2015 BASELINE ASSESSMENT

SUDBURY RIVER SURVEY FINDINGS
AND MANAGEMENT RECOMMENDATIONS

December 2015

Prepared for:
Town of Framingham
150 Concord Street
Memorial Building-Room 213
Framingham, MA

Submitted by:
Aquatic Control Technology
21 Main Street
Spencer, MA 01562

INTRODUCTION

The excessive growth of non-native plants has been an issue in many Framingham waterbodies over the years. Therefore the noticeable expansion of aquatic plant growth within the ponded section of the Sudbury River (Fenwick Street Dam to the Saxonville Dam) has sparked concern over the degradation of system's habitat, recreational, and ecological value. As a result, the Town of Framingham contracted Aquatic Control Technology (ACT) of Spencer, Massachusetts to conduct a baseline assessment of this section of the river. The intent of this investigation was to document current aquatic vegetation growth conditions and assess baseline water quality parameters in order to evaluate potential issues and the feasibility of specific management strategies.

METHODS

On August 28, 2015 two Aquatic Control Biologists performed a detailed survey of the study area. During the course of the field data collection the dominant vegetation growth was identified and mapped and surface grad water quality samples were collected from multiple locations along the section of river. The general methods used in collection of the data are outlined below.

Aquatic Vegetation Inventory

The aquatic vegetation growth was assessed using visual observation, throw-rake, and an underwater camera system. In addition to an overall qualitative survey of the plant growth, quantitative data was collected at representative GPS-referenced points throughout the study area. A total of 38 data point location were established. At each point location, the following information was recorded:

- GPS coordinates
- Water depth
- [Qualitative] sediment type
- Aquatic plant species present
- Relative abundance of each species present
- Total percent bottom covered (i.e., percent of bottom obscured by plant growth)
- Total plant biomass

Georeferenced photographs depicting the representative aquatic vegetation assemblage at the time of the survey were also captured.

The rake toss method, based on protocols developed by Cornell University, was used to retrieve submersed aquatic vegetation from either side of the survey vessel. Each species found on the rake was identified and recorded. Plant species observed in the immediate area, but not found on either of the two rake tosses were also recorded. Any species not readily identified *in situ* was placed into a plastic bag labeled with the data point number and preserved for further taxonomic identification. Once all species were recorded, the most prevalent species was noted as dominant for later use in presence/absence maps. The abundance scale, developed by the US Army Corps of Engineers and modified by Cornell, was used to categorize total observed plant growth.

Total Plant Abundance -
The abundance of each plant species identified was designated using the following notations and criteria:

Z	*Zero*: no plants on rake
T	*Trace*: fingerful on rake
S	*Sparse*: handful on rake
M	*Moderate*: rakeful of plants
D	*Dense*: difficult to bring into boat

Biomass Index -
The biomass for each data point was recorded on a scale from zero to four:

0	No biomass	No plants
1	Low biomass	Very low growth
2	Moderate biomass	Growth extending up, into water column
3	High biomass	Growth filling most of water column
4	Very high biomass	Growth filling the water column and covering the surface

Water Quality Sampling

Water quality sampling was also conducted within the study area. A total of four surface grad water quality samples were collected from four different locations along the ponded section of the river. Although the original scope of work for this assessment called for the collection of six samples, this number seemed to be excessive and in many ways redundant once on the water. As a result only four samples were collected and analyzed. Each sample was tested for the suite of common baseline water quality parameters outlined in the following table.

• Nitrate, Nitrogen	• Dissolved Oxygen[1]
• Total Kjeldahl Nitrogen	• pH[1]
• Ammonia, Nitrogen	• Turbidity
• Total Phosphorus	• True Color
• Dissolved Phosphorus	• Apparent Color
• Algae/Cyanobacteria Count/ID[2]	• Temperature[1]
• Secchi Disk[1]	• Alkalinity
• E. Coli Bacteria	• Temperate/Dissolved Oxygen Profile[1]

[1] Indicates parameters that can be measure *in situ* using water quality sampling gear. The remaining parameters will be gathered and analyzed by a MA DEP certified laboratory.

[2] Denotes parameters that will be analyzed from either a composite sample (of the deeper sampling locations) or the deepest monitoring location.

In addition to collection and analysis of the water quality samples, a composite algae sample was collected for species identification and count by enumeration. Water was collected from each of the four water quality sampling stations and pooled together to create the composite algae sample. *In situ* measurements of water temperature, dissolved oxygen, and Secchi disk transparency were also recorded at each of the sampling stations.

RESULTS & DISCUSSION

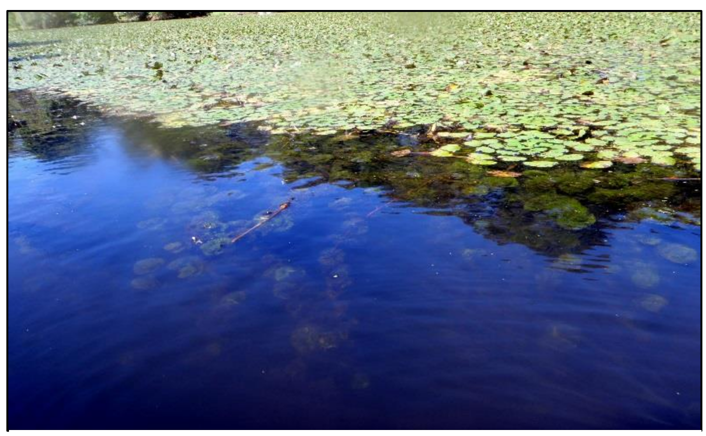
The Sudbury River originates from the Cedar Swamp in Westborough and travels east through the MWRA reservoir system before reaching the approximate 38 acre impounded section of the river that is the focus of this survey (Fenwick Street Dam to the Saxonville Dam). Once the water leaves the impounded section over the Saxonville Dam is flows northeast where it eventually joins the Concord River. The ponded section of the river comprises roughly one mile of the 33 mile long Sudbury River system. Much of the shoreline area of this section is developed with predominantly residential properties.

TABLE 1 – General Site Information

Surface Area	38 +/- acres
Average Depth	3-4 feet
Maximum Depth	15 feet
Qualitative Sediment Type	organic muck
Invasive Plant Species	▪ water chestnut ▪ fanwort ▪ variable milfoil ▪ Eurasian milfoil ▪ purple loosestrife
Dominant Native Plant Species	▪ coontail ▪ waterweed ▪ ribbon-leaf pondweed ▪ water lily

At the time of the August survey, it was visually clear that non-native water Chestnut (*Trapa natans*) dominates the aquatic plant growth in the ponded section of the river (See 'Distribution & Relative Abundance of *Trapa natans')*. In fact, water chestnut was the only plant species that was recorded at all 38 of the recorded data points. The chestnut growth consisted of dense contiguous beds that covered more than 85% of the surface area of the river section. Only a narrow channel of open water remained in most areas of the study area.

In addition, to the water chestnut, the study area also supported the growth of non-native variable watermilfoil (*Myriophyllum heterophyllum),* Eurasian watermilfoil (*Myriophyllum spicatum*), and fanwort (*Cabomba caroliniana*). These species were present at much lower densities and at far more limited distribution than the water chestnut. The milfoil growth was only found in a few locations throughout the study area and density was generally considered to be sparse to trace. The fanwort, however, was observed growing in defined beds that coincided with areas of lower chestnut density. In the areas where fanwort growth was observed, the density ranged from moderate to dense.



Dense fanwort growth along perimeter of water chestnut and water lily canopy

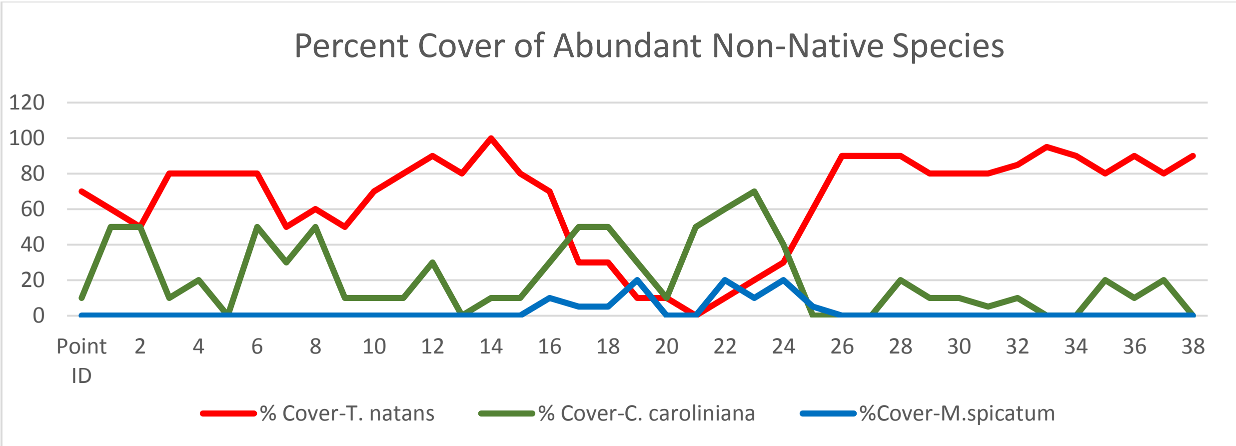
Despite the dense non-native plant cover, a variety of native species were observed within the study area. The native plant growth generally consisted of very low density scattered occurrences.

Overall the plant biomass was high (mean biomass index of 4) throughout the study area and was far and away dominated by non-native species. Regarding species composition, an average of three species were found at each data point with an overall cover average of 93%. These high density and biomass values are representative of a system infested unmanaged non-native plant growth.

A list of plant species identified during the survey along with a general description of their location and growth characteristics is provided in the following table.

TABLE 2 – Study Area Plant List

Scientific Name	Common Name	Plant Type	Distribution
Utricularia vulgaris	Bladderwort	Submersed	Common – moderate density growth located in the inlet cove
Sparganium americanum	Burreed	Emergent	Sparse – growing in shallow shoreline areas
Ceratophyllum demersum	Coontail	Submersed	Sparse – small isolated patches in the inlet cove and along the southeastern shoreline
Myriophyllum spicatum	Eurasian watermilfoil (non-native)	Submersed	Sparse – low density growth in areas of open water
Elodea canadensis	Waterweed	Submersed	Trace – individual plants underneath water chestnut canopy
Cabomba caroliniana	Fanwort (non-native)	Submersed	Dense – found in distinct patches scattered throughout the study area
Potamogeton robbinsii	Fern-leaf Pondweed	Submersed	Trace – individual plants growing along open channel
Lythrum salicaria	Purple loosestrife (non-native)	Emergent	Sparse – Scattered individual plants throughout the wetland areas.
Potamogeton pusillus	Thin-leaf Pondweed	Submersed	Trace – Scattered low density growth along perimeter of chestnut canopy
Myriophyllum heterophyllum	Variable watermilfoil (non-native)	Submersed	Sparse – scattered individual plants found in conjunction with Eurasian watermilfoil growth
Trapa natans	Water Chestnut (non-native)	Floating-Leaf	Dense – found in large contiguous beds throughout the study area
Wolffia sp.	Watermeal	Floating	Sparse – intermixed with floating-leaf canopy and along shorelines
Nymphaea odorata	White waterlily	Floating-leaf	Sparse – most abundant in the shallow areas and intermixed with chestnut
Nuphar lutea (variegatum)	Yellow waterlily	Floating-leaf	Sparse – intermixed with the growth of white lilies



Water Quality

Per the contract, water quality parameters (one algal/ID, pH, alkalinity, turbidity, ammonia, total Kjedahl nitrogen, total phosphorus, dissolved phosphorus, true/apparent color, E. Coli) were collected at four locations. Originally, it was suggested to ACT to gather samples at six locations, but we found that number to be redundant. The ACT biologists on site during the August survey concluded that four sample locations would be more fitting. Results of the single water quality test fall in the average range that we generally see in Massachusetts water bodies.

The following table covers the results of sites 1-4:

TABLE 3 – Water Quality Sampling Results

Parameter	Site 1	Site 2	Site 3	Site 4	Average
Water Clarity – Secchi disk (ft.)	5.0	3.0	4.0	4.0	4.0
pH (S.U.)	6.8	6.8	7.0	7.1	6.9
Turbidity (NTU)	3.2	2.6	4.0	3.4	3.3
Alkalinity (mg $CaCO_3$/l)	31	31	30	31	31
Total Phosphorus (mg/l)	0.037	0.021	0.028	0.041	0.032
Dissolved Phosphorus (mg/l)	0.015	0.017	0.016	0.020	0.023
Kjeldahl Nitrogen (mg/l)	0.59	0.46	0.49	0.52	0.52
Ammonia Nitrogen (mg/l)	0.058	0.066	0.066	0.057	0.062
Nitrate Nitrogen (mg/l)	0.085	0.089	0.073	0.060	0.077
Apparent Color (Pt-Co)	50	45	43	47	46
True Color (Pt-Co)	45	40	40	43	42
E. coli bacteria (col/100ml)	<10	<10	10	<10	<10

pH: pH is a measurement of the concentration of hydrogen ions (h^+) in solution, which reflects the acidity or alkalinity of the measured solution. The pH measurement scale ranges from 0-14, where zero is extremely acidic, seven is neutral, and 14 is the most basic. A pH measurement within the range of 5.5-8.5 S.U. is typical for the northeastern United States and is desired for maintaining a healthy fishery. Maintaining a stable pH ($\pm$ 1 S.U.) is also important, as frequent fluctuations can have adverse effects on water chemistry and fisheries. The pH levels recorded in in the study area were all well within the desired range and indicate that the water should be quite favorable for fish and other aquatic wildlife.

Alkalinity: Alkalinity is a measure of the buffering capacity of a waterbody against acid additions such as acid rain and pollution, which can be detrimental to fish and wildlife populations. Total alkalinity measures the presence of carbonates, bicarbonates and hydroxides and is mostly a function of the surrounding soils and geology. Values below 20 mg/l typically illustrate that the pond may be susceptible to adverse fluctuations in pH. The alkalinity measurements for the study area are all above 20mg/l; therefore, the water is reasonably protected against significant changes in pH resulting from acidic additions to the system.

Turbidity: Turbidity is a relative measurement of the amount of suspended particles in the water. Turbidity values can range from less than one to thousands of units, however, values in most ponds and lakes rarely rise above 5 NTU and typically <1 NTU in waterbodies used for swimming. The turbidity values from the samples taken in study area were all below 5 NTU.

Ammonia nitrogen: Nitrogen is an essential element for plant growth. Nitrogen is found in the environment in several forms. High levels of nitrogen can indicate poor water quality. In particular high concentrations of ammonia nitrogen can be toxic to fish. Ammonia is also important due to the fact that it is a by-product of the decomposition of organic material. In the presence of oxygen, ammonia is readily converted to nitrate nitrogen. Therefore high ammonia nitrogen concentrations may indicate low oxygen levels to anoxic conditions. Low levels of ammonia nitrogen were observed.

Nitrate nitrogen: Nitrate nitrogen is the end product of the nitrogen cycle under aerobic conditions. Nitrate nitrogen is the form of nitrogen that is most readily available to plants as a nutrient source. High levels of nitrate nitrogen indicate an imbalance between the amount of nitrogen entering a system and the amount being utilized by organisms and may also indicate fertilizer or septic system inputs. Excess nutrients may stimulate nuisance plant and algae growth. Generally speaking nitrate concentrations higher than 0.3 mg/l are sufficient to support such nuisance plant and algae growth. Nitrate nitrogen levels in the study area were less than 1.0 mg/L.

Kjeldahl nitrogen: Kjeldahl nitrogen results signify the amounts of organic or biomass nitrogen and ammonium in a sample. Since this form of nitrogen is not as readily utilized by plants as nitrate nitrogen, concentrations generally need to be greater than 1.0 mg/l to support nuisance algae and plant growth. The results from the study area indicate low amounts of organic nitrogen.

Total and Dissolved Phosphorous: Although excess nitrogen can contribute to nuisance plant growth, the ratio of nitrogen to phosphorous in a system is equally important. This ratio will determine which nutrient is the most limiting (i.e.; which nutrient is found in least supply relative to the growth requirements of the plants). Phosphorus is usually the limiting nutrient for plant and algae growth in freshwater systems. Total phosphorus is a reading of particulate and dissolved phosphorus in the water column. Concentrations of 0.03 mg/l or greater are considered sufficient to stimulate nuisance algae blooms. Phosphorous levels were slightly elevated at sites one and four. The results of the dissolved phosphorous analysis indicate that more than 50 percent of the total phosphorous is actually dissolved in the water column. It is important to understand that each sample is representative of a mere “snap-shot” or conditions at a moment in time. As a result, it would be necessary to perform more frequent sampling to establish a more meaningful baseline/mean value for the continually fluctuating phosphorus levels.

True Color/Apparent Color: Apparent color is the color of the unfiltered water that is caused by both suspended and dissolved matter. True color is measured after the water has been filtered to remove the suspended matter and is therefore the color due to dissolved constituents only. Water color can affect light penetration and, as a result, can limit rooted plant and algae growth. The disparity between true and apparent color can indirectly indicate the amount of suspended material in the water and lead to conclusions about the influence of storm water on incoming water quality. The results indicate that the color of the water is caused by substances dissolved in the water.

Escherichia coliform: *E. coli*. is one of many naturally occurring bacteria found within the intestine of humans and animals. The presence of *E. coli* in pond, lake, or river water is indicative of some level of recent fecal contamination (sewage or animal waste). The current standard for freshwater is no single sample shall exceed 235 colonies per 100 ml. The bacterial samples taken all showed desirably low levels of E. coli.

Microscopic Algae

TABLE 4 – Microscopic Algae Identification and Count

ALGAE TAXON	**Cell count/ml**
Bacillariophyta (Diatoms)	
* *Flagilaria*	552
* *Asterionella*	1,452
* *Cyclotella*	415
* *Snyedra*	2,587
Cyanophyta (Blue-Greens)	
* *Microcystis*	4,257
* *Aphanizomenon*	1,256
* *Cylindrospermopsis*	4,521
* *Anabena*	2,247
Chlorophyta (Greens)	
* *Pediastrum*	4,273
* *Ankistrodesmus*	5,425
* *Scenedesmus*	4,781
Other Taxon (totals)	
* **Chyrsophyta** – D*inobryon*	2,759
* **Cryptophyta** – *Cryptomonas*	1,148
* **Pyrrhophyta** – *Peridinium, Ceratium*	352
Estimated Algal Cell Density	**36,025 cells/ml**

* *Estimated cell density per ml – counted by enumeration*

The phytoplankton population observed in the sample collected on August 28th was primarily composed of cyanophyte (blue-green algae) and chlorphyte (green algae) algae species. Dominant taxa within these groups consisted of *Microcystis, Cylindrospermopsis, Ankistrodesmus, Scenedesmus*. Overall the total number of algae cells within the sample (36,025 cells/ml) was not indicative of "bloom" or problematic growth conditions. It is important to keep in mind that this cell count enumeration was created from a composite sample and as a result the cell counts are potentially higher than would be expected in a typical single grab sample.

MANAGEMENT RECOMMENDATIONS

The unbalanced growth of non-native aquatic vegetation within this ponded section of the Sudbury River is negatively impacting the ecological value of the system. Invasive non-native species such as water chestnut, fanwort, Eurasian milfoil, and variable milfoil have the ability to outcompete native species and create dense monotypic stands. Therefore, when left unmanaged, the growth of these species result in loss of species richness and diversity, the degradation of water quality (dissolved oxygen fluctuations, increase phosphorus release from bottom sediments, etc.), reduction of open water habitat, and impairment of recreational accessibility. Therefore in order restore a balanced vegetation community and minimize spread of these invasive species within the river system and neighboring waterbodies, we recommend implementing an aquatic vegetation management program.

By far water chestnut is the most abundant and problematic plant currently growing in the study area. We, therefore, feel that the first phase of the management program should focus on the control of this species. Water chestnut is an annual seed producing plant that can be effectively managed through both mechanical and chemical strategies. Regardless of the management technique employed, long-term control of water chestnut requires a multi-year commitment, as the goal of active management is to annually prevent viable seed production until the dormant seed-bank is depleted. Water chestnut seeds can remain dormant for as long as 10 years before germinating, although typically 3-5 years of large scale annual management is sufficient to reduce the infestation to the point that the management effort can be reduced.

Mechanical Harvesting

Mechanical harvesting is likely the most commonly used strategy to control water chestnut. It has been used successfully to control water chestnut infestations on the Charles River, the Mystic River, Lake Champlain, and many other sites around New England. Mechanical harvesters are paddle-wheel driven barges that cut and collect aquatic vegetation. The front cutting table can be adjusted to a maximum cutting depth of usually 5-7 feet. Hydraulically driven conveyors on these machines facilitate stockpiling and off-loading of the harvested material. By removing the water chestnut rosettes in mid to late summer before viable seed production occurs, the plants can be prevented from successfully reproducing and the infestation reduced over time. Due to the significant biomass associated with water chestnut the shore-based disposal operation is a critical component of an efficient and successful harvesting project.

Although harvesting is a viable management option for the control of the water chestnut in this section of the river, many of the site characteristics and constraints may make this a less desirable and more costly strategy in this case. Some of these specific issues are outlined below.

1. There are currently no access points to the river that would be suitable for launching equipment and staging the shore-based disposal operation. Although public access points exist off Centennial Place and Simpson Drive, they would require significant alterations/improvement (grading, brush & tree clearing, etc.) in order to make them usable for this purpose.
2. Trace level water chestnut growth exists upstream of the Wickford Road bridge that cannot be accessed from the river from points north of the road (existing public access sites). Therefore in order to address all water chestnut growth within the study area an additional access point would need to be identified in this portion of the river.
3. There are many shallow shoreline and backwater areas throughout the study area that support dense growth of water chestnut. Despite the fact that harvesters can effectively operate in shallow water (2-3 ft.), many of these areas are too shallow to be accessed by conventional harvesting equipment. Therefore, in order to remove all of the water chestnut growth a combination of manual hand-pulling and alternate mechanical equipment (hydro-rake & airboat cutter) will likely be required. The use of these other techniques will increase the complexity and cost of a harvesting project.
4. Given the presence of submersed non-native plant species (fanwort, Eurasian milfoil, and variable milfoil) that reproduce through fragmentation (broken pieces of the plant develop new roots and create a new plant), harvesting may contribute to the proliferation of these plants within the ponded section and potentially downstream. Additional measures will be necessary to prevent the migration of fragments downstream during a harvesting project.

All of these issues will increase the complexity and cost of a harvesting project and given the need for a multi-year commitment for long-term water chestnut control harvesting may not be a sustainable option. Harvesting, however, is the only control technique that removes the considerable water chestnut biomass and essentially eliminates the sedimentation and nutrient load associated with the decomposition of this material. The biomass associated with dense water chestnut growth is not insignificant. Past studies and harvesting projects show that an acre of dense growth translates to approximately 8-10 tons (wet weight) or as much as 50-60 cu-yds. of plant material. Therefore, the removal of this biomass potentially has additional benefits to the ponded area and river system as a whole. These benefits should definitely be considered when deciding which control strategy to pursue.

Chemical Treatment

Treatment with USEPA/MA registered aquatic herbicides for the control of nuisance and non-native aquatic plant growth is often the most cost-effective and least disruptive management approach available. Historically chemical control of water chestnut has not been widely used due to the fact that most of the aquatic herbicides available have had fairly limited activity on this plant species. To date the bulk of chemical water chestnut control has been performed using 2,4-D ester (Navigate) or the liquid 2,4-D amine formulation (Platoon, DMA-4, CleanAmine). These products have provided relatively good control; however, treatment timing and water flow can have significant influences on efficacy. Also these products require an added level of scrutiny from regulatory agencies to concerns over possible movement into groundwater. As a result, the use of 2,4-D products are prohibited in Zone II – wellhead protection areas. For these reasons, permits to use 2,4-D based products at this site may be difficult.

Until recently 2,4-D based herbicides were all that were available for treatment of water chestnut in MA. This past spring (2015), however, the aquatic herbicide Clearcast (active ingredient imazamox) was registered for use in MA by the Department of Agriculture. Clearcast has shown very good activity on water chestnut as a foliar spray elsewhere in the Northeast and has a much more favorable toxicology profile than 2,4-D. In fact, Clearcast is labeled for direct application to drinking water reservoirs at low doses. Because of its favorable toxicology and its proven efficacy on water chestnut, we feel that it is the best chemical treatment option for this site. Control of water chestnut with Clearcast is best achieved using a foliar application of the product to the floating rosettes of the plant at a rate of 0.5-1.0 gals per acre. Due to the nature of foliar treatment and the potential for plants to be missed, we recommend two treatments per season to achieve maximum control. Treatment with Clearcast carries very minimal post-treatment water-use restrictions, in fact there are no label required restrictions for swimming, boating, or fishing and only a 24 hour irrigation restriction when applied to still or quiescent waters.

SUMMARY

The non-native aquatic vegetation within the subject area is negatively impacting the entire 38 acre section of the river; therefore, some level of management is required to restore vegetative balance and ecological value. Given the non-native plant assemblage and the current extent of the growth it is our opinion that the management focus should initially be on the control of the extensive water chestnut infestation. Although the other non-native submersed species pose a threat to the area and the river as a whole, the composition and distribution of these species will likely change in response to the removal of the expansive water chestnut canopy. The dense cover of water chestnut currently serves as a deterrent to the spread of these submersed species and therefore once removed will likely promote the spread of these invasive species. Once the non-native species assemblage becomes settled following the control of the water chestnut the appropriate management options can be better evaluated.

Water chestnut control can be effectively achieved through the application of either aquatic herbicides or mechanical removal techniques (harvesting). Both these options have their pros and cons based on the specific site. Regardless of the control mechanism long-term water chestnut control requires a multi-year effort. As result of this multi-year requirement the cost of management is paramount to the sustainability of the management effort. For this reason we have included an estimated five-year cost comparison of chemical control and mechanical harvesting for your review.

TABLE 5 – Management Technique Cost Comparison

Management Technique	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	Total 5 Year Cost
Mechanical Harvesting[1]	$114,000	$94,000	$94,000	$74,000	$60,000	$436,000
Clearcast Treatment[2]	$37,000	$32,000	$27,000	$20,000	$20,000	$136,000

[1] – *This program assumes the cost of a single harvesting effort in late summer (July) and all of the associated site improvements and shore-based disposal operations. Subsequent year costs are estimated based on previous water chestnut harvesting experience and the level of regrowth anticipated.*

[2] – *These costs are based on two foliar herbicide applications in each year of the project, pre and post-treatment inspection, and MA DEP pesticide use permitting.*

APPENDIX A

Survey Point and Water Quality Sample Locations

Sudbury River
Framingham, MA

Data Collected: 08/28/2015
Map Prepared: 11/11/15
For: Audubon Society
Basemap © 2013 Esri

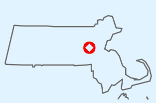
0 500 1,000 1,500 2,000
1:10,000 Feet

N

AQUATIC CONTROL TECHNOLOGY
21 West Main Street • Spencer, MA
info@aquaticcontroltech.com
508-885-0101

Distribution and Relative Abundance of *Trapa natans*

Sudbury River
Framingham, MA



Data Collected: 08/28/2015
Map Prepared: 11/11/15
For: Audubon Society
Basemap © 2013 Esri

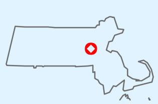
0 500 1,000 1,500 2,000
1:10,000 Feet

N

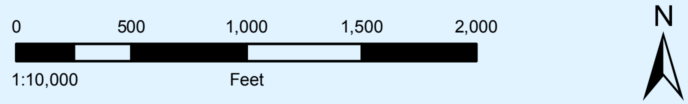
AQUATIC CONTROL TECHNOLOGY
21 West Main Street • Spencer, MA
info@aquaticcontroltech.com
508-885-0101

Distribution and Relative Abundance of Submersed Invasive Vegetation

Sudbury River
Framingham, MA

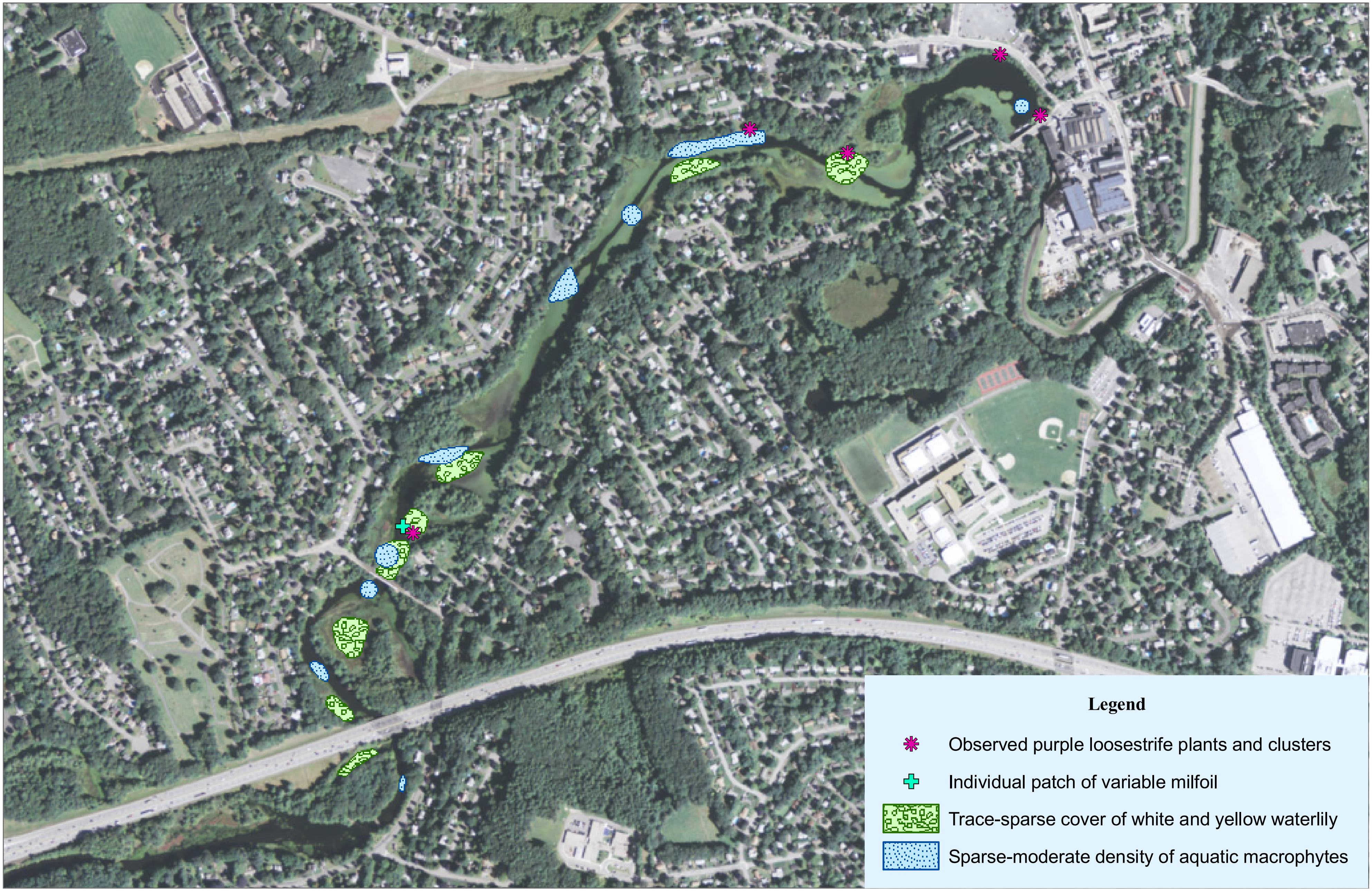


Data Collected: 08/28/2015
Map Prepared: 11/11/15
For: Audubon Society
Basemap © 2013 Esri



AQUATIC CONTROL TECHNOLOGY
21 West Main Street • Spencer, MA
info@aquaticcontroltech.com
508-885-0101

Distribution of Other Recorded Species



Sudbury River
Framingham, MA

Data Collected: 08/28/2015
Map Prepared: 11/11/15
For: Audubon Society
Basemap © 2013 Esri

0 500 1,000 1,500 2,000
1:10,000 Feet

N

AQUATIC CONTROL TECHNOLOGY
21 West Main Street • Spencer, MA
info@aquaticcontroltech.com
508-885-0101