Vincent Lake
Aquatic Plant Management Plan, 2019-2024

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Vincent Lake Association

We would like to thank the following for their contributions to this project. Asterisks indicate members of the Lake Planning Committee.

Additionally, some sections of the following document use text and/or information from the 2018 Vincent Lake Aquatic Plant Harvesting Trial Plan written by Vincent Lake resident Mark Ryan.

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Motivation for Grant Application

Beginning shortly after the period of 2007-2010, landowners began seeing denser aquatic plant growth around much of the shoreline of Vincent Lake. From the shoreline, aquatic plants have grown outwards toward the center of the main portion of the lake. Density of aquatic plants in the second lake has increased significantly between 2012 and 2017 such that this part of the lake has become essentially inaccessible to motorized watercraft. The aquatic plant species that has spread rapidly and densely throughout the lake is *Brasenia schreberi*, commonly known as watershield. The Vincent Lake Association recognizes the benefits of watershield and other native aquatic plants and has observed an improvement in water clarity in the past decade. However, within Vincent Lake the preponderance and domination of watershed has impacted the accessibility and recreational quality of the lake.

Since 2012, landowners on the lake have increasingly voiced concerns over the spread and cover of aquatic plants. In September 2017, landowners officially formed the Vincent Lake Association to collaboratively approach aquatic plant management (with review by Wisconsin DNR) and continue other maintenance activities.

In 2018 the Association implemented a trial harvesting plan with the goal of restoring navigational channels in the second lake. Assistance with access lanes (30 feet per 100 feet of shoreline) was offered to landowners who contributed to the weed harvesting plan fund.

Purpose of the Grant

In December 2018, the Polk County Land and Water Resources Department applied for a Wisconsin Department of Natural Resources Small Scale Planning Grant in partnership with the Vincent Lake Association. The grant was awarded in February 2019.

Activities completed through this grant award include:

- ✓ Development of an aquatic plant management plan for Vincent Lake
- ✓ Plant identification classroom to further the understanding of the Vincent Lake aquatic plant community
- ✓ Formation of a committee to oversee plant management goals for Vincent Lake

The following report details historic data collected on Vincent Lake and the activities completed through this grant.

Introduction to Vincent Lake

Vincent Lake[1] is located in the Town of Georgetown[2] in Polk County, Wisconsin, approximately fifty miles northeast of the Twin Cities metropolitan area. Georgetown is 35 square miles in size and inhabited by less than 1,000 people. According to Natural Heritage Inventory data, the northern dry-mesic forest community group is present in Georgetown. This community is vulnerable in Wisconsin due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, and threats of other factors. The lake has no classifications (i.e. ORW, ERW, ASNRI, Impaired Water).

The area of land that drains to a lake is called a watershed. Vincent Lake is situated within the Upper Apple River watershed which is 195 square miles and includes 139 miles of streams and rivers and 7,663 lake acres. The watershed is dominated by forest (43%), grassland (23%) and agriculture (14%).

Vincent Lake is 70 acres in size with a maximum depth of 15 feet and an average depth of 9 feet. The primary access to Vincent Lake is located on Vincent Lake Lane from County Road I on the southeast side of the lake.

Lakes are hydrologically classified according to their primary source of water and how that water enters and leaves the system. Vincent Lake is classified as a shallow seepage lake. Seepage lakes do not have an outlet and are fed by precipitation, limited runoff, and groundwater. Vincent Lake receives nearly constant flow from the wetland east of Vincent Lake Lane (except in drought conditions) and has a natural outlet through a series of ponds and pits to the northwest towards nearby Bone Lake.

The northern one-third of Vincent Lake has minimal development and is locally referred to as the "second lake." Access to the second lake from the main portion of the lake is only gained via a narrow passage through a land bridge that was constructed as part of a cattle crossing in the early 20th century. This portion of the lake is generally shallower despite having one small pocket that reaches about 10 feet in depth.

Approximately forty-seven landowners have property very near to Vincent Lake. The majority of the land use adjacent to the lake is low-developed residential homes and lake cabins. There is considerable woodland along the lake, particularly around the second lake. Water use on Vincent Lake is relatively moderate compared to nearby Polk County lakes. Lake residents are the primary lake users and enjoy water-skiing, paddle boarding, swimming, kayaking, and fishing.

[1] Vincent Lake water body identification code (WBIC): 2598500.
[2] Georgetown Township 35N, Range 16W, Sections 4, 5, and 9.

Lake Classification

Lake classification in Polk County is a relatively simple model that considers:

- ✓ Lake surface area
- ✓ Maximum depth
- ✓ Lake type
- ✓ Watershed area
- ✓ Shoreline irregularity
- ✓ Existing level of shoreline development

These parameters are used to classify lakes as class one, class two, or class three lakes.

Class one lakes are large and highly developed.
Class two lakes are less developed and more sensitive to development pressure.
Class three lakes are usually small, have little or no development, and are very sensitive to development pressure.

Vincent Lake is classified as a class three lake with high vulnerability and low development.

Vincent Lake Characteristics[3]

Area: 70 acres
Maximum depth: 15 feet
Mean depth: 9 feet
Bottom: 55% sand, 0% gravel, 0% rock, and 45% muck
Hydrologic lake type: seepage
Invasive species: none
Fish: panfish, largemouth bass, and northern pike

Invasive Species

The Polk County Land and Water Resources Department completed the statewide aquatic invasive species early detection smart prevention protocol on Vincent Lake in 2011 and found no aquatic invasive species.

The protocol included the collection of basic water quality data (secchi depth and conductivity) along with numerous detection methods for aquatic invasive species:

- ✓ Thirty minute snorkel searches at all boat landings
- ✓ Ten minute snorkel searches at five sites
- ✓ Spiny water flea tows at three sites
- ✓ Zebra mussel veliger tows at three sites
- ✓ Rake throws and D-nets while completing a shoreline meander

[3] https://dnr.wi.gov/lakes/lakepages/LakeDetail.aspx?wbic=2598500&page=facts.

Fisheries

The latest fish surveys indicate good populations of panfish, largemouth bass, and northern pike. Historically, the lake has supported other fish species, including walleye and perch, but has also been subjected to fish kills during harsh winters where the lake froze-out. The most recent freeze-out events occurred in 2010 and 2011. To help prevent freeze-out conditions, three aerators are maintained with assistance from the DNR with two aerators in the northern part of the main portion of the lake.

The most recent fisheries survey conducted on Vincent Lake was in 2016. Late spring boom shocking in May was used to sample the fisheries population. These surveys are directed towards bass and panfish and although pike and perch will be caught, they are underrepresented in this types of survey.

The following number of fish were caught per mile: 6 black crappie, 533 bluegill, 17 largemouth bass, 4 northern pike, 17 pumpkinseed, and 1 yellow perch. The bluegill population was abundant with low size structure. The largemouth bass population was lower density, but had above average size structure, especially compared to other Polk County lakes. The pike population is likely a moderate abundance and size structure.[4]

First Ice and Ice Out

Volunteers have been monitoring first ice since 2012 and ice out since 2003. First ice has historically ranged from November 10th (2017) to December 8th (2016). Ice out has ranged from as early as April 2nd in 2015 to as late as May 1st in 2018.

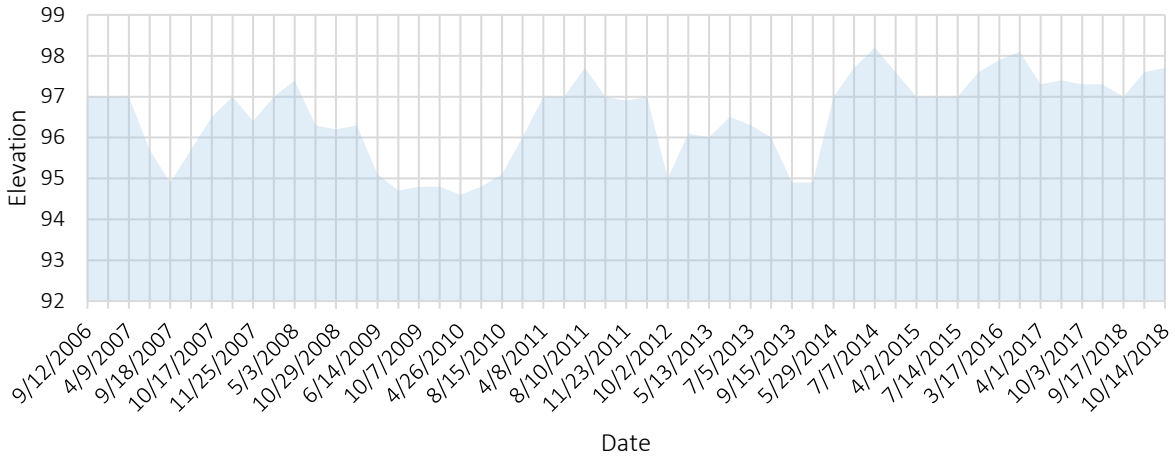
Lake Level

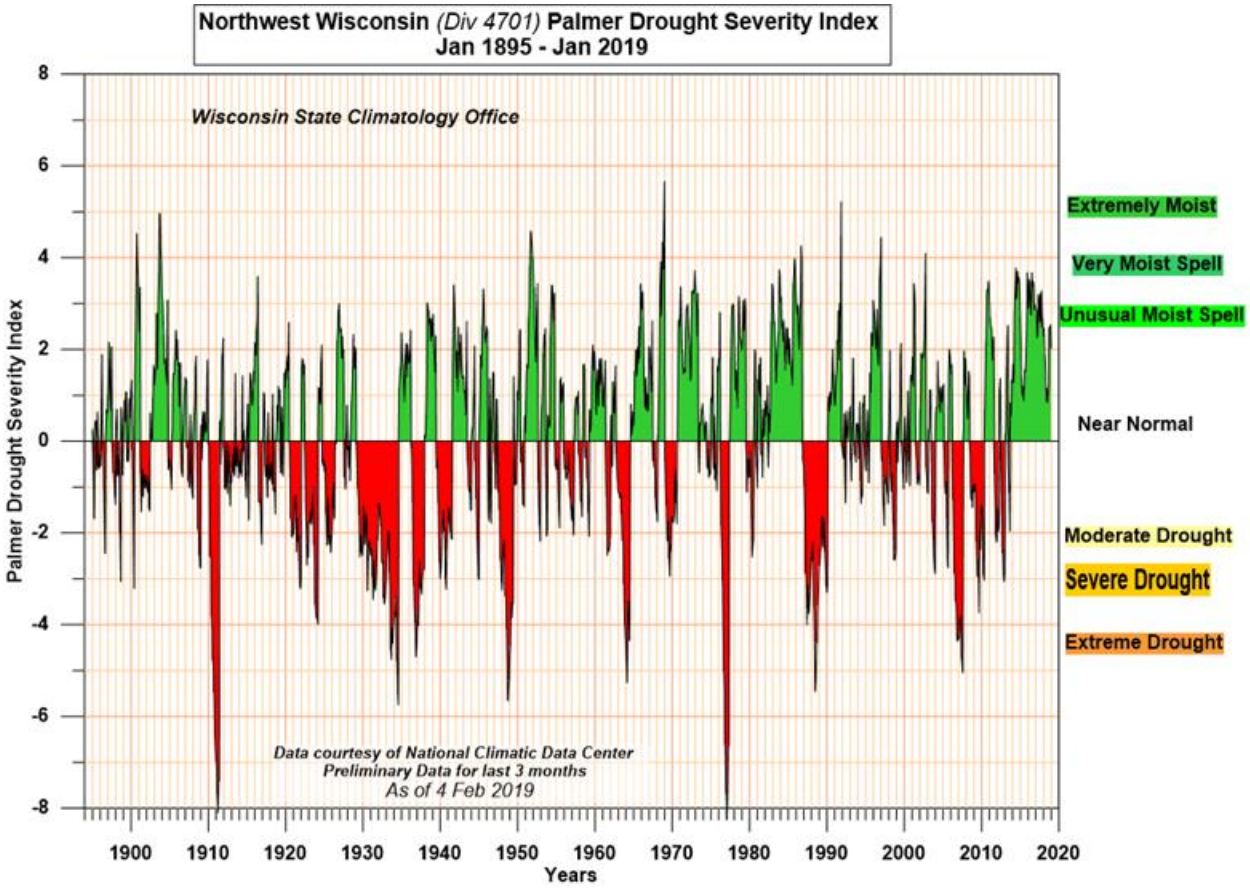
Lake water level fluctuations are important to lake managers, lakeshore property owners, developers, and people using lakes for recreation. Lake level fluctuations can have significant effects on lake water quality and usability. Although lake levels naturally change from year to year, extreme high or low levels can present problems such as restricted water access, flooding, shoreline and structure damage, and changes in near shore riparian vegetation.

Records of lake water elevations can be useful in understanding changes that may occur in lakes. Resident Jack Caroon has been measuring the water level of Vincent Lake since 2006 using a horizontal measurement from a set point on shore to the shoreline. Measurements were extrapolated from a horizontal measurement as opposed to a true vertical elevation. Water levels were lowest in fall of 2007, 2009-2010, fall of 2012, and fall of 2013. These periods of time also coincided with regional drought conditions.

[4] Personal communication, Aaron Cole, WDNR.

Lake elevation based off horizontal measurement





Dissolved Oxygen

Oxygen is required by all aquatic organisms for survival. The amount of oxygen dissolved in water depends on temperature, the amount of wind mixing that brings water into contact with the atmosphere, the biological activity that consumes or produces oxygen within a lake, and the composition of groundwater and surface water entering a lake.

In a process called photosynthesis, plants use carbon, water, and the sun's energy to produce simple sugars and oxygen. Chlorophyll, the pigment in plants that captures the light energy necessary for photosynthesis, is the site where oxygen is produced. Since photosynthesis requires light, the oxygen producing process only occurs during the daylight hours and only at depths where sunlight can penetrate. Plants and animals also use oxygen in a process called respiration. During respiration, sugar and oxygen are used by plants and animals to produce carbon dioxide and water.

Cold water has a higher capacity for oxygen than warm water. Although temperatures are coolest in the deepest part of a lake, these waters often do not contain the most oxygen. This arises because in the deepest parts of lakes, oxygen producing photosynthesis is not occurring, mixing is unable to introduce oxygen, and the only reaction occurring is oxygen consuming respiration. Therefore, it is not uncommon for oxygen depletion to occur in the hypolimnion.

During the sunlight hours, when photosynthesis is occurring, dissolved oxygen levels at a lake's surface may be quite high. Conversely, at night or early in the morning (when photosynthesis is not occurring), the dissolved oxygen values can be expected to be lower.

A water quality standard for dissolved oxygen in warm water lakes and streams is set at 5 mg/L. This standard is based on the minimum amount of oxygen required by fish for survival and growth. For cold water lakes supporting trout, the standard is set even higher at 7 mg/L.

In 2015, dissolved oxygen was above 5 mg/L to a depth of 8 feet in July and 7 feet in August and September.

Residents Jack Carron and Don Kobringer took temperature and dissolved oxygen readings at multiple locations on Vincent Lake in December 2018 and March 2019 before and after the aerators were turned on. Prior to the aerators being turned on and in March 2019 the second lake was anaerobic.

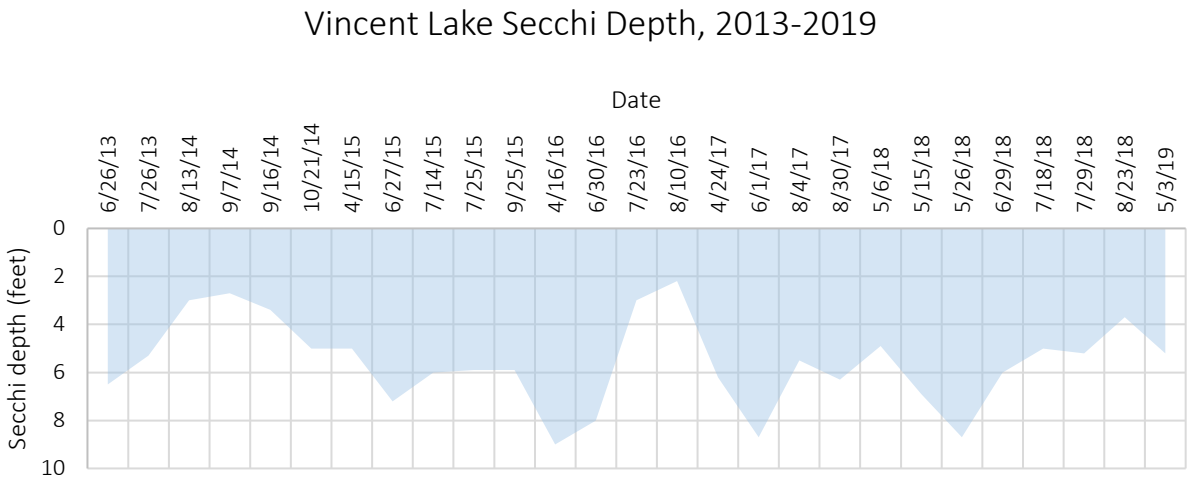
Secchi Depth

The depth light can penetrate into lakes is affected by suspended particles, dissolved pigments, and absorbance by water. Often, the ability of light to penetrate the water column is determined by the abundance of algae or other photosynthetic organisms in a lake.

One method of measuring light penetration is with a secchi disk. A secchi disk is an eight inch diameter round disk with alternating black and white quadrants that is used to provide a rough estimate of water clarity. The depth at which the secchi disk is just visible is defined as the secchi depth. A greater secchi depth indicates greater water clarity.

The average summer secchi depth (July and August) for the Northwest geo-region was 8.4 feet in 2015. The average summer secchi depth for Vincent Lake was 6.5 feet, which is below the average for the Northwest geo-region. Summer index period average secchi depth (July 15-September 15) in 2015 was also 6.5 feet.

Volunteers have been collecting secchi depth measurements on Vincent Lake since 2013. Over this timeframe, the average secchi depth for Vincent Lake was 5.6 feet. Secchi depths were at their lowest in the summer of 2014 and 2016.



Phosphorus

Phosphorus is an element present in lakes which is necessary for plant and algae growth. It occurs naturally in soil and rocks and in the atmosphere in the form of dust. Phosphorus can make its way into lakes through groundwater and human induced disturbances such as soil erosion. Additional sources of phosphorus inputs into a lake can include external sources such as fertilizer runoff from urban and agricultural settings and internal sources such as release from lake bottom sediments.

Phosphorus does not readily dissolve in water, instead it forms insoluble precipitates with calcium, iron, manganese, sulfur, and aluminum. If oxygen is available in the hypolimnion, iron forms sediment particles that store phosphorus in the sediments. However, when lakes lose oxygen in the winter or when the hypolimnion becomes anoxic in the summer, these particles dissolve and phosphorus is redistributed throughout the water column with strong wind action or turnover events.

Phosphorus is necessary for plant and animal growth. Excessive amounts can lead to an overabundance of growth which can decrease water clarity and lead to nutrient pollution in lakes.

Total phosphorus is a measure of all the phosphorus in a sample of water. In many cases total phosphorus is the preferred indicator of a lake's nutrient status because it remains more stable than other forms over an annual cycle.

In lakes, a healthy limit of total phosphorus is set at 20 µg/L. If a value is above the healthy limit it is more likely that a lake could support nuisance algae blooms. The 2015 summer index period average total phosphorus on Vincent Lake was 30.9 µg/L, which is above the healthy limit.

Chlorophyll a

Chlorophyll a is a pigment in plants and algae that is necessary for photosynthesis and is an indicator of water quality in a lake. Chlorophyll a gives a general indication of the amount of algae growth in a lake, with greater values for chlorophyll a indicating greater amounts of algae. However, since chlorophyll a is present in sources other than algae— such as decaying plants— it does not serve as a direct indicator of algae biomass.

Chlorophyll a has the greatest impact on water clarity when levels exceed 30 µg/L. Lakes which appear clear generally have chlorophyll a levels less than 15 µg/L. The 2015 average chlorophyll a concentration on Vincent Lake was 13.2 µg/L which is below the level at which the greatest impact on water clarity occurs and below the level at which lakes generally appear clear.

Date	Secchi depth (feet)	Total phosphorus (µg/L)	Chlorophyll (µg/L)
7/16/15	6.0	32.9	11.9
8/12/15	7.0	31.0	13.6
9/02/15	6.5	28.7	14.2

Trophic State Index

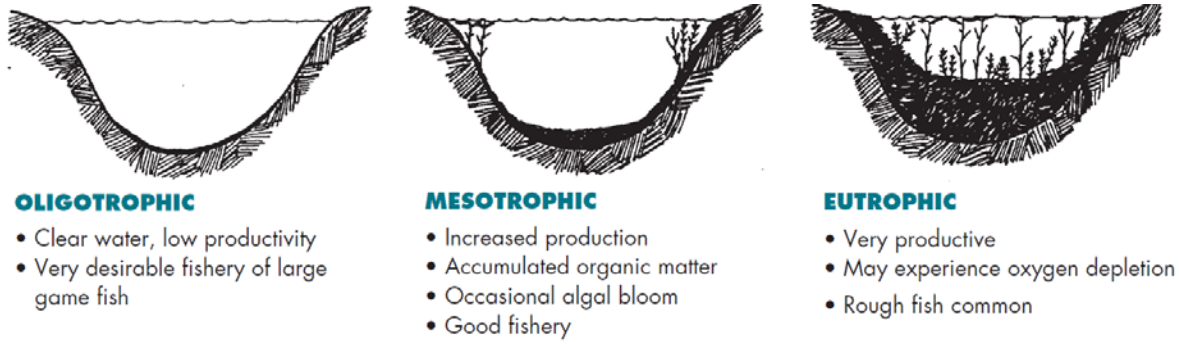
Lakes are divided into three categories based on their trophic states: oligotrophic, eutrophic, and mesotrophic. These categories reflect a lake's nutrient and clarity level and serve as an indicator of water quality. Each category is designed to serve as an overall interpretation of a lake's primary productivity.

Oligotrophic lakes are generally clear, deep, and free of weeds and large algae blooms. These types of lakes are often poor in nutrients and are unable to support large populations of fish. However, oligotrophic lakes can develop a food chain capable of supporting a desirable population of large game fish.

Eutrophic lakes are generally high in nutrients and support a large number of plants and animals. They are usually very productive and subject to frequent algae blooms. Eutrophic lakes often support large fish populations, but are susceptible to oxygen depletion.

Mesotrophic lakes lie between oligotrophic and eutrophic lakes. They usually have good fisheries and occasional algae blooms.

All lakes experience a natural aging process which causes a change from an oligotrophic to a eutrophic state. Human influences that introduce nutrients into a lake (agriculture, lawn fertilizers, and septic systems) can accelerate the process by which lakes age and become eutrophic.



A common method of determining a lake's trophic state is to compare total phosphorus (important for algae growth), chlorophyll a (an indicator of the amount of algae present), and secchi disk readings (an indicator of water clarity). Although many factors influence these relationships, the link between total phosphorus, chlorophyll a, and secchi disk readings is the basis of comparison for the trophic state index (TSI).[5]

[5] Figure from Understanding Lake Data (G3582), UW-Extension, Byron Shaw, Christine Mechenich, and Lowell Klessig, 2004

The average summer trophic state for the last five years for Vincent Lake was mesotrophic and was determined using satellite water clarity observation data. Parameters sampled in 2015 indicate a mildly eutrophic state (TSI = 53). For a shallow seepage lake this is considered good.[6]

Vincent Lake 2015

Average summer index period TSI (total phosphorus) = 54.7

Average summer index period TSI (chlorophyll a) = 54.7

Average summer index period TSI (secchi depth) = 50

Average summer index period TSI = 53 = Mildly eutrophic

TSI	General Description
<30	**Oligotrophic** clear water, high dissolved oxygen throughout the year/lake
30-40	**Oligotrophic** clear water, possible periods of oxygen depletion in the lower depths of the lake
40-50	**Mesotrophic** moderately clear water, increasing chance of anoxia near the bottom of the lake in summer, fully acceptable for all recreation/aesthetic uses
50-60	**Mildly eutrophic** decreased water clarity, anoxic near the bottom, may have macrophyte problem, warm-water fisheries only
60-70	**Eutrophic** blue-green algae dominance, scums possible, prolific aquatic plant growth, full body recreation may be decreased
70-80	**Hypereutrophic** heavy algal blooms possible throughout the summer, dense algae and macrophytes
>80	**Algal scums**, summer fish kills, few aquatic plants due to algal shading, rough fish dominate

[6] TSI thresholds for shallow seepage lake: Excellent = <45, Good = 45-57, Fair = 58-70, Poor ≥71.

Impairment Status

Wisconsin lakes, rivers, and streams are managed to determine if their conditions are meeting state and federal water quality standards. Water samples are collected through monitoring studies and results are compared to guidelines designed to evaluate conditions as compared to state standards. General assessments place waters in four different categories: poor, fair, good, and excellent. The results of assessments can be used to determine which actions will ensure that water quality standards are being met (anti-degradation, maintenance, or restoration).

If a waterbody does not meet water quality standards, it is placed on Wisconsin's Impaired Waters List under the Federal Clean Water Act, Section 303(d). Every two years the State of Wisconsin is required to submit list updates to the United States Environmental Protection Agency for approval.

Waterbodies can be listed as impaired based on pollutants such as total phosphorus, total suspended solids, and metals. Wisconsin waters are each assigned four uses (fish and aquatic life, recreation, public health and welfare, and wildlife) that carry with them a set of goals.

Impairment thresholds vary for each use and vary based on lake characteristics such as whether a waterbody is shallow or deep and whether a waterbody is a drainage or seepage lake. Vincent Lake is classified as a shallow seepage lake.

Impairment status is determined using three sampling events per year for a time period of two years. Although two years of data do not exist for Vincent Lake, sufficient samples were taken in 2015 to account for one year of sampling effort. Although this data would not be sufficient for determining the Impairment status for the lake, they can be used as general indicators for water quality.

The average 2015 total phosphorus falls below the impairment threshold of 40 µg/L for a shallow seepage lake for aquatic life use and for recreation use.

The average 2015 chlorophyll a concentration falls below the impairment threshold of 27 µg/L for a shallow seepage lake for aquatic life use and below the impairment threshold of less than 25% of days in the sampling season with chlorophyll a levels greater than 20 µg/L for recreation use.

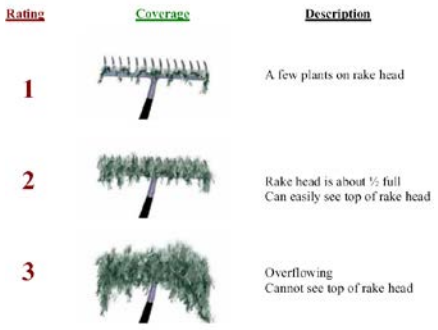
Aquatic Macrophyte Survey

Wisconsin Department of Natural Resources Department conducted an aquatic macrophyte survey on Vincent Lake on August 12th, 2015 using the Jessen and Lound Rake Method.

Two hundred seventy-nine sampling points were established in Vincent Lake by the Wisconsin Department of Natural Resources using a standard formula that takes into account the shoreline shape and length, water clarity, depth, and total lake acres. Points were generated in ArcGIS and downloaded to a GPS unit.

A GPS unit was used to locate each sampling point in the field. At each sampling point a depth finder was used to determine depth and a rake was used to sample the plant community of an approximately one meter section of the benthos.

All plants on the rake, as well as any that were dislodged by the rake, were identified to species and assigned a rake fullness value of 1 to 3 to estimate abundance. Visual sightings of plants within six feet of the sample point were also recorded. The lake bottom substrate was assigned at each sampling point where the bottom was visible or it could be reliably determined using the rake.



Data was collected at each sampling point, with the exception of those that were deep, non-navigable, or terrestrial. Although two hundred seventy-nine sampling points were established in Vincent Lake, only one hundred fourteen points were sampled. Of the sites not sampled, one hundred seventeen were deep, forty-four were non-navigable (plants), and four were terrestrial.

Data collected was entered into a spreadsheet for analysis. The following statistics were generated from the spreadsheet:

- Maximum depth of plants
- Sample points with vegetation
- Species richness
- Number of sites where each species was found
- Average rake fullness
- Frequency of occurrence
- Relative frequency
- Simpson's Diversity Index
- Floristic Quality Index

Following are explanations of the various analysis values with data from Vincent Lake.

Maximum depth of plants

All lakes have a maximum depth at which plants are present. Typically, clearer lakes have a greater depth at which plants can exist, since sunlight can penetrate to greater depths. In Vincent Lake the maximum depth of plants was nine feet.

Sample points with vegetation

This value shows the number of sites where plants were collected and gives an approximation of the plant coverage of a lake. If 10% of all sample points had vegetation, then it is implied that approximately 10% of the lake is covered with plants.

Forty-one percent of Vincent Lake was covered with plants in August 2015 with an additional sixteen percent of the lake being non-navigable due to aquatic plant growth.

Species richness

Species richness is a measure of the number of different species found in a lake. Species richness can be computed based on plants sampled or based on plants sampled/visually located during the survey.

Twenty-one plant species were found in Vincent Lake. Fourteen of these species were on the rake head and an additional seven species were only visually located (three-way sedge, waterwort, creeping spikerush, common waterweed, spatterdock, ribbon-leaf pondweed, and burr reed).

Number of sites where each species was found

Watershield was the most common species in the lake, being present at thirty-six sites. Nitella was present at twenty-four sites, and algal-leaved pondweed was present at fourteen sites.

Average rake fullness

The average rake fullness value was greatest for floating-leaf pondweed (3), followed by watershield (2.5), white water lily (2.3), wild celery (2), and nitella (2).

Frequency of occurrence

Two values are computed for frequency of occurrence: frequency of occurrence within vegetated areas and frequency of occurrence at sites shallower than the maximum depth of plants. In both instances, the greater the value, the more frequently the plant would be encountered in the lake.

Frequency of occurrence within vegetated areas is defined as the number of times a species was sampled in a vegetated area divided by the total number of vegetated sites. This value shows how often the plant would be encountered everywhere vegetation was found in the lake.

Frequency of occurrence at sites shallower than the maximum depth of plants is defined as the number of times a species was sampled divided by the total number of sites shallower than the maximum depth of plants. This value shows how often the plant would be encountered within the depths plants can potentially grow (9 feet in 2015).

The most frequent species found in this survey was watershield, occurring at 52.2% of the sites with vegetation and 31.6% of the sites where plants could potentially grow. Other frequent species were nitella (34.8 % and 21.1%), algal-leaf pondweed (20.3% and 12.3%), common bladderwort (11.6% and 7.0%), and aquatic moss (10.1% and 6.1%) (sites with vegetation and sites where plants could potentially grow, respectively).

Relative Frequency

Relative frequency is the frequency of a plant species relative to other species. This value is independent of the number of points sampled. Relative frequency can be used to show which plants are dominant in a lake. The higher the value a species has for relative frequency, the more common the species is compared to others. The relative frequency of all plants will always add up to 100%. If species A had a relative frequency of 30%, this species occurred 30% of the time compared to all the species sampled or makes up 30% of all species sampled.

The most dominant plant species in Vincent Lake as indicated by relative frequency were watershield (31.6%), followed by nitella (21.1%), algal-leaf pondweed (12.3%), common bladderwort (7%), aquatic moss (6.1%), arrowhead (5.3%), and coontail (5.3%).

Species	FO vegetated (%)	FO < max depth of plants (%)	Relative Frequency (%)	Sites species found	Ave. Rake Fullness	Visual sightings
Brasenia schreberi, Watershield	52.2	31.6	31.6	36	2.5	11
Nitella sp., Nitella	34.8	21.1	21.1	24	2.0	
Potamogeton confervoides, Algal-leaf pondweed	20.3	12.3	12.3	14	1.7	1
Utricularia vulgaris, Common bladderwort	11.6	7.0	7.0	8	1.1	3
Aquatic moss	10.1	6.1	6.1	7	1.0	
Nymphaea odorata, White water lily	8.7	5.3	5.3	6	2.3	27
Sagittaria sp., Arrowhead	8.7	5.3	5.3	6	1.5	7
Ceratophyllum demersum, Coontail	7.2	4.4	4.4	5	1.8	
Vallisneria americana, Wild celery	7.2	4.4	4.4	5	2.0	1
Ceratophyllum echinatum, Spiny hornwort	4.3	2.6	2.6	3	1.0	
Eleocharis acicularis, Needle spikerush	2.9	1.8	1.8	2	1.5	1
Potamogeton robbinsii, Fern pondweed	2.9	1.8	1.8	2	1.0	
Potamogeton illinoensis, Illinois pondweed	1.4	0.9	0.9	1	1.0	
Potamogeton natans, Floating-leaf pondweed	1.4	0.9	0.9	1	3.0	
Typha latifolia, Broad-leaved cattail	1.4	0.9	0.9	1	1.0	
Sparganium sp., Bur-reed						4
Filamentous algae						4
Dulichium arundinaceum, Three-way sedge						2
Nuphar variegata, Spatterdock						2
Potamogeton epihydrus, Ribbon-leaf pondweed						2
Elatine minima, Waterwort						1
Eleocharis palustris, Creeping spikerush						1
Elodea canadensis, Common waterweed						1

Relative frequency of plant type

Aquatic plants can be grouped into three main types: submergent, emergent, and floating. The majority of the plant community on Vincent Lake is made up of submergent species (55.3%), followed by floating species (36.8%), and emergent species (7.9%). In addition, 12.3% of the species are considered sensitive.

Simpson's Diversity Index

Simpson's Diversity Index is used to determine how diverse a plant community in a lake is by measuring the probability that two individuals randomly selected from a sample will belong to the same species. The Simpson's Diversity Index ranges from zero to one, with greater values representing more diverse plant communities.

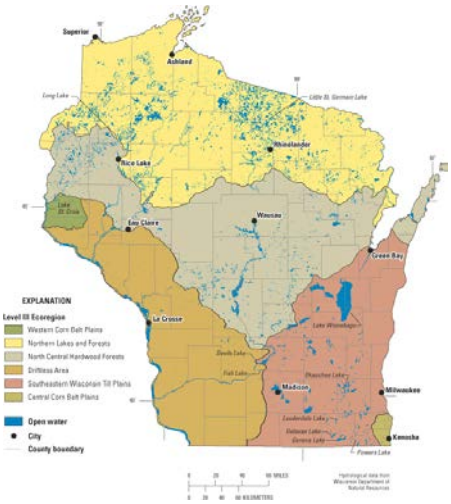
In theory, the value for Simpson's Diversity Index is the chance that two species that are sampled will be different. An Index of one means that the two plants sampled will *always* be different (very diverse) and an Index of zero means that the two plants sampled will *never* be different.

The Simpson's Diversity Index on Vincent Lake was calculated as 0.82.

Floristic Quality Index

The Floristic Quality Index (FQI) is designed to evaluate the closeness of the flora in an area to that of an undisturbed condition. FQI takes into account the species of aquatic plants found and their tolerance for changing water quality and habitat modification.

Each plant species has an assigned coefficient of conservation ranging from 1 to 10. A high value indicates a plant is intolerant of change, and a low value indicates a plant is tolerant of change. Plants with high values are more likely to respond adversely to water quality and habitat changes. Invasive species have a conservatism value of 0. A higher FQI, indicates a healthier plant community.



Summary of North Central Hardwood Forest (NCHF) values for Floristic Quality Index

Mean species richness = 14
Mean average conservatism = 5.6
Mean Floristic Quality = 20.9

Summary of Vincent Lake values for Floristic Quality Index

Mean species richness = 13, less than NCHF value
Mean average conservatism = 6.2, greater than NCHF value
Mean Floristic Quality = 22.2, greater than NCHF value

Vincent Lake Watershed

The Pollutant Load Ratio Estimation Tool (PRESTO) is a GIS-based tool that compares the average annual phosphorus loads originating from point and nonpoint sources in a watershed.

PRESTO was designed to be easily modified, transparent to the end user, and provide a consistent result based on readily available datasets. PRESTO performs three basic functions: watershed delineation, nonpoint source loading estimation, and point source loading aggregation. The PRESTO outputs include a delineated watershed, watershed land cover composition, the estimated average annual nonpoint source and measured point source phosphorus loads, and the ratio of point to nonpoint phosphorus at a watershed outlet.[7]

The Vincent Lake Watershed was delineated with PRESTO. The watershed is 1.15 square miles and is mostly forest (57%), followed by agriculture (28%), grassland (6%), wetland (6%), and urban (3%). The average annual nonpoint phosphorus load is 97 pounds per year.[8]

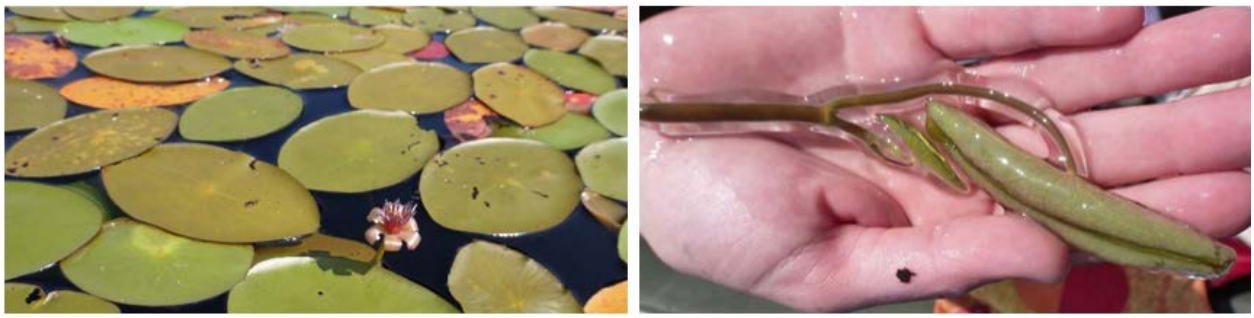
[7] Text from https://dnr.wi.gov/topic/surfacewater/presto.html.
[8] Range of 41-174 pounds of phosphorus.

Lake Resident Actions

Landowners on Vincent Lake restarted regular meetings in the 2000's to address landowner concerns and to ensure that the aerator was being maintained. Landowners began seeing denser aquatic plant growth around much of the shoreline of Vincent Lake shortly after the 2007-2010 time period, with plants growing outwards towards the center of the main portion of the lake. Between 2012 and 2017 aquatic plant growth in the second lake increased so that the lake was essentially inaccessible to motorized watercraft. Since this time, landowners (especially on the second lake) have increasingly voiced concerns over the spread and cover of aquatic plants. In September 2017, landowners officially formed the Vincent Lake Association to collaboratively approach aquatic plant management.

Viewing the channel from the second lake, August 2010 (left) and viewing the second lake just outside the channel, July 2017 (right).

The species spreading most rapidly and densely is *Brasenia schreberi*, or watershield. The leaves, which are mainly floating, are 5-15 cm in length. Stems up to 2 meters in length are attached to the center of the leaf underside. The stems and underside of the leaf are usually covered in a clear, slimy coating. Watershield is a native species in Wisconsin, meaning it has benefits for fish, wildlife, and water quality. In Vincent Lake, its growth has impacted accessibility and recreation.



2018 Trial Harvesting Plan

In 2017 Association members reviewed efforts by northern Wisconsin lake organizations to manage aquatic plants, including the equipment and timing of weed harvesting. Members also met with WDNR to formulate a trial plan for managing aquatic plants during the 2018 season. The trial harvesting plan addressed the following areas:

- ✓ Purpose for proposed removal of aquatic plants
- ✓ Areas and size of areas for proposed plant removal, including estimates of acreage
- ✓ Location and method of disposal of plants
- ✓ Other aquatic plant management options considered

Purpose for proposed removal of aquatic plants

The primary purpose of the Association's aquatic plant harvesting plan is to maintain the recreational quality of Vincent Lake by restoring or improving navigational channels. Navigability, high quality fishing, recreational opportunities, and access to the main portion of the lake have been lost on the second lake. Additionally, as plant growth limits the open water areas of Vincent Lake, conflicting uses (water-skiing motor-boating versus paddle boarding/swimming/kayaking/fishing) are increasing being forced to use the same open water area. Concerns with young children recreating in dense areas of *Brasenia* have also been noted.

Areas and size of areas for proposed plant removal, including estimates of acreage

The main area of focus for the trial harvesting period is a navigation channel providing access through the second lake from the main lake. The majority of the channel will have a width of 30 feet, based off the approved width of access paths for individual landowners. Two areas on either side of the channel on the second lake will be widened to 75 feet to allow for safer turn around for boaters and also for use of the harvester where tighter maneuverability is required. Additionally, the channel in the area between the two lakes will be narrowed to about 15 feet. Based on aerial imagery, the length of the channel is approximately 3,250 feet, although the exact eastern end would depend on the approximate edge of aquatic plant growth to connect to open water. The total area of plant removal is estimated at 105,000 square feet, or 2.4 acres.

The trial harvesting period will also include access lanes for individual landowners. Since approximately 2012, many landowners have removed aquatic plants across their allowable access lanes (30 feet per 100 foot wide lot) by hand or with a handheld rake. Currently, thirty-two members of the Association have contributed to the weed harvesting plan fund and may receive some assistance harvesting their individual access lanes. Additional residents may be added to the list of contributing members once their funds are received and some residents will continue to cut and remove plants using manual methods.

Harvesting of the periphery of existing clusters of aquatic plants will likely be proposed if future plant growth limits the recreational value of the main portion of the lake. Much of the main lake is 8-10 feet in depth and is vulnerable to the expansion of watershield.

Mechanical harvesting will begin when plants reach the surface and continue throughout the growing season. In a typical year, navigation is impaired by plant growth from May through September. The Association intends to use a mechanized sickle that will be extended near the base of the plants to cut them off as close to the root as possible. The sickle has a cutting width of six feet and a maximum depth of four feet. A slightly larger (9 feet) rake with long tines was manufactured by an Association member to capture the cut plants. The rake will extend out the front of a motorized watercraft.

The harvesting team will complete a log sheet to document the approximate number and size of passes made with the equipment, the location of the activity, and an approximation of biomass removed. The Association will use any standard log sheets created by WDNR for harvesting activities.

Members completing the harvesting will be encouraged to identify plants found in the harvesting rake and add them to the documentation, although there are no aquatic biologists with expertise in the area. Review of plants will include consideration for identification and reporting of aquatic invasive species, although none are suspected to be in Vincent Lake at this time. Finally, the Association will plan to include DNR-provided information regarding aquatic plant species and the need for approved methods for aquatic plant harvesting at Association meetings regarding the harvesting activities.

Location and method of disposal of plants

Aquatic plants collected within the navigation channel will be dragged to shore at two parcels on the second lake (Kaufman and Warner). Harvesting crews or additional volunteers will utilize the

rake to bring the harvested plants to shore, drag the plants onto a tarp or similar material placed on the shore, and then move the tarp to a temporary stockpile or directly into a truck for transport. Any stockpiles of plants on the smaller Warner parcel and those placed near the shore on the large Kaufman parcel will be temporary. Both locations where plants will be taken to shore are accessible by a road or driveway that will allow for transport of the plants. Final disposal of the navigation channel plants is expected to be in a compost pile on the approximately 80 acre agricultural (or formerly agricultural) use property that Mr. Kaufman owns to the east of the lake.

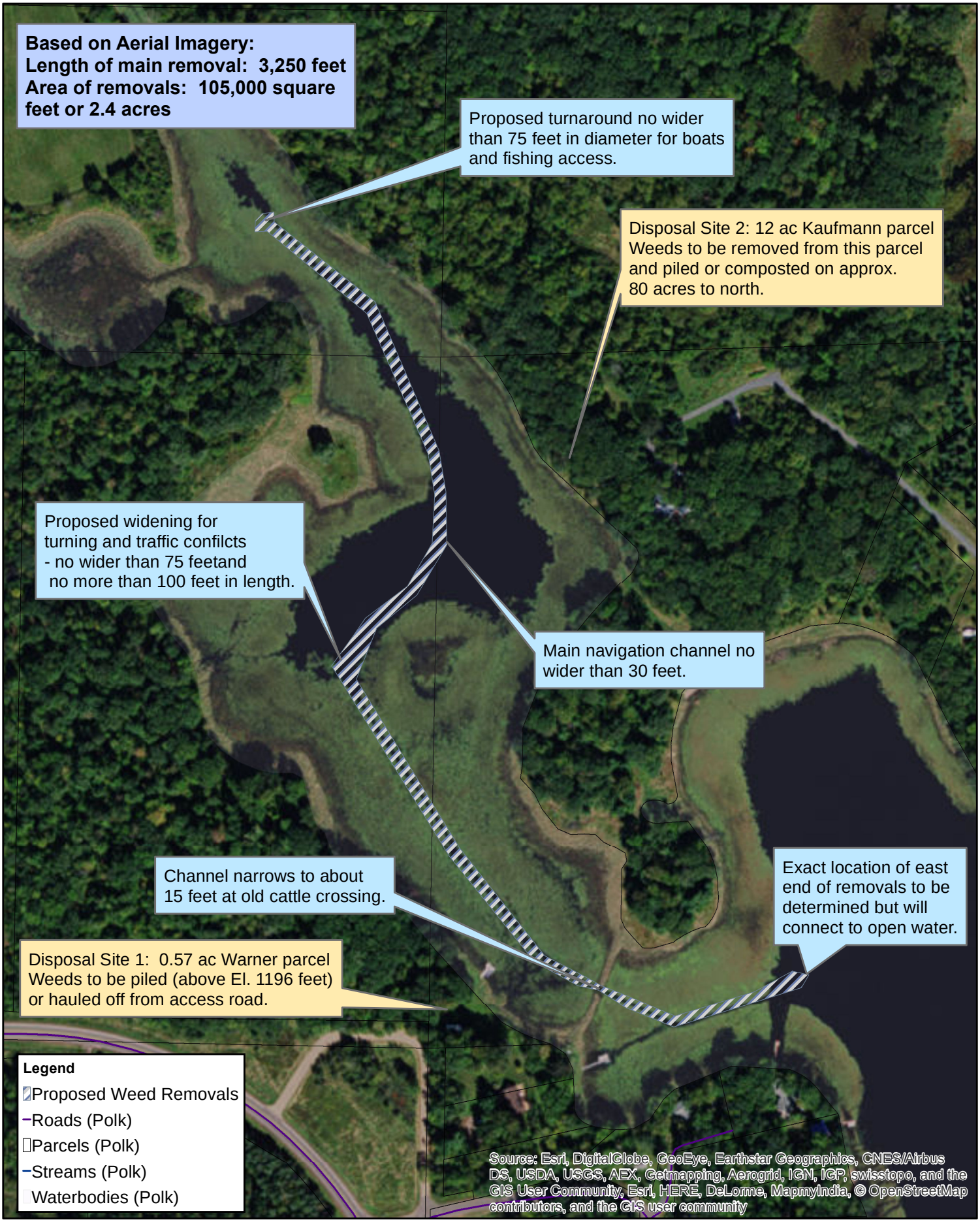
For access lanes to individual landowner lots, the harvesting crew will bring the weeds to the shore, and the individual landowner will be responsible for disposal of the plants. It is anticipated that the material will be stockpiled on-site and/or composted or thinly spread in woodland areas. Landowners will be instructed to not place stockpiles within 50 feet of the lakeshore.

Other aquatic plant management options considered

For many Association members, the "do-nothing" approach will not produce a satisfactory outcome for Vincent Lake. At present, there are limitations to the navigability and access to many areas of the lake. Further, due to the shallow depth of the lake, there is concern that aquatic plants will continue to spread into deeper portions of the lake and impact recreational opportunities.

Multiple Association members have asked about chemical treatment of aquatic plants, and specifically the use of advertised products for treatment of watershield. Chemical treatment can be prone to improper dosing and application may not be successful due to annual variations in plant growth timing and density. In addition, using chemical treatments on large portions of the lake may cause concern with lake users. While the Association does not want to rule out chemical applications from ever being used in the lake, Association members would need to come to an agreement on their use. This will likely only be considered if mechanical harvesting is unsuccessful.

More advanced mechanical methods have only briefly been considered by the Association at this point. Aquatic plant harvesters cost tens or even hundreds of thousands of dollars and would likely be an expense that the Association could not afford. Even use of a contractor that specializes in the use of harvesting equipment has been deemed cost-prohibitive at this time. As with chemical treatment, the Association will not rule out these options should the current approach for harvesting prove unsuccessful or difficult to execute and maintain.



Proposed Spring 2018 Trial Weed Removals

Vincent Lake Association

0 125 250 500 Feet

N

2/3

Vincent Lake 2008

Legend

- Parking Lot
- Shore Fishing
- Boat Access
  - CARRY-IN
  - RAMP
  - UNKNOWN
- Municipality
- State Boundaries
- County Boundaries
- Major Roads
  - Interstate Highway
  - State Highway
  - US Highway
- County and Local Roads
  - County HWY
  - Local Road
- Railroads
- Tribal Lands

Notes

0.3 0 0.13 0.3 Miles

NAD_1983_HARN_Wisconsin_TM

1: 7,920

Vincent Lake 2013

Legend

- Parking Lot
- Shore Fishing
- Boat Access
  - CARRY-IN
  - RAMP
  - UNKNOWN
- Municipality
- State Boundaries
- County Boundaries
- Major Roads
  - Interstate Highway
  - State Highway
  - US Highway
- County and Local Roads
  - County HWY
  - Local Road
- Railroads
- Tribal Lands

Notes

0.3 0 0.13 0.3 Miles

NAD_1983_HARN_Wisconsin_TM

1: 7,920

Vincent Lake 2015

Legend

- Parking Lot
- Shore Fishing
- Boat Access
  - CARRY-IN
  - RAMP
  - UNKNOWN
- Municipality
- State Boundaries
- County Boundaries
- Major Roads
  - Interstate Highway
  - State Highway
  - US Highway
- County and Local Roads
  - County HWY
  - Local Road
- Railroads
- Tribal Lands

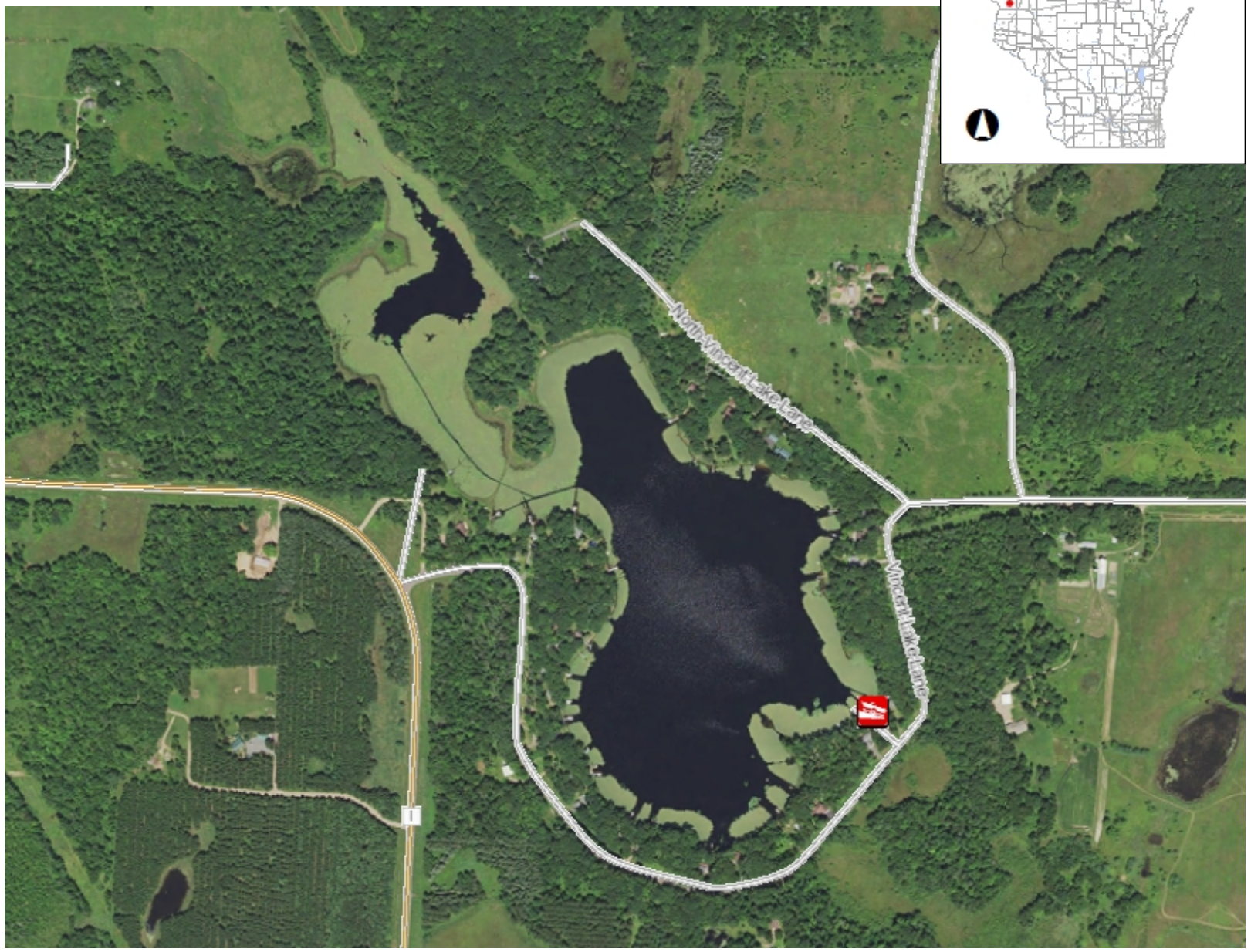
Notes

0.3 0 0.13 0.3 Miles

NAD_1983_HARN_Wisconsin_TM

1: 7,920

Vincent Lake 2017



Legend

- Parking Lot
- Shore Fishing
- Boat Access
  - CARRY-IN
  - RAMP
  - UNKNOWN
- Municipality
- State Boundaries
- County Boundaries
- Major Roads
  - Interstate Highway
  - State Highway
  - US Highway
- County and Local Roads
  - County HWY
  - Local Road
- Railroads
- Tribal Lands

Notes

0.3 0 0.13 0.3 Miles

NAD_1983_HARN_Wisconsin_TM

1: 7,920

2018 Harvesting Results

During the summer of 2018, members of the Vincent Lake Association gathered on the weekends to cut and remove aquatic plants for individual riparian access lanes for property owners and to develop a common use navigation channel in the second lake. This effort took considerable time, with over half the time being committed to the main navigation channel in the second lake. Despite the efforts of the Association, it was never possible to clear the channel to the length and width that were proposed in the trial plan.

Harvesting individual riparian access lanes for property owners was largely successful. Once cut, the plants were easily pushed the short distance to shore and removed from the lake. Depending on the property, each access lane took about 15-30 minutes to complete. In contrast, when cutting the common use navigation channel in the second lake, the longer distance to push the plants to shore was problematic. In addition, the long distance complicated the process of cutting the plants as the boat props and sickle bar were quickly fouled with aquatic plants.

In general, the harvesting crew found that plants within the harvested areas of the common use channel regrew within 2 weeks of harvesting. Since this area of the channel is relatively shallow (4 feet deep or less), aquatic plants were able to recover quickly. Also, plants almost immediately began to move into the open water area, thereby decreasing the width of the channel.

Aquatic Plant Management Plan Development Committee

An initial committee meeting was held on March 22nd and attended by thirteen members of the Vincent Lake Association. An overview of the grant was discussed and members shared their values and concerns for Vincent Lake. Harvesting and chemical treatment options were discussed and aquatic plant management implementation plans from nearby lakes were reviewed.

At a second committee meeting held on April 18th, eleven members of the Association provided feedback on the plan goal related to maintaining navigation routes in the lake. Alex Smith (WDNR) attended the meeting and was able to answer member questions. Judy shared the quotes she had received for herbicide treatment and contractors were discussed.

Thirteen members of the Association attended the third meeting held on May 17th. At this meeting the goals of the plan were reviewed. Judy again shared the quotes for herbicide treatment. An agenda for the annual meeting was outlined and a date for the plant training was chosen.

The draft plan was posted on the Polk County Land and Water Resources Department website and opened for a 30 day public comment period ending on July 14th, 2019. A notice of public comment was published in the Ledger. Fourteen public comments were received. Public comments both supported and opposed chemical treatment of aquatic plants in Vincent Lake. The committee discussed the hope that chemical treatments will be minimal and will last a number of years. The plan was approved by the Vincent Lake Association on May 25th, 2019 and by the Wisconsin Department of Natural Resources on ***.

Implementation Plan

Vision Maintain recreational uses on Vincent Lake including swimming, fishing, and boating while balancing the protection of the natural functions of native plants including fish and wildlife habitat, nutrient uptake (water clarity), and protection against invasive species

Goal 1. Maintain navigation routes in Vincent Lake using multiple management options

A combination of manual removal, harvesting, and chemical control will be used to manage native vegetation and improve navigation in Vincent Lake. Permits are required for both harvesting and chemical control. Control and removal of native aquatic plants are not eligible for WDNR grant funding. Incurring costs will be the responsibility of the Vincent Lake Association.

A. Maintain a common use navigation channel to allow access from the main lake through the second lake (total area: 2.3 acres)
   - Harvesting of the main navigation channel was largely unsuccessful in 2018
   - Herbicide is the desired method to maintain navigation in this area
   - Annual assessments will indicate if herbicide is needed (late June) and the effectiveness of herbicide treatment (fall)
   - GPS and ArcGIS will be used to delineate the width of the navigation channel
   - If the navigation channel decreases to 25 feet, herbicide treatment will be pursued
   - Navigation channel will be 50 feet in width, with two areas widened to 75 feet for turnaround and traffic conflicts (northern end and area east of the cattle crossing)
   - Navigation channel will include a 30 foot wide channel around the island on the second lake
   - Navigation channel boundaries will remain the same from year to year
   - Harvesting will be used for seasonal maintenance of the channel

B. Allow individual riparian access lanes for property owners
   - Harvesting will be used to establish individual riparian access lanes for members who contribute to the weed harvesting plan fund
   - Plant removal will be the responsibility of each individual landowner
   - Residents can use manual removal for individual corridor access without a permit
   - Plant removal width is limited to 30 feet per property and must be adjacent to a dock
   - Riparian access lane boundaries will remain the same from year to year

C. Return plant bed extent on the main lake to 2008 conditions
   - Harvesting will be used to return the width of the plant bed perpendicular to the shoreline to 2008 conditions (total area compared to 2008 plant bed: 5.3 acres)
   - Plants will be disposed at the Warner and Kaufman parcels and piled or composted

D. Address navigation concerns at the boat landing
    - Harvesting will be used to establish a 30 foot wide access at the boat landing

E. Assess the impacts of plant removal on lake quality and adapt management as needed to address concerns
    - Secchi depth will be used to evaluate changes in water clarity
    - Whole lake point intercept survey (every 5 years) will be used to evaluate environmental impacts

Goal 2. Protect the natural functions of native plants including fish and wildlife habitat, nutrient uptake (i.e. water clarity), and protection against invasive species

A. Conduct annual assessments to indicate if herbicide is needed (late June) and the effectiveness of herbicide treatment (fall)
B. Ensure that treatment is conducted according to permit conditions
C. Supervise and direct contracted applicator
D. Increase awareness of slow-no-wake zones (area within 100 feet of the shoreline)
E. Increase residents understanding of the role and importance of aquatic plants in Vincent Lake
F. Maintain the aerator to prevent winter fish kill events

Goal 3. Implement and maintain an aquatic invasive species (AIS) monitoring and prevention program

A. Participate in the AIS Citizen Lake Monitoring Network Program
B. Provide lake residents with the skills necessary to identify common AIS
C. Develop a communication plan for residents who suspect they have found AIS in Vincent Lake
D. Maintain WDNR and County AIS signs at the boat landing

Goal 4. Continue and expand data collection efforts

A. Continue and expand dissolved oxygen, temperature, and secchi depth readings and enter data into the WDNR SWIMS database
B. Monitor lake level through the WDNR lake level monitoring program and enter data into the WDNR SWIMS database
C. Conduct a whole lake point intercept survey every 5 years to evaluate environmental impacts of plant management

Goal 5. Educate lake residents and visitors about the role of aquatic plants

A. Use the following education and information strategy which includes: target audience, messages to communicate, and methods to communicate messages

Target audience

Lake residents
Lake users

Messages to communicate to the target audience

APM plan

The current aquatic plant management plan (APM) is detailed in the Vincent Lake APM Plan and was developed in partnership with the APM Committee and the WDNR
Progress towards the goals of the APM will be shared with lake residents
The APM Plan is a living document that should adapt over time

Role of Aquatic Plants (copied from Aquatic Plant Management in Wisconsin)

Ninety percent of a lake ecosystem depends on what happens in the littoral zone
Aquatic plants create a thriving habitat for animals
Aquatic plants filter runoff from uplands to protect lake water quality
Plant roots create networks that stabilize sediments at the water's edge where buffering waves might otherwise erode the lakeshore
Plants are essential to the spawning success of many fish species
Plants provide shade and refuge for near shore animals
Plants photosynthesize, creating life-giving oxygen for the animals that live in the littoral zone
Submersed plants absorb phosphorus and nitrogen over their leaf surface and through their roots
Plant use nutrients, making them less available for nuisance algae
Native aquatic plants can limit aquatic invasive plant growth
Plant fruits and tubers provide food for mammals, waterfowl, insects and fish

Aquatic Invasive Species (AIS)

Currently, Vincent Lake has no known populations of AIS
Early identification of a small population of AIS increases the likelihood that the AIS can be successfully managed
It is important that lake residents know how to identify AIS and who to contact if they locate suspect AIS
Polk County and the State of Wisconsin have regulations that make it illegal to transport aquatic species on public roads

Methods to communicate messages to the target audience

Handouts	Direct mailings
Flyers	Annual meetings
Signs	Workshops/trainings
Emails	Personal visits

Goal 6. Ensure the goals of the plan are met

A. Review and document progress made towards plan implementation
B. Identify actions that weren't completed and identify why they were not completed
C. Review funding opportunities to implement the goals of the plan
D. Identify and share opportunities for Association members to volunteer for lake management activities (i.e. aerator, trash pick-up, etc.)
E. Apply for a small scale grant to update the plan and complete a whole lake point intercept survey in 2023
F. Apply for harvesting and chemical control permits, as needed

Vincent Lake Common Use Navigation Channel

Vincent Lake, 2008

Vincent Lake, 2017

Implementation Table

Acronyms used for partners in the following implementation table

WDNR = Wisconsin Department of Natural Resources
LWRD = Polk County Land and Water Resources Department
VLA = Vincent Lake Association
CON = Consultant

Acronyms used for funding sources in the following implementation table

LPL = WDNR Lake Planning Grant Program
AEPP = WDNR Aquatic Invasive Species Grant Program

Goal 1. Maintain navigation routes in Vincent Lake using multiple management options	Timeline	$ Estimate	Volunteer hours	Partners	Funding sources
A. Maintain a common use navigation channel to allow access from the main lake through the second lake (total area: 2.3 acres)	Yearly	$2,100-$2,800	10-40 hours	VLA CON	N/A
B. Allow individual riparian access lanes for property owners	Yearly		50 hours	VLA	N/A
C. Return plant bed extent on the main lake to 2008 conditions	Yearly		Hundreds	VLA	N/A
D. Address navigation concerns at the boat landing	Yearly		1 hour	VLA	N/A
E. Assess the impacts of plant removal on lake quality and adapt management as needed to address concerns	Yearly	$0	5 hours	VLA CON	N/A
Goal 2. Protect the natural functions of native plants including fish and wildlife habitat, nutrient uptake (i.e. water clarity), and protection against invasive species	**Timeline**	**$ Estimate**	**Volunteer hours**	**Partners**	**Funding sources**
A. Conduct annual assessments to indicate if herbicide is needed (late June) and the effectiveness of herbicide treatment (fall)	June & Fall, Annual		10 hours	VLA LWRD (GIS)	LPL
B. Ensure that treatment is conducted according to permit conditions	Yearly, if herbicide	$0	5 hours	VLA	
C. Supervise and direct contracted applicator	Yearly, if herbicide	$0	5 hours	VLA	
D. Increase awareness of slow-no-wake zones (area within 100 feet of the shoreline)	Continuous	$0	5 hours	VLA	LPL
E. Increase residents understanding of the role and importance of aquatic plants in Vincent Lake	Continuous	$0	15 hours	VLA CON	LPL
F. Maintain the aerator to prevent winter fish kill events	Yearly			VLA	
Goal 3. Implement and maintain an aquatic invasive species (AIS) monitoring and prevention program	**Timeline**	**$ Estimate**	**Volunteer Hours**	**Partners**	**Funding Sources**
A. Participate in the AIS Citizen Lake Monitoring Network Program	Continuous	$0	10 hours	VLA LWRD	LPL AEPP
B. Provide lake residents with the skills necessary to identify common AIS	Continuous	$0	10 hours	VLA LWRD	LPL AEPP
C. Develop a communication plan for residents who suspect they have found AIS in Vincent Lake	One time	$0	10 hours	VLA LWRD	LPL AEPP
D. Maintain WDNR and County AIS signs at the boat landing	Continuous	$0	1 hour	VLA LWRD	LPL AEPP

Goal 4. Continue and expand data collection efforts	Timeline	$ Estimate	Volunteer Hours	Partners	Funding Sources
A. Continue and expand dissolved oxygen, temperature, and secchi depth readings and enter data into the WDNR SWIMS database	Yearly	$0	10 hours	VLA LWRD DNR	
B. Monitor lake level through the WDNR lake level monitoring program and enter data into the WDNR SWIMS database	Yearly	$0	10 hours	VLA LWRD DNR	
C. Conduct a whole lake point intercept on Vincent Lake every 5 years to evaluate environmental impacts of plant management	2024	$500	1 hour	CON VLA	LPL
Goal 5. Educate lake residents and visitors about the role of aquatic plants	**Timeline**	**$ Estimate**	**Volunteer Hours**	**Partners**	**Funding Sources**
A. Use the education and information strategy which includes: target audience, messages to communicate, and methods to communicate messages	Continuous	$0	25 hours	VLA	LPL
Goal 6. Ensure the goals of the plan are met	**Timeline**	**$ Estimate**	**Volunteer Hours**	**Partners**	**Funding Sources**
A. Review and document progress made towards plan implementation	Yearly	$0	5 hours	VLA	
B. Identify actions that weren't completed and identify why they were not completed	Yearly	$0	5 hours	VLA	
C. Review funding opportunities to implement the goals of the plan	Yearly	$0	2 hours	VLA	
D. Identify and share opportunities for Association members to volunteer for lake management activities (i.e. aerator, trash pick-up, etc.)	Yearly	$0	5 hours	VLA	
E. Apply for a small scale grant to update the Aquatic Plant Management Plan and complete a whole lake point intercept survey in 2024	2024	$0, match volunteer	10 hours	VLA CON	LPL
F. Apply for harvesting and chemical control permits, as needed	Yearly, as needed	$180-$275	5 hours	VLA	

NR 109.09 Plan Specifications and Approval

According to NR 109.09 applicants are required to submit an aquatic plant management plan that presents and discusses a number of items. These items, along with page numbers of this plan which address them, can be found below.

(a) The goals and objectives of the aquatic plant management and protection activities
Pages 28-37

(b) A physical, chemical, and biological description of the waterbody
Pages 2-10 and 12-15

(c) The intensity of water use
Page 2, last paragraph

(d) The location of aquatic plant management activities
Maps on pages 32-34

(e) An evaluation of chemical, mechanical, biological, and physical aquatic plant control methods
Pages 17-26 and Appendix J

(f) Recommendations for an integrated aquatic plant management strategy utilizing some or all of the methods in (e)
Pages 28-37

(g) An education and information strategy
Pages 30-31

(h) A strategy for evaluating the efficacy and environmental impacts of the aquatic plant management activities
Page 29, Goal 1E and Goal 4

(i) The involvement of local units of government and any lake organizations in the development of the plan
Page 27

Chemical Application Requirements and Fees (NR 107.04)

(a) Nonrefundable application fee of $20 plus a refundable acreage fee of $25 per acre

(b) Legal description of Vincent Lake including the township, range, and section number
Appendix A

(c) Detailed map with proposed control area dimensions clearly shown
Maps on pages 32-34
Note: include pertinent information to locate properties riparian to the treatment area: name of the riparian owner, street address, telephone number, or other pertinent information

(d) A description of the uses being impaired by plants and the reason for treatment
Pages 17-26

(e) A description of the plant community causing the use impairment
Pages 17-26

(f) The product names of chemicals proposed for use and the method of application

(g) The name of the person or commercial applicator and applicator certification number of the person conducting the treatment

(h) A comparison of alternative control methods and their feasibility for use on the proposed treatment site
Pages 17-26 and Appendix J

Cutting and Harvesting Application Requirements and Fees (NR 109.04)

(a) Nonrefundable application fee of $30 per acre up to $300
Note: annual renewals can be requested for an additional ½ the original fee

(b) Legal description of Vincent Lake including the township, range, and section number
Appendix A

(c) Detailed map with proposed control area dimensions clearly shown
Maps on pages 32-34
Note: private individuals doing plant control will provide: name of the riparian owner, street address, telephone number, or other pertinent information to locate the property

(d) A copy of this plan and a description of how the proposed control of aquatic plants is compatible with this plan

(e) A description of the impairments to water use caused by the aquatic plants to be managed
Pages 17-26

(f) A description of the aquatic plants to be removed
Pages 17-26

(g) Type of equipment and methods used for removal
Pages 18-20

(h) A description of other control methods considered and the justification for the method selected
Pages 17-26 and Appendix J

(i) A description of any other method being used or intended for use for plant management by the application or on the area abutting the proposed management area
Pages 17-26 and 28-29

(j) The area used for removal, reuse, or disposal of aquatic plants
Pages 19-20 and map on page 21

(k) The name of any person or commercial provider of control or removal services

Appendix A: Vincent Lake Legal Description

Vincent Lake, located in Sections 4, 5 and 9, Township 35 North, Range 16 West, Town of Georgetown, Polk County, Wisconsin,

more specifically being located in the Northwest Quarter of the Southwest Quarter (NW¼-SW¼), the Southwest Quarter of the Southwest Quarter (SW¼-SW¼), and the Southeast Quarter of the Southwest Quarter (SE¼-SW¼) in Section 4;

the Northeast Quarter of the Northwest Quarter (NE¼-NW¼), the Southeast Quarter of the Northwest Quarter (SE¼-NW¼), the Southwest Quarter of the Northwest Quarter (SW¼-NW¼), and the Northwest Quarter of the Northwest Quarter (NW¼-NW¼) in Section 9;

and the Southeast Quarter of the Southeast Quarter (SE¼-SE¼) and the Northeast Quarter of the Southeast Quarter (NE¼-SE¼) in Section 5;

all being located in T35N, R16W, Town of Georgetown, Polk County, Wisconsin.

Appendix B: Fisheries Survey

WISCONSIN DNR FISHERIES INFORMATION SHEET

County: POLK
Lake Name: VINCENT LAKE
WBIC: 2598500
Survey Year: 2016

WDNR Fish Biologist Contact Information
Marty Engel - St. Croix R up to St. Croix falls dam - 715-684-2914 ext.
Aaron Cole - Barron - 715-637-6864

Lake Characteristics

Lake Type: SHALLOW SEEPAGE

Acres: 70 **Shoreline miles:** 2.5 **Maximum Depth (feet):** 15

Survey Information

Survey Dates: May 10, 2016 to May 10, 2016

WDNR Survey ID: 515081236

Gear Types: BOOM SHOCKER

Survey Type: FISHERIES ASSESSMENTS LAKES LATE SPRING BASS PAN

BLACK CRAPPIE

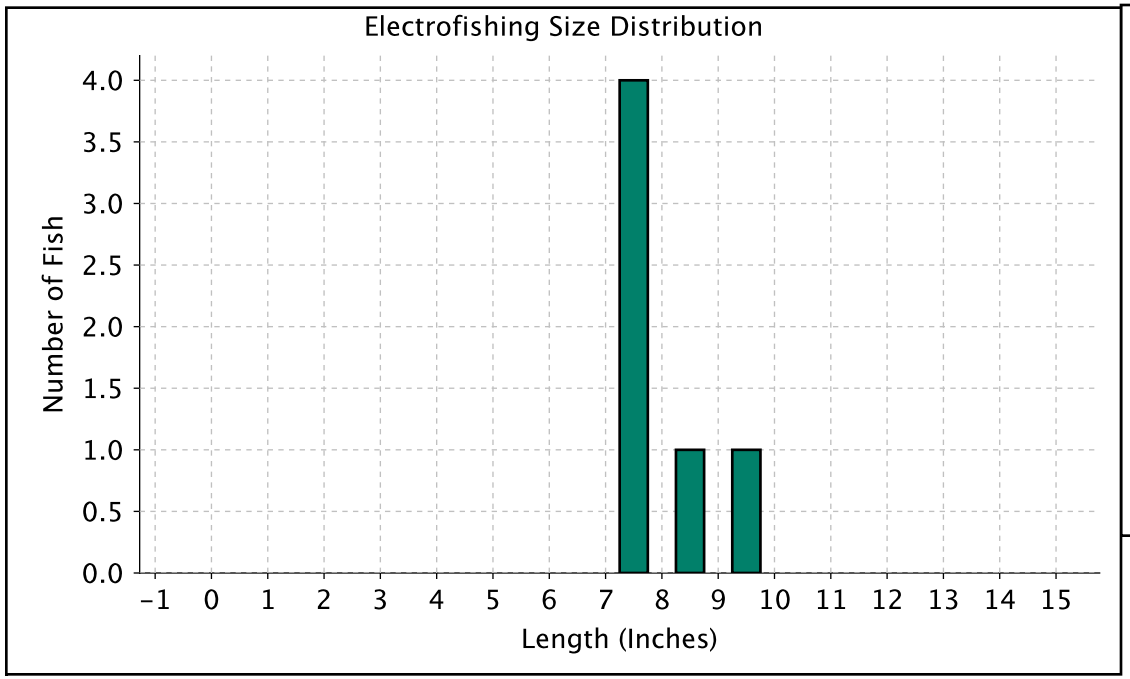
Electrofishing Relative Abundance

Total Catch:	6
Miles of Electrofishing:	1
Catch per mile:	6.00

Proportional Size Distribution (PSD)

(For All Days of Electrofishing)

Stock Size (in):	5	Quality Size (in):	8
Measured Fish Count:			6
Count of Fish >= Stock Size:			6
Count of Fish >= Quality Size:			2
PSD_8 :			Too few fish



Minimum Length: 7.5

Maximum Length: 9.5

Average Length: 8.25

Number Measured: 6

WISCONSIN DNR FISHERIES INFORMATION SHEET

County: POLK
Lake Name: VINCENT LAKE
WBIC: 2598500
Survey Year: 2016

WDNR Fish Biologist Contact Information
Marty Engel - St. Croix R up to St. Croix falls dam - 715-684-2914 ext.
Aaron Cole - Barron - 715-637-6864

Lake Characteristics

Lake Type: SHALLOW SEEPAGE

Acres: 70 **Shoreline miles:** 2.5 **Maximum Depth (feet):** 15

Survey Information

Survey Dates: May 10, 2016 to May 10, 2016

WDNR Survey ID: 515081236

Gear Types: BOOM SHOCKER

Survey Type: FISHERIES ASSESSMENTS LAKES LATE SPRING BASS PAN

BLUEGILL

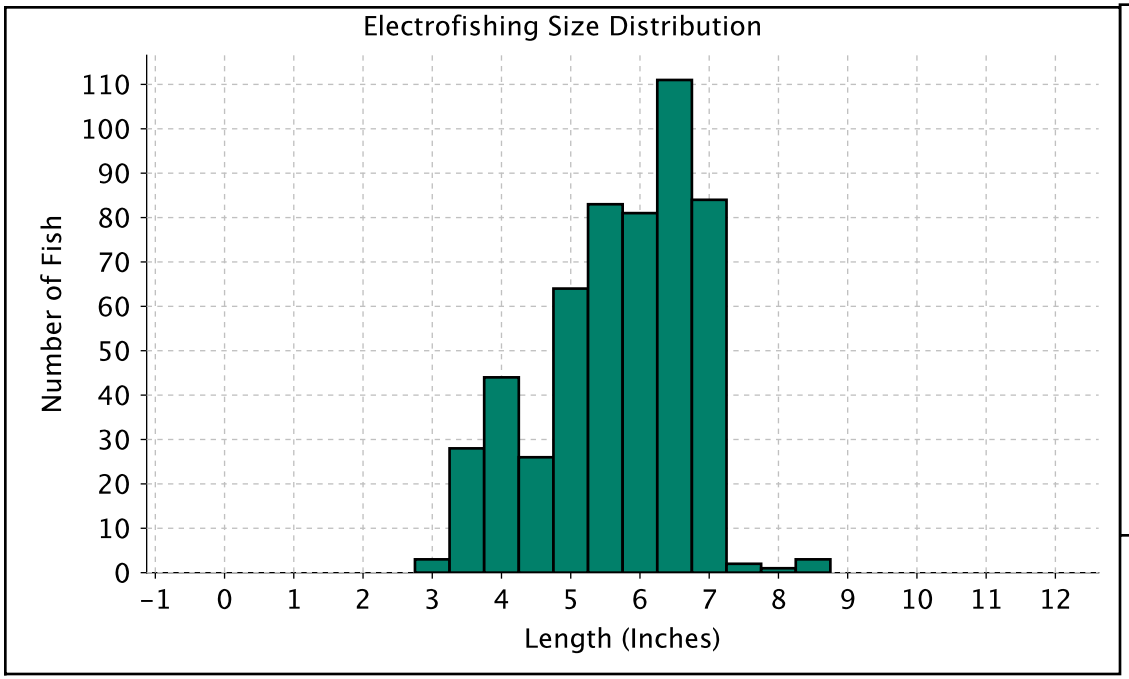
Electrofishing Relative Abundance

Total Catch:	533
Miles of Electrofishing:	1
Catch per mile:	533.00

Proportional Size Distribution (PSD)

(For All Days of Electrofishing)

Stock Size (in):	3	Quality Size (in):	6
Measured Fish Count:			530
Count of Fish >= Stock Size:			530
Count of Fish >= Quality Size:			282
PSD 6 :			53



Minimum Length: 3

Maximum Length: 8.5

Average Length: 5.95

Number Measured: 530

WISCONSIN DNR FISHERIES INFORMATION SHEET

County: POLK
Lake Name: VINCENT LAKE
WBIC: 2598500
Survey Year: 2016

WDNR Fish Biologist Contact Information
Marty Engel - St. Croix R up to St. Croix falls dam - 715-684-2914 ext.
Aaron Cole - Barron - 715-637-6864

Lake Characteristics

Lake Type: SHALLOW SEEPAGE

Acres: 70 **Shoreline miles:** 2.5 **Maximum Depth (feet):** 15

Survey Information

Survey Dates: May 10, 2016 to May 10, 2016

WDNR Survey ID: 515081236

Gear Types: BOOM SHOCKER

Survey Type: FISHERIES ASSESSMENTS LAKES LATE SPRING BASS PAN

LARGEMOUTH BASS

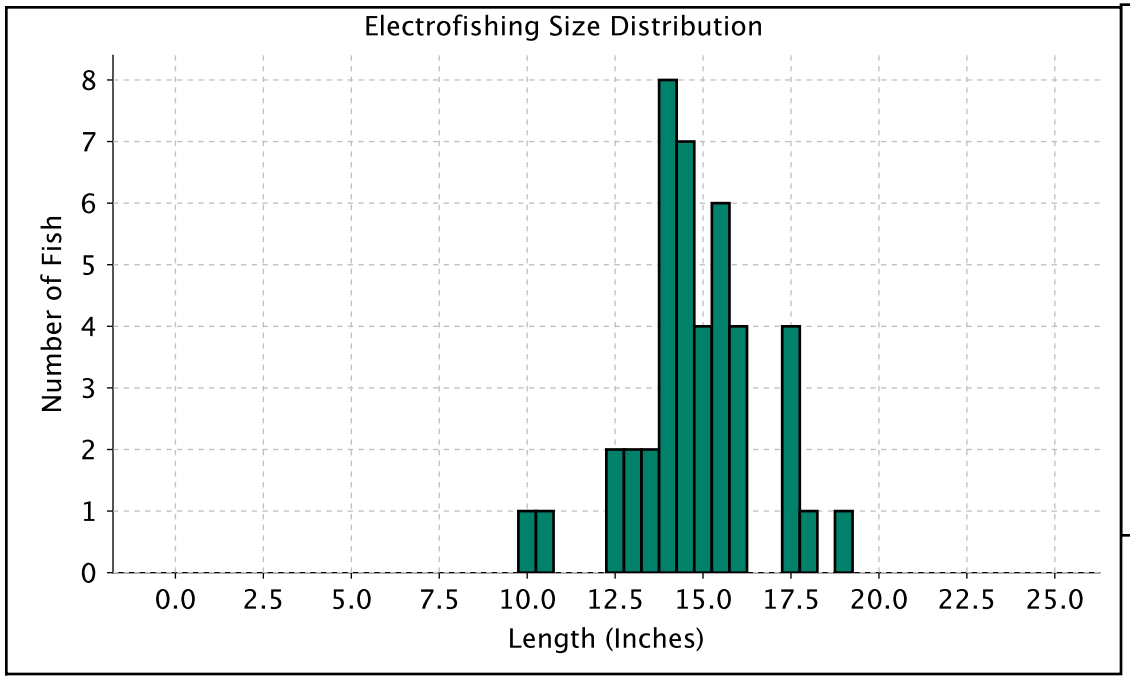
Electrofishing Relative Abundance

Total Catch:	44
Miles of Electrofishing:	2.55
Catch per mile:	17.26

Proportional Size Distribution (PSD)

(For All Days of Electrofishing)

Stock Size (in):	8	Quality Size (in):	12
Measured Fish Count:			43
Count of Fish >= Stock Size:			43
Count of Fish >= Quality Size:			41
PSD 12 :			95



Minimum Length: 10

Maximum Length: 19

Average Length: 15.04

Number Measured: 43

WISCONSIN DNR FISHERIES INFORMATION SHEET

County: POLK
Lake Name: VINCENT LAKE
WBIC: 2598500
Survey Year: 2016

WDNR Fish Biologist Contact Information
Marty Engel - St. Croix R up to St. Croix falls dam - 715-684-2914 ext.
Aaron Cole - Barron - 715-637-6864

Lake Characteristics

Lake Type: SHALLOW SEEPAGE

Acres: 70 **Shoreline miles:** 2.5 **Maximum Depth (feet):** 15

Survey Information

Survey Dates: May 10, 2016 to May 10, 2016

WDNR Survey ID: 515081236

Gear Types: BOOM SHOCKER

Survey Type: FISHERIES ASSESSMENTS LAKES LATE SPRING BASS PAN

NORTHERN PIKE

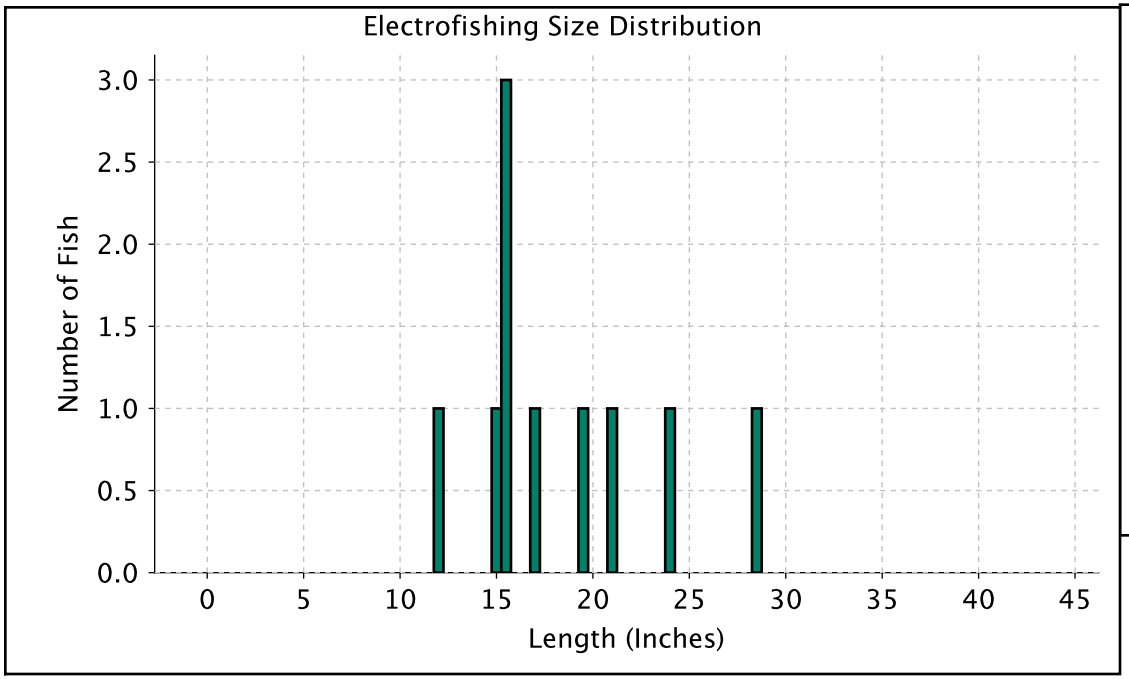
Electrofishing Relative Abundance

Total Catch:	10
Miles of Electrofishing:	2.55
Catch per mile:	3.92

Proportional Size Distribution (PSD)

(For All Days of Electrofishing)

Stock Size (in):	14	Quality Size (in):	21
Measured Fish Count:			10
Count of Fish >= Stock Size:			9
Count of Fish >= Quality Size:			3
PSD 21 :			Too few fish



Minimum Length: 12

Maximum Length: 28.5

Average Length: 18.60

Number Measured: 10

WISCONSIN DNR FISHERIES INFORMATION SHEET

County: POLK
Lake Name: VINCENT LAKE
WBIC: 2598500
Survey Year: 2016

WDNR Fish Biologist Contact Information
Marty Engel - St. Croix R up to St. Croix falls dam - 715-684-2914 ext.
Aaron Cole - Barron - 715-637-6864

Lake Characteristics

Lake Type: SHALLOW SEEPAGE

Acres: 70 **Shoreline miles:** 2.5 **Maximum Depth (feet):** 15

Survey Information

Survey Dates: May 10, 2016 to May 10, 2016

WDNR Survey ID: 515081236

Gear Types: BOOM SHOCKER

Survey Type: FISHERIES ASSESSMENTS LAKES LATE SPRING BASS PAN

PUMPKINSEED

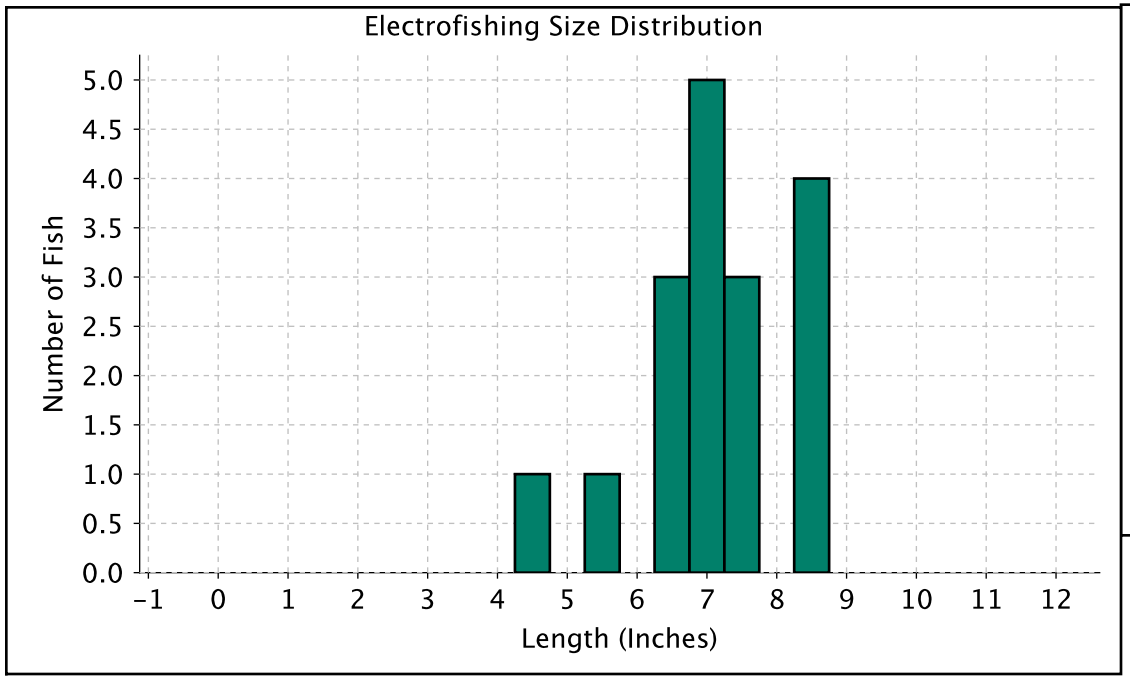
Electrofishing Relative Abundance

Total Catch:	17
Miles of Electrofishing:	1
Catch per mile:	17.00

Proportional Size Distribution (PSD)

(For All Days of Electrofishing)

Stock Size (in):	3	Quality Size (in):	6
Measured Fish Count:			17
Count of Fish >= Stock Size:			17
Count of Fish >= Quality Size:			15
PSD_6 :			Too few fish



Minimum Length: 4.5

Maximum Length: 8.5

Average Length: 7.37

Number Measured: 17

WISCONSIN DNR FISHERIES INFORMATION SHEET

County: POLK
Lake Name: VINCENT LAKE
WBIC: 2598500
Survey Year: 2016

WDNR Fish Biologist Contact Information
Marty Engel - St. Croix R up to St. Croix falls dam - 715-684-2914 ext.
Aaron Cole - Barron - 715-637-6864

Lake Characteristics

Lake Type: SHALLOW SEEPAGE

Acres: 70 **Shoreline miles:** 2.5 **Maximum Depth (feet):** 15

Survey Information

Survey Dates: May 10, 2016 to May 10, 2016

WDNR Survey ID: 515081236

Gear Types: BOOM SHOCKER

Survey Type: FISHERIES ASSESSMENTS LAKES LATE SPRING BASS PAN

YELLOW PERCH

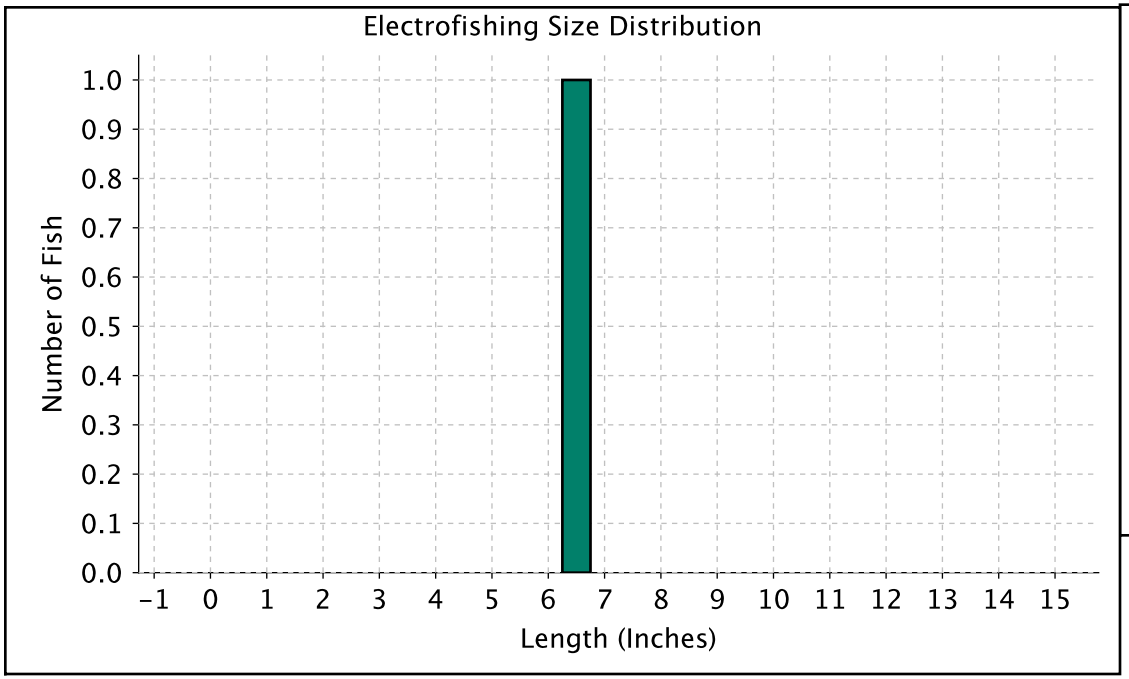
Electrofishing Relative Abundance

Total Catch:	1
Miles of Electrofishing:	1
Catch per mile:	1.00

Proportional Size Distribution (PSD)

(For All Days of Electrofishing)

Stock Size (in):	5	Quality Size (in):	8
Measured Fish Count:			1
Count of Fish >= Stock Size:			1
Count of Fish >= Quality Size:			0
PSD_8 :			Too few fish



Minimum Length: 6.5

Maximum Length: 6.5

Average Length: 6.75

Number Measured: 1

Appendix C: First Ice and Ice Out Data

Vincent Lake --First Ice Records

11-29-12 3 ¾

11-30-13 5

11-28-15

12-08-16

11-10-17 Record Early

Vincent Lake Ice Out Records

2003	4/13
2004	4/10
2005	4/09
2006	4/09
2007	3/31
2008	4/23
2009	4/12
2010	3/25
2011	4/12
2012	3/20
2013	4/30
2014	4/26
2015	4/02
2016	3/25
2017	3/31
2018	5/1

Appendix D: Water Level History

Vincent Lake Water level History

Measured from nail in oak in backyard of 957 Vincent Lake Lane (Feet Below NOHW)

9/12/06 49 (3.0)	4/8/11 48 (3.0)	4/1/17 43 (2.7)
10/25/06 48.3 (3.0)	8/10/11 38 (2.3)	5/6/17 41 (2.6)
4/9/07 47 (3.0)	10/13/11 45 (3.0)	10/3/17 42 (2.7)
8/7/07 69.7 (4.3)	11/23/11 52 (3.1)	04/27/18 43 (2.7)
9/18/07 77.6 (5.1)	3/21/12 49 (3.0)	09/17/18 48 (3.0)
9/24/07 69.2 (4.3)	10/2/12 76 (5.0)	09/21/18 41 (2.4)
10/17/07 54 (3.5)	4/30/13 61.5 (3.9)	10/14/18 39 (2.3)
10/21/07 49 (3.0)	5/13/13 64 (4.0)	
11/25/07 53 (3.4)	6/21/13 54 (3.5)	
4/17/08 49 (3.0)	7/5/13 58 (3.7)	
5/3/08 42.5 (2.6)	7/26/13 65 (4.0)	
9/23/08 58.5 (3.7)	9/15/13 78 (5.1)*	
10/29/08 59.5 (3.8)	10/27/13 77 (5.1)	
4/11/09 58 (3.7)	05/29/14 46 (3.0)	
6/14/09 74 (4.9)	06/7/14 38.5 (2.3)	
9/13/09 87 (5.3)	7/7/14 33.5 (1.8)*	
10/7/09 83 (5.2)	10/21/14 40.0 (2.4)	
3/25/10 84 (5.2)	04/02/15 45.0 (3.0)	
4/26/10 90.5 (5.4)	06/27/15 48.0 (3.0)	
7/17/10 84 (5.2)	07/14/15 45.0 (3.0)	
8/15/10 74 (4.9)	11/18/15 40.0 (2.4)	
9/24/10 65 (4.0)	03-17-16 37.0 (2.1)	
4/8/11 48 (3.0)	04-29-16 34.0 (1.9)	

Appendix E: Dissolved Oxygen, Temperature, and Secchi Disk Readings

Vincent Lake Dissolved Oxygen

12-14-18

	Depth (M)	temp ©	% sat	mg/l
Deep Spot	surface	0.8	75.2	10.35??
	0.5	2.9	39.8	5.19
	1.0	3.9	29.2	3.70
	1.5	4.1	27.5	3.47
	2.0	4.2	24.0	3.02
	2.5	4.3	23.1	2.90
	3.0	4.3	21.2	2.66
	3.5	4.3	21.0	2.64
	3.7	4.3	20.0	2.54
Pendleton	surface	0.8	58.0	8.01
	0.5	2.7	32.4	4.30
	1.0	3.9	23.5	3.21
	1.5	4.2	23.3	2.93
	2.0	4.2	22.9	2.88
	2.5	4.2	22.7	2.85
	3.0	4.2	22.4	2.82
	3.5	4.2	20.9	2.62
Back Lake	surface			
	0.5	2.3	10.2	1.32
	1.0	3.5	2.4	.29
	1.5	3.7	1.1	.14
	2.0	4.1	0.9	.11
	2.5	4.2	0.7	.09
	3.0	4.4	0.3	.04 (anerobic)

12-15-18 Aeration started yesterday

	Depth(M)	temp ©	% sat	mg/l
Deep Spot	surface	1.8	61.3	8.00
	0.5	3.5	27.8	3.55
	1.0	3.7	26.4	3.36
	1.5	3.9	24.8	3.12
	2.0	4.1	23.5	2.96
	2.5	4.1	22.6	2.84
	3.0	4.3	17.3	2.16
	3.5	4.3	16.5	2.07
	3.8	4.3	15.4	1.93
Pendleton	surface	1.1	69.3	9.46
	0.5	3.5	30.0	3.83
	1.0	4.0	27.7	3.49
	1.5	4.2	25.6	3.21
	2.0	4.2	23.2	2.92
	2.5	4.3	19.6	2.45
	3.0	4.3	19.7	2.46
	3.5	4.3	11.9	1.49

Vincent Lake Dissolved Oxygen

3-17-19 (Ice Depth 30")

	Depth (M)	temp©	% sat	mg/l
Deep Spot	surface	.3	19.7	2.75
	1.0	.8	14.2	1.96
	2.0	1.2	12.5	1.72
	3.0	1.3	12.0	1.64
	4.0 (Bottom)	1.6	8.0	1.05
Pendleton	surface	.3	21.5	3.60
	1.0	1.1	15.0	2.66
	2.0	1.2	14.1	1.93
	3.0	1.4	11.7	1.55
	Bottom	1.8	7.9	1.05
Back Lake	surface	.9	3.3	.46
	1.0	1.3	2.2	.30
	2.0	3.9	2.0	.25
	3.0 (Bottom)	4.2	1.6	.20 (Anerobic)

7-13-19 Vincent Lake Dissolved oxygen profiles

	Depth (M)	Temp ©	% sat	mg/l
Deep Spot	surface	26.0	73.8	5.76
	1	25.8	72.7	5.70
	2	24.6	37.3	2.98
	3	20.5	5.6	.48
	Bottom	15.4	2.3	.23
Pendletons	surface	26.3	72.1	5.6
	1	25.8	73.1	5.73
	2	24.6	36.0	2.89
	3	19.7	3.40	0.3
	Bottom	15.7	2.20	0.21

Vincent Lake Secchi Measurements

6-26-13	6.5		7-18-18	5.0	
7-29-13	5.3		7-29-18	5.2	3.6 Back
8-13-14	3.0		8-23-18	3.7	
9-7-14	2.7				
9-16-14	3.4 front	4.2 back			
10-21-14	5.0				
04-15-15	5.0				
06-27-15	7.2				
07-14-15	6.0				
07-25-15	5.9				
09-25-15	5.9				
04-16-16	9.0				
06-30-16	8.0				
07-23-16	3.0				
08-10-16	2.2				
04-24-17	6.2				
06-01-17	8.7				
08-04-17	5.5				
08-30-17	6.3				
05-06-18	4.9				
05-15-18	6.9				
05-26-18	8.7				
06-29-18	6.0				

Appendix F: 2018 Aquatic Plant Harvesting Log

Weed Harvest Log for Vincent Lake 2018

June 2,18	3 cu yd	70% water shield 28 % lily pad some coon tail
June 3,18	16 cu yd	Same as above
June 9,18	5 cu yd	90 % water shield 5 % lily pad 5% other weed
July 1,18	5 cu yd	same as above
July 7,18	8 cu yd	same as above
July 21, 18	8 cu yd	80 % water shield 15 % lily pad 5 % other

Appendix G: Aquatic Plant Management Strategy, Northern Region

AQUATIC PLANT MANAGEMENT STRATEGY

Northern Region WDNR
Summer, 2007

AQUATIC PLANT MANAGEMENT STRATEGY
Northern Region WDNR

ISSUES

- Protect desirable native aquatic plants.
- Reduce the risk that invasive species replace desirable native aquatic plants.
- Promote "whole lake" management plans
- Limit the number of permits to control native aquatic plants.

BACKGROUND

As a general rule, the Northern Region has historically taken a protective approach to allow removal of native aquatic plants by harvesting or by chemical herbicide treatment. This approach has prevented lakes in the Northern Wisconsin from large-scale loss of native aquatic plants that represent naturally occurring high quality vegetation. Naturally occurring native plants provide a *diversity of habitat* that *helps maintain water quality*, helps *sustain the fishing* quality known for Northern Wisconsin, supports common lakeshore wildlife from loons to frogs, and helps to provide the *aesthetics* that collectively create the "up-north" appeal of the northwoods lake resources.

In Northern Wisconsin lakes, an inventory of aquatic plants may often find 30 different species or more, whereas a similar survey of a Southern Wisconsin lake may often discover less than half that many species. Historically, similar species diversity was present in Southern Wisconsin, but has been lost gradually over time from stresses brought on by cultural land use changes (such as increased development, and intensive agriculture). Another point to note is that while there may be a greater variety of aquatic vegetation in Northern Wisconsin lakes, the vegetation itself is often *less dense*. This is because northern lakes have not suffered as greatly from nutrients and runoff as have many waters in Southern Wisconsin.

The newest threat to native plants in Northern Wisconsin is from invasive species of aquatic plants. The most common include Eurasian Water Milfoil (EWM) and CurlyLeaf Pondweed (CLP). These species are described as *opportunistic invaders*. This means that these "invaders" benefit where an opening occurs from removal of plants, and without competition from other plants may successfully become established in a lake. Removal of native vegetation not only diminishes the natural qualities of a lake, it *may increase the risk that an invasive species can successfully invade onto the site where native plants have been removed*. There it may more easily establish itself without the native plants to compete against. This concept is easily observed on land where bared soil is quickly taken over by replacement species (often weeds) that crowd in and establish themselves as new occupants of the site. While not a providing a certain guarantee against invasive plants, protecting and allowing the native plants to remain may reduce the success of an invasive species becoming established on a lake. Once established, the invasive species cause far more inconvenience for all lake users, riparian and others included; can change many of the natural features of a lake; and often lead to *expensive annual control plans*. Native vegetation may cause localized concerns to some users, but as a natural feature of lakes, they generally do not cause harm.

To the extent we can maintain the normal growth of native vegetation, Northern Wisconsin lakes can continue to offer the water resource appeal and benefits they've historically provided. A regional position on removal of aquatic plants that carefully recognizes how native aquatic plants benefit lakes in Northern Region can help prevent a gradual decline in the overall quality and recreational benefits that make these lakes attractive to people and still provide abundant fish, wildlife, and northwoods appeal.

GOALS OF STRATEGY:

1. Preserve native species diversity which, in turn, fosters natural habitat for fish and other aquatic species, from frogs to birds.
2. Prevent openings for invasive species to become established in the absence of the native species.
3. Concentrate on a" whole-lake approach" for control of aquatic plants, thereby fostering systematic documentation of conditions and specific targeting of invasive species as they exist.
4. Prohibit removal of wild rice. WDNR – Northern Region will not issue permits to remove wild rice unless a request is subjected to the full consultation process via the Voigt Tribal Task Force. We intend to discourage applications for removal of this ecologically and culturally important native plant.
5. To be consistent with our WDNR Water Division Goals (work reduction/disinvestment), established in 2005, to "not issue permits for chemical or large scale mechanical control of native aquatic plants – develop general permits as appropriate or inform applicants of exempted activities." This process is similar to work done in other WDNR Regions, although not formalized as such.

BASIS OF STRATEGY IN STATE STATUTE AND ADMINISTRATIVE CODE

State Statute 23.24 (2)(c) states:

"The requirements promulgated under par. (a) 4. may specify any of the following:

1. The **quantity** of aquatic plants that may be managed under an aquatic plant management permit.
2. The **species** of aquatic plants that may be managed under an aquatic plant management permit.
3. The **areas** in which aquatic plants may be managed under an aquatic plant management permit.
4. The **methods** that may be used to manage aquatic plants under an aquatic plant management permit.
5. The **times** during which aquatic plants may be managed under an aquatic plant management permit.
6. The **allowable methods** for disposing or using aquatic

plants that are removed or controlled under an aquatic plant management permit.

7. The requirements for plans that the department may require under sub. (3) (b). “

State Statute 23.24(3)(b) states:
“The department may require that an application for an aquatic plant management permit contain a plan for the department’s approval as to how the aquatic plants will be introduced, removed, or controlled.“

Wisconsin Administrative Code NR 109.04(3)(a) states:
“The department may require that an application for an aquatic plant management permit contain an aquatic plant management plan that describes how the aquatic plants will be introduced, controlled, removed or disposed. Requirements for an aquatic plant management plan shall be made in writing stating the reason for the plan requirement. In deciding whether to require a plan, the department shall consider the potential for effects on protection and development of diverse and stable communities of native aquatic plants, for conflict with goals of other written ecological or lake management plans, for cumulative impacts and effect on the ecological values in the body of water, and the long-term sustainability of beneficial water use activities.”

AQUATIC PLANT MANAGEMENT STRATEGY
Northern Region WDNR

APPROACH

1. After January 1, 2009* no individual permits for control of native aquatic plants will be issued. Treatment of native species may be allowed under the auspices of an approved lake management plan, and only if the plan clearly documents "impairment of navigation" and/or "nuisance conditions". Until January 1, 2009, individual permits will be issued to previous permit holders, only with adequate documentation of "impairment of navigation" and/or "nuisance conditions". No new individual permits will be issued during the interim.

2. Control of aquatic plants (if allowed) in documented sensitive areas will follow the conditions specified in the report.

3. Invasive species must be controlled under an approved lake management plan, with two exceptions (these exceptions are designed to allow sufficient time for lake associations to form and subsequently submit an approved lake management plan):
   a. Newly-discovered infestations. If found on a lake with an approved lake management plan, the invasive species can be controlled via an amendment to the approved plan. If found on a lake without an approved management plan, the invasive species can be controlled under the WDNR's Rapid Response protocol (see definition), and the lake owners will be encouraged to form a lake association and subsequently submit a lake management plan for WNDR review and approval.
   b. Individuals holding past permits for control of *invasive* aquatic plants and/or "mixed stands" of native and invasive species will be allowed to treat via individual permit until January 1, 2009 if "impairment of navigation" and/or "nuisance conditions" is adequately documented, unless there is an approved lake management plan for the lake in question.

4. Control of invasive species or "mixed stands" of invasive and native plants will follow current best management practices approved by the Department and contain an explanation of the strategy to be used. Established stands of invasive plants will generally use a control strategy based on Spring treatment. (typically, a water temperature of less than 60 degrees Fahrenheit, or approximately May 31st, annually).

5. Manual removal (see attached definition) is allowed (Admin. Code NR 109.06).

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* *Exceptions to the Jan. 1, 2009 deadline will be considered only on a very limited basis and will be intended to address unique situations that do not fall within the intent of this approach.*

AQUATIC PLANT MANAGEMENT STRATEGY
Northern Region WDNR

DOCUMENTATION OF IMPAIRED NAVIGATION AND/OR NUISANCE CONDITIONS

Navigation channels can be of two types:

- Common use navigation channel. This is a common navigation route for the general lake user. It often is off shore and connects areas that boaters commonly would navigate to or across, and should be of public benefit.

- Individual riparian access lane. This is an access lane to shore that normally is used by an individual riparian shore owner.

Severe impairment or nuisance will generally mean vegetation grows thickly and forms mats on the water surface. Before issuance of a permit to use a regulated control method, a riparian will be asked to document the problem and show what efforts or adaptations have been made to use the site. (This is currently required in NR 107 and on the application form, but the following helps provide a specific description of what impairments exist from native plants).

Documentation of *impairment of navigation* by native plants must include:

a. Specific locations of navigation routes (preferably with GPS coordinates)
b. Specific dimensions in length, width, and depth
c. Specific times when plants cause the problem and how long the problem persists
d. Adaptations or alternatives that have been considered by the lake shore user to avoid or lessen the problem
e. The species of plant or plants creating the nuisance (documented with samples or a from a Site inspection)

Documentation of the *nuisance* must include:

a. Specific periods of time when plants cause the problem, e.g. when does the problem start and when does it go away.
b. Photos of the nuisance are encouraged to help show what uses are limited and to show the severity of the problem.
c. Examples of specific activities that would normally be done where native plants occur naturally on a site but can not occur because native plants have become a nuisance.

AQUATIC PLANT MANAGEMENT STRATEGY
Northern Region WDNR

DEFINITIONS

Manual removal:	Removal by hand or hand-held devices without the use or aid of external or auxiliary power. Manual removal cannot exceed 30 ft. in width and can only be done where the shore is being used for a dock or swim raft. The 30 ft. wide removal zone cannot be moved, relocated, or expanded with the intent to gradually increase the area of plants removed. Wild rice may not be removed under this waiver.
Native aquatic plants:	Aquatic plants that are indigenous to the waters of this state.
Invasive aquatic plants:	Non-indigenous species whose introduction causes or is likely to cause economic or environmental harm or harm to human health.
Sensitive area:	Defined under s. NR 107.05(3)(i) (sensitive areas are areas of aquatic vegetation identified by the department as offering critical or unique fish and wildlife habitat, including seasonal or lifestage requirements, or offering water quality or erosion control benefits to the body of water).
Rapid Response protocol:	This is an internal WDNR document designed to provide guidance for grants awarded under NR 198.30 (Early Detection and Rapid Response Projects). These projects are intended to control pioneer infestations of aquatic invasive species before they become established.

Appendix H:NR 107 Aquatic Plant Management

Chapter NR 107

AQUATIC PLANT MANAGEMENT

Note: Chapter NR 107 as it existed on February 28, 1989 was repealed and a new Chapter NR 107 was created effective March 1, 1989.

NR 107.01 Purpose. The purpose of this chapter is to establish procedures for the management of aquatic plants and control of other aquatic organisms pursuant to s. 227.11 (2) (a), Stats., and interpreting s. 281.17 (2), Stats. A balanced aquatic plant community is recognized to be a vital and necessary component of a healthy aquatic ecosystem. The department may allow the management of nuisance−causing aquatic plants with chemicals registered and labeled by the U.S. environmental protection agency and labeled and registered by firms licensed as pesticide manufacturers and labelers with the Wisconsin department of agriculture, trade and consumer protection. Chemical management shall be allowed in a manner consistent with sound ecosystem management and shall minimize the loss of ecological values in the water body.

History: Cr. Register, February, 1989, No. 398, eff. 3−1−89; **correction made under s. 13.93 (2m) (b) 7., Stats., Register, December, 2000, No. 540.**

NR 107.02 Applicability. Any person sponsoring or conducting chemical treatment for the management of aquatic plants or control of other aquatic organisms in waters of the state shall obtain a permit from the department. Waters of the state include those portions of Lake Michigan and Lake Superior, and all lakes, bays, rivers, streams, springs, ponds, wells, impounding reservoirs, marshes, watercourses, drainage systems and other ground or surface water, natural or artificial, public or private, within the state or its jurisdiction as specified in s. 281.01 (18), Stats.

History: Cr. Register, February, 1989, No. 398, eff. 3−1−89; **correction made under s. 13.93 (2m) (b) 7., Stats., Register, December, 2000, No. 540.**

NR 107.03 Definitions. (1) "Applicator" means the person physically applying the chemicals to the treatment site.

(2) "Chemical fact sheet" means a summary of information on a specific chemical written by the department including general aquatic community and human safety considerations applicable to Wisconsin sites.

(3) "Department" means the department of natural resources.

History: Cr. Register, February, 1989, No. 398, eff. 3−1−89.

NR 107.04 Application for permit. (1) Permit applications shall be made on forms provided by the department and shall be submitted to the district director for the district in which the project is located. Any amendment or revision to an application shall be treated by the department as a new application, except as provided in s. NR 107.04 (3) (g).

Note: The DNR district headquarters are located at:
1. Southern — 3911 Fish Hatchery Road, Fitchburg 53711
2. Southeast — 2300 N. Dr. Martin Luther King Jr. Dr., Box 12436, Milwaukee 53212
3. Lake Michigan — 1125 N. Military Ave., Box 10448, Green Bay 54307
4. North Central — 107 Sutliff Ave., Box 818, Rhinelander 54501
5. Western — 1300 W. Clairemont Ave., Call Box 4001, Eau Claire 54702
6. Northwest — Hwy 70 West, Box 309, Spooner 54801

(2) The application shall be accompanied by:

(a) A nonrefundable permit application fee of $20, and, for proposed treatments larger than 0.25 acres, an additional refundable acreage fee of $25.00 per acre, rounded up to the nearest whole acre, applied to a maximum of 50.0 acres.

1. The acreage fee shall be refunded in whole if the entire permit is denied or if no treatment occurs on any part of the permitted treatment area. Refunds will not be prorated for partial treatments.

2. If the permit is issued with the proposed treatment area partially denied, a refund of acreage fees shall be given for the area denied.

(b) A legal description of the body of water proposed for treatment including township, range and section number;

(c) One copy of a detailed map or sketch of the body of water with the proposed treatment area dimensions clearly shown and with pertinent information necessary to locate those properties, by name of owner, riparian to the treatment area, which may include street address, local telephone number, block, lot and fire number where available. If a local address is not available, the home address and phone number of the property owner may be included;

(d) A description of the uses being impaired by plants or aquatic organisms and reason for treatment;

(e) A description of the plant community or other aquatic organisms causing the use impairment;

(f) The product names of chemicals proposed for use and the method of application;

(g) The name of the person or commercial applicator, and applicator certification number, when required by s. NR 107.08 (5), of the person conducting the treatment;

(h) A comparison of alternative control methods and their feasibility for use on the proposed treatment site.

(3) In addition to the information required under sub. (2), when the proposed treatment is a large−scale treatment exceeding 10.0 acres in size or 10% of the area of the water body that is 10 feet or less in depth, the application shall be accompanied by:

(a) A map showing the size and boundaries of the water body and its watershed.

(b) A map and list identifying known or suspected land use practices contributing to plant−related water quality problems in the watershed.

(c) A summary of conditions contributing to undesirable plant growth on the water body.

(d) A general description of the fish and wildlife uses occurring within the proposed treatment site.

(e) A summary of recreational uses of the proposed treatment site.

(f) Evidence that a public notice of the proposed application has been made, and that a public informational meeting, if required, has been conducted.

1. Notice shall be given in 2 inch x 4 inch advertising format in the newspaper which has the largest circulation in the area affected by the application.

2. The notice shall state the size of the proposed treatment, the approximate treatment dates, and that the public may request within 5 days of the notice that the applicant hold a public informational meeting on the proposed application.

a. The applicant will conduct a public informational meeting in a location near the water body when a combination of 5 or more individuals, organizations, special units of government, or local units of government request the meeting in writing to the applicant

with a copy to the department within 5 days after the notice is made. The person or entity requesting the meeting shall state a specific agenda of topics including problems and alternatives to be discussed.

b. The meeting shall be given a minimum of one week advance notice, both in writing to the requestors, and advertised in the format of subd. 1.

(g) The provisions of pars. (a) to (e) shall be repeated once every 5 years and shall include new information. Annual modifications of the proposed treatment within the 5−year period which do not expand the treatment area more than 10% and cover a similar location and target organisms may be accepted as an amendment to the original application. The acreage fee submitted under sub. (2) (a) shall be adjusted in accordance with any proposed amendments.

(4) The applicant shall certify to the department that a copy of the application has been provided to any affected property owners' association, inland lake district, and, in the case of chemical applications for rooted aquatic plants, to any riparian property owners adjacent to and within the treatment area.

(5) A notice of the proposed treatment shall be provided by the department to any person or organization indicating annually in writing a desire to receive such notification.

History: Cr. Register, February, 1989, No. 398, eff. 3−1−89.

NR 107.05 Issuance of permit. (1) The department shall issue or deny issuance of the requested permit between 10 and 15 working days after receipt of an acceptable application, unless:

(a) An environmental impact report or statement is required under s. 1.11, Stats. Notification to the applicant shall be in writing within 10 working days of receipt of the application and no action may be taken until the report or statement has been completed; or

(b) A public hearing has been granted under s. 227.42, Stats.

(2) If a request for a public hearing is received after the permit is issued but prior to the actual treatment allowed by the permit, the department is not required to, but may, suspend the permit because of the request for public hearing.

(3) The department may deny issuance of the requested permit if:

(a) The proposed chemical is not labeled and registered for the intended use by the United States environmental protection agency and both labeled and registered by a firm licensed as a pesticide manufacturer and labeler with the Wisconsin department of agriculture, trade and consumer protection;

(b) The proposed chemical does not have a current department aquatic chemical fact sheet;

(c) The department determines the proposed treatment will not provide nuisance relief, or will place unreasonable restrictions on existing water uses;

(d) The department determines the proposed treatment will result in a hazard to humans, animals or other nontarget organisms;

(e) The department determines the proposed treatment will result in a significant adverse effect on the body of water;

(f) The proposed chemical application is for waters beyond 150 feet from shore except where approval is given by the department to maintain navigation channels, piers or other facilities used by organizations or the public including commercial facilities;

(g) The proposed chemical applications, other than those conducted by the department pursuant to ss. 29.421 and 29.424, Stats., will significantly injure fish, fish eggs, fish larvae, essential fish food organisms or wildlife, either directly or through habitat destruction;

(h) The proposed chemical application is in a location known to have endangered or threatened species as specified pursuant to s. 29.604, Stats., and as determined by the department;

(i) The proposed chemical application is in locations identified by the department as sensitive areas, except when the applicant demonstrates to the satisfaction of the department that treatments can be conducted in a manner that will not alter the ecological character or reduce the ecological value of the area.

1. Sensitive areas are areas of aquatic vegetation identified by the department as offering critical or unique fish and wildlife habitat, including seasonal or lifestage requirements, or offering water quality or erosion control benefits to the body of water.

2. The department shall notify any affected property owners' association, inland lake district, and riparian property owner of locations identified as sensitive areas.

(4) New applications will be reviewed with consideration given to the cumulative effect of applications already approved for the body of water.

(5) The department may approve the application in whole or in part consistent with the provisions of subs. (3) (a) through (i) and (4). Denials shall be in writing stating reasons for the denial.

(6) Permits may be issued for one treatment season only.

History: Cr. Register, February, 1989, No. 398, eff. 3−1−89; **corrections in (3) (g) and (h) made under s. 13.93 (2m) (b) 7., Stats., Register, December, 2000, No. 540.**

NR 107.06 Chemical fact sheets. (1) The department shall develop a chemical fact sheet for each of the chemicals in present use for aquatic nuisance control in Wisconsin.

(1m) Chemical fact sheets for chemicals not previously used in Wisconsin shall be developed within 180 days after the department has received notice of intended use of the chemical.

(2) The applicant or permit holder shall provide copies of the applicable chemical fact sheets to any affected property owners' association and inland lake district.

(3) The department shall make chemical fact sheets available upon request.

History: Cr. Register, February, 1989, No. 398, eff. 3−1−89.

NR 107.07 Supervision. (1) The permit holder shall notify the district office 4 working days in advance of each anticipated treatment with the date, time, location, and proposed size of treatment. At the discretion of the department, the advance notification requirement may be waived.

(2) Supervision by a department representative may be required for any aquatic nuisance control project involving chemicals. Supervision may include inspection of the proposed treatment area, chemicals, and application equipment before, during or after treatment. The inspection may result in the determination that treatment is unnecessary or unwarranted in all or part of the proposed area, or that the equipment will not control the proper dosage.

History: Cr. Register, February, 1989, No. 398, eff. 3−1−89.

NR 107.08 Conditions of the permit. (1) The department may stop or limit the application of chemicals to a body of water if at any time it determines that chemical treatment will be ineffective, or will result in unreasonable restrictions on current water uses, or will produce unnecessary adverse side effects on nontarget organisms. Upon request, the department shall state the reason for such action in writing to the applicant.

(2) Chemical treatments shall be performed in accordance with label directions, existing pesticide use laws, and permit conditions.

(3) Chemical applications on lakes and impoundments are limited to waters along developed shoreline including public parks except where approval is given by the department for projects of public benefit.

(4) Treatment of areas containing high value species of aquatic plants shall be done in a manner which will not result in adverse long−term or permanent changes to a plant community in a specific aquatic ecosystem. High value species are individual species of aquatic plants known to offer important values in spe-

cific aquatic ecosystems, including *Potamogeton amplifolius, Potamogeton Richardsonii, Potamogeton praelongus, Potamogeton pectinatus, Potamogeton illinoensis, Potamogeton robbinsii, Eleocharis spp., Scirpus spp., Valisneria spp., Zizania aquatica, Zannichellia palustris* and *Brasenia schreberi.*

(5) Treatment shall be performed by an applicator currently certified by the Wisconsin department of agriculture, trade and consumer protection in the aquatic nuisance control category whenever:

(a) Treatment is to be performed for compensation by an applicator acting as an independent contractor for hire;

(b) The area to be treated is greater than 0.25 acres;

(c) The product to be used is classified as a "restricted use pesticide"; or

(d) Liquid chemicals are to be used.

(6) Power equipment used to apply liquid chemicals shall include the following:

(a) Containers used to mix and hold chemicals shall be constructed of watertight materials and be of sufficient size and strength to safely contain the chemical. Measuring containers and scales for the purpose of measuring solids and liquids shall be provided by the applicator;

(b) Suction hose used to deliver the chemical to the pump venturi assembly shall be fitted with an on−off ball−type valve. The system shall also be designed to prevent clogging from chemicals and aquatic vegetation;

(c) Suction hose used to deliver surface water to the pump shall be fitted with a check valve to prevent back siphoning into the surface water should the pump stop;

(d) Suction hose used to deliver a premixed solution shall be fitted with an on−off ball−type valve to regulate the discharge rate;

(e) Pressure hose used to discharge chemicals to the surface water shall be provided with an on−off ball−type valve. This valve will be fitted at the base of the hose nozzle or as part of the nozzle assembly;

(f) All pressure and suction hoses and mechanical fittings shall be watertight;

(g) Equipment shall be calibrated by the applicator. Evidence of calibration shall be provided at the request of the department supervisor.

(h) Other equipment designs may be acceptable if capable of equivalent performance.

(7) The permit holder shall be responsible for posting those areas of use in accordance with water use restrictions stated on the chemical label, but in all cases for a minimum of one day, and with the following conditions:

(a) Posting signs shall be brilliant yellow and conspicuous to the nonriparian public intending to use the treated water from both the water and shore, and shall state applicable label water use restrictions of the chemical being used, the name of the chemical and date of treatment. For tank mixes, the label requirements of the most restrictive chemical will be posted;

(b) Minimum sign dimensions used for posting shall be 11 inches by 11 inches or consistent with s. ATCP 29.15. The department will provide up to 6 signs to meet posting requirements. Additional signs may be purchased from the department;

(c) Signs shall be posted at the beginning of each treatment by the permit holder or representing agent. Posting prior to treatment may be required as a permit condition when the department determines that such posting is in the best interest of the public;

(d) Posting signs shall be placed along contiguous treated shoreline and at strategic locations to adequately inform the public. Posting of untreated shoreline located adjacent to treated shoreline and noncontiguous shoreline shall be at the discretion of the department;

(e) Posting signs shall be made of durable material to remain up and legible for the time period stated on the pesticide label for water use restrictions, after which the permit holder or representing agent is responsible for sign removal.

(8) After conducting a treatment, the permit holder shall complete and submit within 30 days an aquatic nuisance control report on a form supplied by the department. Required information will include the quantity and type of chemical, and the specific size and location of each treatment area. In the event of any unusual circumstances associated with a treatment, or at the request of the department, the report shall be provided immediately. If treatment did not occur, the form shall be submitted with appropriate comment by October 1.

(9) Failure to comply with the conditions of the permit may result in cancellation of the permit and loss of permit privileges for the subsequent treatment season. A notice of cancellation or loss of permit privileges shall be provided by the department to the permit holder accompanied by a statement of appeal rights.

History: Cr. Register, February, 1989, No. 398, eff. 3−1−89**;** correction in (7) (b) made under s. 13.93 (2m) (b) 7., Stats., Register, September, 1995, No. 477.

NR 107.09 Special limitation. Due to the significant risk of environmental damage from copper accumulation in sediments, swimmer's itch treatments performed with copper sulfate products at a rate greater than 10 pounds of copper sulfate per acre are prohibited.

History: Cr. Register, February, 1989, No. 398, eff. 3−1−89.

NR 107.10 Field evaluation use permits. When a chemical product is considered for aquatic nuisance control and does not have a federal label for such use, the applicant shall apply to the administrator of the United States environmental protection agency for an experimental use permit under section 5 of the federal insecticide, fungicide and rodenticide act as amended (7 USC 136 et seq.). Upon receiving a permit, the permit holder shall obtain a field evaluation use permit from the department and be subject to the requirements of this chapter. Department field evaluation use permits shall be issued for the purpose of evaluating product effectiveness and safety under field conditions and will require in addition to the conditions of the permit specified in s. NR 107.08 (1) through (9), the following:

(1) Treatment shall be limited to an area specified by the department.

(2) The permit holder shall submit to the department a summary of treatment results at the end of the treatment season. The summary shall include:

(a) Total chemical used and distribution pattern, including chemical trade name, formulation, percent active ingredient, and dosage rate in the treated water in parts per million of active ingredient;

(b) Description of treatment areas including the character and the extent of the nuisance present;

(c) Effectiveness of the application and when applicable, a summary comparison of the results obtained from past experiments using the same chemical formulation;

(d) Other pertinent information required by the department; and

(e) Conclusions and recommendations for future use.

History: Cr. Register, February, 1989, No. 398, eff. 3−1−89.

NR 107.11 Exemptions. (1) Under any of the following conditions, the permit application fee in s. NR 107.04 (2) (a) will be limited to the basic application fee:

(a) The treatment is made for the control of bacteria on swimming beaches with chlorine or chlorinated lime;

(b) The treatment is intended to control algae or other aquatic nuisances that interfere with the use of the water for potable purposes;

(c) The treatment is necessary for the protection of public health, such as the control of disease carrying organisms in sanitary sewers, storm sewers, or marshes, and the treatment is sponsored by a governmental agency.

(2) The treatment of purple loosestrife is exempt from ss. NR 107.04 (2) (a) and (3), and 107.08 (5).

(3) The use of chemicals in private ponds is exempt from the provisions of this chapter except for ss. NR 107.04 (1), (2), (4) and (5), 107.05, 107.07, 107.08 (1), (2), (8) and (9), and 107.10.

(a) A private pond is a body of water located entirely on the land of an applicant, with no surface water discharge or a discharge that can be controlled to prevent chemical loss, and without access by the public.

(b) The permit application fee will be limited to the non−refundable $20 application fee.

(4) The use of chemicals in accordance with label instructions is exempt from the provisions of this chapter, when used in:

(a) Water tanks used for potable water supplies;

(b) Swimming pools;

(c) Treatment of public or private wells;

(d) Private fish hatcheries licensed under s. 95.60, Stats.;

(e) Treatment of emergent vegetation in drainage ditches or rights−of−way where the department determines that fish and wildlife resources are insignificant; or

(f) Waste treatment facilities which have received s. 281.41, Stats., plan approval or are utilized to meet effluent limitations set forth in permits issued under s. 283.31, Stats.

History: Cr. Register, February, 1989, No. 398, eff. 3−1−89; **corrections in (4) (d) and (f) made under s. 13.93 (2m) (b) 7., Stats., Register, December, 2000, No. 540.**

Appendix I: NR 109 Aquatic Plants Introduction, Manual Removal, and Mechanical Control Regulations

Chapter NR 109

AQUATIC PLANTS: INTRODUCTION, MANUAL REMOVAL AND MECHANICAL CONTROL REGULATIONS

NR 109.01 Purpose. The purpose of this chapter is to establish procedures and requirements for the protection and regulation of aquatic plants pursuant to ss. 23.24 and 30.07, Stats. Diverse and stable communities of native aquatic plants are recognized to be a vital and necessary component of a healthy aquatic ecosystem. This chapter establishes procedures and requirements for issuing aquatic plant management permits for introduction of aquatic plants or control of aquatic plants by manual removal, burning, use of mechanical means or plant inhibitors. This chapter identifies other permits issued by the department for aquatic plant management that contain the appropriate conditions as required under this chapter for aquatic plant management, and for which no separate permit is required under this chapter. Introduction and control of aquatic plants shall be allowed in a manner consistent with sound ecosystem management, shall consider cumulative impacts, and shall minimize the loss of ecological values in the body of water. The purpose of this chapter is also to prevent the spread of invasive and non–native aquatic organisms by prohibiting the launching of watercraft or equipment that has any aquatic plants or zebra mussels attached.

History: CR 02–061: cr. Register May 2003 No. 569, eff. 6–1–03; **correction made under s. 13.92 (4) (b) 7., Stats., Register March 2011 No. 663.**

NR 109.02 Applicability. A person sponsoring or conducting manual removal, burning or using mechanical means or aquatic plant inhibitors to control aquatic plants in navigable waters, or introducing non–native aquatic plants to waters of this state shall obtain an aquatic plant management permit from the department under this chapter.

History: CR 02–061: cr. Register May 2003 No. 569, eff. 6–1–03.

NR 109.03 Definitions. In this chapter:

(1) "Aquatic community" means lake or river biological resources.

(2) "Beneficial water use activities" mean angling, boating, swimming or other navigational or recreational water use activity.

(3) "Body of water" means any lake, river or wetland that is a water of this state.

(4) "Complete application" means a completed and signed application form, the information specified in s. NR 109.04 and any other information which may reasonably be required from an applicant and which the department needs to make a decision under applicable provisions of law.

(5) "Department" means the Wisconsin department of natural resources.

(6) "Manual removal" means the control of aquatic plants by hand or hand–held devices without the use or aid of external or auxiliary power.

(7) "Navigable waters" means those waters defined as navigable under s. 30.10, Stats.

(8) "Permit" means aquatic plant management permit.

(9) "Plan" means aquatic plant management plan.

(10) "Wetlands" means an area where water is at, near or above the land surface long enough to be capable of supporting aquatic or hydrophytic vegetation and which has soils indicative of wet conditions.

History: CR 02–061: cr. Register May 2003 No. 569, eff. 6–1–03.

NR 109.04 Application requirements and fees. **(1)** Permit applications shall be made on forms provided by the department and shall be submitted to the regional director or designee for the region in which the project is located. Permit applications for licensed aquatic nursery growers may be submitted to the department of agriculture, trade and consumer protection.

Note: Applications may be obtained from the department's regional headquarters or service centers. DATCP has agreed to send application forms and instructions provided by the department to aquatic nursery growers along with license renewal forms. DATCP will forward all applications to the department for processing.

(2) The application shall be accompanied by all of the following unless the application is made by licensed aquatic nursery growers for selective harvesting of aquatic plants for nursery stock. Applications made by licensed aquatic nursery growers for harvest of nursery stock do not have to include the information required by par. (d), (e), (h), (i) or (j).

(a) A nonrefundable application fee. The application fee for an aquatic plant management permit is:

1. $30 for a proposed project to manage aquatic plants on less than one acre.

2. $30 per acre to a maximum of $300 for a proposed project to manage aquatic plants on one acre or larger. Partial acres shall be rounded up to the next full acre for fee determination. An annual renewal of this permit may be requested with an additional application fee of one–half the original application fee, but not less than $30.

(b) A legal description of the body of water including township, range and section number.

(c) One copy of a detailed map of the body of water with the proposed introduction or control area dimensions clearly shown. Private individuals doing plant introduction or control shall provide the name of the owner riparian to the management area, which includes the street address or block, lot and fire number where available and local telephone number or other pertinent information necessary to locate the property.

(d) One copy of any existing aquatic management plan for the body of water, or detailed reference to the plan, citing the plan references to the proposed introduction or control area, and a description of how the proposed introduction or control of aquatic plants is compatible with any existing plan.

(e) A description of the impairments to water use caused by the aquatic plants to be managed.

(f) A description of the aquatic plants to be controlled or removed.

(g) The type of equipment and methods to be used for introduction, control or removal.

(h) A description of other introduction or control methods considered and the justification for the method selected.

(i) A description of any other method being used or intended for use for plant management by the applicant or on the area abutting the proposed management area.

(j) The area used for removal, reuse or disposal of aquatic plants.

(k) The name of any person or commercial provider of control or removal services.

(3) (a) The department may require that an application for an aquatic plant management permit contain an aquatic plant management plan that describes how the aquatic plants will be introduced, controlled, removed or disposed. Requirements for an aquatic plant management plan shall be made in writing stating the reason for the plan requirement. In deciding whether to require a plan, the department shall consider the potential for effects on protection and development of diverse and stable communities of native aquatic plants, for conflict with goals of other written ecological or lake management plans, for cumulative impacts and effect on the ecological values in the body of water, and the long–term sustainability of beneficial water use activities.

(b) Within 30 days of receipt of the plan, the department shall notify the applicant of any additional information or modifications to the plan that are required. If the applicant does not submit the additional information or modify the plan as requested by the department, the department may dismiss the aquatic plant management permit application.

(c) The department shall approve the aquatic plant management plan before an application may be considered complete.

(4) The permit sponsor may request an annual renewal in writing from the department under s. NR 109.05 if there is no change proposed in the conditions of the original permit issued.

History: CR 02–061: cr. Register May 2003 No. 569, eff. 6–1–03.

NR 109.05 Permit issuance. (1) The department shall issue or deny issuance of the requested permit within 15 working days after receipt of a completed application and approved plan as required under s. NR 109.04 (3).

(2) The department may specify any of the following as conditions of the permit:

(a) The quantity of aquatic plants that may be introduced or controlled.

(b) The species of aquatic plants that may be introduced or controlled.

(c) The areas in which aquatic plants may be introduced or controlled.

(d) The methods that may be used to introduce or control aquatic plants.

(e) The times during which aquatic plants may be introduced or controlled.

(f) The allowable methods used for disposing of or using aquatic plants that are removed or controlled.

(g) Annual or other reporting requirements to the department that may include information related to pars. (a) to (f).

(3) The department may deny issuance of the requested permit if the department determines any of the following:

(a) Aquatic plants are not causing significant impairment of beneficial water use activities.

(b) The proposed introduction or control will not remedy the water use impairments caused by aquatic plants as identified as a part of the application in s. NR 109.04 (2) (e).

(c) The proposed introduction or control will result in a hazard to humans.

(d) The proposed introduction or control will cause significant adverse impacts to threatened or endangered resources.

(e) The proposed introduction or control will result in a significant adverse effect on water quality, aquatic habitat or the aquatic community including the native aquatic plant community.

(f) The proposed introduction or control is in locations identified by the department as sensitive areas, under s. NR 107.05 (3) (i) 1., except when the applicant demonstrates to the satisfaction of the department that the project can be conducted in a manner that will not alter the ecological character or reduce the ecological value of the area.

(g) The proposed management will result in significant adverse long–term or permanent changes to a plant community or a high value species in a specific aquatic ecosystem. High value species are individual species of aquatic plants known to offer important values in specific aquatic ecosystems, including Potamogeton amplifolius, Potamogeton Richardsonii, Potamogeton praelongus, Stuckenia pectinata (Potamogeton pectinatus), Potamogeton illinoensis, Potamogeton robbinsii, Eleocharis spp., Scirpus spp., Valisneria spp., Zizania spp., Zannichellia palustris and Brasenia schreberi.

(h) If wild rice is involved, the stipulations incorporated by *Lac Courte Oreilles v. Wisconsin*, 775 F. Supp. 321 (W.D. Wis. 1991) shall be complied with.

(i) The proposed introduction or control will interfere with the rights of riparian owners.

(j) The proposed management is inconsistent with a department approved aquatic plant management plan for the body of water.

(4) The department may approve the application in whole or in part consistent with the provisions of sub. (3). A denial shall be in writing stating the reasons for the denial.

(5) (a) The department may issue an aquatic plant management permit on less than one acre in a single riparian area for a 3–year term.

(b) The department may issue an aquatic plant management permit for a one–year term for more than one acre or more than one riparian area. The permit may be renewed annually for up to a total of 3 years in succession at the written request of the permit holder, provided no modifications or changes are made from the original permit.

(c) The department may issue an aquatic plant management permit containing a department–approved plan for a 3 to 5 year term.

(d) The department may issue an aquatic plant management permit to a licensed nursery grower for a 3–year term for the harvesting of aquatic plants from a publicly owned lake bed or for a 5–year term for harvesting of aquatic plants from privately owned beds with the permission of the property owner.

(6) The approval of an aquatic plant management permit does not represent an endorsement of the permitted activity, but represents that the applicant has complied with all criteria of this chapter.

History: CR 02–061: cr. Register May 2003 No. 569, eff. 6–1–03; reprinted to restore dropped language from rule order, Register October 2003 No. 574.

NR 109.06 Waivers. The department waives the permit requirements under this chapter for any of the following:

(1) Manual removal or use of mechanical devices to control or remove aquatic plants from a body of water 10 acres or less that is entirely confined on the property of one person with the permission of that property owner.

Note: A person who introduces native aquatic plants or removes aquatic plants by manual or mechanical means in the course of operating an aquatic nursery as authorized under s. 94.10, Stats., on privately owned non–navigable waters of the state is not required to obtain a permit for the activities.

(2) A riparian owner who manually removes aquatic plants from a body of water or uses mechanical devices designed for cutting or mowing vegetation to control plants on an exposed lake bed that abuts the owner's property provided that the removal meets all of the following:

(a) 1. Removal of native plants is limited to a single area with a maximum width of no more than 30 feet measured along the shoreline provided that any piers, boatlifts, swimrafts and other recreational and water use devices are located within that 30–foot wide zone and may not be in a new area or additional to an area where plants are controlled by another method; or

2. Removal of nonnative or invasive aquatic plants as designated under s. NR 109.07 when performed in a manner that does not harm the native aquatic plant community; or

3. Removal of dislodged aquatic plants that drift on–shore and accumulate along the waterfront.

(b) Is not located in a sensitive area as defined by the department under s. NR 107.05 (3) (i) 1., or in an area known to contain threatened or endangered resources or floating bogs.

(c) Does not interfere with the rights of other riparian owners.

(d) If wild rice is involved, the procedures of s. NR 19.09 (1) shall be followed.

(4) Control of purple loosestrife by manual removal or use of mechanical devices when performed in a manner that does not harm the native aquatic plant community or result in or encourage re–growth of purple loosestrife or other nonnative vegetation.

(5) Any aquatic plant management activity that is conducted by the department and is consistent with the purposes of this chapter.

(6) Manual removal and collection of native aquatic plants for lake study or scientific research when performed in a manner that does not harm the native aquatic plant community.

Note: Scientific collectors permit requirements are still applicable.

(7) Incidental cutting, removal or destroying of aquatic plants when engaged in beneficial water use activities.

History: CR 02–061: cr. Register May 2003 No. 569, eff. 6–1–03.

NR 109.07 Invasive and nonnative aquatic plants. (1) The department may designate any aquatic plant as an invasive aquatic plant for a water body or a group of water bodies if it has the ability to cause significant adverse change to desirable aquatic habitat, to significantly displace desirable aquatic vegetation, or to reduce the yield of products produced by aquaculture.

(2) The following aquatic plants are designated as invasive aquatic plants statewide: Eurasian water milfoil, curly leaf pondweed and purple loosestrife.

(3) Native and nonnative aquatic plants of Wisconsin shall be determined by using scientifically valid publications and findings by the department.

History: CR 02–061: cr. Register May 2003 No. 569, eff. 6–1–03.

NR 109.08 Prohibitions. (1) No person may distribute an invasive aquatic plant, under s. NR 109.07.

(2) No person may intentionally introduce Eurasian water milfoil, curly leaf pondweed or purple loosestrife into waters of this state without the permission of the department.

(3) No person may intentionally cut aquatic plants in public/navigable waters without removing cut vegetation from the body of water.

(4) (a) No person may place equipment used in aquatic plant management in a navigable water if the person has reason to believe that the equipment has any aquatic plants or zebra mussels attached.

(b) This subsection does not apply to equipment used in aquatic plant management when re–launched on the same body of water without having visited different waters, provided the re–launching will not introduce or encourage the spread of existing aquatic species within that body of water.

History: CR 02–061: cr. Register May 2003 No. 569, eff. 6–1–03.

NR 109.09 Plan specifications and approval. (1) Applicants required to submit an aquatic plant management plan, under s. NR 109.04 (3), shall develop and submit the plan in a format specified by the department.

(2) The plan shall present and discuss each of the following items:

(a) The goals and objectives of the aquatic plant management and protection activities.

(b) A physical, chemical and biological description of the waterbody.

(c) The intensity of water use.

(d) The location of aquatic plant management activities.

(e) An evaluation of chemical, mechanical, biological and physical aquatic plant control methods.

(f) Recommendations for an integrated aquatic plant management strategy utilizing some or all of the methods evaluated in par. (e).

(g) An education and information strategy.

(h) A strategy for evaluating the efficacy and environmental impacts of the aquatic plant management activities.

(i) The involvement of local units of government and any lake organizations in the development of the plan.

(3) The approval of an aquatic plant management plan does not represent an endorsement for plant management, but represents that adequate considerations in planning the actions have been made.

History: CR 02–061: cr. Register May 2003 No. 569, eff. 6–1–03.

NR 109.10 Other permits. Permits issued under s. 30.12, 30.20, 31.02 or 281.36, Stats., or under ch. NR 107 may contain provisions which provide for aquatic plant management. If a permit issued under one of these authorities contains the appropriate conditions as required under this chapter for aquatic plant management, a separate permit is not required under this chapter. The permit shall explicitly state that it is intended to comply with the substantive requirements of this chapter.

History: CR 02–061: cr. Register May 2003 No. 569, eff. 6–1–03.

NR 109.11 Enforcement. (1) Violations of this chapter may be prosecuted by the department under chs. 23, 30 and 31, Stats.

(2) Failure to comply with the conditions of a permit issued under or in accordance with this chapter may result in cancellation of the permit and loss of permit privileges for the subsequent year. Notice of cancellation or loss of permit privileges shall be provided by the department to the permit holder.

History: CR 02–061: cr. Register May 2003 No. 569, eff. 6–1–03.

Appendix J: Management Options for Aquatic Plants

Management Options for Aquatic Plants

Updated Oct 2006

Option	Permit Needed?	How it Works	PROS	CONS
No management	N	Do not actively manage plants	Minimizing disturbance can protect native species that provide habitat for aquatic fauna, reduce shoreline erosion, may improve water clarity, and may limit spread of invasive species	May allow small population of invasive plants to become larger, more difficult to control later
			No financial cost	Excessive plant growth can hamper navigation and recreational lake use
			No system disturbance	May require modification of lake users' behavior and perception
			No unintended effects of chemicals	
			Permit not required	
Mechanical Control	May be required under NR 109	Plants reduced by mechanical means	Flexible control	Must be repeated, often more than once per season
		Wide range of techniques, from manual to highly mechanized	Can balance habitat and recreational needs	Can suspend sediments and increase turbidity and nutrient release
a. Handpulling/Manual raking	Y/N	SCUBA divers or snorkelers remove plants by hand or plants are removed with a rake	Little to no damage done to lake or to native plant species	Very labor intensive
		Works best in soft sediments	Can be highly selective	Needs to be carefully monitored
			Can be done by shoreline property owners without permits within an area <30 ft wide OR where selectively removing exotics	Roots, runners, and even fragments of some species, particularly Eurasian watermilfoil (EWM) will start new plants, so all of plant must be removed
			Can be very effective at removing problem plants, particularly following early detection of an invasive exotic species	Small-scale control only

Management Options for Aquatic Plants

Updated Oct 2006

Option	Permit Needed?	How it Works	PROS	CONS
b. Harvesting	Y	Plants are "mowed" at depths of 2-5 ft, collected with a conveyor and off-loaded onto shore	Immediate results	Not selective in species removed
		Harvest invasives only if invasive is already present throughout the lake	EWM removed before it has the opportunity to autofragment, which may create more fragments than created by harvesting	Fragments of vegetation can re-root
			Usually minimal impact to lake ecology	Can remove some small fish and reptiles from lake
			Harvested lanes through dense weed beds can increase growth and survival of some fish	Initial cost of harvester expensive
			Can remove some nutrients from lake	
Biological Control	Y	Living organisms (e.g. insects or fungi) eat or infect plants	Self-sustaining; organism will over-winter, resume eating its host the next year	Effectiveness will vary as control agent's population fluctates
			Lowers density of problem plant to allow growth of natives	Provides moderate control - complete control unlikely
				Control response may be slow
				Must have enough control agent to be effective
a. Weevils on EWM	Y	Native weevil prefers EWM to other native water-milfoil	Native to Wisconsin: weevil cannot "escape" and become a problem	Need to stock large numbers, even if some already present
			Selective control of target species	Need good habitat for overwintering on shore (leaf litter) associated with undeveloped shorelines
			Longer-term control with limited management	Bluegill populations decrease densities through predation

Management Options for Aquatic Plants

Updated Oct 2006

	Option	Permit Needed?	How it Works	PROS	CONS
b.	Pathogens	Y	Fungal, bacterial, or viral pathogen introduced to target species to induce mortalitiy	May be species specific May provide long-term control Few dangers to humans or animals	Largely experimental; effectiveness and longevity unknown Possible side effects not understood
c.	Allelopathy	Y	Aquatic plants release chemical compounds that inhibit other plants from growing	May provide long-term, maintenance-free control Spikerushes (*Eleocharis* spp.) appear to inhibit Eurasian watermilfoil growth	Initial transplanting slow and labor-intensive Spikerushes native to WI, and have not effectively limited EWM growth Wave action along shore makes it difficult to establish plants; plants will not grow in deep or turbid water
d.	Native plantings	Y	Diverse native plant community established to compete with invasive species	Native plants provide food and habitat for aquatic fauna Diverse native community more repellant to invasive species	Initial transplanting slow and labor-intensive Nuisance invasive plants may outcompete plantings Transplants from another lake or nursery may unintentionally introduce invasive species Largely experimental; few well-documented cases

Management Options for Aquatic Plants

Updated Oct 2006

Option	Permit Needed?	How it Works	PROS	CONS
Physical Control	Required under Ch. 30 / NR 107	Plants are reduced by altering variables that affect growth, such as water depth or light levels		
a. Fabrics/ Bottom Barriers	Y	Prevents light from getting to lake bottom	Reduces turbidity in soft-substrate areas	Eliminates all plants, including native plants important for a healthy lake ecosystem
			Useful for small areas	May inhibit spawning by some fish
				Need maintenance or will become covered in sediment and ineffective
				Gas accumulation under blankets can cause them to dislodge from the bottom
				Affects benthic invertebrates
				Anaerobic environment forms that can release excessive nutrients from sediment
b. Drawdown	Y, May require Environmental Assessment	Lake water lowered with siphon or water level control device; plants killed when sediment dries, compacts or freezes	Winter drawdown can be effective at restoration, provided drying and freezing occur. Sediment compaction is possible over winter	Plants with large seed bank or propagules that survive drawdown may become more abundant upon refilling
		Season or duration of drawdown can change effects	Summer drawdown can restore large portions of shoreline and shallow areas as well as provide sediment compaction	May impact attached wetlands and shallow wells near shore
			Emergent plant species often rebound near shore providing fish and wildlife habitat, sediment stabilization, and increased water quality	Species growing in deep water (e.g. EWM) that survive may increase, particularly if desirable native species are reduced
			Success demonstrated for reducing EWM, variable success for curly-leaf pondweed (CLP)	Can affect fish, particularly in shallow lakes if oxygen levels drop or if water levels are not restored before spring spawning
			Restores natural water fluctuation important for all aquatic ecosystems	Winter drawdawn must start in early fall or will kill hibernating reptiles and amphibians
				Navigation and use of lake is limited during drawdown

Management Options for Aquatic Plants

Updated Oct 2006

	Option	Permit Needed?	How it Works	PROS	CONS
c.	Dredging	Y	Plants are removed along with sediment	Increases water depth	Severe impact on lake ecosystem
			Most effective when soft sediments overlay harder substrate	Removes nutrient rich sediments	Increases turbidity and releases nutrients
			For extremely impacted systems	Removes soft bottom sediments that may have high oxygen demand	Exposed sediments may be recolonized by invasive species
			Extensive planning required		Sediment testing may be necessary
					Removes benthic organisms
					Dredged materials must be disposed of
d.	Dyes	Y	Colors water, reducing light and reducing plant and algal growth	Impairs plant growth without increasing turbidity	Appropriate for very small water bodies
				Usually non-toxic, degrades naturally over a few weeks.	Should not be used in pond or lake with outflow
					Impairs aesthetics
					Effects to microscopic organisms unknown
e.	Non-point source nutrient control	N	Runoff of nutrients from the watershed are reduced (e.g. by controlling construction erosion or reducing fertilizer use) thereby providing fewer nutrients available for plant growth	Attempts to correct source of problem, not treat symptoms	Results can take years to be evident due to internal recycling of already-present lake nutrients
				Could improve water clarity and reduce occurrences of algal blooms	Requires landowner cooperation and regulation
				Native plants may be able to better compete with invasive species in low-nutrient conditions	Improved water clarity may increase plant growth

Management Options for Aquatic Plants

Updated Oct 2006

Option	Permit Needed?	How it Works	PROS	CONS
Chemical Control	Required under NR 107	Granules or liquid chemicals kill plants or cease plant growth; some chemicals used primarily for algae	Some flexibility for different situations	Possible toxicity to aquatic animals or humans, especially applicators
		Results usually within 10 days of treatment, but repeat treatments usually needed	Some can be selective if applied correctly	Often affect desirable plant species that are important to lake ecology and compete with invasive species
		Chemicals must be used in accordance with label guidelines and restrictions	Can be used for restoration activities	Treatment set-back requirements from potable water sources and/or drinking water use restrictions after application, usually based on concentration
				May cause severe drop in dissolved oxygen causing fish kill, depends on plant biomass killed, temperatures and lake size and shape
				Often controversial
a. 2,4-D (e.g. Weedar, Navigate)	Y	Systemic[1] herbicide selective to broadleaf[2] plants that inhibits cell division in new tissue	Moderately to highly effective, especially on EWM	May cause oxygen depletion after plants die and decompose
		Applied as liquid or granules during early growth phase	Monocots, such as pondweeds (e.g. CLP) and many other native species not affected.	May affect native dicots such as water lilies and coontail
			Can be used in synergy with endotholl for early season CLP and EWM treatments	Cannot be used in combination with copper herbicides (used for algae)
			Can be selective depending on concentration and seasonal timing	Toxic to fish
			Widely used aquatic herbicide	

Management Options for Aquatic Plants

Updated Oct 2006

	Option	Permit Needed?	How it Works	PROS	CONS
b.	Endothall (e.g. Aquathol)	Y	Broad-spectrum[3], contact[4] herbicide that inhibits protein synthesis	Especially effective on CLP and also effective on EWM	Affects many native pondweeds
			Applied as liquid or granules	May be effective in reducing reestablishment of CLP if reapplied several years in a row in early spring	Not as effective in dense plant beds; heavy vegetation requires multiple treatments
				Can be selective depending on concentration and seasonal timing	Not to be used in water supplies; post-treatment restriction on irrigation
				Can be combined with 2,4-D for early season CLP and EWM treatments, or with copper compounds	Toxic to aquatic fauna (to varying degrees)
				Limited off-site drift	
c.	Diquat (e.g. Reward)	Y	Broad-spectrum, contact herbicide that disrupts cellular functioning	Mostly used for water-milfoil and duckweed	May affect non-target plants, especially native pondweeds, coontail, elodea, naiads
			Applied as liquid, can be combined with copper treatment	Rapid action	Toxic to aquatic invertebrates
				Limited direct toxicity on fish and other animals	Must be reapplied several years in a row
					Ineffective in muddy or cold water (<50°F)

Management Options for Aquatic Plants

Updated Oct 2006

	Option	Permit Needed?	How it Works	PROS	CONS
d.	Fluridone (e.g. Sonar or Avast)	Y; special permit and Environmental Assessment may be required	Broad-spectrum, systemic herbicide that inhibits photosynthesis	Effective on EWM for 1 to 4 years with aggressive follow-up treatments	Affects native milfoils, coontails, elodea, and naiads, even at low concentrations
			Must be applied during early growth stage	Some reduction in non-target effects can be achieved by lowering dosage	Requires long contact time: 60-90 days
			Available with a special permit only; chemical applications beyond 150 ft from shore not allowed under NR 107	Slow decomposition of plants may limit decreases in dissolved oxygen	Often decreases water clarity, particularly in shallow eutrophic systems
			Applied at very low concentration at whole lake scale	Low toxicity to aquatic animals	Demonstrated herbicide resistance in hydrilla subjected to repeat treatments
					Unknown effect of repeat whole-lake treatments on lake ecology
e.	Glyphosate (e.g. Rodeo)	Y	Broad-spectrum, systemic herbicide that disrupts enzyme formation and function	Effective on floating and emergent plants	RoundUp is often illegally substituted for Rodeo; surfactants in RoundUp believed to be toxic to reptiles and amphibians
			Usually used for purple loosestrife stems or cattails	Selective if carefully applied to individual plants	Cannot be used near potable water intakes
			Applied as liquid spray or painted on loosestrife stems	Non-toxic to most aquatic animals at recommended dosages	Ineffective in muddy water
				Effective control for 1-5 years	No control of submerged plants

Management Options for Aquatic Plants

Updated Oct 2006

	Option	Permit Needed?	How it Works	PROS	CONS
f.	Triclopyr (e.g. Renovate)	Y	Systemic herbicide selective to broadleaf plants that disrupts enzyme function	Effective on many emergent and floating plants	Impacts may occur to some native plants at higher doses (e.g. coontail)
			Applied as liquid spray or liquid	Most effective on dicots, such as purple loosestrife; may be more effective than glyphosate	May be toxic to sensitive invertebrates at higher concentrations
				Control of target plants occurs in 3-5 weeks	Retreatment opportunities may be limited due to maximum seasonal rate (2.5 ppm)
				Low toxicity to aquatic animals	Sensitive to UV light; sunlight can break herbicide down prematurely
				No recreational use restrictions following treatment	Relatively new management option for aquatic plants (since 2003)
g.	Copper compounds (e.g. Cutrine Plus)	Y	Broad-spectrum, systemic herbicide that prevents photosynthesis	Reduces algal growth and increases water clarity	Elemental copper accumulates and persists in sediments
			Used to control planktonic and filamentous algae	No recreational or agricultural restrictions on water use following treatment	Short-term results
			Wisconsin allows small-scale control only	Herbicidal action on hydrilla, an invasive plant not yet present in Wisconsin	Long-term effects of repeat treatments to benthic organisms unknown
					Toxic to invertebrates, trout and other fish, depending on the hardness of the water
					Clear water may increase plant growth

[1]Systemic herbicide - Must be absorbed by the plant and moved to the site of action. Often slower-acting than contact herbicides.

[2]Broadleaf herbicide - Affects only dicots, one of two groups of plants. Aquatic dicots include waterlilies, bladderworts, watermilfoils, and coontails.

[3]Broad-spectrum herbicide - Affects both monocots and dicots.

[4]Contact herbicide - Unable to move within the plant; kills only plant tissue it contacts directly.

This document is intended to be a guide to available aquatic plant control techniques, and is not necessarily an exhaustive list.
References to registered products are for your convenience and not intended as an endorsement or criticism of that product versus other similar products.
Specific effects of herbicide treatment contingent on usage within label guidelines and in accordance with all applicable laws.
Please contact your local Aquatic Plant Management Specialist when considering a permit.

Aquatic Plant Control Techniques Not Allowed in Wisconsin

Updated Oct 2006

	Option	How it Works	PROS	CONS
Biological Control				
a.	Carp	Plants eaten by stocked carp	Effective at removing aquatic plants	Illegal to transport or stock carp in Wisconsin
			Involves species already present in Madison lakes	Carp cause resuspension of sediments, increased water temperature, lower dissolved oxygen levels, and reduction of light penetration
				Widespread plant removal deteriorates habitat for other fish and aquatic organisms
				Complete alteration of fish assemblage possible
				Dislodging of plants such as EWM or CLP turions can lead to accelerated spreading of plants
b.	Crayfish	Plants eaten by stocked crayfish	Reduces macrophyte biomass	Illegal to transport or stock crayfish in Wisconsin
				Control not selective and may decimate plant community
				Not successful in productive, soft-bottom lakes with many fish predators
				Complete alteration of fish assemblage possible
Mechanical Control				
a.	Cutting (no removal)	Plants are "mowed" with underwater cutter	Creates open water areas rapidly	Root system remains for regrowth
			Works in water up to 25 ft	Fragments of vegetation can re-root and spread infestation throughout the lake
				Nutrient release can cause increased algae and bacteria and be a nuisance to riparian property owners
				Not selective in species removed
				Small-scale control only
b.	Rototilling	Sediment is tilled to uproot plant roots and stems	Decreases stem density, can affect entire plant	Creates turbidity
		Works in deep water (17 ft)	Small-scale control	Not selective in species removed
			May provide long-term control	Fragments of vegetation can re-root
				Complete elimination of fish habitat
				Releases nutrients
				Increased likelihood of invasive species recolonization
c.	Hydroraking	Mechanical rake removes plants from lake	Creates open water areas rapidly	Fragments of vegetation can re-root
		Works in deep water (14 ft)		May impact lake fauna
				Creates turbidity
				Plants regrow quickly
				Requires plant disposal

Appendix K: Meeting Agendas and Minutes

Vincent Lake Aquatic Plant Management Plan Development
Committee Meeting 1

Friday, March 22nd, 2019
2-4 PM
Polk County Government Center
100 Polk County Plaza, Balsam Lake
East Conference Room

Introductions (all)

Grant deliverables, volunteer time, and project timeline (Polk County LWRD)

Comments/feedback on the draft Vincent Lake APM document (all)
Addition: Ince wildlife pond dam repair

2018 harvesting plan as a template moving forward (all)

What do you value about Vincent Lake and what concerns/issues do you have for Vincent Lake? (all)

Plan format: Goals, objectives, actions (Polk County LWRD/all)

Schedule next meeting (all)

Adjourn

Katelin Anderson
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katelin.anderson@co.polk.wi.us

Jeremy Williamson
(715) 485-8639
jeremyw@co.polk.wi.us

Vincent Lake Aquatic Plant Management Plan Development

Committee Meeting

March 22, 2019

Katelin gave an overview of the $3,000 DNR Grant, explaining how to keep track of mileage and volunteer hours, and the timeline for the project. The grant includes an aquatic plant training which can highlight aquatic invasive species.

The committee reviewed the draft aquatic plant management plan and provided comments. Members discussed the benefits of aquatic plants including: water quality and fish habitat. Although water clarity has improved other positive aspects have been lost such as fishing in the back lake and access to the back lake. Water levels are also low compared to historic averages. There was a time when you could pontoon to the back lake and access up to three smaller lakes. In the 70's water levels were high enough that shoreline erosion was an issue. A positive result would be restoring the back lake to an open water state of 6-8 years ago. The wildlife pond was discussed, volunteer lake level readings were reviewed, and the drought index for the region was shown.

Members discussed their values and concern for the lake.

Values included: clean water, fish, navigation, wildlife (loons, eagles, otters, frog/toads), property values, swimming, recreation, scenic view, peace and quiet, lake ecosystem, safety to enjoy the lakes (kids and watershield), and fun/adventure for kids.

Concerns included: safety, navigation, oxygen levels decreasing in second lake—problem moving to the main lake, fish kills due to oxygen levels dropping, loss of water quality, loss of property values, loss of appearance of lake (weeds limiting view), weed encroachment of play areas (limited lake use as open water decreases/use conflicts occur between swimming, waterskiing, and paddleboarding), weeds at the boat landing, and invasive species.

Questions for DNR, with answers

* How long is the trial plan (experimental cutting) effective? 2019? The trial plan is still effective for 2019

* Can individuals use chemicals with a permit? Possibly, this should be detailed in the aquatic plant management plan is the committee decides they would like this as an option

* Consensus moving forward with herbicide treatment by property owners? (example: if two property owners don't want herbicide use, is that enough to rule this out as an option). This is detailed in NR 107.04 (3) 2.a. A public informational meeting is required if 5 or more individuals/entities request the meeting. This wouldn't necessarily cause the permit to be denied; however, if more information came to light it could affect the permit.

Objectives for plan: Harvesting plants as much as possible with the option to use chemicals, especially in the north end for navigation channels (including around the island). Committee will get names of contractors who use chemicals and get a consultation on cost and recommended treatment. Cost of the treatments and timeline for implementation was discussed. $300 for permit and approximately $1000 to $2000 per acre for chemicals. Would like to allow indiscriminate cutting late in the year (before Labor Day) to remove plants before they decay and release nutrients into the water column/deplete oxygen.

Committee was advised of upcoming PCALR meeting on April 17th at 6:30 and encouraged to attend.

Previous meetings with Vincent Lake members showed agreement of 95-98% in continuing with plan for weed control. Membership voted and approved moving forward with investigation of management

options. Very few people are unhappy with herbicide treatment as an option. There are approximately 47 properties currently on the lake. (Note: Katelin checked and that is the number of parcels that touch Vincent Lake with duplicates removed, number of properties with houses may be less).

Committee reviewed plans drafted by nearby lake (Bone, Big/Round/Church Pine, Blake, and Dummy Lakes). Goals they would like incorporated are:

1. To maintain recreational uses including, swimming, fishing and boating while balancing the need to preserve important native aquatic plant functions and their values

2. Prevent the introduction of Eurasian water milfoil and other invasive aquatic plants

3. Protect the natural functions of diverse native plants including, fish and waterfowl habitat, sediment stabilization, protection against invasion by non-native species and natural aesthetics

4. Educate lake residents and visitors about the role of aquatic plants in the lake, the management strategies found in the plan, and appropriate plant management actions

5. Educate on AIS (Clean Boats, Clean Water not reasonable based on limited boat traffic, but would be interested in Landing Blitz and Drain Campaign)

6. Maintain navigable routes for boating

7. Expand on dissolved oxygen and water temp monitoring

8. Monitoring lake levels

A draft document with goals, objectives, and actions will be compiled and discussed at the next planning meeting.

Homework for the group: review and provide feedback on the draft APM

Next meeting will be held in the East Conference room on April 12th at from 2-4 PM. Alex can attend the meeting but will need to leave at 3 PM.

Vincent Lake Aquatic Plant Management Plan Development Committee Meeting 2

Friday, April 12th, 2019
2-4 PM
Polk County Government Center
100 Polk County Plaza, Balsam Lake
East Conference Room

Introductions (all)

Changes to the 2018 trial harvesting plan (all)

- Widen the areas on either end of the main access channel
- Extend the main access channel to include the island
- Extend the main access channel width to 60 feet
- Extend the width where individual access channels meet the main access channel to 70 feet
- Allow indiscriminate cutting late in the year

Determine methods to conduct an annual assessment to determine the level of plant management required

Additional comments/feedback on the draft Vincent Lake APM document (all)

Schedule next meeting, if needed (all)

Discuss summer plant training date (all)

Adjourn

Katelin Anderson
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katelin.anderson@co.polk.wi.us

Vincent Lake Aquatic Plant Management Plan Development
Committee Meeting 3

Friday, May 17th, 2019
2-4 PM
Polk County Government Center
100 Polk County Plaza, Balsam Lake
East Conference Room

Introductions (all)

Review draft implementation plan (all)

Determine methods to conduct an annual assessment to determine the level of plant management required

Additional comments/feedback on the draft Vincent Lake APM document (all)

Schedule next meeting, if needed (all)

Discuss lake association meeting date and agenda (all)

Discuss summer plant training date (all)

Adjourn

Katelin Anderson
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katelin.anderson@co.polk.wi.us

Appendix L: Public Comments

Katelin Anderson

From: Vreny Middleton [redacted]
Sent: Thursday, June 20, 2019 11:16 PM
To: Katelin Anderson
Subject: Vincent lake

Hi to whom it may concern. I do not approve of poisoning our small lake with chemicals. The HOA was founded under the believe that weeds are cut and taken care of manually. I will leave this HOA if it now rules and wants to throw chemicals in the water which is not safe for humans or wild life no matter what we are told.
Vreny Middleton

Katelin Anderson

From: Greg Windschitl [redacted]
Sent: Monday, June 24, 2019 4:58 PM
To: Katelin Anderson
Subject: As a cabin owner on Vincent Lake I support the plan, it will make the lake much more usable. Greg Windschitl

Sent from my iPhone

Katelin Anderson

From: Pete/Dorrie Raye [redacted]
Sent: Monday, June 24, 2019 5:08 PM
To: Katelin Anderson
Subject: Draft Aquatic Plant Management Plan for Vincent Lake Available for Public Review and Comment

I found that the management plan was very well researched and written!
The plan is details the future of Vincent Lake and its residents. It meets present issues, is safe for recreation use and fish health.
I'm very much in support of the plan.
Pete Raye
Vincent Lake.

Katelin Anderson

From: Kurt Weiser [redacted]
Sent: Monday, June 24, 2019 6:21 PM
To: Katelin Anderson
Subject: Hello Katelin

I'm giving my input on the Vincent lake project.I believe that it is very important that we proceed with the spray program for the health of our lake in the future. As you know we have been slowly losing our water way and navigation over the past several years.We all would like to keep it as useful and clean as possible the group here on the lake has put lots of time and energy trying to keep it as clean and useful as possible using mechanical means and have found out we just can not keep up. So i am all for going forward with the spray plan as outlined in the APM plan

Thank you Kurt Weiser

Katelin Anderson

From: John Caroon [redacted]
Sent: Monday, June 24, 2019 6:51 PM
To: Katelin Anderson
Subject: Public comment on Vincent Lake APM

I wish to go on the record during this public comment period:

The property owners around Vincent lake have met several times to discuss the future of the lake. It became obvious that without an approved APM for lake, that we would have little control in maintaining the qualities of the lake that we all enjoy. If this APM is approved as is it should give our association the flexibility to preserve and enhance the qualities of the lake we enjoy. In preserving these qualities we hope to maintain our property values as well.

John Caroon
957 Vincent Lake Lane
Luck, Wi 54853

Katelin Anderson

From: Paul Kaufman [redacted]
Sent: Thursday, July 04, 2019 10:58 AM
To: Katelin Anderson
Subject: Vincent Lake

I have been a property owner since 1991. I just want to go on record as saying that I am in favor of both the management plan and spraying the north lake. Also, thank you for your expertise.

Sent from my iPhone

Katelin Anderson

From: Judi Spelhaug [redacted]
Sent: Wednesday, July 10, 2019 12:36 PM
To: Katelin Anderson
Subject: Vincent Lake

Good Morning,

I am one of the property owners and I feel that your plan is a good one to get the lake navigation channel a bit more manageable.
I have put in many hours helping cut weeds and I feel that this is the next best step in the plan to help manage the weeds.

Thank you for you time,
Judi Spelhaug

Katelin Anderson

From: Elaine Wagner [redacted]
Sent: Saturday, July 13, 2019 6:47 AM
To: Katelin Anderson
Subject: Glysophate sounds like a bad solution for our lake and the families that use it. I vote no. Is there a better solution out there?

Sent from Mail for Windows 10

Katelin Anderson

From: wally ellison [redacted]
Sent: Saturday, July 13, 2019 10:13 AM
To: [redacted]
Cc: [redacted]
Subject: Re: Vincent Lake

I still do not believe we need to use chemicals in our beautiful small pristine lake. One resident told us last year that if you cut the weeds close to the ground they won't come back next year. That's what we did and they did not come back. Im asking myself why we are doing this and it seems like clearing weeds for boat access is not a good enough reason to keep my grandkids out of the water for five years. They went swimming all weekend over the fourth and the water is so clean! Could we delay chemicals for one more year and try cutting at the lake bottom and see what happens?

Katelin Anderson

From: John Ryan[redacted]
Sent: Sunday, July 14, 2019 8:03 AM
To: Katelin Anderson
Cc: Jack & Judy Caroon; Mark Ryan; Michael Ryan
Subject: Vincent Lake

Dear Katelin,

My family has owned property on Vincent Lake since 1956. We have seen the lake survive through drought and high water. The recent invasion of water shield has had an alarming effect on the lake. The area of coverage of the lake by the weed is expanding such that access to the north section is not possible, and in light of the fact that water shield can grow in water up to ten feet in depth, and the majority of the lake is ten feet or less deep, we have concerns that without major intervention the lake will become a 70-acre swamp. As it is, the weed is projecting outward at a rapid rate and we already must perform major weed cutting just to maintain a swimming beach.

Our lake association has put together, in conjunction with the Wisconsin DNR, a workable plan to control water shield. I support the use of chemical agents, approved by the DNR, because our weed-cutting efforts have achieved little success.

John Ryan
johne_ryan@yahoo.com
(651) 698-6695 (H)
(651) 402-8697 (C)

Katelin Anderson

From: Marie Jahnke [redacted]
Sent: Sunday, July 14, 2019 8:36 PM
To: Katelin Anderson
Subject: Vincent Lake Weed Control

We are in favor of the weed spraying on Vincent Lake. The water shield has taken over the north end of the lake and is in the process of taking over the rest of the lake. We do what we can to cut the weeds in the main lake, but can not keep up with the weeds in the navigation channels in the north end without chemicals. Please approve the weed control plan.
Thank you.
Doug & Marie Jahnke

Katelin Anderson

From: [redacted]
Sent: Sunday, July 14, 2019 10:52 PM
To: Katelin Anderson
Cc: [redacted]
Subject: Vincent Lake

Hello Katelin

I'm a lake front owner at Vincent Lake. I own 3 lots, 300 feet of frontage. I haven't used my property in the past few years, but it's still an investment with significant taxes!

As much as I'd like to not cause waves, I am NOT in favor of treating Vincent Lake with glysophate.

I prefer to keep my opinion anonymous, but my vote is NO glysophate on Vincent Lake.

Also, maybe you can answer this for me. What's the actual acreage of Vincent Lake?

Thanks for your time

[redacted]

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Katelin Anderson

From: SCOTT & JUDY MONTGOMERY [redacted]
Sent: Sunday, July 14, 2019 11:14 AM
To: [redacted]
Cc: [redacted]

Subject: Re: Vincent Lake

I would like to remind the Vincent lake land owners that the information on the chemical proposed to be applied, approved by the DNR, by a certified biologist , can be found on the WI DNR web sight for anyone that would like to access it for information. Yes the chemical is a glyphosate, specifically designed for aquatic use and is approved by the state .Multiple lakes in the area have used this product. It is NOT Round-up. As the fact sheet stated, swimming is safe after 48 hrs of application in the area. As everyone knows there is a lot of misinformation found on the internet.
As a registered oncology nurse for 26 years, a property owner on Vincent lake and someone who enjoys swimming with my entire family , I would not be in favor of applying an unsafe chemical that would have negative health effects. . Lets not allow scare tactics to prevent us from taking care our beautiful lake and controlling our overwhelming weed population in the back lake.

Katelin Anderson

From: EJM [redacted]
Sent: Wednesday, July 17, 2019 2:30 PM
To: Katelin Anderson
Subject: Vincent Lake comment -try 2

Hi Katelin,

Below is my comment regarding Vincent Lake. I attached you to an email I sent out to the lake owners on Friday as I am sure you are aware. I'm sure you received the responses also, sorry.

Please respond back with a "got it" so I know you received this comment. I think you should have received at least a couple of others also..

Comment:

Hi,

The Vincent lake association was setup for us to be able to mechanically cut the weeds for navigation routes and that was agreed to be the only purpose of the association. Now, putting herbicide into the lake is a completely different situation that will affect everyone on the lake whether they want it or not. Anything being sprayed in the lake will obviously disperse into the rest of the lake and cannot be added only to the water and fish of the people who want to use it. No individual or group has the right to do this to everyone's lake and there are people on Vincent Lake who do not want glysophate being sprayed in the water as well as others who do even participate in the association. If there is one person on the lake who does not want it done, it should not be done. We do not know the long term repercussions to swimmers and eaters of fish or future affects of putting glysopahte in the lake, just as we did not know the hazards of asbestos, lead or ddt in the past. There has been a lot of swimming and fishing activity on Vincent lake this year, which is great. I hope we can err on the side of caution and leave Vincent Lake chemical free. If herbicide is used in the lake I will no longer feel comfortable eating the fish or swimming.

Thank you,
Eric Middleton