SEWRPC Staff Memorandum Report Number 275

AQUATIC PLANT MANAGEMENT PLAN FOR
CRAVATH AND TRIPPE LAKES, WALWORTH COUNTY, WISCONSIN

Chapter 1

INTRODUCTION

The Southeastern Wisconsin Planning Commission ("Commission") completed this aquatic plant inventory and management study of Cravath and Trippe Lakes on behalf of the City of Whitewater ("City"). This memorandum report is the Commission's first aquatic plant management plan for Cravath and Trippe Lakes. The Wisconsin Department of Natural Resources ("WDNR") will use data and conclusions generated as part of the Commission's study to help evaluate the Lake's aquatic plant community and draft an updated Aquatic Plant Control permit.

1.1 PROJECT SETTING, BACKGROUND, SCOPE, AND INTENT

Cravath Lake is a 70-acre impounded drainage lake located in the City of Whitewater in Walworth County. It is fed by both Spring Brook and Trippe Lake, and outflows to the Whitewater Creek, to the Bark River, and then to the Rock River (see Map 1.1).[1] Attaining a maximum depth of 10 feet, the Lake can support aquatic plant growth throughout most of its surface area. A 2017 survey performed by Lake and Pond Solutions observed 12 aquatic plant species in the Lake which included several beneficial native species such as Sago pondweed (*Stuckenia pectinata*), Illinois pondweed (*Potamogeton illinoensis*), and American lotus (*Nelumbo lutea*). Invasive aquatic plant species, including Eurasian watermilfoil (*Myriophyllum spicatum*) and curly-leaf pondweed (*Potamogeton crispus*) were also observed during the survey.

Trippe Lake is a 212-acre lake drainage also located in the City of Whitewater. It is fed by Whitewater Creek, and outflows into Cravath Lake (see Map 1.1). It has a maximum depth of 8 feet and was previously surveyed by Lake and Pond Solutions in 2017. A total of 16 species were reported, with similar beneficial native species (*Stuckenia pectinata*) as well as non-native invasives (*Potamogeton crispus and Myriophyllum spicatum*). Cravath and Trippe lakes underwent a drawdown from 2019 to 2021, followed by dredging and controlled

[1] *https://www.wwparks.org/lakes*

burns in 2022 for management of aquatic plants. The aquatic plant survey conducted for this update was performed in July of 2024 where Commission staff utilized the recommended baseline monitoring protocol employed by the WDNR.[2]

The City of Whitewater manages aquatic plant growth on the Lake to enhance navigation and recreational opportunities. Aquatic plant management is regulated by the WDNR and requires a permit. The City is required to reevaluate the aquatic plant community, update the aquatic plant management plan, and renew the aquatic plant management permit every five years. The City retained the Commission to reevaluate the Lakes' aquatic plant community and update the aquatic plant management plan. This updated plan needs to consider the present status of the aquatic plant community, must identify plant community changes that may have occurred, must examine the potential success or lack of success of the current aquatic plant management strategies, must consider current trends and issues that pertain to aquatic plant management issues and techniques, and must describe the methods and procedures associated with the proposed continuation of aquatic plant management in the Lakes. These efforts are supported through a Wisconsin Department of Natural Resources NR 193 Surface Water Grant.

This updated APM plan summarizes information and recommendations needed to manage the aquatic plant community of the Lake. 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.

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[2] *Hauxwell, J., S. Knight, K. Wagner, A. Mikulyuk, M. Nault, M. Porzky and S. Chase. 2010. Recommended baseline monitoring of aquatic plants in Wisconsin: sampling design, field and laboratory procedures, data entry and analysis, and applications. Wisconsin Department of Natural Resources Bureau of Science Services, PUB-SS-1068 2010. Madison, Wisconsin, USA*

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Chapter 1 Maps

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Chapter 2

INVENTORY FINDINGS AND RELEVANCE TO RESOURCE MANAGEMENT

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 Cravath and Trippe Lakes ("Lakes") APM plan considered input from the City of Whitewater ("City"), Wisconsin Department of Natural Resources ("WDNR"), and the public. Objectives of the Cravath and Trippe Lakes APM program include the following.

- Effectively control the quantity and density of nuisance aquatic plant growth in well-targeted portions of Cravath and Trippe 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 City 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.[1]

To meet these objectives, the City of Whitewater executed an agreement with the Southeastern Wisconsin Regional Planning Commission ("Commission") to investigate the characteristics of the Lakes and to develop an aquatic plant management plan update. As part of this planning process, surveys of the aquatic plant community and comparison to the previous survey results 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, amphibians, reptiles, and fishes
- 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 because they often support many other beneficial functions (see Table 2.1). For example, water lilies play a significant role in providing shade,

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[1]SEWRPC Planning Report No. 30, A Regional Water Quality Management Plan for Southeastern Wisconsin—2000, Volume One, Inventory Findings, September 1978, Volume Two, Alternative Plans, February 1979, Volume Three, Recommended Plan, June 1979, and SEWRPC Memorandum Report No. 93, A Regional Water Quality Management Plan for Southeastern Wisconsin: An Update and Status Report, March 1995.

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 and should be avoided when developing plans for aquatic plant management.

Aquatic Plant Surveys

Aquatic plant inventories have been completed in Cravath and Trippe Lakes in the past to support aquatic plant management permit applications. WDNR surveyed the Lakes' aquatic plants in 2006, followed by Lake and Pond Solutions in 2017 to establish long-term management goals and permitted management of the Lakes. The City has decided to evaluate the Lakes' aquatic plant community and prepare an aquatic plant management plan for the Lakes. The 2017 and 2024 surveys used the same point-intercept grid and methodology (see Figures 2.1 and 2.2).[2,3,4] 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 patterns of Cravath and Trippe Lakes consist of 233 points and 305 points, respectively, (provided by WDNR) that allow the types and abundance of aquatic plants to be directly contrasted to prior point-intercept surveys. 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. The same points were sampled using the same techniques in 2017 and 2024. This consistency enables more detailed evaluation of aquatic plant abundance and distribution change than has been possible in the past.

Commission staff conducted the 2024 survey on Cravath and Trippe Lake surveys on July 29th and July 15th-16th, respectively. Conditions during the surveys were adequate, with partly sunny skies and intermittent

[2] *Sampling methodology changed from transect-based methods in 2011 to a point-intercept method beginning with the 2017 survey.*

[3] *R. Jesson and R. Lound, Minnesota Department of Conservation Game Investigational Report No. 6, An Evaluation of a Survey Technique for Submerged Aquatic Plants, 1962; as refined in the Memo from S. Nichols to J. Bode, J. Leverence, S. Borman, S. Engel, and D. Helsel, entitled "analysis of Macrophyte Data for Ambient Lakes-Dutch Hollow and Redstone Lakes Example," Wisconsin Geological and Natural History Survey, University of Wisconsin-Extension, February 4, 1994.*

[4] *J. Hauxwell, S. Knight, K. Wagner, A. Mikulyuk, M. Nault, M. Porzky, and S. Chase, Recommended Baseline Monitoring of Aquatic Plants in Wisconsin: Sampling Design, Field and Laboratory Procedures, Data Entry and Analysis, and Applications, Wisconsin Department of Natural Resources, Bureau of Science Services, Publication No. PUB-SS-1068 201, March 2010.*

rain, low wind speeds, and little to no boat traffic. The Lakes' water clarity was low, which may have hindered 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 (*Nymphaea odorata*)). In addition to the aquatic plants, Commission staff observed waterfowl, fish, muskrats, and turtles during the survey.

While Commission staff strived to survey as much of the Lakes as feasible, certain areas were not surveyed in 2024 compared to the 2017 survey. These areas included the southern bays of both lakes, as well as large portions near the shorelines that were non-navigable for sampling purposes due to dense cattail growth.[5] Other points that were not surveyed were either due to points that were deemed to be on shore or near to the dam.

Aquatic Plant Survey Metrics

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 of 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 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.

Several metrics are useful to describe aquatic plant community condition and to 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 2017 and 2024 point-intercept surveys are described below.

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[5] See Section 2.3 PAST AND PRESENT AQUATIC PLANT MANAGEMENT PRACTICES and section "Cattails in Trippe and Cravath Lakes for further descriptions of the Lakes' drawdown and subsequent cattail growth.

Cravath Lake

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.[6] This rating, called total rake fullness, can be a useful metric evaluating general abundance of aquatic plants as part of the point-intercept survey. In the 2024 survey on Cravath Lake the average rake fullness was 1.32 (see Table 2.2 and Figure 2.3). This rake fullness is substantially lower than the average rake fullness of 2.36 recorded in the 2017 survey, indicating that the density of aquatic vegetation has decreased in that time.

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.[7] 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 musk grass 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. The MDC in 2024 in Cravath Lake was 7 feet, which was the deepest water depth recorded during the plant survey (see Table 2.2). Thus, the entire lake is shallow enough to support aquatic plant growth.

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. Including visual sightings of aquatic plants, nine species were found in Cravath Lake during the 2024 survey (see Table 2.2). Commission staff saw between zero and five distinct aquatic plant species at individual sampling points on the Lake (see Figure 2.4).

Biodiversity and Species Distribution

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

[7] *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.*

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).[8] Using this measure, a community dominated by one or two species would be considered less diverse than one in which several 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. In 2024, Cravath Lake's SDI score was 0.62 in contrast to the Lake's 2017 SDI of 0.82 (see Table 2.2). Commission staff found between zero and 5 species at points withing Cravath Lake. Only two points had a species richness of 5 and only 6 points had richness of 4 (see Figure 2.4). With an SDI of 0.62, Cravath Lake has relatively low biodiversity compared to other lakes in Southeastern Wisconsin, which range in SDI values from approximately 0.5 (very low biodiversity) to 0.95 (very high biodiversity).

Sensitive Species

Aquatic plant metrics, such as species richness and the floristic quality index (FQI), can be useful for evaluating lake health. In hard water lakes, such as those common in Southeastern Wisconsin, species richness generally increases with water clarity and decreases with nutrient enrichment.[9] The FQI is an assessment metric used to evaluate how closely a lake's aquatic plant community matches that of undisturbed, pre-settlement conditions.[10] To formulate this metric, Wisconsin aquatic plant species were assigned conservatism (C) values on a scale from zero to ten that reflect the likelihood that each species occurs in undisturbed habitat. These values were assigned based on the species substrate preference, tolerance of water turbidity, water drawdown tolerance, rooting strength, and primary reproductive means. Native "sensitive" species that are intolerant of ecological disturbance receive high C values, while natives that are disturbance tolerant receive low C values. Invasive species are assigned a C value of 0. A lake's FQI is calculated as the average C value of species identified in the lake, divided by the square root of species richness. In 2024 Cravath Lake had an FQI of 8.5 and an average C value of 3.8.

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[8] *The SDI expresses values on a zero to one scale where 0 equates to no diversity and 1 equates to infinite diversity.*

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

[10] *S. Nichols, "Floristic Quality Assessment of Wisconsin Lake Plant Communities with Example Applications," Lake and Reservoir Management 15(2), 1999.*

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.[11] Beginning with the 2024 impairment listing cycle, WDNR began utilizing a model developed to assess lake health by examining its aquatic plant community.[12] This model evaluates whether a lake has been disturbed by human activity using known species sensitivity to disturbance as well as the littoral frequency of occurrence of each species observed on the lake.[13] No sensitive aquatic plant species, as designated by this model, were found in Cravath Lake during the 2024 survey, but several species considered "tolerant" were observed, including EWM, coontail, duckweed, elodea, CLP, Illinois pondweed, Sago pondweed, and watermeal. The lack of sensitive species and the number of tolerant species in the Lake indicates that the water and subsequent plant community are not of high quality.

Relative Species Abundance

In the 2024 survey of Cravath Lake, the five most common aquatic plant species found were: 1) Duckweed (*Lemna* sp.), 2) Coontail (*Ceratophyllum demersum*), 3) Elodea (*Elodea canadensis*), 4) Watermeal (*Wolffia* sp.*)*, and 5) Curly-leaf pondweed (*Potamogeton crispus*) (see Appendix A, A1 through A5). Duckweed was observed at 112 points across Cravath Lake and could be seen clumping together among the cattail (*Typha* sp.*)* stands within the Lake. Coontail was found at 81 points across the Lake. Elodea was found at only 13 points in Cravath Lake, primarily located in the southern half of the Lake. Watermeal was found at twelve points in 2024.

Invasive Species

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

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

[12] *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.*

[13] *Disturbance variables in the model included the lake's nutrient status, specific conductance (a proxy measurement for salt concentrations), and the amount of developed land use (e.g., agriculture, roads, urban lands) within the lake's watershed.*

water with moderate clarity and high alkalinity, and tolerates a wide range of pH and salinity.[14,15] 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.[16] For reasons such as these, EWM can grow to dominate an aquatic plant community in as little as two years.[17,18] 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.[19]

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.[20] The fragments can also cling to boats, trailers, motors, and/or bait buckets where they can remain alive 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.

During the 2024 survey of Cravath Lake, Commission staff found EWM at 3 points across the Lake (see Appendix A, Figure A.6). All three points with EWM were located on the northern end of the lake, nearest to Cravath Lakefront Park and the outlet of the Lake. EWM was not found anywhere else in the lake. Two of the three points had a rake fullness of one and one point had a rake fullness of two.

Curly-Leaf Pondweed ("CLP")

Curly-leaf pondweed, like Eurasian watermilfoil, is identified in Chapter NR 109 of the Wisconsin Administrative Code as a nonnative invasive aquatic plant. Although survey data suggests it presently is

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

[15]*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.*

[16]*Ibid.*

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

[18]*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.*

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

[20]*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.*

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 dense strands that exclude other high value aquatic plants. For this reason, curly-leaf pondweed 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.

During the 2024 survey of Cravath Lake, Commission staff did not find CLP on the rake at any points across the Lake (see Appendix A, Figure A.5). It was, however, seen as a visual observation at four points at the southern end of the Lake. CLP was not found anywhere else in the lake.

Apparent Changes in Cravath Lake's Observed Aquatic Plant Communities: 2017 versus 2024

The 2024 aquatic plant survey identified a total of nine different plant species including visual observations, half of the 18 species found in the 2017 aquatic plant survey. Thus, it is evident that Cravath Lake has lost some of the diversity of its aquatic plant community following the 2019 to 2021 drawdown.

In addition to the number of different aquatic plant species detected in the Lake, several other comparisons can be drawn between the 2017 and 2024 aquatic plant survey results, as examined below.

- The total littoral vegetated frequency of occurrence decreased by 17.5 percent from 2017 to 2024. It was 82.5 percent in 2024 compared to 100 percent in 2017 (see Table 2.2).
- The MDC in Cravath Lake during the 2024 survey was 7 feet, 1.5 feet deeper than the 2017 survey, where the MDC was 5.5 feet (see Table 2.2). However, this increase is likely due to the increase in the Lake's water depth as the lake was dredged during the 2019 to 2021 drawdown. In both the 2017 and 2024 surveys, the MDC equals the maximum water depth for the lake indicating that aquatic plants are able to grow across the entire waterbody.
- The composition and order of the five most common species changed from 2017 to 2024. Three of the 5 top most common species remained the same but the other two most common species changed. In 2024 the five were 1) duckweed, 2) coontail, 3) elodea, 4) watermeal, and 5) curly-leaf pondweed. In 2017 the five most common species were 1) duckweed, 2) coontail, 3) watermeal, 4) white water lily (*Nymphaea odorata*), and 5) Eurasian watermilfoil.
- Several native aquatic plant species have small populations within Cravath Lake including white water lily and sago pondweed (*Stuckenia pectinata*), both of which were found at less than 10 points across the Lake (see Table 2.4).

- EWM occurrence decreased greatly between 2017 and 2024. It was found at 98 points in 2017 and 3 sites in 2024 with an additional 21 visual sightings in 2017 and zero in 2024 (see Table 2.4 and Figure 2.5).
- CLP occurrence also decrease with it being found at zero points in 2024 compared to the 27 in 2017. There were 39 additional visual sightings in 2017 and only four sightings in 2024 (see Table 2.4 and Figure 2.6).

It should be noted that the City completed a multi-year drawdown to reduce aquatic invasive species on Cravath Lake.[21] Based on the minimal EWM and CLP found in Cravath Lake in 2024 compared to 2017, it can be concluded that the drawdown was successful in reducing invasive species populations in the Lake.

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. Overall, the sensitive species richness decreased between 2017 and 2024. The sensitive aquatic plant, variable pondweed (*Potamogeton gramineus*), was the only sensitive species found during the 2017 survey and was found at nine points on the Lake. No sensitive species were found in 2024. There are varying reasons that the loss of sensitive plant species can be attributed to including: lake drawdown, increased pollutants, competition by more tolerate plants species, or human disturbances.

Tripple Lake

Aquatic Plant Survey Metrics

In the 2024 survey on Trippe Lake the average rake fullness was 1.29 (see Table 2.5 and Figure 2.7). This rake fullness is slightly lower than Cravath and significantly lower than the 2017 survey of Trippe Lake, indicating that the aquatic plant density has declined following the drawdown. The MDC in 2024 in Trippe Lake was six feet (see Table 2.5). Considering that Trippe Lake reaches a maximum depth of eight feet in only one small portion of the lake, the MDC indicates that aquatic plants can colonize the vast majority of the lake bottom.

[21] See Section 2.3 Past and Present Aquatic Plant Management Practices for more information on the drawdown of Cravath and Trippe Lakes by the City of Whitewater.

During the 2024 survey of Trippe Lake, including visual observations, 12 species of aquatic plants were documented (see Table 2.5). Commission staff found between zero and six individual species at a single point on the Lake (see Figure 2.8) In 2024, Trippe Lake's SDI score was 0.80 (see Table 2.5), up from its 2017 SDI of 0.75, indicating relatively good biodiversity of aquatic plants in the Lake.

Sensitive Species

In 2024, Trippe Lake's FQI was 11.67, with a mean C value of 4.1 within the Lake. Although higher than Cravath Lake, these values are still lower than many lakes in southeastern Wisconsin as FQI within the Region ranges from 6.9 (poor) to 34 (excellent) while the mean C ranges from 4.0 (poor) to 7.5 (excellent). Many of the other low-scoring lakes within southeastern Wisconsin, such as Lake Comus and Honey Lake in Walworth County, are also stream impoundments.

Similar to Cravath Lake, no sensitive aquatic plant species as described in Mikulyuk et al.[22], were found in Trippe Lake during the 2024 survey. However, several of the same tolerant species were observed. Sensitive plants species are more susceptible to pollution and human disturbances in the lake. The lack of sensitive species in the Lake indicates that the water and subsequent plant community are not of high quality. This can also be an indicator of high human disturbance and/or pollution in the Lake.

Relative Species Abundance

In the 2024 survey of Trippe Lake, the five most common aquatic plant species found were: 1) Duckweed (*Lemna sp.*), 2) Curly-leaf pondweed (*Potamogeton crispus*), 3) Coontail (*Ceratophyllum demersum*), 4) Watermeal (*Wolffia sp.),* and 5) Sago pondweed (*Stuckenia pectinata*) (see Appendices B1 through B5). Duckweed was found consistently throughout the Lake and was seen from a distance in areas that were non-navigable due to cattail growth. Curly-leaf pondweed was found in highest abundance in the northwestern portion of the lake and was mainly found as a visual sighting or as a 1 rake fullness. Only one point have a rake fullness for CLP of 2. Coontail was found intermittently throughout the Lake, never having a rake fullness higher that a 2. Watermeal, while found sporadically throughout Trippe Lake, inhabited similar areas to duckweed. Sago pondweed was found at 21 points on Trippe lake with only one point having a sago pondweed rake fullness of 2.

[22] Mikulyuk, A.M., et al., "A Macrophyte Bioassessment Approach Linking Taxon-Specific Tolerance and Abundance in North Temperate Lakes," Journal of Environmental Management 199: 172-180, 2017.

Invasive Species

No EWM was found in the 2024 survey in Trippe Lake, though it has historically been found in the Lake, including at 27 points in 2017. As described later in the chapter, water level drawdowns can be an effective tool for managing EWM populations as is evident by the substantial decrease in the EWM populations of both lakes since 2017.

Curly-leaf pondweed, like Eurasian watermilfoil, is identified in Chapter NR 109 of the Wisconsin Administrative Code as a nonnative invasive aquatic plant and thus must be monitored. In 2024, 12 points had CLP on the rake in Trippe Lake with an additional 27 visual observations (see Appendix B2). CLP was spread throughout the open water portions of the Lake but seen with the highest rake fullness in the northwestern portion of the Lake near the outlet.

Apparent Changes in Observed Aquatic Plant Communities in Trippe Lake: 2017 versus 2024

The 2024 aquatic plant survey identified a total of 13 different plant species including visuals, compared to the 22 species found in the 2017 aquatic plant survey. Thus, it is evident that Trippe Lake has lost some of the diversity of its aquatic plant community.

In addition to the number of different aquatic plant species detected in the Lake, several other comparisons can be drawn between the 2017 and 2024 aquatic plant survey results, as examined below.

- The total littoral vegetated frequency of occurrence declined from 80.56 percent in 2017 to 33.62 in 2024, a decrease of 46.94 percent (see Table 2.5).
- The MDC in Trippe Lake during the 2024 survey was 6 feet, 1.5 feet shallower than the 2017 survey, where the MDC was 7.5 feet (see Table 2.5). In both surveys, aquatic plants were observed to the maximum water depth of the lake indicating that plants could cover the entirety of the lake bottom.
- The composition and order of the five most common species changed from 2017 to 2024. Two of the five most common species remained the same but the other three changed. In 2024, the five most common aquatic plant species found were: 1) duckweed, 2) curly-leaf pondweed, 3) coontail, 4) watermeal, and 5) sago pondweed (see Appendix B, B1 through B5). In 2017 the five most common species were 1) American lotus (*Nelumbo lutea*), 2) coontail, 3) white water lily, 4) Eurasian watermilfoil and 5) duckweed.

- Several native aquatic plant species have small populations within Trippe Lake including spatterdock (*Nuphar variegata*) and bur reed (*Sparganium* sp.), both of which were found at fewer than 10 points across the Lake (see Table 2.7).
- CLP occurrence increased from four points in 2017 to 12 points in 2024 (see Table 2.7 and Figure 2.9). However, CLP still constitutes a small part of the overall aquatic plant community.

It should be noted that the City completed a multi-year drawdown to reduce aquatic invasive species on Trippe Lake.[23] Based on the lack of EWM and minimal CLP found in Trippe Lake in 2024 compared to 2017, it can be concluded that the drawdown was successful in reducing invasive species populations in the Lake.

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. Overall, the sensitive species richness decreased between 2017 and 2024. Two sensitive species were observed in 2017: variable pondweed (*Potamogeton gramineus*) was found at one point while yellow pond lily (*Nuphar advena*, not to be confused with spatterdock, *Nuphar variegata*) was found at four points. No sensitive species were found in 2024. There are varying reasons that the loss of sensitive plant species can be attributed to including: lake drawdown, increased pollutants, competition by more tolerate plants species, or human disturbances.

Cattails in Trippe and Cravath Lakes

A major concern of the Lakes' residents is the dense cattail growth in the Lakes. Hybrid cattail (*Typha x glauca*) are a hybridization of native broad-leaved cattail species (*Typha latifolia*) and invasive narrow-leaved cattail species (*Typha angustifolia*). Hybrid cattail will invade and colonize freshwater marshes, wet meadows, fens, roadsides, ditches, shallow ponds, streams and lakeshores.[24] While cattails have been present in the shallow areas of the lakes for many years, the population increased greatly after water levels remained low post-drawdown of both lakes.

Commission staff were unable to sample large portions of the lake due to the dense growth of hybrid cattails (see Figure 2.10 and Figure 2.11). Much of the shoreline was unable to be seen or accessed from the Lakes' open water due to the dense growth (see Figure 2.12). Commission staff used aerial imagery to

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[23] See Section 2.3 Past and Present Aquatic Plant Management Practices for more information on the drawdown of Cravath and Trippe Lakes by the City of Whitewater.

[24] *https://dnr.wisconsin.gov/topic/Invasives/fact/CattailHybrid*

estimate the increase of cattail growth in the Lakes from pre draw-down conditions in 2015 as well as recent cattail conditions in 2023 (see Figure 2.13)[25]. The cattail coverage on Trippe Lake in June 2015 was estimated to be 27 acres, or 22%. Comparatively, the cattail coverage in May 2023 was estimated to be 50 acres, or 41% or the lake acreage. Cravath Lake's cattail coverage in June 2015 was estimated to be 3 acres, or 5%. Comparatively, the cattail coverage in May 2023 was estimated to be 33 acres, or 47%.

2.3 PAST AND PRESENT AQUATIC PLANT MANAGEMENT PRACTICES

In July of 2019, to "freeze out" invasive species, restore navigation depths, and to improve the overall health of the Lakes, the City began draining both Cravath and Trippe Lakes.[26] The project was originally planned to have the Lakes drawn down for one year but was extended to a second year to ensure maximum lake-bed exposure for the dredging of the lakes. By August 2021, the Lakes were fully drawn down and were originally planned to be refilled in the spring of 2022.

While the Lakes were drawn down, the City received permits to dredge out lake-bottom material to improve future navigation of the Lakes. As of March 1, 2022, 68,800 cubic yards of sediment had been removed from the Lakes, 85 percent of the original 81,000 cubic yards anticipated to be removed. To prepare for the dredging in early 2022, the City contracted with Field & Stream Restorations to conduct a controlled burn in areas of the Lakes (see Figure 2.14). Controlled burns are often used to remove invasive species and reduce the amount of settling sediment in the Lakes from decaying vegetation material from aquatic plants.

In the fall of 2023, the City received permits to dredge Cravath and Trippe Lakes to manage the cattail populations. In total, an estimated 16,300 square feet of material was removed from the Lakes from the Cravath fishing pier, the Cravath west lakefront dock, the Cravath concrete bump-out and the Trippe Lake boat launch. Additionally, in the fall of 2024, the City received a second permit to dredge the Lakes, removing an estimated 37,020 square feet of material. Material was removed from five locations: Cravath amphitheater, Cravath west lakefront dock, the Cravath west fishing pier, the Cravath eastern shoreline, and the Trippe fishing pier at the Clay Street Nature Park.

[25] *Cattail coverage on the lake utilized Google Earth historical imagery. Coverage estimates are approximate and are not exact due to difficulty distinguishing between cattail coverage and floating leaf aquatic plant coverage.*
[26] *For more information on the drawn downs, dredging and controlled burns see: https://www.whitewater-wi.gov/520/Lakes-Drawdown-Updates*

2.4 POTENTIAL AQUATIC PLANT MANAGEMENT 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.
- *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.[27,28] 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 to frame permit requirements. Permits can cover up to a five-year period.[29] At the end of that period, the aquatic plant management plan must be updated. The

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[27] *https://docs.legis.wisconsin.gov/statutes/statutes/30/ii/18*
[28] *https://docs.legis.wisconsin.gov/statutes/statutes/31/02*
[29]*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.*

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.[30] These plans and plan execution are reviewed and overseen by the WDNR regional lakes and aquatic invasive species coordinators.[31]

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 lakes.

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.[32] For example, milfoil weevils (*Eurhychiopsis lecontei)* have been used to control EWM. Milfoil weevils do best in waterbodies with balanced panfish populations,[33] 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 for the Lakes.

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 most plant stems, leaves, roots, and seeds are actively removed from the lake, the reproductive potential and nutrients contained by

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[30] *Aquatic plant harvesters must report harvesting activities as one of the permit requirements.*
[31] *Information on the current aquatic invasive species coordinator is found on the WDNR website.*
[32] *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.*
[33] *Panfish such as bluegill and pumpkinseed are predators of herbivorous insects. High populations of panfish lead to excess predation of milfoil weevils.*

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, and,
- Plant material is immediately removed from a lake (including seeds).[34]

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, CLP) 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.[35]

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[34] *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.*

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

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.

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,[36] 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. Due to the depth of the Lakes and the desire for cattail control, traditional cutting mechanical harvesting is not a feasible method to be used on the Lakes.

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 City 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. This method will be discussed further in Chapter 3.

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.[37] While water level manipulation affects all aquatic plants within the drawdown zone, two studies from Price County, Wisconsin

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[36]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.

[37]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.

show reduced abundance of invasive EWM and curly-leaf pondweed and increased abundance of native plant species following winter drawdowns.[38,39] Thus, drawdowns can be used to dramatically alter the composition of a lake's aquatic plant community. As described in Section 2.3, the City drew down both Cravath and Trippe Lakes and successfully reduced the populations of EWM and CLP.

While drawdowns are effective in reducing submerged invasive species populations, undesired emergent species, such as invasive cattails and phragmites, can also colonize exposed sediment, so measures should be taken to curtail their growth during a drawdown.[40] Both Cravath and Trippe Lakes have experienced this with 41% of Trippe and 47% of Cravath having dense hybrid cattail growth, to the extent of impeding navigation in the Lakes. Additionally, water level manipulation can also have unintended impacts on water chemistry and lake fauna.[41,42] Decreased water clarity and dissolved oxygen concentrations as well as increased nutrient concentrations and algal abundance have all been reported following lake drawdowns. It will be important to monitor the Lakes in the years to come following any potential drawdown.

Controlled Winter Burning

Prescribed burns, also known as controlled burns, are useful in managing emergent plants during drawdowns. While lakes are drawn down, existing organic material from aquatic plants are exposed and able to be burned off. This reduces the amount of plant material on the bottom of the lake, can reduce nonnative plant populations and can allow for new areas to become available for beneficial native plants to grow.

Controlled burns often require a burn plan.[43] A burn plan is a document that addresses all aspects of the burn to ensure a safe implementation of controlled burning activities. The plan should contain the following:

- Describe site conditions, including existing vegetation and desired future conditions
- Dictate specific weather conditions and ignition patterns needed for desired fire behavior
- Outline any issues relating to communities, roads, structure, adjacent lands, smoke management and/or traffic control
- Outline and smoke sensitive areas such as schools, airports or hospitals

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[38] *Onterra, LLC, Lac Sault Dore, Price County, Wisconsin: Comprehensive Management Plan, 2013.*
[39] *Onterra, LLC, Musser Lake Drawdown Monitoring Report, Price County, Wisconsin, 2016.*
[40] *Blanke et al., 2019, op. cit.*
[41] *Ibid.*
[42] *Cooke, op. cit.*
[43] *For more information on controlled burns, see https://dnr.wisconsin.gov/topic/forestfire/prescribedfire.*

- Identify fire break parameters
- Identify personnel and equipment need to safely complete the burn
- Outline of a contingency plan for reacting to any emergencies surrounding the burn

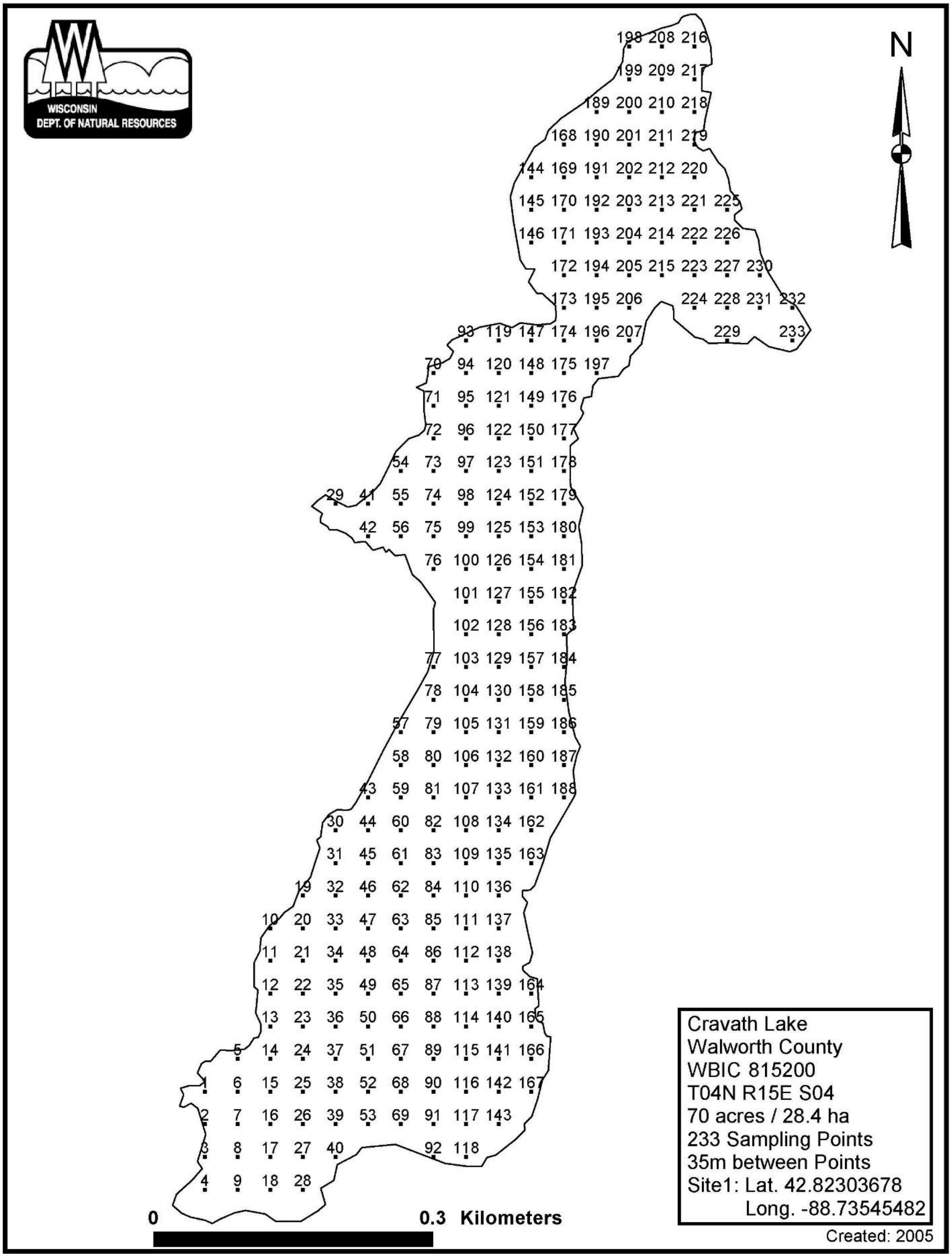
Burns are recommended to be conducted during the winter for lakes. WDNR also recommends that a trained burn boss be consulted on the parameters of the prescribed fire and to be available during the burn. It is also encouraged to reach out to local authorities to ensure they are following local ordinances and regulations. Due to the ability of the lake to be drawn down during the winter months, a controlled burn on the lakes may be beneficial in assisting with aquatic plant management, particularly for encroachment of hybrid cattail.

SEWRPC Staff Memorandum Report Number 275

AQUATIC PLANT MANAGEMENT PLAN FOR
CRAVATH AND TRIPPE LAKES, WALWORTH COUNTY, WISCONSIN

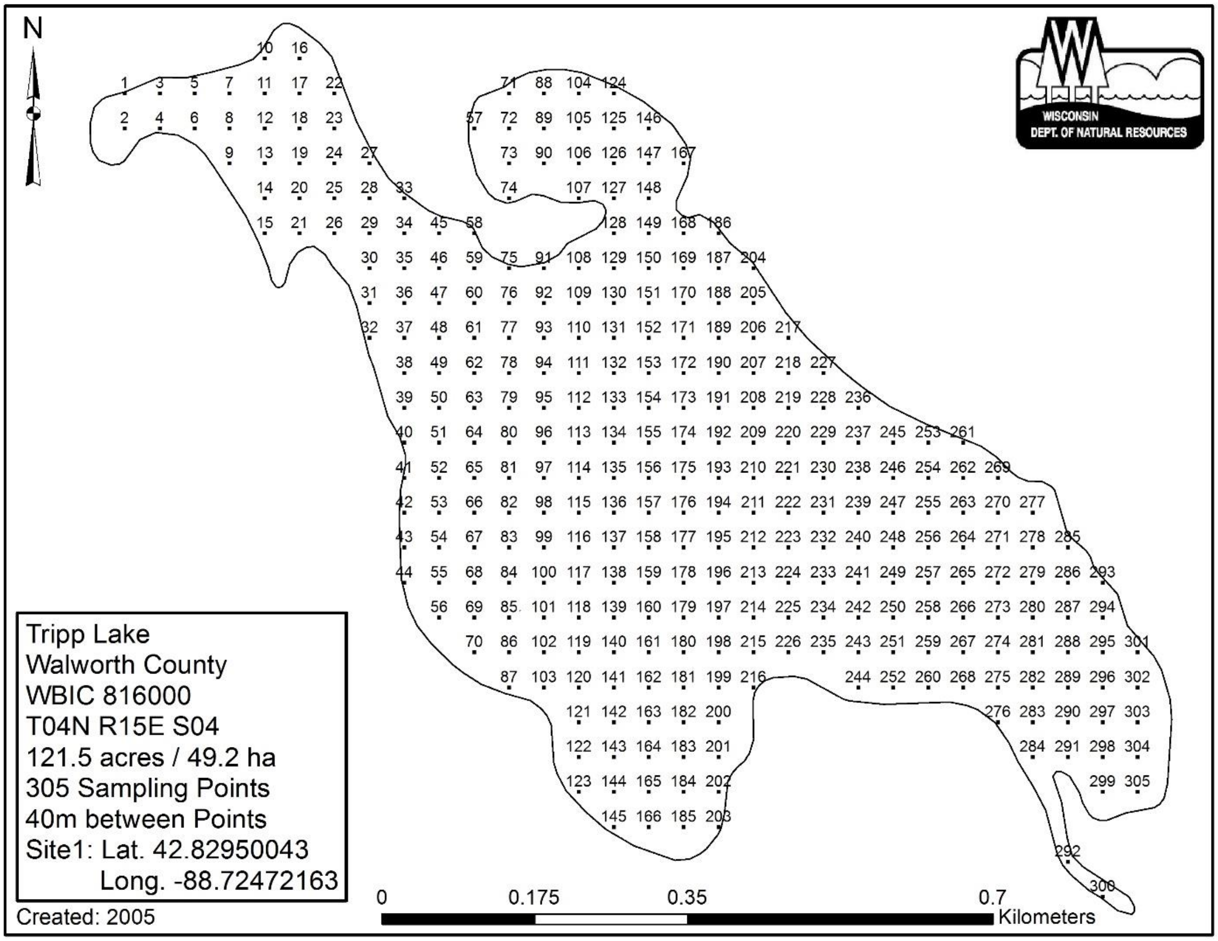
Chapter 2 Figures

Figure 2.1
Aquatic Plant Sampling Grid for Cravath Lake



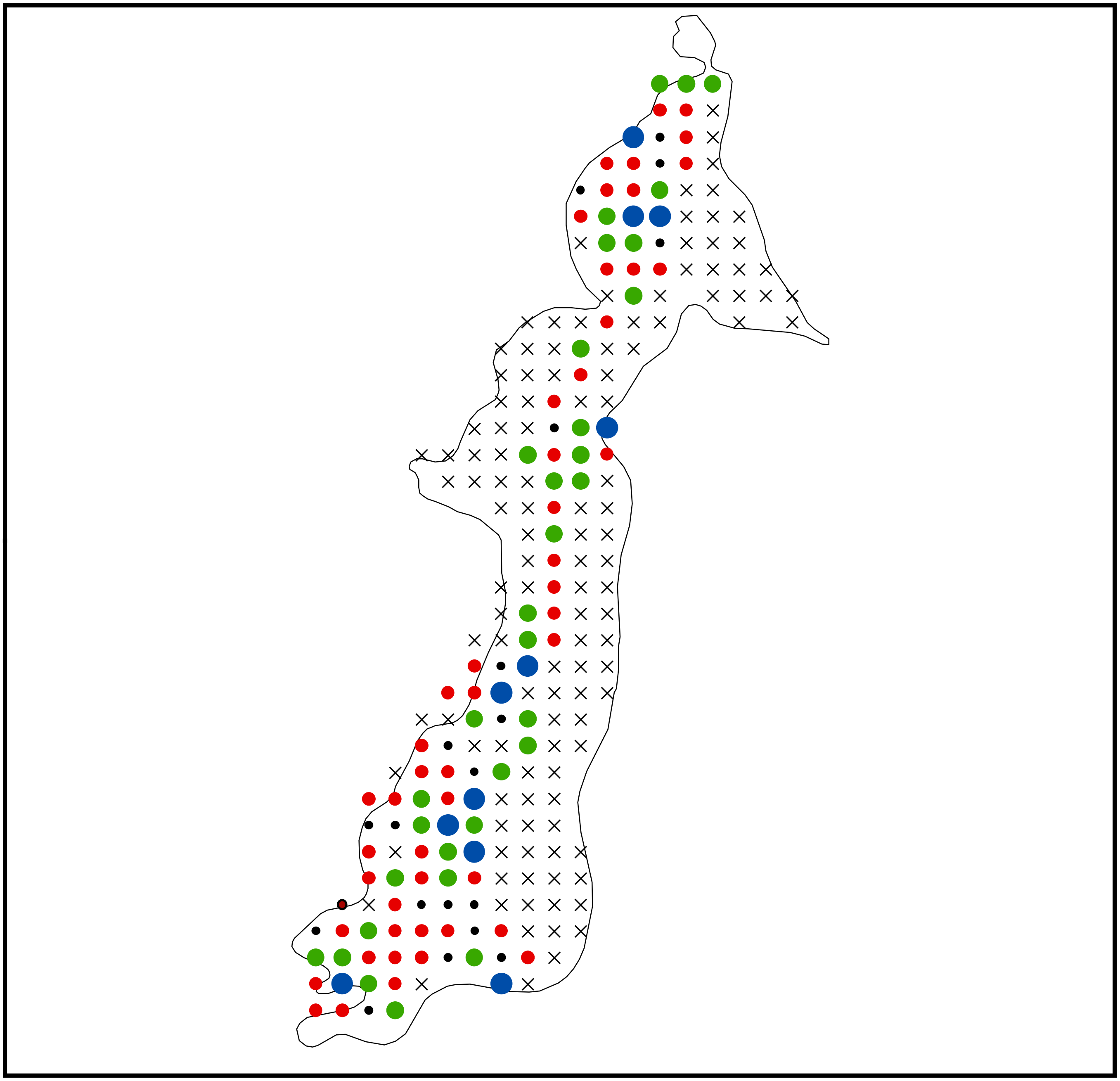
Source: WDNR

Figure 2.2
Aquatic Plant Sampling Grid for Trippe Lake



Source: WDNR

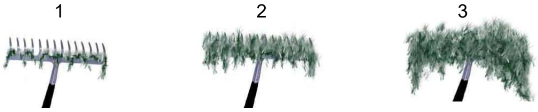
Figure 2.3
Total Rake Fullness in Cravath Lake: July 2024



NOTE: Survey was conducted on Cravath Lake on July 29th, 2024.

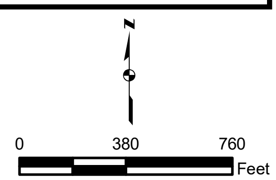
RAKE FULLNESS RATING

1 2 3



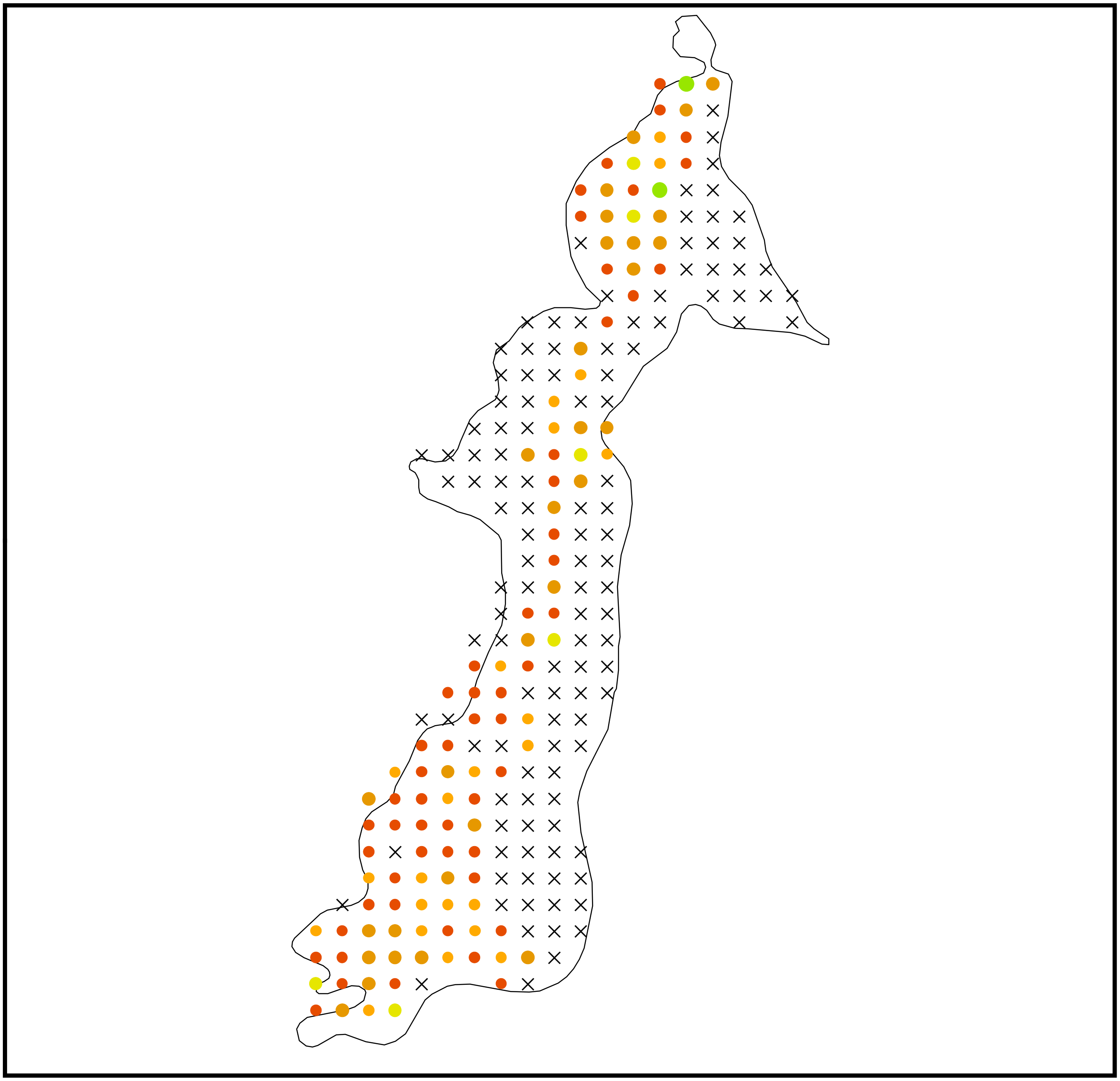
VISIBLE NEARBY

• NO AQUATIC PLANTS FOUND × NOT SAMPLED



Source: WDNR and SEWRPC

Figure 2.4
Species Richness in Cravath Lake: July 2024



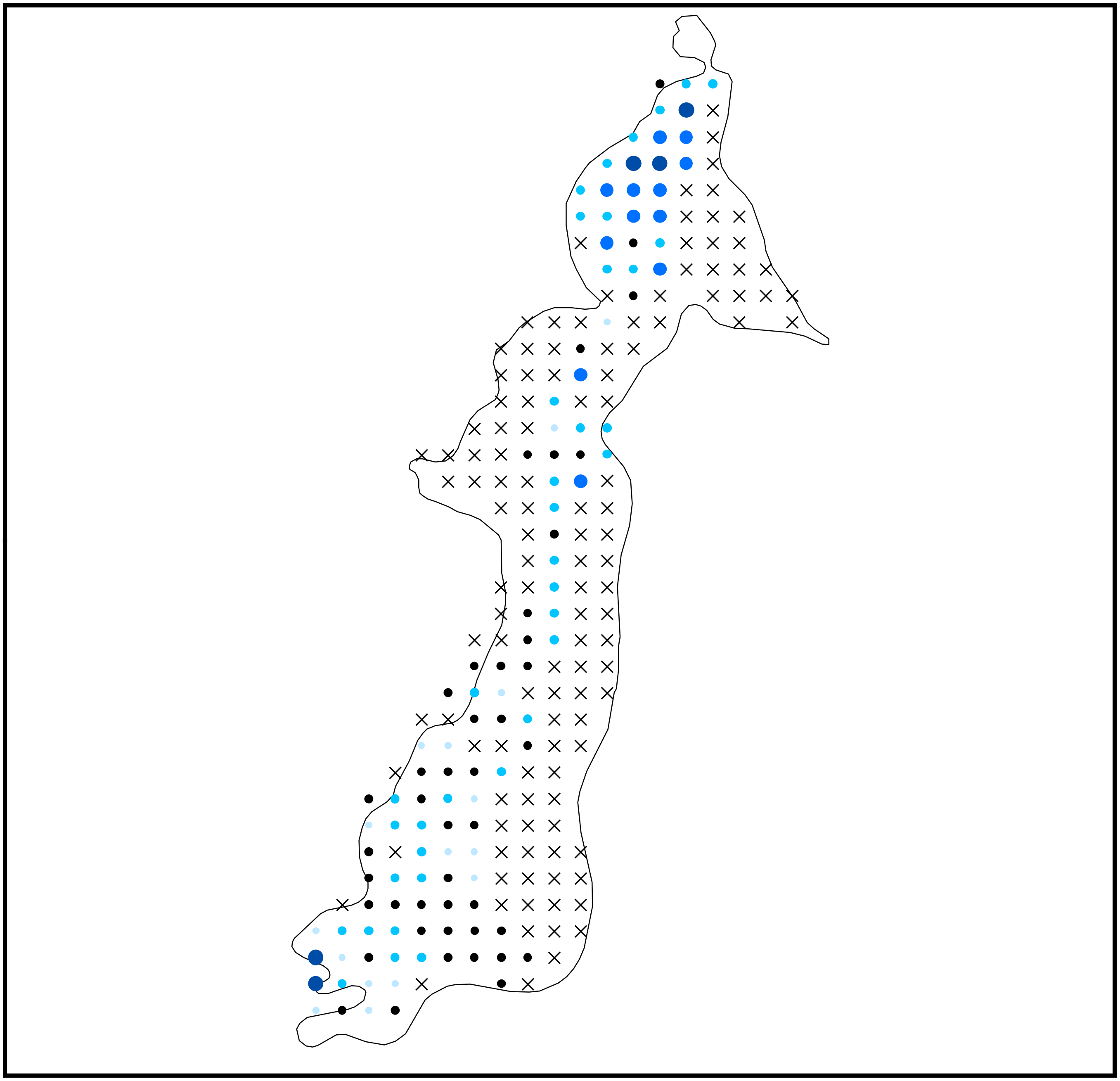
NOTE: Survey was conducted on Cravath Lake from July 29th, 2024.

SPECIES RICHNESS

- 1
- 2
- 3
- 4
- 5
- NOT SAMPLED
- NO AQUATIC PLANTS FOUND

Source: WDNR and SEWRPC

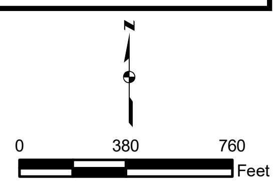
Figure 2.5
Change in Eurasian Watermilfoil Total Rake Fullness in Cravath Lake: 2017-2024



NOTE: Survey was conducted on Cravath Lake from July 29th, 2024.

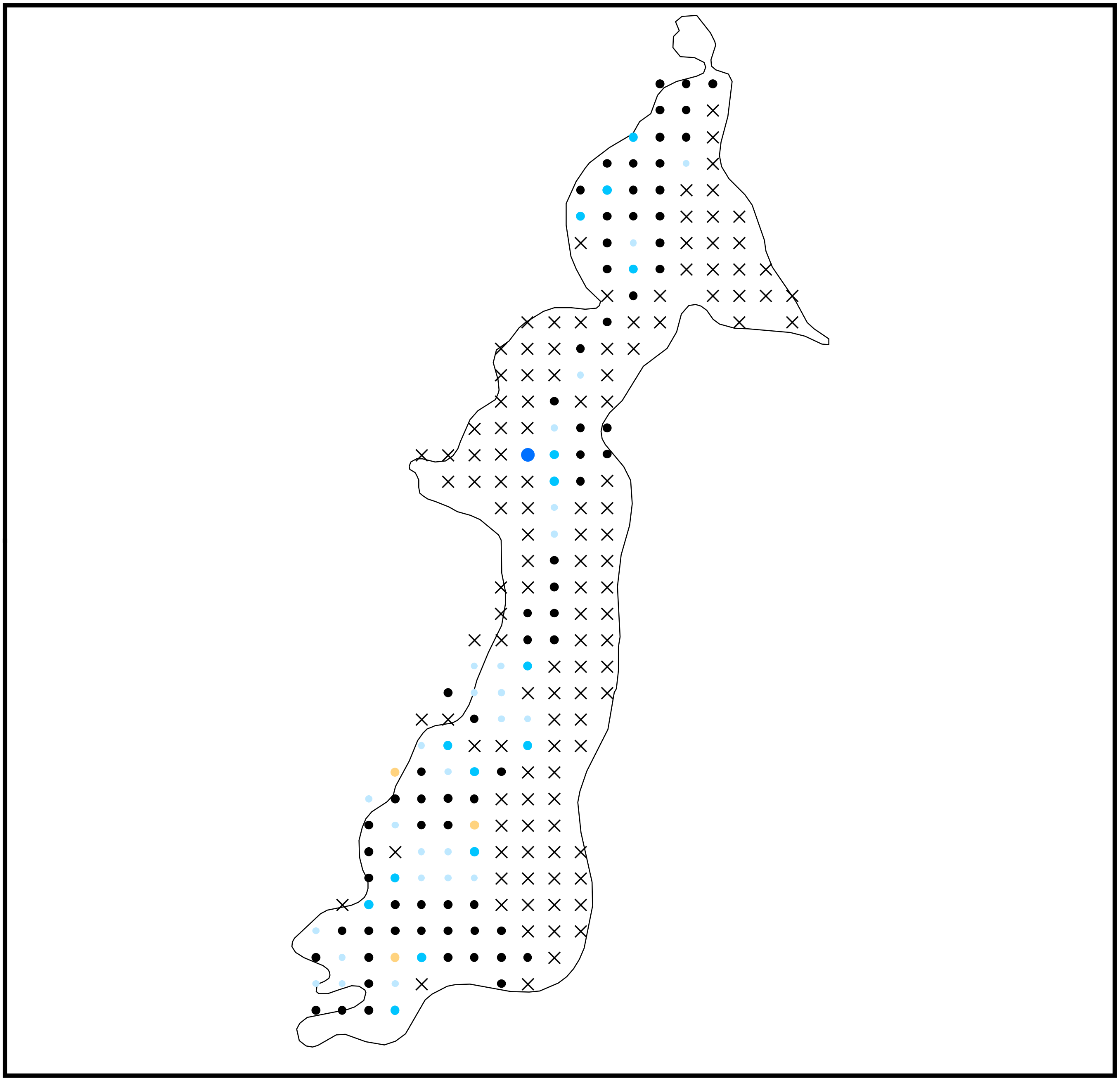
CHANGE IN RAKE FULLNESS RATING

-0.5	0.5	●	NO EWM OBSERVED EITHER YEAR
-1	1	■	EWM PRESENT, NO CHANGE IN FULLNESS
-1.5	1.5	×	NOT SAMPLED BOTH YEARS
-2	2		
-3			



Source: WDNR and SEWRPC

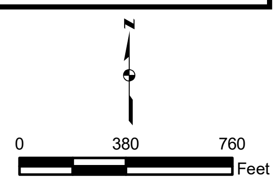
Figure 2.6
Change in Curly-Leaf Pondweed Total Rake Fullness in Cravath Lake: 2017-2024



NOTE: Survey was conducted on Cravath Lake from July 29th, 2024.

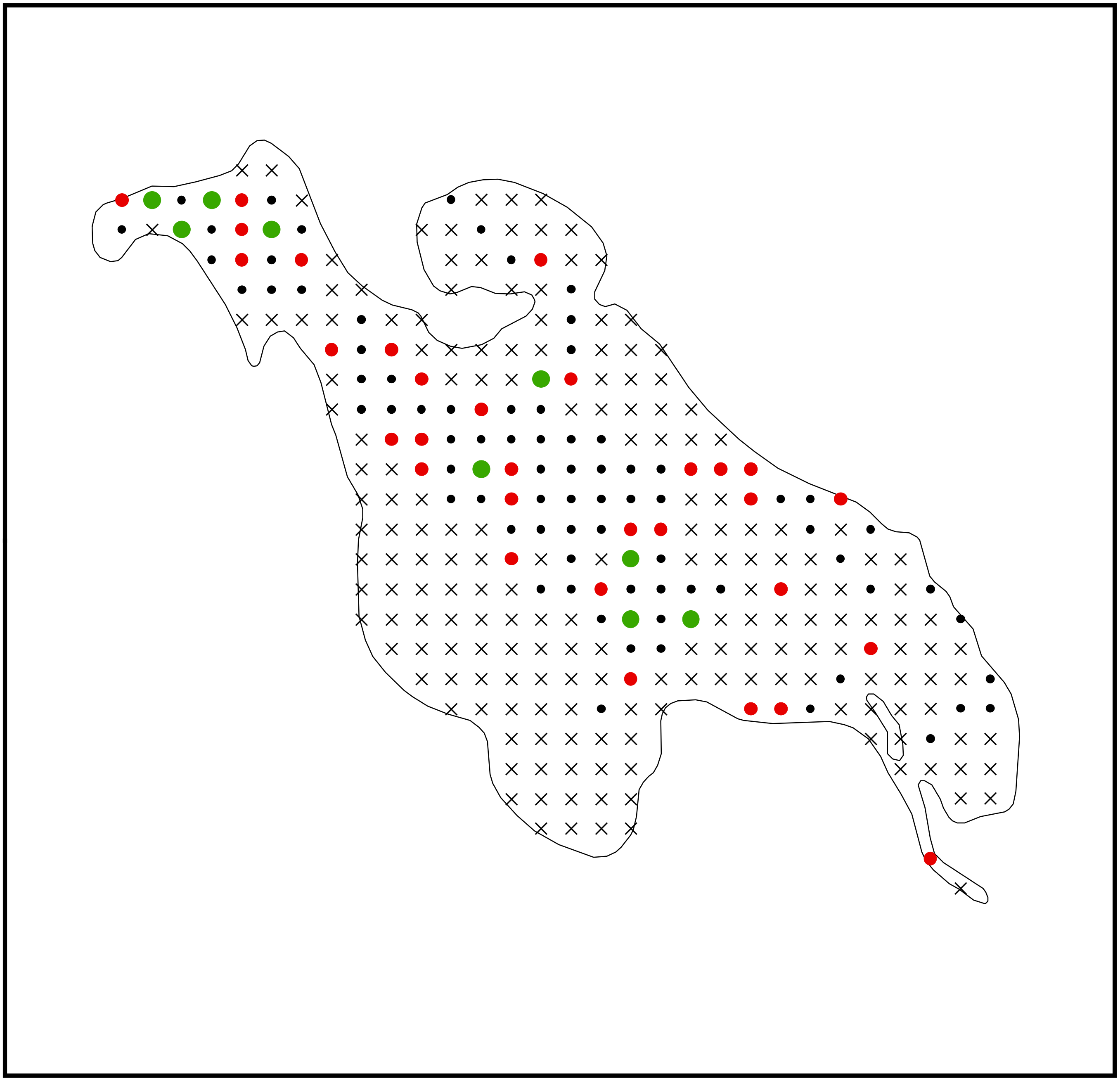
CHANGE IN RAKE FULLNESS RATING

- -0.5
- -1
- -1.5
- -2
- -3
- 0.5
- 1
- 1.5
- 2
- NO CLP OBSERVED EITHER YEAR
- CLP PRESENT, NO CHANGE IN FULLNESS
- NOT SAMPLED BOTH YEARS



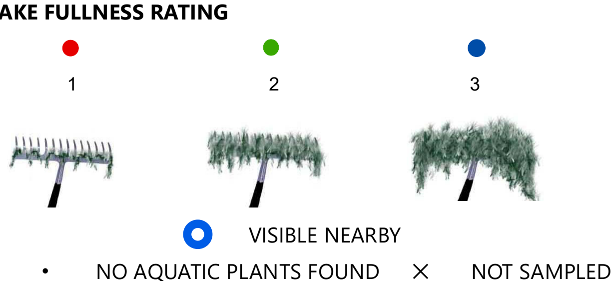
Source: WDNR and SEWRPC

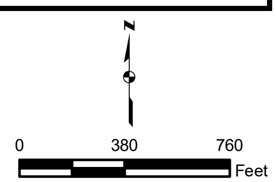
Figure 2.7
Total Rake Fullness on Trippe Lake: July 2024



NOTE: Survey was conducted on Trippe Lake on July 15th-July16th, 2024.

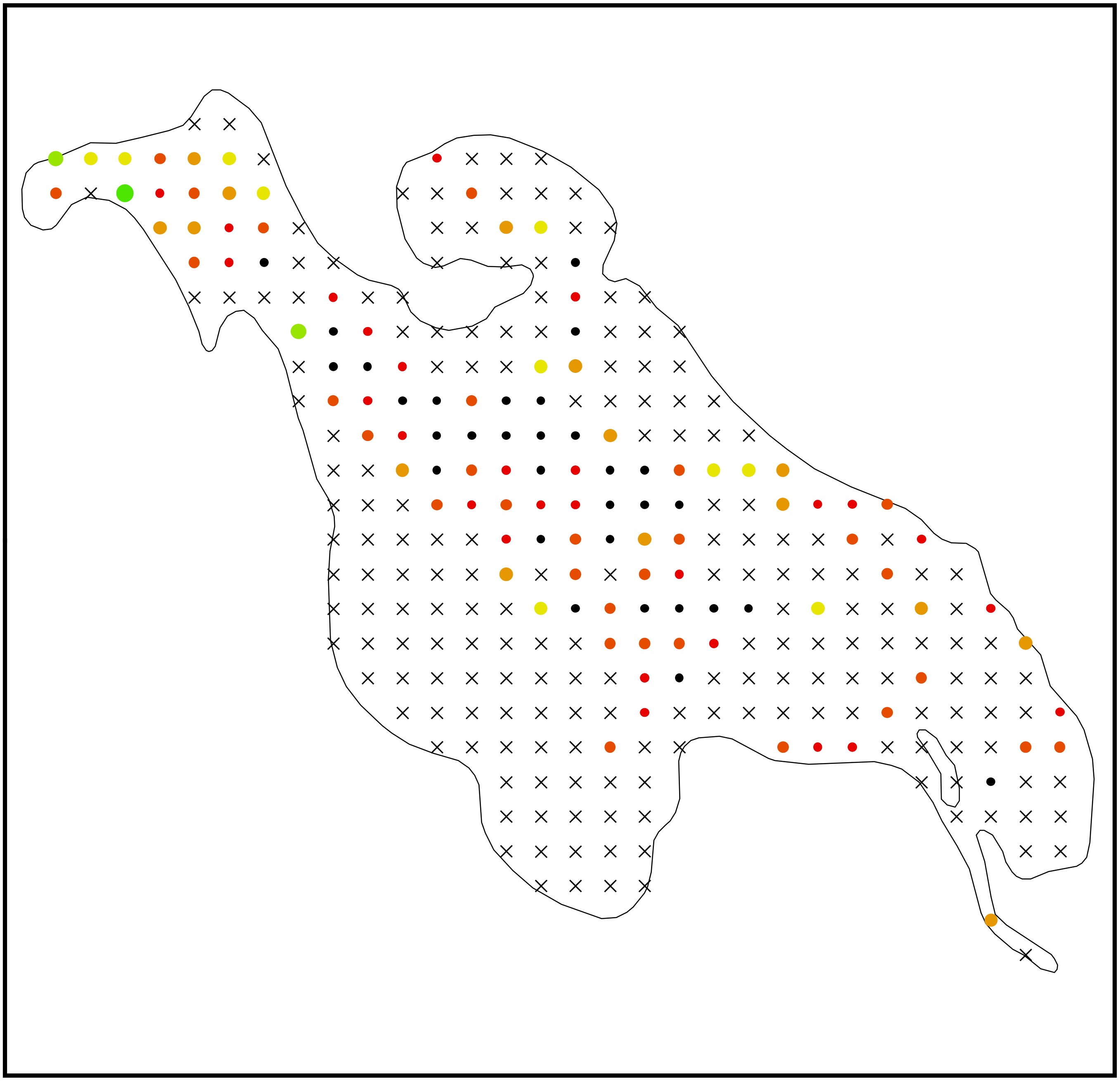
RAKE FULLNESS RATING





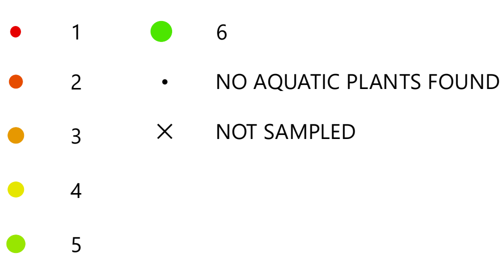
Source: WDNR and SEWRPC

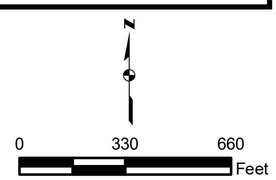
Figure 2.8
Species Richness in Tripppe Lake: July 2024



NOTE: Survey was conducted on Trippe Lake on July 15th -16th, 2024.

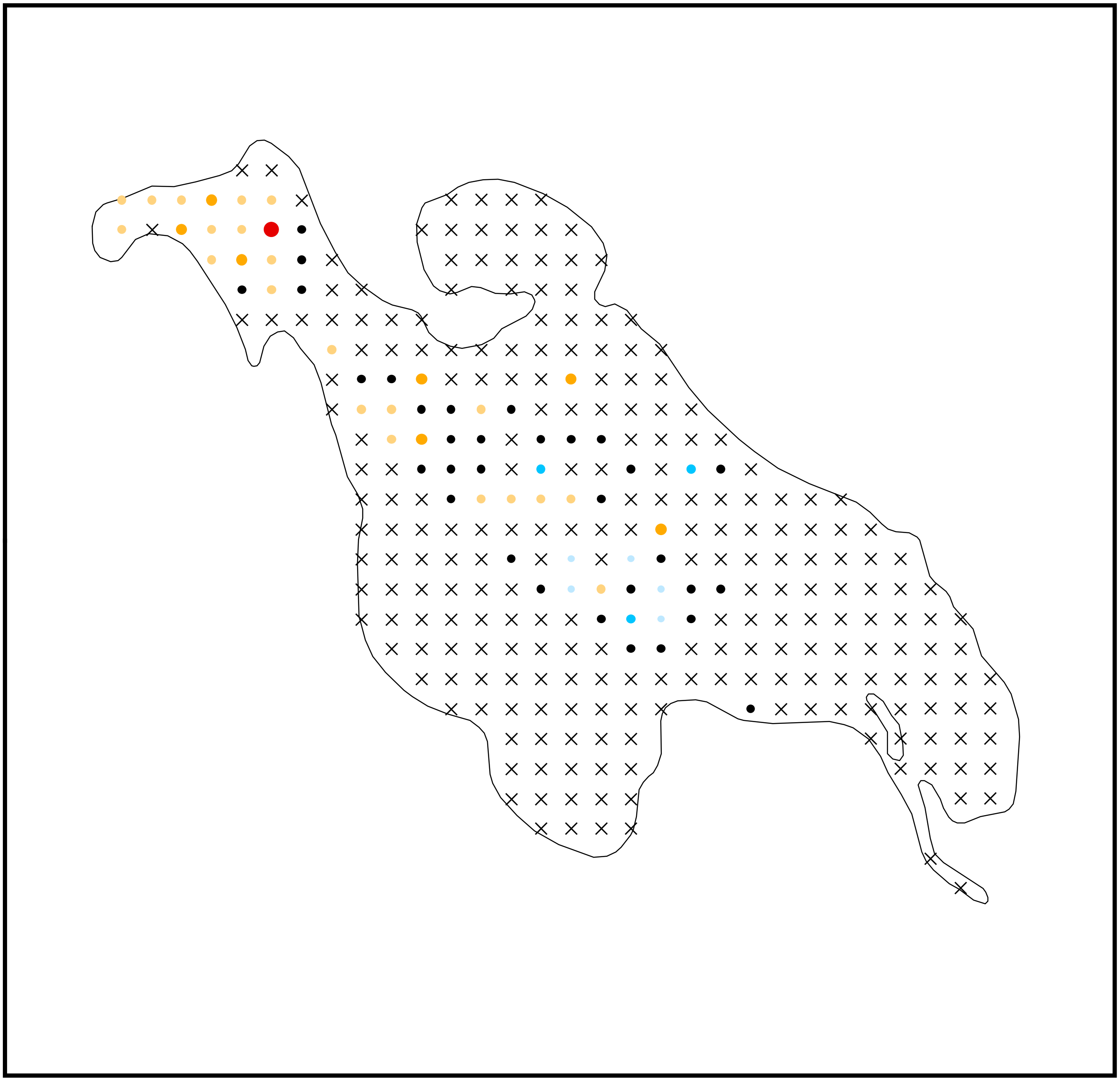
SPECIES RICHNESS





Source: WDNR and SEWRPC

Figure 2.9
Change in Curly Leaf Pondweed in Trippe Lake: 2017-2024



NOTE: Survey was conducted on Trippe Lake on July 15th-July16th, 2024.

CHANGE IN RAKE FULLNESS RATING

- -0.5
- -1
- 0.5
- 1
- 1.5
- 2

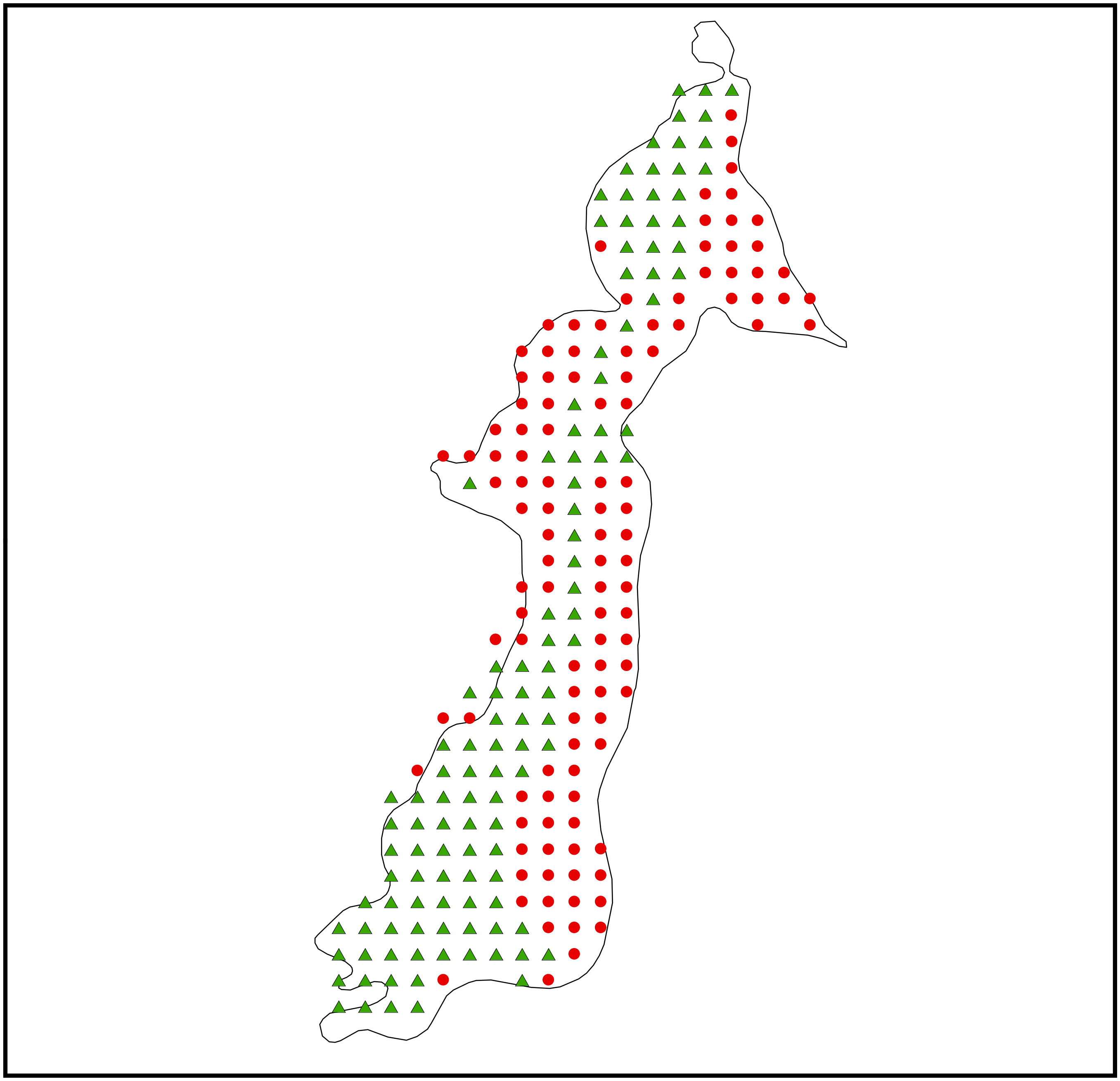
- NO CLP OBSERVED EITHER YEAR
- CLP PRESENT, NO CHANGE IN FULLNESS
- NOT SAMPLED BOTH YEARS

N

0 380 760 Feet

Source: WDNR and SEWRPC

Figure 2.10
Cattail Extent on Cravath Lake: July 2024

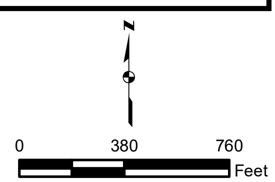


NOTE: Survey was conducted on Cravath Lake on July 29th, 2024.

LAKE BOUNDARY

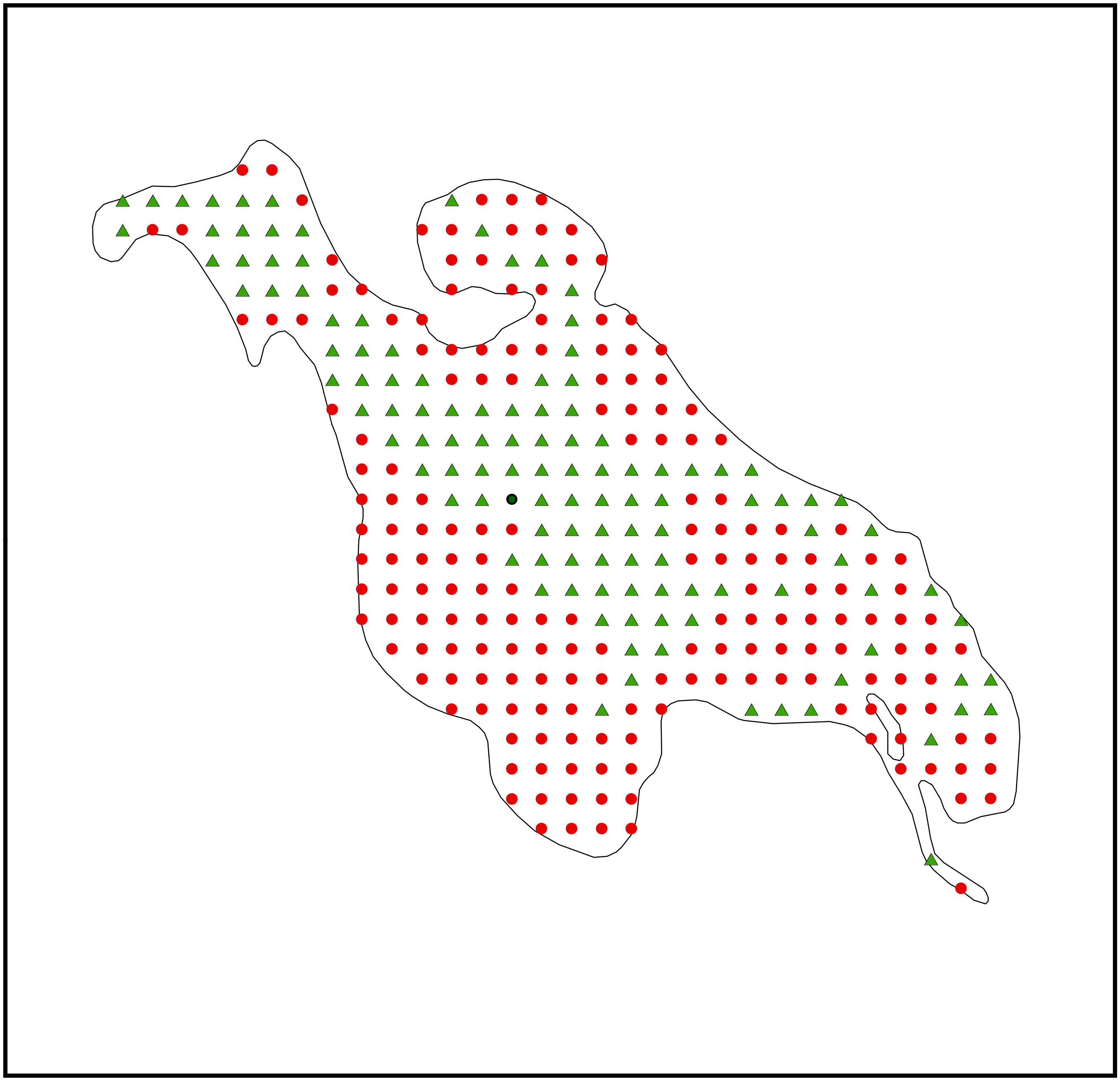
SAMPLED

NONNAVIGABLE DUE TO CATTAIL GROWTH



Source: WDNR and SEWRPC

Figure 2.11
Cattail Extent on Trippe Lake: July 2024



NOTE: Survey was conducted on Cravath Lake on July 29th, 2024.

LAKE BOUNDARY

SAMPLED

NONNAVIGABLE DUE TO CATTAIL GROWTH

N

0 380 760
Feet

Source: WDNR and SEWRPC

Figure 2.12
Hybrid Cattails in Cravath and Trippe Lakes: July 2024

Trippe Lake Cattails

Cravath Lake Cattails

Source: SEWRPC

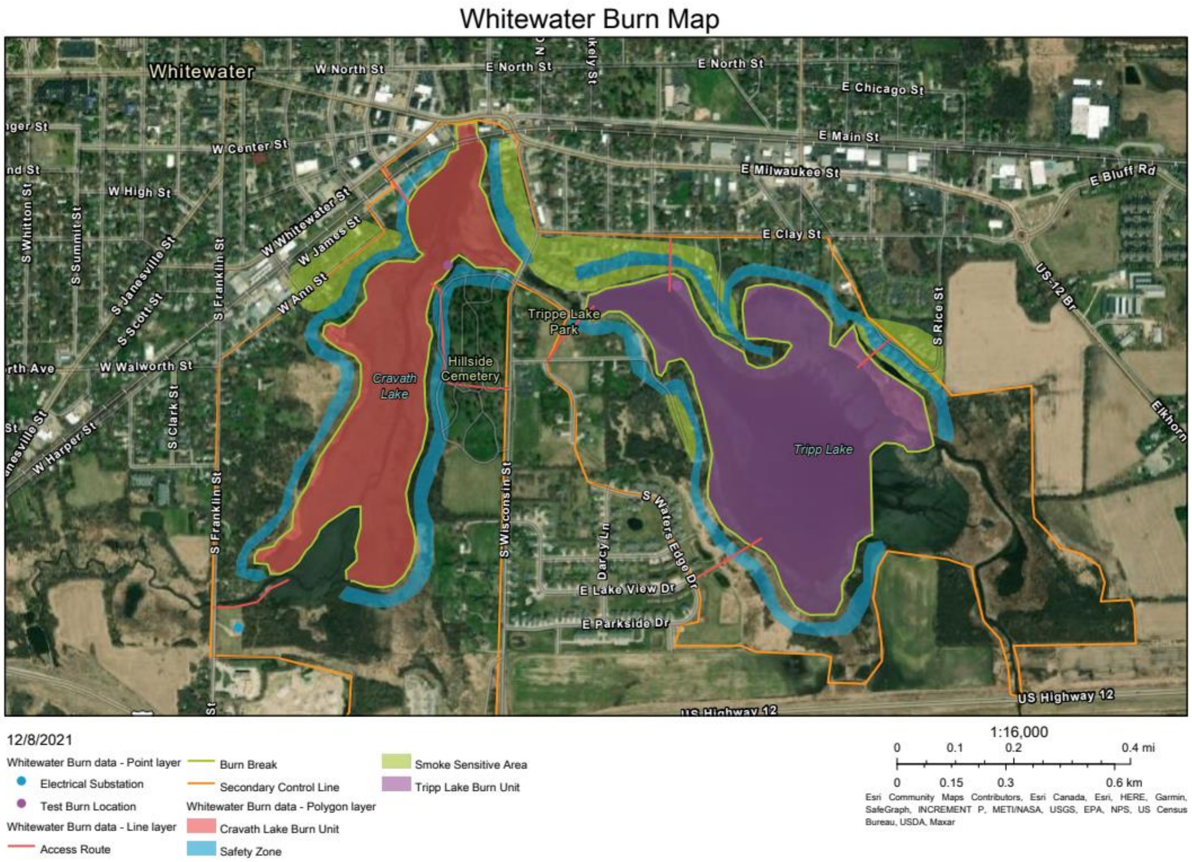
Figure 2.13
Hybrid Cattail Extent in Cravath and Trippe Lakes

June 2015 Cattails

May 2023 Cattails

Source: Google Earth Pro Imagery

Figure 2.14
Controlled Burn Map for Cravath and Trippe Lakes: December 2021



Source: City of Whitewater, Field & Stream Restorations

SEWRPC Staff Memorandum Report Number 275

AQUATIC PLANT MANAGEMENT PLAN FOR
CRAVATH AND TRIPPE LAKES, WALWORTH COUNTY, WISCONSIN

Chapter 2 Tables

Table 2.1
Examples of Positive Ecological Qualities Associated with a Subset of the Aquatic Plant Species Present or Historically Present in Cravath and Trippe 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
Elodea canadensis (common waterweed)	Provides shelter and support for insects which are valuable as fish food; native
Lemna spp. (duckweeds)	Very nutritious food source for waterfowl; mats can prevent extensive mosquito breeding; 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
Nelumbo lutea (American lotus)	Extensive stand provide habitat for wildlife, rhizomes consumed by muskrat and beaver; native
Potamogeton crispus (curly-leaf pondweed)	Adapted to cold water; mid-summer die-off can impair water quality; invasive nonnative
Potamogeton gramineus (variable pondweed)	The fruit is an important food source for many waterfowl; also provides food for muskrat, deer, and beaver; native
Potamogeton natans (floating-leaf pondweed)	The late-forming fruit provides important food source for ducks; provides good fish habitat due to its shade and foraging opportunities; 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

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

Table 2.2
Cravath Lake Aquatic Plant Summary Statistics: PI Survey 2024

Total number of sites visited	114
Total number of sites with vegetation	94
Total number of sites shallower than maximum depth of plants	114
Frequency of occurrence at sites shallower than maximum depth of plants	82.46
Simpson Diversity Index	0.62
Maximum depth of plants (feet)	7.00
Number of sites sampled using rake on Rope (R)	15
Number of sites sampled using rake on Pole (P)	99
Average number of all species per site (shallower than max depth)	1.49
Average number of all species per site (veg. sites only)	1.81
Average number of native species per site (shallower than max depth)	1.46
Average number of native species per site (veg. sites only)	1.78
Species Richness	7
Species Richness (including visuals)	9

Source: SEWRPC

Table 2.3
Aquatic Plant Species Observed in Cravath Lake: 2006 – 2024

Aquatic Plant Species	Native or Invasive	2006	2017	2024
Ceratophyllum demersum	Native	X	X	X
Elodea canadensis	Native	X	X	X
Lemna minor	Native	X	X	X
Myriophyllum spicatum	Invasive	X	X	X
Nelumbo lutea	Native	--	X	--
Nuphar advena	Native	--	X	--
Nuphar variegata	Native	X	--	--
Nymphaea odorata	Native	X	X	X
Potamogeton crispus	Invasive	X	X	X
Potamogeton gramineus	Native	--	X	--
Potamogeton illinoensis	Native	--	X	--
Potamogeton natans	Native	--	X	--
Potamogeton zosteriformis	Native	X	X	--
Sagittaria sp.	Native	--	X	--
Sparganium sp.	Native	X	--	--
Spirodela polyrhiza	Native	X	--	--
Stuckenia pectinata	Native	X	X	X
Typha sp.	Hybrid	--	X	X
Wolffia sp.	Native	--	X	X
Species Total		11	16	9

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

Source: SEWRPC

Table 2.4
Cravath Lake Aquatic Plant Survey Summary: July 2017 Versus July 2024

Aquatic Plant Species	Native or Invasive	Number of Sites Found[a] (2017/2024)	Frequency of Occurrence Within Vegetated Areas[b] (2017/2024)	Average Rake Fullness[c] (2017/2024)	Relative Frequency of Occurrence[d] (2017/2024)	Visual Sightings[e] (2017/2024)
Ceratophyllum demersum (coontail)	Native	200/67	95.69/71.28	2.20/1.57	23.6/39.4	1/14
Elodea canadensis (waterweed)	Native	74/12	35.41/12.77	1.27/1.17	8.7/7.1	14/1
Lemna minor (duckweed)	Native	193/79	92.34/84.04	1.71/1.42	22.8/46.5	12/33
Myriophyllum spicatum (Eurasian watermilfoil)	Invasive	98/3	46.89/3.19	1.35/1.33	11.6/1.8	21/0
Nelumbo lutea (American lotus)	Native	3/--	1.44/--	1.67/--	0.4/--	3/--
Nuphar advena (Yellow pond-lily)[f]	Native	0/--	0/--	0/--	0/--	26/--
Nymphaea odorata (white water lily)	Native	53/1	25.36/1.06	1.43/1.00	6.3/0.6	88/5
Potamogeton crispus (curly-leaf pondweed)	Invasive	27/0	12.92/0	1.04/0	3.2/0	39/4
Potamogeton gramineus (variable pondweed)	Native	2/--	0.96/--	1.00/--	0.2/--	7/--
Potamogeton illinoensis (Illinois pondweed)[g]	Native	0/--	0/--	0/--	0/--	1/--
Potamogeton natans (floating-leaf pondweed)	Native	0/--	0/--	0/--	0/--	4/--
Potamogeton zosteriformis (flat-stem pondweed)	Native	5/--	2.39/--	1.00/--	0.6/--	4/--
Sagittaria sp. (arrowhead)	Native	1/--	0.48/--	1.00/--	0.1/--	5/--
Stuckenia pectinata (Sago pondweed)[g]	Native	14/1	6.70/1.06	1.00/1.00	1.7/0.6	36/8
Typha sp. (cattail)	Native	0/0	0/0	0/0	0/0	33/14
Wolffia sp. (watermeal)	Native	178/7	85.17/7.45	1.63/1.14	21.0/4.1	10/5

Note: Sampling occurred at 114 sampling sites on July 29th, 2024. 94 of the 114 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] *Designated as a Species of Special Concern by the WDNR Natural Heritage Inventory.*

[g] *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 2.5
Trippe Lake Aquatic Plant Summary Statistics: PI Survey 2024

Total number of sites visited	116
Total number of sites with vegetation	39
Total number of sites shallower than maximum depth of plants	116
Frequency of occurrence at sites shallower than maximum depth of plants	33.62
Simpson Diversity Index	0.80
Maximum depth of plants (feet)	6.00
Number of sites sampled using rake on Rope (R)	25
Number of sites sampled using rake on Pole (P)	91
Average number of all species per site (shallower than max depth)	0.49
Average number of all species per site (veg. sites only)	1.46
Average number of native species per site (shallower than max depth)	0.39
Average number of native species per site (veg. sites only)	1.29
Species Richness	9
Species Richness (including visuals)	13

Source: SEWRPC

Table 2.6
Aquatic Plant Species Observed in Trippe Lake: 2006 – 2024

Aquatic Plant Species	Native or Invasive	2017	2024
Ceratophyllum demersum	Native	X	X
Elodea canadensis	Native	X	X
Lemna minor	Native	X	X
Myriophyllum spicatum	Invasive	X	--
Nelumbo lutea	Native	X	X
Nuphar advena	Native	X	--
Nuphar variegata	Native	--	X
Nymphaea odorata	Native	X	X
Potamogeton crispus	Invasive	X	X
Potamogeton foliosis	Native	X	--
Potamogeton gramineus	Native	X	--
Potamogeton illinoensis	Native	X	--
Potamogeton natans	Native	X	--
Potamogeton nodosus	Native	X	--
Potamogeton zosteriformis	Native	X	--
Sagittaria sp.	Native	X	--
Sparganium sp.	Native	--	X
Schoenoplectus sp.	Native	--	X
Spirodela polyrhiza	Native	X	--
Stuckenia pectinata	Native	X	X
Typha sp.	Hybrid	X	X
Vallisneria americana	Native	X	--
Wolffia ap.	Native	X	X
Zizania sp.	Native	X	--
Species Total		21	12

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

Source: SEWRPC

Table 2.7
Tripple Lake Aquatic Plant Survey Summary: July 2017 Versus July 2024

Aquatic Plant Species	Native or Invasive	Number of Sites Found[a] (2017/2024)	Frequency of Occurrence Within Vegetated Areas[b] (2017/2024)	Average Rake Fullness[c] (2016/2024)	Relative Frequency of Occurrence[d] (2016/2024)	Visual Sightings[e] (2016/2024)
Ceratophyllum demersum (coontail)	Native	106/19	91.38/48.72	1.93/1.26	46.3/33.3	37/4
Elodea canadensis (waterweed)	Native	19/3	16.38/7.69	1.11/1.00	8.3/5.3	11/1
Lemna minor (duckweed)	Native	3/7	2.59/17.95	1.00/1.00	1.3/12.3	60/37
Myriophyllum spicatum (Eurasian watermilfoil)	Invasive	27/--	23.28/--	1.15/--	11.8/--	39/--
Nelumbo lutea (American lotus)	Native	19/1	16.38/2.56	1.84/1.00	8.3/1.8	208/3
Nuphar advena (Yellow pond-lily)[f]	Native	0/--	0/--	0/--	0/--	4/--
Nuphar variegata (white-water lily)	Native	--/1	--/2.56	--/1.00	--/1.8	--/0
Nymphaea odorata (white water lily)	Native	15/0	12.93/0	1.53/0	6.6/0	80/8
Potamogeton crispus (curly-leaf pondweed)	Invasive	4/12	3.45/30.77	1.00/1.08	1.7/21.1	21/27
Potamogeton foliosus (leafy pondweed)	Native	3/--	2.59/--	1.00/--	1.3/--	8/--
Potamogeton gramineus (variable pondweed)	Native	1/--	0.86/--	1.00/--	0.4/--	0/--
Potamogeton illinoensis (Illinois pondweed)[g]	Native	4/--	3.45/--	1.25/--	1.7/--	5/--
Potamogeton natans (floating-leaf pondweed)	Native	12/--	10.34/--	1.75/--	5.2/--	14/--
Potamogeton nodosus (long-leafed pondweed)	Native	3/--	2.59/--	1.00/--	1.3/--	7/--
Potamogeton zosteriformis (flat-stem pondweed)	Native	1/--	0.86/--	1.00/--	0.4/--	2/--
Sagittaria sp. (arrowhead)	Native	0/--	0/--	0/--	0/--	3/--
Sparganium sp. (bur-reed)	Native	--/0	--/0	--/0	--/0	--/1
Spirodela polyrhiza (large duckweed)	Native	1/--	0.86	1.00/--	0.4/--	2/--
Stuckenia pectinata (Sago pondweed)[g]	Native	6/9	5.17/23.08	1.00/1.11	2.6/15.8	48/12
Typha sp. (cattail)	Native	0/1	0/2.56	0/1.00	0/1.8	45/17
Vallisneria americana (eel-grass/wild celery)[g]	Native	5/--	4.31/--	1.20/--	2.2/--	5/--
Wolffia columbiana (common watermeal)	Native	0/4	0/10.26	0/1.00	0/7.0	25/17
Zizania sp. (wild rice)	Native	0/--	0/--	0/--	0/--	5/--

Note: Sampling occurred at 116 sampling sites on July 15th-16th, 2024. 39 of the 116 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] *Designated a Species of Special Concern by the WDNR Natural Heritage Inventory.*

[g] *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

Chapter 3

MANAGEMENT RECCOMMENDATIONS AND PLAN IMPLEMENTATION

This chapter summarizes the information and recommendations needed to manage aquatic plants in Cravath and Trippe Lakes, particularly the nonnative species of hybrid cattail, 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 the City of Whitewater ("City") in collaboration with the Wisconsin Department of Natural Resources ("WDNR") and residents on the Lakes. The aquatic plant management recommendations contained in this chapter are limited to approaches that monitor and control nuisance level aquatic plant growth in the Lakes 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 Lakes
- Protecting the native aquatic plant community
- Controlling CLP, EWM, and hybrid cattail 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, 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 techniques are briefly summarized in the following paragraphs. These management techniques were discussed with both the City and the WDNR.

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: harvesting, chemical treatment, and prescribed burning. Each of these techniques have custom adaptations for the conditions present in the Lakes. These methods are combined to form the recommended Cravath and Trippe Lakes' aquatic plant management program. The elements of this program are listed below.

1. **Prescribed/controlled burning of cattail material** should be considered to manage the cattail populations that have densely colonized large portions of the Lakes.[1] Controlled burns should be done during the winter months during a lake-drawdown when the lakebeds are exposed and easily accessed. The City should consult with WDNR and the County to ensure they are following local and state regulations regarding prescribed/controlled burns. Due to the ability to draw down both lakes, this management technique should be considered a high priority.
2. **Chemical treatment of hybrid cattail populations.** The spraying of chemicals has long been used as a method to control non-native plant populations. In the case of Cravath and Trippe Lakes, helicopter spraying of Imazapyr or Glyphosate to control hybrid cattails should be considered a high priority.[2] Imazapyr is most effective when used during spring, when cattails are still actively growing. Glyphosate is most effective when sprayed in the autumn as cattails begin to die back for the winter. In addition to helicopter spraying, hand-wicking and regular spraying from boats, on foot, or from amphibious vehicles should also be considered for smaller cattail stands or in areas

[1] *Should prescribed burns be utilized as a management strategy a Burn Plan should be made to ensure the best outcomes of the burn(s).*
[2] *Should chemical spraying be utilized as a management strategy, maps of the location of the spray events should be created and approved by WDNR.*

where helicopter spraying is not feasible or desired due to proximity to residences or sensitive species (e.g., near stands of yellow water lily (*Nuphar advena*), a Species of Special Concern).

3. **Invasive species plant control**. While the 2024 aquatic plant survey did not reveal a need to actively control EWM or CLP, 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. It should be noted that should winter drawdowns be utilized for controlled burns, they will also assist in keeping invasive species such as EWM and CLP under control. This recommendation should be considered a <u>high priority</u>.
4. **Manual removal of nuisance plant growth in near-shore areas** 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. Cattails can often be drowned out using manual removal techniques such as below-water cutting of the stalks in early spring and late fall. Given what is known of plant distribution, this option is given <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 Lakes.[3] A permit *is* required if the property owner lives adjacent to a sensitive area or if the City or other group actively engages in such work.[4] 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.[5]
5. **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

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[3] *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.*

[4] *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.*

[5] *SEWRPC and WDNR staff could help review documents developed for this purpose.*

native species intact. This tactic may be useful when targeting smaller specific or shallower areas of the Lakes. This recommendation should be considered a low priority.

6. **Stocking of native aquatic plant species.** Once hybrid cattail and other non-native aquatic plant populations have been lowered, opportunities for native aquatic plant colonization will be increased. Stocking of native aquatic plans will promote biodiversity of the plant community in the Lakes as well as assist in preventing the rebound on nonnative and nuisance species of plants. It is recommended that native plants which have been previously documented in the Lakes (e.g., *Potamogeton natans, P. gramineus, P. zosteriformis, P. illinoensis, P. nodosus, Valisneria americana*) be stocked. This recommendation should be considered a medium priority.
7. **Begin participating in the Clean Boats Clean Waters program to monitor the public launches.** Participation in this program proactively encourages lake users to clean boats and equipment before launching and after using them in Cravath and Trippe Lakes. The WDNR has a grant program that can help fund monitoring efforts (see "Future Funding" later in this chapter).
8. **Stay abreast of best management practices to address invasive species.** The City should regularly communicate with Walworth County 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.

Future Funding

The City should utilize WDNR Surface Water Grants to further their efforts in monitoring and managing 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 $4,000 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. The City must participate in the Clean Boats, Clean Waters program to maintain 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**[6] – 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 City has received grants from this program in the past to assist with the funding of projects.

The City 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.

3.2 SUMMARY AND CONCLUSIONS

As requested by the City, the Commission worked with the City to develop a scope of work to provide information needed to allow the City to apply for aquatic plant management permits. 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.

Successfully implementing this plan will require cooperative engagement from the City, State and regional agencies, Walworth County, municipalities, and residents/users of the Lakes. The recommended measures help foster conditions sustaining and enhancing the natural beauty and ambience of Cravath and Trippe

[6] *https://dnr.wisconsin.gov/aid/RBF.html*

Lakes while promoting a wide array of water-based recreational activities suitable for the Lakes' intrinsic characteristics.

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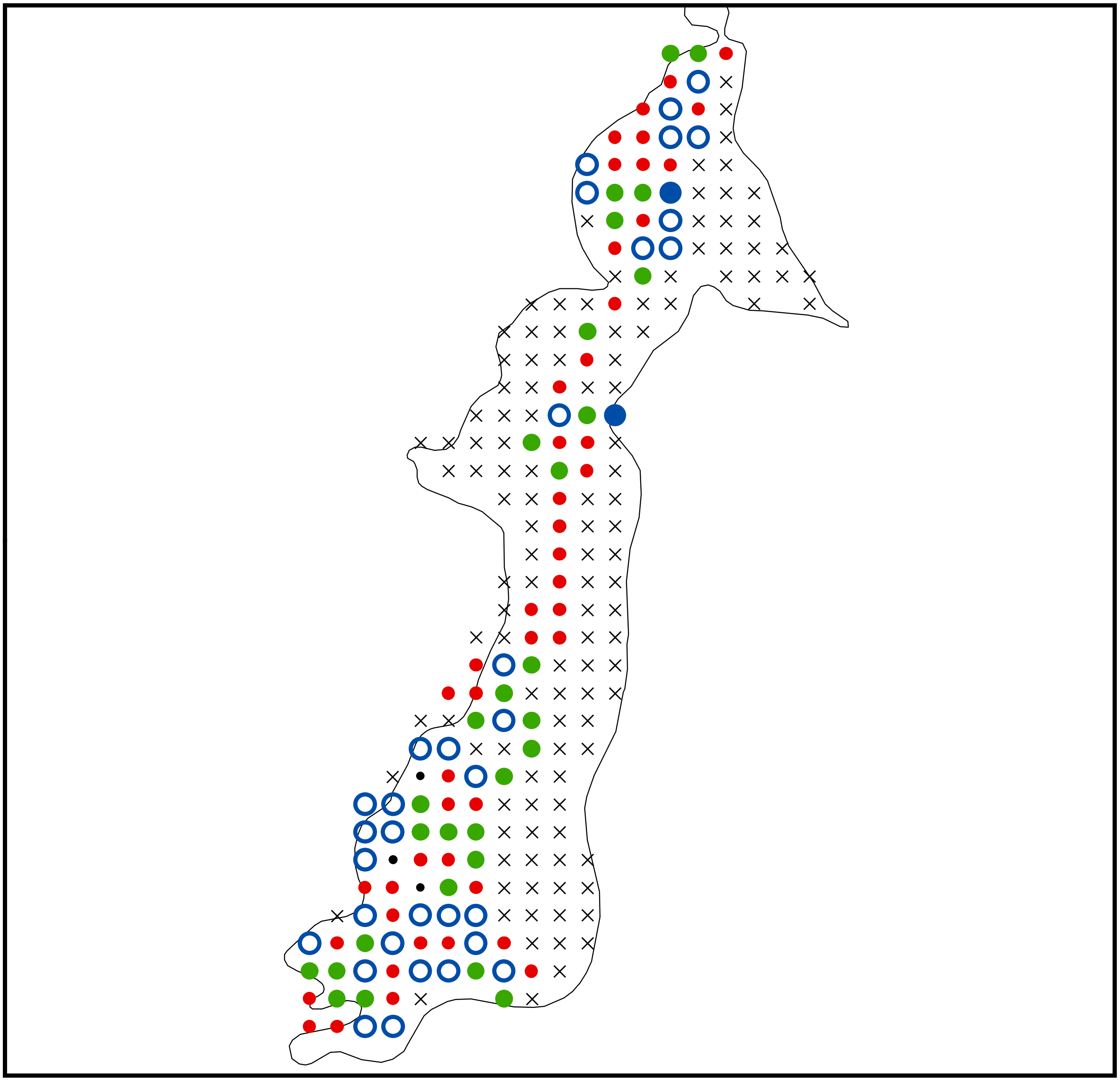
AQUATIC PLANT MANAGEMENT PLAN FOR
CRAVATH AND TRIPPE LAKES, WALWORTH COUNTY, WISCONSIN

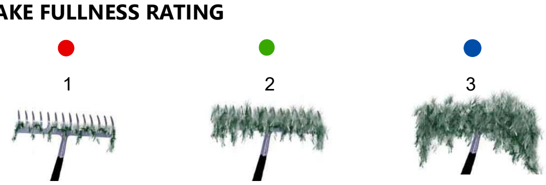
Appendix A

Figure A.1
Duckweed Rake Fullness in Cravath Lake: July 2024



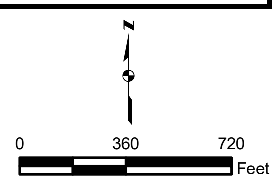
NOTE: Survey was conducted on Cravath Lake on July 29th, 2024.

RAKE FULLNESS RATING



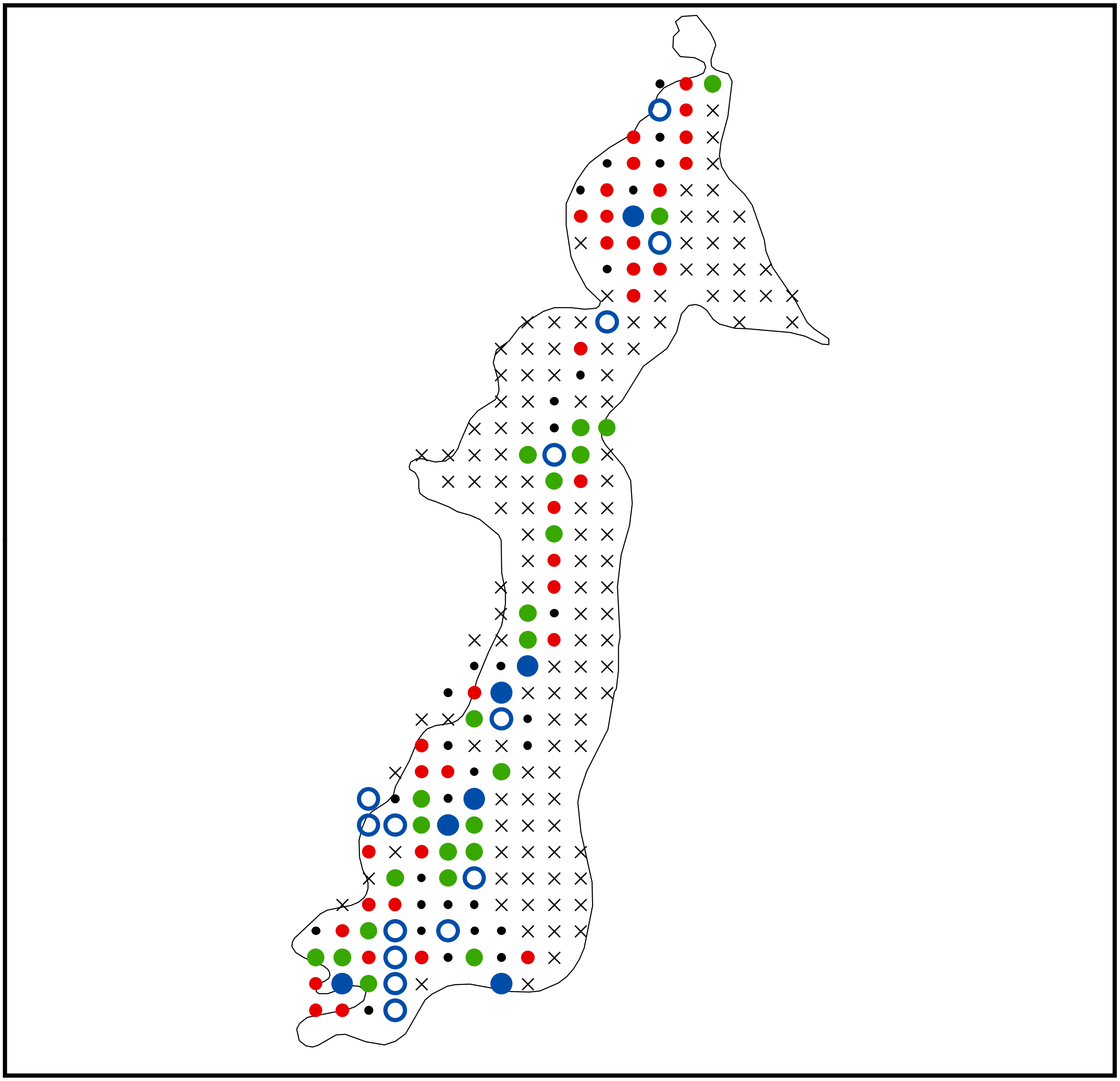
VISIBLE NEARBY

• NO AQUATIC PLANTS FOUND × NOT SAMPLED



Source: WDNR and SEWRPC

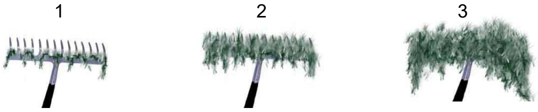
Figure A.2
Coontail Total Rake Fullness in Cravath Lake: July 2024



NOTE: Survey was conducted on Cravath Lake on July 29th, 2024.

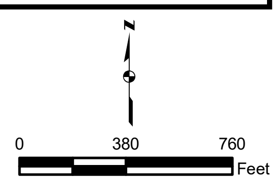
RAKE FULLNESS RATING

1 2 3



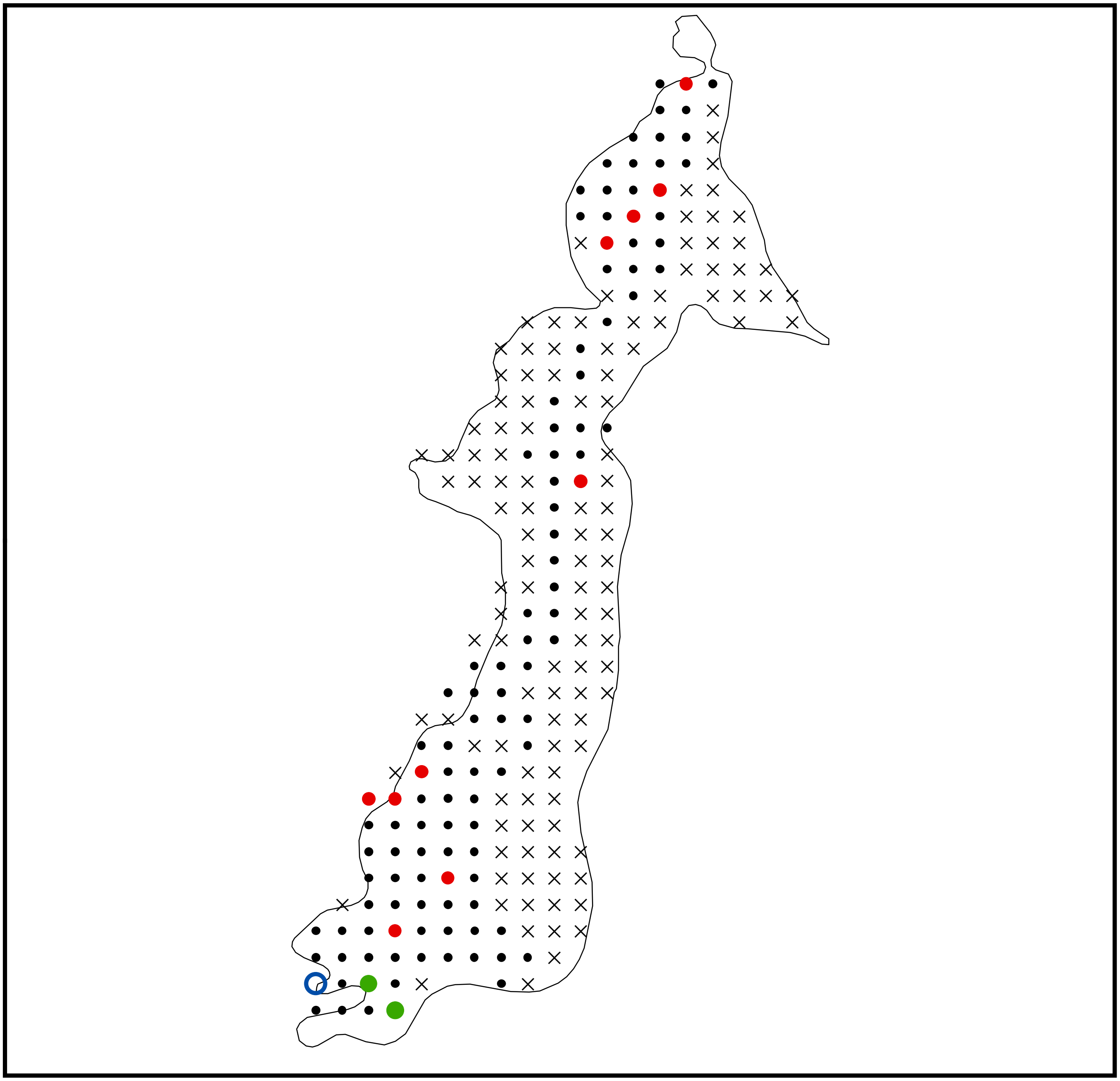
VISIBLE NEARBY

NO AQUATIC PLANTS FOUND NOT SAMPLED



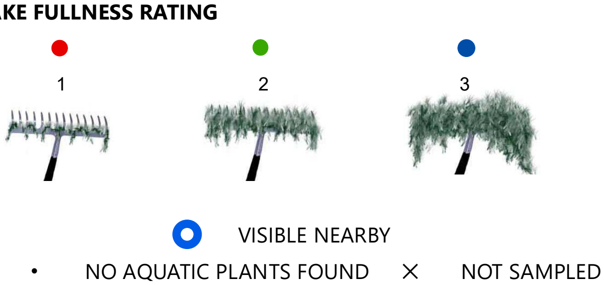
Source: WDNR and SEWRPC

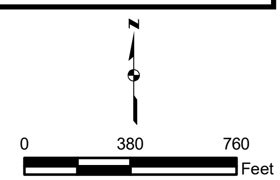
Figure A.3
Elodea Total Rake Fullness in Cravath Lake: July 2024



NOTE: Survey was conducted on Cravath Lake on July 29th, 2024.

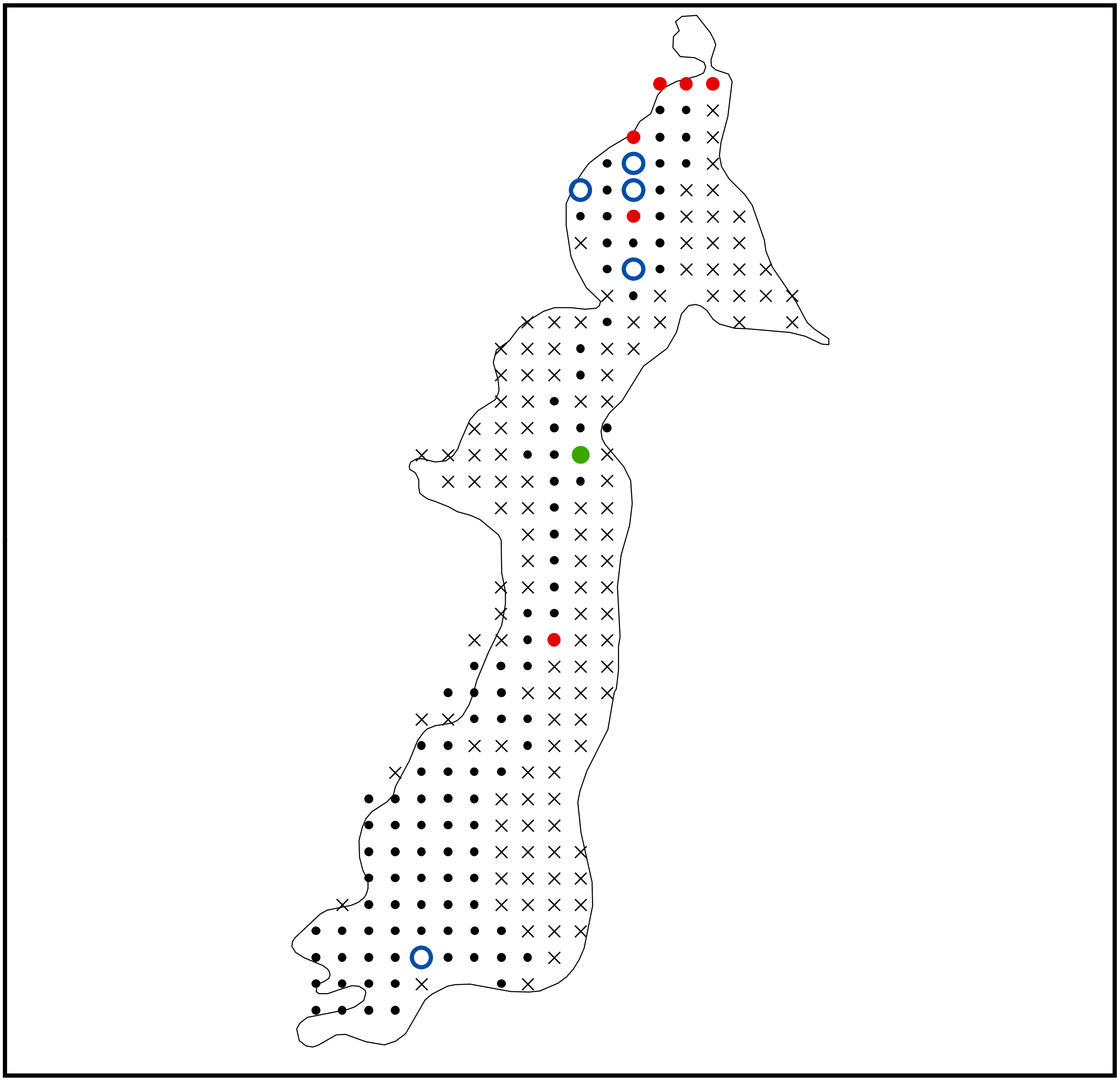
RAKE FULLNESS RATING





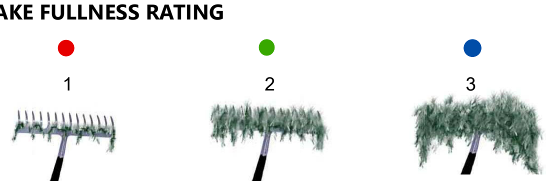
Source: WDNR and SEWRPC

Figure A.4
Watermeal Total Rake Fullness in Cravath Lake: July 2024



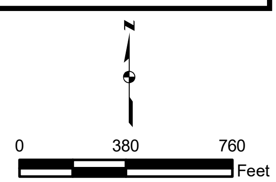
NOTE: Survey was conducted on Cravath Lake on July 29th, 2024.

RAKE FULLNESS RATING



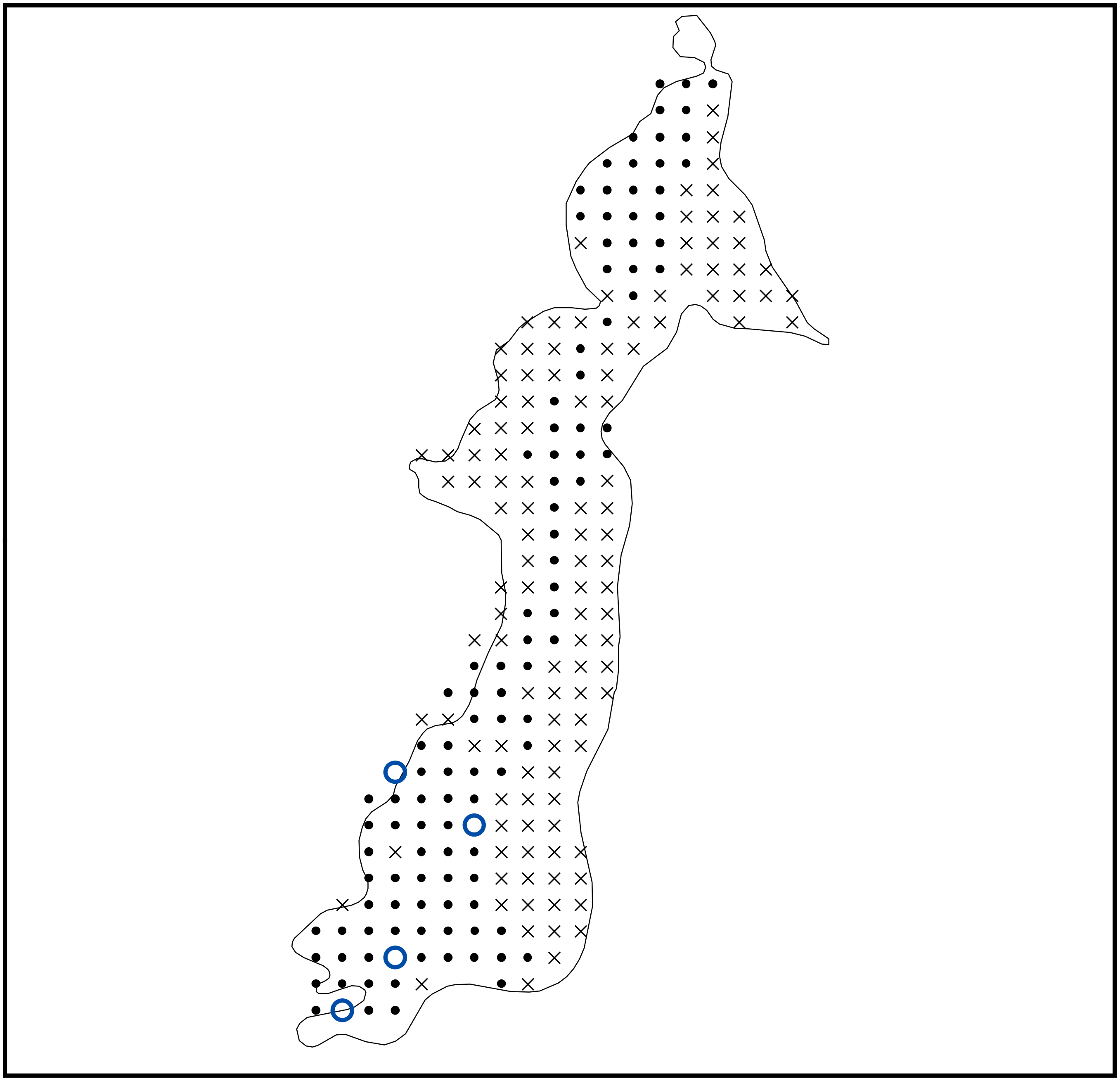
VISIBLE NEARBY

• NO AQUATIC PLANTS FOUND × NOT SAMPLED



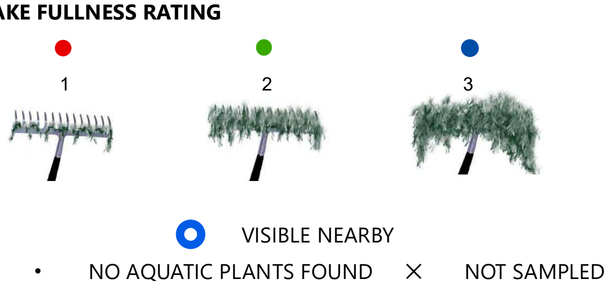
Source: WDNR and SEWRPC

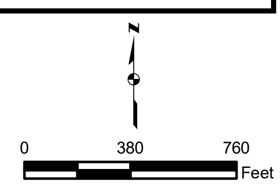
Figure A.5
Curly-leaf Pondweed Total Rake Fullness in Cravath Lake: July 2024



NOTE: Survey was conducted on Cravath Lake on July 29th, 2024.

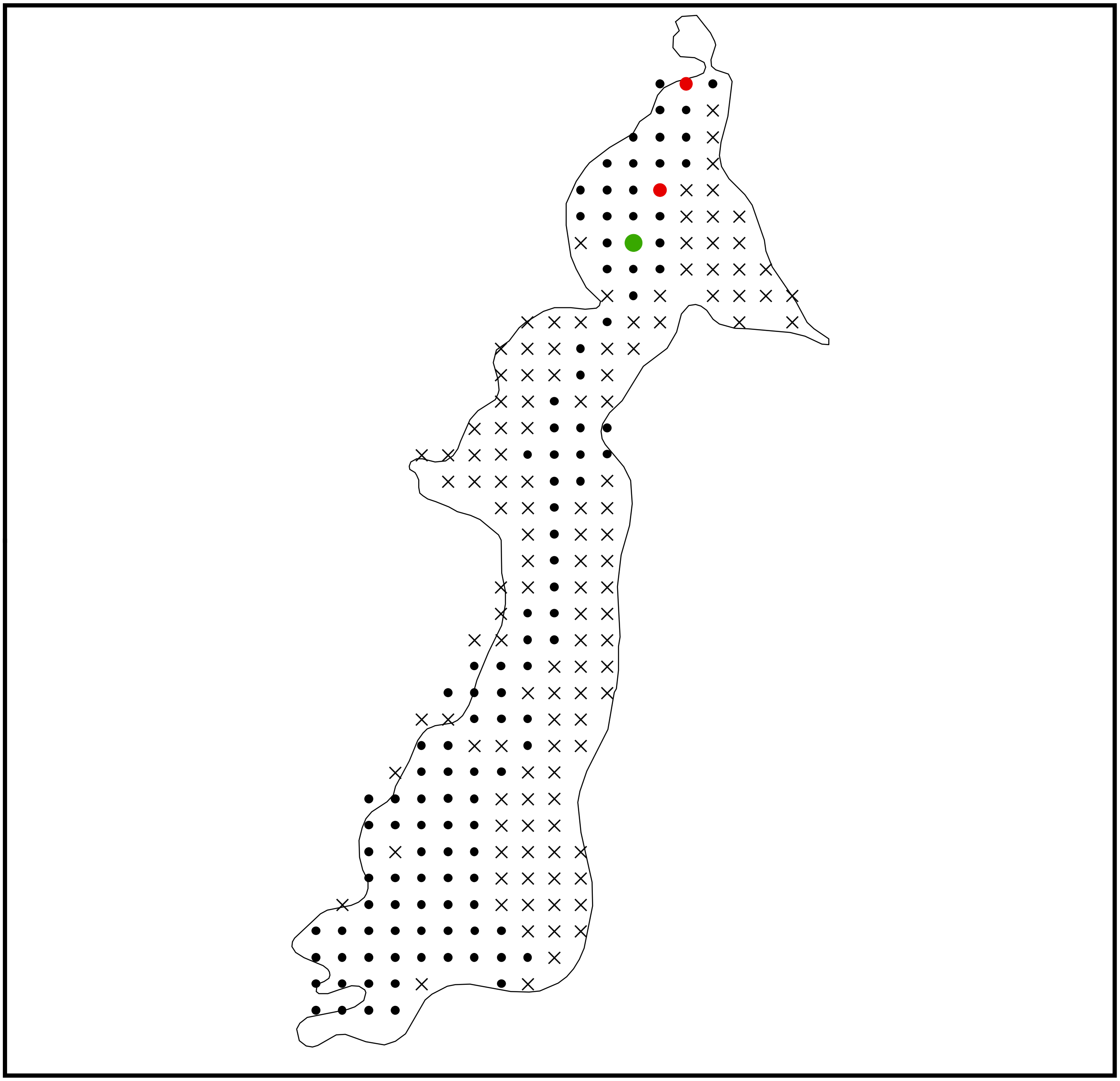
RAKE FULLNESS RATING



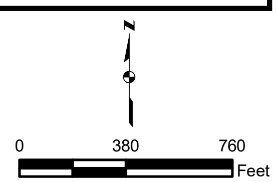


Source: WDNR and SEWRPC

Figure A.6
Eurasian Watermilfoil Total Rake Fullness in Cravath Lake: July 2024

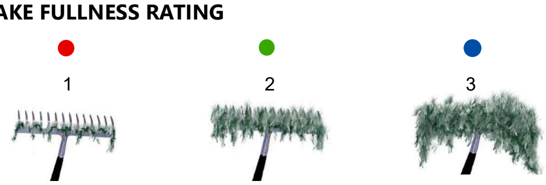


NOTE: Survey was conducted on Cravath Lake on July 29th, 2024.



Source: WDNR and SEWRPC

RAKE FULLNESS RATING



VISIBLE NEARBY

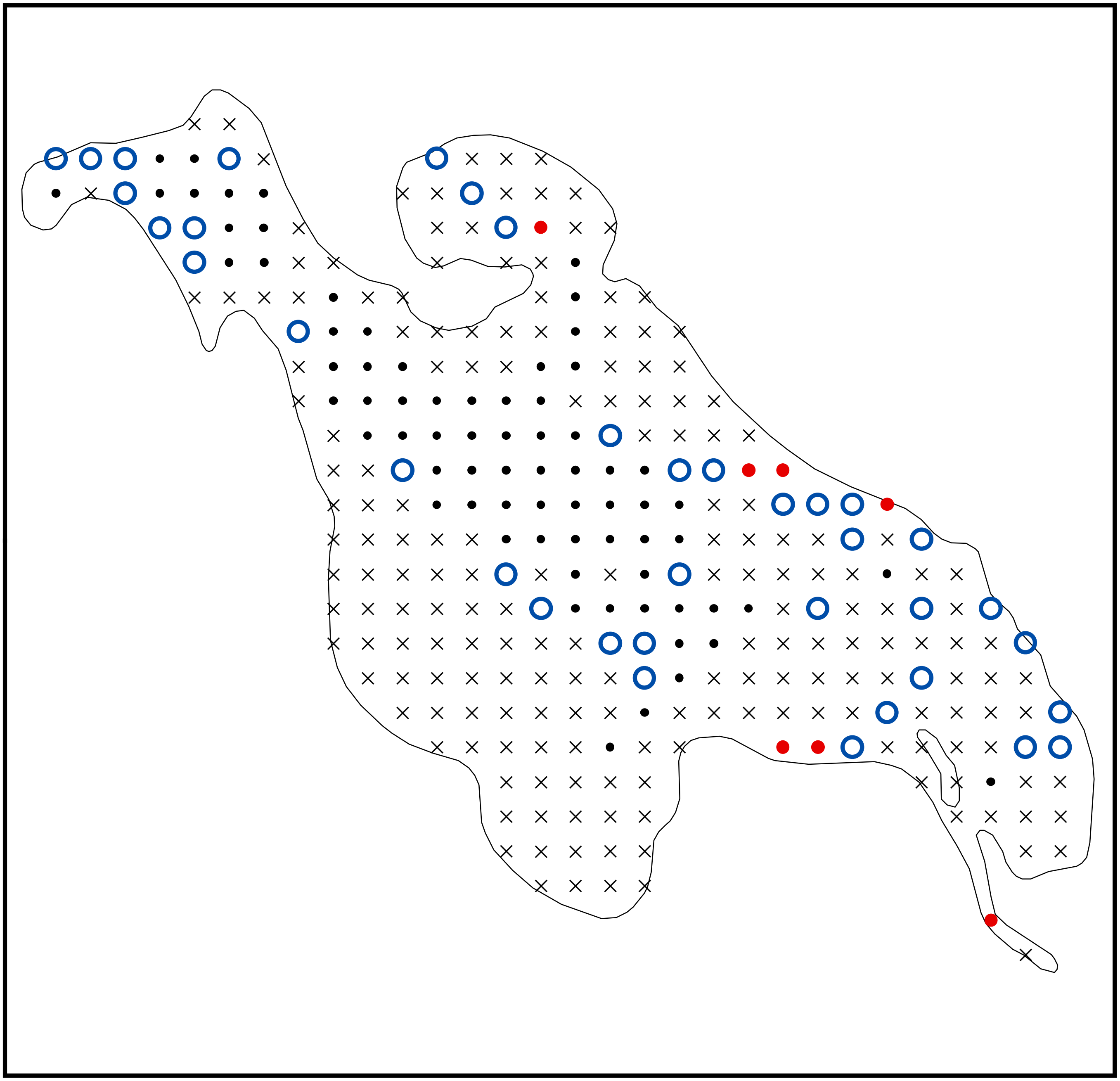
NO AQUATIC PLANTS FOUND

NOT SAMPLED

AQUATIC PLANT MANAGEMENT PLAN FOR
CRAVATH AND TRIPPE LAKES, WALWORTH COUNTY, WISCONSIN

Appendix B

Figure B.1
Duckweed Rake Fullness in Trippe Lake: July 2024



NOTE: Survey was conducted on Trippe Lake on July 15th-16th, 2024.

RAKE FULLNESS RATING

1 2 3

VISIBLE NEARBY

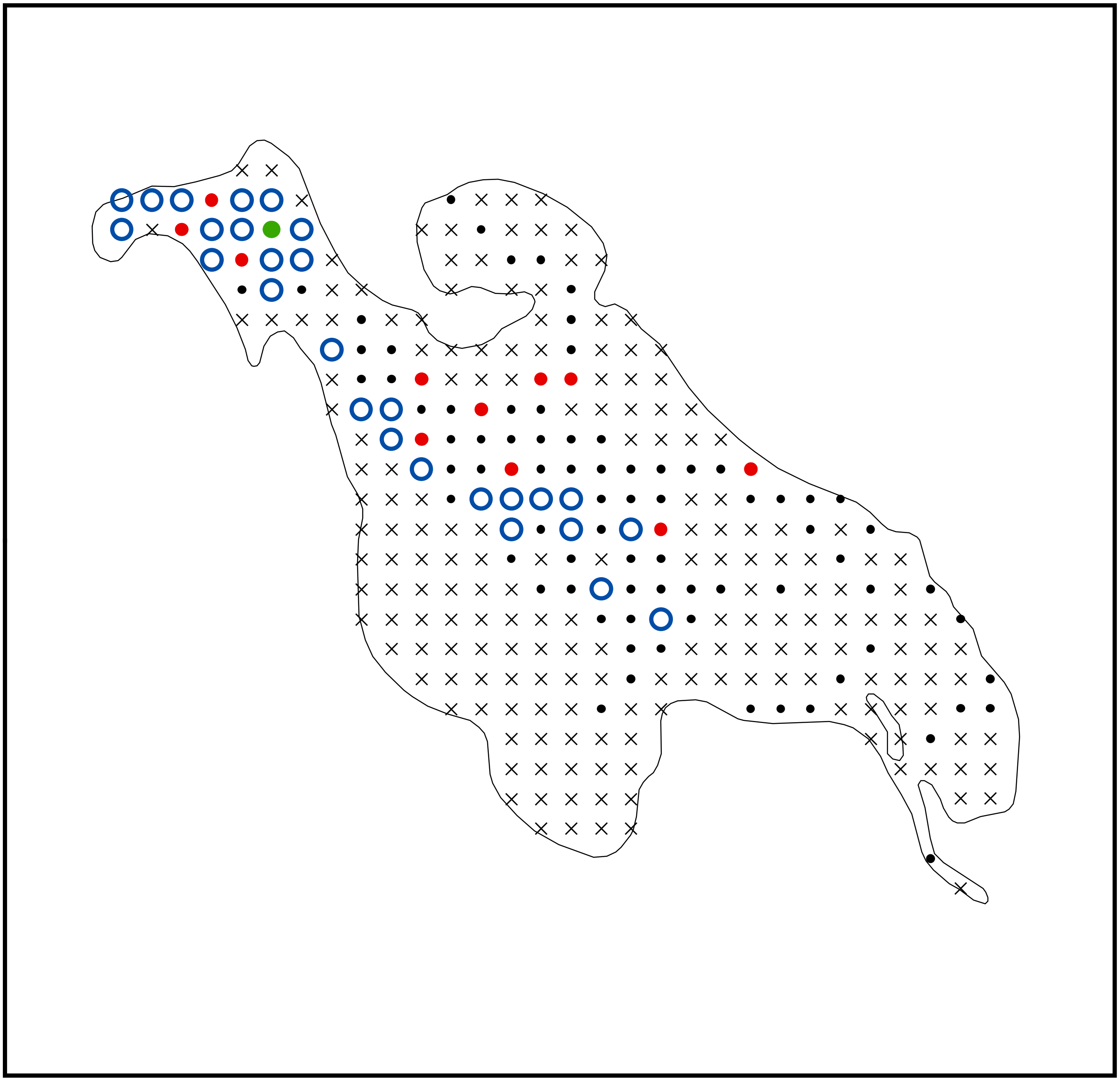
• NO AQUATIC PLANTS FOUND × NOT SAMPLED

N

0 330 660
Feet

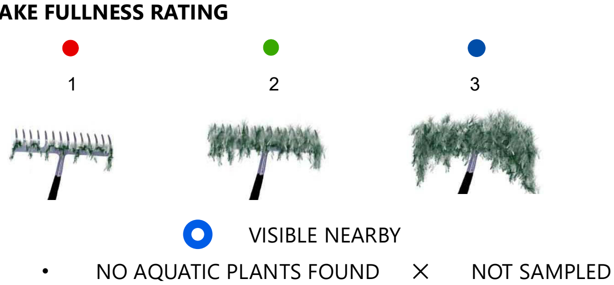
Source: WDNR and SEWRPC

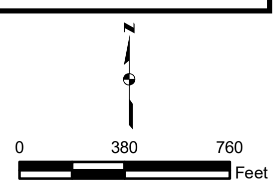
Figure B.2
Curly Leaf Pondweed Rake Fullness on Trippe Lake: July 2024



NOTE: Survey was conducted on Trippe Lake on July 15th-July16th, 2024.

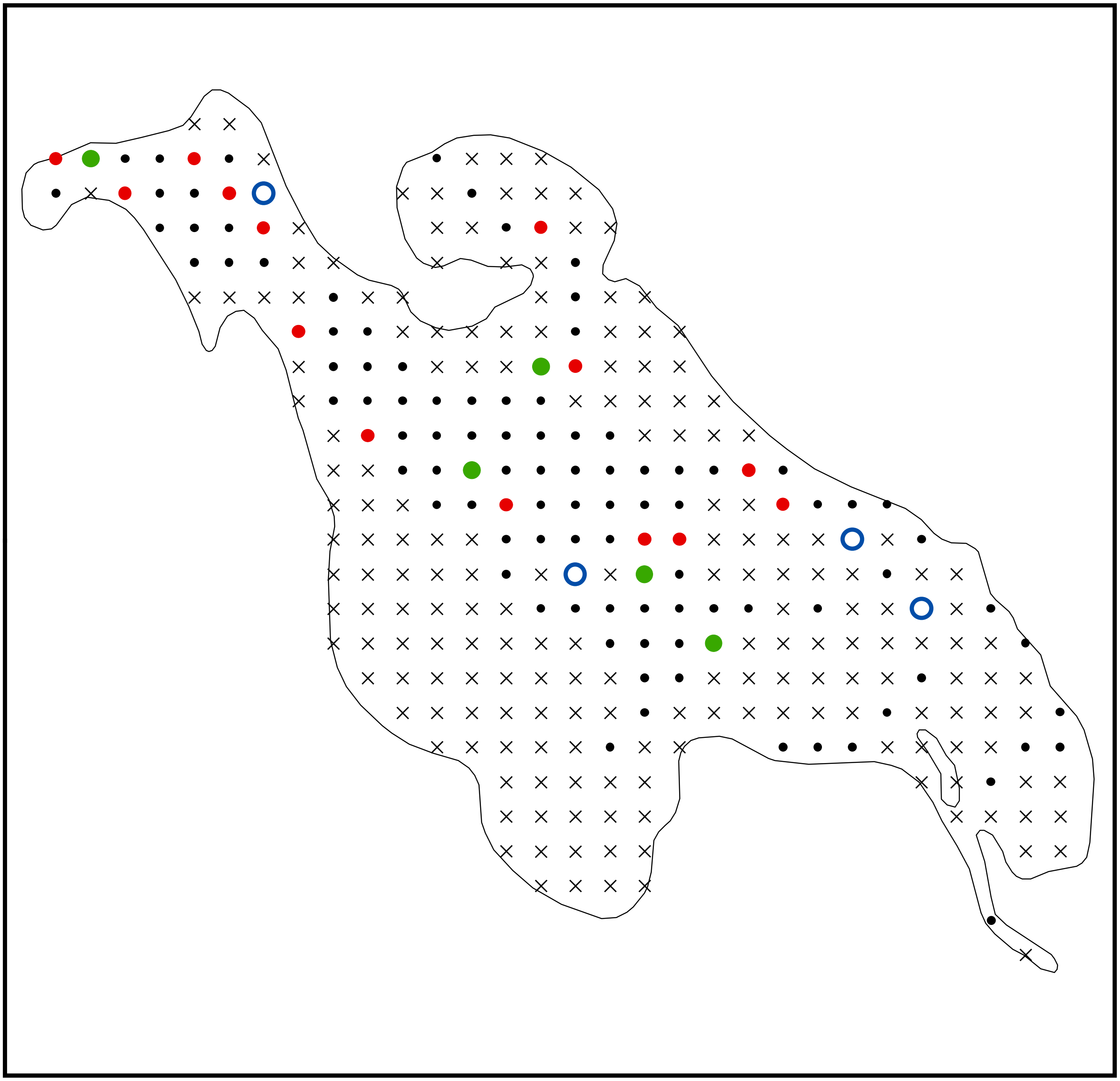
RAKE FULLNESS RATING



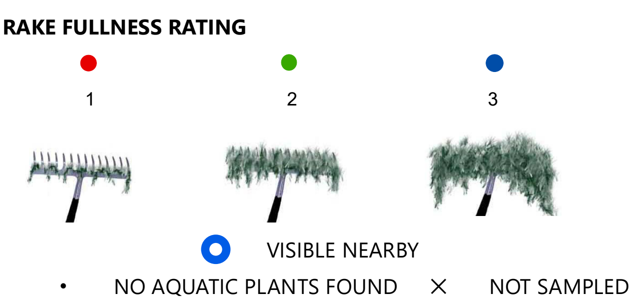


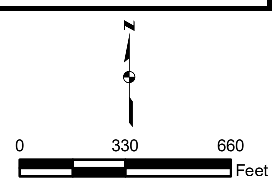
Source: WDNR and SEWRPC

Figure B.3
Coontail Rake Fullness in Trippe Lake: July 2024



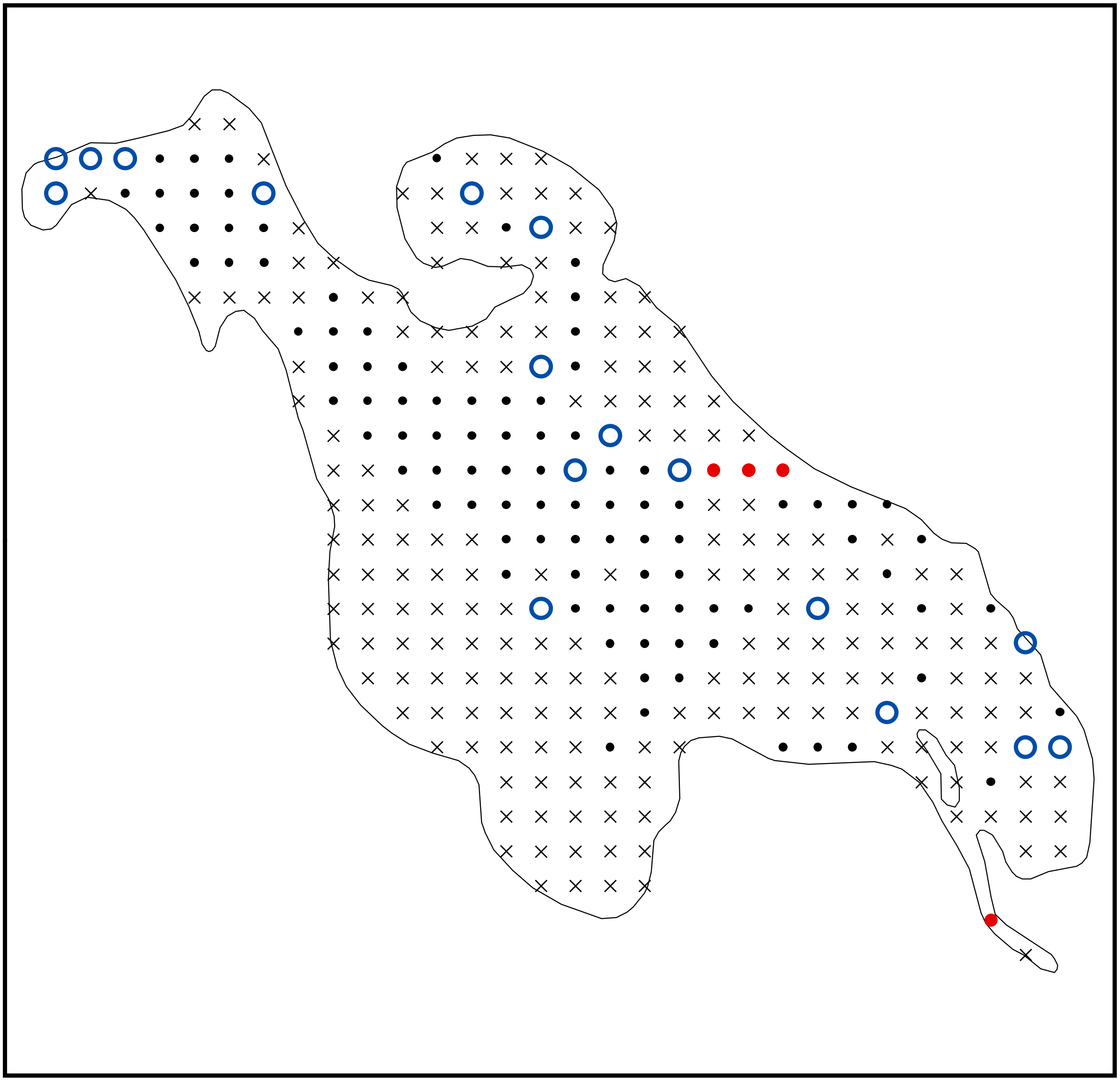
NOTE: Survey was conducted on Trippe Lake on July 15th-16th, 2024.



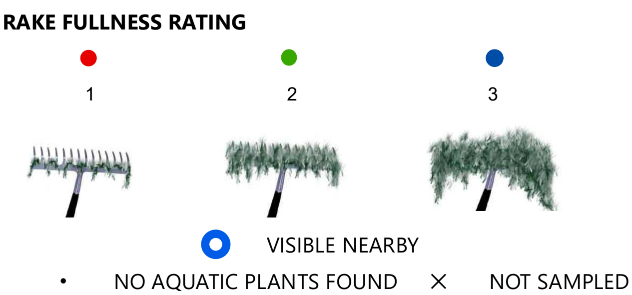


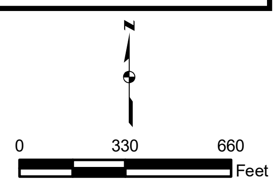
Source: WDNR and SEWRPC

Figure B.4
Watermeal Rake Fullness in Trippe Lake: July 2024



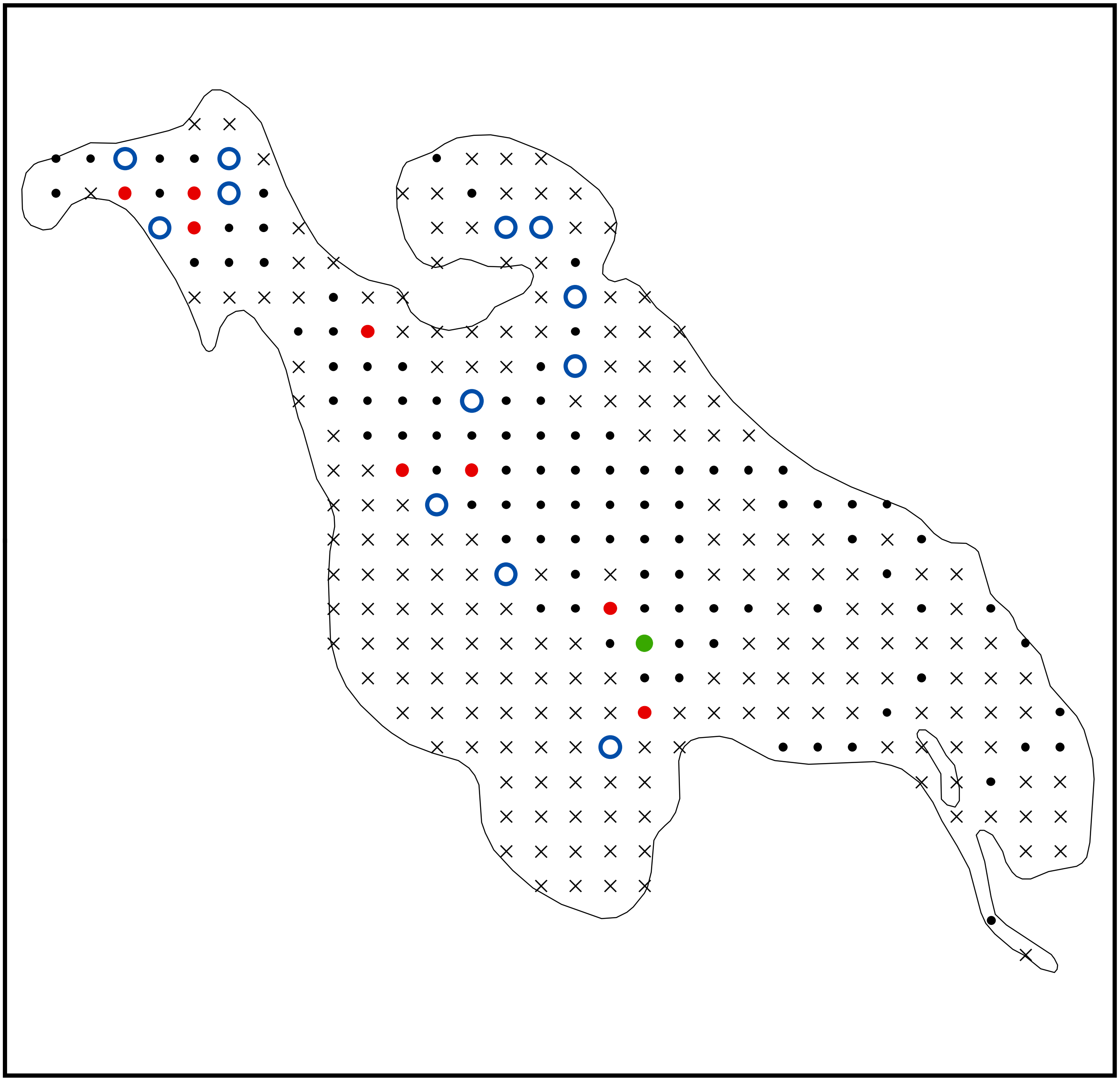
NOTE: Survey was conducted on Trippe Lake on July 15th-16th, 2024.



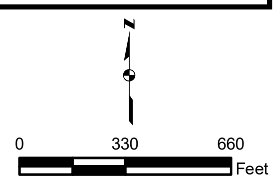


Source: WDNR and SEWRPC

Figure B.5
Sago Pondweed Rake Fullness in Trippe Lake: July 2024



NOTE: Survey was conducted on Trippe Lake on July 15th-16th, 2024.



Source: WDNR and SEWRPC

RAKE FULLNESS RATING