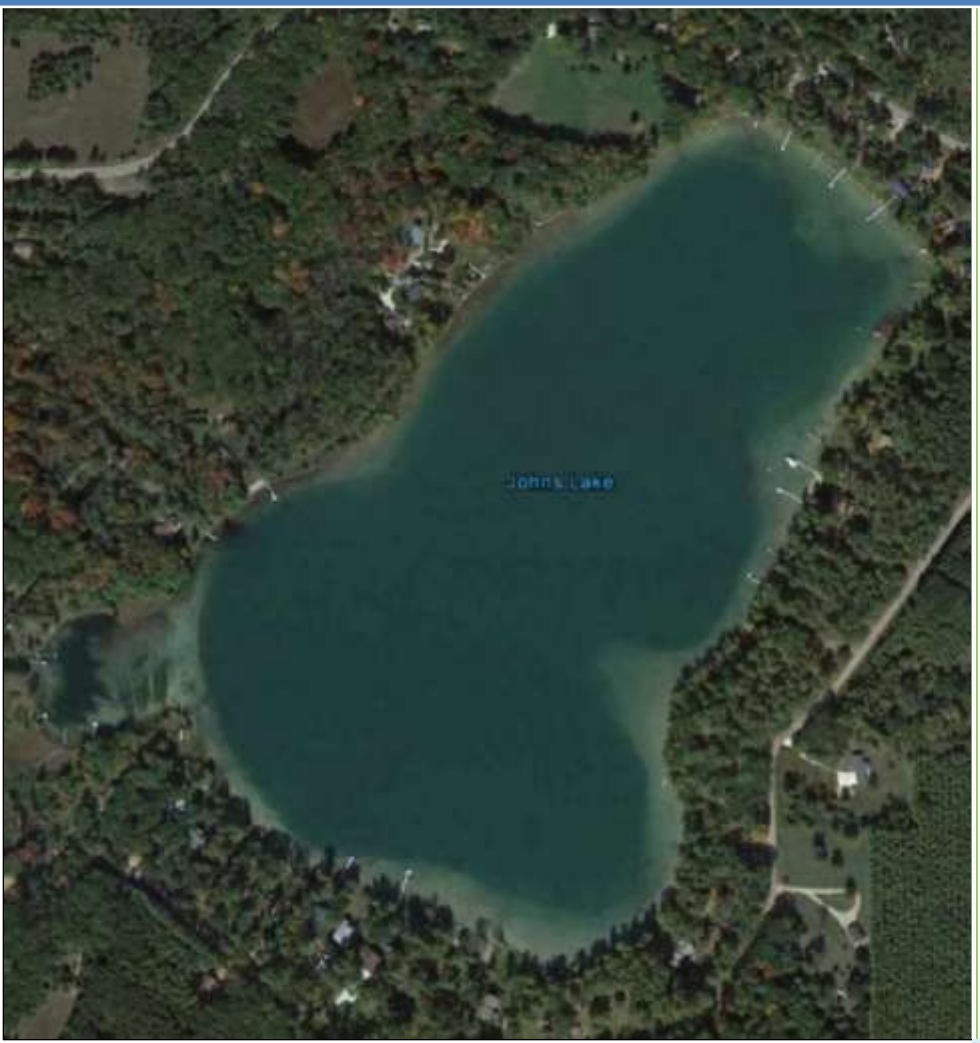
2015

Johns Lake, Waushara County, Wisconsin
Lake Management Plan



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

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

Lake Management Plan for Johns Lake, Waushara County, Wisconsin

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

The plan was adopted by the Johns Lake Management District on: October 17, 2015.

The plan was accepted by the Town of Mount Morris on: _____.

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

The plan was approved by the Wisconsin Department of Natural Resources on: August 9, 2016.

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

Johns Lake Management Planning Committee Members and Resources

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

Waushara County Watershed Lakes Council

Waushara County Staff and Citizens

Wisconsin Department of Natural Resources Lake Manager, Ted Johnson

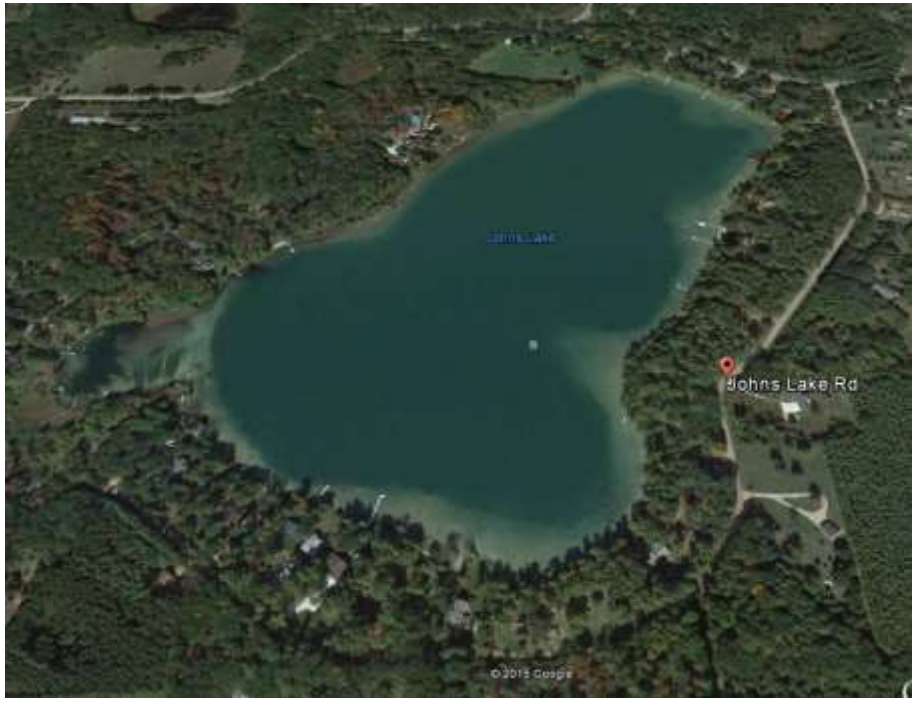
Wisconsin Department of Natural Resources Lake Protection Grant Program

Contents

Introduction

Johns Lake is located in the township of Mount Morris, east of the city of Wautoma and south of Highway 152. Johns Lake is a 71-acre drainage lake with groundwater and surface runoff contributing most of its water, and most water exits via Bruce Creek. Its maximum depth is 41 feet; the lakebed has a steep slope with the depth averaging 22 feet. Its bottom sediments are mostly muck, with some sand located in the northeastern and southern shallows of the lake. The public enjoys access to Johns Lake via the public boat launch on its southern side. In 2015, community members around Johns Lake came together in partnership with Waushara County and technical professionals to develop this lake management plan (LMP).

The purpose of this plan is to provide a framework for the protection and improvement of Johns Lake. Implementing the content of this LMP will enable citizens and other supporters to achieve the vision for Johns Lake now and in the years to come. It is a dynamic document that identifies goals and action items for the purpose of maintaining, protecting and/or creating desired conditions in the lake and identifies steps to correct past problems, improve on current conditions, and provide guidance for future boards, lake users, and technical experts. Because many entities are involved in lake and land management, it can be challenging to navigate the roles, partnerships and resources that are available. The planning process and content of this plan have been designed to identify where some key assistance exists. The actions identified in this LMP can serve as a gateway for obtaining grant funding and other resources to help implement activities outlined in the plan.



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

- **Individuals**: Individuals can use this plan to learn about the lake they love and their connection to it. People living near Johns Lake can have the greatest influence on the lake by understanding and choosing lake-friendly options to manage their land and the lake.
- **Johns Lake Management District:** This plan provides the District with a well thought out plan for the whole lake and lists options that can easily be prioritized. Annual review of the plan will also help the District to realize its accomplishments. Resources and funding opportunities for District management activities are made more available by placement of goals into the lake management plan, and the District can identify partners to help achieve their goals for Johns Lake.

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

Background

One of the first steps in creating this plan was to gather and compile data about the lake and its ecosystem to understand past and current lake conditions. This was done alongside 32 other lakes as part of the Waushara County Lakes Project. The Waushara County Lakes Project was initiated by citizens in the Waushara County Watershed Lakes Council who encouraged Waushara County to work in partnership with personnel from UW-Stevens Point to assess 33 lakes in the county. This effort received funding from the WDNR Lake Protection Grant Program. There was insufficient data available for many of the lakes to evaluate current water quality, aquatic plant communities, invasive species, and shorelands. The data that were available had been collected at differing frequencies or periods of time, making it difficult to compare lake conditions. Professionals and students from UW-Stevens Point and the Waushara County Land Conservation Department conducted the Waushara County Lakes Study and interpreted data for use in the development of lake management plans. Data collected by citizens, consultants, and professionals at the WDNR were also incorporated into the planning process to provide a robust set of information from which informed decisions could be made. Sources of information used in the planning process are listed at the end of this document.

Several reports from the Johns Lake Study and the materials associated with the planning process and reports can be found on the Waushara County website: http://www.co.waushara.wi.us/ (select "Departments", "Zoning and Land Conservation", "Land Conservation", and "Lake Management Planning"). Unless otherwise noted, the data used in the development of this plan were detailed in the 2014 report *Waushara County Lakes Study - Johns Lake*, University of Wisconsin-Stevens Point.

The Planning Process

The planning process included a series of four public planning sessions held between June and September 2014 at the Mountain View Community Center. The Johns Lake Planning Management Committee consisted of property owners and recreational users. Technical assistance during the planning process was provided by the Waushara County Conservationist, the Waushara County Community, Natural Resources and Economic Development Extension Agent, and professionals from the Wisconsin Department of Natural Resources (WDNR), Golden Sands Resource Conservation & Development Council, Inc. (RC&D), University of Wisconsin-Extension (UWEX), and the University of Wisconsin-Stevens Point Center for Watershed Science and Education (CWSE).

Participation in the planning process was open to everyone and was encouraged by letters mailed to Johns Lake waterfront property owners and by press releases in local newspapers. In addition, members of the planning committee were provided with emails about upcoming meetings, which could be forwarded to others. To involve and collect input from as many people as possible, a topic-specific survey related to the subject of each upcoming planning session was made available prior to each planning session. Property owners and interested lake users were notified about the surveys and how to access them (via postcards mailed to waterfront property owners and press releases in local newspapers). The surveys could be filled out anonymously online, or paper copies were available upon request. Survey questions and responses were shared at the planning sessions and can be found in Appendix E. Lake User Survey Results.

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

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

Goals, Objectives and Actions

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

Although each lake is different, the Wisconsin Department of Natural Resources requires that each comprehensive lake management plan address a specific list of topics affecting the character of a lake, whether each topic has been identified as a priority or as simply something to preserve. In this way, every lake management plan considers the many aspects associated with lakes. These topics comprise the chapters in this plan. For the purposes of this plan, the chapters have been grouped as follows:

In-Lake Habitat and a Healthy Lake

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

Landscapes and the Lake

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

People and the Lake

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

List of Goals

Goal 1. Enhance the fish community in Johns Lake.

Goal 2. Protect the native plant community in and around Johns Lake.

Goal 3. Aquatic invasive plant species will be eliminated from Johns Lake.

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

Goal 5. Minimize nutrient and sediment loading to the lake by improving land management practices near the lake.

Goal 6. Water levels in Johns Lake will represent natural fluctuations.

Goal 7. Johns Lake shorelands will become increasingly healthy over time. Approximately 4,476 feet of shoreland is mowed to the water's edge (2011 survey).

Goal 8. Explore and utilize resources for healthy lake management.

Goal 9. Safe access/use of the lake and expectations of lake users and will be clear.

Goal 10. Increase participation in lake stewardship.

Goal 11. Review plan annually and update as needed.

The following goals were identified as priorities by the planning committee:

Goal 6. Water levels in Johns Lake will represent natural fluctuations. (Lake Level section**)**

Objective 6.1. Understand water fluctuations (natural vs. manmade) in and near Johns Lake.

Goal 7. Johns Lake shorelands will become increasingly healthy over time. Approximately 4,476 feet of shoreland is mowed to the water's edge (2011 survey). (Shoreland section)

Objective 7.1. Johns Lake shoreland property owners will be knowledgeable about and make good decisions about shoreland practices that lead to good water quality and habitat.

Goal 10. Increase participation in lake stewardship. (Communication and Organization section)

Objective 10.2. Achieve good communication with clubs, municipalities, agency staff, elected officials, other lake groups and organizations interested in Johns Lake or lake health.

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

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

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

In-Lake Habitat and a Healthy Lake

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

Lake habitat occurs within the lake, along all of its shorelands, and even extends into its watershed for some species. Many animals that live in and near the lake are only successful if their needs – food, a healthy environment, and shelter – are met. Native vegetation including wetlands along the shoreline and adjacent to the lake provides habitat for safety, reproduction, and food, and can improve water quality and balance water quantity. Some lake visitors such as birds, frogs, and turtles use limbs from trees that are sticking out of the water for perches or to warm themselves in the sun. Aquatic plants infuse oxygen into the water and provide food and shelter for waterfowl, small mammals, and people. The types and abundance of plants and animals that comprise the lake community also vary based on the water quality, and the health and characteristics of the shoreland and watershed. Healthy habitat in Johns 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 to flourish. Activities in and around a lake that can affect a fishery may involve disturbances to the native aquatic plant community or substrate, excessive additions of nutrients or harmful chemicals, removal of woody habitat, shoreline alterations, and/or an imbalance in the fishery. Shoreland erosion can cause sediment to settle onto the substrate, causing the deterioration of spawning habitat. Habitat can be improved by allowing shoreland vegetation to grow, minimizing the removal of aquatic plants, providing fallen trees or limbs in suitable areas, and protecting wetlands and other areas of critical habitat.

Photo courtesy of Limnology Center, UW Madison.

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

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

Fish surveys conducted by fisheries biologists with the WDNR occur in an 8-year cycle. The most recent survey was conducted in spring 2009 using electrofishing; the next survey is scheduled for 2017. During the 2009 survey, largemouth bass (LMB) were found to have below average growth (14 inches by age 7) and were in high abundance, with a catch rate of 313/hour for LMB greater than 8 inches and a mean length of 11.1 inches. The LMP population dropped off dramatically above 12-14 inches, which is indicative of harvesting larger fish. The size limit for LMB was removed in 2012 to rebalance the fishery and reduce the number of LMB. The new size limit should also improve the bluegill populations, which were in low abundance with a catch rate of 32/hour for bluegills greater than 3 inches. Bluegills were observed to have above average size structure.

Guiding Vision for the Fish Community

The Johns Lake fishery will be healthy, robust and well-balanced.

Goal 1. Enhance the fish community in Johns Lake.

Objective 1.1. Protect and nurture a balanced fish population in Johns Lake.

Actions	Lead person/group	Resources	Timeline
Explore implementing a 5- or 10-bag limit for panfish.	JLMD	WDNR Fisheries Biologist	2016
Consider stocking bluegill and crappie in Johns Lake.	JLMD	WDNR Fisheries Biologist We Really Kare, Inc.	Annually
Maintain open communication with the WDNR Fisheries Biologist regarding regulation of non-compliance concerns.	JLMD	WDNR Warden (see Appendix A)	Ongoing
Inform area lake users of information and updates on any future fishing rule changes via e-mail, website, newsletter, and posting at public landings.	JLMD		Ongoing

Objective 1.2. Protect and improve near-shore fish habitat in Johns Lake.

Actions	Lead person/group	Resources	Timeline
Protect existing natural habitat, including downed trees and woody features around Johns Lake, by informing landowners about their importance, the depth of woody structure placement and anchor to ensure boating safety, and by providing informational materials on the Town of Mt. Morris website and at the town hall.	JLMD	UWEX educational materials WDNR Fisheries Biologist Town of Mt. Morris	Ongoing
Work with WDNR for assistance and permitting of tree drops and "fish sticks".	JLMD Interested citizens	WDNR Fisheries Biologist WDNR Healthy Lakes grants	Ongoing
Explore the installation of woody habitat under and around docks.	JLMD Shoreland property owners	WDNR Fisheries Biologist	Ongoing

Aquatic Plants

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

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

During the 2011 aquatic plant survey of Johns Lake, 12 species of aquatic plants were found. This number was below average compared with the other lakes in the Waushara County Lakes Study. The greatest plant diversity was found in the bay on the western side of the lake and in the shallows. Ninety-eight percent (104 of 106) sampled sites had vegetative growth. Of the sampled sites within Johns Lake, the average depth was 8 feet and the maximum depth with plant growth was 26 feet. The dominant plant species in the survey was muskgrass, followed by Fries' pondweed and slender naiad. Overall, the aquatic plant community in Johns Lake can be characterized as having average diversity when compared to all lakes in the Waushara County Lakes Study, with aquatic species that are common to central Wisconsin lakes. Eurasian watermilfoil (EWM) was first confirmed in Johns Lake in 1998, but was not observed during the 2011 aquatic plant survey. The habitat, food source, and water quality offered by the plant community within Johns Lake should be focal points of any future lake management strategies.

More detailed information can be found in *Aquatic Plant Survey of Johns Lake, Waushara County; Waushara County Lakes Study - Johns Lake;* and, Appendix D. Aquatic Plants.

Overall, planning participants were quite satisfied with the state of aquatic plants, with the vast majority indicating the lake had just the right amount of plants, or plants were present but did not affect their use of the lake. Five of nine survey respondents felt that aquatic plant management might be warranted.

Guiding Vision for Aquatic Plants in Johns Lake

Johns Lake will host a diverse aquatic plant community that supports good water quality and a balanced fishery.

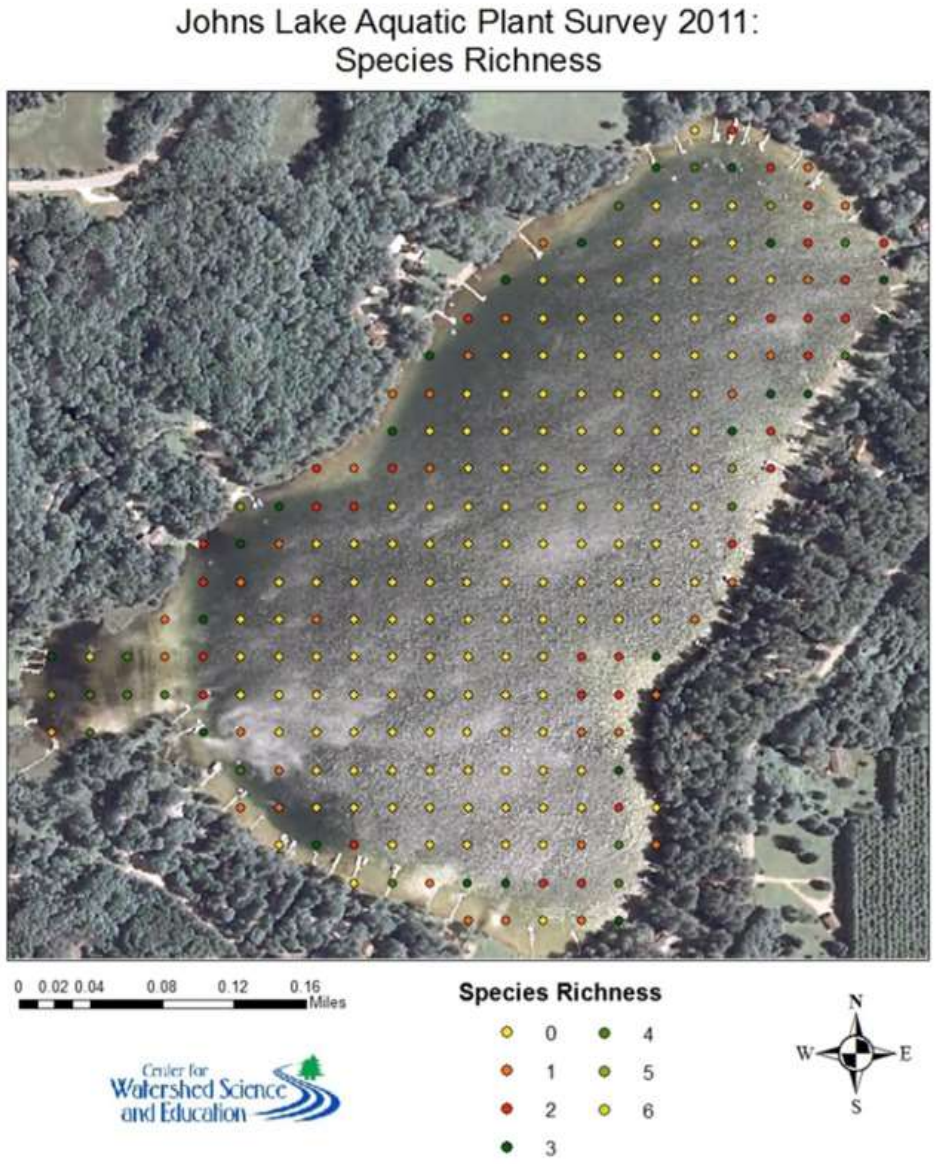


Figure 1. Species richness in Johns Lake, 2011 survey.

Goal 2. Protect the native plant community in and around Johns Lake.

Objective 2.1. Maintain the native aquatic plant community in Johns Lake.

Actions	Lead person/group	Resources	Timeline
Minimize removal and disturbance of native vegetation (to impede establishment of additional AIS) by providing informational materials in the annual mailing and on the website re: mitigation methods available.	JLMD Shoreland property owners	WCLWC UWEX Lakes	Ongoing
Obtain the appropriate permit for harvesting of any native plants beyond 30 feet from docks.	JLMD Shoreland property owners	WDNR Lakes Biologist	Ongoing

Aquatic Invasive Species (AIS)

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

Eurasian watermilfoil (EWM) was not observed during the 2011 aquatic plant survey, but was first confirmed in Johns Lake in 1998. A survey conducted in 2013 by Golden Sands Resource Conservation & Development Council, Inc. (RC&D) staff indicated EWM was present in the southern portion of Johns Lake (Figure 2). They also noted the presence of a native weevil (*Euhrychiopsis lecontei*) on the tips of EWM. This weevil damages EWM and can be used as an effective control option in some lakes.

EWM can exist as part of the plant community or it can create dense beds that can damage boat motors, make areas non-navigable, and inhibit activities like swimming and fishing. This plant produces viable seeds; however, it often spreads by fragmentation. Just a small fragment of the stem is enough to start a new plant, so spread can occur quickly if plants are located near points of activity such as beaches and boat launches.

In May 2013, EWM was first treated in the affected areas (approximately 1 acre) with 2,4-D (Appendix D. Aquatic Plants) by Cason and Associates. Similar applications have since occurred in 2014 and 2015, also conducted by Cason and Associates. Chemical treatment will also kill the native weevil – it is unknown if they are still present in Johns Lake.

Figure 2. Aquatic invasive species survey results, 2013.

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

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

If an aquatic invasive plant species not previously documented in Johns Lake is suspected or observed by any lake user, the lake user should refer to Appendix C. Rapid Response Plan for more information on how to confirm or report it.

Summary of Aquatic Plant Management Planning Session Discussion – August 14, 2015

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

- **Manual removal. (Native plants or EWM)** While it is not strongly advised, property owners are allowed to clear an area up to 30 feet around their docks for boat and swimming access to open water by hand harvesting without a permit. Additionally, those trained to properly identify and remove EWM and other aquatic invasive species can remove plants throughout the lake by manual means any time of year, without a permit. Divers trained in proper removal techniques can be hired to manually remove EWM or other AIS in deeper parts of the lake. Individual hand pulling was supported by 5 of 9 survey respondents, and divers by 7 of 9 survey respondents.

- **Milfoil weevils. (EWM)** This option could be considered in areas of the lake with native or restored shorelines. Milfoil weevils were present in Johns Lake, but may have been adversely affected by chemical treatment. They are commercially available, but are expensive, so obtaining a starter population and rearing them in predator-free conditions can be desirable from a financial standpoint. Professional assistance should be sought if stocking or rearing is pursued. Due to Johns Lake's very limited EWM population, weevils may be a viable option for long-term control if chemical treatment is not being conducted. This option was supported by 6 of 9 survey respondents.

- **Chemical spot treatment. (EWM)** Results of recent studies of the effectiveness of chemical spot treatment suggest the treatment is less effective than previously thought and may actually promote chemically resistant forms of EWM. Chemical spot treatments may still be appropriate in certain conditions to control EWM in the future. If a hybrid watermilfoil (HWM) is determined to be present, the type of chemical should be based on the specific type of hybrid. This can be determined through DNA testing. If EWM is found to not be a hybrid, and the area is less than 5 acres, a contact herbicide such as endothall or diquat should be used instead of systemic herbicides. Treatment should occur early in the season, prior to emergence of native plants. To reduce the chance of developing resilient strains of EWM, it is recommended that different treatments be used in consecutive treatment years. Chemical treatment was supported by 5 of 9 survey respondents.

- **Do nothing.** Doing no active management is an option to see how the EWM may respond. Though EWM is present in Johns Lake and typically behaves very aggressively, there have been cases in other lakes where the population stabilized and did not present a significant issue to the lakes' users. This option was only supported by 1 of 9 survey respondents.

- 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 Invasive Species

Johns Lake will not be adversely affected by aquatic invasive species.

Goal 3. Aquatic invasive plant species will be eliminated from Johns Lake.

Objective 3.1. Reduce or eliminate populations of EWM in Johns Lake.

Actions	Lead person/group	Resources	Timeline
Inform property owners about refraining from removing native aquatic vegetation to diminish the possibility of colonization by AIS.	JLMD Shoreland property owners	RC&D UWEX Lakes – informational materials WCLWC	Ongoing: spring- fall
Re-evaluate plant community routinely to determine the next steps (or no action) in management of EWM.	JLMD	WDNR Lake Biologist RC&D Consultant	EWM - Annually CLP survey? – early June
Follow the guidance in this plan for managing EWM in Johns Lake. Adjust approaches based on current survey results.	JLMD	WDNR Lake Biologist	Ongoing
Inform shoreland property owners they should be trained in proper hand-pulling techniques for EWM.	JLMD	RC&D	Annually or as needed
Work with other area lake groups to apply jointly for a grant to hire divers to hand pull EWM.	JLMD	WDNR Lake Manager RC&D	As needed
If EWM populations exceed what is manageable by hand pulling, consider using herbicides in areas of denser infestation.	JLMD	WDNR Lake Biologist Consultants	As needed
Prior to chemical use, test milfoil to see if hybrid watermilfoil (HWM) exists in Johns Lake.	JLMD	RC&D	Summer 2015
If HWM exists, conduct challenge tests to determine the correct combinations of chemicals for successful treatment.	JLMD	RC&D	
Keep this plan up to date with new or improved approaches to EWM control.	JLMD	WDNR Lake Biologist Consultants	As needed

Objective 3.2. Prevent the establishment of new species of AIS in Johns Lake.

Actions	Lead person/group	Resources	Timeline
Inform lake visitors about AIS and removing aquatic "hitchhikers" using signs at the boat launch, newsletters, and other methods.	JLMD Town of Mt. Morris	UWEX Lakes – informational materials CBCW RC&D	Ongoing
Coordinate volunteers or interns to staff the boat launch on busy days/weekends for boat inspections and information (Clean Boats Clean Waters).	Interested citizens	CBCW Coordinator UWEX Lakes	2016, Ongoing
Inform property owners of the importance of aquatic vegetation and to refrain from removing native aquatic vegetation to reduce the possibility of AIS colonization.	JLMD Shoreland property owners	UWEX Lakes – informational materials	Ongoing
Learn to identify AIS.	Shoreland property owners Lake users	RC&D	Ongoing
Routinely monitor for AIS in Johns Lake.	Shoreland property owners Lake users	WDNR Lake Specialist RC&D	Ongoing
If new AIS is identified, work with area lakes to apply jointly for a grant to hire divers to remove plants by hand pulling.	JLMD	WDNR Lake Specialist RC&D WDNR AIS grants	As needed

Critical Habitat

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

Although Johns Lake does not have an official critical habitat area designation, there are areas within Johns Lake that are important for fish and wildlife. Natural, minimally-impacted areas with woody habitat such as logs, branches, and stumps; areas with emergent and other forms of aquatic vegetation; areas with overhanging vegetation; and wetlands are elements of good quality habitat. Identifying other important areas around the lake that are important habitat and informing lake users of their value can help raise awareness for the protection of these areas. The WDNR website lists a 'proposed' critical habitat area on Johns Lake in 2006.

Guiding Vision Johns Lake's Critical Habitat

Johns Lake's sensitive areas will be enhanced and protected from degradation.

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

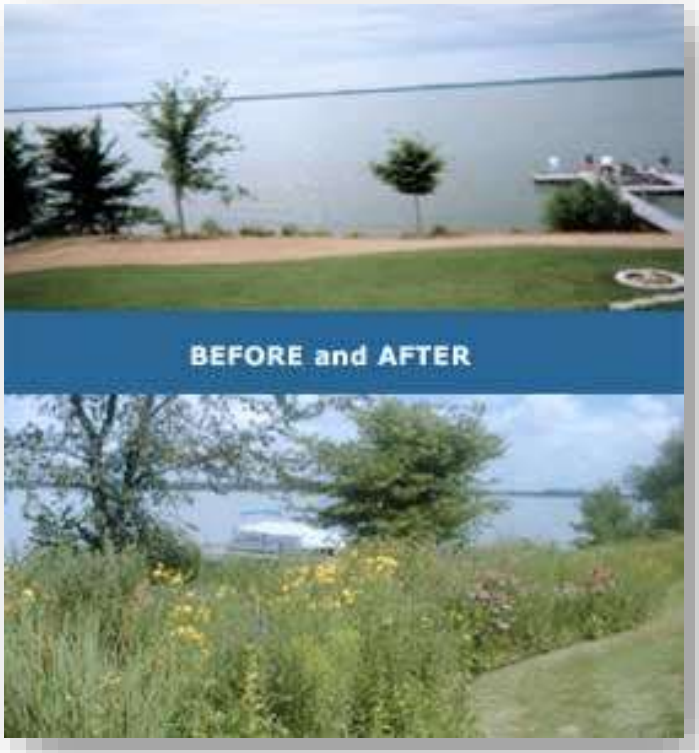
Objective 4.1. Explore options for official identification of important habitat areas to inform others and to better protect areas with prime habitat in/adjacent to Johns Lake.

Actions	Lead person/group	Resources	Timeline
Request clarification of critical habitat designations from WDNR.	JLMD	WDNR Lake Specialists	2016
If critical habitat is designated on Johns Lake, communicate to property owners, visitors, and Town Board why these areas are important.	JLMD	WDNR Critical Habitat Report	If applicable.

Landscapes and the Lake

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

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



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

Water Quality

All 11 respondents to the public survey indicated water quality had a major impact on both the personal enjoyment value and economic value of their lake property. More than one-half felt current water quality was good and while the lake had very minor aesthetic problems, it was still excellent for swimming and boating. Fifty-five percent of the respondents felt the water quality had declined during their time with the lake, and they attributed this to heavy recreation and shoreline damage. Improving water quality was the number one reason people would be willing to change the way they manage their property. Six of ten respondents indicated they use fertilizers on their property to grow lawn, and two of nine indicated they occasionally test their soil prior to using fertilizer. Providing information about the relationship between lawn fertilizer and algae/aquatic plant growth could be beneficial, along with details about soil testing.

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

Dissolved oxygen is an important measure in Johns Lake because a majority of organisms in the water depend on oxygen to survive. Oxygen is dissolved into the water from contact with air, which is increased by wind and wave action. Algae and aquatic plants also produce oxygen when sunlight enters the water, but the decomposition of dead plants and algae reduces oxygen in the lake. During the spring and fall, dissolved oxygen concentrations were uniform throughout the water column and during the summer the oxygen was stratified by June. On some occasions during the summer, dissolved oxygen increased at depths of approximately 15 feet. This is typically due to the production of oxygen by algae. From the top to the bottom of the lake, in February of 2011 and 2012, dissolved oxygen concentrations were below 5 mg/L at the time of sampling. This low dissolved oxygen can limit the types of fish in the lake and over a prolonged period of time, may even result in winter fish kills.

The water clarity measured in Johns Lake was considered fair to good. Water clarity ranged from 9.5 feet to 18 feet. When compared with historical data, average clarity from 2010-2012 was slightly better in August, about the same in June and October, and poorer in April, May, July and November. A fair amount of water clarity data was collected and reported for Johns Lake between 1976 and 2011, with most of the data collected in the 1980s. Reductions in water clarity may be due to increased algae growth or sediment.

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

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

Phosphorus is an element that is essential in trace amounts to most living organisms, including aquatic plants and algae. Sources of phosphorus can include naturally-occurring phosphorus in soils and wetlands, and groundwater. Common sources from human activities include soil erosion, animal waste, fertilizers, and septic systems. Although a variety of compounds are important to biological growth, phosphorus receives attention because it is commonly the "limiting nutrient" in many Wisconsin lakes. Due to its relatively short supply compared to other substances necessary for growth, relatively small increases in phosphorus result in significant increases in aquatic plants and algae.

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

Total phosphorus concentrations for Johns Lake ranged from a high of 23 ug/L in May 2012 to a low of 3 ug/L in July 2011, February 2012 and August 2012. The summer median total phosphorus concentrations for Johns Lake were 9 and 13 ug/L in 2011 and 2012, respectively. Since then, one sample collected in May 2013 was 6 ug/L. This is well below the proposed phosphorus standard of 30 ug/L for deep drainage lakes like Johns Lake. During the study, inorganic nitrogen concentrations were slightly elevated and high enough in the spring and winter to enhance algal blooms throughout the summer (Shaw et al., 2000).

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

Guiding Vision for Water Quality in Johns Lake

Water quality in Johns Lake will support a healthy lake ecosystem and great recreation.

Goal 5. Minimize nutrient and sediment loading to the lake by improving land management practices near the lake.

Objective 5.1. The water quality in Johns Lake will be maintained the same or improved from the measurements observed during the 2010-2012 study *(median summer concentrations of total phosphorus less than 12 ug/L, average water clarity greater than 13 feet)*. Spring nitrogen concentrations will show a decreasing trend over the next 5 years.

Actions	Lead person/group	Resources	Timeline
Inform others around the lake about the impacts of nutrients and land management on water quality via the distribution of a District newsletter and neighborly discussions. Consider including information about healthy shorelands on a lake sign.	JLMD Shoreland property owners	UWEX Lakes (educational materials)	2016, Ongoing
Refrain from the use of fertilizers on shoreland properties (see Shorelands section). Consider distributing educational materials around the lake.	JLMD	UWEX Lakes (educational materials)	2016, Ongoing
Improve the health of the shorelands to reduce phosphorus and sediment loading to the lake (see Shorelands section).	Interested citizens	UWEX Lakes (educational materials)	
Encourage the restoration of unmowed vegetation along the shoreline to slow and absorb runoff and pollutants.	JLMD	UWEX Lakes (educational materials)	2016, Ongoing

Objective 5.2. Monitor water quality for lake and human health.

Actions	Lead person/group	Resources	Timeline
Encourage private well owners around Johns Lake to test their private drinking water for nitrates and atrazine.	JLMD	WC UWEX WEAL or other state certified lab	
Continue summer phosphorus and chlorophyll-a monitoring. Begin spring overturn nitrate monitoring.	Interested volunteer	CLMN	
Monitor dates of ice on/ice off and submit the information to the state database.	Interested volunteer		

Objective 5.3. 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.			

Lake Levels

Johns Lake Management District, due to the concern about possible water level fluctuation, will continue to monitor lake levels. In Waushara County, some of the seepage lakes have historically experienced fluctuations in water levels with some of the plants having adapted to these fluctuations for survival; however, since 2006, the annual precipitation for Wautoma has been average and in some years above average (Kraft, et. al. 2014). Excess withdrawal of groundwater can add to the natural fluctuations, effecting the extent and duration of low water levels (Kraft, 2014). The planning committee for Johns Lake envisions improved water levels in Johns Lake through the maintenance of groundwater levels and limitations on groundwater withdrawals in the surrounding area.

When water levels are low, lakebed (anything below the ordinary high water mark) is often exposed. Exposed lakebeds remain public property; however, shoreland property owners can access this area. These are fragile areas, which provide habitat when water levels rebound. Therefore, care should be taken to avoid "cleaning up" the exposed area, especially woody structure. In Waushara County, the endangered species, Facette's Locoweed grows on some of the lakes' exposed shorelines. Care should be taken to protect these unique species. Activities such as cutting an area larger than 30 feet wide, driving a motor vehicle on the lakebed, tilling, and chemically treating vegetation if the area is wet should be avoided, if possible. If there is reason for one of these activities, a permit from the WDNR is required. In addition to water quality and habitat benefits, maintaining healthy shoreland vegetation will help to keep the shoreline from eroding during periods of low water.

Guiding Vision for Water Quantity

Johns Lake will have typical historic water levels at or near the ordinary high water mark.

Goal 6. Water levels in Johns Lake will represent natural fluctuations.

Objective 6.1. Understand water fluctuations (natural vs. manmade) in and near Johns Lake.

Actions	Lead person/group	Resources	Timeline
Provide information to JLMD members via website and/or email on what is currently happening with water withdrawals and impacts on lake levels.	JLMD	UWEX – informational materials Friends of Central Sands Wisconsin Lakes CWSE	Ongoing
Establish a lake level monitoring program via the installation of an appropriate monitoring well and submit data to the state SWIMS database.	JLMD	WCLCD	Ongoing
Work with WDNR to establish a natural threshold lake level for Johns Lake and associated wildlife.	JLMD	WDNR	2016

Objective 6.2. Work with citizens and elected officials to ensure that Johns Lake has "normal" lake levels.

Actions	Lead person/group	Resources	Timeline
Connect with other lake groups and organizations in the area focused on water level/groundwater issues in Central Wisconsin.	JMLD	WCWLC Friends of Central Sands Wisconsin Lakes	Ongoing-as needed
Work with other lake organizations /lake residents/agriculture on groundwater legislation and to reduce groundwater withdrawals.	JLMD	WCWLC Friends of Central Sands Wisconsin Lakes	Ongoing
Work with local legislators on groundwater legislation; give legislators more support and representation at discussions on groundwater issues related to water withdrawal.	JMLD	Town, Village, County elected officials State and Federal legislators	Ongoing

Shorelands

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

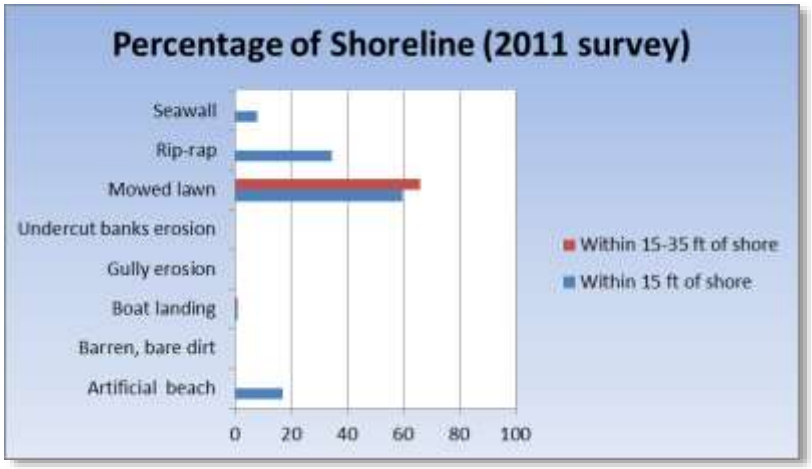
To better understand the health of the Waushara County lakes, shorelands were evaluated. The survey inventoried the type and extent of shoreland vegetation. Areas with erosion, rip-rap, barren ground, sea walls, structures and docks were also inventoried (Figure 3). A scoring system was developed for 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 Johns Lake is displayed on the map in Appendix B. Shoreland Survey – 2011. Many stretches of Johns Lake's shorelands are in good shape, but some portions have challenges that should be addressed. There were no stretches of Johns Lake shoreland that ranked as poor. Nearly 60% of the shoreland has mowed vegetation where unmowed shoreland vegetation should be present.

Shoreland ordinances were enacted to improve water quality and habitat, and to protect our lakes. To protect our lakes, the state's shoreland ordinance (NR 115) state that vegetation should extend at least 35 feet inland from the water's edge, with the exception of an optional 30-foot viewing corridor for each shoreland lot. Johns Lake's maximum disturbance allowable due to access corridors is 1,920 feet (30 feet wide per waterfront lot), which is approximately 24% of the total shoreline. According to the 2011 shoreland survey conducted by Waushara County, approximately 4,476 feet of shoreline are currently mowed. Although some properties were grandfathered in when the ordinance was adopted in 1966, following this guidance will benefit the health of the lake and its inhabitants.

When asked what motivates property owners to change the way they manage their land, five of eight survey respondents indicated water quality improvement would motivate them, and four of eight indicated displaying a commitment to the environment and providing better habitat for fish and wildlife are motivators.

Figure 3. Near-shore disturbances around Johns Lake, 2011.



The following was provided by the JLMD at the August 14, 2015 planning session:

"All Johns Lake residents will be responsible for maintaining their own shoreline. The JLMD will, through our annual meeting and written handouts, educate Johns Lake residents on the benefits of shoreline restoration, but it will be each resident's choice on how they want their respective shoreline to look as long as it conforms to Wisconsin Administrative Code (NR 115) and Waushara County zoning."

Guiding Vision for Johns Lake's Shorelands

Johns Lake will have a shoreland that provides aesthetic beauty and benefits water quality and habitat for birds, frogs, and other animals that use or live near shore.

Goal 7. Johns Lake shorelands will become increasingly healthy over time. Approximately 4,476 feet of shoreland is mowed to the water's edge (2011 survey).

Objective 7.1. Johns Lake shoreland property owners will be knowledgeable about and make good decisions about shoreland practices that lead to good water quality and habitat.

Actions	Lead person/group	Resources	Timeline
Provide informational materials to all shoreland property owners about basic lake stewardship including healthy shorelands and their composition (wildflowers, shrubs, trees, etc.).	JLMD	WCWLC UWEX Lakes – informational materials	Ongoing
Encourage and support shoreland owners interested in shoreland restoration.	JLMD Shoreland property owners	UWEX Lakes – informational materials WCLCD Consultants WDNR Healthy Lakes grants	Ongoing
Consider restoring and showcasing a "demonstration site" at the boat launch with a sign at the water's edge about shoreland restoration and/or hosting a "shoreland tour".	JLMD Town of Mt Morris Shoreland property owners	WCLCD UWEX Lakes Consultants	2016
Host a speaker/demonstration: "How to restore your shoreline."	JLMD	WCLCD UWEX Lakes-Patrick Goggin Consultants	2016
Encourage those interested in shoreland restorations to contact the WCLCD for available resources.	JLMD	WCLCD WDNR Healthy Lakes grants	Ongoing

Additional actions related to shorelands have been identified in the Water Quality section.

Watershed Land Use

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

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

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

The surface watershed for Johns Lake is 464 acres. Primary land use is forest (Figure 4). The lake's shoreland is surrounded primarily by developed land, forest and wetlands. In general, the land closest to the lake has the greatest immediate impact on water quality.

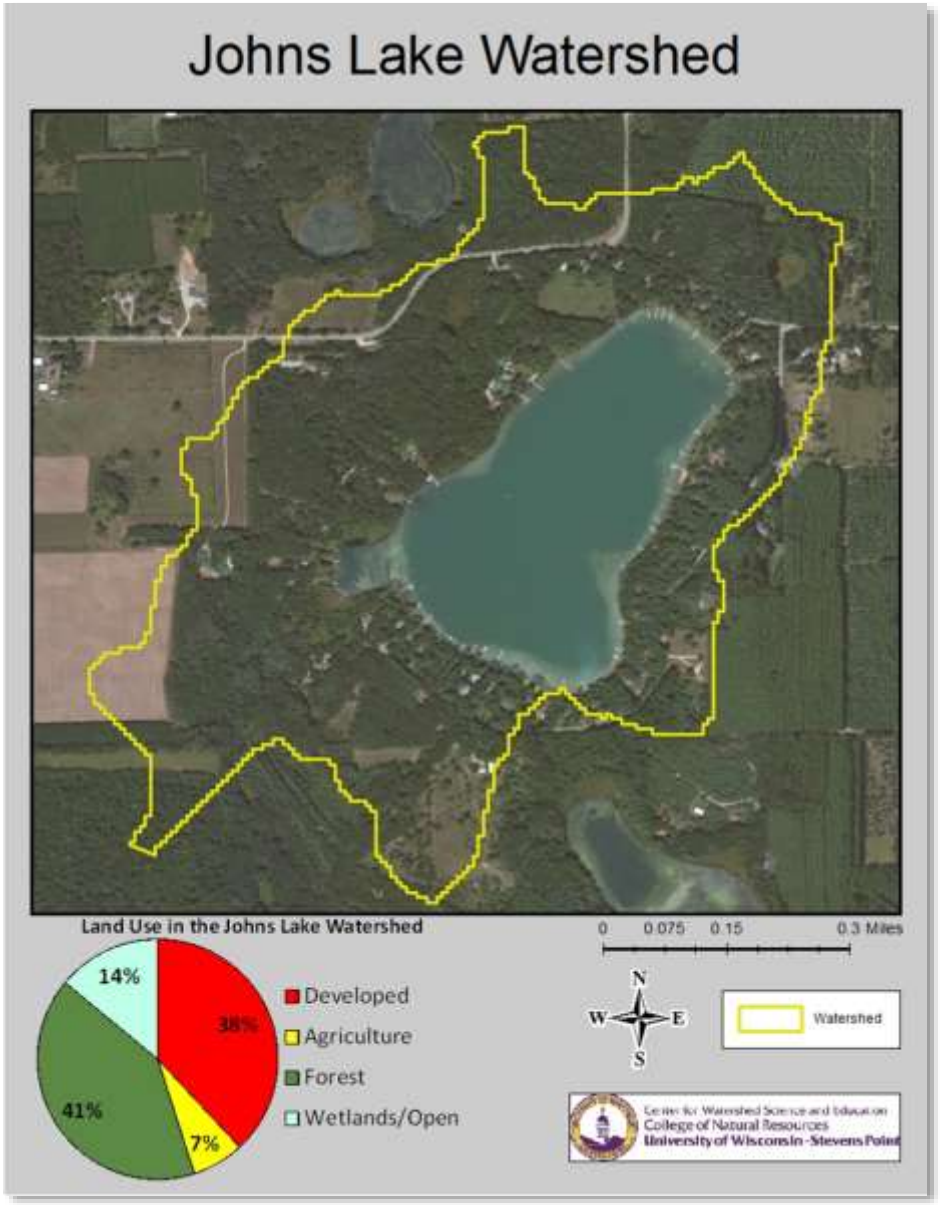


Figure 4. Surface watershed of Johns Lake.

Figure 5. Johns Lake Management District land (red)

In the mid-1990s, the Johns Lake Management District purchased approximately 17 acres of undeveloped land on the west side of the lake, including over 700 feet of shoreline (Figure 5). The cost was partially offset by federal funds requiring the land to be protected in perpetuity from development or subdivision.

Estimates of phosphorus from the landscape can help to understand the phosphorus sources to Johns 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 had the greatest percentage of phosphorus contributions from the watershed to Johns Lake. The phosphorus contributions by land use category, called phosphorus export coefficients, are shown in Table 1. The phosphorus export coefficients have been obtained from studies throughout Wisconsin (Panuska and Lillie, 1995).

Table 1. Modeling data used to estimate phosphorus inputs from land uses in the Johns Lake watershed. Low and most likely coefficients were used to calculate the range, in pounds.

Johns 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	71	**15**	6-20	**14**
Developed	0.13	150	**32**	20-66	**44**
Barren/Herbaceous/Wetland	0.09	55	**12**	5-15	**11**
Forest	0.04	161	**35**	7-13	**15**
Cultivated Agriculture	0.45	28	**6**	7-20	**16**
*Values are not exact due to rounding and conversion					

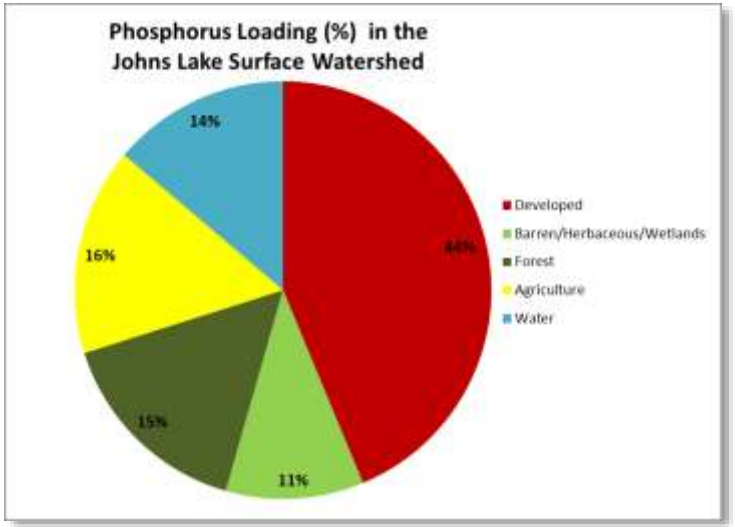


Figure 6. Phosphorus loading to Johns Lake from the surface watershed.

Guiding Vision for Johns Lake's Watershed

Land within the Johns Lake watershed will be managed in a way that supports clean water and a healthy lake.

Goal 8. Explore and utilize resources for healthy lake management.

Objective 8.1. Support healthy land management activities around Johns 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.	JLMD	WCLCD NRCS	Ongoing
Continue to use WCLCD as a resource for land management activities.	JLMD	WCLCD	Ongoing
Support any landowners interested in the protection of their land via a conservation program (i.e. conservation easement or purchase of development rights) by referring them to WCLCD.	JLMD	NCCT NRCS WDNR Lake Protection grants	Ongoing
Explore funding options for land purchase within the watershed for conservation, preservation, or restoration purposes.	JLMD	Wisconsin Stewardship Fund Knowles-Nelson Stewardship Fund WDNR Lake Protection grants Waushara County	Ongoing

People and the Lake

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

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

Recreation

Johns Lake is enjoyed by people who appreciate its beauty, peace and tranquility. Popular activities are fishing, swimming, canoeing and kayaking. A compromise between boating and quiet is reached with No Wake hours from 4pm to 10am. Survey respondents indicated they are satisfied with the current wake hours, but some felt a speed limit should be implemented. No significant conflicts or issues were raised. One public boat landing is located on the southern side of the lake.

Guiding Vision for Recreation

Johns Lake will be valued for its great boating and fishing opportunities, as well as swimming, paddling and relaxation.

Goal 9. Safe access/use of the lake and expectations of lake users and will be clear.

Objective 9.1. Improve signage at the boat launch and nurture an environment of compliance.

Actions	Lead person/group	Resources	Timeline
Upgrade/replace current landing signage regarding wake hours and other lake rules.	Town of Mt Morris	UWEX	2016
Post signage at public accesses emphasizing respectable use of Johns Lake and information about wake hours.	Town of Mt Morris	UWEX Lakes	As needed
Work with the Town to ensure the continuation of boat patrol on the lake, especially during busy times.	JLMD Town of Mt Morris	WC Sheriff WDNR Warden	Ongoing
Develop a neighborhood watch and Inform residents about who to contact if they observe something that should be reported to ensure public safety.	JLMD	WC Sheriff WDNR Warden	Ongoing

Communication and Organization

Many of the goals outlined in this plan focus on distributing information to lake and watershed residents and lake users in order to help them make informed decisions that will result in a healthy ecosystem in Johns 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 Johns Lake community will be connected and informed in lake stewardship.

Goal 10. Increase participation in lake stewardship.

Objective 10.1. Develop opportunities for education and outreach among full and part-time residents.

Actions	Lead person/group	Resources	Timeline
Maintain the JLMD website to provide a common source of communication.	JLMD		Ongoing
Maintain an email list of shoreland property owners and others interested in Johns Lake.	JLMD		Ongoing
Continue to distribute a welcome packet/mailing to all new shoreland property owners with basic lake stewardship information/brochures.	WCWLC	UWEX Lakes	Ongoing
Communicate updates to lake management plan and management activities to residents and users of the lake via email list and/or newsletter.	JLMD		Ongoing
Host annual meeting to discuss lake management and opportunities for shoreland property owners.	JLMD		Annually
Host gatherings to learn about topics identified in this LMP. Invite speakers or conduct demonstrations.	JLMD		

Objective 10.2. Achieve good communication with clubs, municipalities, agency staff, elected officials, other lake groups and organizations interested in Johns Lake or lake health.

Actions	Lead person/group	Resources	Timeline
Network with other lake groups in Waushara County by having a representative of Johns Lake on the WCWLC.	JLMD	UWEX	Quarterly
Network with other lakes in the state to learn lake management strategies by having a representative attend the Wisconsin Lake Convention.	JLMD	UWEX Lakes	Annually
Consider sending an individual interested in Johns Lake to the Lake Leaders Institute.	JLMD	UWEX Lakes	

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

Johns Lake will have an up-to-date and relevant lake management plan that is reviewed annually and documents all management activities and results.

Goal 11. Review plan annually and update as needed.

Objective 11.1. Communicate updates with community members and members of the District.

Actions	Lead person/group	Resources	Timeline
Review plan at annual meeting and discuss accomplishments and identification of goals/objectives/actions for upcoming year.	JLMD		Annually
Formally update this LMP every 5 years.	JLMD	WCWLC WC UWEX	2019
Share updates with partners including staff from the Town, County and WDNR.	JLMD		As needed

Governance

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

Lake Management Plan Approval

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

Lake Assistance

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

Lake Regulations

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

Comprehensive Plans

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

Process for Inclusion in the Municipal Comprehensive Plan

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

Process for Inclusion in the County Comprehensive Plan

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

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

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

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

Use of the Comprehensive Plan

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

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

References

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Turyk, Nancy, 2015. Healthy Land = Healthy Water. Presentation given at the Mountain View Community Center on July 10, 2015.

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

Appendices

Appendix A. Waushara County Lakes Information Directory

Algae - Blue-Green

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

Contact: Wisconsin Department of Health Services
1 West Wilson Street, Madison, WI 53703
Phone: 608-267-3242
Website:
http://www.dhs.wisconsin.gov/eh/bluegreenalgae/contactus.htm

Aquatic Invasive Species/Clean Boats Clean Water

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

Aquatic Plant Management (Native and Invasive)

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

Aquatic Plant Identification

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

Contact: Dr. Emmet Judziewicz
UWSP Freckmann Herbarium
TNR 301, 800 Reserve St., Stevens Point, WI 54481
Phone: 715-346-4248
E-mail: ejudziew@uwsp.edu

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

Aquatic Plant Surveys/Management

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

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

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

Boat Landings, Signage, Permissions (County)

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

Boat Landings (State)

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

Boat Landings (Town)

Contact the clerk for the specific town/village in which the boat landing is located.

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

Conservation Easements

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

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

Contact: Patrick Sorge
Wisconsin Department of Natural Resources
PO Box 4001, Eau Claire, WI 54702
Phone: 715-839-3794
E-mail: Patrick.Sorge@wisconsin.gov

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

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

Critical Habitat and Sensitive Areas

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

Dams

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

Fertilizers/Soil Testing

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

Fisheries Biologist (management, habitat)

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

Frog Monitoring—Citizen Based

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

Grants

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

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

Groundwater Quality

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

Groundwater Levels/Quantity

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

Contact: George Kraft
UWSP Center for Watershed Science & Education
TNR 224, 800 Reserve St., Stevens Point, WI 54481
Phone: 715-346-2984
E-mail: george.kraft@uwsp.edu

Groundwater Levels/Quantity (cont'd)

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

Informational Packets

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

Lake Groups – Friends, Associations, Districts

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

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

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

Contact: Susan Tesarik
Wisconsin Lakes
4513 Vernon Blvd., Suite 101, Madison, WI 53705
Phone: 1-800-542-5253
E-mail: lakeinfo@wisconsinlakes.org
Website: http://wisconsinlakes.org/

Lake Levels

See: Groundwater

Lake-Related Law Enforcement (no-wake, transporting invasives, etc.)

Contact: Ben Mott
State Conservation Warden
Wisconsin Department of Natural Resources
427 E. Tower Drive, Suite 100, Wautoma, WI 54982
Phone: 920-896-3383
Website: http://www.wigamewarden.com/

Land Use Plans and Zoning Ordinances

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

Contact: UWSP Center for Land Use Education
TNR 208, 800 Reserve St., Stevens Point, WI 54481
Phone: 715-346-3783
E-mail: Center.for.Land.Use.Education@uwsp.edu
Website: http://www.uwsp.edu/cnr/landcenter/

Nutrient Management Plans

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

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

Parks (County)

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

Purchase of Development Rights

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

Purchase of Land

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

Rain Barrels – Order

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

Rain Gardens and Stormwater Runoff

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

Septic Systems/Onsite Waste

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

Shoreland Management

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

Shoreland Vegetation

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

Shoreland Zoning Ordinances

See: Land Use Plans and Zoning Ordinances

Soil Fertility Testing

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

Water Quality Monitoring

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

Water Quality Problems

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

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

Wetlands

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

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

Wetland Inventory

Contact: Dr. Emmet Judziewicz
UWSP Freckmann Herbarium
TNR 301, 800 Reserve St., Stevens Point, WI 54481
Phone: 715-346-4248
E-mail: ejudziew@uwsp.edu

Woody Habitat

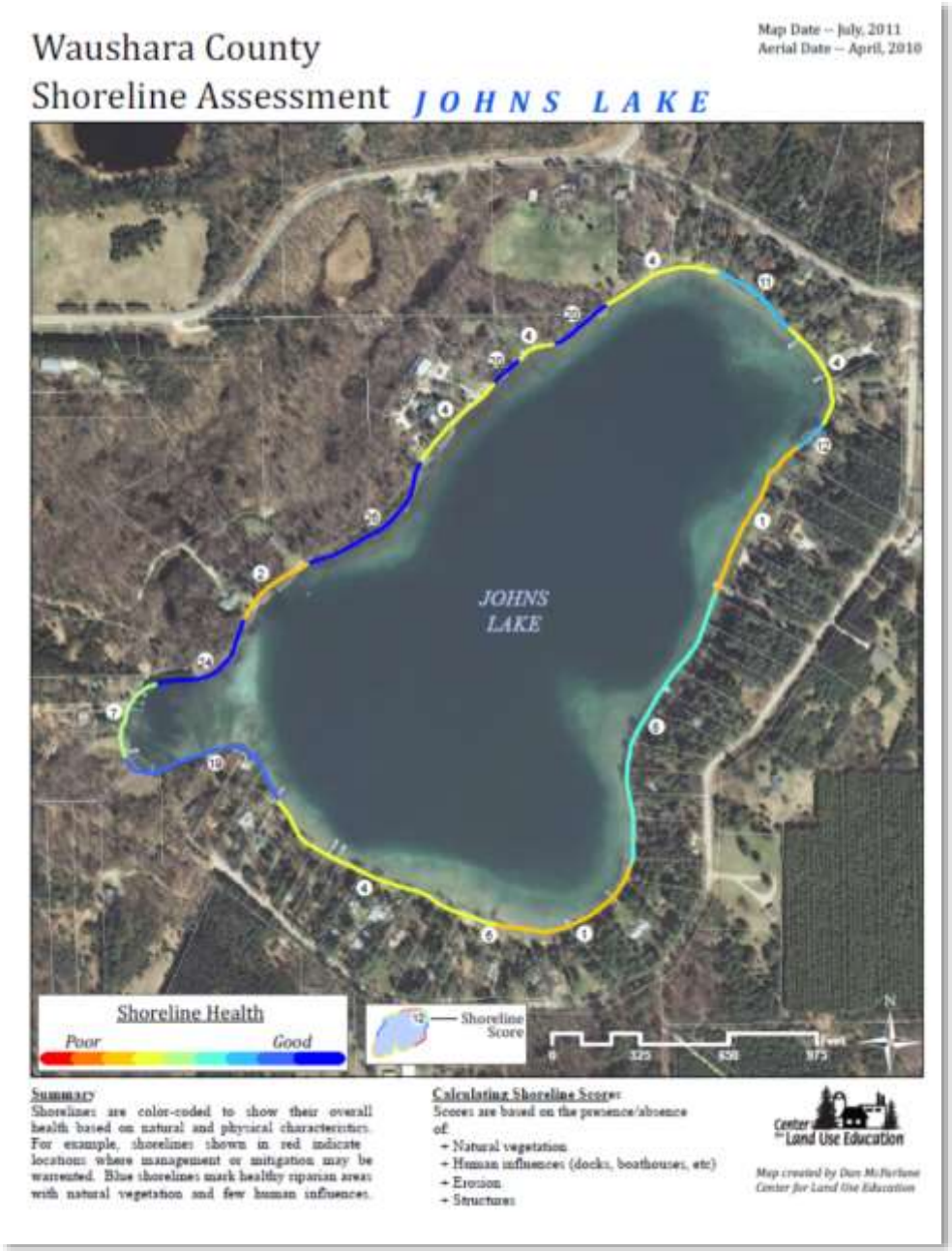
Contact: Dave Bartz
Wisconsin Department of Natural Resources
Phone: 608-635-4989
Address: Hwy 22N Box 430, Montello, WI 53949
E-mail: David.Bartz@wisconsin.gov

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

Appendix B. Shoreland Survey – 2011

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 Johns Lake are displayed 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.



Appendix C. Rapid Response Plan

SURVEY/MONITOR

1. Learn how to survey/monitor the lake.	**Contacts:** **Water Resource Management Specialist** Wisconsin Department of Natural Resources Phone: 920-424-2104 E-Mail: TedM.Johnson@wisconsin.gov **Regional Aquatic Invasive Species (AIS) Coordinator** Golden Sands RC&D 1100 Main St., Suite #150 Stevens Point, WI 54481 Phone: 715-343-6278 E-Mail: info@goldensandsrcd.org
2. Survey/monitor the lake monthly/seasonally/annually.	If you find a suspected invasive species, report it as soon as possible using the procedure below.

REPORTING A SUSPECTED INVASIVE SPECIES

1. Collect specimens or take photos. Regardless of the method used, provide as much information as possible. Try to include flowers, seeds or fruit, buds, full leaves, stems, roots and other distinctive features. In photos, place a coin, pencil or ruler for scale. Deliver or send specimen ASAP.	Collect, press and dry a complete sample. This method is best because a plant expert can then examine the specimen. **-OR-** Collect a fresh sample. Enclose in a plastic bag with a moist paper towel and refrigerate. **-OR-** Take detailed photos (digital or film).
2. Note the location where the specimen was found. If possible, give the exact geographic location using a GPS (global positioning system) unit, topographic map, or the Wisconsin Gazetteer map book. If using a map, include a photocopy with a dot showing the plant's location. You can use TopoZone.com to find the precise location on a digital topographic map. Click the cursor on the exact collection site and note the coordinates (choose UTM or Latitude/Longitude).	Provide one or more of the following: • Latitude & Longitude • UTM (Universal Transverse Mercator) coordinates • County, Township, Range, Section, Part-section • Precise written site description, noting nearest city & road names, landmarks, local topography

3. Gather information to aid in positive species identification.	• Collection date and county • Your name, address, phone, email • Exact location (Latitude/Longitude or UTM preferred, or Township/Range/Section) • Plant name (common or scientific) • Land ownership (if known) • Population description (estimated number of plants and area covered) • Habitat type(s) where found (forest, field, prairie, wetland, open water)
4. Mail or bring specimens and information to any of the following locations: Digital photos may be emailed.	**Wisconsin Dept. Natural Resources** 427 E. Tower Drive, Suite 100 Wautoma, WI 54982 Phone: (920) 787-4686 **Regional AIS Coordinator** Golden Sands RC&D 1100 Main St., Suite #150 Stevens Point, WI 54481 Phone: 715-343-6214 E-Mail : info@goldensandsrcd.org **UW-Stevens Point Herbarium** 301 Trainer Natural Resources Building 800 Reserve Street Stevens Point, WI 54481 Phone: 715-346-4248 E-Mail: ejudziew@uwsp.edu **Wisconsin Invasive Plants Reporting & Prevention Project** Herbarium-UW-Madison 430 Lincoln Drive Madison, WI 53706 Phone: (608) 267-7612 E-Mail: invasiveplants@mailplus.wisc.edu
5. Once the specimen is dropped off or sent for positive identification, be sure to contact:	**Regional AIS Coordinator** Golden Sands RC&D 1100 Main St., Suite #150 Stevens Point, WI 54481 Phone: 715-343-6214 E-Mail : info@goldensandsrcd.org

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

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

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

  Town of: Mount Morris

- **The Lake District** in which the waterbody is located.
  Contact: Ted Miller
  Email: tdmiller@charter.net

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

- **Local Residents**

- **Johns Lake Management District**

If an invasive species is confirmed the secretary of the Johns Lake Management District will make the following public information contacts:

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

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

Appendix D. Aquatic Plants

Johns Lake aquatic plant survey summary, 2011.

	Lake Average	Statewide Average	North Central Hardwood Forests Ecoregion Average
Littoral Frequency of Occurrence (%)	98.11	74.3	76
Maximum Depth of Plant Growth (ft)	26	15.3	15.9
Species Richness (Including visuals)	12	16.8	16.2
Floristic Quality Index (FQI)	19.9	24.1	23.3

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

Scientific Name	Common Name	Coefficient of Conservatism Value (C Value)	2011 % Frequency of Occurrence
Submergent Species			
Chara	Muskgrasses	7	82.69
Najas flexilis	Slender naiad	6	40.38
Potamogeton friesii	Fries' pondweed	8	34.62
Potamogeton illinoensis	Illinois pondweed	6	33.65
Potamogeton gramineus	Variable pondweed	7	10.58
Utricularia vulgaris	Common bladderwort	7	7.69
Schoenoplectus acutus	Hardstem bulrush	6	3.85
Eleocharis acicularis	Needle spikerush	5	1.92
Myriophyllum sibiricum	Northern water-milfoil	6	1.92
Potamogeton natans	Floating-leaf pondweed	5	1.92
Elodea canadensis	Common waterweed	3	0.96

2,4-D Chemical Fact Sheet

Formulations

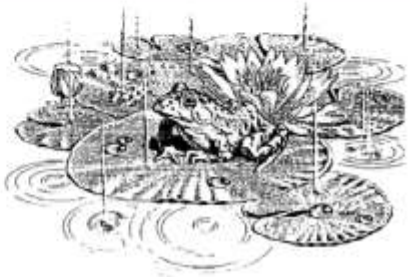
2,4-D is an herbicide that is widely used as a household weed-killer, agricultural herbicide, and aquatic herbicide. It has been in use since 1946, and was registered with the EPA in 1986 and re-reviewed in 2005. The active ingredient is 2,4-dichloro-phenoxyacetic acid. There are two types of 2,4-D used as aquatic herbicides: dimethyl amine salt and butoxyethyl ester. Both liquid and slow-release granular formulations are available. 2,4-D is sold under the trade names Aqua-Kleen, Weedar 64 and Navigate (product names are provided solely for your reference and should not be considered endorsements nor exhaustive).

Aquatic Use and Considerations

2,4-D is a widely-used herbicide that affects plant cell growth and division. It affects primarily broad-leaf plants. When the treatment occurs, the 2,4-D is absorbed into the plant and moved to the roots, stems, and leaves. Plants begin to die in a few days to a week following treatment, but can take several weeks to decompose. Treatments should be made when plants are growing.

For many years, 2,4-D has been used primarily in small-scale spot treatments. Recently, some studies have found that 2,4-D moves quickly through the water and mixes throughout the waterbody, regardless of where it is applied. Accordingly, 2,4-D has been used in Wisconsin experimentally for whole-lake treatments.

2,4-D is effective at treating the invasive Eurasian watermilfoil (*Myriophyllum spicatum*). Desirable native species that may be affected include native milfoils, coontail (*Ceratophyllum demersum*), naiads (*Najas* spp.), elodea (*Elodea canadensis*) and duckweeds (*Lemna* spp.). Lilies (*Nymphaea* spp. and *Nuphar* spp.) and bladderworts (Utricularia spp.) also can be affected.



Post-Treatment Water Use Restrictions

There are no restrictions on eating fish from treated water bodies, human drinking water or pet/livestock drinking water. Following the last registration review in 2005, the ester products require a 24-hour waiting period for swimming. Depending on the type of waterbody treated and the type of plant being watered, irrigation restrictions may apply for up to 30 days. Certain plants, such as tomatoes and peppers and newly seeded lawn, should not be watered with treated water until the concentration is less than 5 parts per billion (ppb).

Herbicide Degradation, Persistence and Trace Contaminants

The half-life of 2,4-D (the time it takes for half of the active ingredient to degrade) ranges from 12.9 to 40 days depending on water conditions. In anaerobic lab conditions, the half-life has been measured up to 333 days. After treatment, the 2,4-D concentration in the water is reduced primarily through microbial activity, off-site movement by water, or adsorption to small particles in silty water. It is slower to degrade in cold or acidic water, and appears to be slower to degrade in lakes that have not been treated with 2,4-D previously.

There are several degradation products from 2,4-D: 1,2,4-benzenetriol, 2,4-dichlorophenol, 2,4-dichloroanisole, chlorohydroquinone (CHQ), 4-chlorophenol and volatile organics.

Impacts on Fish and Other Aquatic Organisms

Toxicity of aquatic 2,4-D products vary depending on whether the formulation is an amine or an ester 2,4-D. The ester formulations are toxic to fish and some important invertebrates such as water fleas (*Daphnia*) and midges at application rates; the amine formulations are not toxic to fish or invertebrates at application rates. Loss of habitat following treatment may cause reductions in populations of invertebrates with either formulation, as with any herbicide treatment. These organisms only recolonize the treated areas as vegetation becomes re-established.

Available data indicate 2,4-D does not accumulate at significant levels in the bodies of fish that have been tested. Although fish that are exposed to 2,4-D will take up some of the chemical, the small amounts that accumulate are eliminated after exposure to 2,4-D ceases.

On an acute basis, 2,4-D is considered moderately to practically nontoxic to birds. 2,4-D is not toxic to amphibians at application rates; effects on reptiles are unknown. Studies have shown some endocrine disruption in amphibians at rates used in lake applications, and DNR is currently funding a study to investigate endocrine disruption in fish at application rates.

As with all chemical herbicide applications it is very important to read and follow all label instructions to prevent adverse environmental impacts.

Human Health

Adverse health effects can be produced by acute and chronic exposure to 2,4-D. Those who mix or apply 2,4-D need to protect their skin and eyes from contact with 2,4-D products to minimize irritation, and avoid inhaling the spray. In its consideration of exposure risks, the EPA believes no significant risks will occur to recreational users of water treated with 2,4-D.

Concerns have been raised about exposure to 2,4-D and elevated cancer risk. Some (but not all) epidemiological studies have found 2,4-D associated with a slight increase in risk of non-Hodgkin's lymphoma in high exposure populations (farmers and herbicide applicators). The studies show only a possible association that may be caused by other factors, and do not show that 2,4-D causes cancer. The EPA determined in 2005 that there is not sufficient evidence to classify 2,4-D as a human carcinogen.

The other chronic health concern with 2,4-D is the potential for endocrine disruption. There is some evidence that 2,4-D may have estrogenic activities, and that two of the break-down products of 2,4-D (4-chlorophenol and 2,4-dichloroanisole) may affect male reproductive development. The extent and implications of this are not clear and it is an area of ongoing research.

For Additional Information

Environmental Protection Agency
Office of Pesticide Programs
www.epa.gov/pesticides

Wisconsin Department of Agriculture, Trade, and Consumer Protection
http://datcp.wi.gov/Plants/Pesticides/

Wisconsin Department of Natural Resources
608-266-2621
http://dnr.wi.gov/lakes/plants/

Wisconsin Department of Health Services
http://www.dhs.wisconsin.gov/

National Pesticide Information Center
1-800-858-7378
http://npic.orst.edu/

Wisconsin Department of Natural Resources
Box 7921
Madison, WI 53707-7921

DNR PUB-WT-964 2012

General recommendations:

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

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

No Action

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

Hand Pulling

ADVANTAGES	LIMITATIONS
∗ Can be used for thinning aquatic plants around docks. ∗ Can target specific plants - with proper training. ∗ Can be effective in controlling small infestations of aquatic invasive species. ∗ No associated cost.	∗ 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	LIMITATIONS
∗ Can be used for thinning plants around docks. ∗ Can be used in deeper areas (with divers). ∗ Can target specific plants with proper training. ∗ Can be effective in controlling small infestations of aquatic invasive species. ∗ May be useful in helping to remove upper root mass of aquatic invasive species.	∗ Costs associated with hiring a diver may be comparable to chemical treatment expenses. ∗ Currently an experimental treatment – not readily available. ∗ If aquatic invasive species are not pulled properly, could worsen the problem.

Mechanical Harvesting

ADVANTAGES	LIMITATIONS
∗ Removes plant material and nutrients. ∗ Can target specific locations. ∗ Used to manage larger areas for recreational access or fishery management.	∗ Not used in water depths less than 3 feet. ∗ Some harm to aquatic organisms. ∗ Is a temporary control. ∗ Risk of introduction of new aquatic invasive species (on a hired harvester) or spread of some existing invasive species. ∗ Hired cost at least $150/hr.

Water Level Manipulation

ADVANTAGES	LIMITATIONS
∗ Controls aquatic plants in shallower, near-shore areas. ∗ Can be low cost.	∗ Requires a controlling structure on the lake. ∗ May cause undesired stress on ecosystem. ∗ Cannot be used frequently.

Milfoil Weevils

ADVANTAGES	LIMITATIONS
∗ Natural, native maintenance of native and exotic milfoils. ∗ Prefers the aquatic invasive Eurasian Watermilfoil. ∗ Some lakes may already have a native populations; need a professional stem count and assessment of shoreland health, structure of fishery, etc. ∗ Doesn't harm lake ecosystem.	∗ Require healthy shoreline habitat for overwintering. ∗ Cannot survive in areas of mechanical harvesting or herbicide application. ∗ Effectiveness highly variable between lakes (only works well for some lakes). ∗ Limited access to weevils for purchase in WI. ∗ Still considered experimental.

Chemical Treatment: Spot

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

Chemical Treatment: Lake-wide

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

Appendix E. Lake User Survey Results