

**Eurasian water-milfoil (*Myriophyllum spicatum*)  
Late Summer Bed Mapping Survey  
Red Lake (WBIC: 2492100)  
Douglas County, Wisconsin**



Red Lake EWM Beds (in red) – 9/4/23



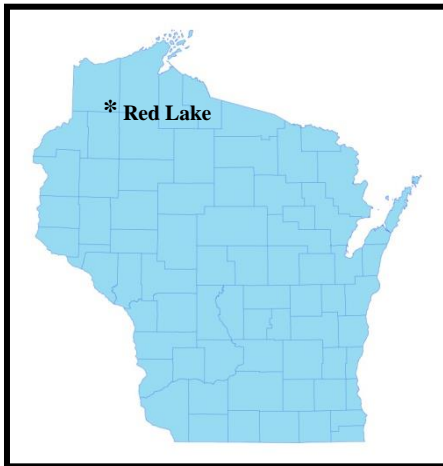
Giant Floating EWM plant – 9/7/24



Eurasian water-milfoil (Berg 2007)

**Project Initiated by:**

The Red Lake Association, Lake Education and Planning Services, LLC and the Wisconsin Department of Natural Resources (Grant # ACEI32023)



Bright sunshine and calm survey conditions – 9/7/24

**Survey Conducted by and Report Prepared by:**

Endangered Resource Services, LLC  
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St. Croix Falls, Wisconsin  
September 7, 2024

## TABLE OF CONTENTS

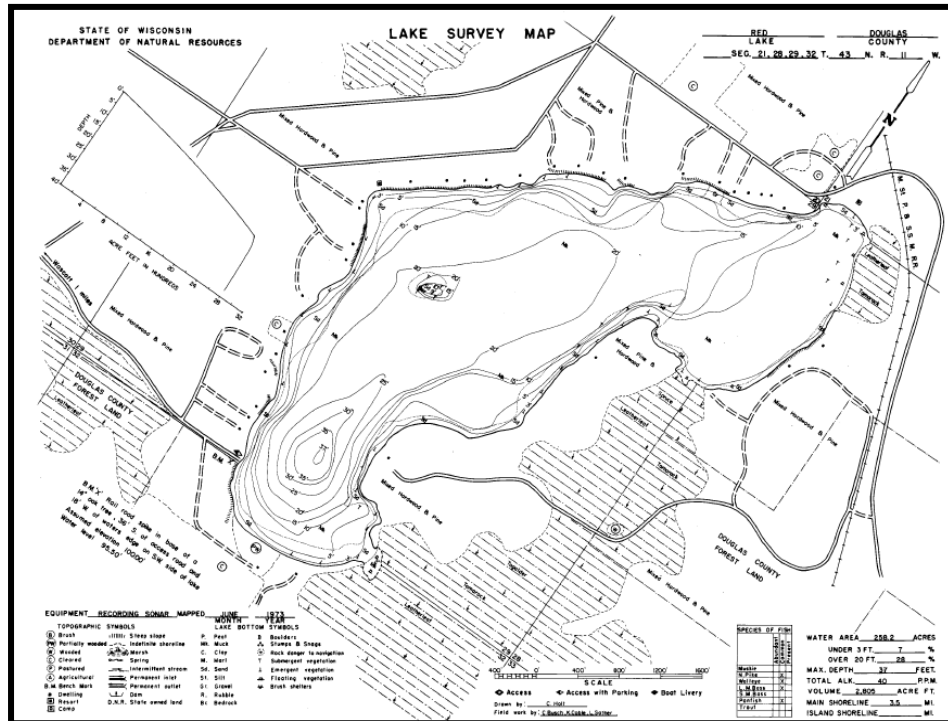
	Page
LIST OF FIGURES AND TABLES.....	ii
INTRODUCTION.....	1
BACKGROUND AND STUDY RATIONALE.....	1
METHODS.....	2
RESULTS AND DISCUSSION.....	3
Manual Removal and DASH Areas.....	3
September EWM Rake Removal and Bed Mapping Survey.....	4
Descriptions of Past and Present Eurasian Water-milfoil Beds.....	8
CONSIDERATIONS FOR MANAGEMENT.....	9
LITERATURE CITED.....	9
APPENDIXES.....	10
I: 2024 Eurasian Water-milfoil Management Areas.....	10
II: 2020, 2021, 2022, 2023, and 2024 EWM Rake Removal and Bed Maps.....	12

**LIST OF FIGURES AND TABLES**

	Page
Figure 1: Red Lake Bathymetric Map.....	1
Figure 2: Rake Fullness Ratings.....	2
Figure 3: 2024 Eurasian Water-milfoil Manual Removal Areas.....	3
Figure 4: September 7, 2024 Littoral Zone EWM Survey Transects.....	4
Figure 5: 2021, 2022, 2023, and 2024 September Eurasian Water-milfoil Bed Maps .....	5
Table 1: Late Summer Eurasian Water-milfoil Bed Mapping Summary – Red Lake – Douglas County, WI – September 7, 2024.....	6
Table 2: Eurasian Water-milfoil Late Summer/Fall Bed Summary – Red Lake – Douglas County, WI – 2016-2024.....	7

## INTRODUCTION:

Red Lake (WBIC 2492100) is a 253-acre stratified seepage lake located in the Town of Wascott in south-central/southeastern Douglas County (T43N R11W S21/28/29/32). It reaches a maximum depth of 37ft in the deep hole on the south end of the central basin and has an average depth of 11ft (WDNR 2024). The lake is mesotrophic in nature, and water clarity is good with Secchi readings averaging 11.0ft over the last ten years (WDNR 2024). The shoreline is dominated by sand with most areas transitioning to sandy muck at depths over 10ft. The lake's only nutrient-rich organic muck occurs in areas adjacent to the tamarack bogs near the small bay in the far southeast corner and on the north and south ends of the northeast bay (Holt et al. 1973) (Figure 1).



**Figure 1: Red Lake Bathymetric Map**

## BACKGROUND AND STUDY RATIONALE:

On July 25, 2013, at the request of the Red Lake Association (RLA) and the Wisconsin Department of Natural Resources (WDNR), we conducted the original warm-water point-intercept survey of all aquatic plants in Red Lake. This extensive study established baseline data on the richness, diversity, abundance, and distribution of the lake's aquatic macrophyte populations. At that time, we found no evidence of Eurasian water-milfoil (*Myriophyllum spicatum*) (EWM), an invasive exotic aquatic plant, anywhere in the lake.




In July 2016, biologists from the Great Lakes Indian Fish & Wildlife Commission (GLIFWC) found a few EWM plants near the public boat landing on the lake's southwest side and near the Red Lake Resort in the northeast bay. A follow-up survey by the WDNR also located plants in these areas, and our lakewide EWM bed mapping survey on October 2, 2016 found ten separate beds totaling 1.18 acres.

Since that time, the RLA’s WDNR approved Aquatic Plant Management Plan has outlined manual removal by both volunteers and professionals as well as limited herbicide applications to control the infestation; and these small-scale treatments occurred annually from 2017-2023. However, as little EWM was found during the 2023 late summer bed mapping survey, it was decided that manual removal and diver assisted suction harvesting (DASH) would be the only control methods used in 2024. Following these efforts, we were asked to again search the lake for surviving EWM. This report is the summary analysis of that survey conducted on September 7, 2024.

**METHODS:**

**Eurasian Water-milfoil Bed Mapping Survey:**

During the survey, we searched the visible littoral zone of the lake. 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 significant EWM, we also mapped “high density areas” where EWM plants were continuous but didn’t meet all of the other “bed” criteria. We also GPS marked and rake removed isolated individual plants as they were generally few in number.

<u>Rating</u>	<u>Coverage</u>	<u>Description</u>
1		A few plants on rake head
2		Rake head is about ½ full Can easily see top of rake head
3		Overflowing Cannot see top of rake head

**Figure 2: Rake Fullness Ratings (UWEX 2010)**

## RESULTS AND DISCUSSION:

### Manual Removal and DASH Areas:

On June 30<sup>th</sup>, Lake Education and Planning Services, LLC (LEAPS – Dave and Lana Blumer) snorkel removed Eurasian water-milfoil from Areas 3, 4, and 5. This was followed by DASH removal (Aquatic Plant Management, LLC) of EWM from Areas 1 and 6 on August 29<sup>th</sup> (Figure 3) (Appendix I).

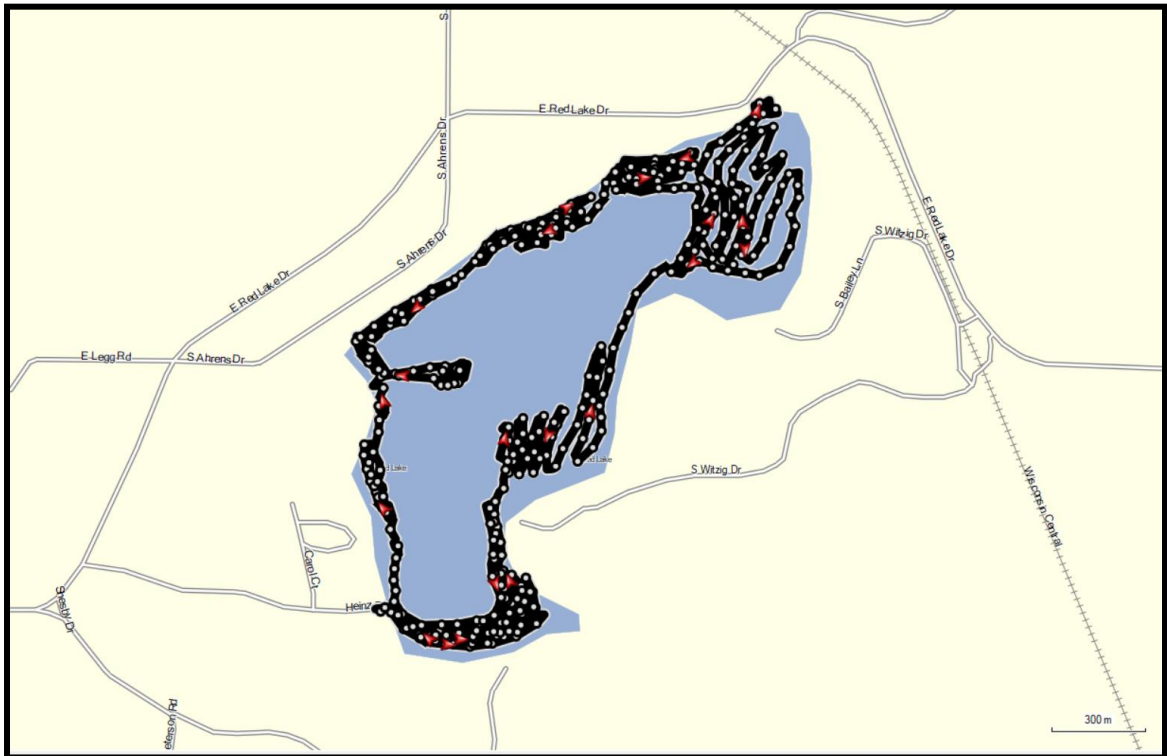


**Figure 3: 2024 Eurasian Water-milfoil Manual Removal Areas**

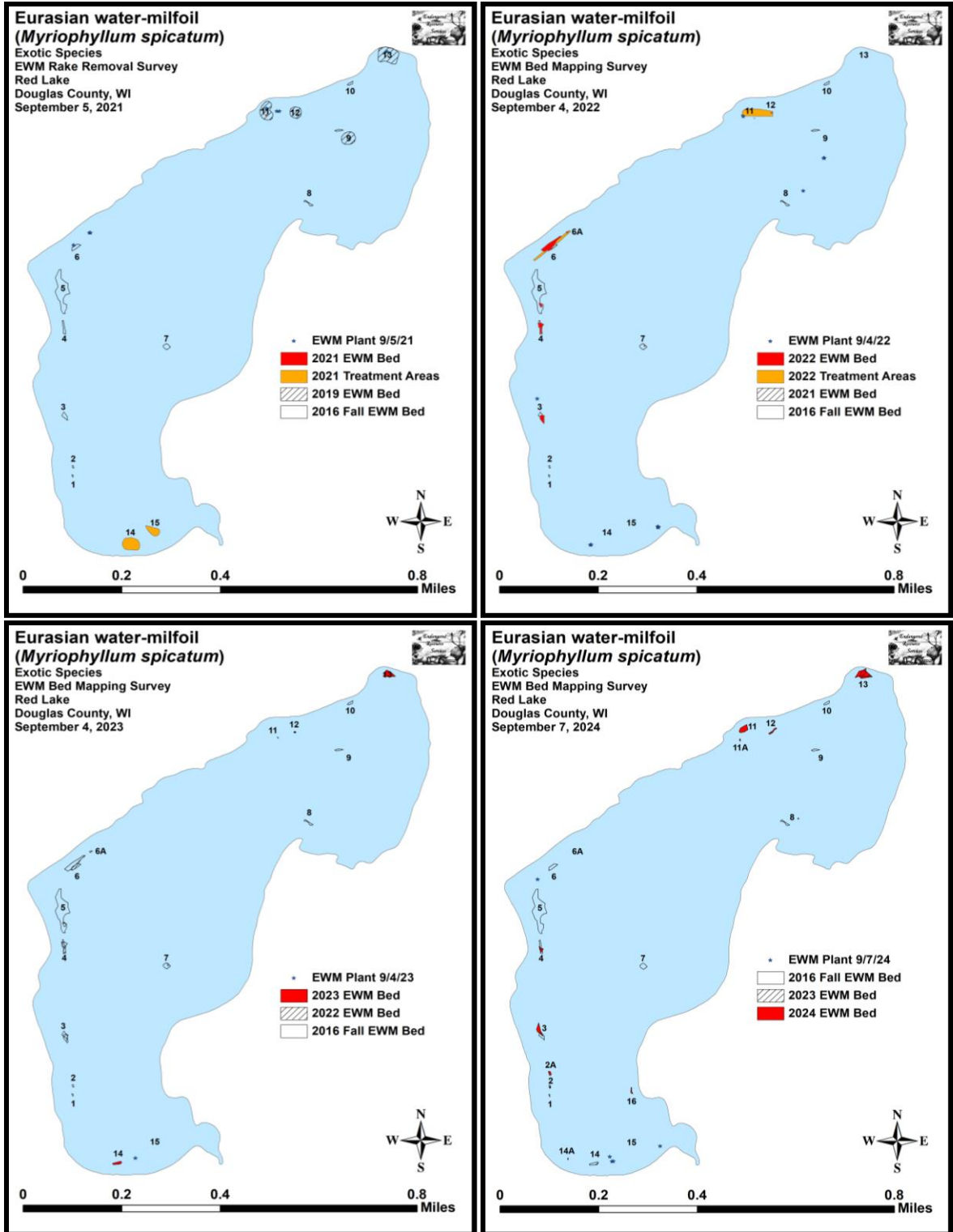
### September EWM Rake Removal and Bed Mapping Survey:

On September 7<sup>th</sup>, we surveyed transects covering 20.0km (12.4 miles) spending extra time in the 2024 manual removal areas, the 2021, 2022, and 2023 treatment areas, looking at all areas that previously supported Eurasian water-milfoil beds, and searching in the northeast bay where fragments from elsewhere would likely be blown by the prevailing winds (Figure 4). We had mostly sunny skies and calm winds which allowed us to see down 7-8ft into the water column – slightly better than normal due to the exceptionally good conditions. We were pleased to again find no sign of EWM in the 2023 treatment area (Beds 6 and 6A). Unfortunately, other than Area 5, all areas that had snorkel or DASH removal conducted in 2024 continued to have EWM present (Figure 5) (Appendix II). Collectively, we mapped 11 microbeds and high-density areas that totaled 0.54 acre (0.21% of the lake’s surface area). The largest true bed was Bed 11 which covered 0.12 acre, was canopied, and seemed likely to cause at least minor navigation impairment. Conversely, “Beds” 2A, 13, and 16 had regular but only scattered EWM, and were likely better described as “high density areas”. Outside of these areas, we found and rake removed five isolated individual plants (Table 1).

Compared to the 0.19 acre (0.08% surface area) we found in 2023; these results suggested a 0.35-acre (+184.21%) increase in total EWM coverage. This acreage was, however, similar to 2022 when we found eight areas totaling 0.45 acre (0.18% surface area) (Table 2).



**Figure 4: September 7, 2024 Littoral Zone EWM Survey Transects**



**Figure 5: 2021, 2022, 2023, and 2024 September Eurasian Water-milfoil Bed Maps**



**Table 1: Late Summer Eurasian Water-milfoil Bed Mapping Summary  
Red Lake - Douglas County, WI  
September 7, 2024**

<b>Bed Number</b>	<b>2024 Acreage</b>	<b>2023 Acreage</b>	<b>2023-24 Change in Acreage</b>	<b>Rake Range and Mean Rake Fullness</b>	<b>Depth Range and Mean Depth</b>	<b>Canopied</b>	<b>Navigation Impairment</b>	<b>2024 Field Notes</b>
1	0.01	0	0.01	1-3; 2	6-10; 8	No	None	Deepwater bed.
2	0.02	0	0.02	1-3; 2	6-10; 8	No	None	Deepwater bed.
2A	0.08	0	0.08	<<<1-1; <<1	6-8; 7	No	None	Scat/but regular plants.
3	0	0	0	-	-	-	-	No EWM found.
4	0.03	0	0.03	<1-3; 2	4-10; 7	No	None	Deepwater bed.
5	0	0	0	-	-	-	-	No EWM found.
6	0	0	0	-	-	-	-	No EWM found.
6A	0	0	0	-	-	-	-	No EWM found.
7	0	0	0	-	-	-	-	No EWM found.
8	<0.01	0	<0.01	1-2; 1	4-5; 5	Yes	None	Microbed.
9	0	0	0	-	-	-	-	No EWM found.
10	0	0	0	-	-	-	-	No EWM found.
11	0.12	0	0.12	<1-3; 2	3-7; 5	Yes	Minor	Shoreline bed.
11A	<0.01	0	<0.01	1-3; 2	8-10; 9	No	None	Deepwater microbed.
12	0.03	<0.01	0.03	<1-3; 2	3-7; 5	Yes	Minor	Shoreline bed.
13	0.23	0.13	0.10	<<<1-2; <<1	1-5; 3	Yes	None	Scattered plants.
14	0	0.05	-0.05	<<<<1	4-7; 6	No	None	All raked out.
14A	<0.01	0	<0.01	<1-1; 1	6-7; 6	No	None	Scattered clusters.
15	0	0	0	<<<<1	5-6; 6	Near	None	Single plant raked out.
16	0.02	0	0.02	<1-2; <1	6-8; 7	No	None	Scattered clusters.
<b>Total</b>	<b>0.54</b>	<b>0.19</b>	<b>+0.35</b>					

**Table 2: Eurasian Water-milfoil Late Summer/Fall Bed Summary  
Red Lake - Douglas County, WI  
2016-2024**

<b>Bed Number</b>	<b>2024 Area in Acres</b>	<b>2023 Area in Acres</b>	<b>2022 Area in Acres</b>	<b>2021 Area in Acres</b>	<b>2020 Area in Acres</b>	<b>2019** Area in Acres</b>	<b>2018 Area in Acres</b>	<b>2017 Area in Acres</b>	<b>2016 Area in Acres</b>	<b>2023-24 Change in Acreage</b>
1	0.01	0	0	0	0	0	0	0	<0.01	0.01
2	0.02	0	0	0	0	0	0	0	<0.01	0.02
2A	0.08	0	0	0	0	0	0	0	0	0.08
3	0	0	0.07	0	0.03	0	0	0	0.06	0
4	0.03	0	0.09	0	<0.01	0	0	0	0.06	0.03
5	0	0	0.02	0	0	0	0.01	0.09	0.83	0
6	0	0	0.25	0	0	0	0	0	0.07	0
6A	0	0	0.01	0	0	0	0	0	0	0
7	0	0	0.01	0	0	0	0.04	0	0.07	0
8	<0.01	0	0	0	0	0	0	0	0.03	<0.01
9	0	0	0	0	0	0.39	0	0	0.03	0
10	0	0	0	0	0	0	0	0	0.03	0
11	0.12	0	<0.01	0.01	0	0.49	0	0	0	0.12
11A	<0.01	0	0	0	0	0	0	0	0	<0.01
12	0.03	<0.01	<0.01	0	0	0.29	0	0	0	0.03
13	0.23	0.13	0	0	0	0.76	0	0	0	0.10
14	0	0.05	0	0	0.49	0	0	0	0	-0.05
14A	<0.01	0	0	0	0	0	0	0	0	<0.01
15	0	0	0	0	0.11	0	0	0	0	0
16	0.02	0	0	0	0	0	0	0	0	0.02
<b>Total</b>	<b>0.54</b>	<b>0.19</b>	<b>0.45</b>	<b>0.01</b>	<b>0.63</b>	<b>1.93</b>	<b>0.05</b>	<b>0.09</b>	<b>1.18</b>	<b>+0.35</b>

\*\*We did not survey in 2019 so treatment areas were used as an estimate

## **Descriptions of Past and Present Eurasian Water-milfoil Beds:**

Beds 1, 2, and 2A – Despite extensive searching in the 8-11ft bathy ring immediately northeast of the public boat landing, we had been unable to locate any Eurasian water-milfoil plants within these narrow littoral areas since the original 2016 survey. However, in 2024, we found dense deepwater patches of EWM in Beds 1 and 2, and scattered plants just north of Bed 2 in a new area we designated as Bed 2A.

Beds 3, 4, and 5 – After being almost completely absent since 2016, we found expanding deepwater EWM beds in each of these areas during our 2022 survey. Interestingly, despite not being chemically treated in 2023, extensive searching and test raking failed to turn up plants in any of these areas in 2023. This suggested that these low EWM density areas experienced residual control from the nearby chemical treatment. In 2024, we again saw no evidence of EWM in Bed 5 (the area closest to the 2023 treatment area); however, patches of EWM had reestablished in Beds 3 and 4. This may also mean they were simply top killed in 2023.

Beds 6 and 6A – We again found no evidence of EWM anywhere in the 2023 treatment area. However, a single plant was located and rake removed southwest of the area formerly covered by Bed 6.

Bed 7 – In 2022, on the western edge of the former bed, we located a small deepwater patch of plants that was barely visible from the surface. Despite careful searching and test raking, we found no evidence of EWM in this area during our 2023 or 2024 surveys. This could potentially be due to residual control from the 2023 chemical treatment.

Beds 8-10 – Other than a single microbed we rake removed from Bed 8, we saw no evidence of EWM on the outer visible littoral edge of the northeast bay.

Beds 11, 11A, and 12 – Despite the June snorkel removal, EWM had firmly reestablished in this narrow shoreline area, and the beds were some of the worst patches on the lake.

Bed 13 – Although not technically a bed, we again found regular plants in and around the docks at the Red Lake Resort.

Beds 14 and 15 – Barely even a “high density area”, we found and rake removed three individual plants scattered near the area formerly covered by Bed 14. In “Bed 15”, we found and rake removed a single plant. West of Bed 14, we delineated a new microbed that contained a few dozen scattered clusters most of which we were able to rake remove.

Bed 16 – This was a new area found during the summer of 2024, and the DASH boat worked to remove it. Our survey found EWM was not common, but plants were still scattered throughout the mapped area.

## **CONSIDERATIONS FOR MANAGEMENT:**

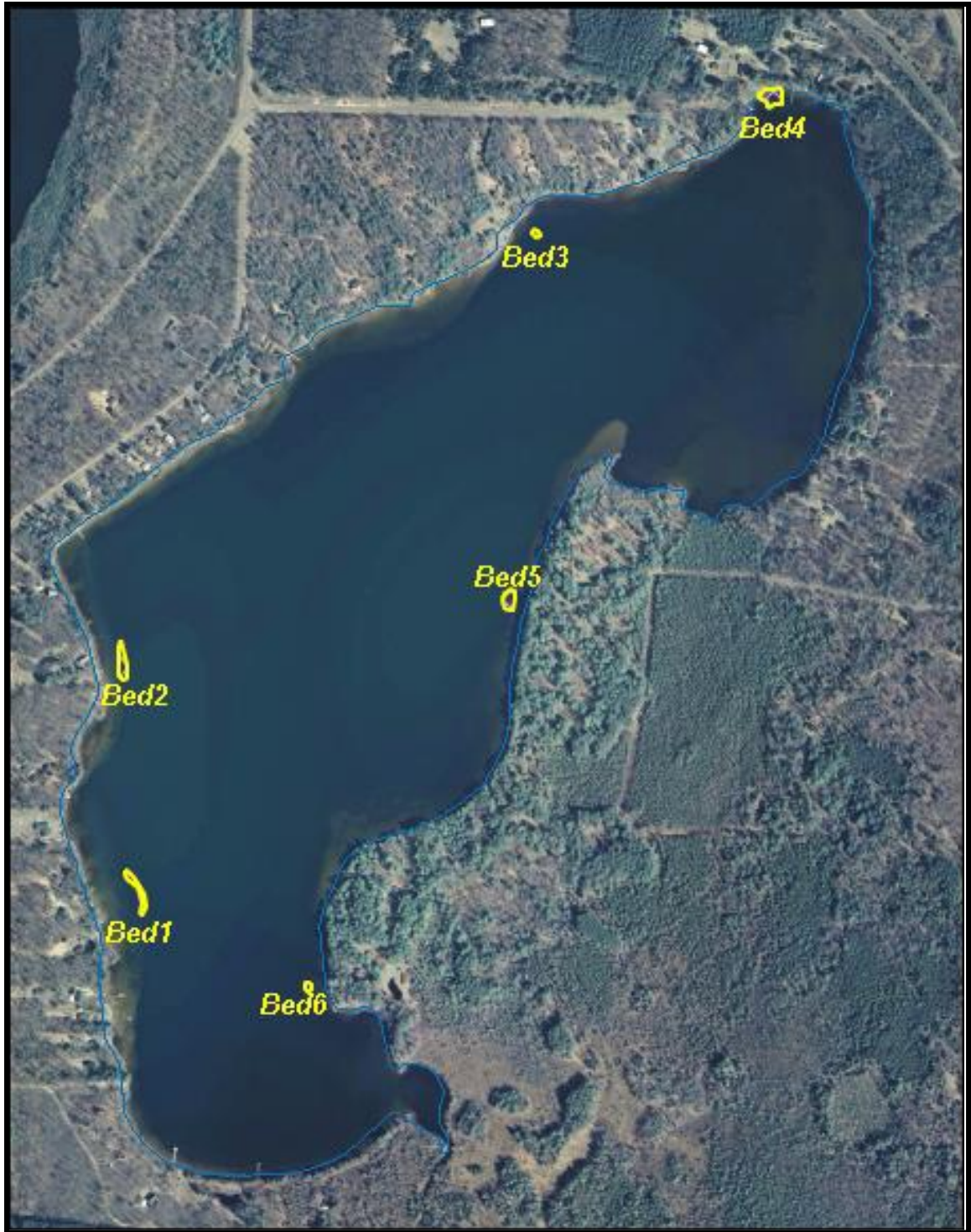
Eurasian water-milfoil continues to occupy only a small percentage of the lake's surface area, but it is widely-established making eradication an unrealistic expectation. With this in mind, continuing to work to control its spread in the most cost-effective manner possible, while simultaneously minimizing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

Following the highly effective herbicide treatment in Bed 6/6A and the apparent surrounding residual control in 2023, EWM levels rebounded in 2024 despite manual removal efforts. Although these beds continue to be small and unlikely to cause significant navigation impairment, the increased spread we documented is somewhat concerning. Ultimately, the RLA, LEAPS, and the WDNR will have to decide on what, if any, active management should occur in 2025. Similarly, how much monitoring will be needed in 2025, if any, is a conversation that needs to take place. In the meantime, lake residents should remain on the lookout for any signs of EWM. If they discover a plant they even suspect may be EWM, we strongly encourage them to 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. Texting pictures from a smartphone is actually ideal as it gives immediate feedback. Likewise, we are happy to identify ANY plant a lake resident finds that they may be curious about.

## **LITERATURE CITED**

- Holt, C, C. Busch, K. Cable, and L. Sather. [online]. 1973. Red Lake Bathymetric Map. [https://apps.dnr.wi.gov/doclink/lakes\\_maps/2492100a.pdf](https://apps.dnr.wi.gov/doclink/lakes_maps/2492100a.pdf) (2024, October).
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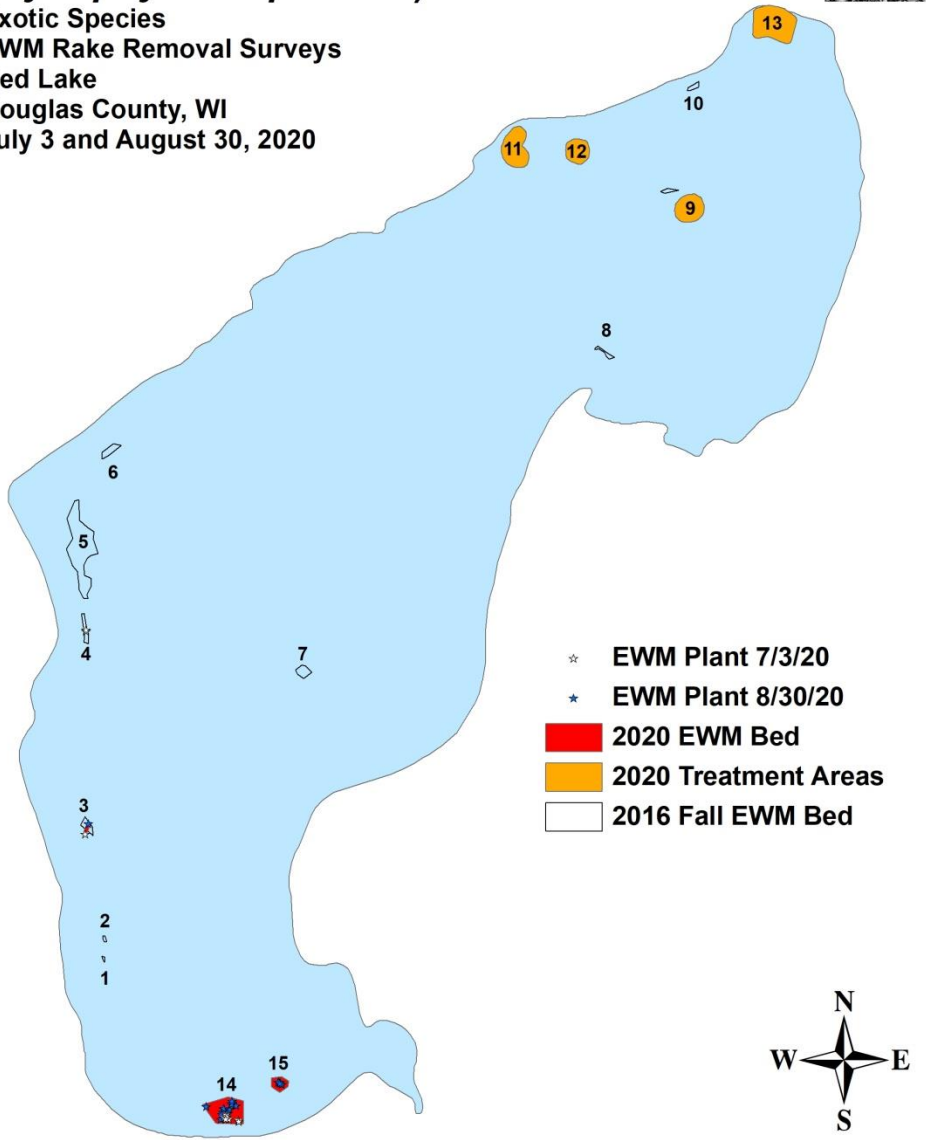
**Appendix I: 2024 Eurasian Water-milfoil Management Areas**



**Appendix II: 2020, 2021, 2022, 2023, and 2024 Eurasian Water-milfoil  
Rake Removal and Bed Maps**

# Eurasian water-milfoil (*Myriophyllum spicatum*)

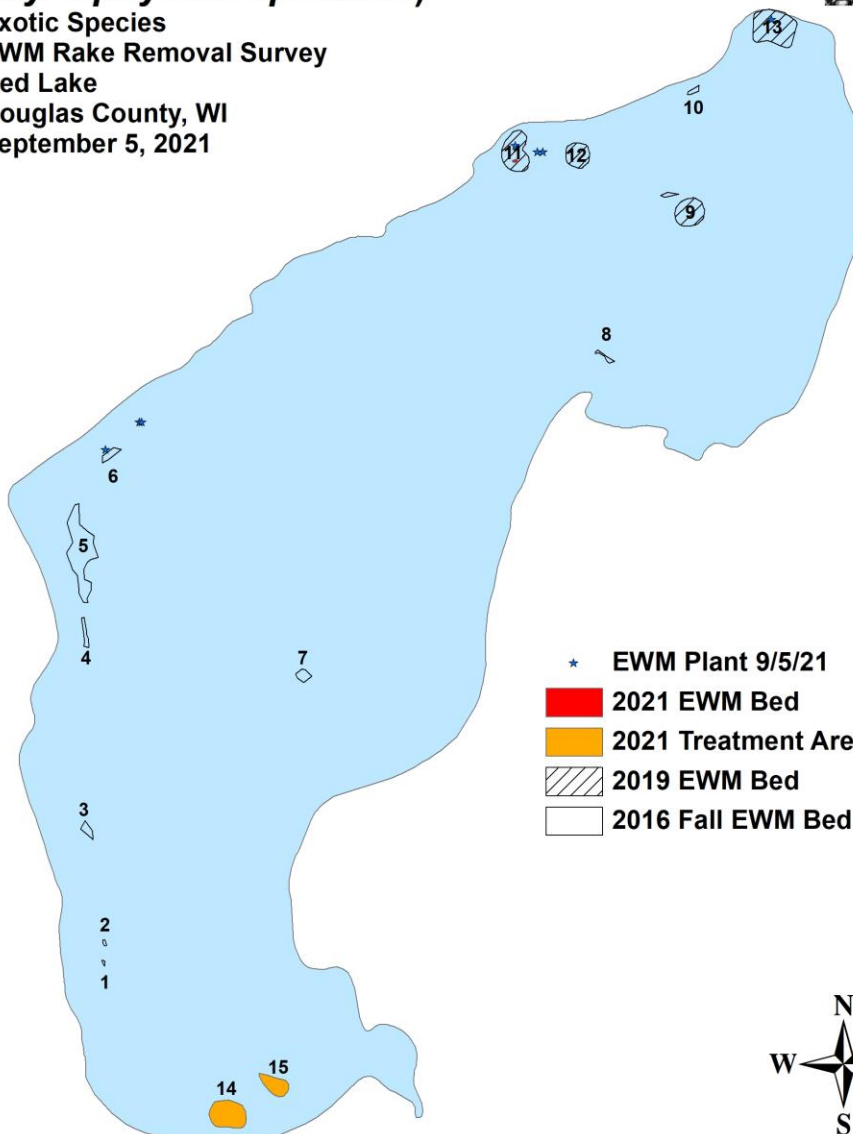
Exotic Species  
EWM Rake Removal Surveys  
Red Lake  
Douglas County, WI  
July 3 and August 30, 2020





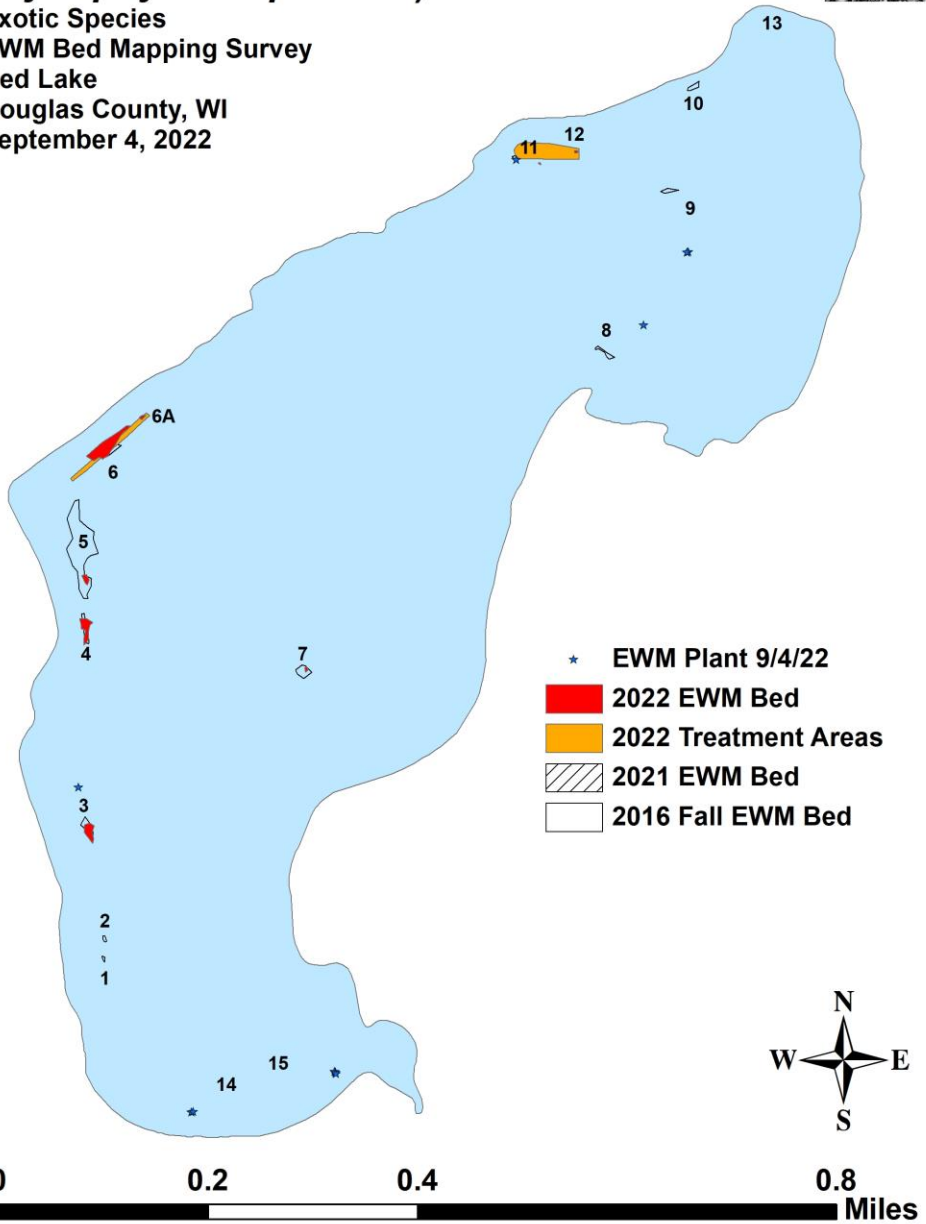
# Eurasian water-milfoil (*Myriophyllum spicatum*)

Exotic Species  
EWM Rake Removal Survey  
Red Lake  
Douglas County, WI  
September 5, 2021



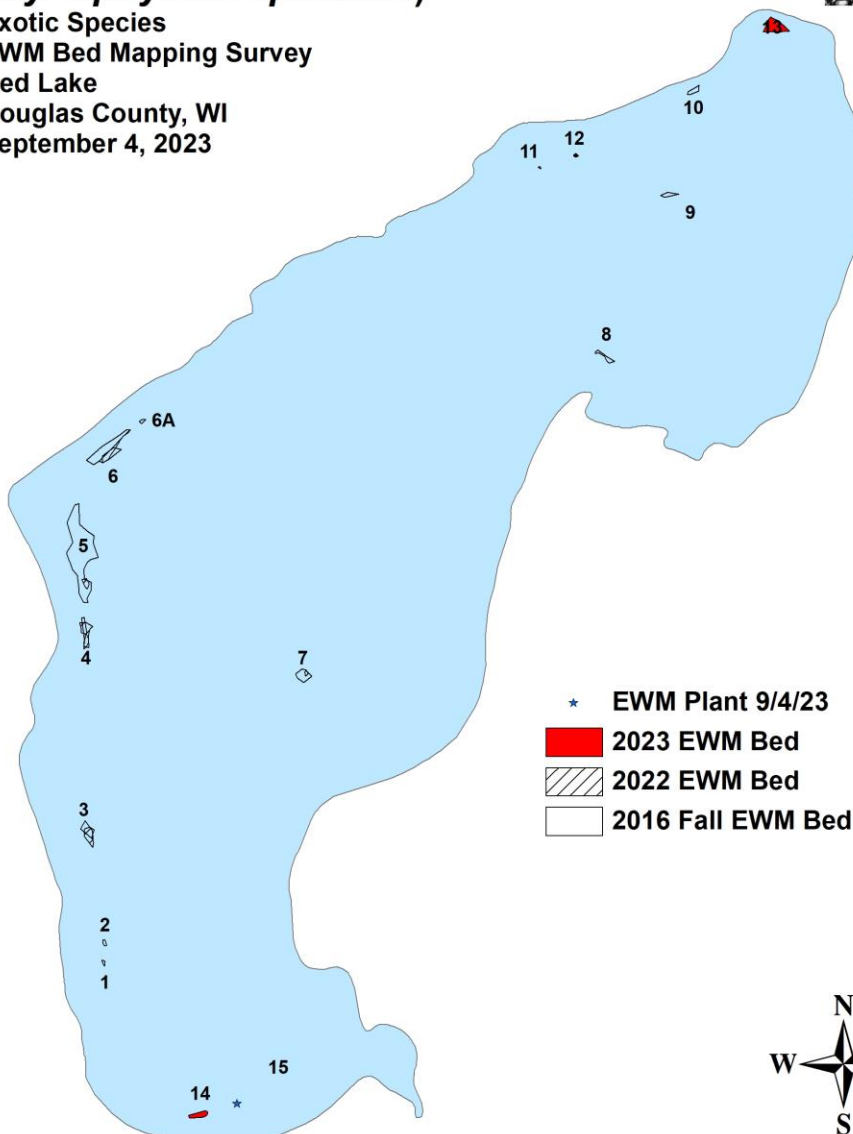
# Eurasian water-milfoil (*Myriophyllum spicatum*)

Exotic Species  
EWM Bed Mapping Survey  
Red Lake  
Douglas County, WI  
September 4, 2022



# Eurasian water-milfoil (*Myriophyllum spicatum*)

Exotic Species  
EWM Bed Mapping Survey  
Red Lake  
Douglas County, WI  
September 4, 2023

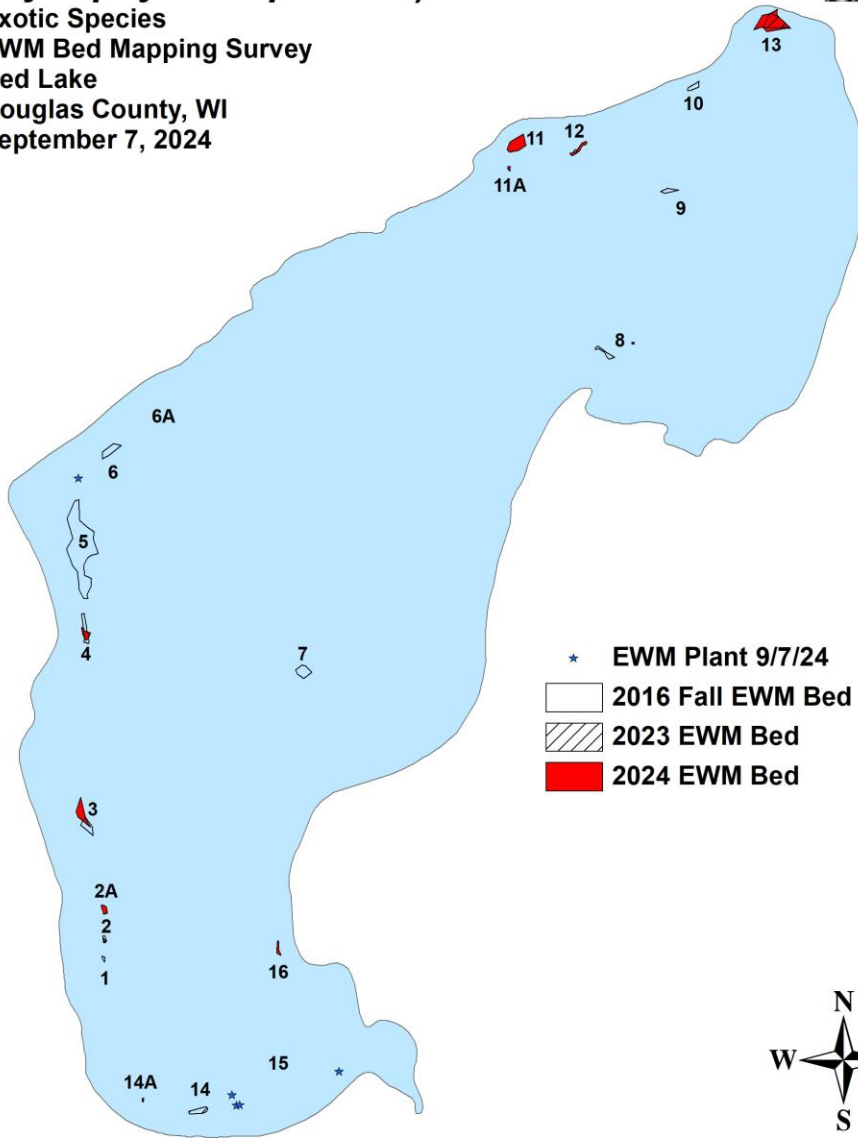


- \* EWM Plant 9/4/23
- 2023 EWM Bed
- ▨ 2022 EWM Bed
- 2016 Fall EWM Bed



# Eurasian water-milfoil (*Myriophyllum spicatum*)

Exotic Species  
EWM Bed Mapping Survey  
Red Lake  
Douglas County, WI  
September 7, 2024



- \* EWM Plant 9/7/24
- 2016 Fall EWM Bed
- ▨ 2023 EWM Bed
- 2024 EWM Bed

