WATER & WETLAND
LAKE, POND & WETLAND MANAGEMENT

November 30, 2022

Hop Brook Protection Association
Attention: Jeff Winston
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Sent via email: jeffw@kwcpa.com

Re: Hop Brook Ponds (Stearns Millpond, Carding Millpond, and Grist Millpond), Sudbury, MA – 2022 Year End Report (DEP File #301-1283)

Dear Association Members:

Figure 1: Stearns Millpond - Sudbury, MA

It is our pleasure to present a year end summary report to The Hop Brook Protection Association regarding the 2022 aquatic management program at the Hop Brook Ponds. The Hop Brook waterbodies include Stearns Millpond (pictured in Figure1 1 to the right), Carding Millpond (see Figure 2 below), and Grist Millpond (Figure 3), all located in Sudbury, MA. Stearns Millpond is the northernmost waterbody and is approximately 16.8 acres. This Pond is primarily surrounded by woodlands with developed properties scattered on both the northern and southern shorelines. The inlet (which is Hop Brook) to Stearns Millpond is found along the southwestern point. Water flows from west to east within the waterbody, with the outlet noted at the northeastern point (adjacent to the public parking lot). This outlet is a constructed dam that flows back into Hop Brook. The Pond is fairly shallow, with an estimated average depth of roughly 2.5-3 feet. Access to this waterbody is gained from the public parking lot off of Dutton Road.

Figure 2: Carding Millpond - Sudbury, MA

Carding Millpond is found in the middle of Grist Millpond and Stearns Millpond. This waterbody is south of Stearns Millpond, and northeast of Grist Millpond. Carding Millpond is approximately 42.8 acres, including two islands within the middle of the Pond. The northern island is roughly 0.85 acres while the southern island (the larger island) is about 2.4 acres. Access to Carding Millpond was gained from a boat launch on the northern shoreline. The road to the boat launch is found off of Dutton Road, which runs along the western shoreline. The Pond is surrounded by sparse woodlands with a handful of developed properties/fields mixed noted on each shoreline. Two inlets are noted within the Pond, one in each southern basin. The primary inlet is found within the southwestern basin. The outlet within the Pond is along the northern shoreline, which flows into Hop Brook.

Grist Millpond is found north of Route 20 (Boston Post Road) and south of Wayside Inn Road. This waterbody is approximately 12.9 acres and is surrounded by woodlands and wetlands, with a small number of developed properties along the northern shoreline. The Wayside Inn Grist Mill is located downstream of the Pond. Access to the Pond was gained from the northeastern point of the waterbody,

adjacent to the outlet. Water flows from the west (inlet at the western point) to east within Grist Millpond. Due to lack of proper boat access, a crane was utilized to assist with launching the airboat for each treatment. The outlet to the Pond is a small culvert that is noted underneath a walking path. There are walking paths observed around portions of the perimeter of this waterbody. Grist Millpond is a well-known historical site in addition to a popular location for outdoor recreational activities such as hiking, fishing, walking dogs, and bird watching. There is public parking off of Wayside Inn Road for both the Grist Millpond area as well as the Wayside Inn Grist Mill.

Figure 3: Grist Millpond - Sudbury, MA

Historically, Hop Brook Protection Association has battled invasive species water chestnut *(Trapa natans)* within all three waterbodies: Stearns Millpond, Carding Millpond, and Grist Millpond). The goal of the 2022 program was to manage the invasive water chestnut population while assessing 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 2022 Management Activities

Date	Task/Description
June 14th, 2022	A pre-treatment survey was conducted to document baseline conditions of the ponds, note the current vegetation species/densities present, and to guide upcoming 2022 management; Water samples were collected
July 7th, 2022	A brief interim survey was completed; The initial water chestnut treatment was performed
July 21st, 2022	A brief interim survey was completed; The follow-up water chestnut treatment was accomplished
September 8th, 2022	A post-treatment inspection was completed to evaluate the effectiveness of the previous treatment and the overall 2022 aquatic management program, in addition to helping guide recommendations for 2023; Water samples were collected

<u>Pre-Treatment Surveys/Water Samples Collected – June 14, 2022</u>

On June 14th, Senior Environmental Scientist, James Lacasse, and Field Assistant, Grace Adams, completed a site visit to Stearns Millpond, Grist Millpond, and Carding Millpond. The visit consisted of performing the pre-management surveys and collecting water quality data. Conditions during the visit were warm and sunny.

Figure 4: A mix of pondweeds and algae within Stearns Millpond

Upon arrival to the ponds, a survey was conducted using visual observation paired with a standard throw-rake and ArcGIS Field

Figure 5: Field Assistant, Grace Adams, collecting water quality data

Maps/external GPS. Stearns Millpond was the first pond surveyed. Throughout the Pond, both native and invasive species (illustrated in Figure 4) were observed, ranging from trace to dense densities. The native species noted were moderate to dense densities of thin-leaf pondweed *(Potamogeton pusillus)*, dense densities of mixed duckweed *(Lemnoideae)* and watermeal *(Wolffia)* along the entire shoreline, and scattered in the middle of the Pond, dense densities of coontail, which can sometimes be mistaken for milfoil. This has 100% been documented as native coontail *(Ceratophyllum demersum)* and not invasive milfoil *(Myriophyllum humile)*. There were also sparse densities of elodea *(Elodea)* observed. As for the invasive species, there were dense densities of curly-leaf pondweed *(Potamogeton crisupus)* throughout the water column, as well as surfacing, and flowering. Some of the curly-leaf pondweed also had epiphytic algae covering it, which is an indication that the plant is decaying. Curly-leaf pondweed is a colder water invasive species that typically starts to die off naturally around this time of year. There were also scattered patches of water chestnut in trace to moderate (primarily trace to sparse densities), with floating seeds, a majority was surfaced, but some was growing throughout the water column. The densest area was the eastern portion of the Pond, and as you travel to the west, it becomes more scattered. Along the shoreline there were scattered patches of invasive phragmites *(Phragmites australis)*.

While on-site, basic water quality was collected using calibrated meters (see Figure 5 above). The pH was 7.0, which is within the standard range for freshwater and considered neutral. The water temperature was consistent with other similar waterbodies we manage in the area, and the dissolved oxygen was sufficient to support fish and wildlife. The water clarity was also assessed, and deemed as above average, as visibility was to the bottom of the Pond, although the Pond is fairly shallow throughout.

Figure 6: Dense water chestnut noted at Grist Millpond

The next waterbody surveyed was Grist Millpond. Since the waterbody was so heavily populated with water chestnut, a motor was not able to make it through, therefore the 12' jon boat was rowed throughout the Pond. The Grist Millpond was roughly 90-100 percent covered with water chestnut (pictured in Figure 6 above, and in the background of Figure 7), as well as watermeal, and algae. Several rake tosses also revealed elodea, a native species, that was under all the surfaced water chestnut. Lastly, moderate to dense curly leaf pondweed (invasive) was documented throughout the majority of the Pond, as shown in the attached map.

Figure 7: Dense water chestnut resulting in difficult conditions to navigate throughout the Pond; Water quality data collected

The pH was 7.3, which is within standard range for freshwater and considered neutral (Grace Adams collecting water quality data in Figure 7). The water temperature was consistent with other similar waterbodies we manage in the area, and the dissolved oxygen was sufficient to support fish and aquatic organisms. The water clarity was difficult to assess, due to the large amount of vegetation on the

surface; however, from the area the Secchi disk reading was collected, we received a reading of 3ft 10in before it was lost within the pondweeds. 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.

Figure 8: Water chestnut pictured in the southern basin at Carding Millpond

Carding Millpond was the final waterbody that was surveyed. Throughout the Pond, both native and invasive species were observed at varying densities. The native species noted were moderate densities of thin-leaf pondweed, dense densities of duckweed and watermeal along the entire shoreline and scatted in the middle of the Pond, dense densities of coontail. There were also moderate to dense densities of elodea observed. As for the invasive species, there were dense densities of curly-leaf pondweed throughout the water column, as well as surfacing, and flowering. Some of the curly-leaf pondweed also had epiphytic algae covering it. The water chestnut (see Figures 8 and 9) was present in dense densities in the southwestern section of the Pond (pictured in Figure 8), as well as around the island, with filamentous algae mixed in around it. The rest of the water chestnut was in moderate densities throughout the entire Pond, with some areas of sparse densities.

Figure 9: A mix of water chestnut, coontail, and filamentous algae

The pH was 7.2, which is within the standard range for fresh waters and considered neutral. The water temperature was consistent with other similar waterbodies we manage in the area, and the dissolved oxygen was sufficient to support fish and wildlife. The water clarity was also assessed, and deemed as above average, as visibility was to the bottom of the Pond. The Secchi reading was 5ft 1 in.

Additionally, to comply with the pre-treatment requirements within the Order of Conditions, water samples were collected, preserved, and transported to Alpha Labs, where they will be analyzed for all other required parameters.

Waterbody	Depth (ft)	Temperature (℃)	Dissolved Oxygen (mg/l)
Stearns Millpond	Surface	24.78	8.97
	1	23.0	4.3
	2	23.0	3.2
Grist Millpond	Surface	24.67	8.24
	1	23.9	8.42
	2	23.82	8.39
Carding Millpond	Surface	24.2	9.57
	1	24.1	9.53

	2	23.2	7.62
	3	22.2	7.41
	4	22.0	6.04
	5	21.3	5.96

Survey/Initial Water Chestnut Treatment – July 7, 2022

On July 7th, Senior Environmental Scientist, James Lacasse, Co-Owner and Aquatic Biologist, Colin Gosselin, and Field Assistant, Grace Adams, completed a site visit to Grist Millpond, Carding Millpond, and Stearns Millpond (conditions within Stearns Millpond pictured in Figure 12 below). The visit consisted of performing a brief interim survey, collecting basic water quality data, and conducting a treatment at each Pond. Conditions during the visit were warm and sunny.

Figure 10: Water and Wetland's airboat lifted by crane into Grist Millpond

Upon arrival, a brief interim survey of each Pond was conducted using visual observation and a throw-rake, as needed. The Ponds were all surveyed in advance of treatment and conditions were similar to those of the pre-treatment surveys. It was however noted that the invasive curly-leaf pondweed, a colder water invasive species, was dying off naturally, as expected due to the increased water temperatures.

Figure 11: Water chestnut documented within Carding Millpond during the treatment

While on-site, basic water quality was collected using calibrated meters. The pH was between 6.9 and 7.1 for all three Ponds, which is within a standard range for freshwater and is considered neutral. The water temperature was consistent with other similar waterbodies we manage in the area, and the dissolved oxygen was sufficient to support fish and wildlife. Water clarity was also assessed using a Secchi disk. The Secchi reading was generally to the bottom of all three Ponds.

As planned, a treatment was conducted for the control of invasive water chestnut. Clearcast (imazamox), the approved herbicide under the Order of Conditions issued by Sudbury Conservation Commission, and the MA-DEP WM04 permit, was paired with a non-ionic surfactant. The mixture was applied to all water chestnut within the three Ponds via foliar application using low-volume calibrated spray equipment. This methodology, which is approved under the Order of Conditions, 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. Conditions for the treatment were perfect. Grist Millpond was accessed by a crane provided by Astro Crane (see Figure 10 above). This was scheduled several weeks in advance of the treatment. The crane lifted the airboat into the Pond, where it was then used for the treatment. Carding Millpond was also treated by airboat but did not require a crane as there is a suitable launch (treatment at Carding Millpond pictured in Figure 11). While on-site, crew leader, Colin Gosselin, assessed the density and distribution of the water chestnut

growth in Stearns Millpond. At that time, he made the decision to utilize a 12' wide jon boat in this Pond, as it would allow for a more productive and effective treatment. While the airboat is necessary to access the water chestnut in Grist Millpond and Carding Millpond due to the density and cover of the water chestnut, the airboat also has a high-powered fan which can flip the plants over. The density and distribution of the water chestnut in Stearns was accessible by a jon boat which would allow for more precise application. This approach was also utilized during the follow-up treatment. Excellent coverage was achieved within all three waterbodies, and we anticipated great control from this initial treatment.

Figure 12: Moderate to dense pondweeds and filamentous algae within Stearns Millpond

Prior to treatment, the required documents were sent to Sudbury Conservation Commission. Additionally, the shoreline of each Pond was posted with neon orange signs noting the treatment and any affiliated water use restrictions. DEP signs were also placed at each waterbody.

Waterbody	Surface Temp (℃)	Surface Dissolved Oxygen (mg/l)
Stearns Millpond	25.6	8.42
Grist Millpond	25.8	8.10
Carding Millpond	25.9	8.98

Interim Survey/Follow-Up Water Chestnut Treatment – July 21, 2022

On July 21st, Senior Environmental Scientist, James Lacasse and Co-Owner/Aquatic Biologist, Colin Gosselin, completed a site visit to Grist Millpond, Carding Millpond, and Stearns Millpond. The visit consisted of performing a brief interim survey, collecting basic water quality data, and conducting a treatment at each pond. Conditions during the visit were sunny and hot.

Figure 13: Lanes of dead and living water chestnut formed from the previous treatment at Grist Millpond

Upon arrival, brief interim surveys of each Pond were conducted using visual observation and a throw-rake. Strips/lanes of dead/dying water chestnut were noticeably visible in all areas previously treated within all three Ponds (lanes created from the previous treatment documented in Figures 13-16). This is consistent with what we'd hope to see following the initial treatment. As you'll see in the photos, some of the water chestnut had already fallen from the water column, while much of it was brown/dead but had not fallen from the water column yet. The dead chestnut plants eventually dropped from the water column. Prior to this treatment, several live water

Figure 14: Grist Millpond post the initial treatment; Lanes formed throughout the waterbody

chestnut plants were hand-pulled from each Pond to confirm that seeds had not dropped. All the pulled plants contained seeds, meaning we were still well within the treatment window.

While on-site, basic water quality was collected using calibrated meters. Similar to the previous events, the pH was between 6.9 and 7.1 for all three ponds, which is within a standard range for freshwater and is considered neutral. The water temperature was consistent with other similar waterbodies we manage in the area and the water temperatures are generally higher than usual given the recent heat stretch and lack of rain. The dissolved oxygen was sufficient to support fish and wildlife. Water clarity was also assessed using a Secchi disk. The Secchi reading was generally to the bottom of all three Ponds, this was consistent with our previous visit.

Figure 15: Carding Millpond after the initial treatment

As planned, a follow-up treatment was conducted for the control of invasive water chestnut. Identical to the initial treatment, Clearcast (imazamox), was paired with a non-ionic surfactant. The mixture was applied to all live water chestnut plants within the three ponds 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. Conditions for the treatment were perfect. Grist Millpond was accessed by a crane provided by Astro Crane. The crane service arrived around 8:30AM. This was scheduled several weeks in advance of the treatment. The crane lifted the airboat into the Pond, where it was then used for the treatment. Simultaneously while Grist Mill was being treated, a second crew was treating Stearns from a flat bottom jon boat. Stearns is accessible from a jon boat due to the lower density of water chestnut, which was further improved following the initial treatment. This made all areas accessible from this boat. We had planned this approach in advance following the conditions/outcome of the initial treatment. Following demobilization of the airboat from Grist Millpond via crane, the airboat was pressure washed using freshwater (brought from our shop/office) with a portable 40V battery operated pressure washer. The boat was also inspected for invasive species. Once that process had been completed, it was launched using standard methodology (truck and trailer) into Carding Millpond. While the crane was being set up, all Ponds were posted with neon posters noting the treatment and any affiliated water-use restrictions. The Sudbury Conservation Commission was also notified in advance of the treatment.

Figure 16: Areas of water chestnut dropping out of the water column around the island at Carding Millpond

Overall, the weather conditions for both treatments were ideal. The results from the first treatment were desirable (illustrated in Figures 13-16), and the second treatment was performed without issue. Excellent coverage was achieved during both treatments, and we were confident that the desired level of control would be achieved. Continued browning of the water chestnut plants treated during this follow-up

application was anticipated. Following the browning, the plants would begin to fall from the water column.

Waterbody	Surface Temp (°C)	Surface Dissolved Oxygen (mg/l)
Stearns Millpond	27.5	8.82
Grist Millpond	27.8	8.39
Carding Millpond	27.9	8.94

Post-Treatment Surveys/Water Samples Collected – September 18, 2022

On September 8th, Senior Environmental Scientist, James Lacasse, completed a site visit to all three waterbodies – Stearns Millpond, Grist Millpond, and Carding Millpond. The visit consisted of performing a survey in addition to collecting basic water quality data and water samples. Conditions during the visit were sunny and calm.

Figure 17: Great results documented at Stearns Pond from the 2022 treatment program

Upon arrival, surveys were conducted using visual observation paired with a standard throw-rake and handheld GPS/ArcGIS Field Maps, as applicable. The overall health and conditions of Stearns Mill Pond had improved drastically since the first treatment. The Pond looked great as the treatments worked very well (conditions noted in Figure 17). Trace densities of water chestnut were observed along the southeastern shoreline; in our estimation less than 20-25 plants remained in the Pond. Also noted during the survey were waterlilies *(Nymphaeaceae)*, curly-leaf pondweed (invasive), elodea, coontail, duckweed, and watermeal (noted in Figure 18 to the left). Elodea was the densest species documented. Filamentous algae was also noted in trace to sparse densities, both on the surface and on the bottom (pictured in Figure 18). There was a significant amount of open water documented, which was much improved from the pre-treatment conditions. The boat was properly cleaned and inspected prior to launching and upon demobilization.

Figure 18: Trace densities of water chestnut remain, noted mixed throughout the pondweeds and algae

The water temperature was consistent with other similar waterbodies we manage in the area, and the dissolved oxygen was sufficient to support fish and wildlife. Water clarity was also assessed using a Secchi disk. The Secchi reading was 2'3", to the bottom.

Grist Millpond was the second waterbody surveyed during the site visit. Overall, the Pond had greatly improved since the series of treatments (illustrated in Figure 19). The water chestnut population had significantly decreased as great control was achieved. Water chestnuts were still documented, but at trace to moderate densities scattered around the Pond. Water chestnut was primarily documented against the shoreline, with a few small patches scattered throughout the middle of the western half of the Pond. The majority of the eastern half of the Pond was open water. A large percentage of the small areas of remaining water chestnut did not appear healthy looking, as the plants were no longer rooted, discolored in appearance, or covered in epiphytic/filamentous algae. Filamentous algae was primarily found in the western half of the Pond, in proximity of dead water chestnut and dense watermeal/duckweed (see Figures 20 and 21). This was typically found on the surface, although benthic filamentous algae was noted throughout the Pond (see Figure 20), but primarily contained within the western point of the Pond. Other native species noted include Elodea, coontail, duckweed, watermeal, and ribbon-leaf pondweed *(Potamogeton epihydrus)*. Duckweed and watermeal were the most prevalent and dominant species documented throughout the Pond. Duckweed and watermeal were observed as very dense throughout the western 2/3's of the Pond (pictured in Figure 21). In the eastern half, it was more scattered at trace to sparse densities. The densest areas of duckweed and watermeal in the eastern half of the Pond were areas where water chestnut was also located. Cattails *(Typha sp.)* were noted scattered around the perimeter of the Pond in sparse to dense densities. Also documented throughout the survey were floating fragments of water chestnut plants and water chestnut seeds. The gate was shut and tied closed with the rope while leaving the site.

Figure 19: Overlooking Grist Millpond post-treatment

Figure 20: Floating water chestnut fragments, watermeal, and duckweed pictured on the surface of Grist Millpond

Figure 21: Dense duckweed and watermeal at Grist Millpond

The water temperature was consistent with other similar waterbodies we manage in the area, and the dissolved oxygen was sufficient to support fish and wildlife. Water clarity was also assessed using a Secchi disk. The Secchi reading was 5'10" (to the bottom), which illustrated excellent water clarity.

Figure 22: Dense coontail and algae noted at Carding Millpond

Carding Millpond was the final waterbody that was surveyed. The water chestnut had significantly decreased in densities since the series of treatments performed over the summer. Water chestnut was documented scattered throughout Carding Millpond in trace to moderate densities (pictured in Figure 23). The densest (problematic) areas included around the island and along the western and eastern shorelines (see Figure 23). These areas contained sparse to moderate, occasionally continuous, patches of water chestnut. Water chestnut

Figure 23: Scattered water chestnut mixed throughout the duckweed, watermeal, coontail and algae at Carding Millpond

was noted as more scattered trace to sparse densities within the middle areas of the Pond. This is where individual plants to very small, isolated patches were located. The southern coves significantly improved from the previous pre-treatment conditions. Water chestnut fragments and seeds were documented floating on the surface throughout the Pond. There were a few areas of open water, including portions of the northwestern corner, middle/eastern-middle of the Pond, and within the southwestern coves. Other species notes included waterlilies, coontail, elodea, watermeal, duckweed, thin-leaf pondweed, and cattails (mix of mentioned species in Figures 22 and 23). The most prominent species throughout the Pond included watermeal, duckweed, and coontail as these species were documented at moderate to dense (see Figures 22 and 23). The coontail made traveling throughout the Pond very difficult as it was surfacing throughout the majority of the Pond. Elodea, waterlilies, and thin-leaf pondweed were documented at trace densities. The southwestern coves were extremely shallow. Filamentous algae and epiphytic algae were noted, with filamentous algae being the primary algae documented (noted in both Figures 22 and 23). Filamentous algae was observed scattered on the surface mixed throughout the vegetation. It was primarily found on the surface, but occasionally documented on the bottom. Epiphytic algae was noted on a small percentage of the vegetation, which indicates that the plant is dying/decaying. The gate was closed and locked while leaving the site.

The water temperature was consistent with other similar waterbodies we manage in the area, and the dissolved oxygen was sufficient to support fish and wildlife. Water clarity was also assessed using a Secchi disk. The Secchi reading was 4’2” (to the bottom), which illustrates great water clarity.

In order to fulfill the order of conditions, additional water samples were collected, preserved, and immediately transported to the lab for analysis.

Waterbody	Depth (ft)	Temperature (°C)	Dissolved Oxygen (mg/l)
Stearns Millpond	Surface	20.1	8.2
	1	20.0	8.0
	2	20.0	6.0
	3	19.8	5.4
Grist Millpond	Surface	19.5	8.76
	1	19.3	8.72
	2	19.2	8.12
	3	19.0	7.64
	4	18.9	7.43
Carding Millpond	Surface	22.5	9.83
	1	22.3	9.41

	2	22.2	8.32
	3	22.0	7.54
	4	21.4	6.92

Water Quality

As required by the special orders (within the order of conditions), during the June 14th and September 8th survey events, water samples (see Figure 24 to the right) were collected to analyze specific water quality within Grist Millpond, Stearns Millpond, and Carding Millpond. Samples were collected from the middle of the Ponds, preserved, and immediately taken to a State certified laboratory where they were analyzed for the specific contracted parameters. As noted above, the samples were analyzed for turbidity, true color, apparent color, total alkalinity, ammonia nitrogen, nitrate nitrogen, total kjeldahl nitrogen, total phosphorus, soluble phosphorus, and E. coli. All samples collected were "surface grabs." Dissolved oxygen, pH, and temperature were measured using a calibrated meter during each site visit.

Figure 24: Water and Wetland collecting water quality

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 and analysis are included in the tables below.

Water Quality Parameter	Results					
	6/14/2022			9/8/2022		
	Grist Millpond	Stearns Millpond	Carding Millpond	Grist Millpond	Stearns Millpond	Carding Millpond
Turbidity (NTU)	3.6	3.1	1.2	0.91	2.2	2.0
True Color (A.P.C.U)	34	41	27	23	25	17
Apparent Color (A.P.C.U)	42	54	33	26	34	26
Total Alkalinity (mg $CaCO_3$/L)	74.9	62.0	73.4	77.8	92.1	108.0
pH (SU)	7.3	7.0	7.2	7.5	7.6	7.6
Ammonia Nitrogen (mg/l)	0.372	ND*	ND*	0.597	ND*	0.299
Nitrogen, Nitrate (mg/l)	1.89	0.183	ND*	6.58	0.590	1.52
Total Kjeldahl Nitrogen (mg/l)	0.264	0.866	0.646	1.21	1.06	1.34
Total Phosphorus (mg/l)	0.093	0.068	0.022	0.065	0.094	0.086
Soluble Phosphorus (mg/l)	0.037	0.034	0.013	0.052	0.038	0.042
E. Coli (col/100ml)	2.0	15.0	2.0	48.0	84.0	30.0

*ND – "Non-detectable"

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Water Quality Parameter Table
Turbidity: Turbidity is either planktonic organisms or suspended solid particulates (algae, clay, silt, dead organic matter) in the water column that interfere with the penetration of light. The more suspended material throughout the water column, the higher the turbidity. *<10 NTU drinking water standards; 10-50 NTU is considered moderate; >50 NTU potentially impactful to aquatic life. All turbidity readings within the three ponds during both samplings were within a desirable range.*
True Color: The color of the water sample after filtering all suspended material. This measurement represents the color of the filtered water due to dissolved components. **Apparent Color:** the color of the entire water sample, which consists of color caused by both dissolved and suspended particles/components. This value can be highly variable based on weather conditions. Typically, values may increase in the case of storm events and may decrease in the event of drought. *0-25 is clear, 25-40 is light tea-color, 40-80 is tea color, >80 is dark tea color. Results for both samplings generally showed a light tea color with the Stearns Pond June sample leaning towards a light tea/tea color.*
Total Alkalinity: Measure of the buffering capacity of water, primarily consisting of carbonate, bicarbonate, and hydroxide in typical freshwater. Waters with lower levels are more susceptible to pH shifts *>20 mg/l is considered healthy; >~50 mg/l illustrates the water is resistant to change. All three Hop Brook Ponds returned results of greater than 50.0 mg/l during both samplings. This is considered healthy and illustrates that the waterbodies are less susceptible to pH shifts.*
pH: the measure of how acidic or basic the water is *<6 notably acidic; 6-9 standard for freshwaters (7 is neutral); >9 notably basic. pH was monitored throughout the season, including additional samplings during treatment events. The pH was consistently within a standard range for freshwater within all three waterbodies and was generally neutral.*
Nitrogen, Ammonia: Ammonia and organic nitrogen can enter water through sewage effluent and runoff from land where manure has been applied or stored. Ammonia in water is non-toxic to humans, but it is toxic to aquatic life. Unlike other forms of nitrogen, which can indirectly harm aquatic ecosystems by increasing nutrient levels and promoting algae growth in the process known as eutrophication, ammonia has direct toxic effects on aquatic ecosystems. High levels of ammonia in lakes and streams can promote the growth of algae, which in turn can choke out the growth of other aquatic plants. Bacteria can also convert ammonia in water to nitrate in a process known as nitrification. Nitrification is a beneficial process if it takes place in the soil — plants can use the

produced nitrates as food. However, nitrification tends to lower the dissolved oxygen levels in water, making it harder for fish and other aquatic life to breathe.

>0.0 mg/l could be potentially dangerous; >1 mg/l could cause a fish kill. Ammonia nitrogen was detectable in Grist Millpond and Carding Millpond but was well below the 1 mg/l threshold.

Nitrogen, Nitrate: Nitrate nitrogen is important to the growth of algae. Nitrate is oxidized nitrogen and is often readily free for algae uptake.

<1 mg/l typical for freshwater; 1-10 mg/l is potentially harmful; >10 mg/l possibly toxic. Generally, <0.30 mg/l is ideal, and a maximum of 10 mg/l is the EPA standard for drinking water. Nitrate was elevated in Grist Millpond, as well as the Carding Millpond September sample. Despite this, levels were well below the EPA standard of 10 mg/l.

Total Kjeldahl Nitrogen (TKN): Total Kjeldahl Nitrogen (TKN) is the organic and ammonia forms of nitrogen. Nitrogen is essential for living organisms to live in a pond.

Generally, concentrations below 1.0 mg/l are considered desirable. The September sampling results for all three ponds are slightly above this threshold, although not surprising as they are largely driven by biological growth and decomposition.

Total Phosphorus: Total phosphorous is a nutrient that is essential for plants and algae to grow. Typically, a value of .03 mg/l, or 30 parts per billion, is sufficient enough to stimulate excessive plant and algae growth. This sample measures all forms of phosphorus in the water column.

<12 ppb is considered nutrient deficient or oligotrophic; 12-24 ppb is considered a moderate amount of nutrients, or mesotrophic; 25-96 ppb is nutrient rich, or eutrophic; >96 ppb is considered excessive nutrients, or hypereutrophic. The June results for both Stearns and Grist Millponds are considered nutrient rich, or eutrophic. Carding Millpond's June results were much more desirable at 22ppb. Grist Millpond showed a reduction in total phosphorus during the September sampling, however both Carding Millpond and Stearns Millpond showed increased total phosphorus. The September sampling showed all three ponds to be nutrient rich or eutrophic.

Soluble Phosphorus: Soluble phosphorous is the measure of filterable soluble and inorganic phosphorus. This form of phosphorus is directly taken up by plant cells.

Soluble phosphorus is considered elevated during all sampling events in all three ponds.

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 and generally, the EPA has set criteria of <126 colonies/100 ml for recreationally used waterbodies. All results were well below both thresholds.

Dissolved Oxygen: amount of diatomic oxygen dissolved in the water. Dissolved oxygen can be affected by many outside factors, such as: temperature, time of day, and pollution. Fish and other aquatic organisms typically require a minimum of four to five milligrams per liter (mg/l) of oxygen.

< 2 mg/l likely toxic with sufficient exposure duration; <5 mg/l stressful to many aquatic organisms; >5 mg/l able to support most fish and invertebrates. Dissolved oxygen was measured throughout the season and was consistently sufficient in all ponds throughout much of the water column.

WATER & WETLAND
LAKE, POND & WETLAND MANAGEMENT

Algae Sampling

During the June 14th and September 8th sampling event, an algae sample from each Pond was collected, and transported to the lab, where they were identified for algae species and enumeration. This parameter is not required within the Order of Conditions, but we felt it necessary in our first year of management and did not charge an extra cost to test for this. For these samplings, we used two different labs. The June sample was sent to Northeast Aquatic Research (NEAR) in Connecticut, and the September sample was analyzed by SePro Labs in North Carolina. We made this switch as NEAR could not keep up with algae sampling demand and their turnaround times were increasing rapidly. Each lab submits results in a different format, so you'll see that the results for each sampling are presented differently below.

Waterbody	Date	Identification	Classification	Density/Biomass (Cells/ml)
Grist Millpond	6/14/22	Cyanobacteria	Aphanocapsa	510
		Cyanobacteria	Chlamydomonas	146
		Greens	Pediastrum	656
		Greens	Zygnema	1,093
		Diatoms	Fragilaria	13,557
		Diatoms	Nitzschia	15
Stearns Millpond	6/14/22	Cyanobacteria	Chlamydomonas	1,749
		Greens	Pediastrum	875
		Chrysophytes	Chrysochromulina	583
		Euglenophytes	Phacus	29
Carding Millpond	6/14/22	Cyanobacteria	Planktothrix	6,341
		Cyanobacteria	Chlamydomonas	1,312

September 8th, 2022

Algae ID Results
Grist Mill Pond

Identification	Classification	Description	Density/Biomass (cells/mL)
***Phacus* sp.**	Euglenophyta- Euglenoids	Single-celled, flagellated, planktonic	< 40
***Tetraselmis* sp.**	Chlorophyta- Green algae	Single-celled, flagellated, planktonic	< 40
***Stephanodiscus* sp.**	Bacillariophyta- Diatoms	Single-celled, planktonic	< 40
***Scenedesmus* sp.**	Chlorophyta- Green algae	Colonial, planktonic	< 40

Algae ID Results
Stearns Mill Pond

Identification	Classification	Description	Density/Biomass (cells/mL)
***Trachelomonas* sp.**	Euglenophyta-Euglenoids	Single-celled, flagellated, planktonic	410

Other algae observed at densities less than 40 cells/mL: *Achnanthes, Cyclotella, Synedra* (Bacillariophyta); *Golenkinia* (Chlorophyta); *Dolichospermum* (Cyanophyta); *Euglena* (Euglenophyta); *Cryptomonas* (Cryptophyta); *Mallomonas* (Synurophyceae)

Algae ID Results
Carding Mill Pond

Identification	Classification	Description	Density/Biomass (cells/mL)
***Cryptomonas* sp.**	Cryptophyta-Crypomonads	Single-celled, flagellated, planktonic	850

Other algae observed at densities less than 40 cells/mL: *Cyclotella, Stephanodiscus* (Bacillariophyta); *Planktolyngbya* (Cyanophyta); *Euglena, Trachelomonas* (Euglenophyta)

Blue-green algae / cyanobacteria occur in aquatic ecosystems and have the ability to produce toxins. These toxins can pose a risk to human and animal health. The Massachusetts Department of Public Health (MA DPH) recommends an advisory when cell counts exceed 70,000 per ml of water. Dense blooms and scum can contain millions of cells/ml and toxin levels in the parts per million. They can form near embankments and in areas suitable for swimming and other forms of recreation. They can also move around in the water body and grow quickly, making management of them difficult. We are happy to report that both sampling events showed non-concerning cyanobacteria counts (<20,000 cells/ml). The June sampling did show cyanobacteria counts in the thousands, particularly notable in Carding Millpond where cell counts reached roughly 7,500 cells of blue greens/ml. The September sample was even more favorable with any cyanobacteria counts being less than 40 cells/ml.

Summary / Future Recommendations

Figure 25: Treating Grist Millpond with the airboat

2022 marked the first year in which Water & Wetland, LLC took over water chestnut management at the Hop Brook Ponds. We strived to provide excellent communication and follow through. We also strived to provide results. While some adjustments can be made to gain even better control in 2023, the 2022 program at Hop Brook Ponds was extremely successful. While good water chestnut control was achieved in all three ponds, some were more successful than others. The best control was achieved in Stearns Millpond where the post-treatment survey revealed a small number of plants, (estimated at <25 total). Really good control was achieved at Grist Millpond where some water

chestnut remained (see post-treatment map), but typically at very sparse densities and much of the water chestnut was extremely unhealthy and likely did not produce seeds. Good control was achieved at Carding Millpond, however we can make some adjustments to further improve upon control in both this pond and Grist Millpond in 2023. Grist Millpond and Carding Millpond are also dominated by duckweed and watermeal, among other species. Much of the remaining water chestnut in these ponds was mixed in at a low density with watermeal and duckweed. It's possible that these non-target species limited some of the herbicide sticking to the water chestnut. The post-treatment maps note locations where water chestnut was found post-management, which was greatly reduced in all ponds. These maps do not necessarily indicate cover, as many areas contained only a small number of plants. Please refer to post-treatment survey notes above.

Figure 26: Stearns Millpond post-treatment; The treatments proved very effective

Based on the above narrative, we recommend continuing with a similar approach to water chestnut management in 2023. From an application perspective we may start slightly earlier in the season in 2023 which will help us gain even better coverage as dense water chestnut virtually grows on top of itself, leaving some plants less susceptible to herbicide cover. This additional time will also allow us to add a potential small third treatment in Carding Millpond and/or Grist Millpond. If access allows us to eliminate the need for a crane, we will have additional flexibility as we will need not rely on the crane company's schedule and lead times. We will keep both Hop Brook Protection Association and Sudbury Conservation Commission up to date throughout the season, as we did in 2022. This will allow us to adjust as needed, including starting slightly earlier and adding a possible third Clearcast application. In conclusion, the water chestnut treatment program works extremely well as designed, and slight adjustments to timing and the number of applications can make the program even more efficient and effective.

Figure 27: Curly-leaf Pondweed

Aside from the water chestnut, some thought should be put towards management of other nuisance and/or invasive species. Especially for Grist Millpond and Carding Millpond, many areas where water chestnut was controlled were replaced by dense watermeal and duckweed covering the surface. Although watermeal and duckweed are both native species, their dense cover also has the ability to limit oxygen exchange and biodiversity. Additionally, these ponds specifically have additional dense species including coontail and/or elodea. Lastly, curly-leaf pondweed (invasive) was documented in all three waterbodies. Luckily, milfoil was not documented in any of the three ponds. In an effort to create open-water habitat in the ponds, some consideration should be given to treatment with Sonar (fluridone), particularly at Carding Millpond and Grist Millpond. Sonar is an aquatic herbicide that was initially registered with the Environmental Protection Agency (EPA) in 1986 and has been used throughout Massachusetts and the United States for decades. The herbicide inhibits the photosynthesis process by stopping plants from making a protective pigment that keeps chlorophyll from breaking down in the sunlight. Fluridone moves quickly throughout a waterbody and is therefore usually applied as a whole lake/basin treatment, as would be recommended for Grist Millpond and Carding Millpond. Sonar is also one of the few herbicides approved for use in drinking water, which speaks volumes to the safety of the

product. This approach requires maintenance of approximately 10-20 parts per billion of fluridone for a period of 45-60+ days, so an initial treatment and at least follow-up application would be recommended. We recommend this approach in an effort to create more open-water habitat in the ponds, specifically Grist Millpond and Carding Millpond.

We bring up Sonar as a recommendation, but not necessarily an immediate recommendation. In many cases, water chestnut becomes the first priority as is the case with Hop Brook Ponds. Once the water chestnut has been controlled to a level where minimal management is needed, such as a small amount of hand-pulling, the project could shift towards management of other species. When that time comes, Sonar is the preferred option for Hop Brook Ponds as it provides rate specific selectivity. Meaning we can control some species while growth regulating others. This approach allows for a more balanced eco-system of native plants at healthy densities.

We hope that this year-end report has provided Hop Brook Protection Association and Sudbury Conservation Commission with valuable information regarding the details of the work performed at Hop Brook Ponds during the 2022 season. We hope that you were impressed by the level of communication, follow through, and expertise provided by Water & Wetland this season. We look forward to working closely with you to further the health of the Hop Brook Ponds for many years to come.

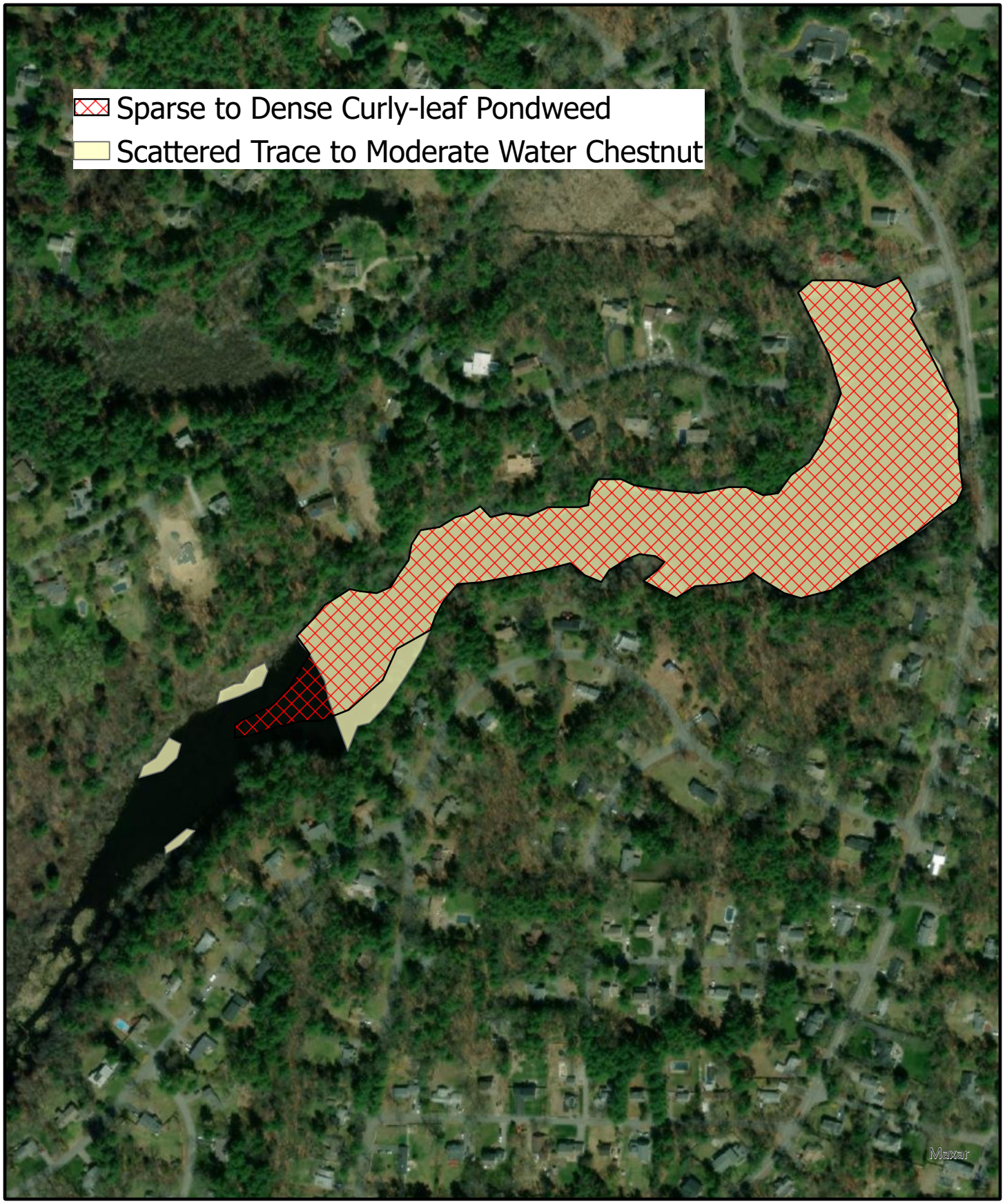
Sincerely,

James Lacasse
Project Manager
Senior Environmental Scientist
c: 774-276-6098
o: 888-4WETLAN(D)
james@waterandwetland.com
www.waterandwetland.com

Attachments Include

- **Pre-Treatment Invasive Species Maps**
- **Post-Treatment Invasive Species Maps**
- **2022 MA-DEP WM04 Approvals**

CC: Sudbury Conservation Commission



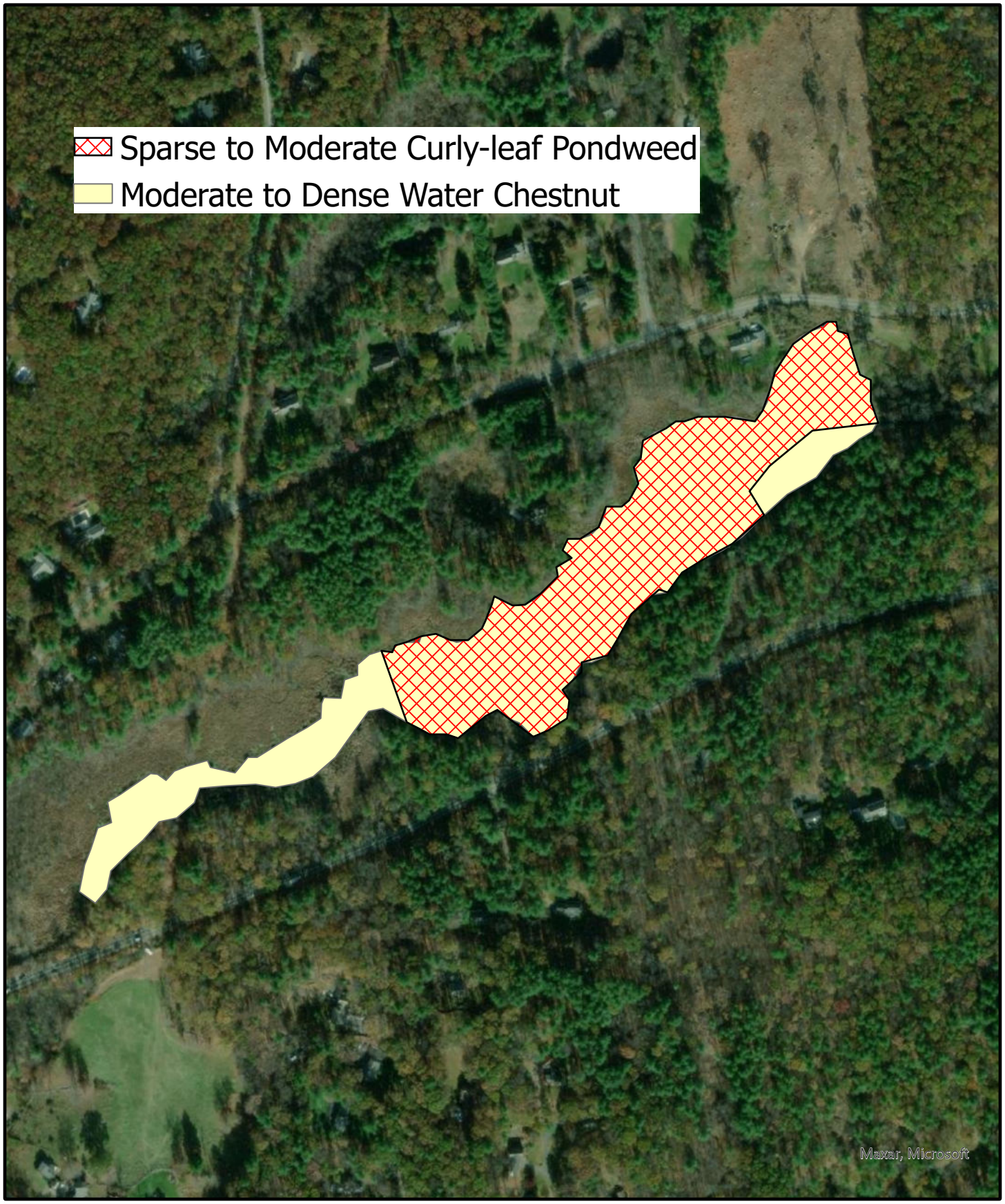
WATER & WETLAND
LAKE, POND & WETLAND MANAGEMENT

Stearns Mill Pond
Invasive Species Distribution
Sudbury, MA

Survey Date
6/14/2022

Map Date
6/14/2022

N



WATER & WETLAND
LAKE, POND & WETLAND MANAGEMENT

Grist Mill Pond
Invasive Species Distribution
Sudbury, MA

Survey Date
6/14/2022

Map Date
6/14/2022

N

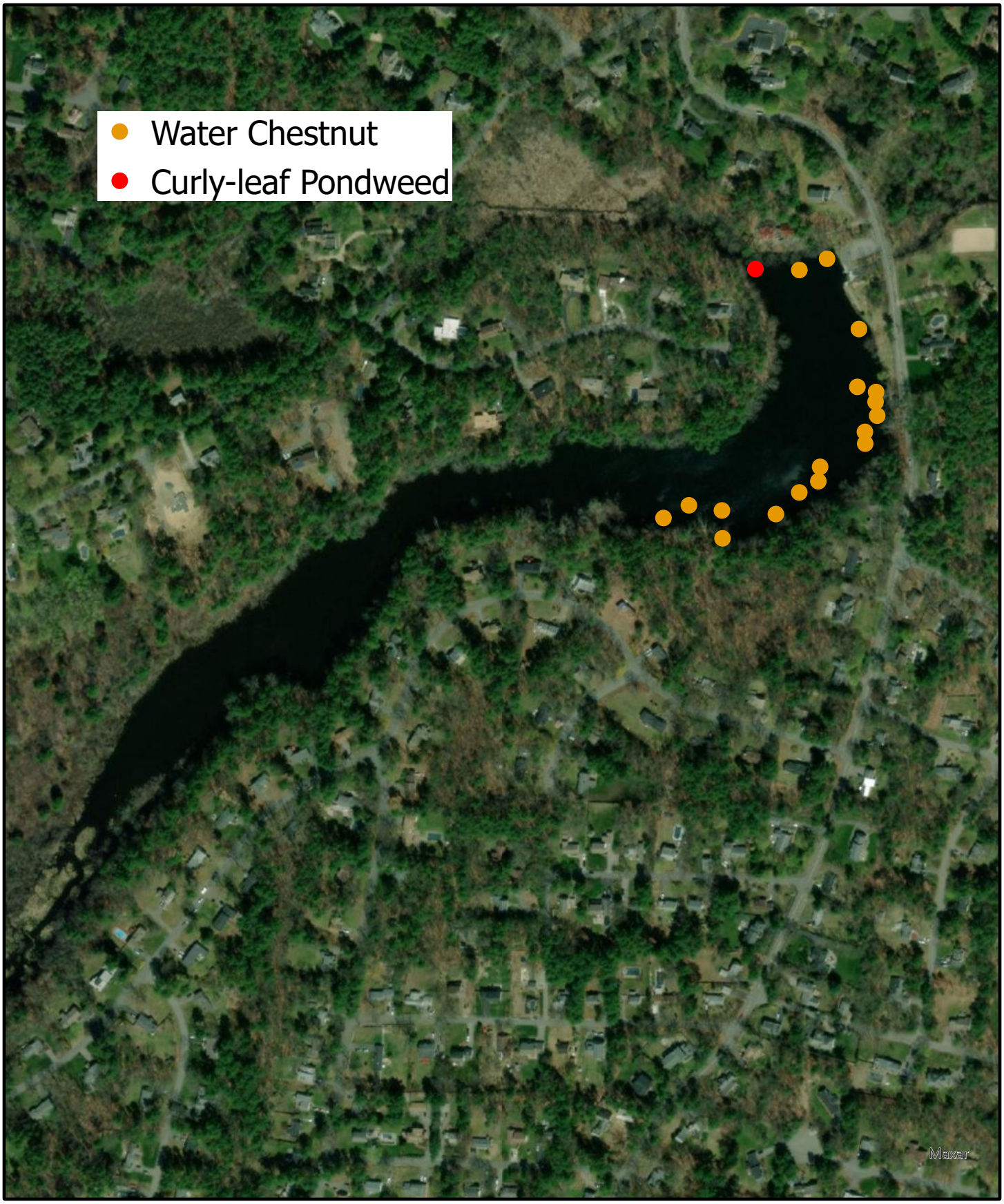
WATER & WETLAND
LAKE, POND & WETLAND MANAGEMENT

Carding Mill Pond
Invasive Species Distribution
Sudbury, MA

Survey Date
6/14/2022

Map Date
6/14/2022

N



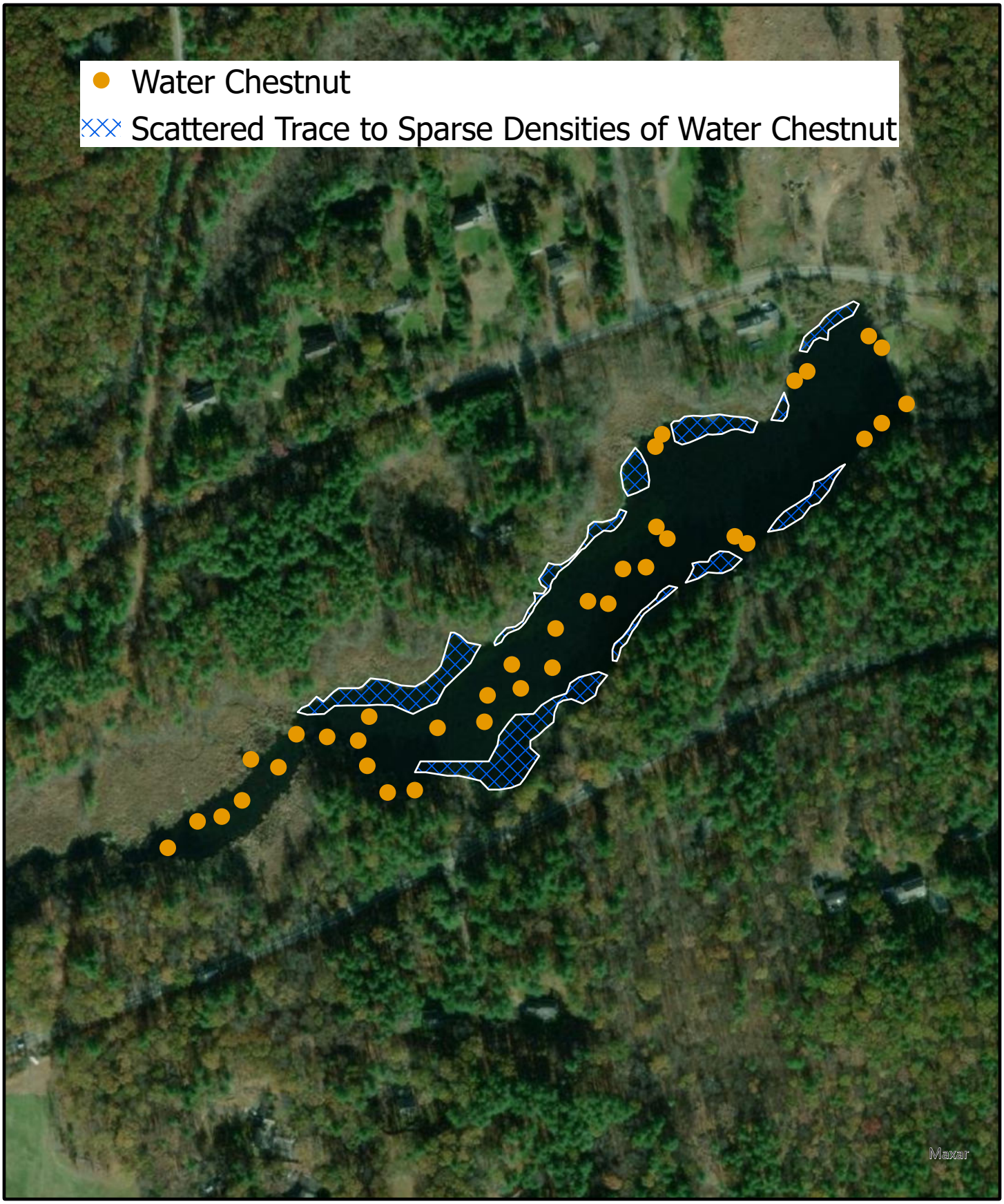
WATER & WETLAND
LAKE, POND & WETLAND MANAGEMENT

Stearns Millpond
Post-Treatment Survey
Sudbury, MA

Survey Date
9/8/2022

Map Date
9/11/2022

N



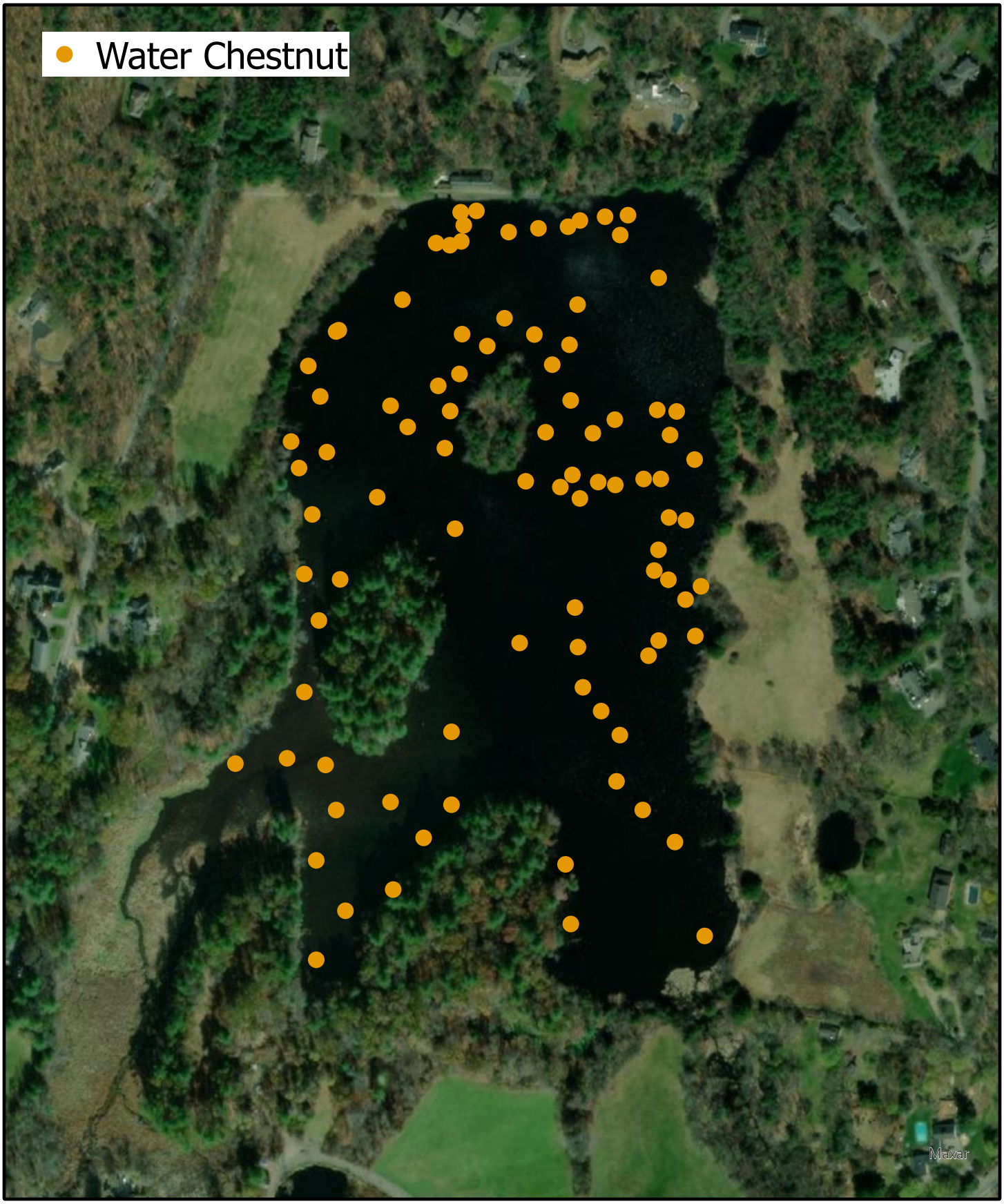
WATER & WETLAND
LAKE, POND & WETLAND MANAGEMENT

Grist Millpond
Post-Treatment Invasive Species Map
Sudbury, MA

Survey Date
9/8/2022

Map Date
9/9/2022

N



WATER & WETLAND
LAKE, POND & WETLAND MANAGEMENT

Carding Millpond
Post-Treatment Invasive Species Map
Sudbury, MA

Survey Date
9/8/2022

Map Date
9/9/2022

N

Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs

Department of Environmental Protection
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License No.: **WM04-0000704**

LICENSE TO APPLY CHEMICALS FOR CONTROL OF NUISANCE AQUATIC VEGETATION

Applicant: COLIN J GOSSELIN
Name of Waterbody: STEARNS MILL POND
Location of Waterbody: SUDBURY
Project Proponent: HOP BROOK PROTECTION ASSOCIATION

AUTHORITY FOR ISSUANCE

Pursuant to the authority granted to the Department of Environmental Protection, by Massachusetts G.L.c. 111, s5E, the following license is hereby issued to **COLIN GOSSELIN, Water and Wetland** (hereinafter called the "licensee"), authorizing the application of chemicals for the control of nutrients, algae or aquatic plants to **STEARNS MILL POND, SUDBURY**; such authorization being expressly conditional on compliance by the licensee with all terms and conditions of the license hereinafter set forth. This license shall become effective on the date of the Director's signature and shall expire on the **12/31/2022**.

Sincerely,

License Effective Date: **02/07/2022**

Stephanie Moura
Director, Division of Wetlands and Waterways
Department of Environmental Protection

License No.: **WM04-0000704**

A. Application Condition(s)

Chemical Information

Product Brand Name/Trade Name	Chemical Form (dry/liquid)	Total Weight/Volume Applied	Units of Measurement (lbs/gallons)	Acres Treated	Application Rate	Planned Maximum Concentration (ppm)
Clearcast	liquid	67.5	gal	67.5	1 gal/acre	

Treatment Method: The treatment program will consist of three treatments separated by 2-4 weeks. The initial treatment will be performed using an airboat to apply the product via foliar application in order for the product to fall onto the plant. The remainder of the treatments will consist of using an air boat or large jon boat, again using a foliar application method. We anticipate a significant decrease in water chestnut after each treatment, but permitted for three whole pond treatments in the event that a treatment is not effective.

B. Application Report

By December 31st of the year of this treatment, the licensee shall submit a written report to the Department certifying the treatment date, application rate and the total weight/volume for each chemical used in the treatment, in accordance with requirements of Section I.A. of this license.
Please send the report to the Massachusetts Department of Environmental Protection (David.W.Wong@mass.gov).

C. Modification of Application Conditions

The licensee shall not apply chemicals in a manner contrary to, or inconsistent with, the application conditions set forth in Section I.A. of this license without the prior written approval of the Department.

General Conditions

A. The licensee is hereby notified that chemical treatments to control aquatic nuisances in public or private lakes and ponds of the Commonwealth involve the alteration of wetland resource areas protected under both Massachusetts G.L.c. 131, s40, the Wetlands Protection Act and 310 CMR 10.00, Massachusetts Wetlands Protection Regulations.

B. The licensee is hereby notified that issuance of this license does not in any way constitute the Department's approval of the chemical treatment as it related to the provisions of the Wetlands Protection Act.

C. The licensee shall obtain either a final Order of Conditions or a negative Determination of Applicability from the **SUDBURY** Conservation Commission(s) prior to application of chemicals authorized under this license.

D. Shoreline areas of the lake or pond must be posted with signs warning the general public of any water use restrictions

stated on the chemical label minimum for one week. This is especially important at bathing beaches and other areas of common access. These signs shall clearly state that the chemical treatment is being conducted pursuant to a license issued by the Department of Environmental Protection, "DEP". A new sign shall be posted for each treatment event.

E. The Department may require the licensee to cease application of chemicals to a body of water at any time following the issuance of a license if the Department determines that the chemical treatment will be ineffective, or will result in unreasonable restrictions on current water uses, or will produce unnecessary adverse side effects on nontarget flora or fauna.

F. Chemical applications shall be performed in accordance with the manufacturer's label directions, existing pesticide use laws, and any conditions imposed by other local or state agencies.

G. Chemical treatments to water using general use pesticides shall only be performed by an applicator currently licensed by the Massachusetts Department of Agricultural Resources Pesticide Program in the aquatics category. Chemical treatments to Bordering Vegetated Wetlands (310 CMR 10.55(2)(a)) and Salt Marsh (310 CMR 10.32(2)) using general use pesticides and techniques that insure chemicals are not applied to water shall only be performed by an applicator currently licensed in Massachusetts Department of Agricultural Resources Pesticide Program. Chemical treatments using restricted use pesticides shall only be performed by an applicator currently certified by the Massachusetts Department of Agricultural Resources Pesticide Program.

H. Issuance of this license does not release the licensee from liability resulting from the use of chemicals or from negligent or reckless application of chemicals specified in Section I.A of this license.

I. Electronic notification of treatment must be made to the Massachusetts Division of Fisheries and Wildlife (jason.stolarski@mass.gov, jason.carmignani@mass.gov). Notification that the treatment was performed shall be made within 24 hours of treatment. The notification message should include waterbody, town, license number and chemicals used.

J. No chemical treatment shall be conducted while a Massachusetts Department of Public Health advisory is in effect.

K. In general, less than 1/3 of the lake area and less than ½ of the littoral zone should be targeted for herbicide treatment when native plants (particularly low growth forms) are dominant.

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Department of Environmental Protection
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Martin Suuberg
Commissioner

License No.: **WM04-0000706**

LICENSE TO APPLY CHEMICALS FOR CONTROL OF NUISANCE AQUATIC VEGETATION

Applicant: COLIN J GOSSELIN
Name of Waterbody: CARDING MILL POND
Location of Waterbody: SUDBURY
Project Proponent: HOP BROOK PROTECTION ASSOCIATION

AUTHORITY FOR ISSUANCE

Pursuant to the authority granted to the Department of Environmental Protection, by Massachusetts G.L.c. 111, s5E, the following license is hereby issued to **COLIN GOSSELIN, Water and Wetland** (hereinafter called the "licensee"), authorizing the application of chemicals for the control of nutrients, algae or aquatic plants to **CARDING MILL POND, SUDBURY**; such authorization being expressly conditional on compliance by the licensee with all terms and conditions of the license hereinafter set forth. This license shall become effective on the date of the Director's signature and shall expire on the **12/31/2022**.

Sincerely,

License Effective Date: **02/07/2022**

Stephanie Moura
Director, Division of Wetlands and Waterways
Department of Environmental Protection

License No.: **WM04-0000706**

A. Application Condition(s)

Chemical Information

Product Brand Name/Trade Name	Chemical Form (dry/liquid)	Total Weight/Volume Applied	Units of Measurement (lbs/gallons)	Acres Treated	Application Rate	Planned Maximum Concentration (ppm)
Clearcast	liquid	117	gal	117 acres	1 gal/acre	

Treatment Method: The treatment program will consist of three treatments separated by 2-4 weeks. The initial treatment will be performed using an airboat to apply the product via foliar application in order for the product to fall onto the plant. The remainder of the treatments will consist of using an air boat or large jon boat, again using a foliar application method. We anticipate a significant decrease in water chestnut after each treatment, but permitted for three whole pond treatments in the event that a treatment is not effective.

B. Application Report

By December 31st of the year of this treatment, the licensee shall submit a written report to the Department certifying the treatment date, application rate and the total weight/volume for each chemical used in the treatment, in accordance with requirements of Section I.A. of this license.
Please send the report to the Massachusetts Department of Environmental Protection (David.W.Wong@mass.gov).

C. Modification of Application Conditions

The licensee shall not apply chemicals in a manner contrary to, or inconsistent with, the application conditions set forth in Section I.A. of this license without the prior written approval of the Department.

General Conditions

A. The licensee is hereby notified that chemical treatments to control aquatic nuisances in public or private lakes and ponds of the Commonwealth involve the alteration of wetland resource areas protected under both Massachusetts G.L.c. 131, s40, the Wetlands Protection Act and 310 CMR 10.00, Massachusetts Wetlands Protection Regulations.

B. The licensee is hereby notified that issuance of this license does not in any way constitute the Department's approval of the chemical treatment as it related to the provisions of the Wetlands Protection Act.

C. The licensee shall obtain either a final Order of Conditions or a negative Determination of Applicability from the **SUDBURY** Conservation Commission(s) prior to application of chemicals authorized under this license.

D. Shoreline areas of the lake or pond must be posted with signs warning the general public of any water use restrictions

stated on the chemical label minimum for one week. This is especially important at bathing beaches and other areas of common access. These signs shall clearly state that the chemical treatment is being conducted pursuant to a license issued by the Department of Environmental Protection, "DEP". A new sign shall be posted for each treatment event.

E. The Department may require the licensee to cease application of chemicals to a body of water at any time following the issuance of a license if the Department determines that the chemical treatment will be ineffective, or will result in unreasonable restrictions on current water uses, or will produce unnecessary adverse side effects on nontarget flora or fauna.

F. Chemical applications shall be performed in accordance with the manufacturer's label directions, existing pesticide use laws, and any conditions imposed by other local or state agencies.

G. Chemical treatments to water using general use pesticides shall only be performed by an applicator currently licensed by the Massachusetts Department of Agricultural Resources Pesticide Program in the aquatics category. Chemical treatments to Bordering Vegetated Wetlands (310 CMR 10.55(2)(a)) and Salt Marsh (310 CMR 10.32(2)) using general use pesticides and techniques that insure chemicals are not applied to water shall only be performed by an applicator currently licensed in Massachusetts Department of Agricultural Resources Pesticide Program. Chemical treatments using restricted use pesticides shall only be performed by an applicator currently certified by the Massachusetts Department of Agricultural Resources Pesticide Program.

H. Issuance of this license does not release the licensee from liability resulting from the use of chemicals or from negligent or reckless application of chemicals specified in Section I.A of this license.

I. Electronic notification of treatment must be made to the Massachusetts Division of Fisheries and Wildlife (jason.stolarski@mass.gov, jason.carmignani@mass.gov). Notification that the treatment was performed shall be made within 24 hours of treatment. The notification message should include waterbody, town, license number and chemicals used.

J. No chemical treatment shall be conducted while a Massachusetts Department of Public Health advisory is in effect.

K. In general, less than 1/3 of the lake area and less than ½ of the littoral zone should be targeted for herbicide treatment when native plants (particularly low growth forms) are dominant.

Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs

Department of Environmental Protection
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Secretary

Martin Suuberg
Commissioner

License No.: **WM04-0000705**

LICENSE TO APPLY CHEMICALS FOR CONTROL OF NUISANCE AQUATIC VEGETATION

Applicant: COLIN J GOSSELIN
Name of Waterbody: GRIST MILL POND
Location of Waterbody: SUDBURY
Project Proponent: HOP BROOK PROTECTION ASSOCIATION

AUTHORITY FOR ISSUANCE

Pursuant to the authority granted to the Department of Environmental Protection, by Massachusetts G.L.c. 111, s5E, the following license is hereby issued to **COLIN GOSSELIN, Water and Wetland** (hereinafter called the "licensee"), authorizing the application of chemicals for the control of nutrients, algae or aquatic plants to **GRIST MILL POND, SUDBURY**; such authorization being expressly conditional on compliance by the licensee with all terms and conditions of the license hereinafter set forth. This license shall become effective on the date of the Director's signature and shall expire on the **12/31/2022**.

Sincerely,

License Effective Date: **02/07/2022**

Stephanie Moura
Director, Division of Wetlands and Waterways
Department of Environmental Protection

License No.: **WM04-0000705**

A. Application Condition(s)

Chemical Information

Product Brand Name/Trade Name	Chemical Form (dry/liquid)	Total Weight/Volume Applied	Units of Measurement (lbs/gallons)	Acres Treated	Application Rate	Planned Maximum Concentration (ppm)
Clearcast	liquid	47.37	gal	47.37	1 gal/acre	

Treatment Method: The treatment program will consist of three treatments separated by 2-4 weeks. The initial treatment will be performed using an airboat to apply the product via foliar application in order for the product to fall onto the plant at the water's surface (July). The remainder of the treatments will consist of using an air boat or large jon boat, using a foliar application method.

B. Application Report

By December 31st of the year of this treatment, the licensee shall submit a written report to the Department certifying the treatment date, application rate and the total weight/volume for each chemical used in the treatment, in accordance with requirements of Section I.A. of this license.
Please send the report to the Massachusetts Department of Environmental Protection (David.W.Wong@mass.gov).

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B. The licensee is hereby notified that issuance of this license does not in any way constitute the Department's approval of the chemical treatment as it related to the provisions of the Wetlands Protection Act.

C. The licensee shall obtain either a final Order of Conditions or a negative Determination of Applicability from the **SUDBURY** Conservation Commission(s) prior to application of chemicals authorized under this license.

D. Shoreline areas of the lake or pond must be posted with signs warning the general public of any water use restrictions stated on the chemical label minimum for one week. This is especially important at bathing beaches and other areas of

License No.: **WM04-0000705**

common access. These signs shall clearly state that the chemical treatment is being conducted pursuant to a license issued by the Department of Environmental Protection, "DEP". A new sign shall be posted for each treatment event.

E. The Department may require the licensee to cease application of chemicals to a body of water at any time following the issuance of a license if the Department determines that the chemical treatment will be ineffective, or will result in unreasonable restrictions on current water uses, or will produce unnecessary adverse side effects on nontarget flora or fauna.

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I. Electronic notification of treatment must be made to the Massachusetts Division of Fisheries and Wildlife (jason.stolarski@mass.gov, jason.carmignani@mass.gov). Notification that the treatment was performed shall be made within 24 hours of treatment. The notification message should include waterbody, town, license number and chemicals used.

J. No chemical treatment shall be conducted while a Massachusetts Department of Public Health advisory is in effect.

K. In general, less than 1/3 of the lake area and less than ½ of the littoral zone should be targeted for herbicide treatment when native plants (particularly low growth forms) are dominant.