



Farlain Lake

2023 EWM Management Year End Report

Prepared by the FLCA Eurasian Watermilfoil Management Team
November 6, 2023



Executive Summary

Despite FLCA's efforts, Eurasian Watermilfoil (EWM) has continued to spread throughout Farlain Lake from the Pioneer Colony location first discovered in 2012 to seventeen scattered sites of various sizes and densities in 2022. The spread of EWM can be attributed to a number of factors. Some of these factors involve the 1) the lake's shallow depths and expansive littoral zone are conducive to aquatic plant growth, 2) different reproduction methods of EWM, 3) recreational activities involving fishing and powered watercraft, 4) natural forces such as storms, 5) climate change, and 6) restricted amount of time spent each summer combatting EWM due to limited funding. The COVID pandemic hampered EWM management efforts as volunteers were not available to work on key projects; the contact herbicide Reward was utilized to minimize the spread of EWM during the 2020-22 time periods.

The approach to managing EWM has shifted over the past nine years from containing the lake's single dense invasive aquatic plant infestation to management of new EWM infestations. As part of its overall EWM management strategy the FLCA undertook ongoing research into the plant's characteristics and the various control methods to manage EWM. As there are no private sector businesses in the Province of Ontario that specialize in aquatic plant management services, the FLCA assumed the tasks of surveying, mapping, monitoring, implementing management control methods (i.e. DASH hand harvesting, benthic mat deployment.), and contracting the services of commercial divers. The FLCA shared its knowledge and experience with other organizations in Ontario and Quebec that were dealing with EWM. It was the recipient of the 2019 Federation of Ontario Cottagers Associations (FOCA) Environmental Award; the award recognized FLCA for its invasive aquatic plant management program and its networking efforts with other organizations. A major challenge facing not-for-profit organizations dealing with invasive aquatic plant management is the access to Government support. Fund raising is a major focus and activity for volunteer organizations managing invasive aquatic plants. The FLCA was fortunate to be awarded funding from the Ontario Trillium Foundation Grant Program beginning in 2019. This financial support proved to be invaluable in the ongoing efforts to manage EWM in Farlain Lake. The remaining funds from the \$199,800 multi-year grant will be depleted in 2024.

As EWM has continued to propagate throughout the lake, a number of near shore and offshore infestations became too large to be effectively and cost efficiently managed using the control methods of jute benthic mats, treatment with the contact herbicide Reward, and FLCA's DASH (diver assisted suction harvesting) equipment. While benthic mats and hand harvesting EWM have seen some success in different locations of the lake, not all areas responded well to these control methods. A major EWM physical management cost involves contracting the services of commercial divers. Treatment of EWM with the aquatic herbicide Reward was not cost effective as the results were only temporary; EWM would regrow the following year.

Executive Summary (continued)

FLCA's ongoing research into viable control methods discovered a new aquatic herbicide (brand name ProcellaCOR) that had been approved by the United States Environmental Protection Agency in 2018. Additional research was undertaken to determine the effectiveness of ProcellaCOR in various USA states during the time period 2019-2021. Further information on ProcellaCOR was obtained from the herbicide's producer the SePRO Corporation, Carmel Indiana, USA. ProcellaCOR FX (Canadian brand name) was approved by Health Canada in May 2023. Farlain Lake was selected to be the first lake in Ontario to treat EWM with ProcellaCOR FX.

As no Canadian licensed pesticide applicator has been trained as a SePRO Certified ProcellaCOR FX Specialist, the American company SOLitude Lake Management, New England/New York Region, was contracted to apply ProcellaCOR FX to the lake's 15 verified EWM sites (4,000 m²) on September 6, 2023. A follow-up assessment of the treated sites was undertaken on October 4, 2023 by Dr. Mark Heilman, SePRO's Director of Aquatic Technology, and FLCA volunteers. The assessment determined EWM treated with ProcellaCOR FX had died or was in the process of dying. It was also determined that native plants were healthy and unaffected by the new aquatic herbicide. The success of the 2023 ProcellaCOR FX treatment of the lake's EWM had exceeded FLCA's expectations.

The use of ProcellaCOR FX is expected to achieve complete control of EWM in the highest density areas that have been difficult to manage with jute benthic mats and FLCA's DASH system. Areas previously occupied with dense EWM are expected to become beds of native plants as the absence of dense EWM canopies will allow native plant species to recover and recolonize the managed areas. It is anticipated that the treatment of EWM with ProcellaCOR FX within the first two years will negate the need to use FLCA's secondary control methods.

It is also assumed that EWM will never be fully eradicated from Farlain Lake due to the lake's shallow depths, large littoral zone, and heavy recreational use. Any plant fragments from unmanaged EWM infestations not previously detected may enter treated areas and re-establish new plant colonies. The intended use of ProcellaCOR FX is to initially reduce the distribution and density of EWM by eliminating dense infestations. Future management of any remaining smaller clusters and widely scattered EWM plants in the lake will likely be undertaken using the hand harvesting control method. ProcellaCOR FX will be used periodically in the future to manage any new large concentrations of EWM.

The key to the long-term success of keeping EWM in check is a focus on continued surveying, mapping, and monitoring of the lake's macrophyte community.

Purpose of Year End Report

The year-end report updates and documents EWM management activities during 2023, reviews current conditions in the lake following the treatment of EWM with the aquatic herbicide ProcellaCOR FX, and provides management recommendations for 2024.

Lake Characteristics

Farlain Lake is a 1.10 km² lake situated in Tiny Township, Simcoe County, Ontario. Classified as a seepage kettle lake, the maximum depth of the lake is 5.0 metres with an average depth of 2.3 metres. The lake's input is from a continuous inflowing stream and from upland recharge areas; there are no outlets. The lake's northwest to southeast direction fetch is approximately 2.6 km in length.

EWM was first discovered in 2012 during a FLCA citizen scientist aquatic plant study of the lake. The infestation, estimated to be approximately 175 m² in size, was located near the inflowing stream's entry point into the lake. A lake-wide aquatic plant survey was undertaken in 2022 by SOLitude Lake Management; no invasive aquatic plants other than EWM were observed. In 2022, there were seventeen (17) EWM near shore and off shore infestations varying in size and density dispersed throughout the lake; the amount (4,124 m²) of EWM represented less than 2% of the lake's surface. These sites were identified by SOLitude Lake Management and observed/verified by the FLCA.

Farlain Lake's shallow water depths essentially comprise an extensive littoral zone suitable for aquatic plant growth. The lake supports a diverse community of aquatic macrophytes (Northern Naiad, Illinois Pondweed, Richardsons Pondweed, Tape Grass, Common Waterweed, White Water lily, Spike Rush) and macroalga (Muskgrass). Prior to a blue-green alga bloom in 2022, Filamentous Algae was observed.

Management Actions History

Since 2014, efforts to manage EWM have included hand removal in shallow depths by community residents, hand harvesting in deeper depths by contracted commercial SCUBA divers, diver assisted suction harvesting (DASH) in deeper depths by contracted commercial divers using FLCA's pontoon boat/DASH system, installing biodegradable jute benthic mats with the assistance of commercial divers, and applying the aquatic herbicide diquat dibromide (brand name Reward) by a contracted licensed pesticide applicator. FLCA volunteers worked closely with contracted service providers. It was determined that FLCA volunteers contributed 3,550 hours (value \$96,000) of community service to the 2019 EWM management effort. Over the past 10 years, the FLCA has spent \$280,000 to manage EWM in Farlain Lake.

An integrated management strategy was adopted; Reward would be applied to suppress the EWM growth, DASH would be used on smaller scattered EWM clusters, and jute benthic mat would be used on dense EWM infestations. While DASH and jute benthic mat control methods were effective, the cost of these control methods was high due to the Ontario Government's commercial diving regulations. EWM control work was limited to two weekends per summer due to the high costs. Reward, the only aquatic herbicide approved for use by Health Canada at the time, is a contact herbicide that temporarily inhibited the photosynthesis process of aquatic plants....invasive as well as native. During the time period 2020 -2022, EWM management efforts were greatly reduced due to a number of factors including the COVID -19 pandemic; the treatment of EWM with Reward was the only control method utilized. EWM continued to spread despite the determined efforts of the FLCA to restrict the spread of the invasive aquatic plant throughout the lake. At the end of 2022, EWM was widely distributed in Farlain Lake with scattered to dense growth in seventeen (17) near shore and offshore infestations.

The continued growth and expansion of EWM throughout the lake, and the costs of using commercial divers to utilize the DASH system and to install jute benthic mats to manage denser EWM infestations were key concerns. The FLCA sought an alternative strategy to effectively and cost efficiently manage EWM in the lake. FLCA's continued research into EWM control methods identified a new aquatic herbicide that was approved by the United States Environmental Protection Agency in 2018. Reports from several USA States that utilized ProcellaCOR to manage EWM indicated that ProcellaCOR was extremely effective in achieving nearly complete control of EWM with little or no impact on native plant species. One of the reasons FLCA was interested in ProcellaCOR was the aquatic herbicide did not impact native plants; an important factor for maintaining fish and wildlife habitat in the lake.

Management Actions History (continued)

The FLCA initiated discussions with Dr. Mark Heilman, Director, Aquatic Technology of the SePRO Corporation which manufactures ProcellaCOR. The FLCA was apprised of SePRO's submission to Health Canada's Pest Management Regulatory Agency (PMRA) to have ProcellaCOR approved for use in Canada as a systemic aquatic herbicide. The FLCA submitted its EWM management plan in January 2023 to the Department of Fisheries and Oceans Canada (DFO) citing ProcellaCOR FX (the brand name in Canada) would be the sole EWM control method in 2023 once approved by the PMRA. Health Canada's PMRA approved ProcellaCOR FX in May 2023. DFO approved FLCA's 2023 EWM management plan in early August and a pesticide permit was issued by the Ministry of Environment, Conservation and Parks (MECP) to FLCA's contracted licensed pesticide applicator SOLitude Lake Management shortly thereafter. Glenn Sullivan, environmental scientist, certified lake manager, and certified SePRO specialist of the SOLitude Lake Management New England/New York Regional Office, applied ProcellaCOR FX to 15 EWM sites totalling 0.4 hectares on September 6, 2023.

2023 Summary of Pre-treatment, Treatment and Post-treatment Activities

Pre-Treatment

FLCA volunteers installed floating markers, to the best of their abilities, around the perimeter of fifteen (15) verified EWM sites. Two sites, previously observed in 2022 but not located/verified in early 2023, were not included in the ProcellaCOR FX treatment plan. Positioning of the markers was determined through surface observations from a boat and FLCA's underwater camera. Observation of the EWM deemed the invasive plants to be healthy. The floating marker buoys were placed on the perimeter of each infestation the weekend before ProcellaCOR FX was applied to the EWM.

A multi-pronged communications effort was undertaken. An article providing an update on the 2023 EWM management plans appeared in the spring issue of Ripples, the FLCA newsletter. Dr. Mark Heilman of SePRO provided an update of ProcellaCOR FX's approval at the August 16, 2023 AGM through a Zoom presentation. FLCA information 'E-alerts' providing an update on the planned treatment of EWM with ProcellaCOR FX were sent to FLCA members, Severn Sound Environmental Association, Tiny Township Council and key Township staff, and the Federation of Ontario Cottagers Association (FOCA) executive director and the communications director. FLCA's website was updated with pertinent information on the 2023 EWM management plan, ProcellaCOR FX, a link to Dr. Heilman's Zoom presentation at the FLCA AGM. Three floating information signs were installed on the lake, five signs advising of the application and identifying the licensed applicator SOLitude Lake Management were posted on signs a key points on roads around the lake, an information poster was posted on FLCA's information kiosk at the Township's parkette boat launch, shoreline property owners within 200 feet of the infestation sites to be treated were sent personal emails at the end of July advising them of the plans for the use of ProcellaCOR FX and inviting the property owners to present any questions/concerns to the FLCA, and further FLCA 'E-alerts' and Facebook postings and reminders were delivered the weekend and day before the application.

Treatment

A solution of ProcellaCOR FX, diluted with water, was prepared by Dr. Mark Heilman in the treatment boat's onboard mixing tank. The recommended application rate (dosage) was based on the percentage (2%) of the lake's surface area that contained EWM. The aquatic herbicide is typically applied in a dosage of approximately 6-10 parts per billion (ppb) of its active ingredient florpyrauxifen-benzyl. A dosage of 10 – 20 ppb was used for very small spot EWM infestations in the lake. This is equivalent to 2.7 ml of ProcellaCOR FX added to a typical sized swimming pool containing 40,000 litres of water. The liquid formulation of ProcellaCOR FX was evenly applied to each of the target EWM sites using a calibrated pumping system and weighted dispersal hoses trailed behind SOLitude's treatment boat. The operator of SOLitude's treatment boat followed GPS coordinates for each of the EWM sites and used the floating marker points around each infestation as a visual reference guide. FLCA volunteers guided the SOLitude treatment boat to the different EWM sites and monitored the treatment operation. The application of ProcellaCOR FX was completed in one day. FLCA's knowledge of each site and the fact the sites were marked was extremely helpful to SOLitude Lake Management and helped ensure the targeted sites were treated completely. FLCA removed the floating markers the day following treatment of the EWM. Weather was sunny and warm (27° C) with light winds for most of the day. There was minimal boat activity on the lake.



Adding ProcellaCOR FX to the treatment boat's mixing tank. Pictured from the left are Scott Dales, FLCA President, Glenn Sullivan of SOLitude Lake Management, and Dr. Mark Heilman of the SePRO Corporation.

Using GPS coordinates to guide treatment boat.



Post-Treatment Assessment

Dr. Heilman and FLCA volunteers assessed the effectiveness of ProcellaCOR FX on treated sites on October 4, 2023. The assessment was undertaken four weeks post-treatment. As with other water bodies treated with ProcellaCOR to manage EWM in the United States, a similar decomposition timeline of EWM in Farlain Lake following treatment with ProcellaCOR FX was projected. Within the first few days post-treatment, EWM leaves will grow larger and become twisted; stems lengthen and leaf tissue becomes fragile. Within a week of treatment EWM plants will begin leaning over in the water column. Within two weeks of treatment some EWM plants will be still standing; remaining plants will have started falling over in the water column. EWM plants will appear brown in colour; if touched the plant parts will easily break apart. Any plant fragments from the plant treated with ProcellaCOR FX would no longer be viable. Within three weeks of treatment the majority of EWM plants will likely have collapsed within the water column and would be difficult to locate along the bottom sediment; remaining semi-buoyant plants have essentially stopped photosynthesizing. At the end of four weeks EWM will have fully collapsed. It will be difficult to detect and evidence of EWM plants.

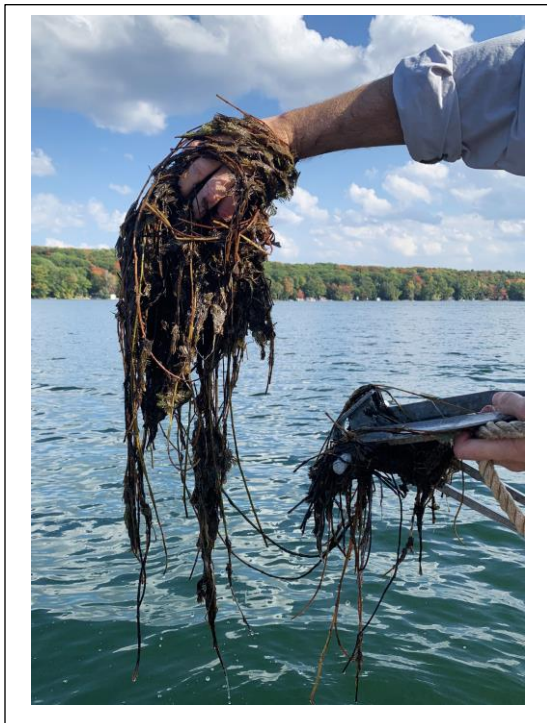
While the air temperature was cool, the day was sunny. Light winds disrupted the water surface making visual observations from the boat difficult. While FLCA's underwater drone camera was deployed, video images at deeper depths were hampered by poor water clarity. Poor visibility at deeper depths may be attributed to the lake's fall turnover. During fall turnover, the clarity of the lake usually decreases because of the mixing of the lake's layers by changing water temperatures and wind/wave action. Mixing causes nutrient rich water from the lake's bottom to rise to the top causing the lake to look cloudy. One observation made during the assessment of the treated EWM sites was the absence of EWM's upper canopy 'topping out' at the lake's surface; in past years EWM was observed just below or touching the lake's surface.

Sampling of aquatic vegetation in the sites treated with ProcellaCOR FX was undertaken using a sample rake that was tossed and dragged along the lake's water bottom. In shallower depths, EWM vegetation was blackened and in a state of decomposition. In a few sites with deeper depths, some plants retained branches, and leaves green in colour. Plant stems displayed a great deal of damage caused by ProcellaCOR FX. Dr. Heilman explained that blackish nodules were displaying the process of the aquatic herbicide's effect on the dying plant. During the sampling of the treated sites, native aquatic plants were also collected. The native plant species were observed to be healthy and un-affected by the aquatic herbicide. The success of the 2023 ProcellaCOR FX treatment of the targeted fifteen (15) EWM sites exceeded FLCA's expectations.

Post Treatment Assessment (continued)



Dr. Mark Heilman and FLCA volunteers assessing treated EWM sites.



EWM four weeks post treatment with ProcellaCOR FX



Native species (Northern Naiad) four weeks post treatment with ProcellaCOR FX

Recommended Actions for 2024

The following actions are recommended:

- 1) The fifteen sites treated in 2023 should be revisited early in 2024 to ascertain the effectiveness of ProcellaCOR FX and to identify any outlier EWM plants that were missed in the first application.
- 2) Any previous sites a) managed with jute benthic mat but not included in the 2023 ProcellaCOR FX treatment plan, and b) previous observed but not verified sites should be revisited to identify the presence of any EWM plants.
- 3) Other areas of the lake should also be searched for any EWM that has not been observed in previous surveying and mapping. Various search techniques (e.g. surface visual observation from a boat or an aerial drone camera, rake sampling, underwater cameras, etc.) should be utilized where feasible.
- 4) FLCA volunteers continue to monitor EWM sites to assess changes in size, density, and health of the invasive aquatic plant.
- 5) EWM vegetation should be plotted on FLCA's transect point study sector maps using GPS coordinates that are comparable to the GPS coordinates assigned to each of the lake's transect points.
- 6) The results of the periodic surveying/mapping should be discussed with SOLitude Lake Management to determine the best course of action to manage EWM remaining in the lake. The discussion should also include best secondary control methods (e.g. DASH hand harvesting, etc.) to augment the treatment of EWM colonies with ProcellaCOR FX.
- 7) Treatment of targeted EWM vegetation with ProcellaCOR FX should occur mid-summer when EWM is fully developed and the FLCA's underwater drone camera can be effectively used to assist in the perimeter marking of each site. The application of the aquatic herbicide mid-summer will also enable the FLCA to use its pontoon boat in conjunction with other watercraft to monitor/assess the EWM during the post treatment phases.

Farlain Lake

2023 Target EWM Locations

Treated with ProcellaCOR FX

Legend

 Verified

