather and compile data about the lake and its ecosystem to understand past and current lake conditions. This was done alongside 32 other lakes as part of the Waushara County Lakes Project. The Waushara County Lakes Project was initiated by

citizens in the Waushara County Watershed Lakes Council who encouraged the Waushara County to work in partnership with personnel from UW-Stevens Point to assess 33 lakes in the county. This effort received funding from the Wisconsin Department of Natural Resources' Lake Protection Grant Program. There was insufficient data available for many of the lakes to evaluate current water quality, aquatic plant communities, invasive species, and shorelands. The data that were available had been collected at differing frequencies or periods of time, making it difficult to compare lake conditions. Professionals and students from UW-Stevens Point and the Waushara County Land Conservation Department conducted the Waushara County Lakes Study and interpreted data for use in the development of lake management plans. Data collected by citizens, consultants, and 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 Wilson 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 Lake Study – Wilson Lake 2010-2012*, University of Wisconsin-Stevens Point.

The Planning Process

The planning process included a series of four public planning sessions held between February and May 2015at the Wild Rose Community Center. The Wilson Lake Planning Management Committee consisted of property owners, recreational users and District members. Technical assistance during the planning process was provided by the Waushara County Conservationist, the Waushara County Community, Natural Resources and Economic Development Extension Agent, and professionals from the Wisconsin Department of Natural Resources (WDNR), Golden Sands Resource Conservation and Development, 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 Wilson Lake 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 the Appendix.

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

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.

Goals, Objectives and Actions

The following goals, objectives and associated actions were derived from the values and concerns of citizens interested in Wilson Lake and members of the Wilson Lake Management Planning Committee, as well as the known science about Wilson Lake, its ecosystem and the landscape within its watershed. A lake management plan is a living document that changes over time to meet the current needs, challenges and desires of the lake and its community. Implementing and regularly updating the goals and actions in the Wilson 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 each comprehensive lake management plan address a specific list of topics affecting the character of a lake, whether each topic has been identified as a priority or as simply something to preserve. In this way, every lake management plan considers the many aspects associated with lakes. These topics comprise the chapters in this plan and have been grouped as follows:

In-Lake Habitat and a Healthy Lake

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

Landscapes and the Lake

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

People and the Lake

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

Communication and Organization—maintaining connections for partnerships, implementation, community involvement
Updates and Revisions—continuing the process
Governance—protection of the lake, constitution, state, county, local municipalities, lake district

The following priorities have been identified as key elements of this plan:

- Wilson Lake will have a healthy and sustainable fish community for recreational fishing
- Wilson Lake will have a healthy and diverse aquatic plan community that supports a balanced fishery and promotes good water quality while still having great swimming and sufficient access for recreation.
- Wilson Lake will not be detrimentally affected by aquatic invasive species.
- Lake users and shoreland property owners on Wilson Lake will remain informed on how to identify, monitor, prevent and control aquatic and terrestrial invasive species.
- Maintain/improve water quality in Wilson Lake.
- Increase and enhance healthy shorelands around Wilson Lake.
- Land use in the Wilson Lake watershed will minimize impacts to its water quality.
- Foster an environment of compliance and cordial recreational use.
- Maintain open communications with lake users to keep visitors and residents informed about responsible lake stewardship and encourage involvement.
- Wilson Lake will have an up-to-date-, accurate and comprehensive lake management plan that is reviewed annually and documents all management activities and effects.

The following goals were identified as "high priority" for Wilson Lake (short-term, 12 to 18 months):

Goal 2. Reduce the abundance of aquatic plants in Wilson Lake by reducing the nutrient loading.
Goal 3. Wilson Lake will have no new aquatic or terrestrial invasive species, and current populations of invasive species will be eradicated or controlled.
Objective 3.1. Eradicate and/or control Eurasian watermilfoil (EWM) on Wilson Lake.
Objective 3.2. Eradicate and/or control curly-leaf pondweed (CLP) on Wilson Lake.

- Conduct regular aquatic plant surveys. (Conducted in Fall 2015 by both WDNR and retained consultants)
- Retain experts to apply for all required permits and treat AIS (spring of calendar year) with herbicide.
- Check effectiveness of treatment in late summer, then assess next steps including the potential of hand-pulling.
- Develop a plan for mechanically harvesting aquatic plants to support quality fishing, good water quality, great swimming and navigational access for both powered, wind-aided and personal recreational use.
    - Develop a Wilson Lake Harvesting Map incorporating the following key elements (see Appendix F)
        - Seventy-five (75) foot wide navigation lanes to support the natural counterclockwise traffic that exists on the lake
        - Navigation lanes from both the north and south public access points
        - Harvesting of aquatic plants within thirty (30) feet of property owner's docks (some docks may be too shallow for a harvester and may require manual harvesting)
    - Retain professionals to apply for all required permits (3-year) and harvest aquatic plants (summer of calendar year)
    - Determine effectiveness of harvesting to assess the necessity and timing of future harvesting

Goal 4. Lake users and shoreland property owners on Wilson Lake will remain informed on how to identify, monitor, prevent and control aquatic and terrestrial invasive species.
Objective 4.1. Identify, monitor and quickly address any new aquatic invasive species on Wilson Lake.

- Hold workshops to teach residents to identify, monitor and properly remove aquatic invasive species.
- Arrange for Clean Boats, Clean Waters volunteers at the public boat launch on busy/holiday weekends.

Goal 8. Foster and environment of compliance and cordial recreational use.
Goal 9. Maintain open communications with lake users to keep visitors and residents informed about responsible lake stewardship and encourage involvement.
Objective 8.1. Provide lake users the information they need to make responsible decisions.

- Continue to implement and enforce current No Wake hours (5pm-10am).
- Assess the recreational and navigational safety issues associated with the shallow water area between the two points and recommend potential solutions.
- Maintain and update district website: www.kwr-lakes.com
- Communicate management activities via website.
- Maintain and utilize email and/or mailing list of lake residents and association membership.

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

Resource	Acronym
Citizen Lake Monitoring Network	CLMN
Center for Watershed Science and Education	CWSE
Kusel, Wilson, Round Lakes Protection & Rehabilitation District	KWRLPRD
Waushara County Land Conservation Department	WCLCD
Natural Resource Conservation Service	NRCS
North Central Conservancy Trust	NCCT
Golden Sands Resource Conservation and Development	RC&D
UW Extension	UWEX
University of Wisconsin-Stevens Point	UWSP
Wisconsin Department of Natural Resources	WDNR

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

In-Lake Habitat and a Healthy Lake

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

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

Fish Community

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

People are an important part of a 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.

67% of survey respondents felt that the quality of fishing had declined during their time associated with the lake. An overabundance of aquatic plants and low numbers of panfish were thought to be causes of this.

In spring 2009, the WDNR conducted its most recent comprehensive fish survey which included fyke-netting and boomshocking. Walleye, which do not naturally reproduce in Wilson Lake, were in average abundance with fair size structure and above average growth. Similarly, northern pike were above average abundance but had below average growth. Size structure and fair abundance for largemouth bass have remained relatively consistent when compared to past surveys and are below average when compared to other area lakes.

Black crappie was found in average abundance and size structure and was the dominant panfish sampled. Growth, however was below average. Bluegill are struggling in Wilson Lake with a below average abundance, poor size structure and below average growth. Yellow perch, which are not well represented in these types of surveys, appear to be common to abundant based on the fisheries biologist's personal fishing experience on Wilson Lake.

The following fishery history was compiled by the WDNR Fisheries Biologist:

> *"Historically, Wilson Lake has supported a good self-sustaining population of northern pike and largemouth bass. Panfishing has been mediocre over the years due to a slow growing population of bluegill. Some fair crappie and perch fishing has existed in the past.*
>
> *Northern pike stocking and even fish toxicants have been unsuccessfully used to control the bluegill population. Toxicants were used in 1964, 1965 and 1966. The first recorded winter kill occurred the winter of 1977-78. Another followed in 1978-79. Species most affected were bluegill and largemouth bass.*
>
> *Wilson Lake is a 75-acre drainage lake with a maximum depth of 12 feet. Historically Wilson Lake has been managed for and supported a self-sustaining warm water sport fishery made up of largemouth bass, northern pike and assorted panfish. Northern Pike have generally been small with most fish sampled less than 20 inches. Some quality largemouth bass are produced in Wilson Lake. Bluegills have been overabundant and small despite attempts to chemically control them in 1964, 1965 and 1966. These attempts all failed. Severe winterkills have been documented on Wilson Lake in the winters of 1977-78, 1978-79 and 1985-86. Northern pike, largemouth bass and bluegill were reintroduced following these winterkills. Spikes in the black crappie, yellow perch population were also observed following these winterkills. This is typical of winterkill situations because both these species are much more tolerant of low oxygen conditions. Since the installation of aerators in Wilson Lake in the late 1980's no winterkills*

have been documented. Past surveys were done in 1960, 1964, 1974, 1980, 1988, 1999 and 2004. In May 1960 a seine haul was done with 36 northern pike (10–21 inches) , 31 largemouth bass (6-20 inches), bluegills, crappies and yellow perch all being sampled. Bluegills and crappies were most abundant panfish, with all bluegills being small size. In May 1964 a seine haul was done to assess the fishery prior to a scheduled chemical treatment. Bluegills were found to be very abundant and in poor condition. In May 1974 a seine haul was done on Wilson Lake to inventory the fish population. Twenty-nine northern pike were sampled all less than 20 inches and a good self-sustaining largemouth bass population with fish up to 18 inches was also observed. Next a seine haul was done May 1980 to assess the winterkill of 1978-79. Strong year classes of smaller northern pike and largemouth bass were sampled, mainly due to the stockings in 1978, 1979 and 1980. A shocker run was done June 1988 to assess winterkill of 1985-1986. All gamefish numbers were down with only 6 largemouth bass (8-16 inches) and 4 northern pike (14-21 inches) sampled. Bluegills were still most abundant panfish sampled followed by yellow perch."

Aerators were installed in Wilson Lake in the 1980s. The aerators are currently being maintained by Aquatic Biologists. John Van Lanan recommended Cason & Associates to maintain and report maintenance work in 2015 going forward. Aerators run from November through May of each year. The aerators were originally run continuously, but lake owners voted to save on electricity and just run in winter months.

Guiding Vision for the Fish Community

Wilson Lake will have a healthy and sustainable fish community for recreational fishing.

Goal 1. Improve and enhance fish habitat, especially in near-shore areas of the lake.

Objective 1.1. Work to improve fish habitat along shoreland and near-shore areas and inform lake residents and users about fishery-related information and issues.

Actions	Lead person/group	Resources	Timeline
Inform individuals about the importance of woody habitat in shallow water near-shore areas of Beans Lake and encourage placement in appropriate areas.	Dave Bartz, WDNR Fish Biologist	WDNR UW-Stevens Point WCLCD	Ongoing
Continue to protect and restore shoreland areas and avoid shoreland alterations to improve fish habitat.	KWRLPRD	WDNR WCLCD	Ongoing
Maintain contact with We Really Kare fishing club and keep them in the loop with Kusel Lake fishery-related issues and actions.	KWRLPRD	We Really Kare, Inc.	Ongoing

Aquatic Plant Community

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

Aquatic plants near shore and in shallows provide food, shelter and nesting material for shoreland mammals, shorebirds and waterfowl. It is not unusual for otters, beavers, muskrats, weasels, and deer to be seen along a shoreline in their search for food, water, or nesting material. The aquatic plants that attract the animals to these areas contribute to the beauty of the shoreland and lake.

An aquatic plant survey was conducted on Wilson Lake in August 2013 by Golden Sands RC&D, Inc. Seventy-eight percent (212 of 272) of the sites visited had vegetative growth. The greatest depth at which aquatic plant growth was found was 14 feet. Twenty species of aquatic plants were found in Wilson Lake, including those that were observed visually (up from 13 species identified in a 2007 survey). This results in it being slightly above average compared with the other lakes in the Waushara County study.

The dominant aquatic plant species found in Wilson Lake was muskgrass (*Chara* spp.), followed by slender naiad (*Najas flexilis*) and common waterweed (*Elodea canadensis*). *Chara* spp. is a favorite waterfowl food and also offers cover for fish. Slender naiad's stems, leaves and seeds are consumed by waterfowl, marsh birds and muskrats. Common waterweed is a food source for muskrats and waterfowl, and also provides shelter and grazing opportunities for fish (Borman et al., 2001). No species of special concern were observed.

Two invasive species were observed during the survey, Eurasian watermilfoil and curly-leaf pondweed.

More detailed information can be found in the Wilson Lake Aquatic Plant Report or the Wilson Lake 2010-2012 Lake Study Report.

In September 2015, an aquatic plant survey was conducted by the WDNR. Seventy-two percent (196 of 272) of the sites visited had vegetative growth. The greatest depth at which aquatic plant growth was found was 14 feet. Twenty-three species of aquatic plants were found, including those that were observed visually. The dominant plant species in the 2015 survey was hybrid watermilfoil (41% of sites visited) followed by muskgrass (31%) and southern naiad (29%). Small bladderwort (*Utricularia minor*), which has a coefficient of conservatism of 10, was observed at one location.

Aquatic plants were discussed during the 4-month planning sessions on March 6, 2015. Survey responses to questions about aquatic plants in Wilson Lake indicated that most lake users perceived an overabundance of plants in the lake at most times. Excessive aquatic plant growth was a top concern for 75% of survey respondents. The following aquatic plant management strategies for NATIVE SPECIES are all options and each were considered and discussed:

- *Do nothing.* This result can be achieved without the expenditure of aggressive management. Some lakes do not experience a significant increase in abundance when no action is taken. Participants did not feel that this was a feasible option.

- *Manual removal.* Lakefront property owners are permitted to clear an area up to 30 feet from their dock for boat and swimming access to open water without a permit. Additionally, those trained to properly identify and remove aquatic invasive species can remove those manually any time of year.
- *Mechanical harvesting.* A harvester can be purchased or hired to cut traffic and access lanes through dense vegetation to provide boating access and improve fish habitat (with the proper permit). Eurasian watermilfoil, an invasive which has a pronounced population in Wilson Lake, is commonly spread through fragmentation. Caution must be used to avoid further spread from chopped plants, so this invasive in particular would need to be controlled prior to mechanical harvesting occurring on the lake.
- *Chemical treatment* is generally not permitted for control of native species.
- 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.

Plant growth in Wilson Lake during the 2015 season was significant and exceeded what many have witnessed in 60+ years spent on the lake.

> "Lake property owners, fishermen and recreational users voiced accessibility and safety concerns with the abundance of 'weeds'. Navigation on the lake's traditional counter-clockwise navigation path was impossible."

A special meeting of lake property owners was held in the fall of 2015. At that meeting, the excessive aquatic plant growth experienced during the summer of 2015 was the top concern for 100% of the attendees. Based on these discussions, the KWRLPRD has decided to obtain a permit to harvest recreational access lanes through heavy vegetation during the 2016 season.

The harvesting of aquatic plants will not only improve navigation and safety on the lake it will enable the removal of nutrients and oxygen-depleting biomass from the lake. The harvesting maybe required to be completed 1-3 times per year, depending upon annual conditions. The harvesting operation will include the harvesting of navigation lanes with exit/entry lanes leading into/out of docks. As much plant material as possible will be removed from the lake by a second pass by the harvester to pick up any floating cut plants. Harvesters should have a depth finder on the blade side of the harvester and a GPS. A professional harvester will be contracted to accurately complete the work. Any areas with EWM should be avoided.

Guiding Vision for Aquatic Plants in Wilson Lake

Wilson Lake will have a healthy and diverse native aquatic plant community that supports a balanced fishery and promotes good water quality while still having great swimming and sufficient access for recreation.

Goal 2. Reduce the abundance of aquatic plants in Wilson Lake by reducing the nutrient loading.

Objective 2.1. Enhance shoreland vegetation and encourage best management practices within the watershed.

Actions	Lead person/group	Resources	Timeline
See **Shorelands** and **Watersheds** sections.			

Goal 3. Balance the health of native plants in and around Wilson Lake while allowing for safe recreational access.

Objective 3.1. A healthy native plant population makes it harder for invasives to take hold. Maintain the native aquatic plant community within Wilson Lake while balancing for safe recreational use unimpeded by excessive aquatic plant growth.

Actions	Lead person/group	Resources	Timeline
Minimize removal and disturbance of native vegetation (to impede establishment of additional AIS) when possible via educational materials provided in annual mailing, website re: mitigation methods available.	KWRLPRD	UWEX WCLWC	Ongoing
Obtain the appropriate permit for harvesting of any native plants beyond 30 feet from docks.	KWRLPRD	WDNR	Ongoing
Retain a professional harvesting contractor to apply for all required permits (3-year) and harvest aquatic plants based on the Wilson Lake harvesting map (Appendix F),	KWRLPRD	WDNR	2016
Evaluate effectiveness of harvesting to assess the necessity and timing of future harvesting.	KWRLPRD	WDNR	Annually

Aquatic Invasive Species (AIS)

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

Curly-leaf pondweed (CLP)

According to WDNR records, CLP was first identified in Wilson Lake in 2009. It was observed during Golden Sands' 2013 aquatic plant survey near the center of both lobes of the lake (see Appendix). 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. In Wilson Lake CLP should be monitored annually in early June, and if the beds expand, management

Figure 1. Curly-leaf pondweed.

should be considered.

Eurasian water-milfoil (EWM)

According to WDNR records, EWM was first identified in Wilson Lake in 2001. It was observed fairly widespread during Golden Sands' 2013 aquatic plant survey (see Appendix). EWM can exist as part of the plant community or it can create dense beds that can damage boat motors, make areas non-navigable, and inhibit activities like swimming and fishing. This plant produces viable seeds; 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.

Figure 2. Eurasian water-milfoil.

If an invasive plant species not previously documented in Wilson Lake is observed by any lake user, the lake user is encouraged to refer to Appendix C: Rapid Response Plan for more information on how to report it.

An aquatic plant management (APM) plan was developed for Wilson Lake in 2008 by Northern Environmental (Appendix E). The APM outlined an action plan for control of CLP and EWM through use of manual removal, herbicide treatments, watercraft inspection, and shoreland improvements.

Chemical control of invasive species has been conducted on Wilson Lake almost annually since about 2000. Below is a list of treatments conducted according to WDNR records:

Date	Species	Acreage	Product	Amount or Application Rate
June 2000	EWM	7.75	Navigate	775 lbs
July 2001	EWM	10.2	Navigate	1020 lbs
July 2002	EWM	9.3	Navigate	950 lbs
July 2003	CLP	16.8	Aquathol K	100 gal
May 2004	CLP	16.8	Aquathol K	100 gal
May 2005	CLP	16.8	Aquathol K	100 gal
June 2006	CLP	7	Aquathol K	54 gal
May 2007	CLP	7	Aquathol K	21 gal
May 2014	EWM	7.5	DMA-4	3ppm (8.7 gal/acre)

The most recent treatment was 7.5 acres on May 22, 2014 in Areas A (5 acres) and N (2.5 acres) shown in Figure 3. A fair amount of EWM was found during the post-treatment survey (Figure 4) in densities ranging from highly scattered to dense. In total, 12.7 acres were found growing primarily in the western half of the lake. Considering herbicide dissipation in the lake, the effective lake-wide concentration was estimated at only 0.18 ppm. Current

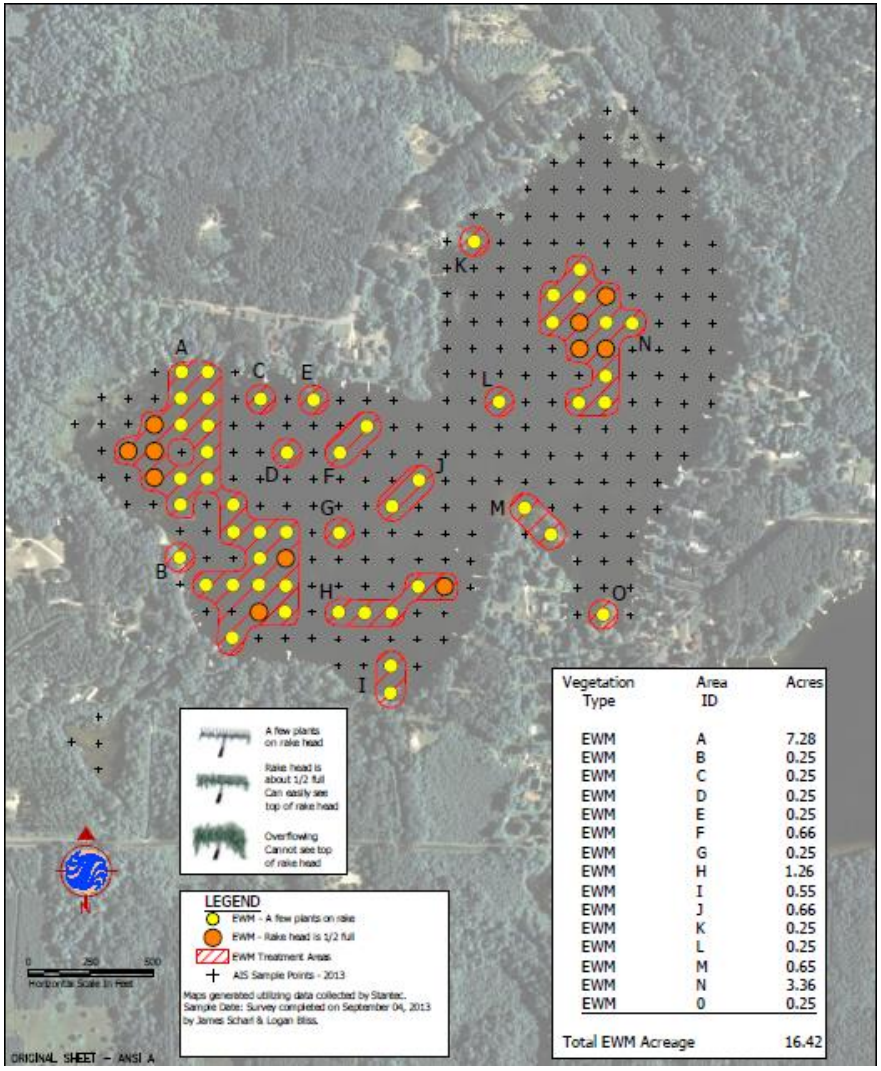


Figure 3. Chemical treatment areas, May 2014.

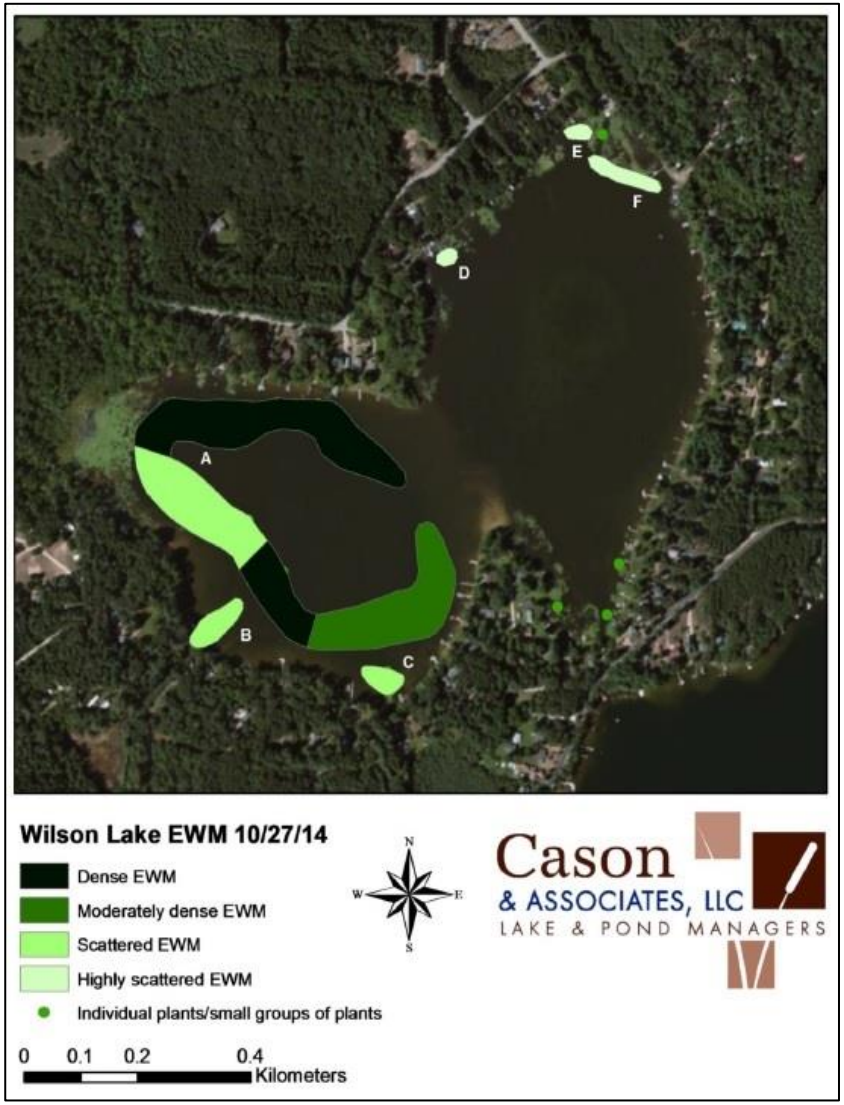


Figure 4. Post-treatment EWM, October 2014.

recommendations to control EWM in lakes are 0.35 to 0.40 ppm, which may explain the treatment's limited effect (an estimated 16.4 acres of EWM in 2013 compared to an estimated 12.7 acres in fall 2014). In the fall of 2014 Cason recommended and submitted to the DNR permit requests to perform a 'whole-lake' treatment at an effective concentration of 0.4 ppm coupled with manual potential removal during calendar year 2015. The requested permit was denied and no treatment was performed.

The following summer, 2015, saw excessive plant growth including native plants and an explosion of EWM across half of the lake. An aquatic plant survey was conducted by WDNR in September 2015. An additional assessment was also conducted by Cason in fall 2015 where they once again arrived at the same conclusion as they did in fall of 2014, recommending a whole-lake treatment.

A special meeting was held in the fall of 2015 regarding the plant abundance in the lake. Subsequently, the district provided the following update to this section:

A special meeting of lake property owners was held in the fall of 2015. At that meeting the excessive aquatic plant growth experienced during the summer of 2015 was the top concern for 100% of the attendees. During the many planning and discussion sessions held in the process of creating this LMP five options were discussed as potential actionable methods to control invasive species and excessive aquatic plant growth. The following bullet points highlight the desired actions being sought by the Wilson Lake community in calendar year 2016 with regard to the five options:

- **Do nothing.** Based on Wilson Lake property owner feedback this is not a viable option. After the summer of 2015 and the worst aquatic plant growth in the last 60 years the membership wants actions that deliver results.
- **Manual removal.** Manual aquatic plant removal on Wilson Lake will continue to be done by individual lake front property owners as in the past. They are permitted to clear an area up to 30 feet from their dock for boat and swimming access to open water. Additionally, based on the results of chemical treatment and harvesting the use of professionals trained to properly identify and remove aquatic invasive species may be enlisted.
- **Mechanical harvesting**. Mechanical harvesting will be used for aquatic plant management in Wilson Lake in areas deeper than three feet. The harvesting of aquatic plants will not only improve navigation and safety on the lake it will enable the removal of nutrients and oxygen-depleting biomass from the lake. The harvesting maybe required to be completed 1-3 times per year, depending upon annual conditions. The harvesting operation will include the harvesting of navigation lanes with exit/entry lanes leading into/out of docks. As much plant material as possible will be removed from the lake by a second pass by the harvester to pick up any floating cut plants. Harvesters should have a depth finder on the blade side of the harvester and a GPS. A professional harvester will be contracted to accurately complete the work. CLP should be harvested in early June, just after the development of turions but prior to flowering to reduce the plants viability over the long term. Allowing CLP to devote energy to turion development, then harvesting, can stress existing plants and reduce the number of new plants that will reproduce. Removing the plant matter from the lake via harvester will remove that biomass and nutrient from the system. The following actions will be performed in support of mechanical harvesting on Wilson lake:

- In early 2016 retain a professional harvester to apply for all required permits (3-year) and harvest aquatic plants based on the Wilson Lake harvesting Map incorporating the following key elements (See Appendix F)
    - Seventy-five (75) foot navigation lanes to support the natural counterclockwise circumnavigation traffic that exists on the lake
    - Navigation lanes from both the north and south public access points
    - Harvesting of aquatic plants within thirty (30) feet of property owner's docks (some docks may be too shallow for a harvester and may require manual harvesting)
- Determine effectiveness of harvesting to assess the necessity and timing of future harvesting

- **Chemical treatment**. The following actions will be performed in support of the chemical treatment of invasive species in Wilson lake:
    - In early 2016 retain professionals to develop a proposal, applications for permits and the actual application of the chemical treatment of invasive aquatic species in Wilson Lake.
    - Determine effectiveness of the chemical treatment to assess the necessity and timing of future potential chemical treatments.
- **Other techniques.** Other 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.

Each lake is different and its response to control of EWM may differ 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 population of EWM should be evaluated using a 'point-intercept' method (accompanied by more thorough observations) before and after treatments to determine the effectiveness of an approach in a given year. Strategies for the subsequent year should be adjusted accordingly. EWM management involves evolving scientific knowledge; therefore the management strategies for the management of EWM in Wilson Lake should be adapted as EWM populations in the lake change and as new information becomes available.

HWM results from a hybridization of native watermilfoils with Eurasian watermilfoil. HWM tends to be more resilient and less effected by chemical treatment. HWM was confirmed in September 2015 by laboratory analysis. Now that HWM is confirmed, a *challenge test* can 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 money.

Guiding Vision for Aquatic Invasive Species

Wilson Lake will not be detrimentally affected by aquatic invasive species.

Goal 3. Wilson Lake will have no new aquatic or terrestrial invasive species, and current populations of invasive species will be eradicated or controlled.

Objective 3.1. Eradicate and/or control Eurasian watermilfoil (EWM) on Wilson Lake.

Actions	Lead person/group	Resources	Timeline
Explore chemical treatment options for EWM and CLP populations. Retain professional to develop proposal, apply for permits and apply herbicide.	KWRLPRD	Consultants WDNR	2016
All chemical treatments should accompany pre- and post-treatment aquatic plant surveys.	KWRLPRD	Consultants RC&D	2016
If a chemical treatment is done, follow-up with manual removal methods (i.e. hand-pulling, SCUBA divers, suction, etc.).	KWRLPRD	RC&D	Annually

Objective 3.2. Eradicate and/or control curly-leaf pondweed (CLP) on Wilson Lake.

Actions	Lead person/group	Resources	Timeline
Hire a harvester to break off curly-leaf pondweed before turions are formed. Timing for this method would be very important.	KWRLPRD	WDNR RC&D	2016

Goal 4. Lake users and shoreland property owners on Wilson Lake will remain informed on how to identify, monitor, prevent and control aquatic and terrestrial invasive species.

Objective 4.1. Identify, monitor and quickly address any new aquatic invasive species on Wilson Lake.

Actions	Lead person/group	Resources	Timeline
Hold workshops to teach residents to identify,	KWRLPRD	RC&D	2016

monitor and properly remove aquatic invasive species.			
Arrange for Clean Boats, Clean Waters volunteers at the public boat launch on busy/holiday weekends.	KWRLPRD	RC&D	Ongoing
Work with RC&D to coordinate volunteer monitoring shared with other area lakes through the Clean Boats, Clean Waters Program.	KWRLPRD	RC&D	Ongoing
Protect native plant species so as not to create open niches for AIS.	KWRLPRD	WDNR Lake Manager	Ongoing

Objective 4.2. Identify, monitor, and control terrestrial invasive species on or around Wilson Lake.

Actions	Lead person/group	Resources	Timeline
Identify, monitor and properly remove purple loosestrife on shoreland properties. Consider biological control methods.	KWRLPRD	RC&D	Following RC&D workshop (see below)
Hold workshops to teach residents to identify, monitor and properly remove phragmites, purple loosestrife, Japanese knotweed and other terrestrial invasive species on their properties.	KWRLPRD	RC&D	Future
Protect native plant species so as not to create open niches for terrestrial invasive species.	KWRLPRD	WDNR Lake Manager	Ongoing

Critical Habitat

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

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

Guiding Vision Wilson Lake's Critical Habitat

Sensitive areas on Wilson Lake will be enhanced and protected.

Goal 4. Identify and inform others of quality habitat in and near Wilson Lake.

Objective 4.1. Explore options for official identification of important habitat areas to inform others and to better protect habitat in the lake.

Actions	Lead person/group	Resources	Timeline
Request critical habitat designations from WDNR.	KWRLPRD	WDNR Lake Specialists	Future
If critical habitat is designated on Wilson Lake, communicate to property owners, visitors, and Town Board as to why these areas are important.	KWRLPRD	WDNR Critical Habitat Report	Future

Landscapes and the Lake

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

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

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

Water Quality

Survey responses varied quite a bit when asked about current water quality in Wilson Lake, but almost three-fourths of the respondents indicated that water quality had declined during their time at the lake. Ninety-five percent of the respondents said that the water quality had a major impact on both the economic value of the lake and their personal enjoyment. The balance of respondents said it had some impact. Participants at the planning session all reiterated the presence of excessive muck that impairs their recreation.

A variety of water chemistry measurements were used to characterize the water quality in Wilson Lake. Water quality was assessed during the 2010-2012 lake study and involved a number of measures including temperature, dissolved oxygen, water chemistry, and nutrients (phosphorus and nitrogen). Nutrients are important measures of water quality in lakes because they are used for growth by algae and aquatic plants. Each of these interrelated measures plays a part in the lake's overall water quality. In addition, water quality data collected in past years was also reviewed to determine trends in Wilson Lake's water quality.

Dissolved oxygen is an important measure in Wilson Lake because a majority of organisms in the water depend on oxygen to survive. Oxygen is dissolved into the water from contact with air, which is increased by wind and wave action. Algae and aquatic plants also produce oxygen when sunlight enters the water, but the decomposition of dead plants and algae reduces oxygen in the lake. Dissolved oxygen in Wilson Lake showed a typical pattern of mixing and stratification throughout the year. During the spring and fall, the dissolved oxygen concentrations were similar from surface to bottom. During the summer, the dissolved oxygen in Wilson Lake stratified, with higher concentrations at the lake surface and lower concentrations at the bottom. There were always sufficient dissolved oxygen concentrations in the top six to nine feet of the lake, but DO stress is frequent in the first few feet.

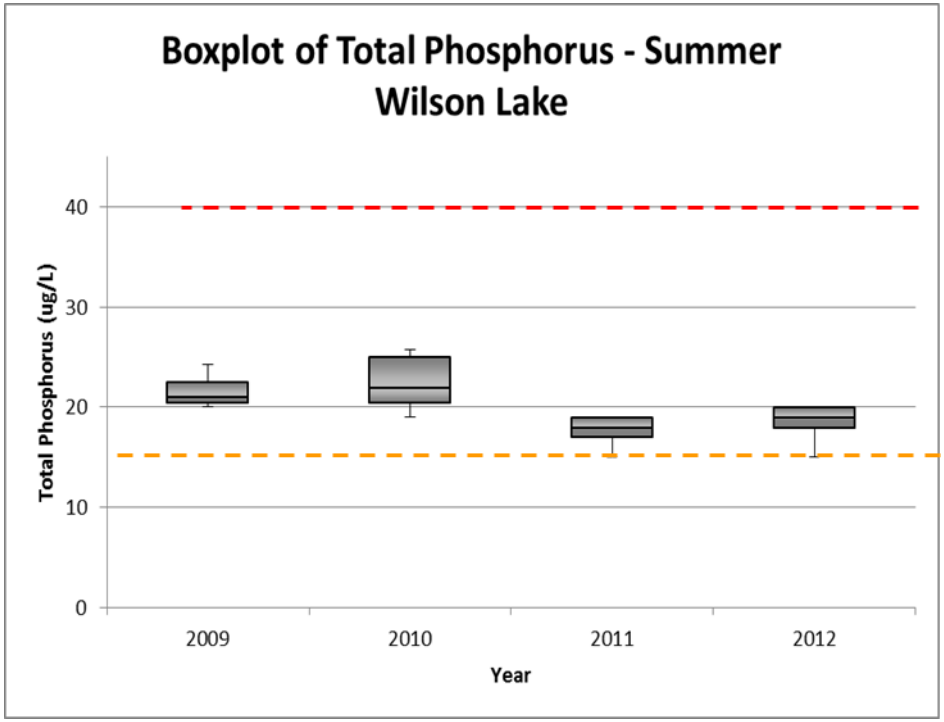
Water clarity in Wilson Lake ranged from 4 feet to 12 feet over the 2010-2012 monitoring period. When compared with historic data, the average water clarity measured during the study was better in April, May, June, and October, about the same in July, and slightly poorer in August and September. Water clarity in Wilson Lake was typically poorer during the summer months, with the shallowest Secchi depth recorded in late summer.

Chloride, sodium and potassium concentrations are commonly used as indicators of how a lake is being impacted by human activity. The presence of these compounds where they do not naturally occur indicates sources of water contaminants. Water in Wilson Lake had slightly elevated chloride and potassium concentrations and a high average sodium concentration over the monitoring period, suggesting impacts to lake water from human activities. Although these elements are not detrimental to the aquatic ecosystem, they indicate that sources of contaminants such as road salt, fertilizer, animal waste and/or septic system effluent may be entering the lake from either surface runoff or via groundwater.

Atrazine (DACT), an herbicide commonly used on corn, was found in low concentrations in Wilson Lake (0.10 ug/L). The presence of this chemical suggests that agricultural activities in the surrounding area are impacting water quality. Some toxicity studies have indicated that reproductive system abnormalities can occur in frogs at these levels (Hayes, 2001; Hayes, 2003).

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 groundwater. Common sources from human activities include soil erosion, animal waste, fertilizers, and septic systems. Although a variety of compounds are important to biological growth, phosphorus receives so much attention because it is commonly the "limiting nutrient" in many Wisconsin lakes. Due to its relatively short supply compared to other substances necessary for growth, relatively small increases in phosphorus result in significant increases in aquatic plants and algae.

One pound of phosphorus entering a lake can result in up to 500 pounds of algal growth! (Vallentyne, 1974)



During the study. total phosphorus concentrations for Wilson Lake ranged from a high of 35 ug/L in April 2012 to a low of 15 ug/L in July 2011 and August 2012. The summer median total phosphorus concentrations were 18 ug/L and 19 ug/L in 2011 and 2012, respectively. These are below Wisconsin's phosphorus water quality standard of 40 ug/L for shallow seepage lakes, but above the flag value of 15 ug/L. This is down from an average of 27 ug/L in 2007. Concentrations of inorganic nitrogen were near background levels for lakes in Wisconsin.

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

Guiding Vision for Water Quality in Wilson Lake

Wilson Lake will have excellent water quality that supports a healthy fishery, abundant wildlife and plentiful recreational opportunities.

Goal 5. Maintain/improve water quality in Wilson Lake.

Objective 5.1. Routinely monitor water quality to evaluate changes over time.

Actions	Lead person/group	Resources	Timeline
Establish a water clarity monitoring program using Secchi depth measurements during the summer.	KWRLPRD	Citizen Lake Monitoring Network local coordinator	Summer

Establish a water quality monitoring program; initiate annual fall overturn sampling and analysis to include nitrogen and phosphorus series.	KWRLPRD	UWSP Water and Environmental Analysis Lab (Package B)	Annually – semi annually
Initiate a Drinking Water Education program for community-wide testing of private wells for atrazine (DACT) and nitrates.	KWRLPRD	UWEX County Extension UWEX Groundwater Educator	Future
Inform KWRLPRD members and others about purpose and importance of monitoring programs through lake newsletter, Facebook page and website.	KWRLPRD		Future

Objective 5.2. Reduce nutrient loading to Wilson Lake. Summer median total phosphorus concentrations will remain below 20 ug/L and a downward trend will be established. Inorganic nitrogen concentrations will remain below 0.12 mg/L.

Actions	Lead person/group	Resources	Timeline
Initiate a farmer-led, water quality based nutrient management plan for landowners in the Wilson Lake watershed (see Watershed).	KWRLPRD	WCLCD	Future
Restore unhealthy shorelands to reduce nutrient inputs and adsorb nutrients in the lake (see Shorelands).	KWRLPRD	UWEX Lakes LCD WDNR Healthy Habitat Grants Consultants	Ongoing

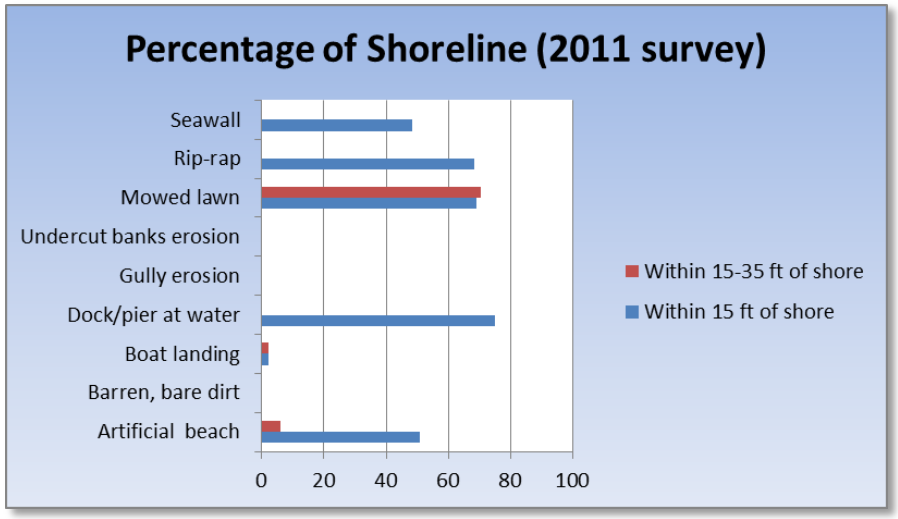
Shorelands

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. 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 Appendix B: Shoreland Survey – 2010 and habitat.

The summary of scores for shorelands around Wilson Lake is displayed on the map in. Much of Wilson Lake's shorelands are in good shape, but large segments of shoreland have challenges that should be addressed. Most of Wilson Lake's eastern shoreland ranked as poor.



Shoreland ordinances were enacted to improve water quality and habitat, and to protect our lakes. To protect our lakes, county and state (NR 115) shoreland ordinances state that vegetation should extend at least 35 feet inland from the water's edge, with the exception of an optional 30 foot viewing corridor for each shoreland lot. With a total of 76 lakefront lots, 2,280 feet (25%) of disturbed shoreland is permitted. Based on the 2011 shoreland inventory, 71% (6,491 feet) of Wilson's shoreland was mowed lawn. Although some properties were grandfathered in when the ordinance was initiated in 1966, following this guidance will benefit the health of the lake and its inhabitants.

Guiding Vision for Wilson Lake's Shorelands

Wilson Lake's shorelands will provide adequate habitat and water quality benefits to support a healthy lake.

Goal 6. Increase and enhance healthy shorelands around Wilson Lake.

Objective 6.1. Maintain healthy, natural shorelands to minimize runoff, protect water quality, and enhance habitat.

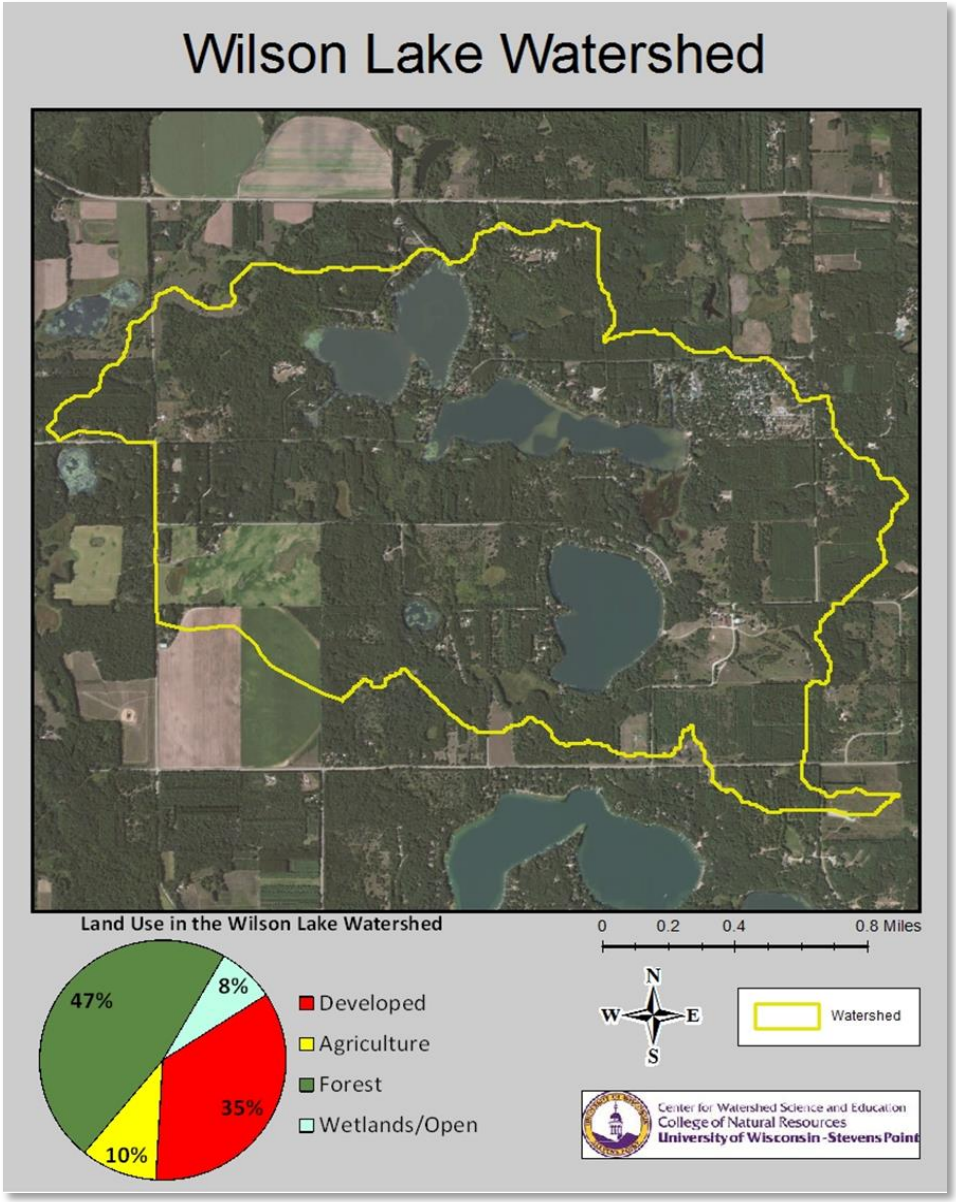
Actions	Lead person/group	Resources	Timeline
Inform property owners of the importance of soil testing (for nutrients) to minimize or eliminate use of fertilizers. Offer/facilitate soil testing for interested landowners at an annual meeting.	KWRLPRD	UWEX County Extension	Winter/early spring
Decrease/eliminate the use of fertilizers on lawns around the lake to reduce inputs of nitrogen and	Shoreland property owners	UWEX Lakes	Ongoing

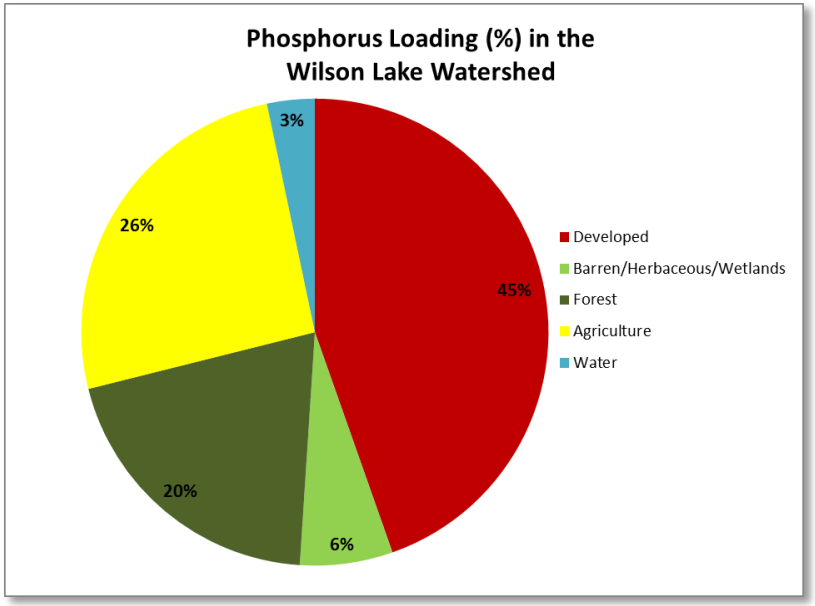
phosphorus.			
Minimize stormwater runoff by encouraging landowners to limit new construction of impervious surfaces (blacktop driveways), to utilize rain gardens/rain barrels and to restore vegetation.	KWRLPRD	WCLCD	Ongoing
Improve shoreland vegetation and use plantings to mitigate runoff from impervious surfaces such as driveways (see also Shoreland section).	Shoreland property owners	WCLCD WDNR Healthy Habitat Grants Consultants	Ongoing
Reestablish bulrush beds to adsorb nutrients and stabilize sediments.	KWRLPRD	RC&D Consultants	Ongoing
Include information on how and why to create healthy shorelands in a welcome packet to new property owners.	KWRLPRD	WCLCD	Ongoing

Watershed Land Use

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

The capacity of the landscape to shed or hold water and contribute or filter particles determines the amount of erosion that may occur, the amount of groundwater feeding a lake, and ultimately, the lake's water quality and quantity. Essentially, landscapes with greater capacities to hold water during rain events and snowmelt slow the delivery of the water to the lake. Less runoff is desirable because it allows more water to recharge the groundwater, which feeds the lake year-round - even during dry periods or when the lake is covered with ice. A variety of land management practices can be put in place to help reduce impacts to our lakes. Some practices are designed to reduce runoff. These include protecting/restoring wetlands, installing rain gardens, swales, rain barrels, and routing drainage from pavement and roofs away from the lake. Some practices are used to help reduce nutrients from moving across the landscape towards the lake. Examples include manure management practices, eliminating/reducing the use of fertilizers, increasing the distance between the lake and a septic drainfield, protecting/restoring wetlands and native vegetation in the shoreland, and using erosion control practices.





The surface watershed for Wilson Lake is 2,159 acres. Primary land use is forest. The lake's shoreland is surrounded primarily by forest with residential spread throughout. In general, the land closest to the lake has the greatest immediate impact on water quality.

Estimates of phosphorus from the landscape can help to understand the phosphorus sources to Bughs Lake. Land use in the surface watershed was evaluated and used to populate the Wisconsin Lakes Modeling Suite (WILMS) model. In general, each type of land use contributes different amounts of phosphorus in runoff and groundwater. The types of land management practices that are used and their distances from the lake also affect the contributions to the lake from a parcel of land. Based on modeling results, developed land and agriculture had the greatest percentages of phosphorus contributions from the watershed to Bughs Lake. The phosphorus contributions by land use category, called phosphorus export coefficients, are shown in the Appendix. The phosphorus export coefficients have been obtained from studies throughout Wisconsin (Panuska and Lillie, 1995). Modeling results indicate the greatest contributor of phosphorus to the lake is developed land, followed by agriculture.

Guiding Vision for Wilson Lake's Watershed

Wilson Lake will be protected so it is available for the use of future generations.

Goal 7. Land use in the Wilson Lake watershed will minimize impacts to its water quality.

Objective 7.1. Protect important habitat and reduce runoff around Wilson Lake and within its watershed by informing landowners of options and opportunities.

Actions	Lead person/group	Resources	Timeline
Explore the purchase of development rights that permanently protect the landscape while retaining private ownership.	KWRLPRD Membership	Waushara County Conservationist	2018, Ongoing
Encourage conservation easements to restrict development or uses of land that would impact critical habitat or natural features of the land.	KWRLPRD Board	NCCT Gathering Waters	2018, Ongoing

Encourage the County to support and follow-up with water quality-based Best Management Practices (BMPs) within the watershed.	KWRLPRD Board	WCLCD NRCS	Ongoing
Encourage subdivisions and other new developments to manage stormwater on site and consider septic system impacts to Wilson Lake.	KWRLPRD Board	Waushara County Planning and Zoning	Ongoing
Discourage large water withdrawal projects that may impact the water levels in Wilson Lake.	KWRLPRD Board	WCLCD Friends of the Central Sands	Ongoing
Protect wetlands to maintain the water budget of Wilson Lake. Any altered wetlands will be mitigated within the lake's watershed.	KWRLPRD Board	WCLCD Waushara County Highway Dept. WDOT	Ongoing
Continue to use Waushara Co. Land Conservation as a resource for land management activities.	KWRLPRD Board	WCLCD	Ongoing

People and the Lake

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

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

Recreation

There are two public boat launches on Wilson Lake on the southern and northeastern sides. No Wake hours are from 5pm to 10am. All of the survey respondents liked the hours as they are. The lake is enjoyed by people who swim, boat, fish, and appreciate its beauty. One of the primary impairments to recreation mentioned by planning participants was the presence of excessive muck (see Water Quality section).

Guiding Vision for Recreation

Wilson Lake will host a variety of quality recreational opportunities.

Goal 8. Foster an environment of compliance and cordial recreational use.

Objective 8.1. Provide lake users with the information they need to make responsible decisions.

Actions	Lead person/group	Resources	Timeline
Continue to implement and enforce current No Wake hours (5pm-10am).	KWRLPRD	WDNR Town of Springwater	Ongoing
Assess the recreational and navigational safety issues associated with the shallow water area between the two points and recommend potential solutions.	KWRLPRD Board	UWEX WDNR	2016, Ongoing

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 Wilson Lake enjoyed by many people. Working together on common values will help to achieve the goals that are outlined in this plan.

Guiding Vision for Communication

The Kusel, Wilson, Round Lakes Protection and Rehabilitation District and its members will maintain and build communications internally and within the community.

Goal 9. Maintain open communications with lake users to keep visitors and residents informed about responsible lake stewardship and encourage involvement.

Objective 9.1. Distribute important lake information to residents and lake visitors.

Actions	Lead person/group	Resources	Timeline
Continue distribution of a welcome packet to all new shoreland owners via WC or WCWLC.	KWRLPRD	WCWLC WCLCD	Ongoing
Maintain and update district website: www.kwr-lakes.com Communicate management activities via website.	KWRLPRD		Ongoing
Maintain and utilize email and/or mailing list of lake residents and association membership.	KWRLPRD		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 updated with any necessary changes.

Guiding Vision for Updates and Revisions

The lake management plan for Wilson Lake will be reviewed annually and updated as needed.

Goal 10. Wilson Lake will have an up-to-date, accurate and comprehensive lake management plan that is reviewed annually and documents all management activities and effects.

Objective 10.1. Communicate updates to District and community members.

Actions	Lead person/group	Resources	Timeline
The plan will be reviewed annually by the District board incorporating updates from the membership.	KWRLPRD	Membership	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 be include a reference to the lake management plan under local policies in the agricultural, natural and cultural resources background information and the addition of a recommendation to support the lake management plan and to implement the applicable recommendations contained in the lake management. The Land Use Committee will recommend the amendment to the comprehensive plan to the Land, Water, and Education Committee.

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

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

Use of the Comprehensive Plan

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

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

References

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.

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.

Haney, Ryan, 2014. Water Quality in Kusel, Wilson and Round Lakes. Presentation given at the Wild Rose Community Center on April 10, 2015.

Hayes, T., K. Haston, M. Tsui, A. Hoang, C. Haeffele and A. Vonk. 2003. *Atrazine-Induced Hermaphroditism at 0.1 PPB in American Leopard Frogs (Rana pipiens): Laboratory and Field Evidence*. Environmental Health Perspectives 111: 568-575.

Hayes, T.K. A. Collins, M, L,, Magdelena Mendoza, N. Noriega, A. A. Stuart, and A. Vonk. 2001. *Hermaphroditic, demasculinized frogs after exposure to the herbicide atrazine at low ecologically relevant doses*. National Academy of Sciences vol. 99 no. 8, 5476–5480.

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Turyk, Nancy, 2014. The Aquatic Plants of Kusel, Wilson and Round Lakes. Presentation given at the Wild Rose Community Center on March 6, 2015.

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

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

Appendices

Appendix A: Waushara County Lakes 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$.startup

Informational Packets

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

Lake Groups – Friends, Associations, Districts

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

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

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

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

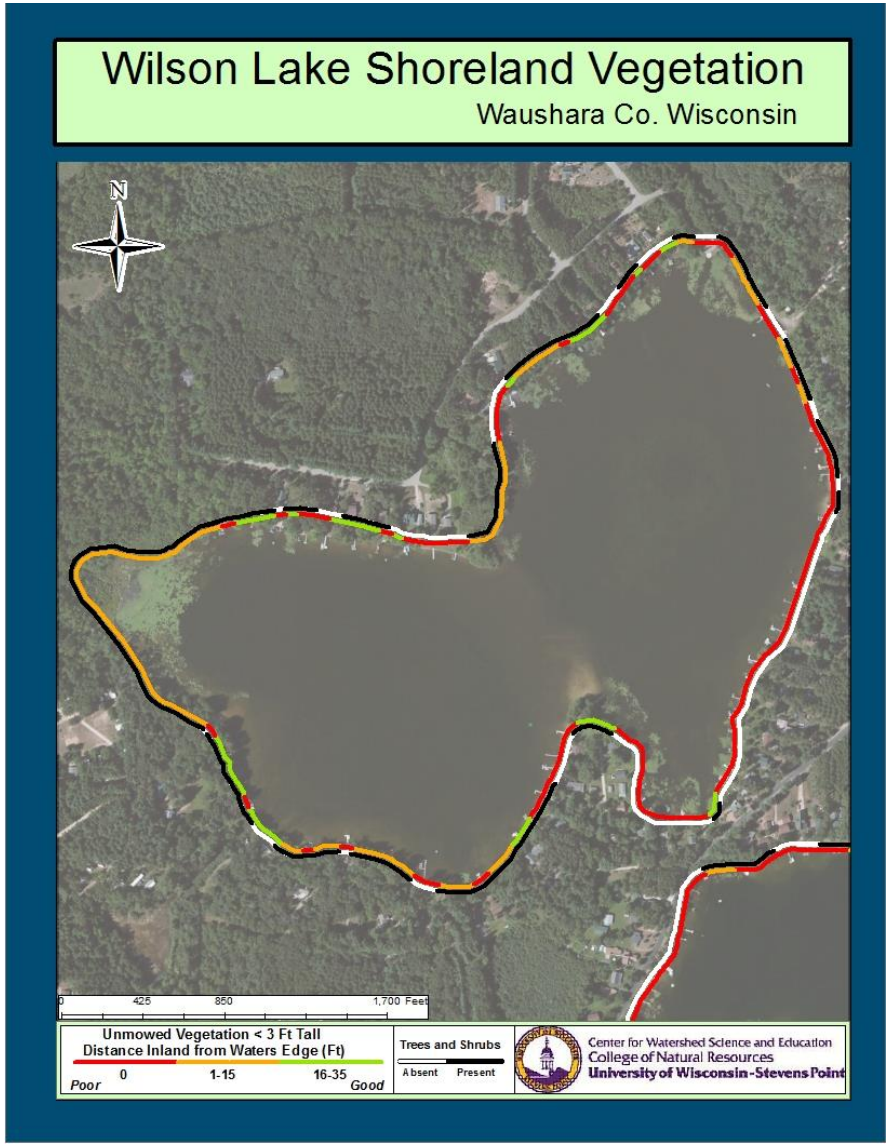
Contact: Dave Bartz
Wisconsin Department of Natural Resources
Phone: 608-635-4989
Address: Hwy 22N Box 430, Montello, WI 53949
E-mail: David.Bartz@wisconsin.gov

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

Appendix B: 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 Wilson Lake are displayed on the next page. The shorelands were color-coded to show their overall health based on natural and physical characteristics. Blue shorelands identify healthy shorelands with sufficient vegetation and few disturbances. Red shorelands indicate locations where changes in management or mitigation may be warranted. Much of Wilson Lake's shorelands are in good shape, but large segments of shoreland have challenges that should be addressed. Most of Wilson Lake's eastern shoreland ranked as poor. For a more complete understanding of the ranking, an interactive map showing results of the shoreland surveys can be found on Waushara County's website at http://gis.co.waushara.wi.us/ShorelineViewer/.



Waushara County Shoreline Assessment

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

WILSON LAKE

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 warrented. 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

Center for Land Use Education

Map created by Dan McFarlane
Center for Land Use Education

Appendix C: Rapid Response Plan

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: ejudziew@uwsp.edu **Wisconsin Invasive Plants Reporting & Prevention Project** Herbarium-UW-Madison 430 Lincoln Drive Madison, WI 53706 Phone: (608) 267-7612 E-Mail: invasiveplants@mailplus.wisc.edu
5. Once the specimen is dropped off or sent for positive identification, be sure to contact:	**Regional AIS Coordinator** Golden Sands RC&D 1100 Main St., Suite #150 Stevens Point, WI 54481 Phone: 715-343-6214 E-Mail : info@goldensandsrcd.org

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

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

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

  Town of: Springwater

- **The Lake District** in which the waterbody is located.
  Contact: Paul Zimmer
  Email: ps9@sbsglobal.net

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

- **Local Residents**

- **Lake District/Association**

If an invasive species is confirmed the secretary of the Kusel Wilson Round Lake District will make the following public information contacts:

- **Newspapers**: The Argus, The Resorter

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

Appendix D: Aquatic Plant Management Strategies

General recommendations:

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

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

No Action

ADVANTAGES	LIMITATIONS
∗ No associated cost. ∗ Least disruptive to lake ecosystem.	∗ May not be effective in achieving aquatic plant management objectives.

Hand Pulling

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

Hand Pulling Using Suction

ADVANTAGES	LIMITATIONS
∗ 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.	∗ 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.

Mechanical Harvesting

ADVANTAGES	LIMITATIONS
∗ Removes plant material and nutrients. ∗ Can target specific locations. ∗ Used to manage larger areas for recreational access or fishery management.	∗ 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	LIMITATIONS
∗ Controls aquatic plants in shallower, near-shore areas. ∗ Can be low cost.	∗ Requires a controlling structure on the lake. ∗ May cause undesired stress on ecosystem. ∗ Cannot be used frequently.

Milfoil Weevils

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

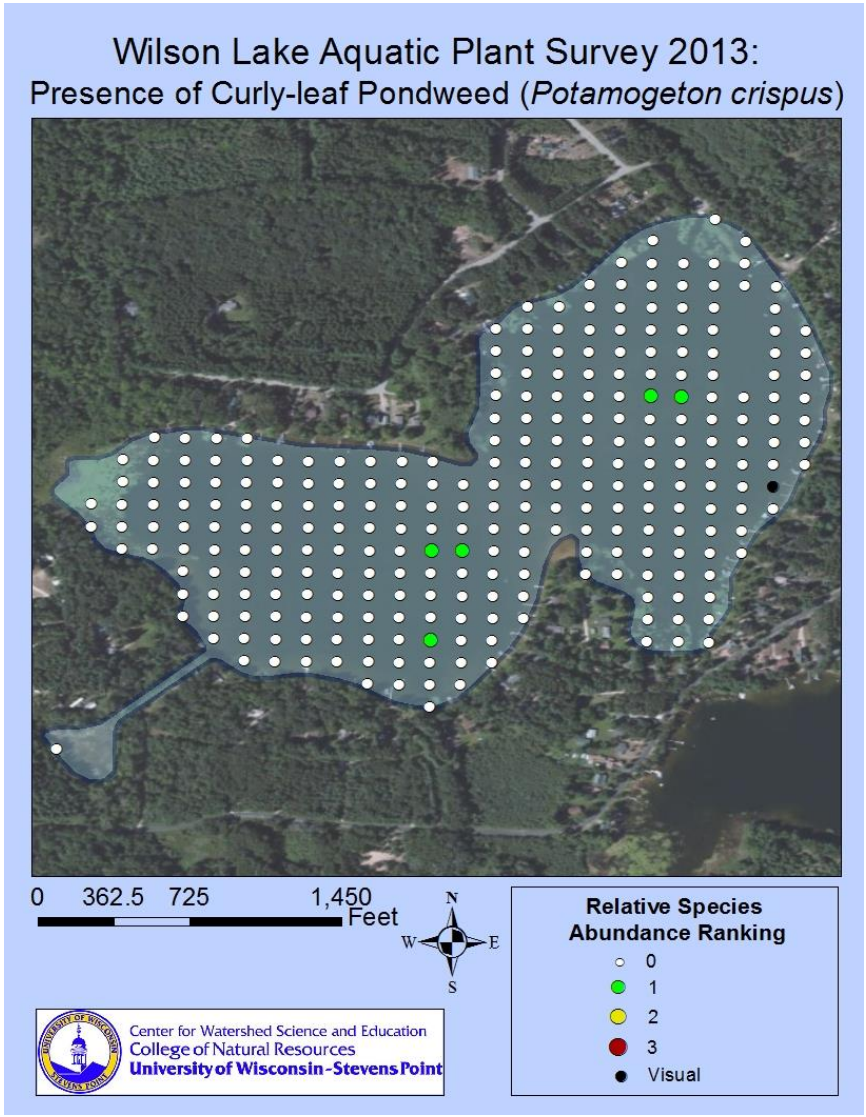
Chemical Treatment: Spot

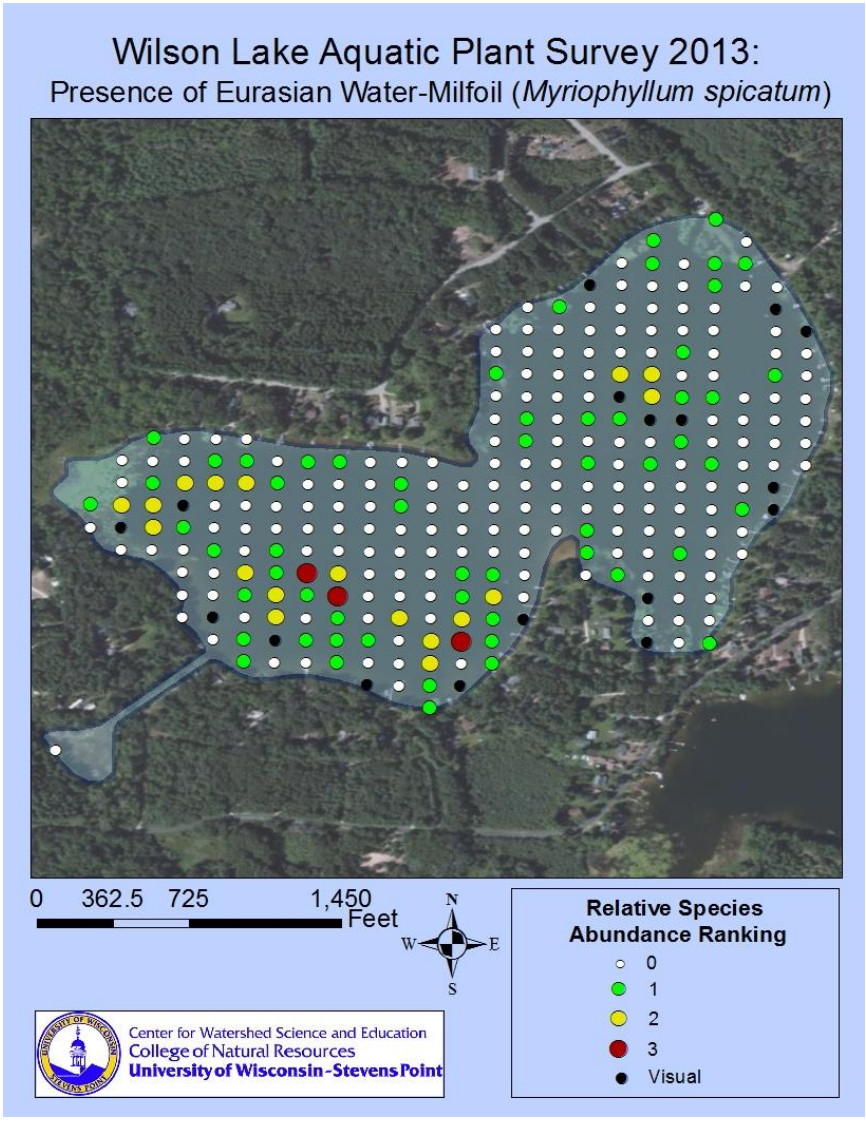
ADVANTAGES	LIMITATIONS
∗ May be less destructive to lake ecosystem than lake-wide treatment.	∗ Only considered in lakes with aquatic invasive plants. ∗ Usually not fully effective in eradicating target species. ∗ Contaminants may remain in sediment. ∗ Effects on lake ecosystem not fully understood. ∗ 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	LIMITATIONS
∗ May reduce aquatic invasives for a time. ∗ Treatment not needed as frequently.	∗ Only considered in lakes with aquatic invasive plants. ∗ Usually not fully effective in eradicating target species. ∗ Contaminants may remain in sediment. ∗ Does not remove dead vegetation, which depletes oxygen and releases nutrients, adds to build-up of muck. ∗ Extra nutrients may spur additional aquatic plant and algae growth. ∗ Negatively affects native vegetation. ∗ Effects on lake ecosystem not fully understood. ∗ Opens up space once taken up by natives for invasive species to colonize once again. ∗ ~$4000 per 5 acres.

Appendix E: Aquatic Plant Management Plan (2008)





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AQUATIC PLANT MANAGEMENT PLAN

WILSON LAKE
WAUSHARA COUNTY, WISCONSIN

April 24, 2008

Prepared for:

Kusel, Wilson, and Round Lakes P & R District
Mr. Sterling Strause
N5389 Lily Pad Lane
Wild Rose, Wisconsin 54984

Prepared by:

Northern Environmental Technologies, Incorporated
1203 Storbeck Drive
Waupun, Wisconsin 53963

Northern Environmental Project Number: WIL 08-5500-0897

Radley Z. Watkins
Project Scientist

Robert C. Redman
Graduate Scientist

RCR/msd

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1.0 EXECUTIVE SUMMARY

Concerned residents of Wilson Lake joined together to form the Kusel, Wilson, and Round Lakes Protection and Rehabilitation District. The Lake District has been active in a number of management activities on the lakes including: aquatic plant management, water quality sampling, invasive species sampling, and community education.

In 2006, the Lake District contracted Northern Environmental to help develop an aquatic plant management (APM) plan for Wilson Lake. The APM Plan included a review of available lake information, an aquatic plant survey, and an evaluation of feasible physical, mechanical, biological, and chemical management alternatives and recommended specific management activities for eurasian watermilfoil (EWM) and curly-leaf pondweed (CLP).

Northern Environmental completed an aquatic plant survey on Wilson Lake in July 2007. Thirteen aquatic plant species were identified in Wilson Lake. The most abundant aquatic plants identified were chara, white water lily and watershield. The Floristic Quality Index (FQI) is an index that uses the aquatic plant community as an indicator of lake health. Plants sensitive to disturbances in the lake ecosystem are assigned a higher value than plants which can tolerate disturbances. The values of all species present are used in a formula to determine the plant community's FQI. Wilson Lake exhibited a 17.07 FQI, lower than the state average of 22.2.

Recommended APM Plan

Proposed management of EWM and CLP should include manual removal in isolated shallow locations. No permit is required to remove EWM or CLP along a landowner's shoreline property, but removal of native plants is restricted to a 30 foot wide recreation zone (for pier, boatlift, or swim raft access). Additional native plant removal is not recommended and would require a permit from the WDNR.

Larger EWM and CLP areas should be treated with an herbicide in accordance with a WDNR issued permit under NR 107 Wisconsin Administrative Code. EWM and CLP treatments should be completed in the spring when native plant growth is minimal to increase the selectivity of the herbicide. Pre and post treatment monitoring should be included for all aquatic plant treatments and is typically a permit requirement. The APM plan also includes prevention efforts; assigns responsibilities for APM activities; and outlines a monitoring protocol to evaluate the EWM and CLP treatment effectiveness, changes in the lake's aquatic plant community, and water quality.

The overall aquatic plant management objective is to reduce the acreage and frequency of occurrence of CLP and EWM on Wilson Lake and restore the native plant community. Management efforts should focus on CLP and EWM reduction. This will allow the natural restoration of native aquatic plant communities. An achievable and quantitative goal for CLP reduction is to reduce the acreage within five years to small-scale herbicide treatments. Wisconsin Administrative Code NR 107.04(3) defines small-scale as any treatment less than ten total acres or 10 percent (%) of the water body that is less than ten feet deep. This overall goal correlates to a reduction of CLP acres by 80% over the next five years. Most of the reduction should occur in the first few years. The following table

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depicts this reduction by year, acreage and percent over 5 years. The numbers used were obtained in a spring CLP pretreatment survey. The aquatic plant survey found CLP at one sample point. With a decline of CLP of 80% over five years, the total acres of CLP will fall to a manageable 1.4 acres within.

Year	CLP Acreage	Percent Acreage Reduction
2007	7	---
2008	4.2	40
2009	2.8	20
2010	2.1	10
2011	1.75	5
2012	1.4	5

EWM was also found on Wilson Lake at one sample point. This re-infestation is believed to have been found prior to expansion and use of a selective herbicide should prevent its spread. The shallow nature of Wilson Lake is ideal conditions for EWM to spread further. All acres of EWM should be chemically treated at the highest application rate.

Highly used recreational areas and public boat launches or access points should be given priority when considering treatment locations due to a greater potential for CLP spread from these areas. The APM plan should be updated in 2011-2012 to evaluate the aquatic plant community and to assess the current management strategies. Reduction numbers are based solely on the use of herbicides. If the 80% reduction goal is met, then CLP the use of herbicides should be considered maintenance activities instead of restoration.

The APM Plan involved evaluating physical, mechanical, biological, and chemical management alternatives and outlines specific management activities for CLP and EWM on Wilson Lake.

2.0 INTRODUCTION

Wilson Lake is an 81 acre lake located in Waushara County. The lake has a 349 acre watershed. Wilson Lake exhibits fair water clarity and according to the Wisconsin Trophic State Index is a eutrophic lake. Eurasian watermilfoil (EWM) and curly-leaf pondweed (CLP), aquatic invasive species (AIS), are confirmed on Wilson Lake. Lake residents have become concerned about the presence of EWM and CLP and other AIS in the aquatic plant community of Wilson Lake.

This document is the APM Plan for Wilson Lake and discusses the following:

- Historical aquatic plant management activities
- Stockholder's goals and objectives
- Aquatic plant ecology
- Baseline aquatic plant survey
- Feasible aquatic plant management alternatives
- Selected suite of aquatic plant management options

3.0 BACKGROUND INFORMATION

3.1 Lake History and Morphology

Wilson Lake is located near the town of Wild Rose in Waushara County, Wisconsin. Figure 1 depicts the lake location. Wisconsin DNR records list Wilson Lake as a Seepage lake. This may be a misnomer and it may in fact be a spring lake according to local residents. The following summarizes the lake's physical attributes:

Lake Type	Seepage
Surface Area (acres)	81
Maximum depth (feet)	14
Shoreline Length (miles)	2.08

Source Wisconsin Lakes, WDNR 2005

Figure 2 illustrates the lake bathymetry. Wilson Lake provides year-round recreation activities ranging from fishing, swimming, waterskiing, pleasure boating, snowmobiling, and more.

3.2 Watershed Overview

The Wilson Lakes watershed encompasses 349 acres square miles located in Waushara County. Majority land cover within the watershed is forested, with some development along the lakeshore. Land cover of the watershed includes the following:

- Forested (268.7 acres - 77%)
- Open Water (80.3 acres - 23%)

(Source: WDNR Land Sat Imagery and WISCLAND database)

Figure 1 illustrates the lakes location and its watersheds. The watershed is in the Central Plains Geographic Province of Wisconsin (United States Department of Agriculture [USDA], 1988). The region in generally considered a gently rolling lake plain. (USDA, 1988)

3.3 Water Quality

Available information from the on-line WDNR Lake Water Quality Database indicates a volunteer citizen monitoring network measured the following parameters on Wilson Lake.

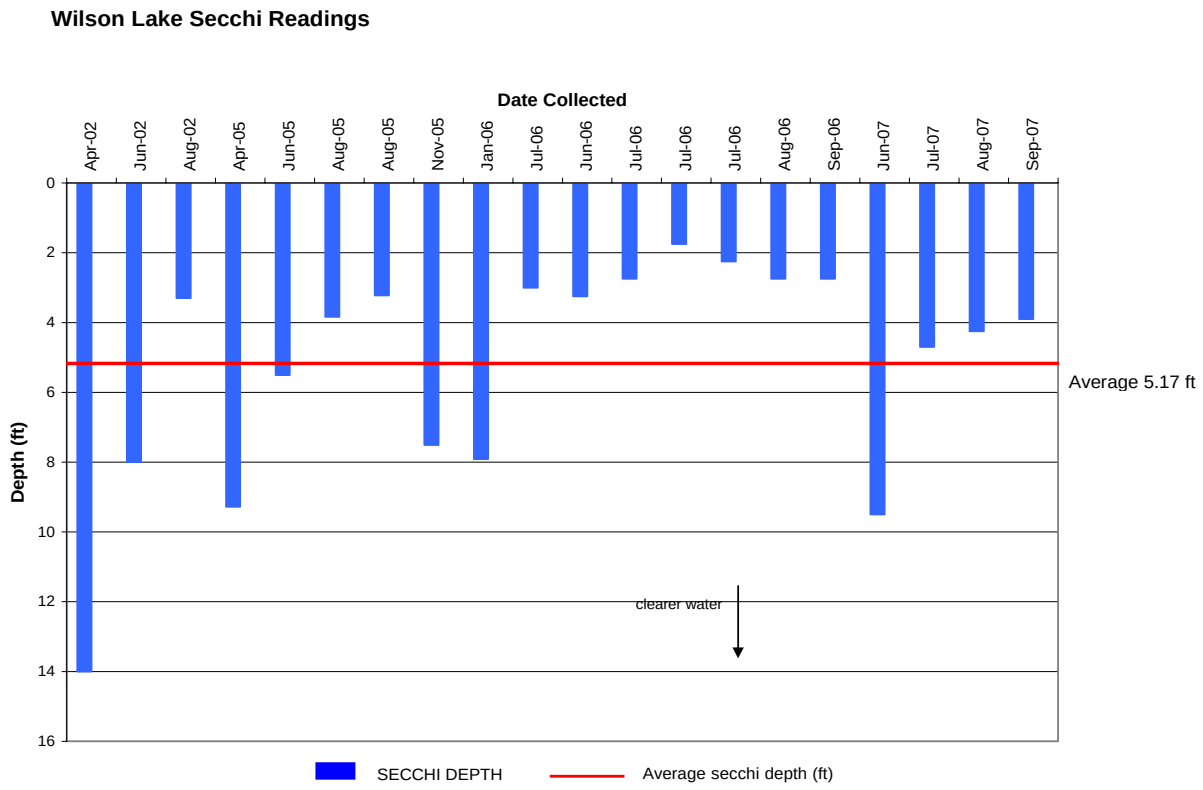
- Water clarity (secchi depth) – 2002, 2005-2006
- Chlorophyll *a* – 2002 & 2005
- Phosphorus – 2003 & 2005

Water clarity is measured by lowering an 8-inch disk with alternating black and white quadrants into the water until it is no longer visible. The disk is raised until it is again visible. The two readings are averaged providing the secchi depth or water clarity measurement. Additionally, Northern Environmental measured water clarity at two locations on Wilson Lake during the 2007 water quality sampling and aquatic plant survey.

Total phosphorus is a measure of nutrients available for plant growth, and chlorophyll *a* is a measure of lake productivity taken by measuring algal pigment in the water.

3.3.1 Water Clarity

The water clarity average is 5.17 feet. The following graph illustrates past and current water clarity measurements on Wilson Lake.



3.3.2 Total Phosphorus and Chlorophyll *a*

The following table illustrates the past water quality parameters measured on Wilson Lake. Wilson Lake has an average total phosphorous of 0.027 milligrams per liter. The average chlorophyll a was 7.71 micrograms per liter.

Date	Total P (*mg/l*)	Chlorophyll *a* (*µg/l*)
4/15/2002	0.01	<1
8/4/2002	0.027	14.7
4/22/2005	0.024	5.34
6/21/2005	0.017	8.56
8/3/2005	0.033	8.9
8/24/2005	0.042	---
11/8/2005	0.036	8.69
6/6/2007	0.037	3.1
7/5/2007	0.032	3.9
8/28/2007	0.03	7.9
9/24/2007	0.016	8.3

Notes: *mg/l= milligrams per liter, (parts per million)*
ug/l = micrograms per liter, (parts per billion)

3.3.3 Trophic State Index

Trophic State Index (TSI) values are assigned to a lake based on total phosphorus, chlorophyll *a*, and water clarity values. The TSI is a measure of a lake's biological productivity. The TSI used for Wisconsin lakes is described below.

Category	TSI	Lake Characteristics	Total P *(mg/l)*	Chlorophyll *a* *(ug/l)*	Water Clarity *(meters)*
Oligotrophic	1-40	Clear water; oxygen rich at all depths, except if close to mesotrophic border; then may have low or no oxygen; cold-water fish likely in deeper lakes.	0.003 to 0.01	2 to 5	3.7 to 2.4
Mesotrophic	41-50	Moderately clear; increasing probability of low to no oxygen in bottom waters.	0.018 to 0.027	8 to 10	1.8
Eutrophic	51-70	Decreased water clarity; probably no oxygen in bottom waters during summer; warm-water fisheries only; blue-green algae likely in summer in upper range; plants also excessive.	0.03 to 0.05	11 to 15	1.5 to 1.2 (less is hyper-eutrophic)

Adopted from Lillie and Mason, 1983, and Shaw 1994 et. al.

The historical water clarity, total phosphorus, and chlorophyll *a* data indicate that Wilson Lake is a eutrophic lake, according to the Wisconsin TSI.

3.4 Summary of Lake Fishery

The following table identifies the fish species that are present and their abundance according to the WDNR.

Fish Species	Present	Common	Abundant
Northern Pike	X		
Largemouth Bass		X	
Smallmouth Bass		X	
Walleye	X		
Panfish	X		

Source: WDNR Wisconsin Lakes Publication # PUB-FH-800, 2005

Available information indicates that northern pike, walleye, catfish, perch, crappie and largemouth bass have been stocked in Wilson Lake (WDNR Fish stocking website, 2007). Total number of each species stocked by year is listed below.

Year	Northern Pike	Largemouth Bass	Walleye	Catfish	Perch	Crappie
1978	113000					
1979	65000	5000				
1980	65000					
1981	65000	7000				
1982	200					
1983	325					
1984	250					
1985	325					
1986	375	4000				
1987	600					
1989	250	650				
1990	1641	200				
2000		800	750			
2001		800	1600	50		
2002		800				
2003					500	
2004			500			500
2005						500
2006			700			1000

3.5 Management History

According to WDNR records, aquatic plant management efforts have included chemical control of EWM and CLP. WDNR records indicated treatments of the following size:

Date	Species	Acreage	Product	Amount
June-00	Eurasian watermilfoil	7.75	Navigate	775 (lbs)
July-01	Eurasian watermilfoil	10.2	Navigate	1020 (lbs)
July-02	Eurasian watermilfoil	9.3	Navigate	950 (lbs)
July-03	Curly-leaf pondweed	16.8	Aquathol K	100 (gal)
May-04	Curly-leaf pondweed	16.8	Aquathol K	100 (gal)
May-05	Curly-leaf pondweed	16.8	Aquathol K	100 (gal)
June-06	Curly-leaf pondweed	7	Aquathol K	54 (gal)
May-07	Curly-leaf pondweed	7	Aquathol K	21 (gal)

Other management activities:

- 1975 Feasibility Study Results and Management Alternatives
- 1977 Environmental Resource Assessment
- 1980 Lake Management Plan
- 1988 Air Injection System Installed (aerator)
- 2002 Aquatic Plant Survey and Water Quality Monitoring Results (Aquatic Biologists)
- 2003 Aquatic Plant Survey (Lake District)
- 2004 Post-Treatment Survey Results and Management Update (Aquatic Biologists)
- 2001-2006 Management of Aquatic Plants (Aquatic Biologists)
- 2006 Evaluation of Sediments and Water Quality (Wis. Lake and Pond Resource)
- June 2007 Wilson Lake Volunteers were trained in AIS identification and water quality parameters

Concerns regarding the number of aquatic plant species present within Wilson Lake and the type of chemical treatments being used during that time period have been noted. Since chemical treatments began in 2000 the number of plants species within the lake has been in a steady decline. However further evaluation and studies would be needed to confirm the reasons for this decline in aquatic plant species. An experiment conducted by the Weaver Lake Conservation Association found that cold weather treatments (50-55 F) with Aquathol-K effectively suppressed the growth of CLP and also allowed native plants to prosper. Aquathol-K has been used to chemically treat Bladderwort, Bur-reed, Coontail, Hydrilla, Milfoil, Water stargrass and members of the Pondweed family.

3.6 Goals and Objectives

The Lake District identified the following goals for aquatic plant management on Wilson Lake.

- Manage EWM and CLP in accordance with the best available technologies
- Maintain and improve recreational opportunities
- Protect and improve fish and wildlife habitat
- Preserve native aquatic plants

- Prevent the introductions of new AIS
- Identify and protect sensitive areas
- Identify and discuss various sources of financial assistance for aquatic plant management activities
- Coordinate sound aquatic plant management practices where needed within Wilson Lake
- Educate the Wilson, Kusel and Round Lake community
- Increase citizen participation in lake management

4.0 PROJECT METHODS

To accomplish the project goals, the Lake District needs to make informed decisions regarding APM on the lake. To make informed decisions, the Lake District proposed to:

- Collect, analyze, and interpret basic aquatic plant community data
- Recommend practical, scientifically-sound aquatic plant management strategies

Offsite and onsite research methods were used during this study. Offsite methods included a thorough review of available background information on the lake, its watershed and water quality. An aquatic plant community survey was completed onsite to provide data needed to evaluate aquatic plant management alternatives.

4.1 Existing Data Review

A variety of background information resources were researched to develop a thorough understanding of the ecology of the lake. Information sources included:

- Local and regional geologic, limnologic, hydrologic, and hydrogeologic research
- Discussions with lake members
- Available topographic maps and aerial photographs
- Data from WDNR files
- Past lake study reports (if available)

These sources were essential to understanding the historic, present, and potential future conditions of the lake, as well as to ensure that previously completed studies were not unintentionally duplicated. Specific references are listed in Section 8.0 of this report.

4.2 Aquatic Plant Survey and Analysis

The aquatic plant community of the Lake was surveyed on July 5, 2007 by Northern Environmental Technologies. During the survey the point intercept sampling method described by Madsen (1999) was used, as recommended in the WDNR draft guidance entitled "Aquatic Plant Management in Wisconsin" (WDNR, 2005).

WDNR research staff determined the sampling point resolution in accordance with the WDNR guidance and provided a base map with the specified sample point locations. The sample resolution was a 32 meter grid with 287 pre-determined intercept points (Figure 3). When completing the actual aquatic plant survey, some points were "terrestrial" and were not sampled. Latitude and longitude coordinates and sample identifications were assigned to each intercept point on the grid (Appendix A). Geographic coordinates were uploaded into a Trimble GeoXT™ global positioning system (GPS) receiver. The GPS unit was then used to navigate to intercept points. At each intercept point, plants were collected by tossing a specialized rake on a

rope and dragging the rake along the bottom sediments. All collected plants were identified to the lowest practicable taxonomic level (e.g., typically genus or species) and recorded on field data sheets. Visual observations of aquatic plants were also recorded. Water depth and, when detectable, sediment types at each intercept point were also recorded on field data sheets. Two specimens of each aquatic plant species identified on Wilson Lake were collected and dried in a plant press for later use as sample vouchers and educational purposes.

The point intercept method was used to evaluate the existing emergent, submergent, floating-leaf, and free-floating aquatic plants. At each intercept point, a value of 1-3 was assigned to the species collected based on densities observed on the rake, or rake fullness ratings; 1 being a few plants on the rake head, 2 when the rake head is approximately ½ full, and three being full of aquatic plants with the rake head not visible. If a species was not collected at that point, the space in the data sheet was left blank. For the survey, the data for each sample point was entered into the WDNR "Worksheets" (i.e., a data-processing spreadsheet) to calculate the following statistics:

- **Taxonomic richness** (the total number of taxa detected)
- **Maximum depth of plant growth**
- **Community frequency of occurrence** (number of intercept points where aquatic plants were detected divided by the number of intercept points shallower than the maximum depth of plant growth)
- **Mean intercept point taxonomic richness** (the average number of taxa per intercept point)
- **Mean intercept point native taxonomic richness** (the average number of native taxa per intercept point)
- **Taxonomic frequency of occurrence within vegetated areas** (the number of intercept points where a particular taxon (e.g., genus, species, etc.) was detected divided by the total number of intercept points where vegetation was present)
- **Taxonomic frequency of occurrence at sites within the photic zone** (the number of intercept points where a particular taxon (e.g., genus, species, etc.) was detected divided by the total number of intercept points which are equal to or shallower than the maximum depth of plant growth)
- **Relative taxonomic frequency of occurrence** (the number of intercept points where a particular taxon (e.g., genus, species, etc.) was detected divided by the sum of all species' occurrences)
- **Mean density** (the sum of the density values for a particular species divided by the number of sampling site)
- **Simpson Diversity Index (SDI)** is an indicator of aquatic plant community diversity. SDI is calculated by taking one minus the sum of the relative frequencies squared for each species present. Based upon the index of community diversity, the closer the SDI is to one, the greater the diversity within the population.

- **Floristic Quality Index (FQI)** (This method uses a predetermined Coefficient of Conservatism (C), that has been assigned to each native plant species in Wisconsin, based on that species' tolerance for disturbance. Non-native plants are not assigned conservatism coefficients. The aggregate conservatism of all the plants inhabiting a site determines its floristic quality. The mean C value for a given lake is the arithmetic mean of the coefficients of all native vascular plant species occurring on the entire site, without regard to dominance or frequency. The FQI value is the mean C times the square root of the total number of native species. This formula combines the conservatism of the species present with a measure of the species richness of the site.

4.3 Shoreline Characterization

The point intercept method described above may not accurately identify emergent and floating leaved aquatic plants in near shore areas. Therefore, a boat tour was completed traveling the entire perimeter of the lake's shoreline. During the boat tour, visual observations of the emergent and floating leaved plant communities were located and recorded. The boat tour also included a shoreline characterization, which provides an evaluation of shoreline development on the lake. The following scale was used to rate the level of shoreline development.

- **1: Undeveloped** (i.e. Forested or wetland)
- **2: Minor development** (i.e. Properties may have mostly natural shoreline, sparse structures set further away from the lake, one pier, and little or no clearing of natural vegetation).
- **3: Moderate development** (i.e. Properties may exhibit additional clearing and/or manipulation to the shore and lawn areas but not to waters edge. More elaborate piers or boathouses may be present).
- **4: Major development** (i.e. Properties may include larger lawn areas extending to the shoreline, which contains little or no natural shoreline vegetation. Increased building density, possibly close to the shore, multiple docks or boathouses, and significant shoreline alteration such as seawalls or rip rap may be present).

Also, the level of shoreline development was noted and recorded around the lake. The shoreline was mostly developed along the entire lake. The western bay consisted of undeveloped shorelines primarily represented by wetlands. Figure 5 illustrates the level of shoreline development.

5.0 DISCUSSION OF PROJECT RESULTS

5.1 Aquatic Plant Ecology

Aquatic plants are vital to the health of a water body. Unfortunately, people all too often refer to rooted aquatic plants as "weeds" and ultimately wish to eradicate them. This type of attitude, and the misconceptions it breeds, must be overcome in order to properly manage a lake ecosystem. Rooted aquatic plants (macrophytes) are extremely important for the well being of a lake community and possess many positive attributes. Despite their importance, aquatic macrophytes sometimes grow to nuisance levels that hamper recreational activities. This is especially prevalent in degraded ecosystems. The introduction of

certain aquatic invasive species (AIS), such as EWM and CLP, often can exacerbate nuisance conditions, particularly when they compete successfully with native vegetation and occupy large portions of a lake.

When "managing" aquatic plants, it is important to maintain a well-balanced, stable, and diverse aquatic plant community that contains high percentages of desirable native species. To be effective, aquatic plant management in most lakes must maintain a plant community that is robust, species rich, and diverse. Appendix B includes a discussion about aquatic plant ecology, habitat types and relationships with water quality.

5.2 Aquatic Invasive Species

Aquatic invasive species are aquatic plants and animals that have been introduced by human action to a location, area, or region where they did not previously exist. AIS often lack natural control mechanisms they may have had in their native ecosystem and may interfere with the native plant and animal interactions in their new "home". Some AIS have aggressive reproductive potential and contribute to ecological lake declines and interfere with recreation on lakes. Common AIS include:

- Eurasian watermilfoil
- Curly-leaf pondweed
- Zebra mussels
- Rusty crayfish
- Spiny water flea
- Purple loosestrife

Appendix G provides additional information on these AIS.

Eurasian watermilfoil, curly-leaf pondweed and purple loosestrife have all been identified within Wilson Lake and its shorelines. All three species can spread rapidly and can become a nuisance problem for navigational purposes and can out-compete native plant species.

5.3 Aquatic Plant Survey

5.3.1 Results

The survey included sampling at 287 intercept points. The aquatic macrophyte community of the lake included thirteen floating-leaved, emergent, and submerged aquatic vascular plant species during 2007. Table 1 lists the taxa identified during the 2007 aquatic plant survey. Figures 4a through Figure 4d illustrate the locations of each species identified.

Vegetation was identified to a maximum depth of thirteen feet (photic zone). Aquatic vegetation was detected at fifty-seven percent (%) of photic zone intercept points. The Simpson Diversity Index value of the community was 0.66. The taxonomic richness was thirteen species and there was an average of 0.85 species identified at points that were within the photic zone. There was an average of 1.48 species present at points with vegetation present. Table 2 summarizes these overall aquatic plant community statistics.

Higher FQI numbers indicate higher floristic quality and biological integrity and a lower level of disturbance impacts. FQI varies around the state of Wisconsin and ranges from 3.0 to 44.6 with the average FQI of 22.2 (WDNR, 2005). The FQI calculated from the 2007 aquatic plant survey data was 17.07. This FQI value is lower than Wisconsin's median of 22.2 and suggests that Wilson Lake exhibits less than average water quality when using aquatic plants as an indicator. Table 4 summarizes the FQI values

The most abundant aquatic plant identified during the aquatic plant survey was muskgrass *(Chara spp)*. It exhibited a forty-seven percent frequency of occurrence (percent of photic zone intercept points at which the taxa was detected). It was present at eighty-one percent of the sites with vegetation, and had a fifty-five percent relative frequency of occurrence. Table 3 includes the abundance statistics for each species.

Chara, sp. (muskgrass / chara) looks like a vascular plant; it actually is a multi-celled algae (macroalgae). Muskgrass is usually found in hard waters and prefers muddy or sandy substrate and can often be found in deeper water than other submergent plants. Muskgrass beds provide valuable habitat for small fish and invertebrates. Muskgrass is also a favorite waterfowl food. Its rhizoids slow the movement and suspension of sediments and benefit water quality in the ability to stabilize the lake bottom (Borman, et al., 1997). It can easily be identified by its characteristic "musty" odor.

Chara sp.
Source: UW Herbarium Website

White water lily
Source: UW Herbarium Website

Nymphaea odorata (white water lily) was the second most abundant vascular plant species occurring at ten percent of the photic zone. It was present at seventeen percent of the sites with vegetation and had a twelve percent relative frequency of occurrence.

Nymphaea odorata (white water lily) has a flexible stalk with a round floating leaf. White water lily can be found growing in a variety of sediment types in less than 6 feet of water. Fragrant white flowers occur throughout the summer. The floating leaves provide shelter and shade for fish as well as habitat for invertebrates (Borman, et al., 1997).

Brasenia schreberi (watershield) and *Najas flexilis* (bushy pondweed) were equally present in the lake, occurring at seven percent of the photic zone. It was present at twelve percent of the sites with vegetation and each had an eight percent relative frequency of occurrence.

Najas flexilis (slender naiad) is sometimes called bushy pondweed and has fine branched stems that emerge from a slight rootstalk. Slender naiad can grow in both shallow and deep water. Waterfowl, marsh birds, and muskrats consume the stems, leaves, and seeds of naiad. The foliage produces forage and shelter opportunities for fish and invertebrates (Borman, et al., 1997).

Slender Naiad
Source: UW Herbarium Website

Watershield
Source: University of Florida Website

Brasenia schreberi (watershield) has floating leaves with elastic stems with the leaf stalk attaching to the middle of the leaves. All submersed portions of the plant are usually covered with a gelatinous coating. Watershield is commonly identified by the lack of a leaf notch and the central location of the petiole. Watershield is most commonly found growing in soft sediments that contain partially decomposed organic matter. The seeds, leaves, stem and buds are a source of food by waterfowl. The floating leaves also offer shelter and shade for fish and invertebrates (Borman, et al., 1997). Watershield is a sensitive aquatic plant this is not tolerant of pollutants and adverse human impacts to the lake ecosystem (Nichols, 1999

5.3.2 Floating-Leaf Plants

The following three floating-leaf aquatic plant species were identified during the 2007 aquatic plant survey.

- *Brasenia schreberi* (watershield)
- *Nuphar variegata* (spatterdock)
- *Nymphaea odorata* (white water lily)

5.3.3 Emergent Plants

No emergent plant species were identified during the 2007 aquatic plant survey.

5.3.3 Submergent Plants

The following ten submergent aquatic plant species were identified during the 2007 aquatic plant survey.

- *Algae spp.* (filamentous algae) [algal]
- *Ceratophyllum demersum* (coontail)
- *Chara* (chara/muskgrass) [algal]
- *Elodea canadensis* (elodea)
- *Myriophyllum spicatum* (eurasian watermilfoil)
- *Najas flexis* (slender naiad / bushy pondweed)
- *Nitella spp.* (nitella)
- *Potamogeton crispus* (curly-leaf pondweed)
- *Potamogeton gramineus* (variable pondweed)
- *Stuckenia pectinata* (sago pondweed)

Table 1 includes data for all species identified. Descriptions of all plants identified can be found in Appendix D.

5.4 Shoreline Characterization

Emergent and floating leaved plants identified along the shoreline outside of formal grid sample points included: *Carex spp (*sedges*)*, *Brasenia schreberi* (watershield), *Nuphar variegata* (spatterdock), *Nymphaea odorata* (white water lily), *Typha latifolia* (broad leaved cattail), and *Schoenoplectus tabernaemontanti* (softstem bulrush), *Alnus incana* subsp., and *Rugosa* (tag alder). Refer to Appendix D for descriptions of these plants. Figure 5 illustrates the floating leaved and emergent plant locations identified during the boat survey. Plants identified during the shoreline survey but not during the point-intercept method were not included in the community statistics or calculation of the FQI.

6.0 MANAGEMENT ALTERNATIVES

Depending of the goals of the stakeholders, several management alternatives are available for an APM. Some general alternatives are discussed below. More information on management alternatives is included in Appendix E.

6.1 Maitenance Alternative

This alternative may be used at a lake in which a health aquatic plant community exists and invasive and non-native plant species are generally not present. The maintanance alternatives is a pretection-oreiented management alternative as no signifiacnt plant concerns exist or no active management is required.

This alternative can include an education plan to inform lake shore owners of the value of a natural shoreline and encourage the protection of the lake water quality and the native aquatic plant community. Measures for the prevention of the introduciton of AIS to the lake should also be included.

6.2 Management Alternatives

6.2.1 Manual Removal

Manual removal efforts include hand raking or hand pulling individual unwanted plants from the water. All aquatic plant material must be removed from the water. Portions of roots may remain in the sediments, so removal may need to be repeated periodically. This technique is well suited for small areas in shallow water. Scuba divers can be contracted to remove unwanted vegetation in deeper areas. Benefits of manual removal include low cost compared to other control methods. The drawback of this alternative is that raking or pulling aquatic plants can be quite labor intensive. Hiring laborers to remove aquatic vegetation is an option, but also increases cost.

Manual removal of aquatic vegetation by individual landowners can be completed to a maximum width of 30 feet to provide pier, boatlift or swimming raft access (recreation zone). A permit is not required for hand pulling or raking if the maximum width cleared does not exceed this 30 foot recreation zone. Manual removal of any native aquatic vegetation beyond the 30 foot area would require a permit from the WDNR that satisfies the requirements of Chapter NR 109, Wisconsin Administrative Code (NR 109). Appendix F includes a copy of NR 109.

6.2.2 Mechanical Harvesting

Harvesting is often used for large areas with dense monotypic AIS plant growth that significantly impedes boating or recreation on the lake. Advantages of this technology include: immediate results; removal of plant material and nutrients; and the flexibility to move to problem areas and at multiple times of the year "as needed". Disadvantages of this method include the limited depth of operation in shallow areas; possible need to repeat harvest an area throughout the summer; high initial equipment costs; maintenance, labor, and insurance costs; disposal site requirements; and a need for trained staff. A WDNR permit is required by NR 109 for aquatic plant harvesting.

6.2.3 Native Vegetation

Native plants are an important natural biological AIS control measure. A healthy native plant population can inhibit or slow an invasion of CLP and EWM by competing for space and nutrients, although in some lakes, even healthy native plant populations may eventually become infested with CLP or EWM. Damaging or stressing native plant communities may increase the potential for an AIS infestation. Any management of a low to mid level infestation should consider the benefits of native vegetation as a CLP and EWM deterrent, and plan for their protection.

Native plant communities on Wilson Lake appear healthy and could be slowing the spread of CLP and EWM in some areas.

6.2.4 Selective Aquatic Herbicides

The WDNR requires a permit (Chapter NR 107. Wis. Adm. Code) for aquatic herbicide applications in public waters. Appendix F includes a copy of NR 107. The product must be approved for aquatic use in Wisconsin and the applicator must be certified with the Wisconsin Department of Agriculture, Trade, and Consumer Protection (WDATCP) and licensed by WDNR. Advantages of herbicides include better control in confined areas (e.g. around docks) than harvesters can achieve. Disadvantages include negative public perception of chemicals, the potential to affect non-target plant species (if not applied at an appropriate application rate and/or time of year) and water use restrictions after application may be necessary.

A few herbicides have demonstrated CLP control. The three WDNR-approved herbicides are Diquat, Endothall and Fluridone. The most successful herbicide for EWM approved by the WDNR is one containing 2,4, D (*2,4-dichlorophenoxyacetic acid*). 2,4-D is a systemic herbicide that simulates a plant growth hormone and interferes with division of the plant cells, resulting in plant death. Fluridone and Endothall are effective for both EWM and CLP, both present on Wilson Lake.

6.2.5 Milfoil Weevils

The use of aquatic weevils (*Euhrychiopsis lecontei*) is a biological control option that has shown effective EWM control in some Wisconsin lakes. The aquatic weevil is native to Wisconsin and normally is present in healthy stands of northern watermilfoil. The weevils however, prefer to feed on EWM plants. The weevil burrows into the plant's stem, destroying plant tissue. Increasing a natural population of weevils can be a costly endeavor but EWM reductions can be observed if the weevil population is maintained. This management alternative is best suited for lakes with limited shoreline development because the insects need to over-winter on a shoreline with vegetation and adequate leaf litter.

6.2.6 Suction Assisted Harvesting

Suction assisted harvesting is considered manual harvesting even though the use of a powered device is involved. The system is run off a barge or modified pontoon boats with steps in this process completed as follows:

- Plants are fed into a suction tube by a diver making sure to follow the plant to its base and remove the roots.
- The plant mass is transported to a capture device (barrel) where the transport water is drained returned to the lake and the plants remain.
- Plants are removed from the barrel, bagged, and properly disposed of.

A great benefit of this method is that, if plants are identified properly, it exhibits a high degree of selectivity towards exotic species. However, the process is very labor intensive and expensive and is still in the early stages of use. As of this writing, the process is under review by the WDNR.

7.0 RECOMMENDED ACTION PLAN

7.1 Conclusions

Wilson Lake is an 81 acre seepage lake. Minimally available water quality information indicates a eutrophic trophic state. EWM and CLP have been confirmed by the WDNR on Wilson Lake.

During the 2007 aquatic plant survey, thirteen aquatic plant species were found (including algal genera). The most abundant aquatic plants identified during the July survey was muskgrass (*Chara spp.*) and *Nymphaea odorata* (white water lily) which were found at forty-seven percent and ten percent of the photic zone, respectively. *Najas flexilis* (bushy pondweed) and *Brasenia schreberi* (watershield) were third and fourth most abundant plants, found at seven percent of the photic zone. EWM was only found at one sampling point location during 2007 (Figure 6). CLP was identified at one sample site; however the survey was conducted after a chemical treatment targeting CLP in the spring and CLP coverage is higher than indicated by the survey. The FQI for Wilson Lake (17.07) is lower than the state average and indicates below average water quality when using aquatic plants as an indicator of lake health.

To accomplish the APM Plan goals, the Lake District has developed an action plan. This plan selects appropriate aquatic plant management techniques for EWM and CLP growth on Wilson Lake based on the evaluations completed in Section 6.2. The specific implementation of the management recommendations, including monitoring, responsibilities, protection of native aquatic plants, education, prevention efforts and funding, are discussed in the following sections.

This APM Plan should be updated periodically to reflect current aquatic plant problems, and the most recent acceptable APM methods. Information is available from the WDNR website:

http://dnr.wi.gov/org/water/fhp/lakes/aquaplan.htm or from Northern Environmental upon request.

7.2 Manual CLP/EWM Removal

Individual property owners can manually remove nuisance aquatic plants in the lake offshore from their property. Manual removal can be completed to a maximum width of 30 feet to provide pier, swim raft, or boat hoist access. A permit is not required for hand pulling or raking if the maximum width cleared does not exceed 30 feet. Manual removal EWM and CLP can be completed beyond 30 feet without a permit. Individuals removing CLP/EWM must try to remove all of the plant material and fragments from the water. Removal of any native vegetation beyond 30 feet would require a permit under NR 109, Wis. Adm. Code. Native plant removal is not recommended because it could actually facilitate the spread of EWM and CLP.

Landowners should know the difference between CLP/EWM and other native species. If an individual has questions about a particular aquatic plant or what manual removal is allowed , they should talk to an District representative and/or the WDNR. Appendix E identifies additional resources for plant identification.

We recommend that manual removal of both CLP and EWM be conducted in shallow areas along landowner's properties. This is a cheap and effective way to target specific nuisance plants.

7.3 Mechanical Harvesting for EWM and CLP control

Mechanical harvesting is not recommended on Wilson Lake. Mechanical harvesting could actually promote AIS spread by creating additional plant fragments. EWM can spread by sections of the plant that break free and drift to another location in the lake and establish itself and a new infestation. Early season harvesting of CLP can be an effective management tool to limit reproductive capabilities of the plant. However, due to the presence of EWM, mechanical harvesting is not recommended for Wilson Lake.

7.4 Native Vegetation for EWM and CLP control

A healthy native plant population can inhibit or slow an invasion of CLP and EWM by competing for space and nutrients. If EWM and CLP are treated early enough in the growing season the treatment will have a minimal impact on the native vegetation. This may not be feasible due to the history of AIS in Wilson Lake. It does not seem that the native plant community is strong enough to out-compete EWM and CLP.

7.5 Selective Herbicide Treatment

7.5.1 EWM Herbicides

EWM beds beyond the 30 foot manual removal zone or too dense for effective hand removal efforts should be treated with an aquatic herbicide. 2,4-D products have demonstrated selective control of EWM if applied correctly. At this time, application rates should not exceed 150 pounds per surface acre. All treatments will need to be completed in accordance with a permit issued under NR 107, Wis. Adm. Code. No nuisance levels of native plants should be treated on a large scale. A commercial aquatic pesticide applicator, certified with the Wisconsin Department of Agriculture and Consumer Protection (DATCP) and licensed by the WDNR should be hired to treat priority EWM beds as local funding allows. The applicator shall specify in the NR 107 permit application the chemical application size, rate, and location of proposed treatment areas. A list of licensed applicators may be available from DATCP or on the "Lake List" located at UW Extension Lakes Program website at http://www.uwsp.edu/cnr/uwexlakes/lakelist/ where people can search for companies offering select APM services by company name or area of expertise.

Significant control of EWM may be feasible on Wilson Lake, due to the small abundance and isolated locations. Aggressive management may prevent the spread of EWM. Figure 6 illustrates the July 2007 EWM distribution. Note that this EWM distribution map was created from aquatic plant survey data collected during July 2007.

The verification of EWM beds should preferably occur in late summer or early fall, when EWM would be at its maximum growth. A permit application process should begin in the fall prior to the year of the proposed treatment. This mapping effort will be used to determine potential treatment acreages. Next, priority treatment areas should be selected from these areas. A permit application should be completed by December of each year to allow for full utilization of WDNR AIS grant funds. Application for WDNR AIS grants are due February 1st and August 1st of each year. WDNR personnel prefer to see a draft grant application at least one month prior to the application deadline. Since grant preference is given to local units of government, the lake organization should work closely with the Town and the WDNR throughout the permitting process. A spring EWM Assessment or "pre-treatment survey" should be completed each year to modify the permit application prior to the actual EWM treatment. This pre treatment survey allows the permit application to be modified to accurately reflect proposed treatment areas and current EWM locations/acreages. This modification request will be submitted in writing to WDNR along with a map of proposed treatment areas.

One major EWM treatment per season should be completed. This treatment should occur before water temperatures reach approximately 60°F, realizing that this is a target time when EWM is actively growing and natives are not. However, one potential follow up "spot treatment" may also be needed which will be determined by completing a post treatment aquatic plant survey one month after the initial treatment. All NR 107 public notice and water use restriction posting requirements should be followed. A public notice must be filed in the local newspaper, if the treatment is > 10 acres or the treatment area is > 10% of the lakes area, and a public informational meeting held if requested. All property owners within or adjacent to treatment areas should be notified with a copy of the permit application and map indicating the proposed treatment areas. A yellow sign describing the treatment must be posted by the dock or shoreline of any properties being treated. The WDNR requires post and pre EWM treatment assessments completed annually to apply for subsequent permits and funds. Copies of the WDNR protocol for these assessments are available at local WDNR service centers and are not yet available via the WDNR website. Figure 6 indicates current EWM coverage will be updated annually.

Herbicide treatment of EWM would be a sufficient alternative to controlling the EWM and to keep it form spreading throughout the lake and other near by water bodies. Since the abundance of EWM is so small, it would be easier to control with herbicide treatments.

7.5.2 CLP Herbicides

A few herbicides have demonstrated CLP control. The three WDNR-approved herbicides are Diquat, Endothall and Fluridone. Endothall and Diquat are both fast acting contact herbicides. Diquat binds to sediments readily and its effectiveness is reduced by turbid waters. Endothall is not readily transferred to other plants tissue, therefore re-growth can be expected and repeated treatments may be needed. Fluridone is capable of killing the roots of plants, producing a longer lasting effect. Fluridone and Endothall are effective for both EWM and CLP, both present on Wilson Lake.

CLP herbicides treatment should continue to be used on Wilson Lake during early spring before native plants start to grow.

7.5.3 Schedule of Events

The following table describes a schedule of required activities for the EWM and CLP treatment program on Wilson Lake.

Activity	Frequency	Date
Mapping of CLP/EWM or post-treatment survey	Annually	No later than September 30th
Establish Priority Treatment Areas	Annually	October 30th
Prepare NR 107 Permit Application for grant and conditional permit purposes	Annually	December 1st
Prepare DRAFT WDNR AIS Control Grant Application	Annually/Multi-year	January 1st
Submit WNDR AIS Control Grant Application*	Annually	February 1st
Pre-treatment Survey	Annually	2 weeks after ice-out or when CLP/EWM plants are approximately 6 inches tall
EWM and CLP treatment**	Annually	Before May 31st or before water temperatures reach 60°F
Lake District Budget Voting	Annually	??
Town Budget Voting	Annually	??
Lake wide Aquatic Plant Survey	Every 5 years	July 30th 2012
Update APM Plan	Every 5 years	December 1, 2012

* = August 1st is a second AIS Control grant deadline.
** = Activity will not be completed until water temperature reaches approximately 60 degrees Fahrenheit.

7.5.4 Designation of Responsibility

The following table assigns responsibility for the CLP/EWM treatment program events listed above. When the Town or District is identified as a responsible party, these entities should identify which individual, or committee should complete the specified activity.

Activity	Responsible Party
Mapping of CLP/EWM or post-treatment CLP/EWM survey	Aquatic plant professional with assistance from trained volunteers
Establish Priority Treatment Areas	Lake district, WDNR and aquatic plant professional
Prepare NR 107 Permit Application (*for grant purposes*)	Certified/licensed applicator or lake district
Prepare DRAFT WDNR AIS Control Grant Application	Lake district

Submit WDNR AIS Control Grant Application	Town* (acts as grant sponsor)
Pre-treatment CLP/EWM Survey	Aquatic plant professional
CLP/EWM treatment	Certified/licensed applicator
Lake District Budget Voting	Lake district
Town Budget Voting	Town
Lake wide Aquatic Plant Survey	Aquatic plant professional hired by lake district or town
Update APM Plan	Aquatic plant professional , lake district and WDNR

* Local units of government receive preference in AIS Control grant projects and should act as project sponsor

7.6 Milfoil Weevils

Milfoil weevils would not be recommended on Wilson Lake due to the lack of milfoil presence. There would not be a sufficient food source to sustain a population of milfoil weevils within Wilson Lake.

7.7 Suction Assisted Harvesting

This method is an effective way to control EWM by harvesting the entire plant. However, this method is very costly and is not recommended on smaller lakes which may be limited by funding.

7.8 Prevention Efforts

The following sections discuss recommended activities to prevent the spread of new AIS into Wilson Lake. Prevention efforts can also prevent the spread of CLP and EWM from Wilson Lake into other area lakes.

7.8.1 Watercraft Inspection

A watercraft inspection program should be developed for Wilson, Kusel and Round Lakes similar to the Clean Boat/ Clean Waters (CB/CW) Program. A watercraft inspection program is extremely important to prevent the introductions of new AIS into Wilson Lake. CB/CW is a highly regarded volunteer watercraft inspection program developed by the WDNR and University of Wisconsin Extension Lakes Program.

The CB/CW efforts in Wisconsin involves providing information to lake users about what invasive species look like and what precautions they should take to avoid spreading them. It also involves visual inspection of boats to make sure they are "clean" and demonstration to the public of how to take the proper steps to clean their boats and trailers. Watercraft inspectors also install signs at boat landings informing boaters of infestation status, state law, and steps to prevent spreading AIS. The **Clean Boats Clean Waters** Program is sponsored by the DNR, UW Extension, and the Wisconsin District of Lakes and offers training to volunteers on how to organize a watercraft inspection program. For more information see the following website:

http://www.uwsp.edu/cnr/uwexlakes/CBCW/default.asp

Training materials, a list of workshop dates, publications, supplies, and links to other important information are all provided on the CB/CW web page. Volunteers may also contact Erin Henegar Volunteer Coordinator for the Invasive Species Program, UW Extension-Lakes Program at (715) 346-4978 for details.

7.8.2 Aquatic Plant Protection and Shoreline Management

Protection of the native aquatic plant community is needed to slow the spread of CLP and EWM. Therefore, riparian landowners should refrain from removing native vegetation. Additionally, CLP and EWM can thrive in nutrient (phosphorus and nitrogen) enriched waters or where nutrient rich sediments occur. Two simple actions can prevent excessive nutrients and sediments from reaching the lake. The first activity is the restoration of natural shorelines, which act as a buffer for runoff containing nutrients and sediments. Establishing natural shoreline vegetation can sometimes be as easy as not mowing to the waters edge. Native plants can also be purchased from nurseries for restoration efforts. Shoreline restoration has the added benefits of providing wildlife habitat and erosion prevention. A vegetative buffer can also prevent surface water runoff from roads, parking areas, and lawns from carrying nutrients into the lake.

The second easy nutrient prevention effort is to use lawn fertilizers only when soil samples show a lack of nutrients. Phosphorus free fertilizers should be used when possible. The fertilizers commonly used for lawns and gardens have three major plant macronutrients - nitrogen, phosphorus, and potassium. These are summarized on the fertilizer package by three numbers. The middle number represents the amount of phosphorus. Since most Wisconsin lakes are "phosphorus limited", meaning additions of phosphorus can cause increased aquatic plant or algae growth, preventing phosphorus from reaching the lake is a good practice. Landowners should be encouraged to use phosphorus free fertilizers on lakeshore lawns. Local retailers and lawn care companies can provide soil test kits to determine a lawn's nutrient needs.

Nutrients from old or failing septic systems may also contribute nutrients to the lake. Septic systems should be inspected and maintained in accordance with the Waushara County Sanitary Ordinance.

Appendix E includes resources for further information about these AIS Prevention efforts.

7.9 Public Education and Involvement

Public involvement and education efforts to date include a presentation by Northern Environmental at a Lake District board meeting on December 15, 2007 to introduce the APM Plan project and discuss preliminary goals. The information presented included the results of the aquatic plant survey. This meeting was open to the public and questions were answered after the presentation.

The Lake District should continue to educate lake users about the importance of aquatic plants to the lake ecosystem and EWM and CLP management efforts. The WDNR and UW Extension Lakes Program are superb sources of public education materials and programs. Many important materials can be ordered at the following website:

http://www.uwsp.edu/cnr/uwexlakes/publications/

Appendix E includes resources for further information about public education opportunities.

7.10 Monitoring

To evaluate the effectiveness of the APM Program, monitoring of multiple components should be completed. Some of these are discussed in the section(s) above related to a specific management activity, but are re-iterated here in the context of overall monitoring efforts.

7.10.1 Aquatic Plant Monitoring

In some lake systems, native aquatic plants "hold their own" and AIS never grow to nuisance levels, in others, however vigilant management is required. Areas that have not been treated or were treated in previous years should also be monitored to see if native plant communities have inhibited further spread of AIS. Additionally, the lake should be monitored for new AIS infestations. At a minimum the public boat launch area should be inspected at least once per year. Grants may be available to help fund hiring professionals to complete these monitoring efforts or local lake enthusiasts can become trained AIS monitors. The Wisconsin Citizen Monitoring Network offers training of volunteers for AIS monitoring and other citizen monitoring opportunities such as water quality monitoring. Additional information about this program can be obtained at

http://www.dnr.state.wi.us/org/water/fhp/lakes/selfhelp/shlmhowto.htm

Appendix E includes resources for further information about volunteer monitoring opportunities.

Wilson Lake should complete pre-treatment and post-treatment EWM CLP monitoring to gauge the effectiveness of treatments. See section 7.5 for monitoring dates and assignment of responsibility for EWM and CLP treatment monitoring.

Northern Environmental also recommends completing lakewide aquatic macrophyte surveys every 5 to 10 years to monitor changes in the overall aquatic plant community and the effects of the APM activities. Aquatic plant communities may change with varying water levels, water clarity, nutrient levels, and aquatic plant management actions. These formal surveys should duplicate the 2007 point intercept survey.

7.10.2 APM Technologies

The APM technologies listed in Appendix C should be re-visited periodically to evaluate if new or improved alternatives are available. The professional environmental science community includes universities, state natural resource agencies (e.g. WDNR), and federal agencies (e.g. EPA, United States Army Corps of Engineers [USACE]) are excellent sources for information. Appendix E includes resources for further information about APM alternatives and current research. This activity should be completed in conjunction with an overall APM Plan update effort, which includes a lake wide aquatic plant survey.

7.10.3 Public

Periodically, the lake users should be polled to evaluate the public's perception of APM activities on the lake. A questionnaire similar to the one solicited during this project could be used. Other methods of soliciting public opinion include telephone interviews, face to face interviews, web-based online surveys, and focus groups. A professional with experience conducting public surveys may be required for this activity.

7.10.4 Water Quality

The WDNR citizen monitoring website identifies very limited current water quality data. Members of the Lake District should consider becoming an active Citizen Lake Monitor for water quality (secchi depth, total phosphorus and chlorophyll *a*). At a minimum, water clarity (secchi depth) monitoring is recommended. Secchi depth monitoring is an easy volunteer activity that yields useful information about lake health over the long term. For more information, please visit:

http://dnr.wi.gov/org/water/fhp/lakes/selfhelp/shlmhowto.htm

7.11 Funding

The Lake District and Town should work together to fund the activities listed in this Recommended Action Plan. First, all available volunteer roles should be filled if possible. Then, cost estimates or professional bids should be solicited for the remaining activities (e.g. monitoring and EWM/CLP treatments) from professional firms. These cost estimates can be used to budget for needed activities.

One example of how funding APM efforts could work is that the individual Lake District can determine what individual property owners are willing to pay for EWM/CLP treatment. This dollar amount can then be presented to the Town (through a Lake District / Town liaison) who can decide what the Town may be willing to sponsor for additional management dollars. Collectively, these funds can then be used as local matching funds to apply for cost sharing assistance from the WDNR AIS Control grant program. Qualified lake Districts and local governments are both eligible applicants, but funding preference goes to local units of government. Eligible projects include monitoring, permit fees, and CLP treatment. The application deadline is February 1st annually. A proposed schedule and assignment of responsibility are provided in Section 7.2. For more detailed information about AIS Control grants, please visit:

http://www.dnr.state.wi.us/org/caer/cfa/Grants/Lakes/invasivespecies.html

A second source for EWM/CLP control projects is the WDNR Recreational Boating Facilities (RBF) grant program. Projects are presented to the Wisconsin Waterways Commission (WWC) which meets approximately 4 times per year to review project presentations. This program funds 50 % of eligible activities.

http://www.dnr.state.wi.us/org/caer/cfa/Grants/recboat.html

If the above funding combinations appear woefully inadequate to fund the management activities, then additional sources should be considered. Other funding alternatives may include:

- Additional State grant assistance
- Private (landowner) funding
- Countywide sales or room tax
- Resource user fee (e.g. AIS boat sticker)
- Property tax or special assessment
- Federal invasive species management partnerships

These sources would require government action at the State and/or County levels.

7.12 Closing

This APM Plan was prepared in cooperation with the Kusel, Wilson, and Round Lakes P & R District, representatives from the local units of government. It includes the major components outlined in the WDNR Aquatic Plant Management guidance. The "Recommended Action Plan" section of this report can be used as a stand alone document to facilitate CLP and EWM management activities for the lake. This section outlines roles and responsibilities for local governments and Lake Districts. The greater APM Plan document provides a central source of information for the lake's aquatic plant community information and the overall lake ecology. If there are any questions about how to use this APM Plan or its contents, please contact Northern Environmental.

8.0 REFERENCES

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APPENDIX A

POINT INTERCEPT SAMPLE COORDINATES

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APPENDIX B

AQUATIC PLANT ECOLOGY

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APPENDIX C

SUMMARY OF AQUATIC PLANT MANAGEMENT ALTERNATIVES

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APPENDIX D

AQUATIC PLANT IDENTIFICATION

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APPENDIX E

RESOURCE FOR ADDITIONAL INFORMATION

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APPENDIX F

NR 107 AND NR 109 WISCONSIN ADMINISTRATIVE CODES

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APPENDIX G

AIS INFORMATION

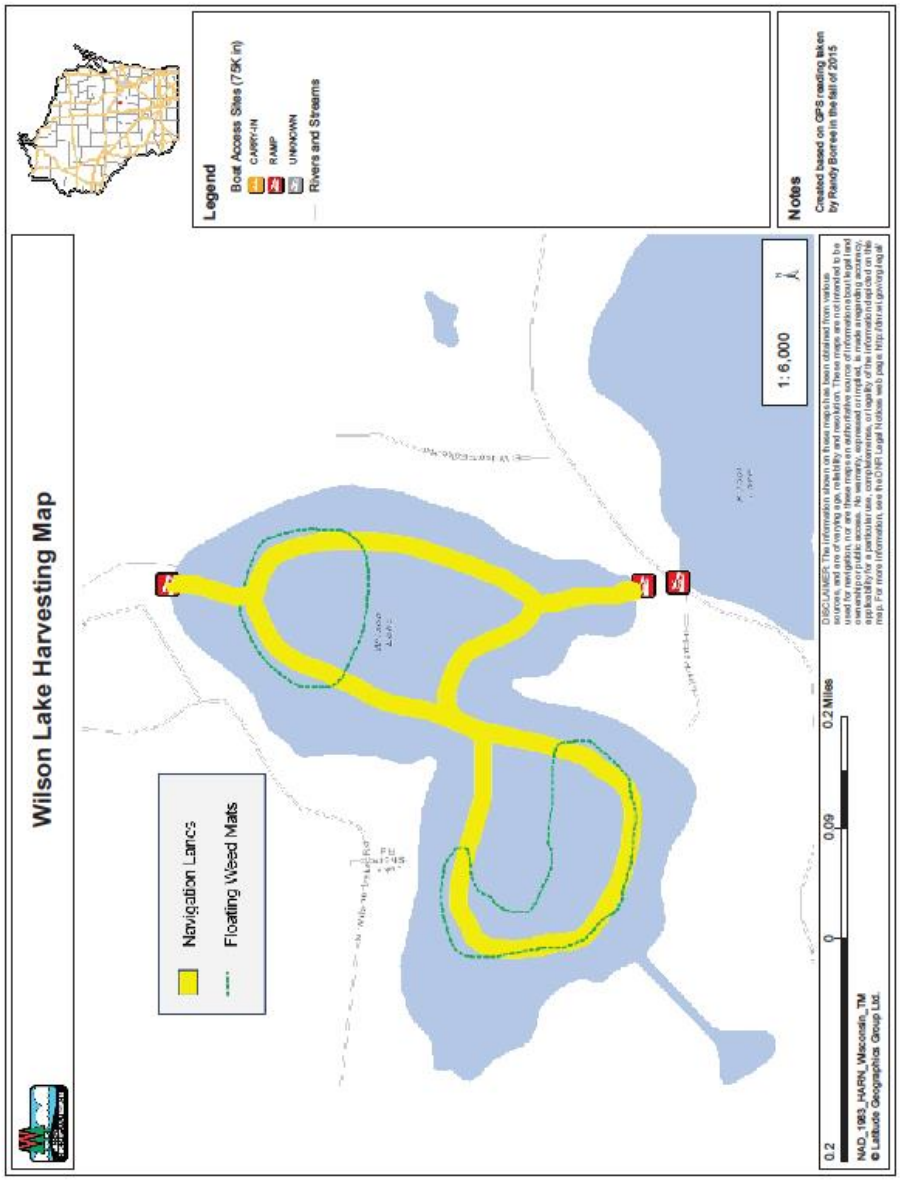
AQUATIC PLANT MANAGEMENT PLAN

WILSON LAKE
WAUSHARA COUNTY, WISCONSIN

April 24, 2008

Appendix F: Wilson Lake Harvesting Map

Appendix F: Wilson Lake Harvesting Map



Appendix G: Wilson Lake Management Plan – Planning Meeting (July 17, 2015)

A planning meeting was held at the Springwater Town Hall on Friday July 17, 2015 at 4:00 pm. The purpose of the meeting was to update attendees on the current status of the 2015 Wilson Lake Management Plan, a review of the plans identified goals and objectives and a polling of the attendees as to the highest priority goals for the next 12 to 18 months. There were 21 individuals in attendance. The attendees were asked to vote for their 3 highest priority goals as identified in the plan.

The top three goals, based on the voting of the attendees were:

1. Eradicate and/or control Eurasian watermilfoil (EWM) and curly-leaf pondweed (CLP).
2. Reduce the abundance of aquatic plants.
3. Improve fish habitat.

The plan will be updated to reflect the voting. A follow-up meeting will be held in August 2015.

Other discussions included the approach to dealing with the abundance of weeds including: spot treatment, whole-lake treatment and harvesting.

Individuals were assigned specific tasks:

- Fill in missing Lake Owner contact information
    - Cathy Deuhring
    - Andrew Long
- Status of EWM DNA testing
    - Paul Zimmer
    - Craig Strebig
- Status of EWM treatment alternatives
    - Paul Zimmer
    - Craig Strebig
- Confirming DNR treatment approval requirements
    - Randy Borree
- Gather more information on weed harvesting
    - Chuck Coufal
- Updating the 2015 Wilson Lake Management Plan
    - Randy Borree
    - Julie Dunlap

Appendix H: Lake User Survey Results

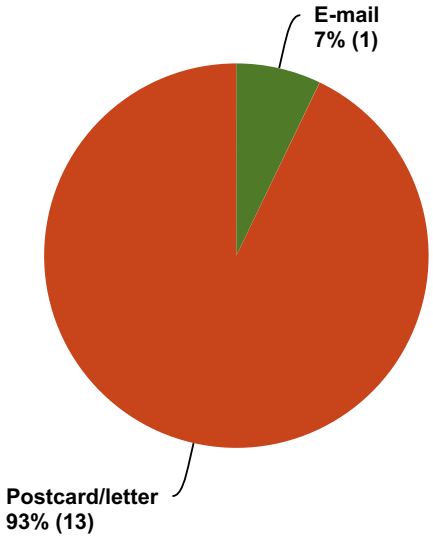
Q1 What is your Waushara County Lakes Survey ID?

Answered: 16 Skipped: 0

#	Responses	Date
1	[redacted]	1/30/2015 3:24 PM
2	[redacted]	1/28/2015 10:34 AM
3	[redacted]	1/27/2015 9:56 AM
4	[redacted]	1/24/2015 6:36 AM
5	[redacted]	1/22/2015 2:35 PM
6	[redacted]	1/22/2015 12:40 PM
7	[redacted]	1/22/2015 10:15 AM
8	[redacted]	1/21/2015 6:02 PM
9	[redacted]	1/21/2015 5:51 PM
10	[redacted]	1/21/2015 11:56 AM
11	[redacted]	1/21/2015 6:54 AM
12	[redacted]	1/21/2015 6:33 AM
13	[redacted]	1/20/2015 9:38 PM
14	[redacted]	1/20/2015 6:07 PM
15	[redacted]	1/20/2015 6:06 PM
16	[redacted]	1/20/2015 5:27 PM

Q2 How did you hear about this survey?

Answered: 14 Skipped: 2

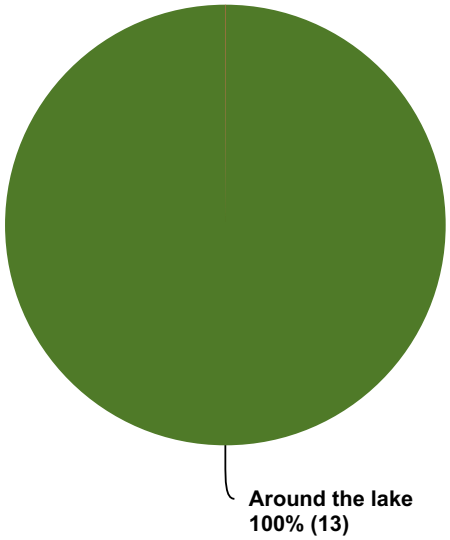


Answer Choices	Responses	
E-mail	7%	1
Newspaper	0%	0
Postcard/letter	93%	13
Facebook	0%	0
Radio	0%	0
Total		14

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

Q3 Do you own or rent property...

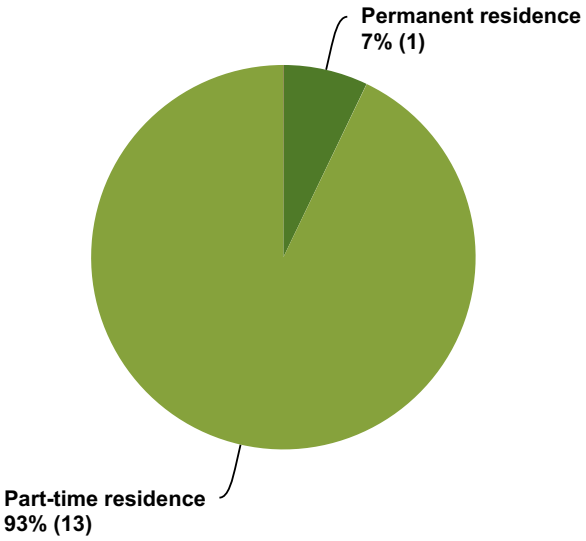
Answered: 13 Skipped: 3



Answer Choices	Responses	
Around the lake	**100%**	13
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		**13**

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

Answered: 14 Skipped: 2

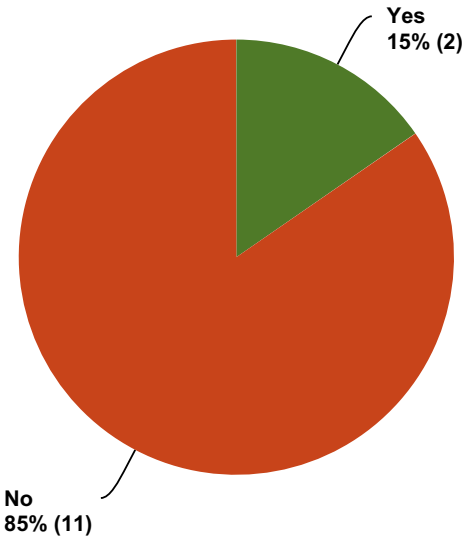


Answer Choices	Responses	
Permanent residence	7%	1
Part-time residence	93%	13
I do not own or rent property near the lake	0%	0
Total		14

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

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

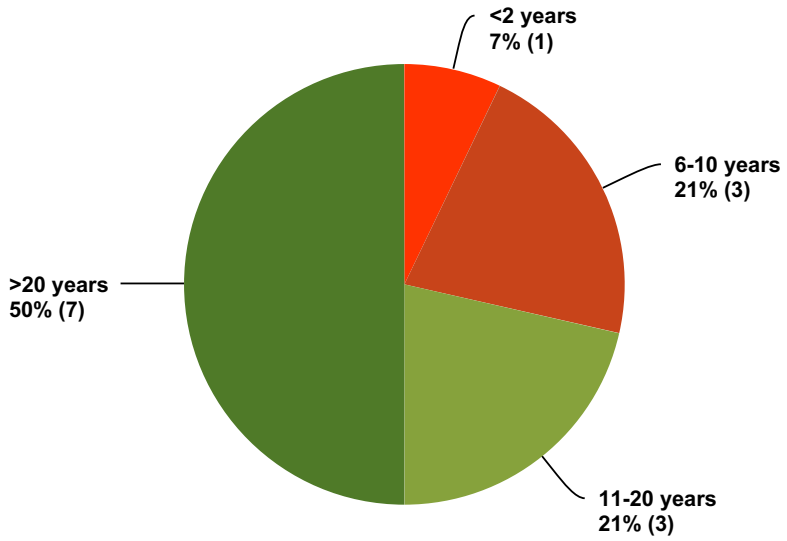
Answered: 13 Skipped: 3



Answer Choices	Responses	
Yes	15%	2
No	85%	11
Total		13

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

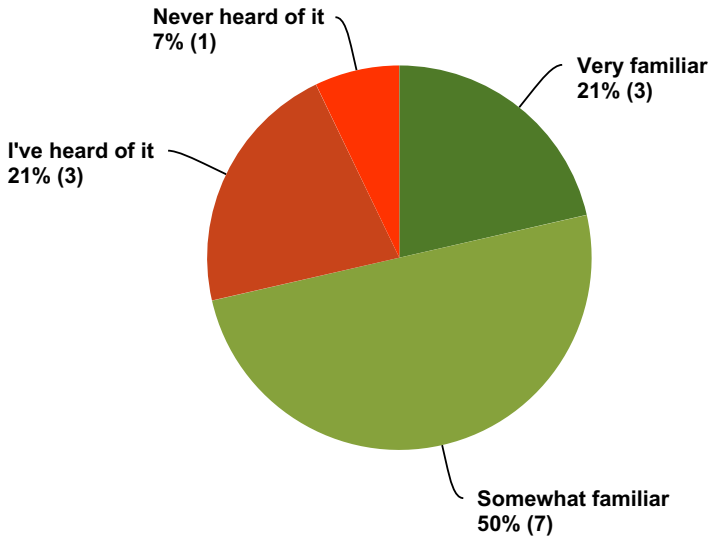
Answered: 14 Skipped: 2



Answer Choices	Responses	
<2 years	7%	1
2-5 years	0%	0
6-10 years	21%	3
11-20 years	21%	3
>20 years	50%	7
Total		14

Q7 Are you familiar with the Kusel/Wilson/Round Lake Protection & Rehabilitation District?

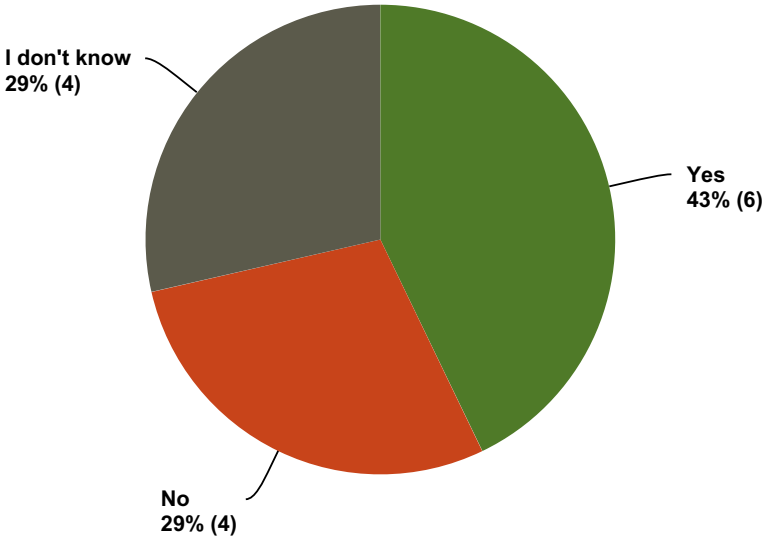
Answered: 14 Skipped: 2



Answer Choices	Responses	
Very familiar	21%	3
Somewhat familiar	50%	7
I've heard of it	21%	3
Never heard of it	7%	1
Total		14

Q8 Are you a member of the Kusel/Wilson/Round Lakes Protection & Rehabilitation District?

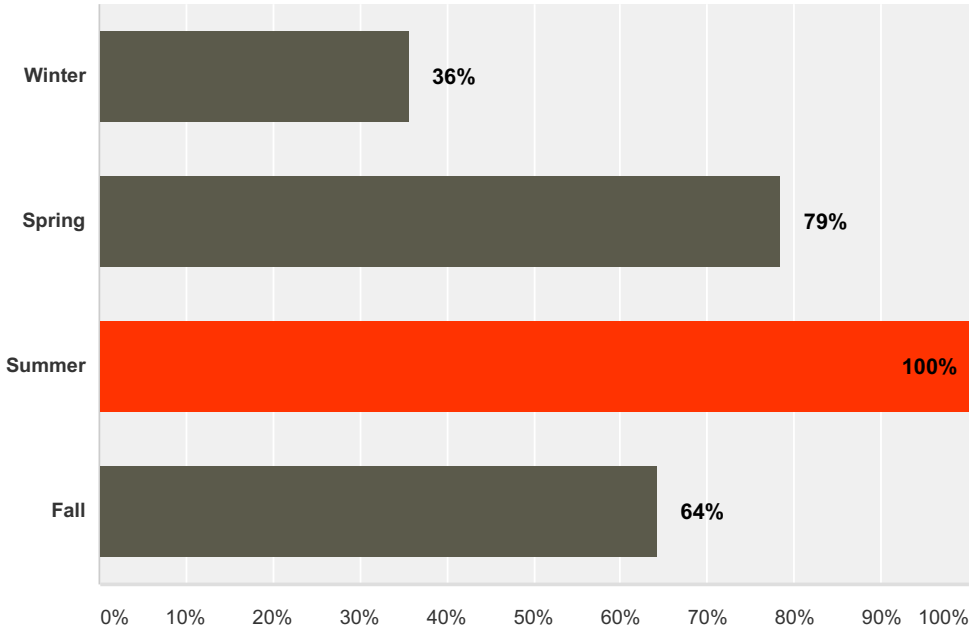
Answered: 14 Skipped: 2



Answer Choices	Responses	
Yes	43%	6
No	29%	4
I don't know	29%	4
Total		14

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

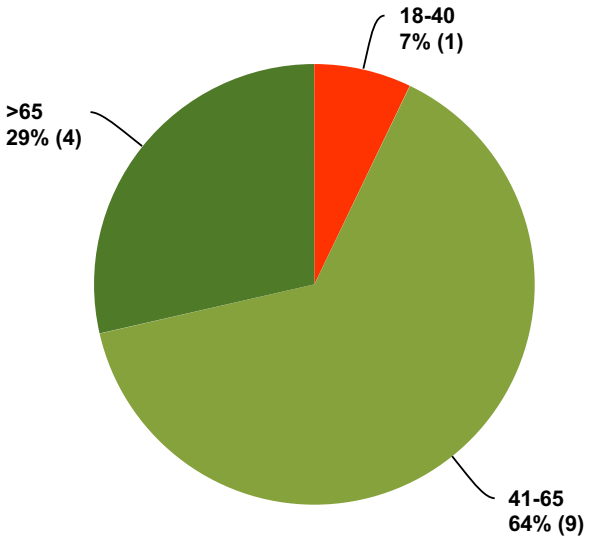
Answered: 14 Skipped: 2



Answer Choices	Responses	
Winter	36%	5
Spring	79%	11
Summer	100%	14
Fall	64%	9
Total Respondents: 14		

Q10 Which category below includes your age?

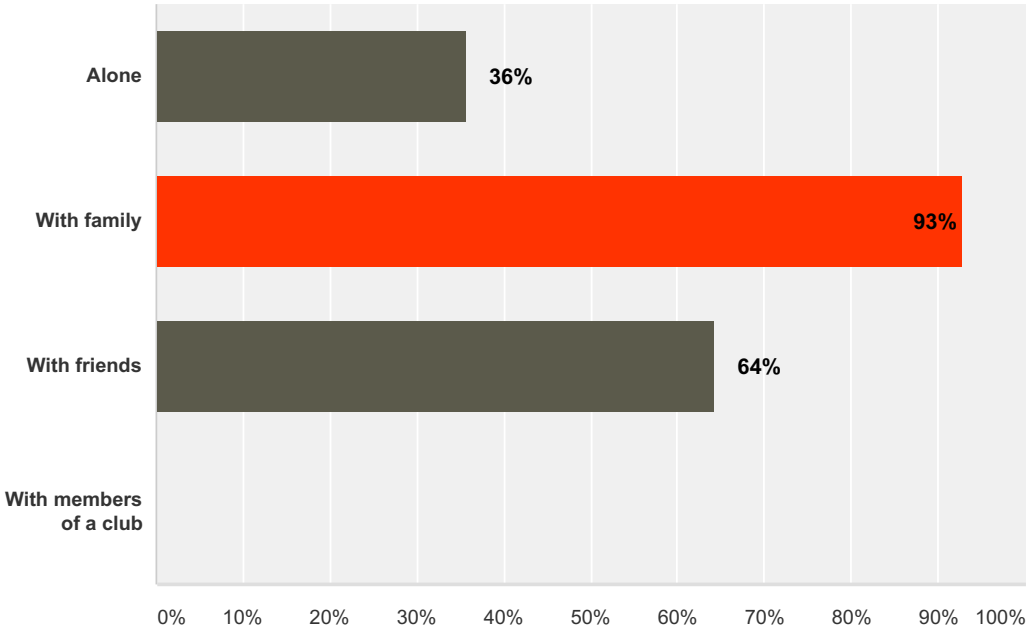
Answered: 14 Skipped: 2



Answer Choices	Responses	
Under 18	0%	0
18-40	7%	1
41-65	64%	9
>65	29%	4
Total		14

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

Answered: 14 Skipped: 2

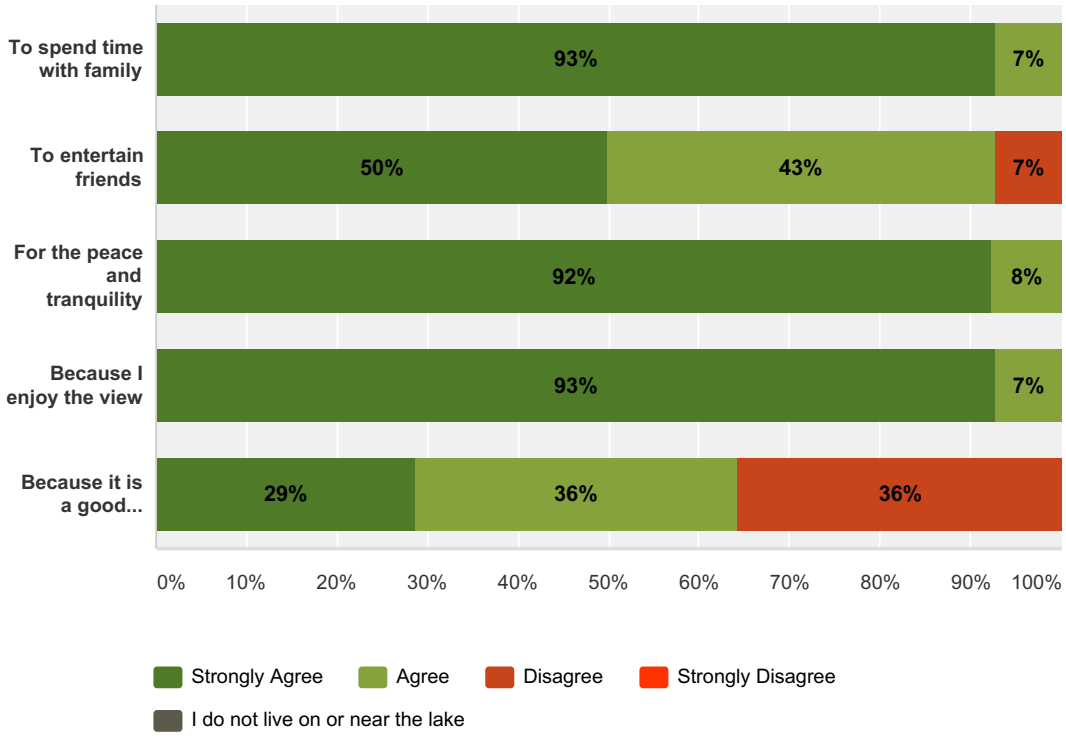


Answer Choices	Responses	
Alone	36%	5
With family	93%	13
With friends	64%	9
With members of a club	0%	0
Total Respondents: 14		

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

Q12 I live on or near the lake...

Answered: 14 Skipped: 2



	Strongly Agree	Agree	Disagree	Strongly Disagree	I do not live on or near the lake	Total
To spend time with family	**93%** 13	**7%** 1	**0%** 0	**0%** 0	**0%** 0	14
To entertain friends	**50%** 7	**43%** 6	**7%** 1	**0%** 0	**0%** 0	14
For the peace and tranquility	**92%** 12	**8%** 1	**0%** 0	**0%** 0	**0%** 0	13
Because I enjoy the view	**93%** 13	**7%** 1	**0%** 0	**0%** 0	**0%** 0	14
Because it is a good investment	**29%** 4	**36%** 5	**36%** 5	**0%** 0	**0%** 0	14

Q13 What do you value most about Wilson Lake?

Answered: 12 Skipped: 4

#	Responses	Date
1	Nature and tranquil setting	1/30/2015 3:26 PM
2	Views, peace, quiet	1/28/2015 10:38 AM
3	the fishing and the view	1/24/2015 6:40 AM
4	relaxation time	1/22/2015 2:37 PM
5	recreational activity & fishing	1/22/2015 12:43 PM
6	Smaller Lake and less activity.	1/22/2015 10:22 AM
7	Natural serenity	1/21/2015 12:00 PM
8	peaceful	1/21/2015 6:42 AM
9	I value the view and location. Wish the swimming and fishing were better.	1/20/2015 9:46 PM
10	The fact that it is a smaller lake and generally not too busy on weekends.	1/20/2015 6:16 PM
11	Quiet escape from the pace of life. Close to home (FdL).	1/20/2015 6:12 PM
12	The serenity it provides, off season.	1/20/2015 6:10 PM

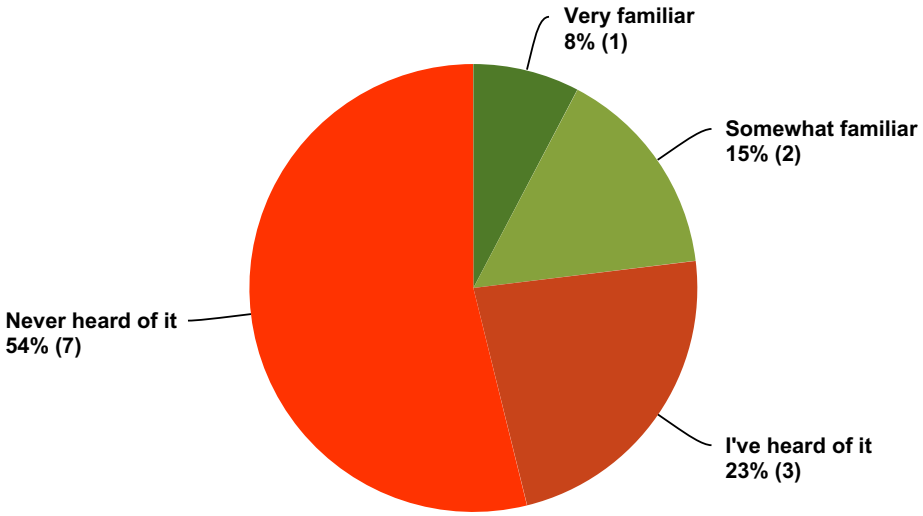
Q14 In your opinion, what should be done to restore, maintain, or improve Wilson Lake?

Answered: 12 Skipped: 4

#	Responses	Date
1	Stop reckless jet skiers. Dredge muck.	1/30/2015 3:26 PM
2	Get rid of muck and weeds. Huge fines for people taking down trees on shoreline. No jet skis since they really cannot operate on a lake this small and still be within state laws (no wake 200 ft. of shoreline)	1/28/2015 10:38 AM
3	dredge the muck.	1/24/2015 6:40 AM
4	reduction of weeds (invasive and otherwise) and quality of water	1/22/2015 2:37 PM
5	reduction of weeds - especially the bad invasive ones	1/22/2015 12:43 PM
6	Weed Control for ALL areas	1/22/2015 10:22 AM
7	Limit or slow down skiing speed	1/21/2015 12:00 PM
8	reduce the weed population - improve / clean - remove - limit bottom sediment	1/21/2015 6:42 AM
9	We feel that there are too many weeds! The lake should be cleaned up - remove the weeds and improve the bottom surface of the lake. When you step into the lake you sink into the muck. We wish the lake could be improved for fishing and swimming.	1/20/2015 9:46 PM
10	Treat the weeds, they are taking over which is beginning to make it less desirable	1/20/2015 6:16 PM
11	Remove/dredge the muck. Improve water clarity with muck removal. Consider removal of some weeds but want to maintain the right habitat for fish.	1/20/2015 6:12 PM
12	Do something about the silt that the aerators were supposed to improve many years ago.	1/20/2015 6:10 PM

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

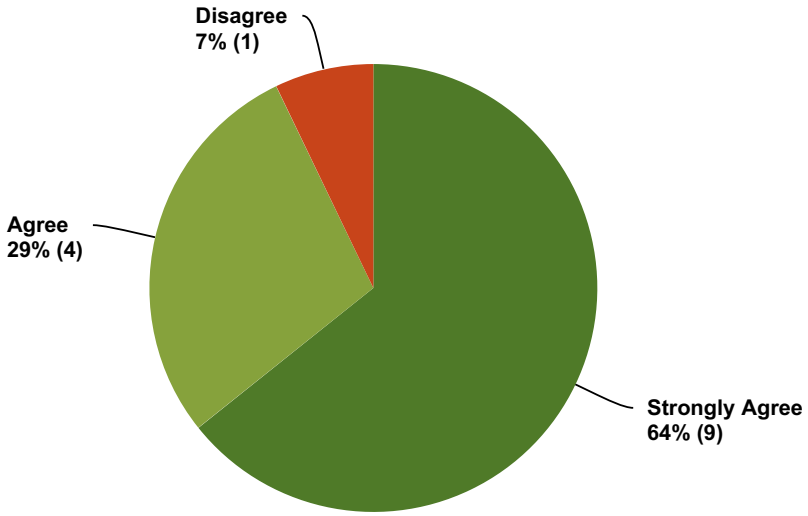
Answered: 13 Skipped: 3



Answer Choices	Responses	
Very familiar	8%	1
Somewhat familiar	15%	2
I've heard of it	23%	3
Never heard of it	54%	7
Total		13

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

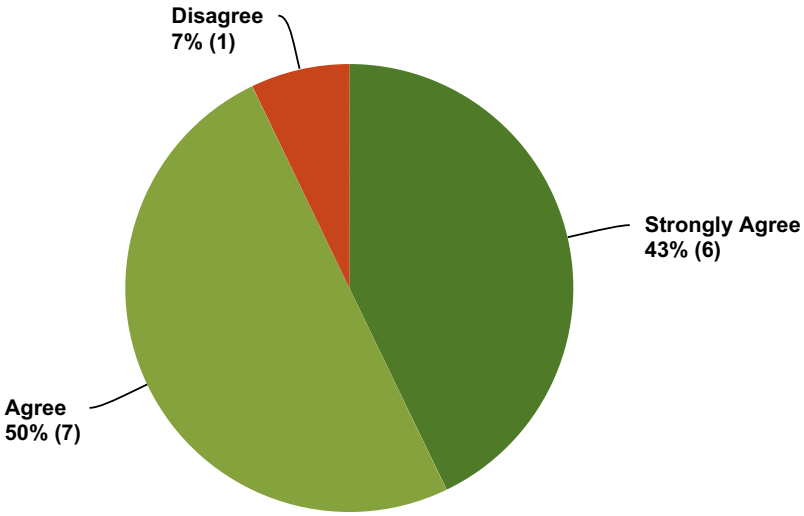
Answered: 14 Skipped: 2



Answer Choices	Responses	
Strongly Agree	64%	9
Agree	29%	4
Disagree	7%	1
Strongly Disagree	0%	0
Total		14

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

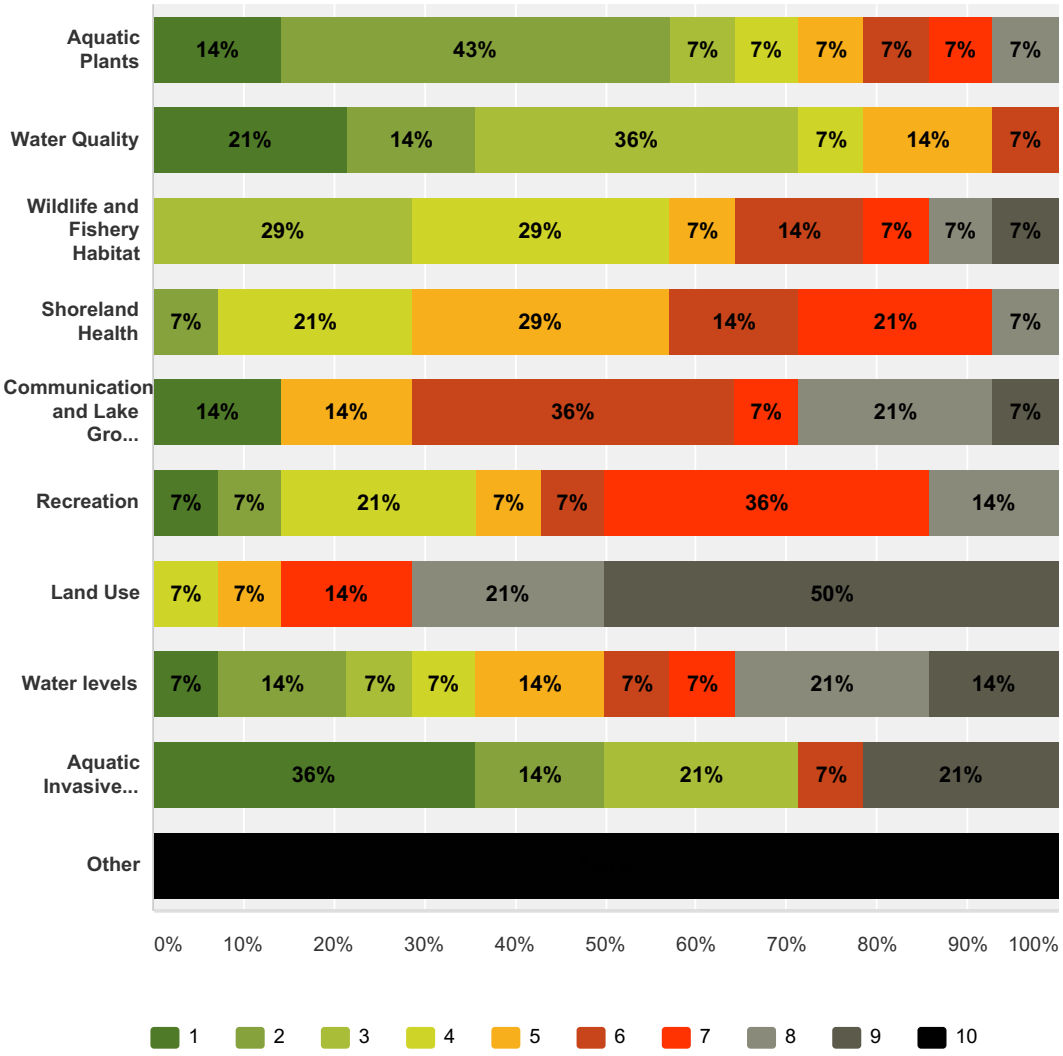
Answered: 14 Skipped: 2



Answer Choices	Responses	
Strongly Agree	43%	6
Agree	50%	7
Disagree	7%	1
Strongly Disagree	0%	0
Total		14

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

Answered: 14 Skipped: 2

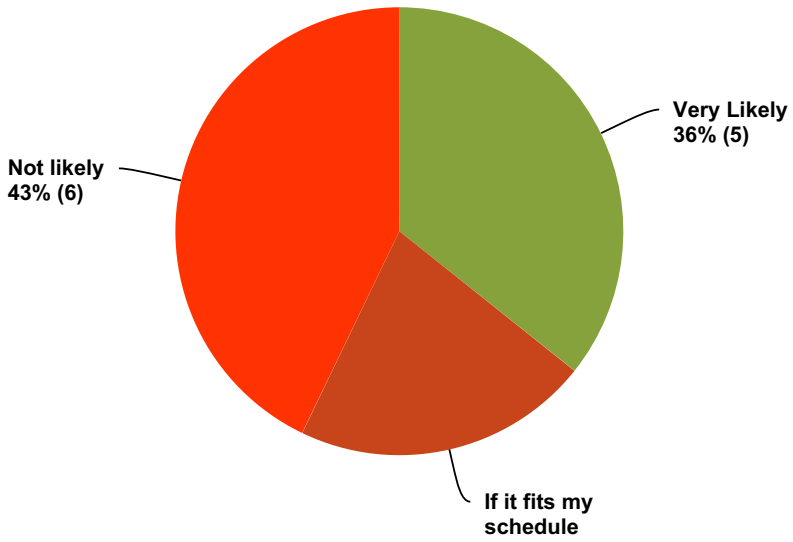


	1	2	3	4	5	6	7	8	9	10	Total	Score
Aquatic Plants	14% 2	43% 6	7% 1	7% 1	7% 1	7% 1	7% 1	7% 1	0% 0	0% 0	14	7.64
Water Quality	21% 3	14% 2	36% 5	7% 1	14% 2	7% 1	0% 0	0% 0	0% 0	0% 0	14	8.00
Wildlife and Fishery Habitat	0% 0	0% 0	29% 4	29% 4	7% 1	14% 2	7% 1	7% 1	7% 1	0% 0	14	6.07
Shoreland Health	0% 0	7% 1	0% 0	21% 3	29% 4	14% 2	21% 3	7% 1	0% 0	0% 0	14	5.64
Communication and Lake Group Support	14% 2	0% 0	0% 0	0% 0	14% 2	36% 5	7% 1	21% 3	7% 1	0% 0	14	5.14

Recreation	**7%** 1	**7%** 1	**0%** 0	**21%** 3	**7%** 1	**7%** 1	**36%** 5	**14%** 2	**0%** 0	**0%** 0	14	5.50
Land Use	**0%** 0	**0%** 0	**0%** 0	**7%** 1	**7%** 1	**0%** 0	**14%** 2	**21%** 3	**50%** 7	**0%** 0	14	3.14
Water levels	**7%** 1	**14%** 2	**7%** 1	**7%** 1	**14%** 2	**7%** 1	**7%** 1	**21%** 3	**14%** 2	**0%** 0	14	5.50
Aquatic Invasive Species	**36%** 5	**14%** 2	**21%** 3	**0%** 0	**0%** 0	**7%** 1	**0%** 0	**0%** 0	**21%** 3	**0%** 0	14	7.36
Other	**0%** 0	**0%** 0	**0%** 0	**0%** 0	**0%** 0	**0%** 0	**0%** 0	**0%** 0	**0%** 0	**100%** 14	14	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?

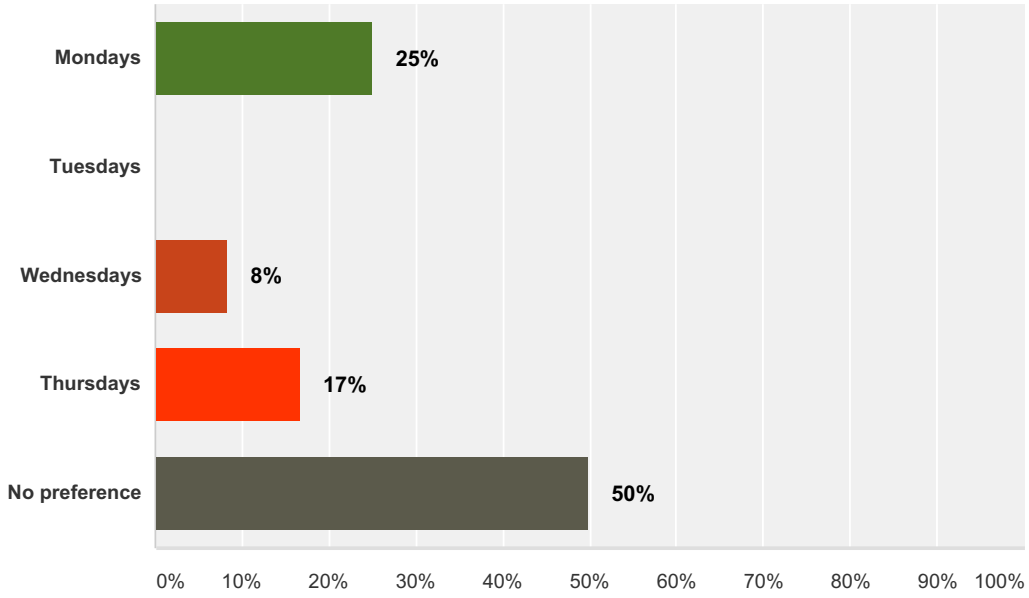
Answered: 14 Skipped: 2



Answer Choices	Responses	
Definitely	0%	0
Very Likely	36%	5
If it fits my schedule	21%	3
Not likely	43%	6
I won't attend any	0%	0
Total		14

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

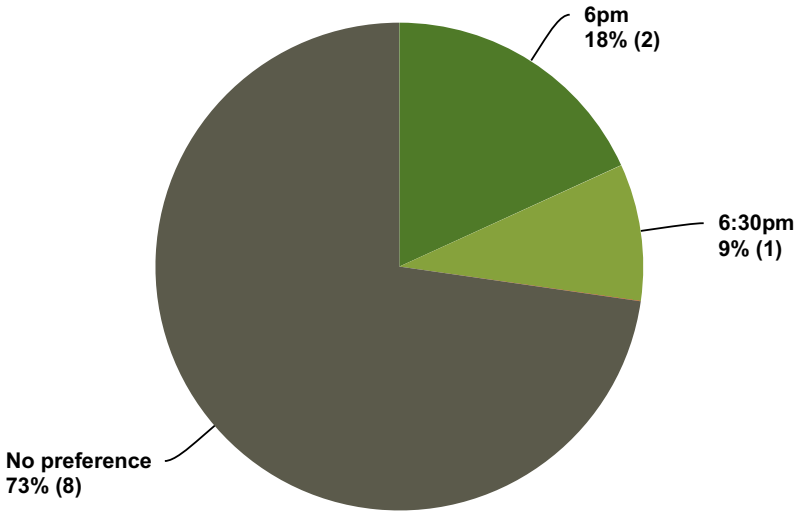
Answered: 12 Skipped: 4



Answer Choices	Responses	
Mondays	25%	3
Tuesdays	0%	0
Wednesdays	8%	1
Thursdays	17%	2
No preference	50%	6
Total Respondents: 12		

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

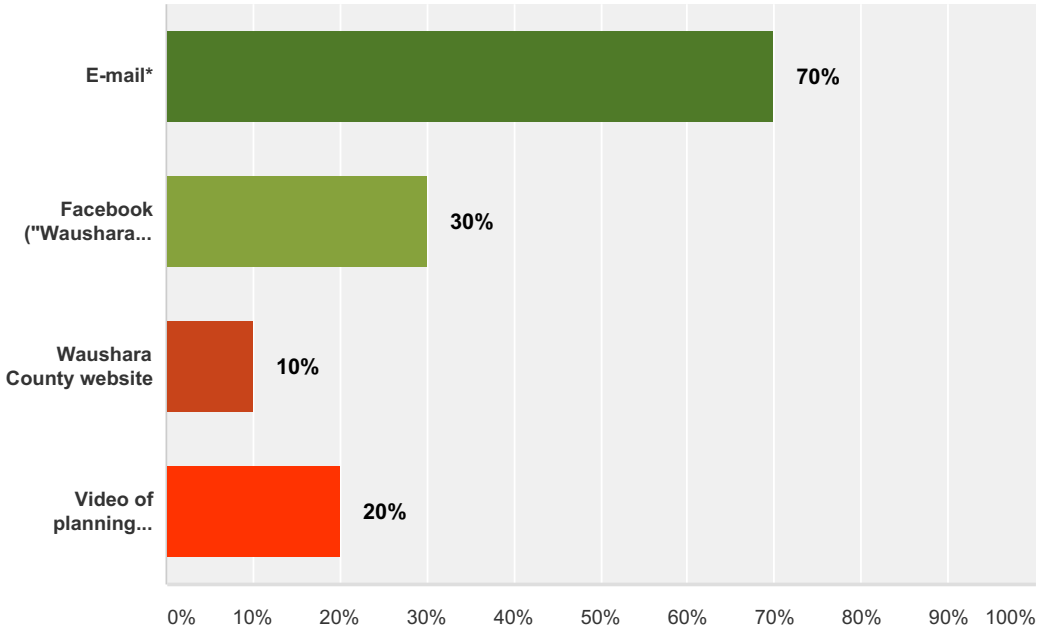
Answered: 11 Skipped: 5



Answer Choices	Responses	
6pm	18%	2
6:30pm	9%	1
7pm	0%	0
7:30pm	0%	0
No preference	73%	8
Total		11

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

Answered: 10 Skipped: 6



Answer Choices	Responses	
E-mail*	70%	7
Facebook ("Waushara County Lakes Project")	30%	3
Waushara County website	10%	1
Video of planning meeting posted on the web	20%	2
Total Respondents: 10		

#	Other (please specify)	Date
1	mail to ALL landowners	1/22/2015 2:42 PM
2	mail	1/22/2015 1:06 PM

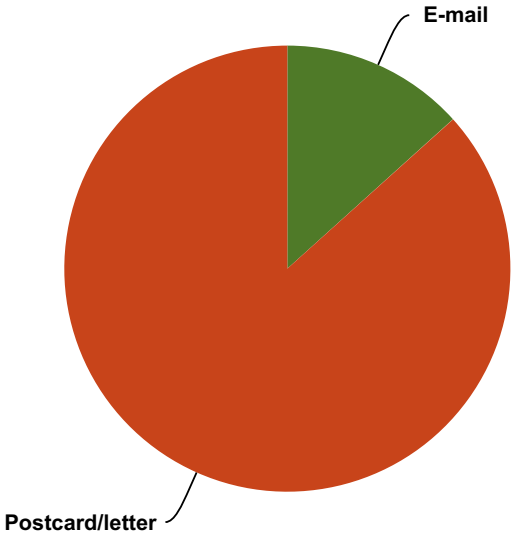
Q1 Enter your Waushara County Lakes Survey ID. If you've forgotten your ID or haven't created one yet, follow the instructions below.

Answered: 17 Skipped: 0

#	Responses	Date
1	[redacted]	3/5/2015 9:39 PM
2	[redacted]	3/5/2015 9:38 PM
3	[redacted]	3/5/2015 7:29 PM
4	[redacted]	3/4/2015 7:55 PM
5	[redacted]	3/4/2015 9:15 AM
6	[redacted]	3/3/2015 6:07 PM
7	[redacted]	3/3/2015 11:59 AM
8	[redacted]	3/3/2015 8:31 AM
9	[redacted]	3/2/2015 8:22 PM
10	[redacted]	3/2/2015 9:09 AM
11	[redacted]	3/1/2015 2:10 PM
12	[redacted]	3/1/2015 8:54 AM
13	[redacted]	3/1/2015 7:03 AM
14	[redacted]	2/28/2015 2:31 PM
15	[redacted]	2/28/2015 1:41 PM
16	[redacted]	2/28/2015 12:36 PM
17	[redacted]	2/27/2015 12:11 PM

Q2 How did you hear about this survey?

Answered: 15 Skipped: 2

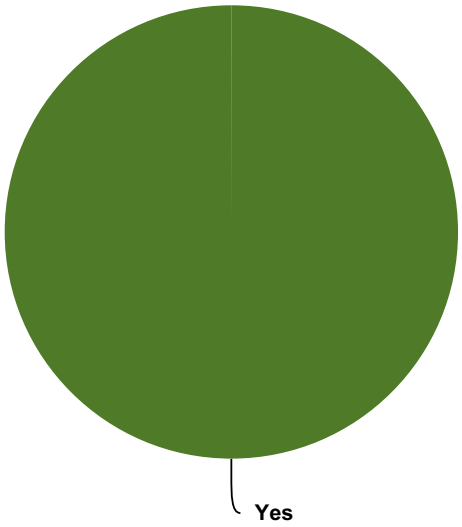


Answer Choices	Responses	
E-mail	**13.33%**	2
Newspaper	**0.00%**	0
Postcard/letter	**86.67%**	13
Facebook	**0.00%**	0
Radio	**0.00%**	0
Total		**15**

#	Other (please specify)	Date
1	word of mouth	3/3/2015 8:31 AM
2	Meeting	3/1/2015 8:54 AM

Q3 Were you aware of the importance of aquatic plants?

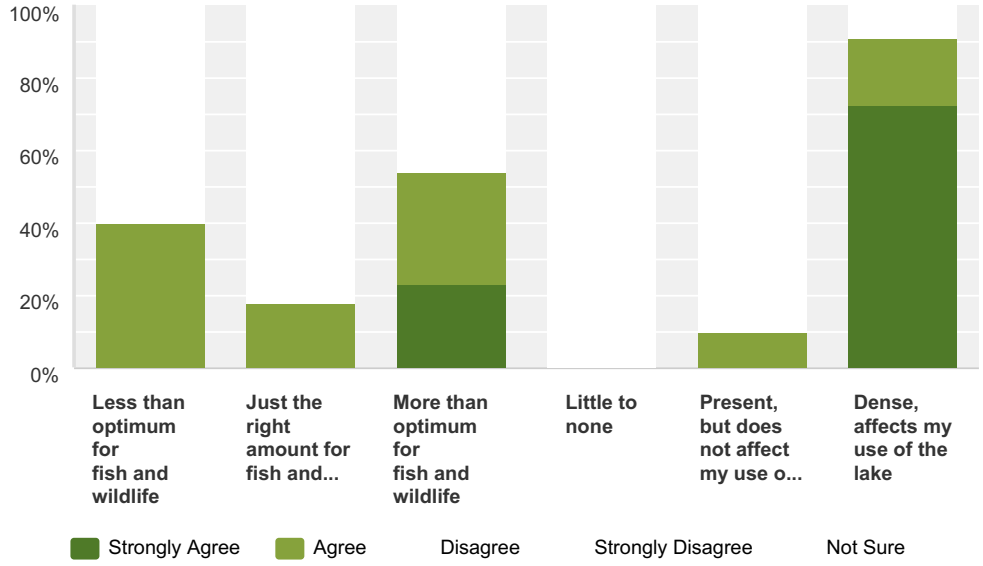
Answered: 14 Skipped: 3



Answer Choices	Responses	
Yes	**100.00%**	14
No	**0.00%**	0
Unsure	**0.00%**	0
Total		**14**

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

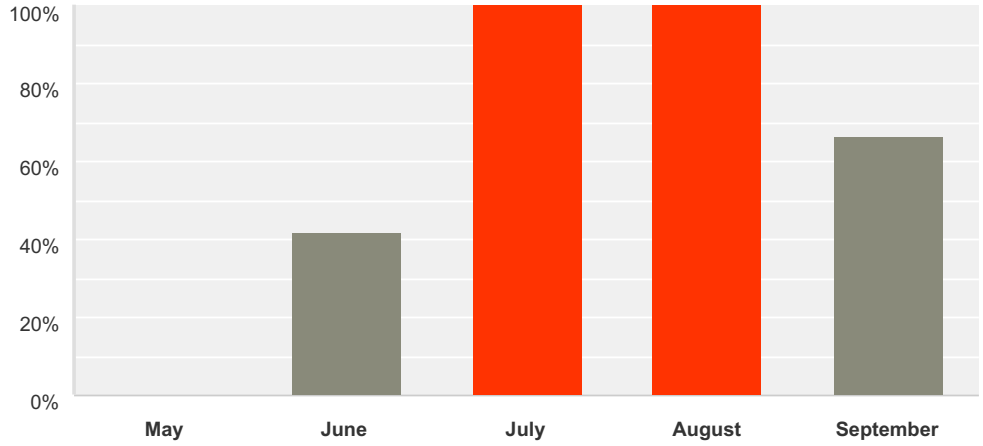
Answered: 15 Skipped: 2



	Strongly Agree	Agree	Disagree	Strongly Disagree	Not Sure	Total
Less than optimum for fish and wildlife	**0.00%** 0	**40.00%** 4	**30.00%** 3	**20.00%** 2	**10.00%** 1	10
Just the right amount for fish and wildlife	**0.00%** 0	**18.18%** 2	**72.73%** 8	**9.09%** 1	**0.00%** 0	11
More than optimum for fish and wildlife	**23.08%** 3	**30.77%** 4	**23.08%** 3	**23.08%** 3	**0.00%** 0	13
Little to none	**0.00%** 0	**0.00%** 0	**0.00%** 0	**80.00%** 8	**20.00%** 2	10
Present, but does not affect my use of the lake	**0.00%** 0	**10.00%** 1	**50.00%** 5	**40.00%** 4	**0.00%** 0	10
Dense, affects my use of the lake	**72.73%** 8	**18.18%** 2	**9.09%** 1	**0.00%** 0	**0.00%** 0	11

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

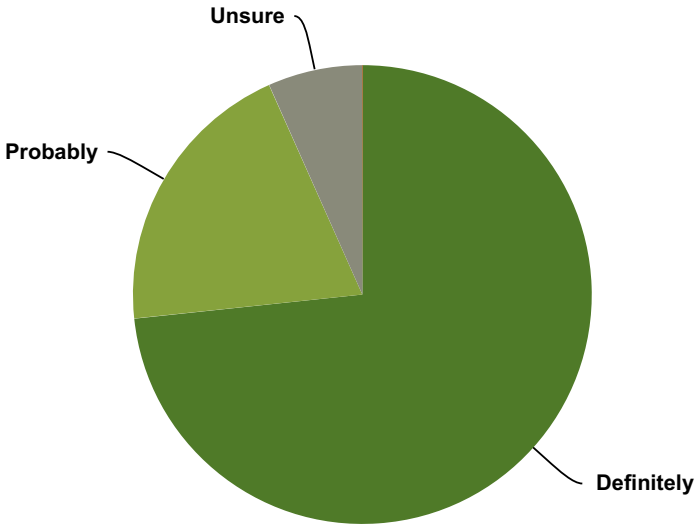
Answered: 12 Skipped: 5



Answer Choices	Responses	
May	**0.00%**	0
June	**41.67%**	5
July	**100.00%**	12
August	**100.00%**	12
September	**66.67%**	8
Total Respondents: 12		

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

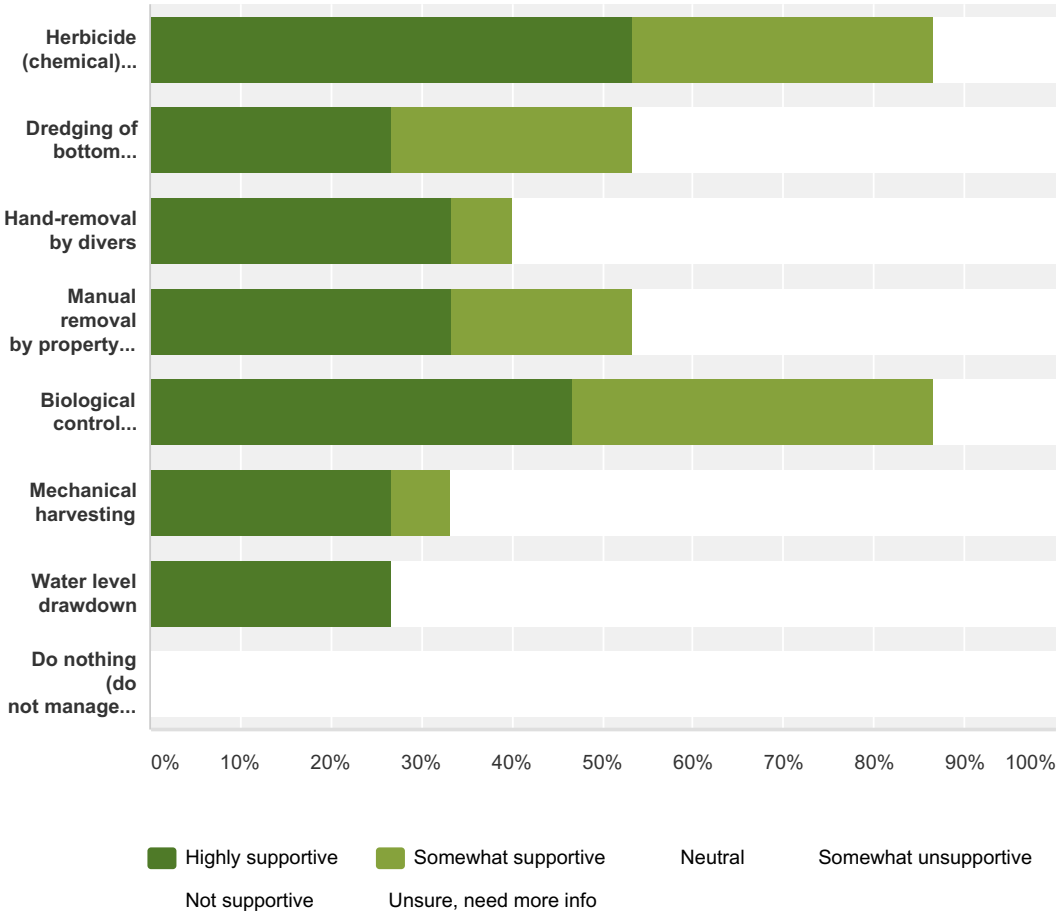
Answered: 15 Skipped: 2



Answer Choices	Responses	
Definitely	**73.33%**	11
Probably	**20.00%**	3
Unsure	**6.67%**	1
Probably not	**0.00%**	0
Definitely not	**0.00%**	0
Total		**15**

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

Answered: 15 Skipped: 2

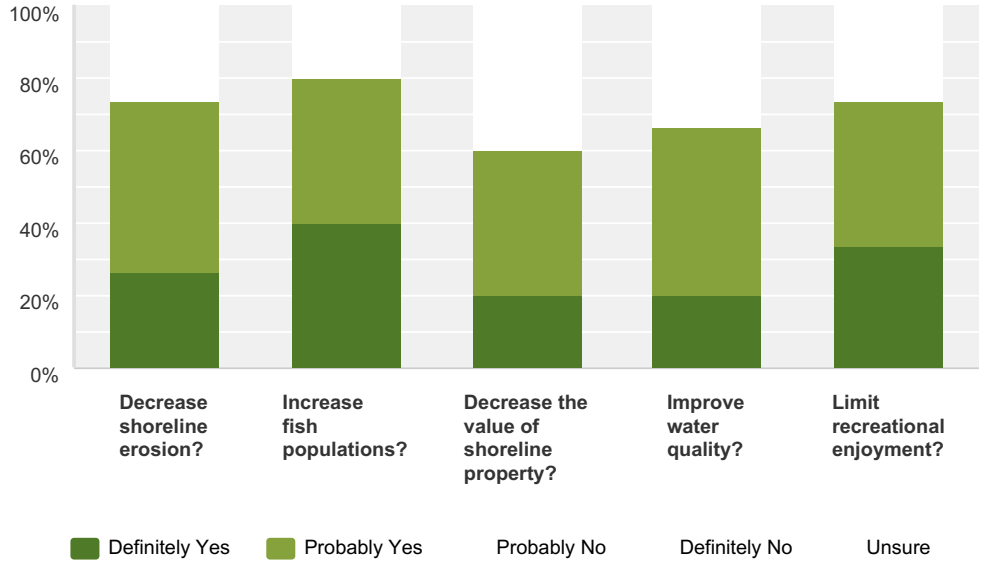


	Highly supportive	Somewhat supportive	Neutral	Somewhat unsupportive	Not supportive	Unsure, need more info	Total	Weighted Average
Herbicide (chemical) control	**53.33%** 8	**33.33%** 5	**0.00%** 0	**6.67%** 1	**6.67%** 1	**0.00%** 0	15	1.80
Dredging of bottom sediments	**26.67%** 4	**26.67%** 4	**6.67%** 1	**0.00%** 0	**26.67%** 4	**13.33%** 2	15	2.33
Hand-removal by divers	**33.33%** 5	**6.67%** 1	**13.33%** 2	**13.33%** 2	**13.33%** 2	**20.00%** 3	15	2.07
Manual removal by property owners	**33.33%** 5	**20.00%** 3	**13.33%** 2	**6.67%** 1	**20.00%** 3	**6.67%** 1	15	2.40
Biological control (milfoil weevil, loosestrife beetle, etc.)	**46.67%** 7	**40.00%** 6	**6.67%** 1	**0.00%** 0	**0.00%** 0	**6.67%** 1	15	1.47
Mechanical harvesting	**26.67%** 4	**6.67%** 1	**20.00%** 3	**0.00%** 0	**40.00%** 6	**6.67%** 1	15	3.00

Water level drawdown	**26.67%** 4	**0.00%** 0	**0.00%** 0	**0.00%** 0	**53.33%** 8	**20.00%** 3	15	2.93
Do nothing (do not manage plants)	**0.00%** 0	**0.00%** 0	**0.00%** 0	**0.00%** 0	**100.00%** 14	**0.00%** 0	14	5.00

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

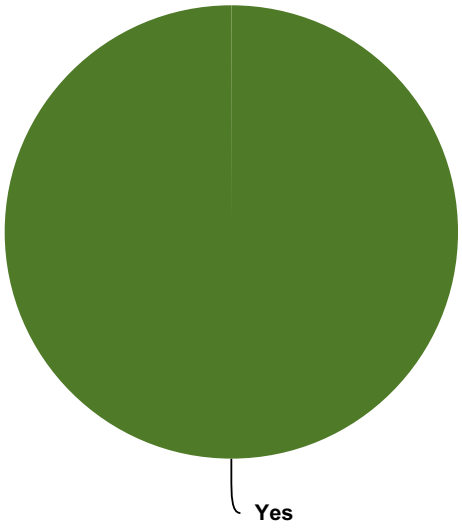
Answered: 15 Skipped: 2



	Definitely Yes	Probably Yes	Probably No	Definitely No	Unsure	Total
Decrease shoreline erosion?	**26.67%** 4	**46.67%** 7	**13.33%** 2	**6.67%** 1	**6.67%** 1	15
Increase fish populations?	**40.00%** 6	**40.00%** 6	**6.67%** 1	**6.67%** 1	**6.67%** 1	15
Decrease the value of shoreline property?	**20.00%** 3	**40.00%** 6	**26.67%** 4	**13.33%** 2	**0.00%** 0	15
Improve water quality?	**20.00%** 3	**46.67%** 7	**13.33%** 2	**6.67%** 1	**13.33%** 2	15
Limit recreational enjoyment?	**33.33%** 5	**40.00%** 6	**13.33%** 2	**13.33%** 2	**0.00%** 0	15

Q9 Have you ever heard of aquatic invasive species?

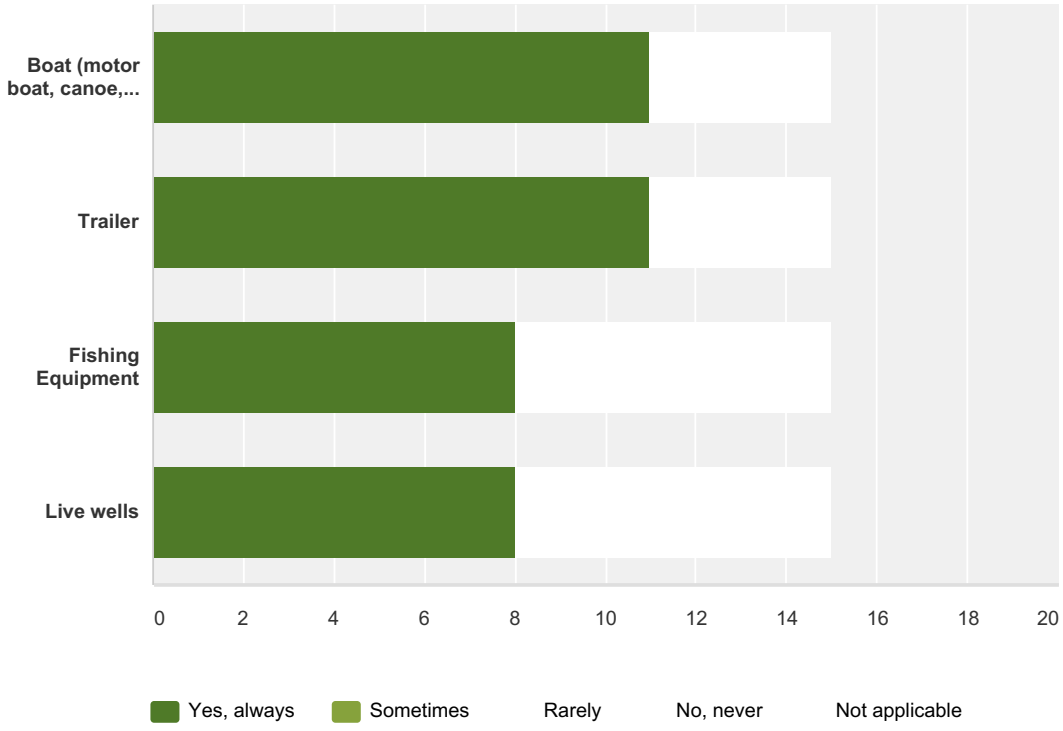
Answered: 15 Skipped: 2



Answer Choices	Responses	
Yes	**100.00%**	15
No	**0.00%**	0
Total		**15**

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

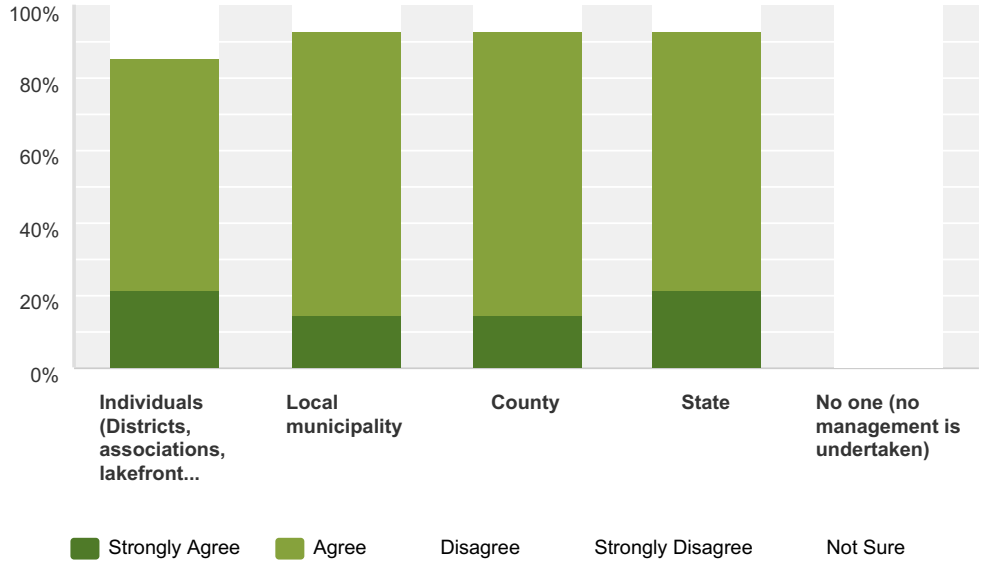
Answered: 15 Skipped: 2



	Yes, always	Sometimes	Rarely	No, never	Not applicable	Total Respondents
Boat (motor boat, canoe, kayak, etc.)	**73.33%** 11	**0.00%** 0	**0.00%** 0	**0.00%** 0	**26.67%** 4	15
Trailer	**73.33%** 11	**0.00%** 0	**0.00%** 0	**0.00%** 0	**26.67%** 4	15
Fishing Equipment	**53.33%** 8	**0.00%** 0	**6.67%** 1	**0.00%** 0	**40.00%** 6	15
Live wells	**53.33%** 8	**0.00%** 0	**0.00%** 0	**0.00%** 0	**46.67%** 7	15

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

Answered: 14 Skipped: 3

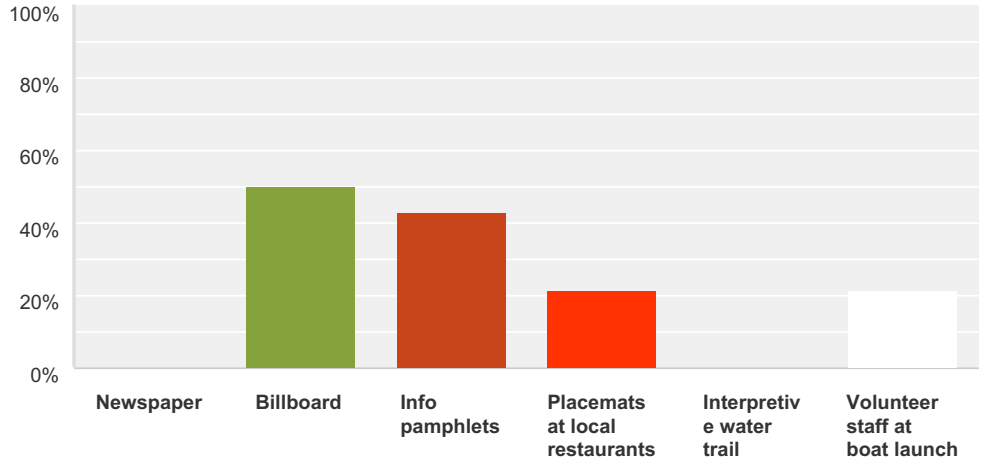


	Strongly Agree	Agree	Disagree	Strongly Disagree	Not Sure	Total
Individuals (Districts, associations, lakefront property owners)	**21.43%** 3	**64.29%** 9	**7.14%** 1	**7.14%** 1	**0.00%** 0	14
Local municipality	**14.29%** 2	**78.57%** 11	**0.00%** 0	**7.14%** 1	**0.00%** 0	14
County	**14.29%** 2	**78.57%** 11	**7.14%** 1	**0.00%** 0	**0.00%** 0	14
State	**21.43%** 3	**71.43%** 10	**7.14%** 1	**0.00%** 0	**0.00%** 0	14
No one (no management is undertaken)	**0.00%** 0	**0.00%** 0	**10.00%** 1	**90.00%** 9	**0.00%** 0	10

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

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

Answered: 14 Skipped: 3

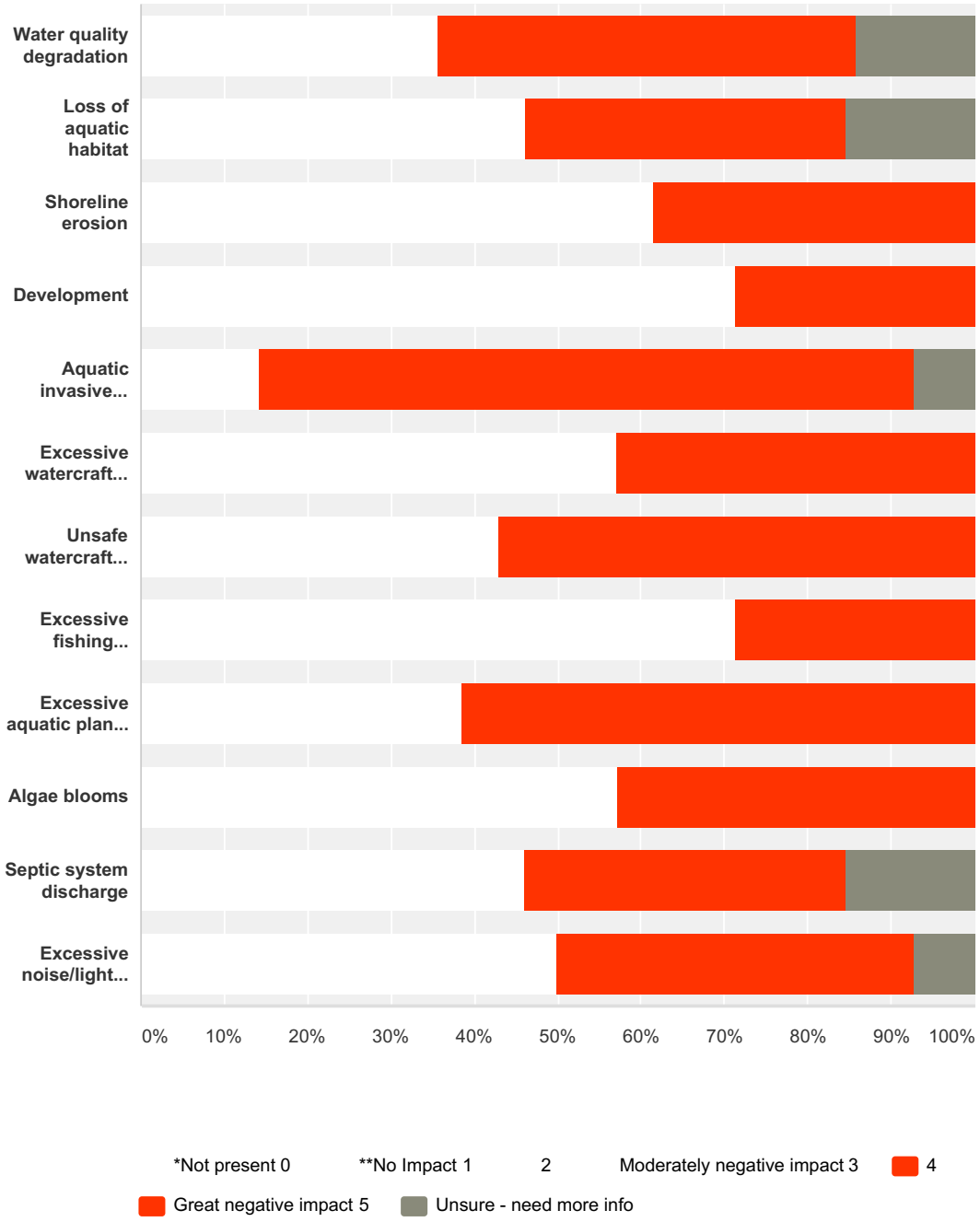


Answer Choices	Responses	
Newspaper	0.00%	0
Billboard	50.00%	7
Info pamphlets	42.86%	6
Placemats at local restaurants	21.43%	3
Interpretive water trail	0.00%	0
Volunteer staff at boat launch	21.43%	3
Total Respondents: 14		

#	Other (please specify)	Date
1	signs at boat launches and public accesses.	3/3/2015 6:12 PM
2	Post signs at boat launch	3/2/2015 8:34 PM
3	Lake Association Meetings	3/1/2015 7:45 AM

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

Answered: 14 Skipped: 3



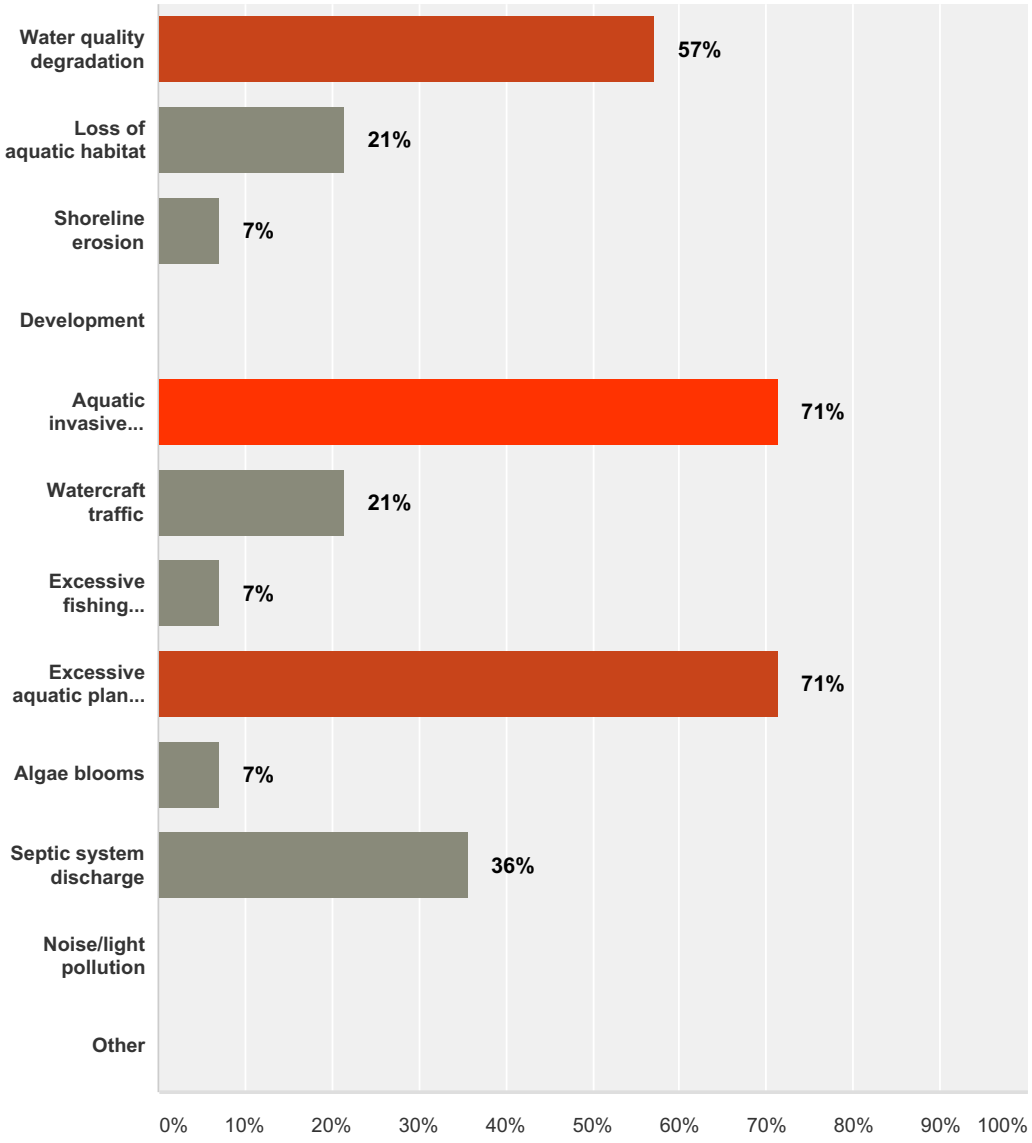
	*Not present 0	**No Impact 1	2	Moderately negative impact 3	4	Great negative impact 5	Unsure - need more info	Total	Weighted Average
Water quality degradation	**7.14%** 1	**0.00%** 0	**0.00%** 0	**28.57%** 4	**14.29%** 2	**35.71%** 5	**14.29%** 2	14	3.21
Loss of aquatic habitat	**15.38%** 2	**7.69%** 1	**0.00%** 0	**23.08%** 3	**23.08%** 3	**15.38%** 2	**15.38%** 2	13	2.46
Shoreline erosion	**15.38%** 2	**23.08%** 3	**15.38%** 2	**7.69%** 1	**30.77%** 4	**7.69%** 1	**0.00%** 0	13	2.38
Development	**14.29%** 2	**21.43%** 3	**21.43%** 3	**14.29%** 2	**21.43%** 3	**7.14%** 1	**0.00%** 0	14	2.29

Aquatic invasive species introduction	**0.00%** 0	**7.14%** 1	**0.00%** 0	**7.14%** 1	**0.00%** 0	**78.57%** 11	**7.14%** 1	14	4.21
Excessive watercraft traffic	**7.14%** 1	**28.57%** 4	**7.14%** 1	**14.29%** 2	**14.29%** 2	**28.57%** 4	**0.00%** 0	14	2.86
Unsafe watercraft practices	**7.14%** 1	**7.14%** 1	**21.43%** 3	**7.14%** 1	**28.57%** 4	**28.57%** 4	**0.00%** 0	14	3.29
Excessive fishing pressure	**14.29%** 2	**14.29%** 2	**28.57%** 4	**14.29%** 2	**14.29%** 2	**14.29%** 2	**0.00%** 0	14	2.43
Excessive aquatic plant growth (excluding algae)	**0.00%** 0	**7.69%** 1	**0.00%** 0	**30.77%** 4	**15.38%** 2	**46.15%** 6	**0.00%** 0	13	3.92
Algae blooms	**14.29%** 2	**21.43%** 3	**0.00%** 0	**21.43%** 3	**7.14%** 1	**35.71%** 5	**0.00%** 0	14	2.93
Septic system discharge	**23.08%** 3	**15.38%** 2	**0.00%** 0	**7.69%** 1	**15.38%** 2	**23.08%** 3	**15.38%** 2	13	2.15
Excessive noise/light pollution	**21.43%** 3	**14.29%** 2	**14.29%** 2	**0.00%** 0	**21.43%** 3	**21.43%** 3	**7.14%** 1	14	2.36

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

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

Answered: 14 Skipped: 3



Answer Choices	Responses	
Water quality degradation	57%	8
Loss of aquatic habitat	21%	3
Shoreline erosion	7%	1
Development	0%	0
Aquatic invasive species introduction	71%	10
Watercraft traffic	21%	3

Excessive fishing pressure	**7%**	1
Excessive aquatic plant growth (excluding algae)	**71%**	10
Algae blooms	**7%**	1
Septic system discharge	**36%**	5
Noise/light pollution	**0%**	0
Other	**0%**	0
Total Respondents: 14		

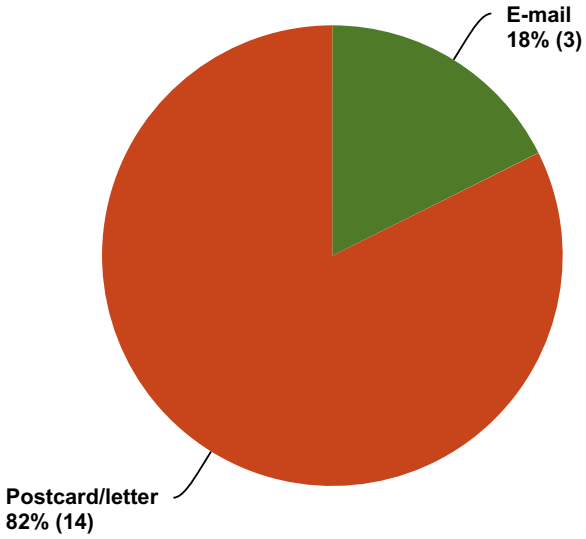
Q1 What is your Waushara County Lakes Study ID?

Answered: 19 Skipped: 0

#	Responses	Date
1	[redacted]	4/8/2015 7:59 PM
2	[redacted]	4/8/2015 7:41 PM
3	[redacted]	4/7/2015 2:31 PM
4	[redacted]	4/7/2015 2:19 PM
5	[redacted]	4/6/2015 7:02 AM
6	[redacted]	4/2/2015 11:24 AM
7	[redacted]	4/2/2015 11:11 AM
8	[redacted]	3/31/2015 7:47 PM
9	[redacted]	3/31/2015 4:20 PM
10	[redacted]	3/31/2015 8:17 AM
11	[redacted]	3/30/2015 7:19 PM
12	[redacted]	3/30/2015 5:49 PM
13	[redacted]	3/30/2015 11:32 AM
14	[redacted]	3/30/2015 9:34 AM
15	[redacted]	3/29/2015 2:30 PM
16	[redacted]	3/29/2015 7:10 AM
17	[redacted]	3/28/2015 3:38 PM
18	[redacted]	3/27/2015 7:07 AM
19	[redacted]	3/26/2015 9:47 PM

Q2 How did you hear about this survey?

Answered: 17 Skipped: 2

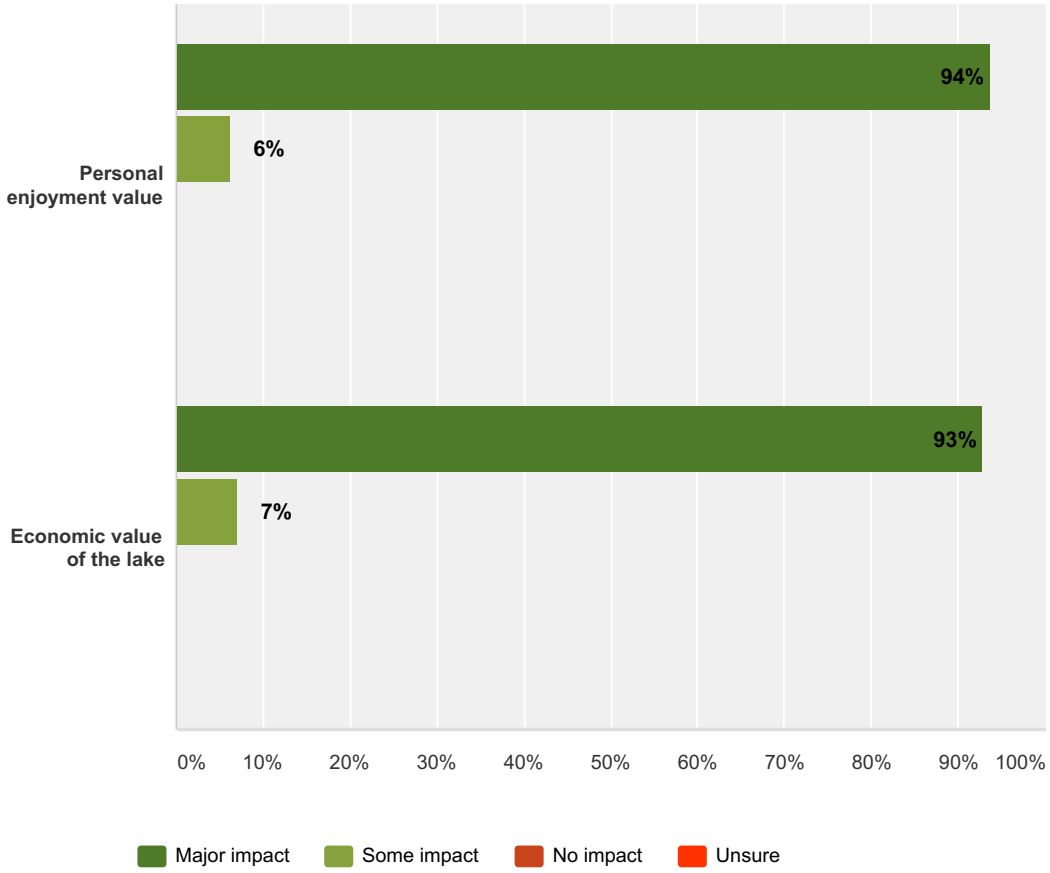


Answer Choices	Responses	
E-mail	18%	3
Newspaper	0%	0
Postcard/letter	82%	14
Facebook	0%	0
Radio	0%	0
Word of mouth	0%	0
Total		17

#	Other (please specify)	Date
1	documentation from family member	4/2/2015 11:24 AM
2	documentation from family member	4/2/2015 11:11 AM

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

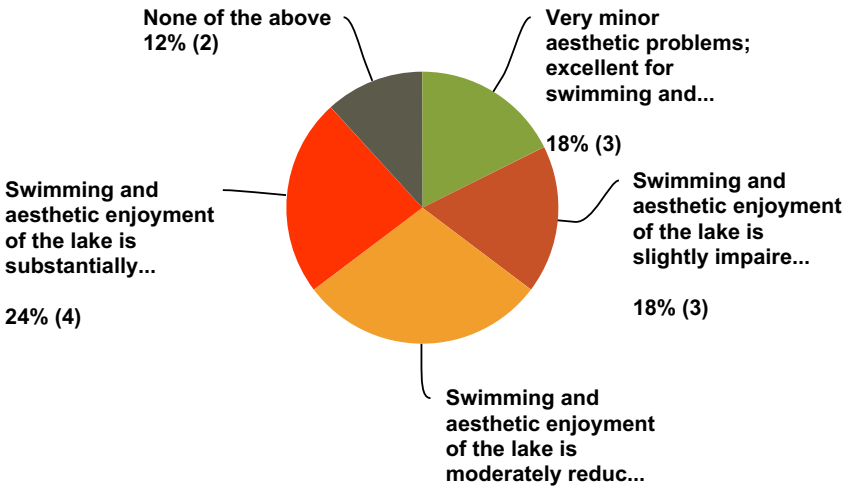
Answered: 16 Skipped: 3



	Major impact	Some impact	No impact	Unsure	Total
Personal enjoyment value	**94%** 15	**6%** 1	**0%** 0	**0%** 0	16
Economic value of the lake	**93%** 13	**7%** 1	**0%** 0	**0%** 0	14

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

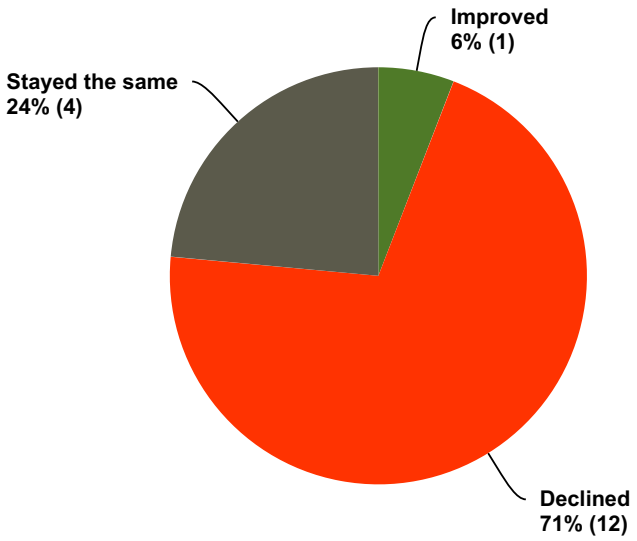
Answered: 17 Skipped: 2



Answer Choices	Responses	
Beautiful, could not be any nicer	0%	0
Very minor aesthetic problems; excellent for swimming and boating enjoyment	18%	3
Swimming and aesthetic enjoyment of the lake is slightly impaired because of algae	18%	3
Swimming and aesthetic enjoyment of the lake is moderately reduced because of algae	29%	5
Swimming and aesthetic enjoyment of the lake is substantially reduced because of algae	24%	4
None of the above	12%	2
Unsure	0%	0
Total		**17**

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

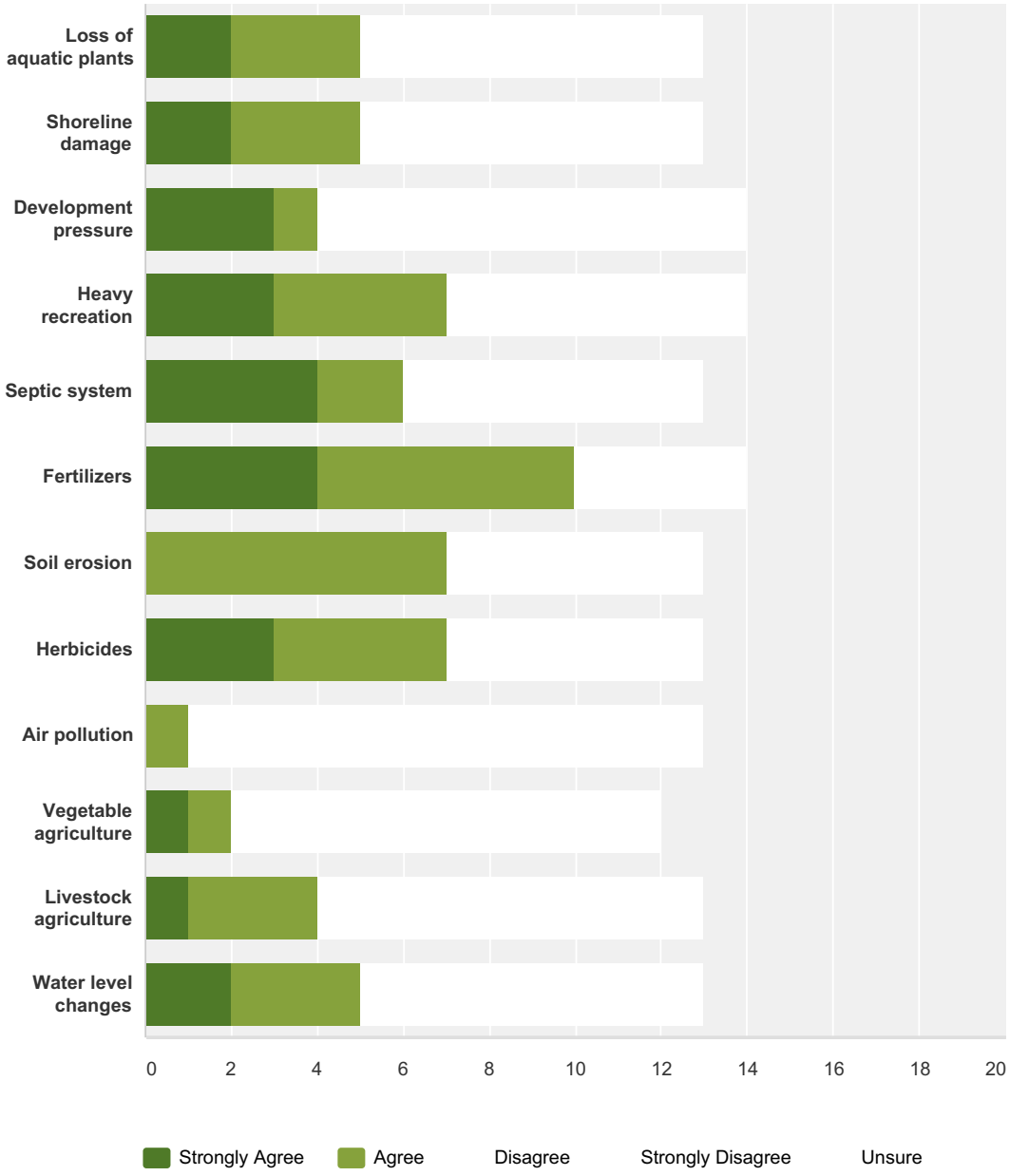
Answered: 17 Skipped: 2



Answer Choices	Responses	
Improved	6%	1
Declined	71%	12
Stayed the same	24%	4
Unsure	0%	0
Total		17

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

Answered: 15 Skipped: 4

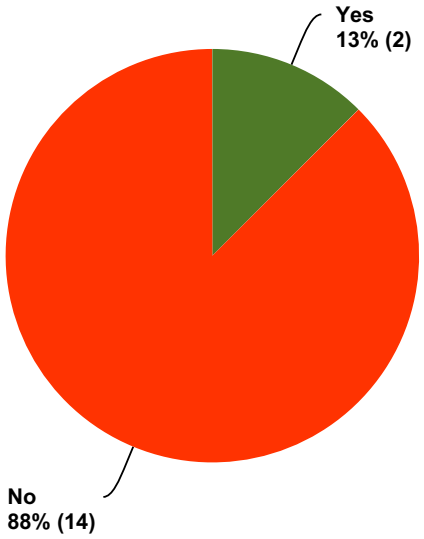


	Strongly Agree	Agree	Disagree	Strongly Disagree	Unsure	Total Respondents
Loss of aquatic plants	**15%** 2	**23%** 3	**15%** 2	**38%** 5	**8%** 1	13
Shoreline damage	**15%** 2	**23%** 3	**23%** 3	**15%** 2	**23%** 3	13
Development pressure	**21%** 3	**7%** 1	**29%** 4	**21%** 3	**21%** 3	14
Heavy recreation	**21%** 3	**29%** 4	**29%** 4	**21%** 3	**0%** 0	14

Septic system	**31%** 4	**15%** 2	**23%** 3	**0%** 0	**31%** 4	13
Fertilizers	**29%** 4	**43%** 6	**7%** 1	**7%** 1	**14%** 2	14
Soil erosion	**0%** 0	**54%** 7	**23%** 3	**8%** 1	**15%** 2	13
Herbicides	**23%** 3	**31%** 4	**15%** 2	**0%** 0	**31%** 4	13
Air pollution	**0%** 0	**8%** 1	**46%** 6	**15%** 2	**31%** 4	13
Vegetable agriculture	**8%** 1	**8%** 1	**50%** 6	**17%** 2	**17%** 2	12
Livestock agriculture	**8%** 1	**23%** 3	**54%** 7	**15%** 2	**0%** 0	13
Water level changes	**15%** 2	**23%** 3	**46%** 6	**0%** 0	**15%** 2	13

Q7 Do you use herbicides or pesticides (i.e. "weed and feed") on your land? If selecting No, please skip to Question 11.

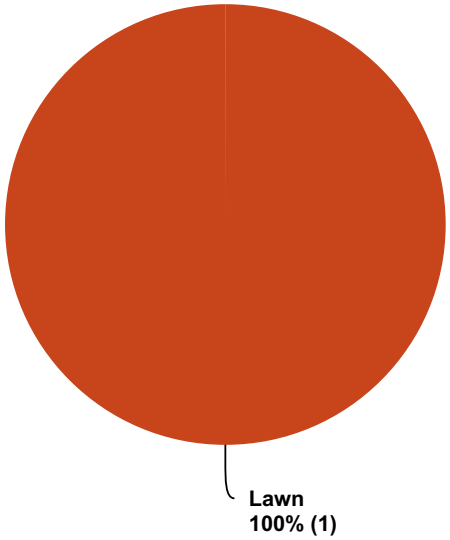
Answered: 16 Skipped: 3



Answer Choices	Responses	
Yes	13%	2
No	88%	14
Total		16

Q8 Where do you apply herbicides and/or pesticides?

Answered: 1 Skipped: 18

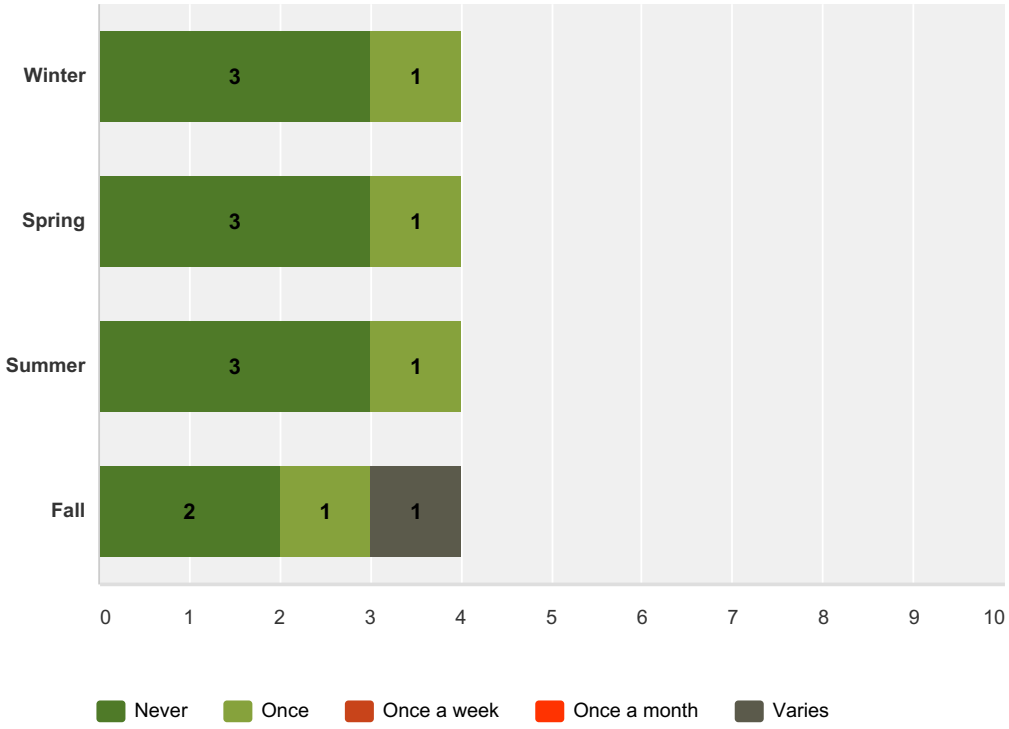


Answer Choices	Responses	
Agricultural fields	0%	0
Garden	0%	0
Lawn	100%	1
Total		1

#	Other (please specify)	Date
1	wild areas to get rid of an invasive species	4/2/2015 11:15 AM
2	none	3/27/2015 7:10 AM

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

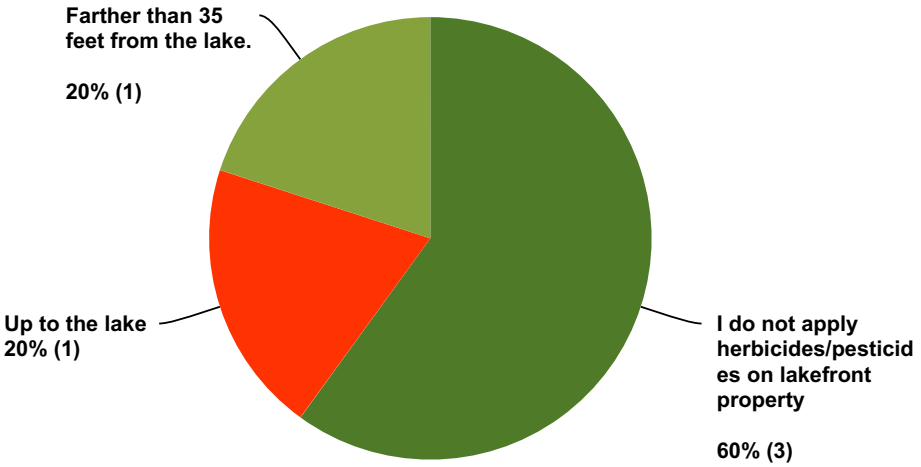
Answered: 4 Skipped: 15



	Never	Once	Once a week	Once a month	Varies	Total Respondents
Winter	**75%** 3	**25%** 1	**0%** 0	**0%** 0	**0%** 0	4
Spring	**75%** 3	**25%** 1	**0%** 0	**0%** 0	**0%** 0	4
Summer	**75%** 3	**25%** 1	**0%** 0	**0%** 0	**0%** 0	4
Fall	**50%** 2	**25%** 1	**0%** 0	**0%** 0	**25%** 1	4

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)?

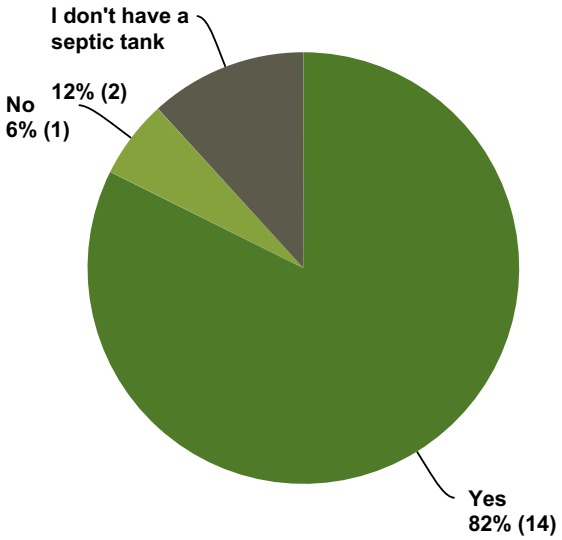
Answered: 5 Skipped: 14



Answer Choices	Responses	
I do not apply herbicides/pesticides on lakefront property	60%	3
Up to the lake	20%	1
Within 35 feet of the lake	0%	0
Farther than 35 feet from the lake.	20%	1
Total		5

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

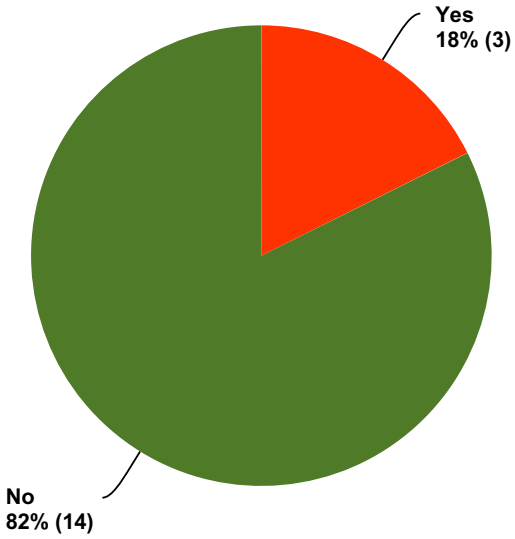
Answered: 17 Skipped: 2



Answer Choices	Responses	
Yes	82%	14
No	6%	1
I don't have a septic tank	12%	2
Total		17

Q12 Do you use fertilizer on your land?

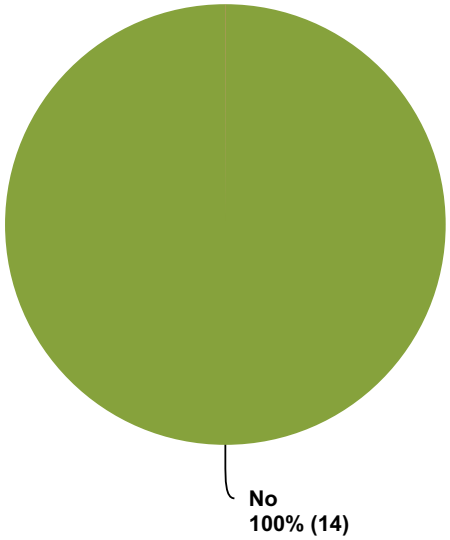
Answered: 17 Skipped: 2



Answer Choices	Responses	
Yes	18%	3
No	82%	14
Total		17

Q13 Do you use fertilizer which contains phosphorus?

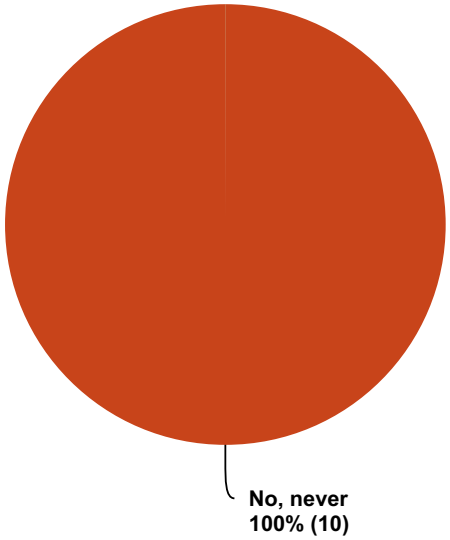
Answered: 14 Skipped: 5



Answer Choices	Responses	
Yes	0%	0
No	100%	14
I don't know	0%	0
Total		14

Q14 Do you have your soil tested before applying fertilizer?

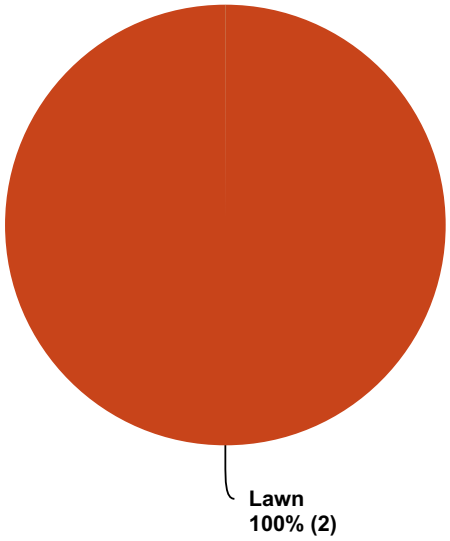
Answered: 10 Skipped: 9



Answer Choices	Responses	
Yes, all of the time	0%	0
Yes, some of the time	0%	0
No, never	100%	10
Total		10

Q15 Where do you apply fertilizer?

Answered: 2 Skipped: 17

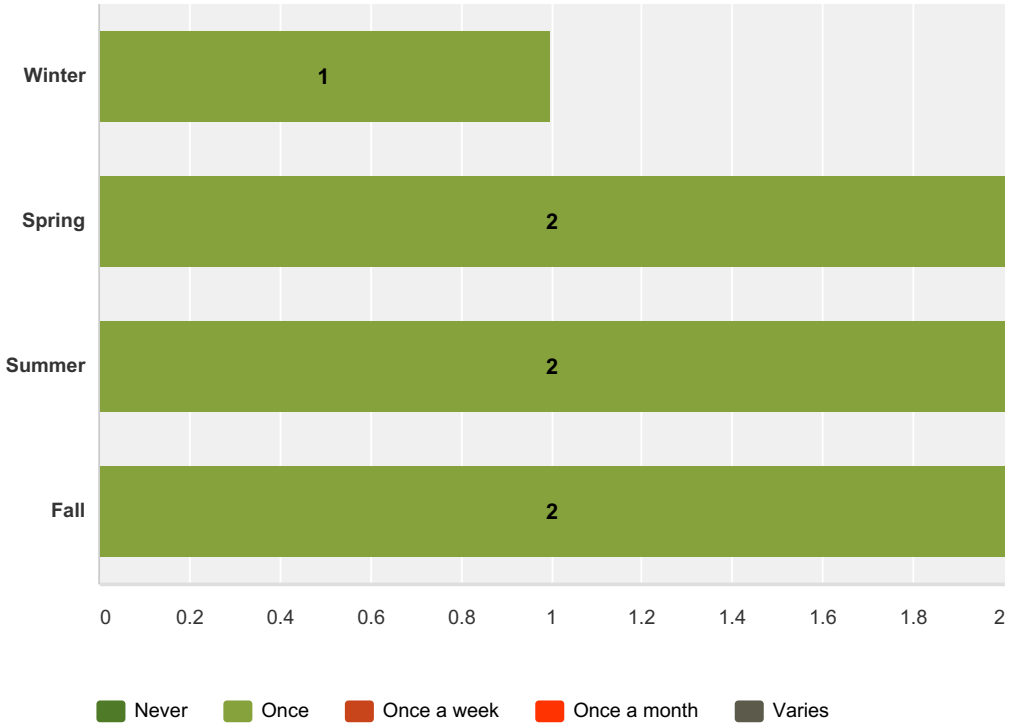


Answer Choices	Responses	
Agricultural fields	0%	0
Garden	0%	0
Lawn	100%	2
Total		2

#	Other (please specify)	Date
1	small lawn is 150 feet from lake, apply 3 times per year	4/2/2015 11:17 AM

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

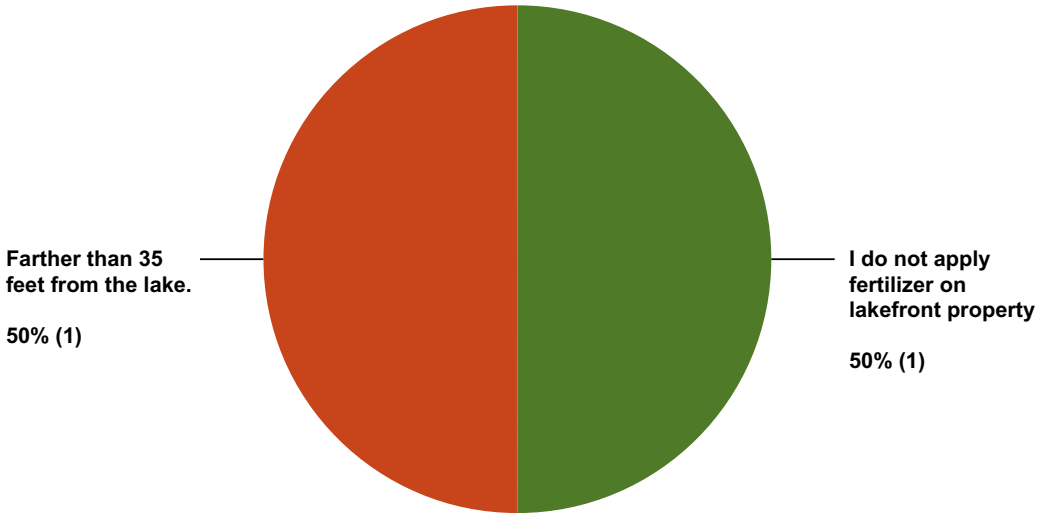
Answered: 2 Skipped: 17



	Never	Once	Once a week	Once a month	Varies	Total Respondents
Winter	0% 0	100% 1	0% 0	0% 0	0% 0	1
Spring	0% 0	100% 2	0% 0	0% 0	0% 0	2
Summer	0% 0	100% 2	0% 0	0% 0	0% 0	2
Fall	0% 0	100% 2	0% 0	0% 0	0% 0	2

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

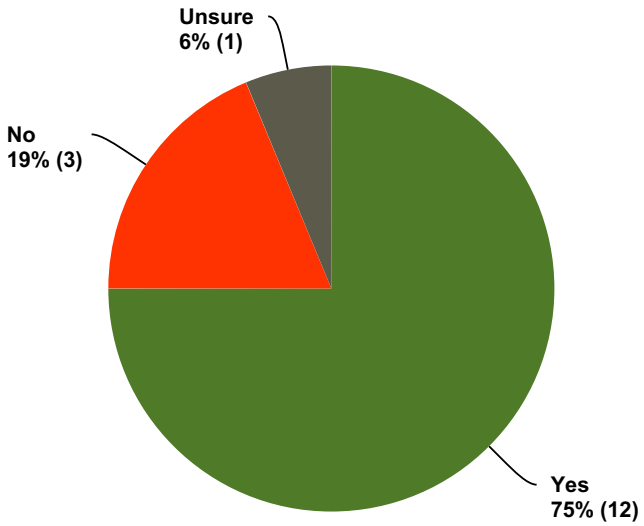
Answered: 2 Skipped: 17



Answer Choices	Responses	
I do not apply fertilizer on lakefront property	50%	1
Up to the lake	0%	0
Within 35 feet of the lake	0%	0
Farther than 35 feet from the lake.	50%	1
Total		2

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

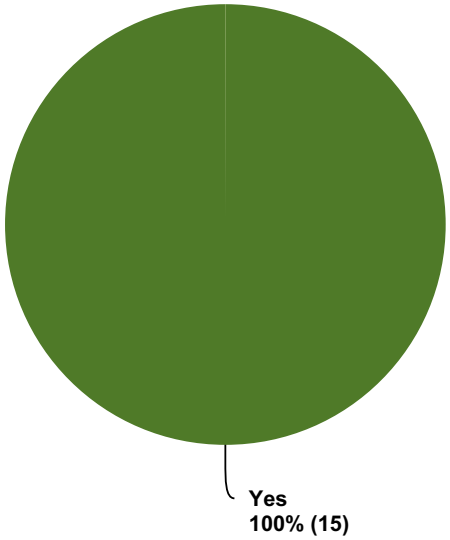
Answered: 16 Skipped: 3



Answer Choices	Responses	
Yes	75%	12
No	19%	3
Unsure	6%	1
Total		16

Q19 Do you own shoreland property? If selecting No, please skip to the last page.

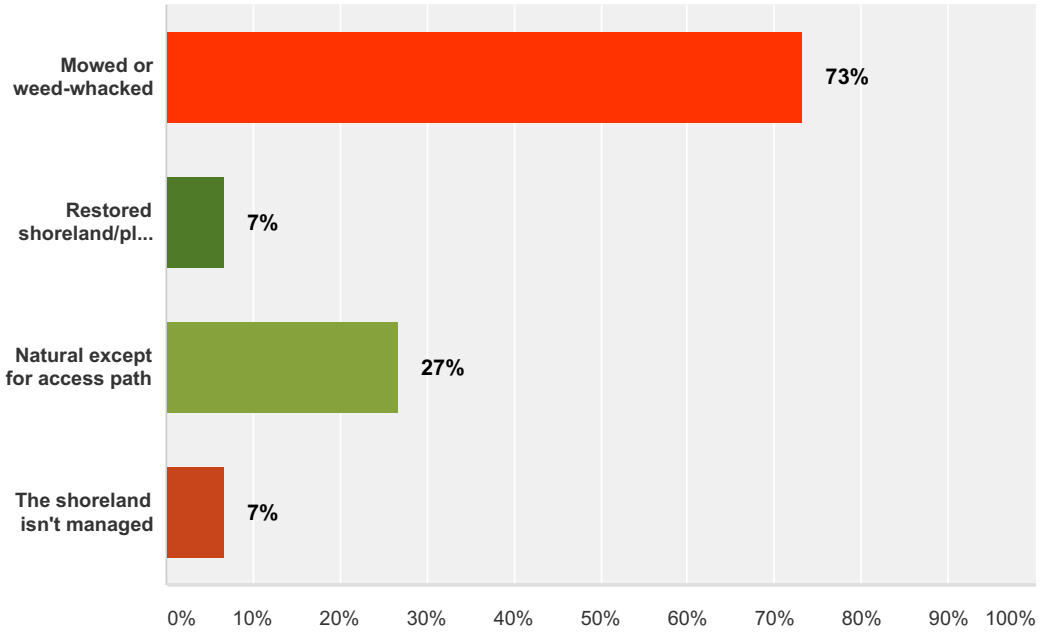
Answered: 15 Skipped: 4



Answer Choices	Responses	
Yes	100%	15
No	0%	0
Total		15

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

Answered: 15 Skipped: 4

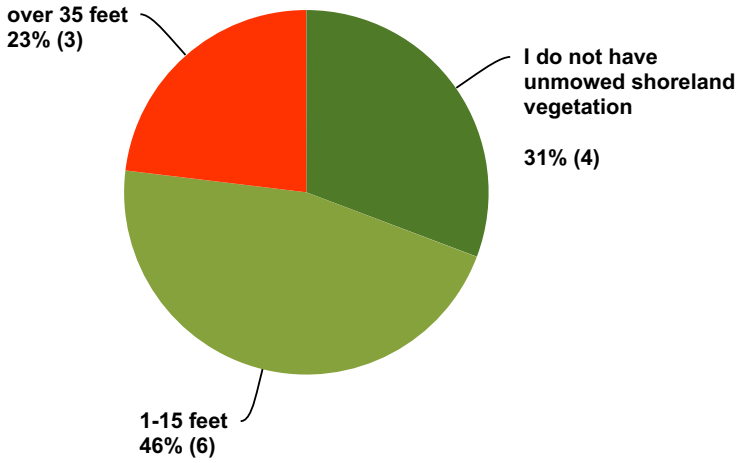


Answer Choices	Responses	
Mowed or weed-whacked	73%	11
Restored shoreland/planted	7%	1
Natural except for access path	27%	4
The shoreland isn't managed	7%	1
Total Respondents: 15		

#	Other (please specify)	Date
1	Cant remember name but we had a 1 foot roll of material installed all along the shoreline. THen, we had wildflowers and grasses planted. No trees removed.	4/2/2015 11:19 AM
2	Weed whack a small area but mostly natural	3/30/2015 5:59 PM
3	half natural half mowed	3/27/2015 7:13 AM

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

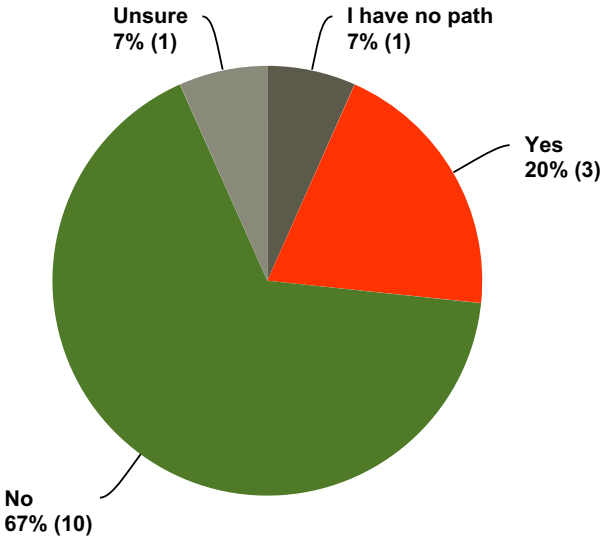
Answered: 13 Skipped: 6



Answer Choices	Responses	
I do not have unmowed shoreland vegetation	31%	4
1-15 feet	46%	6
16-35 feet	0%	0
over 35 feet	23%	3
Total		13

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

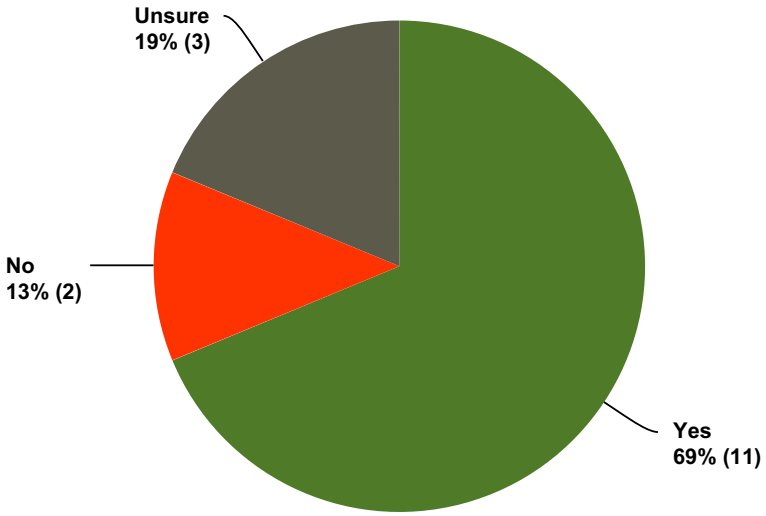
Answered: 15 Skipped: 4



Answer Choices	Responses	
I have no path	7%	1
Yes	20%	3
No	67%	10
Unsure	7%	1
Total		15

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

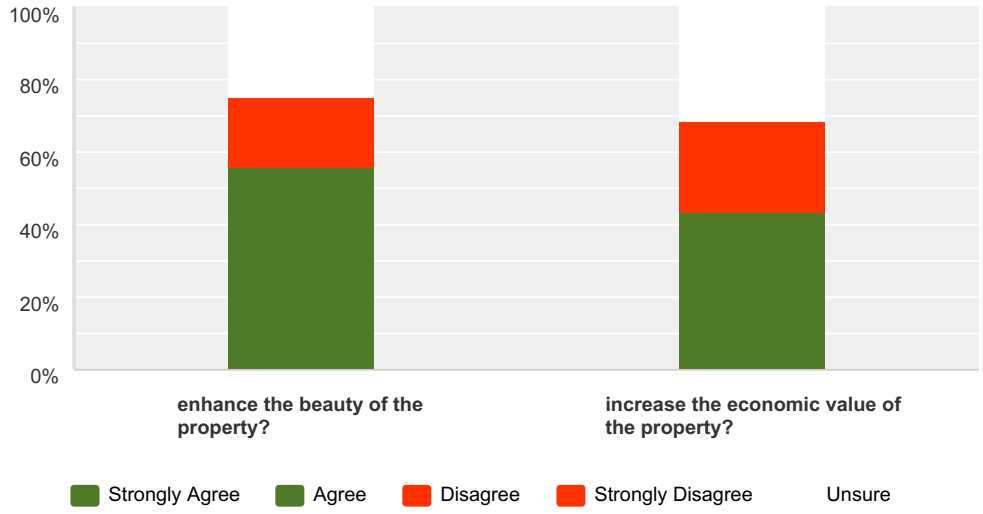
Answered: 16 Skipped: 3



Answer Choices	Responses	
Yes	69%	11
No	13%	2
Unsure	19%	3
Total		16

Q24 In your opinion, does shoreland vegetation...

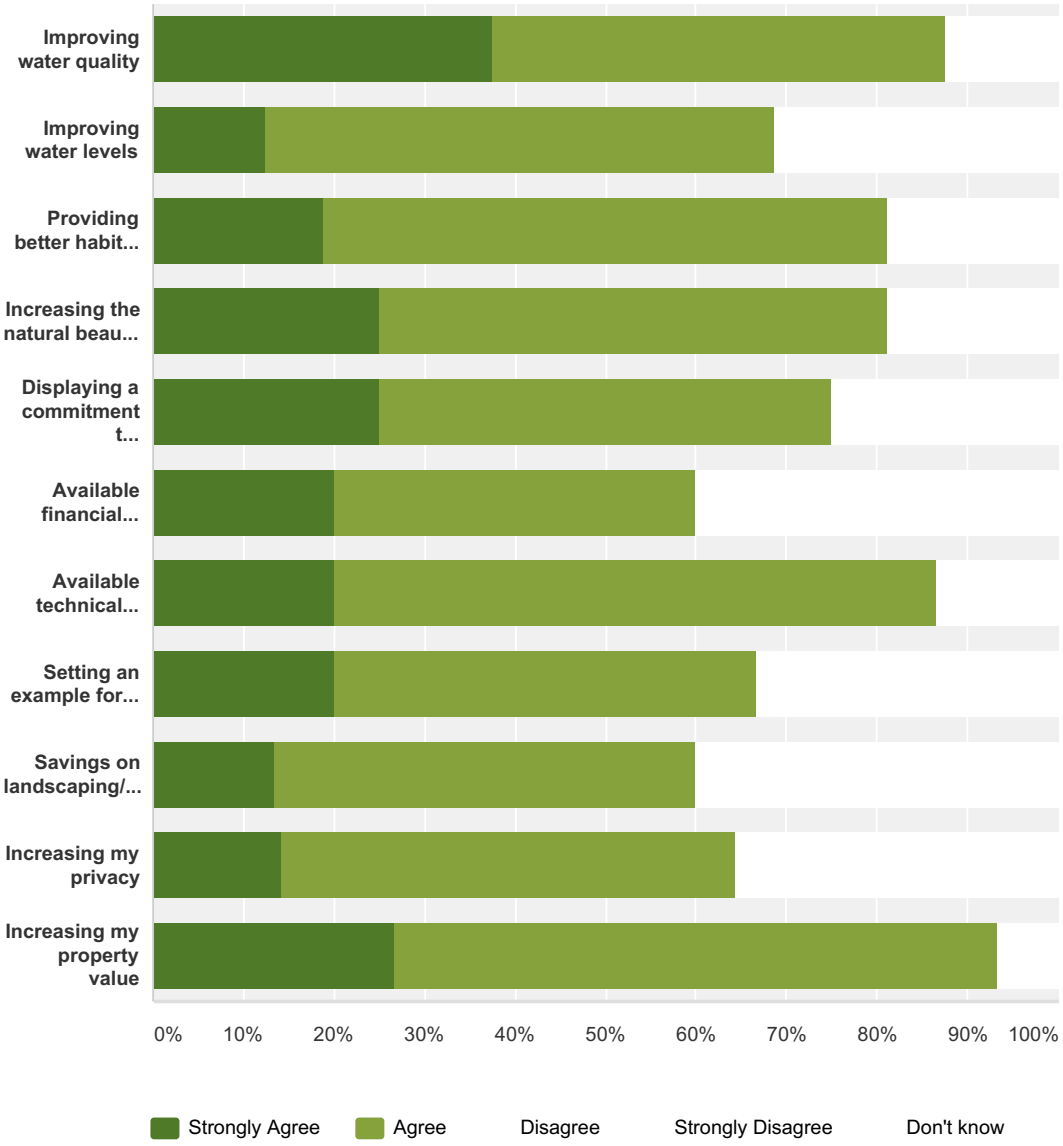
Answered: 16 Skipped: 3



	Strongly Agree	Agree	Disagree	Strongly Disagree	Unsure	Total
enhance the beauty of the property?	**19%** 3	**38%** 6	**13%** 2	**6%** 1	**25%** 4	16
increase the economic value of the property?	**19%** 3	**25%** 4	**19%** 3	**6%** 1	**31%** 5	16

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

Answered: 16 Skipped: 3



	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't know	Total
Improving water quality	**38%** 6	**50%** 8	**13%** 2	**0%** 0	**0%** 0	16
Improving water levels	**13%** 2	**56%** 9	**19%** 3	**0%** 0	**13%** 2	16
Providing better habitat for fish and wildlife	**19%** 3	**63%** 10	**13%** 2	**0%** 0	**6%** 1	16
Increasing the natural beauty of my property	**25%** 4	**56%** 9	**13%** 2	**0%** 0	**6%** 1	16
Displaying a commitment to the environment	**25%** 4	**50%** 8	**13%** 2	**6%** 1	**6%** 1	16

Available financial assistance	**20%** 3	**40%** 6	**33%** 5	**7%** 1	**0%** 0	15
Available technical assistance	**20%** 3	**67%** 10	**13%** 2	**0%** 0	**0%** 0	15
Setting an example for community members	**20%** 3	**47%** 7	**27%** 4	**7%** 1	**0%** 0	15
Savings on landscaping/maintenance costs	**13%** 2	**47%** 7	**27%** 4	**0%** 0	**13%** 2	15
Increasing my privacy	**14%** 2	**50%** 7	**36%** 5	**0%** 0	**0%** 0	14
Increasing my property value	**27%** 4	**67%** 10	**7%** 1	**0%** 0	**0%** 0	15

#	Other (please specify)	Date
1	Near a boat landing, no wake signs removed, suffering shore erosion	4/7/2015 2:29 PM

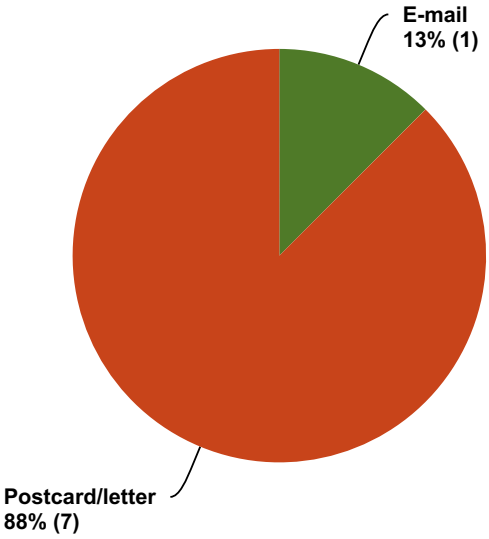
Q1 Enter your Waushara County Lakes Survey ID. Your survey cannot be processed without this information. If you've forgotten your ID or haven't created one yet, follow the instructions below.

Answered: 8 Skipped: 0

#	Responses	Date
1	[redacted]	5/1/2015 6:56 AM
2	[redacted]	4/28/2015 6:52 PM
3	[redacted]	4/27/2015 9:31 PM
4	[redacted]	4/25/2015 4:23 PM
5	[redacted]	4/25/2015 4:16 PM
6	[redacted]	4/24/2015 12:08 PM
7	[redacted]	4/21/2015 6:31 PM
8	[redacted]	4/20/2015 6:03 PM

Q2 How did you hear about this survey?

Answered: 8 Skipped: 0

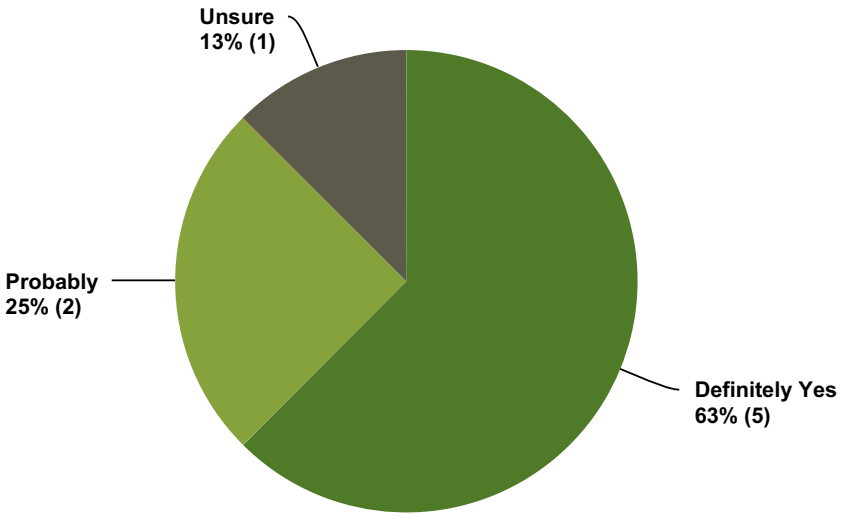


Answer Choices	Responses	
E-mail	13%	1
Newspaper	0%	0
Postcard/letter	88%	7
Facebook	0%	0
Radio	0%	0
Total		8

#	Other (please specify)	Date
1	postcard in the mail	4/21/2015 6:31 PM

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

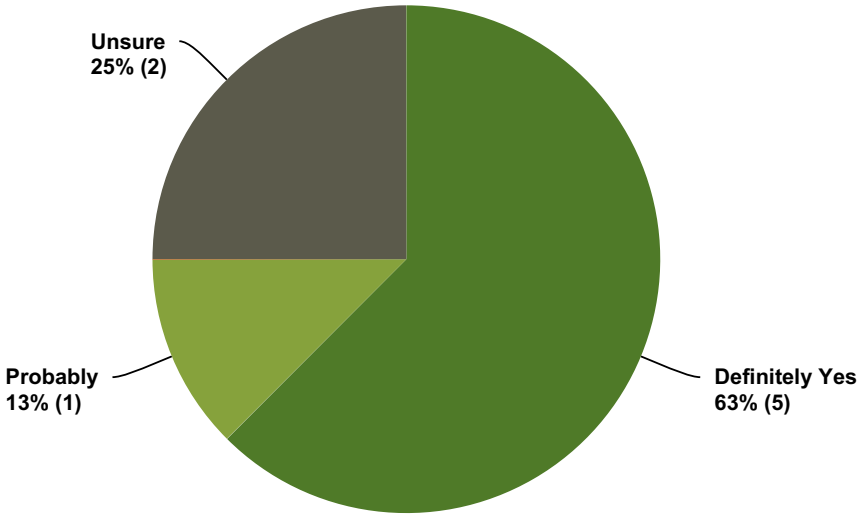
Answered: 8 Skipped: 0



Answer Choices	Responses	
Definitely Yes	63%	5
Probably	25%	2
Not Likely	0%	0
Definitely No	0%	0
Unsure	13%	1
Total		8

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

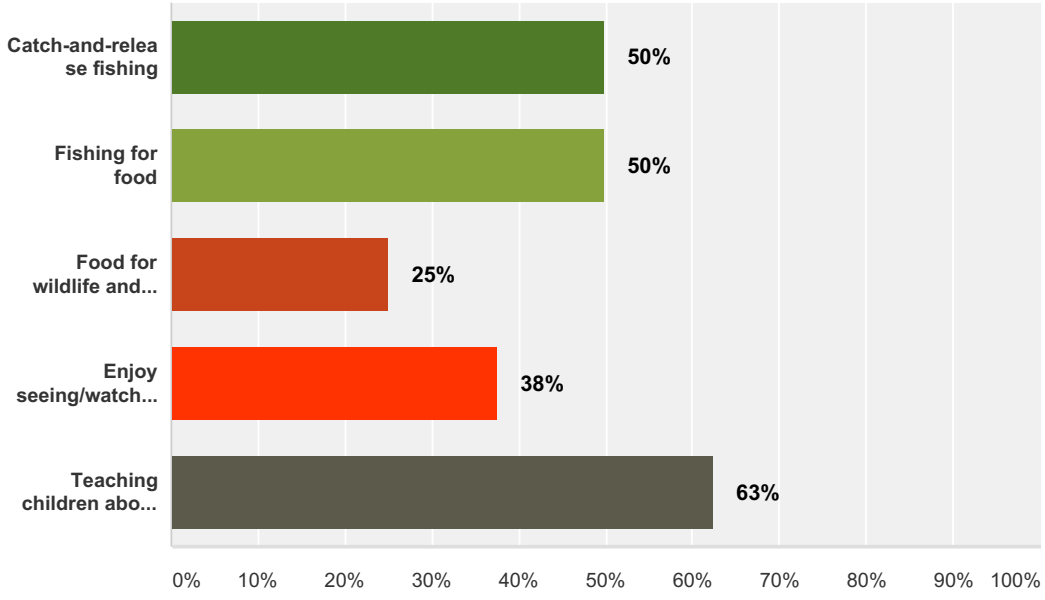
Answered: 8 Skipped: 0



Answer Choices	Responses	
Definitely Yes	63%	5
Probably	13%	1
Not Likely	0%	0
Definitely No	0%	0
Unsure	25%	2
Total		8

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

Answered: 8 Skipped: 0

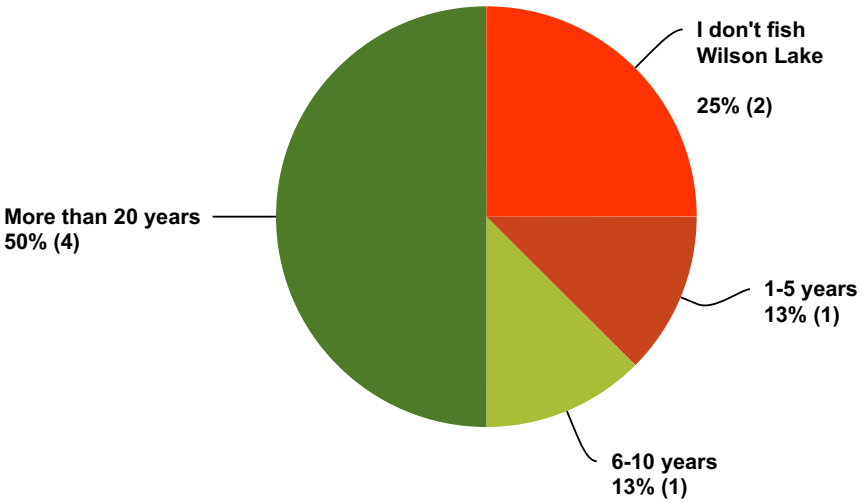


Answer Choices	Responses	
Catch-and-release fishing	50%	4
Fishing for food	50%	4
Food for wildlife and birds	25%	2
Enjoy seeing/watching fish	38%	3
Teaching children about fishing/lakes	63%	5
Total Respondents: 8		

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

Q6 How many years of fishing experience do you have on Wilson Lake? If you don't fish Wilson Lake, skip to Question 14.

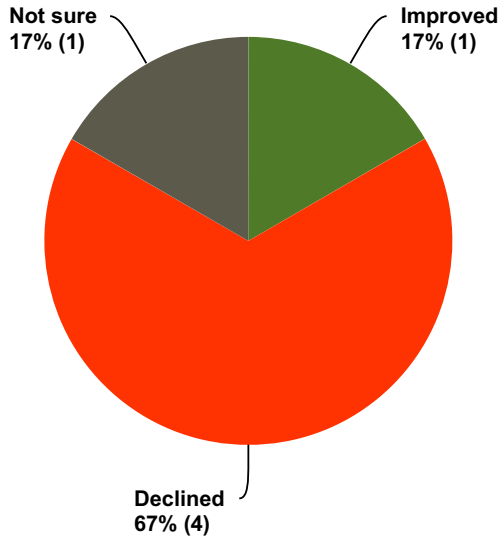
Answered: 8 Skipped: 0



Answer Choices	Responses	
I don't fish Wilson Lake	25%	2
1-5 years	13%	1
6-10 years	13%	1
11-20 years	0%	0
More than 20 years	50%	4
Total		8

Q7 In the years you have been fishing Wilson Lake, would you say the quality of fishing has... (If answering 'Stayed the same' or 'Not sure', skip to Question 9).

Answered: 6 Skipped: 2



Answer Choices	Responses	
Improved	17%	1
Stayed the same	0%	0
Declined	67%	4
Not sure	17%	1
Total		6

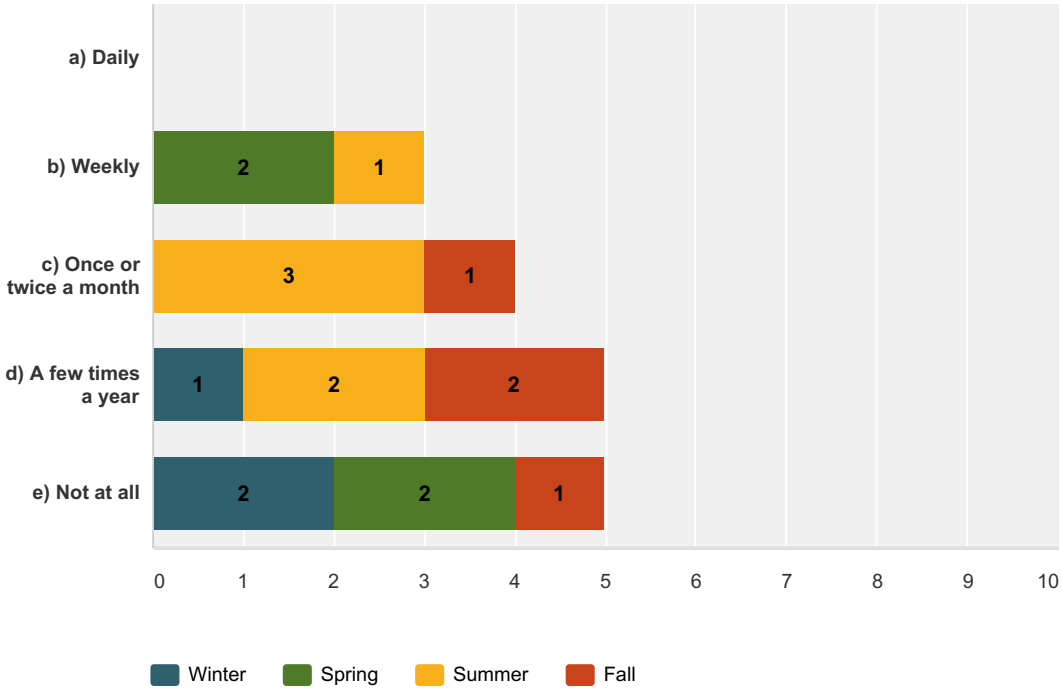
Q8 What factors do you feel have contributed to the change in fishing?

Answered: 2 Skipped: 6

#	Responses	Date
1	over abundance of weeds, low numbers of "feed" panfish	4/28/2015 7:02 PM
2	weeds have gotten worse	4/21/2015 6:34 PM

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

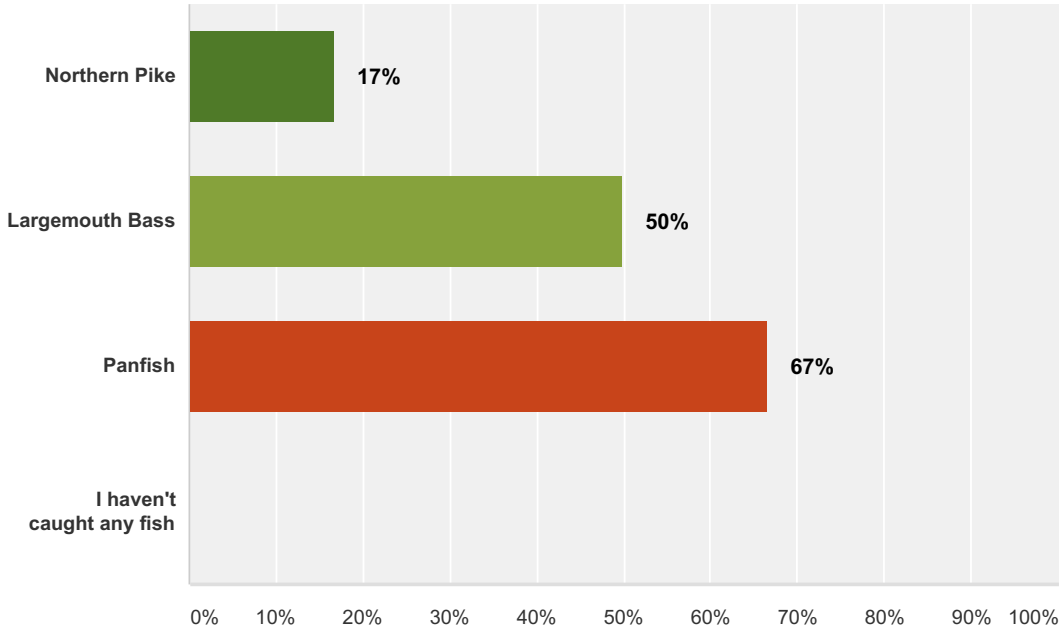
Answered: 6 Skipped: 2



	Winter	Spring	Summer	Fall	Total Respondents
a) Daily	0% 0	0% 0	0% 0	0% 0	0
b) Weekly	0% 0	100% 2	50% 1	0% 0	2
c) Once or twice a month	0% 0	0% 0	100% 3	33% 1	3
d) A few times a year	33% 1	0% 0	67% 2	67% 2	3
e) Not at all	100% 2	100% 2	0% 0	50% 1	2

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

Answered: 6 Skipped: 2

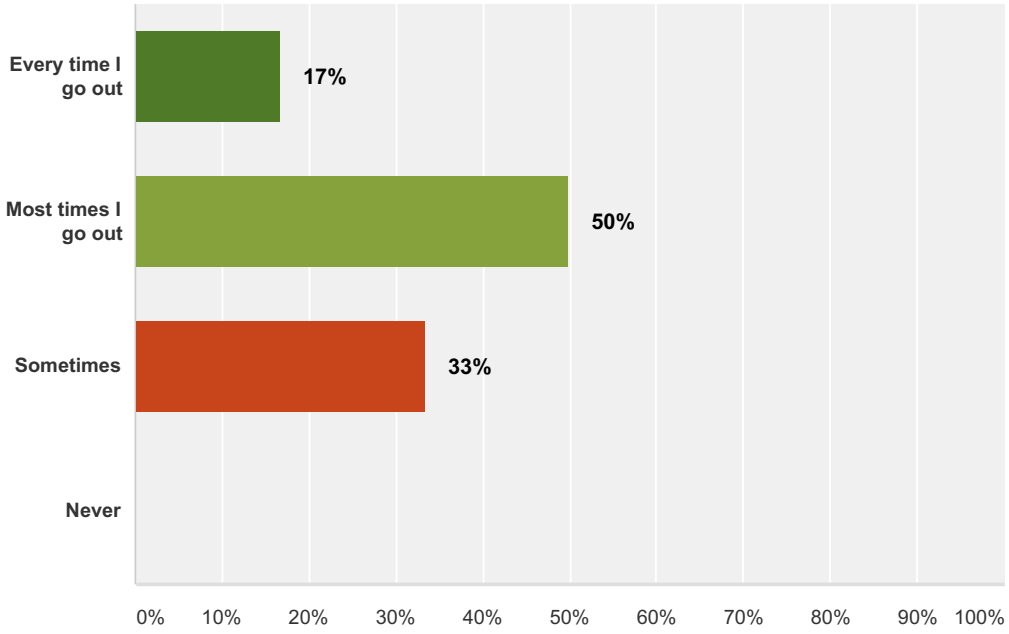


Answer Choices	Responses	
Northern Pike	17%	1
Largemouth Bass	50%	3
Panfish	67%	4
I haven't caught any fish	0%	0
Total Respondents: 6		

#	Other (please specify)	Date
1	have caught a few walleyes	4/21/2015 6:34 PM

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

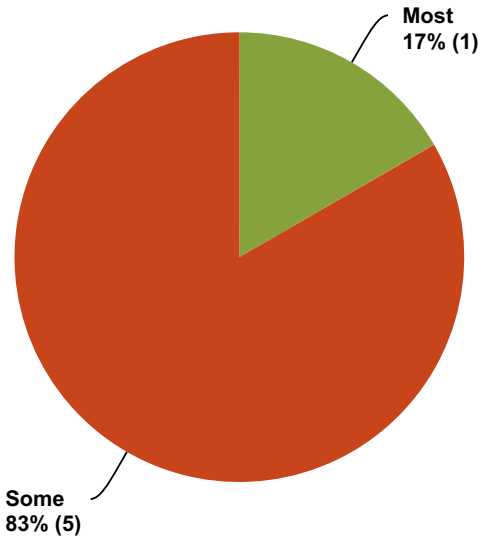
Answered: 6 Skipped: 2



Answer Choices	Responses	
Every time I go out	17%	1
Most times I go out	50%	3
Sometimes	33%	2
Never	0%	0
Total Respondents: 6		

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

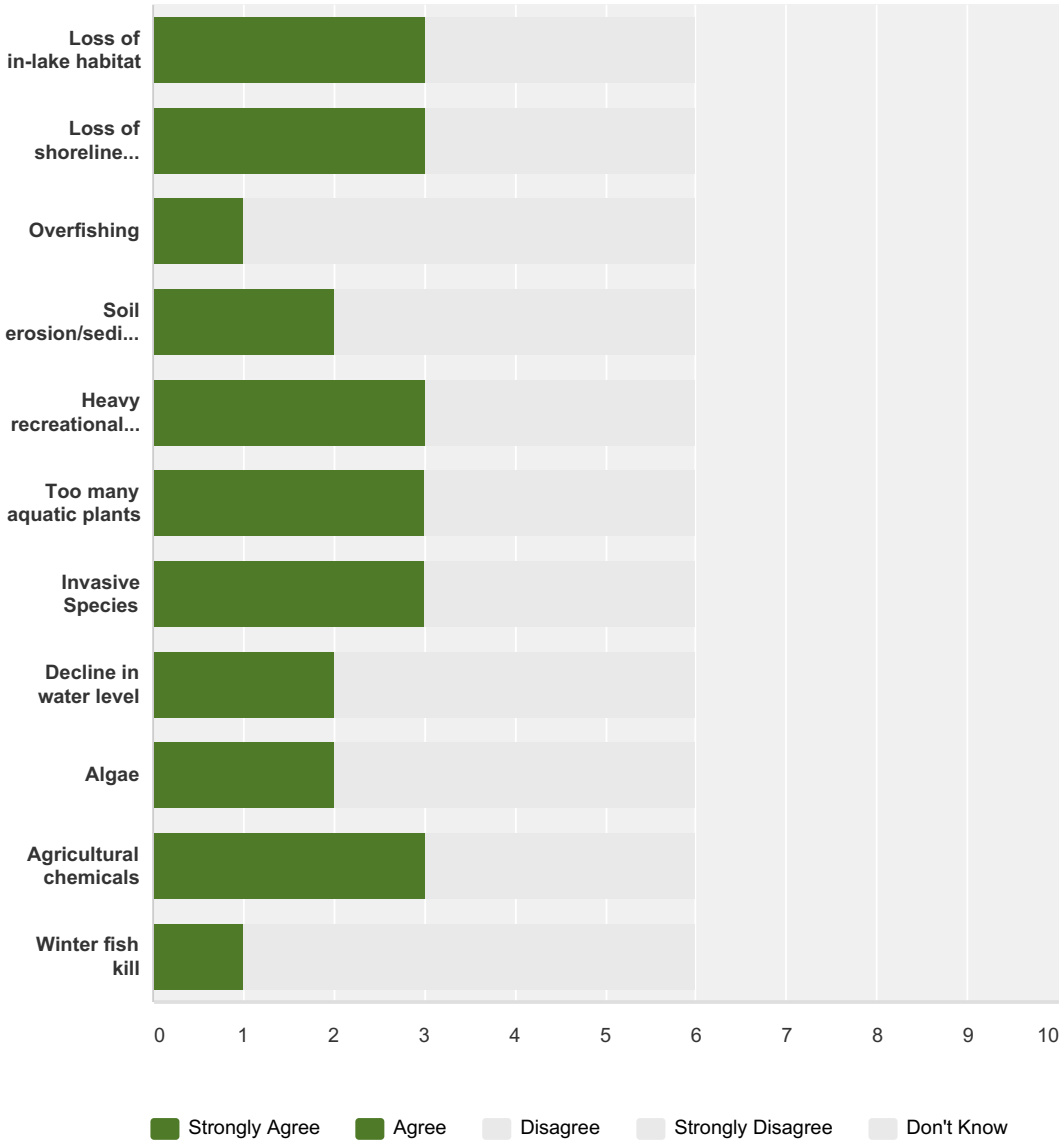
Answered: 6 Skipped: 2



Answer Choices	Responses	
All	0%	0
Most	17%	1
Some	83%	5
None	0%	0
Total		6

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

Answered: 6 Skipped: 2



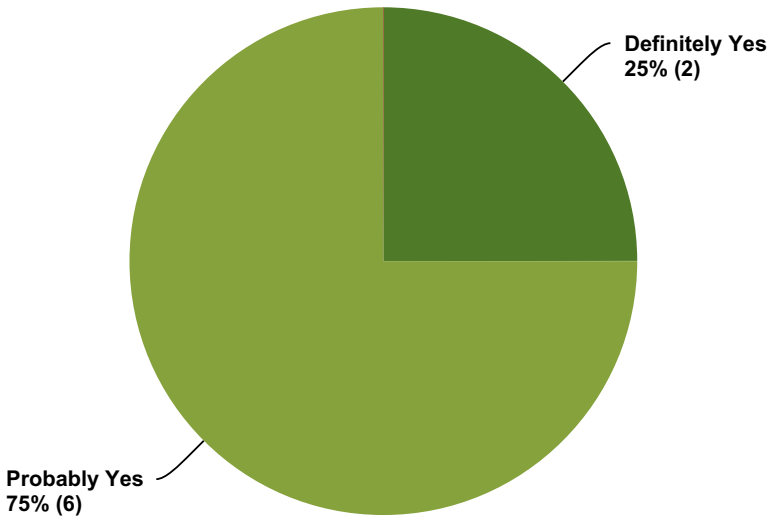
	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't Know	Total Respondents
Loss of in-lake habitat	17% 1	33% 2	0% 0	0% 0	50% 3	6
Loss of shoreline habitat	17% 1	33% 2	0% 0	0% 0	50% 3	6
Overfishing	0% 0	17% 1	67% 4	0% 0	17% 1	6
Soil erosion/sedimentation	17% 1	17% 1	17% 1	0% 0	50% 3	6

Heavy recreational use	**17%** 1	**33%** 2	**0%** 0	**0%** 0	**50%** 3	6
Too many aquatic plants	**33%** 2	**17%** 1	**0%** 0	**0%** 0	**50%** 3	6
Invasive Species	**33%** 2	**17%** 1	**0%** 0	**0%** 0	**50%** 3	6
Decline in water level	**17%** 1	**17%** 1	**50%** 3	**0%** 0	**17%** 1	6
Algae	**17%** 1	**17%** 1	**17%** 1	**0%** 0	**50%** 3	6
Agricultural chemicals	**17%** 1	**33%** 2	**0%** 0	**0%** 0	**50%** 3	6
Winter fish kill	**0%** 0	**17%** 1	**17%** 1	**0%** 0	**67%** 4	6

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

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

Answered: 8 Skipped: 0



Answer Choices	Responses	
Definitely Yes	25%	2
Probably Yes	75%	6
Probably No	0%	0
Definitely No	0%	0
Unsure	0%	0
Total		8

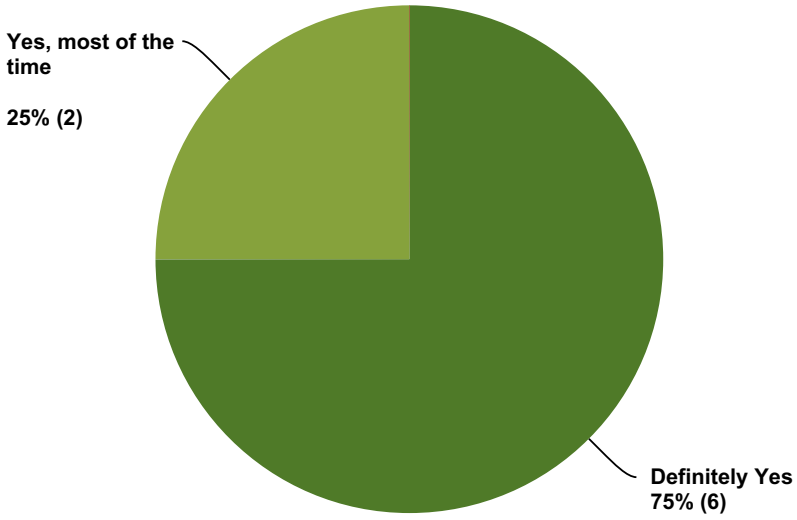
Q15 Do you have any additional comments regarding the fishery in Wilson Lake?

Answered: 1 Skipped: 7

#	Responses	Date
1	Love the area, would be a great investment to improve the lake.	4/21/2015 6:34 PM

Q16 The "No Wake" hours on Wilson Lake are 5pm to 10am. Do you like the current "No Wake" hours as they are? (If answering 'Definitely Yes', please skip to Question 18.)

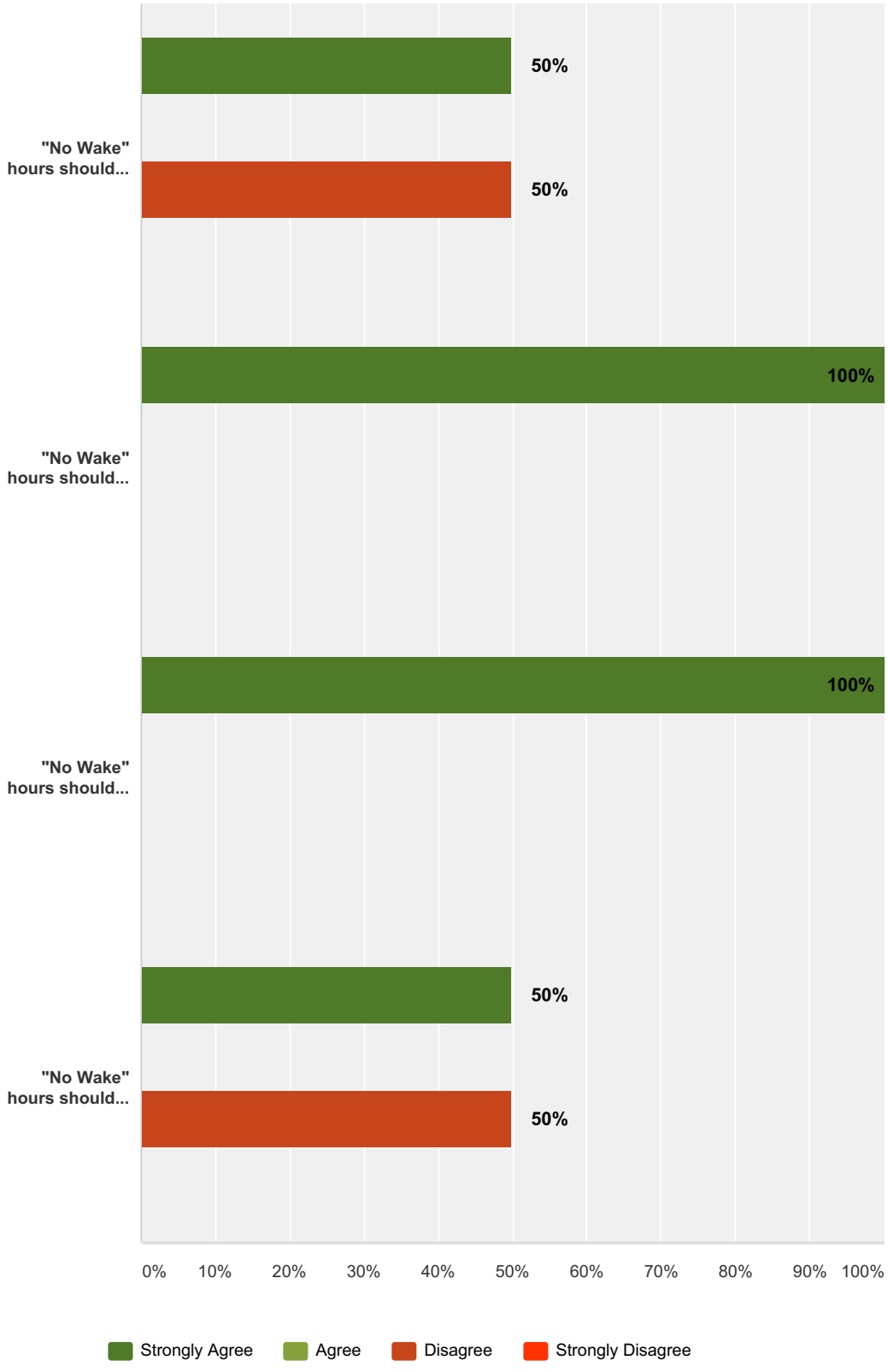
Answered: 8 Skipped: 0



Answer Choices	Responses	
Definitely Yes	75%	6
Yes, most of the time	25%	2
No, not most of the time	0%	0
Definitely No	0%	0
Unsure	0%	0
Total		8

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

Answered: 2 Skipped: 6

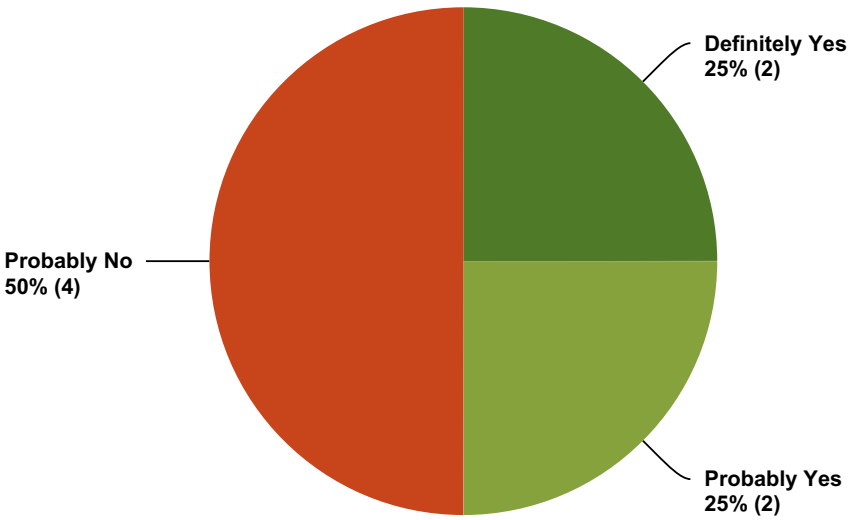


	Strongly Agree	Agree	Disagree	Strongly Disagree	Total
"No Wake" hours should start earlier in the day	**50%** 1	**0%** 0	**50%** 1	**0%** 0	2
"No Wake" hours should start later in the day	**100%** 1	**0%** 0	**0%** 0	**0%** 0	1
"No Wake" hours should end earlier in the day	**100%** 1	**0%** 0	**0%** 0	**0%** 0	1
"No Wake" hours should end later in the day	**50%** 1	**0%** 0	**50%** 1	**0%** 0	2

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

Q18 Do you think there should be a maximum speed limit on Wilson Lake?

Answered: 8 Skipped: 0



Answer Choices	Responses	
Definitely Yes	25%	2
Probably Yes	25%	2
Probably No	50%	4
Definitely No	0%	0
Total		8

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

Answered: 3 Skipped: 5

#	Responses	Date
1	Better understanding of power boaters of the regulations regarding approaching and dealing with wind powered crafts	4/28/2015 7:20 PM
2	Management of weeds and less muck to enjoy more swimming.	4/24/2015 12:16 PM
3	make the lake have no motorized boats, like little silver by the red fox. That lake is great.	4/21/2015 6:35 PM