Wisconsin Lake & Pond Resource LLC
"Providing Professional Resources for Management of Your Lake or Pond"

Professional Pond Management Products and Services
Aquatic Herbicide and Algaecide Applications
Lake Management Planning and Services
Pond Design and Development

Waupaca Chain o' Lakes - 2023 Aquatic Plant Management Update

Report Description

Prepared by:
Wisconsin Lake & Pond Resource

James Scharl

February 2, 2024

P.O. Box 109

Toll Free: 866-208-0724
www.wisconsinlpr.com

N7828 Town Hall Rd.
Eldorado, WI 54932
Phone: (920) 872-2032
Fax: (920) 872-2036

Table of Contents Page

1.0 INTRODUCTION 1.1

2.0 2022 MANAGEMENT ACTIONS 2.1
2.1 EWM CONTROL 2.2
2.2 HWM TREATMENT AREA MONITORING 2.2
2.3 2022 AQUATIC INVASIVE SPECIES MAPPING SURVEYS 2.6

3.0 2023 MANAGEMENT RECCOMENDATIONS 3.9

TABLES 3.12

FIGURES 3.17

2022 WDNR PERMIT & TREATMENT RECORD 3.18

1.0 INTRODUCTION

The Waupaca Chain O' Lakes is group of 22 spring-fed lakes totaling 792-acres located in southwester Waupaca County, Wisconsin. The Chain features steep-dropping shorelines throughout much of the waters with very clear water and maximum depths of plant growth beyond 20-ft. For purposes of this report, the focus areas are on the main Chain O' Lakes, excluding the lakes of Marl, Pope, Knight, Orlando, and Ottman. The Waupaca Chain O' Lakes District (WCOLD) is an active lake district that has been managing aquatic plants on the waterway through monitoring, surveying, chemical treatments, mechanical harvesting, and hand pulling. Three AIS, curly-leaf pondweed (CLP), hybrid Eurasian water-milfoil (HWM), and starry stonewort (SSW) are present in the Chain.

Starry stonewort was first identified in fall, 2022 and has been managed with a focus on monitoring and public education. CLP & HWM have been the primary AIS managed in the Chain over the past decade. During recent surveys curly-leaf pondweed has primarily been found at low levels not requiring management. Hybrid water-milfoil can grow to nuisance levels and require management. Control of HWM has focused on the use of aquatic herbicides and ranged from spot treatment of areas 5.0 acres or less to whole-lake dosing of individual lakes on the Chain.

In large areas of the lakes HWM has been shown to cause significant impacts to recreation, use, and habitat. In response to increasing threats and impacts to the waters, the District created an updated comprehensive lake management plan for their waters. This assessed conditions, reviewed collected data and user input, and laid on management recommendations for the future. For a summary of actions prior to 2020 and lake management recommendations please see *Waupaca Chain O' Lakes – Comprehensive Management Plan* (Onterra, LLC, 2021)

Following WDNR approval of the plan, management and monitoring of AIS took place on targeted locations throughout the Chain. Work completed in 2023 was focused to conduct follow-up monitoring from the 2023 action and control stands of AIS, if necessary, within the District's boundaries.

2.0 2023 MANAGEMENT ACTIONS

After management discussion between the District, WDNR, and Wisconsin Lake & Pond Resources (WLPR) representative a plan of action was formulated. Actions included early season control for the densest areas of HWM, treatment area monitoring, and post-treatment surveys. Whole-lake point intercept surveys were conducted on Dake and Miner Lakes for enhanced AIS monitoring. The Dake Lake survey was conducted to gauge results of a near whole-lake HWM control in early 2023 while the Miner Lake survey was completed as an in-depth monitor and tracking for starry stonewort. Finally, all lakes within the Chain had year-end AIS mapping surveys completed to update current conditions, further map areas of AIS growth, review results from the 2023 control applications, and plan for 2024.

A discussion and presentation of management results is included in the following sections. Dates and figures for each of these actions are included in the below table.

Action	Waterbody	Dates	Figures
HWM Treatment	Long Lake	5/17/2023	1.1
	Dake Lake		1.2
Dake Lake: Whole-lake Point Intercept Surveys	Pre-treatment 2022 HWM	9/13/2022	2.1
	Post-treatment 2023 HWM	8/7/2023	2.2
Miner Lake: Whole-lake Point Intercept Survey	2023 Hybrid Watermilfoil	8/7/2023	3.1
	2023 Starry Stonewort		3.2
Year-End AIS Surveys	Overview of Chain	09/26-27/2023	4.1
	Otter Lake		4.2
	George & Taylor Lakes		4.3
	Rainbow, Sunset, & Nessling Lakes		4.4
	McCrossen, Round, & Lime Kiln Lakes		4.5
	Columbia, Bass, Beasley, & Youngs Lakes		4.6
	Long Lake		4.7
	Dake Lake		4.8
	Miner Lake - HWM		4.9
	Miner Lake - Starry Stonewort		4.10

2.1 HWM CONTROL

Prior to targeted control and herbicide application, an AIS mapping survey was completed throughout the Chain in late 2022. The survey was completed using a meander method within the entire photic zone of the waterways for the presence of AIS, primarily HWM. Each location was fully assessed with rake throws and visual observations to verify the presence and/or density of EWM. All locations of HWM were recorded on a GPS for mapping (Figures 1.1 – 1.2).

A WDNR aquatic herbicide permit was applied for and approved to control areas of HWM growth. The aquatic herbicide ProcellaCOR EC (active ingredient florpyrauxifen-benzyl) was permitted for use within target areas. Application for control of HWM was completed on May 17, 2023. The approved permit and treatment record are attached. Areas and application rates of ProcellaCOR EC permitted by waterbody include the following:

Waterbody	Treatment Area	Acres	Avg. Depth	Rate (PDU/ac-ft)
Long Lake	F	1	6.0	3.0
Dake Lake	G	7.45	6.0	3.5
Treatment Total	---	8.45	---	---

2.2 DAKE LAKE HWM TREATMENT AREA MONITORING

Due to the scale of the Dake Lake treatment being 21% of the entire lake, whole-lake point intercept surveys were used to monitor treatment not only results of HWM control but also for impact to non-target native species. For point-intercept surveys, a grid or set of sample points is established within each area targeted for EWM control. These sample points are then sample before and after herbicide application to assess plant community response. Point intercept

locations used were the same established by the WDNR for a whole-lake survey (Figures 2.1 – 2.2). In Dake Lake, 106 sample points were present and spaced 37 meters (121-ft) apart. The pre-treatment survey was completed on September 13, 2022 while the post-treatment survey was completed on August 7, 2023.

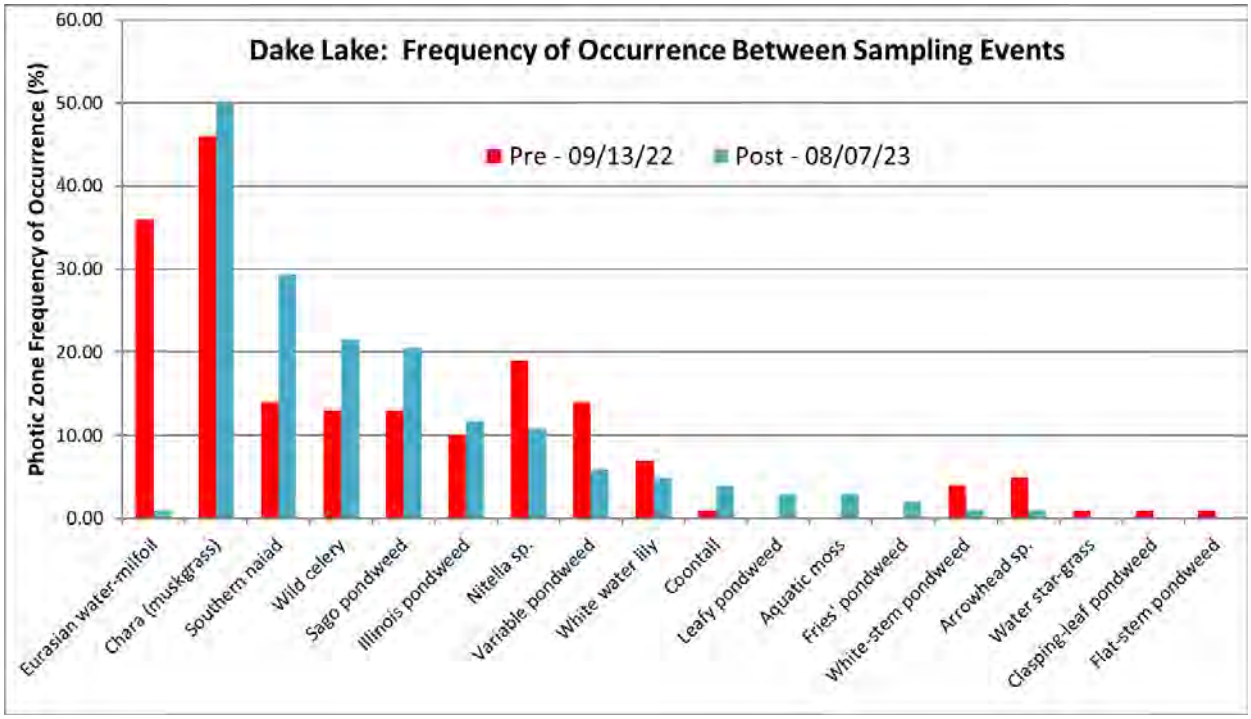
The floristic quality index (FQI) is a calculation used to monitor the relative health of a lake's aquatic plant community and compare it to similar waterbodies within a designated region. Each aquatic plant species has an assigned coefficient of conservatism (C) that ranges from 1-10 and is based on a species tolerance for disturbance. Common species that can tolerate a wide range of habitats and disturbance have lower C values, such as coontail with a C-value of 3. Less common and often higher quality species that do best in more natural conditions have higher C values. The C values are used in a calculation to return the lake's FQI. Higher FQI numbers indicate higher floristic quality and biological integrity and a lower level of disturbance impacts. FQI varies around the state of Wisconsin and ranges from 3.0 to 44.6 with the average FQI of 22.2. Table 3 displays the FQI for the Dake Lake surveys.

To assess changes between pre- and post-treatment surveys statistical analysis was completed using a Chi-square test with a 5% Type-I error rate. This error rate is standard in ecological studies and equals that there is a 5% chance of claiming statistically significant change when no real change occurred. Only those species that display a p-value of 0.05 or lower changed significantly population-wise between sampling events. To calculate these values, the total number of sample locations each species was found at is compared between surveys. Table 4 displays statistical changes, if any, for each species sampled within Dake Lake.

Dake Lake – Figures 1.2, 2.1, & 2.2. Tables 1-4: Target area F was mapped at 7.45 acres and over 21% of the entire lake's surface in late 2022 (Figure 1.2). Populations of HWM were dominant to highly dominant. Control of HWM was excellent and a significant reduction noted. HWM was found at 36% of sample points throughout the lake during the pre-treatment survey, but at only one location during the post-treatment survey. The target HWM control area occupied the western portion of the lake as a broad bed with pockets of denser HWM located within. Control resulted in a statistically significant reduction of HWM across the entire site.

In Dake Lake, 15 species, including one non-native invasives, were identified pre-treatment while 14 species, only one non-native, were identified post-treatment. A slight change in overall species composition was noted between events. Overall diversity remained stable. Total native species found per sample site increased from 162 per vegetated site pre-treatment and 1.97 post-treatment (Table 1).

Non-target impact from the ProcellaCOR EC application appears minimal (Tables 2-4). FQI values remained nearly the same pre and post treatment while the mean C increased by 0.25 post treatment (Table 3). The only species to show a statistically significant decline between sampling events was the target species HWM. One native species saw a statistical increase; southern naiad. At a smaller level, there were three species present during the pre-treatment survey that were not found during the post-treatment survey; water star-grass, clasping-leaf pondweed, and flat-stem pondweed. All three of these species were found at only one location in 2022 and likely still present. Conversely, there were three species sampled during the post-treatment survey that were not sampled in 2022; leafy pondweed, Fries' pondweed, and aquatic moss. These were also found at low levels and likely present pre-treatment. None of these species are listed as susceptible to ProcellaCOR EC on the product's label and their presence or absence between surveys is not a concern. Frequency of occurrence between sampling events for all species is included in Table 2 and shown below.



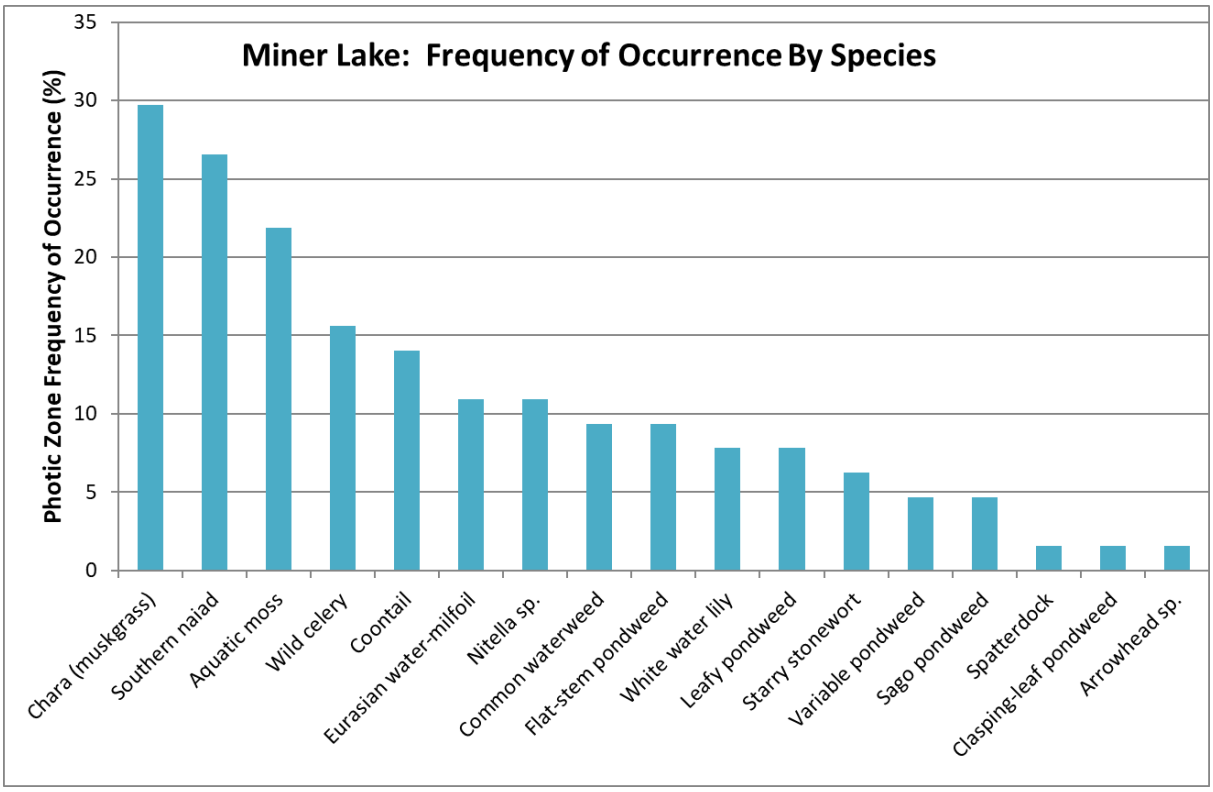
2.3 MINER LAKE STARRY STONEWORT MONITORING

Starry stonewort is a non-native plant-like macroalgae and was first identified in the Chain in Miner Lake in 2022. The District was awarded a WDNR rapid response AIS control grant to assist in starry stonewort monitoring. A WNDR approach focused on monitoring growth and educating lake users was taken in 2023. As part of the 2023 actions a whole-lake point intercept survey was used to monitor the growth and potential impact of starry stonewort in Miner Lake. These sample points are then continually monitored during the project to assess potential spread of AIS and impact to native species.

Point intercept locations used were the same established by the WDNR for a whole-lake survey (Figures 3.1-3.2). In Miner Lake, 119 sample points were present and spaced 37 meters (121-ft) apart. The survey was completed on August 7, 2023. The data collected as part of the point-intercept survey also allowed for the calculation of FQI as described above. Continued monitoring through this type of survey will allow tracking of the lake's aquatic plant community over time and assess potential impact of starry stonewort on species abundance, the overall community's health, and potential statistical changes in individual species.

In Miner Lake, 16 species, including two non-native invasives, were identified. Figures 3.1 displays location of HWM sampled while Figure 3.2 shows locations of starry stonewort. Vegetation was found growing to a depth of 25-ft. Species were spread even throughout the lake with an average Simpson Diversity Index (SDI) of 0.9. The closer the SDI is to 1.0 the more evenly spread species are throughout a lake. Diversity per sample point was moderately high with 2.43 native species per vegetated sample point (Table 5).

Muskgrass (*Chara sp.*), a native macroalgae, was the most common species and was found at 29.7% of sites shallower than 25-ft. Hybrid water-milfoil was found at low density at 10.9% of littoral zone locations (Figure 3.1). Starry stonewort was found at moderate to high densities and 6.25% of littoral zone locations (Figure 3.2). Frequency of occurrence between sampling events for all species is included in Table 6 and shown below. The calculated FQI was like Dake lake at 20.25 with a mean C of 5.62 (Table 7).



The point-intercept survey will be repeated in 2024 and allow for a more in-depth comparison after completion. Locations of AIS noted outside direct sample points were also recorded in Miner Lake. This was used to better map the density and spread of AIS, primarily starry stonewort and hybrid water-milfoil. Mapping indicated a change in distribution of starry stonewort in Miner Lake. Tow locations of small, dense beds from 2022 were either gone significantly reduced in abundances. One location, (Area B, Figure 4.10) remained nearly the same as first mapped in 2022. Area C (Figure 4.10) is a new bed and likely expanded from nearby Area B.

The largest bed, Area A (Figure 4.10) greatly expanded in size and density from 2022. In shallower portions growth of SSW was near enough to the surface to show impact from boating with clear prop scars visible. In total, starry stonewort nearly doubled from 0.31 ac across four sites in 2022 to 0.61 across five sites in 2023 (Figure 4.10). Two of the 2023 sites were a single plant or stem found during the point intercept survey. Additional rakes near these areas did not turn up more SSW biomass. Enhanced surveying during the AIS survey across the entire Chain, including a whole-lake point intercept in immediately adjacent Dake Lake, did not identify SSW growing in locations outside of Miner Lake.

2.4 2023 AQUATIC INVASIVE SPECIES MAPPING SURVEYS

WLPR conducted the 2023 surveys using a meander method to the entire photic zone of the waterways for the presence of AIS, primarily HWM, CLP, and SSW. In addition, a whole-lake point intercept survey was carried out on Dake and Miner Lakes as discussed above. For the meander surveys, each location was fully assessed with rake throws and visual observations to verify the presence and/or density of AIS. All locations of AIS were recorded on a GPS for mapping (Figures 4.1 – 4.10). Areas for the survey included all lakes on the main portion of the Chain.

The whole-lake point-intercept aquatic plant surveys completed in Dake and Miner Lakes were used to update the entire community after a large-scale HWM control (Dake Lake) and an enhanced monitoring for SSW (Miner Lake). The 2023 included sampling at pre-determined locations, and in the case of Dake Lake repeated sampling at the same locations from past point-intercept surveys. These surveys are designed to be more repeatable between years. The 2023 surveys identified AIS growing at various densities and distribution in the survey locations. The following dominance ratings were used to describe the populations of HWM, CLP, and SSW:

1. **Spots / Clumps** – small locations of individual plants or clumps that were not large enough to map around their perimeter.
2. **Scattered** – locations of AIS that had plants close enough to map as an area, but were still widely scattered. The AIS is merely present and not a large component of the biomass.
3. **Dominant** – AIS identified in distinct beds. While individual plants or clumps may reach the surface, most are lower growing or not as dense, often mixed with other vegetation.
4. **Highly Dominant** – The AIS occupies over half the water column with many plants or clumps at or just below the surface. Few other plant species were found.
5. **Surface Matted** – locations of the AIS that were at or near the surface and occupied much of the water column. The AIS may be the only plant found growing in these locations.

Overall, growth of HWM continued a downward trend across the entire Chain – even for areas that were not directly management. Only 1.47 acres of HWM were identified in 2023 (Figures 3.1-3.9, table below). Curly-leaf pondweed was again sampled at low, background levels and present at 0.18 acres. However, due to its life cycle, its spread may be underrepresented. An early spring survey would allow for a more accurate documentation of CLP populations.

Starry stonewort was only confirmed 0.61 acres Miner Lake (Figure 4.10). Starry stonewort is a plant-like macroalgae that can grow very dense, impacting the health and recreation of a waterway. Samples of starry stonewort were collected, submitted to the WDNR, and confirmed. The Waupaca Chain of Lakes is excellent habitat for the native macroalgae species muskgrass (chara) and stoneworts (nitella). Many areas already harbor robust populations of these native macroalgaes mixed with other, native plant species.

Populations of hybrid the various AIS undoubtably exist outside the areas surveyed or identified in 2023. Areas of scattered AIS are shown for each lake, but not included in the total acreages since they are not dense enough to warrant active management. A breakdown of the AIS present by density across the entire Chain is shown at the right:

Density	Acres of AIS Mapped		
	HWM	CLP	SSW
Scattered	1.09	0.18	---
Dominant	0.38	---	0.17
Highly Dominant	---	---	0.44
TOTAL	**1.47**	**0.18**	**0.61**

Otter Lake – Figure 4.2: HWM and CLP were both noted at low frequency and density. 2022's control of HWM continues to have great, continue results. A small, scattered bed of CLP was present on the north section of the lake. This bed has been here for most surveys and has not greatly expanded. Outside of this bed, growth of HWM and CLP was primarily found in a narrow band of 8-14 feet and only as individual stems or small clumps. Based on 2023 results no active control of HWM or CLP is warranted for 2024. No starry stonewort was identified in Otter Lake.

George Lake – Figure 3.3: HWM was present in a dominant bed along a portion of the southern shore with portions of scattered density around its permitter. It was again found in tightly grouped clumps in front of the Veteran's fishing pier. No active management took place in 2023 and the HWM in this location increased from 2022. Area A may be a candidate for targeted control in 2024 using small-scale, selective herbicide application to reduce HWM populations and nuisance issues to users of the Veteran's property.

Taylor Lake – Figure 3.3: HWM and CLP were present in as a single stem/clump for each species. No starry stonewort was identified. Populations of HWM in Taylor Lake are not dense enough to need active control.

Rainbow, Sunset, and Nessling Lakes – Figure 3.4: As a recurring theme across the Chain, populations of HWM are reduced compared to 2022 surveys. Small scale control of HWM in 2022 continues to show excellent results in locations that historically had dense population. All areas of HWM noted were widely scattered and as individual stems or clumps. No curly-leaf pondweed or starry stonewort was identified. Populations of AIS in these lakes are not dense enough to need active control.

McCrossen Lake – Figure 3.5: Populations of HWM are again reduced from the year prior. HWM was sparse and scattered with only one spot recorded. In McCrossen Lake, historic locations of HWM were often found near anchors for swimming rafts, which allows for an accumulation of organic matter near them. No curly-leaf pondweed or starry stonewort was identified. Populations of AIS in McCrossen are not dense enough to warrant active control currently.

Round and Lime Kiln Lakes – Figure 3.5: Similar to most other lakes in the Chain, the HWM in Round Lake was significantly reduced from the year prior by natural occurrences. No AIS were identified growing in Round Lake.

Areas of HWM in **Lime Kiln Lake** were have been mapped as highly dominant in past surveys within the main thoroughfare for boats travelling between lakes and immediately in from of a busy marina. During the 2023 survey populations were noted to be greatly reduced as it was found at only scattered densities with a small, 0.1-acre bed along the north shore and individual plants/clumps in the southern portion. No curly-leaf pondweed or starry stonewort were identified.

Columbia Lake – Figure 3.6: Populations of HWM in Columbia Lake were like most other lakes in the Chain, consisting of very small scattered beds and spots or clumps. A low-density 0.23-acre bed of scattered HWM noted just south of the public launch in a shallow bay. Current populations are not dense enough to warrant control in 2023. No curly-leaf pondweed or starry stonewort locations were identified.

Bass, Beasley, & Youngs Lakes – Figure 3.6: HWM populations in **Beasley Lake** were found as a stem or clump, like most other locations throughout the Chain. HWM growth in **Bass Lake** is

reduced from 2022 and mapped as a few, widely-scattered clumps. Native species were noted to be dense in locations, with many areas of pondweeds noted. One clump of CLP was noted in Bass Lake. Populations of HWM in **Youngs Lake** were very similar to Bass and Beasley with only individual spots located. Youngs Lake also contained healthy populations of the native northern water-milfoil and whorled water-milfoil. These species were differentiated from HWM by the following features: leaves are erect from the stem, leaflet counts of 12 or less, presence of winter buds, and a more typical, "tubular" growth versus stems with numerous arms or branches. Curly-leaf pondweed was not identified in Beasley or Youngs Lake. Starry stonewort was not identified in any of these lakes.

Long Lake – Figure 3.7: Continuing prior trends noted on the Chain in 2023, populations of HWM were reduced to only small location. HWM appeared at very low frequency as a low-density bed outside the mouth of Emmons Creek (Area B – 0.17 acres). HWM in this location is reduced from the 2023 control and located just outside most of the application area. A few stems of curly-leaf pondweed were also noted in this location. No starry stonewort was identified.

Dake Lake – Figure 3.8: Dake Lake's HWM control and results is covered in more detail above. During the 2023 whole-lake survey HWM was identified at only 1 location. The large-scale control was requested for 2022, but put on hold to gather more data. To better assess the Lake's aquatic was very successful at significantly reducing HWM populations and limiting impact to non-target native species. No curly-leaf pondweed was identified. Though Dake Lake is immediately adjacent to Miner Lake, no populations of starry stonewort were identified. If starry stonewort were to spread throughout the Chain, Dake Lake is most likely waterbody to have new growth identified.

Miner Lake – Figure 3.9 – 3.10: The north bay has historically been the densest location for HWM in the lake and had a very dense, topped out area of HWM controlled in 2022. This control continues to show excellent results with only two spots/clumps identified here. HWM outside the north bay remained reduced from 2022. Narrow bands of scattered density were noted along the lake's west/northwest shoreline with scattered spots/clumps in other areas. No curly-leaf pondweed was identified.

After finding a pioneer infestation of starry stonewort in 2022, population were again present in 2023 (Figure 3.10). The Waupaca Chain of Lakes provides ideal habitat for a fast expansion of this newly found invader. No active management was taken for starry stonewort in 2023 and acreage and density increased. The largest bed, Area A, increased significantly in size and density. Many stems of starry stonewort were close enough to the surface to be cut by boat props as clear prop scars were visible. Being cut or attached to boats is large concern for increased spread of starry stonewort to other areas of the Chain.

To reduce the potential for spread to other lakes within the Chain targeted control to the densest areas starry stonewort should be performed in 2024. Two of the locations noted as individual spots/clumps from the point-intercept survey. In the north bay, two small, dense monotypic stands (Areas B-C) in relatively shallow water. Area A was found in slightly deeper water (8-12-ft) and mixed nearly monotypic through much of its location. When sampled it was found to form a carpet along the bottom while scattered stems of other plants poked through. Areas B-C are prime candidates for DASH removal. Due to depth and mixed composition with other species in Area A alternate methods of control may be required.

3.0 2024 MANAGEMENT RECCOMENDATIONS

The WCOLD has completed successful AIS control in varying scales in 2023. Various AIS still exists within the system and a newly found invasive species, starry stonewort, was first identified during the 2022 surveys and has expanded in 2023. Future management is necessary to keep non-native species at tolerable levels and limit its impact to lake health and use. Some key takeaways from the 2023 management include the following:

- All lakes have a diverse native aquatic plant community
- The 2023 targeted ProcellaCOR EC applications was very successful in controlling HWM in Dake Lake while limiting non-target impacts.
- Populations of HWM are largely decreased across all lakes from 2023 through continue natural occurrences
- Curly-leaf pondweed remains at low, background levels
- Hybrid Eurasian water-milfoil still exists throughout the system and may require some level of continued, active management in select locations
- Starry stonewort should be controlled to reduce spread throughout the Chain

NEXT STEPS

Current DNR recommendations for control of AIS include the use of an integrated pest management approach (IPM). The use of IPM includes changing methods of control, including, but not limited to: varying herbicide active ingredients, mechanical harvesting, hand or suction harvesting, and no-action. Past and current surveys and management for the Waupaca Chain O' Lakes have shown that AIS, primarily HWM, can occupy large colonies and require management up to whole-lake or bay dosing. The spread of AIS in the Chain recorded in 2023 was largely reduced from 2022, but still varies from dense colonies of starry stonewort (Miner Lake) to only sporadic, low densities occurrences (many other locations of CLP and HWM).

Specific to HWM, many locations have historically been found on steep-dropping break lines, which can offer limited control due to reduced contact time from herbicide rapidly moving offsite. It is our recommendation to conduct HWM management within the surveyed areas on a periodic basis and only once it reaches levels that are large and/or dense enough to allow for a successful application.

Past control efforts have focused on the use of suction harvesting or hand pulling when harvested or a variety of active ingredients and application methods when using herbicides. Commonly, 2,4-D, alone or in combination with a second active ingredient, was used. Increasing research has shown that tolerance of 2,4-D by heavily managed HWM is a likely occurrence. In addition, 2,4-D requires longer contact time for successful control versus other active ingredients. Continued use of 2,4-D in the Chain is likely to have limited results due to expected tolerance of the strain of HWM present and the physical conditions present.

It is recommended that HWM management use an active ingredient that works quickly, is selective to limit non-target species impacts, and offers excellent long-term control. For this reason, we recommend the use of ProcellaCOR EC, active ingredient florpyrauxifen-benzyl. As shown in in other areas of the Chain from 2022-23, ProcellaCOR EC has shown to be extremely effective against HWM, including tough to control strains, and works very quickly with limited

non-target impacts/ In addition, a product performance guarantee is available for select areas (>10 acres). The performance guarantee states the SePro, manufacturer of ProcellaCOR, warrants that EWM will be controlled for three growing seasons from the application date and will not reach nuisance levels in any contiguous, one-acre area.

WCOLD is recommended to focus on the larger, densest areas of HWM for control and to follow the priority outline listed within their lake management plan. Specific application rates would be obtained in continued project planning with product, WCOLD, lake management consultants, and WDNR to achieve desired HWM management results.

In addition to HWM, starry stonewort is also present in areas of the Chain on Miner Lake. Starry stonewort is a non-native species that is new to Wisconsin. Much of the Chain offers ideal habitat for quick expansion of starry stonewort. Populations were monitored only in 2023 and doubled in size. Direct control efforts for starry stonewort should occur in 2024. For small areas in the north part of Miner Lake (B & C), DASH is a viable solution to reduce biomass and the potential for spread. In the large, southern area (A), boats are already clearly cutting through dense beds, leading to a high potential for spread throughout the Chain. Populations of starry stonewort in Area A can be reduced through targeted herbicide application to reduce biomass height and density and, in turn, the potential for spread into other areas of the Chain.

Curly-leaf pondweed is a third AIS present in the Chain O' Lakes. Most of its locations are simply individual stems or widely scattered, small pockets and do not require active management. Curly-leaf pondweed's life cycle is unique for aquatic plants. It begins growing in late fall, overwinters under the ice, and quickly grows after ice-out. CLP naturally dies back in mid-summer. Because of its life cycle the best time to more accurately document populations is in early spring when plants are actively growing and at the highest frequency. Small beds of CLP have been noted in the Upper Chain lakes of Marl, Pope, Manomin, Knight, and Orlando. These lakes should be thoroughly surveyed in spring, 2024 to accurately document populations and plan for control if necessary.

Any AIS control should be coupled with continued monitoring and planning, including follow-up AIS mapping and monitoring surveys to gauge the plant community's response. A repeat of the survey as completed in 2022 is recommended to capture active management area results and continue monitoring the rest of the Chain O' Lakes for new locations of HWM. If this approach is chosen for 2023 management, we recommend the following courses of action for the appropriate species. Final details, including control timing and application rates are currently estimated and will be finalized with assistance from WDNR and product manufacture professionals prior to control:

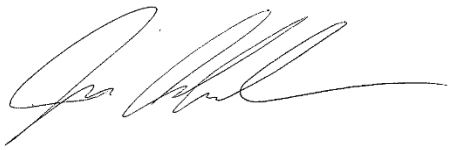
- **February 2024**: Apply for appropriate permit(s) for control of starry stonewort as requested (Figure 4.10).
- **April/May 2024:** Early-season curly-leaf pondweed survey in Marl, Pope, Manomin, Knight and Orlando Lakes.
- **May/June 2024**: Herbicide application for starry stonewort control using a mix of copper, diquat, and/or flumioxazin in Area A. Final application rates will be confirmed with ongoing project planning between WLPR, the WCOLD, and WDNR.
- **Summer, 2024**: Targeted DASH AIS control to select areas of starry stonewort. Final control areas be confirmed with ongoing project planning between WLPR, the WCOLD, and WDNR.

- **Summer/Fall, 202r**: Complete an assessment of 2024 AIS control actions for 2025 planning
    - Targeted AIS meander survey
    - Whole-lake point intercept survey of Miner Lake
    - Update management report and recommendations to the WCOLD. Future planning may involve any of the following actions:
        - Varying scale of AIS control in 2024
        - Continued monitoring
        - No action

If you have any questions, require any additional information, or would like a formal proposal on any of the above management options please contact us directly as follows:

Jim Scharl: (920) 872-2032 or jim@wisconsinlpr.com

Respectfully,



TABLES

WAUPACA CHAIN O' LAKES -
2023 AQUATIC PLANT MANAGEMENT UPDATE
TABLES
February 2, 2024

Table 1: Aquatic Plant Community Statistics, Dake Lake, Waupaca Co., WI.

	Pre - 09/13/22	Post - 08/07/23
Number of sites sampled	104	103
Number of sites with vegetation	92	86
Number of sites shallower than maximum depth of plants	100	102
Frequency of occurrence at sites shallower than maximum depth of plants (%)	92	84.31
Simpson Diversity Index	0.86	0.83
Maximum Depth of Plants (Feet)	22	23
Taxonomic Richness (Number Taxa - includes visuals)	15	14
Average Number of Species per Site (less than max depth of plant growth)	1.85	1.67
Average Number of Species per Site (sites with vegetation)	2.01	1.98
Average Number of Native Species per Site (less than max depth of plant growth)	1.49	1.66
Average Number of Native Species per Site (sites with vegetation)	1.62	1.97

Table 2: Frequency of Occurrence of Aquatic Plant Species by Event, Dake Lake, Waupaca Co., Wisconsin.

	Pre - 09/13/22	Post - 08/07/23
Eurasian water-milfoil	**36.00**	**0.98**
Coontail	1.00	3.92
Chara (muskgrass)	46.00	50.00
Water star-grass	1.00	---
Southern naiad	14.00	29.41
Nitella sp.	19.00	10.78
White water lily	7.00	4.90
Leafy pondweed	---	2.94
Fries' pondweed	---	1.96
Variable pondweed	14.00	5.88
Illinois pondweed	10.00	11.76
White-stem pondweed	4.00	0.98
Clasping-leaf pondweed	1.00	---
Flat-stem pondweed	1.00	---
Arrowhead sp.	5.00	0.98
Sago pondweed	13.00	20.59
Wild celery	13.00	21.57
Aquatic moss	---	2.94

--- - species not sampled

Table 3: FQI Breakdown by species for Dake Lake, Waupaca County, WI

	Coefficient of Conservatism	
Common Name	**2022**	**2023**
Coontail	3	3
Chara (muskgrass)	7	7
Water star-grass	6	---
Southern naiad	8	8
Nitella sp.	7	7
White water lily	6	6
Leafy pondweed	---	6
Fries' pondweed	---	8
Variable pondweed	7	7
Illinois pondweed	6	6
White-stem pondweed	8	8
Clasping-leaf pondweed	5	---
Flat-stem pondweed	6	---
Sago pondweed	3	3
Wild celery	6	6
Total Species	13	12
Mean C	6.00	6.25
Floristic Quality Index (FQI)	**21.63**	**21.65**

Table 4: Statistical Significance of Species between Sampling Events, Dake Lake, Waupaca Co., WI.

	Pre - 09/13/22 vs Post - 08/07/23		
Species	**P-value**	**Significance**	**+ / -**
Eurasian water-milfoil	**1.24736E-10**	***	-
Coontail	0.181481619	n.s.	+
Chara (muskgrass)	0.569406837	n.s.	+
Water star-grass	0.31131831	n.s.	-
Southern naiad	**0.007972789**	**	+
Nitella sp.	0.100651433	n.s.	-
White water lily	0.528237537	n.s.	-
Leafy pondweed	0.084012516	n.s.	+
Fries' pondweed	0.1593491	n.s.	+
Variable pondweed	0.053442939	n.s.	-
Illinois pondweed	0.687292475	n.s.	+
White-stem pondweed	0.167264763	n.s.	-
Clasping-leaf pondweed	0.31131831	n.s.	-
Flat-stem pondweed	0.31131831	n.s.	-
Arrowhead sp.	0.092471383	n.s.	-
Sago pondweed	0.149529869	n.s.	+
Wild celery	0.107665983	n.s.	+
Aquatic moss	0.084012516	n.s.	+

* - somewhat significant change, ** - moderatly significant change, *** - very significant change
n.s. - Change not significant
--- - Species was not sampled in both comparison surveys

Table 5: Aquatic Plant Community Statistics, Miner Lake, Waupaca Co., WI.

	8/7/2023
Number of sites sampled	118
Number of sites with vegetation	40
Number of sites shallower than maximum depth of plants	64
Frequency of occurrence at sites shallower than maximum depth of plants (%)	62.5
Simpson Diversity Index	0.9
Maximum Depth of Plants (Feet)	25
Taxonomic Richness (Number Taxa - includes visuals)	16
Average Number of Species per Site (less than max depth of plant growth)	1.63
Average Number of Species per Site (sites with vegetation)	2.6
Average Number of Native Species per Site (less than max depth of plant growth)	1.52
Average Number of Native Species per Site (sites with vegetation)	2.43

Table 6: Frequency of Occurrence of Aquatic Plant Species, MinerLake, Waupaca Co., WI.

	8/7/2023
Eurasian water-milfoil	**10.94**
Starry stonewort	**6.25**
Coontail	14.06
Chara (muskgrass)	29.69
Common waterweed	9.38
Southern naiad	26.56
Nitella sp.	10.94
Spatterdock	1.56
White water lily	7.81
Leafy pondweed	7.81
Variable pondweed	4.69
Clasping-leaf pondweed	1.56
Flat-stem pondweed	9.38
Arrowhead sp.	1.56
Sago pondweed	4.69
Wild celery	15.63
Aquatic moss	21.88

--- - species not sampled

Table 7: FQI Breakdown by species for Miner Lake, Waupaca County, WI

Common Name	2023
Coontail	3
Chara (muskgrass)	7
Common waterweed	3
Southern naiad	8
Nitella sp.	7
Spatterdock	6
White water lily	6
Leafy pondweed	6
Variable pondweed	7
Clasping-leaf pondweed	5
Flat-stem pondweed	6
Sago pondweed	3
Wild celery	6
Total Species	13
Mean C	5.62
Floristic Quality Index (FQI)	**20.25**

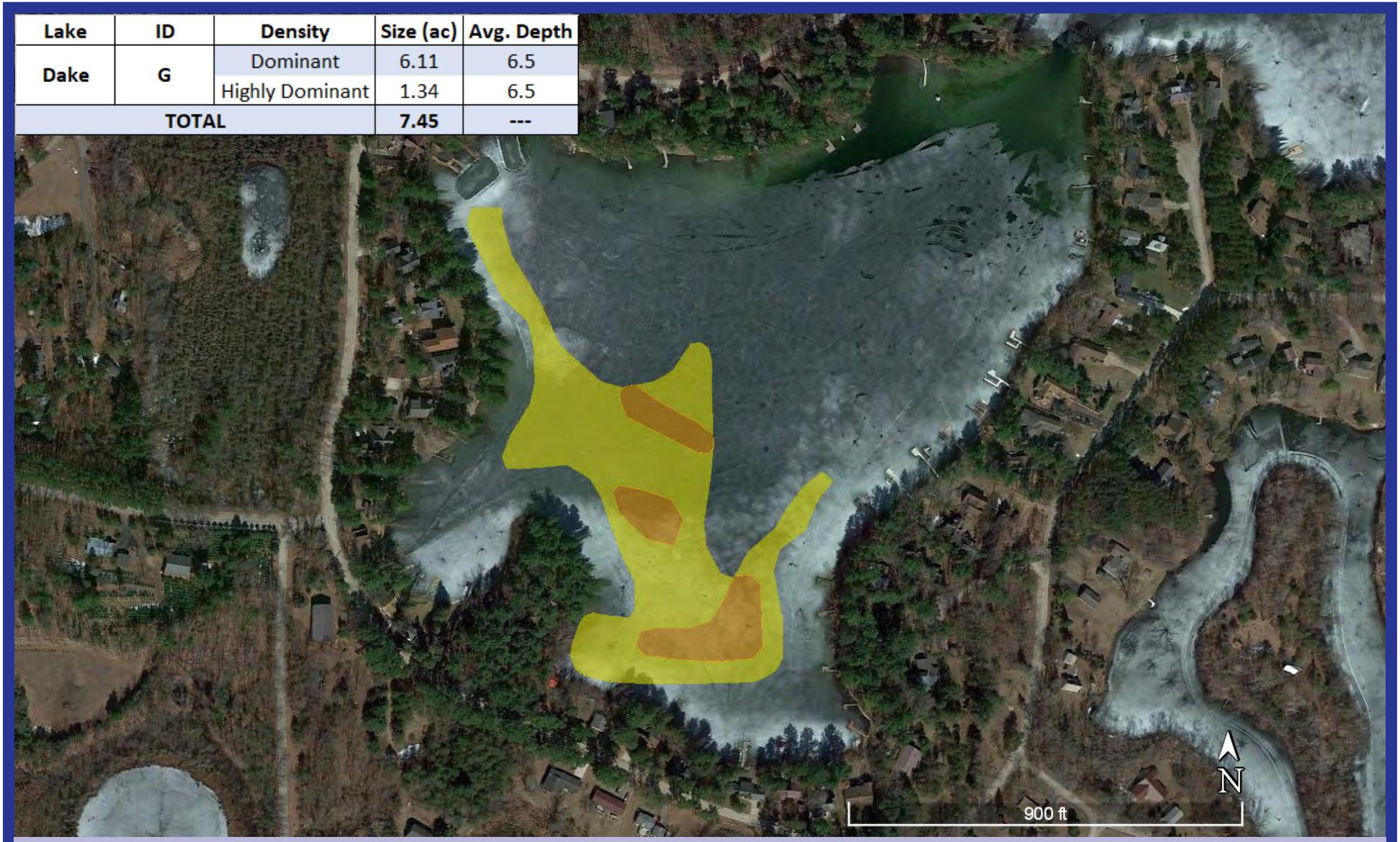
FIGURES

Long Lake - Hybrid Water-milfoil Control Locations

Wisconsin Lake & Pond Resource LLC
"Providing Professional Resources for Management of Your Lake or Pond"
www.WisconsinLPR.com (920) 872-2032

Figure 1.1
Waupaca Chain o' Lakes
Treated: May 17, 2023

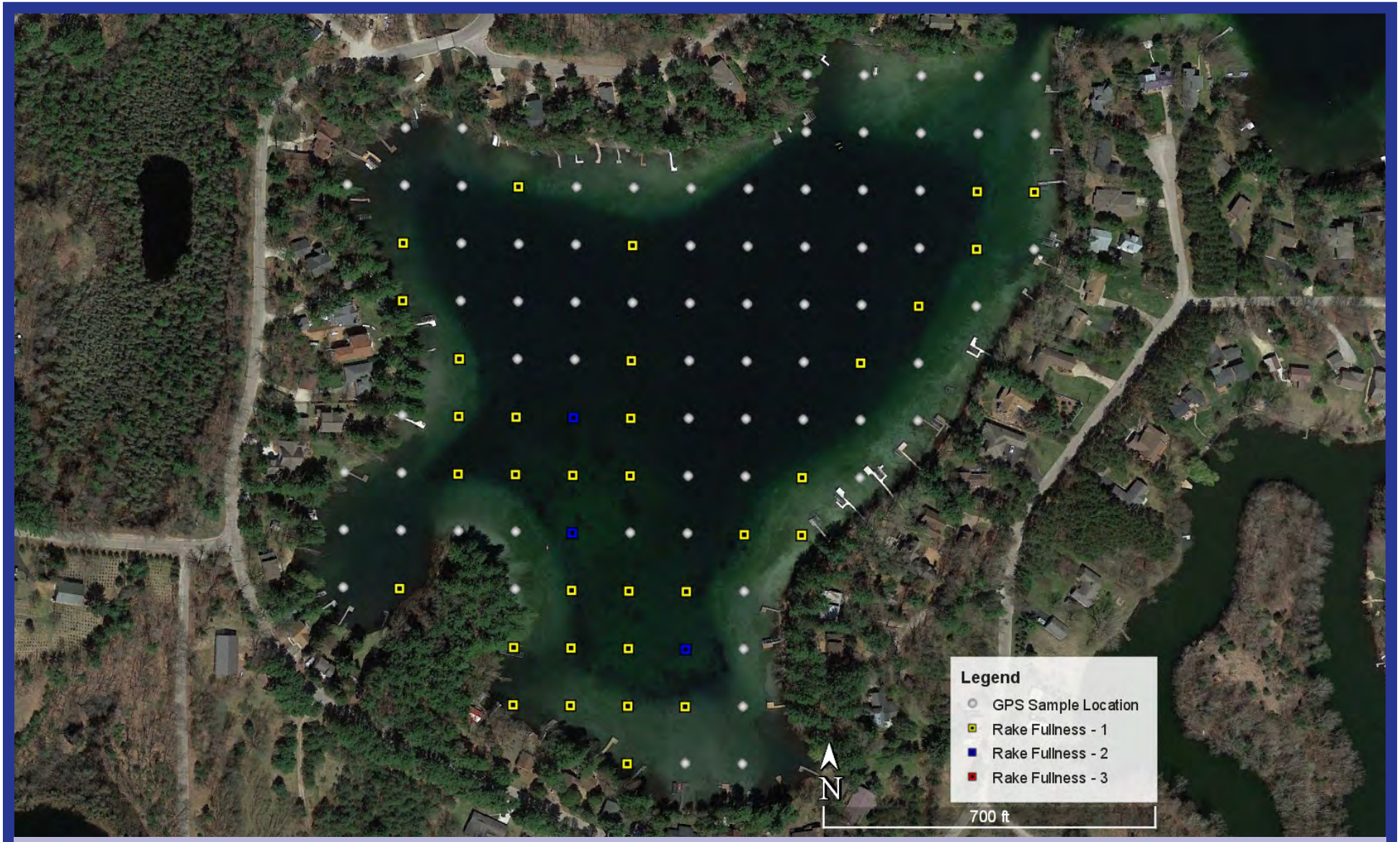
Lake	ID	Density	Size (ac)	Avg. Depth
Dake	G	Dominant	6.11	6.5
		Highly Dominant	1.34	6.5
TOTAL			7.45	---



Wisconsin Lake & Pond Resource LLC
"Providing Professional Resources for Management of Your Lake or Pond"
www.WisconsinLPR.com (920) 872-2032

Dake Lake - HWM Control Locations

Figure 1.2
Waupaca Chain o' Lakes, Waupaca County
Treated: May 17, 2023

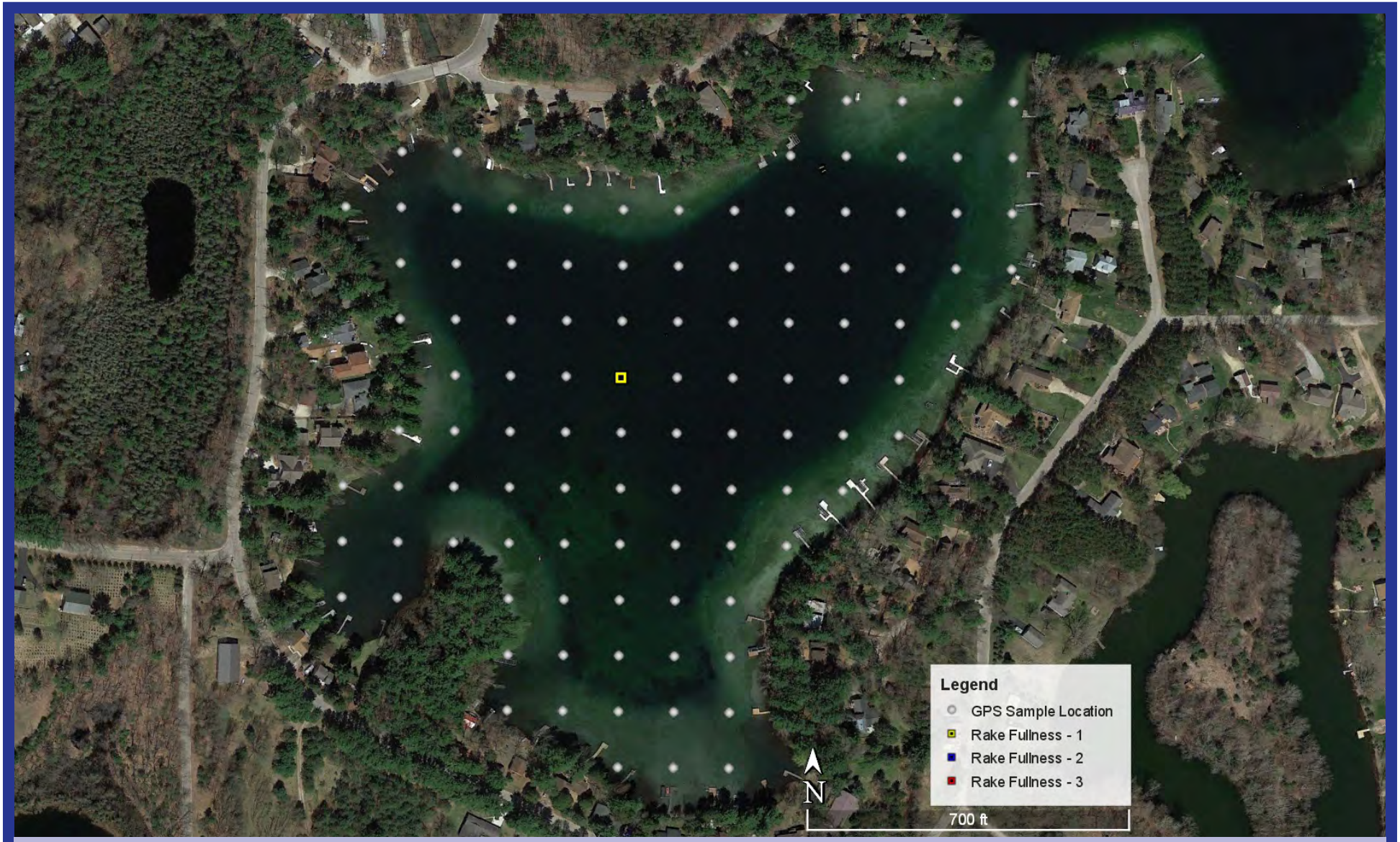


Wisconsin Lake & Pond Resource LLC
"Providing Professional Resources for Management of Your Lake or Pond"
www.WisconsinLPR.com (920) 872-2032

Dake Lake - HWM Locations

2022 Point Intercept Survey

Figure 2.1
Waupaca Chain o' Lakes, Waupaca County
Surveyed: September 13, 2022

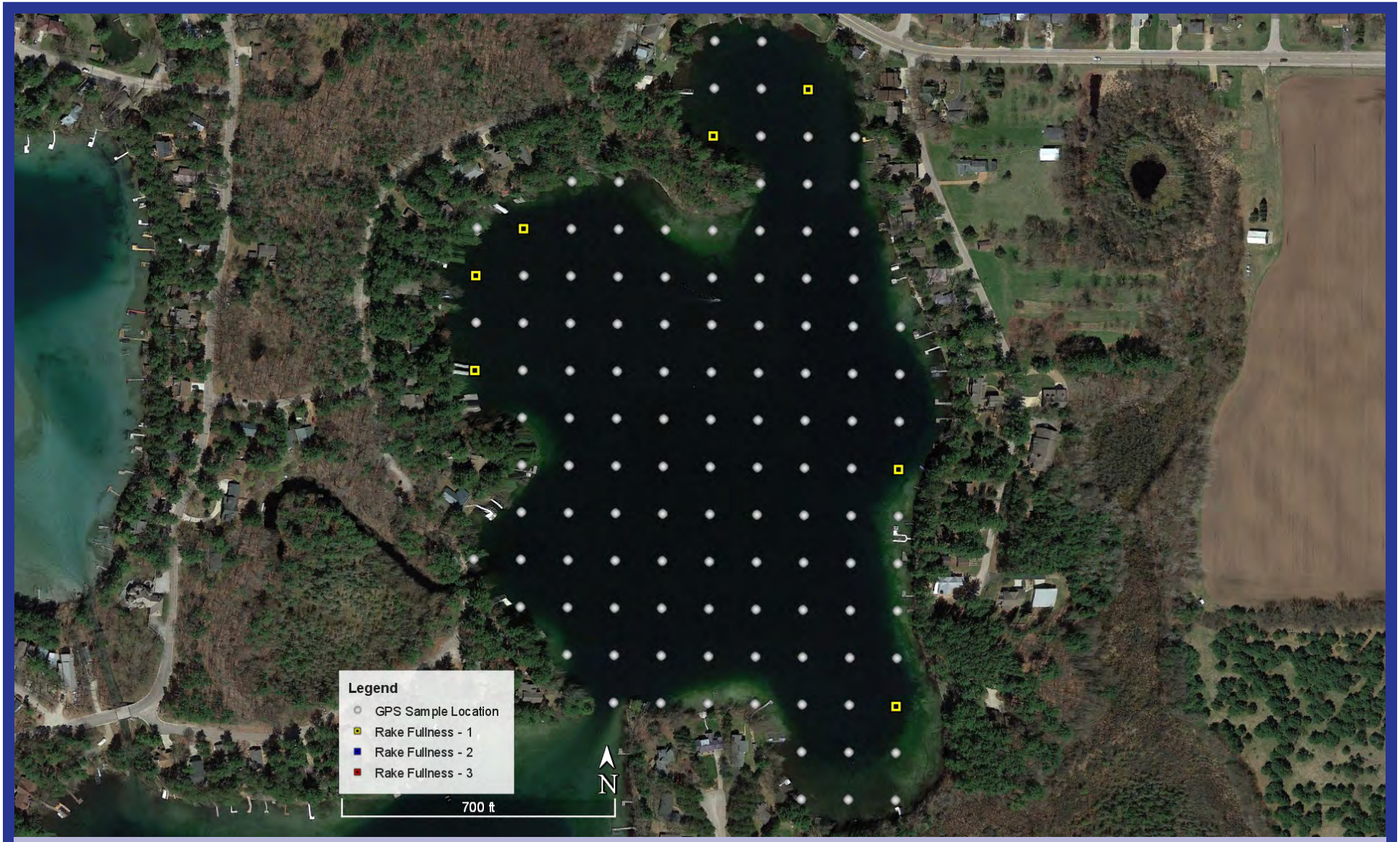


Wisconsin Lake & Pond Resource LLC
"Providing Professional Resources for Management of Your Lake or Pond"
www.WisconsinLPR.com (920) 872-2032

Dake Lake - HWM Locations

2023 Point Intercept Survey

Figure 2.2
Waupaca Chain o' Lakes, Waupaca County
Surveyed: August 7, 2023

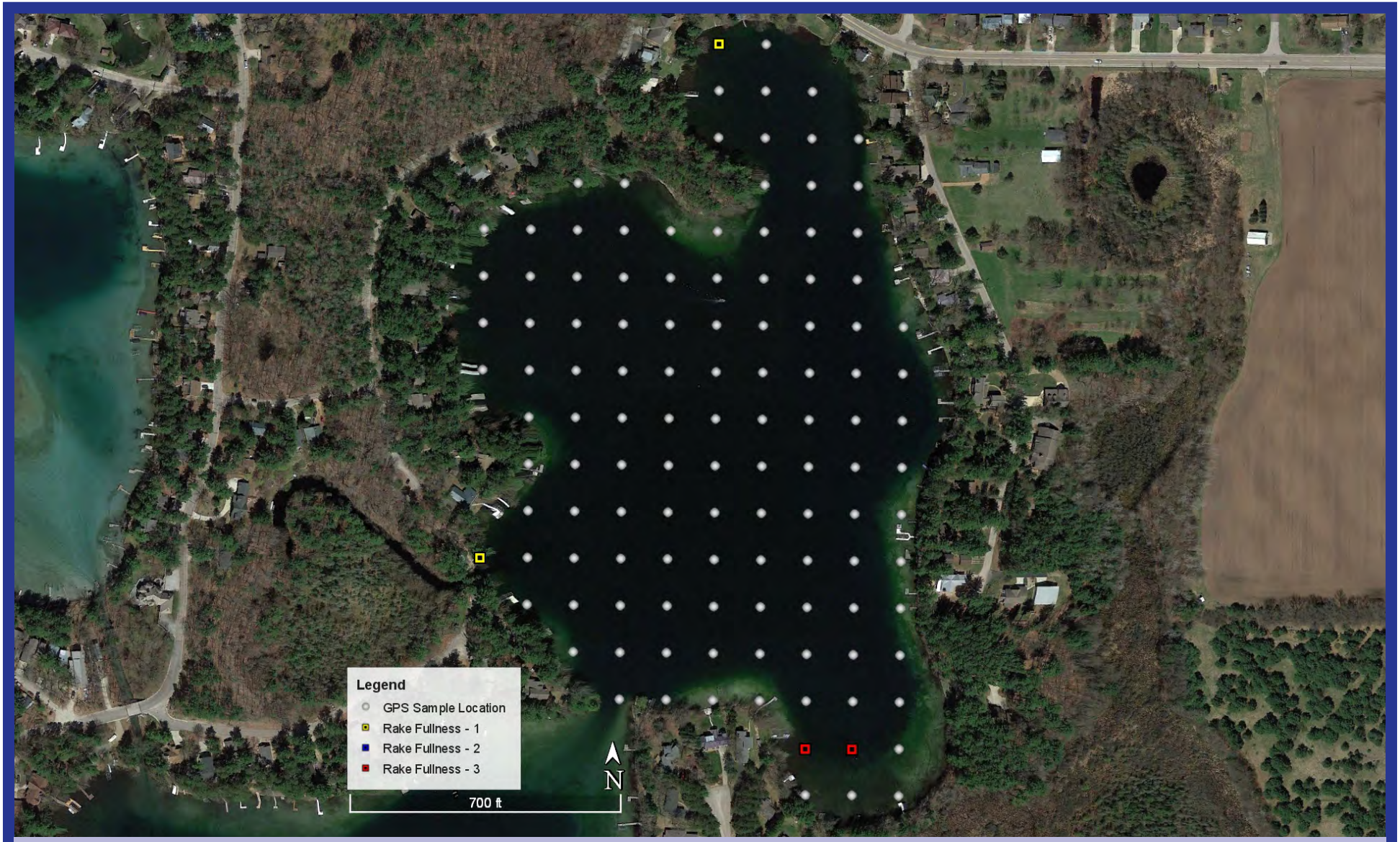


Wisconsin Lake & Pond Resource LLC
"Providing Professional Resources for Management of Your Lake or Pond"
www.WisconsinLPR.com (920) 872-2032

Miner Lake - HWM Locations

2023 Point Intercept Survey

Figure 3.1
Waupaca Chain o' Lakes, Waupaca County
Surveyed: August 7, 2023

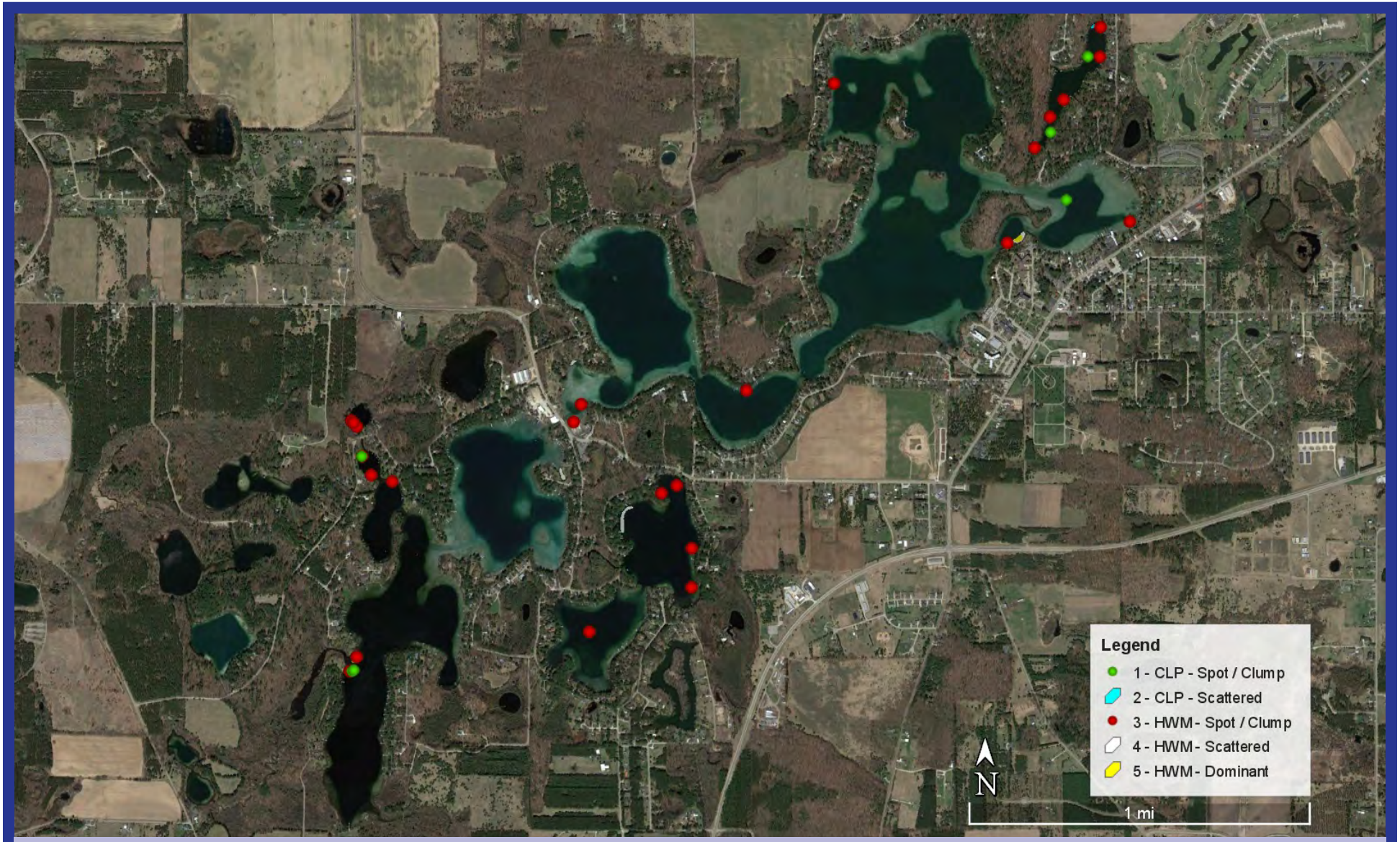


Wisconsin Lake & Pond Resource LLC
"Providing Professional Resources for Management of Your Lake or Pond"
www.WisconsinLPR.com (920) 872-2032

Miner Lake - Starry Stonewort Locations

2023 Point Intercept Survey

Figure 3.2
Waupaca Chain o' Lakes, Waupaca County
Surveyed: August 7, 2023

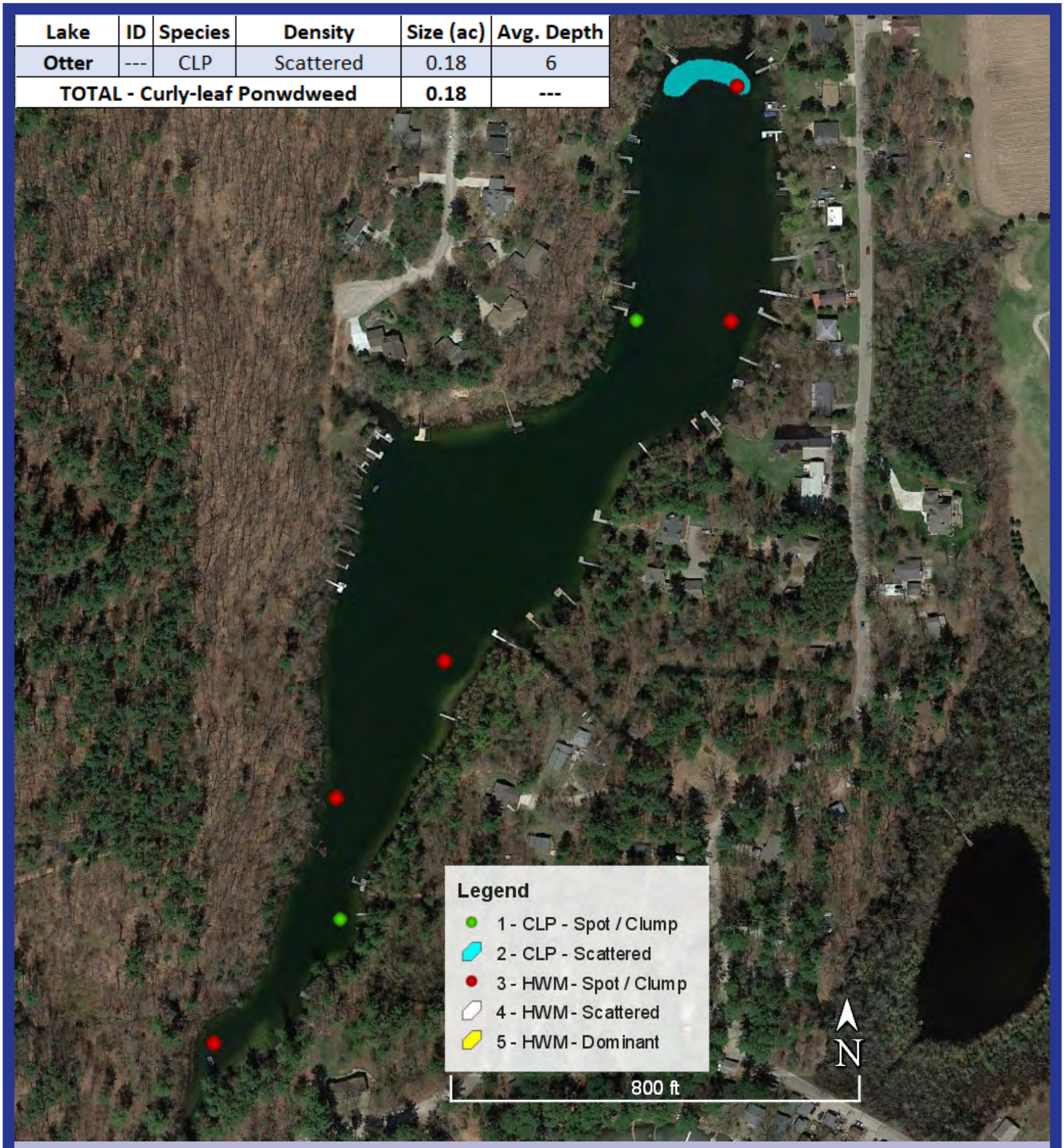


Waupaca Chain o' Lakes - CLP & HWM Locations

Wisconsin Lake & Pond Resource LLC
"Providing Professional Resources for Management of Your Lake or Pond"
www.WisconsinLPR.com (920) 872-2032

Figure 4.1
Waupaca Chain o' Lakes, Waupaca County
Surveyed: September 26-27, 2023

Lake	ID	Species	Density	Size (ac)	Avg. Depth
Otter	---	CLP	Scattered	0.18	6
TOTAL - Curly-leaf Ponwdweed				0.18	---

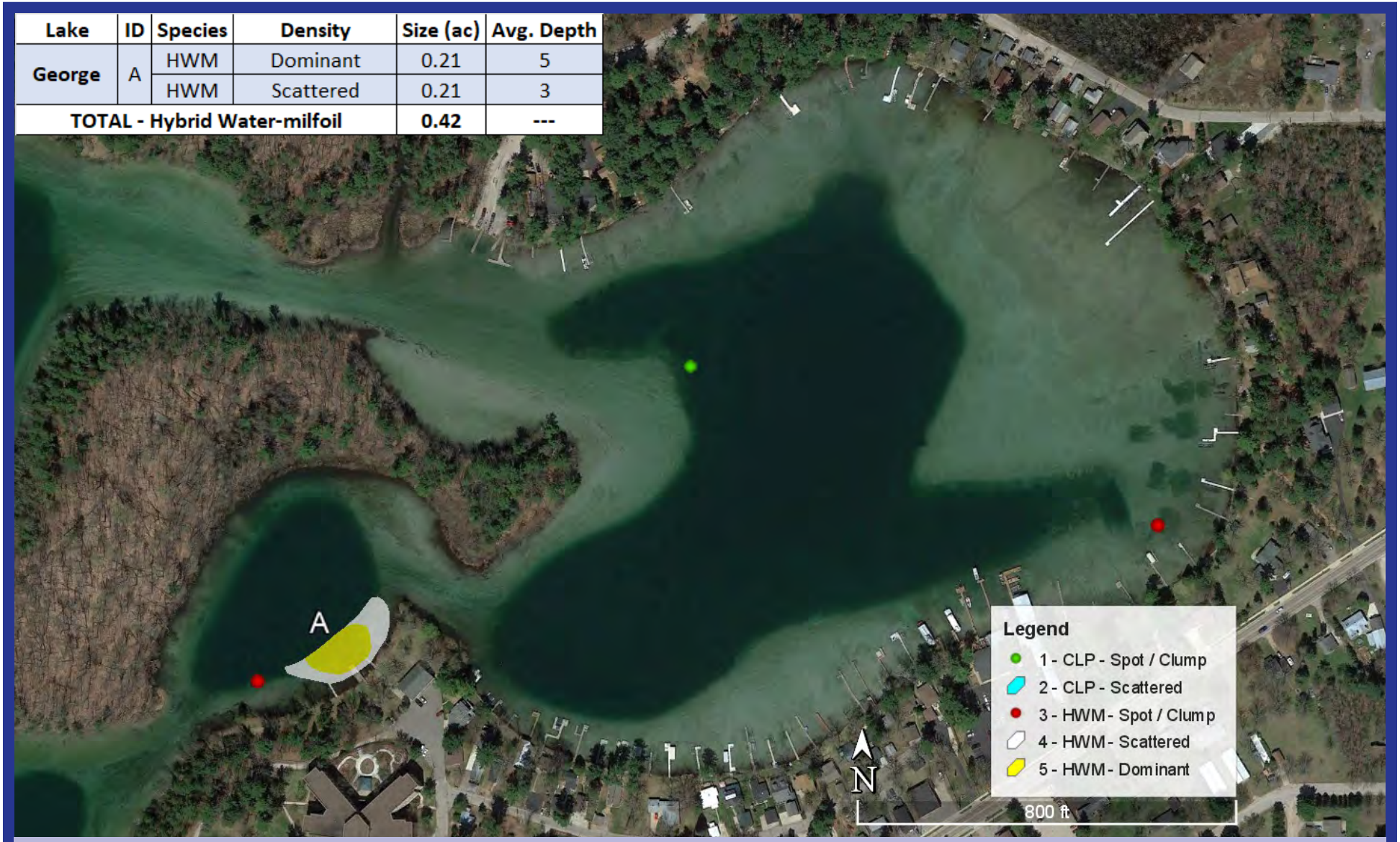


Otter Lake - CLP & HWM Locations

Wisconsin Lake & Pond Resource LLC
"Providing Professional Resources for Management of Your Lake or Pond"
www.WisconsinLPR.com (920) 872-2032

Figure 4.2
Waupaca Chain o' Lakes
Surveyed: September 26-27, 2023

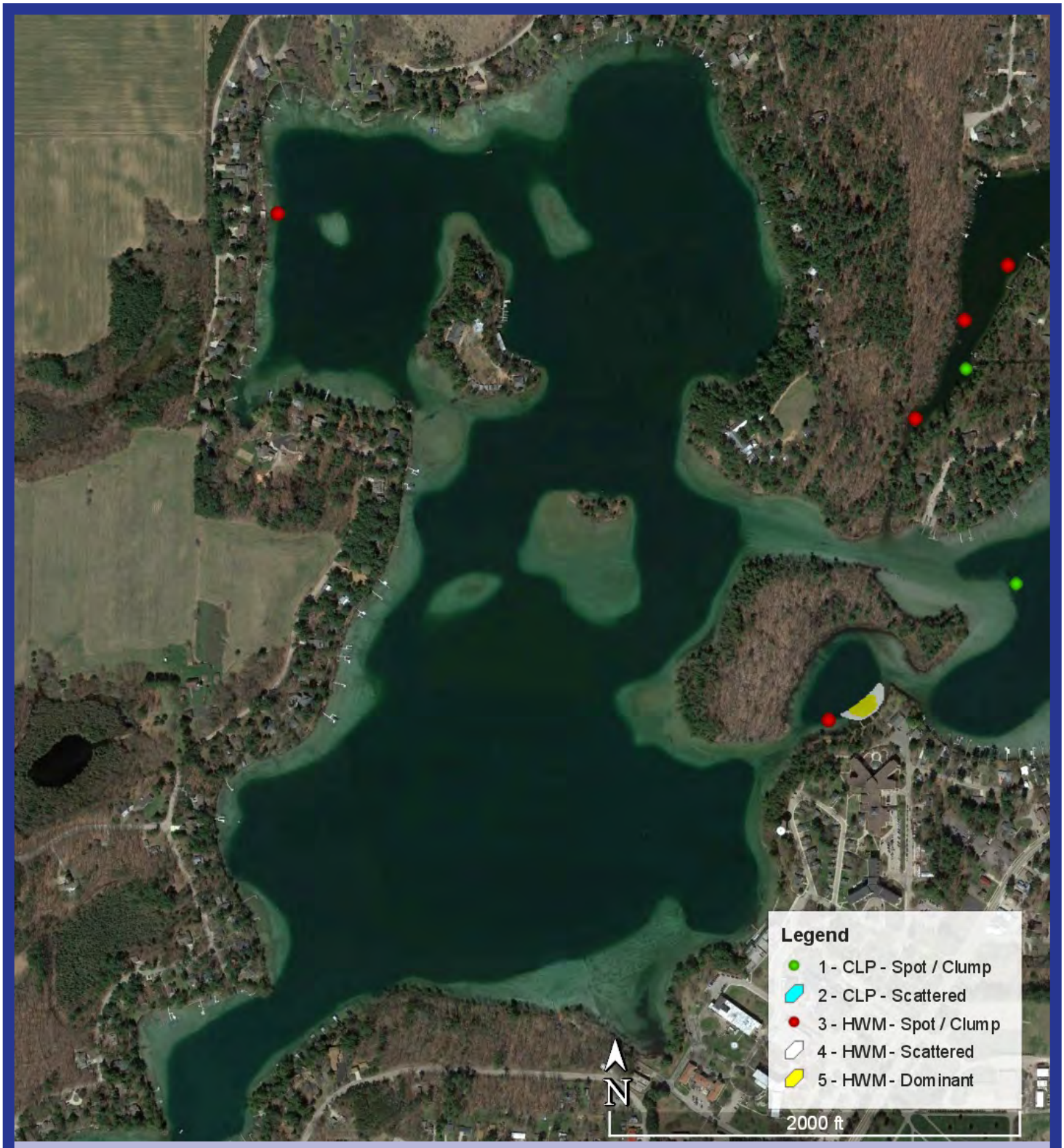
Lake	ID	Species	Density	Size (ac)	Avg. Depth
George	A	HWM	Dominant	0.21	5
		HWM	Scattered	0.21	3
TOTAL - Hybrid Water-milfoil				0.42	---



George & Taylor Lakes - CLP & HWM Locations

Figure 4.3
Waupaca Chain o' Lakes, Waupaca County
Surveyed: September 26-27, 2023

Wisconsin Lake & Pond Resource LLC
"Providing Professional Resources for Management of Your Lake or Pond"
www.WisconsinLPR.com (920) 872-2032

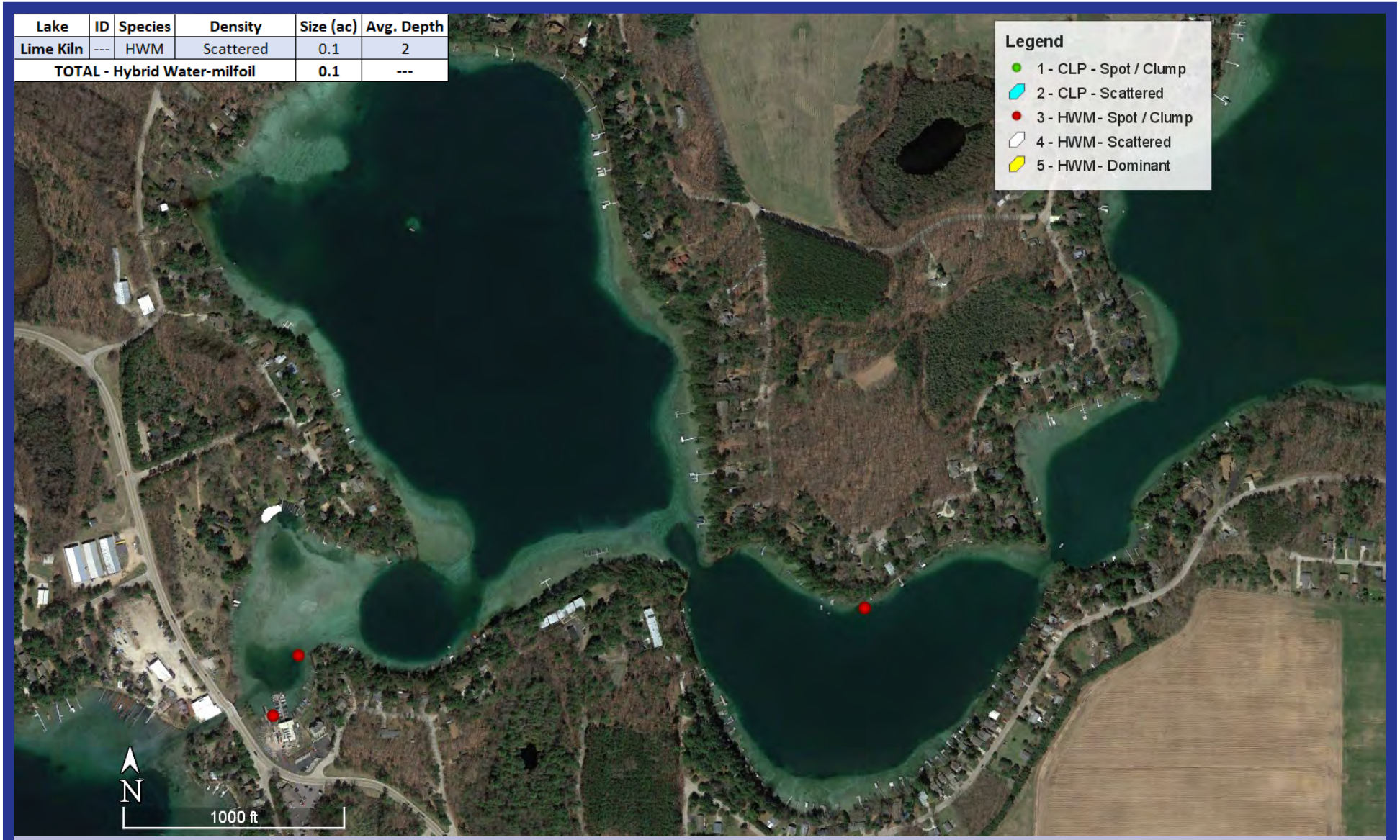


Rainbow, Sunset, & Nessling Lakes - CLP & HWM Locations

Wisconsin Lake & Pond Resource LLC
"Providing Professional Resources for Management of Your Lake or Pond"
www.WisconsinLPR.com (920) 872-2032

Figure 4.4
Waupaca Chain o' Lakes
Surveyed: September 26-27, 2023

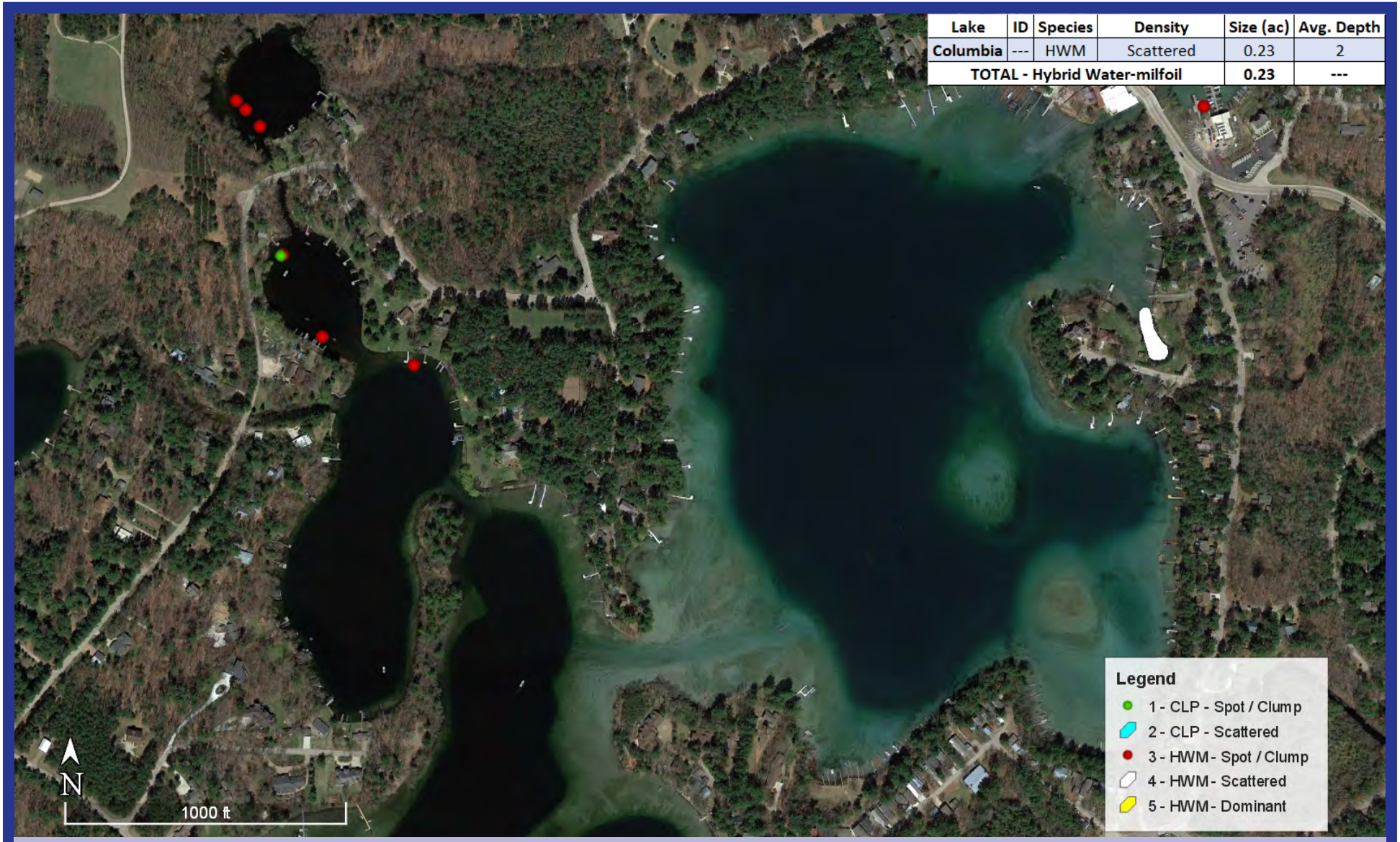
Lake	ID	Species	Density	Size (ac)	Avg. Depth
Lime Kiln	---	HWM	Scattered	0.1	2
TOTAL - Hybrid Water-milfoil				0.1	---



McCrossen, Round, & Lime Kiln Lakes - CLP & HWM Locations

Figure 4.5
Waupaca Chain o' Lakes, Waupaca County
Surveyed: September 26-27, 2023

Wisconsin Lake & Pond Resource LLC
"Providing Professional Resources for Management of Your Lake or Pond"
www.WisconsinLPR.com (920) 872-2032

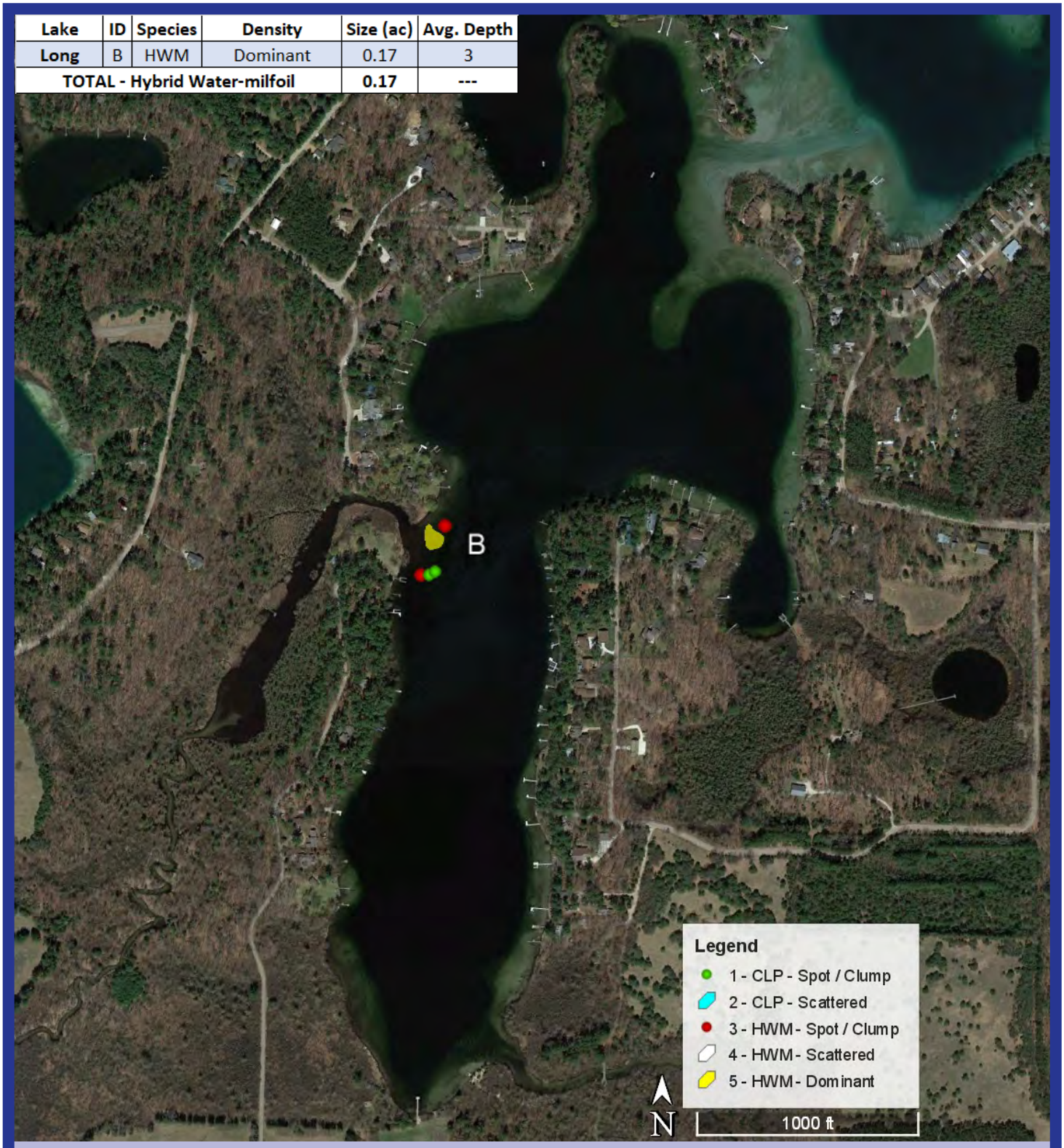


Columbia, Bass, Beasley, & Youngs Lakes - CLP & HWM Locations

Wisconsin Lake & Pond Resource LLC
"Providing Professional Resources for Management of Your Lake or Pond"
www.WisconsinLPR.com (920) 872-2032

Figure 4.6
Waupaca Chain o' Lakes, Waupaca County
Surveyed: September 26-27, 2023

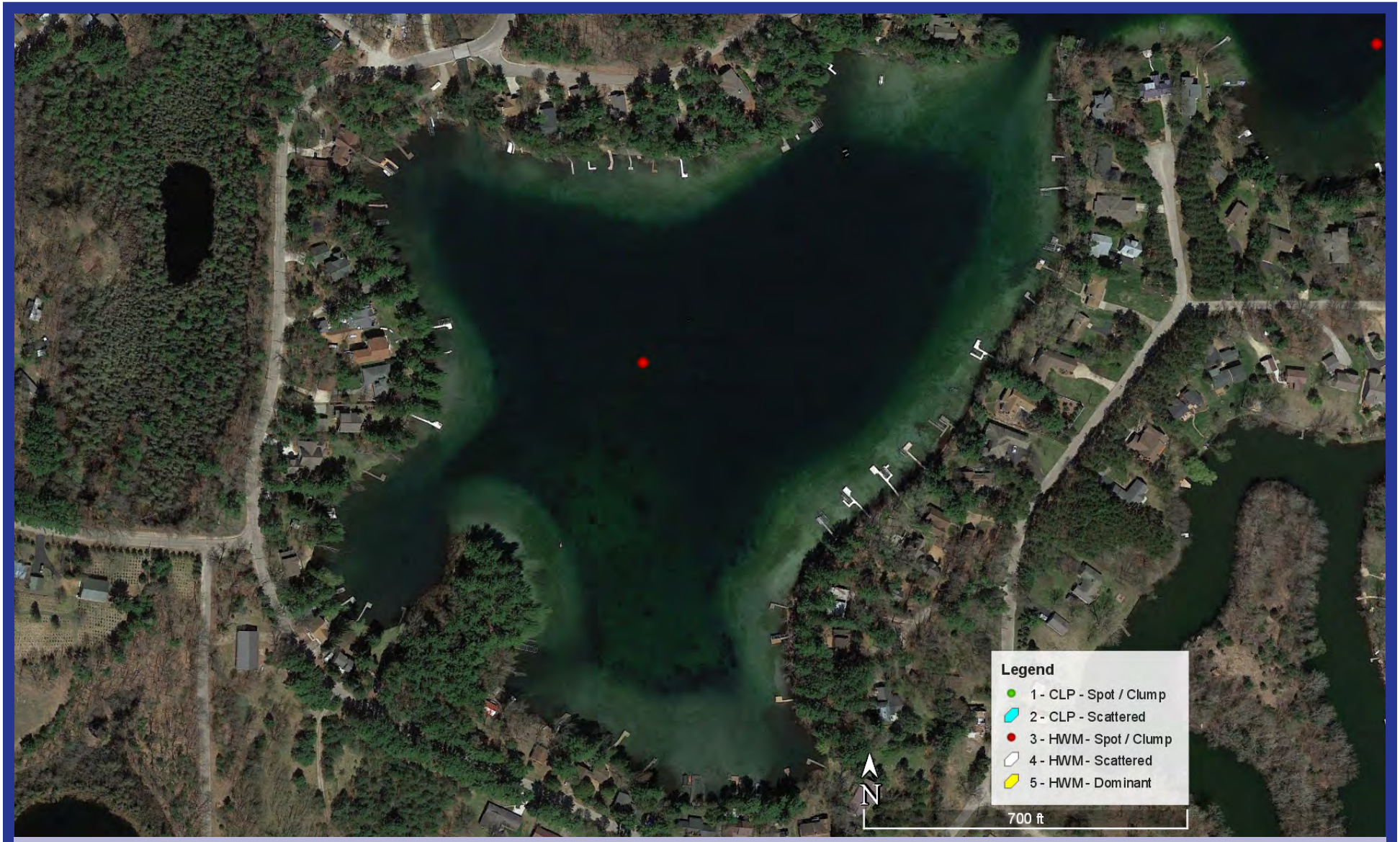
Lake	ID	Species	Density	Size (ac)	Avg. Depth
Long	B	HWM	Dominant	0.17	3
TOTAL - Hybrid Water-milfoil				0.17	---



Long Lake - CLP & HWM Locations

Wisconsin Lake & Pond Resource LLC
"Providing Professional Resources for Management of Your Lake or Pond"
www.WisconsinLPR.com (920) 872-2032

Figure 4.7
Waupaca Chain o' Lakes
Surveyed: September 26-27, 2023

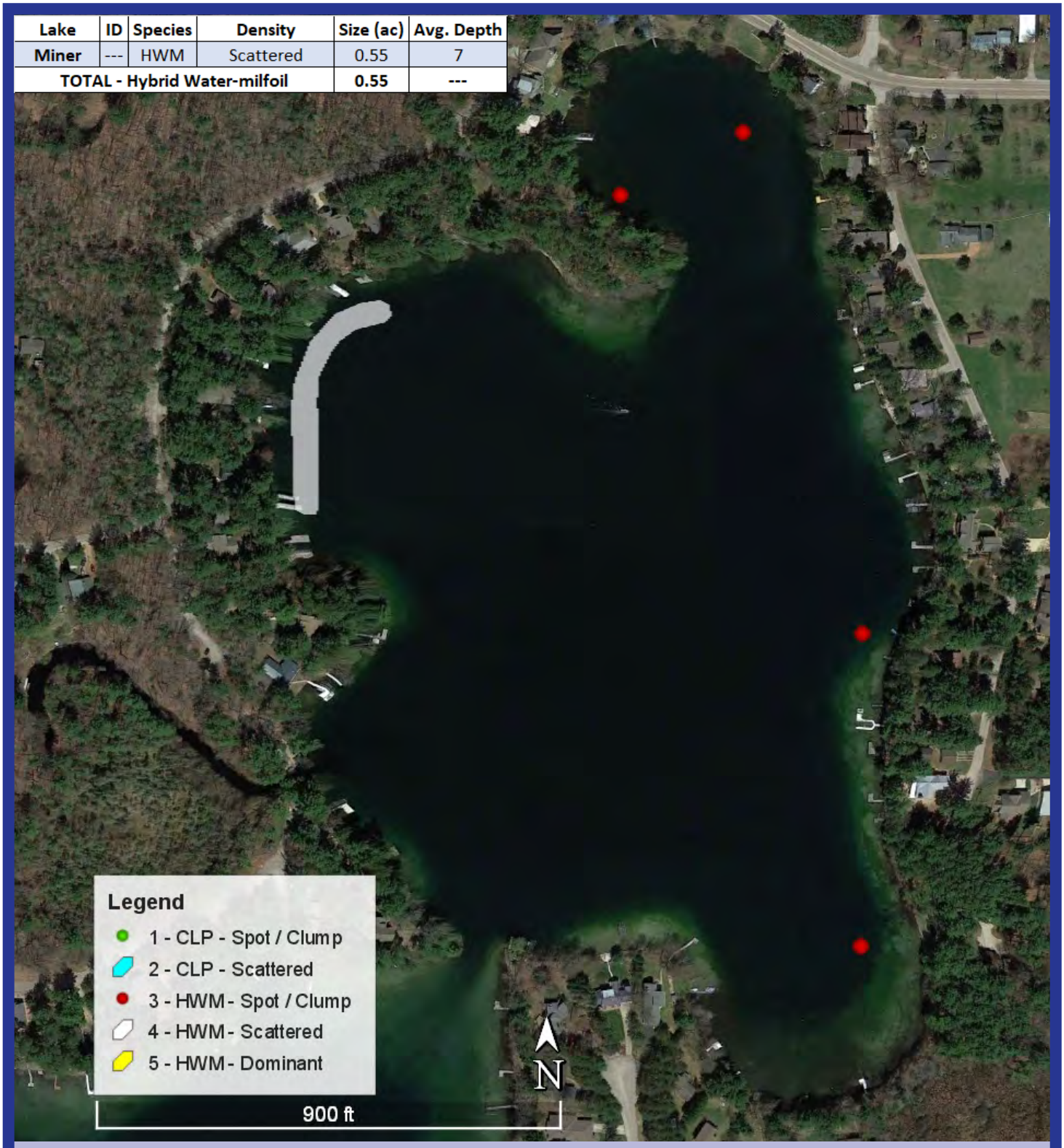


Wisconsin Lake & Pond Resource LLC
"Providing Professional Resources for Management of Your Lake or Pond"
www.WisconsinLPR.com (920) 872-2032

Dake Lake - HWM & CLP Locations

Figure 4.8
Waupaca Chain o' Lakes, Waupaca County
Surveyed: September 26-27, 2023

Lake	ID	Species	Density	Size (ac)	Avg. Depth
Miner	---	HWM	Scattered	0.55	7
TOTAL - Hybrid Water-milfoil				0.55	---

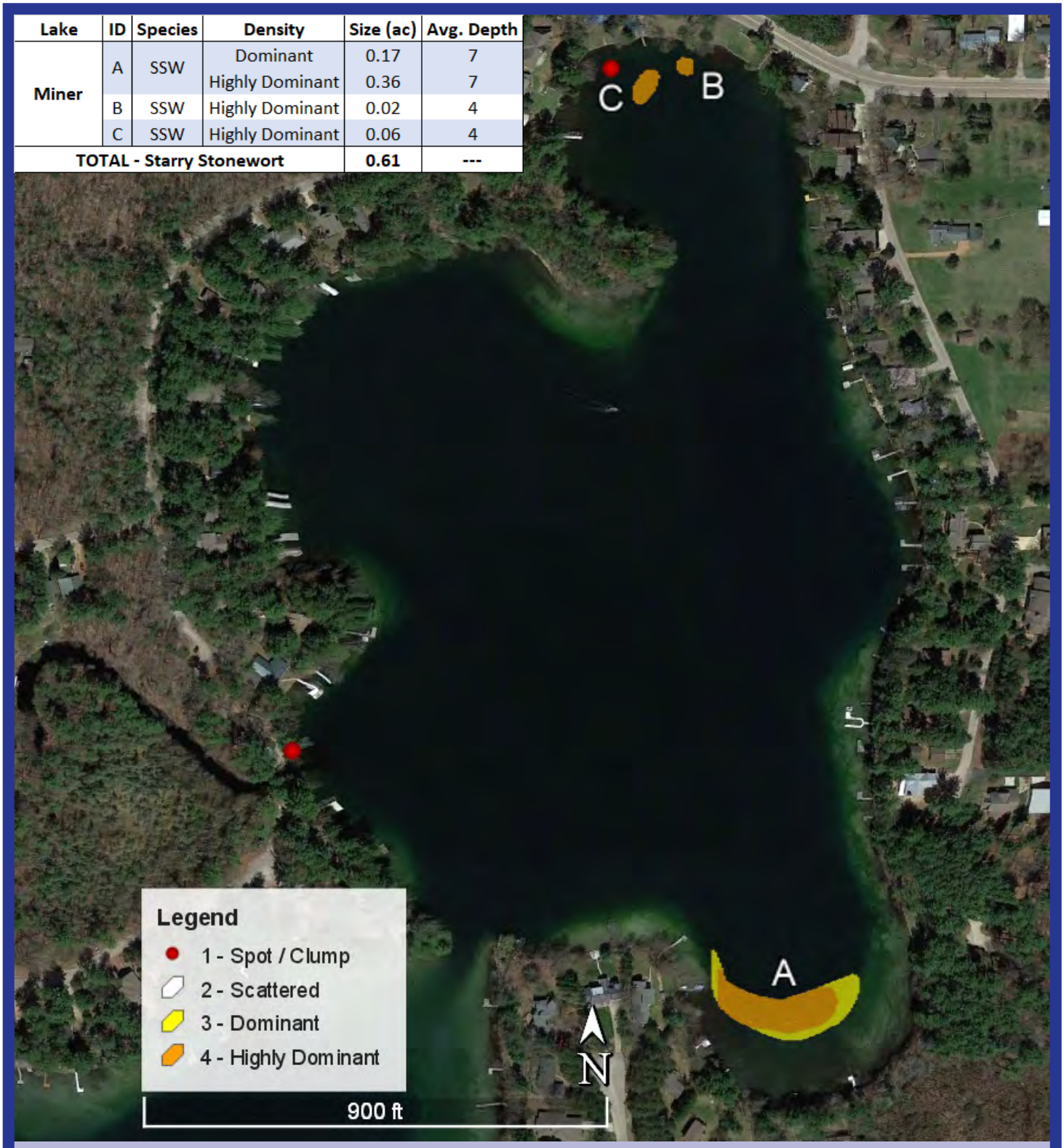


Miner Lake - HWM & CLP Locations

Wisconsin Lake & Pond Resource LLC
"Providing Professional Resources for Management of Your Lake or Pond"
www.WisconsinLPR.com (920) 872-2032

Figure 4.9
Waupaca Chain o' Lakes
Surveyed: September 26-27, 2023

Lake	ID	Species	Density	Size (ac)	Avg. Depth
Miner	A	SSW	Dominant	0.17	7
			Highly Dominant	0.36	7
	B	SSW	Highly Dominant	0.02	4
	C	SSW	Highly Dominant	0.06	4
TOTAL - Starry Stonewort				0.61	---



Miner Lake - Starry Stonewort Locations

Wisconsin Lake & Pond Resource LLC
"Providing Professional Resources for Management of Your Lake or Pond"
www.WisconsinLPR.com (920) 872-2032

Figure 4.10
Waupaca Chain o' Lakes
Surveyed: September 26-27, 2023

2023 WDNR PERMIT & TREATMENT RECORD

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
101 S. Webster Street
Box 7921
Madison WI 53707-7921

Tony Evers, Governor
Adam N. Payne, Secretary
Telephone 608-266-2621
Toll Free 1-888-936-7463
TTY Access via relay - 711

State of Wisconsin DNR Department of Natural Resources Water Permit Central Intake – attn. APM PO Box 7185 Madison, WI 53707-7185	Chemical Aquatic Plant Control Permit

Permit Number: *NE-2023-69-16890*
Permit Expiration Date: *October 1, 2023*
Waterbody Name: *Waupaca Chain O' Lakes*

Waterbody # (WBIC): *261200, 264700*
Fee Received: *245*
Waterbody Address: *PO Box 123*

Applicant Name: *Waupaca Chain O' Lakes District*
PO Box 123
King, WI 54946
Email:
Phone:
Advanced Notification of Treatment is required

Applicator Name: *Wisconsin Lake & Pond Resource, LLC*
N7828 Town Hall Rd
Eldorado, WI 54932
Email: *jim@wisconsinlpr.com*
Phone: *920-872-2032*

The Department has received and reviewed your application to chemically treat up to 8.45 acres of Eurasian and hybrid watermilfoil in the Waupaca Chain o' Lakes in Waupaca County. Aspects of this permit may not be changed. Please go to this web address: https://permits.dnr.wi.gov/water/SitePages/Permit%20Search.aspx to search for and download the permit documents. Your permit application meets the minimum requirements by law and a permit is being issued with the following conditions.

- It is the responsibility of the applicant to follow the treatment plan outlined in the permit application and permit conditions. The treatment notification protocols, treatment plan, and reporting protocols shall be performed in compliance with Wisconsin Administrative Code Chapter NR 107. Noncompliance with the permit can result in enforcement actions under Wis. Stat. ss. 23.24(6) and 281.98 and restriction of aquatic plant management activities for subsequent years under Wis. Adm. Code Ch. NR 107. The conditions and treatment plan are required to be followed to ensure efficacy of the treatment.

- You shall notify Christopher Kolasinski of the Department of Natural Resources at Christopher.kolasinski@wisconsin.gov or 920-252-5053, at least 4 business days before treatment with the date and time of proposed treatment.

- The Department may stop or limit the application of chemicals to a body of water if at any time it determines that the treatment will be ineffective, or will result in unreasonable restrictions on current water uses, or will produce unnecessary adverse side effects on nontarget organisms.

- You shall have a paper or electronic copy of this cover letter and permit with the individual conducting the treatment.

- You shall submit the Aquatic Plant Management Treatment record on the most updated form supplied by the Department as follows:

    a. Immediately, if any unusual circumstances occur during treatment.
    b. Within 30 days, if treatment occurs.
    c. By October 1 of this year if no treatment occurred.

If you have any questions or concerns, I can be reached at 920-252-5053 or by email at Christopher.Kolasinski@wisconsin.gov

State of Wisconsin Department of Natural Resources for the Secretary

By: Kolasinski, Chris	4/26/2023	4/26/2023
Water Resources Biologist	Date Signed	Date Mailed

Please Note:
If you believe that you have a right to challenge this decision, you should know that Wisconsin statutes and administrative rules establish time periods within which requests to review Department decisions must be filed. For judicial review of a decision pursuant to ss. 227.52 and 227.53, Wis. Stats., you have 30 days after the decision is mailed or otherwise served by the Department, to file your petition with the appropriate circuit court and serve the petition on the Department. Such a petition for judicial review shall name the Department of Natural Resources as the respondent. This notice is provided pursuant to s. 227.48(2), Wis. Stats. To request a contested case hearing pursuant to s. 227.42, Wis. Stats., you have 30 days after the decision is mailed, or otherwise served by the Department, to serve a petition for hearing on the Secretary of the Department of Natural Resources. The filing of a request for a contested case hearing is not a prerequisite for judicial review and does not extend the 30-day period for filing a petition for judicial review.

Notice:

- You shall decontaminate all project equipment used in the waterbody to minimize transport of aquatic invasive species (AIS) immediately after each use on the project site. You shall utilize best management practices: https://dnr.wi.gov/topic/Invasives/disinfection.html You shall comply with all provisions in State Stat. s. 30.07 and Wis. Adm Code s. NR 40.07 and Manual code 9183.1 For further information, please refer to the following: https://dnr.wi.gov/topic/invasives/classification.html.

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

Aquatic Plant Management

NOTE: Missing or incomplete fields are highlighted at the bottom of each page. You may save, close and return to your draft permit as often as necessary to complete your application. If there are no updates in 90 days, your draft is deleted

This Application has been Signed and Submitted by: i:0#.f|wamsmembership|jscharl signed on 2023-04-10T12:58:56

Site or Project Name:	Waupaca Chain - 2023 The permit application will be saved automatically with this name
Activity:	Chemical Control Application
Eligibility: (All questions must be no for it to be considered a private pond.)	**Does the waterbody have:** • More than one property owner? ◉ Yes ○ No • Uncontrolled surface water discharge? ◉ Yes ○ No • Public access? ◉ Yes ○ No

3200-004 Chemical Aquatic Control Application

NOTE: To be considered a private pond, a waterbody must meet all of the following requirements:

1. Confined to one property owner.
2. The pond has no uncontrolled surface water discharge.
3. No public access.

Upon submittal of your permit application, a **non-refundable $20 permit processing fee will be charged**. Additional acreage fees will be refunded if the permit request is denied or if no treatment occurs.

3200-004 Chemical Aquatic Plant Control Application

- Annually complete all pages on Form 3200-004 for chemical plant management applications. Complete form 3200-004a for large scale treatments(exceeds 10.0 acres in size or 10% of the area of the water body that is 10 feet or less in depth) as required by NR107.04(3).
  - Form 3200-004 is competed electronically through this system.
  - Form 3200-004a must be completed outside the system and uploaded to the attachments section. Please refer to this link for a copy of this form: http://dnr.wi.gov/files/pdf/forms/3200/3200-004A.pdf
- Attach a map that shows the treatment location(s), treatment dimensions and riparian landowners. If requesting WPDES coverage, attach a water body map that shows surface outflow and receiving waters.
- For a large-scale treatment, attach evidence that a public notice has been published in a regional / local newspaper and if required that a public informational meeting has been conducted as defined in NR107.04(3).
- Pay fee online.
- Sign and Submit form.
- A signed permit application certifies to the Department that a copy of the application has been provided to any affected property owner's association/district and to landowners adjacent to treatment area.

Contact Information

Applicant Information

Organization	Waupaca Chain O' Lakes District
Last Name:	
First Name:	
Mailing Address:	PO Box 123
City:	King
State:	WI
Zip Code:	54946
Email:	
Phone Number: (xxx-xxx-xxxx)	
Alternative Phone Number: (xxx-xxx-xxxx)	

Waterbody Address

Last Name:	
First Name:	
Street Address:	PO Box 123
City:	King
State:	WI
Zip Code:	54946
Email:	
Phone Number: (xxx-xxx-xxxx)	
Alternative Phone Number: (xxx-xxx-xxxx)	

Applicator

Name of Applicator Firm:	Wisconsin Lake & Pond Resource, LLC
Applicator Certification #:	041446, 073906, 080532, 092501, 077803, 105360, 11117...
Business Location License #:	93-015182-012226
Restricted Use Pesticide #:	
Address:	N7828 Town Hall Rd
City:	Eldorado
State:	WI
Zip:	54932
Email:	jim@wisconsinlpr.com
Phone Number: (xxx-xxx-xxxx)	920-872-2032

Adjacent Riparian Property Owners

NOTE: Phone and email address will not be publicly viewable.

☑ Uploaded riparian owners to attachment tab

Name	Address	Phone	Email Address

Site Information - Complete

Waterbody Containing Control Area(s)

Waterbody Property Owners Association or Waterbody District Representative : Fred Silloway

☐ None

Water Body Name: Waupaca Chain O' Lakes

Primary County: Waupaca

Latitude: 44.340283

Longitude: -89.151814

Section: 04

Township: 21

Range: 11

Direction: ◉ E ○ W

Waterbody Surface Area: 725 acres

Estimated Surface area that is 10ft or less 145 acres

Proposed Control Area(s)

Area(s) Proposed for Control:

Site Name (Optional)	Treatment Length		Treatment Width			Estimated Acreage		Average Depth		Calculated Volume	
Long Lk - F	0	ft. x	0	ft.	÷ 43,560 ft.^{2} =	1.00	ac	6	ft =	6.00	ac-ft
Dake Lake - G	0	ft. x	0	ft.	÷ 43,560 ft.^{2} =	7.45	ac	7	ft =	52.15	ac-ft
					Estimated Acreage Grand Total	8.45	ac		Calculated Volume Grand Total	58.15	ac-ft

Is the area with in or adjacent to a sensitive area designated by the Department of Natural Resources. More Information

○ Yes ◉ No

If the estimated acreage is greater than 10 acres, or is greater than 10 percent of the estimated area 10 feet or less in depth in Section II, complete and attach Form 3200-004A, Large-Scale Treatment Worksheet.

Chemical Aquatic Plant Control Information - Form 3200-004 (R 2/17)

Notice: Use of this form is required by the Department for any application filed pursuant to s. 281.17(2), Wis. Stats., and Chapters NR 107, 200 and 205, Wis. Adm. Code. This permit application is required to request coverage for pollutant discharge into waters of the state. Personally identifiable information on this form may be provided to requesters to the extent required by Wisconsin's Open Records Law [ss. 19.31-19.39, Wis. Stats.].

Treatment Type:

◉ *Lake* ○ *Pond* ○ *Wetland* ○ *Marina* ○ *Other*

Has a Lake Management plan been provided to the DNR?	If Yes, date approved of most current copy	Link to Approved Plan:
◉ Yes ○ No ○ Don't Know	12/1/2021	http://nebula.wsimg.com/0490bc981338a ☐ Uploaded Plan copy as an Attachment

Does the proposed plant removal agree with the approved plan? ◉ Yes ○ No

If NO, explain, Attach additional sheets if necessary.

Goal of Aquatic Plant Control:

- ☐ Maintain navigation channel
- ☐ Maintain boat landing and carry in access
- ☑ Improve fish habitat
- ☐ Maintain swimming area
- ☑ Control of invasive exotics
- ☐ Other

Nuisance Caused By:

- ☐ Algae
- ☐ Emergent water plants (majority of leaves & stems growing above water surface, e.g. cattail, bulrushes)
- ☐ Floating water plants (majority of leaves floating on water surface, e.g., water lilies, duckweed)
- ☑ Submerged water plants (leaves & stems below surface, flowering parts may be exposed: milfoil, coontail)
- ☐ Other

List Target Plants

☐ Algae	☐ Flowering Rush	☐ Purple Loosestrife
☐ Common/Glossy Buckthorn	☐ Hybrid Cattail	☐ Reed Canary Grass
☐ Coontail	☑ Hybrid Watermilfoil	☐ Reed Manna Grass
☐ Curly-Leaf Pondweed	☐ Japanese Knotweed	☐ Starry Stonewort
☐ Duckweed	☐ Naiad	☐ Yellow Floating Heart
☐ Elodea	☐ Narrow-Leaf Cattail	☐ Yellow Iris
☑ Eurasian Watermilfoil	☐ Phragmites	☐ Pondweed

Other Target Plants:

Note: Different plants require different chemicals for effective treatment. Do not purchase chemical before identifying plants.

Chemical Control

Full Trade Name of Proposed Chemical(s)

☐ Agristar 2,4-D Amine	☐ Clipper	☐ K-Tea	☐ SCI-62
☐ Algimycin PWF	☐ Clipper SC	☐ Littora	☐ Sculpin G
☐ Alligare 2,4-D	☐ Current	☐ Milestone	☐ SeClear
☐ Alligare Argos	☐ Cutrine-Plus	☐ Nautique	☐ SeClear G
☐ Alligare Diquat	☐ Cutrine-Plus Granular	☐ Navigate	☐ Shoreklear-Plus
☐ Alligare Ecomazapyr	☐ Cutrine-Ultra	☐ Navitrol	☐ Shredder Amine
☐ Alligare Glyphosate 5.4	☐ DMA 4 IVM	☐ Navitrol DPF	☐ Sonar AS
☐ Aqua Neat	☐ Earthtec	☐ Phycomycin SCP	☐ Sonar Genesis
☐ Aqua Star	☐ Element 3A	☐ Polaris	☐ Sonar H4C
☐ AquaPro	☐ Flumioxazin 51% WDG	☐ Polaris AC	☐ Sonar PR
☐ Aquashade	☐ Formula F-30	☐ Pond-Klear	☐ Sonar Q
☐ Aquashadow	☐ Garlon 3A	☑ ProcellaCOR EC	☐ Sonar RTU
☐ Aquastrike	☐ Green Clean	☐ Refuge	☐ Sonar SRP
☐ Aquathol K	☐ Habitat	☐ Renovate 3	☐ SonarOne
☐ Aquathol Super K	☐ Harpoon	☐ Renovate LZR	☐ Stingray
☐ Avast! SC	☐ Harvester	☐ Renovate LZR Max	☐ Symmetry NXG
☐ Captain	☐ Havoc Amine	☐ Renovate Max G	☐ Touchdown Pro
☐ Captain XTR	☐ Hydrothol 191	☐ Renovate OTF	☐ Tribune
☐ Chinook	☐ Hydrothol Granular	☐ Reward	☐ Trycera
☐ Clearcast	☐ Komeen	☐ Rodeo	☐ Weedar 64
☐ Clearigate	☐ Komeen Crystal	☐ Roundup Custom	☐ Weedestroy AM-40

Other Proposed Chemical(s):

Have the proposed chemicals been permitted in a prior year on the proposed site?

○ *All* ○ *Some* ◉ *None*

What were the results of the treatment?

ProcellaCOR EC has been used on other lakes in the Chain with great success

Method of Application: Injection

Other Method of Application

NOTE: Chemical fact sheets for aquatic pesticides used in Wisconsin are available from the Department of Natural Resources upon request.

Alternatives to Chemical Control:	Feasible?	If No, Why Not?
1. Mechanical harvesting	○ Yes ◉ No	Spreads EWM
2. Manual removal	○ Yes ◉ No	too large an area
3. Sediment screens/covers	○ Yes ◉ No	non-target damage
4. Dredging	○ Yes ◉ No	non-target damage
5. Waterbody drawdown	○ Yes ◉ No	no ability to drawdown
6. Nutrient controls in watershed	○ Yes ◉ No	not a control option for immediate concerns
7. Other:	○ Yes ○ No	

Note: If proposed treatment involves multiple properties, consider feasibility of EACH alternative for EACH property owner.

Will surface water outflow and/or overflow be controlled to prevent chemical loss?

○ *Yes* ◉ *No*

Is the treatment area greater than 5% of surface area?

○ *Yes* ◉ *No*

WPDES Permit Request

Is WPDES coverage being requested? Refer to http://dnr.wi.gov/topic/wastewater/aquaticpesticides.html for more information

○ *Yes - complete section VII with signature.*

◉ *No*

- ◉ *Already have WPDES*
- ○ *WPDES coverage not needed*

Lake	NAME	ADDRESS	CITY	ST	Zip
DAKE	BENDING TRUST ANN M ET AL	480 COUNTRY CLUB LANE	GLEN ELLYN	IL	60137
	BERND JAMES D & JOANN L	N2274 CLEGHORN RD	WAUPACA	WI	54981
	BITTMAN TRUST ANITA L	N2250 CLEGHORN RD	WAUPACA	WI	54981
	BROOKS SHIRLEY A	N2240 CLEGHORN RD	WAUPACA	WI	54981
	CAPIZZI MICHAEL J & DAWN D	N2244 CLEGHORN RD	WAUPACA	WI	54981
	CARROLL THOMAS V & KRISTINE A	N2256 CLEGHORN RD	WAUPACA	WI	54981
	CLARSON REV TRUST CASSANDRA M	1101 CONNERY COVE - APT#106	WAUNAKEE	WI	53597
	DECKER JT LIVING TRUST WILLIAM J & NANCY C	783 S WASHINGTON	ELMHURST	IL	60126
	ELLIS TRUST KAY D	E1228 PINE TREE PT	WAUPACA	WI	54981
	ENGELHARDT LUKE & TIFFANY	7487 AUDREY AVE	YORKVILLE	IL	60560
	FERRARA JOHN H	2042 W GRACE ST	CHICAGO	IL	60618
	FREUND INVESTMENTS LLC	208 E UNION ST	WAUPACA	WI	54981
	HENRIKSEN REV TRUST KRISTIN S	720 S WASHINGTON	ELMHURST	IL	60126
	HINZE DONALD & NATALIE	N2232 CLEGHORN RD	WAUPACA	WI	54981
	JOHNSON DANIEL R	N2380 CLEGHORN RD	WAUPACA	WI	54981
	KESLER RICHARD L	N2286 CLEGHORN RD	WAUPACA	WI	54981
	KLISMET JT REV TRUST JAMES & DIANNA L	PO BOX 575	WAUPACA	WI	54981
	MINOR KEVIN L & WENDY L	N74 W22552 TWIN OAK CT	SUSSEX	WI	53089
	MUELLER REV TRUST DEBRA	26 DENALI CT	SOUTH BARRINGTON	IL	60010
	OFTEDAHL REV IN TRUST SANDRA L	4214 VINCENT AVE S	MINNEAPOLIS	MN	55410
	OLSEN JAMES T & KAREN M	N2308 CLEGHORN RD	WAUPACA	WI	54981
	PALMER THOMAS A & BARBARA L	4061 JOHNSON AVE	WESTERN SPRINGS	IL	60558
	PANKRATZ REV TRUST JOSEPH J & BONNIE M	N2340 CLEGHORN RD	WAUPACA	WI	54981
	PETERSEN STEVEN K & JUNE K	N2348 CLEGHORN RD	WAUPACA	WI	54981
	PIOTROWSKI FAM TRUST GREGORY E & REGINA T	1487 ARMSTRONG LN	ELK GROVE VILLAGE	IL	60007
	ROLOFF LIV TRUST PAUL E & KATHY L	E1203 CHANNEL PARK DR	WAUPACA	WI	54981
	SCHROEDER 2021 REV TRUST SCOTT H	10633 W VISTA VIEW CIR	MEQUON	WI	53097
	SCHUELKE FAMILY RETREAT LLC	N2236 CLEGHORN RD	WAUPACA	WI	54981
	SHABINO JOHN E	6105 E SURREY RD	BLOOMFIELD HILLS	MI	48301
	SIMPSON JT LIV TRUST DALE C & VIRGINIA C	E1234 PINE TREE PT	WAUPACA	WI	54981
	TYRE JT REV LIV TRUST WILLIAM R & CATHERINE M	N2564 COUNTY ROAD QQ	WAUPACA	WI	54981
	ULRICH RYAN S & LAURA JEAN	N2263 COUNTRY LN	WAUPACA	WI	54981
	WAGNER & A BRUBAKER RYAN	201 S RIVERHEATH WAY - APT 201	APPLETON	WI	54915
	WATSON GARY W & BARB M L	N2362 CLEGHORN RD	WAUPACA	WI	54981
	WEISS THOMAS R & BARBARA A	N2318 CLEGHORN RD	WAUPACA	WI	54981
	WELNICK TRUST	102 BLUE RIDGE PKWY	MADISON	WI	53705
	WIENKERS STEVEN F ET AL	N105W7515 CHATHAM ST	CEDARBURG	WI	53012
	ZEINERT & DEANN R GOLLA DAWN M & DALE E	E1211 CHANNEL PARK DR	WAUPACA	WI	54981
LONG	ET AL PALMER LIVING TRUST	2936 N 74TH CT	ELMWOOD PARK	IL	60707
	NAL PROPERTIES LLC	3189 WINNEGAMIE DR	APPLETON	WI	54914
	RAY U JR ET AL LANE LIVING TRUST	436 W ELM PARK AVE	ELMHURST	IL	60126
	THOMAS R MASURA	506 N HAVANA RD	VENICE	FL	34292

State of Wisconsin
Department of Natural Resources
dnr.wi.gov

Aquatic Plant Management Herbicide Treatment Record

Form 3200-111 (R4/20)

Notice: Completion of this form is a condition of the permit and provides records required by WDNR (NR 107) and DATCP (ATCP 29.21 and 29.22). The Department may not issue you future permits unless you complete and submit this form. Personal information collected will be used for administrative purposes and may be provided to requesters to the extent required by Wisconsin's Open Records Law [ss. 19.31-19.39, Wis. Stats.].

Submit this form: (1) immediately if any unusual circumstances occurred during treatment
(2) as soon after treatment as possible, no later than 30 days
(3) by October 1 if no treatment occurred

Completion of this form along with the permit satisfies the requirements of WDNR (NR 107) and DATCP (ATCP 29.21 and 29.22).

Permit Number	Water body Name (including ponds, e.g., Smith Pond)
NE-2023-69-16890	Waupaca Chain O' Lakes
County: Waupaca	Permit Holder Name (Customer Name): Waupaca Chain O' Lakes District

Permit Holder Address	City	State	Zip Code
PO Box 123	King	WI	54946

Treatment Information

Treatment Date(mm/dd/yyyy)	Starting Time (24:00 hour)	Ending Time (24:00 hour)	Water Temp	☐ C ☑ F	Ambient Air Temp	☐ C ☑ F
5/30/2023	08:45	12:00	58		48	

Wind Speed (mph)	Wind Direction	Expected Duration of Chemical Residuals
0-3	East	1 day

Adverse Conditions Noted (i.e., dead fish, spawning fish, algae bloom, etc.)

If adverse conditions noted, indicate corrective actions taken

Comments

Onsite Supervision by DATCP and/or DNR Staff: ○ Yes ◉ No

If Yes, Supervisor Name :

Mixing and Loading Site Location (if other than business site or from prepackaged retail container or applied with equipment with a total capacity of not more than 5 gallons liquid or 50 pounds dry)

Waupaca Lake Boat Launch

Water User Restriction

☐ No Restrictions ☐ Consuming Fish ☑ Pet/Livestock Water ☑ Irrigation (Crop)
☐ Swimming ☑ Drinking Water ☐ Irrigation Other: _____

☑ Herbicide Treatment and Water Use Restrictions Signs Posted In Accordance With NR 107 and ATCP 29.22?

Applicator shall provide each customer with a free copy of each pesticide label used (if requested)

Applicator Information

Individual or Business Name	Telephone xxx -xxx-xxxx
Wisconsin Lake & Pond Resource, LLC	920-872-2032 x

Street Address: N7828 Town Hall Rd

City	State	ZIP Code
Eldorado	WI	54932

Individuals Making or Supervising Pesticide Application	Last Name	First	Certification #	License #
	Scharl	James	077803	224355

Name of Person Completing Form: Jaime Anderson

Date: 5/30/2023

Aquatic Plant Management Herbicide Treatment Record

Form 3200-111 (R4/20)

Site No	Property Name	Address / Fire No	Treated acreage	Permitted Acreage	Sensitive Area?	Latitude	Longitude
F	n/a	n/a	1.00	8.45	☐		

Herbicide Name	Other Herbicide	EPA Reg. No.	Amount Applied	Units	Application Concentration Rate (mg/l = ppm)
ProcellaCOR EC		67690-80	19	PDU	0.006 ppm

Site No	Property Name	Address / Fire No	Treated acreage	Permitted Acreage	Sensitive Area?	Latitude	Longitude
G	n/a	n/a	7.45	8.45	☐		

Herbicide Name	Other Herbicide	EPA Reg. No.	Amount Applied	Units	Application Concentration Rate (mg/l = ppm)
ProcellaCOR EC		67690-80	156	PDU	0.006 ppm

TS	SP		Site(s)	TS	SP		Site(s)	TS	SP		Site(s)
☐	☐	Cattail		☐	☐	Flat-Stem Pondweed		☐	☐	Richardson Pondweed	
☐	☑	Chara	all	☐	☐	Floating-Leaf Pondweed		☐	☐	Robbins Pondweed	
☐	☐	Coontail		☐	☑	Illinois Pondweed	all	☐	☐	Sago Pondweed	
☐	☑	Curly-Leaf Pondweed	F	☐	☐	Large-Leaf Pondweed		☐	☐	Watershield	
☐	☐	Duckweed		☐	☐	Northern Milfoil		☐	☐	White Water Lily	
☐	☑	Elodea	all	☐	☐	Phragmites		☐	☐	Wild Celery	
☑	☐	Eurasion /hybrid Milfoil	all	☐	☐	Planktonic Algae		☐	☑	White-Stem Pondweed	G
☐	☑	Filamentous Algae	all	☐	☐	Purple Loosestrife					

Other Plants (not listed above)

TP	SP	Name	Site(s)
☐	☐		