

Long Lake

Comprehensive Lake Management Plan

2024-2034



“We do not inherit the earth from our ancestors. We borrow it from our children.”
– Chief Seattle

Plan Approved
2/23/2024

Acknowledgements

The LLPA Board of Directors would like to acknowledge the efforts of many LLPA members for their participation in collecting the data used in the Comprehensive Lake Management Plan. In addition, our partners at the Tomahawk Scout Camp and Hunt Hill contributed to this project in data collection and general support. Services from the Mary Griggs Burke Center for Freshwater Innovation at Northland College were important in completing the coarse woody habitat inventory.

We also want to extend our great appreciation to the Northwest Regional Planning Commission whose support made the creation of this plan possible. Their Water Resources Specialist, Megan Mader, BS, MS, has served as the Long Lake Consultant. With her expertise in Aquatic Biology, she directed the efforts of those noted above, advised the Board of Directors on how to prepare to preserve and protect Long Lake and its watershed, and developed the Comprehensive Lake Management Plan.

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Plan Partners

Hunt Hill Audubon Sanctuary
Long Lake Chamber of Commerce
Northland College
Northwest Regional Planning Commission
Tomahawk Scout Camp
Town of Birchwood
Town of Long Lake
Town of Madge
Washburn County Highway Department
Washburn County Lakes and Rivers Association
Washburn County Land and Water Conservation Department
Wisconsin Department of Natural Resources



Introduction

Overview of Plan

This Comprehensive Lake Management Plan addresses four primary concerns: lake water quality, habitat, aquatic invasive species prevention and management, and the social framework to support the long-term health of Long Lake. This plan will be implemented from 2024 through 2034 with the option to update the plan in 2029.

The Long Lake Preservation Association (LLPA) initiated the planning process by working with the Northwest Regional Planning Commission (NWRPC) to secure a Wisconsin Department of Natural Resources (WDNR) grant early in 2023. The grant funded data gathering, public engagement, and the writing of reports to be used in the development of this plan. These documents include:

- Long Lake Shoreland & Shallows Habitat Survey, Washburn County WI (Mader, 2023)
- Long Lake Shoreland Property Owners Social Survey Report (Mader, 2023)

Additional reports included in this plan:

- Warm-water Point-intercept Macrophyte Survey Long Lake - WBIC: 2106800 Washburn County, Wisconsin (Berg, 2022)
- Wisconsin Department of Natural Resources Fisheries Survey Report for Long Lake, Washburn County, WI 2022 (Roberts, 2023)¹

These and past reports are available on the LLPA website.²

Successful management of Long Lake is dependent on an understanding of the relationship between the desired “use” of the lake and physical, chemical, biological, and social processes that shape the lake ecosystem. To address these facets, this plan includes an implementation plan to meet the goals and objectives based on adaptive management strategies.

¹ <https://dnr.wisconsin.gov/sites/default/files/topic/Fishing/WashburnLong2022CompSurvey%20.pdf>

² <https://longlakellpa.org/>

Lake Management Goals

The following goals were defined by the LLPA in the *2019 State of Long Lake Report*. These goals are central to the mission of the LLPA to “preserve and protect Long Lake, its watershed, and its ecosystems.”

- I. **Long Lake Monitoring** – The LLPA will pursue and evaluate ecosystem mapping and monitoring efforts to establish baseline data to be used for appropriate management/protection and education/communication efforts that support the mission of the LLPA.
- II. **Long Lake Management** – The LLPA will pursue and evaluate ecosystem management and protection efforts to maintain the natural integrity of Long Lake and its watershed as a healthy, functioning ecosystem.
- III. **Long Lake Education/Communication** – The LLPA will provide diverse education outreach opportunities to all stakeholders.
- IV. **LLPA Capacity Building** – The LLPA will develop and regularly evaluate its organizational structure and capacity.

Visioning

Two meetings of LLPA Board Members were held at Hunt Hill Audubon Sanctuary to gather input from the board on the vision, goals, and objectives of the comprehensive plan. The LLPA also provided an additional 21-day public comment period to solicit feedback from the LLPA membership on the goals and objectives of the comprehensive plan. Finally, the LLPA opened the plan for public comment for 37 days to solicit feedback from LLPA members and Long Lake enthusiasts.

Long Lake Social Survey

A social survey was distributed to all current and past LLPA members (Mader, 2023). This survey was designed to assess the base knowledge and interest in lake stewardship and the feelings of shoreland property owners of the current state of Long Lake. The survey paralleled the format of the statewide survey distributed by UW Extension Lakes in 2020, as well as the 2021 survey distributed by the LLPA. The survey was subdivided into the following areas:

- **Survey Narrative** – Provided an explanation of the purpose of the survey.
- **Participant Residency** – Description of area of residency on the lake, tenure, and basic demographic information.
- **Lake Use and Assessment** – Information on preferred lake activities and assessment of potential issues on Long Lake.
- **Lake Stewardship** – Interest in stewardship activities and limitations that prevent participation.
- **Personal Thoughts** – Open ended areas to comment on Long Lake and provide additional feedback and information.

The survey was conducted through Google Forms and was distributed using the Constant Contact LLPA mailing list (793 members) which includes approximately current 400 LLPA members from May 25, 2023 to July 10, 2023 (46 days). The survey had 273 responses for a return rate of approximately 34%. Survey methods and results are explained in the survey report (Mader, 2023). This survey was intended to provide information related to identifying owner concerns and interests, willingness to participate in and support lake stewardship activities and the LLPA, motivations for change, and the current perception of the state of Long Lake. The results of the survey will be used to inform the Long Lake Comprehensive Lake Management Plan and future management discussions and decisions.

Survey Conclusions

A typical Long Lake shoreland property owner. Over half of shoreland owners who responded to the survey (52%) live on the lake year-round or come to the lake on summer weekends. Over half of respondents have owned property on the lake for more than 20 years (56.7%). Survey respondents responding to where they reside on the lake to this survey were comparable to the 2021 Issues Survey.

Activities. The top five activities that Long Lake property owners participate in are family gatherings (220), fishing (183), canoeing/kayaking/paddleboarding (174), observing wildlife (161), and skiing/wakeboarding/tubing. Other answers included ice fishing (72), jet skiing (42), boating/pontooning (39), and hunting (15).

Perceptions of Long Lake. Respondents largely agreed that facets of Long Lake like water quality and overall health are “good” but have been declining since they arrived on the lake; 58.6% of respondents agree that overall water quality is about the same as when they first came to the lake. Algal blooms and lack of water clarity occur mostly in the North End of the lake. Recreation conflicts largely occur in the North End and the Narrows. Excessive plant growth is an issue in the south basin and the North End. Shoreline erosion concerns are centered on the Narrows and the North End. Respondents agree that the beauty of the lake is very good.

Lake Stewardship. The majority of respondents say they are very willing to do or are already doing or are willing to participate in lake stewardship activities. A large portion of respondents indicated that lack of time, lack of support from other lake property owners, and lack of information was at least slightly important as a factor limiting their participation in lake stewardship.

LLPA. Almost 90% of respondents are LLPA members, and 93.8% get their information about the lake from the LLPA.

Public Review and Comment

An initial draft of the goals and objectives of this plan were distributed for public comment from August 22, 2023 through September 12, 2023 (21 days). Comments received were reviewed and incorporated into the final draft of this comprehensive plan.

A draft plan was made available to the public by posting on the LLPA website, social media and the fall newsletter with additional notification sent to lake residents through multiple Constant Contact direct emailings in November 2023 through early January 2024. The public review period of the draft plan began December 1, 2023 and ended January 7, 2024 (37 days). Public comments are available from the LLPA on request. The LLPA Board of Directors reviewed the public comments and additions were made to the plan to reflect information provided by the public.

Organizational Capacity and Readiness

The Long Lake Preservation Association is organized for charitable, educational, and scientific purposes and is a charitable organization as defined by Section 501(c)(3) of the Internal Revenue Code. The mission of the Long Lake Preservation Association is to preserve and protect Long Lake, its watershed and its ecosystems.

LLPA community and capacity building efforts include an ice cream social, an annual meeting, social media, neighborhood meetings, and Constant Contact emails. The Education/Communication Committee publishes a biannual newsletter and a yearly calendar, and it organizes educational events – Cakes on the Lake – with Hunt Hill. The LLPA is also working with Hunt Hill and the Tomahawk Scout Camp to promote citizen science and biodiversity monitoring for the Long Lake watershed using apps like Seek and iNaturalist.

Additionally, the Sustainability and Capacity Building Committee is responsible for updating many practical functions of the LLPA. Volunteers helped create a new, updated website with online donation and membership options. Members have also developed a strategic fundraising plan and have established an endowment for Long Lake.

The LLPA has also participated in organizational capacity building efforts. From 2022 through 2023, the Board of Directors has defined its position descriptions and reorganized the structure of the LLPA's committees to be more efficient. The Board also completed an internal skills gap analysis and has developed an evaluation form to regularly reevaluate the effectiveness of the board.

Historical Management Actions

The LLPA has a long history of engagement in data collection and lake management including:

- In-lake, shoreland, and watershed invasive species monitoring and management
- Clean Boats, Clean Waters watercraft inspections
- Yellow flag iris monitoring and removal
- Citizen Lake Monitoring at five sites on the lake
- Cakes on the Lake education program with Hunt Hill
- Participation in LoonWatch
- Installation of Fish Sticks projects

Reports and plans related to Long Lake³:

- 1978-2004 Summary of Fisheries Surveys Long and Mud Lakes
- 1995 Long Lake Management Plan Phase I: Water Quality Study of Long Lake and its Watershed
- 1995 Long Lake Management Plan Phase II: Hydrologic and Phosphorus Budgets
- 1995 Long Lake Management Plan Phase III: Lake Management Plan
- 1998 Assessing Lake Productivity in the Long Lake Watershed
- 1998 Long Lake Sensitive Area Survey Report and Management Guidelines
- 1998-2001 Water Quality Study of Long Lake
- 2002-2004 Integration of Watershed Management Issues in a Comprehensive Community Plan
- 2003 State of the Long Lake Watershed
- 2004 State of the Long Lake Watershed
- 2006 Assessing Lake Productivity in the Long Lake Watershed
- 2006 Long Lake Groundwater Testing Project
- 2009 Long Lake Comprehensive Fishery Survey
- 2011 Long Lake CLP and Point Intercept Surveys Final Report
- 2011 Mud Lake Bed Mapping and Warm Water Point Intercept Macrophyte Surveys
- 2013-2017 Aquatic Plant Management Plan for Long and Mud Lakes
- 2015-2015 Red Cedar Watershed 9-Key Element Plan
- 2016 Long Lake and Mud Lake Comprehensive Fishery Survey, Washburn County, Wisconsin
- 2016 Long Lake Warm Water PI Macrophyte Survey Final Report
- 2016 Mud Lake Warm Water PI Macrophyte Survey Final Report
- 2019 State of Long Lake
- 2022 LLPA Organizational Sustainability and Capacity Building Plan
- 2022 Long Lake Washburn Co WBIC 2106800 Warm Water PI Macrophyte Survey Final Report
- 2022 WDNR Fisheries Survey Report for Long Lake, Washburn County, WI Baseline Data and Assessments

³ <https://longlakellpa.org/resources/>

Long Lake Background Report

Lake Description

Long Lake (WBIC 2106800) is a 3,478 acre, stratified, eutrophic⁴, drainage lake located in southeastern Washburn County, Wisconsin in the Towns of Birchwood, Long Lake, and Madge (T37N R10/11W). Long Lake is at the headwaters of the Brill River that flows into the Red Cedar River (Figure 1). This large lake is irregularly shaped and consists of numerous bays and basins, which often exhibit different water quality characteristics. The lake has a hydraulic residence time of two years and a volume of 86,967 acre-ft.

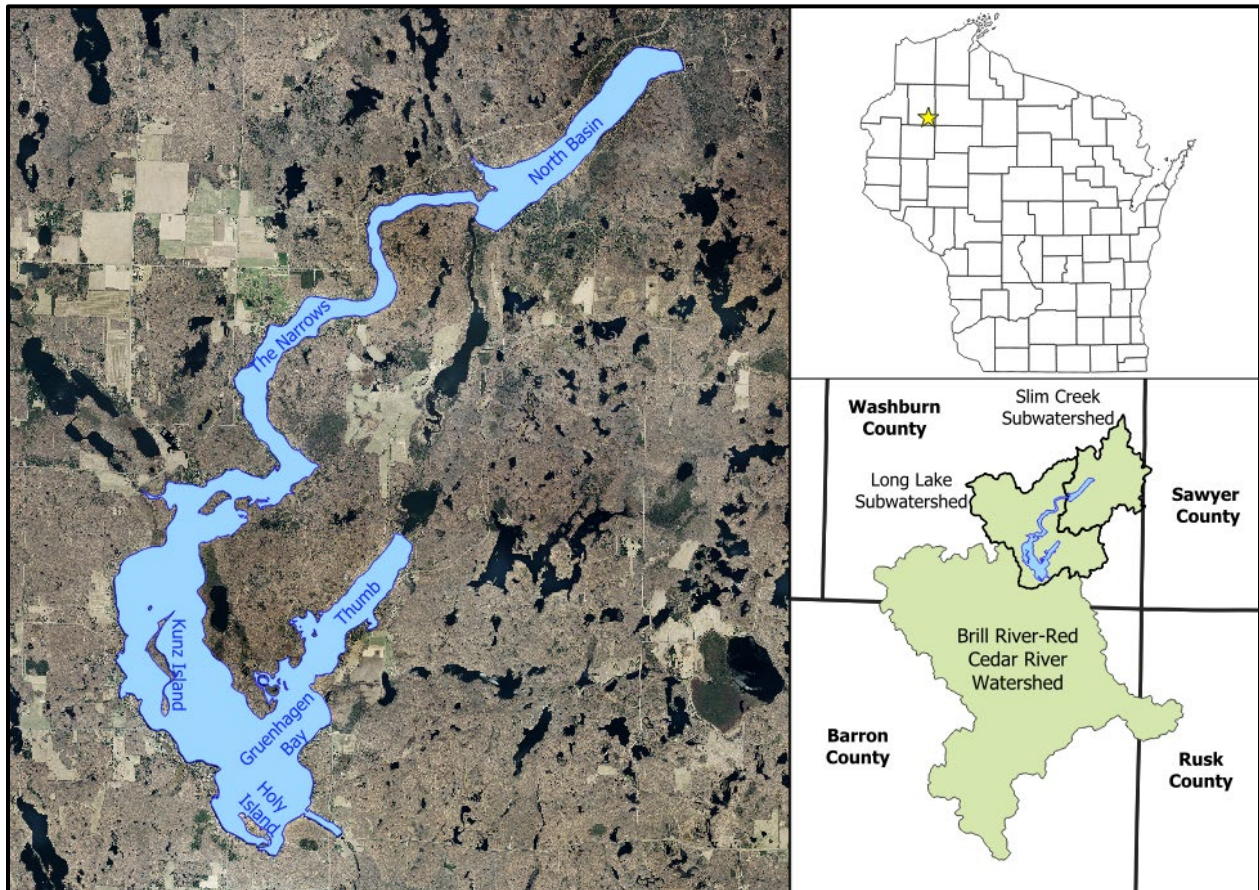


FIGURE 1. LONG LAKE LOCATION

⁴ WDNR classifies Long Lake as Eutrophic based on the last 5 years of chlorophyll data.

Lake Depth and Substrate

The lake reaches a maximum depth of 74ft in the northeast thumb and has an average depth of 26ft (Figure 2). Only five percent of the lake surface area is less than 3 feet deep, but 63 percent of the lake has depths of over 20 feet (WDNR, 1978). The bottom substrate is predominantly organic muck in sheltered bays and a mixture of sand, rock, and sandy muck along the majority of the rest of the shoreline (Figure 2; Berg, 2022). Away from the immediate shoreline, the lake’s many bars, humps and sunken inlands are dominated by gravel and sand, while many shallow flats tend to have a thin layer of muck over these firmer substrates (Berg 2022).

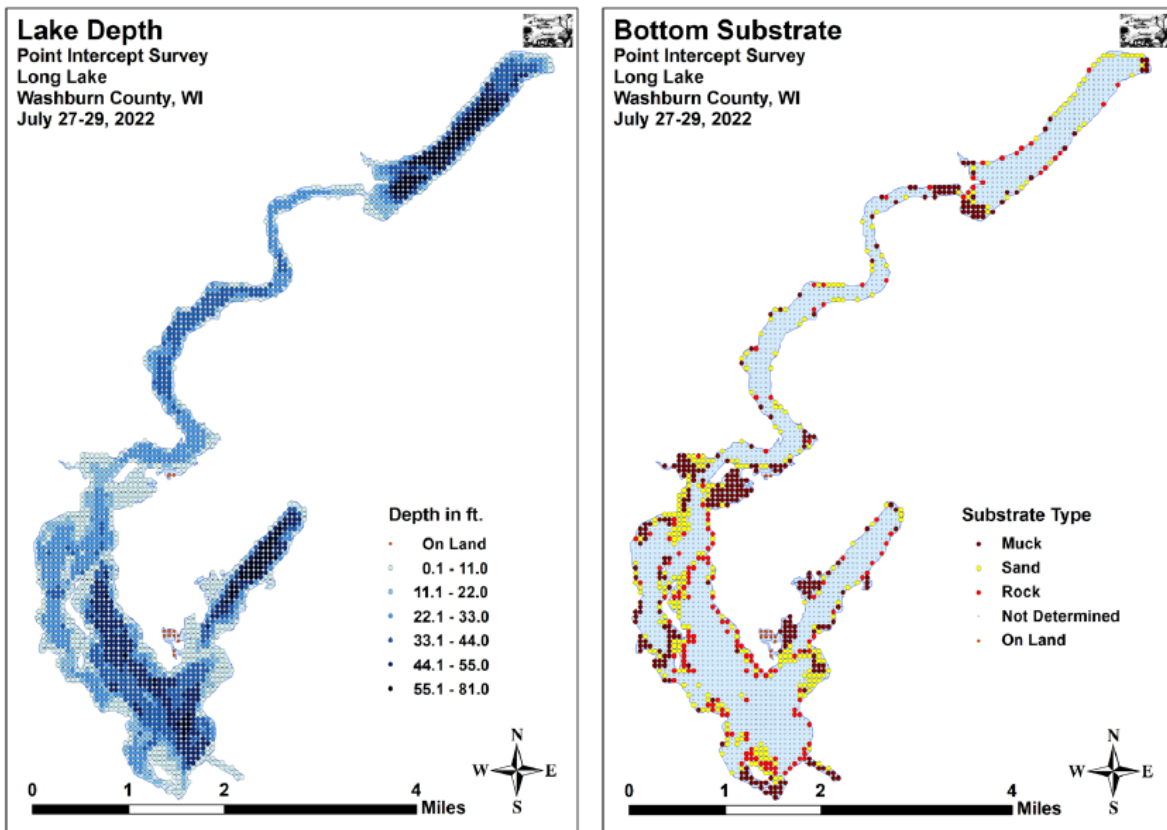


FIGURE 2. LAKE DEPTH AND BOTTOM SUBSTRATE OF LONG LAKE (BERG, 2022)

WDNR Lakes Classification

The WDNR uses four levels of classifications to delineate waterbodies based on water quality:

- Excellent – Waters are considered to be fully supporting their assessed designated uses.
- Good or Fair – Waters are considered to be supporting their assessed designated uses.
- Poor – Waters may not support assessed designated use(s) but have insufficient information for a decision at the impairment assessment level.

Listing thresholds and detailed methodology for assessment and analysis are included in WisCALM (Wisconsin Consolidated and Assessment Listing Methodology). Based on this methodology, the Wisconsin Department of Natural Resources publishes a list of waters considered impaired, as required by the federal Clean Water Act, every two years. Impaired waters are those that do not meet water quality standards and may not support fishing, swimming, recreating, or public health and welfare. A water body is considered healthy when it supports: healthy aquatic animal and plant communities, safe human recreation like swimming, and safe fish consumption. If any of these are not supported, then the water is considered impaired (Wisconsin Department of Natural Resources, 2021). The WDNR establishes standards for various lake types. Further, there are standards set for Fish and Aquatic Life (FAL) and for Recreational Use.

Long Lake was placed on the impaired waters list for total phosphorus in 2014. The 2018 assessment showed continued impairment by phosphorus; total phosphorus sample data overwhelmingly exceeded the 2018 WisCALM listing thresholds for the Recreational Use and Fish and Aquatic Life use. Chlorophyll-a sample data only exceeded the FAL use threshold.

Long Lake is a two-story drainage lake classified as impaired due to high levels of phosphorus and eutrophication. WisCALM lists Fish and Aquatic Life as Poor, Recreation as Poor, and Fish Consumption as Excellent (Figure 3).

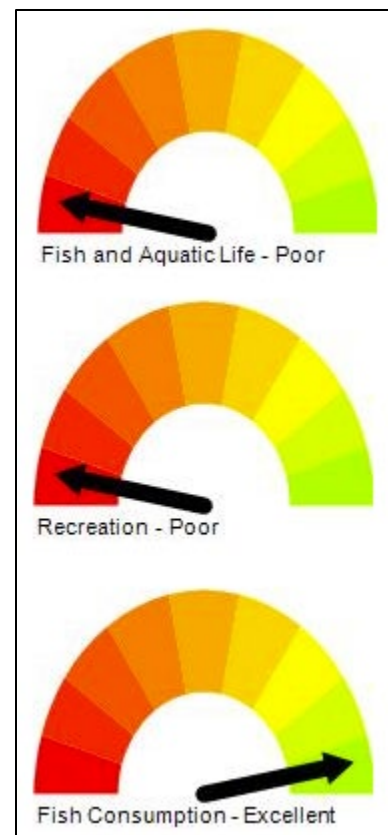


FIGURE 3. WISCALM LISTING FOR LONG LAKE

Water Quality

Long Lake has five water quality monitoring sites to capture the variability of the morphologically diverse lake (Figure 4). Site A is located in the relatively productive North Basin. Site F is in the Narrows where there is some level of current flowing from the North Basin to the southern portion of the lake. Site C captures water quality near Kunz Island. Site D is centrally located in the South Basin. Site E is in Gruenhagen Bay (“the Thumb”) at the deepest point in the lake (74 feet)

Volunteers have been collecting water quality data on Long Lake through the Citizen Lake Monitoring Program (CLMP) since 1991.

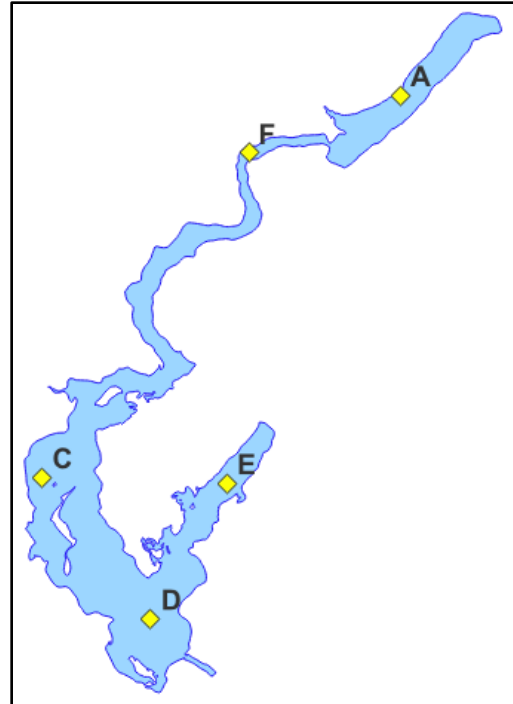


FIGURE 4. LONG LAKE WATER QUALITY MONITORING SITES

Trophic State

The trophic state index (TSI) score places a lake into a category of oligotrophic, mesotrophic, eutrophic, or hypereutrophic based on three measurements: chlorophyll-*a* (a measure of algal biomass), total phosphorus (a vital nutrient for algal growth), and secchi depth (a measure of water clarity). Lakes naturally occur in each of the first three categories, but hypereutrophic lakes are within that category because of human-caused nutrient enrichment (Table 1).

Oligotrophic lakes are generally very clear, deep, and cold. The lake substrate is typically firm and sandy. Nutrient levels are low, so the lake generally does not support large populations of aquatic plants, animals, or algae. The fish that occur in oligotrophic lakes are often low in abundance, but large in size. Many oligotrophic lakes divide into two layers in the summer, a condition known as stratification.

Mesotrophic lakes contain moderate amounts of nutrients, and contain healthy, diverse populations of aquatic plants, algae, and fish. Occasional algae blooms may occur. If the lake is deep enough to stratify, the hypolimnion often becomes low in oxygen by the end of summer and may result in some phosphorus release from the sediments.

Eutrophic lakes are high in nutrients and contain large populations of aquatic plants, algae, and fish. The lake substrate is typically soft and mucky. The aquatic plants and algae often grow to nuisance levels, and the fish species are generally tolerant of warm temperatures and low oxygen conditions. Common fish species include carp, bullheads, and bluegills. If the lake is deep enough to stratify, the hypolimnion is usually very low in oxygen by mid-summer. This results in a release of phosphorus from the sediments, which can fuel algae blooms.

Table-1. TSI Classification characteristics and descriptions

TSI	Chlorophyll-a (µg/L)	Secchi Depth (ft)	Total Phosphorus (µg/L)	Classification	Attributes	Fisheries and Recreation
<30	<0.95	>26	<6	ULTRAOLIGOTROPHIC	clear water, many algal species, oxygen throughout the year in bottom water, cold water	oxygen-sensitive species, cold water fish species in deep lakes
30-40	0.95 - 2.6	13 - 26	6 - 12	OLIGOTROPHIC	clear water, many algal species, oxygen throughout the year in bottom water except possibly in shallow lakes, cold water	oxygen-sensitive species, cold water fish species in deep lakes only
40-50	2.6 - 7.3	6.5 - 13	12 - 24	MESOTROPHIC	water moderately clear, but increasing change of low dissolved oxygen in deep water during summer	walleye may dominate
50-60	7.3 - 20.0	3.0 - 6.5	24 - 48	EUTROPHIC	decreased clarity, fewer algal species, oxygen-depleted bottom waters during summer, plant overgrowth evident	warm-water fisheries (pike, perch, bass, sunfish, etc.)
60-70	20 - 56	1.5 - 3.0	48 - 96	EUTROPHIC	blue-green algae become dominant and algal scums are possible, extensive plant overgrowth problems possible	thick aquatic vegetation and algal scums may discourage swimming and boating
70-80	56 - 155	0.75 - 1.5	96 - 192	HYPEREUTROPHIC	heavy algal blooms possible throughout summer, dense plant beds, but extent limited by light penetration (blue-green algae block sunlight)	summer fish kills possible, rough fish (sucker, redhorse, bullhead, carp, etc.) dominant
>80	>155	<0.75	192 - 384	HYPEREUTROPHIC	Algal scums, few plants	

Using water quality data from Long Lake, the TSI can be determined at each sampling site and for the lake as a whole (Figure 5). Using data from 1991-2023, it is apparent that Long Lake is consistently borderline eutrophic to mesotrophic (Figure 5).

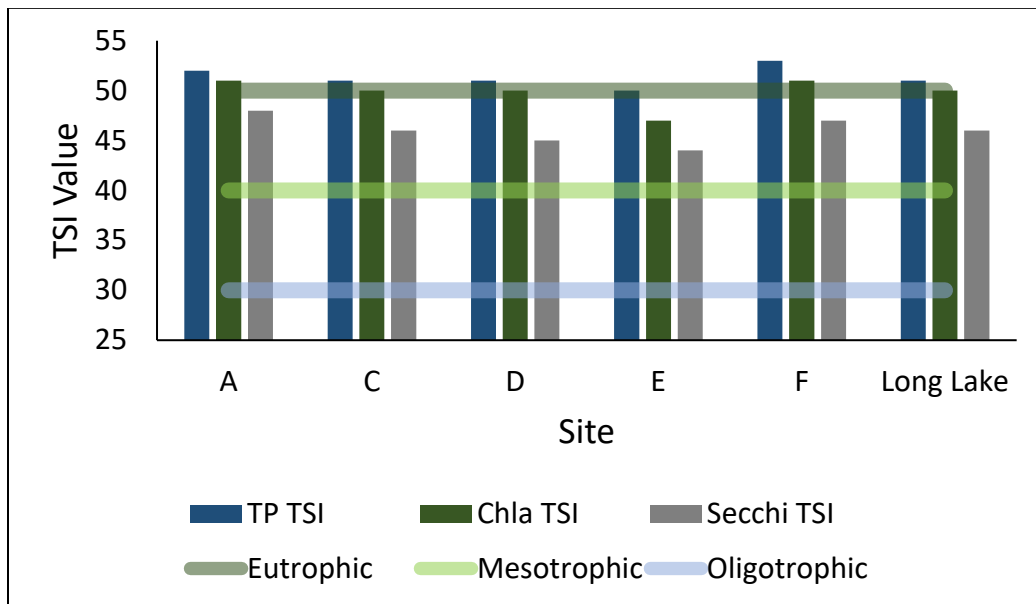


FIGURE 5. TSI VALUES FOR LONG LAKE AND ITS MONITORING STATIONS FROM 1991-2023

The average summer trophic state for 2018-2023 determined by chlorophyll data was 55 (eutrophic). This is considered ‘poor’ for a two-story lake. However, when considering the average summer trophic state for 2018-2023 for total phosphorus and secchi depth, the TSI for total phosphorus is 45 (mesotrophic) and the TSI for secchi depth is 45 (mesotrophic). The combined TSI for all three metrics from 2018-2023 is 47 (mesotrophic). However, chlorophyll – which measures algal biomass – is the most visible and prominent indicator of trophic state.

Nutrients

Historic glacial deposits throughout the watershed contribute to elevated phosphorus levels flowing into the lake from upstream and groundwater sources (Hudak, 2006). Other sources of phosphorus include fertilizers, pet waste, runoff, and faulty septic systems. These additional sources combined with Long Lake’s geologic baseline sources have led to Long Lake having higher levels of phosphorus than other lakes.

Phosphorus is an important metric in lakes because it is often the nutrient limiting plant and algae growth – if there is not enough then algal growth is suppressed, if there is an excess then algal blooms and excessive plant growth can occur. Phosphorus is dissolved in runoff water and carried in soil particles. Phosphorus runoff from the watershed is determined by how land is used in the watershed along with watershed soils and topography. When a watershed is comprised of mostly natural vegetation, there is less runoff that can negatively impact a waterbody. Agricultural, commercial, and residential lands tend to contribute greater amounts of phosphorus in runoff.

Lake Stratification

Dissolved oxygen (DO) and temperature profiles are regularly completed at Long Lake’s water quality monitoring stations⁵. Depths greater than 50 feet regularly become anoxic (DO < 1mg/L) as early as July. With low oxygen levels, lake sediments tend to release phosphorus, a phenomenon known as internal loading. The temperature profile indicates the lake is stratified, which confines phosphorus that is released from the sediment to the lower levels of the water column (hypolimnion). When fall turnover occurs, that phosphorus becomes available throughout the water column.

Outstanding Resource Water Designation

Long Lake is designated as an Outstanding Resource Water (ORW)⁶. Waters designated as ORW or ERW (Exceptional Resource Waters) are surface waters which provide outstanding recreational opportunities, support valuable fisheries and wildlife habitat, have good water quality, and are not significantly impacted by human activities. Less than 1% of Wisconsin’s 15,000 lakes and impoundments are designated as ORW. The state of Wisconsin assigns ORW and ERW status to waters that warrant additional protection from the effects of pollution. These designations are intended to meet federal Clean Water Act obligations requiring Wisconsin to adopt an “antidegradation” policy that is designed to prevent any lowering of water quality – especially in those waters having significant ecological or cultural value.

ORWs typically do not have any point sources discharging pollutants directly to the water (e.g., industrial sources or municipal sewage treatment plants), though they may receive runoff from nonpoint sources (e.g., agricultural runoff, residential runoff).

Public Use

Long Lake has four public boat launches⁷ (Figure 6). The boat launches are owned and maintained by surrounding townships (Table 2). All the launches are relatively small (less than 15 vehicle stalls), and none have ADA (Americans with Disabilities Act)

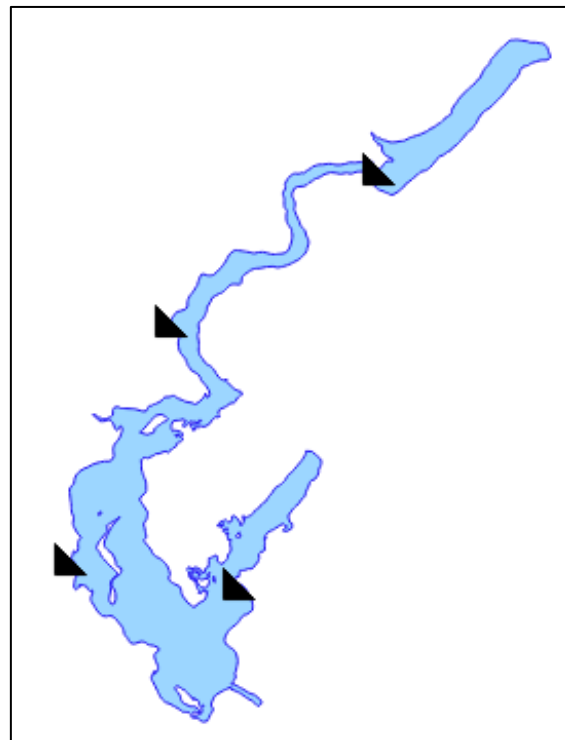


FIGURE 6. LONG LAKE PUBLIC BOAT LAUNCHES

⁵ <https://apps.dnr.wi.gov/lakes/lakepages/LakeDetail.aspx?wbic=2106800&page=waterquality>

⁶ <https://dnr.wisconsin.gov/topic/SurfaceWater/orwerw.html>

⁷ <https://apps.dnr.wi.gov/lakes/lakepages/LakeDetail.aspx?wbic=2106800&page=boating>

TABLE-2. LONG LAKE BOAT LANDING SUMMARY INFORMATION

Landing Name	Access	Vehicle Stalls	ADA Accessible	Ownership	CBCW
Hank's Landing	Todd Rd	6 to 10	No	Town of Madge	Yes
Long Lake Access	End of Blackhawk Rd	6 to 10	No	Town of Birchwood	Yes
Long Lake Access	Off County Hwy M	11 to 15	No	Town of Long Lake	Yes
Long Lake Access	End of Sunset Bay Rd	1 to 5	No	Town of Long Lake	No

Sensitive Areas

Sensitive Areas of Lakes (Areas of Special Natural Resource Interest) are designated as Critical Habitat Areas in Wisconsin. These areas have been identified by the Wisconsin Department of Natural Resources as offering critical or unique fish and wildlife habitat, including seasonal or life stage requirements, or offering water quality or erosion control benefits to the body of water. Wisconsin law mandates special protections for these critical habitats⁸.

Long Lake has 32 designated Sensitive Areas⁹ (Figure 7). The sensitive areas total 456.19 acres – 13% of Long Lake’s surface area. These areas were designated by the WDNR because they provide quality habitat for spawning, nurseries, wildlife habitat, and shoreline protection. Knowing the location of these areas provides insight into management decisions and the possible implications of management activities. For more information on Long Lake’s individual sensitive areas, please review the Long Lake Sensitive Area Survey Report and Management Guidelines¹⁰ (1998) document.

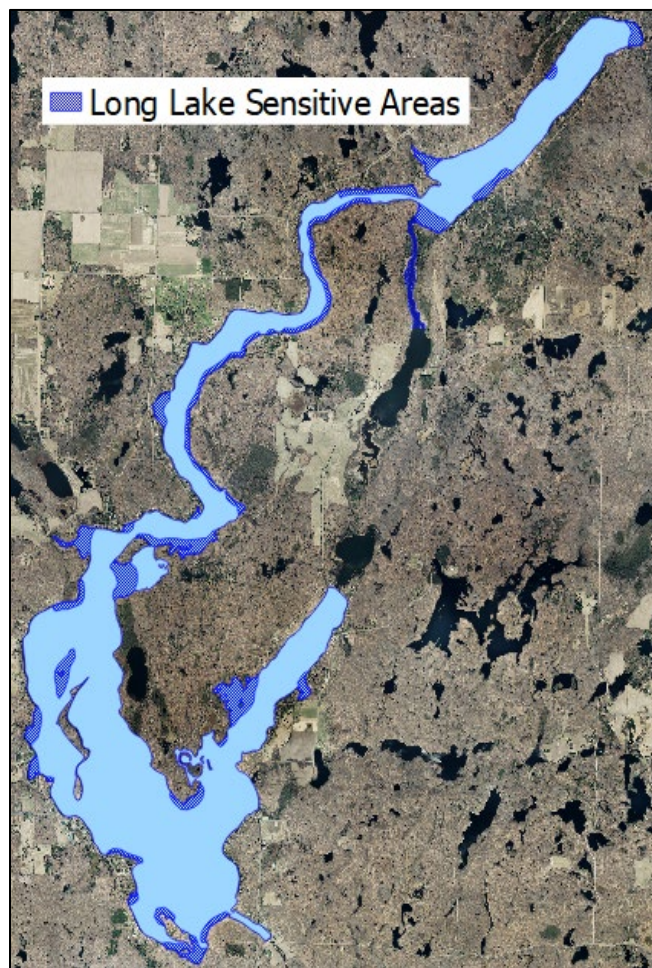


FIGURE 7. LONG LAKE SENSITIVE AREAS

⁸ <https://dnr.wisconsin.gov/topic/lakes/criticalhabitat>

⁹ <https://apps.dnr.wi.gov/lakes/criticalhabitat/Project.aspx?project=10419350>

¹⁰ <https://longlakellpa.org/resources/>

Fishery

Long Lake is a complex-two story lake with a popular multi-species fishery. In 2022, Long Lake was surveyed by the WDNR using several techniques to evaluate the status of the fishery – walleye, northern pike, largemouth bass, smallmouth bass, and panfish were assessed¹¹. A population estimate for walleye was conducted and the catch rates for northern pike, largemouth bass and panfish species were indexed. General population characteristics, size structure and growth of all species were assessed and compared to previous years. Recent fisheries management activities have been focused on stocking, regulation changes, public outreach and education.

Stocking History

Walleye are the only species to have been stocked in Long Lake. Stocking activities have occurred since 1998 and have been supported by a variety of sources – private, WDNR, tribal, and Walleye Wagon (Roberts, 2023). Since 2014, Long Lake has received only large fingerling walleye as part of the Wisconsin Walleye Initiative (average length 6.9 inches; Roberts, 2023). More information can be found at the WDNR stocking database¹².

Fishing Regulations

In Long Lake, there is an 18-inch minimum size limit and a three fish daily bag limit for walleye. All other species follow the statewide, regional, or county fishing regulations.

2022 Fishery Survey Results Summary

Walleye

There is some natural reproduction of walleye occurring in Long Lake, but stocking is still an important tool in promoting recruitment. Natural reproduction of walleye based on fall age-0 surveys has been poor since 2010 (10 fish/mile; Roberts, 2023). Low catch rates of naturally reproduced age-0 walleye were observed in fall surveys, but they are still contributing comparatively high numbers to the adult walleye population of Long Lake (Roberts, 2023). This level of higher natural contribution may be for a few reasons: 1) natural juvenile walleye survive better into adulthood than stocked fish, 2) natural juvenile walleye are not as susceptible to fall sampling methods or 3) possible fin generation has altered our results (Roberts, 2023). Supplementing the walleye population with stocking will continue to maintain the fishery, but natural reproduction – even at low levels – is an essential factor for Long Lake’s walleye (Roberts, 2023).

The Long Lake walleye population has remained relatively stable for the last 30 years, with some variation between surveys. Currently, the adult walleye population has a density of 1.9 fish/acre, which is consistent with the long-term average density (Roberts, 2023). Since 2015, the population of adult walleye has declined slightly but is still above 1.5 fish/acre, which is a target for many stocked fisheries. Despite the decline in adult fish, the overall size structure

¹¹ <https://dnr.wisconsin.gov/sites/default/files/topic/Fishing/WashburnLong2022CompSurvey%20.pdf>

¹² <https://apps.dnr.wi.gov/fisheriesmanagement/Public/Summary/Index>

has increased since 2015, and over 52% of sampled walleye at or above the minimum size limit of 18 inches (Roberts, 2023). The larger stocked year classes are not yet sexually mature, which may explain why the adult population appears lower (Roberts, 2023). The population density may increase when these immature fish enter the adult population (Roberts, 2023).

In Long Lake, walleye grow relatively quickly and reach 18 inches in 4-6 years (Roberts, 2023). The 18-inch minimum length limit and a daily bag limit of 3 walleye regulation protects mature fish and increases the chances for successful natural reproduction (Roberts, 2023). At this time, the WDNR does not recommend any changes for the minimum length limit for Long Lake due to these reasons (Roberts, 2023).

Northern Pike

The northern pike population in Long Lake has increased in abundance and average size since the last survey, and their population is stable (Roberts, 2023). Additionally, the catch rates are high when compared to other Wisconsin Complex-Two Story lakes (Roberts, 2023). The abundance of northern pike may be slightly underestimated based on survey methods.

Largemouth and Smallmouth Bass

Populations of largemouth and smallmouth bass appear stable and healthy (Roberts, 2023). Average size and growth has improved for largemouth bass, suggesting that anglers are continuing to harvest smaller bass which helps improve the growth rates for the other bass (Roberts, 2023). In this survey, all bass were observed for signs of disease (lesions or dead fish) due to an unknown disease observed in 2021; no bass were observed with signs of active disease (Roberts, 2023). Only two of the 126 largemouth and smallmouth bass collected electrofishing had healed lesions (1.6%) (Roberts, 2023). These results suggest the disease had run its course and these fish were likely surviving after the infection (Roberts, 2023).

Panfish

The bluegill population was similar to 2015 (Roberts, 2023). Bluegill size structure was good when compared to other Two-Story lakes in Wisconsin (Roberts, 2023). However, the 2015 creel survey also found good numbers of bluegill harvested at 7-8 inches, which may suggest sampling was not as effective for bluegill in Long Lake (Roberts, 2023). The black crappie population appears to be healthy in Long Lake with a good catch rate and size structure and was comparable to the last survey (Roberts, 2023). Black crappie continue to provide a popular fishery with anglers (Roberts, 2023).

Fishery Management Recommendations

The following Fishery Management Recommendations are from the 2023 Fisheries Survey Report for Long Lake, Washburn County, WI 2022 (Roberts, 2023)¹³.

1. Long Lake has a healthy stocked walleye population. Large fingerling walleye have good stocking survival and contribution to the adult fishery. Alternate year large fingerling walleye stocking should continue at the current rate (10 fish/ac).
2. The current walleye regulation (18-inch minimum length limit, three fish daily bag limit) likely keeps harvest low and the walleye population high. Good growth allows for quick replacement of 18-inch fish, so no regulation changes are recommended. This regulation also protects mature fish and increases the chances for successful natural reproduction.
3. The northern pike population seems stable and healthy. If possible, a subset of nets should be set for northern pike in the next survey. No management changes are recommended.
4. The largemouth and smallmouth bass populations changed little since 2015. The largemouth bass catch rate was slightly lower than 2015, but growth and size structure improved. There was little evidence of impacts from an unknown bass disease which was reported in largemouth bass and smallmouth bass in 2021. No management changes are recommended.
5. The panfish populations have remained similar to the last survey in 2015. Bluegill numbers are healthy and had a lower average size. Bluegill growth remains below average. This suggests lowered bag limits may not benefit bluegill. No management changes are recommended.
6. Black crappie are present at a higher density with multiple age classes present. Long Lake continues to have a strong fishery for black crappie. No management changes are recommended.
7. Efforts to increase habitat complexity in Long Lake should continue, where applicable. More inputs of coarse woody habitat, protection/promotion of aquatic vegetation and maintenance/restoration of vegetative buffers are needed habitat work in Long Lake.
8. Invasive species monitoring and control programs should continue. Efforts to keep aquatic invasive species out of a waterbody are much more effective than controlling invasive species once they are established.

¹³ <https://dnr.wisconsin.gov/sites/default/files/topic/Fishing/WashburnLong2022CompSurvey%20.pdf>

These recommendations were taken into consideration within this comprehensive plan's goals and objectives.

Aquatic Plant Community

Long Lake's native aquatic plants provide many beneficial functions. They provide habitat for a diverse range of species, support fisheries, help protect shorelines, and even help improve water quality.

Aquatic plants are essentially a first line of defense against many variables that can threaten a lake's health. Plants absorb nutrients that would otherwise fuel algal blooms. They also help keep sediments from re-suspending and reducing water clarity by slowing the movement of water and trapping sediment with their root structures. Floating and emergent species like water lilies and bullrushes can help protect shorelines from erosion by buffering waves before they reach shore.

Aquatic plants are an essential part of aquatic ecosystems because of the food and shelter they supply. Adult fish can use beds of aquatic plants for spawning habitat. Young fish use the plants for protection, and adult fish use them to ambush their prey. They also support the bacteria and plankton at the bottom of the food chain by providing structure for them to grow on; these species are then preyed on by juvenile fish and aquatic invertebrates like dragonfly larvae.

Native aquatic plants also help protect against invasive plant species like Eurasian water milfoil (EWM) and curly leaf pondweed (CLP). If there are lots of native plants and no available 'real estate', invasive plant species have no room to move in.

Aquatic Plant Survey Results

In 2022, the LLPA authorized a full point-intercept aquatic macrophyte survey to determine if Eurasian watermilfoil or any other new exotic plant had invaded the lake, and to compare data from the 2011 and 2016 surveys with the 2022 data to identify any significant changes in the lake's vegetation over time.

The following results extracted from the 2022 Long Lake Warm Water PI Macrophyte Survey Report (Berg, 2023) summarize the results of the 2022 survey and the comparisons to 2011 and 2016.

During the 2011 survey, Flat-stem pondweed, Coontail, Muskgrass, and Wild celery were the most common macrophyte species found. Present at 42.64%, 40.24%, 33.22%, and 31.34% of survey points with vegetation respectively, they accounted for 37.91% of the total relative frequency. Fries' pondweed (7.35%), Northern water-milfoil (6.25%), Slender naiad (5.15%), Common waterweed (5.06%), and Small pondweed (4.54%) also had relative frequencies over 4.00%.

The August 2016 survey identified Northern water milfoil, Coontail, Flat-stem pondweed, and Muskgrass as the most common species. These species were found at 39.24%, 38.02%, 37.50%, and 29.69% of sites with vegetation, and, collectively, they accounted for 39.83% of the total relative frequency. Wild celery (6.65%), Slender naiad (5.98%), Small pondweed (5.94%), Common waterweed (4.64%), and Fries' pondweed (4.02%) also had relative frequencies over 4.00% (Maps for all plants found in 2016 can be found in the project folder).

Lakewide, 12 species saw significant changes in distribution from 2011 to 2016. Northern water-milfoil enjoyed a highly significant increase ($p < 0.001$), and Southern naiad saw a moderately significant increase ($p = 0.009$). Conversely, Fries' pondweed and Stiff pondweed suffered highly significant declines ($p < 0.001$); Wild celery ($p = 0.002$), Needle spikerush ($p = 0.004$), Northern wild rice ($p = 0.004$), and Blunt-leaf pondweed ($p = 0.002$) underwent moderately significant declines; and Flat-stem pondweed ($p = 0.02$), Sago pondweed ($p = 0.01$), Nitella ($p = 0.01$), and Small bladderwort ($p = 0.04$) saw significant declines.

The July 2022 survey identified Coontail (45.83% of points with vegetation), Flat-stem pondweed (44.83%), Small pondweed (33.00%), and Northern water-milfoil (27.50%) as the most common species with a combined relative frequency of 41.32%. Muskgrass (6.56%), Fries' pondweed (6.29%), Wild celery (5.28%), Slender naiad (4.24%), and Illinois pondweed (4.19%) also had relative frequencies over 4.00%.

From 2016 to 2022, eight species experienced significant changes in distribution (Figure 8). Filamentous algae, Coontail, Flat-stem pondweed, Small pondweed, and Fries' pondweed all saw highly significant increases ($p < 0.001$); and Common bladderwort ($p = 0.03$) and aquatic moss ($p = 0.03$) both had significant increases. Northern water-milfoil was the only species that showed a statistically significant decline, and it was moderately significant ($p = 0.003$).

Flat-stem pondweed was the most common species during the initial 2011 survey when it was present at 249 sites with a mean rake fullness of 1.82. During the 2016 survey, it had undergone a significant decline ($p = 0.02$) in distribution to 216 sites and a highly significant decline ($p < 0.001$) in density to a mean rake fullness of 1.42. Visual analysis of the maps showed these pullbacks were essentially a lakewide phenomenon; however, despite these losses, it remained the third most common species on the lake. In 2022, there was a highly significant increase ($p < 0.001$) in distribution (269 sites), and a significant increase ($p = 0.01$) in density (mean rake fullness of 1.54) as it climbed to the second ranked species in the community.

Coontail was the second most common species during both the 2011 and 2016 surveys. Over this time, it underwent a non-significant decline ($p = 0.16$) in distribution from 235 sites in 2011 to 219 sites in 2016. It also saw a moderately significant decline ($p = 0.005$) in mean rake fullness from 1.91 in 2011 to 1.44 in 2016. The 2022 survey found it at 275 sites, and it was the most common macrophyte in the community. Although this was a highly significant increase ($p < 0.001$) in distribution, it underwent a nearly significant decline ($p = 0.07$) in density to a mean rake fullness of 1.36.

Northern water-milfoil was just the sixth most common species in 2011 (142 sites) before jumping to become the most common species in 2016 (226 sites). This highly significant increase ($p < 0.001$) in distribution was accompanied by a moderately significant increase ($p < 0.01$) in density from a mean rake fullness of 1.46 in 2011 to 1.63 in 2016. This trend had reversed in 2022 as it suffered a moderately significant decline ($p = 0.003$) in distribution (165 sites) and a significant decline ($p = 0.03$) in density (mean rake fullness of 1.50). It also fell to the fourth ranked plant in the overall community. A species known for boom/bust population cycles, its lakewide expansion and subsequent contraction may explain some of the other significant changes in density and/or distribution we observed in species that prefer the same sandy muck habitat such as Muskgrass, Slender naiad, Fries pondweed, Stiff pondweed, and Wild celery.

Wild Rice

In 2011, Northern wild rice was widely scattered throughout Long Lake. Rice plants were growing in creek and seep inlets as well as in sheltered muck-bottomed bays; especially those that had stump fields. Lakewide, it was present in the rake at 20 points with six additional visual sightings. Of these, none had a rake fullness value of 3, eight were a 2, and twelve were a 1. This produced a mean rake fullness of 1.40 and suggested 0.4% of the lake had a significant amount of rice (rake fullness of 2 or 3). Most of the rice observed during the original survey was extremely patchy and not fit for human harvest.

During the 2016 survey, rice was recorded at six points with ten additional visual sightings. This moderately significant decline ($p = 0.004$) in total distribution and rake fullness 2 ($p = 0.004$) was accompanied by a moderately significant decline ($p = 0.001$) in density as all samples were a rake fullness of 1. Consequently, in 2016, there were no areas that even approached having human harvest potential.

The 2022 survey found rice at ten points with ten additional visual sightings. None had a rake fullness of 3, two were a 2, and the remaining eight were a 1 for a mean rake fullness of 1.20 (Figure 13). This increase in distribution compared to 2016 was not significant ($p = 0.26$). Similarly, none of the changes in rake fullness were significant, although mean density was nearly so ($p = 0.08$). As in the past, none of the rice beds offered significant human harvest potential. The densest areas occurred in the far northeast bay, but the rice only occurred at moderate density over a small area.

Floristic Quality Index

The Floristic Quality Index is a tool used to assess the ecological integrity of a waterbody based on the composition of its plant community (Nichols, 1999). Some species only occur in high quality habitat, and some thrive in low quality conditions. The presence of these species can indicate the health of the lake.

In 2011, 51 native index species were identified with a mean Coefficient of Conservatism of 6.3 and a Floristic Quality Index of 44.9. The 2016 point-intercept survey identified a total of 49 native index plants with a mean Coefficient of Conservatism of 6.1 and a Floristic Quality Index of 42.9. The 2022 point-intercept survey found a total of 49 native index plants with a mean

Coefficient of Conservatism of 6.2 and a Floristic Quality Index of 43.7. An average score for the North Central Hardwood Forests Region is 5.6, putting Long Lake well above average for this part of the state. The FQI was also more than double the median FQI of 20.9 for the North Central Hardwood Forests (Nichols, 1999).

Filamentous Algae

Filamentous algae are normally associated with excessive nutrients in the water column from such things as agricultural and residential runoff, internal nutrient recycling, and failed septic systems. In 2011, these algae were located at 107 sites with a mean rake fullness of 1.54. The 2016 survey documented them at 88 points with a mean rake fullness of 1.17 – a nearly significant decline in distribution ($p=0.08$), and a highly significant decline ($p<0.001$) in density. In 2022, there was a sharp reversal in algal levels, as there were highly significant increases ($p<0.001$) in both distribution (135 sites) and density (mean rake fullness of 1.43). Visual analysis of the map showed these expansions appeared to be lakewide.

Curly-leaf Pondweed

Curly-leaf pondweed (CLP) is an aquatic invasive plant species. It thrives early in the growing season and can crowd out native plant species. It was first identified in Long Lake in 2005. The leaves are reddish-green, oblong, and about 3 inches long, with distinct wavy edges that are finely toothed. The stem of the plant is flat, reddish-brown and grows from 1 to 3 feet long. The density of curly-leaf pondweed early on prompted the first Long Lake Aquatic Plant Management Plan that is now expired. However, its density has drastically reduced since its initial introduction and is not a major concern at this time.

During the 2011 survey, Curly-leaf pondweed was present at four sites, all of which had a rake fullness of 1. In 2016, CLP was found at three points with one additional visual sighting (all points again had a rake fullness of 1). The July 2022 survey documented a single CLP plant in the rake at a single point. Because CLP normally completes its annual life cycle by late June and most plants have set turions and senesced by early July, this midsummer survey tells little about the current distribution and density of this potentially invasive exotic species.



Other Aquatic Invasive Species

There was no evidence of Eurasian water-milfoil – a highly invasive species – in Long Lake during the 2022 survey. However, in addition to Curly-leaf pondweed, four other exotic species were documented growing in and around the lake: Yellow iris, Common forget-me-not, Reed canary grass, and Hybrid cattail.

Yellow iris was restricted to the northeast bay, but it appeared to be spreading rapidly as we noticed clusters of plants were peppered along much of the northern shoreline. Common forget-me-nots were less common, and we only saw them around a few cold-water seeps. In contrast, Reed canary grass was regularly encountered in disturbed shoreline areas throughout the system.

Narrow-leaved cattail (*Typha angustifolia*) - a species native to southern but not northern Wisconsin that, along with its hybrids with Broad-leaved cattail (*Typha latifolia*) tends to be invasive - continues to expand on the lake. In 2011, Hybrid cattail (*Typha X glauca*) was found at 32 sites with a mean rake fullness of 2.84. This species formed dense stands east and south of Rice Island and in the bays on the north shoreline of the “Thumb”. By 2016, these beds had expanded to cover 41 sites all of which had a rake fullness of 3. The 2022 survey found them at 38 points all of which again had a rake fullness of 3.

In 2016, several Purple loosestrife (*Lythrum salicaria*) plants were found in the Narrows. Despite rechecking these areas in 2022, there was no further evidence of this species.

Other AIS include Banded Mystery Snail and Chinese Mystery Snail, both verified in 2005¹⁴.

AIS Management Recommendations

Curly-leaf pondweed should continue to be monitored through regular AIS monitoring protocol to observe its relationship to the native plant community. It currently appears to have assimilated with the native plant community and does not pose a significant threat to habitat or navigation.

Yellow iris appears to be spreading rapidly in the northeast bays of the lake. Because no biological control agents currently exist for this species, it is strongly recommended to residents to watch for and eliminate plants on their property before a minor problem becomes a significant one. Plants should be bagged to prevent seed dispersal and disposed of well away from the lake. June is the best time to look for this iris as the bright yellow “fleur-de-lis” are most common at this time. At other times of the year when it is not in bloom, its leaves could be confused with Northern blue flag (*Iris versicolor*) – a native and non-invasive species.

Purple loosestrife wasn’t seen anywhere during the July 2022 survey, but it is unlikely that the plant has been eliminated from the system. Because of this, residents should be on the lookout for Purple loosestrife in August and September when the bright fuchsia candle-shaped flower spikes are most easily seen. Plants should be bagged and disposed of well away from any

¹⁴ <https://apps.dnr.wi.gov/lakes/lakepages/LakeDetail.aspx?wbic=2106800&page=invasive>

wetland. Also, because the plants have an extensive root system, care should be taken to remove the entire plant as even small root fragments can survive and produce new plants the following year.

All of Wisconsin's cattails have wildlife value as many bird species nest in them, and muskrats and a variety of insects use them as food. Because Narrow-leaved cattail and its hybrids can be invasive along the shoreline to the point that they interfere with lake access, property owners may want to remove pioneering individuals before they become a bed. However, unless they are interfering with human activity, removing previously established stands is probably unnecessary and unlikely to be ecologically beneficial. Because cattail seeds are transported by the wind, the continued expansion of this species in northern Wisconsin is likely inevitable.

Below are identifying characteristics of AIS in Long Lake courtesy of the WDNR Aquatic and Wetland Invasive Species Identification Guide.¹⁵

Curly leaf pondweed - CLP
(*Potamogeton crispus*)



Photos: Frank Koshere, Paul Skawinski

Leaves: Submersed and alternate; attached directly to stem; oblong leaves (1.2-9 cm [0.5-3.5 in] long, 4-10 mm [0.16-0.4 in] wide) have **distinctly wavy edges with finely serrated teeth** and 3-5 veins. Sheaths (stipules) up to 0.5 cm (0.2 in) long are free of the leaf base and disintegrate with age.

Flowers: Tiny, with 4 petal-like lobes; in terminal spikes (1-3 cm; 0.4-1.2 in) on stalks up to 7 cm (2.75 in) above the water surface.

Fruits & seeds: Seed-like achene (4-6mm; 0.16-0.24 in) including 2-3 mm [0.08-0.12 in] beak, back ridged).

Roots: Fibrous, from slender rhizomes.

Similar species: There are many native pondweed (*Potamogeton*) species found in Wisconsin. They vary considerably in leaf width, shape, and overall size, although none of them have a visibly serrated leaf margin or produce a similar pine-cone like turion. Curly-leaf pondweed emerges early in the growing season and typically dies back by mid-summer, although in cold water systems (such as spring fed trout streams) it can persist year-round.

Eurasian water-milfoil - EWM
(*Myriophyllum spicatum*)



Photo: Paul Skawinski

Leaves: Feather-like; leaves with **12 or more pairs of leaflets**; typically arranged in whorls of 4 leaves around the stem; leaves fall limp when pulled out of water; whorls of leaves spaced 1-3 cm (0.4-1.2 in) apart on stem.

Flowers: Small, yellow or reddish, 4-parted on a spike that projects 5-10 cm (2-4 in) above the water surface.

Fruits & seeds: A hard, segmented capsule containing four seeds.

Roots: Fibrous, often developing on plant fragments.

Similar species: There are several native water-milfoils (*Myriophyllum* spp.) which may be confused with EWM, however these milfoils generally have fewer than 12 pairs of leaf segments, whereas Eurasian water-milfoil leaves have 12 or more. *M. spicatum* can cross with native *M. sibiricum*, forming a viable hybrid with intermediate characteristics. Non-native parrot feather (*M. aquaticum*) often produces more than 4 leaves in a whorl and has emergent leaves. Native coontail (*Ceratophyllum demersum*) has leaves that are forked like a wishbone (not feather-like) and toothed, giving the plant a rough feel when pulled through the hand.

¹⁵ <https://dnr.wisconsin.gov/topic/Lakes/AIS/Monitoring.html>

Yellow flag iris
(Iris pseudacorus)



Photo: Granberg

Leaves & stems: Broad, sword-shaped leaves grow upright, tall and stiff; green with a slight blue-grey tint.

Flowers: Showy and variable in color from pale to dark yellow; need flowers to know ID, but should still take pictures of plant if suspected. 7.5-10 cm (3-4 in) wide and on a stem which can be 1.0-1.2 m (3-4 ft) tall; blooms from April to June; three upright petals are less showy than the larger three downward pointing sepals, which may have brown to purple colored streaks.

Fruits & seeds: Fruits are 6-angled capsules, 5-10 cm (2-4 in) long; each fruit may have over 100 seeds that start pale before turning dark brown; each seed has a hard outer casing with a small air space underneath, which allows the seeds to float.

Roots: Thick, fleshy pink-colored rhizomes spread extensively in good conditions, forming thick mats that can float on the surface of water.

Similar species: When not flowering, yellow flag iris could be easily confused with native blue flag irises (*I. versicolor* and *I. virginica*) as well as other ornamental iris that are not invasive. Blue flag irises are usually smaller and do not tend to form dense monocultures. Yellow flag iris which is not in flower may also be confused with other emergent plants such as cattails (*Typha* spp.), sweet flag (*Acorus* spp.), or bur-reeds (*Sparganium* spp.).

Purple loosestrife – PL
(Lythrum salicaria)



Leaves: Simple, lance-shaped and attached directly to the stem; usually opposite and rotated 90° from those below, but are sometimes whorled.

Flowers: Closely attached to the stem with 5-6 purple-pink colored petals; blooms from the bottom of the flower spike to the top from late June to September; plants can bloom the first year after seeds germinate.

Fruits & seeds: Capsules burst open when mature in late July-September.

Roots: Large woody taproot and many side roots; plants intertwine to form dense clumps.

Stems: Green, sometimes tinged purple, stiff, erect, and generally 4-sided (older stems, 5 or 6 sided).

Similar species: Garden loosestrife (*Lysimachia vulgaris*) is a non-native, wetland garden escapee with yellow flowers. Smaller, native winged loosestrife (*L. alatum*) is found in moist prairies and wet meadows, has winged, square stems, solitary flowers in separated leaf axils, paired lower leaves and alternate upper leaves. Swamp loosestrife (*Decodon verticillatus*) arches out from shorelines, has mostly whorled leaves, and flowers in well-separated leaf axils.

Chinese mystery snails - CMS
(Cipangopaludina chinensis malleata)



Photo: Paul Skawinski, ???

Adult snails are often greater than 1.5 inches in length.

They have a width to height ratio of 0.74–0.82, the shell has 6–7 whorls.

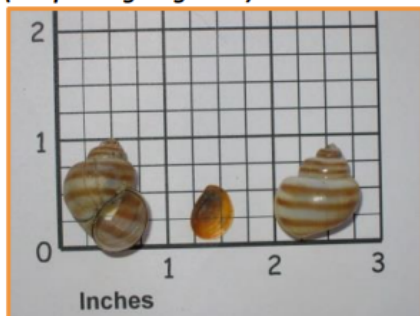
Operculum (trap door) present

Shell is typically light to dark olive green

Uniform coloring on the shell (no banding)

Chinese mystery snail is often wider than the native brown mystery snail.

Banded mystery snails - BMS
(Viviparus georgianus)



Often smaller than Chinese mystery snails

Adult snails can get up to 1.5 inches in length

Operculum (trap door) present

Shells have distinct reddish-brown bands circling the shell. This feature is obvious in empty shells, but more subtle on living snails.

Considerations for Management

Long Lake continues to have an exceptionally healthy aquatic plant community. Like trees in a forest, these native plants are the basis of the aquatic ecosystem. They capture the sun's energy and turn it into usable food, "clean" the water of excess nutrients, and provide habitat for other organisms like aquatic invertebrates and the lake's fish populations. Because of this, preserving them is critical to maintaining the lake's overall health. Unfortunately, when phosphorus and nitrogen levels exceed what the lake's macrophytes can utilize, it tends to promote algae blooms which impact these sensitive species as well as general lake aesthetics. Soil erosion, especially from lakeshore development, and agricultural runoff can also be significant contributors to a lake's overall nutrient load. Internal loading from nutrient rich sediments like those found in Long Lake's side bays can also contribute significant amounts of phosphorus to the water column.

Regardless of the primary source of a lake's nutrient inputs, all residents have the opportunity to help reduce runoff by evaluating how their shoreline practices may be impacting the lake. Simple things like establishing or maintaining a buffer strip of native vegetation along the lakeshore to prevent erosion, building rain gardens, bagging grass clippings, switching to a phosphorus-free fertilizer or preferably eliminating fertilizer near the lake altogether, collecting pet waste, and disposing of the ash from fire pits away from the lakeshore can all significantly reduce the amount of nutrients entering the system. Hopefully, a greater understanding of how all property owners can have lake-wide impacts will result in more people taking appropriate conservation actions to not only help improved water clarity and quality, but also to benefit the lake's native plant species.

Watershed

A watershed is an area of land that drains rainfall and snowmelt to a body of water. Slim Creek Watershed (20,625.77 acres) and Long Lake Watershed (33,545.14 acres) make up the land area that drains directly to Long Lake (Figure 8). The Slim Creek Watershed contributes to the North Basin through Slim Creek, and the Long Lake Watershed contributes to the lower portion of the lake. The Long Lake watershed areas are part of the larger Brill River-Red Cedar River Watershed¹⁶.

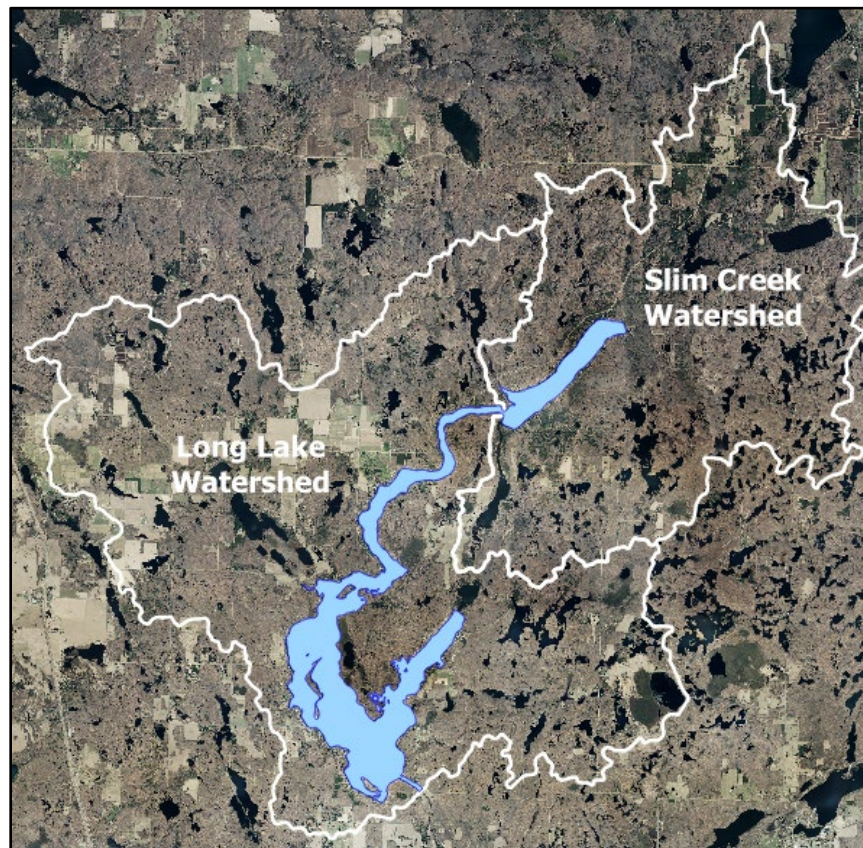


FIGURE 8. LONG LAKE WATERSHEDS

¹⁶ <https://apps.dnr.wi.gov/water/waterDetail.aspx?key=15992>

Land Cover

The U.S. Geological Survey (USGS) has developed a National Land Cover Database (NLCD) that provides spatially explicit and reliable information on land cover¹⁷. This publicly accessible dataset makes it possible to accurately map land cover¹⁸. The NLCD 2019 database was used to map the land cover of Long Lake’s watershed area.

The watershed has very little development and is largely dominated by forest cover (Figure 9; Table 3; Figure 10). Deciduous forests alone make up 54.08% of the watershed (Table 3). What little development there is in the watershed (3.77%) is mostly related to roadways and resort areas around Long Lake (Figure 9). There are 5,106.43 acres of agriculture (Cultivated Crops + Pasture/Hay) in the watershed (Figure 9; Table 3; Figure 10). Wetlands (Woody Wetlands + Emergent Herbaceous Wetlands) make up 12.64% of the watershed, and open water (lakes, ponds, rivers, etc.) make up 11.58% of the watershed (Table 3; Figure 10).

Understanding the land cover of a watershed is an important piece to understanding the impacts of human actions on the landscape like agriculture, logging, developing, etc. It is also valuable for understanding potential sources of pollution (i.e., nutrients and sediment) that can negatively affect a waterbody. A natural watershed, like the Long Lake watershed area, is a critical piece of protecting the lake and limiting negative landscape-scale impacts.

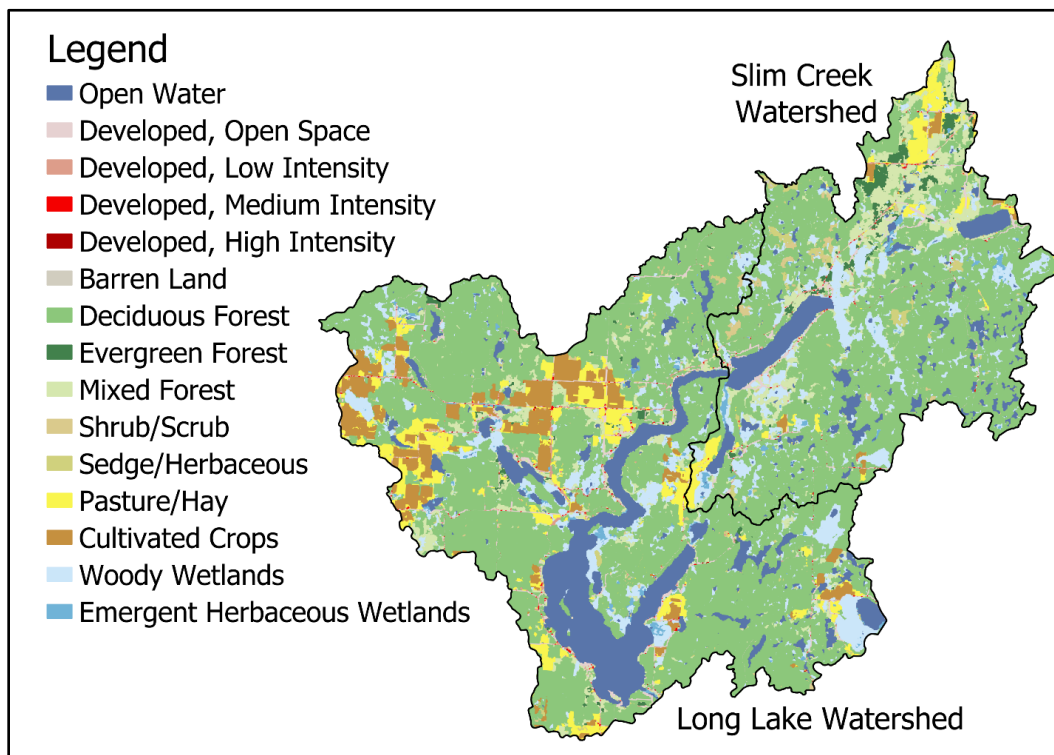


FIGURE 9. LONG LAKE WATERSHED AREA LAND COVER (NLCD, 2019)

¹⁷ <https://www.mrlc.gov/data/nlcd-2021-land-cover-conus>

¹⁸ For more information on NLCD Land Cover Classifications: <https://www.mrlc.gov/data/legends/national-land-cover-database-class-legend-and-description>

TABLE-3. LONG LAKE WATERSHED AREA LAND COVER (NLCD, 2019)

NLCD Classification	Acres	Percent of Total
Open Water	6,272.50	11.58%
Developed, Open Space	1,444.87	2.67%
Developed, Low Intensity	424.98	0.78%
Developed, Medium Intensity	143.21	0.26%
Developed, High Intensity	29.27	0.05%
Barren Land	17.28	0.03%
Deciduous Forest	28,203.60	52.08%
Evergreen Forest	668.93	1.24%
Mixed Forest	3,871.79	7.15%
Shrub/Scrub	434.16	0.80%
Sedge/Herbaceous	690.25	1.27%
Pasture/Hay	2,688.20	4.96%
Cultivated Crops	2,418.23	4.47%
Woody Wetlands	6,224.73	11.50%
Emergent Herbaceous Wetlands	618.26	1.14%
Total	54,150.26	100.00%

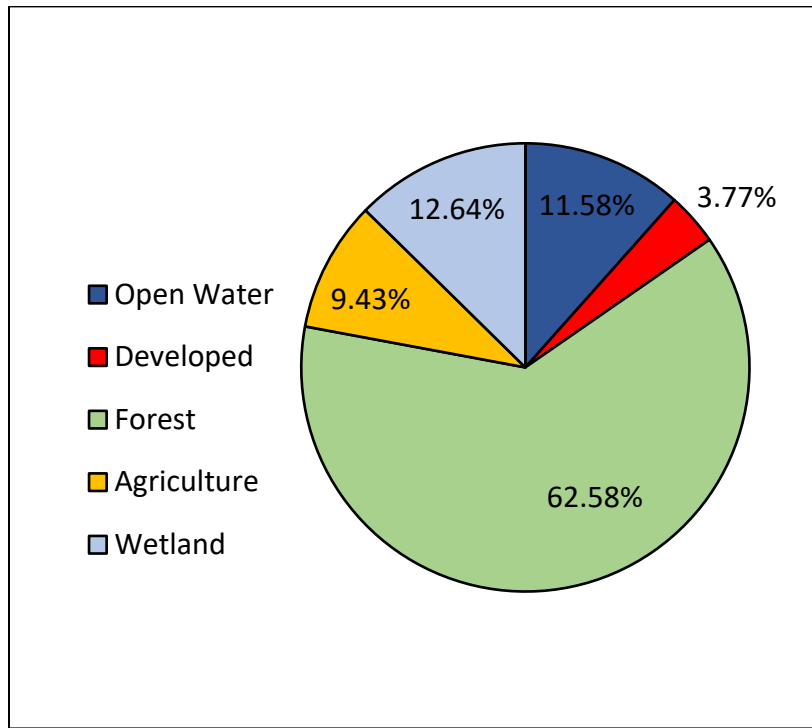


FIGURE 10. SIMPLIFIED LONG LAKE WATERSHED AREA LAND COVER (NLCD, 2019)

The Long Lake watershed area is primarily forested and undeveloped due to the large areas of Washburn County Forest and Tomahawk Scout Camp land (Figure 11). The Washburn County Forest makes up 30.18% of Long Lake’s Watershed area, DNR managed lands (including Dory’s Bog State Natural Area) makes up 0.31%, and the Tomahawk Scout Camp land makes up 5.51% of the watershed. These areas will not see major development or land cover changes and make up 36.00% of the watershed (Figure 11). Forested areas have less runoff and less phosphorus concentration in runoff due to tree cover breaking raindrops, more infiltration of water into the soil, and less erosion.

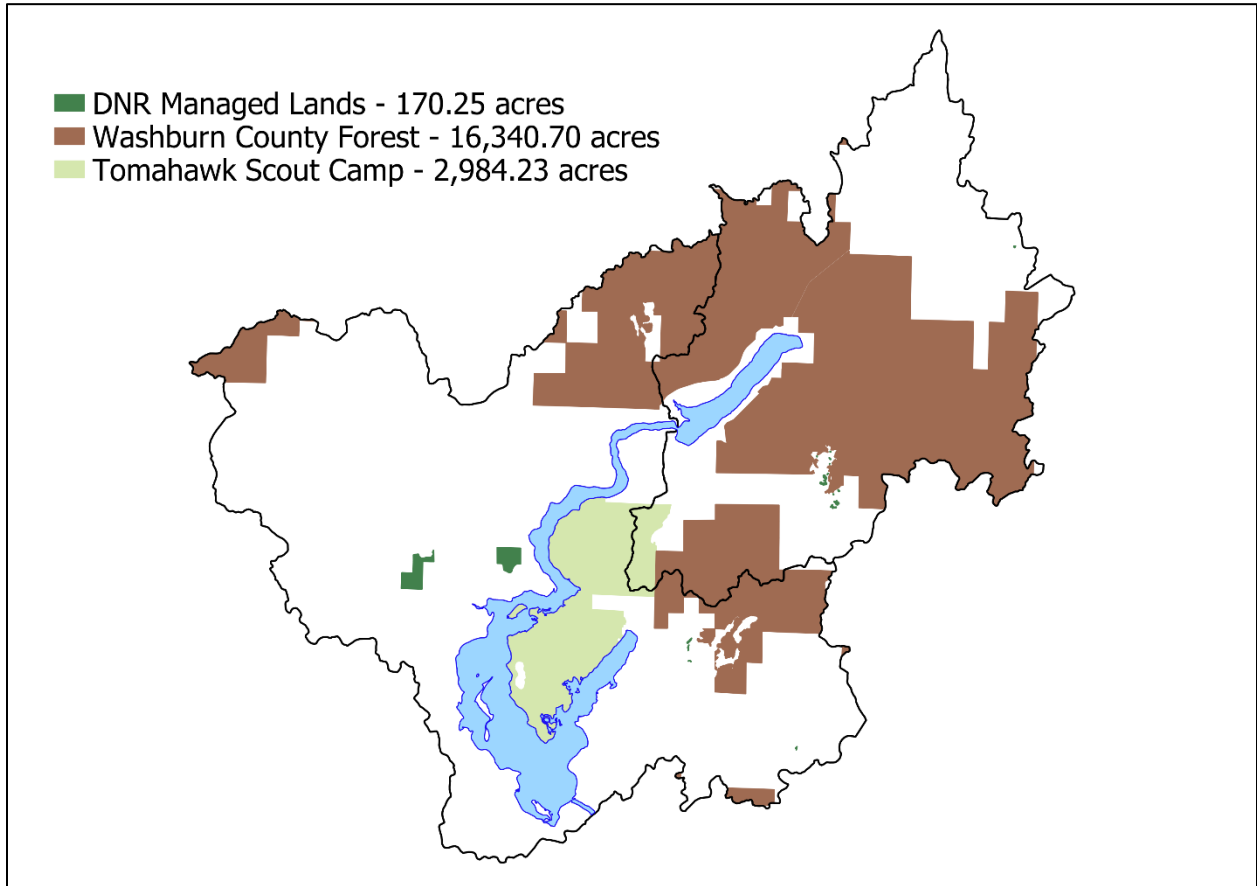


FIGURE 11. LONG LAKE WATERSHED PRIMARY FOREST AREAS

Sources of Pollution

There are two main categories of pollution sources: point source and nonpoint source. Point source pollution sources are any single identifiable sources of pollution like discharge pipes, smokestacks, and drainage ditches (e.g., sources you can *point* to). Nonpoint source pollution sources are pollution sources that do not originate from a single discrete source like agricultural lands and residential areas.

The Wisconsin Lake Modeling Suite (WiLMS) calculates nonpoint source phosphorus loading using land cover information¹⁹. WiLMS estimates that 7,492 pounds of phosphorus are entering Long Lake through nonpoint sources (Table 4). Most of that phosphorus is coming from natural sources like forest land use (37.45% of total phosphorus load), but 32.01% (pasture/grass + rural residential + row crop agriculture + urban) come from nonpoint sources that could be alternatively managed to reduce phosphorus runoff (Table 4).

TABLE-4. NONPOINT SOURCES OF PHOSPHORUS (WILMS)

Land Use	Likely P Load (kg/ha)	Load (lbs)	% of Total P Load
Forest	0.09	2,806	37.45%
Lake Surface	0.30	1,952	26.05%
Pasture/Grass	0.30	1,109	14.80%
Wetlands	0.10	336	4.48%
Rural Residential	0.10	213	2.84%
Row Crop Ag	1.00	1,074	14.34%
Urban	0.50	2	0.03%
Total	2.39	7,492	100.00%

The Wisconsin Healthy Watersheds Assessment (HWA) evaluates watersheds by aggregating multiple metrics of health and vulnerability into composite indexes²⁰. Long Lake has an overall HWA Health score of 71, which puts it into the 60th-80th percentile of Wisconsin Lakes. This means that Long Lake is in relatively good condition. The overall vulnerability score for Long Lake is 86, which puts it into the <20th percentile. This means that Long Lake is especially vulnerable to climate change, runoff changes, total nitrogen changes, total phosphorus changes, total suspended sediment changes, and water use changes. Identifying watersheds that are both healthy and vulnerable can be a useful tool for water quality planning.

¹⁹ <https://dnr-wisconsin.shinyapps.io/WaterExplorer/?stationid=663088>

²⁰ <https://dnr-wisconsin.shinyapps.io/WaterExplorer/?stationid=663088>

Shoreland

There are many advantages to maintaining a natural shoreline. Trees and shrubs provide wildlife habitat, shade for fish and privacy for the landowner. They create a natural buffer that helps protect the water body from erosion and sedimentation when it rains. Manicured lawns, on the other hand, seldom provide this protection. If they are fertilized, heavy rains carry nutrients directly into the lake. The cumulative effect of many lawns along a lake shore will adversely affect water quality, fish, wildlife, and esthetics.

With increased shoreland development, high quality habitat is degraded, and many species are adversely impacted. For example:

- Frogs decrease with increased shoreland development density (Woodford, 2003)
- Loons avoid lakes with low water clarity and high shoreland development (Kelly, 1992)
- Rare songbirds decrease with increased shoreland development (Lindsay et al., 2002)
- Coarse woody habitat (essential for many species) is drastically reduced with shoreland development (Christensen et al., 1996)

Healthy Lakes and Rivers

Protecting natural shorelines, restoring developed shoreline, and following best management practices should be promoted by the LLPA. Tools and grant funding are available through the Wisconsin Surface Water Grant Program²¹. Within the grant program, Healthy Lakes and Rivers grants are available specifically for shoreland property owners to implement best management practices on their property²². These practices include:

- Fish Sticks – large woody habitat structures that utilize whole trees grouped together, resulting in the placement of more than 1 tree per 50 feet of shoreline. Fish Sticks are anchored to the shore and are partially or fully submerged. This fish and wildlife habitat best practice creates food, shelter, and breeding areas for all sorts of creatures from small aquatic insects, to fish, to turtles, ducks, and songbirds. Fish Sticks can also help prevent bank erosion – protecting lakeshore properties and your lake.
- Native Plantings – improve wildlife habitat, slow runoff water, and promote natural beauty. Each template described above serves all of these functions to some degree, but one may be better than another given a property’s unique site characteristics and areas of concern. For example, the bird/butterfly template includes flowers that attract these types of wildlife.
- Diversions – redirect runoff that would otherwise move downhill into the lake or river to a dispersion area where it can soak into the ground. It may be used in connection with a

²¹ <https://dnr.wisconsin.gov/aid/SurfaceWater.html>

²² <https://healthylakeswi.com/>

rock infiltration or rain garden practice. By increasing the frequency of diversion practices, runoff volume can be kept low, decreasing erosion.

- Rock Infiltration – capture, clean, and infiltrate runoff that would otherwise move downhill into the lake or river. It is appropriate for sandy to loamy soils only (not clay!) and may require a catch basin or diversion practice to redirect runoff water to it.
- Rain Garden – capture and infiltrate runoff allowing about 30% more water to soak into the ground than conventional lawn and can be used with any soil type. Rain gardens collectively protect lakes and rivers by diverting and cleaning polluted runoff; much of the runoff soaks into the ground and the rest is filtered through native plants that help clean the runoff before it drains to the lake or river. They also simultaneously provide habitat for birds, butterflies, and beneficial insects and promote natural beauty. Rain gardens are designed to drain within 1-2 days, which means they won't pond water long enough to grow more mosquitoes who need 7-12 days for a successful hatch.

In addition to shoreland best practices, the Healthy Lakes and Rivers program offers an online Shoreland Evaluation Tool that assists property owners in assessing their own properties and determining what practices and improvements could be appropriate.

Value of Shoreland Zoning

Another tool to protect and improve shorelines is shoreland zoning. Shoreland zoning works at the state and county level to provide guidance and protection for shorelines by limiting impervious surfaces, promoting setbacks, improving shoreland buffers, etc. The guidelines provided by shoreland zoning helps protect fish, wildlife, and water quality. The Center for Land use Education (CLUE) has a short video that describes the benefits of shoreland zoning at <https://www.youtube.com/watch?v=7BP4alqLx-g>.

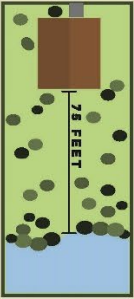


Center for Land Use Education
College of Natural Resources
University of Wisconsin-Stevens Point

Design by
Melissa Neuenhaus

THE VALUE OF SHORELAND ZONING

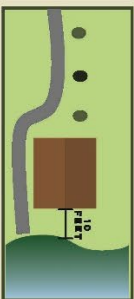
✓ SHORELAND ZONING
A house that is set back at least 75 feet from the water allows space for trees and native plants.



When hard surfaces are built far from the shore and trees and native plants are kept in place the shoreline is naturally more stable allowing:

- Clear water = **High waterfront property values**
- More trees and native plants = **Stable shorelines = Less water pollution**
- More trees and native plants = **More fish and frogs**
- Less algae growth**

✗ NO SHORELAND ZONING
A house that is close to the water does not leave space for trees and native plants that stabilize the shoreline.



When hard surfaces are built close to the shore and native plants are removed, the shoreline erodes into the lake or river causing:

- Cloudy water = **Reduced waterfront property values**
- Fewer trees and native plants = **Eroded shorelines = More water pollution**
- More lawn attracts geese
- Fewer frogs, fish, and fish species
- Increased algae growth**
- Fish eggs suffocate** when covered in eroded soil

CONCLUSIONS

Shoreland zoning standards make it possible to carefully develop a waterfront property, stabilize shorelines, protect the lake or river, and keep waterfront property values high.

For more information, check with your local zoning office.

WHAT DO SHORELAND ZONING STANDARDS ACCOMPLISH?

Stable shorelines

Clearer water = Higher property values

More food and shelter for fish and frogs

More fish and fish species

CONCLUSIONS

Waterfront property developed without shoreland zoning standards can cause eroded shorelines, a degraded lake or river, and reduced waterfront property values.

Complete the Shoreland Evaluation Tool to assess your waterfront property at survey.healthylakeswi.com.



Extension
UNIVERSITY OF WISCONSIN-MADISON

Riparian Land Ownership

Long Lake’s shoreline is primarily privately owned with a mosaic of large parcels and smaller, lotted parcels. The Tomahawk Boy Scout Camp covers nearly 3,000 acres (1,000 acres of parcels directly adjacent to the shoreline) and 8.5 miles of Long Lake’s shoreline; this portion of shoreline is largely natural and undeveloped (Figure 12). The surrounding towns of Madge, Birchwood, and Long Lake own small lots on the lake. The LLPA also owns a small lot in the North Basin of Long Lake. The rest of the shoreline is privately owned.

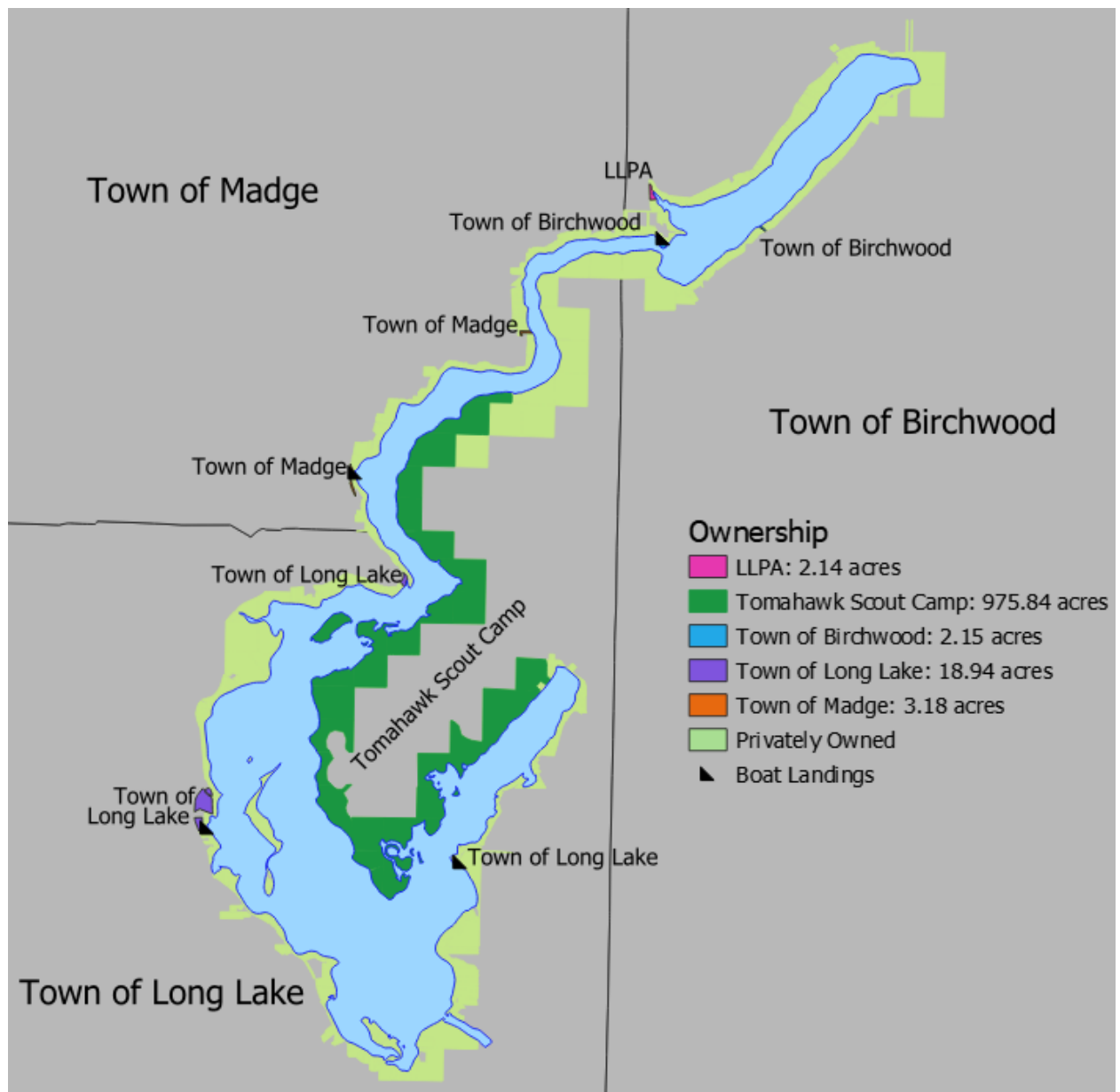


FIGURE 12. RIPARIAN LAND OWNERSHIP

Shoreland Habitat Monitoring

In order to assess the state of Long Lake's shoreline, the LLPA performed a Shoreland Habitat Assessment. Volunteers used the Lake Shoreland & Shallows Habitat Monitoring Field Protocol to assess tax parcels along Long Lake's shoreline; count and categorize Long Lake's coarse woody habitat, and document the shoreline with a photo survey loop.

The Lake Shoreland guidance document provides a standard methodology for mapping habitat in lake shoreland areas, including the riparian, bank, and littoral zones. The data collected is intended to provide important information for use by local and regional resource managers, community stakeholders, and others who are interested in protecting and enhancing Wisconsin's lakes.

This data can be used to highlight areas where Healthy Lakes best management practices, like rain gardens and Fish Sticks, could be implemented or areas where the shoreline should be preserved in its natural state.

Shoreline Habitat Assessment

In the shoreline habitat assessment, 26 volunteers spent 183 hours assessing nearly 1,000 shoreline tax parcels. The riparian buffer zone was assessed for tree cover, human structures, and runoff concerns; the bank zone for modifications and erosion; and the littoral zone for human structures and docks.

Using riparian canopy cover and the percentages of herbaceous/shrub cover, impervious surfaces, manicured lawn, and agriculture as indicators of development, scores were assigned to parcels on a scale of 0-5 with 5 representing totally undeveloped shorelines and 0 representing worst case developed shorelines. No parcels scored below 2.5 based on these parameters. The survey showed that there are condensed areas where improvements could be made and areas where the shoreline should continue to be protected (Figure 12).

The area of the Tomahawk Boy Scouts Camp has a largely natural shoreline. In areas where the map below indicates lower scoring parcels, it should be noted that the large parcels of the camp are skewed by relatively developed recreational areas – these areas may be candidates for restoration projects in the future (Figure 13).

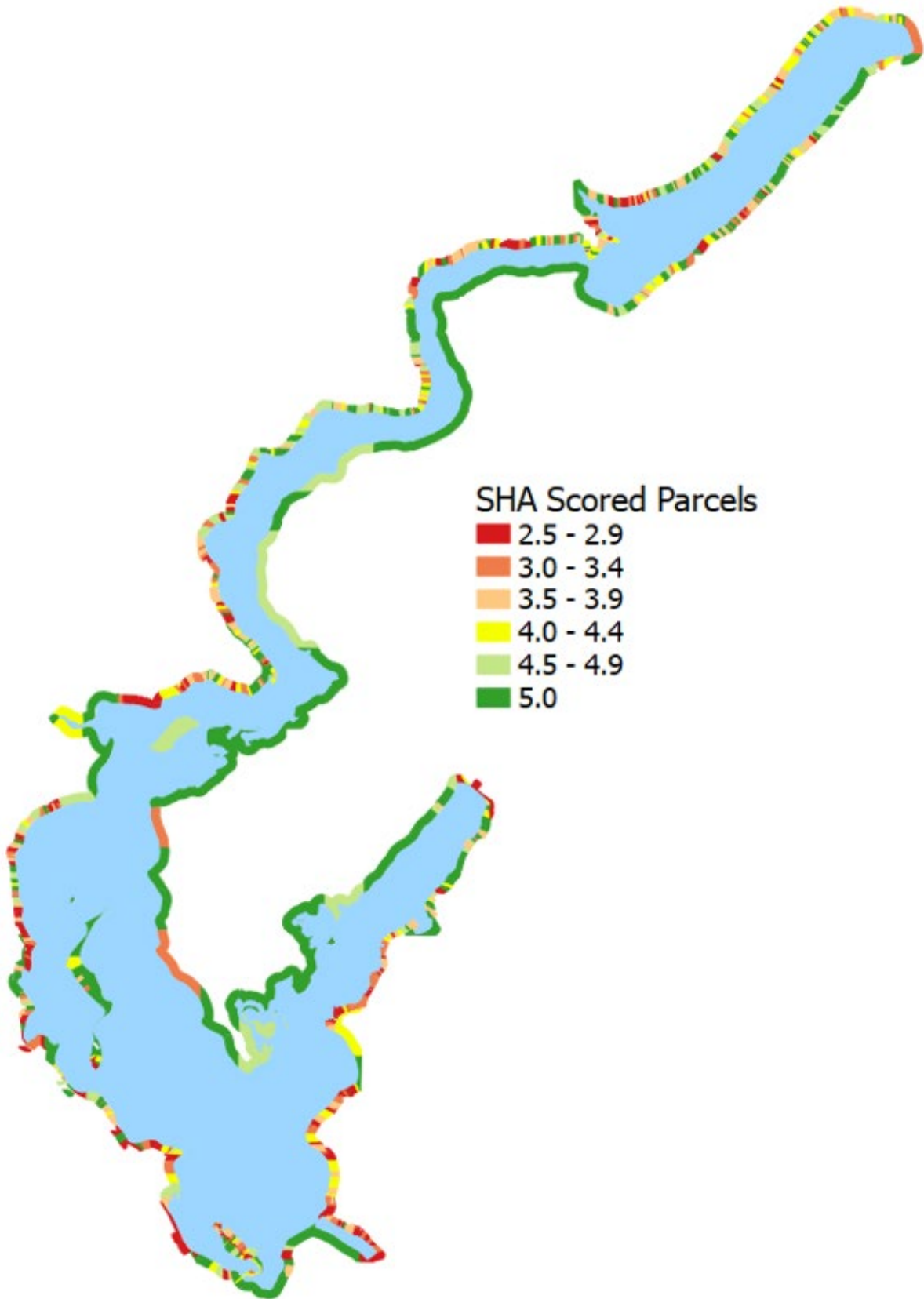


FIGURE 13. SHORELINE HABITAT ASSESSMENT SCORED PARCELS

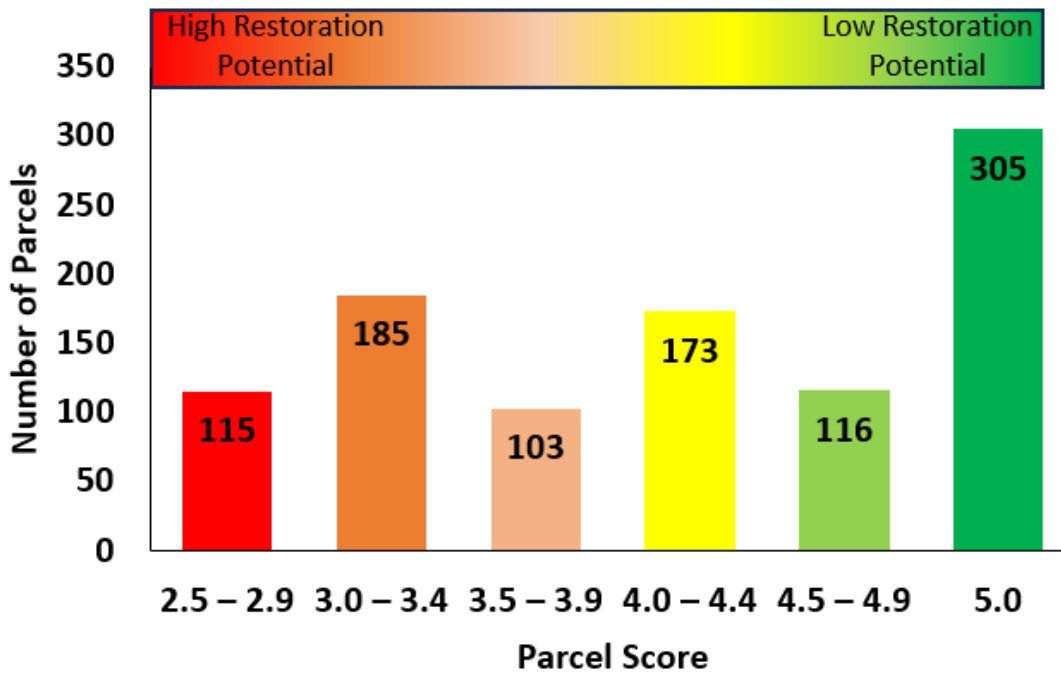


FIGURE 14. PARCEL RESTORATION POTENTIAL

Coarse Woody Habitat Survey

Coarse woody habitat (CWH) in the littoral or near-shore zone serves many functions within a lake ecosystem including erosion control, as a carbon source, and as a surface for algal growth which is an important food base for aquatic macroinvertebrates. The presence of CWH has also been shown to prevent suspension of sediments, thereby improving water clarity. CWH serves as important refuge, foraging, and spawning habitat for fish, aquatic invertebrates, turtles, birds, and other animals. Woody structure in lakes and ponds has been shown to be an important and preferred habitat for many fish species.

The LLPA solicited the assistance of the Mary Griggs Burke Center for Freshwater Innovation and the Tomahawk Boy Scout Camp to conduct the coarse woody habitat survey. The presence and characteristics of coarse woody habitat was documented around the shoreline of Long Lake following the Shoreland Habitat Monitoring Field Protocol. This protocol only enumerates “large wood,” defined as greater than 4 inches in diameter somewhere along its length and at least 5 feet long. Wood is counted that is between the high water level (HWL) and the 2 foot depth contour. Tree branches hanging over the water and live/dead wood standing vertically in the water and tree stumps with roots should were counted if they met the size criteria. Each piece of wood was marked using a GPS and given a series of scores. The wood was scored based on branchiness, whether or not it touches shore, and whether or not the wood was underwater.



On a lake with no development, there is an average of about 895 logs per mile of shoreline (about 1 log every 7 feet). On developed lakes, there is an average of about 92 logs per mile of shoreline (about 1 log every 63 feet) (Christensen et al., 1996). On Long Lake, there were 1,470 pieces of wood documented along the shoreline, for an average of about 138 logs per mile of shoreline (about 1 log every 38 feet). However, this distribution was not even around the lake. The Boy Scout Camp shoreline, bays, and natural areas contained the majority of the CWH, and some areas where there was likely additional CWH were difficult to access (Figure 15). Some areas of Boy Scout Camp shoreline did not have much CWH habitat, this is likely because the shoreline is high energy with lots of wind and wave action as well as a steeply sloping lake bottom (Figure 15).

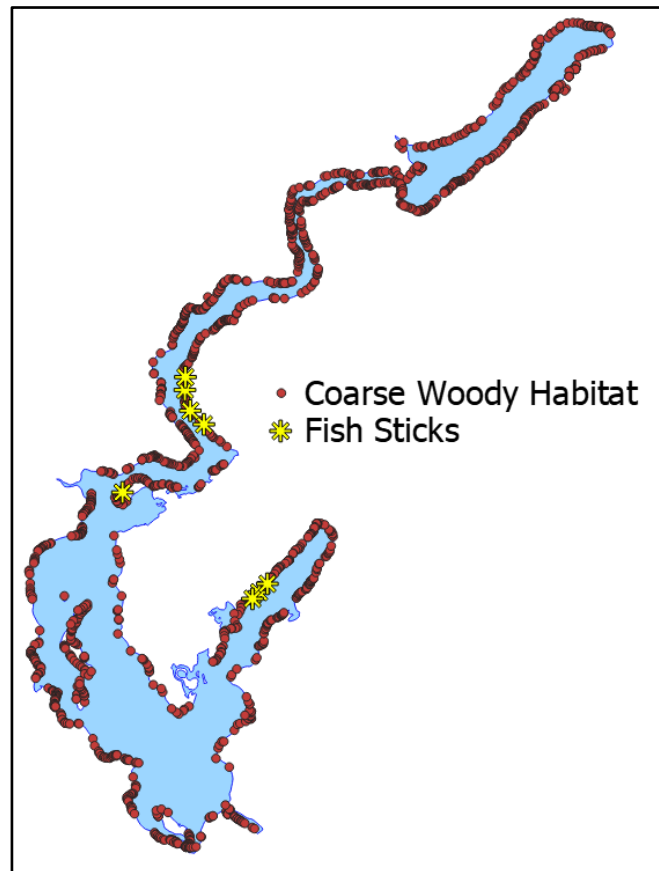


FIGURE 15. COARSE WOODY HABITAT

Shoreland Photo Survey

As part of the shoreland habitat assessment, volunteers performed a photo survey loop of Long Lake in the summer of 2023. There were 2,639 georeferenced images taken of the shoreline. The entire shoreline was photographed with slightly overlapping images taken from about 50 feet from shore and perpendicular to shore. Photos did not contain identifiable images of people.






Lake Management Tools

Lake management often focuses on water quality – especially related to nutrient loading and eutrophication. However, successful management incorporates a diversity of tools that address issues beyond just water quality. The following management tools are viewed through five lenses: improving water quality, controlling aquatic invasive species, managing algal blooms, controlling nuisance aquatic plant growth, and protection of current resources. Many strategies used to meet these challenges are similar or may complement each other. The implementation of many of these strategies is discussed in the Goals, Objectives, and Actions section of this plan. Some management tools will be discussed in greater detail in the coming Long Lake Aquatic Plant Management Plan. The management tools described in the following pages address the scientific and physical concerns of Long Lake; however, another important area of lake management is the human component. These aspects will be discussed in the Capacity Building section of this plan.

Lake systems are complex, as such, there are many unknowns when making management decisions. Adaptive management is an approach that addresses uncertainties by simultaneously managing and learning about the system. Incorporating adaptive management where possible should be a primary focus of the LLPA when making management decisions. This will allow the lake group to continue to make informed decisions based on scientific research and data before projects are implemented as well as learning from past decisions for the future.

Some lake management tools are more suitable than others; their appropriateness and/or need in Long Lake and its watershed is discussed in the sections below.

The primary management areas related to each topic are denoted using the following symbols:

-  Improving water quality
-  Controlling aquatic invasive species
-  Managing algal blooms
-  Controlling nuisance aquatic plant growth
-  Protection of current resources

Aeration Systems

Aeration systems are primarily used to increase the amount of oxygen in a waterbody. They move the water and increase its contact with the air, which adds oxygen to the water. Increasing the amount of oxygen and movement of the water helps eliminate thermocline (the division between warm, oxygen-rich surface water and cold, oxygen-depleted bottom water). Oxygenating the bottom waters enables bacteria to break down organic material (muck). Aerators can also be used to reduce aquatic vegetation in small areas.

Using aeration systems in Long Lake to have any lake-wide impact is not appropriate or feasible because systems are not designed for waterbodies as large as Long Lake. Wind and wave action are the primary drivers of aeration at a lake-wide scale. Individuals may find aeration systems useful for reducing ‘muck’ or vegetation in swim areas; however, DNR permits are required for placing structures in the water and disturbing the lake bottom.



Aluminum Sulfate (Alum) Treatments

Alum treatments are a relatively common tool used to reduce nutrients (primarily phosphorus and nitrogen) in waterbodies. These treatments should be used after point sources (e.g. effluent discharge) and non-point sources (e.g. agricultural runoff) of nutrient pollution are addressed in the watershed and riparian area. After sources of nutrients outside the lake are remediated, there may still be the need to address internal loading of phosphorus that is released from the bottom sediment. Aluminum sulfate binds to the phosphorus and keeps it from becoming biologically available, which can greatly reduce algal growth.

An alum treatment may be a management tool to consider in the future for Long Lake in the North Basin where eutrophication is most prominent and nutrients are coming directly into the basin from Slim Creek. However, the LLPA should monitor stream inputs to the lake and work to remediate shoreline and other watershed sources of nutrients before attempting to do an alum treatment. Additionally, treatment costs range from \$280/acre to \$700/acre. The North Basin is approximately 500 acres, so treating even 25% (125 acres) could cost between \$35,000-\$87,500 (not including additional applicator and permitting fees).



💧 Artificial Floating Islands

Artificial floating islands are a type of wetland treatment system designed for water quality improvement. These islands use wetland plants and microbes on small floating platforms to absorb nutrients like phosphorus and nitrogen.

This is not an appropriate management tool for Long Lake. The scale required to provide any significant nutrient reduction would be quite large. These floating islands may also cause navigation impairments.



💧 Barley Straw

Barley straw is used to control algae in small ponds. While the mechanism for control is still not completely understood, there is a chemical compound that is released as the barley straw decomposes that prevents algae from growing. Barley straw is not recognized by the WDNR as an algal control product or device. This management tool is not appropriate for use in Long Lake at this time.



🌿 Benthic Barriers

Benthic barriers are sheets of material placed on the bottom of the lake to prevent sunlight from reaching the sediment – this prevents plant growth. Benthic barriers can be effective, but it can be expensive and logistically challenging to cover large areas due to the gases that form underneath the barrier causing it to lift. These can be costly and will require a WDNR permit. This is not a feasible or appropriate management tool for Long Lake.



Biologic Control of Aquatic Invasive Species

Biologic control refers to the use of animals, fungi, or diseases to control populations of invasive species. Control organisms typically come from the same place as the invasive species where they are a natural predator and less likely to target native species. Biologic control does not usually result in the total eradication of an invasive species, but it can be effective. For example, the *Galerucella* beetle (shown on the right) can be used to control invasive Purple loosestrife (present in very low levels around Long Lake). Another aquatic invasive species where biologic control (using the *Euhrychiopsis* weevil) can be used is Eurasian watermilfoil (not present in Long Lake).



Currently, there is no need to explore biological control options in Long Lake. However, these options may be useful in the future and will be described in greater depth in the upcoming Long Lake Aquatic Plant Management Plan.

Biologic Control of Aquatic Vegetation

Biologic control of aquatic vegetation (native and non-native) typically utilizes herbivorous fish to reduce vegetation in waterbodies. Sterile grass carp are most commonly used to reduce vegetation. This is not an appropriate tool for Long Lake because biocontrol can be unpredictable and have many unintended consequences with ecologically devastating impacts.



Chemical Herbicides

Aquatic chemical herbicides are used to reduce the abundance of invasive species, to reduce spread to new water bodies, to help maintain a healthy native plant community, to improve navigational access to lakes and rivers and make boat navigation safer, and to control nuisance plant and algae growth. Herbicides are an effective tool for managing aquatic vegetation, and their use/appropriateness will be discussed in greater detail in the upcoming Aquatic Plant Management Plan (APMP). The use of herbicides must be preceded by an approved APMP and WDNR permits, and they can be expensive. Herbicides are currently not appropriate for Long Lake.

Clean Boats, Clean Waters

Clean Boats, Clean Waters (CBCW) is a WDNR program through which volunteers or paid staff conduct boat and trailer inspections and educate boaters on how to prevent the spread of aquatic invasive species at boat landings. CBCW is currently conducted at Long Lake boat landings. This can be an effective tool for reducing the introduction of invasive species. It is highly recommended that this program continues on Long Lake, especially because Long Lake currently does not have Eurasian watermilfoil, spiny waterflea, or zebra mussels – all of which are invasive species found in nearby waterbodies.



Dredging

Dredging uses large machinery to physically remove sediment from the bottom of the lake. Sediments naturally build up over time through the process of sedimentation. It can cause issues over time, such as water depth reduction or reduced navigability. Dredging is an expensive, temporary solution. It may be an option worth exploring for areas with sedimentation like the Narrows, Holy Island, and near the dam. However, all other options should be explored first due to the drastic impacts to the lake-bed that will require local, WDNR, and U.S. Army Corp of Engineer permitting and approvals.



Enhanced Wake Restrictions

A growing issue on many lakes are the hazards and ecologic issues presented by ‘enhanced wakes.’ One way to combat these issues is to develop an ordinance restricting enhanced wakes on Long Lake. This would require coordination from the surrounding townships of Birchwood, Long Lake, and Madge. Additionally, these types of ordinances are typically difficult to enforce. Therefore, it is recommended that the LLPA develop a “Preferred Enhanced Wake” map of areas where large wakes will have less of an impact. This would not be a legally enforceable document, but it would be an educational tool to show recreators areas where enhanced wakes are safer for the lake and other lake users. It is recommended that the LLPA explore the possibility of an ordinance, and in the meantime develop these educational tools.

Fish Stocking

Fish stocking is currently used to supplement and maintain walleye production in Long Lake. This activity is largely controlled by the WDNR, and the LLPA should continue to support their recommendations.

🍷 Land Acquisition and Conservation Easements

Acquiring land along Long Lake’s shoreline and in the watershed will help protect the lake from runoff and further development in perpetuity. Long Lake is currently listed as an Outstanding Resource Water, and protecting the lake should be a priority. Surface Water Grants are available to help fund land acquisitions. Once lands are acquired, they can be remediated to further protect the lake. This management tool is highly recommended for the LLPA to explore.

🌿 Manual Removal of Aquatic Plants

Aquatic plants can be manually removed through a variety of techniques. Plants can be manually removed by hand or rake, by scuba divers or snorkels, or through diver assisted suction harvesting (DASH). Shoreline property owners can remove vegetation by hand up to a maximum width of 30 feet (see NR 109, Wis. Adm. Code for more information²³). Larger areas can be managed by snorkelers or DASH (extraction of plants using a diver, suction tube, a unique set of pumps mounted on a boat and a bagging or filtration system). However, WDNR permits will be required, and these methods are typically used on invasive species.



Manually removing vegetation around docks, boat lifts, and swim rafts may be a management tool that individual landowners wish to explore. This will be explored in the upcoming Long Lake Aquatic Plant Management Plan. Individuals should contact the local aquatic plant management coordinator before engaging in any aquatic plant management activities.²⁴

🌿 Mechanical Aquatic Plant Harvesting

Aquatic plant harvesting can be an effective tool to manage dense, nuisance aquatic vegetation or aquatic invasive species like Curly-leaf pondweed (present in low levels in Long Lake). Harvesting aquatic plants can be done using large, floating machines that cut the vegetation. Harvesting is a temporary solution; however, it can be a useful tool to improve navigation.



Mechanical harvesting could be a management tool that could be used in Long Lake. The coming Long

²³ <https://dnr.wisconsin.gov/topic/lakes/plants>

²⁴ <https://dnr.wisconsin.gov/topic/lakes/plants>

Lake Aquatic Plant Management Plan will explore its feasibility in greater detail, but it could be a useful tool in some of the densely vegetated bays and other areas in Long Lake where lake access is severely impacted by the vegetation. It may also be considered in the future if the Curly-leaf pondweed in the lake begins to form dense, expansive beds. Before mechanical harvesting can take place, there needs to be an Aquatic Plant Management Plan in place (coming in 2024) and permitting needs to be approved by the WDNR.

Nanobubble Technology

Nanobubble generators can be used to oxygenate the sediment and reduce the release of phosphorus. Oxygenating the bottom waters enables bacteria to break down organic material. Using this technology in Long Lake may be a management option in the near future as the technology becomes more available. However, the effects of this technology would likely be localized in smaller areas and bays – not lake-wide.

No Management

An often overlooked management tool is to not employ any management strategy. As part of an adaptive management approach, sometimes it is best to simply observe the system for a given amount of time before trying to artificially manipulate the lake using a management tool that may cause more harm than good. Lakes are complex and influenced by many variables, so allowing enough time to understand the issue and potential conflicts before acting is critical. Likewise, allowing enough time after the implementation of a management tool to study its effects is an important part of adaptive management and should be incorporated into future plans.

Sensitive Area Marking

Long Lake has 32 designated sensitive areas. A management tool that could be explored in the future is using buoys to mark where the sensitive areas are to promote their protection. The surrounding townships would need to approve the appropriate permits for the placement of these buoys, and a plan would need to be formed for managing and maintaining the buoys.

Septic Tank Inspections

One way for individual property owners to contribute to protecting and preserving Long Lake is to have their septic tanks inspected and pumped on a regular basis. Leaky septic systems can be a source of unwanted bacteria and nutrients that greatly degrade water quality. Wisconsin law requires septic systems to be inspected at least once every three years. Inspections help identify potential problems, such as leaking pipes or cracks in the tank, that could be polluting the groundwater and the lake with bacteria and nutrients that greatly degrade water quality. It is highly recommended that property owners have their tanks inspected regularly.

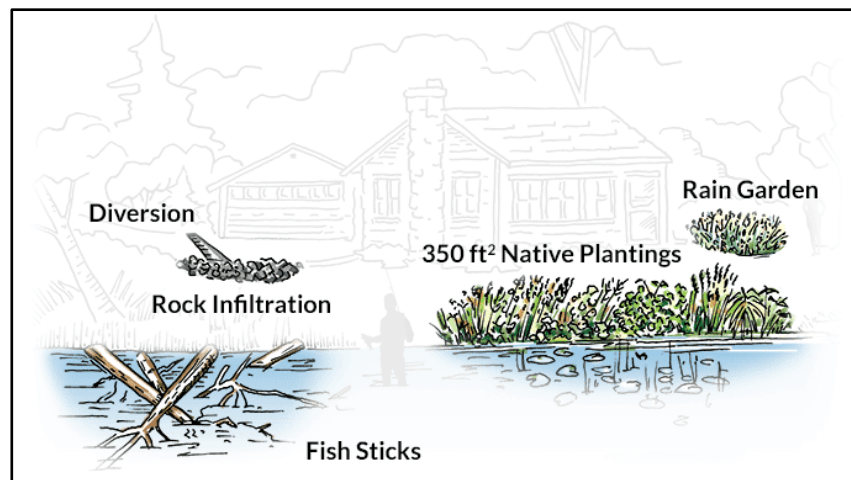
🌿 Shoreland Zoning

Shoreland zoning helps protect water quality, fishing, recreation, natural beauty, and home values. Following shoreland zoning regulations is a great way for landowners to protect their investment and their lake. While the LLPA cannot set shoreland zoning regulations, they can inform shoreline property owners about the value of shoreland zoning. See the Wisconsin Shoreland Management Program for more information²⁵.

💧 Shoreline Restoration

Shoreline restoration projects can be an excellent way to improve water quality, provide high quality habitat, and protect against erosion. The Healthy Lakes and Rivers Program highlights five simple and inexpensive shoreline restoration practices that can be grant funded: diversions, rock infiltrations, native plantings, rain gardens, and fish sticks. For more information, see the ‘Shoreland’ section of this plan and the Healthy Lakes and Rivers webpage²⁶.

Shoreline restoration projects should be strongly considered by the LLPA. These are simple projects that would provide many benefits to the lake. Additionally, if the group wishes to pursue larger scale projects, like an alum treatment, implementing shoreline restoration projects should be done first in an attempt to mitigate as many external nutrient sources as possible. The results of the Shoreland Habitat Monitoring project are a great place to start on this process



☀️ Ultrasonic Algae Control

Ultrasonic algae control is a new, commercial technology that claims to control algae by pulsing ultrasound and disrupting cellular processes in algae. However, this technology has not been tested in large lake settings. This management tool is not approved by the WDNR, and it would not be practical for Long Lake.

²⁵ <https://dnr.wisconsin.gov/topic/ShorelandZoning/Programs/program-management.html>

²⁶ <https://healthylakeswi.com/>

Water Level Manipulation

Water level manipulation is a tool that can be used to manage aquatic invasive species like Eurasian watermilfoil or Curly-leaf pondweed by raising or lowering water levels at strategic times during the plant's life cycle. This management tool is not currently necessary or appropriate for Long Lake because there is not a current need based on recently collected plant point intercept data.

Capacity Building Tools

Capacity building is a valuable tool for lake groups to build their membership and keep their members informed about and involved in lake projects. Keeping a steady focus on capacity building improves the LLPA's ability to develop and strengthen the organization, fund various projects, participate in monitoring and research activities, and ensure the longevity of the lake association.

The LLPA has a Sustainability and Capacity Building Committee (SCBC) that is responsible for engaging in and developing capacity building techniques, generating revenue through social events (Revenue Subcommittee), obtaining grants (Grants/Contracts Subcommittee), and securing donations (Gifts/Donations Subcommittee). LLPA community and capacity building efforts include an ice cream social, an annual meeting, social media, neighborhood meetings, and Constant Contact emails. Volunteers helped create a new, updated website with online donation and membership options. Members have also developed a strategic fundraising plan and have established an endowment for Long Lake.

The Education/Communication Committee publishes a biannual newsletter and a yearly calendar, and it organizes educational events – Cakes on the Lake – with Hunt Hill. The LLPA is also working with Hunt Hill and the Tomahawk Scout Camp to promote citizen science and biodiversity monitoring for the Long Lake watershed using apps like Seek and iNaturalist.

The LLPA has also participated in organizational capacity building efforts. From 2022 through 2023, the Board of Directors has defined its position descriptions and reorganized the structure of the LLPA's committees to be more efficient. The Board also completed an internal skills gap analysis and has developed an evaluation form to regularly reevaluate the effectiveness of the board.

The following capacity building tools are tools that the LLPA is currently using, could be updated, or should be implemented.

Board Member Orientation

Providing an orientation opportunity is a capacity building tool that helps familiarize new board members with the goals of the LLPA and its internal functions. This has been done to some level in the past, but it is recommended that the LLPA BOD increase its efforts to help new board members become acquainted with relevant materials and resources like the website, the Google Drive, its committees, current projects, and areas where there may be skills gaps.

Calendar/Newsletter

Currently, the LLPA produces a yearly calendar and a biannual newsletter. These materials are produced by the Education and Communication Committee. The calendar is purchased by the membership as a fundraiser or gifted to new members. It typically includes pictures and stories related to Long Lake that are submitted by the membership; this is a wonderful project that engages and highlights the membership as well as the beauty and history of Long Lake. The newsletter is distributed in the spring and fall to update and inform the membership on upcoming and completed projects. Both projects are engaging for the membership and valuable ways to keep the membership informed – these activities are highly recommended to continue.

Constant Contact/Social Media

Constant Contact and social media are valuable tools that the LLPA uses to send and share information and updates with the membership. Constant Contact is an email service used to distribute information that is more immediate or timely than things that can be shared via newsletter (e.g. checking your dock for zebra mussels in the fall). The LLPA also uses Facebook to share information with its membership and other lake users. It is highly recommended that the LLPA continue to utilize these resources.

Document Sharing Resources

Currently, the LLPA uses Google Drive to store and share documents for board members. Additionally, the LLPA shares board meeting minutes and agendas, reports, and other relevant materials via their newly updated website. The use of these resources should continue, although the LLPA should consider offering training for new board members on using Google Drive and for updating/maintaining the website.

Board Member Evaluations

The LLPA Board of Directors (BOD) recently developed a board member evaluation form to informally check in with board members to make sure they have all the information and resources they need. This has been a helpful tool to highlight areas where the LLPA can improve its internal functions. It is recommended that the LLPA BOD continue to perform these evaluations on at least an annual basis.

Internal Operations

The LLPA Operations Committee is responsible for handling membership information, event coordination, and internal operations. It is recommended that the Operations Committee continue to work to document the various operations of the LLPA for the sake of preserving continuity within the organization.

Membership Surveys

A membership survey is a tool that allows membership to voice their concerns and opinions in an anonymous way. Providing a membership survey is a good way for the organization to hear from all members. The LLPA electronically distributed a survey to its membership in 2023 and received valuable feedback that has been incorporated into this plan. It is recommended that the LLPA regularly survey its members as pertinent issues and projects arise.

Position Descriptions

The LLPA recently created position descriptions for its internal organizational structure. Position descriptions include the president, vice president, past president, secretary, treasurer, and board members. Additionally, the LLPA has developed descriptions describing the roles and duties for each of its committees. These documents are available in the shared Google Drive owned by the LLPA. It is recommended that the LLPA continue to modify and update these documents on a regular basis.

Skills Gap Analysis

A skills gap analysis is an internal assessment of the BOD that pinpoints what skills are lacking, what skills are being underutilized, and what skills are being used effectively. This helps organizations identify weak points where they may need to outsource assistance, look for additional volunteers, or provide training opportunities. The LLPA BOD did a skills gap analysis in 2023. It is recommended that the LLPA BOD continue to do these assessments at least on an annual basis, especially when new members join the board.

Welcome Packets

Offering welcome packets to new shoreline property owners is an excellent way to provide important information to people who are new to the lake. Materials to include could be a welcome letter, information on the goals and activities of the LLPA, important dates (annual meeting, ice cream social, etc.), local contacts (lakes biologist, consultants, etc.), shoreland zoning information, and anything else relevant to the current issues and discussions around Long Lake. It is highly recommended that the LLPA pursue this capacity building tool by working with local realtors and other stakeholders.

Lake Management Planning

The LLPA Board of Directors discussed priority concerns for Long Lake and the vision for the future of the lake and its watershed. These discussions combined with the results of the social survey were the foundation of the goals and objectives within this plan.

The following goals and objectives were devised by the LLPA to address current issues and opportunities in Long Lake. The four primary goals of Monitoring, Management, Education/Communication, and Capacity Building were devised by the LLPA in previous planning efforts, as such, they form the foundation of management planning for this document. Within each of the four primary goals are objectives divided by In-Water, Shoreline, and Watershed. Within these objectives are actions to be taken in order to meet the objective and ultimately the overarching goal. Methods to evaluate and measure objectives are included.

The LLPA board and committees will track implementation of plan actions and evaluate progress toward reaching plan goals and objectives. Some actions are repeated under more than one objective; this is purposeful to ensure that progress is made and accounted for.

Long Lake management activities are guided by the best available science and adaptive management strategies. Adaptive management is a systematic approach for improving resource management by learning from management outcomes. Adaptive management uses results of monitoring, evaluation of project activities, and updated information to modify and guide future project implementation. This is fundamental to the LLPA’s approach to managing Long Lake.

PLANNING TERMS

Goals are broad statements of desired results.

Objectives are the measurable accomplishments toward achieving a goal.

Actions are the steps taken to accomplish objectives and ultimately goals.

In-Lake components refer to management actions directly related to the water quality of Long Lake and its biota.

Shoreline components refer to management actions that affect shoreline habitat, erosion, AIS, etc.

Watershed components refer to management actions that affect Long Lake at a greater scale – land cover, run off, etc.

Goals, Objectives, and Actions

Goal 1

Long Lake Monitoring: The LLPA will pursue and evaluate ecosystem mapping and monitoring efforts to establish baseline data to be used for appropriate management/protection and education/communication efforts that support the mission of the LLPA.

In Water - Objective 1: Collect data to monitor Long Lake’s trophic state, water quality, and ecological health.

Evaluate and measure this objective with water quality data collected through the Citizen Lake Monitoring Network.

Action 1 - Continue participating in the Citizen Lake Monitoring Network (CLMN) to collect water quality data (Secchi reading, temperature, dissolved oxygen, total phosphorus, and chlorophyll-*a*) to monitor changes in water quality.

Action 2 - Use Shoreline Habitat Assessment data and GIS analyses to identify high priority sites for mitigation of runoff of nutrients to the lakes, and support mitigation efforts. Funding and additional support may be available from Washburn County and/or WDNR Surface Water grant program for mitigation projects.

Action 3 - Support shoreland restoration and runoff best management practices (potentially through the WDNR Healthy Lakes grant program) to mitigate potential impacts of future shoreland development. Use Shoreland Habitat Assessment results to target efforts. Identify what works best to encourage participation.

Action 4 - Conduct an analysis of potential sources of phosphorus to develop a phosphorus budget for Long Lake.

See Long Lake Groundwater Testing Project, 2006

- a. Develop a monitoring program for inflows to Long Lake.
- b. Evaluate septic systems for potential contamination into Long Lake.
- c. Develop a phosphorus budget for Long Lake (*See 2021-2025 Red Cedar Watershed 9-Key Element Plan*).

Action 5 - Explore land conservancy options to protect watershed areas from development. Include partnerships with landowners, Federal, state, and local agencies, nonprofit organizations, Hunt Hill, and the Tomahawk Scout Camp.

Action 6 - Explore using research buoys to monitor water quality and supplement the CLMN water quality data.

Action 7 - Explore innovative monitoring techniques and technologies.

In Water - Objective 2: Aquatic Invasive Species (AIS) are monitored and managed so that they do not negatively impact Long Lake; no new AIS should become established in the lake, and existing infestations should be properly managed to mitigate their spread and impact.

AIS currently in Long Lake include: Curly-leaf pondweed, Yellow flag iris, Common forget-me-not, Reed canary grass, Hybrid cattail, Banded mystery snail, and Chinese mystery snail (WDNR and Berg, 2022). Additionally, Eurasian water milfoil, Hybrid Northern-Eurasian water milfoil, Purple loosestrife, and Zebra mussels are present in nearby lakes and threaten Long Lake.

Evaluate and measure this objective with volunteer AIS monitoring and continued PI surveys every five years.

Action 1 - Continue to conduct and expand Clean Boats, Clean Waters inspections at public access points.

Action 2 - Maintain AIS signage at the public access points consistent with Wisconsin DNR guidance.

Action 3 - Maintain and promote the use of AIS decontamination stations at public access points.

Washburn County Ordinance Chapter 28 Article III, Section 28-143: "If a decontamination station is available for use at a public or private access, the boater shall decontaminate per posted directions using the station provided."

Action 4 - Identify private boat launches and work with owners to identify and employ methods to limit AIS introduction at these locations.

Action 5 - Stay informed on AIS developments in area water bodies, primarily through contact with the Washburn County AIS Coordinator and the DNR AIS Coordinator for NW Wisconsin, to understand AIS threats to Long Lake.

Action 6 - Follow standard WDNR Citizen Lake Monitoring Network standards and reporting to complete AIS monitoring.

- a. Recruit and train AIS lake monitoring volunteers with the Monitoring Committee. Complete expert training of volunteers at least every two years.
- b. Continue to conduct volunteer AIS littoral zone monitoring twice-per season.
- c. Divide the lake into manageable sections for volunteers to reasonably monitor.
- d. Ask CBCW volunteers to check near boat landings for invasive species like Eurasian water milfoil.

Action 7 - Develop an updated aquatic plant management plan that addresses AIS and integrated pest management. Items to include:

- a. AIS Monitoring schedule for the Monitoring Committee
- b. A rapid response protocol for when a new potential AIS is discovered.

Action 8 - Work with NWRPC or other consultants to conduct professional AIS meandering survey twice per year following standard WDNR protocols. A mid-June early season survey will target Curly-leaf pondweed and Yellow flag iris. A second survey in late August or September will look for EWM and Purple loosestrife.

Action 9 - Continue to conduct Zebra mussel monitoring. Also use contact methods to ask residents to check docks and lifts when removed from the lake each year.

Action 10 - Continue to complete aquatic plant point intercept surveys on Long Lake every 5 to 7 years.

Action 11 - Work with the Long Lake Chamber of Commerce and other entities to provide education related to AIS concerns (distribution of educational materials, unified AIS messaging, etc.).

Shoreline - Objective 1: The shoreline of Long Lake is protected and restored.

Evaluate and measure this objective by comparing changes over time to the 2023 Shoreline Habitat Assessment, the implementation of Healthy Lakes best management practices, and changes in Yellow flag iris distribution.

Action 1 - Promote the implementation of Healthy Lakes projects (native plantings, rain gardens, rock infiltrations, water diversions, and fish sticks). Use the Shoreline Habitat Assessment to identify areas with potential for restoration and use constant contact to reach out to landowners who may be interested in projects based on the Social Survey results.

Action 2 - Explore land conservancy options to protect sensitive shoreline areas from development. Include partnerships with landowners, Federal, state, and local agencies, nonprofit organizations, Hunt Hill, and the Tomahawk Scout Camp.

Action 3 - Encourage boaters to follow “Slow No Wake” regulations in sensitive areas, in the Narrows, within 100’ of another craft, and within 200’ of the shoreline. Promote using signage at boat launches and resorts, constant contact emails, the website, and buoys where warranted.

See Wisconsin State Statute 30.66.(3) Speed Restrictions

- a. Develop a “Preferred Wake Zone” map that delineates areas far enough from shore where large wakes have less negative impact. Share map through Constant Contact, website, posting at boat launches, and annual meeting.

Action 4 - Develop a schedule for monitoring, mapping, and removing Yellow flag iris along the shoreline of Long Lake.

- a. Incorporate partnerships with Washburn County and the Tomahawk Scout Camp.
- b. Educate shoreline property owners about Yellow flag iris using constant contact.

Action 5 - Perform Shoreline Habitat Assessment every 15 years (next survey in 2038).

Watershed - Objective 1: The LLPA will monitor and anticipate the impacts of climate change on Long Lake and will take appropriate action to minimize negative impact.

Evaluate and measure this objective with continued water quality, aquatic plant, and fisheries surveys.

Action 1 - Educate the LLPA Board of Directors and the LLPA membership on the potential impacts of climate change to Long Lake and its surrounding watershed.

Action 2 - Monitor and identify best practices regarding climate change impact on the lake system.

- a. Continue to maintain a long term record of water quality metrics through the CLMN program.
- b. Continue to perform PI surveys to monitor the changing plant community over time.
- c. Continue to work with the WDNR to understand the impacts of climate change to Long Lake's fishery.
- d. Continue to research and pursue climate change mitigation strategies for lakes.

Watershed - Objective 2: The LLPA will monitor and manage invasive species within the watershed where possible.

Evaluate and measure this objective with monitoring of invasive species and completed projects.

Action 1 - Work with the Washburn County Land and Water Conservation Department to identify and manage AIS in the Long Lake watershed.

- a. Use existing relationships with Washburn County and other groups, like the Tomahawk Scout Camp and Hunt Hill, to monitor and manage invasive species like Japanese knotweed.
- b. Work with Washburn County to map known invasive species in the watershed and identify their potential impact to Long Lake.
- c. Lead and support efforts to manage invasive species within the watershed.

Watershed - Objective 3: The LLPA will continue to collect data on health of loons and other flora and fauna and insects that establish the biodiversity of the Long Lake ecosystem.

Evaluate and measure this objective with participation in LoonWatch and use of Long Lake iNaturalist submissions.

Action 1 - Continue participation in LoonWatch through Northland College.

Action 2 - Work with Hunt Hill and the Tomahawk Scout Camp to promote the Long Lake, Washburn County iNaturalist project to encourage citizen science documentation of the area's biodiversity.

Action 3 - Pursue aquatic invertebrate and other biodiversity studies to monitor the health of Long Lake. Work with the WDNR and Endangered Resource Services, LLC.

Goal 2

Long Lake Management - The LLPA will pursue and evaluate ecosystem management and protection efforts to maintain the natural integrity of Long Lake and its watershed as a healthy, functioning ecosystem.

In-Water - Objective 1: The LLPA will explore management and protection efforts to protect the ecological integrity of Long Lake.

Evaluate and measure this objective with monitoring of water quality, aquatic plant communities, and the fishery.

Action 1 - Continue to research and develop management practices that serve to maintain the physical and chemical factors of a healthy mesotrophic lake.

Action 2 - Develop an aquatic plant management plan to address concerns related to the density of native aquatic plants and invasive species (e.g., Holy Island area, south of the Narrows, and bays with dense plant growth, etc.).

- a. Explore methods to manage native aquatic plant growth in high traffic areas and where navigation is impaired.

Action 3 - Determine and maintain the optimal balance of aquatic plant density in high traffic areas and where navigation is impaired.

Action 4 - Develop a Rapid Response Plan to address management needs should Eurasian water milfoil, Zebra mussels, or other highly undesirable invasive species enter Long Lake.

Action 5 - Develop a “Preferred Wake Zone” map that delineates areas far enough from shore where large wakes have less negative impact. Share map through Constant Contact, website, posting at boat launches, and annual meeting.

In-Water - Objective 2: The LLPA will work with the WDNR to support a healthy and diverse fishery.

Evaluate and measure this objective with WDNR fishery reports and the implementation of Fish Sticks projects.

Action 1 - Work with the WDNR to evaluate sensitive areas and define areas that are important for fish habitat and spawning.

- a. Use results to identify and prioritize areas for potential projects like buoy placement.
- b. Use results to inform management decisions related to aquatic plant management and shoreline restoration.

Action 2 - Use the Coarse Woody Habitat survey to identify high priority areas for installing woody habitat (Fish Sticks) to restore shoreline habitat, provide protection from erosion, and reduce runoff.

- a. Pursue installation of fish cribs and Fish Sticks where appropriate based on WDNR guidelines.

Shoreline - Objective 1: Encourage the preservation, enhancement, and restoration of natural shorelines.

Evaluate and measure this objective using purchased acres and implemented Healthy Lakes projects.

Action 1 - Promote a culture of natural shorelines, viewing corridors, and emphasis on natural views. Use constant contact, the newsletter, calendars, and the annual meeting to emphasize the importance of a natural shoreline.

- a. Promote the implementation of Healthy Lakes projects (native plantings, rain gardens, rock infiltrations, water diversions, and fish sticks). Use the Shoreline Habitat Assessment to identify areas with potential for restoration and use constant contact to reach out to landowners who may be interested in projects based on the Social Survey results.

Action 2 - Explore land conservancy options to protect sensitive shoreline areas from development. Include partnerships with landowners, Federal, state, and local agencies, nonprofit organizations, Hunt Hill, and the Tomahawk Scout Camp.

Watershed - Objective 1: The LLPA will promote and incorporate innovative ways to mitigate the effects of climate change within Long Lake and its watershed (i.e., drought, flooding, severe storms, etc.).

Evaluate and measure this objective using educational campaigns and participation in relevant meetings.

Action 1 - Encourage robust, native and diverse wetland, riparian, and aquatic plant communities within the entire watershed area.

- a. Work with Hunt Hill to develop dialogue on the importance of the natural community of lakes and wetlands that connect Hunt Hill to Long Lake.
- b. Work with the Tomahawk Scout Camp to promote the protection and preservation of the camp's natural shoreline.

Action 2 - Work with partners to ensure future watershed development meets existing design standards or better, in anticipation of climate change induced flooding in the watershed. This would pertain to stormwater structures, agriculture, new development, and storm water control.

Action 3 - Identify operational contingencies/limitations for the Long Lake outlet dam as it relates to flooding and dam protection. Partnerships with Washburn County Highway department and surrounding townships required.

- a. Promote one, year-round water level target.

Action 4 - Participate in public dialog regarding land use policy and zoning and stormwater regulations as they potentially influence Long Lake water quality.

Watershed - Objective 2: The LLPA will pursue opportunities for land acquisition and restoration in the Long Lake watershed.

Evaluate and measure this objective using purchased acres and partnerships.

Action 1 - Work with partners to identify possible land to purchase to preserve or restore.

- a. Potentially pursue Surface Water grant funding.
- b. Look to Grindstone Lake Association as a nearby example.

Goal 3

Long Lake Education/Communication - The LLPA will provide diverse education outreach opportunities to all stakeholders.

The LLPA will use positive, direct messaging that encourages and involves people to maintain good practices and results in positive changes.

Objective 1: All stakeholders are aware of what lake stewardship means and how to practice it.

Evaluate and measure this objective by using Constant Contact to distribute surveys related to lake stewardship at the beginning and end of a summer dedicated to increasing lake stewardship knowledge and compare results.

Action 1 - Continue using Constant Contact, the calendar, the newsletters, the website, social media, the annual meeting, Cakes on the Lake, etc. to promote good lake stewardship practices.

Action 2 - Continue promoting educational materials and opportunities beyond the LLPA such as Lake Leaders, Lake Tides, the Northwest Wisconsin Lakes Conference, etc. to help stakeholders educate themselves on lake stewardship.

Action 3 - Engage new shoreline property owners in best management practices for lake stewardship.

- a. Develop welcome packets of information to new owners. Identify owners shortly after they purchase property. Distribute the packets via personal visits and working with local real estate agents.
- b. Provide outreach to real estate agents in order to educate them on Long Lake characteristics (e.g., quiet hours, slow no wake zones, sensitive areas, shoreline best management practices, etc.) resulting in informed buyers.

Action 4 - Reach owners of resorts, rental properties, property managers, renters, and guests with lake stewardship information.

- a. Make brochures available at each property, establishments, and the landings.
- b. Post information on the LLPA website.
- c. Assemble packets of information and mail to Long Lake area rental property owners.

Action 5 - Develop a list of good lake stewardship practices and make it available on the LLPA website, through social media, and with Constant Contact.

Action 6 - Develop Constant Contact and social media schedule for distributing lake stewardship information.

Objective 2: Stakeholders who practice good lake stewardship are recognized.

Evaluate and measure this objective by keeping track of recognition and participation.

Action 1 - Develop a program to recognize stakeholders who practice good lake stewardship. Offer incentives, discounted memberships, plaques, signs, etc.

Action 2 - Encourage the LLPA membership to participate in Healthy Lakes best management projects and offer recognition to those who do.

Objective 3: Suggestions for improvements are provided in a positive manner to stakeholders who do not currently follow good lake stewardship practices.

Evaluate and measure this objective by keeping track of implementation of best management practices.

Action 1 - Use the results of the Shoreline Habitat Assessment to further educate shoreline property owners with information regarding Healthy Lakes best management practices.

Action 2 - Educate and communicate why shoreland restoration and stormwater projects are important for the protection of Long Lake water quality. Identify and encourage stewardship actions to preserve water quality.

a. Encourage the following practices:

- Allowing a 10 foot or deeper no-mow area along your shoreline
- Consider a 350 ft² or larger native planting
- Take advantage of available consulting and design assistance to complete shoreland restoration and capture stormwater runoff
- Consider installing a Healthy Lakes best management practice project
- Encourage growth of natural vegetation such as ferns and native shrubs to prevent shoreline erosion.

Goal 4

LLPA Capacity Building - The LLPA will develop and regularly evaluate its organizational structure and capacity.

Objective 1: The LLPA board processes are efficient, and the board consists of engaged people with a variety of expertise.

Evaluate and measure this objective by annually re-evaluating board processes and skills gap analyses.

Action 1 - Review existing LLPA organizational structure relative to increasing its capacity to more effectively pursue its Mission.

- a. Review board documents and procedures
- b. Organize and digitally store documents in the LLPA Google Drive
- c. Maintain updated records on the LLPA website
- d. Identify needed guidance for board operations

Action 2 - Review existing LLPA organizational structure relative to the need for securing long term sustainability of the organization.

Action 3 - Provide updates regarding LLPA lake management goals and objectives, actions, and results to partners. Discuss opportunities for coordination and new partnerships. Current partners include: Long Lake Chamber of Commerce, Town of Long Lake, Town of Madge, Town of Birchwood, Hunt Hill, Tomahawk Scout Camp, Washburn County Lakes and Rivers Association, Washburn County Land and Water Conservation Department, Washburn County Extension, Washburn County Highway Department, WDNR, UW Extension Lake, and NWRPC.

Action 4 - Continue to encourage LLPA board members (and LLPA membership) to take part in Lake Leaders, the Wisconsin Lakes and Rivers Conference, the Northwest Wisconsin Lakes Conference, and other educational opportunities.

Objective 2: The LLPA pursues sustainable and strategic forms of fundraising.

Evaluate and measure this objective by periodically re-evaluating fundraising strategies and projects completed.

Action 1 - Periodically re-evaluate fundraising goals and strategies to support projects related to the LLPA's mission.

Action 2 - Investigate and seek grant funding sources to carry out management goals.

- a. Continue to work with the NWRPC to secure grant funding to implement projects.

Action 3 - Complete an economic analysis of the “natural capital” of the lake resource as it relates to the local business community.

- a. Work with the Long Lake Chamber of Commerce and surrounding townships to develop an understanding of Long Lake’s role in the local economy.
- b. Work with the NWRPC and Washburn County to develop an understanding of Long Lake’s role in the regional economy.

Action 4 - Assemble and publish a yearly fundraising report to be shared at the annual meeting.

Objective 3: The LLPA pursues sustainable and strategic forms of increasing membership and engagement.

Evaluate and measure this objective by annually evaluating membership – renewals and new memberships.

Action 1 - Provide the membership with a clear description of management responsibilities and interaction with partners. This can be partially completed via newsletters, annual meetings, constant contact, and the website. Develop professional publications which list all the organizations, what they do, how they do it, and how they work together.

Action 2 - Evaluate priorities on an annual basis and make adjustments based on changing conditions (via monitoring), funding availability (grants and otherwise), and membership feedback (annual meeting, surveys, etc.).

Action 3 - Evaluate and report on LLPA efficacy on an annual basis to be presented at the annual meeting.

Action 4 - Create a timeline chart with management accomplishments. This should include significant milestones for all local partner organizations.

Action 5 - Use Constant Contact to encourage LLPA members to attend local town board meetings, county board meetings, and other relevant meetings.

Action 6 - Develop brochure/educational materials to advise shoreline property owners of best lawn care practices for lake and shoreline health.

Implementation Plan

Glossary of Terms:

BMP – Best Management Practices

BOD – Board of Directors (LLPA)

ECC – Education and Communication Committee (LLPA)

ERS – Endangered Resource Services, LLC

LLCC – Long Lake Chamber of Commerce

LLPA – Long Lake Preservation Association

MC – Monitoring Committee (LLPA)

NWRPC – Northwest Regional Planning Commission

OC – Operations Committee (LLPA)

Ongoing – no specific timeline; continued efforts for the foreseeable future

SCBC – Sustainability and Capacity Building Committee (LLPA)

Surrounding townships – includes Town of Birchwood, Town of Long Lake, and Town of Madge

SWRC – Shoreline and Watershed Restoration Committee (LLPA)

WCLWCD – Washburn County Land and Water Conservation Department

WDNR – Wisconsin Department of Natural Resources

Goal 1: Long Lake Monitoring	Responsible Group(s)	Target Timeline(s)
<p>IN WATER - Objective 1: Collect data to monitor Long Lake’s trophic state, water quality, and ecological health. Evaluate and measure this objective with water quality data collected through the Citizen Lake Monitoring Network.</p>		
<p>Action 1 - Continue participating in the Citizen Lake Monitoring Network (CLMN) to collect water quality data to monitor changes in water quality.</p>	<p>LLPA MC</p>	<p>Ongoing</p>
<p>Action 2 - Use Shoreline Habitat Assessment data and GIS analyses to identify high priority sites for mitigation of runoff of nutrients to the lakes, and support mitigation efforts. Funding and additional support may be available from WCLWCD and/or WDNR Surface Water grant program for mitigation projects.</p>	<p>NWRPC</p>	<p>2024-2025</p>
<p>Action 3 - Support shoreland restoration and runoff best management practices (potentially through the WDNR Healthy Lakes grant program) to mitigate potential impacts of future shoreland development. Use Shoreland Habitat Assessment results to target efforts. Identify what works best to encourage participation.</p>	<p>LLPA SWRC; WCLWCD; NWRPC</p>	<p>2024-2029</p>
<p>Action 4 - Conduct an analysis of potential sources of phosphorus to develop a phosphorus budget for Long Lake.</p> <ol style="list-style-type: none"> a. Develop a monitoring program for inflows to Long Lake. b. Evaluate septic systems for potential contamination into Long Lake. c. Develop a phosphorus budget for Long Lake. 	<p>NWRPC; LLPA MC</p>	<p>2024-2026</p>
<p>Action 5 - Explore land conservancy options to protect watershed areas from development. Include partnerships with landowners, Federal, state, and local agencies, nonprofit organizations, Hunt Hill, and the Tomahawk Scout Camp.</p>	<p>WDNR, Hunt Hill, Tomahawk Scout Camp, NWRPC</p>	<p>Ongoing</p>
<p>Action 6 - Explore using research buoys to monitor water quality and supplement the CLMN water quality data.</p>	<p>LLPA MC; NWRPC</p>	<p>2024-2025</p>
<p>Action 7 - Explore innovative monitoring techniques and technologies.</p>	<p>LLPA BOD; NWRPC</p>	<p>Ongoing</p>
<p>IN WATER - Objective 2: Aquatic Invasive Species (AIS) are monitored and managed so that they do not negatively impact Long Lake; no new AIS should become established in the lake, and existing infestations should be properly managed to mitigate their spread and impact. Evaluate and measure this objective with volunteer AIS monitoring and continued PI surveys every five years.</p>		
<p>Action 1 - Continue to conduct and expand Clean Boats, Clean Waters inspections at public access points.</p>	<p>LLPA MC</p>	<p>Ongoing</p>

Action 2 - Maintain AIS signage at the public access points consistent with Wisconsin DNR guidance.	LLPA MC	Ongoing
Action 3 - Maintain and promote the use of AIS decontamination stations at public access points.	LLPA MC; WCLWCD	Ongoing
Action 4 - Identify private boat launches and work with owners to identify and employ methods to limit AIS introduction at these locations.	NWRPC; LLPA MC	Ongoing
Action 5 - Stay informed on AIS developments in area water bodies, primarily through contact with the WCLWCD AIS Coordinator and the DNR AIS Coordinator for NW Wisconsin, to understand AIS threats to Long Lake.	WDNR, WCLWCD; LLPA BOD; NWRPC	Ongoing
Action 6 - Follow standard WDNR Citizen Lake Monitoring Network standards and reporting to complete AIS monitoring. <ul style="list-style-type: none"> a. Recruit and train AIS lake monitoring volunteers with the Monitoring Committee. Complete expert training of volunteers at least every two years. b. Continue to conduct volunteer AIS littoral zone monitoring twice-per season. c. Divide the lake into manageable sections for volunteers to reasonably monitor. d. Ask CBCW volunteers to check near boat landings for invasive species like Eurasian water milfoil. 	LLPA MC; NWRPC; WCLWCD	Ongoing
Action 7 - Develop an updated aquatic plant management plan that addresses AIS and integrated pest management. Items to include: <ul style="list-style-type: none"> a. AIS Monitoring schedule for the Monitoring Committee b. A rapid response protocol for when a new potential AIS is discovered. 	LLPA BOD; NWRPC; WDNR	2024
Action 8 – Perform AIS meandering surveys twice per year following standard WDNR protocols. A mid-June early season survey will target Curly-leaf pondweed and Yellow flag iris. A second survey in late August or September will look for EWM and Purple loosestrife.	LLPA MC; NWRPC; ERS	Ongoing; Early season & late season annually
Action 9 - Continue to conduct Zebra mussel monitoring. Also use contact methods to ask residents to check docks and lifts when removed from the lake each year.	LLPA MC; WCLWCD; NWRPC	Ongoing
Action 10 - Continue to complete aquatic plant point intercept surveys on Long Lake every 5 to 7 years.	LLPA MC; ERS	Every 5-7 years (2027-29 next survey)
Action 11 - Work with the Long Lake Chamber of Commerce and other entities to provide education related to AIS concerns (distribution of educational materials, unified AIS messaging, etc.).	LLPA ECC; LLCC	2024-2025 Ongoing

<p>SHORELINE - Objective 1: The shoreline of Long Lake is protected and restored. Evaluate and measure this objective by comparing changes over time to the 2023 Shoreline Habitat Assessment, the implementation of Healthy Lakes best management practices, and changes in Yellow flag iris distribution.</p>		
<p>Action 1 - Promote the implementation of Healthy Lakes projects (native plantings, raingardens, rock infiltrations, water diversions, and fish sticks). Use the Shoreline Habitat Assessment to identify areas with potential for restoration and use constant contact to reach out to landowners who may be interested in projects based on the Social Survey results.</p>	<p>LLPA BOD; NWRPC; WCLWCD</p>	<p>Ongoing; 2024-2025 Implement 5 Healthy Lakes BMP</p>
<p>Action 2 - Explore land conservancy options to protect sensitive shoreline areas from development. Include partnerships with landowners, Federal, state, and local agencies, nonprofit organizations, Hunt Hill, and the Tomahawk Scout Camp.</p>	<p>WDNR, Hunt Hill, Tomahawk Scout Camp, NWRPC</p>	<p>Ongoing</p>
<p>Action 3 Encourage boaters to follow “Slow No Wake” regulations in sensitive areas, in the Narrows, within 100’ of another craft, and within 200’ of the shoreline. Promote using signage at boat launches and resorts, constant contact emails, the website, and buoys where warranted.</p> <p>a. Develop a “Preferred Wake Zone” map that delineates areas far enough from shore where large wakes have less negative impact. Share map through Constant Contact, website, posting at boat launches, and annual meeting.</p>	<p>LLPA MC; LLPA BOD; NWRPC</p>	<p>Ongoing; Develop map 2024</p>
<p>Action 4 - Develop a schedule for monitoring, mapping, and removing Yellow flag iris along the shoreline of Long Lake. Incorporate partnerships with Washburn County and the Tomahawk Scout Camp. Educate shoreline property owners about Yellow flag iris using Constant Contact.</p>	<p>NWRPC; LLPA MC; WCLWCD; Tomahawk Scout Camp</p>	<p>Develop schedule 2024; Ongoing</p>
<p>Action 5 - Perform Shoreline Habitat Assessment every 15 years (next survey in 2038).</p>	<p>LLPA BOD; LLPA MC; NWRPC</p>	<p>2038</p>
<p>WATERSHED - Objective 1: The LLPA will monitor and anticipate the impacts of climate change on Long Lake and will take appropriate action to minimize negative impact. Evaluate and measure this objective with continued water quality, aquatic plant, and fisheries surveys.</p>		
<p>Action 1 - Educate the LLPA Board of Directors and the LLPA membership on the potential impacts of climate change to Long Lake and its surrounding watershed.</p>	<p>LLPA BOD; NWRPC</p>	<p>Ongoing</p>
<p>Action 2 - Monitor and identify best practices regarding climate change impacts on the lake system.</p> <p>a. Continue to maintain a long-term record of water quality metrics through the CLMN program.</p> <p>b. Continue to perform PI surveys to monitor the changing plant community over time.</p>	<p>LLPA MC; LLPA BOD; WDNR</p>	<p>Ongoing</p>

<ul style="list-style-type: none"> c. Continue to work with the WDNR to understand the impacts of climate change to Long Lake’s fishery. d. Continue to research and pursue climate change mitigation strategies for lakes. 		
<p>WATERSHED - Objective 2: The LLPA will monitor and manage invasive species within the watershed where possible.</p>		
<p>Evaluate and measure this objective with monitoring of invasive species and completed projects.</p>		
<p>Action 1 - Work with the Washburn County Land and Water Conservation Department to identify and manage AIS in the Long Lake watershed.</p> <ul style="list-style-type: none"> a. Use existing relationships with Washburn County and other groups, like the Tomahawk Scout Camp and Hunt Hill, to monitor and manage invasive species like Japanese knotweed. b. Work with Washburn County to map known invasive species in the watershed and identify their potential impact to Long Lake. c. Lead and support efforts to manage invasive species within the watershed. 	<p>LLPA BOD; LLPA MC; NWRPC; WCLWCD; Tomahawk Scout Camp; Hunt Hill</p>	<p>Ongoing</p>
<p>WATERSHED - Objective 3: The LLPA will continue to collect data on health of loons and other flora and fauna and insects that establish the biodiversity of the Long Lake ecosystem.</p>		
<p>Evaluate and measure this objective with participation in LoonWatch and use of Long Lake iNaturalist submissions.</p>		
<p>Action 1 - Continue participation in LoonWatch through Northland College.</p>	<p>LLPA MC; Northland College</p>	<p>Ongoing</p>
<p>Action 2 - Work with Hunt Hill and the Tomahawk Scout Camp to promote the Long Lake, Washburn County iNaturalist project to encourage citizen science documentation of the area’s biodiversity.</p>	<p>Hunt Hill; Tomahawk Scout Camp</p>	<p>Ongoing</p>
<p>Action 3 - Pursue aquatic invertebrate and other biodiversity studies to monitor the health of Long Lake.</p>	<p>WDNR</p>	<p>2025</p>

Goal 2: Long Lake Management	Responsible Group(s)	Target Timeline(s)
<p>IN WATER - Objective 1: The LLPA will explore management and protection efforts to protect the ecological integrity of Long Lake. Evaluate and measure this objective with monitoring of water quality, aquatic plant communities, and the fishery.</p>		
<p>Action 1 - Continue to research and develop management practices that serve to maintain the physical and chemical factors of a healthy mesotrophic lake.</p>	<p>LLPA BOD; NWRPC</p>	<p>Ongoing</p>
<p>Action 2 - Develop an aquatic plant management plan to address concerns related to the density of native aquatic plants and invasive species (e.g., Holy Island area, south of the Narrows, and bays with dense plant growth, etc.).</p> <p>a. Explore methods to manage native aquatic plant growth in high traffic areas and where navigation is impaired.</p>	<p>LLPA BOD; NWRPC</p>	<p>2024</p>
<p>Action 3 - Determine and maintain the optimal balance of aquatic plant density in high traffic areas and where navigation is impaired.</p>	<p>LLPA BOD</p>	<p>Ongoing</p>
<p>Action 4 - Develop a Rapid Response Plan to address management needs should Eurasian water milfoil, Zebra mussels, or other highly undesirable invasive species enter Long Lake.</p>	<p>LLPA BOD; NWRPC</p>	<p>2024</p>
<p>Action 5 - Develop a “Preferred Wake Zone” map that delineates areas far enough from shore where large wakes have less negative impact. Share map through Constant Contact, website, posting at boat launches, and annual meeting.</p>	<p>LLPA BOD; NWRPC</p>	<p>2024</p>
<p>IN WATER - Objective 2: The LLPA will work with the WDNR to support a healthy and diverse fishery. Evaluate and measure this objective with WDNR fishery reports and the implementation of Fish Sticks projects.</p>		
<p>Action 1 - Work with the WDNR to evaluate sensitive areas and define areas that are important for fish habitat and spawning.</p> <p>a. Use results to identify and prioritize areas for potential projects like buoy placement.</p> <p>b. Use results to inform management decisions related to aquatic plant management and shoreline restoration.</p>	<p>LLPA BOD; NWRPC</p>	<p>2024</p>
<p>Action 2 - Use the Coarse Woody Habitat survey to identify high priority areas for installing woody habitat (Fish Sticks) to restore shoreline habitat, provide protection from erosion, and reduce runoff.</p>	<p>LLPA BOD; LLPA MC; LLPA SWRC; NWRPC</p>	<p>2024; Ongoing</p>

<p>a. Pursue installation of fish cribs where appropriate based on WDNR guidelines.</p>		
<p>SHORELINE - Objective 1: Encourage the preservation, enhancement, and restoration of natural shorelines. Evaluate and measure this objective using purchased acres, implemented Healthy Lakes projects, and future Shoreline Habitat Assessments.</p>		
<p>Action 1 - Promote a culture of natural shorelines, viewing corridors, and emphasis on natural views. Use constant contact, the newsletter, calendars, and the annual meeting to emphasize the importance of a natural shoreline.</p> <p>a. Promote the implementation of Healthy Lakes projects (native plantings, rain gardens, rock infiltrations, water diversions, and fish sticks). Use the Shoreline Habitat Assessment to identify areas with potential for restoration and use constant contact to reach out to landowners who may be interested in projects based on the Social Survey results.</p>	<p>LLPA BOD; LLPA ECC; LLPA SWRC; NWRPC</p>	<p>2024; Ongoing</p>
<p>Action 2 - Explore land conservancy options to protect sensitive shoreline areas from development. Include partnerships with landowners, Federal, state, and local agencies, nonprofit organizations, Hunt Hill, and the Tomahawk Scout Camp.</p>	<p>LLPA BOD; Hunt Hill; Tomahawk Scout Camp</p>	<p>2024</p>
<p>WATERSHED - Objective 1: The LLPA will promote and incorporate innovative ways to mitigate the effects of climate change within Long Lake and its watershed (i.e., drought, flooding, severe storms, etc.). Evaluate and measure this objective using educational campaigns and participation in relevant meetings.</p>		
<p>Action 1 - Encourage robust, native and diverse wetland, riparian, and aquatic plant communities within the entire watershed area.</p> <p>a. Work with Hunt Hill to develop dialogue on the importance of the natural community of lakes and wetlands that connect Hunt Hill to Long Lake.</p> <p>b. Work with the Tomahawk Scout Camp to promote the protection and preservation of the camp’s natural shoreline.</p>	<p>LLPA BOD; LLPA SWRC; WCLWCD; Hunt Hill; Tomahawk Scout Camp; NWRPC</p>	<p>2024; Ongoing</p>
<p>Action 2 - Work with partners to ensure future watershed development meets existing design standards or better, in anticipation of climate change induced flooding in the watershed. This would pertain to stormwater structures, agriculture, new development, and storm water control.</p>	<p>Hunt Hill; Tomahawk Scout Camp; Wisconsin/Washburn County DOT; Surrounding townships</p>	<p>Ongoing</p>

<p>Action 3 - Identify operational contingencies/limitations for the Long Lake outlet dam as it relates to flooding and dam protection. Partnerships with Washburn County Highway department and surrounding townships required.</p> <p>a. Promote one, year-round water level target.</p>	<p>Washburn County Highway Department; Surrounding townships</p>	<p>Ongoing</p>
<p>Action 4 - Participate in public dialog regarding land use policy and zoning and stormwater regulations as they potentially influence Long Lake water quality.</p>	<p>Surrounding townships; Washburn County</p>	<p>Ongoing</p>
<p>WATERSHED - Objective 2: The LLPA will pursue opportunities for land acquisition and restoration in the Long Lake watershed. Evaluate and measure this objective using purchased acres and partnerships.</p>		
<p>Action 1 - Work with partners to identify possible land to purchase to preserve or restore.</p> <p>a. Potentially pursue Surface Water grant funding.</p> <p>b. Look to Grindstone Lake Association as a nearby example.</p>	<p>WCLWCD; Hunt Hill; Tomahawk Scout Camp; NWRPC</p>	<p>2024; Ongoing</p>

Goal 3: Long Lake Education/Communication	Responsible Group(s)	Target Timeline(s)
<p>Objective 1: All stakeholders are aware of what lake stewardship means and how to practice it. Evaluate and measure this objective by using Constant Contact to distribute surveys related to lake stewardship at the beginning and end of a summer dedicated to increasing lake stewardship knowledge and compare results.</p>		
<p>Action 1 - Continue using Constant Contact, the calendar, the newsletters, the website, social media, the annual meeting, Cakes on the Lake, etc. to promote good lake stewardship practices.</p>	<p>LLPA ECC; Hunt Hill; Tomahawk Scout Camp; NWRPC</p>	<p>Ongoing; End of year summary</p>
<p>Action 2 - Continue promoting educational materials and opportunities beyond the LLPA such as Lake Leaders, Lake Tides, the Northwest Wisconsin Lakes Conference, etc. to help stakeholders educate themselves on lake stewardship.</p>	<p>LLPA ECC Extension Lakes; WDNR; NWRPC</p>	<p>Ongoing; End of year summary</p>
<p>Action 3 - Engage new shoreline property owners in best management practices for lake stewardship.</p> <ul style="list-style-type: none"> a. Develop welcome packets of information to new owners. Identify owners shortly after they purchase property. Distribute the packets via personal visits and working with local real estate agents. b. Provide outreach to real estate agents in order to educate them on Long Lake characteristics (e.g., quiet hours, slow no wake zones, sensitive areas, shoreline best management practices, etc.) resulting in informed buyers. 	<p>LLPA ECC; LLCC; Local Realtors</p>	<p>Ongoing; 2024 develop materials</p>
<p>Action 4 - Reach owners of resorts, rental properties, property managers, renters, and guests with lake stewardship information.</p> <ul style="list-style-type: none"> a. Make brochures available at each property, establishments, and the landings. b. Post information on the LLPA website. c. Assemble packets of information and mail to Long Lake area rental property owners. 	<p>LLPA ECC; LLCC; Local Realtors</p>	<p>Ongoing; 2024 develop materials</p>
<p>Action 5 - Develop a list of good lake stewardship practices and make it available on the LLPA website, through social media, and with Constant Contact.</p>	<p>LLPA BOD; NWRPC</p>	<p>Ongoing; Annual meeting</p>
<p>Action 6 - Develop Constant Contact and social media schedule for distributing lake stewardship information.</p>	<p>LLPA ECC; NWRPC</p>	<p>Ongoing; Spring and Fall determine materials</p>

<p>Objective 2: Stakeholders who practice good lake stewardship are recognized. Evaluate and measure this objective by keeping track of recognition and participation.</p>		
<p>Action 1 - Develop a program to recognize stakeholders who practice good lake stewardship. Offer incentives, discounted memberships, plaques, signs, etc.</p>	<p>LLPA BOD; LLPA ECC</p>	<p>Ongoing; 2024 develop program</p>
<p>Action 2 - Encourage the LLPA membership to participate in Healthy Lakes best management projects and offer recognition to those who do.</p>	<p>LLPA BOD; LLPA ECC</p>	<p>Ongoing; Annual meeting</p>
<p>Objective 3: Suggestions for improvements are provided in a positive manner to stakeholders who do not currently follow good lake stewardship practices. Evaluate and measure this objective by keeping track of implementation of best management practices.</p>		
<p>Action 1 - Use the results of the Shoreline Habitat Assessment to further educate shoreline property owners with information regarding Healthy Lakes best management practices.</p>	<p>LLPA BOD; LLPA ECC; LLPA SWRC; WCLWCD; NWRPC</p>	<p>2024; Ongoing</p>
<p>Action 2 - Educate and communicate why shoreland restoration and stormwater projects are important for the protection of Long Lake water quality. Identify and encourage stewardship actions to preserve water quality.</p>	<p>LLPA BOD; LLPA ECC; LLPA SWRC; WCLWCD; NWRPC</p>	<p>2024; Ongoing</p>

Goal 4: LLPA Capacity Building	Responsible Group(s)	Target Timeline(s)
<p>Objective 1: The LLPA board processes are efficient, and the board consists of engaged people with a variety of expertise. Evaluate and measure this objective by annually re-evaluating board processes and skills gap analyses.</p>		
<p>Action 1 - Review existing LLPA organizational structure relative to increasing its capacity to more effectively pursue its Mission.</p> <ul style="list-style-type: none"> a. Review board documents and procedures b. Organize and digitally store documents in the LLPA Google Drive c. Maintain updated records on the LLPA website d. Identify needed guidance for board operations 	<p>LLPA BOD; NWRPC</p>	<p>Ongoing; End of year check-in</p>
<p>Action 2 - Review existing LLPA organizational structure relative to the need for securing long term sustainability of the organization.</p>	<p>LLPA BOD; NWRPC</p>	<p>Ongoing; End of year check-in</p>
<p>Action 3 - Provide updates regarding LLPA lake management goals and objectives, actions, and results to partners. Discuss opportunities for coordination and new partnerships.</p>	<p>LLPA BOD; NWRPC</p>	<p>Ongoing; End of year check-in</p>
<p>Action 4 - Continue to encourage LLPA board members (and LLPA membership) to take part in Lake Leaders, the Wisconsin Lakes and Rivers Conference, the Northwest Wisconsin Lakes Conference, and other educational opportunities.</p>	<p>LLPA BOD; NWRPC</p>	<p>Ongoing; Annual meeting</p>
<p>Objective 2: The LLPA pursues sustainable and strategic forms of fundraising. Evaluate and measure this objective by periodically re-evaluating fundraising strategies and projects completed.</p>		
<p>Action 1 - Periodically re-evaluate fundraising goals and strategies to support projects related to the LLPA's mission.</p>	<p>LLPA BOD; LLPA SCBC</p>	<p>Ongoing; End of year check-in</p>
<p>Action 2 - Investigate and seek grant funding sources to carry out management goals.</p> <ul style="list-style-type: none"> a. Continue to work with the NWRPC to secure grant funding to implement projects. 	<p>LLPA BOD; LLPA SCBC; NWRPC</p>	<p>Ongoing; Determine grant projects by July</p>
<p>Action 3 - Complete an economic analysis of the "natural capital" of the lake resource as it relates to the local business community.</p> <ul style="list-style-type: none"> a. Work with the Long Lake Chamber of Commerce and surrounding townships to develop an understanding of Long Lake's role in the local economy. 	<p>LLPA BOD; LLPA SCBC; LLCC; Washburn County; NWRPC</p>	<p>2024-2025</p>

b. Work with the NWRPC and Washburn County to develop an understanding of Long Lake’s role in the regional economy.		
Action 4 - Assemble and publish a yearly fundraising report to be shared at the annual meeting.	LLPA BOD; LLPA SCBC	Annual Meeting
Objective 3: The LLPA pursues sustainable and strategic forms of increasing membership and engagement. Evaluate and measure this objective by annually evaluating membership – renewals and new memberships.		
Action 1 - Provide the membership with a clear description of management responsibilities and interaction with partners. This can be partially completed via newsletters, annual meetings, constant contact, and the website. Develop professional publications which list all the organizations, what they do, how they do it, and how they work together.	LLPA BOD; NWRPC	Ongoing; Annual
Action 2 - Evaluate priorities on an annual basis and make adjustments based on changing conditions (via monitoring), funding availability (grants and otherwise), and membership feedback (annual meeting, surveys, etc.).	LLPA BOD; NWRPC	Ongoing; Annual
Action 3 - Evaluate and report on LLPA efficacy on an annual basis to be presented at the annual meeting.	LLPA BOD; NWRPC	Annual Meeting
Action 4 - Create a timeline chart with management accomplishments. This should include significant milestones for all local partner organizations.	LLPA BOD; NWRPC	2024; Ongoing
Action 5 - Use Constant Contact to encourage LLPA members to attend local town board meetings, county board meetings, and other relevant meetings.	LLPA ECC; Surrounding townships; WCLWCD; NWRPC	Ongoing
Action 6 - Develop brochure/educational materials to advise shoreline property owners of best lawn care practices for lake and shoreline health.	LLPA BOD; LLPA ECC; LLPA SWRC; NWRPC	2024

Works Cited

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- Lindsay, Alec R., Sandra S. Gillum, and Michael W. Meyer. "Influence of lakeshore development on breeding bird communities in a mixed northern forest." *Biological Conservation* 107.1 (2002): 1-11.
- Nichols, Stanley A. "Floristic Quality Assessment of Wisconsin Lake Plant communities with Example Applications". *Journal of Lake and Reservoir Management* 15 (2) (1999): 133-141.
- Roberts, Craig M. "WDNR Fisheries Survey Report for Long Lake, Washburn County, WI" (2023).
- Woodford, James E., and Michael W. Meyer. "Impact of lakeshore development on green frog abundance." *Biological Conservation* 110.2 (2003): 277-284.

Long Lake Comprehensive Plan

Public Comments

Goals and Objectives Public Comment Period

August 22, 2023 – September 12, 2023 (21 days)

24 comments

<p>The management plan looks very well designed. One concern I have is it seems some property owners are renting out space for docks and boat lifts that are taking up more of the shoreline.</p>
<p>Absolutely support Shoreline Objective 1, action 3a in an effort to direct high wake boats to main Bay Area and out of narrows and Grunhaugen Bay</p>
<p>Well done</p>
<p>Wow, what a plan! Extensive, comprehensive, wide reaching.....I like it all, but in the end, if you asked yourselves if we could consolidate our plan, I believe the answer to be YES! You see, a lot of the water clarity problems that are starting to show up are the direct result, I believe, of shoreline erosion. The big boats are causing problems. I fish Long Lake a LOT, and when I fish in the narrows, the water clarity is worse the closer you get to the shore. That is not because the Boy Scouts are polluters, it is because those big waves erode the shoreline! Friends, something has to be done about those wake boats and their 3-4ft waves. I have inquired around other lakes, and guess what.....they have the same problem! I am scared of invasive species too, I am concerned about the runoff issues too.....but are we EVER going to be successful at eliminating those 2 concerns.....sadly, no.....so let's tackle something that we CAN control. Thanks for all you do. It is appreciated.</p>
<p>You discuss stewardship of the lake but don't really describe what that entails. Making that phrase clearer with an explanation of how to be a good steward would be helpful. We need to do something to protect the loons. Boats are always screaming by them in way too close proximity.</p>
<p>Excellent plans for water, shoreline, weed management but feeble on watercraft regulation. Other lakes have better restrictions on wake boats, hydroplanes, jet skis, etc. And there is nothing about penalizing bad boating behavior, a factor that helped us decide to sell after 47 years on the lake.</p>
<p>It appears to me that the seaweed has exploded again this summer and growing from the shore line out about 20-30 feet. Never had that in the sixties. The clarity of the water has degraded as well over the years. Hopefully, your plans will address these issues. Thanks for your efforts!</p>
<p>I very much appreciate the LLPA board and committees volunteering their time to look after the needs of the lake. I only have one comment on the goals and objectives listed.... Please have a tough meeting and agree on the top 5 action items LLPA will focus on in the next 12 months. I counted 97 goals and objectives in the report. With that many nothing will ever get done. Focus, focus , focus and make tough decisions to prioritize.</p>
<p>Excellent plan. Obviously, a lot of work went into this!. Unless I missed it, I didn't see anything about shoreline damage caused by Wakeboard boats especially in narrow areas of lake.</p>
<p>Great Goal/Objectives! Very aggressive and I hope the energy behind these G/O's remain high. My biggest concern with the existing lake owners is the mindset of folks bringing in their pristine yard concept they may have had in the Cities, to LL. The Loading effect of Phosphorus, Nitrates/Nitrates, including herbicides and pesticides have an effect especially with the driving down effect of irrigation. I would suggest placing an additional bullet under Goal 3, Objective 2, Action 1, that would include something similar to the following:</p>

- Develop brochure (or language to existing brochures) to educate lake owners on the potential adverse effects of lawn amendments to water quality. (Not sure this is the best place to place this suggestion).

Next suggestion - can be developed under existing Goal and Obj. somewhere, but I see value in developing a LL boat sticker that identifies it as a LL use only boat/pontoon. Helps landing volunteer surveyors focus those crafts (w/o LL sticker) that may have come in from other lakes. This also can be a point of pride that these are LL boats only and they show we care about lake quality. Sticker can be a one-- time nominal fee via a "donation", or not. Registration for sticker should include DNR registration number, and LL address when applying. That way stickers are hopefully not just handed out to anybody.

Last suggestion, this will be a lot of work to coordinate communications and brochures and getting the word out via mailings and/or email. Wondering if any state grant money obtained through this process can be used for hiring a communication expert. I bring this up as I have experienced great success in my former life using such firms relating to environmental matters. Not cheap but takes a burden of voluntary committees and keeps it well organized.

Great job folks! I can see a lot of thought and effort went into this.

I read the whole thing, it's comprehensive almost to the point of being exhaustive. So many objectives, all of which are good, but implementation? IMO, way too many to start at once, so assuming this is a 10 year or more strategic plan (good), it's breaking it down into manageable parts and then getting agreement on what is most important that will determine success. Appreciate all you are doing, thanks.

I think the lake management plan is a tremendous step in helping to secure the healthy and longevity of Long Lake.

This is an impressive and expansive plan-truly comprehensive- which deserves our support. Implementation assures a more hopeful future for our beloved Long Lake. Where possible, it would benefit implementation and marking of progress to include more specific metrics, markers and target goals. Thank you for all the effort represented in this memorable document.

Steve Cornils - N1667 Schnacky Rd.

The "comprehensive plan" at this stage seems very broad and the actions lack specificity (many requiring further study/exploration). What happens next to determine sufficient detail & definition in order to determine priorities and trade offs? The board will need clarity on what are the greatest threats and opportunities, so that resources can be invested to address the most urgent issues and achieve the most impact. And assuming significant fundraising is required to confront issues, donors will want assurance that their contributions will be efficiently spent to arrest the lakes decline; ie tackle the most pressing issues first. Seems like there is a lot more work required to set a clear direction.

I think that you folks have done an outstanding job on the Comprehensive Lake Management Plan Goals and Objectives. This is thoroughly thought out, the goals are realistic, the intended approach to all stakeholders is transparent and fair. I thank all of you for your time, efforts, and professionalism in creating this draft. Very well done.

I think the Plan Goals and Objectives are excellent in general. I have some specific feedback which I will list and correlate with the Goals/Objective/Actions they relate to.

Goal 1/IN WATER Objective 1/Actions:

#2-I think it might be helpful to use some sort of tool to ascertain what people around the lake know about various topics such as the relationship between phosphorus and lakes; the effect of lawn & garden fertilizers on lakes; what non-phosphorus fertilizers are available (actual brands, etc.); the options for Shoreland Habitat other than 'letting it go wild' vs. having a perfectly manicured lawn and flower beds. Then, educating people about this could be fitted to the gaps in our knowledge.

IN WATER Objective 2: Could LLPA provide a map of the lake showing where the AIS are currently located in reasonable detail - if some of them are near one's own shoreline it would help the members eradicate them to know that they are there. (There is an objective to draw a map in WATERSHED Objective 2/Action 1 b.)

SHORELINE Objective 1/Action 2: Has any relationship been developed with Sunset Resort? (They have filled in more than one wetland, built without posted building permits, and are using residential lots for commercial purposes.)

Goal 2/LONG LAKE MANAGEMENT/Objective 1/Action 5 - this is excellent. We can give copies to guests who come to stay with us.

<p>SHORELINE Objective 1/Action 1a: See suggestion above in IN WATER Objective 1/Action #2.</p> <p>WATERSHED Objective 2: Explore encouraging LLPA members to consider estate planning vehicles to encourage/provide conserved, restored, and or set-aside land. Keith Nelson (N1273 Waters Edge Road, cellphone: 402-850-7191, email: keithtn@outlook.com) retired 10 yrs, ago from a career as a planned gift officer and might be interested in helping with this effort.</p> <p>Goal 3/LONG LAKE EDUCATION /COMMUNICATION Objective 1/Action 3a: The time for this is rapidly approaching. Sunset Resort is expanding now in ways that will affect the lakeshore and lake in the future.</p> <p>Action 3b: This action references "quiet hours" - are those 'on the water itself'? There are no sound ordinances in Long Lake Township, or in Washburn County. The state of Wisconsin has an ordinance, but the other government entities do not.</p> <p>Action 5: 1) Perhaps a couple of very attractive lakeshore landscapes that practice good lakeshore stewardship could be designed, implemented, and photographed/be made visible to members so that they have some ideas about appealing alternatives. 2) Maybe an extensive list of attractive plants that could be used could be drawn up, perhaps with photographs of the particular plants. 3.) Perhaps a plant sale could be held at an LLPA meeting where plants on the list mentioned in #2 are offered - profits to the LLPA.</p>
<p>We would like to see stronger restrictions on wake boats. Some lakes in Minnesota have banned them because of shoreline erosion and damage to wildlife nesting.</p>
<p>I strongly support the continued fall drawdown and the summer water levels as they currently exist or even lower (back to mid 1990s levels) as increasing power boat, jet ski, wake boating adversely affect shoreline and cause increasing erosion! Also fall draw down is very important to protect against ice damage in spring! I understand LLPA is for removing draw downs; I am a member and they do not represent my position!</p>
<p>I agree with the plan goals and objectives as outlined in the draft document. I'm especially interested in water quality & invasive species issues, proper shoreline stewardship, as well as educating boaters on etiquette, rules of the road, and the need to minimize wakes close to shore.</p>
<p>I read the draft and don't have anything constructive to add other than to say thank you. We are grateful there are resources striving to protect the wellbeing of our lake. We have owned our property five years but want to continue learning about good lake stewardship practices, so we look forward to ongoing content from LLPA on this.</p>
<p>Increased boat traffic, high wakes, disregard of safety rules and lack of basic common courtesy are all working to kill Long Lake, particularly in the area between the upper and lower lakes.</p>
<p>Looks good to us!</p>
<p>You need to narrow your areas of concern to the top 3-5 items. Currently you have too many items to effectively pursue with any efficacy. I applauded your pursuit of many areas of concern but you can't do everything at once.</p>
<p>This appears to be a very comprehensive plan. I am pleased to see all the issues and concerns addressed in the plan. I am concerned that there is a lot on the plate here.....not sure what areas are being prioritized to implement all this. Would suggest that water quality issues be put on the fore front and shoreline erosion issues be addressed by mandating that wake surfing be done only in the large bodies of water at the North and south end of the lake. Education in all areas is paramount and perhaps all lessors that rent their place should be required to provide a short (probably should not be more than a page on both sides) brochure that summarizes the key things that should be observed when visiting Long Lake. Thank you for all your great work on this.</p>
<p>Action 4 - Reach owners of resorts, rental properties, property managers, renters, and guests with lake stewardship information.</p> <p>a. Make brochures available at each property, establishments, and the landings.</p> <p>I like this action because there are so many weekend/weekly vacationers that bring up large boats and even though we don't want to discourage the economic growth of our businesses on Long Lake, we need education about ripping up aquatic species with wake boats and personal water equipment . So many of these boaters run much too fast and too close to shoreline, which rocks docked boats and beats the shoreline.</p>

Draft Plan Public Comment Period

December 1, 2023 – January 7, 2023 (37 days)

17 comments

This was definitely a comprehensive plan for Long Lake! Very impressive and thank you for the team that put that together! We especially like the welcome packet for new home owners so they are aware of what activities benefits the lake and their neighbors as well.

The plan is thorough and give us a place to start the work. I am most concerned about excessive weeds and hope we can investigate mechanical aquatic plant management. I think residents would notice and appreciate this. i realize we need the aquatic plant management plan first, but I do think it would be excellent for people to see this action taken. My second big concern are out of date septic systems. Many residents on Holy Island who live in close proximity to each other and the lake, have out of date systems. The honor system isn't working. I also think run-off from Hwy M and Holy Island road creates excessive siltation in the bays around Holy Island and the dam. The culverts on Holy Island Road are NEVER cleaned out and no water is able to flow. The town placed a grate on one side of the culvert, but not the other. so it doesn't stop the beaver from filling the culvert in one day. Also the culverts on M at either side of the wall.

I reviewed the entire Long Lake management plan. Below are my brief comments.

1. It is awesome that we will soon have a management plan. A sincere thank you to the Long Lake Association board and to the Northwest Regional Planning Commission water quality resource person Megan Matter.
2. I fully support the LLPA goals objectives and action plans as submit . I feel they are comprehensive and allow for the evolution of appropriate monitoring, management and education actions by LLP . I appreciate the use of the concept of "adaptive management" which will allow us to move ahead as we increase our knowledge base relative to managing the Lake.
3. In the background Section I did not see a number related to the number of parcels on the lake. That might be important for future background information in areas such as fundraising. I may have missed it. input. Oh yes page 8 it should read Hunt Hill Audubon Sanctuary rather than society.
4. In the "position description" area page 56 there should be a reference to the water resources position at NWRP . Also there should be somewhere a brief ref to or description of Northwest Regional Planning Commission.
5. Thank you for adding relevant information relative to managing sensitive areas with the use of navigational markers. That would be page 5 ,sensitive area marking , and Goal II objective 2 action 1. I think if we begin looking at the pursuit of this it will be effective and innovative.
6. In summary I did provide previous comments and presently this is the extent of my comments .I think we should move ahead with the formal acceptance of the draft document .Again "Thank You" to all who provided such valuable input.

First let me thank the LLPA for the work you do and for putting together the start of a comprehensive lake plan.

My thoughts ...

* Its critical to make some tough decisions regarding what the biggest threats are and what are the most important near-term actions. Given the limited resources, both dollars and headcount it's critical for the LLPA to focus. As I read the action plan there is no evidence as to what the most important actions are. I suggest force ranking the threats so the most critical are identified and agreed to by the board.

* The action plan needs to get much more specific. Instead of listing LLPA as the responsible party, for an action, list the name of an LLPA board member that is personally responsible for making progress on the action.

* Add a column to the action plan that lists the goal or target for the action. How do you know if there is progress if there isn't a specific goal or measure of the actions taken?

* I know it's not easy, but the municipalities need to help the LLPA. I realize they aren't in a position of

<p>making large donations, but they could lay out clear guidelines for septic system maintenance / replacement as well as new building codes that better protect the lake. Enforcement and monitoring could be a combination of municipalities resources, LLPA and community awareness so we all know what to look for.</p> <p>Thanks again.</p>
<p>AIS - milfoil is the biggest threat to the lake. We have 4 basically unmonitored landings. We should do similar to what Shell Lake did and go to one manned landing with a fee and cleaning facilities to clean boats and trailers before entering the lake. Milfoil would destroy the lake.</p>
<p>This report is very impressive! Thank you for your time and passion on this project.</p> <p>I have not read through the entire report, but noticed a few places where Hunt Hill was listed incorrectly. We should be listed as Hunt Hill Audubon Sanctuary, not Society. Here are a few spots I found the error: Page 2 - next to Sage's name Page 6 Page 8 - Under the Visioning paragraph.</p>
<p>It would be helpful to provide each lake property owner with their SHA Score and suggestions for increasing that score. I represent the Butternut Hills PUD and we control about 300 feet of shoreline by the golf course. We need to limit wake boat activity particularly in the "narrows" it is not uncommon to have these large wake boats traveling at high speed through the narrows creating significant waves as they impact the shoreline. We should consider acquisition of a mechanical harvesting device. Do we have any resolution regarding lake water levels and the annual draw down which is killing the lakes amphibians? Welcome packets for new lake property owners is a great idea. Can we provide these packets digitally to all lake property owners? We appreciate everything the LLPA is doing. Keep up the great work.</p>
<p>How about addressing all of the illegal/unnecessary buoys, swim platforms and Other floating devices.</p>
<p>Thank you so much to all who assisted in the development of this plan. It appears very thorough, informative, and well thought out. There are several action items I took note of that I can do on my property to help improve lake quality in my immediate area in the Narrows and look forward to starting that. I also appreciate the emphasis that was put on controlling the shoreline erosion caused by wake boats and communicating (again) the proper distances to maintain from shore and other boats. I like the idea of the Preferred Wake Zone map and communicating that to all residents. Overall, I think the plan sounds an alarm that the health of the lake has deteriorated and that all of us need to take whatever steps we can to minimize the ongoing decline and hopefully start to reverse that trend.</p>
<p>Please strictly limit or forbid the use of wake boats. Even with the usage of distance from the shore, they are still damaging the shoreline and destroying loon nests. Just because there are distance rules doesn't mean they are effective and not many of the rental people abide by the rules or even the laws about harassing the lake waterfowl. Minnesota has forbidden the use on some lakes because of the damage they cause.</p>
<p>The biggest threat financially and environmentally is milfoil Access to Long Lake should be limited - like Shell Lake. Close down all the landings but one. Charge a fee at the landing. Inspect boats, trailers, bilges and live wells for invasive species.</p>
<p>Thank you for sharing this comprehensive report. I found it very educational and can tell that every effort was made to identify problematic issues and hopefully we can preserve this beautiful lake!</p>
<p>WE APPRECIATE ALL THE CONCERN THAT LONG LAKE RESIDENTS HAVE FOR OUR BEAUTIFUL LAKE. OUR PRIMARY CONCERN IS HOW OUR VISITORS TREAT OUR LAKE. WAVE RUNNERS DAMAGE THE SHORELINE, AND JETSKIS OUT OF CONTROL</p>
<p>Sorry for not responding sooner, but having Covid during the Holidays and some makeup travel afterwards I didn't read this draft in its entirety until now. This draft is very thorough and comprehensive.</p> <p>One question I have regards the effects, if any, of the multi-boat fishing tournaments on the transfer of lake water from lake to lake and the potential for the introduction of invasive species. I have had some tree trimming done recently in an attempt to gain more light entering the lake edge grasses and</p>

understory plants with the intent of promoting a larger a buffer zone . Our family feels blessed to be a part of the Long Lake property owners community. Thank you.

I have read the DNR fish stocking summary. The stocking efforts over the years have resulted in 1.9 walleyes per acre! That doesn't seem like an acceptable density of walleyes that survive to maturity (it take 4-6 years for a walleye to get to 18"). I would like to see a density of walleyes double in the next 10 years. Does that mean we should ask for a doubling of stocking extended growth walleyes? Should we ask for a moratorium of native spearing for 1-3 years to see if density levels increase? Should we ask the tribal fisheries people to stock 4-10 extended growth walleyes for every walleyes that is speared? Should we have a catch and release policy for 1-3 years to see if that would increase walleye density? Can Long Lake be the Walleye Capital of Wisconsin again? Thank you to all of you LLPA volunteers for your work on our beautiful resource.

I've become increasingly concerned about the clarity of the water here on Long Lake, particularly after seeing the "recreational " gauge in solid red territory. There are many days in the summer where it makes one extremely skeptical of jumping in the water due to weeds, whole and chopped up, clouding up the water. I'm not sure what the cure would be, just offering up an observation. If something is not done about the problem, this beautiful lake will lose its recreational appeal and property owners will lose value on their homes.

We're incredibly fortunate to have not only a beautiful lake, but also a committed and thoughtful LLPA. This plan gives me hope that both will continue for generations to come! I'm so impressed by the scope, quality, detail and pragmatism of these recommendations. Many thanks to the experts and volunteers who pulled it together.

I particularly like the idea of the Welcome Packet, since people are inclined to put their own "stamp" on a newly acquired property early on. The packets would be a great way to welcome them, affirm their pride in finding their dream spot, and make the point that we who are lucky enough to be on this lake are a community with a shared responsibility for keeping it the lovely setting that it is.

I also like the idea of recognizing those who are working to improve the shoreline and water quality through their own initiative. I regret that (thinking of my own condo association) there are some who are unwilling to make even small sacrifices for the greater good. Public recognition of those who are, might, with time, subtly change attitudes like these.

Thanks again for all the work that's gone into this plan.

The response period closed on me, so I am responding with a reply. My apologies for my lateness. The work that has been done is beyond impressive, and I greatly appreciate the work. It is so comprehensive, the readers are likely overwhelmed. I know I was and tried a couple of times to get through this plan. I would recommend trying to break this down to an executive summary, so more members will grasp the power of the work. I think the background, information and plan are very good. We need engagement by the property owners. It's not easy. I am the president of a MN lake property owners association and understand the challenge. Work on shorelines, adhering to wake limits and monitoring of septic systems are important opportunities each of us could and should do to protect the lake. Trying to remove vegetation by mechanical, chemical and manual intervention are extremely challenging in large areas. I am of the opinion it is likely impossible. Focusing on upstream nutrient runoff may have potential if there is an obvious source or two. We should all be watching for more invasive, but from my experience, once AIS are identified, it's often too late to stop them. I would love to be wrong, so it's worth the try.

I wish the Board the best and again, I thank you for your energy and passion for this project. I will do my part and am one of the shorelines that has been left in its natural state by design. My parents cared about the lake, and I do as well. Recognizing those that take this path may help others see the value in it.

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
810 W. Maple Street
Spooner WI 54801

Tony Evers, Governor
Preston D. Cole, Secretary
Telephone 608-266-2621
Toll Free 1-888-936-7463
TTY Access via relay - 711



February 23, 2024

Megan Mader
Via Email

Subject: Long Lake Comprehensive Lake Management Plan Eligibility Determination

Dear Megan Mader:

Thank you for your efforts to understand and manage Long Lake. This letter is to notify you that the Department has determined the 2024-2034 Comprehensive Lake Management Plan, is eligible for NR193 Surface Water Grants, subject to the application requirements of the program.

Thanks to you and the lake community for your continued efforts. Please contact Aquatic Plant Management Coordinator Austin Dehn (austin.dehn@wisconsin.gov or 715-919-8059) if you have any questions.

Sincerely yours,

Austin Dehn

Austin Dehn
APM specialist