A Brief History of Eurasian-water milfoil on Teal and Lost Land Lakes

What plants can teach us about a lake's health, and how they can guide management moving forward

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Specializing in Aquatic Plant, Mussel, Dragonfly and Bird Surveys
Habitat Assessment and Endangered Species Mitigation

Founded in 2002

Working on over 350 lakes since 2006

Worked on over 100 different lakes in 2024

Lake Management in Wisconsin

Using Plants to Help Understand and Improve Our Waters

Wisconsin's Natural Lakes formed in the wake of receding glaciers

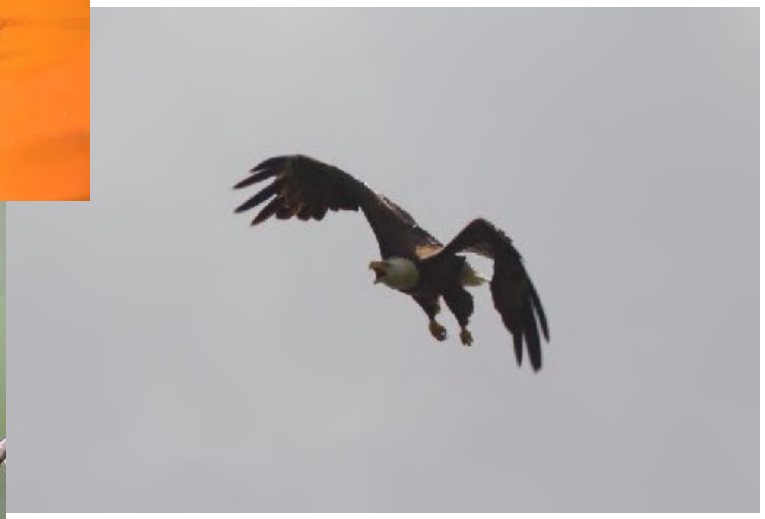
Today in the State of Wisconsin

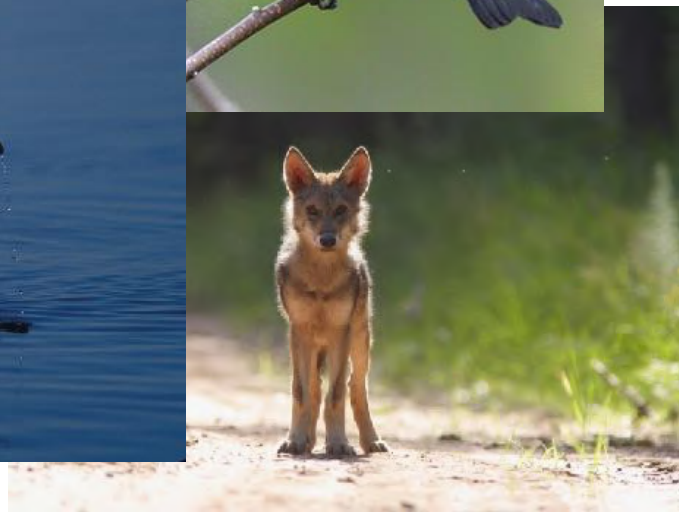
We have over 16,000 Lakes

How about that Minnesota?!?

Fish swam up rivers from the south and repopulated our lakes

Plants quickly established in these new areas creating rich habitats





With a Healthy Plant Community, We have a Vibrant Ecosystem

Lake Biologist Specializing in Plants – Conduct Surveys to ociations Better Manag

Why survey a lake's plants –
In other words, what value does this bring to a lake association?

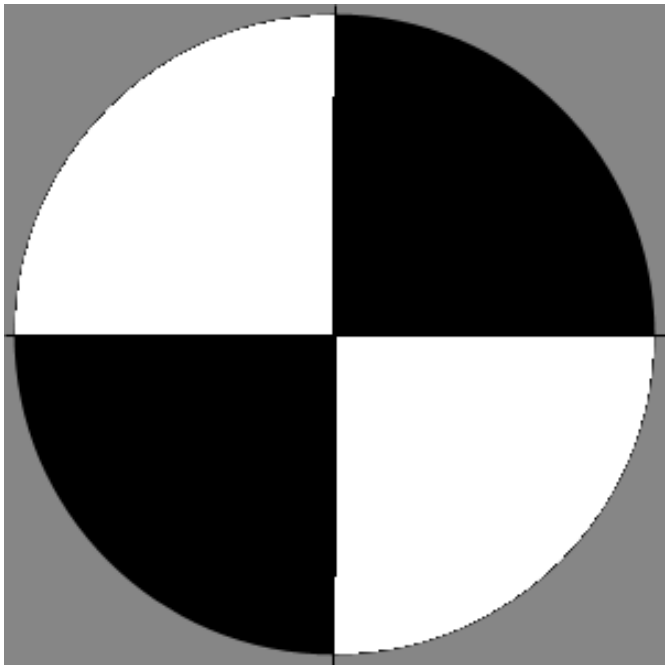
Lake Management

- Weeds!! What good are they?

What does a plant need to survive?

Plants need light to photosynthesize and make sugars

This can be difficult in a lake with poor clarity.

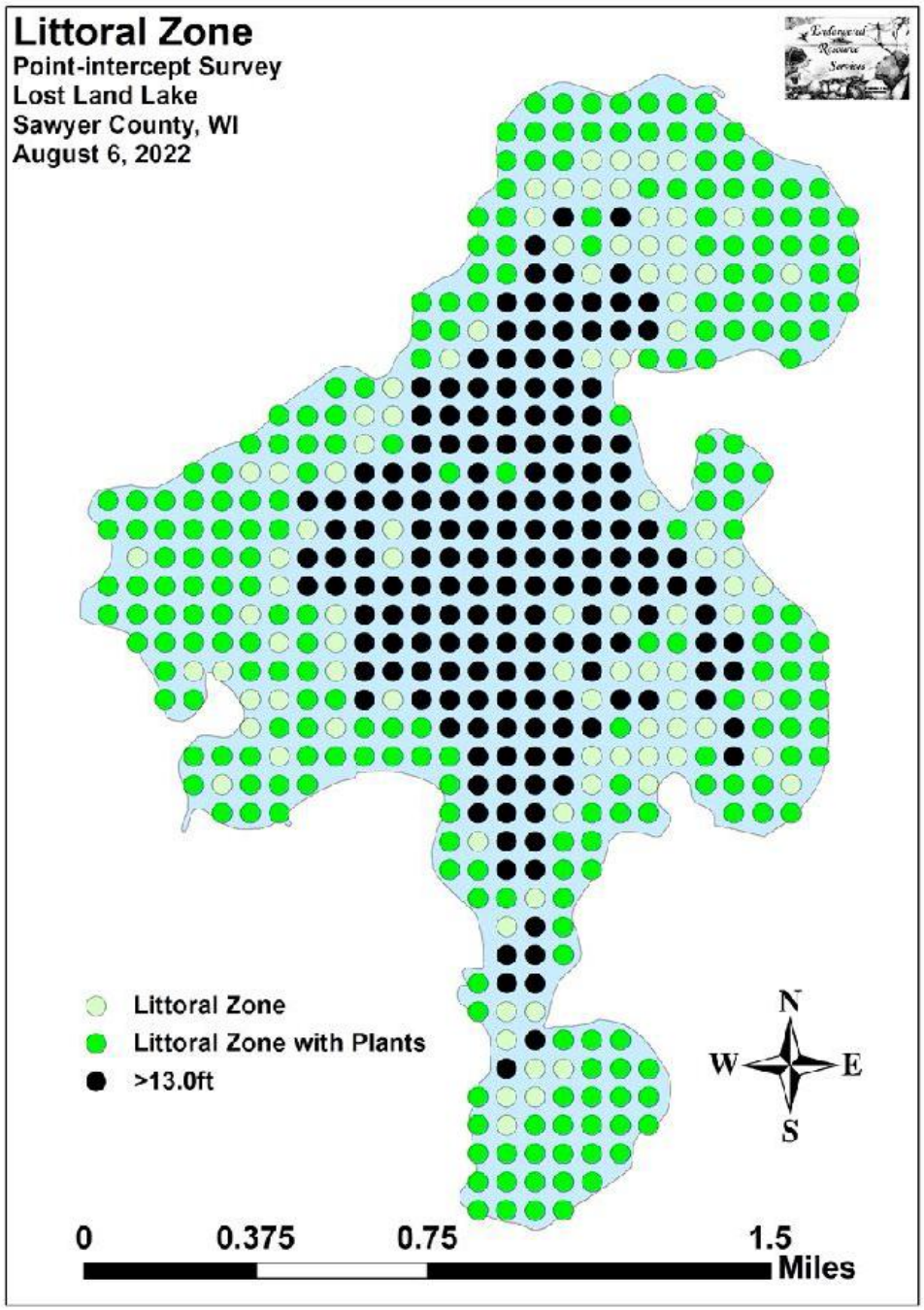


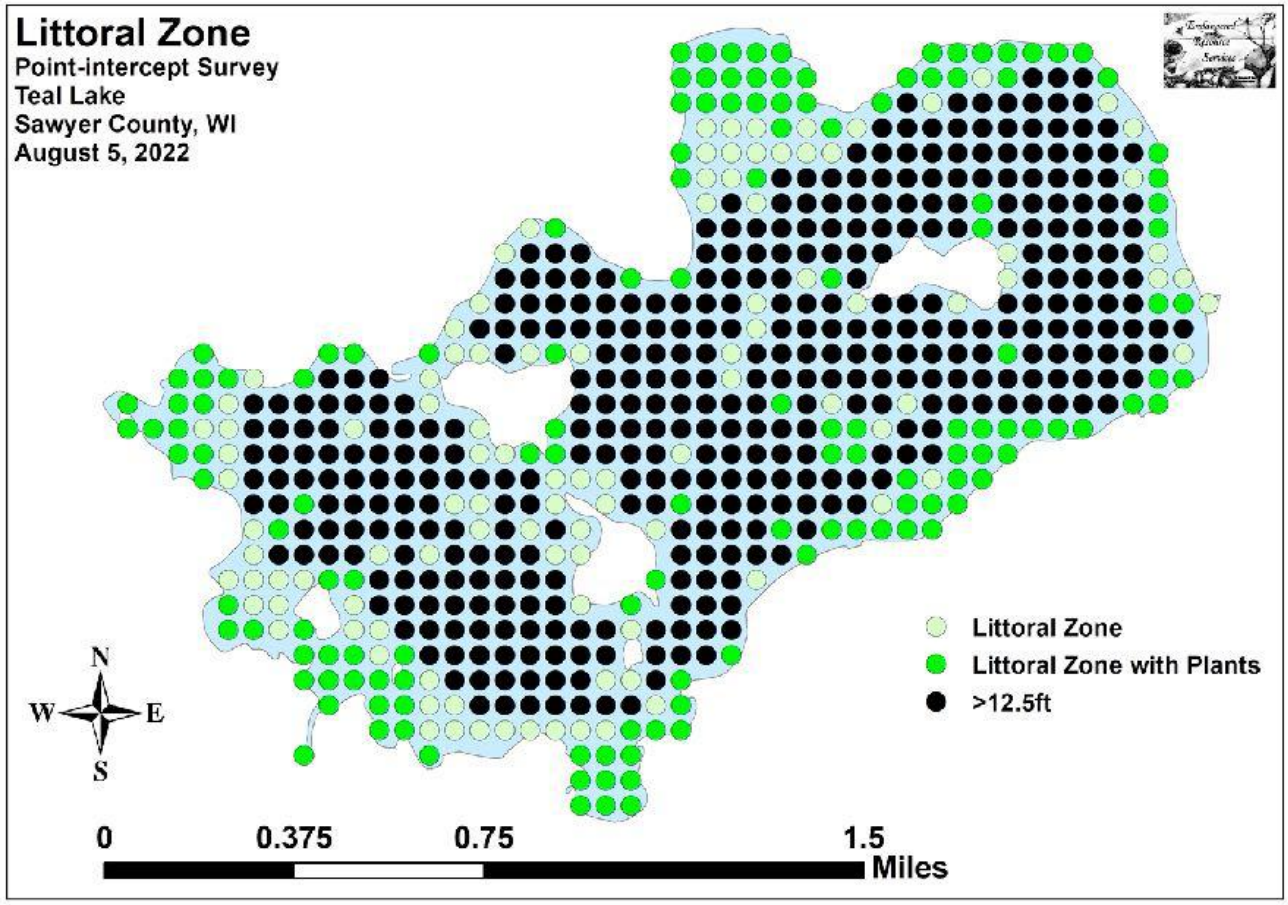
How is your lake's clarity?

What ever your Secchi value is, you can expect plants to grow 1.5 to 2.5X that depth.

Littoral Zone

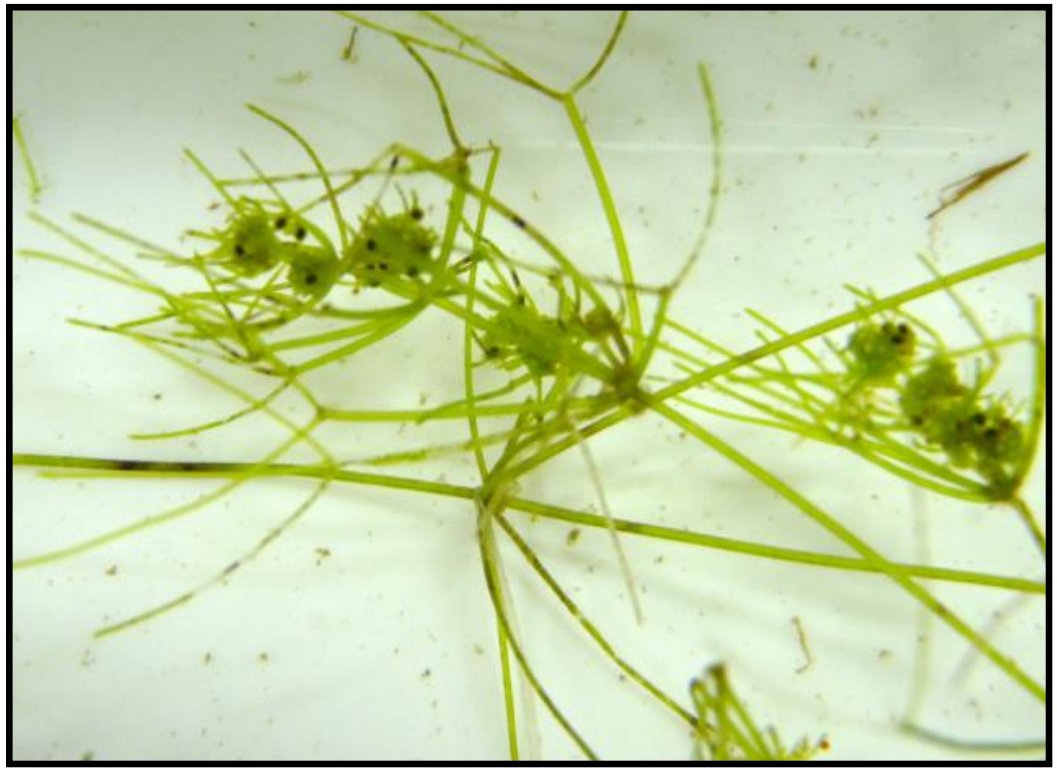
The depth to which plants can grow in a lake




Littoral Zone
Point-intercept Survey
Teal Lake
Sawyer County, WI
August 5, 2022
N
W
E
S
Littoral Zone
Littoral Zone with Plants
>12.5ft
0
0.375
0.75
1.5
Miles

Deep submersed plants (13ft+)

Deep submersed plants (13ft+)



And Nitella
Usually last species to disappear

Mid-range submersed plants (6-1

Large-leaf pondweeds

Mid-range submersed plants (6-1

Northern water milfoil

Mid-range submersed plants (6-1

White-stem pondweed

Mid-range submersed plants (6-1

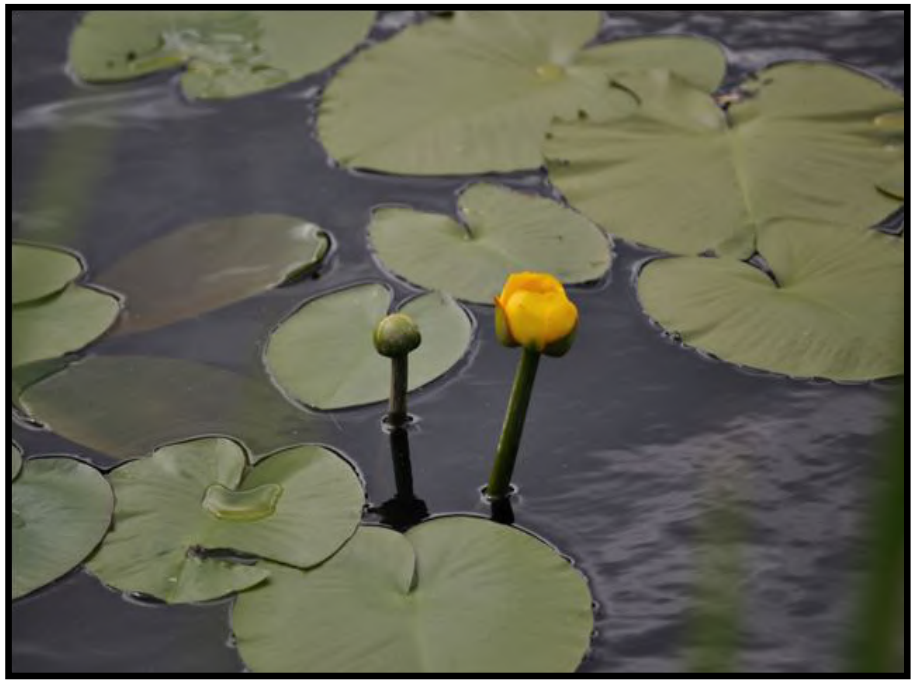
White-stem pondweed

They provide hunting habitat and cover for game and bait fish alike

These “pondweeds” make up the bulk of rooted plants (macrophytes) on most lakes

Floating-leaf plants (0-5ft)

White water lily



Floating-leaf plants (0-5ft)

Spatterdock

Floating-leaf plants (0-5ft)

Watershield

Floating-leaf plants (0-5ft)

Water smartweed

These floating canopies are used for shelter by bass and panfish

Emergent Species

Bulrushes

Emergent Species

Pickerelweed

Shoreline plants provide cover for amphibians…

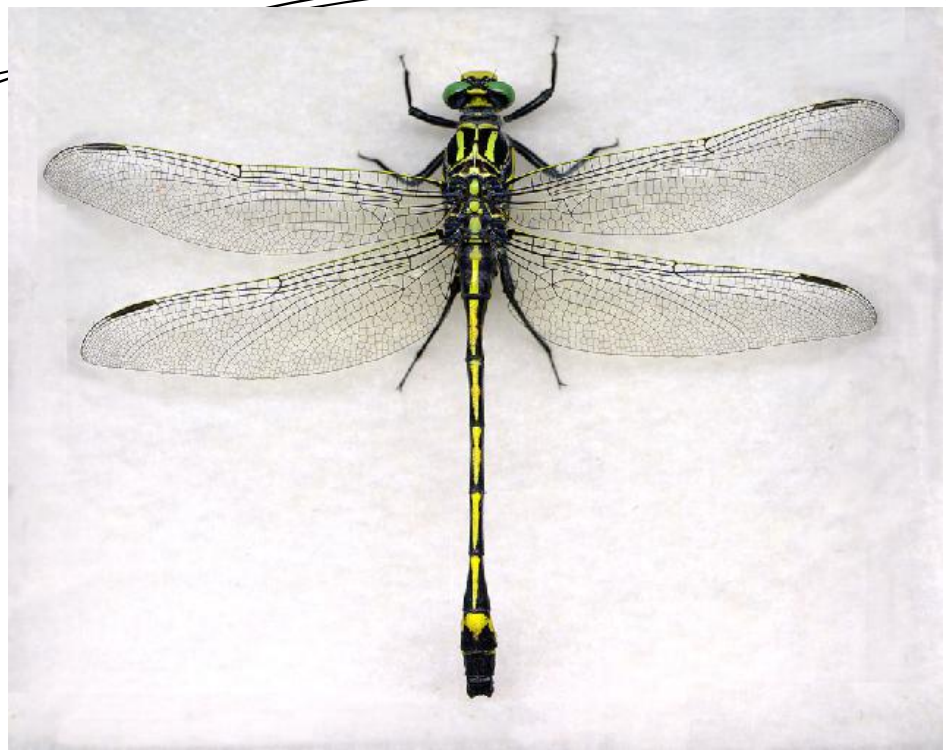
And a place for their predators to hunt...

Ultimately, their complete removal results in a very real loss of property.

Ultimately, their complete removal results in a very real loss of property.

All of these macrophytes provide food for aquatic insects and other invertebrates low on the food chain

Without these tiny herbivores, aquatic insect predators would starve



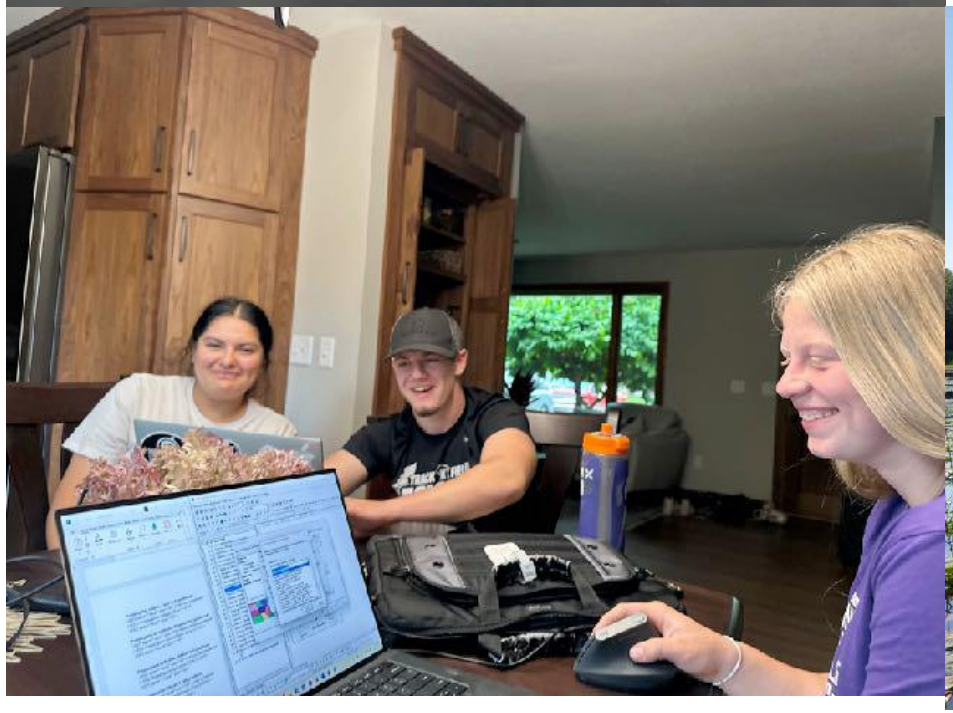
And we would never get to see them as adults

Lake Management

- First surveyed the lakes in 2022
- Goal of determining how EWM levels had changed since first surveys in 2016
- Update the lakes' Aquatic Plant Management Plan

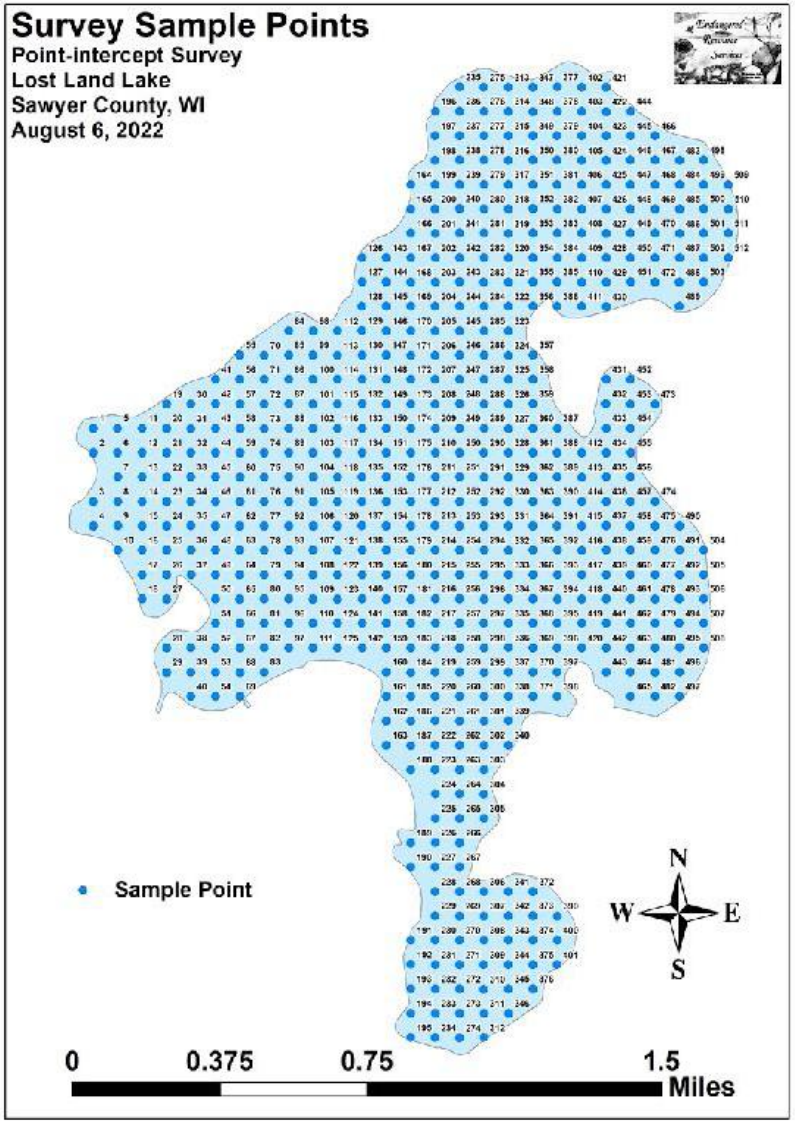
1. Health of native plants –
What species are most common? Is the community rich? Diverse? Healthy? Suffering? Improving? Declining?

With the help of my trusty field crews.



With the help of my trusty field crews.

1. Rake Survey at WDNR Generated Grid–
Lost Land Lake–
512 points
100m apart

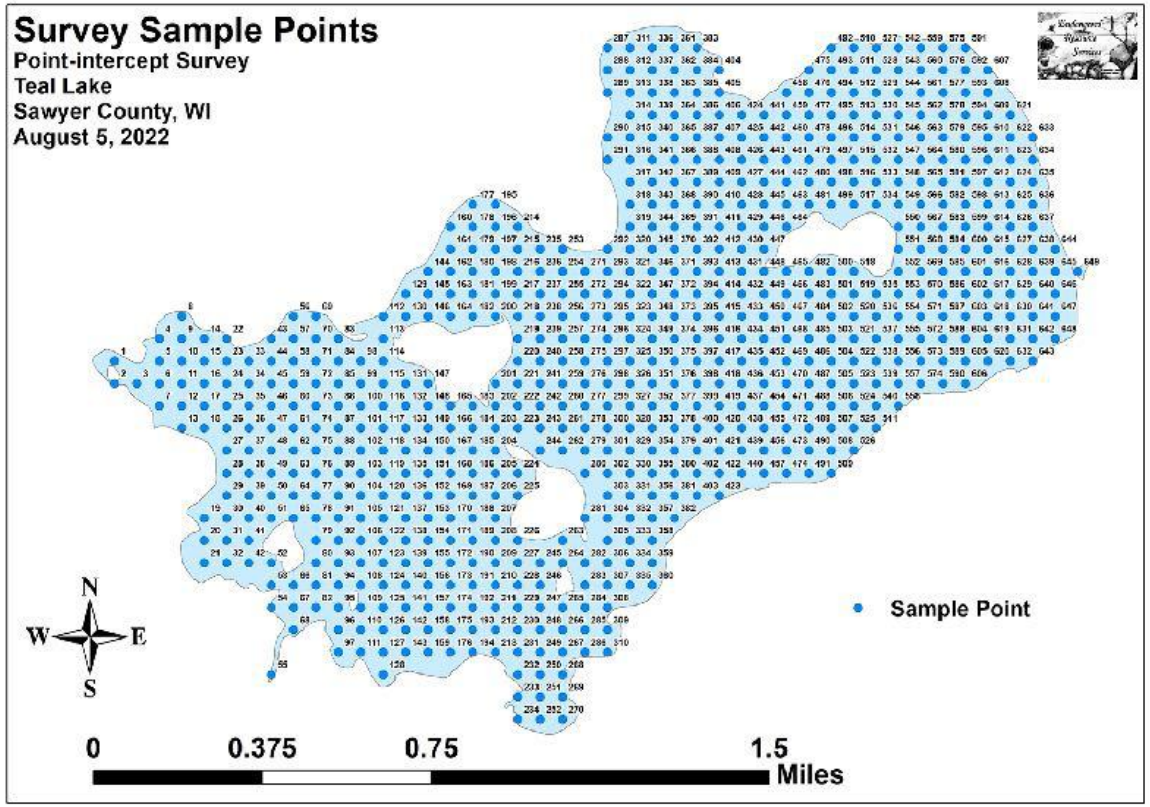


1. Rake Survey at WDNR Generat

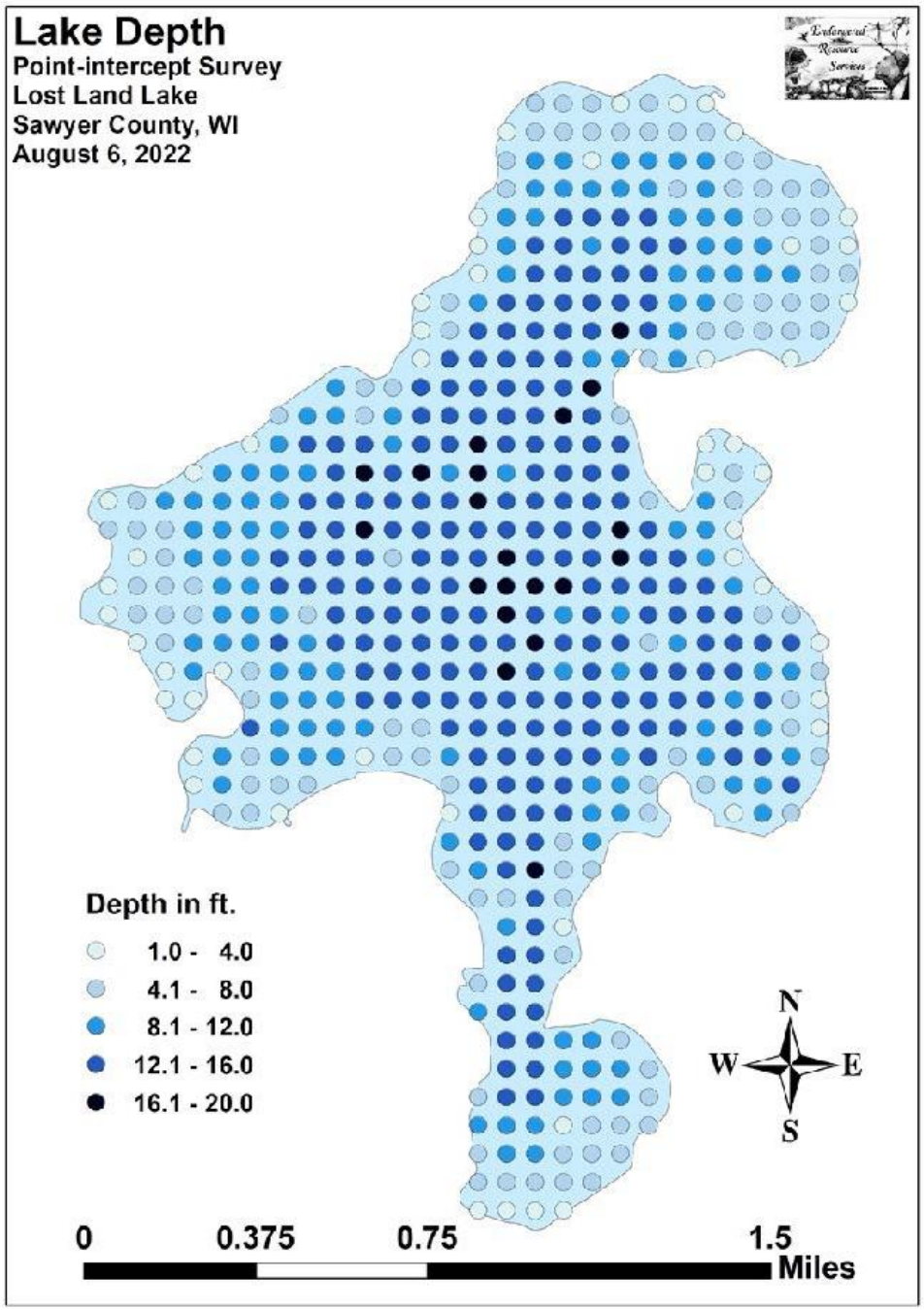
Teal Lake–

649 points

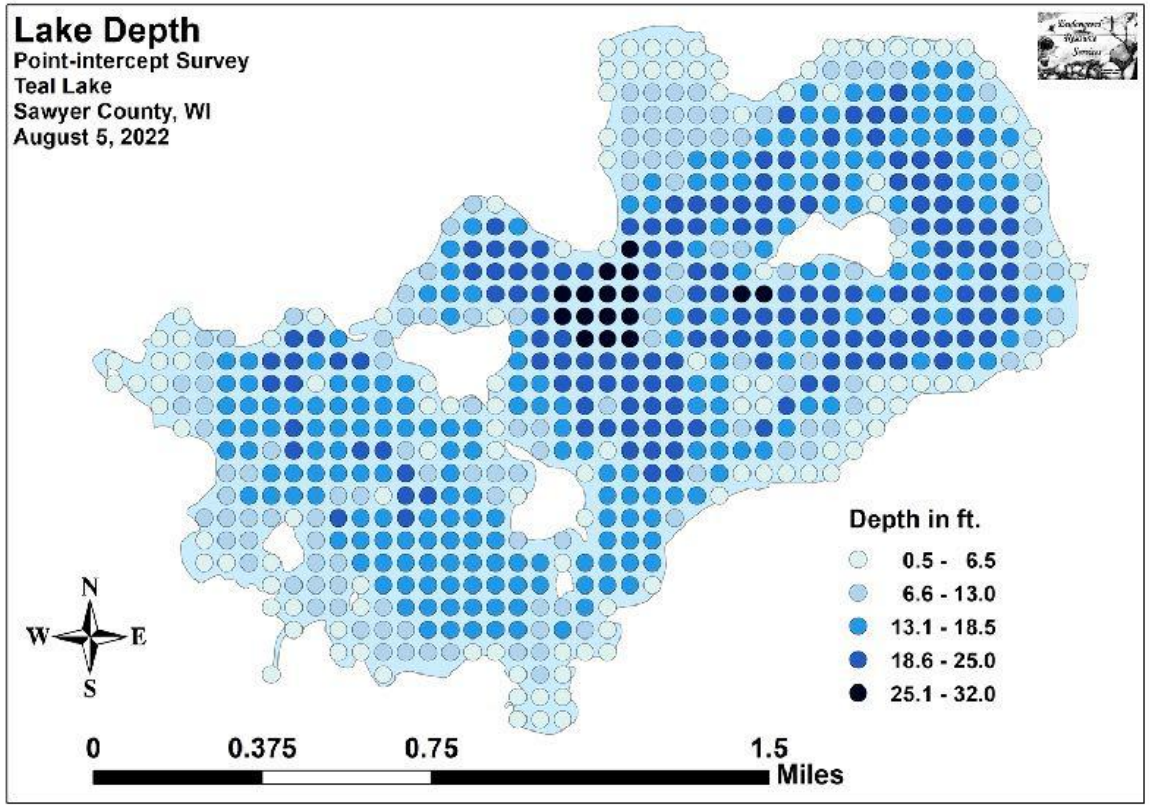
80m apart



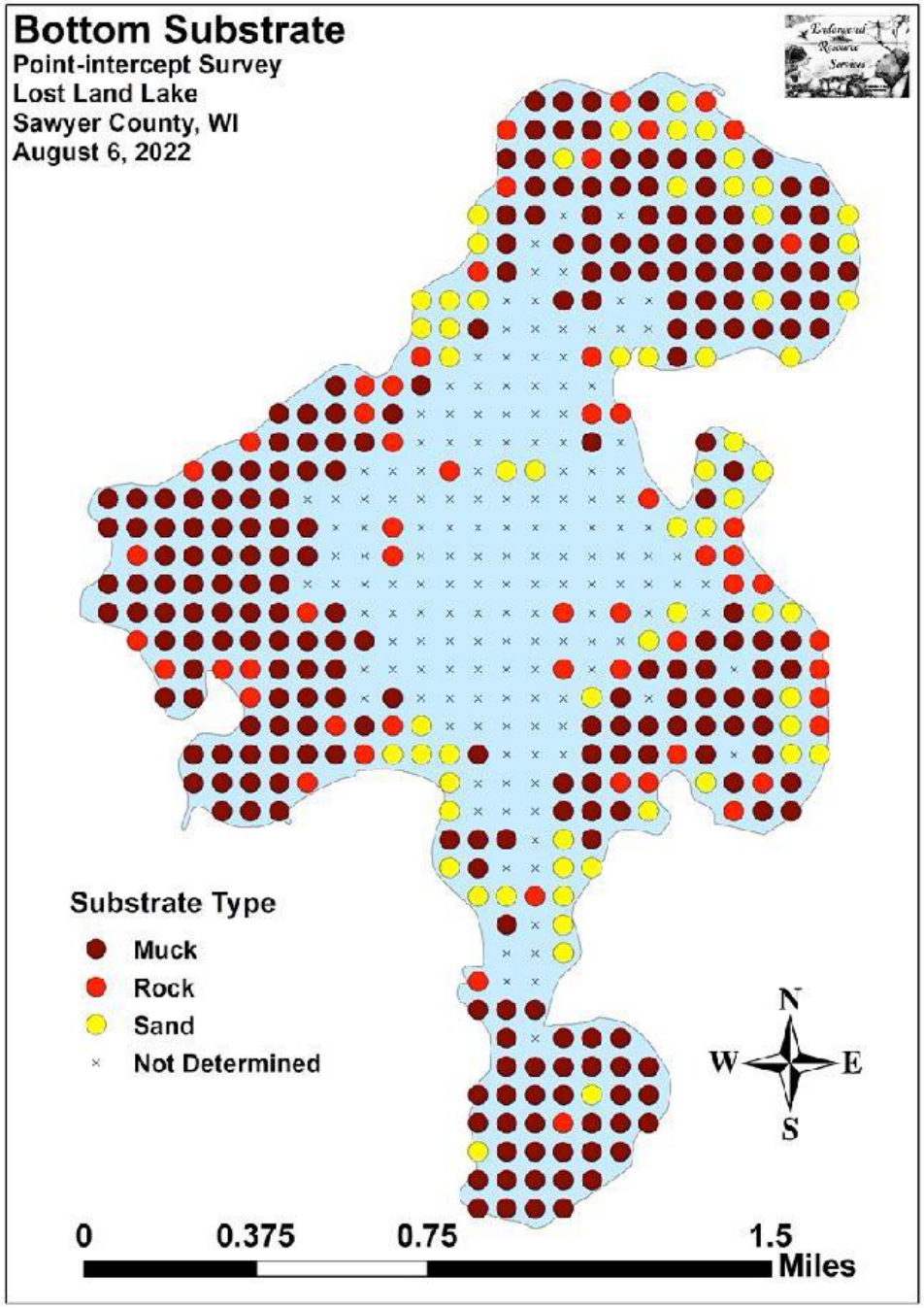
1. Depth


Lake Depth
Point-intercept Survey
Lost Land Lake
Sawyer County, WI
August 6, 2022
Depth in ft.
1.0 - 4.0
4.1 - 8.0
8.1 - 12.0
12.1 - 16.0
16.1 - 20.0
N
W
E
S
0
0.375
0.75
1.5
Miles

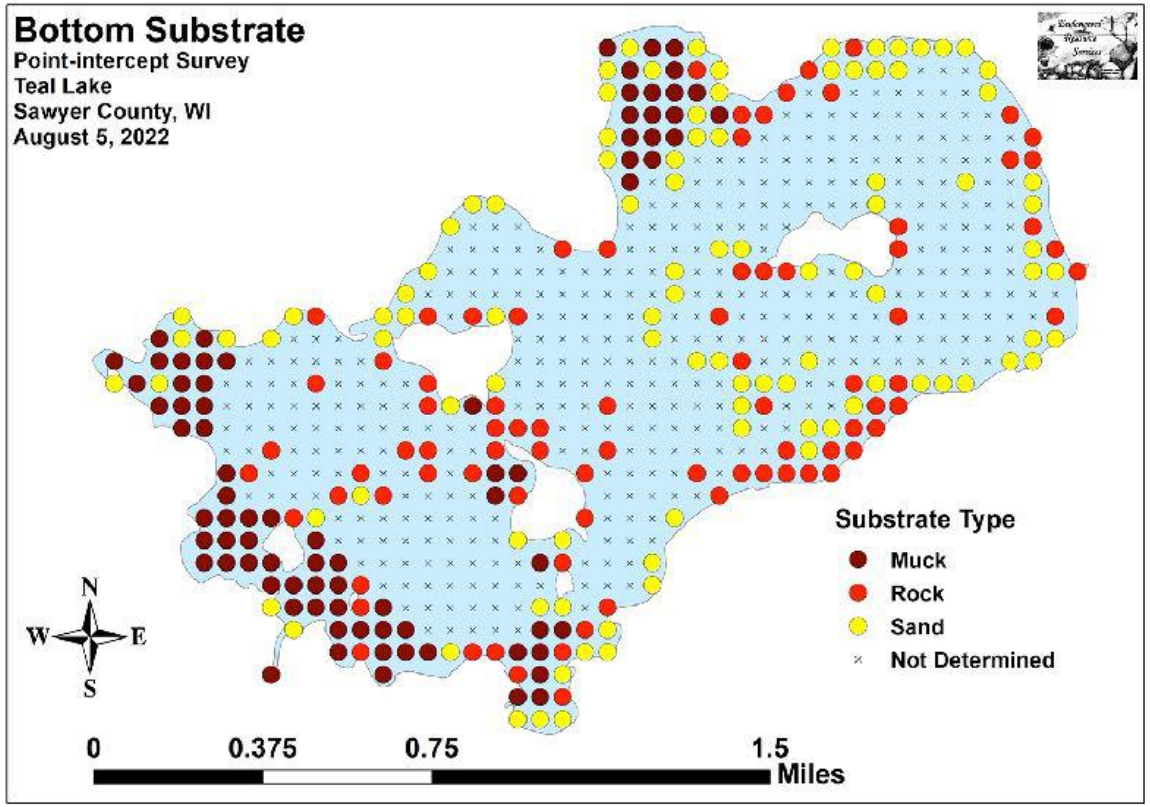
1. Depth


Lake Depth
Point-intercept Survey
Teal Lake
Sawyer County, WI
August 5, 2022
Depth in ft.
0.5 - 6.5
6.6 - 13.0
13.1 - 18.5
18.6 - 25.0
25.1 - 32.0
N
W
E
S
0
0.375
0.75
1.5
Miles

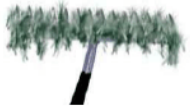
1. Bottom Substrate Type

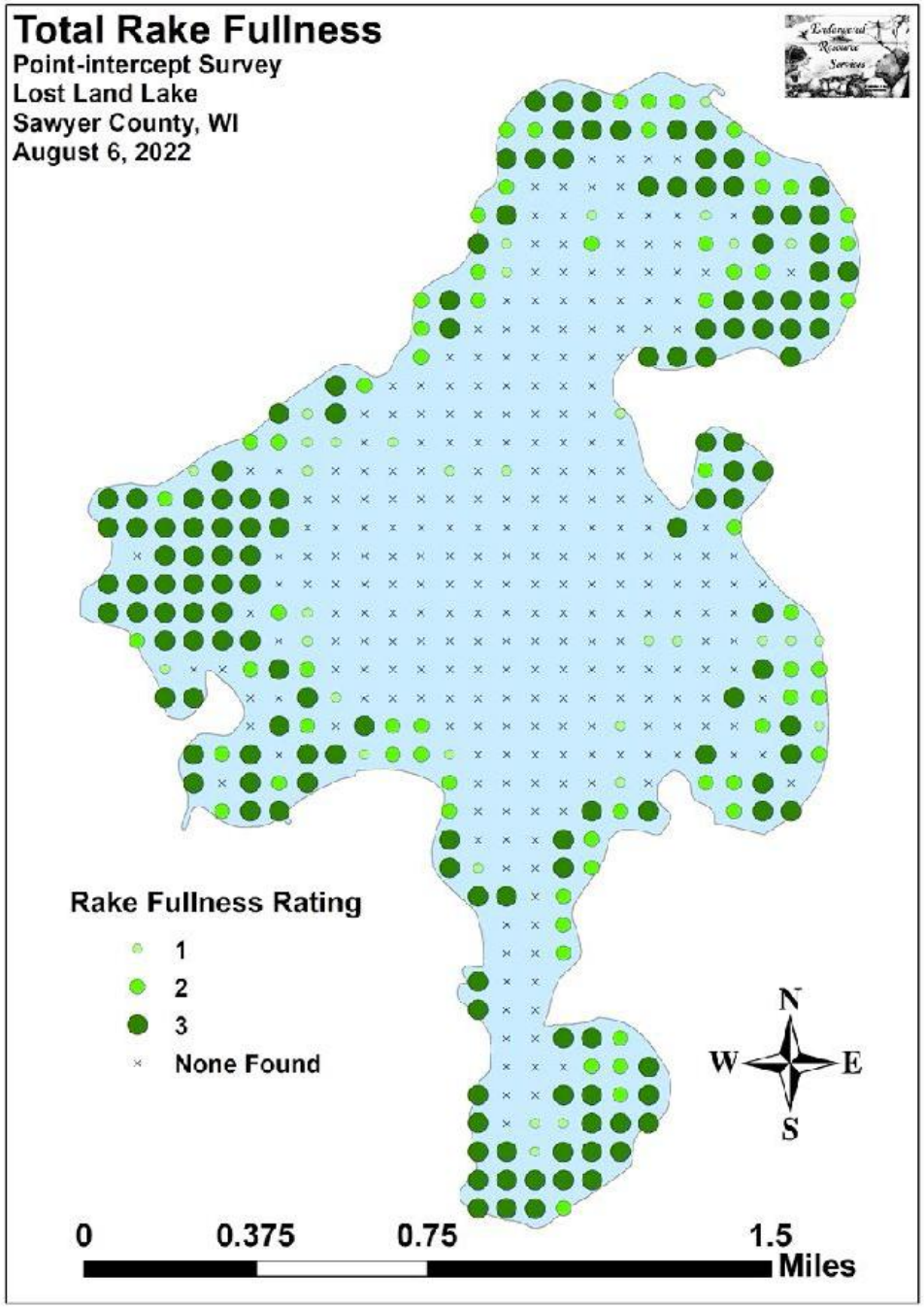


1. Bottom Substrate



1. Rake Fullness (Plant Density)

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



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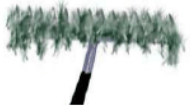
2		Rake head is about ½ full Can easily see top of rake head
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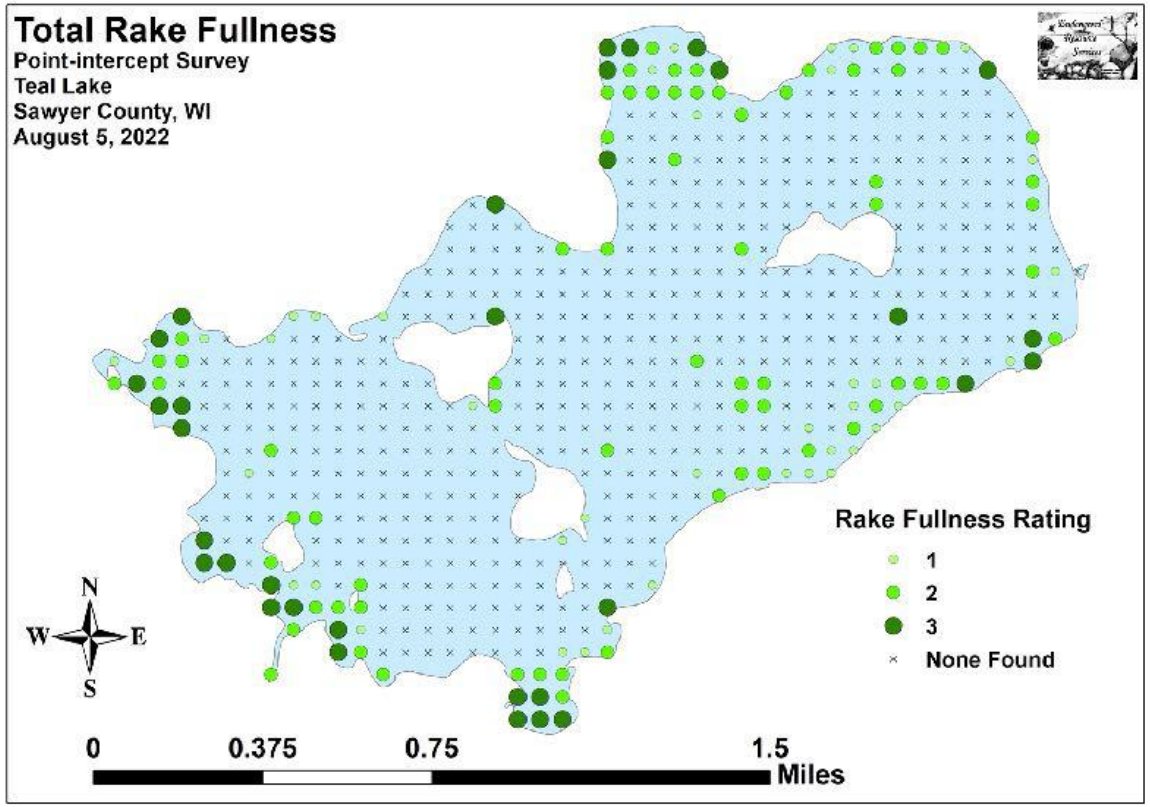
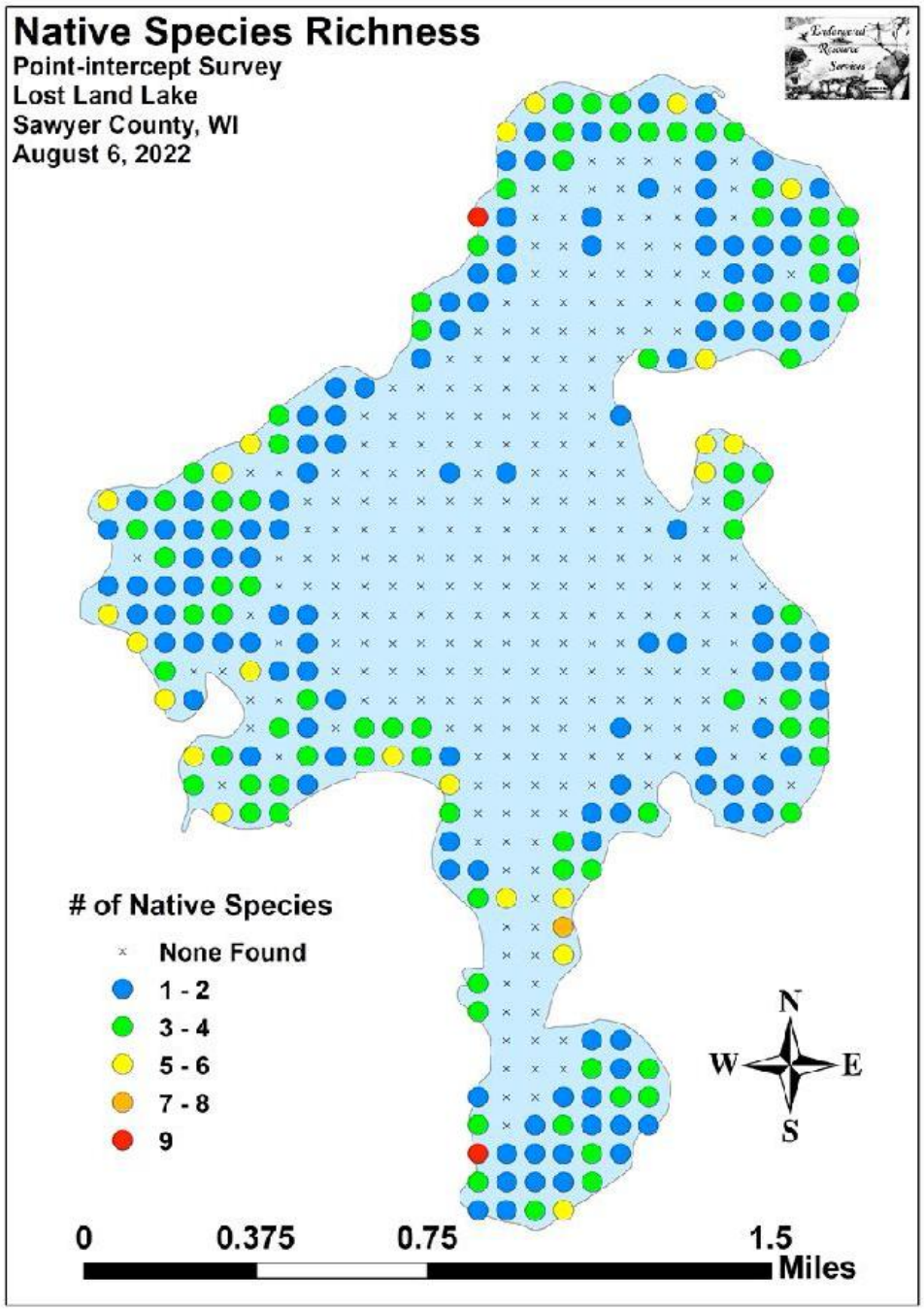


1. Native Plant Species Richness



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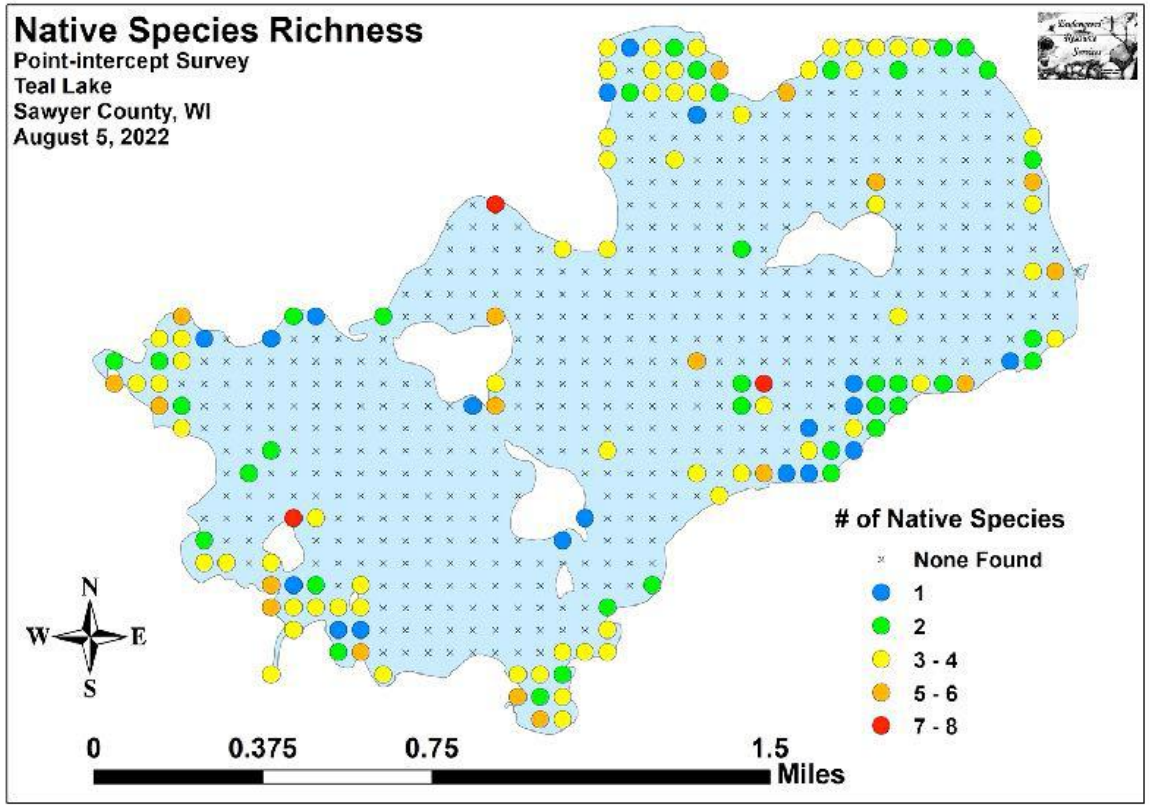
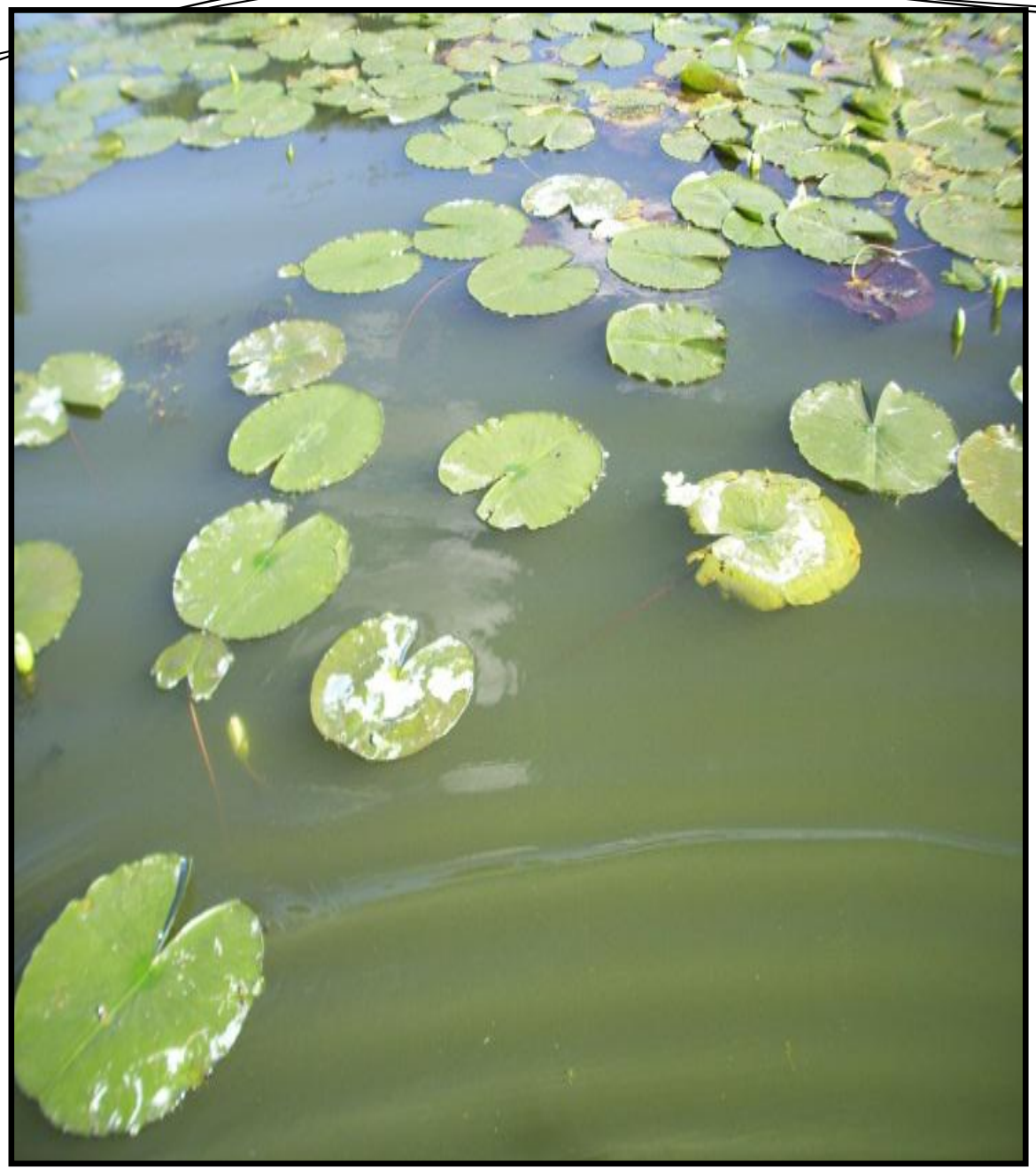


2. Internal Challenges –

Water Clarity –

Plants absorb nutrients from the water – if you don't have them, you lose



Blue-green algae blooms

Pet Death from toxins

2. Water Clarity–

Filamentous algae proliferate locally when septic systems fail, people allow shoreline erosion, and allow fertilizer or grass clippings into the lake

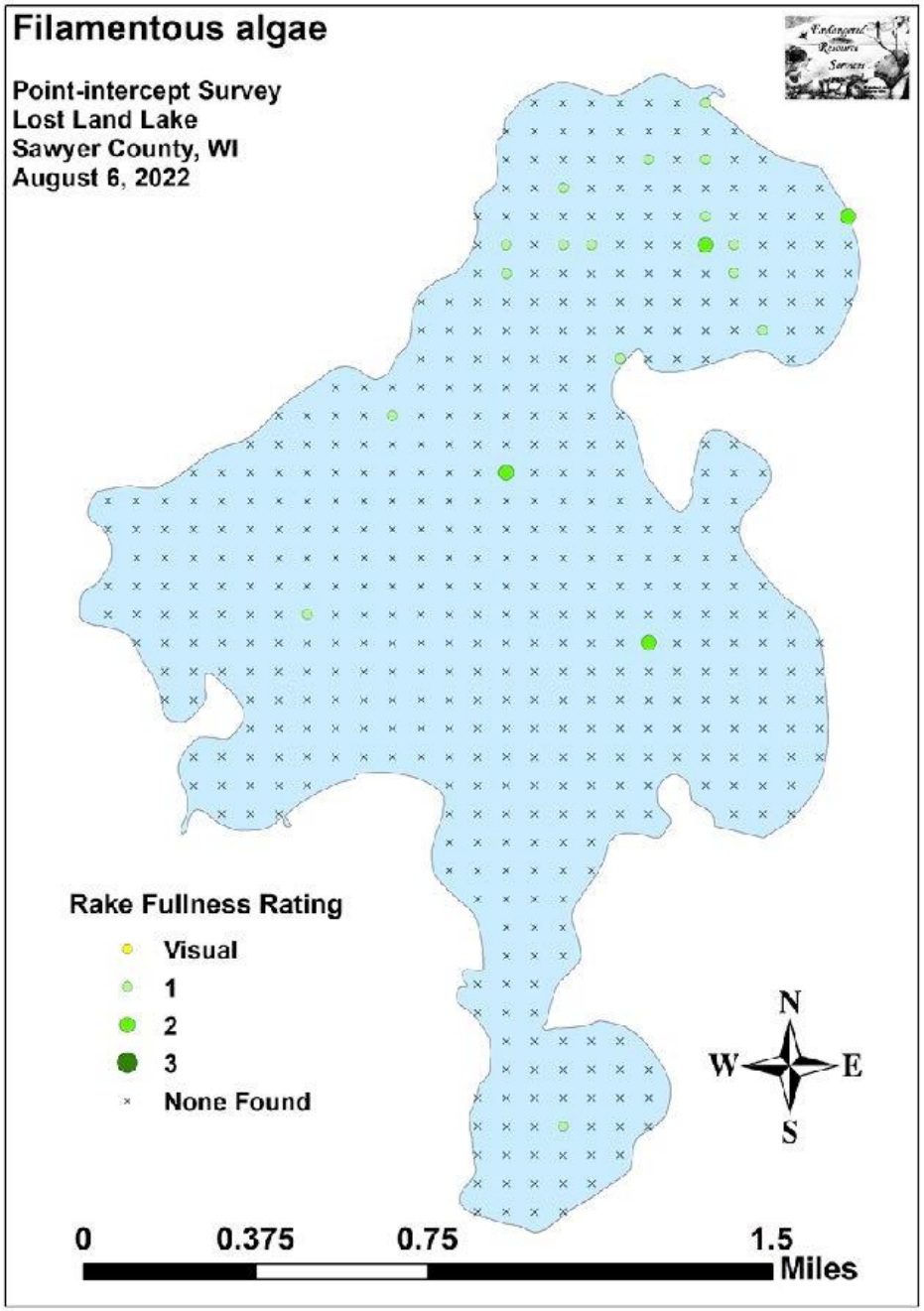
Natural Shoreline

Mowed Shoreline

Notice the mat of algae in front of this property

Stripped shoreline

Erosion of shoreline = algae fertilizer



Notice Filamentous is rare in the Quiet Lakes

Notice Filamentous is rare in the Quiet Lakes – None in Teal ☺

3. External Challenges – Preventing Exotic Species– A growing threat to recreation, the environment, jobs and property values in Wisconsin

3. Exotic species–

Plants an animals that are not originally found in an environment. When introduced, they can have unforeseen consequences.

Why all the concern?

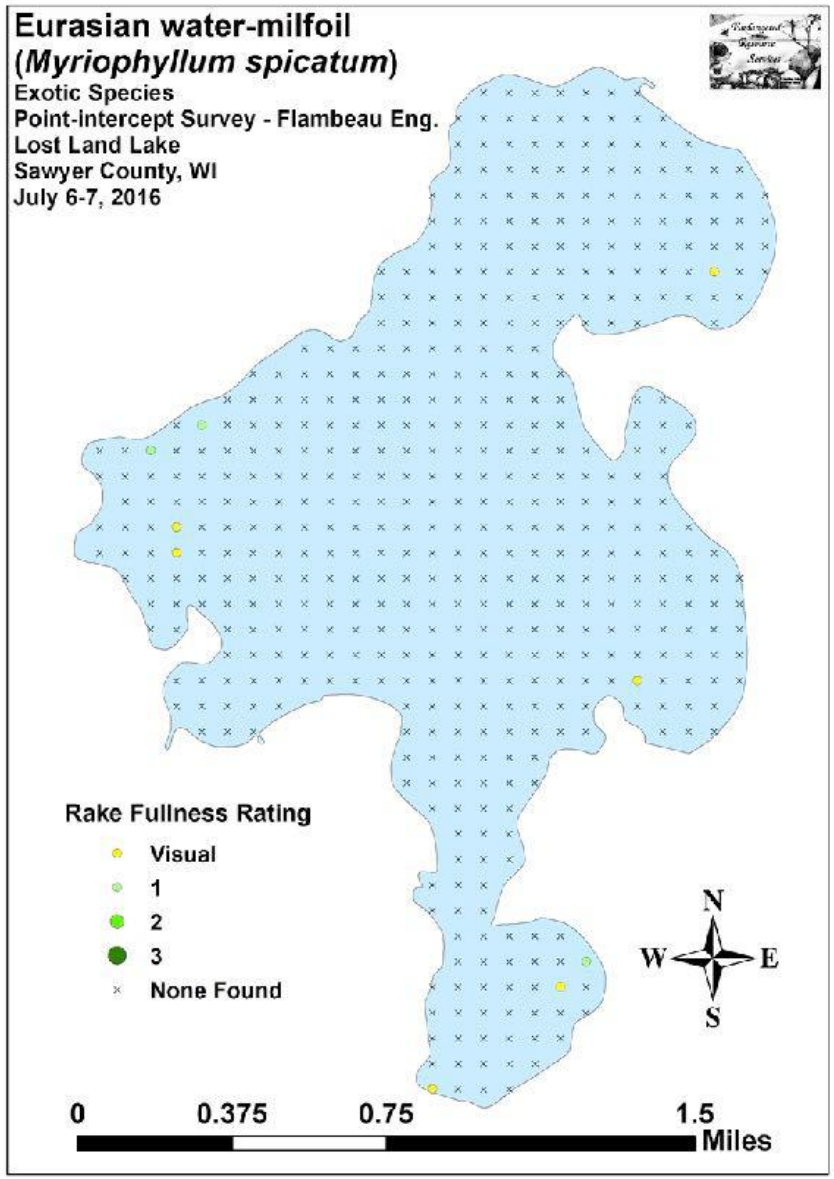
With few diseases, predators or competition, AIS reproduce out of control.

In the presence of these invaders, our local ecosystems

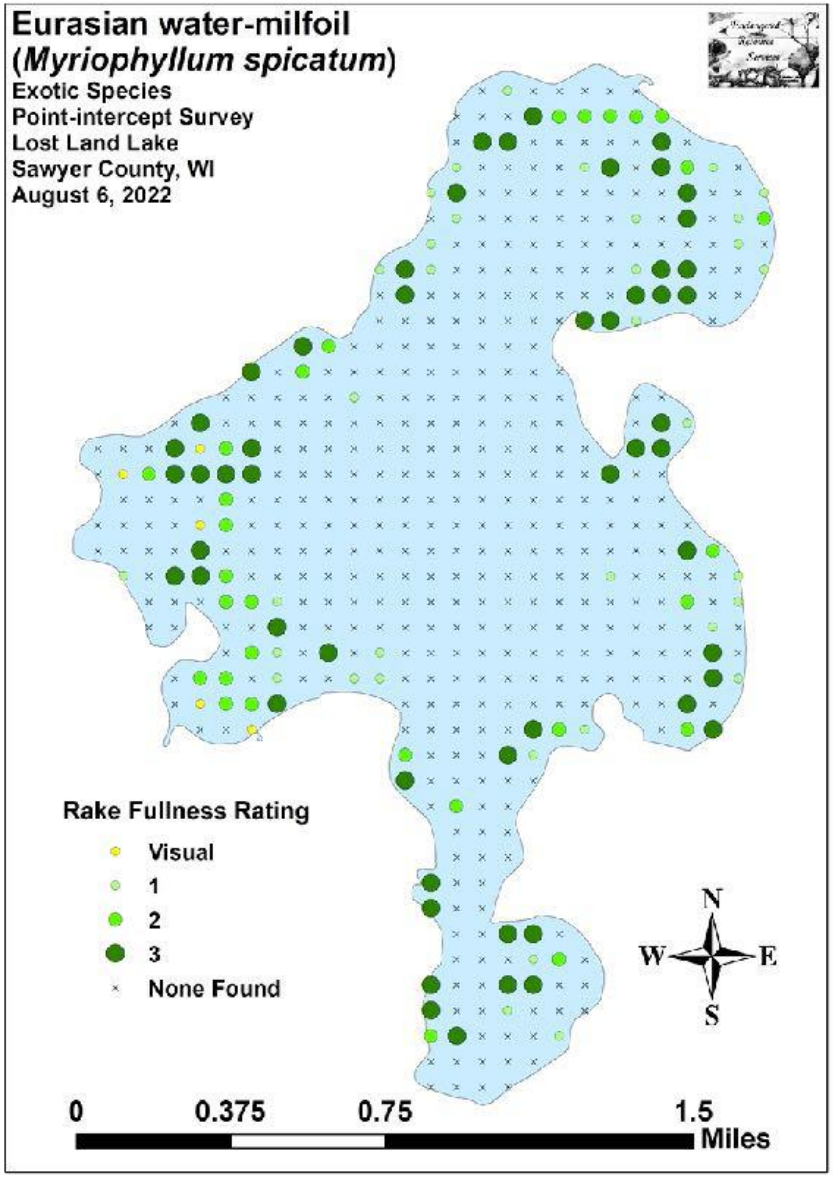
can be completely overrun (or not?)

Eurasian water milfoil

3. EWM Distribution in 2016



3. EWM Distribution in 2022



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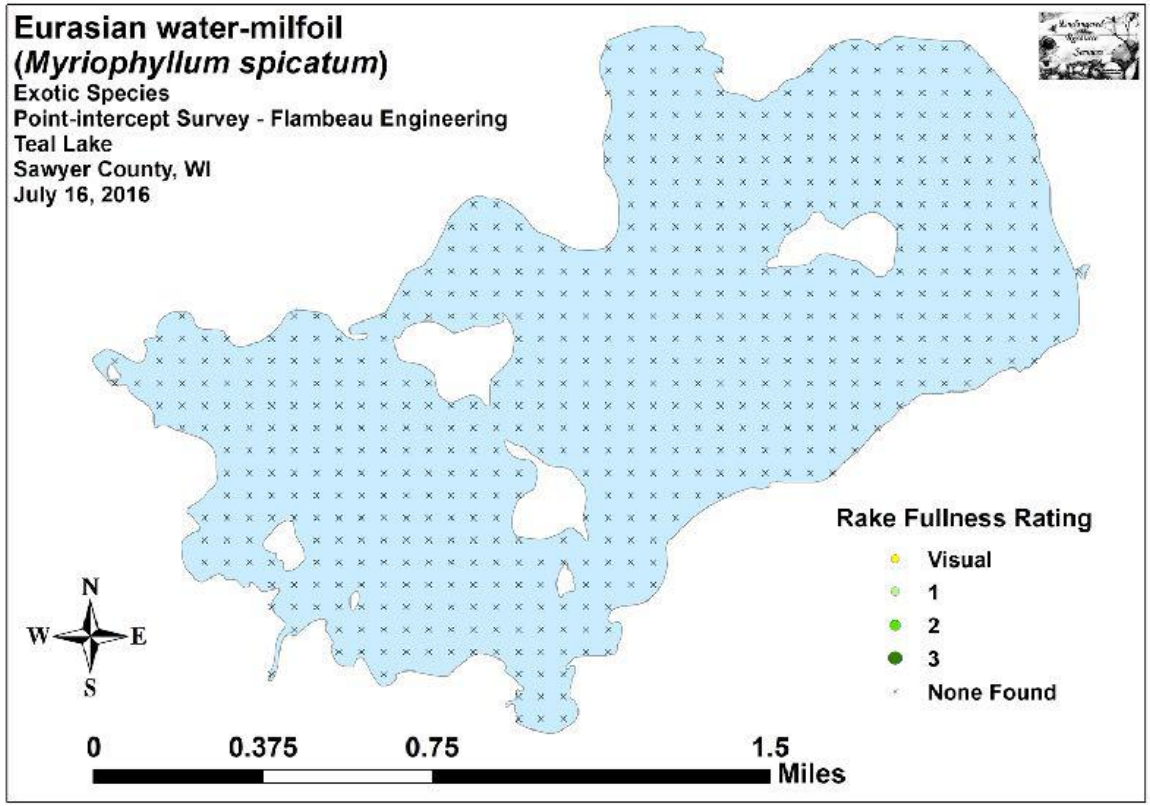

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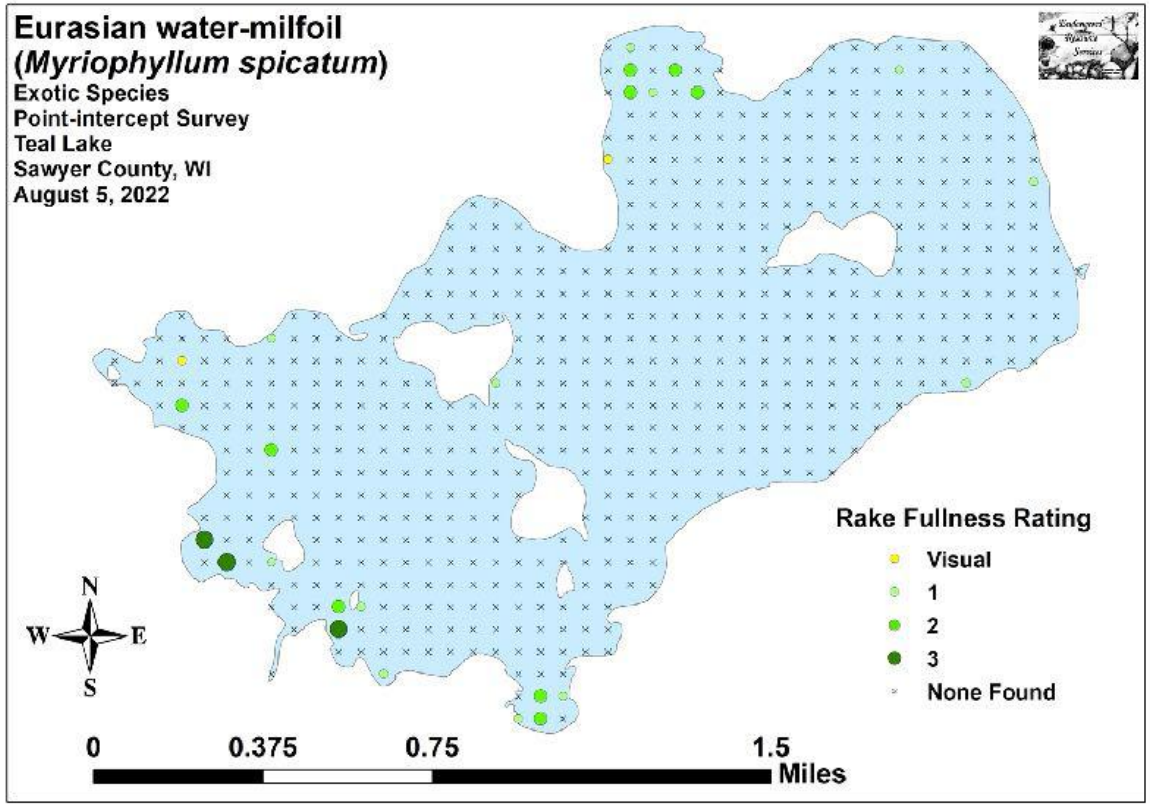
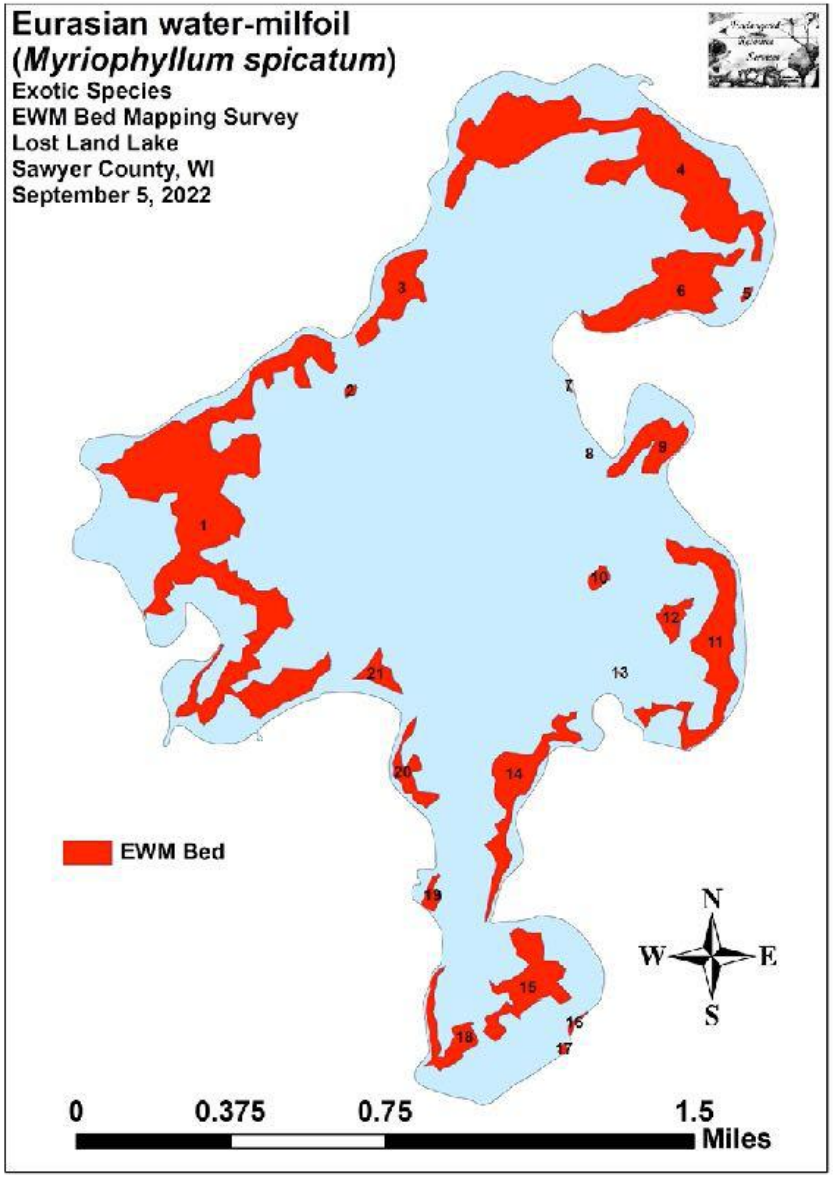
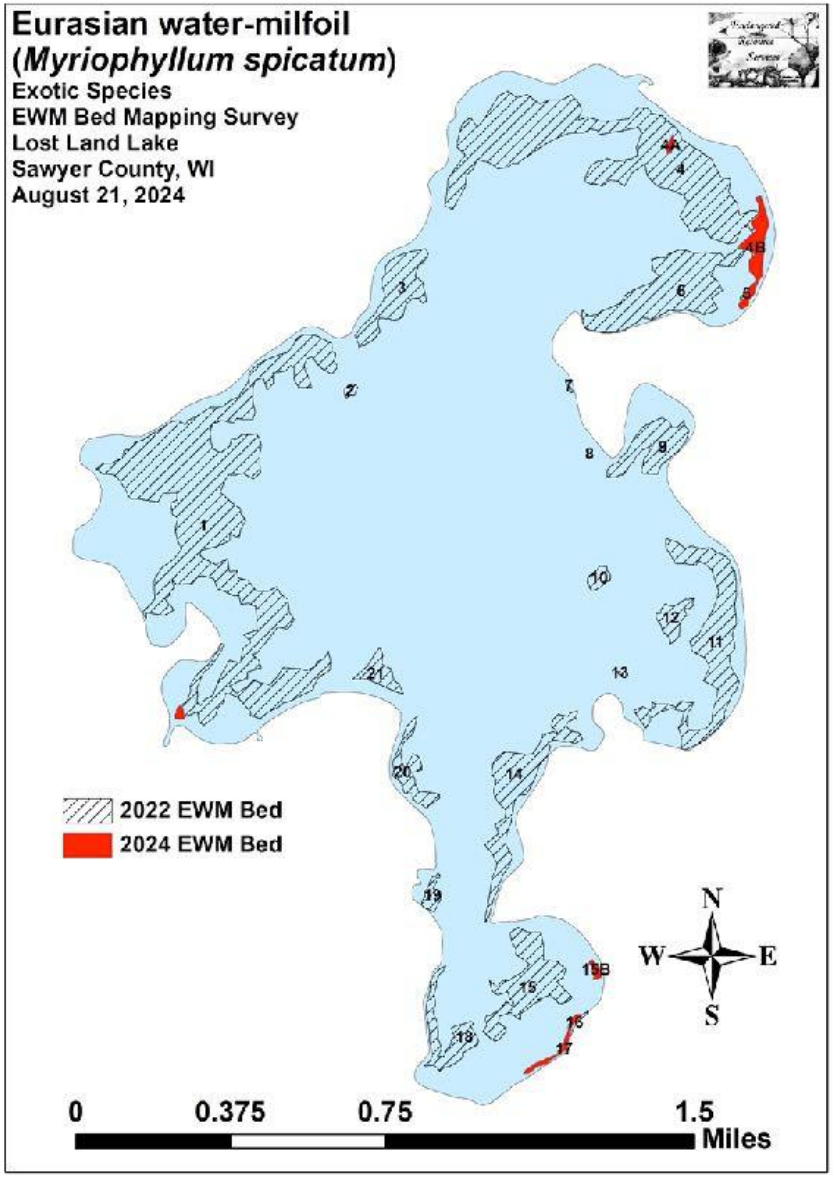


7. EWM Distribution in 2025

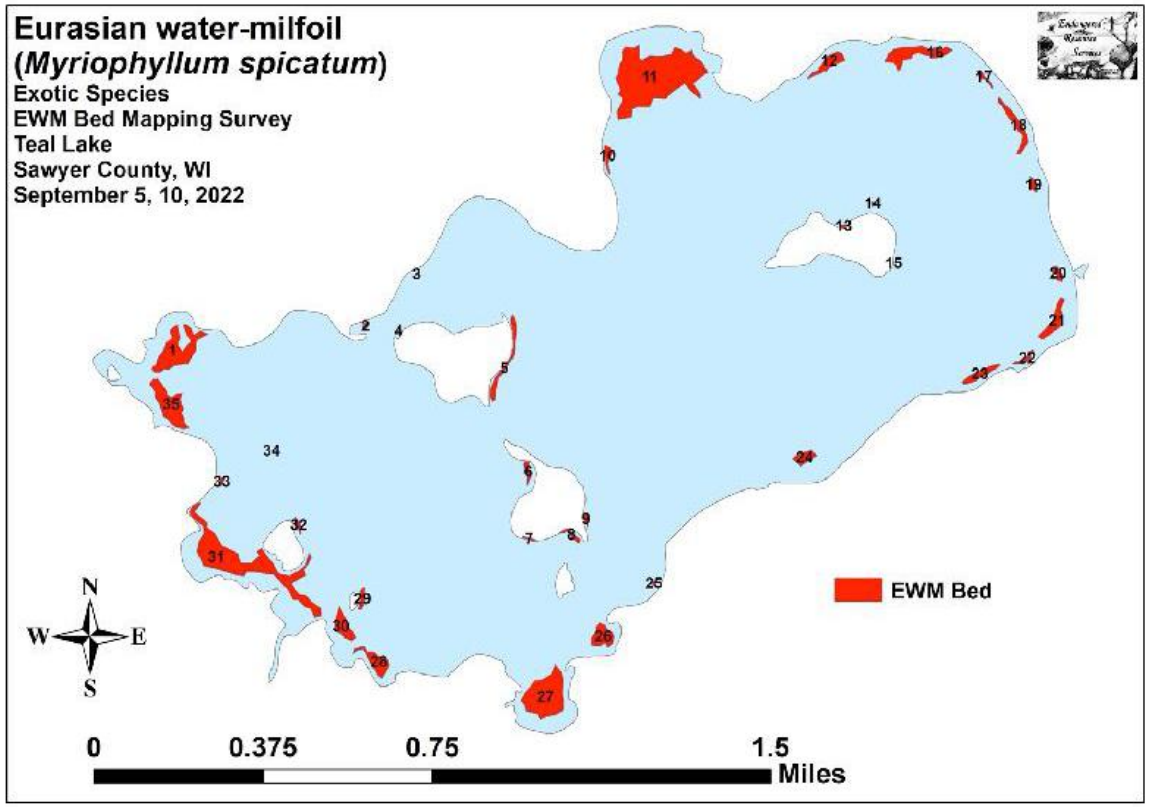
3. 2022
EWM Bed Mapping Survey
21 Beds – 263 acres



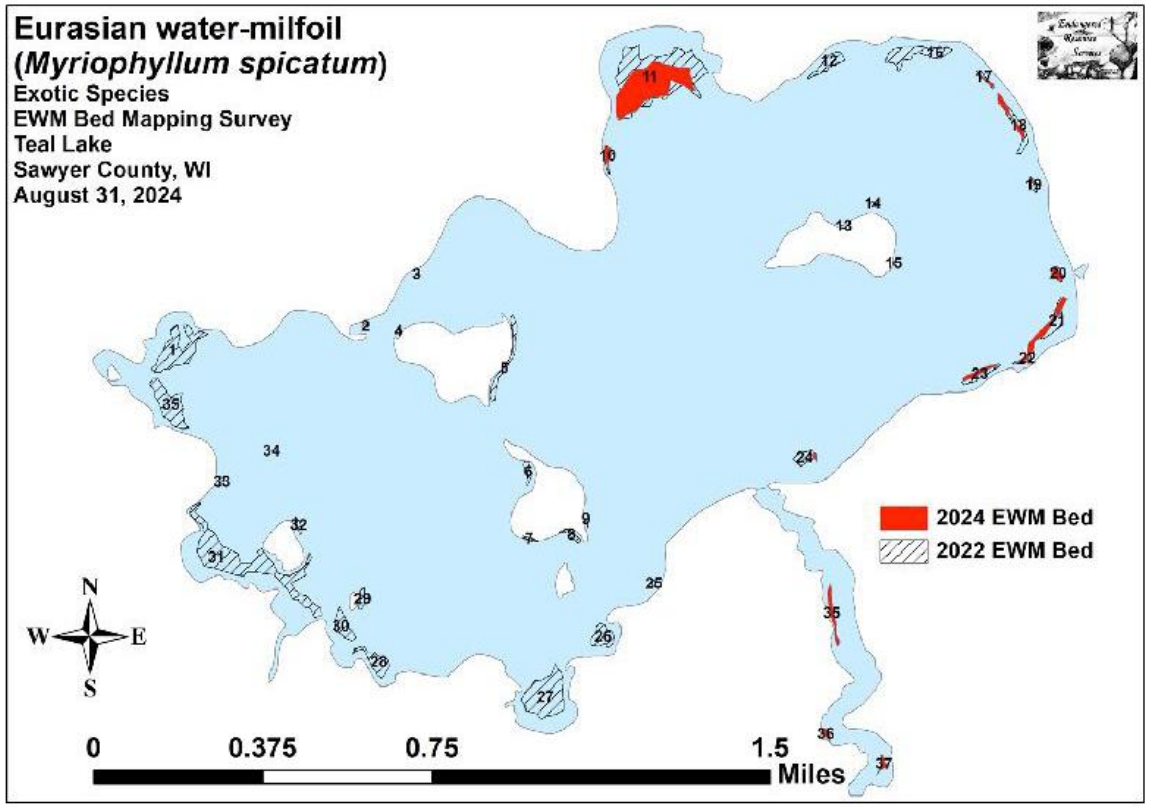
3. 2024
EWM Bed Mapping Survey
5 Beds – 7.26 acres



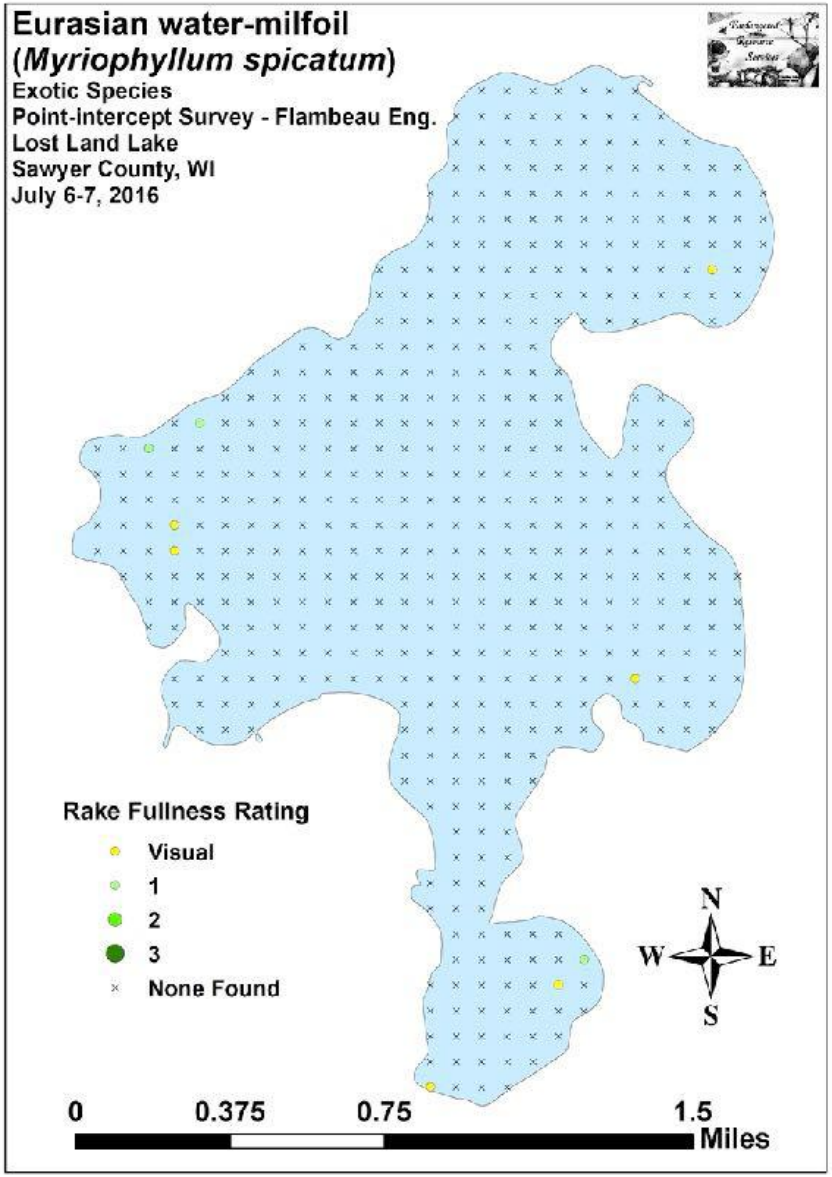
3. 2022
EWM Bed Mapping Survey
35 Beds – 44 acres



3. 2024
EWM Bed Mapping Survey
11 Beds – 10 acres



3. What changed?



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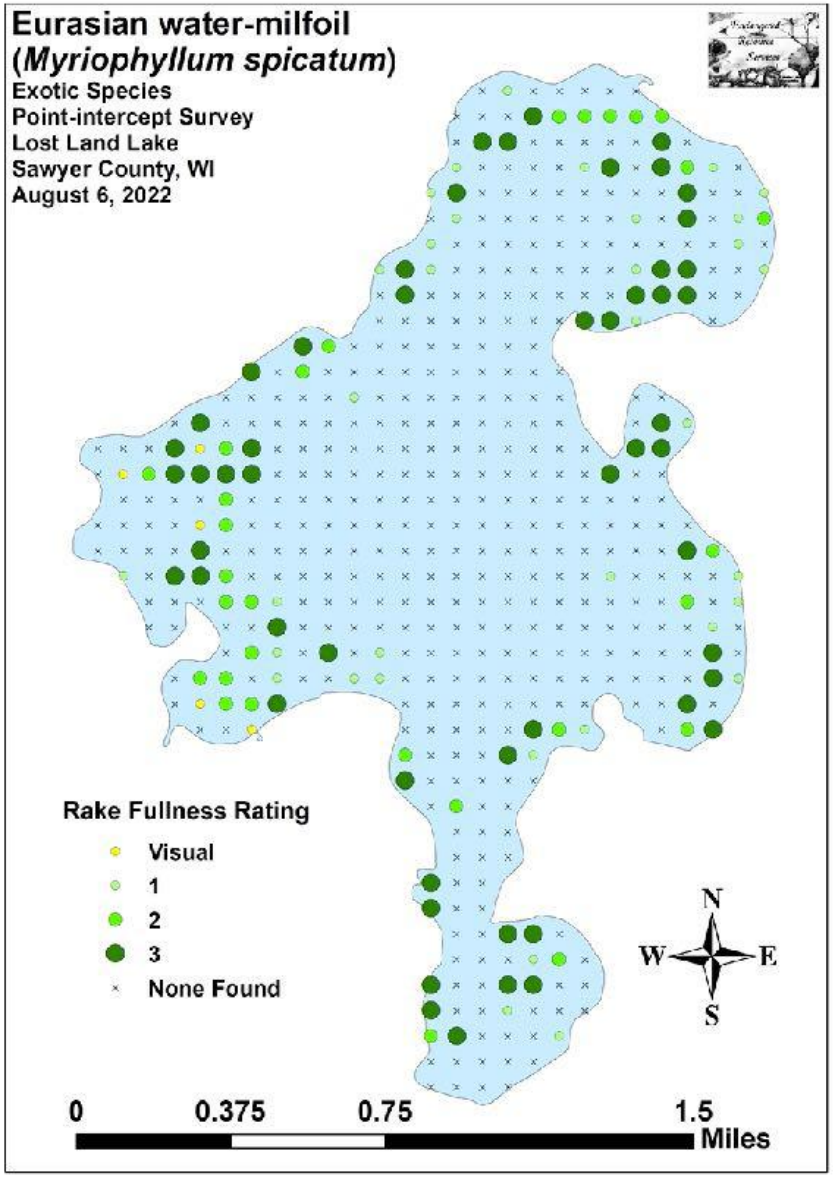

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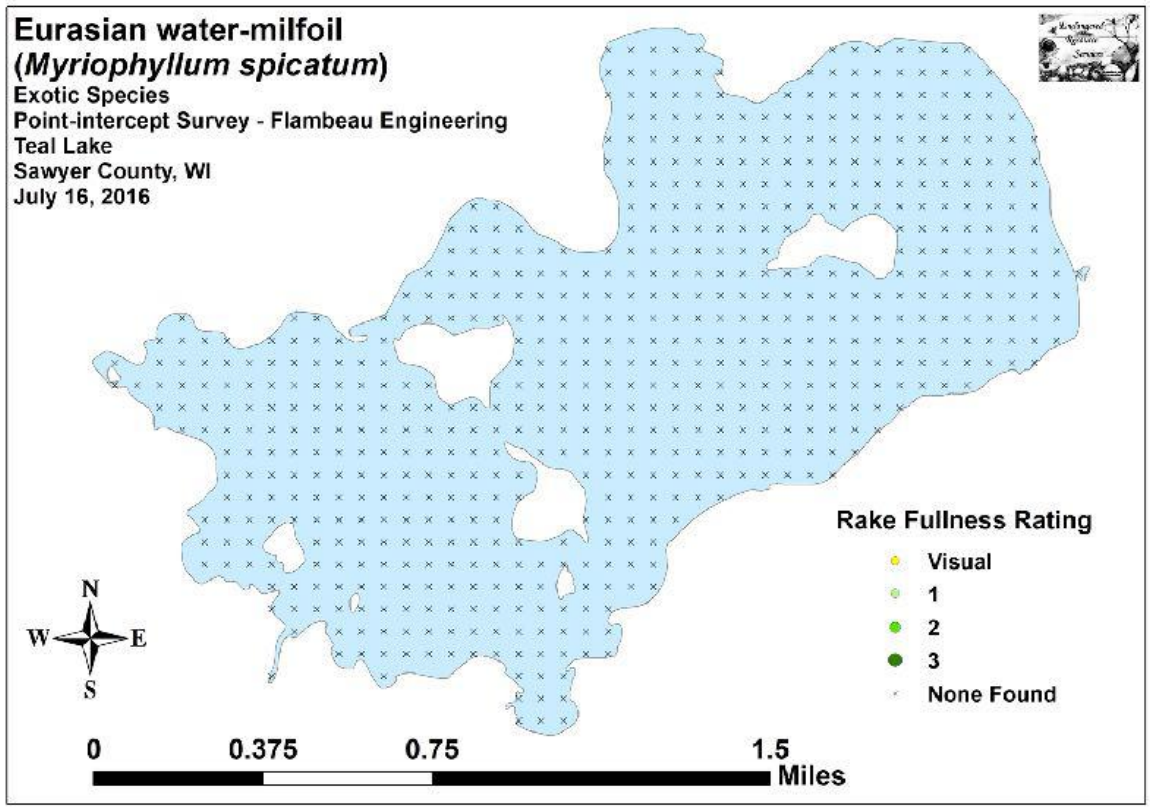
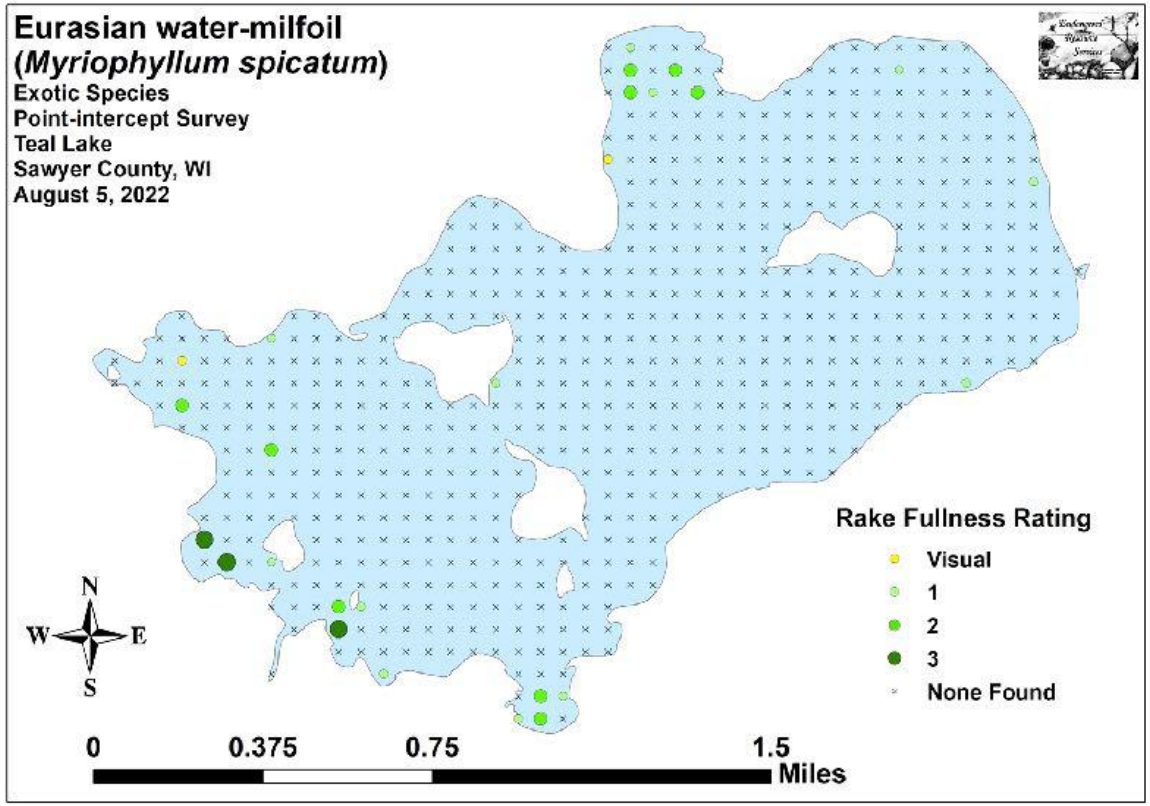

Eurasian water-milfoil
(Myriophyllum spicatum)
Exotic Species
Point-intercept Survey - Flambeau Engineering
Teal Lake
Sawyer County, WI
July 16, 2016
Rake Fullness Rating
Visual
1
2
3
None Found
N
W
E
S
0
0.375
0.75
1.5
Miles

3. What cha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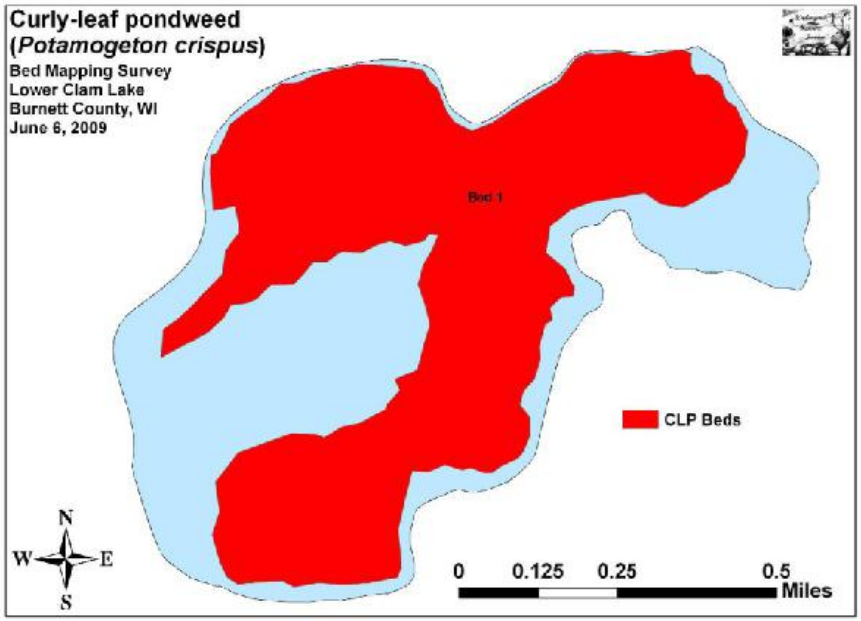
Harvesting spreads EWM fragments



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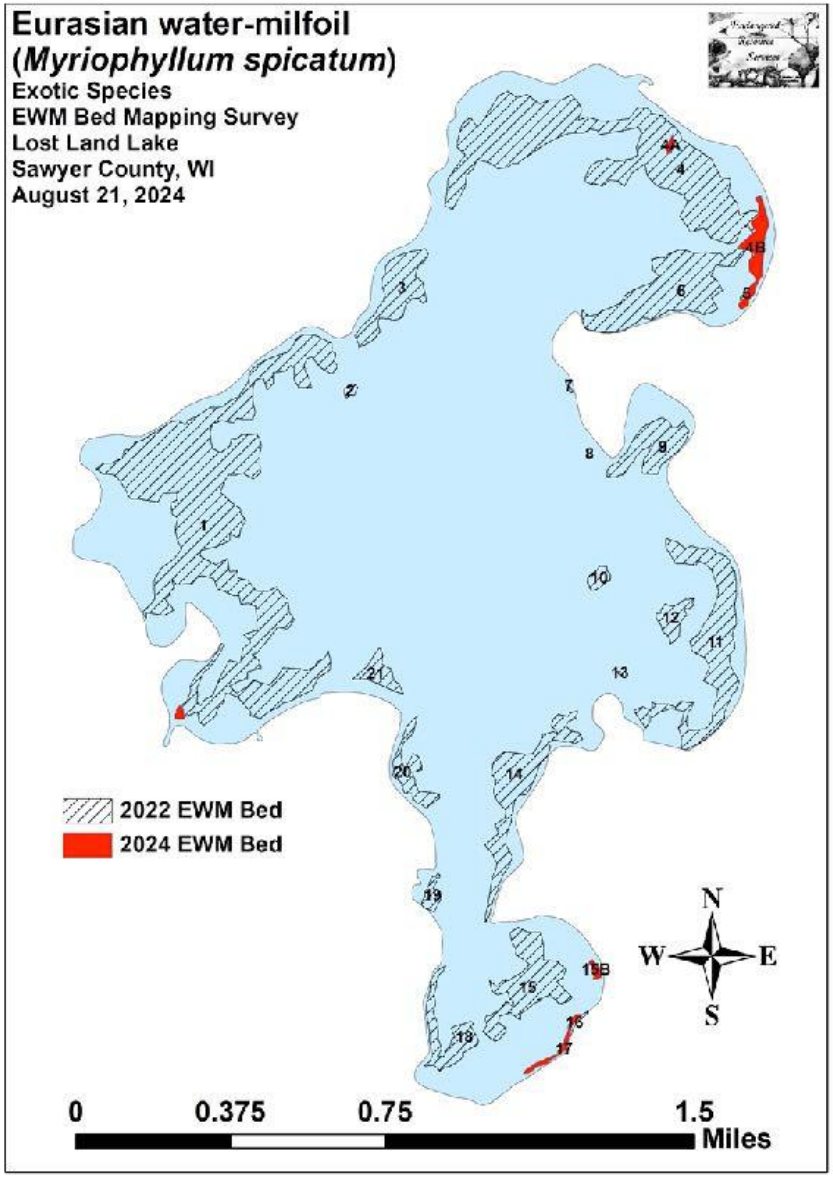

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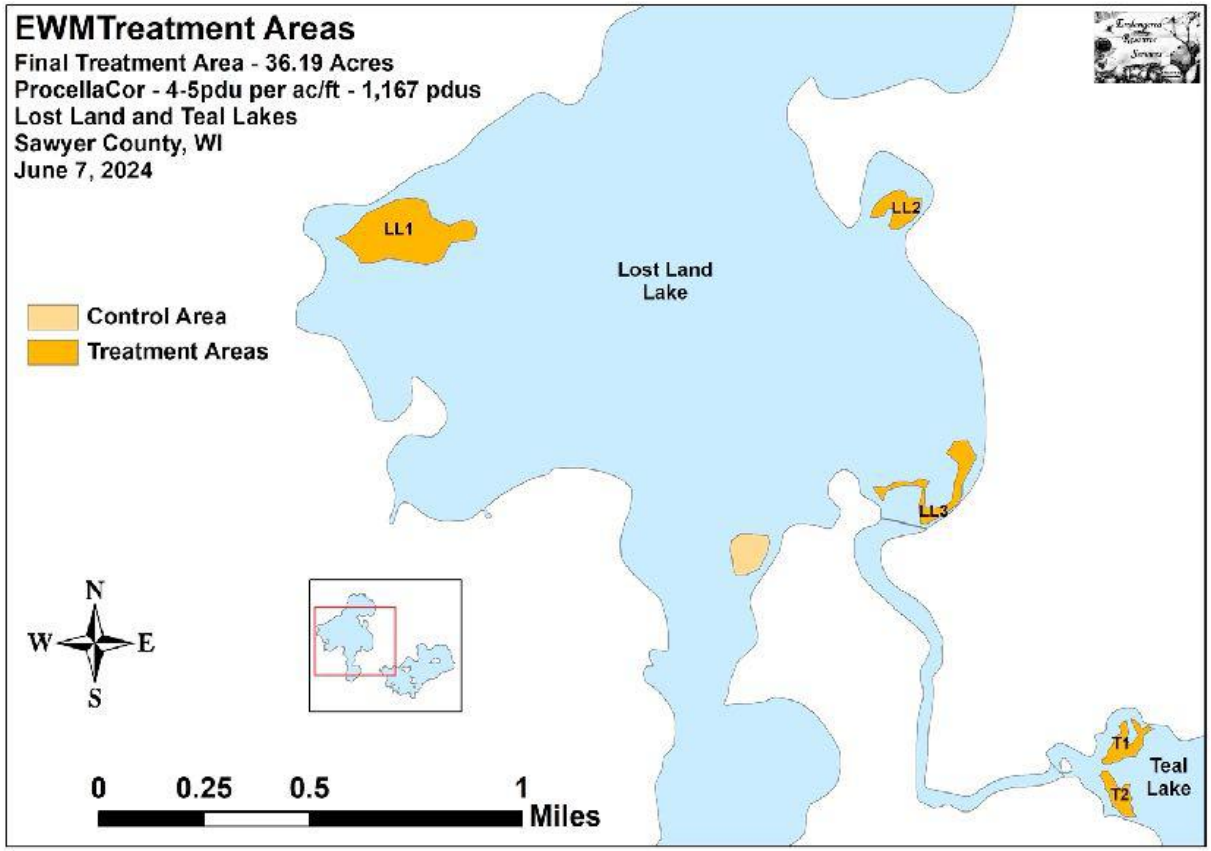
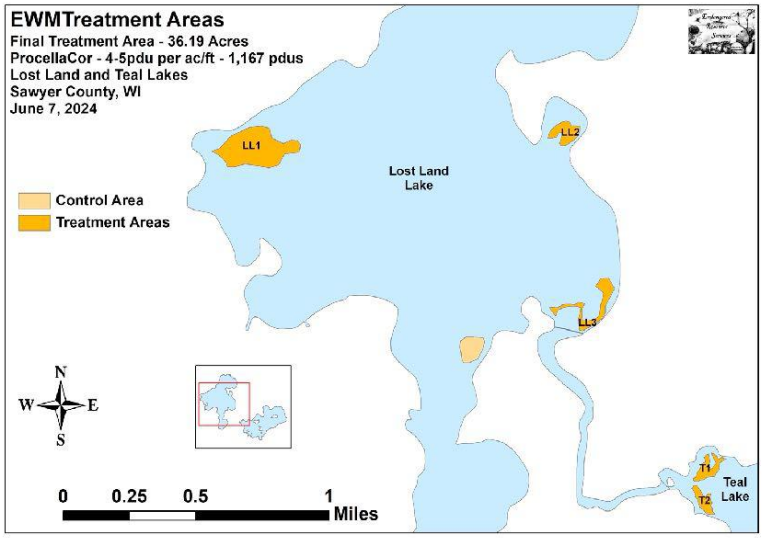

EWMTreatment Areas
Final Treatment Area - 36.19 Acres
ProcellaCor - 4-5pdu per ac/ft - 1,167 pdus
Lost Land and Teal Lakes
Sawyer County, WI
June 7, 2024
LL1
LL2
LL3
Lost Land Lake
Control Area
Treatment Areas
N
W
E
S
T1
T2
Teal Lake
0
0.25
0.5
1
Miles



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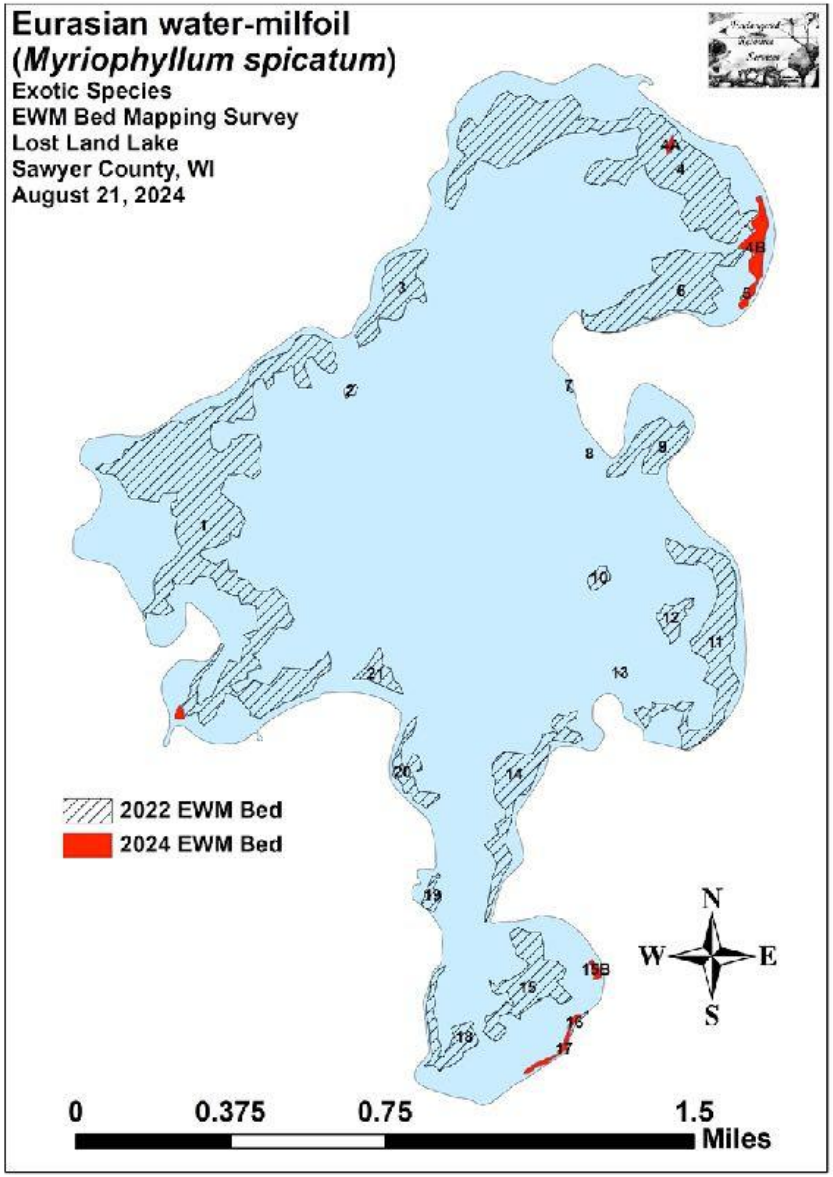

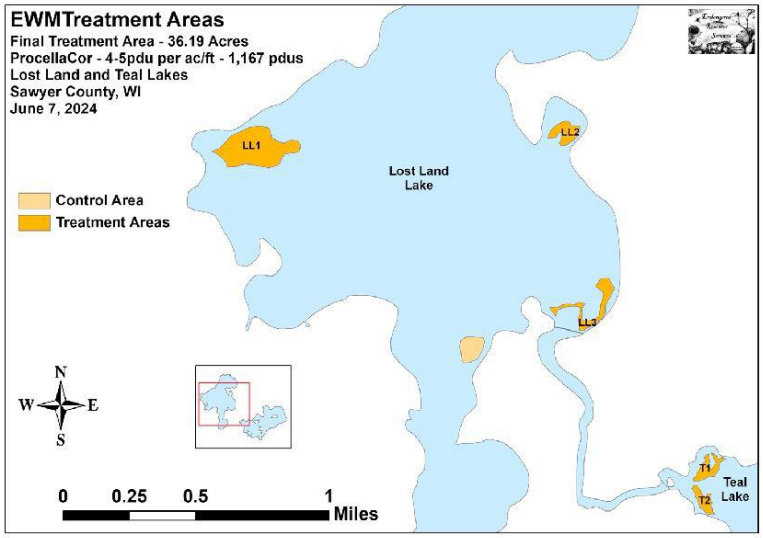
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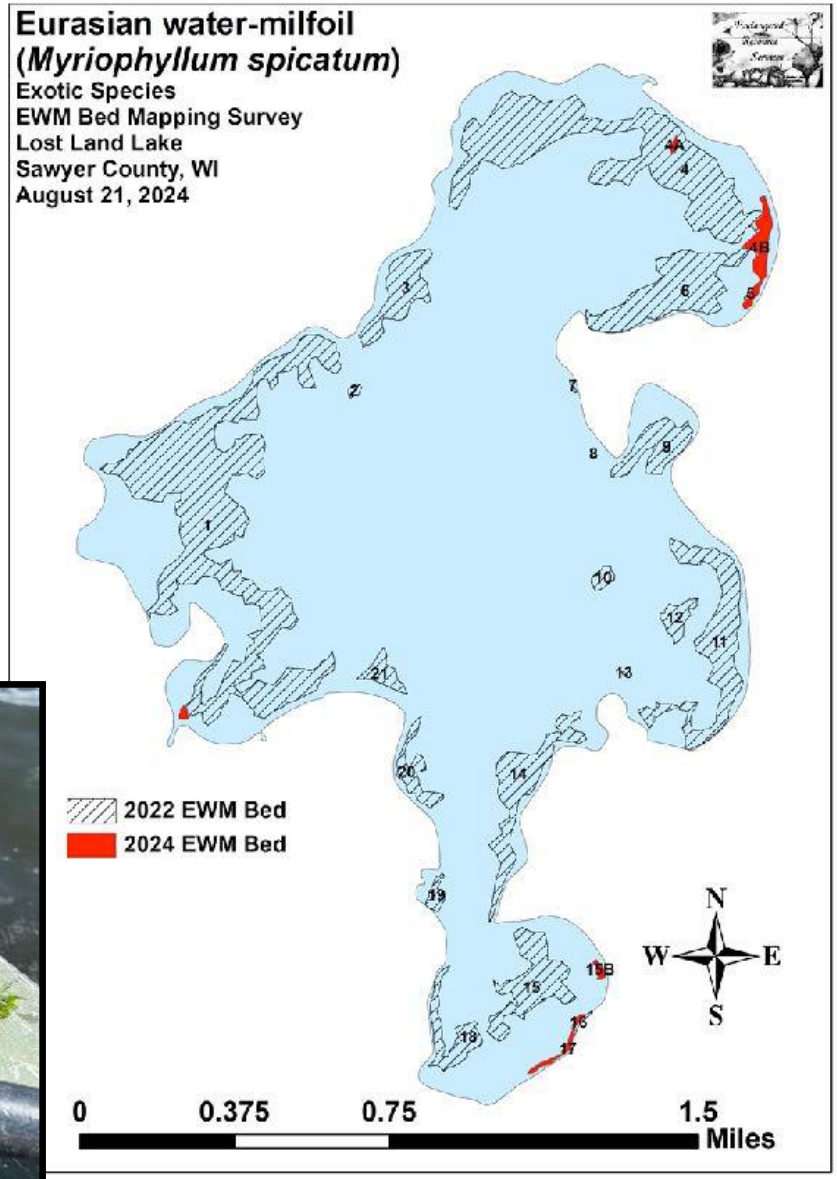
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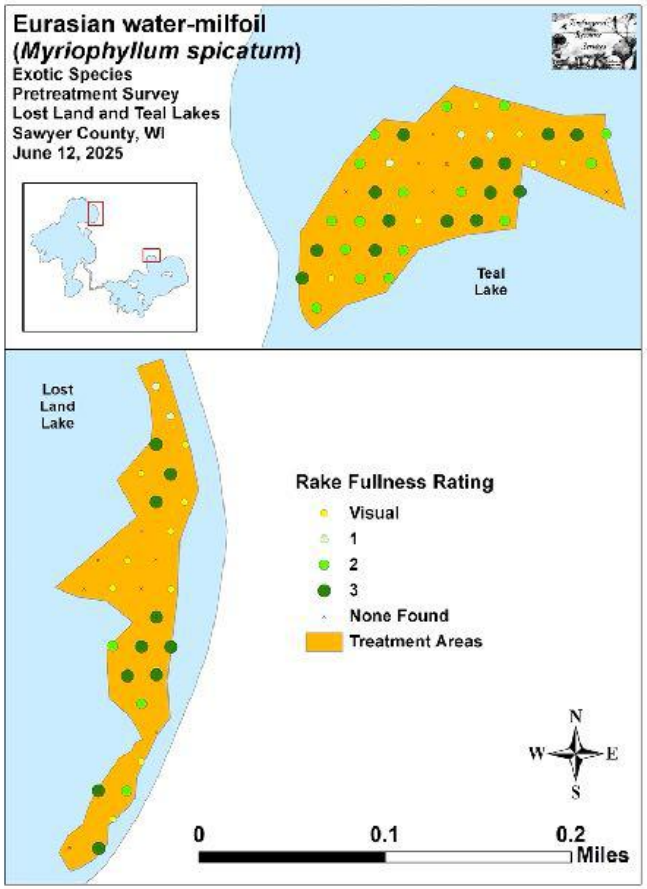
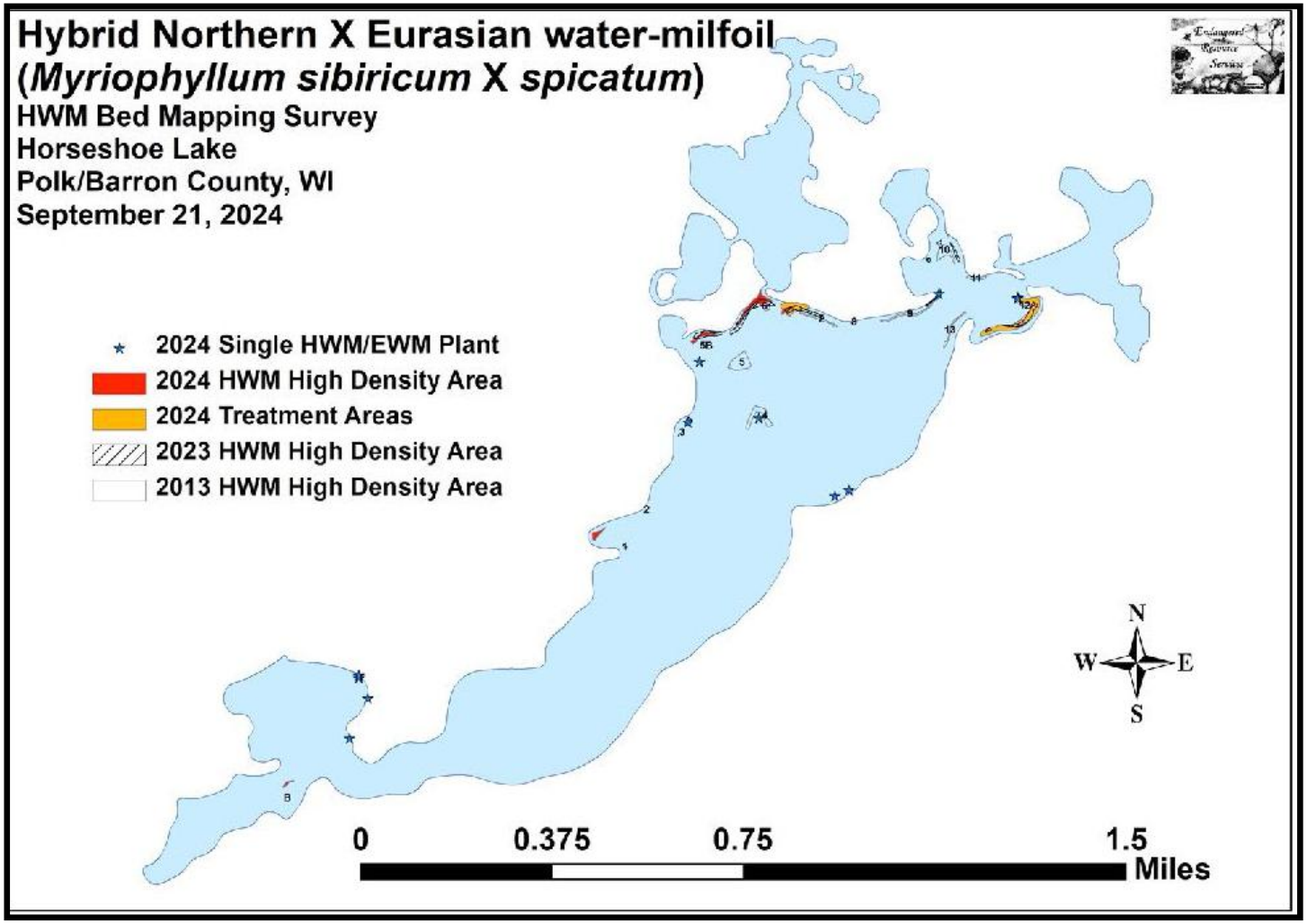
3. What Cha

3. 2025 Treatment

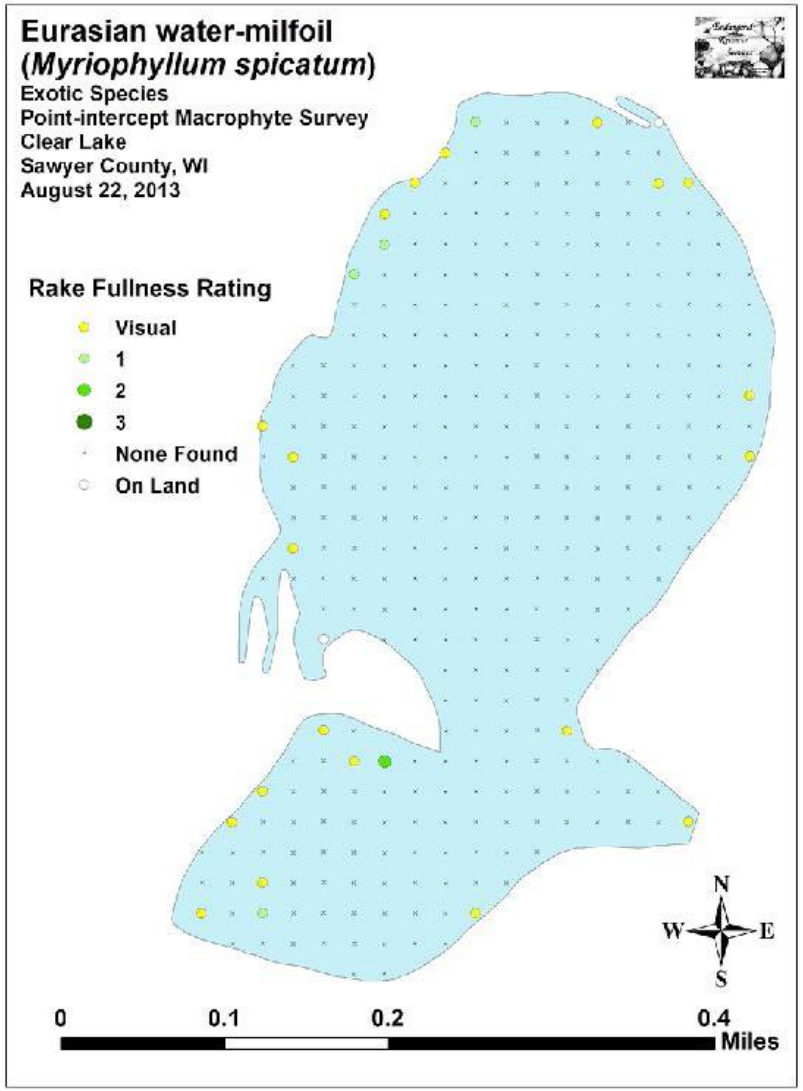


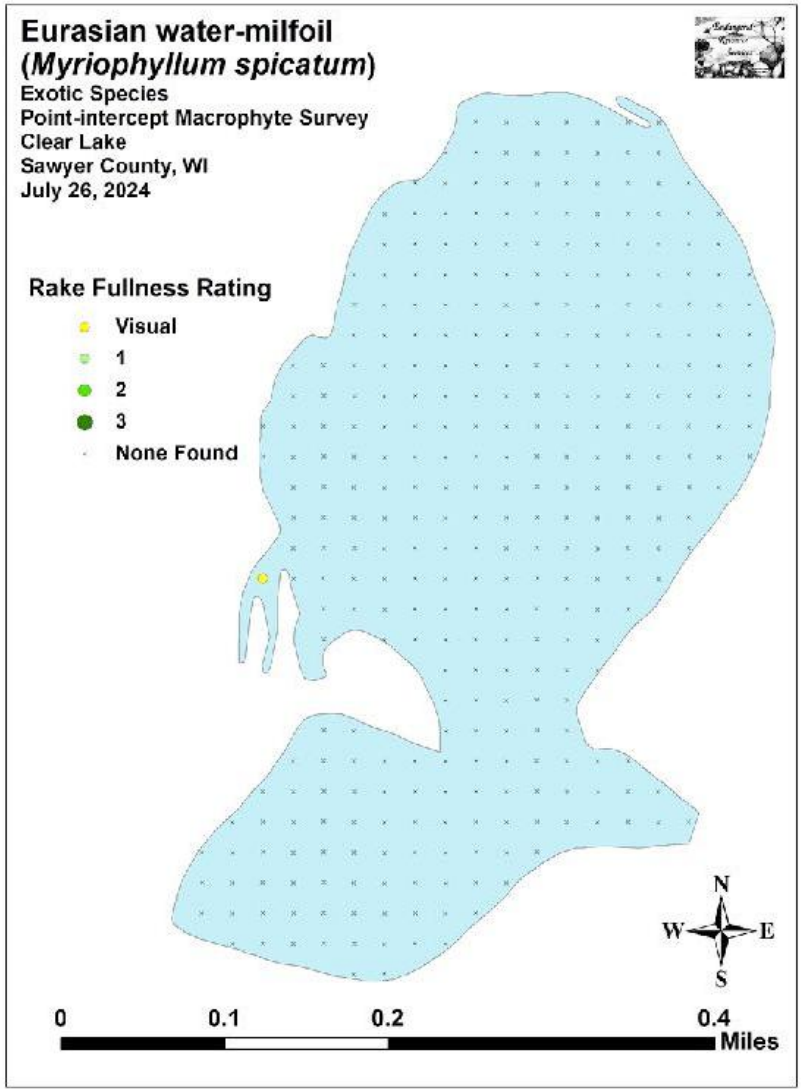
4. Assess impact of management on lake over time–

Should herbicides continue to be used?



Some of my clients have had amazing success.





Some of my clients have spectacularly failed.

All of these changes and demands have resulted in new challenges for how we manage and protect our waterways – more and more, different people, with diverse values are using our lakes.

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Healthy lakes are everyone's responsibility. Only an engaged, educated public can secure their long-term sustainability. A lake association can help make that happen.