A LAKE MANAGEMENT PLAN FOR NAGAWICKA LAKE

EXECUTIVE SUMMARY

A Management Plan for Nagawicka Lake and its Watershed

The health of a lake ecosystem is usually a direct reflection of the use and management of the land within its watershed. While Nagawicka Lake (the Lake) is generally healthy, high rates of phosphorus and sediment loading have and will continue to harm the Lake if active management action is not taken. The Nagawicka Lake Management Plan (the Plan) is the second comprehensive management plan for this Lake and was developed to provide a set of targeted, specific recommendations to improve Nagawicka Lake, the Bark River (the River), and ecological conditions throughout the watershed. This Plan supplements and builds upon previous plans and recommendations, such as the 2006 and 2012 aquatic plant management plan updates (see sewrpc.org), as well as studies by the Wisconsin Department of Natural Resources (WDNR) and the U.S. Geological Survey (USGS).

Characteristics of Nagawicka Lake and its Watershed

Nagawicka Lake is a high-quality lake and a premier recreational destination. The Lake, one of the largest and deepest in Southeastern Wisconsin, has hard water, good water clarity, a diverse aquatic plant community, and a healthy sport and panfish fishery. Classified as one of the few two-story lakes in the Region, the Lake could potentially again host this rare ecosystem that would support an even more outstanding sport fishery (e.g., larger, faster growing walleye and northern pike). Located in the metropolitan Milwaukee area, its visitors and residents engage in a wide variety of recreational pursuits including fishing, swimming, sailing, water-skiing, and other activities. The Lake's largest tributary is the Bark River, supplying nearly three-quarters of its water, while precipitation, groundwater, and other tributaries supply the rest. The Lake is fed by a 44.6 square mile watershed located primarily within Waukesha County, with the most upstream area draining a small portion of Washington County. Agricultural and residential land uses are the most common land uses within the watershed.

Boating, sailing, fishing, and swimming are popular recreational activities on Nagawicka Lake

Justification for Plan

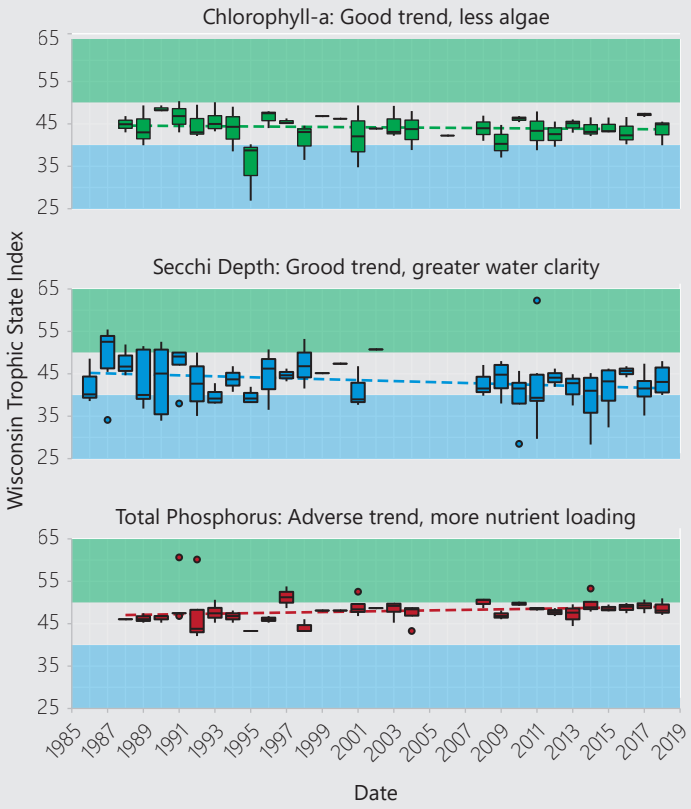
While the Lake enjoys generally good water quality and conditions supporting a wide variety of use, issues of concern exist that justify further study. These issues of concern addressed in this management plan include the following:

- Water Quality Trends
- Sediment Loading and Accumulation
- Priority Areas for Pollutant Load Reduction
- Aquatic Plant Management
- Restoring Natural Hydrology in a Changed Landscape

A LAKE MANAGEMENT PLAN FOR NAGAWICKA LAKE

Water Quality Trends

Nagawicka Lake has maintained its mesotrophic status for decades, with recent improvements in water clarity, algae reduction, and oxygen concentrations. In the 1970s, the Lake was hypereutrophic, but the water quality substantially increased after diversion of sewage effluent in 1980. Since the late 1980s, water clarity has increased and chlorophyll-*a* concentrations, an indication of algal abundance, has decreased. Additionally, the extent of summertime anoxic (no oxygen) water near the lake bottom has substantially decreased, providing more suitable habitat for aquatic organisms and reducing phosphorus release from sediment. However, total phosphorus concentrations have increased since 1980. If this trend continues, excessive phosphorus will decrease water clarity, fuel excessive growth of algae and aquatic plants, and may impair the Lake's ability to support its current recreational uses. These insights are only possible thanks to the 35 years of consistent water quality monitoring on the Lake, much of which has been conducted by volunteers.



Source: Wisconsin Department of Natural Resources and SEWRPC

Greater water clarity and reduced algal abundance indicate improving water quality. Increasing phosphorus remains an issue of concern.

35 years of water quality monitoring on Nagawicka Lake provides invaluable insight. Continued monitoring is essential to track future water quality change.

Increasing phosphorus and sediment loading threaten environmental quality and/or recreational use within the Lake if unaddressed. The U.S. Environmental Protection Agency (USEPA) and the Wisconsin Department of Natural Resources (WDNR) have identified the Bark River watershed as a significant contributor of phosphorus and sediment to the Rock River, with reaches of the River listed as impaired for low dissolved oxygen. The USEPA established a total maximum daily load (TMDL) in 2011 for the Rock River basin to address excessive phosphorus and sediment pollution. Since the Bark River watershed is part of Rock River TMDL, these state-permitted allocations establish a minimum standard of phosphorus and sediment reduction goals in the Lake watershed. These goals are as follows:

Pollutant	Nonpoint Source Pollution Sources	Non-Permitted Urban Sources	MS4 Systems	Wastewater Treatment Plants
Total Phosphorus	46% (445 lbs)	8% (73 lbs)	68% (894 lbs)	79% (1,786 lbs)
Total Suspended Solids	35% (58 yd^3)	4% (7.5 yd^3)	43% (114 yd^3)	28% (9 yd^3)

The recommendations provided within this management plan will help communities reduce their pollutant loading to meet and exceed these goals.

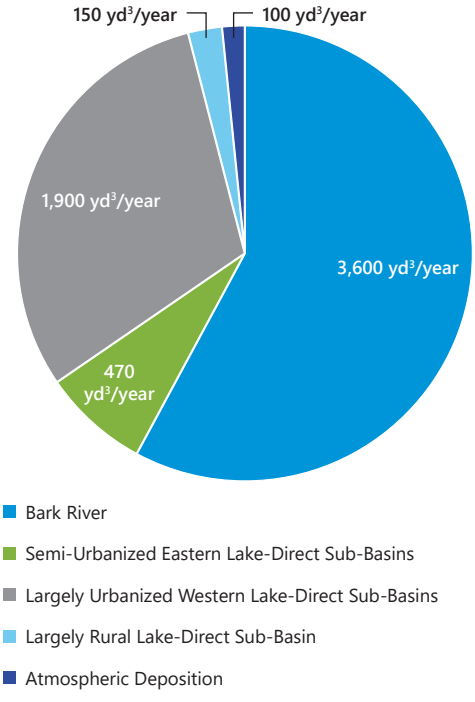
Sediment Loading and Accumulation

Sedimentation has been a long-time concern of Lake residents. The Commission evaluated sediment depths within the Lake, as well as sediment accumulations along the Bark River. Sediment was scarcely present in the River below the Merton millpond, but thick sediment deposits were found close to the River's inlet to the Lake. Sediment accumulation in the Lake was most pronounced at the mouth of the River, where an "island" of sediment has become a navigational and safety concern for Lake residents. The River is the single largest contributor of externally sourced sediment to the Lake. Available data suggests it delivers 3,600 cubic yards of sediment each year, predominantly in large pulses after heavy rainfall. Lake-direct urbanized and semiurbanized tributaries contribute more sediment per acre then those draining into the Bark River, collectively contributing 2,370 cubic yards of sediment each year. A rural Lake-direct tributary contributes an additional 150 cubic yards per year while atmospheric deposition contributes 100 cubic yards per year.

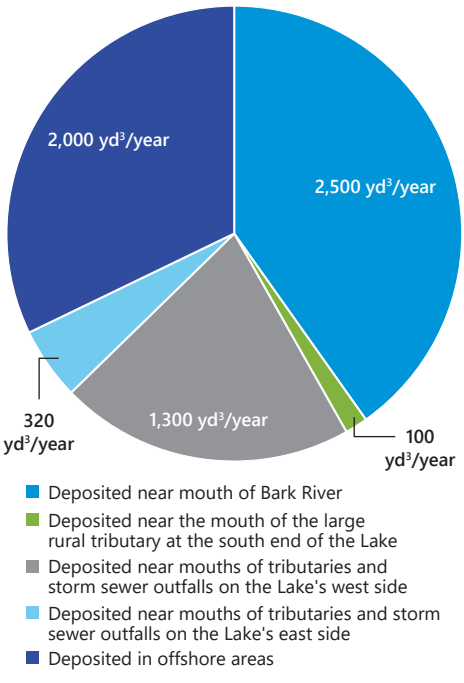
Sediment accumulation at the mouth of the Bark River on Nagawicka Lake is an important issue of concern.

Sediment is not uniformly deposited throughout the Lake. The Bark River delta accumulates the largest amount of externally sourced sediment, with an estimated sediment deposition rate of roughly 2,500 cubic yards per year. Portions of the Lake near the mouths of Lake-direct tributaries accumulate about 1,720 cubic yards of externally sourced sediment per year. The remainder of the externally sourced sediment (about 2,000 cubic yards) is likely deposited in offshore areas. Management recommendations to address sediment loading and accumulation are provided in greater detail in the Plan.

Nagawicka Lake External Sediment Sources



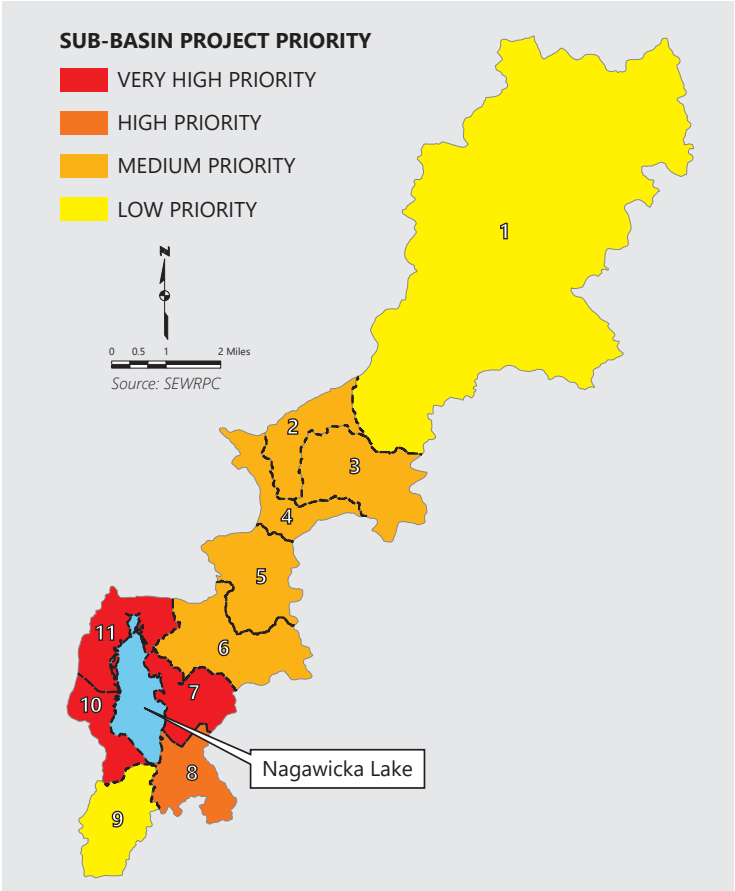
Fate of Nagawicka Lake External Sediment Sources



A LAKE MANAGEMENT PLAN FOR NAGAWICKA LAKE

Priority Areas for Pollutant Load Reduction

This planning project identifies priority areas for pollutant load reduction to the Lake. In this regard, the Commission performed field inventories of the Bark River and Lake shoreline conditions, examined previous studies, and conducted pollutant load modeling throughout the watershed. The majority of the Bark River was in good condition, with ample connection to adjacent floodplain, extensive vegetation buffers, and few instances of bank erosion. In contrast, the Lake shoreline exhibited several instances of shoreline erosion and most of the shoreline lacked vegetative buffers. A previous USGS study noted that basins with direct drainage to the Lake contributed more phosphorus per acre than the upstream Bark River basin. Commission pollutant load modeling, which indicated that basins adjacent to the Lake had the highest phosphorus and sediment loading per acre, supported the USGS findings.



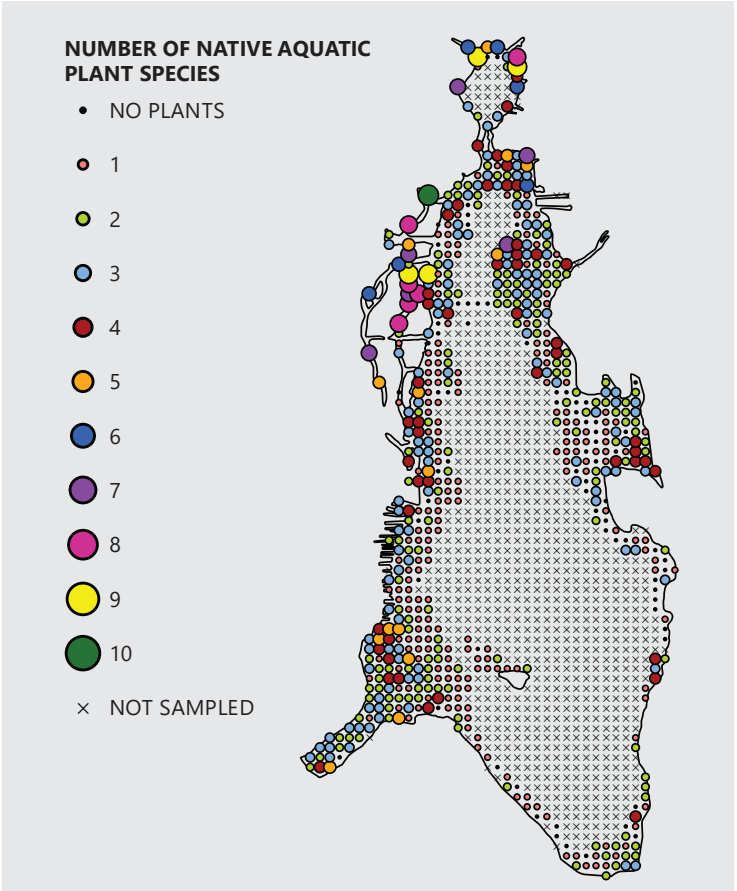
Sub-basins of the Nagawicka Lake watershed were prioritized by their potential to reduce phosphorus and sediment loading.

Achieving the phosphorus and sediment reduction goals set by the TMDL will require major commitments from all watershed stakeholders to implement best management practices. These practices include creating shoreline and riparian buffers, installing rain gardens, using cover crop and no-till practices, and retrofitting existing stormwater infrastructure. Sub-basins with direct drainage to the Lake should be prioritized, as management practices here will be the most effective at reducing pollutant loading to the Lake. A comprehensive inventory of priority areas and parcels for riparian and shoreline buffers as well as storm drainage systems is provided in the Plan.

The shoreline of Nagawicka Lake has many opportunities for vegetated buffers to reduce phosphorus and sediment loading as well as protect the shoreline from erosion. Deep-rooted native vegetation stabilizes shorelines and helps remove phosphorus and sediment from runoff.

Aquatic Plant Management

Dedicated aquatic plant management in Nagawicka Lake has supported a healthy aquatic plant community and removed substantial amounts of total phosphorus from the Lake. The aquatic plant community of Nagawicka Lake is very diverse with 32 species identified in a 2016 survey, including many beneficial native species. Muskgrass (*Chara* spp.), the most dominant species, is a native that stabilizes lake bottom sediment and removes phosphorus from the water column; this species should be a priority for protection. Invasive species, such as Eurasian watermilfoil and Curly-leaf pondweed, are present in the Lake but are not widespread, covering less than 3 percent of the Lake. Since 2003, the aquatic plant harvesting program operated by the City of Delafield has removed up to a cumulative 12,346 lbs. of total phosphorus from the Lake. This phosphorus removal, as well as nurturing a healthy native plant community, contributes to water quality improvements. The Plan provides detailed aquatic plant management recommendations, including measures to maintain navigational lanes within sensitive areas.



Nagawicka Lake has a healthy native aquatic plant community. Species richness within the Lake is highest along the northwestern shore and the northern kettle.

Phosphorus Removal by Harvesting:
The City of Delafield has removed up to 12,346 lbs. of phosphorus through aquatic plant harvesting since 2003.

Restoring Natural Hydrology in a Changed Landscape

The Nagawicka Lake watershed has been dramatically altered from pre-settlement conditions when upland hardwood forest covered the northern portion and the southern portion supported oak savannah and wetlands. The watershed is now mostly occupied by agricultural and residential land uses, with urban development expected to comprise 59 percent of the watershed by 2050. Land conversion has changed the hydrology of the watershed through stream channelization, dam construction, filling of wetlands, and increasingly through cover by impervious surface (e.g., buildings, roads, parking lots). These hydrologic changes reduce the landscape's ability to capture, filter, and retain precipitation; maintain streamflow during dry periods; and provide suitable habitat for many fish species. Additionally, public sewers, which export water out of the Lake's watershed and ultimately reduce the volume of groundwater discharged to the Lake and its tributaries, service or plan to service at least one-third of the watershed. The recommendations in this Plan will help communities preserve the Lake's water supply by modulating floodwater volumes, protecting groundwater infiltration, and limiting water exports from the watershed.

A LAKE MANAGEMENT PLAN FOR NAGAWICKA LAKE

Key Management Objectives to Improve the Nagawicka Lake Watershed

- Use existing TMDL guidance for phosphorus and sediment load reduction goals
- Continue water quality monitoring to track progress toward meeting nonpoint source load reductions and improving water quality
- Prioritize implementation of buffers, rain gardens, and other best management practices (BMPs) in sub basins adjacent to Lake and especially along shoreline
- Promote native aquatic plant species and remove phosphorus through discerning aquatic plant harvesting
- Preserve or enhance groundwater infiltration and limit water exports from the watershed
- Establish partnerships between municipalities, associations, and permitted entities to collaborate on water quality goals and pursue funding

Funding and Partnerships

Fortunately, funding may be available to implement BMPs within the Nagawicka Lake watershed. For example, interested Lake shoreline owners can apply by contacting the Lake Welfare Committee (LWC) to receive funding for implementing the BMPs recommended in the Healthy Lakes Program, including fish sticks, rain gardens, native vegetation buffers, diversions, and rock infiltrations. Implementing the Healthy Lake BMPs on at least 75 percent of the shoreline properties would substantially reduce pollutant loading into the Lake while improving habitat for fish and wildlife. Several federal and state funding sources also exist to promote conservation practices and protect water quality. The Natural Resource Conservation Service (NRCS) provides several programs, such as the Conservation Reserve Program, to implement BMPs and promote land conservation in agricultural lands. The Wisconsin Department of Agriculture, Trade and Consumer Protection offers grant funding for farmer-led activities to reduce nonpoint source pollution. Local land trusts work with landowners to preserve land through conservation easements, land purchases, and land donations.

Native vegetation buffer implemented on Nagawicka Lake with funding from the Healthy Lakes Program.

The greatest potential for funding projects within the Lake's watershed may be through the establishment of an "Adaptive Management Program" to address permitted phosphorus point source loads. Adaptive management is a phosphorus compliance option that allows point and nonpoint sources to work together to reduce watershed phosphorus loading. As an example, the City of Oconomowoc established a program with the City of Oconomowoc Wastewater Utility and other partners to reduce pollutant loading in the Oconomowoc River watershed for the Rock River TMDL. Establishment of a similar program between the Dela-Hart wastewater treatment facility and the municipalities within the Bark River watershed should be considered, as this would enable greater opportunities for cost-sharing and achieving TMDL compliance.

Investing in the watershed, such as helping farmers purchase equipment for cover crops and retrofitting stormwater systems, is the best long term solution to protect Nagawicka Lake.

Partnership and Collaboration Necessary to Achieve Water Quality Goals

The Nagawicka Lake watershed currently embodies significant and unique aesthetic and ecological values and has the potential to be a more diverse and resilient aquatic ecosystem. Water quality within the Lake has slightly improved since 1980, but phosphorus and sediment loading as well as long-term depletion of groundwater resources remain major challenges. Following the recommendations provided in this Plan will lead to improved water quality and quantity for human needs and will help improve the hydrological and ecological integrity of the water resources. This will also lead to a healthier and more resilient local economy.

Meeting the goals for the Nagawicka Lake watershed will continue to be a challenge requiring the collaboration of many participating organizations adopting the efforts of a unified plan. The measures presented in this Plan primarily focus on those that can be implemented through collaboration between local organizations and individuals, such as the LWC; Lake residents; Waukesha County; the WDNR; the Dela-Hart wastewater treatment facility; the City of Delafield; the Villages of Chenequa, Hartland, Merton, Nashotah, Richfield, and Sussex; and the Towns of Delafield, Lisbon, and Merton. The plan must be adaptable to address challenges that will arise during implementation. Watershed implementation is primarily a volunteer effort, but this effort needs support through targeted technical and financial assistance. All communities within the watershed must commit and collaborate to reach compliance with existing regulations, which in turn help improve the Lake's condition.

You Can Help Protect Nagawicka Lake

CLEAN BOATS CLEAN WATERS

Citizen Lake Monitoring Network Since 1986

INTRODUCTION 1

Credit: SEWRPC Staff

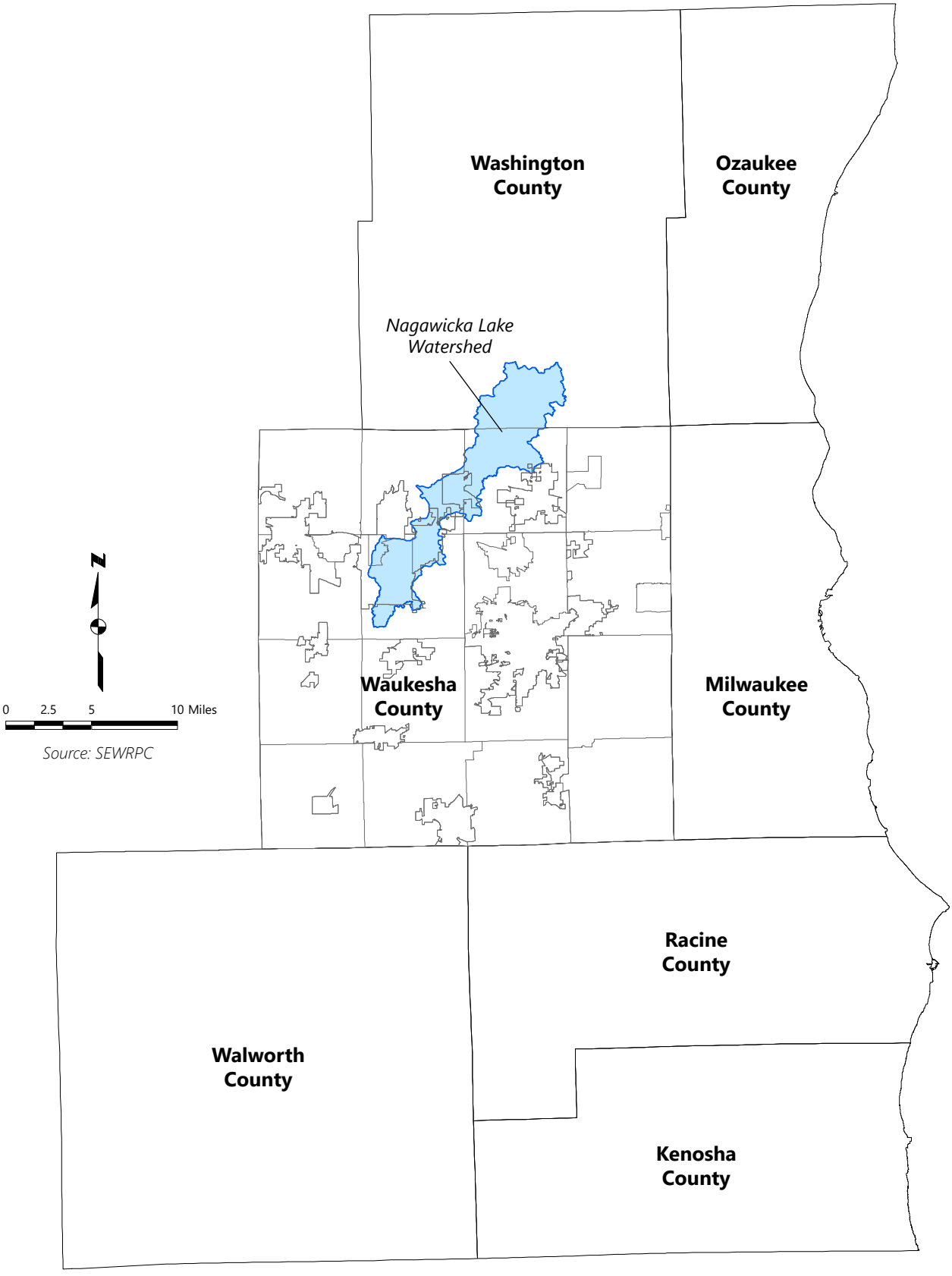
Nagawicka Lake lies within U.S. Public Land Survey Sections 5, 8, 9, 16, 17, 20, and 21, Township 7 North, Range 18 East in north-central Waukesha County, Wisconsin. The Lake is located partially in the City of Delafield and partially in the Village of Nashotah and is on the fringe of metropolitan Milwaukee (see Map 1.1). Nagawicka Lake, together with its associated watershed and wetlands, is an important high-quality natural resource and is a substantial asset to the local and regional community. For this reason, preserving and enhancing the Lake's health is an issue of considerable interest to resource managers, Lake residents, Lake users, and others who benefit from the Lake's recreational, ecological, and aesthetic value.

1.1 PLAN PURPOSE AND OVERVIEW

The health of a lake or stream is usually a direct reflection of land use and management within its watershed. Intervention is often necessary to maintain or improve lake and watershed conditions. This plan provides a framework to protect and improve the land and water resources of Nagawicka Lake and its watershed with a focus on protecting this high-quality resource from undesirable human influence thus preventing future degradation.

The plan is divided into three chapters. Chapter One briefly outlines the plan's purpose, summarizes basic Lake characteristics and assets, and presents the study's general goals and objectives. Chapter Two presents and interprets information needed to understand Lake conditions and the factors that could imperil Lake health. Finally, Chapter Three discusses approaches to protect and enhance the Lake and its watershed. Chapter Three recommendations aim to enhance and preserve Nagawicka Lake's native plant community, ecology, and water quality yet allow activities that continue to allow lake users and watershed residents with comfortable modern lifestyles and opportunities for safe and enjoyable recreation within the Lake and the Lake's watershed.

Map 1.1
Location of the Nagawicka Lake Watershed



Source: SEWRPC

This plan complements existing plans,[1] programs, and ongoing management actions in the Nagawicka Lake watershed. The plan represents the continuing commitment of government agencies, municipalities, and citizens to diligent lake planning and natural resource protection. Additionally, this plan was designed to assist State agencies, local units of government, nongovernmental organizations, businesses, and citizens develop strategies that benefit the natural assets of Nagawicka Lake and its watershed. By using the strategies outlined in this plan, results will be achieved that enrich, preserve, and increase ecological resilience, and help assure long-term sustainability of the natural environment.

This planning program was funded in part by a Chapter NR 190 Lake Management Planning grant awarded to the City of Delafield Lake Welfare Committee (LWC), which is a cooperative effort between the City of Delafield and the Village of Nashotah. Examples of major grant program deliverables include the following items:

- An updated aquatic plant inventory and management plan
- An assessment of Lake water quality condition and trends
- A field inventory mapping locations of streambank erosion and nonpoint pollution sources on the Bark River upstream of the Lake and on the Lake itself
- A field investigation allowing sediment depths to be estimated in the Lake and suggestions for controlling sedimentation
- Maps delineating the watershed and defining characteristics such as groundwater recharge potential, buffers, and existing/planned land use
- Estimated sediment and nutrient loads derived from several simulation models
- Specific recommendations for watershed management including maps and an action plan
- Establishing load reduction goals consistent with the Rock River basin Total Maximum Daily Load (TMDL) allocations
- A comprehensive written report

The inventory and aquatic plant management plan elements presented in this report conform to requirements and standards set forth in relevant Wisconsin Administrative Codes.[2]

1.2 CHARACTERISTICS AND ASSETS OF NAGAWICKA LAKE AND ITS WATERSHED

Nagawicka Lake is classified by the Wisconsin Department of Natural Resources (WDNR) as a drainage lake. The Lake is essentially a wide and deep section of the Bark River. The River enters the Lake on the northeastern shore and exits the Lake's southwestern embayment. Nagawicka Lake is located in the central portion of the Bark River watershed, downstream of Bark Lake, and upstream of a chain of lakes that include Upper and Lower Nemahbin Lakes and Crooked Lake. The Bark River enters the Rock River near Fort Atkinson, Wisconsin. From there, the Rock River enters the Mississippi River just south of Rock Island, Illinois. Water from Nagawicka Lake and the Bark River watershed ultimately discharges to the Gulf of Mexico.

---

[1] *SEWRPC Memorandum Report No. 130,* A Lake and Watershed Inventory for Nagawicka Lake, Waukesha County, Wisconsin*, March 1999; SEWRPC Community Assistance Planning Report No. 262,* A Lake Management Plan for Nagawicka Lake, Waukesha County, Wisconsin*, March 2001; and SEWRPC Memorandum Report No. 161,* An Aquatic Plant Management Plan for Nagawicka Lake, Waukesha County, Wisconsin*, March 2006*.

[2] *This plan has been prepared pursuant to the standards and requirements set forth in the following chapters of the* Wisconsin Administrative Code*: Chapter NR 1, "Public Access Policy for Waterways;" Chapter NR 40, "Invasive Species Identification, Classification and Control;" Chapter NR 103, "Water Quality Standards for Wetlands;" Chapter NR 107, "Aquatic Plant Management;" and Chapter NR 109, "Aquatic Plants Introduction, Manual Removal and Mechanical Control Regulations*."

Based upon WDNR records, Nagawicka Lake is one of Waukesha County's largest lakes. The Lake is also the second deepest in Waukesha County and the fourth deepest in all of Southeastern Wisconsin.[3] The Lake and its watershed cover over 46 square miles in Waukesha and Washington Counties. Chapter Two provides more detail regarding the morphometry, morphology, and hydrology of Nagawicka Lake and the Bark River, and relates these characteristics to water quality, aquatic plants, fisheries, recreation, and overall Lake management.

Nagawicka Lake and its watershed provide numerous, widely varying, recreational assets. Prominent features include Naga-Waukee County Park, the Lake Country Trail, several public boat launches and marinas, campgrounds, and large number of shoreline residences. The Lake successfully supports a spectrum of recreational interests as evidenced by boat counts and observations completed by Southeastern Wisconsin Regional Planning Commission staff during summer 2016 (see Chapter Two for more details). Lake users engage in full-body contact uses (such as swimming and water skiing) as well as pleasure cruising, high-speed boating, fishing, and other activities.

Nagawicka Lake supports a healthy fishery with a wide range of sport and panfish. Nagawicka Lake is one of only a few lakes in Southeastern Wisconsin that hosts or once hosted a naturally occurring population of cisco, or lake herring (*Coregonus artedi*).[4,5] Cisco require cold, deep, well oxygenated lakes, are considered to be excellent early responding indicators of changes in water quality, and contribute to exceptional forage opportunities for gamefish. Although cisco are no longer present in the Lake, water quality has improved over the years, and the Lake may once again be able to support this fish in the future. Additionally, as is further described in Chapter Two, the Lake's watershed contains critical species habitat areas and a variety of wetlands, uplands, and woodlands. The watershed likely supports a large number of resident animal species, including several species of reptiles and amphibians, small and large mammals, insects, and invertebrates, as well as a number of transient bird species that may be found in the area during seasonal migrations.[6]

1.3 LAKE PROTECTION GOALS

General lake protection goals that aim to maintain and enhance the Lakes' assets were developed as a part of this planning process. The goals listed below were developed in consultation with the LWC, the City of Delafield, the Village of Nashotah, and the public. The goals also directly address objectives established in the Waukesha County Comprehensive Development Plan and the Waukesha County Land and Water Resources Management Plan,[7,8] and helps provide additional detail regarding the sources of phosphorus described in the 2006 USGS report.[9]

---

[3] *Wisconsin Department of Natural Resources Bureau of Fisheries and Habitat Management,* Wisconsin Lakes*, WDNR Publication FH-800, 2009.*

[4] *A.R. Cahn, "An Ecological Study of Southern Wisconsin Fishes, The Brook Silversides (*Labidesthes sicculus*) and the Cisco (*Leucichthys artedi*) in Their Relations to the Region,"* Illinois Biological Monographs *Volume XI, Number 1, University of Illinois, 1927.*

[5] *Recent fishery surveys suggest that Nagawicka Lake's cisco population is severely depleted or extirpated. For more information, please consult the following reference: J. Lyons, J. Kamp, T. Parks, and G. Sass,* The Whitefishes of Wisconsin's Inland Lakes: The 2011-2014 Wisconsin Department of Natural Resources Cisco and Lake Whitefish Survey*, Fisheries and Aquatic Research Section, Wisconsin Department of Natural Resources, February 2015.*

[6] *These estimates are based on bird, amphibian, and reptile databases for the Region.*

[7] *Waukesha County Department of Parks and Land Use,* A Comprehensive Development Plan for Waukesha County, Waukesha, Wisconsin*, February 24, 2009, www.waukeshacounty.gov/ctydevplan.*

[8] *Waukesha County Department of Parks and Land Use,* Waukesha County Land and Water Resource Management Plan*, 2012.*

[9] *H. S. Garn, D. M. Robertson, W. J. Rose, G. L. Goddard, and J. A. Horwatich.,* Water Quality, Hydrology, and Response to Changes in Phosphorus Loading of Nagawicka Lake, a Calcareous Lake in Waukesha County, Wisconsin*, U. S. Geological Survey, Scientific Investigations Report 2005-5273, 2006, pubs.usgs.gov/sir/2006/5273.*

- Examine the Lake's aquatic plant community
    - Document the status of the Lake's aquatic plant community, with particular emphasis on the occurrence and distribution of nonnative species. Use this information to better understand the changes and dynamics of the Lake's aquatic plant community.
    - Evaluate the impact of aquatic plants on Lake use and habitat value.
    - Identify measures and methods useful to reduce the extent and abundance of nonnative aquatic plant species.
    - Reduce the risk of allowing nonnative aquatic species to spread to other waterbodies, including downstream lakes, as noted in relevant previous Lake protection management plans.[10]
    - Provide the bulk of the information needed to successfully apply for an aquatic plant management permit.
- Update watershed condition descriptions, with particular emphasis on the Bark River watershed immediately upstream of the Lake. This includes identifying and quantifying potential point and nonpoint sources of pollution, nutrient and sediment inputs, and nutrient and contaminant balances. Also, provide conceptual examples of projects that could be undertaken to mitigate the impact of identified sediment and pollution sources.
- Identify the extent of existing and potential future water quality problems likely to be experienced in the Lake. This includes examining the Lake's water quality using physicochemical monitoring data collected as part of ongoing water quality monitoring programs. In addition, estimate future water quality changes and provide advice regarding appropriate future monitoring activity.
- Assess the degree and intensity of recreational water use in and around Nagawicka Lake.
- Formulate appropriate management objectives, action plans, public information and education strategies, ordinances, and other possible responses to the identified problems.
- Provide advice and concepts describing management, enhancement, and restoration measures that address identified issues of concern and could improve current and future Lake health and ecological resilience/resistance. This likely will include active measures as well as outreach and education.

Conscientiously implementing the actions recommended herein should provide an important step toward achieving the LWC's desired lake use/protection objectives over time.

[10] *SEWRPC Community Assistance Planning Report No. 262,* A Lake Management Plan for Nagawicka Lake*, 2001; and SEWRPC Memorandum Report No. 161,* An Aquatic Plant Management Plan for Nagawicka Lake, Waukesha County, Wisconsin*, 2006.*