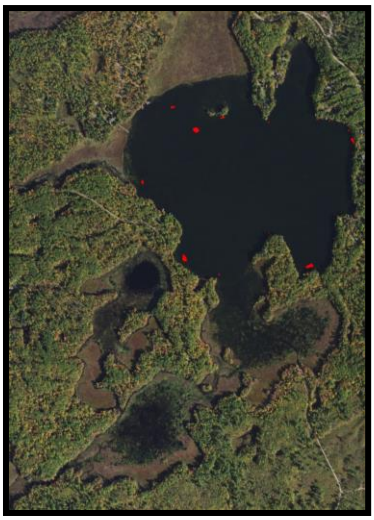
Eurasian water-milfoil (*Myriophyllum spicatum*)
Late Summer Bed Mapping Survey
Osprey Lake (WBIC: 2395100)
Sawyer County, Wisconsin

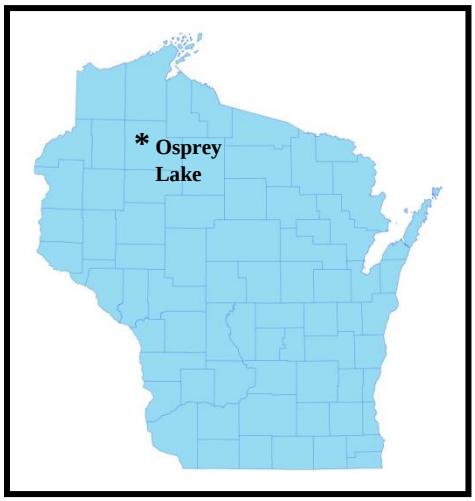


2024 Eurasian Water-milfoil beds

Dead calm at sunrise launch 9/1/24

Project Initiated by:

The Osprey Lake Property Owners Association, the Lac Courte Oreilles Conservation Department, the Sawyer County Land & Water Conservation Department, and the Wisconsin Department of Natural Resources



Chemically burned EWM outside the northeast treatment area – 9/1/24

Survey Conducted by and Report Prepared by:

Endangered Resource Services, LLC
Matthew S. Berg, Research Biologist
Saint Croix Falls, Wisconsin
September 1, 2024

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INTRODUCTION:

Osprey Lake (WBIC 2395100) is a 214-acre seepage lake in northwest Sawyer County, Wisconsin in the Lac Courte Oreilles Reservation and the Towns of Hayward, Hunter, and Round Lake (T40/41N R7/8W). It has a maximum depth of 32ft and an average depth of 12ft. The lake is oligotrophic in nature, and water clarity is generally good with summer Secchi readings ranging from 10-18ft and averaging 16.2ft over the past ten years (WDNR 2024). The lake's bottom substrate is variable with sand, gravel, and rock occurring along the majority of shorelines and around the lake's island, while sandy, marly, and organic muck dominate the deep flats and sheltered bays (Holt et al. 1972) (Figure 1).

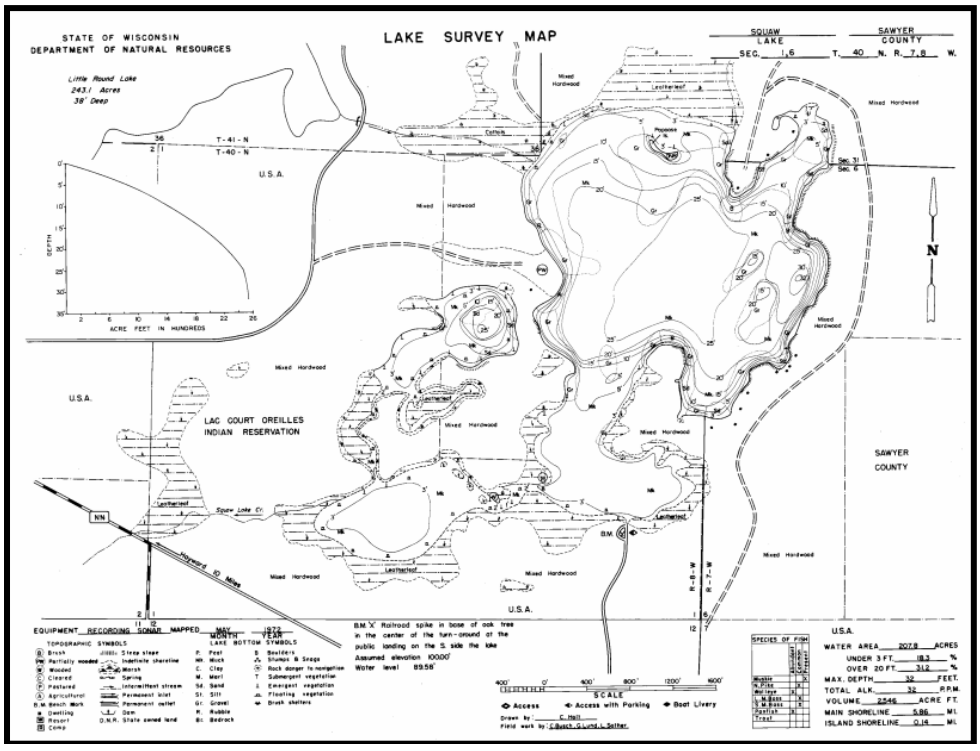

Figure 1: Osprey Lake Bathymetric Map

STUDY BACKGROUND AND RATIONALE:

Eurasian water-milfoil (*Myriophyllum spicatum*) (EWM) was first identified by the Lac Courte Oreilles Conservation Department (LCOCD) in 2005 near the LCO boat landing. A follow-up survey by the Wisconsin Department of Natural Resources (WDNR) also located plants around the shoreline of much of the main northern basin.

After applying for and receiving a WDNR rapid response grant, the Osprey Lake Property Owners Association (OLPOA) and the Sawyer County Land and Water Conservation Department (SCLWC - K. Maki) used a 2006 WDNR point-intercept macrophyte survey to develop the lake's original Aquatic Plant Management Plan (APMP) that outlined manual removal by both volunteers and professionals as well as limited herbicide applications to control the infestation (OLPOA 2011). Since the APMP's approval by the WDNR in 2011, these small-scale herbicide treatments have occurred periodically based on low intensity boat surveys by the applicator and/or the SCLWC prior to treatment.

In 2023, the OLPOA opted to use Diver Assisted Suction Harvesting (DASH) on six small beds adjacent to deep water in lieu of herbicides. Following our late-summer 2023 bed mapping survey that showed a significant expansion of EWM in the north bays, it was decided to chemically treat two areas totaling 7.34 acres (3.43% of the lake's total surface area) on June 26, 2024. Northern Aquatics (Dale Dressel – Dresser, WI) applied 2,680lbs of Renovate Max G (Triclopyr/2,4-D) at a target concentration of 3ppm. The reported water temperature at the time of treatment was 71° with an ambient air temp of 59° and variable winds ranging from 3-7mph (Appendix I). To determine EWM levels following the treatment and to guide future management, the OLPOA requested we again complete a 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 1, 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.

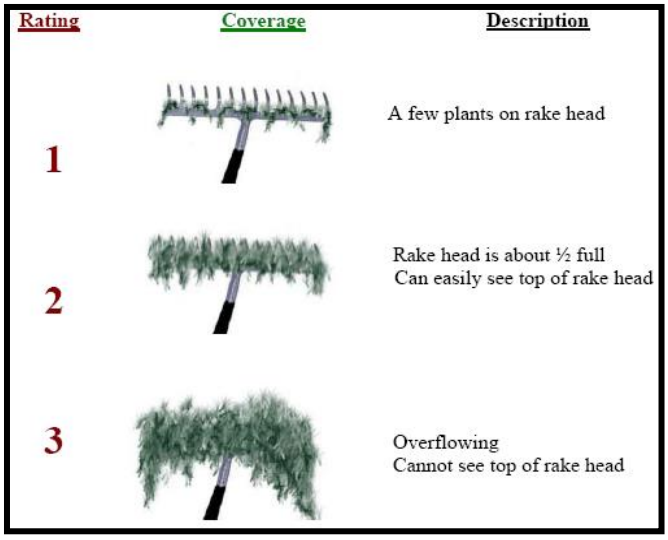

Figure 2: Rake Fullness Ratings (UWEX 2010)

RESULTS:

Eurasian Water-milfoil Bed Mapping Survey:

On September 1, 2024, we searched 10.7km (6.7 miles) of transects throughout the lake's visible littoral zone (Figure 3). In total, we mapped 15 areas covering 0.44 acres (0.21% of the lake's total surface area) (Figure 4) (Appendix II). This was a decrease of 4.22 acres (-90.56%) compared to 2023 when we mapped 24 areas covering 4.66 acres (2.15% surface area). It was also sharply lower than both the 2022 survey (24 areas/5.06 acres – 2.36% surface area) and the 2020 survey (23 areas/4.26 acres – 1.99% surface area) (Table 1).

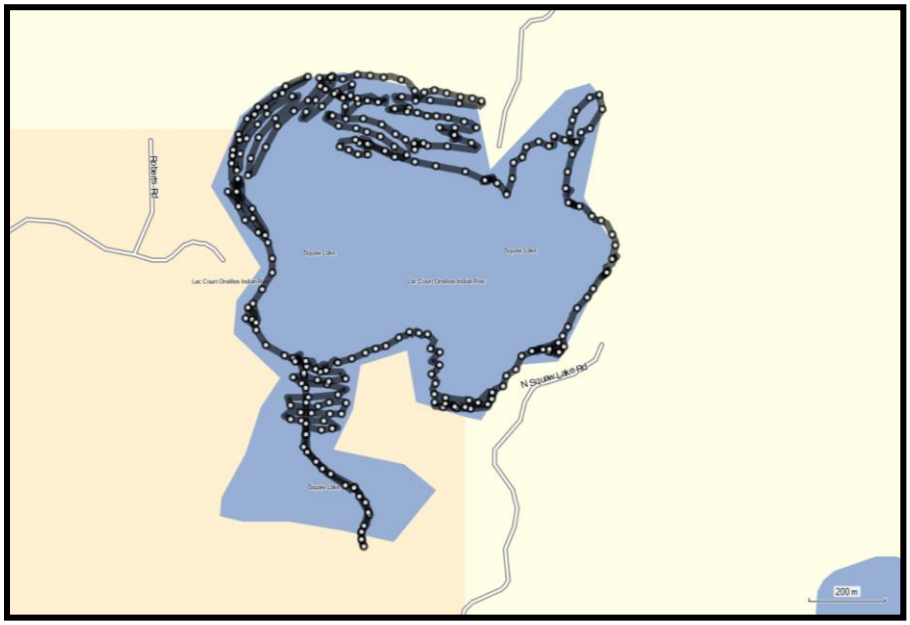

Figure 3: September 1, 2024 EWM Littoral Zone Survey – GPS Tracks

Table 1: Late Summer Eurasian Water-milfoil Bed Mapping Summary
Osprey Lake – Sawyer County, Wisconsin
September 1, 2024

Bed Number	2024 Acreage	2023 Acreage	2022 Acreage	2020 Acreage	2023-2024 Difference	Rake Range/ Mean Rake Fullness	Depth Range/ Mean Depth	Canopied	Navigation Impairment	2024 Field Notes
Bed 1 (1A and 1B)	0.00	<0.01	0.12	0.09	-<0.01	-	-	-	-	No EWM seen.
Bed 2	0.01	<0.01	0.02	0.01	<0.01	<<<1-1; 1	6-8; 7	No	None	Open bed.
Bed 3	0.09	<0.01	0.10	0.04	0.09	<1-3; 1	3-8; 6	Near	Minor	Largely grown back after DASH.
Bed 4	0.03	0.14	0.21	0.06	-0.11	<<<1-1; <1	5-8; 7	No	None	Only plants in core of former bed.
Bed 5 (5 and 5B)	0.00	0.04	0.28	0.13	-0.04	<<<1-1; <<<1	2-4; 4	No	None	Only a handful of plants seen.
Bed 6	0.03	2.35	2.41	2.10	-2.32	<<<1-1; <<<1	5-8; 7	No	None	Regular pioneering plants.
Bed 7	0.00	0.11	0.13	0.01	-0.11	-	-	-	-	No EWM seen.
Bed 8	0.00	0.01	0.08	0.08	-0.01	-	-	-	-	No EWM seen.
Bed 9	0.00	0.06	0.06	0.10	-0.06	-	-	-	-	No EWM seen.
Bed 10	0.00	0.01	0.02	0.02	-0.01	-	-	-	-	No EWM seen.
Bed 11	0.09	0.10	0.13	0.05	-0.01	<<<1-3; 1	7-9; 8	Near	Minor	Open bed – residual impact?
Bed 11A	0.02	0.07	0.04	0.00	-0.05	<<<1-2; 1	3-8; 6	Near	Minor	Open bed – residual impact?
Bed 11B and 11C	0.01	<0.01	0.00	0.00	<0.01	<1-1; 1	3-8; 6	No	None	Microbed on point.
Bed 12	0.00	0.00	Merged	<0.01	-<0.01	-	-	-	-	No EWM seen.
Bed 13	0.00	1.37	0.49	0.55	-1.37	-	-	-	-	No EWM seen.
Bed 14	0.00	Merged	0.16	0.14	-	-	-	-	-	No EWM seen.
Bed 15	0.00	Merged	0.46	0.35	-	-	-	-	-	No EWM seen.
Bed 16	0.00	Merged	0.10	0.24	-	-	-	-	-	No EWM seen.
Bed 16A	0.00	0.00	<0.01	0.00	0.00	-	-	-	-	No EWM seen.
Bed 17	0.01	0.01	0.02	0.01	0.00	<1-1; 1	6-8; 7	No	None	Regular plants.
Bed 18	0.01	0.01	0.01	0.01	0.00	<1-1; 1	6-8; 7	No	None	Regular plants.
Bed 19 and 19A	0.05	0.04	0.01	0.01	0.01	<1-1; 1	5-8; 6	No	None	Regular plants.
Bed 20	<0.01	0.05	0.02	0.03	-0.04	<<<1-1; <1	5-8; 6	No	None	Scattered plants – residual impact?
Bed 20A	<0.01	0.01	0.00	0.00	-<0.01	<1-1; 1	4-7; 5	No	None	Open microbed.
Beds 21 and 22	0.08	0.18	0.17	0.23	-0.10	<<<1-1; <<1	4-8; 6	No	None	Regular sprinkling of plants.
Bed 23	<0.01	0.10	<0.01	0.01	-0.10	<1-1; 1	3-7; 5	No	None	Regular plants.
Total	**0.44**	**4.66**	**5.06**	**4.26**	**-4.22**					

Descriptions of Past and Present Eurasian Water-milfoil Beds:

Bed 1 – Despite finding two small but dense microbeds in this area after DASH removal in 2023, we saw no evidence of EWM anywhere in the former bed. This is possibly due to residual herbicide control (Figure 4) (Appendix II).

Beds 2 and 3 – These areas also underwent DASH removal in 2023, but here the results were not long lasting as we found both beds had essentially returned to their pre-DASH acreage.

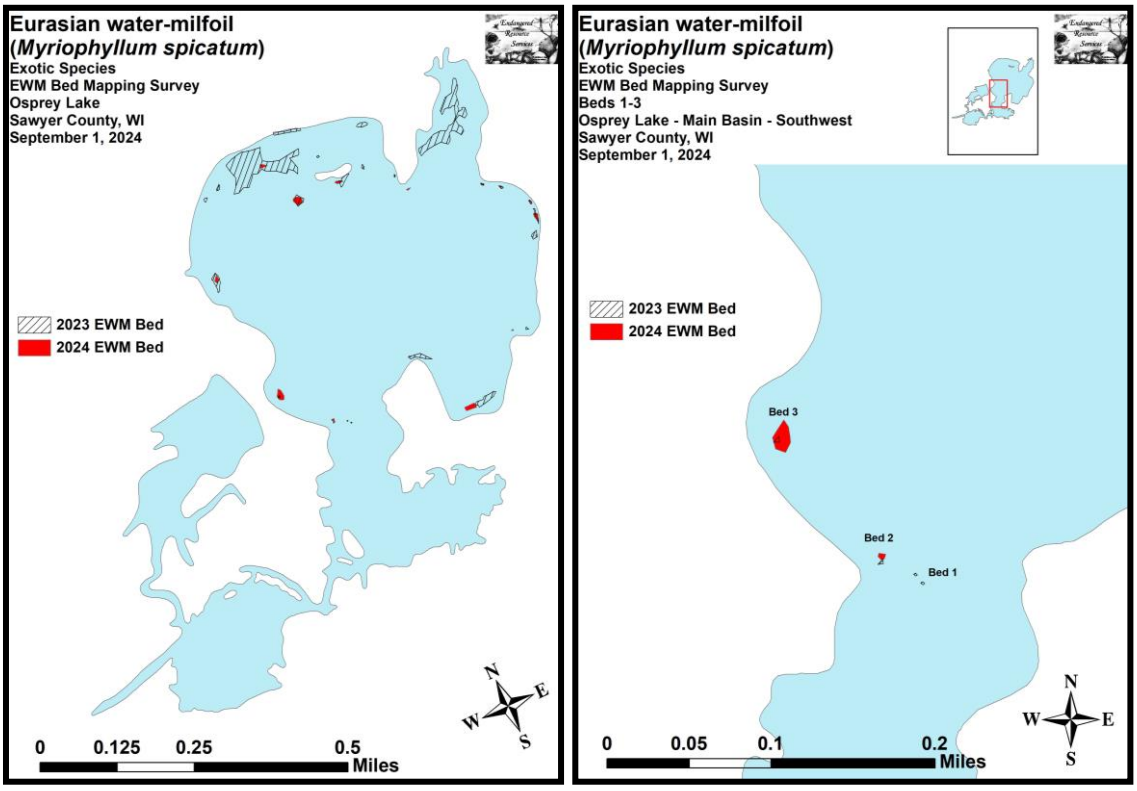

Figure 4: 2024 EWM Bed Map/Beds 1-3 – Main Basin – Southwest

Bed 4 – EWM had retreated to just the core area we mapped in 2023. As this area was unmanaged, it's likely this contraction was due to residual herbicide control. Even where present, we noted EWM was scattered, and plants seemed to be small and in generally poor condition (Figure 5) (Appendix II).

Beds 5 and 5A – Similar to Bed 4, we found almost no EWM in these areas. In general, the plant community appeared healthy and robust as we noted diverse stands of native pondweeds; especially Large-leaf pondweed (*Potamogeton amplifolius*) and Fern pondweed (*Potamogeton robbinsii*) which blanketed the bottom in most areas.

Bed 6 – A very few pioneering EWM plants had reestablished in the core of the former bed – potentially blown here from Bed 11. Other than this, the treatment appeared to have been extremely successful as we saw no other evidence of milfoil. Most of the area was again dominated by beds of Wild celery (*Vallisneria americana*).

Beds 7-10, 11B and 12 – We saw no evidence of EWM in these former beds. Apparently, the small number of plants that we found in these areas during the 2023 were eliminated by residual herbicide.

Beds 11 and 11A – Bed 11 was again dense at its core, but it was open and low density on the periphery. This was similar to Bed 11A where only the highest density areas found in 2023 still had EWM. Apparently these beds also saw some residual control.

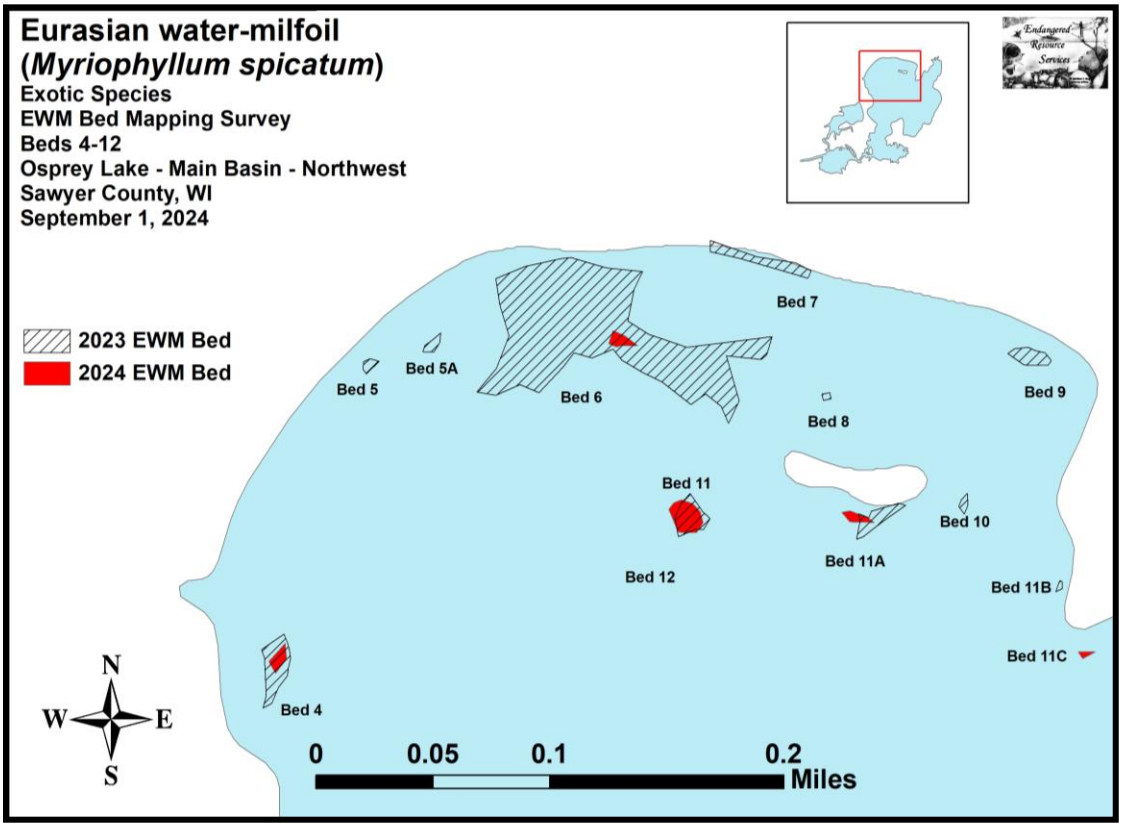

Figure 5: Beds 4-12 – Main Basin – Northwest and Around the Island

Beds 13-16 – After these four areas merged into a single canopied superbed in 2023, we saw no evidence of EWM anywhere in the 2024 treatment area that covered this bay (Figure 6) (Appendix II).

Beds 16A and 17 – Bed 16A was cleared by DASH in 2023, and we again saw no evidence of EWM in this area. Regular EWM plants were present in Bed 17, but they occurred at low density and were generally few in number (Figure 6) (Appendix II)

Beds 18, 19, 19A, 20, and 20A – These microbeds and narrow strips of generally low-density plants were established near docks along the east shoreline's narrow littoral zone. Because of their small size and similarity to Beds 16A and 17, they may be good candidates for DASH removal in the future.

Beds 21 and 22 – In 2023, we found canopied microbeds throughout this bay. Presumably due to residual control, we saw only a sprinkling of surviving EWM plants during our 2024 survey, and all of them were single-stemmed and appeared to be recently established.

Bed 23 – After DASH removal took out most plants in this bed in 2023, it appears residual herbicide eliminated the majority of surviving individuals in 2024 as we found a single open microbed on this rocky point.

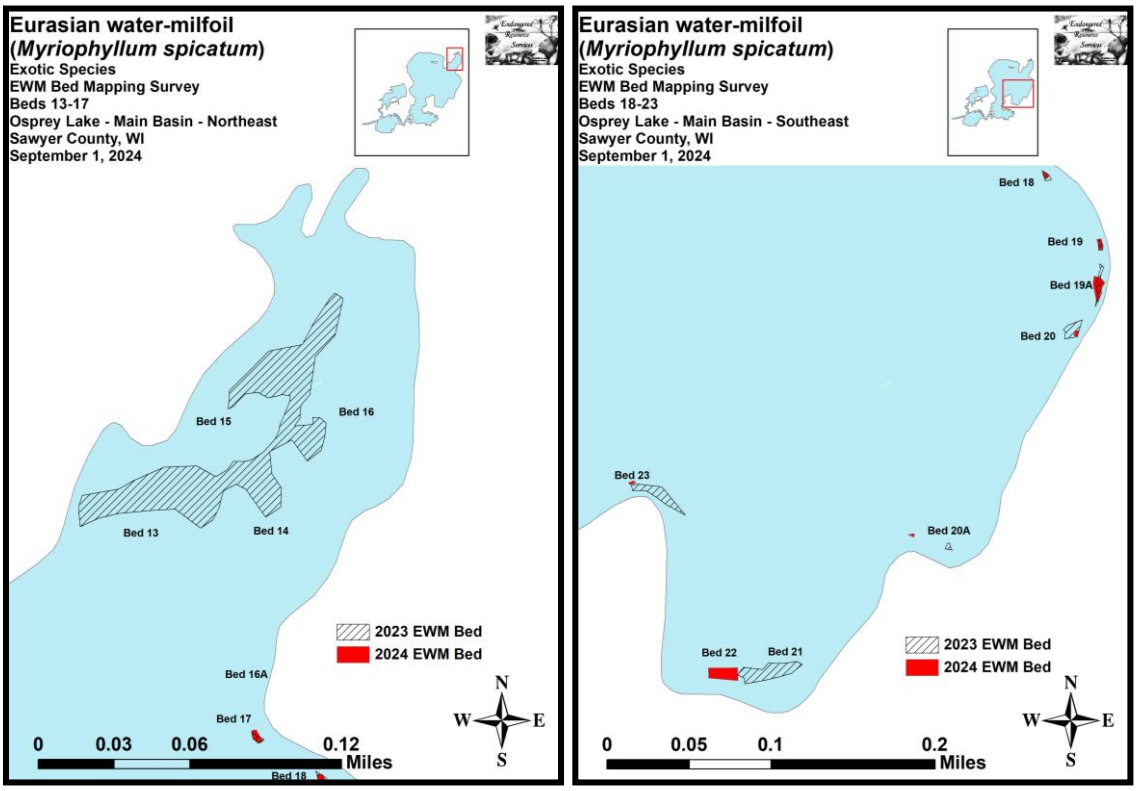

Figure 6: Beds 13-17 – Main Basin – Northeast/ Beds 18 – 23 – Main Basin - Southeast

DISCUSSION AND CONSIDERATIONS FOR MANAGEMENT:

Eurasian water-milfoil continues to occupy only a small percentage of Osprey 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 OLPOA moving forward.

The 2024 treatment was highly successful at knocking back EWM. The decision to focus on two large areas appears to have not only produced successful local control, but also provided residual control of nearby moderate-density stands and distant control of low-density plants. Several areas where DASH was used in 2023 also continued to have few EWM plants, while others had returned to their preharvest densities. When these EWM beds are small and occur at low densities, especially near deep water drop-offs, suction harvesting was especially effective. In this environment, it may offer better control than chemicals. Ultimately, the OLPOA, LCOCD, and the WDNR will have to decide what, if any, management and monitoring will occur on the lake in 2025.

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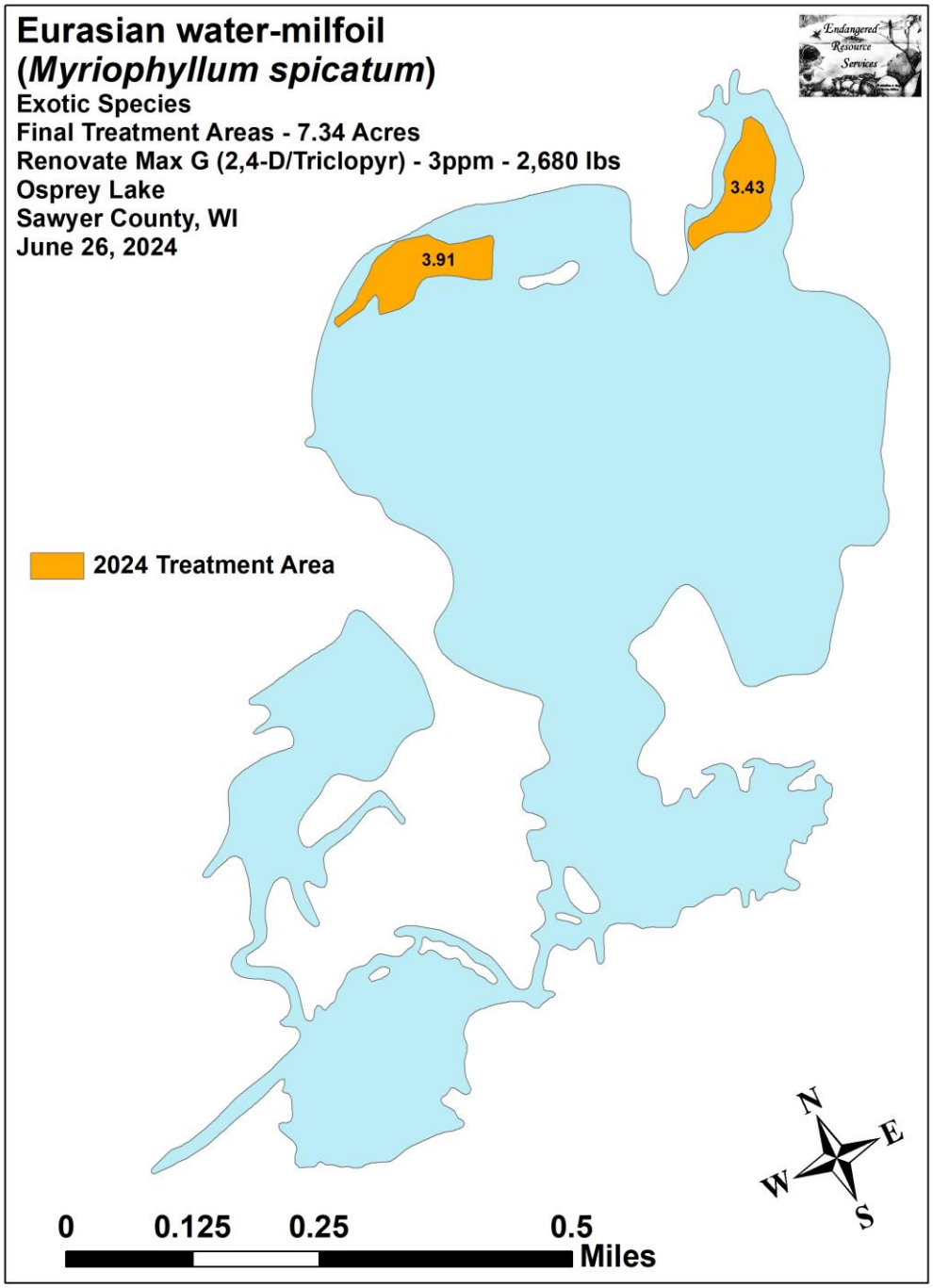
Appendix I: 2023 DASH Removal and 2024 Eurasian Water-milfoil Treatment Area Maps

Map of Osprey Lake Dive Sites


Eurasian water-milfoil
(Myriophyllum spicatum)
Exotic Species
Final Treatment Areas - 7.34 Acres
Renovate Max G (2,4-D/Triclopyr) - 3ppm - 2,680 lbs
Osprey Lake
Sawyer County, WI
June 26, 2024
Endangered Resource Services
3.43
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2024 Treatment Area
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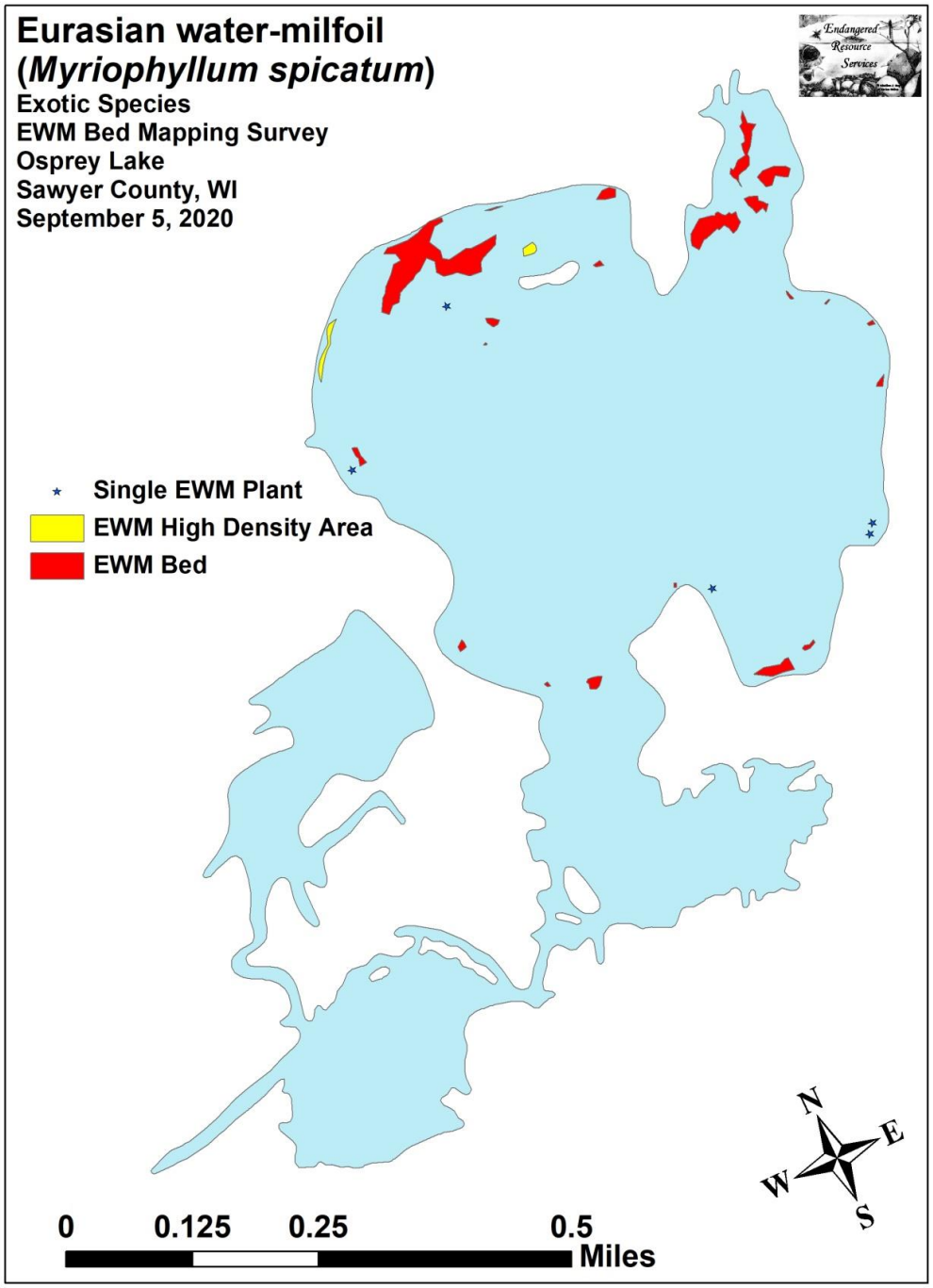
Appendix II: 2020, 2022, 2023, and 2024 Eurasian Water-milfoil Bed Maps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Exotic Species
EWM Bed Mapping Survey
Osprey Lake
Sawyer County, WI
September 5, 2020
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EWM High Density Area
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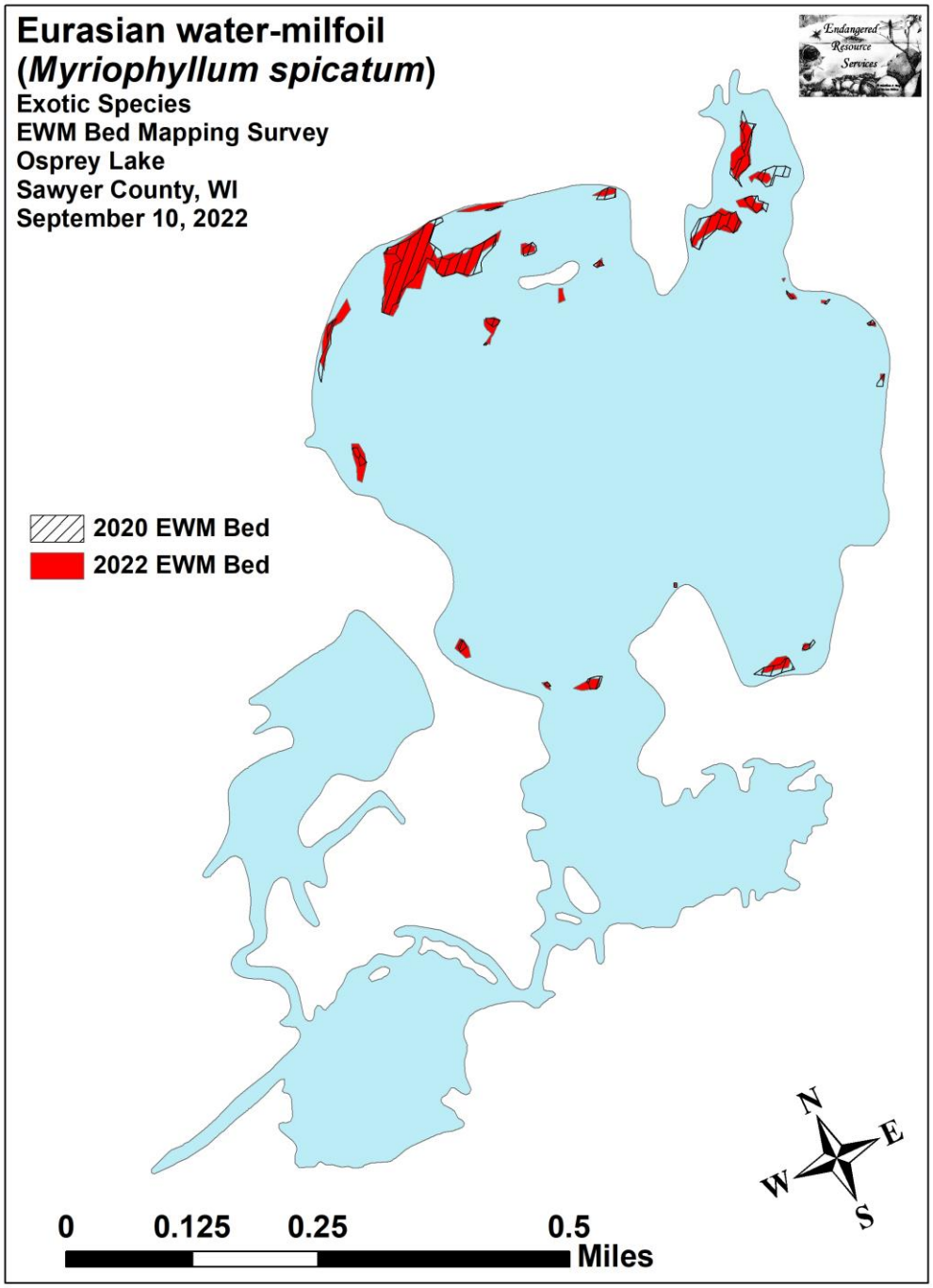
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2020 EWM Bed
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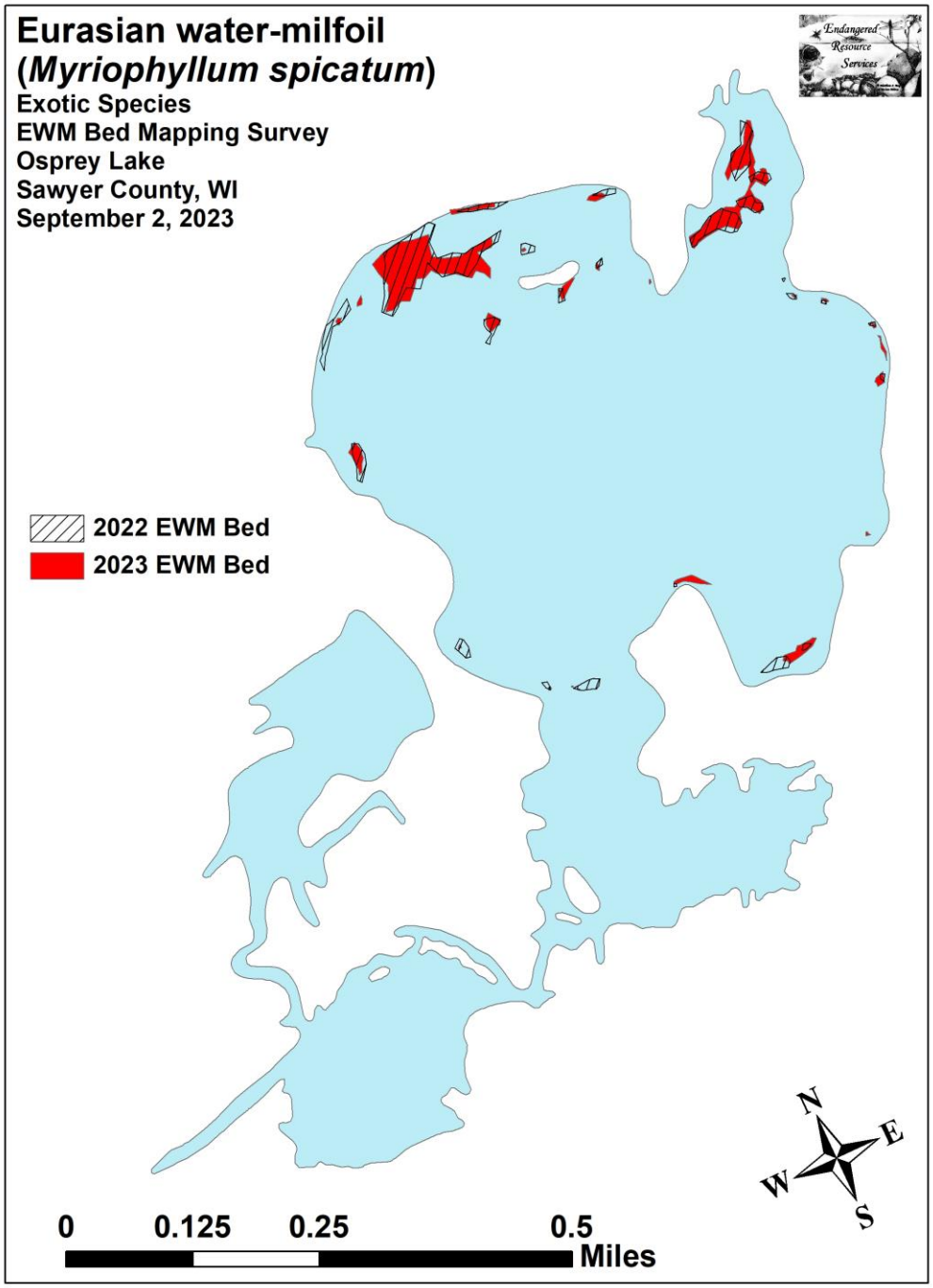
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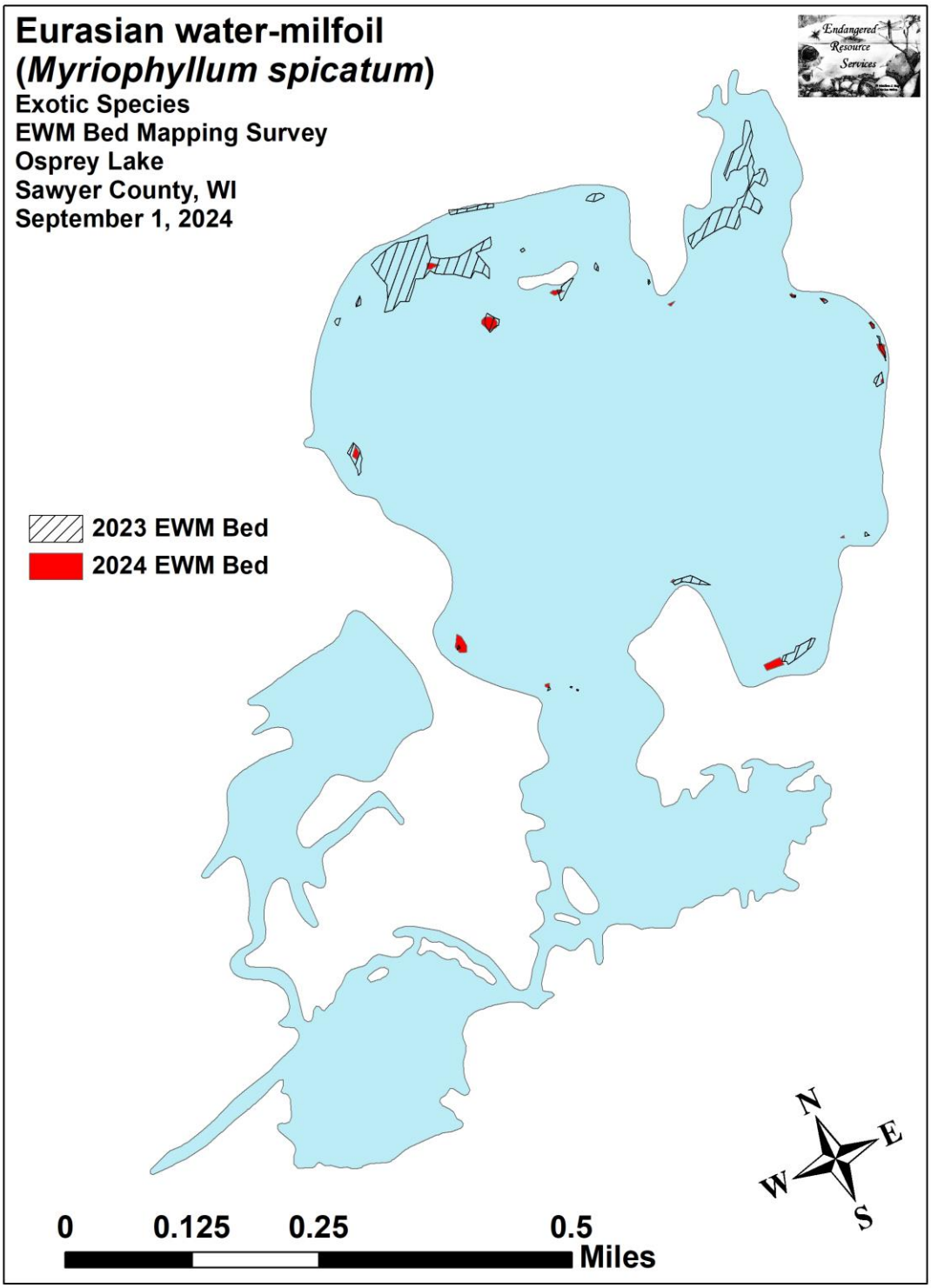
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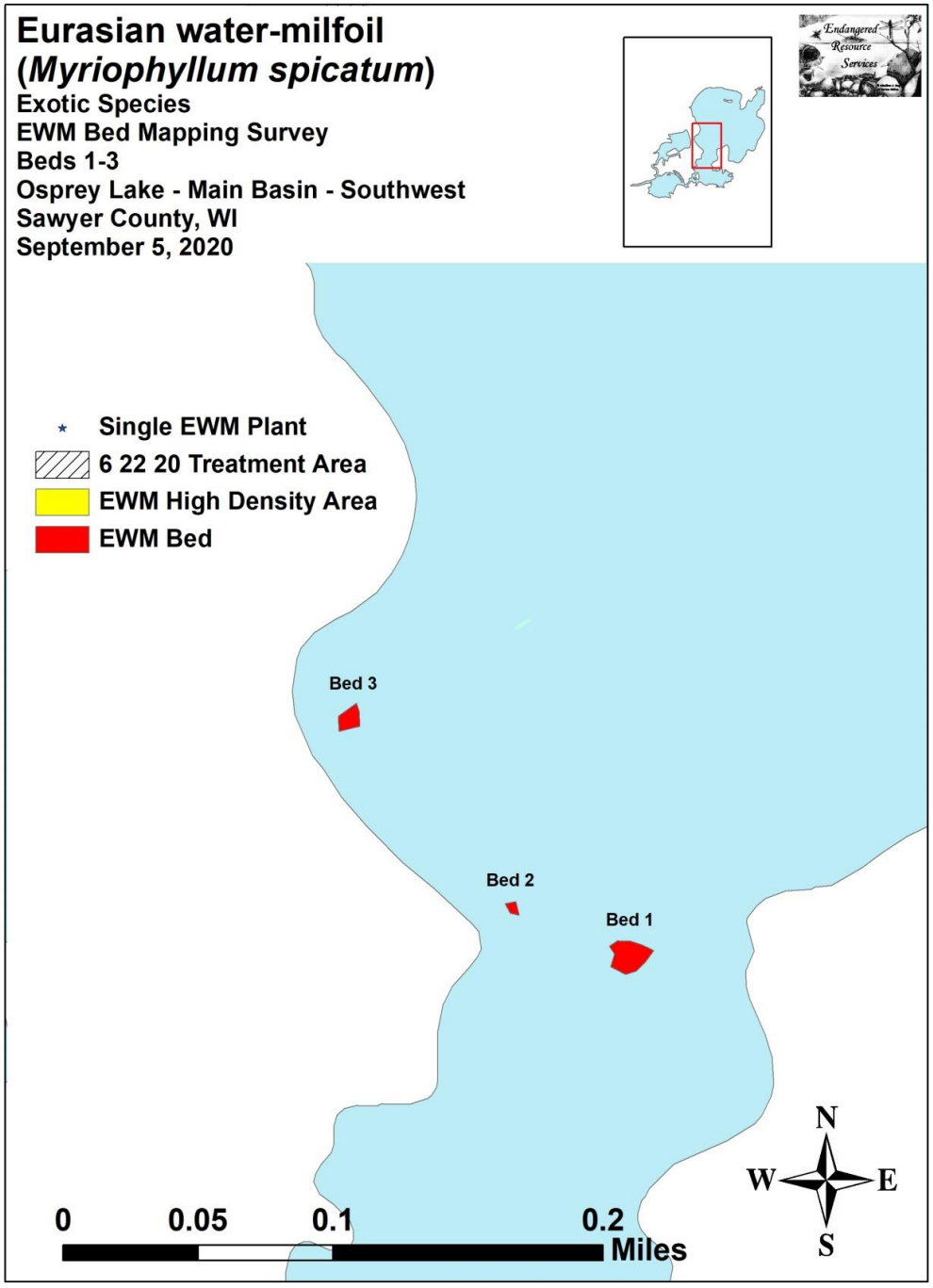
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September 5, 2020
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Single EWM Plant
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EWM High Density Area
EWM Bed
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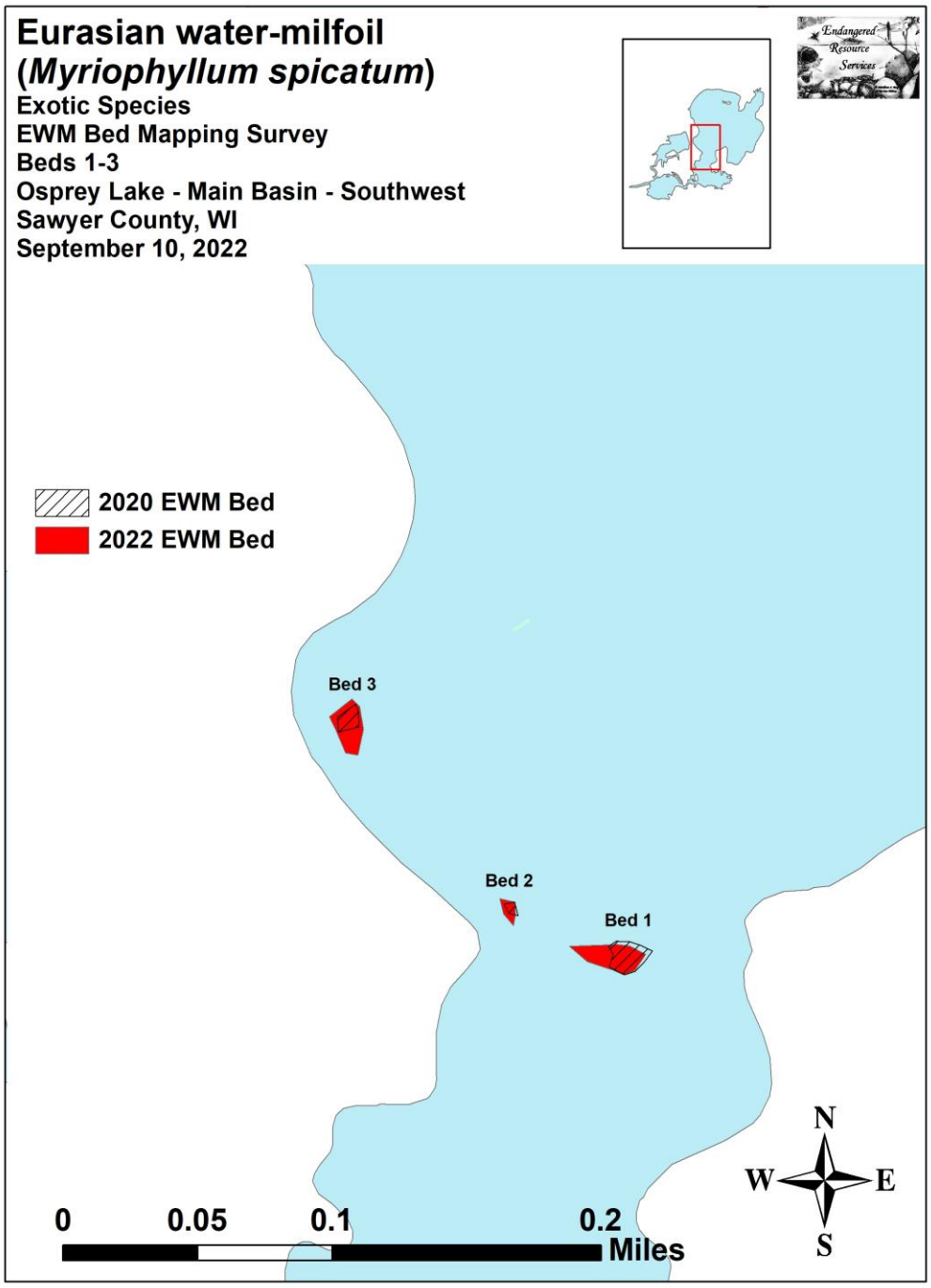
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2020 EWM Bed
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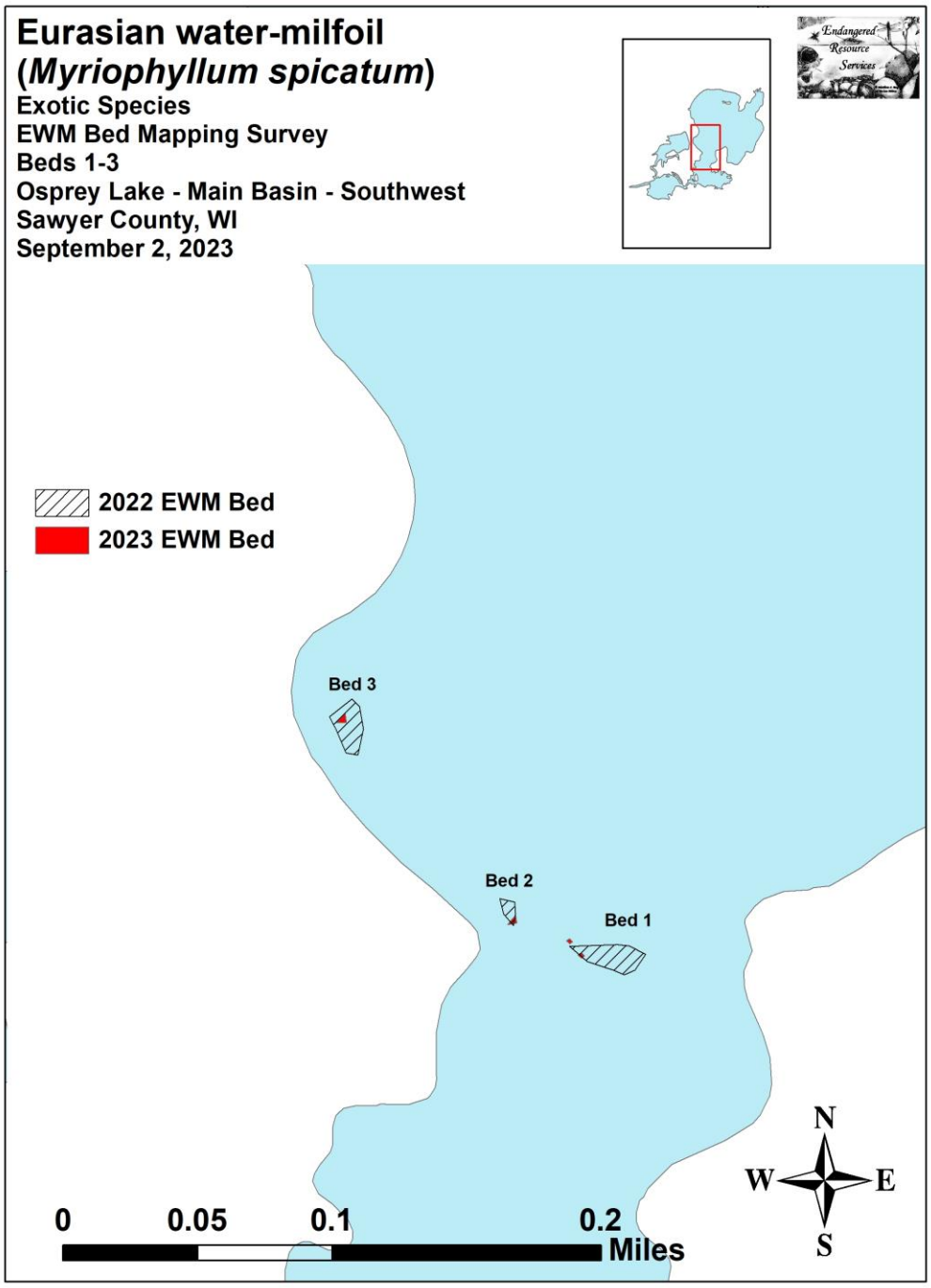
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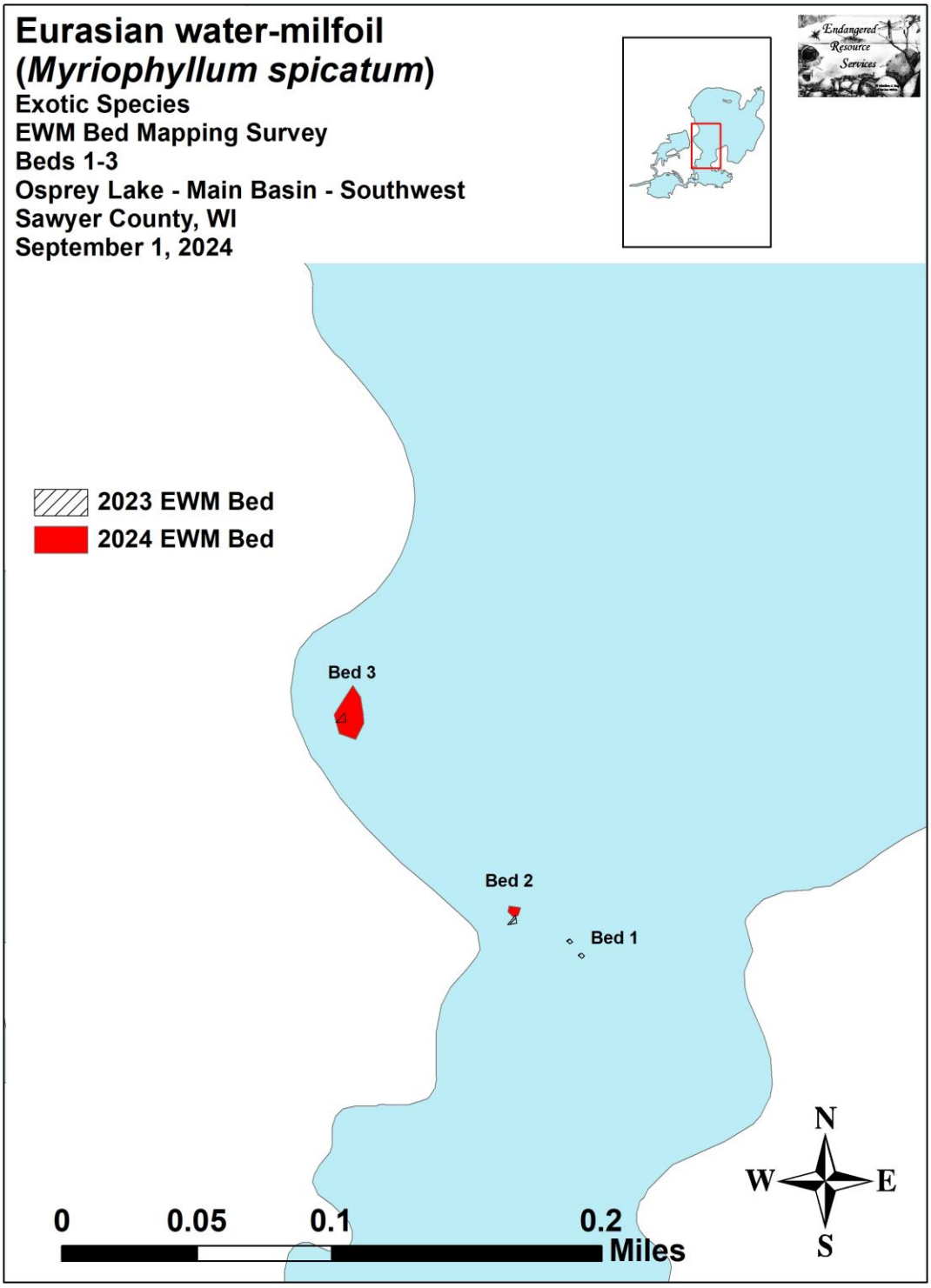
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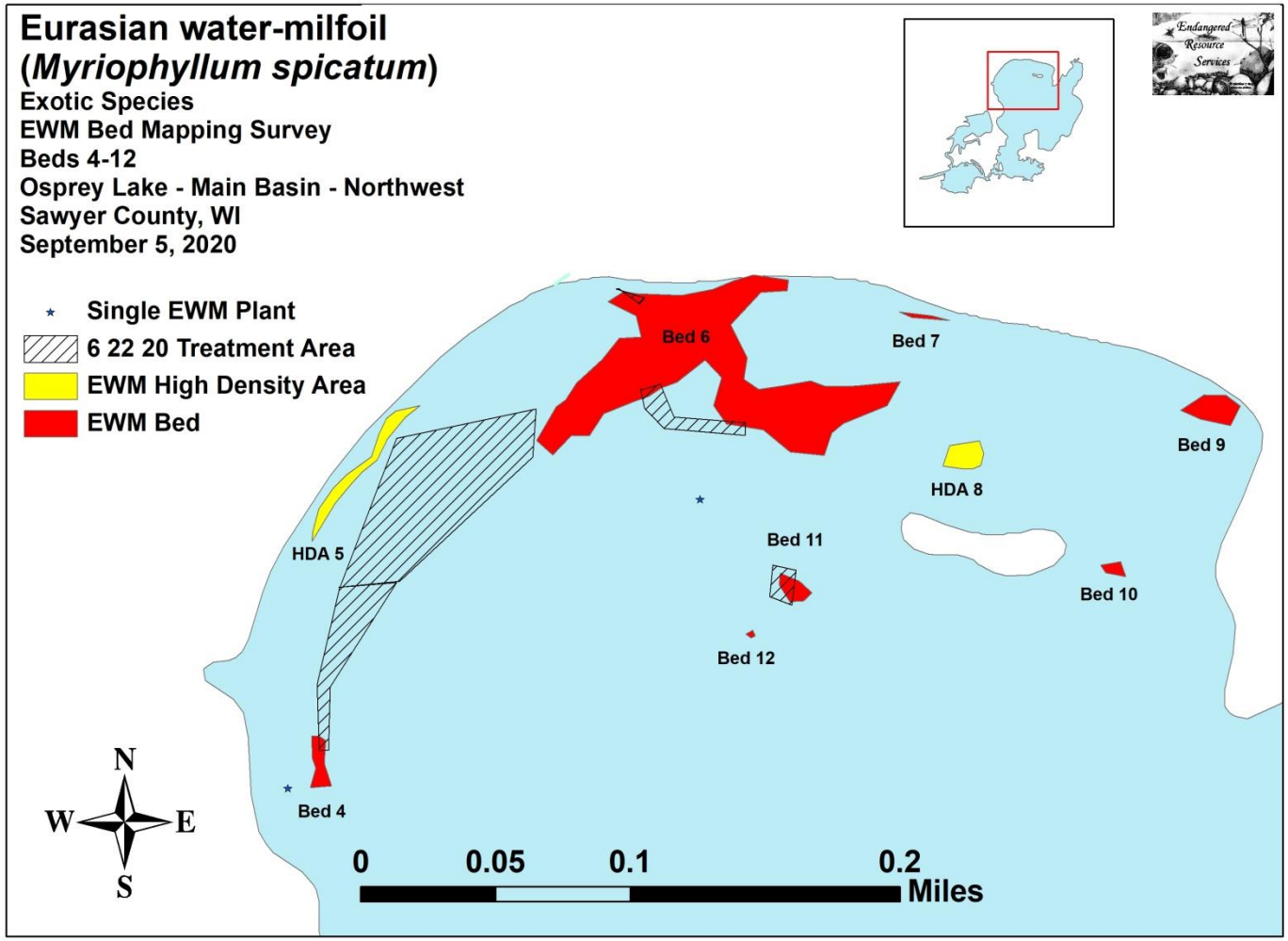
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Single EWM Plant
6 22 20 Treatment Area
EWM High Density Area
EWM Bed
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Bed 7
Bed 9
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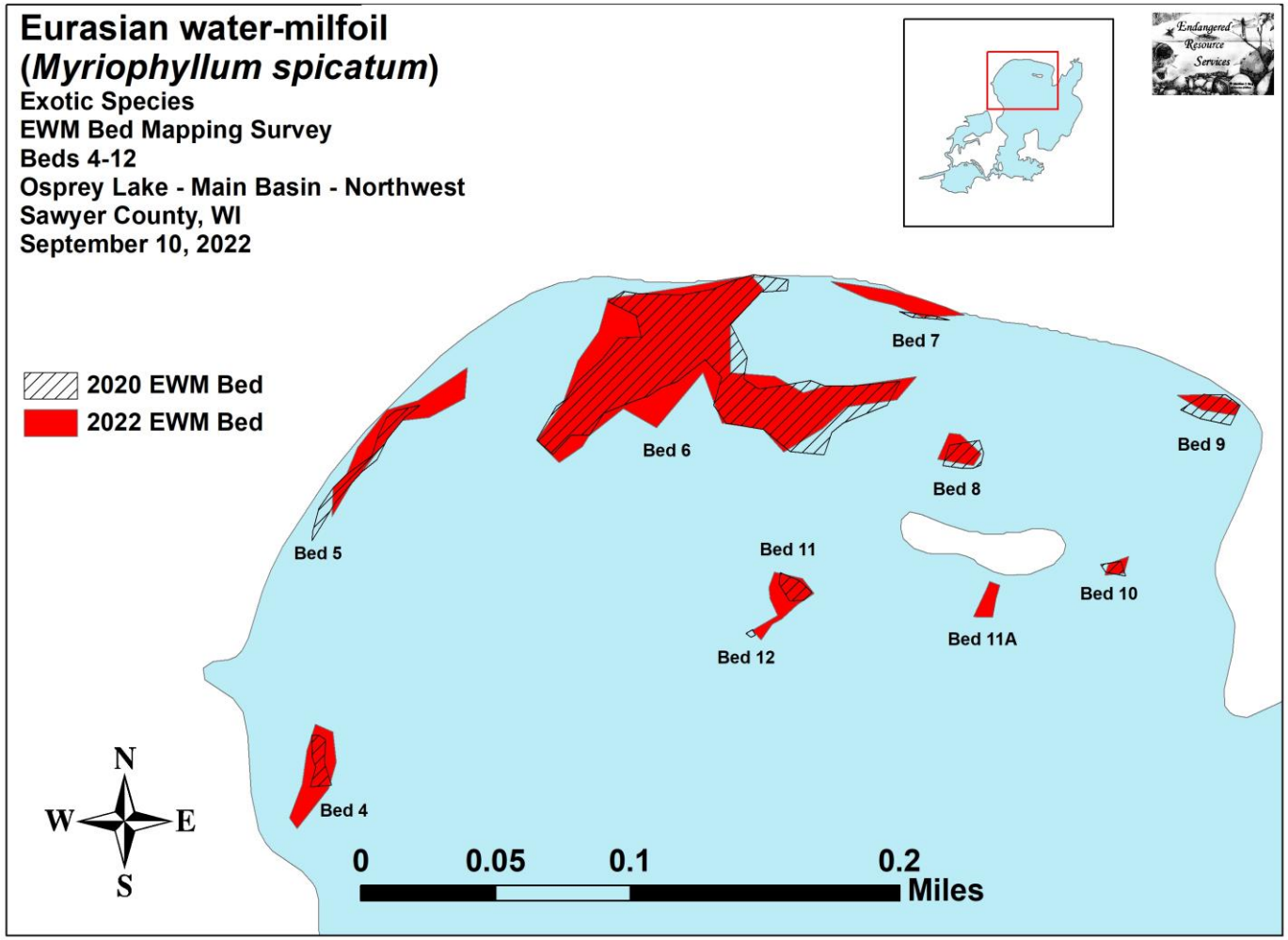
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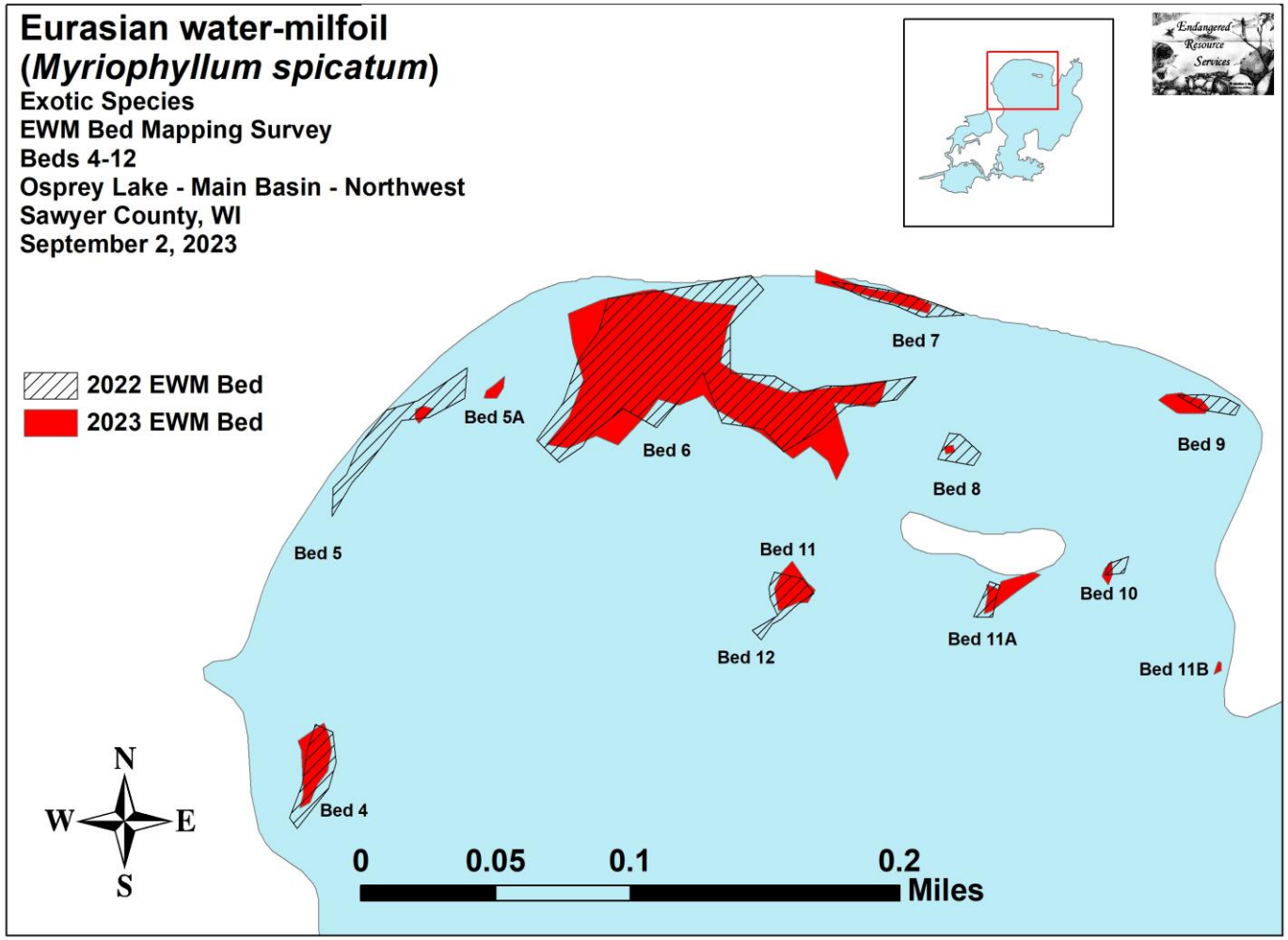
Eurasian water-milfoil
(Myriophyllum spicatum)
Exotic Species
EWM Bed Mapping Survey
Beds 4-12
Osprey Lake - Main Basin - Northwest
Sawyer County, WI
September 2, 2023
Endangered Resource Services
2022 EWM Bed
2023 EWM Bed
Bed 4
Bed 5
Bed 5A
Bed 6
Bed 7
Bed 8
Bed 9
Bed 10
Bed 11
Bed 11A
Bed 11B
Bed 12
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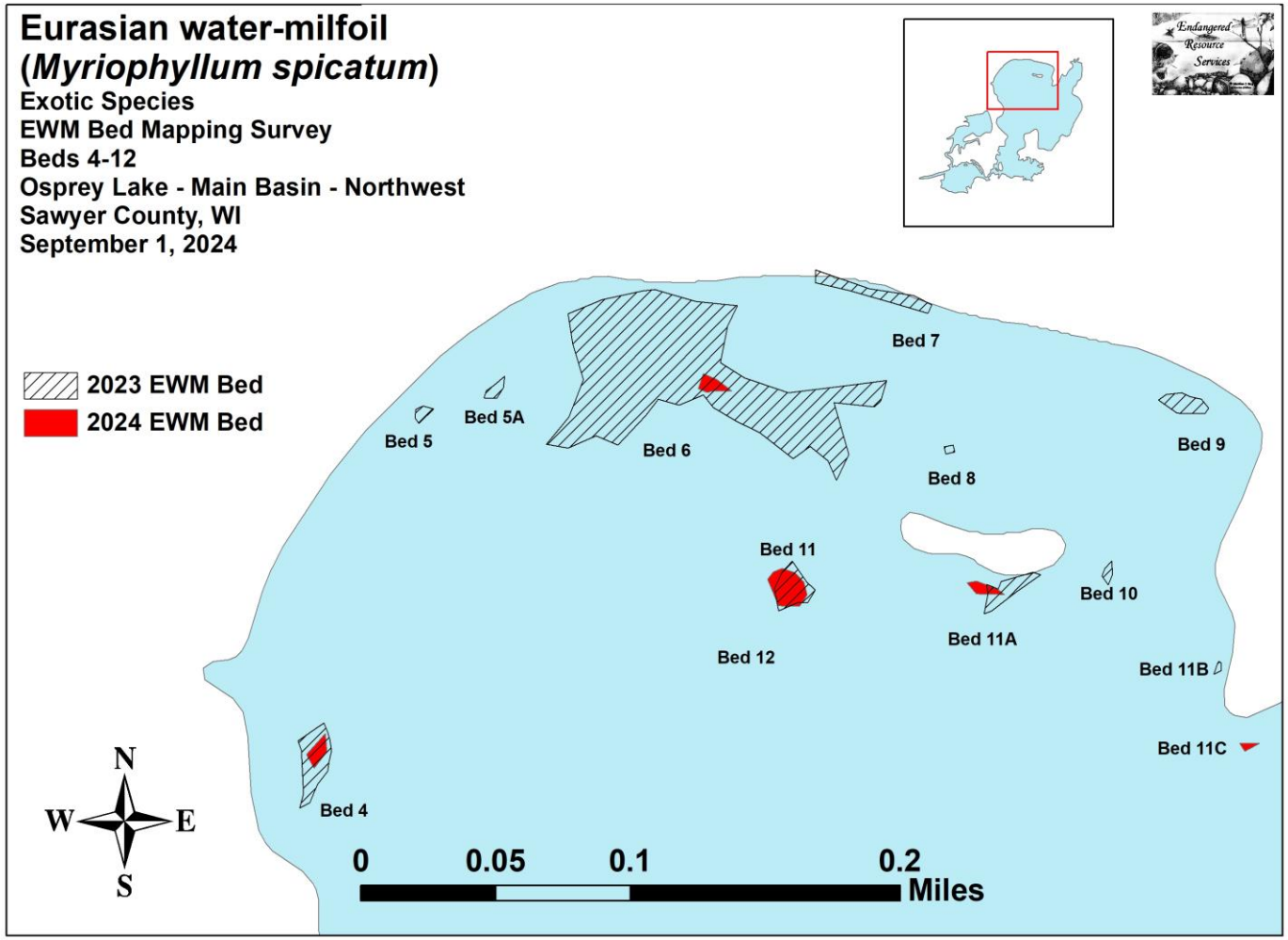
Miles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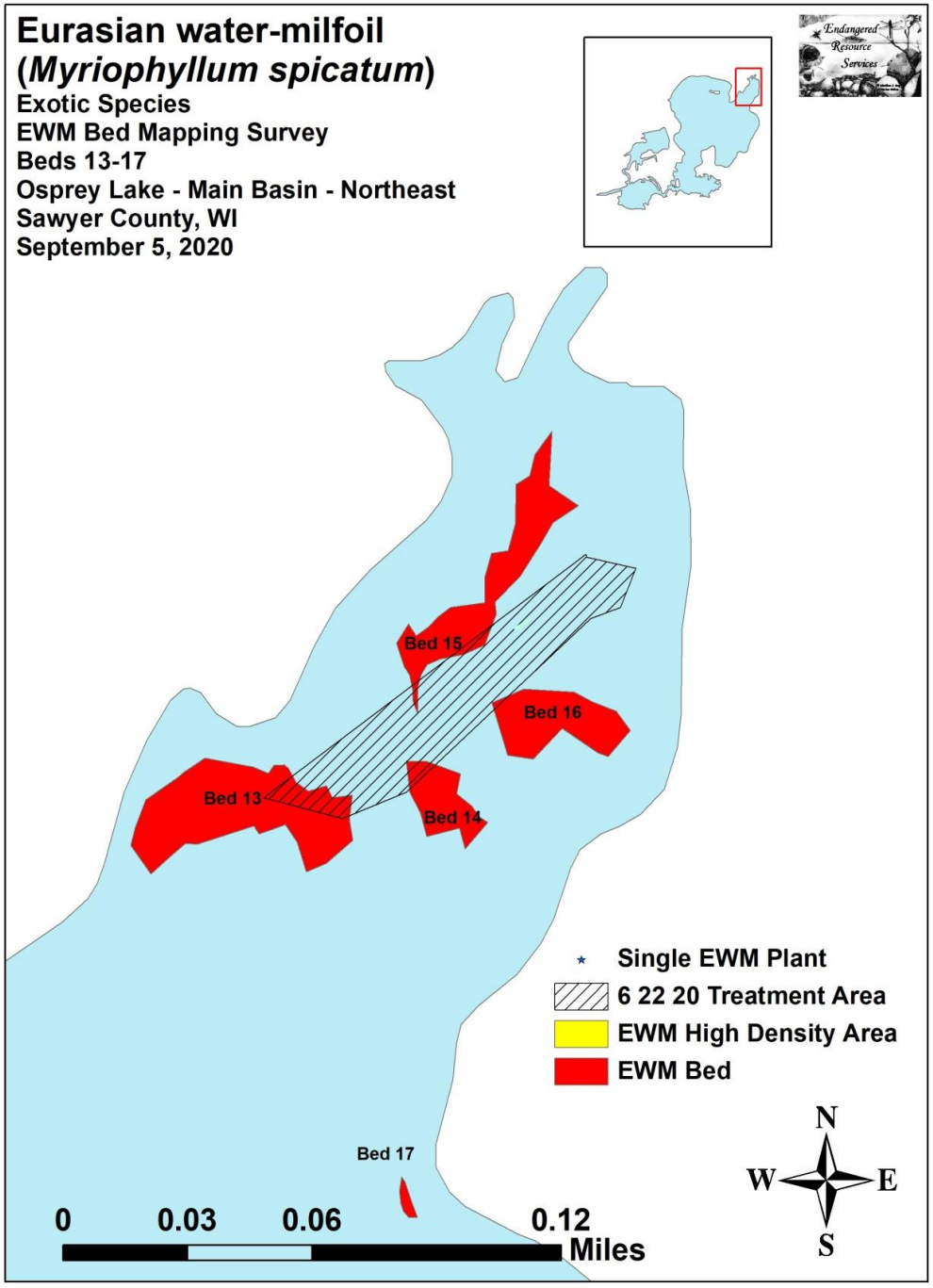
Eurasian water-milfoil
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EWM Bed Mapping Survey
Beds 13-17
Osprey Lake - Main Basin - Northeast
Sawyer County, WI
September 5, 2020
Endangered Resource Services
Bed 15
Bed 16
Bed 13
Bed 14
Bed 17
Single EWM Plant
6 22 20 Treatment Area
EWM High Density Area
EWM Bed
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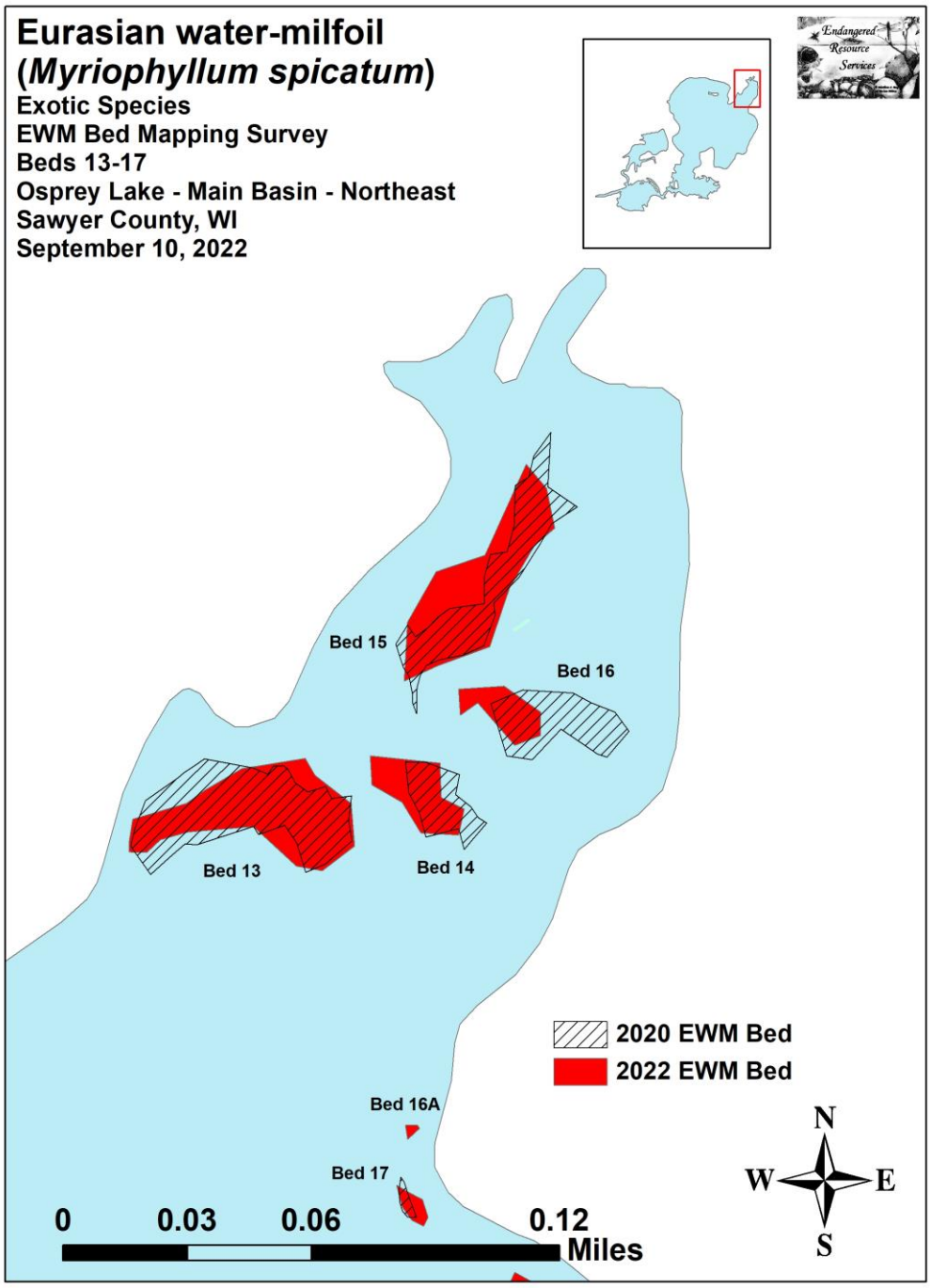
Miles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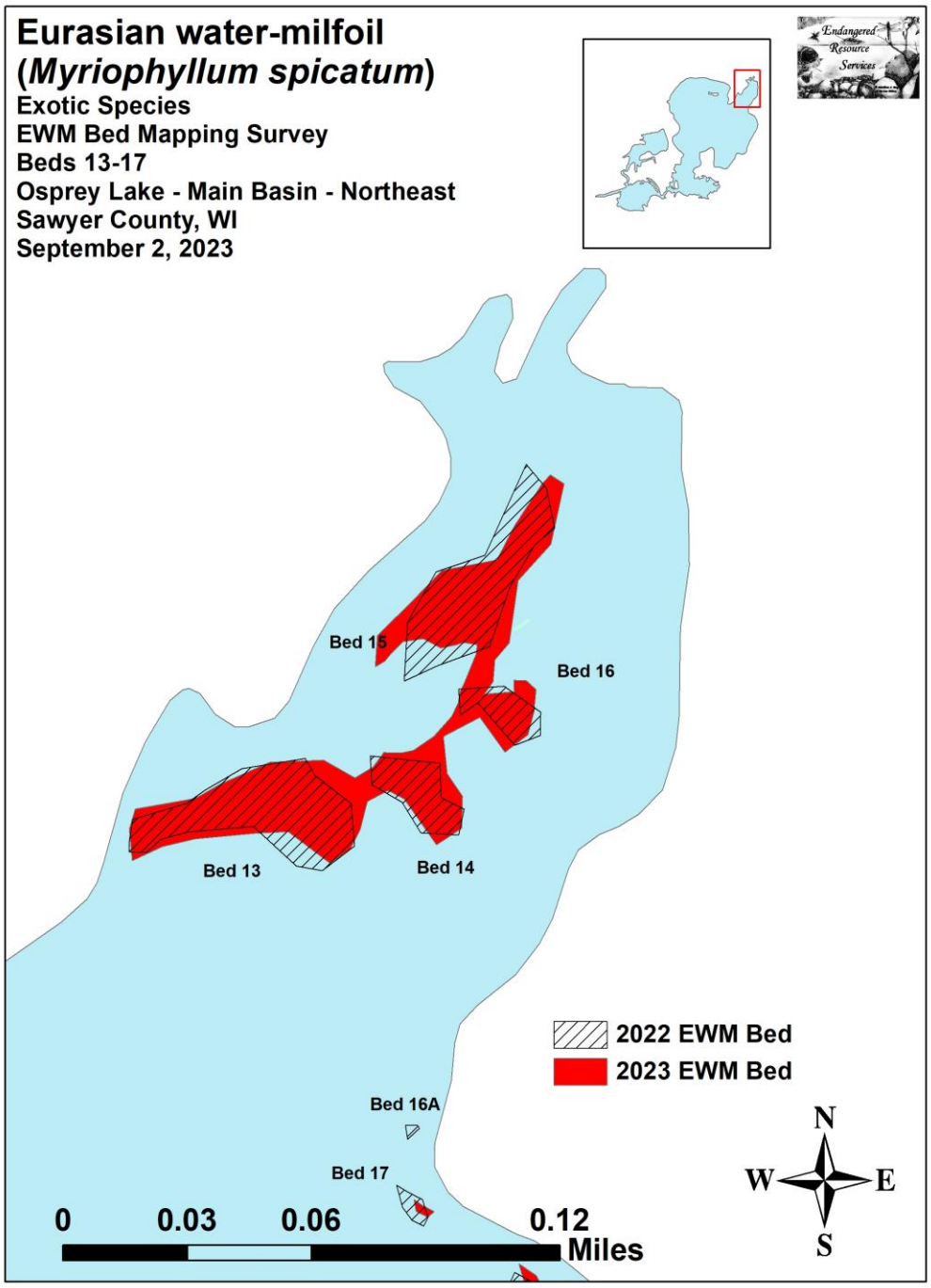
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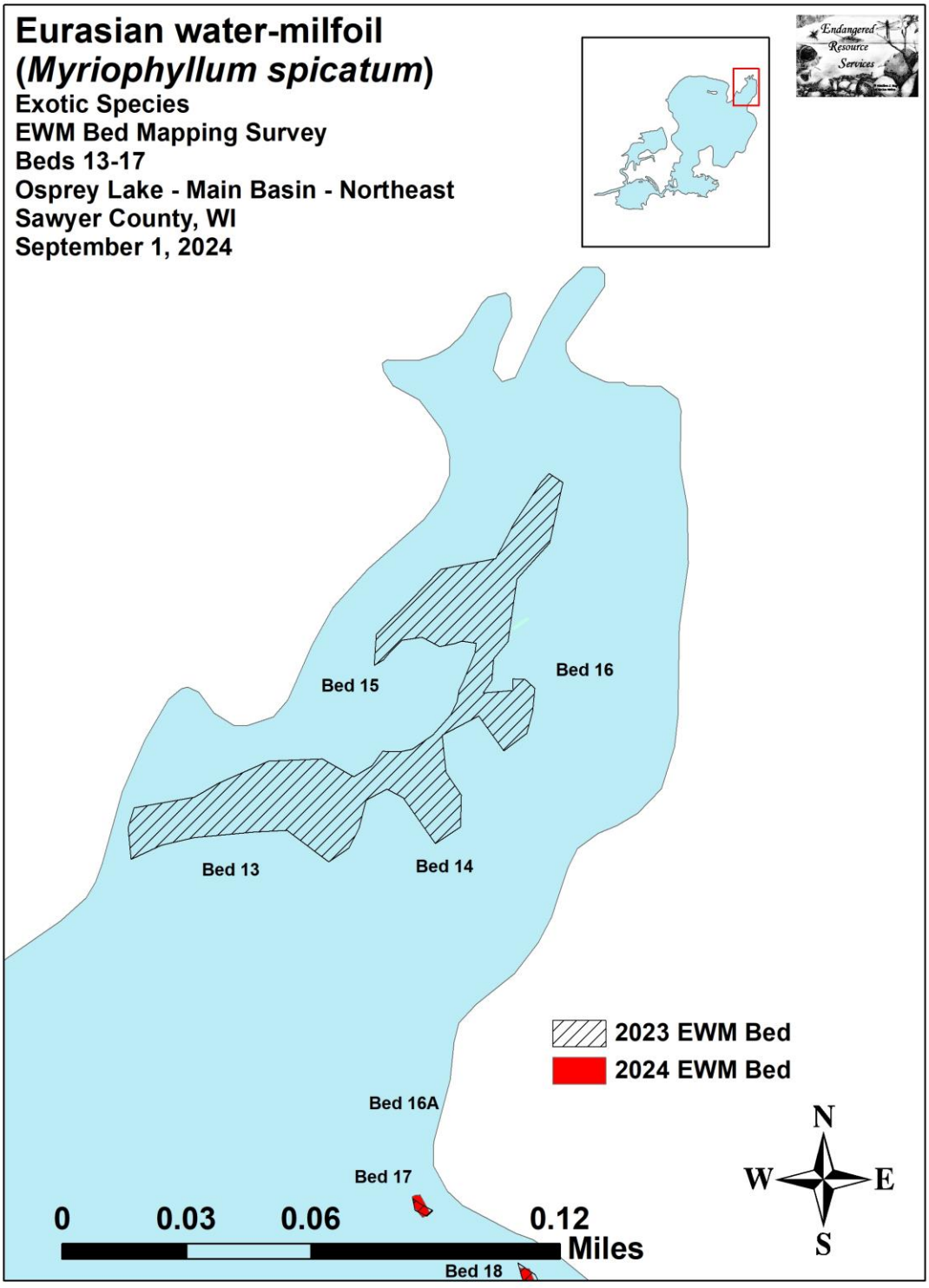
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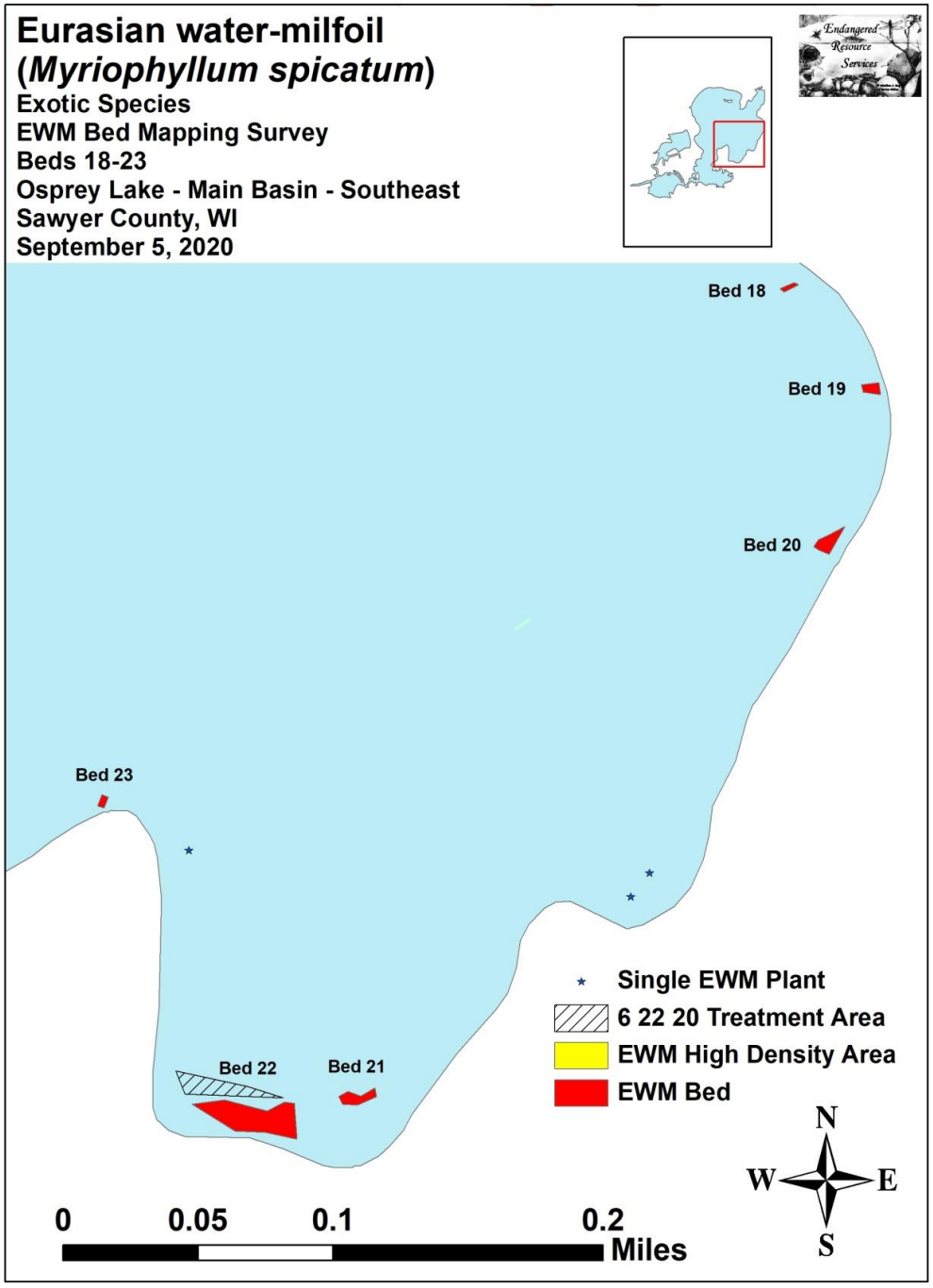
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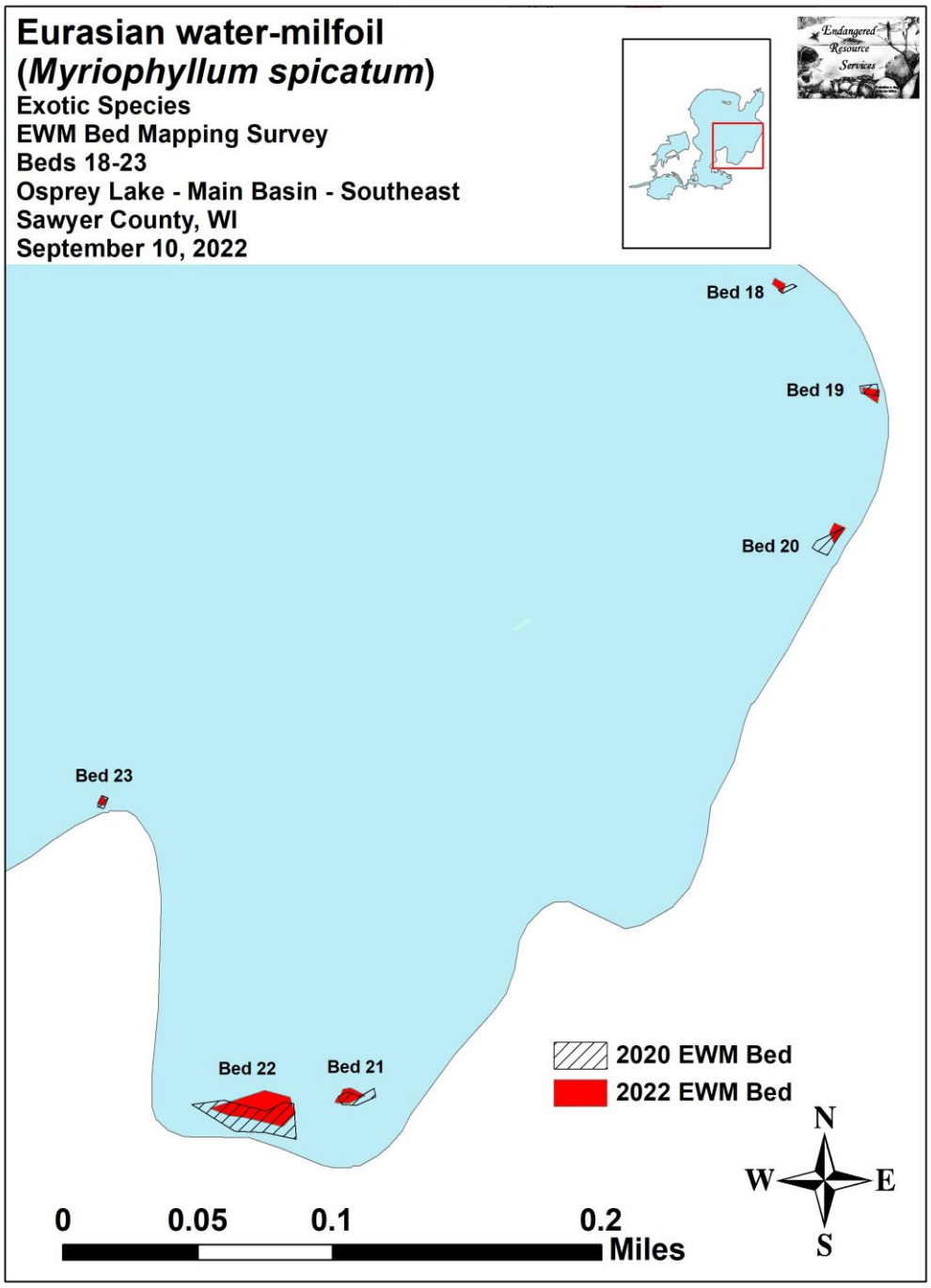
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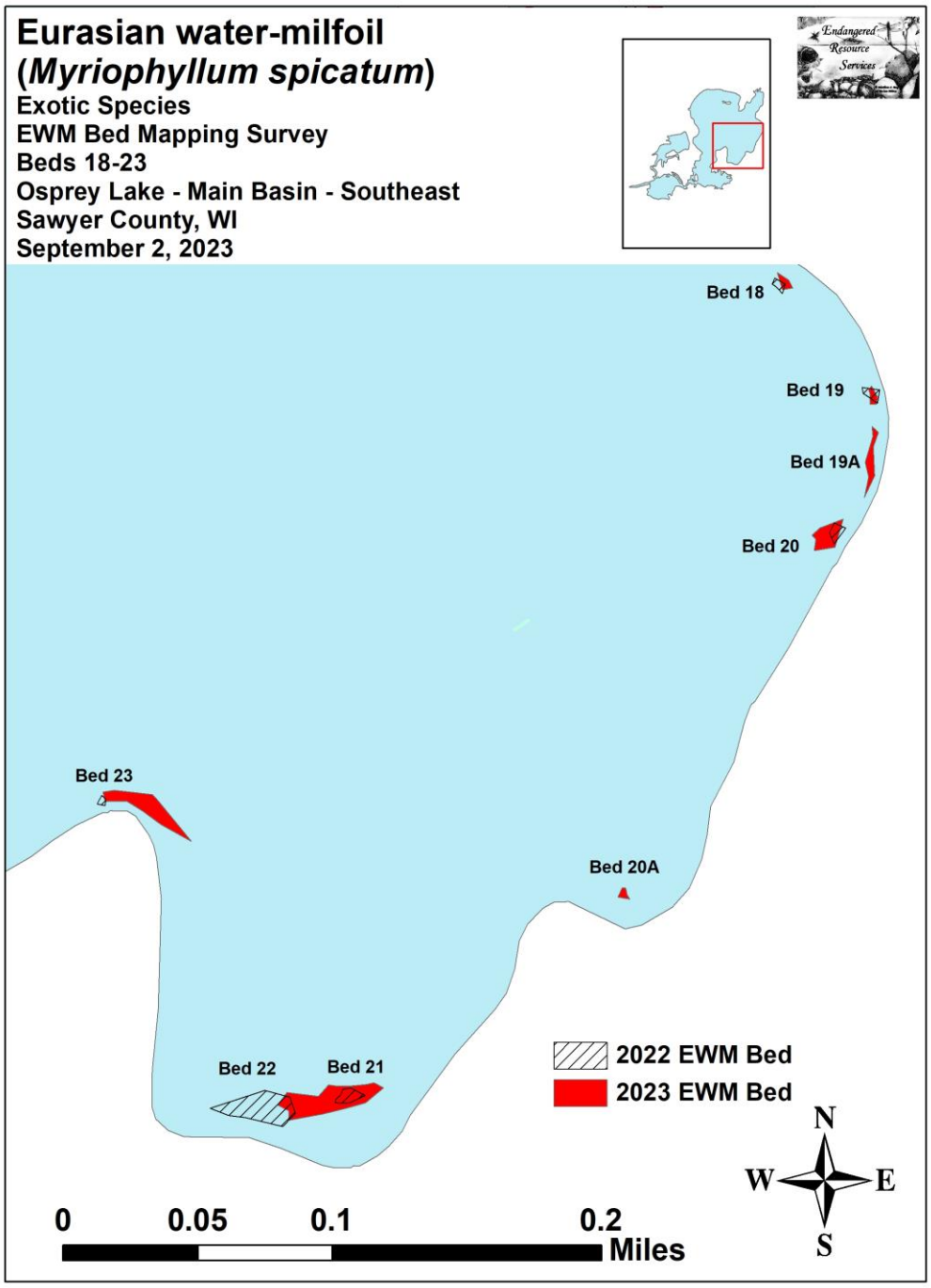
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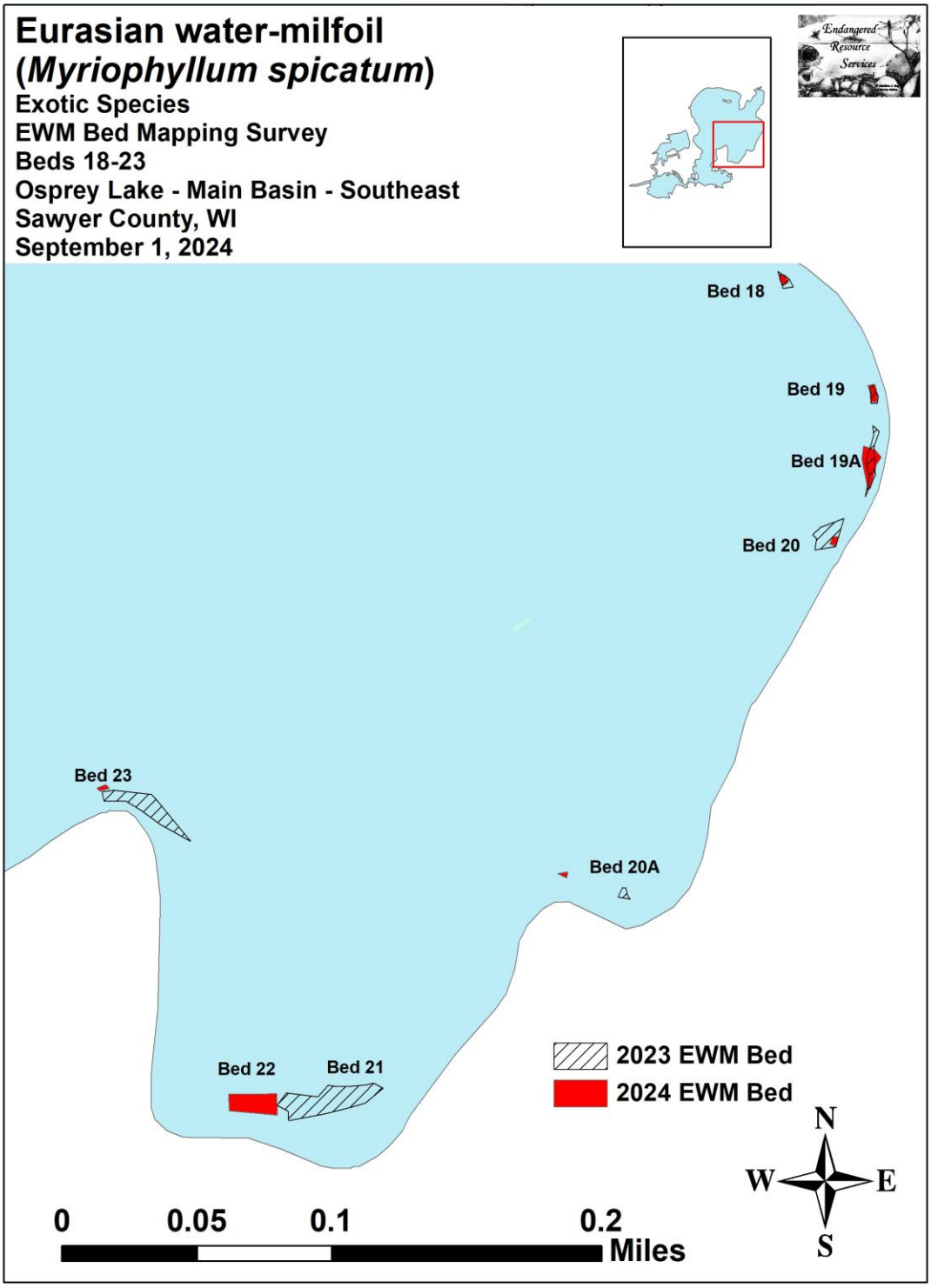
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