

Sand Bar and Tomahawk Lakes, Bayfield County

2023-2027 Aquatic Plant Management Goals

This Aquatic Plant Management Plan establishes the following goals for aquatic plant management in Sand Bar and Tomahawk Lakes:

1. **EWM Management.** Limit the spread of EWM through environmentally responsible methods to benefit the native plant community while maintaining EWM at manageable levels.
2. **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.
3. **Research and Monitoring.** Develop a better understanding of the lake and the factors affecting lake water quality through continued and expanded monitoring efforts.
4. **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

Despite several years of treatment, EWM continues to be a nuisance in the 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 small-scale physical removal, diver removal, DASH, and targeted use of aquatic herbicides. Other AIS will continue to be monitored for, but no specific management is recommended at this time.

Pre and Post Treatment Survey and/or Spring Management Readiness Surveys

Management of EWM will be based on pre-treatment surveys and post-treatment surveys or management readiness surveys performed by either trained volunteers or resource professionals retained by the Town of Barnes. Pre and post-treatment surveys are point-intercept based. A pre-treatment survey is best completed in the year prior to the year of planned chemical management. Post-treatment surveys should be performed within the same year of treatment and in at least the year following treatment. If resources are available, they can be completed in more than just the year after treatment, particularly if it is expected that management impacts will last more than two years.

Management readiness surveys are visual and rake-based surveys completed prior to actual management in the same year only to determine if a given management area is ready to be treated. Ready is defined as having target plants present in sufficient quantity and growth to go through with the proposed chemical treatment. Proposed treatment areas may be modified based on the results of the readiness survey but still must follow restrictions in the WDNR-approved chemical application permit.

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. Readiness surveys provide a quick check and balance on a proposed treatment proposal and are recommended in any year chemical treatment is to occur.

Fall Bed Mapping

Fall bed mapping or reconnaissance surveys are completed in the late summer or fall each year to help identify potential areas for management in the following year. These are visual and rake-based, meandering surveys of the lake's littoral zone. GPS tracking of individual plants, small clumps, and beds of EWM is completed. With the fall bed mapping survey data, proposed treatment maps can be created.

Goal 2 - Education and Awareness

Aquatic invasive species (AIS) can be transported via a number of vectors, but most invasions are associated with human activity. It is recommended that the Town of Barnes and other stakeholders continue to maintain and update signage at the boat launch as necessary.

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 group 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 curly-leaf pondweed, 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 SWIMS database.

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 Town of Barnes 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 they 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 Town of Barnes 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 Town of Barnes 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. 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.

Goal 3 - Research and Monitoring

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

The last time that there is any water quality data from either Sand Bar or Tomahawk Lake is in 2015. It is recommended that volunteers be identified to collect basic water quality data as a part of the CLMN program and that these volunteers start as soon as possible. Volunteers should at least sign up for level one (collecting Secchi disk readings of water clarity) of the CLMN program. CLMN expanded monitoring parameters (temperature, dissolved oxygen, total phosphorus, and chlorophyll-*a*) should be added as soon as the lakes can be enrolled by the WDNR. 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.

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 APM Plan 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.

Goal 4 - Adaptive Management

This APM Plan is a working document guiding management actions on the 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 deem fit following IPM strategy. 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 Town of Barnes, FOECLA, 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 lake group, Bayfield 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 Aquatic Plant Management Plan.

Aquatic Plant Management Discussion

Both lakes support a valuable aquatic plant community with a number of uncommon species and a quality fishery valued by the lake community and the general public. The lakes currently have only one known fully aquatic invasive species – Eurasian watermilfoil. Nuisance conditions and navigation impairment occur

throughout the open water season as a direct result of the EWM infestation. The main goal of the Aquatic Plant Management Plan is to control EWM in a sound, ecological manner.

Any amount of EWM can and should be managed, albeit in different ways. 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.

Management Priority Matrix

Figure 1 provides a method to determine priority. Referred to as **FLIPS**, it involves evaluating each areas 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.

Eurasian Watermilfoil FLIPS Management Approach				
F ormation	L ocation	I mpairment	P rior Year	S ensitive Area
Is this the first time the area has been identified in survey work?	Is the EWM in an area of high use? (boat landings, navigation channels, beach or swimming area, area of high boat traffic, etc.)	Does the EWM cause beneficial use impairment? (preventing or limiting fishing, boating, swimming, navigation, etc.)	Was the EWM in this area treated in the year prior?	Is the EWM having a negative impact on native plants or other fauna in the area?
If the answer to 3 or more of the questions for a specific bed (>50% EWM) or area (<50% EWM) is “yes”, then using aquatic herbicides to manage that area should be given a higher priority. If the answer to 3 or more of the questions is “no”, then using aquatic herbicides to manage that area should be given a lower priority, although other control actions should still be applied where possible to prevent EWM from spreading more.				

Figure 1: FLIPS Management Priority Matrix

Management Planning Matrix

After an 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 2 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, WDNR permitting, and the level of support from the constituency will determine the action used.

General EWM Management Guidelines

In general, EWM management in the lakes will be based on the following criteria.

- 1) Late summer or fall bedmapping will be completed every year. PI surveys could be substituted instead of bed mapping.
- 2) Any amount of EWM in the lake 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, and snorkel/scuba diver removal, and/or DASH removal (still considered diver removal, but more expensive).
 - a. DASH removal requires a mechanical harvesting permit from the WDNR.
- 3) Chemical management of EWM may be implemented if prior year mapping identifies any single area that is ≥ 0.20 acres, or multiple areas that total more than an acre.
 - 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.
 - i. If possible, installation of a limno-barrier or curtain could be used to help contain the treatment area, particularly if a 2,4D or triclopyr herbicide is used.
 - c. When EWM beds in the entire lake exceed 10.0 acres, herbicide applications 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 entire lake exceed 10.0 acres and it is clear that targeted treatments will no longer be effective, whole-lake, low dose herbicide applications can 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.

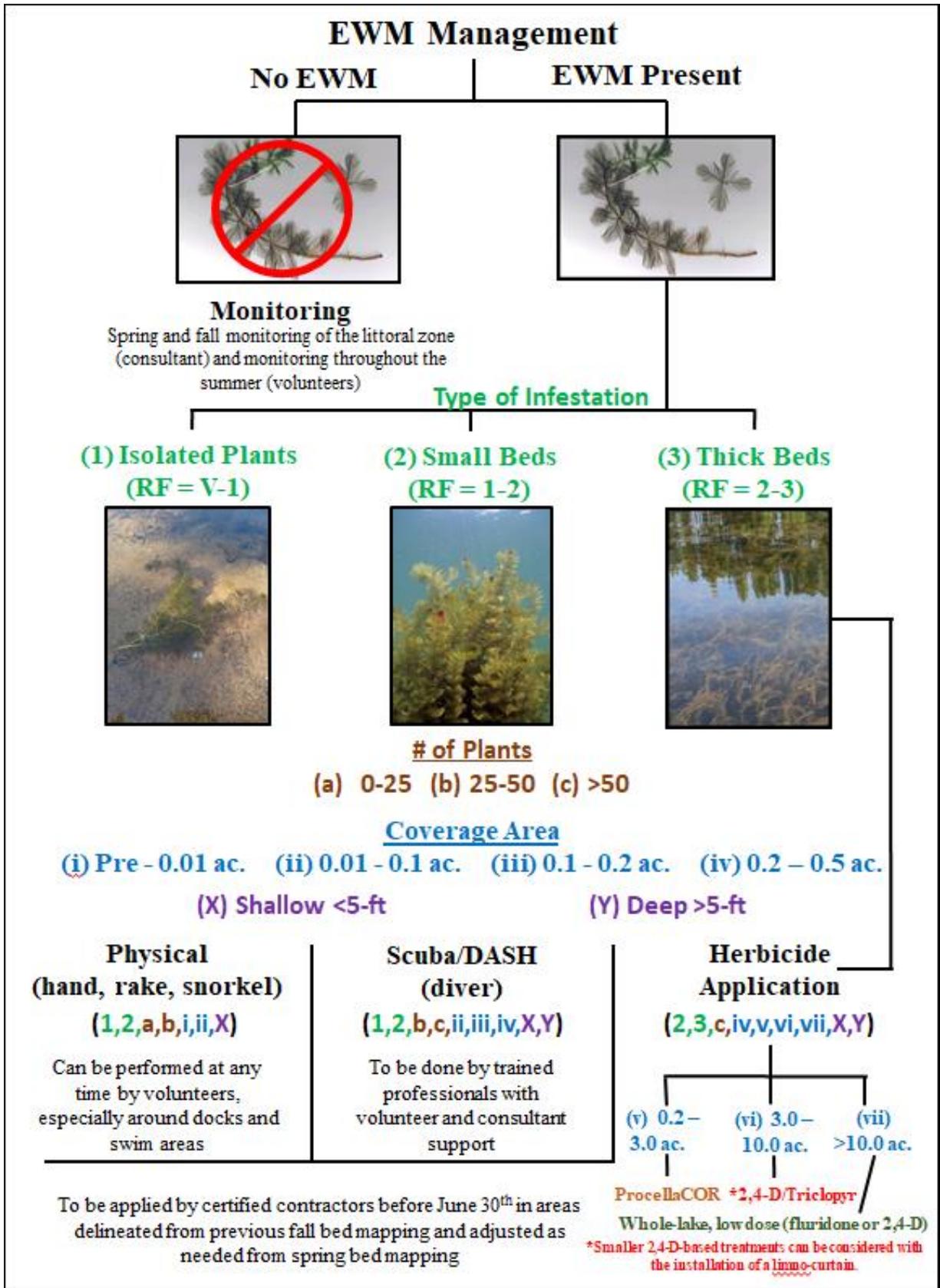


Figure 2: Management Planning Matrix