

**Eurasian water-milfoil (*Myriophyllum spicatum*)
Late Summer Bed Mapping Survey
Stone Lake (WBIC: 2395100)
Washburn County, Wisconsin**



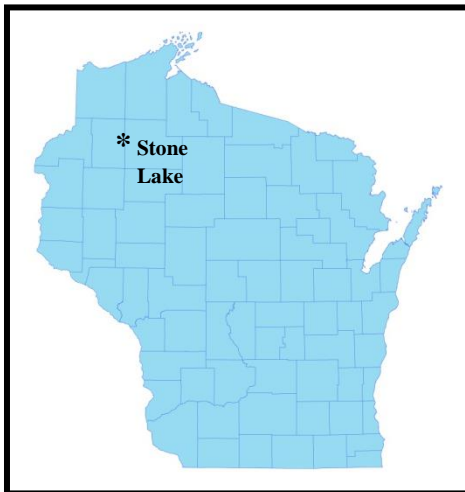
2023 Stone Lake EWM beds (red)



Near canopied Eurasian water-milfoil along the northeast shoreline - 9/2/23

Project Initiated by:

The Shoreowners of Stone Lake Association and the
Wisconsin Department of Natural Resources



Calm and sunny conditions on Avery Pond - 9/2/23

Survey Conducted by and Report Prepared by:

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September 2, 2023

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INTRODUCTION:

Stone Lake (WBIC 1884100) is a 490-acre stratified seepage lake located in the Town of Stone Lake in east-central Washburn County (T39N R10W S23-26). It has a maximum depth of 49ft in the deep hole on the south end of lake and an average depth of 33ft. The lake is oligotrophic in nature, and water clarity is excellent with Secchi readings averaging 21.4ft over the past ten years (WDNR 2023). The lake’s bottom substrate is dominated by sand, gravel, and cobble with scattered patches of sandy muck (Ginder et al. 1969) (Figure 1).

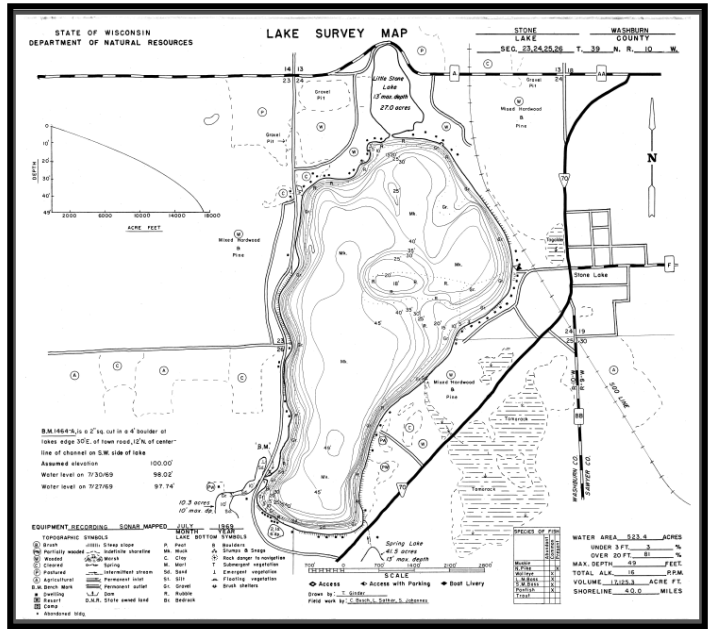


Figure 1: Stone Lake Bathymetric Map

STUDY BACKGROUND AND RATIONALE:

The Shoreowners of Stone Lake Association (SOSLA) and the Wisconsin Department of Natural Resources (WDNR) authorized the lake’s original warm-water point-intercept survey of all aquatic plants on August 24, 2014. During that survey, we found no evidence of Curly-leaf pondweed (*Potamogeton crispus*) (CLP), Eurasian water-milfoil (*Myriophyllum spicatum*) (EWM), or any other fully aquatic invasive plant species (AIS). However, we did find patches of both Purple loosestrife (*Lythrum salicaria*) and Reed canary grass (*Phalaris arundinacea*) scattered along the lake’s margins.

In July 2023, a lake resident found a plant off the end of their dock that we confirmed as Eurasian water-milfoil. A follow-up survey by the WDNR located a sizable bed along the northeast shoreline north of the public boat landing. Due to the narrowness of the bed and the late date, it was decided to use manual removal by divers rather than chemicals to manage this initial bed. In preparation for any potential future management and to get a better idea of EWM’s lakewide distribution and density, the SOSLA requested we complete an intensive late-summer EWM bed mapping survey of the lake’s visible littoral zone. This report is the summary analysis of that field survey conducted on September 2, 2023.

METHODS:

Eurasian Water-milfoil Bed Mapping Survey:

During the survey, we searched the visible littoral zone of Stone Lake, Little Stone Lake, and Avery Pond which was accessible by boat through a culvert. By definition, a “bed” was determined to be any area where we visually estimated that EWM made up >50% of the area’s plants, was generally continuous with clearly defined borders, and was canopied or close enough to being canopied that it would likely interfere with boat traffic. After we located a bed, we motored around the perimeter taking GPS coordinates at regular intervals. We also estimated the rake density range and mean rake fullness of the bed (Figure 2), the range and mean depth of the bed, whether it was canopied, and the impact it was likely to have on navigation (**none** – easily avoidable with a natural channel around or narrow enough to motor through/**minor** – one prop clear to get through or access open water/**moderate** – several prop clears needed to navigate through/**severe** – multiple prop clears and difficult to impossible to row through). These data were then mapped using ArcMap 9.3.1, and we used the WDNR’s Forestry Tools Extension to determine the acreage of each bed to the nearest hundredth of an acre. Because the goal of the survey was to identify all areas of the lake with EWM, we also GPS marked isolated plants. These plants were then removed by their roots with a telescopic rake. We also took extra care to gather any fragments that broke off of the plants during removal.




<u>Rating</u>	<u>Coverage</u>	<u>Description</u>
1		A few plants on rake head
2		Rake head is about 1/2 full Can easily see top of rake head
3		Overflowing Cannot see top of rake head

Figure 2: Rake Fullness Ratings (UWEX 2010)

RESULTS:

Eurasian Water-milfoil Bed Mapping Survey:

On September 2, 2023, we searched 28.1km (17.5 miles) of transects throughout the lake's visible littoral zone (Figure 3). In total, we mapped six areas covering 0.31 acre (0.06% of the lake's total surface area) (Table 1). In addition to these areas, we found and rake removed three isolated plants (Figure 4) (Appendix II).

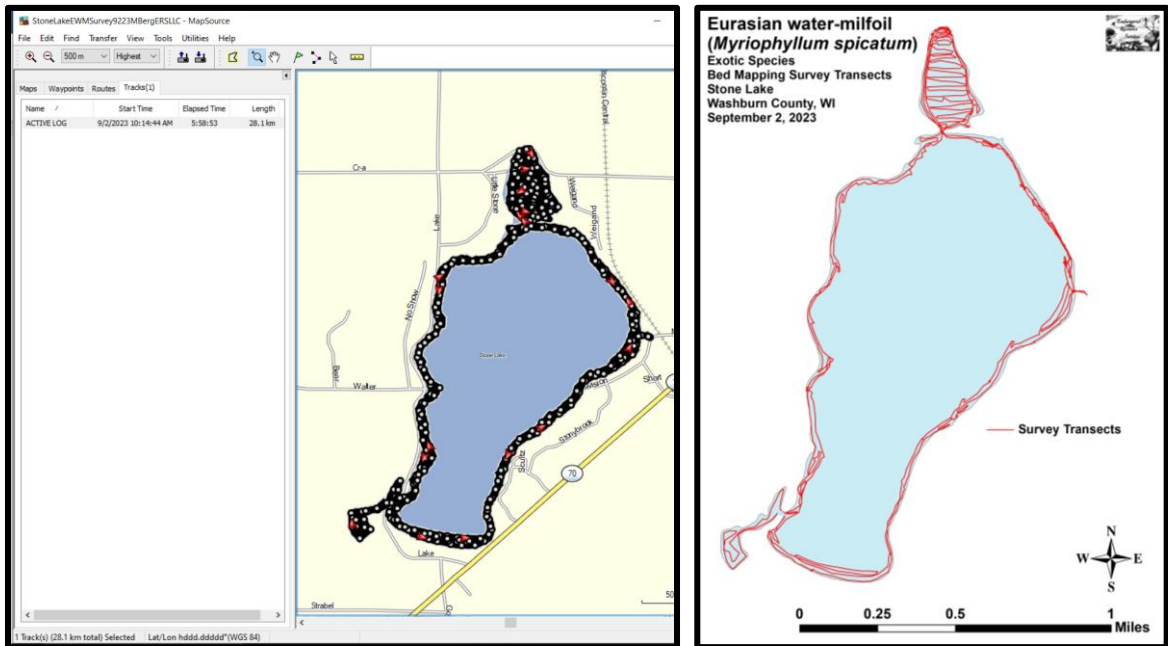


Figure 3: September 2, 2023 EWM Littoral Zone Survey – GPS Tracks

**Table 1: Late Summer Eurasian Water-milfoil Bed Mapping Summary
Stone Lake – Washburn County, Wisconsin
September 2, 2023**

Bed Number	2023 Acreage	Rake Range/ Mean Rake Fullness	Depth Range/ Mean Depth	Canopied	Navigation Impairment	2023 Field Notes
Bed 1	0.12	<<<1-3; 2	3-12; 7	Near	Minor	Narrow but solid core in buoyed area.
Bed 2	0.07	<1-2; 1	6-12; 10	No	None	Thin continuous ribbon of EWM.
Bed 3	<0.01	2-3; 3	6-10; 8	No	None	Dense microbed.
Bed 4	<0.01	2-3; 3	6-10; 8	No	None	Dense microbed.
Bed 5	<0.01	<1-1; 1	6-10; 8	No	None	Scattered pioneering plants.
Bed 6	0.11	<<<1-1; <1	1-3; 2	Yes	None	Peppering of plants along the shoreline.
Total	0.31					

Descriptions of Eurasian Water-milfoil Beds:

Bed 1 – This area occurred at the core of the buoyed management area on the northeast shoreline (Figure 4) (Appendix II). Eurasian water-milfoil was nearing canopy in 8ft of water, and plants were actively fragmenting. Despite its overall moderate density, the narrowness of the bed meant it likely wasn't more than a minor impairment to navigation.

Bed 2 – This bed was similarly narrow, but it had a lower overall mean density and plants were shorter suggesting it was more recently established. For management purposes, these two areas, and perhaps the entirety of Beds 1-5, should likely be considered continuous.

Beds 3 and 4 – Although both of these microbeds were extremely dense, neither was big enough to cause significant navigation impairment. Due to their proximity to each other, it seems likely that divers would find pioneering plants between these two and perhaps all five of these beds.

Bed 5 – EWM plants were peppered throughout this small area near the shoreline “elbow” north of the public boat landing. All were short suggesting they were recently established.

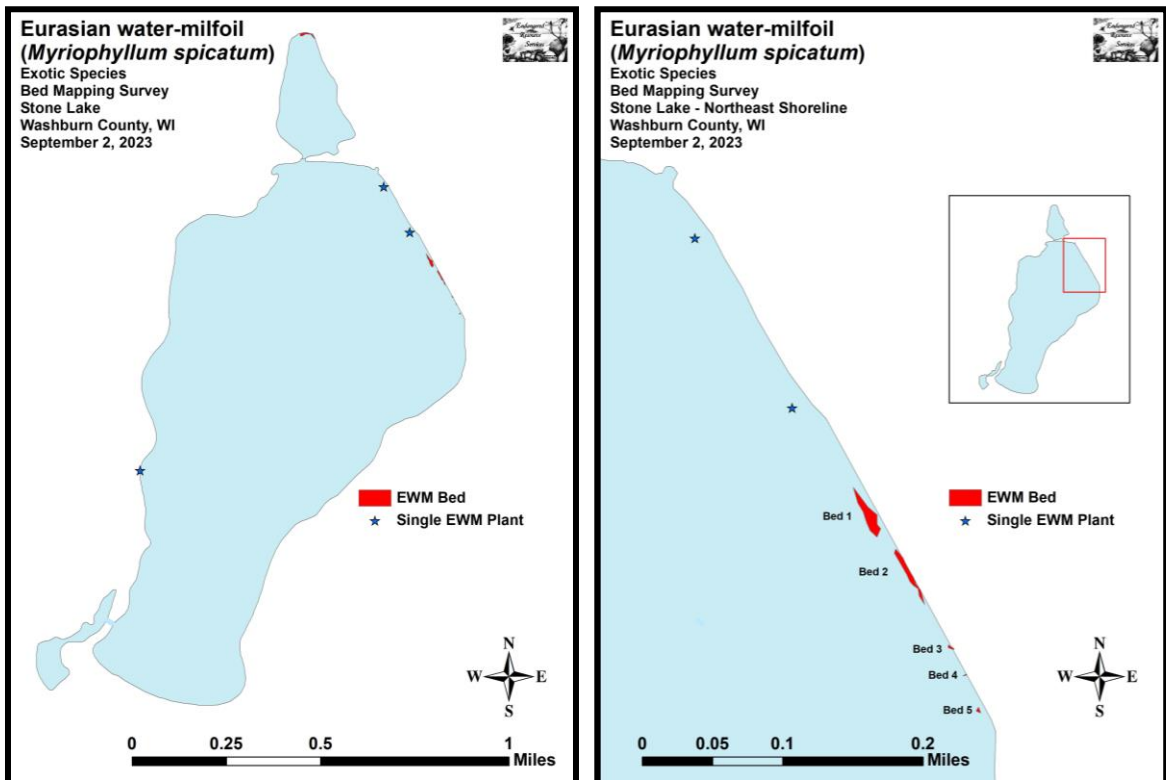


Figure 4: 2023 EWM Bed Map/Beds 1-5 – Northeast Shoreline

Shoreline northwest of Beds 1-5 – We found and rake removed two single plants “upwind” of the main beds. Similar to the initial plants we raked out of Bed 2, these isolated individuals were vibrant green and growing. They also showed evidence of sloughing fragments (Figure 5).

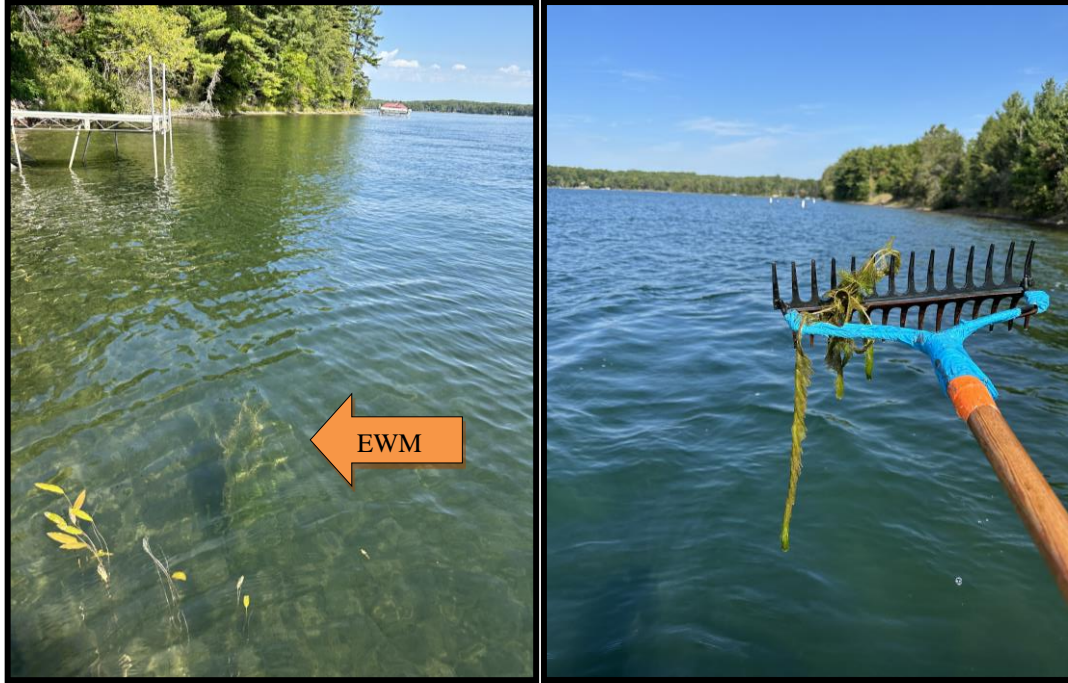


Figure 5: Isolated EWM Plant on the Northeast Shoreline and Growing EWM Plant Raked out of Bed 2

Rest of Stone Lake – Along the entirety of the rest of the lake’s shoreline, we found and rake removed a single plant on the western side (Figure 4) (Appendix II). Most of the nearshore areas of the lake are devoid of plants beyond a carpet of “isoetids” – small turf forming species that stabilize the bottom substrate and help maintain water clarity. One of these species is Dwarf water-milfoil (*Myriophyllum tenellum*) – the only native milfoil species we saw during our 2014 and 2023 surveys. It is almost unrecognizable as a milfoil as it has no true leaves or leaflets and seldom grows more than a few inches tall (for more information on how to recognize and identify milfoils, see Appendix II).

Avery Pond – At low water, it appears the pond was likely dry or nearly so as it had almost no vegetation at all (Figure 6). Ultimately, we saw no evidence of EWM anywhere in Avery Pond.



Figure 6: Accessing Avery Pond Through the Culvert

Bed 6 - Little Stone Lake – Although we searched the entirety of Little Stone Lake (Figure 3), the only Eurasian water-milfoil we saw was on the far north shore where **we rake removed all 31 plants found**. Most individuals were less than 2ft tall, but several showed evidence of being prop-clipped by passing boats. The majority of plants were on the edge of the dead trees that had been killed by rising water on the lake (Figure 6).

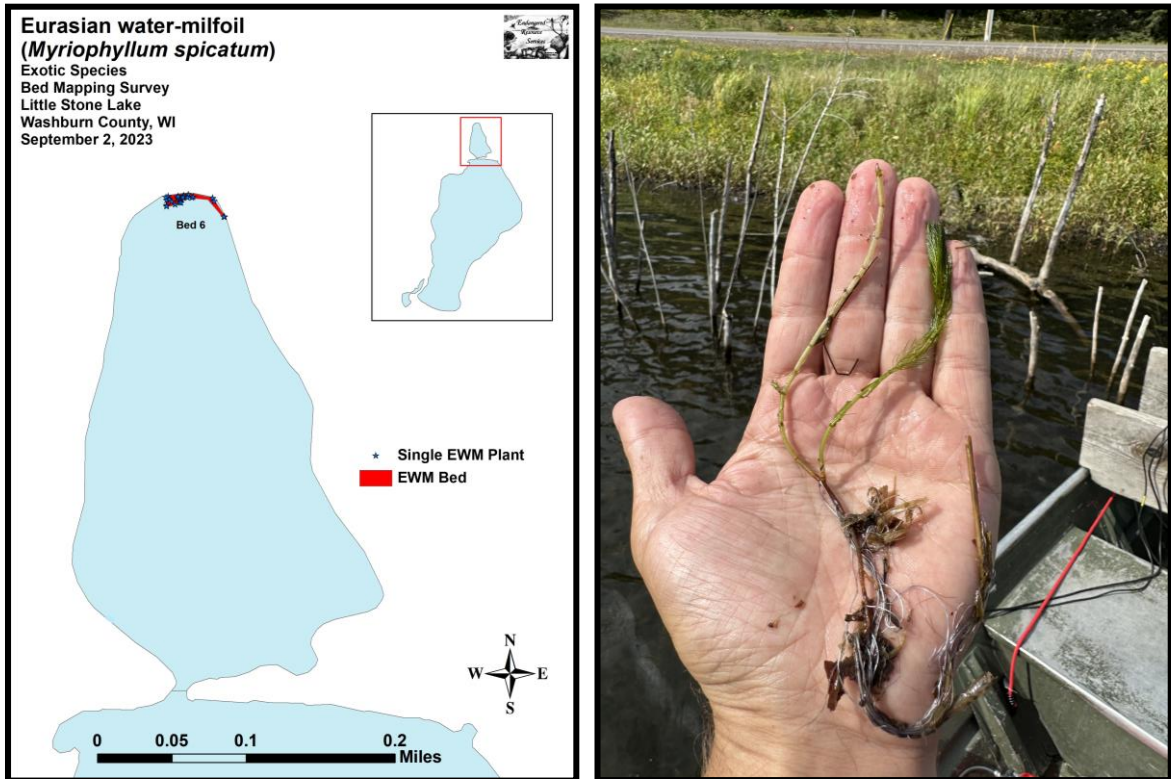


Figure 7: Bed 6 in Little Stone Lake and a Prop-clipped EWM Plant

DISCUSSION AND CONSIDERATIONS FOR MANAGEMENT:

Eurasian water-milfoil occupies only a small percentage of Stone Lake's surface area, but it is widely-established making eradication an unrealistic expectation. With this in mind, working to control its spread in the most cost-effective manner possible, while simultaneously minimizing its impact on the lake's aquatic ecosystem will likely be important goals for the SOSLA moving forward.

Focusing initial management of EWM on high traffic areas like near the boat up beach next to the railroad tracks would likely help slow the rate of dispersal and establishment from floating and windblown fragments. Residents are also reminded that leaving the lake's native plants in place rather than rake removing them can help slow the spread of EWM. These patches of barren substrate not only increase nutrients in the water column, but they also provide exotic species like EWM an ideal place to establish.

Finally, we encourage lake residents to be on the lookout for any signs of EWM near their residences. If they discover a plant they even suspect may be EWM, we strongly encourage them to **immediately** contact Matthew Berg, ERS, LLC Research Biologist at 715-338-7502 for identification confirmation. If possible, a specimen, a jpg, and the accompanying GPS coordinates of the location should be included so the plants can be manually removed as soon as possible. Texting pictures from a smartphone is actually ideal as it allows for immediate feedback. Likewise, we are happy to identify **ANY** plant a lake resident finds that they may want identified.

LITERATURE CITED

Ginder, T, C. Busch, L. Sather, and S. Johannes. [online]. 1969. Stone Lake Bathymetric Map. <http://dnr.wi.gov/lakes/maps/DNR/1884100a.pdf> (2023 October).

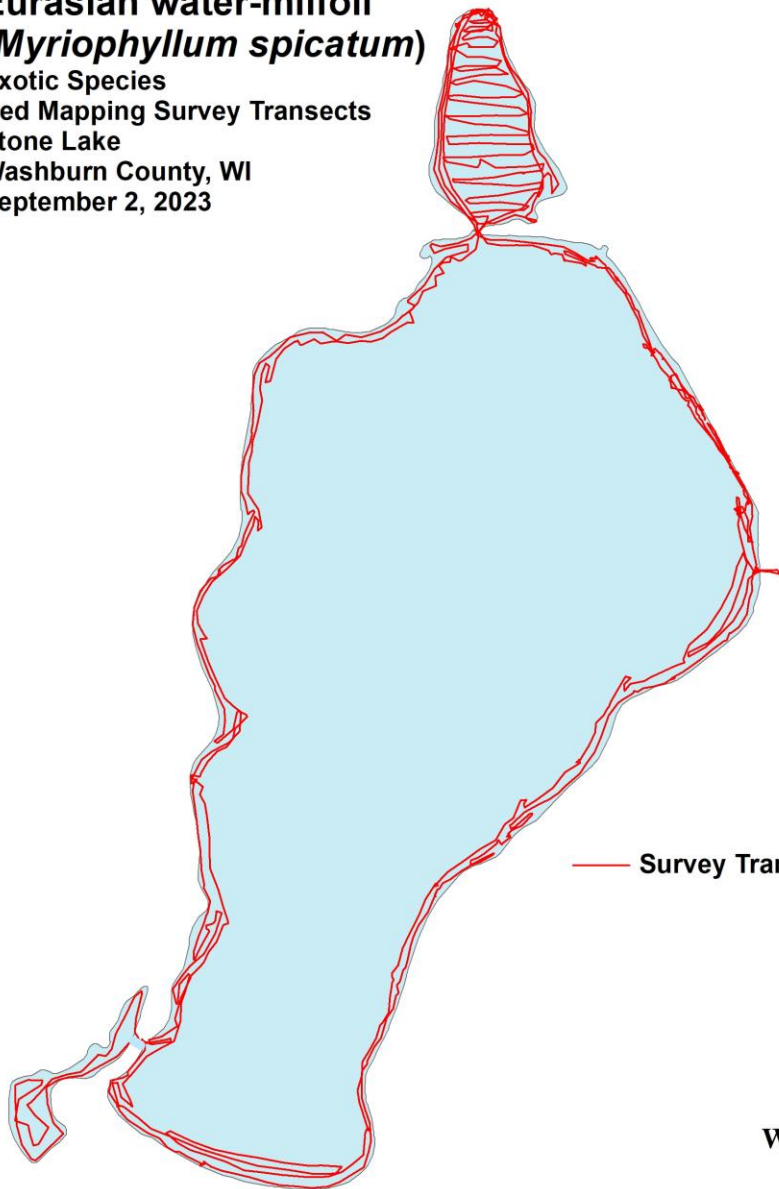
WDNR. [online]. 2023. Stone Lake - Citizen Lake Water Quality Monitoring Database. Available from <https://dnr-wisconsin.shinyapps.io/WaterExplorer/?stationid=663051> (2023 October).

WDNR. [online]. 2023. Stone Lake - Wisconsin Lakes Information. <https://apps.dnr.wi.gov/lakes/lakepages/LakeDetail.aspx?wbic=1884100> (2023 October).

Appendix I: 2023 Eurasian Water-milfoil Survey Transect and Bed Maps

**Eurasian water-milfoil
(*Myriophyllum spicatum*)**

Exotic Species
Bed Mapping Survey Transects
Stone Lake
Washburn County, WI
September 2, 2023

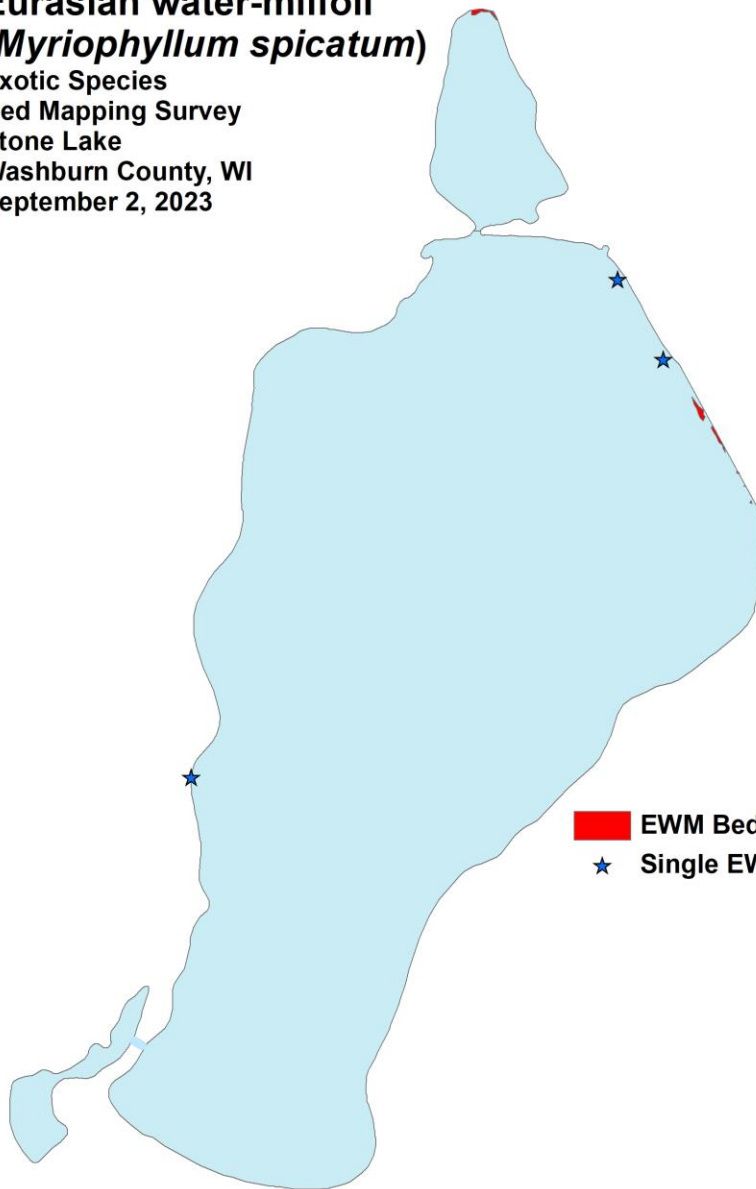


— Survey Transects



Eurasian water-milfoil
(*Myriophyllum spicatum*)

Exotic Species
Bed Mapping Survey
Stone Lake
Washburn County, WI
September 2, 2023



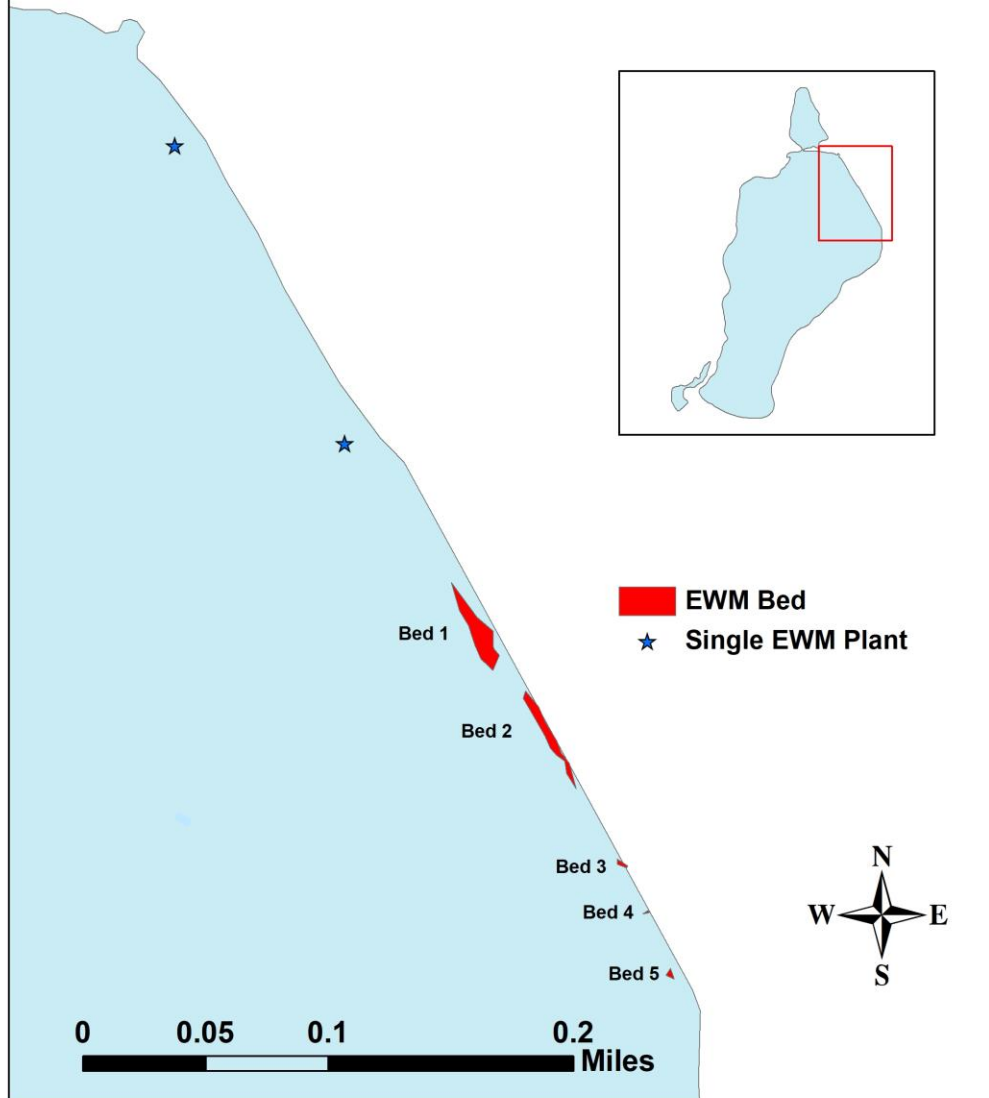
■ EWM Bed
★ Single EWM Plant



0 0.25 0.5 1 Miles

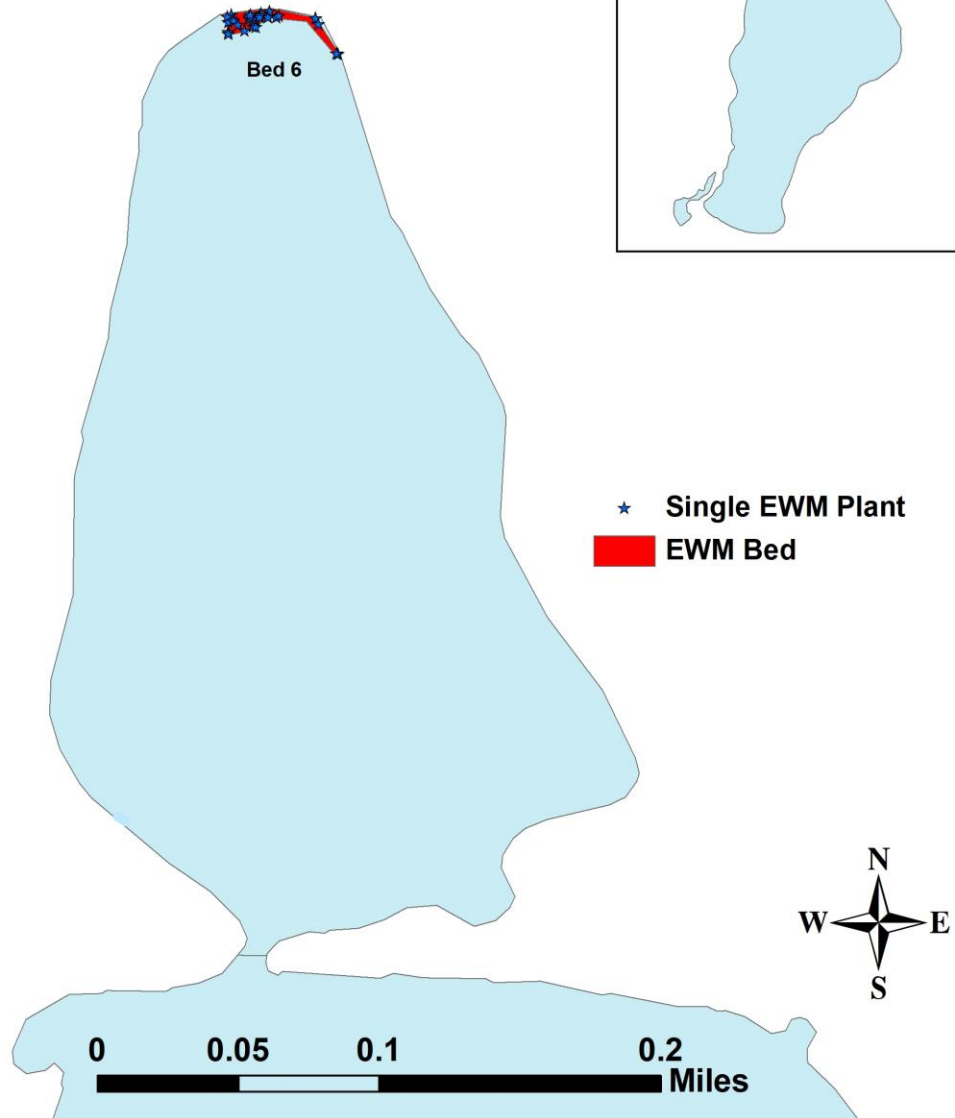
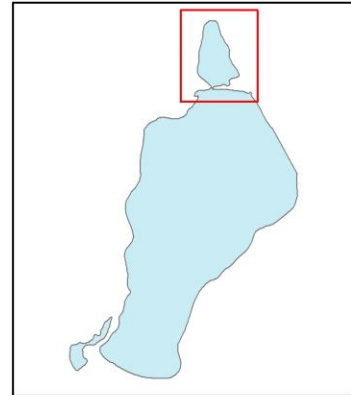
Eurasian water-milfoil (*Myriophyllum spicatum*)

Exotic Species
Bed Mapping Survey
Stone Lake - Northeast Shoreline
Washburn County, WI
September 2, 2023



Eurasian water-milfoil (*Myriophyllum spicatum*)

Exotic Species
Bed Mapping Survey
Little Stone Lake
Washburn County, WI
September 2, 2023



Appendix II: Milfoil Identification Guide

Eurasian water-milfoil vs. Northern water-milfoil

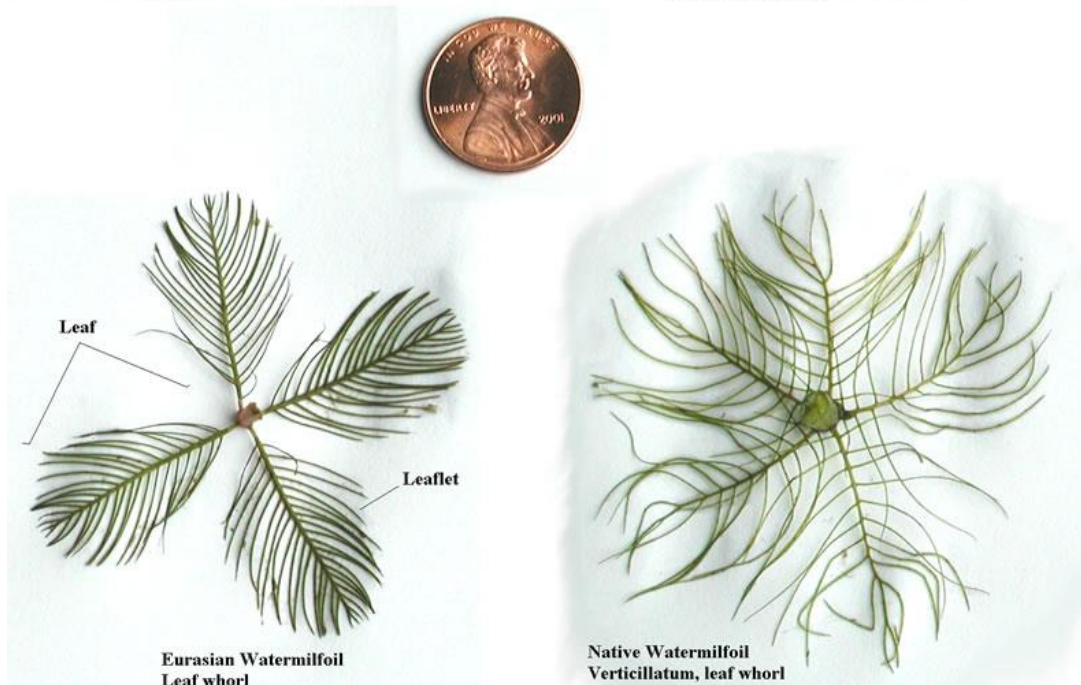


EWM Leaflets >26 NWM Leaflets < 24



EWM Leaflets Limp out of Water - NWM Leaflets Stiff Out of Water

Eurasian water-milfoil vs. Whorled water-milfoil



Dwarf water-milfoil



Plants spread by rhizomes, have no leaflets and are usually <6in.