WATER & WETLAND
LAKE, POND & WETLAND MANAGEMENT

ENVIRONMENTAL SCIENTIST:
JAMES LACASSE
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CALL/TEXT WITH ANY QUESTIONS!

FIELD NOTES SUMMARY

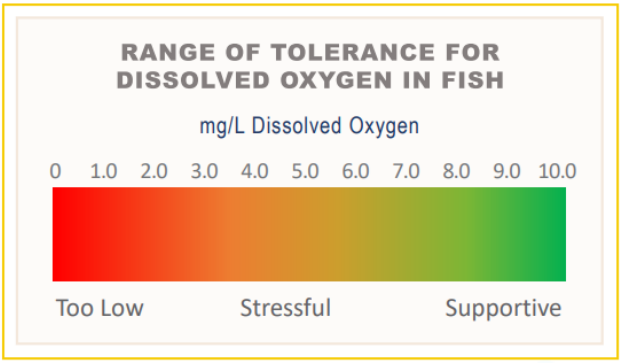
Customer: Hop Brook Protection Association
Pond Name: Grist Millpond
Site Location: Sudbury, MA
Date: 9/6/23

On 9/6/23, Senior Environmental Scientist, James Lacasse, made a visit to Grist Millpond. The following services were completed during the visit:

Upon arrival to the site, a survey was conducted using visual observation paired with a standard throw-rake and handheld GPS/ArcGIS Field Maps, as applicable. Plants documented during the survey are documented in the table below. (*) denotes an invasive species. Invasive species are non-native to the ecosystem and are likely to cause economic harm, environmental harm, or harm to human health.

Species Identified	
Common Name	**Latin Name**
Duckweed	*Lemna*
Watermeal	*Wolffia*
Filamentous Algae	
Common Waterweed/Elodea	*Elodea canadensis*
Cattails	*Typha*
Coontail	*Ceratophyllum demersum*
Water Chestnut*	*Trapa natans*

While on-site, dissolved oxygen (DO) and temperature readings were collected using a calibrated YSI meter with optical sensor. 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, but the figure below provides 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.

Results from the visit are included in the table below:

Temperature & Dissolved Oxygen		
Depth	Surface Temp (°C)	Surface DO (mg/L)
Surface	26.2	7.27
1 Foot	25.9	7.11
2 Feet	25.4	6.02
3 Feet	25.3	5.87
4 Feet	25.2	5.77
5 Feet	24.7	5.39

Secchi Disk Clarity	
Secchi Disk Depth (Feet)	5'4"

A Secchi disk is a disk with alternating black and white quadrants. It is lowered into the water of a lake until it can no longer be seen by the observer. This depth of disappearance, called the Secchi depth, is a measure of the transparency of the water.

Water Quality Parameters
Algae ID, Classification, Biomass
Alkalinity
Apparent Color
Microbial Bacteria (total coliforms & E. coli)
Nitrogen, Total (Kjeldahl)
pH
Phosphorus, Total & Free Reactive (Water)
True Color
Turbidity
Ammonia Nitrogen
Nitrate Nitrogen

Additional samples were collected from the contracted locations. The samples were properly preserved, and shipped on-ice via FedEx Overnight, or transported directly to the most appropriate lab. The lab will analyze the samples for the contracted/required parameters which are listed in the table above. Results will be provided upon receipt from the lab or in the year end-summary report, as applicable. Any concerning results will immediately be brought to the attention of the Client.

Additional Notes from the Biologist
The treatment program targeting water chestnut at Grist Millpond worked fantastic in 2023, as minimal water chestnut was noted. It is important not to confuse the "green" appearance on the surface of the

Pond for water chestnut as it was a mix of nuisance densities of natives and filamentous algae. Water chestnut was primarily found within the inlet and towards the inlet, with a few scattered individual plants found along the remainder of the Pond. The most abundant species documented during the survey included duckweed, watermeal, coontail, Elodea, and filamentous algae. In addition to the water quality parameters mentioned above, ammonia nitrogen and nitrate nitrogen samples were also collected and delivered to the lab for further analysis. Numerous floating water chestnut seeds were observed throughout the survey.

Attached is a map of the invasive species. The blue dots signify water chestnut, these were typically just one or two plants. Most of these were also dead and not producing seeds or attached to a stem/root.

As always, we will notify you prior to any upcoming visits, as applicable. Please feel free to reach out to us directly with any questions.

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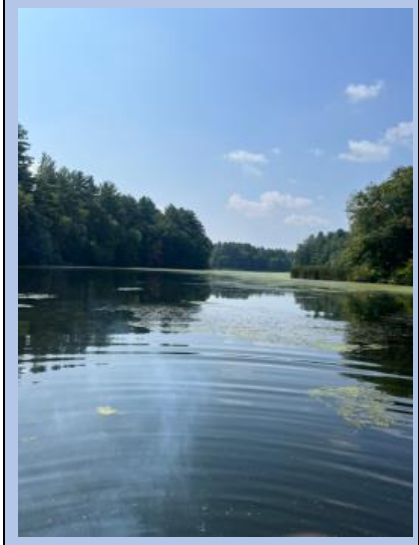		

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Photo 4	Photo 5	Photo 6
		

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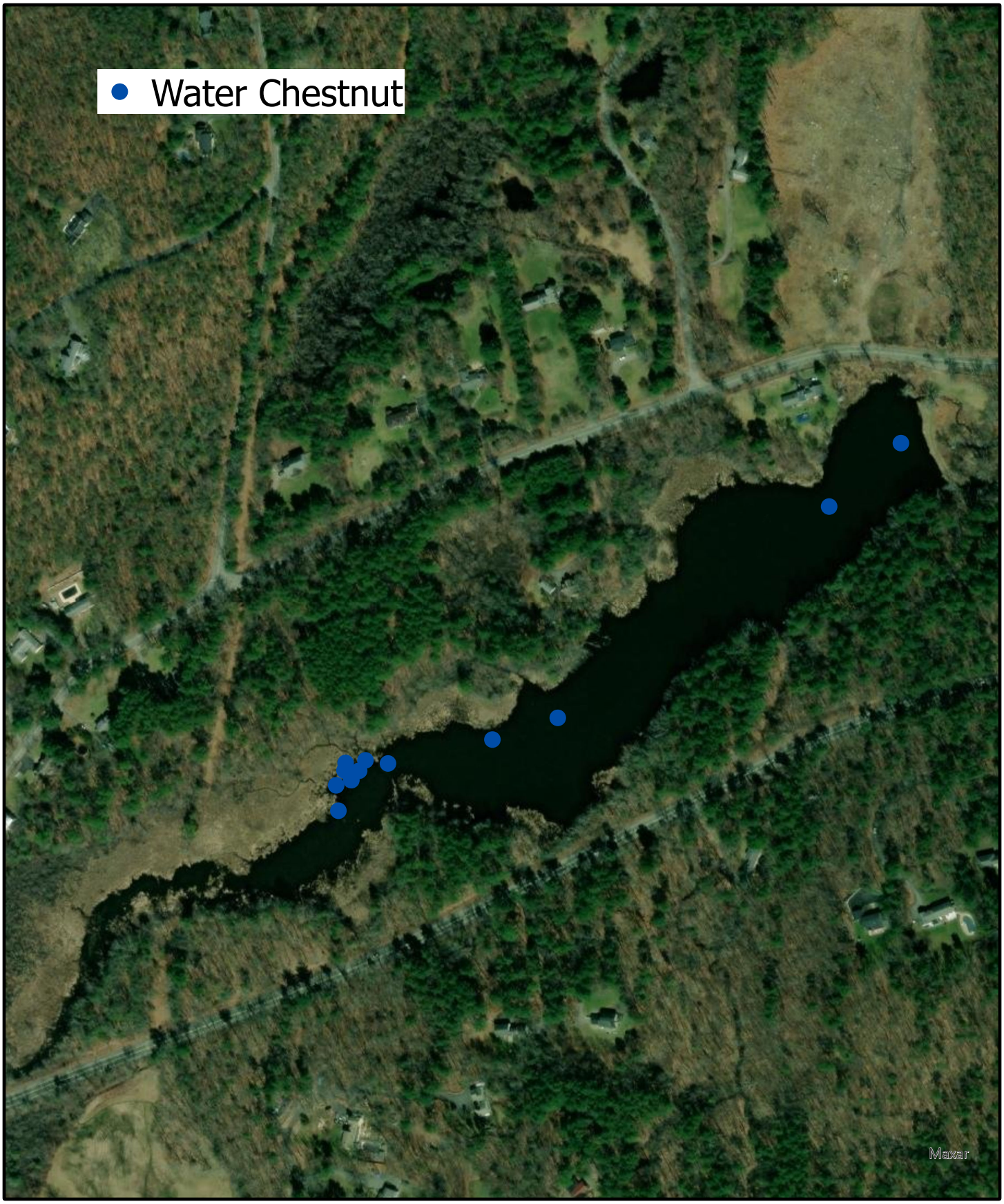

WATER & WETLAND
LAKE, POND & WETLAND MANAGEMENT

Grist Millpond
Post-Treatment Invasive Distribution
Sudbury, MA

Survey Date
9/6/2023

Map Date
9/6/2023

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FIELD NOTES SUMMARY

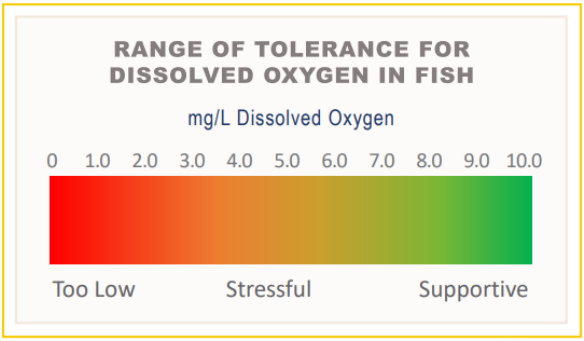
Customer: Hop Brook Protection Association
Pond Name: Carding Millpond
Site Location: Sudbury, MA
Date: 9/6/23

On 9/6/23, Senior Environmental Scientist, James Lacasse, made a visit to Carding Millpond. The following services were completed during the visit:

Upon arrival to the site, a survey was conducted using visual observation paired with a standard throw-rake and handheld GPS/ArcGIS Field Maps, as applicable. Plants documented during the survey are documented in the table below. (*) denotes an invasive species. Invasive species are non-native to the ecosystem and are likely to cause economic harm, environmental harm, or harm to human health.

Species Identified	
Common Name	**Latin Name**
Filamentous Algae	
Duckweed	*Lemna*
Water Chestnut*	*Trapa natans*
Cattails	*Typha*
Coontail	*Ceratophyllum demersum*
Common Waterweed/Elodea	*Elodea canadensis*
Watermeal	*Wolffia*
Waterlilies	*Nymphaeaceae*

While on-site, dissolved oxygen (DO) and temperature readings were collected using a calibrated YSI meter with optical sensor. 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, but the figure below provides 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.

Results from the visit are included in the table below:

Temperature & Dissolved Oxygen		
Depth	Surface Temp (°C)	Surface DO (mg/L)
Surface	27.5	13.01
1 Foot	26.7	13.22
2 Feet	26.2	13.20
3 Feet	25.6	12.61
4 Feet	25.2	11.39
5 Feet	25.2	10.08

Secchi Disk Clarity	
Secchi Disk Depth (Feet)	2'11"

A Secchi disk is a disk with alternating black and white quadrants. It is lowered into the water of a lake until it can no longer be seen by the observer. This depth of disappearance, called the Secchi depth, is a measure of the transparency of the water.

Water Quality Parameters
Phosphorus, Total & Free Reactive (Water)
Microbial Bacteria (total coliforms & E. coli)
Nitrogen, Total (Kjeldahl)
Alkalinity
Turbidity
Apparent Color
True Color
Algae ID, Classification, Biomass
pH
Ammonia Nitrogen
Nitrate Nitrogen

Additional samples were collected from the contracted locations. The samples were properly preserved, and shipped on-ice via FedEx Overnight, or transported directly to the most appropriate lab. The lab will analyze the samples for the contracted/required parameters which are listed in the table above. Results will be provided upon receipt from the lab or in the year end-summary report, as applicable. Any concerning results will immediately be brought to the attention of the Client.

Additional Notes from the Biologist
The water chestnut treatment program at Carding Millpond has worked great as the population has significantly decreased since the initial survey. Although water chestnut was noted, it was documented

as much lower, scattered, densities. Portions of the water chestnut population were observed floating on the surface (not connected to a stem or root system). The most dominant species within Carding Millpond included watermeal, duckweed, filamentous algae, and coontail. It is important to note that the "green" vegetation appearance on the surface of the Pond is not all water chestnut, as the majority of this "green" includes the dominant species mentioned above. There appeared to be a minor microscopic algae bloom within the water column. Epiphytic algae was noted on a small portion of the vegetation (which indicates that the plant is dying or decaying), specifically on coontail and elodea. A handful of floating water chestnut seeds were documented during the survey. Dissolved oxygen was excellent.

Attached is a post-treatment invasive species map. Any time a water chestnut plant was found, a GPS point was collected. The blue dots signify individual plants (or a small grouping of a small number of plants). There were no large contiguous patches of water chestnut anywhere in the pond; however in the areas where polygons exist on the map, there were scattered groupings or small patches but by no means throughout these areas. Overall, good coverage was achieved, with scattered plants remaining but the majority of the chestnut was controlled.

As always, we will notify you prior to any upcoming visits, as applicable. Please feel free to reach out to us directly with any questions.

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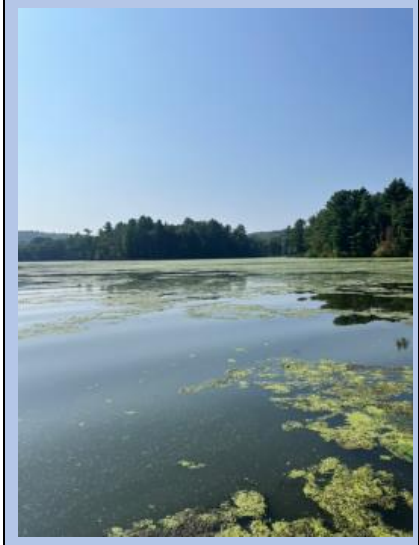		

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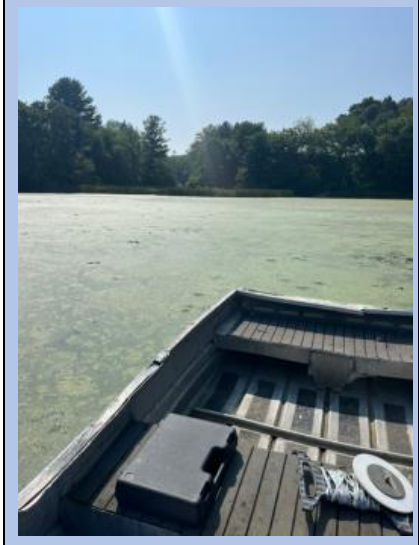
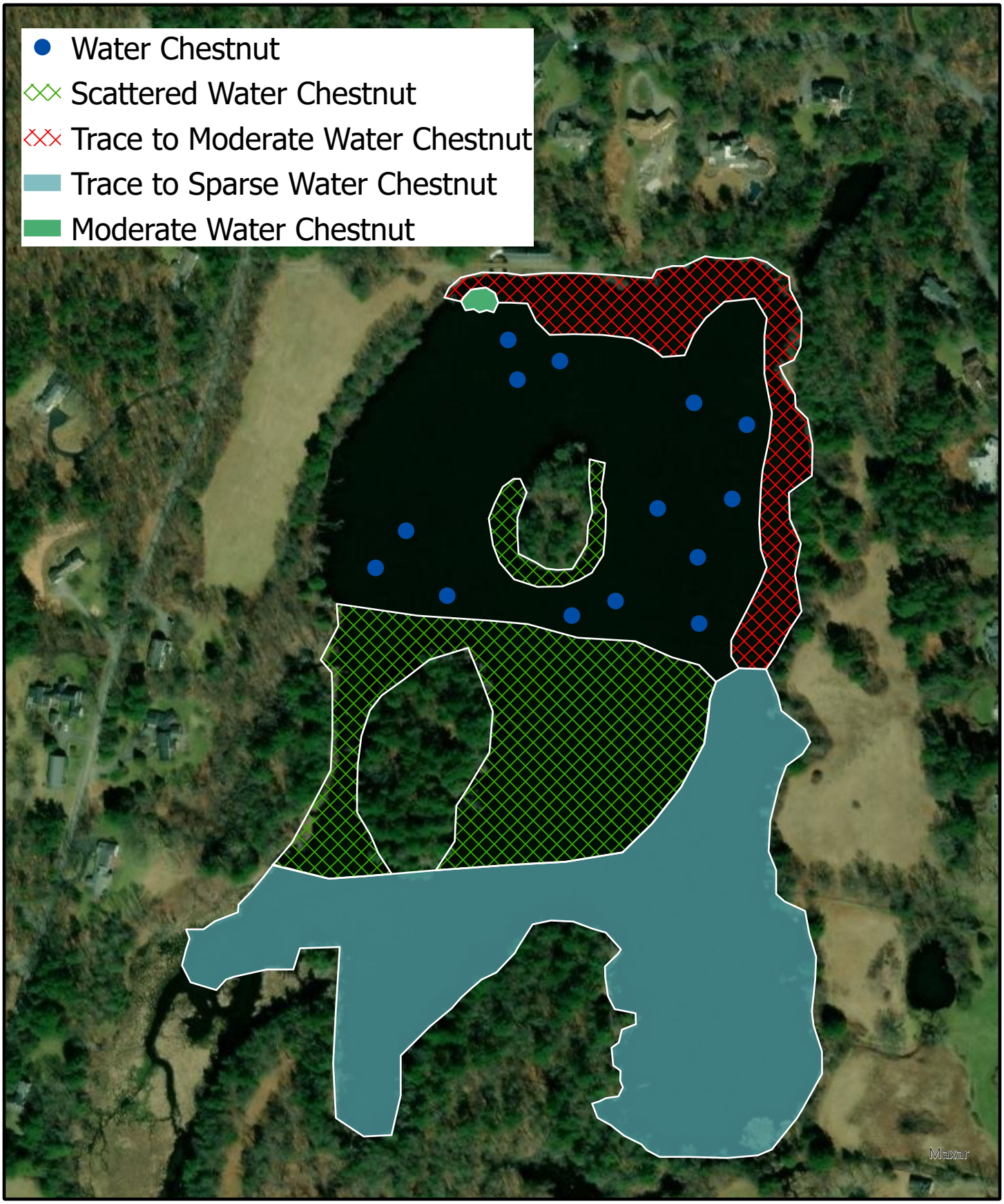
Photo 4	Photo 5	Photo 6
		



WATER & WETLAND
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Carding Millpond
Post-Treatment Invasive Distribution
Sudbury, MA

Survey Date
9/6/2023

Map Date
9/6/2023

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FIELD NOTES SUMMARY

Customer: Hop Brook Protection Association
Pond Name: Stearns Millpond
Site Location: Sudbury, MA
Date: 9/6/23

On 9/6/23, Senior Environmental Scientist, James Lacasse, made a visit to Stearns Millpond. The following services were completed during the visit:

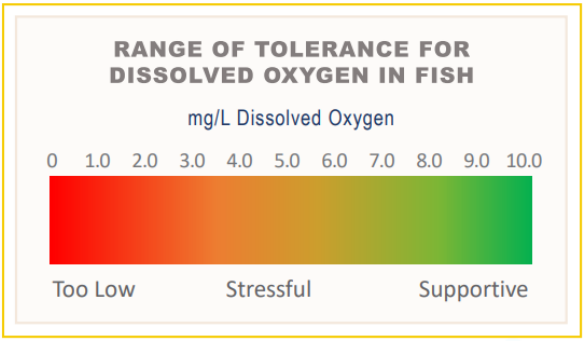
Upon arrival to the site, a survey was conducted using visual observation paired with a standard throw-rake and handheld GPS/ArcGIS Field Maps, as applicable. Plants documented during the survey are documented in the table below. (*) denotes an invasive species. Invasive species are non-native to the ecosystem and are likely to cause economic harm, environmental harm, or harm to human health.

Species Identified	
Common Name	**Latin Name**
Filamentous Algae	
Duckweed	*Lemna*
Watermeal	*Wolffia*
Common Waterweed/Elodea	*Elodea canadensis*
Curly-leaf Pondweed*	*Potamogeton crispus*
Cattails	*Typha*
Water Chestnut*	*Trapa natans*
Common Reed*	*Phragmites australis*
Floating Leaf Pondweed	*Potamogeton natans*
Purple Loosestrife*	*Lythrum salicaria*
Coontail	*Ceratophyllum demersum*
Waterlilies	*Nymphaeaceae*

While on-site, dissolved oxygen (DO) and temperature readings were collected using a calibrated YSI meter with optical sensor. 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, but the figure below provides 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.

Results from the visit are included in the table below:



Temperature & Dissolved Oxygen		
Depth	Surface Temp (°C)	Surface DO (mg/L)
Surface	26.0	6.29
1 Foot	26.1	6.16
2 Feet	24.8	5.49

Secchi Disk Clarity	
Secchi Disk Depth (Feet)	2'10" - to the bottom

A Secchi disk is a disk with alternating black and white quadrants. It is lowered into the water of a lake until it can no longer be seen by the observer. This depth of disappearance, called the Secchi depth, is a measure of the transparency of the water.

Water Quality Parameters
Phosphorus, Total & Free Reactive (Water)
Microbial Bacteria (total coliforms & E. coli)
Alkalinity
Apparent Color
True Color
Turbidity
Nitrogen, Total (Kjeldahl)
Algae ID, Classification, Biomass
pH
Nitrate Nitrogen
Ammonia Nitrogen

Additional samples were collected from the contracted locations. The samples were properly preserved, and shipped on-ice via FedEx Overnight, or transported directly to the most appropriate lab. The lab will analyze the samples for the contracted/required parameters which are listed in the table above. Results will be provided upon receipt from the lab or in the year end-summary report, as applicable. Any concerning results will immediately be brought to the attention of the Client.

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Additional Notes from the Biologist
The treatment program at Stearns Millpond worked excellent as minimal water chestnut was documented throughout the survey. Water chestnut was noted in trace, scattered densities; in isolated populations. The majority of the water chestnut noted was hand-pulled and properly disposed of. Some of the water chestnut present was already dead (floating on the surface), as the plants were not attached to a stem/root. The most prevalent species observed was Elodea as it was found in varying densities ranging from sparse to dense throughout the Pond. Coontail, also native, was the next most prevalent species. Filamentous algae was documented throughout approximately 70-80% of the Pond both on the bottom, throughout the water column, and forming a mat on the surface. Epiphytic algae was also documented in roughly 25% of the vegetation populations. Scattered floating water chestnut seeds were observed throughout the Pond, primarily towards the outlet. Curly-leaf pondweed (invasive) was noted (primarily within the outlet cove). Clarity was to the bottom or to the vegetation throughout the Pond. A family of swans was documented during the survey. Attached is a map of the invasive species. The blue dots signify water chestnut and typically represent just a plant or two. Most were windblown to a shoreline and were not attached to a root or stem and were not producing seeds.

As always, we will notify you prior to any upcoming visits, as applicable. Please feel free to reach out to us directly with any questions.

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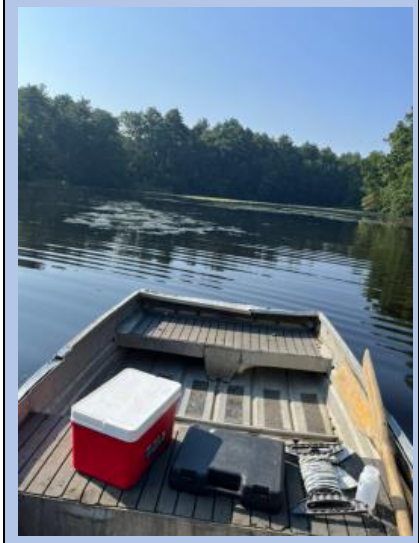		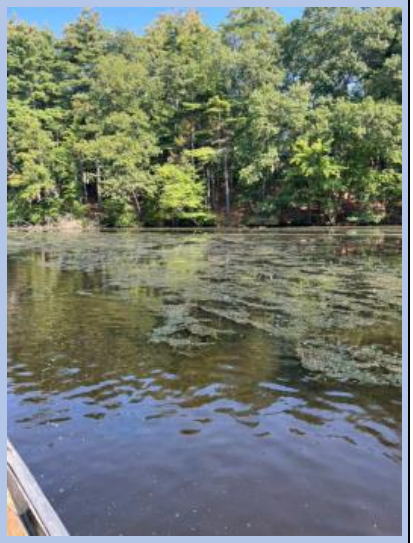

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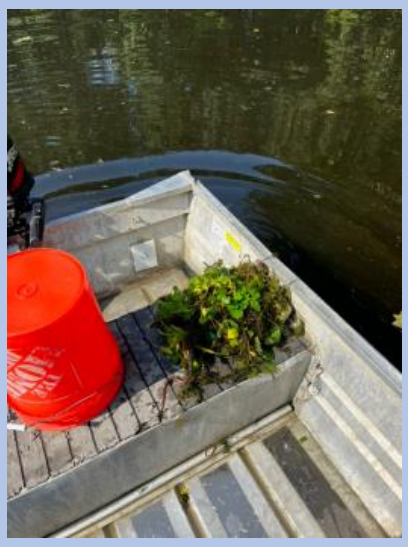
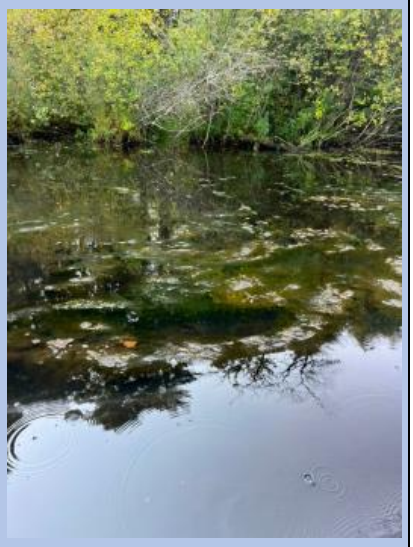
Photo 4 	Photo 5 	Photo 6 

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Stearns Millpond
Post-Treatment Invasive Distribution
Sudbury, MA

Survey Date
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Map Date
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