SŌLITUDE
LAKE MANAGEMENT

Annual Report

2017 Aquatic Management Program
Foster's Pond
Andover, MA

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Submitted on: January 4, 2018

Introduction

Invasive aquatic vegetation control, blue-green algae management, and water quality monitoring were the focus of this year's lake management efforts at Foster's Pond. This year's treatments were limited to one for cyanobacteria as well as a spot-treatment for areas of spiny naiad (*Najas minor*) growth. This season marked two years since a whole-pond Sonar herbicide treatment program was conducted (2015) to control invasive fanwort (*Cabomba caroliana*), and although that treatment continued to be effective, some areas of regrowth were observed throughout the season. The purpose of the 2017 survey was to document the level of control from prior treatments, track the biodiversity of aquatic vegetation, and assess water quality. Additionally this season, hydro-raking was conducted in some areas of private shoreline to remove nuisance aquatic vegetation and accumulated organic matter. The treatments, survey, and monitoring described in this report were performed by SŌLitude Lake Management under contract with the Foster's Pond Corporation. Hydro-raking, which was also performed by SŌLitude Lake Management, was coordinated by the Foster's Pond Corporation (FPC), but contracted by individual homeowners

All work performed at Foster's Pond this season was conducted in accordance with the current Order of Conditions (OOC) issued by the Andover Conservation Commission (DEP #090-535) and the MA DEP – Office of Watershed Management issued License to Apply Chemicals (#17139).

A chronology of this year's management and brief description of events is as follows:

2017 Program Chronology

- Pre-hydro-raking phosphorus sample collection 04/24/17
- Hydro-raking of shoreline areas commenced 04/24/17
- Hydro-raking completed 04/26/17
- Post-hydro-raking phosphorus sample collection 05/04/17
- MA DEP License to Apply Chemicals issued 05/11/17
- Collection of algae samples (round 1) 07/13/17
- Spiny naiad pre-treatment survey 07/13/17
- Herbicide treatment of spiny naiad 07/31/17
- Collection of algae samples (round 2) 07/31/17
- Algaecide treatment 08/09/17
- Late-season vegetation survey 09/11/17
- Collection of water quality and algae (round 3) samples 09/11/17

Hydro-raking

Private shoreline hydro-raking services were provided for various residents of Foster's Pond to remove nuisance aquatic vegetation as well as accumulated organic matter. Eighteen (18) hours of hydro-raking services were provided between April 24 and 26. All removed material was placed on the respective residents' shoreline. Pursuant to the OOC, property owners were responsible for proper upland disposal.

This was the first year, since hydro-raking at Foster's Pond began in 1992, when operations were scheduled for the spring. In past years, hydro-raking was performed in the fall. However, planned fall hydro-raking was rendered impossible in 2016 due to drought conditions which rendered many coves too shallow for effective rake operation.

The 2017 spring operations proved highly effective, as higher water made shorelines more accessible. The Corporation commissioned pre- and post-raking phosphorous testing to determine whether hydro-raking appeared to have any detectable impact on phosphorous levels in the water. No such impact was detected. As a result, it appears that spring hydro-raking will be an acceptable scheduling option for Foster's Pond in future years.

Algae Monitoring

Nuisance algae blooms and corresponding poor water clarity have exhibited themselves periodically through the years at Foster's Pond. The blooms are commonly dominated by cyanobacteria, or blue-green algae, due to elevated phosphorus concentrations within the various basins. The Foster's Pond Corporation diligently monitors water clarity, conducts periodic algae sampling, and requests formally reported laboratory analyses and algaecide treatments as necessary to avoid potential toxic blooms of cyanobacteria.

This season, based upon visual observation of microscopic algae blooms, multiple rounds of algae samples were collected by SŌLitude and analyzed by Northeast Laboratories in Berlin, CT. Secchi disk readings and visual cues were the primary factors guiding the decision to conduct as algaecide treatment, as recent sample results were not finalized by the time a treatment appeared necessary. The Secchi disk measurements and algal sampling results are as follows:

Table 1. Secchi disk readings

Date	Secchi Disk Depth (ft)				
	Mill Reservoir	Dug Pond	Main Basin	Outlet Cove	Azalea Drive
07/13/17	3.0	-	6.0	4.3	-
07/31/17	-	-	4.1	4.8	-
09/11/17	3.4	11.7	3.7	5.2*	8.9*

*Denotes to basin bottom

Table 2. Algae Count Data

Algal Division	Description	Measurement	Mill Reservoir		Main Basin		Outlet Cove	
			07/13	09/11	07/31	09/11	07/13	07/31
Cyanophytes	Cyanobacteria (blue-green)	cells/ml	0	4320	170	0	0	508
		% of total Natural Units	0	11	<1	0	0	1
Chlorophytes	Greens	Natural Units/ml	21	39	359	594	25	63
Other	Diatoms, goldens, euglena, etc.	Natural Units/ml	14,074	442	900	367	158	816

Secchi disk water clarity readings conducted during the spiny naiad pre-treatment survey on July 13 prompted algae sample collection from both Mill Reservoir and Outlet Cove. Results were favorable with no cyanobacteria present and protozoans dominant in both locations. Approximately two weeks later, immediately prior to the spiny naiad treatment, algae samples from Main Pond and Outlet Cove were collected as water clarity was becoming noticeably more impaired. There was evidence of slight algae scums along shoreline areas within Main Pond that were thought to be caused by cyanobacteria. Due to logistical challenges, algae sample analysis was not completed before an algaecide treatment was requested by Stephen Cotton of the Foster's Pond Corporation; shoreline scum and diminished water clarity were the determining factors.

To the best of our knowledge, conditions improved following the algaecide treatment. A final round of algae samples was collected during the late-season vegetation survey, based on the basins' respective Secchi disk reading. Samples were collected from the Main Pond and Mill Reservoir, where algae colonies were visible within the water column. Samples from the Main Pond showed no cyanobacteria, and were dominated by chlorophytes (green algae), primarily *Coelastrum* and *Staurastrum*. Similar to samples from late August 2016, Mill Reservoir showed a slightly elevated cyanobacteria count, with *Pseudanabaena*, *Anabaena*, and *Chroococcus* present.

Overall, cyanobacteria levels in Foster's Pond through this season were generally lower than those from previous years when algaecide treatments were conducted (2013, 2015, and 2016). As with last year, co-dominance of green algae and other taxa likely contributed to the lessened water clarity results.

Algaecide Treatment

Only one copper sulfate treatment was necessary and conducted in 2017. Prior to application, the treatment date was determined in consultation with the Foster's Pond Corporation, based on examination of samples, and prior and contemporaneous Secchi disk readings. Prior notification of treatment was submitted to the Conservation Commission, email notifications were provided to shoreline property owners and local residents on the FPC's email list, notice was posted on the FPC's website of treatment areas and water-use restrictions, and posters warning of the water-use restrictions following treatment were posted at key access points along the shoreline of the pond.

Treatment was conducted on August 9 by SŌLitude's licensed aquatic applicators in accordance with conditions of the DEP License to Apply Chemicals, the copper sulfate product label, and the OOC.

Approximately 46 acres of the total surface area of Foster's Pond were treated. The treatment was limited to the Main Pond. No algaecide treatment was performed in any other basin of the pond during the 2017 season. The copper sulfate dose was calculated based on the upper five feet of the water column, and resulted in 230-acre feet of water to be treated. A dose of 0.25 ppm or 150 pounds of copper sulfate was applied. The copper sulfate was dissolved in 50-gallon mixing tanks onboard an 18-foot jonboat and applied subsurface using a calibrated pump system. A hand-held GPS unit was used on the boat to ensure the designated treatment area received an even application of the diluted copper sulfate solution. Treatment took approximately an hour and a half.

Spiny Naiad Herbicide Treatment

Spiny naiad growth was observed in approximately 5 acres of Foster's Pond, in various basins, during the 2016 late season vegetation survey. The FPC sought approval from the Conservation Commission for a 2017 treatment, with the precise locations determined on the basis of pre-treatment observations. A locative pre-treatment survey was conducted on July 13 to assess the spiny naiad growth and further determine areas requiring treatment. Treatment was scheduled for July 31 in coordination with FPC. Notification of treatment was submitted to the Conservation Commission, email notifications of the treatment areas and water-use restrictions were provided to shoreline property owners and local residents on the FPC's email list, notice was posted on the FPC's website, and warning posters were posted along the shoreline at key access points of the pond prior to treatment by FPC members.

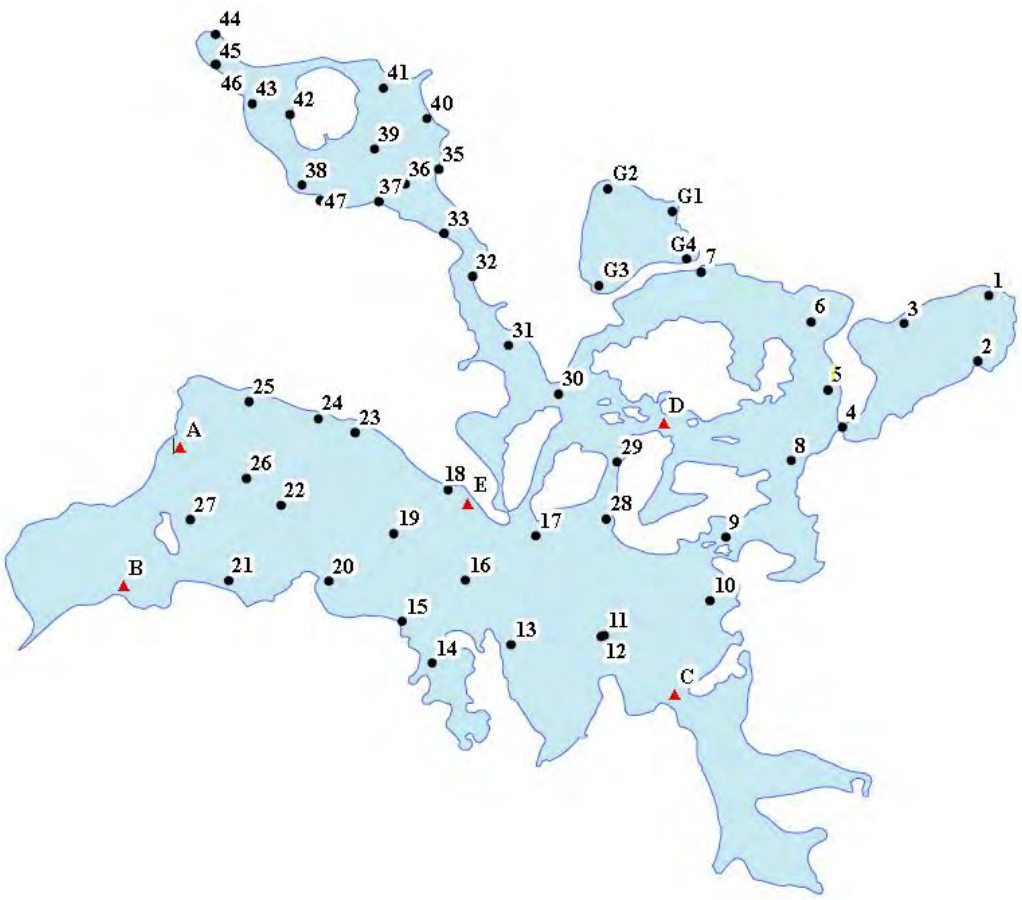
Immediately prior to treatment, a cursory survey of additional spiny naiad areas noted by FPC members was conducted with Steve Cotton of the FPC in order to finalize all areas to be treated. Treatment of approximately 10 acres with Reward (diquat) herbicide was conducted on July 31 by SŌLitude's licensed aquatic applicators in accordance with conditions of the DEP License to Apply Chemicals, the diquat herbicide label, and the OOC. The diquat liquid was diluted with pond water and applied subsurface using a calibrated pump system. The pre-determined treatments areas were preloaded into a GPS unit which was used for navigation during the treatment to ensure even application of the herbicide within those areas.

A map of the treatment areas is attached.

Annual Late-Season Vegetation Survey

SŌLitude conducted an aquatic vegetation survey of Foster's Pond (including Dug Pond) on September 11. This was the tenth such comprehensive survey conducted for the Foster's Pond Corporation since the start of its lake management program in 2004. These surveys document the aquatic plant composition and distribution utilizing consistent survey methodology, transects and data points established at the time of the first survey in 2004. A total of 56 data points were surveyed. A map illustrating the transect and data point locations follows; the raw data collected is attached.

Figure 1. Aquatic plant survey data point locations



Overall, vegetative cover maintained similar levels to those observed last year, with Percent Total Plant Cover, Biomass Index, and Species Richness Index all having results near those of 2016. The dominant species was again filamentous algae, which likely skews the Percent Cover value higher than just the vegetation. Percent Fanwort Cover increased 17%, which was anticipated as it has been two seasons since the last whole-pond Sonar treatment and regrowth was observed through the season.

Table 1. Aquatic vegetation data summary

Year	Estimated % Total Plant Cover	Estimated % Fanwort Cover	Biomass Index	Species Richness Index
2004	78.9	54.5	2.9	3.6
2005[1]	25.5	0.1	1.4	1.7
2008	15.9	0.9	1.6	1.7
2009	34.2	6.1	1.6	5.5
2011[1]	19.0	0	1.2	1.4
2012	21.2	0.1	1.3	1.6
2014	53.6	10.9	2.4	2.7
2015[1]	41.7	0	1.6	0.8
2016	70.3	0.2	2.4	1.3
2017	67.8	17.2	2.3	1.7

[1]Whole-lake Sonar (fluridone) treatment performed

Aside from filamentous algae, vegetation levels rebounded further this season, but remained dominated by white waterlilies (*Nymphaea* sp.), especially within shallow and cove areas. Spiny naiad was still present, however at only three of the survey points, which indicated that the spot-treatment to control its growth earlier in the season was successful. Cover of stonewort (*Nitella* spp.) and bladderwort (*Utricularia* spp.) was also commonly encountered through the pond. Other species encountered, including but not limited to: pondweeds (*Potamogeton* spp.), coontail (*Ceratophyllum demersum*), and watershield (*Brasenia schreberi*), had generally low-density scattered growth. Benthic filamentous algae was again the most frequently encountered aquatic species, observed at more than 66% of the data points. A total of 16 data points supported varying densities on fanwort growth; these points were primarily in protected, narrow areas where fanwort growth has historically been found. Additional growth was observed by residents in the southeastern, shallow coves.

The most severe benthic filamentous algae growth again was the channel from Main Pond to Outlet Cove. Filamentous algae thrives in shallow, nutrient rich water and has the potential to cause water quality issues and be recreationally limiting.

The invasive species (fanwort and spiny naiad) distribution is illustrated on an attached map. The areas of observed spiny naiad growth were within relatively shallow waters, which likely encourage its growth. Spiny naiad growth should continue to be monitored closely and an herbicide treatment can be considered again depending on growth observed in 2018.

A list of the aquatic plant species observed in 2017 with historical comparison of presence and absence is as follows:

Table 2. Aquatic species list (2005-2017)

Type	Macrophyte Species	Common Name	2005	2008	2009	2011	2012	2014	2015	2016	2017
Submersed	*Bidens beckii*	Water marigold			X						
	Cabomba caroliniana	Fanwort	X	X	X		X	X		X	X
	Callitriche palustris	Water starwort			X					X	
	Ceratophyllum demersum	Coontail	X	X	X	X	X	X	X	X	X
	Chara vulgaris	Musk grass			X	X					
	Chlorophyta	Filamentous algae	X	X	X	X	X	X	X	X	X
	Egeria densa	Brazilian elodea	X	X	X						
	Elodea canadensis	Common waterweed			X						
	Hypericum boreale	Northern St. John's wort			X						
	Isoetes sp.	Quillwort	X	X	X	X	X				
	Ludwigia palustris	Water purslane			X	X	X				
	Musci	Water moss	X	X	X		X	X	X		X
	Myriophyllum humile	Lowly Milfoil	X	X	X	X		X			X
	Najas flexilis	Bushy pondweed	X	X	X		X	X			
	Najas minor	Spiny naiad			X			X		X	X
	Nitella sp.	Stonewort	X	X	X	X	X	X	X	X	X
	Potamogeton amplifolius	Largeleaf pondweed									
	Potamogeton epihydrus	Ribbonleaf pondweed		X	X	X	X	X	X	X	X
	Potamogeton gramineus	Variable-leaf pondweed			X		X				X
	Potamogeton natans	Floating leaf pondweed		X	X			X			X
	Potamogeton perfoliatus	Clasping-leaf pondweed									
	Potamogeton pusillus	Thin-leaf Pondweed						X		X	
	Potamogeton robinsii	Robbins' Pondweed								X	X
	Sagittaria sp.	Arrowhead		X	X		X				
	Utricularia spp.	Bladderwort	X	X	X	X	X	X	X	X	X
	Valliseria americana	Wild celery			X						X
Floating Leaf	*Brasenia schreberi*	Watershield		X	X		X	X	X		X
	Lemna minor	Lesser duckweed			X						
	Nuphar variegatum	Yellow waterlily	X	X	X	X	X	X	X	X	X
	Nymphaea odorata	White waterlily	X	X	X	X	X	X	X	X	X
	Spirodela polyrhiza	Big duckweed			X						
Emergent	*Decodon verticillatus*	Water willow	X	X	X	X	X		X*	X*	X*
	Eleocharis sp.	Spikerush			X						
	Eriocaulon sp	Pipewort	X	X							
	Lythrum salicaria	Purple loosestrife	X	X	X	X	X	X	X*	X*	X*
	Peltandra viginica	Arrow arum			X						
	Pontederia cordata	Pickerelweed	X	X	X	X	X				X*
	Scirpus sp.	Rushes	X	X							
	Sparganium sp.	Burreed		X	X	X	X	X	X*	X*	X*
	Typha sp.	Cattail	X	X	X	X	X		X*	X*	X*

* Observed in the pond, but not at data point locations. Red font indicates species considered invasive.

Water Quality Monitoring

Water quality sampling was performed at Foster's Pond in 2017 in consistency with prior year's efforts. Surface grab water samples were collected from four locations, shown on below map, on September 11. Laboratory analysis was performed for the following parameters: pH, alkalinity, total phosphorus, turbidity, true and apparent color, E. Coli and total coliform.

Figure 2. Water quality sample locations

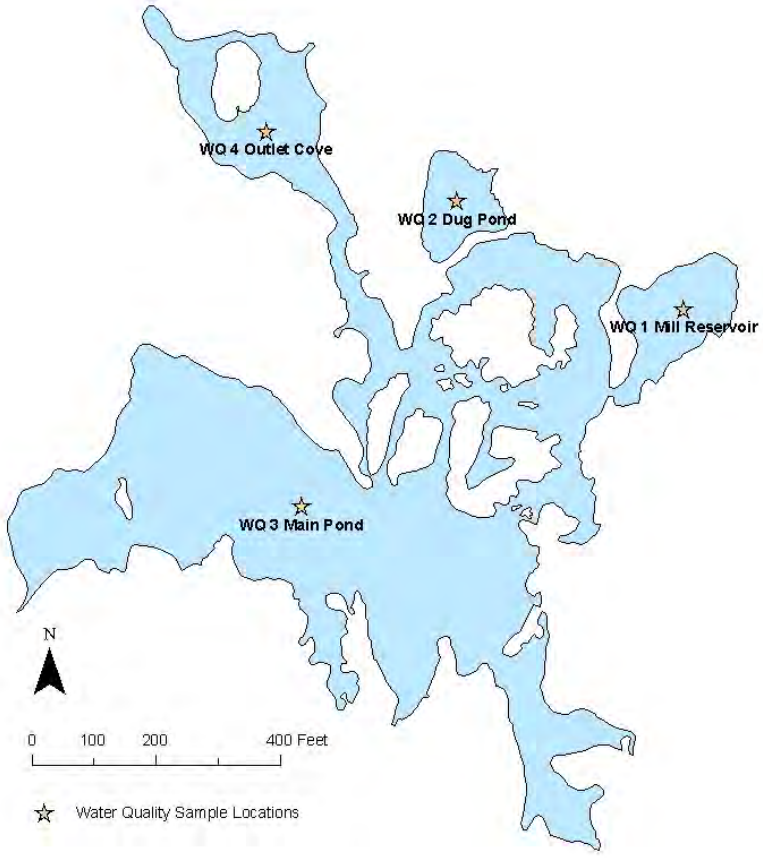


Table 3. Water quality results

Parameter	Units	Desirable Thresholds	Mill Reservoir (WQ1)	Dug Pond (WQ2)	Main Pond (WQ3)	Outlet Cove (WQ4)
pH	S.U.	5.5 – 8.5	7.5	6.7	6.8	6.7
Alkalinity, total	mg/L CaC03	>20	28	17.1	107	18.1
Phosphorus, total	mg/L	<0.03	0.017	0.013	0.026	0.022
Turbidity	NTU	<5	3.7	0.89	3.8	0.70
True Color	Pt-Co	<100	36	6.0	30	23
Apparent Color	Pt-Co	<100	42	13	40	27
Fecal Coliform	MPN/100mL	<200	11	2.0	6.0	8.0
Total Coliform	MPN/100mL	-	2400	2400	2400	460
E. Coli	MPN/100mL	<235	13	<1	1.0	2.0

Overall, the water quality results were similar to those reported in previous years. The pH values of all locations were close to neutral and within normal ranges for northeast freshwater systems. If the pH is above 5.0 and below 9.0, adverse impacts to fish and other aquatic organisms are generally not observed. Alkalinity values varied between locations, as some values were lower than desirable, but are characteristic for waterbodies in the region. Total phosphorus levels were all within the desirable thresholds, however some locations were near the upper end of the threshold. Based on their phosphorus levels, all locations were capable of supporting at least some level of algal blooms, as phosphorus concentrations 0.02 mg/L and above are adequate.

Turbidity values were split with two locations elevated and two locations having low results; however, all were below desired thresholds. True color is a measure of filtered water, whereas apparent color is the measure of the raw water. Color results were similar to prior years, with dissolved material and suspended particles both likely contributing to the colors.

Coliform bacteria can be understood as a series of concentric circles: the outermost ring of total coliform bacteria encompasses all forms; the next ring is fecal coliform which is a sub-group of total coliform and is composed of many strains of bacteria commonly found in the intestines and feces of people and animals; the innermost ring is that of *E.* coli which is a specific strain of fecal coliform linked to causing illness in humans. Measuring fecal coliform allows for an indicator to the presence of human or animal waste inputs. Acceptable values for "swimmable waters" for fecal coliform bacteria is less than 200 organisms per 100 mL. All coliform results were well below the established thresholds.

Algae sampling data can be found in a previous section of this report. In summary, primarily taxa other than cyanobacteria contributed to decreased water clarity this season. Overall, cyanobacteria levels were lower in general than in previous years when algaecide treatments have been conducted.

Conclusions and Recommendations

In Foster's Pond, and other managed waterbodies throughout Massachusetts, in years following Sonar treatments, native aquatic vegetation rebounds quickly and a more diverse plant composition is observed. Most native and desirable aquatic plant species reproduce via seed each year, so continued recovery is possible as seeds remain in the pond sediment. Although the waterlilies and other floating leaf species were originally impacted by the treatment, they have shown a continual increase in abundance and distribution throughout the pond.

Based on the history of conditions and management at Foster's Pond, as well as the presence of invasive aquatic species, specifically fanwort, it is likely that problematic aquatic plant growth will continue in the future. Future, timely management will be required to maintain control of non-native species, fanwort and spiny naiad. It is recommended that the Foster's Pond Corporation continue annual monitoring efforts to assess fanwort distribution and watch for potential pioneer infestations of other invasive species.

Fanwort control: For 2018, we are recommending spot-treatment with Sonar (fluridone) herbicide to control areas of regrowth that were observed this season. We will work with the Foster's Pond Corporation to determine the most appropriate areas of growth to target for treatment following an early-season pre-treatment inspection. Based on the results of the late summer 2017 survey, there was approximately 14 acres of fanwort growth observed at varying densities. To our knowledge, there are other areas of fanwort growth according to the FPC, however the water level was too low to access those areas at the time of the survey. It is anticipated that the areas to be targeted for treatment with Sonar in 2018 will be no more than 25 acres.

Fanwort alternatives analysis: The Massachusetts Department of Conservation and Recreation (MA DCR) has provided guidance that considers alternative methods of controlling fanwort. MA DCR reviewed eradication and control options, including hand harvesting, suction harvesting, benthic barriers, water level drawdown, and herbicides. The MA DCR alternatives analysis, as applied to conditions in Foster's Pond, indicates that there is no practicable non-herbicidal control alternative. This analysis considers the number of acres found this year to be affected by fanwort (about 20), the number of stems per 100 square feet (in excess of 10 through much or all of the affected area), the absence of sensitive protected species, the ability to control dilution and flushing during the treatment period, and the physical limitations at the Foster's Pond Dam

to draw down the pond lower than about 18 inches. Hand harvesting would be limiting, given the cost associated with efforts, extent and density of the fanwort, and potential for fragmentation and further spread of the species. Suction harvesting would be impossible given the thick and silty sediments, increasing the turbidity of the water body and rendering the target plants invisible. Large benthic barriers require significant time and effort to install, relocate and remove over the course of a season and have additional, negative impacts to other aquatic species present within the immediate area. However, recent experience with smaller scale barriers has shown promising feasibility when used in isolated areas of growth. This would be an informative opportunity for the FPC and SŌLitude to gain more experience using this control methodology and they will continue to work together to develop a plan to potentially do so.

With respect to chemical alternatives, two herbicides are currently approved for use in Massachusetts to manage fanwort infestations. Fluridone and Clipper (flumioxazin) are both registered by the Massachusetts Department of Agricultural Resources and authorized by the current OOC for Foster's Pond. Clipper has proven effective in spot-treating fanwort growth in Massachusetts lakes and ponds; however, the Department of Environmental Protection limits treatment to less than 25% of the total waterbody's acreage in one year, and a treated area may not be retreated for 3 years. Since Clipper is a contact herbicide, regrowth can be expected in the year after treatment. Experience in other jurisdictions indicates that at least several years of consecutive treatment followed by periodic re-treatment are usually required to manage an infestation with Clipper. Given the current restrictions on the use of Clipper in Massachusetts and the past success of treatments with fluridone in Foster's Pond, addressing the re-growth using Clipper is not likely to provide a substantial benefit to Foster's Pond. We will continue to evaluate new technologies as they become available or re-visit options should regulatory restrictions change. In the meantime, spot-treatment with fluridone remains the best alternative for controlling regrowth in 2018. Based on past experience in Foster's Pond, it is anticipated that treating a limited number of acres in 2018 will minimize the need for a whole-lake treatment in the immediate future.

Spiny naiad control: Spiny naiad is a late germinating species which spreads via seed production. Plants typically emerge in mid to late July from seeds dropped by plants in the previous year or two. A late-July survey is necessary to assess growth and determine the extent requiring a spot-treatment. Multiple years of successful treatment can effectively reduce the viable seed bank.

We recommend that in 2018 the FPC conduct a survey focusing on the presence of spiny naiad and, to the extent treatable infestations are observed, proceed with a spot-treatment of those areas with diquat. Timely application would require securing Conservation Commission approval, and a DEP license, in advance for this contingency, as was done in 2017. Based on the 2017 survey, it is preliminarily estimated that 15+ acres might require treatment in 2018, though actual observations in 2018 could vary considerably from this estimate.

Spiny naiad alternatives analysis: According to NOAA's Great Lakes Aquatic Nonindigenous Species Information System (GLANSIS), use of aquatic herbicides are the most effective at controlling spiny naiad growth, especially as it relates to the infestation within Foster's Pond. Diquat and fluridone herbicides are two of the recommended aquatic herbicides that provide control of spiny naiad, and are also included in the current OOC for Foster's Pond. Manual removal of spiny naiad is also possible, likely via use of a mechanical harvester or hydro-rake. However, spiny naiad is an incredibly brittle plant which spreads via fragmentation and thus mechanical removal may provide short-term relief, but likely increase the infestation within the pond overall. Benthic barriers are also a viable option, but as mentioned previously in regards to fanwort control, these are time consuming to manage while having non-target impacts. However, a smaller scale option may be more feasible within isolated areas of growth.

Algae control: Continued algal composition and density monitoring through the summer months is recommended as it allows for appropriately timed algaecide treatment(s) when necessary.

Based on the Watershed-Based Plan developed by Geosyntec for the FPC, we understand that overall phosphorus remains an extensive challenge within the surrounding watershed. To continue to better understand the phosphorus loading, we recommend conducting in-pond sediment sampling to be analyzed for available phosphorus. By gaining this information, and utilizing the Watershed-Based Plan, we can develop the most effective in-water nutrient management plan to correlate with the watershed plan.

Based on the in-lake sediment phosphorus analysis, SŌLitude will work with the FPC to align nutrient management techniques with their goals. Management of phosphorus within the pond, among other nutrients, will likely limit algal growth. Using various management techniques together can prevent excessive algae growth and potential health hazards and associated waterbody closures from state agencies.

Copper-based algaecides effectively manage an algae bloom, and can prevent a cyanobacteria bloom from becoming a health danger. We recommend that the FPC continue to monitor the Pond for cyanobacteria and treat affected basins if conditions warrant. As for benthic filamentous algae, we continue to advise against treating localized areas of filamentous algae. In 2017, as in 2016, the growth of filamentous algae was likely exacerbated by the drought conditions. Now that the drought has broken, filamentous algae may be less of a problem in 2018, but will remain to be seen.

Low-dose aluminum treatments have proven to be effective in reduction of nutrients, specifically phosphorus, while limiting the need for conducting copper-algaecide treatments. Ultimately, by reducing the phosphorus readily available for uptake by algae, the frequency and severity of algal blooms is also reduced. A low-dose alum treatment is conducted by applying the aluminum sulfate subsurface from a treatment boat, during which the alum mixes with the pond water and creates a floc. This floc slowly falls from the water column and binds with the available phosphorus as it passes, eventually settling on the pond bottom with the bound phosphorus which has become biologically unavailable for algae use. Annual, low-dose alum treatments have been found to have cumulative effects on reducing iron-bound phosphorus released from sediments during anoxic times. Prior to any alum treatment implementation, a detailed plan would need to be established. Higher dose alum treatments are also available as an option for Foster's Pond, however, we recommend conducting more in-lake phosphorus sampling to supplement the Watershed-Based Plan before proceeding with any alum treatments.

Another available product that combines algaecidal properties with a phosphorus reducing agent is SeClear. SeClear will not reduce the available phosphorus levels as significantly as alum would, but it could be a viable alternative to conducting copper sulfate treatments. A SeClear treatment would carry a cost in the mid-range of traditional copper sulfate treatments and a low-dose alum treatment, while potentially reducing phosphorus levels enough to minimize the potential for subsequent blooms later in the season.

Attachments

- Spiny Naiad 2017 Treatment Map
- Fanwort Distribution Map
- Aquatic Plant Survey Field Data Table
- Water Quality Laboratory Reports
- Algae Count Reports

FIGURE 1: 2017 Spiny Naiad Treatment Area

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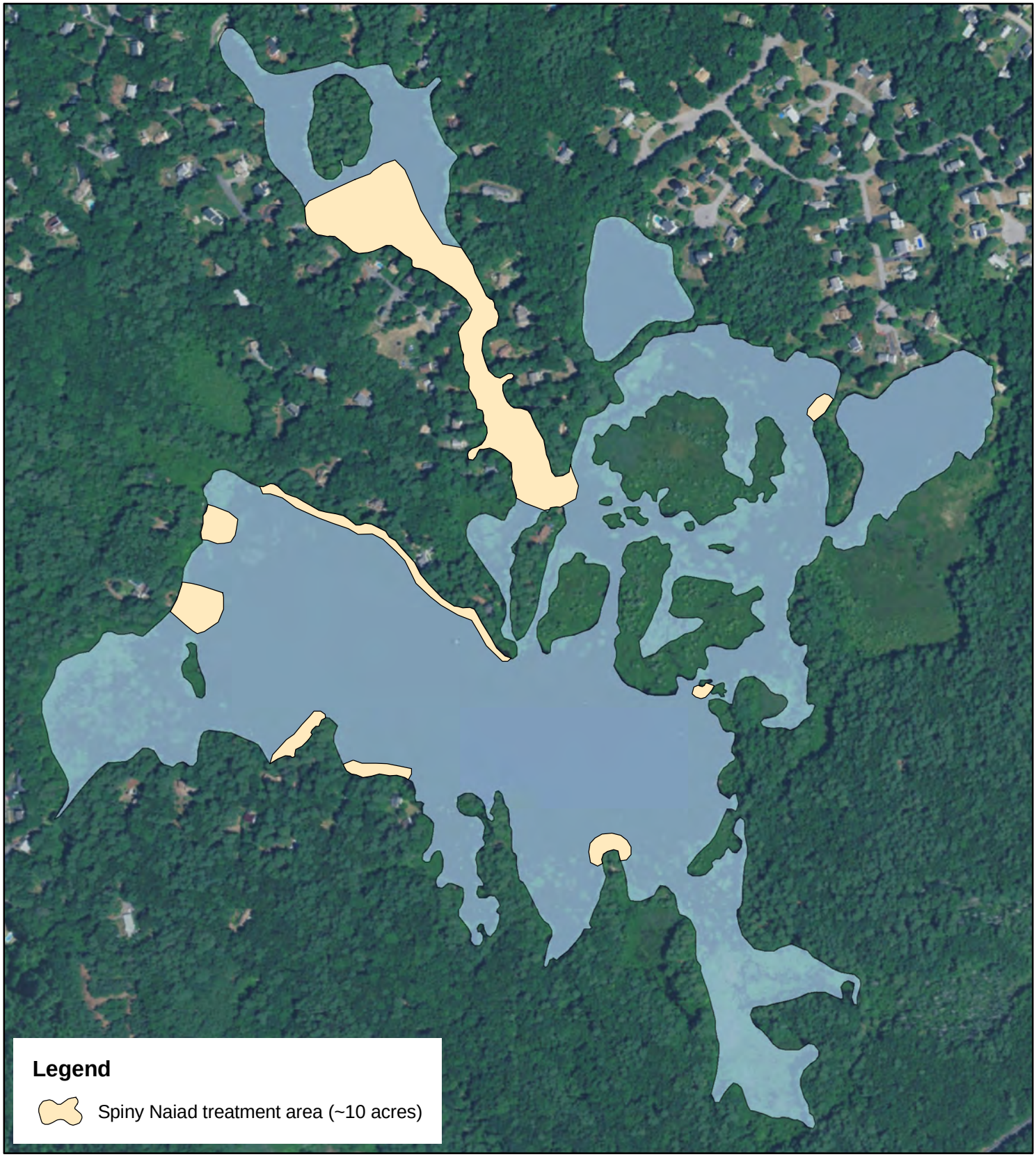
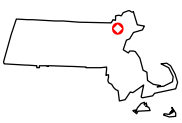


Foster's Pond
Andover, MA
Essex County
42.6060° N, 71.1382° W



Foster's Pond

0 500 1,000 Feet

1:6,500

N

Map Date: 07/19/17
Prepared by: KS
Office: SHREWSBURY, MA

FIGURE 2: September 2017 Fanwort Distribution

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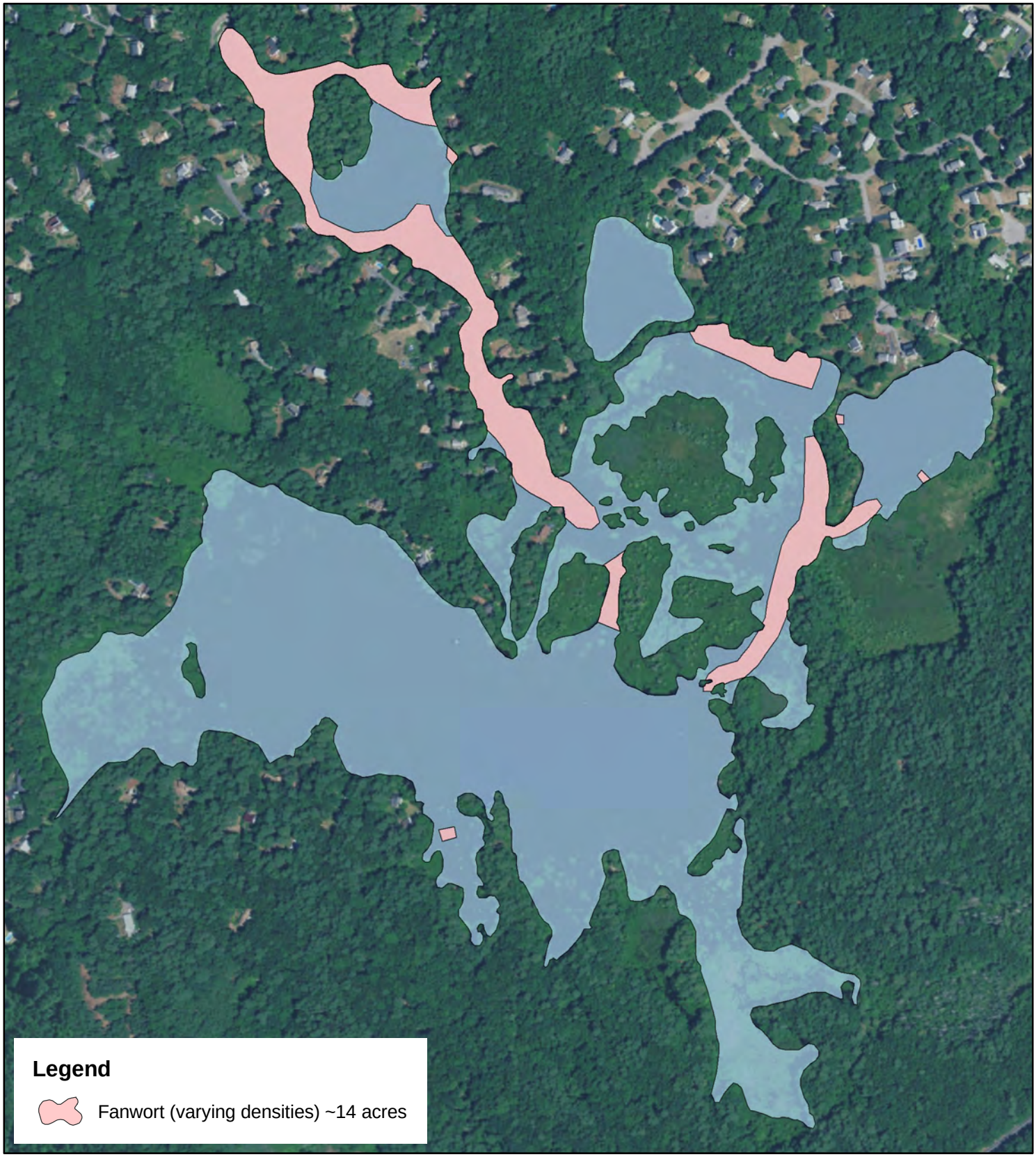
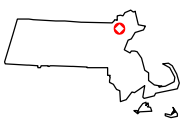


Foster's Pond
Andover, MA
Essex County
42.6060° N, 71.1382° W



Foster's Pond

0 500 1,000 Feet

1:6,500

N

Map Date: 01/03/18
Prepared by: KS
Office: SHREWSBURY, MA

Data Point	Water Depth (ft.)	Cc	Mu	Pe	Pg	Pn	Pp	Pr	U	Cd	Nm	Ca	Ni	Fa	Nu	Bs	Ny	Sp	Ch	Mh	Va	Nf	% Total Plant Cover	%Fanwort Cover	Biomass index	Species Richness index
1	13							D		X						X							40	-	3	3
2	11					X				X						X	D						80	-	4	4
3	4																D			X			50	-	4	2
4	2	D									X		X		X		X						70	40	4	5
5	2	X									X		X		X		D						50	20	4	5
6	11													D									100	-	1	0
7	4	X							D				X										80	10	2	3
8	2	X												X			D						40	20	2	2
9	2	D									X		X				X						80	50	4	4
10	4		X											D	X		X						50	-	4	3
11	5													D									100	-	1	0
12	7													D									100	-	1	0
13	7													D									100	-	1	0
14	2	X												D	X	X							100	5	2	3
15	7													D									100	-	1	0
16	9													D									100	-	1	0
17	6													D									100	-	1	0
18	6													D									50	-	1	0
19	10																						0	-	0	0
20	8													D	X		X						100	-	2	2
21	4													X			D						40	-	4	1
22	9																						0	-	0	0
23	7													D			X						20	-	4	1
24	5													D									100	-	1	0
25	4													D			X						100	-	1	1
26	7																						0	-	0	0
27	4												X	D									100	-	1	1
28	3																D						40	-	4	1
29	3													X			D						50	-	4	1
30	3	X											D				X						100	10	4	3
31	2	X												D			X						100	20	2	2
32	2	X												D									100	10	3	1
33	4	X							D				X	X									80	10	3	3
34	3	D												X			X						50	30	3	2
35	3								X					X			D						40	-	2	2
36	4												X				D						80	-	4	2
37	2													D			X						50	-	4	1
38	6								D				X	X			X						80	-	1	3
39	6												X	D									100	-	1	1
40	6													D									100	-	1	0
41	3	X							D					X			X						60	10	4	3
42	5								D				X	X									40	-	2	2
43	7								X				D	X									60	-	1	2
44	3	X							X				X	D									30	10	2	3
45	6	X							X					D									50	10	3	2
46		X							X					D									50	10	2	2
47									D				X				X						80	-	3	3
G1	5			X					D								X				X		100	-	3	4
G2	6			X	X				D								X						100	-	2	4
G3	5								U								D						20	-	1	1
G4	5								D				X										40	-	1	2
A													X	X			D						100	-	3	2
B		D												X			X						40	10	4	2
C														D	X								100	-	4	1
D																							-	-	-	-
E														D									40	-	1	0

56

#X	12	1	2	1	1	0	0	5	2	3	0	14	12	6	3	16	0	0	1	1	0
#D	4	0	0	0	0	0	1	9	0	0	0	2	25	0	0	11	0	0	0	0	0
total #	16	1	2	1	1	0	1	14	2	3	0	16	37	6	3	27	0	0	1	1	0
% FOC	28.6%	1.8%	3.6%	1.8%	1.8%	0.0%	1.8%	25.0%	3.6%	5.4%	0.0%	28.6%	66.1%	10.7%	5.4%	48.2%	0.0%	0.0%	1.8%	1.8%	0.0%

67.8 17.2 2.3 1.7

ANALYTICAL REPORT

Lab Number:	L1731981
Client:	Solitude Lake Management LLC 590 Lake Street Shrewsbury, MA 01545
ATTN:	Bregieta Arvidson
Phone:	(508) 865-1000
Project Name:	FOSTERS POND
Project Number:	Not Specified
Report Date:	09/18/17

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), NJ NELAP (MA935), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-14-00197).

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

Project Name: FOSTERS POND
Project Number: Not Specified

Lab Number: L1731981
Report Date: 09/18/17

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1731981-01	MAIN POND	WATER	ANDOVER	09/11/17 11:20	09/11/17
L1731981-02	MILL RESERVOIR	WATER	ANDOVER	09/11/17 12:15	09/11/17
L1731981-03	OUTLET COVE	WATER	ANDOVER	09/11/17 01:30	09/11/17
L1731981-04	DUG POND	WATER	ANDOVER	09/11/17 12:30	09/11/17

Project Name: FOSTERS POND
Project Number: Not Specified

Lab Number: L1731981
Report Date: 09/18/17

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. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated 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.

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 table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

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 Client Service Representative 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 Client Services at 800-624-9220 with any questions.

Project Name: FOSTERS POND **Lab Number:** L1731981
Project Number: Not Specified **Report Date:** 09/18/17

Case Narrative (continued)

Report Reissue

This report replaces the report issued on September 15, 2017. The project name has been revised.

Sample Receipt

The samples were received at the laboratory above the required temperature range. The samples were transported to the laboratory in a cooler with ice and delivered directly from the sampling site.

L1731981-03: The analyses of E.Coli, Total Coliform, and Fecal Coliform were received with the method required holding times exceeded.

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: Elizabeth Porta

Title: Technical Director/Representative Date: 09/18/17

INORGANICS
&
MISCELLANEOUS

Project Name: FOSTERS POND
Project Number: Not Specified

Lab Number: L1731981
Report Date: 09/18/17

SAMPLE RESULTS

Lab ID: L1731981-01
Client ID: MAIN POND
Sample Location: ANDOVER
Matrix: Water

Date Collected: 09/11/17 11:20
Date Received: 09/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Microbiological Analysis - Westborough Lab										
Coliform, Total (MPN)	2400		MPN/100ml	1.0	NA	1	-	09/11/17 17:50	121,9223B	RP
Coliform, Fecal (MPN)	6.0		MPN/100ml	2.0	NA	1	-	09/11/17 19:15	121,9221E	RP
E. Coli (MPN)	1.0		MPN/100ml	1.0	NA	1	-	09/11/17 17:50	121,9223B	RP
General Chemistry - Westborough Lab										
Turbidity	3.8		NTU	0.20	--	1	-	09/11/17 23:06	121,2130B	AS
Color, True	30		A.P.C.U.	5.0	--	1	-	09/11/17 18:48	121,2120B	AS
Color, Apparent	34		A.P.C.U.	10	--	2	-	09/11/17 18:48	121,2120B	AS
Alkalinity, Total	107.		mg CaCO3/L	2.00	NA	1	-	09/13/17 09:23	121,2320B	BR
pH (H)	6.8		SU	-	NA	1	-	09/11/17 17:55	1,9040C	AS
Phosphorus, Total	0.026		mg/l	0.010	--	1	09/14/17 10:10	09/15/17 10:09	121,4500P-E	SD

Project Name: FOSTERS POND
Project Number: Not Specified

Lab Number: L1731981
Report Date: 09/18/17

SAMPLE RESULTS

Lab ID: L1731981-02
Client ID: MILL RESERVOIR
Sample Location: ANDOVER
Matrix: Water

Date Collected: 09/11/17 12:15
Date Received: 09/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Microbiological Analysis - Westborough Lab										
Coliform, Total (MPN)	2400		MPN/100ml	1.0	NA	1	-	09/11/17 17:50	121,9223B	RP
Coliform, Fecal (MPN)	11		MPN/100ml	2.0	NA	1	-	09/11/17 19:15	121,9221E	RP
E. Coli (MPN)	13		MPN/100ml	1.0	NA	1	-	09/11/17 17:50	121,9223B	RP
General Chemistry - Westborough Lab										
Turbidity	3.7		NTU	0.20	--	1	-	09/11/17 23:06	121,2130B	AS
Color, True	36		A.P.C.U.	10	--	2	-	09/11/17 18:48	121,2120B	AS
Color, Apparent	42		A.P.C.U.	10	--	2	-	09/11/17 18:48	121,2120B	AS
Alkalinity, Total	28.0		mg CaCO3/L	2.00	NA	1	-	09/13/17 09:23	121,2320B	BR
pH (H)	7.5		SU	-	NA	1	-	09/11/17 17:55	1,9040C	AS
Phosphorus, Total	0.017		mg/l	0.010	--	1	09/14/17 10:10	09/15/17 10:10	121,4500P-E	SD

Project Name: FOSTERS POND
Project Number: Not Specified

Lab Number: L1731981
Report Date: 09/18/17

SAMPLE RESULTS

Lab ID: L1731981-03
Client ID: OUTLET COVE
Sample Location: ANDOVER
Matrix: Water

Date Collected: 09/11/17 01:30
Date Received: 09/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Microbiological Analysis - Westborough Lab										
Coliform, Total (MPN)	460		MPN/100ml	1.0	NA	1	-	09/11/17 17:50	121,9223B	RP
Coliform, Fecal (MPN)	8.0		MPN/100ml	2.0	NA	1	-	09/11/17 19:15	121,9221E	RP
E. Coli (MPN)	2.0		MPN/100ml	1.0	NA	1	-	09/11/17 17:50	121,9223B	RP
General Chemistry - Westborough Lab										
Turbidity	0.70		NTU	0.20	--	1	-	09/11/17 23:06	121,2130B	AS
Color, True	23		A.P.C.U.	5.0	--	1	-	09/11/17 18:48	121,2120B	AS
Color, Apparent	27		A.P.C.U.	5.0	--	1	-	09/11/17 18:48	121,2120B	AS
Alkalinity, Total	18.1		mg CaCO3/L	2.00	NA	1	-	09/13/17 09:23	121,2320B	BR
pH (H)	6.7		SU	-	NA	1	-	09/11/17 17:55	1,9040C	AS
Phosphorus, Total	0.022		mg/l	0.010	--	1	09/14/17 10:10	09/15/17 10:11	121,4500P-E	SD

Project Name: FOSTERS POND
Project Number: Not Specified

Lab Number: L1731981
Report Date: 09/18/17

SAMPLE RESULTS

Lab ID: L1731981-04
Client ID: DUG POND
Sample Location: ANDOVER
Matrix: Water

Date Collected: 09/11/17 12:30
Date Received: 09/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Microbiological Analysis - Westborough Lab										
Coliform, Total (MPN)	2400		MPN/100ml	1.0	NA	1	-	09/11/17 17:50	121,9223B	RP
Coliform, Fecal (MPN)	2.0		MPN/100ml	2.0	NA	1	-	09/11/17 19:15	121,9221E	RP
E. Coli (MPN)	<1		MPN/100ml	1	NA	1	-	09/11/17 17:50	121,9223B	RP
General Chemistry - Westborough Lab										
Turbidity	0.89		NTU	0.20	--	1	-	09/11/17 23:06	121,2130B	AS
Color, True	6.0		A.P.C.U.	5.0	--	1	-	09/11/17 18:48	121,2120B	AS
Color, Apparent	13		A.P.C.U.	5.0	--	1	-	09/11/17 18:48	121,2120B	AS
Alkalinity, Total	17.1		mg CaCO3/L	2.00	NA	1	-	09/13/17 09:23	121,2320B	BR
pH (H)	6.7		SU	-	NA	1	-	09/11/17 17:55	1,9040C	AS
Phosphorus, Total	0.013		mg/l	0.010	--	1	09/14/17 10:10	09/15/17 10:13	121,4500P-E	SD

Project Name: FOSTERS POND
Project Number: Not Specified
Lab Number: L1731981
Report Date: 09/18/17

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Microbiological Analysis - Westborough Lab for sample(s): 01-04 Batch: WG1040507-1										
Coliform, Total (MPN)	<1		MPN/100ml	1	NA	1	-	09/11/17 17:50	121,9223B	RP
Microbiological Analysis - Westborough Lab for sample(s): 01-04 Batch: WG1040508-1										
E. Coli (MPN)	<1		MPN/100ml	1	NA	1	-	09/11/17 17:50	121,9223B	RP
Microbiological Analysis - Westborough Lab for sample(s): 01-04 Batch: WG1040509-1										
Coliform, Fecal (MPN)	<2		MPN/100ml	2	NA	1	-	09/11/17 19:15	121,9221E	RP
General Chemistry - Westborough Lab for sample(s): 01-04 Batch: WG1040539-1										
Turbidity	ND		NTU	0.20	--	1	-	09/11/17 23:06	121,2130B	AS
General Chemistry - Westborough Lab for sample(s): 01-04 Batch: WG1041115-1										
Alkalinity, Total	ND		mg CaCO3/L	2.00	NA	1	-	09/13/17 09:23	121,2320B	BR
General Chemistry - Westborough Lab for sample(s): 01-04 Batch: WG1041540-1										
Phosphorus, Total	ND		mg/l	0.010	--	1	09/14/17 10:10	09/15/17 09:53	121,4500P-E	SD

Lab Control Sample Analysis

Batch Quality Control

Project Name: FOSTERS POND
Project Number: Not Specified

Lab Number: L1731981
Report Date: 09/18/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-04 Batch: WG1040477-1								
pH	100		-		99-101	-		5
General Chemistry - Westborough Lab Associated sample(s): 01-04 Batch: WG1040539-2								
Turbidity	104		-		90-110	-		
General Chemistry - Westborough Lab Associated sample(s): 01-04 Batch: WG1041115-2								
Alkalinity, Total	104		-		90-110	-		10
General Chemistry - Westborough Lab Associated sample(s): 01-04 Batch: WG1041540-2								
Phosphorus, Total	107		-		80-120	-		

Matrix Spike Analysis
Batch Quality Control

Project Name: FOSTERS POND
Project Number: Not Specified

Lab Number: L1731981
Report Date: 09/18/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-04 QC Batch ID: WG1041115-4 QC Sample: L1731953-02 Client ID: MS Sample												
Alkalinity, Total	8.70	100	107	98		-	-		86-116	-		10
General Chemistry - Westborough Lab Associated sample(s): 01-04 QC Batch ID: WG1041540-3 QC Sample: L1731067-01 Client ID: MS Sample												
Phosphorus, Total	0.197	0.5	0.686	98		-	-		75-125	-		20

Lab Duplicate Analysis
Batch Quality Control

Project Name: FOSTERS POND
Project Number: Not Specified

Lab Number: L1731981
Report Date: 09/18/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-04 QC Batch ID: WG1040477-2 QC Sample: L1731981-01 Client ID: MAIN POND						
pH (H)	6.8	6.8	SU	0		5
General Chemistry - Westborough Lab Associated sample(s): 01-04 QC Batch ID: WG1040491-1 QC Sample: L1731981-01 Client ID: MAIN POND						
Color, Apparent	34	34	A.P.C.U.	0		
General Chemistry - Westborough Lab Associated sample(s): 01-04 QC Batch ID: WG1040501-1 QC Sample: L1731981-01 Client ID: MAIN POND						
Color, True	30	29	A.P.C.U.	3		
General Chemistry - Westborough Lab Associated sample(s): 01-04 QC Batch ID: WG1040539-3 QC Sample: L1731981-04 Client ID: DUG POND						
Turbidity	0.89	0.81	NTU	9		13
General Chemistry - Westborough Lab Associated sample(s): 01-04 QC Batch ID: WG1041115-3 QC Sample: L1731953-01 Client ID: DUP Sample						
Alkalinity, Total	9.70	9.40	mg CaCO3/L	3		10
General Chemistry - Westborough Lab Associated sample(s): 01-04 QC Batch ID: WG1041540-4 QC Sample: L1731067-01 Client ID: DUP Sample						
Phosphorus, Total	0.197	0.185	mg/l	6		20

Project Name: FOSTERS POND
Project Number: Not Specified

Lab Number: L1731981
Report Date: 09/18/17

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(*)
L1731981-01A	Bacteria Cup Na2S2O3 preserved	A	NA		18.6	Y	Absent		F-COLI-MPN(.33),E-COLI-QT(.33),T-COLI-QT(.33)
L1731981-01B	Bacteria Cup Na2S2O3 preserved	A	NA		18.6	Y	Absent		F-COLI-MPN(.33),E-COLI-QT(.33),T-COLI-QT(.33)
L1731981-01E	Plastic 250ml unpreserved/No Headspace	A	NA		18.6	Y	Absent		ALK-T-2320(14)
L1731981-01F	Plastic 500ml H2SO4 preserved	A	<2	<2	18.6	Y	Absent		TPHOS-4500(28)
L1731981-01G	Brown Plastic 1000ml unpreserved	A	N/A	N/A	18.6	Y	Absent		TURB-2130(2),COLOR-T-2120(2),COLOR-A-2120(2),PH-9040(1)
L1731981-02A	Bacteria Cup Na2S2O3 preserved	A	NA		18.6	Y	Absent		F-COLI-MPN(.33),E-COLI-QT(.33),T-COLI-QT(.33)
L1731981-02B	Bacteria Cup Na2S2O3 preserved	A	NA		18.6	Y	Absent		F-COLI-MPN(.33),E-COLI-QT(.33),T-COLI-QT(.33)
L1731981-02E	Plastic 250ml unpreserved/No Headspace	A	NA		18.6	Y	Absent		ALK-T-2320(14)
L1731981-02F	Plastic 500ml H2SO4 preserved	A	<2	<2	18.6	Y	Absent		TPHOS-4500(28)
L1731981-02G	Brown Plastic 1000ml unpreserved	A	N/A	N/A	18.6	Y	Absent		TURB-2130(2),COLOR-T-2120(2),COLOR-A-2120(2),PH-9040(1)
L1731981-03A	Bacteria Cup Na2S2O3 preserved	A	NA		18.6	Y	Absent		F-COLI-MPN(.33),E-COLI-QT(.33),T-COLI-QT(.33)
L1731981-03B	Bacteria Cup Na2S2O3 preserved	A	NA		18.6	Y	Absent		F-COLI-MPN(.33),E-COLI-QT(.33),T-COLI-QT(.33)
L1731981-03E	Plastic 250ml unpreserved/No Headspace	A	NA		18.6	Y	Absent		ALK-T-2320(14)
L1731981-03F	Plastic 500ml H2SO4 preserved	A	NA		18.6	Y	Absent		TPHOS-4500(28)
L1731981-03G	Brown Plastic 1000ml unpreserved	A	N/A	N/A	18.6	Y	Absent		TURB-2130(2),COLOR-T-2120(2),COLOR-A-2120(2),PH-9040(1)
L1731981-04A	Bacteria Cup Na2S2O3 preserved	A	NA		18.6	Y	Absent		F-COLI-MPN(.33),E-COLI-QT(.33),T-COLI-QT(.33)
L1731981-04B	Bacteria Cup Na2S2O3 preserved	A	NA		18.6	Y	Absent		F-COLI-MPN(.33),E-COLI-QT(.33),T-COLI-QT(.33)
L1731981-04E	Plastic 250ml unpreserved/No Headspace	A	NA		18.6	Y	Absent		ALK-T-2320(14)
L1731981-04F	Plastic 500ml H2SO4 preserved	A	<2	<2	18.6	Y	Absent		TPHOS-4500(28)

*Values in parentheses indicate holding time in days

Project Name: FOSTERS POND
Project Number: Not Specified

Lab Number: L1731981
Report Date: 09/18/17

Container Information

Container ID	*Container Type*	*Cooler*	*Initial pH*	*Final pH*	*Temp deg C*	*Pres*	*Seal*	*Frozen Date/Time*	*Analysis(*)*
L1731981-04G	Brown Plastic 1000ml unpreserved	A	N/A	N/A	18.6	Y	Absent		TURB-2130(2),COLOR-T-2120(2),COLOR-A-2120(2),PH-9040(1)

*Values in parentheses indicate holding time in days

Project Name:	FOSTERS POND	**Lab Number:**	L1731981
Project Number:	Not Specified	**Report Date:**	09/18/17

GLOSSARY

Acronyms

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).
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.
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.
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.
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.
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.

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.

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'.

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.

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 Condensation Product".
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

Report Format: Data Usability Report

Project Name:	FOSTERS POND	**Lab Number:**	L1731981
Project Number:	Not Specified	**Report Date:**	09/18/17

Data Qualifiers

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.

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.

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

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.

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

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

Report Format: Data Usability Report

Project Name: FOSTERS POND
Project Number: Not Specified
Lab Number: L1731981
Report Date: 09/18/17

REFERENCES

1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.

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: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
EPA 300: DW: Bromide
EPA 6860: NPW and SCM: Perchlorate
EPA 9010: NPW and SCM: Amenable Cyanide Distillation
EPA 9012B: NPW: Total Cyanide
EPA 9050A: NPW: Specific Conductance
SM3500: NPW: Ferrous Iron
SM4500: NPW: Amenable Cyanide, Dissolved Oxygen; SCM: Total Phosphorus, TKN, NO2, NO3.
SM5310C: DW: Dissolved Organic Carbon

Mansfield Facility
SM 2540D: TSS
EPA 3005A NPW
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
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: 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**
EPA 332: Perchlorate; **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, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **SM4500NO3-F, EPA 353.2**: Nitrate-N**, EPA 351.1, 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 624: Volatile Halocarbons & Aromatics,
EPA 608: 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: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E.**

Mansfield Facility:

Drinking Water
EPA 200.7: Ba, Be, Cd, Cr, Cu, Ni, Na, Ca. **EPA 200.8:** Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Ni, Se, TL. **EPA 245.1** Hg.

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, Pb, Mn, Ni, Se, Ag, 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
8 Walkup Drive
Westboro, MA 01581
Tel: 508-898-9220

320 Forbes Blvd
Mansfield, MA 02048
Tel: 508-822-9300

Date Rec'd in Lab: 09/11/2017

ALPHA Job #: L1731981

Client Information

Client: Solitude Lake Mgmt

Address: 590 Lake St
Shrewsbury

Phone: 865 1000

Email: barvidson@solitudelake.com

Project Information

Project Name: Fosters Pond

Project Location: Andover

Project #:

Project Manager: K. Sliwoski

ALPHA Quote #:

Turn-Around Time

☒ Standard ☐ RUSH (only confirmed if pre-approved!)

Date Due:

Report Information - Data Deliverables

☐ ADEx ☐ EMAIL

Billing Information

☐ Same as Client info PO #:

Regulatory Requirements & Project Information Requirements

☐ Yes ☐ No MA MCP Analytical Methods ☐ Yes ☐ No CT RCP Analytical Methods
☐ Yes ☐ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)
☐ Yes ☐ No GW1 Standards (Info Required for Metals & EPH with Targets)
☐ Yes ☐ No NPDES RGP
☐ Other State /Fed Program _____ Criteria _____

Additional Project Information:

run out of hold time

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	VOC: ☐ 8260 ☐ 624 ☐ 524.2	SVOC: ☐ ABN ☐ PAH	METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15	METALS: ☐ RCRA5 ☐ RCRA8 ☐ PP13	EPH: ☐ Ranges & Targets ☐ Ranges Only	VPH: ☐ Ranges & Targets ☐ Ranges Only	☐ PCB ☐ PEST	TPH: ☐ Quant Only ☐ Fingerprint	pH, alk, turb, T phos, total coliform, fecal E. Coli	Sample Comments	TOTAL # BOTTLES
31981-01	Main Pond	9/11	11:20	aq	KS									6		6
02	Mill Reservoir	9/11	12:15	aq	KS									6		6
03	Outlet cove	9/11	1:30	aq	KS									6		6
04	Dug Pond	9/11	12:30	aq	KS									6		6

SAMPLE INFO
Filtration
☐ Field
☐ Lab to do
Preservation
☐ Lab to do

Container Type																
Preservative																

Container Type
P= Plastic
A= Amber glass
V= Vial
G= Glass
B= Bacteria cup
C= Cube
O= Other
E= Encore
D= BOD Bottle

Preservative
A= None
B= HCl
C= HNO_3
D= H_2SO_4
E= NaOH
F= MeOH
G= $NaHSO_4$
H = $Na_2S_2O_3$
I= Ascorbic Acid
J = NH_4Cl
K= Zn Acetate
O= Other

Relinquished By:	Date/Time	Received By:	Date/Time
	9/11/17		9/11/17 1547

All samples submitted are subject to Alpha's Terms and Conditions.
See reverse side.

FORM NO. 01-01 (rev. 12-Mar-2012)

SOLitude Lake Management
590 Lake Street
Shrewsbury, MA 01545

EMAIL ADDRESS:
BArvidson@solitudelake.com

Report Date:	**7/26/2017**	**Date Sampled:**	**7/13/2017**
Laboratory ID#:	**1770777-01**	**Date Received:**	**7/17/2017**
		Date Tested:	**7/25/2017**

Sample Site: SURFACE WATER: MILL RESERVOIR, FOSTERS POND

MICROSCOPIC EXAMINATION == Natural Units Count & Blue/Green Cell Counts

ORGANISM	#/ml
Diatomaceae	
Amphora	
Asterionella*	
Amphiprora	
Cocinodiscus	
Cyclotella*	62
Cymbella	
Diatoma*	
Frustulia	
Fragilaria	
Gyrosigma	
Gomphonema	
Melosira	
Meridion*	
Navicula	
Nitzschia	
Pleurosigma	
Stephanodiscus	
Surirella	
Synedra	
Tabellaria*	
Rotifera	
Anuraea	
Asplanchna	
Brachionus	
Conochilus	
Euchlanis	
Keratella	
Notholca	
Polyarthra	
Rotifer	12
Synchaeta	
Kellicottia	

ORGANISM	#/ml
Chlorophyceae	
Actinastrum	
Arthrodesmus	
Ankistrodesmus	
Chorella	
Closterium	
Coelastrum	21
Cosmarium	
Dictyosphaerium*	
Eudorina*	
Elakatothrix	
Gleocystis	
Micrasterias	
Mougeotia	
Pandorina*	
Pediastrum	
Protococcus	
Quadrigula	
Scenedesmus	
Sphaerocystis	
Sphaerozosma	
Spirogyra	
Staurastrum	
Tetraspora	
Westella	
Ulothrix	
Volvox*	
Xanthidium	
Zygnema	

ORGANISM	Cell #/ml	#/ml
Cyanophyceae		
Anabaena*		
Anabaenopsis		
Aphanocapsa		
Aphanizomenon*		
Aphanothece		
Aulosira		
Arthrospira		
Chroococcus		
Clathrocystis*		
Coelosphaerium*		
Cylindrospermum		
Cuspidothrix		
Dactylococcopsis		
Eucapsis		
Gleocapsa		
Galucocystis		
Gloeothece		
Gomphosphaeria		
Hydrocoleum		
Microcystis		
Merismopedia		
Nostoc		
Nodularia		
Oscillaria		
Pseudanabaena		
Spirulina		
Rivularia*		
Xenococcus		
Miscellaneous		
Acarina		
Anguillula		
Bosmina		
Canthocamptus		
Cyclops		
Daphnia		
Diaptomus		

ORGANISM	#/ml
Protozoa	
Actinophrys	
Amoeba	
Arcella	
Bursaria*	
Ceratium	
Cercomonas	
Chilomonas	
Chlamydomonas	
Codonella	
Cryptomonas*	
Difflugia	
Dinobryon*	14000
Euglena	
Glenodinium*	
Gonium	
Halteria	
Mallomonas*	
Monas	
Peridinium*	
Synura*	
Trachelomonas	
Uroglenopsis*	
Vorticella	
* Odor Producing	

TOTAL NATURAL UNIT COUNT: 14000/ml

BLUE GREEN CELL COUNT: 0/ml

Comments: **Results are based on sample, as submitted to Northeast Laboratories, Inc. on: 7/17/2017.**

Approved by:

SOLitude Lake Management
590 Lake Street
Shrewsbury, MA 01545

EMAIL ADDRESS:
BArvidson@solitudelake.com

Report Date:	**7/26/2017**	**Date Sampled:**	**7/13/2017**
Laboratory ID#:	**1770777-02**	**Date Received:**	**7/17/2017**
		Date Tested:	**7/25/2017**

Sample Site: SURFACE WATER: OUTLET COVE, FOSTERS POND

MICROSCOPIC EXAMINATION == Natural Units Count & Blue/Green Cell Counts

ORGANISM	#/ml
Diatomaceae	
Amphora	
Asterionella*	15
Amphiprora	
Cocinodiscus	
Cyclotella*	
Cymbella	
Diatoma*	
Frustulia	
Fragilaria	
Gyrosigma	
Gomphonema	
Melosira	
Meridion*	
Navicula	
Nitzschia	
Pleurosigma	
Stephanodiscus	
Surirella	
Synedra	
Tabellaria*	
Rotifera	
Anuraea	
Asplanchna	
Brachionus	
Conochilus	
Euchlanis	
Keratella	
Notholca	
Polyarthra	
Rotifer	
Synchaeta	
Kellicottia	

ORGANISM	#/ml
Chlorophyceae	
Actinastrum	
Arthrodesmus	
Ankistrodesmus	
Chorella	
Closterium	
Coelastrum	12
Cosmarium	
Dictyosphaerium*	
Eudorina*	
Elakatothrix	
Gleocystis	
Micrasterias	
Mougeotia	
Pandorina*	
Pediastrum	
Protococcus	
Quadrigula	
Scenedesmus	
Sphaerocystis	
Sphaerozosma	
Spirogyra	
Staurastrum	23
Tetraspora	
Westella	
Ulothrix	
Volvox*	
Xanthidium	
Zygnema	

ORGANISM	Cell #/ml	#/ml
Cyanophyceae		
Anabaena*		
Anabaenopsis		
Aphanocapsa		
Aphanizomenon*		
Aphanothece		
Aulosira		
Arthrospira		
Chroococcus		
Clathrocystis*		
Coelosphaerium*		
Cylindrospermum		
Cuspidothrix		
Dactylococcopsis		
Eucapsis		
Gleocapsa		
Galucocystis		
Gloeothece		
Gomphosphaeria		
Hydrocoleum		
Microcystis		
Merismopedia		
Nostoc		
Nodularia		
Oscillaria		
Pseudanabaena		
Spirulina		
Rivularia*		
Xenococcus		
Miscellaneous		
Acarina		
Anguillula		
Bosmina		
Canthocamptus		
Cyclops		
Daphnia		
Diaptomus		

ORGANISM	#/ml
Protozoa	
Actinophrys	
Amoeba	
Arcella	
Bursaria*	
Ceratium	85
Cercomonas	
Chilomonas	
Chlamydomonas	
Codonella	
Cryptomonas*	
Difflugia	50
Dinobryon*	
Euglena	
Glenodinium*	
Gonium	
Halteria	
Mallomonas*	8
Monas	
Peridinium*	
Synura*	
Trachelomonas	
Uroglenopsis*	
Vorticella	
* Odor Producing	

TOTAL NATURAL UNIT COUNT: 190/ ml

BLUE GREEN CELL COUNT: 0/ml

Comments: **Results are based on sample, as submitted to Northeast Laboratories, Inc. on: 7/17/2017.**

Approved by:

SOLitude Lake Management
590 Lake Street
Shrewsbury, MA 01545

EMAIL ADDRESS:
BArvidson@solitudelake.com

Report Date:	**8/11/2017**	**Date Sampled:**	**7/31/2017**
Laboratory ID#:	**1771089-01**	**Date Received:**	**8/09/2017**
		Date Tested:	**8/10/17**

Sample Site: SURFACE WATER: FOSTERS POND, MAIN

MICROSCOPIC EXAMINATION == Natural Units Count & Blue/Green Cell Counts

ORGANISM	#/ml
Diatomaceae	
Amphora	
Asterionella*	190
Amphiprora	
Cocinodiscus	
Cyclotella*	230
Cymbella	
Diatoma*	
Frustulia	
Fragilaria	
Gyrosigma	
Gomphonema	
Melosira	
Meridion*	
Navicula	10
Nitzschia	
Pleurosigma	
Stephanodiscus	
Surirella	
Synedra	140
Tabellaria*	77
Rotifera	
Anuraea	
Asplanchna	
Brachionus	
Conochilus	
Euchlanis	
Keratella	
Notholca	
Polyarthra	
Rotifer	
Synchaeta	
Kellicottia	

ORGANISM	#/ml
Chlorophyceae	
Actinastrum	
Arthrodesmus	
Ankistrodesmus	
Chorella	
Closterium	72
Coelastrum	110
Cosmarium	
Dictyosphaerium*	
Eudorina*	
Elakatothrix	
Gleocystis	
Micrasterias	
Mougeotia	
Pandorina*	
Pediastrum	
Protococcus	
Quadrigula	
Scenedesmus	
Sphaerocystis	
Sphaerozosma	
Spirogyra	
Staurastrum	77
Tetraspora	
Westella	
Ulothrix	100
Volvox*	
Xanthidium	
Zygnema	

ORGANISM	Cell #/ml	#/ml
Cyanophyceae		
Anabaena*	170	5
Anabaenopsis		
Aphanocapsa		
Aphanizomenon*		
Aphanothece		
Aulosira		
Arthrospira		
Chroococcus		
Clathrocystis*		
Coelosphaerium*		
Cylindrospermum		
Cuspidothrix		
Dactylococcopsis		
Eucapsis		
Gleocapsa		
Galucocystis		
Gloeothece		
Gomphosphaeria		
Hydrocoleum		
Microcystis		
Merismopedia		
Nostoc		
Nodularia		
Oscillaria		
Pseudanabaena		
Spirulina		
Rivularia*		
Xenococcus		
Miscellaneous		
Acarina		
Anguillula		
Bosmina		
Canthocamptus		
Cyclops		
Daphnia		
Diaptomus		

ORGANISM	#/ml
Protozoa	
Actinophrys	
Amoeba	
Arcella	
Bursaria*	
Ceratium	
Cercomonas	
Chilomonas	
Chlamydomonas	
Codonella	
Cryptomonas*	
Difflugia	
Dinobryon*	190
Euglena	
Glenodinium*	
Gonium	
Halteria	
Mallomonas*	63
Monas	
Peridinium*	
Synura*	
Trachelomonas	
Uroglenopsis*	
Vorticella	
* Odor Producing	

TOTAL NATURAL UNIT COUNT: 1300/ ml

BLUE GREEN CELL COUNT: 170/ ml

Comments: **Results are based on sample, as submitted to Northeast Laboratories, Inc. on: 8/09/2017.**

Approved by: Adam C. Drake

SOLitude Lake Management
590 Lake Street
Shrewsbury, MA 01545

EMAIL ADDRESS:
BArvidson@solitudelake.com

Report Date:	**8/11/2017**	**Date Sampled:**	**7/31/2017**
Laboratory ID#:	**1771089-02**	**Date Received:**	**8/09/2017**
		Date Tested:	**8/10/17**

Sample Site: SURFACE WATER: FOSTERS POND, OUTLET COVE

MICROSCOPIC EXAMINATION == Natural Units Count & Blue/Green Cell Counts

ORGANISM	# / ml
Diatomaceae	
Amphora	200
Asterionella*	
Amphiprora	
Cocinodiscus	
Cyclotella*	210
Cymbella	
Diatoma*	
Frustulia	
Fragilaria	53
Gyrosigma	
Gomphonema	
Melosira	
Meridion*	
Navicula	
Nitzschia	
Pleurosigma	
Stephanodiscus	
Surirella	
Synedra	190
Tabellaria*	53
Rotifera	
Anuraea	
Asplanchna	
Brachionus	
Conochilus	
Euchlanis	
Keratella	
Notholca	
Polyarthra	
Rotifer	
Synchaeta	
Kellicottia	

ORGANISM	# / ml
Chlorophyceae	
Actinastrum	
Arthrodesmus	
Ankistrodesmus	
Chorella	
Closterium	10
Coelastrum	34
Cosmarium	
Dictyosphaerium*	
Eudorina*	
Elakatothrix	
Gleocystis	
Micrasterias	
Mougeotia	
Pandorina*	
Pediastrum	
Protococcus	
Quadrigula	
Scenedesmus	
Sphaerocystis	
Sphaerozosma	
Spirogyra	
Staurastrum	
Tetraspora	
Westella	
Ulothrix	19
Volvox*	
Xanthidium	
Zygnema	

ORGANISM	Cell # / ml	# / ml
Cyanophyceae		
Anabaena*	48	5
Anabaenopsis		
Aphanocapsa	460	5
Aphanizomenon*		
Aphanothece		
Aulosira		
Arthrospira		
Chroococcus		
Clathrocystis*		
Coelosphaerium*		
Cylindrospermum		
Cuspidothrix		
Dactylococcopsis		
Eucapsis		
Gleocapsa		
Galucocystis		
Gloeothece		
Gomphosphaeria		
Hydrocoleum		
Microcystis		
Merismopedia		
Nostoc		
Nodularia		
Oscillaria		
Pseudanabaena		
Spirulina		
Rivularia*		
Xenococcus		
Miscellaneous		
Acarina		
Anguillula		
Bosmina		
Canthocamptus		
Cyclops		
Daphnia		
Diaptomus		

ORGANISM	# / ml
Protozoa	
Actinophrys	
Amoeba	
Arcella	
Bursaria*	
Ceratium	
Cercomonas	
Chilomonas	
Chlamydomonas	
Codonella	
Cryptomonas*	
Difflugia	
Dinobryon*	110
Euglena	
Glenodinium*	
Gonium	
Halteria	
Mallomonas*	
Monas	
Peridinium*	
Synura*	
Trachelomonas	
Uroglenopsis*	
Vorticella	
* Odor Producing	

TOTAL NATURAL UNIT COUNT: 889/ ml

BLUE GREEN CELL COUNT: 510/ ml

Comments: **Results are based on sample, as submitted to Northeast Laboratories, Inc. on: 8/09/2017.**

Approved by: Adam C. Drake

ANALYTICAL REPORT

SOLitude Lake Management
590 Lake Street
Shrewsbury, MA 01545

EMAIL ADDRESS:
BArvidson@solitudelake.com

Report Date:	9/11/2017	**Date Sampled:**	9/11/2017
Laboratory ID#:	1771512-03	**Date Received:**	9/12/2017
		Date Tested:	9/15/2017

Sample Site: SURFACE WATER: FOSTERS POND, MILL RESERVOIR

MICROSCOPIC EXAMINATION == Natural Units Count & Blue/Green Cell Counts

ORGANISM	# / ml
Diatomaceae	
Amphora	
Asterionella*	
Amphiprora	
Cocinodiscus	
Cyclotella*	58
Cymbella	19
Diatoma*	
Frustulia	
Fragilaria	
Gyrosigma	
Gomphonema	
Melosira	
Meridion*	
Navicula	
Nitzschia	
Pleurosigma	
Stephanodiscus	
Surirella	
Synedra	72
Tabellaria*	130
Rotifera	
Anuraea	
Asplanchna	
Brachionus	
Conochilus	
Euchlanis	
Keratella	
Notholca	
Polyarthra	
Rotifer	
Synchaeta	
Kellicottia	

ORGANISM	# / ml
Chlorophyceae	
Actinastrum	
Arthrodesmus	
Ankistrodesmus	
Chorella	
Closterium	
Coelastrum	
Cosmarium	
Dictyosphaerium*	
Eudorina*	
Elakatothrix	
Gleocystis	
Micrasterias	
Mougeotia	
Pandorina*	
Pediastrum	
Protococcus	
Quadrigula	
Scenedesmus	
Sphaerocystis	
Sphaerozosma	
Spirogyra	
Staurastrum	39
Tetraspora	
Westella	
Ulothrix	
Volvox*	
Xanthidium	
Zygnema	

ORGANISM	Cell # / ml	# / ml
Cyanophyceae		
Anabaena*	1300	24
Anabaenopsis		
Aphanocapsa		
Aphanizomenon*		
Aphanothece		
Aulosira		
Arthrospira		
Chroococcus	20	5
Clathrocystis*		
Coelosphaerium*		
Cylindrospermum		
Cuspidothrix		
Dactylococcopsis		
Eucapsis		
Gleocapsa		
Galucocystis		
Gloeothece		
Gomphosphaeria		
Hydrocoleum		
Microcystis		
Merismopedia		
Nostoc		
Nodularia		
Oscillaria		
Pseudanabaena	3000	34
Spirulina		
Rivularia*		
Xenococcus		
Miscellaneous		
Acarina		
Anguillula		
Bosmina		
Canthocamptus		
Cyclops		
Daphnia		
Diaptomus		

ORGANISM	# / ml
Protozoa	
Actinophrys	
Amoeba	
Arcella	
Bursaria*	
Ceratium	19
Cercomonas	
Chilomonas	
Chlamydomonas	
Codonella	
Cryptomonas*	
Difflugia	
Dinobryon*	130
Euglena	
Glenodinium*	
Gonium	
Halteria	
Mallomonas*	
Monas	
Peridinium*	14
Synura*	
Trachelomonas	
Uroglenopsis*	
Vorticella	
* Odor Producing	

TOTAL NATURAL UNIT COUNT: 540 / ml

BLUE GREEN CELL COUNT: 4300 / ml

Comments: **Results are based on sample, as submitted to Northeast Laboratories, Inc. on: 9/12/2017.**

Approved by: Adam C. Shaw

SOLitude Lake Management
590 Lake Street
Shrewsbury, MA 01545

EMAIL ADDRESS:
BArvidson@solitudelake.com

Report Date:	**9/11/2017**	**Date Sampled:**	**9/11/2017**
Laboratory ID#:	**1771512-04**	**Date Received:**	**9/12/2017**
		Date Tested:	**9/15/2017**

Sample Site: SURFACE WATER: FOSTERS POND, MAIN POND

MICROSCOPIC EXAMINATION == Natural Units Count & Blue/Green Cell Counts

ORGANISM	# / ml
Diatomaceae	
Amphora	
Asterionella*	180
Amphiprora	
Cocinodiscus	
Cyclotella*	77
Cymbella	
Diatoma*	
Frustulia	
Fragilaria	
Gyrosigma	
Gomphonema	
Melosira	
Meridion*	
Navicula	
Nitzschia	
Pleurosigma	
Stephanodiscus	
Surirella	
Synedra	100
Tabellaria*	
Rotifera	
Anuraea	
Asplanchna	
Brachionus	
Conochilus	
Euchlanis	
Keratella	
Notholca	
Polyarthra	
Rotifer	10
Synchaeta	
Kellicottia	

ORGANISM	# / ml
Chlorophyceae	
Actinastrum	
Arthrodesmus	
Ankistrodesmus	
Chorella	
Closterium	
Coelastrum	360
Cosmarium	
Dictyosphaerium*	
Eudorina*	
Elakatothrix	
Gleocystis	
Micrasterias	
Mougeotia	
Pandorina*	
Pediastrum	
Protococcus	
Quadrigula	
Scenedesmus	
Sphaerocystis	
Sphaerozosma	
Spirogyra	
Staurastrum	190
Tetraspora	10
Westella	
Ulothrix	34
Volvox*	
Xanthidium	
Zygnema	

ORGANISM	Cell # / ml	# / ml
Cyanophyceae		
Anabaena*		
Anabaenopsis		
Aphanocapsa		
Aphanizomenon*		
Aphanothece		
Aulosira		
Arthrospira		
Chroococcus		
Clathrocystis*		
Coelosphaerium*		
Cylindrospermum		
Cuspidothrix		
Dactylococcopsis		
Eucapsis		
Gleocapsa		
Galucocystis		
Gloeothece		
Gomphosphaeria		
Hydrocoleum		
Microcystis		
Merismopedia		
Nostoc		
Nodularia		
Oscillaria		
Pseudanabaena		
Spirulina		
Rivularia*		
Xenococcus		
Miscellaneous		
Acarina		
Anguillula		
Bosmina		
Canthocamptus		
Cyclops		
Daphnia		
Diaptomus		

ORGANISM	# / ml
Protozoa	
Actinophrys	
Amoeba	
Arcella	
Bursaria*	
Ceratium	
Cercomonas	
Chilomonas	
Chlamydomonas	
Codonella	
Cryptomonas*	
Difflugia	
Dinobryon*	
Euglena	
Glenodinium*	
Gonium	
Halteria	
Mallomonas*	
Monas	
Peridinium*	
Synura*	
Trachelomonas	
Uroglenopsis*	
Vorticella	
* Odor Producing	

TOTAL NATURAL UNIT COUNT: 960 / ml

BLUE GREEN CELL COUNT: 0 / ml

Comments: **Results are based on sample, as submitted to Northeast Laboratories, Inc. on: 9/12/2017.**

Approved by: Adam C. Drake