

Hybrid Eurasian water-milfoil
(*Myriophyllum spicatum* X *sibiricum*)
Bed Mapping Survey
Jackson Lake – WBIC: 2734200 - Bayfield County, Wisconsin



HWM beds (red) in Jackson Lake 8/20/24



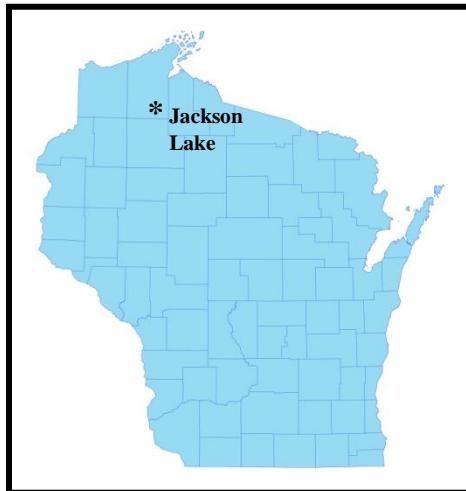
HWM plant (Berg 2018)



HWM leaves with 24-30 leaflets (Berg 2016)

Project Initiated by:

The Namekagon Lake Association, Harmony Environmental, the Wisconsin Department of Natural Resources, and the Bayfield County Land & Water Conservation Department



Canopied HWM in Jackson Lake's southeast bay (8/20/24)

Survey Conducted by and Report Prepared by:

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August 20, 2024

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INTRODUCTION:

Jackson Lake (WBIC 2734200) is a 149-acre drainage lake in south-central Bayfield County, Wisconsin in the Towns of Namekagon and Grand View (T43/44N R6W). It reaches a maximum depth of 13ft along the eastern shoreline immediately east of the southern rock bar and has an average depth of 8ft (Figure 1). The lake is eutrophic in nature, and water clarity is generally poor with summer Secchi readings from 1998 to 2017 (the most recent year data was available) ranging from 2-6ft and averaging 4.0ft (WDNR 2024). This clarity produced a littoral zone that extended to approximately 6ft in 2024. The lake's bottom substrate is primarily sand and sandy muck in the main basin, rock and gravel on the scattered sunken islands, and organic muck in sheltered bays and the outlet channel (Holt et al. 1972).

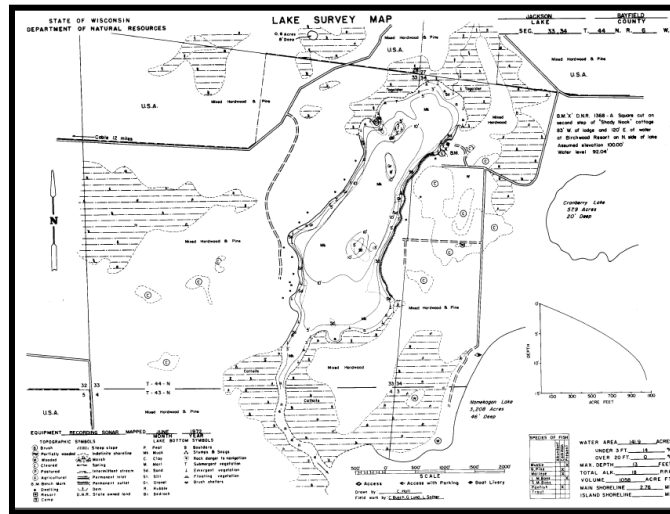


Figure 1: Jackson Lake Bathymetric Map

STUDY BACKGROUND AND RATIONALE:

On June 17, 2016, while doing bird surveys on Namekagon Lake, we discovered plants at the Lakewoods Resort Marina boat landing that looked to be intermittent between the exotic invasive Eurasian water-milfoil (*Myriophyllum spicatum*) (EWM) and native Northern water-milfoil (*Myriophyllum sibiricum*) (NWM). Wisconsin Department of Natural Resources (WDNR) and Bayfield County Land and Water Conservation Department (BCLWCD) immediately followed-up with a collection of plants that were sent to the state lab where DNA analysis confirmed them as Hybrid water-milfoil (HWM).

With the expectation that, eventually, HWM would move through the system and establish in all connected lakes, we were asked to complete a full warm-water point-intercept macrophyte survey on Jackson Lake in 2018 and subsequent annual late-summer or fall shoreline surveys. The immediate goals of these initial surveys were to determine if HWM had invaded the lake; and, if found, to delineate the extent of the infestation. Following the discovery of HWM in Jackson Lake in 2022 and the decision not to manage it at that time, we were asked to return to the lake in 2023 and 2024 to see how much HWM had expanded. This report is the summary analysis of our bed mapping survey conducted on August 20, 2024.

METHODS:

Late Summer Hybrid 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 HWM 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 HWM, we also mapped “high density areas” where HWM plants were continuous but didn’t meet all of the other “bed” criteria. We also GPS marked individual HWM plants not associated with beds or “high density areas” and attempted to rake remove them.




<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:

Late Summer Hybrid Water-milfoil Bed Mapping Survey:

On August 20, 2024, we surveyed transects covering 6.8km (4.2 miles) (Figure 3). At the time of the survey, we had sunny skies and mostly calm winds which made for excellent search conditions and allowed us to see down in the water column approximately 3ft. After seeing nothing in the access channel from Namekagon Lake or along the western shoreline during our 2022 survey, we found and rake removed four individual Hybrid water-milfoil plants in the southwest end of Jackson Lake in 2023. In 2024, this area supported two microbeds of HWM, and we located an additional small bed further north along the shoreline (Figure 4) (Appendix I). In the northeast bay where we found and rake removed a single HWM plant in 2022, we were again pleased to find no evidence of HWM. Similarly, we found nothing in the area where we rake removed a single HWM plant on the eastern shoreline in 2023.

The initial bed discovered in the lake's southeast bay again showed considerable expansion. In 2022, we found the bed had 100+ plants and covered 0.05 acre (0.03% of the lake's surface area) (Table 1). By 2023, it had grown to 0.29 acre (+480%), had 100's of canopied plants, and had spawned a second small low-density bed that covered 0.04 acre. Together, these two beds totaled 0.33 acre (0.22% surface area) and represented a 0.28-acre increase (+560%) over 2022 levels. The 2024 survey found the 2023 beds had merged into a super bed that now covered 2.00 acres. Collectively, the four beds totaled 2.23 acres (1.50% of the lake's surface) – a further 1.90-acre (+576%) increase over 2023 levels.



Figure 3: August 20, 2024 Littoral Zone HWM Survey Transects

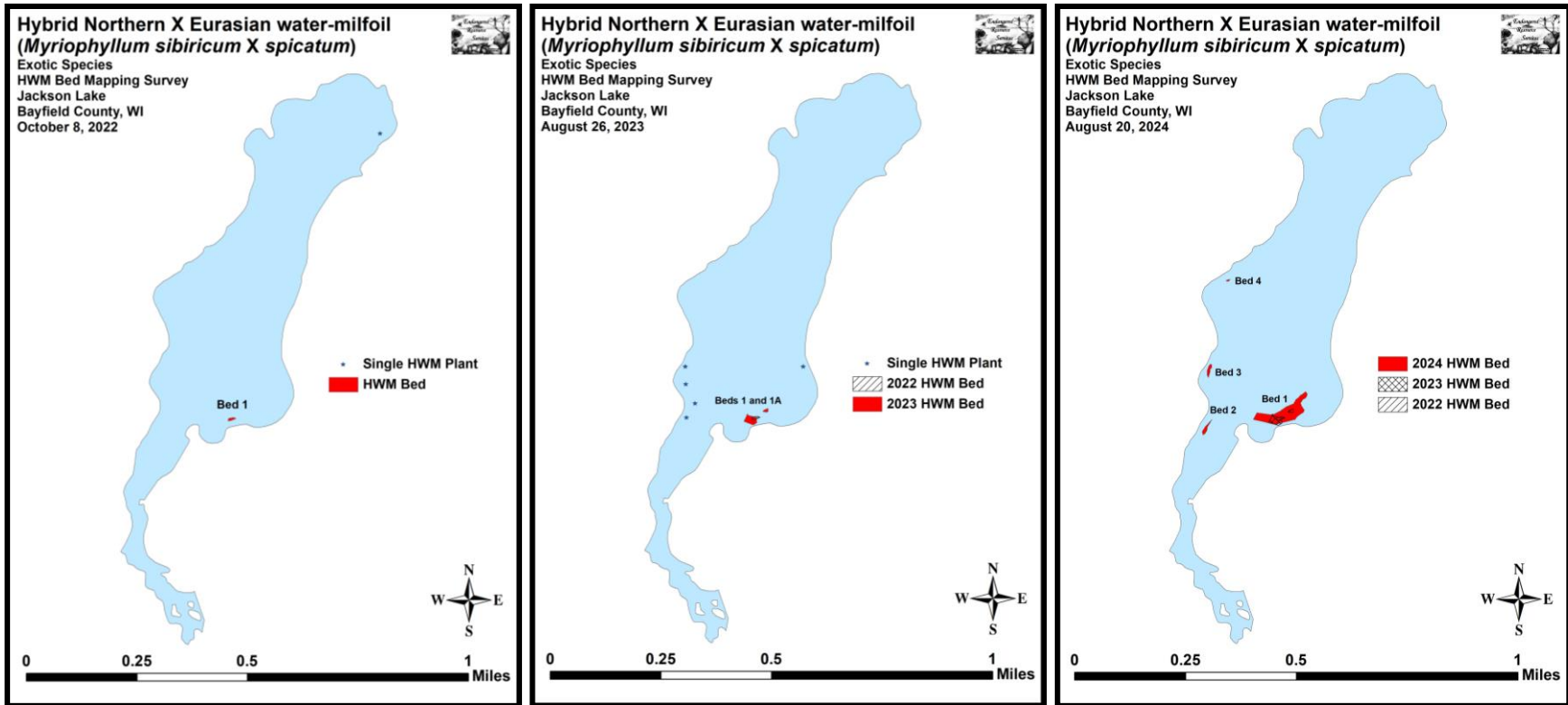


Figure 4: 2022, 2023, and 2024 Hybrid Water-milfoil Bed Maps

**Table 1: Hybrid Water-milfoil Bed Mapping Summary
Jackson Lake - Bayfield County, WI
August 20, 2024**

Bed Number	2024 Acreage	2023 Acreage	2022 Acreage	2023-2024 Change in Acreage	Rake Range and Mean Rake Fullness	Depth Range and Mean Depth	Canopied	Navigation Impairment	2024 Field Notes
1	2.00	0.29	0.05	1.71	<<<<1-3; 2	2-5; 4	Yes	Moderate	Merging into canopied mat.
1A	Merged	0.04	0	-	<<<<1-3; 2	2-5; 4	Yes	Moderate	Merged with Bed 1.
2	0.11	0	0	0.11	<<<<1-3; 1	2-5; 4	Yes	Minor	Shoreline microbed.
3	0.10	0	0	0.10	<<<<1-3; 2	2-5; 4	Yes	Minor	Shoreline microbed.
4	0.01	0	0	0.01	<<<<1-2; 1	2-5; 4	Yes	Minor	Shoreline microbed.
Total	2.23	0.33	0.05	+1.90					

CONSIDERATIONS FOR MANAGEMENT:

Following another year without management, the expansion of Hybrid water-milfoil in Jackson Lake is disappointing, but not unexpected. Fortunately, HWM continues to occupy a relatively small percentage of the lake's surface area, but it is now 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 lake association moving forward.

Based on our findings, manual removal is likely no longer a realistic management option, and it now seems probable that a limited herbicide treatment would be needed to reduce the infestation from its current level. Similarly, how much monitoring will be needed in 2025, if any, is a conversation that needs to take place. Ultimately, the NLA, HE, and the WDNR will have to decide on a course of action. In the meantime, lake residents should remain on the lookout for any signs of HWM. Because native Northern water-milfoil continues to be widely-distributed throughout Jackson Lake and closely resembles HWM, finding and identifying HWM will likely be challenging for volunteers. To assist in identification, surveyors should remember that Northern water-milfoil has leaflets numbering <24 whereas EWM normally has >26 with HWM tending to have leaflet numbers that range from 20-30 – intermittent between both parent species (Figure 5). When looking at the plants as a whole, EWM and HWM tend to have a bright red growth tip on the top of the plant whereas NWM has a bright lime-green growth tip. When picked out of the water, EWM and HWM leaflets tend to fall limp against the stem while NWM tends to hold its leaflets perpendicular to the stem. In the fall, NWM also forms winter buds on the tips of shoots whereas EWM/HWM have none (Figure 6). If residents discover a plant they even suspect may be HWM, 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 want identified.



Eurasian Water-milfoil

Hybrid Water-milfoil

Northern Water-milfoil

Figure 5: Eurasian, Hybrid, and Northern Water-milfoil Identification



Figure 6: Limp Nature of EWM/HWM Leaflets along Stem – Stiff Nature of NWM Leaflets along Stem and Overwintering Turions

LITERATURE CITED

Holt, C., C. Busch, G. Lund, and L. Sather. [online]. 1972. Jackson Lake Bathymetric Map. Available from https://apps.dnr.wi.gov/doclink/lakes_maps/2734200a.pdf (2024, November).

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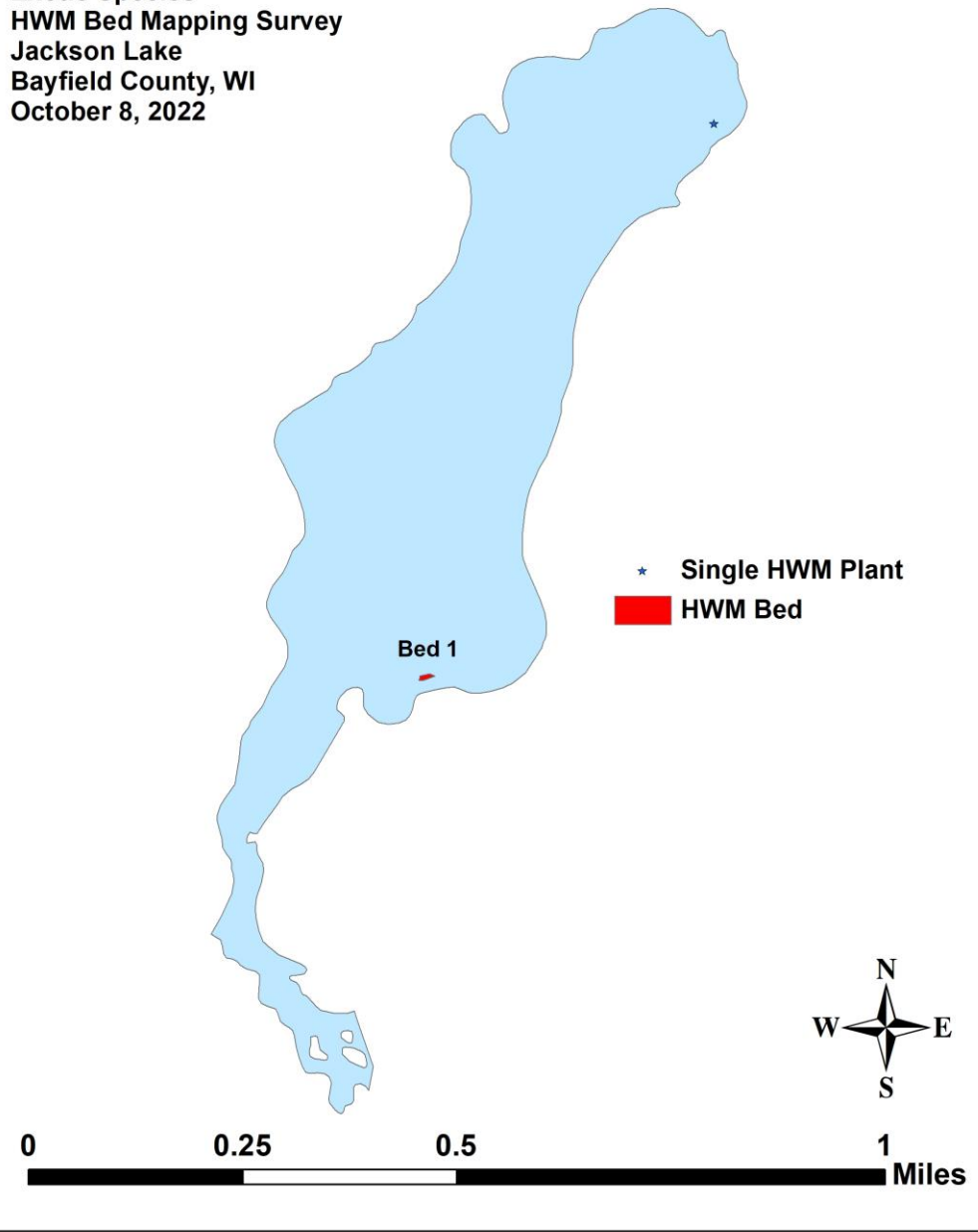
WDNR. [online]. 2024. Jackson Lake – Wisconsin Lakes Information. <https://apps.dnr.wi.gov/lakes/lakepages/LakeDetail.aspx?wbic=2734200> (2024, November).

Appendix I: 2022, 2023, and 2024 Hybrid Water-milfoil Bed Maps

**Hybrid Northern X Eurasian water-milfoil
(*Myriophyllum sibiricum* X *spicatum*)**



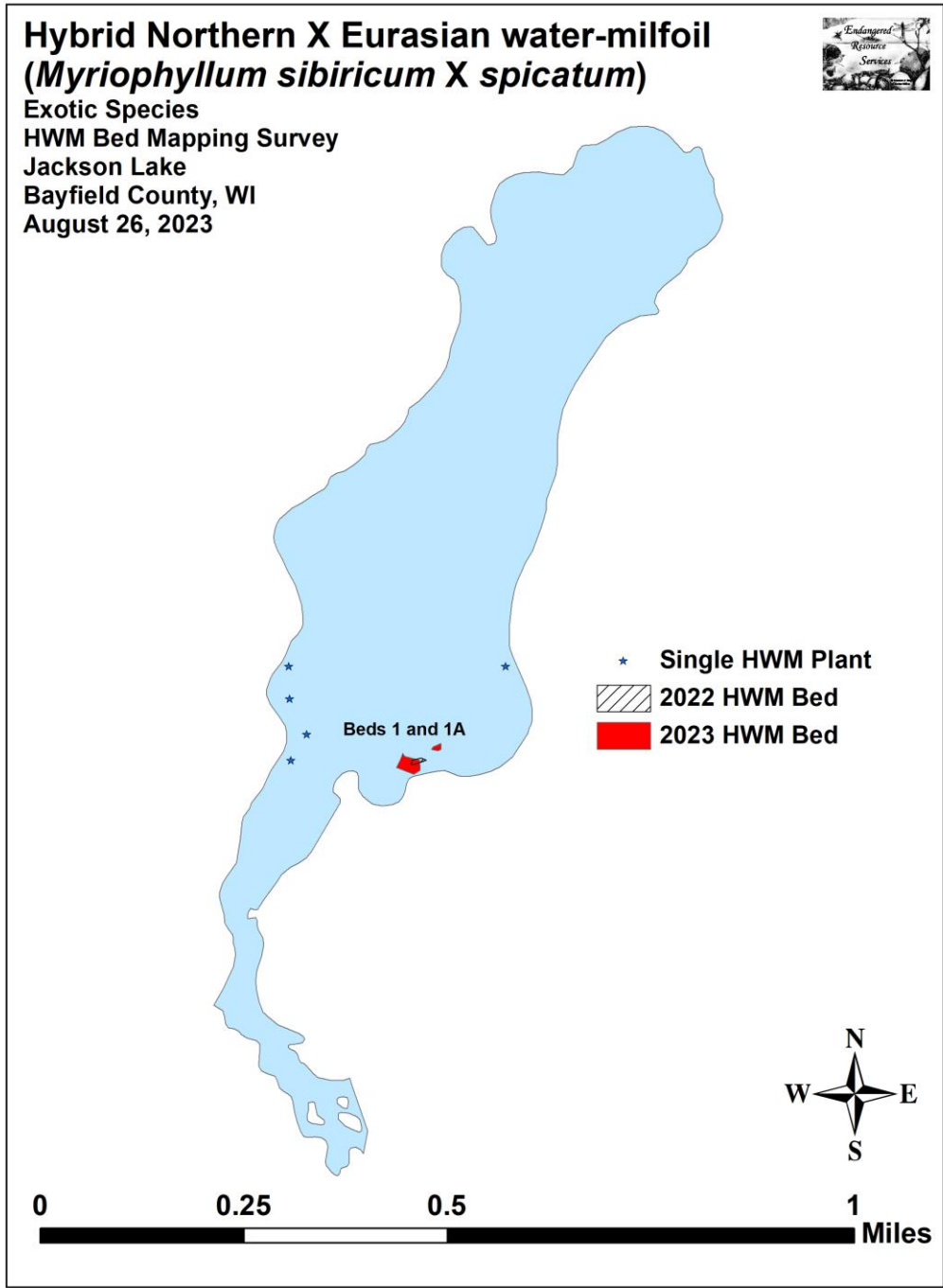
Exotic Species
HWM Bed Mapping Survey
Jackson Lake
Bayfield County, WI
October 8, 2022



Hybrid Northern X Eurasian water-milfoil (*Myriophyllum sibiricum* X *spicatum*)



Exotic Species
HWM Bed Mapping Survey
Jackson Lake
Bayfield County, WI
August 26, 2023



Hybrid Northern X Eurasian water-milfoil (*Myriophyllum sibiricum* X *spicatum*)



Exotic Species
HWM Bed Mapping Survey
Jackson Lake
Bayfield County, WI
August 20, 2024

