Teal, Lost Land & Ghost Lakes Improvement Association

Quiet Lakes Large Scale AIS Management
Grant #: ACEI34024

2024 Management & Monitoring Report

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Introduction

The Teal, Lost Land & Ghost Lakes Improvement Association, hereby referred to as the Quiet Lakes Improvement Association (QLIA) has been engaged in an ongoing effort to manage Eurasian watermilfoil (*Myriophyllum spicatum*) and Hybrid watermilfoil (*Myriophyllum spicatum x Myriophyllum sibiricum*) in Lost Land Lake and Teal Lake. Following the approval of their aquatic plant management plan in 2023, the QLIA submitted a Large-Scale AIS Management grant through the Wisconsin Department of Natural Resources (WDNR) Surface Water Grant Program.

In 2024, the QLIA was awarded the grant for the Quiet Lakes Large Scale AIS Management project (ACEI34024). The grant included funding for: 1) EWM management (herbicide treatment and hand pulling); 2) Annual late summer EWM bed mapping; 3) Pre-post point-intercept surveys of treatment areas; 4) Herbicide concentration monitoring and analysis; 5) Installation of AIS decontamination station at the Lost Land Lake boat landing; 6) Clean Boats, Clean Waters (CBCW) inspections; and 7) Distributing EWM educational materials to resorts.

Much data has been collected throughout this project. As part of the grant process, there are required deliverables: 1) EWM management and permit reporting (herbicide treatment records); 2) Data from all aquatic plant surveys; 3) Herbicide concentration results in SWIMS; 4) Decontamination station; 5) CBCW data in SWIMS; 6) Annual and final EWM management and monitoring reports. This document is a summary of all 2024 monitoring and management activities and the data collected, serving as an annual EWM management report.

EWM Monitoring and Management History

2006
Point-intercept survey of the Quiet Lakes performed by Flambeau Engineering, LLC; no EWM detected

2012
Point-intercept survey of the Quiet Lakes performed by Flambeau Engineering, LLC; no EWM detected

2013
EWM detected in Lost Land Lake by Great Lakes Indian Fish & Wildlife Commission on July 24, 2013

From the 2013 End of Year Sawyer County AIS Program Report:

- Scattered locations were found in the northern bay of Lost Land Lake and one location just south of the boat landing.
- The Sawyer County AIS Coordinator went out with 4 volunteers on Monday, August 5th, 2013 to locate and hand pull EWM locations found by GLIFWC.
- The Sawyer County AIS Coordinator surveyed the lake again on August 21st and found no EWM.
- The AIS Coordinator again went out on September 5th and surveyed the remaining areas on the lake where no EWM had been found. Again, no EWM was found.

2014
AIS Early Detection Monitoring detection of EWM/HWM

- HWM found at four sites in Lost Land Lake on August 27, 2014

Genetic testing at confirms presence of HWM on October 10, 2014

- Grand Valley State University tested a sample as part of Project AquaGen to genetically determine EWM, NWM, or HWM

2015
Chemical control attempted in Lost Land using 2,4-D in Wilson Bay; no additional details found

2016
Point-intercept survey of the Quiet Lakes performed by Flambeau Engineering, LLC

- Teal and Ghost had no EWM
- Lost Land had EWM at 3 points (1.7% frequency of occurrence)
    - Approximately 22 acres of EWM

WDNR Water Resources Management Specialist Alex Smith estimated approximately 21 acres of "topped out" HEWM in Lost Land Lake on June 23, 2016

2017

Aquatic Plant Management Plan Update approved in May

- Mechanical removal with an EcoHarvester in addition to chemical control was recommended
- 9.9 acres of EWM were treated using 37.3% Diquat Dibromide

2019

EcoHarvester purchased to mechanically remove EWM

- Mechanical removal begins

2020

EcoHarvester mechanical removal of EWM

- EWM anecdotally spreads to Teal Lake

2021

EcoHarvester mechanical removal of EWM

2022

EcoHarvester mechanical removal of EWM

Point-intercept survey performed by Endangered Resource Services, LLC

- Lost Land had EWM at 239 points (46.7% frequency of occurrence)
- Teal had EWM at 26 points (18.3% frequency of occurrence)

Fall bedmapping performed by Endangered Resource Services, LLC

- Lost Land had 21 beds totaling 263.39 acres of EWM
- Teal had 35 beds totaling 44.36 acres of EWM

2023

EcoHarvester mechanical removal of EWM

Aquatic Plant Management Plan for 2024-2028 by Lake Education and Planning Services, LLC approved

2024

Pre-treatment point-intercept survey of treatment areas performed by Endangered Resource Services, LLC May 31, 2024

- EWM found at 110 of 150 total treatment sites (73.3% frequency of occurrence)

ProcellaCOR treatment by Schmidt's Aquatic

- 30.11 acres in Lost Land
- 6.08 acres in Teal

Post-treatment point-intercept survey of treatment areas performed by Endangered Resource Services, LLC August 21, 2024

- EWM found at 5 of 150 total treatment sites (3.3% frequency of occurrence)

EcoHarvester mechanical removal of EWM in Steamboat Bay only (primarily harvesting plants that were already uprooted and floating on the surface).

Fall bedmapping performed by Endangered Resource Services, LLC

- Lost Land had 5 beds totaling 7.26 acres of EWM (-97.24% reduction from 2022)
- Teal had 11 beds totaling 9.92 acres of EWM (-77.64% reduction from 2022)

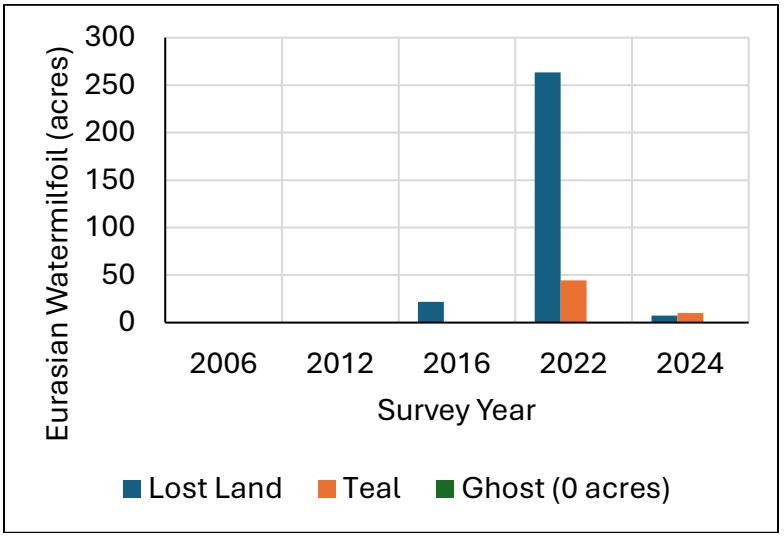


FIGURE 1. ACRES OF EWM DETECTED DURING SURVEYS

2022 Point Intercept Survey

As a precursor to this project, the QLIA received grant funding in 2022 (Grant AEPP67622 and Grant AEPP67522) to update their aquatic plant management plan, perform point-intercept surveys, and do fall bedmapping. The following information is summarized from Endangered Resource Services (ERS) 2022 Eurasian watermilfoil warm-water point-intercept survey reports for Lost Land and Teal Lakes conducted in August 2024. These reports provide comparisons to surveys conducted in 2016 as well.

Lost Land Lake

EWM 2016 and 2022 (ERS)

In 2022, EWM was the most common species Lost Land Lake with a relative frequency of 15.67%. It was documented in the rake at 118 points (23.04% total coverage/35.01% of littoral points) with five additional visual sightings. Of these, 54 points rated a rake fullness of 3, 29 were a 2, and the remaining 35 were a 1 for a mean rake fullness of 2.16. This extrapolated to 16.21% of the entire lake and 24.62% of the littoral zone having a significant infestation (rake fullness 2 or 3). When compared to the 2016 survey, the 2022 results suggested EWM had undergone a highly significant increase ($p<0.001$) in total distribution, rake fullness 1, rake fullness 2, and rake fullness 3. The mean density also saw a highly significant increase ($p<0.001$; Figure 2).

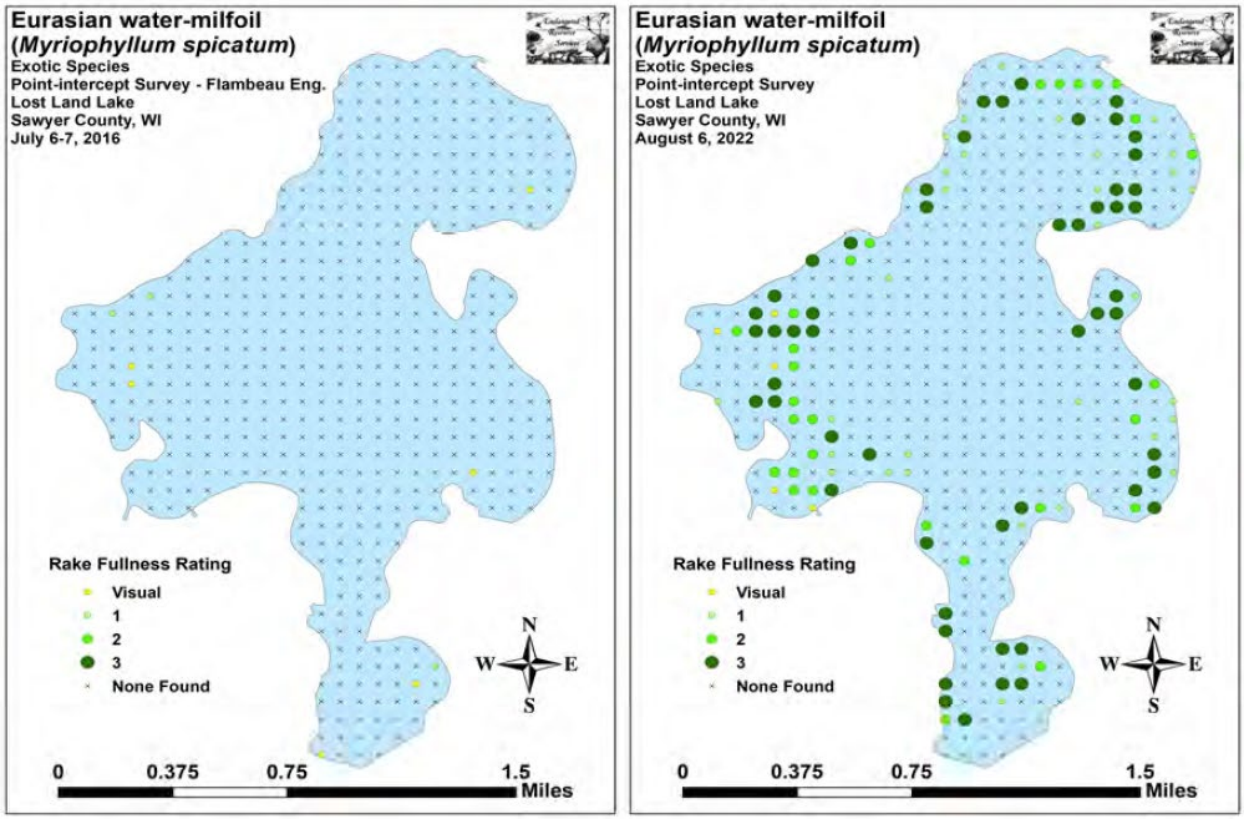


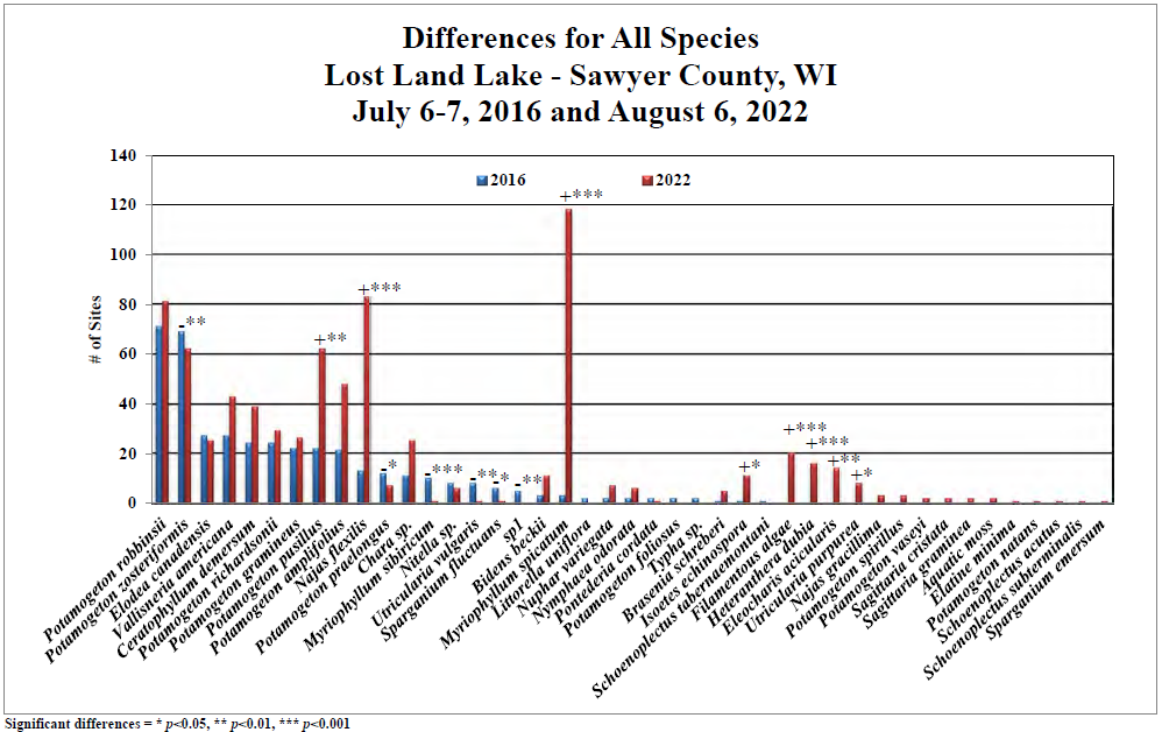
FIGURE 2. LOST LAND LAKE 2016 AND 2022 POINT INTERCEPT SURVEY EWM COMPARISON (ERS)

Native Macrophyte Species 2016 and 2022 (ERS)

In July 2016, Flambeau Engineering identified Fern pondweed, Flat-stem pondweed, Common waterweed, and Wild celery as the most widely-distributed species. They were present at 30.60%, 29.74%, 11.64%, and 11.64% of survey points with vegetation respectively; and, collectively, they accounted for 48.38% of the total relative frequency. Coontail (5.99%), Clasping-leaf pondweed (5.99%), Variable pondweed (5.49%), Small pondweed (5.49%), and Large-leaf pondweed (5.24%) also had relative frequencies over 4.00%.

In the 2022 ERS survey, Eurasian water-milfoil, Slender naiad, Fern pondweed, and Small pondweed were the most common species. Present at 35.01%, 24.63%, 24.04%, and 18.40% of sites with vegetation, they accounted for 45.68% of the total relative frequency. Flat-stem pondweed (8.23%), Large-leaf pondweed (6.37%), Wild celery (5.71%), and Coontail (5.18%) also had relative frequencies over 4.00%.

Lakewide, 14 species showed significant changes in distribution from 2016 to 2022. Northern water-milfoil suffered a highly significant decline ($p<0.001$); Flat-stem pondweed ($p=0.002$), Common bladderwort ($p=0.003$), and an unidentified species (sp. 1) ($p=0.007$) underwent moderately significant declines; and White-stem pondweed ($p=0.04$), and Floating-leaf bur-reed ($p=0.01$) saw significant declines. Conversely, Slender naiad, Eurasian water-milfoil, filamentous algae, and Water star-grass enjoyed highly significant increases ($p<0.001$); Small pondweed ($p=0.003$) and Needle spikerush ($p=0.002$) saw moderately significant increases; and Spiny-spored quillwort ($p=0.02$) and Large purple bladderwort ($p=0.02$) had significant increases (Figure 3).



Significant differences = * $p<0.05$, ** $p<0.01$, *** $p<0.001$

FIGURE 3. LOST LAND LAKE 2016-2022 ALL SPECIES DIFFERENCES (ERS)

Teal Lake

EWM 2016 and 2022 (ERS)

In 2016, Flambeau Engineering found no evidence of EWM in Teal Lake. However, by 2022, it was established as the seventh most common species in the lake with a relative frequency of 5.23%. In the 2022 PI survey, it documented in the rake at 24 points (3.70% total coverage/9.72% of littoral points) with two additional visual sightings. Of these, three points rated a rake fullness of 3, nine were a 2, and the remaining 12 were a 1 for a mean rake fullness of 1.63. This extrapolated to 1.85% of the entire lake and 4.86% of the littoral zone having a significant infestation (rake fullness 2 or 3).

Statistically, when compared to the 2016 survey, the 2022 results suggested EWM had undergone a highly significant increase ($p<0.001$) in total distribution and rake fullness 1; a moderately significant increase ($p=0.002$) in rake fullness 2; and a nearly-significant increase ($p=0.08$) in rake fullness 3. The mean density also saw a significant increase ($p<0.001$; Figure 3).

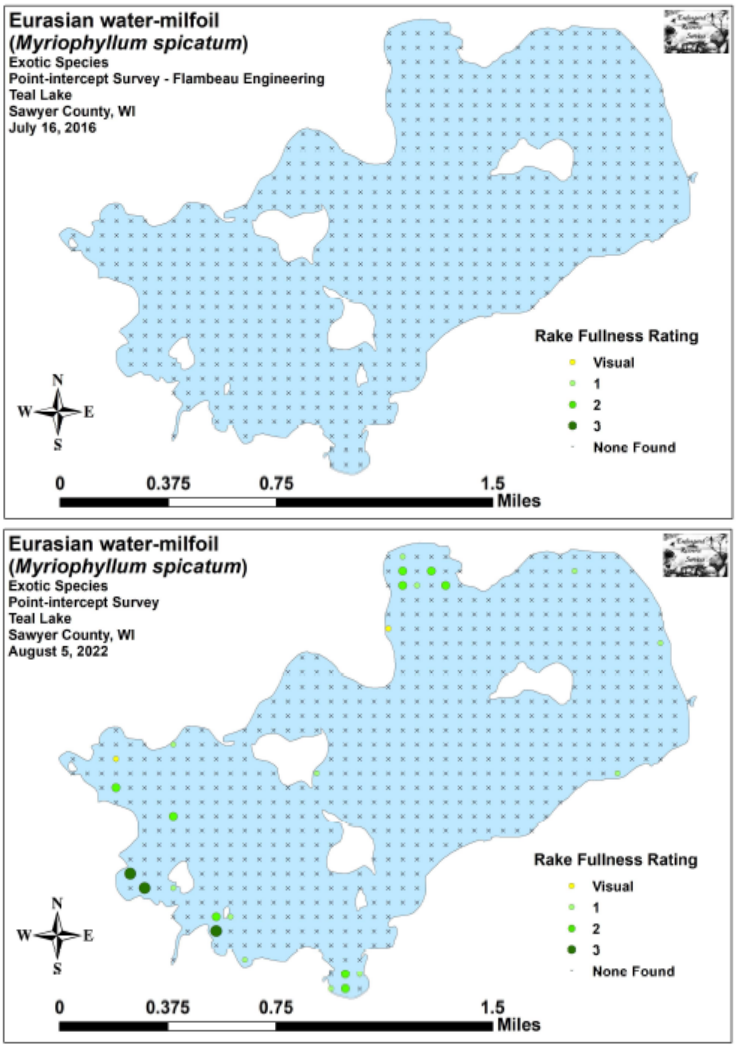


FIGURE 4. TEAL LAKE 2016 AND 2022 POINT INTERCEPT SURVEY EWM COMPARISON (ERS)

Native Macrophyte Species 2016 and 2022 (ERS)

In July 2016, Flambeau Engineering identified Wild celery, Large-leaf pondweed, Fern pondweed, and Nitella as the most widely-distributed species. They were present at 40.37%, 22.02%, 19.27%, and 17.43% of survey points with vegetation respectively; and, collectively, they accounted for 48.21% of the total relative frequency. Flat-stem pondweed (6.70%), Variable pondweed (6.25%), Common waterweed (5.36%), Small pondweed (5.36%), Slender naiad (4.46%), and Coontail (4.02%) also had relative frequencies over 4.00%

In the ERS 2022 survey, Slender naiad, Wild celery, Large-leaf pondweed, and Small pondweed were the most common species. Present at 42.25%, 37.32%, 24.65%, and 24.65% of sites with vegetation, they accounted for 39.87% of the total relative frequency. Nitella (6.10%), Flat-stem pondweed (5.66%), Eurasian water-milfoil (5.23%), Variable pondweed (5.01%), and Fern pondweed (5.01%) also had relative frequencies over 4.00%.

Lakewide, 12 species showed significant changes in distribution from 2016 to 2022. Aquatic moss was the only species that demonstrated a significant decline (p=0.03). Conversely, Slender naiad, Eurasian water-milfoil, Small pondweed, and Vasey's pondweed all enjoyed highly significant increases (p<0.001); Water marigold (p=0.001), Spiral-fruited pondweed (p=0.007), and Needle spikerush (p=0.007) saw moderately significant increases; and Muskgrass (p=0.02), Northern naiad (p=0.02), White water lily (p=0.03), and Spiny-spored quillwort (p=0.04) had significant increases (Figure 5).

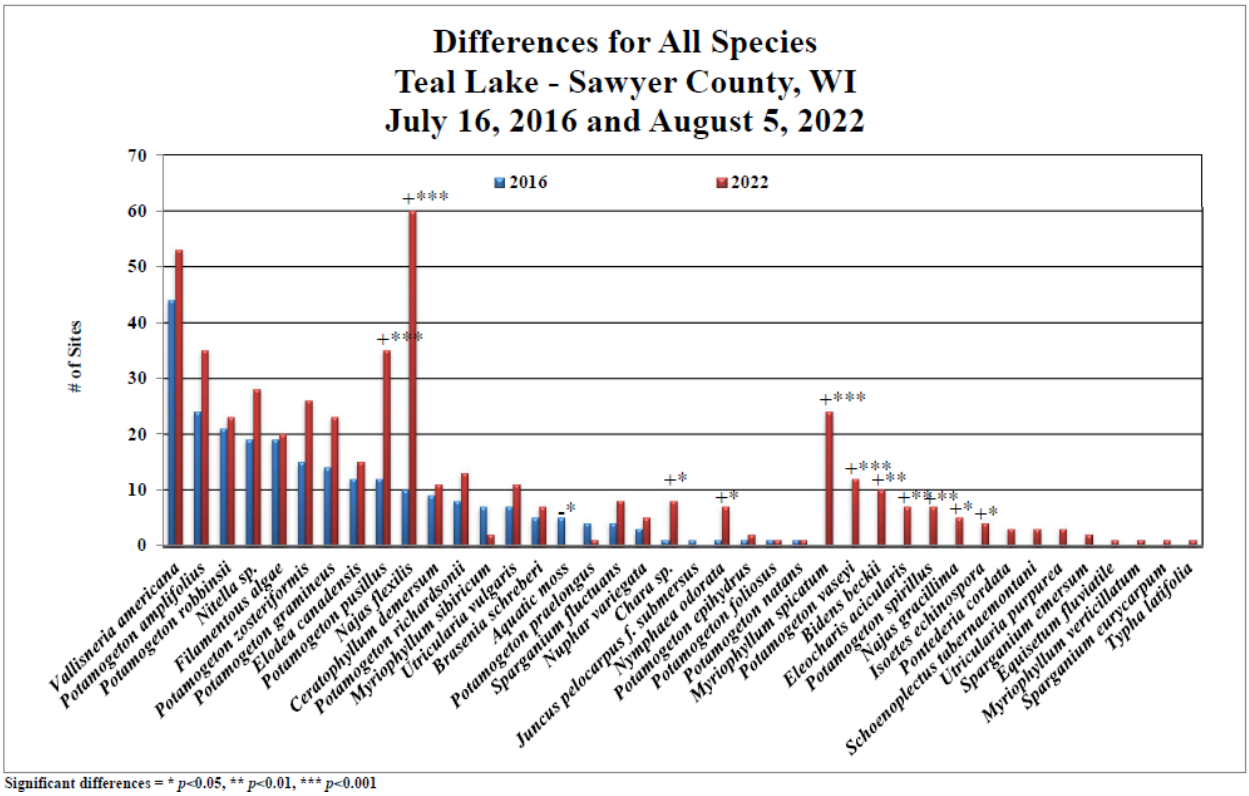


FIGURE 5. TEAL LAKE 2016-2022 ALL SPECIES DIFFERENCES (ERS)

2022 Bed Mapping

The results of the 2022 fall bedmapping surveys on Lost Land and Teal Lakes (performed by Endangered Resource Services) were used to inform the 2024 herbicide treatment. As such, it is pertinent to provide a summary of those results to provide context and justification for the treatment information.

The following information is summarized from the ERS 2024 Eurasian watermilfoil Late Summer Bed Mapping Survey reports for Lost Land and Teal Lakes conducted in September 2022.

Lost Land Lake

ERS searched 38.8 miles of transects across Lost Land Lake and found 21 beds of EWM covering 263.39 acres, which is 20.84% of the lake's surface area (Figure 6).

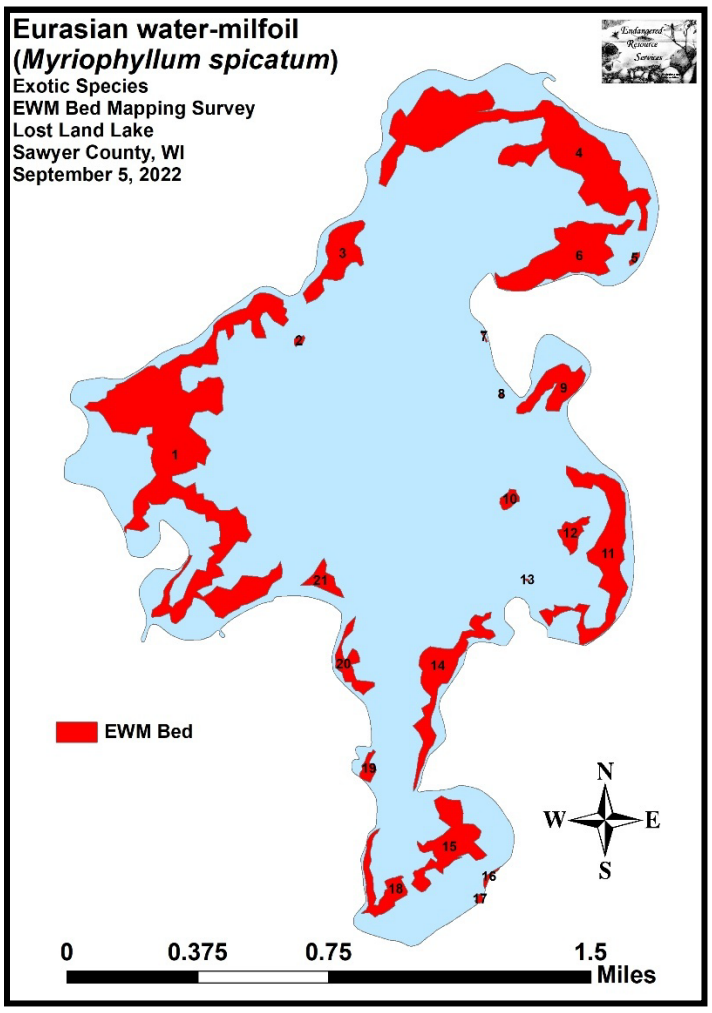


FIGURE 6. LOST LAND LAKE EWM BEDMAPPING 2022 (ERS)

Of these 21 beds, 15 had an average rake fullness of 2, 2 were judged to cause a 'severe' navigation impairment, 19 were nearly canopied or fully canopied, 2 beds were over 50 acres in size, and 7 were noted as 'dense' (Table 1).

TABLE-1. LOST LAND LAKE 2022 EWM BED NOTES (ERS)

Bed Number	2022 Acreage	Rake Range and Mean Rake Fullness	Depth Range and Mean Depth	Canopied	Navigation Impairment	2022 Field Notes
Bed 1	89.50	<<<1-3; 2	4-11; 8	Near	Moderate	Dense, nearly monotypic EWM throughout.
Bed 2	0.40	1-3; 3	6-10; 8	Near	Moderate	Dense bed on bar – canopied in center only.
Bed 3	10.19	<<<1-3; 2	4-10; 8	Near	Minor	Regular plants with dense microbeds interspersed.
Bed 4	60.14	<<<1-3; 3	4-10; 8	Near	Moderate	Majority of area is nearly monotypic EWM.
Bed 5	0.39	<<<1-2; <1	3-5; 4	Near	None	More of a High Density Area – peppering of plants.
Bed 6	22.10	<<<1-3; 3	2-10; 8	Yes	Severe	West side of bed canopied mat/east side fragmented.
Bed 7	0.09	<<<1-2; 1	4-10; 8	No	None	Narrow strip along shore/seems to be newly established.
Bed 8	0.07	1-3; 3	6-10; 8	Near	Minor	Dense microbed – too small to be more than a minor imp.
Bed 9	8.57	<<<1-3; 3	4-10; 8	Near	Moderate	Dense bed in majority of bay, but most subcanopy.
Bed 10	1.36	1-3; 3	7-10; 8	Yes	Moderate	Too small to be a severe impairment.
Bed 11	22.37	<1-3; 3	4-10; 8	Yes	Severe	Majority of bed canopied mat – fragments everywhere.
Bed 12	3.06	<1-3; 2	7-10; 8	Near	Moderate	Mixed with some native pondweeds.
Bed 13	0.04	1-3; 1	7-10; 8	Near	Minor	Microbed.
Bed 14	14.80	<<<1-3; 2	4-10; 8	Near	Minor	Highly variable, but essentially continuous.
Bed 15	14.03	<<<1-3; 2	4-10; 8	Near	Minor	Some plants flat on bottom/other patches canopied.
Bed 16	0.43	<<<1-2; 1	4-6; 5	Near	Minor	Thin band along shore.
Bed 17	0.27	<<<1-2; <1	4-8; 6	Near	None	Regular peppering of plants – more HDA than true bed.
Bed 18	6.46	<<<1-3; 3	4-10; 8	Near	Moderate	Majority of bed along shoreline – deep water areas dense.
Bed 19	1.52	1-3; 3	4-10; 8	Near	Moderate	Dense bed in underdeveloped bay.
Bed 20	4.57	<<<1-3; 2	4-10; 8	Near	Minor	Variable narrow bed in developed bay
Bed 21	3.03	<<<1-1; <1	4-10	No	None	Patchy – more HDA than true bed.
Total	**263.39**					

Teal Lake

ERS searched 27.3 miles of transects within the thoroughfare to Teal Lake and across its littoral zone and found 35 beds of EWM covering 44.36 acres, which is 4.33% of the lake's surface area (Figure 7).

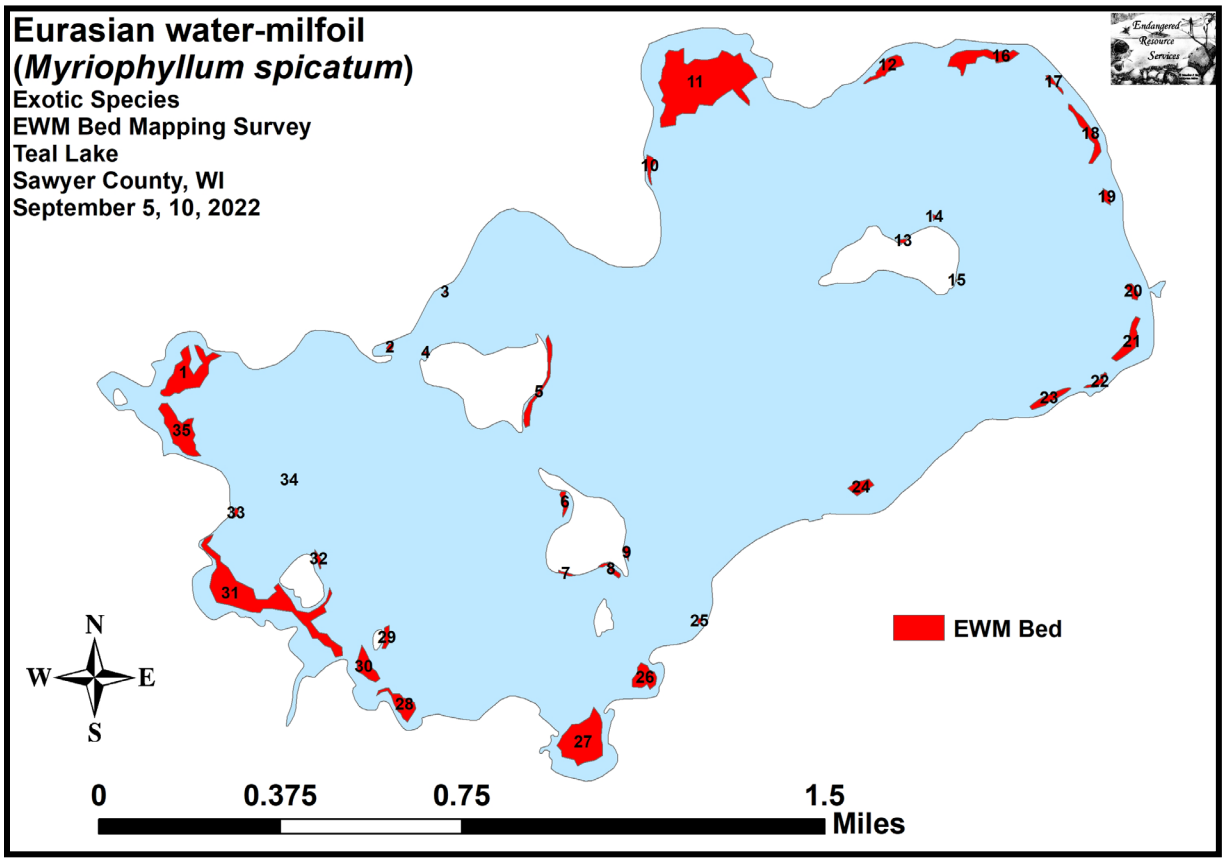


FIGURE 7. TEAL LAKE EWM BEDMAPPING 2022 (ERS)

Of these 35 beds, 27 had an average rake fullness of 2, none were judged to cause a 'severe' navigation impairment, all were nearly canopied or fully canopied, the largest bed was 12 acres, and the average bed size was 1.27 acres (Table 2).

TABLE-2. TEAL LAKE 2022 EWM BED NOTES (ERS)

Bed Number	2022 Acreage	Rake Range and Mean Rake Fullness	Depth Range and Mean Depth	Canopied	Navigation Impairment	2022 Field Notes
Bed 1	3.43	<<<1-3; 3	3-8; 6	Near	Moderate	Would be severe impairment but subcanopy.
Bed 2	0.10	<<<1-3; 2	3-8; 5	Near	Minor	Too small to be moderate impairment.
Bed 3	0.01	<<<1-2; 1	4-8; 6	Near	Minor	On edge of Spatterdock bed.
Bed 4	0.04	<<<1-3; 1	3-7; 5	Near	Minor	Along state-owned island.
Bed 5	1.03	<<<1-3; 2	3-7; 5	Near	Minor	Too narrow to be moderate impairment.
Bed 6	0.27	<<<1-3; 2	3-6; 5	Near	Minor	Along state-owned island - too narrow to be moderate.
Bed 7	0.09	<1-3; 3	3-6; 5	Near	Minor	Narrow ribbon along state-owned island.
Bed 8	0.26	<<<1-3; 2	3-7; 5	Near	Minor	Narrow ribbon along state-owned island.
Bed 9	0.13	<<<1-2; 1	3-7; 5	Near	Minor	Narrow ribbon along state-owned island.
Bed 10	0.37	<<<1-3; 2	3-7; 5	Near	Minor	Narrow ribbon along shoreline.
Bed 11	12.19	<<<1-3; 1	3-8; 5	Near	Minor	Highly variable area filled with merging towers.
Bed 12	0.95	<<<1-3; 3	3-6; 4	Near	Moderate	Too narrow to be severe impairment.
Bed 13	0.06	<<1-2; 2	3-6; 4	Near	Minor	Along state-owned island – too narrow to be moderate.
Bed 14	0.04	<<<1-2; 1	3-6; 4	Near	Minor	Open establishing bed along state-owned island.
Bed 15	0.01	<<<1-2; 1	2-5; 4	Yes	Minor	Open bed next to state-owned island.
Bed 16	2.06	<<<1-3; 1	3-6; 4	Near	Minor	Open bed mixed with Northern water-milfoil.
Bed 17	0.20	1-3; 2	4-8; 6	Near	Minor	Subcanopy, but full of prop-trails.
Bed 18	1.06	<<<1-3; 2	4-7; 6	Near	Minor	Nearly continuous shoreline ribbon.
Bed 19	0.23	1-3; 3	4-7; 6	Near	Moderate	Dense but narrow bed.
Bed 20	0.32	<<1-3; 2	4-7; 6	Near	Minor	Mixed with Northern water-milfoil.
Bed 21	1.03	<<1-3; 2	4-7; 6	Near	Minor	Mixed with Northern water-milfoil.
Bed 22	0.26	1-3; 3	4-7; 6	Yes	Moderate	Too narrow to be severe impairment.
Bed 23	0.72	1-3; 3	4-7; 6	Yes	Moderate	Too narrow to be severe impairment.
Bed 24	0.63	<<1-3; 2	4-7; 6	Near	Minor	Deepwater bed away from the immediate shoreline.
Bed 25	0.05	<1-2; 1	4-7; 6	Near	Minor	Mixed with native pondweeds.
Bed 26	1.17	<<1-3; 2	3-7; 6	Near	Minor	Prop-trails throughout bed.
Bed 27	4.46	<<<1-3; 2	3-7; 6	Near	Moderate	Almost entire bay covered in EWM.
Bed 28	1.19	<<<1-3; 2	4-8; 6	Near	Moderate	Bay dominated by EWM/natives on inner/outer edges.
Bed 29	0.29	<<<1-3; 2	4-8; 6	Near	Minor	Narrow ribbon next to state-owned island.
Bed 30	1.06	<<<1-3; 2	4-8; 6	Near	Moderate	EWM between island and shore – prop trails throughout.
Bed 31	7.77	<<<1-3; 2	4-8; 6	Near	Moderate	EWM between island and shore – prop trails throughout.
Bed 32	0.15	1-3; 3	3-7; 5	Yes	Moderate	Too narrow to be severe impairment.
Bed 33	0.09	1-3; 2	3-7; 5	Yes	Minor	Too narrow to be moderate impairment.
Bed 34	<0.01	1-3; 2	6-8; 8	Near	Minor	Deep waterbed on isolated rock bar.
Bed 35	2.65	<<1-3; 2	3-7; 5	Yes	Moderate	Mixed with natives.
	Total	**263.39**				

Treatment Selection

Lost Land Lake

Using the 2022 bedmapping information, the QLIA selected treatment areas in Lost Land Lake based on the following criteria:

1. Rake fullness of at least 2
2. Area of at least 5 acres
3. Nearly monotypic stand of EWM
4. Causing moderate to severe impairments to navigation
5. Location in high-traffic areas with more boat traffic than other areas (like the boat landing and thoroughfare)
6. Selecting multiple beds in different locations where the wind on the day of treatment would have the least impact

Initially, this left the QLIA with the desire to treat nearly 90 acres of EWM on Lost Land Lake. However, input from WDNR aquatic and fisheries biologists narrowed the scope of treatment areas with the following criteria:

7. Avoiding significant walleye and musky spawning areas
8. Leaving open areas where fish could go to avoid the herbicide
9. Avoiding whole-lake impacts by selecting beds far apart
10. Strategically selecting beds so that we can establish a rotation of treatment beds in the future that meet these criteria

With this input, the QLIA reached an agreement with the DNR to treat 3 areas totaling 30.11 acres of EWM in Lost Land Lake (Figure 4). These areas are described in the 2022 bedmapping report from ERS as the following:

Bed 1 (near the Lost Land Lake boat landing)

> "This immense nearly continuous milfoil bed dominated the majority of the western bay in almost all locations from 4-11ft of water over organic and sandy-muck. Viewed from the surface, the majority of the bed appeared to be nearly monotypic, and we noted there were few native pondweeds (Potamogeton spp.) visible. Within the bed's core, continuous dense EWM filled the water column, while areas over pure sand or gravel tended to be patchier with lower overall densities. For no obvious reason, most areas in the western bay were a foot or two subcanopy, although this could potentially be due to past harvesting. Despite not being canopied, we noted floating fragments and prop-clipped plants and trails throughout the bed – especially leading to/from the public landing and resorts."

Although this bed totals nearly 90 acres, the QLIA selected 20 acres within that giant bed to treat with the hopes that if any herbicide was not consumed in the treatment area, it would just encounter more EWM. Additionally, this area was selected due to its high concentration of boat traffic coming to and from landing to relieve navigation impairment, reduce further spreading by fragmentation caused from prop damage, and hopefully reduce the chances of

EWM spreading to other nearby lakes as boats travel through the large, dense bed directly to the boat landing.

Bed 2 (Bailey's Bay)

> "This dense bed dominated a highly developed bay, and it likely would have caused severe impairment if the bed had been canopied. This is an area that may have been harvested at some point as EWM formed a nearly continuous carpet, but it was still several feet below the surface. Even so, we noticed many plants were prop-clipped, and there were fragments throughout the entire bay."

This area was selected for treatment due to its relative protection from winds, creating greater likelihood of treatment success. This area is popular for fishing and sees a lot of boat traffic. Continuous years of harvesting in this bay had not been successful at reducing the prevalence and density of EWM.

Bed 3 (Thoroughfare Bed)

> "[This bed] was a dense canopied mat, causing at least moderate impairment with parts of [this bed] trending towards severe impairment as we documented prop-trails and fragments throughout."

This bed was selected due to its proximity to the thoroughfare to Teal Lake and the fact that boats need to cut right through this bed to leave or enter Lost Land Lake. The hope is to relieve navigation impairment in this area and reduce spreading from fragmentation caused by props as boats travel through.

Control Bed

In order to determine the effects of the treatment in areas that have been treated versus areas that have not, the QLIA selected a 'reference' or 'control' bed that would receive no herbicide treatment at all (Figure 8).

Teal Lake

The selection criteria for Teal Lake were largely the same as in Lost Land Lake; however, the total acreage of EWM is much less, many of the beds are less than an acre in size, and most beds do not greatly impair navigation. The primary choice following these criteria was the bed at the entrance from the thoroughfare into Teal where the most boat traffic occurs. The bedmapping survey noted the following of this area:

> "These two moderate to high density beds would likely have caused severe impairment had they not been subcanopy. Boats entering Teal Lake from Lost Land Lake appear to have cut them [the beds] in half, but, for management purposes, they should likely be considered one area as the beds would probably have been continuous without this constant disturbance. We noted the regular traffic and prop-clipping of plants in these beds had left the entire bay full of floating fragments, and this likely makes them a priority for any future management."

With DNR input, it was decided to treat the 6.08 acres at the entrance to Teal Lake (Figure 8).

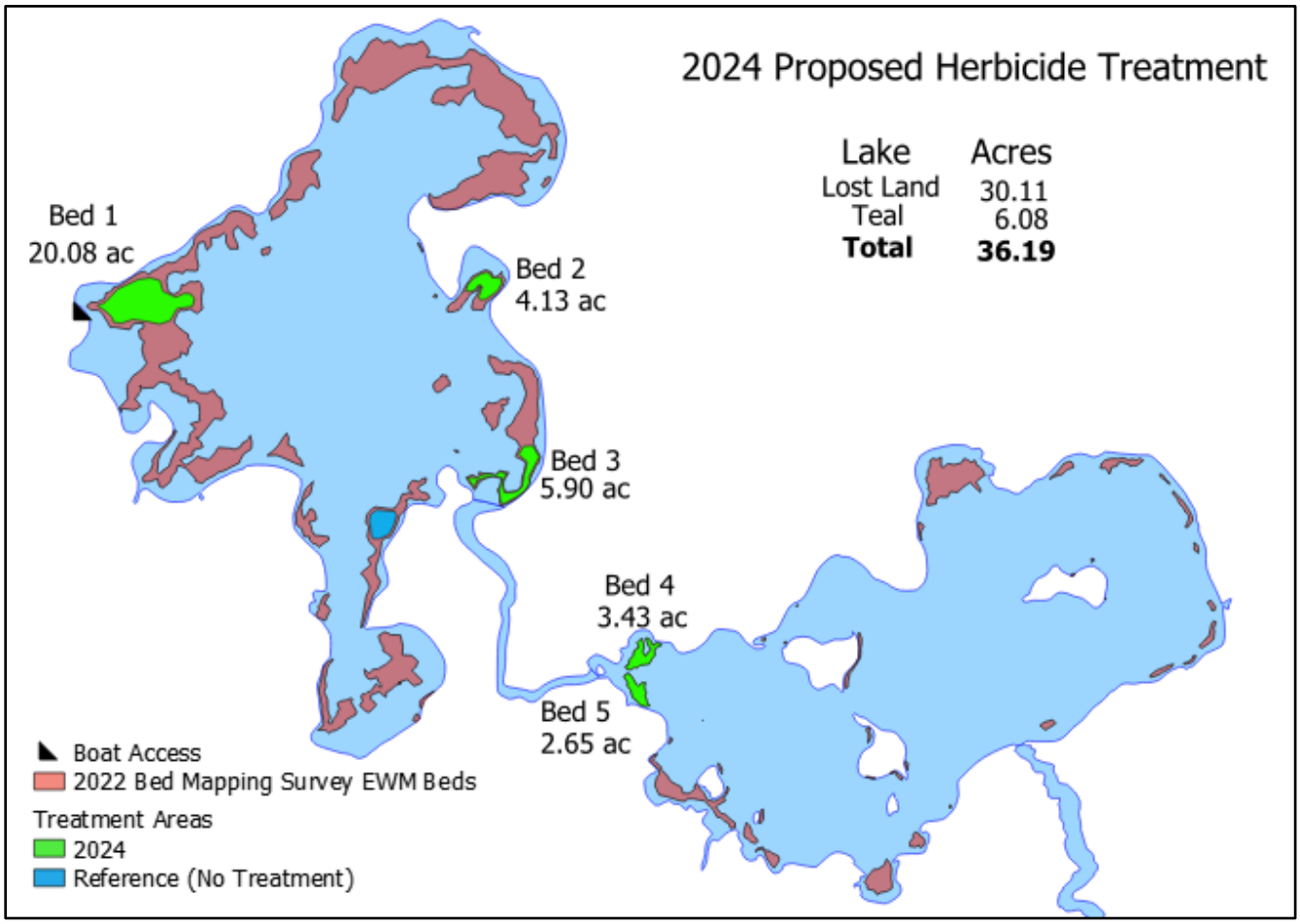


FIGURE 8. SELECTED TREATMENT AREAS FOR 2024 HERBICIDE APPLICATION

2024 Pre-Treatment Point Intercept Survey

A point-intercept survey within the treatment and control areas was conducted by Endangered Resource Services on May 31, 2024 to determine initial EWM density, treatment effectiveness, and consequences to native plants as a result of the 2024 herbicide treatment. ERS sampled 150 points within the treatment areas, equally approximately 4 points per acre to meet the minimum number of points required by WDNR protocol. The control area was sampled at 35 points, equaling about 8 points per acre; the increase in points in the control area was requested by the WDNR to improve statistical analyses (Figure 9).

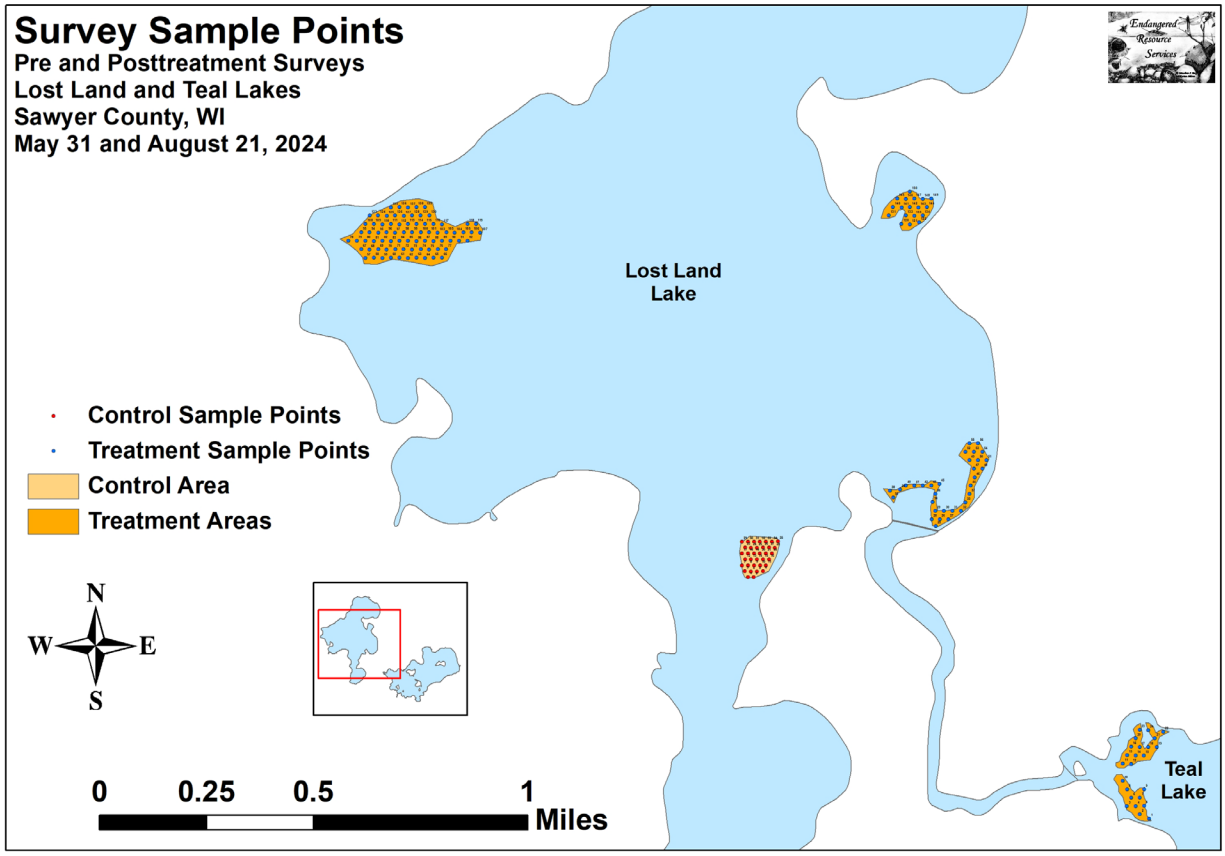


FIGURE 9. SAMPLING POINTS FOR LOST LAND LAKE AND TEAL LAKE (ERS)

The following information is summarized from the Eurasian watermilfoil Pre and Posttreatment Surveys Lost Land Lake and Teal Lake (2024) report by Endangered Resource Services.

Eurasian watermilfoil was found at 110 of 150 total sites (73.3% coverage) within the treatment areas. Of these, 52 points were given a rake fullness rating of 3, 30 points a 2, and the remaining 28 points a 1 with one additional visual sighting. This produced a moderate mean rake fullness of 2.22 and suggested that 54.7% of the treatment area had a significant infestation (rake fullness 2 or 3). In the control area, EWM was found at 28 of 35 sites (80.0% coverage) with two additional visual sightings. Fourteen points had a rake fullness of 3, eight rated a 2 (62.9% significant infestation), and the remaining six were a 1 for a mean rake fullness of 2.29.

Eurasian watermilfoil had the highest frequency (27.92 relative frequency and 74.32 frequency in vegetation) and density (2.22 mean rake fullness) of plants sampled in the pretreatment survey. Fern pondweed (*Potamogeton robinsii*) was the most common native species in the treatment area. The next five most common native species were small pondweed (*Potamogeton pusillus*), flat-stem pondweed (*Potamogeton zosteriformis*), coontail (*Ceratophyllum demersum*), common waterweed (*Elodea canadensis*), and large-leaf pondweed (*Potamogeton amplifolius*) (Table 3).

TABLE-3. PRETREATMENT FREQUENCIES AND MEAN RAKE SAMPLE OF AQUATIC MACROPHYTES IN TREATMENT AREAS (ERS)

Species	Common Name	Total Sites	Relative Freq.	Freq. in Veg.	Freq. in Lit.	Mean Rake	Visual Sight.
Myriophyllum spicatum	**Eurasian water-milfoil**	**110**	**27.92**	**74.32**	**73.33**	**2.22**	**1**
Potamogeton robbinsii	Fern pondweed	58	14.72	39.19	38.67	1.93	0
Potamogeton pusillus	Small pondweed	51	12.94	34.46	34.00	1.45	0
Potamogeton zosteriformis	Flat-stem pondweed	41	10.41	27.70	27.33	1.17	0
Ceratophyllum demersum	Coontail	30	7.61	20.27	20.00	1.10	0
Elodea canadensis	Common waterweed	22	5.58	14.86	14.67	1.41	0
Potamogeton amplifolius	Large-leaf pondweed	18	4.57	12.16	12.00	1.44	0
Potamogeton richardsonii	Clasping-leaf pondweed	18	4.57	12.16	12.00	1.00	0
Najas flexilis	Slender naiad	17	4.31	11.49	11.33	1.18	0
Heteranthera dubia	Water star-grass	11	2.79	7.43	7.33	1.09	0
	Filamentous algae	10	*	6.76	6.67	1.20	0
	Aquatic moss	9	*	6.08	6.00	1.00	0
Potamogeton praelongus	White-stem pondweed	7	1.78	4.73	4.67	1.43	0
Potamogeton vaseyi	Vasey's pondweed	4	1.02	2.70	2.67	1.25	0
Lemna trisulca	Forked duckweed	2	0.51	1.35	1.33	1.00	0
Potamogeton gramineus	Variable pondweed	2	0.51	1.35	1.33	1.00	0
Vallisneria americana	Wild celery	2	0.51	1.35	1.33	1.00	0
Chara sp.	Muskgrass	1	0.25	0.68	0.67	1.00	0

Eurasian watermilfoil had the highest frequency (25.93 relative frequency and 80.00 frequency in vegetation) and density (2.29 mean rake fullness) of plants sampled in the pretreatment control area. Large-leaf pondweed was the most common native species in the treatment area. The next five most common native species were, water star-grass (*Heteranthera dubia*), variable pondweed (*Potamogeton gramineus*), muskgrass (*Chara* sp.), needle spikerush (*Eleocharis acicularis*), and common waterweed (Table 4). This shows a slightly different species composition than the treatment areas, likely due to the slightly shallower depth and sandy to rocky bottom of the control area (Figure 10).

TABLE-4. PRETREATMENT FREQUENCIES AND MEAN RAKE SAMPLE OF AQUATIC MACROPHYTES IN CONTROL AREA (ERS)

Species	Common Name	Total Sites	Relative Freq.	Freq. in Veg.	Freq. in Lit.	Mean Rake	Visual Sight.
Myriophyllum spicatum	**Eurasian water-milfoil**	**28**	**25.93**	**80.00**	**80.00**	**2.29**	**2**
Potamogeton amplifolius	Large-leaf pondweed	24	22.22	68.57	68.57	1.67	0
Heteranthera dubia	Water star-grass	22	20.37	62.86	62.86	1.32	0
Potamogeton gramineus	Variable pondweed	11	10.19	31.43	31.43	1.27	0
Chara sp.	Muskgrass	6	5.56	17.14	17.14	1.17	0
Eleocharis acicularis	Needle spikerush	6	5.56	17.14	17.14	1.33	0
Elodea canadensis	Common waterweed	4	3.70	11.43	11.43	1.25	0
Najas flexilis	Slender naiad	2	1.85	5.71	5.71	1.00	0
Isoetes echinospora	Spiny spored-quillwort	1	0.93	2.86	2.86	1.00	0
Lemna trisulca	Forked duckweed	1	0.93	2.86	2.86	1.00	0
Potamogeton pusillus	Small pondweed	1	0.93	2.86	2.86	2.00	0
Potamogeton richardsonii	Clasping-leaf pondweed	1	0.93	2.86	2.86	1.00	0
Potamogeton robbinsii	Fern pondweed	1	0.93	2.86	2.86	2.00	0

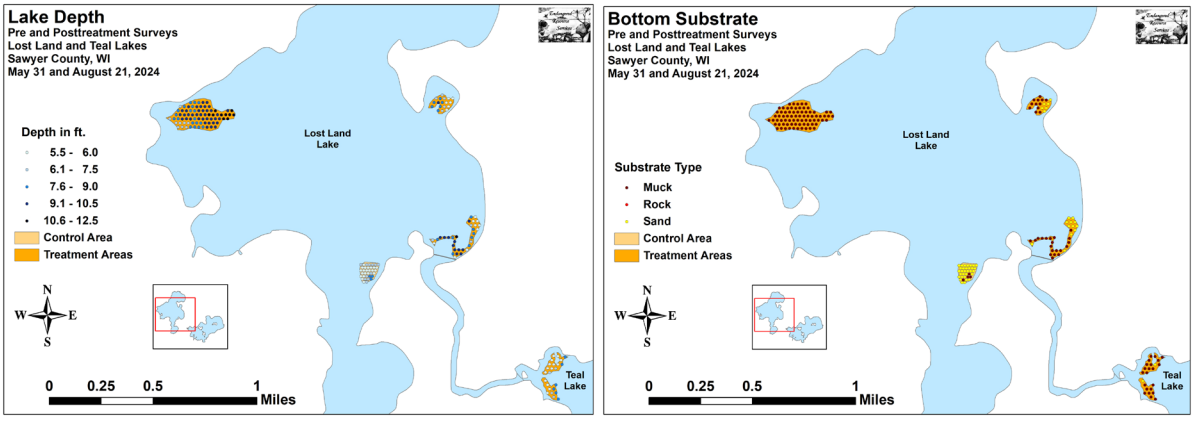


FIGURE 10. SURVEY AREAS DEPTHS AND BOTTOM SUBSTRATE (ERS)

Herbicide Treatment

The 2024 pretreatment point-intercept survey supported the initial criteria for selecting the treatment areas and indicated a significant presence of EWM in the treatment and control areas. Subsequently the three areas totaling 30.11 acres in Lost Land Lake and two areas covering 6.08 acres in Teal Lake were treated on June 7, 2024. This timeframe was selected under the guidance of WDNR Sawyer County fisheries biologist, Max Wolter, to avoid possible interference with muskellunge and walleye spawning.

Schmidt's Aquatic LLC (Hamilton Harvey) applied 1,167pdu of florpyrauxifen-benzyl (ProcellaCOR) at 4-5pdu per ac/ft (Table 5). The reported water temperature at the time of treatment was 62-63°F, the ambient air temperature was 53-56°F, and winds were out of the north at 2-8mph. The calculated lake-wide concentration for Lost Land Lake was 0.18ppb, and Teal Lake was 0.02ppb.

TABLE-5. 2024 HERBICIDE TREATMENT INFORMATION (ERS)

Bed Number	Final Treatment Area (acres)	Chemical, Rate, and Total Applied
Lost Land 1 (boating landing)	20.08	ProcellaCor – 4pdu – 643pdu
Lost Land 2 (Bailey's Bay)	4.13	ProcellaCor – 5pdu – 165pdu
Lost Land 3 (Thoroughfare to Teal)	5.90	ProcellaCor – 5pdu – 189pdu
Teal 1 (Thoroughfare entrance)	3.43	ProcellaCor – 5pdu – 103pdu
Teal 2 (Thoroughfare entrance)	2.65	ProcellaCor – 5pdu – 67pdu
Total	**36.19**	**ProcellaCor – 4-5pdu – 1,167pdu**

Concentration Testing

Testing the residual concentration of herbicide present throughout a lake is standard practice when treating large areas for the first time. As such, a concentration sampling regime was created for Lost Land and Teal Lakes to follow the herbicide application. Four sites were selected: treatment area near the Lost Land Lake boat landing, the middle of Lost Land Lake, the thoroughfare treatment bed, and the treatment area in Teal Lake (Figure 11). This array was meant to capture the flow and dissipation of the herbicide through the system over time.

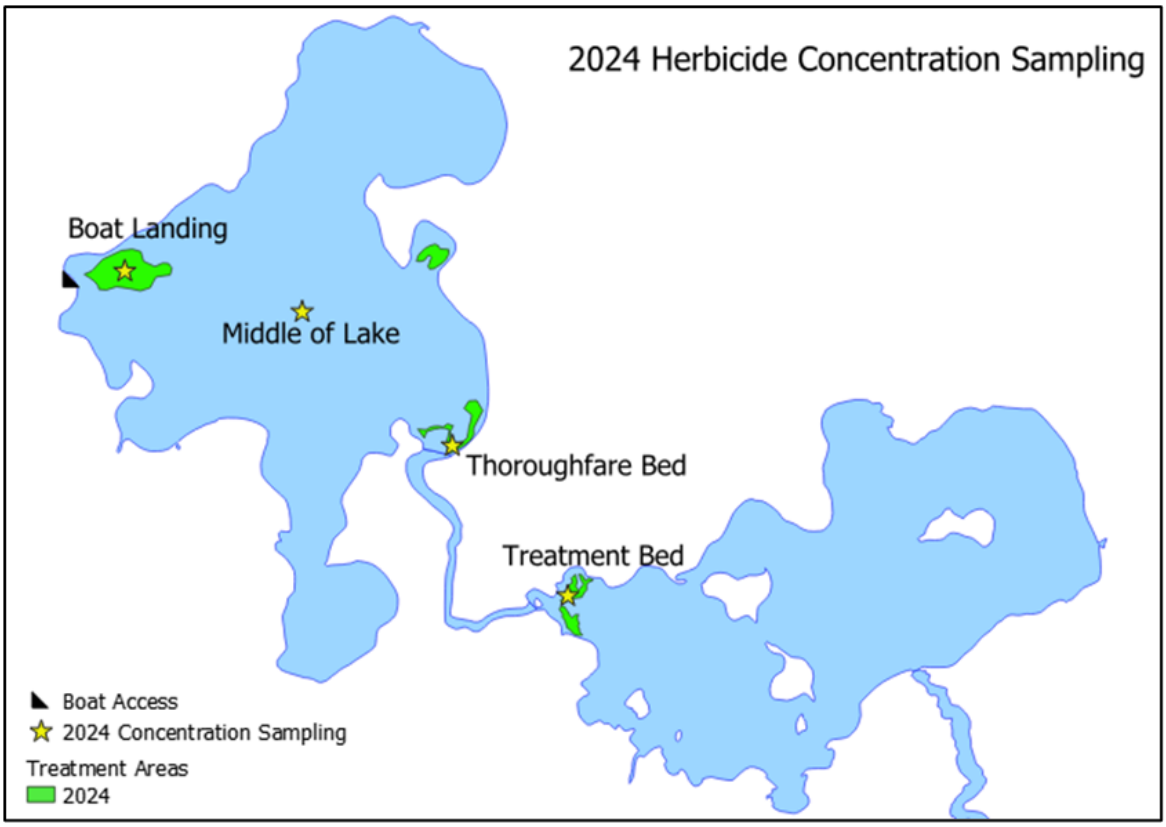


FIGURE 11. 2024 HERBICIDE CONCENTRATION SAMPLING POINTS

With assistance from WDNR personnel (Scott Van Egeren and Michelle Nault), sampling intervals were determined for capturing the dissipation of the herbicide over time up to 14 days after the treatment (Table 6).

TABLE-6. HERBICIDE CONCENTRATION SAMPLING INTERVALS

Site	Pre	3 HAT	6 HAT	9 HAT	24 HAT	48 HAT	4 DAT	7 DAT	14 DAT
LLL1 – Boat Landing Bed	Y	Y		Y	Y	Y	Y	Y	
LLL2 – Thoroughfare Bed		Y		Y	Y	Y	Y	Y	
LLL3 – Middle of Lake		Y		Y	Y	Y	Y	Y	Y
TL1 – Teal Treatment Bed	Y	Y	Y	Y	Y	Y	Y	Y	

Pre = Pretreatment, LLL = Lost Land Lake, TL = Teal Lake, HAT = Hours After Treatment, DAT = Days After Treatment, Y = Sample

Samples were collected by QLIA volunteers and shipped to EPL Bio Analytical Services for analysis.

Results

The following data has been summarized from the EPL laboratory results. The lab analyzes ProcellaCOR (florpyrauxifen-benzyl) by measuring the amount in the sample as well as the florpyrauxifen-benzyl acid, which is the next component that ProcellaCOR is broken down into. The limit of detection (the lowest concentration of a substance in a sample that can be consistently detected with a certain level of certainty, typically 95%) for ProcellaCOR is 0.06ng/mL and 0.15ng/mL for the ProcellaCOR metabolite acid.

Lost Land Lake

TABLE-7. LOST LAND LAKE PROCELLACOR CORRECTED SAMPLE CONCENTRATION (NG/ML)

Time After Treatment	Boat Landing Bed	Middle of Lake	Thoroughfare Bed
Pretreatment	0.0159*		
3 HAT	0.3310	0.0000*	0.1430
9 HAT	-0.0023*	-0.0091*	0.0204*
24 HAT	-0.00907*	0.0929	0.0589*
48 HAT	0.00453*	0.0295*	0.0113*
4 DAT	-0.00227*	0.00453*	0.0272*
7 DAT	-0.00680*	-0.0136*	0.00*
14 DAT		0.00453*	

*indicates lower than the limit of detection

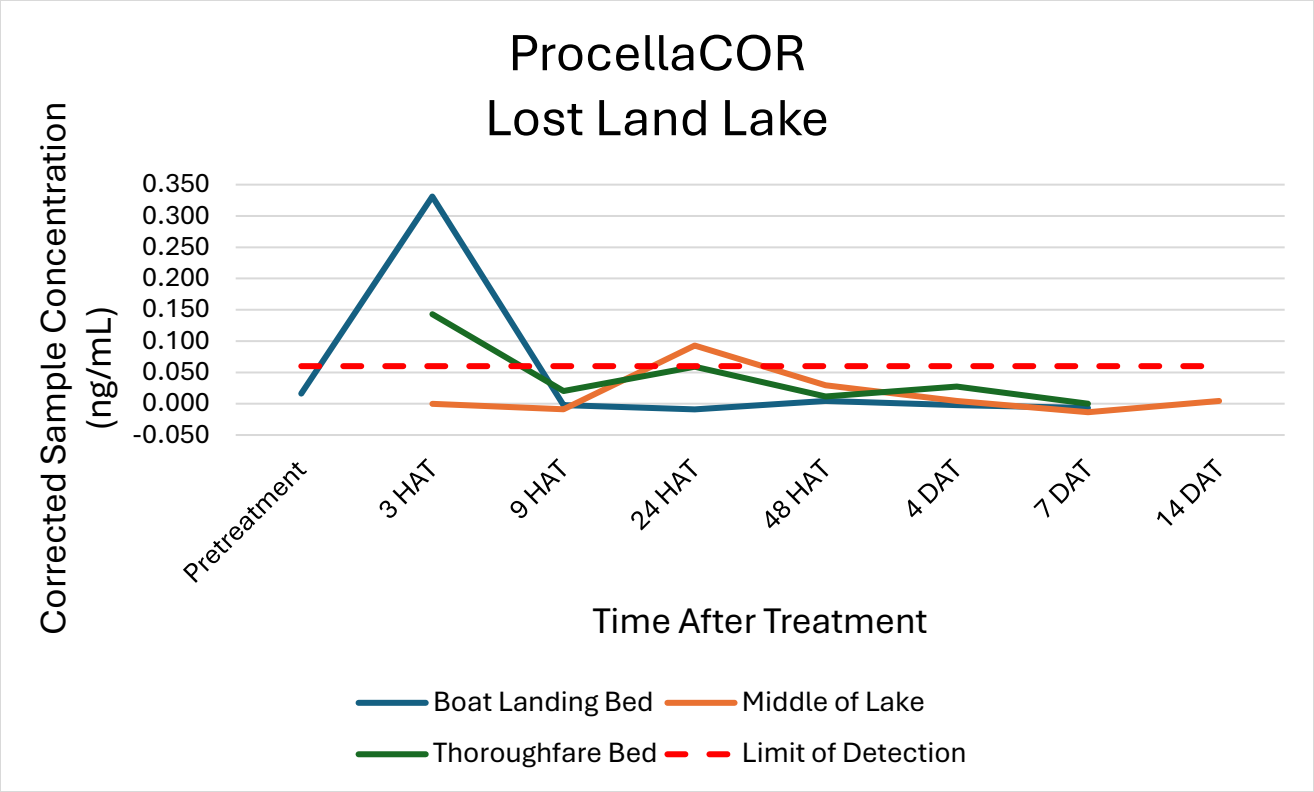


FIGURE 12. LOST LAND LAKE PROCELLACOR CONCENTRATIONS

TABLE-8. LOST LAND LAKE PROCELLACOR ACID CORRECTED SAMPLE CONCENTRATION (NG/ML)

Time After Treatment	Boat Landing Bed	Middle of Lake	Thoroughfare Bed
Pretreatment	0.0852*		
3 HAT	0.00799*	0.00*	0.00266*
9 HAT	-0.0852*	-0.0852*	0.00266*
24 HAT	-0.00266*	0.0266*	0.0133*
48 HAT	-0.00266*	0.0107*	0.0266*
4 DAT	0.00533*	0.00799*	0.0160*
7 DAT	0.0479*	0.0213*	0.0213*
14 DAT		0.0346*	

*indicates lower than the limit of detection

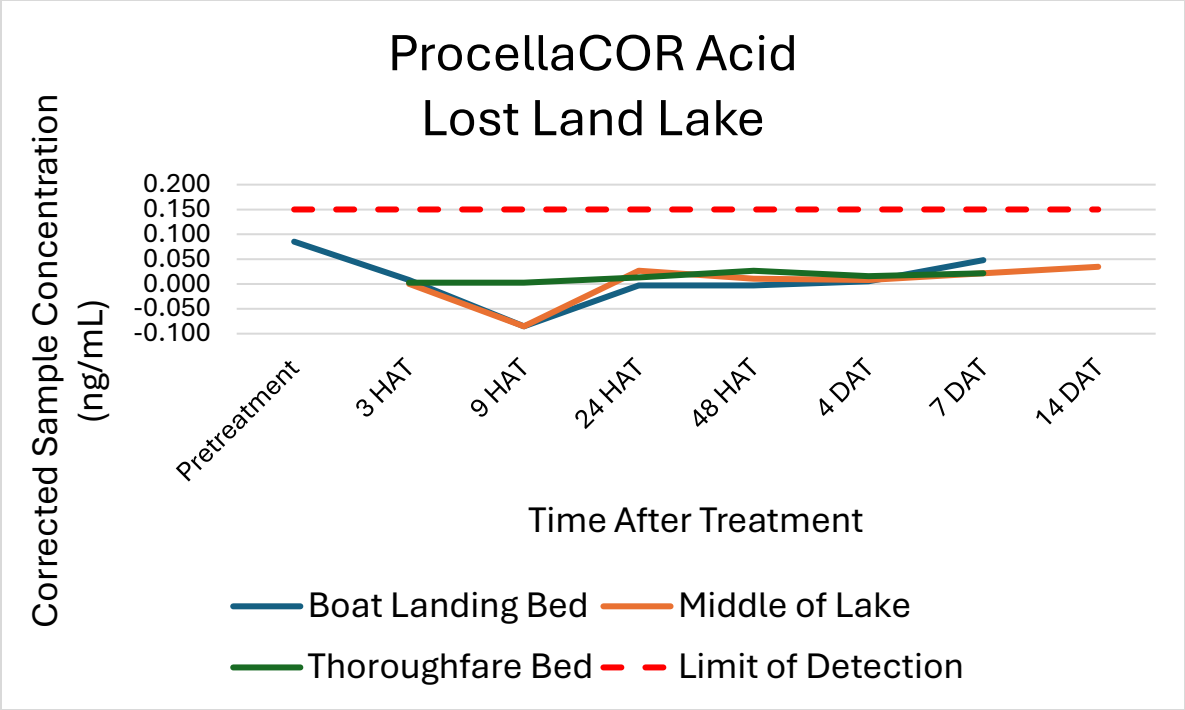


FIGURE 14. LOST LAND LAKE PROCELLACOR ACID CONCENTRATIONS

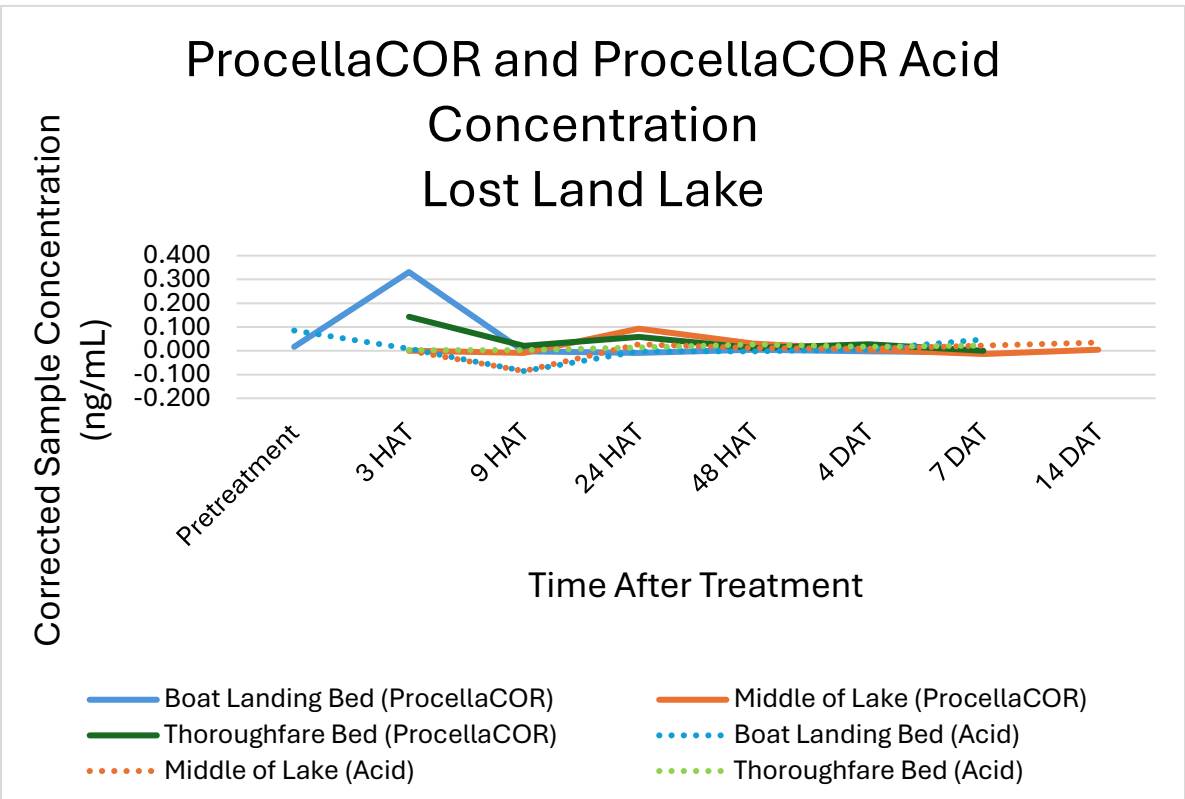


FIGURE 13. LOST LAND LAKE PROCELLACOR AND PROCELLACOR ACID CONCENTRATIONS

It is clear that the ProcellaCOR concentration spikes at 3 HAT, then drops as the herbicide is absorbed by the plants and spread throughout the water and broken down into its acid. The herbicide then peaks again at 24 HAT after it has likely been able to spread across and mix throughout the lake. It drops off to nondetectable levels by 48 HAT.

Teal Lake

TABLE-9. TEAL LAKE PROCELLACOR AND PROCELLACOR ACID CORRECTED SAMPLE CONCENTRATION (NG/ML)

Time After Treatment	ProcellaCOR	ProcellaCOR Acid
Pretreatment	0.00*	0.000*
3 HAT	0.00*	0.000*
6 HAT	0.00*	0.00206*
9 HAT	0.313	0.00206*
24 HAT	0.362	0.00823*
48 HAT	0.297	0.00412*
4 DAT	0.00*	0.000*
7 DAT	0.00810*	0.000*

*indicates lower than the limit of detection

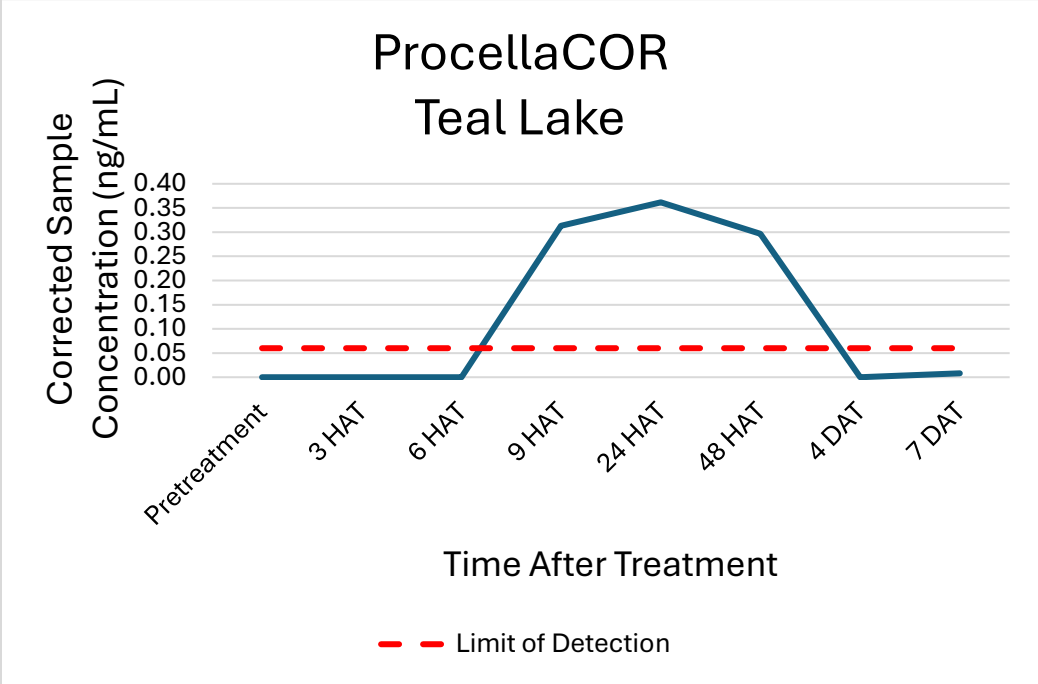


FIGURE 15. TEAL LAKE PROCELLACOR CONCENTRATIONS

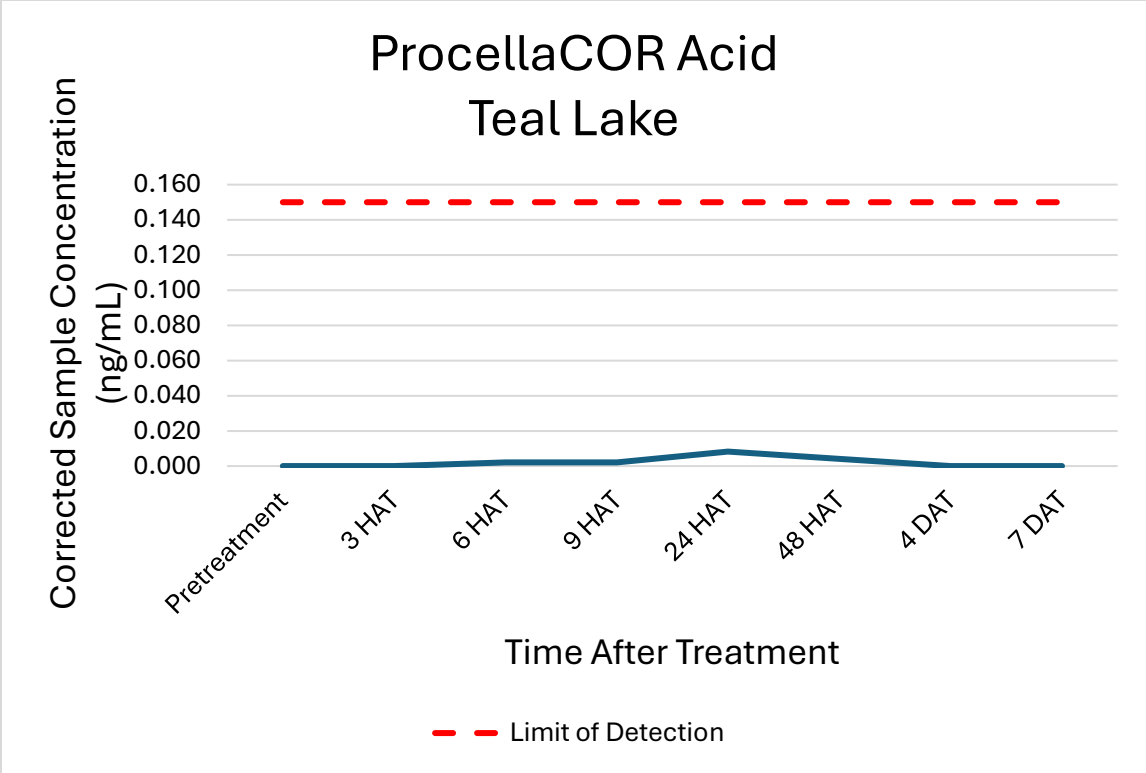


FIGURE 16. TEAL LAKE PROCELLACOR ACID CONCENTRATIONS

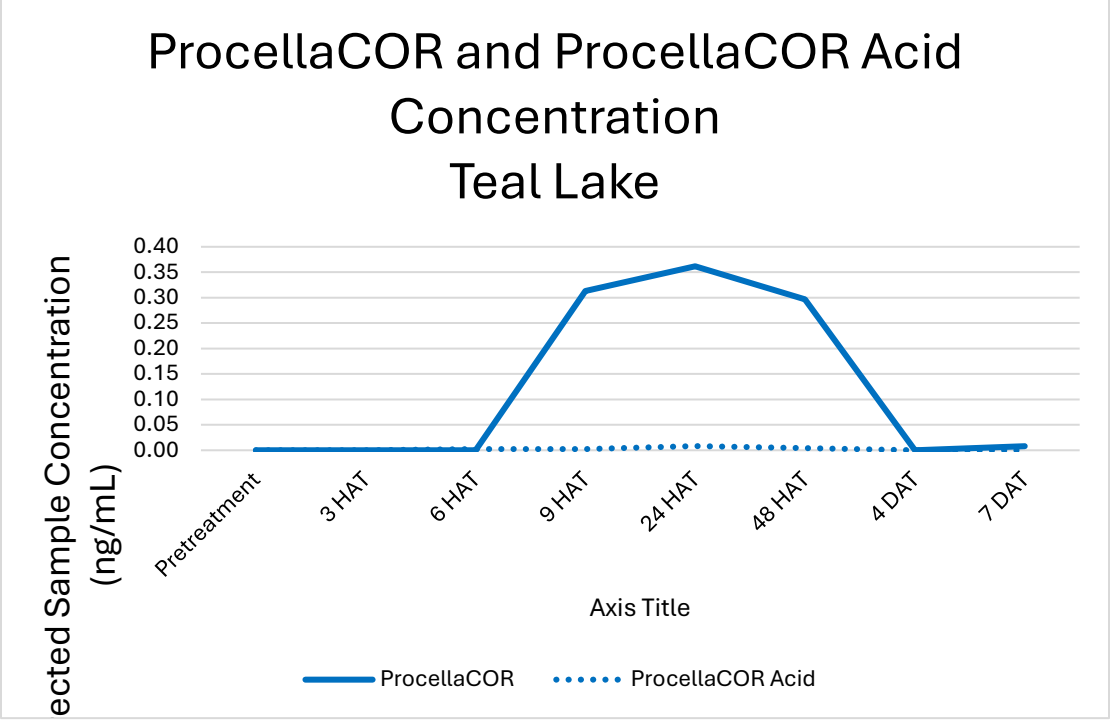


FIGURE 17. TEAL LAKE PROCELLACOR AND PROCELLACOR ACID CONCENTRATIONS

The interpretation for the herbicide concentration after treatment in Teal is relatively straightforward. The herbicide peaks at 24 HAT and then quickly drops off to nondetectable levels by 4 DAT. By 7 DAT, there is a slight rise, which may be indicative of some natural variation in sampling, or it may indicate a push of the herbicide coming through the thoroughfare from Lost Land Lake. However, that measurement was still below the limit of detection.

2024 Pre & Post-Treatment PI Comparison

*****Comparisons for the Pre and Post-Treatment Point Intercept Surveys should be considered carefully because results may be misleading due to the timing of the surveys and the life cycles of individual species (e.g. some species may or may not appear in early summer versus late summer).*****

A point-intercept survey within the treatment and control areas was conducted by Endangered Resource Services on August 21, 2024 to determine EWM density, treatment effectiveness, and consequences to native plants as a result of the 2024 herbicide treatment. Sampling in August gave the plants much of the growing season to recover and later-growing species to appear, so results should take into consideration the varying life cycles of individual species. ERS sampled the same points within the treatment and control areas as the pretreatment survey and followed the same survey protocols.

The following information is summarized from the Eurasian watermilfoil Pre and Posttreatment Surveys Lost Land Lake and Teal Lake (2024) report by Endangered Resource Services. For a more detailed analysis of individual species, please view that report.

Eurasian watermilfoil was found at 5 of 150 total sites (3.3% coverage) within the treatment areas. No points were rated a 3 for rake fullness, one point had a rake fullness of 2, and four points were a 1 for a mean rake fullness of 1.20. These results suggested the treatment provided a 95.5% reduction in EWM coverage and a 98.8% decline in areas likely to cause significant navigation impairment. Statistically, this was a highly significant decline ($p<0.001$) in total distribution as well as the number of points that rated a rake fullness of 3, 2, and 1; and a moderately significant decline in total mean density ($p=0.003$).

Although the control area was 0.28 miles from the nearest treatment area, all Eurasian water-milfoil found during the August survey was either totally dead or showed evidence of severe chemical burn with minimal regrowth. Ultimately, 12 points had surviving EWM (34.3% coverage). No points rated a 3, one had a rake fullness of 2, and the other 11 were a 1 for a mean rake fullness of 1.08. This was a 78.9% reduction in coverage and a 95.5% reduction in nuisance coverage when compared to May levels. Statistically, this was also a highly significant decline ($p<0.001$) in total density, total distribution, and points that rated a rake fullness of 3. The decline in rake fullness 2 points was also moderately significant ($p=0.01$).

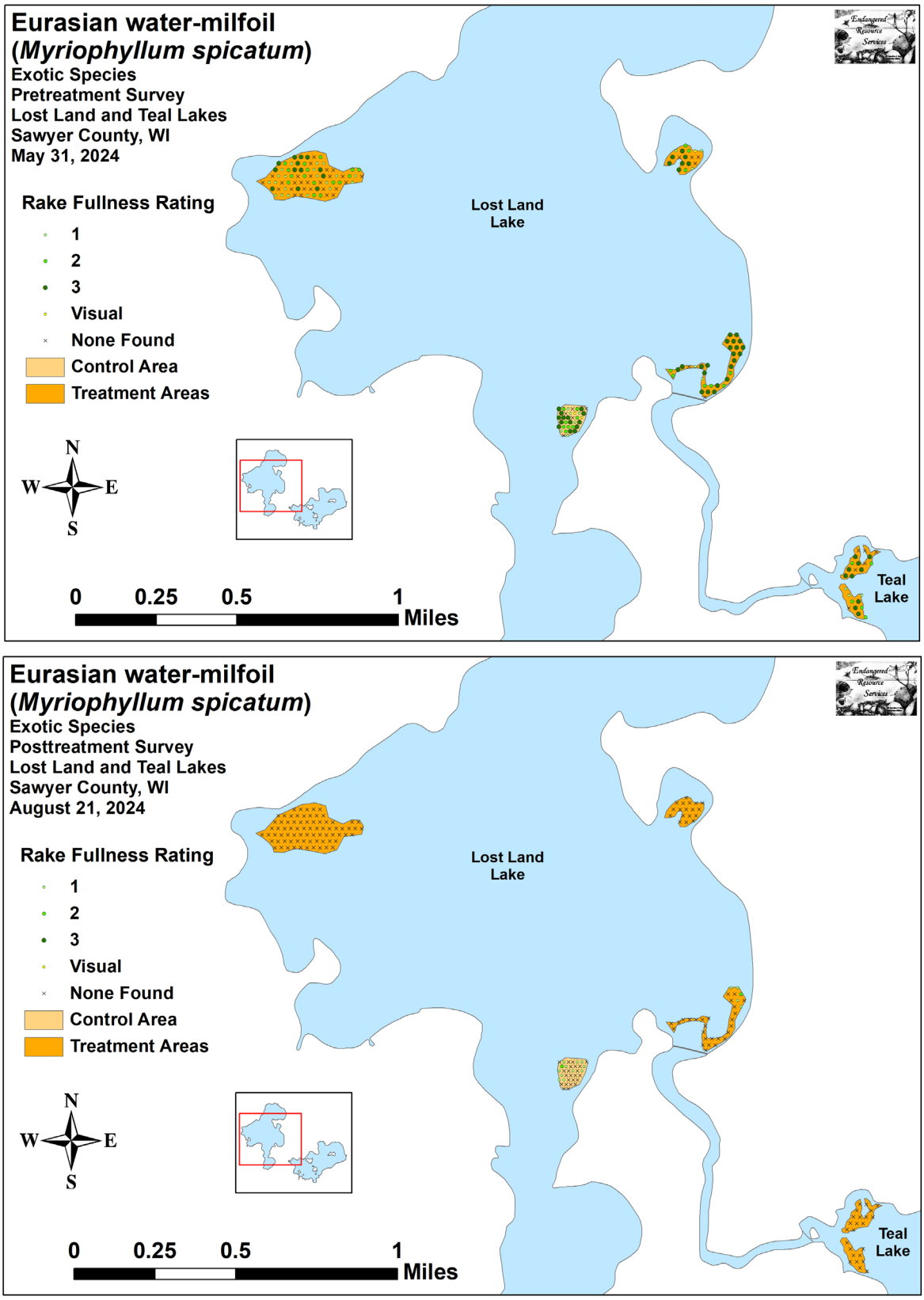
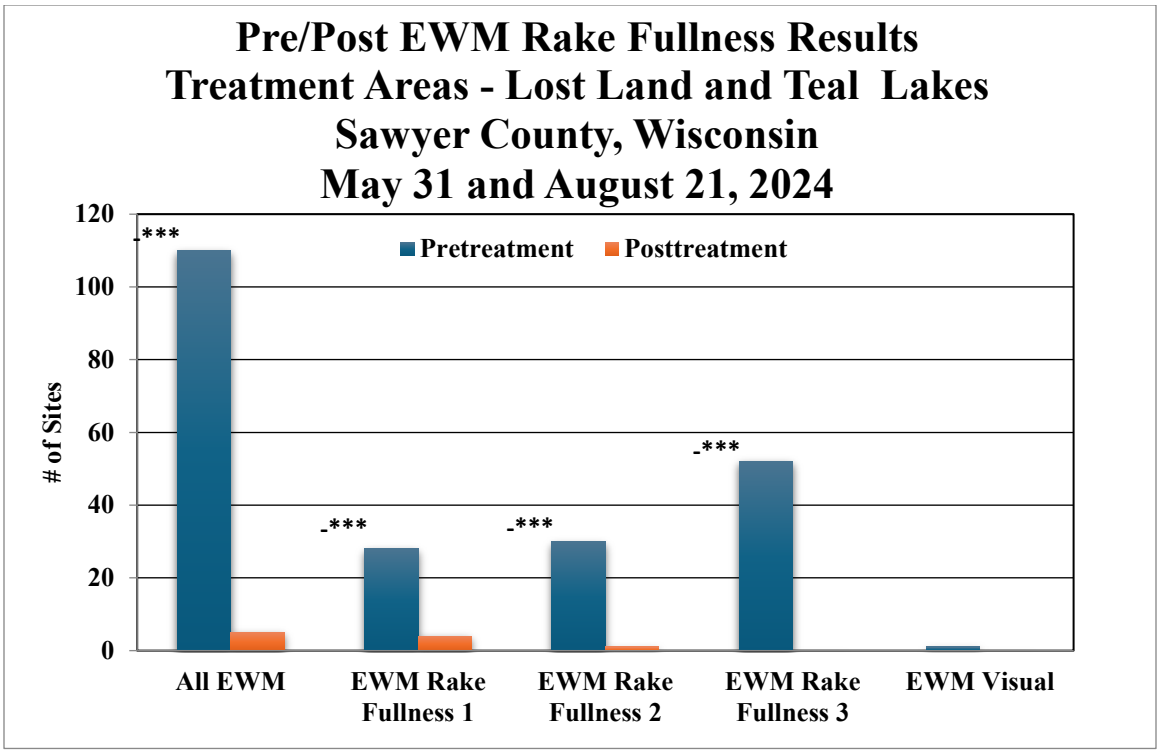
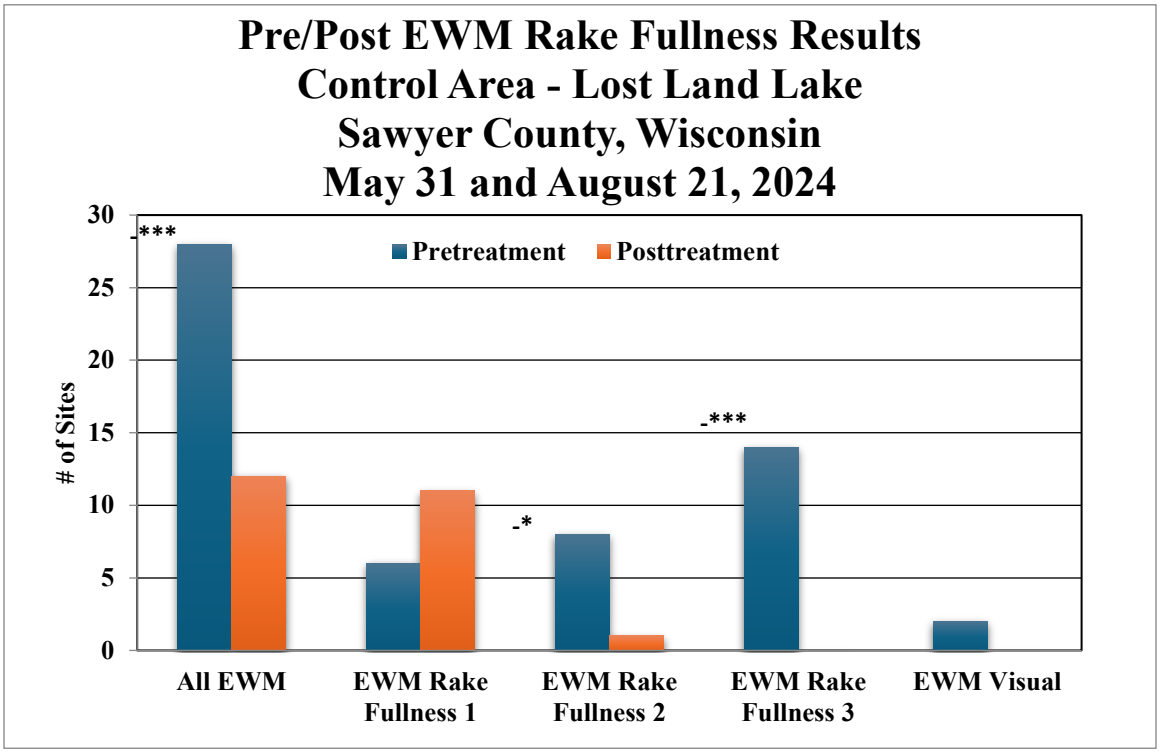


FIGURE 18. PRE AND POSTTREATMENT EWM DENSITY AND DISTRIBUTION (ERS)



Significant differences = * $p<0.05$, ** $p<0.01$, *** $p<0.001$

FIGURE 19. TREATMENT AREAS - CHANGES IN EWM RAKE FULLNESS RATINGS (ERS)



Significant differences = * $p<0.05$, ** $p<0.01$, *** $p<0.001$

FIGURE 20. CONTROL AREA - CHANGES IN EWM RAKE FULLNESS RATINGS (ERS)

As expected, several later-growing native species that were largely dormant during the pretreatment survey showed significant lake-wide increases in distribution by August. In the treated areas, Flat-stem pondweed, Clasping-leaf pondweed (*Potamogeton richardsonii*), and Wild celery (*Vallisneria americana*) had highly significant increases (p<0.001); Common waterweed (p=0.001) and Common bladderwort (*Utricularia vulgaris*) (p=0.002) saw moderately significant increases; and Fern pondweed (p=0.04) and Ribbon-leaf pondweed (*Potamogeton epihydrus*) (p=0.04) showed significant increases. EWM was the only species that suffered a highly significant decline (p<0.001) in the treatment areas, but aquatic moss saw a moderately significant decline (p=0.002); and Vasey's pondweed (*Potamogeton vaseyi*) had a significant decline (p=0.04).

In the control area, Wild celery experienced a highly significant increase (p<0.001); Variable pondweed saw a moderately significant increase (p=0.002); and both Spiny-spored quillwort (*Isoetes echinospora*) (p=0.002) and Flat-stem pondweed (p=0.002) had significant increases. Other than EWM's highly significant decline (p<0.001), Large-leaf pondweed was the only other species that showed a significant loss in coverage (p=0.03).

Richness in the treatment areas rose from 16 species in May to 19 in August, and the control area increased from 13 species in May to 16 in August. The treatment areas' Simpson's Diversity Index rose from 0.86 to 0.89. In the control area, this metric increased sharply from 0.82 to 0.90. The Floristic Quality Index (another measure of the native plant community health) also rose from 24.5 treatment/21.7 control in May to 27.6 treatment/24.0 control in August.

TABLE-10. PRE AND POSTTREATMENT SURVEYS SUMMARY STATISTICS LOST LAND AND TEAL LAKES (ERS)

Summary Statistics:	Treated Pre	Treated Post	Control Pre	Control Post
Total number of points sampled	150	150	35	35
Total number of sites with vegetation	148	146	35	35
Total number of sites shallower than the maximum depth of plants	150	150	35	35
Frequency of occurrence at sites shallower than max. depth of plants	98.7	97.3	100.0	100.0
Simpson Diversity Index	0.86	0.89	0.82	0.90
Mean Coefficient of Conservatism	6.3	6.5	6.3	6.2
Floristic Quality Index	24.5	27.6	21.7	24.0
Average number of all species per site (shallower than max depth)	2.63	2.78	3.09	3.74
Average number of all species per site (veg. sites only)	2.66	2.86	3.09	3.74
Ave. number of native species/site (shallower than max depth)	1.89	2.75	2.29	3.40
Ave. number of native species/site (sites with native plants only)	2.06	2.82	2.42	3.40
Species Richness	16	19	13	16
Maximum depth of plants (ft)	12.5	11.5	9.0	8.5
Mean depth of plants (ft)	8.4	8.1	6.2	5.9
Median depth of plants (ft)	8.5	8.5	6.0	5.5
Mean Rake Fullness (veg. sites only)	2.45	2.25	2.43	1.94

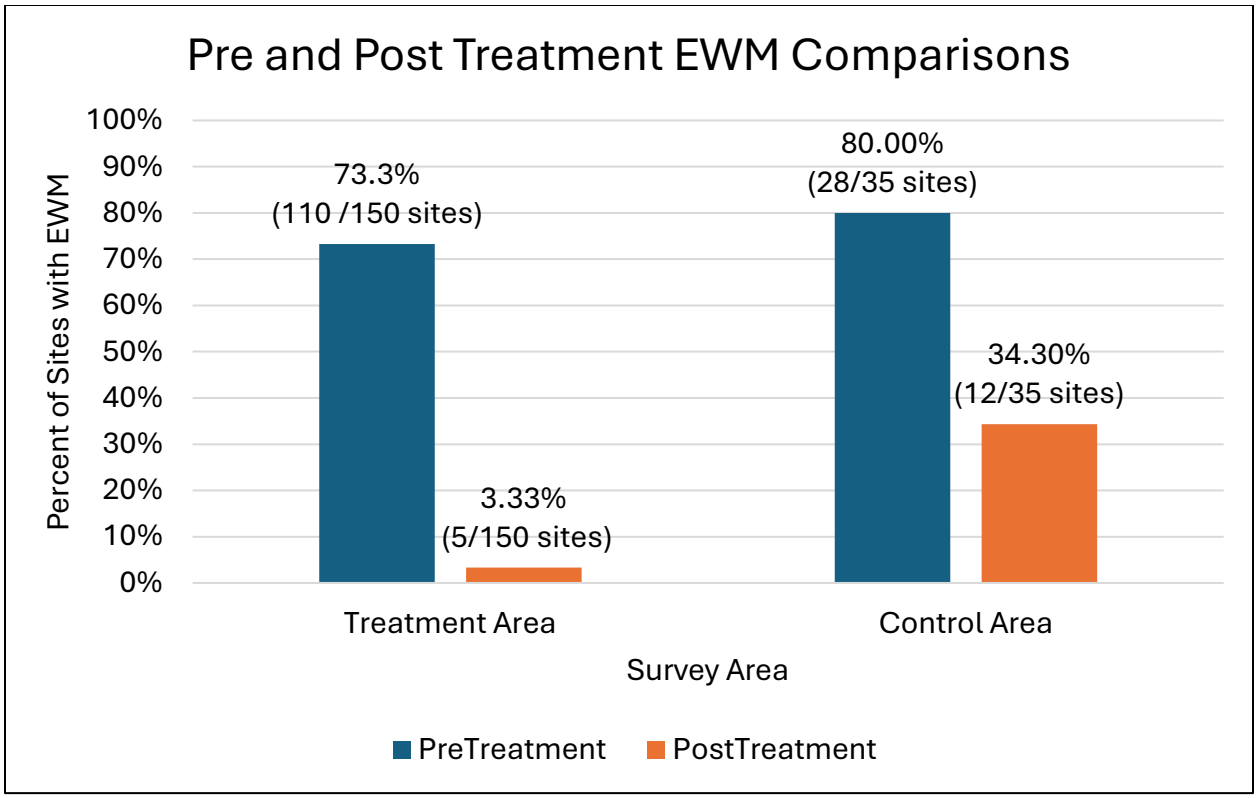


FIGURE 21: PRE AND POSTTREATMENT EWM COMPARISONS

2024 Bed Mapping

As a follow up to the 2024 herbicide treatment and to inform 2025 management activities, EWM bedmapping was performed in August 2024 by Endangered Resource Services. The following information is summarized from the 2024 Eurasian watermilfoil (Myriophyllum spicatum) Late Summer Bed Mapping Survey reports for Lost Land Lake and Teal Lake by Endangered Resource Services

Lost Land Lake

On August 21, 2024, ERS searched 22.0 miles of transects throughout Lost Land's visible littoral zone. Five Eurasian watermilfoil beds that covered 7.26 acres (0.57 % of the lake's surface area) were mapped. This was a 256.13-acre reduction (-97.24%) compared to 2022 when ERS delineated 21 beds covering 263.39 acres (20.84% of the lake's surface area). Most beds occurred in the far ends of muck bottom bays away from the 2024 treatment areas.

The following are descriptions of the treatment areas from the ERS 2024 Lost Land Lake bed mapping report:

Bed 1 (near the Lost Land Lake boat landing)

> "In 2022, this immense, nearly continuous milfoil bed dominated the majority of the western bay in almost all locations from 4-11ft of water. Posttreatment, it was reduced to a small but dense bed in the Ole Creek Inlet where incoming water flow appeared to have prevented residual herbicide from killing EWM as it did in all other parts of the bed. Test raking both inside and outside the treatment area near the public landing produced no evidence of EWM, and the entire area was now dominated by open beds of native pondweeds (*Potamogeton* spp.)."

Bed 2 (Bailey's Bay)

> "Despite test raking throughout these former beds, we found no evidence of any surviving EWM."

Bed 3 (Thoroughfare Bed)

> "Inexplicably, despite being treated directly, some of the tallest and healthiest remaining EWM occurred along the eastern shoreline of Bed 11. Test raking regularly produced plants that, although severely burned, had survived the treatment and occasionally has as much as a foot of new growth. Despite this, no plants were visible from the surface, and we wouldn't have known they were there without test raking."

Control Bed

> "EWM was not visible in this area that served as a control for the 2024 treatment. However, several test rakes produced a few severely burned stems with at least some regrowth."

TABLE-11. LATE SUMMER EURASIAN WATER-MILFOIL BED MAPPING SUMMARY – LOST LAND LAKE (ERS)

Bed Number	2024 Acreage	2022 Acreage	2022-24 Change in Acreage	Rake Range and Mean Rake Fullness	Depth Range and Mean Depth	Canopied	Navigation Impairment	2024 Field Notes
Bed 1	0.37	89.50	-89.13	2-3; 3	2-5; 4	Near	Minor	Only surviving plants were in the Ole Creek Inlet.
Bed 2	0.00	0.40	-0.40	-	-	-	-	No evidence of EWM despite random raking.
Bed 3	0.00	10.19	-10.19	-	-	-	-	No evidence of EWM despite random raking.
Bed 4 (A/B)	5.14	60.14	-55.00	<<<1-3; 1	3-7; 5	Near	Minor	Dead stems breaking free from the bottom everywhere.
Bed 5	Merged w/ 4B	0.39	-	<<<1-2; 11	3-6; 4	Near	Minor	Regular open bed.
Bed 6	0.00	22.10	-22.10	<<<1	6-10; 8	No	None	Dead stems breaking free from the bottom on east side.
Bed 7	0.00	0.09	-0.09	-	-	-	-	No evidence of EWM despite random raking.
Bed 8	0.00	0.07	-0.07	-	-	-	-	No evidence of EWM despite random raking.
Bed 9	0.00	8.57	-8.57	-	-	-	-	No evidence of EWM despite random raking.
Bed 10	0.00	1.36	-1.36	-	-	-	-	No evidence of EWM despite random raking.
Bed 11	0.00	22.37	-22.37	<<<1	6-10; 8	No	None	Dead stems breaking free from the bottom on east side.
Bed 12	0.00	3.06	-3.06	-	-	-	-	No evidence of EWM despite random raking.
Bed 13	0.00	0.04	-0.04	-	-	-	-	No evidence of EWM despite random raking.
Bed 14	0.00	14.80	-14.80	<<<1	4-10; 8	No	None	Random raking produced a few highly burned stems.
Bed 15	0.00	14.03	-14.03	<<<1	4-10; 8	No	None	Scattered young individuals on the east side of former bed.
Bed 15B	0.51	0.00	0.51	<<<1-1; <<1	4-7; 6	Near	None	EWM reestablishing in area that was recently harvested.
Bed 16	Merged w/ 17	0.43	-	<<<1-2; <<1	4-6; 5	Near	None	EWM reestablishing in area that was recently harvested.
Bed 17	1.25	0.27	0.98	<<<1-2; <<1	4-8; 6	Near	None	EWM reestablishing in area that was recently harvested.
Bed 18	0.00	6.46	-6.46	<<<1	6-10; 8	No	None	Dead stems breaking free from the bottom on west side.
Bed 19	0.00	1.52	-1.52	-	-	-	-	No evidence of EWM despite random raking.
Bed 20	0.00	4.57	-4.57	-	-	-	-	No evidence of EWM despite random raking.
Bed 21	0.00	3.03	-3.03	-	-	-	-	No evidence of EWM despite random raking.
Total	**7.26**	**263.39**	**-256.13**					

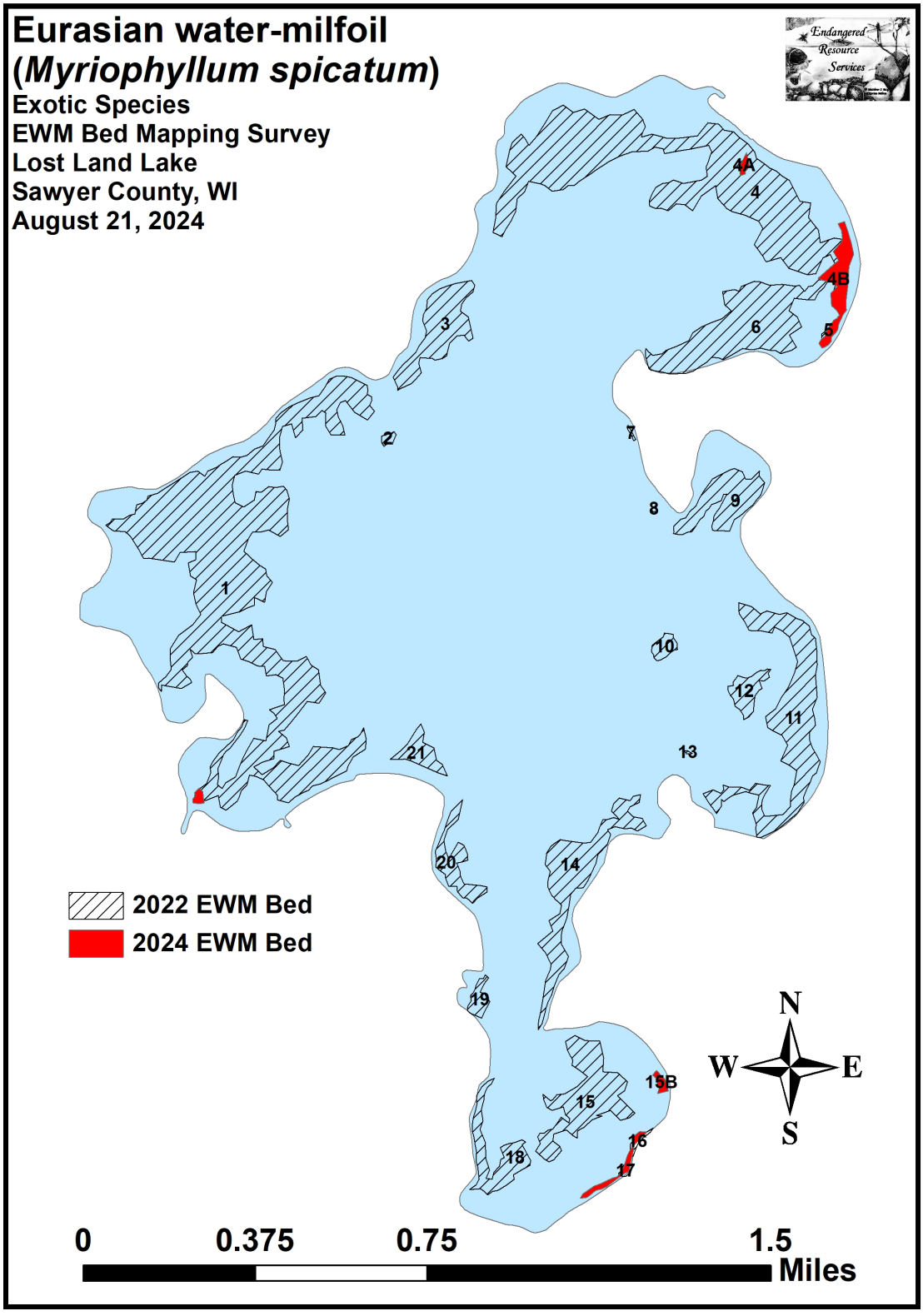


FIGURE 22. 2024 LOST LAND LAKE EURASIAN WATER-MILFOIL BEDS (ERS)

Teal Lake

On August 31, 2024, ERS searched 18.6 miles of transects throughout Teal Lake's visible littoral zone. Eleven Eurasian watermilfoil beds that covered 9.92 acres (0.97 % of the lake's surface area) were mapped. This was a 34.44-acre reduction (-44.64%) compared to 2022 when ERS delineated 35 beds covering 44.36 acres (4.33% of the lake's surface area). Most beds occurred along the far east shoreline well away from the 2024 treatment areas. ERS noted that EWM plants showed evidence of chemical burn, and many were laying on the bottom. At the lake outlet, ERS mapped three additional beds that totaled 0.93 acre. Interestingly, these plants showed no evidence of chemical burn, were canopied, likely impacting navigation, and appeared to be growing vigorously.

The following is a description of the Teal Lake treatment area from the ERS 2024 Teal Lake bed mapping report:

"In 2022, these two moderate to high density beds would likely have caused severe impairment had they not been subcanopy, and boats entering Teal Lake from Lost Land Lake had to cut their way through them which left the entire bay full of floating fragments. Following the 2024 treatment, we saw no sign of EWM anywhere in either bed, and test raking both inside and outside the treatment areas also failed to produce any evidence of EWM. We noted the entire treatment area was now dominated by open beds of native pondweeds (*Potamogeton* spp.)."

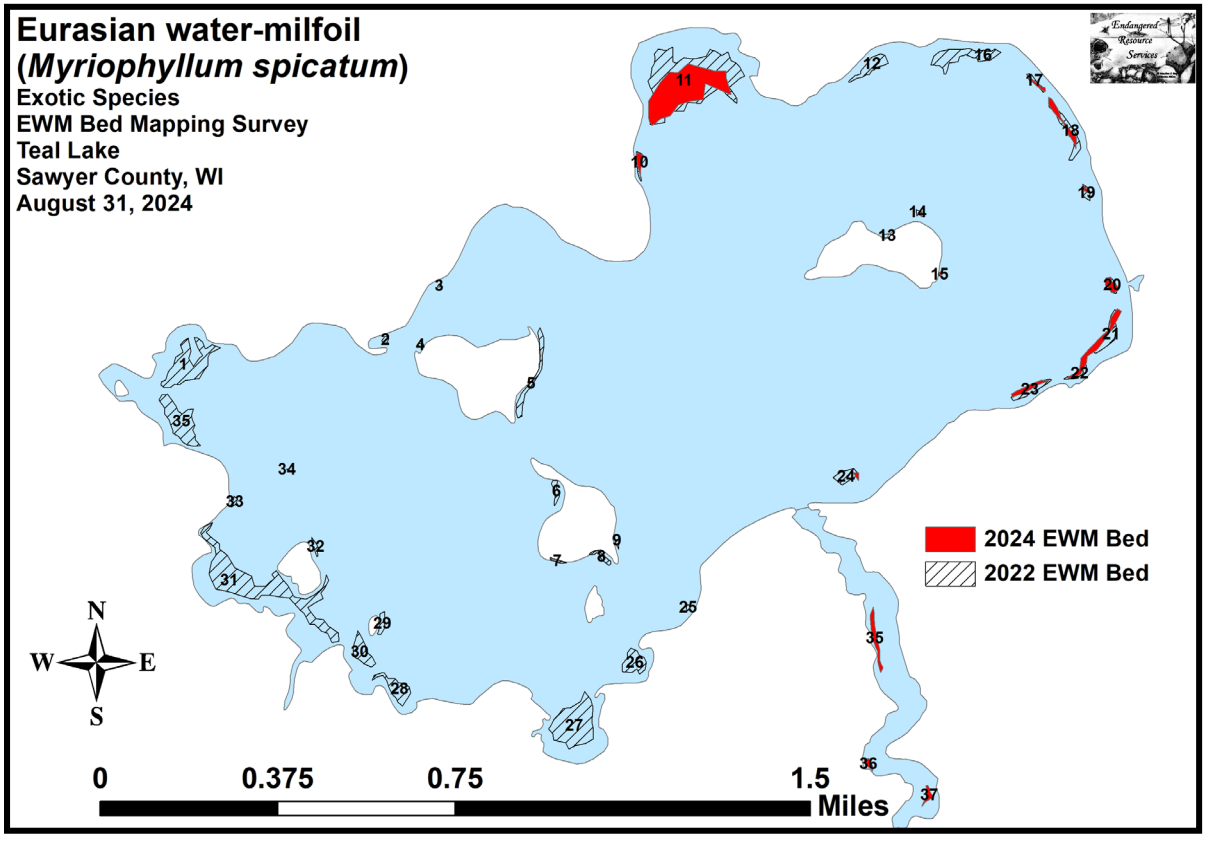


FIGURE 23. 2024 EURASIAN WATER-MILFOIL BEDS (ERS)

TABLE-12. LATE SUMMER EURASIAN WATER-MILFOIL BED MAPPING SUMMARY – TEAL LAKE (ERS)

Bed Number	2024 Acreage	2022 Acreage	2022-24 Change in Acreage	Rake Range and Mean Rake Fullness	Depth Range and Mean Depth	Canopied	Navigation Impairment	2024 Field Notes
Bed 1	0.00	3.43	-3.43	-	-	-	-	No evidence of EWM despite random raking.
Bed 2	0.00	0.10	-0.10	-	-	-	-	No evidence of EWM despite random raking.
Bed 3	0.00	0.01	-0.01	-	-	-	-	No evidence of EWM despite random raking.
Bed 4	0.00	0.04	-0.04	-	-	-	-	No evidence of EWM despite random raking.
Bed 5	0.00	1.03	-1.03	-	-	-	-	No evidence of EWM despite random raking.
Bed 6	0.00	0.27	-0.27	-	-	-	-	No evidence of EWM despite random raking.
Bed 7	0.00	0.09	-0.09	-	-	-	-	No evidence of EWM despite random raking.
Bed 8	0.00	0.26	-0.26	-	-	-	-	No evidence of EWM despite random raking.
Bed 9	0.00	0.13	-0.13	-	-	-	-	No evidence of EWM despite random raking.
Bed 10	0.24	0.37	-0.13	<<<1-2; 1	3-6; 5	Near	Minor	Narrow ribbon along shoreline.
Bed 11	6.96	12.19	-5.23	<<<1-2; <1	3-7; 5	Near	None	Regular plants – all showed chemical burn.
Bed 12	0.00	0.95	-0.95	-	-	-	-	No evidence of EWM despite random raking.
Bed 13	0.00	0.06	-0.06	-	-	-	-	No evidence of EWM despite random raking.
Bed 14	0.03	0.04	-0.01	<<<1-2; 1	3-6; 4	Near	None	Fragments shedding from surviving burned plants.
Bed 15	0.02	0.01	0.01	<<<1-1; <1	3-5; 4	Near	None	Fragments shedding from surviving burned plants.
Bed 16	0.00	2.06	-2.06	-	-	-	-	No evidence of EWM despite random raking.
Bed 17	0.13	0.20	-0.07	<<<1-3; 2	3-6; 5	Near	Minor	Prop-trails/many plants burned/lying on the bottom.
Bed 18	0.56	1.06	-0.50	<<<1-3; 1	3-6; 5	Near	Minor	All plants burned/many lying on the bottom.
Bed 19	0.04	0.23	-0.19	<<<1-1; <1	3-5; 4	Near	None	All plants burned/many lying on the bottom.
Bed 20	0.33	0.32	0.01	<<1-3; 2	3-6; 5	Near	Minor	Many plants burned/lying on the bottom.
Bed 21	1.13	1.03	-0.16	<<<1-3; 2	3-7; 6	Near	Minor	All plants burned/many lying on the bottom.
Bed 22	Merged	0.26	-	<<<1-3; 2	3-7; 6	Near	Minor	Essentially continuous with Bed 21.
Bed 23	0.41	0.72	-0.31	<<<1-3; 2	3-7; 6	Near	Minor	All plants burned/many lying on the bottom.
Bed 24	0.06	0.63	-0.57	<<1-1; <1	3-6; 5	Near	None	Dead plants pulling free from the bottom.

Bed Number	2024 Acreage	2022 Acreage	2022-24 Change in Acreage	Rake Range and Mean Rake Fullness	Depth Range and Mean Depth	Canopied	Navigation Impairment	2024 Field Notes
Bed 25	0.00	0.05	-0.05	-	-	-	-	No evidence of EWM despite random raking.
Bed 26	0.00	1.17	-1.17	-	-	-	-	No evidence of EWM despite random raking.
Bed 27	0.00	4.46	-4.46	-	-	-	-	No evidence of EWM despite random raking.
Bed 28	0.00	1.19	-1.19	-	-	-	-	No evidence of EWM despite random raking.
Bed 29	0.00	0.29	-0.29	-	-	-	-	No evidence of EWM despite random raking.
Bed 30	0.00	1.06	-1.06	-	-	-	-	No evidence of EWM despite random raking.
Bed 31	0.00	7.77	-7.77	-	-	-	-	No evidence of EWM despite random raking.
Bed 32	0.00	0.15	-0.15	-	-	-	-	No evidence of EWM despite random raking.
Bed 33	0.00	0.09	-0.09	-	-	-	-	No evidence of EWM despite random raking.
Bed 34	0.00	<0.01	-<0.01	-	-	-	-	No evidence of EWM despite random raking.
Bed 35	0.00	2.65	-2.65	-	-	-	-	No evidence of EWM despite random raking.
Total	**9.92**	**44.36**	**-34.44**					

Mechanical Harvesting

The QLIA felt that it was prudent to continue mechanical harvesting EWM in the southernmost bay of Lost Land Lake (Steamboat Bay). Harvesting occurred in late summer, and volunteer operators report using the harvester to primarily collect EWM that had uprooted and floated to the surface. However, the Lost Land Lake 2024 bedmapping report indicates that in areas where the harvester was used, EWM was actively reestablishing (Table 11).

> "**Beds 15B, 16, and 17** – "Bed" 15B consisted of dozens of small newly established plants. Similarly, EWM plants in Beds 16 and 17 were also young. The harvester was running during our survey, and we noticed floating EWM fragments throughout the area it had just passed. **We also noted that, in areas that had been recently harvested, EWM was rapidly reestablishing, and it was so confined to these disturbed areas that it looked like it had been planted there."**

This area of the lake is also the farthest from any treatment area, and the lake's morphology (a narrow neckdown into the bay) along with the north wind at the time of treatment may have limited the travel of the herbicide into this bay.

Clean Boats, Clean Waters

Clean Boats, Clean Waters (CBCW) is an AIS education/prevention program through which volunteer or paid staff conduct boat and trailer inspections and educate boaters on how to prevent the spread of AIS at boat landings.

In 2024, QLIA volunteers participated in CBCW to assist in educating boaters entering and leaving the Quiet Lakes about AIS and specifically EWM. In 2024, there were 99 boats inspected, 222 people contacted, and 88 volunteer hours. All 2024 data have been entered into the SWIMS database. There are 37 hours remaining for the QLIA to fulfill in 2025 as part of the grant agreement. However, it is recommended the QLIA aim to meet or surpass 2024 CBCW hours in order to continue education efforts and the prevention of spreading AIS and EWM to other nearby lakes that do not have EWM (Spider Chain, Moose Lake, and Ghost Lake primarily).

Decontamination Station

As an additional education effort, the QLIA aimed to install a 'Decontamination Station' at the Lost Land Lake boat landing. This site is owned and managed by the WDNR, and the installation of any new signage requires a land use agreement. As such, an agreement was obtained in September 2024 to install an AIS Removal Station sign. WDNR personnel, Jeanne Sherer, was contacted for the AIS Removal Station template (below). The sign will be installed in 2025 by QLIA volunteers.

AQUATIC INVASIVE SPECIES

AIS REMOVAL STATION

BEFORE LEAVING, YOU ARE REQUIRED BY LAW TO:

- **INSPECT** boats, trailers and equipment
- **REMOVE** all attached aquatic plants, animals and mud
- **DRAIN** all water from boats, vehicles and equipment including livewells
- **NEVER MOVE** plants or live fish away from a water body*

*Limited exceptions apply. Visit DNR.WI.GOV and search for "BAIT LAWS."

Optional steps include:

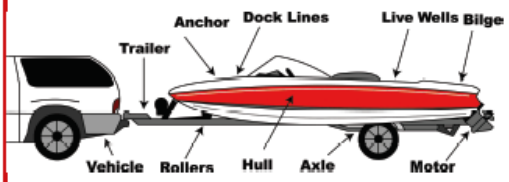
- Pressure wash areas indicated for at least 90 seconds to help remove invasive species that are hard to see and remove by hand
  - Keep the nozzle at a 90° angle to the boat and at least 12 inches away from the boat to prevent removing decals
- Treat live wells with a mild bleach or salt solution
  - ½ oz bleach/quart of water or ⅔ cup salt/gallon of water
  - Spray the inside of the live well and rinse before next use

STOP AQUATIC HITCHHIKERS!
Prevent the spread of invasive species. It's the Law!

Extension

Sea Grant

CHECK THESE LOCATIONS FOR INVASIVE SPECIES:



TOOLS

- Use tools to remove vegetation
- Place vegetation in the grass
- Dispose of unwanted bait in the trash at home

These tools help protect our lakes.
Please replace them when finished!

Discussion and Consideration for 2025

It is apparent that the 30-acre ProcellaCOR treatment in Lost Land Lake resulted in nearly a whole-lake treatment of Eurasian watermilfoil in 2024. However, areas with surviving plants could rapidly reestablish in 2025. Herbicide concentration testing indicates that the herbicide was consumed fairly quickly within Lost Land, but low levels still had notable impact across the 1,264-acre waterbody. Despite the apparent success of controlling EWM in 2024, it is important to note that the unintended whole-lake effect of the treatment may have inadvertent consequences. There are many unknowns regarding the potential disruption of biotic processes and impacts to larval fish, zooplankton, native plant species, etc. that are integral to a lake's ecosystem.

Harvesting may be relieving minor navigation impairment, but it may also be contributing to the spread of EWM based on the abundance of floating fragments released during the harvesting process. Based on observations from ERS, the northeast and south bays of Lost Land Lake are likely to have the highest EWM densities in 2025. Mechanical harvesting should be carefully considered as a management option in areas where EWM reaches nuisance levels and is causing navigational impairment.

While lake-wide relief from EWM is an outcome that is ideal for getting the most out of the money spent on the treatment, this was an unintended result with unknown consequences that should be avoided in the future. Continuous exposure to herbicides can cause EWM to develop resistance to the herbicide, reducing future effectiveness and possibly resulting in more harm to the native plant community. While some plant community indicators show improvement from May to August in the pre and post treatment surveys, these changes could be attributed to the natural shifts in plant communities through the growing season and not solely to the herbicide treatment, so these results should be regarded with caution. Future whole-lake point intercept surveys should be compared to the 2016 and 2022 point intercept surveys for a better understanding of impacts to native species.

Future management actions should take into consideration the risks of harming native plants which would open more areas for EWM growth and reduce the valuable ecosystem services provided by a diverse plant community. It should also be noted that EWM, despite being a nonnative species, also provides ecosystem services such as fish habitat, shoreline protection from waves, carbon sequestration, etc.

Schmidt's Aquatic representative, Hamilton Harvey, notes that many lakes with a similar outcome as Lost Land Lake can expect 3-5 years of relief from EWM. As such, the QLIA should use this time to continue education and handpulling efforts and utilize smaller, focused herbicide treatments at most. Ultimately, further herbicide treatments are at the discretion of the WDNR, and consideration of these factors will be taken into account.

The 6-acre ProcellaCOR treatment at the entrance of the thoroughfare into Teal Lake also produced residual control of EWM in the entire western half of Teal Lake in 2024. EWM showed evidence of chemical burn and a general reduction in density in the eastern portion of the lake;

however, because so many of those plants survived, those beds could reestablish in 2025. Based on these observations, the north-central bay and along the entire eastern and southeastern shorelines of Teal Lake are likely to have the highest EWM densities in 2025.

Selection of possible treatment areas in Teal Lake should take into consideration the level of navigation impairment and overall density of the EWM beds. Teal Lake has a much steeper bathymetry and generally a more sandy to rocky substrate than Lost Land Lake, making it a less hospitable habitat for EWM to establish. The QLIA should consider increasing handpulling efforts on small, shallow beds and strategically select beds for herbicide treatment based on density, impact on navigation, impacts to the fishery, and other criteria to be determined in conversations with the WDNR.

Eradication of EWM is an unrealistic goal for any waterbody, but especially so in a system where it is as widespread as it is in Lost Land Lake and Teal Lake. Focusing management to reduce navigational impairments and impact to native plants should be the primary focus of the QLIA.

Management Considerations for 2025:

1. Consider only using the EcoHarvester for relieving areas with severe navigational impairment.
2. Encouraging more handpulling (with training) and educational opportunities.
3. Using smaller, targeted herbicide treatments and limiting treatment near areas treated in 2024.
4. Consider taking the 'no management' approach (a valid management strategy) to allow the native plant community to fully recover and to measure the time for EWM to reestablish. This data would be helpful for informing future management decisions and for setting realistic management goals.

ERS Reports

The remarkable amount of work and the quality of the work and report writing done by Endangered Resource Services, LLC should be acknowledged, because without their efforts, management planning would not be possible on these lakes.

For more information related to the aquatic plant surveys please view the following reports:

Berg, Matthew. (2022). *Warm-water Point-intercept Macrophyte Survey Lost Land Lake (WBIC: 2418600) Sawyer County, Wisconsin*. Report.

Berg, Matthew. (2022). *Warm-water Point-intercept Macrophyte Survey Teal Lake (WBIC: 2417000) Sawyer County, Wisconsin*. Report.

Berg, Matthew. (2022). *Eurasian Water-Milfoil (Myriophyllum Spicatum) Late Summer Bed Mapping Survey Lost Land Lake (WBIC: 2418600) Sawyer County, Wisconsin.* Report.

Berg, Matthew. (2022). *Eurasian Water-Milfoil (Myriophyllum Spicatum) Late Summer Bed Mapping Survey Teal Lake (WBIC: 2417000) Sawyer County, Wisconsin.* Report.

Berg, Matthew. (2024). *Eurasian Water-Milfoil (Myriophyllum Spicatum) Pre and Posttreatment Surveys Lost Land Lake (WBIC: 2418600) and Teal Lake (WBIC: 2417000) – Sawyer County, Wisconsin.* Report.

Berg, Matthew. (2024). *Eurasian Water-Milfoil (Myriophyllum Spicatum) Late Summer Bed Mapping Survey Lost Land Lake (WBIC: 2418600) Sawyer County, Wisconsin.* Report.

Berg, Matthew. (2024). *Eurasian Water-Milfoil (Myriophyllum Spicatum) Late Summer Bed Mapping Survey Teal Lake (WBIC: 2417000) Sawyer County, Wisconsin.* Report.