# Eagle River Chain of Lakes

Vilas County, Wisconsin

# 2024 EWM Management and Monitoring Report

April 2025

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# 1.0 INTRODUCTION

The Eagle River Chain of Lakes is comprised of ten contiguous waterbodies that spans nearly 4,000 acres. The Lower Eagle River Chain is managed by two entities: the Eagle River Chain of Lakes Association (ERCLA) and the Unified Lower Eagle River Chain of Lakes Commission (ULERCLC). ERCLA offers educational initiatives focused on topics relevant to the chain and its associated rivers while the ULERCLC largely focuses on the management of Aquatic Invasive Species (AIS). Although each organization has distinct responsibilities, they collaborate closely to protect and enhance the chain.

The ULERCLC has been the successful recipient of several Wisconsin Department of Natural Resources (WDNR) AIS Control Grants since 2007. These grants have been used to assist with monitoring and managing the Eurasian watermilfoil (*Myriophyllum spicatum*; EWM) population in the Eagle River Chain of Lakes (Figure 1.0-1) since its discovery in 2004. This report specifically discusses the monitoring and control activities conducted during 2024. The chain-wide results will be presented first, followed by results from each lake individually. Additional information regarding the management and monitoring actions completed from 2008-2023 can be found in their respective annual reports.


**Figure 1.0-1 Lower Eagle River Chain of Lakes, Vilas-Oneida Counties.**

## 1.1 Chain-wide EWM Management & Monitoring History

EWM mapping surveys are typically completed at two main intervals in a given year, early season (June) and late season (late-August to the end of September). These surveys consist of a complete meander survey of the system's littoral zone by professional ecologists (Photograph 1.1-1). Under the program carried out by Onterra, EWM population encountered are mapped using sub-meter GPS technology by using either 1) point-based or 2) area-based methodologies. Large colonies >40 feet in diameter are mapped using polygons (areas) and are qualitatively attributed a density rating based upon a five-tiered scale from *highly scattered* to *surface matting*. Point-based techniques are applied to EWM locations that were considered as *small plant colonies* (<40 feet in diameter), *clumps of plants*, or *single or few plants*.


**Photograph 1.1-1. EWM mapping survey on a Wisconsin lake.** Photo credit Onterra.

Early Season EWM Mapping Survey results are most commonly used to prioritize the upcoming summer's manual removal program. This provides the lake group with the most up-to-date and accurate information regarding locations of EWM within the lake. These data help the lake organization prioritize the manual removal efforts, especially when the lake-wide EWM population is relatively low and identifying even small/isolated occurrences is important. When EWM populations are larger on a given lake, the utility of this survey diminishes as the previous year's Late Season EWM Mapping Survey is typically sufficient to drive management decisions and priorities.

As the name implies, the Late Season EWM Mapping Survey is a professionally contracted survey completed towards the end of the growing season when EWM is at its anticipated peak growth stage. However, on some lakes, complicated dynamics over the summer may result in EWM population declines compared to the beginning of the season. Regardless, the late season survey documents the EWM population that the system has going into winter and will be emerging in spring of next year. So these data are important for driving management decisions for next year. They are also the most important for making annual comparisons.

The ULERCLC has relied on a combination of Early Season and Late Season EWM Mapping Surveys to direct management on the Eagle River Chain. Since 2007, annual late season EWM mapping surveys have occurred and are used as the most important comparative metric for understanding the population over time. Figure 1.1-1 displays a breakdown of acreages and densities of EWM mapped using area-based methodologies (i.e. polygons). This figure excludes EWM mapped with point-based methodologies (*single or few plants, clumps of plants,* or *small plant colonies*). In other words, EWM marked with point-based mapping methods do not contribute to the colonized acreage shown in Figure 1.1-1.

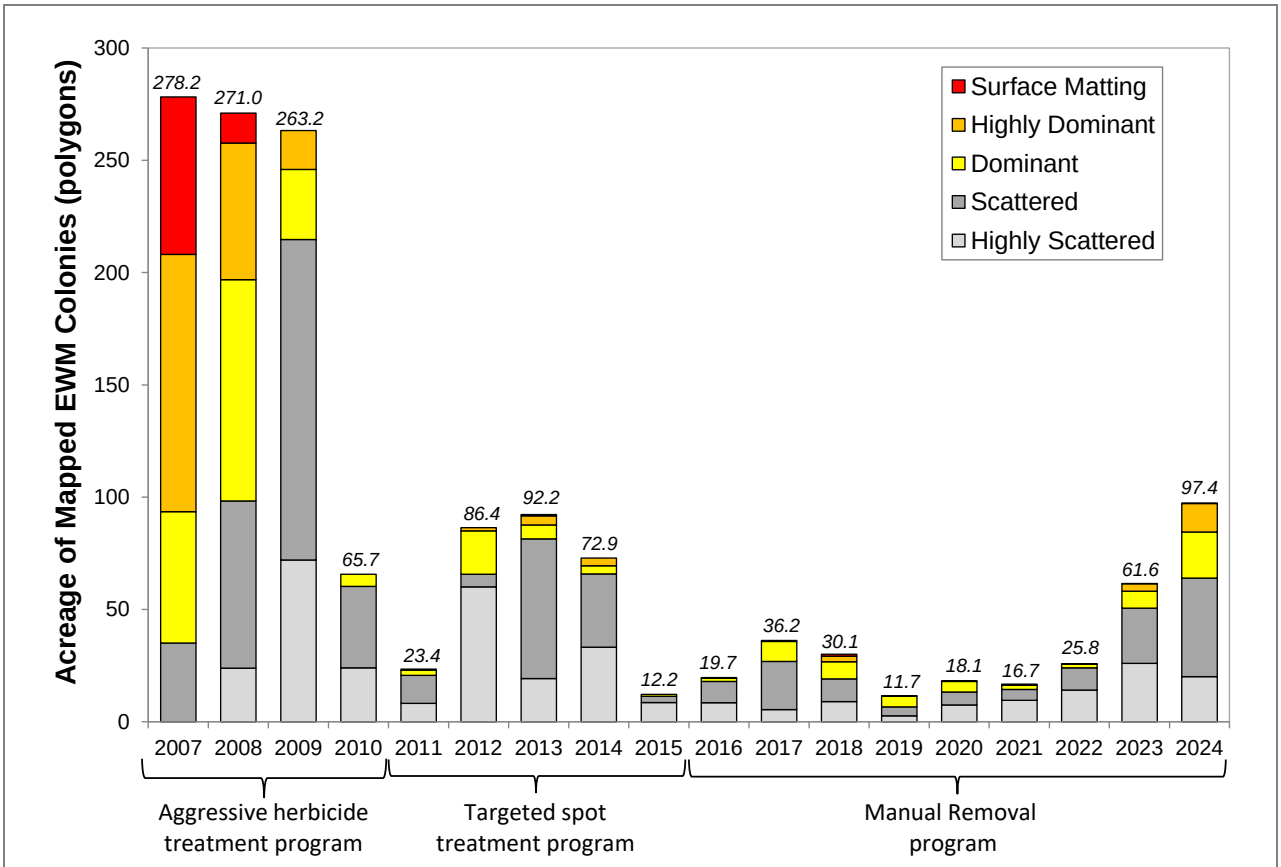



**Figure 1.1-1. Chain-wide acreage of mapped EWM colonies on the Lower Eagle River Chain of Lakes from 2007-2024.**

## *Aggressive Herbicide Treatment Program (2007-2010)*

Over this same timeframe, the ULERCLC has coordinated active management of EWM. From 2007 to 2010, an aggressive herbicide treatment program occurred consisting of strategically targeted herbicide spot treatments and a few whole-lake or whole-basin herbicide treatments.

## *Targeted Spot Treatment Program (2011-2015)*

A more directed herbicide spot treatment strategy occurred from 2011 to 2015. During this timeframe, the ULERCLC was an active participant in a Cooperative Research and Development Agreement (CRADA) between the WDNR and U.S. Army Corps of Engineers Research and Development Center that coupled field-collected herbicide concentration data with professional monitoring to understand efficacy, selectivity, and longevity of chemical control strategies. During this project, the ULERCLC found that as the spot treatments targeted increasingly smaller areas of EWM, they were not as effective as previous control strategies.

Ongoing studies stemming from this project indicate that in small spot treatments, the herbicide dissipates too rapidly to cause EWM mortality if traditional weak-acid auxin systemic herbicides like 2,4-D are used. Even in some cases where larger treatment areas can be constructed, their narrow shape or exposed location within a lake may result in insufficient herbicide concentrations and exposure times for long-term control. With this knowledge, more effective herbicide spot treatment

strategies were implemented in the latter years of this phase of management. In 2015, the EWM population of the Eagle River Chain of Lakes was at its lowest levels in over a decade, with just over 12 acres of colonized EWM being documented chain-wide (Figure 1.1-1).

In 2015, the ULERCLC developed a working treatment strategy where consideration for herbicide application would be given to areas of EWM if they met a specific threshold (i.e., trigger). This trigger was further revised as part of the *Eagle River Chain of Lakes Comprehensive Management Plan (Dec 2019)*. If the following trigger is met, the ULERCLC would initiate pretreatment monitoring and begin discussions, including consultation with WDNR staff, regarding conducting herbicide spot treatments:

> Colonized (polygons) areas of EWM, with preference to areas of *dominant* or greater densities, that have a size/shape/location where management is anticipated to be effective.

Based upon this established herbicide treatment strategy, no areas of EWM in the Lower Eagle River Chain of Lakes have met this threshold since 2015. The late season EWM mapping survey in 2023 contained the highest acreage since 2014, approaching levels that would meet this trigger.

### *Manual removal Program (2016-current)*

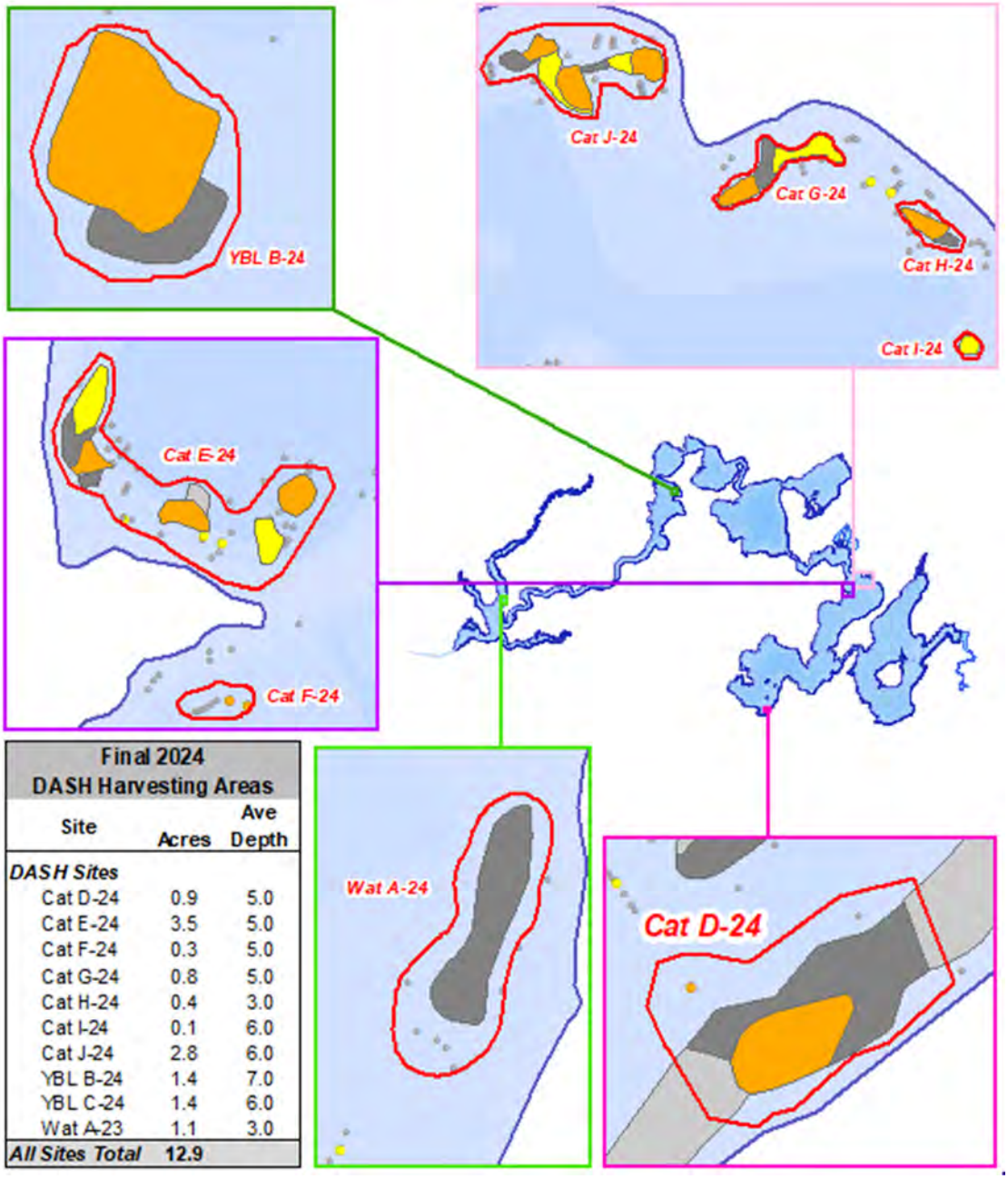
Following the herbicide management period, the EWM managed areas within the chain had diminished to the extent that herbicide spot treatment methods were no longer warranted. The ULERCLC recognized the necessity of maintaining active management instead of discontinuing and waiting for EWM populations to return to a level suitable for herbicide control. The ULERCLC enacted a strategy that balanced a level of EWM population tolerance while targeting other locations with a coordinated manual removal approach.

A series of EWM mapping surveys are used to coordinate and monitor the manual removal efforts. A preliminary hand harvesting strategy is developed over the fall/winter based on the results of the previous year's Late-Summer EWM Mapping Survey. In late-spring/early summer, an Early Season EWM Mapping Survey is completed from which the manual removal strategy is finalized. After the professional manual removal activities are completed, Onterra completes a focused Late-Summer EWM Mapping Survey supplemented with volunteer surveillance monitoring, the results of which serve as a post-harvesting assessment of the manual removal efforts. The manual removal program would be considered successful if the EWM population within the targeted areas was found to have been reduced and inhibited from expanding between the year before and year after Late-Summer EWM Mapping Surveys.

Diver Assisted Suction Harvest (DASH) is a form of manual removal which involves divers removing target plants (i.e., EWM) and feeding them into a suctioned hose for delivery to the deck of the harvesting vessel. The DASH system is thought to be more efficient than manual removal alone as the diver does not have to go to the surface to deliver the pulled plants to someone on a boat. The DASH system also is believed to cause less fragmentation, as the plants are immediately transported to the surface using the pumping mechanism.

# 2.0 2024 EWM MONITORING & MANAGEMENT ACTIVITIES

Based on the results of the 2023 Late Season EWM Mapping Survey, a preliminary manual removal strategy was designed for areas of Catfish, Watersmeet, and Yellow Birch lakes for 2024 (Figure 2.0-1).

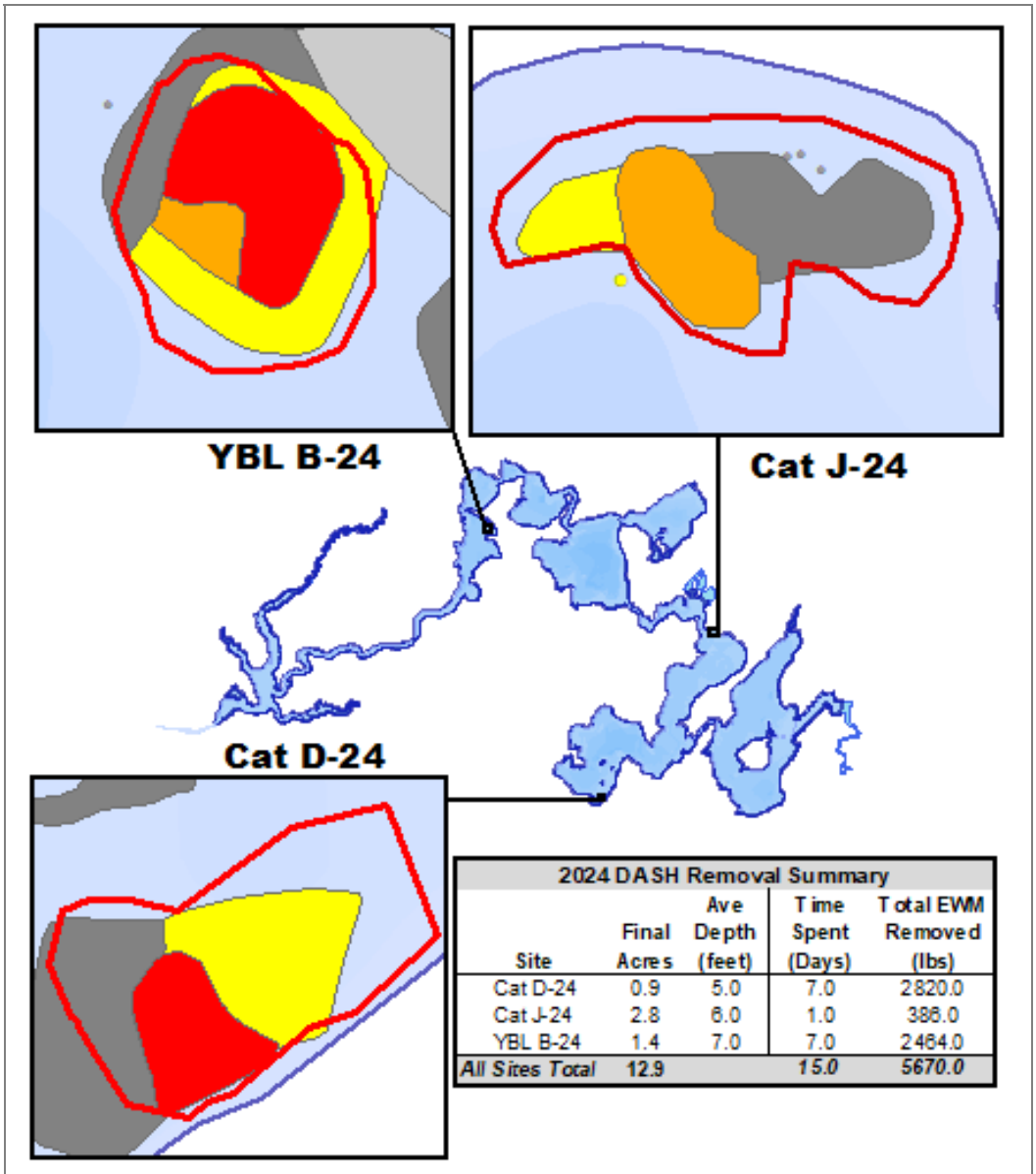



| Final 2024 DASH Harvesting Areas | | |
|---|---|---|
| Site | Acres | Ave Depth |
| ***DASH Sites*** | | |
| Cat D-24 | 0.9 | 5.0 |
| Cat E-24 | 3.5 | 5.0 |
| Cat F-24 | 0.3 | 5.0 |
| Cat G-24 | 0.8 | 5.0 |
| Cat H-24 | 0.4 | 3.0 |
| Cat I-24 | 0.1 | 6.0 |
| Cat J-24 | 2.8 | 6.0 |
| YBL B-24 | 1.4 | 7.0 |
| YBL C-24 | 1.4 | 6.0 |
| Wat A-23 | 1.1 | 3.0 |
| ***All Sites Total*** | **12.9** | |

**Figure 2.0-1. Preliminary 2023 Manual Removal Plan**. Mapping data shown from 2023 Late Season EWM Mapping Survey

## 2.1 Chain-wide Professional Manual Removal Activities

The ULERCLC EWM Committee created a site prioritization methodology that considered EWM density from the 2024 Early Season EWM Mapping Survey, high-use areas, and other factors. While there were initially ten proposed harvesting sites for 2024, three sites were chosen to be the subject of all removal efforts (Figure 2.1-1). Onterra provided the contracted professional manual removal firm with the spatial data from the Early Season EWM Mapping Survey and the targeted manual removal sites to coordinate the removal efforts.




2024 DASH Removal Summary

| Site | Final Acres | Ave Depth (feet) | Time Spent (Days) | Total EWM Removed (lbs) |
|---|---|---|---|---|
| Cat D-24 | 0.9 | 5.0 | 7.0 | 2820.0 |
| Cat J-24 | 2.8 | 6.0 | 1.0 | 386.0 |
| YBL B-24 | 1.4 | 7.0 | 7.0 | 2464.0 |
| *All Sites Total* | 12.9 | | *15.0* | *5670.0* |

**Figure 2.1-1 2024 Hand-harvest summary.** 2024 DASH removal sites outlined in red outline.

The ULERCLC contracted with DASH Aquatic Services, LLC in 2024 to provide professional manual removal services using DASH methods. Over the course of about 15 days, approximately 5,670 lbs of EWM were removed from the Eagle River Chain in 2024. Further details of manual

removal efforts and amount of EWM removed on a site-by-site basis is discussed within the Individual Lake Sections (4.0) below.

## 2.2 Volunteer EWM Surveillance Monitoring

In recent years, a team of dedicated ULERCLC volunteers have conducted EWM monitoring efforts during the summer months (Photograph 2.2-1). These efforts have been instrumental in aiding professional monitoring efforts through searching the Chain for new EWM infestations. Volunteers use a dedicated GPS unit that is loaded with the most recent professional EWM mapping survey results. The volunteer team focuses on searching for EWM in other areas of the Chain outside of where known EWM populations have been recently documented in the professional mapping surveys. If volunteers encounter a new suspected occurrence of EWM, a waypoint is taken on the GPS unit. All volunteer data is ultimately provided to Onterra prior to the next scheduled professional mapping survey. This allows the professional surveyors to visit the volunteer locations to confirm the presence of EWM.

**Photograph 2.2-1. Volunteers conducting surveillance monitoring on the Eagle River Chain**. Photo credit ERCLA.

In 2024, ULERCLC volunteer monitoring data was provided to Onterra in advance of the Late Season EWM Mapping. While many of the lakes were surveyed in July and August, volunteers were unable to locate EWM outside of general areas that were mapped during the June Early Season EWM Mapping Survey except for a few locations in Catfish Lake.

## 2.3 Late Season EWM Mapping Surveys

During mid-September 2024,Onterra had multiple crews conducting the Late Season EWM Mapping Survey on the Eagle River Chain. The crews had an excellent stretch of weather during that time and the survey timing was perfect. During this survey, Onterra crews systematically meandered areas of the littoral zone that were either identified as having EWM during the June Early Season EWM Mapping Survey, or by volunteers as a part of the well-established volunteer-based monitoring program.

In response to the 2024 summer's conducive environmental conditions for growing aquatic plants following an almost non-existent winter; (short ice-on period and snow coverage) many lakes Onterra monitored had a banner year for EWM growth. A favorable year for EWM growth was also noted on the Eagle River Chain.

As shown on Figure 2.3-1, just shy of 100 acres of colonized EWM was located during the 2024 Late Season EWM Mapping Survey on the Chain. This is an increase compared to the 61.6 acres mapped in 2023 (Figure 2.3-2). The majority of the EWM acreage mapped in the Eagle River Chain was in Catfish and Cranberry Lakes. All lakes except Otter and Lynx contained colonized acreage of EWM. When comparing the 2023 and 2024 Late Season EWM Mapping data, Cranberry, Catfish, Voyageur,

Scattering Rice, and Yellow Birch Lakes all saw increasing in colonized EWM, while Eagle, Otter, Lynx, Duck and Watersmeet all saw reduction in colonized EWM.

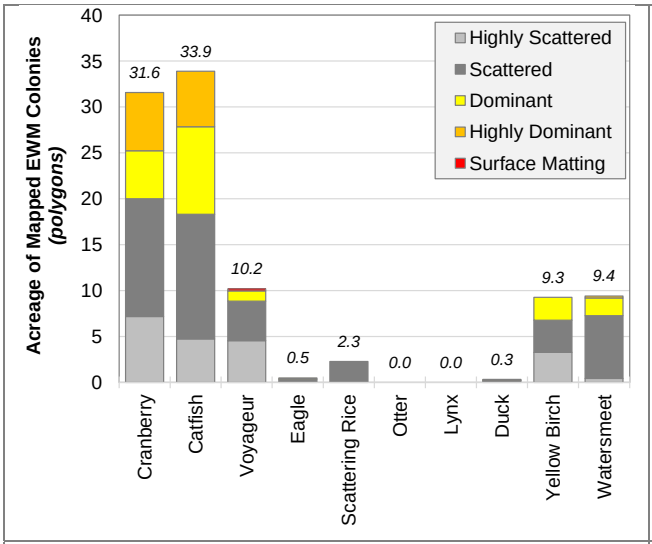



**Figure 2.3-1. Distribution of acreage & density of mapped EWM colonies by lake in 2024.**

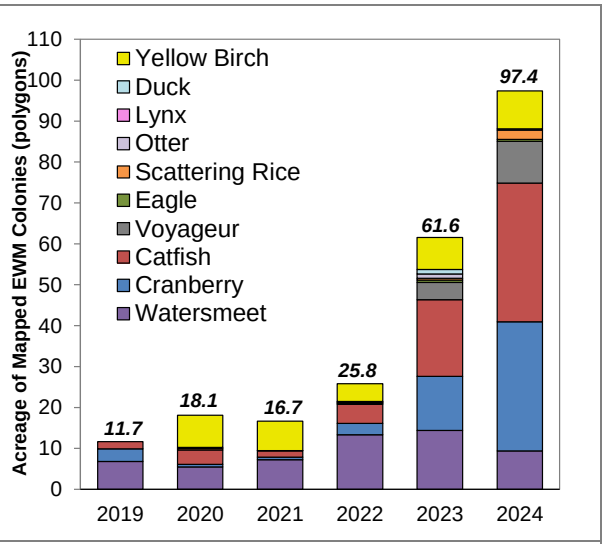



**Figure 2.3-2. Distribution of acreage of mapped EWM colonies by lake in 2019-2024.**

## 3.0 CHAIN-WIDE CONCLUSIONS & DISCUSSIONS

Overall, there has been a significant reduction of EWM in the Eagle River Chain since the start of the management program in 2007. It is clear that the management program has resulted in a lowered EWM population compared to if it was left unmanaged.

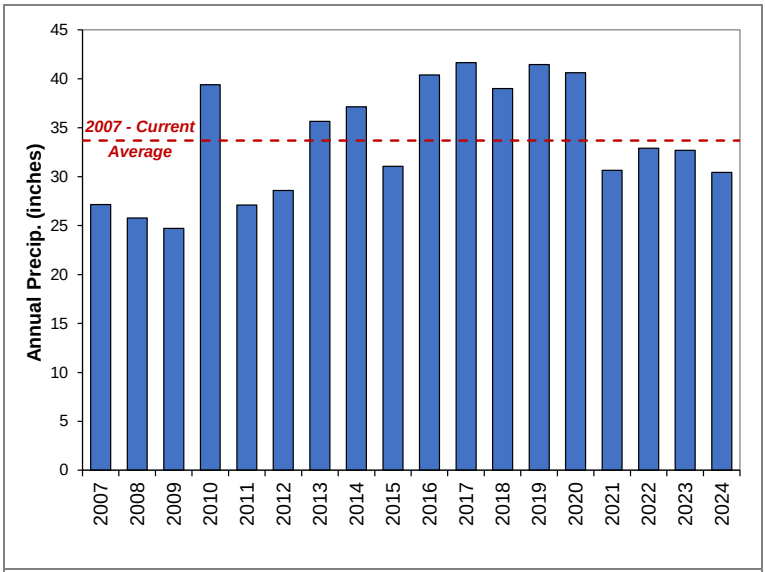



**Figure 3.0-1. Eagle River station average annual precipitation.** https://mrcc.purdue.edu/

But it is also important to note the role of the reduced water clarity in the system this past decade. On the Eagle River Chain, water clarity has been tied to precipitation. As precipitation increases, water clarity decreases. The increase in precipitation brings in more nutrients from the watershed which increases algal production. The increased precipitation also brings in more organic compounds which give the system its brown *stained* appearance. When EWM is treated, and also has the added environmental stress of low water clarity, it is more difficult for the plants to rebound following the management action. The darker water has likely helped the treatments be more effective and last longer. Said another way, if the chain had clearer water during the years of treatment, the results may not have been as positive. The slightly below average precipitation levels observed since 2021, and the corresponding increase in water clarity, may also be a driver in the increased EWM population observed on the chain in that timeframe (Figure 3.0-1). If low

precipitations levels persist, Onterra predicts larger and denser EWM populations within the Eagle River Chain regardless of management intervention.

With continued increasing EWM populations observed in 2024, more discussion of management alternatives to manual removal are occurring. During the November 2024 EWM Information Meeting, intense discussion of herbicide treatment potential and risk assessment occurred. The *Eagle River Chain Comprehensive Management Plan* was completed in 2019, with many of the EWM-related goals and actions being developed in 2015. In the past decade, there have been large changes in EWM management philosophies, techniques, and risk management. For this reason, the WDNR now requires that *Aquatic Plant Management (APM) Plans* need to be periodically updated at a minimum of five-year intervals to maintain eligibility for certain grants and permits. With the Eagle River Chain's current plan being older than five years and being written for outdated herbicides and use patterns, the likelihood of receiving permit approval for herbicide treatment currently is low.

The ULERCLC EWM Committee has been aware of these changing guidelines for several years, and has developed a strategy to continue EWM management in tandem with creating an updated APM Plan (Figure 3.0-2). With 2024 being the final year of eligibility under the *2019 Comprehensive Plan*, the ULERCLC applied for and received an AIS Large-Scale Population Management Grant-funded project (ACEI-368-25) to fund manual removal and monitoring efforts from 2025-2027. This project will follow the same monitoring and planning strategy utilized during the previous 5-year project.

During the summer of 2025, continued project design and grant application development will occur to start an APM Planning Project in 2026-2027. Therefore, the planning project would be completed at the same time the 3-year AIS Control Grant will be completed and the ULERCLC would be again eligible to apply for a grant for 2028 and beyond.

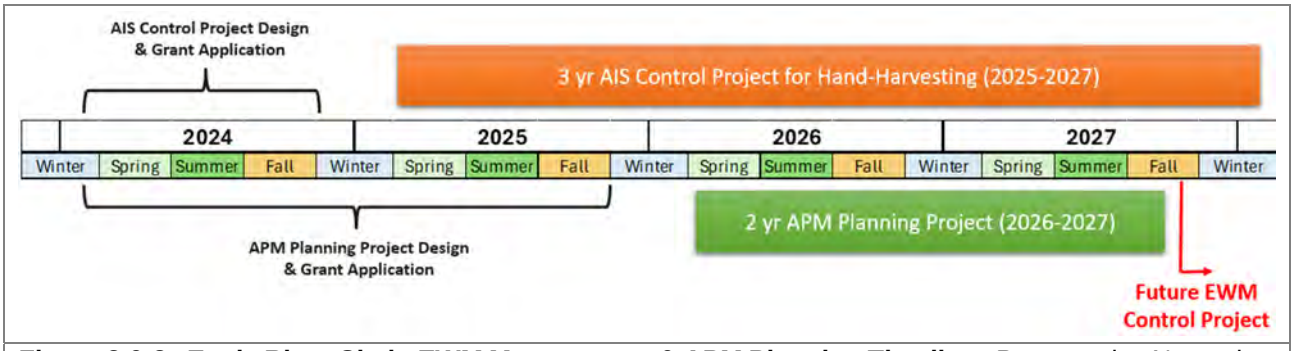
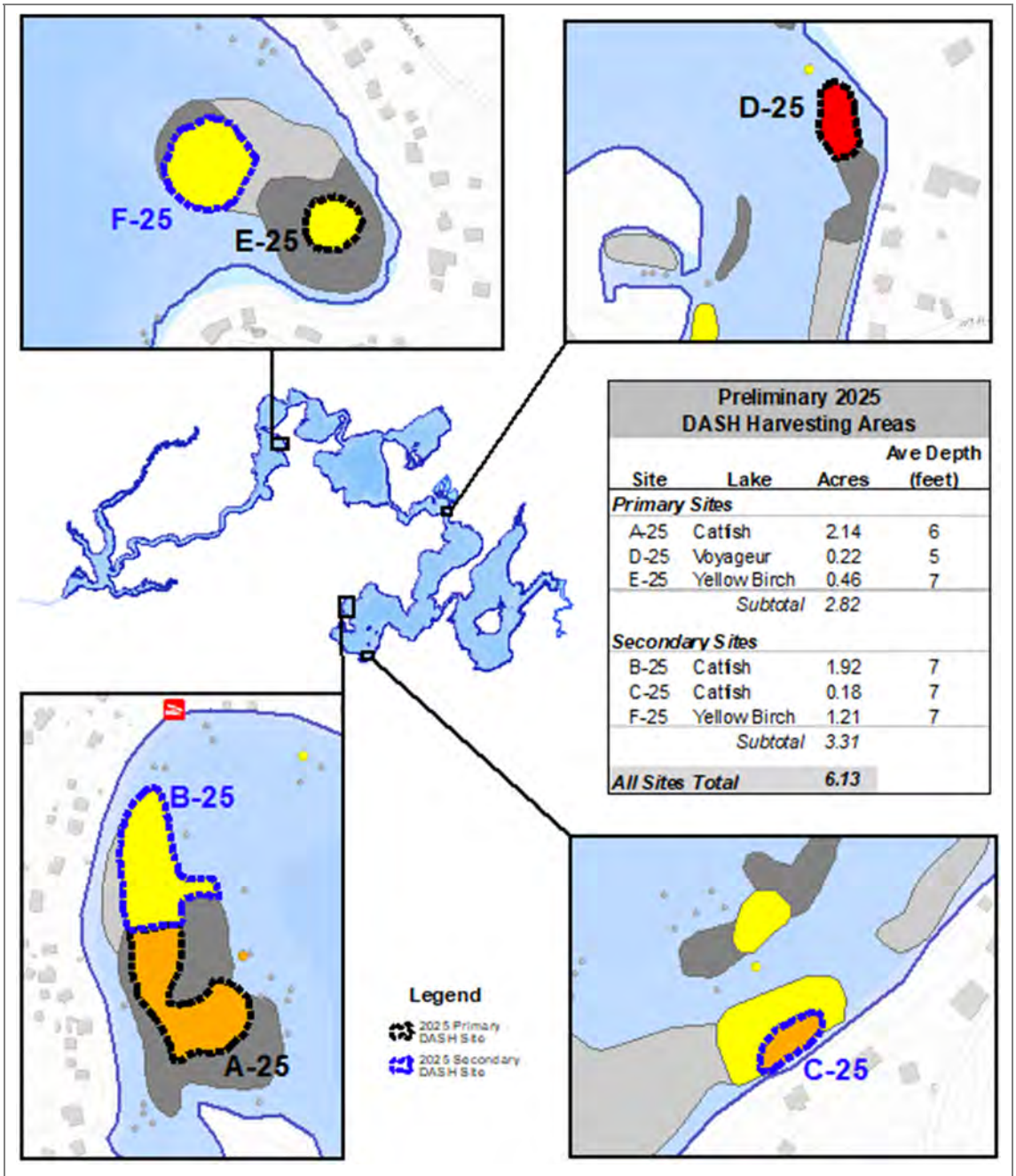



**Figure 3.0-2. Eagle River Chain EWM Management & APM Planning Timeline**. Presented at November 2024 EWM Information Meeting

Using the 2024 Late Season EWM Mapping Surveys, a preliminary professional manual removal EWM control strategy for 2025 was developed targeting three sites in Catfish Lake (one primary and two secondary), two sites in Yellow Birch Lake (one primary and one secondary), and one primary site in Voyageur (Figure 3.0-3). Based upon the results of the 2025 Early Season AIS Survey, areas could potentially be added, omitted, or revised. Onterra will provide the manual removal firm with the spatial data from the early season survey to aid in the removal efforts.

Following the manual removal activities, a Late Season EWM Mapping Survey will qualitatively assess the EWM removal efforts and be used to plan management and monitoring activities in 2025.




| Preliminary 2025 DASH Harvesting Areas | | | |
|---|---|---|---|
| Site | Lake | Acres | Ave Depth (feet) |
| *Primary Sites* | | | |
| A-25 | Catfish | 2.14 | 6 |
| D-25 | Voyageur | 0.22 | 5 |
| E-25 | Yellow Birch | 0.46 | 7 |
| | *Subtotal* | *2.82* | |
| *Secondary Sites* | | | |
| B-25 | Catfish | 1.92 | 7 |
| C-25 | Catfish | 0.18 | 7 |
| F-25 | Yellow Birch | 1.21 | 7 |
| | *Subtotal* | *3.31* | |
| *All Sites Total* | | *6.13* | |

**Figure 3.0-3. Preliminary 2024 Manual Removal Plan**. Map to be submitted for NR109 permit for DASH. Primary sites are outlined in black dashed line and secondary sites are outlined in blue dashed lines.

# 4.0 INDIVIDUAL LAKE SECTIONS

The remainder of this report will focus on the 2024 EWM monitoring and management activities on a lake-by-lake basis. Some of the text will seem redundant if one reads each lake section. However, this is intentional to ensure the information is portrayed to those who only read the chain-wide sections and their individual lake-specific section.

Early Season EWM Mapping Survey were completed on June 25-27, July 2 and July 7. 2024. During the Early Season EWM Mapping Survey, the entire littoral zone of the Eagle River Chain of Lakes was searched for EWM by Onterra field staff. Completion of an Early Season EWM Mapping Survey presents numerous advantages. Typically, the water is clearer during the early summer allowing for more effective viewing of submersed plants. While not at their peak growth stage (peak biomass), EWM plants are higher in the water column than most native plants during this time of year which increases the chances that even low-density and isolated EWM occurrences would be located.

The results from the Early Season EWM Mapping Survey were loaded onto specific ULERCLC GPS units, and trained volunteers were tasked with searching and mapping EWM in areas where Onterra did not locate it during the Early Season EWM Mapping Survey. Prior to the Late Season EWM Mapping Survey, the volunteer mapping data were provided to Onterra.

The Late Season EWM Mapping Survey was completed on September 18-20, 2024. During the Late Season EWM Mapping Survey, Onterra ecologists revisited and refined areas of EWM mapped during the Early Season EWM Mapping Survey as well as any areas marked by volunteers. The following individual lake sections will focus on the results of the 2024 Late Season EWM Mapping Survey in the context of manual removal efforts that may have taken place. The 2024 Late Season EWM Mapping Survey results map for each lake is provided after the respective individual lake section. Stand alone maps for both EWM Survey maps can be found at:

*https://eagleriverchaincommission.org/lake-reports.html*

## 4.2 Catfish Lake

The ULERCLC contracted with DASH Aquatic Services, LLC to conduct professional DASH harvesting of EWM in two sites in Catfish Lake in 2024. Over a period of about 8 days in 2024, a total of approximately 3,206 pounds of EWM were harvested from sites within Catfish Lake (Table 4.2-1).

**Table 4.2-1. 2024 Hand-harvest summary.**

| DASH Removal Summary | | |
|---|---|---|
| Site | Time Spent (Days) | Total EWM Removed (lbs) |
| Cat D-24 | 7.0 | 2820.0 |
| Cat J-24 | 1.0 | 386.0 |
| ***All Sites Total*** | **8.0** | ***3206.0*** |

Site Cat D-24 had the greatest amount of professional harvesting efforts in 2023 with approximately 2,820 pounds of EWM removed over seven days. Monitoring shows no *surface matting* EWM colonies after the removal took place; however, *dominant* and *highly dominant* colonies still remained in this site (Figure 4.2-1, top frames).

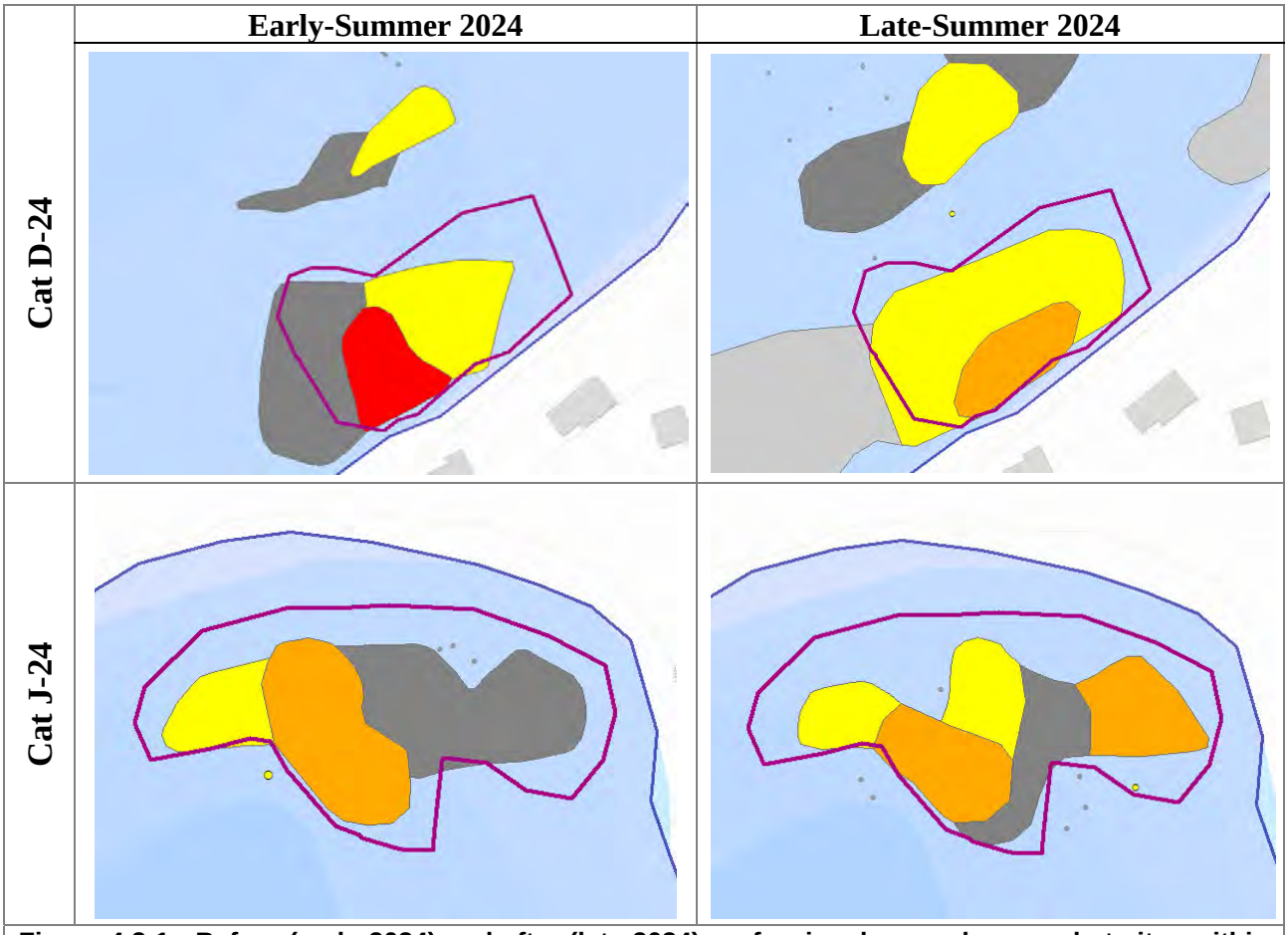



**Figure 4.2-1. Before (early 2024) and after (late 2024) professional manual removal at sites within Catfish Lake.**

Site Cat J-24 had approximately 386 pounds of EWM removed over one day. While short-term EWM reductions likely occurred, the rate of EWM rebound over the summer resulted in this site containing a relatively similar EWM population by the time the September Late Season EWM Mapping Survey took place (Figure 4.2-1, bottom frames).

The 2024 Late Season EWM Mapping Survey located EWM in most of the littoral zone of the lake, much of which was mapped with point-based mapping methods. Colonized EWM was located in a few of the more protected bays of the lake that are generally more conducive to aquatic plant growth, with the largest and densest EWM colony located in the bay near the Braywood boat landing. The total acreage of EWM colonies mapped during the 2024 Late Season EWM Mapping Survey was 33.9 acres, the most observed since herbicide management ceased (Figure 4.2-2).

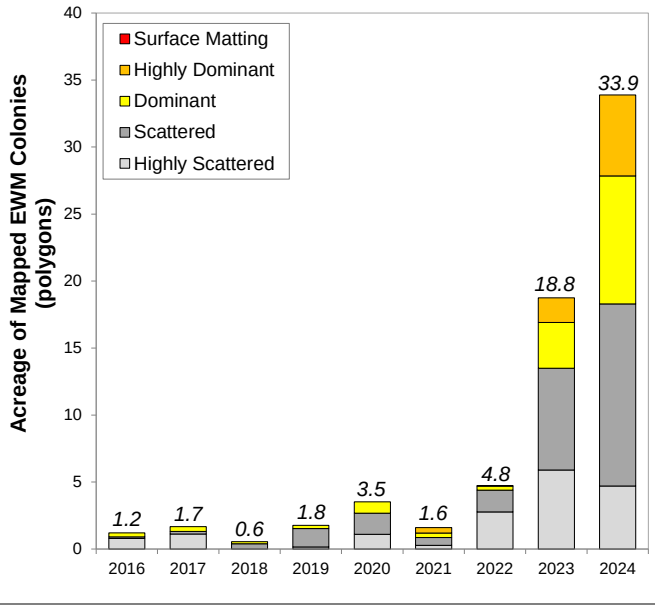
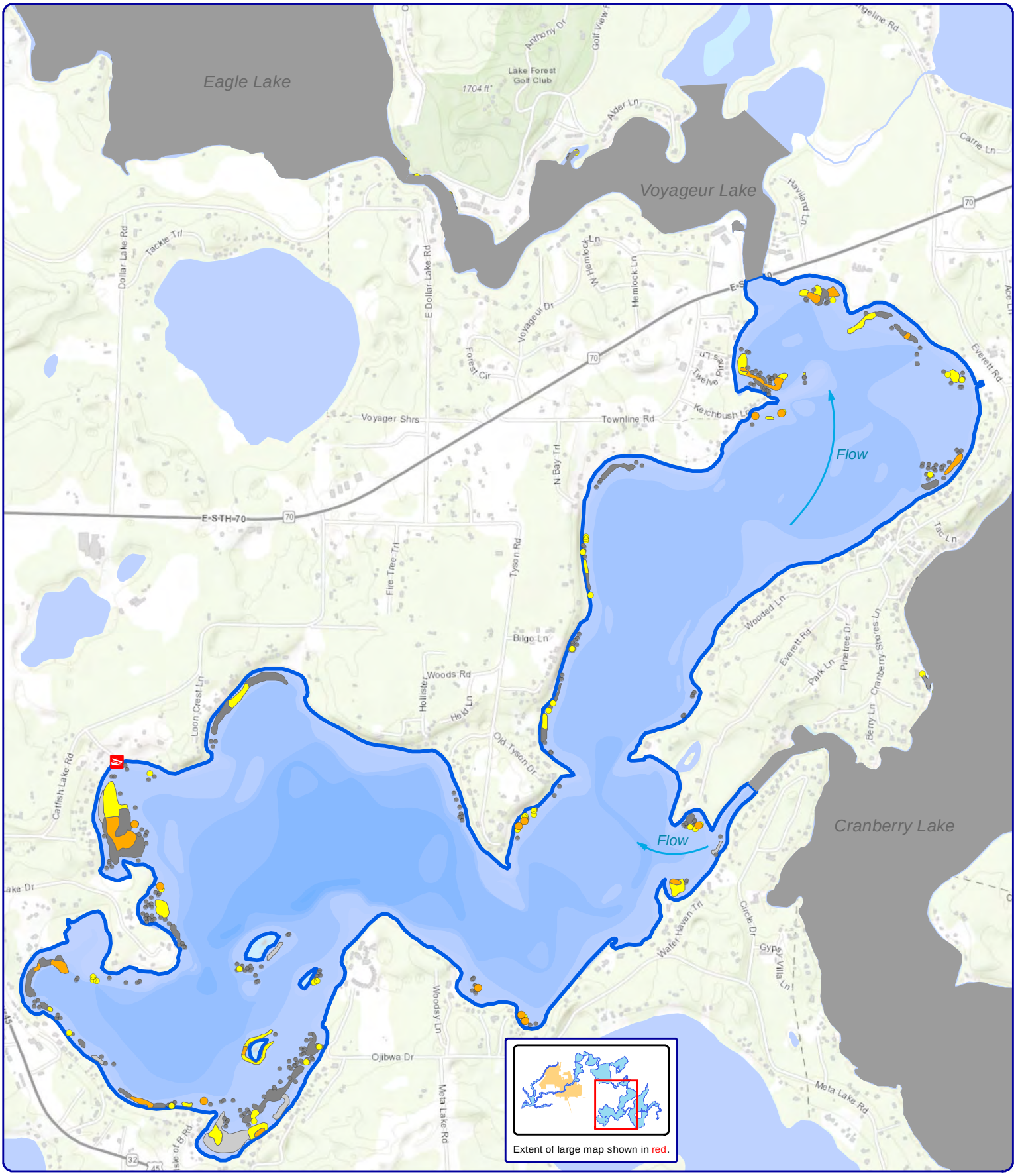



**Figure 4.2-2. Catfish Lake acreage of mapped EWM colonies during 2016-2024 Late Season EWM Mapping Surveys.**

Approximately half of the mapped EWM colonies consisted of *highly scattered* or *scattered* densities, likely not impeding recreational opportunities at the current time.

The ULERCLC will again use manual removal efforts in Catfish Lake in 2025. Three (3) sites in Catfish Lake are being preliminarily considered for manual removal in 2025 (Figure 3.0-3). Based upon the 2025 Early Season EWM Mapping Survey a refined and final strategy will be devised.

It is also important to note that each riparian owner can legally harvest EWM and native plant species in a 30-foot-wide area of one's frontage directly adjacent to one's pier without a permit. A permit is only required if an area larger than the 30-foot corridor is being harvested or if a mechanical assistance mechanism, like DASH, is being used. Simply wading into the lake and removing EWM by hand with or without the aid of snorkeling accessories can be helpful in managing EWM on a small and individual property-based scale.

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**Sources:**
Basemap: ESRI AGOL
Roads and Hydro: WDNR
Bathymetry: WDNR, Onterra digitized
Aquatic Plants: Onterra, 2024
**Map Date:** March 24, 2025 - SCD

## Legend

***2024 EWMPB Survey (September 2024)***

- Highly Scattered
- Scattered
- Dominant
- Highly Dominant
- Surface Matting
- Single or Few Plants
- Clumps of Plants
- Small Plant Colony

Map 2

# Catfish Lake

Vilas County, Wisconsin

## 2024 Late-Season EWM Survey Results