

Appendix D - Big and Little Trade Lakes - Aquatic Plant Management Discussion

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 and Eurasian watermilfoil. 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. 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. Unlike the management actions implemented on Big Trade Lake that didn't work, the management actions implemented in Little Trade Lake did.

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 4th 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 Physical Removal and/or DASH to Manage CLP and EWM

Physical methods, including hand-pulling, rake removal, snorkel, divers, and/or diver-assisted suction harvest (DASH) can be implemented at any time for any amount of CLP or EWM. Hand-pulling, rake removal, snorkel, and diver removal does not require a permit to implement. Implementation of DASH requires a mechanical harvesting permit from the WDNR. These management actions are recommended for control of EWM in both lakes as a means to help maintain a low level of EWM, particularly after a large-scale herbicide application that is likely to be completed.

These management actions can be completed for CLP as well, but they likely will not have any significant impact on reducing the amount of CLP in the lakes. Given the complete domination of the littoral zone exhibited by CLP in both lakes, it will be some time before these actions can be relied upon to help keep CLP levels in the lake low.

Implementing hand-pulling, rake removal, snorkel, diver, and/or DASH removal will depend on the resources, financial and human, available to the RTLIA in any given year. These management alternatives can be used in any combination to remove CLP and EWM from the lake regardless of the size of the bed.

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 and Little Trade Lakes would be mechanical harvesting. CLP already dominates more than 50% of the littoral zone of both lakes (Figure 42), and at least on Big Trade Lake, EWM appears headed in the same direction (Figure 36). If the 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 and Little Trade Lakes, EWM has 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.

Using mechanical harvesting to control CLP and EWM in both lakes has one major issue, at the present time, there is no public access/boat landing on Little Trade Lake that would allow the launch of the harvester, and access between the two lakes for the harvester is blocked by a low bridge over the channel between them. The easiest solution to this issue would be developing an access point on Little Trade Lake.

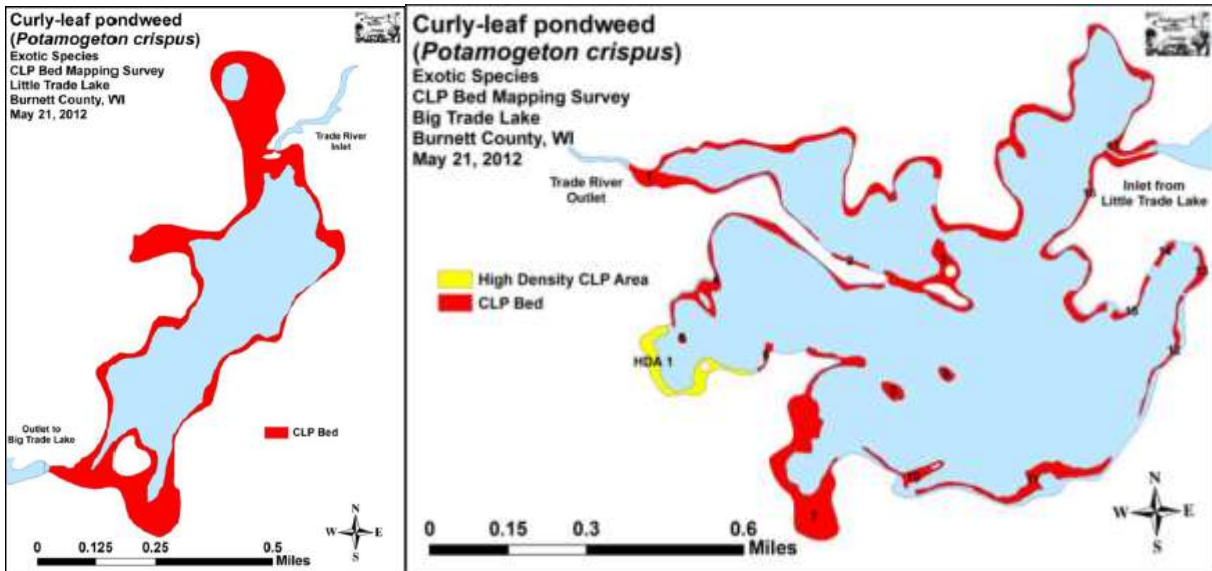


Figure 1: 2012 CLP bed mapping results in Little and Big Trade Lakes

Using Aquatic Herbicides to Manage CLP and EWM

Until such a time when the RTLIA obtains a mechanical harvester and access is created to Little Trade Lake, aquatic herbicides can be used effectively to manage both CLP and EWM.

EWM

Prior to 2021, the amount of EWM mapped in Big Trade Lake never exceeded 3.5 acres or 2.5% of a littoral zone estimated at about 142 acres or 43.4% of the lake's surface area over the last three PI surveys. When EWM was present at that level, few property owners and lake users noticed it or thought it to be a major issue. At more than 10 acres now, a large-scale herbicide application is likely the best management action to bring it back down to that level. Once brought back to that level, keeping the amount at or below that level is reasonable. To do this, any amount of EWM can and should be managed, albeit in different ways.

The amount of EWM mapped in Little Trade Lake over the last 10 years has averaged 2.15 acres or 2.8% of a littoral zone estimated at about 78 acres or 62% of the lakes surface area in the last three PI surveys. Keeping the amount of EWM mapped in Little Trade Lake annually at or below 2.5% (1.95 acres) of the littoral zone is reasonable. As with Big Trade Lake, to do this, any amount of EWM can and should be managed, albeit in different ways.

By itself, the use of herbicides cannot keep EWM from spreading in the lakes. Other management actions must be done in complement to the use of herbicides. No management of EWM has been completed in Big Trade Lake since 2020, not even any physical or diver/DASH removal. This will have to change during the implementation of this current plan. Between herbicide applications, property owner removal, diver, and DASH removal will have to increase or the gains from the herbicide treatment will be lost quickly – leading to another large-scale management action.

With the current results from whole-lake aquatic plant surveys, there is no undeniable proof that the spread of EWM has negatively impacted the native aquatic plant community in either lake. Neither is there any undeniable proof that the use of herbicides, as was done prior to 2021, has had a significant negative impact on native aquatic vegetation in either lake.

Once a large-scale herbicide application on Big Trade Lake has reduced the amount of EWM in the system, the use of herbicides will again be limited in nature and used only when the level of EWM in a given area exceeds what is manageable by other means. Through careful management planning that includes abundant aquatic plant surveys, appropriate timing, and calculated herbicide application rates, the previous small-scale use of aquatic herbicides can be continued without negatively impacting native aquatic vegetation, while at the same time reducing the negative impacts of EWM on lake use.

Herbicides that are 2,4-D or triclopyr-based, and ProcellaCOR are best suited to effectively control EWM in both lakes. ProcellaCOR is the best alternative, and recommended for the first large-scale management application on Big Trade, and all future smaller scale herbicide applications. Future large-scale (>10 acres) applications could consider the use of other herbicides, particularly if the financial resources available for completing EWM management are restrictive. Using different herbicides at different times may actually improve efficiency as there is some research that suggests EWM can build up a resistance to 2,4-D based herbicides at the concentrations traditionally used for submerged aquatic plant control (Poovey, 2007) (Glomski, 2010).

In general, EWM management in Big and Little Trade Lakes will be based on the following criteria.

- 1) EWM bedmapping will be completed every year.
- 2) Any amount of EWM in the lake can be managed at any time if chemical management is not used. Non-chemical management actions include hand pulling, rake removal, and snorkel/scuba diver removal, and/or DASH removal.
 - a. DASH removal requires a mechanical harvesting permit from the WDNR.
- 3) Chemical management of EWM may be implemented if prior year bed mapping identifies a total of 3.5 or more acres of EWM on Big Trade Lake or 1.95 or more acres on Little Trade Lake. An individual bed or combination of beds will only be chemically treated if it is at least 1.0 acres in size, unless the use of new herbicides like ProcellaCOR are approved for smaller treatment areas by the WDNR.
 - a. The use of aquatic herbicides requires a chemical application permit from the WDNR.
 - b. Herbicides will be applied early in the season, generally prior to June 15, unless weather and lake conditions are prohibitive.
 - c. Applied herbicide concentrations should be based on current research and existing lake characteristics.
- 4) Herbicides applied to EWM beds that reach or exceed 10.0 acres in total will be considered large-scale chemical treatments. With a large-scale chemical treatment, the following activities will be added in support of that treatment.
 - a. Pre and post-treatment, point-intercept surveys will be completed.
 - b. Herbicide concentration testing will be completed unless deemed unnecessary by the WDNR.
- 5) The same area will not be chemically treated with the same herbicide, two years in a row.

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 PI 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 be used to manage CLP. Physical removal whether by hand or using a diver or DASH is not recommended. There is simply too much CLP for these management actions to have any quantifiable benefit to the 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 a 37% reduction in the amount of CLP in the lake. 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 than 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 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 Lake. In the second period (2018-2020), CLP and EWM were targeted in Little Trade Lake, but only EWM was targeted in Big Trade Lake. 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 with a goal of reducing the amount of CLP by 35% (12 acres in Little Trade Lake and 21 acres in Big Trade Lake) over the five year period covered by this Plan. 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, 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.

In general, CLP management in both Big and Little Trade Lakes will be based on the following criteria.

- 1) June bed mapping must be completed in the year prior to a planned chemical treatment.
- 2) Any amount of CLP in the lake can be managed at any time if chemical management is not used.
 - a. Non-chemical management actions include hand pulling, rake removal, and snorkel/scuba diver removal, and/or DASH removal
 - i. DASH is considered mechanical removal, is more expensive than diver removal, and requires a WDNR permit.
- 3) Chemical management of CLP may be completed if prior year mapping has been completed and the CLP is within a planned EWM chemical treatment area and ≥ 1.0 acres in size.
 - a. A WDNR permit is required.
 - b. Treatment should be completed no later than late May (weather and water temperature related).
 - c. Endothall-based or penoxsulam herbicides should be used in combination with ProcellaCOR when CLP and EWM are treated simultaneously.
 - i. Applied herbicide concentrations should be based on current research and existing lake characteristics.
 - d. At least three consecutive years of CLP management in the same area is recommended.
 - i. Once started, chemical treatments can be completed in the same areas even if EWM is not being managed.
 - ii. If only CLP is being managed, endothall or diquat based herbicides should be used.

The long-term success of EWM and CLP 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; by pre and post-chemical treatment point-intercept aquatic plant surveys completed during treatment, 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. Purple loosestrife will continue to be managed with the release of Galerucella beetles. 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.