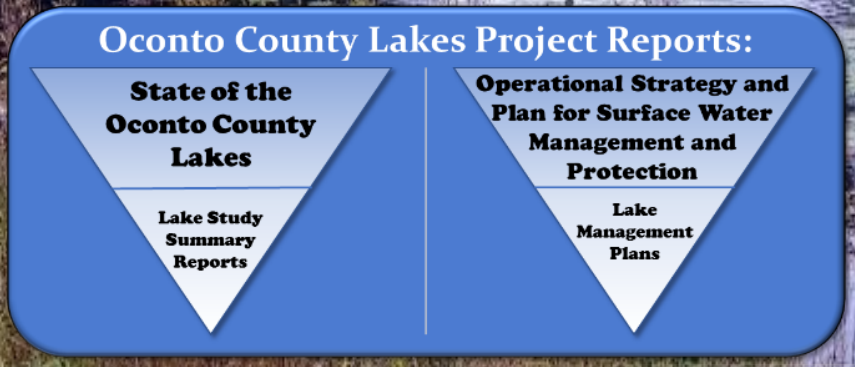
Oconto County Lakes Project

LEIGH FLOWAGE MANAGEMENT PLAN

2018



VISION

Leigh Flowage will remain the ideal Northwoods lake with clean water, friendly neighbors and great fishing.

Leigh Flowage Management Plan

The authors would like to acknowledge the support and enthusiasm of the Lee and Underwood Lake Conservation Club, Oconto County Lakes & Waterways Association, Oconto County Land and Water Conservation Department, UW Extension – Oconto County, Wisconsin Department of Natural Resources, UW-Stevens Point Water and Environmental Analysis Laboratory, landowners in the Leigh Flowage watershed, and participants in the Oconto County Lakes Project.

This plan was prepared by the Center for Watershed Science and Education at University of Wisconsin – Stevens Point.

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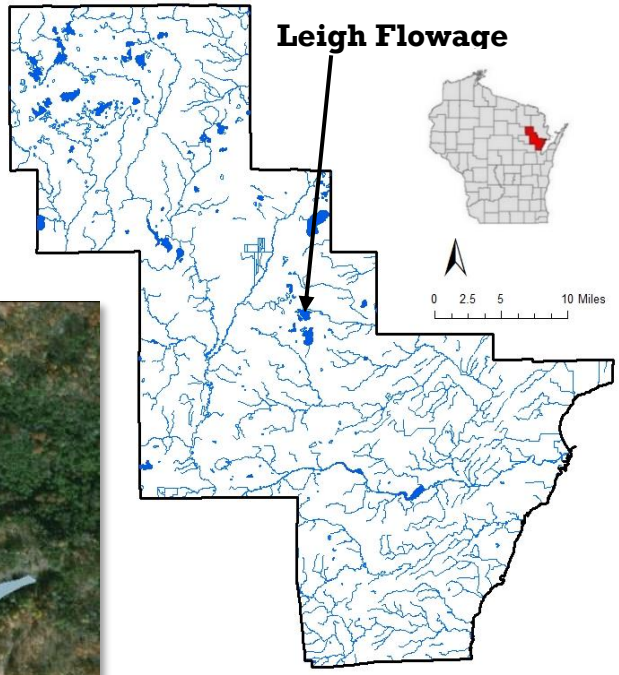
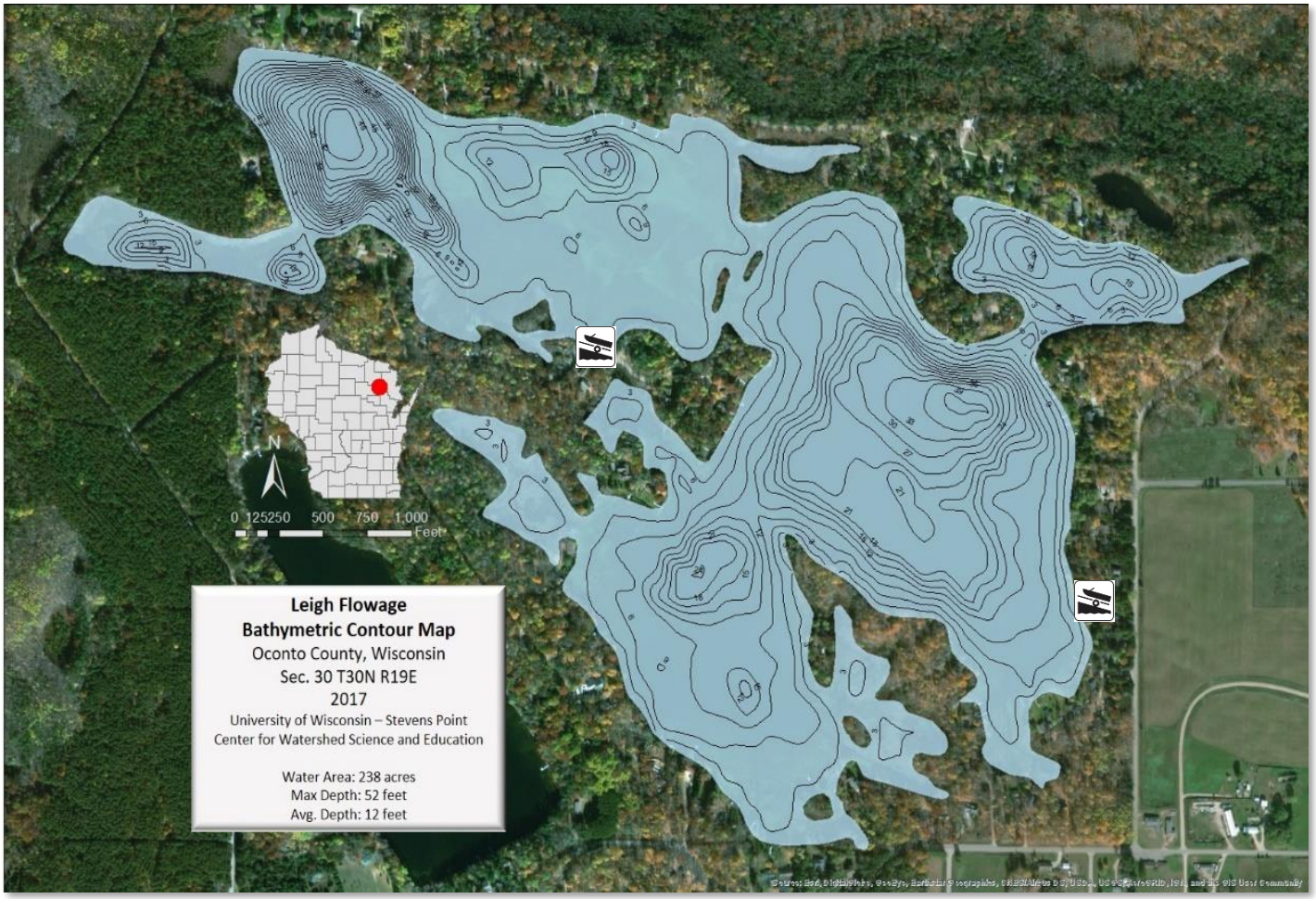
Resource	Acronym or Truncated Name
Citizen Lake Monitoring Network	CLMN
Clean Boats Clean Waters	CBCW
Lee and Underwood Lake Conservation Club	LULCC
Lumberjack Resource Conservation & Development	LRCD
Oconto County Land Conservation Dept.	OC LCD
Oconto County Board of Supervisors	OC Board
Oconto County Lakes and Waterways Association	OCLAWA
Northeast Wisconsin Land Trust	NWLT
Town of Brazeau	TOB
University of Wisconsin - Extension	UWEX
UWSP Water & Environmental Analysis Laboratory	WEAL
UWSP Center for Watershed Science and Education	CWSE
USDA Natural Resources Conservation Service	NRCS
Wisconsin Department of Natural Resources	WDNR

Background

ABOUT LEIGH FLOWAGE

Leigh Flowage, comprising three lobes known as Lee Lake, Marl Lake and Rice Lake, is located in the Town of Brazeau. This 238-acre impoundment has a maximum depth of 52 feet with very clear water. Its bottom sediments are primarily marl/muck, sand and limited gravel. Visitors have access to the lake from two public boat landings, located on Leigh Flowage's east side off Lee Lake Park Road and on Marl Lake off South Marl Lake Road, which are owned by the Town of Brazeau.





Water enters Leigh Flowage from small tributaries and wetlands and leaves via Messenger Creek on the northeast side.

What Is A Lake Management Plan?

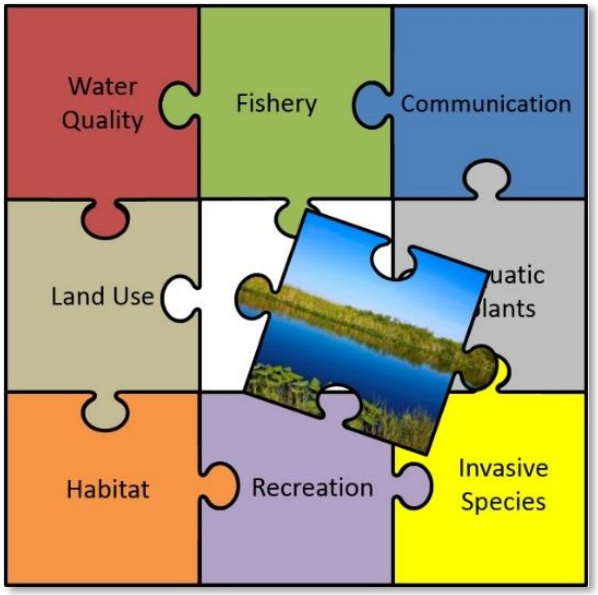
LAKE MANAGEMENT PLANS (LMP)

What is an LMP?

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. Although each lake is different, the WDNR requires that each comprehensive LMP address a specific list of topics affecting the character of the lake, whether each topic has been identified as a priority or as simply something to consider. In this way, every LMP considers the many aspects associated with lakes.

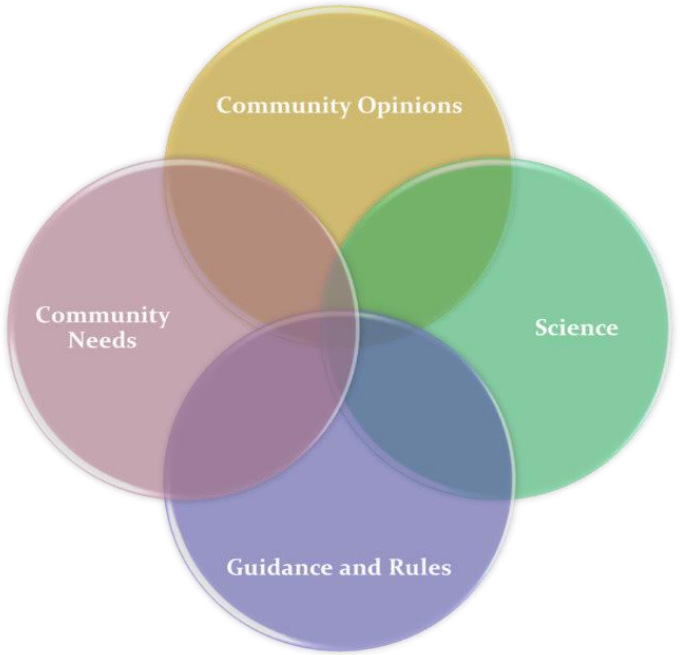
What is the purpose of this LMP?

This plan was created to ensure that Leigh Flowage is healthy now and for future generations. It was designed to learn about the Leigh Flowage and identify features important to the lake community to provide a framework for the protection and improvement of the lakes.



Implementing the content of this LMP will enable citizens and others to work together to achieve the vision for Leigh Flowage 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.



How Was This Plan Created?

ABOUT THIS PLAN

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 conditions. This was done in 2016-2017 alongside 8 other lakes as part of the Oconto County Lakes Project. The project was initiated by citizens in the Oconto County Lakes and Waterways Association who encouraged Oconto County to prioritize lake interests. This effort led to 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, Oconto County Land Conservation Department, UW Extension, Oconto County citizens and WDNR staff collected the data for use in the development of lake management plans. Sources of information used in the planning process are listed at the end of this document.

Reports from the Leigh Flowage Study and the materials associated with the planning process and reports can be found on the Oconto County website: **www.co.oconto.wi.us** and navigating to Departments>Land Conservation>County Waterways>County-wide Lake Study.

THE PLANNING PROCESS

Who created the strategic plan?

This plan is the result of a stakeholder-driven effort which involved many partners combining insight, knowledge, and expertise throughout the process. Members of the conservation club, area residents, lake users, and representatives of local municipalities gathered at a public meeting held August 24, 2018 at the Bagley Town Hall to learn from one another and make decisions about the fishery, water quality, habitat, and land management in the Leigh Flowage watershed. Technical assistance during the planning process was provided by the Oconto County Conservationist, and staff from WDNR, UWEX, and the CWSE.

How were various opinions incorporated?

Participation in the planning process was open to everyone and was encouraged by letters mailed to Leigh Flowage waterfront property owners and by press releases in local newspapers. In addition, those individuals and organizations who provided their information were provided with emails about upcoming meetings, which could be forwarded to additional contact lists. To involve and collect input from as many people as possible, including those who might not be able to attend the public meetings, an online survey was conducted. Property owners and interested lake users were notified about the survey and how to access it via direct mailings to waterfront property owners and associated lake organizations and press releases in local newspapers. The surveys could be filled out anonymously online, or paper copies were available upon request. Survey questions and responses were shared at the planning sessions and can be found in the Appendix.

How Is This Management Plan Used?

Who will use this plan?

- **Individuals:** Individuals can use this plan to learn about the lake they love and their connection to it. People living near Leigh Flowage can have the greatest influence on the lake by understanding and choosing lake-friendly options to manage their land and the lakes.
- **Lee and Underwood Lake Conservation Club:** This plan provides the club with guidance for the whole lake and lists options that can easily be prioritized. Resources and funding opportunities for lake management activities are made more available by placement of goals into the lake management plan, and the group can identify partners to help achieve their goals for the lake.
- **Neighboring lake groups, sporting and conservation clubs:** 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 Brazeau:** Municipalities can utilize the visions, objectives, and goals documented in this lake management plan when considering town-level planning or decisions within the watershed that may affect the lakes.
- **Oconto 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 Oconto County lakes, streams, wetlands, and groundwater.
- **Wisconsin Department of Natural Resources (WDNR):** Professionals working with lakes in Oconto 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. LMPs help them to identify and prioritize needs, and where to apply resources. A well thought out lake management plan increases an application's competitiveness for funding from the State.

Who can help implement this plan?

Lead persons and resources are identified under each action in this plan. These individuals and organizations are able to provide information, suggestions, or services to 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.

Management Plan Structure

GOALS FOR LEIGH FLOWAGE

The foundation of any effective strategic plan is clear identification of goals and the steps needed to achieve the goals. The selected goals should achieve the overall vision for Leigh Flowage. This plan also identifies available resources within each objective.

The topics comprise the chapters in this plan and have been grouped as follows:

In-Lake Habitat and a Healthy Lake

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

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

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

Landscapes and the Lake

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

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

Watershed—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 & Revisions—plan for maintaining a living document

Leigh Flowage Management Plan Goals

Goals for Leigh Flowage

The following goals and actions were derived from the values and concerns of citizens interested in the Leigh Flowage and members of the planning committee, as well as the known science about the lakes, their ecosystems and the landscape within their watershed.

Implementing and regularly updating the goals and actions in this plan will ensure that the vision is supported and that changes are incorporated into the plan.

LIST OF GOALS

Goal 1	**Leigh Flowage will have a healthy and abundant fish population.**
Goal 2	**Maintain a healthy and diverse aquatic plant community free of invasive species.**
Goal 3	**Sensitive areas in Leigh Flowage that provide essential habitat and/or water quality benefits will be protected.**
Goal 4	**Property owners in Leigh Flowage's watershed will understand their connection to the lake and will know about/utilize resources for healthy land management practices.**
Goal 5	**Leigh Flowage will have healthy shorelands that protect water quality and provide essential habitat.**
Goal 6	**Maintain or improve water quality in Leigh Flowage.**
Goal 7	**Lake users will be informed and respectful of Leigh Flowage.**
Goal 8	**Optimize conditions for safe and responsible recreational use.**
Goal 9	**Increase participation in lake stewardship.**
Goal 10	**Review plan annually and update as needed.**

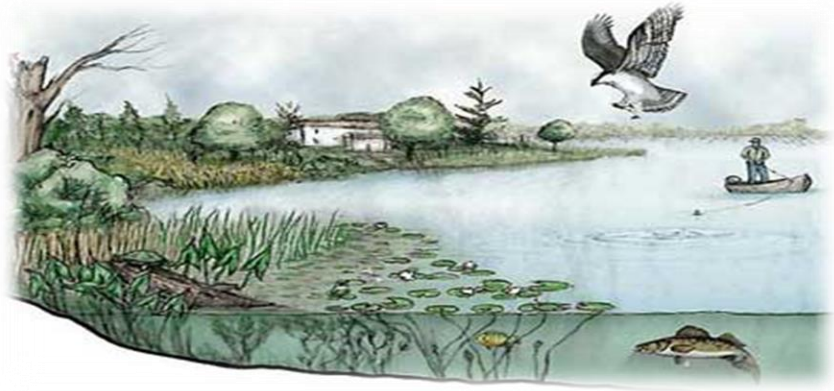
Fish Community

IN-LAKE HABITAT AND A HEALTHY LAKE

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. Many animals that live in and near the lake are only successful if their habitat needs are met.

What is lake-habitat?

Healthy lake-habitat in Leigh Flowage includes native aquatic plants and shoreland vegetation, as well as tree branches/limbs above and below the water. Habitat exists within the lake, along the shoreland, and even extends into its watershed for some wildlife species. Native vegetation (including wetlands) along the shoreline and connected to the lake provides shelter and food for waterfowl, small mammals, turtles, frogs, and fish. Native plants in and near the lake can also improve water quality and balance water quantity. Aquatic plants infuse oxygen into the water, which is essential for the fish community. 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. 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.

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.

What can affect the fishery?

Activities in and around a lake that can affect a fishery include:

- disturbances to the native aquatic plant community or substrate,
- excessive additions of nutrients or harmful chemicals,
- removal of woody habitat,
- shoreline alterations,
- shoreland erosion can cause sediment to settle onto the substrate, causing the degradation of spawning habitat.

What People Value about Leigh Flowage

Wildlife
Clear water
Smaller size lake, beauty, neighbors, fishing
Clean water, enjoying the lake

Habitat provides shelter and food for fish and wildlife.

Fish Community

Can the fishery be improved?

Habitat can be improved by allowing shoreland vegetation to grow, minimizing the removal of aquatic plants, providing fallen trees or limbs in suitable areas, and protecting wetlands and other areas of critical habitat.

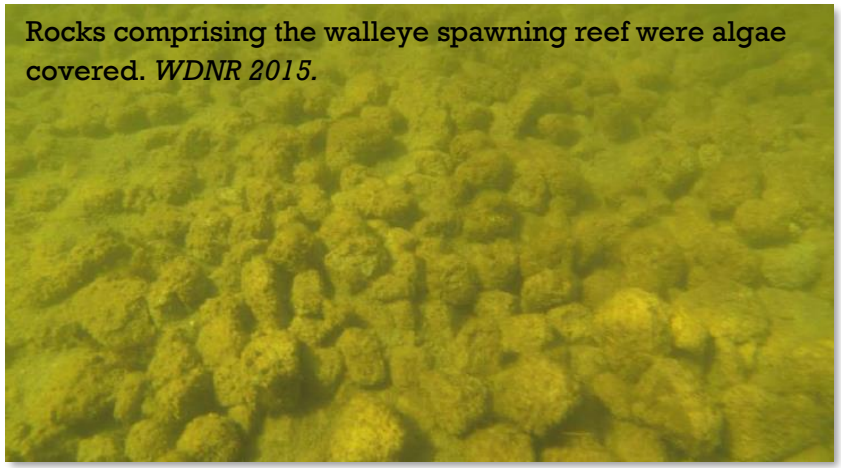
People are an important part of a sustainable fish community; their actions on the landscape and the numbers and sizes of fish taken out of the lake can influence the entire lake ecosystem. Putting appropriate fishing regulations in place and adhering to them can help to balance the fishery with healthy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

- 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.
- Restoring habitat in and around a lake can have an up-front cost, but the effects will often continue for decades.

Leigh Flowage 2015 Fish Survey Highlights

- ✓ The previous comprehensive survey was conducted in 1987.
- ✓ The five most abundant species were bluegill, largemouth bass, black crappie, rock bass, and bullhead.
- ✓ Bluegill growth was slightly above average (6.4" average) with considerably more caught in 2015 than 1987.
- ✓ Black crappie growth was above average (7.6" average).
- ✓ Largemouth bass growth rates were slightly below average with an average length of 12.4", but size structure is fair. A slot limit is not recommended at this time.
- ✓ Northern pike size structure was poor with significantly fewer caught in 2015 compared to 1987.
- ✓ Walleye average length was 16.3" with a very low estimated density of 0.3/acre. Low abundance suggests they are not reproducing. Private walleye stocking may continue to provide a minor recreational fishery.
- ✓ The next comprehensive fish survey is scheduled for 2025.



Rocks comprising the walleye spawning reef were algae covered. *WDNR 2015.*

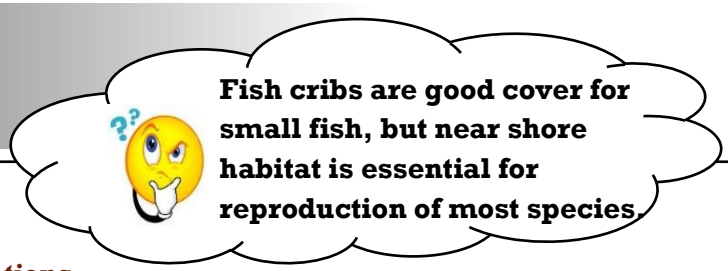
Fish Community

Several deep holes throughout the flowage as well as extensive littoral areas with submergent and emergent vegetation and abundant woody habitat provides for a very diverse fish habitat. The littoral area around Leigh Flowage is primarily sand and muck. A walleye reef was constructed along the point on the southeast portion of the flowage in the late 1990s, however, it was observed to be algae covered and does not show much evidence of effective use. 38 mudpuppies (*Necturus maculosus*), a salamander species of special concern in Wisconsin, were regularly captured in the fyke nets.

Stocking Date	Species	# Stocked	Avg. Length (in)
1973	Walleye	12000	3
1977	Walleye	11500	3
1996	Walleye	10281	1.6
1997	Walleye	11000	2.7
1998	Walleye	11000	1.2
2000	Walleye	11000	1.7
2003	Walleye	1000	6.8
2004	Walleye	10987	1.3
2005	Walleye	1700	6.5
2005	Walleye	11520	1.4
2006	Walleye	995	6.5
2006	Walleye	8082	1.4
2007	Walleye	1055	7.25
2007	Yellow Perch	800	6.5
2008	Walleye	963	7
2008	Walleye	8079	1.4
2009	Walleye	750	7
2010	Walleye	8000	1.4
2011	Walleye	850	7
2011	Yellow Perch	850	7
2012	Walleye	989	8
2012	Walleye	8085	1.5
2013	Walleye	1068	7
2014	Walleye	1113	7
2015	Walleye	1046	7.5
2016	Walleye	1050	7
2017	Walleye	724	8
2017	Yellow Perch	230	6

A fyke net set in Leigh Flowage. WDNR 2015

Fish Community



Goal 1. Leigh Flowage will have a healthy and abundant fish population.

Objective 1.1 Continue to manage for a healthy balance of game and panfish populations.

Actions	Lead person/group	Resources	Timeline
Manage the lake for bass, pike and panfish. Continue private stocking of walleye if desired to provide minor fishery.	LULCC	WDNR-Tammie Paoli	Annually
Complete a comprehensive fishery survey on a 10-year rotation. Next survey scheduled for 2025.	WDNR	WDNR-Tammie Paoli	2025
Adjust fishing regulations as needed based on results of future fish surveys.	LULCC	WDNR-Tammie Paoli	2025

Objective 1.2 Continue to enhance fish and wildlife habitat in and around the lake. At least 7 more fish stick clusters will be installed in each basin over the next 3 years.

Actions	Lead person/group	Resources	Timeline
Identify landowners for fish stick installations (at least 10% of properties with fish sticks is recommended). Trees can be sourced by identifying other landowners who need a tree removed.	LULCC	WDNR-Tammie Paoli	Winter 2019-2020
Educate and encourage landowners to leave logs, tree branches and limbs in place in the water, whenever possible.	LULCC	WDNR-Tammie Paoli UWEX-Pat Goggin	Ongoing
Continue to protect and restore shoreland areas and avoid shoreland alterations to improve fish habitat.	LULCC	Shoreland property owners	Ongoing

Mudpuppy caught in Leigh Flowage. W*DNR 2015.*

Aquatic Plant Community

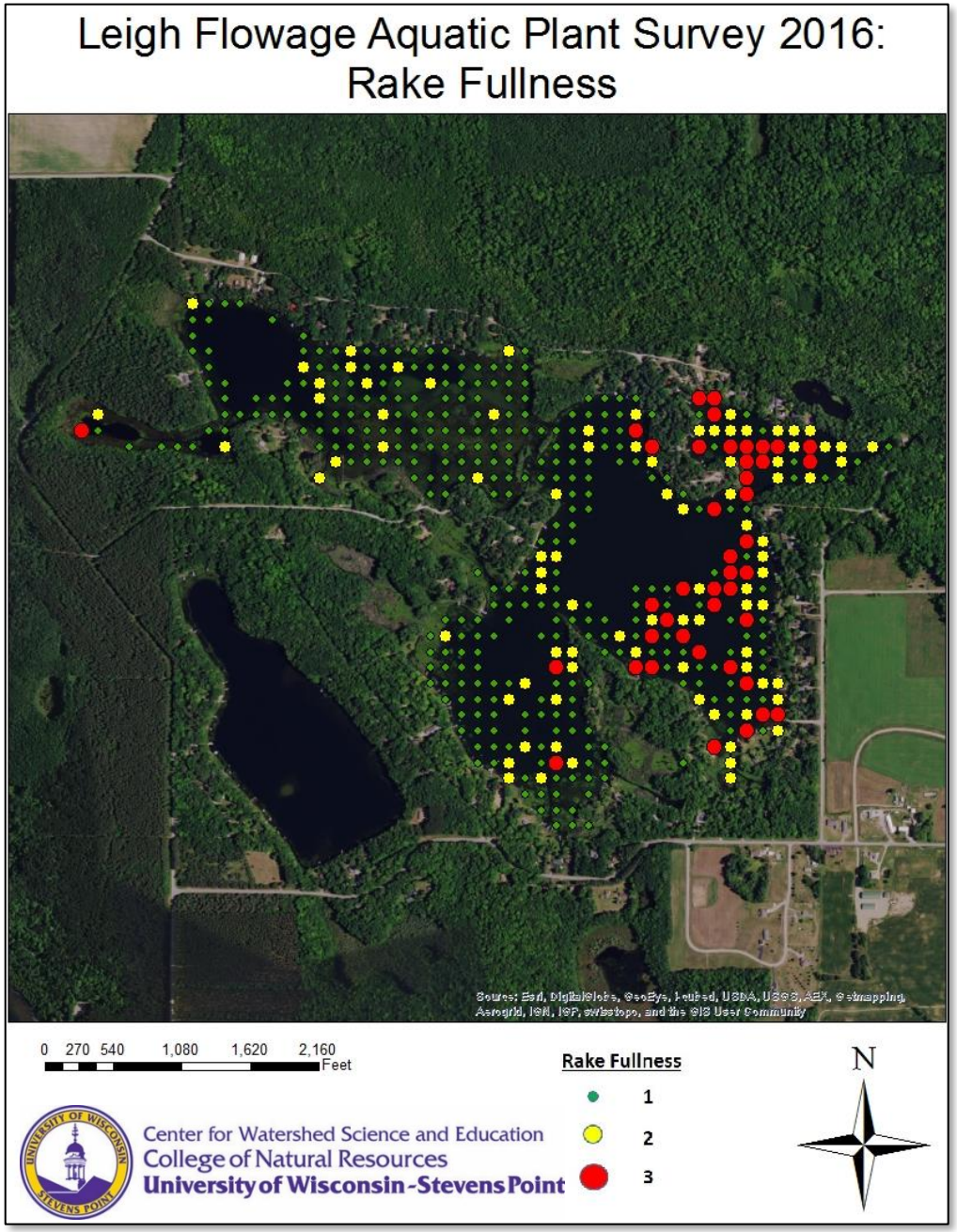
Aquatic Plants

Aquatic plants provide the forested landscape within a 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 makes the aquatic plant community more resilient and can help to prevent the establishment of non-native aquatic species. Additionally, they stabilize the bottom sediment and help filter out the suspended sediments from the water column.

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 lake. Aquatic plants also serve as indicator species for environmental stressors that could be occurring in a lake or river, such as a runoff event.

Leigh Flowage 2016 Aquatic Plant Survey Highlights

- ✓ 67% (446 of 662) of the sites visited had vegetative growth.
- ✓ Greatest depth aquatic plants were found was 29.5 feet.
- ✓ 37 species of aquatic plants were identified. This is above the North Central Hardwood average of 16.2.
- ✓ The three most dominate species were chara (62%), Slender naiad (24%), and Northern water-milfoil (9.5%).
- ✓ The Floristic Quality Index (FQI) was 37.36. The North Central Hardwood average is 23.3.
- ✓ **Common reed was the only invasive species observed.**



Aquatic Plant Community

Chara is a type of macro-algae that grows attached to muddy lake bottoms and has a musky odor. Muskgrass, as it is known, filters the lake water helps prevent the establishment of invasive species, and provides excellent habitat for small fish and other organisms.

Slender naiad has glossy, finely toothed leaves appearing as whorls near the end of stems. Also known as the water-nymph, the whole plant is eaten by waterfowl and provides shelter for small fish and insects.

Northern water-milfoil is important forage and cover for aquatic animals and an important food source for waterfowl.

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 commonly occurs on trailers, boats, equipment, and from the release of bait. In some lakes, AIS 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.

During the 2016 aquatic plant survey, **Common reed** (*Phragmites australis)* was found along the shoreline in two places. Invading moist habitats, it alters hydrology and wildlife habitat, increases fire potential and shades native species. This population was reportedly removed by volunteers in 2017.

Aquatic Plant Management in Leigh Flowage

Management strategies in Leigh Flowage were designed to achieve a balance between healthy aquatic habitat, good water quality, and recreation. A variety of management options were discussed during the development of this plan.

Management Options for Excessive Native Aquatic Plants

Management options that offer the most practical and effective approaches for managing native plants, while minimizing impacts to the lake, were identified. Depending upon conditions, the following options may be used alone or in combination with others.

Hand-pulling. No permit required.

Lakefront property owners are allowed to manually remove aquatic plants from an area no more than 30 feet wide without a permit for swimming and boat access. Any denuded lakebed is prime real estate for invasive species, however, and close monitoring is necessary to ensure no populations are established.

Mechanical Harvesting. Permit required.

While harvesting, operators should take care (by raising and lowering the harvesting bar) to minimize the impact on habitat and to reduce sediment disturbance. Harvesting in depths less than 3 feet should be avoided, keeping in mind sediment resuspension can lead to additional plant growth and algae blooms. A second pass should be made on harvested areas to remove plant fragments and floaters. **Areas with Eurasian water-milfoil (EWM), if present, should be avoided to prevent its fragmentation and spread** unless it is specifically mentioned in the plan. This is a form of integrated plant management and can be successful.

Mechanical Harvesting Plan for Navigation: Harvesting of dense plant beds that are not comprised of EWM may be conducted as needed to provide navigation. Paths from piers to open water may be cut to improve navigation and the fishery. Lanes should be no wider than 15 yards. To minimize disturbances to sediment and important fish habitat, harvesting should be avoided in water depths less than 3 feet. A depth finder on the cutter end of the harvester can aid in evaluating water depths.

Skimming, target: dense floating plant material, filamentous algae. Permit required.

This mechanical removal method would be applied when targeting uprooted aquatic plants that have accumulated in parts of Leigh Flowage. Skimming of floating plant material can be conducted by mechanical or non-mechanical means in areas where sediment and emergent plants would not be disturbed by this activity. The surface of the lake is skimmed to collect plant material for removal from the lake. When skimming with a harvester, aquatic plants are not cut.

Aquatic Plant Management Plan Review

A good aquatic plant management strategy should reduce the amount of management activity needed as time goes on. In Leigh Flowage, a series of successful strategies should lead to a balance between healthy aquatic habitat, water quality, and recreation with minimal annual management. To evaluate if management strategies are succeeding, updates to aquatic plant point-intercept surveys should be conducted at least every five years. If chemical treatments are pursued, more frequent (pre- and post-treatment) surveys are necessary. It is critical that the person doing the control action be different than the person evaluating it. This ensures that an unbiased assessment is being made. Assistance in updating surveys can be provided by the WDNR Aquatic Plant Specialist and/or consultants.

Be part of the solution!

Practices designed to deter establishment of invasive species:

- ✓ Learn to identify invasive species and routinely look for them when on the lake.
- ✓ Do not remove native aquatic vegetation beyond what is necessary to access the lake. Any denuded areas should be monitored closely for invasive species.

Aquatic Plant Community

Goal 2. Maintain a healthy and diverse aquatic plant community free of invasive species.

Objective 2.1 Minimize disturbance to native aquatic plants.

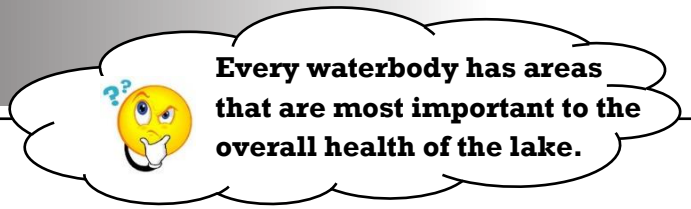
Actions	Lead person/group	Resources	Timeline
Inform property owners of the importance of native aquatic vegetation to impede the establishment of additional AIS, provide food and habitat for wildlife, and protect the shoreline via educational materials provided at the annual meeting, direct mailings and in a newsletter.	LULCC	WNDR-Brenda Nordin	Ongoing
Encourage landowners to limit plant removal to invasive species or skimming off those that have become unrooted and free-floating. If plants severely impede recreation, consider hand-pulling small areas around private docks (within WDNR guidelines). Cleared lakebed is ideal habitat for AIS to become established, so be vigilant about watching for AIS in these areas.	LULCC	WDNR-Brenda Nordin	Ongoing
Regularly monitor aquatic plant community to detect any changes in lake conditions and ensure stable populations. A point-intercept survey is recommended.	LULCC	WDNR-Brenda Nordin Consultants	Every 5-10 years.
Reduce nutrient and sediment loading to the lake by improving shoreland buffers (see **Shorelands** section) and implementing BMPs in the watershed (see **Watershed** section).	LULCC	WDNR-Brenda Nordin OCLCD	Ongoing

Objective 2.2 Protect against establishment of invasive species.

Actions	Lead person/group	Resources	Timeline
Encourage/host training, post signage at boat landing, develop coasters or placemats for area businesses, provide brochures for rental properties, etc. on how to identify and properly remove invasive species, particularly EWM. The more people who know how to recognize EWM, the more eyes there are on the lake.	LULCC	WDNR LRCD	Summer 2019
Educate lake users on importance of native aquatic plants for preventing AIS. Bring in speaker for annual meeting, mail literature to property owners, include information in a newsletter, etc.	LULCC	WDNR UWEX-Lakes LRCD	Ongoing, Summer 2019
Participate in Clean Boats Clean Waters program. Identify volunteers or consider paying someone to staff the boat launch on busy days (apply for CBCW grant or ask OCLWA to do so and share inspectors with other lakes).	LULCC	CBCW	Ongoing, in summer

If ever considering chemical spot treatment on a large bed of EWM, have a sample tested for hybrid water-milfoil (HWM) prior to application. Some HWM has been shown to have tolerance to traditional chemicals (2,4-D).	LULCC	WDNR	As needed
If a new AIS is suspected or observed, follow the guidance in **Appendix B**.	LULCC	WDNR	As needed

Critical Habitat



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 Leigh Flowage does not have an official critical habitat area designation, there are areas within the 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 examples 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.

Goal 3. Sensitive areas in Leigh Flowage that provide essential habitat and/or water quality benefits will be protected.

Objective 3.1 Identify and inform others of quality habitat areas in and around Leigh Flowage.

Actions	Lead person/group	Resources	Timeline
Request a Critical Habitat Designation from WDNR.	LULCC	WDNR-Brenda Nordin	2019
If critical habitat is designated on Leigh Flowage, communicate to property owners, visitors, and Town Board as to why these areas are important.	LULCC		TBD
Support landowners interested in preserving natural and sensitive areas around the lake.	LULCC	WDNR UWEX NWLT	As available.

LANDSCAPES AND THE LAKE

Leigh Flowage Watershed

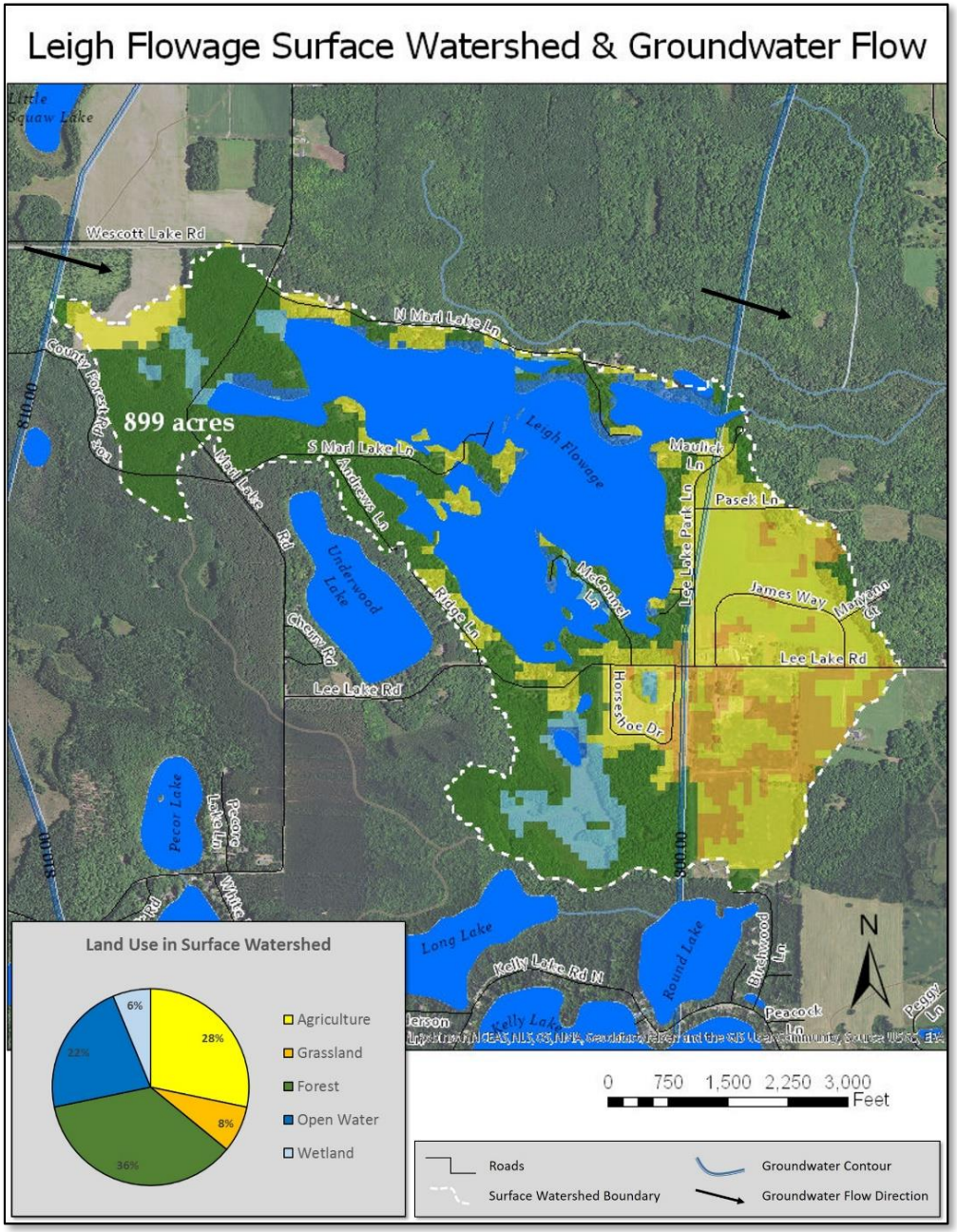
A Lake is a Reflection of its Watershed…

Understanding where a lake's water originates is important to understanding lake health. During snowmelt or rainstorms, water moves across the surface of the landscape (runoff) towards lower elevations such as lakes, streams, and wetlands. This area is called the watershed. Groundwater also feeds Leigh Flowage; the ground watershed may be slightly different than the surface watershed.

Less runoff is desirable because it allows more water to infiltrate the soils and recharge the groundwater. Groundwater then feeds the lake steadily, year-round (even during dry periods or when the lake is covered with ice). The capacity of the landscape to hold (or shed) water and filter (or contribute) particles determines the amount of erosion that may occur and the amount of groundwater feeding a lake, and, thus, the lake's water quality and quantity.

Leigh Flowage's Watershed

The Leigh Flowage watershed is 899 acres. Primary land use is forest and wetland. The lakes' shoreland is surrounded primarily by developed residential lots and forest.



Watershed

Why does land matter?

Land use and land management practices within the 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 also be sources of pollutants that can impact the lake and its inhabitants.

Soil and Erosion

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

Development on the land may result in changes to natural drainage patterns, 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.

What can be done?

Land management practices can be put into place that 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.

Be Part of the Solution!

Practices designed to reduce runoff include:

- protecting/restoring wetlands,
- installing rain gardens, swales, rain barrels, and other practices that increase infiltration
- routing drainage from pavement and roofs away from the lake
- meandering lake access paths to minimize direct flow to the lake.

Practices used to help reduce nutrients from moving across the landscape towards the lake include:

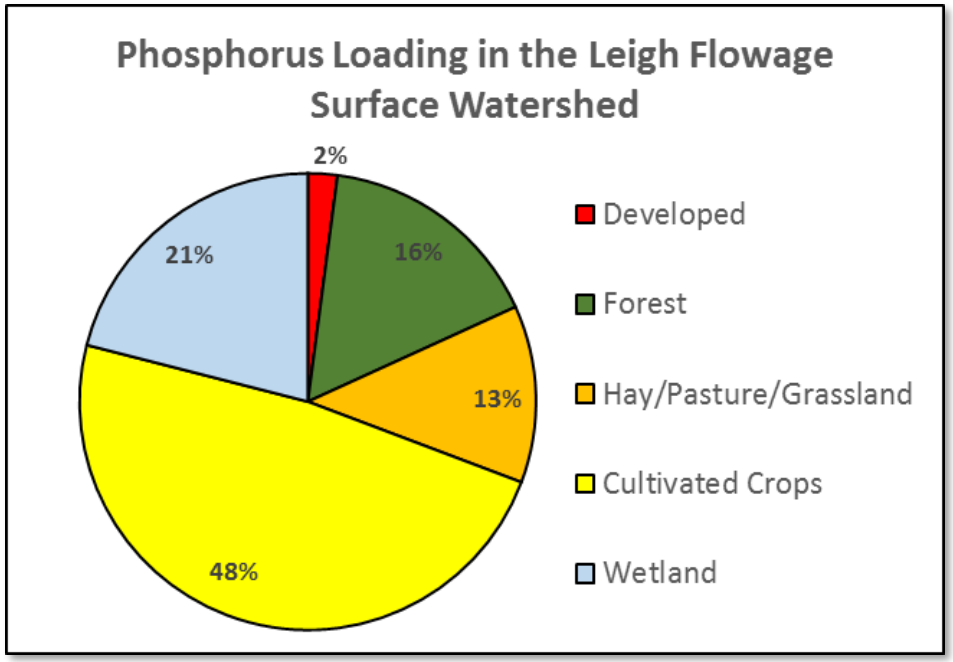
- eliminating/reducing the use of fertilizers,
- increasing the distance between the lake and a septic drainfield,
- protecting/restoring wetlands and native vegetation in the shoreland,
- controlling erosion,
- manure management and cropping practices.

Most of these activities are eligible for cost share and grant assistance!

Watershed

Phosphorus Modeling

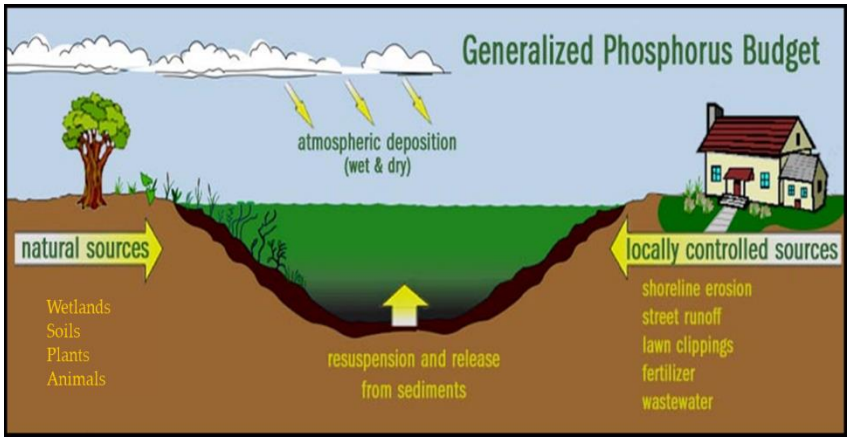
Estimates of phosphorus from the landscape can help to understand the phosphorus sources to Leigh Flowage. Land use in the surface watershed was evaluated and used to populate the Wisconsin Lakes Modeling Suite (WILMS) model. In general, each type of land use contributes different amounts of phosphorus 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. The phosphorus contributions by land use category, called phosphorus export coefficients, have been obtained from studies throughout Wisconsin (Panuska and Lillie, 1995).



Phosphorus Loading in Leigh Flowage Watershed

Based on modeling results, agriculture had the greatest percentage of phosphorus contributions from the watershed. Though forest and wetland also comprise a good chunk of the pie, efforts to reduce nutrient inputs to the lake must be focused on land uses that we have some control over such as agriculture and developed areas.

The fields along Wescott Lake Road lie directly upstream of the Flowage and drain into its tributaries. Additionally, the fields east of Lee Lake Park Road fall within the Flowage's surface watershed. It would be prudent to ensure that runoff from these areas is captured or diverted prior to flowing into the lake.



Goal 4. Property owners in Leigh Flowage's watershed will understand their connection to the lake and will know about/utilize resources for healthy land management practices.

Objective 4.1 Support healthy land management practices in the Leigh Flowage watershed to reduce sediment and nutrient loading.

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. These efforts should be focused on the fields east of Lee Lake Park Road and along Wescott Lake Road.	LULCC	OCLCD County Board Supervisors	Ongoing
Contact WDNR forester to see if there are any BMPs that could be followed by the forest owners in the watershed that would reduce forest runoff.	LULCC	WDNR-Chris Duncan	2019
Support landowners (consider financial support) interested in the protection of their land via a land conservation program (i.e. Conservation Easement, Purchase of Development Rights, or sale of land for protection).	LULCC	WDNR Lake Protection Grants Knowles-Nelson Stewardship Fund NWLT	As needed
Encourage any new developments to manage runoff on site and consider ways to minimize impacts from septic systems.	LULCC	Town of Brazeau Developers/Builders	As needed
Protect wetlands to maintain the water budget of Leigh Flowage. Any altered wetlands should be mitigated within the lake's watershed.	LULCC	WDNR	As needed
Encourage design of road and construction projects that will minimize impacts to the lake.	LULCC	Town of Brazeau OC Highway Department/WDOT	As needed

Shorelands

90% of lake life spends all or part of their life in the near shore zone.

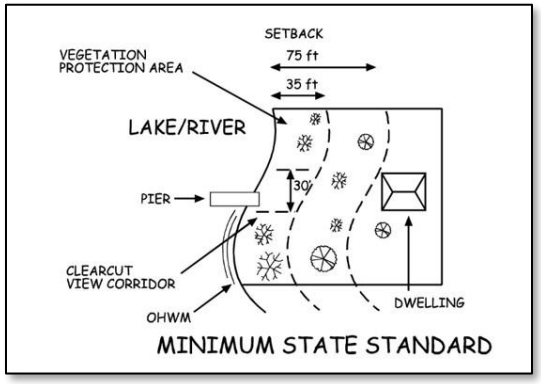
Shorelands

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.

Shoreland ordinances have been in place since the 1960s to protect and improve lake water quality and habitat. To protect our lakes, county and state shoreland ordinances (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 wide view corridor for each shoreland lot. Although some properties were grandfathered in when the ordinance was initiated in 1966, following this guidance will benefit the health of the lake and its inhabitants.

Disturbed shoreland is measured as any shoreline without a shrub or herbaceous layer at the water's edge, regardless of buffer thickness. This may be a result of mowed lawn, artificial beach, etc.



Be Part of the Solution!

Follow Healthy Shoreland Practices

- Mow Less: The simplest, most affordable way to improve your shoreland is to reduce mowing near shore. Native vegetation will re-establish itself over time.
- Leave natural shoreland vegetation in place.
- Restore native shoreland vegetation where it is lacking.
- Plant attractive native species of grasses/flowers, shrubs and trees that will add interest and beauty to your property.
- Don't use fertilizers or herbicides, they may run into the lake. Test your soil to determine if fertilizer is warranted.
- Add or leave woody habitat near the shore. Turtles, birds, and fish love it!
- Never transplant water garden plants or aquarium plants into lakes, streams, or wetlands.
- Visit **www.healthylakeswi.com** for additional resources.

State Shoreland Zoning Ordinance

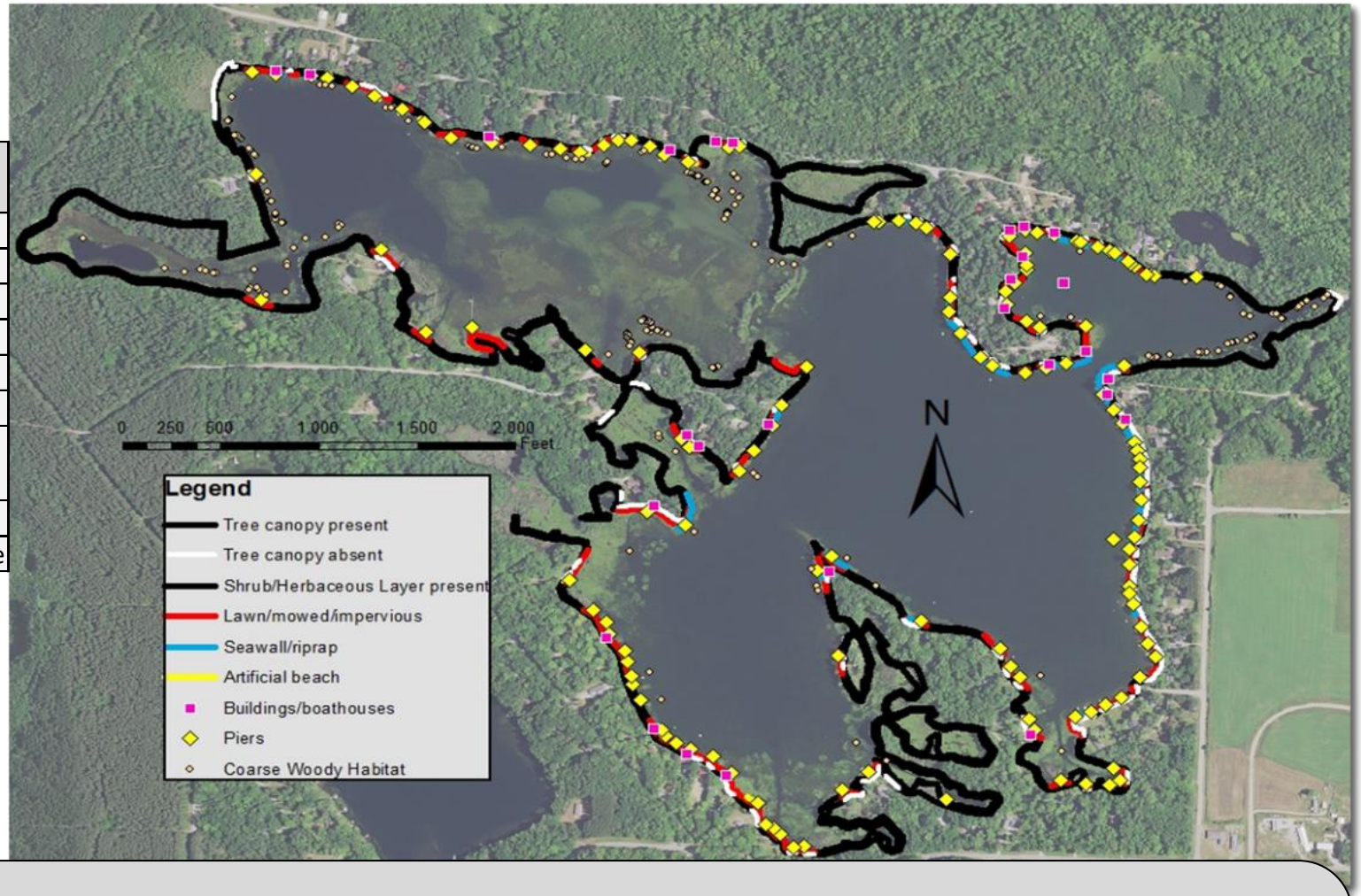
NR 115 Wisc. Adm. Code for Unincorporated Municipalities

No vegetation within 35 feet of the lake's edge shall be removed except for:

- Up to 30% of shoreline may be removed of shrubs and trees for a view corridor
- A mowed or constructed pedestrian path up to 5 feet wide to access lake

Shorelands

Modifications, Structures, Erosion	Measured Occurrence
Artificial Beach	165 ft
Rip Rap	1,212 ft
Sea Wall	1,138 ft
Impervious Surface	3,607 ft
Mowed Lawn	10,076 ft
Erosion	75 ft
Nonconforming Buildings	30
Piers	131
Coarse Woody Habitat	29 logs/mile



To better understand the health of Leigh Flowage, shorelands were evaluated in August 2017. The survey inventoried shoreland vegetation, erosion, riprap, barren ground, seawalls, structures, and docks. The majority of the 7.5 miles of shoreline is developed as homes and seasonal cottages.

- With 143 lakefront lots, 4,290 feet (11%) of disturbed shoreland is permitted. Based on the 2017 shoreland inventory, 27% (10,605 feet) of Leigh Flowage's shoreland was disturbed. Coarse woody habitat was measured at 29 logs/mile (250 logs/mile recommended).
- Leigh Flowage had average shoreland health compared to other lakes in the study. Some stretches of the lake's shorelands are in good shape, but many portions have challenges that should be addressed.

Shorelands

Leigh Flowage 2017 Shoreland Survey Results			
Total lakefront footage	**# Riparian Lots**	**Total allowable (NR115) disturbed shoreline**	**Measured disturbed shoreline**
39,396 ft	143	4,290 feet or 11%	10,605 feet or 27%

Goal 5. Leigh Flowage will have healthy shorelands that protect water quality and provide essential habitat.

Objective 5.1. Shoreland property owners will be knowledgeable about and make good decisions regarding shoreland practices that result in good water quality and habitat. 16% of the shoreline (or about 6300 feet) is in need of restoration to achieve the NR115 goal. The east side of the lake in particular has the densest development with a large agricultural field behind it draining toward the lake (this is where efforts should be focused).

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.). Include information on cost share programs.	LULCC	OCLAWA UWEX Lakes Healthy Lakes grants	Ongoing
Encourage and support shoreland owners interested in shoreland restoration (including rain gardens, diversion practices, infiltration practices, native plantings, no mow, or fish sticks). Include information on how and why to create healthy shorelands in a welcome packet to new property owners.	LULCC	UWEX Lakes OCLCD WDNR Healthy Lakes Grants	Ongoing
Encourage those interested in shoreland restorations to contact the OCLCD for available resources.	LULCC	OCLCD WDNR Healthy Lakes Grants	Ongoing
Host a speaker/demonstration: "How to restore your shoreline."	LULCC	UWEX Lakes-Pat Goggin	2019
Consider restoring and showcasing a "demonstration site" with a sign at the water's edge about shoreland restoration (perhaps at the boat launch or on one of the commercial properties).	LULCC	OCLCD UWEX Lakes-Pat Goggin WDNR Healthy Lakes Grants	2019

Explore purchase of undeveloped shoreland property.	LULCC	UWEX Lakes Knowles-Nelson Stewardship Fund	As available
Work with town to design and install a water diversion structure at the boat ramps to keep runoff from flowing directly into lake.	LULCC	TOB WDNR	2019

Water Quality

Water Quality

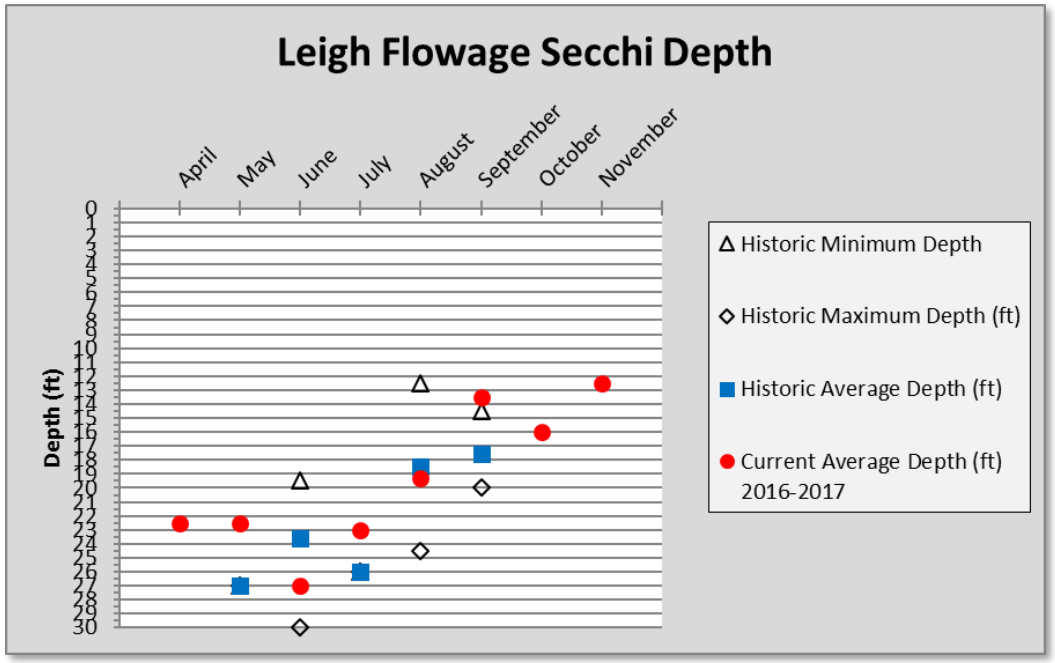
A variety of water chemistry measurements were used to characterize the water quality in Leigh Flowage. Water quality was assessed during the 2016-2017 lake study and involved a number of measures including temperature, dissolved oxygen, water chemistry, and nutrients (phosphorus and nitrogen). Nutrients are important measures of water quality in lakes because they contribute to algae and aquatic plant growth. Each of these interrelated measures plays a part in the lake's overall water quality. In addition, water quality data collected in past years was also reviewed to determine trends in Leigh Flowage's water quality.

Water Clarity

Water clarity is a measure of how deep light can penetrate (Secchi depth). Clarity is affected by water color, turbidity, and algae and helps determine where rooted aquatic plants grow. Leigh Flowage sees its highest water clarity in June, at the beginning of the growing season, then progressively declines through the rest of the summer. Current data is consistent with previous observations in the early 2000s, suggesting stable conditions with little change.

Leigh Flowage's Water Quality Summary

- ✓ Sufficient **dissolved oxygen** was present in at least the upper 25-30 feet of water at all times during the study.
- ✓ **Water clarity** ranged from 12.4-24.5 feet (considered very good), which is consistent with historic measurements.
- ✓ Low concentrations of **contaminants** were measured during the study. Atrazine was not detected.
- ✓ **Phosphorus** concentrations remained below the Wisconsin state standard of 30 ug/L for deep drainage lakes throughout the study. Inorganic nitrogen remained well below concentrations that spur algal blooms.
- ✓ Water in the lake is calcium-rich (hard), which helps reduce the impacts of phosphorus.

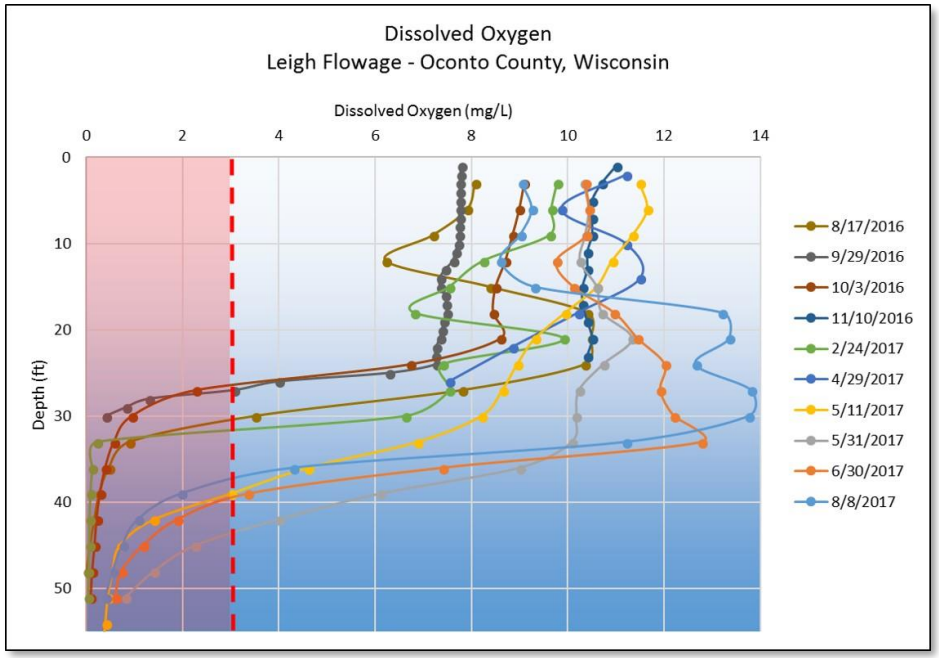


Water Quality

Dissolved Oxygen

Dissolved oxygen is an important measure because most 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, but the decomposition of excessive amounts of dead plants and algae reduces oxygen in the lake.

Leigh Flowage shows sufficient oxygen to depths of about 25 feet throughout the year. Typical of a deep lake, it stratifies between 25 and 35 feet, separating the warmer shallow water and colder deep water. Unlike many deep lakes, however, Leigh Flowage does not appear to 'turn over' (an annual or biannual event that mixes water from surface to bottom). As a result, deeper water does not get an input of new oxygen, and remains anoxic at depth. Increases in oxygen at depth (such as in the 8/8/17 profile between 15 and 30 feet) are indicative of algae blooms.



Contaminants

Chloride, sodium, potassium and atrazine concentrations are commonly used as indicators of how a lake is being impacted by human activity. The presence of these compounds where they do not naturally occur indicates sources of water contaminants. Although these elements are usually not detrimental to the aquatic ecosystem, they indicate that sources of contaminants such as road salt, fertilizer, animal waste, septic system or pesticides effluent may be entering the lake from either surface runoff or via groundwater. Measurements of contaminants from both lakes were considered low or not detected.

Be part of the solution!

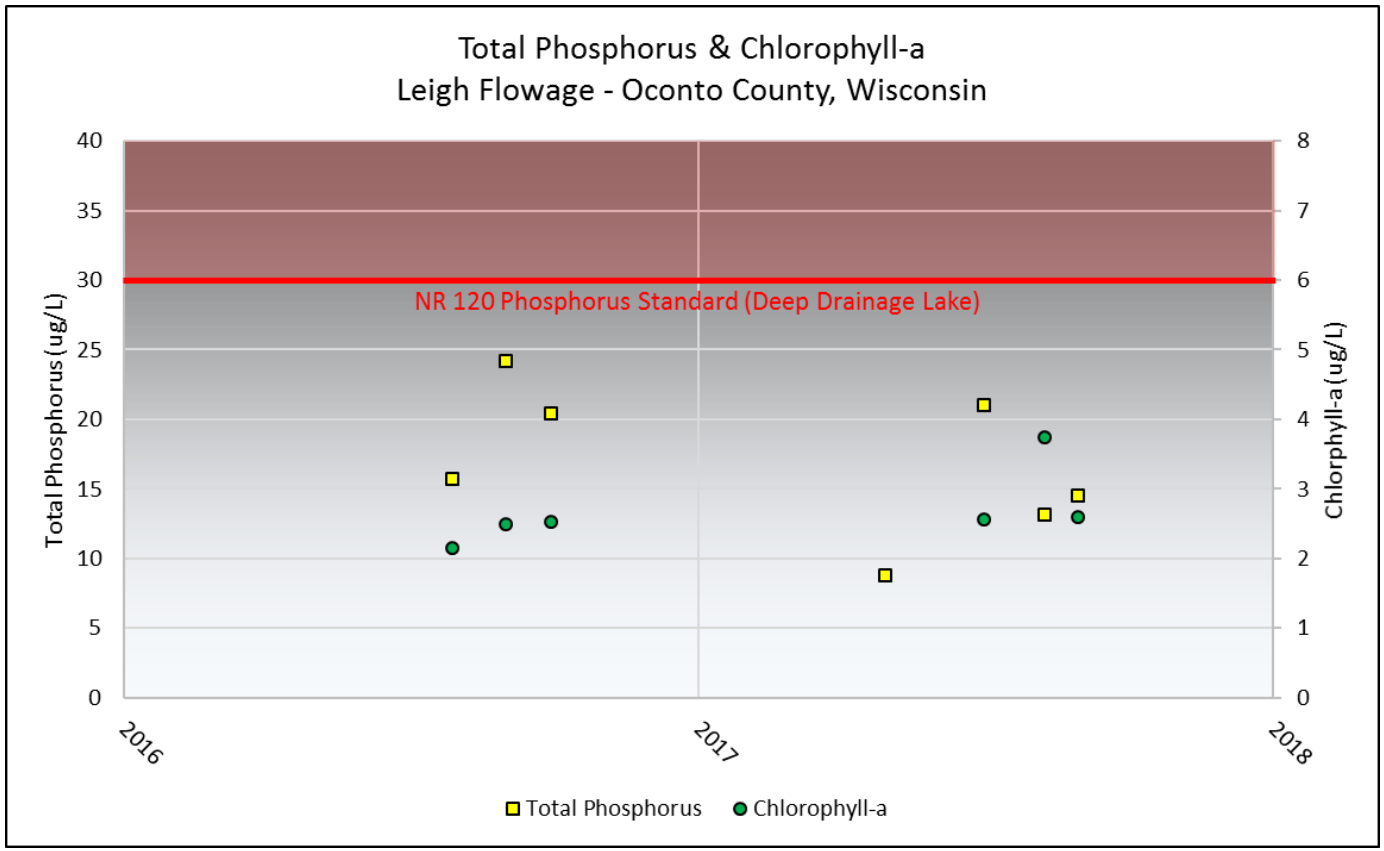
Managing nitrogen, phosphorus and soil erosion throughout the Leigh Flowage watershed is one of the keys to protecting the lake itself. Near shore activities that may increase the input of phosphorus to the lake include applying fertilizer, removing native vegetation (trees, bushes and grasses), mowing vegetation, and increasing the amount of exposed soil. Nitrogen inputs to a 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.

Water Quality

Nutrients

Phosphorus is an element that is essential in trace amounts to most living organisms, including aquatic plants and algae. Naturally-occurring sources of phosphorus include soils and wetlands, and groundwater. Common sources from human activities include soil erosion, animal waste, fertilizers, and septic systems. Although a variety of compounds are important to biological growth, phosphorus receives so much attention because it is commonly the "limiting nutrient" in many Wisconsin lakes. Due to its relatively short supply compared to other substances necessary for growth, relatively small increases in phosphorus result in significant increases in aquatic plants and algae. One pound of phosphorus can produce up to 500 pounds of algae. NR 120, Wisconsin Administrative Code lists phosphorus limits for different lake types. Deep drainage lakes such as Leigh Flowage have a standard of 30 ug/L they must stay below to remain healthy. Nutrient data for Leigh Flowage is limited to that collected during the two-year study, which in insufficient for determining any reliable trends. Monitoring of nutrients should continue to evaluate these trends so that appropriate action, if necessary, can be taken before conditions deteriorate.

Concentrations of 0.3 mg/L inorganic nitrogen in spring are sufficient to fuel algal blooms throughout the summer. Sources of inorganic nitrogen include animal waste, septic systems/waste treatment effluent, and fertilizers. The concentration in Leigh Flowage was 0.07 mg/L in 2017, well below this threshold.



Water Quality

Goal 6. Maintain or improve water quality in Leigh Flowage.

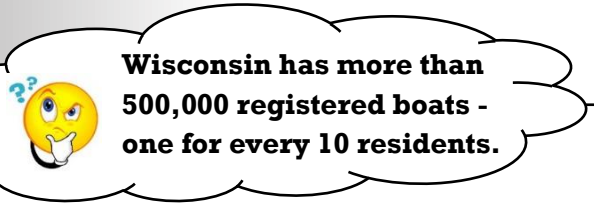
Objective 6.1 Maintain median summer phosphorus concentrations below 30 ug/L and fall inorganic nitrogen concentrations below 0.3 mg/L.

Actions	Lead person/group	Resources	Timeline
Inform others around the lake about the impact of nutrients and land management on water quality through the distribution of a club newsletter and/or hosting a guest speaker at the annual meeting.	LULCC	OCLWA WNDR UWEX Lakes	Ongoing, 2019
Refrain from the use of fertilizers. Encourage soil testing to determine if fertilizer is necessary.	LULCC	OC UWEX	Ongoing
Encourage the restoration of unmowed vegetation to slow and absorb runoff and pollutants.	LULCC	UWEX Lakes	Ongoing

Objective 6.2 Continue to build a solid water quality dataset to evaluate trends, declines or improvements over time.

Actions	Lead person/group	Resources	Timeline
Identify volunteer(s) to participate in collecting summer phosphorus and chlorophyll-a data.	LULCC	CLMN	3+ times annually in summer

Recreation



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 the 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

According to survey responses, the lakes are enjoyed for their scenery, wildlife, boating and fishing. There is one public boat launch located on the southeastern side of Leigh Flowage. Wake speeds are not allowed on Leigh Flowage between 6pm and 10am. Planning participants felt that unsafe boat operation including wake speeds too close to shore are common.

Dam

Leigh Flowage is an impoundment along in the headwaters of Messenger Creek, a tributary of the Little Peshtigo River. The dam, located on the northeast end, is owned by Oconto County and maintains a head of 21 feet.

Goal 7. Lake users will be informed and respectful of Leigh Flowage.

Objective 7.1 Foster and environment of compliance among lake users.

Actions	Lead person/group	Resources	Timeline
Work with other lake groups and towns to support a recreational officer and municipal court for enforcement of regulations, including 'No Wake' and safe boat operation.	LULCC	TOB OCLWA OC UWEX	Ongoing
Inform residents and consider posting signage of "DNR Hotline" to report unlawful behavior. (1-800-TIP-WDNR)	LULCC	WDNR	Ongoing

Create and install signage (perhaps a map) at boat landing regarding 'No Wake' zones (within 100 feet of shore). Landowners can install a swim dock up to 200 feet from shore to help protect this zone.	LULCC	TOB WDNR	2019
Continue to ensure signage is up-to-date and clear including basic information on regulations and expectations. This can convey to lake users that there is an active and watchful group on the lake.	LULCC	TOB UWEX Lakes	Ongoing

Goal 8. Optimize conditions for safe and responsible recreational use.

Objective 8.1 Maintain structures that support lake access.

Actions	Lead person/group	Resources	Timeline
Work with Town to upkeep boat ramp. This may include a water diversion structure to keep runoff from flowing directly to lake. Boat ramps in disrepair can be unhealthy to the lake if it results in spinning tires, power loading, loose sediment and debris, etc.	LULCC	TOB	2019, as needed
Maintain dam in accordance with regulatory requirements and recommendations. Maintain current water levels.	LULCC	WDNR Oconto County	Ongoing

Communication & Organization

LakeKit.net is a network of lake groups helping others to build and maintain websites.

Communication and Organization

Working together on common values will help to achieve the goals outlined in this plan. This will involve communication between individuals, the conservation club, the Town of Brazeau, Oconto County, resource managers, and elected officials. In addition, staying informed about lake and groundwater-related topics will be essential to achieving the goals laid out in this plan. See the Oconto County Lake Information Directory in the Appendices for contact information.

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

Goal 9. Increase participation in lake stewardship.

Objective 9.1 Develop opportunities and incentives for active participation in the management of Leigh Flowage.

Actions	Lead person/group	Resources	Timeline
Maintain a LULCC website to provide a common source of communication. Continue to maintain Facebook page: **www.facebook.com/LeeUnderwoodLake**	LULCC	LakeKit.net OC UWEX	Ongoing
Maintain an email list of shoreland property owners and others interested in Leigh Flowage.	LULCC	OC UWEX	Ongoing
Share minutes (or meeting notes) from annual meeting on website and/or newsletter.	LULCC		As needed
Distribute a welcome packet/mailing to all new shoreland property owners with basic lake stewardship information/brochures. These can be purchased with a WDNR Small-scale Planning grant. OCLWA could also purchase these in bulk (with grant) to distribute to members.	LULCC	OC UWEX OC Zoning Dept. OCLCD	Ongoing
Continue to communicate updates to lake management plan and management activities to residents and users of the lake via email list and/or newsletter (and to WDNR).	LULCC		Ongoing
Continue annual meetings to discuss lake management and opportunities for shoreland property owners.	LULCC		Annually
Host gatherings to learn about topics identified in this plan. Invite speakers or conduct demonstrations.	LULCC	UWEX Lakes WDNR OCLCD	As needed

Communication & Organization

Objective 9.2 Maintain good, clear communication between MLA, its residents, clubs, municipalities, agency staff, elected officials and organizations interested in Leigh Flowage.

Actions	Lead person/group	Resources	Timeline
Network with other lake groups in Oconto County by having Leigh Flowage represented at OCLWA.	LULCC	OC UWEX	Quarterly
Network with other lakes in the state to learn lake management strategies, etc. by having a representative attend the Wisconsin Lakes Convention.	LULCC	UWEX Lakes	Annually in April
Consider nominating an individual from Leigh Flowage for the Lake Leaders Institute and/or supporting individuals interested in attending the Wisconsin Lakes Conference.	LULCC	UWEX Lakes	2020

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. Partners listed in the plan should be contacted annually, and updated information complied. A list of changes/updates to the plan should be documented. To ensure that everyone is informed about changes, appropriate approval for changes should be acquired by all partners signing on to this plan.

Goal 10. Review plan annually and update as needed.

Objective 10.1 Maintain an up-to-date and relevant lake management plan and communicate updates to the lake community, Oconto County and WDNR.

Actions	Lead person/group	Resources	Timeline
Review plan at annual meeting and discuss accomplishments and identification of goals/objectives/actions for coming year.	LULCC		Annually
Formally update this plan every 5 years.	LULCC	OC UWEX UWEX Lakes WDNR	2023

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APPENDICES

Appendix A. Oconto County Lake Information Directory

Algae - Blue-Green
Contact: Brenda Nordin
Wisconsin Department of Natural Resources
Phone: 920-360-3167
E-mail: brenda.nordin@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:
www.dhs.wisconsin.gov/eh/bluegreenalgae/contactus.htm

Aquatic Invasive Species/Clean Boats Clean Water
Contact: Brenda Nordin
Wisconsin Department of Natural Resources
Phone: 920-360-3167
E-mail: brenda.nordin@wisconsin.gov
Website: http://dnr.wi.gov/topic/Invasives/

Aquatic Plant Management (Native and Invasive)

Contact: Brenda Nordin
Wisconsin Department of Natural Resources
Phone: 920-360-3167
E-mail: brenda.nordin@wisconsin.gov
Website: http://dnr.wi.gov/lakes/plants/

Aquatic Plant Identification
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: Brenda Nordin
Wisconsin Department of Natural Resources
Phone: 920-360-3167
E-mail: brenda.nordin@wisconsin.gov

Aquatic Plant Surveys/Management
Contact: Brenda Nordin
Wisconsin Department of Natural Resources
Phone: 920-360-3167
E-mail: brenda.nordin@wisconsin.gov
Website: http://dnr.wi.gov/lakes/plants/

Best Management Practices (rain gardens, shoreland buffers, agricultural practices, runoff controls)
Contact: Ken Dolata
Oconto County Land Conservation Department
410 ½ East Main Street, Lena, WI 54139
Phone: 920-834-7152
E-mail: ken.dolata@co.oconto.wi.us

Website: http://www.co.oconto.wi.us/departments/

Boat Landings, Signage, Permissions (County)
Contact: Monty Brink
Oconto County Forestry/Park/Recreation
301 Washington Street, Oconto, WI 54153
Phone: 920-834-6995
E-mail: monty.brink@co.oconto.wi.us

Website: http://www.co.oconto.wi.us/departments/

Boat Landings (State)
Contact: Tammie Paoli
Wisconsin Department of Natural Resources
101 N. Ogden Road, Peshtigo, WI 54157
Phone: 715-582-5052
E-mail: Tammie.Paoli@wisconsin.gov

Website: http://dnr.wi.gov/org/land/facilities/boataccess/

Appendices-Appendix A

Boat Landings (Town)

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

Conservation Easements

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

Website: http://gatheringwaters.org/

Contact: Brenda Nordin
Wisconsin Department of Natural Resources
Phone: 920-360-3167
E-mail: brenda.nordin@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: Northeast Wisconsin Land Trust
14 Tri-Park Way, Suite 1, Appleton, WI 54914
Phone: 920-738-7265
E-mail: newlt@newlt.org

Website: www.newlt.org

Contact: NRCS Lena Service Center
410 ½ East Main Street, Lena, WI 54139
Phone: 920-829-5406

Critical Habitat and Sensitive Areas

Contact: Brenda Nordin
Wisconsin Department of Natural Resources
Phone: 920-360-3167
E-mail: brenda.nordin@wisconsin.gov

Dams

Contact: Meg Galloway
Wisconsin Department of Natural Resources
PO Box 7921, Madison, WI 53707
Phone: 608-266-7014
E-mail: meg.galloway@wisconsin.gov

Website: http://dnr.wi.gov/org/water/wm/dsfm/dams/

Fertilizers/Soil Testing

Contact: Dale Mohr
Oconto County UW- Extension
301 Washington Street, Oconto, WI 54153
Phone: 920-835-6845
E-mail: dale.mohr@co.oconto.wi.us

Website: http://oconto.uwex.edu

Fisheries Biologist (management, habitat)

Contact: Tammie Paoli
Wisconsin Department of Natural Resources
101 N. Ogden Road, Peshtigo, WI 54157
Phone: 715-582-5017
E-mail: Christopher.Long@wisconsin.gov

Website: http://dnr.wi.gov/fish/

Frog Monitoring—Citizen Based

Contact: Andrew Badje
Wisconsin Department of Natural Resources
Phone: 608-785-9472
E-mail: Andrew.badje@wisconsin.gov

Website: WFTS@wisconsin.gov

Grants

Contact: Brenda Nordin
Wisconsin Department of Natural Resources
Phone: 920-360-3167
E-mail: brenda.nordin@wisconsin.gov

Website: http://dnr.wi.gov/Aid/Grants.html

Contact: Ken Dolata
Oconto County Land Conservation Department
410 ½ East Main Street, Lena, WI 54139
Phone: 920-834-7152
E-mail: ken.dolata@co.oconto.wi.us

Website: http://www.co.oconto.wi.us/departments/

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: Ken Dolata
Oconto County Land Conservation Department
410 ½ East Main Street, Lena, WI 54139
Phone: 920-834-7152
E-mail: ken.dolata@co.oconto.wi.us

Website: http://www.co.oconto.wi.us/departments/

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

Informational Packets

Contact: UW Extension - Lakes
TNR 224, 800 Reserve St. Stevens Point, WI 54481
Phone: 715-346-2116
E-mail: uwexlakes@uwsp.edu

Lake Groups – Friends, Associations, Districts

Contact: Dale Mohr
Oconto County UW- Extension
301 Washington Street, Oconto, WI 54153
Phone: 920-835-6845
E-mail: dale.mohr@co.oconto.wi.us

Website: http://oconto.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/

Appendices-Appendix A

Land Use Plans and Zoning Ordinances

Contact: Patrick Virtues
Oconto County Planning/Zoning/Solid Waste
301 Washington Street, Oconto, WI 54153
Phone: 920-834-6827
E-mail: Patrick.virtues@co.oconto.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: Ken Dolata
Oconto County Land Conservation Department
410 ½ East Main Street, Lena, WI 54139
Phone: 920-834-7152
E-mail: ken.dolata@co.oconto.wi.us

Website: http://www.co.oconto.wi.us/departments/

Contact: NRCS Lena Service Center
410 ½ East Main Street, Lena, WI 54139
Phone: 920-829-5406

Parks (County)

Contact: Monty Brink
Oconto County Forestry/Park/Recreation
301 Washington Street, Oconto, WI 54153
Phone: 920-834-6995
E-mail: monty.brink@co.oconto.wi.us

Website: http://www.co.oconto.wi.us/departments/

Purchase of Development Rights

Contact: Northeast Wisconsin Land Trust
14 Tri-Park Way, Suite 1, Appleton, WI 54914
Phone: 920-738-7265
E-mail: newlt@newlt.org

Website: www.newlt.org

Purchase of Land

Contact: Brenda Nordin
Wisconsin Department of Natural Resources
Phone: 920-360-3167
E-mail: brenda.nordin@wisconsin.gov

Website: http://dnr.wi.gov/topic/stewardship/

Rain Gardens and Stormwater Runoff

Contact: Ken Dolata
Oconto County Land Conservation Department
410 ½ East Main Street, Lena, WI 54139
Phone: 920-834-7152
E-mail: ken.dolata@co.oconto.wi.us

Website: http://www.co.oconto.wi.us/departments/

Septic Systems/Onsite Waste

Contact: Patrick Virtues
Oconto County Planning/Zoning/Solid Waste
301 Washington Street, Oconto, WI 54153
Phone: 920-834-6827
E-mail: Patrick.virtues@co.oconto.wi.us

Website: http://www.co.waushara.wi.us/zoning.htm

Shoreland Management

Contact: Ken Dolata
Oconto County Land Conservation Department
410 ½ East Main Street, Lena, WI 54139
Phone: 920-834-7152
E-mail: ken.dolata@co.oconto.wi.us

Website: http://www.co.oconto.wi.us/departments/

Shoreland Vegetation

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

Shoreland Zoning Ordinances

See: Land Use Plans and Zoning Ordinances

Soil Fertility Testing

Contact: Dale Mohr
Oconto County UW- Extension
301 Washington Street, Oconto, WI 54153
Phone: 920-835-6845
E-mail: dale.mohr@co.oconto.wi.us
Website: http://oconto.uwex.edu

Water Quality Monitoring

Contact: Brenda Nordin
Wisconsin Department of Natural Resources
Phone: 920-360-3167
E-mail: brenda.nordin@wisconsin.gov

Water Quality Problems

Contact: Brenda Nordin
Wisconsin Department of Natural Resources
Phone: 920-360-3167
E-mail: brenda.nordin@wisconsin.gov

Wetlands

Contact: Jason Fleener
Wisconsin Department of Natural Resources
GEF2 DNR Central Office, Madison, WI 53707
Phone: 608-266-7408
E-mail: Jason.fleener@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: Tammie Paoli
Wisconsin Department of Natural Resources
101 N. Ogden Road, Peshtigo, WI 54157
Phone: 715-582-5052
E-mail: Tammie.Paoli@wisconsin.gov

Appendix B. Rapid Response Plan

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.

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 (lat/long or UTM, Township/Range)
- Plant name
- Land ownership (if known/applicable)
- Population description (estimated # plants, area covered)
- Habitat type 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
2984 Shawano Avenue
Green Bay, WI 54313
Phone: (920) 662-5100

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

Appendix C. Lake User Survey Results