1. **Introduction and Attendees**: The meeting started at approximately 6:40 pm at Primal Eats. We thank Scott & Salley Follett and the Primal Eats staff for providing food and soft drinks for the meeting. The attendees included the following:

Name	Description
Sara Hatleli	Consultant, Aquatic Plant & Habitat Services, LLC
Heather Pyatskowit	Menominee Indian Tribe
Claire Hetzel	WDNR
Mark Emerick, Gene Finn, Bob Kemps, Steve O'Shea, Gary Sturtevant	MLA Board Members

   The other meeting attendees were all MLA members. The total number of attendees was about 21.

2. **Meeting Presentation:** Sara Hatleli went through the presentation deck attached to these notes.
3. **Water Quality Monitoring:** It was reported that Beth Gorak will take ovr the water quality monitoring role from Ellyn Dercks.
4. **Weasel Nut Gatherer for Snail Collection:** Sara pointed out that the weasel nut gather shown in the presentation deck can also be used to collect mystery snails which are an invasive species.
5. **Zebra Mussel Population Cycles**: In response to a question, Sara said that the zebra mussel population probably goes through cycles.
6. **DASH Unit**: We used the DASH unit to remove EWM in 2017-2019. A question was asked if this work caused EWM fragments to spread which then led to the EWM spike we saw in 2021. There is no way to know what caused the spike in 2021 and was likely a combination of many factors. DASH workers were careful to collect fragments during DASH activities. Any type of control is disturbance and invasive species do well in disturbed areas.
7. **Legend Lake Harvester**: Legend Lake uses a weed harvester to clear weeds from several channels. A question was asked if this work causes EWM fragments that spread and flow through the dam into Moshawquit Lake. Heather said Legend Lake has people along the shore to collect fragments created by the harvesting operation.
8. **Number of Lakes with EWM**: A question was asked about the number of lakes in Wisconsin and Menominee County that have EWM, but the answer is unknown. Sara will look for an answer and provide it to the MLA board.
9. **Curry Leaf Pond Weed**: CLP is another invasive plant species that is already in Moshawquit Lake. CLP growth starts in the early in the year. Growth is inhibited by winter snow cover but since Moshawquit Lake had only minimal ice and snow cover this year, we might see a spike in CLP growth.
10. **Chemical Herbicides and Water Wells:** A question was asked is chemical herbicides used to treat lakes for invasive plant species can contaminate water wells. It was mentioned that ProcellaCOR, the herbicide used in 2022 in Moshawquit Lake, breaks down fast which should limit the potential for well contamination. Sara will look for a clearer answer and provide it to the MLA board.
11. **Potential for Invasive Species Coming Into Moshawquit Lake from Boats:** Boats launched into Moshawquit Lake that are also used in other lakes are a potential source of invasive plant species.

The potential for this problem increases on holiday weekends. Solutions include boat inspections at the landing or having property owners read and sign a document that pledges them to inspect boats they and their guests launch into the lake. The updated plant management plan will address this issue. We need a solution that also covers boats launched by users of the Menominee Indian beach.

12. **Status of the Dam:** Mark reported that he received confirmation that the dam is owned by the Menominee Indian Tribe or one of its organizations, the Menominee Indian Tribal Enterprises. Ther dam is not owned by the Federal Bureau of Indian Affairs. This fact should help us get information about when the dam will be repaired.
13. **Plant Management, Lake Protection and Monitoring, AIS Prevention Worksheets:** The last half of the meeting was to go through the 3 worksheets (see the presentation deck) that list options to address each topic. Sara explained the options and the meeting attendees filled in a worksheet to indicate their view about the priority of each option. The new plant management plan will use this information as an input.
14. **Next Steps**: The next steps are to summarize the input obtained during this meeting and then meet with the Moshawquit Lake stakeholders (Sara Hatleli, Heather Pyatskowit, Jeremy Johnson from Menominee County, Brenda Nordin from the WDNR and the MLA board). The plan is to release the draft lake management plan for public review within the next 1-2 months.
15. **Meeting Conclusion**: The meeting ended at about 8:20 pm.

Submitted by:

Gary C. Sturtevant
May 12, 2024

Attachment: Meeting Presentation

PUBLIC MEETING MOSHAWQUIT LAKE AQUATIC PLANT MANAGEMENT PLAN

Sara Hatleli, Aquatic Plant & Habitat Services LLC, 715-299-4604

sarahatleli97@gmail.com

Presented May 6th, 2024

Public Input Meeting for Moshawquit Lake Aquatic Plant Management

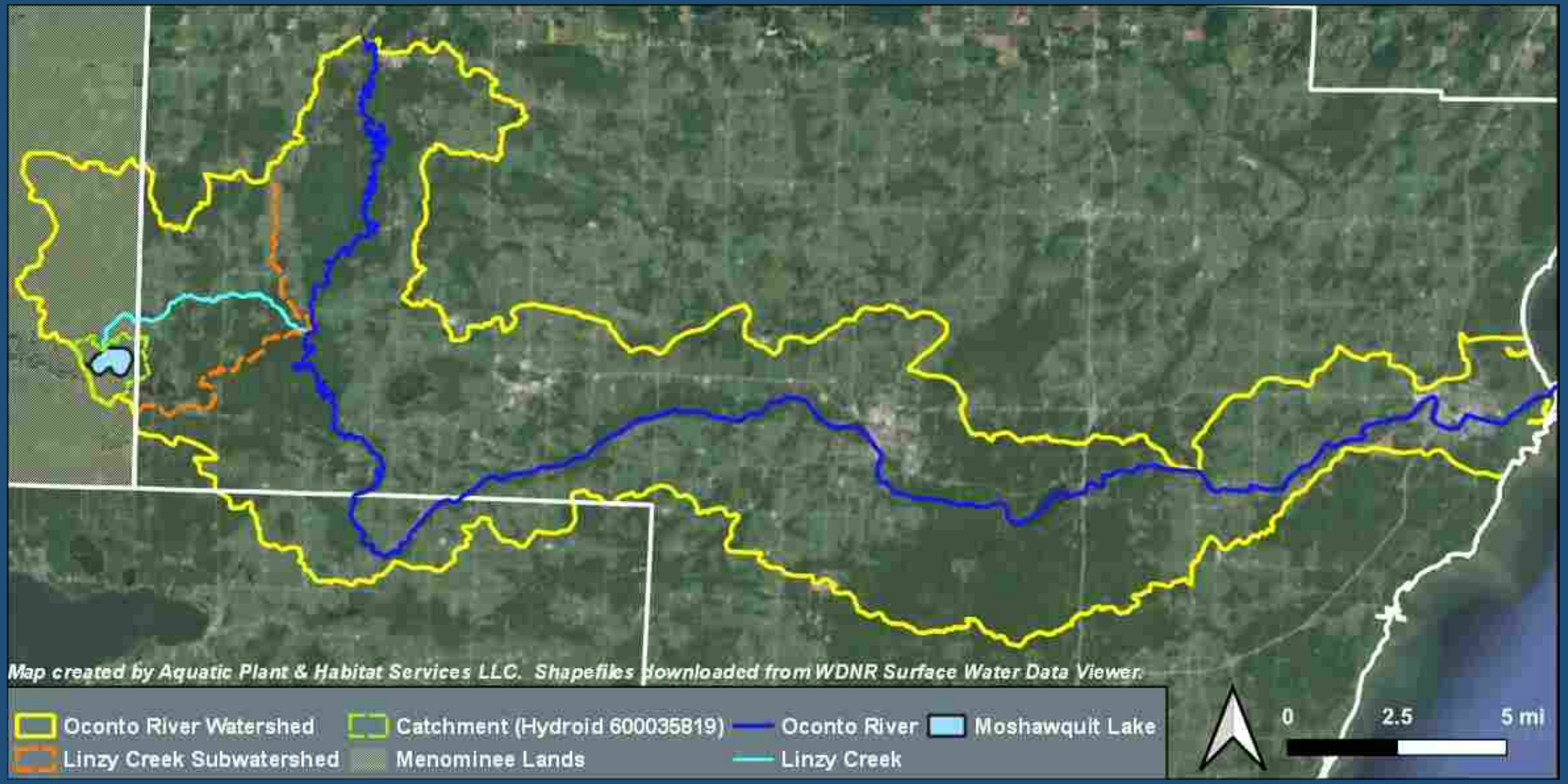
Today's Meeting

Learn about survey results

Discuss protection of native plants

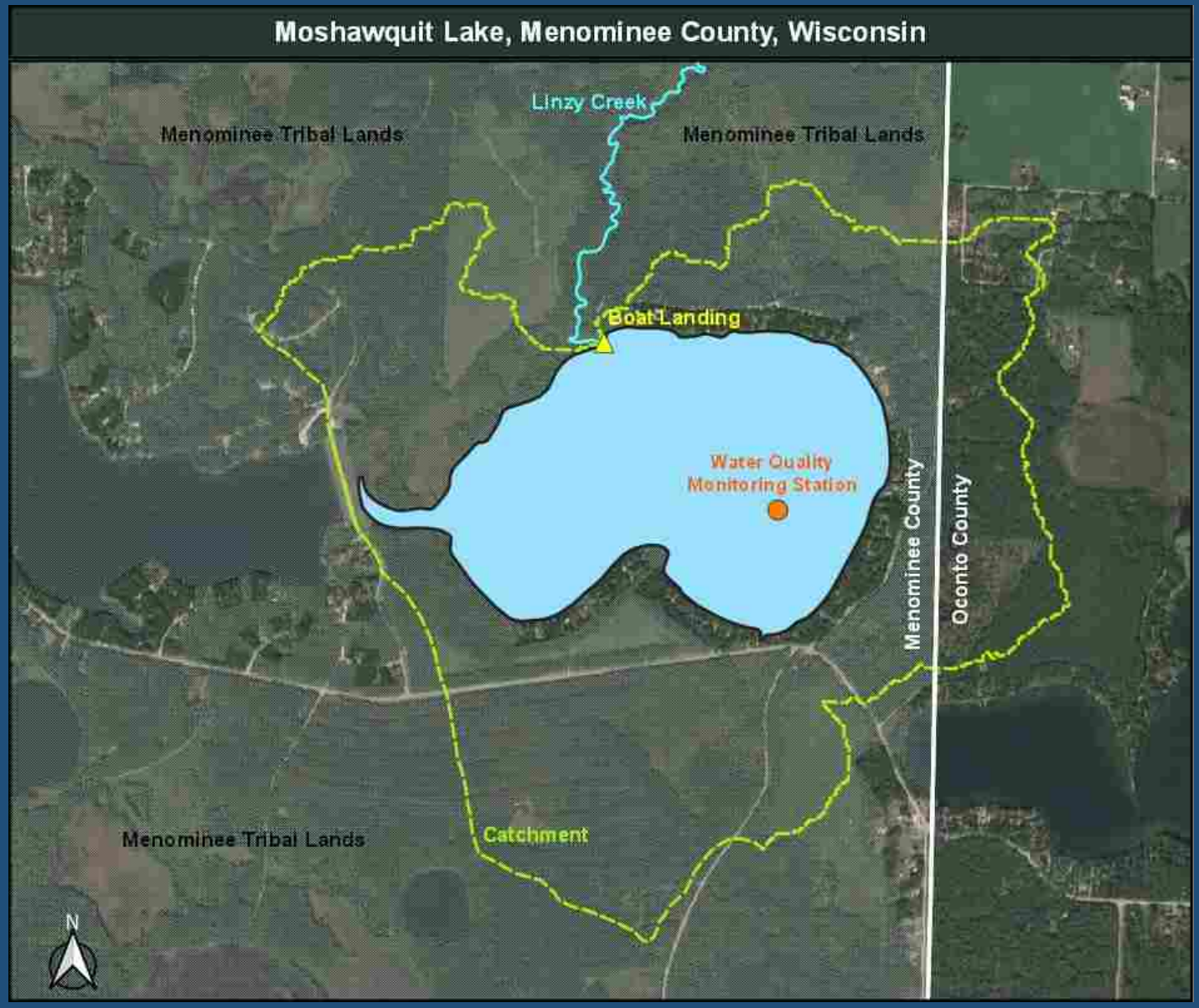
Share input for the Aquatic Plant Management Plan

Moshawquit in the Landscape



Zoom to Moshawquit Lake

- 301 acres
- 30 ft max depth
- Good water clarity
- Drainage lake
  - Surface water inlet and/or outlet

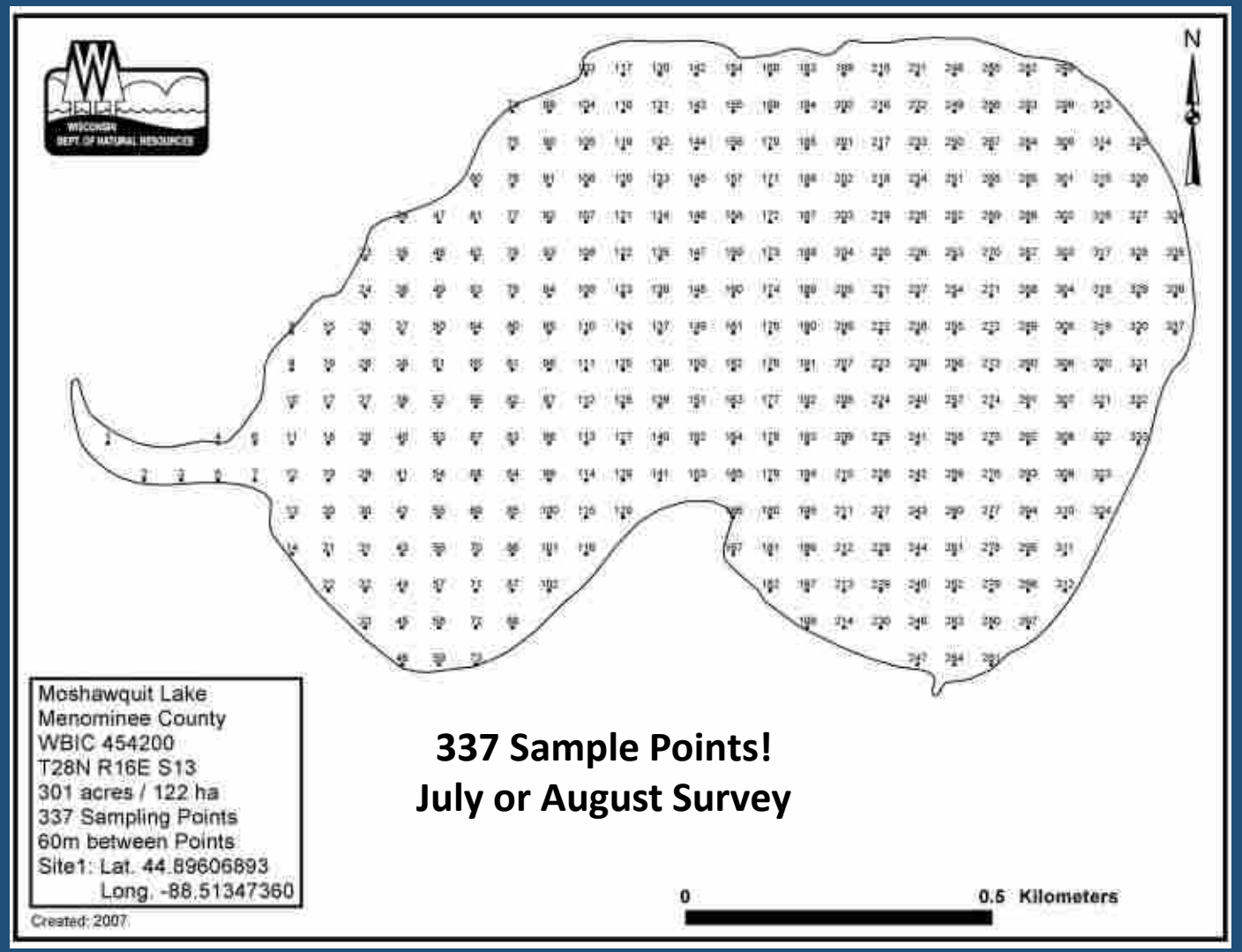


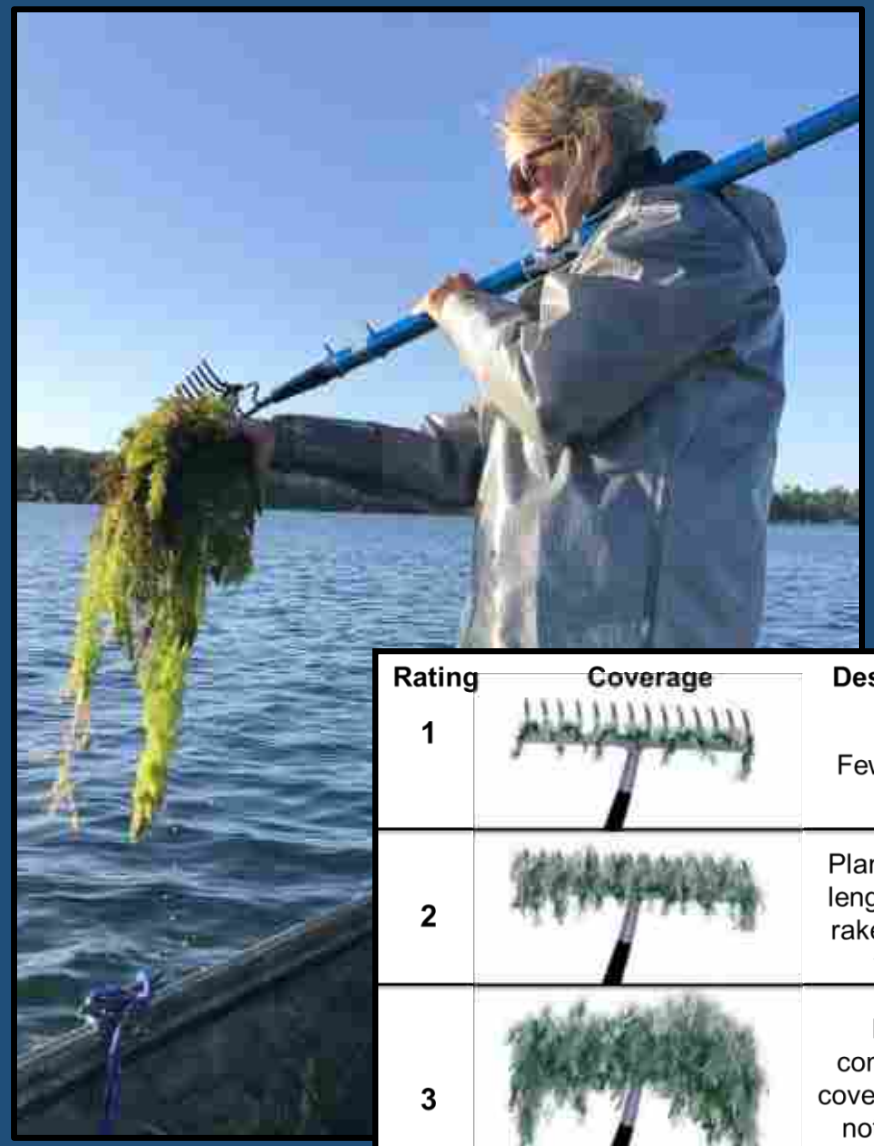
Aquatic plants are important

- Provide structural habitat
- Help absorb wave energy & reduce/prevent erosion
- Stabilize lake bottom sediments
- Consume nutrients

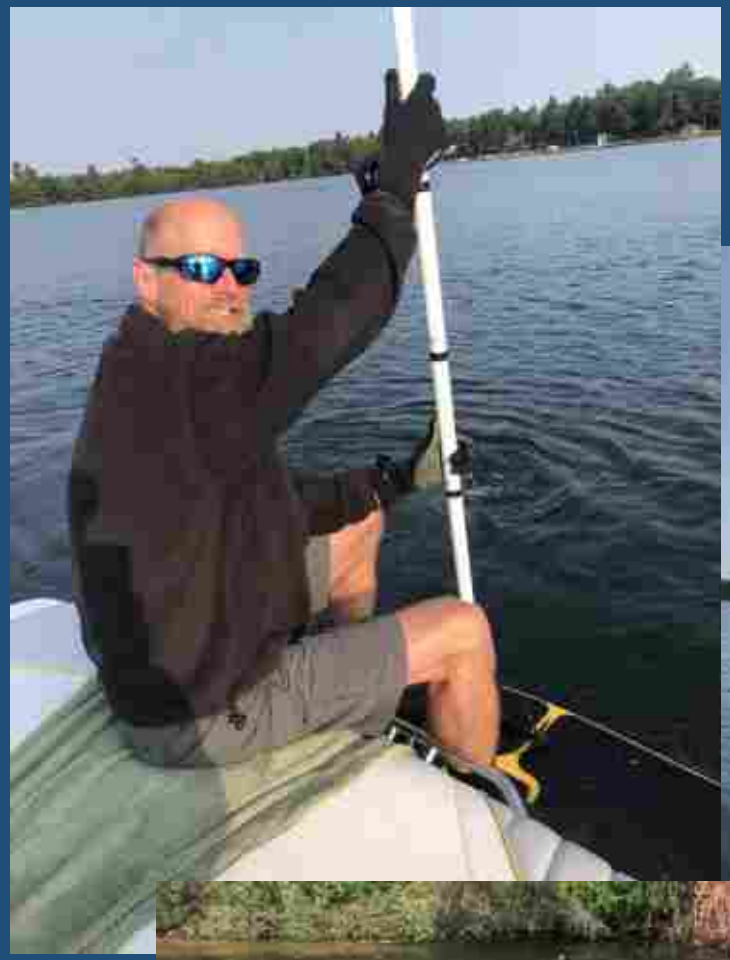
2023 Aquatic Plant Surveys
Methods & Results

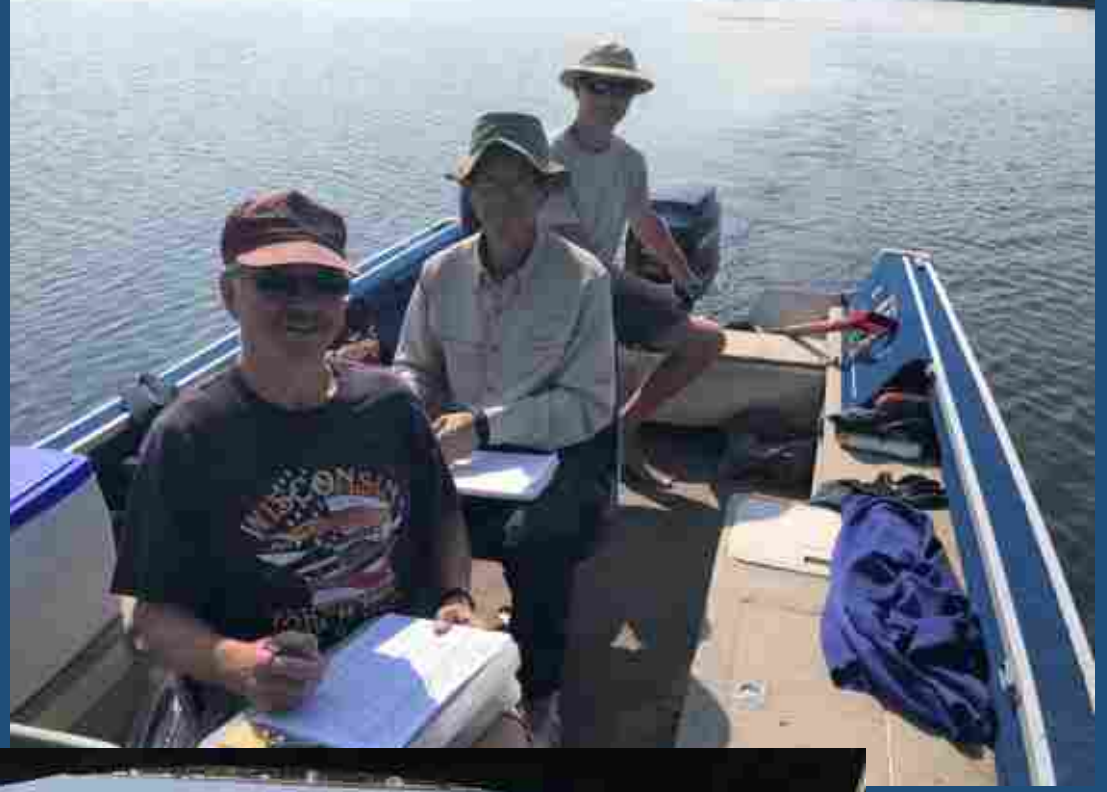
Aquatic Plant Survey Methods





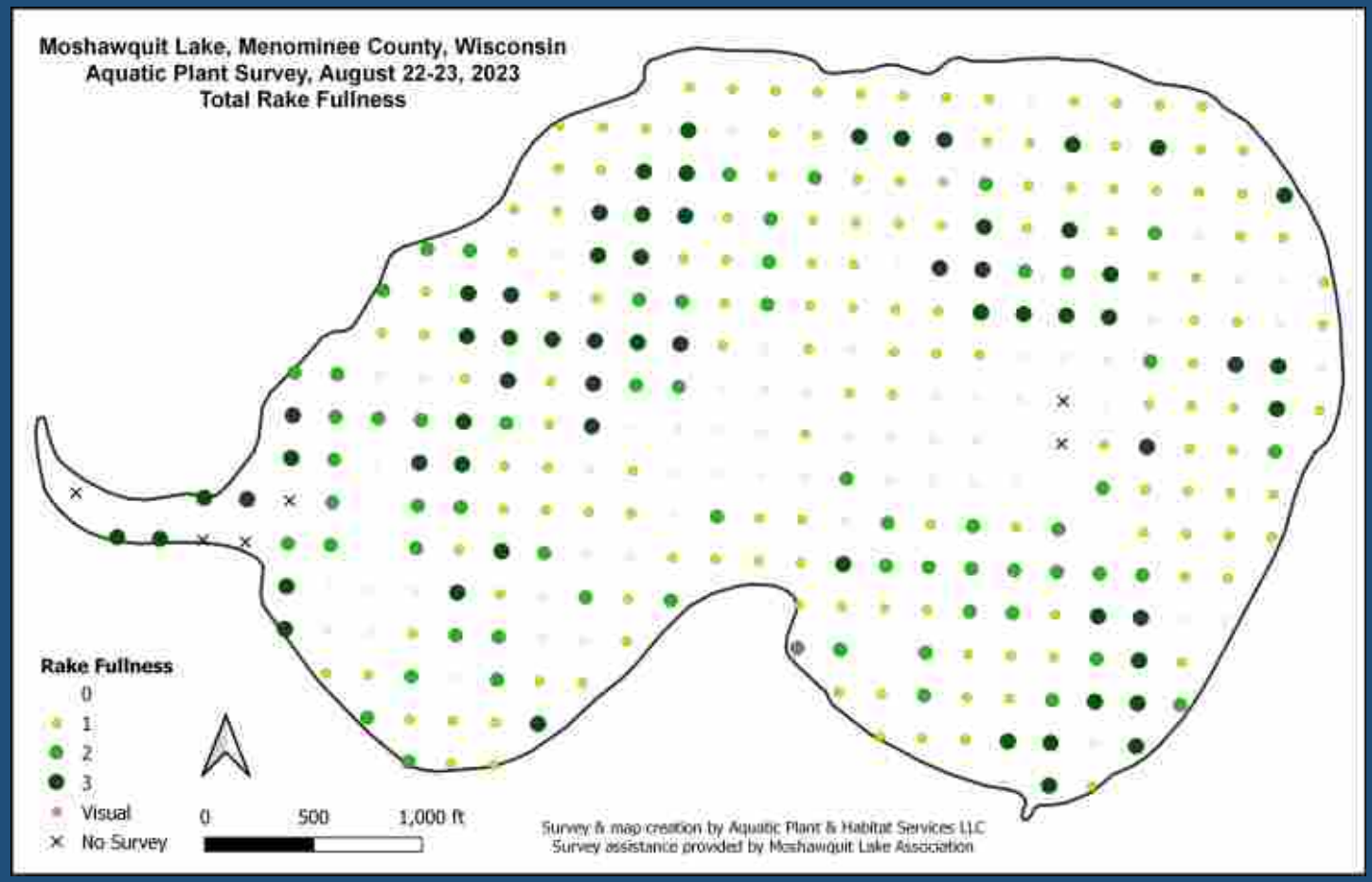
Rating	Coverage	Description
1		Few plants
2		Plants cover length of the rake but not tines
3		Rake completely covered, tines not visible





Results – Plant Occurrence

- 264 sites with plants
- 326 points shallower than maximum depth of plants (22.5 ft)
- 264/326 = 81% sites with plants (frequency of occurrence or FOO)



Results – Plant Community

43 species present, that's a LOT

Heterogeneous
(not the same old stuff at every sample point)

High Floristic Quality Index at 35.8
High Mean C Value at 6.2

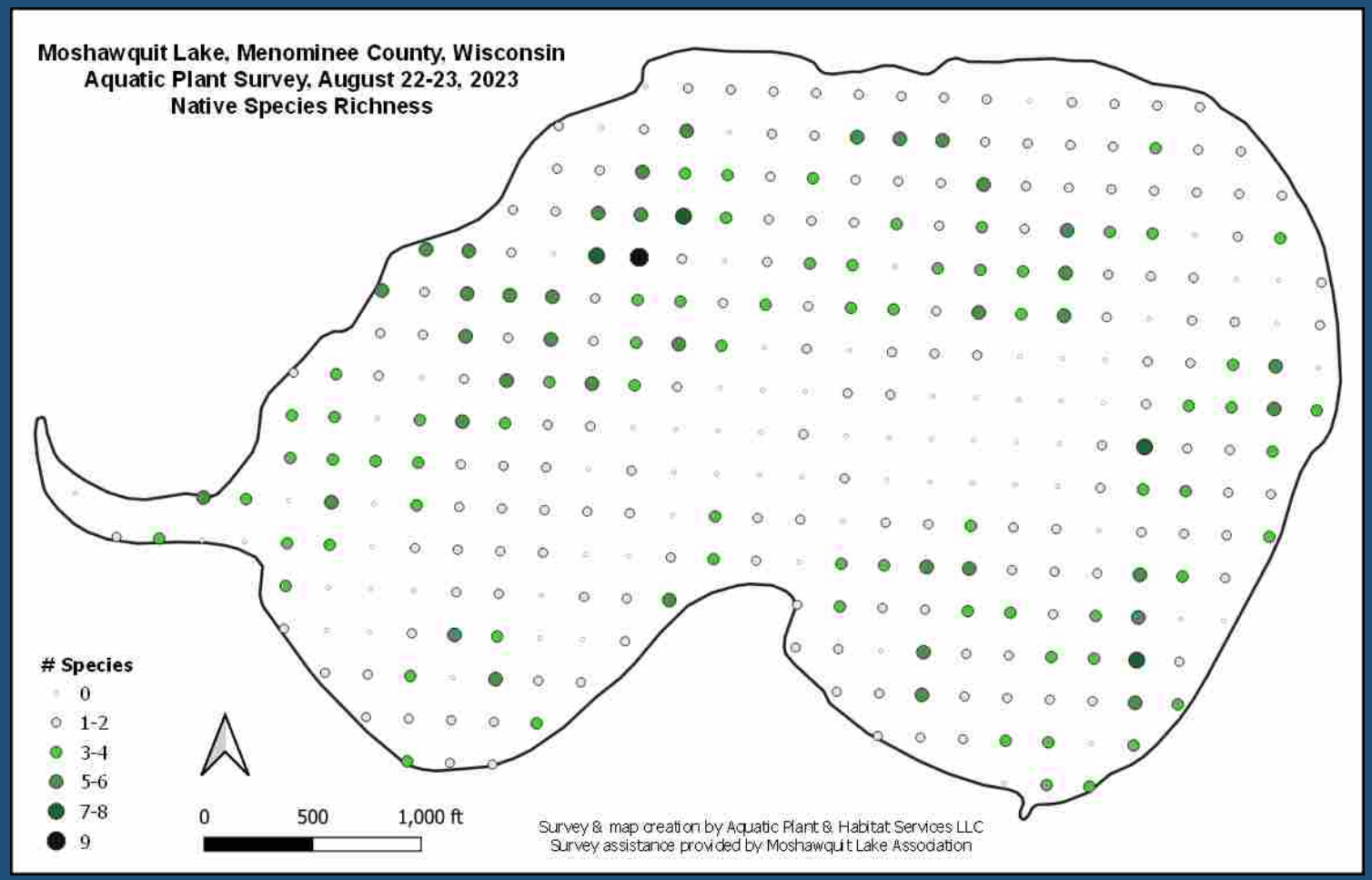
FQI	Description
0-19	Low quality
20-35	High Quality
35-50	Very High Quality
> 50	Extremely rare and important

Mean C	Description
0-3	Common, high tolerance
4-6	Specific needs, moderate tolerance
7-8	Narrow range, minor tolerance
9-10	Very narrow range, low tolerance

Healthy Native Aquatic Plant Community

Results
Overall Conclusions

- Diverse plant community.
- Plant community suggests low human disturbance.
- EWM occurrence is low.



AQUATIC INVASIVE SPECIES IN MOSHAWQUIT LAKE

Invasive Species

"An invasive species is **an organism that causes ecological or economic harm in a new environment where it is not native**. Invasive species are capable of causing extinctions of native plants and animals, reducing biodiversity, competing with native organisms for limited resources, and altering habitats."

-NOAA

Mystery Snails

- Verified 2016
- Carrier of parasites that can be passed along to predators (fish, waterfowl, mammals).
- Compete with native species for resources
- Impact to native species may be insignificant

Snail Removal

Credit: Matthews Lake Association

Zebra Mussels

- Verified 2009
- Filter feed on the good algae
- Increase water clarity
  - Increase aquatic plant growth to greater depths
- Attach to hard surfaces
  - Including native clams
- No options for control

Eurasian & Hybrid Watermilfoil

- EWM verified in 2006-2007
- HWM verified in 2012
- Sometimes forms dense mats on lake surface
  - Can outcompete native species
  - Might Impair navigation
- Once introduced many options for control depending on severity of the issue
  - Chemical
  - Manual removal
  - Mechanical removal
  - Biological control

Hybrid Watermilfoil

- 6 native milfoils (with feather-like leaves) in WI
- Hybrid = Northern watermilfoil (native) X Eurasian watermilfoil (non-native)
- Hybrid watermilfoil has intermediate characteristics
- Hybrid watermilfoil often
  - Has thicker stems
  - Is a prolific flowerer
  - Grows faster
  - Can be less susceptible to herbicide

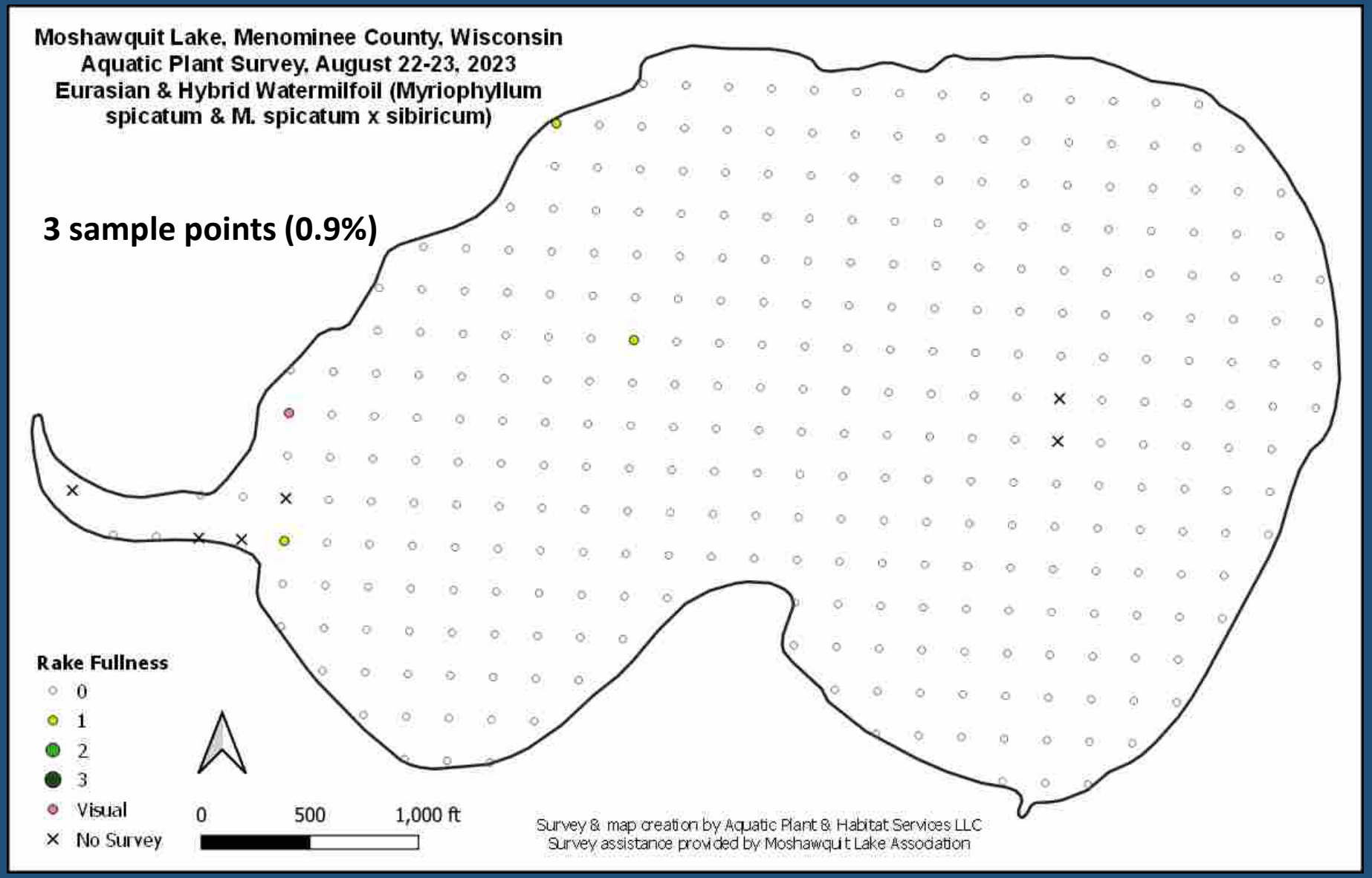
Hybrid Watermilfoil & Herbicide Resistance

- Whole-lake 2,4-D herbicide treatments
  - have smaller population reductions in HWM[1]
  - Have shorter longevity of control for HWM[1]
- HWM found more frequently in lakes with a history of 2,4-D use[2]
- HWM more genetically diverse than EWM
  - Some genetic strains sensitive to herbicide
  - Other genetic strains more resistant to herbicide
  - Treatment can inadvertently select for more resistant genetic strains by killing/injuring the more sensitive strains

[1]Nault et al. 2018

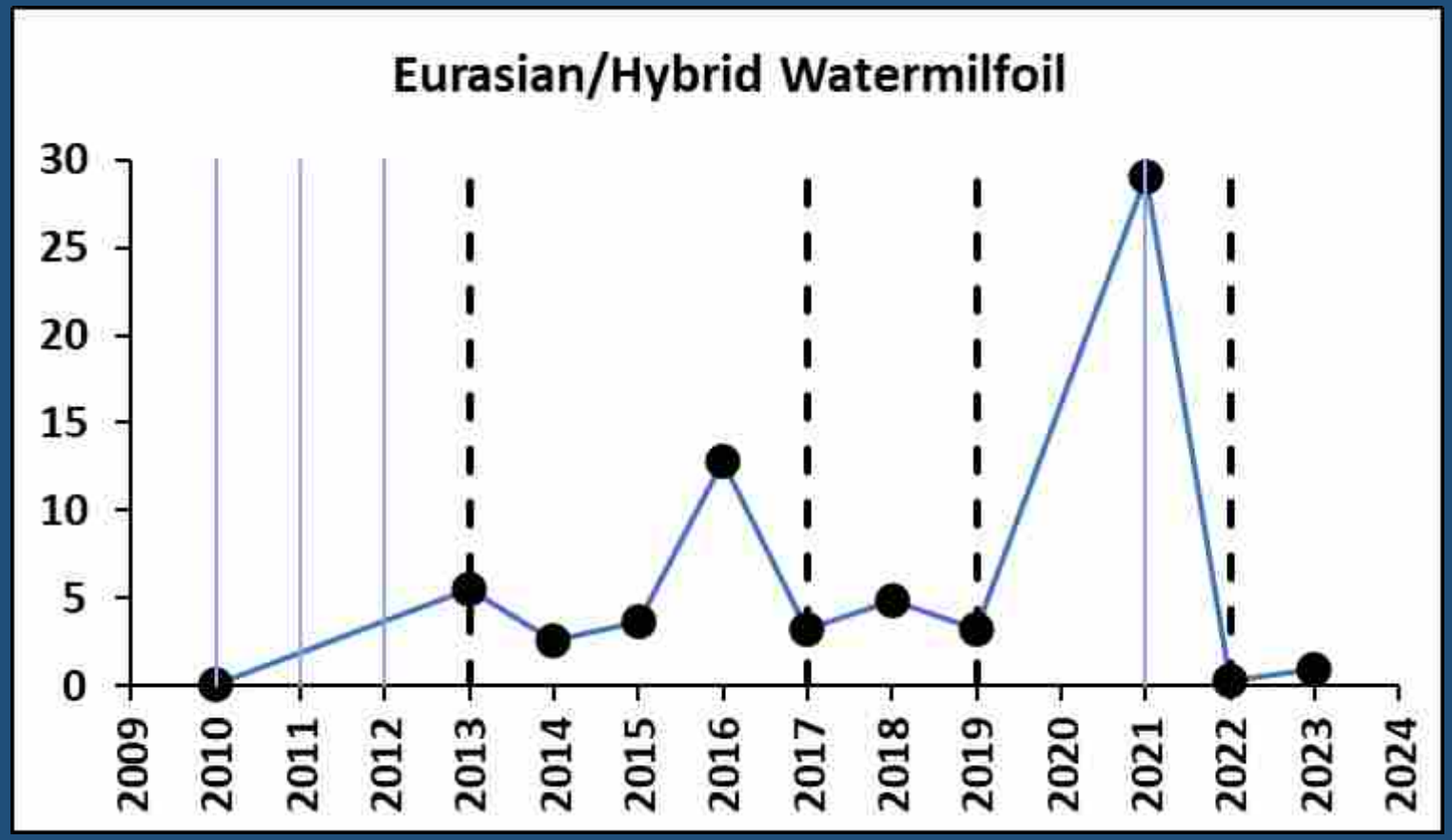
[2]LaRue 2012

Results – EWM 2023



EWM/HWM Occurrence & Management

- Small <10 ac. Herbicide 2007, 2008, 2009, 2010, 2011x2, 2012, 2021
- Large >10 ac. Herbicide 2013, 2017, 2019, 2022
- DASH 2017, 2018, 2019, 2021



Curly-leaf Pondweed

- Verified 2007
- Can become dominant
  - Low light tolerant
  - Low temperature tolerant
  - Dense mats can interfere with recreation
- Once introduced many options for control depending on severity of the issue
  - Chemical
  - Manual removal
  - Mechanical removal

MANAGEMENT OPTIONS & FEASIBILITY

With an emphasis on Hybrid watermilfoil occurrence & Curly-leaf pondweed

Sara Hatleli, Aquatic Plant & Habitat Services LLC, 715-299-4604

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May 6, 2024

Public Input Meeting for Moshawquit Lake Aquatic Plant Management

Five Broad Management Methods

- No Active Management
- Manual or Mechanical
- Chemical Treatment
- Habitat Alteration
- Biological Control

KEEP IN MIND……..

MORE THAN ONE METHOD CAN BE USED IN THE SAME YEAR

Integrated Pest Management

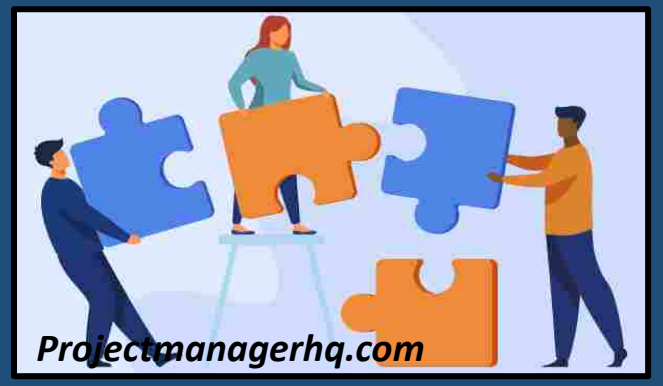
MANAGEMENT CAN CHANGE BASED ON NEW INFORMATION

Adaptive Management

ALSO KEEP IN MIND…….

Feasibility

- Socially feasible?
- Economically feasible?
- Biologically feasible?



Plant Management

Plant Management	Level of PREFERENCE			
	Do not include	Low	Medium	High
No active management (survey, monitor, education)				
Chemical (Herbicide applied to reduce EWM occurrence)				
Manual (paid or volunteer hand removal of EWM)				
Mechanical – DASH (paid or volunteer SCUBA removal of EWM)				
Mechanical – Harvester (mow the EWM)				
Biological (first find out if weevils are present)				

No Active Management

- Strong monitoring, education, outreach component
- Identify threshold range for active management
- Financial Cost
  - Whole Lake Point-Intercept Survey 2023 - $5,190
  - EWM Bed Survey 2023 - $300. 2024 est. $600.

PRO: No unintended consequences of active management (AIS ❤️ disturbed sites, control activities = disturbance)

CON: The issue *might (or might not)* become more challenging to address later.

Socially feasible? Economically feasible? Biologically feasible? Organizational capacity?

Chemical Control

- Herbicide applied to lake to kill plants
- Permit required
- Financial Cost: ProcellaCOR $3400/acre*

PRO: Some selectivity depending on plant targeted. Can be very effective with large-scale treatments. Control (2,4-D) 2-8 years. ProcellaCOR new in WI since 2019, research is ongoing.

CON: Possible unintended consequences such as impacts to non-target plant species, recent research suggests deformities in egg and larval stages of walleye, perch, crappie, LM bass, pike, minnows, & suckers (Dehnert, 2020). Juvenile stages (60 days post hatch) not affected. HWM herbicide resistance.

**Cost variable depending on type of herbicide, average depth, dosage, and herbicide applicator*

Manual or Mechanical

"Pulling and removing plants by hand or using harvesting machines or devices"

- Manual Plant Removal
- Diver Assisted Suction Harvesting (DASH)
- Mechanical Harvest

Manual or Mechanical
Manual Plant Removal

- Remove plants by hand
  - 30-feet wide, single area, must include recreational devices (piers, rafts, etc.), no other plant control in that area, not allowed in designated sensitive areas
- Financial Cost $2,400 for 4 workers / day
- PRO: Can be done by lake residents at no cost, no permit required, can be highly selective

CON: Labor intensive & expensive

Manual or Mechanical
Diver Assisted Suction Harvesting (DASH)

- Uproot vegetation
- Suction tube/pontoon
- Permit required
- Financial Cost $2,600 for 2 divers / day

PRO: can be highly selective, aims to remove roots, thought to be minimal impact to lake ecology

CON: Labor intensive, expensive, EWM fragmentation

Manual or Mechanical
Mechanical Harvest

- Cutting plants down to depth of 5-6 feet
- Permit required
- Concerns associated with impacts to panfish spawning, timing important
- Financial Cost
  - $2,000 - $2,200/day to hire
  - $100K-$200K* to purchase new (not including shore conveyor, trailer, operator cost, storage, insurance, maintenance. Big Blake Lake P&R District $8500 annual budget + $4500 insurance)

**Cost variable depending on size of harvester*

PRO: immediate results, thought to be minimal impact to lake ecology

CON: Not selective, repeat treatment required, EWM fragmentation

Biological Control

- Using living organisms to control plant growth
- Native weevil that feeds on EWM
- Mixed success
  - Darker water inhibits predators' ability to feed on them
- First step is weevil survey to determine presence.

https://klsa.wordpress.com/published-material/milfoil-weevil-guide/

Feasible options

- No active management some years
- Manual Removal – individuals around docks
- DASH – to complement herbicide application
- Herbicide

ADDITIONAL LAKE MANAGEMENT TOPICS

Lake Protection & Monitoring

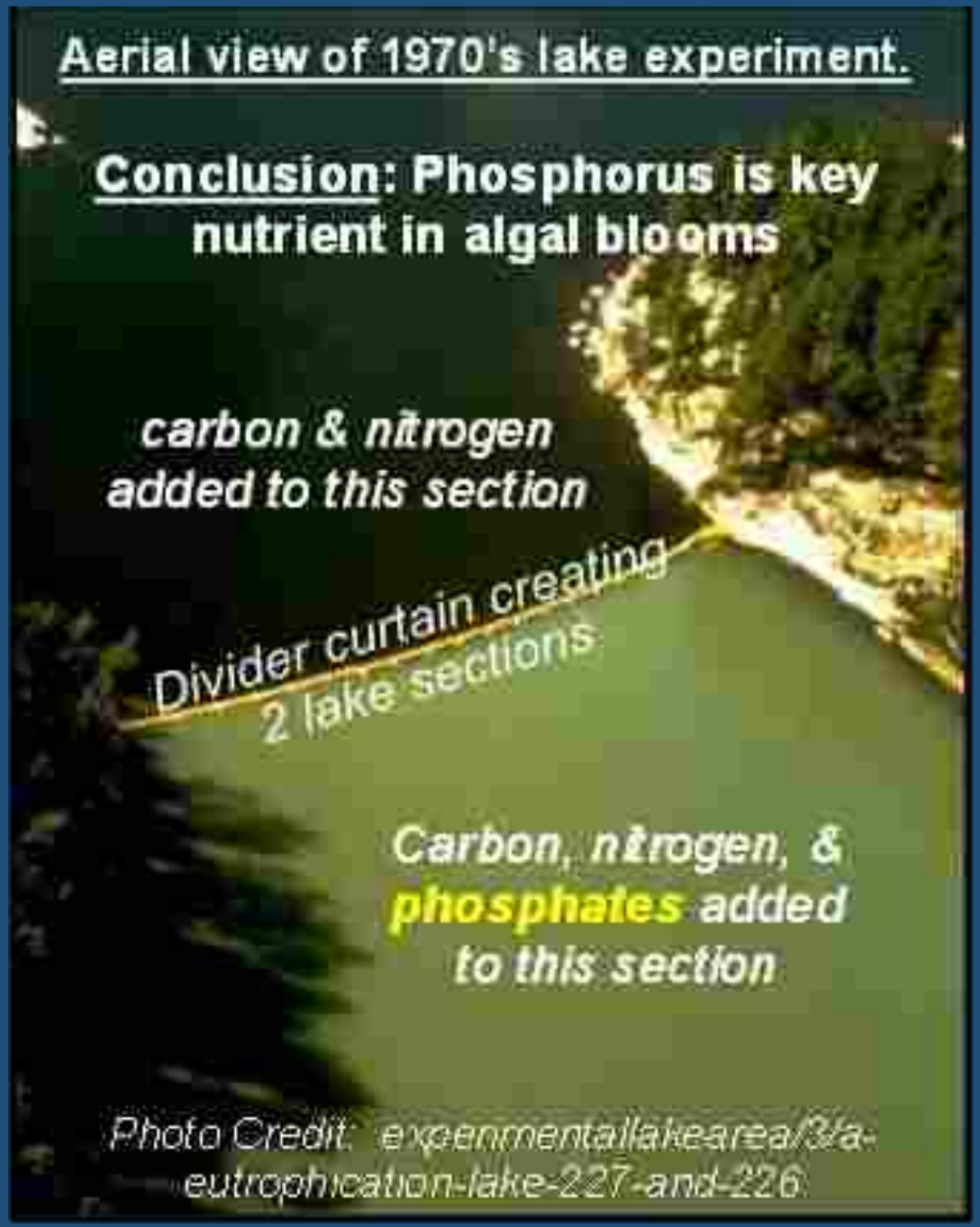
Lake Protection & Monitoring 2024-2029	Level of PRIORITY			
	Do not include	Low	Medium	High
Workshop - Water quality protection through shoreland improvement				
Healthy Lakes Grant – shoreland improvement practices				
Shoreland Assessment				
Water quality monitoring by volunteer(s)				
OTHER?				

Surface Water Runoff

- Impervious surfaces are those that do not allow precipitation to infiltrate into soil
  - Buildings, paved surface, decks, compacted gravel sites, etc.
- Precipitation becomes surface water runoff
  - Runoff is warmer
  - Warmer water “holds” less dissolved oxygen
  - Runoff carries sand, soil into lake
  - Runoff carries phosphorus into a lake

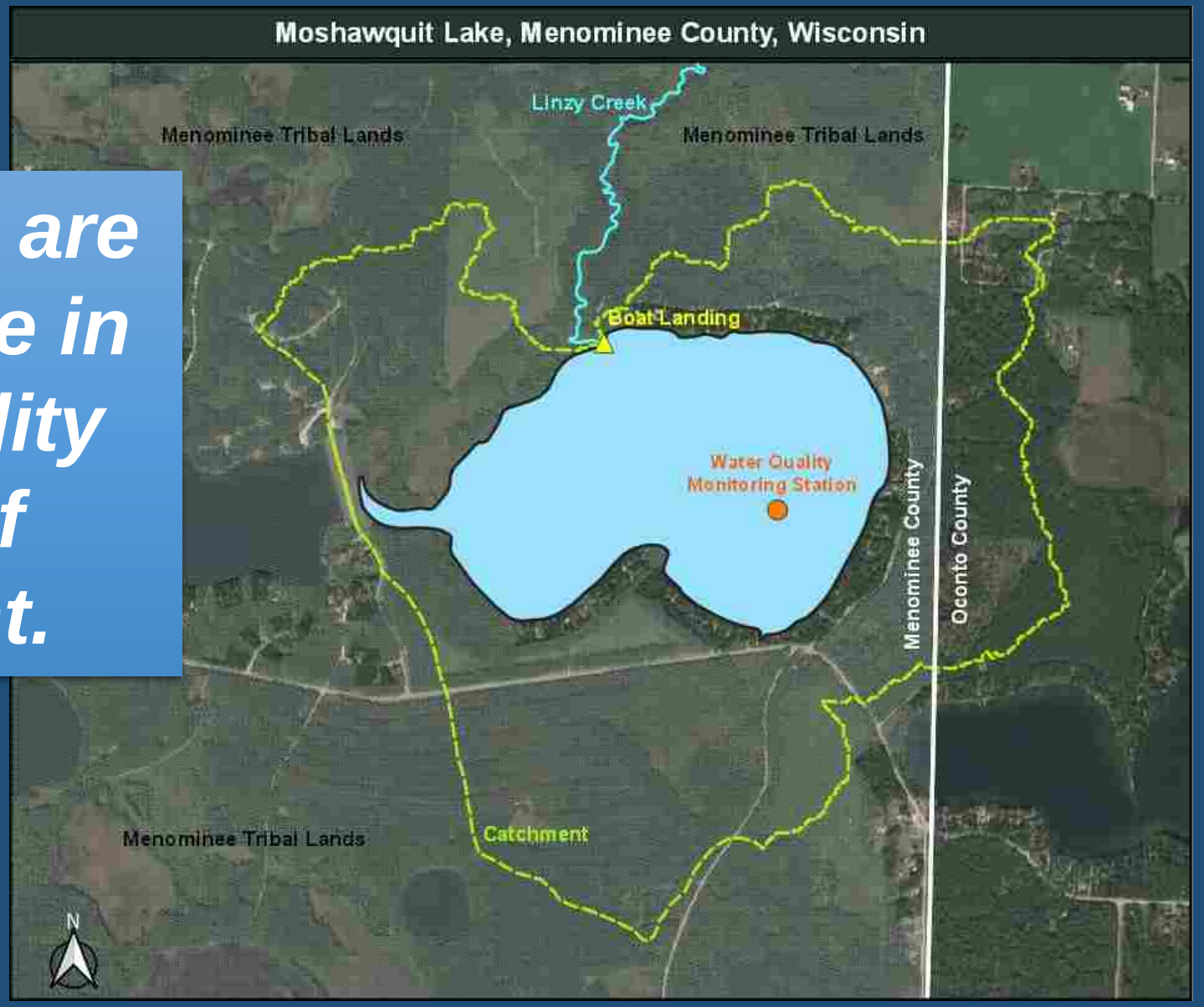
Phosphorus

A little phosphorus goes a long way!



Moshawquit Lake Catchment

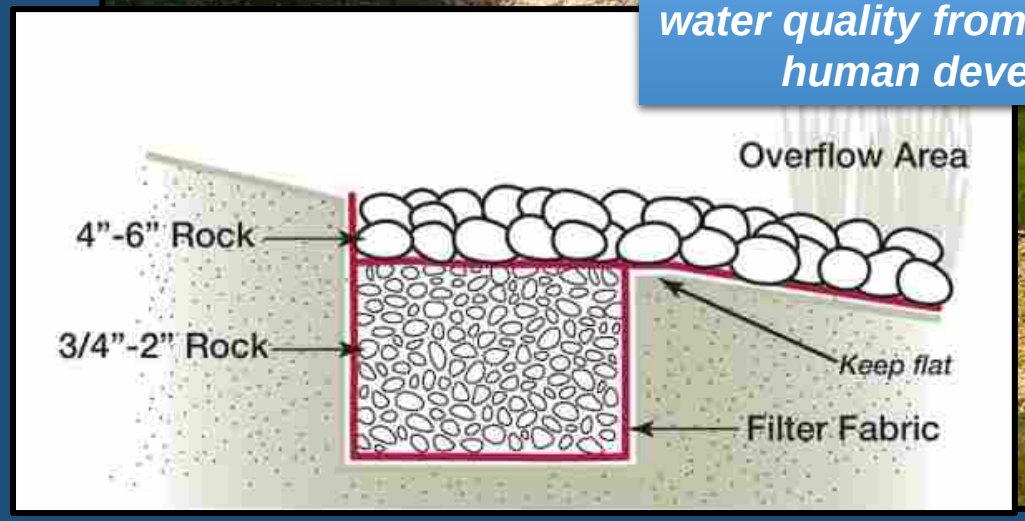
Lake property owners are the last line of defense in protecting water quality from the impacts of human development.



“With great property comes great responsibility”

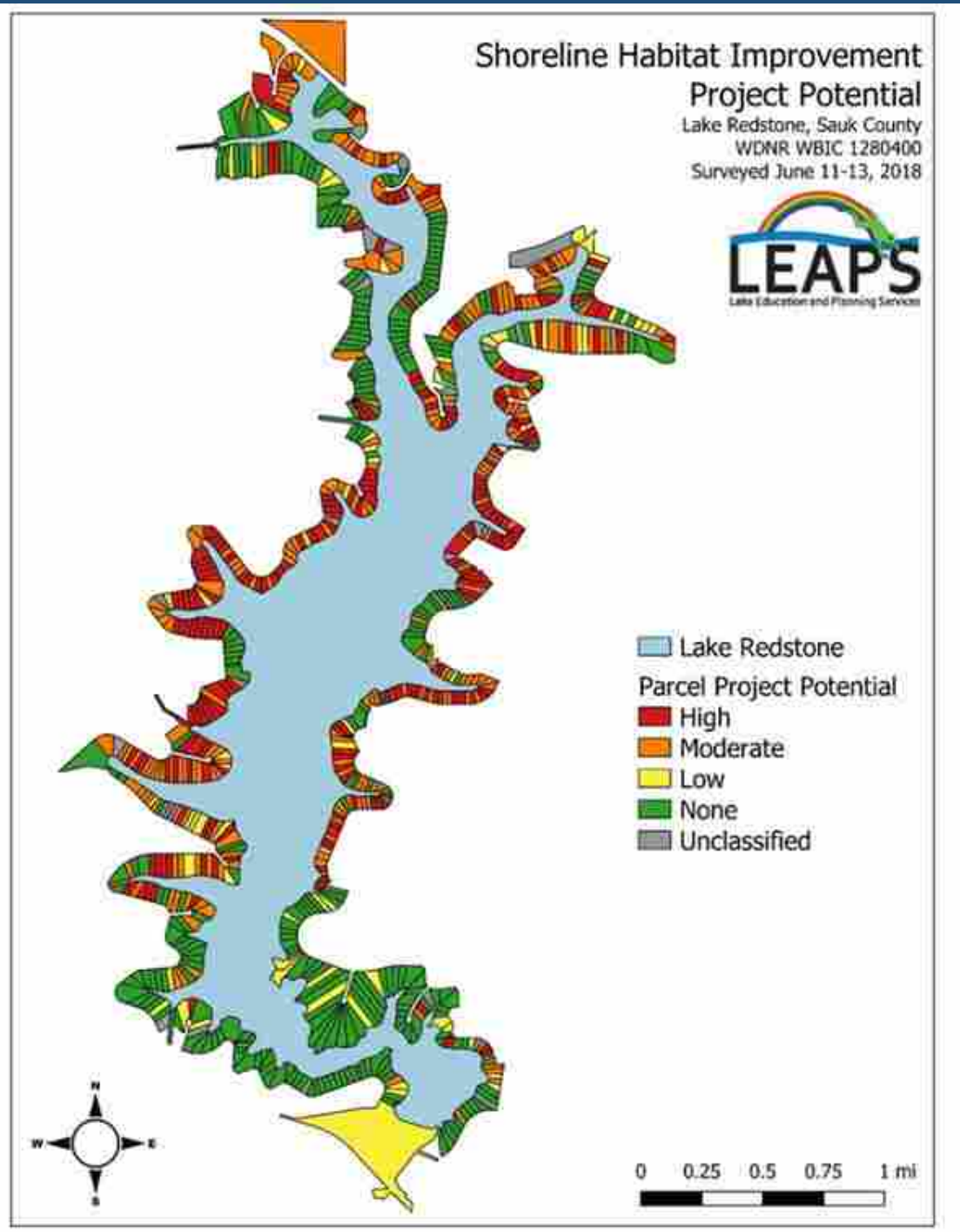
- Opportunities
  - Buffers
  - Water diversions
  - Rain gardens
  - Rock Infiltration

Lake property owners are the last line of defense in protecting water quality from the impacts of human development.



Shoreland Assessment

- 35-ft riparian area surveyed from the water
  - Canopy cover
  - Herbaceous / shrub cover
  - Impervious surface
  - Lawn
- Identify parcels with high, moderate, low, and no potential for improvement



Water Quality Monitoring

- Secchi Depth (water clarity)
- Phosphorus
- Chlorophyll (biomass)

AIS PREVENTION MOSHAWQUIT LAKE

AIS Prevention

AIS Prevention Tasks 2024-2029	Level of PRIORITY			
	Do not include	Low	Medium	High
Watercraft Inspection Program (Clean Boats Clean Waters)				
Internet Landing Installed Device Sensor (I-LIDS) motion sensor audio				
Outreach to residents - “Know your boating guests” & “Disinfection”				
Volunteer Monitoring for AIS				
Protect native plant community				
OTHER?				

AIS Prevention

Preventing their introduction will go a long way to prevent other species introduction

AIS Prevention - Decontamination & ILIDS

- Internet Landing Installed Device Sensor (ILIDS)
  - Motion sensor audio instructs boaters
  - Camera records boater activity
- GRANT ELIGIBLE (AIS Prevention)
  - CBCW program required
  - Pre-application Sept. 15, final application Nov. 15
  - $4000 per landing from state, BLA would provide $1333 match in money or volunteer time
  - Cash flow consideration – 25% advance payment

AIS Prevention – Know your guests

What was prior waterbody and when? Are zebra mussels present in that prior waterbody? Has the watercraft been properly disinfected?

Internet search "wi dnr lakes with zebra mussels"

AIS Prevention – Disinfection Protocols

- BOAT, GEAR AND EQUIPMENT DECONTAMINATION AND DISINFECTION MANUAL CODE 9183.1

Table 2 Efficacy of treatment methods for invertebrates.

AIS	Steam Cleaning (212°F)	Hot Water (140°F)	Drying (5 days)	Chlorine (500 ppm, 10 min)	Virkon (2:100 solution, 20 min)	Freezing (26°F[†])
Faucet Snail	☑ 18*	☑ 18*	⊗ 35	⊗ 18	Ⓡ	Ⓡ
New Zealand mud snail	☑ 4, 65*	☑ 4, 65*	☑ 6*, 66*	⊗ 76*	☑ 9, 10*, 74, 76, 83	☑ 4, 6*
Quagga Mussel (Adults)	☑ 7*,16*	☑ 7*,16*	☑ 14*	Ⓡ	☑ 9	Ⓡ
Quagga Mussel (Veligers)	☑ 4, 17, 80*	☑ 4, 17	☑ 69*	Ⓡ	☑ 9	Ⓡ
Zebra Mussel (Adult)	☑ 7*, 8*, 25	☑ 7*, 8*, 25	☑ 14*, 25*, 27	☑ 22*	Ⓡ	☑ 25, 27
Zebra Mussel (Veligers)	☑ 4, 80*	☑ 4	Ⓡ	☑ 22*, 25	Ⓡ	Ⓡ
Asian Clam	☑ 4, 37, 78	☑ 4, 37	⊗ 4	⊗ 37*, 38*	Ⓡ	Ⓡ
Spiny Water Flea (Adult)	☑ 7*, 47*, 80*	☑ 7*, 47*	Ⓡ	☑ 76, 83	☑ 76, 83	☑ 76, 83
Spiny Water Flea (Resting Eggs)	☑ 2*, 80*	☑ 2*	☑ 2*, 4	⊗ 2	Ⓡ	⊗ 2*
Bloody Red Shrimp	Ⓡ	☑ 83*	☑ 83*	☑ 83*	☑ 83*	Ⓡ
					Ⓡ	Ⓡ

Key:

☑= Effective- Eliminates spp when applied at rates outlined in the manual code.

⊗=Not Effective- Requiring higher rates and/or longer time periods than outlined in code to eliminate spp.

Ⓡ= Research Needed- No/insufficient sources or references found.

AIS Detection - Routine Monitoring

- AIS monitoring
  - Assistance possibly through County
  - Volunteer monitoring
  - Aquatic plant survey every 5 years
    - GRANT ELIGIBLE

AIS Prevention – Protect Native Plants

- Moshawquit Lake has a plant community that is WONDERFUL!
- Plants can be protected by
  - Minimize herbicides if needed for AIS control
  - Education events & presentations GRANT ELIGIBLE

Thank you!