# Aquatic Plant Management Discussion for Big and Little Trade Lakes in Burnett County

*An excerpt from the recently developed Big and Little Trade Lake Aquatic Plant Management Plan*[1]

## Need for Management

Both Big and Little Trade Lakes support a valuable aquatic plant community and a quality fishery valued by the lake community and the general public. Both lakes are heavily impacted by curly-leaf pondweed (CLP) and Eurasian watermilfoil (EWM). In addition, Big Trade Lake, in particular, supports abundant growth of purple loosestrife on its shoreline. Of these three aquatic invasive species, EWM is the most problematic. Five years ago in Big Trade Lake (2017), EWM was identified on the rake at 4 points for a relative frequency of 0.75%. In 2021 it was found on the rake at 17 points for a relative frequency of 2.51%, >3x what it was in 2017. If the points that EWM was found near, but not on the rake, were included then 8 points had EWM in 2017 and 29 points had it in 2021. At 327 acres, each point represents about a half-acre of surface water. This means that in 2017 there was up to 4 acres of EWM in the entire lake. In 2021, there was up to 14.5 acres. Bed mapping confirms this with 2.99 acres in 2017 and 10.88 acres in 2021 (Figure 1). Neither of these numbers includes the 100's of additional pioneering plants that were found during both the 2017 and 2021 surveys. It is conceivable, that if left unmanaged, EWM could easily take over as much surface area as does the CLP now, 35 acres or more.

EWM in Little Trade Lake is not nearly as bad. Six years ago in Little Trade Lake (2016), EWM, though known to be present in the lake, was not identified at any rake point; therefore it had no relative frequency. In 2021, it was found on the rake at 2 points for a relative frequency of 0.28%. If the points that EWM was found near, but not on the rake, were included then 4 points had EWM in 2021. In 2016, there were no visuals near any point. At 126 acres, each point represents about a third of an acre of surface water. This means that in 2016 there was not enough EWM to consider how many acres it covered. In 2021, the 4 points represent up to 1.5 acres of EWM in the entire lake. The number of individual pioneering EWM plants was also very limited. Bed mapping confirms this with only 0.34 acres mapped in 2016 and 1.11 acres mapped in 2021(Figure 1). Unlike the management actions implemented on Big Trade Lake that didn't work, the management actions implemented in Little Trade Lake did.

[1] This document was prepared by Lake Education and Planning Services (LEAPS) on July 27, 2022 on behalf of the Round Trade Lakes Improvement Association. It is not intended to be the entire Aquatic Plant Management Plan for Big and Little Trade Lakes, but rather a shortened version that includes only the management recommendations for implementation between 2023 and 2027. The larger APM Plan for Big and Little Trade Lake is available from the RTLIA or LEAPS.

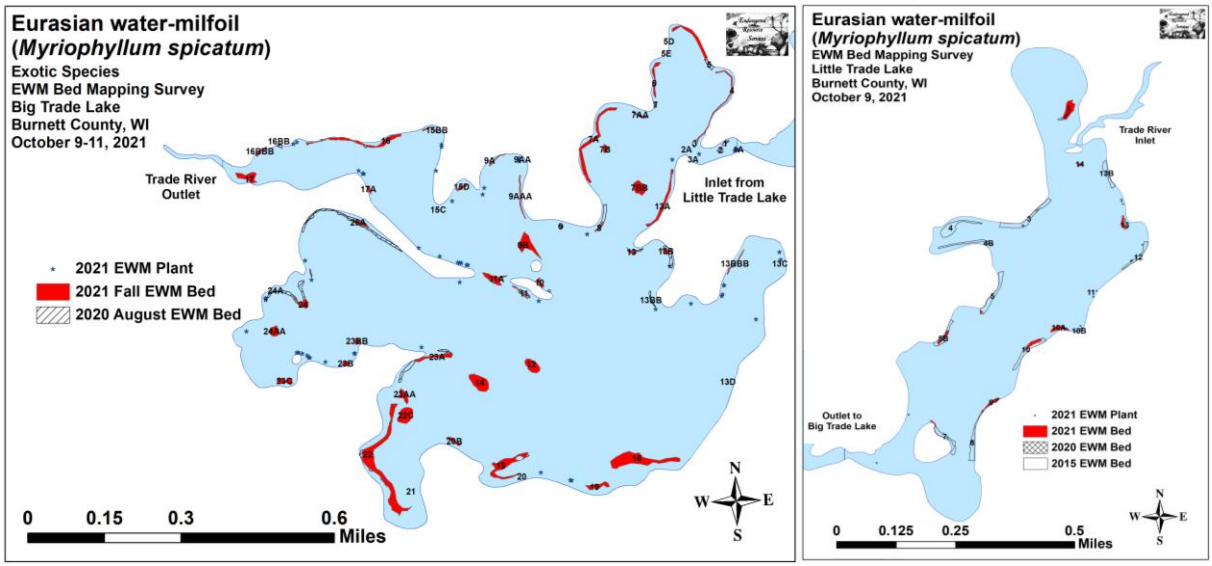


**Figure 1. 2021 Fall EWM bedmapping on Big Trade and Little Trade Lakes (ERS, 2021)**

Mapping has not been completed in 2022 yet, on either lake, but it is expected that the total amount in both lakes will increase further, given that no management has been done in either lake since 2020. Clearly, management actions to control EWM in Big Trade Lake need to be continued and expanded, but utilizing different strategies. What has been done on Little Trade Lake to control EWM appears to have been effective at keeping the levels down, and should be continued.

Curly-leaf pondweed in both lakes is even more dominant than the EWM. In early spring, both lakes present shorelines almost entirely overrun with CLP. The only thing that makes the amount of CLP less of a management priority is the fact that it drops out of the water column, usually by the 4$^{th}$ of July. That said, where management of EWM and CLP can be done together, in both lakes, it should be. However, if resources – primarily financial – are limited, focus should remain on EWM.

Management of purple loosestrife includes shoreline surveys and physical removal where possible. Individual or new pioneering plants should at very least, have the flowering heads removed to prevent them from going to seed. On Big Trade Lake, beetles should continue to be reared and released until an established population can be verified. In order to verify that population, survey work should be completed in May, and again in July, to see what level of predation and beetle population is present.

For each of these invasive species, nuisance conditions and navigation impairment occur in both lakes throughout the open water season. The main goal of this management plan is to control all three in a sound, ecological manner to minimize the negative effect on native plants, water quality, shoreland habitat, and visitor and property owner use of the lakes for recreational purposes.

## Using Mechanical Harvesting to Manage CLP and EWM

In a more perfect world where financial and human resources were readily available, the best management alternative for both CLP and EWM in Big Trade Lake would be mechanical harvesting. CLP already dominates more than a third of the littoral zone of the lake and EWM appears headed in the same direction. If the Round Trade Lakes Improvement Association (RTLIA) had the resources to purchase and operate their own aquatic plant harvester, it could be used to manage both species and be held to fewer restrictions than what are in place for the use of aquatic herbicides. Once a mechanical harvesting permit

has been approved for a given year, harvesting could be completed as often as necessary in the designated areas to keep invasive species at bay. Harvesting would reduce the amount of CLP over time if done during the appropriate window. And while harvesting is generally not recommended for EWM control because of the increased fragmentation, in the case of Big Trade Lake, EWM is already spread throughout the littoral zone so it may not matter. Furthermore, if necessary at some time in the future, the same harvesting could be used to maintain access and navigation corridors through nuisance growth native vegetation.

However, until such a time when an access point is determined or developed on Little Trade Lake, the same harvester would not be able to operate there.

## Using Aquatic Herbicides to Manage CLP and EWM

Until such a time when the RTLIA obtains a mechanical harvester, aquatic herbicides can be used effectively to manage both CLP and EWM. However, as mentioned, if resources are limited, the primary focus of management in both lakes is to control/reduce the amount of EWM.

### *EWM*

Any amount of EWM can and should be managed, albeit in different ways. Without mechanical harvesting, a combination of manual/physical removal and chemical control methods are recommended for both lakes. Physical methods can be implemented at any time for any amount of EWM, but for the average lake steward it may be difficult to determine when the use of aquatic herbicides should be considered a priority.

Figure 2 provides a method to determine priority. Referred to as FLIPS, this management planning priority matrix involves evaluating each area of EWM in the lake in any given year based on when it was first discovered (**F**ormation), where it is located (**L**ocation), whether it is causing use issues (**I**mpairment), whether it was chemically treated in a previous year (**P**rior year), and whether it is negatively impacting the native aquatic plant community (**S**ensitive area). When evaluating a potential treatment area, the five questions in the FLIPS figure should be asked. If the answer to 3 or more of the questions is "yes" then herbicide use can be considered a priority. If the answer to 3 or more of the questions is "no" then herbicide use should not be considered a priority.

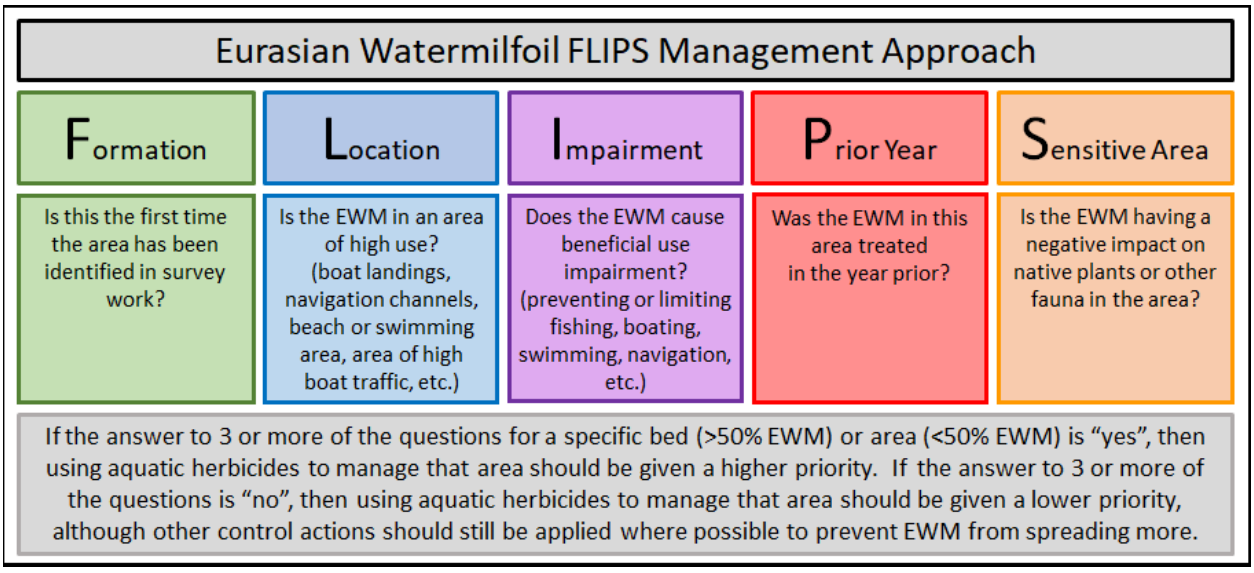


**Figure 2: FLIPS Management Priority Matrix**

After a EWM survey has been completed and each bed or high density area that was identified has been run through the FLIPS management priority matrix, management actions should be considered and planned. The Management Planning Matrix in Figure 3 will help determine what management actions should be done for each area identified.

To utilize the management planning matrix, the user first determines the **Type of Infestation** (level 1); then the **Number of Plants** present (level 2); then **Coverage Area** (level 3); and finally the **Water Depth** in the area (level 4). Each of these levels returns a "symbol" depending on the characteristics of the bed or area of EWM being considered. When all the symbols are combined, look to that management action that contains them all.

There is some overlap in when each different management action should be considered. This is because there is no "canned" or definitive parameter that would say implement one action over another. In some cases, two different actions might make sense. In that situation the resources available, Wisconsin Department of Natural Resources (WDNR) permitting, and the level of support from the constituency will determine the action used.

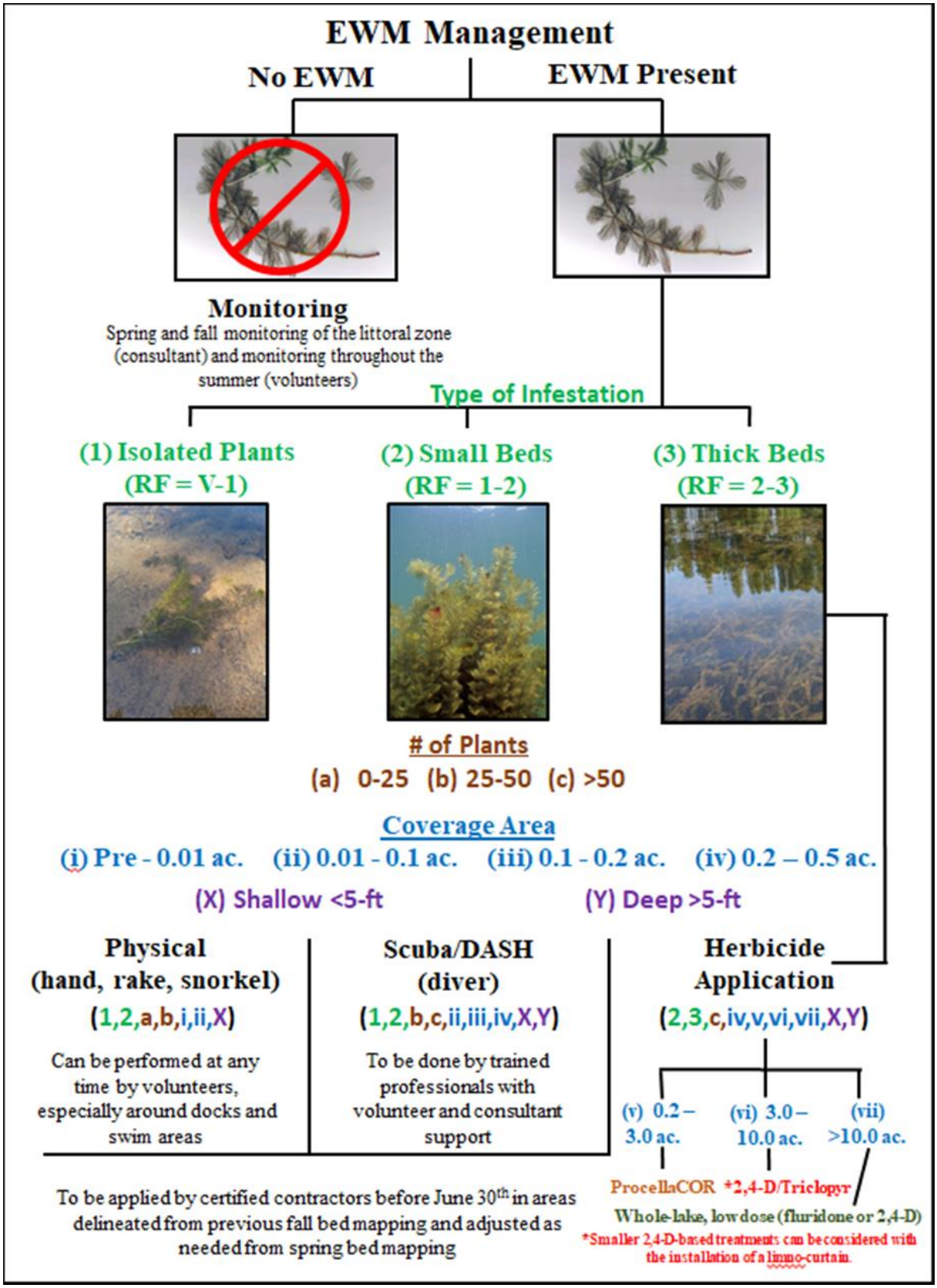


**Figure 3: EWM Management Planning Matrix for Big and Little Trade Lakes**

For both lakes, the following monitoring and control activities have been outlined:

1) Late summer or fall bedmapping will be completed on the lakes every year. Point-intercept surveys could be substituted instead of bed mapping.

2) Any amount of EWM in the lakes can be managed at any time if aquatic herbicides are not used. Non-chemical management actions that can be used at any time include hand pulling, rake removal, snorkel/scuba diver removal, and/or diver assisted suction harvest (DASH) removal (still considered diver removal, but more expensive).

    a. DASH removal requires a mechanical harvesting permit from the WDNR.

3) Management of EWM using aquatic herbicides may be implemented if prior year mapping identifies any single area with >50 isolated plants, multiple clumps, and/or thick beds of EWM >0.20 acres.

    a. On EWM beds that are candidates for chemical treatment **AND** ≤3.0 acres, ProcellaCOR® should be used.

        i. If a limno-barrier or curtain is used, then other herbicides can be considered.

    b. On EWM beds from 3.0-10.0 acres, ProcellaCOR, 2,4D-based, or triclopyr-based herbicides can be used based on the financial resources available.

    c. When the total treated area in either lake exceeds 10.0 acres, herbicide application should be considered large-scale.

        i. Pre and post-treatment, point-intercept surveys will be completed.

        ii. Herbicide concentration testing will be completed unless deemed unnecessary by the WDNR.

    d. When EWM beds in the either lake exceed 10.0 acres and it is clear that targeted treatments have not been effective, whole-lake, low dose herbicide applications should be considered.

        i. If possible, section off the portion of the lake to be chemically treated using a whole-lake/whole-basin approach, by installing a limno-barrier or curtain.

            1. Appropriate measures would need to be completed to inform lake users when and if a limno-barrier or curtain is used.

        ii. Sonar, liquid 2,4-D, and ProcellaCOR could all be used in a low dose application.

    e. The same area will not be chemically treated with the same herbicide, two years in a row.

Concerns exist when herbicide treatments using the same herbicide are done over multiple and subsequent years. Target plant species may build up a tolerance to a given herbicide making it less effective, susceptible plant species may be damaged and/or disappear from the lake (ex. water lilies), concerns over fish and other wildlife might occur, and concern over recreational use in chemically treated water may be voiced. By using several different aquatic herbicides interspersed with physical removal efforts between treatments, many of these concerns are minimized.

## *CLP*

CLP is well established in both Big and Little Trade Lakes covering 50% or more of the littoral zone in any given year based on 2009, 2016/17, and 2021 cold-water, point-intercept survey results. The majority of this growth is considered moderate to dense in nature interfering with native aquatic plant growth in the spring, causing navigation and nuisance conditions in parts of the lake in the late spring and early summer, and then contributing to nutrient loading and organic material build up in the sediment mid-summer. Unless a mechanical harvester is purchased by the RTLIA, it is recommended that only aquatic herbicides by used to manage CLP. Physical removal whether by hand or using a diver or DASH setup is not recommended. There is simply too much CLP for these management actions to have any quantifiable benefit to the lakes (Figure 4).

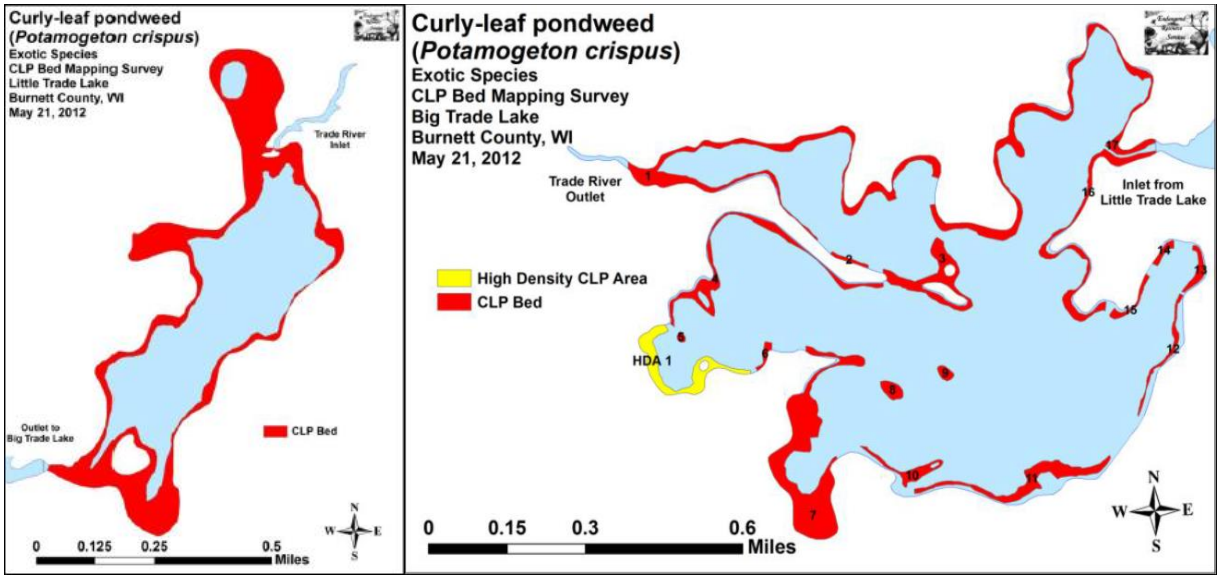


**Figure 4: 2012 CLP bed mapping results in Little and Big Trade Lakes**

To date, CLP management using aquatic herbicides has only been done in tandem with management of EWM using aquatic herbicides that occurred at the same time. This approach has worked well on Little Trade Lake, with the three early season, whole-lake, point-intercept surveys showing a consistent decline in CLP. Since 2012, CLP has been treated in seven different years including two separate 3-yr periods (2013-2016 and 2018-2020) resulting in that decline. In some years on Little Trade Lake, more CLP than EWM was managed using aquatic herbicides.

On its face, this approach did not work well in Big Trade Lake as there was more CLP in 2021 then there was in 2012. However, unlike in Little Trade Lake, CLP was only treated in tandem with EWM in Big Trade in three years (2014-2016) since 2012. The difference was two separate 3-yr aquatic invasive species (AIS) control grant periods. In the first period (2013-2016), both CLP and EWM were targeted in both lakes. At that time, EWM was still a new infestation in Big Trade. In the second period (2018-2020), CLP and EWM were targeted in Little Trade, but only EWM was targeted in Big Trade. It could be that if the CLP management using aquatic herbicides had continued on Big Trade Lake like it did on Little Trade Lake, that a decline in CLP would have been the result.

With that thought in mind, it is recommended that CLP continue to be managed using aquatic herbicides in the same areas that are treated for EWM at the same time in both lakes. Any CLP that is targeted for management using aquatic herbicides should be treated for a minimum of three successive years for the

best outcomes, regardless of the status of the EWM in those areas. Endothall and diquat based herbicides have been successfully used in both lakes in the past to control CLP. It is recommended that endothall-based herbicides be used for future management at 1-3 parts per million (ppm). Diquat-based herbicides could also be used at maximum label rate, particularly after the first year when ProcellaCOR may have been applied to control EWM. Diquat-based herbicides provide a cheaper alternative to endothall. As non-selective, contact herbicides, both endothall and diquat should be applied as early as possible to minimize negative impacts on native vegetation. However, because management of CLP is secondary to management of EWM, if the resources are not available to do both, management of EWM is a priority.

If both CLP and EWM are treated at the same time, a combination of aquatic herbicides could be used. Endothall can be combined with 2,4-D products and with ProcellaCOR to complete treatment of both species. Another aquatic herbicide, penoxsulam, sold under the trade name Galleon SC® can be added to ProcellaCOR to increase the impact on CLP as well. Penoxsulam is considered a systemic herbicide, rather than a contact herbicide.

### *CLP and EWM Management Goals*

The goal for EWM management in Little Trade Lake is to keep EWM at a level where the use of aquatic herbicides is not a priority management action. In Big Trade Lake, the goal is to first bring down EWM to a level where the use of aquatic herbicides is not a priority management action, and then to keep it there. The goal for CLP management in both lakes is to see a steady decline in the distribution and density of CLP over the five year period included in this management plan. An overall goal for both lakes is to see no decline in the distribution and diversity of native plants while striving to reach the goals set for CLP and EWM.

The long-term success of these management actions will be measured by whole-lake, point-intercept surveys repeated near the end of the five year period covered by this management plan, and by spring and fall bed-mapping where appropriate.

## Purple Loosestrife and Other AIS

A fair amount of purple loosestrife is present along the shores of and in wetlands adjacent to Big Trade Lake in particular. Monitoring for purple loosestrife and other aquatic invasive plant species including yellow iris, giant reed grass, and Japanese knotweed will continue on both Big and Little Trade Lakes. Management of yellow iris will be pursued if the resources are available to do so. Monitoring for zebra mussels will be made more active and immediate given the lakes' proximity to lakes in both Burnett and Polk County that have established populations.

# Aquatic Plant Management Plan

This Aquatic Plant Management Plan establishes the following goals for aquatic plant management in Big and Little Trade Lakes:

1. **EWM Management.** Limit the spread of EWM in the two lakes through environmentally responsible methods that will benefit the native plant community while at the same time maintain EWM at manageable levels.

2. **CLP Management.** Reduce the dominance of CLP in the littoral zone of the two lakes through environmentally responsible methods that will benefit the native plant community while at the same time maintain CLP at manageable levels.

3. **Education and Awareness.** Continue to educate property owners and lake users on aquatic invasive species through public outreach and education programs to help contain EWM within the lake and prevent its spread further in the lake, as well as to other water bodies.

4. **Research and Monitoring.** Develop a better understanding of the lake and the factors affecting lake water quality through continued and expanded monitoring efforts.

5. **Adaptive Management.** Follow an adaptive management approach that measures and analyzes the effectiveness of control activities and modify the management plan as necessary to meet goals and objectives.

## Goal 1. EWM Management

EWM continues to be a nuisance in Little and Big Trade Lakes. A combination of management alternatives will be used to help minimize the negative impacts of EWM on native plants and water quality, and to provide relief for navigation impairment caused by EWM. EWM management options to be utilized include the possibility of mechanical harvesting, small-scale physical removal, diver removal and/or DASH, and targeted use of aquatic herbicides. Control of EWM is the primary goal of management in the two lakes.

### *Pre and Post Treatment Survey and Fall Bed Mapping*

Management of EWM will be updated regularly based on annual fall bed mapping surveys, pre-treatment surveys, and post-treatment surveys performed by either trained RTLIA volunteers or resource professionals retained by the RTLIA. Post-treatment surveys can and should be included not only in the year of treatment, but also in the year after treatment, and perhaps up to two or three years after to determine longevity of the completed application. Pre and post treatment surveys are not required by the WDNR unless the chemically treated area covers more than 10 acres or 10% of the littoral zone. However, completing these tasks is highly recommended in any treatment program as they provide a means to measure success.

## Goal 2. CLP Management

CLP continues to be a nuisance in Little Trade and Big Trade Lakes. If the resources are available to do so, CLP will be managed in the same areas where EWM is managed in the two lakes. At some point it is recommended that mechanical harvesting be the main management alternative incorporated to control

CLP. However, until such a time as a harvester is obtained by the RTLIA, CLP will be managed using a limited amount of physical removal and using aquatic herbicides in the same areas where EWM is managed. The goal of CLP management is to see a decline in CLP distribution and density in the treated areas from the first year included in this Aquatic Plant Management Plan (APM Plan) to the last year included. However, if resources are limited, management of CLP is secondary to management of EWM.

## Goal 3. Education and Awareness

Aquatic invasive species can be transported via a number of vectors, but most invasions are associated with human activity. It is recommended that that the RTLIA continue to maintain and update signage at the boat launch as necessary, and implement some level of watercraft inspection to remind lake users about what they can do to prevent the spread of AIS in area lakes.

Early detection and rapid response efforts increase the likelihood that a new aquatic invasive species will be addressed successfully while the population is still localized and levels are not beyond that which can be contained and eradicated. Once an aquatic invasive species becomes widely established in a lake, complete eradication becomes extremely difficult, so attempting to partially mitigate negative impacts becomes the goal. The costs of early detection and rapid response efforts are typically far less than those of long-term invasive species management programs needed when an AIS becomes established.

It is recommended that the RTLIA continue to implement a proactive and consistent AIS monitoring program. At least three times during the open water season, trained volunteers should patrol the shoreline and littoral zone looking for Eurasian watermilfoil (and other species like purple loosestrife, Japanese knotweed, giant reed grass, zebra mussels). Free support for this kind of monitoring program is provided as part of the UW-Extension Lakes/WDNR Citizen Lake Monitoring Network (CLMN) AIS Monitoring Program. Any monitoring data collected should be recorded annually and submitted to the WDNR through the appropriate channels.

Providing education, outreach opportunities, and materials to the lake community will improve general knowledge and likely increase participation in lake protection and restoration activities. It is further recommended that the RTLIA continue to cultivate an awareness of the problems associated with AIS and enough community knowledge about certain species to aid in detection, planning, and implementation of management alternatives within their lake community. It is also recommended that the RTLIA continue to strive to foster greater understanding and appreciation of the entire aquatic ecosystem including the important role plants, animals, and people play in that system.

Understanding how their activities impact the aquatic plants and water quality of the lakes is crucial in fostering a responsible community of lakeshore property owners. To accomplish this, the RTLIA should distribute, or re-distribute informational materials and provide educational opportunities on aquatic invasive species and other factors that affect the lakes. At least one annual activity (picnic at the lake, public workshop, guest speakers, etc.) should be sponsored and promoted by the RTLIA that is focused on AIS. Maintaining signs and continuing aquatic invasive species monitoring should be done to educate lake users about what they can do to prevent the spread of AIS.

## Goal 4. Research and Monitoring

Long-term data can be used to identify the factors leading to changes to water quality. Aquatic plant management activities, changes in the watershed land use, and the response of the lakes to environmental

changes all have a direct impact on water quality. The CLMN Water Quality Monitoring Program supports volunteer water quality monitors across the state following a clearly defined schedule. In the first level of the program, Secchi disk readings are encouraged 2-3 times a month from ice out to ice on. In the CLMN expanded monitoring program, water samples are collected for analysis of TP two weeks after ice out, and once each in June, July and August. Water samples are collected and processed for chlorophyll-*a* once each in June, July, and August. Temperature profiles are encouraged anytime a Secchi reading is taken, but recommended to be done at the same time water samples for TP and chlorophyll-*a* are collected. If the necessary equipment is available to collect dissolved oxygen profiles these are encouraged at least monthly as well.

Available data suggests that the RTLIA has been monitoring water quality as a part of the Citizen Lake Monitoring Network (CLMN) at the Deep Hole in Big Trade Lake since 1986 with data gaps from 1996-1998, 2004-2011, and 2016. CLMN water quality monitoring in Little Trade Lake began in 2000, with a large data gap from 2004 to 2013. It is recommended that the RTLIA maintain at least one volunteer to continue water quality monitoring as a part of the CLMN on both lakes. Parameters should include water clarity, temperature and DO profiles, total phosphorus and chlorophyll-a sampling. The intensity/success of water quality monitoring efforts should be evaluated at least every three years. The background information and trends provided by these data are invaluable for current and future lake and aquatic plant management planning. Results of water quality monitoring should be shared with the lake community at the annual meeting, or another event, to promote a greater understanding of the lake ecosystem and potentially increase participation in planning and management.

To monitor any changes in the plant community, it is recommended that whole-lake point intercept aquatic plant surveys be completed at three to five-year intervals. This will allow managers to adjust the APMP as needed in response to how the plant community changes as a result of management and natural factors like water level.

To monitor changes in the amount of EWM in the system, late season bed mapping surveys should be completed annually. Early season bed mapping surveys of CLP should be completed at least twice in the five year period covered by this management plan.

## Goal 5. Adaptive Management

This APM Plan is a working document guiding management actions on Big and Little Trade Lakes for the next five years. This plan will follow an adaptive management approach by adjusting actions as the results of management and data obtained. This plan is therefore a living document, progressively evolving and improving to meet environmental, social, and economic goals, to increase scientific knowledge, and to foster good relations among stakeholders. Annual and end of project assessment reports are necessary to monitor progress and justify changes to the management strategy, with or without state grant funding. Project reporting will meet the requirements of all stakeholders, gain proper approval, allow for timely reimbursement of expenses, and provide the appropriate data for continued management success. Success will be measured by the efficiency and ease in which these actions are completed.

The RTLIA and their retainers will compile, analyze, and summarize management operations, public education efforts, and other pertinent data into an annual report each year. The information will be presented to members of the RTLIA, Burnett County, and the WDNR and made available in hardcopy and digital format on the internet. These reports will serve as a vehicle to propose future management recommendations and will therefore be completed prior to implementing following year management

actions (approximately March 31st annually). At the end of this five-year project, all management efforts (including successes and failures) and related activities will be summarized in a report to be used for revising the APM Plan.

## Timeline of Activities

The activities in this APM Plan are designed to be implemented over a 5-year period beginning in 2023. The plan is intended to be flexible to accommodate future changes in the needs of the lake and its watershed, as well as those of the RTLIA. Some activities in the timeline (Appendix D) are eligible for grant support to complete.

## Potential Funding

There are several WDNR grant programs that may be able to assist the RTLIA in implementing its new APM Plan for Big and Little Trade Lakes. AIS grants are specific to actions that involve education, prevention, planning, and in some cases, implementation of AIS management actions. Lake Management Planning grants can be used to support a broad range of management planning and education actions. Lake Protection grants can be used to help implement approved management actions that would help to improve water quality.

More information about WDNR grant programs can be found at:
https://dnr.wisconsin.gov/aid/SurfaceWater.html