MEMORANDUM REPORT NO. 169
(2ND EDITION)

AN AQUATIC PLANT MANAGEMENT PLAN FOR FRIESS AND LITTLE FRIESS LAKES

WASHINGTON COUNTY, WISCONSIN

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

Special acknowledgement is due to Danielle Matuszak MS, Specialist-Biologist; Justin Poinsatte, PhD, Principal Specialist-Biologist; Hanna Helker, Intern Biologist; Thomas Slawski, PhD, Chief Biologist; and Megan Deau, Principal Graphic Designer, for their contributions to the conduct of this study and the preparation of this report. Acknowledgement is also extended to the lake monitoring volunteers for their time, efforts, and equipment. Volunteers included Mike Glunz and Karl Glunz.

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF MAPS

LIST OF TABLES

INTRODUCTION 1

Credit: Commission Staff

The Southeastern Wisconsin Regional Planning Commission (Commission or SEWRPC) completed this aquatic plant inventory and management study of Friess and Little Friess Lakes on behalf of the Friess Lake Advancement Association (Association). This memorandum report is the Commission's second aquatic plant management plan for Friess Lake,[1] and the first plan to include Little Friess Lake. The Wisconsin Department of Natural Resources (WDNR) will use data and conclusions generated as part of the Commission's study to evaluate the Lake's aquatic plant community and draft an updated Aquatic Plant Control permit.

1.1 PROJECT SETTING, BACKGROUND, SCOPE, AND INTENT

Friess Lake is a 121-acre deep lowland lake located in the Village of Richfield in Washington County. The Lake is fed and drained by the Oconomowoc River (see Map 1.1)[2]. Attaining a maximum depth of 48 feet, the deepest portions of the Lake are likely not capable of supporting an aquatic plant community, but previous surveys have indicated that the shallow nearshore areas support abundant growth of rooted aquatic plants. The most recent point-intercept survey of the Lake in 2021 conducted by Washington County observed 14 species, including several beneficial native species like muskgrass (*Chara* spp.), Sago pondweed (*Stuckenia pectinata*), and eelgrass (*Vallisneria americana*). Invasive aquatic plant species, including Eurasian watermilfoil (EWM) (*Myriophyllum spicatum*) and curly-leaf pondweed (*Potamogeton crispus*) were also observed during this survey.

Little Friess Lake is a 16-acre deep lowland lake also located in the Village of Richfield approximately 230 yards downstream from Friess Lake along the Oconomowoc River (see Map 1.1). Despite its small surface

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[1] *SEWRPC Memorandum Report No. 169,* An Aquatic Plant Management Plan for Friess Lake, Washington County, Wisconsin*, 2008.*

[2] *It should be noted that Washington County announced plans in 2024 for improving swimming and kayaking access to Friess Lake at Glacial Hill County Park, which resides on the shores of Friess Lake. The plan includes constructing a new Americans with Disabilities Act (ADA) compliant boardwalk that leads to a large, permanent dock with a kayak launch in the Lake; adding a pit toilet facility; and installing a new stormwater system to mitigate runoff into the Lake. (Kozlowicz, Cathy. "Project at Glacier Hills County Park Would Improve Swimming and Kayaking at Friess Lake." MSN, 17 Sept. 2024, www.msn.com/en-us/travel/news/project-at-glacier-hills-county-park-would-improve-swimming-and-kayaking-at-friess-lake/ar-AA1qHlDc?ocid=hpmsn&cvid=78bb54c354c64afffde2f222c3ed889c&ei=18).*

area, this lake attains a maximum depth of 34 feet. No known aquatic plant point-intercept survey has been completed for Little Friess Lake. Little Friess was informally sampled by the Commission in 2008, where beneficial native species like eelgrass and yellow water lily (*Nuphar variegata*) were noted.[3] The non-native invasives Eurasian watermilfoil and curly-leaf pondweed were also observed in Little Friess.

The Association and private owners manage aquatic plant growth on Friess Lake to enhance navigation and recreational opportunities primarily through chemical treatments, although diver-assisted suction harvesting (DASH) has also been utilized in select occasions. The Association has recently begun promoting an annual hand-pulling event for riparian owners to participate in as well. Aquatic plant management is regulated by the WDNR and requires a permit. Use of chemical treatments requires permit applications annually while mechanical harvesting requires a permit application with an accompanying management plan every five years.

Aquatic plant inventories have been completed on Friess Lake several times in the past to support aquatic plant management permit applications. Point-intercept surveys of Friess Lake were conducted in 2005, 2014, and 2021. In recent years, Cason & Associations have surveyed aquatic plants in select areas of the Lake as part of the chemical treatment process. Little Friess Lake was not included in any of these previous survey efforts. To establish long-term management goals and permitted management of the Lakes, the Association has decided to evaluate the Lakes' aquatic plant community and prepare an aquatic plant management plan encompassing both Lakes. This plan considers the present status of the aquatic plant community, identifies plant community changes that may have occurred, examines the potential success or lack of success of the current aquatic plant management strategies, considers current trends and issues that pertain to aquatic plant management issues and techniques, and describes the methods and procedures associated with proposed continuation of aquatic plant management in the Lakes.

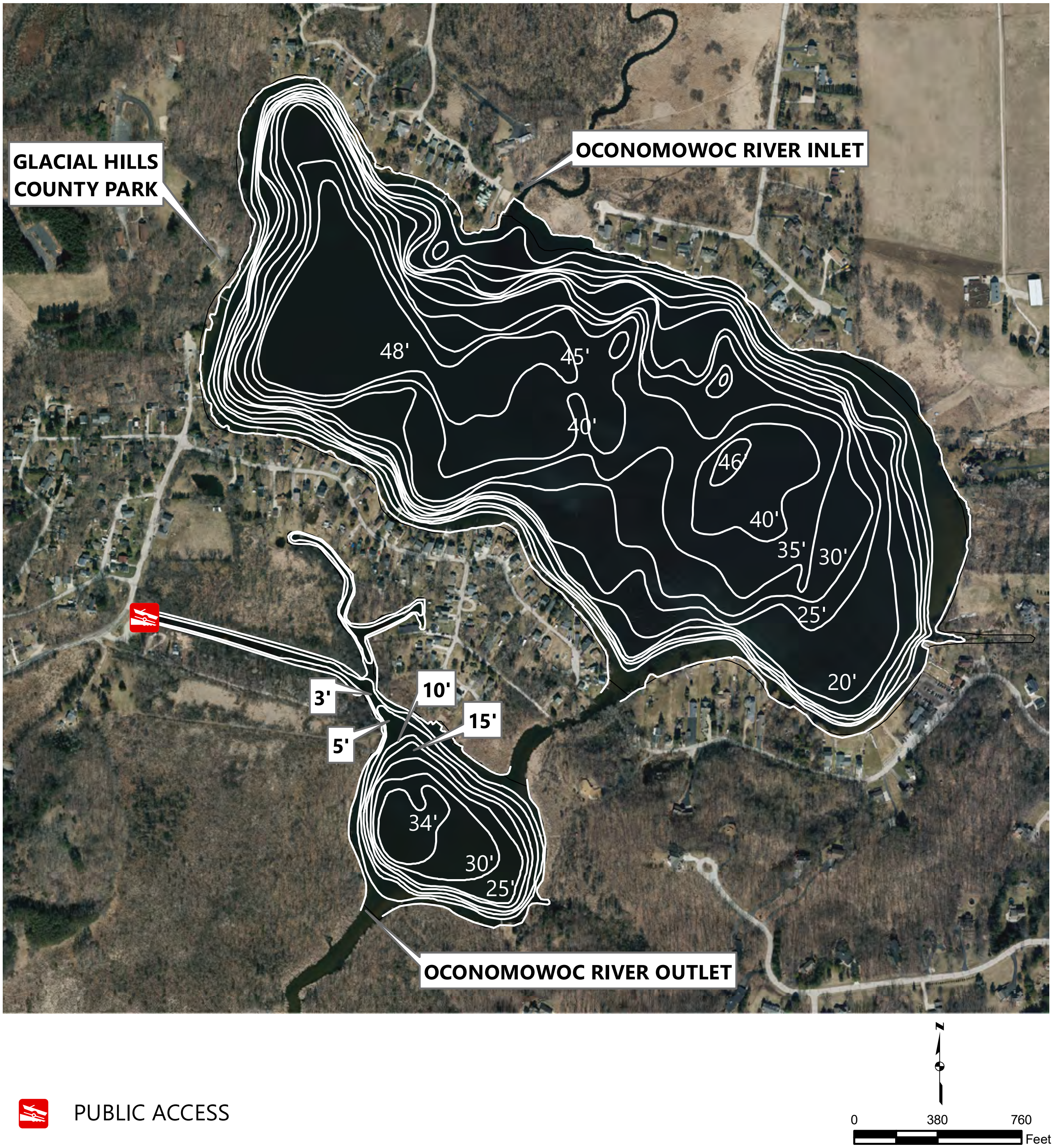
This updated aquatic plant management (APM) plan summarizes information and recommendations needed to manage nuisance plants (including EWM and curly-leaf pondweed). The plan covers four main topics:

- APM goals and objectives
- Aquatic plant community changes and quality
- Aquatic plant control alternatives
- Recommended aquatic plant management plan

This memorandum focuses upon approaches to monitor and control actively growing nuisance populations of aquatic plants and presents a range of alternatives that could potentially be used to achieve desired APM goals and provides specific recommendations related to each alternative. These data and suggestions can be valuable resources when developing requisite APM permit applications and implementing future aquatic plant management efforts.

[3] *SEWRPC MR No. 169, 2008,* op. cit.

Map 1.1
Bathymetry and Key Locations for Friess and Little Friess Lakes



Source: SEWRPC

INVENTORY FINDINGS AND RELAVANCE TO RESOURCE MANAGEMENT 2

Credit: Commission Staff

2.1 AQUATIC PLANT MANAGEMENT GOALS AND OBJECTIVES

Aquatic plant management (APM) programs are designed to further a variety of lake user and riparian landowner goals and desires. For example, most APM programs aim to improve lake navigability. However, APM programs must also be sensitive to other lake uses and must maintain or enhance a lake's ecological integrity. Consequently, APM program objectives are commonly developed in close consultation with many interested parties. The Friess and Little Friess APM plan considered input from Friess Lake Advancement Association (Association) and the Wisconsin Department of Natural Resources (WDNR). Objectives of the Friess and Little Friess APM program include the following.

- Effectively control the quantity and density of nuisance aquatic plant growth in well-targeted portions of Friess and Little Friess Lakes (the Lakes). This objective helps:
  - Enhance water-based recreational opportunities,
  - Improve community-perceived aesthetic values, and
  - Maintain or enhance the Lakes' natural resource value.
- Manage the Lakes in an environmentally sensitive manner in conformance with *Wisconsin Administrative Code* standards and requirements under Chapters NR 103 *Water Quality Standards for Wetlands*, NR 107 *Aquatic Plant Management*, and NR 109 *Aquatic Plants: Introduction, Manual Removal & Mechanical Control Regulations*. Following these rules helps the Association preserve and enhance the Lakes' water quality, biotic communities, habitat value, and essential structure and relative function in relation to adjacent areas.
- Protect and maintain public health and promote public comfort, convenience, and welfare while safeguarding the Lakes' ecological health through environmentally sound management of vegetation, wildlife, fish, and other aquatic/semi-aquatic organisms in and around the Lakes.
- Promote a high-quality water-based experience for residents and visitors to the Lakes consistent with the policies and practices of the WDNR, as described in the regional water quality management plan, as amended.

To meet these objectives, the Association executed an agreement with the Southeastern Wisconsin Regional Planning Commission (Commission or SEWRPC) to investigate the characteristics of the Lakes and to update the aquatic plant management plan. As part of this planning process, surveys of the aquatic plant community and comparison to results of previous surveys were conducted. This chapter presents the results of each of these inventories.

2.2 AQUATIC PLANT COMMUNITY COMPOSITION, CHANGE, AND QUALITY

All healthy lakes have plants and native aquatic plants form a foundational part of a lake ecosystem. Aquatic plants form an integral part of the aquatic food web, converting sediments and inorganic nutrients present in the water into organic compounds that are directly available as food to other aquatic organisms. Through photosynthesis, plants utilize energy from sunlight and release the oxygen required by many other aquatic life forms into the water. Aquatic plants also serve several other valuable functions in a lake ecosystem, including:

- Improving water quality by filtering excess nutrients from the water
- Providing habitat for invertebrates and fish
- Stabilizing lake bottom substrates
- Supplying food for waterfowl and various lake-dwelling animals

Even though aquatic plants may hinder human use and/or access to a lake, aquatic plants should not necessarily be eliminated or even significantly reduced in abundance as they often support many other beneficial functions as described above (see Table 2.1). For example, water lilies play a significant role in providing shade, habitat, and food for fish and other important aquatic organisms. They also help prevent damage to the lakeshore by dampening the power of waves that could otherwise erode the shoreline. Additionally, the shade that these plants provide helps reduce the growth of undesirable plants because it limits the amount of sunlight reaching the lake bottom. Given these benefits, large-scale removal of native plants that may be perceived as a nuisance should be avoided when developing plans for aquatic plant management.

Aquatic Plant Surveys

Aquatic plant inventories have been completed of Friess Lake several times in the past to support aquatic plant management permit applications. Point-intercept surveys of Friess Lake were conducted in 2005 by WDNR. Surveys done in 2014 and 2021 were completed by Washington County (see Table 2.2). Little Friess Lake was not included in any of these previous survey efforts. To establish long-term management goals and permitted management of the Lakes, the Association has decided to evaluate the Lakes' aquatic plant community and prepare an aquatic plant management plan encompassing both Lakes. The 2024 survey uses a point-intercept grid for sample collection. In this method, sampling sites are based on predetermined global positioning system (GPS) location points that are arranged in a grid pattern across the entire surface of a lake.

The grid pattern of Friess and Little Friess Lakes were sampled on set grid patterns of 541 and 177 points (provided by WDNR staff), respectively, that allows the types and abundance of aquatic plants to be directly contrasted to prior point-intercept surveys (see Figures 2.1 and 2.2). At each grid point sampling site, a single rake haul is taken and a qualitative assessment of the rake fullness, on a scale of zero to three, is made for each species identified (see Figure 2.3).

With the assistance of volunteers from the Association, Commission staff conducted the survey of Friess Lake on June 23rd, 2024 and Little Friess on June 24th, 2024. The conditions during the survey were excellent, with sunny to partly-cloudy skies, low wind speeds, and little boat traffic. Friess Lake's water clarity was poor to moderate, with higher water clarity observed in Little Friess than Friess Lake. The water clarity of the Lakes limited the ability to document visual observations of aquatic plant species within six feet of the sampling location. In general, the aquatic plant specimens were mature, and several species were in flower (e.g., white water lily, spatterdock, and white water crowfoot). In addition to the aquatic plants, Commission staff observed fish, waterfowl, herons, turtles, frogs, and whitetail deer.

Table 2.1
Examples of Positive Ecological Qualities Associated with a Subset of the Aquatic Plant Species Present in Friess and Little Friess Lakes

Aquatic Plant Species Present	Ecological Significance
Ceratophyllum demersum (coontail)	Provides good shelter for young fish; supports insects valuable as food for fish and ducklings; native
Chara spp. (muskgrasses)	A favorite waterfowl food and fish habitat, especially for young fish; native
Elodea canadensis (common waterweed)	Provides shelter and support for insects which are valuable as fish food; native
Heteranthera dubia (water stargrass)	Locally important food source for waterfowl and forage for fish; native
Myriophyllum spicatum (Eurasian watermilfoil)	None known. Invasive nonnative. Hinders navigation, outcompetes desirable aquatic plants, reduces water circulation, depresses oxygen levels, and reduces fish/invertebrate populations
Najas flexilis (slender naiad)	Important food source for waterfowl, marsh birds, and muskrats; provides food and shelter for fish; native
Potamogeton crispus (curly-leaf pondweed)	Adapted to cold water; mid-summer die-off can impair water quality; invasive nonnative
Potamogeton zosteriformis (flat-stem pondweed)	Provides some food for ducks; native
Stuckenia pectinata (Sago pondweed)	This plant is the most important pondweed for ducks, in addition to providing food and shelter for young fish; native
Utricularia spp. (bladderworts)	Stems provide food and cover for fish; native
Vallisneria americana (eelgrass/water celery)	Provides good shade and shelter, supports insects, and is valuable fish food; native

Note: Information obtained from A Manual of Aquatic Plants by Norman C. Fassett, University of Wisconsin Press; Guide to Wisconsin Aquatic Plants, Wisconsin Department of Natural Resources; and, Through the Looking Glass: A Field Guide to Aquatic Plants, Wisconsin Lakes Partnership, University of Wisconsin-Extension.

Source: SEWRPC

While Commission staff strived to survey as much of the Lakes as feasible, some points were not surveyed in 2024. These points included the central portions of the main Lake bodies of Friess and Little Friess, which were determined to be too deep for vascular aquatic plants to grow. Other points that were not surveyed were due to proximity to docks, temporary obstacles, and points that were deemed to be on shore or too shallow to access. In Little Friess Lake, the northwestern channels were very shallow with dense aquatic plant growth and woody debris that limited the Commission's staff ability to survey portions of the channels.

Aquatic Plant Survey Metrics

Several metrics are useful to describe aquatic plant community condition and design management strategies. These metrics include total rake fullness, maximum depth of colonization, species richness, biodiversity, evaluation of sensitive species, and relative species abundance. Metrics derived from the 2024 point-intercept survey are described below.

Each aquatic plant species has preferred habitat conditions in which that species thrives as well as conditions that limit or completely inhibit its growth. For example, water conditions (e.g., depth, clarity, source, alkalinity, and nutrient concentrations), substrate composition, the presence or absence of water movement, and pressure from herbivory and/or competition all can influence the type of aquatic plants found in a water body. All other factors being equal, water bodies with a diverse array of habitat variables are more likely to host a diverse aquatic plant community. For similar reasons, some areas of a particular lake may contain plant communities with low diversity, while other areas of the same lake may exhibit a higher diversity. Historically, human manipulation has often favored certain plants and reduced biological diversity (biodiversity). Thoughtful aquatic plant management can help maintain or even enhance aquatic plant biodiversity.

Total Rake Fullness

As described earlier in this section, Commission staff qualitatively rated the plant abundance at each survey point by how much of the sampling rake was covered by all aquatic plant species.[4] This rating, called total rake fullness, can be a useful metric evaluating general abundance of aquatic plants as part of the point-

[4] *This method follows the standard WDNR protocol.*

Table 2.2
Aquatic Plant Species Observed in Friess Lake: 2005-2024

Aquatic Plant Species	Native or Invasive	2005	2014	2021	2024
Ceratophyllum demersum	Native	X	X	X	X
Chara spp.	Native	X	X	X	X
Eleocharis acicularis	Native	X	--	--	--
Elodea canadensis	Native	X	--	X	--
Elodea nutallii	Native	X	--	--	--
Heteranthera dubia	Native	--	X	--	X
Lemna minor	Native	--	X	X	X
Myriophyllum spicatum	Invasive	X	X	X	X
Najas flexilis	Native	X	X	X	X
Nuphar variegata	Native	X	X	--	X
Nymphaea odorata	Native	X	X	X	X
Potamogeton amplifolius	Native	X	X	--	--
Potamogeton crispus	Invasive	X	X	X	X
Potamogeton foliosus	Native	X	--	--	--
Potamogeton illinoensis	Native	X	X	--	--
Potamogeton pusillus	Native	X	--	X	X
Potamogeton nodosus	Native	--	X	--	--
Potamogeton richardsonii	Native	X	X	--	--
Potamogeton zosteriformis	Native	--	X	X	X
Riccia fluitans	Native	--	X	--	--
Ricciocarpus natans	Native	--	X	--	--
Sagittaria sp.	Native	--	X	--	--
Schoenoplectus tabernaemontani	Native	--	X	--	--
Stuckenia pectinata	Native	X	X	X	X
Stuckenia vaginata	Native	--	--	X	--
Typha spp.		--	--	--	X
Vallisneria americana	Native	X	X	--	X
Species Total	--	17	20	13	14

Note: Red text indicates nonnative and/or invasive species.

Source: SEWRPC

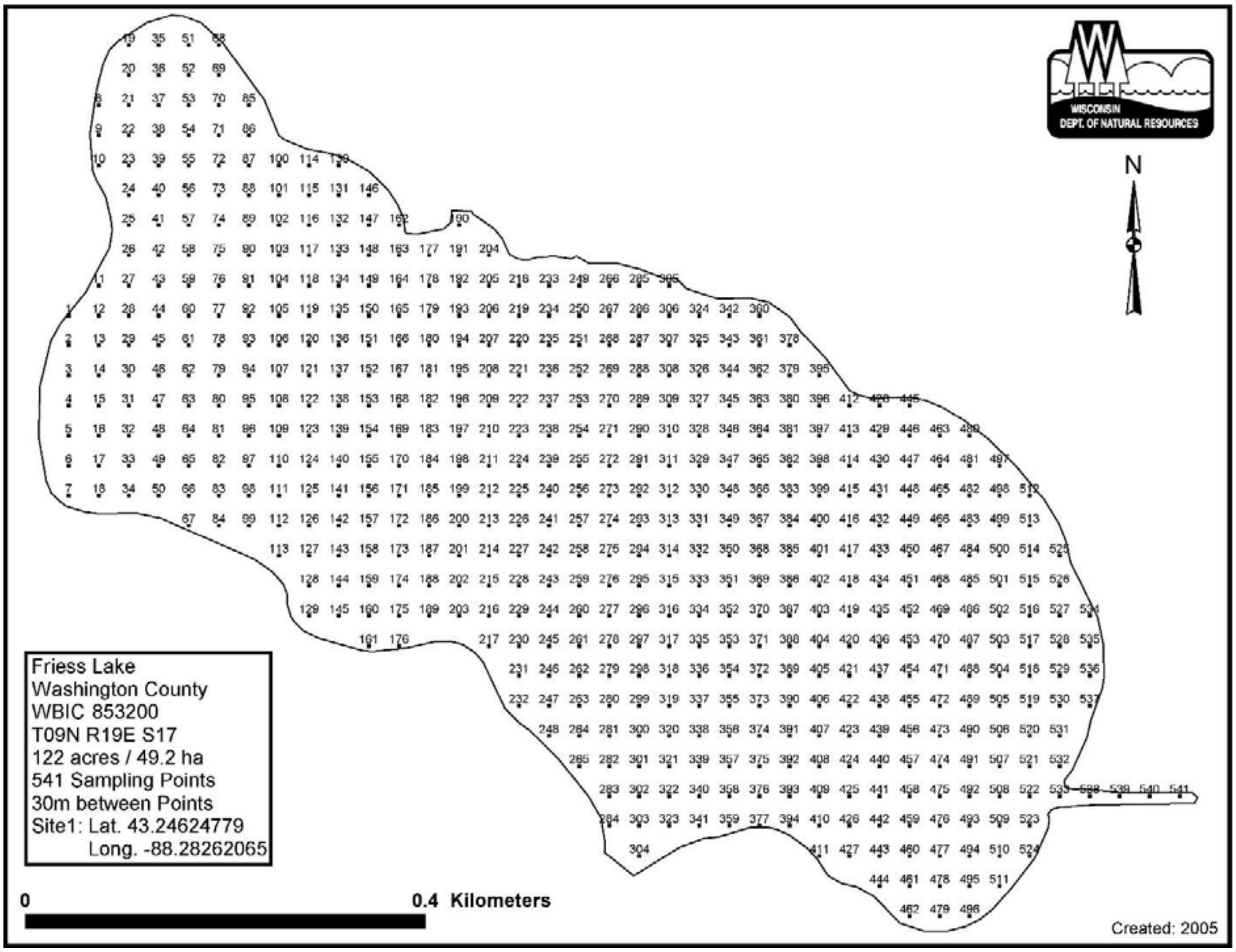
intercept survey. As shown in Figure 2.4, the average total rake fullness of sampled points in Friess and Little Friess Lakes was 0.24 and 0.94 respectively, in the 2024 survey. Of the 173 sites visited on Friess Lake during the 2024 survey, 38 had aquatic plants present (see Table 2.3 and Appendix C). Much of the eastern and southern littoral zones of the Lake were devoid of plants and the plants that were not found were not particularly abundant. The vast majority of Friess Lake did not have any aquatic plants. Additionally, 60 of the 86 sites visited on Little Friess Lake had aquatic plants present (see Table 2.4).

Maximum Depth of Colonization

Maximum depth of colonization (MDC) can be a useful indicator of water quality, as turbid and/or eutrophic (nutrient-rich) lakes generally have shallower MDC than lakes with clear water.[5] It is important to note that for surveys using the point-intercept protocol, the protocol allows sampling to be discontinued at depths greater than the maximum depth of colonization for vascular plants. However, aquatic moss and macroalgae, such as muskgrass and nitella, frequently colonize deeper than vascular plants and thus may be under-sampled in some lakes. For example, *Chara globularis* and *Nitella flexilis* have been found growing as deep as 37 and 35 feet, respectively, in Silver Lake, in Washington County. In 2024 the MDC was found to be 13 feet in Friess Lake and 9 feet in Little Friess Lake (see Table 2.3 and Table 2.4). These MDCs are considered low to moderate in depth, which is indicative of lower water clarity.

[5] *D.E. Canfield Jr, L. Langeland, and W.T. Haller, "Relations Between Water Transparency and Maximum Depth of Macrophyte Colonization in Lakes,"* Journal of Aquatic Plant Management *23, 1985.*

Figure 2.1
Friess Lake Aquatic Plant Point Intercept Survey Grid Survey Grid



Source: WDNR

Species Richness

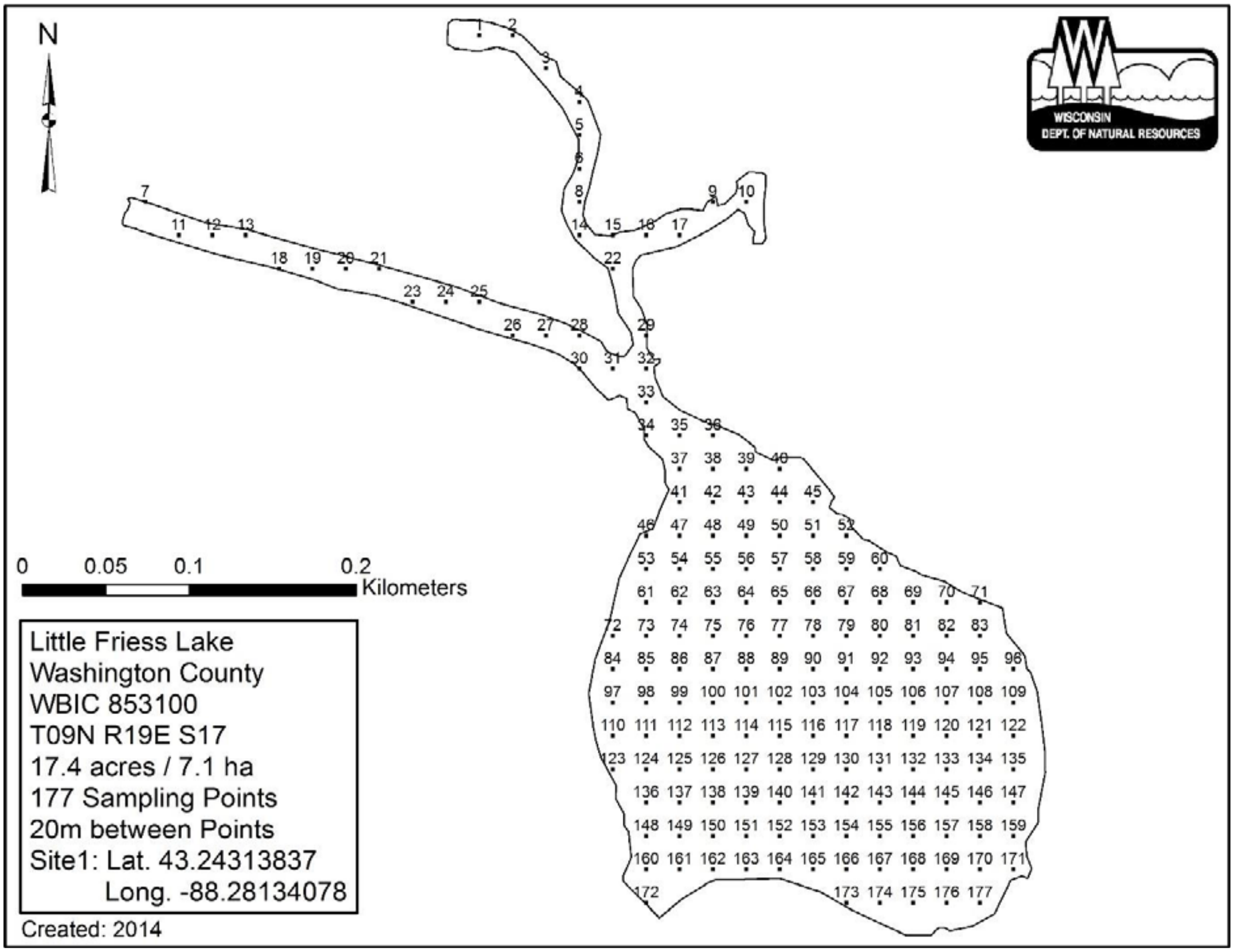
The number of distinct types of aquatic plants present in a lake is referred to as the species richness of the lake. Larger lakes with diverse lake basin morphology, less human disturbance, and/or healthier, more resilient lake ecosystems have greater species richness. Aquatic plants provide a wide variety of benefits to lakes, examples of which are briefly described in Table 2.1. Including visuals, Commission staff observed a total of 14 species on Friess Lake and 23 species on Little Friess Lake during the 2024 survey. Even though Little Friess Lake is smaller than Friess Lake, more species of plants were found in Little Friess Lake. This is likely due different habitat availability between the Lakes as well as Little Friess having slightly improved water quality compared to Friess Lake.

Biodiversity and Species Distribution

Species richness is often incorrectly used as a synonym for biodiversity. The difference in meaning between these terms is both subtle and significant. Biodiversity is based on the number of species present in a habitat along with the abundance of each species. For the purposes of this study, abundance was determined as the percentage of observations of each species compared to the total number of observations made. Aquatic plant biodiversity can be measured with the Simpson Diversity Index (SDI).[6] Using this measure, a community dominated by one or two species would be considered less diverse than one in which several

[6] *The SDI expresses values on a zero to one scale where 0 equates to no diversity and 1 equates to infinite diversity. Within Southeastern Wisconsin, lakes with exceptionally poor aquatic plant diversity have SDI values near 0.5 while lakes with the highest diversity have SDI values exceeding 0.9.*

Figure 2.2
Little Friess Aquatic Plant Point Intercept Survey Grid



Source: WDNR

different species have similar abundance. In general, more diverse biological communities are better able to maintain ecological integrity in response to environmental stresses. Promoting biodiversity not only helps sustain an ecosystem but preserves the spectrum of options useful for future management decisions.

Friess Lake has an SDI of 0.84, while Little Friess Lake has an SDI of 0.81. Between one and five species, including visuals were found at a single sampling point across Friess Lake and between one and seven species were found at a single sampling point in Little Friess Lake (see Figure 2.5). The northwestern channels of Little Friess Lake had the highest diversity of plant species across both lakes. Actions that conserve and promote aquatic plant biodiversity are critical to the long term health of the Lake. Such actions not only help sustain and increase the robustness and resilience of the existing ecosystem but also promote efficient and effective future aquatic plant management.

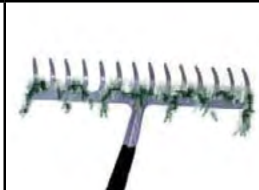
Sensitive Species

Aquatic plants metrics such as species richness and disturbance tolerance are often used as indicators of the ecological health of a lake due to aquatic plants' varying sensitivity to human activity. In hard water lakes, such as those common in Southeastern Wisconsin, species richness generally increases with water quality and decreases with nutrient enrichment.[7] In 2017, a new method of tying aquatic plants to lake health was developed that utilized human disturbance variables and found that as those variables

[7] *Vestergaard, O. and Sand-Jensen, K. "Alkalinity and Trophic State Regulate Aquatic Plant Distribution in Danish Lakes,"* Aquatic Botany *67, 2000.*

increased, the abundance of sensitive aquatic plant species decreased, with tolerant species becoming more prevalent.[8] Friess Lake had one sensitive species found during the 2024 survey. Little Friess Lake also had one sensitive species found during the 2024 survey. In both Lakes that sensitive species was small pondweed (*Potamogeton pusillus*). Distribution of the sensitive species of aquatic plants is illustrated in Figure 2.6.

Figure 2.3
WDNR Rake Fullness Rating

Fullness Rating	Coverage	Description
1		Only few plants. There are not enough plants to entirely cover the length of the rake head in a single layer.
2		There are enough plants to cover the length of the rake head in a single layer, but not enough to fully cover the tines.
3		The rake is completely covered and tines are not visible

Source: WDNR

Relative Species Abundance

The most commonly observed aquatic plants in the Friess Lake 2024 survey were: 1) Eurasian watermilfoil (*Myriophyllum spicatum*), 2) Sago pondweed (*Stuckenia pectinata*), 3) Coontail (*Ceratophyllum demersum)*, 4) Curly-leaf pondweed (*Potamogeton crispus*), 5) White water-lily (*Nymphaea odorata*) (see Appendix A Figures A.1-A.5). EWM was mainly found along nearshore areas of the lake with very few occurrences in the southern near shore area. Sago pondweed was found primarily along the northern and western portion of the lake in the nearshore areas. Sago pondweed was found near or at a total of 24 points in Friess Lake. Coontail was found at 12 points and seen near an additional three points in Friess Lake. CLP was mainly along the northern portion of Friess Lake with a few occurrences elsewhere in the lake.

The most commonly observed aquatic plants in the Little Friess 2024 survey were: 1) Coontail (*Ceratophyllum demersum)*, 2) Eurasian watermilfoil (*Myriophyllum spicatum*), 3) White water-lily (*Nymphaea odorata*). 4) Watermeal (*Wolffia* sp.), and 5) Duckweed (*Lemna* sp.) (see Appendix A Figures A.3, A.1, A.5, A.6 and A.7 respectively). The greatest EWM abundance was in the western half of Little Friess Lake, having been found at or seen near 51 points. White water lily was seen at 24 points on Little Friess Lake. Watermeal and duckweed were mainly found in the north/northwestern channels of Little Friess lake. In some areas the two free-floating plants grew so densely on the water's surface that Commission staff could not see into the water.

Invasive Species

This subsection will discuss invasive species observations in Friess and Little Friess Lakes, as these are often the focus of aquatic plant management efforts.

Eurasian Watermilfoil (EWM)

EWM is one of eight milfoil species found in Wisconsin and is the only exotic or nonnative milfoil species. EWM favors mesotrophic to moderately eutrophic waters, fine organic-rich lake-bottom sediment, warmer water with moderate clarity and high alkalinity, and tolerates a wide range of pH and salinity.[9,10] In Southeastern Wisconsin, EWM can grow rapidly and has few natural enemies to inhibit its growth. Furthermore, it can grow explosively following major environmental disruptions, as small fragments of EWM can grow into entirely new plants.[11] For reasons such as these, EWM can grow to dominate an aquatic plant community

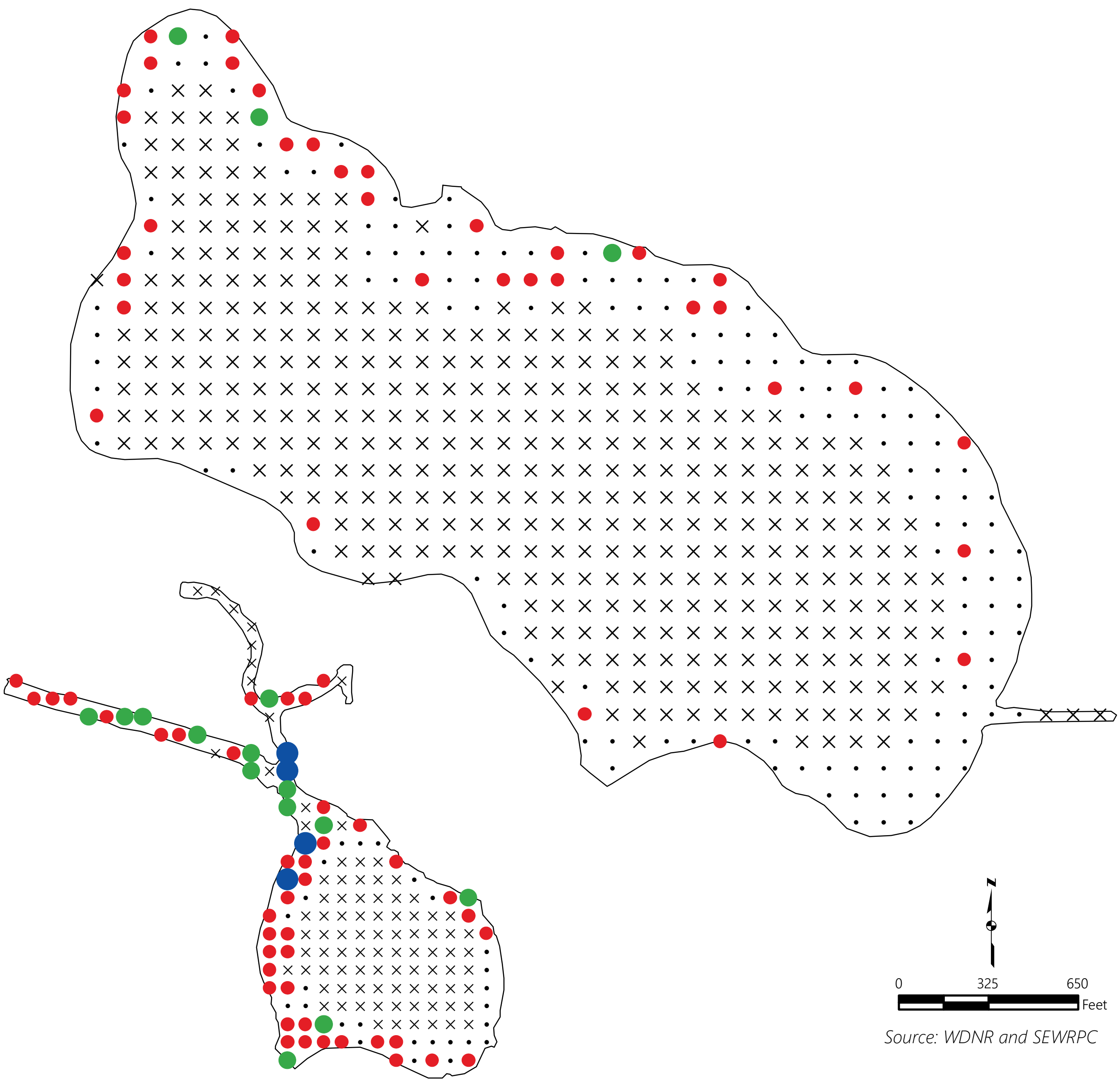
[8] *Mikulyuk, Alison, Martha Barton, Jennifer Hauxwell, Catherine Hein, Ellen Kujawa, Kristi Minahan, Michelle E. Nault, Daniel L. Oele, and Kelly I. Wagner. "A macrophyte bioassessment approach linking taxon-specific tolerance and abundance in north temperate lakes."* Journal of Environmental Management *199 (2017): 172-180.*

[9] *U.S. Forest Service, Pacific Islands Ecosystems at Risk (PIER), 2019.: hear/org/pier/species/myriophyllum_spicatum.htm.*

[10] *S.A. Nichols and B. H. Shaw, "Ecological Life Histories of the Three Aquatic Nuisance Plants: Myriophyllum spicatum, Potamogeton crispus, and Elodea canadensis,"* Hydrobiologia *131(1), 1986.*

[11] Ibid.

Figure 2.4
Total Rake Fullness in Friess and Little Friess Lakes: June 2024



Source: WDNR and SEWRPC

Note: Survey was conducted on Friess lake on June 24th, 2024 and the survey was conducted on Little Friess Lake on June 25th, 2024.

RAKE FULLNESS RATING

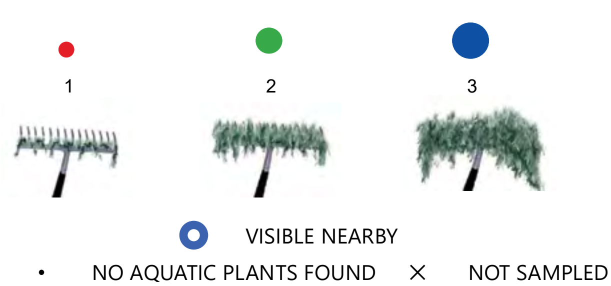


Table 2.3
Aquatic Plants Summary Statistics: Friess Lake PI Survey – June 2024

Statistic	Value
Total number of sites visited	173
Total number of sites with vegetation	38
Total number of sites shallower than maximum depth of plants	148
Frequency of occurrence at sites shallower than maximum depth of plants	25.68
Simpson Diversity Index	0.84
Maximum depth of plants (feet)	13.00
Number of sites sampled using rake on Rope (R)	53
Number of sites sampled using rake on Pole (P)	120
Average number of all species per site (shallower than max depth)	0.40
Average number of all species per site (vegetation sites only)	1.55
Average number of native species per site (shallower than max depth)	0.25
Average number of native species per site (vegetation sites only)	1.32
Species Richness	12
Species Richness (including visuals)	14

Source: SEWRPC

Table 2.4
Aquatic Plants Summary Statistics: Little Friess Lake PI Survey – June 2024

Statistic	Value
Total number of sites visited	86
Total number of sites with vegetation	60
Total number of sites shallower than maximum depth of plants	67
Frequency of occurrence at sites shallower than maximum depth of plants	89.55
Simpson Diversity Index	0.65
Maximum depth of plants (feet)	24.00
Number of sites sampled using rake on Rope (R)	20
Number of sites sampled using rake on Pole (P)	66
Average number of all species per site (shallower than max depth)	2.63
Average number of all species per site (vegetation sites only)	1.79
Average number of native species per site (shallower than max depth)	2.27
Average number of native species per site (vegetation sites only)	1.62
Species Richness	18
Species Richness (including visuals)	24

Source: SEWRPC

in as little as two years.[12,13] In such cases, EWM can displace native plant species and interfere with the aesthetic and recreational use of waterbodies. However, established populations may rapidly decline after approximately ten to 15 years.[14]

Human-produced EWM fragments (e.g., created by boating through EWM), as well as fragments generated from natural processes (e.g., wind-induced turbulence, animal feeding/disturbance) readily colonize disturbed sites, contributing to EWM spread. EWM fragments can remain buoyant for two to three days in summer and two to six days in fall, with larger fragments remaining buoyant longer than smaller ones.[15] The fragments can also cling to boats, trailers, motors, and/or bait buckers where they can remain alive

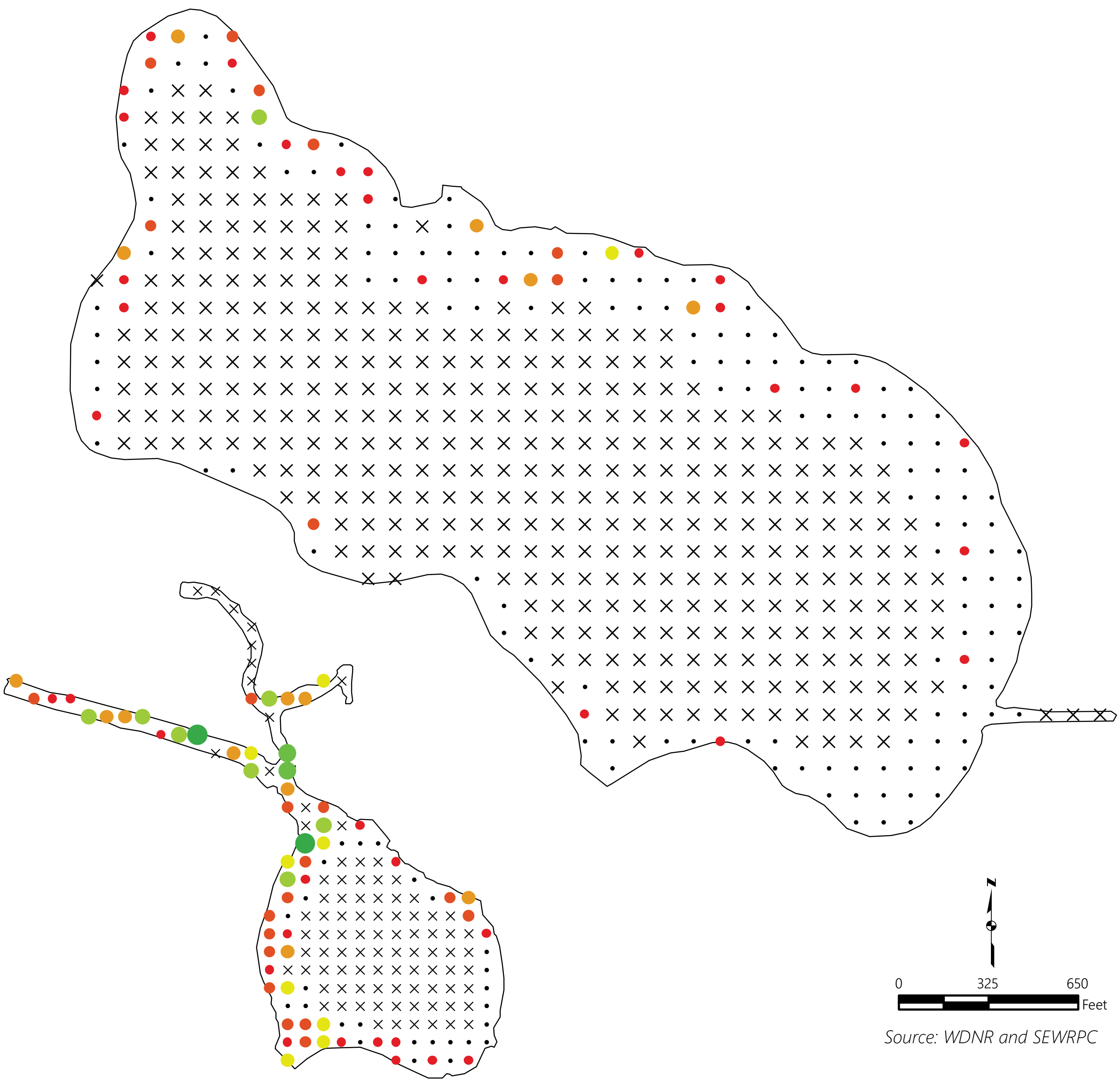
[12] *S.R. Carpenter, "The Decline of Myriophyllum spicatum in Eutrophic Wisconsin (USA) Lake,"* Canadian Journal of Botany *58(5), 1980.*

[13] *Les, D. H., and L. J. Mehrhoff, "Introduction of Nonindigenous Vascular Plants in Southern New England: a Historical Perspective,"* Biological Invasions *1:284-300, 1999.*

[14] *S.R. Carpenter, 1980,* op. cit.

[15] *J.D. Wood and M. D. Netherland, "How Long Do Shoot Fragments of Hydrilla (Hydrilla verticullata) and Eurasian Watermilfoil (Myriophyllum spicatum) Remain Buoyant?',* Journal of Aquatic Plant Management *55: 76-82, 2017.*

Figure 2.5
Species Richness in Friess and Little Friess Lakes: June 2024



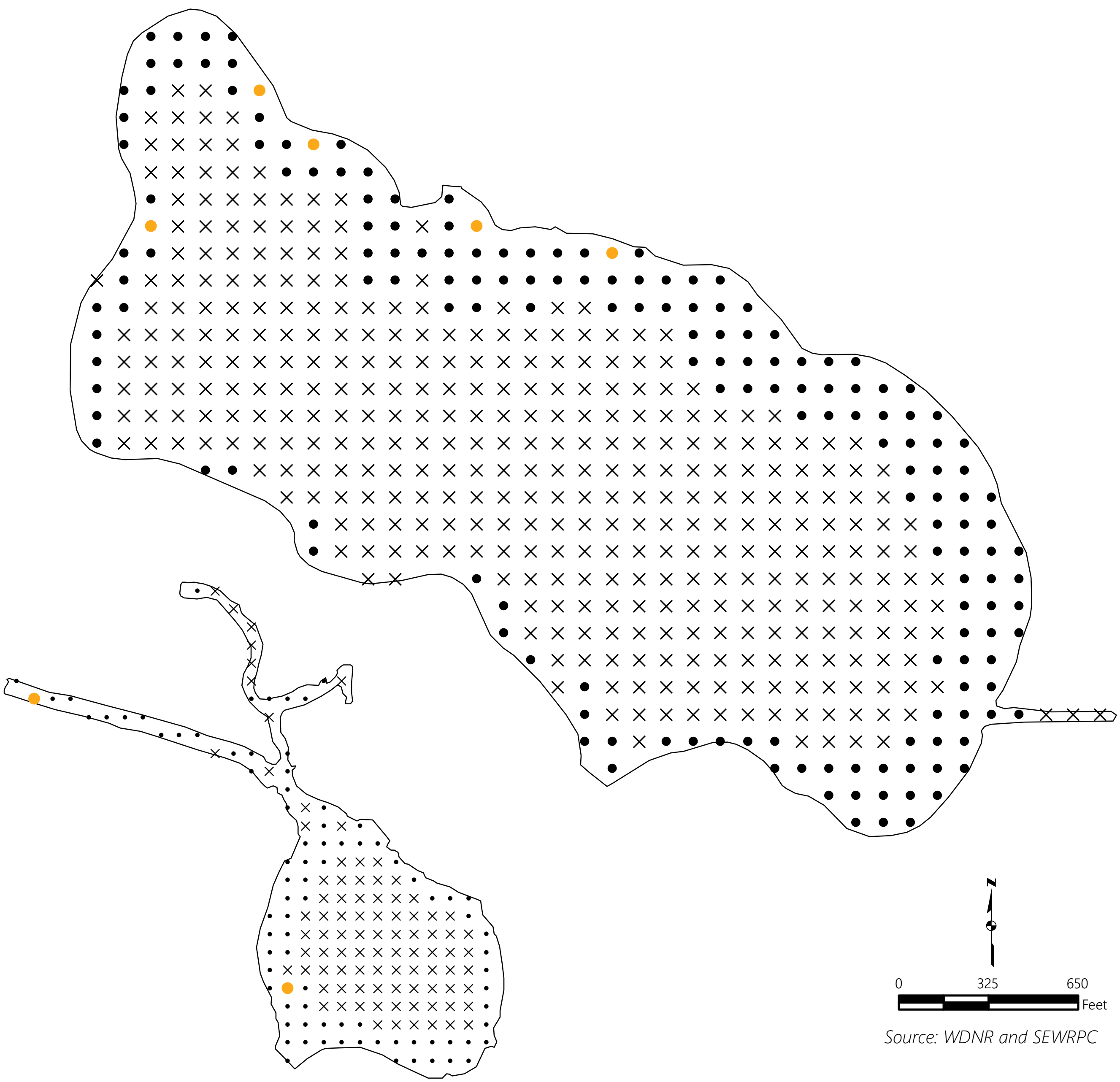
Source: WDNR and SEWRPC

Note: Survey was conducted on Friess lake on June 24th, 2024 and the survey was conducted on Little Friess Lake on June 25th, 2024.

SPECIES RICHNESS

●	1	●	6
●	2	●	7
●	3	•	NO AQUATIC PLANTS FOUND
●	4	×	NOT SAMPLED
●	5		

Figure 2.6
Sensitive Species Richness in Friess and Little Friess Lakes: June 2024



Note: Survey was conducted on Friess lake on June 24th, 2024 and the survey was conducted on Little Friess Lake on June 25th, 2024.

SENSITIVE SPECIES RICHNESS

- 1
- NOT SAMPLED
- NO AQUATIC PLANTS FOUND

for weeks contributing to transfer of milfoil to other lakes. For these reasons, it is especially important to remove all vegetation from boats, trailers, and other equipment after removing them from the water and prior to launching in other waterbodies.

EWM was the most commonly observed species on Friess Lake in 2024 and the second most commonly observed species on Little Friess Lake. In Friess Lake, EWM was observed at 42 points, although 28 of these points were only visual observations where the plant was not on the survey rake. Where observed on rake, EWM was generally low abundance (rake fullness of one) with only two points with moderate abundance (rake fullness of two). Most of the EWM was observed along the north and northwestern shores of Friess Lake in water depth ranging from two to ten feet. In Little Friess Lake, EWM was found on the rake at 24 points and observed visually at an additional 12 points. The abundance of EWM in Little Friess Lake was similar to Friess Lake, with most points having low abundance and only four points having moderate abundance of EWM. EWM was found at slightly shallower water depths (two to six feet) in Little Friess than in Friess Lake.

Curly Leaf Pondweed (CLP)

Curly-leaf pondweed (*Potamogeton crispus*) continues to be present in the Lakes. This plant, like EWM, is identified in Chapter NR 109 of the *Wisconsin Administrative Code* as a nonnative invasive aquatic plant. Although survey data suggests it presently is only a relatively minor species in terms of dominance, and, as such, is less likely to interfere with recreational boating activities, the plant can grow in dense stands that exclude other high value aquatic plants. For this reason, CLP must continue to be monitored and managed as an invasive member of the aquatic community. Lastly, it must be remembered that curly-leaf pondweed senesces by midsummer and therefore may be underrepresented in the inventory data presented in this report.

In the 2024 survey, seven points in Little Friess Lake had CLP present with an additional four visual sightings. Friess Lake has eight points with CLP present with six additional visuals. The abundance of CLP was low at each point where it was observed in both lakes.

Apparent Changes in Observed Aquatic Plant Communities in Friess Lake: 2021 Versus 2024

The 2024 aquatic plant survey identified a total of 14 different plant species in Friess Lake, including visuals, similar to the 13 species found in the 2021 survey. In addition to the number of different aquatic plant species detected in the Lake, several other comparisons can be drawn between the 2021 and 2024 aquatic plant survey results, as examined below:

- The total littoral vegetated frequency of occurrence decreased by 54.05 from 2021 to 2024. It was 25.68 in 2024 compared to 79.73 in 2021 (see Table 2.3). It should be noted that the previous plan for the lake recommended intensive aquatic plant management along the eastern shoreline, an area that now hosts very few plants.

- The MDC in Friess Lake during the 2024 survey was 13 feet, which was five feet shallower than the 18-foot MDC in 2021 survey (see Table 2.3).

- The composition and order of the five most common species changed from 2021 to 2024. In 2024 the five were 1) Eurasian watermilfoil, 2) Sago pondweed, 3) Coontail, 4) Curly-leaf pondweed, and 5) White water-lily. In 2021 they were 1) Muskgrass, 2) Coontail, 3) Eelgrass (*Vallisneria americana*), 4) Slender naiad (*Najas flexilis*), and 5) *Stuckenia* sp. (unidentified species in *Stuckenia* genus).[16]

- EWM occurrence increased from a single point in 2021 to 28 points in 2024 (see Table 2.5 and Figure 2.7)

- CLP occurrence increased slightly with it being found at eight points in 2024 compared to the six in 2021. There were no additional visual sightings in 2021 and six sightings in 2024 (see Table 2.5 and Figure 2.8).

- Several native aquatic plant species have small populations within Friess Lake including water stargrass (*Heteranthera dubia),* duckweeds (*Lemna* sp.), spatterdock (*Nuphar variegata*), and several pondweeds (*P. pusillus and P. zosteriformis*). All of which were found at less than five points across the Lake.

[16] *This unidentified* Stuckenia *species was originally identified in the 2021 as* Stuckenia vaginata*, a State Threatened species that is unlikely to be observed in in Southeastern Wisconsin. This plant was most likely misidentified Sago pondweed* (Stuckenia pectinata). *In a data quality assurance check, WDNR staff corrected the* Stuckenia vaginata *to* Stuckenia *sp.*

Table 2.5
Friess Lake Aquatic Plant Survey Summary: July 2021 Versus July 2024

Aquatic Plant Species	Native or Invasive	Number of Sites Found[a] (2021/2024)	Frequency of Occurrence Within Vegetated Areas[b] (2021/2024)	Average Rake Fullness[c] (2021/2024)	Relative Frequency of Occurrence[d] (2021/2024)	Visual Sightings[e] (2021/2024)
Ceratophyllum demersum (coontail)	Native	61/12	51.69/31.58	1.51/1.00	25.6/20.3	0/3
Chara spp. (muskgrass)	Native	66/9	55.93/23.68	1.56/1.00	27.7/15.3	0/0
Elodea canadensis (waterweed)	Native	4/--	3.39/--	1.00/--	1.7/--	0/--
Heteranthera dubia (water stargrass)	Native	--/0	--/0	--/0	--/0	--/1
Lemna minor (duckweed)	Native	4/1	3.39/2.63	1.25/1.00	1.7/1.7	0/0
Myriophyllum spicatum (Eurasian watermilfoil)	Invasive	1/14	0.85/36.84	1.00/1.14	0.4/23.7	0/28
Najas flexilis (slender naiad)	Native	35/4	29.66/10.53	1.20/1.00	14.7/6.8	0/0
Nuphar variegata (spatterdock)[f]	Native	--/1	0/2.63	--/2.00	--/0.68	--/2
Nymphaea odorata (white water lily)	Native	4/1	3.39/2.63	1.00/2.00	1.7/1.7	0/5
Potamogeton crispus (curly-leaf pondweed)	Invasive	6/8	2.08/21.05	1.17/1.00	2.5/13.6	0/6
Potamogeton pusillus (small pondwed)	Native	1/1	0.85/2.63	1.00/1.00	0.4/1.7	0/0
Potamogeton zosteriformis (flat-stem pondweed)	Native	1/1	0.85/2.63	1.00/1.00	0.4/1.7	0/0
Stuckenia pectinata (Sago pondweed)[f]	Native	1/6	0.85/15.79	1.00/1.00	0.4/10.2	0/18
Stuckenia sp. (pondweed)	Native	10/--	8.47/--	1.00/--	4.2/--	0/--
Vallisneria americana (eel-grass/wild celery)[f]	Native	44/3	37.29/2.63	1.27/1.00	18.5/0.68	0/3

Note: Sampling occurred at 153 sampling sites on in 2021 and 173 sampling sites in 2024. Red text indicates non-native and/or invasive species. See Appendix A for distribution maps of most commonly found species.

[a] *Number of Sites refers to the number of sites at which the species was retrieved and identified on the rake during sampling.*

[b] *Frequency of Occurrence, expressed as a percent, is the percentage of times a particular species occurred when there was aquatic vegetation present at the sampling site.*

[c] *Average rake fullness is the average amount, on a scale of 0 to 3, of a particular species at each site where that species was retrieved by the rake.*

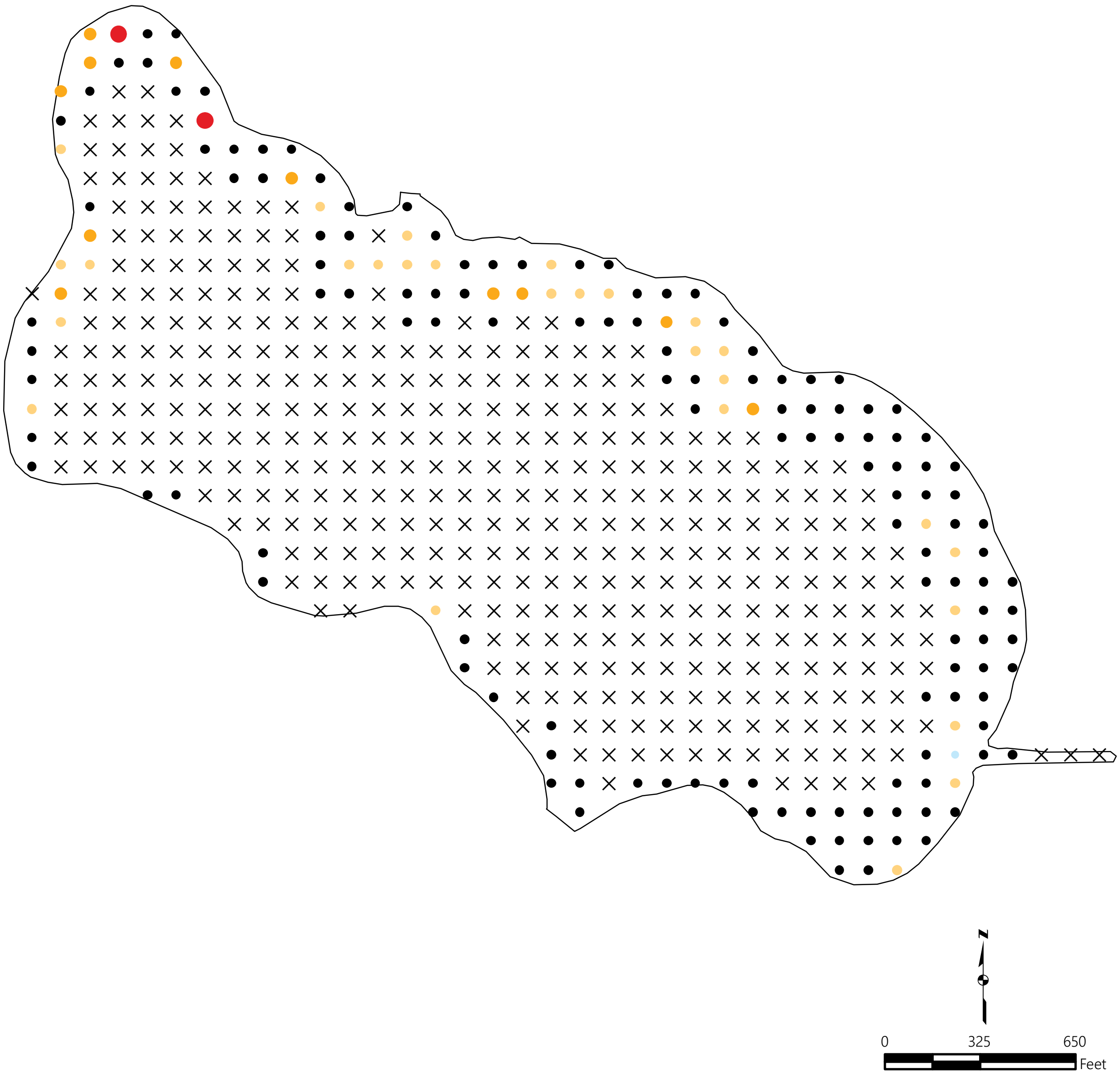
[d] *Relative Frequency of Occurrence, expressed as a percent, is the frequency of that particular species compared to the frequencies of all species present.*

[e] *Visual Sightings is the number of sites where that particular species was visually observed within six feet of the actual rake haul location but was not actually retrieved on the rake and was not, therefore, assigned a rake fullness measurement for that site. At sites where this occurred, the species was simply marked as "present" at that site. Recording the number of visual sightings helps give a better picture of species distribution throughout the lake.*

[f] *Considered a high-value aquatic plant species known to offer important values in specific aquatic ecosystems under Section NR 107.08 (4) of the* Wisconsin Administrative Code.

Source: Wisconsin Department of Natural Resources and SEWRPC

Figure 2.7
Change in Eurasian Watermilfoil in Friess Lake: 2021-2024



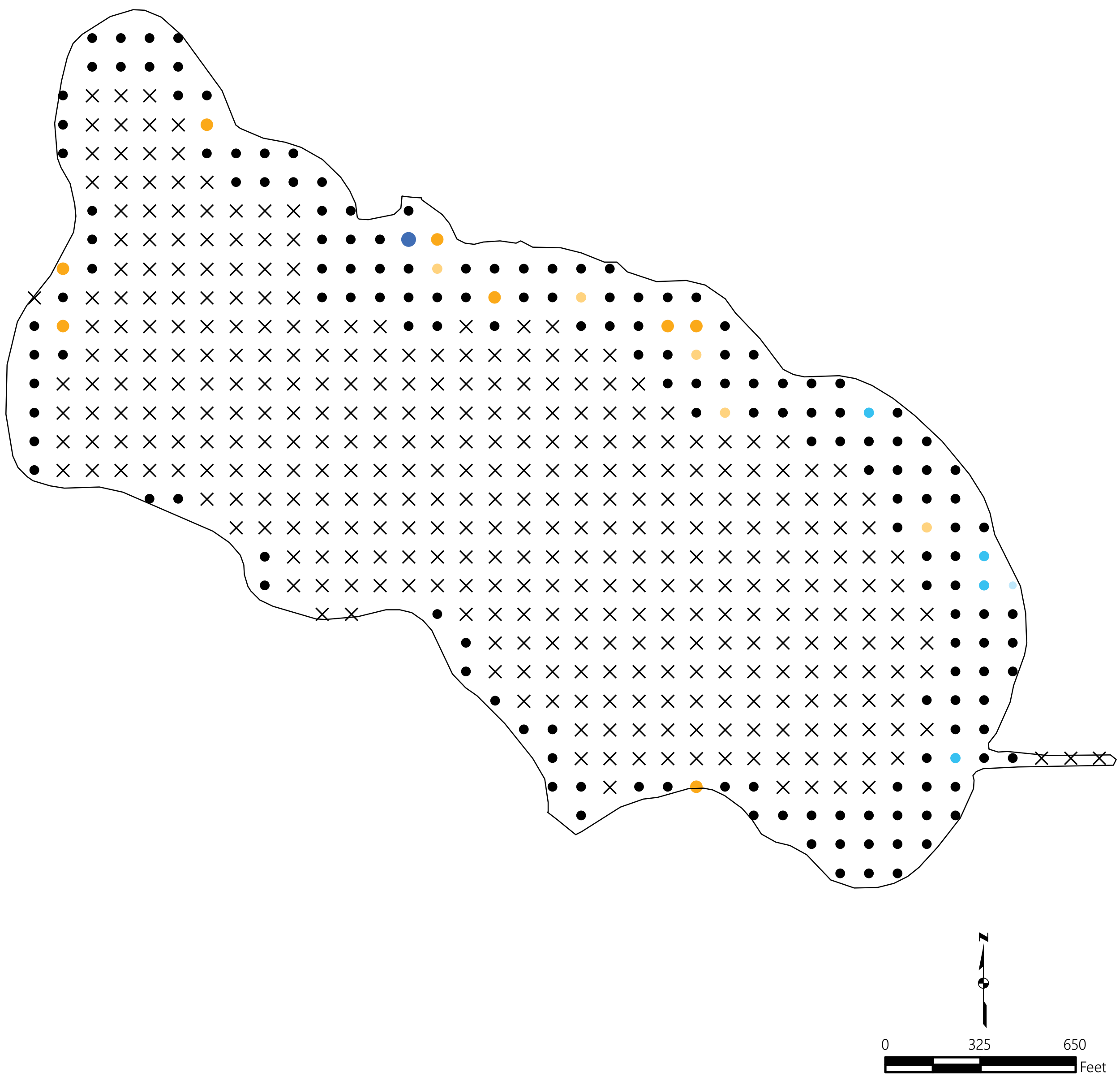
Source: WDNR and SEWRPC

Note: Survey was conducted on Friess lake on June 24th, 2024.

CHANGE IN RAKE FULLNESS

●	-0.5	×	NOT SAMPLED
●	0.5	•	NEVER FOUND
●	1	■	NO CHANGE
●	2		

Figure 2.8
Change in Curly-Leaf Pondweed in Friess Lake: 2021-2024



Source: WDNR and SEWRPC

Note: Survey was conducted on Friess lake on June 24th, 2024.

SENSITIVE SPECIES RICHNESS

●	-0.5	×	NOT SAMPLED
●	-1	●	NEVER FOUND
●	-2	■	NO CHANGE
●	0.5		
●	1		

As was described earlier, sensitive aquatic plant species are the most vulnerable to human disturbance. Therefore, changes in sensitive species abundance can indicate the general magnitude of human disturbance derived stress on a waterbody's ecosystem. The number of sensitive species at each sample point during 2021 and 2024 were contrasted (see Figure 2.9). Overall, the sensitive species richness increased between 2021 and 2024. A few significant observations were noted:

- The most common sensitive "species" in the Lake in both the 2021 and 2024 surveys was slender naiad, found at four points in 2024. The least-found sensitive species was small pondweed (*Potamogeton pusillus*) which was found at one point in 2024.
- Sensitive species were distributed throughout the northern portion of the Lake; however, they were only found at five of the 173 surveyed points (<3 percent) in 2024 (see Figure 2.6).
- Gains and losses in the number of sensitive species at each survey point were distributed throughout the Lake, with more points losing sensitive species numbers than gaining them (see Figure 2.9).

Little Friess Lake Summary

This survey was the first aquatic plant point-intercept survey of Little Friess Lake and thus Commission staff could not evaluate changes over time from previous surveys. Table 2.6 presents a summary of the aquatic plant community in Little Friess Lake. Little Friess Lake had some similar aquatic plant species to Friess Lake, but was more vegetated, had a higher species richness, and contained species that were not observed in Friess Lake such as spikerush (*Eleocharis* spp.), forked duckweed (*Lemna trisulca*), Fries' pondweed (*Potamogeton friesii*), and common bladderwort (*Utricularia vulgaris*). Several of these species were only found within the northwestern channels of the Lake, which had a substantially different aquatic plant community than the main Lake body. Unlike Friess Lake, much of the Lake shoreline is undeveloped and no aquatic plant management is known to occur within Little Friess Lake.

2.3 PAST AND PRESENT AQUATIC PLANT MANAGEMENT PRACTICES

While many lakes in Southeastern Wisconsin managed their aquatic plant populations prior to 1950, the WDNR did not regulate nor record those management practices and efforts. Chemical treatment of aquatic plants has long been the main strategy for managing aquatic plant populations on Friess Lake with its use documented starting in the early 1950s as shown in Table 2.7. From the early 1970s to the early 1980s, copper sulphate was the primary chemical used in the Lake. By the mid-1980s, a variety of chemicals were used on Friess Lake including Cutrine and Cutrine Plus, 2,4-D, Diquat, and Endothall. Most recently, in 2020 and 2021 chemicals such as Tribune, Aquathol K, Pondzilla Adjuvant and Aquasticker Adjuvant were used to treat Friess Lake's aquatic plant community. In addition to organized treatments of the lakes, individual riparian landowners have received permits to treat the areas directly adjacent to their properties. Most recently Tribune, Pondzilla Adjuvant, AquaSticker Adjuvant, Cutrine-Plus, Citrine-Ultra, and Aquathol-K have been used to manage aquatic plants in Friess Lake.

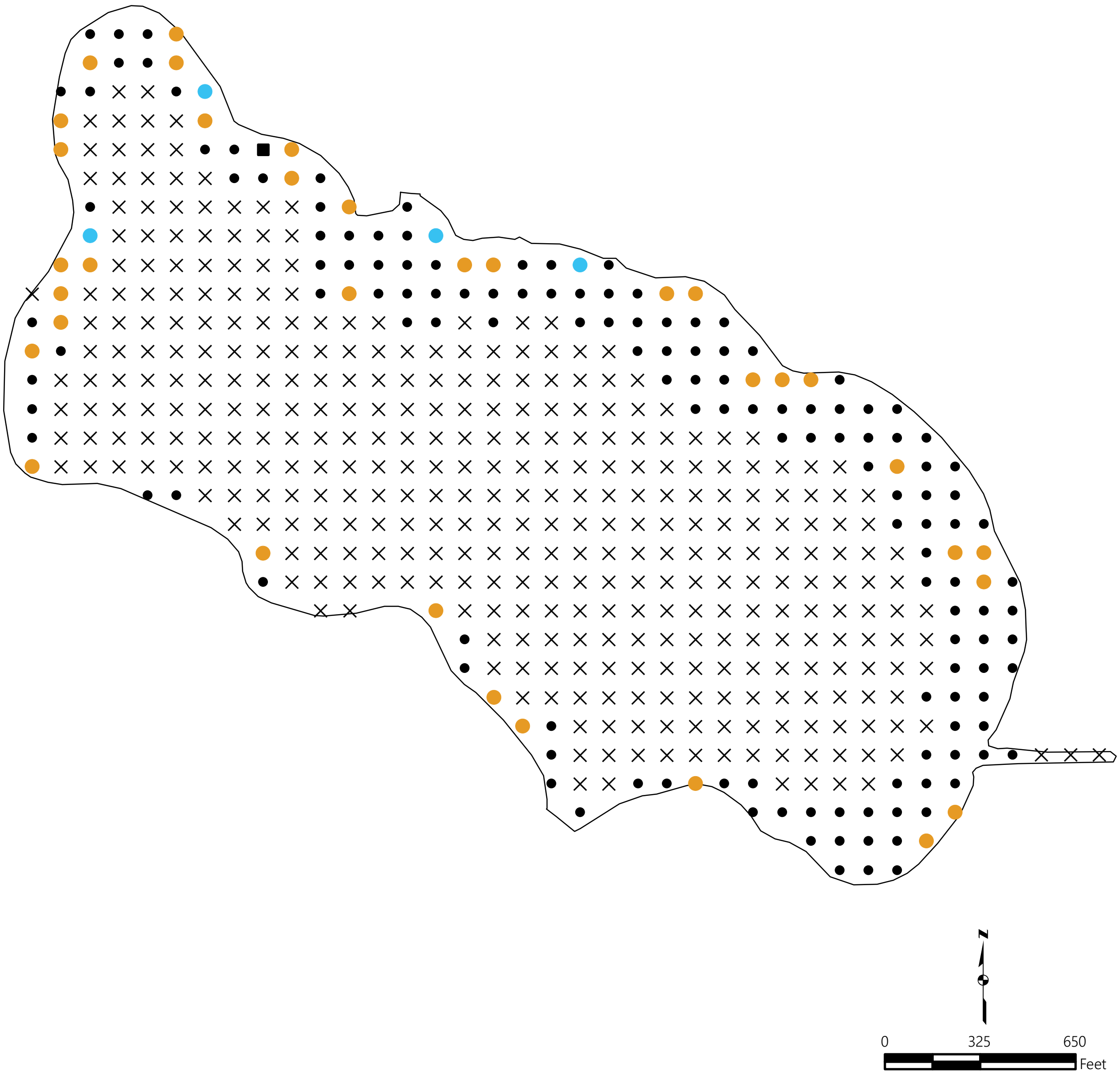
Harvesting of aquatic plants as a management strategy has not been widely used by the Association. Diver Assisted Suction Harvesting (DASH) has been used sparingly around individual riparian property owners' docks in 2022 on Friess Lake.

2.4 POTENTIAL AQUATIC PLANT CONTROL METHODOLOGIES

Aquatic plant management techniques can be classified into six categories.

- *Physical measures* include lake bottom coverings
- *Biological measures* include the use of organisms such as herbivorous insects
- *Manual measures* involve physically removing plants by hand or using hand-held tools such as rakes
- *Mechanical measures* rely on artificial power sources and remove aquatic plants with a machine known as a harvester or by suction harvesting

Figure 2.9
Change in Sensitive Species Richness in Friess Lake: 2021-2024



Source: WDNR and SEWRPC

Note: Survey was conducted on Friess lake on June 24th, 2024.

SENSITIVE SPECIES RICHNESS

- -1
- 1
- NOT SAMPLED
- NEVER FOUND
- NO CHANGE

Table 2.6
Little Friess Lake Aquatic Plant Survey Summary: July 2024

Aquatic Plant Species	Native or Invasive	Number of Sites Found[a]	Frequency of Occurrence Within Vegetated Areas[b]	Average Rake Fullness[c]	Relative Frequency of Occurrence[d]	Visual Sightings[e]
Ceratophyllum demersum (coontail)	Native	51	85.00	1.41	36.4	0
Chara spp. (muskgrass)	Native	2	3.33	1.00	1.4	0
Eleocharis spp. (spikerush)	Native	0	0	0	0	2
Elodea canadensis (waterweed)	Native	3	5.00	1.00	2.1	0
Lemna minor (duckweed)	Native	12	20.00	1.00	8.6	9
Lemna trisulca (forked duckweed)	Native	0	0	0	0	1
Myriophyllum spicatum (Eurasian watermilfoil)	Invasive	24	40.00	1.17	17.1	12
Najas flexilis (slender naiad)	Native	1	1.67	1.00	0.7	0
Nuphar variegata (spatterdock)[g]	Native	2	3.33	1.00	1.4	3
Nymphaea odorata (white water lily)	Native	8	13.33	1.00	5.7	16
Potamogeton crispus (curly-leaf pondweed)	Invasive	7	11.67	1.00	5.0	4
Potamogeton foliosus (Leafy pondweed)	Native	2	3.33	1.00	1.4	1
Potamogeton friesii (Fries' pondweed)	Native	1	1.67	1.00	0.7	1
Potamogeton pusillus (small pondwed)	Native	1	1.67	1.00	0.7	1
Ranunculus aquatilis (white water crowfoot)	Native	1	1.67	1.00	0.7	2
Riccia flutian (slender Riccia)	Native	0	0	0	0	1
Sagittaria sp. (arrowhead)	Native	0	0	0	0	2
Schenoplectus tabernaemontani. (soft stem bullrush)	Native	0	0	0	0	2
Spirodela polyrhiza (large duckweed)	Native	3	5.00	1.00	2.1	11
Stuckenia pectinata (Sago pondweed) [f]	Native	11	18.33	1.00	7.9	5
Typha spp. (cattail)	Native	0	0	0	0	1
Utricularia vulgaris (bladderwort)	Native	4	6.67	1.00	2.9	2
Wolffia spp. (watermeal)	Native	7	11.67	1.14	5.0	15

Note: Sampling occurred at 86 sampling sites on June 25th, 2024. 60 of the 86 surveyed sites had vegetation. Red text indicates non-native and/or invasive species.

[a] *Number of Sites refers to the number of sites at which the species was retrieved and identified on the rake during sampling.*

[b] *Frequency of Occurrence, expressed as a percent, is the percentage of times a particular species occurred when there was aquatic vegetation present at the sampling site.*

[c] *Average rake fullness is the average amount, on a scale of 0 to 3, of a particular species at each site where that species was retrieved by the rake.*

[d] *Relative Frequency of Occurrence, expressed as a percent, is the frequency of that particular species compared to the frequencies of all species present.*

[e] *Visual Sightings is the number of sites where that particular species was visually observed within six feet of the actual rake haul location but was not actually retrieved on the rake and was not, therefore, assigned a rake fullness measurement for that site. At sites where this occurred, the species was simply marked as "present" at that site. Recording the number of visual sightings helps give a better picture of species distribution throughout the lake.*

[f] *Considered a high-value aquatic plant species known to offer important values in specific aquatic ecosystems under Section NR 107.08 (4) of the* Wisconsin Administrative Code.

Source: Wisconsin Department of Natural Resources and SEWRPC

Table 2.7
Aquatic Plant Chemical Control Agents Applied to Friess Lake: 1954-2024

Year	Copper Sulfate (pounds)	2,4-D (gallons)	Diquat (gallons)	Tribune (gallons)	Pondzilla Adjuvant (gallons)	AquaSticker Adjuvant (pounds)	Cutrine or Cutrine-Plus (gallons)	Citrine-Ultra (gallons)	Endothall/ Aquathol K (gallons)	Sodium Arsenite (pounds)
1954	--	--	--	--	--	--	--	--	--	400
1955-1971	--	--	--	--	--	--	--	--	--	--
1972	160	--	--	--	--	--	--	--	--	--
1973	200	--	--	--	--	--	--	--	--	--
1974	190	--	--	--	--	--	--	--	--	--
1975	210	--	--	--	--	--	--	--	--	--
1976	200	--	--	--	--	--	--	--	--	--
1977	200	--	--	--	--	--	--	--	--	--
1978	--	--	--	--	--	--	--	--	--	--
1979	100	--	--	--	--	--	--	--	--	--
1980	190	--	--	--	--	--	--	--	--	--
1981	130	--	--	--	--	--	--	--	--	--
1982	150	--	--	--	--	--	--	--	--	--
1983	--	--	--	--	--	--	--	--	--	--
1984	--	0.5	--	--	--	--	75	--	--	--
1985	--	--	--	--	--	--	--	--	--	--
1986	--	0.5	--	--	--	--	--	--	--	--
1987	--	0.5 + 4 lbs	--	--	--	--	29.6 lbs + 225	--	195 lbs	--
1988	--	1.0 + 54 lbs	--	--	--	--	0.50	--	0.50	--
1989	--	--	--	--	--	--	--	--	--	--
1990	--	26.0	--	--	--	--	--	--	--	--
1991	--	41.0	6.00	--	--	--	6.00	--	--	--
1992	--	--	--	--	--	--	--	--	--	--
1993	--	30.0	--	--	--	--	27.50	--	--	--
1994	--	--	2.00	--	--	--	0.40	--	2.50	--
1995	--	--	7.50	--	--	--	7.50	--	7.50	--
1996	--	5.5	2.50	--	--	--	2.50	--	2.50	--
1997	--	--	3.25	--	--	--	3.25	--	3.25	--
1998	--	--	--	--	--	--	--	--	--	--
1999	3.0 gal	-	3.50	--	--	--	--	--	--	--
2000	--	--	--	--	--	--	--	--	--	--
2001	--	--	3.50	--	--	--	2.75	--	2.75	--
2002	--	--	3.00	--	--	--	2.00	--	3.25	--
2003	--	--	2.25	--	--	--	2.25	--	2.25	--
2004-2019	--	--	--	--	--	--	--	--	--	--
2020	--	--	--	8.75	14.0	7.0	--	10.5	10.5	--
2021	--	--	--	7.5	--	--	5.0	--	25.0	--
2022-2024	--	--	--	--	--	--	--	--	--	--
Total	1,730 lbs + 3.0 gal	105 lbs + 279.65 gal	33.50 gal	16.25 gal	14.0 gal	7.0 lbs	29.6 lbs + 363.25 gal	10.5 gal	195 lbs + 60 gal	400 lbs

Source: WDNR, Friess Lake Advancement Association, and SEWRPC

- *Chemical measures* use aquatic herbicides to kill nuisance and nonnative plants *in-situ*
- *Water level manipulation measures* utilize fluctuations in water levels to reduce aquatic plant abundance and promote growth of specific native species

All aquatic plant control measures are stringently regulated and most require a State of Wisconsin permit. Chemical controls, for example, require a permit and are regulated under *Wisconsin Administrative Code* Chapter NR 107, "Aquatic Plant Management", while placing bottom covers (a physical measure) requires a WDNR permit under Chapter 30 of the *Wisconsin Statutes*. All other aquatic plant management practices are regulated under *Wisconsin Administrative Code* Chapter NR 109, "Aquatic Plants: Introduction, Manual Removal and Mechanical Control Regulations." Furthermore, the aquatic plant management measures described in this plan are consistent with the requirements of Chapter NR 7, "Recreational Boating Facilities Program," and with the public recreational boating access requirements relating to eligibility under the State cost-share grant programs set forth in *Wisconsin Administrative Code* Chapter NR 1, "Natural Resources Board Policies." Water level manipulations require a permit and are regulated under *Wisconsin Statutes* 30.18 and 31.02.[17,18] More details about each aquatic plant management category are discussed in the following sections, while recommendations are provided later in this document.

Non-compliance with aquatic plant management permit requirements is an enforceable violation of Wisconsin law and may lead to fines and/or complete permit revocation. The information and recommendations provided in this memorandum help frame permit requirements. Permits can cover up to a five-year period.[19] At the end of that period, the aquatic plant management plan must be updated. The updated plan must consider the results of a new aquatic plant survey and should evaluate the success, failure, and effects of earlier plant management activities that have occurred on the lake.[20] These plans and plan execution are reviewed and overseen by the WDNR regional lakes and aquatic invasive species coordinators.[21]

Physical Measures

Lake-bottom covers and light screens provide limited control of rooted plants by creating a physical barrier that reduces or eliminates plant-available sunlight. Various materials such as pea gravel or synthetics like polyethylene, polypropylene, fiberglass, and nylon can be used as covers. The longevity, effectiveness, and overall value of some physical measures is questionable. The WDNR does not permit these kinds of controls. Consequently, lake-bottom covers are not a viable aquatic plant control strategy for the Lake.

Biological Measures

Biological control offers an alternative to direct human intervention to manage nuisance or exotic plants. Biological control techniques traditionally use herbivorous insects that feed upon nuisance plants. This approach has been effective in some southeastern Wisconsin lakes.[22] For example, milfoil weevils (*Eurhychiopsis lecontei)* have been used to control EWM. Milfoil weevils do best in waterbodies with balanced panfish populations,[23] where dense EWM beds reach the surface close to shore, where natural shoreline areas include leaf litter that provides habitat for over-wintering weevils, and where there is comparatively little boat traffic. This technique is not presently commercially available, making the use of milfoil weevils non-viable.

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[17] *docs.legis.wisconsin.gov/statutes/statutes/30/ii/18.*

[18] *docs.legis.wisconsin.gov/statutes/statutes/31/02.*

[19] *Five-year permits allow a consistent aquatic plant management plan to be implemented over a significant length of time. This process allows the selected aquatic plant management measures to be evaluated at the end of the permit cycle.*

[20] *Aquatic plant harvesters must report harvesting activities as one of the permit requirements.*

[21] *Information on the current aquatic invasive species coordinator is found on the WDNR website.*

[22] *B. Moorman, "A Battle with Purple Loosestrife: A Beginner's Experience with Biological Control,"* LakeLine *17(3): 20-21, 34-37, September 1997; see also, C.B. Huffacker, D.L. Dahlsen, D.H. Janzen, and G.G. Kennedy, Insect Influences in the Regulation of Plant Population and Communities, pp. 659-696, 1984; and C.B. Huffacker and R.L. Rabb, editors,* Ecological Entomology*, John Wiley, New York, New York, USA.*

[23] *Panfish such as bluegill and pumpkinseed are predators of herbivorous insects. High populations of panfish lead to excess predation of milfoil weevils.*

Manual Measures

Manually removing specific types of vegetation is a highly selective means of controlling nuisance aquatic plant growth, including invasive species such as EWM. Two commonly employed methods include hand raking and hand pulling. Both physically remove target plants from a lake. Since the vast majority of plant stems, leaves, roots, and seeds are actively removed from the lake, the reproductive potential and nutrients contained by pulled/raked plants material is also removed. These plants, seeds, and nutrients would otherwise re-enter the lake's water column or be deposited on the lake bottom. Hence, this aquatic plant management technique helps incrementally maintain water depth, improves water quality, and can help decrease the spread of nuisance/exotic plants. Hand raking and hand pulling are readily allowed by WDNR and are practical methods to control riparian landowner scale problems.

Raking with specially designed hand tools is particularly useful in shallow nearshore areas. This method allows nonnative plants to be removed and provides a safe and convenient aquatic plant control method in deeper nearshore waters around piers and docks. Advantages of this method include:

- Tools are inexpensive ($100 to $150 each)
- The method is easy to learn and use
- It may be employed by riparian landowners without a permit if certain conditions are met
- Results are immediately apparent
- Plant material is immediately removed from a lake (including seeds)[24]

The second manual control method, hand-pulling whole plants (stems, roots, leaves, seeds) where they occur in isolated stands, is a simple means to control nuisance and invasive plants in shallow nearshore areas that may not support large-scale initiatives. This method is particularly helpful when attempting to target nonnative plants (e.g., EWM, curly-leaf pondweed) during the high growth season when native and nonnative species often mix. Hand pulling is more selective than raking, mechanical removal, and chemical treatments, and, if carefully applied, is less damaging to native plant communities. Recommendations regarding hand-pulling, hand-cutting, and raking are discussed later in this document.

Mechanical Measures

Two methods of mechanical harvesting are currently employed in Wisconsin—mechanical harvesting and suction harvesting. Both are regulated by WDNR and require a permit.[25]

Mechanical Harvesting

Aquatic plants can be mechanically gathered using specialized equipment commonly referred to as harvesters. Harvesters use an adjustable depth cutting apparatus that can cut and remove plants from the water surface to up to about five feet below the water surface. The harvester gathers cut plants with a conveyor, basket, or other device. Mechanical harvesting is often a very practical and efficient means to control nuisance plant growth and is widely employed in Southeastern Wisconsin.

In addition to controlling plant growth, gathering and removing plant material from a lake reduces in-lake nutrient recycling, sedimentation, and targets plant reproductive potential. In other words, harvesting removes plant biomass, which would otherwise decompose and release nutrients, sediment, and seeds or other reproductive structures (e.g., turions, bulbils, plant fragments) into a lake. Mechanical harvesting is particularly effective and popular for large-scale open-water projects. However, small harvesters are also produced that are particularly suited to working around obstacles such as piers and docks in shallow nearshore areas.

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[24] *Most of the material is removed during raking, however fragmentation/local spread from raking can occur in addition to fragmentation/local spread from wave action/other mechanical disruption.*

[25] *Mechanical control permit conditions depend upon harvesting equipment type and specific equipment specifications.*

An advantage of mechanical harvesting is that the harvester, when properly operated, "mows" aquatic plants and, therefore, typically leaves enough living plant material in place to provide shelter for aquatic wildlife and stabilize lake-bottom sediment. Harvesting, when done properly, does not kill aquatic plants, it simply trims plants back. Aside from residual plant mass remaining because of imperfect treatment strategy execution, none of the other aquatic plant management methods purposely leave living plant material in place after treatment. Aquatic plant harvesting has been shown to allow light to penetrate to the lakebed and stimulate regrowth of suppressed native plants. This is particularly effective when controlling invasive plant species that commonly grow quickly early in the season (e.g., EWM, curly-leaf pondweed) when native plants have not yet emerged or appreciably grown.

A disadvantage of mechanical harvesting is that the harvesting process may fragment plants and thereby unintentionally propagate EWM and curly-leaf pondweed. EWM fragments are particularly successful in establishing themselves in areas where plant roots have been removed. This underscores the need to avoid harvesting or otherwise disrupting native plant roots. Harvesting may also agitate bottom sediments in shallow areas, thereby increasing turbidity and resulting in deleterious effects such as smothering fish breeding habitat and nesting sites. To this end, most WDNR-issued permits do not allow deep-cut harvesting in water less than three feet deep,[26] which limits the utility of this alternative in many littoral and shoal areas. Nevertheless, if employed correctly and carefully under suitable conditions, harvesting can benefit navigation lane maintenance and can reduce regrowth of nuisance plants while maintaining, or even enhancing, native plant communities.

Cut plant fragments commonly escape the harvester's collection system and form mats or accumulate on shorelines. In addition, boating activity can fragment aquatic plants and also contribute to accumulations of cut plant fragments in the lake or along the shoreline. To compensate for this, most harvesting programs include a plant pickup program. Some plant pickup programs use a harvester to gather and collect significant accumulations of floating plant debris as well as sponsor regularly scheduled aquatic plant pick up from lakefront property owner docks. Property owners are encouraged to actively rake plant debris along their shorelines and place these piles on their docks for collection. This kind of program, when applied systematically, can reduce plant propagation from plant fragments and can help alleviate the negative aesthetic consequences of plant debris accumulating on shorelines. Nevertheless, it is important to remember that normal boating activity (particularly during summer weekends) often creates far more plant fragments than generated from mechanical harvesting. Therefore, a plant pickup program is often essential to protect a lake's health and aesthetics, even in areas where harvesting has not recently occurred.

Suction Harvesting, DASH, and Diver-Assisted Hand Pulling

Another mechanical plant harvesting method uses suction to remove aquatic plants from a lake. Suction harvesting removes sediment, aquatic plants, plant roots, and anything else from the lake bottom and disposes this material outside the lake. Since bottom material is removed from the lake, this technique also requires a dredging permit in addition to the aquatic plant management permit.

First permitted in 2014, DASH is a mechanical process where divers identify and pull select aquatic plants and roots from the lakebed and then insert the entire plant into a suction hose that transports the plant to the surface for collection and disposal. The process is a mechanically assisted method for hand-pulling aquatic plants. Such labor-intensive work by skilled professional divers is, at present, a costly undertaking and long-term monitoring will need to evaluate the efficacy of the technique. If the Association or individual property owners choose to employ DASH, a NR 109 permit is required. Nevertheless, many apparent advantages are associated with this method including: 1) lower potential to release plant fragments when compared to mechanical harvesting, raking, and hand-pulling, thereby reducing spread and growth of invasive plants like EWM; 2) increased selectivity of plant removal when compared to mechanical harvesting which in turn reduces native plant loss; and 3) lower potential for disturbing fish habitat.

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[26] *Deep-cut harvesting is harvesting to within one foot of the lake bottom. This is not allowed in shallow water because it is challenging to ensure that the harvester avoids lake-bottom contact in such areas.*

Water Level Manipulation Measures

Manipulating water levels can also be an effective method for controlling aquatic plant growth and restoring native aquatic plant species, particularly emergent species such as bulrush and wild rice.[27] In Wisconsin, water level manipulation is considered to be most effective by using winter lake drawdowns, which expose lake sediment to freezing temperatures while avoiding conflict with summer recreational uses. One to two months of lake sediment exposure can damage or kill aquatic plant roots, seeds, and turions through freezing and/or desiccation. As large areas of lake sediment need to remain exposed for extended periods, water level manipulation is most cost effective in lakes with operable dam gates that can provide fine levels of control of water elevations within the lake. In lakes without dams, high capacity water pumping can be used to reduce lake levels at much greater cost. Given that the Lakes do not have an outlet dam, water level manipulation is not considered a viable form of aquatic plant management on the Lakes.

[27] *For detailed literature reviews on water level manipulation as an aquatic plant control measure, see C. Blanke, A. Mikulyuk, M. Nault, et al.,* Strategic Analysis of Aquatic Plant Management in Wisconsin*, Wisconsin Department of Natural Resources, pp. 167-171, 2019 as well as J.R. Carmignani and A.H. Roy, "Ecological Impacts of Winter Water Level Drawdowns on Lake Littoral Zones: A Review,"* Aquatic Sciences *79: 803-824, 2017.*

Credit: Commission Staff

3 MANAGEMENT RECOMMENDATIONS AND PLAN IMPLEMENTATION

This Chapter summarizes the information and recommendations needed to manage aquatic plants in Friess and Little Friess Lakes, particularly the nonnative species of Eurasian watermilfoil (EWM) and curly-leaf pondweed (CLP). Accordingly, it presents a range of alternatives that could potentially be used, and provides specific recommendations related to each alternative. The measures discussed focus on those that can be implemented by Friess Lake Advancement Association (Association) in collaboration with the Wisconsin Department of Natural Resources (WDNR) and Lake residents. The aquatic plant management recommendations contained in this chapter are limited to approaches that monitor and control nuisance level aquatic plant growth in the Lake after the growth has already occurred.

The individual recommendations presented below, and which collectively constitute the recommended aquatic plant management plan, balance three major goals:

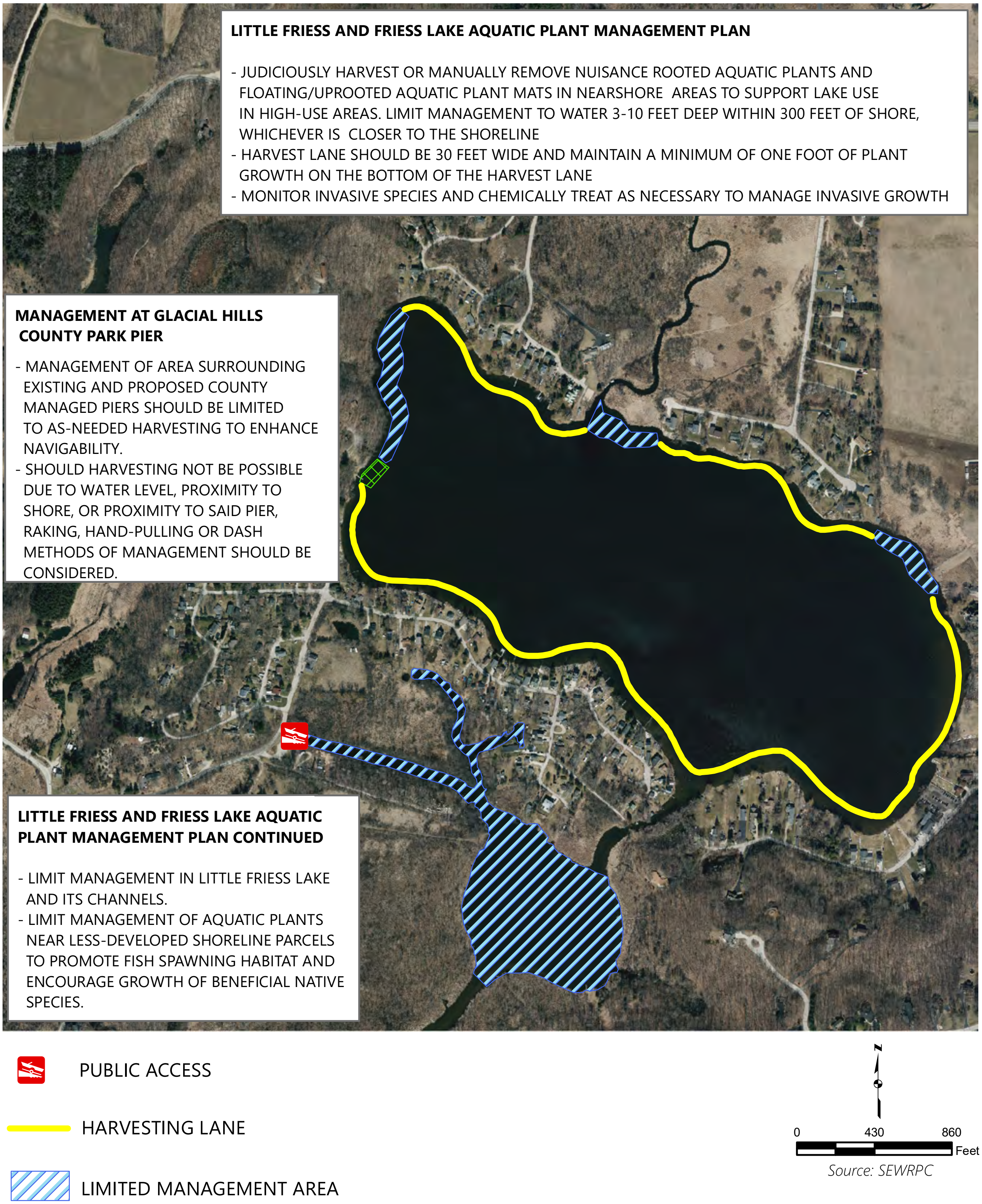
- Improving navigational access within the Lake
- Protecting the native aquatic plant community
- Controlling CLP, EWM, and hybrid watermilfoil populations

Plan provisions also ensure that current recreational uses of the Lakes (e.g., swimming, boating, fishing) are maintained or promoted. The plan recommendations described below consider common, State-approved, aquatic plant management alternatives including manual, biological, physical, chemical, and mechanical measures.

3.1 RECOMMENDED AQUATIC PLANT MANAGEMENT PLAN

The most effective plans to manage nuisance and invasive aquatic plant growth rely on a combination of methods and techniques as well as consideration of when and where these techniques should be applied. The recommended aquatic plant management plan is presented in Figure 3.1 and recommended management techniques are briefly summarized in the following paragraphs. These management techniques were discussed with both the Association and the WDNR.

Figure 3.1
Aquatic Plant Management Reccomendations for Friess and Little Friess Lakes: 2025-2029



Source: SEWRPC

Aquatic Plant Management Recommendations

The most effective plans to manage nuisance and invasive aquatic plant growth rely on a *combination* of methods and techniques. A "silver bullet" single-minded strategy rarely produces the most efficient, most reliable, or best overall result. This plan recommends three primary aquatic plant management techniques: mechanical harvesting, chemical treatment, and invasive species prevention. Each of these techniques have custom adaptations for the conditions present in certain portions of the Lakes. Figure 3.1 illustrates the overall aquatic plant recommendations for Friess Lake. Minimal management has been conducted on Little Friess Lake, and it is recommended that this hands off approach be continued. These methods are combined to form the recommended Friess Lake aquatic plant management program. The elements of this program are listed below.

1. **Mechanically harvest invasive and nuisance aquatic plants.** Mechanical harvesting should remain the primary means to manage invasive and nuisance aquatic plants on Friess Lake. Harvesting must avoid, or must be substantially restricted, in certain areas of the Lake. This includes areas of greater ecological value, areas that provide unique habitat, areas that are difficult to harvest due to lake morphology (e.g., excessively shallow water depth), and where boat access is not desired or necessary (e.g., marshland areas).

2. **Manually remove nearshore invasive and nuisance plant growth.** Manual removal involves controlling aquatic plants by hand or using hand-held non-powered tools. Manual removal does not require a permit if riparian landowners remove only invasive plants without injuring native plants or remove nuisance native aquatic plants along 30 or less feet of shoreline (inclusive of dock, pier, and other lake access areas) and generally not more than 100 feet into the lake.

3. **Early spring chemical treatment, if nuisance plant growth impedes Lake access.** Treatment should be limited to Eurasian water milfoil and curly-leaf pondweed infested areas of the Lake where navigation is impeded. If chemical treatment is used, it should only occur in the early spring when human contact and risks to native plants are most limited, and not after July 1st. A WDNR permit and WDNR staff supervision are required to implement this alternative. Lakeshore property owners must be notified of planned chemical treatment schedules and permit conditions before chemicals are applied to the lake. This recommendation should be considered a <u>low priority</u>.

4. **Invasive species plant control.** While the 2024 aquatic plant survey did not reveal a need to actively control Eurasian water milfoil or curly-leaf pondweed, these plants should still be monitored. As aquatic plant community species change, the need for management changes. This is particularly true in heavily used shallow areas. Populations should be controlled with top-cut harvesting and early spring chemical treatments. This recommendation should be considered a <u>high priority</u>.

5. **Manual removal of nuisance plant growth in near-shore areas and Eurasian water milfoil** should be considered in areas too shallow, inaccessible, or otherwise unsuitable for other plant control methods**. "**Manual removal" is defined as control of aquatic plants by hand or using hand-held non- powered tools. Given what is known of plant distribution, this option is given a <u>medium priority</u>. Riparian landowners need not obtain a permit for manually removing aquatic plants if they confine this activity to a 30-foot width of shoreline (including the recreational use area such as a pier) that does not extend more than 100 feet into the Lakes and they remove all resulting plant materials from the Lake.[28] A permit *is* required if the property owner lives adjacent to a sensitive area or if the Association or other group actively engages in such work.[29] Prior to the "raking/hand-pulling" season, an educational campaign should be actively conducted to help assure that shoreline residents appreciate the value of native plants, understand the relationship between algae and plants (i.e., more algae will grow if fewer plants remain), know the basics of plant identification, and the specifics about the actions they are allowed to legally take to "clean up" their shorelines.[30]

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[28] *The manual removal area limitation for nearshore aquatic plants applies to shorelines where native plants are present. The removal area limitation does not apply to areas populated solely with nonnative and invasive plants.*

[29] *If a lake district or other group wants to remove invasive species along the shoreline, a permit is necessary under Chapter NR 109, "Aquatic Plants: Introduction, Manual Removal and Mechanical Control Regulations," of the* Wisconsin Administrative Code, *as the removal of aquatic plants is not being completed by an individual property owner along his or her property.*

[30] *The Southeastern Wisconsin Regional Planning Commission (Commission or SEWRPC) and WDNR staff could help review documents developed for this purpose.*

6. **Diver-Assisted Suction Harvesting or Hand-pulling.** Diver-assisted harvesting or hand-pulling is beneficial when conducting aquatic plant management in an area that a full-sized harvester may not be able to reach. Additionally, it is useful when targeting specific invasive species while keeping native species intact. This tactic may be useful when targeting smaller specific areas of Friess Lake.

7. **Begin participating in the Clean Boats Clean Waters program to monitor the public launch.**[31] Participation in this program proactively encourages lake users to clean boats and equipment before launching and using them in Friess and Little Friess Lakes.[32] This will help lower the probability of invasive species entering and leaving the lakes. The Village of Richfield maintains aquatic invasive species signage at the Wild Marsh Landing public access (see Figure 3.2).

8. **Stay abreast of best management practices to address invasive species.** The Association should regularly communicate with the Washington County Aquatic Invasive Species (AIS) Coordinator and WDNR staff about the most effective treatment options for invasive species as novel techniques and/or chemical products that may more effectively target these species become available.

9. **Protect high values sensitive species when found.** Avoid harvesting and disturbing sensitive species of aquatic plants to help preserve the diversity and quality of the plant community (see Figure 3.1).

Aquatic Plant Recommendations for Proposed Glacial Hills County Park

In late 2024, Washington County (County) announced plans to expand the public access to Friess Lake from Glacial Hills County Park, located on the western shore of Friess Lake. The County project would construct a new ADA boardwalk that leads to a large, permanent dock with a kayak launch (see Appendix B).[33] The project also seeks to improve the stormwater system to increase water quality on Friess Lake. As of January 2025, the project, expected to cost $1.2 million dollars, is pending grant funding from WDNR with match funding secured.[34]

While the project is not confirmed, aquatic plant management around the proposed area for the new dock should be considered. The proposed dock would have a larger footprint and likely see higher use than the current dock, consequently, there may be a need for more intensive plant management in this area to enhance recreational use. As necessary, harvesting could be used to enhance navigability from the dock to the main body of the lake by top-cutting plants towards the end of the dock. Should harvesting not be feasible due to water depth, then hand-raking or pulling near the dock should be considered if necessary to permit navigation to the main lake. Use of chemicals near the Glacial Hills County Park pier is not recommended due to its intended use as a recreational area.

Harvesting Conditions

Figure 3.1 illustrates the overall aquatic plant recommendations for Friess and Little Friess Lakes.[35] Aquatic plant harvesting to create access lanes should be considered a high priority. As can be seen on Figure 3.1, harvesting is recommended to create *access lanes* in areas of Friess Lake that may host dense aquatic plant growth, impeding boat access to and within the main body of the Lake. Harvesting along the near shore area should be limited to a 30-foot wide channel at a 3-foot depth. During low-water periods when the Lakes are too shallow for harvesting, use of chemical treatment should be considered to create an access lane as necessary. If the Association is unwilling or unable to acquire its own harvester, then the Association could consider contracting a local private harvesting firm if harvesting within the Lake is permitted through WDNR.

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[31] *Proposed development of the Glacial Hills County Park on the shore of Friess Lake would add additional public access. If this occurs, Clean Boats Clean Water and appropriate signage is encouraged to be present at the park and maintained by Washington County.*

[32] *Further information about Clean Boats Clean Waters can be found on the WDNR website at: dnr.wi.gov/lakes/cbcw.*

[33] *For a press release regarding the Glacial Hills Lakefront Development Project see www.washcowisco.gov/news/glacier_hills_lakefront_development_project.*

[34] *Email communication between Commission Staff and Washington County Assistant Natural Resource Director, Logan Bliss.*

[35] *Line width and locations are not scaled and only illustrate overall concept. The actual size, orientation, and depth of plant management activities depend upon sensitive area restrictions and permit conditions and site-specific factors. Site-specific factors include the composition of the plant community, water depth, shoreline configuration and obstacles, and other factors.*

Figure 3.2
Wild Marsh Landing Signage on Little Friess Lake: 2024

Source: SEWRPC

To assure sustainable recreational use and the long-term health of the Lake, the following conditions must be added to all aquatic plant harvesting practices:

1. **Maintain and operate harvesting equipment in conformance with manufacturer's recommendations.** For example, never operate the harvester in water shallower than the maximum draft range of the harvester and never operate with the cutter head or paddle wheels at or near the lake bottom.

2. **Inspect all cut plants for live animals. Immediately return live animals to the water.** When feasible, a second staff person equipped with a net could accompany and assist the harvester operator. Animals can be caught in the harvester and harvested plants, particularly when cutting larger plant mats. Consequently, carefully examine cut materials to avoid inadvertent harvest of fish, crustaceans, amphibians, turtles, and other animals.

3. **Harvesting should not occur in the early spring** to avoid disturbing fish spawning. Studies suggest that harvesting activities can significantly disturb the many fish species that spawn in early spring. Thus, avoiding harvesting during this time can benefit the Lakes' fishery.

4. **All harvester operators must successfully complete WDNR training to help assure adherence to harvesting permit specifications and limitations.** Harvester operators should 1) understand "deep-cut" versus "shallow-cut" techniques and when to employ each in accordance with this plan, 2) review of the aquatic plant management plan and associated permits with special emphasis focused on the need to restrict cutting in shallow areas, and 3) have plant identification skills to encourage preservation of native plant communities. Additionally, all harvester operators are obligated to record their work for inclusion in annual reports that are required under harvesting permits.

5. **Harvesting can fragment plants.** Plant fragments may float in the Lake, accumulate on shorelines, and help spread undesirable plants. The harvesting program should include a comprehensive plant pickup program that all residents can use. This helps ensure that harvesting and recreational boating does not create a nuisance for Lake residents. The program typically includes residents raking plants, placing them in a convenient location accessible to the harvester (e.g., the end of a pier), and regularly scheduled pickup of cut plants by the harvester operators. This effort should be as collaborative as practical.

6. **Proper disposal of aquatic plants is required.** All plant debris collected from harvesting activities must be collected and disposed of at the designated disposal sites. No aquatic plant material may be deposited within identified floodplain and wetland areas. Should the Association choose to harvest, maps indicating harvested plant material disposal routes and locations should be provided to WDNR for approval prior to the start of harvesting.

Future Funding

Current efforts pursued by the Association and lake residents have been effective suppressing aquatic invasive species populations. The Association should continue to utilize WDNR Surface Water Grants to further their efforts in monitoring the Lakes, inspecting watercraft at boat launches, and targeting areas for management. Key grant programs to fund these efforts are as follows:

- **Clean Boats, Clean Waters** – this grant program covers up to 75 percent of up to $24,000 to conduct watercraft inspections, collect data, educate boaters about invasive species, and reporting invasive species to the WDNR.

- **Aquatic Invasive Species Prevention** – this grant program covers up to 75 percent of either $4,000 or $24,000 for projects that help prevent the spread of AIS species. Eligible costs include the acquisition of decontamination equipment at public boat launches as well as targeted management at boat launches or other access points. All lakes are eligible for at least $4,000 in funding but lakes that are designated as high priorities for AIS spread statewide, due to large amounts of boat traffic and/or the presence of particular invasive species, are eligible for $24,000. Friess Lake has been designated as a high priority lake and is thus eligible for $24,000.[36] The Association should participate in the Clean Boats, Clean Waters program to gain eligibility for this grant program.

- **Aquatic Invasive Species Control** – this grant program covers up to 75 percent of up to $50,000 for small-scale projects and $150,000 for large-scale projects that suppress or reduce an AIS population within a lake. Given the current limited spread of EWM and CLP within the lakes, the small-scale project is more appropriate at this time. The large-scale projects should be considered if the populations of these species increase or a novel invasive species, such as starry stonewort, is observed within the lake. Aquatic Invasive Species Control grants fund projects that utilize integrated pest management and are designed to cause multi-season suppression of the target species. An approved aquatic plant management plan is a requirement to participate in this program and only approved recommendations from the plan are eligible projects for funding through this program.

- **Recreational Boating Facilities Grant Program**[37] – this grant program covers up to 50% of $250,00 for a recreational boating facility project. These projects can include aquatic plant harvesting equipment, rehabilitation of facilities, trash skimming equipment, improvement or repair of locks, construction projects such as ramps or dredging for safe water depths.

The Association should consider applying for these grant programs whenever feasible to support the monitoring, communication, watercraft inspection, and targeted management recommended in this aquatic plant management plan.

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[36] *See Appendix G of the WDNR Surface Water Grant program guidance: dnr.wisconsin.gov/sites/default/files/topic/Aid/grants/surfacewater/CF0002.pdf#page=25.*

[37] *dnr.wisconsin.gov/aid/RBF.html.*

3.2 SUMMARY AND CONCLUSIONS

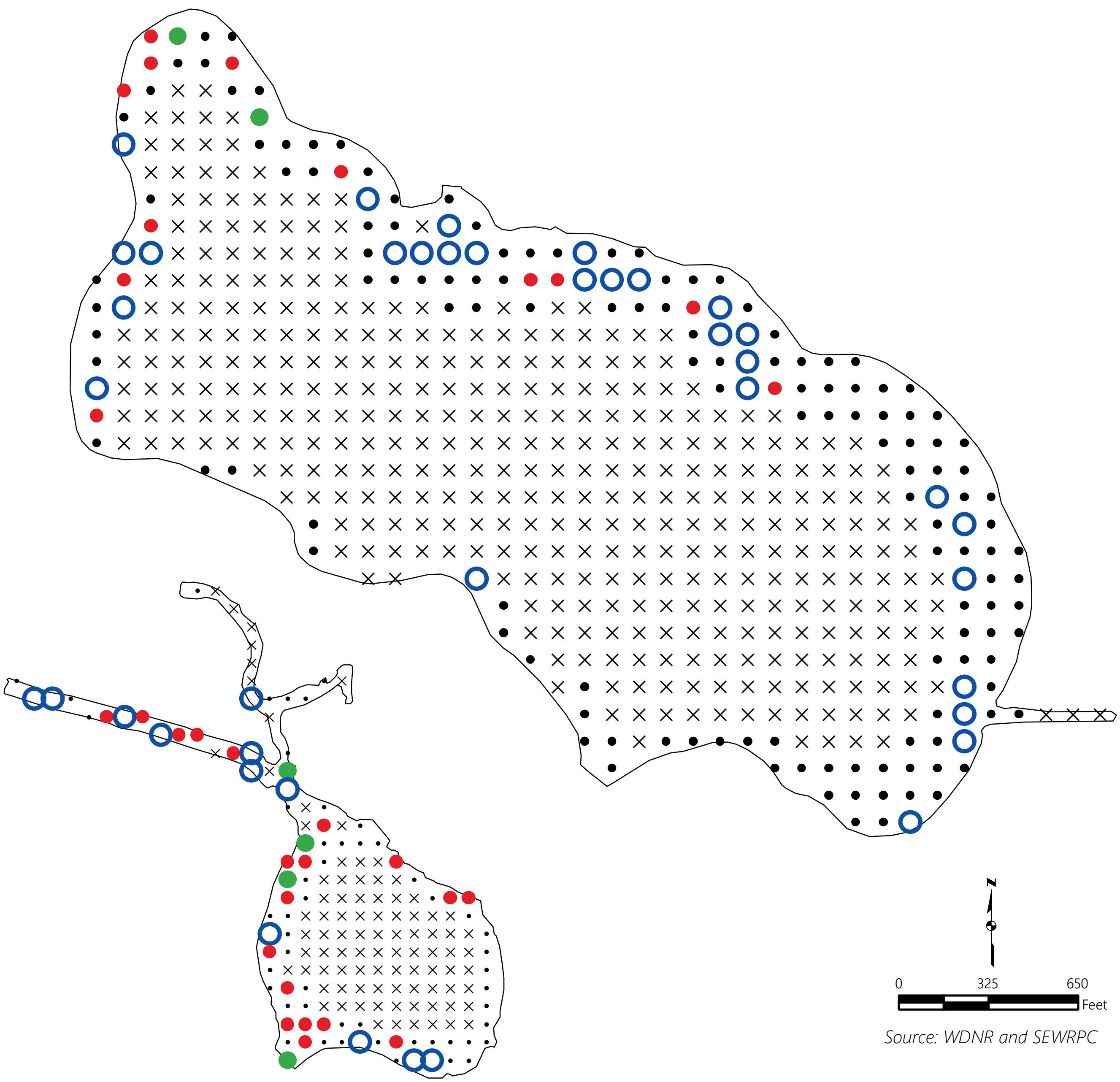
As requested by the Association, the Commission worked with the Association to develop a scope of work and secure funding to provide information needed to update the aquatic plant management plan. This report, which documents the findings and recommendations of the study, examines existing and anticipated conditions, potential aquatic plant management problems, and lake use. Conformant with the study's intent, the plan includes recommended actions and management measures as well as options for future funding. Figure 3.1 summarizes and locates where aquatic plant management recommendations should be implemented.

Successfully implementing this plan will require cooperative engagement from the Association, State and regional agencies, Washington County, municipalities, and residents/users of the Lakes. The recommended measures help foster conditions to sustain and enhance the natural beauty and ambience of Friess and Little Friess Lakes while promoting a wide array of water-based recreational activities suitable for the Lakes' intrinsic characteristics.

APPENDICES

FRIESS AND LITTLE FRIESS LAKES
RAKE FULLNESS OF AQUATIC PLANT SPECIES
APPENDIX A

Figure A.1
Eurasian Watermilfoil Total Rake Fullness in Friess and Little Friess Lakes: June 2024



Note: Survey was conducted on Friess lake on June 24th, 2024 and the survey was conducted on Little Friess Lake on June 25th, 2024.

RAKE FULLNESS RATING

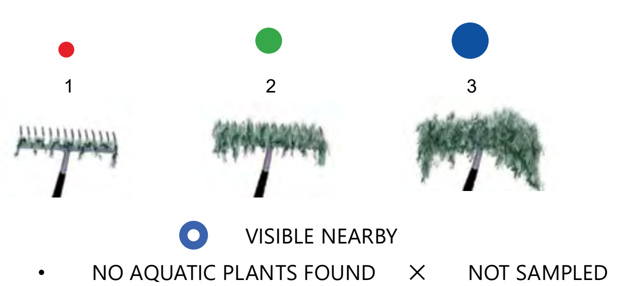
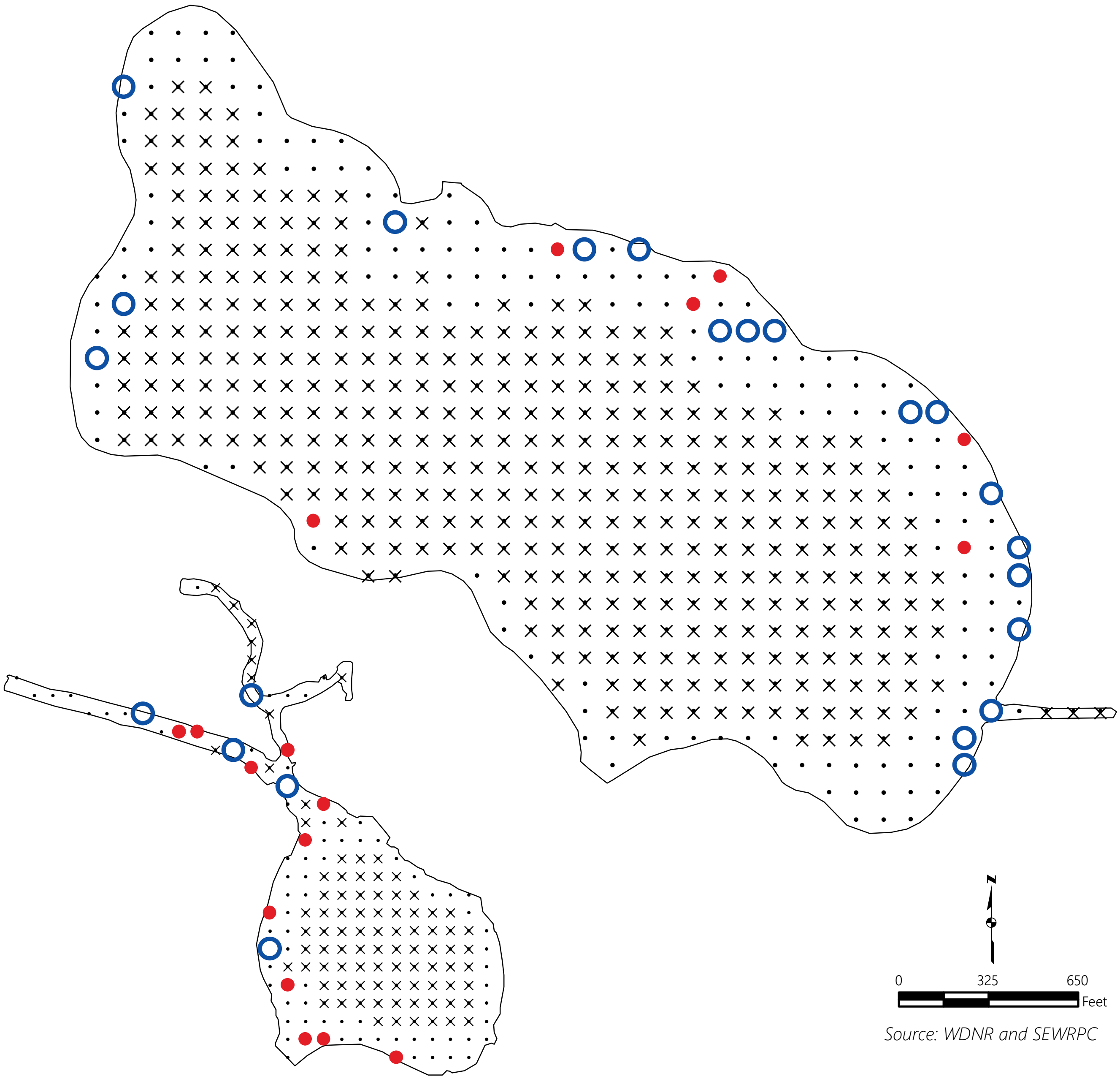


Figure A.2
Sago Pondweed Rake Fullness in Friess and Little Friess Lakes: June 2024



Source: WDNR and SEWRPC

Note: Survey was conducted on Friess lake on June 24th, 2024 and the survey was conducted on Little Friess Lake on June 25th, 2024.

RAKE FULLNESS RATING

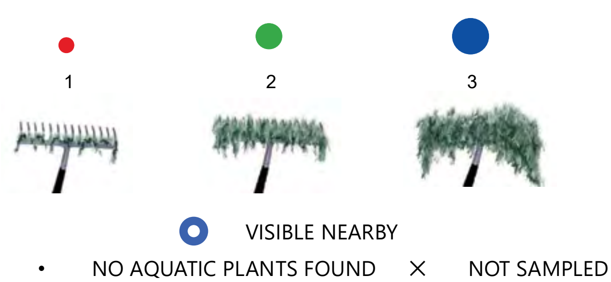
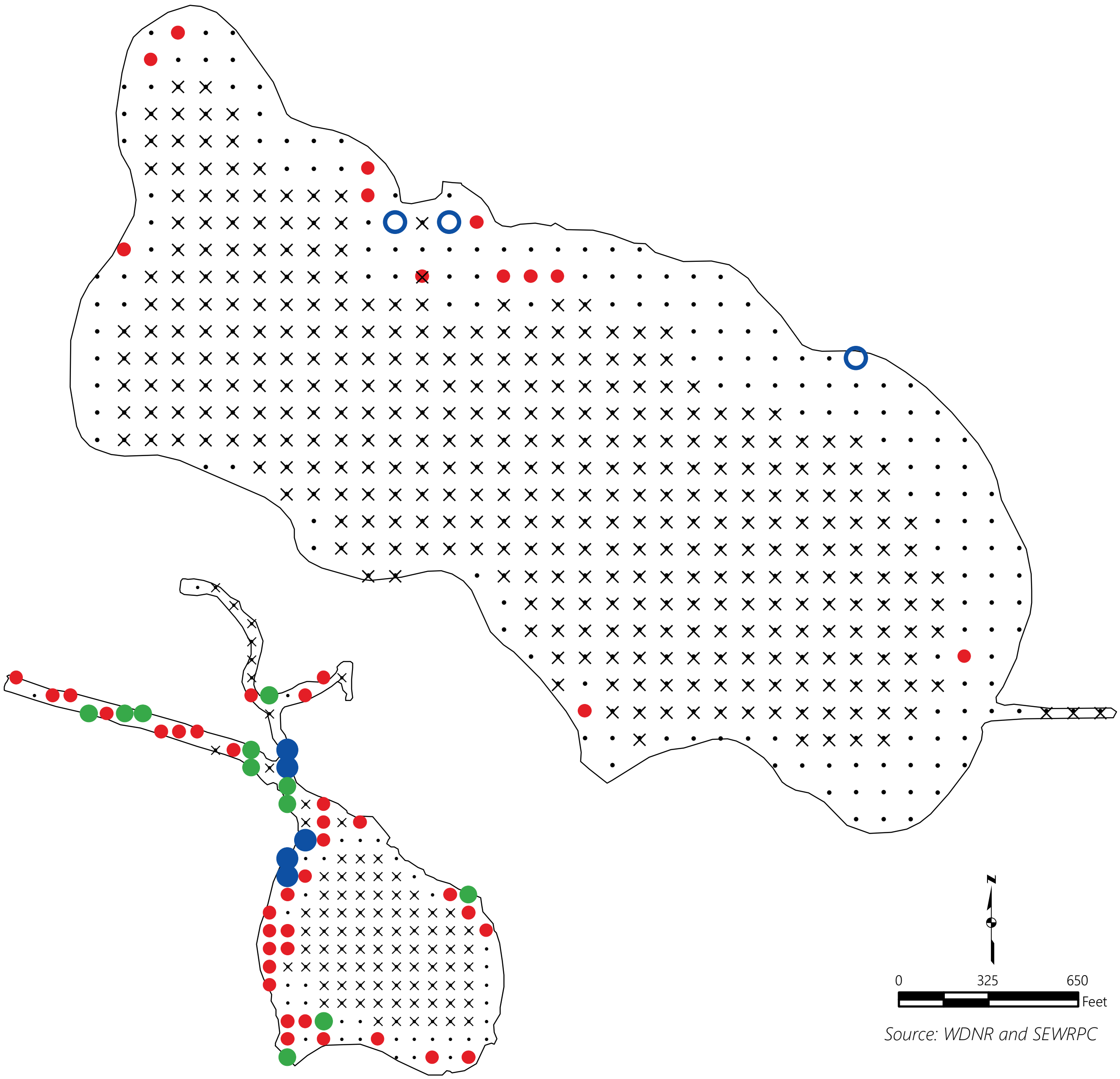


Figure A.3
Coontail Rake Fullness in Friess and Little Friess Lakes: June 2024



Source: WDNR and SEWRPC

Note: Survey was conducted on Friess lake on June 24th, 2024 and the survey was conducted on Little Friess Lake on June 25th, 2024.

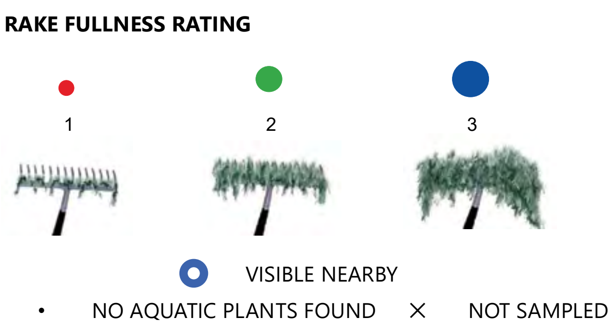
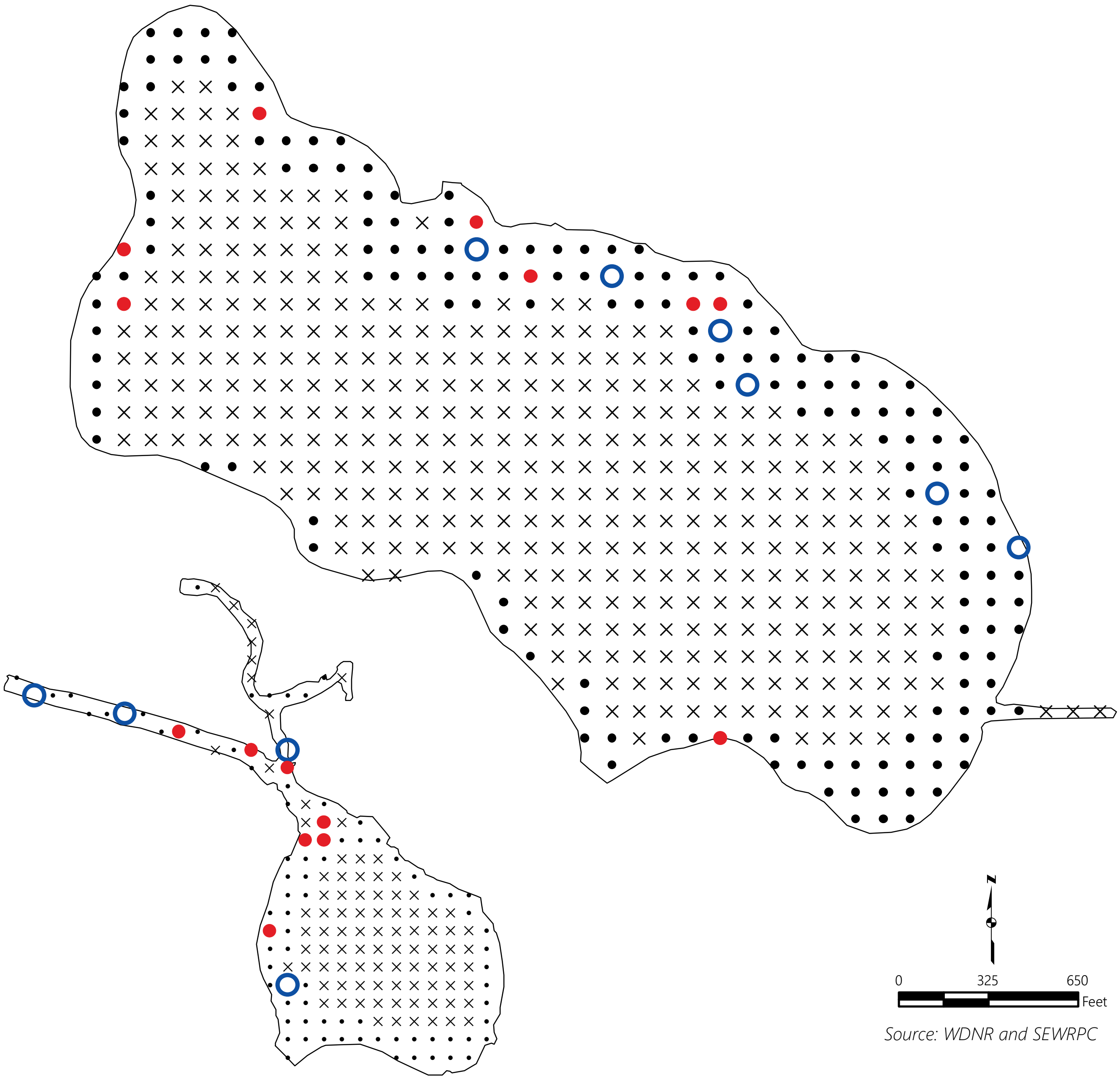


Figure A.4
Curly-Leaf Pondweed Total Rake Fullness in Friess and Little Friess Lakes: June 2024



Source: WDNR and SEWRPC

Note: Survey was conducted on Friess lake on June 24th, 2024 and the survey was conducted on Little Friess Lake on June 25th, 2024.

RAKE FULLNESS RATING

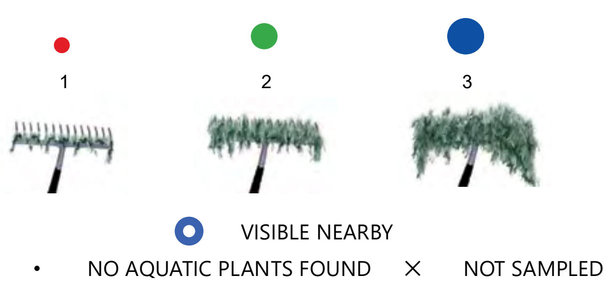
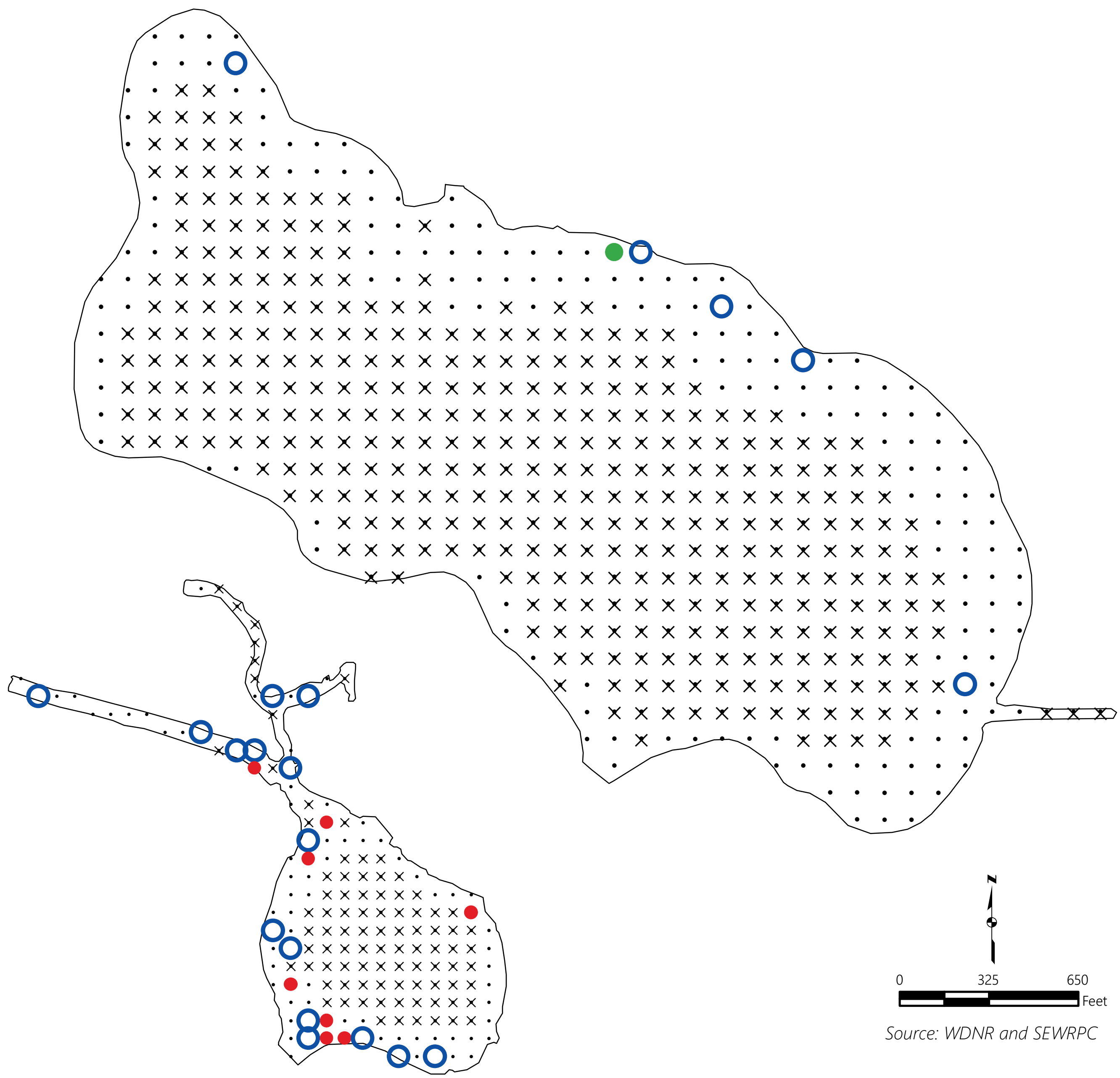


Figure A.5
White Water Lily Rake Fullness in Friess and Little Friess Lakes: June 2024



Note: Survey was conducted on Friess lake on June 24th, 2024 and the survey was conducted on Little Friess Lake on June 25th, 2024.

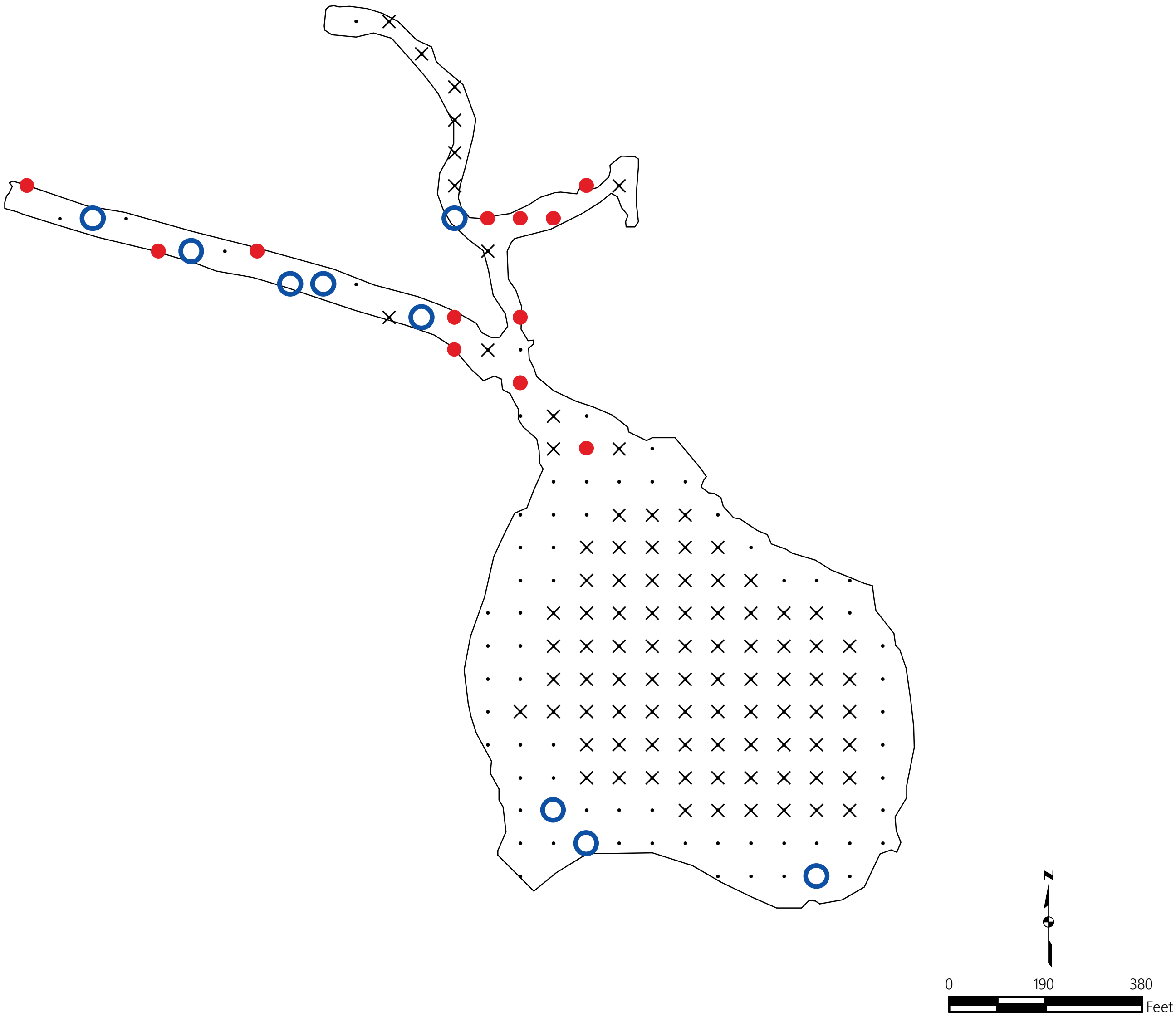
RAKE FULLNESS RATING

VISIBLE NEARBY

NO AQUATIC PLANTS FOUND

NOT SAMPLED

Figure A.6
Duckweed Rake Fullness in Little Friess Lake: June 2024



Source: WDNR and SEWRPC

Note: Survey was conducted on Little Friess Lake on June 25th, 2024.

RAKE FULLNESS RATING

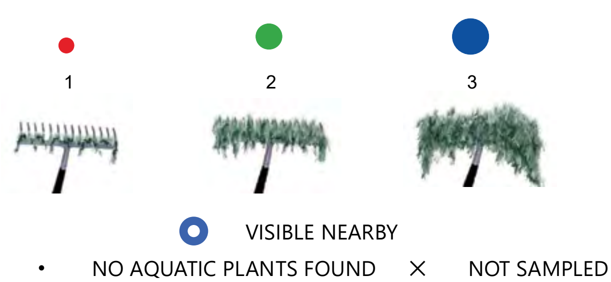
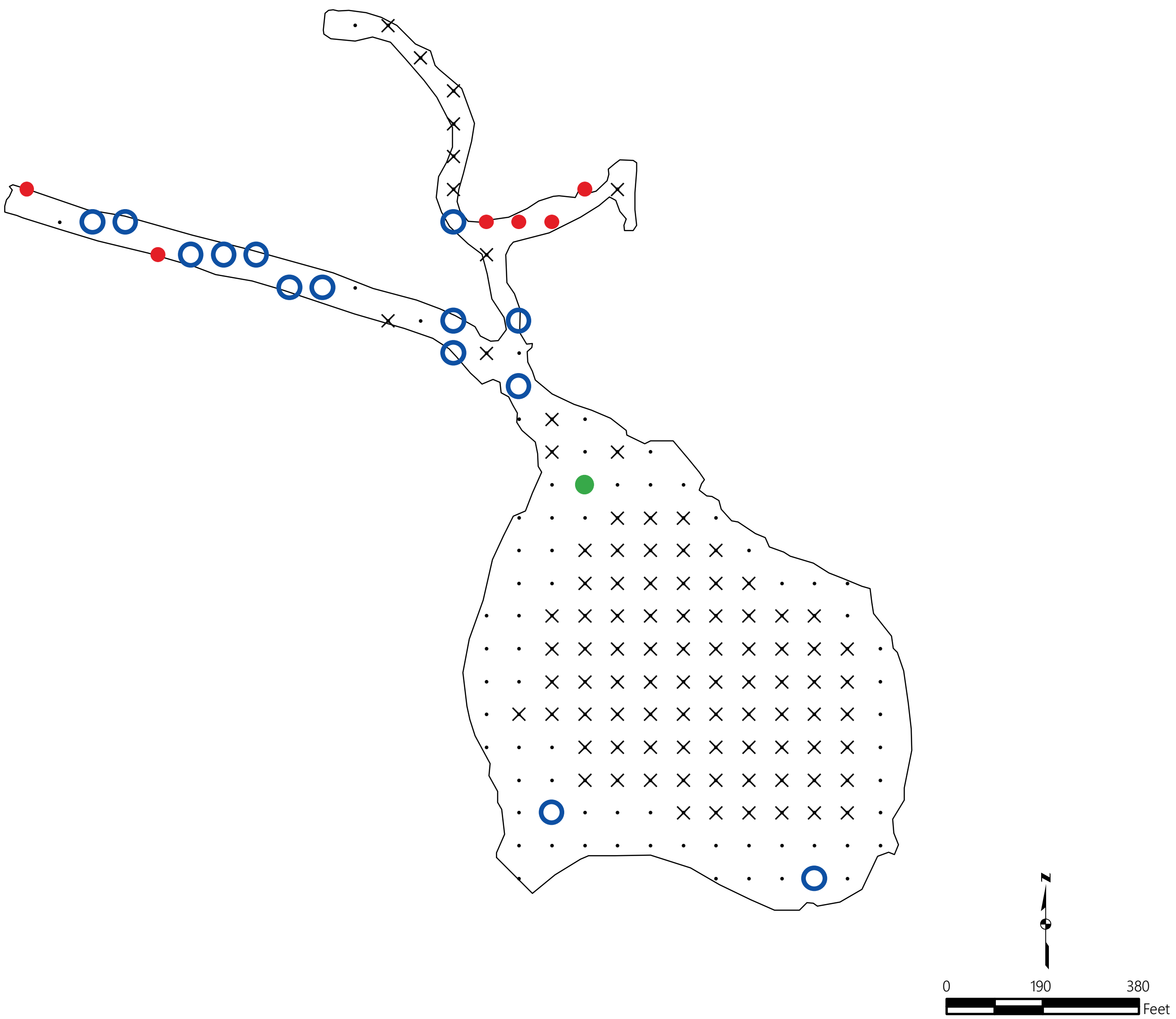


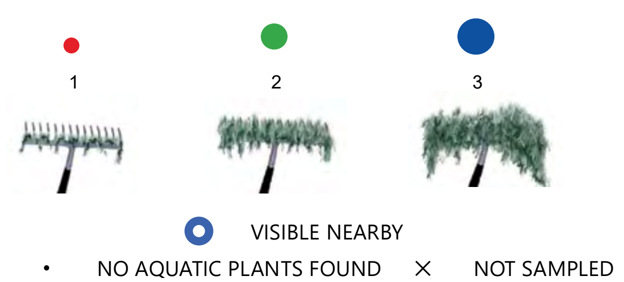
Figure A.7
Watermeal Rake Fullness in Little Friess Lake: June 2024



Source: WDNR and SEWRPC

Note: Survey was conducted on Little Friess Lake on June 25th, 2024.

RAKE FULLNESS RATING



FRIESS LAKE PROPOSED DEVELOPMENT AT GLACIAL HILLS COUNTY PARK

APPENDIX B

Glacier Hills County Park | Friess Lake Access and Marina | *View 1*

Stantec

Glacier Hills County Park | Friess Lake Access and Marina | *View 2*

Stantec

Source: Washington County and Stantec

AQUATIC PLANT SPECIES LITTORAL FREQUENCY OF OCCURRENCE IN FRIESS LAKE: 2005-2024

APPENDIX C

Table C.1
Aquatic Plant Species Littoral Frequency of Occurrence in Friess Lake: 2005-2024

Aquatic Plant Species	Native or Invasive	2005	2014	2021	2024
Ceratophyllum demersum	Native	10.4	11.4	51.69	31.58
Chara spp.	Native	49.4	49.5	55.93	23.68
Eleocharis acicularis	Native	1.1	--	--	--
Elodea canadensis	Native	13.8	--	3.39	--
Elodea nutallii	Native	2.3	--	--	--
Heteranthera dubia	Native	--	0.95	--	V
Lemna minor	Native	--	0.95	3.39	2.63
Myriophyllum sibericum	Native	--	2.9	--	--
Myriophyllum spicatum	Invasive	47.1	61.9	0.85	36.84
Najas flexilis	Native	14.9	48.6	29.66	10.53
Nuphar variegata	Native	V	0.95	--	2.63
Nymphaea odorata	Native	V	4.8	3.39	2.63
Polygonum amphibium	Native	--	V	--	--
Potamogeton amplifolius	Native	V	--	--	--
Potamogeton crispus	Invasive	12.3	8.6	5.08	21.05
Potamogeton foliosus	Native	17.2	--	--	--
Potamogeton illinoensis	Native	1.1	5.7	--	--
Potamogeton pusillus	Native	1.1	--	08.85	2.63
Potamogeton nodosus	Native	--	V	--	--
Potamogeton richardsonii	Native	1.1	4.8	--	--
Potamogeton zosteriformis	Native	--	6.7	0.85	2.63
Riccia fluitans	Native	--	--	--	--
Ricciocarpus natans	Native	--	--	--	--
Sagittaria sp.	Native	--	V	--	--
Schoenoplectus tabernaemontani	Native	--	1.9	--	--
Stuckenia pectinata	Native	27.6	13.3	0.85	15.79
Stuckenia vaginata	Native	--	8.6	8.47	--
Typha spp.	NA	--	--	--	V
Vallisneria americana	Native	28.7	30.5	--	2.63

Note: Red text indicates nonnative and/or invasive species; "V" indicated species was seen as a visual and not on the rake.

Source: WDNR and SEWRPC