

2015

Bughs Lake Management Plan



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



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

Bughs Lake Management Plan

The Bughs 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, the Wautoma Public Library, and the Waushara County Courthouse in May, June, July and August 2014. The inclusive community sessions were designed to learn about and identify key lake community concerns, assets, opportunities and priorities. Representatives of state and local agencies, municipalities, and nonprofit organizations also attended the planning sessions to offer their assistance to the group in developing this strategic lake management plan (LMP).

The plan was adopted by the Bughs Lake Property Owners Association (future Bughs Lake Management District) on November 17, 2014.

The plan was accepted by the Town of Wautoma on June 9, 2015.

The plan was accepted by the Town of Dakota on December 14, 2015.

The plan was accepted by the City of Wautoma on November 9, 2015.

The plan was accepted by Waushara County on December 2, 2015.

The plan was approved by the Wisconsin Department of Natural Resources on December 12, 2014.

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

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Overarching Vision and Mission for Bughs Lake

Vision: Bughs Lake will nurture an environment that is clean, safe and fun for generations to come.

Bughs Lake property owners have come together in collaboration with the Waushara County Lakes Project committee to assist in the formation of an informed and environmentally sound lake management plan. With information provided by the Waushara County Lakes Study, The Wisconsin Department of Natural Resources, and the University of Wisconsin-Stevens Point College of Natural Resources, our mission is to accomplish the following:

- 1. Procure grant funding assistance from the State of Wisconsin to address invasive species in Bughs Lake.*
- 2. Educate Bughs Lake residents as to shoreline maintenance of individual lakefront properties.*
- 3. Form a lake management plan to provide clean habitat for fish and wildlife on Bughs Lake.*
- 4. Provide a future environment on Bughs Lake for our families and our children's families that can be clean, safe and fun.*

Introduction

Bughs Lake is a 23-acre seepage lake located just to the east of the city of Wautoma in Waushara County, Wisconsin. Land in the towns of Wautoma, Dakota, Marion and the city of Wautoma are included in the Bughs Lake watershed. The people of the lake, which include both permanent and part-time residents, have an active property owners association and feel a deep appreciation for the Bughs Lake community. Roots run deep for the residents, many of whom have lived on, visited, or recreated on the lake for over twenty years. It is clear that lake values revolve around family experiences and traditions, the quietude of the lake, water quality, swimming and fishing. These values helped to inspire Bughs Lake residents and users to come together in partnership with local professionals, experts and county staff in 2014 to document their knowledge, concerns, values and goals. This document provides information about Bughs Lake while laying out a framework for the protection and improvement of lake features identified as important to the community. This framework, or lake management plan, provides the guidance needed for citizens and others involved in lake or land management to achieve the vision of the Bughs Lake community.

The planning process included a series of four public planning sessions held between May and August 2014 at the Wild Rose Community Center, the Wautoma Public Library, and the Waushara County Courthouse. Public participation in these sessions was achieved via letters mailed to Bughs Lake waterfront property owners and by press releases in local newspapers. In addition, participants were sent emails about upcoming meetings which could be forwarded to others. In order to involve and collect input from as many people as possible, a survey was conducted prior to each planning session which sought feedback on the upcoming planning session's topic(s). The public was informed about the surveys via postcards (waterfront property owners) and press releases in local newspapers. The surveys could be completed anonymously online or on paper upon request. Survey questions and responses were shared at the planning sessions and can be found in Appendix F.

This lake management plan provides the guidance needed for citizens and others involved in lake or land management to achieve the vision of the Bughs Lake community.

Guest experts and professionals were invited to attend the planning sessions to assist area residents, Bughs Lake Property Owners Association members, lake users, and representatives of local municipalities with the development of the lake management plan. 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. Information provided by the professionals was organized into the same discussion topics as the surveys: 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, participants identified goals, objectives and actions for the lake management plan that were then recorded by professionals from UW-Stevens Point. Planning session notes and presentations were posted to the Waushara County website

The Bughs Lake Management Planning Committee consisted of Bughs Lake shoreland property owners. 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, Golden Sands Resource Conservation and Development Council, Inc., University of Wisconsin-Extension, and the University of Wisconsin-Stevens Point Center for Watershed Science and Education.

This lake management plan and the process used to create and update it allow the community to guide the health of its lake. It is a dynamic document that identifies goals and action items for the purpose of maintaining, protecting and/or creating desired conditions in the lake over the next 20 years. It will provide guidance for future boards, lake users, and technical experts by identifying which issues have been addressed and how successful previous efforts were. Each plan is unique, dependent upon the conditions of the lake, its watershed, and the interests of the stakeholders involved. The actions identified in a lake management plan can serve as a gateway for obtaining resources, including grant funding, to help implement activities outlined in the plan. Because many entities are involved in lake and land management, it can be challenging to navigate the roles, partnerships, and the resources that are available. From the beginning of this plan's development, efforts have been made to identify where key assistance exists and identify opportunities for ensuring that the lake's ecological, aesthetic, and recreational opportunities are plentiful into the future.

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

- **Individuals:** Can use this plan to learn about the lake they love and their connection to it. People living near Bughs Lake can have the greatest influence on the lake and its inhabitants by understanding and choosing lake-friendly options to manage their land and the lake.
- **Bughs Lake Property Owners Association (BLPOA):** This plan provides BLPOA with an organized list of goals which can easily be prioritized. Annual review of the plan can also help the association to realize its accomplishments. Resources and funding opportunities for BLPOA's management activities are made more readily available by placement of goals into the lake management plan, and BLPOA can readily identify partners to help achieve the goals for Bughs Lake.
- **Neighboring lake groups, conservation clubs, and sporting clubs:** Nearby groups with similar lake stewardship goals can join forces to provide each other with support, improve competitiveness for funding opportunities, and make efforts more fun.
- **The Towns of Wautoma, Dakota, Marion and the City of Wautoma:** Municipalities will understand their connection/impact to lake water quality and utilize the visions, wishes and goals documented in this lake management plan when considering municipal-level management planning or decisions within the watershed that may affect the lake. Municipalities can work with requests by individuals or developers to best represent the documented wishes of the lake community. The city has the ability to manage the lighting, noise, and runoff that impacts the aesthetics and health of Bughs Lake.
- **Waushara County:** County professionals will better understand 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, rivers, wetlands, and groundwater.
- **Wisconsin Department of Natural Resources:** Professionals working with Waushara County lakes can use this plan as guidance for management activities and decisions. The WDNR requires a lake management plan to provide funding for certain lake stewardship activities. A plan increases an application's competitiveness for funding from the State.



Photo courtesy of Red and Anna Reilly, ca 1934

Background

One of the first steps in creating this plan was to gather and compile data about the lake and its ecosystem to understand past and current lake conditions. This was done alongside 32 other lakes as part of the Waushara County Lakes Project. The Waushara County Lakes Project was initiated by citizens in the Waushara County Watershed Lakes Council who encouraged Waushara County to work in partnership with 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. Prior to this project, many of the lakes had insufficient data available to help evaluate current water quality, aquatic plant communities, aquatic invasive species, and shorelands, or had data obtained 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 collected and interpreted data for use in the development of lake management plans. Additional data collected by citizens, consultants, and Wisconsin Department of Natural Resources professionals were also incorporated into the planning process, providing a robust set of information to inform decision-making. Sources of information used in the planning process are listed at the end of this document for ease of reference. The results of this project, including this plan, will assist citizens, municipalities, Waushara County, and State staff to efficiently manage water resources and make informed decisions and policies that will affect lakes now and for future generations.

Several reports from the Bughs 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/>. Hover over the 'Departments' tab, select 'Zoning and Land Conservation', 'Land Conservation', and finally 'Lake Management Planning'.

Goals, Objectives and Actions

The following goals, objectives and associated actions were derived from the values and concerns of citizens interested in Bugh Lake and members of the Bugh Lake Management Planning Committee, and the known science about Bugh Lake, its ecosystem and the landscape within its watershed. Implementing and regularly updating the goals and actions in the Bugh 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, to ensure a lake management plan considers the many aspects associated with a lake, the Wisconsin Department of Natural Resources requires that a comprehensive lake management plan address, at a minimum, a list of topics that affect the character of a lake, whether each topic has been identified as a priority or as simply something to preserve. These topics comprise the chapters in this plan. For the purposes of this plan, the chapters have been grouped as follows:

Fisheries and In-Lake Habitat

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 goals have been identified as 'high priority':

Goal 1. Improve fish habitat in and around Bughs Lake.

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

Educate new and existing shoreland owners about the importance of native plants. Explore locations for placement of additional woody habitat and leave existing woody structure in place. Reduce dense growth of aquatic plants to improve predator visibility.

Goal 2. Bughs Lake will have balanced predator/prey fish populations.

Objective 2.1: Pursue year-round Catch and Release Only designation for Bughs Lake.

Consider implementing volunteer Catch & Release for largemouth bass during spawning season. Communicate with and explore options for protecting largemouth bass population.

Goal 6. Current populations of invasive species in Bughs Lake will be reduced or eliminated.

Objective 6.1. Continue exploring various strategies for removing aquatic invasive species in Bughs Lake.

Evaluate treatment options (including whole-lake treatment) and apply for grant funding in February 2015. Hand-pull invasives once density is reduced and provide pick up of plant debris.

Goal 9. Reduce nutrient inputs into Bughs Lake.

Objective 9.1. Maintain vegetated shorelands where they already exist, and encourage a vegetated buffer where the shorelands are mowed to the edge. Show support for healthy shoreland maintenance and restoration. Restore 30% of the currently mowed shoreland over the next 5 years.

Explore obtaining a grant to conduct a beginning phase of a demonstration shoreland restoration project. Continue project through stages if possible with grant/landowner permission.

Control runoff, erosion, sound pollution and aesthetics from Highway 21/73. Explore work on former Peck's Plantation (Yorad, LLC) and St. Peter's Episcopal Church.

Lead organizations and individuals are identified as resources for the actions in this plan. These resources can provide information, suggestions or services to help accomplish objectives and achieve goals. The following table lists acronyms used in this plan. Contact information for organizations and individuals who support lake management in Waushara County can be found in Appendix A. This list should not be considered all-inclusive – assistance may also be provided by other entities, consultants and organizations.

Table 1. List of organizations and acronyms used in this plan.

Resource	Acronym
Bughs Lake Property Owners Association	BLPOA
Clean Boats, Clean Waters	CBCW
Citizen Lake Monitoring Network	CLMN
Center for Watershed Science and Education	CWSE
North Central Conservancy Trust	NCCT
USDA Natural Resources Conservation Service	NRCS
Golden Sands Resource Conservation and Development	RC&D
University of Wisconsin Extension	UWEX
University of Wisconsin – Stevens Point	UWSP
Waushara County Land Conservation Department	WCLCD
Waushara County Watershed Lakes Council	WCWLC
Wisconsin Department of Natural Resources	WDNR
Wisconsin Department of Transportation	WDOT
University of Wisconsin-Stevens Point Water and Environmental Analysis Lab	WEAL

Fisheries and In-Lake Habitat

Based on survey results, many lake users value Bugh's Lake for its fishing, wildlife and water quality. These attributes are all interrelated; the health of one part of the lake system affects the health of all aquatic plant and animal communities, the experiences of the people enjoying the lake, and the quality and quantity of water in the lake.

Habitat provides shelter and food for a healthy fishery and wildlife community. 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 fallen tree limbs 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 Bugh's Lake includes the aquatic plants, branches and tree limbs above and below the water.

The Fish Community

A balanced fish community has a mix of predator and prey species, each with different food, habitat, nesting substrate and water quality needs in order to flourish. 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 critical habitat areas.

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

Managing a lake for a sustainable 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 frequent 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 benefits 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 and provide fishing opportunities without requiring a lot of supplemental effort and associated expense to maintain these conditions.

Fisheries biologists with the Wisconsin Department of Natural Resources conducted an electrofishing survey of Bughs Lake in spring 2014. The survey showed a low abundance of largemouth bass with good size structure and an extremely high abundance of bluegill with poor size structure. Many young bluegill were caught during this survey, indicating reproductive success. Recommendations given by the fisheries biologists included protecting and restoring the near-shore area and shoreland vegetation, the protection and enhancement of large woody habitat (logs, treefalls, etc.), and the protection of the largemouth bass population. It was noted that Bughs Lake’s low shoreland score based on the Waushara County Shoreland Survey created concern for fish habitat: 77% of the shoreland was mowed and 7% had barren soil. These types of disturbances can have detrimental effects on spawning habitat, water quality, and other habitat needs of the fish community (see Shoreland section and Appendix B).

Guiding Vision for the Fish Community

Bughs Lake will have a balanced, sustainable fish community.

Goal 1. Improve fish habitat in and around Bughs Lake.

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

Actions	Lead person/group	Resources	Timeline
Include information about the importance of native aquatic plants and woody habitat to the fish community in welcome packets for new (and/or existing) shoreland property owners.		UWEX Lakes WCWLC	Ongoing
Leave existing woody habitat (trees, stumps, branches, etc.) in the lake, especially in near-shore (littoral) areas.		UWEX Lakes (educational material)	Ongoing
Communicate with WDNR Fisheries Biologist to explore permitting options for supplemental woody habitat such as tree drops and “fish sticks”.		WDNR Fisheries Biologist Local fishing clubs	As needed
Work with willing property owners to place more woody structure in areas that will not impede recreation.	WDNR Fisheries Biologist	UWEX Lakes (as needed)	As needed
Reduce dense growth of aquatic invasive plants to improve visibility for largemouth bass and improve bluegill size structure.		WDNR Lake Management Specialist	As needed

Goal 2. Bughs Lake will have balanced predator/prey fish populations.

Objective 2.1. Pursue year-round Catch and Release Only designation for Bughs Lake.

Actions	Lead person/group	Resources	Timeline
Consider posting a sign at the boat launch designating Bughs Lake “Volunteer Catch and Release” for largemouth bass during spawning season.		WDNR Fisheries Biologist Town of Wautoma	
Explore options for protecting largemouth bass (i.e. higher size limit).		WDNR Fisheries Biologist	
Coordinate with WDNR Fisheries Biologist to receive updates on any fish surveys completed in Bughs Lake (the next to be conducted in 2015).		WDNR Fisheries Biologist	
Submit a resolution to annual Conservation Congress (CC) requesting Catch and Release designation for largemouth bass.		WDNR Fisheries Biologist Waushara Conservation Congress Representatives Local fishing clubs	
If the CC resolution results in a question of support on the CC annual ballot, encourage citizens to vote.		WDNR Fisheries Biologist Waushara Conservation Congress Representatives Local fishing clubs	
Maintain open communication with WDNR Warden regarding regulation non-compliance concerns.		WDNR Warden WDNR Fisheries Biologist	

Aquatic Plants

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

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

During a July 2011 aquatic plant survey of Bughs Lake, ninety-nine percent (101 of 103) of the sampled sites had vegetative growth and approximately 30% of the sites sampled had dense vegetation. Ten species of aquatic plants were found, with the greatest plant species diversity in the northeastern shallows of the lake. The most common species (72% of sites) was common waterweed followed by coontail (60%) and southern naiad (47%). More detailed information can be found in the 2012 Bughs Lake Aquatic Plant Report or the Bughs Lake 2010-2012 Lake Study Report.

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

Survey responses to questions about aquatic plants in Bughs Lake indicated that most lake users perceived an overabundance of plants in the lake at most times. Many residents rake and hand pull aquatic plants near their docks or swimming areas to provide easier access to open water. A chemical treatment for Eurasian watermilfoil was conducted by a consultant in 2013. The Lake Manager with the Wisconsin Department of Natural Resources conducted pre- and post-treatment aquatic plant surveys in May 2013 and August 2013, respectively. Twelve species of aquatic plants were identified in the August post-treatment survey, with an FQI of 18.3.

According to Wisconsin Department of Natural Resources records, Bughs Lake has been undergoing chemical treatment for invasive species since 1990, the most recent covering 8 acres in summer 2013. Residents at the planning session indicated that they do not feel treatments have been effective, as invasive and native plant abundance is as dense as ever. The following aquatic plant management strategies were discussed:

- *Do nothing.* With the aquatic plants in the lake in an already ‘choked’ state, the density of aquatic plants cannot likely get much worse. This result can be achieved without the expenditure of aggressive management.
- *Manual removal.* This is essentially being done by individual lake front property owners now. They are permitted to clear an area up to 30 feet from their dock for boat and swimming access to open water. 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). However, Eurasian watermilfoil, which has a pronounced population in Bugh Lake, is commonly spread through fragmentation. For this reason the Eurasian watermilfoil population may be exacerbated by mechanical harvesting, 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.

Guiding Vision for Aquatic Plants in Bugh Lake

Bugh Lake will have a healthy and diverse native aquatic plant community that supports a balanced fishery and promotes good water quality while having great swimming and areas for non-motorized boating.

Goal 3. Reduce the abundance of aquatic plants in Bugh Lake by reducing the nutrient loading.

Objective 3.1. Enhance shoreland vegetation and encourage best management practices within the watershed.

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

Goal 4. Protect native plants in and around Bugh Lake.

Objective 4.1. Maintain the native aquatic plant community within Bugh Lake while allowing for recreational use unimpeded by excessive aquatic plant growth.

Actions	Lead person/group	Resources	Timeline
Refer to the Bugh Lake Aquatic Plant Management Plan for more detailed aquatic plant information, management options, and chosen actions.		WDNR Lake Manager	
Minimize removal and disturbance of native vegetation (to impede establishment of additional AIS) via educational materials provided in annual mailing, website re: mitigation methods available.		UWEX Lakes WCLWC	
Obtain the appropriate permit for harvesting of any native plants beyond 30 feet from docks.			

Aquatic Invasive Species (AIS)

Aquatic invasive species are non-native aquatic plants and animals that are most often unintentionally introduced into a lake via lake users (trailers, boats, equipment, and from the release of bait). Proper boat hygiene is essential in preventing the spread of AIS. Strategies should be in place to reduce the introduction of AIS from boats visiting Bughs Lake that enter at the boat launch. Boat inspectors at the boat landing, trained through the Clean Boats, Clean Waters (CBCW) program, can help. Disturbed conditions often encourage the colonization of AIS. The lack of intensive high-speed recreational boating helps to preserve the integrity of Bughs Lake by reducing disturbance to the lakebed. Shoreland property owners should also minimize the disturbance of native aquatic plants to avoid creating conditions that favor the establishment of AIS. Monitoring for AIS should be conducted routinely throughout the lake by either trained citizen volunteers or paid personnel.



Bughs Lake has confirmed populations of curly-leaf pondweed, Eurasian watermilfoil, hybrid watermilfoil, and banded mystery snail. In 2012, a special plant survey observed the presence of the aquatic invasive species curly-leaf pondweed (CLP). 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. A map of CLP populations in Bughs Lake can be found in Appendix C.

Identification of a second aquatic invasive species, Eurasian watermilfoil (EWM), can be problematic when northern watermilfoil is documented in a lake. Northern watermilfoil easily hybridizes with EWM. The Wisconsin Department of Natural Resources recommends genetic testing to distinguish between northern watermilfoil and hybridized watermilfoil. During the 2011 plant survey, it was believed that the watermilfoil found was northern watermilfoil; the following year, researchers suggested that because EWM was documented in the lake in 1993, any watermilfoil found later should be categorized as hybridized. In 2013, Golden Sands Resource Conservation and Development Council, Inc. confirmed the presence of hybridized watermilfoil in Bughs Lake in a separate survey. A map of EWM/Hybrid watermilfoil can be found in Appendix C.

A variety of chemical treatment strategies have been applied in Bughs Lake since 2000, the most recent being a 7.7 acre treatment in summer 2013 (Table 2). Pre- and post-treatment surveys were conducted by the Wisconsin Department of Natural Resources in May 2013 and August 2013, respectively. Eurasian watermilfoil, which had a 15% frequency of occurrence (FOQ) prior to treatment in May 2013, had an 8.9% FOQ after treatment in August 2013.

Table 2. Chemical treatment history in Bughs Lake.

Year	Acres	Product	Amount	Target Species
2000	29	Sonar	4.16 qts	EWM
2000	NA	Rodeo	4 oz	PL
2001	--	No Treatment	--	--
2002	18	Navigate (2,4-D)	1,800 lbs	EWM
2003	14.2	Navigate (2,4-D)	1,450 lbs	EWM
2004	10	Navigate (2,4-D)	740 lbs	EWM
2005	0.35	Navigate (2,4-D)	50 lbs	EWM
2006	4.2	Aquathol K (endothall)	23.5 gal	EWM/CLP
2007	4.3	Aquathol K (endothall)	30 gal	EWM/CLP
2008	15	DMA4 IVM (2,4-D)	32.5 gal	EWM
2008	15	Aquathol K (endothall)	52.5 gal	EWM/CLP
2009	8	Navigate (2,4-D)	1,200 lbs	EWM
2010	3.3	Navigate (2,4-D)	500 lbs	EWM
2011	9.3	DMA4 IVM (2,4-D)	17.5 gal	HWM
2011	9.3	Aquathol K (endothall)	31 gal	HWM
2012	8.75	DMA4 IVM (2,4-D)	61.5 gal	HWM
2013	7.7	Navigate (2,4-D)	2,187 lbs	HWM
2014	--	No Treatment	--	--

The following AIS management strategies were discussed:

- *Do nothing.* Much research is presently being conducted on treatment methods for EWM and hybrid watermilfoil. Chemical treatment in Bughs Lake has been costly and relatively ineffective. According to the Wisconsin Department of Natural Resources Lake Manager, conditions will not likely deteriorate significantly if no action is taken in the near future while various methods for control are evaluated.
- *Manual removal.* Often a low cost approach (especially if done by trained volunteers and/or NGOs), manual removal alone has been very effective in some lakes. Due to the density of EWM/HWM in Bughs Lake, manual removal alone would not likely eradicate the plant from the lake. Residents should be trained on the proper identification and removal of AIS, particularly EWM/HWM, so as not to spread fragments.

- *Spot chemical treatment.* EWM/HWM is widespread in Bughs Lake, and dense aquatic vegetation in general is present as the entire lake is shallow enough to support the growth of aquatic plants. Isolated beds are not able to be discerned. Furthermore, recent research on spot treatment raises question as to its effectiveness and how much damage it does to native aquatic plants.
- *Whole lake chemical treatment.* To proceed with chemical treatments in Bughs Lake with current technology, a whole lake treatment may be most effective. However, this approach comes with drawbacks, most notably the potential impact to native plants and animals, exorbitant cost, and difficulty in determining the appropriate dose (controlled by lake depth, morphology, stratification, timing, etc.).

The following is adapted from language provided by Stantec, Inc.:

An herbicide treatment may be an appropriate way to treat larger areas of AIS to conduct restoration of native plants. When using chemicals to control AIS, it is a good idea to reevaluate the lake's plant community and the extent of the AIS conditions before, during, and after chemical treatment as the chosen herbicide may impact native plant communities including coontail, common waterweed, naiad species, and others, especially during whole-lake applications and/or extended periods of herbicide exposure. The Wisconsin Department of Natural Resources may require another whole-lake plant survey and will likely require a pre-treatment AIS survey. Along with the above mentioned surveys, pre and post treatment monitoring should be included for all aquatic plant treatments and is typically a Wisconsin Department of Natural Resources requirement.

The science regarding what chemicals are most effective, dosages, timing and how they should be applied is constantly being updated. Currently EWM is the most common aquatic invasive plant species targeted for chemical treatment in Wisconsin. At present, 2,4-D is the most common active ingredient for selective systemic herbicides used for EWM management in Wisconsin, although triclopyr use is increasing and has been commonly used in Minnesota for over a decade. Typically granular based formulations are more costly and are used for smaller spot type treatments, while liquid formulations are typically less costly on a per acre basis and used for larger contiguous treatment areas or whole lake type treatments. In order to decrease any potential impact to native plants and be as selective as possible for EWM, treatments are generally completed in the spring when native plant growth is minimal, typically prior to 65° water temperatures.

Current Wisconsin Department of Natural Resources and Army Corps of Engineer research has shown that herbicide applied to water diffuses off site quickly due to a variety of environmental and physical conditions, including wind, waves, water depth, and size of treatment area relative to lake volume. Due to these actions, as treatment areas decrease, herbicide retention time needed for impact is lessened due to dilution off site because of the small amount of area treated and amount of herbicide applied relative to the entire water volume. To combat this, it is recommended to apply at higher rates for "spot" type

treatments, when compared to whole-lake rates, and typically with a granular herbicide on a day with less than 10 mph winds in an effort to extend contact time.

It is worth noting there are various hybrid strains of EWM that have been genetically confirmed throughout the State and many of these are showing resistance to typical systemic herbicides (such a hybrid was confirmed in Bughs Lake in 2012). This has been shown through laboratory analyses and a PlanTest® evaluation in which 4 plant specimens were collected from the lake and grown in the laboratory and then exposed to various herbicides at various rates, confirming resistance to typical systemic herbicides at various doses. There are research projects currently underway with the WDNR and herbicide manufacturers' testing in the field as well as in the lab various combination herbicides (systemic & contact – English Lake, Manitowoc County 2013) as well other modes of action like pigment bleaching herbicides (fluridone – Frog Lake, Florence County 2013) that may be more effective on these strains of hybrid EWM which have shown to be resistant to systemic herbicides. In the year of treatment both products performed well with 99% control on lakes that were treated previously on a whole lake basis with 2,4-D at rates of 350 PPB with little control. Year after treatment initial results indicate that the fluridone treatment may yield longer lasting results.

The size of the infestation tends to dictate the type of the treatment, small treatment areas or beds under 5 - 10 acres are many times consider spot treatments and are usually targeted with granular type herbicides, at higher or even maximum label rates, with a minimum treatment areas of usually at least 0.5 acres recommended for maximum herbicide retention and efficacy. Although many times when you have multiple “spot” treatments it sometimes makes more sense from an economic and efficacy standpoint to target the “whole” lake for treatment. What this typically entails is calculating the entire volume of water within the lake, in acre/feet and then using a low dose of a liquid herbicide depending on either true or hybrid strain of EWM, such as 2,4-D or fluridone, respectively, at a lake wide rate of typically between 250 – 350 parts per billion (PPB) for 2,4-D and 4- 6 ppb for fluridone, which is then bumped or maintained at that low level of 6 PPB for ideally 60 - 90 days or longer for lower doses. Combinations of herbicides have shown promise over the last year in combating HWM in particular endothall and 2,4-D at a 2:1 or 3:1 ratio of endothall to 2,4-D with whole lake target dosing typically being around 600 – 750 PPB for endothall with a targeted rate of 250 - 300 PPB for 2,4-D. Lastly for spot treatments in areas of high water exchange Diquat has worked well and shown reasonable selectivity, if rapid dilution is an issue.

Many times the amount of herbicide for a whole lake type treatment can be further reduced by timing the treatment as close as possible to after lake stratification has taken place. After the thermocline develops in the lake, typically between 60 – 70 degrees anywhere between mid-May to mid-June, this may effectively eliminate the area of the water column below the thermocline from the treatment, reducing the amount of herbicide needed for a whole lake treatment by 30- 40%. Where this technique can

be utilized it should in order to reduce the amount of herbicide used within the lake and to more effectively target the whole lake treatment within the upper 15' – 20' of the water column.

Currently CLP is considered the second most prevalent aquatic invasive plant species targeted for chemical treatment in the State. At present, endothall, a contact herbicide is the most common active ingredient in herbicides used for CLP management in Wisconsin, although the more selective systemic herbicide imazamox and penoxsulam have been used periodically over the last several years fairly successfully with both showing more selectivity. These active ingredients have shown promise in that they are systemic herbicides and have shown the ability to disrupt turion production yielding very good very after treatment control, more so than a contact herbicide. Similar to EWM treatments, granular based formulations are more typically costly per acre and are used for smaller spot type treatments, while liquid formulations are less costly and used for larger contiguous treatment areas or whole lake type treatments. In order to decrease any potential impact to native plants and be as selective as possible for CLP, treatments are completed in the spring when native plant growth is minimal, typically prior to 60° water temperatures, and ideally should be timed prior to the start of turion production on the plant. CLP seems to prefer and flourish in mucky or in a highly flocculent substrate, which is generally not present in most of Silver Lake. Given the lack of appropriate substrate and the limited expansion of this invasive within Silver Lake, monitoring may be the best option for management.

Chemical treatment is usually a long term commitment and requires a specific plan with a goal set for “tolerable” levels of the relevant AIS. One such landmark might be 10% or less of the littoral area being occupied by aquatic invasive plants. WDNR recommends conducting a whole-lake point-intercept survey on a five year bases (for Silver Lake the next would be 2017). Such a survey may reveal new AIS and at the very least would provide good trend data to see how the aquatic plant community is evolving.

Aquatic plants use nutrients that may otherwise be available to algae. Any management activities should be planned to maintain the balance between aquatic plants and algae, and minimize disturbance of the native species in the water and on shore. In addition, care should be taken to minimize the amount of disturbed lakebed from raking or pulling of plants, since these open spaces are “open real estate” for aquatic invasive plants to become established.

Like terrestrial plants, aquatic plant growth increases with nutrients, so reducing excess nutrient inputs to a lake should be part of an aquatic plant management strategy. Sedimentation and excessive nutrient inputs accelerate algae and aquatic plant growth in the lake. Some nutrient loading and sedimentation occur naturally in the watershed, but they are commonly increased by shoreline disturbance, erosion, and fertilizer applications near shore and throughout the watershed. Protecting lake and stream shorelands throughout the watershed will help to reduce the amounts of sediment and nutrients delivered to the lake. A minimum 35-foot vegetative buffer from the water’s edge inland is specified in the Waushara County shoreland zoning

ordinance. This buffer helps to provide filtering of runoff. Healthy, vegetated shoreline buffers are comprised of native unmown grasses, forbs, shrubs and trees. A 30-foot wide viewing corridor (reduced shrub and tree cover) is allowed, along with a 5-foot wide path to the lake. Properly managed pathways will minimize erosion to the lake.

Guiding Vision for Aquatic Invasive Species in Bugh Lake.

Bugh Lake will not be adversely impacted by aquatic invasive species.

Goal 5. No additional invasive species will become established in Bugh Lake.

Objective 5.1. Monitor for and immediately address any new populations of aquatic invasive species in Bugh Lake.

Actions	Lead person/group	Resources	Timeline
Install 'plates' on docks to monitor for zebra mussels. Report any suspicious observations to AIS Coordinator.		RC&D	
Teach residents to identify, monitor and properly remove phragmites, purple loosestrife and knotweed on their properties.		RC&D	
Arrange for Clean Boats, Clean Waters volunteers at the public boat launch on busy/holiday weekends.		RC&D	
Protect native plant species so as not to create open niches for AIS.		WDNR Lake Manager	
Work with RC&D to coordinate volunteer monitoring shared with other area lakes through the Clean Boats, Clean Waters Program.		RC&D	

Objective 5.2. Inform lake residents and visitors about the spread of aquatic invasive species.

Actions	Lead person/group	Resources	Timeline
Include information on AIS in welcome packets and/or newsletters.		UWEX Lakes – educational materials WCLWC	Ongoing
Learn how to identify and monitor for aquatic invasive species (AIS).		RC&D	

Monitor routinely for early AIS outbreaks.			
Host a Clean Boats, Clean Waters workshop to organize volunteers to monitor boat launch during busy boating weekends.		RC&D	
Organize educational AIS identification program.		RC&D	
Provide educational materials about AIS at boat launch.		UWEX Lakes – educational materials RC&D	
Inform property owners about refraining from removing native aquatic vegetation to diminish the possibility of invasive species colonization.		UWEX Lakes – educational materials	

Goal 6. Current populations of invasive species in Bugh Lake will be reduced or eliminated.

Objective 6.1. Continue exploring various strategies for removing aquatic invasive species in Bugh Lake.

Actions	Lead person/group	Resources	Timeline
Learn results of chemical treatment experiments conducted on other lakes in summer 2014 (e.g. triclopyr on Big Silver).		WDNR Lake Manager	2014-2015
Evaluate treatment options and apply for grant funding in February 2015.		RC&D WDNR Lake Manager	
Conduct whole-lake treatment for EWM and HWM if appropriate.			
Hand pull aquatic invasive plants using proper techniques by property owners (around docks), hire divers, other once population density is reduced enough to make feasible (≤ 2 acres).		RC&D	
Provide pick up of removed invasive aquatic plant debris from resident docks on designated days.		Harvester contractor	

Critical Habitat

Special areas harbor habitat 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. Designating areas of the lake as critical habitat enables these areas to be identified on maps, and information about their importance to aquatic plants, animals and the overall health and integrity of the lake to be shared. Identifying critical habitat areas can help lake groups and landowners plan waterfront projects that will minimize impacts to important habitat and help ensure the long-term health of the lake. Bughs Lake does not currently have any officially designated critical habitat areas.

Guiding Vision for Bughs Lake’s Critical Habitat

Bughs Lake’s sensitive areas will be enhanced and protected from degradation.

Goal 7. Identify and inform others of quality habitat in and near Bughs Lake.

Objective 7.1. 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.		WDNR Lake Specialists	
If critical habitat is designated on Bughs Lake, communicate to property owners, visitors, and Town Board as to why these areas are important.		WDNR Critical Habitat Report	

Landscapes and the Lake

Land use and land management practices within a lake's watershed can affect both its water quantity and quality. Forests, grasslands and wetlands allow 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 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, and 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 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 mimic some of the natural processes, and the reduction or elimination of nutrients added to the landscape will help prevent 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 serve the lake by reducing contaminants, providing shelter for fish and wildlife, and decreasing shoreline erosion by providing deep roots that hold soil in place and provide a shoreland barrier from waves and wind.

The water quality in Bugh's 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, protection of wetlands and healthy land management practices are the primary actions that can have positive impacts on the lake's water quality. The water quality in Bugh's Lake was assessed by measuring a variety of characteristics, including temperature, dissolved oxygen, water clarity, water chemistry and algae. All of these were taken into consideration when decisions were made for this plan.

Water Quality

Water quality was assessed during the 2010-2012 lake study and involved a number of measures including temperature, dissolved oxygen, water chemistry, and phosphorus. Each of these interrelated measures plays a part in the lake's overall water quality. Citizen survey responses indicated that water quality in Bugh's Lake has a major impact on personal enjoyment of the lake. Fifty-seven percent of survey respondents felt that the water quality of Bugh's Lake had declined with time.

Dissolved oxygen is an important measure in Bugh's 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 during some seasons the decomposition of dead plants and algae can reduce oxygen in the lake. During February 2011, in depths greater than three feet, dissolved oxygen concentrations were less than 5 mg/L in Bugh Lake. Concentrations below 5 mg/L can stress some species of cold water fish and over time can reduce the amount of available habitat for sensitive cold water species of fish and other aquatic organisms.

In Bugh Lake, color (staining) was relatively low, indicating that the variability in transparency throughout the year is primarily due to fluctuating algal abundance and re-suspended sediment following strong wind events. The water clarity measured in Bugh Lake during the study was considered good. Water clarity ranged from a low of 9 feet in June 2012 to 15.2 feet in June 2011. Only two water clarity measurements were reported prior to 2010 so it is unclear if this has changed in Bugh Lake. Typical of most Wisconsin lakes, water clarity in Bugh Lake is poorer during the summer months, with the poorest water clarity recorded in late summer. Half of the survey respondents felt that their swimming and aesthetic enjoyment of the lake is moderately reduced because of limited water clarity.

Chloride concentrations, and to a lesser degree sodium and potassium concentrations, are commonly used as indicators of how strongly a lake is being impacted by human activity. Bugh Lake had low average potassium, chloride and sodium concentrations. Chloride sources include animal waste, septic systems, fertilizer, and road-salting chemicals.

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

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

Total phosphorus concentrations for Bugh Lake ranged from a high of 30 ug/L in November 2010 to a low of 12 ug/L in February 2012. The median summer total phosphorus concentrations in Bugh Lake were 24 ug/L and 19 ug/L in 2011 and 2012, respectively. These median concentrations are higher than other shallow seepage lakes in Waushara County. They are below Wisconsin’s phosphorus water quality standard of 40 ug/L for shallow seepage lakes, but above the proposed flag value of 15 ug/L.

Managing phosphorus and soil erosion throughout the Bugh Lake watershed is one of the keys to protecting the lake itself. One of the first steps that can be taken is enhancing the near shore landscape that serves as a ‘last wall of defense’ for sediment and nutrients moving toward the lake. Near shore activities that may increase the input of phosphorus to the lake include applying fertilizer, removing native vegetation (trees, bushes and grasses), mowing vegetation, and increasing the amount of impervious surfaces. Phosphorus inputs to Bugh Lake can be controlled by using lake-friendly land management decisions, such as the restoration of shoreland vegetation, elimination/reduction of fertilizers, and the use of water quality-based best management practices (BMPs).

Guiding Vision for Water Quality in Bugh's Lake

Bugh's Lake will have good water quality that maintains a balanced aquatic plant community and a healthy fishery.

Goal 8. Learn more about the water quality in Bugh's Lake and reduce nutrients to the lake and reduce the abundance of aquatic plants.

Objective 8.1. Routinely monitor water quality for lake and human health. Maintain median summer phosphorus concentrations ≤ 20 ug/L and average chlorophyll-*a* concentrations ≤ 5 ug/L.

Actions	Lead person/group	Resources	Timeline
Establish a water quality monitoring program to include regular water clarity measurements and analysis of phosphorus and chlorophyll- <i>a</i> to evaluate changes over time. Phosphorus samples need to be collected according to WisCALM guidance to compare to the State's phosphorus rule.		CLMN Coordinator	
Monitor dates of ice on/ice off and submit the information to the state database.		WDNR	
If indicated by changes in summer sampling results, consider adding overturn sample for additional water quality data.		CLMN Coordinator	
Explore possibilities for further monitoring initiatives such as surface and groundwater monitoring for contaminants and other Waushara County lakes through public/government sector with findings provided to stakeholders.		WDNR Lake Manager WEAL Consultants	

Objective 8.2. Develop strategies to ensure healthy shorelands remain intact and improvements are made to those that have disturbance.

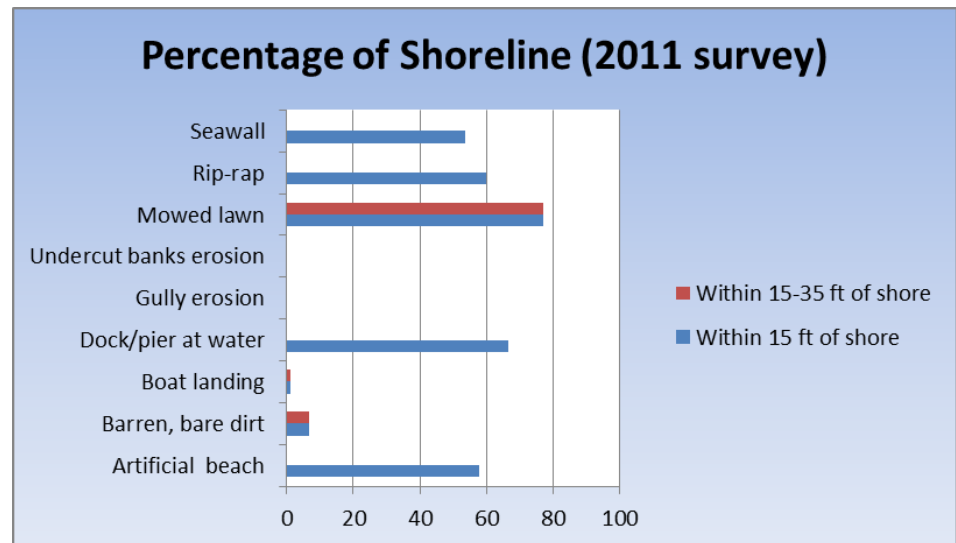
Actions	Lead person/group	Resources	Timeline
See Shorelands section.			

Shorelands

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

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

The summary of scores for shorelands around Bughs Lake is displayed on the map in Appendix B. While much of the eastern shore of Bughs Lake is in good shape, the shorelands along the western side of the lake have challenges that should be addressed. Most of the western shores of Bughs Lake ranked as poor. Based on the 30-foot viewing corridor per shoreland lot standard set by NR115, Bughs Lake’s maximum allowable disturbance for access corridors is 1,260 feet. There are 3,071 feet of mowed shoreline based on the shoreland survey conducted in 2011. Shoreland ordinances were enacted to improve water quality and habitat, and 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 42 lakefront lots, 1,260 feet (32%) of disturbed shoreland is permitted. Based on the 2011 shoreland inventory included, 77% (3,071 feet) of Bughs Lake’s shoreland was mowed lawn. Although some properties have been grandfathered in, following this guidance will benefit the health of the lake and its inhabitants.



Guiding Vision for Bugh's Lake's Shorelands

Bugh's Lake will have healthy natural shorelands to provide a healthy lake ecosystem for aquatic and terrestrial wildlife and to improve the water quality of runoff.

Goal 9. Reduce nutrient inputs into Bugh's Lake.

Objective 9.1. Maintain vegetated shorelands where they already exist, and encourage a vegetated buffer where the shorelands are mowed to the edge. Show support for healthy shoreland maintenance and restoration. Restore 30% (543 feet) of the currently mowed shoreland over the next 5 years.

Actions	Lead person/group	Resources	Timeline
Provide materials to property owners about healthy shorelands and lake friendly practices in welcome packets, at the annual meeting, and on the website.	Waushara County	Educational materials from: UWEX Lakes WCWLC	Ongoing
Maintain information and get assistance for restoration of shoreland vegetation, help with restoration/plantings, and cost-sharing for interested property owners.		WCLCD Consultants	Ongoing
Encourage soil testing for shoreland residents prior to spring application. Consider providing information and sample bags at annual fall meeting.		Waushara County UWEX	
Commend property owners who maintain/restore a shoreland vegetation buffer using website to post information re: permitted information on locations.			
Explore posting specific locations/dates/times on website that can be viewed for examples of shoreland vegetation buffers.		WCLCD Consultants	
Organize boating parties/events to view shorelines.		WCLCD	
Explore obtaining a grant to conduct a beginning phase of a demonstration shoreland restoration project. Continue project through stages if possible with grant/landowner permission.		WCLCD Consultants WDNR Healthy Lakes Grant Program WCWLC	

Explore options to increase rental property participation in healthy shoreland practices: by disseminating brochures, pamphlets.		Educational materials from: UWEX Lakes WCWLC	
Complete a second shoreline survey to track improvements.		WCLCD UWSP CWSE Consultant WDNR Lakes Grant	

Objective 9.2. Reduce the effects of impervious surfaces on properties surrounding the lake.

Actions	Lead person/group	Resources	Completion Status
Encourage installation of rain gardens and native vegetation around the lake. Provide information about rain gardens and shoreline restoration; direct those interested to contact Waushara County Land Conservation.		WCLCD UWEX Lakes – educational materials WDNR Lake Grant Program	Ongoing
Work with Town to mitigate runoff from public boat landing (possible demonstration site).		WCLCD WDNR Lake Grant Program WDNR Fisheries Biologist	
Control runoff, erosion, sound pollution and aesthetics from Highway 21/73. Explore work on former Peck's Plantation (Yorad, LLC) and St. Peter's Episcopal Church.		Waushara County Highway Dept. WDOT	

Watershed Land Use

It is important to understand where Bugh's 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 Bugh's Lake; its land area may be slightly different than the surface watershed. The boundaries of the surface watershed can change with alterations to the landscape, such as the installation of culverts.

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. Minimizing excess runoff is desirable because it allows more water to recharge the groundwater, which feeds the lake year-round - even during dry periods or when the lake is covered with ice.

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

The surface watershed of Bugh's Lake is 404 acres. Primary land use is developed land and agriculture (Figure 1). The lake's shoreland is comprised primarily of residential development, forest and wetlands. In general, the land closest to the lake has the greatest immediate impact on water quality.

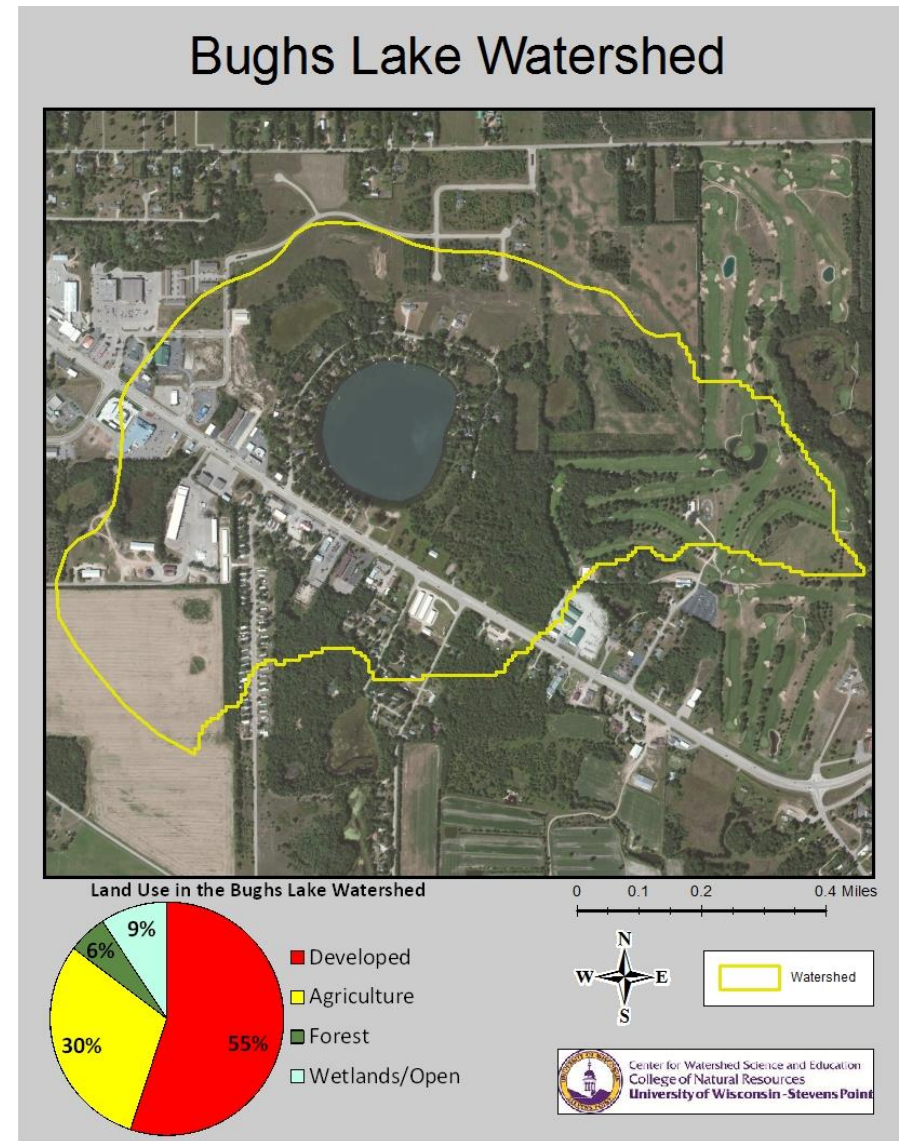
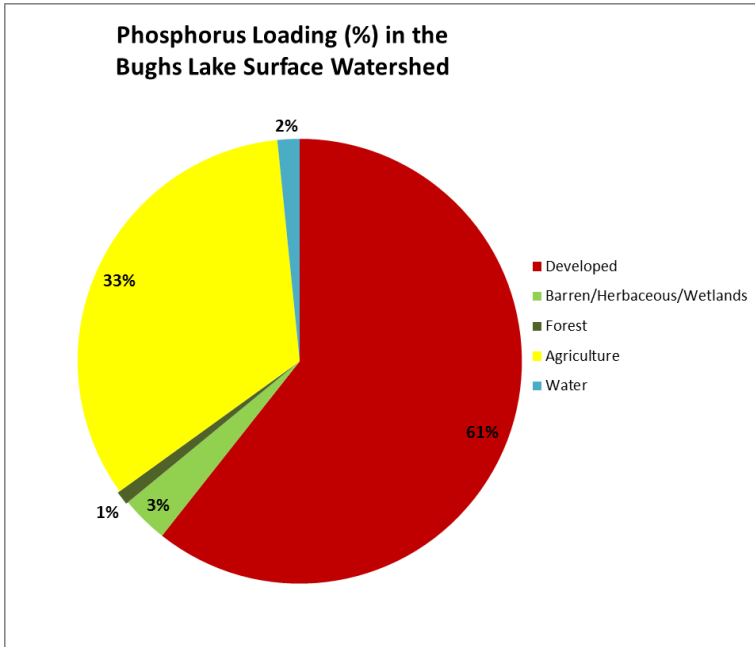


Figure 1. Surface watershed of Bugh's Lake.

In addition to the topographically-delineated watershed, Bugh Lake also receives surface water from artificial drainage from a subdivision to the north of the lake. Storm water from this area is drained to the east, where it enters a small pond which in turn drains into the small wetland to the northeast of the lake. Water from the wetland eventually flows into the lake. Concerns about the potential influx of contaminants in runoff to the lake from the subdivision exist within the Bugh Lake community (this information is not shown in Figure 1 and is not included in the phosphorus budget calculations).

Estimates of phosphorus from the landscape can help to understand the phosphorus sources to Bugh 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 Bugh Lake. The phosphorus contributions by land use category, called phosphorus export coefficients, are shown in Appendix E. The phosphorus export coefficients have been obtained from studies throughout Wisconsin (Panuska and Lillie, 1995).



Guiding Vision for Bugh Lake’s Watershed

The land around Bugh Lake will be managed in a way that supports clean water and a healthy lake.

Goal 10. Watershed property owners and Town and City board members will know about and utilize resources for healthy land management practices.

Objective 10.1. Support healthy land management activities around Bugh Lake.

Actions	Lead person/group	Resources	Timeline
Encourage the County to support and follow-up with water quality-based Best Management Practices (BMPs) within the watershed.		WCLCD NRCS	

Continue to use Waushara Co. Land Conservation as a resource for land management activities.		WCLCD	
Support landowners interested in the protection of their land via a land conservation program (i.e. Conservation Easement, Purchase of Development Rights, or sale of land for protection).		NCCT NRCS WDNR Lake Protection Grants	
Explore funding options for land purchase within the watershed for conservation, preservation, or restoration purposes.		WDNR Lake Protection Grants Wisconsin Stewardship Funds	
Encourage subdivisions and other new developments to manage stormwater on site and consider septic system impacts to Bughs Lake.		Waushara County Planning and Zoning City of Wautoma Planning and Zoning	
Discourage large water withdrawal projects that may impact the water levels in Bughs Lake.		WCLWC Friends of the Central Sands	
Protect wetlands to maintain the water budget of Bughs Lake. Any altered wetlands will be mitigated within the lake's watershed.		WCLCD NRCS Waushara County Highway Dept. WDOT Town of Wautoma City of Wautoma	
Encourage design of road and construction projects that will minimize impacts to Bughs Lake.		WCLCD NRCS Waushara County Highway Dept. WDOT Town of Wautoma City of Wautoma	
Open dialogue and inform City of Wautoma about its impacts to Bughs Lake.		WCLCD NRCS Waushara County Highway Dept. WDOT Town of Wautoma City of Wautoma	

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. This plan summarizes the decisions of people to take proactive steps to improve their lake and their community. Good decisions by lake shore residents and visitors can have a positive impact on the lake and on those who enjoy this common resource. Collaborative efforts can increase the positive impacts; therefore, communication and cooperation between the lake district, community, and suite of lake users are essential to maximize the effects of the implementation of this plan.

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

Bughs Lake is a no-wake lake due to its small area. Many lake residents appreciate this rule and the peacefulness of the lake. Planning participants suggested that recreational experiences on Bughs Lake could be improved by the control of aquatic invasive species and reduction of light pollution, as well as adjusting fishing rules and awareness.



Red Reilly, 1934

Guiding Vision for Recreation

Recreation on Bughs Lake will be unimpeded by excessive plant growth, nighttime light pollution, or overfishing.

Goal 11. Reduce nuisance growth of aquatic invasive species.

Objective 11.1. Remove aquatic invasive species to improve recreation and fishing.

Actions	Lead person/group	Resources	Timeline
Refrain from the removal of native aquatic plants to support the fish community.	Shoreland property owners	UWEX (educational material)	Ongoing
Consider posting a sign at the boat launch designating Bughs Lake as “volunteer catch and release” during bass spawning season.			

Goal 12. Reduce nuisance lake-area lighting from commercial lighting sources.

Objective 12.1. Work with local municipalities and the county to explore options for responsible shoreland/near-lake lighting.

Actions	Lead person/group	Resources	Timeline
Explore options for local ordinances that could involve the regulation of lighting within the county or municipality.		Waushara County Planning and Zoning Town of Wautoma City of Wautoma	
Work with municipal and county professionals to explore zoning options that support lake water quality.	Town of Wautoma	Waushara County Planning and Zoning	
Consider asking businesses around Bughs Lake to consider different lighting options on behalf of lake/town residents.		UWEX Lakes – educational materials	
Provide information to lake property owners about lighting options.		UWEX Lakes – educational materials	Ongoing

Goal 13. Facilitate the availability of important lake information to the public.

Objective 13.1. Provide lake users with information and rules necessary to make responsible decisions.

Actions	Lead person/group	Resources	Timeline
Maintain signage at boat landings and around the lake with important lake, recreation, and habitat information.		WDNR Town of Wautoma Property owners UWEX Lakes	
Support the no-wake designation on Bughs Lake.		Town of Wautoma	
Support enforcement of current fishing regulations (i.e. valid fishing license, bag limits, ice fishing regulations re: fish shanties, bag limit, tip-ups, etc.).		WDNR Warden Town of Marion Boat Officer	

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 Bugh's 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 Bugh's Lake Property Owners Association and planning committee will maintain and build communications internally and within the community.

Goal 14. Maintain open communications with lake users to keep visitors and residents informed about responsible lake stewardship and encourage involvement.

Objective 14.1. Distribute important lake and related land management information to residents and lake visitors.

Actions	Lead person/group	Resources	Timeline
Continue the distribution of a welcome packet to all new and current residents of Bugh's Lake via the WCLWC.		WCLWC	
Announce lake happenings and management activities, events, at the annual meeting.			
Start annual newsletter; post information on the town website.		Town of Wautoma	
Plan a post-annual meeting "social hour".		BLPOA members	

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

Bugs Lake will have a living, regularly updated management plan in place to adaptively protect and improve lake health.

Goal 15. Review plan annually and update as needed.

Objective 15.1. Receive input from and communicate updates with community and BLPOA members.

Actions	Lead person/group	Resources	Timeline
Include plan updates as a regular agenda item at the annual meeting.			
Notify lake district members of any potential changes in the lake management plan.			
Notify organizations that adopted this Bugs Lake Management Plan of proposed changes to the plan.		WCLCD Town of Wautoma WDNR Lake Manager	

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 Resource Conservation and Development Council, Inc., Wisconsin Wetlands Association, and Wisconsin Trout Unlimited.

Lake Regulations

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

Comprehensive Plans

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

Process for Inclusion in the Municipal Comprehensive Plan

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

Process for Inclusion in the County Comprehensive Plan

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

The Land, Water, and Education Committee will review the amendment and if it concurs with the recommendation from the Land Use Committee, it will make a recommendation to the Planning & Zoning Committee. The Planning & Zoning Committee will hold a public hearing with a thirty-day class one

notice. The Planning & Zoning Committee will recommend by resolution the amendment to the comprehensive plan or the amendment with changes be adopted by the County Board.

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

Use of the Comprehensive Plan

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

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

References

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- Boat Ed, 2013. *The Handbook of Wisconsin Boating Laws and Responsibilities*. Approved by Wisconsin Department of Natural Resources. www.boat-ed.com
- Borman, Susan, Robert Korth, and Jo Temte, 2001. *Through the looking glass, a field guide to aquatic plants*. Reindl Printing, Inc. Merrill, Wisconsin.
- Haney, Ryan, 2014. Water Quality of Bughes and Napowan Lakes. Presentation given at the Waushara County Courthouse on August 12, 2014.
- Johnson, T., 2014. Aquatic Plant Management in Bughes and Napowan Lakes. Presentation given at the Wautoma Public Library on July 8, 2014.
- 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.
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- Stushek, Kaycie, 2014. AIS in Bughes and Napowan Lakes. Presentation given at the Wautoma Public Library on July 8, 2014.
- Turyk, Nancy, 2014. Healthy Land = Healthy Water. Presentation given at the Waushara County Courthouse on August 12, 2014.
- UW-Stevens Point Center for Watershed Science and Education, 2014. Waushara County Lake Study - Bughes Lake 2010-2012. Final Report to Waushara County and Wisconsin Department of Natural Resources.
- UW-Stevens Point Center for Watershed Science and Education, 2013. Waushara County Lake Study - Bughes Lake 2010-2012 Mini-Report. Report to Waushara County and Wisconsin Department of Natural Resources. Planning Meeting Presentations
- Vallentyne, J.R., 1974. *The Algal Bowl-Lakes and Man*. Ottawa Department of the Environment.
- Wetzel, R.G., 2001. *Limnology, Lake and River Ecosystems, Third Edition*. Academic Press. San Diego, California.

Appendices

Appendix A: Waushara County 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
Phone: 608-267-3242
Address: 1 West Wilson Street, Madison, WI 53703
Website:
<http://www.dhs.wisconsin.gov/eh/bluegreenalgae/contactus.htm>

Aquatic Invasive Species /Clean Boats Clean Water

Contact: Golden Sands RC&D
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
Phone: 715-343-6215
Websites: www.goldensandsrcd.org

Contact: Dr. Emmet Judziewicz, UWSP Freckmann Herbarium
Phone: 715-346-4248
Address: 301 TNR UWSP 800 Reserve St. Stevens Point, WI 54481
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 (Raingardens, shoreland buffers, agricultural practices, runoff controls)

Contact: Ed Hernandez, Waushara County Land Conservation Department
Phone: 920-787-0453
Address: PO Box 1109 Wautoma, WI 54982
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
Phone: 920-787-7037
Address: PO Box 300 Wautoma, WI 54982
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
Phone: 608-635-4989
Address: Hwy 22N Box 430, Montello, WI 53949
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.

Chemical Treatments for Aquatic Plants

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

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
Phone: 608-251-9131
Address: 211 S. Paterson St. Suite 270 Madison, WI 53703
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](#)
[Phone: 715-839-3794](#)
[Address: PO Box 4001, Eau Claire, WI 54702](#)
[E-mail: Patrick.Sorge@wisconsin.gov](#)

Contact: North Central Conservancy Trust
Phone: 715-344-1910
Address: P.O. Box 124 Stevens Point, WI 54481
E-mail: info@ncctwi.org
Website: <http://www.ncctwi.org/>

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

Critical Habitat and Sensitive Areas

Contact: Ted Johnson, Wisconsin Department of Natural Resources Lake Coordinator
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
Phone: 715-421-9940
Address: 473 Griffith Ave. Wisconsin Rapids, WI 54494
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
Phone: 920-787-0416
Address: 209 S St. Marie Street, PO Box 487, Wautoma, WI 54982
E-mail: ken.williams@ces.uwex.edu
Website: <http://waushara.uwex.edu/agriculture/services>

Fisheries Biologist (management, habitat)

Contact: Dave Bartz, Wisconsin Department of Natural Resources
Phone: 608-635-4989
Address: Hwy 22N Box 430, Montello, WI 53949
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 Lake Coordinator
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
Phone: 920-787-0453
Address: PO Box 1109 Wautoma, WI 54982
E-mail: lcdzoning.courthouse@co.waushara.wi.us
Website: <http://www.co.waushara.wi.us/zoning.htm>

Groundwater Quality

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

Groundwater Levels/Quantity

Contact: George Kraft
Phone: 715-346-2984
Address: TNR 224 800 Reserve Street, Stevens Point, WI 54481
E-mail: george.kraft@uwsp.edu

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

Informational Packets

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

Lake Groups – Friends, Associations, Districts

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

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

Lake Groups (Cont'd)

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

Contact: Susan Tesarik, Wisconsin Lakes
Phone: 1-800-542-5253
Address: 4513 Vernon Blvd. Suite 101 Madison, WI 53705
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, Wisconsin Department of Natural Resources State Conservation Warden
Phone: 920-896-3383
Address: 427 E. Tower Drive, Suite 100 Wautoma, WI 54982
Website: <http://www.wigamewarden.com/>

Land Use Plans and Zoning Ordinances

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

Contact: Center for Land Use Education, UWSP
Phone: 715-346-3783
Address: TNR 208 800 Reserve St. Stevens Point, WI 54481
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
Phone: 920-787-0453
Address: PO Box 1109 Wautoma, WI 54982
E-mail: lcdzoning.courthouse@co.waushara.wi.us
Website: <http://www.co.waushara.wi.us/zoning.htm>

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

Parks (County)

Contact: Scott Schuman, Waushara County Parks
Phone: 920-787-7037
Address: PO Box 300 Wautoma, WI 54982
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
Phone: 715-341-7741
Address: P.O. Box 124 Stevens Point, WI 54481
E-mail: info@ncctwi.org
Website: <http://www.ncctwi.org/>

Purchase of Land

Contact: Ted Johnson, Wisconsin Department of Natural Resources Lake Coordinator
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
Phone: 715-343-6215
Address: 1100 Main Street, Suite #150, Stevens Point, WI 54481
Website: <http://www.goldensandsrcd.org/store>

Rain Gardens and Stormwater Runoff

Contact: Ed Hernandez, Waushara County Land Conservation Department
Phone: 920-787-0453
Address: PO Box 1109 Wautoma, WI 54982
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
Phone: 920-787-0453
Address: PO Box 1109 Wautoma, WI 54982
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
Phone: 920-787-0453
Address: PO Box 1109 Wautoma, WI 54982
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: Zoning Ordinances

Soil Fertility Testing

Contact: Ken Williams, Waushara County UW-Extension
Phone: 920-787-0416
Address: 209 S St Marie PO Box 487, Wautoma, WI 54982
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 Lake Coordinator
Phone: 920-424-2104
E-mail: TedM.Johnson@wisconsin.gov

Water Quality Problems

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

Water Quality Problems (Cont'd)

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

Wetlands

Contact: Keith Patrick, Wisconsin Department of Natural Resources
Phone: 715-241-7502
Address: 5301 Rib Mt. Drive Wausau, WI 54401
E-mail: keith.patrick@wisconsin.gov
Website: <http://dnr.wi.gov/wetlands/>

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

Wetland Inventory

Contact: Dr. Emmet Judziewicz, UWSP Freckmann Herbarium
Phone: 715-346-4248
Address: 301 TNR UWSP 800 Reserve St. Stevens Point, WI 54481
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
Website: <http://dnr.wi.gov/fish/>

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

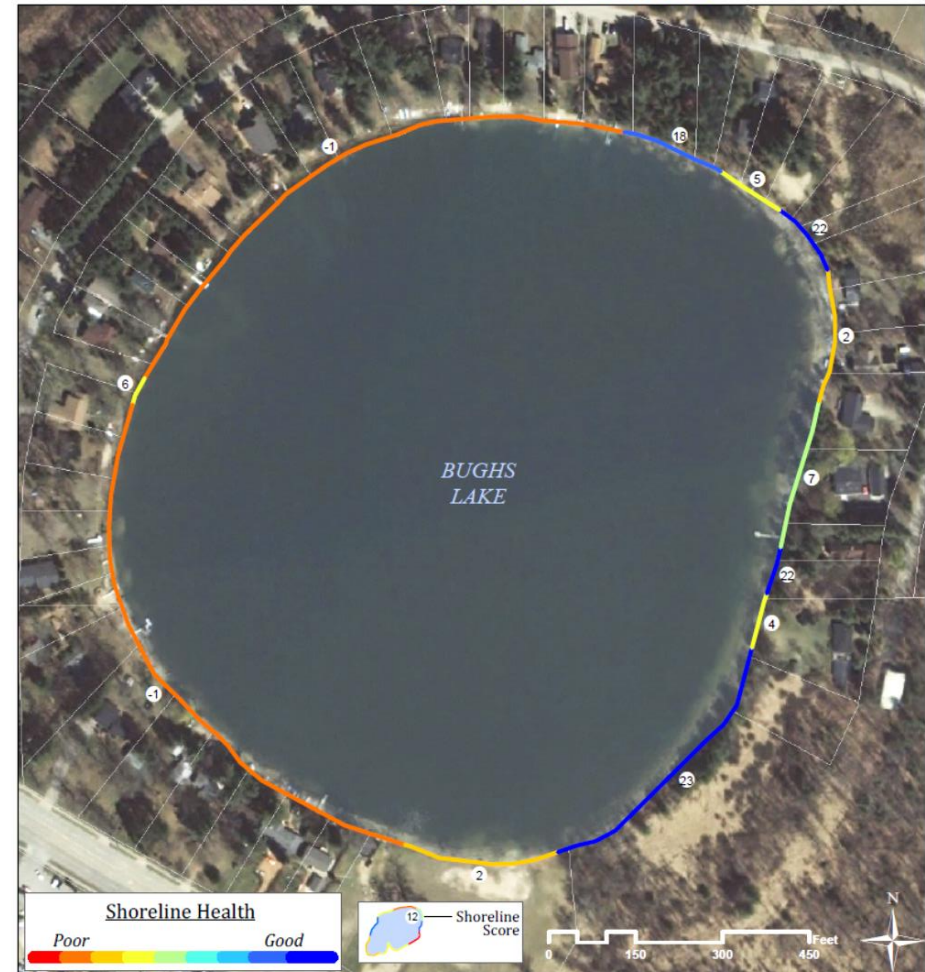
A scoring system was developed for the collected data to provide a more holistic assessment. Areas that are healthy will need strategies to keep them healthy, and areas with potential problem areas and where management and conservation may be warranted may need a different set of strategies for improvement. 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 Bughs Lake is displayed in the figure to the right. The shorelands were color-coded to show their overall health based on natural and physical characteristics. Blue shorelands identify healthy shorelands with sufficient vegetation and few disturbances. Red shorelands indicate locations where changes in management or mitigation may be warranted. Most of the western shores of Bughs Lake 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 *BUGHS LAKE*

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



Summary

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

Calculating Shoreline Scores

Scores are based on the presence/absence of:

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



Map created by Dan McFarlane
Center for Land Use Education

Appendix C: Rapid Response Plan

SURVEY/MONITOR

1. Learn how to survey/monitor the lake.	Contacts: Water Resource Management Specialist Ted Johnson Wisconsin Department of Natural Resources Phone: 920-787-3048 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: 715-343-6215 E-Mail: info@goldensandsrca.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: <ul style="list-style-type: none">• 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

<p>3. Gather information to aid in positive species identification.</p>	<ul style="list-style-type: none"> • 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)
<p>4. Mail or bring specimens and information to any of the following locations:</p> <p>Digital photos may be emailed.</p>	<p>Wisconsin Dept. of Natural Resources 427 E. Tower Drive, Suite 100 Wautoma, WI 54982 Phone: 920- 787-4686</p> <p>Regional AIS Coordinator Golden Sands RC&D 1100 Main St., Suite 150 Stevens Point, WI 54481 Phone: 715-343-6215 E-Mail : info@goldensandsrcd.org</p> <p>UW-Stevens Point Herbarium TNR 301 800 Reserve Street Stevens Point, WI 54481 Phone: 715-346-4248 E-Mail: ejudziew@uwsp.edu</p> <p>Wisconsin Invasive Plants Reporting & Prevention Project UW-Madison Herbarium 430 Lincoln Drive Madison, WI 53706 Phone: 608- 267-7612 E-Mail: invasiveplants@mailplus.wisc.edu</p>
<p>5. Once the specimen is dropped off or sent for positive identification, be sure to contact:</p>	<p>Regional AIS Coordinator Golden Sands RC&D 1100 Main St., Suite 150 Stevens Point, WI 54481 Phone: 715-343-6215 E-Mail : info@goldensandsrcd.org</p>

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

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

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

Town of Wautoma
Town of Dakota

- **The Bugh Lake Property Owners Association (BPLOA)**

Contact: Lars Rogeberg, President
N2342 Bugh Lake Road
Wautoma, WI 54982
920-787-3998
BPLOA@centurytel.net

Contact: Bugh Lake Management District
Richard E. DeLisle
N2678 Bugh Lake Road
Wautoma, WI 54982
414-305-9570
rconstructive@yahoo.com

- **University of Wisconsin-Stevens Point**
Water Resource Scientist
Nancy Turyk
TNR 216, 800 Reserve Street
Stevens Point, WI 54481
Telephone: 715-346-4155
E-mail: nturyk@uwsp.edu
- **Local Residents**
All property owners in the Bugh Lake Management District.

If an invasive species is confirmed, the lake association will make the following public information contacts:

- **Newspapers:** The Argus

Contact the Wisconsin Department of Natural Resources to post notice(s) at the access point(s) to the water body.

Bugs Lake Curly-leaf pondweed Survey 2012:
Curly-leaf pondweed (*Potamogeton crispus*)

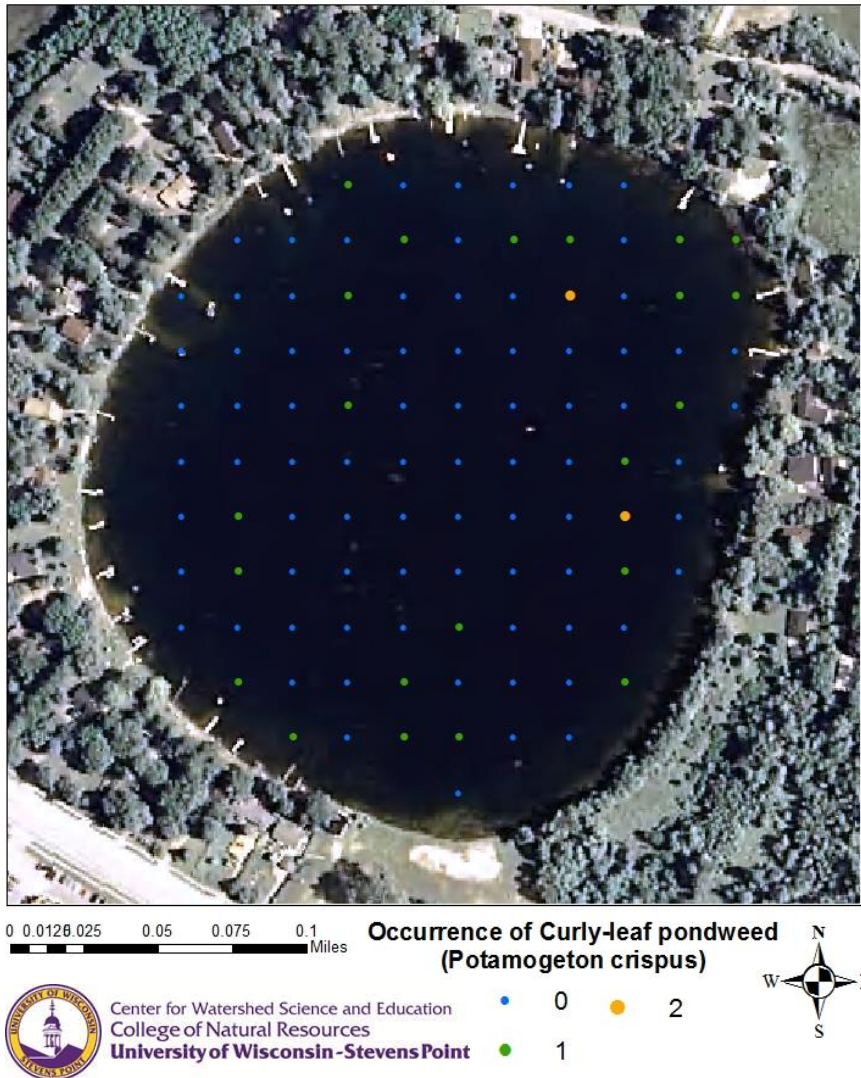


Figure 1. Locations of curly leaf pondweed identified in 2012 by UW-Stevens Point.



Figure 2. Locations of Eurasian watermilfoil hybrids and curly leaf pondweed identified in 2013 by Golden Sands Resource Conservation and Development Council, Inc.

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

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

LIMITATIONS

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

Hand Pulling

ADVANTAGES

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

LIMITATIONS

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

Hand Pulling Using Suction

ADVANTAGES

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

LIMITATIONS

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

Mechanical Harvesting

ADVANTAGES

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

LIMITATIONS

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

Water Level Manipulation

ADVANTAGES

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

LIMITATIONS

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

Milfoil Weevils

ADVANTAGES

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

LIMITATIONS

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

Chemical Treatment: Spot

ADVANTAGES

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

LIMITATIONS

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

Chemical Treatment: Lake-wide

ADVANTAGES

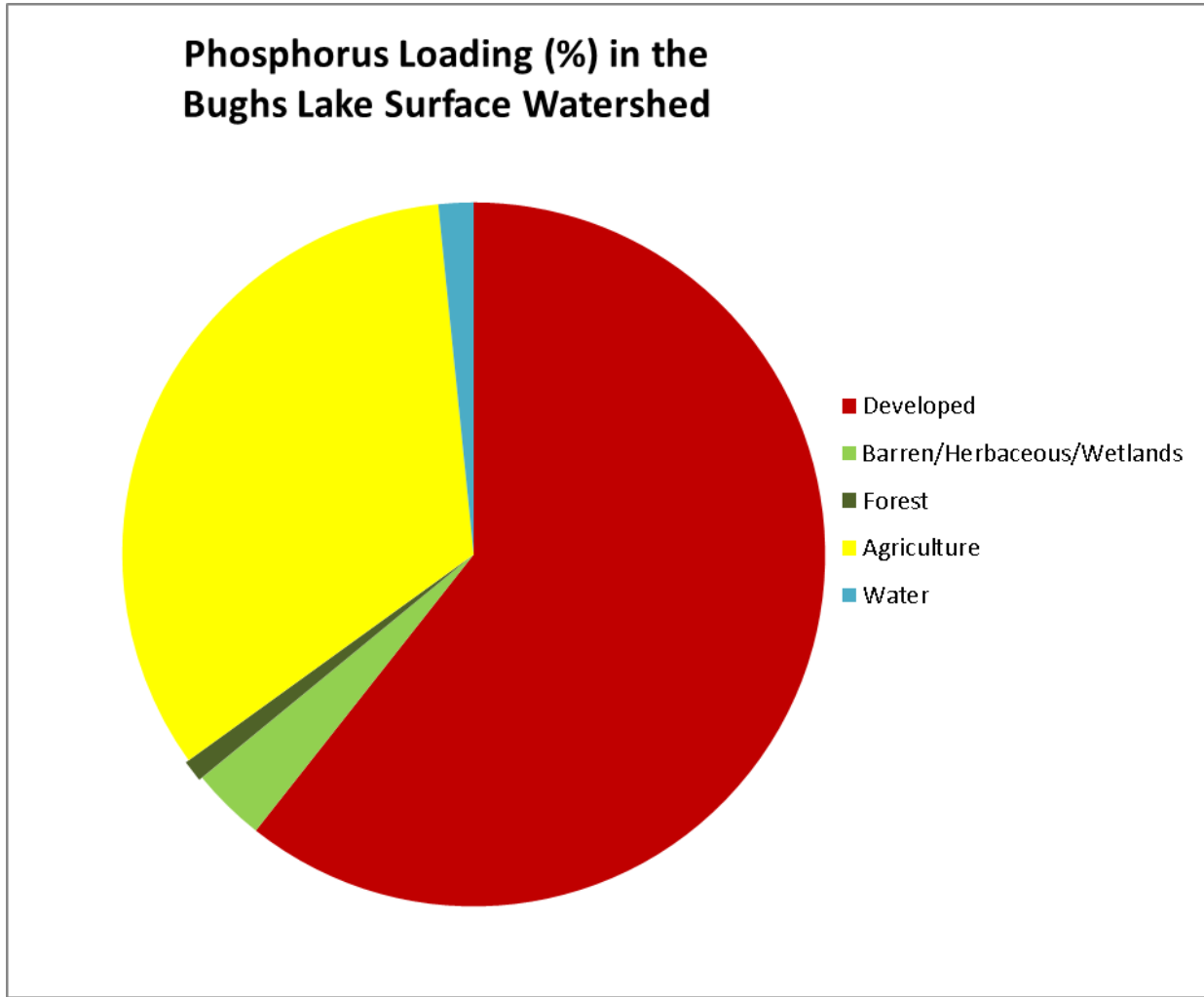
- * May reduce aquatic invasives for a time.
- * Treatment not needed as frequently.

LIMITATIONS

- * Only considered in lakes with aquatic invasive plants.
- * Usually not fully effective in eradicating target species.

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

Appendix E: Phosphorus Modeling



Bugh's Lake Land Use	Phosphorus Export Coefficient (lbs/acre-yr)	Land Use Area Within the Watershed		Estimated Phosphorus Load	
		Acres	Percent	Pounds	Percent
Water	0.1	23	4	2-7	2
Developed	0.27	295	53	79-159	62
Barren/Herbaceous/Wetland	0.09	50	9	4-13	3
Forest	0.04	29	5	1-2	1
Cultivated Agriculture	0.45	162	29	43-115	34

*Values are not exact due to rounding and conversion.

Appendix F: Lake User Survey Results (Combined)

Bughs Lake Survey #1 and #2

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

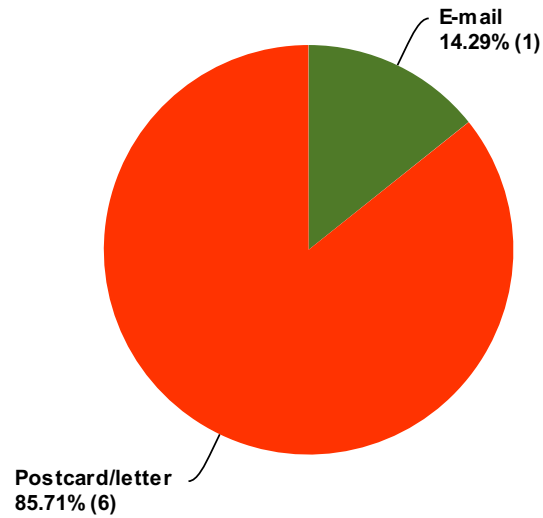
Answered: 18 Skipped: 0

#	Responses	Date
1	██████	6/9/2014 10:36 AM
2	██████	6/9/2014 10:32 AM
3	██████	6/9/2014 10:26 AM
4	██████	6/9/2014 10:14 AM
5	██████	6/9/2014 10:07 AM
6	██████	6/8/2014 10:25 PM
7	██████	6/8/2014 6:19 PM
8	██████	6/4/2014 1:45 PM
9	██████	6/3/2014 8:38 PM
10	██████	6/3/2014 8:18 PM
11	██████	6/2/2014 4:08 PM
12	██████	6/2/2014 4:00 PM
13	██████	6/2/2014 3:48 PM
14	██████	6/2/2014 3:24 PM
15	██████	6/1/2014 10:55 AM
16	██████	5/31/2014 7:08 PM
17	██████	5/31/2014 5:07 PM
18	██████	5/28/2014 8:29 PM

Bugh's Lake Survey #1 and #2

Q2 How did you hear about this survey?

Answered: 7 Skipped: 11



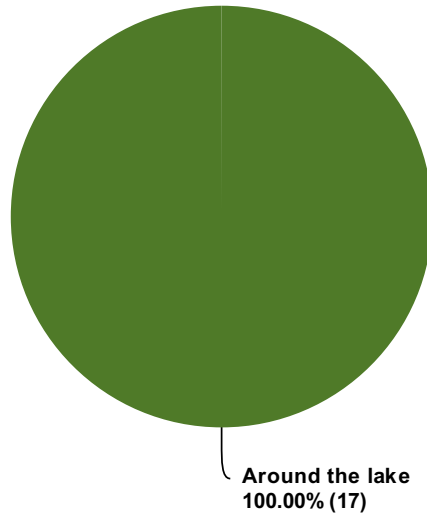
Answer Choices	Responses	
E-mail	14.29%	1
Newspaper	0.00%	0
Postcard/letter	85.71%	6
Facebook	0.00%	0
Radio	0.00%	0
Total		7

#	Other (please specify)	Date
1	lake meeing	6/9/2014 10:36 AM
2	meeting	6/9/2014 10:32 AM
3	Lake Association meeting	6/9/2014 10:26 AM
4	Bugh's Lake property owners Association meeting in May	6/9/2014 10:14 AM
5	Bugh's Lake property association in may 2014	6/9/2014 10:07 AM
6	Lake association meeting	6/8/2014 10:25 PM
7	lake associaion meeting	6/2/2014 4:08 PM
8	Lake meeting	6/2/2014 4:00 PM
9	Annual spring meeting of bugh's lake property owners association	6/2/2014 3:48 PM
10	Lake Association Spring Meeting	6/2/2014 3:24 PM
11	At a meeting	5/31/2014 5:07 PM

Bughs Lake Survey #1 and #2

Q3 Do you own or rent property...

Answered: 17 Skipped: 1

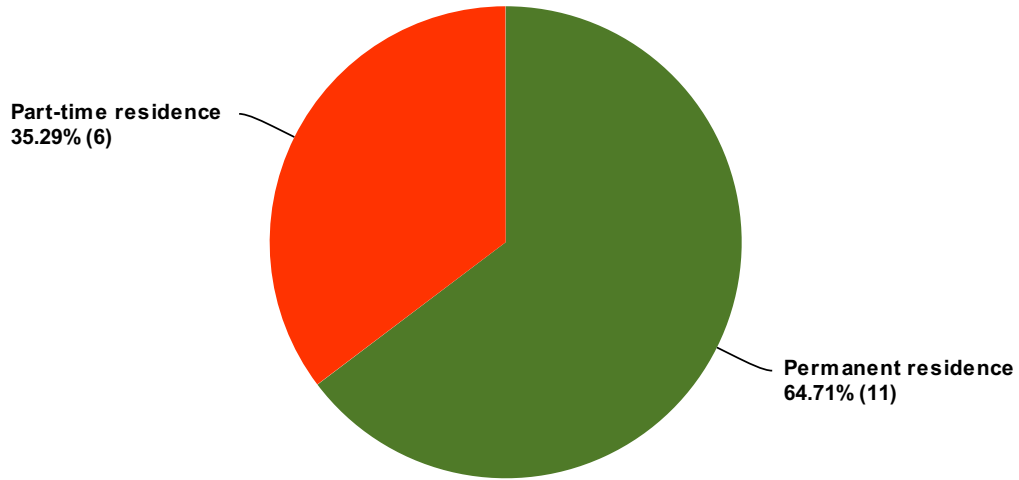


Answer Choices	Responses
Around the lake	100.00% 17
Less than 1/2 mile from the lake	0.00% 0
1/2 mile to 1 mile of the lake	0.00% 0
More than 1 mile from the lake	0.00% 0
I do not own or rent property near the lake	0.00% 0
Total	17

Bughs Lake Survey #1 and #2

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: 17 Skipped: 1

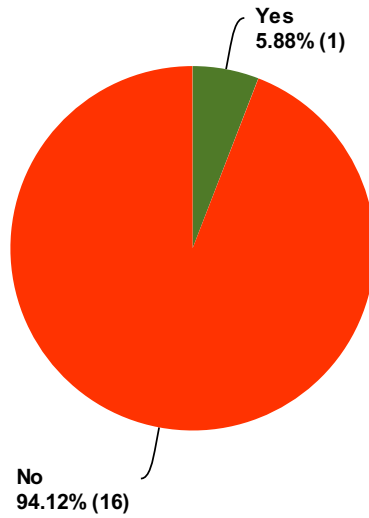


Answer Choices	Responses	
Permanent residence	64.71%	11
Part-time residence	35.29%	6
I do not own or rent property near the lake	0.00%	0
Total		17

Bughs Lake Survey #1 and #2

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

Answered: 17 Skipped: 1

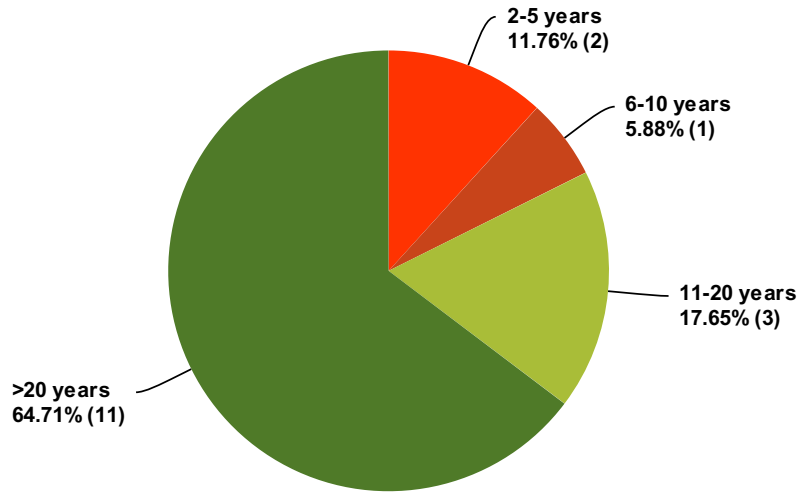


Answer Choices	Responses	
Yes	5.88%	1
No	94.12%	16
Total		17

Bughs Lake Survey #1 and #2

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

Answered: 17 Skipped: 1

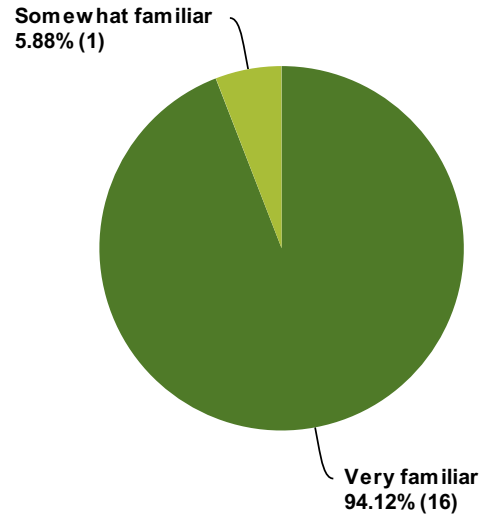


Answer Choices	Responses
2-5 years	11.76% 2
6-10 years	5.88% 1
11-20 years	17.65% 3
>20 years	64.71% 11
Total	17

Bughs Lake Survey #1 and #2

Q7 Are you familiar with the Bughs Lake Property Owners Association?

Answered: 17 Skipped: 1

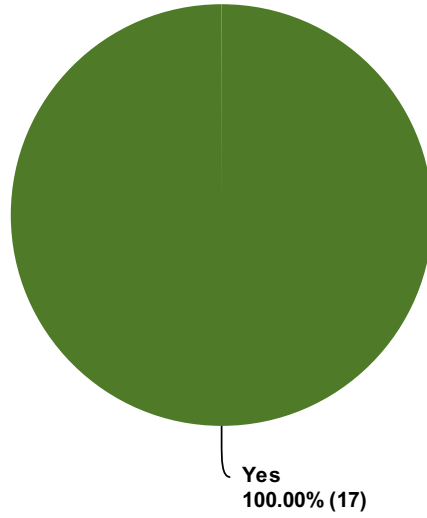


Answer Choices	Responses	
Very familiar	94.12%	16
Somewhat familiar	5.88%	1
I've heard of it	0.00%	0
Never heard of it	0.00%	0
Total		17

Bughs Lake Survey #1 and #2

Q8 Are you a member of the Bughs Lake Property Owners Association?

Answered: 17 Skipped: 1

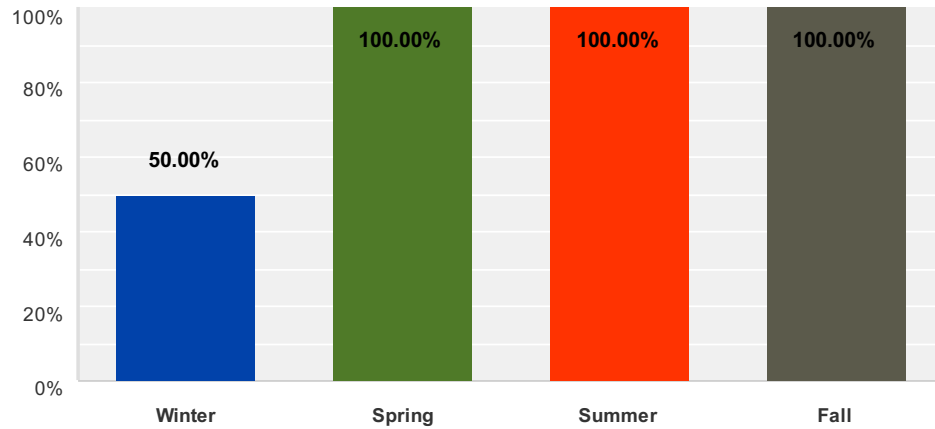


Answer Choices	Responses	
Yes	100.00%	17
No	0.00%	0
I don't know	0.00%	0
Total		17

Bughs Lake Survey #1 and #2

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

Answered: 16 Skipped: 2

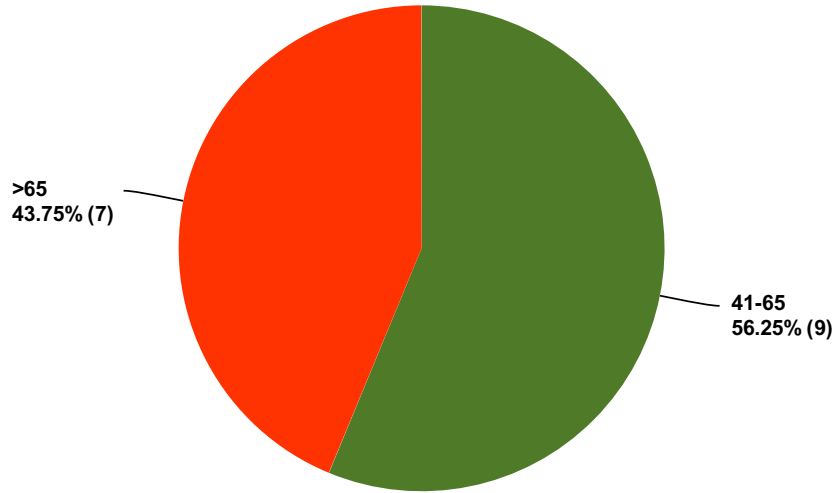


Answer Choices	Responses	
Winter	50.00%	8
Spring	100.00%	16
Summer	100.00%	16
Fall	100.00%	16
Total Respondents: 16		

Bughs Lake Survey #1 and #2

Q10 Which category below includes your age?

Answered: 16 Skipped: 2

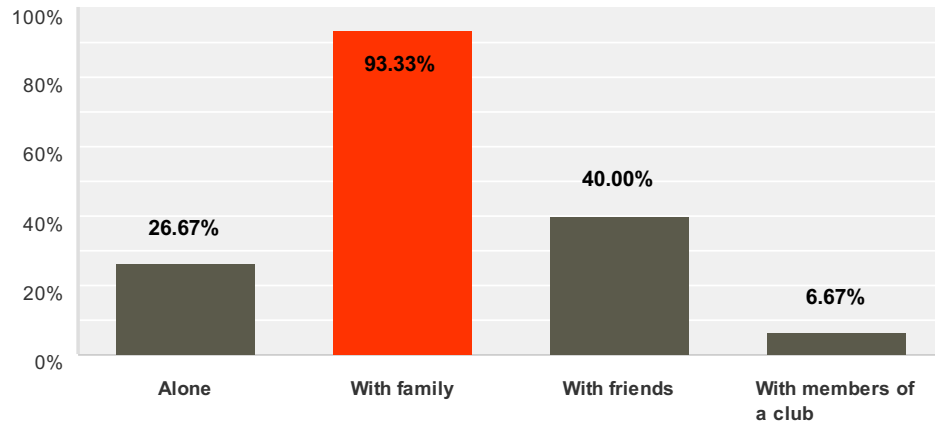


Answer Choices	Responses
Under 18	0.00% 0
18-40	0.00% 0
41-65	56.25% 9
>65	43.75% 7
Total	16

Bugs Lake Survey #1 and #2

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

Answered: 15 Skipped: 3



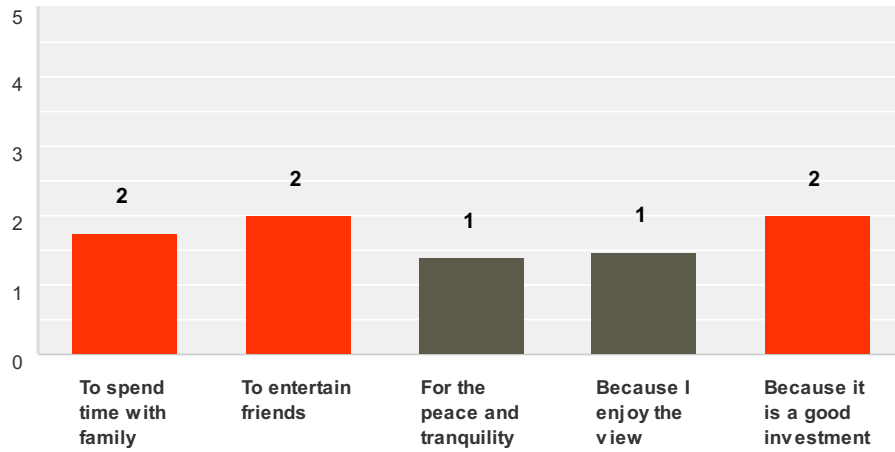
Answer Choices	Responses
Alone	26.67% 4
With family	93.33% 14
With friends	40.00% 6
With members of a club	6.67% 1
Total Respondents: 15	

#	Other (please specify)	Date
1	I live on the lake with spouse.	6/9/2014 10:15 AM
2	Live on lake with spouse	6/9/2014 10:08 AM
3	Live on lake	6/2/2014 3:49 PM

Bugs Lake Survey #1 and #2

Q12 I live on or near the lake...

Answered: 17 Skipped: 1



	Strongly Agree	Agree	Disagree	Strongly Disagree	I do not live on or near the lake	Total
To spend time with family	29.41% 5	64.71% 11	5.88% 1	0.00% 0	0.00% 0	17
To entertain friends	23.53% 4	52.94% 9	23.53% 4	0.00% 0	0.00% 0	17
For the peace and tranquility	58.82% 10	41.18% 7	0.00% 0	0.00% 0	0.00% 0	17
Because I enjoy the view	58.82% 10	35.29% 6	5.88% 1	0.00% 0	0.00% 0	17
Because it is a good investment	17.65% 3	64.71% 11	17.65% 3	0.00% 0	0.00% 0	17

Bughs Lake Survey #1 and #2

Q13 What do you value most about Bughs Lake?

Answered: 16 Skipped: 2

#	Responses	Date
1	peaceful place to relax outside swim and boat	6/9/2014 10:38 AM
2	Beauty & nature	6/9/2014 10:27 AM
3	A nice little lake without loud boat motors, close to town, quiet lake, good neighbors, no public beach or commercial	6/9/2014 10:17 AM
4	Close to town, good neighbors, nice quiet lake, nice lake association	6/9/2014 10:09 AM
5	View, my children enjoying the lake, peace and quiet that we use to have	6/8/2014 10:38 PM
6	fishing and swimming with family and friends.	6/8/2014 6:21 PM
7	commeradie	6/3/2014 8:42 PM
8	quiet lake, great neighbors	6/3/2014 8:20 PM
9	Being on the water	6/2/2014 4:10 PM
10	Peach and tranquility	6/2/2014 4:01 PM
11	Recreation, no wake	6/2/2014 3:50 PM
12	No wake- quiet community surrounding the lake	6/2/2014 3:26 PM
13	Quality of living Life on the lake.	6/1/2014 11:00 AM
14	Lack of use.	5/31/2014 7:13 PM
15	The view	5/31/2014 5:18 PM
16	Quiet	5/28/2014 8:32 PM

Bugs Lake Survey #1 and #2

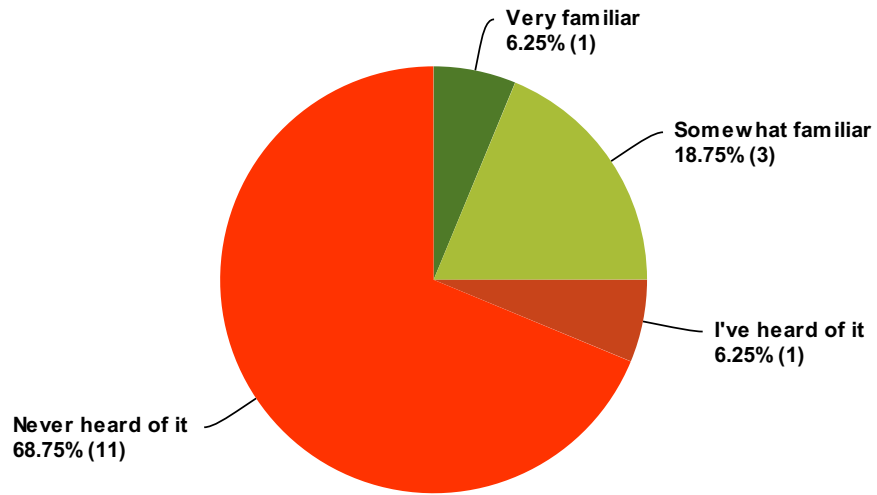
Q14 In your opinion, what should be done to restore, maintain, or improve Bugs Lake?

Answered: 16 Skipped: 2

#	Responses	Date
1	Weed control	6/9/2014 10:38 AM
2	Determine any problem, seek advice, do it	6/9/2014 10:27 AM
3	Keep invasive weeds down, don't let lake get like a swamp with massive amount of weeds decomposing and creating alot of muck at the bottom.	6/9/2014 10:17 AM
4	Work with other lake owners, decaest dying weeds by removal of settlement	6/9/2014 10:09 AM
5	Get rid of invasive weeds; remove commercial lights shining on the lake from Shell, previously Don's auto and all other commercial lighting that reflects on the lake; noise pollution from Hwy 21 after Peck's was torn down without planting trees or bushes to buffer the noise; stop runoff from Weekly and Shell into the lake	6/8/2014 10:38 PM
6	whatever we need to do to preserve it and reduce the weeds that take over by July.	6/8/2014 6:21 PM
7	weed control	6/3/2014 8:42 PM
8	rid the lake of milfoil and curly pondleaf	6/3/2014 8:20 PM
9	Control weeds	6/2/2014 4:10 PM
10	Weed reduction	6/2/2014 4:01 PM
11	eradicate invasive weeds, control of stunted panfish	6/2/2014 3:50 PM
12	Eradicate milfoil and fish management	6/2/2014 3:26 PM
13	I feel that the control of invasive weeds should be of main concern, but am unsure as to how this should be done.	6/1/2014 11:00 AM
14	Remove more weeds.	5/31/2014 7:13 PM
15	Eradicate the invasive plants, cut all commercial lighting, eliminate traffic noise and increase the fish size.	5/31/2014 5:18 PM
16	Better weed control	5/28/2014 8:32 PM

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

Answered: 16 Skipped: 2

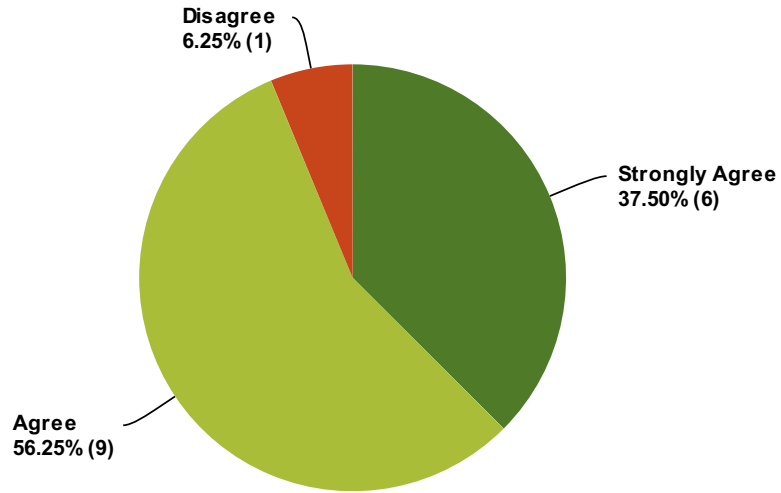


Answer Choices	Responses
Very familiar	6.25% 1
Somewhat familiar	18.75% 3
I've heard of it	6.25% 1
Never heard of it	68.75% 11
Total	16

Bughs Lake Survey #1 and #2

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

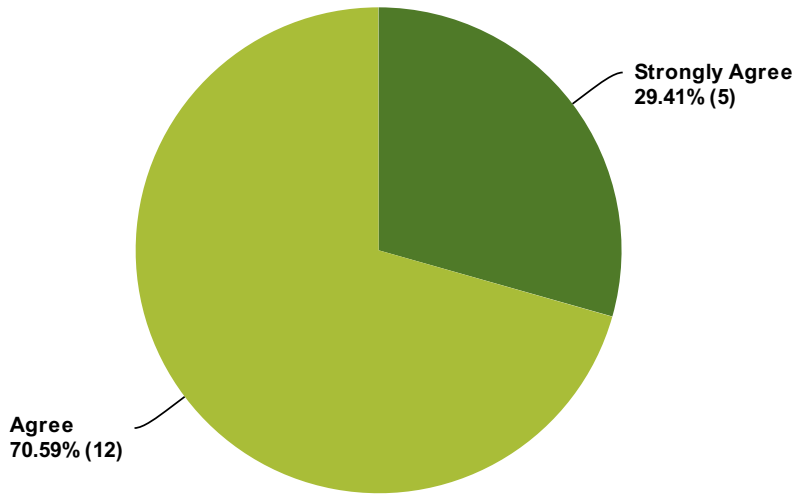
Answered: 16 Skipped: 2



Answer Choices	Responses	
Strongly Agree	37.50%	6
Agree	56.25%	9
Disagree	6.25%	1
Strongly Disagree	0.00%	0
Total		16

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

Answered: 17 Skipped: 1

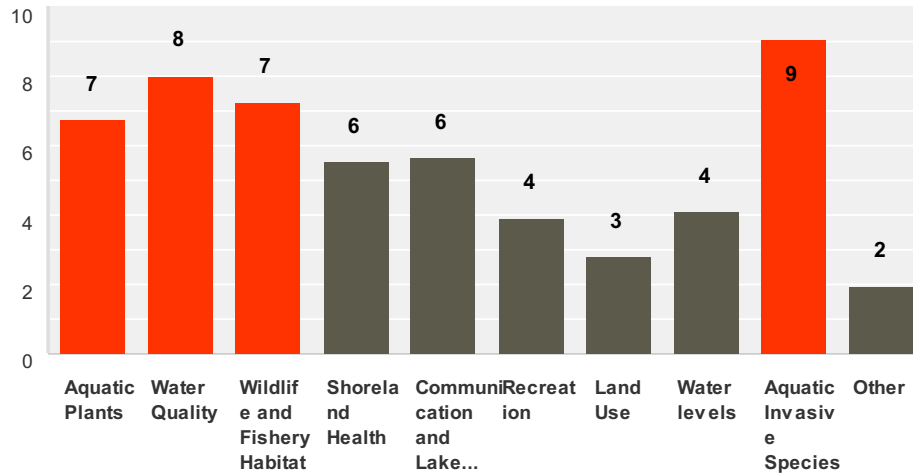


Answer Choices	Responses	
Strongly Agree	29.41%	5
Agree	70.59%	12
Disagree	0.00%	0
Strongly Disagree	0.00%	0
Total		17

Bugs Lake Survey #1 and #2

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

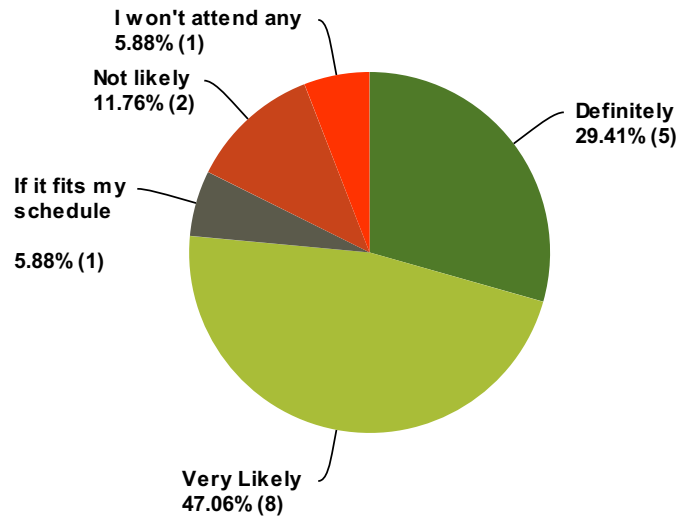
Answered: 17 Skipped: 1



	1	2	3	4	5	6	7	8	9	10	Total	Average Ranking
Aquatic Plants	0.00% 0	11.76% 2	17.65% 3	41.18% 7	5.88% 1	11.76% 2	11.76% 2	0.00% 0	0.00% 0	0.00% 0	17	6.76
Water Quality	23.53% 4	11.76% 2	23.53% 4	23.53% 4	17.65% 3	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	17	8.00
Wildlife and Fishery Habitat	5.88% 1	23.53% 4	23.53% 4	11.76% 2	23.53% 4	5.88% 1	0.00% 0	0.00% 0	5.88% 1	0.00% 0	17	7.24
Shoreland Health	5.88% 1	0.00% 0	5.88% 1	11.76% 2	23.53% 4	35.29% 6	5.88% 1	5.88% 1	0.00% 0	5.88% 1	17	5.53
Communication and Lake Group Support	5.88% 1	5.88% 1	11.76% 2	0.00% 0	17.65% 3	29.41% 5	23.53% 4	0.00% 0	5.88% 1	0.00% 0	17	5.65
Recreation	0.00% 0	0.00% 0	5.88% 1	5.88% 1	0.00% 0	5.88% 1	41.18% 7	23.53% 4	17.65% 3	0.00% 0	17	3.88
Land Use	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	11.76% 2	58.82% 10	29.41% 5	0.00% 0	17	2.82
Water levels	0.00% 0	11.76% 2	0.00% 0	5.88% 1	11.76% 2	11.76% 2	5.88% 1	11.76% 2	35.29% 6	5.88% 1	17	4.12
Aquatic Invasive Species	58.82% 10	23.53% 4	11.76% 2	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	5.88% 1	0.00% 0	17	9.06
Other	0.00% 0	11.76% 2	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	88.24% 15	17	1.94

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?

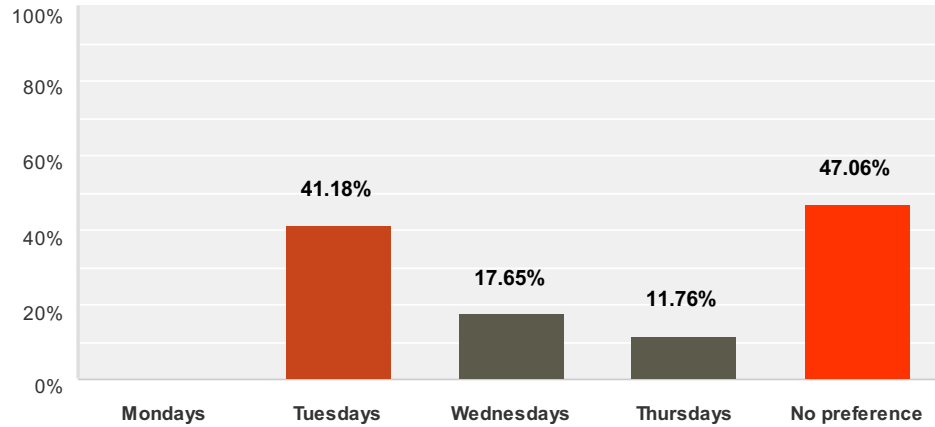
Answered: 17 Skipped: 1



Answer Choices	Responses	
Definitely	29.41%	5
Very Likely	47.06%	8
If it fits my schedule	5.88%	1
Not likely	11.76%	2
I won't attend any	5.88%	1
Total		17

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: 17 Skipped: 1

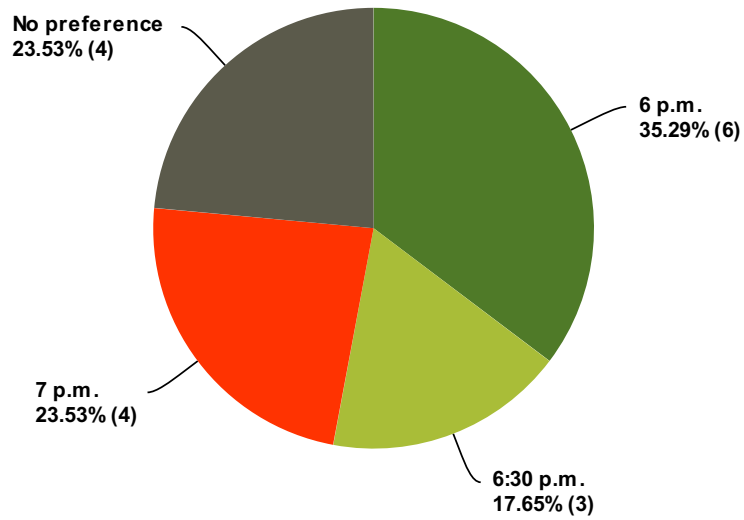


Answer Choices	Responses
Mondays	0.00% 0
Tuesdays	41.18% 7
Wednesdays	17.65% 3
Thursdays	11.76% 2
No preference	47.06% 8
Total Respondents: 17	

Bughs Lake Survey #1 and #2

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

Answered: 17 Skipped: 1

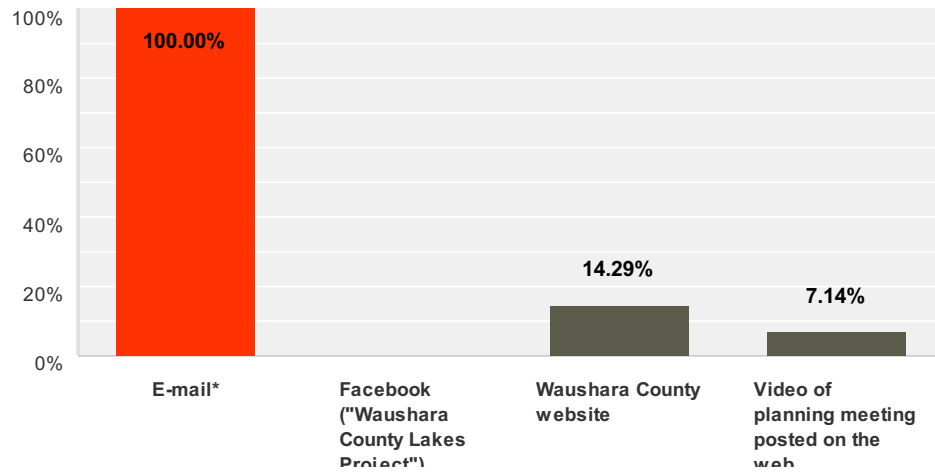


Answer Choices	Responses	
6 p.m.	35.29%	6
6:30 p.m.	17.65%	3
7 p.m.	23.53%	4
7:30 p.m.	0.00%	0
No preference	23.53%	4
Total		17

Bugs Lake Survey #1 and #2

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

Answered: 14 Skipped: 4



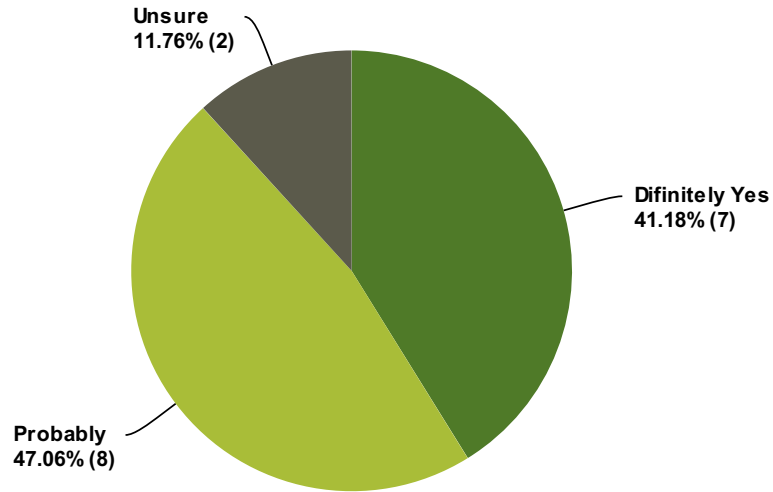
Answer Choices	Responses	
E-mail*	100.00%	14
Facebook ("Waushara County Lakes Project")	0.00%	0
Waushara County website	14.29%	2
Video of planning meeting posted on the web	7.14%	1
Total Respondents: 14		

#	Other (please specify)	Date
1	Mail postcard could meetings be held in wautoma	6/9/2014 10:43 AM
2	US Mail	6/9/2014 10:11 AM
3	Mail	6/8/2014 10:44 PM
4	Snail mail	6/2/2014 3:28 PM

Bughs Lake Survey #1 and #2

Q23 Does a desire to provide better habitat for fish and wildlife motivate you to support (morally) efforts to improve Bughs Lake?

Answered: 17 Skipped: 1

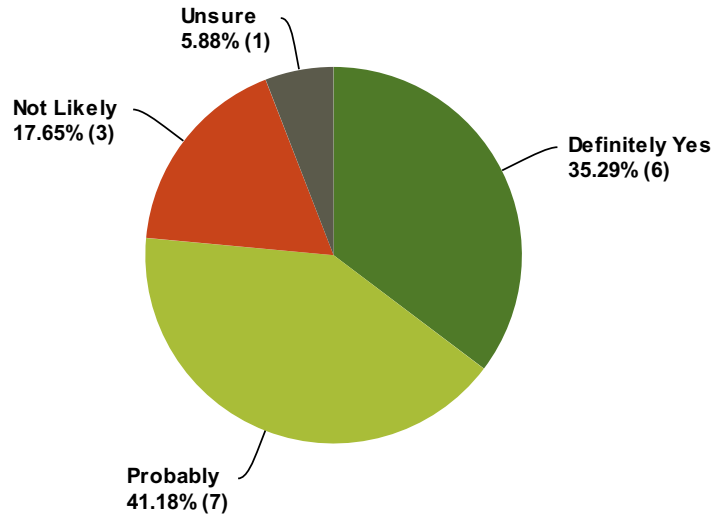


Answer Choices	Responses	
Difinitely Yes	41.18%	7
Probably	47.06%	8
Not Likely	0.00%	0
Difinitely No	0.00%	0
Unsure	11.76%	2
Total		17

Bughs Lake Survey #1 and #2

Q24 Does a desire to provide better habitat for fish and wildlife motivate you to support (by direct action) efforts to improve Bughs Lake?

Answered: 17 Skipped: 1

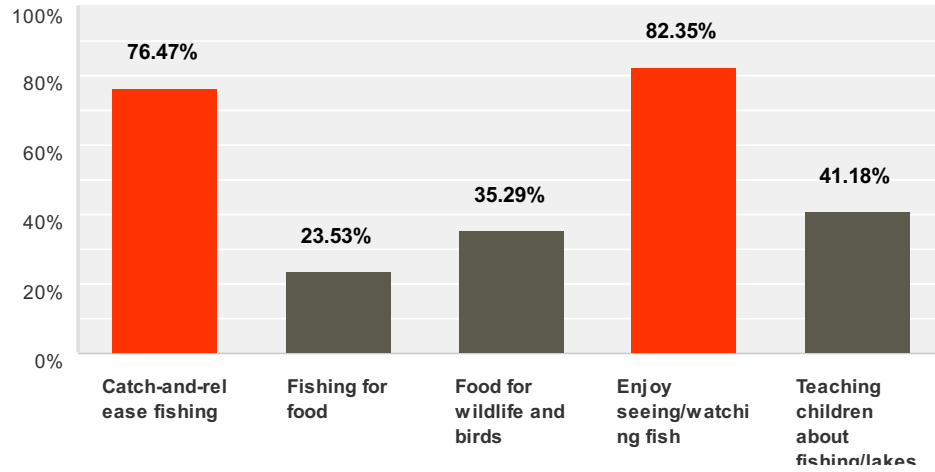


Answer Choices	Responses	
Definitely Yes	35.29%	6
Probably	41.18%	7
Not Likely	17.65%	3
Definitely No	0.00%	0
Unsure	5.88%	1
Total		17

Bugs Lake Survey #1 and #2

Q25 For what purposes do you value the fishery in Bugs Lake? (Check all that apply.)

Answered: 17 Skipped: 1



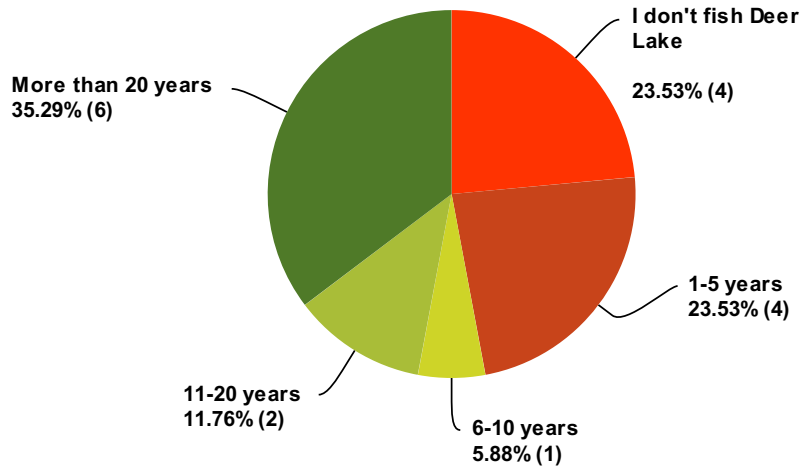
Answer Choices	Responses	
Catch-and-release fishing	76.47%	13
Fishing for food	23.53%	4
Food for wildlife and birds	35.29%	6
Enjoy seeing/watching fish	82.35%	14
Teaching children about fishing/lakes	41.18%	7
Total Respondents: 17		

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

Bughs Lake Survey #1 and #2

Q26 How many years of fishing experience do you have on Bughs Lake?

Answered: 17 Skipped: 1

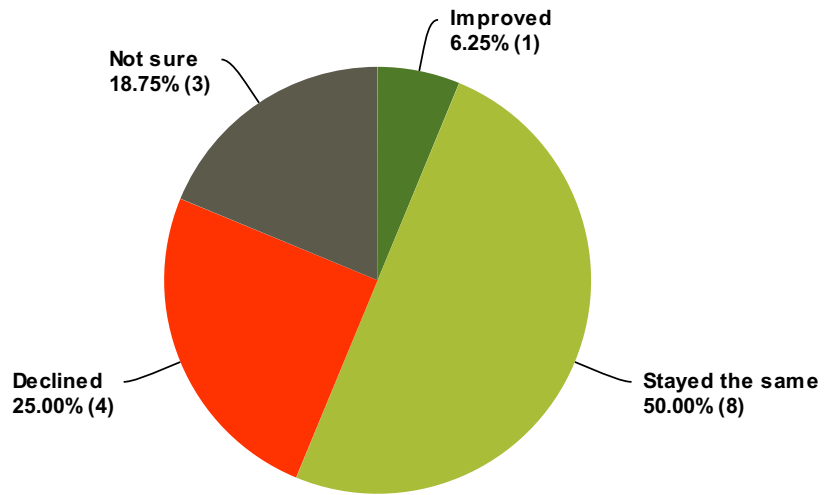


Answer Choices	Responses	
I don't fish Deer Lake	23.53%	4
1-5 years	23.53%	4
6-10 years	5.88%	1
11-20 years	11.76%	2
More than 20 years	35.29%	6
Total		17

Bugh Lake Survey #1 and #2

Q27 In the years you have been fishing Bugh Lake, would you say the quality of fishing has...

Answered: 16 Skipped: 2



Answer Choices	Responses	
Improved	6.25%	1
Stayed the same	50.00%	8
Declined	25.00%	4
Not sure	18.75%	3
Total		16

Bughs Lake Survey #1 and #2

Q28 What factors do you feel have contributed to the change in fishing?

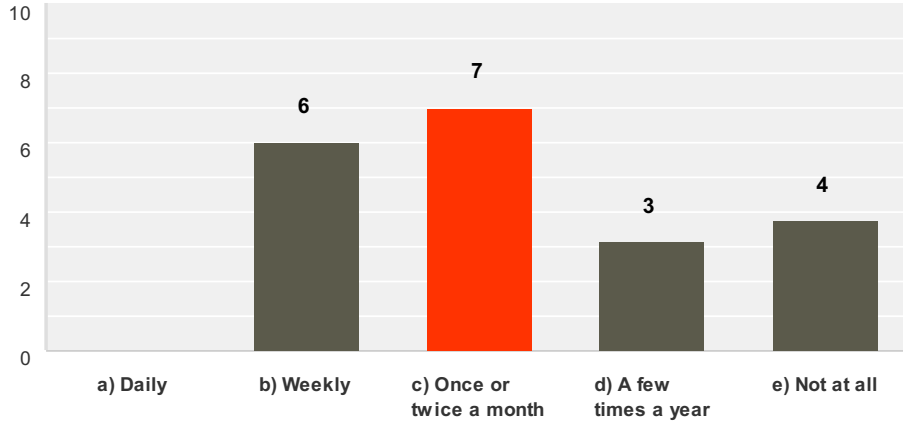
Answered: 3 Skipped: 15

#	Responses	Date
1	The open season on game fish during spawning	6/9/2014 10:12 AM
2	The planting of predator fish and cleaner water.	5/31/2014 5:39 PM
3	Possible use of chemical treatments for weed reduction	5/28/2014 8:41 PM

Bugs Lake Survey #1 and #2

Q29 When and how often do you typically fish Bugs Lake? (Please answer a-e)

Answered: 12 Skipped: 6

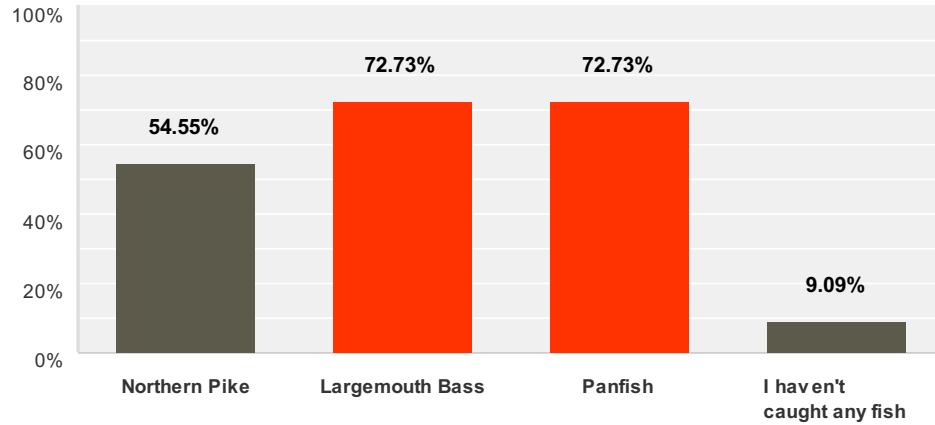


	Winter	Spring	Summer	Fall	Total Respondents
a) Daily	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0
b) Weekly	0.00% 0	50.00% 2	100.00% 4	50.00% 2	4
c) Once or twice a month	0.00% 0	83.33% 5	66.67% 4	83.33% 5	6
d) A few times a year	57.14% 4	28.57% 2	28.57% 2	28.57% 2	7
e) Not at all	75.00% 3	25.00% 1	50.00% 2	25.00% 1	4

Bugs Lake Survey #1 and #2

Q30 What fish do you typically catch at Bugs Lake? Check all that apply.

Answered: 11 Skipped: 7



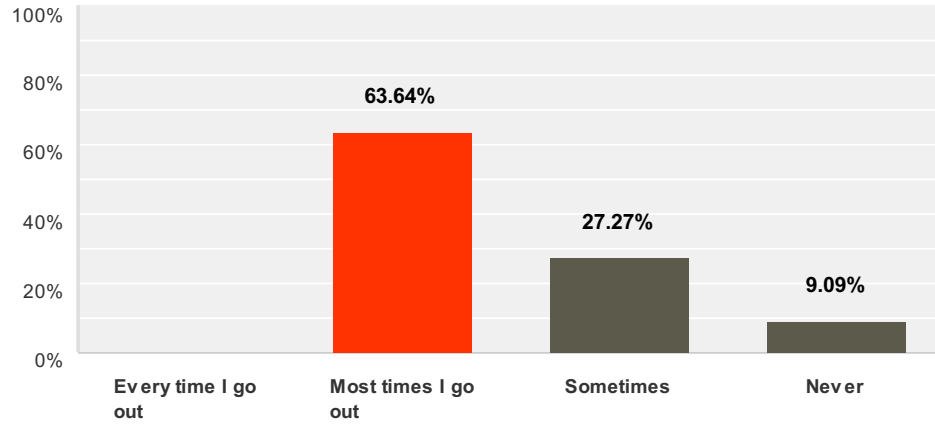
Answer Choices	Responses
Northern Pike	54.55% 6
Largemouth Bass	72.73% 8
Panfish	72.73% 8
I haven't caught any fish	9.09% 1
Total Respondents: 11	

#	Other (please specify)	Date
1	don't fish any longer	6/9/2014 10:30 AM
2	bullheads	6/9/2014 10:18 AM

Bughs Lake Survey #1 and #2

Q31 In general, how often do you catch fish at Bughs Lake?

Answered: 11 Skipped: 7

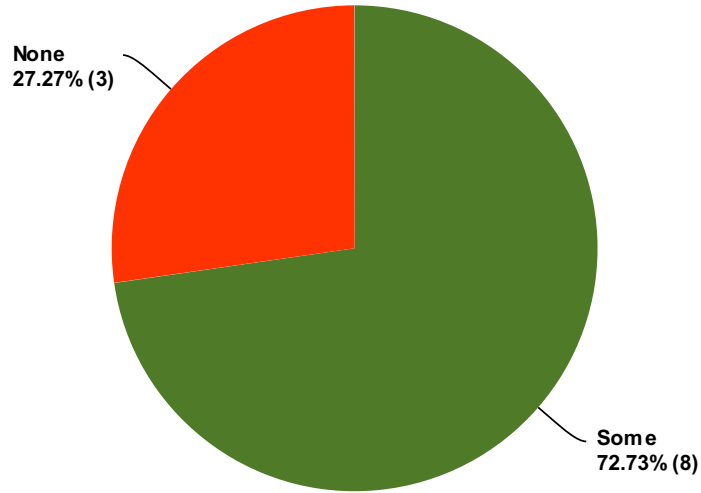


Answer Choices	Responses
Every time I go out	0.00% 0
Most times I go out	63.64% 7
Sometimes	27.27% 3
Never	9.09% 1
Total Respondents: 11	

Bughs Lake Survey #1 and #2

Q32 In general, how many of the fish are big enough to keep?

Answered: 11 Skipped: 7

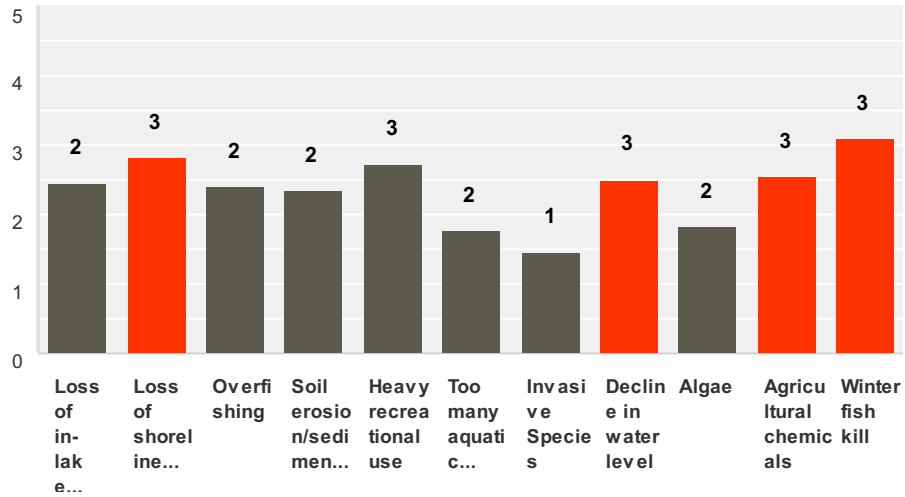


Answer Choices	Responses	
All	0.00%	0
Most	0.00%	0
Some	72.73%	8
None	27.27%	3
Total		11

Bugs Lake Survey #1 and #2

Q33 What do you believe is the greatest threat to the fishery in Bugs Lake in the next 10 years?

Answered: 13 Skipped: 5



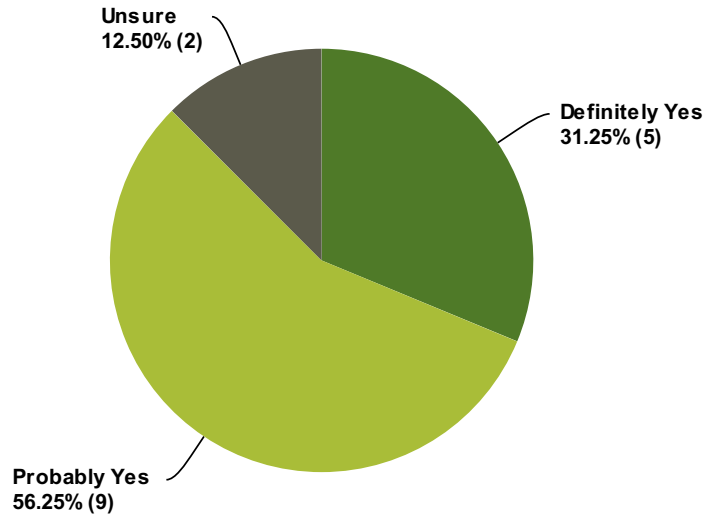
	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't Know	Total Respondents
Loss of in-lake habitat	18.18% 2	27.27% 3	45.45% 5	9.09% 1	0.00% 0	11
Loss of shoreline habitat	0.00% 0	45.45% 5	36.36% 4	9.09% 1	9.09% 1	11
Overfishing	20.00% 2	30.00% 3	40.00% 4	10.00% 1	0.00% 0	10
Soil erosion/sedimentation	27.27% 3	18.18% 2	45.45% 5	9.09% 1	0.00% 0	11
Heavy recreational use	18.18% 2	9.09% 1	54.55% 6	18.18% 2	0.00% 0	11
Too many aquatic plants	38.46% 5	46.15% 6	15.38% 2	0.00% 0	0.00% 0	13
Invasive Species	53.85% 7	46.15% 6	0.00% 0	0.00% 0	0.00% 0	13
Decline in water level	8.33% 1	41.67% 5	41.67% 5	8.33% 1	0.00% 0	12
Algae	33.33% 4	50.00% 6	16.67% 2	0.00% 0	0.00% 0	12
Agricultural chemicals	18.18% 2	27.27% 3	45.45% 5	0.00% 0	9.09% 1	11
Winter fish kill	0.00% 0	18.18% 2	63.64% 7	9.09% 1	9.09% 1	11

#	Other (please specify)	Date
1	Stunted pan fish	6/2/2014 3:58 PM
2	The city expansion and it's pollution.	5/31/2014 5:46 PM

Bughs Lake Survey #1 and #2

Q34 Do you believe fish from Bughs Lake are safe to eat?

Answered: 16 Skipped: 2



Answer Choices	Responses	
Definitely Yes	31.25%	5
Probably Yes	56.25%	9
Probably No	0.00%	0
Definitely No	0.00%	0
Unsure	12.50%	2
Total		16

Bughs Lake Survey #1 and #2

Q35 Do you have any additional comments regarding the fishery in Bughs Lake?

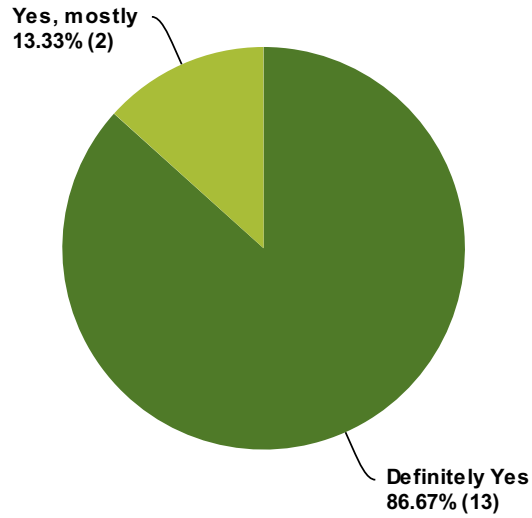
Answered: 8 Skipped: 10

#	Responses	Date
1	Is Bugh's Lake a no wake lake or a no motors allowed lake.	6/9/2014 10:19 AM
2	Close bass and northern season during their spawning season.	6/9/2014 10:13 AM
3	too many bluegill	6/3/2014 8:49 PM
4	no	6/3/2014 8:27 PM
5	Stunted panfish is same since 1961 survey done by old Wisconsin conservation department	6/2/2014 3:58 PM
6	I don't fish. I don't put any fertilizer on my lawn. I don't put anything into the water of the lake. We swim every day and we have company that comes to swim.	6/1/2014 11:07 AM
7	No	5/31/2014 7:25 PM
8	Our lake should be a catch and release only lake.	5/31/2014 5:46 PM

Bughs Lake Survey #1 and #2

Q36 Bughs Lake is a 'No Wake' lake. Do you like this rule?

Answered: 15 Skipped: 3



Answer Choices	Responses	
Definitely Yes	86.67%	13
Yes, mostly	13.33%	2
Not most of the time	0.00%	0
Definitely No	0.00%	0
Unsure	0.00%	0
Total		15

Bughs Lake Survey #1 and #2

Q37 What could be done to improve your recreation experience on Bughs Lake?

Answered: 14 Skipped: 4

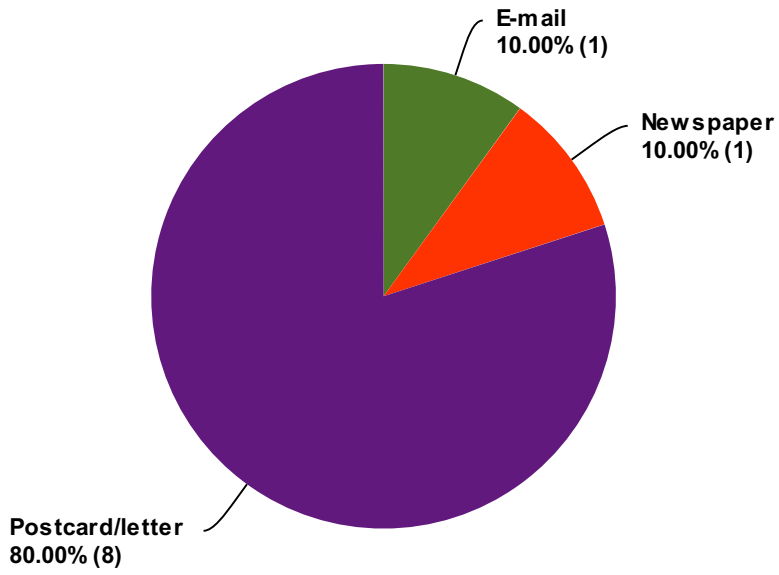
#	Responses	Date
1	Weed control	6/9/2014 10:31 AM
2	Keep the weeds down naturally if possible, introduce some larger fish to eat some of the little blue gills.	6/9/2014 10:20 AM
3	Reduction of noise pollution and commercial light pollution. Removal of invasive aquatic plants and reduction of other tall weeds	6/8/2014 10:53 PM
4	reduce weeds through management and fertilizer reductions. Increase fish habitat and cribs to maximize fish reproduction and size.	6/8/2014 6:28 PM
5	nothing	6/3/2014 8:49 PM
6	nothing	6/3/2014 8:28 PM
7	Weed control so we can navigate paddle boats	6/2/2014 4:12 PM
8	less weeds	6/2/2014 4:08 PM
9	Control of invasive weeds, catch and release of bass, northerns for a 5 year period to increase number of predatory fish to control panfish.	6/2/2014 3:59 PM
10	Eradicate milfoil Catch & release of bass and northerns	6/2/2014 3:31 PM
11	Keep the invasive plant life under control and keep the water clean.	6/1/2014 11:07 AM
12	Remove more milfoil.	5/31/2014 7:26 PM
13	Reduce noise and commercial light pollution.	5/31/2014 5:48 PM
14	Less weeds; for swimming and electric motors.	5/28/2014 8:45 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

Q2 How did you hear about this survey?

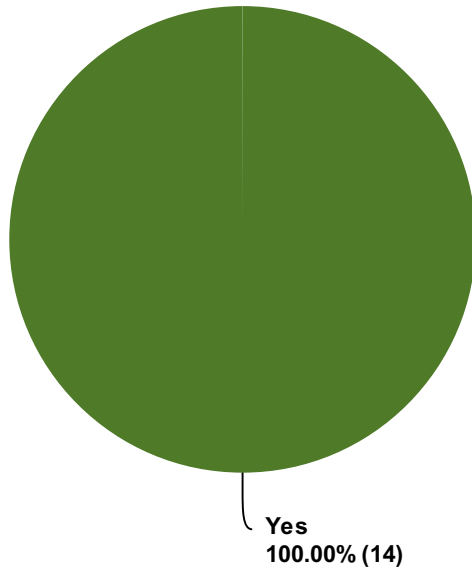
Answered: 10 Skipped: 7



Answer Choices	Responses	
E-mail	10.00%	1
Newspaper	10.00%	1
Postcard/letter	80.00%	8
Facebook	0.00%	0
Radio	0.00%	0
Total		10

Q3 Were you aware of the importance of aquatic plants?

Answered: 14 Skipped: 3

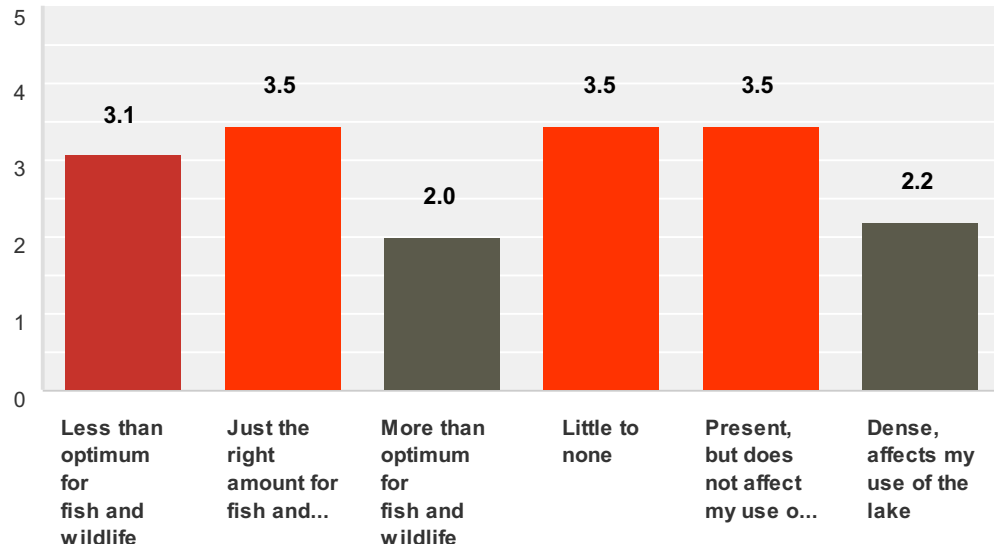


Answer Choices	Responses	
Yes	100.00%	14
No	0.00%	0
Unsure	0.00%	0
Total		14

Bughs Lake Survey #3

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

Answered: 16 Skipped: 1

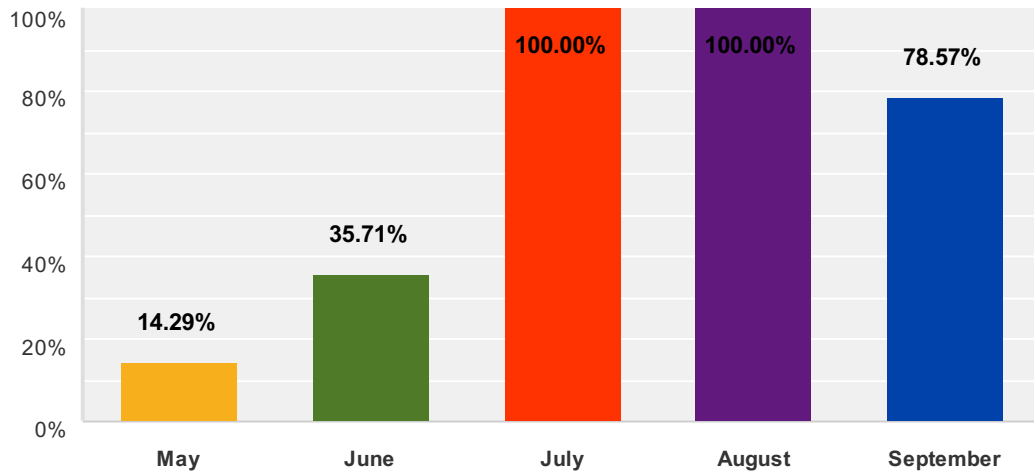


	Strongly Agree	Agree	Disagree	Strongly Disagree	Not Sure	Total
Less than optimum for fish and wildlife	15.38% 2.0	15.38% 2.0	23.08% 3.0	38.46% 5.0	7.69% 1.0	13
Just the right amount for fish and wildlife	0.00% 0.0	7.69% 1.0	46.15% 6.0	38.46% 5.0	7.69% 1.0	13
More than optimum for fish and wildlife	28.57% 4.0	50.00% 7.0	14.29% 2.0	7.14% 1.0	0.00% 0.0	14
Little to none	9.09% 1.0	0.00% 0.0	27.27% 3.0	63.64% 7.0	0.00% 0.0	11
Present, but does not affect my use of the lake	7.69% 1.0	0.00% 0.0	30.77% 4.0	61.54% 8.0	0.00% 0.0	13
Dense, affects my use of the lake	33.33% 5.0	33.33% 5.0	13.33% 2.0	20.00% 3.0	0.00% 0.0	15

Bughs Lake Survey #3

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

Answered: 14 Skipped: 3

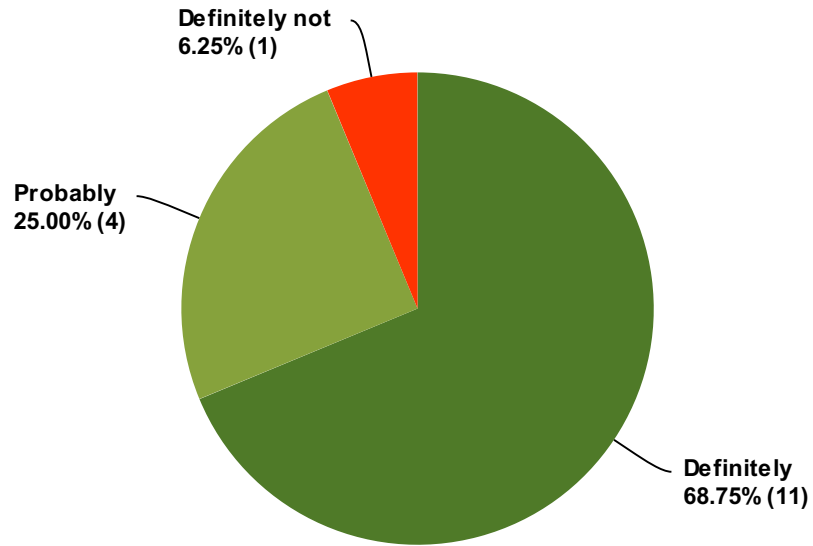


Answer Choices	Responses	
May	14.29%	2
June	35.71%	5
July	100.00%	14
August	100.00%	14
September	78.57%	11
Total Respondents: 14		

Bughs Lake Survey #3

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

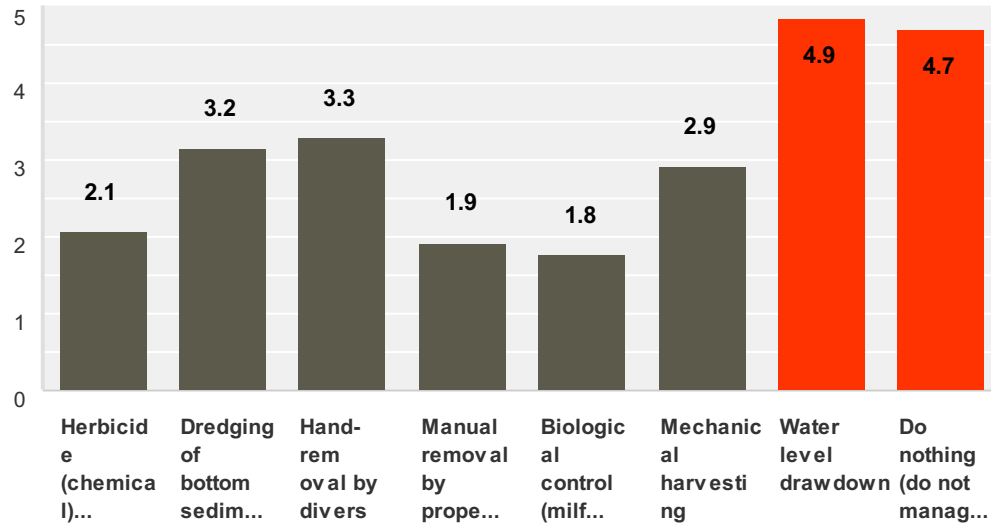
Answered: 16 Skipped: 1



Answer Choices	Responses	
Definitely	68.75%	11
Probably	25.00%	4
Unsure	0.00%	0
Probably not	0.00%	0
Definitely not	6.25%	1
Total		16

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

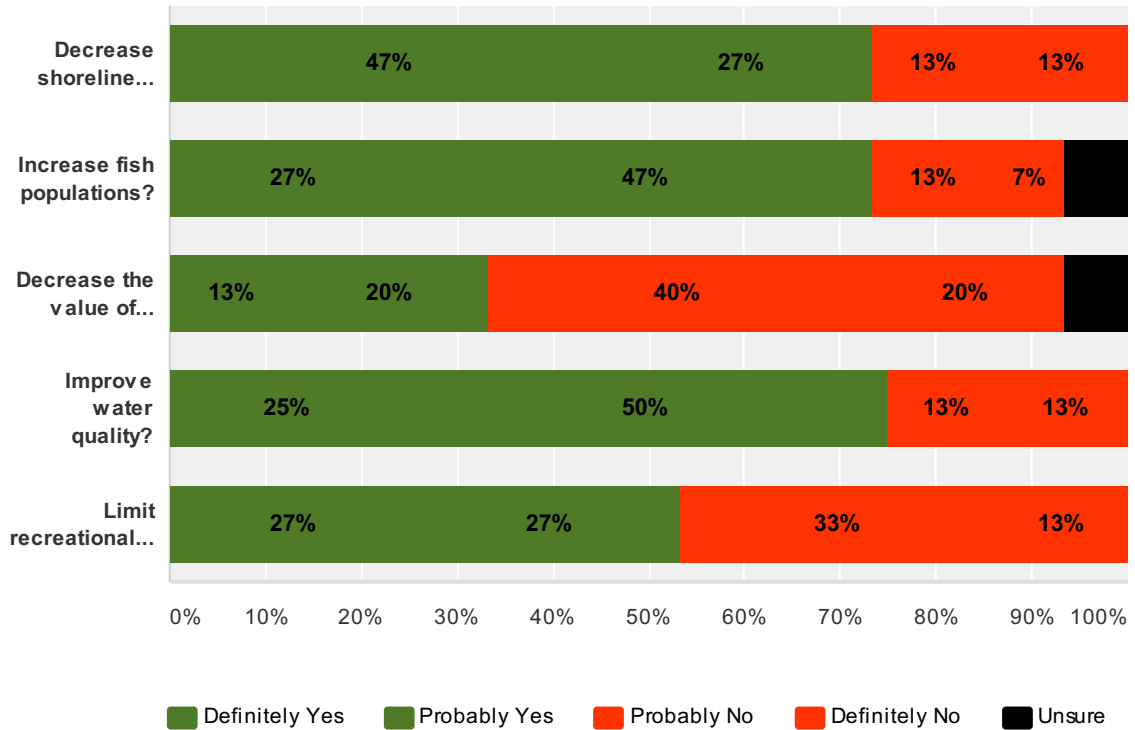
Answered: 16 Skipped: 1



	Highly supportive	Somewhat supportive	Neutral	Somewhat unsupportive	Not supportive	Unsure, need more info	Total	Average Rating
Herbicide (chemical control)	46.67% 7.0	26.67% 4.0	13.33% 2.0	0.00% 0.0	13.33% 2.0	0.00% 0.0	15	2.07
Dredging of bottom sediments	23.08% 3.0	7.69% 1.0	30.77% 4.0	7.69% 1.0	30.77% 4.0	0.00% 0.0	13	3.15
Hand-removal by divers	15.38% 2.0	15.38% 2.0	23.08% 3.0	15.38% 2.0	30.77% 4.0	0.00% 0.0	13	3.31
Manual removal by property owners	58.33% 7.0	25.00% 3.0	0.00% 0.0	0.00% 0.0	16.67% 2.0	0.00% 0.0	12	1.92
Biological control (milfoil weevil, loosestrife beetle, etc.)	53.85% 7.0	30.77% 4.0	7.69% 1.0	0.00% 0.0	7.69% 1.0	0.00% 0.0	13	1.77
Mechanical harvesting	26.67% 4.0	20.00% 3.0	13.33% 2.0	13.33% 2.0	26.67% 4.0	0.00% 0.0	15	2.93
Water level drawdown	0.00% 0.0	0.00% 0.0	0.00% 0.0	15.38% 2.0	84.62% 11.0	0.00% 0.0	13	4.85
Do nothing (do not manage plants)	7.69% 1.0	0.00% 0.0	0.00% 0.0	0.00% 0.0	92.31% 12.0	0.00% 0.0	13	4.69

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

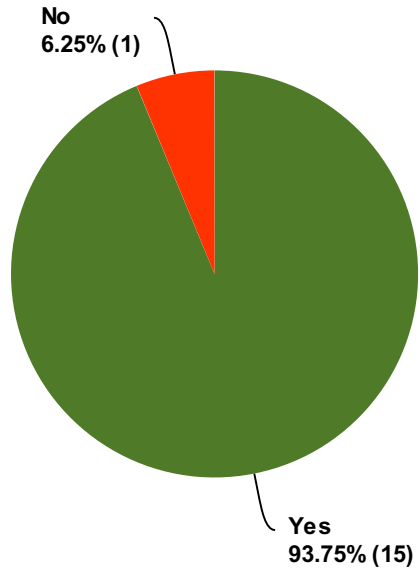
Answered: 16 Skipped: 1



	Definitely Yes	Probably Yes	Probably No	Definitely No	Unsure	Total
Decrease shoreline erosion?	47% 7.0	27% 4.0	13% 2.0	13% 2.0	0% 0.0	15
Increase fish populations?	27% 4.0	47% 7.0	13% 2.0	7% 1.0	7% 1.0	15
Decrease the value of shoreline property?	13% 2.0	20% 3.0	40% 6.0	20% 3.0	7% 1.0	15
Improve water quality?	25% 4.0	50% 8.0	13% 2.0	13% 2.0	0% 0.0	16
Limit recreational enjoyment?	27% 4.0	27% 4.0	33% 5.0	13% 2.0	0% 0.0	15

Q9 Have you ever heard of aquatic invasive species?

Answered: 16 Skipped: 1

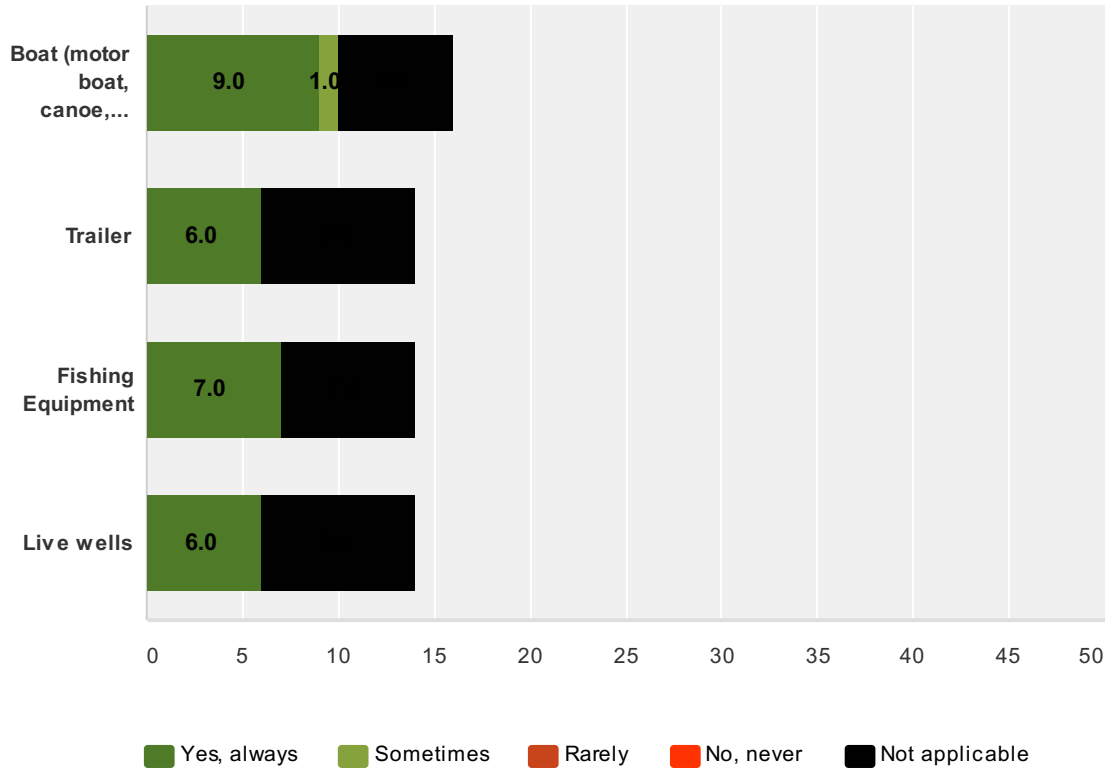


Answer Choices	Responses	
Yes	93.75%	15
No	6.25%	1
Total		16

Bughs Lake Survey #3

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

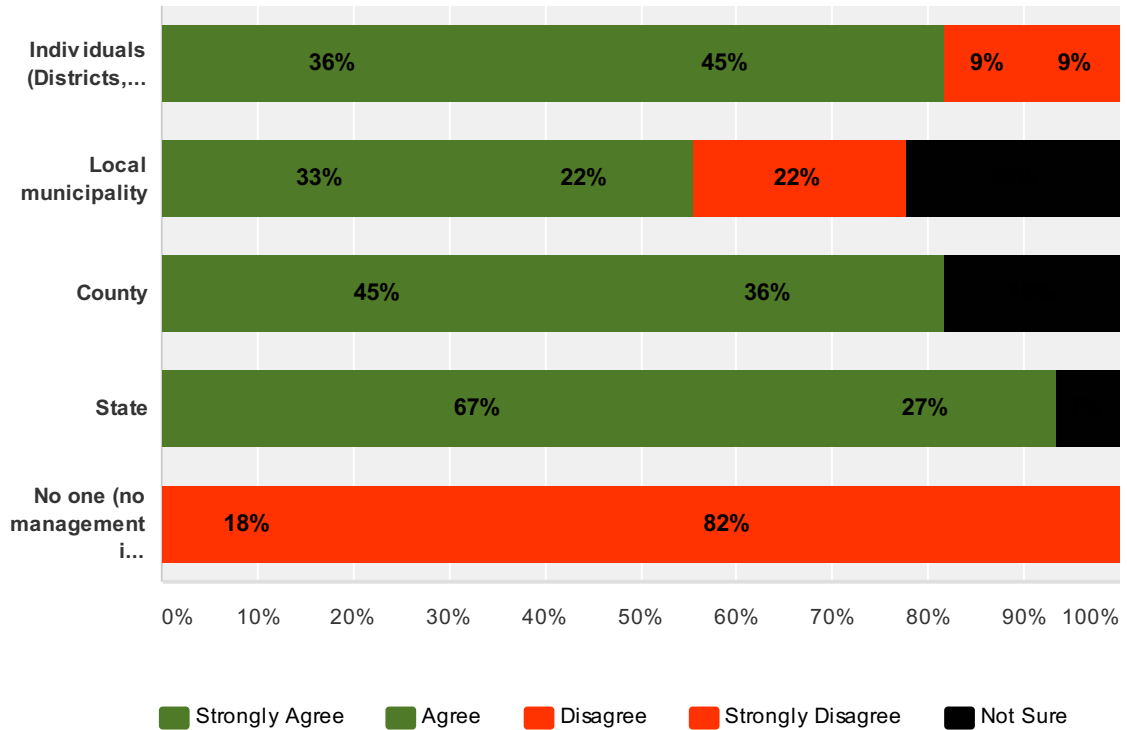
Answered: 16 Skipped: 1



	Yes, always	Sometimes	Rarely	No, never	Not applicable	Total Respondents
Boat (motor boat, canoe, kayak, etc.)	56.25% 9.0	6.25% 1.0	0.00% 0.0	0.00% 0.0	37.50% 6.0	16
Trailer	42.86% 6.0	0.00% 0.0	0.00% 0.0	0.00% 0.0	57.14% 8.0	14
Fishing Equipment	50.00% 7.0	0.00% 0.0	0.00% 0.0	0.00% 0.0	50.00% 7.0	14
Live wells	42.86% 6.0	0.00% 0.0	0.00% 0.0	0.00% 0.0	57.14% 8.0	14

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

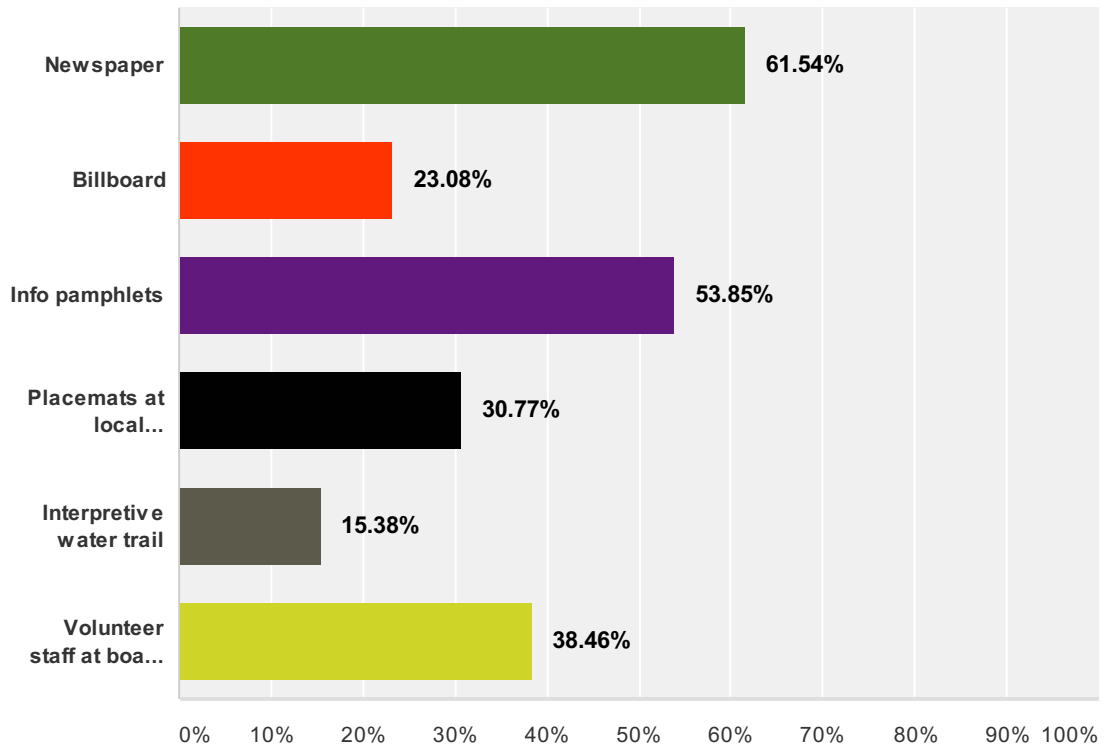
Answered: 16 Skipped: 1



	Strongly Agree	Agree	Disagree	Strongly Disagree	Not Sure	Total
Individuals (Districts, associations, lakefront property owners)	36% 4	45% 5	9% 1	9% 1	0% 0	11
Local municipality	33% 3	22% 2	22% 2	0% 0	22% 2	9
County	45% 5	36% 4	0% 0	0% 0	18% 2	11
State	67% 10	27% 4	0% 0	0% 0	7% 1	15
No one (no management is undertaken)	0% 0	0% 0	18% 2	82% 9	0% 0	11

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

Answered: 13 Skipped: 4

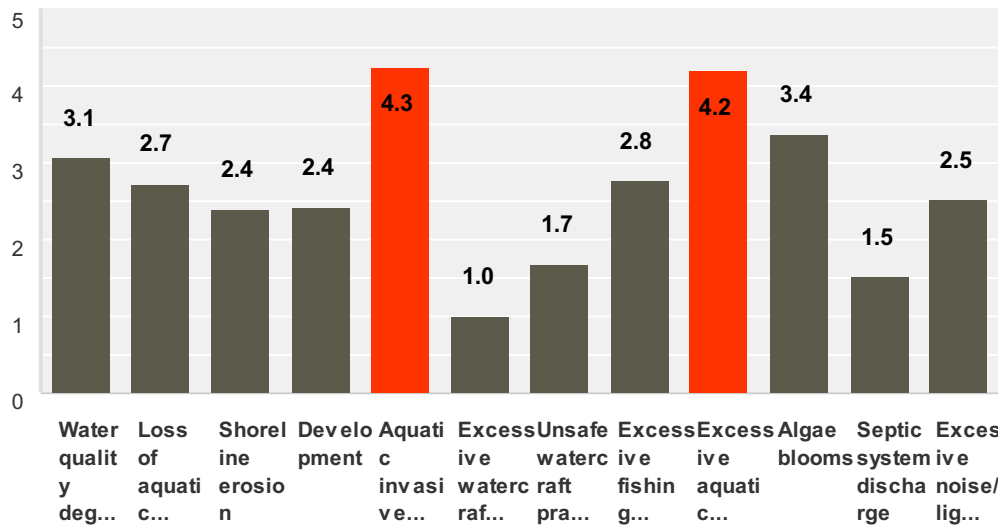


Answer Choices	Responses
Newspaper	61.54% 8
Billboard	23.08% 3
Info pamphlets	53.85% 7
Placemats at local restaurants	30.77% 4
Interpretive water trail	15.38% 2
Volunteer staff at boat launch	38.46% 5
Total Respondents: 13	

Bugh Lake Survey #3

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

Answered: 16 Skipped: 1



	*Not present 0	**No Impact 1	2	Moderately negative impact 3	4	Great negative impact 5	Unsure - need more info	Total	Average Rating
Water quality degradation	6.67% 1.0	0.00% 0.0	20.00% 3.0	46.67% 7.0	6.67% 1.0	20.00% 3.0	0.00% 0.0	15	3.07
Loss of aquatic habitat	6.67% 1.0	20.00% 3.0	20.00% 3.0	26.67% 4.0	0.00% 0.0	26.67% 4.0	0.00% 0.0	15	2.73
Shoreline erosion	6.67% 1.0	20.00% 3.0	20.00% 3.0	40.00% 6.0	6.67% 1.0	6.67% 1.0	0.00% 0.0	15	2.40
Development	7.14% 1.0	0.00% 0.0	42.86% 6.0	21.43% 3.0	14.29% 2.0	7.14% 1.0	7.14% 1.0	14	2.43
Aquatic invasive species introduction	6.25% 1.0	0.00% 0.0	0.00% 0.0	12.50% 2.0	18.75% 3.0	62.50% 10.0	0.00% 0.0	16	4.25
Excessive watercraft traffic	40.00% 6.0	33.33% 5.0	13.33% 2.0	13.33% 2.0	0.00% 0.0	0.00% 0.0	0.00% 0.0	15	1.00
Unsafe watercraft practices	33.33% 5.0	26.67% 4.0	20.00% 3.0	0.00% 0.0	0.00% 0.0	20.00% 3.0	0.00% 0.0	15	1.67
Excessive fishing pressure	0.00% 0.0	30.77% 4.0	23.08% 3.0	15.38% 2.0	0.00% 0.0	30.77% 4.0	0.00% 0.0	13	2.77

Excessive aquatic	6.25%	0.00%	0.00%	18.75%	12.50%	62.50%	0.00%		
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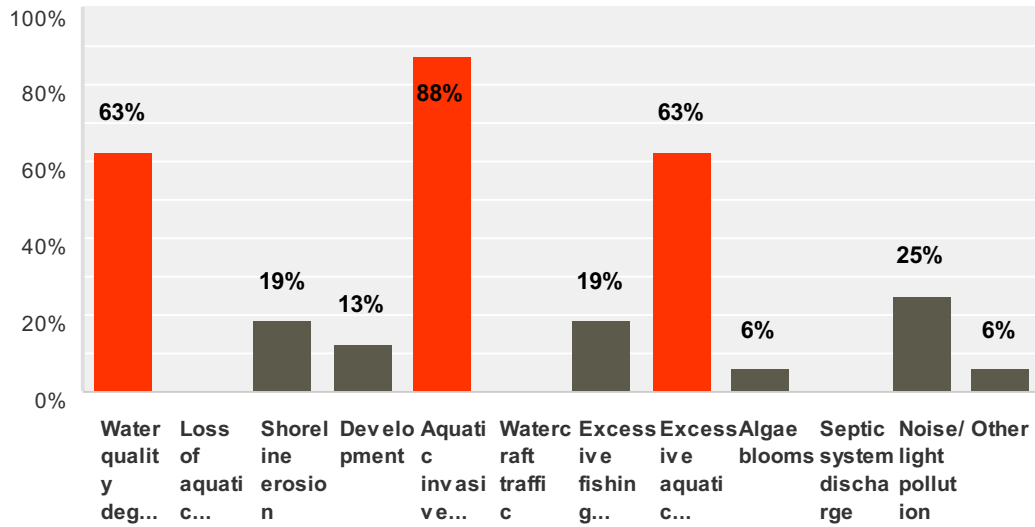
Bugs Lake Survey #3

Excessive aquatic plant growth (excluding algae)	0.00% 1.0	0.00% 0.0	0.00% 0.0	10.00% 3.0	12.50% 2.0	37.50% 10.0	0.00% 0.0	16	4.19
Algae blooms	12.50% 2.0	0.00% 0.0	12.50% 2.0	25.00% 4.0	12.50% 2.0	37.50% 6.0	0.00% 0.0	16	3.38
Septic system discharge	40.00% 6.0	20.00% 3.0	6.67% 1.0	0.00% 0.0	13.33% 2.0	13.33% 2.0	6.67% 1.0	15	1.53
Excessive noise/light pollution	13.33% 2.0	33.33% 5.0	6.67% 1.0	13.33% 2.0	0.00% 0.0	33.33% 5.0	0.00% 0.0	15	2.53

Bugh Lake Survey #3

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

Answered: 16 Skipped: 1



Answer Choices	Responses	
Water quality degradation	63%	10
Loss of aquatic habitat	0%	0
Shoreline erosion	19%	3
Development	13%	2
Aquatic invasive species introduction	88%	14
Watercraft traffic	0%	0
Excessive fishing pressure	19%	3
Excessive aquatic plant growth (excluding algae)	63%	10
Algae blooms	6%	1
Septic system discharge	0%	0
Noise/light pollution	25%	4
Other	6%	1
Total Respondents: 16		

Bughs Lake Survey #4

Q1 What is your Waushara County Lakes Study ID?

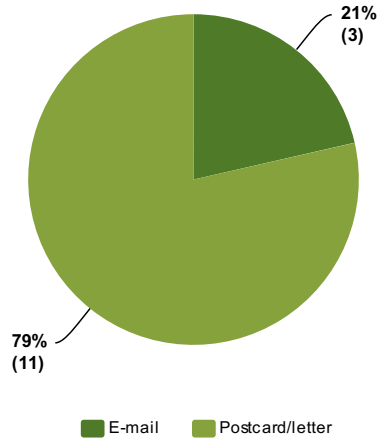
Answered: 14 Skipped: 0

#	Responses	Date
1	[REDACTED]	8/11/2014 11:10 PM
2	[REDACTED]	8/11/2014 7:49 PM
3	[REDACTED]	8/11/2014 2:25 PM
4	[REDACTED]	8/11/2014 2:20 PM
5	[REDACTED]	8/11/2014 1:37 PM
6	[REDACTED]	8/9/2014 10:49 AM
7	[REDACTED]	8/9/2014 7:44 AM
8	[REDACTED]	8/8/2014 12:31 PM
9	[REDACTED]	8/8/2014 12:23 PM
10	[REDACTED]	8/1/2014 9:12 AM
11	[REDACTED]	7/29/2014 8:28 AM
12	[REDACTED]	7/28/2014 11:37 AM
13	[REDACTED]	7/28/2014 11:23 AM
14	[REDACTED]	7/28/2014 7:46 AM

Bugh Lake Survey #4

Q2 How did you hear about this survey?

Answered: 14 Skipped: 0



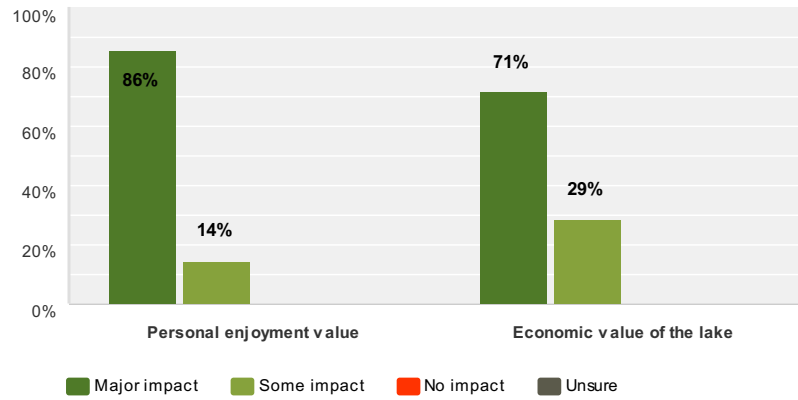
Answer Choices	Responses
E-mail	21% 3
Newspaper	0% 0
Postcard/letter	79% 11
Facebook	0% 0
Radio	0% 0
Word of mouth	0% 0
Total	14

#	Other (please specify)	Date
1	At Lake Management Planning meeting	8/11/2014 2:25 PM

Bughs Lake Survey #4

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

Answered: 14 Skipped: 0

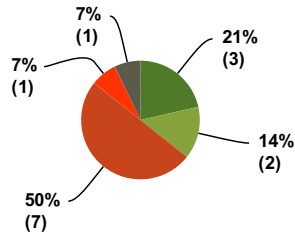


	Major impact	Some impact	No impact	Unsure	Total
Personal enjoyment value	86% 12	14% 2	0% 0	0% 0	14
Economic value of the lake	71% 10	29% 4	0% 0	0% 0	14

Bugh Lake Survey #4

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

Answered: 14 Skipped: 0



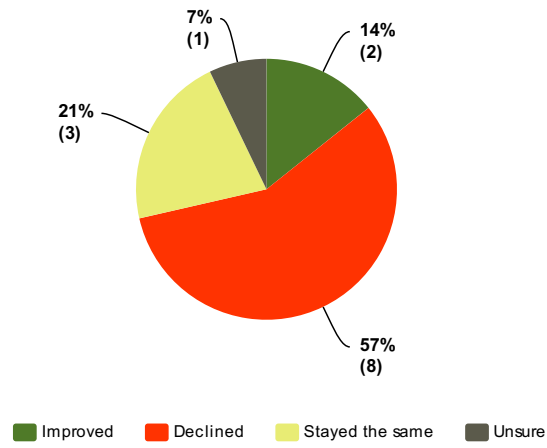
- Very minor aesthetic problems; excellent for swimming and boating enjoyment
- Swimming and aesthetic enjoyment of the lake is slightly impaired because of algae
- Swimming and aesthetic enjoyment of the lake is moderately reduced because of algae
- Swimming and aesthetic enjoyment of the lake is substantially reduced because of algae
- None of the above

Answer Choices	Responses	
Very minor aesthetic problems; excellent for swimming and boating enjoyment	21%	3
Swimming and aesthetic enjoyment of the lake is slightly impaired because of algae	14%	2
Swimming and aesthetic enjoyment of the lake is moderately reduced because of algae	50%	7
Swimming and aesthetic enjoyment of the lake is substantially reduced because of algae	7%	1
None of the above	7%	1
Total		14

Bugh's Lake Survey #4

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

Answered: 14 Skipped: 0

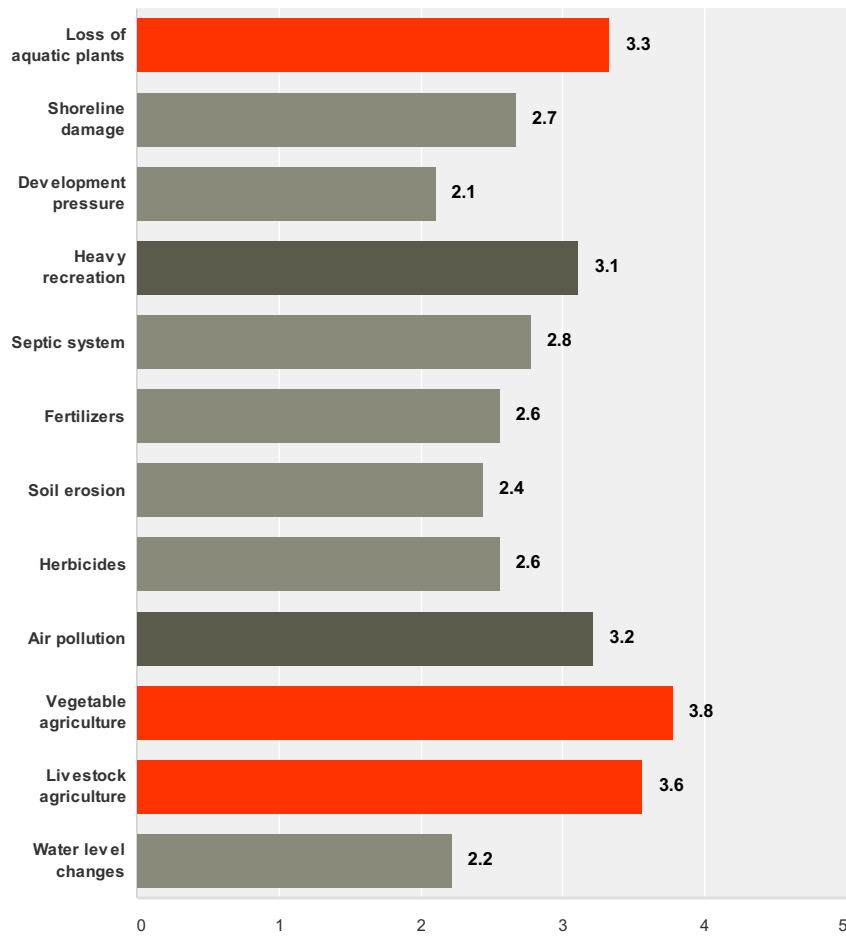


Answer Choices	Responses
Improved	14% 2
Declined	57% 8
Stayed the same	21% 3
Unsure	7% 1
Total	14

Bugh Lake Survey #4

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

Answered: 9 Skipped: 5

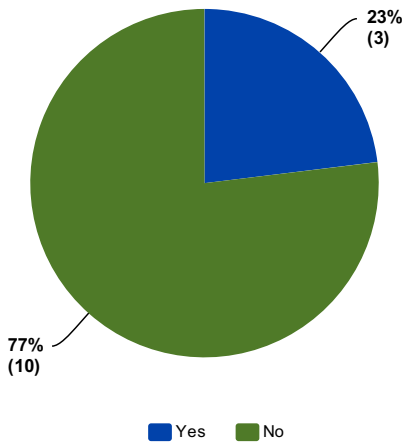


	Strongly Agree	Agree	Disagree	Strongly Disagree	Unsure	Total Respondents
Loss of aquatic plants	0% 0.0	11% 1.0	44% 4.0	44% 4.0	0% 0.0	9
Shoreline damage	22% 2.0	11% 1.0	56% 5.0	0% 0.0	11% 1.0	9
Development pressure	22% 2.0	44% 4.0	33% 3.0	0% 0.0	0% 0.0	9
Heavy recreation	11% 1.0	0% 0.0	67% 6.0	11% 1.0	11% 1.0	9
Septic system	11% 1.0	33% 3.0	33% 3.0	11% 1.0	11% 1.0	9
Fertilizers	22% 2.0	44% 4.0	11% 1.0	0% 0.0	22% 2.0	9
Soil erosion	33% 3.0	22% 2.0	22% 2.0	11% 1.0	11% 1.0	9
Herbicides	22% 2.0	44% 4.0	11% 1.0	0% 0.0	22% 2.0	9
Air pollution	0% 0.0	22% 2.0	56% 5.0	0% 0.0	22% 2.0	9
Vegetable agriculture	11% 1.0	0% 0.0	33% 3.0	11% 1.0	44% 4.0	9
Livestock agriculture	0% 0.0	0% 0.0	67% 6.0	11% 1.0	22% 2.0	9
Water level changes	22% 2.0	44% 4.0	22% 2.0	11% 1.0	0% 0.0	9

Bughs Lake Survey #4

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

Answered: 13 Skipped: 1

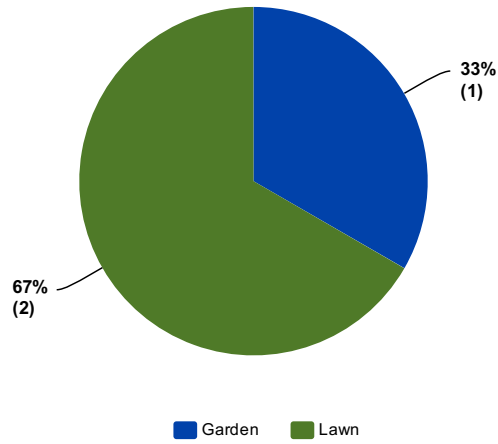


Answer Choices	Responses	
Yes	23%	3
No	77%	10
Total		13

Bughs Lake Survey #4

Q8 Where do you apply herbicides and/or pesticides?

Answered: 3 Skipped: 11



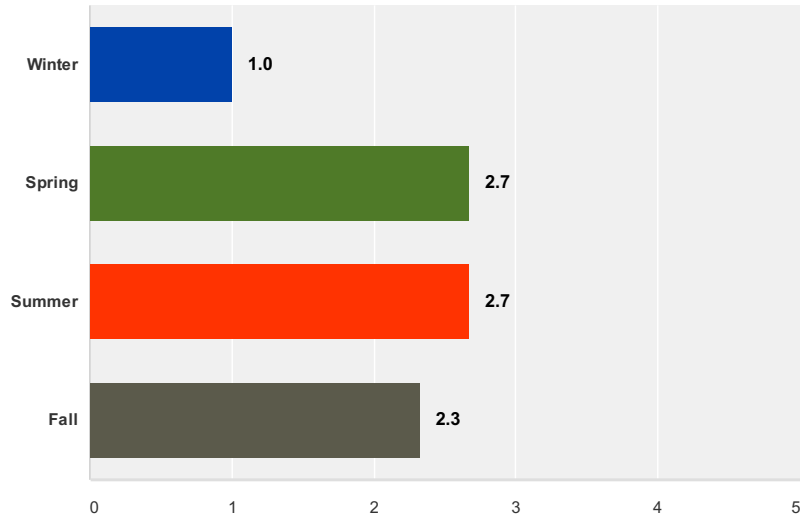
Answer Choices	Responses
Agricultural fields	0% 0
Garden	33% 1
Lawn	67% 2
Total	3

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

Bugh Lake Survey #4

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

Answered: 3 Skipped: 11

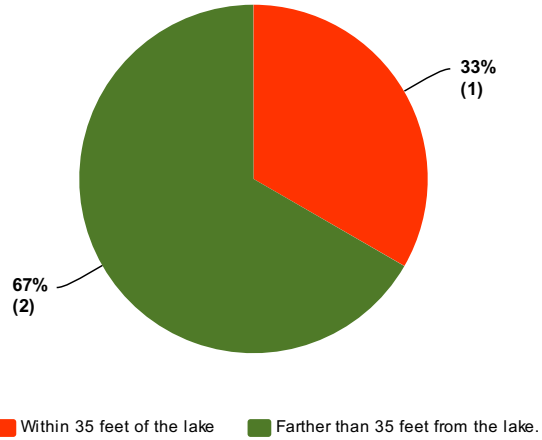


	Never	Once	Once a week	Once a month	Varies	Total Respondents
Winter	100% 3.0	0% 0.0	0% 0.0	0% 0.0	0% 0.0	3
Spring	0% 0.0	67% 2.0	0% 0.0	33% 1.0	0% 0.0	3
Summer	0% 0.0	67% 2.0	0% 0.0	33% 1.0	0% 0.0	3
Fall	33% 1.0	33% 1.0	0% 0.0	33% 1.0	0% 0.0	3

Bughs Lake Survey #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: 3 Skipped: 11

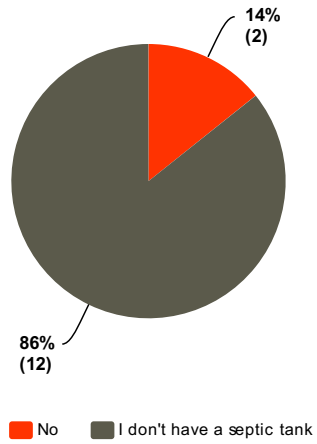


Answer Choices	Responses
I do not apply herbicides/pesticides on lakefront property	0% 0
Up to the lake	0% 0
Within 35 feet of the lake	33% 1
Farther than 35 feet from the lake.	67% 2
Total	3

Bughs Lake Survey #4

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

Answered: 14 Skipped: 0

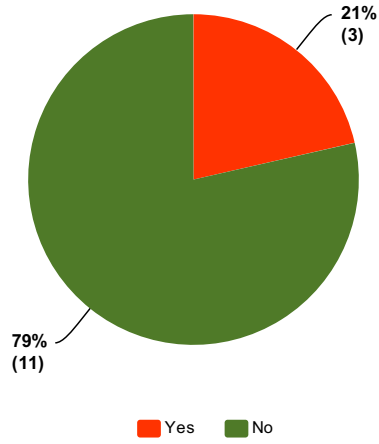


Answer Choices	Responses	
Yes	0%	0
No	14%	2
I don't have a septic tank	86%	12
Total		14

Bughs Lake Survey #4

Q12 Do you use fertilizer on your land?

Answered: 14 Skipped: 0

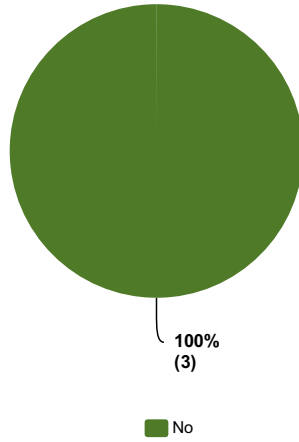


Answer Choices	Responses	
Yes	21%	3
No	79%	11
Total		14

Bughs Lake Survey #4

Q13 Do you use fertilizer which contains phosphorus?

Answered: 3 Skipped: 11

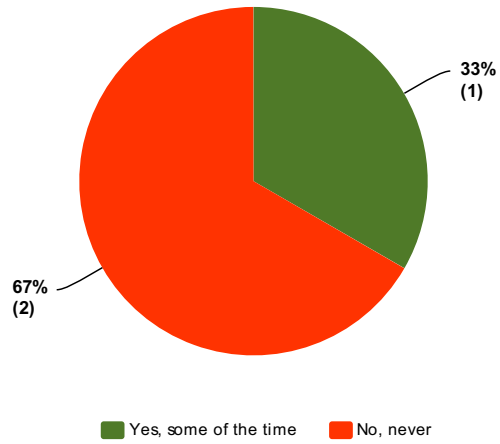


Answer Choices	Responses	
Yes	0%	0
No	100%	3
I don't know	0%	0
Total		3

Bughs Lake Survey #4

Q14 Do you have your soil tested before applying fertilizer?

Answered: 3 Skipped: 11

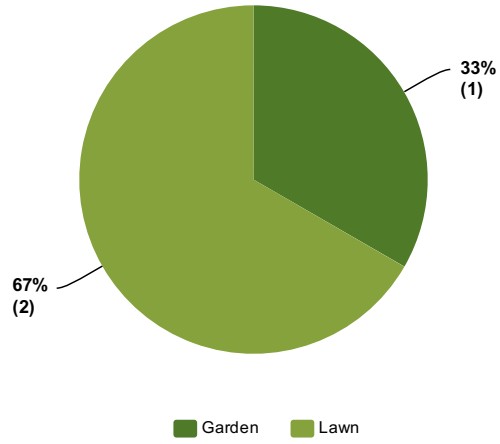


Answer Choices	Responses	
Yes, all of the time	0%	0
Yes, some of the time	33%	1
No, never	67%	2
Total		3

Bughs Lake Survey #4

Q15 Where do you apply fertilizer?

Answered: 3 Skipped: 11



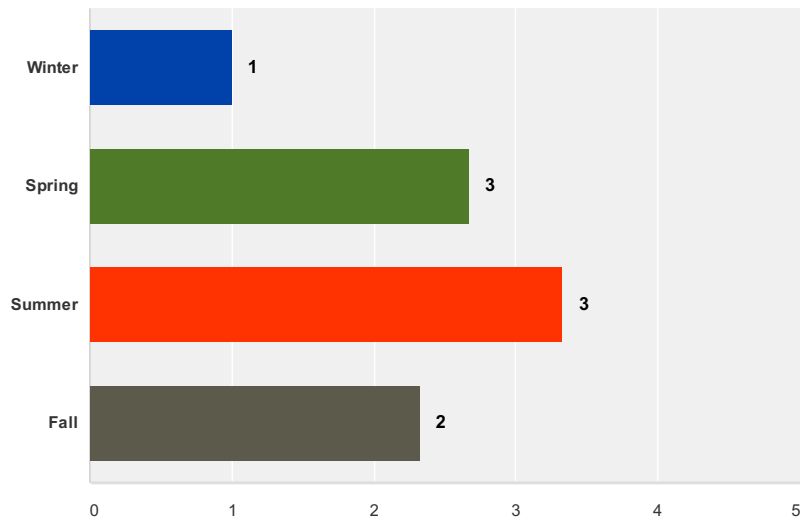
Answer Choices	Responses
Agricultural fields	0% 0
Garden	33% 1
Lawn	67% 2
Total	3

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

Bughs Lake Survey #4

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

Answered: 3 Skipped: 11

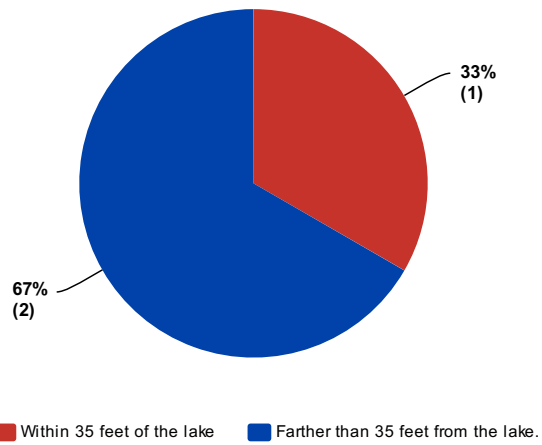


	Never	Once	Once a week	Once a month	Varies	Total Respondents
Winter	100% 3	0% 0	0% 0	0% 0	0% 0	3
Spring	0% 0	67% 2	0% 0	33% 1	0% 0	3
Summer	0% 0	33% 1	0% 0	67% 2	0% 0	3
Fall	33% 1	33% 1	0% 0	33% 1	0% 0	3

Bughs Lake Survey #4

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

Answered: 3 Skipped: 11

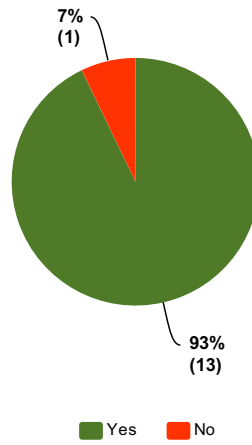


Answer Choices	Responses
I do not apply fertilizer on lakefront property	0% 0
Up to the lake	0% 0
Within 35 feet of the lake	33% 1
Farther than 35 feet from the lake.	67% 2
Total	3

Bughs Lake Survey #4

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

Answered: 14 Skipped: 0

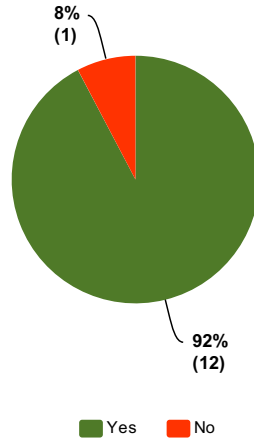


Answer Choices	Responses	
Yes	93%	13
No	7%	1
Unsure	0%	0
Total		14

Bughs Lake Survey #4

Q19 Do you own shoreland property?

Answered: 13 Skipped: 1

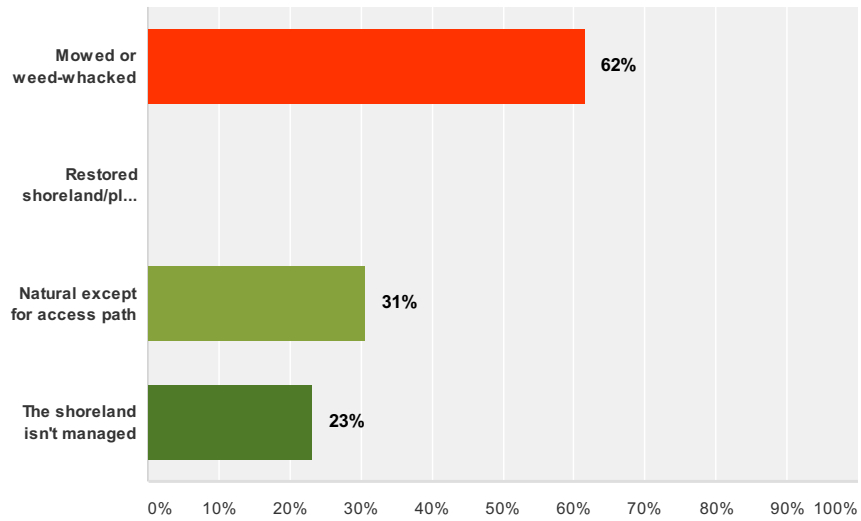


Answer Choices	Responses	
Yes	92%	12
No	8%	1
Total		13

Bughs Lake Survey #4

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

Answered: 13 Skipped: 1



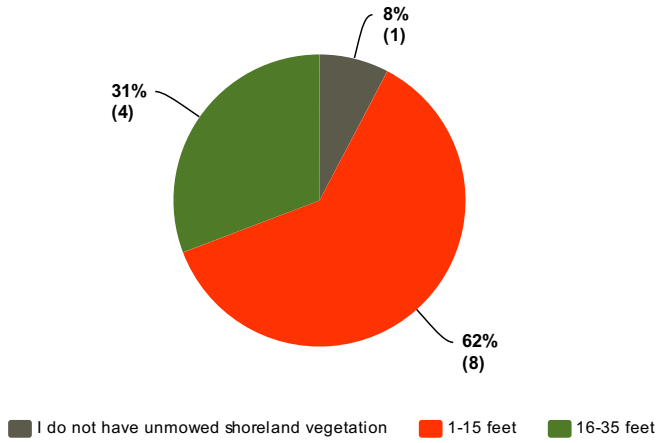
Answer Choices	Responses
Mowed or weed-whacked	62% 8
Restored shoreland/planted	0% 0
Natural except for access path	31% 4
The shoreland isn't managed	23% 3
Total Respondents: 13	

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

Bughs Lake Survey #4

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

Answered: 13 Skipped: 1

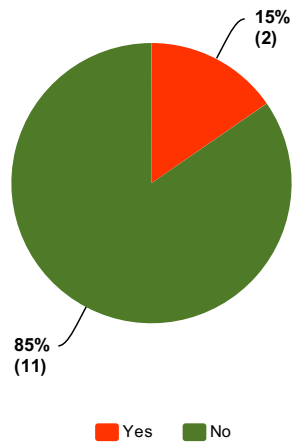


Answer Choices	Responses	
I do not have unmowed shoreland vegetation	8%	1
1-15 feet	62%	8
16-35 feet	31%	4
over 35 feet	0%	0
Total		13

Bughs Lake Survey #4

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

Answered: 13 Skipped: 1

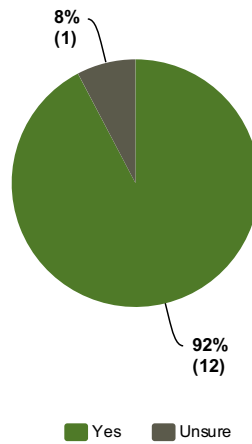


Answer Choices	Responses	
I have no path	0%	0
Yes	15%	2
No	85%	11
Unsure	0%	0
Total		13

Bughs Lake Survey #4

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

Answered: 13 Skipped: 1

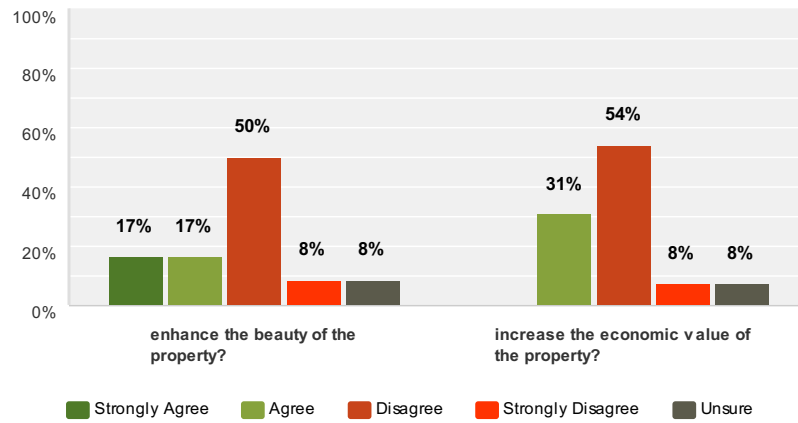


Answer Choices	Responses	
Yes	92%	12
No	0%	0
Unsure	8%	1
Total		13

Bugh Lake Survey #4

Q24 In your opinion, does shoreland vegetation...

Answered: 13 Skipped: 1

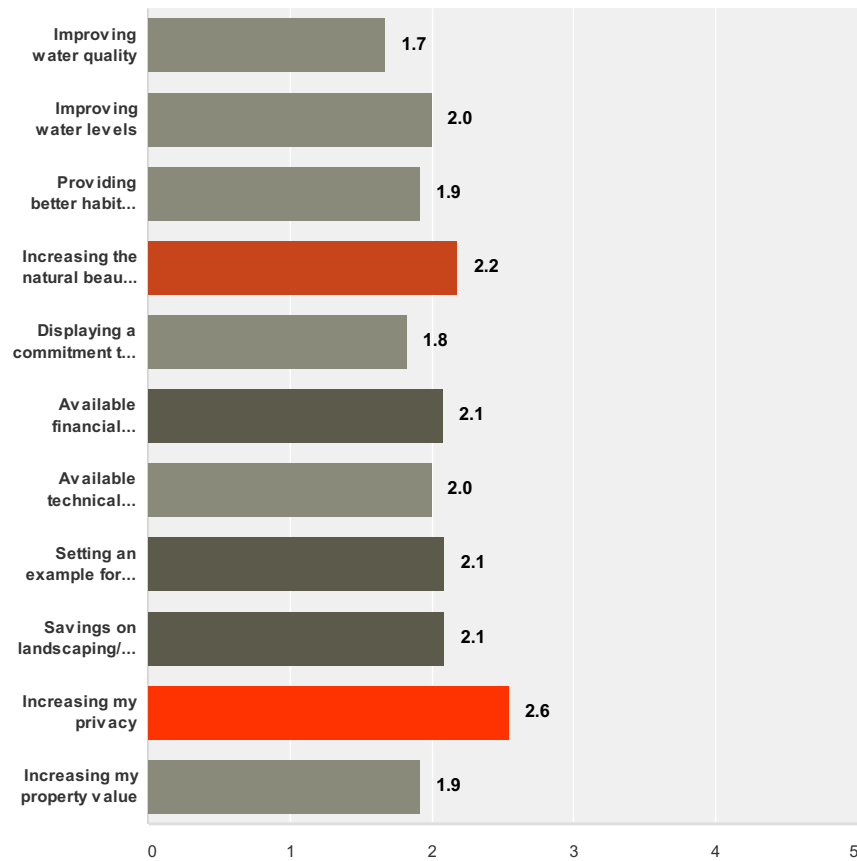


	Strongly Agree	Agree	Disagree	Strongly Disagree	Unsure	Total
enhance the beauty of the property?	17% 2.0	17% 2.0	50% 6.0	8% 1.0	8% 1.0	12
increase the economic value of the property?	0% 0.0	31% 4.0	54% 7.0	8% 1.0	8% 1.0	13

Bugh Lake Survey #4

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

Answered: 12 Skipped: 2



	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't know	Total
Improving water quality	50% 6.0	33% 4.0	17% 2.0	0% 0.0	0% 0.0	12
Improving water levels	36% 4.0	45% 5.0	9% 1.0	0% 0.0	9% 1.0	11
Providing better habitat for fish and wildlife	25% 3.0	58% 7.0	17% 2.0	0% 0.0	0% 0.0	12
Increasing the natural beauty of my property	27% 3.0	45% 5.0	9% 1.0	18% 2.0	0% 0.0	11
Displaying a commitment to the environment	42% 5.0	33% 4.0	25% 3.0	0% 0.0	0% 0.0	12
Available financial assistance	42% 5.0	25% 3.0	25% 3.0	0% 0.0	8% 1.0	12
Available technical assistance	42% 5.0	33% 4.0	17% 2.0	0% 0.0	8% 1.0	12
Setting an example for community members	36% 4.0	18% 2.0	45% 5.0	0% 0.0	0% 0.0	11
Savings on landscaping/maintenance costs	36% 4.0	18% 2.0	45% 5.0	0% 0.0	0% 0.0	11
Increasing my privacy	27% 3.0	18% 2.0	36% 4.0	9% 1.0	9% 1.0	11
Increasing my property value	50% 6.0	25% 3.0	17% 2.0	0% 0.0	8% 1.0	12

#	Other (please specify)	Date
1	To get control of our weed problem in the lake more naturally with out using all chemicals.	8/11/2014 2:27 PM