2016

Lake Huron, Waushara County, Wisconsin
Lake Management Plan

Prepared in 2016 by staff from the Center for Watershed Science and Education
University of Wisconsin-Stevens Point

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

Lake Management Plan for Lake Huron. Waushara County, Wisconsin

The Lake Huron Management Plan was developed with input from residents and lake users at a series of four public planning sessions held at the Waushara County Courthouse in Wautoma, Wisconsin from December 2015 to March 2016. 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 Huron Lake Association on: July 31, 2016.
Date

The plan was accepted by the Town of Oasis on: March 14, 2017.
Date

The plan was accepted by Waushara County on: 11/02/2016.
Date

The plan was approved by the Wisconsin Department of Natural Resources on: 03/14/2017.
Date

Any changes, updates or revisions to this document after the last date on this page do not reflect contributions made or approved by University of Wisconsin-Stevens Point.

A special thanks to all who helped to create the 2016 Lake Huron Management Plan and provided guidance during the plan's development.

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Waushara County Watershed Lakes Council
Waushara County Staff and Citizens
Wisconsin Department of Natural Resources Professionals, Ted Johnson
Wisconsin Department of Natural Resources Lake Protection Grant Program

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Overarching Vision for Lake Huron

Lake Huron will maintain its tradition of clean water, abundant wildlife and quiet, no wake setting; a serene refuge for family gatherings, superb fishing, and enjoyment of nature.

Introduction

Lake Huron is located in the Township of Oasis, southeast of Plainfield and north of Highway 73, with one public boat launch located on its northwestern side. It is a 41-acre seepage lake with surface runoff and groundwater contributing most of its water. The maximum depth in Lake Huron is 46 feet (though closer to 35 feet in recent years). The lakebed has a moderate slope; its bottom sediments are mostly muck, with some sand along the northern and western edges of the lake.

In 2015, community members around Lake Huron came together in partnership with local professionals and experts to develop this lake management plan (LMP). The purpose of this plan is to provide a framework for the protection and improvement of Lake Huron. Implementing the content of this LMP will enable citizens and other supporters to achieve the vision for Lake Huron now and in the years to come. The plan was developed by community members who learned about the lake and identified features important to the Lake Huron community to help guide the fate of the lake. It is a dynamic document that identifies goals and action items for the purpose of maintaining, protecting and/or creating desired conditions in a lake and identifies steps to correct past problems, improve on current conditions, and provide guidance for future boards, lake users, and technical experts. Because many entities are involved in lake and land management, it can be challenging to navigate the roles, partnerships and resources that are available; the planning process and content of this plan have been designed to identify where some key assistance exists. The actions identified in this LMP can serve as a gateway for obtaining grant funding and other resources to help implement activities outlined in the plan.

Who can use the Lake Huron 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 Lake Huron can have the greatest influence on the lake by understanding and choosing lake-friendly options to manage their land and the lake.
- **Huron Lake Association:** This plan provides the Association 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 Association to realize its accomplishments. Resources and funding opportunities for Association management activities are made more available by placement of goals into the lake management plan, and the Association can identify partners to help achieve their goals for Lake Huron.
- **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 Oasis**: The Town can utilize the visions, wishes, and goals documented in this lake management plan when considering town-level management planning or decisions within the watershed that may affect the lake.
- **Waushara County:** County professionals will better know how to identify needs, provide support, base decisions, and allocate resources to assist in lake-related efforts documented in this plan. This plan can also inform county board supervisors in decisions related to Waushara County lakes, streams, wetlands, and groundwater.
- **Wisconsin Department of Natural Resources**: Professionals working with lakes in Waushara County can use this plan as guidance for management activities and decisions related to the management of the resource, including the fishery, and invasive species. Lake management plans help the Wisconsin Department of Natural Resources to identify and prioritize needs within Wisconsin's lake community, and decide where to apply resources and funding. A well thought out lake management plan increases an application's competitiveness for funding from the State – if multiple Waushara County lakes have similar goals in their lake management plans, they can join together when seeking grant support to increase competitiveness for statewide resources.

Background

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

The Planning Process

The planning process included a series of four public planning sessions held between December 2015 and March 2016 at the Waushara County Courthouse. The Lake Huron 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).

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

Participation in the planning process was open to everyone and was encouraged by letters mailed to Lake Huron waterfront property owners and by press releases in local newspapers. In addition, participants were sent emails about upcoming meetings which could be forwarded to others. In order to involve and collect input from as many people as possible, a 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.

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

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

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, Huron Lake Association

List of Goals

Goal 1. Water levels in Lake Huron will represent natural fluctuations.

Goal 2. Water quality in Lake Huron will improve by minimizing nutrient loading through improving land management practices near the lake and in its watershed.

Goal 3. Create a robust dataset for Lake Huron to monitor trends, declines and improvements over time.

Goal 4. Protect and/or restore healthy stable shoreland habitat near and around Lake Huron.

Goal 5. Watershed and shoreland property owners will know about and utilize resources for healthy land management practices.

Goal 6. Improve the quality of the fishery in Lake Huron through sustainable management practices.

Goal 7. Protect native plants in and around Lake Huron.

Goal 8. Eliminate aquatic invasive species (AIS) from Lake Huron.

Goal 9. Identify and inform others of quality habitat in and near Lake Huron.

Goal 10. Users of Lake Huron will appreciate and respect the lake and recreate responsibly.

Goal 11. Increase participation in lake stewardship.

Goal 12. The goals, objectives, and actions outlined in this Lake Huron Management Plan will be recognized in decisions that affect Lake Huron by incorporating them into local land management and comprehensive plans. This plan will be reviewed annually and updated as needed.

***The following goals were identified as short-term priorities*:**

Goal 1. Water levels in Lake Huron will represent natural fluctuations.

Objective 1.1. Understand water fluctuations (natural vs. manmade) in and near Lake Huron.

Objective 1.2. Work with citizens and elected officials to ensure that Lake Huron has "normal" lake levels.

Goal 6. Improve the quality of the fishery in Lake Huron through sustainable management practices.

Objective 6.1. Work to improve fish habitat along shoreland and near-shore areas and inform lake residents and users about fishery-related information and issues.

Goal 8. Eliminate aquatic invasive species (AIS) from Lake Huron.

Objective 8.1. Reduce or eliminate populations of EWM and CLP in Lake Huron and prevent the establishment of new AIS.

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

Resource	Acronym
Citizen Lake Monitoring Network	CLMN
UWSP Center for Watershed Science and Education	CWSE
Wisconsin Department of Agriculture, Trade and Consumer Protection	DATCP
Huron Lake Association	HLA
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 & Environmental Analysis Laboratory	WEAL

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

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 and 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 Lake Huron 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 and quantity. The water quality in Lake Huron 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.

Lake Levels

Lake Huron has experienced declining water levels in recent years, the number one concern for many residents and visitors. The majority of water in Lake Huron arrives as groundwater, resulting in a close connection between the groundwater and the lake water. This connection is illustrated by the surface of Lake Huron being the same level as the top of the groundwater table. Historically, a relationship existed between the amount of precipitation, the groundwater level, and the level of Lake Huron. Groundwater and lake levels declined with decreased precipitation, and rose with increased precipitation. However, based on available records, these relationships began to deviate in the late 1980s and that deviation continues to expand. Figure 1 shows Lake Huron's measured water levels (blue) compared to those that would be expected in the absence of groundwater pumping. Levels in the absence of pumping were determined based on comparisons of lake levels to levels at a monitoring well less affected by groundwater pumping than Lake Huron. In recent years, five to eight feet differences occur. To better understand how groundwater and the associated lake levels are affected by groundwater pumping, a model of the Central Sands Region was developed (Kraft et al., 2014). Some areas of the Central Sands are more affected than others; Figure 2 shows the general pattern of groundwater pumping drawdowns around year 2000 as determined by a groundwater flow model. Lake Huron falls into a zone where 3-4 feet of drawdown is predicted.

In Waushara County, some seepage lakes have historically experienced fluctuations in water levels and some of their plants have adapted to these fluctuations for survival. Since 2006, the annual precipitation for Wautoma has been average and in some years above average; therefore, the reduced lake levels cannot be attributed to lack of precipitation. Excess groundwater withdrawals can add to natural fluctuations, affecting the extent and duration of low water levels (Kraft et al., 2014).

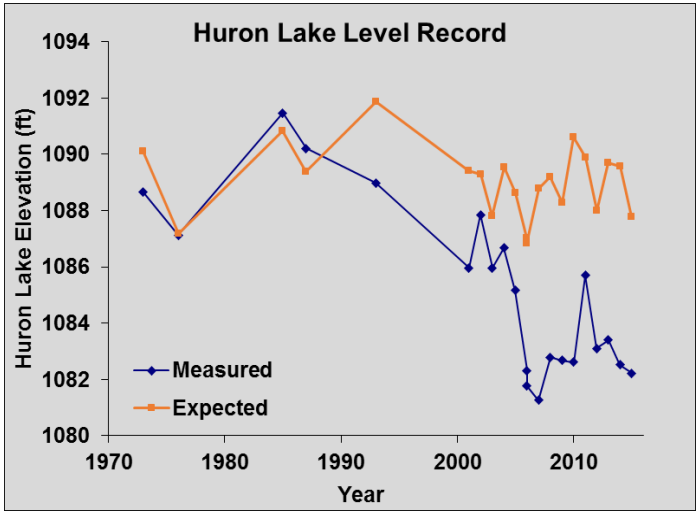


Figure 1. Expected lake levels, based on precipitation and actual levels of Lake Huron (Kraft et al., 2014).

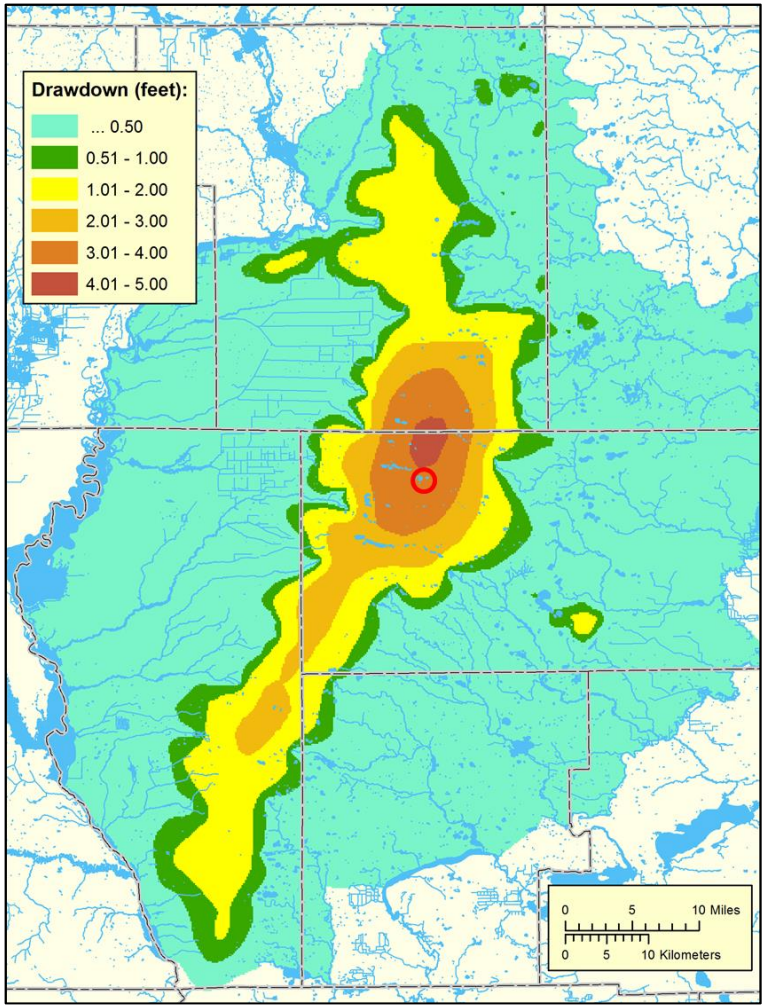


Figure 2. Aquifer pumping drawdowns around year 2000 as determined by a groundwater flow model. Lake Huron falls into a zone where 3-4 feet of drawdown is predicted (red circle) (Kraft et al., 2014).

The planning committee for Lake Huron envisions improved water levels in Lake Huron through the maintenance of groundwater levels and limitations on groundwater withdrawals in the surrounding area.

When the lake level is below the ordinary high water mark, the lakebed is often exposed. Exposed lakebeds remain public property that is protected through the Public Trust Doctrine; 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 of "debris" such as woody structure. 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 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.

In Waushara County, the endangered species Fassett's Locoweed grows on some of the lakes' exposed shorelines, including Lake Huron. This species is known to grow only on a handful of lakes below the Arctic Circle; therefore, disturbance should be avoided and care should be taken to protect this unique species.

Fassett's Locoweed. Photo: WDNR

Guiding Vision for Water Quantity

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

Goal 1. Water levels in Lake Huron will represent natural fluctuations.(Limit the impacts of outside influences such as agricultural irrigation in the area to a state that will allow the water level in Huron Lake to be governed by natural fluctuations alone)

Objective 1.1. Understand water fluctuations (natural vs. manmade) in and near Lake Huron.

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

Objective 1.2. Work with citizens and elected officials to ensure that Lake Huron 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.	HLA	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.	HLA	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.	HLA	Town, Village, County elected officials State and Federal legislators	Ongoing

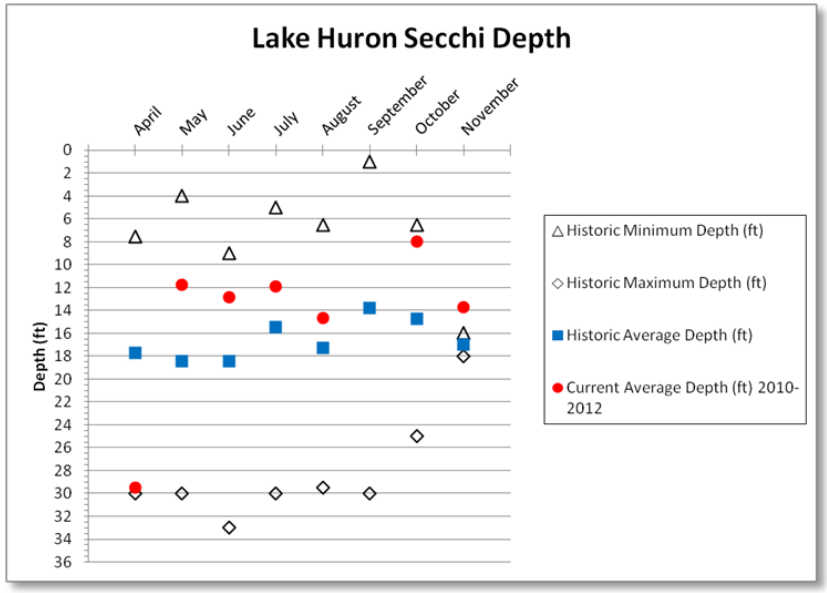
Water Quality

All of the survey respondents indicated water quality had a major impact on both their personal enjoyment value and the economic value of their lake property. While most often only minor aesthetic problems were identified, 80% felt water quality had declined overall during their time at the lake, primarily due to water level changes and the use of fertilizers and herbicides.

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

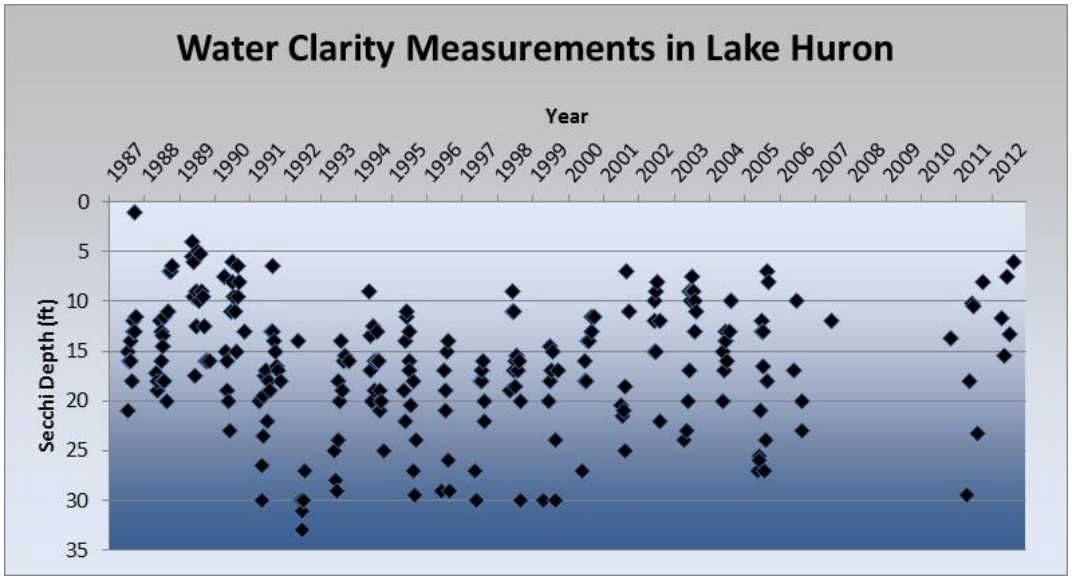
Dissolved oxygen is an important measure in Lake Huron because a majority of organisms in the water depend on oxygen to survive. Oxygen is dissolved into the water from contact with air, which is increased by wind and wave action. Algae and aquatic plants also produce oxygen when sunlight enters the water, but the decomposition of dead plants and algae reduces oxygen in the lake. During the study period, concentrations of dissolved oxygen were always plentiful in the upper 18 feet of water.

Water clarity measured in Lake Huron during the study was considered fair. Water clarity measures ranged from 6 feet to 29.5 feet. When compared with historic data, the average water clarity measured during the study was better in April, but poorer during all other months that sampling occurred, but continues to show a stable trend. "Historic" water clarity measurements dated back to 1987.



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. Chloride concentrations were moderately elevated during the study period, with an average concentration of 8.6 mg/L. 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 groundwater.

Atrazine, an herbicide commonly used on corn, was detected in Lake Huron (0.11 µg/L and 0.12 µg/L DACT). Some toxicity studies have indicated that reproductive system abnormalities can occur in frogs at these levels (Hayes et al., 2001; Hayes et al., 2003). The presence of this chemical suggested that agricultural activities in the surrounding landscape may be impacting the lake.



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

Total phosphorus concentrations for Lake Huron ranged from a high of 35 ug/L in November 2010 to a low of 3 ug/L in August 2012. The summer median total phosphorus concentrations were 11 ug/L and 9 ug/L in 2011 and 2012, respectively. This is below Wisconsin's phosphorus standard of 20 ug/L for deep seepage lakes like Lake Huron.

During the study, concentrations of inorganic nitrogen were elevated in the spring (0.50 and 0.91 mg/L). These concentrations are sufficient to produce algal blooms throughout the summer (Shaw et al., 2000). It is likely this nitrogen is entering Lake Huron via groundwater. Common sources of nitrogen include septic systems, fertilizers, and animal waste. Managing nitrogen, phosphorus and soil erosion throughout the Lake Huron watershed is one of the keys to protecting the lake itself.

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

Guiding Vision for Water Quality in Lake Huron

Lake Huron will have clear, clean water that supports a healthy lake ecosystem and great recreational opportunities.

Goal 2. Water quality in Lake Huron will improve by minimizing nutrient loading through improving land management practices near the lake and in its watershed.

Objective 2.1. The water quality in Lake Huron will be maintained the same or better than the average measurements observed during the 2010-2012 study. Spring nitrogen concentrations will show a decreasing trend over the next 5 years with spring concentrations less than 0.3 mg/L. Median summer concentrations of total phosphorus will remain less than 20 ug/L and average water clarity greater than 12 feet.

Actions	Lead person/group	Resources	Timeline
Inform others around the lake about the impacts of nutrients and land management on water quality through the distribution of an HLA newsletter and neighborly discussions. Consider including information on a lake sign.	HLA	UWEX Lakes (info materials)	2016, Ongoing
Refrain from the use of fertilizers on shoreland properties (see Shorelands section).	HLA		2016, Ongoing
Encourage the restoration of unmowed vegetation between in shoreland areas to slow and absorb runoff and pollutants from the road (see Shorelands section).	HLA	UWEX Lakes (info materials)	2016, Ongoing
Improve shoreland vegetation to reduce nitrogen loading to the lake (see Shorelands section).	Shoreland property owners	WDNR Healthy Lakes Grants	Ongoing
Inform landowners in the watershed about ways to reduce their inputs of nitrogen to groundwater that feeds Lake Huron.	WCLCD	NRCS DATCP	
Repair loose asphalt at boat landing. Asphalt can leach hydrocarbons into the lake.	Town of Oasis WC Parks	UWEX Lakes WCLCD	2016

Objective 2.2. Develop strategies to ensure healthy shorelands remain intact and improvements are made to those that have disturbance.

Actions	Lead person/group	Resources	Timeline
See **Shorelands** section.			

Goal 3. Create a robust dataset for Lake Huron to monitor trends, declines and improvements over time.

Objective 3.1. Continue current monitoring initiatives and begin collecting data that are not routinely recorded.

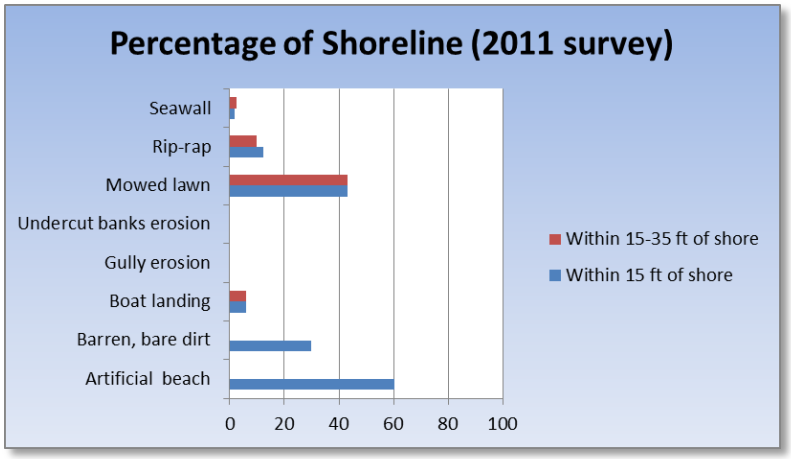
Actions	Lead person/group	Resources	Timeline
Encourage private well owners around Lake Huron to test their water for nitrates and atrazine.	HLA	WEAL Other state certified labs	Ongoing
Regularly monitor water clarity (minimum 5 times/summer).	Trained volunteer	CLMN Coordinator	Ongoing – summer
Continue monitoring water chemistry (total phosphorus and chlorophyll-*a*).	Trained volunteer	CLMN Coordinator	Ongoing – summer
Test for inorganic nitrogen in lake water during spring overturn.	Interested volunteer	State certified testing labs WEAL	Ongoing – spring
Monitor dates of ice on/ice off.	Interested citizen		Annually
Submit all collected data to WDNR for long term storage, interpretation, and use.	HLA, volunteer monitors	CLMN Coordinator	As needed

Shorelands

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

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

The summary of scores for shorelands around Lake Huron is displayed on the map in the Appendix. While many stretches of Lake Huron's shorelands are in good to moderately good shape, some portions have challenges that should be addressed. Shoreland ordinances were enacted to improve water quality and habitat, and to protect our lakes. To protect our lakes, county and state (NR 115) shoreland ordinances state that vegetation should extend at least 35 feet inland from the water's edge, with the exception of an optional 30-foot wide access 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.



Healthy shoreland habitat is particularly important for shorelands of lakes that experience fluctuating water levels. When lake levels are down, it is important to avoid the temptation to "clean up" the exposed lakebed. When water levels increase, terrestrial plants, shrubs, and wood provide important habitat for young fish and other lake inhabitants.

Guiding Vision for Lake Huron's Shorelands

Lake Huron will have stable, healthy and naturally vegetated shorelines that provide quality habitat.

Goal 4. Protect and/or restore healthy stable shoreland habitat near and around Lake Huron.

Over the next five years, at least 50 feet of shoreland will be restored.

Objective 4.1. Maintain and protect vegetated shorelands where they already exist, and encourage restoring a vegetated buffer where the shorelands are mowed to the edge. Show support for healthy shoreland maintenance and restoration.

Actions	Lead person/group	Resources	Timeline
Continue to protect and restore shoreland areas and avoid shoreland alterations to improve fish habitat, water quality, etc.	Shoreland property owners	WCLCD	Ongoing
Provide opportunities for shoreland property owners to learn about the benefits of healthy shorelands to the lake. When water levels are low, remind residents to avoid "cleaning up" the exposed lakebed.	HLA	WCLCD WCWLC. UWEX Lakes – info materials	
Obtain assistance and incentives for restoration of shoreland vegetation, help with restoration/plantings, and cost-sharing for interested property owners.	HLA	WCLCD Consultants WDNR Healthy Lakes Grants	As needed.
Consider restoration projects to create a shoreland demonstration site and offer tours. The boat landing may be an optimal site.	Town of Oasis Waushara County Parks	WCLCD Consultants WDNR Healthy Lakes Grants	2016
Inform individuals about the importance of woody habitat in shallow water near-shore areas of Lake Huron and encourage placement in appropriate areas.	HLA	WDNR UWSP WCLCD	Ongoing
Support property owners interested in conservation easements, purchase of development rights, etc. Inform property owners of options.	HLA	Waushara Co. NCCT	Ongoing

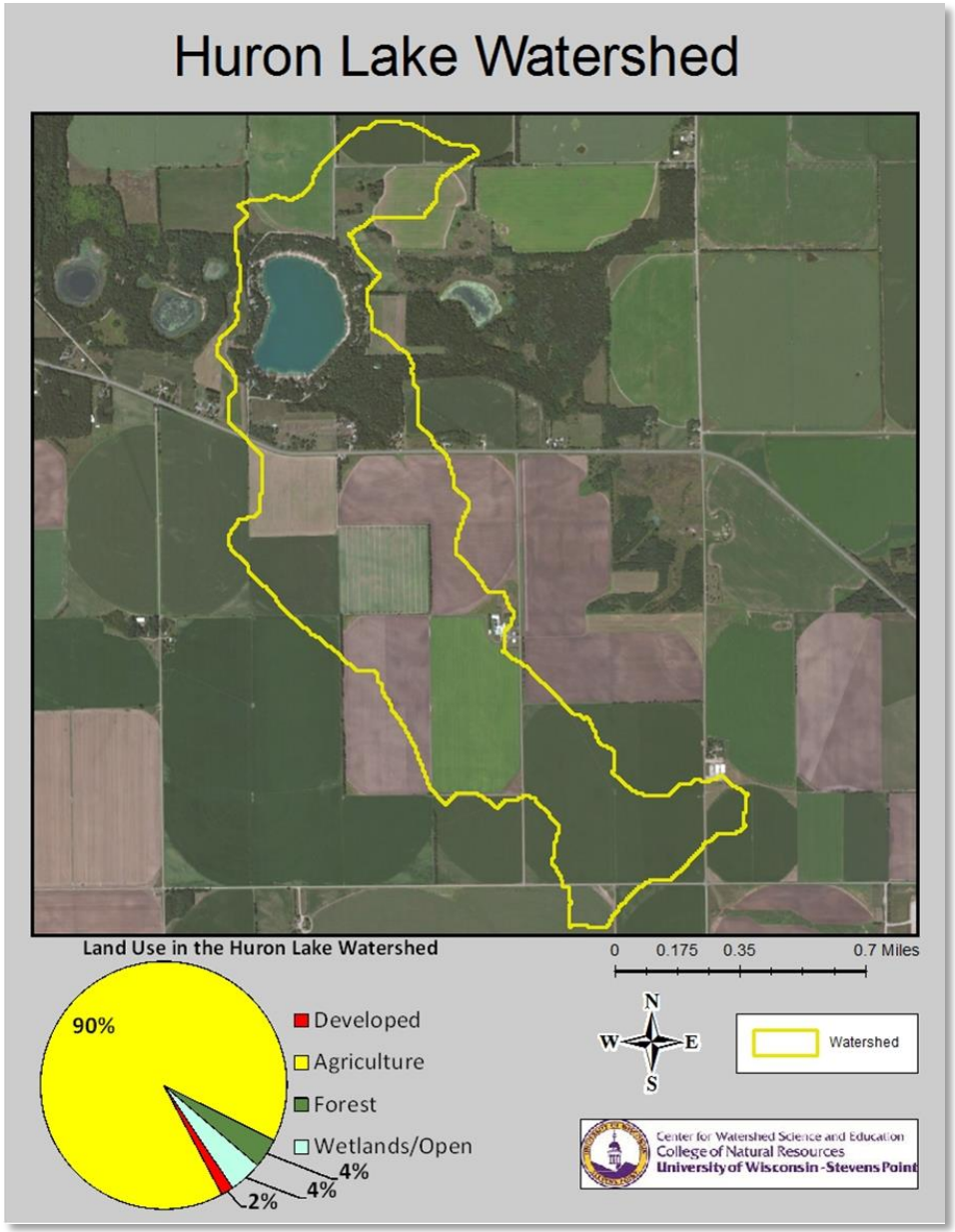
Objective 4.2. Shoreland property owners around Lake Huron and local decision-makers will understand their roles in protecting and restoring shoreland vegetation and will make informed land management decisions.

Actions	Lead person/group	Resources	Timeline
Distribute welcome packets to all new shoreland property owners. Packets should contain information regarding the importance of healthy shoreland habitat and steps to restore areas near or surrounding the lake.	WCWLC	UWEX Lakes WCLCD	Ongoing
Explore options for repair of loose asphalt at boat landing.	Town of Oasis WC Parks	WDNR Fisheries Biologist WCLCD	2016

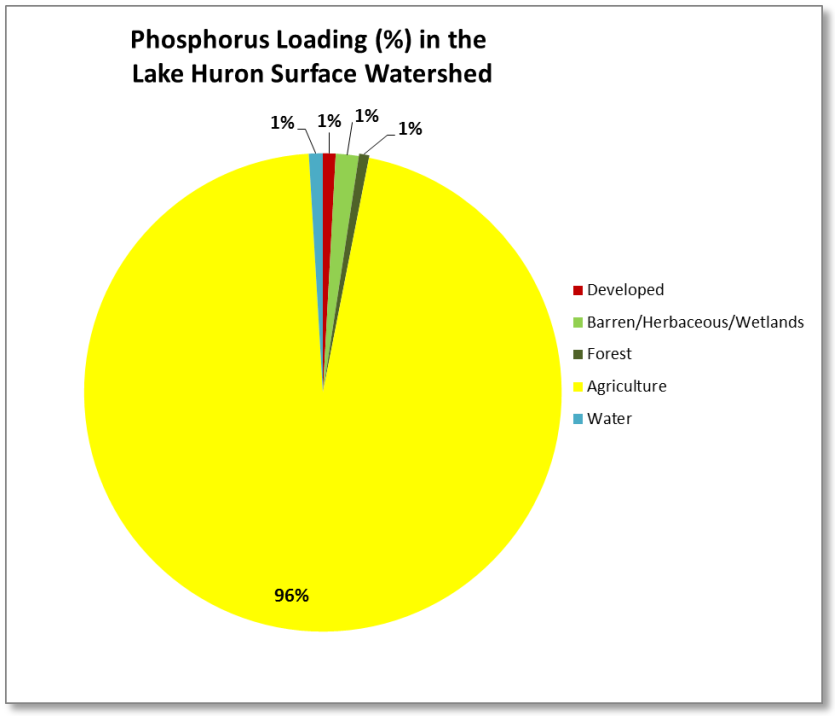
Watershed Land Use

It is important to understand where Lake Huron's water originates in order to understand the lake's health. During snowmelt or rainstorms, water moves across the surface of the landscape (runoff) towards lower elevations such as lakes, streams, and wetlands. The land area that contributes runoff to a lake is called the surface watershed. Groundwater also feeds Lake Huron; 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 Lake Huron is 1,600 acres. Primary land use is agriculture (figure on right**Error! Reference source not found.**). The ake's shoreland is surrounded primarily by development and forests. In general, the land closest to the lake has the greatest immediate impact on water quality.



Estimates of phosphorus from the landscape can help to understand the phosphorus sources to Lake Huron. Land use in the surface watershed was evaluated and used to populate the Wisconsin Lakes Modeling Suite (WILMS) model. In general, each type of land use contributes different amounts of phosphorus in runoff and groundwater. The types of land management practices that are used and their distances from the lake also affect the contributions to the lake from a parcel of land. Based on modeling results, developed land and agriculture had the greatest percentages of phosphorus contributions from the watershed to Lake Huron. The phosphorus export coefficients have been obtained from studies throughout Wisconsin (Panuska and Lillie, 1995). Modeling results indicate agriculture is the greatest contributor of phosphorus to the lake (90%).

Guiding Vision for Lake Huron's Watershed

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

Goal 5. Watershed and shoreland property owners will know about and utilize resources for healthy land management practices.

Objective 5.1. Support healthy land management activities in the Lake Huron watershed to reduce sediment/phosphorus 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. Include BMPs that reduce application of excess nitrogen and pesticides that leach to groundwater.	WCLCD Watershed property owners	NRCS DATCP County Board Supervisors	Ongoing
Support landowners interested in the protection of their land via a land conservation program (i.e. Conservation Easement, Purchase of Development Rights, or sale of land for protection).	Watershed property owners	NCCT WDNR Lake Protection grants Knowles-Nelson Stewardship funds	As needed
Encourage subdivisions and other new developments to manage stormwater on site and consider ways to minimize impacts from septic systems on Lake Huron.	WC	Town of Oasis Developers	As needed
Protect wetlands to maintain the water budget of Lake Huron. Any altered wetlands should be mitigated within the lake's watershed.		WDNR	As needed
Encourage the design of road and construction projects that will minimize impacts to Lake Huron.	HLA	Town of Oasis WC Highway Department WDOT WCLCD	As needed
Explore implementation of deed restrictions (regarding limits on hi-capacity wells and groundwater recharge areas) on large blocks of property within the lake's watershed. Consider purchase then resell with conservation easement.	HLA	NCCT WDNR Lake Protection Grant Knowles-Nelson Stewardship Funds	Ongoing

In-Lake Habitat and a Healthy Lake

Many lake users value Lake Huron for its fishing, clear water, scenic views, serenity, and 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 Lake Huron includes the aquatic plants, branches, and tree limbs above and below the water.

The Fish Community

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

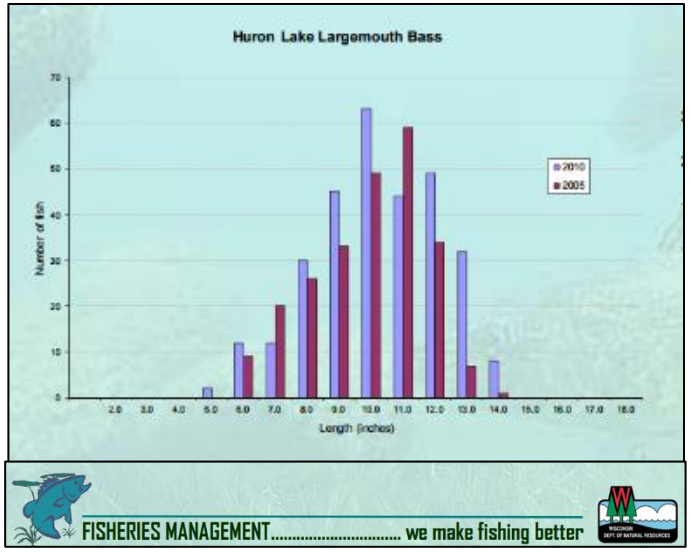
People are an important part of a sustainable fish community; their actions on the landscape and the numbers and sizes of fish taken out of the lake can influence the entire lake ecosystem. Putting appropriate fishing regulations in place and adhering to them can help to balance the fishery with healthy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

Managing a lake for a balanced fishery can result in fewer expenses to lake stewards and the public. While some efforts may be needed to provide a more suitable environment to meet the needs of the fish, they usually do not have to be repeated on a frequently reoccurring basis. Protecting existing habitat such as emergent, aquatic, and shoreland vegetation, and allowing trees that naturally fall into the lake to remain in the lake are free of cost.

Alternatively, restoring habitat in and around a lake can have an up-front cost, but the effects will often continue for decades. Costs in time, travel, and other expenses are associated with routine efforts such as fish stocking and aeration. Ideally, a lake contains the habitat, water quality, and food necessary to support the fish communities that are present within the lake and provide fishing opportunities for people without a lot of supplemental effort and associated expenses to maintain these conditions.

The following information was provided by Dave Bartz, WDNR Fisheries Biologist, at the March 22, 2016 planning session.

The most recent fish survey was a spring electrofishing survey completed in 2010; the next survey is scheduled for 2018. Largemouth bass were observed in very high abundance. The catch rate was 478/hr for largemouth bass greater than 8 inches. This is slightly higher than the catch rate of 418/hr which was observed in 2005 for the same size class. The preferred density for largemouth bass would be measured by a catch rate of 100-150/hr. Despite the high abundance, size structure was fair - the PSD12 was 33%, which was up from the 2005 survey where the PSD12 was 20%. The RSD14 was 3% and overall size ranged from 5.8 to 14.9 inches. Growth, however, was poor, with largemouth bass taking 9 years to reach 14 inches.



Bluegill were observed in fairly high abundance with a capture rate of 619/hr, compared to 418/hr in 2005. Bluegill had good size structure with a PSD6 of 58% and RSD7 of 33%. These measures were similar to the 2005 survey which had a PSD6 of 57% and an RSD7 of 30%. Growth was average, taking bluegill five years to reach 6 inches.

Black crappie and green sunfish were also caught, but in insufficient numbers for statistical analysis. Though previously abundant in Lake Huron, no perch were observed. Perch require near shore structure (plants, woody habitat) to drape their eggs over. Especially when water levels are low, additional woody habitat may need to be added to enhance the perch population. Perch eat minnows, which also need near shore habitat.

General recommendations by the fisheries biologist were primarily focused on improving habitat in Lake Huron, with emphasis that this is particularly important with the low water levels. Coarse woody habitat should be placed at the water's edge. Another consideration was the removal of the 14-inch size limit on largemouth bass and a reduction in the overall panfish bag limit. This approach is being used on other lakes with excessive bluegill populations. Since the size structure remains good, results of the 2018 survey should be obtained before making these changes.

Guiding Vision for the Fish Community

Lake Huron will have a healthy, well-balanced and sustainable fishery.

Goal 6. Improve the quality of the fishery in Lake Huron through sustainable management practices.

We will know we have achieved this goal when the current fishery surveys indicate a healthy, balanced and fishable community with self-sustaining populations.

Objective 6.1. Work to improve fish habitat along shoreland and near-shore areas and inform Lake Huron residents and users about fishery-related information and issues.

Actions	Lead person/group	Resources	Timeline
Inform individuals about the importance of woody habitat in shallow water near-shore areas of Lake Huron, particularly with the low water levels. Encourage placement in appropriate areas.	HLA	WDNR Fisheries Biologist UWEX Lakes – info materials	Ongoing
Improve fishery habitat by adding woody habitat to near shore areas of Lake Huron.	Shoreland property owners	WDNR Fisheries Biologist WDNR Healthy Lakes Grants WCLCD	Ongoing
Continue to protect and restore shoreland areas and avoid shoreland alterations to improve fish habitat.	Shoreland property owners	HLA WDNR Healthy Lakes Grants WCLCD	Ongoing

Objective 6.2. If warranted, adjust the fishing regulations to improve the fishery in Lake Huron.

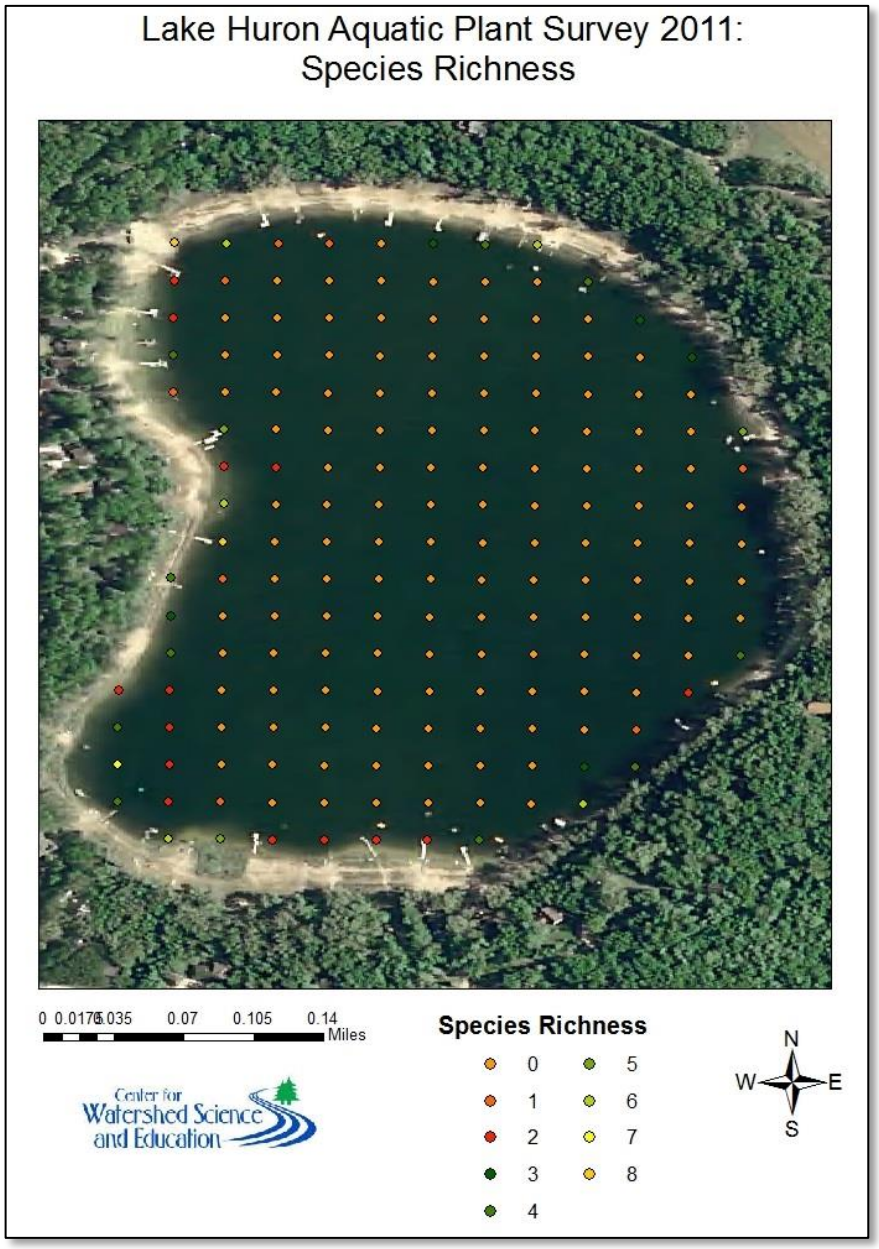
Actions	Lead person/group	Resources	Timeline
Review the next fishery survey results to discuss potential changes to fishing regulations.	WDNR Fisheries Biologist HLA	Local fishing clubs	Post 2018
Consider removal of 14” size limit on largemouth bass and reduction in panfish bag limit depending on results of 2018 fish survey.	WDNR Fisheries Biologist	WDNR	2019

Aquatic Plants

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

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

An aquatic plant survey was conducted in August 2011 by UWSP staff. Seventeen species of aquatic plants were observed, which is average when compared with other lakes in the Waushara County study. Sixty percent (49 of 82) of the sites sampled had vegetative growth. Plants were found on average at the depth of 20 feet, with a maximum depth of 27 feet. The highest diversity of aquatic plants observed was limited to bays and undeveloped shores on the southern and western sides of the lake. The dominant plant species in the survey was muskgrass (*Chara* spp.), which occurred at 83% of the vegetated sites. This plant is actually a macro-algae, which prefers the hard water found in Lake Huron. Muskgrass provides good habitat for fish and other lake inhabitants and utilizes nutrients that may otherwise be used for algae growth. Limited occurrence of the invasive plant Eurasian watermilfoil (EWM) was observed along the southern side. Although not observed during the 2011 aquatic plant survey, a remnant population of Fassett's Locoweed, a small perennial herb of the pea family considered endangered in Wisconsin, has been documented near the boat landing. See the Lake Levels section for more details. Participants felt



plant growth was more abundant than the 2011 survey indicated, and also felt algal blooms had increased. More detailed information about the aquatic plant survey can be found in Appendix D. Aquatic Plants; *Aquatic Plant Survey of Lake Huron, Waushara County*; and, *Waushara County Lakes Study – Lake Huron.*

Guiding Vision for Aquatic Plants in Lake Huron

Lake Huron will have a healthy and diverse native aquatic plant community that supports a balanced fishery and promotes good water quality while allowing for unimpeded recreation.

Goal 7. Protect native plants in and around Lake Huron.

Objective 7.1. Maintain the native aquatic plant community within Lake Huron while allowing for recreational use while reducing disturbance from dense aquatic plant growth.

Actions	Lead person/group	Resources	Timeline
Inform property owners of the importance of native aquatic vegetation to provide habitat and impede the establishment of aquatic invasive species via educational materials provided at the annual meeting and in spring newsletter.	HLA	UWEX Lakes - info WCWLC	Ongoing
If aquatic plants severely restrict recreation, consider hand pulling small areas around personal docks. However, these areas are prone to the establishment of AIS so diligent monitoring should occur.	Property owners	WDNR Lake Manager and guidelines	Ongoing
Remind shoreland property owners about refraining from the application of pesticides on shorelands at annual meeting and in spring newsletter.	HLA	UWEX Lakes - info	Ongoing

Objective 7.2. Enhance shoreland vegetation and encourage best management practices within the watershed.

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

Aquatic Invasive Species (AIS)

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

Eurasian watermilfoil (EWM) was first documented in Lake Huron in 1993 and was observed in isolated populations on the southern side of the lake during the 2011 aquatic plant survey. 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.

Although large portions of Lake Huron do not grow extensive plants, some property owners experience dense growth near the shore and around piers. Lake Huron has seen spot treatments, primarily for EWM, almost annually since 2000. After reduction of the initial population in 2000 and 2001, EWM has persisted in the lake in areas generally less than 1-2 acres with little change. Many of the records associated with aquatic plant management in Lake Huron were not available. The following table contains the data that was obtained.

Year	Acreage	Chemical	Targeted Plants & Notes
2000	5-6	Unk	
2001	2.5	Unk	
2002	<2	Unk	
2003	<2	Unk	
2004	<2	Unk	
2005	<2	Unk	
2006	<2	Unk	
2012	1.75 0.5	Navigate Aquathol Super K	EWM
2013	0.35	Aquathol Super K	
2014	1 0.5	Navigate Aquathol Super K	EWM
2015	3	-	Permitted but not applied.

Aquatic Plant Management in Lake Huron

The primary purpose of managing aquatic plants in Lake Huron to control EWM in the lake. The following aquatic plant management strategies were determined to be the most practical and effective options to minimize impacts to Lake Huron as a whole. Planning session participants indicated a desire to move away from chemical applications, but expressed concern the EWM population might explode as a result.

If an invasive plant species not previously documented in Lake Huron is suspected or observed by any lake user, the lake user is encouraged to refer to Appendix C for more information on how to report it.

Option for management native aquatic plants

Manual removal

Native aquatic plants provide habitat help to reduce algal blooms, and can provide competition that makes it more difficult for AIS to become established; however, in some instances it is recognized that dense growth of native aquatic plants may be a nuisance to recreation in some locations. Property owners are permitted to clear an area up to 30' around their dock for boat and swimming access to open water. If EWM is mixed in with the native plants, proper techniques for removal of EWM and resulting plant fragments should be followed. In addition, since barren lake beds provide ideal conditions for the establishment of AIS, diligent monitoring should accompany any clearing of native plants to quickly identify and remove AIS to prevent it from becoming established.

Options for the control of Eurasian watermilfoil (EWM)

Each lake is different and its response to EWM control efforts may differ from lake to lake. Often multiple approaches and adaptive year-to-year changes in approach and strategies are most successful. The population of EWM should be evaluated before and after treatments to determine the effectiveness of an approach in a given year. Strategies for the subsequent year should be adjusted accordingly. EWM management involves evolving scientific knowledge; therefore, the management strategies for EWM in Lake Huron should be adapted as EWM populations in the lake change and as new information becomes available.

Hybrid watermilfoil (HWM) results from a hybridization of native watermilfoils with Eurasian watermilfoil. HWM tends to be more resilient and less effected 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; and, 3) the lake is near other lakes with HWM. If these criteria are met, plant samples should be submitted to a lab for confirmation. Once HWM is confirmed, a *challenge test* should be conducted to determine which combination of chemicals will be effective in controlling that particular strain of HWM. Many combinations of chemicals can potentially be used to treat HWM; the only way to know the appropriate

combination is by sending samples to be challenge tested. Treating HWM without knowing the appropriate combination of chemicals can result in an even more resilient strain in the lake, damage to the native aquatic plant population, and a waste of money.

Management options will change depending upon the amount of EWM in Lake Huron; therefore, routine annual monitoring of these species is essential. The presence of AIS will also define the type of aquatic plant management that could be conducted to address recreational impediments. Fragmenting EWM should be avoided when undertaking any steps to reduce native aquatic plants. Surveys of the extent of EWM should be conducted annually followed by a meeting with professionals to determine the effectiveness of the current year's strategies and to develop the strategy for the upcoming year. Strategies may include one or more of the following options.

Manual removal No permit needed.
Those trained to properly identify and remove EWM and other aquatic invasive species can remove those plants manually any time of year. Trained divers (DASH) can be hired to manually remove AIS. DASH is typically used in deeper parts of the lake.

Chemical spot treatment Permit required.
Results of recent studies on the effectiveness of chemical spot treatment suggest that chemical spot treatment is less effective than previously thought and may actually promote chemically resistant forms of EWM. However, chemical spot treatments may still be appropriate in certain conditions to control EWM. 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 *challenge testing*. If EWM is found to not be a hybrid, and is covers fewer than 5 acres, a contact herbicide such as endothall or diquat can be used. Systemic herbicides should not be used. Impacts to native aquatic plant species can be minimized by conducting a chemical treatment early in the season, prior to the emersion of native plants. To reduce the chance of developing resilient strains of EWM; different treatments should be used each year. Whole lake chemical treatments are not appropriate for Lake Huron at this time.

Note: Any chemical application will result in some degree of collateral damage to native species (plant & animal).

Milfoil weevils. No permit needed.
Milfoil weevils (*Euhrychiopsis lecontei*) are native to some lakes in Wisconsin and have been shown to effectively reduce EWM populations in some conditions. They require natural shoreline for over wintering habitat, which is currently limited around Lake Huron. Milfoil weevils are difficult and expensive to obtain commercially, so obtaining a starter population and rearing them in predator-free conditions can be desirable. Professional assistance should be sought if stocking or rearing is pursued.

Do nothing.
Doing no active management is an option to evaluate the EWM response. Although EWM is aggressive in many lakes, there have been cases where the EWM population stabilized and did not present a significant problem for the lakes' ecosystem or recreation.

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

AIS in Lake Huron will be controlled to a level that it does not impede residents' enjoyment of the lake.

Goal 8. Eliminate aquatic invasive species (AIS) from Lake Huron.

Objective 8.1. Reduce or eliminate populations of EWM in Lake Huron and prevent the establishment of new AIS.

Actions	Lead person/group	Resources	Timeline
Inform property owners about refraining from removing native aquatic vegetation to diminish the possible colonization by AIS at the annual meeting and in a spring newsletter (and periodically after that).	HLA	RC&D UWEX Lakes – info materials WCLWC	Annually in spring
Educate shoreland property owners about removing floating fragments of EWM and proper hand pulling techniques.	HLA	RC&D WCLWC	Annually or as needed
Continue the annual late summer survey to determine the next steps (or no action) in management of EWM. Base decisions on survey results and summer observations.	HLA	WDNR Lake Manager RC&D Consultant	Annually
Determine appropriate strategies to manage EWM and/or HWM based on survey results.	HLA	WDNR Lake Manager Consultant	Annually
Work with other area lake groups to apply jointly for a grant to hire divers to hand pull EWM in deeper parts of the lake (DASH), if appropriate.	HLA	WDNR Lake Manager RC&D	As needed
If the presence of HWM is suspected (see previous narrative), conduct DNA testing of EWM specimens for a positive determination.	HLA	RC&D WDNR Lake Manager Consultant	As needed
If HWM is present and chemical treatment is desired, conduct challenge tests to determine the correct combinations of chemicals for successful treatment.	HLA	RC&D Consultant	As needed
Arrange meeting with individuals from Porters Lake to learn about their successful approaches to the eradication of EWM.	HLA Interested citizens	Porters Lake	2016

Objective 8.2. Prevent the establishment of new species of AIS in Lake Huron.

Actions	Lead person/group	Resources	Timeline
Continue to use signs, newsletters, and other methods to inform lake visitors about AIS and removing aquatic hitchhikers. Ensure signs at boat launch remain in good repair.	HLA Town of Oasis	UWEX Lakes – info materials	Ongoing
Learn to identify AIS and routinely look for it by obtaining identification cards for EWM and northern milfoil and distributing them to HLA members.	Shoreland property owners, lake users	RC&D	Ongoing
Review and consider participation in the Clean Boats Clean Waters program. Explore options for staffing boat launch including interns, students, boy scouts, etc.	HLA	RC&D UWEX Lakes CBCW	2016, Ongoing

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 Wisconsin Department of Natural Resources in order to protect features that are important to the overall health and integrity of the lake, including aquatic plants and animals. While every lake contains important natural features, not all lakes have official critical habitat designations. Designating areas of the lake as 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 Lake Huron does not have an official critical habitat area designation, there are areas within Lake Huron that are important for fish and wildlife. Natural, minimally-impacted areas with woody habitat such as logs, branches, and stumps; areas with emergent and other forms of aquatic vegetation; areas with overhanging vegetation; and wetlands are elements of good quality habitat. Identifying other important areas around the lake that are important habitat and informing lake users of their value can help raise awareness for the protection of these areas.

Guiding Vision Lake Huron's Critical Habitat

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

Goal 9. Identify and inform others of quality habitat in and near Lake Huron.

Objective 9.1. Explore options for official identification of important habitat areas to inform others and to better protect habitat in the lake.

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

People and the Lake

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

The 41-acre Lake Huron is enjoyed by people who swim, boat, fish, and appreciate its beauty. Visitors have access to the lake along the shoreline and a public boat landing located on the northwest side at the half-acre Waushara County Park. Picnic tables, grills, and restrooms are provided at the park The park and boat launch are owned by the Town of Oasis and leased by the County. No wake is allowed by boats operating on Lake Huron. No ADA features are present at the boat launch or park. Fishing and boating pressure on Lake Huron has decreased with the substantial drop in water levels. Participants indicated that the boat landing needs attention as it is breaking up at the water line and leaching hydrocarbons to the lake. Also, the entire area is graded to direct runoff into the lake.

Guiding Vision for Recreation

Lake Huron will remain a place of solitude and quiet recreation.

Goal 10. Users of Lake Huron will appreciate and respect the lake and recreate responsibly.

Objective 10.1. Provide lake users with information and rules necessary to make responsible decisions.

Actions	Lead person/group	Resources	Timeline
Work with the Town and County to reconstruct the boat landing including repair/replacement of fractured asphalt and runoff diversion.	Town of Oasis WC Parks Department	WDNR Fisheries Biologist WDNR Healthy Lake Grants WCLCD	2016
Maintain signage at the boat landing and around the lake with important lake, recreation, and habitat information.	HLA	UWEX Lakes WDNR	Ongoing
Support enforcement of current fishing regulations (i.e. valid fishing license, bag limits, ice fishing regulations re: fish shanties, bag limit, tip-ups, etc.).	HLA	WDNR Town of Oasis	Ongoing

Communication and Organization

Working together on common values is essential to achieve the goals that are outlined in this plan so communicating with the partners identified in the plan along with lake stewards in the county and throughout the state is important. Many of the goals outlined in this plan focus on distributing information to lake and watershed residents and lake users in order to help them make informed decisions that will result in a healthy ecosystem in Lake Huron enjoyed by many people.

Guiding Vision for Communication

The Lake Huron community will be connected and informed in lake stewardship.

Goal 11. Increase participation in lake stewardship.

Objective 11.1. Develop opportunities for the exchange of information among full and part-time residents.

Actions	Lead person/group	Resources	Timeline
Maintain an up-to-date email list of lake association members	HLA	WC UWEX	Ongoing
Continue to distribute a welcome packet/mailing to all new shoreland property owners with basic lake stewardship information/brochures.	HLA 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.	HLA	Partners listed in the plan	Ongoing
Encourage shoreland property owners to subscribe to "Lake Tides" publication to keep current of lake related topics in Wisconsin.	HLA	UWEX Lakes	

Objective 11.2. Achieve good communication with clubs, municipalities, agency staff, elected officials, other lake groups and organizations interested in Lake Huron or lake health.

Actions	Lead person/group	Resources	Timeline
Network with other lake groups in Waushara County by continuing to participate in the WCWLC.	HLA	WC UWEX	Quarterly
Network with other lakes in the state to learn lake management strategies, etc. by having a representative attend the Wisconsin Lake Convention.	HLA	UWEX Lakes	Annually in spring
Consider sending an individual interested in Lake Huron to the Lake Leaders Institute.	HLA	UWEX Lakes	Even numbered years

Updates and Revisions

A lake management plan is a living document that changes over time to meet the current needs, challenges and desires of the lake and its community. 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

Lake Huron will have an up-to-date and relevant lake management plan that is reviewed annually and documents all management activities and results. The intent in this plan will be recognized and used by the local governments.

Goal 12. The goals, objectives, and actions outlined in this Lake Huron Management Plan will be recognized in decisions that affect Lake Huron by incorporating them into local land management and comprehensive plans. This plan will be reviewed annually and updated as needed.

Objective 12.1. Incorporate goals, objectives, and actions outlined in the Lake Huron Management Plan into local land management and comprehensive plans.

Actions	Lead person/group	Resources	Timeline
Incorporate goals, objectives, and actions outlined in the Lake Huron Management Plan into Waushara County and Town of Oasis comprehensive plans, water and land, and other plans.	WCLCD Town of Oasis Waushara County	Waushara County Town of Oasis Copies to WDNR, etc.	2016 and ongoing
Local officials will inform HLA when decisions will be made that might affect Lake Huron.	Town of Oasis Waushara County		As needed

Objective 12.2. Review this plan annually and update as needed.

Actions	Lead person/group	Resources	Timeline
Review plan at annual meeting and discuss accomplishments and identification of goals, objectives, and actions for upcoming year.	HLA	Partners listed in this plan	Annually
Formally update this LMP every 5 years.	HLA	WCWLC WCLCD WDNR Partners listed in this plan	2021

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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Haney, Ryan, 2016. *Water Quality in Lake Huron and White River Flowage*. Presentation given February 25, 2016 at the Waushara County Courthouse.

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

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

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Shaw, B., C. Mechenich, and L. Klessig, 2000. *Understanding Lake Data*. University of Wisconsin-Extension, Stevens Point. 20 pp.

Turky, Nancy, 2015. *Aquatic plants and invasive species in Lake Huron and White River Flowage*. Presentation given January 28, 2016 at the Waushara County Courthouse.

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

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

Appendices

Appendix A. Waushara County Lake Information Directory

Algae - Blue-Green

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

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

Aquatic Invasive Species/Clean Boats Clean Water

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

Aquatic Plant Management (Native and Invasive)

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

Aquatic Plant Identification

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

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

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

Aquatic Plant Surveys/Management

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

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

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

Boat Landings, Signage, Permissions (County)

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

Boat Landings (State)

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

Boat Landings (Town)

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

Citizen Lake Monitoring Network

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

Conservation Easements

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

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

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

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

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

Critical Habitat and Sensitive Areas

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

Dams

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

Fertilizers/Soil Testing

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

Fisheries Biologist (management, habitat)

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

Frog Monitoring—Citizen Based

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

Grants

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

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

Groundwater Quality

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

Groundwater Levels/Quantity

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

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

Groundwater Levels/Quantity (cont'd)

Contact: Scott Provost
Wisconsin Department of Natural Resources
473 Griffith Ave., Wisconsin Rapids, WI 54494
Phone: 715-421-7881
E-mail: scott.provost@wisconsin.gov
Website:
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

Land Use Plans and Zoning Ordinances (cont'd)

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 St, PO Box 487, Wautoma, WI 54982
Phone: 920-787-0416
E-mail: Ken.williams@ces.uwex.edu
Website: http://waushara.uwex.edu/index.html

Water Quality Monitoring

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

Water Quality Problems

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

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

Wetlands

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

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

Wetland Inventory

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

Woody Habitat

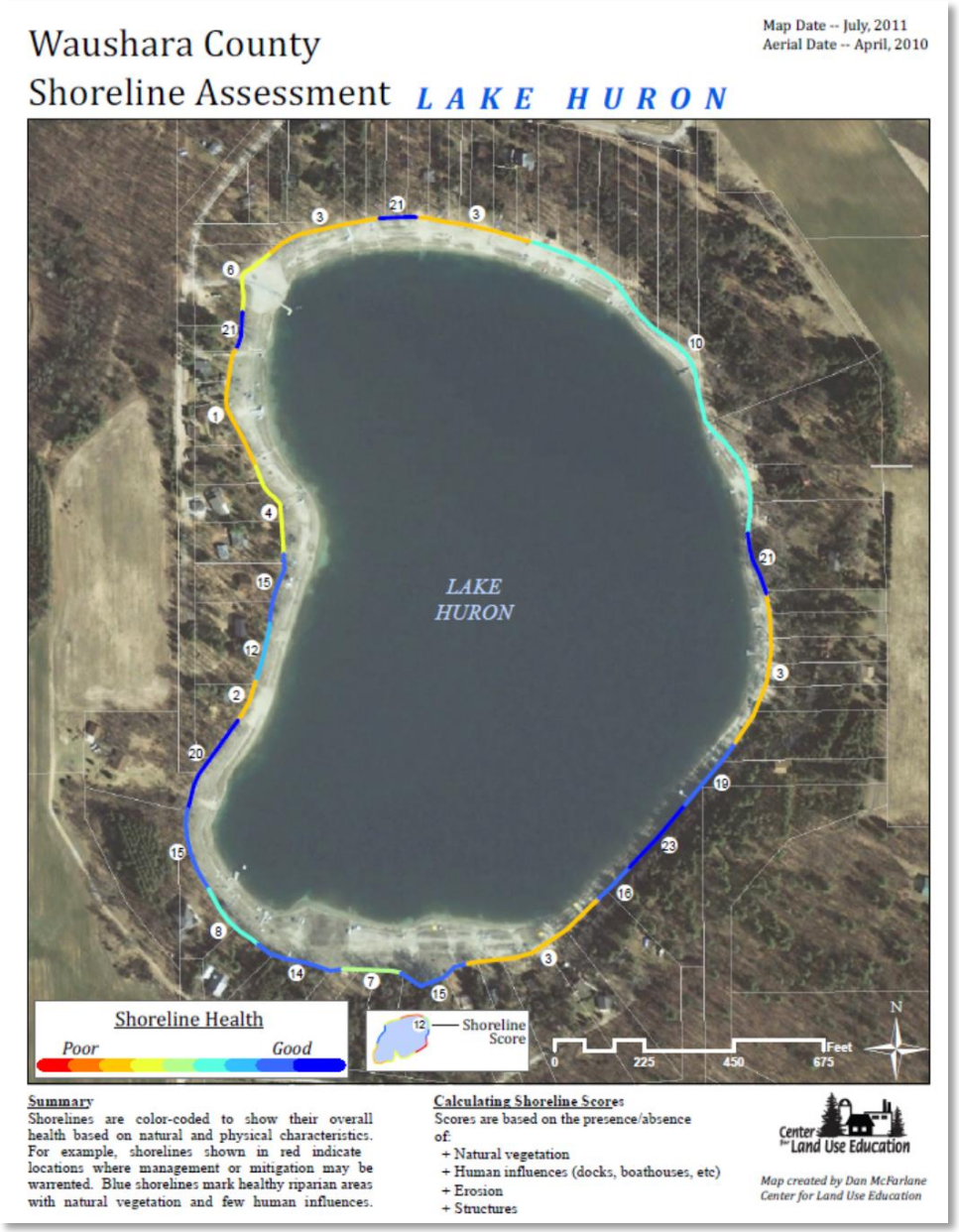
Contact: Dave Bartz, Wisconsin Department of Natural Resources
Phone:608-635-4989
Address: Hwy 22N Box 430, Montello, WI 53949
E-mail: David.Bartz@wisconsin.gov

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

Appendix B. Shoreland Survey – 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 Lake Huron 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. While many stretches of Lake Huron's shorelands are in good to moderately good shape, some portions have challenges that should be addressed. There were no stretches of Lake Huron shoreland ranked as poor.




Lake Huron Shoreland Vegetation
Waushara Co. Wisconsin
N
0
295
590
1,180 Feet
Unmowed Vegetation < 3 Ft Tall
Distance Inland from Waters Edge (Ft)
Poor
0
1-15
16-35
Good
Trees and Shrubs
Absent
Present
Center for Watershed Science and Education
College of Natural Resources
University of Wisconsin-Stevens Point

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: Oasis

- **The Lake Association** where the waterbody is located.
  Contact: Cris Van Houten, President
  Phone: 715-335-4306
  Email: candlvh@uniontel.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**

- **Huron Lake Association**

If an invasive species is confirmed the Huron Lake Association 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

Lake Huron aquatic plant survey summary, 2011.

	2006 Lake Average	2011 Lake Average	Statewide Average	North Central Hardwood Forests Ecoregion Average
Littoral Frequency of Occurrence (%)	86.79	88.89	74.3	76
Maximum Depth of Plant Growth (ft)	21.9	27	15.3	15.9
Species Richness (Including visuals)	8	17	16.8	16.2
Floristic Quality Index (FQI)	14	19.1	24.1	23.3

Frequency of occurrence of aquatic plant species observed in Lake Huron, 2006 and 2011.

Scientific Name	Common Name	Coefficient of Conservatism Value (C Value)	2006 % Frequency of Occurrence	2011 % Frequency of Occurrence
Emergent Species				
Eleocharis palustris	Creeping spikerush	6	-	4.17
Submergent Species				
Chara	Muskgrasses	7	84.78	83.33
Potamogeton foliosus	Leafy pondweed	6	-	39.58
Stuckenia pectinata	Sago pondweed	3	-	35.42
Najas guadalupensis	Southern naiad	8	-	33.33
Potamogeton zosteriformis	Flat-stem pondweed	6	41.3	25
Ceratophyllum demersum	Coontail	3	15.22	22.92
Potamogeton illinoensis	Illinois pondweed	6	47.83	22.92
Najas flexilis	Slender naiad	6	28.26	20.83
Myriophyllum sibiricum	Northern water-milfoil	6	6.52	18.75
Heteranthera dubia	Water star-grass	6	-	14.58
Elodea canadensis	Common waterweed	3	4.35	4.17
Myriophyllum spicatum	Eurasian water-milfoil	0	2.17	4.17

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. ∗ If aquatic invasive species are not pulled properly, could worsen the problem. ∗ No associated cost.	∗ Removes near-shore wildlife and fish habitat. ∗ Opens up areas where invasives can become established.

Hand Pulling Using Suction

ADVANTAGES	LIMITATIONS
∗ Can be used for thinning plants around docks. ∗ Can be used in deeper areas (with divers). ∗ Can target specific plants with proper training. ∗ Can be effective in controlling small infestations of aquatic invasive species. ∗ May be useful in helping to remove upper root mass of aquatic invasive species.	∗ Costs associated with hiring a diver may be comparable to chemical treatment expenses. ∗ Currently an experimental treatment – not readily available. ∗ If aquatic invasive species are not pulled properly, could worsen the problem.

Mechanical Harvesting

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

Water Level Manipulation

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

Milfoil Weevils

ADVANTAGES	LIMITATIONS
∗ Natural, native maintenance of native and exotic milfoils. ∗ Prefers the aquatic invasive Eurasian Watermilfoil. ∗ Some lakes may already have a native population; 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