

LONG-TERM PLAN

SALEM LAKE EURASIAN WATER MILFOIL MITIGATION

MARCH 2023



SALEM LAKES
PRESERVATION
ASSOCIATION

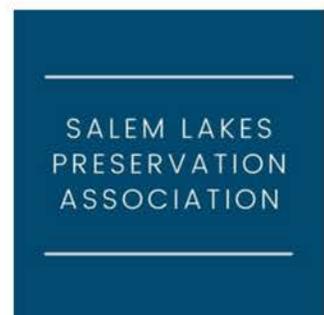


PREPARED BY THE SALEM LAKES PRESERVATION ASSOCIATION
& ARROWWOOD ENVIRONMENTAL

CONTENT



INTRODUCTION	03
HISTORY OF EWM COLONIZATION & MANAGEMENT IN SALEM	05
EWM MANAGEMENT PLAN	12
EWM MANAGEMENT ALTERNATIVES	13
EWM MANAGEMENT RECOMMENDATIONS	16
THRESHOLDS FOR FOLLOW-UP HERBICIDE APPLICATION	21
EWM MONITORING SCHEDULE	22
RARE/SENSITIVE SPECIES	23
BUDGET	25
REFERENCES CITED	27



INTRODUCTION

The Salem Lakes System is located in Derby and Morgan, Vermont. The system is comprised of two lakes: Big Salem and Little Salem. The State of Vermont recognizes both water bodies as two separate lakes.

The Salem Lakes System is fed primarily by the Clyde River. The Clyde River watershed originates in Island Pond, flows through several lakes in northern Vermont and eventually flows into Lake Memphremagog in Newport. Most of the Salem Lakes System lies within the town of Derby with a small portion in the town of Morgan.

The Salem Lakes System is approximately 780 acres. Big Salem is roughly 615 acres and has a very shallow, sandy shelf surrounding a majority of the shoreline. The shallow shoreline drops off to depths as much as 70 feet. Little Salem is located south of the main basin and is roughly 165 acres with maximum depths of approximately 28 feet. Water from Little Salem flows through a shallow channel of the Clyde River before entering Big Salem.

The littoral zone of the lake system (region where aquatic plants grow) is approximately 372 acres. Roughly 207 acres of this 372-acre littoral zone is within Big Salem, and roughly 165 acres of the littoral zone is the entirety of Little Salem. The littoral zone of Big Salem is proving to be a favorable environment for the invasive Eurasian Water Milfoil (*Myriophyllum Spicatum*, EWM).

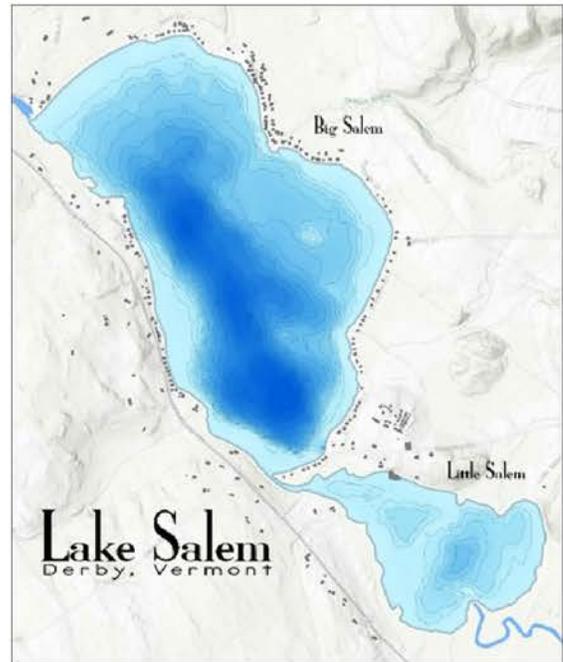


Figure 1: Salem Lakes System Map

This favorable environment is evident with the EWM growth seen since infestation was discovered in 2017. The littoral zone of Big Salem currently supports at least 30 known aquatic plant species including substantial colonies of native Northern Water Milfoil (NWM). According to DEC scientist, Kim Jensen, NWM may be undergoing hybridization with invasive Eurasian Water Milfoil. Among the native plant community is the typically inconspicuous plant, Resupinate Bladderwort (*Utricularia Resupinata*), a threatened species in Vermont.

The relatively warm waters of these lakes support an abundant fishery of both warm and cold-water species such as Walleyed Pike, Small Mouth Bass, Yellow Perch, Landlocked Salmon, Brown Trout and Rainbow Smelt.

INTRODUCTION

Lakes are often classified based on their trophic status, or the amount of nutrients that are available for plant and algae growth. Oligotrophic lakes are those lakes that are nutrient-poor, mesotrophic lakes have moderate nutrient levels and eutrophic lakes have high nutrient levels. Based on total phosphorus (TP) levels, Lake Salem is a mesotrophic lake, though it is at the lower (nutrient-poor) end of the mesotrophic lake classification (Vermont DEC, <https://tinyurl.com/mr4bphxk>).

While spring TP levels have been stable, levels of TP taken during the summer when plant growth occurs have been increasing. These increases in nutrient availability have also been evident with increasing summer Chlorophyll A readings, which is an approximate measure of algal growth in the lake's water column. While increases in algal growth can often lead to lower water clarity, the water clarity (measured via secchi disk readings) has remained stable in Lake Salem.

SALEM LAKES ASSOCIATION (SLA) & THE SALEM LAKES PRESERVATION ASSOCIATION (SLPA)

The name SLA was changed to the Salem Lake Preservation Association (SLPA) in 2019 to accommodate the tax status transition to a 501(c)(3) non-profit organization. One of the primary missions the SLPA has undertaken is the mitigation of EWM.



DASH on Big Salem in 2022.

The original Salem Lake Association (SLA) formed in 1984, acted as stewards of the Salem Lakes. The SLA was focused on water quality including water clarity testing and E. coli sampling. The SLA also managed the greeter program at the boat launches at Big and Little Salem. More recently SLA and SLPA have managed the EWM mitigation programs including Vermont Invasive Patrollers (VIP), EWM hand pulling, Diver Assisted Suction Harvesting (DASH).

This EWM management plan focuses on infestation in Big Salem. Little Salem currently doesn't have any known EWM, and the State of Vermont considers Little Salem a separate lake. As such Little Salem management is not considered as part of this management plan.



HISTORY: EWM COLONIZATION & MANAGEMENT IN SALEM

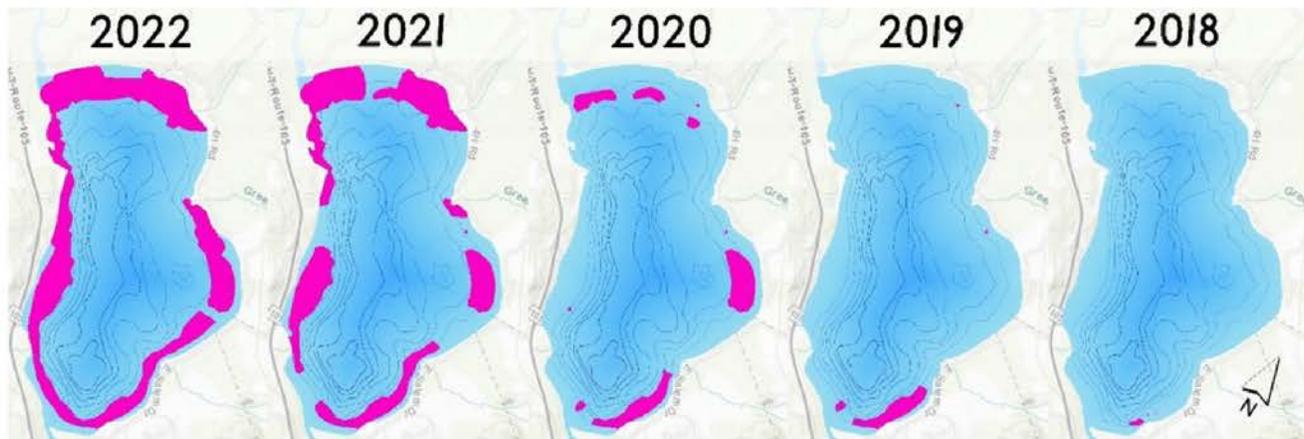


Figure 2. EWM Progression from 2018 to 2022

A roughly 50' by 50' patch of EWM was discovered near the state boat access in October 2017 during an annual lake survey by AE Diving. As shown in Figure 2, EWM is now prevalent throughout the lake littoral zone and in dense surface mats in unharvested areas. Big Salem has a significant population of NWM, and there is evidence to suggest hybridization of EWM and NWM. Genetic testing to confirm this probability is currently pending by the state Department of Environmental Conservation (DEC).

Heavy recreational use of Salem Lake increases the EWM management challenge as milfoil plants fragment easily. One study (Madsen and Smith 1997), found that 46% of these fragments result in new plant and EWM colony formation. Also, competition from other lakes and ponds for diver time along with a scarcity of qualified divers in VT greatly adds to the challenge.

The negative impacts that EWM can have on a lake ecosystem have been well-documented. These include a decline in native species richness and abundance (Boylen et al. 1999), reduced dissolved oxygen levels (Smith and Barko 1990) and change in ecosystem structure and function (Martin and Valentine 2009; Mack, Simberloff, and Clout 2000).

Numerous fish and animals rely on Salem's abundant native plant diversity to survive. Over time, EWM tends to dominate a lake's littoral zone, greatly interfering with recreational activities and lowering property values (Zhang and Boyle 2010). These reasons drive our efforts to control it.

EWM Control Activities

A 10-year Aquatic Nuisance Control Individual Permit was granted by the state in October 2017 allowing DASH. A three-year VT Rapid Response permit was granted in 2019 followed by a 10-year bottom barrier permit in 2022.

HISTORY: EWM COLONIZATION & MANAGEMENT IN SALEM

In support of the Salem Lakes Greeter boat inspection program, SLPA applies for a permit from the Department of Fish and Wildlife (DFW) each year to park a shed at the boat access. An addendum to the permit allows a utility trailer (for EWM removal) to be parked on site.

A summary of the SPLA EWM control activities is presented in Table 1. In late October 2018 bottom barriers (on loan from Derby Pond) were installed following suction harvesting by AE Diving. In 2019, a team of SLPA volunteers was formed. During this time, many experts

were consulted, a different diver was located, bottom barriers were purchased, buoys assembled, and more volunteers recruited.

The diver and volunteers conducted on and in-water surveys for EWM. They found another similar-sized patch of EWM about 100 yards NE of the original discovery. GPS mapping of EWM locations began in 2018 and continues along with volunteer-based surface and in-water visual inspections. Many hundreds of hours and use of personal boats have been donated by SLPA volunteers.

Control Activity	Operator	Dates	Objective
Greeter Program	SLPA	2002 - PT	Prevent re-introduction of EWM or other AIS
Volunteer-based Visual Inspection	SPLA	2004 - PT	Monitor EWM populations
Hand-Harvesting	Contractors Volunteers	2019 - 2021 2019 - PT	Remove small populations of EWM
DASH	AE Diving, Swampguana	2018 2021 - 2022	Remove small - medium populations of EWM
Bottom Barriers	AE Diving Swampguana	2018 2019 - PT	Kill EWM in locally dense, small populations
Public Outreach	SPLA	Ongoing	Make public aware of issues with EWM in lake
Aquatic Plant Surveys	SPLA, DEC, SOLITUDE	2019 - PT 2019 2021	Track growth of EWM populations

Table 1. SLPA EWM Control Activity.

HISTORY: EWM COLONIZATION & MANAGEMENT IN SALEM

In 2019, 73 diver hours yielded 250-300 EWM plants; 500 linear feet of bottom barrier were also used.

In 2020, 163 diver hours, using similar control methods, resulted in a harvest of 1,400 EWM plants; 650 linear feet of bottom barrier were used. In 2021, 45 hours of hand pulling and barrier use combined with 40 hours of DASH resulted in an EWM harvest of 3,375 pounds. Hand pulling and bottom barriers were used until the latter half of the 2021 season when DASH became available; hand-pulling, alone, was no longer an effective method of control. About 300 linear feet of bottom barrier were used. Hand-pulling of EWM was done by a few volunteers when weather allowed.

Between 2018 and 2022 SLPA has invested a significant portion of its available funds toward EWM mitigation and control. Table 2 shows the progression of control activities through the years, including the funds spent in each of those years.

Each year in response to the explosive growth of EWM, more effective methods of control were administered with significant year-to-year increases in control cost.

In 2022, diver hours increased to 240 resulting in an EWM harvest of 50,000 pounds. In addition, 650 linear feet of bottom barrier were used. A utility trailer was purchased to haul plants to safe disposal locations away from the lake. Volunteer-based visual inspections continued as was hand pulling by a few dedicated individuals near family camps. Hand pulling of EWM plants remains an essential component of effective EWM control.

Faced with exponential EWM growth over the past few years the SLPA board of directors approved a plan to seek a state permit to apply an EPA-approved herbicide in 2023. Michael Lew-Smith of Arrowwood Environmental is consulting along with SOLitude Lake Management, an approved applicator of the herbicide, ProcellaCOR EC.

'Hand pulling alone was deemed to no longer be an effective method of control.'

HISTORY: EWM COLONIZATION & MANAGEMENT IN SALEM

Table 2. SLPA EWM Control Cost History

Year	Control Activity	Costs	Total Costs
2018	diver surveying, hand harvesting, DASH, bottom barrier		\$5,750.00
2019	hand harvesting, bottom barrier installation -----	\$3,560.00 -----	\$6,172
	purchased bottom barrier, rebar, buoys, misc. supplies, permit	\$2,612.00	
2020	hand harvesting, bottom barriers -----	\$8,150.00 -----	\$9,850
	mileage, misc. equipment purchased	\$1,700.00	
2021	hand harvesting -----	\$9,220.00	\$17,420
	DASH -----	-----	
	bottom barriers -----	-----	
	plant survey	\$8,200.00	
2022	DASH, bottom barrier, diver survey, utility trailer		\$31,535.00

GREETER PROGRAM

Since 2002, SLPA has operated the Greeter Program at the state boat access. It operates seven days a week from roughly Memorial Day to Labor Day depending on available funds. Direct program cost in 2022 was \$25,107 and resulted in 808 boat inspections. The yearly average of boats inspected is 500-600.

Paid Greeter staff check boats and trailers for invasive plants and animals. Volunteers are encouraged to apply.

Salem Lake has been fortunate to have a core of experienced Greeters over the years. Greeters inform boaters about state laws and guide them in the safe handling of plant fragments and on-board water. They also identify areas of the lake where EWM infestation is dense and prone to fragmentation. Greeters serve as unofficial harbormasters, assisting with medical emergencies, law enforcement, boats launching and retrieving, parking trailers and as sources of information.



PUBLIC OUTREACH

The SLPA has engaged in a multi-faceted communications program in the years since EWM was first identified as a threat to the lake. Our primary communication line for major news has traditionally been our annual newsletter (LakeFront) and our annual meeting in July. However, once the invasive plant found its way into our lake, significant time and resources were spent on outreach.

Our website took on a whole new life with content posted on invasive species management. Our newsletter evolved overnight into a magazine quality edition with full-color print and digital issues loaded with everything we could find on EWM, our monitor program and other efforts to expand mitigation and vital program funding.

Today, this communication program includes the annual issue, the website hub and social media. We have also launched our own YouTube channel which has its own series called "Around Salem." Produced by one of our own directors who is a marketing communications professional, this series has dedicated several segments on the environmental health of Salem including coverage of our 2022 DASH program,

our water sampling and more.

Every one of these videos was also posted to our Facebook page which has 231 followers. So clearly, we are reaching the lion's share of our community throughout the year and continue to do so as we develop more news content in the coming months.

SLPA also began using email for outreach in 2022. With a database of over 130 emails, this line has been used to announce a fundraising campaign, newsletter releases and special dates of interest.

Our audience list includes email addresses gathered from our annual meetings, personal contact, website visitors, plus many addresses associated with area businesses. Open rates for our emails range from 63% to 71% (much higher than average). Our July 2022 newsletter email alone generated the highest open rate with a 39% click-through rate as recipients tapped a download link embedded in that email to download our LakeFront issue.

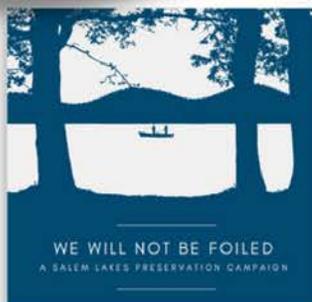
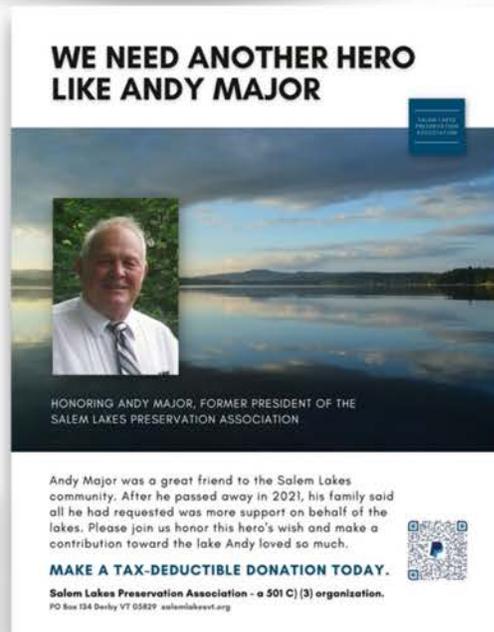
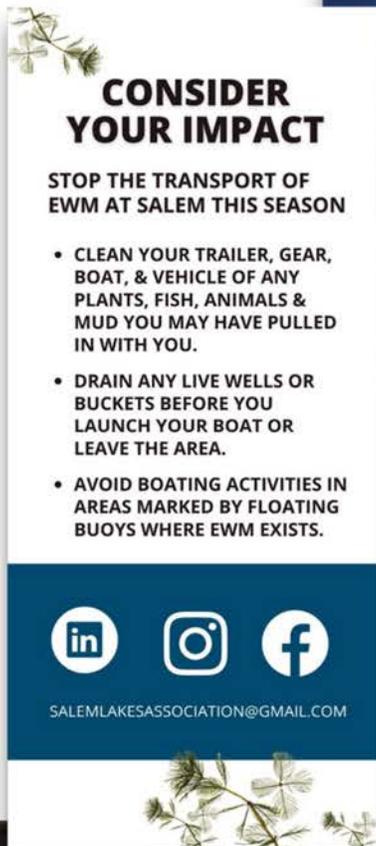
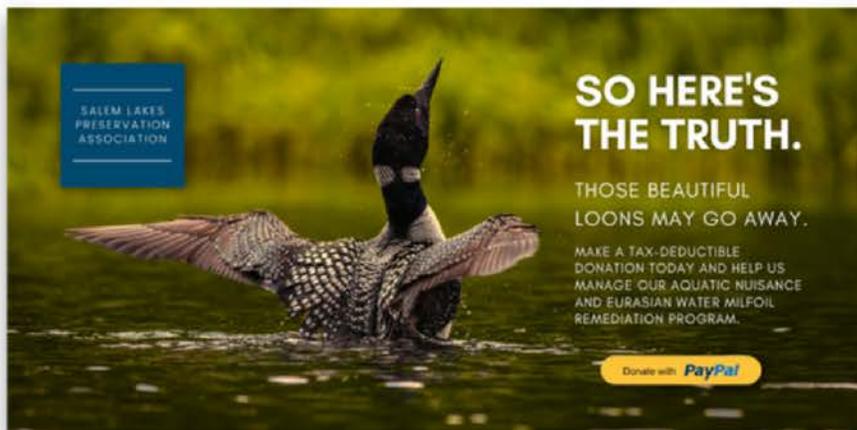
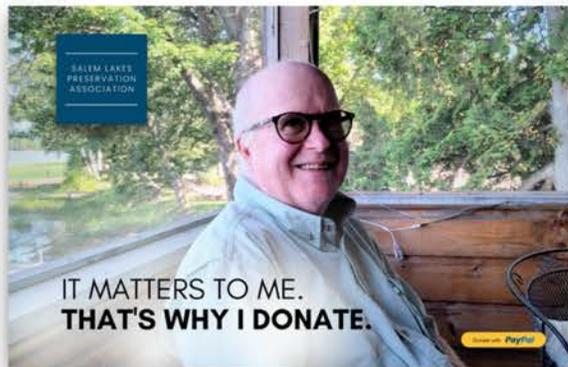
This indicates that our online audience is interested and engaged in lake issues.

VIDEOS PUBLISHED ON JUST THE SLPA FACEBOOK GROUP 174 MEMBERS

Welcome to Around Salem.....87 Views
 A Fish-Eye View of EWM.....72 Views
 A Word from Matt Hammond.....85 Views
 A Little DASH of This.....48 Views
 A Sample of Ingenuity.....63 Views
 A Visit with SLPA President.....91 Views
 Success at Iroquois.....78 Views
 ARPA Announcement.....66 Views
 Grant Funding Update.....72 Views

With 174 members on the SLPA Facebook group, it is clear that each each video posted to just this channel alone reaches the majority of people with a vested interest in the health of Salem Lakes.

PUBLIC OUTREACH



EWM MANAGEMENT PLAN

The goals of the EWM management plan are:

- 1.Reduce the amount of EWM in Lake Salem to promote a healthy and native aquatic vegetation community
- 2.Reduce the amount of EWM in Lake Salem to levels that do not impede recreational activities
- 3.Prevent the additional reintroduction of EWM and other aquatic invasive species
- 4.Develop and maintain an educated and involved citizenry of Lake Salem users

In order to achieve these goals, a multi-faceted approach to EWM management has been developed and is detailed below. This includes examining the current status of EWM in the lake and an alternatives analysis for different management approaches. Based on this alternatives analysis, a preferred management approach has been recommended and is detailed below.

CURRENT STATUS OF EWM IN SALEM

The current status of EWM in the Lake is shown in Figure 3, which includes density data of each infested region along with acreage, depth and percent of the littoral zone occupied. This map is based on extensive lake survey and personal observations of SLPA members and lake residents.

The polygons were generated from GPS data of EWM occurrences with Vermont DEC littoral zone mapping to serve as a base map. The lake-side boundaries of these polygons therefore are coincident with the Vermont DEC mapped littoral zone.

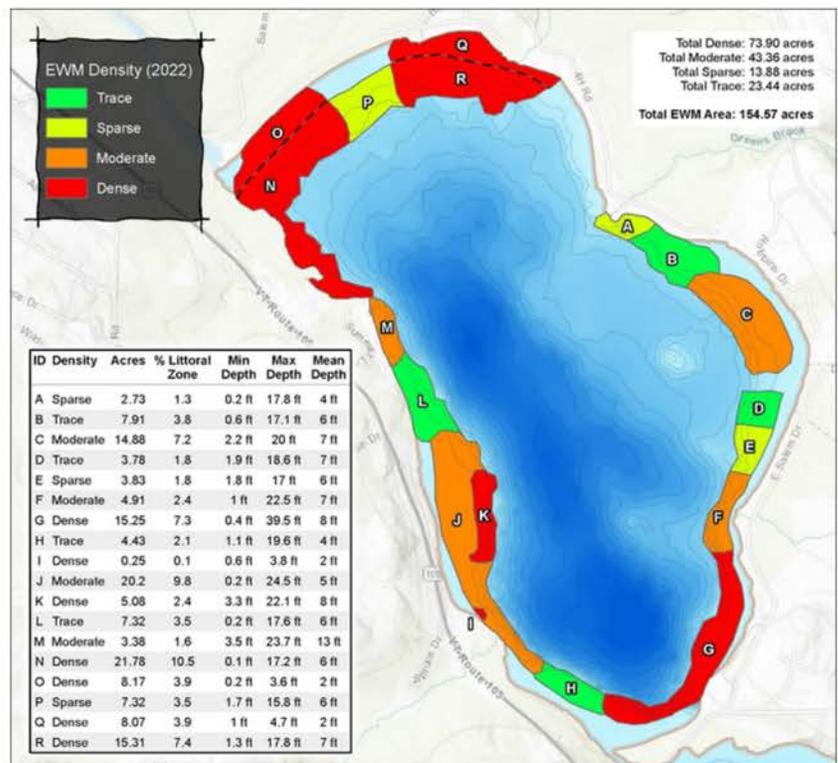


Figure 3. EWM Infestation Region Map.



EWM MANAGEMENT ALTERNATIVES

Three management alternatives have been explored and are explained below along with likely outcomes of each approach and preferred management recommendations.

Alternative 1: No action

Approach: The first management alternative consists of a hands-off approach to the management of EWM in the lake. This approach would involve the retirement of the greeter program, the public outreach, the DASH control efforts and the bottom barriers. No actions to control the growth or spread of EWM would be undertaken.

Likely Outcome: Based on the ecology and life history of EWM, it is likely that this species would become even more dominant in the lake if this alternative were pursued. It would become more dense where it is currently only sparse and it would spread to areas of the lake where it is currently not found. It would likely spread by natural means but also via motorboat traffic throughout the lake and especially around the area of the public boat launch.

Because EWM spreads so readily by fragmentation, areas around the public boat launch would likely harbor very dense infestations, making boating very difficult. Recreational uses such as swimming would also be severely hindered or dangerous because of the dense infestations that would develop.

As EWM becomes more dominant throughout the lake, aquatic plant species diversity would likely decline.

Dense EWM would likely have a negative impact on the state threatened Resupinate Bladderwort (*Utricularia Resupinata*). In addition to serious declines in recreational opportunities in the lake, a decrease in plant diversity and loss of rare species, "no action" may preclude the possibility of ever controlling EWM in the future. Once populations become so well established, the chance of implementing significant control (as well as the prohibitive cost of attempting meaningful control) is lost.

Management Recommendation: Based on the high costs of this alternative outlined above, SLPA does not recommend this approach.

Alternative 2: Status Quo

Approach: Continue with status quo of direct control using Bottom Barriers and DASH and indirect control with Public Outreach and the Greeter Program based on EWM densities and distribution. This approach does not include use of herbicide, though it may increase the amount of DASH control that occurs, based on EWM population levels.

Likely Outcome: The attempted control of EWM in Lake Salem using bottom barriers and DASH has been occurring since 2018, soon after EWM was first documented in the lake.

EWM MANAGEMENT ALTERNATIVES

As the maps in Figure 3 show, EWM has continued to spread despite these intensive control efforts. The likely outcome of continuing with this approach is that EWM would continue to spread throughout the lake. The areas where it is only sparsely abundant would likely become more densely infested. The density of EWM could be controlled locally in areas that are the focus of DASH and bottom barriers. However, outside of these areas EWM would continue to increase in abundance and expand into areas that it does not currently occupy.

Management Recommendation:

Ramping up the DASH and barriers to try and match the increase in EWM populations is an alternative worth considering. However, three factors make this approach problematic. First, the cost of these treatments exceeds the cost of other treatment options (such as herbicide). Second, evidence shows that the growth of EWM is outpacing the ability to control its spread with these methods.

Despite active management of EWM in the five years since its discovery in the Lake, EWM has significantly increased in both distribution and abundance. Third, there is limited capacity of the contractors to significantly increase work on DASH in the lake due to availability of certified and properly equipped crews. Evidence shows that in Lake Salem, the control methods that have been employed are not sufficient to slow the spread of EWM in the lake. For these reasons, SLPA does not recommend this management approach.

Alternative 3: Integrated Management Approach

Approach: This option consists of incorporating limited use of ProcellaCOR EC along with Bottom Barriers and DASH for direct control, while continuing the Greeter Program and Public Outreach for indirect control. As outlined below, herbicide treatments will focus on areas of dense infestation where the herbicide is most effective and other treatments are more difficult to employ. DASH will be used in areas where EWM is dense in smaller areas or is more sparse over larger areas. Bottom barriers will continue to be employed for locally dense infestations in high-priority areas.

Likely Outcome: Compared to Alternatives 1 and 2, the likely outcome of this Alternative is greater control of EWM in the lake. It is not expected that EWM will be eradicated from Lake Salem with this alternative. Yet it is expected that this strategy will reduce the need for annual use of herbicide in the future. This will prevent the significant decrease in recreational use of the lake, maintain the existing plant diversity of the native aquatic plant communities and protect the rare bladderwort population.

Management Recommendations: The explosive growth of EWM in the last five years has not been significantly hindered by the intensive management undertaken by SLPA. Therefore, there is no reason to believe that the measures in Alternative 2 would be any more effective in the future. Given the growth of EWM, it is clear that a more intensive approach is needed before EWM spreads even further.

EWM MANAGEMENT ALTERNATIVES

Alternative 3 is the only alternative that includes the possibility of controlling this explosive growth of EWM in Lake Salem. For these reasons, SLPA recommends undertaking this alternative. Details of this management approach are presented in the next section and in Appendix 1.

Alternative 3 consists of three methods of direct control and two methods of indirect control of EWM. In order to successfully control EWM in the lake, a plan integrating all five of these methods over a five-year time period has been developed and is summarized in Table 3 on the next page. Details of each of the methods is described, including goals, anticipated outcomes and thresholds for action



Hand harvesting



Diver-Assisted Suction Harvesting (DASH)



Harvested EWM after two-days of DASH treatment.

EWM MANAGEMENT RECOMMENDATIONS

YEAR 1

2023

Herbicide Treatment

Treat dense infestation areas equaling 83 acres

DASH

No treatment assuming herbicide application is approved

Hand Harvesting

Treat shallow, dense infestation areas and deeper moderate areas

Greeter Program

Continue greeter program to prevent further EWM introduction

Public Outreach

Continue public outreach

YEAR 4

2026

Herbicide Treatment

Follow-up treatment on dense infestations only as necessary

DASH

Moderately infested, or small, dense areas

Hand Harvesting

Treat shallow, dense infestation areas and deeper moderate areas

Bottom Barriers

Treat select localized dense infestations

Greeter Program

Continue greeter program to prevent further EWM introduction

Public Outreach

Continue public outreach

YEAR 2

2024

Herbicide Treatment

Follow-up treatment on dense infestations only as necessary

DASH

Moderately infested, or small, dense areas

Hand Harvesting

Treat shallow, dense infestation areas and deeper moderate areas

Bottom Barriers

Treat select localized dense infestations

Greeter Program

Continue greeter program to prevent further EWM introduction

Public Outreach

Continue public outreach

YEAR 5

2027

Herbicide Treatment

Follow-up treatment on dense infestations only as necessary

DASH

Moderately infested, or small, dense areas

Hand Harvesting

Treat shallow, dense infestation areas and deeper moderate areas

Bottom Barriers

Treat select localized dense infestations

Greeter Program

Continue greeter program to prevent further EWM introduction

Public Outreach

Continue public outreach

YEAR 3

2025

Herbicide Treatment

Follow-up treatment on dense infestations only as necessary

DASH

Moderately infested, or small, dense areas

Hand Harvesting

Treat shallow, dense infestation areas and deeper moderate areas

Bottom Barriers

Treat select localized dense infestations

Greeter Program

Continue greeter program to prevent further EWM introduction

Public Outreach

Continue public outreach

'In order to successfully control EWM in the lake, a plan integrating all five of these methods over a five-year time period has been developed.'

TABLE 3. FIVE-YEAR EWM MANAGEMENT RECOMMENDATIONS

EWM MANAGEMENT RECOMMENDATIONS

As can be seen from Table 3, the proposed treatment plan uses herbicide treatment to target the dense and moderate EWM infestation areas in Year 1 comprising 83 acres (40% of the littoral zone). Hand-harvesting in Year 1 will focus on the shallow areas in the northern lake with dense EWM and scattered patches of EWM in deeper areas. In Years 2-5, herbicide will only be used if EWM infestations reach levels that cannot be controlled by other methods (see Thresholds for Action section).

DASH will be used in Years 2-5 to treat areas that have a moderate EWM density or smaller areas that harbor dense infestations. Hand-Harvesting in Years 2-5 will stay consistent with the approach used in Year 1, targeting shallow, dense infestations and deeper, moderate infestations that are too small to justify DASH control. Justification for this approach is provided below and in the Budget Section. Short and long-term goals for each management method are summarized in Table 4.

TABLE 4. SHORT AND LONG-TERM GOALS OF EWM MANAGEMENT METHODS

Hand Harvesting

- Targeted Application: Shallow areas with EWM and deeper areas with scattered EWM growth
- Short-Term Goals: Decrease abundance of EWM in shallow areas; protect habitat for rare bladderwort
- Long-Term Goals: Decrease abundance of EWM in shallow areas; protect habitat for rare bladderwort

DASH

- Targeted Application: Areas with scattered EWM growth
- Short-Term Goals: Support control of EWM in areas not targeted by herbicide
- Long-Term Goals: Conduct maintenance-level eradication on moderate-dense areas of EWM

Bottom Barriers

- Small areas with dense EWM
- Support control of EWM in areas not targeted by herbicide
- Reduce use as EWM levels decrease and sufficient control obtained by DASH/hand harvesting

ProcellaCOR EC

- Larger areas with extensive, dense EWM
- Decrease overall abundance of EWM in lake by targeting extensive areas of dense infestation
- Discontinue use of herbicide if EWM levels can be reduced enough to manage with other methods

A detailed explanation of each management method follows.

EWM MANAGEMENT RECOMMENDATIONS

ProcellaCOR EC Herbicide Treatment

As mentioned earlier, use of bottom barriers and DASH to control EWM in Lake Salem has not resulted in an overall decrease of EWM abundance. As EWM abundance increases significantly each year, despite these efforts, the need for an additional control activity is warranted.

The herbicide treatment plan is included in Appendix 1, below. The goal of the ProcellaCOR EC treatment is to reduce the EWM population to levels that are manageable without the further (or only sporadic) use of herbicide. For 2023, we are looking at applying ProcellaCOR EC to the high-density EWM infestations.

Some of these areas were identified by the 2021 aquatic plant survey (SOLitude Lake Management 2021), and by SLPA EWM monitors.

There is a constraint on Herbicide (ProcellaCOR EC), DASH, and Bottom Barrier treatments imposed by the State of Vermont to 40% of the 207-acre littoral zone or 83-acres in any given year. The current known EWM infestation in the lake (154.8 acres) is larger than this constraint and as such, optimization decisions must be made to maximize long-term effectiveness of management activities. Because of this constraint, the matrix in Table 5 was developed to optimize the management method for each infested region.

TABLE 5. EWM INFESTATION & TREATMENT REGIONS

Region	EWM Density or Abundance	EWM Infestation Area (acres)	Trace (treatment acres)	Sparse (treatment acres)	Moderate (treatment acres)	Dense (treatment acres)	Sub Total (treatment acres)	
		Total 154.85	23.7	13.9	26.4	56.3	120.3	All
				13.9	26.4	56.3	96.6	D & M & S
					26.4	56.3	82.7	D & M
A	Sparse	2.73		2.73				
B	Trace	7.91	7.91					
C	Moderate	14.88			2.98			
D	Trace	3.78	3.78					
E	Sparse	3.83		3.83				
F	Moderate	4.91			1.93			
G	Dense	15.25				13.88		
H	Trace	4.43	4.43					
I	Dense	0.25				0.25		
J	Moderate	20.2			16.16			
K	Dense	5.08				5.08		
L	Trace	7.32	7.32					
M	Moderate	3.38			3.38			
N	Dense	21.78				21.78		
O	Dense	8.17				0.66		
P	Sparse	7.32		7.32				
Q	Dense	8.07				0.66		
R	Dense	15.31				15.31		
S	Trace	0.25	0.25					

EWM MANAGEMENT RECOMMENDATIONS

Table 5 shows the known current total EWM infested area in January of 2023, at 154.8 acres. It also shows the subtotal acres for each of the EWM treatment regions categorized with infestation densities. An attempt to treat the most abundant regions (moderate and dense) of EWM as this is the most cost-effective treatment technique. Because of the shallow depths of regions O and Q, it is difficult to treat with ProcellaCOR EC. For this reason, regions O and Q will not be considered for ProcellaCOR EC treatment, and their acreage numbers removed from the treatment columns in the table. To fit into our 83-acre constraint, only a portion of regions C, F, G, and J (hashed in the table) can be treated. The reduced acreages listed for these regions represent the treatment acreages. Taking into account these region reductions the plan is to treat regions I, J, K, M, N, R, C, F, and G, totaling 82.7 acres to stay below the 83-acre maximum constraint. This planned treatment for 2023 is shown in table 3 (82.7 acres, green row D&M).

A pre-treatment plant survey is planned for spring and will help target the final treatment areas for 2023.

Further information about ProcellaCOR EC application and testing is presented in Appendix 1.

Hand-Harvesting

Hand-harvesting will focus on shallow areas with dense EWM and on deeper areas with sparse EWM. The shallow northern shore of the lake (areas "O" and

"Q" in Figure 3) is less than 4' deep, contain moderately dense infestations of EWM and also provide habitat to the rare Resupinate Bladderwort. These areas are generally too shallow for employing DASH or herbicide treatment. Hand-harvesting in these areas is the best way to manage the EWM population while protecting the rare bladderwort. Hand-harvesting is also the most efficient way to control EWM in deeper areas where it is found in scattered or less dense abundance. The short- and long-term goals for this management technique are to control EWM in deeper areas with sparse EWM and in shallow areas while protecting habitat for the rare bladderwort.

DASH

Diver Assisted Suction Harvesting (DASH) has been performed on the lake for the past five years. DASH control efforts focused on the most densely infested areas. In 2023, these areas will be the focus of the herbicide treatment. In 2024 through 2027, DASH control occurs multiple times throughout the growing season, areas with infestations not previously documented can be controlled, allowing for crucial adaptive management. The short-term goals of this management method area to support control of EWM in areas not targeted by herbicide by controlling moderately dense and/or scattered EWM infestations. Long term, it is hoped that EWM will be controlled enough to warrant maintenance-level eradication on EWM infestations.

EWM MANAGEMENT RECOMMENDATIONS

Bottom Barriers

Bottom barriers will be used to target localized areas of dense EWM that are small in size. This technique is particularly useful in high-traffic areas or areas around docks, boat launches and moorings.

The short-term goals of this management method are to efficiently control small areas of dense EWM that are not targeted by other management methods. Long-term, it is hoped that EWM will be controlled to the degree that bottom barriers are needed rarely or not at all.

Greeter Program

As outlined above, SLPA has undertaken a consistent Greeter Program over the

past 20 years. This program will continue to be operational for the five-year management plan window with the goal of preventing further introduction of EWM or other invasive species.

Public Outreach

An extensive public outreach effort has been ongoing as outlined earlier. SLPA will continue these efforts and expand the range of content provided. As for ProcellaCOR EC and other management plans, we are looking at hosting a community briefing online sometime in the early Spring. This will enable us to update our public on our management approach much the way we did in July 2022 at our annual meeting.

'An extensive public outreach effort has been ongoing as outlined earlier. SLPA will continue these efforts and expand the range of content provided.'

THRESHOLDS FOR FOLLOW UP HERBICIDE APPLICATION

At least seven other public lakes in Vermont have been treated with ProcellaCOR EC since it was registered in 2019. It has replaced Sonar (active ingredient Fluridone) and Renovate (active ingredient Triclopyr) as the herbicide of choice for EWM control in Vermont for several reasons.

ProcellaCOR EC has a significantly shorter concentration-exposure-time (CET) requirement than triclopyr, which makes it effective for the shoreline spot-treatments that are needed at Lake Sale.

ProcellaCOR is also applied targeting in-water concentrations of less than 10 parts per billion, as opposed to the 1.5-2.0 parts per million (1500-2000 ppb) rates that are needed for triclopyr. Thus, less herbicide needs to be applied and restrictions on using lake water for irrigation and domestic purposes are shortened to a few days.

Additionally, ProcellaCOR EC has proven to be extremely selective for EWM control and generally provide nuisance level control in treated areas for a 2-3 year period.

Considering that the EWM infestation in Lake Salem is fairly recent, it is hoped that long-term control will be achieved following ProcellaCOR EC treatments and that non-chemical control strategies will be able to be employed to manage EWM regrowth.

Three factors will be considered when determining if follow up ProcellaCOR EC treatments are warranted:

1. density and extent of localized EWM infestation;
2. configuration and location of the localized EWM infestation, and
3. overall level of EWM in the lake.

The density and extent of the localized EWM infestation will be the primary factor considering follow up herbicide treatment. In general, follow up treatment will be considered if areas infested with EWM >50% comprise >10 acres or areas infested with >75% comprise >5 acres.

The second factor is the location and configuration of the EWM infestation. Areas that limit the influence of dilution with untreated water (i.e. coves or round or square blocks as opposed to long narrow strips) will have a better likelihood of successful treatment.

The final yet important consideration is that the other control methods (DASH, bottom barriers) are limited in the total acreage/amount of EWM that they can address in a given year. For example, if overall infestation levels in the lake are beyond the capacity of the non-chemical methods, chemical methods may be necessary.

RARE/SENSITIVE SPECIES

In 2020, Vermont DEC documented the presence of Resupinate Bladderwort (*Utricularia Resupinata*) at numerous locations in the lake. Resupinate Bladderwort is listed as a threatened species in Vermont and is found in nutrient-poor lakes with good water clarity. This plant is a small aquatic macrophyte with thread-like leaves and small “bladders” used to catch zooplankton. Resupinate bladderwort typically grows on the sediment surface or just below the sediment surface, making it an inconspicuous part of the aquatic flora. The most conspicuous part of the plant is the relatively large purple flower which grows on a slender scape above the water surface. Unfortunately, flowering is sporadic and tends to occur when water levels are low and temperatures are above average. This species usually grows in fairly shallow waters (less than 15 cm deep), though it can reach greater depths in lakes with good water clarity.

In Lake Salem, this species has been documented in shallow areas along the northwestern, northeastern and southern shores of the lake. This data was collected during a lake-wide aquatic plant inventory and may not represent the full extent of the population. Since this species is inconspicuous, a targeted inventory for this species is the only way to determine the full extent of the population in the lake.

Most of these occurrences documented by Vermont DEC are located in the very shallow waters along the shoreline. One occurrence in the northeastern corner of the lake was found in approximately 4' of water. This occurrence and the good water clarity of Lake Salem (mean secchi depth of 4.6 m) suggests that this species can colonize these deeper areas of the lake. However, the 2021 aquatic plant survey conducted by SOLitude did not detect this species at any of the 154 sampling points, the majority of which were deeper than 15cm (SOLitude Lake Management 2021). This suggests that Resupinate Bladderwort, is not likely very abundant in the deeper areas of the lake.

In general, since this species reaches its greatest abundance in shallow water, its habitat does not directly overlap with that of EWM. EWM, while it can grow in waters 15 cm deep, reaches its greatest abundance in waters >0.5 meters deep. However, there are areas where these two species do overlap in the lake. The most notable is the shallow sandy shore at the northwestern end of the lake. From the Vermont DEC data, this is the area where Resupinate Bladderwort is most abundant and also harbors some dense infestations of EWM.

In order to protect this bladderwort habitat, these areas have been drawn as separate management zones in Figure 3 (shown as areas “O” and “Q”).

RARE/SENSITIVE SPECIES RECOMMENDATIONS

The establishment of dense EWM infestations over a population of Resupinate Bladderwort would likely have a significant negative impact on the bladderwort population. For this reason, protecting the bladderwort population in these areas may be contingent upon controlling the EWM infestation. Since most of the Resupinate Bladderwort population occurs in areas of shallow water, the options for management of EWM where it co-occurs is limited to hand-harvesting.

The process of hand-harvesting EWM necessarily involves uprooting the plants to prevent regrowth. This disturbance of the sediment may impact Resupinate Bladderwort plants growing in the vicinity of the EWM. A Threatened Species Takings permit for this activity is therefore being developed and will be submitted to the Vermont Agency of Natural Resources before any hand-harvesting occurs in the vicinity of the rare bladderwort.

'The establishment of dense EWM infestations over a population of resupinate bladderwort would likely have a significant negative impact on the bladderwort population. For this reason, protecting the bladderwort population in these areas may be contingent upon controlling the EWM infestation.'

BUDGET

When developing the EWM management budget, SLPA has considered the ability of the fundraising committee to raise money for mitigation, the state treatment constraint of 40% of the 207-acre littoral zone (83 acres), and the EWM infestation acreage and density. Herbicide (ProcellaCOR EC), DASH, and Bottom Barrier treatments are all constrained by the 83-acre-per-year limit. Because of the 83-acre constraint the appropriate treatment technique must be selected to have the maximum effect of EWM mitigation. SLPA has established an estimated cost table (Table 7) to help in the mitigation technique decisions.

Estimated EWM Treatment cost per acre per year

Rank	Infestation Abundance	Biomass estimation (g/sqf m)	Biomass estimation (lbs/Acre)	DASH Low Cost per acre per year	DASH High Cost per acre per year	ProcellaCor Cost per acre per year	Bottom Barrier Cost per acre per year including pre-treatment Low DASH costs	Hand Harvesting Low Cost per acre per year	Hand Harvesting High Cost per acre per year
0	No Plants	0	0	\$0	\$0	\$1,200	\$12,400	\$0	\$0
1	Trace	.0001 - 2.000	0 - 17.9	\$350	\$1,400	\$1,200	\$12,750	\$0	\$54
2	Sparse	2.001 - 140.000	17.9 - 1249.8	\$1,400	\$2,333	\$1,200	\$13,800	\$54	\$3,749
3	Moderate	140.001 - 230.000	1249.8 - 2053.2	\$2,333	\$3,500	\$1,200	\$14,733	\$3,749	\$6,160
4	Dense	230.001 - 450.000	2053.2 - 4017.2	\$3,500	\$7,000	\$1,200	\$15,900	\$6,160	\$12,052
4	Dense (Vertical Wall)	Greater than 450.000	Greater than 4017.2	\$7,000	\$9,333	\$1,200	\$19,400	\$12,052	\$16,068

TABLE 7 - EWM TREATMENT COST PER ACRE PER YEAR

This cost table shows ProcellaCOR EC is the most cost-effective treatment in Dense, and Moderate infestation densities. Hand Harvesting might be the most cost effective in Sparse regions. In Trace densities Hand Harvesting is the most cost effective and DASH can be more cost-effective than ProcellaCOR EC. In all abundance's Bottom Barrier is the least cost effective but might have useful application around endangered plants.

Table 8 (Five-Year SLPA EWM Budgeted Treatment Expenses) on the next page shows the planned yearly EWM mitigation expenses. In Year 1, 2023, the plan calls for treating 83-acre Dense and Moderate infested regions with the most cost-effective treatment method: ProcellaCOR EC. Also, in 2023 there are funds budgeted for Hand Harvesting which does not fall into the 83-acre constraint.

In years 2024 through 2027, it is anticipated EWM infestation acreage will decrease from the 2023 levels. This reduction should allow for more flexibility with treatment options as we get below the 83-acre littoral zone constraint. EWM monitoring will help drive treatment decisions. To enable flexibility, funds have been budgeted for Herbicide, DASH, Hand Harvesting, and Bottom Barrier treatments. With the 83-acre constraint, not all EWM-infested acres will be treated in 2023. The expectation is the remaining untreated infested acres will continue explosive growth doubling roughly every six months. With this anticipated EWM growth all mitigation options are budgeted for in the later years of this plan.

BUDGET

In the later plan years, EWM monitoring including infestation densities will be needed to optimize treatment option decisions. The Greater Program is planned to continue at current levels for the entire five-year period. Permitting and SLPA expenses are anticipated and budgeted for as shown in the Table 8.

	Year 1	Year 2	Year 3	Year 4	Year 5
Control Activity	2023	2024	2025	2026	2027
Herbicide Treatment	\$100,000	\$45,000	\$45,000	\$45,000	\$45,000
DASH		\$15,000	\$15,000	\$15,000	\$15,000
Hand Harvesting	\$4,000	\$4,000	\$4,000	\$4,000	\$4,000
Bottom Barriers		\$1,000	\$1,000	\$1,000	\$1,000
Pre-Treatment Monitoring	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000
Post Treatment Monitoring	\$7,500	\$7,500	\$7,500	\$7,500	\$7,500
Greeter Program	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000
Permitting	\$1,500		\$1,500		\$1,500
SLPA Expenses	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000
Total	\$140,000	\$99,500	\$101,000	\$99,500	\$101,000

TABLE 8 - FIVE YEAR SLPA EWM BUDGETED TREATMENT EXPENSES

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APPENDIX

2021 Solitude Plant Survey

2022 DASH Report

DEC 2019 Vegetation Analysis Summary

PROCELLACOR™ EC HERBICIDE TREATMENT PLAN

After receiving its full aquatic registration from the EPA in February 2018, ProcellaCOR™ EC has been used in numerous locations throughout the country for control of milfoil species and other susceptible, invasive aquatic plants. Since 2018 in New England alone, SŌlitude has applied ProcellaCOR™ EC at dozens of locations in all six New England states the control of variable milfoil (*Myriophyllum heterophyllum*) and Eurasian watermilfoil (*Myriophyllum spicatum*). In Vermont, ProcellaCOR™ EC has replaced Sonar (fluridone) or Renovate (triclopyr) for EWM control and has been the only herbicide permitted and applied over the past several years due to its efficacy, selectivity, rapid half-life and favorable toxicology profile. Results of all ProcellaCOR™ EC treatments performed in Vermont to date have been positive, achieving nearly complete control (>95% biomass reduction) of targeted EWM growth during the year of treatment, with little or no impact to non-target native plants. Documentation on the selectivity of ProcellaCOR™ EC at Vermont projects has been provided to VT DEC annually, and it has proven to be even more selective for EWM control in Vermont lakes than fluridone or triclopyr.

Recently issued ProcellaCOR™ EC herbicide permits issued by Vermont DEC for other waterbodies are conditioned such that a maximum of 40% of the littoral zone can be managed in any one calendar year. This management includes the use of DASH, bottom barriers and/or herbicide, but excludes hand-pulling as that can be done at any time without a permit. As such, SLPA is proposing 83 treatment acres for the 2023 season.

The 40% management limitation to the littoral zone of a given waterbody is the protective measure that DEC has provided in order to minimize any significant impacts to the waterbody as a resource to all of its users. Additionally, the 40% threshold allows for wildlife habitat to remain protected. For example, EWM is not an ideal fish habitat, but if few native aquatic plant species are present within the respective waterbody, then EWM is likely providing habitat. As such, the intention is not to impact the entire habitat in order to maintain an appropriate balance within the system; a compromise. Based on ProcellaCOR™ EC's reduced risk profile issued by the US EPA and its overall brief presence within the water (24-48 hours maximum; reported photolytic half-life is 0.07 days or 1.68 hours), there are no cumulative adverse impacts anticipated to affect the lake as a resource for its users.

Excellent selectivity and minimal impact to non-target species has been demonstrated with ProcellaCOR™ EC treatments that have been performed in Vermont and the Northeast to date. Of the other species reported in Lake Salem, the only plants that are expected to show some impact following treatment are coontail (*Ceratophyllum demersum*), watershield (*Brasenia schreberi*), yellow waterlily (*Nuphar variegata*) and white waterlily (*Nymphaea odorata*). Coontail is typically not impacted by ProcellaCOR™ EC treatments except when using rates of 4+ PDUs/ac-ft; while the watershield and white and yellow waterlilies may show some discoloration and twisting, depending on their proximity to the treatment area(s), before outgrowing the symptoms and recovering as a population.

Use of this herbicide is intended to supplement SLPA's current integrated, long range pest management program outlined in the Purpose section. Herbicide treatment will be used to target areas of the most abundant EWM growth, while the non-chemical techniques will be utilized on smaller and more widely scattered patches in subsequent years. The program objective will be to initially reduce the distribution and density of EWM and subsequently minimize herbicide use. Undoubtedly, other areas of Lake Salem would be significantly more infested with EWM growth if it were not for SLPA's diligent and intensive non-chemical management programs.

The treatment program being proposed at Lake Salem involves the treatment of approximately 83 acres of EWM growth or 40% of the littoral zone. EWM growth in these areas is now too abundant to be cost-effectively managed using suction harvesting, bottom barriers or hand-pulling.

ProcellaCOR™ EC herbicide is used as a one-time application during each year when it is to be used; however, which control method (DASH, bottom barriers, ProcellaCOR™ EC, etc.) is the most appropriate for use will be determined annually based on EWM densities and distributions. It is anticipated that treatment areas would experience multiple years of control following one treatment effort. However, it is understood that any fragments entering the treated area(s) from unmanaged areas elsewhere in the lake may allow for the population to be reestablished within that area. Thus, diligent control and spread prevention measures, as SLPA has already undertaken and will continue, must be taken by all lake users in order to mitigate future spread potential at Lake Salem as well as other waterbodies nearby.

The treatment program is expected to follow the following timeline and protocol:

Date	Task
May	<ul style="list-style-type: none"> ● Early season survey to develop final treatment map. ● Submission of map and specific treatment plants to DEC for review and approval. ● Perform required pre-treatment notifications.
June	<ul style="list-style-type: none"> ● Schedule and conduct ProcellaCOR™ EC herbicide treatment
July – September	<ul style="list-style-type: none"> ● Surveys / inspections and sampling
November	<ul style="list-style-type: none"> ● Submission of annual report identifying preliminary plans for upcoming year
December / January	<ul style="list-style-type: none"> ● Project review and meeting with DEC, as necessary

Based on the recent treatment experiences with ProcellaCOR™ EC herbicide at other New England lakes and from SePRO Corporation manufacturer input, the following protocols are recommended for the proposed ProcellaCOR™ EC treatment at Lake Salem in 2023 and future years, if needed:

1. Formulation – ProcellaCOR™ EC aquatic herbicide, liquid formulation.
2. Application – A solution of ProcellaCOR™ EC diluted with lake water would be prepared in a mixing tank onboard the treatment boat and the solution will be evenly injected throughout the designated treatment areas using trailing drop hoses and a calibrated pumping system. This is a sub-surface injection.
3. Timing – Treatment would be scheduled for anytime between early June and mid-late August (temperature dependent), when there is sufficient EWM growth to maximize herbicide uptake.
4. Rate – The recommended application rate (dose) is based on the percentage of the waterbody being treated and the susceptibility of the target plant. EWM has proven to be especially susceptible to ProcellaCOR™ EC allowing for low application rates to be used. The EPA label allows for application of 25 Prescription Dose Units (PDUs) per acre-foot of water being treated. Based on the high susceptibility of EWM, the recommended application rate for Lake Salem in 2023 is up to 3 PDUs per acre-foot. The 3 PDU application rate is only 12% of the maximum allowable application rate listed on the product label. Should smaller-scale maintenance treatments be required in subsequent years, the application rates may increase to 4-5 PDU's to overcome the effects of dilution, but rates higher than 5 PDU per acre foot will not be proposed to ensure selectivity.

This treatment strategy was employed at Lake Beebe, Lake Hortonia, Lake Saint Catherine and Lake Fairlee in 2022. All of the aforementioned projects were conducted in the same way that the Lake Salem project is proposed under this application. All results from each of those treatments, as well as overall lack of non-target impacts, were incredibly successful.

Herbicide	<p>ProcellaCOR™ EC</p> <p>Liquid formulation</p> <p><u>EPA Reg. No.:</u> 67690-80</p> <p><u>Active Ingredient:</u> florpyrauxifen-benzyl 2.7%</p> <p>1 PDU is equal to 3.2 fl. oz.</p>
Application Rate	Up to 3 PDU per acre-foot
Treatment Area	<p>Up to approximately 83 acres</p> <p><i>* Actual acreage is anticipated to be finalized in May 2023.</i></p>
Total product to be Applied	<p>If electing to treat all 83 acres or 40% of the littoral zone at a rate of 3 PDUs per acre-foot, total product applied will be 1743 PDUs.</p> <p><i>*Actual quantity to be applied will be determined after the May 2023 pre-treatment inspection.</i></p>
Target Concentration	<p>1 PDU of ProcellaCOR™ EC (3.2 fl. oz) achieves 1.93 ppb/acre foot</p> <p>The proposed application rate of 3 PDU/ac-ft will result in concentrations of 5.79 ppb within the treated areas.</p>
Treatment Timing	<p>Between early June and early September 2023.</p> <p>Delay treatment until there is sufficient active EWM growth to maximize herbicide uptake.</p>
Method of Application	<p>The liquid formulation will be diluted with lake water and evenly applied throughout the designated treatment areas using a calibrated pumping system and trailing drop hoses.</p> <p>GPS systems with WAAS or differential accuracy will be used to provide real-time navigation and to ensure that the herbicide is evenly applied throughout the designated treatment areas.</p>

IMPACTS TO NATIVE PLANT COMMUNITY AND WILDLIFE

Significant adverse impacts to the native plant community are not expected from the proposed ProcellaCOR™ EC herbicide treatment at Lake Salem. Data gathered by SePRO Corporation during the product registration process and actual results documented since the 2018 treatment season has shown that EWM is highly susceptible to low rates of ProcellaCOR™ EC. Few, if any, adverse impacts are expected on most non-target native plants at the rate anticipated for use at Lake Salem.

At treatments performed by SÖLitude since 2018, the only temporary impacts observed were slight stem twisting, leaf curling and discoloration on watershield (*Brasenia schreberi*), white waterlily (*Nymphaea odorata*) and yellow waterlily (*Nuphar variegata*), but the plants grew out

of the symptoms after a period of several weeks. Although coontail (*Ceratophyllum demersum*) is on the ProcellaCOR™ EC label as a potentially impacted species, it has been observed that only application rates above 4 PDUs/ac-ft have any observable impacts on coontail. Thus, injury, if any, is expected to be minor with population recovery. There are additional species listed on the ProcellaCOR™ EC label which may be susceptible to treatment, however they are not known to be present within Lake Salem. Further, all potentially susceptible species have susceptibilities dependent upon their proximity to the treatment areas and the dose being applied (e.g. if a patch of watershield is not located close to any treatment area, it would be anticipated that the watershield would be unimpacted).

No impact to State protected or rare plant species is anticipated following treatment with ProcellaCOR™ EC herbicide. Specifically, Purple Bladderwort or Northeastern Bladderwort (*Utricularia resupinata*) is not a listed non-target species on the ProcellaCOR™ EC label and no observational impacts have been documented to date. Of the State listed species previously observed in Lake Salem, according to the VT DEC Lake Score Card, none are anticipated to be adversely impacted by a ProcellaCOR™ EC herbicide treatment.

It is possible that Northern watermilfoil (*Myriophyllum sibiricum*), present in Lake Salem, is hybridizing with EWM. Thus, ProcellaCOR™ EC may have an impact on this population. In other Vermont lakes, hybridized milfoil has required slightly higher dose rates of ProcellaCOR™ EC than the 3 PDU rate being proposed at Lake Salem in 2023. Northern watermilfoil itself is not a listed non-target species on the herbicide label, though final treatment areas will consider the presence of this species.

Following treatment efforts, the plants within the treatment areas would be anticipated to follow a similar decomposition timeline as follows:

- Within a week of treatment – EWM plants are anticipated to be leaning over within the water column
- Within two weeks of treatment – EWM plants are anticipated to be leaning and more fallen over within the water column, beginning to become discolored, and if touched, the plants would be anticipated to easily break apart. However, fragments of these plants are no longer viable.
- Within three weeks of treatment – EWM plants are anticipated to be completely fallen within the water column and be difficult to find even along the bottom sediment.

As a result of the timeframe of decomposition, and minimal amount of area to be managed utilizing ProcellaCOR™ EC relative to the overall waterbody acreage, there is no additional concern for an increase of available nutrients to stimulate an algal bloom beyond what may be present in any one given year at a waterbody of Lake Salem' nature.

The permit application is anticipated to be conditioned to limit EWM management (all herbicide use, diver-assisted suction harvesting, and benthic barrier use) to 40% of the littoral zone. The 40% threshold was established by DEC to maintain and protect existing fish and wildlife habitat, as a result, the habitat will not be changed significantly enough to be permanently changed. Overall, EWM is not a beneficial habitat for fish for a variety of reasons.

Based on the ecotoxicological testing completed for ProcellaCOR™ EC, there was no toxicity observed for avian, fish, or other species exposed to the product during both short and long-term studies. It should be noted that these testing efforts included higher concentrations than even those available at the maximum label rate.

WATER USE RESTRICTIONS AND NOTIFICATIONS

Water Use Restrictions – The only water use restrictions listed on the current ProcellaCOR™ EC label are all centered around the use of ProcellaCOR™ EC treated water for irrigation purposes. There are no restrictions on using ProcellaCOR™ EC treated water for drinking water, swimming or fishing.

However, it is anticipated that Vermont DEC will condition the permit similarly to others issued for ProcellaCOR™ EC use in 2019-2021; on the day of treatment and out of an abundance of caution, no use of the treated waterbody and associated outlet stream up to one mile downstream is recommended for any purpose, including swimming, boating, fishing, irrigation, and all domestic uses. Additional advisories and recommendations related to irrigation and the use of treated waters are to follow what is listed on the ProcellaCOR™ EC label.

Irrigation restrictions vary depending on what is being irrigated. Turf may be irrigated immediately after treatment without restriction. Irrigation of landscape vegetation and other non-agricultural plants can occur once ProcellaCOR™ EC concentrations are determined to be less than 2 ppb or by following a waiting period that is 7 days for the use rates being proposed.

Based on sample results of prior ProcellaCOR™ EC applications in Vermont, it is not anticipated that this product will travel downstream through the outlet given the increased dilution at its headwaters, plus any absorption by EWM assuming it were to travel outside of the bounds of Lake Salem.

Based on prior ProcellaCOR™ EC application review in Vermont, the Vermont Department of Health had issued a favorable drinking water review for this product, which states application according to the label would pose a negligible risk to public health. It is anticipated the agency's review for Lake Salem would be similar.

Written Notification – In accordance with the Vermont DEC permit conditions, all direct waterfront abutters of the treated waterbody and up to one mile downstream will be notified in

writing by USPS mail. This will include notification of permit application submission and prior to any herbicide treatment, which will occur two weeks in advance of the date of treatment.

Posting – In accordance with VT DEC permit requirements, the adjacent shorelines and access points to the lake will be posted with signage warning of the pending herbicide application and water use recommendations to be imposed. The signs will include language specified by VT DEC for this purpose. The signage will be the source of information for the specific treatment areas and water use restrictions and will include the website(s) where additional treatment information can be accessed.

SURVEYS AND MONITORING

Consistent with other Five-Year Integrated Management Plans for Vermont waterbodies and existing efforts undertaken by the SLPA, the organization proposes to continue the comprehensive late season aquatic plant survey as conditioned in the permit. By conducting annual survey efforts, changes in EWM and native aquatic plant species distributions and densities can be tracked effectively to align management efforts for the following season. In addition, an interim, one month post-treatment survey will be conducted to assess ProcellaCOR™ EC efficacy.