

Eurasian Watermilfoil Management Lake Leelanau 2024 Field Report



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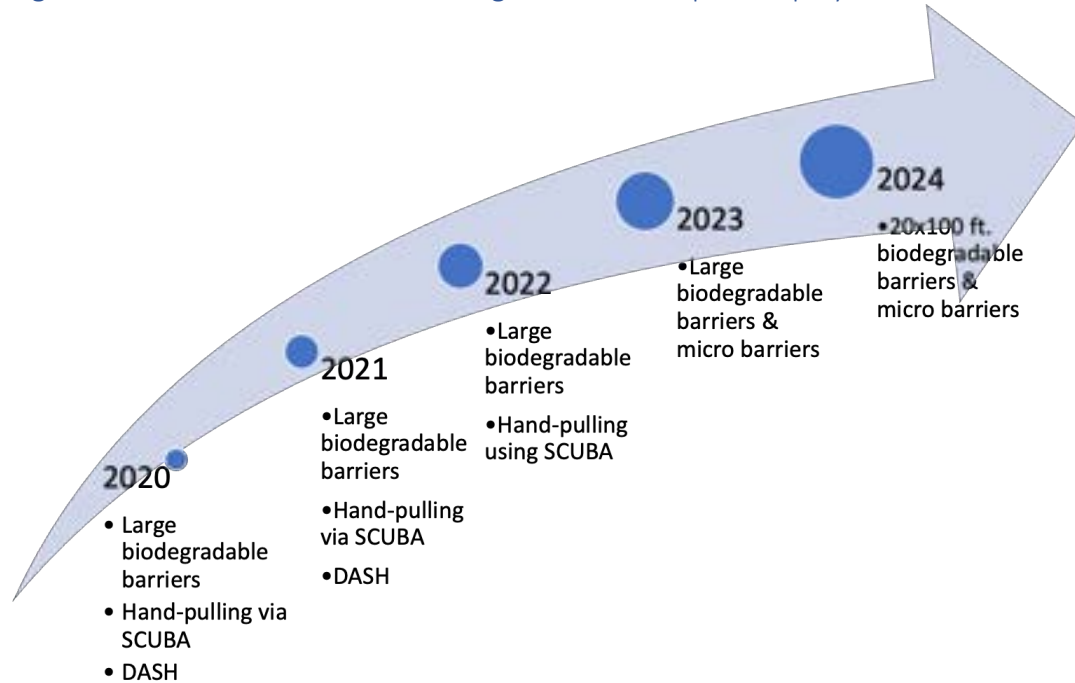
“The questions we ask determine the culture we create...our questions determine our focus, and our focus determines our future.”

from *Fighting Shadows*
Jon Tyson & Jefferson Bethke

Introduction

If you are just beginning to follow our progress with Eurasian watermilfoil (EWM) control and eradication on Lake Leelanau using only non-chemical methods, we encourage you to read the Annual Field Reports from 2020-2023 (<https://lakeleelanau.org/aquatic-invasive-species/>) to gain an historical perspective important for understanding our progress in 2024. Figure 1 summarizes our work.

Figure 1 – Brief Historical EWM Management Techniques Employed 2020-24

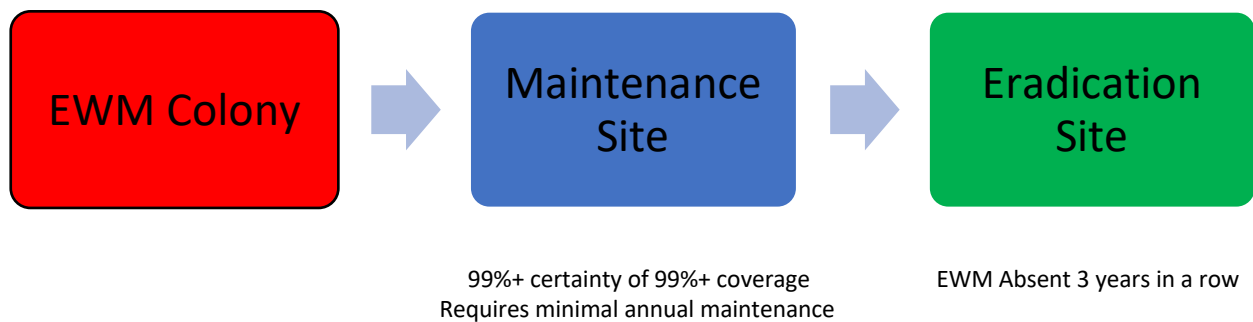


The rich, questioning culture we've developed with our field team these last few years led us to ask some important questions regarding the management of EWM. These questions determined our focus, which now determines our future. What method is best for non-chemical control? (2020-22) Can we locally eradicate EWM, not just control it? (2023) Can we eradicate EWM lake wide? Can we simplify our methods for easier application on Lake Leelanau and enable application on other lakes? (2024) The future of EWM management on Lake Leelanau looks bright. We continue to foster a culture of continual questioning and believe our new questions will provide our focus and hopefully determine a bright future in our battle with this and other aggressive invasive species on Lake Leelanau.

Work Plan - 2024

As documented previously, we saw a mysterious disappearance of EWM at some satellite locations in the fall of 2023. Will these colonies also mysteriously reappear in the coming years? This unexpected phenomenon forced us to create a “Plan A Workplan” if the EWM quickly reappeared in 2024 and a “Plan B Workplan” if it didn’t. Project partners budgeted for the worst-case scenario (Plan A), which allowed us to build our infrastructure in the off-season. This included hiring more SCUBA divers and another field technician, purchasing and preparing equipment to allow us to fill our own dive tanks, making important modifications to our work boats, researching and improving our daily surveillance capabilities, and creating a volunteer army to fill sandbags throughout the season. What we observed in 2024 fell somewhere between Plan A and Plan B. In some areas where EWM was previously documented, often growing on the perimeter of previous years’ burlap where the EWM wasn’t completely covered, it returned. However, in some areas where EWM had previously been documented, very little to none at all was observed in 2024. Since we did not observe a complete resurgence of EWM in 2024, we implemented our “Plan B Workplan”. This consisted of revisiting our five 2023 “maintenance sites” (see Figure 2) with divers, to cover any plants that were either missed or had landed and colonized on top of the barrier after the 2023 field season. Fortunately, this took from less than a day to just a few days at each site, with two of the sites (the largest and the smallest) having no new EWM plants. They are now considered sites with one year of progress towards “eradication” status, as shown below. If a site has no EWM for 3 years in a row, we will then declare it eradicated at that location.

Figure 2 – EWM Colony Management Overview



We spent the middle portion of our field season increasing maintenance sites from 5 to 17. We ended the last couple weeks of the field season revisiting all 17 sites, thoroughly surveying each site with a team mantra of “no strand left behind!”

Figure 3 – 2023 (red) and 2024 (yellow) Maintenance Sites

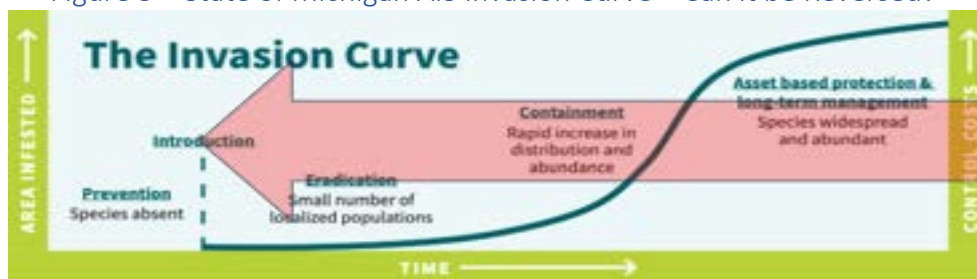


Figure 4 – Maintenance Sites to Date

Site Name	GPS Coordinates	Square Feet Set in 2024
1. Narrows Yacht Club	44.982272, -85.713654	272
2. The Narrows	44.977674, -85.709879	32
3. Dar’s Landing	44.937814, -85.720641	576
4. Otto Road	44.938506, -85.711152	46,358
5. Grant’s Point	44.929403, -85.716846	104,137
6. Farber Point	44.923155, -85.716717	3,898
7. Mebert Creek	44.912629, -85.708452	3,120
8. Willow Point	44.909166, -85.717987	13,212
9. North Gordon’s Point	44.905995, -85.711915	100
10. South Gordon’s Point	44.902683, -85.709769	12,780
11. Shallow Spring	44.900278, -85.702841	0
12. Kelenski Point	44.890328, -85.710066	16
13. Billman’s Beach	44.871311, -85.723009	3
14. Bingham Boat Launch	44.876638, -85.697211	3
15. Cedar River Entrance (CLP)	44.846862, -85.755314	2,216
16. Cedar River Trib	44.841764, -85.760799	36
17. Tiki Bar Bay	44.838722, -85.717563	1,160

Our goal in the coming years is to convert newly discovered EWM colonies into maintenance sites and then into eradication sites with continued improvement and implementation of high-confidence surveillance work. We will ask the question of whether we can reverse the State of Michigan’s AIS Invasion Curve and actually eradicate EWM from the entire lake (Figure 5).

Figure 5 – State of Michigan AIS Invasion Curve – Can it be Reversed?



Notable Progress, Innovations, and Observations in 2024

Ours was another year of innovation and progress toward our goal of eradicating EWM from Lake Leelanau. We strategically placed over 2.86 acres of burlap and over 3,000 “micro-barriers” (gravel-filled burlap sandbags) on nearly all the remaining EWM we could find by the end of the field season. We are confident, given our expanded team infrastructure, that we would have found similar success by this point even if there had been a resurgence of EWM. By mid-August, we had difficulty finding even a single strand of EWM throughout the entire South Lake Leelanau, even when employing our full dive team.

I. Natural regrowth of native plants and macroalgae

We documented numerous sites with GoPro videos and photographs where native plants and macroalgae were recolonizing the areas previously covered in burlap (Figure 6). This was predicted since it was observed in previous years. We hypothesize that native plants are able to sprout up through the burlap from the bottomland seed bank. To our knowledge, EWM has never sexually reproduced in Lake Leelanau to produce a seed bank of EWM.

Surprisingly, we even found some native pondweed growing up through the benthic barriers we placed in 2024, within just a couple weeks of deployment (Figure 7).

Figure 6 – Study Site Native Plant/Algae Regrowth

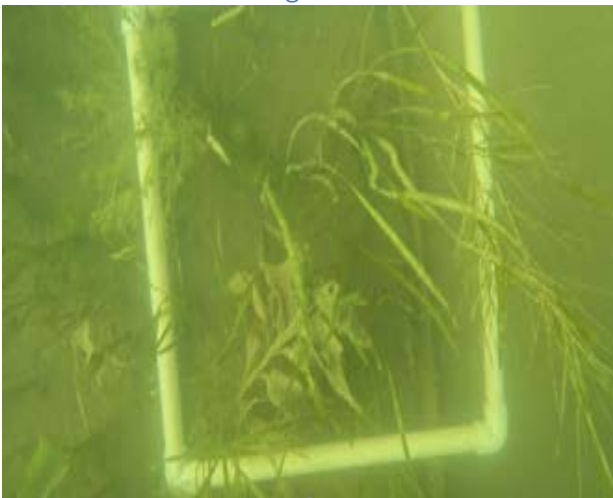


Figure 7 – Natural Plant Regrowth Through a 2024 Barrier



II. Shallow water placement of micro-barriers without divers

EWM colonies at a couple of shallow water sites were managed using an innovative tool (Figure 8) designed to hold and place a small piece of burlap (up to 3x5') over a small colony without the need for SCUBA. It was nicknamed “the spreader” because it allowed for stretched burlap placement and subsequent release of the burlap after sandbags were employed.

Figure 8 – Innovative Shallow Water Burlap Application Device



III. DIY “Crow’s Nest” for EWM surveillance

We secured and employed an industrial strength ladder on the front end of our workboat to give a “bird’s eye view” of the surrounding area (Figure 9). This “Crow’s Nest” allowed for more effective viewing of underwater aquatic gardens from a higher vantage point at any time, without the need for an aerial drone. This gave us the flexibility we needed on a daily basis and proved very useful in spotting EWM.

Figure 9 – DIY “Crow’s Nest” for EWM Surveillance



IV. Early Detection Using our “GoPro on a Pole” Innovation

LLA volunteers used a new technique we developed that uses two GoPro cameras mounted on the end of an expandable, aluminum paint pole to video document plants and macroinvertebrates. Volunteers went out on the lake at least monthly to critical sites around our major boat launches on both North and South Lake Leelanau to record horizontal and vertical footage of the areas. An initial review of a video from one site (Bingham boat launch) showed a few short strands of EWM which might not have been discovered from a boat or crow’s nest. Divers were deployed to the area shortly after and covered all of the observed EWM with micro barriers, showcasing its value in our “early detection, rapid response” protocol.

Figure 10 – “GoPro on Pole” Apparatus



Additional AIS Work

The Curly-leaf Pondweed discovered late in 2023 at the entrance of the Cedar River (Victoria Creek) was either pulled using a long-handled rake or covered using biodegradable benthic barriers. A survey in late September showed it was all gone at the infestation site, but a couple of small colonies were discovered at the mouth of the river as it enters the lake. Those sites will be targeted for 2025.

Ongoing Research

This year marked the third and final year of a research project, conducted in collaboration with Grand Valley State University, aimed at measuring the impact of benthic barriers on the aquatic ecosystem and their efficacy in controlling EWM. This work was spearheaded by graduate student Anna Briem and sponsored by Dr. Mark Luttenton. Anna plans to defend her thesis late in 2024 with likely publication of results in early 2025.

Figure 11 – Divers and Crew Collecting Water for Research

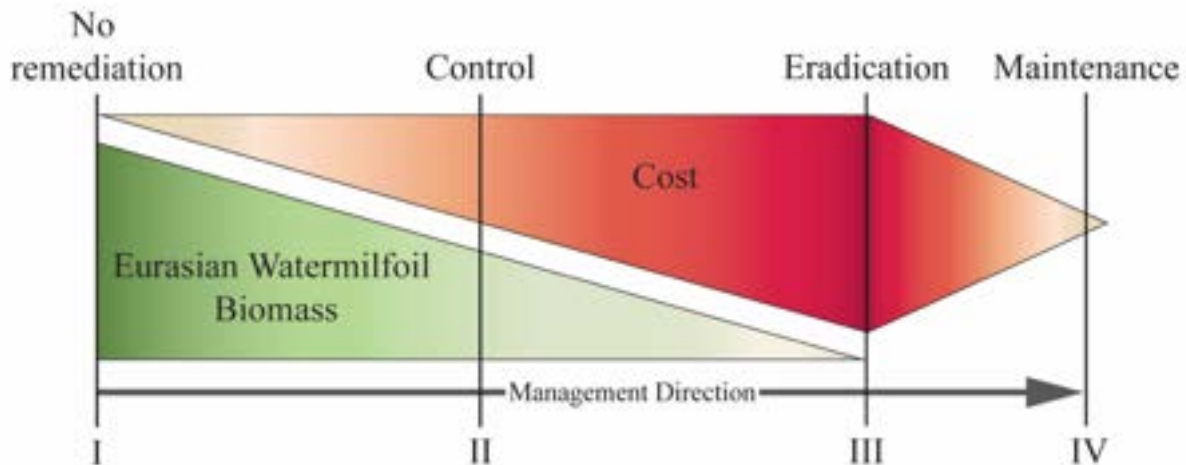


Solidifying Management Strategy

Discoveries and advances made since Brian Price (former LLLA biologist and LLLA “Living Legend” recipient 2023) initiated this EWM management initiative back in 2020 have allowed us to formulate, initiate, and continue with the new EWM management strategy begun in 2023 as illustrated in Figure 12. Increased association support allowed us to shift our strategy from “control” to “eradication”. This important decision greatly impacted how we approached our

fieldwork in 2023 and 2024. Although moving past “control” towards “eradication” was initially more costly, we predict great cost savings in the long run as we move more sites into the maintenance and finally eradication stages as depicted in Figure 2.

Figure 12 – Predicted Cost v. Management Diagram



Looking Ahead

The questions we ask determine our culture, focus, and ultimately our future. We will continue to ask important questions moving forward. What caused the mysterious disappearance of certain satellite EWM colonies? Will they reappear? Can we reduce our management costs by continually improving our workflow, with an eye towards eradication? Will our techniques benefit other lake associations wanting to control and eradicate EWM without the use of chemicals? These and other questions that are sure to emerge will keep us focused on success in the future.

Acknowledgments

Once again, our progress on EWM management would not have been possible without the support, both financially and with their time, of a whole community of people.

Darren and Jennie Keller who completed their third and final year of significant funding, which ensured we had the financial resources to complete our work.

The **Lake Leelanau Lake Association** for their continued financial and volunteer support for all aspects of our fieldwork.

The **Bureau of Indian Affairs-Great Lakes Restoration Initiative** for their continued financial support and for the **Grand Traverse Band of Ottawa and Chippewa Indians** for their guidance and field assistance.

Darlene Doorlag (former LLLA “Living Legend” recipient - 2023) for her continued support and generosity in allowing our use of her lakefront property and storage sheds for our critical work.

Lonnie Rademacher (former LLLA “Living Legend” recipient - 2024), LLLA volunteer who always went well beyond what any volunteer would do to make certain we had everything we needed to continue our progress on a daily basis. Along with many other things, he also formed a band of volunteers (him included) to fill sandbags with pea gravel on a weekly basis. Over 3,000 sandbags were filled and utilized by this effort in 2024!

Thad Popa, LLLA volunteer who purchased, innovated, prepared, and trained us on how to safely fill our own dive tanks. He continually monitored the equipment and helped with maintenance issues during the entire field season, including year-end preparations.

The **2024 Field Work Team**, consisting of **Chris Froelich** (2nd year field technician), **Sarah Elwell** (1st year field technician), **Austin O’Connor** (3rd year diver), **Catherine Dunn** (3rd year diver), **Em Masterson** (2nd year diver), **Anna Briem** (1st year diver), and **Sean Vilter** (1st year diver) for their hard work and commitment. GTB employees **Dan Mays**, **Josh Jackiewicz**, **Nate Campbell**, **Brett Diffin** and **Cherrie McSawby** for extensive work with burlap management, buoy innovations, and multiple fish assessments. **Kelsey Froelich** (Freshwater Solutions) for volunteering to fill in numerous times with various field tasks on the water when we were short-handed. Our team was committed to excellence and willing to work, sometimes in adverse conditions, so that we would improve our chance for success. Without such a talented and committed team our chance for progress and advancement would have been greatly diminished.