SŌLITUDE
LAKE MANAGEMENT

Annual Report
2020 Aquatic Management Program
Foster's Pond
Andover, MA

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Introduction

Invasive aquatic vegetation control and water quality monitoring were the focus of this year's lake management efforts at Foster's Pond. This year's treatments included spot-treatments of fanwort (*Cabomba caroliana*), and a spot treatment for spiny naiad (*Najas minor*). There was no treatment for cyanobacteria management this year. This season marked five years since a whole-pond Sonar herbicide treatment program was conducted (2015) to control invasive fanwort, and some areas of regrowth were targeted for treatment with Sonar again this season. The purpose of the 2020 survey was to document the level of control from this year's treatments, track the biodiversity of aquatic vegetation, and assess water quality. Again, 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 (#WM04-0000105).

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

2020 Program Chronology

- MA DEP License to Apply Chemicals issued 04/16/20
- Pre-treatment inspection 05/28/20
- Initial Sonar treatment 06/04/20
- Hydro-raking of shoreline areas commenced 06/16/20
- Hydro-raking completed 06/23/20
- Sonar booster treatment 06/23/20
- Spiny naiad pre-treatment survey 07/20/20
- Sonar booster treatment 07/20/20
- Spiny naiad treatment 08/13/20
- Late-season vegetation survey 09/03/20
- Collection of water quality samples 09/03/20

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. Approximately forty-two and a half (42.5) hours of hydro-raking services were provided between June 16 and June 23. 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 fourth consecutive year when hydro-raking operations were scheduled for the spring. In years prior to 2017, hydro-raking was performed in the fall. However, planned fall hydro-raking was rendered impossible in 2016 due to drought conditions as many coves were too shallow for effective rake operation. Due to the drought conditions experienced this summer and through early fall, a similar situation would have been encountered had hydro-raking been planned for the fall.

The 2020 operations, initially planned to begin in April, were delayed when the Conservation Commission suspended meetings due to the coronavirus epidemic and was unable to approve the list of hydro-raking participants until it conducted its first virtual meeting on May 26. Fortunately, the water level remained sufficiently high to allow shoreline access at the participating sites. It is anticipated that spring hydro-raking will continue to be the preferred option, except when maintenance or repair work on the Foster's Pond Dam requires an extension of the annual winter drawdown, as may be the case in 2021.

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, FPC volunteers conducted multiple rounds of Secchi disk readings in different basins and, when water clarity dropped noticeably in July, brought water samples to the Andover Water Treatment Plant for informal analysis. In addition, the FPC also often relies on non-quantitative visual cues, such as shoreline scums, to guide their decision to proceed with algae management or not.

Algaecide Treatment

For the first time in a few years, there was no algaecide treatment conducted at Foster's Pond this season.

Fanwort Herbicide Treatment

Based on the last season 2019 survey results, fanwort growth within the opening of Mill Reservoir was targeted for treatment with Sonar (fluridone) herbicide in 2020. This area totaled 1.1 acres. Granular Sonar One pellets were the only formulation utilized during the treatment program to better apply the herbicide directly to the fanwort plants. No fanwort was detected in the treatment area in the course of the fall vegetation survey.

On May 28, a SŌLitude biologist conducted the cursory, pre-treatment survey to assess the fanwort growth stage for timing of the initial Sonar application. This survey was conducted later than in prior years as a result of management approval from the Andover Conservation Commission due to COVID-19 related meeting delays. At this time, fanwort plants were just beginning to grow within the water column, as well as other native species. Based on prior years' Sonar One treatment program at Foster's Pond, it is imperative to apply the Sonar pellets early to allow the plants to "grow into" the fluridone concentration within the water. This treatment approach allows for lower concentrations of Sonar to be used as there is less plant biomass to impact. Following the pre-treatment survey, the initial treatment was scheduled for June 4. Again, this date was later than normal due to COVID-19 related delays.

All treatment dates for the Sonar treatment applications were coordinated with the 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. The initial treatment was completed on June 4, with follow-up booster treatments completed on June 23, and July 20; all treatments were applied to the same pre-determined 1.1 acres by SŌLitude's licensed aquatic applicators in accordance with conditions of the DEP License to Apply Chemicals, the Sonar One herbicide label, the OOC, and the program and protocol approved by the Conservation Commission on May 26. The Sonar pellets were applied via backpack blower. The pre-determined treatment 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.

The total amount of Sonar H4C applied to the Pond through the course of the three treatments was 70 pounds. The target in-water concentration in the treatment area was 5 to 10 ppb. On June 23 (just prior to the application of the first booster treatment), a water sample was drawn from the treatment area. That sample was analyzed for the presence of Sonar and yielded a result of 1.2 ppb. The laboratory report is attached. Given the slow-release profile of granular Sonar pellets, their proclivity to sink into the bottom sediments, and the relatively short half-life of Sonar (approximately 20 days), it was anticipated that the peak release would occur 1-2 weeks after treatment. The observed concentration of 1.2 ppb less than three weeks after the initial treatment indicates that the maximum concentration was at or below the low end of the target concentration.

A map of the Sonar treatment areas is attached.

During the booster applications, it was noted by Steve Cotton of FPC and observed during application that fanwort growth existed beyond the boundaries of the Sonar treatment area within Mill Reservoir. This growth had not been observed during the fall 2019 survey and thus had not been included for management in 2020. The extent of the growth is indicated in the Fanwort

and Spiny Naiad Locations 2020 map, attached, which was developed as part of this year's fall survey.

Spiny Naiad Survey

Spiny naiad growth has been observed in various areas of Foster's Pond over the last few seasons. In anticipation of this again in 2020, the FPC sought approval from the Conservation Commission for a treatment, with the precise locations determined on the basis of pre-treatment observations. A locative pre-treatment survey was conducted on July 20 (following the Sonar booster application) to assess the spiny naiad growth and further determine areas requiring treatment. Spiny naiad growth was prevalent within the channel from the Main Pond to Outlet Cove; as such, treatment of approximately 2.5 acres within that area was targeted for treatment on August 13.

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.

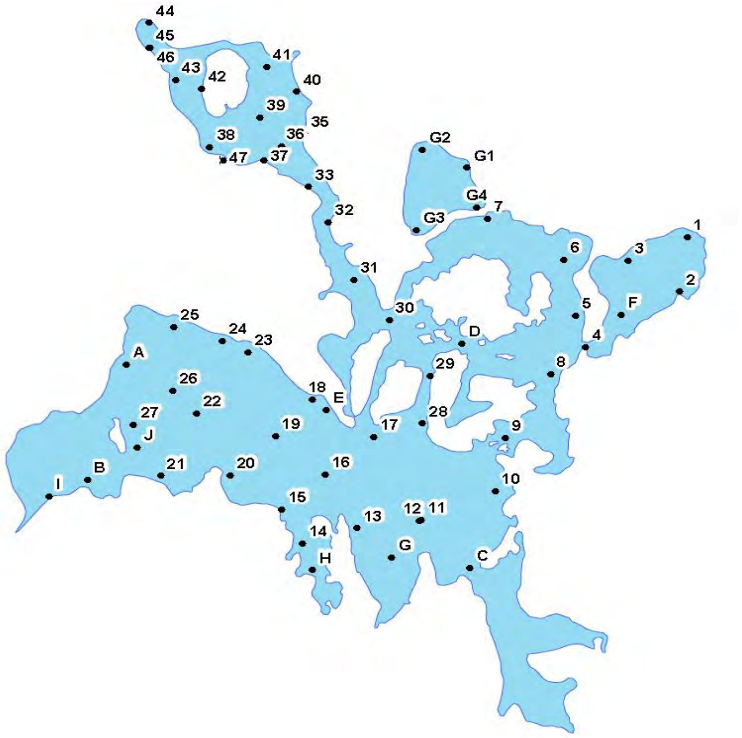
Treatment of approximately 2.5 acres with Tribune (diquat) herbicide was conducted on August 13 by SŌLitude's licensed aquatic applicators in accordance with conditions of the DEP License to Apply Chemicals, the diquat herbicide label, the OOC, and the program and protocol approved by the Conservation Commission on May 26. 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 diquat treatment areas is attached. The subsequent fall vegetation survey found no spiny naiad in the treated areas.

Annual Late-Season Vegetation Survey

On September 3rd, a SŌLitude biologist conducted the annual aquatic vegetation survey of Foster's Pond, including the Main Pond, Outlet Cove, Azalea Drive, Mill Reservoir, the channels connecting these basins, and Dug Pond. This annual survey documents the aquatic plant composition and distribution utilizing consistent survey methodology, transects and data points established at the time of the first survey in 2004. Supplementary survey points have been added into the survey based on client recommendation and request: ten data points including G1-G4 in Dug Pond in 2008 A-E in 2016, and F-J in 2018. A total of 61 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, the basins supported similar levels of vegetation to those observed over the last few years, with regard to total percent cover, biomass, and species richness (Table 2). White and yellow waterlilies, muskgrass, and filamentous algae, and were the dominant species within the lake. Other plant species in the lake are fairly sporadic across the basins – most notably humped bladderwort (*Utricularia* gibba), purple bladderwort (*Utricularia purpurea*), common bladderwort (*Utricularia vulgaris*), and spiny naiad (*Najas minor*).

Table 2. Aquatic vegetation analysis 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[2]	67.6	17.7	2.2	1.8
2018[2]	59.3	11.7	2.0	1.4
2019[2]	41.5	1.5	1.8	3.0
2020[2]	49.6	2.1	3.1	2.8

[1]Whole-lake Sonar (fluridone) treatment performed
[2]Excludes additional points A-J, compares to 2016 data points

Percent fanwort cover increased slightly from 1.5% in 2019 to 2.1% in 2020 comparing only the 2016 point locations. The additional points A-J should not be used for past comparison, but rather documentation for future efforts. However, the frequency of fanwort documentation across all points remained the same regardless of the point additions – 13% frequency. Of the 2020 A-J points, none supported fanwort growth. Additional growth of fanwort was noted between point locations, and as such the point survey should not be used to determine the specific locations of fanwort, rather for just the whole-lake percentage. Spiny naiad was documented at several new points, including in the historical areas.

Notably, the fanwort infestation in Dug Pond (G1-G4) was present at only two of the four sites (G1 & G2) within that basin.

The shallow and cove areas support the majority of white waterlilies. Other species encountered, including but not limited to pondweeds (*Potamogeton* spp.), coontail (*Ceratophyllum demersum*), Spikerush (Eleocharis spp.); other bladderwort species had generally low-density scattered growth.

A list of the aquatic plant species observed in 2020 with historical comparison of presence and absence is as follows:

Table 3. Aquatic species list (2005-2020)

Type	Macrophyte Species	Common Name	2005	2008	2009	2011	2012	2014	2015	2016	2017	2018	2019	2020
Submersed	*Bidens beckii*	Water marigold			X									
	Cabomba caroliniana	Fanwort	X	X	X		X	X		X	X	X	X	X
	Callitriche sp.	Water starwort			X					X		X		X
	Ceratophyllum demersum	Coontail	X	X	X	X	X	X	X	X	X	X	X	X
	Chara sp.	Muskgrass			X	X						X	X	X
	Chlorophyta	Filamentous algae	X	X	X	X	X	X	X	X	X	X	X	X
	Egeria densa	Brazilian elodea	X	X	X									
	Elodea canadensis	Common waterweed			X							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/Fontinalis	Water moss	X	X	X		X	X	X		X	X		
	Myriophyllum humile	Low watermilfoil	X	X	X	X		X			X	X	X	
	Najas flexilis	Slender naiad	X	X	X		X	X						X
	Najas guadalupensis	Southern naiad										X		X
	Najas minor	Spiny naiad			X			X		X	X	X	X	X
	Nitella sp.	Stonewort	X	X	X	X	X	X	X	X	X			
	Potamogeton amplifolius	Largeleaf pondweed										X	X	
	Potamogeton epihydrus	Ribbonleaf pondweed		X	X	X	X	X	X	X	X	X	X	X
	Potamogeton gramineus	Variable-leaf pondweed			X		X				X	X		
	Potamogeton natans	Floating leaf pondweed		X	X			X			X		X	X
	Potamogeton pusillus	Thin-leaf Pondweed						X		X		X	X	X
	Potamogeton robbinsii	Robbins' Pondweed								X	X		X	
	Sagittaria sp.	Arrowhead		X	X		X							
	Schoenoplectus subterminalis	Grassy bulrush										X	X	
	Utricularia spp.	Bladderwort	X	X	X	X	X	X	X	X	X	X	X	X
	Vallisneria americana	Wild celery			X						X			
Floating Leaf	*Brasenia schreberi*	Watershield		X	X		X	X	X		X		X	X
	Lemna minor	Lesser duckweed			X									
	Nuphar variegata	Yellow waterlily	X	X	X	X	X	X	X	X	X	X	X	X
	Nymphaea odorata	White waterlily	X	X	X	X	X	X	X	X	X	X	X	X
	Nymphoides cordata	Floating heart										X		
	Spirodela polyrhiza	Big duckweed			X									
Emergent	*Decodon verticillatus*	Water willow	X	X	X	X	X		X*	X*	X*	X*	X*	X*
	Eleocharis sp.	Spikerush			X									X
	Eriocaulon sp	Pipewort	X	X										
	Lythrum salicaria	Purple loosestrife	X	X	X	X	X	X	X*	X*	X*	X*	X*	X*
	Peltandra virginica	Arrow arum			X							X*	X*	
	Pontederia cordata	Pickerelweed	X	X	X	X	X				X*	X*	X*	X*
	Scirpus sp.	Rushes	X	X								X*	X*	X*
	Sparganium sp.	Burreed		X	X	X	X	X	X*	X*	X*	X*	X*	
	Typha sp.	Cattail	X	X	X	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 2020 consistent with prior year's efforts and locations, in addition to Azalea Drive that was added in 2017. Surface grab water samples were collected from five locations, shown on below map, on September 3rd. Laboratory analysis was performed for the following parameters: pH, alkalinity, total phosphorus, turbidity, true and apparent color, fecal and total coliform.

Figure 2. Water quality sample locations

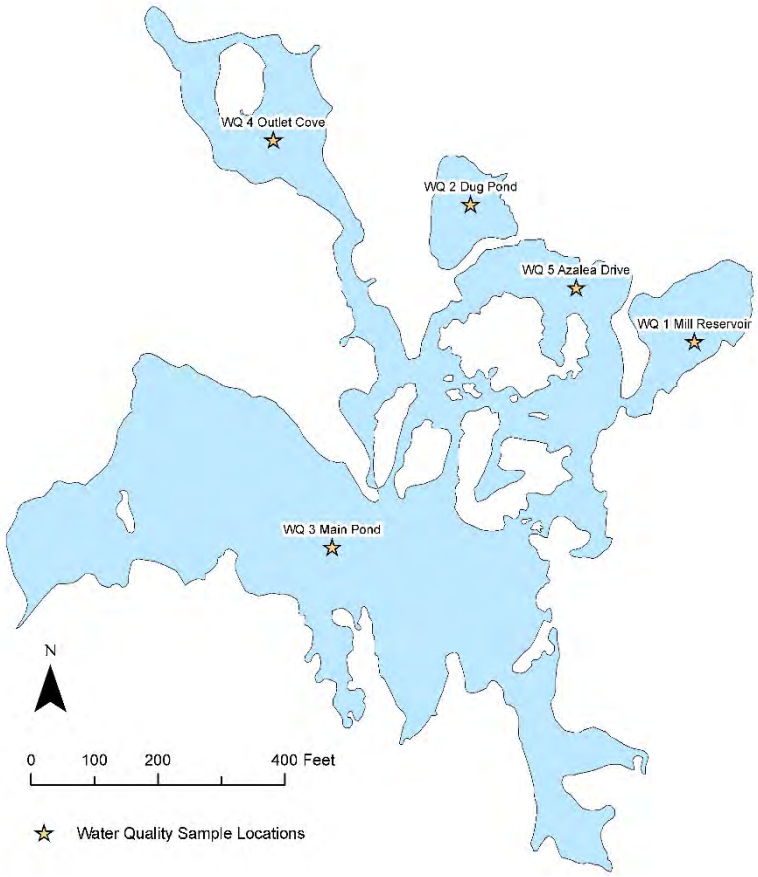


Table 4. Water quality results

Parameter	Units	Desirable Thresholds	Mill Reservoir (WQ1)	Dug Pond (WQ2)	Main Pond (WQ3)	Outlet Cove (WQ4)	Azalea Drive (WQ5)
pH	S.U.	6.0-8.0	7.6	6.6	6.8	6.7	6.7
Alkalinity, total	mg/L CaC03	<50	24.6	15.1	24.0	24.7	30
Phosphorus, total	mg/L	0.030	0.032	0.010	0.040	0.030	0.033
Phosphorus, soluble	Mg/L	0.020	0.011	ND	0.013	ND	0.015
True Color	Pt-Co		34	ND	27	20	24
Apparent Color	Pt-Co		38	ND	37	26	30
Total Kjedahl Nitrogen	Mg/L	<1.00	0.916	0.376	0.861	0.561	0.701
Fecal Coliform	col/100mL		5.0	240.0	7.0	11	8.0
Total Coliform	MPN/100mL		13776	3158	920.84	579.43	726.99

In general, 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 between 5.0-9.0, adverse impacts to fish and other aquatic biota are generally not observed. Alkalinity values varied between locations, as some values were slightly lower than desirable, but all are characteristic for waterbodies in the region and similar to historical values. Total phosphorus levels in the Mill Reservoir, Main Pond, Outlet Cove and Azalea Drive locations were elevated at the time of the sampling (≥0.03 mg/L), whereas Dug Pond fell within the desirable threshold, which is typical as Dug Pond historically has much lower total phosphorus results. Based on the measured phosphorus levels, four of the basins were capable of supporting some level of algal blooms at >0.03 mg/L. 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 relative clarity of the basins.

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 basins, except Dug Pond, fell below concerning thresholds.

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 waterlilies and other floating leaf species are initially impacted by Sonar treatments, they show a continual increase in abundance and distribution throughout the pond in years following Sonar treatments. This has been true based on whole-lake or spot-treatment applications of Sonar at Foster's Pond through the years, as the pond still supports a diverse native plant community.

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 highly 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 as many other invasive species are in nearby waterbodies.

Fanwort control: We continue to recommend a balanced approach to managing fanwort: attempting with non-chemical controls where economically and logistically feasible and targeting with spot treatments specific infestations that are too large or too dense to be effectively controlled by other means. Eradicating small infestations, as they emerge and are identified, is the best way to minimize the need for whole-lake treatments. Based on the results of this season's Sonar herbicide spot-treatment and continued minimal fanwort growth observed during the annual survey, we recommend Sonar herbicide treatment of fanwort in Mill Reservoir in 2021. Fanwort growth has expanded along the perimeter of the basin and is interspersed with the waterlilies. Divers report that tannins in the water throughout this basin reduce visibility to the point where hand-pulling is impractical. Fanwort growth in the 5.7-acre area is so widespread that the entire basin should be treated, potentially with both pelletized and liquid formulations being utilized. One problem is presented by the gentle but steady flow through the mouth of Mill Reservoir which tends to flush treated water out of the basin. In order to reduce this flushing, the installation of a limno-barrier across the narrow opening may be required to maintain fluridone concentrations.

We are also recommending management of the other areas of fanwort growth, totaling approximately 9.3 acres, via hand-pulling as shown on the attached map. The survey detected little or no fanwort in the specific areas – amounting to approximately 8 acres – in which hand-pulling was undertaken in 2020. While the hand-pulling was not 100% effective in all areas, it was sufficiently successful to warrant a continuation of the experiment. Although the survey found some growth of fanwort in Dug Pond, even after extensive hand-pulling, we recommend again targeting Dug Pond for hand-pulling or suction harvesting in 2021, understanding that the infestation is still relatively new and may be able to be successfully managed this way. However, if manual removal proves to be inefficient or ineffective in Dug Pond, we recommend conducting a whole-basin Sonar herbicide treatment in a future year. At this time, we do not feel this is necessary in 2021.

Based on the Foster's Pond Corporation's experience in 2018-2020 with small benthic barriers (see the alternatives analysis below), we are recommending continued experimentation, to the extent feasible, with the use of these barriers along those residential shorelines which can most easily be accessed but recognize that their effectiveness in Foster's Pond is proving to be quite limited. A barrier was deployed at only one location in 2020, and while it proved effective in controlling a few fanwort plants, that location is one of only a handful of shorelines where it is possible to stand on a firm bottom and place the barrier into position without fragmenting the target plants.

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 Foster's Pond Corporation has varying degrees of experience with all of these methods, most recently experimenting with the use of hand harvesting, suction harvesting, and benthic barriers. The Corporation's experience to date is consistent with the MA DCR alternatives analysis.

The Corporation has long used winter drawdowns, primarily to protect the Foster's Pond Dam from overtopping in potential spring-time flood events but secondarily to control nuisance vegetation. Due to the physical limitations of the 160-year-old dam, the Pond can only be lowered about 18 inches below the lip of the spillway. As a consequence, only the shallowest coves are exposed to freezing temperatures over the winter. While nuisance vegetation appears to be controlled in these coves, the geographic reach of the drawdown, as a weed management technique, is limited and is anticipated to continue to be. Moreover, with climate change, milder winters result in shorter and less severe intervals of freezing, which may render drawdowns a less effective control technique.

In 2019, the Corporation experimented for the first time with both diver-assisted suction harvesting (DASH) and hand harvesting by divers. DASH proved to be impractical in the conditions presented by Foster's Pond. There are no launch points to accommodate the large craft typically used for the necessary equipment. Even a small, jury-rigged raft proved difficult to maneuver into position through the Pond's shallow channels. Moreover, as predicted by the MA DCR analysis, the Pond's thick and silty sediments instantly turned the water opaque, blinding the diver and making it impossible to see the target plants. The operation also resulted in a great deal of fragmentation, which could not be effectively controlled as the fragments interspersed with non-target vegetation. The 2019 DASH experiment was terminated, and divers were instead deployed to engage in hand-pulling.

Hand-pulling yielded mixed results in 2019 but proved more effective in 2020, perhaps due to the deployment of more experienced divers, greater selectivity in the target areas, and scheduling repetitive dives in the same areas on successive days. Hand-pulling, like DASH, increases the turbidity of the water, making it challenging for the diver to distinguish between target and non-target plants; diving in the same area on a later date allows sediments to settle, revealing plants that were missed on the first dive. Additionally, if fanwort is interspersed with lilies, the delicate fanwort stems entwine around the sturdier lily stems, making it impossible for divers to remove the fanwort rootballs or stems without extensive fragmentation. The Foster's Pond Corporation's experience was consistent with the MA DCR alternatives analysis, which indicated that areas of more than a few hundred square feet, with more than 10 fanwort stems per 100 square feet, are not susceptible to effective control through hand-pulling. Fortunately, although the areas targeted for diving in 2020 totaled approximately 8 acres, the infestations within the areas covered were each less than a few hundred square feet.

Based on the MA DCR analysis, the Foster's Pond Corporation has determined not to attempt the use of large benthic barriers. Large 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. The use of large barriers is not permitted under the current OOC.

The Foster's Pond Corporation has experimented recently with smaller scale benthic barriers, which are authorized by the OOC. During the 2018 season, the FPC and SŌLitude coordinated the use of nine (9), small scale (5' x 5') benthic barriers within Foster's Pond on individual and/or small areas of fanwort growth that were observed later in the season outside of any treatment areas. The barriers proved difficult for the volunteers to install, as fanwort was detected in locations that were too deep and heavily silted for the volunteers to stand. The installation caused some fragmentation. The barriers were likewise difficult to remove, clean, and store in the fall. The results of this experiment could not conclusively be evaluated in 2019, as the barriers had been emplaced in areas that were treated in 2019 with Sonar (based on the 2018 vegetation survey) before fanwort emerged anywhere in the Pond. However, because it was evident when the barriers were positioned that they did not completely cover the infested areas, it was obvious that fanwort control would be unsatisfactory.

In 2019 and 2020, an effort was made to continue experimenting with the small barriers. It was time-consuming and difficult to locate suitable locations at which to deploy the barriers. The infestation needed to (1) be accessible from the shoreline, so that the barrier could be assembled on dry ground; (2) consist of just one or two plants that could be completely covered by the barrier; (3) be growing in water shallow enough for a volunteer to stand while carefully guiding the barrier into position; and (4) not be interspersed with lilies or other plants which would interfere with proper placement. Only two such locations were identified in 2019, and one in 2020, The barriers were successful at all sites, but eliminated only a very small number of plants. Diving would likely have been quicker and as effective.

With respect to chemical alternatives, only 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 granular Sonar remains the best alternative for controlling regrowth in 2020 and beyond. Based on this year's and past experience in Foster's Pond, it is anticipated that, if necessary, treating a limited number of acres in 2021 will minimize the need for a whole-lake treatment in the immediate future. This allows less herbicide to be used at any one given time and provides a more financially feasible approach for the FPC.

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 mid-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.

As with past years, we again recommend that in 2021 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 since 2017 (whether treatment ends up being necessary or not). Based on the 2020 annual survey, it is preliminarily estimated that approximately 3.5 acres might require treatment in 2021, though actual observations in 2021 could vary considerably from this estimate as a result of plant germination and reproduction.

Spiny naiad alternatives analysis: According to NOAA's Great Lakes Aquatic Nonindigenous Species Information System (GLANSIS), use of aquatic herbicides is the most effective method of 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. Mechanical removal of spiny naiad is also possible (but not recommended), using 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 would likely increase the infestation within the pond overall. Benthic barriers are also a viable option, but as mentioned previously in regard 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. The FPC and SŌLitude will continue to assess the feasibility each year of utilizing smaller barriers where appropriate for spiny naiad growth and do so accordingly, if possible. To date, no spiny naiad growth has been applicable for this approach.

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 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 can 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, potential health hazards and associated waterbody closures from state agencies.

Copper-based algaecides effectively manage an active algae bloom; however, an algaecide treatment is merely controlling the symptom of excessive nutrients present within Foster's Pond. 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. 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 before proceeding with any alum treatments.

SeClear is another available product that combines algaecidal properties with a phosphorus reducing agent. 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 between that 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

- 2020 Sonar and Diquat Treatment Areas Map
- Fanwort and Spiny Naiad Distribution Map
- Potential 2021 Fanwort Management Areas Map
- Aquatic Plant Survey Field Data Table
- Water Quality Laboratory Reports
- SePRO FasTest Laboratory Report

2020 Sonar and Diquat Treatment Areas

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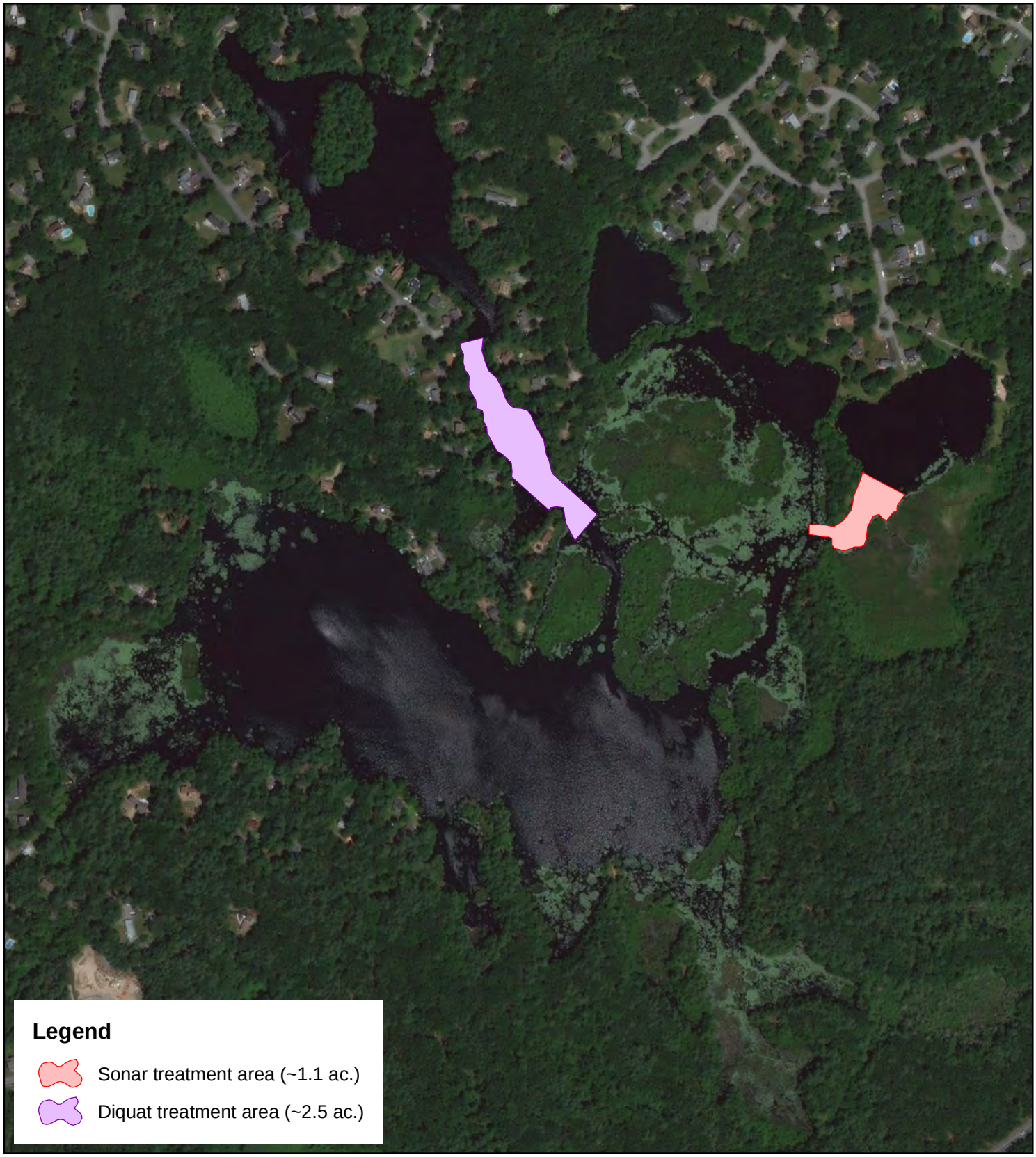
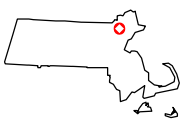
888.480.5253
solitudelakemanagement.com



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



Foster's Pond

0 525 1,050 Feet

N

1:6,500

Map Date: 06/22/20
Prepared by: KS
Office: SHREWSBURY, MA

Fanwort and Spiny Naiad Locations 2020

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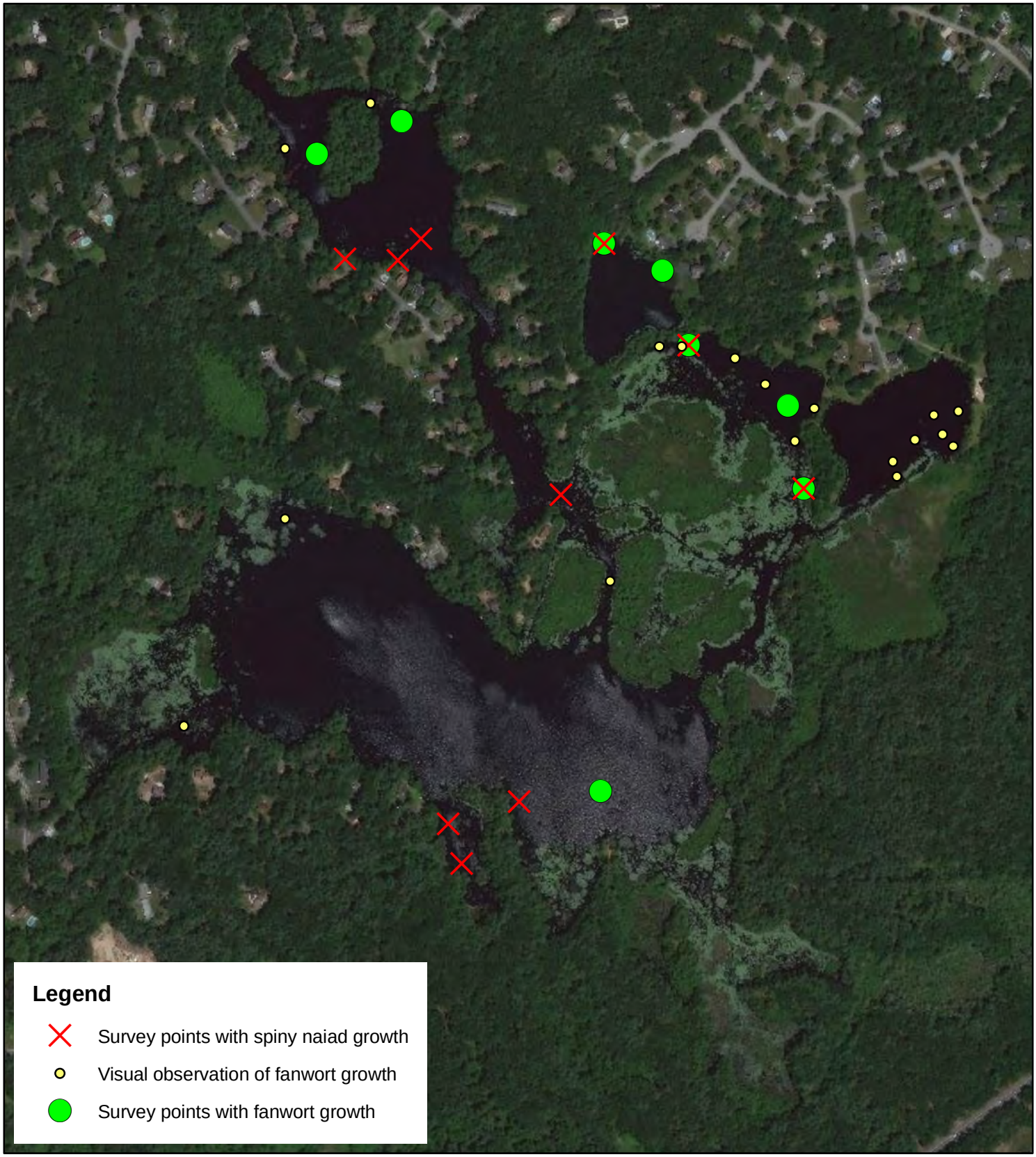
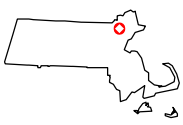
888.480.5253
solitudelakemanagement.com



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



Foster's Pond

0 610 1,220 Feet
N
1:6,800

Map Date: 12/28/20
Prepared by: KS
Office: SHREWSBURY, MA

Potential 2021 Management Areas

SOLITUDE LAKE MANAGEMENT
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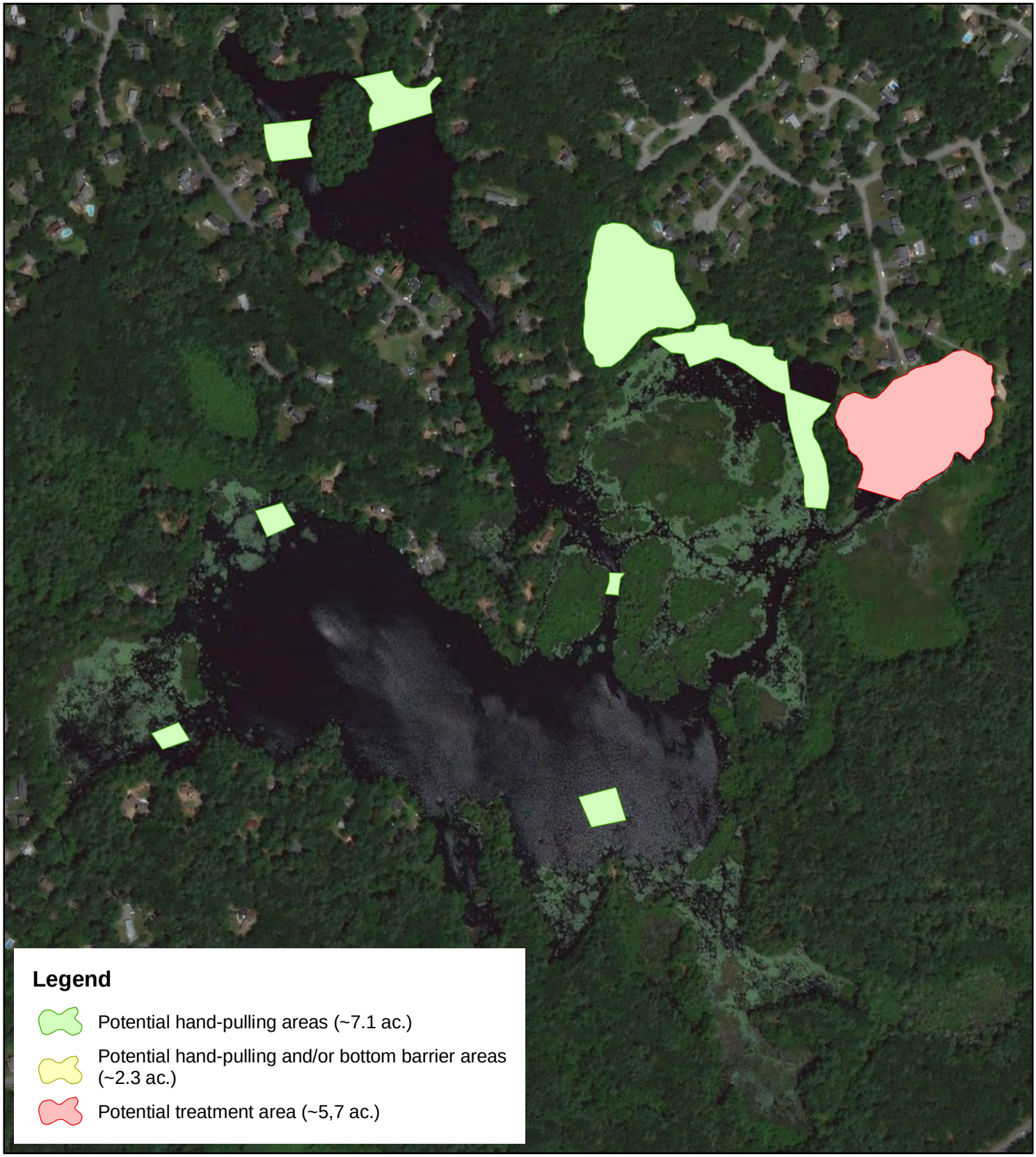
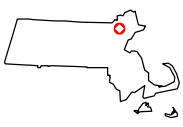
solitudelakemanagement.com



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



Foster's Pond

0 550 1,100 Feet

N

1:6,500

Map Date: 12/28/20
Prepared by: KS
Office: SHREWSBURY, MA

Data Point	Water Depth (ft.)	Bs	Cal	Cc	Cd	Ch	Fa	Gb	Mu	Nm	Nf	Ng	Ele	Pa	Pe	Pn	Pp	Pr	Ug	Ui	Um	Up	Ur	Uv	WL	YL	% Total Plant Cover	%Fanwort Cover	Biomass index	Species Richness index
1	1																								D	D	60	0	4	2
2	2									X															D	D	60	0	4	3
3	2																								D	D	80	0	4	2
4	2					X																			D	D	80	0	4	3
5	2			X		X				X									X						D	D	100	20	4	6
6	2			X															X	X				X	D	D	70	0	4	6
7	3	X		X		X				X												X			D	D	100	30	4	7
8	2					X													X			X			D	D	100	0	4	5
9	2	X				X																			D	D	60	0	3	4
10	2																								D	D	35	0	4	2
11	4						X																		T		10	0	2	2
12	5	X		X											X									X	D		80	0	4	5
13	2					D				X												X			X		80	0	4	4
14	5	X				X				X									X						D	X	60	0	4	6
15	2						X																		D	X	35	0	4	3
16	9						D																				10	0	1	1
17	4						X																		D		30	0	4	2
18	3						X																		D		10	0	4	2
19	11						D																				5	0	1	1
20	5																								D		25	0	4	1
21	4						X												X						X	D	70	0	4	4
22	9																										0	0	0	0
23	6						X																		D		5	0	1	2
24	3						X																		D		5	0	1	2
25	3						X															X			D		65	0	4	3
26	7																										0	0	0	0
27	4																								D		10	0	4	1
28	2																					X			D	X	100	0	4	3
29																														0
30	2	X				X				X											X				D		100	0	3	5
31	2	X																									10	0	1	1
32	3						X					X										X		D			80	0	4	4
33	3																					D					75	0	3	1
34	2						X															X					30	0	2	2
35	3						X																	D	X		30	0	4	3
36	4									D															X		75	0	4	2
37	3									D	X						X					X		X	X		100	0	4	6
38	5																							X	D		35	0	4	2
39	3																										0	0	0	0
40	5																										0	0	0	0
41	3			X									X						X			X		X	D		80	15	4	6
42	4			X		X																		X	D		20	10	4	4
43	3		X			X									X									D			50	0	4	4
44	8					D																					15	0	1	1
45	6					D																					15	0	1	1
46																														0
47	3						X			D						X								X	X		65	0	4	5
G1	2			X																					D	D	75	15	3	3
G2	2			X		X				X															D	D	100	10	4	5
G3	4					X																X			D	D	80	0	4	4
G4																														0
A	3						X								X				X			X			D	X	80	0	4	6
B																														0
C	4																		X						D	X	75	0	4	3
D	2					X													X					X	D	X	100	0	4	5
E	4						X								X										D		15	0	4	3
F	2					X													X						D	X	75	0	4	4
G	2	X																							D	X	85	0	4	3
H	5	X				X	X			X															D		60	0	4	5
I	6				X														X					X	D	D	70	0	4	5
J	3																								D	D	25	0	4	2
61	57																									includes A-J	52.0	1.8	3.2	2.9
																										excludes A-J	49.6	2.1	3.1	2.8

#X	8	1	8	1	14	15	0	0	8	1	1	1	0	4	1	1	0	11	1	1	11	0	9	6	8
#D	0	0	0	0	3	2	0	0	3	0	0	0	0	0	0	0	0	0	0	0	1	0	3	37	16
total #	8	1	8	1	17	17	0	0	11	1	1	1	0	4	1	1	0	11	1	1	12	0	12	43	24
% FOC	13.1%	1.6%	13.1%	1.6%	27.9%	27.9%	0.0%	0.0%	18.0%	1.6%	1.6%	1.6%	0.0%	6.6%	1.6%	1.6%	0.0%	18.0%	1.6%	1.6%	19.7%	0.0%	19.7%	70.5%	39.3%

Bs	Watershield
Cal	Callitriche
Cc	Fanwort
Cd	Coontail
Ch	Muskgrass
Fa	Filamentous algae
Gb	Grassy bulrush
Mu	Low watermilfoil
Nm	Spiny naiad
Nf	Slender Naiad
Ng	Northern Naiad
Ele	Spikerush
Pa	Largeleaf pondweed
Pe	Ribbonleaf pondweed
Pn	Floatingleaf pondweed
Pp	Thinleaf pondweed
Pr	Robbins pondweed
Ug	Humped Bladderwort
Ui	Flat-leaved Bladderwort
Um	Small Bladderwort
Up	Purple Bladderwort
Ur	Floating Bladderwort
Uv	Common Bladderwort
WL	White waterlily
YL	Yellow waterlily

ANALYTICAL REPORT

Lab Number:	L2036482
Client:	Solitude Lake Management, LLC 590 Lake Street Shrewsbury, MA 01545
ATTN:	Amanda Mahaney
Phone:	(508) 865-1000
Project Name:	FOSTERS POND
Project Number:	Not Specified
Report Date:	09/10/20

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

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: L2036482
Report Date: 09/10/20

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2036482-01	MAIN PD	WATER	ANDOVER	09/03/20 12:15	09/03/20
L2036482-02	DUG POND	WATER	ANDOVER	09/03/20 11:45	09/03/20
L2036482-03	AZALEA DRIVE	WATER	ANDOVER	09/03/20 10:30	09/03/20
L2036482-04	OUTLET COVE	WATER	ANDOVER	09/03/20 10:45	09/03/20
L2036482-05	MILL RESERVOIR	WATER	ANDOVER	09/03/20 11:00	09/03/20

Project Name:	FOSTERS POND	**Lab Number:**	L2036482
Project Number:	Not Specified	**Report Date:**	09/10/20

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.

Project Name: FOSTERS POND **Lab Number:** L2036482
Project Number: Not Specified **Report Date:** 09/10/20

Case Narrative (continued)

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. This is considered acceptable since the samples were in the process of cooling.

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: Melissa Sturgis Melissa Sturgis

Title: Technical Director/Representative Date: 09/10/20

INORGANICS
&
MISCELLANEOUS

Project Name: FOSTERS POND
Project Number: Not Specified

Lab Number: L2036482
Report Date: 09/10/20

SAMPLE RESULTS

Lab ID: L2036482-01
Client ID: MAIN PD
Sample Location: ANDOVER

Date Collected: 09/03/20 12:15
Date Received: 09/03/20
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Microbiological Analysis - Westborough Lab										
Coliform, Total (MPN)	920.84		MPN/100ml	1	NA	1	-	09/03/20 15:40	121,9223B	AA
Coliform, Fecal (MF)	7.0		col/100ml	2.0	NA	2	-	09/03/20 16:05	121,9222D	CM
General Chemistry - Westborough Lab										
Color, True	27		A.P.C.U.	5.0	--	1	-	09/03/20 17:59	121,2120B	AS
Color, Apparent	37		A.P.C.U.	5.0	--	1	-	09/03/20 17:59	121,2120B	AS
Alkalinity, Total	24.0		mg CaCO3/L	2.00	NA	1	-	09/04/20 10:38	121,2320B	BR
pH (H)	6.8		SU	-	NA	1	-	09/03/20 17:34	1,9040C	AS
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	09/04/20 01:43	09/04/20 20:37	121,4500NH3-BH	AT
Nitrogen, Total Kjeldahl	0.861		mg/l	0.300	--	1	09/04/20 01:52	09/04/20 22:02	121,4500NH3-H	AT
Phosphorus, Total	0.040		mg/l	0.010	--	1	09/04/20 09:45	09/04/20 14:41	121,4500P-E	SD
Phosphorus, Soluble	0.013		mg/l	0.010	--	1	09/08/20 09:15	09/08/20 12:47	121,4500P-E	SD

Project Name: FOSTERS POND
Project Number: Not Specified

Lab Number: L2036482
Report Date: 09/10/20

SAMPLE RESULTS

Lab ID: L2036482-02
Client ID: DUG POND
Sample Location: ANDOVER

Date Collected: 09/03/20 11:45
Date Received: 09/03/20
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Microbiological Analysis - Westborough Lab										
Coliform, Total (MPN)	3158		MPN/100ml	200	NA	200	-	09/03/20 15:40	121,9223B	AA
Coliform, Fecal (MF)	240		col/100ml	10	NA	10	-	09/03/20 16:05	121,9222D	CM
General Chemistry - Westborough Lab										
Color, True	ND		A.P.C.U.	5.0	--	1	-	09/03/20 17:59	121,2120B	AS
Color, Apparent	ND		A.P.C.U.	5.0	--	1	-	09/03/20 17:59	121,2120B	AS
Alkalinity, Total	15.1		mg CaCO3/L	2.00	NA	1	-	09/04/20 10:38	121,2320B	BR
pH (H)	6.6		SU	-	NA	1	-	09/03/20 17:34	1,9040C	AS
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	09/04/20 01:43	09/04/20 20:38	121,4500NH3-BH	AT
Nitrogen, Total Kjeldahl	0.376		mg/l	0.300	--	1	09/04/20 01:52	09/04/20 22:03	121,4500NH3-H	AT
Phosphorus, Total	0.010		mg/l	0.010	--	1	09/04/20 09:45	09/04/20 14:42	121,4500P-E	SD
Phosphorus, Soluble	ND		mg/l	0.010	--	1	09/08/20 09:15	09/08/20 12:49	121,4500P-E	SD

Project Name: FOSTERS POND
Project Number: Not Specified

Lab Number: L2036482
Report Date: 09/10/20

SAMPLE RESULTS

Lab ID: L2036482-03
Client ID: AZALEA DRIVE
Sample Location: ANDOVER

Date Collected: 09/03/20 10:30
Date Received: 09/03/20
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Microbiological Analysis - Westborough Lab										
Coliform, Total (MPN)	726.99		MPN/100ml	1	NA	1	-	09/03/20 15:40	121,9223B	AA
Coliform, Fecal (MF)	8.0		col/100ml	2.0	NA	2	-	09/03/20 16:05	121,9222D	CM
General Chemistry - Westborough Lab										
Color, True	24		A.P.C.U.	5.0	--	1	-	09/03/20 17:59	121,2120B	AS
Color, Apparent	30		A.P.C.U.	5.0	--	1	-	09/03/20 17:59	121,2120B	AS
Alkalinity, Total	22.9		mg CaCO3/L	2.00	NA	1	-	09/04/20 10:38	121,2320B	BR
pH (H)	6.7		SU	-	NA	1	-	09/03/20 17:34	1,9040C	AS
Nitrogen, Ammonia	0.127		mg/l	0.075	--	1	09/04/20 01:43	09/04/20 20:39	121,4500NH3-BH	AT
Nitrogen, Total Kjeldahl	0.701		mg/l	0.300	--	1	09/04/20 01:52	09/04/20 22:04	121,4500NH3-H	AT
Phosphorus, Total	0.033		mg/l	0.010	--	1	09/04/20 09:45	09/04/20 14:43	121,4500P-E	SD
Phosphorus, Soluble	0.015		mg/l	0.010	--	1	09/08/20 09:15	09/08/20 12:50	121,4500P-E	SD

Project Name: FOSTERS POND
Project Number: Not Specified

Lab Number: L2036482
Report Date: 09/10/20

SAMPLE RESULTS

Lab ID: L2036482-04
Client ID: OUTLET COVE
Sample Location: ANDOVER

Date Collected: 09/03/20 10:45
Date Received: 09/03/20
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Microbiological Analysis - Westborough Lab										
Coliform, Total (MPN)	579.43		MPN/100ml	1	NA	1	-	09/03/20 15:40	121,9223B	AA
Coliform, Fecal (MF)	11		col/100ml	2.0	NA	2	-	09/03/20 16:05	121,9222D	CM
General Chemistry - Westborough Lab										
Color, True	20		A.P.C.U.	5.0	--	1	-	09/03/20 17:59	121,2120B	AS
Color, Apparent	26		A.P.C.U.	5.0	--	1	-	09/03/20 17:59	121,2120B	AS
Alkalinity, Total	24.7		mg CaCO3/L	2.00	NA	1	-	09/04/20 10:38	121,2320B	BR
pH (H)	6.7		SU	-	NA	1	-	09/03/20 17:34	1,9040C	AS
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	09/04/20 01:43	09/04/20 20:43	121,4500NH3-BH	AT
Nitrogen, Total Kjeldahl	0.561		mg/l	0.300	--	1	09/04/20 01:52	09/04/20 22:05	121,4500NH3-H	AT
Phosphorus, Total	0.030		mg/l	0.010	--	1	09/04/20 09:45	09/04/20 14:44	121,4500P-E	SD
Phosphorus, Soluble	ND		mg/l	0.010	--	1	09/08/20 09:15	09/08/20 12:51	121,4500P-E	SD

Project Name: FOSTERS POND
Project Number: Not Specified

Lab Number: L2036482
Report Date: 09/10/20

SAMPLE RESULTS

Lab ID: L2036482-05
Client ID: MILL RESERVOIR
Sample Location: ANDOVER

Date Collected: 09/03/20 11:00
Date Received: 09/03/20
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Microbiological Analysis - Westborough Lab										
Coliform, Total (MPN)	13776		MPN/100ml	200	NA	200	-	09/03/20 15:40	121,9223B	AA
Coliform, Fecal (MF)	5.0		col/100ml	2.0	NA	2	-	09/03/20 16:05	121,9222D	CM
General Chemistry - Westborough Lab										
Color, True	34		A.P.C.U.	5.0	--	1	-	09/03/20 17:59	121,2120B	AS
Color, Apparent	38		A.P.C.U.	5.0	--	1	-	09/03/20 17:59	121,2120B	AS
Alkalinity, Total	24.6		mg CaCO3/L	2.00	NA	1	-	09/04/20 10:38	121,2320B	BR
pH (H)	7.6		SU	-	NA	1	-	09/03/20 17:34	1,9040C	AS
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	09/04/20 01:43	09/04/20 20:44	121,4500NH3-BH	AT
Nitrogen, Total Kjeldahl	0.916		mg/l	0.300	--	1	09/04/20 01:52	09/04/20 22:05	121,4500NH3-H	AT
Phosphorus, Total	0.032		mg/l	0.010	--	1	09/04/20 09:45	09/04/20 14:45	121,4500P-E	SD
Phosphorus, Soluble	0.011		mg/l	0.010	--	1	09/08/20 09:15	09/08/20 12:51	121,4500P-E	SD

Project Name: FOSTERS POND
Project Number: Not Specified
Lab Number: L2036482
Report Date: 09/10/20

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): 01-05 Batch: WG1406296-1										
Coliform, Total (MPN)	<1		MPN/100ml	1	NA	1	-	09/03/20 15:40	121,9223B	AA
Microbiological Analysis - Westborough Lab for sample(s): 01-05 Batch: WG1406309-1										
Coliform, Fecal (MF)	ND		col/100ml	1.0	NA	1	-	09/03/20 16:05	121,9222D	CM
General Chemistry - Westborough Lab for sample(s): 01-05 Batch: WG1406429-1										
Nitrogen, Total Kjeldahl	ND		mg/l	0.300	--	1	09/04/20 01:52	09/04/20 21:37	121,4500NH3-H	AT
General Chemistry - Westborough Lab for sample(s): 01-05 Batch: WG1406437-1										
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	09/04/20 01:43	09/04/20 20:18	121,4500NH3-BH	AT
General Chemistry - Westborough Lab for sample(s): 01-05 Batch: WG1406562-1										
Phosphorus, Total	ND		mg/l	0.010	--	1	09/04/20 09:45	09/04/20 14:23	121,4500P-E	SD
General Chemistry - Westborough Lab for sample(s): 01-05 Batch: WG1406617-1										
Alkalinity, Total	ND		mg CaCO3/L	2.00	NA	1	-	09/04/20 10:38	121,2320B	BR
General Chemistry - Westborough Lab for sample(s): 01-05 Batch: WG1407296-1										
Phosphorus, Soluble	ND		mg/l	0.010	--	1	09/08/20 09:15	09/08/20 12:35	121,4500P-E	SD

Lab Control Sample Analysis

Batch Quality Control

Project Name: FOSTERS POND
Project Number: Not Specified

Lab Number: L2036482
Report Date: 09/10/20

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-05 Batch: WG1406344-1								
pH	100		-		99-101	-		5
General Chemistry - Westborough Lab Associated sample(s): 01-05 Batch: WG1406429-2								
Nitrogen, Total Kjeldahl	91		-		78-122	-		
General Chemistry - Westborough Lab Associated sample(s): 01-05 Batch: WG1406437-2								
Nitrogen, Ammonia	96		-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 01-05 Batch: WG1406562-2								
Phosphorus, Total	102		-		80-120	-		
General Chemistry - Westborough Lab Associated sample(s): 01-05 Batch: WG1406617-2								
Alkalinity, Total	104		-		90-110	-		10
General Chemistry - Westborough Lab Associated sample(s): 01-05 Batch: WG1407296-2								
Phosphorus, Soluble	102		-		80-120	-		

Matrix Spike Analysis
Batch Quality Control

Project Name: FOSTERS POND
Project Number: Not Specified

Lab Number: L2036482
Report Date: 09/10/20

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): 01-05 QC Batch ID: WG1406429-4 QC Sample: L2036158-02 Client ID: MS Sample												
Nitrogen, Total Kjeldahl	2.20	8	7.55	**67**	Q	-	-		77-111	-		24
General Chemistry - Westborough Lab Associated sample(s): 01-05 QC Batch ID: WG1406437-4 QC Sample: L2036388-01 Client ID: MS Sample												
Nitrogen, Ammonia	ND	4	3.69	92		-	-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 01-05 QC Batch ID: WG1406562-3 QC Sample: L2036455-01 Client ID: MS Sample												
Phosphorus, Total	0.034	0.5	0.524	98		-	-		75-125	-		20
General Chemistry - Westborough Lab Associated sample(s): 01-05 QC Batch ID: WG1406617-4 QC Sample: L2032938-01 Client ID: MS Sample												
Alkalinity, Total	5.80	100	108	102		-	-		86-116	-		10
General Chemistry - Westborough Lab Associated sample(s): 01-05 QC Batch ID: WG1407296-3 QC Sample: L2036191-04 Client ID: MS Sample												
Phosphorus, Soluble	0.080	0.5	0.585	101		-	-		75-125	-		20

Lab Duplicate Analysis
Batch Quality Control

Project Name: FOSTERS POND
Project Number: Not Specified

Lab Number: L2036482
Report Date: 09/10/20

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-05 QC Batch ID: WG1406344-2 QC Sample: L2036482-01 Client ID: MAIN PD						
pH (H)	6.8	6.7	SU	1		5
General Chemistry - Westborough Lab Associated sample(s): 01-05 QC Batch ID: WG1406351-1 QC Sample: L2036482-01 Client ID: MAIN PD						
Color, Apparent	37	35	A.P.C.U.	6		
General Chemistry - Westborough Lab Associated sample(s): 01-05 QC Batch ID: WG1406352-1 QC Sample: L2036482-01 Client ID: MAIN PD						
Color, True	27	27	A.P.C.U.	0		
General Chemistry - Westborough Lab Associated sample(s): 01-05 QC Batch ID: WG1406429-3 QC Sample: L2036158-02 Client ID: DUP Sample						
Nitrogen, Total Kjeldahl	2.20	2.21	mg/l	0		24
General Chemistry - Westborough Lab Associated sample(s): 01-05 QC Batch ID: WG1406437-3 QC Sample: L2036388-01 Client ID: DUP Sample						
Nitrogen, Ammonia	ND	ND	mg/l	NC		20
General Chemistry - Westborough Lab Associated sample(s): 01-05 QC Batch ID: WG1406562-4 QC Sample: L2036455-01 Client ID: DUP Sample						
Phosphorus, Total	0.034	0.034	mg/l	0		20
General Chemistry - Westborough Lab Associated sample(s): 01-05 QC Batch ID: WG1406617-3 QC Sample: L2032938-01 Client ID: DUP Sample						
Alkalinity, Total	5.80	5.50	mg CaCO3/L	5		10
General Chemistry - Westborough Lab Associated sample(s): 01-05 QC Batch ID: WG1407296-4 QC Sample: L2036191-02 Client ID: DUP Sample						
Phosphorus, Soluble	0.016	0.013	mg/l	**21**	Q	20

Project Name: FOSTERS POND
Project Number: Not Specified

Lab Number: L2036482
Report Date: 09/10/20

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(*)
L2036482-01A	Bacteria Cup Na2S2O3 preserved	A	NA		18.2	Y	Absent		F-COLI-MF(.33)
L2036482-01B	Bacteria Cup Na2S2O3 preserved	A	NA		18.2	Y	Absent		F-COLI-MF(.33)
L2036482-01C	Bacteria Cup Na2S2O3 preserved	A	NA		18.2	Y	Absent		T-COLI-QT(.33)
L2036482-01D	Bacteria Cup Na2S2O3 preserved	A	NA		18.2	Y	Absent		T-COLI-QT(.33)
L2036482-01E	Plastic 250ml unpreserved/No Headspace	A	NA		18.2	Y	Absent		ALK-T-2320(14)
L2036482-01F	Plastic 250ml unpreserved	A	7	7	18.2	Y	Absent		PH-9040(1),SPHOS-4500(28)
L2036482-01F9	Plastic 250ml H2SO4 preserved Filtrates	A	NA		18.2	Y	Absent		SPHOS-4500(28)
L2036482-01G	Plastic 250ml H2SO4 preserved	A	<2	<2	18.2	Y	Absent		TKN-4500(28),TPHOS-4500(28),NH3-4500(28)
L2036482-01H	Amber 500ml unpreserved	A	7	7	18.2	Y	Absent		COLOR-T-2120(2),COLOR-A-2120(2)
L2036482-02A	Bacteria Cup Na2S2O3 preserved	A	NA		18.2	Y	Absent		F-COLI-MF(.33)
L2036482-02B	Bacteria Cup Na2S2O3 preserved	A	NA		18.2	Y	Absent		F-COLI-MF(.33)
L2036482-02C	Bacteria Cup Na2S2O3 preserved	A	NA		18.2	Y	Absent		T-COLI-QT(.33)
L2036482-02D	Bacteria Cup Na2S2O3 preserved	A	NA		18.2	Y	Absent		T-COLI-QT(.33)
L2036482-02E	Plastic 250ml unpreserved/No Headspace	A	NA		18.2	Y	Absent		ALK-T-2320(14)
L2036482-02F	Plastic 250ml unpreserved	A	7	7	18.2	Y	Absent		PH-9040(1),SPHOS-4500(28)
L2036482-02F9	Plastic 250ml H2SO4 preserved Filtrates	A	NA		18.2	Y	Absent		SPHOS-4500(28)
L2036482-02G	Plastic 250ml H2SO4 preserved	A	<2	<2	18.2	Y	Absent		TKN-4500(28),TPHOS-4500(28),NH3-4500(28)
L2036482-02H	Amber 500ml unpreserved	A	7	7	18.2	Y	Absent		COLOR-T-2120(2),COLOR-A-2120(2)
L2036482-03A	Bacteria Cup Na2S2O3 preserved	A	NA		18.2	Y	Absent		F-COLI-MF(.33)
L2036482-03B	Bacteria Cup Na2S2O3 preserved	A	NA		18.2	Y	Absent		F-COLI-MF(.33)
L2036482-03C	Bacteria Cup Na2S2O3 preserved	A	NA		18.2	Y	Absent		T-COLI-QT(.33)
L2036482-03D	Bacteria Cup Na2S2O3 preserved	A	NA		18.2	Y	Absent		T-COLI-QT(.33)
L2036482-03E	Plastic 250ml H2SO4 preserved Filtrates	A	NA		18.2	Y	Absent		PH-9040(1),SPHOS-4500(28)

*Values in parentheses indicate holding time in days

Project Name: FOSTERS POND
Project Number: Not Specified

Lab Number: L2036482
Report Date: 09/10/20

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2036482-03F	Plastic 250ml unpreserved/No Headspace	A	7	7	18.2	Y	Absent		ALK-T-2320(14),SPHOS-4500(28)
L2036482-03F9	Plastic 250ml H2SO4 preserved Filtrates	A	NA		18.2	Y	Absent		SPHOS-4500(28)
L2036482-03G	Plastic 250ml H2SO4 preserved	A	<2	<2	18.2	Y	Absent		TKN-4500(28),TPHOS-4500(28),NH3-4500(28)
L2036482-03H	Amber 500ml unpreserved	A	7	7	18.2	Y	Absent		COLOR-T-2120(2),COLOR-A-2120(2)
L2036482-04A	Bacteria Cup Na2S2O3 preserved	A	NA		18.2	Y	Absent		F-COLI-MF(.33)
L2036482-04B	Bacteria Cup Na2S2O3 preserved	A	NA		18.2	Y	Absent		F-COLI-MF(.33)
L2036482-04C	Bacteria Cup Na2S2O3 preserved	A	NA		18.2	Y	Absent		T-COLI-QT(.33)
L2036482-04D	Bacteria Cup Na2S2O3 preserved	A	NA		18.2	Y	Absent		T-COLI-QT(.33)
L2036482-04E	Plastic 250ml unpreserved/No Headspace	A	NA		18.2	Y	Absent		ALK-T-2320(14)
L2036482-04F	Plastic 250ml unpreserved	A	7	7	18.2	Y	Absent		PH-9040(1),SPHOS-4500(28)
L2036482-04F9	Plastic 250ml H2SO4 preserved Filtrates	A	NA		18.2	Y	Absent		SPHOS-4500(28)
L2036482-04G	Plastic 250ml H2SO4 preserved	A	<2	<2	18.2	Y	Absent		TKN-4500(28),TPHOS-4500(28),NH3-4500(28)
L2036482-04H	Amber 500ml unpreserved	A	7	7	18.2	Y	Absent		COLOR-T-2120(2),COLOR-A-2120(2)
L2036482-05A	Bacteria Cup Na2S2O3 preserved	A	NA		18.2	Y	Absent		F-COLI-MF(.33)
L2036482-05B	Bacteria Cup Na2S2O3 preserved	A	NA		18.2	Y	Absent		F-COLI-MF(.33)
L2036482-05C	Bacteria Cup Na2S2O3 preserved	A	NA		18.2	Y	Absent		T-COLI-QT(.33)
L2036482-05D	Bacteria Cup Na2S2O3 preserved	A	NA		18.2	Y	Absent		T-COLI-QT(.33)
L2036482-05E	Plastic 250ml unpreserved/No Headspace	A	NA		18.2	Y	Absent		ALK-T-2320(14)
L2036482-05F	Plastic 250ml unpreserved	A	7	7	18.2	Y	Absent		PH-9040(1),SPHOS-4500(28)
L2036482-05F9	Plastic 250ml H2SO4 preserved Filtrates	A	NA		18.2	Y	Absent		SPHOS-4500(28)
L2036482-05G	Plastic 250ml H2SO4 preserved	A	<2	<2	18.2	Y	Absent		TKN-4500(28),TPHOS-4500(28),NH3-4500(28)
L2036482-05H	Amber 500ml unpreserved	A	7	7	18.2	Y	Absent		COLOR-T-2120(2),COLOR-A-2120(2)

*Values in parentheses indicate holding time in days

Project Name:	FOSTERS POND	**Lab Number:**	L2036482
Project Number:	Not Specified	**Report Date:**	09/10/20

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.

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.

Footnotes

Report Format: Data Usability Report

Project Name:	FOSTERS POND	**Lab Number:**	L2036482
Project Number:	Not Specified	**Report Date:**	09/10/20

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.

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'.

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. If a 'Total' result is requested, the results of its individual components will also be reported.

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.)

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.

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

Report Format: Data Usability Report

Project Name:	FOSTERS POND	**Lab Number:**	L2036482
Project Number:	Not Specified	**Report Date:**	09/10/20

Data Qualifiers

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.

Report Format: Data Usability Report

Project Name: FOSTERS POND
Project Number: Not Specified
Lab Number: L2036482
Report Date: 09/10/20

REFERENCES

1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.

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 624/624.1: m/p-xylene, o-xylene, Naphthalene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
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.
EPA TO-12 Non-methane organics
EPA 3C Fixed gases
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 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: 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), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603.**

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.

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 _____

Date Rec'd in Lab: 9/3/20

ALPHA Job #: L2036482

ALPHA ANALYTICAL
8 Walkup Drive, Westboro, MA 01581, Tel: 508-898-9220
320 Forbes Blvd, Mansfield, MA 02048, Tel: 508-822-9300

Client Information

Client: Solitude Lake Mgmt
Address: 590 Lake St
Shrewsbury, MA
Phone:
Email:

Additional Project Information:

Project Information

Project Name: Fosters Pond
Project Location: Andover MA
Project #:
Project Manager: AM
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 _____

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	Fecal Coliform	Tphos, TKN, NH3	Alkalinity	Total Coliform	Tox/App Color	Sphos, pH	Sample Comments	TOTAL # BOTTLES
36482-01	Main Pd	9/3	12:15pm	SW	AM	2	2	1	2	2	2		
02	Dug Pond	9/3	11:45am	SW	AM	2	2	1	2	2	2		
03	Azalea Drive	9/3	10:30am	SW	AM	2	2	1	2	2	2		
04	Outlet Cove	9/3	10:45am	SW	AM	2	2	1	2	2	2		
05	Mill Reservoir	9/3	11:00am	SW	AM	2	2	1	2	2	2		

ANALYSIS: 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

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
Amanda Moranz	9/3/20 1:40pm	[signature] UPS	9/3/20 13:40

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: amahaney@solitudelake.com

Report Date:	**9/25/2020**	Date Sampled:	**9/03/2020**
Laboratory ID#:	**N2082046**	Date Received:	**9/18/2020**
		Date Tested:	**9/21/2020**

Sample Site: SURFACE WATER FOSTERS POND - ANDOVER, MA

Cyanophyta: Unicellular & Colonial Forms	
Anabaena	5800
Aphanocapsa	
Aphanothece	
Chroococcus	
Coelosphoerium	
Dactylococcopsis	
Gomphosphaeria	
Merismpedia	640
Microcystis	
Snowella	
Synechococcus/Related	
Woronichinia	
Other Coccoid Blue Greens	
Filamentous Non-Nitrogen Fixers	
Arthrospira	
Limonothrix	
Lyngbya	
Limnoraphis	
Microseira/Plectonema	
Oscillatoria	
Phormidium	
Planktolyngbya	
Planktothrix	
Pseudanabaena/Kromvophoron	7000
Spirulina	
Synechocystis	

Filamentous Nitrogen Fixers	
Anabaenopsis	
Aphanizomenon	
Calothrix/Rivularia	
Chrysosporxium	
Cuspidothrix	210,000
Cylindrospermium	
Dolichospermium	
Gloeotrichia	
Hapalosiphon	
Nodularia	
Nostoc	
Raphidiopsis	
Sytonema	
Sphaerospermopsis	
Tolypothrix	
Other Filamentous Bluegreens (L)	
Other Filamentous Bluegreens (S)	

Total Cell Count: 220,000/ ml

Approved by: Alan C. Johnson

Alan C. Johnson,
Laboratory Director

SePRO Research & Technology Campus

FasTEST*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC7799 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name SOLitude Lake Management	Contact Person: Kara Sliwoski
Address: 1320 Brookwood Drive, Ste. H Little Rock, AR 72202	E-mail Address: ksliwoski@solitudelake.com
	Phone: 508.885.0101

Waterbody Information

Waterbody:	Fosters Pond - MA
Waterbody size:	120
Depth Average:	0

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM22973-1		Sonar/fluridone (ug/L)	FAST 10	1.2	06/23/2020

ANALYSIS STATEMENTS:
SAMPLE RECEIPT /HOLDING TIMES: All samples arrived in an acceptable condition and were analyzed within prescribed holding times in accordance with the SRTC Laboratory Sample Receipt Policy unless otherwise noted in the report.
PRESERVATION: Samples requiring preservation were verified prior to sample analysis and any qualifiers will be noted
in the report.
QA/QC CRITERIA: All analyses met method criteria, except as noted in the report with data qualifiers.
COMMENTS: No significant observations were made unless noted in the report.
MEASUREMENT UNCERTAINTY: Uncertainty of measurement has been determined and is available upon request.

accordance with the applicable certifications as noted. All soil samples are reported on a dry weight basis unless otherwise noted in the report. This Laboratory Report is confidential and is intended for the exclusive use of SRTC Laboratory and its client. This report shall not be reproduced, except in full, without written permission from SRTC Laboratory. The Chain of Custody is included and is an essential component of this report.

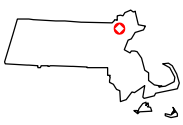
This entire report was reviewed and approved for release.

Reviewed By: Laboratory Supervisor

2020 FasTEST Sample Location

SOLITUDE LAKE MANAGEMENT
888.480.5253
solitudelakemanagement.com

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



Foster's Pond

0 550 1,100 Feet

N

1:6,845

Map Date: 12/28/20
Prepared by: KS
Office: Shrewsbury, MA