WATER & WETLAND
LAKE, POND & WETLAND MANAGEMENT

November 20, 2023

City of Framingham – Conservation Commission
Attention: Dominic Portelli
150 Concord Street
Framingham, MA 01702
Sent via email: dportelli@framinghamma.gov

Re: Framingham Ponds (Big Farm Pond, Little Farm Pond, Mohawk Pond, Norton Pond, Sudbury River, Gleason Pond, Learned Pond, and Waushakum Pond), Framingham, MA – 2023 Year End Report

Dear Mr. Portelli and Commission Members,

It is our pleasure to present a year end summary report to The City of Framingham regarding the 2023 Aquatic Management Program at The Framingham Ponds. The contracted Framingham waterbodies include Big Farm Pond, Little Farm Pond, Mohawk Pond, Norton Pond, Sudbury River, Gleason Pond, Learned Pond, and Waushakum Pond, all located in Framingham, MA. Waushakum Pond also contains a small percentage in the Town of Ashland.

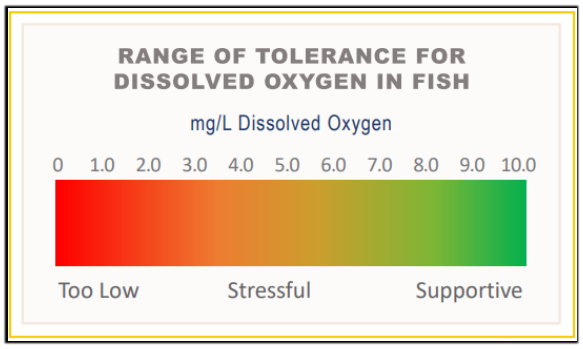

Figure 1: Dissolved oxygen table

During each visit to the Ponds, a survey was conducted using visual observation paired with a standard throw-rake and handheld GPS/ArcGIS Field Maps, as applicable. Additionally, dissolved oxygen (DO) and temperature readings were collected throughout the season using a calibrated YSI meter with optical sensor (pictured in Figure 2 below). Dissolved oxygen is the amount of oxygen in water that is available to aquatic organisms. DO is necessary to support fish spawning, growth, and activity. Tolerance varies by species, please see the figure provided for a general range of fish tolerance (Source: epa.gov). Dissolved oxygen can be affected by many outside factors, such as: temperature, time of day, and pollution. Dissolved oxygen levels are typically lowest early in the morning. Healthy water should generally have concentrations of about 6.5-8+ mg/L (illustrated in Figure 1 above). Water clarity was also assessed using a Secchi disk (Figure 2), as applicable. A Secchi disk is a disk with alternating black and white quadrants. It is lowered into the water of a pond or lake until it can no longer be seen by the observer. This depth of disappearance, called the Secchi depth, is a measurement of the transparency of the water. All readings are included in the tables throughout this report.

Figure 2: Equipment and meters utilized during each site visit

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Big Farm Pond

Big Farm Pond (pictured in Figure 3) is approximately 151 acres and located in the center of Framingham. Railroad tracks abut the eastern shoreline (CSX Railroad), while parks and small woodlands run along the western shoreline. The parks that are adjacent to the western shoreline include Farm Pond Park and Framingham Skatepark. Access to the Pond was granted through a public boat launch, located at the northern point of the waterboy (off Lakeview Avenue). Big Farm Pond is a popular recreational waterbody for swimming, fishing, and boating.

Figure 3: Big Farm Pond - Framingham, MA

Historically, Big Farm Pond has battled invasive species water chestnut (*Trapa natans),* curly-leaf pondweed (*Potamogeton crispus),* and Eurasian milfoil (*Myriophyllum spicatum)*, along with nuisance densities of native pondweeds (*Potamogeton sp.).* The goal of the 2023 program was to monitor the invasive growth while examining basic water quality through a proactive monitoring schedule. This would be accomplished by implementing an Aquatic Management Program that focused around performing all applicable tasks, including planning, surveys, and reporting.

All tasks were completed without issue and at the proper times. The table below provides the specific dates of each task. Below the table, each visit/task performed is described in additional detail.

Summary Of 2023 Management Activities

Date	Task/Description
June 15, 2023	An early-season survey was performed to document baseline conditions of the Pond, note the current vegetation species/densities present; Water samples were collected
September 19, 2023	A late-season survey was conducted to update the condition of the Pond and to assist with developing future management plants; Water samples were collected

<u>June 15, 2023 - Pre-Management Survey / Water Samples Collected</u>

On June 15th, Senior Environmental Scientist, James Lacasse, and Field Assistant, Grace Adams, completed a site visit to Big Farm Pond. The visit consisted of performing an early season survey (Figure 5) and collecting water quality data in addition to water samples. Conditions during the visit were sunny with a slight breeze.

Figure 4: Pondweeds documented often surfacing

Both native and invasive species were documented throughout Farm Pond. The dominant native species include Robbin's pondweed (*Potamogeton robbinsii)*, thin-leaf pondweed (*Potamogeton pusillus)*, and elodea (*Elodea canadensis)*. The Robbin's pondweed and thin-leaf pondweed were documented growing within the water column and approaching the surface (illustrated in Figure 4). Other less prevalent native species included clasping leaf pondweed (*Potamogeton perfoliatus)* and coontail (*Ceratophyllum demersum)*. Invasive species documented during the survey include Eurasian milfoil (Figure 4), curly-leaf pondweed, and water chestnut. These species were found in varying densities ranging from trace to moderate. The water chestnut was found near the boat launch as well as by the old brick building. The native species were more widespread than the invasive species, and no growth was observed in the deeper portions of the Pond. In addition, scattered patches of waterlilies (*Nymphaeaceae)* were observed throughout the Pond while scattered populations of arrowhead (*Sagittaria latifolia)*. Minimal filamentous algae was observed on the surface and growing within the water column. The secchi disk reading resulted in 10 feet, 11 inches.

Figure 5: Water & Wetland conducting a survey

Temperature & Dissolved Oxygen		
Depth (ft)	**Surface Temp (°C)**	**Surface DO (mg/L)**
Surface	24.3	8.33
1	23.7	8.61
2	23.4	8.79
3	23.3	8.73
4	23.1	8.73
5	21.8	8.37
6	21.3	8.26
7	21.3	8.24
8	20.6	8.12
9	20.2	8.10
10	19.8	7.98

<u>September 19, 2023 – Late Season Survey / Water Samples Collected</u>

On September 19th, Senior Environmental Scientist, James Lacasse completed a site visit to Big Farm Pond. The visit consisted of performing a late season survey and collecting water quality data in addition to water samples. Conditions during the visit were sunny with a strong breeze.

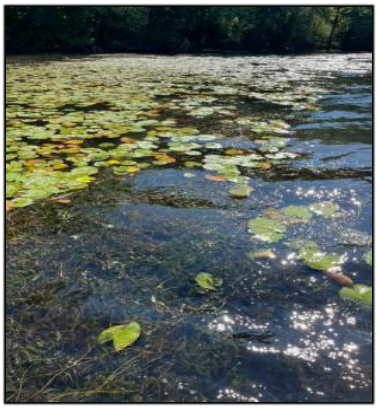

Figure 6: Pondweeds surfacing within the waterlilies

Conditions at Big Farm Pond were fairly similar to pre-season survey conditions. Both native and invasive species were documented throughout the majority of the waterbody (with the exception of a few areas). The three invasive species noted included water chestnut, Eurasian milfoil, and curly-leaf pondweed. The most dominant invasive species was Eurasian milfoil (pictured in Figures 6 and 7), as it was found throughout most of the waterbody ranging from trace to dense densities. It was observed growing throughout the water column and occasionally surfacing, forming a mat of Eurasian milfoil. Portions of the Eurasian milfoil population were still at the end of the flowering stage. Water chestnut was the second most prevalent invasive, noted within the northern/southern points of the Pond; followed by curly-leaf pondweed, which was documented at trace densities. Robbin's pondweed and coontail were the most dominant native species, followed by waterlilies, thin-leaf pondweed, and elodea (native pondweeds scattered within the Eurasian milfoil in Figure 7). Several families of Swans were noted throughout the survey, primarily within the northern half of the Pond. Water clarity was noted as great. Epiphytic algae was documented on roughly 25% of the vegetation population, indicating that the plant is dying/decaying. Other species noted during the survey included pickerelweed (*Pontederia cordata),* tape grass (*Vallisneria americana),* arrowhead, clasping-leaf pondweed, watershield (*Brasenia schreberi),* cattails (*Typha sp.),* duckweed (*Lemnoideae*), and benthic algae. The secchi disk reading resulted in 6 feet, 4 inches.

Figure 7: Dense vegetation noted throughout the survey

Temperature & Dissolved Oxygen		
Depth (ft)	**Temp (℃)**	**DO (mg/L)**
Surface	21.0	7.22
1	21.0	7.09
2	20.9	7.15
3	20.9	7.18
4	20.8	7.08
5	20.8	6.87
6	20.8	6.51
7	20.6	6.28
8	20.6	6.37
9	20.5	5.81

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Little Farm Pond

Little Farm Pond (Figure 8) is found due south of Big Farm Pond – separated by a berm used for hiking and fishing. This waterbody is approximately 22.9 acres. The Pond is primarily surrounded by sparse woodlands to the west and south, with the berm separating Big Farm Pond and Little Farm Pond to the north. Access to this waterbody was gained from Big Farm Pond, as the jon boat was carried over the berm. All of Little Farm Pond is considered to be a littoral zone, meaning that sunlight can penetrate the bottom of the entire Pond resulting in potential algae/vegetation growth. Little Farm Pond is a popular recreational waterbody for fishing.

Figure 8: Little Farm Pond - Framingham, MA

Historically, Little Farm Pond has battled invasive species water chestnut, curly-leaf pondweed, and Eurasian milfoil, in addition to nuisance densities of native pondweeds. The goal of the 2023 program was to monitor the invasive species population while examining basic water quality through a proactive monitoring schedule. This would be accomplished by implementing an Aquatic Management Program that focused around performing all applicable tasks, including planning, surveys, and reporting.

All tasks were completed without issue and at the proper times. The table below provides the specific dates of each task. Below the table, each visit/task performed is described in additional detail.

Summary Of 2023 Management Activities

Date	Task/Description
June 15, 2023	An early-season survey was performed to document baseline conditions of the Pond, note the current vegetation species/densities present; Water samples were collected
September 19, 2023	A late-season survey was conducted to update the condition of the Pond and to assist with developing future management plants; Water samples were collected

<u>June 15, 2023 – Early-Season Survey / Water Samples Collected</u>

On June 15th, Senior Environmental Scientist, James Lacasse, and Field Assistant, Grace Adams, completed a site visit to Little Farm Pond. The visit consisted of conducting an early-season survey and collecting basic water quality data in addition to water samples. Conditions during the visit were sunny with a slight breeze.

Figure 9: Epiphytic algae noted on vegetation

Both native and invasive species were observed throughout the Pond. The native Robbin's pondweed, coontail, and elodea were observed in dense populations, and had epiphytic algae attached to them (pictured in Figure 9). Sparse water chestnut was mixed in with the waterlilies along the shoreline of the Pond. The densest population of waterlilies was located in the western portion of the Pond. In addition to the water chestnut, two other Invasive species were noted during the survey, Eurasian milfoil, and curly-leaf pondweed. These species were noted in varying densities. The Secchi disk reading resulted in 7 feet, 2 inches. Water samples were collected and transported to the laboratory for further analysis.

Temperature & Dissolved Oxygen		
Depth (ft)	**Surface Temp (℃)**	**Surface DO (mg/L)**
Surface	25.0	7.42
1	24.3	8.62
2	24.2	8.72
3	24.0	8.82
4	23.9	8.90
5	21.4	5.50
6	21.4	5.45
7	20.9	5.44

<u>September 19, 2023 – Late-Season Survey / Water Samples Collected</u>

On September 19th, Senior Environmental Scientist, James Lacasse completed a site visit to Little Farm Pond. The visit consisted of performing a late-season survey and collecting water quality data in addition to water samples. Conditions during the visit were sunny with a slight breeze.

Figure 10: Seeds noted on the water chestnut plants

Similar to Big Farm Pond, conditions at Little Farm Pond were fairly similar to the conditions during the early-season survey. Three invasive species were documented including curly-leaf pondweed, water chestnut, and Eurasian milfoil. Eurasian milfoil and water chestnut were the most dominant, followed by curly-leaf pondweed. Eurasian milfoil was scattered throughout the Pond in trace to sparse densities, while water chestnut was noted at trace to sparse densities primarily mixed within the waterlilies. Water chestnut seeds were documented developing on the plants (documented in Figure 10). Elodea, coontail, and Robbin's pondweed were the most prevalent native species documented as they were documented throughout the majority of Pond. Waterlilies followed in density, with the densest area of waterlilies being the northern point. The Secchi

disk reading resulted in 7 feet, 3 inches. Water samples were collected and transported to the laboratory for further analysis. Other species noted during the survey included cattails and benthic algae.

Temperature & Dissolved Oxygen		
Depth (ft)	**Temp (℃)**	**DO (mg/L)**
Surface	20.7	8.62
1	20.7	8.49
2	20.7	8.39
3	20.7	8.28
4	20.6	8.31
5	20.6	7.81
6	20.5	7.52
7	20.5	7.03

Mohawk Pond

Mohawk Pond (pictured in Figure 11) is found at the end of Mohawk Drive in Framingham and is approximately 1.65 acres. The Pond is extremely shallow as the average depth is only roughly 2 feet. Mohawk Pond is primarily surrounded by woodlands, with one developed residential property along the northern shoreline. Access to the waterbody was gained from a walking trail along the western shoreline. This trail is typically gated off to vehicles.

Figure 11: Mohawk Pond - Framingham, MA

Historically, Mohawk Pond has battled invasive species variable milfoil (*Myriophyllum heterophyllum*), along with potentially nuisance densities of pondweeds and algae. The goal of the 2023 program was to manage the invasive variable milfoil population while examining basic water quality through a proactive monitoring schedule. This would be accomplished by implementing an Aquatic Management Program that focused around performing all applicable tasks, including planning, permitting, surveys, treatments, and reporting.

All permitting, treatments, and survey tasks were completed without issue and at the proper times. The table below provides the specific dates of each task. Below the table, each visit/task performed is described in additional detail.

Summary Of 2023 Management Activities

Date	Task/Description
June 15, 2023	A pre-management survey was performed to document baseline conditions of the Pond, note the current vegetation species/densities present, and to guide future 2023 management; Water samples were collected
June 27, 2023	A brief survey was completed to confirm potential treatment areas; An herbicide treatment was conducted

July 31, 2023	An interim survey was performed to evaluate the effectiveness of the previous treatment and to guide the need for any future 2023 management
September 19, 2023	A post-management survey was completed to evaluate the effectiveness of the previous treatment and the overall 2023 Aquatic Management Program, in addition to helping guide recommendations for 2024; Water samples were collected

June 15, 2023 - Pre-Management Survey / Water Samples Collected

Figure 12: Cattails pictured at Mohawk Pond

On June 15th, Senior Environmental Scientist, James Lacasse, and Field Assistant, Grace Adams, completed a site visit to Mohawk Pond. The visit consisted of performing the pre-management survey and collecting water quality data in addition to water samples. Conditions during the visit were sunny with a slight breeze.

Throughout Mohawk Pond, there were scattered patches of filamentous algae, which were slightly more concentrated near shorelines. In addition, there were trace densities of variable milfoil and waterlilies. The Pond was characteristically very shallow all around. Native cattails (Figure 12) also bordered one of the shorelines. Minimal vegetation was documented during the survey. The Secchi disk reading resulted in 2 feet, 1 inch – or to the bottom (clarity was to the bottom throughout the waterbody).

Temperature & Dissolved Oxygen		
Depth (ft)	**Surface Temp (℃)**	**Surface DO (mg/L)**
Surface	20.8	10.86
1	20.1	9.80
2	20.0	9.60

June 27, 2023 – Survey / Treatment Conducted

On June 27th, Co-Owner/Senior Aquatic Biologist, Colin Gosselin, and Aquatic Field Assistant, Brian Sweeney, completed a site visit to Mohawk Pond. The visit consisted of performing a brief survey, collecting water quality data, and completing a treatment. Conditions during the visit were cloudy and humid.

Upon arrival, a brief survey was conducted to confirm treatment areas. There were no visual signs of algae within the Pond, although the overall water clarity was low and appeared murky. There was a strong, unpleasant odor at the Pond, potentially attributed to the large, deceased Snapping Turtle located on the shore. Similar to the survey performed earlier this month, variable milfoil was scattered throughout the Pond (documented in Figure 13). Native waterlilies were also documented scattered around the shoreline of the Pond.

A treatment was conducted for the control of invasive variable milfoil. The liquid contact herbicide was applied using a treatment boat equipped with a calibrated sub-surface injection system. This application methodology allows for even coverage within the treatment areas. The treatment was completed without issue. We anticipated plant die-off within just a few days to a few weeks.

Prior to the treatment, the shoreline was posted with neon pink signs noting the treatment, affiliated water use restrictions, and Water & Wetland contact information. The signs fulfill permit obligations for shoreline posting. Framingham Conservation Commission was also notified, and the required newspaper ad was placed.

Figure 13: Water and Wetland conducting a treatment at Mohawk Pond

Temperature & Dissolved Oxygen	
Surface Temp (℃)	**Surface DO (mg/L)**
23.7 C	9.12

July 31, 2023 - Survey

Figure 14: Improved conditions since the previous treatment

On July 31st, Co-Owner/Senior Aquatic Biologist, Colin Gosselin, and Aquatic Field Assistant, Brian Sweeney, completed a site visit to Mohawk Pond. The visit consisted of performing the post-treatment survey and collecting water quality data. Conditions during the visit were sunny and calm.

The purpose of the visit was to survey the condition of Mohawk Pond to determine if further management is necessary at this time. We were happy to report that the previous treatment for the control of variable milfoil was successful, as no milfoil was documented during today's survey. Overall, the Pond looked great (see conditions in Figure 14). Benthic algae and surface filamentous algae were present during the visit, but only at trace densities. This did not warrant treatment at this time. Because Mohawk Pond is extremely dynamic, continued monitoring occurred during the rest of the Summer.

Temperature & Dissolved Oxygen	
Surface Temp (℃)	**Surface DO (mg/L)**
22.8	9.06

September 19, 2023 - Post-Management Survey / Water Samples Collected

On September 19th, Senior Environmental Scientist, James Lacasse completed a site visit to Mohawk Pond. The visit consisted of performing the post-management survey and collecting water quality data in addition to water samples. Conditions during the visit were sunny with a slight breeze.

Figure 15: Post-Management survey at Mohawk Pond

Overall, Mohawk Pond looked great (see Figure 15). All pondweeds and algae were documented in only trace densities, scattered around the Pond. The only invasive species noted during the survey was variable milfoil, which was found in two, very small, isolated areas. It is typical to see milfoil regrowth towards the end of the season when using contact herbicides. Other species noted included cattails, filamentous algae, waterlilies, and duckweed. Water samples were collected and shipped to the laboratory for further analysis. The Secchi disk reading resulted in 2 feet, 1 inch – or to the bottom (clarity was to the bottom throughout the Pond).

Temperature & Dissolved Oxygen		
Depth (ft)	**Temp (℃)**	**DO (mg/L)**
Surface	20.9	8.43
1	21.0	8.47
2	21.0	8.26

Norton Pond

Figure 16: Norton Pond - Framingham, MA

Norton Pond (Figure 16) is approximately 3.4 acres and is surrounded between four roadways (Pinewood Drive to the south, Elm Street to the east, Michael Road to the north, and Alfred Road to the west). Sparse woodlands abut each shoreline, as developed residential properties are found along all shorelines except the eastern shoreline. Access to the Pond was granted from Elm Street.

Historically, Norton Pond has battled nuisance densities of pondweeds, algae, in addition to invasive variable milfoil. The goal of the 2023 program was to manage the invasive variable milfoil population and nuisance densities of pondweeds/algae while examining basic water quality through a proactive monitoring schedule. This would be accomplished by implementing an Aquatic Management Program that focused around performing all applicable tasks, including planning, permitting, surveys, treatments, and reporting.

All permitting, treatments, and survey tasks were completed without issue and at the proper times. The table below provides the specific dates of each task. Below the table, each visit/task performed is described in additional detail.

Summary Of 2023 Management Activities

Date	Task/Description
June 15, 2023	A pre-management survey was performed to document baseline conditions of the Pond, note the current vegetation species/densities present, and to guide future 2023 management; Water samples were collected
June 27, 2023	A brief survey was completed to confirm potential treatment areas; An herbicide treatment was completed
July 31, 2023	An interim survey was performed to evaluate the effectiveness of the previous treatment and to guide the need for any potential future 2023 management
September 19, 2023	A post-management survey was completed to evaluate the effectiveness of the overall 2023 Aquatic Management Program, in addition to helping guide recommendations for 2024; Water samples were collected

June 15, 2023 - Pre-Management Survey / Water Samples Collected

On June 15th, Senior Environmental Scientist, James Lacasse, and Field Assistant, Grace Adams, completed a site visit to Norton Pond. The visit consisted of performing the pre-management survey and collecting water quality data in addition to water samples. Conditions during the visit were sunny with a slight breeze.

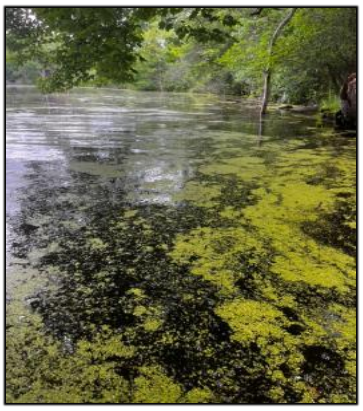

Figure 17: Duckweed, watermeal, and algae

Along the entire shoreline, there were moderate to dense densities of duckweed (pictured in Figure 17). Towards the middle of the pond the population of duckweed became more scattered. There was also minimal filamentous algae throughout the Pond. Watermeal was also documented scattered throughout the duckweed and algae (illustrated in Figure 17). Water clarity was deemed below average, with a brown tint. The secchi disk reading resulted in 2 feet, 7 inches.

Temperature & Dissolved Oxygen		
Depth (ft)	**Surface Temp (℃)**	**Surface DO (mg/L)**
Surface	22.5	8.88
1	23.1	8.39
2	22.1	6.58
~3	22.2	4.26

June 27, 2023 – Survey / Treatment Conducted

On June 27th, Co-Owner/Senior Aquatic Biologist, Colin Gosselin, and Aquatic Field Assistant, Brian Sweeney, completed a site visit to Norton Pond. The visit consisted of performing a brief survey, collecting basic water quality data, and completing a treatment. Conditions during the visit were humid and rainy.

Figure 18: Pondweeds documented around the perimeter of the Pond

Upon arrival, a brief survey was completed to confirm potential treatment areas. Duckweed and watermeal were found scattered around the perimeter of the Pond (noted in Figure 18) along with trace variable milfoil. The duckweed/watermeal cover is best seen in the photo. Any/all treatments were based on survey data.

Based on the previous survey, a treatment was planned for the control of the nuisance duckweed and watermeal. While both native species, these species typically cover large portions of the surface of Norton Pond. This leads to lessened biodiversity and oxygen transfer. The best practice is to control these species prior to them taking over the entirety of the Pond. This approach limits biomass die-off and requires less chemical usage. The contact herbicide was applied using a jon boat equipped with a calibrated sub-surface injection system. This application methodology allows for even coverage throughout the treatment areas. The treatment was successfully completed, and we anticipated signs of control in the next few days.

Prior to the treatment, the shoreline was posted with neon pink signs noting the treatment, affiliated water use restrictions, and Water & Wetland contact information. The signs fulfill permit obligations for shoreline posting.

Temperature & Dissolved Oxygen	
Surface Temp (℃)	**Surface DO (mg/L)**
25.4	9.57

July 31, 2023 - Survey

On July 31st, Co-Owner/Senior Aquatic Biologist, Colin Gosselin, and Aquatic Field Assistant, Brian Sweeney, completed a site visit to Norton Pond. The visit consisted of performing an interim survey and collecting water quality data. Conditions during the visit were sunny with a slight breeze.

Figure 19: Duckweed, watermeal, and algae

The purpose of the visit was to survey the condition of Norton Pond to determine if further management is necessary at this time. Variable milfoil was controlled from the previous treatment. Scattered duckweed, watermeal, and filamentous algae were documented (Figure 19). All species have the ability to cover large surface areas of Ponds, thus limiting biodiversity and oxygen transfer. The watermeal and duckweed were scaled back from the previous treatment and at this time are confined just to the windblown shorelines in low densities. Filamentous algae was also only observed at trace densities scattered around the shoreline. This did not warrant treatment at this time. Several warm water fish species were noted during the survey.

Temperature & Dissolved Oxygen	
Surface Temp (℃)	**Surface DO (mg/L)**
28.3	10.55

September 19, 2023 - Post-Management Survey / Water Samples Collected

Figure 20: Filamentous algae mats on the surface of the Pond

On September 19th, Senior Environmental Scientist, James Lacasse, completed a site visit to Norton Pond. The visit consisted of performing the post-management survey and collecting water quality data in addition to water samples. Conditions during the visit were sunny and calm.

Observed within Norton Pond was primarily filamentous algae, with duckweed and watermeal mixed in. Filamentous algae ranged from sparse to dense densities. Duckweed and watermeal were documented as trace to sparse densities. Filamentous algae (Figure 20), duckweed, and watermeal were found towards each shoreline, encroaching towards the middle of the Pond, with the middle of the Pond open water habitat. Bulrush (*Scirpus pungens)* was scattered in low densities around the shoreline of the waterbody. Filamentous algae was noted growing along the bottom, within the water column, and forming mats at the surface. Water samples were collected and shipped to the laboratory for further analysis. Algae in the Pond warranted treatment. It is however late in the season, so we anticipated the algae to die-off naturally as water temperatures cool. The secchi disk reading resulted in 2 feet, 8 inches.

Temperature & Dissolved Oxygen		
Depth (ft)	**Temp (℃)**	**DO (mg/L)**
Surface	22.1	7.87
1	22.1	7.81
2	22.1	7.53
3	22.1	7.16

Sudbury River

Water and Wetland took over management within the Framingham portion of the Sudbury River (Figure 21) in 2023. The portion of the Sudbury River considered within the management area included from the outlet (a dammed structure), adjacent to Central Street, extending to the area of the Sudbury River that abuts the Mass Pike (Route 90). Access to the River was granted from a boat launch off Centennial Place. Most of this portion of the River is surrounded by woodlands, with developed residential properties scattered throughout the woodlands.

Historically, this portion of the Sudbury River has battled several invasive species including water chestnut, variable milfoil, Eurasian milfoil, fanwort, and curly-leaf pondweed. The goal of the 2023 program was to manage the invasive water chestnut population only, while examining basic water quality through a proactive monitoring schedule. This would be accomplished by implementing an Aquatic Management Program that focused around performing all applicable tasks, including planning, permitting, surveys, treatments, and reporting.

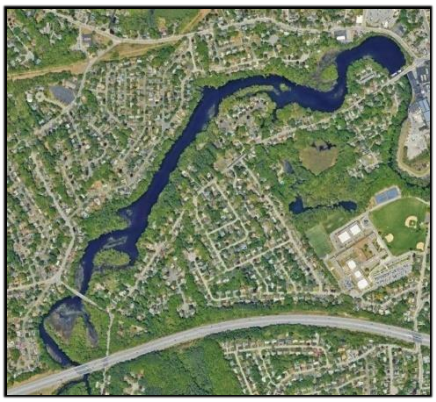

Figure 21: Sudbury River - Framingham, MA

All permitting, treatments, and survey tasks were completed without issue and at the proper times. The table below provides the specific dates of each task. Below the table, each visit/task performed is described in additional detail.

Summary Of 2023 Management Activities

Date	Task/Description
June 12, 2023	A pre-management survey was performed to document baseline conditions of the River, note the current vegetation species/densities present, and to guide future 2023 management; Water samples were collected
June 29, 2023	A brief survey was completed; The initial water chestnut treatment was performed
July 27, 2023	An interim survey was performed; The follow-up water chestnut treatment was accomplished
August 17, 2023	An interim survey was completed to evaluate the effectiveness of the previous treatment; Hand-pulling of water chestnut occurred
September 19, 2023	A post-management survey was completed to evaluate the effectiveness of the previous treatment and the overall 2023 Aquatic Management Program, in addition to helping guide recommendations for 2024; Water samples were collected

June 12, 2023 - Pre-Treatment Survey / Water Samples Collected

On June 12th, Senior Environmental Scientist, James Lacasse, and Field Assistant Grace Adams, completed a site visit to Sudbury River in Framingham. The visit consisted of performing a survey and collecting basic water quality data in addition to collecting water samples. Conditions during the visit were sunny with a slight breeze.

Upon arrival, a survey was conducted using visual observation paired with a standard throw-rake and handheld GPS/ArcGIS Field Maps, as applicable. Five invasive species were documented during the survey, including fanwort (Figure 22), variable milfoil (also pictured in Figure 22), Eurasian milfoil, curly-leaf pondweed, and water chestnut. Eurasian milfoil was the most dominant invasive species noted as it was found throughout most of the littoral zone. Water chestnut was scattered throughout the River, mostly in isolated populations but occasionally in areas where the population reached trace to sparse continuous densities. Floating water chestnut seeds were also observed throughout the survey. Native species

Figure 22: Invasive species growing throughout the water column

documented included thin-leaf pondweed, duckweed, watermeal, waterlilies, Robbin's pondweed, and ribbon-leaf pondweed. The pH was 6.9, which is within a standard range for freshwater and is considered neutral. The Secchi reading was 4 feet, 7 inches.

Temperature & Dissolved Oxygen		
Depth (ft)	**Temp (℃)**	**DO (mg/L)**
Surface	21.8	8.71
1	21.8	8.22
2	21.6	8.14
3	21.6	7.31
4	21.5	7.02

<u>June 29, 2023 - Survey / Treatment Completed</u>

On June 29th, Co-Owner/Senior Aquatic Biologist Colin Gosselin, completed a site visit to the Sudbury River. The visit consisted of performing a survey, collecting water quality data, and completing a treatment. Conditions during the visit were sunny with a slight breeze.

Figure 23: Water chestnut treated during the site visit

Upon arrival, a brief survey was completed to confirm potential treatment areas. It was observed that most of the dense patches were closer to the highway and the shallow coves. There were many scattered water chestnut plants mixed in with the waterlilies. Milfoil species and fanwort were observed in moderate to dense densities throughout the stretch of the River. Overall, the Sudbury River looked great and there had been a huge improvement since the start of the project. Much of the water chestnut was found in scattered patches throughout the River as seen in the photo above (Figure 23).

A treatment was conducted for the control of water chestnut. The liquid herbicide, Clearcast (imazamox), was applied using an airboat, equipped with a calibrated pump, which is used to target the water chestnut plants via foliar application methodology. This method allows for even and precise coverage. Weather was also closely monitored prior to treatment to ensure a treatment date without rain or high winds. Generally, the weather was perfect as no rain occurred and there was very little wind.

Prior to the treatment, the shoreline was posted with neon pink signs noting the treatment, affiliated water use restrictions, and Water & Wetland contact information. The signs fulfill permit obligations for shoreline posting. Framingham Conservation Commission was also notified of the treatment and the required newspaper ad was placed at the beginning of the season.

Temperature & Dissolved Oxygen	
Surface Temp (℃)	Surface DO (mg/L)
24.2	7.32

July 27, 2023 - Survey / Follow-up Treatment Completed

Figure 24: Fanwort documented during the survey

On July 27th, Co-Owner/Senior Aquatic Biologist Colin Gosselin, and Aquatic Field Assistant Grace Adams, completed a site visit to the Sudbury River. The visit consisted of performing a post-treatment survey, collecting basic water quality data, and completing the follow-up treatment. Conditions during the visit were sunny with a slight breeze.

Along the shoreline and within cove areas, there were trace to sparse densities of water chestnut. The airboat was utilized to navigate in these areas and the calibrated back-pack application precisely targeted water chestnut plants. Although not targeted today, there were dense densities of fanwort (documented in Figure 24 to the right), with the greatest populations residing in the cove areas. In certain areas the fanwort was also flowering and approaching the surface. The Secchi disk reading resulted to the bottom of the River.

As mentioned, a follow-up treatment was conducted for the control of invasive water chestnut. Clearcast (imazamox), was paired with a non-ionic surfactant. The mixture was applied to live water chestnut via foliar application using low-volume calibrated spray equipment. This methodology allows for even coverage and distribution to the target water chestnut, while limiting any non-target impacts. Weather was also closely monitored prior to treatment to ensure a treatment date without rain or high winds.

Prior to the treatment, the shoreline was posted with neon pink signs noting the treatment, affiliated water use restrictions, and Water & Wetland contact information. The signs fulfill permit obligations for shoreline posting.

Temperature & Dissolved Oxygen	
Surface Temp (℃)	Surface DO (mg/L)
24.3	7.48

August 17, 2023 - Survey / Hand-pulling Water Chestnut

On August 17th, Aquatic Biologist Scott Conrade and Aquatic Field Assistant, Brian Sweeney, completed a site visit to the designated portion of the Sudbury River. The visit consisted of performing the post-treatment survey, collecting water quality data, and hand-pulling the remaining water chestnut population. Conditions during the visit were mostly cloudy with a slight breeze.

Figure 25: Improved conditions since the previous treatments

Based on the previous water chestnut treatments, it was recommended that the final water chestnut management visit of the 2023 season consist of hand-pulling only. Due to the low densities resulting from the first two Clearcast applications, it was simply best practice to hand-pull the trace remaining plants. An intense search for water chestnut was conducted within the designated stretch of River. Only trace water chestnut was found, consisting of a few dozen plants which were hand-pulled and removed from the site. Several water chestnut seeds were found floating on the surface, which were also gathered and removed. We are confident that 100% water chestnut control was achieved during the 2023 season (great conditions pictured in Figure 25). Fanwort was noted throughout nearly the entirety of the management area. It was noted at high densities along the banks. Purple loosestrife and Japanese knotweed (*Reynoutria japonica)* were also noted along the banks in varying densities ranging from moderate to dense. Other species noted during the survey included waterlilies, thin-leaf pondweed, benthic algae, filamentous algae, and cattails.

Temperature & Dissolved Oxygen	
Surface Temp (℃)	**Surface DO (mg/L)**
22.3	7.33

September 19, 2023 - Post-Management Survey / Water Samples Collected

Figure 26: Dense submersed invasives growing throughout the River

On September 19th, Senior Environmental Scientist, James Lacasse, completed a site visit to Sudbury River. The visit consisted of performing the post-management survey and collecting water quality data in addition to water samples. Conditions during the visit were partly sunny with a slight breeze.

The water chestnut treatments in 2023 worked excellent as no living water chestnut was noted throughout the survey. One water chestnut plant was documented, but upon further observation, the plant was just floating on the surface as it was not attached to a root system/stem. The most prevalent invasive species (see Figure 26) documented was fanwort, followed by Eurasian milfoil, variable milfoil, and curly-leaf pondweed. Portions of the fanwort population were at the end of the flowering stage. The most dominant native species included waterlilies and coontail. Water samples were collected and shipped to the laboratory for further analysis. Water chestnut seeds were noted scattered, floating on the surface of the River. The water level was slightly higher than average (due to the recent rain events). Epiphytic algae was noted on roughly 50-75% of the vegetation, which indicates that the plant is dying or decaying. Other species noted during the survey included cattails, duckweed, filamentous algae, Robbin's pondweed, ribbon-leaf pondweed (*Potamogeton epihydrus)*, pickerelweed, arrowhead, purple loosestrife, and thin-leaf pondweed. The Secchi disk reading resulted in 4 feet, 10 inches.

Temperature & Dissolved Oxygen		
Depth (ft)	**Temp (℃)**	**DO (mg/L)**
Surface	19.8	7.02
1	19.8	6.98
2	19.8	6.81
3	19.6	6.72
4	19.4	6.56
5	19.3	6.07

Gleason Pond

Figure 27: Gleason Pond - Framingham, MA

Gleason Pond (pictured in Figure 27) is approximately 11.3 acres and is located between Dennison Avenue (to the west and south), Concord Street (to the east), and Prindiville Avenue (to the north). Gleason Pond is primarily surrounded by sparse woodlands, with developed residential properties scattered throughout the woodlands. Gallagher Park abuts the Pond to the east, where access to the Pond was granted. Like other shallow Framingham Ponds, the entirety of Gleason Pond is considered a littoral zone. Gleason Pond is a popular recreational waterbody for fishing.

Historically, Gleason Pond has battled nuisance densities of native pondweeds and invasive species curly-leaf pondweed. The goal of the 2023 program was to monitor the vegetation growth while examining basic water quality through a proactive monitoring schedule. This would be accomplished by implementing an Aquatic Management Program that focused around performing all applicable tasks, including planning, permitting, surveys, and reporting.

All permitting and survey tasks were completed without issue and at the proper times. The table below provides the specific dates of each task. Below the table, each visit/task performed is described in additional detail.

Summary Of 2023 Management Activities

Date	Task/Description
June 15, 2023	An early-season survey was performed to document baseline conditions of the Pond, note the current vegetation species/densities present, and to guide future 2023 management; Water samples were collected
September 19, 2023	A late-season survey was conducted to assess the condition of the Pond and to guide future management recommendations; Water samples were collected

June 15, 2023 – Early-Season Survey / Water Samples Collected

Figure 28: Dense waterlilies noted around the perimeter of the Pond

On June 15th, Senior Environmental Scientist, James Lacasse, and Field Assistant, Grace Adams, completed a site visit to Gleason Pond. The visit consisted of performing a survey and collecting water quality data in addition to water samples. Conditions during the visit were mostly cloudy with a slight breeze.

Throughout the Pond, there were dense densities of Robbin's pondweed documented. Along the shoreline, there were dense densities of waterlilies that were confined to the shoreline (documented in Figure 28). There were also scattered densities of coontail, and bladderwort (*Utricularia sp.)* mixed in with the Robbin's pondweed. The coontail was more prevalent in the northern section of the pond. In addition, there was minimal benthic filamentous algae surfacing, but the majority was still within the water column. Curly-leaf pondweed was the only invasive species observed. It was documented at trace, isolated densities. The Secchi disk reading resulted in 4 feet, 3 inches – or to the top of the vegetation.

Temperature & Dissolved Oxygen		
Depth (ft)	**Surface Temp (℃)**	**Surface DO (mg/L)**
Surface	24.1	7.42
1	7.51	23.6
2	23.6	7.63
3	23.5	6.63
Bottom	23.5	4.75

September 19, 2023 – Late-Season Survey / Water Samples Collected

On September 19th, Senior Environmental Scientist, James Lacasse, completed a site visit to Gleason Pond. The visit consisted of performing a survey (illustrated in Figure 29) and collecting water quality data in addition to water samples. Conditions during the visit were sunny with a slight breeze.

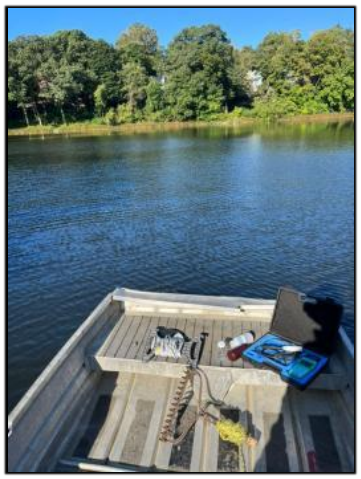

Figure 29: Water and Wetland conducting a post-management survey at Gleason Pond

Gleason Pond looked excellent (see great conditions in Figure 29). Only one invasive species was noted during the survey, which included curly-leaf pondweed. This species was localized to one area, documented in isolated, trace densities. Robbin's pondweed was the most prominent species observed throughout the survey, followed by waterlilies, and coontail. The water clarity was great as it was to the bottom throughout the Pond. Water samples were collected and shipped to the laboratory for further analysis. Epiphytic algae was documented on roughly 75% of the vegetation, which indicates that the plant is dying/decaying. A handful of small, floating islands were noted throughout the waterlilies.

Other species documented included purple loosestrife, bladderwort, thin-leaf pondweed, and benthic algae. The Secchi disk reading was 4 feet, 7 inches – or to the top of the vegetation.

Temperature & Dissolved Oxygen		
Depth (ft)	**Temp (℃)**	**DO (mg/L)**
Surface	20.3	7.71
1	20.3	7.67
2	20.1	7.54
3	20.1	7.11
4	20.0	7.08

Learned Pond

Figure 30: Learned Pond - Framingham, MA

Learned Pond (pictured in Figure 30) is approximately 33.9 acres with a maximum depth of roughly 13 feet. Learned Park and Beach compromise most of the eastern shoreline, which is open to the public. The boat launch (where access to the Pond was granted), is adjacent to the Learned Park and Beach, off Shawmut Terrace. Learned Pond is a popular recreational waterbody for activities such as fishing and swimming. The Pond is surrounded by sparse woodlands, with developed properties scattered within the woodlands. The majority of the residential properties are found along the western and northern shorelines.

Historically, Learned Pond has battled nuisance algal blooms and occasionally nuisance densities of native pondweeds. The goal of the 2023 program was to monitor the conditions within the Pond while examining basic water quality through a proactive monitoring schedule. This would be accomplished by implementing an Aquatic Management Program that focused around performing all applicable tasks, including planning, permitting, surveys, and reporting.

All permitting and survey tasks were completed without issue and at the proper times. The table below provides the specific dates of each task. Below the table, each visit/task performed is described in additional detail.

Summary Of 2023 Management Activities

Date	Task/Description
June 15, 2023	An early-season survey was performed to document baseline conditions of the Pond, note the current vegetation species/densities present, and to guide potential 2023 management; Water samples were collected
September 19, 2023	A late-season survey was conducted to provide updated conditions of the Pond, in addition to guiding recommendations for 2024; Water samples were collected

June 15, 2023 – Early-Season Survey / Water Samples Collected

On June 15th, Senior Environmental Scientist, James Lacasse, and Field Assistant, Grace Adams, completed a site visit to Learned Pond. The visit consisted of performing the pre-management survey and collecting water quality data in addition to water samples. Conditions during the visit were sunny with a slight breeze.

Figure 31: Filamentous algae noted

The water clarity throughout the Pond was excellent. Along the shoreline, there were scattered patches of waterlilies, with filamentous algae mixed in on the surface and within the water column (illustrated in Figure 31). The western shoreline of the Pond was noted as having the densest populations of filamentous algae. Native cattails were observed along the shoreline. Minimal vegetation was documented in the Pond. Robbin's pondweed was found in the southern portion of the Pond in trace densities. Overall, the pond looked excellent. The Secchi disk reading resulted in 9 feet, 2 inches – to the bottom.

Temperature & Dissolved Oxygen		
Depth (ft)	**Surface Temp (℃)**	**Surface DO (mg/L)**
Surface	23.4	7.57
1	23.3	7.58
2	23.1	7.59
3	23.0	7.57
4	22.8	7.59
5	22.1	7.76
6	21.8	7.34
7	21.2	7.28
8	20.6	7.19
Bottom	20.6	7.10

September 19, 2023 – Late-Season Survey / Water Samples Collected

Figure 32: Post-management survey at Learned Pond

On September 19th, Senior Environmental Scientist, James Lacasse, completed a site visit to Learned Pond. The visit consisted of conducting a late-season survey (Figure 32) and collecting water quality data in addition to water samples. Conditions during the visit were sunny with a slight breeze.

Upon arrival to the Pond, the first noticeable observation was that there was a current microscopic algae bloom. This was visible on the surface, specifically against windblown shorelines, as well as within the water column. Minimal vegetation was documented throughout the Pond - the most dominant species noted was waterlilies. Waterlilies were observed scattered in small to large patches around the shoreline. Samples were collected and shipped to the laboratory for further analysis. Trace

densities of Robbin's pondweed were noted mixed throughout some of the waterlily patches. Other species documented during the survey included benthic algae, cattails, and purple loosestrife. The secchi disk reading resulted in 5 feet, 4 inches.

Temperature & Dissolved Oxygen		
Depth (ft)	**Temp (℃)**	**DO (mg/L)**
Surface	22.2	7.70
1	22.2	7.59
2	22.2	7.58
3	22.2	7.57
4	22.1	7.57
5	22.1	7.31
6	22.0	7.12
7	19.1	6.96

Waushakum Pond

Waushakum Pond (pictured in Figure 33 below) is located in both Framingham and Ashland and is approximately 80 acres. Most of the waterbody falls within Framingham city boundaries, as only the southern cove is in Ashland (town boundaries fall at the end of Shore Road on the western shoreline and between Willis Avenue and Waushakum Avenue along the eastern shoreline). The Pond is primarily surrounded by sparse woodlands, shrubbery, and developed residential properties. Waushakum Beach is located along the northern shoreline. Waushakum Pond is a popular recreational waterbody for activities such as fishing, boating, and swimming. Access to the Pond is granted from the southern cove, on the corner of Washington Avenue and Lakeside Drive.

Figure 33: Waushakum Pond – Framingham /Ashland, MA

Historically, Waushakum Pond has battled invasive species variable milfoil along with nuisance densities of pondweeds. The Pond has also battled potentially harmful algae, including in 2023. The goal of the 2023 program was to manage the invasive variable milfoil population and nuisance densities of pondweeds while examining basic water quality through a proactive monitoring schedule. This would be accomplished by implementing an Aquatic Management Program that focused around performing all applicable tasks, including planning, permitting, surveys, treatments, and reporting.

All permitting, treatments, and survey tasks were completed without issue and at the proper times. The table below provides the specific dates of each task. Below the table, each visit/task performed is described in additional detail.

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Summary Of 2023 Management Activities

Date	Task/Description
June 15, 2023	A pre-treatment survey was performed to document baseline conditions of the Pond, note the current vegetation species/densities present, and to guide future 2023 management; Water samples were collected
June 27, 2023	A brief survey was completed; An herbicide treatment was conducted
July 12, 2023	An interim survey was conducted
August 24, 2023	A post-management inspection was completed to evaluate the effectiveness of the previous treatment and the overall 2023 Aquatic Management Program, in addition to helping guide recommendations for 2024
September 19, 2023	Water samples collected

June 15, 2023 - Pre-Treatment Survey / Water Samples Collected

On June 15th, Senior Environmental Scientist, James Lacasse, and Field Assistant, Grace Adams, completed a site visit to Waushakum Pond. The visit consisted of performing the pre-management survey and collecting water quality data in addition to water samples. Conditions during the visit were sunny with a slight breeze.

Throughout the entire littoral zone, elodea, thin-leaf pondweed, clasping-leaf pondweed, coontail, and waterlilies were the dominate native species. These species were reaching nuisance densities in many areas. Filamentous algae was noted on the bottom, within the water column, and on the surface forming mats of algae. Epiphytic algae was present on roughly half of the vegetation. Invasive species documented throughout the survey included variable milfoil and curly-leaf pondweed. The variable milfoil was isolated to only the areas documented on the attached map. The curly-leaf pondweed population appeared very unhealthy. The unhealthy appearance of the curly-leaf pondweed may have been attributed to the time of year, as this species is a colder water species. The curly-leaf pondweed was primarily mixed throughout the dense native species, occasionally noted by itself. The Secchi disk reading resulted in 7 feet, 10 inches.

Temperature & Dissolved Oxygen		
Depth (ft)	**Surface Temp (℃)**	**Surface DO (mg/L)**
Surface	25.0	8.20
1	24.5	8.64
2	24.4	8.71
3	23.5	8.85
4	22.6	8.28
5	21.0	8.20
6	20.8	8.15
7	20.6	8.03
8	20.3	7.98
9	19.5	7.64
10	19.2	7.62

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June 27, 2023 - Herbicide Treatment

Figure 34: Coontail documented during the site visit

On June 27th, Co-Owner/Senior Aquatic Biologist, Colin Gosselin, and Aquatic Field Assistant, Brian Sweeney, completed a site visit to Waushakum Pond. The visit consisted of performing a brief survey, collecting basic water quality data, and completing a treatment. Conditions during the visit were sunny with a slight breeze.

As planned, a treatment was conducted for the control of the target nuisance and invasive plant growth. This consisted of 5-acres on the Ashland side and 10-acres on the Framingham side. Treatment areas on the Ashland side focused on the shorelines and a channel through the middle of the southernmost cove. In Framingham, the acres of treatment targeted the densest areas of weed growth which included the eastern shoreline including near the beach, and the northwestern cove around Monkey Island. It is important to note that we were extremely cautious around Monkey Island to avoid the privately owned property and adjacent area outlined by Framingham Conservation Commission prior to treatment. This area was expressly avoided. The treatment utilized triclopyr herbicide only. This is the only herbicide approved for use in Waushakum Pond by Natural Heritage Endangered Species Program (NHESP). It is important to note that we anticipated control of both coontail (Figure 34) and variable milfoil, but clasping-leaf pondweed is the densest species in the Pond. Triclopyr is not labeled for control of either clasping-leaf pondweed or elodea. Given this, we anticipated some impacts to these species, but full control may not be realized. We did anticipate significant overall improvements in the treated areas, however. The liquid herbicide was applied using a treatment boat equipped with a calibrated sub-surface injection system. This application methodology allows for even coverage within the treatment areas. The treatment was completed without issue. We anticipated the target plants to die-off within just a few days to a few weeks.

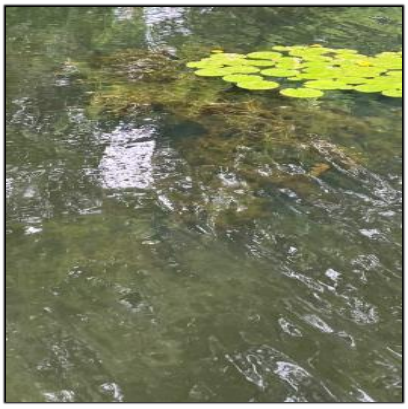

Figure 35: Pondweeds mixed within the waterlilies

Prior to the treatment, the shoreline was posted with neon pink signs noting the treatment, affiliated water use restrictions, and Water & Wetland contact information. The signs were posted in the required languages noted in the OOC's. The signs fulfill permit obligations for shoreline posting. An ad was also placed in the newspaper, and Ashland abutters were notified by the Ashland Conservation Agent. The water level was also confirmed by John Burns who then received approval from NHESP allowing for treatment.

Temperature & Dissolved Oxygen	
Surface Temp (℃)	**Surface DO (mg/L)**
25.5	7.89

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July 12, 2023 - Survey

Figure 3610: Improved conditions since the treatment

On July 12th, Co-Owner/Senior Aquatic Biologist, Colin Gosselin, and Aquatic Field Assistant, Grace Adams completed a site visit to Waushakum Pond. The visit consisted of performing the post-treatment survey and collecting water quality data. Conditions during the visit were partly cloudy and calm.

A post-treatment survey was conducted to evaluate the effectiveness of the previous treatment. The elodea was drastically reduced within the treated areas, although there were some mats that appeared unhealthy/dead but still within the water column. The thin-leaf pondweed was also reduced but was found matted on the surface. No variable milfoil was observed as this was successfully controlled from the treatment. Clasping-leaf pondweed was necrotic, with some stalks stripped of its leaves; however, it had not yet fallen from the water column. This was not surprising as triclopyr is not labeled for control of clasping leaf pondweed. We were hopeful that based on the condition of the clasping-leaf, it would fall from the water column eventually. In addition, the start of an algae bloom was also noted.

Temperature & Dissolved Oxygen	
Surface Temp (℃)	**Surface DO (mg/L)**
28.6	8.98

August 24, 2023 - Post-Management Survey / Water Samples Collected (Sept 19)

On August 24th, Co-Owner/Senior Aquatic Biologist Colin Gosselin, completed a site visit to Waushakum Pond. The visit consisted of performing the post-management survey (Figure 37) and collecting water quality data in addition to water samples. Conditions during the visit were mostly sunny with a slight breeze.

Figure 37: Post-management survey at Waushakum Pond

A post-management survey of Waushakum Pond was conducted on both the Framingham and Ashland sides. We typically perform the Ashland side post-survey in August, which is why we surveyed this Pond in August and the rest of the Framingham Ponds (including the Sudbury River) in September.

The water clarity in Waushakum Pond during the survey was much better than during previous visits as there were no visual signs of an algae bloom in any area. The most recent DPH algae samples seemed to confirm this, as cyanobacteria counts have dropped rapidly. Specific to aquatic plants, no invasive species were documented. The 2023 triclopyr treatment worked well at controlling both variable milfoil and curly-leaf pondweed. Somewhat surprisingly, the clasping leaf pondweed (which is less susceptible to triclopyr and not on the product label) was fully controlled on the Framingham side. Coontail was documented on the Ashland side, which is a native species. It appeared that the triclopyr affected waterlilies to some extent, which is about what we anticipated as well. Thin-

leaf pondweed and tapegrass (*Vallisneria americana)* were observed scattered throughout the waterbody, but generally at healthy densities. Both are native species. Overall, the Pond looked good and much better than pre-treatment, specific to aquatic macrophyte growth. The Secchi disk reading resulted in 5 feet, 4 inches.

Temperature & Dissolved Oxygen	
Surface Temp (°C)	**Surface DO (mg/L)**
21.9	8.33

Water Quality

During the June 15th and September 19th survey events, water samples were collected from each Framingham pond mentioned above. Samples were collected from the middle of the ponds, preserved, and immediately taken and/or shipped to a certified laboratory where they were analyzed for the specific contracted parameters. The samples were analyzed for Alkalinity, Chlorophyll A, Conductivity, Hardness, Nitrates & Nitrites, Nitrogen - Total (Kjeldahl), pH, Phosphorus - Free Reactive, Phosphorus - Total, Turbidity, and E. Coli. All samples collected were "surface grabs." Dissolved oxygen and temperature were measured using a calibrated meter during each site visit; these values are located within the details of each visit above.

Water quality in ponds and lakes is constantly changing and is altered by many environmental factors. The samples collected during the two site visits provide a baseline and the results depict a "snap-shot" of the results specific to the sampling date. The results from the two sampling events, as well as a description of each parameter are included in the tables below.

As shown below, one table for each waterbody is included. We understand this is quite a bit of data. For ease, we have highlighted any results which we have deemed as either high, or out of a normal range.

Mohawk Pond - Total phosphorus was elevated during both sampling events. Total nitrogen was also elevated. We also had one extremely elevated E. Coli sample during the September event. This could have been driven by previous heavy rains but should absolutely be monitored moving forward.

Norton Pond - Total phosphorus was elevated during both sampling events. Chlorophyll a was also elevated during the Spring sampling. This signified high algae production, which was consistent without pre-treatment survey results. Algae was treated shortly thereafter.

Waushakum Pond – Waushakum Pond was closed at various times throughout the 2023 season due to various water quality issues including both E. Coli and cyanobacteria. Surprisingly, nutrient levels in Waushakum Pond were fairly good. Chlorophyll a was also low. E. Coli results were all returned as fairly safe, although present. It is however extremely important to again note that water quality is constantly changing, and the results below depict just a snapshot in time, at the collection location.

Sudbury River – Total phosphorus was elevated during both sampling events, although not all that excessive. Total nitrogen was also just over our recommended threshold during the Spring sampling. The September E. Coli result was also above the recommended threshold.

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Big Farm & Little Farm Pond – Results were similar in both ponds, and overall, the water quality is fairly desirable. The September total phosphorus values were elevated, although this could have been driven by an influx of nutrients from previous heavy rains.

Gleason Pond – Total phosphorus results were elevated during both sampling events.

Learned Pond – Alkalinity at Learned Pond is low, suggesting that this waterbody is susceptible to potential shifts in pH. Additionally, E. Coli was high during the Spring sampling event.

2023 Water Quality Results – Mohawk Pond			
Parameter	**Units**	**6/15/2023**	**9/19/2023**
Turbidity	NTU	3.2	4.2
Conductivity	uS/cm	375.0	153.8
Free Reactive Phosphorus	ug/L	5.3	6.7
Chlorophyll a	ug/L	13.4	<10
Total Phosphorus	ug/L	36.3	52.4
Alkalinity	mg/L as CaCO3	29.9	20.4
Total Hardness	mg/L as CaCO3	43.2	29.1
Total Nitrate and Nitrite	mg/L	0.56	0.39
Nitrite	mg/L	<0.02	<0.02
Nitrate	mg/L	0.56	0.39
Total Kjeldahl Nitrogen	mg/L	0.56	0.96
Total Nitrogen	mg/L	1.12	1.35
pH	NTU	7.0	6.8
E. Coli	CFU/100ml	114.5	2419

2023 Water Quality Results – Norton Pond			
Parameter	**Units**	**6/15/2023**	**9/19/2023**
Turbidity	NTU	3.6	2.7
Conductivity	uS/cm	327.0	108.8
Free Reactive Phosphorus	ug/L	7.5	5.8
Chlorophyll a	ug/L	38.2	<10
Total Phosphorus	ug/L	60.2	30.2
Alkalinity	mg/L as CaCO3	34.4	25
Total Hardness	mg/L as CaCO3	29.9	27.4
Total Nitrate and Nitrite	mg/L	<0.02	0.18
Nitrite	mg/L	0.02	<0.02
Nitrate	mg/L	<0.02	0.18
Total Kjeldahl Nitrogen	mg/L	0.94	<0.01
Total Nitrogen	mg/L	0.94	0.18

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pH	NTU	7	7.1
E. Coli	CFU/100ml	15.6	90.9

2023 Water Quality Results – Waushakum Pond			
Parameter	**Units**	**6/15/2023**	**9/19/2023**
Turbidity	NTU	2.7	3.1
Conductivity	uS/cm	554.0	385.0
Free Reactive Phosphorus	ug/L	<5	<5
Chlorophyll a	ug/L	<10	<10
Total Phosphorus	ug/L	11.6	21.5
Alkalinity	mg/L as CaCO3	28.4	29.2
Total Hardness	mg/L as CaCO3	46.1	43.0
Total Nitrate and Nitrite	mg/L	<0.02	0.02
Nitrite	mg/L	<0.02	<0.02
Nitrate	mg/L	<0.02	0.02
Total Kjeldahl Nitrogen	mg/L	0.47	0.84
Total Nitrogen	mg/L	0.47	0.86
pH	NTU	7.7	7.1
E. Coli	CFU/100ml	2.0	82.0

2023 Water Quality Results – Sudbury River			
Parameter	**Units**	**6/15/2023**	**9/19/2023**
Turbidity	NTU	3.3	3.7
Conductivity	uS/cm	740.0	344.0
Free Reactive Phosphorus	ug/L	5.5	8.3
Chlorophyll a	ug/L	<10	<10
Total Phosphorus	ug/L	35	35.6
Alkalinity	mg/L as CaCO3	37.8	26.8
Total Hardness	mg/L as CaCO3	53.6	35.5
Total Nitrate and Nitrite	mg/L	0.29	0.23
Nitrite	mg/L	<0.02	<0.02
Nitrate	mg/L	0.29	0.23
Total Kjeldahl Nitrogen	mg/L	0.81	<0.01
Total Nitrogen	mg/L	1.1	0.23
pH	NTU	7	7
E. Coli	CFU/100ml	50.4	410.6

WATER & WETLAND

LAKE, POND & WETLAND MANAGEMENT

2023 Water Quality Results – Big Farm Pond			
Parameter	**Units**	**6/15/2023**	**9/19/2023**
Turbidity	NTU	2.6	3.1
Conductivity	uS/cm	1083.0	889.0
Free Reactive Phosphorus	ug/L	<5	<5
Chlorophyll a	ug/L	<10	<10
Total Phosphorus	ug/L	12.6	43.9
Alkalinity	mg/L as CaCO3	45.9	49.4
Total Hardness	mg/L as CaCO3	75.9	71.5
Total Nitrate and Nitrite	mg/L	<0.02	0.05
Nitrite	mg/L	<0.02	<0.02
Nitrate	mg/L	<0.02	0.05
Total Kjeldahl Nitrogen	mg/L	0.29	0.48
Total Nitrogen	mg/L	0.29	0.53
pH	NTU	8.2	7.5
E. Coli	CFU/100ml	25.3	16.0

2023 Water Quality Results – Little Farm Pond			
Parameter	**Units**	**6/15/2023**	**9/19/2023**
Turbidity	NTU	2.7	2.9
Conductivity	uS/cm	963.0	669.0
Free Reactive Phosphorus	ug/L	<5	<5
Chlorophyll a	ug/L	<10	<10
Total Phosphorus	ug/L	18.2	34.2
Alkalinity	mg/L as CaCO3	49.4	46.2
Total Hardness	mg/L as CaCO3	65.6	60.7
Total Nitrate and Nitrite	mg/L	<0.02	<0.02
Nitrite	mg/L	<0.02	<0.02
Nitrate	mg/L	<0.02	<0.02
Total Kjeldahl Nitrogen	mg/L	0.37	0.51
Total Nitrogen	mg/L	0.37	0.51
pH	NTU	7.8	7.5
E. Coli	CFU/100ml	11.0	38.8

2023 Water Quality Results – Gleason Pond			
Parameter	**Units**	**6/15/2023**	**9/19/2023**
Turbidity	NTU	2.7	3.2
Conductivity	uS/cm	937.0	617.0

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Free Reactive Phosphorus	ug/L	<5	6.7
Chlorophyll a	ug/L	<10	<10
Total Phosphorus	ug/L	35.2	37.9
Alkalinity	mg/L as CaCO3	26.4	26.1
Total Hardness	mg/L as CaCO3	34.5	32.1
Total Nitrate and Nitrite	mg/L	<0.02	0.03
Nitrite	mg/L	<0.02	<0.02
Nitrate	mg/L	<0.02	0.03
Total Kjeldahl Nitrogen	mg/L	0.55	0.95
Total Nitrogen	mg/L	0.55	0.98
pH	NTU	7.1	7.2
E. Coli	CFU/100ml	47.9	1.0

2023 Water Quality Results – Learned Pond			
Parameter	**Units**	**6/15/2023**	**9/19/2023**
Turbidity	NTU	2.4	3.4
Conductivity	uS/cm	600.0	414.0
Free Reactive Phosphorus	ug/L	<5	<5
Chlorophyll a	ug/L	<10	11.3
Total Phosphorus	ug/L	15.7	18.3
Alkalinity	mg/L as CaCO3	10.8	15.3
Total Hardness	mg/L as CaCO3	16.3	21.9
Total Nitrate and Nitrite	mg/L	<0.02	0.02
Nitrite	mg/L	<0.02	<0.02
Nitrate	mg/L	<0.02	0.02
Total Kjeldahl Nitrogen	mg/L	0.35	0.87
Total Nitrogen	mg/L	0.35	0.89
pH	NTU	7.6	6.8
E. Coli	CFU/100ml	770.1	18.9

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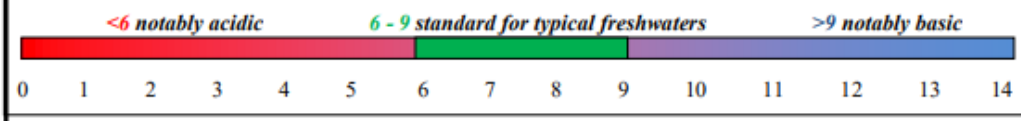
Water Quality Analysis Explanation

These water quality parameters are essential to document the condition of a water body and design custom treatment prescriptions to achieve desired management objectives.

pH: Measure of how acidic or basic the water is (pH 7 is considered neutral).



Hardness: Measure of the concentration of divalent cations, primarily consisting of calcium and magnesium in typical freshwaters. *0-60 mg/L as $CaCO_3$ soft; 61-120 moderately hard; 121-180 hard; > 181 very hard*

Alkalinity- Measure of the buffering capacity of water, primarily consisting of carbonate, bicarbonate and hydroxide in typical freshwaters. Waters with lower levels are more susceptible to pH shifts.
≤ 50 mg/L as $CaCO_3$ low buffered; 51-100 moderately buffered; 101-200 buffered; > 200 high buffered

Conductivity- Measure of the waters ability to transfer an electrical current, increases with more dissolved ions.
< 50 uS/cm relatively low concentration may not provide sufficient dissolved ions for ecosystem health; 50-1500 typical freshwaters; > 1500 may be stressful to some freshwater organisms, though not uncommon in many areas

Dissolved Oxygen- amount of diatomic oxygen dissolved in the water.
< 2 mg/L likely toxicity with sufficient exposure duration; < 5 stressful to many aquatic organisms; ≥ 5 able to support most fish and invertebrates

Phosphorus: Essential nutrient often correlating to growth of algae in freshwaters.

Total Phosphorus (TP) is the measure of all phosphorus in a sample as measured by persulfate strong digestion and includes: inorganic, oxidizable organic and polyphosphates. This includes what is readily available, potential to become available and stable forms.
<12 µg/L oligotrophic; 12-24 µg/L mesotrophic; 25-96 µg/L eutrophic; > 96 µg/L hypereutrophic

Free Reactive Phosphorus (FRP) is the measure of inorganic dissolved reactive phosphorus (PO_4^{-3}, HPO_4^{-2}, etc.). This form is readily available in the water column for algae growth.

Nitrogen: Essential nutrient that can enhance growth of algae.

Total N is all nitrogen in the sample (organic N^+ and Ammonia) determined by the sum of the measurements for Total Kjeldahl Nitrogen (TKN) and ionic forms.

Nitrites and Nitrates are the sum of total oxidized nitrogen, often readily free for algae uptake.
< 1 mg/L typical freshwater; 1-10 potentially harmful; >10 possible toxicity, above many regulated guidelines

Chlorophyll *a*: primary light-harvesting pigment found in algae and a measure of the algal productivity and water quality in a system.
0-2.6µg/L oligotrophic; 2.7-20 µg/L mesotrophic; 21-56 µg/L eutrophic; > 56 µg/L hypereutrophic

Turbidity- Measurement of water clarity. Suspended particulates (algae, clay, silt, dead organic matter) are the common constituents impacting turbidity.
< 10 NTU drinking water standards and typical trout waters; 10-50 NTU moderate; > 50 NTU potential impact to aquatic life.

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E. Coli: E. Coli is a potentially harmful fecal coliform bacteria that can be harmful to humans and pose a health threat.

>235 colonies/100 ml is potential harmful within a single sample.

Summary / 2024 Recommendations

2023 marked the first year in which Water & Wetland took over management of the designated Framingham Ponds. Prior to starting the project, we worked closely with both Dominic, the Conservation Agent, and Commission members, to look at each pond individually. Following this analysis, we made recommendations for each specific waterbody. The season was successful as all tasks were completed without issue, and great lines of communication between the City (specifically Conservation) and Water & Wetland were kept open at all times. The 2023 season brought challenging conditions, with excessive rain, high water and air temperatures, high humidity, and increased sunlight penetration. Generally, these conditions promoted excessive weed and algae growth within many area waterbodies. Additionally, the high precipitation increased nutrient loading and E. Coli spikes. Closures of lakes and ponds were documented throughout the State. The majority of the ponds were "business as usual," where we were able to stay on track, with a focus on monitoring. Waushakum Pond specifically was faced with challenges throughout the Summer. Given this, recommendations are bulleted below; however, we provided additional recommendations and narrative specific to Waushakum Pond.

Learned Pond – 2024 Recommendations

- Pre-Management survey to document conditions and to guide the need for any potential management. All management should be based on survey data.
- Late-Season/post-management survey to document conditions, update the management plan, and to assess any management conducted, if applicable.
- Continued water quality analysis, to be paired with surveys.

Gleason Pond – 2024 Recommendations

- Pre-Management survey to document conditions and to guide the need for any potential management. All management should be based on survey data.
- Late-Season/post-management survey to document conditions, update the management plan, and to assess any management conducted, if applicable.
- Continued water quality analysis, to be paired with surveys.
- Potential need for waterlily treatment in August or September, to be based on survey data.
- Treatment of curly-leaf pondweed, which is an invasive species (May).

Big Farm Pond & Little Farm Pond – 2024 Recommendations

- Whole Pond Sonar (fluridone) treatment programs to provide overall weed control. In lieu of Sonar, use of contact herbicides paired with treatment of water chestnut with Imazamox.
- Waterlily treatment (Little Farm Pond only)
- Prior to any management, proper approvals from Natural Heritage Endangered Species Program (NHESP will need to be obtained.
- Continued early and late season surveys paired with water quality collection.

Mohawk Pond – 2024 Recommendations

- Pre-Management survey to document conditions and to guide the need for any potential management. All management should be based on survey data.
- Late-Season/post-management survey to document conditions, update the management plan, and to assess any management conducted, if applicable.
- Continued water quality analysis, to be paired with surveys.
- Interim monitoring visits to document changing conditions and to assess the need for management throughout the season.
- Treatments of nuisance and invasive species based on survey data. Consider Procellacor herbicide for milfoil control.

Norton Pond – 2024 Recommendations

- Pre-Management survey to document conditions and to guide the need for any potential management. All management should be based on survey data.
- Late-Season/post-management survey to document conditions, update the management plan, and to assess any management conducted, if applicable.
- Continued water quality analysis, to be paired with surveys.
- Interim monitoring visits to document changing conditions and to assess the need for management throughout the season.
- Treatments of nuisance and invasive species based on survey data.

Sudbury River – 2024 Recommendations

- Pre-Management survey to document conditions and to guide the need for any potential management.
- Late-Season/post-management survey to document conditions, update the management plan, and to assess any management conducted.
- Continued water quality analysis, to be paired with surveys.
- Continued treatment with Imazamox for the control of water chestnut. Two treatments are necessary, it is possible that a third treatment may be foregone.
- Consider supplemental hand-pulling of water chestnut in lieu of a third treatment, or in addition to treatments in areas with only sparse density.
- Consider future management of other invasive species as water chestnut continues to decrease. Species include fanwort, variable milfoil, Eurasian milfoil, curly-leaf pondweed. Treatments are most applicable; however, herbicide choice should consider target species, flow, and control provided.

Waushakum Pond – 2024 Recommendations

The focus of the 2023 management program at Waushakum Pond was on the control of nuisance and invasive aquatic weeds through the application of triclopyr herbicide only. Waushakum Pond has strict requirements through Natural Heritage Endangered Species Program. Currently, the only approved herbicide is triclopyr. The use of this herbicide must be paired with additional monitoring and reporting, which is provided by John Burns. Specific targets at Waushakum Pond include two invasive species, variable milfoil, and curly-leaf pondweed, in addition to nuisance native species, elodea, clasping leaf pondweed, and coontail. Both elodea and clasping leaf pondweed tend to be most dense. Waterlilies are

also dense in some area of Waushakum Pond. As noted within the report, triclopyr is not labeled for the control of many of these targets. We anticipated control of the two invasive species using triclopyr; however, we anticipated only marginal control of the other target species when using this herbicide. Triclopyr also works slower than many contact herbicides, so results are not immediately visible. Overall, the 2023 treatment was extremely successful as virtually all target plants were controlled. Looking forward to 2024, we recommend this treatment be completed slightly earlier in the season. We had anticipated an earlier treatment in 2023; however, this was not possible due to a public health advisory being in place. The MA-DEP permits we obtain prohibit treatment from occurring when an advisory is in effect. At times, abutters questioned the treatment, so an interim survey was conducted. At that time, we saw effects of the treatment on many species; however, clasping leaf pondweed was still within the water column. Reports from the City, and later confirmed by the post-treatment survey, showed that the clasping leaf pondweed did eventually fall from the water column and was controlled greatly within the treatment areas. In addition to the earlier treatment, it may make sense to try to obtain approval for additional herbicides at Waushakum Pond. Options may include diquat and endothall, to start. These herbicides are more applicable to the assemblage of target species in Waushakum Pond.

While not expressly part of the Water & Wetland contract, algae, specifically cyanobacteria, was the largest issue in Waushakum Pond throughout the entirety of the 2023 season. Closures plagued Waushakum Pond throughout the season. This pond is heavily used for recreation so not only did the closures inhibit recreational use, but they also impacted the schedule of the herbicide treatment and limited use of copper-based algaecide.

Cyanobacteria is typically driven by phosphorus. The limited nutrient sampling in Waushakum Pond did not show alarmingly high phosphorus levels. Despite this, it is clear that phosphorus is sufficient to promote potentially harmful algal blooms. Consideration was given to copper sulfate during the 2023 season. Water & Wetland had even scheduled copper sulfate treatment at times throughout the season; however, the decision to postpone was made by various city officials. Copper sulfate is frequently used in lakes, ponds, and even drinking water reservoirs for the control of cyanobacteria. This tool can be useful moving forward in Waushakum Pond as a reactive approach, specifically to ensure safety of the pond's users. Prior to copper sulfate treatments, we recommend frequent algae sampling to guide management. As cyanobacteria counts approach 20,000 cells/ml we typically recommend treatment. This approach will ideally keep counts below the 70,000 cells/ml threshold which would warrant an advisory. For this to be accomplished, approval from both Framingham Conservation and Ashland Conservation Commission will need to be in place. Additionally, approval from NHESP must also be in-hand.

We recommend that ideally, sources of algae, specifically nutrients, be addressed. Externally, we are aware that the city's engineering department is working on improvements to limit/minimize phosphorus input to Waushakum Pond. We understand these improvements take time and involve extensive logistics. These recommendations should generally be considered prior to or in conjunction with internal nutrient management. Generally speaking, we recommend that the stakeholders educate not only direct abutters but also property owners within the watershed to Waushakum Pond on best management practices. This may include dialogue specific to fertilization practices, beneficial buffers, and other landscaping best management practices. Nutrient input can be limited through utilization of these best management practices. Not fertilizing is always recommended, however using fertilizers without nitrogen or

phosphorus when not fertilizing is not an option. Fertilizer packaging typically contains three numbers separated by dashes. These numbers note nutrient content, with the first number being nitrogen, the second number being phosphorus, and the third number being potassium. Packaging with 10-5-20 on it would contain 10% nitrogen content, 5% phosphorus content, and 20% potassium content by weight. Not fertilizing in a watershed is always recommended to limit nutrient input into the pond. If this is not an option, choosing a fertilizer with either no nitrogen and phosphorus, or very little nitrogen or phosphorus is also recommended. Buffer management may consist of specific planting, or even simply not mowing directly down to the shoreline if a direct abutter.

An additional recommendation pertaining to the watershed may be the selective use of EutroSORB filters. EutroSORB filters are fairly new technology and approval from Conservation would be necessary. We recommend that use and potential locations be guided by information provided by the city engineers and any watershed information available. SePro (manufacturer of many aquatic management technologies) recently developed a variety of phosphorus binding technologies. One of which is EutroSORB filters. EutroSORB filters are a novel technology specifically designed for intercepting phosphorus from moving water. EutroSORB provides water resource managers with an efficient and economical solution to reduce phosphorus inputs, slow down or stop the eutrophication process, and restore water quality. EutroSORB filters rapidly remove phosphorus from moving water after being deployed in a water resource. EutroSORB reactive filter media has a high affinity and capacity for phosphorus and will continue to bind soluble reactive phosphorus until all binding sites have been exhausted. This technology is best suited for areas where phosphorus has been found to enter Waushakum Pond, including stormwater outfalls and/or tributaries. These filters cost approximately $250 each (installed), but ultimately the deployment will depend on the watershed assessment, size, and depth of the area, etc. We recommend this, because EutroSORB filters provide a fairly low-cost solution to phosphorus filtration from the watershed. This strategy could be implemented as the city's BMPs are put in place or prior.

Beyond watershed improvements, internal phosphorus loading is likely contributing to the current blooms. One internal approach would be through the use of aluminum sulfate (alum). While copper sulfate is an algaecide, alum targets source phosphorus, as phosphorus is considered the limiting nutrient driving nuisance plant and algae growth. Alum is commonly used in ponds, lakes and drinking water reservoirs to remove phosphorus through precipitation, forming a heavier than water particulate known as floc. This floc settles to the bottom of the waterbody to create a barrier that slows sediment phosphorus release. Alum dosing can vary greatly. A low dose treatment can be used to strip phosphorus from the water column but may need to be repeated annually or more. Higher doses are typically needed to inactivate sediment phosphorus reserves. Higher doses also typically require buffering with sodium aluminate. Additional testing should be implemented to further explore alum feasibility, dosing, and costs. We recommend this be conducted by an environmental consultant specializing in this type of work such as TRC Environmental. By conducting these specialized tests, accurate dosing can be determined, which will ensure an effective alum treatment. Alum costs can also vary greatly depending on how much alum is necessary to inactivate the phosphorus in the pond's bottom sediments, and dosing may vary in different areas of the pond. This is why properly dosing alum is so crucial.

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LAKE, POND & WETLAND MANAGEMENT

Above, we noted EutroSORB filters. SePro has also recently received EPA approval for additional EutroSORB products including EutroSORB WC and EutroSORB G. These proprietary blend of phosphate binding materials do not impact water chemistry, are safe for fish, invertebrates, and personnel, and do not carry any water use restrictions. Much like alum, the EutroSORB products noted above are applied directly to the water column using specialized treatment equipment. Unfortunately, these products are not approved in Massachusetts at this time. SePro is developing another product, however, called EutroSORB SI, which is anticipated to receive Massachusetts approval in the coming year or so. While not currently an option, we feel these products are applicable to Waushakum Pond and should be considered as regulatory approval occurs.

All recommendations for Waushakum Pond detailed above are subject to approval by Framingham Conservation Commission, Ashland Conservation Commission, and Natural Heritage Endangered Species Program. These approvals must be obtained in advance of any management differing from the approved triclopyr treatment.

Water quality collection should continue to occur at Waushakum Pond. In addition to the water quality collected this year, parameters specific to the alum feasibility study should be implemented including sediment sampling specific to phosphorus fractions. Finally, regular algae samples should be implemented to guide the potential use of copper sulfate, if selected.

Great progress was made in 2023 as conditions in the Framingham Ponds were greatly improved. We hope that you were impressed not only with the results of the 2023 Aquatic Management Program, but also the communication, expertise, sense of urgency, and follow-through provided by Water & Wetland over the course of the year. We look forward to working with the city of Framingham in 2024 and for many years to come.

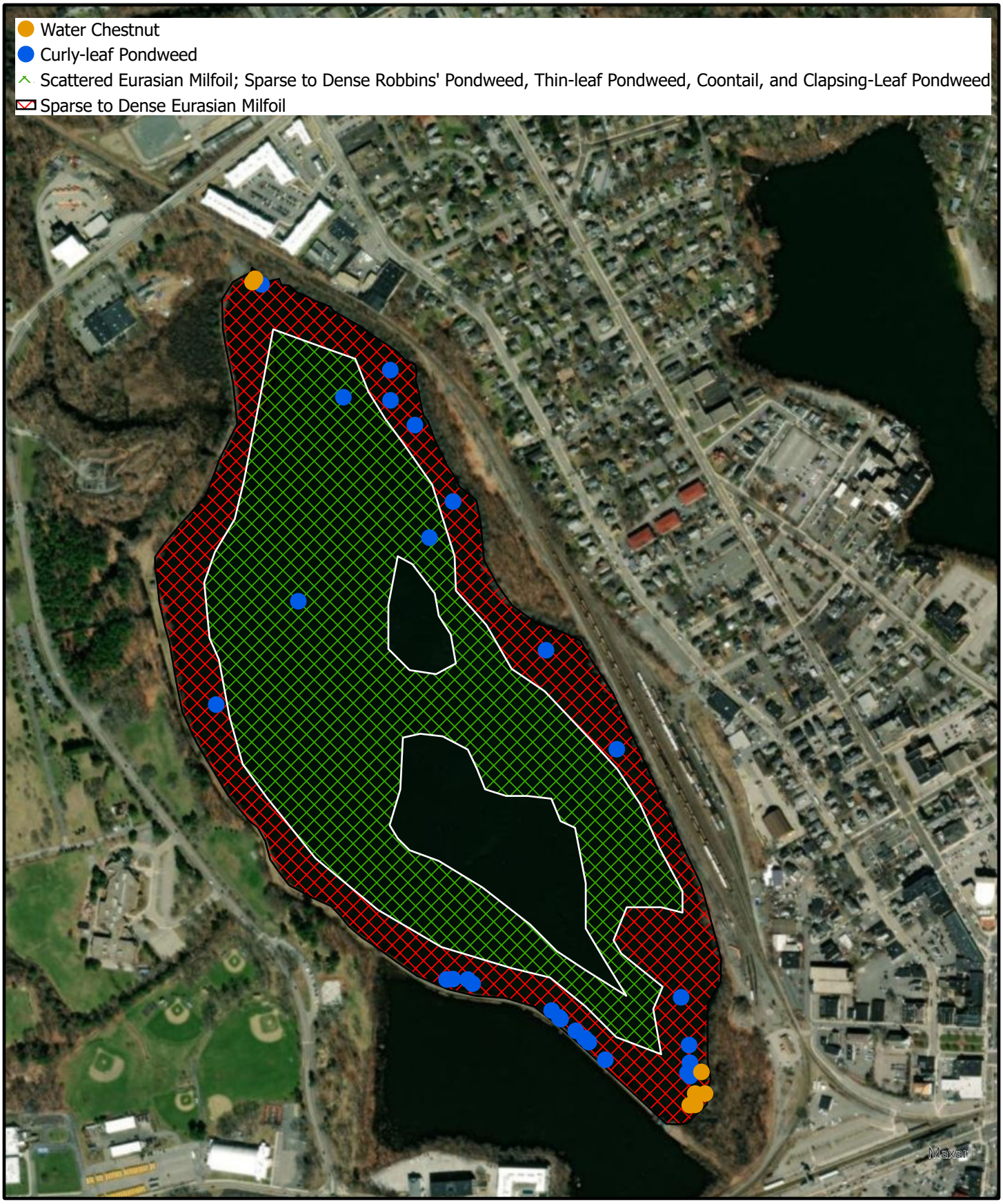
Sincerely,

Colin Gosselin
Director of Operations
Senior Aquatic Biologist
c: 508-259-3153
o: 888-4WETLAN(D)
colin@waterandwetland.com
www.waterandwetland.com

Attachments Include: June Survey Maps, September Survey Maps, Lab Water Quality Results

Survey Maps

- June Survey Maps
- September Survey Maps



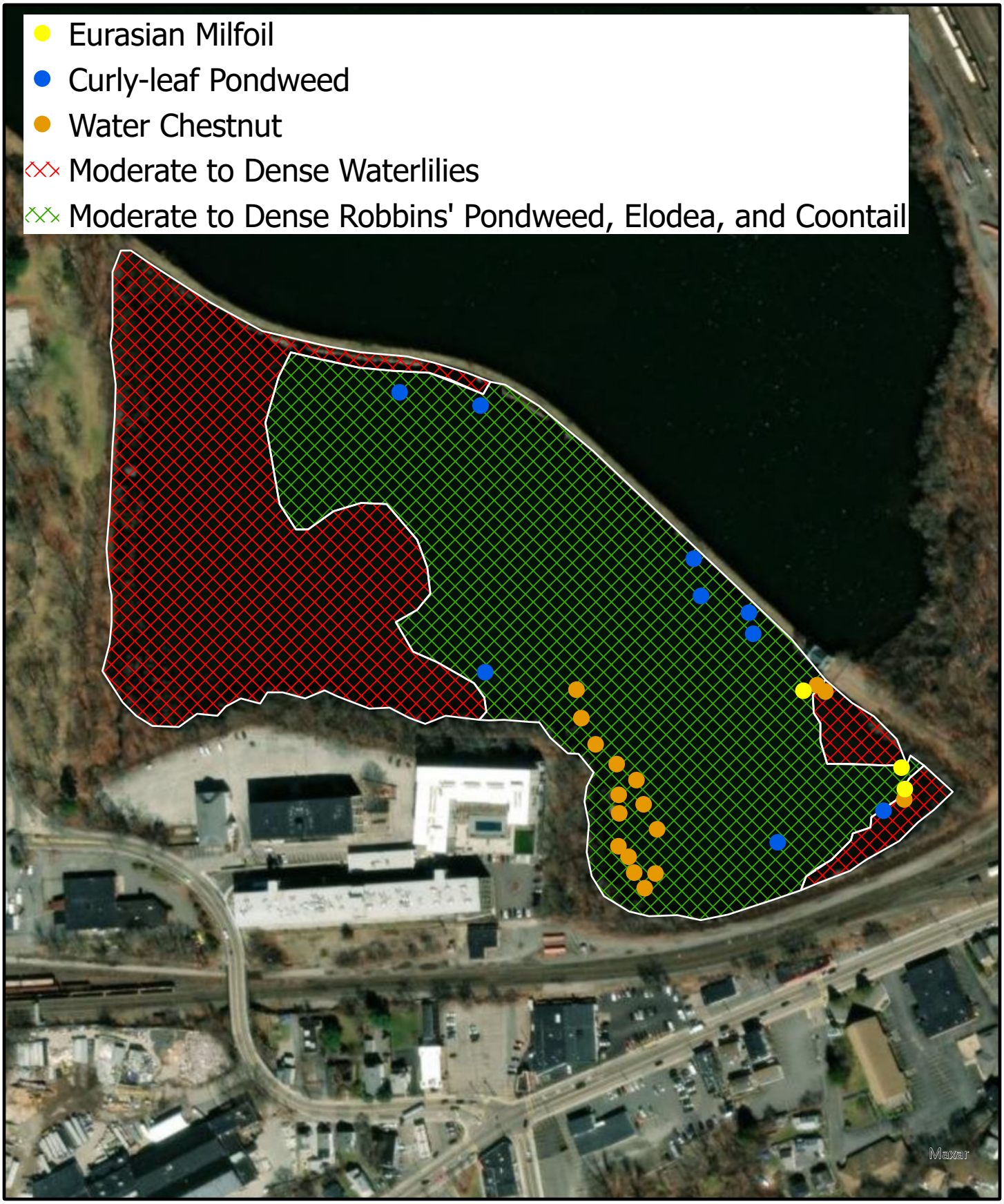
WATER & WETLAND
LAKE, POND & WETLAND MANAGEMENT

Big Farm Pond
Vegetation Assemblage
Framingham, MA

Survey Date
6/15/2023

Map Date
6/16/2023

N



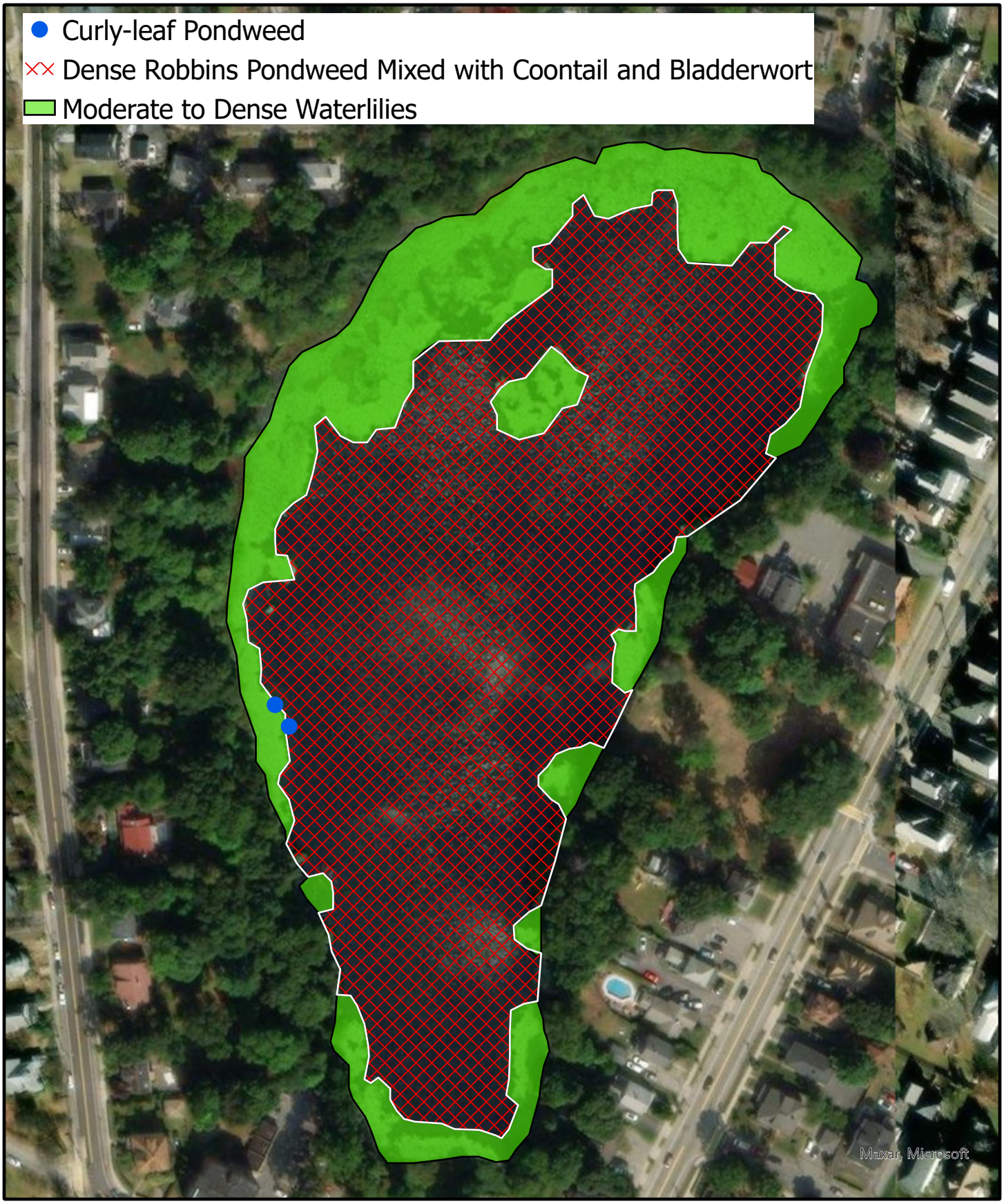
WATER & WETLAND
LAKE, POND & WETLAND MANAGEMENT

Little Farm Pond
Vegetation Distribution
Framingham, MA

Survey Date
6/15/2023

Map Date
6/16/2023

N



WATER & WETLAND
LAKE, POND & WETLAND MANAGEMENT

Gleason Pond
Vegetation Assemblage
Framingham, MA

Survey Date
6/15/2023

Map Date
6/16/2023

N

WATER & WETLAND
LAKE, POND & WETLAND MANAGEMENT

Learned Pond
Vegetation Assemblage
Framingham, MA

Survey Date
6/15/2023

Map Date
6/16/2023

N

WATER & WETLAND
LAKE, POND & WETLAND MANAGEMENT

Mohawk Pond
Invasive Species Distribution
Framingham, MA

Survey Date
6/15/2023

Map Date
6/16/2023

N

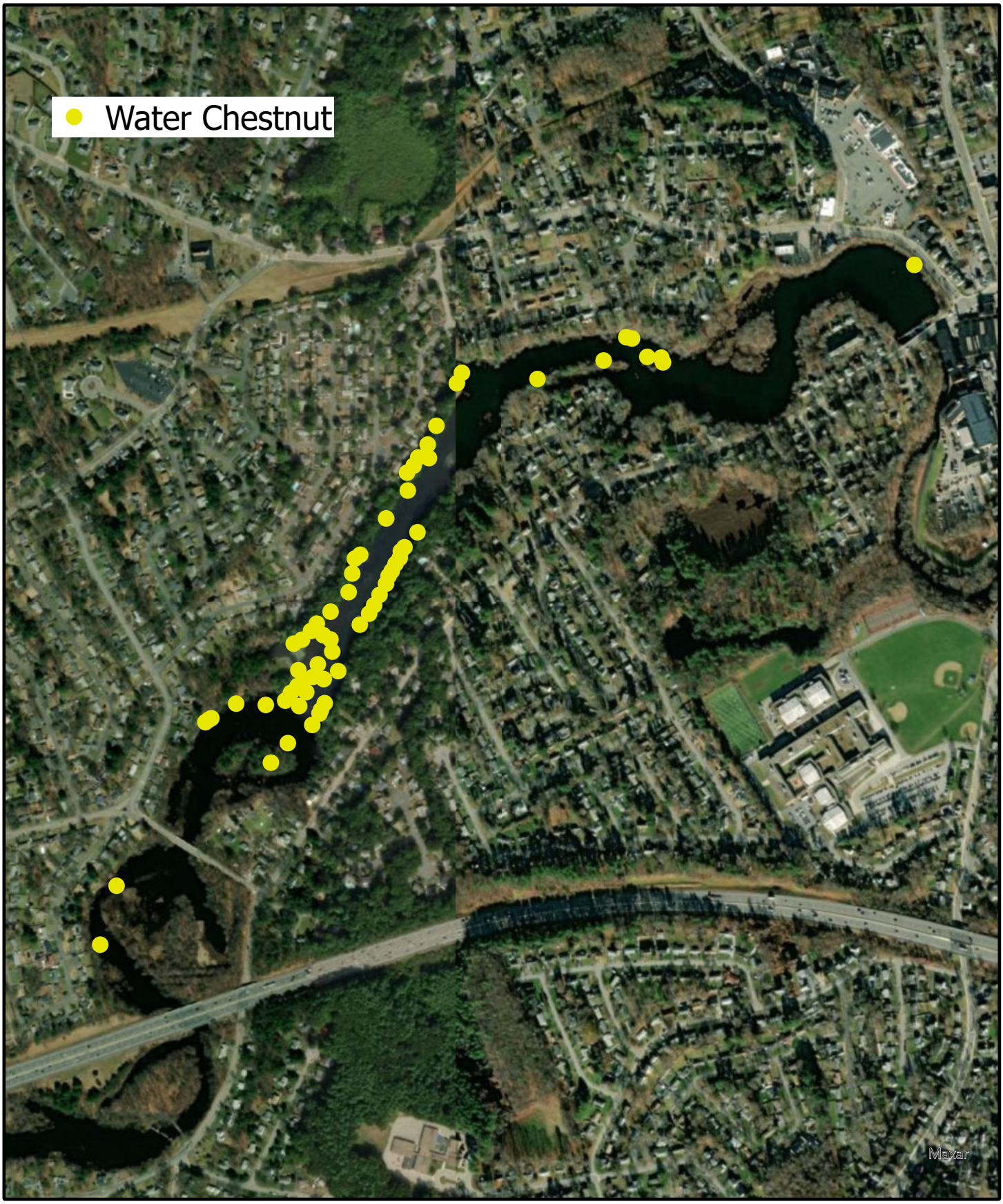
WATER & WETLAND
LAKE, POND & WETLAND MANAGEMENT

Norton Pond
Vegetation Assemblage
Framingham, MA

Survey Date
6/15/2023

Map Date
6/16/2023

N



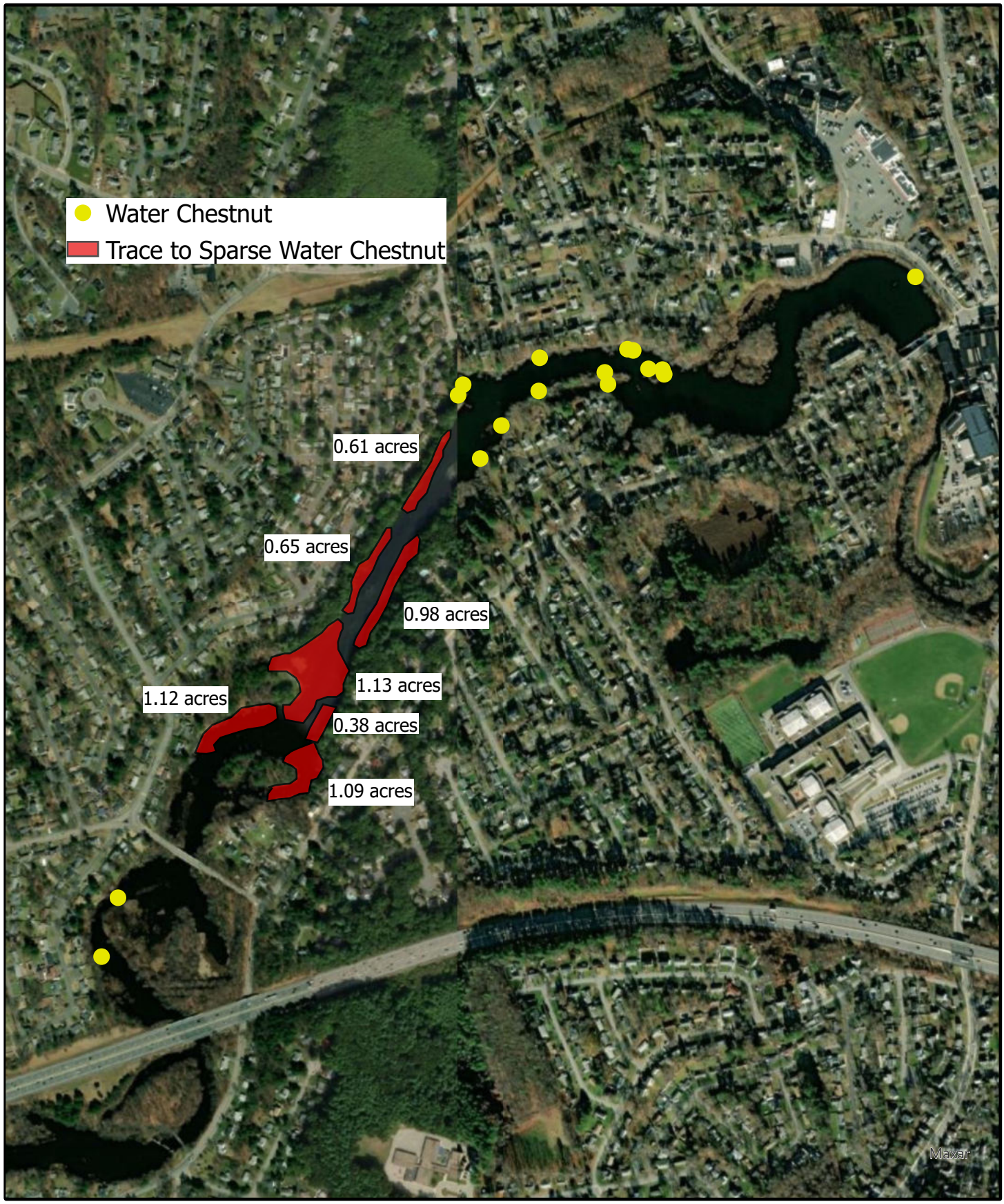
WATER & WETLAND
LAKE, POND & WETLAND MANAGEMENT

Sudbury River
Water Chestnut Distribution
Framingham, MA

Survey Date
6/12/2023

Map Date
6/14/2023

N



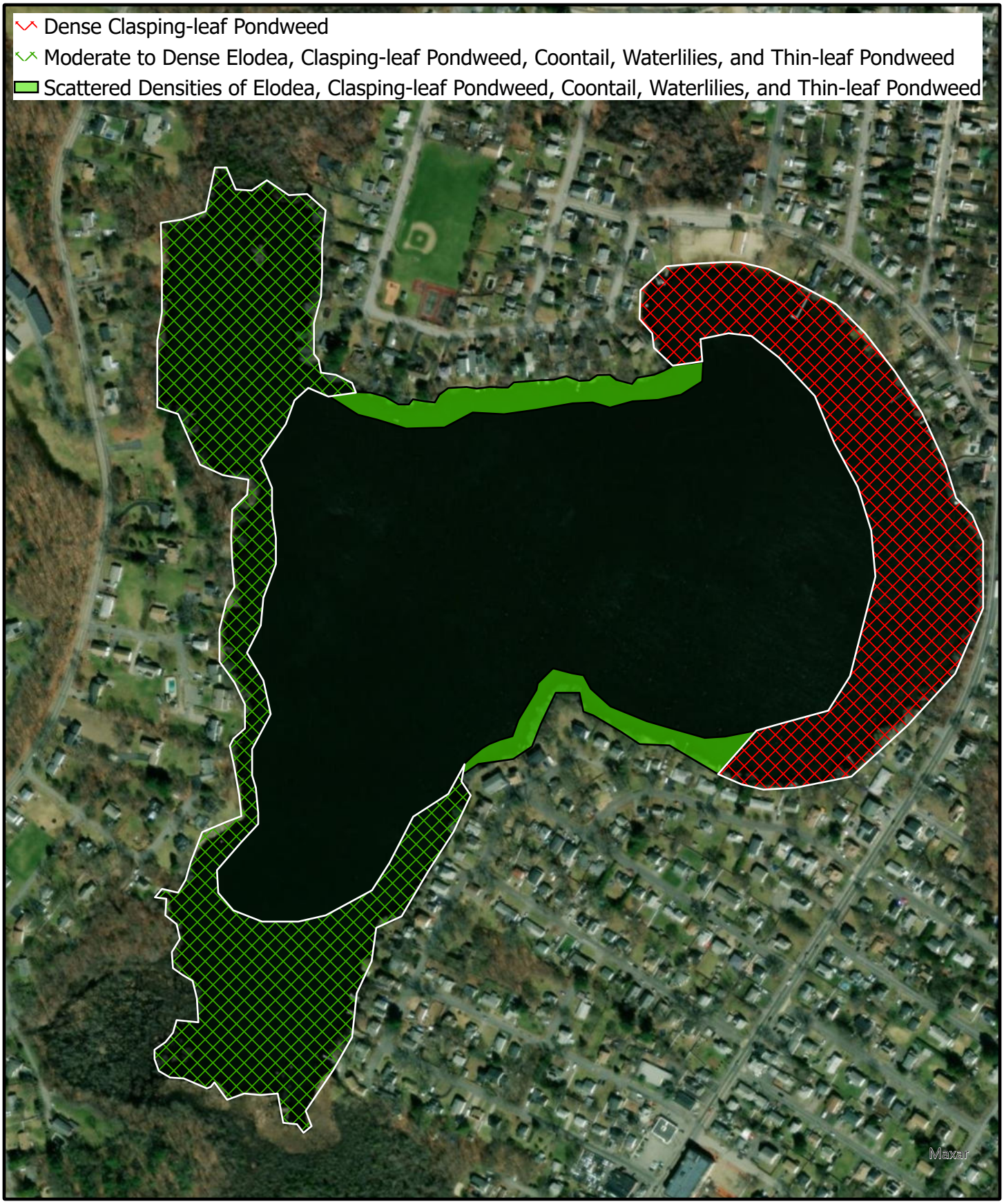
WATER & WETLAND
LAKE, POND & WETLAND MANAGEMENT

Sudbury River
Water Chestnut Distribution
Framingham, MA

Survey Date
6/12/2023

Map Date
6/14/2023

N



WATER & WETLAND
LAKE, POND & WETLAND MANAGEMENT

Waushakum Pond
Native Species Distribution
Framingham, MA

Survey Date
6/15/2023

Map Date
6/16/2023

N

WATER & WETLAND
LAKE, POND & WETLAND MANAGEMENT

Waushakum Pond
Invasive Species Distribution
Framingham, MA

Survey Date
6/15/2023

Map Date
6/16/2023

N

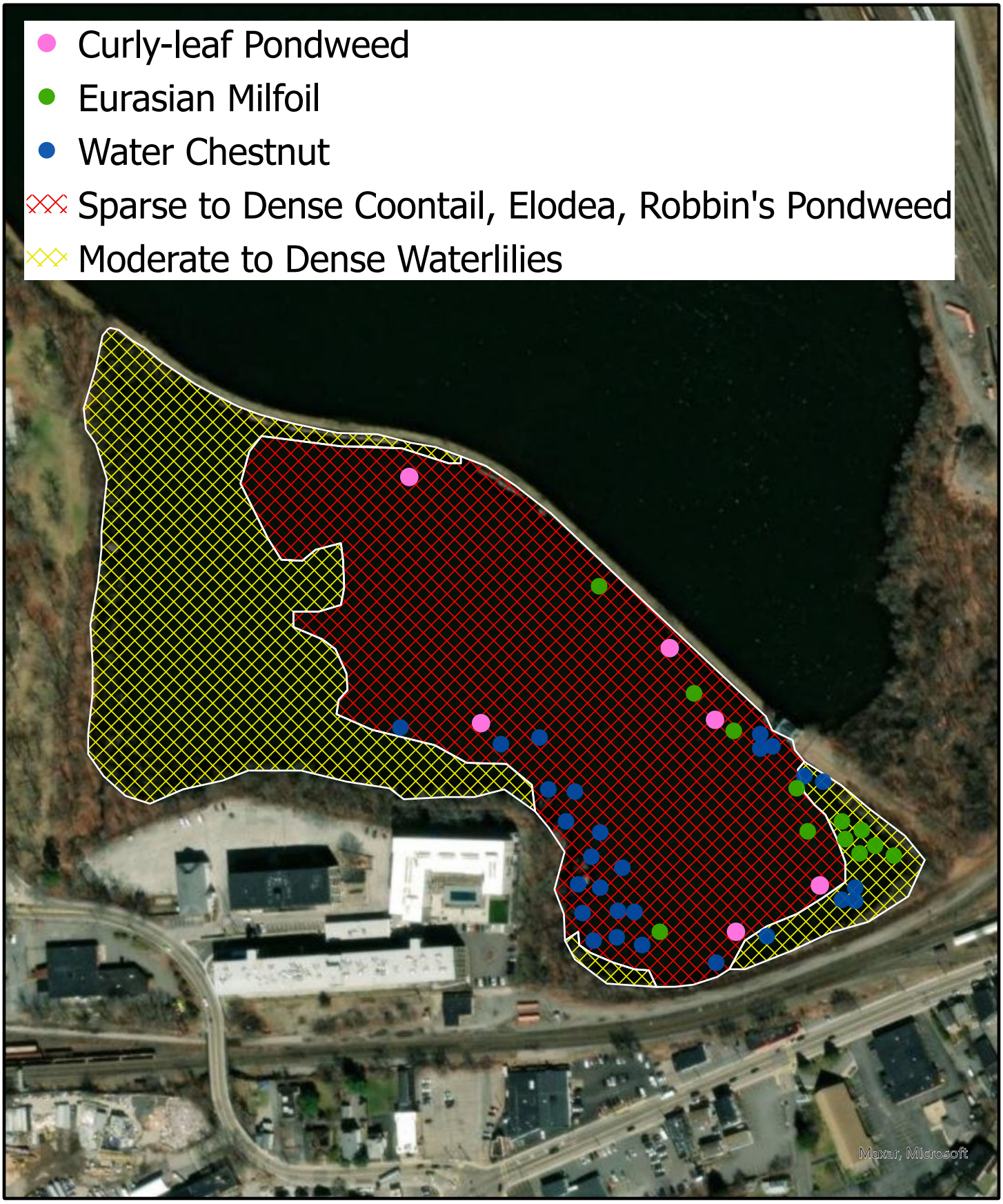
WATER & WETLAND
LAKE, POND & WETLAND MANAGEMENT

Big Farm Pond
Aquatic Vegetation Distribution
Framingham, MA

Survey Date
9/19/2023

Map Date
9/25/2023

N



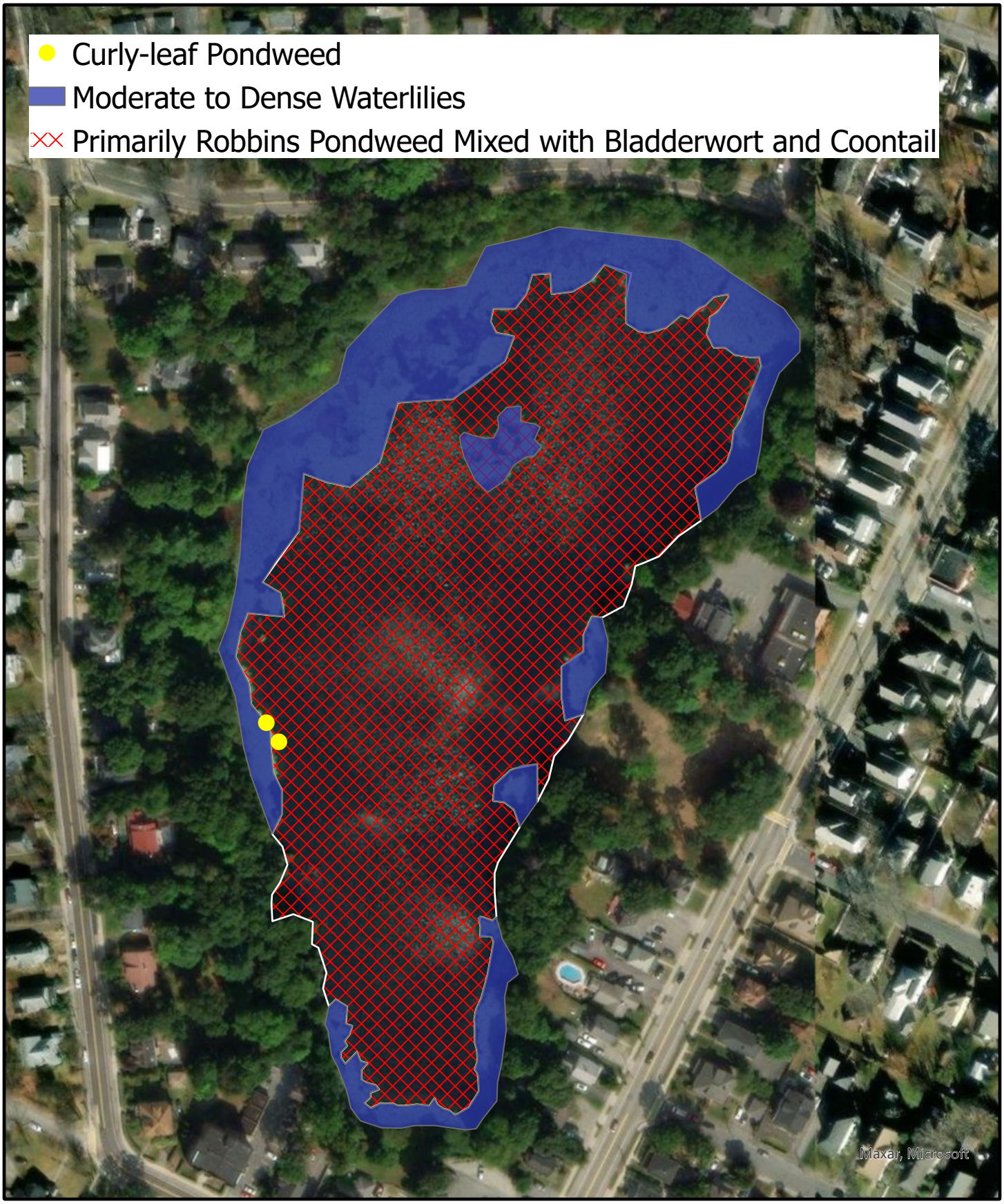
WATER & WETLAND
LAKE, POND & WETLAND MANAGEMENT

Little Farm Pond
Aquatic Vegetation Distribution
Framingham, MA

Survey Date
9/19/2023

Map Date
9/25/2023

N



WATER & WETLAND
LAKE, POND & WETLAND MANAGEMENT

Gleason Pond
Vegetation Assemblage
Framingham, MA

Survey Date
9/19/2023

Map Date
9/25/2023

N

WATER & WETLAND
LAKE, POND & WETLAND MANAGEMENT

Learned Pond
Waterlily Distribution
Framingham, MA

Survey Date
9/19/2023

Map Date
9/25/2023

N

WATER & WETLAND
LAKE, POND & WETLAND MANAGEMENT

Mohawk Pond
Invasive Species Distribution
Framingham, MA

Survey Date
9/19/2023

Map Date
9/25/2023

N

WATER & WETLAND
LAKE, POND & WETLAND MANAGEMENT

Norton Pond
Vegetation and Algae Distribution
Framingham, MA

Survey Date
9/19/2023

Map Date
9/25/2023

N

WATER & WETLAND
LAKE, POND & WETLAND MANAGEMENT

Waushakum Pond
Aquatic Vegetation Distribution
Framingham, MA

Survey Date
9/19/2023

Map Date
9/25/2023

N

Water Quality Results

- June WQ Results
- September WQ Results

SePRO Research & Technology Campus SeSCRIPT*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC15902 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name: Water and Wetland LLC	Contact Person: Joe Onorato
Address: 115 South St. Upton, MA 01568	E-mail Address: info@waterandwetland.com
	Phone: 508-250-6238

Waterbody Information

Waterbody:	Big Farm Pond - MA
Waterbody size:	
Depth Average:	13

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM44301-1	Big Farm Pond	Turbidity (NTU)	EPA 180.1	2.6	06/15/2023
		Conductivity (uS/cm)	EPA 120.1	1083.0	
		Free Reactive Phosphorus (ug/L)	EPA 365.3	<5	
		Chlorophyll a (ug/L)	EPA 445	<10	
		Total Phosphorus (ug/L)	EPA 365.3	12.6	
		Alkalinity (mg/L as CaCO3)	EPA 310.2	45.9	
		Total Hardness (mg/L as CaCO3)	EPA 130.2	75.9	
		Total Nitrate (mg/L) and Nitrite (mg/L)	Campbell et al 2004	<0.02	
		Nitrite (mg/L)	Campbell et al 2004	<0.02	
		Nitrate (mg/L)	calculated	<0.02	
		Total Kjeldahl Nitrogen (mg/L)	EPA 351.2	0.29	
		Total Nitrogen (mg/L)	calculated	0.29	
		pH	EPA 150.1	8.2	

ANALYSIS STATEMENTS:
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in the report.
QA/QC CRITERIA: All analyses met method criteria, except as noted in the report with data qualifiers.
COMMENTS: No significant observations were made unless noted in the report.
MEASUREMENT UNCERTAINTY: Uncertainty of measurement has been determined and is available upon request.

Laboratory Information
Date / Time Received: 06/16/23 12:00 PM
Date Results Sent: Friday, June 23, 2023

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This entire report was reviewed and approved for release.

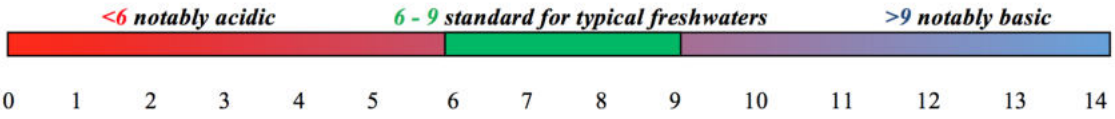
Reviewed By: Laboratory Supervisor

SRTC SePRO Research & Technology Campus SePRO

Water Quality Analysis Explanation

These water quality parameters are essential to document the condition of a water body and design custom treatment prescriptions to achieve desired management objective

pH: Measure of how acidic or basic the water is (pH 7 is considered neutral).



Hardness: Measure of the concentration of divalent cations, primarily consisting of calcium and magnesium in typical freshwaters. *0-60 mg/L as CaCO3 soft; 61-120 moderately hard; 121-180 hard; > 181 very hard*

Alkalinity- Measure of the buffering capacity of water, primarily consisting of carbonate, bicarbonate and hydroxide in typical freshwaters. Waters with lower levels are more susceptible to pH shifts.
<= 50 mg/L as CaCO3 low buffered; 51-100 moderately buffered; 101-200 buffered; > 200 high buffered

Conductivity- Measure of the waters ability to transfer an electrical current, increases with more dissolved ions.
< 50 uS/cm relatively low concentration may not provide sufficient dissolved ions for ecosystem health; 50-1500 typical freshwaters; > 1500 may be stressful to some freshwater organisms, though not uncommon in many areas

Phosphorus: Essential nutrient often correlating to growth of algae in freshwaters.

Total Phosphorus (TP) is the measure of all phosphorus in a sample as measured by persulfate strong digestion and includes: inorganic, oxidizable organic and polyphosphates. This includes what is readily available, potential to become available and stable forms. *<12 Âµg/L oligotrophic; 12-24 Âµg/L mesotrophic; 25-96 Âµg/L eutrophic; > 96 Âµg/L hypereutrophic*
Free Reactive Phosphorus (FRP) is the measure of inorganic dissolved reactive phosphorus (PO4-3, HPO4-2, etc). This
form is readily available in the water column for algae growth.

Nitrogen: Essential nutrient that can enhance growth of algae.

Total N is all nitrogen in the sample (organic N+ and Ammonia) determined by the sum of the measurements for Total Kjeldahl Nitrogen (TKN) and ionic forms.
Nitrites and Nitrates are the sum of total oxidized nitrogen, often readily free for algae uptake.
< 1 mg/L typical freshwater; 1-10 potentially harmful; >10 possible toxicity, above many regulated guidelines

Chlorophyll a: primary light-harvesting pigment found in algae and a measure of the algal productivity and water quality in a system.
0-2.6Âµg/L oligotrophic; 2.7-20 Âµg/L mesotrophic; 21-56 Âµg/L eutrophic; > 56 Âµg/L hypereutrophic

Turbidity- Measurement of water clarity. Suspended particulates (algae, clay, silt, dead organic matter) are the common constituents impacting turbidity.
< 10 NTU drinking water standards and typical trout waters; 10-50 NTU moderate; > 50 NTU potential impact to aquatic life.

SePRO Research & Technology Campus SeSCRIPT*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC16008 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name: Water and Wetland LLC	Contact Person: Joe Onorato
Address: 115 South St. Upton, MA 01568	E-mail Address: info@waterandwetland.com
	Phone: 508-250-6238

Waterbody Information

Waterbody:	Big Farm Pond - MA
Waterbody size:	151
Depth Average:	6

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM44503-1	Big Farm Pond	E. coli (CFU/100mL)	EPA 9223B	25.3	06/21/2023
		Total Coliforms (CFU/100mL)	EPA 9223B	>2419.6	

ANALYSIS STATEMENTS:
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QA/QC CRITERIA: All analyses met method criteria, except as noted in the report with data qualifiers.
COMMENTS: No significant observations were made unless noted in the report.
MEASUREMENT UNCERTAINTY: Uncertainty of measurement has been determined and is available upon request.

Laboratory Information
Date / Time Received: 06/22/23 11:30 AM
Date Results Sent: Tuesday, June 27, 2023

This entire report was reviewed and approved for release.

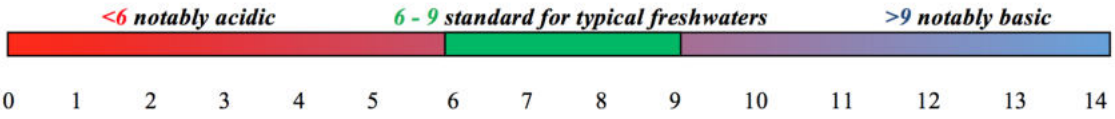
Reviewed By: Laboratory Supervisor

SRTC SePRO Research & Technology Campus SePRO

Water Quality Analysis Explanation

These water quality parameters are essential to document the condition of a water body and design custom treatment prescriptions to achieve desired management objective

pH: Measure of how acidic or basic the water is (pH 7 is considered neutral).



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< 10 NTU drinking water standards and typical trout waters; 10-50 NTU moderate; > 50 NTU potential impact to aquatic life.

SePRO Research & Technology Campus SeSCRIPT*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC15900 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name: Water and Wetland LLC	Contact Person: Joe Onorato
Address: 115 South St. Upton, MA 01568	E-mail Address: info@waterandwetland.com
	Phone: 508-250-6238

Waterbody Information

Waterbody:	Little Farm Pond - MA
Waterbody size:	
Depth Average:	4

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM44299-1	Little Farm Pond	Turbidity (NTU)	EPA 180.1	2.7	06/15/2023
		Conductivity (uS/cm)	EPA 120.1	963.0	
		Free Reactive Phosphorus (ug/L)	EPA 365.3	<5	
		Chlorophyll a (ug/L)	EPA 445	<10	
		Total Phosphorus (ug/L)	EPA 365.3	18.2	
		Alkalinity (mg/L as CaCO3)	EPA 310.2	49.4	
		Total Hardness (mg/L as CaCO3)	EPA 130.2	65.6	
		Total Nitrate (mg/L) and Nitrite (mg/L)	Campbell et al 2004	<0.02	
		Nitrite (mg/L)	Campbell et al 2004	<0.02	
		Nitrate (mg/L)	calculated	<0.02	
		Total Kjeldahl Nitrogen (mg/L)	EPA 351.2	0.37	
		Total Nitrogen (mg/L)	calculated	0.37	
		pH	EPA 150.1	7.8	

ANALYSIS STATEMENTS:
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QA/QC CRITERIA: All analyses met method criteria, except as noted in the report with data qualifiers.
COMMENTS: No significant observations were made unless noted in the report.
MEASUREMENT UNCERTAINTY: Uncertainty of measurement has been determined and is available upon request.

Laboratory Information
Date / Time Received: 06/16/23 12:00 PM
Date Results Sent: Friday, June 23, 2023

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This entire report was reviewed and approved for release.

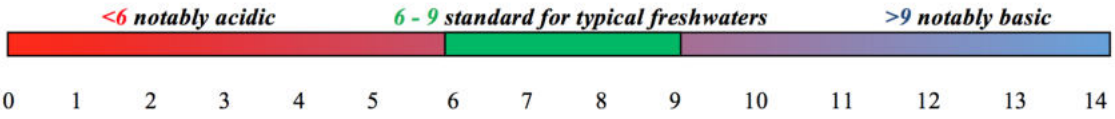
Reviewed By: Laboratory Supervisor

SRTC SePRO Research & Technology Campus SePRO

Water Quality Analysis Explanation

These water quality parameters are essential to document the condition of a water body and design custom treatment prescriptions to achieve desired management objective

pH: Measure of how acidic or basic the water is (pH 7 is considered neutral).



Hardness: Measure of the concentration of divalent cations, primarily consisting of calcium and magnesium in typical freshwaters. *0-60 mg/L as CaCO3 soft; 61-120 moderately hard; 121-180 hard; > 181 very hard*

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Conductivity- Measure of the waters ability to transfer an electrical current, increases with more dissolved ions.
< 50 uS/cm relatively low concentration may not provide sufficient dissolved ions for ecosystem health; 50-1500 typical freshwaters; > 1500 may be stressful to some freshwater organisms, though not uncommon in many areas

Phosphorus: Essential nutrient often correlating to growth of algae in freshwaters.

Total Phosphorus (TP) is the measure of all phosphorus in a sample as measured by persulfate strong digestion and includes: inorganic, oxidizable organic and polyphosphates. This includes what is readily available, potential to become available and stable forms. *<12 Âµg/L oligotrophic; 12-24 Âµg/L mesotrophic; 25-96 Âµg/L eutrophic; > 96 Âµg/L hypereutrophic*
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Turbidity- Measurement of water clarity. Suspended particulates (algae, clay, silt, dead organic matter) are the common constituents impacting turbidity.
< 10 NTU drinking water standards and typical trout waters; 10-50 NTU moderate; > 50 NTU potential impact to aquatic life.

SePRO Research & Technology Campus SeSCRIPT*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC16013 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name: Water and Wetland LLC	Contact Person: Joe Onorato
Address: 115 South St. Upton, MA 01568	E-mail Address: info@waterandwetland.com
	Phone: 508-250-6238

Waterbody Information

Waterbody:	Little Farm Pond - MA
Waterbody size:	
Depth Average:	4

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM44507-1	Little Farm Pond	E. coli (CFU/100mL)	EPA 9223B	11.0	06/21/2023
		Total Coliforms (CFU/100mL)	EPA 9223B	>2419.6	

ANALYSIS STATEMENTS:
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Laboratory Information
Date / Time Received: 06/22/23 11:30 AM
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Reviewed By: Laboratory Supervisor

SRTC SePRO Research & Technology Campus SePRO

Water Quality Analysis Explanation

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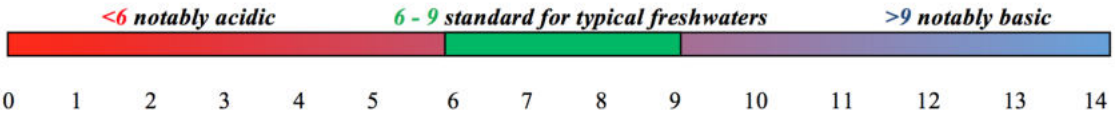

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SePRO Research & Technology Campus SeSCRIPT*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC15899 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name: Water and Wetland LLC	Contact Person: Joe Onorato
Address: 115 South St. Upton, MA 01568	E-mail Address: info@waterandwetland.com
	Phone: 508-250-6238

Waterbody Information

Waterbody:	Gleason Pond - MA
Waterbody size:	
Depth Average:	6

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM44298-1	Gleason Pond	Turbidity (NTU)	EPA 180.1	2.7	06/15/2023
		Conductivity (uS/cm)	EPA 120.1	937.0	
		Free Reactive Phosphorus (ug/L)	EPA 365.3	<5	
		Chlorophyll a (ug/L)	EPA 445	<10	
		Total Phosphorus (ug/L)	EPA 365.3	35.2	
		Alkalinity (mg/L as CaCO3)	EPA 310.2	26.4	
		Total Hardness (mg/L as CaCO3)	EPA 130.2	34.5	
		Total Nitrate (mg/L) and Nitrite (mg/L)	Campbell et al 2004	<0.02	
		Nitrite (mg/L)	Campbell et al 2004	<0.02	
		Nitrate (mg/L)	calculated	<0.02	
		Total Kjeldahl Nitrogen (mg/L)	EPA 351.2	0.55	
		Total Nitrogen (mg/L)	calculated	0.55	
		pH	EPA 150.1	7.1	

ANALYSIS STATEMENTS:
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Laboratory Information
Date / Time Received: 06/16/23 12:00 PM
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Reviewed By: Laboratory Supervisor

SRTC SePRO Research & Technology Campus SePRO

Water Quality Analysis Explanation

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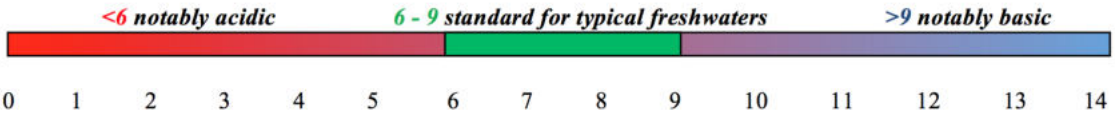

Hardness: Measure of the concentration of divalent cations, primarily consisting of calcium and magnesium in typical freshwaters. *0-60 mg/L as CaCO3 soft; 61-120 moderately hard; 121-180 hard; > 181 very hard*

Alkalinity- Measure of the buffering capacity of water, primarily consisting of carbonate, bicarbonate and hydroxide in typical freshwaters. Waters with lower levels are more susceptible to pH shifts.
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SePRO Research & Technology Campus SeSCRIPT*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC16006 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name: Water and Wetland LLC	Contact Person: Joe Onorato
Address: 115 South St. Upton, MA 01568	E-mail Address: info@waterandwetland.com
	Phone: 508-250-6238

Waterbody Information

Waterbody:	Gleason Pond - MA
Waterbody size:	
Depth Average:	6

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM44502-1	Gleason Pond	E. coli (CFU/100mL)	EPA 9223B	47.9	06/21/2023
		Total Coliforms (CFU/100mL)	EPA 9223B	>2419.6	

ANALYSIS STATEMENTS:
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Laboratory Information
Date / Time Received: 06/22/23 11:30 AM
Date Results Sent: Tuesday, June 27, 2023

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Reviewed By: Laboratory Supervisor

SRTC SePRO Research & Technology Campus SePRO

Water Quality Analysis Explanation

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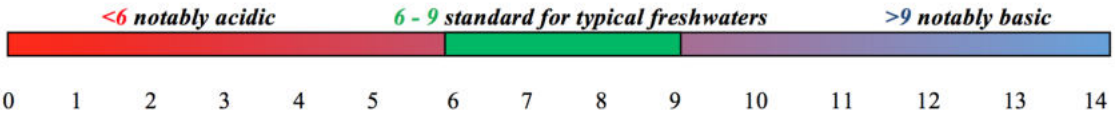

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Chlorophyll a: primary light-harvesting pigment found in algae and a measure of the algal productivity and water quality in a system.
0-2.6Âµg/L oligotrophic; 2.7-20 Âµg/L mesotrophic; 21-56 Âµg/L eutrophic; > 56 Âµg/L hypereutrophic

Turbidity- Measurement of water clarity. Suspended particulates (algae, clay, silt, dead organic matter) are the common constituents impacting turbidity.
< 10 NTU drinking water standards and typical trout waters; 10-50 NTU moderate; > 50 NTU potential impact to aquatic life.

SePRO Research & Technology Campus SeSCRIPT*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC15905 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name: Water and Wetland LLC	Contact Person: Joe Onorato
Address: 115 South St. Upton, MA 01568	E-mail Address: info@waterandwetland.com
	Phone: 508-250-6238

Waterbody Information

Waterbody:	Learned Pond - MA
Waterbody size:	
Depth Average:	

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM44304-1	Learned Pond	Turbidity (NTU)	EPA 180.1	2.4	06/15/2023
		Conductivity (uS/cm)	EPA 120.1	600.0	
		Free Reactive Phosphorus (ug/L)	EPA 365.3	<5	
		Chlorophyll a (ug/L)	EPA 445	<10	
		Total Phosphorus (ug/L)	EPA 365.3	15.7	
		Alkalinity (mg/L as CaCO3)	EPA 310.2	10.8	
		Total Hardness (mg/L as CaCO3)	EPA 130.2	16.3	
		Total Nitrate (mg/L) and Nitrite (mg/L)	Campbell et al 2004	<0.02	
		Nitrite (mg/L)	Campbell et al 2004	<0.02	
		Nitrate (mg/L)	calculated	<0.02	
		Total Kjeldahl Nitrogen (mg/L)	EPA 351.2	0.35	
		Total Nitrogen (mg/L)	calculated	0.35	
		pH	EPA 150.1	7.6	

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

Laboratory Information
Date / Time Received: 06/16/23 12:00 PM
Date Results Sent: Friday, June 23, 2023

Disclaimer: The results listed within this Laboratory Report relate only to the samples tested in the laboratory. The analyses contained in this report were performed in accordance with the applicable certifications as noted. All soil samples are reported on a dry weight basis unless otherwise noted in the report. This Laboratory Report is confidential and is intended for the exclusive

This entire report was reviewed and approved for release.

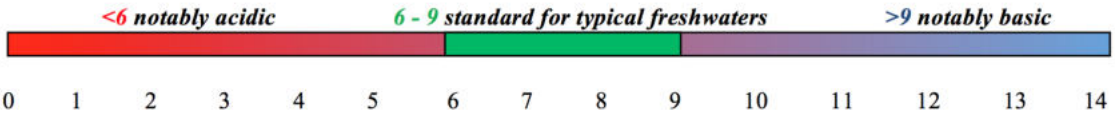
Reviewed By: Laboratory Supervisor

SRTC SePRO Research & Technology Campus SePRO

Water Quality Analysis Explanation

These water quality parameters are essential to document the condition of a water body and design custom treatment prescriptions to achieve desired management objective

pH: Measure of how acidic or basic the water is (pH 7 is considered neutral).



Hardness: Measure of the concentration of divalent cations, primarily consisting of calcium and magnesium in typical freshwaters. *0-60 mg/L as CaCO3 soft; 61-120 moderately hard; 121-180 hard; > 181 very hard*

Alkalinity- Measure of the buffering capacity of water, primarily consisting of carbonate, bicarbonate and hydroxide in typical freshwaters. Waters with lower levels are more susceptible to pH shifts.
<= 50 mg/L as CaCO3 low buffered; 51-100 moderately buffered; 101-200 buffered; > 200 high buffered

Conductivity- Measure of the waters ability to transfer an electrical current, increases with more dissolved ions.
< 50 uS/cm relatively low concentration may not provide sufficient dissolved ions for ecosystem health; 50-1500 typical freshwaters; > 1500 may be stressful to some freshwater organisms, though not uncommon in many areas

Phosphorus: Essential nutrient often correlating to growth of algae in freshwaters.

Total Phosphorus (TP) is the measure of all phosphorus in a sample as measured by persulfate strong digestion and includes: inorganic, oxidizable organic and polyphosphates. This includes what is readily available, potential to become available and stable forms. *<12 Âµg/L oligotrophic; 12-24 Âµg/L mesotrophic; 25-96 Âµg/L eutrophic; > 96 Âµg/L hypereutrophic*
Free Reactive Phosphorus (FRP) is the measure of inorganic dissolved reactive phosphorus (PO4-3, HPO4-2, etc). This
form is readily available in the water column for algae growth.

Nitrogen: Essential nutrient that can enhance growth of algae.

Total N is all nitrogen in the sample (organic N+ and Ammonia) determined by the sum of the measurements for Total Kjeldahl Nitrogen (TKN) and ionic forms.
Nitrites and Nitrates are the sum of total oxidized nitrogen, often readily free for algae uptake.
< 1 mg/L typical freshwater; 1-10 potentially harmful; >10 possible toxicity, above many regulated guidelines

Chlorophyll a: primary light-harvesting pigment found in algae and a measure of the algal productivity and water quality in a system.
0-2.6Âµg/L oligotrophic; 2.7-20 Âµg/L mesotrophic; 21-56 Âµg/L eutrophic; > 56 Âµg/L hypereutrophic

Turbidity- Measurement of water clarity. Suspended particulates (algae, clay, silt, dead organic matter) are the common constituents impacting turbidity.
< 10 NTU drinking water standards and typical trout waters; 10-50 NTU moderate; > 50 NTU potential impact to aquatic life.

SePRO Research & Technology Campus SeSCRIPT*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC16012 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name: Water and Wetland LLC	Contact Person: Joe Onorato
Address: 115 South St. Upton, MA 01568	E-mail Address: info@waterandwetland.com
	Phone: 508-250-6238

Waterbody Information

Waterbody:	Learned Pond - MA
Waterbody size:	
Depth Average:	

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM44506-1	Learned Pond	E. coli (CFU/100mL)	EPA 9223B	770.1	06/21/2023
		Total Coliforms (CFU/100mL)	EPA 9223B	>2419.6	

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.
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in the report.
QA/QC CRITERIA: All analyses met method criteria, except as noted in the report with data qualifiers.
COMMENTS: No significant observations were made unless noted in the report.
MEASUREMENT UNCERTAINTY: Uncertainty of measurement has been determined and is available upon request.

Laboratory Information
Date / Time Received: 06/22/23 11:30 AM
Date Results Sent: Tuesday, June 27, 2023

This entire report was reviewed and approved for release.

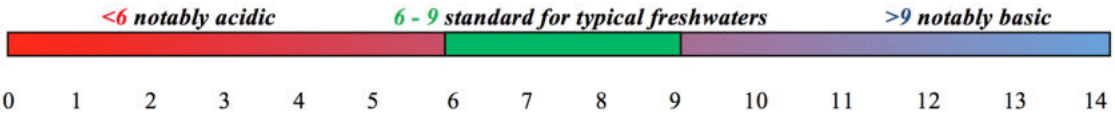
Reviewed By: Laboratory Supervisor

SRTC SePRO Research & Technology Campus SePRO

Water Quality Analysis Explanation

These water quality parameters are essential to document the condition of a water body and design custom treatment prescriptions to achieve desired management objective

pH: Measure of how acidic or basic the water is (pH 7 is considered neutral).



Hardness: Measure of the concentration of divalent cations, primarily consisting of calcium and magnesium in typical freshwaters. *0-60 mg/L as CaCO3 soft; 61-120 moderately hard; 121-180 hard; > 181 very hard*

Alkalinity- Measure of the buffering capacity of water, primarily consisting of carbonate, bicarbonate and hydroxide in typical freshwaters. Waters with lower levels are more susceptible to pH shifts.
<= 50 mg/L as CaCO3 low buffered; 51-100 moderately buffered; 101-200 buffered; > 200 high buffered

Conductivity- Measure of the waters ability to transfer an electrical current, increases with more dissolved ions.
< 50 uS/cm relatively low concentration may not provide sufficient dissolved ions for ecosystem health; 50-1500 typical freshwaters; > 1500 may be stressful to some freshwater organisms, though not uncommon in many areas

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Total Phosphorus (TP) is the measure of all phosphorus in a sample as measured by persulfate strong digestion and includes: inorganic, oxidizable organic and polyphosphates. This includes what is readily available, potential to become available and stable forms. *<12 Âµg/L oligotrophic; 12-24 Âµg/L mesotrophic; 25-96 Âµg/L eutrophic; > 96 Âµg/L hypereutrophic*
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Nitrogen: Essential nutrient that can enhance growth of algae.

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Nitrites and Nitrates are the sum of total oxidized nitrogen, often readily free for algae uptake.
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< 10 NTU drinking water standards and typical trout waters; 10-50 NTU moderate; > 50 NTU potential impact to aquatic life.

SePRO Research & Technology Campus SeSCRIPT*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC15901 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name: Water and Wetland LLC	Contact Person: Joe Onorato
Address: 115 South St. Upton, MA 01568	E-mail Address: info@waterandwetland.com
	Phone: 508-250-6238

Waterbody Information

Waterbody:	Mohawk Pond - MA
Waterbody size:	
Depth Average:	2

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM44300-1	Mohawk Pond	Turbidity (NTU)	EPA 180.1	3.2	06/15/2023
		Conductivity (uS/cm)	EPA 120.1	375.0	
		Free Reactive Phosphorus (ug/L)	EPA 365.3	5.3	
		Chlorophyll a (ug/L)	EPA 445	13.4	
		Total Phosphorus (ug/L)	EPA 365.3	36.3	
		Alkalinity (mg/L as CaCO3)	EPA 310.2	29.9	
		Total Hardness (mg/L as CaCO3)	EPA 130.2	43.2	
		Total Nitrate (mg/L) and Nitrite (mg/L)	Campbell et al 2004	0.56	
		Nitrite (mg/L)	Campbell et al 2004	<0.02	
		Nitrate (mg/L)	calculated	0.56	
		Total Kjeldahl Nitrogen (mg/L)	EPA 351.2	0.56	
		Total Nitrogen (mg/L)	calculated	1.12	
		pH	EPA 150.1	7	

ANALYSIS STATEMENTS:
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in the report.
QA/QC CRITERIA: All analyses met method criteria, except as noted in the report with data qualifiers.
COMMENTS: No significant observations were made unless noted in the report.
MEASUREMENT UNCERTAINTY: Uncertainty of measurement has been determined and is available upon request.

Laboratory Information
Date / Time Received: 06/16/23 12:00 PM
Date Results Sent: Friday, June 23, 2023

This entire report was reviewed and approved for release.

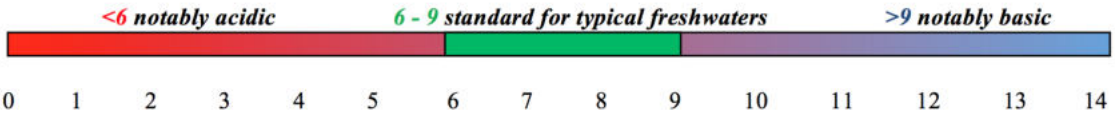
Reviewed By: Laboratory Supervisor

SRTC SePRO Research & Technology Campus SePRO

Water Quality Analysis Explanation

These water quality parameters are essential to document the condition of a water body and design custom treatment prescriptions to achieve desired management objective

pH: Measure of how acidic or basic the water is (pH 7 is considered neutral).



Hardness: Measure of the concentration of divalent cations, primarily consisting of calcium and magnesium in typical freshwaters. *0-60 mg/L as CaCO3 soft; 61-120 moderately hard; 121-180 hard; > 181 very hard*

Alkalinity- Measure of the buffering capacity of water, primarily consisting of carbonate, bicarbonate and hydroxide in typical freshwaters. Waters with lower levels are more susceptible to pH shifts.
<= 50 mg/L as CaCO3 low buffered; 51-100 moderately buffered; 101-200 buffered; > 200 high buffered

Conductivity- Measure of the waters ability to transfer an electrical current, increases with more dissolved ions.
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Phosphorus: Essential nutrient often correlating to growth of algae in freshwaters.

Total Phosphorus (TP) is the measure of all phosphorus in a sample as measured by persulfate strong digestion and includes: inorganic, oxidizable organic and polyphosphates. This includes what is readily available, potential to become available and stable forms. *<12 Âµg/L oligotrophic; 12-24 Âµg/L mesotrophic; 25-96 Âµg/L eutrophic; > 96 Âµg/L hypereutrophic*
Free Reactive Phosphorus (FRP) is the measure of inorganic dissolved reactive phosphorus (PO4-3, HPO4-2, etc). This
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Total N is all nitrogen in the sample (organic N+ and Ammonia) determined by the sum of the measurements for Total Kjeldahl Nitrogen (TKN) and ionic forms.
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< 1 mg/L typical freshwater; 1-10 potentially harmful; >10 possible toxicity, above many regulated guidelines

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Turbidity- Measurement of water clarity. Suspended particulates (algae, clay, silt, dead organic matter) are the common constituents impacting turbidity.
< 10 NTU drinking water standards and typical trout waters; 10-50 NTU moderate; > 50 NTU potential impact to aquatic life.

SePRO Research & Technology Campus SeSCRIPT*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC16011 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name: Water and Wetland LLC	Contact Person: Joe Onorato
Address: 115 South St. Upton, MA 01568	E-mail Address: info@waterandwetland.com
	Phone: 508-250-6238

Waterbody Information

Waterbody:	Mohawk Pond - MA
Waterbody size:	
Depth Average:	2

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM44505-1	Mohawk Pond	E. coli (CFU/100mL)	EPA 9223B	114.5	06/21/2023
		Total Coliforms (CFU/100mL)	EPA 9223B	>2419.6	

ANALYSIS STATEMENTS:
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PRESERVATION: Samples requiring preservation were verified prior to sample analysis and any qualifiers will be noted
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QA/QC CRITERIA: All analyses met method criteria, except as noted in the report with data qualifiers.
COMMENTS: No significant observations were made unless noted in the report.
MEASUREMENT UNCERTAINTY: Uncertainty of measurement has been determined and is available upon request.

Laboratory Information
Date / Time Received: 06/22/23 11:30 AM
Date Results Sent: Tuesday, June 27, 2023

This entire report was reviewed and approved for release.

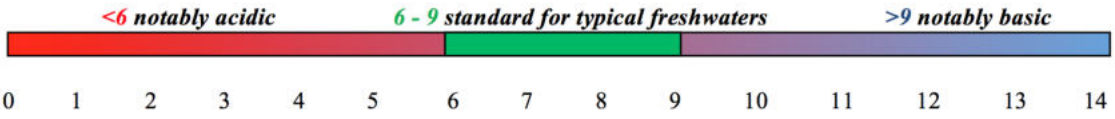
Reviewed By: Laboratory Supervisor

SRTC SePRO Research & Technology Campus SePRO

Water Quality Analysis Explanation

These water quality parameters are essential to document the condition of a water body and design custom treatment prescriptions to achieve desired management objective

pH: Measure of how acidic or basic the water is (pH 7 is considered neutral).



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Nitrogen: Essential nutrient that can enhance growth of algae.

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< 10 NTU drinking water standards and typical trout waters; 10-50 NTU moderate; > 50 NTU potential impact to aquatic life.

SePRO Research & Technology Campus SeSCRIPT*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC15906 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name: Water and Wetland LLC	Contact Person: Joe Onorato
Address: 115 South St. Upton, MA 01568	E-mail Address: info@waterandwetland.com
	Phone: 508-250-6238

Waterbody Information

Waterbody:	Norton Pond - MA
Waterbody size:	
Depth Average:	

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM44305-1	Norton Pond	Turbidity (NTU)	EPA 180.1	3.6	06/15/2023
		Conductivity (uS/cm)	EPA 120.1	327.0	
		Free Reactive Phosphorus (ug/L)	EPA 365.3	7.5	
		Chlorophyll a (ug/L)	EPA 445	38.2	
		Total Phosphorus (ug/L)	EPA 365.3	60.2	
		Alkalinity (mg/L as CaCO3)	EPA 310.2	34.4	
		Total Hardness (mg/L as CaCO3)	EPA 130.2	29.9	
		Total Nitrate (mg/L) and Nitrite (mg/L)	Campbell et al 2004	<0.02	
		Nitrite (mg/L)	Campbell et al 2004	0.02	
		Nitrate (mg/L)	calculated	<0.02	
		Total Kjeldahl Nitrogen (mg/L)	EPA 351.2	0.94	
		Total Nitrogen (mg/L)	calculated	0.94	
		pH	EPA 150.1	7	

ANALYSIS STATEMENTS:
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QA/QC CRITERIA: All analyses met method criteria, except as noted in the report with data qualifiers.
COMMENTS: No significant observations were made unless noted in the report.
MEASUREMENT UNCERTAINTY: Uncertainty of measurement has been determined and is available upon request.

Laboratory Information
Date / Time Received: 06/16/23 12:00 PM
Date Results Sent: Friday, June 23, 2023

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This entire report was reviewed and approved for release.

Reviewed By: Laboratory Supervisor

SRTC SePRO Research & Technology Campus SePRO

Water Quality Analysis Explanation

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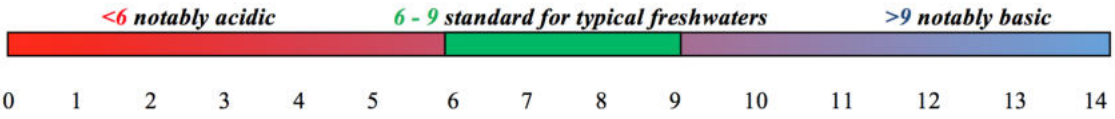
pH: Measure of how acidic or basic the water is (pH 7 is considered neutral).



Hardness: Measure of the concentration of divalent cations, primarily consisting of calcium and magnesium in typical freshwaters. *0-60 mg/L as CaCO3 soft; 61-120 moderately hard; 121-180 hard; > 181 very hard*

Alkalinity- Measure of the buffering capacity of water, primarily consisting of carbonate, bicarbonate and hydroxide in typical freshwaters. Waters with lower levels are more susceptible to pH shifts.
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Conductivity- Measure of the waters ability to transfer an electrical current, increases with more dissolved ions.
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SePRO Research & Technology Campus SeSCRIPT*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC16010 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name: Water and Wetland LLC	Contact Person: Joe Onorato
Address: 115 South St. Upton, MA 01568	E-mail Address: info@waterandwetland.com
	Phone: 508-250-6238

Waterbody Information

Waterbody:	Norton Pond - MA
Waterbody size:	
Depth Average:	

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM44504-1	Norton Pond	E. coli (CFU/100mL)	EPA 9223B	15.6	06/21/2023
		Total Coliforms (CFU/100mL)	EPA 9223B	>2419.6	

ANALYSIS STATEMENTS:
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Laboratory Information
Date / Time Received: 06/22/23 11:30 AM
Date Results Sent: Tuesday, June 27, 2023

This entire report was reviewed and approved for release.

Reviewed By: Laboratory Supervisor

SRTC SePRO Research & Technology Campus SePRO

Water Quality Analysis Explanation

These water quality parameters are essential to document the condition of a water body and design custom treatment prescriptions to achieve desired management objective

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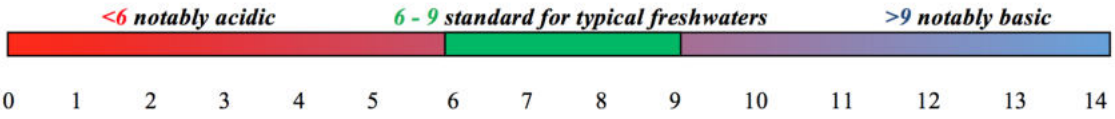

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Phosphorus: Essential nutrient often correlating to growth of algae in freshwaters.

Total Phosphorus (TP) is the measure of all phosphorus in a sample as measured by persulfate strong digestion and includes: inorganic, oxidizable organic and polyphosphates. This includes what is readily available, potential to become available and stable forms. *<12 Âµg/L oligotrophic; 12-24 Âµg/L mesotrophic; 25-96 Âµg/L eutrophic; > 96 Âµg/L hypereutrophic*
Free Reactive Phosphorus (FRP) is the measure of inorganic dissolved reactive phosphorus (PO4-3, HPO4-2, etc). This
form is readily available in the water column for algae growth.

Nitrogen: Essential nutrient that can enhance growth of algae.

Total N is all nitrogen in the sample (organic N+ and Ammonia) determined by the sum of the measurements for Total Kjeldahl Nitrogen (TKN) and ionic forms.
Nitrites and Nitrates are the sum of total oxidized nitrogen, often readily free for algae uptake.
< 1 mg/L typical freshwater; 1-10 potentially harmful; >10 possible toxicity, above many regulated guidelines

Chlorophyll a: primary light-harvesting pigment found in algae and a measure of the algal productivity and water quality in a system.
0-2.6Âµg/L oligotrophic; 2.7-20 Âµg/L mesotrophic; 21-56 Âµg/L eutrophic; > 56 Âµg/L hypereutrophic

Turbidity- Measurement of water clarity. Suspended particulates (algae, clay, silt, dead organic matter) are the common constituents impacting turbidity.
< 10 NTU drinking water standards and typical trout waters; 10-50 NTU moderate; > 50 NTU potential impact to aquatic life.

SePRO Research & Technology Campus SeSCRIPT*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC15821 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name: Water and Wetland LLC	Contact Person: Joe Onorato
Address: 115 South St. Upton, MA 01568	E-mail Address: info@waterandwetland.com
	Phone: 508-250-6238

Waterbody Information

Waterbody:	Sudbury River - MA
Waterbody size:	
Depth Average:	4.5

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM44066-1	Sudbury River	Turbidity (NTU)	EPA 180.1	3.3	06/12/2023
		Conductivity (uS/cm)	EPA 120.1	740.0	
		Free Reactive Phosphorus (ug/L)	EPA 365.3	5.5	
		Chlorophyll a (ug/L)	EPA 445	<10	
		Total Phosphorus (ug/L)	EPA 365.3	35	
		Alkalinity (mg/L as CaCO3)	EPA 310.2	37.8	
		Total Hardness (mg/L as CaCO3)	EPA 130.2	53.6	
		Total Nitrate (mg/L) and Nitrite (mg/L)	Campbell et al 2004	0.29	
		Nitrite (mg/L)	Campbell et al 2004	<0.02	
		Nitrate (mg/L)	calculated	0.29	
		Total Kjeldahl Nitrogen (mg/L)	EPA 351.2	0.81	
		E. coli (CFU/100mL)	EPA 9223B	50.4	
		Total Coliforms (CFU/100mL)	EPA 9223B	>2419.6	
		Total Nitrogen (mg/L)	calculated	1.1	
		pH	EPA 150.1	7	

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

Laboratory Information
Date / Time Received: 06/13/23 11:00 AM
Date Results Sent: Friday, June 16, 2023

This entire report was reviewed and approved for release.

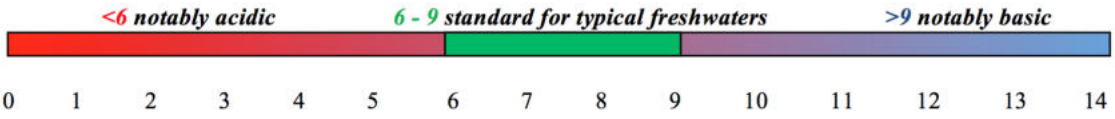
Reviewed By: Laboratory Supervisor

SRTC SePRO Research & Technology Campus SePRO

Water Quality Analysis Explanation

These water quality parameters are essential to document the condition of a water body and design custom treatment prescriptions to achieve desired management objective

pH: Measure of how acidic or basic the water is (pH 7 is considered neutral).



Hardness: Measure of the concentration of divalent cations, primarily consisting of calcium and magnesium in typical freshwaters. *0-60 mg/L as CaCO3 soft; 61-120 moderately hard; 121-180 hard; > 181 very hard*

Alkalinity- Measure of the buffering capacity of water, primarily consisting of carbonate, bicarbonate and hydroxide in typical freshwaters. Waters with lower levels are more susceptible to pH shifts.
<= 50 mg/L as CaCO3 low buffered; 51-100 moderately buffered; 101-200 buffered; > 200 high buffered

Conductivity- Measure of the waters ability to transfer an electrical current, increases with more dissolved ions.
< 50 uS/cm relatively low concentration may not provide sufficient dissolved ions for ecosystem health; 50-1500 typical freshwaters; > 1500 may be stressful to some freshwater organisms, though not uncommon in many areas

Phosphorus: Essential nutrient often correlating to growth of algae in freshwaters.

Total Phosphorus (TP) is the measure of all phosphorus in a sample as measured by persulfate strong digestion and includes: inorganic, oxidizable organic and polyphosphates. This includes what is readily available, potential to become available and stable forms. *<12 Âµg/L oligotrophic; 12-24 Âµg/L mesotrophic; 25-96 Âµg/L eutrophic; > 96 Âµg/L hypereutrophic*
Free Reactive Phosphorus (FRP) is the measure of inorganic dissolved reactive phosphorus (PO4-3, HPO4-2, etc). This
form is readily available in the water column for algae growth.

Nitrogen: Essential nutrient that can enhance growth of algae.

Total N is all nitrogen in the sample (organic N+ and Ammonia) determined by the sum of the measurements for Total Kjeldahl Nitrogen (TKN) and ionic forms.
Nitrites and Nitrates are the sum of total oxidized nitrogen, often readily free for algae uptake.
< 1 mg/L typical freshwater; 1-10 potentially harmful; >10 possible toxicity, above many regulated guidelines

Chlorophyll a: primary light-harvesting pigment found in algae and a measure of the algal productivity and water quality in a system.
0-2.6Âµg/L oligotrophic; 2.7-20 Âµg/L mesotrophic; 21-56 Âµg/L eutrophic; > 56 Âµg/L hypereutrophic

Turbidity- Measurement of water clarity. Suspended particulates (algae, clay, silt, dead organic matter) are the common constituents impacting turbidity.
< 10 NTU drinking water standards and typical trout waters; 10-50 NTU moderate; > 50 NTU potential impact to aquatic life.

SePRO Research & Technology Campus SeSCRIPT*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC15903 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name: Water and Wetland LLC	Contact Person: Joe Onorato
Address: 115 South St. Upton, MA 01568	E-mail Address: info@waterandwetland.com
	Phone: 508-250-6238

Waterbody Information

Waterbody:	Waushakum Pond - MA
Waterbody size:	82
Depth Average:	

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM44302-1	Waushakum Pond	Turbidity (NTU)	EPA 180.1	2.7	06/15/2023
		Conductivity (uS/cm)	EPA 120.1	554.0	
		Free Reactive Phosphorus (ug/L)	EPA 365.3	<5	
		Chlorophyll a (ug/L)	EPA 445	<10	
		Total Phosphorus (ug/L)	EPA 365.3	11.6	
		Alkalinity (mg/L as CaCO3)	EPA 310.2	28.4	
		Total Hardness (mg/L as CaCO3)	EPA 130.2	46.1	
		Total Nitrate (mg/L) and Nitrite (mg/L)	Campbell et al 2004	<0.02	
		Nitrite (mg/L)	Campbell et al 2004	<0.02	
		Nitrate (mg/L)	calculated	<0.02	
		Total Kjeldahl Nitrogen (mg/L)	EPA 351.2	0.47	
		Total Nitrogen (mg/L)	calculated	0.47	
		pH	EPA 150.1	7.7	

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

Laboratory Information
Date / Time Received: 06/16/23 12:00 PM
Date Results Sent: Friday, June 23, 2023

Disclaimer: The results listed within this Laboratory Report relate only to the samples tested in the laboratory. The analyses contained in this report were performed in accordance with the applicable certifications as noted. All soil samples are reported on a dry weight basis unless otherwise noted in the report. This Laboratory Report is confidential and is intended for the exclusive

This entire report was reviewed and approved for release.

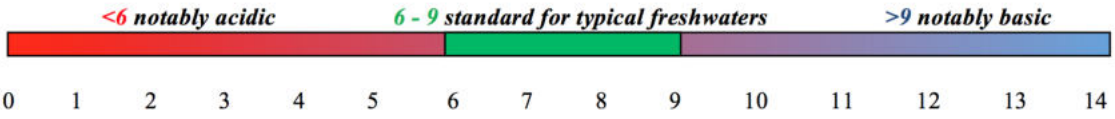
Reviewed By: Laboratory Supervisor

SRTC SePRO Research & Technology Campus SePRO

Water Quality Analysis Explanation

These water quality parameters are essential to document the condition of a water body and design custom treatment prescriptions to achieve desired management objective

pH: Measure of how acidic or basic the water is (pH 7 is considered neutral).



Hardness: Measure of the concentration of divalent cations, primarily consisting of calcium and magnesium in typical freshwaters. *0-60 mg/L as CaCO3 soft; 61-120 moderately hard; 121-180 hard; > 181 very hard*

Alkalinity- Measure of the buffering capacity of water, primarily consisting of carbonate, bicarbonate and hydroxide in typical freshwaters. Waters with lower levels are more susceptible to pH shifts.
<= 50 mg/L as CaCO3 low buffered; 51-100 moderately buffered; 101-200 buffered; > 200 high buffered

Conductivity- Measure of the waters ability to transfer an electrical current, increases with more dissolved ions.
< 50 uS/cm relatively low concentration may not provide sufficient dissolved ions for ecosystem health; 50-1500 typical freshwaters; > 1500 may be stressful to some freshwater organisms, though not uncommon in many areas

Phosphorus: Essential nutrient often correlating to growth of algae in freshwaters.

Total Phosphorus (TP) is the measure of all phosphorus in a sample as measured by persulfate strong digestion and includes: inorganic, oxidizable organic and polyphosphates. This includes what is readily available, potential to become available and stable forms. *<12 Âµg/L oligotrophic; 12-24 Âµg/L mesotrophic; 25-96 Âµg/L eutrophic; > 96 Âµg/L hypereutrophic*
Free Reactive Phosphorus (FRP) is the measure of inorganic dissolved reactive phosphorus (PO4-3, HPO4-2, etc). This
form is readily available in the water column for algae growth.

Nitrogen: Essential nutrient that can enhance growth of algae.

Total N is all nitrogen in the sample (organic N+ and Ammonia) determined by the sum of the measurements for Total Kjeldahl Nitrogen (TKN) and ionic forms.
Nitrites and Nitrates are the sum of total oxidized nitrogen, often readily free for algae uptake.
< 1 mg/L typical freshwater; 1-10 potentially harmful; >10 possible toxicity, above many regulated guidelines

Chlorophyll a: primary light-harvesting pigment found in algae and a measure of the algal productivity and water quality in a system.
0-2.6Âµg/L oligotrophic; 2.7-20 Âµg/L mesotrophic; 21-56 Âµg/L eutrophic; > 56 Âµg/L hypereutrophic

Turbidity- Measurement of water clarity. Suspended particulates (algae, clay, silt, dead organic matter) are the common constituents impacting turbidity.
< 10 NTU drinking water standards and typical trout waters; 10-50 NTU moderate; > 50 NTU potential impact to aquatic life.

SePRO Research & Technology Campus SeSCRIPT*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC16004 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name: Water and Wetland LLC	Contact Person: Joe Onorato
Address: 115 South St. Upton, MA 01568	E-mail Address: info@waterandwetland.com
	Phone: 508-250-6238

Waterbody Information

Waterbody:	Waushakum Pond - MA
Waterbody size:	82
Depth Average:	

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM44501-1	Waushakum Pond	E. coli (CFU/100mL)	EPA 9223B	2.0	06/21/2023
		Total Coliforms (CFU/100mL)	EPA 9223B	727.0	

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

Laboratory Information
Date / Time Received: 06/22/23 11:30 AM
Date Results Sent: Tuesday, June 27, 2023

This entire report was reviewed and approved for release.

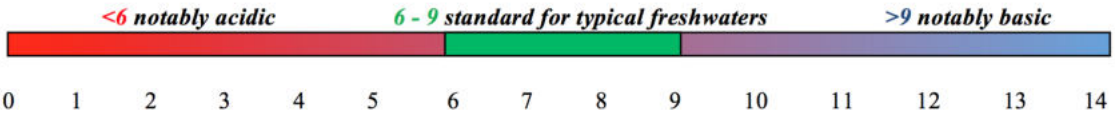
Reviewed By: Laboratory Supervisor

SRTC SePRO Research & Technology Campus SePRO

Water Quality Analysis Explanation

These water quality parameters are essential to document the condition of a water body and design custom treatment prescriptions to achieve desired management objective

pH: Measure of how acidic or basic the water is (pH 7 is considered neutral).



Hardness: Measure of the concentration of divalent cations, primarily consisting of calcium and magnesium in typical freshwaters. *0-60 mg/L as CaCO3 soft; 61-120 moderately hard; 121-180 hard; > 181 very hard*

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< 50 uS/cm relatively low concentration may not provide sufficient dissolved ions for ecosystem health; 50-1500 typical freshwaters; > 1500 may be stressful to some freshwater organisms, though not uncommon in many areas

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Total Phosphorus (TP) is the measure of all phosphorus in a sample as measured by persulfate strong digestion and includes: inorganic, oxidizable organic and polyphosphates. This includes what is readily available, potential to become available and stable forms. *<12 Âµg/L oligotrophic; 12-24 Âµg/L mesotrophic; 25-96 Âµg/L eutrophic; > 96 Âµg/L hypereutrophic*
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Turbidity- Measurement of water clarity. Suspended particulates (algae, clay, silt, dead organic matter) are the common constituents impacting turbidity.
< 10 NTU drinking water standards and typical trout waters; 10-50 NTU moderate; > 50 NTU potential impact to aquatic life.

SePRO Research & Technology Campus SeSCRIPT*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC17525 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name: Water and Wetland LLC	Contact Person: Joe Onorato
Address: 115 South St. Upton, MA 01568	E-mail Address: info@waterandwetland.com
	Phone: 508-250-6238

Waterbody Information

Waterbody:	Big Farm Pond - MA
Waterbody size:	151
Depth Average:	6

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM48154-1	Big Farm Pond	Turbidity (NTU)	EPA 180.1	3.1	09/19/2023
		Conductivity (uS/cm)	EPA 120.1	889.0	
		Free Reactive Phosphorus (ug/L)	EPA 365.3	<5	
		Chlorophyll a (ug/L)	EPA 445	<10	
		Total Phosphorus (ug/L)	EPA 365.3	43.9	
		Alkalinity (mg/L as CaCO3)	EPA 310.2	49.4	
		Total Hardness (mg/L as CaCO3)	EPA 130.2	71.5	
		Total Nitrate (mg/L) and Nitrite (mg/L)	Campbell et al 2004	0.05	
		Nitrite (mg/L)	Campbell et al 2004	<0.02	
		Nitrate (mg/L)	calculated	0.05	
		Total Kjeldahl Nitrogen (mg/L)	EPA 351.2	0.48	
		E. coli (CFU/100mL)	EPA 9223B	16.0	
		Total Coliforms (CFU/100mL)	EPA 9223B	579.4	
		Total Nitrogen (mg/L)	calculated	0.53	
		pH	EPA 150.1	7.5	

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

Laboratory Information
Date / Time Received: 09/20/23 11:00 AM
Date Results Sent: Monday, September 25, 2023

This entire report was reviewed and approved for release.

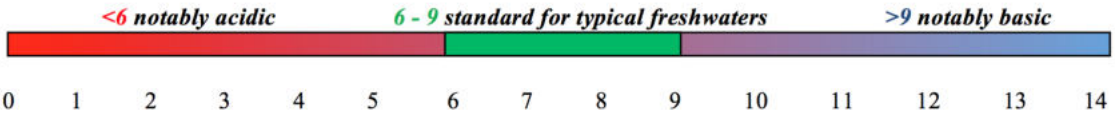
Reviewed By: Laboratory Supervisor

SRTC SePRO Research & Technology Campus SePRO

Water Quality Analysis Explanation

These water quality parameters are essential to document the condition of a water body and design custom treatment prescriptions to achieve desired management objective

pH: Measure of how acidic or basic the water is (pH 7 is considered neutral).



Hardness: Measure of the concentration of divalent cations, primarily consisting of calcium and magnesium in typical freshwaters. *0-60 mg/L as CaCO3 soft; 61-120 moderately hard; 121-180 hard; > 181 very hard*

Alkalinity- Measure of the buffering capacity of water, primarily consisting of carbonate, bicarbonate and hydroxide in typical freshwaters. Waters with lower levels are more susceptible to pH shifts.
<= 50 mg/L as CaCO3 low buffered; 51-100 moderately buffered; 101-200 buffered; > 200 high buffered

Conductivity- Measure of the waters ability to transfer an electrical current, increases with more dissolved ions.
< 50 uS/cm relatively low concentration may not provide sufficient dissolved ions for ecosystem health; 50-1500 typical freshwaters; > 1500 may be stressful to some freshwater organisms, though not uncommon in many areas

Phosphorus: Essential nutrient often correlating to growth of algae in freshwaters.

Total Phosphorus (TP) is the measure of all phosphorus in a sample as measured by persulfate strong digestion and includes: inorganic, oxidizable organic and polyphosphates. This includes what is readily available, potential to become available and stable forms. *<12 Âµg/L oligotrophic; 12-24 Âµg/L mesotrophic; 25-96 Âµg/L eutrophic; > 96 Âµg/L hypereutrophic*
Free Reactive Phosphorus (FRP) is the measure of inorganic dissolved reactive phosphorus (PO4-3, HPO4-2, etc). This
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Total N is all nitrogen in the sample (organic N+ and Ammonia) determined by the sum of the measurements for Total Kjeldahl Nitrogen (TKN) and ionic forms.
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Chlorophyll a: primary light-harvesting pigment found in algae and a measure of the algal productivity and water quality in a system.
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Turbidity- Measurement of water clarity. Suspended particulates (algae, clay, silt, dead organic matter) are the common constituents impacting turbidity.
< 10 NTU drinking water standards and typical trout waters; 10-50 NTU moderate; > 50 NTU potential impact to aquatic life.

SePRO Research & Technology Campus SeSCRIPT*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC17524 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name: Water and Wetland LLC	Contact Person: Joe Onorato
Address: 115 South St. Upton, MA 01568	E-mail Address: info@waterandwetland.com
	Phone: 508-250-6238

Waterbody Information

Waterbody:	Little Farm Pond - MA
Waterbody size:	
Depth Average:	4

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM48153-1	Little Farm Pond	Turbidity (NTU)	EPA 180.1	2.9	09/19/2023
		Conductivity (uS/cm)	EPA 120.1	669.0	
		Free Reactive Phosphorus (ug/L)	EPA 365.3	<5	
		Chlorophyll a (ug/L)	EPA 445	<10	
		Total Phosphorus (ug/L)	EPA 365.3	34.2	
		Alkalinity (mg/L as CaCO3)	EPA 310.2	46.2	
		Total Hardness (mg/L as CaCO3)	EPA 130.2	60.7	
		Total Nitrate (mg/L) and Nitrite (mg/L)	Campbell et al 2004	<0.02	
		Nitrite (mg/L)	Campbell et al 2004	<0.02	
		Nitrate (mg/L)	calculated	<0.02	
		Total Kjeldahl Nitrogen (mg/L)	EPA 351.2	0.51	
		E. coli (CFU/100mL)	EPA 9223B	38.8	
		Total Coliforms (CFU/100mL)	EPA 9223B	>2419.6	
		Total Nitrogen (mg/L)	calculated	0.51	
		pH	EPA 150.1	7.5	

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

Laboratory Information
Date / Time Received: 09/20/23 11:00 AM
Date Results Sent: Monday, September 25, 2023

This entire report was reviewed and approved for release.

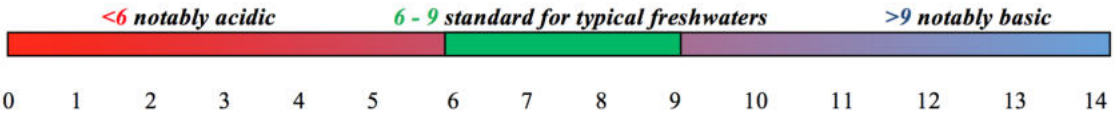
Reviewed By: Laboratory Supervisor

SRTC SePRO Research & Technology Campus SePRO

Water Quality Analysis Explanation

These water quality parameters are essential to document the condition of a water body and design custom treatment prescriptions to achieve desired management objective

pH: Measure of how acidic or basic the water is (pH 7 is considered neutral).



Hardness: Measure of the concentration of divalent cations, primarily consisting of calcium and magnesium in typical freshwaters. *0-60 mg/L as CaCO3 soft; 61-120 moderately hard; 121-180 hard; > 181 very hard*

Alkalinity- Measure of the buffering capacity of water, primarily consisting of carbonate, bicarbonate and hydroxide in typical freshwaters. Waters with lower levels are more susceptible to pH shifts.
<= 50 mg/L as CaCO3 low buffered; 51-100 moderately buffered; 101-200 buffered; > 200 high buffered

Conductivity- Measure of the waters ability to transfer an electrical current, increases with more dissolved ions.
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Phosphorus: Essential nutrient often correlating to growth of algae in freshwaters.

Total Phosphorus (TP) is the measure of all phosphorus in a sample as measured by persulfate strong digestion and includes: inorganic, oxidizable organic and polyphosphates. This includes what is readily available, potential to become available and stable forms. *<12 Âµg/L oligotrophic; 12-24 Âµg/L mesotrophic; 25-96 Âµg/L eutrophic; > 96 Âµg/L hypereutrophic*
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< 10 NTU drinking water standards and typical trout waters; 10-50 NTU moderate; > 50 NTU potential impact to aquatic life.

SePRO Research & Technology Campus SeSCRIPT*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC17526 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name: Water and Wetland LLC	Contact Person: Joe Onorato
Address: 115 South St. Upton, MA 01568	E-mail Address: info@waterandwetland.com
	Phone: 508-250-6238

Waterbody Information

Waterbody:	Gleason Pond - MA
Waterbody size:	
Depth Average:	4

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM48155-1	Gleason Pond	Turbidity (NTU)	EPA 180.1	3.2	09/19/2023
		Conductivity (uS/cm)	EPA 120.1	617.0	
		Free Reactive Phosphorus (ug/L)	EPA 365.3	6.7	
		Chlorophyll a (ug/L)	EPA 445	<10	
		Total Phosphorus (ug/L)	EPA 365.3	37.9	
		Alkalinity (mg/L as CaCO3)	EPA 310.2	26.1	
		Total Hardness (mg/L as CaCO3)	EPA 130.2	32.1	
		Total Nitrate (mg/L) and Nitrite (mg/L)	Campbell et al 2004	0.03	
		Nitrite (mg/L)	Campbell et al 2004	<0.02	
		Nitrate (mg/L)	calculated	0.03	
		Total Kjeldahl Nitrogen (mg/L)	EPA 351.2	0.95	
		E. coli (CFU/100mL)	EPA 9223B	1.0	
		Total Coliforms (CFU/100mL)	EPA 9223B	268.2	
		Total Nitrogen (mg/L)	calculated	0.98	
		pH	EPA 150.1	7.2	

ANALYSIS STATEMENTS:
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PRESERVATION: Samples requiring preservation were verified prior to sample analysis and any qualifiers will be noted
in the report.
QA/QC CRITERIA: All analyses met method criteria, except as noted in the report with data qualifiers.
COMMENTS: No significant observations were made unless noted in the report.
MEASUREMENT UNCERTAINTY: Uncertainty of measurement has been determined and is available upon request.

Laboratory Information
Date / Time Received: 09/20/23 11:00 AM
Date Results Sent: Monday, September 25, 2023

This entire report was reviewed and approved for release.

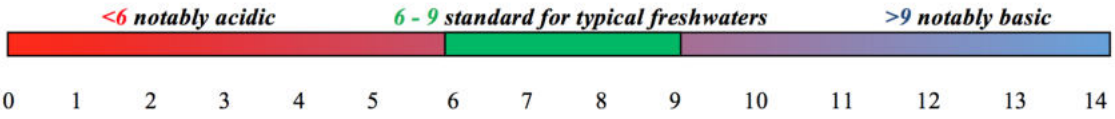
Reviewed By: Laboratory Supervisor

SRTC SePRO Research & Technology Campus SePRO

Water Quality Analysis Explanation

These water quality parameters are essential to document the condition of a water body and design custom treatment prescriptions to achieve desired management objective

pH: Measure of how acidic or basic the water is (pH 7 is considered neutral).



Hardness: Measure of the concentration of divalent cations, primarily consisting of calcium and magnesium in typical freshwaters. *0-60 mg/L as CaCO3 soft; 61-120 moderately hard; 121-180 hard; > 181 very hard*

Alkalinity- Measure of the buffering capacity of water, primarily consisting of carbonate, bicarbonate and hydroxide in typical freshwaters. Waters with lower levels are more susceptible to pH shifts.
<= 50 mg/L as CaCO3 low buffered; 51-100 moderately buffered; 101-200 buffered; > 200 high buffered

Conductivity- Measure of the waters ability to transfer an electrical current, increases with more dissolved ions.
< 50 uS/cm relatively low concentration may not provide sufficient dissolved ions for ecosystem health; 50-1500 typical freshwaters; > 1500 may be stressful to some freshwater organisms, though not uncommon in many areas

Phosphorus: Essential nutrient often correlating to growth of algae in freshwaters.

Total Phosphorus (TP) is the measure of all phosphorus in a sample as measured by persulfate strong digestion and includes: inorganic, oxidizable organic and polyphosphates. This includes what is readily available, potential to become available and stable forms. *<12 Âµg/L oligotrophic; 12-24 Âµg/L mesotrophic; 25-96 Âµg/L eutrophic; > 96 Âµg/L hypereutrophic*
Free Reactive Phosphorus (FRP) is the measure of inorganic dissolved reactive phosphorus (PO4-3, HPO4-2, etc). This
form is readily available in the water column for algae growth.

Nitrogen: Essential nutrient that can enhance growth of algae.

Total N is all nitrogen in the sample (organic N+ and Ammonia) determined by the sum of the measurements for Total Kjeldahl Nitrogen (TKN) and ionic forms.
Nitrites and Nitrates are the sum of total oxidized nitrogen, often readily free for algae uptake.
< 1 mg/L typical freshwater; 1-10 potentially harmful; >10 possible toxicity, above many regulated guidelines

Chlorophyll a: primary light-harvesting pigment found in algae and a measure of the algal productivity and water quality in a system.
0-2.6Âµg/L oligotrophic; 2.7-20 Âµg/L mesotrophic; 21-56 Âµg/L eutrophic; > 56 Âµg/L hypereutrophic

Turbidity- Measurement of water clarity. Suspended particulates (algae, clay, silt, dead organic matter) are the common constituents impacting turbidity.
< 10 NTU drinking water standards and typical trout waters; 10-50 NTU moderate; > 50 NTU potential impact to aquatic life.

SePRO Research & Technology Campus SeSCRIPT*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC17527 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name: Water and Wetland LLC	Contact Person: Joe Onorato
Address: 115 South St. Upton, MA 01568	E-mail Address: info@waterandwetland.com
	Phone: 508-250-6238

Waterbody Information

Waterbody:	Learned Pond - MA
Waterbody size:	34
Depth Average:	6

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM48156-1	Learned Pond	Turbidity (NTU)	EPA 180.1	3.4	09/19/2023
		Conductivity (uS/cm)	EPA 120.1	414.0	
		Free Reactive Phosphorus (ug/L)	EPA 365.3	<5	
		Chlorophyll a (ug/L)	EPA 445	11.3	
		Total Phosphorus (ug/L)	EPA 365.3	18.3	
		Alkalinity (mg/L as CaCO3)	EPA 310.2	15.3	
		Total Hardness (mg/L as CaCO3)	EPA 130.2	21.9	
		Total Nitrate (mg/L) and Nitrite (mg/L)	Campbell et al 2004	0.02	
		Nitrite (mg/L)	Campbell et al 2004	<0.02	
		Nitrate (mg/L)	calculated	0.02	
		Total Kjeldahl Nitrogen (mg/L)	EPA 351.2	0.87	
		E. coli (CFU/100mL)	EPA 9223B	18.9	
		Total Coliforms (CFU/100mL)	EPA 9223B	>2419.6	
		Total Nitrogen (mg/L)	calculated	0.89	
		pH	EPA 150.1	6.8	

ANALYSIS STATEMENTS:
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Laboratory Information
Date / Time Received: 09/20/23 11:00 AM
Date Results Sent: Monday, September 25, 2023

This entire report was reviewed and approved for release.

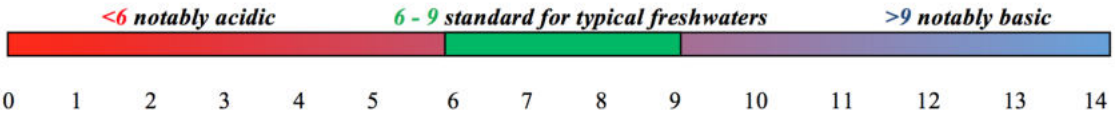
Reviewed By: Laboratory Supervisor

SRTC SePRO Research & Technology Campus SePRO

Water Quality Analysis Explanation

These water quality parameters are essential to document the condition of a water body and design custom treatment prescriptions to achieve desired management objective

pH: Measure of how acidic or basic the water is (pH 7 is considered neutral).



Hardness: Measure of the concentration of divalent cations, primarily consisting of calcium and magnesium in typical freshwaters. *0-60 mg/L as CaCO3 soft; 61-120 moderately hard; 121-180 hard; > 181 very hard*

Alkalinity- Measure of the buffering capacity of water, primarily consisting of carbonate, bicarbonate and hydroxide in typical freshwaters. Waters with lower levels are more susceptible to pH shifts.
<= 50 mg/L as CaCO3 low buffered; 51-100 moderately buffered; 101-200 buffered; > 200 high buffered

Conductivity- Measure of the waters ability to transfer an electrical current, increases with more dissolved ions.
< 50 uS/cm relatively low concentration may not provide sufficient dissolved ions for ecosystem health; 50-1500 typical freshwaters; > 1500 may be stressful to some freshwater organisms, though not uncommon in many areas

Phosphorus: Essential nutrient often correlating to growth of algae in freshwaters.

Total Phosphorus (TP) is the measure of all phosphorus in a sample as measured by persulfate strong digestion and includes: inorganic, oxidizable organic and polyphosphates. This includes what is readily available, potential to become available and stable forms. *<12 Âµg/L oligotrophic; 12-24 Âµg/L mesotrophic; 25-96 Âµg/L eutrophic; > 96 Âµg/L hypereutrophic*
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form is readily available in the water column for algae growth.

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Chlorophyll a: primary light-harvesting pigment found in algae and a measure of the algal productivity and water quality in a system.
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Turbidity- Measurement of water clarity. Suspended particulates (algae, clay, silt, dead organic matter) are the common constituents impacting turbidity.
< 10 NTU drinking water standards and typical trout waters; 10-50 NTU moderate; > 50 NTU potential impact to aquatic life.

SePRO Research & Technology Campus SeSCRIPT*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC17529 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name: Water and Wetland LLC	Contact Person: Joe Onorato
Address: 115 South St. Upton, MA 01568	E-mail Address: info@waterandwetland.com
	Phone: 508-250-6238

Waterbody Information

Waterbody:	Mohawk Pond - MA
Waterbody size:	
Depth Average:	2

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM48158-1	Mohawk Pond	Turbidity (NTU)	EPA 180.1	4.2	09/19/2023
		Conductivity (uS/cm)	EPA 120.1	153.8	
		Free Reactive Phosphorus (ug/L)	EPA 365.3	6.7	
		Chlorophyll a (ug/L)	EPA 445	<10	
		Total Phosphorus (ug/L)	EPA 365.3	52.4	
		Alkalinity (mg/L as CaCO3)	EPA 310.2	20.4	
		Total Hardness (mg/L as CaCO3)	EPA 130.2	29.1	
		Total Nitrate (mg/L) and Nitrite (mg/L)	Campbell et al 2004	0.39	
		Nitrite (mg/L)	Campbell et al 2004	<0.02	
		Nitrate (mg/L)	calculated	0.39	
		Total Kjeldahl Nitrogen (mg/L)	EPA 351.2	0.96	
		E. coli (CFU/100mL)	EPA 9223B	>2419.6	
		Total Coliforms (CFU/100mL)	EPA 9223B	>2419.6	
		Total Nitrogen (mg/L)	calculated	1.35	
		pH	EPA 150.1	6.8	

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COMMENTS: No significant observations were made unless noted in the report.
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Laboratory Information
Date / Time Received: 09/20/23 11:00 AM
Date Results Sent: Monday, September 25, 2023

This entire report was reviewed and approved for release.

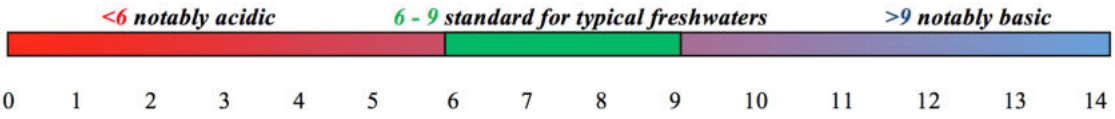
Reviewed By: Laboratory Supervisor

SRTC SePRO Research & Technology Campus SePRO

Water Quality Analysis Explanation

These water quality parameters are essential to document the condition of a water body and design custom treatment prescriptions to achieve desired management objective

pH: Measure of how acidic or basic the water is (pH 7 is considered neutral).



Hardness: Measure of the concentration of divalent cations, primarily consisting of calcium and magnesium in typical freshwaters. *0-60 mg/L as CaCO3 soft; 61-120 moderately hard; 121-180 hard; > 181 very hard*

Alkalinity- Measure of the buffering capacity of water, primarily consisting of carbonate, bicarbonate and hydroxide in typical freshwaters. Waters with lower levels are more susceptible to pH shifts.
<= 50 mg/L as CaCO3 low buffered; 51-100 moderately buffered; 101-200 buffered; > 200 high buffered

Conductivity- Measure of the waters ability to transfer an electrical current, increases with more dissolved ions.
< 50 uS/cm relatively low concentration may not provide sufficient dissolved ions for ecosystem health; 50-1500 typical freshwaters; > 1500 may be stressful to some freshwater organisms, though not uncommon in many areas

Phosphorus: Essential nutrient often correlating to growth of algae in freshwaters.

Total Phosphorus (TP) is the measure of all phosphorus in a sample as measured by persulfate strong digestion and includes: inorganic, oxidizable organic and polyphosphates. This includes what is readily available, potential to become available and stable forms. *<12 Âµg/L oligotrophic; 12-24 Âµg/L mesotrophic; 25-96 Âµg/L eutrophic; > 96 Âµg/L hypereutrophic*
Free Reactive Phosphorus (FRP) is the measure of inorganic dissolved reactive phosphorus (PO4-3, HPO4-2, etc). This
form is readily available in the water column for algae growth.

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Nitrites and Nitrates are the sum of total oxidized nitrogen, often readily free for algae uptake.
< 1 mg/L typical freshwater; 1-10 potentially harmful; >10 possible toxicity, above many regulated guidelines

Chlorophyll a: primary light-harvesting pigment found in algae and a measure of the algal productivity and water quality in a system.
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Turbidity- Measurement of water clarity. Suspended particulates (algae, clay, silt, dead organic matter) are the common constituents impacting turbidity.
< 10 NTU drinking water standards and typical trout waters; 10-50 NTU moderate; > 50 NTU potential impact to aquatic life.

SePRO Research & Technology Campus SeSCRIPT*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC17531 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name: Water and Wetland LLC	Contact Person: Joe Onorato
Address: 115 South St. Upton, MA 01568	E-mail Address: info@waterandwetland.com
	Phone: 508-250-6238

Waterbody Information

Waterbody:	Norton Pond - MA
Waterbody size:	
Depth Average:	3

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM48160-1	Norton Pond	Turbidity (NTU)	EPA 180.1	2.7	09/19/2023
		Conductivity (uS/cm)	EPA 120.1	108.8	
		Free Reactive Phosphorus (ug/L)	EPA 365.3	5.8	
		Chlorophyll a (ug/L)	EPA 445	<10	
		Total Phosphorus (ug/L)	EPA 365.3	30.2	
		Alkalinity (mg/L as CaCO3)	EPA 310.2	25	
		Total Hardness (mg/L as CaCO3)	EPA 130.2	27.4	
		Total Nitrate (mg/L) and Nitrite (mg/L)	Campbell et al 2004	0.18	
		Nitrite (mg/L)	Campbell et al 2004	<0.02	
		Nitrate (mg/L)	calculated	0.18	
		Total Kjeldahl Nitrogen (mg/L)	EPA 351.2	<0.1	
		E. coli (CFU/100mL)	EPA 9223B	90.9	
		Total Coliforms (CFU/100mL)	EPA 9223B	>2419.6	
		Total Nitrogen (mg/L)	calculated	0.18	
		pH	EPA 150.1	7.1	

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Laboratory Information
Date / Time Received: 09/20/23 11:00 AM
Date Results Sent: Monday, September 25, 2023

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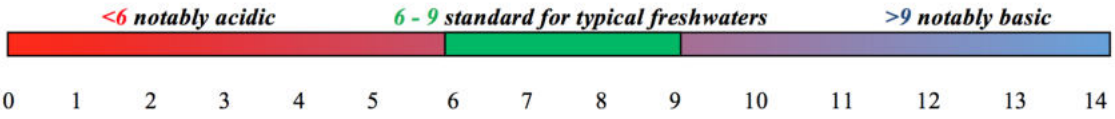
Reviewed By: Laboratory Supervisor

SRTC SePRO Research & Technology Campus SePRO

Water Quality Analysis Explanation

These water quality parameters are essential to document the condition of a water body and design custom treatment prescriptions to achieve desired management objective

pH: Measure of how acidic or basic the water is (pH 7 is considered neutral).



Hardness: Measure of the concentration of divalent cations, primarily consisting of calcium and magnesium in typical freshwaters. *0-60 mg/L as CaCO3 soft; 61-120 moderately hard; 121-180 hard; > 181 very hard*

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<= 50 mg/L as CaCO3 low buffered; 51-100 moderately buffered; 101-200 buffered; > 200 high buffered

Conductivity- Measure of the waters ability to transfer an electrical current, increases with more dissolved ions.
< 50 uS/cm relatively low concentration may not provide sufficient dissolved ions for ecosystem health; 50-1500 typical freshwaters; > 1500 may be stressful to some freshwater organisms, though not uncommon in many areas

Phosphorus: Essential nutrient often correlating to growth of algae in freshwaters.

Total Phosphorus (TP) is the measure of all phosphorus in a sample as measured by persulfate strong digestion and includes: inorganic, oxidizable organic and polyphosphates. This includes what is readily available, potential to become available and stable forms. *<12 Âµg/L oligotrophic; 12-24 Âµg/L mesotrophic; 25-96 Âµg/L eutrophic; > 96 Âµg/L hypereutrophic*
Free Reactive Phosphorus (FRP) is the measure of inorganic dissolved reactive phosphorus (PO4-3, HPO4-2, etc). This
form is readily available in the water column for algae growth.

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Turbidity- Measurement of water clarity. Suspended particulates (algae, clay, silt, dead organic matter) are the common constituents impacting turbidity.
< 10 NTU drinking water standards and typical trout waters; 10-50 NTU moderate; > 50 NTU potential impact to aquatic life.

SePRO Research & Technology Campus SeSCRIPT*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC17530 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name: Water and Wetland LLC	Contact Person: Joe Onorato
Address: 115 South St. Upton, MA 01568	E-mail Address: info@waterandwetland.com
	Phone: 508-250-6238

Waterbody Information

Waterbody:	Sudbury River - MA
Waterbody size:	
Depth Average:	4

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM48159-1	Sudbury River	Turbidity (NTU)	EPA 180.1	3.7	09/19/2023
		Conductivity (uS/cm)	EPA 120.1	344.0	
		Free Reactive Phosphorus (ug/L)	EPA 365.3	8.3	
		Chlorophyll a (ug/L)	EPA 445	<10	
		Total Phosphorus (ug/L)	EPA 365.3	35.6	
		Alkalinity (mg/L as CaCO3)	EPA 310.2	26.8	
		Total Hardness (mg/L as CaCO3)	EPA 130.2	35.5	
		Total Nitrate (mg/L) and Nitrite (mg/L)	Campbell et al 2004	0.23	
		Nitrite (mg/L)	Campbell et al 2004	<0.02	
		Nitrate (mg/L)	calculated	0.23	
		Total Kjeldahl Nitrogen (mg/L)	EPA 351.2	<0.1	
		E. coli (CFU/100mL)	EPA 9223B	410.6	
		Total Coliforms (CFU/100mL)	EPA 9223B	>2419.6	
		Total Nitrogen (mg/L)	calculated	0.23	
		pH	EPA 150.1	7	

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Reviewed By: Laboratory Supervisor

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Water Quality Analysis Explanation

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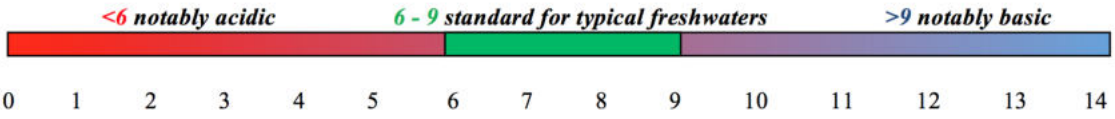

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SePRO Research & Technology Campus SeSCRIPT*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC17528 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name: Water and Wetland LLC	Contact Person: Joe Onorato
Address: 115 South St. Upton, MA 01568	E-mail Address: info@waterandwetland.com
	Phone: 508-250-6238

Waterbody Information

Waterbody:	Waushakum Pond - MA
Waterbody size:	80
Depth Average:	8

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM48157-1	Waushakum Pond	Turbidity (NTU)	EPA 180.1	3.1	09/19/2023
		Conductivity (uS/cm)	EPA 120.1	385.0	
		Free Reactive Phosphorus (ug/L)	EPA 365.3	<5	
		Chlorophyll a (ug/L)	EPA 445	<10	
		Total Phosphorus (ug/L)	EPA 365.3	21.5	
		Alkalinity (mg/L as CaCO3)	EPA 310.2	29.2	
		Total Hardness (mg/L as CaCO3)	EPA 130.2	43.0	
		Total Nitrate (mg/L) and Nitrite (mg/L)	Campbell et al 2004	0.02	
		Nitrite (mg/L)	Campbell et al 2004	<0.02	
		Nitrate (mg/L)	calculated	0.02	
		Total Kjeldahl Nitrogen (mg/L)	EPA 351.2	0.84	
		E. coli (CFU/100mL)	EPA 9223B	82.0	
		Total Coliforms (CFU/100mL)	EPA 9223B	2419.6	
		Total Nitrogen (mg/L)	calculated	0.86	
		pH	EPA 150.1	7.1	

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PRESERVATION: Samples requiring preservation were verified prior to sample analysis and any qualifiers will be noted
in the report.
QA/QC CRITERIA: All analyses met method criteria, except as noted in the report with data qualifiers.
COMMENTS: No significant observations were made unless noted in the report.
MEASUREMENT UNCERTAINTY: Uncertainty of measurement has been determined and is available upon request.

Laboratory Information
Date / Time Received: 09/20/23 11:00 AM
Date Results Sent: Monday, September 25, 2023

This entire report was reviewed and approved for release.

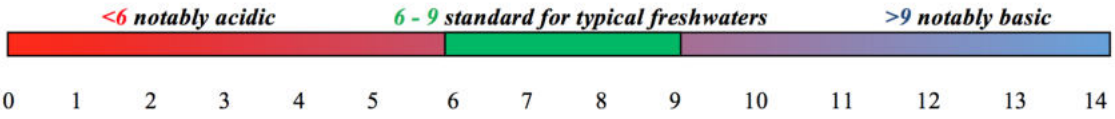
Reviewed By: Laboratory Supervisor

SRTC SePRO Research & Technology Campus SePRO

Water Quality Analysis Explanation

These water quality parameters are essential to document the condition of a water body and design custom treatment prescriptions to achieve desired management objective

pH: Measure of how acidic or basic the water is (pH 7 is considered neutral).



Hardness: Measure of the concentration of divalent cations, primarily consisting of calcium and magnesium in typical freshwaters. *0-60 mg/L as CaCO3 soft; 61-120 moderately hard; 121-180 hard; > 181 very hard*

Alkalinity- Measure of the buffering capacity of water, primarily consisting of carbonate, bicarbonate and hydroxide in typical freshwaters. Waters with lower levels are more susceptible to pH shifts.
<= 50 mg/L as CaCO3 low buffered; 51-100 moderately buffered; 101-200 buffered; > 200 high buffered

Conductivity- Measure of the waters ability to transfer an electrical current, increases with more dissolved ions.
< 50 uS/cm relatively low concentration may not provide sufficient dissolved ions for ecosystem health; 50-1500 typical freshwaters; > 1500 may be stressful to some freshwater organisms, though not uncommon in many areas

Phosphorus: Essential nutrient often correlating to growth of algae in freshwaters.

Total Phosphorus (TP) is the measure of all phosphorus in a sample as measured by persulfate strong digestion and includes: inorganic, oxidizable organic and polyphosphates. This includes what is readily available, potential to become available and stable forms. *<12 Âµg/L oligotrophic; 12-24 Âµg/L mesotrophic; 25-96 Âµg/L eutrophic; > 96 Âµg/L hypereutrophic*
Free Reactive Phosphorus (FRP) is the measure of inorganic dissolved reactive phosphorus (PO4-3, HPO4-2, etc). This
form is readily available in the water column for algae growth.

Nitrogen: Essential nutrient that can enhance growth of algae.

Total N is all nitrogen in the sample (organic N+ and Ammonia) determined by the sum of the measurements for Total Kjeldahl Nitrogen (TKN) and ionic forms.
Nitrites and Nitrates are the sum of total oxidized nitrogen, often readily free for algae uptake.
< 1 mg/L typical freshwater; 1-10 potentially harmful; >10 possible toxicity, above many regulated guidelines

Chlorophyll a: primary light-harvesting pigment found in algae and a measure of the algal productivity and water quality in a system.
0-2.6Âµg/L oligotrophic; 2.7-20 Âµg/L mesotrophic; 21-56 Âµg/L eutrophic; > 56 Âµg/L hypereutrophic

Turbidity- Measurement of water clarity. Suspended particulates (algae, clay, silt, dead organic matter) are the common constituents impacting turbidity.
< 10 NTU drinking water standards and typical trout waters; 10-50 NTU moderate; > 50 NTU potential impact to aquatic life.