

Annual Report
2023 Aquatic Herbicide Treatment Program
Lake Salem
Derby, Vermont

Prepared by: SÖLitude Lake Management
590 Lake Street
Shrewsbury, MA 01545

Prepared for: Salem Lakes Preservation Association
P.O. Box 116
Orwell, VT 05760

Submitted on: December 20, 2023

Introduction

An Integrated Aquatic Plant Management Program focused on the control of Eurasian watermilfoil (*Myriophyllum spicatum*, EWM) within Lake Salem was implemented during the 2023 season. SÖLitude Lake Management was contracted by the Salem Lakes Preservation Association (SLPA) to conduct an herbicide spot-treatment program. The remainder of this text describes 2023 management practices and offers 2024 recommendations.

2023 Program Chronology

- | | |
|--------------------------------------|------------|
| • Pre-treatment survey | 06/21/2023 |
| • ProcellaCOR herbicide treatment | 08/17/2023 |
| • FasTEST herbicide residue sampling | 08/19/2023 |
| • Post-treatment survey | 09/14/2023 |

Summary of Key Findings

- Active EWM growth was verified during the June 21st survey and the recommendations for treatment were finalized.
- Treatment of 78.81 acres was performed on August 17th.
- Excellent control of EWM was seen in the treatment area with limited impacts to non-target species.

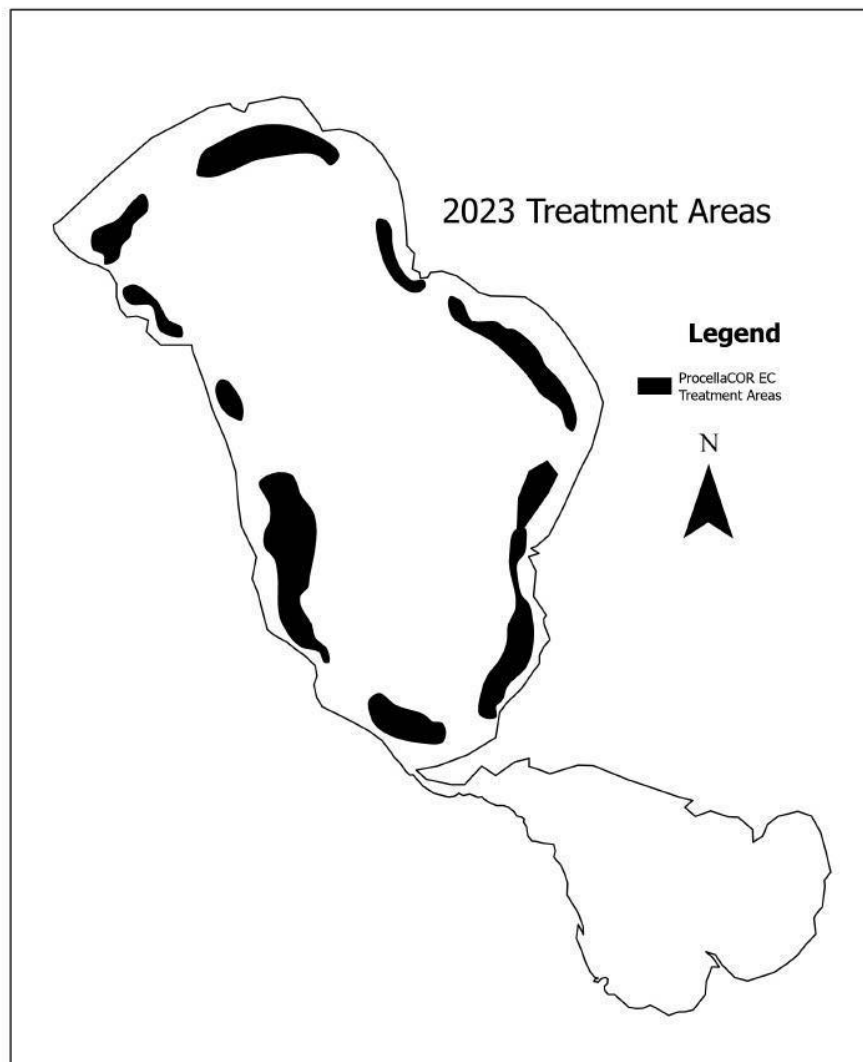


Pre-Treatment Survey

A pre-treatment survey was conducted by SOLitude Staff on June 21, 2023 to confirm Eurasian watermilfoil (EWM) growth and to finalize treatment areas with SLPA. Nine treatment areas of approximately 78.18 acres were agreed to given the density and distribution of Eurasian watermilfoil. The target concentration of ProcellaCOR™ EC was 3 PDU/ac-ft.

Final treatment information was submitted to Vermont DEC on July 13, 2023 and final approval was received on August 1, 2023.

Figure 1. 2023 Herbicide Management Areas





Herbicide Treatment

On August 17, 2023 the selected 78.18 acres of Lake Salem were treated with ProcellaCOR™ EC at a rate of 3 PDUs or total herbicide amount of 1641.7 PDUs. Specific quantities were calculated for each treatment area. Weather was partly sunny, low 70s °F with winds Southwest at 5-10 mph. Treatment occurred between 9 am and 1:30 pm. An 18-foot airboat equipped with a 100 gallon calibrated sprayer equipped subsurface injection hoses was utilized for treatment. For each treatment area, the prescribed amount of concentrated herbicide was diluted with lake water in the spray tank and was evenly applied throughout the treatment areas. Application was guided using a GPS system. Prior to treatment, a temperature and dissolved oxygen profile was recorded (Table 1). Empty product containers were triple-rinsed with lake water within the treatment area and recycled at the SŌlitude office in Shrewsbury, Massachusetts. No problem occurred during the treatment.

Table 1. Temperature and Dissolved Oxygen Profile During Treatment

Depth (meters)	Temperature (°C)	Dissolved Oxygen (mg/L)
Surface	25.6	7.4
1	25.4	7.2
2	24.9	7.4
3	24.1	5.8

A treatment report documenting these details was written and submitted to SLPA and Vermont DEC. FastEST sampling began following treatment (see attachments for details).

Post-Treatment Survey

On September 14th, approximately one-month following treatment, SŌlitude staff conducted a post-treatment inspection of the lake to document the treatment's impact and efficacy. No viable Eurasian watermilfoil was seen within the treatment areas. Thus, excellent control of EWM using ProcellaCOR EC was achieved at this time.

Native plant growth was observed in varying densities in all of the treatment areas. There did not appear to be any adverse impact to the marsh spikerush (*Eleocharis palustris*) along the eastern shoreline. Most of the submersed native plant species - specifically, *Potamogeton* spp., *Elodea canadensis*, *Vallisneria americana*, *Naiad* spp., and *Utricularia* spp. - appeared to be healthy and did not show signs of stress or impact from the treatment. The beds of white waterlily (*Nymphaea odorata*) along the north and west shorelines were visibly impacted from the



treatment in the form of thinning and leaf curling and discoloration. This was an expected impact; however, the population as a whole remained present and full recovery is anticipated based on experiences in other Vermont lakes. Oftentimes, recovery of white waterlily is seen in the late summer during the year of treatment, but the treatment at Lake Salem was performed in mid-August and there was not enough of the growing season left to see active recovery. We expect that recovery will be evident throughout the 2024 season.



Summary and Recommendations

The 2023 ProcellaCOR™ EC treatment was successful and efficacious, as no Eurasian watermilfoil was observed in the Lake Salem treatment areas during our post-treatment inspection approximately one-month after treatment. However, there was one patch located adjacent to the treatment area abutting the channel connecting Lake Salem and Little Lake Salem. This occurrence was documented in the comprehensive 2023 Salem Macrophyte Survey conducted by Arrowwood Environmental on September 20 and 23. The patch was described to be approximately 50-feet in diameter and was on the edge of a treatment area. We are unsure



why this small patch was not controlled by the treatment. It was likely due to dilution, possibly due to the proximity of the channel to Little Lake Salem.

Despite slight decreases in percent frequency of occurrence of some native, non-target species, and the more noticeable impact to white waterlily (*Nymphaea odorata*), no other significant impacts to the non-target plant community were observed. It is expected that the waterlily population will make a recovery by the end of the 2024 season.

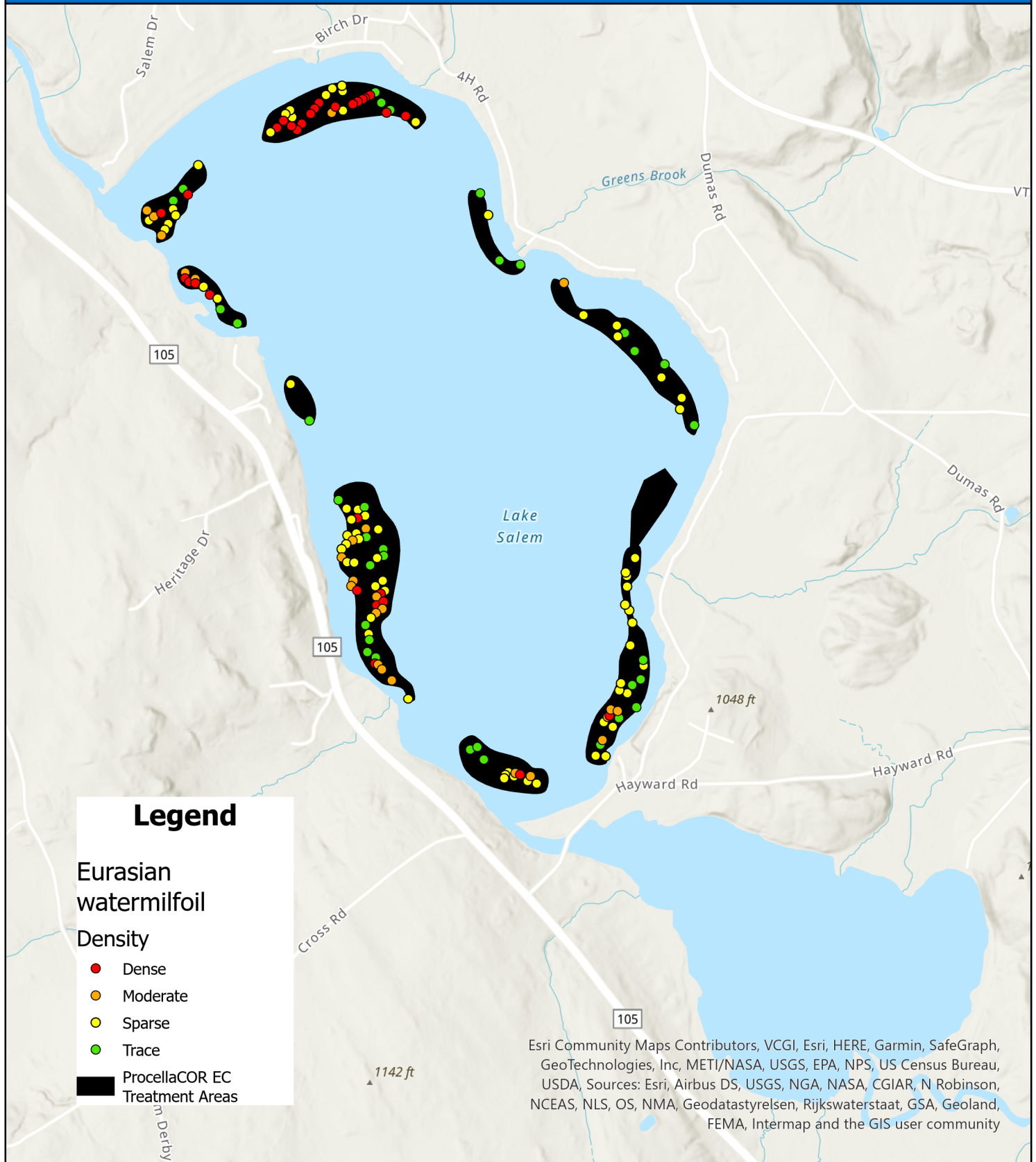
The small bed of EWM found at the southern end of the lake during the comprehensive survey should be re-inspected in the spring of 2024 to determine the most appropriate management strategy. If EWM growth is limited in size and scope, SLPA should embark on permitted non-chemical control strategies as soon as possible. In the event that additional EWM growth is discovered, then a spot-treatment with ProcellaCOR EC could be considered. In general, areas smaller than 1-2 acres in size that are subject to dilution with untreated water do not respond well to spot-treatments.



ATTACHMENTS

- 2023 Treatment Map
- FastEST Sampling Locations
- FastEST Herbicide Residue Test Results

Density and Distribution of Eurasian watermilfoil and 2023 Treatment Areas



Lake Salem
Derby, Vermont

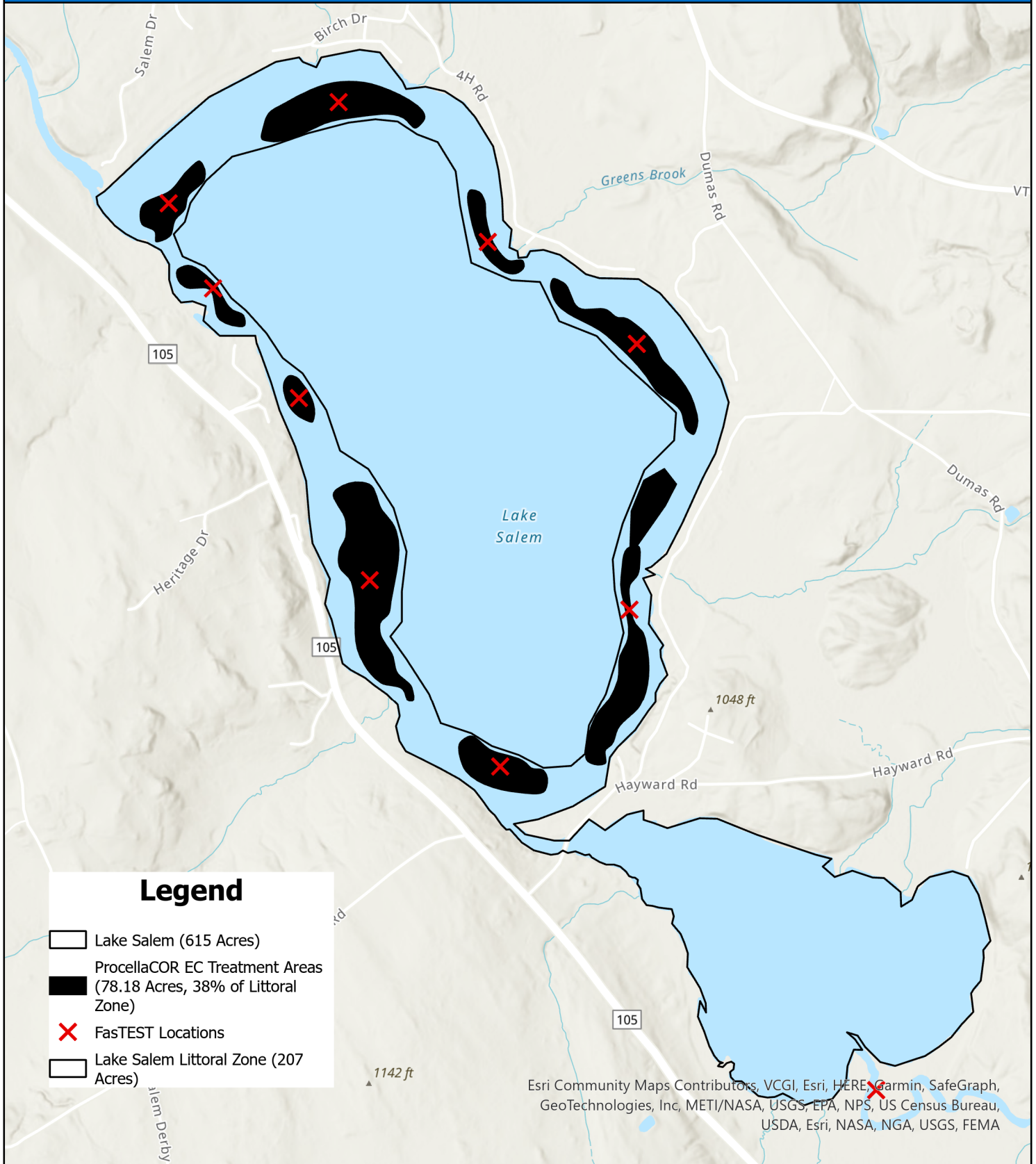


Lake Salem

0 0.13 0.25 0.5
Miles

Survey Date: 6/21/2023
Prepared by: E. Vulgamore
Office: SHREWSBURY, MA

2023 FasTEST Sample Locations (10)



Lake Salem
Derby, Vermont



Lake Salem
0 0.13 0.25 0.5
Miles

Survey Date: 6/21/2023
Prepared by: E. Vulgamore
Office: SHREWSBURY, MA



SePRO Research
& Technology Campus

FastTEST*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC17108 **LABORATORY REPORT**

Customer Company Customer Contact

Company Name SOLitude Lake Management	Contact Person: Marc Bellaud
Address: 1320 Brookwood Drive, Ste. H Little Rock, AR 72202	E-mail Address: mbellaud@solitude.com
	Phone: 508.885.0101

Waterbody Information

Waterbody:	Salem Lake - VT
Waterbody size:	554
Depth Average:	20

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM47151-1	A	ProcellaCOR/florpyrauxifen-benzyl (ug/L) ProcellaCOR acid/florpyrauxifen (ug/L)	FAST 16 FAST 16	<1 <1	08/19/2023
CTM47152-1	B	ProcellaCOR/florpyrauxifen-benzyl (ug/L) ProcellaCOR acid/florpyrauxifen (ug/L)	FAST 16 FAST 16	<1 <1	08/19/2023
CTM47153-1	C	ProcellaCOR/florpyrauxifen-benzyl (ug/L) ProcellaCOR acid/florpyrauxifen (ug/L)	FAST 16 FAST 16	<1 <1	08/19/2023
CTM47154-1	D	ProcellaCOR/florpyrauxifen-benzyl (ug/L) ProcellaCOR acid/florpyrauxifen (ug/L)	FAST 16 FAST 16	<1 <1	08/19/2023
CTM47155-1	E	ProcellaCOR/florpyrauxifen-benzyl (ug/L) ProcellaCOR acid/florpyrauxifen (ug/L)	FAST 16 FAST 16	<1 <1	08/19/2023

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM47156-1	F	ProcellaCOR/lorpyrauxifen-benzyl (ug/L)	FAST 16	<1	08/19/2023
		ProcellaCOR acid/lorpyrauxifen (ug/L)	FAST 16	<1	
CTM47157-1	G	ProcellaCOR/lorpyrauxifen-benzyl (ug/L)	FAST 16	<1	08/19/2023
		ProcellaCOR acid/lorpyrauxifen (ug/L)	FAST 16	<1	
CTM47158-1	H	ProcellaCOR/lorpyrauxifen-benzyl (ug/L)	FAST 16	<1	08/19/2023
		ProcellaCOR acid/lorpyrauxifen (ug/L)	FAST 16	<1	
CTM47159-1	I	ProcellaCOR/lorpyrauxifen-benzyl (ug/L)	FAST 16	<1	08/19/2023
		ProcellaCOR acid/lorpyrauxifen (ug/L)	FAST 16	<1	
CTM47160-1	DS	ProcellaCOR/lorpyrauxifen-benzyl (ug/L)	FAST 16	<1	08/19/2023
		ProcellaCOR acid/lorpyrauxifen (ug/L)	FAST 16	<1	

ANALYSIS STATEMENTS:

SAMPLE RECEIPT /HOLDING TIMES: All samples arrived in an acceptable condition and were analyzed within prescribed holding times in accordance with the SRTC Laboratory Sample Receipt Policy unless otherwise noted in the report.

PRESERVATION: Samples requiring preservation were verified prior to sample analysis and any qualifiers will be noted in the report.

QA/QC CRITERIA: All analyses met method criteria, except as noted in the report with data qualifiers.

COMMENTS: No significant observations were made unless noted in the report.

MEASUREMENT UNCERTAINTY: Uncertainty of measurement has been determined and is available upon request.

Laboratory Information

Date / Time Received: 08/22/23 11:00 AM

Date Results Sent: Thursday, August 24, 2023

Disclaimer: The results listed within this Laboratory Report relate only to the samples tested in the laboratory. The analyses contained in this report were performed in accordance with the applicable certifications as noted. All soil samples are reported on a dry weight basis unless otherwise noted in the report. This Laboratory Report is confidential and is intended for the exclusive use of SRTC Laboratory and its client. This report shall not be reproduced, except in full, without written permission from SRTC Laboratory. The Chain of Custody is included and is an essential component of this report.

This entire report was reviewed and approved for release.



Reviewed By: Laboratory Supervisor

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