10 Hemingway Drive, 2nd Fl.
East Providence, RI 02915

T 401.434.5560
TRCcompanies.com

August 25, 2023

Revised: September 26, 2023
November 7, 2023

Laura Russell
Lake Massapoag Advisory Committee
90 South Main Street
Sharon, Massachusetts 02067

Re: ***Low Dose Alum Treatment Monitoring Report***
South Cove of Lake Massapoag
Sharon, Massachusetts
TRC Project No. 556559.0000.0000

Dear Ms. Russell,

TRC Environmental Corporation (TRC), provides the Lake Massapoag Advisory Committee ("LMAC", the Client) with this summary report of the 2023 alum treatment program at Lake Massapoag in Sharon, Massachusetts. The purpose of the alum treatment was to reduce the availability of phosphorus in the lake and to prevent blooms of potentially toxigenic cyanobacteria in the South Cove and areas adjacent to the Everwood Day Campgrounds.

TRC was contracted to provide monitoring of water quality in accordance with Special Condition No. 11 of the Amended Order of Conditions (DEP File No. SE-280-0425) and the Massachusetts Natural Heritage and Endangered Species Program (NHESP) Determination Letter, dated June 23, 2023. This report is intended to serve as documentation of the key monitoring provided by TRC immediately prior to and during implementation of the July 26, 2023 alum application at Lake Massapoag. Additionally, this report includes the initial post-treatment monitoring results collected by TRC.

Permits Obtained

Prior to the start of the alum treatment at Lake Massapoag, the project received the following permits, licenses, or approvals:

- Amended Order of Conditions (File #SE-280-0425) issued in June 2023.
- MESA Determination Letter (NHESP Tracking No. 02-10499) issued on June 23, 2023.
- License to Apply Chemicals (License No. WM04-0001307) from the Massachusetts Department of Environmental Protection for the application of alum and sodium aluminate to Lake Massapoag.

TRC conducting pre-treatment water quality sampling prior to the start of alum treatment on July 26, 2023.

Project Implementation

Water & Wetland LLC (Water & Wetland) served as the chemical applicator under direct contract with the Client. Following initial project staging on Everwood Day Campgrounds adjacent to the lake, aluminum sulfate (alum) and sodium aluminate were applied to the lake from separate boat-mounted tanks over a period of approximately four hours, with a two hour pause in the middle. Water & Wetland reported that the final volume of treatment over

the course of the program was approximately 1,500 gallons of aluminum sulfate and 750 gallons of sodium aluminate which was consistent with the South Cove low dose treatment plan (Table 1). The areal aluminum dose rate is 8.8 grams Al/m^2.

Table 1. Alum and Sodium Aluminate Applied to Lake Massapoag on July 26, 2023

Units	Aluminum Sulfate	Sodium Aluminate
Gallons	1,500	750
Lbs per Gallon	11.09	12.6
Lbs	16,635	9,450
% Aluminum (Al)	4.4	10
Pounds of Aluminum	732	945

Water Quality Monitoring

Methods

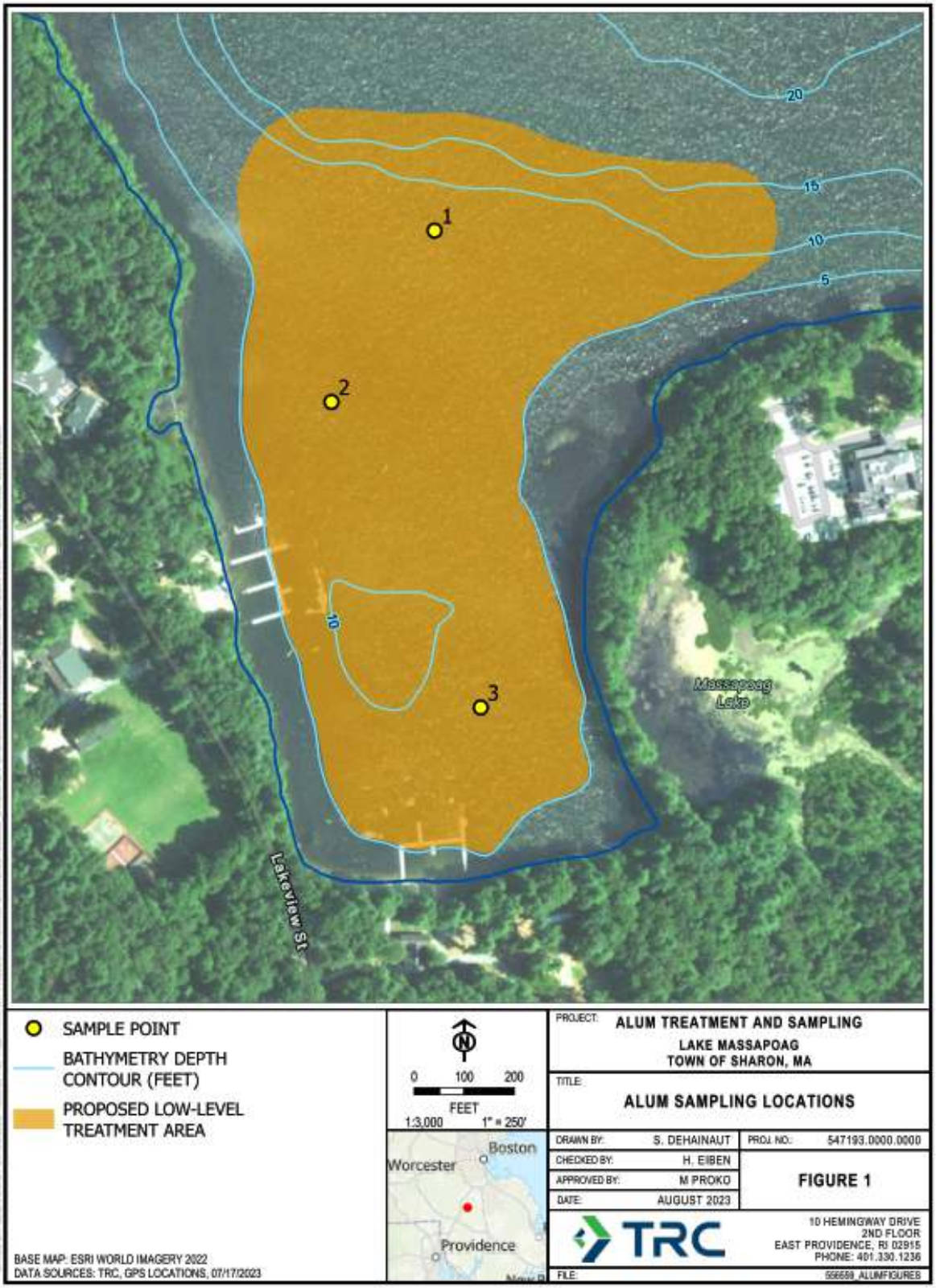
One June 26, 2023, TRC completed comprehensive monitoring events prior to the commencement of alum treatment. One round of pre-treatment water quality monitoring was completed in Lake Massapoag at three sampling locations 1, 2, and 3 (Figure 1).

During the treatment, TRC recorded pH levels at various locations and depths in the lake, and areas inside the active treatment zone. These pH measurements were collected during the entirety of active treatment.

TRC also completed a comprehensive post-treatment water quality monitoring event following the conclusion of the alum treatment, at the same locations, the next morning on June 27, 2023.

Flocculant is evident as whitish cloud below the surface during the alum treatment.

During the pre- and post-treatment water quality monitoring event, TRC measured the following water quality parameters in the field: water temperature, dissolved oxygen, specific conductance, pH, and Secchi disk depth. TRC also collected pre- and post-treatment water samples at the three locations for laboratory analysis of the following parameters: alkalinity, total phosphorus, chlorophyll A, and phytoplankton.


20
15
10
5
1
2
3
10
Massapoag Lake
Lakeview St
SAMPLE POINT
BATHYMETRY DEPTH CONTOUR (FEET)
PROPOSED LOW-LEVEL TREATMENT AREA
BASE MAP: ESRI WORLD IMAGERY 2022
DATA SOURCES: TRC, GPS LOCATIONS, 07/17/2023
0 100 200
FEET
1:3,000 1" = 250'
Boston
Worcester
Providence
PROJECT: ALUM TREATMENT AND SAMPLING
LAKE MASSAPOAG
TOWN OF SHARON, MA
TITLE: ALUM SAMPLING LOCATIONS
DRAWN BY: S. DEHAINAUT
CHECKED BY: H. EIBEN
APPROVED BY: M PROKO
DATE: AUGUST 2023
PROJ. NO.: 547193.0000.0000
FIGURE 1
TRC
10 HEMINGWAY DRIVE
2ND FLOOR
EAST PROVIDENCE, RI 02915
PHONE: 401.330.1236
FILE: 556559_ALUMFIGURES

Results

During Treatment Monitoring

Water & Wetland applying the treatment on July 26, 2023.

The first pass of the treatment was located near the beach to the south of the cove where the treatment vessel traversed orientated West to East multiple times. After this first pass, TRC staff noticed pH levels drastically dropping as low as 4.64 in some areas, well below the permitted operating range for pH (i.e., 6.5 SU to 7.7 SU). TRC's understanding from communication with Water & Wetland in the field is that they adjusted their dosages (i.e. increasing sodium aluminate ratio to alum) after the first pass. TRC observed Water & Wetland move to a deeper part of the treatment area, closer to the lake center, for a second pass of treatment. After one more pass by Water & Wetland, pH levels were as low as 4.8-5.6 SU in some of the profiles collected by TRC. At this point, TRC observed biological stress in the center of the cove, as multiple small fish (later identified as yellow perch) started coming to the surface. About an hour after the treatment had started, Water & Wetland paused active treatment at approximately 4:30 pm while TRC contacted the client to relay observations and confer on preferred course of action.

During discussions with the client, TRC continued to monitor pH and biological activity in the treatment area. TRC continued to note signs of biological stress and pH readings below the threshold. The pH values began rising around 6:00 pm and, in consultation with TRC and Water & Wetland, the client allowed the treatment to continue at a lower ratio of alum to sodium aluminate, with the intent of raising pH levels back into the permitted range. Water & Wetland began treating again at 6:30 pm and continued until the treatment was complete at around 7:30 pm. The pH values during this time stayed within the permitted pH operating range. Towards the end of the treatment, about 7:15 pm, pH readings were about 7.2 SU in the southern part of the cove near the beach. Refer to Table 2 for a summary of the measured pH values, inclusive of all depths. Field notes that document the pH measurements during the treatment, including locations, times, and depths, are included in Attachment A.

Table 2. Maximum, Minimum and Median pH Observed during Alum Treatment

Maximum pH (SU)	Minimum pH (SU)	Median pH (SU)
7.75	4.12	6.96

Pre and Post-Treatment Monitoring

Overall, the post-treatment field measurements were consistent with the values recorded during the pre-treatment field measurements. The Secchi depth appeared to slightly decrease between the pre-treatment field measurements and the post-treatment field measurements at locations 1. The decrease in water clarity at location 1 may have been caused by strong winds at the time of the post-treatment measurements. However, this was expected to be temporary with improvement anticipated going forward. Secchi depth at locations 2 and 3 were either the same or increased from the pre- to post-treatment measurements (Table 3).

The post-treatment pH levels remained low in the lake (as seen in Tables 4 through 6), at around 5.99 SU between the three sampling locations. The other field-measured parameters (dissolved oxygen and specific conductance)

were relatively similar between the pre- and post-treatment results (Tables 3 through 6), suggesting no meaningful impact of the treatment on those parameters.

On the morning of July 27, TRC staff observed several dead fish, all young-of-year yellow perch, that washed up on the shoreline of Everwood Day Campgrounds during post-treatment sampling.

Table 3. Pre- and Post-treatment Comprehensive Monitoring Field Results

Parameter	Units	Pre-treatment Location 1	Pre-treatment Location 2	Pre-treatment Location 3	Post-treatment Location 1	Post-treatment Location 2	Post-treatment Location 3
Temperature*	°C	28.3	28.4	28.7	26.5	26.6	26.5
DO*	mg/L	7.10	7.41	6.83	7.31	6.96	6.69
	%	91.45	95.8	88.7	90.6	86.8	83.3
Specific conductance*	(µS/cm)	174.0	172.1	170.3	172.7	172.4	182.2
pH*	(SU)	7.19	6.88	6.75	6.86	6.22	6.19
Secchi disk depth	m	2.5	1.5	1.0	2.0	1.5	1.5
Total depth	m	3.25	1.8	1.5	3	1.8	1.5

*Measured 0.5 m below water surface

Table 4. Pre- and Post-treatment Temperature and Dissolved Oxygen Profiles at Location 1

Depth (m)	Pre-treatment					Post-treatment				
	Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	Spec Cond (µS/cm)	pH (SU)	Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	Spec Cond (µS/cm)	pH
0.5	28.3	7.10	91.4	174.0	7.19	26.5	7.31	90.6	172.7	6.06
1.0	27.9	7.04	90.1	173.8	7.14	26.5	7.22	89.8	172.7	6.34
1.5	27.7	7.17	91.2	173.7	7.05	26.5	7.14	88.8	173.2	6.05
2.0	27.2	7.03	89.3	173.5	7.04	26.5	7.24	89.1	173.6	5.95
2.5	26.6	7.00	87.5	172.1	6.68	26.5	7.04	87.9	174.4	5.93
3.0	26.5	6.83	84.8	167.2	6.67					

Table 5. Pre- and Post-treatment Temperature and Dissolved Oxygen Profiles at Location 2

Depth (m)	Pre-treatment					Post-treatment				
	Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	Spec Cond (µS/cm)	pH (SU)	Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	Spec Cond (µS/cm)	pH (SU)
0.5	28.4	7.41	95.8	172.1	6.88	26.6	6.96	86.8	172.4	6.22
1.0	27.5	7.01	88.5	168.3	6.62	26.6	6.78	84.5	174.4	6.09
1.5	26.5	6.67	83.1	165.7	6.49	26.5	7.14	88.4	177.4	6.04

Table 6. Pre- and Post-treatment Temperature and Dissolved Oxygen Profiles at Location 3

Depth (m)	Pre-treatment					Post-treatment				
	Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	Spec Cond (µS/cm)	pH (SU)	Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	Spec Cond (µS/cm)	pH (SU)
0.5	28.7	6.83	88.7	170.3	6.75	26.5	6.69	83.3	182.2	6.19
1.0	27.5	6.55	82.5	167.5	6.42	26.1	6.33	78.3	177.8	6.04

Laboratory results at the three monitoring locations were relatively consistent between the pre- and post-treatment water samples (Table 7). Alkalinity slightly decreased from the pre- to the post-treatment samples except at location 3, which increased. Overall, alkalinity values generally stayed consistent from pre- to post-treatment (ranging from 9.9 to 11.6 mg/L), indicating that alkalinity in the lake rebounded quickly and did not experience a significant or prolonged decline as a result of the alum treatment. Similar to alkalinity, total phosphorus slightly decreased from the pre- to the post-treatment samples except alkalinity at location 3, which increased. However, it is likely that total phosphorus will continue to decrease with time, as more of the flocculent settled out of the water column, taking the bound phosphorus with it. Chlorophyll A was not extreme anywhere. However, it was higher post-treatment at locations 1 and 2. Chlorophyll A test methodology does not distinguish between active pigment and pheophytin (a breakdown product), so some portion of this could be “inactive” pigment. This could mean that portions of the Chlorophyll A concentrations could include pigment from dead algae. Laboratory reports are included in Attachment B.

Table 7. Pre- and Post-treatment Comprehensive Monitoring Lab Results

Analyte	Units	Pre-treatment Location 1	Pre-treatment Location 2	Pre-treatment Location 3	Post treatment Location 1	Post treatment Location 2	Post treatment Location 3
Alkalinity	mg/L	10.2	11.1	10.6	10.1	9.9	11.6
Total Phosphorus	mg/L	0.016	0.014	0.019	0.013	0.011	0.013
Chlorophyll-A	mg/m3	2.78	3.31	3.51	4.84	4.13	3.41

Phytoplankton samples were also taken during pre- and post- treatment monitoring at all three sampling locations. Sub-bloom levels of cyanobacteria were present in both the pre- and post-treatment phytoplankton samples. Some of the species observed are potential toxin producers (e.g., *Microcystis aeruginosa, Dolichospermum (Anabaena)* spp). They were present at several hundred to a few thousand cells per mL, which is well below the state recreational advisory guidance (70,000 cells/mL). The phytoplankton laboratory data are included in Attachment C.

After post-treatment measurements were conducted in the treatment area, TRC took pH readings outside of the treatment area, closer to the center of Lake Massapoag, to compare pH values (Table 8). pH readings at depth towards the center of the lake ranged from 5.92 SU to 6.26 SU, indicating lower pH levels outside the treatment area on the morning of July 27th.

Table 8. Post-treatment Monitoring in a Non-Treatment Area

Depth (m)	pH (SU)
0.5	6.18
1.0	6.20
1.5	6.26
2.0	6.25
2.5	6.24
3.0	5.92
3.5	5.92

Recommendations for Future Treatments

Should the client wish to pursue future low dose alum applications to the lake, TRC recommends performing the treatment earlier in the summer when the water temperature in the lake is cooler. The client has indicated that in previous summers, the fish community at Lake Massapoag tends to show temperature-related signs of stress. It is likely that warmer water temperatures may have already been placing a stress on the aquatic community prior to the alum treatment. Applications planned for late June may reduce the impacts to the biological community. Results from a June treatment paired with observations of the lakes condition and summer weather patterns can be used to inform whether another treatment in late July or early August would be appropriate.

TRC also recommends applying alum to a small-scale area as a “test run” prior to future treatments, preferably the day of the treatment when water conditions are most similar. This would allow the contractor to adjust the ratio of alum and sodium aluminate accordingly before proceeding with the full treatment. Extensive pH monitoring should continue to occur prior to, during, and post-treatment to identify areas where the pH may be out of range.

Finally, TRC recommends a more thorough bathymetric survey of the treatment area to ensure that dosage volumes are calculated accurately and that treatment areas are not occurring in areas shallower than five feet, in order to remain in compliance with the MESA Determination Letter.

Sincerely,

TRC Environmental Corporation

Morgan Proko

Morgan Proko
Staff Scientist

Attachment A: During Treatment Field Notes

404 Wyman Street, Ste. 375
Waltham, MA 02451
T 781.419.7696
TRCcompanies.com

In-Treatment pH Monitoring:

Timeline

1300: Morgan Proko and Sophia Mottola (TRC) arrive on Site for pre-treatment sampling.

1445: Colin and Grace (Water & Wetland, W&W) arrive on Site.

1520: Alum treatment of South Cove begins with first pass of treatment. W&W targets area closer to southern end of cove by beaches.

1605: Initial readings are low (see below). Morgan notifies TRC and communicates with W&W of the low readings. Colin states he will make adjustments. W&W returns to fill up boat and perform a second pass of treatment. Morgan continues to monitor pH during the second pass.

1630: Numbers still low after W&W adjustment. Five small fish observed in center of the lake, floating near the surface. Treatment Stops.

1630-1830: Treatment on pause while discussions with W&W and the client occur. TRC continues to monitor pH.

1730: TRC field staff observe additional small fish in the center of the cove.

1800: TRC meets with Laura and Josh. Client decides to pursue treatment. W&W adjusts ratios again.

1830: Treatment resumes. Monitoring within range for remainder of treatment (see below).

1930: Treatment ends.

pH Readings

Sample Time: 1535	**Location: Near the beaches, first pass**
Depth (m)	**pH**
0.5	7.05
1	5.66
1.5	5.74
2	5.95
2.5	5.54
Total Depth= 2.6	

Sample Time: 1610	**Location: Near the beaches, second pass.**
Depth (m)	**pH**
0.5	6.42
1	4.64
1.5	5.5
Total Depth= 1.5	

Sample Time: 1615	Location: Close to center of cove, second pass
Depth (m)	**pH**
0.5	4.12
1	4.23
Total Depth= 1.5	

Sample Time: 1630	Location: Close to center of cove, second pass
Depth (m)	**pH**
0.5	5.65
1	4.8
1.5	5.6
Total Depth= 1.5	

Sample Time: 1710	Location: Close to center of cove, while treatment stopped.		
Depth (m)	**pH**	**DO (mg/L)**	**DO (%)**
0.5	7.05	7.24	92.3
1	6.75	7.21	91.7
Total Depth= 1.5			

Sample Time: 1715	Location: Center of cove, while treatment stopped.		
Depth (m)	**pH**	**DO (mg/L)**	**DO (%)**
0.5	6.6	6.72	75.5
1	7.0	6.04	75.6
Total Depth= 1.2			

Sample Time: 1830	Location: Center of cove, treatment resumes.
Depth (m)	**pH**
0.5	7.75
1	7.18
Total Depth= 1.5	

Sample Time: 1835	Location: Center of cove
Depth (m)	**pH**
0.5	7.18
1	7.44
Total Depth= 1.5	

Sample Time: 1845	Location: Center of cove
Depth (m)	**pH**
0.5	6.92
1	6.92
Total Depth= 1.2	

Sample Time: 1855	Location: Closer to Location 3
Depth (m)	**pH**
0.5	7.56
1	7.20
Total Depth= 1.5	

Sample Time: 1913	Location: Closer to Location 3
Depth (m)	**pH**
0.5	7.7
1	7.65
Total Depth= 1.5	

Sample Time: 1925	Location: Closer to Location 3
Depth (m)	**pH**
0.5	7.01
Total Depth= 1.5	

Attachment B: Laboratory Reports

PHOENIX
Environmental Laboratories, Inc.

Thursday, August 03, 2023

Attn: Margaret O'Brien
ESS Group Inc. A TRC Company
10 Hemingway Drive 2nd Floor
Riverside, RI 02915-2224

Project ID: LAKE MASSAPOAG
SDG ID: GCO61701
Sample ID#s: CO61701 - CO61706

This laboratory is in compliance with the NELAC requirements of procedures used except where indicated.

This report contains results for the parameters tested, under the sampling conditions described on the Chain Of Custody, as received by the laboratory. This report is incomplete unless all pages indicated in the pagination at the bottom of the page are included.

A scanned version of the COC form accompanies the analytical report and is an exact duplicate of the original.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200. The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Sincerely yours,

Phyllis Shiller
Laboratory Director

NELAC - #NY11301
CT Lab Registration #PH-0618
MA Lab Registration #M-CT007
ME Lab Registration #CT-007
NH Lab Registration #213693-A,B
NJ Lab Registration #CT-003
NY Lab Registration #11301
PA Lab Registration #68-03530
RI Lab Registration #63
VT Lab Registration #VT11301

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Sample Id Cross Reference

August 03, 2023

SDG I.D.: GCO61701

Project ID: LAKE MASSAPOAG

Client Id	Lab Id	Matrix
MASS-1-PRE	CO61701	SURFACE WATER
MASS-2-PRE	CO61702	SURFACE WATER
MASS-3-PRE	CO61703	SURFACE WATER
MASS-1-POST	CO61704	SURFACE WATER
MASS-2-POST	CO61705	SURFACE WATER
MASS-3-POST	CO61706	SURFACE WATER

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

August 03, 2023

FOR: Attn: Margaret O'Brien
ESS Group Inc. A TRC Company
10 Hemingway Drive 2nd Floor
Riverside, RI 02915-2224

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		07/26/23	13:50
Location Code:	TRC-RI	Received by:	CP	07/28/23	17:51
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCO61701
Phoenix ID: CO61701

Project ID: LAKE MASSAPOAG
Client ID: MASS-1-PRE

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Alkalinity-CaCO3	10.2	5.00	mg/L	1	07/29/23	MW/KDB	SM2320B-11
Phosphorus, as P	0.016	0.003	mg/L	0.5	08/02/23	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Phyllis Shiller, Laboratory Director
August 03, 2023
Reviewed and Released by: Anil Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

August 03, 2023

FOR: Attn: Margaret O'Brien
ESS Group Inc. A TRC Company
10 Hemingway Drive 2nd Floor
Riverside, RI 02915-2224

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		07/26/23	14:10
Location Code:	TRC-RI	Received by:	CP	07/28/23	17:51
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCO61701
Phoenix ID: CO61702

Project ID: LAKE MASSAPOAG
Client ID: MASS-2-PRE

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Alkalinity-CaCO3	11.1	5.00	mg/L	1	07/29/23	MW/KDB	SM2320B-11
Phosphorus, as P	0.014	0.003	mg/L	0.5	08/02/23	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller, Laboratory Director
August 03, 2023
Reviewed and Released by: Anil Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

August 03, 2023

FOR: Attn: Margaret O'Brien
ESS Group Inc. A TRC Company
10 Hemingway Drive 2nd Floor
Riverside, RI 02915-2224

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		07/26/23	14:20
Location Code:	TRC-RI	Received by:	CP	07/28/23	17:51
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCO61701
Phoenix ID: CO61703

Project ID: LAKE MASSAPOAG
Client ID: MASS-3-PRE

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Alkalinity-CaCO3	10.6	5.00	mg/L	1	07/29/23	MW/KDB	SM2320B-11
Phosphorus, as P	0.019	0.003	mg/L	0.5	08/02/23	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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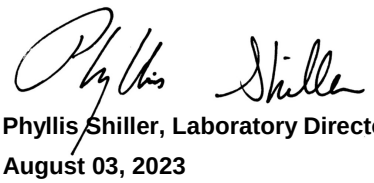

Phyllis Shiller, Laboratory Director
August 03, 2023
Reviewed and Released by: Anil Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

August 03, 2023

FOR: Attn: Margaret O'Brien
ESS Group Inc. A TRC Company
10 Hemingway Drive 2nd Floor
Riverside, RI 02915-2224

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		07/27/23	10:00
Location Code:	TRC-RI	Received by:	CP	07/28/23	17:51
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCO61701
Phoenix ID: CO61704

Project ID: LAKE MASSAPOAG
Client ID: MASS-1-POST

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Alkalinity-CaCO3	10.1	5.00	mg/L	1	07/29/23	MW/KDB	SM2320B-11
Phosphorus, as P	0.013	0.003	mg/L	0.5	08/02/23	LG	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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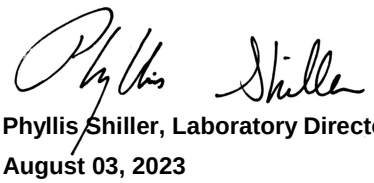

Phyllis Shiller, Laboratory Director
August 03, 2023
Reviewed and Released by: Anil Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

August 03, 2023

FOR: Attn: Margaret O'Brien
ESS Group Inc. A TRC Company
10 Hemingway Drive 2nd Floor
Riverside, RI 02915-2224

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		07/27/23	10:15
Location Code:	TRC-RI	Received by:	CP	07/28/23	17:51
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCO61701
Phoenix ID: CO61705

Project ID: LAKE MASSAPOAG
Client ID: MASS-2-POST

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Alkalinity-CaCO3	9.9	5.00	mg/L	1	07/29/23	MW/KDB	SM2320B-11
Phosphorus, as P	0.011	0.003	mg/L	0.5	08/02/23	LG	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Phyllis Shiller, Laboratory Director
August 03, 2023
Reviewed and Released by: Anil Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

August 03, 2023

FOR: Attn: Margaret O'Brien
ESS Group Inc. A TRC Company
10 Hemingway Drive 2nd Floor
Riverside, RI 02915-2224

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		07/27/23	10:25
Location Code:	TRC-RI	Received by:	CP	07/28/23	17:51
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCO61701
Phoenix ID: CO61706

Project ID: LAKE MASSAPOAG
Client ID: MASS-3-POST

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Alkalinity-CaCO3	11.6	5.00	mg/L	1	07/29/23	MW/KDB	SM2320B-11
Phosphorus, as P	0.013	0.003	mg/L	0.5	08/02/23	LG	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller, Laboratory Director
August 03, 2023
Reviewed and Released by: Anil Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102

QA/QC Report

August 03, 2023

QA/QC Data

SDG I.D.: GCO61701

Parameter	Blank	Blk RL	Sample Result	Dup Result	Dup RPD	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
QA/QC Batch 689915 (mg/L), QC Sample No: CO61174 (CO61701, CO61702, CO61703)													
Phosphorus, as P	BRL	0.01	0.097	0.100	3.00	98.1			106			85 - 115	20
Comment:													
Additional criteria matrix spike acceptance range is 75-125%.													
QA/QC Batch 689295 (mg/L), QC Sample No: CO61410 (CO61701, CO61702, CO61703, CO61704, CO61705, CO61706)													
Alkalinity-CaCO3	BRL	5.00	407	396	2.70	92.7						85 - 115	20
QA/QC Batch 689955 (mg/L), QC Sample No: CO62062 (CO61704, CO61705, CO61706)													
Phosphorus, as P	BRL	0.01	2.01	1.89	6.20	96.3			115			85 - 115	20
Comment:													
Additional criteria matrix spike acceptance range is 75-125%.													

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

RPD - Relative Percent Difference
LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample Duplicate
MS - Matrix Spike
MS Dup - Matrix Spike Duplicate
NC - No Criteria
Intf - Interference

Phyllis Shiller, Laboratory Director
August 03, 2023

Thursday, August 03, 2023

Criteria: None

State: CT

Sample Criteria Exceedances Report

GCO61701 - TRC-RI

SampNo	Acode	Phoenix Analyte	Criteria	Result	RL	Criteria	RL Criteria	Analysis Units

*** No Data to Display ***

Phoenix Laboratories does not assume responsibility for the data contained in this exceedance report. It is provided as an additional tool to identify requested criteria exceedences. All efforts are made to ensure the accuracy of the data (obtained from appropriate agencies). A lack of exceedence information does not necessarily suggest conformance to the criteria. It is ultimately the site professional's responsibility to determine appropriate compliance.

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

Analysis Comments

August 03, 2023 SDG I.D.: GCO61701

The following analysis comments are made regarding exceptions to criteria not already noted in the Analysis Report or QA/QC Report: None.

Cooler: Yes ☐ No ☐
Coolant: IPK ☐ ICE ☐ No ☐
Temp 2.0 °C Pg of

PHOENIX
Environmental Laboratories, Inc.

CT/MA/RI CHAIN OF CUSTODY RECORD

587 East Middle Turnpike, P.O. Box 370, Manchester, CT 06040
Email: makrina@phoenixlabs.com Fax (860) 645-0823
Client Services (860) 645-1102

Data Delivery/Contact Options:
☐ Fax:
☐ Phone:
☑ Email: mobrien@trccompanies.com

Customer: TRC
Address: 10 Hemenway Dr
E. Providence, RI

Project: Lake Massapoag
Report to: Margaret OBrien
Invoice to:
Quote #

Project P.O:

This section MUST be completed with Bottle Quantities.

Sampler's Signature
Client Sample - Information - Identification
Date: 7/27/23

Matrix Code:
DW=Drinking Water **GW**=Ground Water **SW**=Surface Water **WW**=Waste Water
RW=Raw Water **SE**=Sediment **SL**=Sludge **S**=Soil **SD**=Solid **W**=Wipe **OIL**=Oil
B=Bulk **L**=Liquid **X** = _____(Other)

PHOENIX USE ONLY SAMPLE #	Customer Sample Identification	Sample Matrix	Date Sampled	Time Sampled	*MS/MSD (May be billable at analysis unit rate)	Total Phos	alkalinity
61701	Mass-1-Pre	SW	7/26	1350	✓	✓	✓
61702	Mass-2-Pre	SW	7/26	1410	✓	✓	✓
61703	Mass-3-Pre	SW	7/26	1420	✓	✓	✓
61704	Mass-1-Post	SW	7/27	1000	✓	✓	✓
61705	Mass-2-Post	SW	7/27	1015	✓	✓	✓
61706	Mass-3-Post	SW	7/27	1025	✓	✓	✓

GL Amber 8 oz. [ ] w/H_3PO_4 [ ] $NAHSO_4$	Soil VOA Vials [ ] methanol [ ] H_2O	GL Soil container ( ) oz	GL Soil container ( ) oz	40 ml VOA Vial [ ] As is [ ] HCl	GL Amber 1000ml [ ] As is [ ] H_2SO_4	PL As is	PL H_2SO_4	PL HNO_3 250ml	PL NaOH 250ml	Bacteria Bottle w/thio	Bacteria Bottle as is
						1	1				
						1	1				
						1	1				
						1	1				
						1	1				
						1	1				

Relinquished by:	Accepted by:	Date:	Time:
		7-28-23	930
		7/28/23	17:51

Comments, Special Requirements or Regulations:
* low detect OA phos
-0.01 mg/L or better

Turnaround Time:
☐ 1 Day* ☐ 2 Days* ☐ 3 Days* ☐ 4 Days* ☐ 5 Days*
☑ Standard ☐ Other _____

RI
☐ RES DEC
☐ I/C DEC
☐ GA Leachability
☐ GB Leachability
☐ GA -GW Objectives
☐ GB -GW Objectives
☐ Other

CT
☐ RCP Cert
☐ GWPC
☐ SWPC
☐ GA PMC
☐ GB PMC
☐ SWPC
☐ RES DEC
☐ I/C DEC

MA
☐ MCP Certification
☐ GW-1 ☐ RCS-1 / RCGW-1
☐ GW-2 ☐ RCS-2 / RCGW-2
☐ GW-3
☐ S-1
☐ S-2
☐ S-3
☐ SW Protection
☐ _____

Data Format
☑ Excel
☑ PDF
☐ GIS/Key
☐ EQuIS
☐ Other

Data Package
☐ Tier II Checklist*
☐ Full Data Package*
☐ Phoenix Std
☐ Other

***MS/MSD are considered site samples and will be billed as such in accordance with the prices quoted.**

*** SURCHARGES MAY APPLY**

State where samples were collected: MA

*** SURCHARGE APPLIES**

Form PEL126 Rev. 1/23

ANALYTICAL REPORT

Lab Number:	L2343267
Client:	TRC Companies, Inc. 404 Wyman St. Suite 375 Waltham, MA 02451
ATTN:	Margaret O'Brien
Phone:	(781) 419-7704
Project Name:	LAKE MASSAPOAG ALUM
Project Number:	556559.0000.0000
Report Date:	08/10/23

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0826), IL (200077), IN (C-MA-03), KY (KY98045), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), OH (CL108), OR (MA-1316), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #525-23-122-91930).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com

Project Name: LAKE MASSAPOAG ALUM
Project Number: 556559.0000.0000

Lab Number: L2343267
Report Date: 08/10/23

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2343267-01	MASS-1-POST	WATER	SHARON, MA	07/27/23 10:00	07/27/23
L2343267-02	MASS-2-POST	WATER	SHARON, MA	07/27/23 10:15	07/27/23
L2343267-03	MASS-3-POST	WATER	SHARON, MA	07/27/23 10:25	07/27/23

Project Name:	LAKE MASSAPOAG ALUM	**Lab Number:**	L2343267
Project Number:	556559.0000.0000	**Report Date:**	08/10/23

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:  Ashaley Moynihan

Title: Technical Director/Representative Date: 08/10/23

INORGANICS
&
MISCELLANEOUS

Project Name: LAKE MASSAPOAG ALUM
Project Number: 556559.0000.0000

Lab Number: L2343267
Report Date: 08/10/23

SAMPLE RESULTS

Lab ID: L2343267-01
Client ID: MASS-1-POST
Sample Location: SHARON, MA

Date Collected: 07/27/23 10:00
Date Received: 07/27/23
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chlorophyll A	4.84		mg/m3	2.00	NA	1	07/28/23 06:45	07/31/23 13:45	121,10200H	LOF

Project Name: LAKE MASSAPOAG ALUM
Project Number: 556559.0000.0000

Lab Number: L2343267
Report Date: 08/10/23

SAMPLE RESULTS

Lab ID: L2343267-02
Client ID: MASS-2-POST
Sample Location: SHARON, MA

Date Collected: 07/27/23 10:15
Date Received: 07/27/23
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chlorophyll A	4.13		mg/m3	2.00	NA	1	07/28/23 06:45	07/31/23 13:45	121,10200H	LOF

Project Name: LAKE MASSAPOAG ALUM
Project Number: 556559.0000.0000

Lab Number: L2343267
Report Date: 08/10/23

SAMPLE RESULTS

Lab ID: L2343267-03
Client ID: MASS-3-POST
Sample Location: SHARON, MA

Date Collected: 07/27/23 10:25
Date Received: 07/27/23
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chlorophyll A	3.41		mg/m3	2.00	NA	1	07/28/23 06:45	07/31/23 13:45	121,10200H	LOF

Project Name: LAKE MASSAPOAG ALUM
Project Number: 556559.0000.0000
Lab Number: L2343267
Report Date: 08/10/23

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01-03 Batch: WG1808866-1										
Chlorophyll A	ND		mg/m3	2.00	NA	1	07/28/23 06:45	07/31/23 13:45	121,10200H	LOF

Lab Duplicate Analysis

Batch Quality Control

Project Name: LAKE MASSAPOAG ALUM

Project Number: 556559.0000.0000

Lab Number: L2343267

Report Date: 08/10/23

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1808866-2 QC Sample: L2343347-05 Client ID: DUP Sample						
Chlorophyll A	ND	2.01	mg/m3	NC		35

Project Name: LAKE MASSAPOAG ALUM
Project Number: 556559.0000.0000

Lab Number: L2343267
Report Date: 08/10/23

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2343267-01A	Brown Plastic 1000ml unpreserved	A	NA		3.4	Y	Absent		CHLORO-A(1)
L2343267-01B	Brown Plastic 1000ml unpreserved	A	NA		3.4	Y	Absent		CHLORO-A(1)
L2343267-02A	Brown Plastic 1000ml unpreserved	A	NA		3.4	Y	Absent		CHLORO-A(1)
L2343267-02B	Brown Plastic 1000ml unpreserved	A	NA		3.4	Y	Absent		CHLORO-A(1)
L2343267-03A	Brown Plastic 1000ml unpreserved	A	NA		3.4	Y	Absent		CHLORO-A(1)
L2343267-03B	Brown Plastic 1000ml unpreserved	A	NA		3.4	Y	Absent		CHLORO-A(1)

*Values in parentheses indicate holding time in days

Project Name:	LAKE MASSAPOAG ALUM	**Lab Number:**	L2343267
Project Number:	556559.0000.0000	**Report Date:**	08/10/23

GLOSSARY

Acronyms

DL - Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

EDL - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).

EMPC - Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.

EPA - Environmental Protection Agency.

LCS - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

LFB - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LOD - Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

LOQ - Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

MDL - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

MS - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

NC - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.

NDPA/DPA - N-Nitrosodiphenylamine/Diphenylamine.

NI - Not Ignitable.

NP - Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.

NR - No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.

RL - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

RPD - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.

SRM - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

STLP - Semi-dynamic Tank Leaching Procedure per EPA Method 1315.

TEF - Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.

TEQ - Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.

TIC - Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: Data Usability Report

Project Name:	LAKE MASSAPOAG ALUM	**Lab Number:**	L2343267
Project Number:	556559.0000.0000	**Report Date:**	08/10/23

Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA,this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

J - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

Report Format: Data Usability Report

Project Name:	LAKE MASSAPOAG ALUM	**Lab Number:**	L2343267
Project Number:	556559.0000.0000	**Report Date:**	08/10/23

Data Qualifiers

ND - Not detected at the reporting limit (RL) for the sample.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

V - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Z - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Report Format: Data Usability Report

Project Name:	LAKE MASSAPOAG ALUM	**Lab Number:**	L2343267
Project Number:	556559.0000.0000	**Report Date:**	08/10/23

REFERENCES

121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624.1: m/p-xylene, o-xylene, Naphthalene
EPA 625.1: alpha-Terpineol
EPA 8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270E: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**
EPA 524.2: THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N**, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables).
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522, EPA 537.1.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb**,** As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

CHAIN OF CUSTODY

PAGE _____ OF _____

ALPHA ANALYTICAL
WESTBORO, MA TEL: 508-898-9220 FAX: 508-898-9193
MANSFIELD, MA TEL: 508-822-9300 FAX: 508-822-3288

Date Rec'd in Lab: 7/27/23

ALPHA Job #: L2343267

Client Information

Client: TRC
Address: 404 Wyman St Suite 375 Waltham, MA 02451
Phone: 781 419 7707
Fax:
Email: mobrien@trcompanies.com
☐ These samples have been previously analyzed by Alpha

Project Information

Project Name: Lake Massapoag Alum
Project Location: Sharon, MA
Project #: 556559.0000.0000
Project Manager: Margaret O'brien
ALPHA Quote #:

Turn-Around Time

☑ Standard ☐ RUSH (only confirmed if pre-approved)
Date Due: Time:

Report Information - Data Deliverables

☐ FAX ☐ EMAIL
☐ ADEx ☐ Add'l Deliverables

Billing Information

☑ Same as Client info PO #:

Regulatory Requirements/Report Limits

State /Fed Program | Criteria

MA MCP PRESUMPTIVE CERTAINTY --- CT REASONABLE CONFIDENCE PROTO

☐ Yes ☐ No Are MCP Analytical Methods Required?
☐ Yes ☐ No Is Matrix Spike (MS) Required on this SDG? (If yes see note in Comments)
☐ Yes ☐ No Are CT RCP (Reasonable Confidence Protocols) Required?

Other Project Specific Requirements/Comments/Detection Limits:

If MS is required, indicate in Sample Specific Comments which samples and what tests MS to be performed.
(Note: All *CAM* methods for inorganic analyses require MS every 20 soil samples)

ANALYSIS: CAM-A

SAMPLE HANDLING
Filtration
☐ Done ☐ Not needed ☐ Lab to do
Preservation
☐ Lab to do (Please specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	CAM-A	Sample Specific Comments	TOTAL # BOTTLES
43267-01	Mass-1-Post	7/27	1000	SW	MP	x		2
-02	Mass-2-Post	7/27	1015	SW	MP	x		2
-03	Mass-3-Post	7/27	1025	SW	MP	x		2

PLEASE ANSWER QUESTIONS ABOVE!

IS YOUR PROJECT MA MCP *or* CT RCP?

	Container Type															
	Preservative															

Relinquished By:	Date/Time	Received By:	Date/Time
	7/27 1210		7/27/23 1210
	7/27/23	AAL	7/27/23 1600

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 18-Jan-2010)

ANALYTICAL REPORT

Lab Number:	L2343158
Client:	TRC Companies, Inc. 404 Wyman St. Suite 375 Waltham, MA 02451
ATTN:	Margaret O'Brien
Phone:	(781) 419-7704
Project Name:	LAKE MASSAPOAG ALUM
Project Number:	556559.0000.0000
Report Date:	08/04/23

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0826), IL (200077), IN (C-MA-03), KY (KY98045), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), OH (CL108), OR (MA-1316), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #525-23-122-91930).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com

Project Name: LAKE MASSAPOAG ALUM
Project Number: 556559.0000.0000

Lab Number: L2343158
Report Date: 08/04/23

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2343158-01	MASS-1-PRE	WATER	SHARON, MA	07/26/23 13:50	07/26/23
L2343158-02	MASS-2-PRE	WATER	SHARON, MA	07/26/23 14:10	07/26/23
L2343158-03	MASS-3-PRE	WATER	SHARON, MA	07/26/23 14:20	07/26/23

Project Name:	LAKE MASSAPOAG ALUM	**Lab Number:**	L2343158
Project Number:	556559.0000.0000	**Report Date:**	08/04/23

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

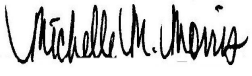
When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:  Michelle M. Morris

Title: Technical Director/Representative Date: 08/04/23

INORGANICS
&
MISCELLANEOUS

Project Name: LAKE MASSAPOAG ALUM
Project Number: 556559.0000.0000

Lab Number: L2343158
Report Date: 08/04/23

SAMPLE RESULTS

Lab ID: L2343158-01
Client ID: MASS-1-PRE
Sample Location: SHARON, MA

Date Collected: 07/26/23 13:50
Date Received: 07/26/23
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chlorophyll A	2.78		mg/m3	2.00	NA	1	07/27/23 07:10	07/28/23 08:30	121,10200H	MKT

Project Name: LAKE MASSAPOAG ALUM
Project Number: 556559.0000.0000

Lab Number: L2343158
Report Date: 08/04/23

SAMPLE RESULTS

Lab ID: L2343158-02
Client ID: MASS-2-PRE
Sample Location: SHARON, MA

Date Collected: 07/26/23 14:10
Date Received: 07/26/23
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chlorophyll A	3.31		mg/m3	2.00	NA	1	07/27/23 07:10	07/28/23 08:30	121,10200H	MKT

Project Name: LAKE MASSAPOAG ALUM
Project Number: 556559.0000.0000

Lab Number: L2343158
Report Date: 08/04/23

SAMPLE RESULTS

Lab ID: L2343158-03
Client ID: MASS-3-PRE
Sample Location: SHARON, MA

Date Collected: 07/26/23 14:20
Date Received: 07/26/23
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chlorophyll A	3.51		mg/m3	2.00	NA	1	07/27/23 07:10	07/28/23 08:30	121,10200H	MKT

Project Name: LAKE MASSAPOAG ALUM
Project Number: 556559.0000.0000
Lab Number: L2343158
Report Date: 08/04/23

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01-03 Batch: WG1808331-1										
Chlorophyll A	ND		mg/m3	2.00	NA	1	07/27/23 07:10	07/28/23 08:30	121,10200H	MKT

Lab Duplicate Analysis

Batch Quality Control

Project Name: LAKE MASSAPOAG ALUM

Project Number: 556559.0000.0000

Lab Number: L2343158

Report Date: 08/04/23

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1808331-2 QC Sample: L2343158-03 Client ID: MASS-3-PRE						
Chlorophyll A	3.51	2.96	mg/m3	17		35

Project Name: LAKE MASSAPOAG ALUM
Project Number: 556559.0000.0000

Lab Number: L2343158
Report Date: 08/04/23

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2343158-01A	Brown Plastic 1000ml unpreserved	A	NA		4.6	Y	Absent		CHLORO-A(1)
L2343158-01B	Brown Plastic 1000ml unpreserved	A	NA		4.6	Y	Absent		CHLORO-A(1)
L2343158-02A	Brown Plastic 1000ml unpreserved	A	NA		4.6	Y	Absent		CHLORO-A(1)
L2343158-02B	Brown Plastic 1000ml unpreserved	A	NA		4.6	Y	Absent		CHLORO-A(1)
L2343158-03A	Brown Plastic 1000ml unpreserved	A	NA		4.6	Y	Absent		CHLORO-A(1)
L2343158-03B	Brown Plastic 1000ml unpreserved	A	NA		4.6	Y	Absent		CHLORO-A(1)

*Values in parentheses indicate holding time in days

Project Name:	LAKE MASSAPOAG ALUM	**Lab Number:**	L2343158
Project Number:	556559.0000.0000	**Report Date:**	08/04/23

GLOSSARY

Acronyms

DL - Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

EDL - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).

EMPC - Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.

EPA - Environmental Protection Agency.

LCS - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

LFB - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LOD - Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

LOQ - Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

MDL - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

MS - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

NC - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.

NDPA/DPA - N-Nitrosodiphenylamine/Diphenylamine.

NI - Not Ignitable.

NP - Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.

NR - No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.

RL - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

RPD - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.

SRM - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

STLP - Semi-dynamic Tank Leaching Procedure per EPA Method 1315.

TEF - Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.

TEQ - Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.

TIC - Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: Data Usability Report

Project Name:	LAKE MASSAPOAG ALUM	**Lab Number:**	L2343158
Project Number:	556559.0000.0000	**Report Date:**	08/04/23

Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA,this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

J - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

Report Format: Data Usability Report

Project Name:	LAKE MASSAPOAG ALUM	**Lab Number:**	L2343158
Project Number:	556559.0000.0000	**Report Date:**	08/04/23

Data Qualifiers

ND - Not detected at the reporting limit (RL) for the sample.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

V - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Z - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Report Format: Data Usability Report

Project Name:	LAKE MASSAPOAG ALUM	**Lab Number:**	L2343158
Project Number:	556559.0000.0000	**Report Date:**	08/04/23

REFERENCES

121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624.1: m/p-xylene, o-xylene, Naphthalene
EPA 625.1: alpha-Terpineol
EPA 8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270E: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**
EPA 524.2: THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N**, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables).
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522, EPA 537.1.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb**,** As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

CHAIN OF CUSTODY

PAGE _____ OF _____

ALPHA ANALYTICAL
WESTBORO, MA TEL: 508-898-9220 FAX: 508-898-9193
MANSFIELD, MA TEL: 508-822-9300 FAX: 508-822-3288

Date Rec'd in Lab: 07/26/23

ALPHA Job #: L2343158

Client Information

Client: TRC
Address: 404 Wyman St Suite 375
Waltham, MA 02451
Phone: 781 419 7707
Fax:
Email: mobren@trcompanies.com
☐ These samples have been previously analyzed by Alpha

Project Information

Project Name: Lake Massapoag Alum
Project Location: Sharon, MA
Project #: 356559.0000.0000
Project Manager: Margaret OBrien
ALPHA Quote #:

Turn-Around Time

☒ Standard ☐ RUSH (only confirmed if pre-approved)
Date Due: Time:

Report Information - Data Deliverables

☐ FAX ☐ EMAIL
☐ ADEx ☐ Add'l Deliverables

Billing Information

☐ Same as Client info PO #:

Regulatory Requirements/Report Limits

State /Fed Program | Criteria

MA MCP PRESUMPTIVE CERTAINTY --- CT REASONABLE CONFIDENCE PROTO

☐ Yes ☐ No Are MCP Analytical Methods Required?
☐ Yes ☐ No Is Matrix Spike (MS) Required on this SDG? (If yes see note in Comments)
☐ Yes ☐ No Are CT RCP (Reasonable Confidence Protocols) Required?

Other Project Specific Requirements/Comments/Detection Limits:

If MS is required , indicate in Sample Specific Comments which samples and what tests MS to be performed.
(Note: All *CAM* methods for inorganic analyses require MS every 20 soil samples)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	ANALYSIS Cadmium	SAMPLE HANDLING	TOTAL # BOTTLES
43580	Mass-1-Pre	7/26/23	1350	SW	MP	x		
-02	Mass-2-Pre	7/26/23	1410	SW	MP	x		
-03	Mass-3-Pre	7/26/23	1420	SW	MP	x		

SAMPLE HANDLING: Filtration ☐ Done ☐ Not needed ☐ Lab to do; Preservation ☐ Lab to do (Please specify below); Sample Specific Comments

Container Type																		
Preservative																		

PLEASE ANSWER QUESTIONS ABOVE!

IS YOUR PROJECT MA MCP or CT RCP?

Relinquished By:	Date/Time	Received By:	Date/Time
	4:27 7/26/23		16:27
Shawn Thompson	16:27 7/26/23	AAL	7/26/23 2050

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 16-Jan-2010)

Attachment C: Phytoplankton Results

Phytoplankton Sample Analysis

Sample: Massapoag L
Sample Site: Mass-1-pre
Sample Depth:
Sample Date: 26-Jul-23

Total Density (#/mL): 565
Total Biovolume (um^3/mL): 160,913
Trophic State Index: 36.7

	Species	Density #/mL	Density Percent	Biovolume um^3/mL	Biovolume Percent
1	Rhodomonas minuta	277	49.0	5,539	3.4
2	Cryptomonas erosa	102	18.0	52,899	32.9
3	Sphaerocystis schroeteri	45	8.0	12,660	7.9
4	Gomphosphaeria wichurae	28	5.0	42,726	26.6
5	Aphanothece sp.	23	4.0	5,426	3.4
6	Ankistrodesmus falcatus	23	4.0	1,017	0.6
7	Chroococcus minimus	17	3.0	1,424	0.9
8	Crucigenia quadrata	11	2.0	1,441	0.9
9	Microcystis aeruginosa	6	1.0	11,303	7.0
10	Anabaena flos-aquae	6	1.0	11,360	7.1
11	Cyclotella stelligera	6	1.0	311	0.2
12	Melosira distans alpigena	6	1.0	1,978	1.2
13	Tabellaria flocculosa	6	1.0	3,334	2.1
14	Anabaena planctonica	6	1.0	8,274	5.1
15	Oocystis pusilla	6	1.0	1,221	0.8

Microcystis aeruginosa cells/mL = 1,413

Anabaena flos-aquae cells/mL = 170

Anabaena planctonica cells/mL = 45

Aquatic Analysts

Sample ID: ZM76

Phytoplankton Sample Analysis

Sample: Massapoag L
Sample Site: Mass-1-post
Sample Depth:
Sample Date: 27-Jul-23

Total Density (#/mL): 343
Total Biovolume (um^3/mL): 169,847
Trophic State Index: 37.1

	Species	Density #/mL	Density Percent	Biovolume um^3/mL	Biovolume Percent
1	Cryptomonas erosa	143	41.7	74,451	43.8
2	Rhodomonas minuta	63	18.3	1,253	0.7
3	Trachelomonas volvocina	33	9.6	61,848	36.4
4	Sphaerocystis schroeteri	27	7.8	9,396	5.5
5	Gomphosphaeria wichurae	18	5.2	10,148	6.0
6	Aphanothece sp.	15	4.3	2,416	1.4
7	Microcystis aeruginosa	12	3.5	6,204	3.7
8	Kephyrion spirale	9	2.6	564	0.3
9	Kephyrion littorale	6	1.7	567	0.3
10	Chrysococcus rufescens	3	0.9	254	0.1
11	Crucigenia quadrata	3	0.9	254	0.1
12	Gomphonema gracile	3	0.9	731	0.4
13	Oocystis pusilla	3	0.9	644	0.4
14	Oocystis lacustris	3	0.9	931	0.5
15	Kephyrion sp.	3	0.9	188	0.1

Microcystis aeruginosa cells/mL = 776

Aquatic Analysts

Sample ID: ZM79

Phytoplankton Sample Analysis

Sample: Massapoag L
Sample Site: Mass-2-pre
Sample Depth:
Sample Date: 26-Jul-23

Total Density (#/mL): 350
Total Biovolume (um^3/mL): 136,492
Trophic State Index: 35.5

	Species	Density #/mL	Density Percent	Biovolume um^3/mL	Biovolume Percent
1	Cryptomonas erosa	120	34.2	62,320	45.7
2	Rhodomonas minuta	57	16.2	1,135	0.8
3	Sphaerocystis schroeteri	44	12.6	18,545	13.6
4	Aphanothece sp.	28	8.1	4,087	3.0
5	Epithemia sorex	13	3.6	17,258	12.6
6	Scenedesmus quadricauda	9	2.7	2,460	1.8
7	Gomphosphaeria wichurae	9	2.7	6,358	4.7
8	Microcystis aeruginosa	9	2.7	6,282	4.6
9	Kephyrion spirale	6	1.8	397	0.3
10	Ankistrodesmus falcatus	6	1.8	158	0.1
11	Asterionella formosa	6	1.8	1,388	1.0
12	Oocystis pusilla	6	1.8	2,725	2.0
13	Cyclotella stelligera	6	1.8	520	0.4
14	Cyclotella comta	3	0.9	7,159	5.2
15	Navicula cryptocephala	3	0.9	583	0.4
16	Synedra rumpens	3	0.9	442	0.3
17	Anabaena flos-aquae	3	0.9	1,690	1.2
18	Chlamydomonas sp.	3	0.9	1,025	0.8
19	Nitzschia frustulum	3	0.9	378	0.3
20	Navicula pupula	3	0.9	852	0.6
21	Chroococcus minimus	3	0.9	177	0.1
22	Melosira distans alpigena	3	0.9	552	0.4

Anabaena flos-aquae cells/mL = 25

Microcystis aeruginosa cells/mL = 785

Aquatic Analysts

Sample ID: ZM77

Phytoplankton Sample Analysis

Sample: Massapoag L
Sample Site: Mass-2-post
Sample Depth:
Sample Date: 27-Jul-23

Total Density (#/mL): 475
Total Biovolume (um^3/mL): 206,777
Trophic State Index: 38.5

	Species	Density #/mL	Density Percent	Biovolume um^3/mL	Biovolume Percent
1	Cryptomonas erosa	154	32.5	80,142	38.8
2	Rhodomonas minuta	81	17.1	1,622	0.8
3	Gomphosphaeria wichurae	49	10.3	32,706	15.8
4	Microcystis aeruginosa	28	6.0	11,356	5.5
5	Trachelomonas volvocina	24	5.1	45,871	22.2
6	Aphanothece sp.	24	5.1	4,745	2.3
7	Sphaerocystis schroeteri	20	4.3	9,227	4.5
8	Kephyrion spirale	20	4.3	1,278	0.6
9	Chroococcus minimus	12	2.6	562	0.3
10	Oocystis lacustris	8	1.7	1,898	0.9
11	Chlamydomonas sp.	8	1.7	2,636	1.3
12	Crucigenia quadrata	8	1.7	2,758	1.3
13	Quadrigula closterioides	8	1.7	1,557	0.8
14	Staurastrum dejectum	4	0.9	1,622	0.8
15	Melosira distans alpigena	4	0.9	1,420	0.7
16	Oocystis pusilla	4	0.9	876	0.4
17	Kephyrion littorale	4	0.9	385	0.2
18	Glenodinium sp.	4	0.9	2,839	1.4
19	Ulothrix sp.	4	0.9	2,596	1.3
20	Elakatothrix gelatinosa	4	0.9	681	0.3

Microcystis aeruginosa cells/mL = 1,420

Aquatic Analysts

Sample ID: ZM80

Phytoplankton Sample Analysis

Sample: Massapoag L
Sample Site: Mass-3-pre
Sample Depth:
Sample Date: 26-Jul-23

Total Density (#/mL): 371
Total Biovolume (um^3/mL): 131,691
Trophic State Index: 35.3

	Species	Density #/mL	Density Percent	Biovolume um^3/mL	Biovolume Percent
1	Cryptomonas erosa	75	20.2	39,087	29.7
2	Gomphosphaeria wichurae	35	9.5	16,342	12.4
3	Kephyrion spirale	27	7.1	1,671	1.3
4	Eunotia pectinalis	18	4.8	15,281	11.6
5	Sphaerocystis schroeteri	18	4.8	8,666	6.6
6	Rhodomonas minuta	18	4.8	354	0.3
7	Aphanothece sp.	18	4.8	2,653	2.0
8	Kephyrion littorale	18	4.8	1,680	1.3
9	Chlamydomonas sp.	13	3.6	4,311	3.3
10	Chrysococcus rufescens	9	2.4	752	0.6
11	Tabellaria flocculosa	9	2.4	5,217	4.0
12	Fragilaria construens venter	9	2.4	671	0.5
13	Navicula cryptocephala	9	2.4	1,636	1.2
14	Cyclotella stelligera	9	2.4	486	0.4
15	Cymbella minuta	9	2.4	3,272	2.5
16	Synedra rumpens	9	2.4	1,238	0.9
17	Synedra radians	9	2.4	3,184	2.4
18	Oocystis lacustris	9	2.4	2,759	2.1
19	Coelastrum microporum	4	1.2	4,245	3.2
20	Pediastrum duplex	4	1.2	2,405	1.8
21	Microcystis aeruginosa	4	1.2	1,415	1.1
22	Scenedesmus denticulatus	4	1.2	796	0.6
23	Achnanthes recurvata	4	1.2	354	0.3
24	Achnanthes hauckiana	4	1.2	212	0.2
25	Crucigenia quadrata	4	1.2	376	0.3
26	Fragilaria construens	4	1.2	495	0.4
27	Elakatothrix gelatinosa	4	1.2	743	0.6
28	Oocystis pusilla	4	1.2	955	0.7
29	Trachelomonas hispida	4	1.2	9,285	7.1
30	Scenedesmus quadricauda	4	1.2	1,150	0.9

Phytoplankton Sample Analysis

Sample: Massapoag L
Sample Site: Mass-3-post
Sample Depth:
Sample Date: 27-Jul-23

Total Density (#/mL): 306
Total Biovolume (um^3/mL): 95,414
Trophic State Index: 33.0

	Species	Density #/mL	Density Percent	Biovolume um^3/mL	Biovolume Percent
1	Cryptomonas erosa	73	23.9	37,920	39.7
2	Kephyrion spirale	50	16.5	3,181	3.3
3	Kephyrion littorale	48	15.6	4,530	4.7
4	Chlamydomonas sp.	25	8.3	8,204	8.6
5	Rhodomonas minuta	20	6.4	393	0.4
6	Achnanthes minutissima	11	3.7	561	0.6
7	Sphaerocystis schroeteri	11	3.7	3,927	4.1
8	Gomphosphaeria wichurae	6	1.8	1,414	1.5
9	Cyclotella stelligera	6	1.8	309	0.3
10	Kephyrion sp.	6	1.8	353	0.4
11	Oocystis pusilla	6	1.8	1,212	1.3
12	Microcystis aeruginosa	6	1.8	3,814	4.0
13	Anabaena flos-aquae	6	1.8	7,141	7.5
14	Trachelomonas volvocina	6	1.8	10,574	11.1
15	Ulothrix sp.	6	1.8	4,488	4.7
16	Ankistrodesmus falcatus	6	1.8	351	0.4
17	Glenodinium sp.	3	0.9	1,963	2.1
18	Nitzschia palea	3	0.9	505	0.5
19	Aphanothece sp.	3	0.9	337	0.4
20	Coscinodiscus sp.	3	0.9	2,104	2.2
21	Elakatothrix gelatinosa	3	0.9	118	0.1
22	Eunotia pectinalis	3	0.9	2,019	2.1

Microcystis aeruginosa cells/mL = 477

Anabaena flos-aquae cells/mL = 107

Aquatic Analysts

Sample ID: ZM81