LAKE EDUCATION AND PLANNING SERVICES, LLC

CALLAHAN LAKE & MUD LAKE

SAWYER COUNTY

2021 MANAGEMENT SUMMARY REPORT
WBIC: 2434700

Prepared by: Megan Mader, Aquatic Biologist & Dave Blumer, Lake Educator

CALLAHAN (AND MUD) LAKES PROTECTIVE ASSOCIATION

Table of Contents

Figures

Tables

INTRODUCTION

This report discusses lake management activities completed by the Callahan Lake Protective Association (CLPA) and Lake Education and Planning Services (LEAPS) throughout 2021. The following actions were completed by LEAPS to assist the CLPA in aquatic plant management and lake stewardship education.

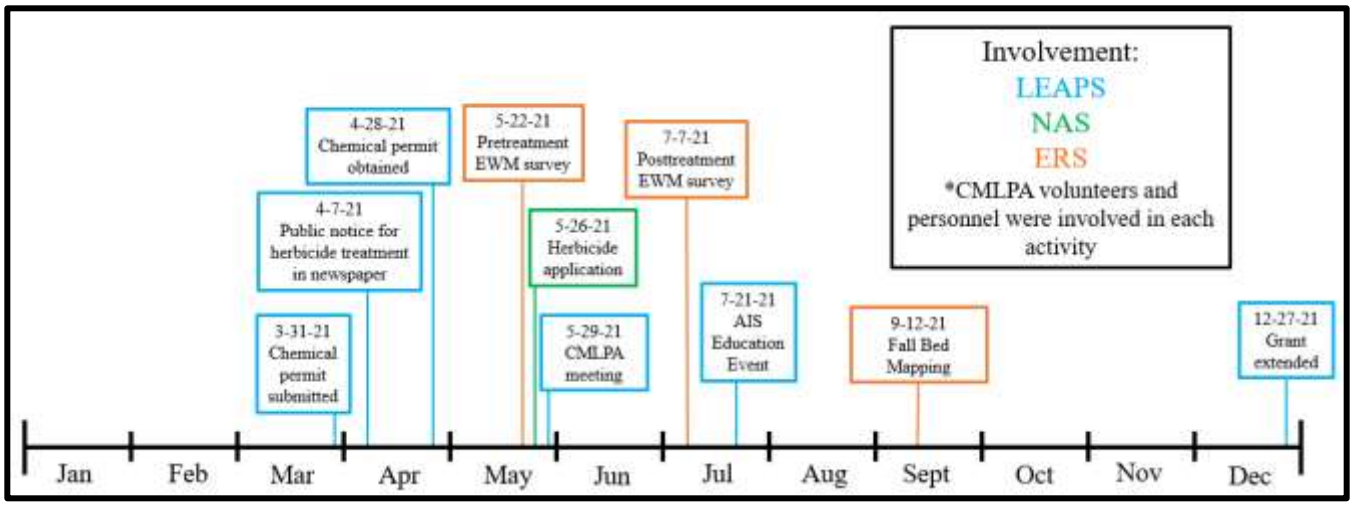

Figure 1. Timeline of 2021 management events involving LEAPS and other hired contractors in Callahan and Mud Lakes

2021 EWM MANAGEMENT

The CLPA participated in EWM management in 2021 as approved by the Wisconsin Department of Natural Resources. The proposed areas for chemical treatment were delineated from Endangered Resource Services, LLC (ERS) 2020 late summer bed mapping survey. LEAPS and the CLPA determined that two beds totaling 12.69 acres should be treated in spring of 2021. After submitting a preliminary treatment plan and receiving a chemical permit early in 2021, the CLPA was approved to chemically treat one bed in Callahan (1.36 acres) and one bed in Mud (11.33 acres; Figure 2).

On 5/22/2021, ERS performed a pretreatment survey of the proposed treatment areas and found EWM present in the two beds (Figure 3). Thus, the treatment was conducted as originally planned. On 5/26/2021, Dale Dressel of Northern Aquatic Services (NAS) applied 99.12 gallons of 2,4-D (Amine 4) at 3 parts per million to the bed in Mud Lake and 25.11 gallons of 2,4-D at 4 parts per million to the bed in Callahan Lake (Table 1). Dressel reported that the water temperature was 62°F and that there was a 5-7mph wind from the northwest at the time of the application.

ERS performed a post-treatment survey on 7/7/2021 in order to determine the effectiveness of the herbicide treatment. They found EWM on the rake at four points in Mud and no EWM in the treatment bed in Callahan, resulting in significant declines in total distribution, rake fullness, and total density. ERS also reported that the mean native species richness significantly increased from 17 species before the treatment to 28 species after the treatment; the Simpson's Diversity Index increased from 0.88 to 0.90; and the Floristic Quality Index increased from 25.8 pretreatment to 33.3 posttreatment (Table 2).

ERS returned to the lakes on 9/12/2021 to conduct a meandering littoral survey for any surviving EWM. They reported that the EWM in the Mud treatment bed was almost eliminated by the treatment (Figure 4). The treatment bed in Callahan had some recurring EWM plants (Figure 5). Both lakes had several other areas and small beds of EWM (Figure 4; Figure 5).

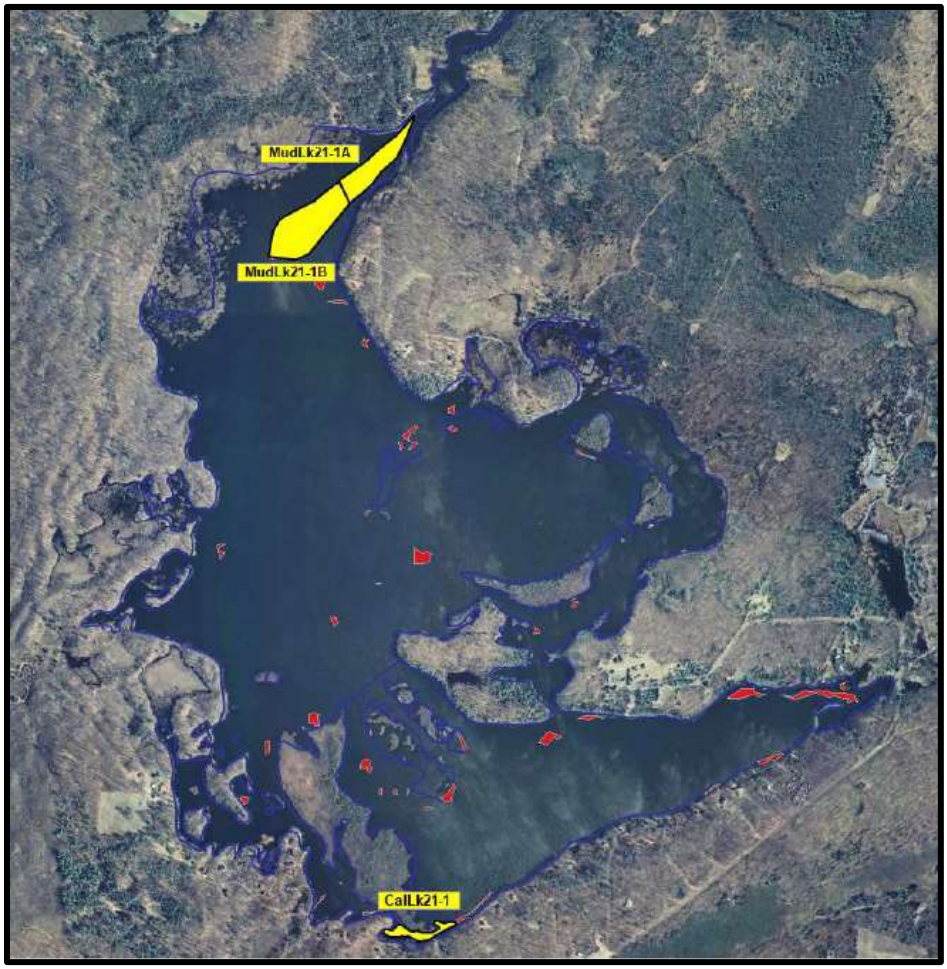

Figure 2. 2021 Callahan and Mud Lake EWM chemical treatment areas (yellow)

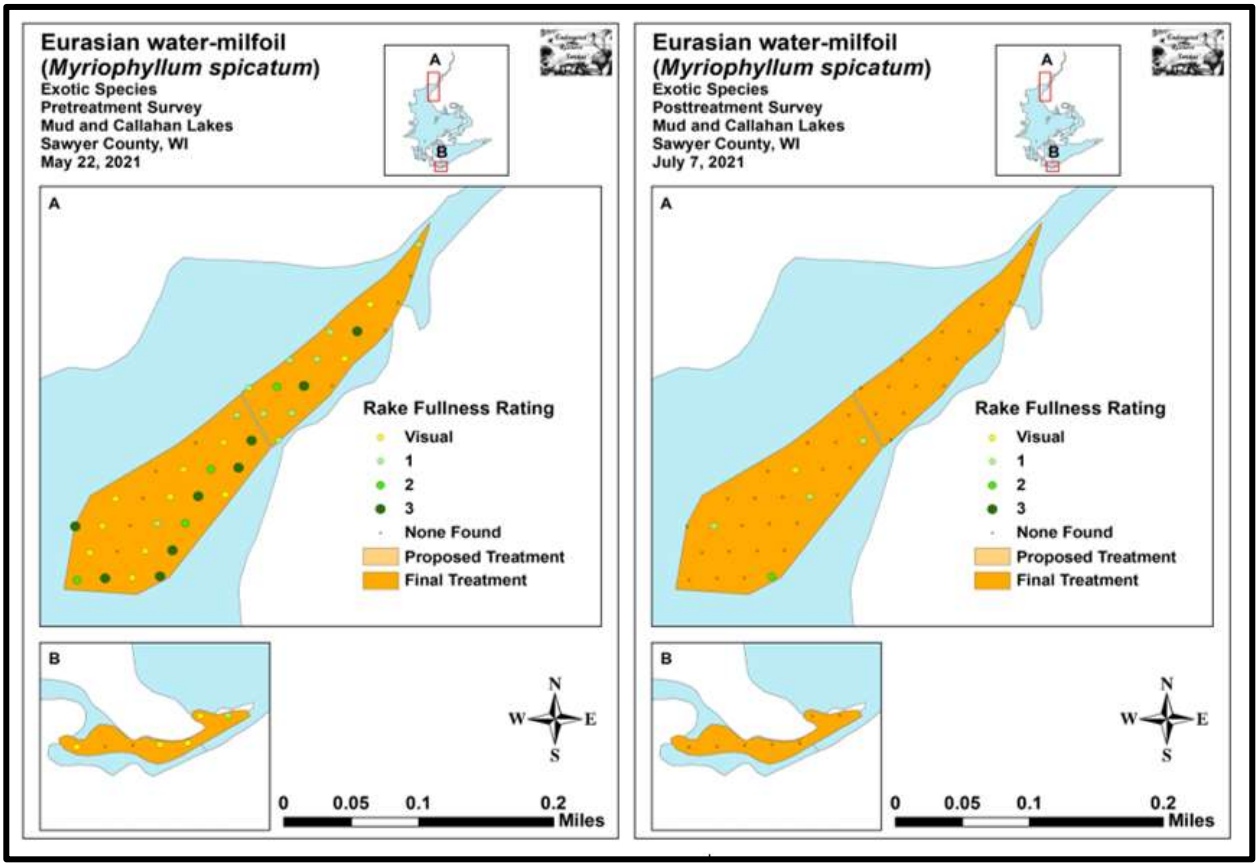

Figure 3. 2021 Callahan and Mud Lake EWM pre/posttreatment survey

Table 1. 2021 Callahan and Mud Lake EWM chemical treatment

Lake	Proposed Treatment Area (acres)	Final Treatment Area (acres)	Change in Acreage (+/-)	Chemical, Rate, and Total Volume
Mud	11.33	11.33	0.00	2,4-D (Amine 4) – 3ppm – 99.12gal.
Callahan	1.36	1.36	0.00	2,4-D (Amine 4) – 4ppm – 25.11gal.
Total	**12.69**	**12.69**	**0.00**	**2,4-D (Amine 4) – 3-4ppm – 127.23gal.**

Table 2. 2021 Callahan and Mud Lake EWM pre/posttreatment survey summary statistics

Summary Statistics:	Pre	Post
Total number of points sampled	50	50
Total number of sites with vegetation	50	50
Total number of sites shallower than the maximum depth of plants	50	50
Freq. of occur. at sites shallower than max. depth of plants (in percent)	100.0	100.0
Simpson Diversity Index	0.88	0.90
Mean Coefficient of Conservatism	6.4	6.4
Floristic Quality Index	25.8	33.3
Maximum depth of plants (ft)	8.0	8.0
Mean depth of plants (ft)	5.5	5.5
Median depth of plants (ft)	5.5	5.5
Average number of all species per site (shallower than max depth)	2.88	3.96
Average number of all species per site (veg. sites only)	2.88	3.96
Average number of native species per site (shallower than max depth)	2.40	3.88
Average number of native species per site (sites with native veg. only)	2.50	3.88
Species Richness	17	28
Mean Rake Fullness (veg. sites only)	2.18	2.24

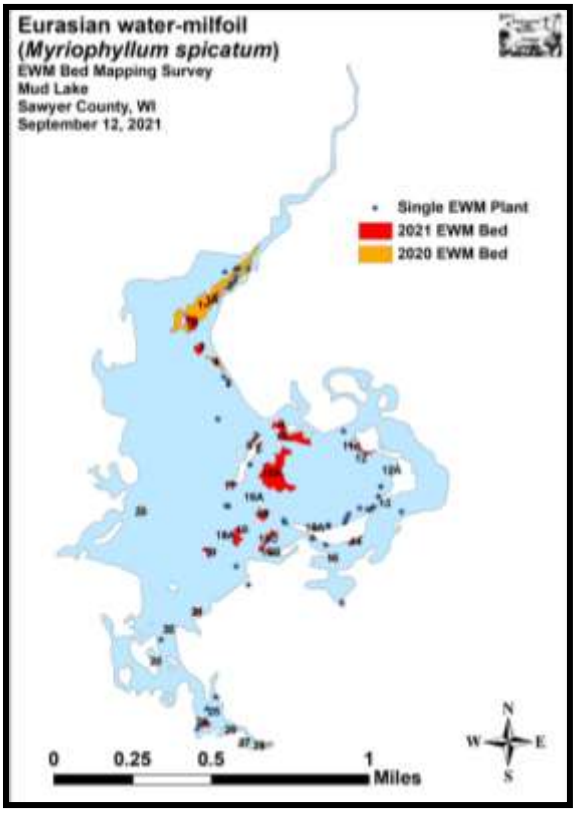

Figure 4. 2021 Mud Lake meandering littoral EWM survey and rake removal results

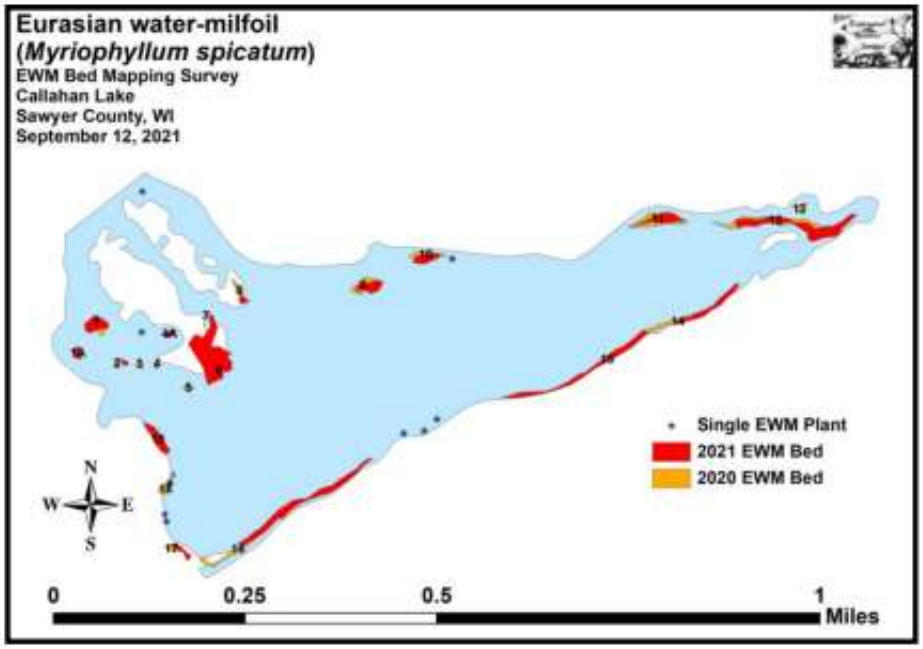

Figure 5. 2021 Callahan Lake meandering littoral EWM survey and rake removal results

Water quality data was collected by volunteers in 2021 from the deep hole site on Callahan Lake (Station ID: 584005) and the deep hole site on Mud Lake (Station ID: 583216). Total phosphorus (TP) samples were collected on three dates in Callahan Lake and averaged 25.3 ug/L (Table 3; Table 4), and on the same three dates in Mud Lake, TP averaged 20.3 ug/L. Chlorophyll samples were also collected three times in Callahan and Mud, averaging 3.3 ug/L and 2.6 ug/L, respectively (Table 3; Table 4). Secchi disk readings were taken three times in both lakes and averaged 10.2 feet in Callahan Lake and 9.4 feet in Mud (Table 3; Table 4). These results gave Callahan an average Trophic Status Index (TSI) score of 47.0 and Mud an average TSI of 46.1 (Table 3; Table 4). These scores place both lakes in the mesotrophic range, which is consistent with the results of previous years. Mesotrophic lakes are characterized by moderate water clarity with occasional oxygen depletion in the bottom waters. These conditions accurately describe Callahan and Mud Lakes in 2021.

LEAPS supports the collection of these data and uses it to inform management decisions and educate CLPA members and lake users about the lake.

Table 3. 2021 Callahan Lake water quality data

Sample Date	TP (ug/L)	Chl-*a* (ug/L)	Secchi (ft)	
6/30/2021	-	-	10.3	
7/27/2021	28.2	3.3	-	
8/22/2021	26.1	4.2	10.2	
9/27/2021	21.5	2.5	10.0	
Average	**25.3**	**3.3**	**10.2**	
Average TSI	**53.0**	**44.0**	**44.0**	**= 47.0**

Table 4. 2021 Mud Lake water quality data

Sample Date	TP (ug/L)	Chl-*a* (ug/L)	Secchi (ft)	
6/30/2021	-	-	10.0	
7/27/2021	25.2	2.5	-	
8/22/2021	19.4	2.5	9.1	
9/27/2021	16.4	2.8	9.0	
Average	**20.3**	**2.6**	**9.4**	
Average TSI	**51.3**	**42.3**	**44.7**	**= 46.1**

2021 AQUATIC PLANT MANAGEMENT PLAN

LEAPS updated the Aquatic Plant Management Plan (APMP) for Callahan and Mud Lakes as part of the Callahan-Mud Lakes APM Planning Project Grant (#AEPP61020.1). Unfortunate circumstances delayed the completion of the plan by the end of 2021 as originally intended. Thus, LEAPS assisted the CLPA in asking for an extension on the grant. The extension was approved, allowing the CLPA and LEAPS to finalize the plan in 2022.

As of the date of this writing, a draft of the new Aquatic Plant Management Plan has been completed and sent to the CLPA for initial review.

2021 AIS MONITORING AND EDUCATION

EWM was first discovered in the lakes in 2005. Since then, volunteers have performed aquatic invasive species (AIS) monitoring on a regular basis. No other AIS are verified on the lake, but purple loosestrife, Japanese knotweed, and several other species are known to be in the immediate area. To stay ahead of the current infestations, as well as any other future AIS concerns, monitoring and education will continue in the future to prevent new introductions and limit their spread should they occur. LEAPS promotes and provides AIS education through events geared towards education and by attending CLPA meetings.

In 2021, LEAPS assisted with AIS education through several events. Personnel attended CLPA meetings and presented information on AIS. Constituents were engaged and interested in the information and reported that they felt like they knew more about the lake and AIS and that they would be more likely to be able to identify AIS in the future. LEAPS also worked with the CLPA to put on an education event on 7/21/21. Around 40 people attended the event that featured a pontoon tour of the lakes with LEAPS personnel presenting information on the lakes and AIS. The event especially focused on milfoil – native and nonnative – identification and EWM removal methods.

2022 EWM PRELIMINARY MANAGEMENT PLANNING

Eurasian water-milfoil currently occupies a small percentage of Mud and Callahan Lakes' surface area, but it is well established, making eradication an unrealistic expectation. Although the species grows well in the Mud/Callahan system, active management has dramatically reduced the levels of EWM from an estimated 109 acres covering 23.49% of the lake's surface area in 2008 to 13.01 acres (2.80% of the lake's surface area) in 2021. Although still low by historical standards, the 2021 total acreage was an increase of +17.63% compared to the 11.06 acres (2.38% coverage) mapped in 2020.

Reducing Eurasian water-milfoil in Mud and Callahan Lakes has come at a high economic cost, and, as herbicides are non-selective, has also likely had significant impacts on the aquatic plant community. In the future, maintaining EWM at its current low levels using targeted management will likely continue to produce satisfactory control while simultaneously minimizing financial and ecological costs. Ultimately, the amount of EWM growth the CLPA is comfortable with will determine how much, if any, management occurs in the lakes in 2022.

Preliminary EWM management proposals have been completed for Callahan and Mud lakes in 2022. 2022 chemical treatment plans follow guidelines in the new APM Plan, except for they do not include the use of ProcellaCOR, due to the expense. Because the new APM Plan has not been approved by the WDNR yet, the CLPA was not eligible for grant funding in 2022. All EWM management will have to be covered by the CLPA. Some level of EWM planning and implementation support may be eligible for reimbursement due to the extension of the existing grant, but this is only speculative at the moment.

The chemical treatment proposal on Mud Lake includes 11.98 acres in three treatment areas, but could be modified to less than that if the financial resources are not available in 2022. The chemical treatment proposal on Callahan Lake includes three areas totaling 4.29 acres. Liquid 2,4-D is proposed for both lakes in 2022. No pre or post chemical treatment survey work would be done in 2022 unless required by the WDNR for permitting purposes. If required by the WDNR, the expense to do so will likely be an eligible expense for reimbursement.

It is expected that a WDNR AIS population control grant application will be prepared in the summer/fall of 2022 to support EWM management in 2023 and 2024.