

Eagle River Chain of Lakes
Vilas County, Wisconsin

2020-2022 Final EWM
Management and Monitoring Report
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1.0 INTRODUCTION

The Unified Lower Eagle River Chain of Lakes Commission (ULERCLC) has been the successful recipient of several Wisconsin Department of Natural Resources (WDNR) Aquatic Invasive Species (AIS) Control Grants since 2007 to assist with monitoring and managing the Eurasian watermilfoil (*Myriophyllum spicatum*; EWM) population in the Eagle River Chain of Lakes (Figure 1.0-1). This report specifically discusses the monitoring and control activities conducted during 2022 as well as the 2022 whole-lake point-intercept survey results. 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 2008-2021 can be found in their respective annual reports.

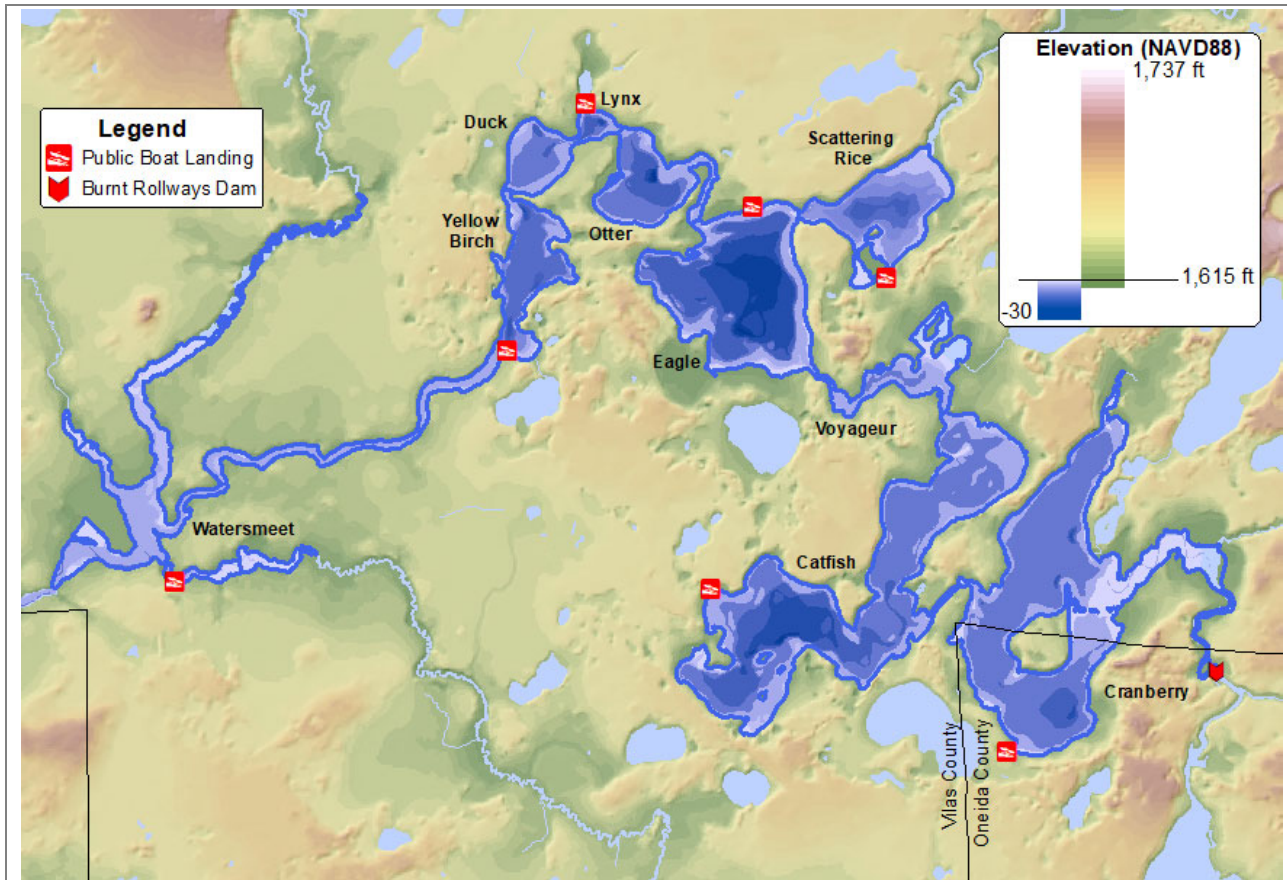
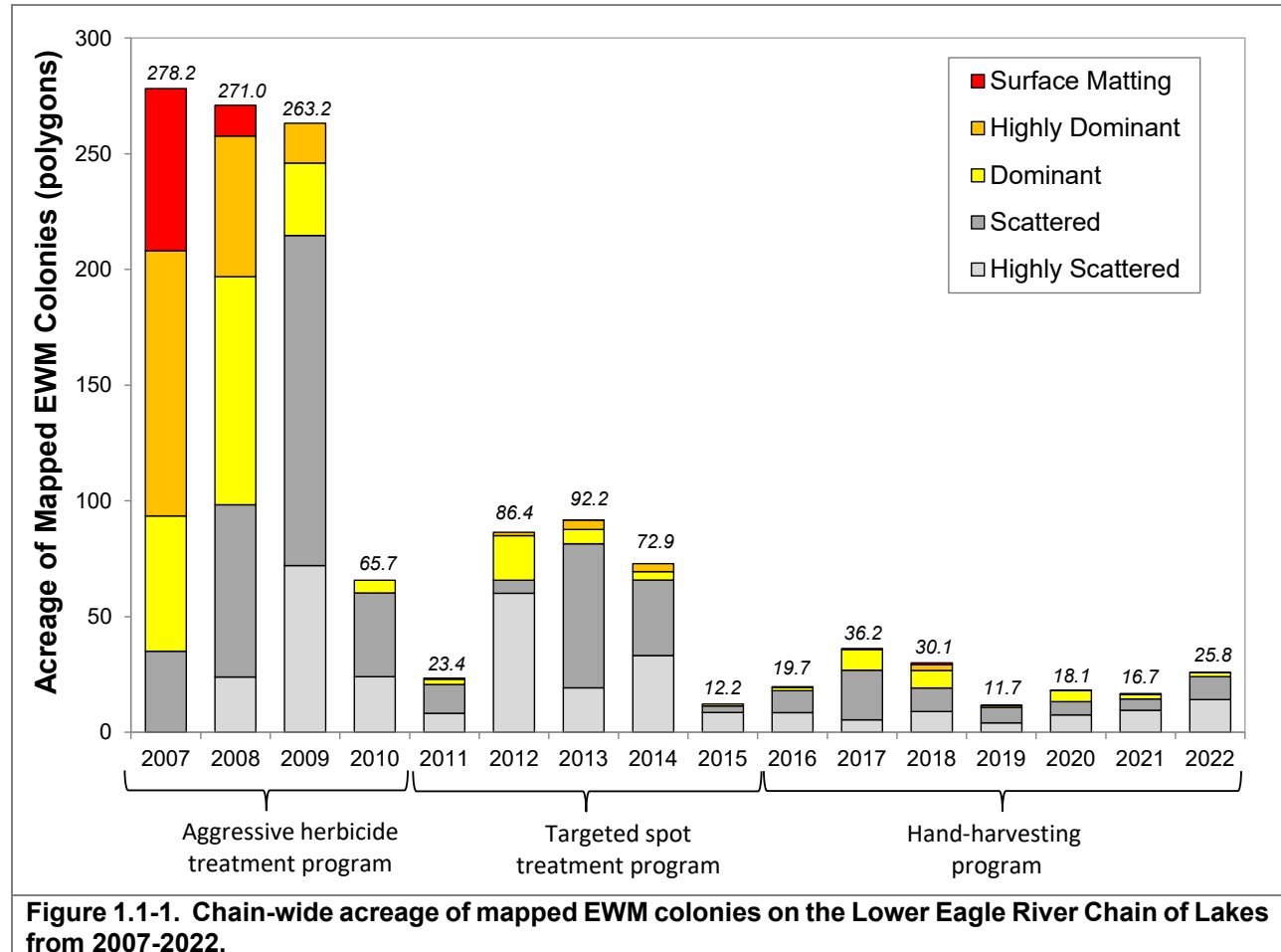


Figure 1.0-1 Lower Eagle River Chain of Lakes, Vilas-Oneida Counties.

1.1 Chain-wide Historic EWM Management

In an effort to increase the flow of information between lake stakeholders and project planners, Onterra has piloted an interactive web map application for the Eagle River Chain, allowing users to see each year's late-season EWM mapping survey results and management areas as they relate to their property or favorite recreation and fishing spots. Various layers can be turned on and off, and some layers can be selected and a pop-up window will provide additional information. This platform allows a better understanding of the EWM population dynamics and management strategies over time. To directly access this interactive map, click on the following link [Interactive Web Application](#). A link to the interactive web application is also hosted on the ULERCLC website.

Starting in 2007, late-season EWM mapping surveys commenced on the Eagle River Chain of Lakes using a consistent density rating system (Figure 1.1-1). Please note that this figure only represents the acreage of mapped EWM polygons, not EWM mapped with point-based methodologies (*single or few plants, clumps of plants, or small plant colonies*). Said another way, EWM marked with point-based mapping methods do not contribute to colonized acreage as shown in Figure 1.1-1.



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).

Between 2010 and 2015, average chain-wide summer water clarity declined by over one foot to an average of 4.4 feet. To investigate the reduction in water clarity within the chain since 2010, annual precipitation data were obtained from a station at the Eagle River wastewater treatment facility located on West Division Street. Correlation analysis between precipitation data and average summer Secchi disk depth revealed that total growing season precipitation (April-September) had the strongest negative correlation with average summer Secchi disk depth. This means that as precipitation increases, water clarity decreases. The increase in precipitation may have resulted in increased phosphorus loading to the chain, increasing algal production and reducing water clarity. The increased precipitation may have also increased the amount of dissolved humic substances within the chain, increasing the stained appearance and decreasing water clarity.

It is clear that the management program reduced the EWM population within the Eagle River Chain. But it is also important to note the role of the reduced water clarity in the system this past decade. When EWM is targeted with an herbicide treatment, and also has the added environmental stress of low water clarity, it is more difficult for the plants to rebound. 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. It will be important for the ULERCLC to understand this reality and be prepared when water clarity returns.

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 and therefore no herbicide treatments have occurred since.

Hand-Harvesting Program (2016-current)

After the period of herbicide management, the remaining areas of EWM within the chain were too small to be effectively controlled using herbicide spot treatment techniques available. It was important to the ULERCLC to not abandon management completely and simply wait for EWM populations to reach levels that are again applicable for herbicide control. The ULERCLC enacted a strategy that balanced a level of EWM population tolerance while targeting other locations with a coordinated hand-harvesting approach.

Many lake groups initiate a large-scale management strategy with the intention of implementing smaller-scale control measures when EWM begins rebounding. This use of multiple control practices in a strategy that focuses on long-term control is referred to as Integrated Pest Management (IPM). With Onterra's assistance, the ULERCLC successfully secured a WDNR Established Population Control Grant (ACEI-240-20) to assist with funding a continued IPM strategy as outlined by: 1) a 3-year EWM monitoring and hand-harvesting project and 2) completion of chain-wide point-intercept surveys in 2022 as outlined within the ERCLA's *Comprehensive Management Plan*. This report discusses the management and monitoring activities that took place during the third year of this project (2022).

A series of EWM mapping surveys were used to coordinate and monitor the hand-harvesting efforts. During the EWM mapping survey, the entire littoral area of the lake is surveyed through visual observations from the boat (Photo 1.1-2). 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 Aquatic Invasive Species Survey (ESAIS) is completed from which the hand-harvesting strategy was finalized. After the professional hand-harvesting activities are completed, Onterra completes the Late-Summer EWM Mapping Survey, the results of which serve as a post-harvesting assessment of the hand-removal efforts. The hand-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.



Photo 1.1-2. EWM mapping survey on a WI lake. Photo credit Onterra.

Diver Assisted Suction Harvest (DASH) is a form of hand-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 2022 EWM MONITORING & MANAGEMENT ACTIVITIES

Based on the results of the 2021 Late-Season AIS Survey, a preliminary DASH strategy was designed for areas of Catfish, Watersmeet, and Yellow Birch lakes for 2022. During the 2022 Early-Season AIS Survey (ESAIS), the extents of EWM within the proposed hand-harvesting areas were refined and a final hand-harvesting strategy was determined. Onterra provided the contracted professional hand-harvesting firm with the spatial data from the ESAIS Survey to coordinate the removal efforts.

2.1 Chain-wide Professional Hand-Harvesting Activities

The ULERCLC contracted with DASH Aquatic Services, LLC in 2022 to provide professional hand-harvesting services using Diver-Assisted Suction Harvesting (DASH) methodologies. DASH methodologies involve divers removing plants from the sediment and then feeding them into a suctioned hose for delivery to the deck of the harvesting vessel. The DASH methodology is considered a form of mechanical harvesting and thus requires a WDNR-approved permit. DASH is thought to be more efficient in removing target plants than divers alone and is believed to limit fragmentation during the harvesting process. Professional services to remove EWM do not require a permit unless DASH or a mechanical device is being used in the process.

The ULERCLC EWM Committee created a site prioritization methodology that considered EWM density from the 2021 Late Season EWM Mapping Survey, high-use areas, and other factors to outline the preliminary 2022 DASH harvest areas. Prior to the implementation of the hand-harvesting program, Onterra conducted an Early Season EWM Mapping Survey of the entire chain. The results of this survey were used to determine if changes in targeted areas or prioritization were warranted. Based upon this late-June survey, no changes were made to the initial DASH work areas outlined in the *2020 EWM Monitoring & Control Strategy Assessment Report (March 2022)* and outlined in the WDNR permit materials.

Over the course of 16 days, approximately 3,232 lbs of EWM were removed from the Eagle River Chain in 2022 (Table 2.1-1). Watersmeet Lake area A-22 was not harvested due to surface matting native plant species in the area which would have made inefficient work conditions. Further details of hand-harvesting efforts and amount of EWM removed on a site-by-site basis is discussed within the Individual Lake Sections (4.0) below, as well as can be accessed on the ULERCLC's interactive map.

Table 2.1-1. 2022 Hand-harvest summary.
Summarized from Appendix A.

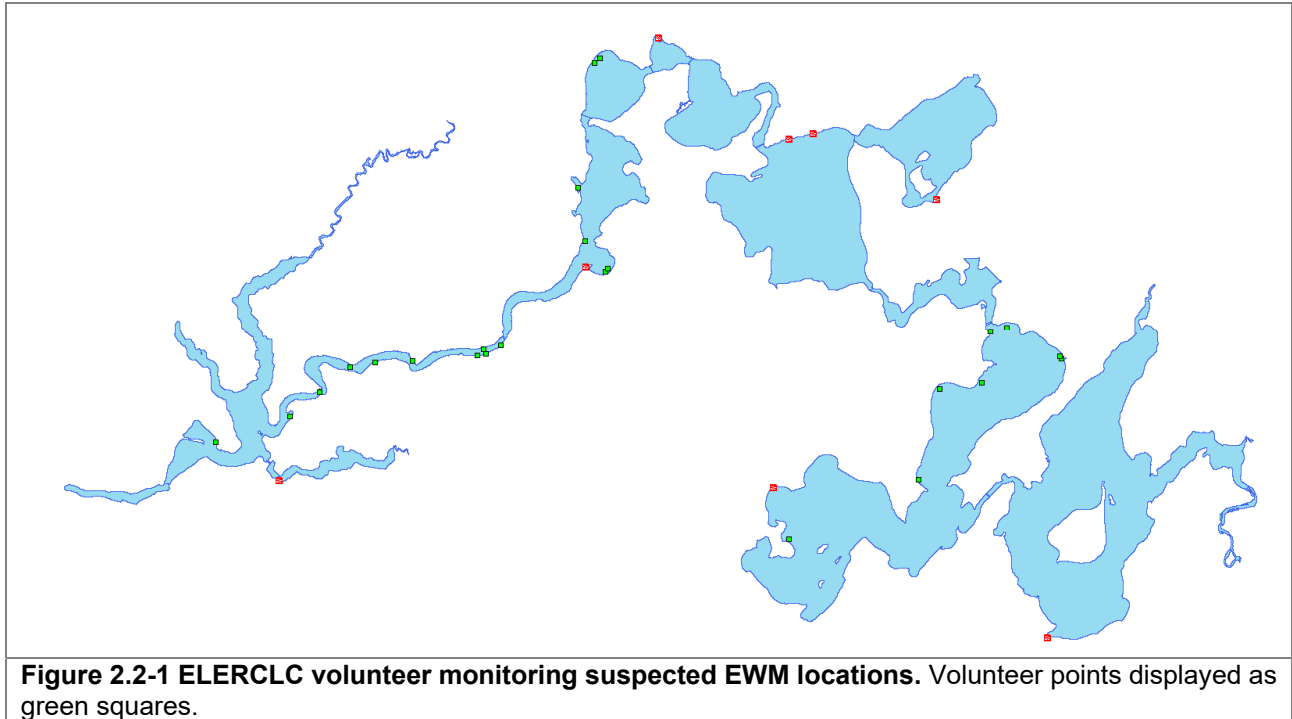
DASH Removal Summary		
Site	Time Spent (Hours)	Total EWM Removed (lbs)*
Cat A-22	15.5	436
Cat B-22	39.0	950
Cat E-22	7.3	364
Cat F-22	14.0	702
Cat G-22	15.5	594
YBL B-22	14.5	186
Wat A-22	0	0
Total	105.8	2202

*Each harvesting event included between
5-15% non-target species

2.2 Volunteer EWM Surveillance Monitoring

In recent years, a team of dedicated ULERCLC volunteers have conducted EWM monitoring efforts during the summer months. 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. In the event that the 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. In 2022, ULERCLC volunteer monitoring efforts identified suspected EWM within Watersmeet Lake, the Eagle River between Watersmeet and Yellow Birch Lake, Yellow Birch Lake, Duck Lake, and in Catfish Lake (Figure 2.2-1).

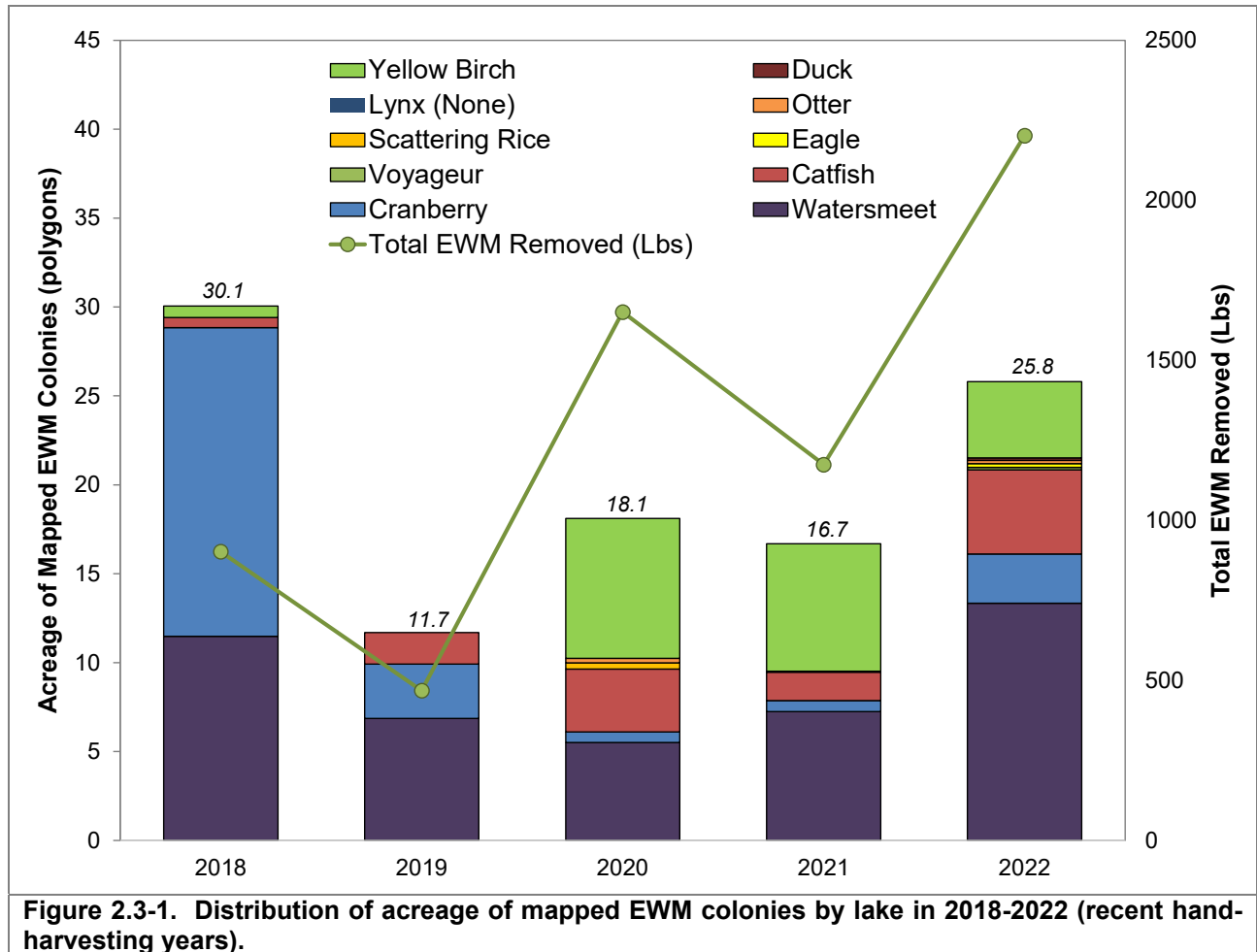


2.3 Late-Season EWM Mapping Surveys

As shown on Figure 2.3-1, 25.8 acres of EWM was located during the 2022 Late-Season EWM Mapping Survey on the Chain. This is an increase compared to the 16.7 acres mapped in 2021 and is much lower than acreages of colonized EWM documented annually from 2007-2009. Historically, the majority of the EWM acreage mapped in the Eagle River Chain of Lakes has been in Cranberry and Watersmeet Lakes. The EWM within these lakes is largely located in channelized areas where water flow is higher. Past herbicide treatments conducted in these areas revealed it is difficult to achieve the needed concentration and exposure time to achieve EWM mortality. In 2020-2022 however, EWM acreage in Cranberry Lake has been very low (1.3-acre average), aside from 2015 when no polygons were mapped at all there.

The highest EWM acreages during the 2022 Late-Season EWM Mapping Survey were from Watersmeet, Catfish, and Yellow Birch Lakes, each with 13.0, 4.7, and 4.3 acres respectively (Figure 2.3-1). All lakes within the chain, with the exception of Lynx and Yellow Birch Lakes, saw increases in EWM during 2022 when compared to 2021.

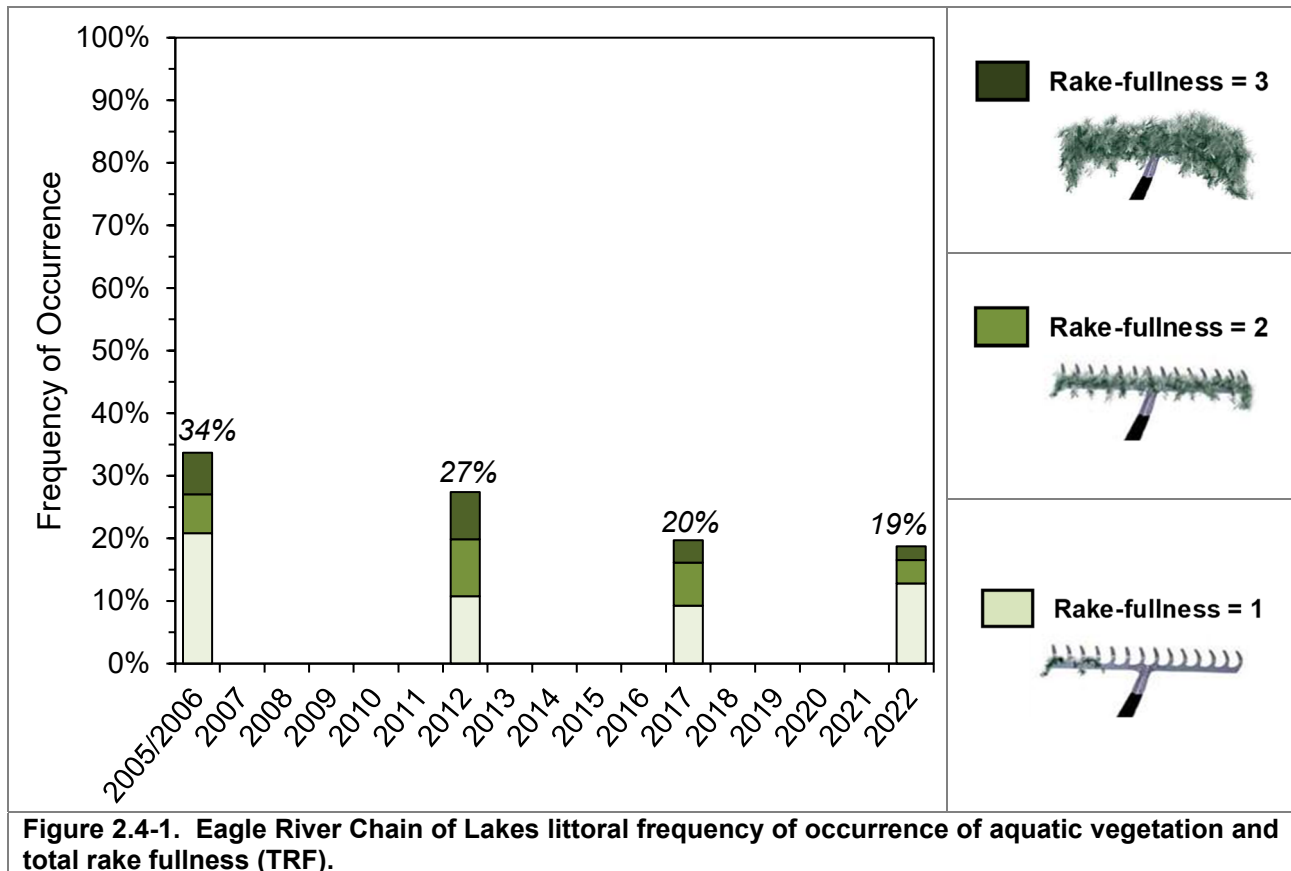
As colonized EWM populations increased chain-wide from 2021 to 2022, the amount of EWM occurrences marked with point-based methodologies has remained relatively stable during this timeframe in most areas. The majority of point data consists of *single or few plants*.



2.4 2022 Aquatic Vegetation Point-Intercept Survey Results

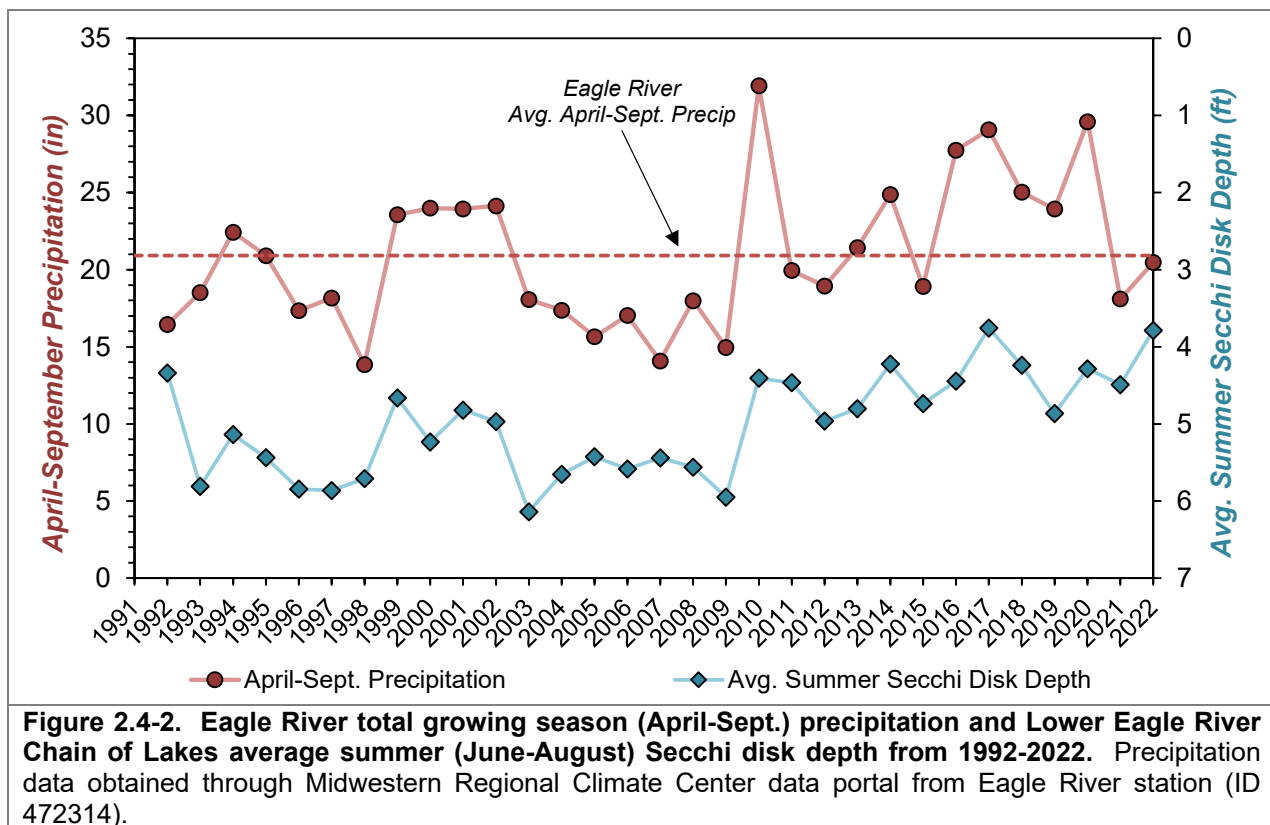
The point-intercept survey provides a standardized way to gain quantitative information about a lake's aquatic plant population through visiting predetermined locations and using a rake sampler to identify all the plants at each location. The point-intercept survey can be applied at various scales. Most commonly, the point-intercept survey is applied at the whole-lake scale to provide a lake-wide assessment of the overall plant community. More focused point-intercept surveys, called sub-sample point-intercept surveys, may be conducted over specific areas to monitor an active management strategy such as herbicide treatments or mechanical harvesting. These types of focused sub-sample point-intercept surveys have been conducted on the Eagle River Chain as part of prior herbicide treatment monitoring and planning.

The whole-lake point-intercept surveys were conducted on the Eagle River Chain of Lakes on July 18-21 2022. The results of these surveys can be compared to the results from the 2005/06, 2012, and 2017 point-intercept surveys to determine if any significant changes in the abundance of plants or species composition have occurred over this period. In 2005/06, of the 3,669 point-intercept sampling locations on the Lower Eagle River Chain, 34% contained aquatic vegetation (frequency of occurrence) (Figure 2.4-1). In 2012, the frequency of occurrence of aquatic plants decreased to 27%. In 2017, the frequency of occurrence of vegetation was found to have declined further to 20%. The 2022 surveys showed the frequency of occurrence of vegetation declined again to 19% and less TRF ratings of 2 or 3 were found indicated less biomass. Overall, the frequency of occurrence of native aquatic vegetation in the chain has remained about the same since the 2017 survey.

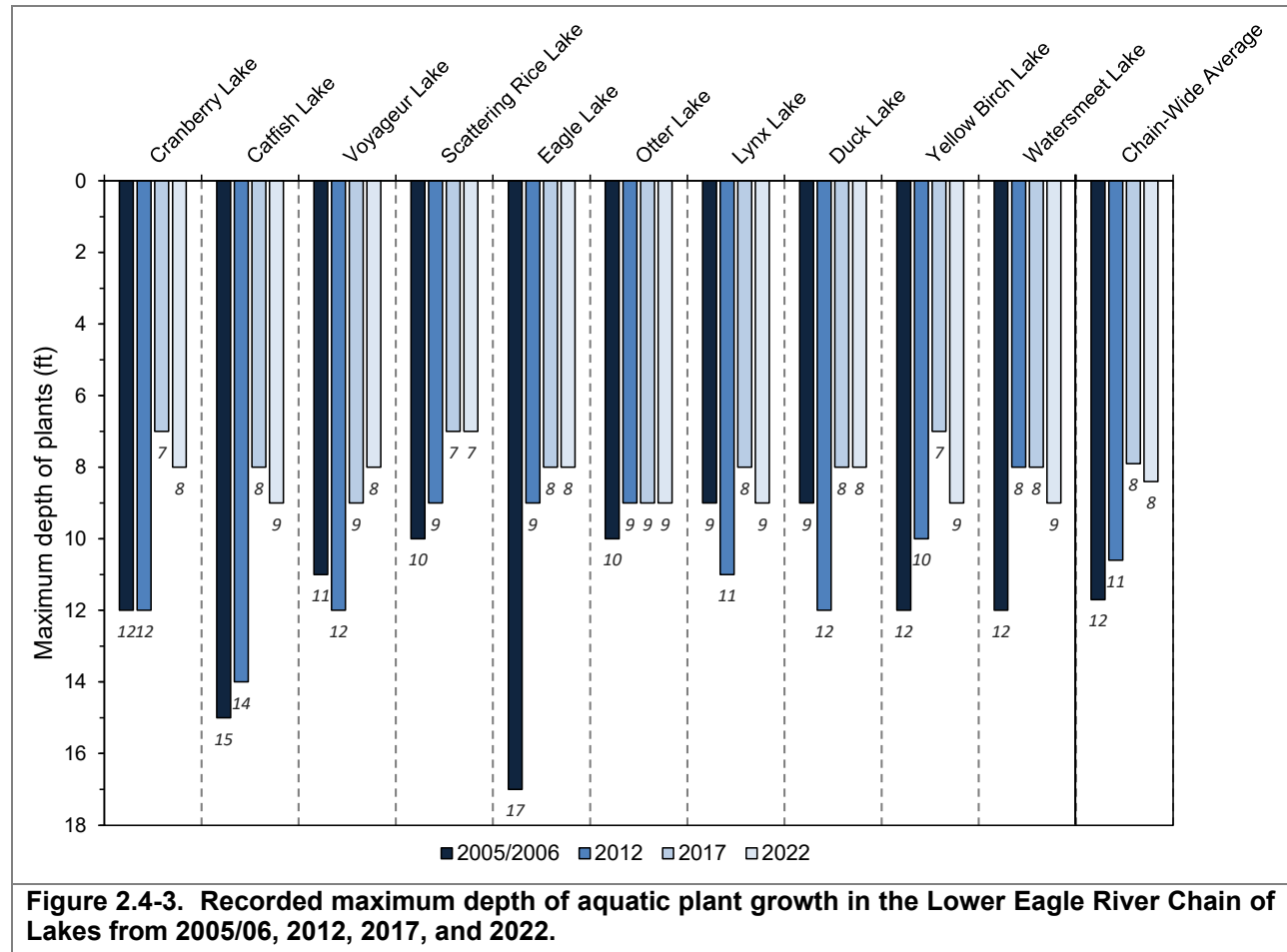


Since the herbicide (2,4-D amine and 2,4-D ester) used to control EWM on the chain has been shown to have potential adverse impacts to select native aquatic plant species, a link to the decline in the overall occurrence of aquatic vegetation from 2005 to 2017 in the chain was evaluated. The amount of acreage applied with herbicide in the chain was highest from 2008-2010, with an average of 257 acres applied with herbicide per year. The amount of acreage treated from 2011-2015 was lower with an annual average of 69 acres, and no herbicide applications took place between 2016 and 2022. Despite less acreage treated in the chain between 2012-2015 and the absence of herbicide use between 2016-2022, native aquatic plant occurrence has continued to decline.

Within the *Comprehensive Management Planning Project*, the role of reduced water clarity caused by above-normal growing season precipitation was investigated in terms of the reduction in native aquatic vegetation over this period. Average chain-wide water clarity has declined by approximately 2.0 feet in recent years, coinciding with increases in precipitation (Figure 2.4-2).



In 2022, average chain-wide Secchi disk depth was 3.8 feet, one of the lowest values recorded since record keeping began in 1992. Response of the aquatic plant community to the reduction in water clarity is evidenced by the recorded maximum depth of plant growth during the point-intercept surveys. In 2005/2006, the chain-wide average maximum depth of aquatic plant growth was 11.7 feet (Figure 2.4-3). In 2012, the chain-wide average maximum depth of aquatic plant growth declined to 10.7 feet, which then declined further in 2017 to 7.9 feet. The reduction in light availability with decreased water clarity, caused aquatic plant growth to decline in deeper waters between 2012 and 2017. The 2022 point-intercept surveys showed a slight increase in the average maximum depth of plant growth to 8.4 feet.



Chi-square analysis ($\alpha = 0.05$) was used to compare individual aquatic plant species chain-wide littoral frequencies of occurrence between the point-intercept surveys in 2005/06, 2012, 2017, and 2022 (Figure 2.4-4). The aquatic plant species that had a littoral frequency of occurrence of at least 5% in one of the four surveys are applicable for analysis. Within the some of the individual lake analysis, slender pondweed (*Potamogeton berchtoldii*) and small pondweed (*P. pusillus*) are lumped together as well as muskgrasses *Chara* spp.) & stoneworts (*Nitella* spp. due to their morphological similarity. Prior to 2011, slender pondweed (*Potamogeton berchtoldii*) was considered to be a subspecies of small pondweed (*P. pusillus*) until genetic studies warranted classification of slender pondweed as a distinct species. Of the native aquatic plant species that had a littoral occurrence of at least 5% in one of the four surveys, eight exhibited statistically valid changes in their littoral occurrence between the 2017 and 2022 surveys.

Of the eight native species which saw changes in their littoral frequency of occurrence between the 2017 and 2022 surveys, six saw statistically valid reductions in their occurrence, while two native species showed valid increases during the same timeframe (Figure 2.4-4).

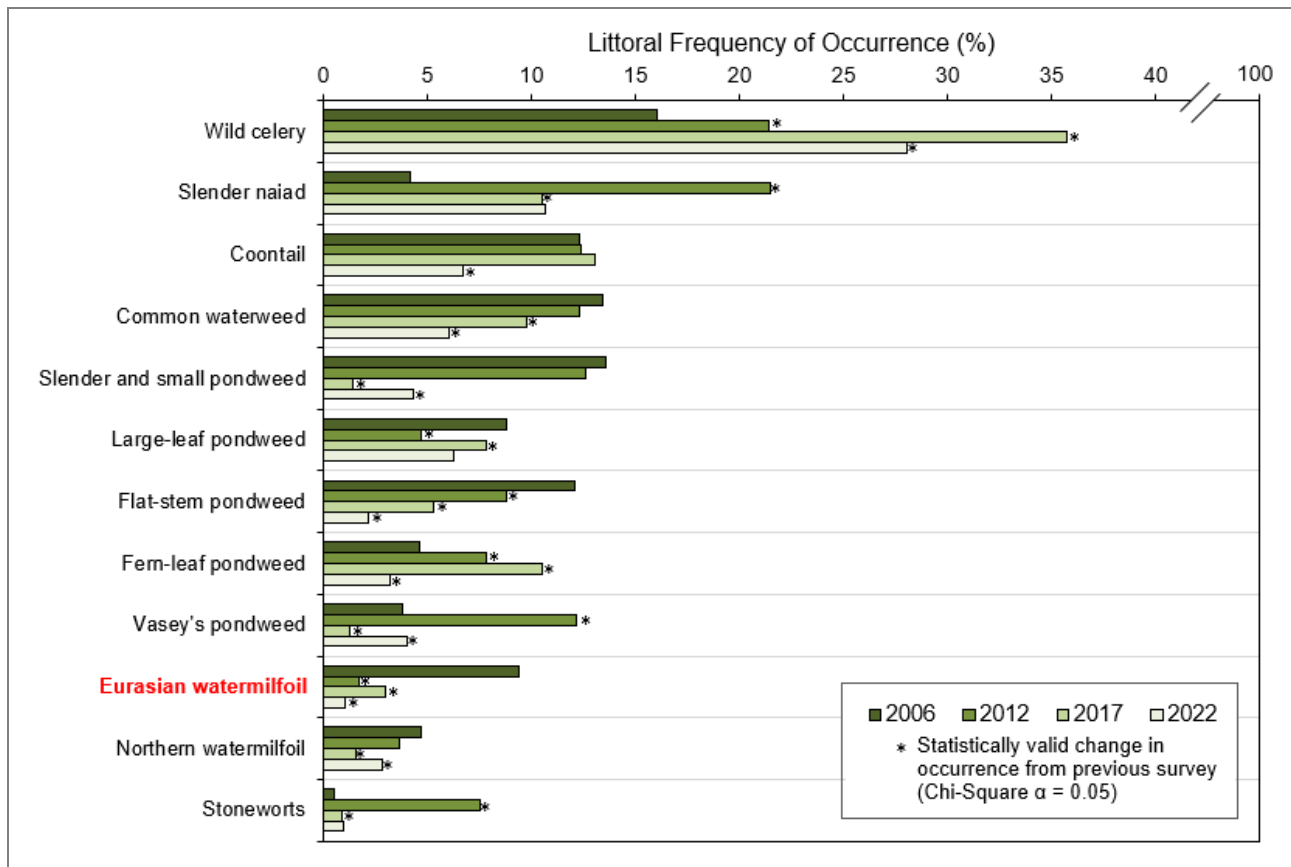
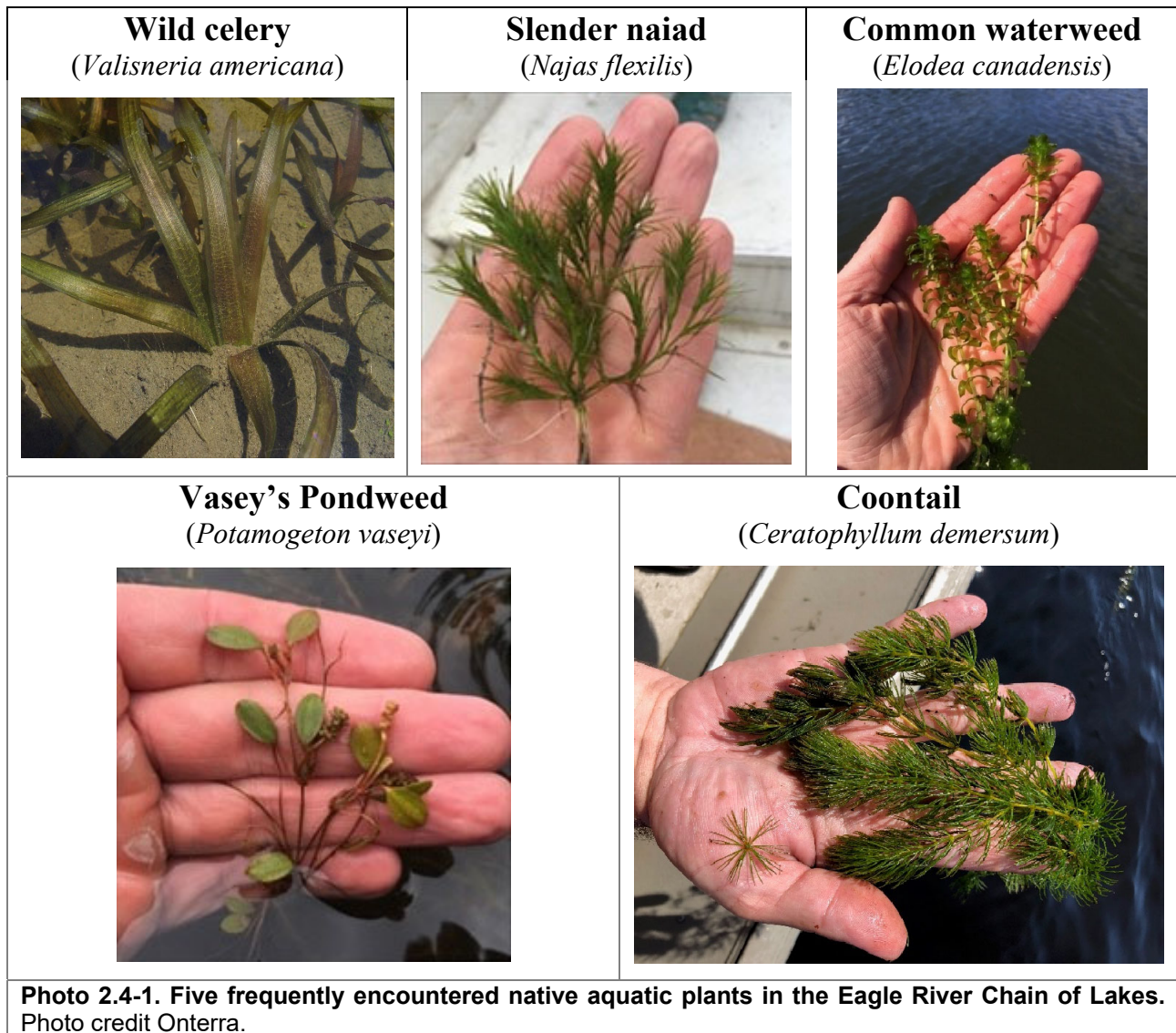


Figure 2.4-4. Eagle River Chain of Lakes littoral frequency of occurrence of select aquatic plant species from 2005/06, 2012, 2017, and 2022 point-intercept surveys. Please note that only those species with an occurrence of at least 5% in one of the surveys are displayed.

Wild celery (*Valisneria americana*) had been the most commonly encountered species during point-intercept surveys within the Eagle River Chain. Wild celery is a submerged aquatic plant with ribbon-shaped floating leaves that may grow to as long as two meters, depending on water depth (Photo 2.4-1). It is a preferred food choice by numerous species of waterfowl and aquatic invertebrates.

Coontail (*Ceratophyllum demersum*) was very stable throughout the previous surveys until the 2022 when the littoral occurrence declined by 49%. Coontail has whorls of leaves which fork into two to three segments, and provides ample surface area for the growth of periphyton and habitat for invertebrates. Unlike most of the submersed plants found in Wisconsin, coontail does not produce true roots and is often found growing entangled amongst other aquatic plants or matted at the surface. Because it lacks true roots, coontail derives most of its nutrients directly from the water (Gross, Erhard, & Ivanyi, 2003).

Like coontail, common waterweed (*Elodea canadensis*) can be found in waterbodies across Wisconsin, is tolerant of high-nutrient, low-light conditions, and can grow to nuisance levels under ideal conditions. Common waterweed has blade-like leaves in whorls of three produced on long, slender stems. Like other submersed aquatic plants, common waterweed helps to stabilize bottom sediments and provides structural habitat and food for wildlife.



Slender naiad (*Najas flexilis*), a common annual species in Wisconsin, is considered to be one of the most important food sources for a number of migratory waterfowl species (Borman, Korth, & Temte, 1997). Their numerous seeds, leaves, and stems all provide sources of food. The small, condensed network of leaves provide excellent habitat for aquatic invertebrates.

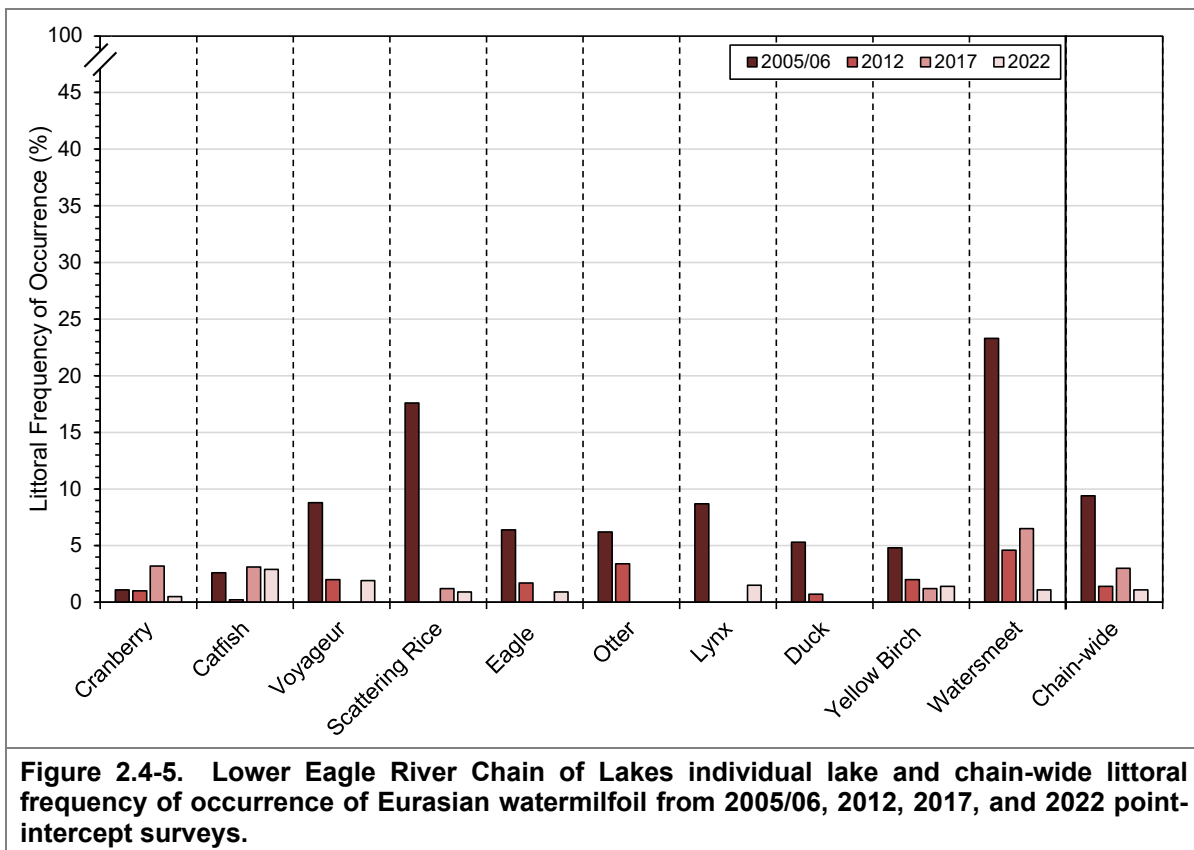
Vasey's pondweed (*Potamogeton vaseyi*), is listed by the Wisconsin Natural Heritage Inventory as a species of special concern in Wisconsin due to uncertainty regarding its distribution and abundance in Wisconsin. Vasey's pondweed is typically found in bays of large soft-water lakes as well as in rivers and ponds. The littoral occurrences of Vasey's pondweed saw statistically valid increases over the period from 2005/06 to 2022 (Figure 2.4-4). Vasey's pondweed produces very fine, narrow leaves which alternate along a long, slender stem (Photo 2.4-1).

Aquatic plant communities are dynamic and the abundance of certain species from year to year can fluctuate depending on climatic conditions, herbivory, competition, disease, and management among other factors. Ongoing research on Wisconsin's lakes shows that native aquatic plant populations can

fluctuate over short- and long-term periods, believed to be driven by natural variations in climate, growing season, water levels, etc.

The chain-wide littoral frequency of occurrence of EWM in the Eagle River Chain of Lakes was found to have exhibited a statistically valid reduction in occurrence of 64% from 2017 to 2022 (Figure 2.4-4). In 2006 the EWM littoral frequency of occurrence was 9.4%, while during the 2022 survey it was found to at its lowest of all four surveys at 1.1%.

Figure 2.4-5 displays the individual littoral frequency of occurrence of EWM within each of the Eagle River Chain of Lakes from 2005/06, 2012, 2017, and 2022. Between 2005/06 to 2017, the littoral frequency of occurrence of EWM varied within each lake from 0% to 23.3%. In 2022, the littoral frequency of occurrence of EWM in each lake ranged from 0% in Otter Lake to 2.9% in Catfish. As is discussed within the individual lake summary and conclusion sections, ecologists still observed EWM in Otter and Duck Lakes during 2022; however, EWM was not physically encountered on the survey rake during the point-intercept survey which results in an occurrence of 0%.



With the exception of Watersmeet, the lakes within the Lower Eagle River Chain of Lakes have maintained EWM littoral frequencies of occurrence of 3% or less between 2012 and 2022. The 2022 surveys indicate that overall, the EWM population within the Lower Eagle River Chain of Lakes remains low and highlights the continued success of the control and monitoring program. However, areas still remain within the chain that have larger, localized populations of EWM. These areas in 2022 primarily include localized areas in Catfish Lake and the Wisconsin River branch of Watersmeet.

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. The 2022 EWM population of the Eagle River Chain of Lakes continues to mostly consist of locations mapped with point-based methods or mapped with low-density colonies. Higher density EWM populations have been documented in Catfish Lake, and in river portions of Watersmeet Lake. The high flows in the Wisconsin River make reaching EWM control goals difficult. Currently some of the high-density EWM populations in Watersmeet are in low-traffic areas with navigation obstructions (i.e., stumps). No areas within the Chain meet the management plan trigger for considering herbicide control in 2022, resulting in seven consecutive years without herbicide management.

Due largely to manual removal expenditures being less than estimated within the WDNR AIS Control Grant (ACEI-240-20), the ULERCLC was able to extend this 3-year project through 2023. This project will follow the same monitoring and planning strategy utilized during the history of this project.

Using the 2022 Late-Season EWM Mapping Surveys, a preliminary professional manual removal EWM control strategy for 2023 was developed targeting 6 sites in Catfish, 1 site in Yellow Birch, and one site in Watersmeet (Figure 3.0-1). Based upon the results of the 2023 Early-Season AIS Survey, areas could potentially be added, omitted, or revised. Onterra will provide the hand-harvesting firm with the spatial data from the early-season survey to aid the removal efforts.

Low-density occurrences in the shallow bay to the east of the T-Docks Boat Landing (area locally known as the *bullpen*) would be targeted with organized volunteer-based efforts. Relatively shallow water, coupled with a modest EWM population in this site may allow for volunteers to effectively harvest EWM with minimal accessories such as fins or a snorkeling mask.

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.

Following the hand-harvesting activities, a Late-Season EWM Mapping Survey will qualitatively assess the EWM removal efforts and be used to plan management and monitoring activities in 2024.

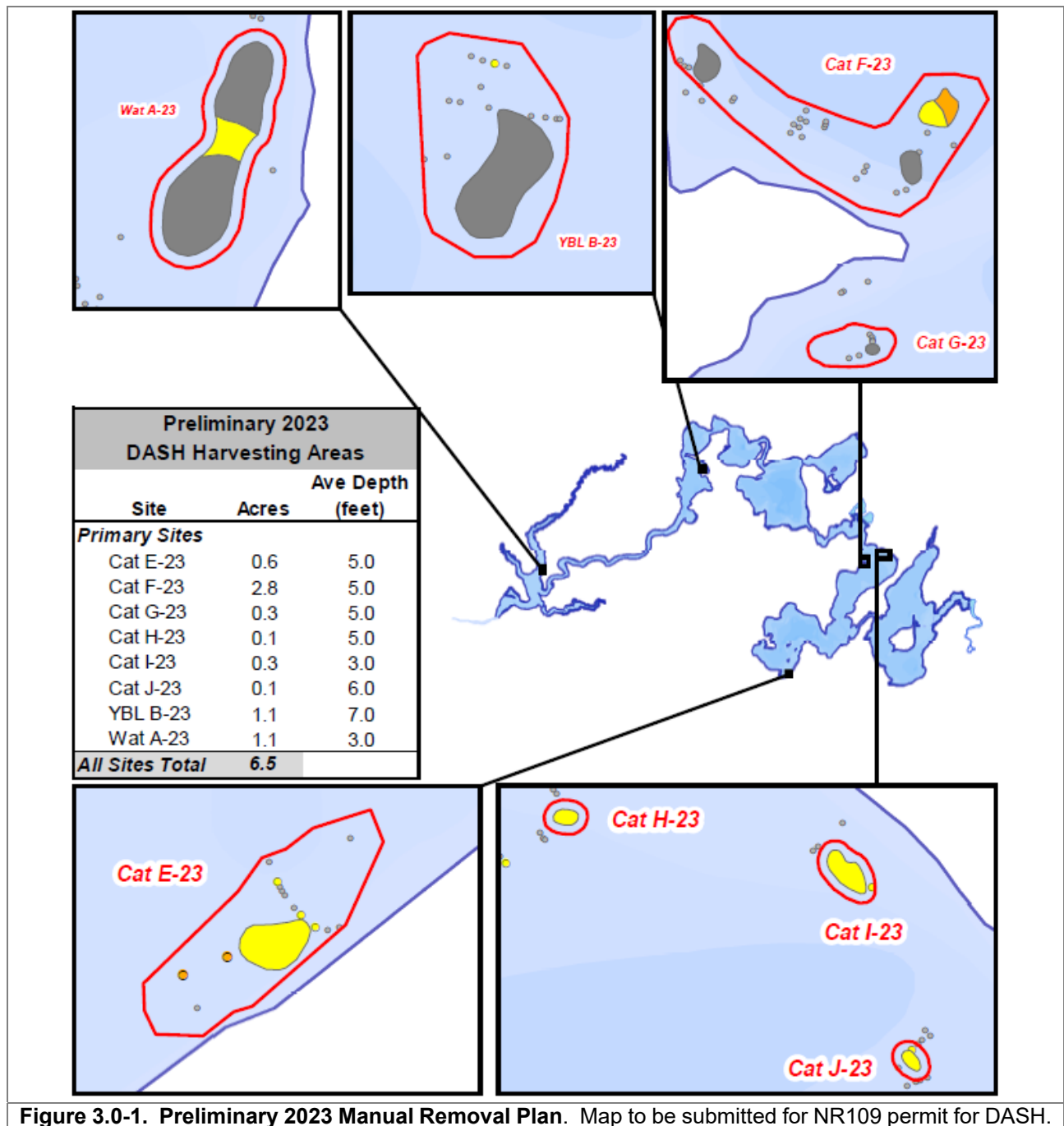


Figure 3.0-1. Preliminary 2023 Manual Removal Plan. Map to be submitted for NR109 permit for DASH.

4.0 INDIVIDUAL LAKE SECTIONS

The remainder of this report will focus on the 2022 EWM monitoring and management activities and point intercept survey results 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.

Professional EWM monitoring surveys took place on each lake twice during 2022. An early season AIS survey (ESAIS) was completed during July 5-7, and a Late-Season EWM Mapping Survey was completed on September 13-14.

The whole-lake point-intercept surveys were conducted on the Eagle River Chain of Lakes on July 18-21, 2022, with highlights of each individual lake's results included in the individual lake sections. A table displaying the littoral frequency of occurrence of each aquatic plant species from all four point-intercept surveys is included in Appendix B.

4.1 Cranberry Lake

EWM Monitoring & Management

As in past years, the EWM population in Cranberry Lake was mapped professionally during Onterra's 2022 Early-Season AIS (ESAIS) and Late-Season EWM Mapping Survey (also called EWM Peak-Biomass Survey). During the ESAIS Survey, the entire littoral zone of the Lower Eagle River Chain of Lakes was searched for EWM by Onterra field staff. Completion of an ESAIS 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. No volunteer data points were added to Cranberry Lake following the ESAIS survey.

The majority of EWM in Cranberry Lake in 2022 was mapped in small protected bays and shallow nearshore areas (Cranberry Lake - Map 1). The total acreage of contiguous EWM colonies mapped during the 2022 Late-Season EWM Mapping Survey was about the same as the acreage found during the 2019 survey - 2.9-acres. These were again small, low-density occurrences with acreages below previous years (2017 and 2018) when dense colonies over more areas were observed. A low EWM population that consisted of isolated *single or few plants* occurrences were located within the Cranberry Channel area where large contiguous colonies have been present in past years. The population in this area of the lake has declined significantly between 2019-2022 in the absence of management efforts.

Because of the modest overall EWM population in Cranberry Lake, with no areas of *dominant* or greater density ratings, no herbicide strategy is being considered for 2023. While Cranberry Lake did see a slight increase in the acreage of the EWM population, there are no hand-harvesting sites being proposed for EWM management efforts in 2023. Professional EWM monitoring will continue during 2023 including early and late-season AIS surveys.

2022 Point-Intercept Survey Results

The entire aquatic plant community in Cranberry Lake was assessed in 2022 through the completion of a whole-lake point-intercept survey. The whole-lake point-intercept survey was conducted in Cranberry Lake on July 20-21, 2022 and 34 aquatic plant species were recorded. Wild celery (39.8%), slender naiad (16.1%), common waterweed (13.4%), and large-leaf pondweed (12.4%) were the most frequently encountered species (Figure 4.1-1).

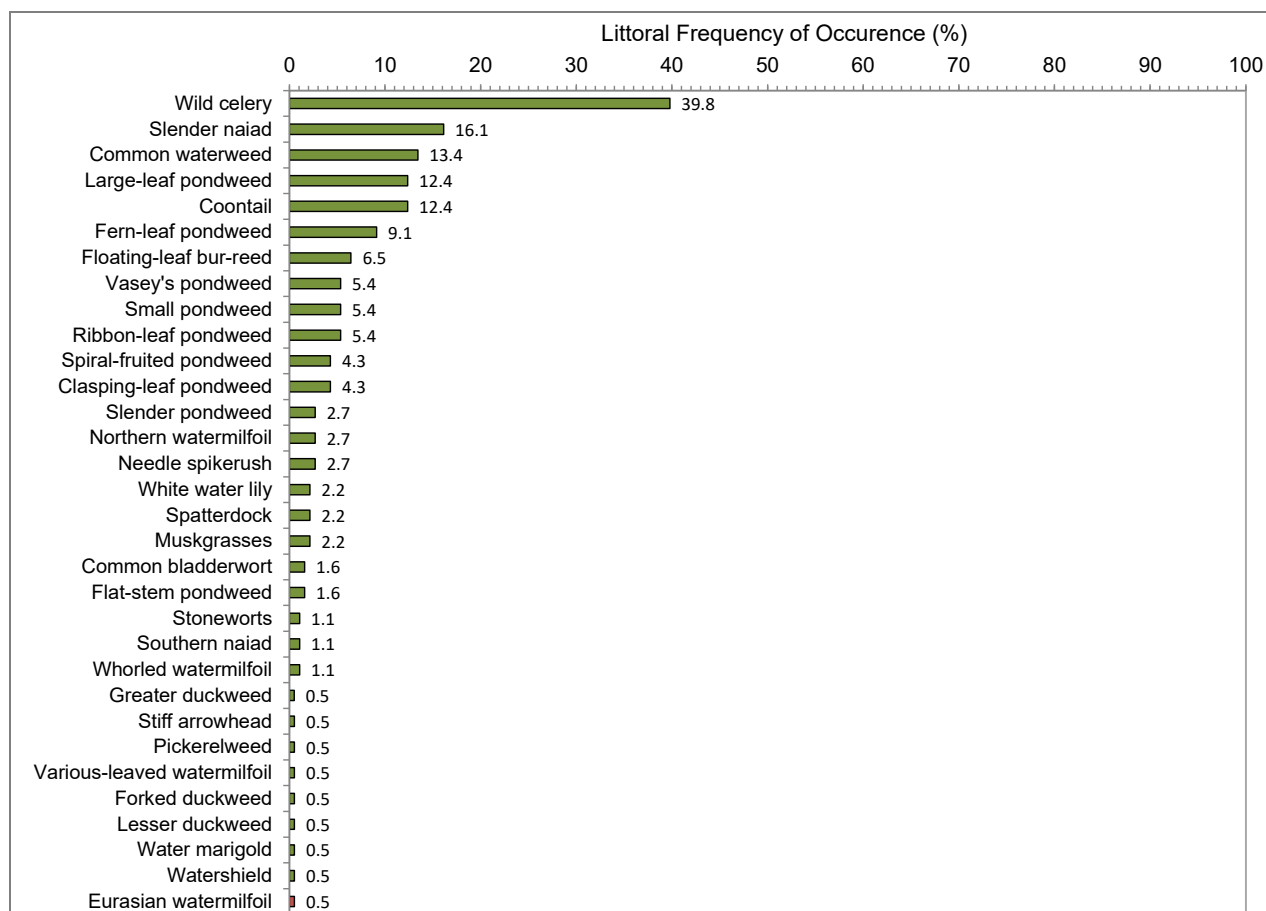
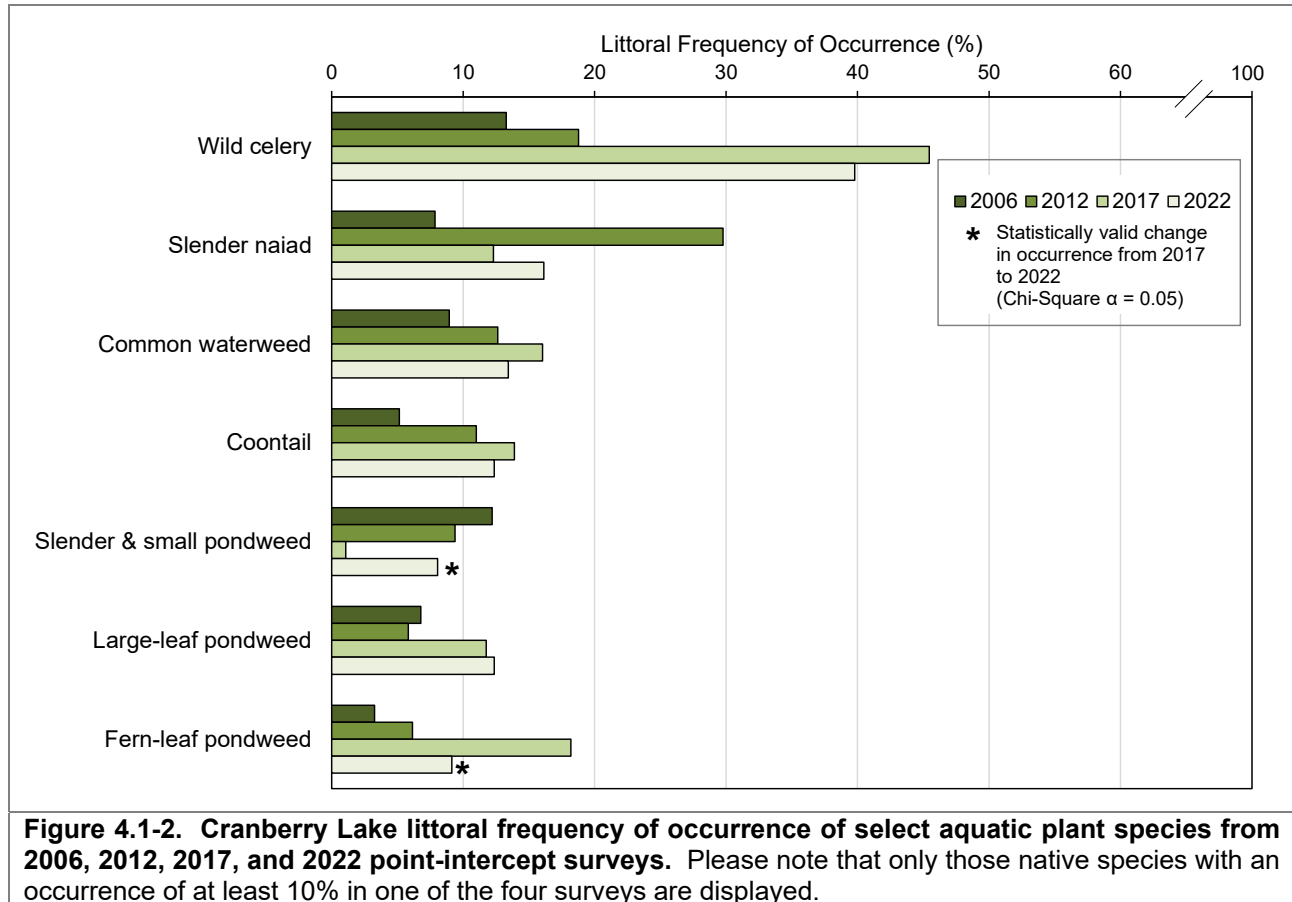


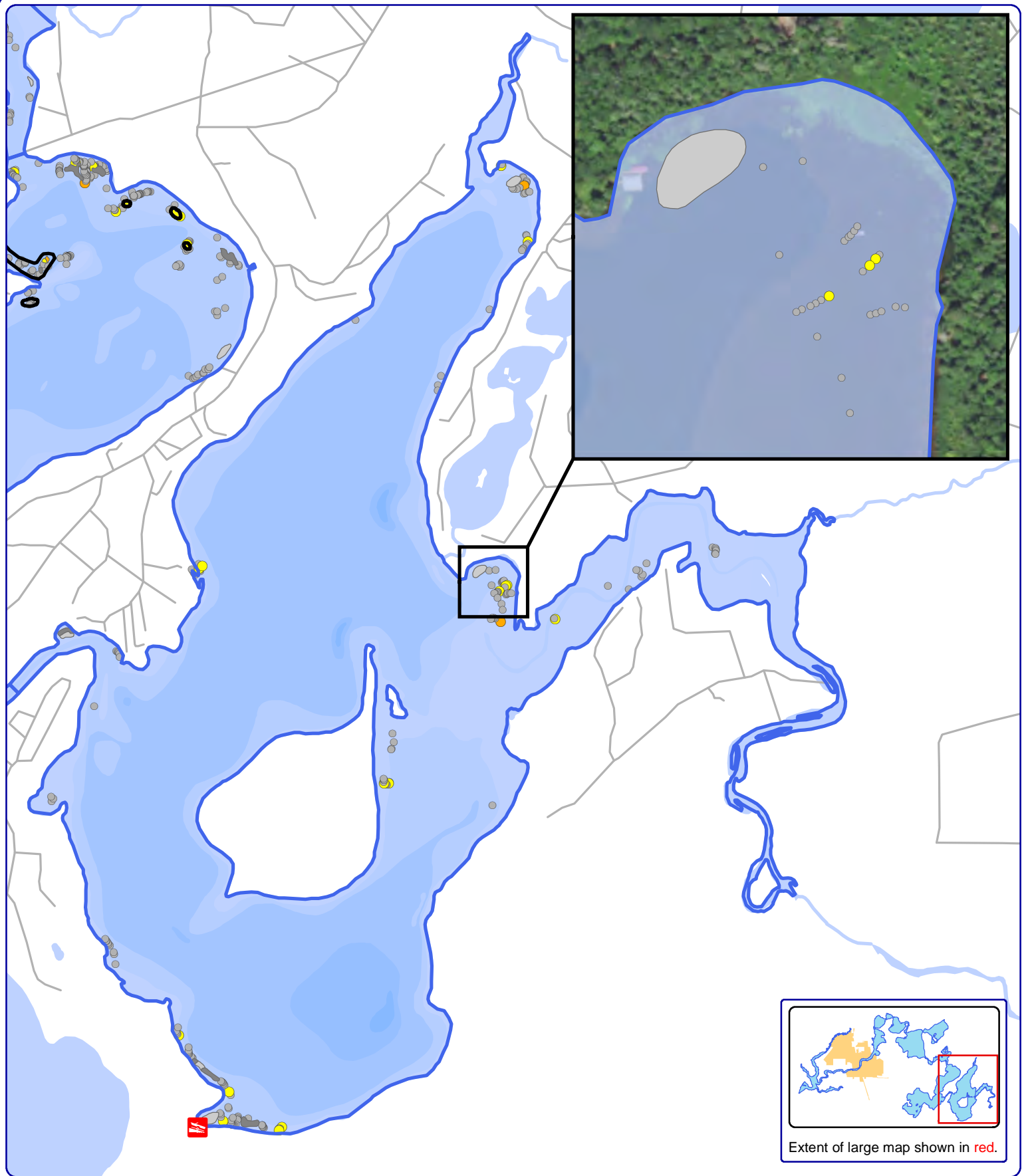
Figure 4.1-1. Cranberry Lake littoral frequency of occurrence of aquatic plant species from 2022 point-intercept survey.

A chi-square analysis ($\alpha = 0.05$) was used to compare individual aquatic plant species littoral occurrences in Cranberry Lake between the point-intercept surveys in 2006, 2012, 2017, and 2022 (Figure 4.1-2). The aquatic plant species that had a littoral frequency of occurrence of at least 5% in at least one of the four surveys are included in the analysis. A table displaying the littoral frequency of occurrence of each aquatic plant species from all four point-intercept surveys is included in Appendix B.

Fern-leaf pondweed exhibited a statistically valid reduction in its occurrence from 2017-2022. The littoral frequencies of occurrence of small and slender pondweed displayed statistically valid increase from 2017 to 2022.

The occurrence of EWM has been relatively low in past surveys with 1.1% occurrence in 2006, 1.0% in 2012, and 3.2% in 2017. Eurasian watermilfoil was present at one sampling location in the 2022 survey, resulting in a littoral frequency of occurrence of 0.5%.





4.2 Catfish Lake

EWM Monitoring & Management

As has occurred in past years, the EWM population in Catfish Lake was mapped professionally during Onterra's 2022 Early-Season AIS (ESAIS) and Late-Season EWM Mapping Surveys (also called EWM Peak-Biomass Survey). During the ESAIS Survey, the entire littoral zone of the Lower Eagle River Chain of Lakes was searched for EWM by Onterra field staff. Completion of an ESAIS 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 ESAIS 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 ESAIS Survey. Volunteers marked several locations of suspected EWM during the summer and shared the findings with Onterra in advance of the Late-Season Survey.

The ULERCLC contracted with DASH Aquatic Services, LLC to conduct professional DASH harvesting of EWM in five sites in Catfish Lake in 2022. Over a period of about 16 days in June, July, and August of 2022, a total of approximately 3,046 pounds of EWM were harvested from sites within Catfish Lake (Table 4.2-1).

Site Cat B-22 saw the greatest amount of professional harvesting efforts in 2022 with approximately 950 pounds of EWM removed over six days. Monitoring shows a reduction in the EWM population in the site following the hand harvesting efforts. A *dominant* colony on the north end of the site was reduced to a *highly scattered* density, while the main body of the site was reduced from *scattered* density to *highly scattered* (Figure 4.2-1).

Table 4.2-1. 2022 Hand-harvest summary.
Summarized from Appendix A.

DASH Removal Summary		
Site	Time Spent (Hours)	Total EWM Removed (lbs)*
Cat A-22	15.5	436
Cat B-22	39.0	950
Cat E-22	7.3	364
Cat F-22	14.0	702
Cat G-22	15.5	594
YBL B-22	14.5	186
Wat A-22	0	0
Total	105.8	2202
*Each harvesting event included between 5-15% non-target species		

The EWM population before and after harvesting efforts in sites F-22 and G-22 are highlighted in Figure 4.2-1. Professional harvesting in site F-22 totaled 14 hours of dive time resulting yielding 702 pounds of harvested EWM. Nearly 600 pounds of EWM were harvested from site Cat G-22 over the course of 15.5 hours of effort. A reduction in one particular *dominant/highly dominant* colony of EWM within site F-22 is apparent when comparing the pre- and post-harvesting mapping surveys (Figure 4.2-1). A reduction in the EWM population within site G-22 was also documented when comparing the pre- and post-harvesting mapping surveys, with the main *highly dominant* colony being reduced to a smaller *scattered* colony (Figure 4.2-1).

Professional hand harvesting efforts in site E-22 resulted in the harvest of 364 pounds of EWM. The site was reduced by one density rating in 2022 from *highly dominant* to *dominant* (Figure 4.2-1). Harvesting activities at site A-22 resulted in a reduction in density from *dominant* to *highly scattered*.

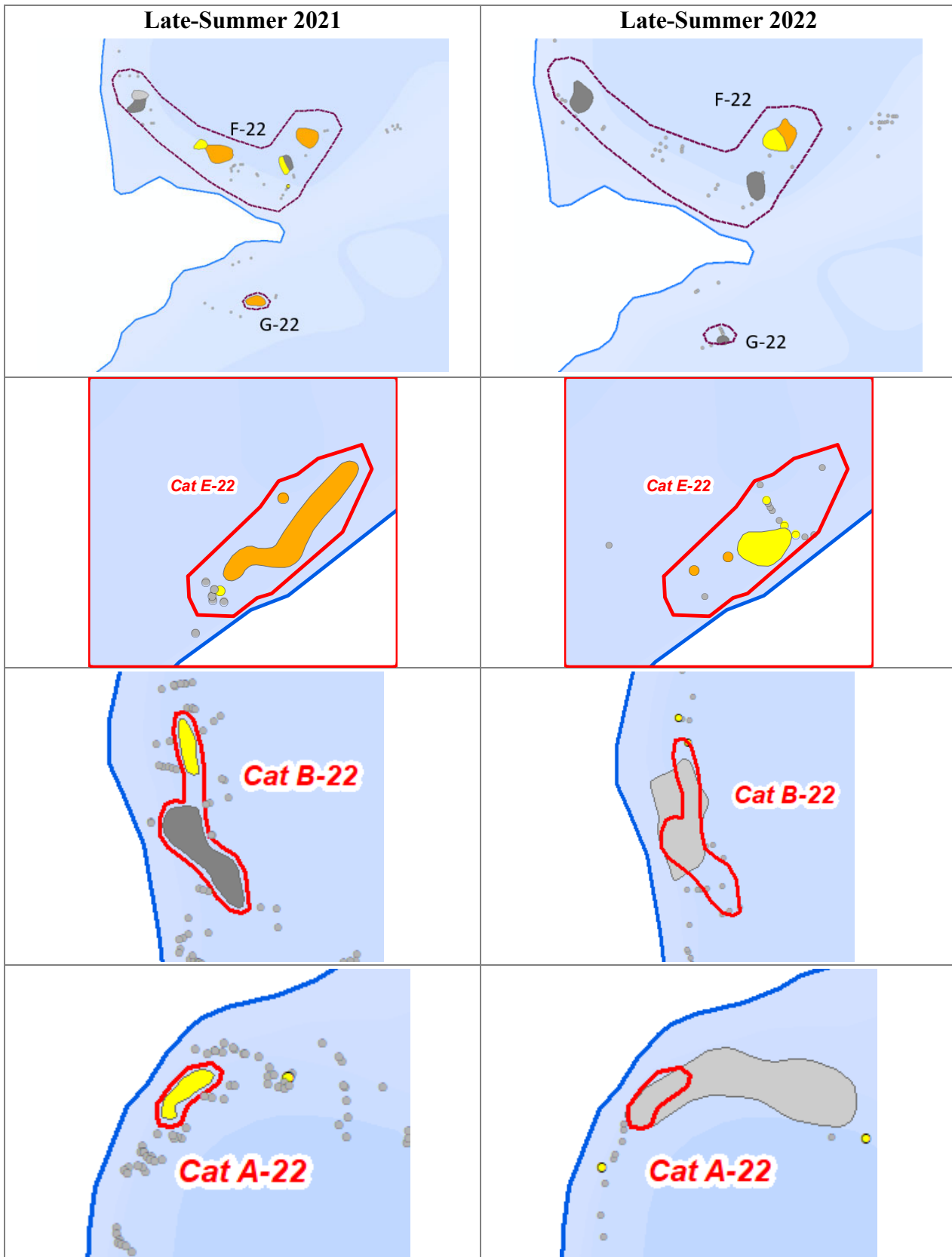


Figure 4.2-1. Before (2021) and After (2022) professional hand-harvesting at sites within Catfish Lake.

With the relatively small and low-density EWM population present in Catfish Lake in 2022, herbicide treatment is not being considered for 2023. However, six sites in Catfish Lake are being proposed for professional hand-harvesting actions in 2023 (Catfish Lake Map 2). The sites include continued efforts in former sites F-22 and G-22, as well as a number of other sites that harbor colonized EWM. The final DASH harvesting strategy is subject to change pending the results of the 2023 Early-Season AIS survey.

2022 Point-Intercept Survey Results

Onterra ecologists completed a whole-lake point-intercept survey on Catfish Lake on July 19-20, 2022. In total, 26 native aquatic plant species were encountered during the 2022 survey. Wild celery (40.8%), slender naiad (27.6%), and large-leaf pondweed (16.1%) were the most frequently encountered species in the 2022 survey (Figure 4.2-2).

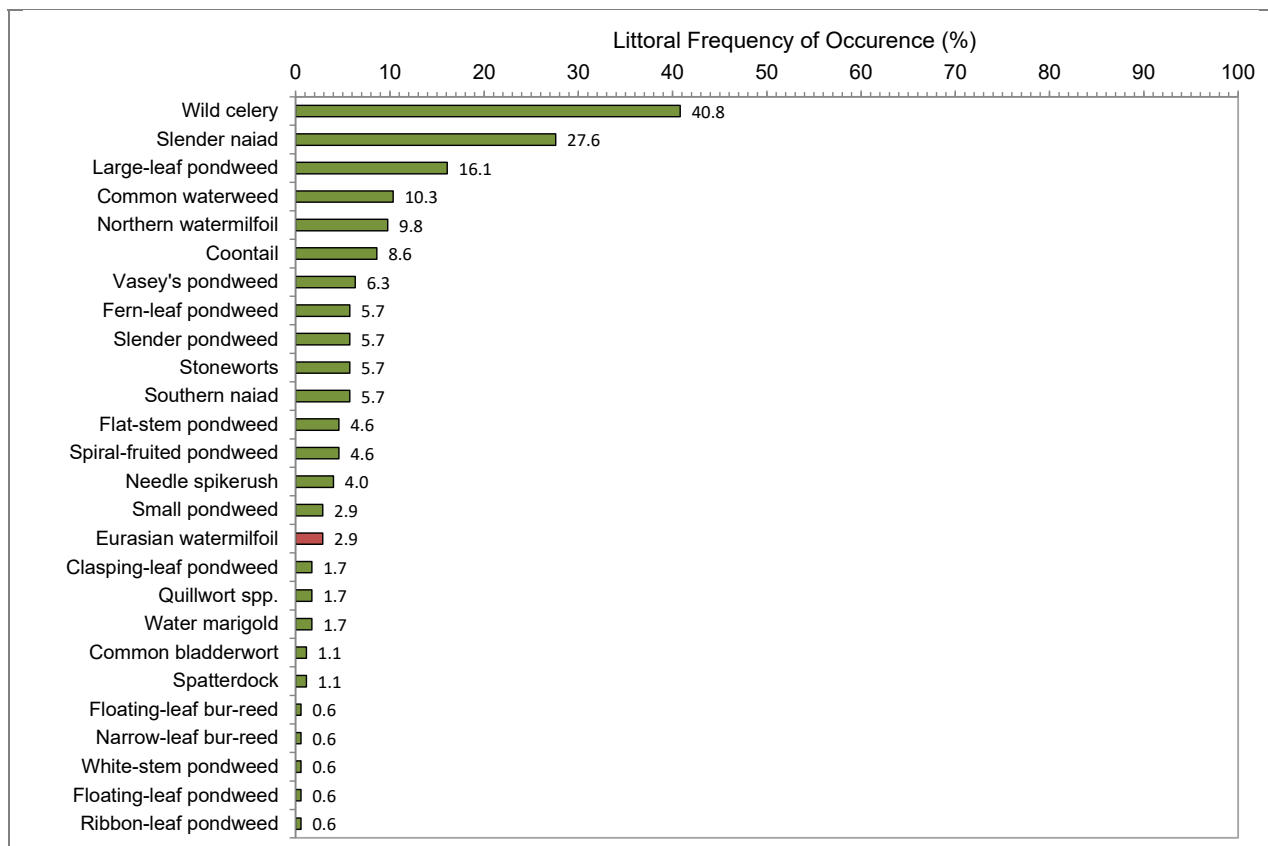


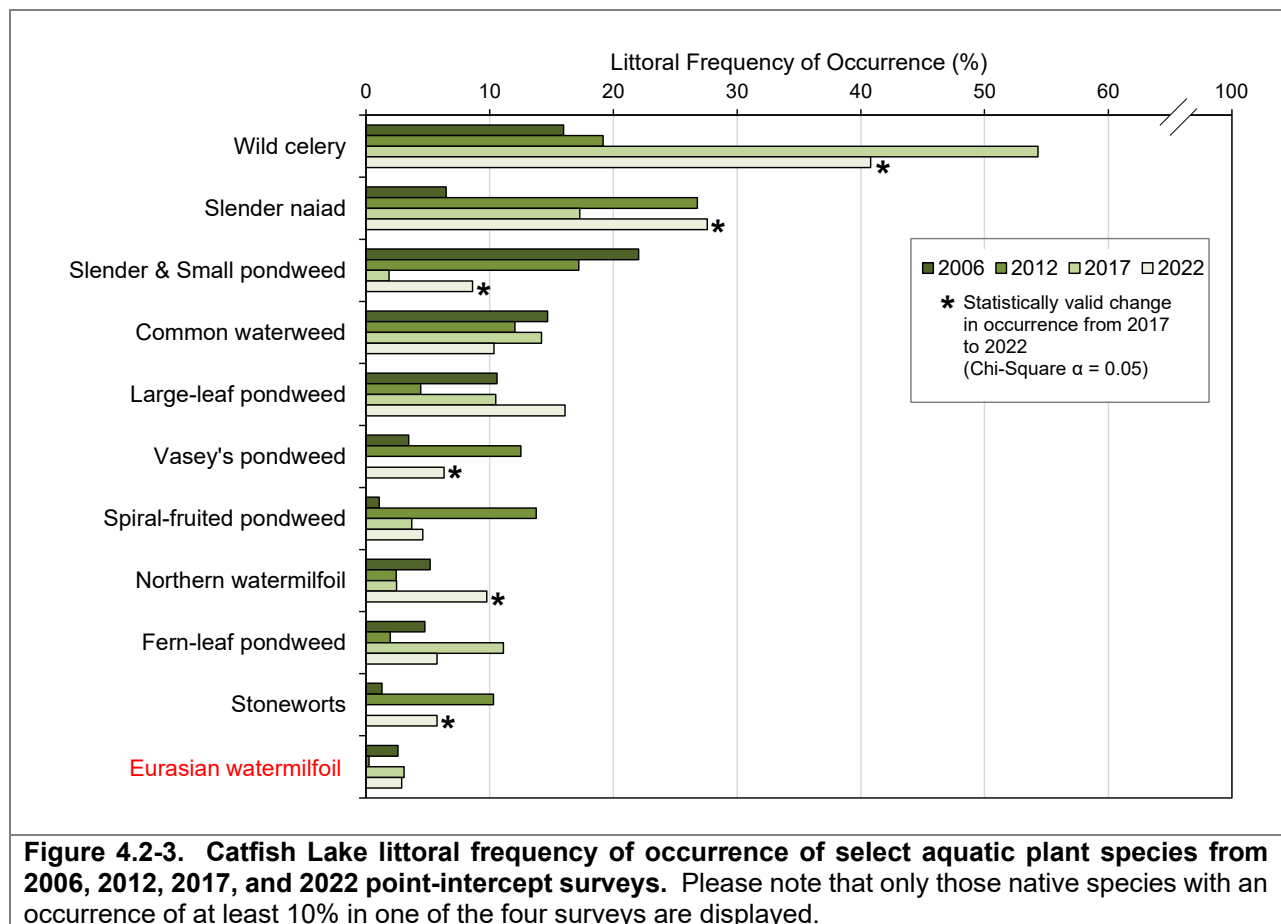
Figure 4.2-2. Catfish Lake littoral frequency of occurrence of aquatic plant species from 2022 point-intercept survey.

A chi-square analysis ($\alpha = 0.05$) was used to compare individual aquatic plant species littoral frequencies of occurrence in Catfish Lake between the point-intercept surveys in 2006, 2012, 2017, and 2022 (Figure 4.2-3). Of the 14 native aquatic plant species that had a littoral occurrence of at least 5% in one of the four surveys, six exhibited statistically valid changes in their littoral occurrence between the 2017 and 2022 surveys (Figure 4.2-3). A table displaying the littoral frequency of occurrence of each aquatic plant species from all four point-intercept surveys is included in Appendix B.

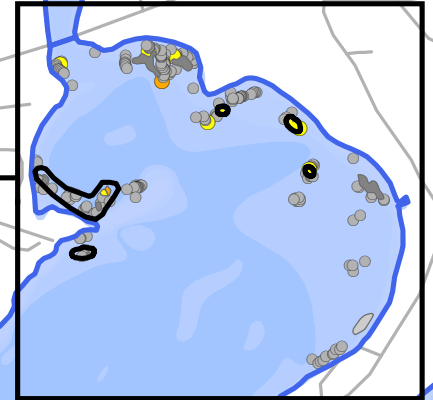
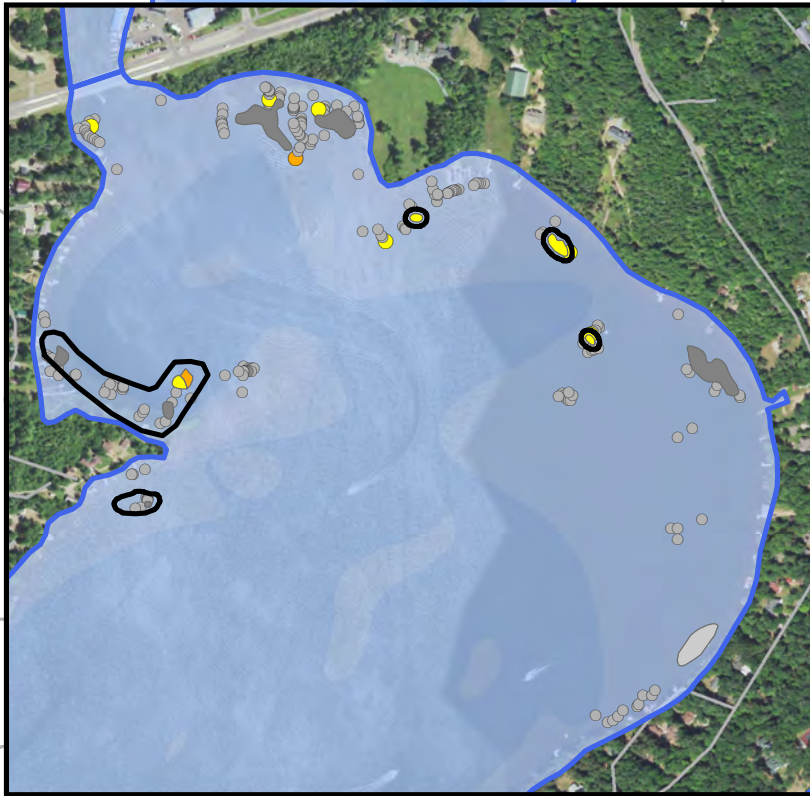
Of the six native species which saw changes in their occurrence, one species saw a statistically valid reduction in its occurrence over this time period: wild celery (Figure 4.2-3).

Five native species exhibited statistically valid increases in occurrence between 2017 and 2022: slender naiad (59.6%), slender & small pondweed (365.5%), Vasey's pondweed (100%), northern watermilfoil (295.7%), and stoneworts (100%). The littoral occurrences of common waterweed, large-leaf pondweed, spiral-fruited pondweed, and fern-leaf pondweed have remained relatively stable over the course of the four surveys. No statistically significant changes in occurrence were observed between 2017 and 2022 for any of these species.

Eurasian watermilfoil was sampled on 5 of 174 littoral sampling locations in the 2022 survey resulting in an occurrence of 2.9%. The occurrence of EWM has remained relatively low in each survey with values between 0.2% and 3.1%.



Eagle D-12



Preliminary 2023 DASH Harvesting Areas		
Site	Acres	Ave Depth
Primary Sites		
Cat E-23	0.6	5.0
Cat F-23	2.8	5.0
Cat G-23	0.3	5.0
Cat H-23	0.1	5.0
Cat I-23	0.3	3.0
Cat J-23	0.1	6.0
All Sites Total	4.3	

Legend 2022 EWMPB Survey (September 13-14, 2022)

- Highly Scattered
- Scattered
- Dominant
- Highly Dominant
- Surface Matting
- Single or Few Plants
- Clumps of Plants
- Small Plant Colony
- 2023 Hand-Harvest Site

Sources:
Roads and Hydro: WDNR
Bathymetry: WDNR, Onterra digitized
Aquatic Plants: Onterra, 2022
Map Date: APRIL 5, 2023 JMB

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Map 2
Catfish Lake
Vilas County, Wisconsin
**2022 EWM Peak-Biomass
Survey Results & 2023
Preliminary Hand-Harvest Plan**

4.3 Voyageur Lake

EWM Monitoring & Management

As has occurred in past years, the EWM population in Voyageur Lake was mapped professionally during Onterra's 2022 Early-Season AIS (ESAIS) and Late-Season EWM Mapping Surveys. During the ESAIS Survey, the entire littoral zone of the Lower Eagle River Chain of Lakes was searched for EWM by Onterra field staff. Completion of an ESAIS 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 ESAIS 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 ESAIS Survey. Prior to the Late-Season EWM Mapping Survey, the volunteer mapping data were provided to Onterra. During the Late-Season EWM Mapping Survey, Onterra ecologists revisited and refined areas of EWM mapped during the ESAIS Survey as well as any areas marked by volunteers.

With the modest EWM population documented within the lake in recent surveys, no active management of EWM took place on Voyageur Lake during 2022. The September 2022 Late-Season EWM Mapping Survey documented several isolated and generally low-density occurrences around the lake (Map 3). Most EWM occurrences were mapped as point-based occurrences such as *single plants* or *clumps of plants*. One *small plant colony* was mapped on the western end of the lake near the border with Eagle Lake. One small *highly scattered* colony was delineated during the survey on the east end of the lake. No EWM management activities are currently planned to occur in Voyageur Lake during 2023. Professional EWM monitoring will continue during 2023 including early and late-season AIS surveys.

2022 Point-Intercept Survey Results

Onterra ecologists conducted a whole lake point-intercept survey was conducted in Voyageur Lake on July 20th, 2022. A total of 22 aquatic plant species were recorded during the 2022 survey. Wild celery (42.1%), slender naiad (15.0%), and coontail (12.1%) were the most frequently encountered species (Figure 4.3-1).

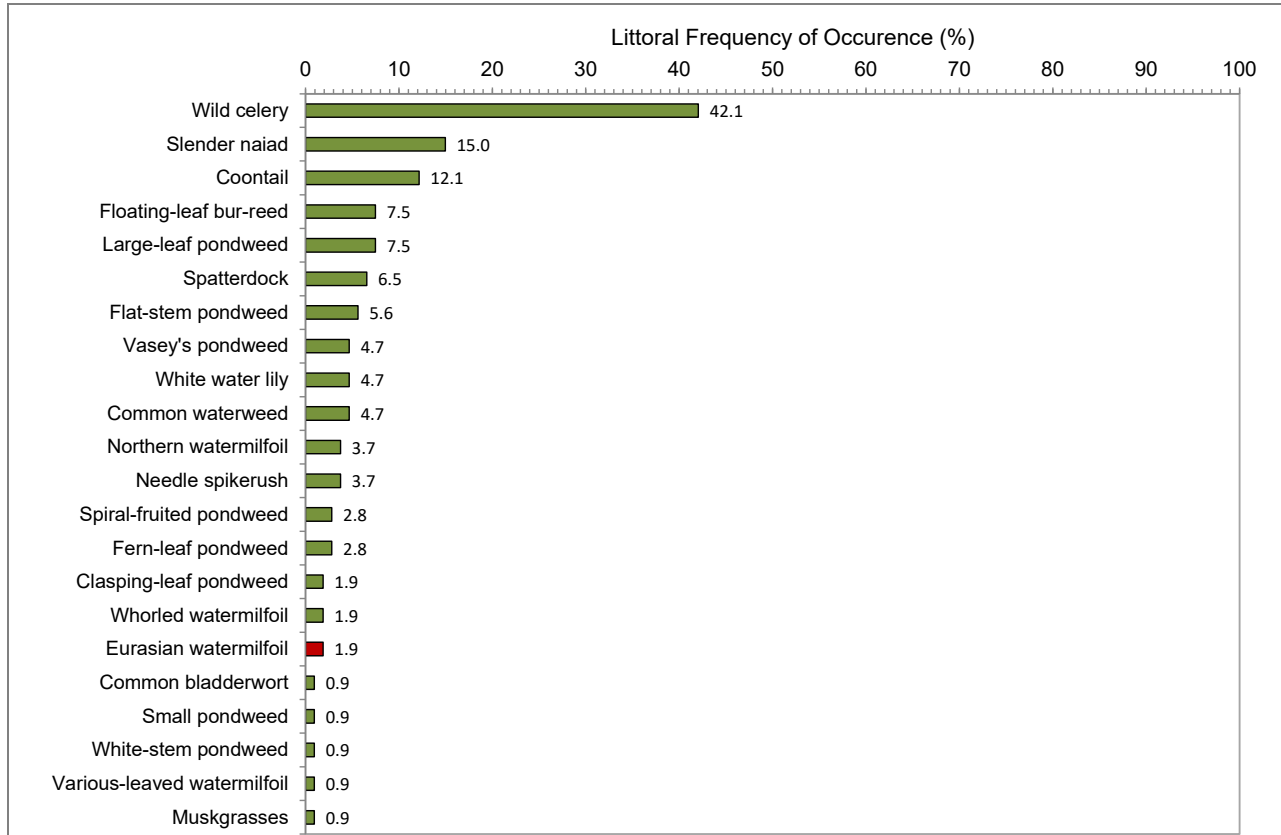


Figure 4.3-1. Voyageur Lake littoral frequency of occurrence of aquatic plant species from 2022 point-intercept survey.

A chi-square analysis ($\alpha = 0.05$) was used to compare individual aquatic plant species littoral occurrences in Voyageur Lake between the point-intercept surveys in 2006, 2012, 2017, and 2022 (Figure 4.3-2). Aquatic plant species that had a littoral frequency of occurrence of at least 5% in one of the four surveys are included in the analysis. A table displaying the littoral frequency of occurrence of each aquatic plant species from all four point-intercept surveys is included in Appendix B.

Of the 22 species found during the survey, only coontail had a statistically valid decrease in occurrence from 2017 to 2022.

Eurasian watermilfoil was sampled on 2 of 107 littoral sampling sites in the 2022 survey representing an occurrence of 1.9%. The occurrence of EWM was 8.8% in the 2006 survey, 2.0% in 2012, and was not detected in the 2017 survey (0%).

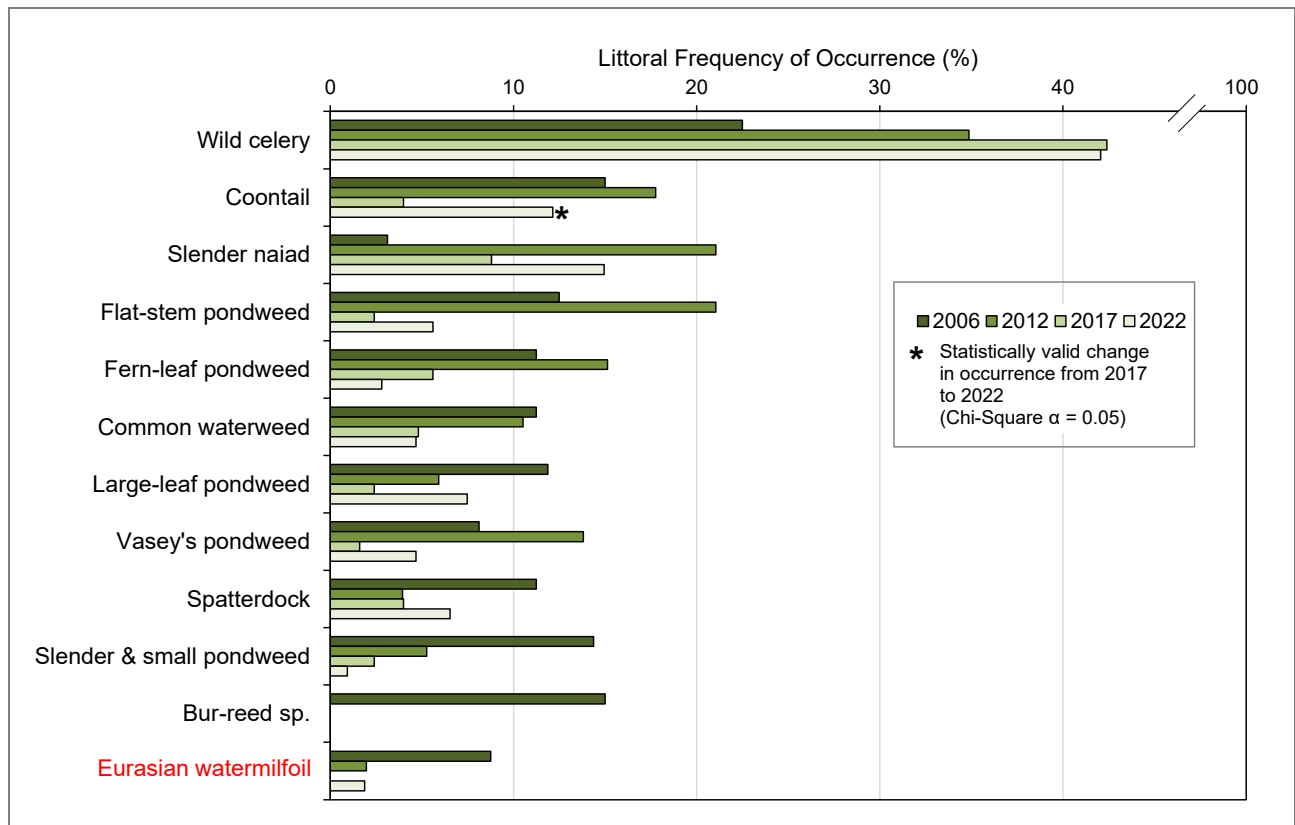
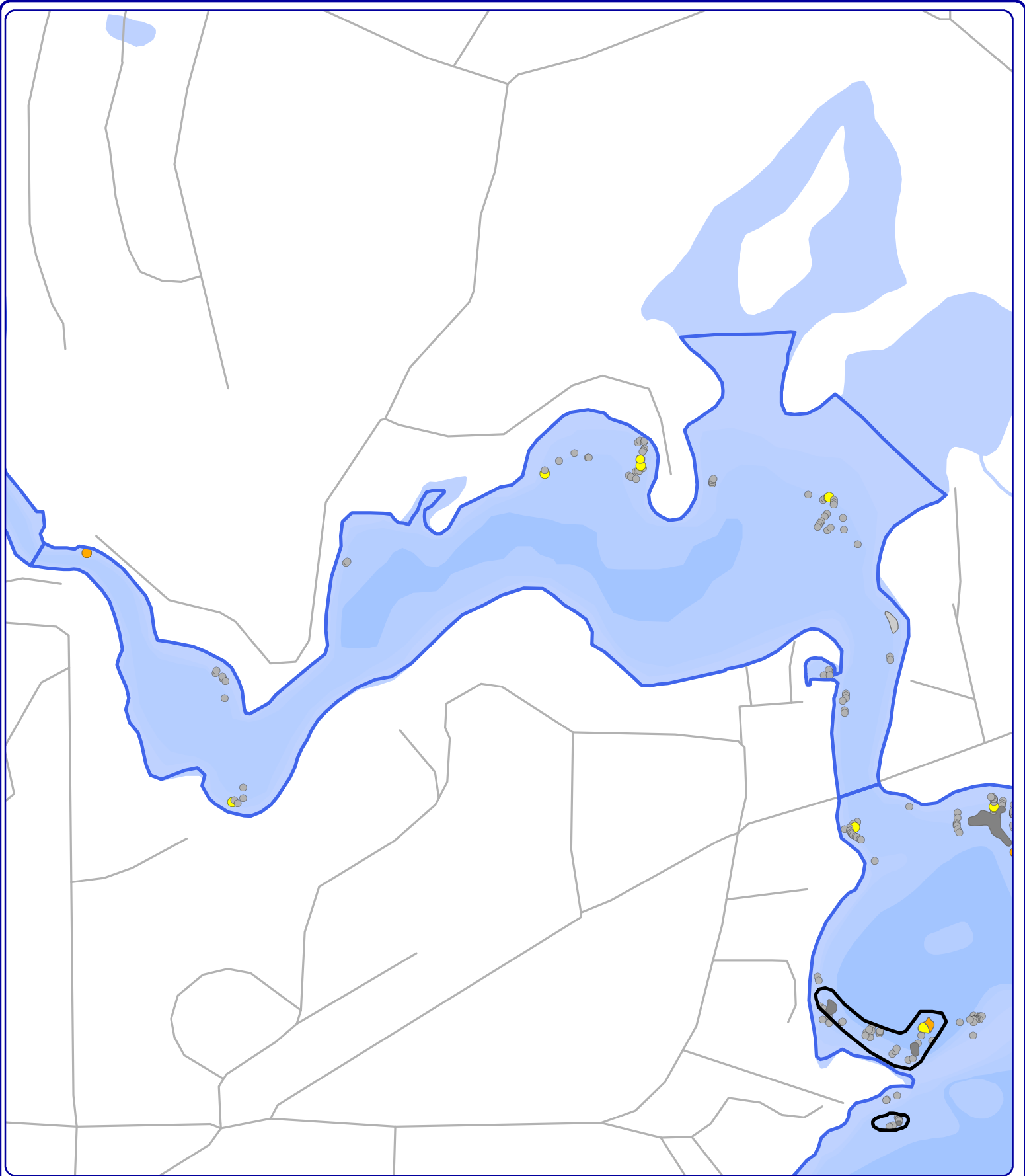


Figure 4.3-2. Voyageur Lake littoral frequency of occurrence of select aquatic plant species from 2006, 2012, 2017, and 2022 point-intercept surveys. Please note that only those native species with an occurrence of at least 10% in one of the four surveys are displayed.



1,600
Feet

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Sources:
Roads and Hydro: WDNR
Bathymetry: WDNR, Onterra digitized
Aquatic Plants: Onterra, 2022
Map Date: APRIL 5, 2023 JMB

Legend 2022 EWMPB Survey (September 13-14, 2022)

- | | | | |
|--|------------------|--|------------------------|
| | Highly Scattered | | Single or Few Plants |
| | Scattered | | Clumps of Plants |
| | Dominant | | Small Plant Colony |
| | Highly Dominant | | 2023 Hand-Harvest Site |
| | Surface Matting | | |

Map 3
Voyageur Lake
Vilas County, Wisconsin
**2022 EWM Peak-Biomass
Survey Results & 2023
Preliminary Hand-Harvest Plan**

4.4 Eagle Lake

EWM Monitoring & Management

As has occurred in past years, the EWM population in Eagle Lake was mapped professionally during Onterra's 2022 Early-Season AIS (ESAIS) and Late-Season EWM Mapping Survey (also called EWM Peak-Biomass Survey). During the ESAIS Survey, the entire littoral zone of the Lower Eagle River Chain of Lakes was searched for EWM by Onterra field staff. Completion of an ESAIS 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 ESAIS 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 ESAIS Survey. During the Late-Season EWM Mapping Survey, Onterra ecologists revisited and refined areas of EWM mapped during the ESAIS Survey as well as any areas marked by volunteers.

With a modest EWM population documented in recent surveys, no active management occurred in Eagle Lake during 2022. The Late-Season EWM Mapping Survey found a relatively sparse population in 2022 with the majority of occurrences described as *single or few plants* (Map 4). One *clump of plants* was marked within the lake and one small *highly scattered* colony was delineated in the southwest end of the lake. With the modest EWM population present in Eagle Lake, no active management is currently planned to occur during 2023. Professional EWM monitoring will continue during 2023 including early and late-season AIS surveys.

2022 Point-Intercept Survey Results

The whole-lake point-intercept survey was conducted in Eagle Lake on July 19th, 2022, and 22 native aquatic plant species were recorded. Wild celery, slender naiad, clasping-leaf pondweed, and large-leaf pondweed were the most frequently encountered species.

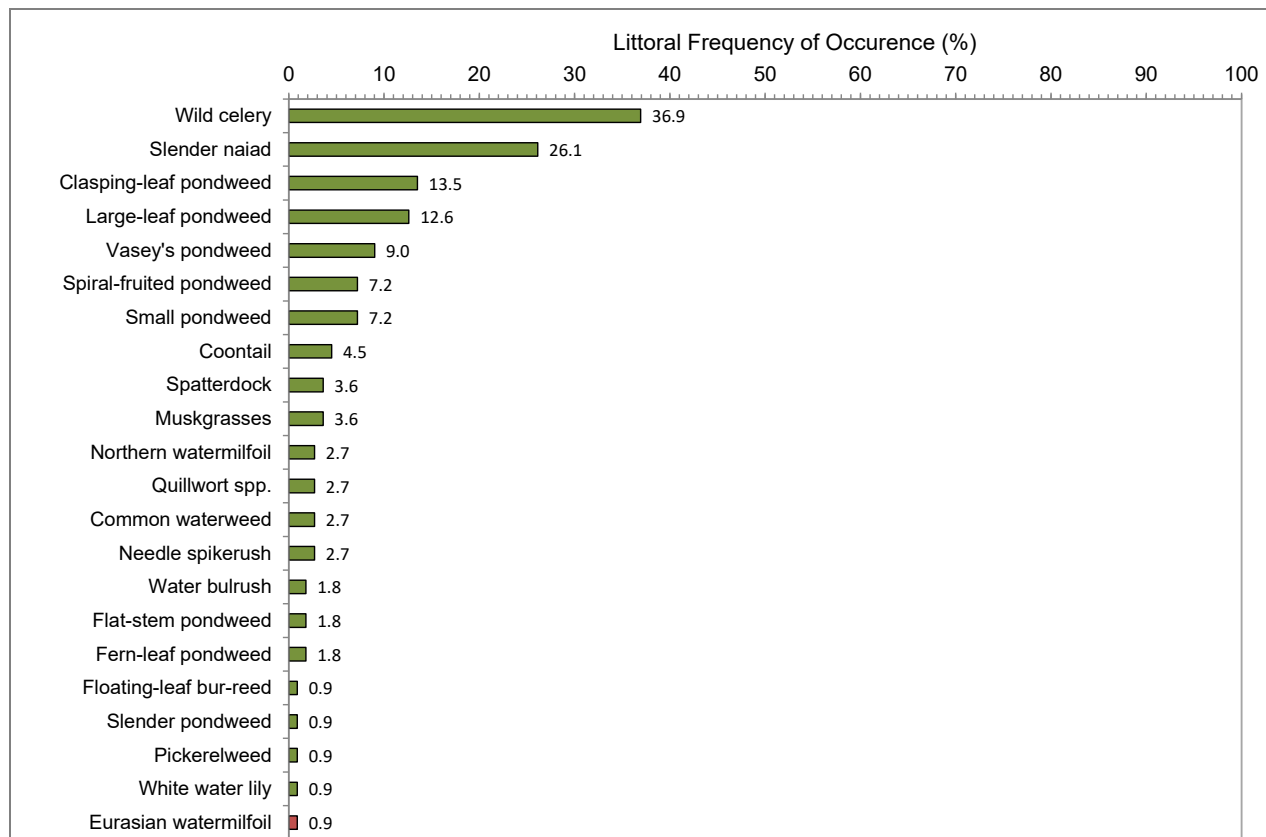


Figure 4.4-1. Eagle Lake littoral frequency of occurrence of aquatic plant species from 2022 point-intercept survey.

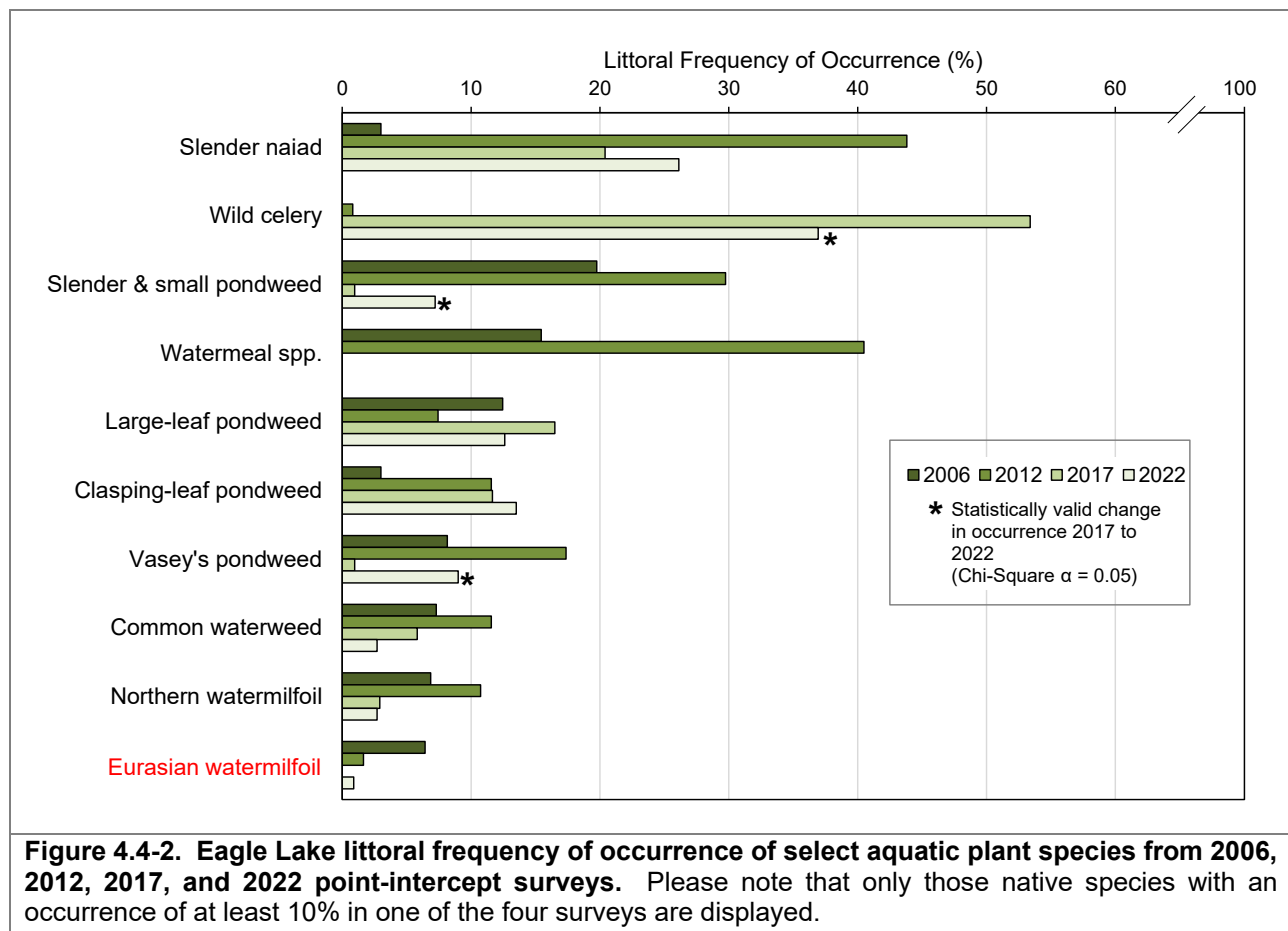
A chi-square analysis ($\alpha = 0.05$) was used to compare individual aquatic plant species littoral occurrences in Eagle Lake between the point-intercept surveys in 2006, 2012, 2017, and 2022 (Figure 4.4-2). Aquatic plant species that had a littoral frequency of occurrence of at least 5% in one of the four surveys are including within the analysis. For the purpose of this analysis, slender pondweed (*Potamogeton berchtoldii*) and small pondweed (*Potamogeton pusillus*) are combined due to their morphological similarity. The combined occurrence of these species exhibited a statistically valid increase in occurrence between the 2017 and 2022 surveys. A table displaying the littoral frequency of occurrence of each aquatic plant species from all four point-intercept surveys is included in Appendix B.

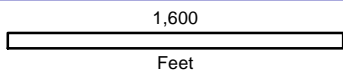
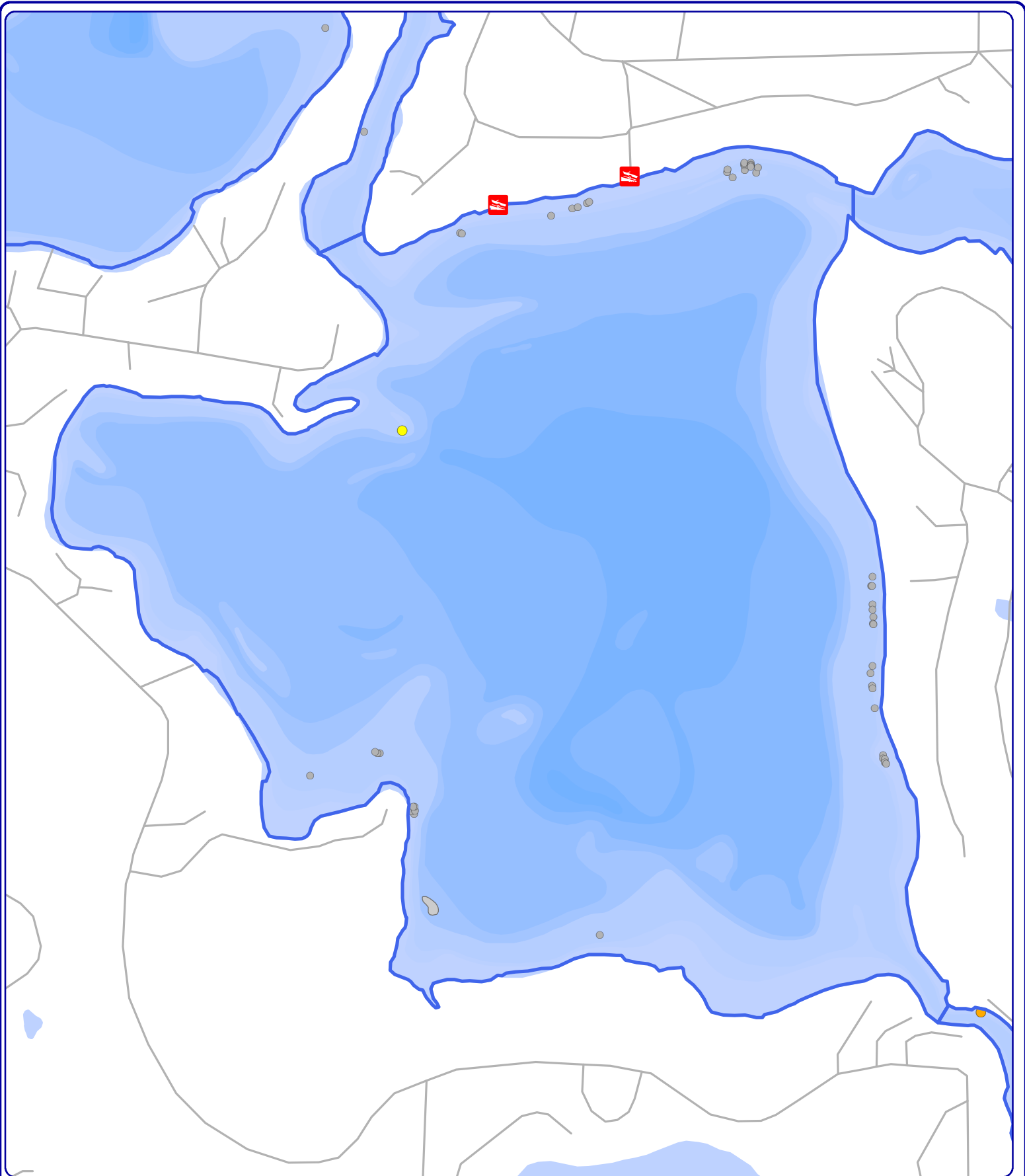
Wild celery exhibited a statistically valid decrease in occurrence between the 2017 and 2022 surveys; however, with an occurrence of 36.9%, was the most frequently encountered species within Eagle Lake in the 2022 survey.

Many of the species commonly sampled within Eagle Lake did not show valid changes in occurrence between the 2017 and 2022 survey including slender naiad, large-leaf pondweed, clasping-leaf pondweed, common waterweed, and northern watermilfoil.

Vasey's pondweed was present at 10 of 111 littoral sampling locations in the 2022 survey which corresponds to an occurrence of 9.0%, a statistically valid increase in occurrence compared to the previous survey completed in 2017 (Figure 4.4-2). Vasey's pondweed is currently listed as special concern in Wisconsin by the WDNR's Natural Heritage Inventory Program. A designation of special concern means that these species are rare in Wisconsin and there is uncertainty regarding their distribution and population size within the state. Vasey's pondweed produces very fine, narrow leaves which alternate along a long, slender stem. As it approaches the surface, it produces small floating leaves no larger than a human finger nail which help support a small cluster of flowers which emerge above the surface. In Wisconsin, Vasey's pondweed is primarily found in the northern and central portions of the state.

Eurasian watermilfoil was present at one sampling location in the 2022 survey, representing an occurrence of 0.9%. The occurrence of EWM has been relatively low in all past surveys with values of 6.4% in 2006, 1.7% in 2012, and 0% in 2017 (Figure 4.4-2).





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Sources:
 Roads and Hydro: WDNR
 Bathymetry: WDNR, Onterra digitized
 Aquatic Plants: Onterra, 2022
 Map Date: APRIL 5, 2023 JMB

Legend 2022 EWMPB Survey (September 13-14, 2022)

- | | |
|------------------|------------------------|
| Highly Scattered | Single or Few Plants |
| Scattered | Clumps of Plants |
| Dominant | Small Plant Colony |
| Highly Dominant | 2023 Hand-Harvest Site |
| Surface Matting | |

Map 4
 Eagle Lake
 Vilas County, Wisconsin
**2022 EWM Peak-Biomass
 Survey Results**

4.5 Scattering Rice Lake

EWM Monitoring & Management

As in past years, the EWM population in Scattering Rice Lake was mapped professionally during Onterra's 2022 Early-Season AIS (ESAIS) and Late-Season EWM Mapping Surveys. During the ESAIS Survey, the entire littoral zone of the Lower Eagle River Chain of Lakes was searched for EWM by Onterra field staff. Completion of an ESAIS 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 ESAIS 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 ESAIS Survey. During the Late-Season EWM Mapping Survey, Onterra ecologists revisited and refined areas of EWM mapped during the Early-Season AIS Survey.

A modest EWM population has been documented in Scattering Rice Lake in recent surveys and no areas were actively managed during 2022. The 2022 Late-Season EWM Mapping Survey documented a very modest population within Scattering Rice Lake with only a few isolated *single or few plants* occurrences located within the lake (Map 5). No EWM management activities are currently planned for 2023 in Scattering Rice Lake. Professional EWM monitoring will continue during 2023 including early and late-season AIS surveys.

2022 Point-Intercept Survey Results

The whole-lake point-intercept survey was conducted in Scattering Rice Lake on July 19-20, 2022 and 15 aquatic plant species were recorded. Wild celery (20.5%) and large-leaf pondweed (8.4%) were the most frequently encountered species (Figure 4.5-1).

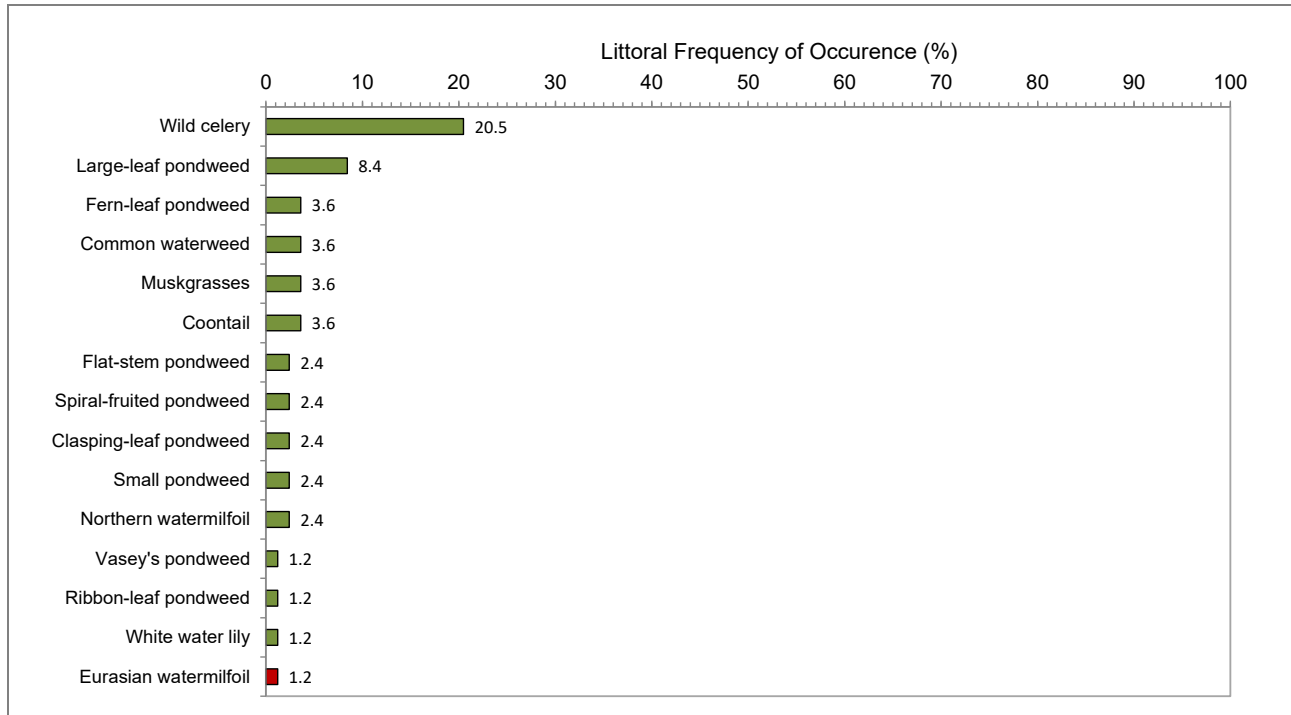


Figure 4.5-1. Scattering Rice Lake littoral frequency of occurrence of aquatic plant species from 2022 point-intercept survey.

Figure 4.5-2 displays the littoral frequencies of occurrence of EWM and native aquatic plant species that had a littoral occurrence of at least 5% in one of the four surveys. Several native plants exhibited a statistically valid decrease in occurrence from 2017 to 2022. Specifically, coontail (87% decrease), flat-stem pondweed (84% decrease), common waterweed (72% decrease), clasping-leaf pondweed (83% decrease), white water lily (91% decrease), and whorled watermilfoil (100%). A table displaying the littoral frequency of occurrence of each aquatic plant species from all four point-intercept surveys is included in Appendix B.

In 2006, Scattering Rice Lake had one of the highest littoral occurrences of EWM within the chain of 18%. Following the implementation of herbicide control strategies, EWM was reduced to 0% in 2012. Herbicide control strategies from 2012-2015 followed by hand-harvesting in 2016 have successfully maintained a small population of EWM in Scattering Rice Lake. The littoral occurrence of EWM in Scattering Rice Lake in 2017 was 1.2%. In the 2022 survey, EWM was present at one sampling location resulting in a littoral frequency of occurrence of 0.9%.

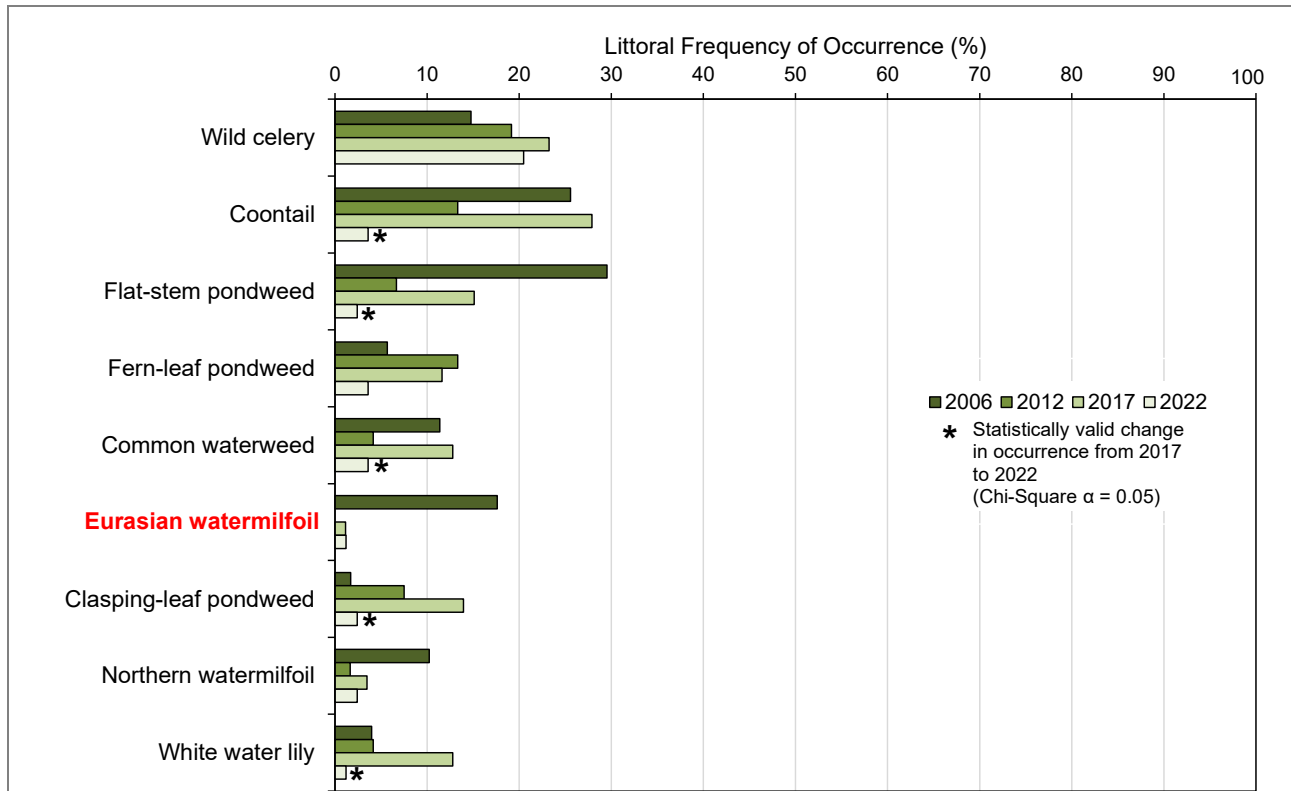
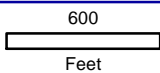
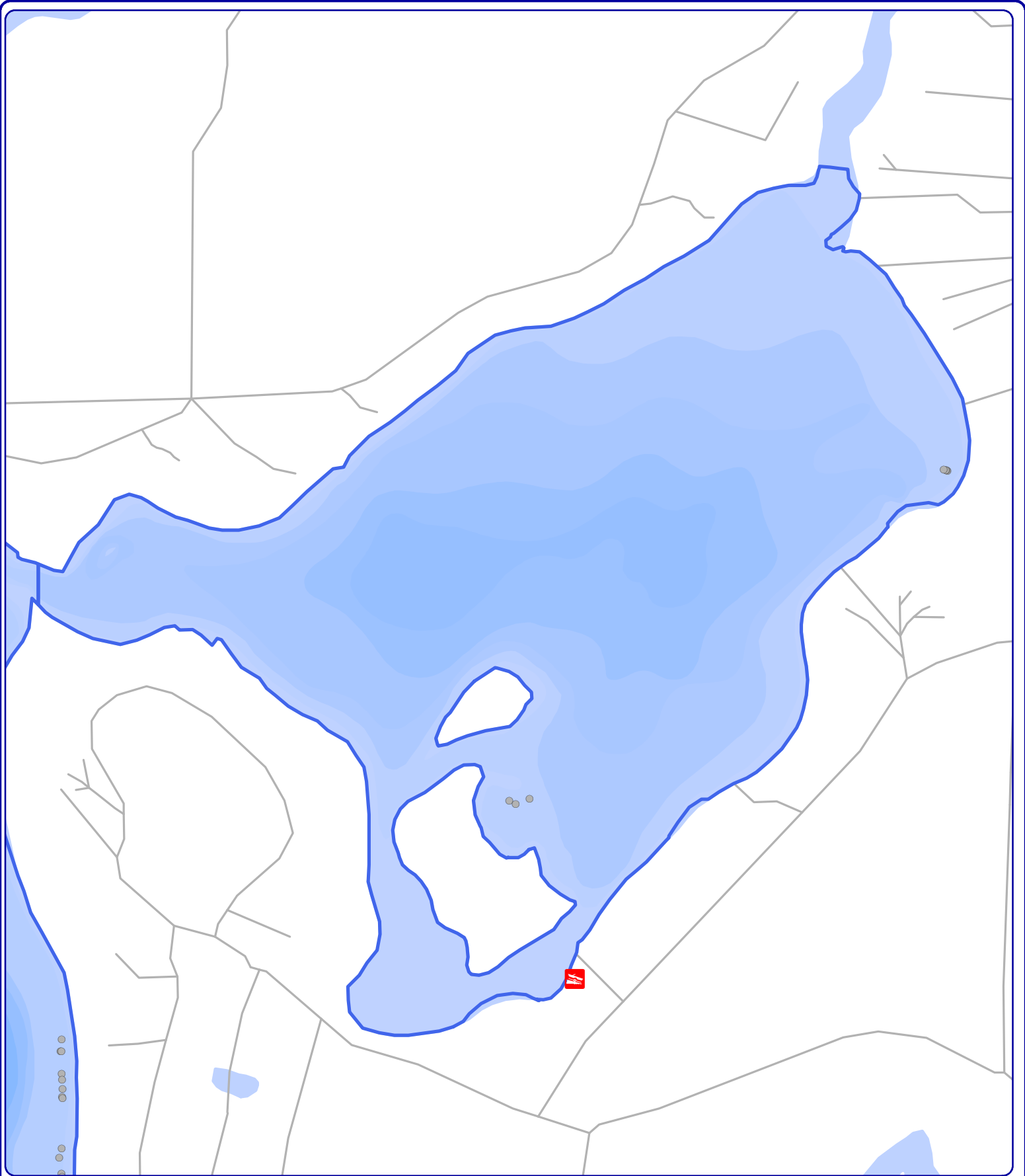


Figure 4.5-2. Scattering Rice Lake littoral frequency of occurrence of select aquatic plant species from 2006, 2012, 2017 and 2022 point-intercept surveys. Please note that only those native species with an occurrence of at least 10% in one of the four surveys are displayed.



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Sources:
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 Bathymetry: WDNR, Onterra digitized
 Aquatic Plants: Onterra, 2022
 Map Date: APRIL 5, 2023 JMB

Legend
2022 EWMPB Survey (September 13-14, 2022)

- | | |
|------------------|------------------------|
| Highly Scattered | Single or Few Plants |
| Scattered | Clumps of Plants |
| Dominant | Small Plant Colony |
| Highly Dominant | 2023 Hand-Harvest Site |
| Surface Matting | |

Map 5
 Scattering Rice Lake
 Vilas County, Wisconsin
**2022 EWM Peak-Biomass
 Survey Results**

4.6 Otter Lake

EWM Monitoring & Management

As has occurred in past years, the EWM population in Otter Lake was mapped professionally during Onterra's 2022 Early-Season AIS (ESAIS) and Late-Season EWM Mapping Surveys. During the ESAIS Survey, the entire littoral zone of the Lower Eagle River Chain of Lakes was searched for EWM by Onterra field staff. Completion of an ESAIS 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 ESAIS 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 ESAIS Survey. During the Late-Season EWM Mapping Survey, Onterra ecologists revisited and refined areas of EWM mapped during the ESAIS Survey.

A modest EWM population has been documented in Otter Lake in recent surveys and no areas were actively managed during 2022. The 2022 Late-Season EWM Mapping Survey documented a sparse population within Otter Lake with only one *single or few plants* and one *clump of plants* occurrences located within the main body of the lake (Map 6). A *scattered* colony and adjacent *single plants* were mapped in the river channel between Otter Lake and Eagle Lake as well. No EWM management activities are currently planned for 2023 in Otter Lake. Professional EWM monitoring will continue during 2023 including early and late-season AIS surveys.

2022 Point-Intercept Survey Results

The whole-lake point-intercept survey was conducted in Otter Lake on July 20th, 2022 and 13 native aquatic plant species were recorded. Wild celery (37.0%), slender naiad (18.5%), and Vasey's pondweed (14.8%) were the most frequently encountered species in the 2022 survey (Figure 4.6-1).

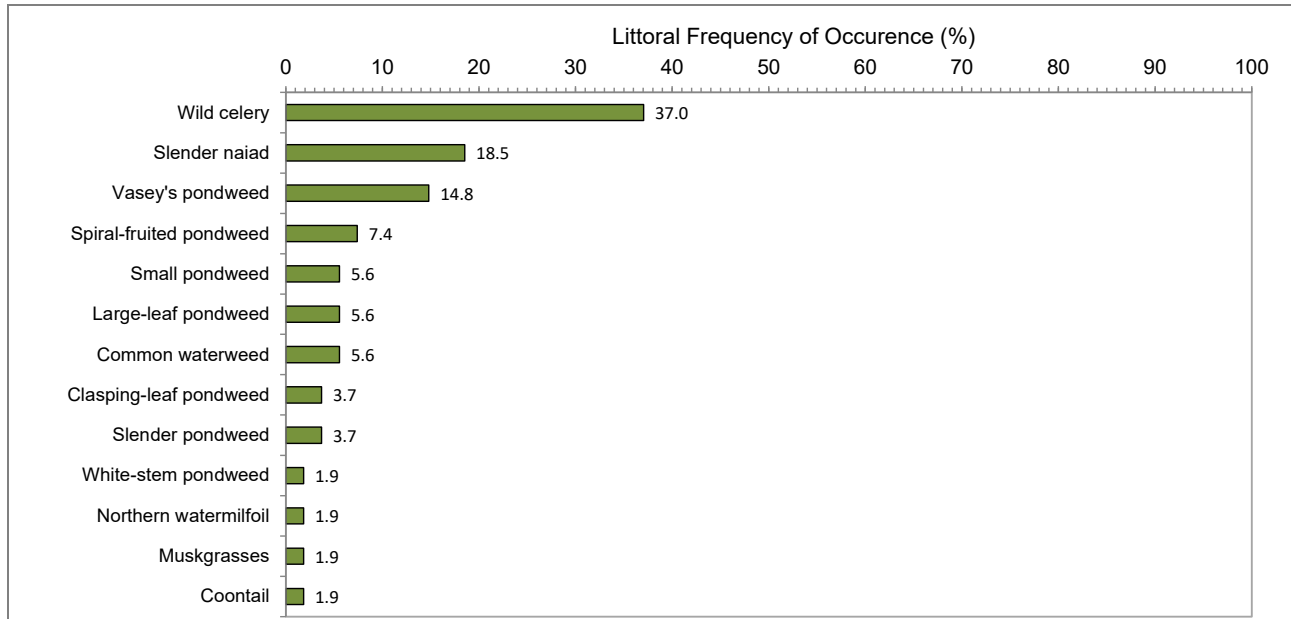


Figure 4.6-1. Otter Lake littoral frequency of occurrence of aquatic plant species from 2022 point-intercept survey.

A chi-square analysis ($\alpha = 0.05$) was used to compare individual aquatic plant species littoral frequencies of occurrence in Otter Lake between the point-intercept surveys in 2006, 2012, 2017, and 2022 (Figure 4.6-2). The aquatic plant species that had a littoral frequency of occurrence of at least 5% in one of the four surveys are applicable for analysis. A table displaying the littoral frequency of occurrence of each aquatic plant species from all four point-intercept surveys is included in Appendix B.

Vasey's pondweed exhibited a statistically valid increase in occurrence from 2017 to 2022 while the occurrence of all other native species was not statistically different during the same timeframe.

Eurasian watermilfoil was not detected on the rake during the 2022 whole-lake point-intercept survey, yielding a littoral frequency of occurrence of 0%. In past surveys, the occurrence of EWM has been relatively low at 6.2% in 2006, 3.4% in 2012, and 0% in 2017.

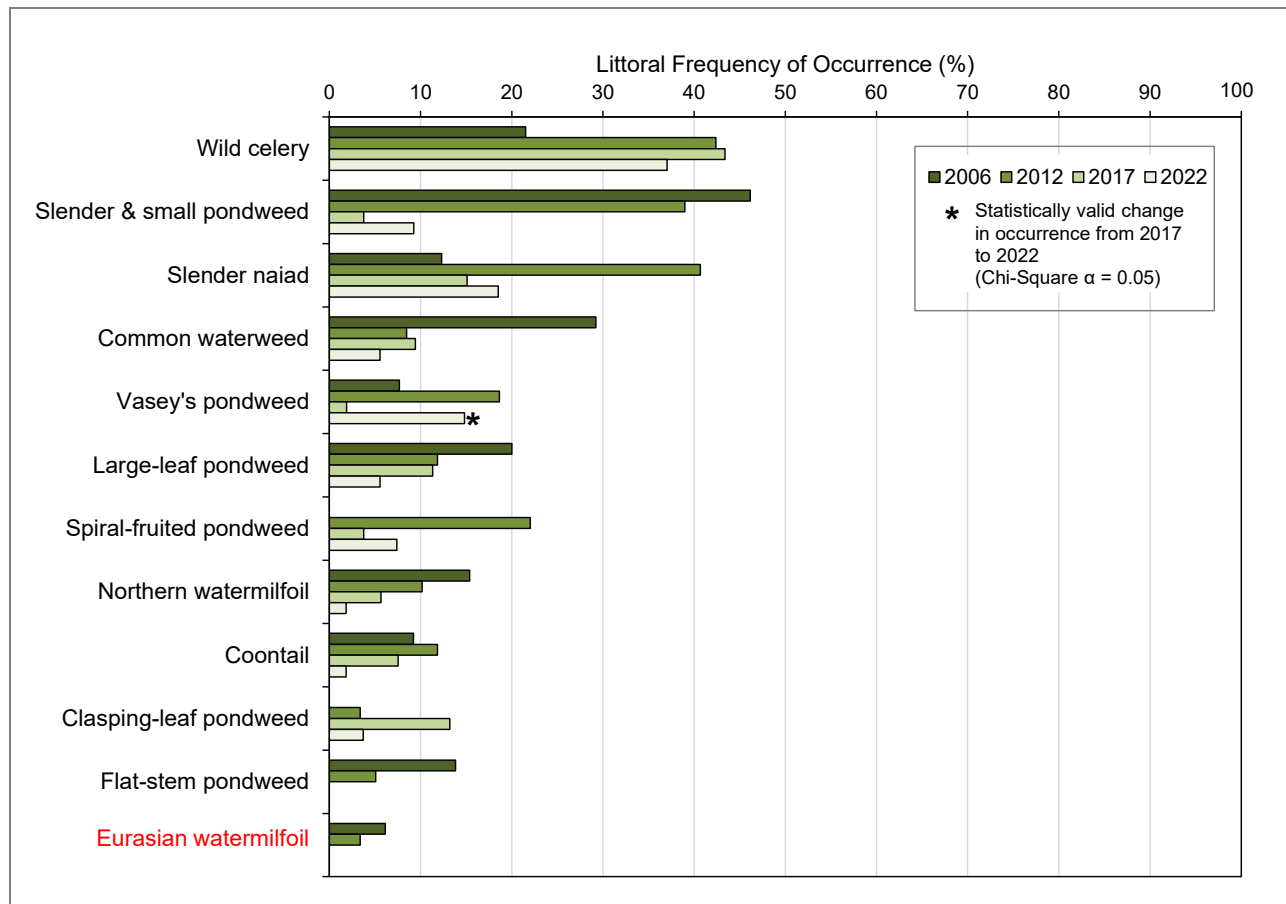
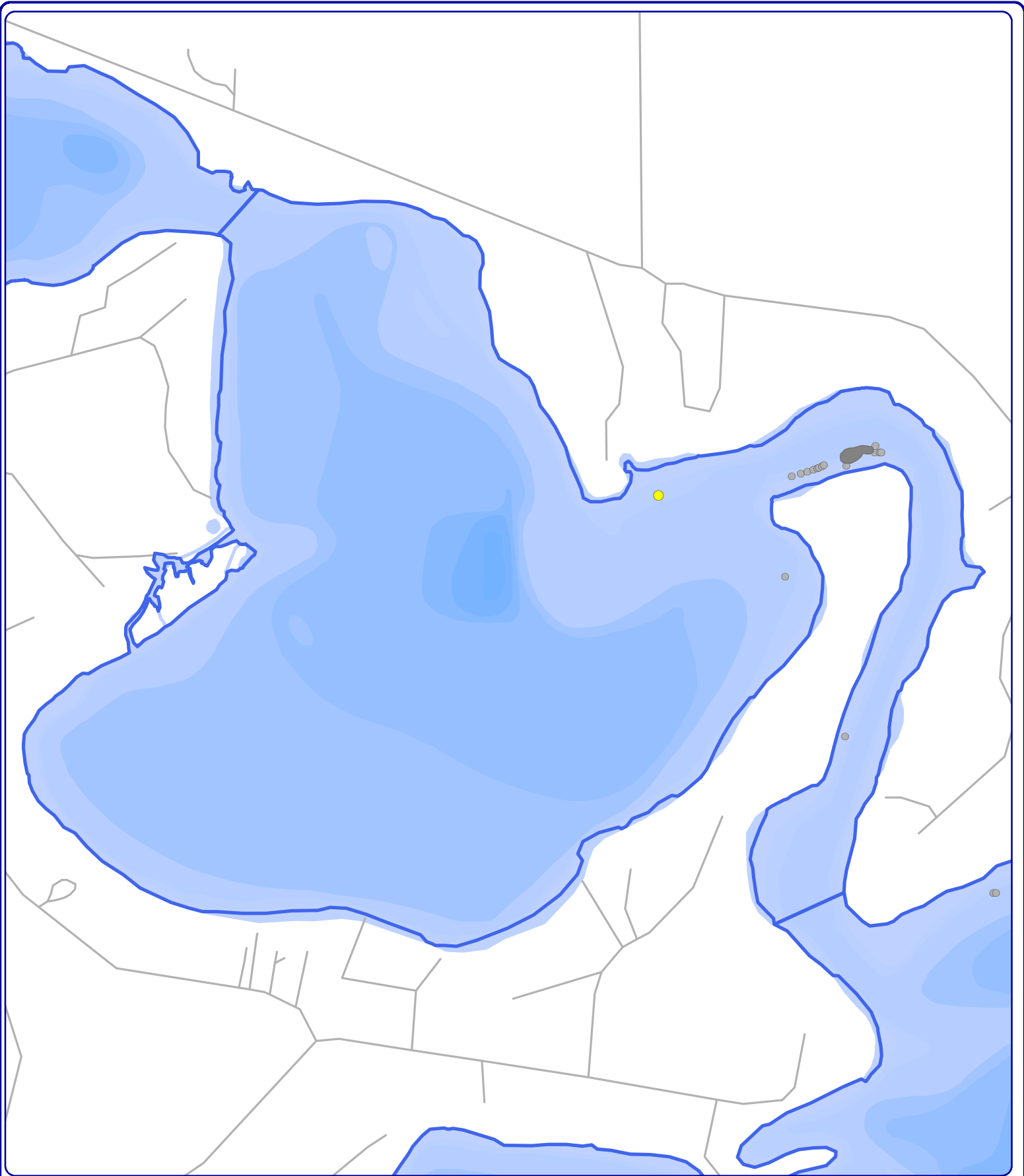


Figure 4.6-2. Otter Lake littoral frequency of occurrence of select aquatic plant species from 2006, 2012, 2017, and 2022 point-intercept surveys. Please note that only those native species with an occurrence of at least 10% in one of the four surveys are displayed.



600
Feet

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Sources:
Roads and Hydro: WDNR
Bathymetry: WDNR, Onterra digitized
Aquatic Plants: Onterra, 2022
Map Date: APRIL 5, 2023 JMB

Legend 2022 EWMPB Survey (September 13-14, 2022)

- | | |
|------------------|------------------------|
| Highly Scattered | Single or Few Plants |
| Scattered | Clumps of Plants |
| Dominant | Small Plant Colony |
| Highly Dominant | 2023 Hand-Harvest Site |
| Surface Matting | |

Map 6
Otter Lake
Vilas County, Wisconsin
**2022 EWM Peak-Biomass
Survey Results**

4.7 Lynx Lake

EWM Monitoring & Management

As in past years, the EWM population in Lynx Lake was mapped professionally during Onterra's 2022 Early-Season AIS (ESAIS) and Late-Season EWM Mapping Surveys. During the ESAIS Survey, the entire littoral zone of the Lower Eagle River Chain of Lakes was searched for EWM by Onterra field staff. Completion of an ESAIS 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 ESAIS 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 ESAIS Survey. During the Late-Season EWM Mapping Survey, Onterra ecologists revisited and refined areas of EWM mapped during the ESAIS Survey.

EWM has not been spotted within Lynx Lake since early 2020 and no active management took place during 2022. No EWM was located within Lynx Lake during the 2022 Late-Season EWM Mapping Survey (Map 7) and no EWM management activities are currently planned for 2023. Professional EWM monitoring will continue during 2023 including early and late-season AIS surveys.

2022 Point-Intercept Survey Results

The whole-lake point-intercept survey was conducted in Lynx Lake on July 19th, 2022 and 13 native aquatic plant species were recorded. Wild celery (48.5%), slender naiad (11.8%), and large-leaf pondweed (8.8%) were the most frequently encountered species (Figure 4.7-1).

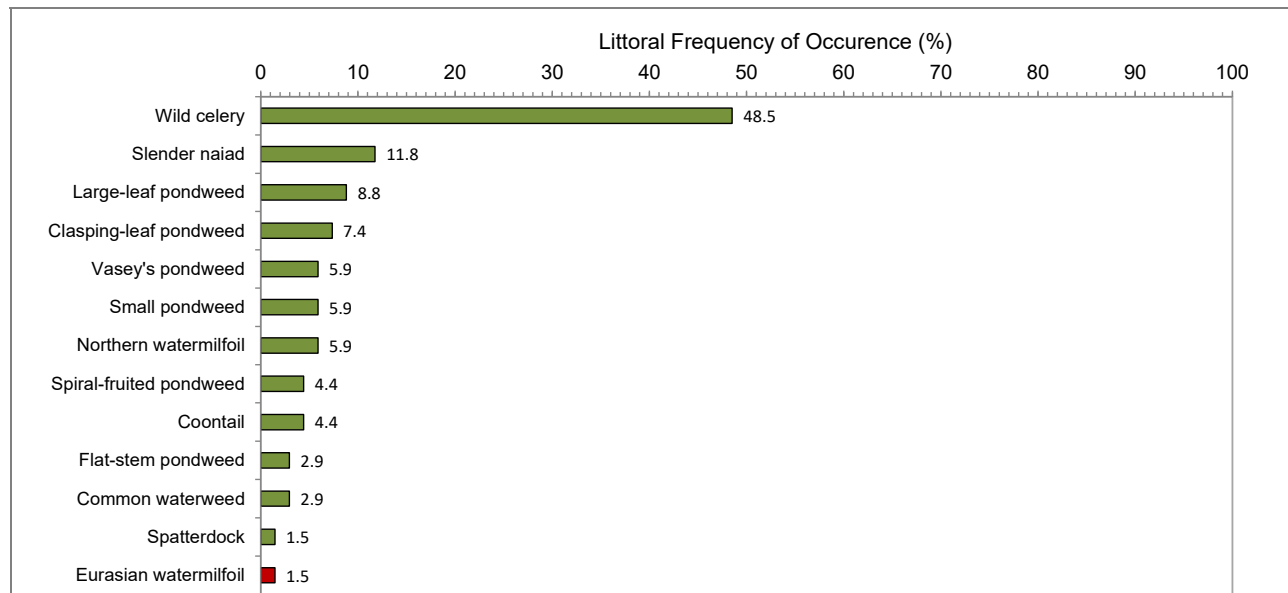
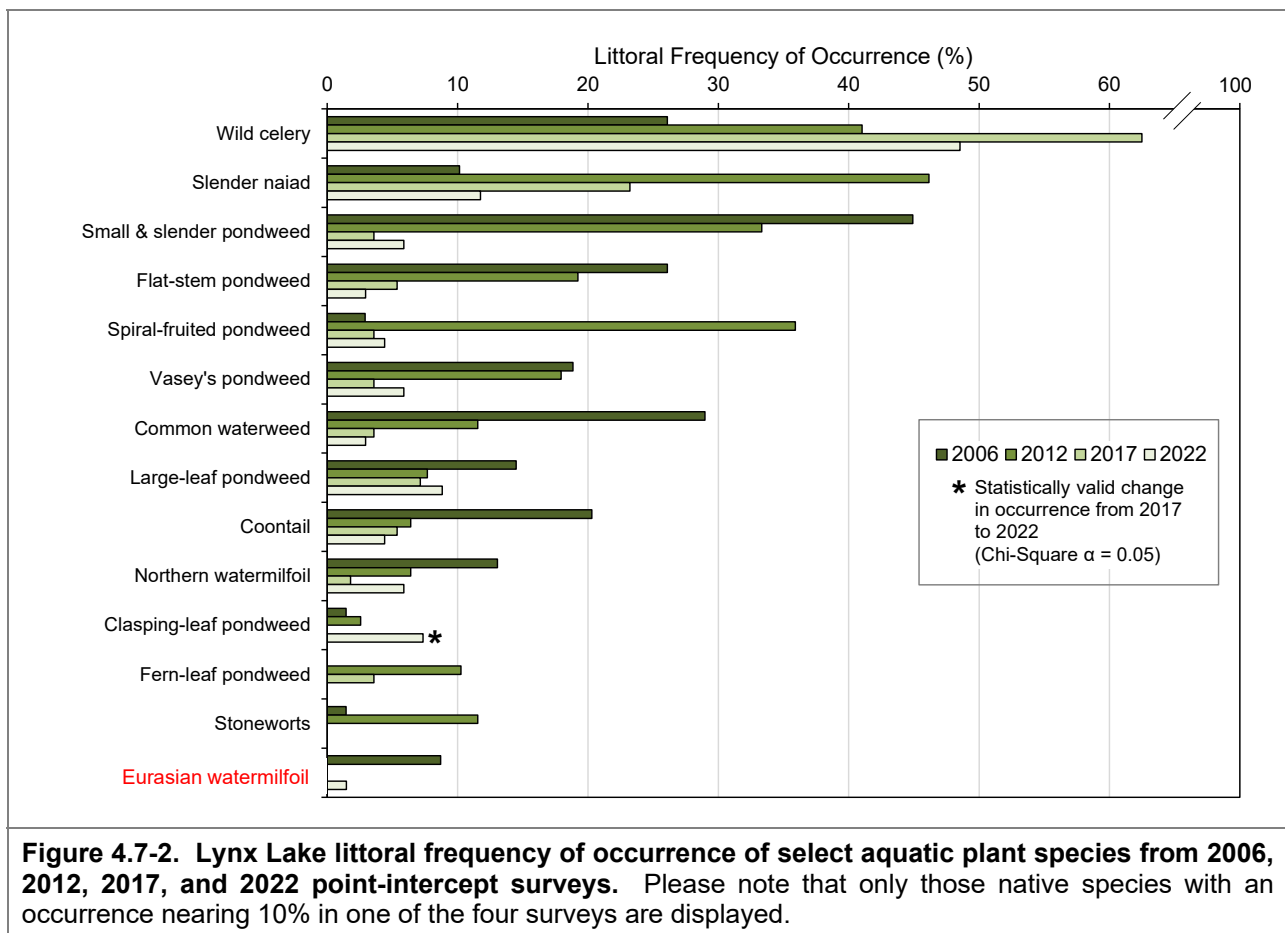


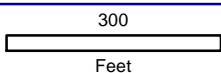
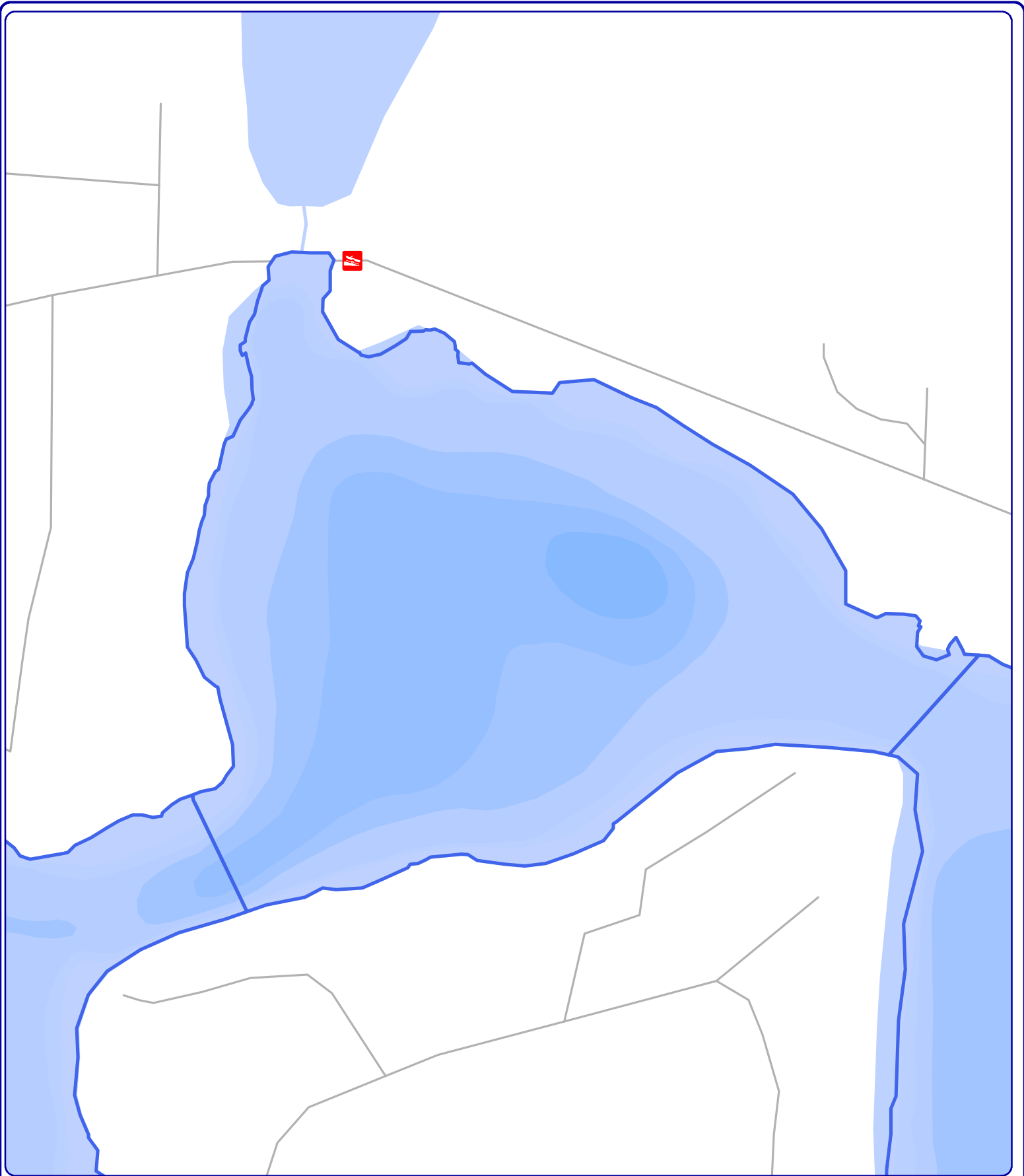
Figure 4.7-1. Lynx Lake littoral frequency of occurrence of aquatic plant species from 2022 point-intercept survey.

A chi-square analysis ($\alpha = 0.05$) was used to compare individual aquatic plant species littoral occurrences in Lynx Lake between the point-intercept surveys in 2006, 2012, 2017, and 2022 (Figure 4.7-2). Aquatic plant species that had a littoral frequency of occurrence of at least 5% in one of the four surveys are included within the analysis. A table displaying the littoral frequency of occurrence of each aquatic plant species from all four point-intercept surveys is included in Appendix B.

Clasping-leaf pondweed indicated a statistically valid increase in littoral frequency of occurrence from 0% in 2017 to 7.4% in 2022 (Figure 4.7-2).

In 2006, EWM had a littoral frequency of occurrence of 8.7% in Lynx Lake. EWM was not detected on either the 2012 or 2017 point-intercept surveys. Eurasian watermilfoil was present on the rake at one sampling location during the 2022 whole-lake point-intercept survey, yielding a littoral frequency of occurrence of 1.5%.





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 Bathymetry: WDNR, Onterra digitized
 Aquatic Plants: Onterra, 2022
 Map Date: APRIL 5, 2023 JMB

Legend 2022 EWMPB Survey (September 13-14, 2022)

- | | |
|------------------|------------------------|
| Highly Scattered | Single or Few Plants |
| Scattered | Clumps of Plants |
| Dominant | Small Plant Colony |
| Highly Dominant | 2023 Hand-Harvest Site |
| Surface Matting | |

Map 7
 Lynx Lake
 Vilas County, Wisconsin
**2022 EWM Peak-Biomass
 Survey Results**

4.8 Duck Lake

EWM Monitoring & Management

As has occurred in past years, the EWM population in Duck Lake was mapped professionally during Onterra's 2022 Early-Season AIS (ESAIS) and Late-Season EWM Mapping Surveys (also called EWM Peak-Biomass Survey). During the ESAIS Survey, the entire littoral zone of the Lower Eagle River Chain of Lakes was searched for EWM by Onterra field staff. Completion of an ESAIS 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 ESAIS 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 ESAIS Survey. Volunteers recorded two suspected EWM locations in 2022. Prior to the Late-Season EWM Mapping Survey, the volunteer mapping data were provided to Onterra and integrated into the on-board GIS software. During the Late-Season EWM Mapping Survey, Onterra ecologists revisited and refined areas of EWM mapped during the Early-Season AIS Survey as well as any areas marked by volunteers.

With a modest EWM population in recent surveys, no active management took place in Duck Lake during 2022. The 2022 Late-Season EWM Mapping Survey documented a modest population in the lake comprised of one small *highly scattered/dominant* colony, as well as isolated *single plants* and one *clump of plants* (Map 8). No active management is currently planned to occur in Duck Lake in 2023. Professional EWM monitoring will continue during 2023 including early and late-season AIS surveys.

2022 Point-Intercept Survey Results

The whole-lake point-intercept survey was conducted on July 18-19, 2022 and 12 aquatic plant species were recorded on the rake. Wild celery (56.3%), small pondweed (18.8%), slender naiad (18.8%), and northern watermilfoil (18.8%) were the most frequently encountered species (Figure 4.8-1).

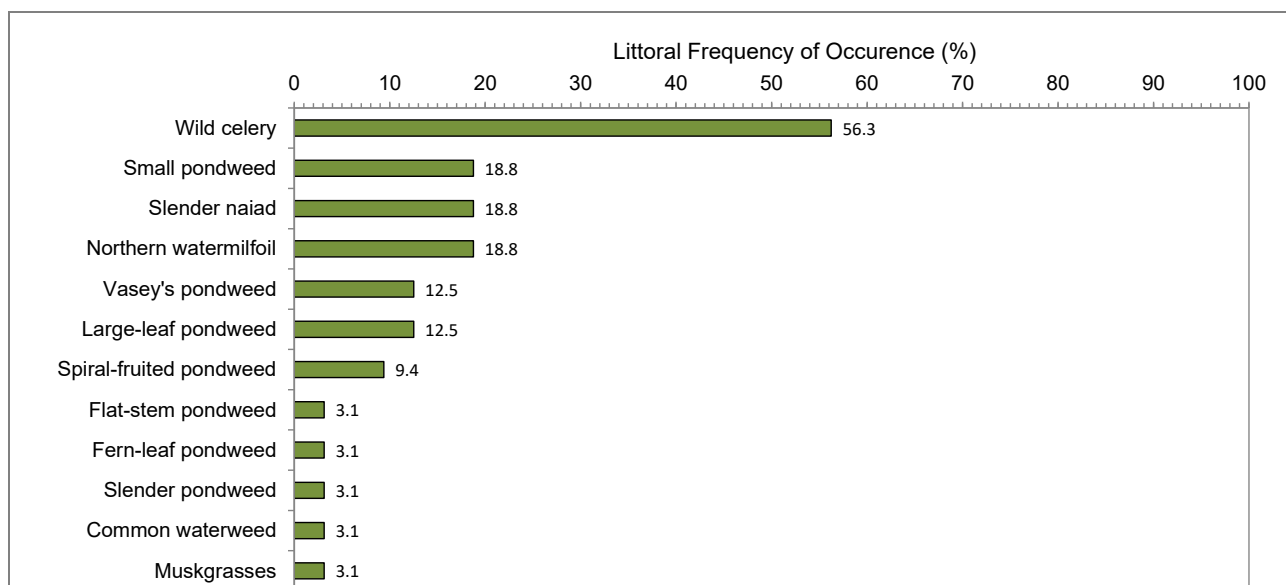


Figure 4.8-1. Duck Lake littoral frequency of occurrence of aquatic plant species from 2022 point-intercept survey.

A chi-square analysis ($\alpha = 0.05$) was used to compare individual aquatic plant species littoral occurrences in Duck Lake between the point-intercept surveys in 2006, 2012, 2017, and 2022 (Figure 4.8-2). Aquatic plant species that had a littoral frequency of occurrence of at least 5% in one of the four surveys are included within the analysis. No native species exhibited statistically valid changes in occurrence between the 2017 and 2022 surveys (Figure 4.8-2). A table displaying the littoral frequency of occurrence of each aquatic plant species from all four point-intercept surveys is included in Appendix B.

Eurasian watermilfoil was not detected on the rake during the 2022 whole-lake point-intercept survey, yielding a littoral frequency of occurrence of 0%. The occurrence of EWM was 5.3% in 2006, 0.7% in 2012, and 0% in 2017.

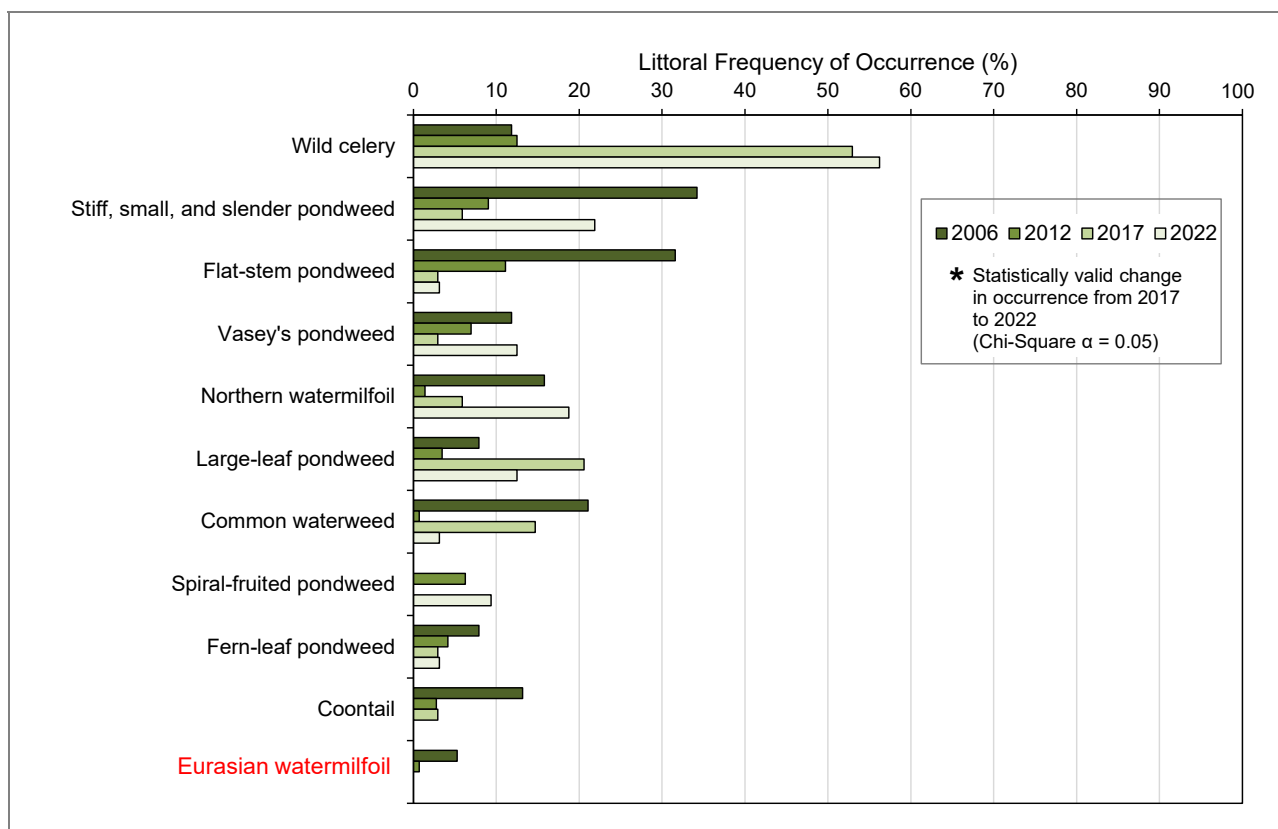
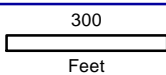
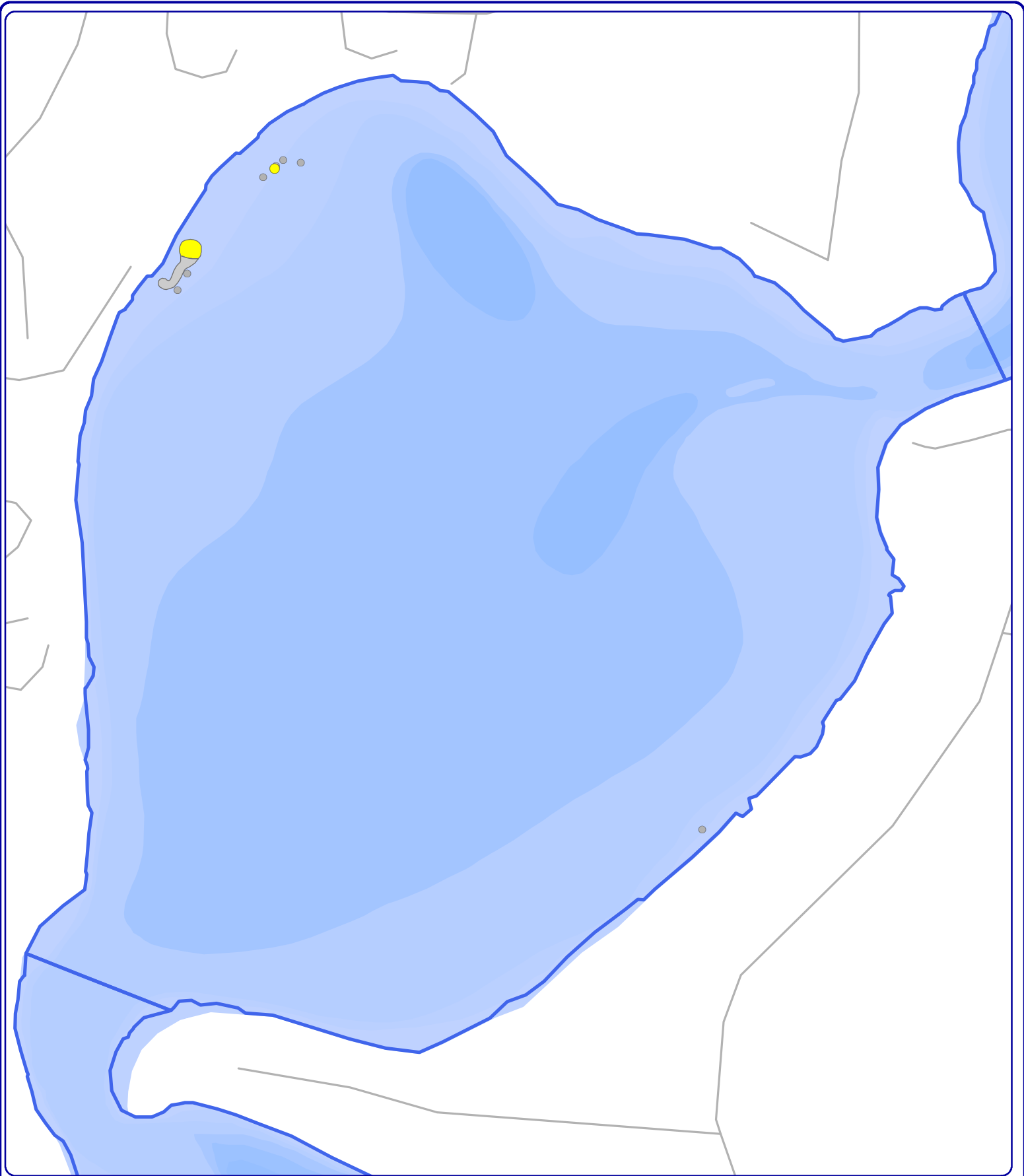


Figure 4.8-2. Duck Lake littoral frequency of occurrence of select aquatic plant species from 2006, 2012, 2017, and 2022 point-intercept surveys. Please note that only those native species with an occurrence of at least 10% in one of the four surveys are displayed.



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 Bathymetry: WDNR, Onterra digitized
 Aquatic Plants: Onterra, 2022
 Map Date: aPRIL 5, 2023 JMB

Legend 2022 EWMPB Survey (September 13-14, 2022)

- | | |
|------------------|------------------------|
| Highly Scattered | Single or Few Plants |
| Scattered | Clumps of Plants |
| Dominant | Small Plant Colony |
| Highly Dominant | 2023 Hand-Harvest Site |
| Surface Matting | |

Map 8
 Duck Lake
 Vilas County, Wisconsin
**2022 EWM Peak-Biomass
 Survey Results**

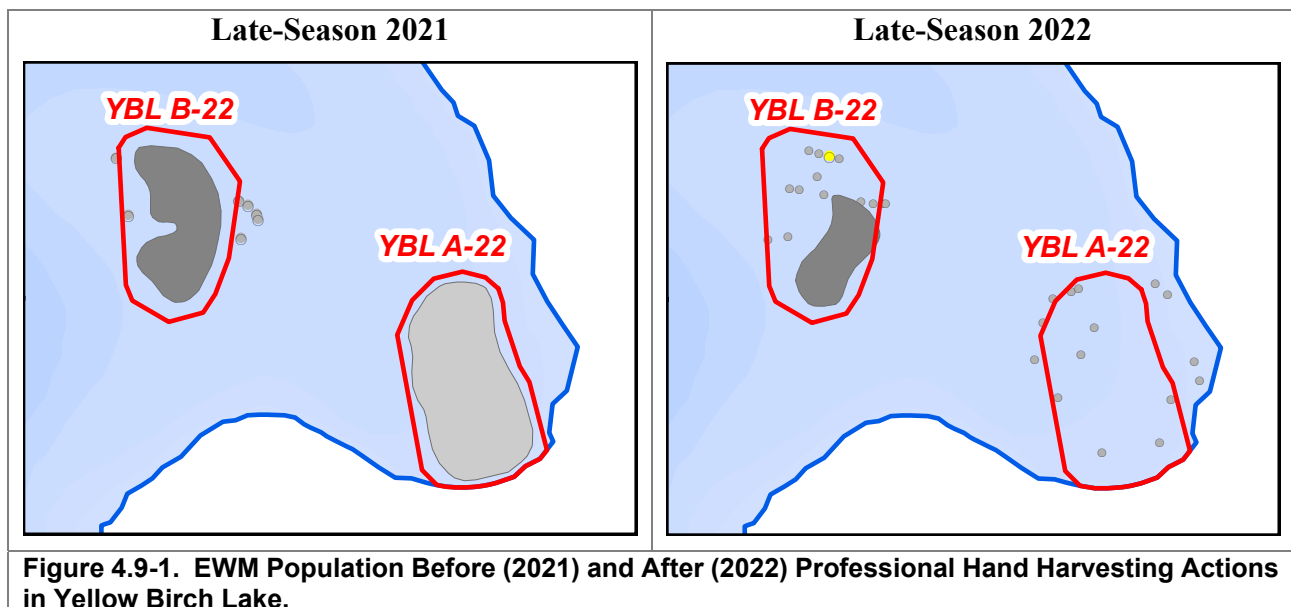
4.9 Yellow Birch Lake

EWM Monitoring & Management

As has occurred in past years, the EWM population in Yellow Birch Lake was mapped professionally during Onterra's 2022 Early-Season AIS (ESAIS) and Late-Season EWM Mapping Surveys. During the ESAIS Survey, the entire littoral zone of the Lower Eagle River Chain of Lakes was searched for EWM by Onterra field staff. Completion of an ESAIS 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 ESAIS 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 ESAIS Survey. A few additional points of EWM in Yellow Birch Lake were marked by UERCLC volunteers. During the Late-Season EWM Mapping Survey, Onterra ecologists revisited and refined areas of EWM mapped during the Early-Season AIS Survey and searched at the volunteer points.

Professional hand harvesting activities were conducted during 2022 in two sites within Yellow Birch Lake. Approximately 186 pounds of EWM was harvested from site B-22 over the course of 14.5 hours, and about 10 small plants were harvested from within site A-22 (Appendix A). Pre- and post-harvesting EWM populations at the two harvesting sites are displayed on Figure 4.9-1. The size of the *scattered* EWM colony within site B-22 was reduced following the removal efforts, and the population in A-22 was reduced from a *highly scattered* colony to *single or few plants* occurrences.



The 2022 Late-Season EWM Mapping Survey documented colonized EWM in a few locations within Yellow Birch Lake. A *highly scattered* colony was mapped just east of the T-docks public boat landing (Map 9). Many *single plants*, *clumps of plants*, and thin *highly scattered* colonies lined each side of the river channel on the west end of the lake. A *scattered* colony was delineated within the

extents of DASH site YBL B-22 which is being included in a 2023 DASH strategy with the naming convention of YBL B-23 (Map 9). The final DASH harvesting strategy is subject to change pending the results of the 2023 Early-Season AIS survey. Professional EWM monitoring will continue during 2023 including early and late-season AIS surveys.

2022 Point-Intercept Survey Results

The whole-lake point-intercept survey was conducted in Yellow Birch Lake on July 18-19, 2022 and 21 aquatic plant species were recorded. Wild celery (32.6%), common waterweed (14.8%), and slender naiad (12.6%) were the most frequently encountered species (Figure 4.9-2).

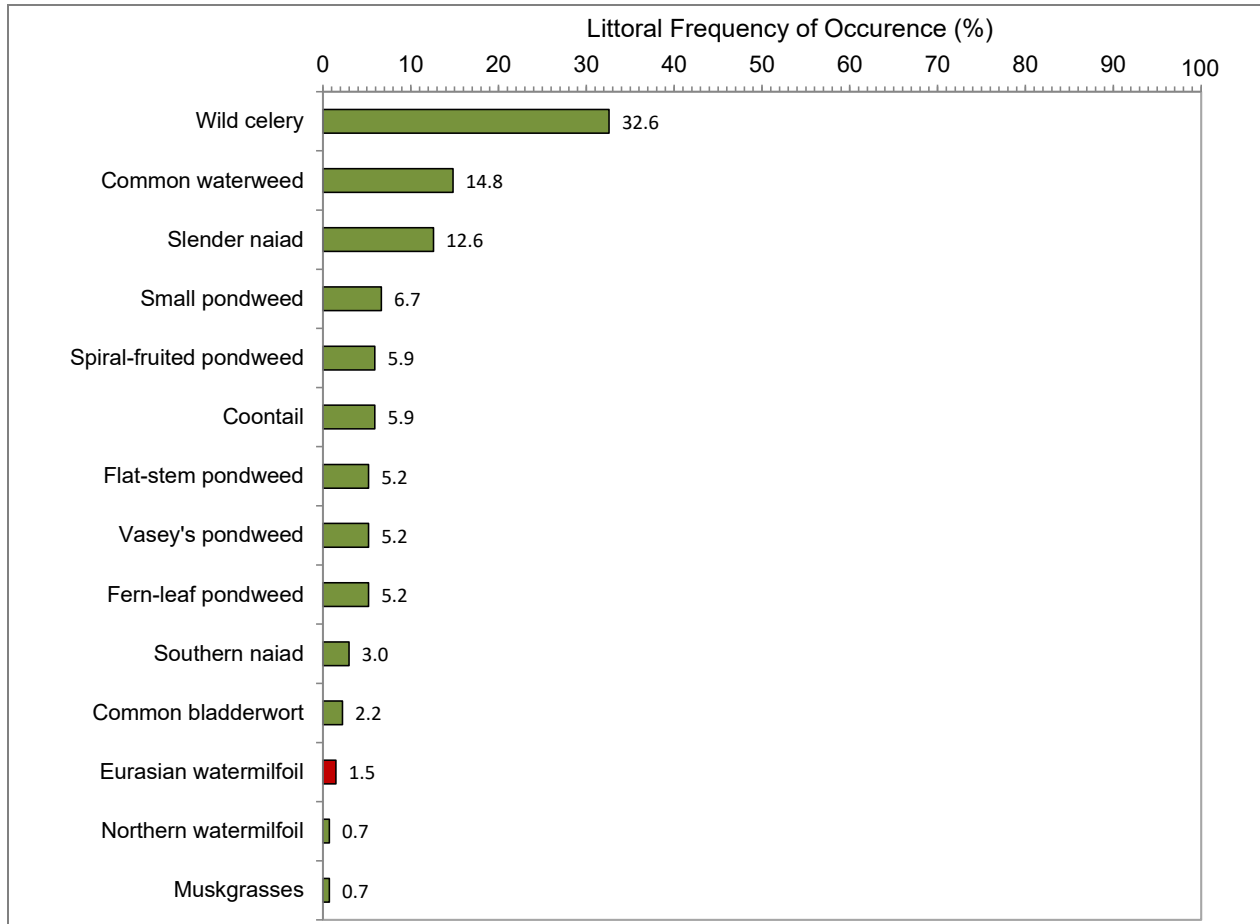


Figure 4.9-2. Yellow Birch Lake littoral frequency of occurrence of aquatic plant species from 2022 point-intercept survey.

A chi-square analysis ($\alpha = 0.05$) was used to compare individual aquatic plant species littoral occurrences in Yellow Birch Lake between the point-intercept surveys in 2005, 2012, 2017, and 2022 (Figure 4.9-3). Aquatic plant species that had a littoral frequency of occurrence of at least 5% in one of the four surveys are included within the analysis. Most aquatic plants did not show statistically valid changes in occurrence between the 2017 and 2022 surveys. Wild celery and fern-leaf pondweed were the only species that showed statistically valid declines in occurrence between 2017-2022. A table displaying the littoral frequency of occurrence of each aquatic plant species from all four point-intercept surveys is included in Appendix B.

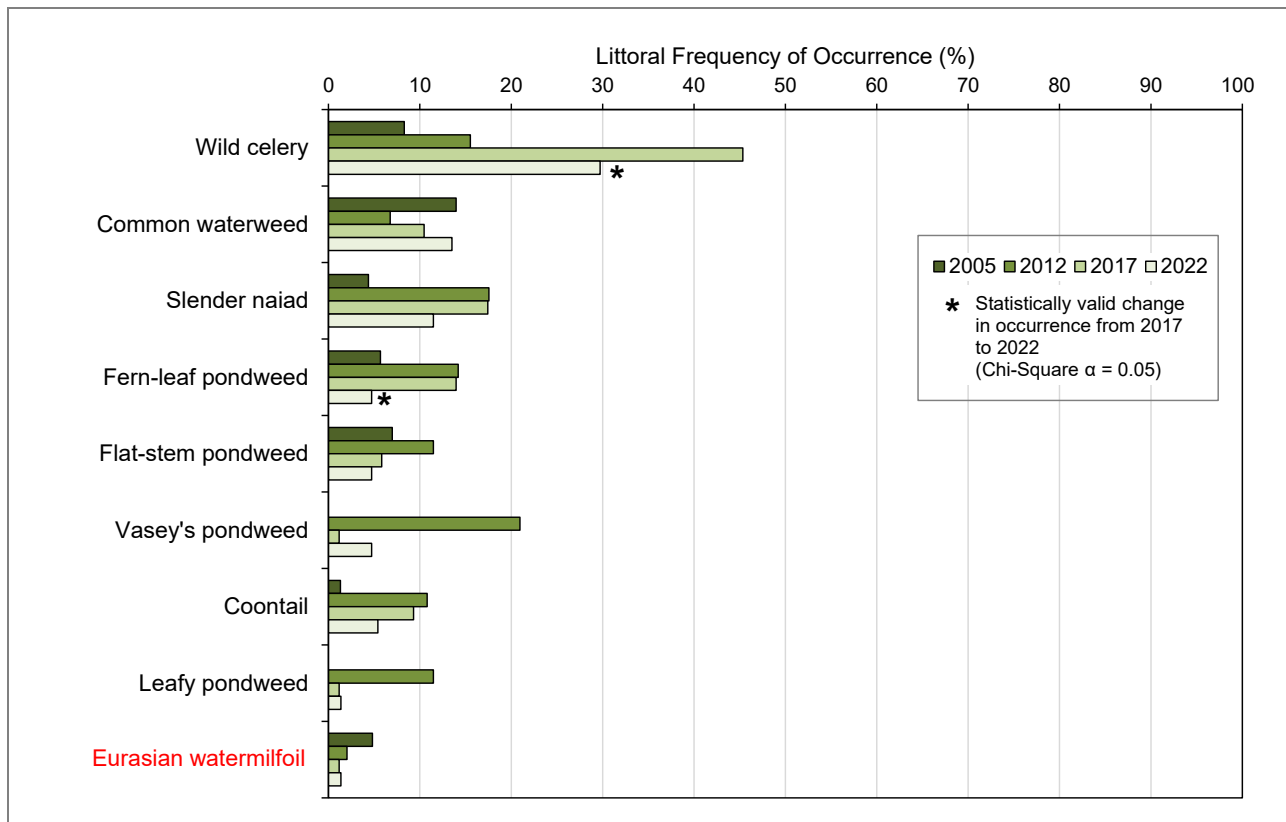
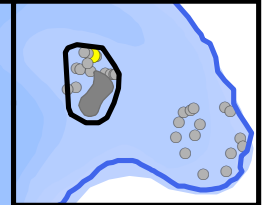
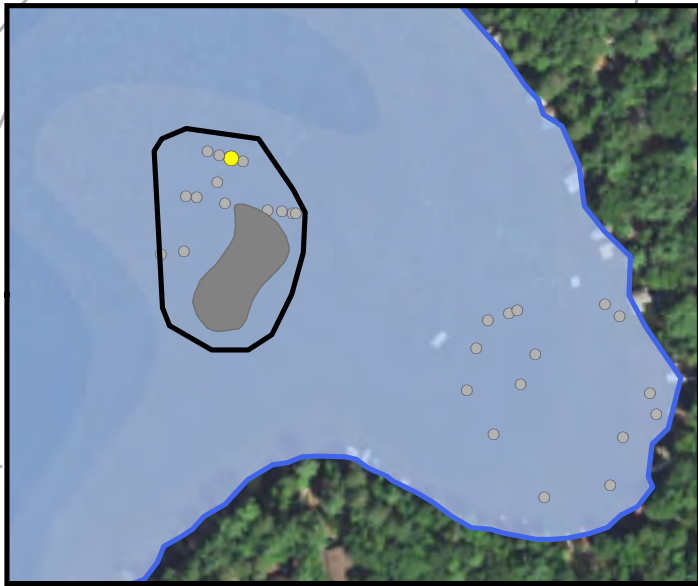


Figure 4.9-3. Yellow Birch Lake littoral frequency of occurrence of select aquatic plant species from 2005, 2012, 2017, and 2022 point-intercept surveys. Please note that only those native species with an occurrence of at least 10% in one of the four surveys are displayed.

The occurrence of EWM was 4.8% in 2006, 2.0% in 2012, and 1.2% in 2017. Eurasian watermilfoil was present at two sampling locations in the 2022 survey, resulting in a littoral frequency of occurrence of 1.4%.



Preliminary 2023 DASH Harvesting Areas		
Site	Acres	Ave Depth
Primary Sites		
YBL B-23	1.1	7.0



300
Feet

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Sources:
Roads and Hydro: WDNR
Bathymetry: WDNR, Onterra digitized
Aquatic Plants: Onterra, 2022
Map Date: aPRIL 5, 2023 JMB

Legend
2022 EWMPB Survey (September 13-14, 2022)

- Highly Scattered
- Scattered
- Dominant
- Highly Dominant
- Surface Matting
- Single or Few Plants
- Clumps of Plants
- Small Plant Colony
- 2023 Hand-Harvest Site

Map 9

Yellow Birch Lake
Vilas County, Wisconsin

**2022 EWM Peak-Biomass
Survey Results & 2023
Preliminary Hand-Harvest Plan**

4.10 Watersmeet

EWM Monitoring & Management

As has occurred in past years, the EWM population in Watersmeet Lake was mapped professionally during Onterra's 2022 Early-Season AIS (ESAIS) and Late-Season EWM Mapping surveys. During the ESAIS Survey, the entire littoral zone of the Lower Eagle River Chain of Lakes was searched for EWM by Onterra field staff. Completion of an ESAIS 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 ESAIS 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 ESAIS Survey. Several suspected EWM points were located by volunteers in Watersmeet Lake in 2022 and provided to Onterra in advance of the Late-Season survey. During the Late-Season Survey, Onterra ecologists revisited and refined areas of EWM mapped during the Early-Season AIS Survey as well as any areas marked by volunteers.

One site was included in the 2022 DASH EWM management strategy. Upon visiting the permitted site, extensive native aquatic plant growth made for difficult working conditions and therefore no EWM harvesting was attempted in the site.

The 2022 Late-Season EWM Mapping Survey identified several EWM populations around Watersmeet Lake, with most areas consisting of low-density ratings such as *highly scattered* or *scattered* colonies, or point-based occurrences such as *single plants* or *clumps of plants* (Map 10). The same site that was included in the 2022 harvesting strategy is being considered for a hand harvesting effort again in 2023, with plans to conduct harvesting efforts earlier in the season while native plant biomass is at lower levels. The final DASH harvesting strategy is subject to change pending the results of the 2023 Early-Season AIS survey. Professional EWM monitoring will continue during 2023 including early and late-season AIS surveys.

2022 Point-Intercept Survey Results

The whole-lake point-intercept survey was conducted in Watersmeet on July 19th, 2022 and 30 aquatic plant species were recorded. Wild celery (23.9%), coontail (9.9%), and common waterweed (4.7%) were the most frequently encountered species (Figure 4.10-1).

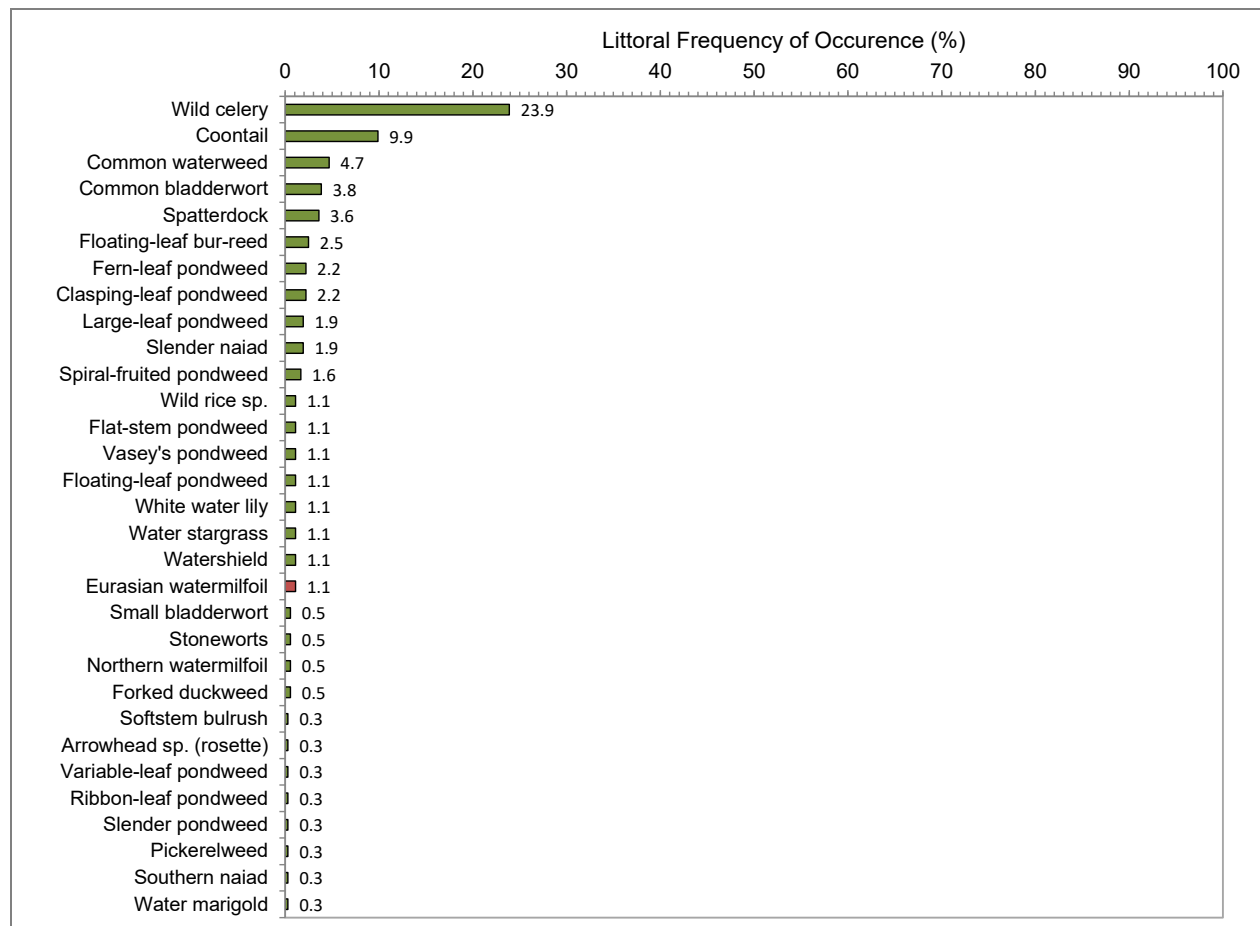
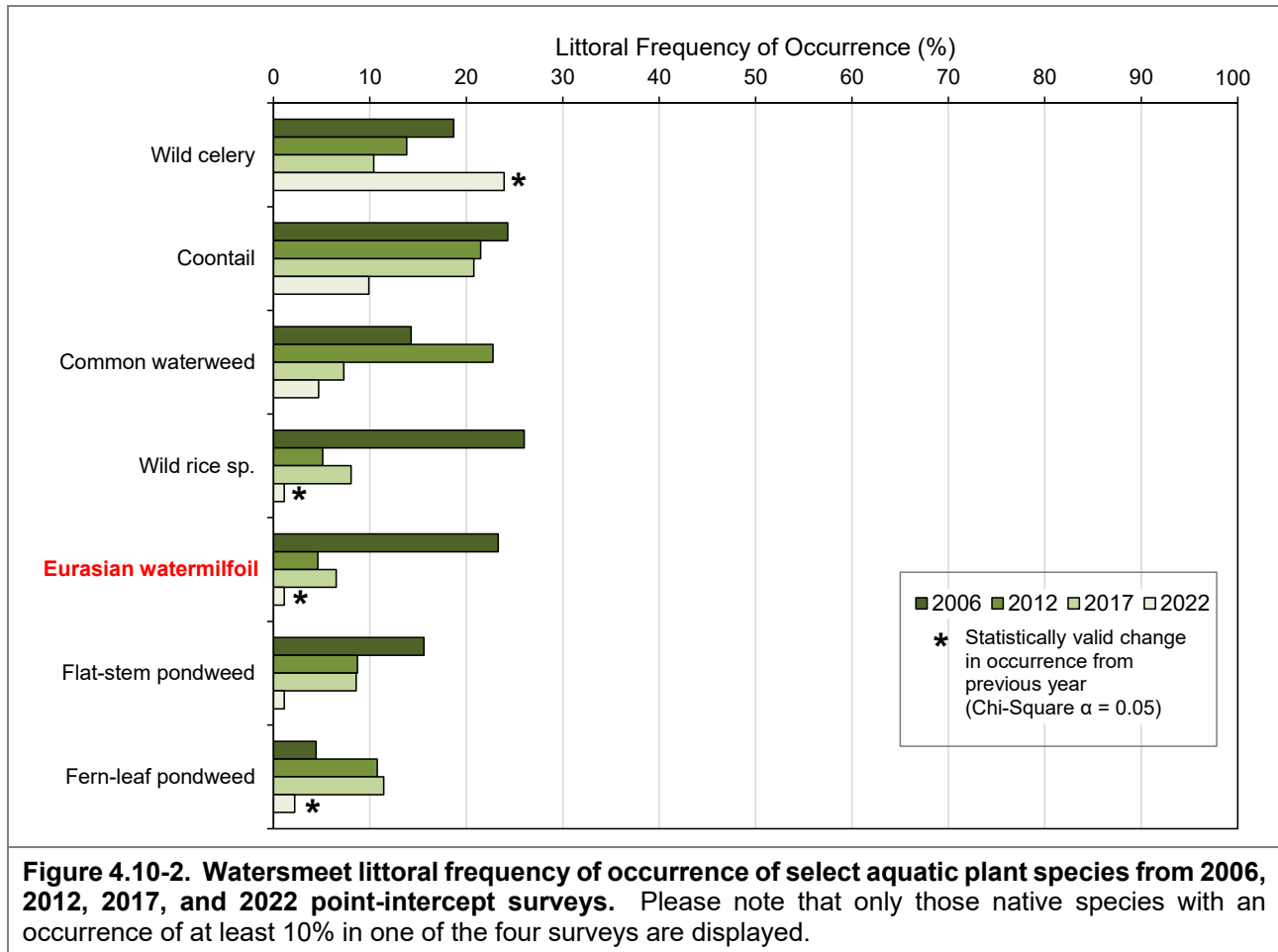


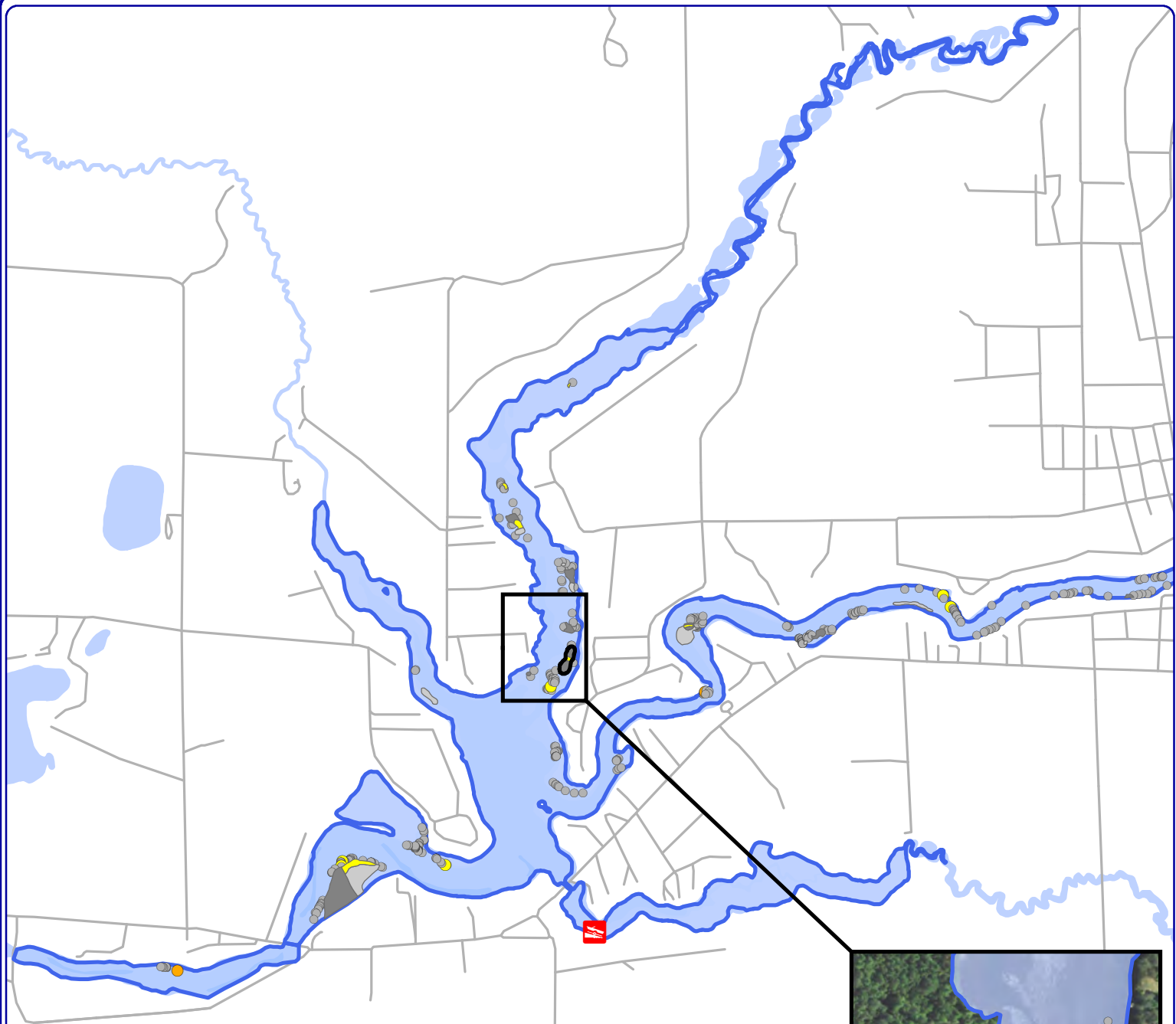
Figure 4.10-1. Watersmeet littoral frequency of occurrence of aquatic plant species from 2022 point-intercept survey.

A chi-square analysis ($\alpha = 0.05$) was used to compare individual aquatic plant species littoral occurrences in Watersmeet between the point-intercept surveys in 2006, 2012, 2017, and 2022 (Figure 4.10-2). Aquatic plant species that had a littoral frequency of occurrence of at least 5% in one of the four surveys are included within the analysis. A table displaying the littoral frequency of occurrence of each aquatic plant species from all four point-intercept surveys is included in Appendix B.

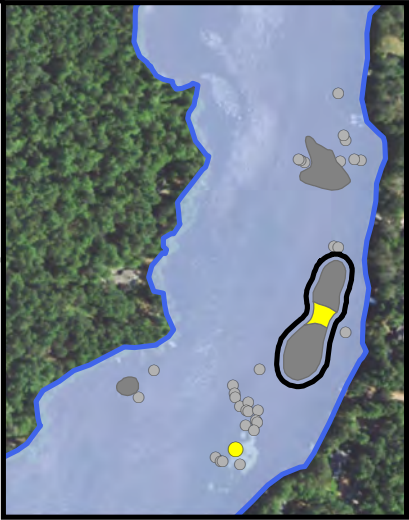
Turion & lesser duckweed (-100%), greater duckweed (-100%), spiny hornwort (100% decline), common bur-reed (-100%), flat-stem pondweed (-87%), wild rice (-86%), white water lily (-83%), fern-leaf pondweed (-81%), aquatic moss (-74%), large-leaf pondweed (-54%), and coontail (-52%) all displayed statistically valid changes from 2017 to 2022.

Eurasian watermilfoil was present at four sampling locations in the 2022 survey resulting in a littoral frequency of occurrence of 1.1%. The 2022 occurrence represents a statistically valid decrease in compared to the 2017 survey which was 6.5% (Figure 4.10-2).





Preliminary 2023 DASH Harvesting Areas		
Site	Acres	Ave Depth
Primary Sites		
Wat A-23	1.1	3.0





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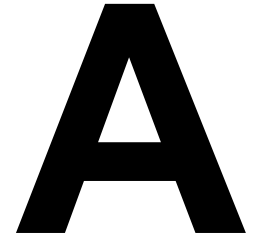
Sources:
 Roads and Hydro: WDNR
 Bathymetry: WDNR, Onterra digitized
 Aquatic Plants: Onterra, 2022
 Map Date: APRIL 5, 2023 JMB

Legend

2022 EWMPB Survey (September 13-14, 2022)

- Highly Scattered
- Scattered
- Dominant
- Highly Dominant
- Surface Matting
- Single or Few Plants
- Clumps of Plants
- Small Plant Colony
- 2023 Hand-Harvest Site

Map 10
 Watersmeet Lake
 Vilas County, Wisconsin
**2022 EWM Peak-Biomass
 Survey Results & 2023
 Preliminary Hand-Harvest Plan**



APPENDIX A

DASH Aquatic Services, LLC 2022 Harvesting Summary



2022 DASH SUMMARY

Harvesting of Eurasian Water Milfoil took place on the Eagle River Chain of Lakes
June 28, July 18-21, July 25-28, August 1-4, August 8-10

Catfish Lake area A-22

436 pounds were harvested over 15 ½ hours on 7/28, 8/1, and 8/2

Approx. 10% native plants harvested

EWM was scattered among native plants mostly single plants with a few small clumps in the center of the area

Catfish Lake Area B-22

950 pounds were harvested over 39 hours on 7/25, 7/27, 8/2, 8/4, 8/8, and 8/9

Approx. 10% native plants harvested

Clumps of large EWM plants were dominant in the center and north end of the area with single plants and small clumps mixed in with native plants

Catfish Lake Area E-22

364 pounds were harvested over 7 ¼ hours on 7/20

Approx. 10% native plants harvested

Clumps and single plants were mixed in with native plants

Catfish Lake Area F-22

702 pounds were harvested over 14 hours on 7/19, 7/21, and 8/10

Approx. 5% native plants were harvested

Clumps of large EWM plants were dominant with few native plants mixed in
The yellow dominant area and gray scattered area in the center were targeted, the east and west ends of the area were not harvested

Catfish Lake Area G-22

594 pounds were harvested over 15 ½ hours on 6/28, 7/18, 7/19, and 7/21

Approx. 5% native plants were harvested

Large clumps of EWM were dominant with scattered plants mixed with natives around the outside of the area

Yellow Birch Lake Area B-22 and A-22

186 pounds were harvested over 14 ½ hours on 7/26 and 8/3

Approx. 5% native plants were harvested

Scattered single plants and small clumps were found mixed with native plants

Approx. 10 small EWM plants were removed from area A-22 where the map shows single/few plants with the gray dots

Watersmeet Lake Area A-22

This area of EWM is surrounded by surface matting native plants making it difficult to place the DASH boat in a location to efficiently work without drawing the native plants into the pick up hose for the pump. To avoid significant damage to the native plant population and equipment down time, it was decided to not harvest in this area.

Harvesting this area earlier in the season would have better results

Catfish Lake

A-22 436#

B-22 950#

E-22 364#

F-22 702#

G-22 594#

3046

Yellow Birch Lake

A-22 186#

3232# total harvest

B

APPENDIX B

Littoral Frequency of Occurrence of Aquatic Plants in the Eagle River Chain

Cranberry Lake

Scientific Name	Common Name	LFOO (%)					2006-2012		2012-2017		2017-2022	
		2006	2012	2017	2022	2021	% Change	Direction	% Change	Direction	% Change	Direction
<i>Vallisneria americana</i>	Wild celery	13.3	18.8	45.5	39.8	0.0	41.4	▲	142.2	▲	-12.5	▼
<i>Najas flexilis</i>	Slender naiad	7.9	29.8	12.3	16.1	0.0	278.8	▲	-58.7	▼	31.1	▲
<i>Elodea canadensis</i>	Common waterweed	8.9	12.6	16.0	13.4	0.0	41.1	▲	27.1	▲	-16.2	▼
<i>Ceratophyllum demersum</i>	Coontail	5.1	11.0	13.9	12.4	0.0	113.7	▲	26.4	▲	-11.1	▼
<i>Potamogeton berchtoldii</i> & <i>P. pusillus</i>	Slender & small pondweed	12.2	9.4	1.1	8.1	0.0	-23.0	▼	-88.6	▼	654.0	▲
<i>Potamogeton amplifolius</i>	Large-leaf pondweed	6.8	5.8	11.8	12.4	0.0	-14.0	▼	102.0	▲	5.1	▲
<i>Potamogeton pusillus</i>	Small pondweed	12.2	9.4	0.0	5.4	0.0	-23.0	▼	-100.0	▼		▲
<i>Potamogeton robbinsii</i>	Fern-leaf pondweed	3.3	6.1	18.2	9.1	0.0	89.1	▲	195.7	▲	-49.7	▼
<i>Potamogeton vaseyi</i>	Vasey's pondweed	3.0	17.2	2.7	5.4	0.0	475.4	▲	-84.4	▼	101.1	▲
<i>Potamogeton spirillus</i>	Spiral-fruited pondweed	0.3	19.1	3.7	4.3	0.0	6945.6	▲	-80.4	▼	14.9	▲
<i>Nitella</i> spp.	Stoneworts	1.1	10.7	3.2	1.1	0.0	885.2	▲	-70.0	▼	-66.5	▼
<i>Potamogeton epihydrus</i>	Ribbon-leaf pondweed	0.0	5.8	3.7	5.4	0.0		▲	-35.7	▼	43.6	▲
<i>Sparganium fluctuans</i>	Floating-leaf bur-reed	0.0	2.6	6.4	6.5	0.0		▲	147.9	▲	0.5	▲
<i>Nuphar variegata</i>	Spatterdock	4.6	2.3	1.6	2.2	0.0	-50.8	▼	-29.2	▼	34.1	▲
<i>Potamogeton zosteriformis</i>	Flat-stem pondweed	3.8	3.9	0.5	1.6	0.0	2.4	▲	-86.2	▼	201.6	▲
<i>Nymphaea odorata</i>	White water lily	2.2	1.0	3.2	2.2	0.0	-55.2	▼	230.5	▲	-33.0	▼
<i>Myriophyllum sibiricum</i>	Northern watermilfoil	0.3	3.9	0.0	2.7	0.0	1333.0	▲	-100.0	▼		▲
<i>Potamogeton richardsonii</i>	Clasping-leaf pondweed	0.0	1.0	1.6	4.3	0.0		▲	65.2	▲	168.1	▲
<i>Myriophyllum spicatum</i>	Eurasian watermilfoil	1.1	1.0	3.2	0.5	0.0	-10.4	▼	230.5	▲	-83.2	▼
<i>Eleocharis acicularis</i>	Needle spikerush	0.0	1.3	2.7	2.7	0.0		▲	106.6	▲	0.5	▲
<i>Bidens beckii</i>	Water marigold	0.0	1.6	4.3	0.5	0.0		▲	164.4	▲	-87.4	▼
<i>Sagittaria</i> sp. (rosette)	Arrowhead sp. (rosette)	3.0	0.3	0.5	0.0	0.0	-89.1	▼	65.2	▲	-100.0	▼
<i>Utricularia vulgaris</i>	Common bladderwort	0.5	1.0	1.6	1.6	0.0	79.1	▲	65.2	▲	0.5	▲
<i>Pontederia cordata</i>	Pickerselweed	0.0	1.9	1.1	0.5	0.0		▲	-44.9	▼	-49.7	▼
<i>Brasenia schreberi</i>	Watershield	0.0	0.6	3.2	0.5	0.0		▲	395.7	▲	-83.2	▼
<i>Potamogeton strictifolius</i>	Stiff pondweed	0.0	2.6	0.0	0.0	0.0		▲	-100.0	▼		-
<i>Myriophyllum verticillatum</i>	Whorled watermilfoil	1.4	0.3	0.0	1.1	0.0	-76.1	▼	-100.0	▼		▲
<i>Potamogeton berchtoldii</i>	Slender pondweed	0.0	0.0	1.1	2.7	0.0		-		▲	151.3	▲
<i>Myriophyllum heterophyllum</i>	Various-leaved watermilfoil	0.0	0.0	3.2	0.5	0.0		-		▲	-83.2	▼
<i>Chara</i> spp.	Muskgrasses	0.8	0.0	0.0	2.2	0.0	-100.0	▼		-		▲
<i>Sparganium</i> sp.	Bur-reed sp.	1.4	0.0	0.0	0.0	0.0	-100.0	▼		-		-
<i>Potamogeton foliosus</i>	Leafy pondweed	0.0	1.3	0.0	0.0	0.0		▲	-100.0	▼		-
<i>Ceratophyllum echinatum</i>	Spiny hornwort	0.0	1.0	0.5	0.0	0.0		▲	-44.9	▼	-100.0	▼
<i>Typha</i> spp.	Cattail spp.	0.8	0.0	0.0	0.0	0.0	-100.0	▼		-		-
<i>Lemna trisulca</i>	Forked duckweed	0.0	0.6	0.0	0.5	0.0		▲	-100.0	▼		▲
<i>Najas guadalupensis</i>	Southern naiad	0.0	0.0	0.0	1.1	0.0		-		-		▲
<i>Heteranthera dubia</i>	Water stargrass	0.0	0.3	0.5	0.0	0.0		▲	65.2	▲	-100.0	▼
<i>Spirodela polyrhiza</i>	Greater duckweed	0.0	0.0	0.0	0.5	0.0		-		-		▲
<i>Sparganium emersum</i> var. <i>acaule</i>	Short-stemmed bur-reed	0.0	0.0	0.5	0.0	0.0		-		▲	-100.0	▼
<i>Sparganium angustifolium</i>	Narrow-leaf bur-reed	0.0	0.3	0.0	0.0	0.0		▲	-100.0	▼		-
<i>Sparganium angrocladum</i>	Shining bur-reed	0.0	0.3	0.0	0.0	0.0		▲	-100.0	▼		-
<i>Sagittaria rigida</i>	Stiff arrowhead	0.0	0.0	0.0	0.5	0.0		-		-		▲
<i>Potamogeton natans</i>	Floating-leaf pondweed	0.3	0.0	0.0	0.0	0.0	-100.0	▼		-		-
<i>Potamogeton hybrid 1</i>	Pondweed Hybrid 1	0.0	0.3	0.0	0.0	0.0		▲	-100.0	▼		-
<i>Lemna minor</i>	Lesser duckweed	0.0	0.0	0.0	0.5	0.0		-		-		▲

Catfish Lake

Scientific Name	Common Name	LFOO (%)					2006-2012		2012-2017		2017-2022	
		2006	2012	2017	2022	2022	% Change	Direction	% Change	Direction	% Change	Direction
<i>Vallisneria americana</i>	Wild celery	16.0	19.2	54.3	40.8	40.8	19.9	▲	183.4	▲	-24.9	▼
<i>Najas flexilis</i>	Slender naiad	6.5	26.8	17.3	27.6	27.6	313.3	▲	-35.5	▼	59.6	▲
<i>Potamogeton berchtoldii</i> & <i>P. pusillus</i>	Slender & Small pondweed	22.0	17.2	1.9	8.6	8.6	-21.9	▼	-89.2	▼	365.5	▲
<i>Potamogeton pusillus</i>	Small pondweed	22.0	17.2	1.9	2.9	2.9	-21.9	▼	-89.2	▼	55.2	▲
<i>Elodea canadensis</i>	Common waterweed	14.7	12.0	14.2	10.3	10.3	-18.0	▼	17.9	▲	-27.1	▼
<i>Potamogeton amplifolius</i>	Large-leaf pondweed	10.6	4.4	10.5	16.1	16.1	-58.2	▼	137.3	▲	53.3	▲
<i>Ceratophyllum demersum</i>	Coontail	7.1	8.4	5.6	8.6	8.6	17.2	▲	-33.5	▼	55.2	▲
<i>Potamogeton vaseyi</i>	Vasey's pondweed	3.5	12.5	0.0	6.3	6.3	262.6	▲	-100.0	▼		▲
<i>Potamogeton zosteriformis</i>	Flat-stem pondweed	7.8	6.6	4.3	4.6	4.6	-14.7	▼	-34.9	▼	6.4	▲
<i>Potamogeton spirillus</i>	Spiral-fruited pondweed	1.1	13.8	3.7	4.6	4.6	1174.1	▲	-73.1	▼	24.1	▲
<i>Myriophyllum sibiricum</i>	Northern watermilfoil	5.2	2.5	2.5	9.8	9.8	-52.6	▼	0.5	▲	295.7	▲
<i>Potamogeton robbinsii</i>	Fern-leaf pondweed	4.8	2.0	11.1	5.7	5.7	-58.6	▼	465.3	▲	-48.3	▼
<i>Nitella</i> spp.	Stoneworts	1.3	10.3	0.0	5.7	5.7	696.3	▲	-100.0	▼		▲
<i>Myriophyllum spicatum</i>	Eurasian watermilfoil	2.6	0.2	3.1	2.9	2.9	-90.5	▼	1156.2	▲	-6.9	▼
<i>Eleocharis acicularis</i>	Needle spikerush	0.0	0.7	3.1	4.0	4.0		▲	318.7	▲	30.3	▲
<i>Potamogeton berchtoldii</i>	Slender pondweed	0.0	0.0	0.0	5.7	5.7		-		-		▲
<i>Najas guadalupensis</i>	Southern naiad	0.0	0.0	0.0	5.7	5.7		-		-		▲
<i>Potamogeton richardsonii</i>	Clasping-leaf pondweed	0.4	1.7	1.2	1.7	1.7	298.2	▲	-28.2	▼	39.7	▲
<i>Nuphar variegata</i>	Spatterdock	1.3	0.5	1.2	1.1	1.1	-62.1	▼	151.2	▲	-6.9	▼
<i>Isoetes</i> spp.	Quillwort spp.	0.4	0.2	1.2	1.7	1.7	-43.1	▼	402.5	▲	39.7	▲
<i>Bidens beckii</i>	Water marigold	0.9	0.0	0.6	1.7	1.7	-100.0	▼		▲	179.3	▲
<i>Chara</i> spp.	Muskgrasses	0.9	0.2	1.9	0.0	0.0	-71.6	▼	653.7	▲	-100.0	▼
<i>Sparganium angustifolium</i>	Narrow-leaf bur-reed	0.0	0.7	0.6	0.6	0.6		▲	-16.3	▼	-6.9	▼
<i>Potamogeton epihydrus</i>	Ribbon-leaf pondweed	0.0	0.7	0.6	0.6	0.6		▲	-16.3	▼	-6.9	▼
<i>Ceratophyllum echinatum</i>	Spiny hornwort	0.0	0.0	3.1	0.0	0.0		-		▲	-100.0	▼
<i>Utricularia vulgaris</i>	Common bladderwort	0.0	0.0	0.0	1.1	1.1		-		-		▲
<i>Sparganium fluctuans</i>	Floating-leaf bur-reed	0.0	0.0	0.6	0.6	0.6		-		▲	-6.9	▼
<i>Schoenoplectus tabernaemontani</i>	Softstem bulrush	0.4	0.2	0.0	0.0	0.0	-43.1	▼	-100.0	▼		-
<i>Potamogeton praelongus</i>	White-stem pondweed	0.0	0.2	0.0	0.6	0.6		▲	-100.0	▼		▲
<i>Sparganium</i> sp.	Bur-reed sp.	0.4	0.0	0.0	0.0	0.0	-100.0	▼		-		-
<i>Potamogeton natans</i>	Floating-leaf pondweed	0.0	0.0	0.0	0.6	0.6		-		-		▲
<i>Potamogeton foliosus</i>	Leafy pondweed	0.0	0.5	0.0	0.0	0.0		▲	-100.0	▼		-
<i>Nymphaea odorata</i>	White water lily	0.0	0.5	0.0	0.0	0.0		▲	-100.0	▼		-
<i>Fissidens</i> spp. & <i>Fontinalis</i> spp.	Aquatic Moss	0.0	0.5	0.0	0.0	0.0		▲	-100.0	▼		-
<i>Spirodela polyrhiza</i>	Greater duckweed	0.0	0.2	0.0	0.0	0.0		▲	-100.0	▼		-
<i>Sagittaria</i> sp. (rosette)	Arrowhead sp. (rosette)	0.0	0.2	0.0	0.0	0.0		▲	-100.0	▼		-
<i>Potamogeton strictifolius</i>	Stiff pondweed	0.0	0.2	0.0	0.0	0.0		▲	-100.0	▼		-
<i>Potamogeton gramineus</i>	Variable-leaf pondweed	0.0	0.0	0.6	0.0	0.0		-		▲	-100.0	▼
<i>Potamogeton friesii</i>	Fries' pondweed	0.0	0.2	0.0	0.0	0.0		▲	-100.0	▼		-
<i>Lobelia dortmanna</i>	Water lobelia	0.2	0.0	0.0	0.0	0.0	-100.0	▼		-		-
<i>Heteranthera dubia</i>	Water stargrass	0.0	0.2	0.0	0.0	0.0		▲	-100.0	▼		-

Voyageur Lake

Scientific Name	Common Name	LFOO (%)					2006-2012		2012-2017		2017-2022	
		2006	2012	2017	2022	2022	% Change	Direction	% Change	Direction	% Change	Direction
<i>Vallisneria americana</i>	Wild celery	22.5	34.9	42.4	42.1	42.1	55.0	▲	21.6	▲	-0.8	▼
<i>Ceratophyllum demersum</i>	Coontail	15.0	17.8	4.0	12.1	12.1	18.4	▲	-77.5	▼	203.7	▲
<i>Najas flexilis</i>	Slender naiad	3.1	21.1	8.8	15.0	15.0	573.7	▲	-58.2	▼	69.9	▲
<i>Potamogeton zosteriformis</i>	Flat-stem pondweed	12.5	21.1	2.4	5.6	5.6	68.4	▲	-88.6	▼	133.6	▲
<i>Potamogeton robbinsii</i>	Fern-leaf pondweed	11.3	15.1	5.6	2.8	2.8	34.5	▲	-63.0	▼	-49.9	▼
<i>Elodea canadensis</i>	Common waterweed	11.3	10.5	4.8	4.7	4.7	-6.4	▼	-54.4	▼	-2.6	▼
<i>Potamogeton amplifolius</i>	Large-leaf pondweed	11.9	5.9	2.4	7.5	7.5	-50.1	▼	-59.5	▼	211.5	▲
<i>Potamogeton vaseyi</i>	Vasey's pondweed	8.1	13.8	1.6	4.7	4.7	70.0	▲	-88.4	▼	192.1	▲
<i>Nuphar variegata</i>	Spatterdock	11.3	3.9	4.0	6.5	6.5	-64.9	▼	1.3	▲	63.6	▲
<i>Sparganium fluctuans</i>	Floating-leaf bur-reed	0.0	8.6	7.2	7.5	7.5		▲	-15.8	▼	3.8	▲
<i>Potamogeton berchtoldii</i> & <i>P. pusillus</i>	Slender & small pondweed	14.4	5.3	2.4	0.9	0.9	-63.4	▼	-54.4	▼	-61.1	▼
<i>Potamogeton pusillus</i>	Small pondweed	14.4	5.3	2.4	0.9	0.9	-63.4	▼	-54.4	▼	-61.1	▼
<i>Nymphaea odorata</i>	White water lily	3.1	2.6	4.8	4.7	4.7	-15.8	▼	82.4	▲	-2.6	▼
<i>Myriophyllum sibiricum</i>	Northern watermilfoil	3.1	7.2	0.8	3.7	3.7	131.6	▲	-88.9	▼	367.3	▲
<i>Sparganium</i> sp.	Bur-reed sp.	15.0	0.0	0.0	0.0	0.0	-100.0	▼				
<i>Myriophyllum spicatum</i>	Eurasian watermilfoil	8.8	2.0	0.0	1.9	1.9	-77.4	▼	-100.0	▼		▲
<i>Chara</i> & <i>Nitella</i> spp.	Muskgrasses & Stoneworts	0.0	10.5	1.6	0.9	0.9		▲	-84.8	▼	-41.6	▼
<i>Myriophyllum verticillatum</i>	Whorled watermilfoil	5.6	1.3	4.0	1.9	1.9	-76.6	▼	204.0	▲	-53.3	▼
<i>Potamogeton spirillus</i>	Spiral-fruited pondweed	3.1	2.6	1.6	2.8	2.8	-15.8	▼	-39.2	▼	75.2	▲
<i>Nitella</i> spp.	Stoneworts	0.0	10.5	0.0	0.0	0.0		▲	-100.0	▼		-
<i>Utricularia vulgaris</i>	Common bladderwort	5.0	1.3	2.4	0.9	0.9	-73.7	▼	82.4	▲	-61.1	▼
<i>Heteranthera dubia</i>	Water stargrass	2.5	3.3	0.0	0.0	0.0	31.6	▲	-100.0	▼		-
<i>Eleocharis acicularis</i>	Needle spikerush	0.0	0.0	0.8	3.7	3.7		-		▲	367.3	▲
<i>Potamogeton richardsonii</i>	Clasping-leaf pondweed	0.0	1.3	1.6	1.9	1.9		▲	21.6	▲	16.8	▲
<i>Potamogeton strictifolius</i>	Stiff pondweed	0.0	3.9	0.8	0.0	0.0		▲	-79.7	▼	-100.0	▼
<i>Sagittaria</i> sp. (rosette)	Arrowhead sp. (rosette)	3.8	0.0	0.0	0.0	0.0	-100.0	▼		-		-
<i>Ranunculus aquatilis</i>	White water crowfoot	3.1	0.0	0.0	0.0	0.0	-100.0	▼		-		-
<i>Chara</i> spp.	Muskgrasses	0.0	0.7	1.6	0.9	0.9		▲	143.2	▲	-41.6	▼
<i>Potamogeton epihydrus</i>	Ribbon-leaf pondweed	0.0	2.6	0.0	0.0	0.0		▲	-100.0	▼		-
<i>Ceratophyllum echinatum</i>	Spiny hornwort	0.0	0.0	3.2	0.0	0.0		-		▲	-100.0	▼
<i>Potamogeton praelongus</i>	White-stem pondweed	0.6	0.0	0.0	0.9	0.9	-100.0	▼		-		▲
<i>Pontederia cordata</i>	Pickerselweed	1.3	0.0	0.8	0.0	0.0	-100.0	▼		▲	-100.0	▼
<i>Myriophyllum heterophyllum</i>	Various-leaved watermilfoil	0.0	0.0	0.8	0.9	0.9		-		▲	16.8	▲
<i>Bidens beckii</i>	Water marigold	1.3	0.7	0.0	0.0	0.0	-47.4	▼	-100.0	▼		-
<i>Potamogeton natans</i>	Floating-leaf pondweed	0.6	0.0	0.8	0.0	0.0	-100.0	▼		▲	-100.0	▼
<i>Potamogeton gramineus</i>	Variable-leaf pondweed	0.0	0.0	1.6	0.0	0.0		-		▲	-100.0	▼
<i>Schoenoplectus tabernaemontani</i>	Softstem bulrush	0.6	0.0	0.0	0.0	0.0	-100.0	▼		-		-
<i>Najas guadalupensis</i>	Southern naiad	0.0	0.0	0.8	0.0	0.0		-		▲	-100.0	▼
<i>Isoetes</i> spp.	Quillwort spp.	0.0	0.0	0.8	0.0	0.0		-		▲	-100.0	▼
<i>Fissidens</i> spp. & <i>Fontinalis</i> spp.	Aquatic Moss	0.0	0.0	0.8	0.0	0.0		-		▲	-100.0	▼

Eagle Lake

Scientific Name	Common Name	LFOO (%)					2006-2012		2012-2017		2017-2022	
		2006	2012	2017	2022	2022	% Change	Direction	% Change	Direction	% Change	Direction
<i>Najas flexilis</i>	Slender naiad	3.0	43.8	20.4	26.1	26.1	1358.0	▲	-53.5	▼	28.1	▲
<i>Vallisneria americana</i>	Wild celery	0.0	0.8	53.4	36.9	36.9		▲	6361.2	▲	-30.8	▼
<i>Potamogeton berchtoldii</i> & <i>P. pusillus</i>	Slender & small pondweed	19.7	29.8	1.0	7.2	7.2	50.7	▲	-96.7	▼	642.3	▲
<i>Potamogeton pusillus</i>	Small pondweed	19.7	29.8	1.0	7.2	7.2	50.7	▲	-96.7	▼	642.3	▲
<i>Wolffia</i> spp.	Watermeal spp.	15.5	40.5	0.0	0.0	0.0	162.1	▲	-100.0	▼		-
<i>Potamogeton amplifolius</i>	Large-leaf pondweed	12.4	7.4	16.5	12.6	12.6	-40.2	▼	121.9	▲	-23.6	▼
<i>Potamogeton richardsonii</i>	Clasping-leaf pondweed	3.0	11.6	11.7	13.5	13.5	285.1	▲	0.7	▲	16.0	▲
<i>Potamogeton vaseyi</i>	Vasey's pondweed	8.2	17.4	1.0	9.0	9.0	112.8	▲	-94.4	▼	827.9	▲
<i>Elodea canadensis</i>	Common waterweed	7.3	11.6	5.8	2.7	2.7	58.6	▲	-49.7	▼	-53.6	▼
<i>Ceratophyllum demersum</i>	Coontail	4.7	9.9	6.8	4.5	4.5	110.1	▲	-31.5	▼	-33.7	▼
<i>Myriophyllum sibiricum</i>	Northern watermilfoil	6.9	10.7	2.9	2.7	2.7	56.5	▲	-72.9	▼	-7.2	▼
<i>Potamogeton spirillus</i>	Spiral-fruited pondweed	0.0	9.1	1.9	7.2	7.2		▲	-78.6	▼	271.2	▲
<i>Potamogeton zosteriformis</i>	Flat-stem pondweed	6.4	5.0	1.9	1.8	1.8	-23.0	▼	-60.8	▼	-7.2	▼
<i>Nuphar variegata</i>	Spatterdock	1.7	6.6	3.9	3.6	3.6	285.1	▲	-41.3	▼	-7.2	▼
<i>Myriophyllum spicatum</i>	Eurasian watermilfoil	6.4	1.7	0.0	0.9	0.9	-74.3	▼	-100.0	▼		▲
<i>Potamogeton robbinsii</i>	Fern-leaf pondweed	1.7	5.0	3.9	1.8	1.8	188.8	▲	-21.7	▼	-53.6	▼
<i>Chara</i> spp.	Muskgrasses	0.9	3.3	2.9	3.6	3.6	285.1	▲	-11.9	▼	23.7	▲
<i>Isoetes</i> spp.	Quillwort spp.	0.0	1.7	5.8	2.7	2.7		▲	252.4	▲	-53.6	▼
<i>Potamogeton strictifolius</i>	Stiff pondweed	0.0	7.4	3.9	0.0	0.0		▲	-47.8	▼	-100.0	▼
<i>Eleocharis acicularis</i>	Needle spikerush	0.0	0.0	3.9	2.7	2.7		-		▲	-30.4	▼
<i>Sagittaria</i> sp. (rosette)	Arrowhead sp. (rosette)	1.3	0.0	1.9	0.0	0.0	-100.0	▼		▲	-100.0	▼
<i>Nymphaea odorata</i>	White water lily	0.9	0.0	1.0	0.9	0.9	-100.0	▼		▲	-7.2	▼
<i>Schoenoplectus subterminalis</i>	Water bulrush	0.0	0.0	0.0	1.8	1.8		-		-		▲
<i>Potamogeton epihydrus</i>	Ribbon-leaf pondweed	0.0	3.3	0.0	0.0	0.0		▲	-100.0	▼		-
<i>Heteranthera dubia</i>	Water stargrass	0.4	1.7	1.0	0.0	0.0	285.1	▲	-41.3	▼	-100.0	▼
<i>Utricularia vulgaris</i>	Common bladderwort	0.0	0.0	1.9	0.0	0.0		-		▲	-100.0	▼
<i>Sparganium fluctuans</i>	Floating-leaf bur-reed	0.0	0.0	0.0	0.9	0.9		-		-		▲
<i>Sparganium emersum</i> var. <i>acaule</i>	Short-stemmed bur-reed	0.0	0.8	1.0	0.0	0.0		▲	17.5	▲	-100.0	▼
<i>Schoenoplectus tabernaemontani</i>	Softstem bulrush	0.4	0.8	0.0	0.0	0.0	92.6	▲	-100.0	▼		-
<i>Ranunculus aquatilis</i>	White water crowfoot	0.9	0.0	0.0	0.0	0.0	-100.0	▼		-		-
<i>Potamogeton gramineus</i>	Variable-leaf pondweed	0.0	0.0	1.9	0.0	0.0		-		▲	-100.0	▼
<i>Potamogeton berchtoldii</i>	Slender pondweed	0.0	0.0	0.0	0.9	0.9		-		-		▲
<i>Pontederia cordata</i>	Pickerselweed	0.0	0.0	0.0	0.9	0.9		-		-		▲
<i>Nitella</i> spp.	Stoneworts	0.4	0.8	0.0	0.0	0.0	92.6	▲	-100.0	▼		-
<i>Eleocharis palustris</i>	Creeping spikerush	0.4	0.8	0.0	0.0	0.0	92.6	▲	-100.0	▼		-
<i>Bidens beckii</i>	Water marigold	0.0	0.0	1.9	0.0	0.0		-		▲	-100.0	▼
<i>Stuckenia pectinata</i>	Sago pondweed	0.0	0.8	0.0	0.0	0.0		▲	-100.0	▼		-
<i>Riccia</i> sp.	Riccia sp.	0.0	0.8	0.0	0.0	0.0		▲	-100.0	▼		-
<i>Lythrum salicaria</i>	Purple loosestrife	0.0	0.8	0.0	0.0	0.0		▲	-100.0	▼		-

Scattering Rice Lake

Scientific Name	Common Name	LFOO (%)					2006-2012		2012-2017		2017-2022	
		2006	2012	2017	2022	2022	% Change	Direction	% Change	Direction	% Change	Direction
<i>Vallisneria americana</i>	Wild celery	14.8	19.2	23.3	20.5	20.5	29.7	▲	21.3	▲	-11.9	▼
<i>Ceratophyllum demersum</i>	Coontail	25.6	13.3	27.9	3.6	3.6	-47.9	▼	109.3	▲	-87.0	▼
<i>Potamogeton zosteriformis</i>	Flat-stem pondweed	29.5	6.7	15.1	2.4	2.4	-77.4	▼	126.7	▲	-84.1	▼
<i>Potamogeton robbinsii</i>	Fern-leaf pondweed	5.7	13.3	11.6	3.6	3.6	134.7	▲	-12.8	▼	-68.9	▼
<i>Elodea canadensis</i>	Common waterweed	11.4	4.2	12.8	3.6	3.6	-63.3	▼	207.0	▲	-71.7	▼
<i>Potamogeton amplifolius</i>	Large-leaf pondweed	6.8	5.0	8.1	8.4	8.4	-26.7	▼	62.8	▲	3.6	▲
<i>Myriophyllum spicatum</i>	Eurasian watermilfoil	17.6	0.0	1.2	1.2	1.2	-100.0	▼		▲	3.6	▲
<i>Potamogeton richardsonii</i>	Clasping-leaf pondweed	1.7	7.5	14.0	2.4	2.4	340.0	▲	86.0	▲	-82.7	▼
<i>Myriophyllum sibiricum</i>	Northern watermilfoil	10.2	1.7	3.5	2.4	2.4	-83.7	▼	109.3	▲	-30.9	▼
<i>Nymphaea odorata</i>	White water lily	4.0	4.2	12.8	1.2	1.2	4.8	▲	207.0	▲	-90.6	▼
<i>Chara</i> & <i>Nitella</i> spp.	Muskgrasses & Stoneworts	0.0	7.5	2.3	3.6	3.6		▲	-69.0	▼	55.4	▲
<i>Potamogeton pusillus</i>	Small pondweed	2.3	5.0	1.2	2.4	2.4	120.0	▲	-76.7	▼	107.2	▲
<i>Nuphar variegata</i>	Spatterdock	7.4	0.8	1.2	0.0	0.0	-88.7	▼	39.5	▲	-100.0	▼
<i>Najas flexilis</i>	Slender naiad	0.0	10.8	2.3	0.0	0.0		▲	-78.5	▼	-100.0	▼
<i>Potamogeton spirillus</i>	Spiral-fruited pondweed	1.1	5.0	0.0	2.4	2.4	340.0	▲	-100.0	▼		▲
<i>Potamogeton berchtoldii</i> & <i>P. pusillus</i>	Slender & small pondweed	0.0	5.0	1.2	2.4	2.4		▲	-76.7	▼	107.2	▲
<i>Nitella</i> spp.	Stoneworts	0.0	7.5	0.0	0.0	0.0		▲	-100.0	▼		-
<i>Chara</i> spp.	Muskgrasses	0.0	0.0	2.3	3.6	3.6		-		▲	55.4	▲
<i>Bidens beckii</i>	Water marigold	0.6	3.3	3.5	0.0	0.0	486.7	▲	4.7	▲	-100.0	▼
<i>Utricularia vulgaris</i>	Common bladderwort	1.7	0.8	3.5	0.0	0.0	-51.1	▼	318.6	▲	-100.0	▼
<i>Pontederia cordata</i>	Pickerselweed	2.8	0.8	1.2	0.0	0.0	-70.7	▼	39.5	▲	-100.0	▼
<i>Potamogeton vaseyi</i>	Vasey's pondweed	1.1	0.0	0.0	1.2	1.2	-100.0	▼		-		▲
<i>Potamogeton epihydrus</i>	Ribbon-leaf pondweed	0.0	0.8	1.2	1.2	1.2		▲	39.5	▲	3.6	▲
<i>Myriophyllum verticillatum</i>	Whorled watermilfoil	0.0	0.0	4.7	0.0	0.0		-		▲	-100.0	▼
<i>Heteranthera dubia</i>	Water stargrass	1.1	0.8	1.2	0.0	0.0	-26.7	▼	39.5	▲	-100.0	▼
<i>Fissidens</i> spp. & <i>Fontinalis</i> spp.	Aquatic Moss	0.0	0.0	3.5	0.0	0.0		-		▲	-100.0	▼
<i>Spirodela polyrhiza</i>	Greater duckweed	0.6	0.0	1.2	0.0	0.0	-100.0	▼		▲	-100.0	▼
<i>Sagittaria</i> sp. (rosette)	Arrowhead sp. (rosette)	1.1	0.0	0.0	0.0	0.0	-100.0	▼		-		-
<i>Utricularia minor</i>	Small bladderwort	0.0	0.8	0.0	0.0	0.0		▲	-100.0	▼		-
<i>Sparganium fluctuans</i>	Floating-leaf bur-reed	0.0	0.0	1.2	0.0	0.0		-		▲	-100.0	▼
<i>Sparganium emersum</i> var. <i>acaule</i>	Short-stemmed bur-reed	0.0	0.0	1.2	0.0	0.0		-		▲	-100.0	▼
<i>Sparganium angustifolium</i>	Shining bur-reed	0.0	0.8	0.0	0.0	0.0		▲	-100.0	▼		-
<i>Riccia</i> sp.	Riccia sp.	0.0	0.8	0.0	0.0	0.0		▲	-100.0	▼		-
<i>Potamogeton natans</i>	Floating-leaf pondweed	0.6	0.0	0.0	0.0	0.0	-100.0	▼		-		-
<i>Potamogeton alpinus</i>	Alpine pondweed	0.0	0.0	1.2	0.0	0.0		-		▲	-100.0	▼
<i>Lemna turionifera</i>	Turion duckweed	0.6	0.0	0.0	0.0	0.0	-100.0	▼		-		-
<i>Lemna trisulca</i>	Forked duckweed	0.0	0.8	0.0	0.0	0.0		▲	-100.0	▼		-
<i>Ceratophyllum echinatum</i>	Spiny hornwort	0.0	0.0	1.2	0.0	0.0		-		▲	-100.0	▼

Otter Lake

Scientific Name	Common Name	LFOO (%)					2006-2012		2012-2017		2017-2022	
		2006	2012	2017	2022	2022	% Change	Direction	% Change	Direction	% Change	Direction
<i>Vallisneria americana</i>	Wild celery	21.5	42.4	43.4	37.0	37.0	96.7	▲	2.4	▲	-14.7	▼
<i>Potamogeton berchtoldii</i> & <i>P. pusillus</i>	Slender & small pondweed	46.2	39.0	3.8	9.3	9.3	-15.5	▼	-90.3	▼	145.4	▲
<i>Potamogeton pusillus</i>	Small pondweed	46.2	39.0	3.8	5.6	5.6	-15.5	▼	-90.3	▼	47.2	▲
<i>Najas flexilis</i>	Slender naiad	12.3	40.7	15.1	18.5	18.5	230.5	▲	-62.9	▼	22.7	▲
<i>Elodea canadensis</i>	Common waterweed	29.2	8.5	9.4	5.6	5.6	-71.0	▼	11.3	▲	-41.1	▼
<i>Potamogeton vaseyi</i>	Vasey's pondweed	7.7	18.6	1.9	14.8	14.8	142.4	▲	-89.9	▼	685.2	▲
<i>Potamogeton amplifolius</i>	Large-leaf pondweed	20.0	11.9	11.3	5.6	5.6	-40.7	▼	-4.6	▼	-50.9	▼
<i>Potamogeton spirillus</i>	Spiral-fruited pondweed	0.0	22.0	3.8	7.4	7.4		▲	-82.9	▼	96.3	▲
<i>Myriophyllum sibiricum</i>	Northern watermilfoil	15.4	10.2	5.7	1.9	1.9	-33.9	▼	-44.3	▼	-67.3	▼
<i>Ceratophyllum demersum</i>	Coontail	9.2	11.9	7.5	1.9	1.9	28.5	▲	-36.4	▼	-75.5	▼
<i>Potamogeton richardsonii</i>	Clasping-leaf pondweed	0.0	3.4	13.2	3.7	3.7		▲	289.6	▲	-72.0	▼
<i>Potamogeton zosteriformis</i>	Flat-stem pondweed	13.8	5.1	0.0	0.0	0.0	-63.3	▼	-100.0	▼		-
<i>Chara</i> & <i>Nitella</i> spp.	Muskgrasses & Stoneworts	0.0	5.1	1.9	1.9	1.9		▲	-62.9	▼	-1.9	▼
<i>Myriophyllum spicatum</i>	Eurasian watermilfoil	6.2	3.4	0.0	0.0	0.0	-44.9	▼	-100.0	▼		-
<i>Potamogeton robbinsii</i>	Fern-leaf pondweed	1.5	3.4	3.8	0.0	0.0	120.3	▲	11.3	▲	-100.0	▼
<i>Potamogeton berchtoldii</i>	Slender pondweed	0.0	0.0	0.0	3.7	3.7		-	-	-		▲
<i>Nitella</i> spp.	Stoneworts	0.0	5.1	0.0	0.0	0.0		▲	-100.0	▼		-
<i>Chara</i> spp.	Muskgrasses	0.0	0.0	1.9	1.9	1.9		-		▲	-1.9	▼
<i>Potamogeton praelongus</i>	White-stem pondweed	0.0	0.0	0.0	1.9	1.9		-		-		▲
<i>Potamogeton epihydrus</i>	Ribbon-leaf pondweed	0.0	1.7	1.9	0.0	0.0		▲	11.3	▲	-100.0	▼
<i>Potamogeton strictifolius</i>	Stiff pondweed	0.0	1.7	0.0	0.0	0.0		▲	-100.0	▼		-
<i>Nuphar variegata</i>	Spatterdock	1.5	0.0	0.0	0.0	0.0	-100.0	▼		-		-
<i>Heteranthera dubia</i>	Water stargrass	0.0	1.7	0.0	0.0	0.0		▲	-100.0	▼		-
<i>Fissidens</i> spp. & <i>Fontinalis</i> spp.	Aquatic Moss	0.0	1.7	0.0	0.0	0.0		▲	-100.0	▼		-

Lynx Lake

Scientific Name	Common Name	LFOO (%)					2006-2012		2012-2017		2017-2022	
		2006	2012	2017	2022	2022	% Change	Direction	% Change	Direction	% Change	Direction
<i>Vallisneria americana</i>	Wild celery	26.1	41.0	62.5	48.5	48.5	57.3	▲	52.3	▲	-22.4	▼
<i>Najas flexilis</i>	Slender naiad	10.1	46.2	23.2	11.8	11.8	354.9	▲	-49.7	▼	-49.3	▼
<i>Potamogeton pusillus</i> & <i>P. berchtoldii</i>	Small & slender pondweed	44.9	33.3	3.6	5.9	5.9	-25.8	▼	-89.3	▼	64.7	▲
<i>Potamogeton pusillus</i>	Small pondweed	44.9	33.3	0.0	5.9	5.9	-25.8	▼	-100.0	▼		▲
<i>Potamogeton zosteriformis</i>	Flat-stem pondweed	26.1	19.2	5.4	2.9	2.9	-26.3	▼	-72.1	▼	-45.1	▼
<i>Potamogeton spirillus</i>	Spiral-fruited pondweed	2.9	35.9	3.6	4.4	4.4	1138.5	▲	-90.1	▼	23.5	▲
<i>Potamogeton vaseyi</i>	Vasey's pondweed	18.8	17.9	3.6	5.9	5.9	-4.7	▼	-80.1	▼	64.7	▲
<i>Elodea canadensis</i>	Common waterweed	29.0	11.5	3.6	2.9	2.9	-60.2	▼	-69.0	▼	-17.6	▼
<i>Potamogeton amplifolius</i>	Large-leaf pondweed	14.5	7.7	7.1	8.8	8.8	-46.9	▼	-7.1	▼	23.5	▲
<i>Ceratophyllum demersum</i>	Coontail	20.3	6.4	5.4	4.4	4.4	-68.4	▼	-16.4	▼	-17.6	▼
<i>Myriophyllum sibiricum</i>	Northern watermilfoil	13.0	6.4	1.8	5.9	5.9	-50.9	▼	-72.1	▼	229.4	▲
<i>Potamogeton richardsonii</i>	Clasping-leaf pondweed	1.4	2.6	0.0	7.4	7.4	76.9	▲	-100.0	▼		▲
<i>Potamogeton robbinsii</i>	Fern-leaf pondweed	0.0	10.3	3.6	0.0	0.0		▲	-65.2	▼	-100.0	▼
<i>Nitella</i> spp.	Stoneworts	1.4	11.5	0.0	0.0	0.0	696.2	▲	-100.0	▼		-
<i>Myriophyllum spicatum</i>	Eurasian watermilfoil	8.7	0.0	0.0	1.5	1.5	-100.0	▼		-		▲
<i>Potamogeton foliosus</i>	Leafy pondweed	0.0	5.1	0.0	0.0	0.0		▲	-100.0	▼		-
<i>Typha</i> spp.	Cattail spp.	4.3	0.0	0.0	0.0	0.0	-100.0	▼		-		-
<i>Nuphar variegata</i>	Spatterdock	0.0	1.3	0.0	1.5	1.5		▲	-100.0	▼		▲
<i>Potamogeton ephedrus</i>	Ribbon-leaf pondweed	0.0	2.6	0.0	0.0	0.0		▲	-100.0	▼		-
<i>Potamogeton berchtoldii</i>	Slender pondweed	0.0	0.0	3.6	0.0	0.0		-		▲	-100.0	▼
<i>Ceratophyllum echinatum</i>	Spiny hornwort	0.0	0.0	3.6	0.0	0.0		-		▲	-100.0	▼
<i>Sparganium eurycarpum</i>	Common bur-reed	0.0	1.3	0.0	0.0	0.0		▲	-100.0	▼		-
<i>Potamogeton strictifolius</i>	Stiff pondweed	0.0	1.3	0.0	0.0	0.0		▲	-100.0	▼		-
<i>Potamogeton friesii</i>	Fries' pondweed	0.0	1.3	0.0	0.0	0.0		▲	-100.0	▼		-

Duck Lake

Scientific Name	Common Name	LFOO (%)					2006-2012		2012-2017		2017-2022	
		2006	2012	2017	2022	2022	% Change	Direction	% Change	Direction	% Change	Direction
<i>Vallisneria americana</i>	Wild celery	11.8	12.5	52.9	56.3	56.3	5.6	▲	323.5	▲	6.2	▲
<i>Potamogeton strictifolius</i> & <i>P. pusillus</i>	Stiff, small, and slender pondweed	34.2	9.0	5.9	21.9	21.9	-73.6	▼	-34.8	▼	271.9	▲
<i>Potamogeton pusillus</i>	Small pondweed	34.2	9.0	0.0	18.8	18.8	-73.6	▼	-100.0	▼		▲
<i>Potamogeton zosteriformis</i>	Flat-stem pondweed	31.6	11.1	2.9	3.1	3.1	-64.8	▼	-73.5	▼	6.3	▲
<i>Potamogeton vaseyi</i>	Vasey's pondweed	11.8	6.9	2.9	12.5	12.5	-41.4	▼	-57.6	▼	325.0	▲
<i>Myriophyllum sibiricum</i>	Northern watermilfoil	15.8	1.4	5.9	18.8	18.8	-91.2	▼	323.5	▲	218.8	▲
<i>Potamogeton amplifolius</i>	Large-leaf pondweed	7.9	3.5	20.6	12.5	12.5	-56.0	▼	492.9	▲	-39.3	▼
<i>Najas flexilis</i>	Slender naiad	0.0	6.3	14.7	18.8	18.8		▲	135.3	▲	27.5	▲
<i>Elodea canadensis</i>	Common waterweed	21.1	0.7	14.7	3.1	3.1	-96.7	▼	2017.6	▲	-78.8	▼
<i>Potamogeton spirillus</i>	Spiral-fruited pondweed	0.0	6.3	0.0	9.4	9.4		▲	-100.0	▼		▲
<i>Potamogeton robbinsii</i>	Fern-leaf pondweed	7.9	4.2	2.9	3.1	3.1	-47.2	▼	-29.4	▼	6.3	▲
<i>Ceratophyllum demersum</i>	Coontail	13.2	2.8	2.9	0.0	0.0	-78.9	▼	5.9	▲	-100.0	▼
<i>Myriophyllum spicatum</i>	Eurasian watermilfoil	5.3	0.7	0.0	0.0	0.0	-86.8	▼	-100.0	▼		-
<i>Potamogeton foliosus</i>	Leafy pondweed	0.0	2.8	0.0	0.0	0.0		▲	-100.0	▼		-
<i>Nitella</i> spp.	Stoneworts	0.0	2.1	0.0	0.0	0.0		▲	-100.0	▼		-
<i>Potamogeton strictifolius</i>	Stiff pondweed	0.0	0.0	5.9	0.0	0.0		-		▲	-100.0	▼
<i>Potamogeton richardsonii</i>	Clasping-leaf pondweed	0.0	0.7	2.9	0.0	0.0		▲	323.5	▲	-100.0	▼
<i>Potamogeton berchtoldii</i>	Slender pondweed	0.0	0.0	0.0	3.1	3.1		-		-		▲
<i>Nymphaea odorata</i>	White water lily	1.3	0.7	0.0	0.0	0.0	-47.2	▼	-100.0	▼		-
<i>Chara</i> spp.	Muskgrasses	0.0	0.0	0.0	3.1	3.1		-		-		▲
<i>Pontederia cordata</i>	Pickerselweed	0.0	0.7	0.0	0.0	0.0		▲	-100.0	▼		-
<i>Nuphar variegata</i>	Spatterdock	0.0	0.7	0.0	0.0	0.0		▲	-100.0	▼		-
<i>Heteranthera dubia</i>	Water stargrass	0.0	0.0	2.9	0.0	0.0		-		▲	-100.0	▼

Yellow Birch Lake

Scientific Name	Common Name	LFOO (%)					2005-2012		2012-2017		2017-2022	
		2005	2012	2017	2022	2022	% Change	Direction	% Change	Direction	% Change	Direction
<i>Vallisneria americana</i>	Wild celery	8.3	15.5	45.3	29.7	29.7	87.3	▲	191.8	▲	-34.4	▼
<i>Elodea canadensis</i>	Common waterweed	14.0	6.8	10.5	13.5	13.5	-51.6	▼	54.9	▲	29.1	▲
<i>Najas flexilis</i>	Slender naiad	4.4	17.6	17.4	11.5	11.5	302.3	▲	-0.7	▼	-34.1	▼
<i>Potamogeton robbinsii</i>	Fern-leaf pondweed	5.7	14.2	14.0	4.7	4.7	149.9	▲	-1.7	▼	-66.1	▼
<i>Potamogeton spirillus</i>	Spiral-fruited pondweed	8.7	9.5	5.8	5.4	5.4	8.3	▲	-38.5	▼	-7.0	▼
<i>Potamogeton zosteriformis</i>	Flat-stem pondweed	7.0	11.5	5.8	4.7	4.7	64.4	▲	-49.4	▼	-18.6	▼
<i>Potamogeton vaseyi</i>	Vasey's pondweed	0.0	20.9	1.2	4.7	4.7		▲	-94.4	▼	306.8	▲
<i>Potamogeton berchtoldii</i> & <i>P. pusillus</i>	Slender & small pondweed	2.6	8.8	3.5	7.4	7.4	235.2	▲	-60.3	▼	113.1	▲
<i>Ceratophyllum demersum</i>	Coontail	1.3	10.8	9.3	5.4	5.4	725.2	▲	-14.0	▼	-41.9	▼
<i>Potamogeton pusillus</i>	Small pondweed	2.6	8.8	3.5	6.1	6.1	235.2	▲	-60.3	▼	74.3	▲
<i>Potamogeton foliosus</i>	Leafy pondweed	0.0	11.5	1.2	1.4	1.4		▲	-89.9	▼	16.2	▲
<i>Myriophyllum spicatum</i>	Eurasian watermilfoil	4.8	2.0	1.2	1.4	1.4	-57.8	▼	-42.6	▼	16.2	▲
<i>Myriophyllum sibiricum</i>	Northern watermilfoil	1.7	5.4	1.2	0.7	0.7	209.5	▲	-78.5	▼	-41.9	▼
<i>Potamogeton epihydrus</i>	Ribbon-leaf pondweed	2.2	1.4	1.2	0.7	0.7	-38.1	▼	-14.0	▼	-41.9	▼
<i>Heteranthera dubia</i>	Water stargrass	1.7	0.0	1.2	1.4	1.4	-100.0	▼		▲	16.2	▲
<i>Najas guadalupensis</i>	Southern naiad	0.0	0.0	0.0	2.7	2.7		-		-		▲
<i>Nuphar variegata</i>	Spatterdock	2.6	0.7	0.0	0.0	0.0	-74.2	▼	-100.0	▼		-
<i>Utricularia vulgaris</i>	Common bladderwort	0.0	0.0	0.0	2.0	2.0		-		-		▲
<i>Potamogeton amplifolius</i>	Large-leaf pondweed	2.2	0.0	1.2	0.0	0.0	-100.0	▼		▲	-100.0	▼
<i>Nymphaea odorata</i>	White water lily	0.9	1.4	0.0	0.7	0.7	54.7	▲	-100.0	▼		▲
<i>Chara</i> spp.	Muskgrasses	1.7	0.0	0.0	0.7	0.7	-100.0	▼		-		▲
<i>Potamogeton richardsonii</i>	Clasping-leaf pondweed	0.4	0.7	0.0	0.7	0.7	54.7	▲	-100.0	▼		▲
<i>Potamogeton berchtoldii</i>	Slender pondweed	0.0	0.0	0.0	1.4	1.4		-		-		▲
<i>Nitella</i> spp.	Stoneworts	0.0	1.4	0.0	0.7	0.7		▲	-100.0	▼		▲
<i>Potamogeton gramineus</i>	Variable-leaf pondweed	0.0	0.0	0.0	0.7	0.7		-		-		▲
<i>Lemna turionifera</i>	Turion duckweed	0.9	0.0	0.0	0.0	0.0	-100.0	▼		-		-
<i>Typha</i> spp.	Cattail spp.	0.4	0.0	0.0	0.0	0.0	-100.0	▼		-		-
<i>Sparganium fluctuans</i>	Floating-leaf bur-reed	0.0	0.0	1.2	0.0	0.0		-		▲	-100.0	▼
<i>Sparganium emersum</i> var. <i>acaule</i>	Short-stemmed bur-reed	0.4	0.0	0.0	0.0	0.0	-100.0	▼		-		-
<i>Sparganium angustifolium</i>	Narrow-leaf bur-reed	0.4	0.0	0.0	0.0	0.0	-100.0	▼		-		-
<i>Potamogeton strictifolius</i>	Stiff pondweed	0.0	0.7	0.0	0.0	0.0		▲	-100.0	▼		-
<i>Myriophyllum heterophyllum</i>	Various-leaved watermilfoil	0.4	0.0	0.0	0.0	0.0	-100.0	▼		-		-
<i>Bidens beckii</i>	Water marigold	0.0	0.0	1.2	0.0	0.0		-		▲	-100.0	▼

Watersmeet Lake

Scientific Name	Common Name	LFOO (%)					2006-2012		2012-2017		2017-2022	
		2006	2012	2017	2022	2022	% Change	Direction	% Change	Direction	% Change	Direction
<i>Vallisneria americana</i>	Wild celery	18.7	13.8	10.4	23.9	23.9	-26.1	▼	-24.8	▼	130.0	▲
<i>Ceratophyllum demersum</i>	Coontail	24.3	21.5	20.8	9.9	9.9	-11.5	▼	-3.3	▼	-52.4	▼
<i>Elodea canadensis</i>	Common waterweed	14.3	22.8	7.3	4.7	4.7	59.6	▲	-68.0	▼	-35.8	▼
<i>Zizania spp.</i>	Wild rice sp.	26.0	5.1	8.1	1.1	1.1	-80.3	▼	57.4	▲	-86.4	▼
<i>Myriophyllum spicatum</i>	Eurasian watermilfoil	23.3	4.6	6.5	1.1	1.1	-80.3	▼	41.1	▲	-83.1	▼
<i>Potamogeton zosteriformis</i>	Flat-stem pondweed	15.6	8.7	8.6	1.1	1.1	-44.3	▼	-1.4	▼	-87.2	▼
<i>Potamogeton robbinsii</i>	Fern-leaf pondweed	4.4	10.7	11.4	2.2	2.2	142.4	▲	6.4	▲	-80.8	▼
<i>Nuphar variegata</i>	Spatterdock	7.3	3.8	2.9	3.6	3.6	-47.6	▼	-25.5	▼	25.0	▲
<i>Potamogeton amplifolius</i>	Large-leaf pondweed	7.5	3.3	4.2	1.9	1.9	-55.8	▼	25.0	▲	-53.7	▼
<i>Utricularia vulgaris</i>	Common bladderwort	1.3	6.6	4.4	3.8	3.8	393.0	▲	-33.6	▼	-12.9	▼
<i>Nymphaea odorata</i>	White water lily	3.7	4.9	6.5	1.1	1.1	32.7	▲	33.6	▲	-83.1	▼
<i>Potamogeton richardsonii</i>	Clasping-leaf pondweed	0.6	4.1	4.2	2.2	2.2	607.9	▲	1.6	▲	-47.1	▼
<i>Najas flexilis</i>	Slender naiad	0.4	5.1	1.8	1.9	1.9	1227.4	▲	-64.5	▼	5.8	▲
<i>Potamogeton spirillus</i>	Spiral-fruited pondweed	0.0	3.8	2.9	1.6	1.6		▲	-25.5	▼	-42.3	▼
<i>Nitella spp.</i>	Stoneworts	0.0	7.2	1.3	0.5	0.5		▲	-81.9	▼	-57.7	▼
<i>Potamogeton vaseyi</i>	Vasey's pondweed	0.4	5.9	0.8	1.1	1.1	1426.5	▲	-86.8	▼	41.0	▲
<i>Sparganium fluctuans</i>	Floating-leaf bur-reed	1.5	0.5	1.8	2.5	2.5	-66.8	▼	255.5	▲	36.0	▲
<i>Brasenia schreberi</i>	Watershield	1.7	2.6	1.6	1.1	1.1	47.5	▲	-39.1	▼	-29.5	▼
<i>Potamogeton berchtoldii</i> & <i>P. pusillus</i>	Slender & small pondweed	1.3	4.9	0.3	0.3	0.3	260.3	▲	-94.7	▼	5.8	▲
<i>Potamogeton pusillus</i>	Small pondweed	1.3	4.9	0.3	0.0	0.0	260.3	▲	-94.7	▼	-100.0	▼
<i>Lemna turionifera</i> & <i>L. minor</i>	Turion & lesser duckweed	0.4	0.5	5.7	0.0	0.0	32.7	▲	1017.1	▲	-100.0	▼
<i>Pontederia cordata</i>	Pickerselweed	2.7	1.5	1.0	0.3	0.3	-43.1	▼	-32.3	▼	-73.6	▼
<i>Fissidens spp.</i> & <i>Fontinalis spp.</i>	Aquatic Moss	0.0	0.8	3.1	0.8	0.8		▲	306.2	▲	-73.6	▼
<i>Myriophyllum sibiricum</i>	Northern watermilfoil	2.3	0.5	0.5	0.5	0.5	-77.9	▼	1.6	▲	5.8	▲
<i>Potamogeton natans</i>	Floating-leaf pondweed	0.0	0.5	2.3	1.1	1.1		▲	357.0	▲	-53.0	▼
<i>Lemna minor</i>	Lesser duckweed	0.0	0.0	4.9	0.0	0.0		-		▲	-100.0	▼
<i>Heteranthera dubia</i>	Water stargrass	0.0	0.8	1.3	1.1	1.1		▲	69.3	▲	-15.4	▼
<i>Potamogeton ephedrus</i>	Ribbon-leaf pondweed	0.0	1.8	1.3	0.3	0.3		▲	-27.5	▼	-78.8	▼
<i>Spirodela polyrrhiza</i>	Greater duckweed	0.0	1.8	1.3	0.0	0.0		▲	-27.5	▼	-100.0	▼
<i>Bidens beckii</i>	Water marigold	0.0	0.5	1.6	0.3	0.3		▲	204.7	▲	-82.4	▼
<i>Lemna trisulca</i>	Forked duckweed	0.4	0.0	0.8	0.5	0.5	-100.0	▼		▲	-29.5	▼
<i>Ceratophyllum echinatum</i>	Spiny hornwort	0.0	0.0	2.1	0.0	0.0		-		▲	-100.0	▼
<i>Lemna turionifera</i>	Turion duckweed	0.4	0.5	0.8	0.0	0.0	32.7	▲	52.3	▲	-100.0	▼
<i>Sparganium emersum</i> var. <i>acaule</i>	Short-stemmed bur-reed	0.0	0.8	0.8	0.0	0.0		▲	1.6	▲	-100.0	▼
<i>Sagittaria sp.</i> (rosette)	Arrowhead sp. (rosette)	0.8	0.0	0.0	0.3	0.3	-100.0	▼		-		▲
<i>Utricularia minor</i>	Small bladderwort	0.0	0.0	0.3	0.5	0.5		-		▲	111.5	▲
<i>Sparganium eurycarpum</i>	Common bur-reed	0.0	0.0	1.3	0.0	0.0		-		▲	-100.0	▼
<i>Schoenoplectus tabernaemontani</i>	Softstem bulrush	0.2	0.3	0.0	0.3	0.3	32.7	▲	-100.0	▼		▲
<i>Ranunculus aquatilis</i>	White water crowfoot	0.6	0.0	0.3	0.0	0.0	-100.0	▼		▲	-100.0	▼
<i>Potamogeton foliosus</i>	Leafy pondweed	0.0	0.8	0.0	0.0	0.0		▲	-100.0	▼	-	-
<i>Sagittaria latifolia</i>	Common arrowhead	0.0	0.3	0.3	0.0	0.0		▲	1.6	▲	-100.0	▼
<i>Potamogeton gramineus</i>	Variable-leaf pondweed	0.0	0.0	0.0	0.3	0.3		-		-		▲
<i>Potamogeton berchtoldii</i>	Slender pondweed	0.0	0.0	0.0	0.3	0.3		-		-		▲
<i>Najas guadalupensis</i>	Southern naiad	0.0	0.0	0.0	0.3	0.3		-		-		▲
<i>Equisetum fluviatile</i>	Water horsetail	0.0	0.3	0.3	0.0	0.0		▲	1.6	▲	-100.0	▼
<i>Eleocharis palustris</i>	Creeping spikerush	0.0	0.3	0.3	0.0	0.0		▲	1.6	▲	-100.0	▼
<i>Typha spp.</i>	Cattail spp.	0.0	0.3	0.0	0.0	0.0		▲	-100.0	▼	-	-
<i>Riccia sp.</i>	Riccia sp.	0.0	0.0	0.3	0.0	0.0		-		▲	-100.0	▼
<i>Potamogeton praelongus</i>	White-stem pondweed	0.0	0.3	0.0	0.0	0.0		▲	-100.0	▼	-	-
<i>Eleocharis acicularis</i>	Needle spikerush	0.0	0.0	0.3	0.0	0.0		-		▲	-100.0	▼
<i>Chara spp.</i>	Muskgrasses	0.0	0.0	0.3	0.0	0.0		-		▲	-100.0	▼