1.0 INTRODUCTION

Silver Lake is an approximate 57-acre, oligo-mesotrophic, deep headwater drainage lake located in Eagle River (Vilas County), Wisconsin (Figure 1.0-1). Water from Silver Lake flows north through an unnamed outlet into Yellow Birch Lake of the Eagle River Chain of Lakes. Silver Lake's watershed encompasses an area of approximately 217 acres. The lake has a shoreline perimeter of 1.4 miles, a maximum depth of 19 feet, and a mean depth of 8 feet.

Figure 1.0-1. Silver Lake, Vilas County.

The conservation and management of Silver Lake has largely been undertaken by a partnership between the City of Eagle River, Town of Lincoln, and the Eagle River Silver Lake Association (ERSLA). A comprehensive management plan was completed for Silver Lake in 2013 and focused primarily on the management of Eurasian watermilfoil (EWM).

The City of Eagle River along with the ERSLA and Town of Lincoln were awarded a Wisconsin Department of Natural Resources (WDNR) Lake Management Planning Grant to aid in funding the creation of an updated management plan (LPL-175821). The goal of this management plan update was to evaluate the management actions taken since the original plan development, their outcomes, and to create updated management goals and actions. The updated *Comprehensive Management Plan* was finalized in May 2023 and provides a framework for the conservation and enhancement of the Silver Lake ecosystem. The management plan development included a comprehensive assessment of Silver Lake through baseline studies designed to evaluate the lake's water quality, watershed, shoreland condition, and aquatic plant community.

1.1 Eurasian watermilfoil Management History

Onterra first mapped the EWM population of Silver Lake in 2008, and 2.5 acres of *scattered* EWM were located. Following a 3.4-acre 2,4-D treatment in the spring of 2009, no colonized areas of EWM were mapped in 2009, 2010, or 2012. From 2013-2015, colonized acreage of EWM increased from 0.9 to 5.6 acres while limited volunteer hand-harvesting efforts were taking place. The increasing EWM population culminated in a whole-lake 2,4-D treatment that was implemented in 2016. No EWM was observed in 2016 following the treatment, while only point-based occurrences were located in 2017.

No mapping surveys were completed in 2018-2020, and mapping completed in 2021 revealed the largest EWM footprint to that point in time with 16.7 acres and this increased further to 19.2 acres in 2022. The surveys in 2021 and 2022 found that the lake's population of Eurasian watermilfoil had increased to the highest level recorded since surveys began in 2005.

2.0 2023 MONITORING SURVEY RESULTS

It is important to note that two types of surveys are discussed in the subsequent materials: 1) point-intercept surveys and 2) EWM mapping surveys. The point-intercept survey provides a standardized way to gain quantitative information about a lake's aquatic plant population through visiting predetermined locations and using a rake sampler to identify all the plants at each location. The survey methodology allows comparisons to be made over time, as well as between lakes. The point-intercept survey can be applied at various scales. The point-intercept survey is most often applied at the whole-lake scale. The whole-lake point-intercept survey has been conducted on Silver Lake in 2005 and then annually since 2007.

While the point-intercept survey is a valuable tool to understand the overall plant population of a lake, it does not offer a full account (census) of where a particular species exists in the lake. The EWM mapping survey offers a full account (census) of where a particular species exists in the lake. During the EWM mapping survey, the entire littoral area of the lake is surveyed through visual observations from the boat (Photo 2.0-1). Field crews supplement the visual survey by deploying a submersible camera along with periodically doing rake tows as applicable. The EWM population is mapped using sub-meter GPS technology by using either 1) point-based or 2) area-based methodologies. Large colonies >40 feet in diameter are mapped using polygons (areas) and are qualitatively attributed a density rating based upon a five-tiered scale from *highly scattered* to *surface matting*. Point-based techniques were applied to EWM locations that were considered as *small plant colonies* (<35 feet in diameter), *clumps of plants*, or *single or few plants*.

Overall, each survey has its strengths and weaknesses, which is why both are utilized in different ways as part of this project.

2.1 Late-Season EWM Mapping Survey

The Late-Season EWM Mapping Survey was conducted on September 7, 2023 to qualitatively assess the peak growth (peak-biomass) of the EWM population throughout the lake and to guide management activities in 2024. The entire littoral zone of Silver Lake was systematically meandered during the visual survey and EWM populations were mapped by using the methodology described above.

The results of the survey are displayed on the bottom frame of Map 1. The survey crew noted cloudy weather, modest winds, and cool temperatures. A total of 1.5 acres were mapped as *surface matting* density and are displayed in red on the map. Another 0.4 acres was *highly dominant,* and 1.8 acres were given a *dominant* density rating. EWM was present throughout much of the littoral area of the lake. A total of 22.3 acres of EWM was delineated during the 2023 survey of which 18.6 acres consisted of relatively low density ratings of highly *scattered* or *scattered*. The EWM population increased in size and density compared to the previous survey in 2021 (Map 1-

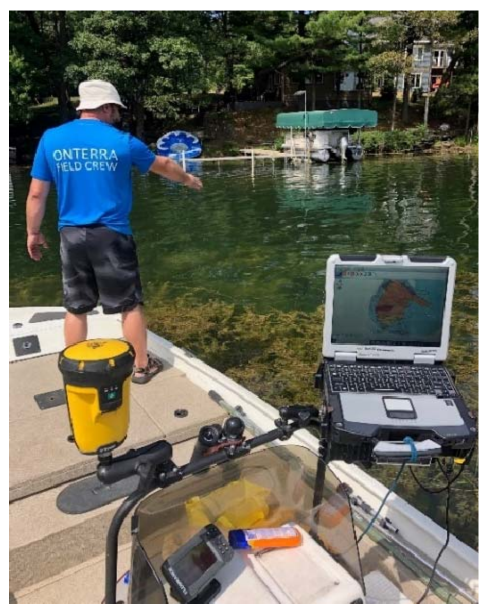


Photo 2.1-1. EWM mapping survey on a Wisconsin lake. Photo credit Onterra.

top frame). The past three years of monitoring has documented an expanding population that is significantly larger than past mapping surveys that have taken place on the lake (Figure 2.1-1).

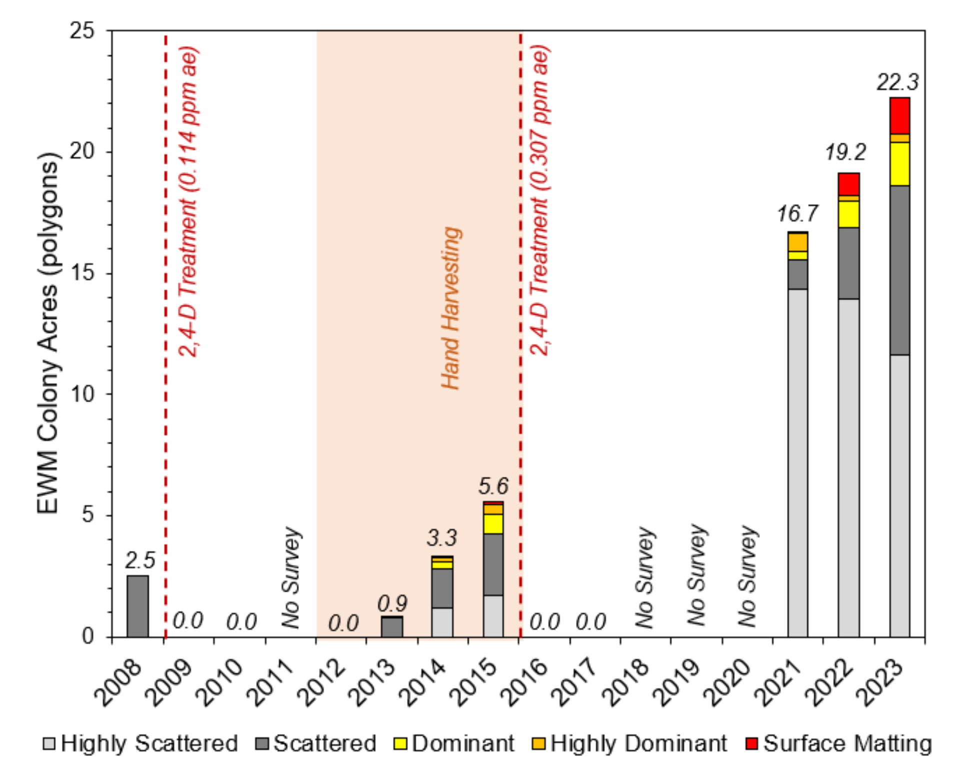


Figure 2.1-1. Acreage of colonized EWM in Silver Lake from 2005-2023. Created using data from Onterra late-season EWM mapping surveys.

2.2 Point-Intercept Survey

The point-intercept method as described in the WDNR publication (WDNR PUB-SS-1068 2010) was used to complete this study. A point spacing of 40 meters was used resulting in 144 total sampling locations. This survey allows for a quantitative analysis of the aquatic plant community in the lake and is directly comparable to past or future surveys completed with the same methodology. Silver Lake is one of the WDNR's long-term trends monitoring lakes for aquatic plants, and whole-lake point-intercept surveys have been completed almost annually between 2005 and 2023.

Analysis of these data show a high-quality aquatic plant population that includes the presence of several rare native species. Trend analysis indicates some species have trended higher while others have trended lower during the period of study. Expanded discussion of Silver Lake's aquatic plant population is included within the 2023 Comprehensive Management Plan. The 2023 point-intercept survey data is highlighted within this report, with comparisons to prior surveys integrated within.

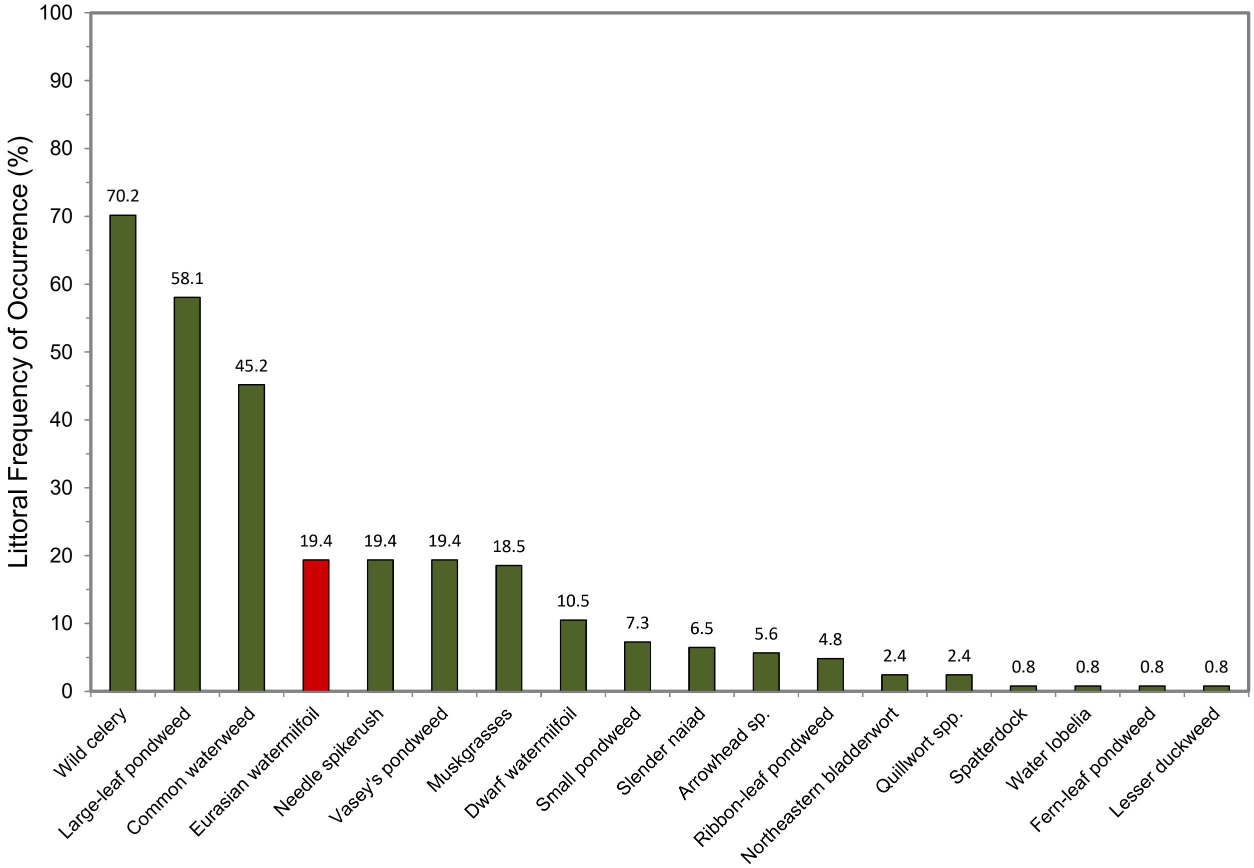


Figure 2.2-1. Littoral Frequency of Occurrence of aquatic plant species from a 2023 point-intercept survey in Silver Lake.

Wild celery was the most frequently encountered native aquatic plant in 2023 with a littoral frequency of occurrence of 70.2%. Wild celery is relatively tolerant of low-light conditions and is able to grow in deeper water. Wild celery produces long, grass-like leaves which extend in a circular fashion from a basal rosette (Photo 2.2-1). To keep the leaves standing in the water column, lacunar cells in the leaves contain gas making them buoyant. Towards the late-summer when wild celery is at its peak growth stage, it is easily uprooted by wind and wave activity. It can then pile up on shorelines depending on the predominant wind direction. The leaves, fruits, and winter buds of wild celery are food sources for numerous species of waterfowl and other wildlife and are an important component of the Silver Lake ecosystem.

Large-leaf pondweed was the second-most frequently encountered species in the 2023 survey with an occurrence of 58.1%. Large-leaf pondweed is the largest pondweed species in Wisconsin, and is relatively sensitive to environmental changes. The leaves are arched and slightly folded, and though often found in a greenish color can take on a reddish appearance in the late summer (Photo 2.2-1).

Common waterweed exhibited an occurrence of 45.2% in 2023 survey making it the third-most commonly encountered species. Common waterweed can be found in waterbodies across Wisconsin, is tolerant of high-nutrient, low-light conditions, and can grow to nuisance levels under ideal conditions. Common waterweed has blade-like leaves in whorls of three produced on long, slender stems (Photo

2.2-1). Like other submersed aquatic plants, common waterweed helps to stabilize bottom sediments and provides structural habitat and food for wildlife. Common waterweed obtains much of its nutrients directly from the water.

Wild celery Vallisneria americana	Large-leaf pondweed Potamogeton amplifolius	Common waterweed Elodea canadensis
		

Photograph 2.2-1. Three-most frequently encountered aquatic plants in Silver Lake in 2023. Photo credit Onterra.

Eurasian watermilfoil was found at 24 of the sampling locations during the 2023 point-intercept survey resulting in a littoral frequency of occurrence of 19.4% making it tied for the fourth most frequently encountered species in the 2023 survey. The occurrence of EWM from all point-intercept surveys dating back to 2005 is displayed on Figure 2.2-2. These data show the EWM population has historically been at 6.1% or below until rapidly increasing from 2.8% in 2020 to 9.2% in 2021, 13.2% in 2022 and 19.4% in 2023.

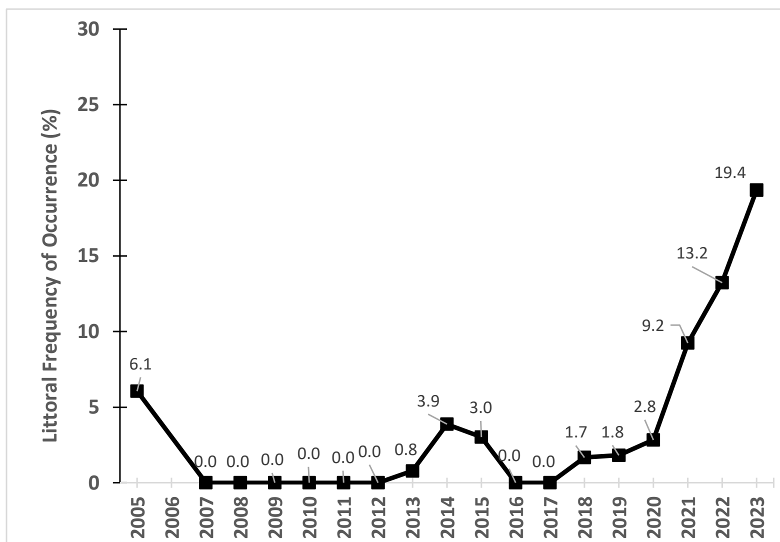


Figure 2.2-2. Littoral occurrence of EWM in Silver Lake. Created using data from whole-lake point-intercept surveys.

Figure 2.2-3 displays number of sampling locations that contained native plants, EWM and native plants, or EWM only from the point-intercept surveys. After the 2016 2,4-D herbicide treatment, EWM was not present on any sampling locations until 2018. The number of points with EWM has increased incrementally in recent years while the number of sampling locations with native plants has been relatively stable over the period of monitoring.

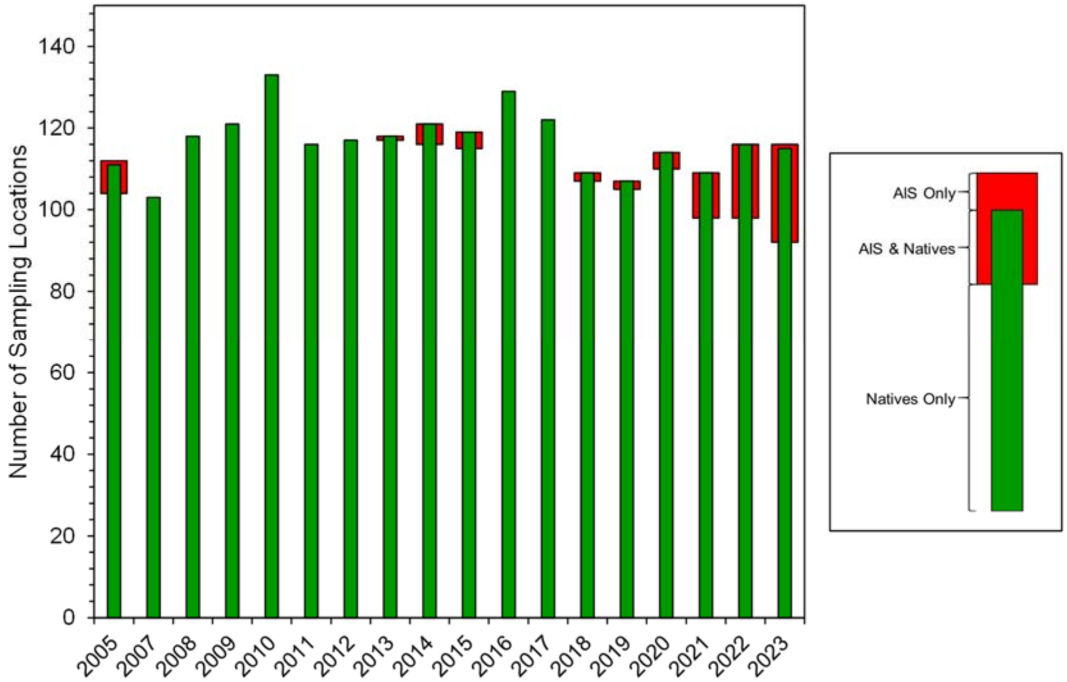


Figure 2.2-3. Number of sampling locations with native and non-native species from point-intercept surveys.

Another metric that assesses the native plant community in the lake over time is through comparing the average number of native plant species per sampling location from the point-intercept surveys. These data indicate an increasing trend in this metric from 2005 to 2012, followed by a decreasing pattern from 2012-2017. The lowest recorded value of 1.73 was from the first survey in this dataset which was collected in 2005. Values have trended higher again since 2017 and the 2.84 species per sampling site measured in 2023 falls above the average value of 2.53 from all surveys.

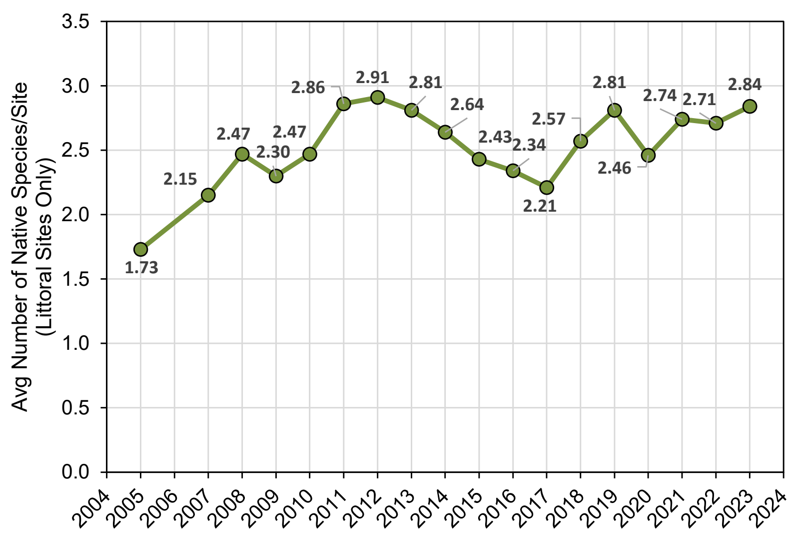


Figure 2.1-8. Silver Lake Number of Native Aquatic Plant Species per Sampling Site. Created using data from point-intercept surveys.

3.0 2024 EWM MANAGEMENT & MONITORING STRATEGY

Goal #3 within the ERSLA's Comprehensive Management Plan is to "monitor AIS in the ecosystem and conduct management based on results". The fourth action under this goal is to "conduct management actions towards EWM". The Plan includes guidance for when hand harvesting strategies would be utilized as well as when considerations for herbicide use would be made. The Plan outlines that the ERSLA will use the data from the whole-lake point-intercept survey to select a "trigger" for when they would begin discussions relating to considering a whole-lake herbicide treatment strategy. The ERSLA would reserve this management approach for when the EWM population reaches a level where the population comprises a larger portion of the lakes littoral zone. The ERSLA set the following "trigger" for initiating conversations leading towards pursuing a whole-lake treatment:

Whole-lake point-intercept survey indicates an EWM littoral frequency of occurrence of 15% or greater

At the time the trigger was created during the management planning process, the 15% trigger represented an EWM occurrence that was higher than had been documented to date in Silver Lake. The occurrence of EWM exceeded this threshold in 2023 at 19.4%. The 19.4% occurrence represents the highest occurrence to date in Silver Lake dating back to 2005 when annual point-intercept surveys began on the lake. This prompted the ERSLA to begin discussions for a potential 2024 herbicide treatment strategy and subsequently led to the application for a WDNR AIS-Control grant during the fall 2023 cycle which if awarded, would provide state funding assistance to complete the treatment and associated monitoring aspects outlined below.

The Plan states if the trigger is met from the point-intercept survey, the ERSLA would solicit a professional firm to conduct an EWM mapping survey which is necessary for designing an herbicide treatment strategy. The ERSLA funded the completion of a late-summer EWM mapping survey in 2023 without that aid of state funds. Results of that survey are discussed in section 2.1 above.

One of the first aspects in pursuing an herbicide treatment strategy is to create a Control and Monitoring Plan for which this report serves to achieve. The Control and Monitoring Plan is created based on the results of a late-summer EWM mapping survey or in combination with the results of a whole-lake point-intercept survey. These data are used to create a specific EWM control strategy for the following year including information such as the herbicide to be used, dosing strategy, targeted areas, and an accompanying monitoring strategy. The Control and Monitoring Plan includes applicable risk assessment materials for the ERSLA to review including a summary of available research, toxicity, and selectivity within section 4.0 below.

Following the current understanding of best management practices, a ProcellaCOR treatment is proposed to occur in 2024. The herbicide treatment is planned to occur during approximately mid-June 2024. To target the colonized EWM in Silver Lake, five application areas were constructed around the densest of the EWM colonies resulting in a total 13.1 acres (Map 2). An application rate of 2.0 prescription dosing units (PDU) is being considered. For reference, an application rate of 2.0 PDU's equates to approximately 3.9 parts per billion (ppb). Onterra confirmed the dosing strategy being considered for 2023 on Silver Lake with experts from SePRO, the manufacturer of ProcellaCOR™. All application area dosing rates are consistent with typical dosing rates being used in EWM spot-treatment designs in Wisconsin.

Designing an herbicide management strategy also considers the potential lake-wide herbicide concentrations as the product dissipates and reaches a whole-lake equilibrium concentration. At the proposed application rates, a theoretical lake-wide epilimnetic florpyrauxifen-benzyl concentration of

0.79 ppb is calculated. In other intentional whole-lake designs, Onterra has employed target florpyrauxifen-benzyl concentrations of 0.6-1.0 ppb. This means that along with the upfront high concentration in the application area, the entire lake will reach an equilibrium concentration that at an extended exposure could have the potential to impact EWM and sensitive native species throughout the entire lake. However, measured whole-lake concentrations of florpyrauxifen-benzyl typically fall short of predicted levels as the herbicide converts into its acid metabolite form (florpyrauxifen acid) during the time it takes to mix evenly within the lake.

The primary breakdown product of florpyrauxifen-benzyl is florpyrauxifen acid. This chemical metabolite is reported to have activity as an herbicide on aquatic plants, albeit to a lower degree than the active ingredient. Within Onterra's case studies, the acid metabolite is detected during early monitoring periods (ie. hours after treatment), increasing in concentration after days to weeks as the active ingredient is converted into this form. Florpyrauxifen acid has been shown to persist in the lake longer than the active ingredient, particularly in seepage lakes or lakes with limited water loss via an outlet. It is suspected that florpyrauxifen acid would persist for several weeks after treatment in Silver Lake and is a factor that is considered in the design of the herbicide concentration monitoring plan.

A Pretreatment Confirmation and Refinement Survey would be completed prior to the herbicide application to verify application area extents and inspect the condition of the EWM colonies targeted for treatment through the use of a combination of surface surveys, rake tows, and submersible video monitoring. This meander-based survey would investigate for colonial expansion, reduced occurrence, growth stage of the EWM (and native plants), application area specifies (e.g. average depth & extents), and other aspects including water temperatures and pH.

Following the Pretreatment Confirmation and Refinement Survey, an email narrative report would be provided to the ERSLA, City of Eagle River, WDNR, and other project partners, including a map outlining the finalized control strategy. Spatial data would be provided to the third-party herbicide application firm prior to treatment in compatible format.

The ERSLA intends to employ an integrated pest management strategy that would utilize professional hand-harvesting/DASH, if needed, to maintain low occurrence of EWM in Silver Lake the year after treatment (2025). The results of the 2024 Late-Summer EWM Mapping Survey would be used to prioritize areas for professional hand-harvesting/DASH. Spatial data would be provided to the professional harvesters for use in their onboard GPS units. The contractor would be responsible for obtaining mechanical harvesting permits if DASH is used. Onterra would supply the map of DASH areas for use in the permit application.

3.1 Monitoring Plan

The monitoring plan includes conducting native plant and EWM population monitoring during the *year before treatment* (2023), the *year of treatment* (2024), and the *year after treatment* (2025) on Silver Lake. This includes replications of both the point-intercept survey and late-summer EWM mapping survey. While much of the published literature compares the *year before treatment* to the *year of treatment* data, having the *year after treatment* data allows a better understanding of EWM efficacy as plants begin to rebound. While some native plants can be impacted during the year of treatment, data from the year following treatment allow managers to understand longer-term and meaningful impacts.

Herbicide concentration monitoring would occur following the 2024 treatment. The tentative volunteer-based herbicide concentration monitoring plan includes sampling three locations at 10 time intervals. The scope of this activity is modeled from the 2020-2023 WDNR's (central office) research project in which herbicide concentration monitoring samples were sent to a lab with lower detection limits (EPL Bio Analytical Services) than the manufacturer's lab (SePRO). Properly preserved samples would be overnight delivered EPL Bio Analytical Services. ERSLA volunteers would be supplied and trained by Onterra staff on the day the pretreatment survey is completed.

4.0 RISK ASSESSMENT

The content in this section offers a general risk assessment for the proposed 2024 management strategy as it relates to herbicide resistance management, ProcellaCOR specific information, expected aquatic plant impacts from the proposed treatment, and fisheries toxicology research. The ERSLA was also provided similar information during the management planning project, with some related text within the 2023 Management Plan document. This section does not claim to be an exhaustive view of risk assessment for all aspects of an herbicide use strategy, but attempts to convey basic information for stakeholders and project partners to review as it relates to the specific herbicide strategy that is proposed to occur in 2024 in Silver Lake.

EWM Herbicide Resistance

While understood in terrestrial herbicide applications for years, herbicide resistance is an emerging topic amongst aquatic herbicide applicators, lake management planners, regulators, and researchers. Herbicide resistance is when a population of a given species develops reduced susceptibility to an herbicide over time, such that an herbicide use pattern that once was effective no longer produces the same level of effect. This occurs in a population when some of the targeted plants have an innate tolerance to the herbicide and some do not. Following an herbicide treatment, the more tolerant strains will rebound whereas the more sensitive strains will be controlled. Thus, the plants that re-populate the lake will be those that are more tolerant to that herbicide resulting in a more tolerant population over time.

Repetitive treatments with the same herbicide mode-of-action may cause a shift towards increased herbicide tolerance in the population. Rotating herbicide use-patterns can help avoid population-level herbicide tolerance evolution from occurring. Onterra maintains concern for future use of 2,4-D in Silver Lake, as the sole use of this herbicide mode of action in the past may yield a cause for concern about potential herbicide resistance and therefore herbicide rotation away from this herbicide is recommended. While florpyrauxifen-benzyl is a similar mode of action to 2,4-D (auxin hormone mimic), differences in molecular configuration and binding affinity are thought to generate a different enough response in the plant to minimize this potential.

ProcellaCOR™ (florpyrauxifen-benzyl)

ProcellaCOR™ has been the state's most popular herbicide for EWM management in recent years. The active ingredient florpyrauxifen-benzyl is sold exclusively by SePRO under the tradename ProcellaCOR™. This herbicide has largely been used in spot treatment scenarios, but has recently been adopted as a whole-lake treatment option on a number of Wisconsin lakes. Data analysis related to herbicide concentration monitoring and native aquatic plant impacts has been investigated in the many of the treatments. Analysis of these data have allowed lake managers to better understand the ways in which the herbicide dissipates or mixes within a lake in the hours and days after application. Additionally, aquatic plant monitoring data provides insights as to which native species are typically impacted with ProcellaCOR™ treatments. The WDNR's fact sheet on this chemistry can be found here: https://apps.dnr.wi.gov/swims/Documents/DownloadDocument?id=332109305

ProcellaCOR™ is in a new class of synthetic auxin mimic herbicides with reportedly short concentration and exposure time (CET) requirements compared to other systemic herbicides. Auxin-mimic herbicides are translocated throughout the plant and suppress growth regulation hormones, so the plant grows uncontrollably at the cellular level which causes mortality.

Traditional auxin-mimic herbicides used to manage EWM, like 2,4-D and triclopyr, require longer exposure times that can be achieved by most spot treatments. Uptake rates of ProcellaCOR™ into EWM were two times greater than reported for triclopyr (Haug 2018) (Vassios et al. 2017). The active ingredient of ProcellaCOR™, florpyrauxifen-benzyl, is primarily degraded by photolysis (light exposure), with some microbial degradation. The active ingredient is relatively short-lived in the environment, with half-lives of 4-6 days in aerobic environments and 2 days in anerobic environments (WSDE 2017). Onterra's experience monitoring herbicide concentrations following ProcellaCOR treatments in Wisconsin confirms the active ingredient typically is below detectable levels within a week after treatment, sometimes slightly longer in whole-lake use patterns. Preliminary research suggests that florpyrauxifen-benzyl may have a different or quicker breakdown pattern in waters with high pH and high biomass of aquatic plants.

Onterra's experience monitoring ProcellaCOR™ treatments indicates that EWM control has been high with almost no EWM being located during the summer post treatment surveys. Some treated sites have shown EWM population recovery two-years after treatment, while most other sites have demonstrated three years and counting of continued EWM reductions to-date. For many ProcellaCOR™ treatments that Onterra monitored in Wisconsin to date, EWM impacts were observed extending outside of the application area and into a basin or semi-defined mixing area. Few projects that were designed as purposeful whole-lake treatments with ProcellaCOR have progressed beyond two years after treatment; however, monitoring to date indicate that EWM reductions are likely to last 3-5 years or more after treatment. Whole-lake treatment designs carry expectations that reduced EWM populations would span somewhere on the order of 3-5 years or more, with eventual population rebound over time. No treatment designs currently exist to fully eradicate EWM from a lake with an established population.

ProcellaCOR has no swimming restrictions associated with it. There are also no fish consumption restrictions. The only restriction is a non-turf irrigation restriction because the product is an herbicide. There is a certain amount of time, days to weeks, that the lake water should not be used to water garden plants and flowers. The time period on the non-turf irrigation restriction is dependent on the amount of herbicide used and the size of the lake. The currently proposed treatment design would result in a five-day non-turf irrigation restriction, or until concentrations of the active ingredient are measured below 2 ppb.

Aquatic Plants

Native aquatic plant monitoring data indicates that northern watermilfoil is highly susceptible to ProcellaCOR™ and other species that have shown a degree of susceptibility to this chemical include water marigold, coontail, white water crowfoot, and water stargrass. Of the species that are currently known to be impacted by ProcellaCOR treatment strategies, only water stargrass has been located within Silver Lake, however this species has only been documented in one (2015) of the many point-intercept surveys that have been completed over time and is uncommon within the lake.

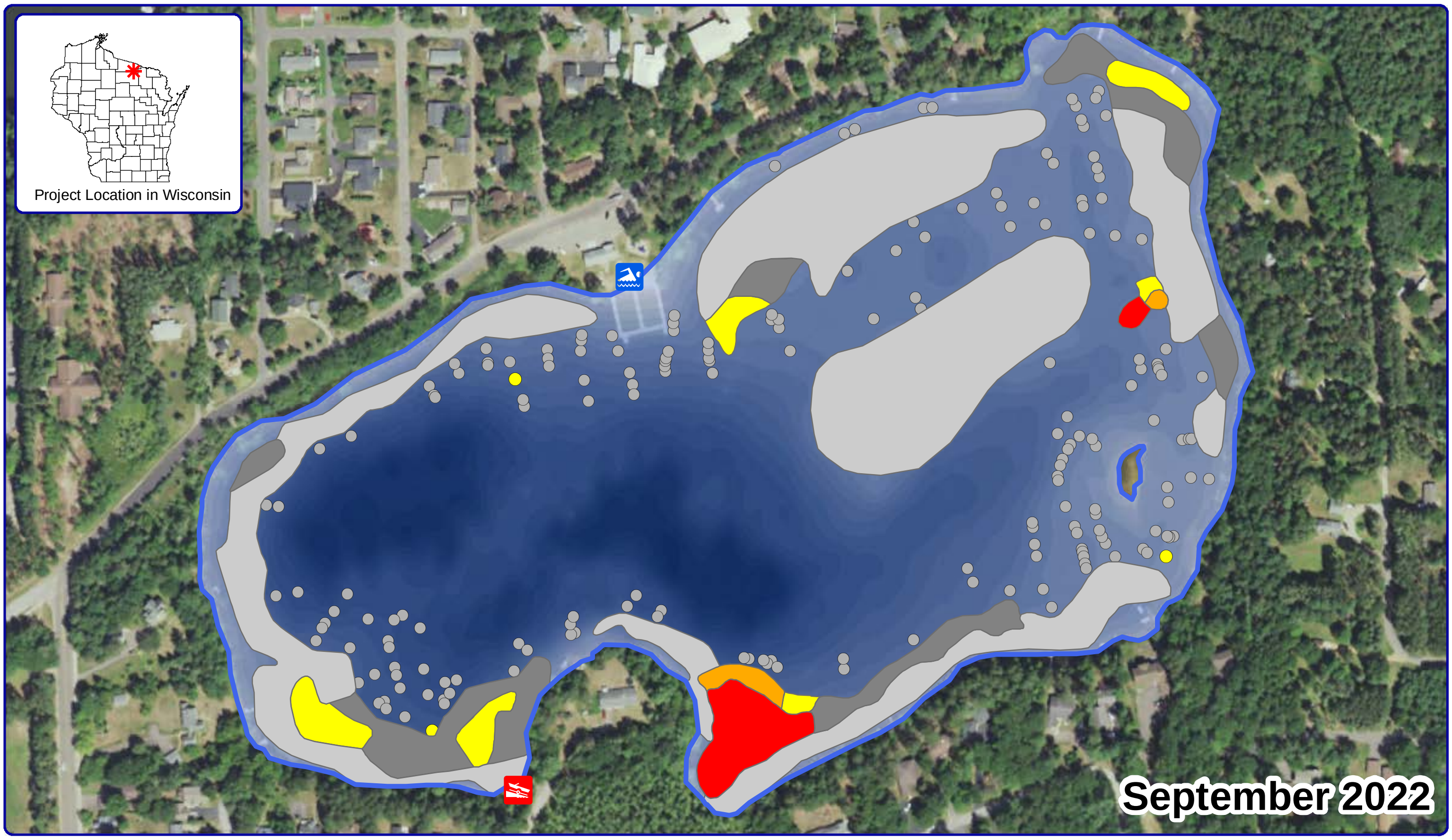
Pondweed species appear to be largely unaffected by this herbicide, with some lakes having observed increases in species, such as clasping-leaf pondweed, during the years following treatment. Limited data are available for some of the less common aquatic plants such as Vasey's pondweed and dwarf watermilfoil. Onterra's experience is that adjacent populations of floating-leaf species (i.e. water lilies) may initially show signs of herbicidal stress such as leaf twisting (epinasty), but typically rebound a few weeks after treatment including in intentional whole-lake treatment scenarios.

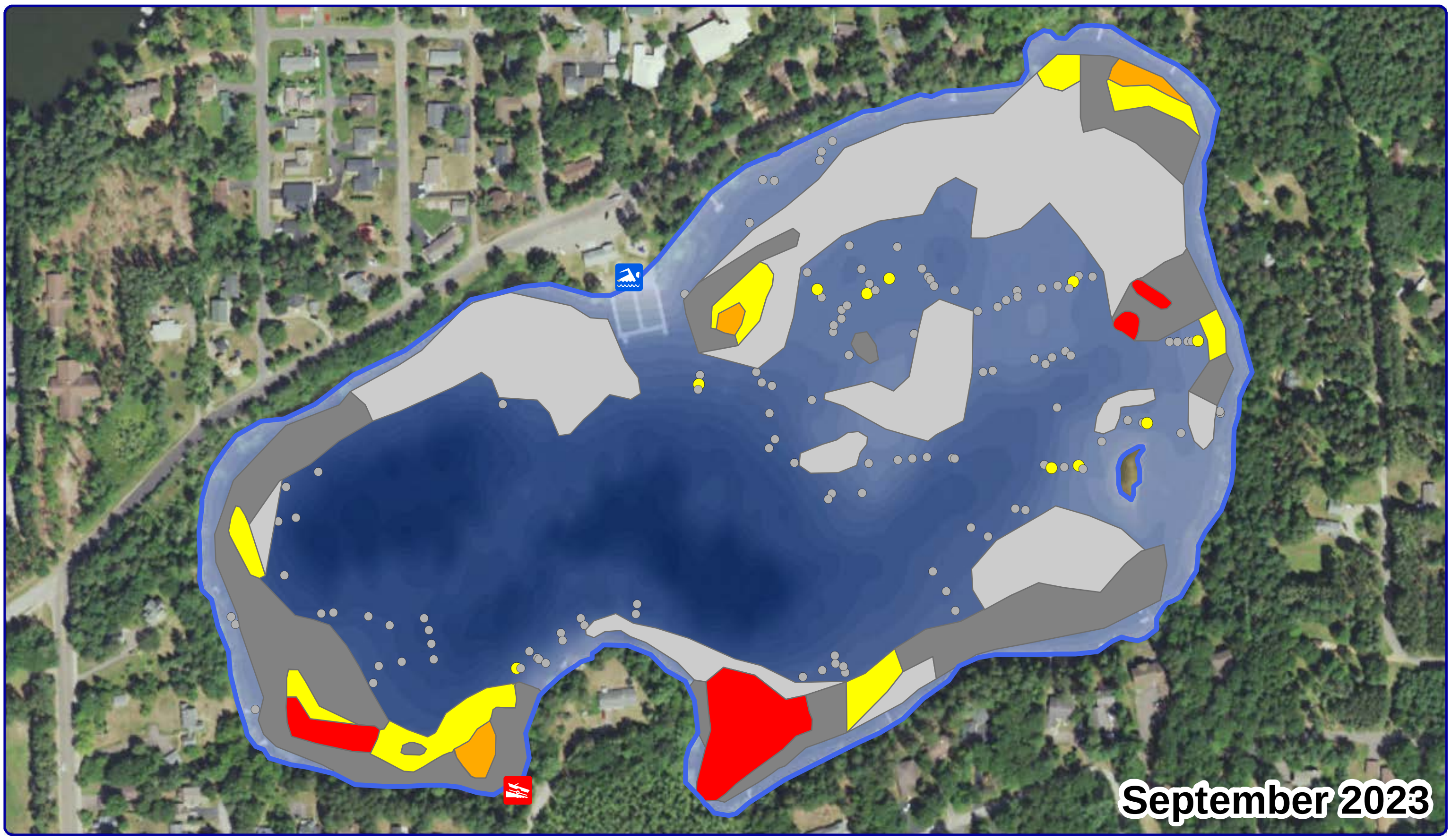
Overall, there are few species in Silver Lake that are known to be sensitive to ProcellaCOR treatments. Post-treatment monitoring through replicate point-intercept surveys will allow for an understanding of any changes in occurrence of native aquatic plants surrounding the timeframe of treatment.

Herbicide Exposure to Larval Fishes

Registration of aquatic herbicides by the US Environmental Protection Agency (EPA) is conducted at short exposure and high concentration scenarios. As the use of aquatic herbicides in whole-lake or whole-basin scenarios have become more common, research on environmental toxicity for long exposure and low concentrations scenarios has followed. Studies conducted by UW-Madison researchers have confirmed impacts of 2,4-D in long-exposure situations when exposure overlapped with specific early life stages of some fish species (G. K. Dehnert et al. 2020), with the first 14 days post hatch being the most sensitive stage (G. K. Dehnert et al. 2018). Specifically, walleye, yellow perch, white sucker, and fathead minnow are fish species shown to be impacted by 2,4-D when larval states are exposed to long exposures. It is important to recognize that published data is not currently available on ProcellaCOR™ impacts to early life stages of fishes; however, the potential for similar sensitivity is high considering it is classified in the same group as 2,4-D due to having an auxin-mimic hormone mode of action.

In working with WDNR fisheries biologists and Tribal organizations, some lake groups choose to avoid conducting herbicide treatments until after a species of interest (such as walleye) have progressed beyond the first 14 days post hatch. Operationally, this has resulted in ProcellaCOR treatments occurring during approximately mid-June in many northern Wisconsin lakes. Onterra would work with the regional WDNR fisheries biologist to determine if there is a preferred herbicide timing as it relates to fish spawning.





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Onterra, LLC
Lake Management Planning

815 Prosper Rd
De Pere, WI 54115
920.338.8860
www.onterra-eco.com

Sources
Roads and Hydro: WDNR
Bathymetry: Onterra, 2015
EWM Survey: Onterra, 2022-23
Orthophotography: NAIP, 2022
Map Date: 12-26-2023 TWH
Filename: *SilverV_EWM_2022-23.mxd*

Legend

- Highly Scattered
- Scattered
- Dominant
- Highly Dominant
- Surface Matting
- Single or Few Plants
- Clumps of Plants
- Small Plant Colony
- Boat Landing
- Public Beach

Map 1

Silver Lake

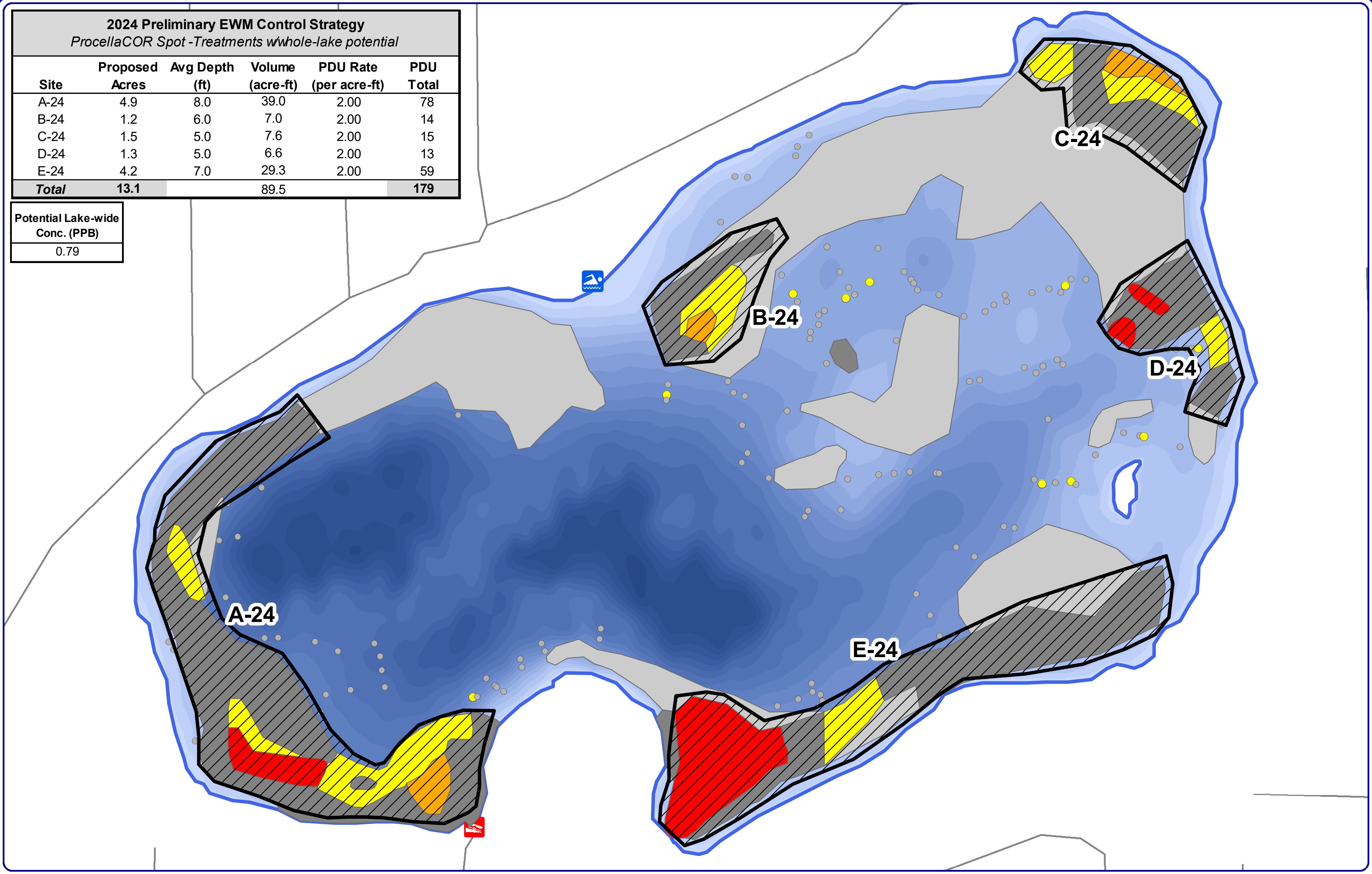
Vilas County, Wisconsin

2022-2023
Eurasian watermilfoil
Survey Results

2024 Preliminary EWM Control Strategy
ProcellaCOR Spot -Treatments w/whole-lake potential

Site	Proposed Acres	Avg Depth (ft)	Volume (acre-ft)	PDU Rate (per acre-ft)	PDU Total
A-24	4.9	8.0	39.0	2.00	78
B-24	1.2	6.0	7.0	2.00	14
C-24	1.5	5.0	7.6	2.00	15
D-24	1.3	5.0	6.6	2.00	13
E-24	4.2	7.0	29.3	2.00	59
Total	**13.1**		89.5		**179**

Potential Lake-wide Conc. (PPB)
0.79



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Onterra LLC
Lake Management Planning
815 Prosper Road
De Pere, WI 54115
920.338.8860
www.onterra-eco.com

Sources:
Roads Hydro: WDNR
Bathymetry: Onterra, 2015
Plant Survey: Onterra, 2023
Map Date: 9-8-23 - TWH

Project Location in Wisconsin

Legend

EWM Survey (September 7, 2023)

- Highly Scattered
- Scattered
- Dominant
- Highly Dominant
- Surface Matting
- Single or Few Plants
- Clumps of Plants
- Small Plant Colony
- Boat Landing
- Public Beach

Map 2
Silver Lake
Vilas County, Wisconsin

Preliminary 2024 Herbicide Treatment Strategy