

Monitoring Report Invasive Aquatic Plants

Lake Housatonic 2022

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Figure 1. Yale crew team practicing on Lake Housatonic on a beautiful September afternoon.

Introduction

Lake Housatonic offers a diverse freshwater ecosystem and exceptional opportunities for fishing, boating, and other outdoor activities. The lake is an impoundment of the Housatonic River made possible by a dam in Derby, CT. The dam is equipped with a hydroelectric generating facility owned and operated by McCallum Enterprises of Stratford. Invasive aquatic plants have become established in the lake (CAES IAPP, 2022) and have few natural enemies to control their growth (Wilcove et al. 1998). They degrade native aquatic ecosystems (Les and Mehrhoff, 1999), impede recreation, and reduce home values (Connecticut Aquatic Nuisance Species Working Group, 2006). Once invasive plants are established, long term and costly management programs are often necessary.

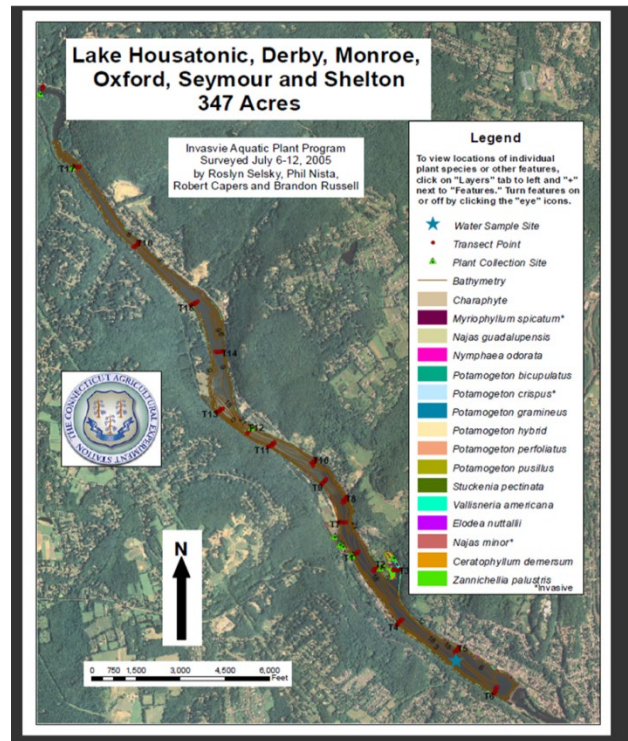
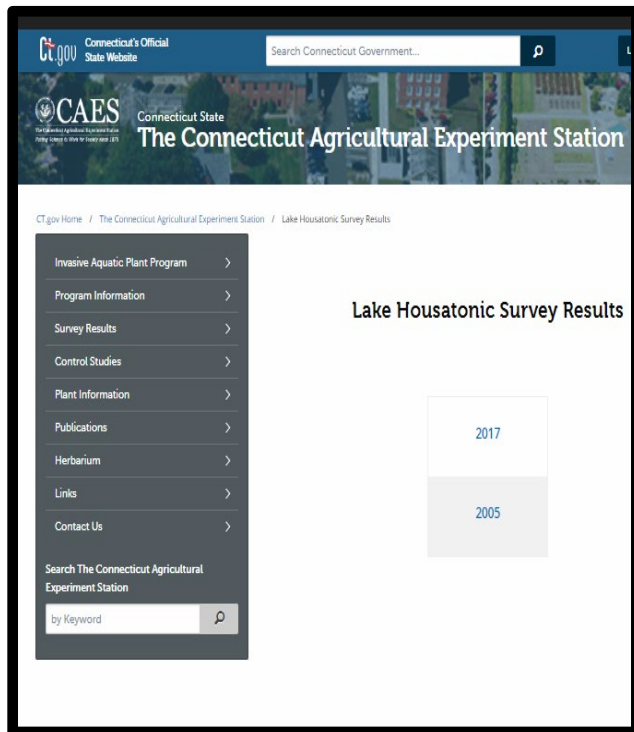


Figure 2. CAES IAPP webpages where the 2005 and 2017 survey information can be found.

CAES IAPP surveys of Lake Housatonic in 2005 and 2017 found the invasive plant species Eurasian watermilfoil (*Myriophyllum spicatum*), minor naiad (*Najas minor*), and curlyleaf pondweed (*Potamogeton crispus*). Fourteen native species were observed in 2005 and 18 were documented in 2017. Eurasian watermilfoil was the most common invasive plant along with smaller populations of minor naiad and curlyleaf pondweed. Curlyleaf pondweed may have been underestimated in the 2005 survey because it naturally dies back in late spring (Catling and Dobson, 1985) before the survey occurred. The most common native plants in Lake Housatonic in 2005 were coontail (*Ceratophyllum demersum*) and eelgrass (*Vallisneria americana*). Overall, however, the coverage of both invasive and native plants in 2005 was minimal with an increase in 2017. Eurasian watermilfoil coverage increased from 5 to 139 acres and native eelgrass became a nuisance resulting in concern that it may need control. This information was used in part to target 110 acres of Eurasian watermilfoil with the herbicide diquat from 2018 – 2021. In 2021, 10 acres of eelgrass was treated with diquat as well (Jim Olsen personal communication). This report expands on or previous reports by

conducting pre and post treatment surveys to determine the effects on both target and non-target plants.

The following report represents the third CAES IAPP surveillance and mapping of invasive aquatic plants and native eelgrass in Lake Housatonic with emphasis on pre and posttreatment conditions.

Objectives

- Survey and map invasive aquatic plants and eelgrass in Lake Housatonic
- Resurvey CAES IAPP transects established in 2005 for all plant species
- Document changes from the 2005 and 2017 CAES IAPP surveys
- Document changes before and after the 2022 herbicide treatment
- Assess current aquatic plant management strategy

Materials and Methods

Our 2022 aquatic vegetation surveys utilized methods established by CAES IAPP. These methods have provided a consistent record throughout the years of nearly 300 Connecticut lakes and ponds (CAES IAPP, 2022). We recorded locations of all invasive plants and eelgrass with Trimble R1[®] GNSS or ProXT[®] global positioning systems (GPS) with sub-meter accuracy. In 2022, we included native eelgrass based on the concern that it was becoming a nuisance and would need management. We used a Lowrance HDS[®] sonar system, with structure scan technology, to determine patches near the bottom and to eliminate the need for time-consuming grapple tosses. We circumnavigated the plant patches to form georeferenced polygons. Patches covering less than one square meter were recorded as a point and assigned an area of 0.0002 acres (1 m²). We measured depth with a rake handle, drop line, or digital depth finder, and sediment type was estimated. Comparing depths from our surveys to determine changes over time is inherently inaccurate because of the wide fluctuations in lake level caused by the release of water from Lake Zoar. Plant samples were obtained in shallow water with a rake and in deeper water with a grapple. We measured plant abundance using a visual scale of 1 to 5 (1 = single stem; 2 = few stems; 3 = common; 4 = abundant; 5 = extremely abundant). When field identifications of plants were questionable,

Table 1. Yearly comparisons of the frequency of occurrence on transects and total area of aquatic vegetation in Lake Housatonic (2022 data is pretreatment).

Species (invasives in bold)		FOQ (%/point)		
Common Name	Scientific Name	2005	2017	2022
Arrowhead	<i>Sagittaria species</i>	0%	1%	1%
Bur-reed	<i>Sparganium species</i>	0%	2%	0%
Clasping-leaf pondweed	<i>Potamogeton perfoliatus</i>	0%	3%	1%
Coontail	<i>Ceratophyllum demersum</i>	9%	33%	5%
Curlyleaf pondweed	<i>Potamogeton crispus</i>	0%	17%	19%
Eelgrass	<i>Vallisneria americana</i>	8%	25%	22%
Eurasian watermilfoil	<i>Myriophyllum spicatum</i>	6%	52%	12%
Flat-leaf pondweed	<i>Potamogeton zosteriformis</i>	0%	19%	0%
Great duckweed	<i>Spirodela polyrhiza</i>	0%	7%	0%
Hybrid pondweed	<i>Potamogeton gramineus x nodosus</i>	0%	4%	0%
Illinois pondweed	<i>Potamogeton illinoensis</i>	0%	0%	1%
Large-leaf pondweed	<i>Potamogeton amplifolius</i>	0%	3%	0%
Long-leaf pondweed	<i>Potamogeton nodosus</i>	0%	3%	7%
Minor naiad	<i>Najas minor</i>	1%	9%	0%
Small pondweed	<i>Potamogeton pusillus</i>	0%	37%	19%
Southern naiad	<i>Najas guadalupensis</i>	0%	4%	0%
Variable pondweed	<i>Potamogeton gramineus</i>	1%	0%	0%
Water stargrass	<i>Zosterella dubia</i>	0%	25%	18%
Western waterweed	<i>Elodea nuttallii</i>	3%	23%	15%
Total Species Richness	19	6	17	11
Total Native Species Richness	16	4	14	9
Total Invasive Species Richness	3	2	3	2

we brought samples back to the lab for review using the taxonomy of Crow and Hellquist (2000a; 2000b). We post-processed the GPS data using Pathfinder[®] 5.85 (Trimble Navigation Limited, Sunnyvale, CA) and then imported it into ArcGIS[®] Pro 2.9.0 (ESRI Inc., Redlands, CA). Data were then overlaid onto recent high-resolution (1m or better) aerial imagery for the continental United States made available by the USDA Farm Services Agency.

We collected occurrence and abundance plant information from ten transects pre and posttreatment. Transect points were positioned 0.5, 5, 10, 20, 30, 40, 50, 60, 70 and 80 meters perpendicular from the shore. These transects were a subset of the 18 laid out in 2005 (CAES IAPP, 2022) and contained at least one occurrence of each native and invasive plant species. We selected transects formerly numbered 3, 4, 5, 7, 10, 11, 14, 15, 16, and 17 and renamed them 1-10 respectively. Significant differences in the frequency of occurrence of plant species

between the two years along transects were determined using chi-squared statistical calculations. Significant differences in species richness per transect point were determined by \pm one standard error of the mean (SEM).

We performed our pretreatment survey on Lake Housatonic from June 28 - 30 and our posttreatment survey from September 11 - 12. Pretreatment transect data was obtained on June 28 and posttreatment transect data was gathered on September 10.

We obtained water chemistry information on June 30. We used a Secchi disk to measure transparency and an YSI® 58 meter (YSI Inc. Yellow Springs, Ohio) to measure water temperature and dissolved oxygen. Measurements occurred in the same deep areas of each lake as previous surveys at 0.5 m and at 1 m depth intervals until we reached the bottom. We collected water samples from 0.5 m below the surface and 0.5 m from the bottom.

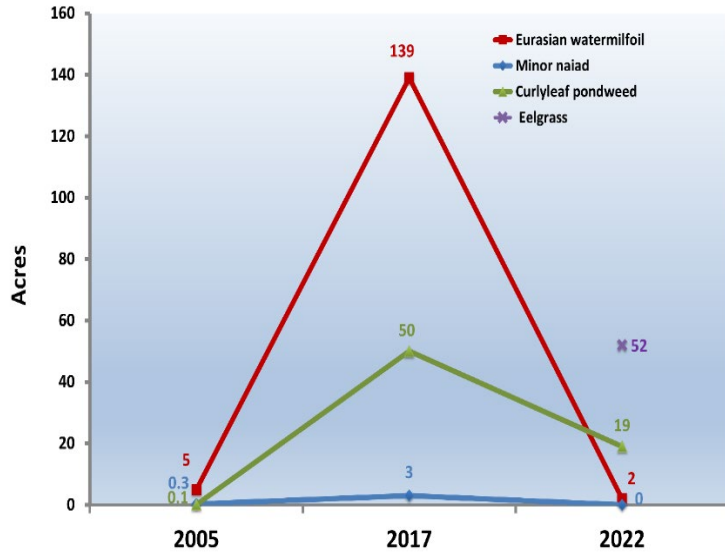


Figure 3. Changes in acreages of plants in Lake Housatonic from 2005 – 2022.

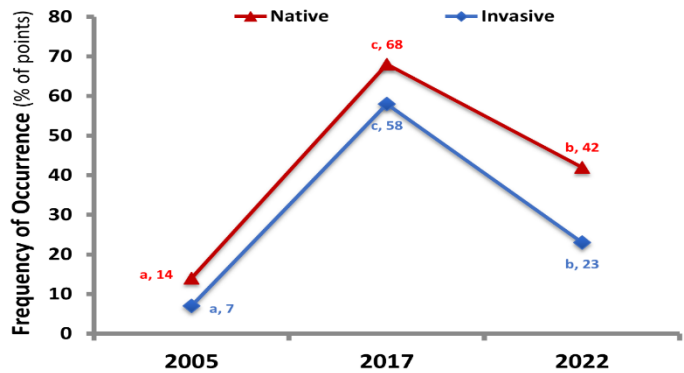


Figure 6. Yearly comparison of the frequency of occurrence of native and invasive species on transects in Lake Housatonic. Points with the same letter are not significantly different.

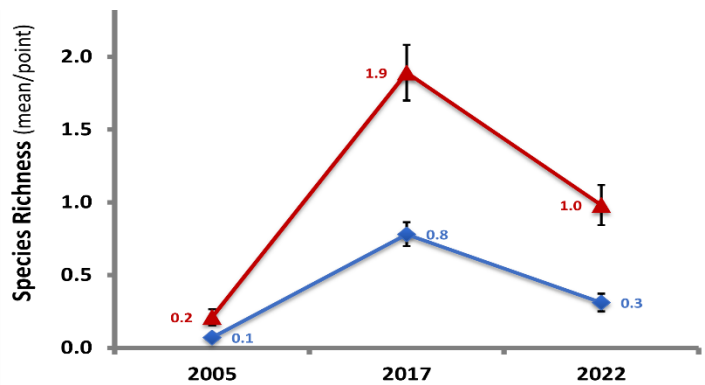


Figure 7. Yearly comparison of the average number of species per transect point in Lake Housatonic.

Table 2. Yearly comparisons of the number and size of invasive patches in Lake Housatonic.

Patch Size (acres)																
Year	Eurasian watermilfoil				Minor naiad				Curlyleaf pondweed				Eelgrass			
	Number	(min)	(max)	(mean)	Number	(min)	(max)	(mean)	Number	(min)	(max)	(mean)	Number	(min)	(max)	(mean)
2005	152	0.0013	0.4	0.03	6	0.0028	0.1	0.1	12	0.0009	0.02	0.01	ND	ND	ND	ND
2017	179	0.0002	54.5	0.78	14	0.0002	0.7	0.2	103	0.0002	12.14	0.48	ND	ND	ND	ND
2022	53	0.0002	1.1	0.04	0	0	0.0	0.0	88	0.0002	10.86	0.21	193	0.0002	14.3	0.3

Table 3. Yearly comparisons of the abundance of invasive plants in patches in Lake Housatonic.

Patch Abundance (1 = sparse - 5 = dense)													
Year	Eurasian watermilfoil			Minor naiad			Curlyleaf pondweed			Eelgrass			
	(min)	(max)	(mean)	(min)	(max)	(mean)	(min)	(max)	(mean)	(min)	(max)	(mean)	
2005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2017	1	4	2.7	2	3	2.1	1	4	2.0	ND	ND	ND	ND
2022	1	4	2.0	0	0	0.0	1	4	2.4	2	5	2.8	2.8

Results and Discussion

Aquatic Plant Survey

Our 2022 survey of Lake Housatonic confirmed the presence of the invasive species Eurasian watermilfoil and curlyleaf pondweed as also found in 2005 and 2017 (Table 1). Eurasian watermilfoil covered only 2.4 acres in 2022 compared to 139 acres in 2017 while curlyleaf pondweed coverage decreased from 50 to 19 acres over the same timeframe (Figure 3). Minor naiad was found in 2005 and 2017 but not in 2022. Nine native plant species were documented in 2022 compared to 14 in 2017 and 4 in 2005. Notable reductions in the frequency of occurrence of species on transects from 2017 to 2022 include Eurasian watermilfoil (52% to 12%), coontail (33% to 5%), small pondweed (37% to 19%), water stargrass (25% to 18%), flat-leaf pondweed (19% to 0%) and western waterweed (23% to 15%). Little change occurred in the frequency of eelgrass (25% to 22%) and curlyleaf pondweed (17% to 19%). The combined frequency of all native species (Figure 6) and the number of species per transect point i.e. species richness (Figure 7) both increased substantially from 2005 to 2017 followed by a similar the decrease from 2017 to 2022.

Patch size, number, and abundance of all species also decreased substantially from 2017 to 2022 (Tables 2 and 3). This was likely the result of the post 2017 herbicide treatments but other factors such as water level changes and natural year to year variation could play a role.

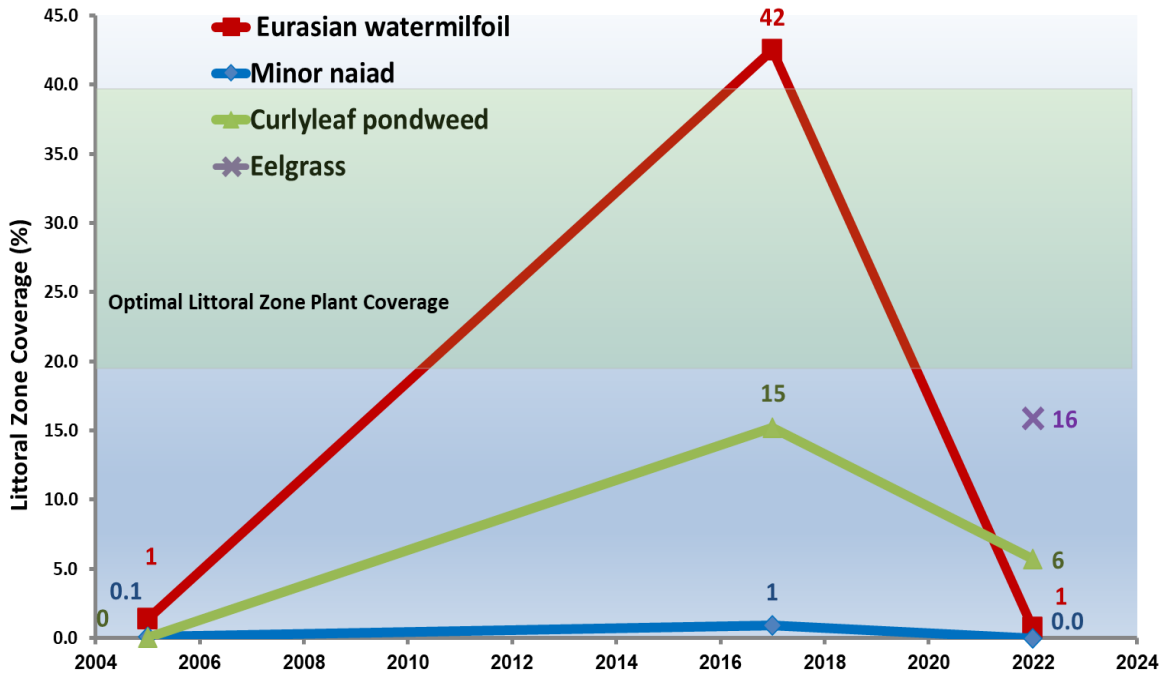


Figure 8. Littoral zone coverage of invasive aquatic plants and native eelgrass in Lake Housatonic from 2005 to 2022.

Aquatic plants are necessary to maintain a healthy ecosystem. They provide habitat for fish and other aquatic organisms, remove nutrients and pollutants from water, and stabilize the shoreline. Lake Housatonic has a littoral zone (area with suitable substrate where there is sufficient light) of 327 acres or 94.5% of its total area. CT DEEP fisheries biologists suggest the optimal coverage of the littoral zone with plants is 20 - 40% (Jacobs and O'Donnell, 2002). Compared to 2017 when Eurasian watermilfoil alone covered 42% of Lake Housatonic's littoral zone, all invasives plus eelgrass covered 23% in 2022, and therefore the 20% – 40% threshold was met (Figure 8). When the acreage of the other native species not measured in this report are included the total littoral zone coverage could exceed 40%.

FIGURE 1: Potential Treatment Areas (v3)

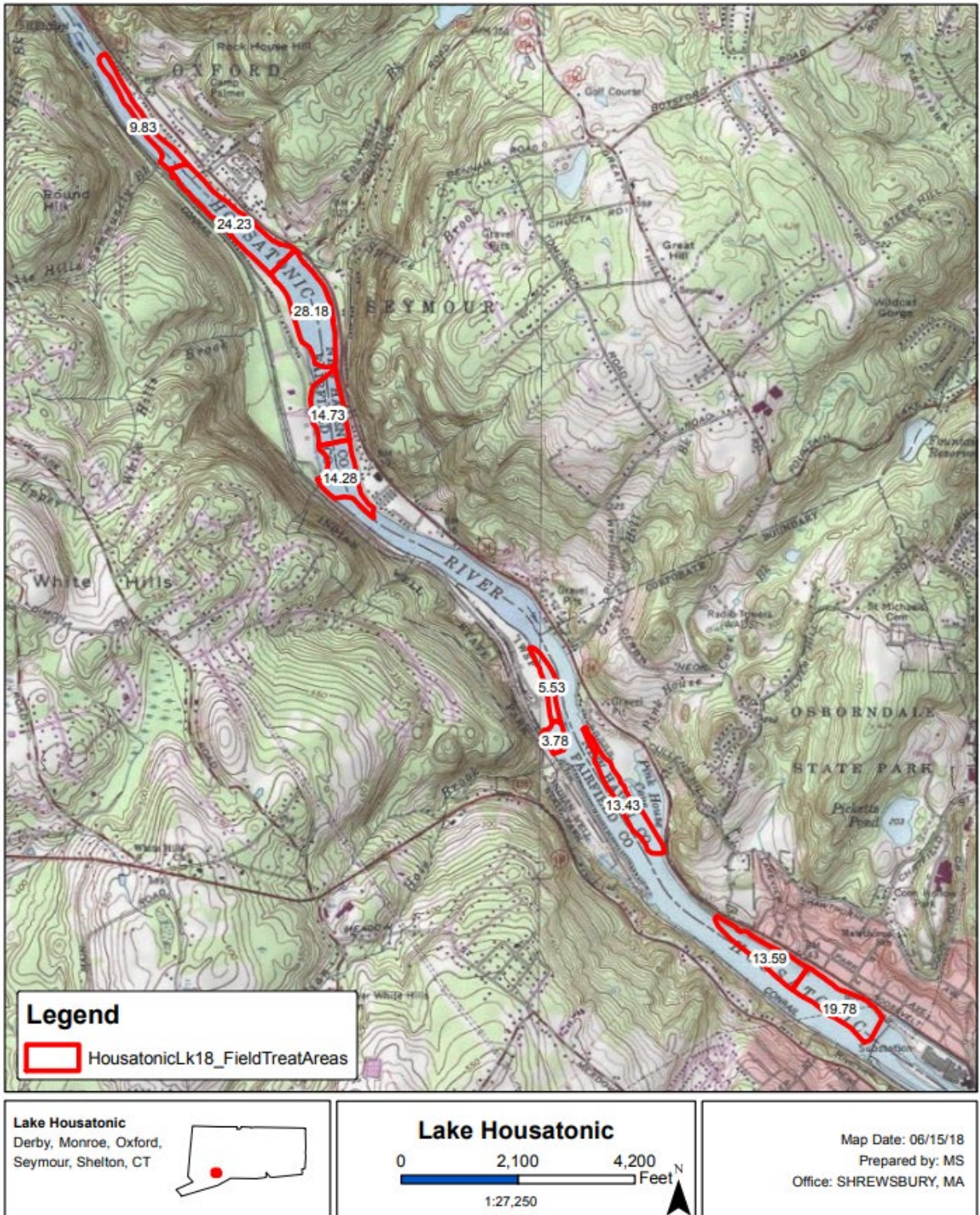


Figure 9. Eurasian watermilfoil and eelgrass areas treated with diquat in 2022.

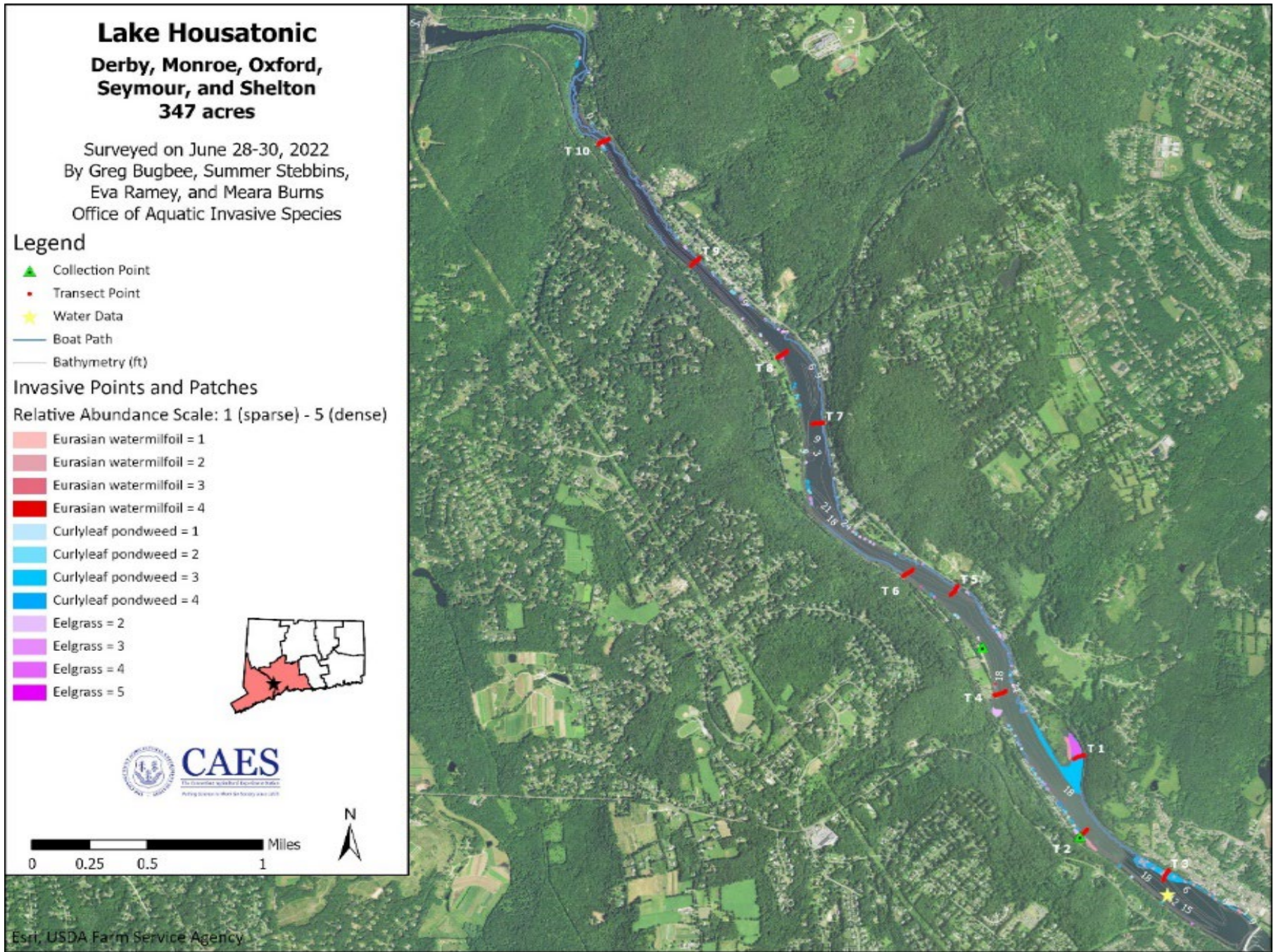


Figure 10. CAES IAPP pretreatment survey of Lake Housatonic in 2022 (see appendix for close-ups).

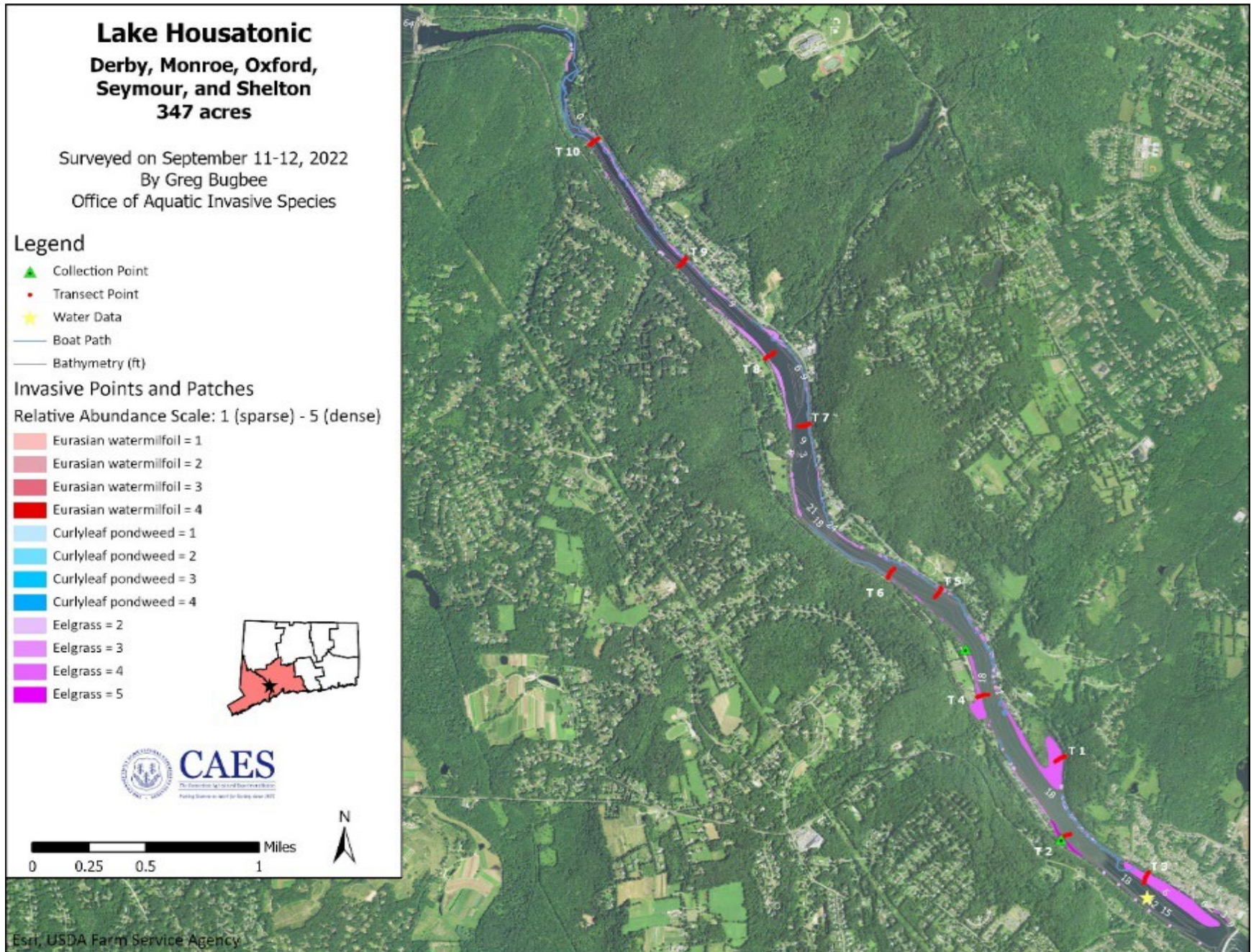


Figure 11. CAES IAPP posttreatment survey of Lake Housatonic in 2022 (see appendix for close-ups).



Figure 12. Aquatic vegetation change at Indian Well State Park from 2017 (left) to 2022 (right).

Pre and Posttreatment Comparisons

A total of 150 acres of Eurasian watermilfoil and eelgrass was treated with the herbicide diquat in 2022(Figure 9). Our pretreatment survey (Figure 10) and posttreatment survey (Figure 11) show the decline in Eurasian watermilfoil and curlyleaf pondweed combined with the increase in eelgrass described previously. Plant growth is limited to depths of less than 12 feet. This occurs along the shoreline with the exception of the coves near the State Boat Launch and Transect 1 as well as the east side of the lake near the dam where shallow conditions prevail well into the lake. This area may adversely impact the activities of the Yale Crew teams. In July 2022 approximately 50 acres of Lake Housatonic were treated for nuisance vegetation. This and treatments since 2018 have nearly eliminated Eurasian watermilfoil. Indian Well State Park beach is now free of the weed but

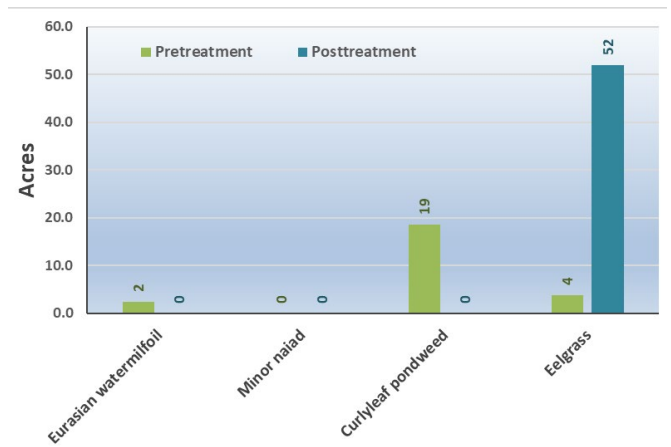


Figure 13. Acreage of aquatic vegetation in Lake Housatonic before and after the 2022 herbicide treatment.

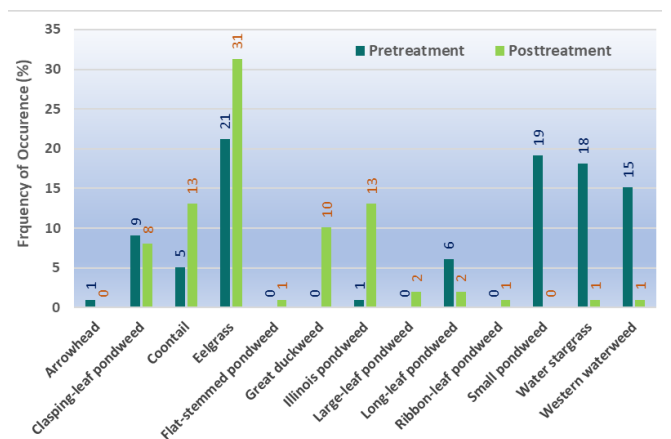


Figure 14. Frequency of occurrence of native plants in Lake Housatonic before and after the 2022 herbicide treatment.



Figure 15. Native eelgrass and pondweeds reaching the surface and potentially becoming a nuisance in Lake Housatonic in 2022.

some replacement with eelgrass and other native plants is likely occurring (Figure 12). Prior to treatment we observed two acres of Eurasian watermilfoil while posttreatment there was virtually none (Figure 13). Curlyleaf pondweed declined from 19 acres to zero. This is likely not because of the herbicide treatment but rather the natural life cycle of the plant which results in it senescing naturally by mid-summer (Catling and Dobson, 1985). Unlike the previous species, eelgrass acreage increased substantially posttreatment, probably because of its natural summertime growth, occurrence in untreated areas, and/or resistance to the herbicide (Figure 15).

Based on our frequency of occurrence data taken from transects (Figure 14), coontail, eelgrass, great duckweed, Illinois pondweed, and large-leaf pondweed exhibited substantial increases posttreatment. Long-leaf pondweed, small pondweed, water stargrass, and



Figure 16. Nuisance mats of filamentous algae often attached aquatic vegetation in Lake Housatonic in 2022.

western waterweed showed notable declines and arrowhead, claspingleaf pondweed, flatstemmed pondweed, and ribbonleaf pondweed remained nearly unchanged. As with the invasive species differences are likely caused by natural summertime growth patterns, occurrence in untreated areas, and/or resistance to the herbicide. The changing plant community may require alterations in the type, timing, and/or application technique for herbicides.

Nutrients released when plants treated with herbicides decompose can create conditions favoring algal blooms. Mats of filamentous algae were common during our posttreatment survey and would likely be considered problematic if the areas were used for recreational activities or adjacent to real estate seeking sale (Figure 16). Identification of the species of algae take microscopic analysis by a trained phycologists which was beyond the scope of this work. Based on visual keys the species was more than likely in the genus *Lyngbia* or *Pithophora*. Both are extremely tough stringy mats that are highly resistant to copper based algicides. They usually start growing on the bottom then come to the surface particularly in hot weather.

Water Chemistry

CAES IAPP has found that the occurrence of invasive plants in lakes can be attributed to specific water chemistries (June-Wells et al. 2013). For instance, lakes with higher alkalinities and conductivities are more likely to support Eurasian watermilfoil, minor naiad and curlyleaf pondweed while lakes with lower values support fanwort and variable watermilfoil. Lake

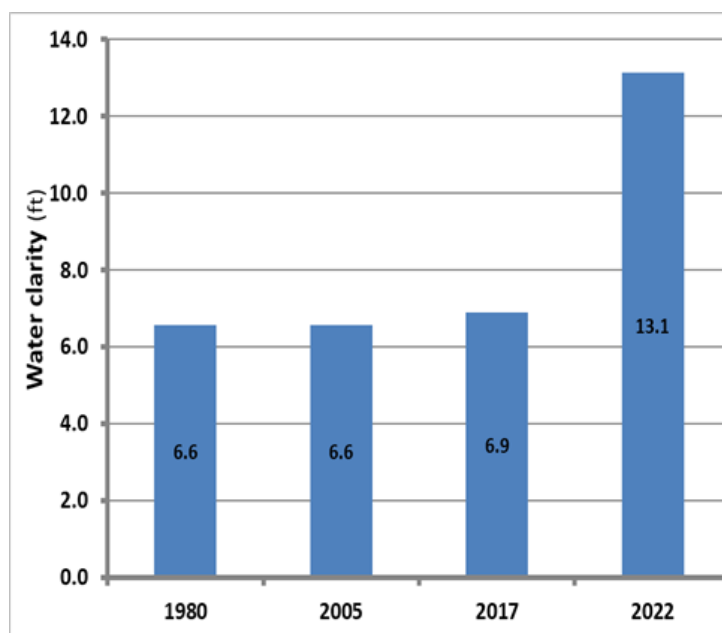


Figure 17. Water clarity in Lake Housatonic in 1980, 2005, 2017, and 2022.

Housatonic falls into the former category. Zebra mussels also prefer water in the former category. Water chemistry may be altered when nutrients are utilized by plants or when plants decay from herbicide damage. In addition, nutrients not used by plants can support the occurrence of nuisance algal blooms. During each lake survey we perform chemical water testing to compare conditions between lakes. Because these water tests are performed only once a year, they may not be indicative of conditions at other times. Identification of sources and quantities of nutrient reaching Lake Housatonic from the watershed are beyond the scope of this report.

On June 30, 2022, the water clarity of Lake Housatonic was 13 feet (Figure 17). This is considerably greater than measurements in 1980 (Frink and Norvell, 1984) and 2017 (Bugbee and Wiegand, 2018). Water clarities in Connecticut's lakes ranged from <1 to over 30 feet with an average of 7 feet (CAES IAPP, 2022). Thus, the water clarity of Lake Housatonic in 2022 ranks above the norm. Because the 2022 measurement was done about a month earlier, timing could play a role in the increase.

Temperature and dissolved oxygen profiles were relatively consistent from year to year and surface to bottom (Figure 18) indicating little stratification. The coolest water

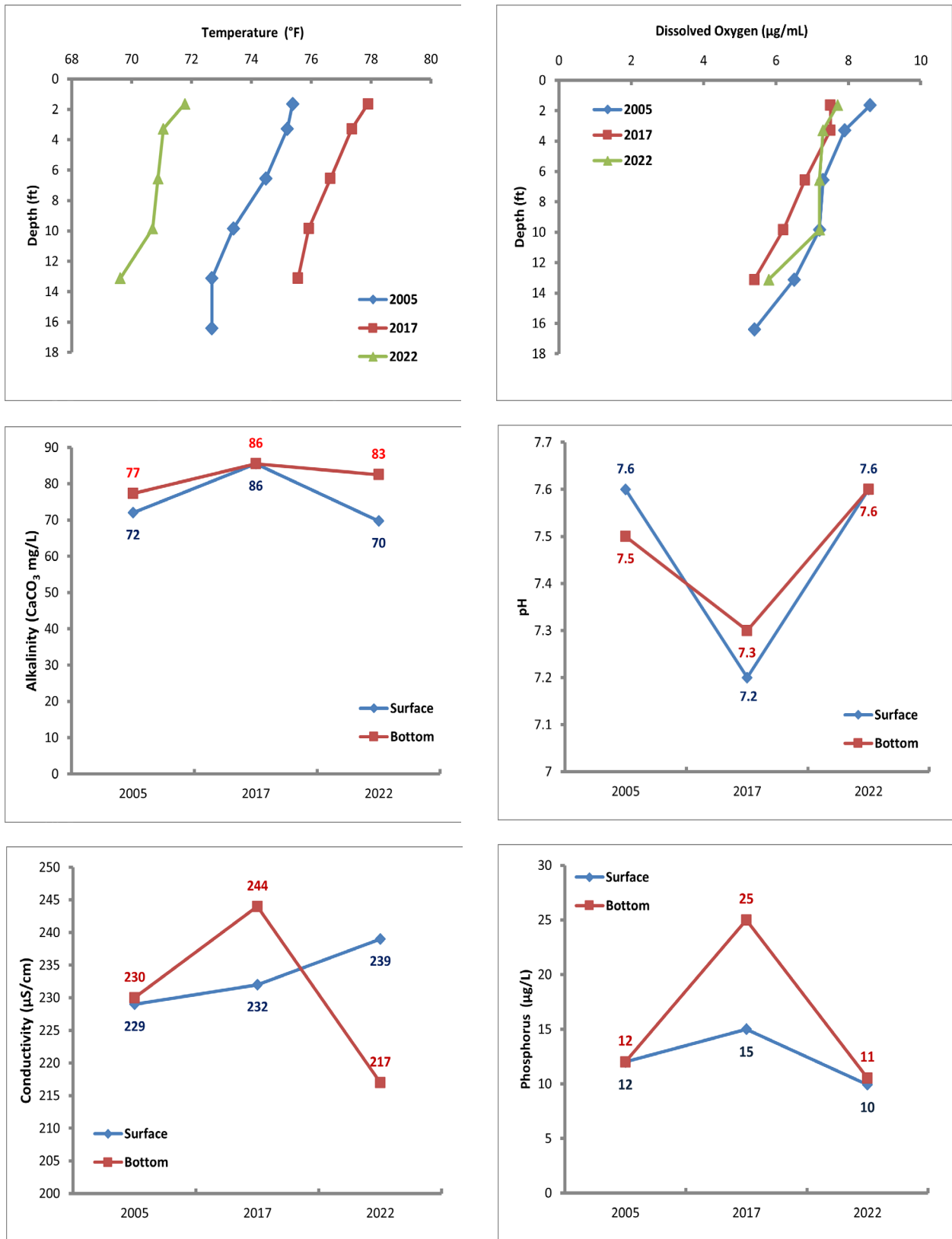


Figure 18. Water chemistry in Lake Housatonic in 2005, 2017, and 2022 (nitrogen tests are pending).

temperature was observed in 2022 likely because of the late June sampling date was nearly a month earlier than previous sampling dates. Dissolved oxygen remained high throughout the water column.

The pH of Lake Housatonic was 7.6 at both the surface and near the bottom in 2022 indicating a near neutral condition (Figure 18). This is likely due to mixing in the riverine environment. Previous pH tests found slightly lower pH's in 2017 (7.2 surface, 7.3 bottom) and nearly the same pH's in 2005 (7.2 surface, 7.3 bottom).

Alkalinities in Connecticut's lakes range from near 0 to over 170 mg/L CaCO₃ (CAES IAPP 2022, Canavan and Siver 1995, Frink and Norvell 1984). Increasing alkalinities reduce the risk of changes caused by acid rain and other natural and manmade influences. Lake Housatonic's surface alkalinity in 2022 ranged from 70 mg/L at the surface to 83 mg/L near the bottom. This has changed little from 2005 and 2017 when surface alkalinities ranged from 72 mg/L to 86 mg/L and bottom samples ranged from 77 mg/L to 86 mg/L.

Conductivity is an indicator of dissolved ions that come from natural and man-made sources (rainfall, mineral weathering, organic matter decomposition, fertilizers, septic systems, road salts, etc.). The 2022 conductivity of Lake Housatonic ranged from 217 - 239 $\mu\text{S}/\text{cm}$ with the higher level occurring in the surface water (Figure 18). This has remained consistent to the earlier surveys when the lake's conductivity ranged from 229 $\mu\text{S}/\text{cm}$ to 244 $\mu\text{S}/\text{cm}$.

A key parameter used to categorize a lake's trophic state is the concentration of phosphorus (P) in the water column. High levels of P and N can lead to nuisance or toxic algal blooms (Frink and Norvell, 1984; Wetzel, 2001). Rooted macrophytes are considered to be less dependent on P from the water column as they obtain a majority of their nutrients from the hydrosol (Bristow and Whitcombe, 1971). Lakes with P levels from 0 - 10 $\mu\text{g}/\text{L}$ are considered nutrient-poor or oligotrophic. When P concentrations reach 15 - 25 $\mu\text{g}/\text{L}$, lakes are classified as moderately fertile or mesotrophic and when P reaches 30 - 50 $\mu\text{g}/\text{L}$ they are considered fertile or eutrophic (Frink and Norvell, 1984). Lakes with P concentrations over 50 $\mu\text{g}/\text{L}$ are categorized as extremely fertile or hypereutrophic. The P concentration in Lake Housatonic in summer 2005 was 12 $\mu\text{g}/\text{L}$ at both the surface and the bottom. The spring and summer 2017 tests yielded similar results in P concentration. At the surface both times the concentration was 15 $\mu\text{g}/\text{L}$ and the bottom water concentrations increased similarly to 25

$\mu\text{g/L}$ in the spring and $23 \mu\text{g/L}$ in summer 2017. This partitioning of P between the surface and bottom water is common in the summer as anoxic conditions release P from the sediment (Norvell, 1974) and temperature stratification prevents vertical mixing. In 2022, P concentrations were very similar to 2005 levels with $11 \mu\text{g/L}$ at the bottom and $10 \mu\text{g/L}$ at the surface. This suggests oligotrophic conditions, but with only one water data point from one day of the season, it is not certain. We tested total nitrogen (TN) for the first time in 2022 and found $1312 \mu\text{g/L}$ at the surface and $1305 \mu\text{g/L}$ near the bottom. Although nitrogen is likely less limiting to the growth of aquatic plants and algae compared to terrestrial plants, it may play a role in lake productivity. Frink and Norvell (1984) found TN in Connecticut lakes ranged from 193 - 1830 $\mu\text{g/L}$ and averaged 554 $\mu\text{g/L}$.

In order to get a more complete picture of the water chemistry of Lake Housatonic, more water data points could be established in the future. In particular, a sampling site near the Stevenson Dam would give information on the water (possibly high P, anaerobic bottom water) being removed from Lake Zoar.

Conclusions

Lake Housatonic was surveyed for aquatic vegetation by CAES IAPP for the third time in 2022. Previous surveys were performed in 2005 and 2017. In 2018, herbicide applications began targeting Eurasian watermilfoil and other nuisance plants. The 2022 survey included both pre and posttreatment mapping. Our 2022 survey found the invasive species Eurasian watermilfoil and curlyleaf pondweed. Eurasian watermilfoil covered 2.4 acres in 2022 compared to 139 acres in 2017 while curlyleaf pondweed coverage decreased from 50 to 19 acres. Nine native plant species occurred in 2022 compared to 14 in 2017 and 4 in 2005. After the 2022 herbicide application virtually no Eurasian watermilfoil remained. Curlyleaf pondweed was not found as well but this was likely due to its natural mid-summer decline. Eelgrass acreage increased posttreatment indicating the herbicide application was less effective on this plant. The response of the other native species to the herbicides varied with some increasing, some decreasing and others remaining largely unchanged. Changes in herbicide strategy may be needed to reflect the changing plant community.

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References

- Bristow, J. M. and Whitcombe, M. (1971). The role of roots in the nutrition of aquatic vascular plants. *Amer. J. Bot.* 58, 8-13.
- Bugbee, G. J., Barton, M. E., Gibbons, J. A., and Stebbins, S. E. (2018). Connecticut's Invasive Aquatic Plant, Clam, and Mussel Identification Guide 3rd Ed. CAES Bulletin 1056. Retrieved December 16, 2022, from <https://portal.ct.gov/-/media/CAES/Invasive-Aquatic-Plant-Program/Publications/Plant-Identification/B1056.pdf>
- Bugbee, G. J. and Wiegand, A. C. (2018). Monitoring Report: Invasive Aquatic Plants, Lake Housatonic 2017. The Connecticut Agricultural Experiment Station. <https://portal.ct.gov/-/media/CAES/Invasive-Aquatic-Plant-Program/Publications/Survey-Information/LakeHousatonicReport2017FinalRev121817pdf>
- CAES IAPP. (2022). The Connecticut Agricultural Experiment Station Invasive Aquatic Plant Program (CAES IAPP). Retrieved December 15, 2022, from <https://portal.ct.gov/caes-iapp>
- Canavan, R. W. IV, and Siver, P. A. (1995). Connecticut Lakes: A study of the chemical and physical properties of fifty-six Connecticut Lakes. Connecticut College Arboretum. New London, CT.

- Catling, P. M. and Dobson, I. (1985). The biology of Canadian weeds. *Potamogeton crispus* L. *Canadian Journal of Plant Science*, 65, 655-668.
- Connecticut Aquatic Nuisance Species Working Group. (2006). Connecticut aquatic nuisance species management plan. Retrieved December 17, 2007 from <http://www.ctiwr.uconn.edu/ProjANS/SubmittedMaterial2005/Material200601/ANS%20Plan%20Final%20Draft121905.pdf>
- Crow, G. E. and Hellquist, C. B. (2000a). Aquatic and Wetland Plants of Northeastern North America. Vol. 1. Pteridophytes, Gymnosperms and Angiosperms: Dicotyledons. University of Wisconsin Press, Madison.
- Crow, G. E. and Hellquist, C. B. (2000b). Aquatic and Wetland Plants of Northeastern North America. Vol. 2. Angiosperms: Monocotyledons. University of Wisconsin Press, Madison.
- Frink, C. R. and Norvell, W. A. (1984). Chemical and physical properties of Connecticut lakes. *CAES Bulletin* 817.
- Jacobs, R. P. and O'Donnell, E. B. (2002). A fisheries guide to lakes and ponds of Connecticut. Including the Connecticut River and its coves. *CT DEP Bulletin* 35.
- June-Wells, M. F., Gallagher, J., Gibbons, J. A., and Bugbee, G. J. (2013). Water chemistry preferences of five nonnative aquatic macrophyte species in Connecticut: A preliminary risk assessment tool. *Lake and Reservoir Management*, 29, 303-316.
- Les, D. H. and Mehroff, L. J. (1999). Introduction of nonindigenous aquatic vascular plants in southern New England: a historical perspective. *Biological Invasions*, 1, 281-300.
- Norvell, W. A. (1974). Insolubilization of inorganic phosphorus by anoxic lake sediment. *Soil Sci. Soc. Amer. Proc.* 38, 441-445.
- Wetzel, R. G. (2001). Limnology: Lake and River Ecosystems 3rd ed. Academic Press, San Diego, CA. <http://www.academicpress.com>
- Wilcove, D. S., Rothstien, D., Dubow, J., Phillips, A., and Losos, E. (1998). Quantifying threats to imperiled species in the United States. *BioScience*, 48, 607-615.

Appendix






2022 Survey Pretreatment Maps

Lake Housatonic

Derby, Monroe, Oxford,
Seymour, and Shelton
347 acres


Surveyed on June 28-30, 2022
By Greg Bugbee, Summer Stebbins,
Eva Ramey, and Meara Burns
Office of Aquatic Invasive Species

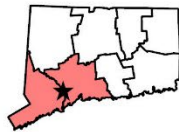
Legend

-  Collection Point
-  Transect Point
-  Water Data
-  Boat Path
-  Bathymetry (ft)

Invasive Points and Patches

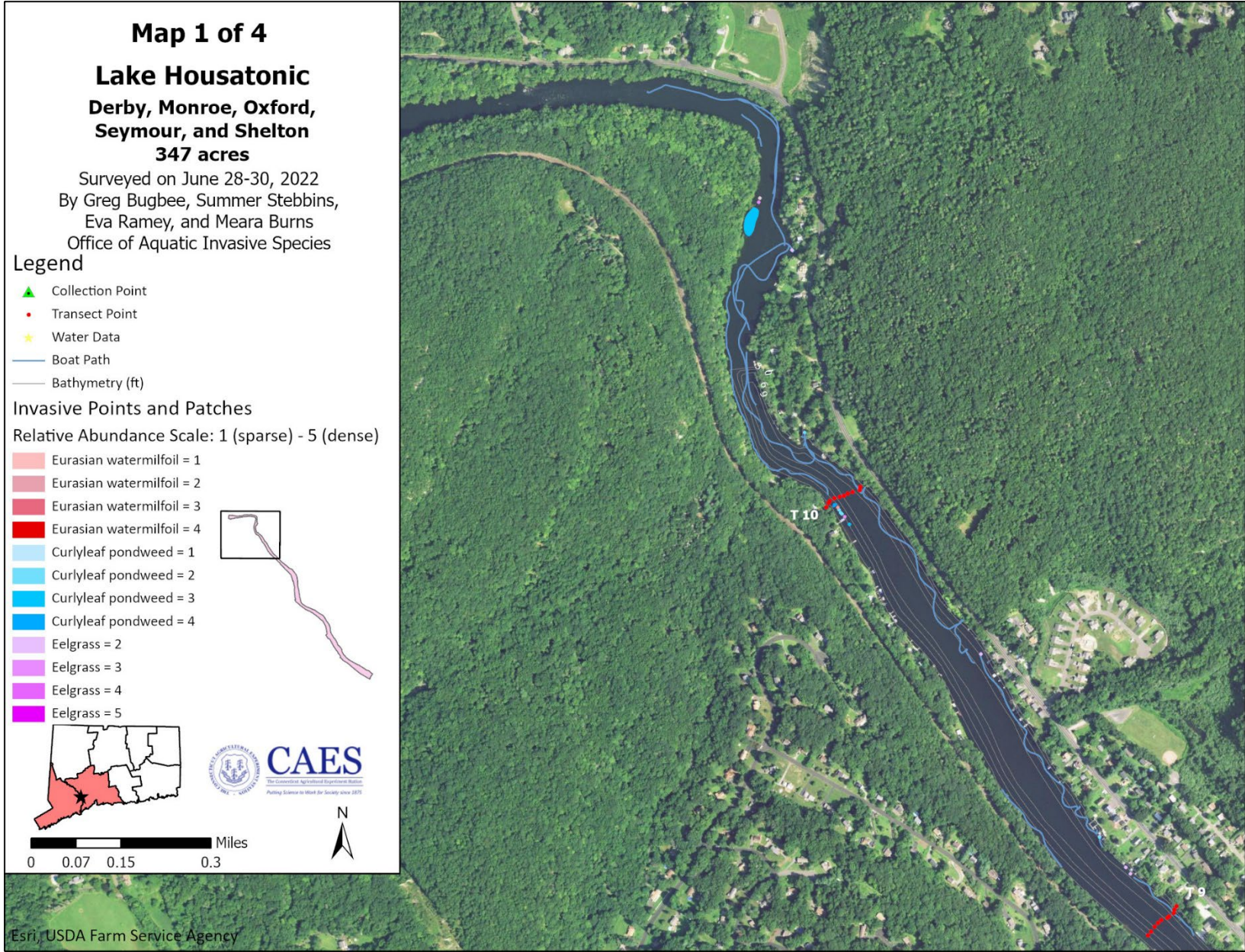
Relative Abundance Scale: 1 (sparse) - 5 (dense)

-  Eurasian watermilfoil = 1
-  Eurasian watermilfoil = 2
-  Eurasian watermilfoil = 3
-  Eurasian watermilfoil = 4
-  Curlyleaf pondweed = 1
-  Curlyleaf pondweed = 2
-  Curlyleaf pondweed = 3
-  Curlyleaf pondweed = 4
-  Eelgrass = 2
-  Eelgrass = 3
-  Eelgrass = 4
-  Eelgrass = 5



Esri, USDA Farm Service Agency










Map 2 of 4

Lake Housatonic Derby, Monroe, Oxford, Seymour, and Shelton 347 acres


Surveyed on June 28-30, 2022
By Greg Bugbee, Summer Stebbins,
Eva Ramey, and Meara Burns
Office of Aquatic Invasive Species

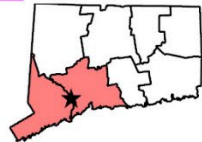
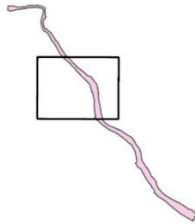
Legend

-  Collection Point
-  Transect Point
-  Water Data
-  Boat Path
-  Bathymetry (ft)

Invasive Points and Patches

Relative Abundance Scale: 1 (sparse) - 5 (dense)

-  Eurasian watermilfoil = 1
-  Eurasian watermilfoil = 2
-  Eurasian watermilfoil = 3
-  Eurasian watermilfoil = 4
-  Curlyleaf pondweed = 1
-  Curlyleaf pondweed = 2
-  Curlyleaf pondweed = 3
-  Curlyleaf pondweed = 4
-  Eelgrass = 2
-  Eelgrass = 3
-  Eelgrass = 4
-  Eelgrass = 5



0 0.07 0.15 0.3 Miles



Esri, USDA Farm Service Agency








Map 3 of 4

Lake Housatonic Derby, Monroe, Oxford, Seymour, and Shelton 347 acres



Surveyed on June 28-30, 2022
By Greg Bugbee, Summer Stebbins,
Eva Ramey, and Meara Burns
Office of Aquatic Invasive Species

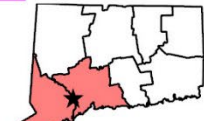
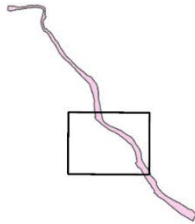
Legend

-  Collection Point
-  Transect Point
-  Water Data
-  Boat Path
-  Bathymetry (ft)

Invasive Points and Patches

Relative Abundance Scale: 1 (sparse) - 5 (dense)

-  Eurasian watermilfoil = 1
-  Eurasian watermilfoil = 2
-  Eurasian watermilfoil = 3
-  Eurasian watermilfoil = 4
-  Curlyleaf pondweed = 1
-  Curlyleaf pondweed = 2
-  Curlyleaf pondweed = 3
-  Curlyleaf pondweed = 4
-  Eelgrass = 2
-  Eelgrass = 3
-  Eelgrass = 4
-  Eelgrass = 5

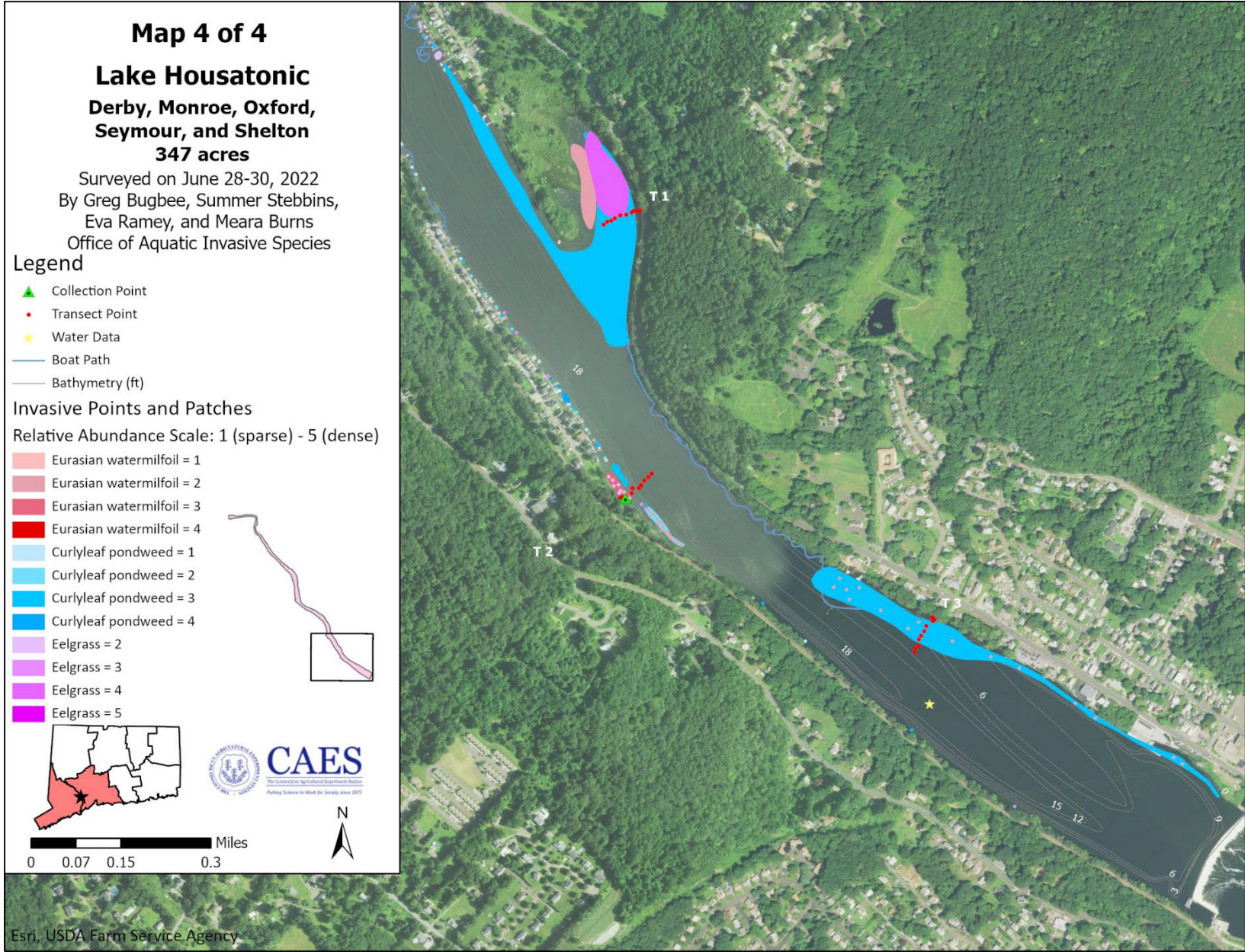


0 0.07 0.15 0.3 Miles



Esri, USDA Farm Service Agency





2022 Survey Posttreatment Maps

Lake Housatonic

Derby, Monroe, Oxford,
Seymour, and Shelton
347 acres

Surveyed on September 11-12, 2022
By Greg Bugbee
Office of Aquatic Invasive Species

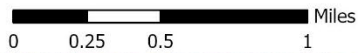
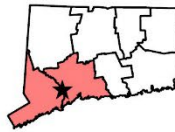
Legend

- Collection Point
- Transect Point
- Water Data
- Boat Path
- Bathymetry (ft)

Invasive Points and Patches

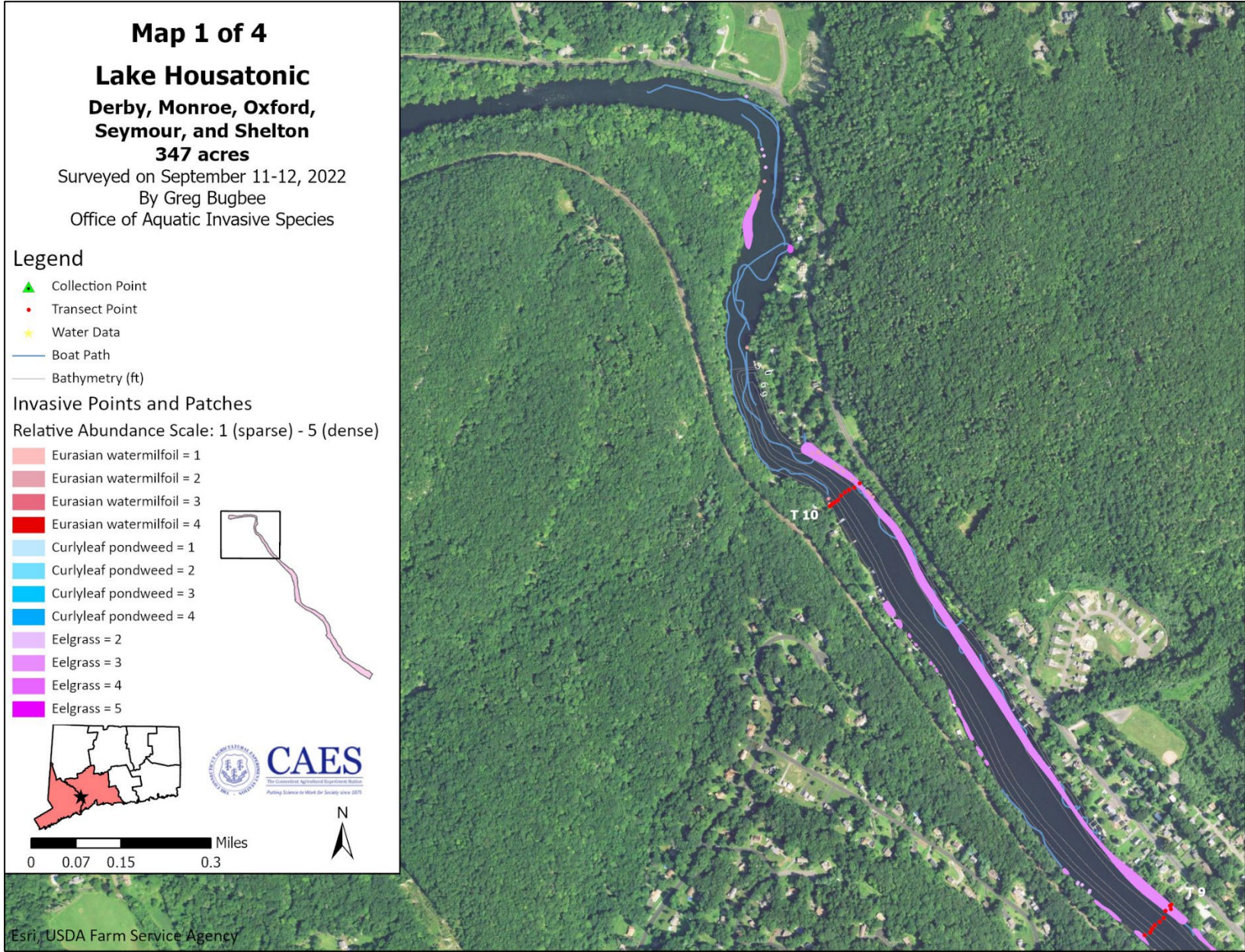
Relative Abundance Scale: 1 (sparse) - 5 (dense)

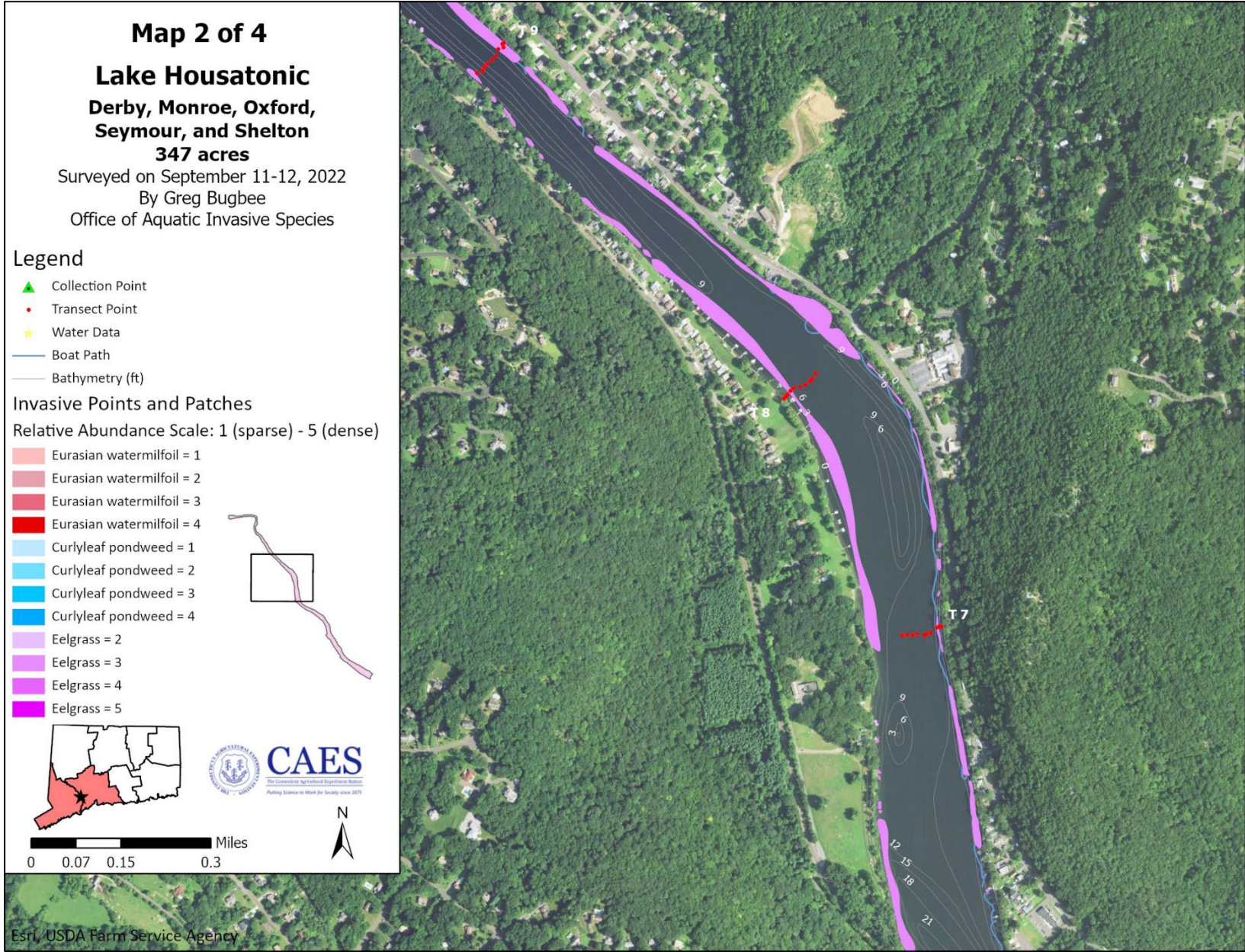
- Eurasian watermilfoil = 1
- Eurasian watermilfoil = 2
- Eurasian watermilfoil = 3
- Eurasian watermilfoil = 4
- Curlyleaf pondweed = 1
- Curlyleaf pondweed = 2
- Curlyleaf pondweed = 3
- Curlyleaf pondweed = 4
- Eelgrass = 2
- Eelgrass = 3
- Eelgrass = 4
- Eelgrass = 5

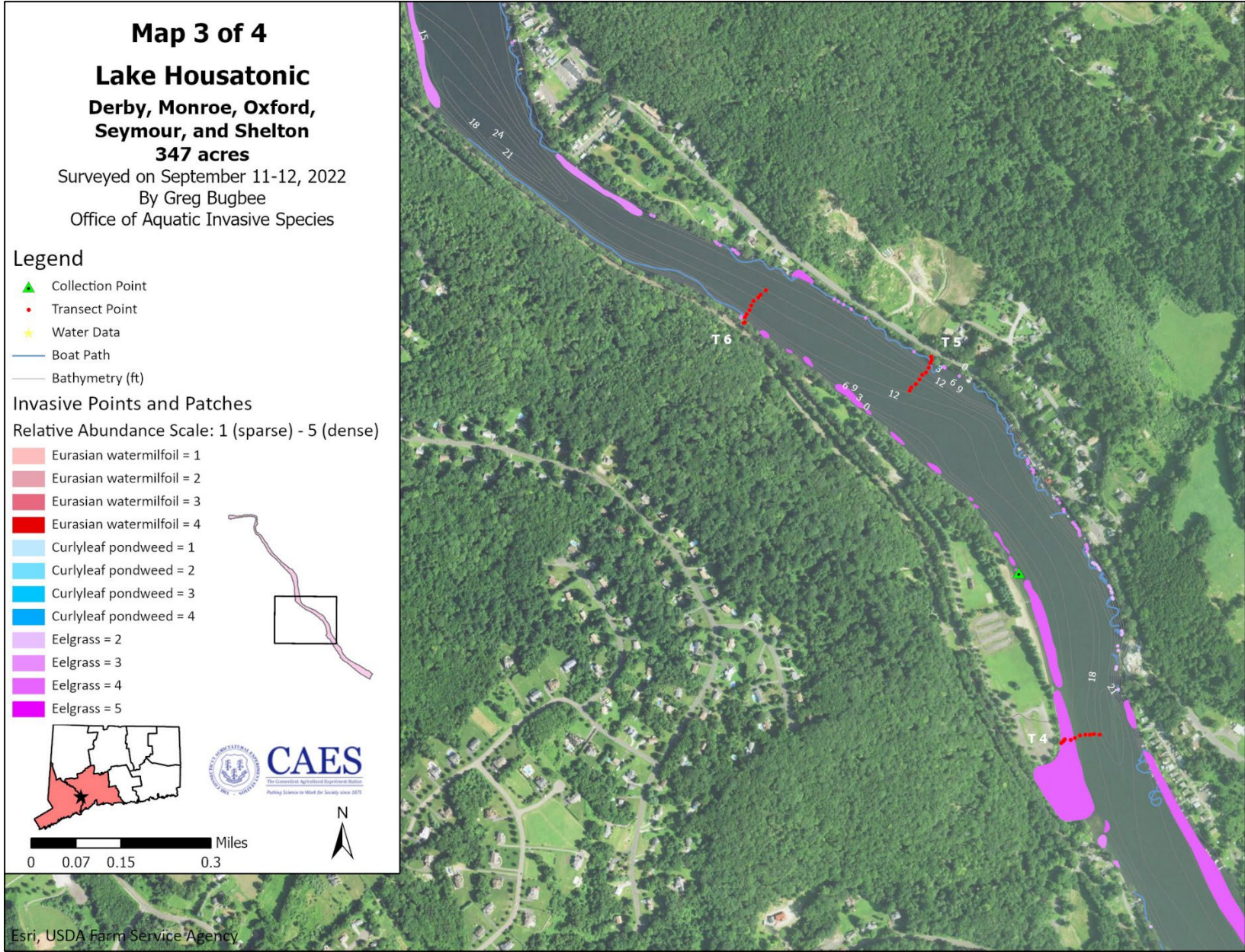


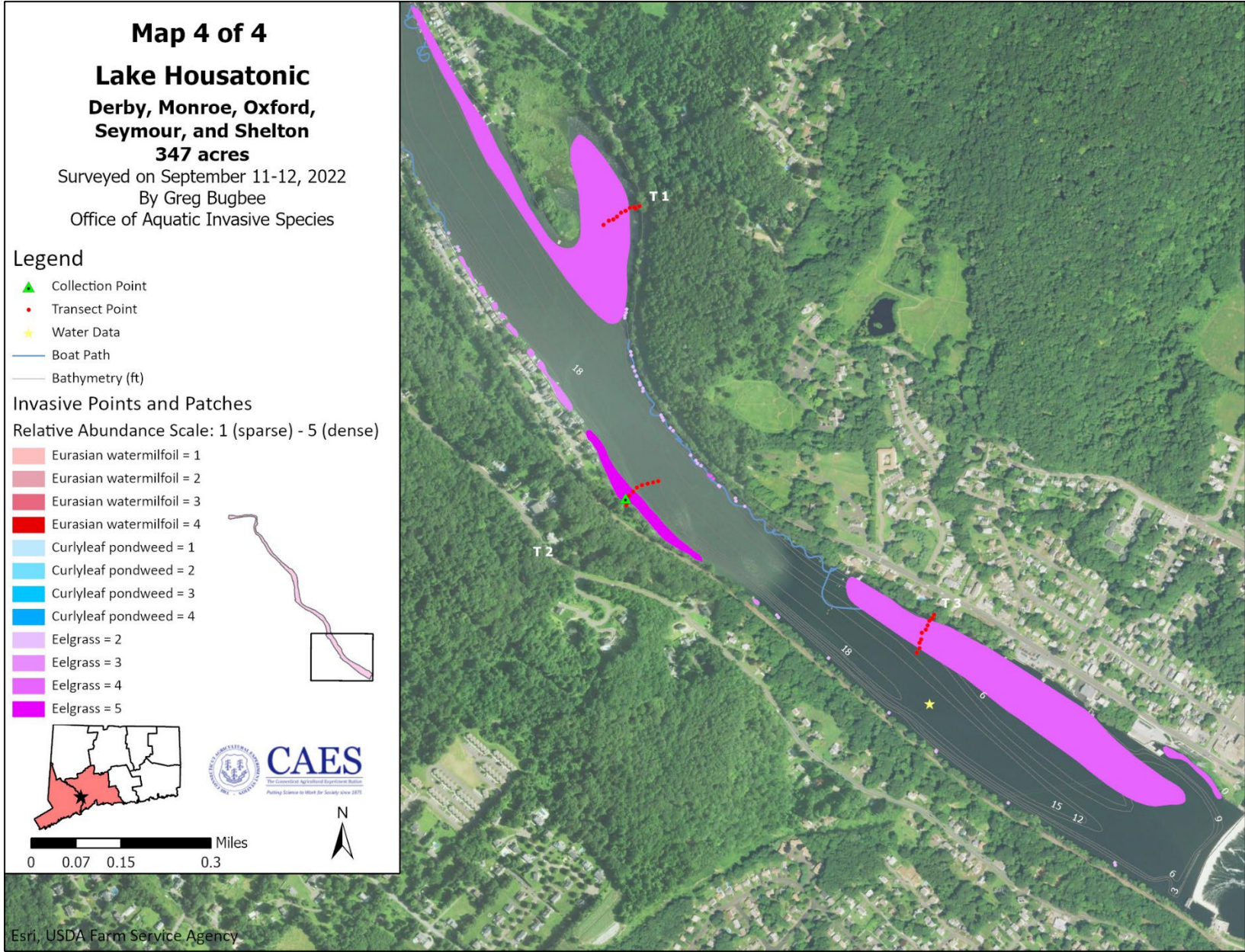
Esri, USDA Farm Service Agency











Invasive Plant Descriptions

Myriophyllum spicatum

Common name:
Eurasian watermilfoil

Origin:
Europe and Asia

Key features:
Plants are submersed

Stems: Stem diameter below the inflorescence is greater with reddish stem tips

Leaves: Leaves are rectangular with ≥ 12 pairs of leaflets per leaf and are dissected giving a feathery appearance, arranged in a whorl, whorls are 1 inch (2.5 cm) apart

Flowers: Small pinkish male flowers that occur on reddish spikes, female flowers lack petals and sepals and have 4 lobed pistil

Fruits/Seeds: Fruit are round 0.08-0.12 inches (2-3 mm) and contain 4 seeds

Reproduction: Fragmentation and seeds

Easily confused species:

Variable-leaf watermilfoil: *Myriophyllum heterophyllum*

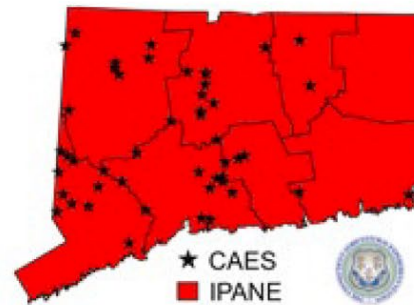
Low watermilfoil: *Myriophyllum humile*

Northern watermilfoil: *Myriophyllum sibiricum*

Whorled watermilfoil: *Myriophyllum verticillatum*



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Center for Aquatic and Invasive Plants



Najas minor

Common names:

- Minor naiad
- Brittle waternymph
- Spiny leaf naiad
- Eutrophic waternymph

Origin:

Europe

Key features:

Plants are submersed

Stems: Branched stems can grow up to 4-8 inches (10-20 cm) long

Leaves: Opposite and lance shaped on branched stems with easily visible toothed leaf edges and leaves appear curled under, basal lobes of leaf are also serrated, 0.01-0.02 inches (0.3-0.5 mm)

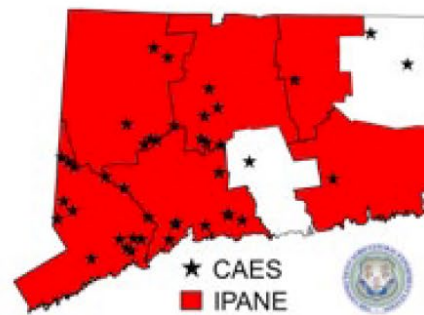
Flowers: Monoecious (male and female flowers on same plant)

Fruits/Seeds: Fruits are purple-tinged and seeds measure 0.03-0.06 inches (1.5-3 mm)

Reproduction: Seeds and fragmentation

Easily confused species:

Other naiads (native): *Najas* spp.



Potamogeton crispus

Common names:

Curly leaf pondweed
Crispy-leaved pondweed
Crisped pondweed

Origin:

Asia, Africa, and Europe

Key features:

Plants are submersed

Stems: Stems are flattened, can form dense stands in water up to 15 feet (5 m) deep

Leaves: Alternate leaves 0.3-1 inches (3-8 cm) wide with wavy edges (similar to lasagna) with a prominent mid-vein

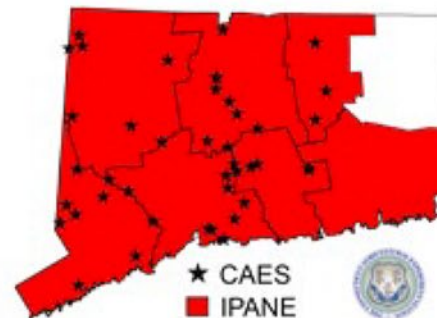
Flowers: Brown and inconspicuous

Fruits/Seeds: Fruit is oval 0.1 inches (3 mm) long

Reproduction: Turions (right) and seeds

Easily confused species:

None



Vallisneria americana

Common names:

Eelgrass
Tapegrass
Wild celery

Origin:

Native to Connecticut

Key features:

Plants are submersed

Stems:

Leaves: Leaves basal, long and ribbon-like, broad lacunae band

Flowers: Pistillate flowers solitary, sessile, enclosed in a tubular spathe, reaching surface by peduncle elongation

Reproduction: Asexually via runners or stolons and winter buds and sexually via seeds

Easily confused species:

Arrowheads (Native): *Sagittaria* species

Pickeralweed (Native): *Pontederia cordata*

Bur-reeds (Native): *Sparganium* species



Photo by Ron Vanderhoff (CC BY-NC)

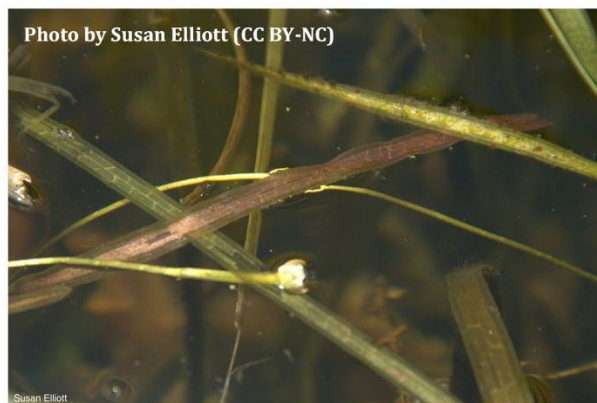
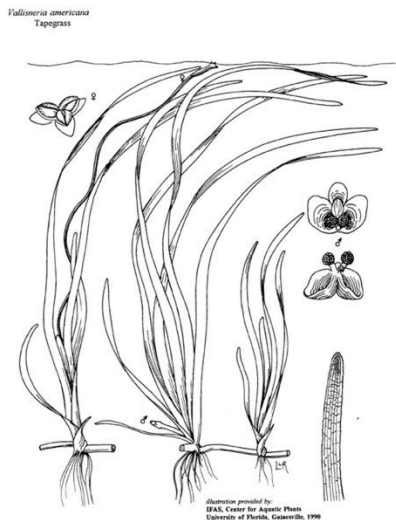


Photo by Susan Elliott (CC BY-NC)



Sources:

Crow, G.E. and C.B. Hellquist. 2000. Aquatic and wetland plants of northeastern North America. Vol 2. Angiosperms: Monocotyledons. The University of Wisconsin Press, Madison, Wisconsin.

Tootoonchi M, Gettys L.A., and Bhadha J.H. 2019. Tapegrass, eelgrass, or wild celery (*Vallisneria americana* Michaux): a native aquatic and wetland plant. University of Florida's Institute of Food and Agricultural Sciences. Retrieved December 15, 2022. <https://edis.ifas.ufl.edu/publication/AG437>.

Invasive Aquatic Plant Location Data

Appendix Lake Housatonic Invasive Plant Location data (1 of 9)

FID	Invasive Plant Name	Notes	Type	Date	Latitude	Longitude	Depth (m)	Abundance	Area (acres)
1	MyrSpi		Point	6/28/2022	41.33423	-73.11830	0-1	2	0.0002
2	MyrSpi		Point	6/28/2022	41.33271	-73.11693	0-1	1	0.0002
3	MyrSpi		Point	6/28/2022	41.34181	-73.12358	0-1	4	0.0002
4	MyrSpi		Point	6/28/2022	41.34098	-73.12343	0-1	1	0.0002
5	MyrSpi		Point	6/28/2022	41.34476	-73.12502	0-1	1	0.0002
6	MyrSpi		Point	6/28/2022	41.34604	-73.12668	0-1	1	0.0002
7	MyrSpi		Point	6/28/2022	41.34799	-73.12973	0-1	4	0.0002
8	MyrSpi		Point	6/28/2022	41.34801	-73.12977	0-1	3	0.0002
9	MyrSpi		Point	6/28/2022	41.35367	-73.13904	0-1	2	0.0002
10	MyrSpi		Point	6/28/2022	41.36362	-73.14271	0-2	1	0.0002
11	MyrSpi		Point	6/28/2022	41.36409	-73.14322	0-2	1	0.0002
12	MyrSpi		Point	6/28/2022	41.37630	-73.15655	0-2	2	0.0002
13	MyrSpi		Point	6/28/2022	41.38190	-73.15843	0-2	1	0.0002
14	MyrSpi		Point	6/28/2022	41.34946	-73.12964	0-1	2	0.0002
15	MyrSpi		Point	6/28/2022	41.36434	-73.14099	0-2	1	0.0002
16	MyrSpi		Point	6/28/2022	41.36434	-73.14111	0-2	2	0.0002
17	MyrSpi		Point	6/28/2022	41.33181	-73.11589	1-3	2	0.0002
18	MyrSpi		Point	6/28/2022	41.33172	-73.11587	1-3	2	0.0002
19	MyrSpi		Point	6/28/2022	41.33166	-73.11571	1-3	2	0.0002
20	MyrSpi		Point	6/28/2022	41.33174	-73.11580	1-3	2	0.0002
21	MyrSpi		Point	6/28/2022	41.33157	-73.11569	1-3	2	0.0002
22	MyrSpi		Point	6/28/2022	41.33142	-73.11551	1-3	2	0.0002
23	MyrSpi		Point	6/28/2022	41.33152	-73.11555	1-3	2	0.0002
24	MyrSpi		Point	6/28/2022	41.33141	-73.11544	1-3	2	0.0002
25	MyrSpi		Point	6/28/2022	41.33147	-73.11558	1-3	2	0.0002
26	MyrSpi		Point	6/28/2022	41.33159	-73.11563	1-3	2	0.0002
27	MyrSpi		Point	6/28/2022	41.33130	-73.11537	1-3	2	0.0002
28	MyrSpi		Point	6/28/2022	41.33123	-73.11520	1-3	2	0.0002
29	MyrSpi		Point	6/28/2022	41.33118	-73.11513	1-3	2	0.0002
30	MyrSpi		Point	6/28/2022	41.33127	-73.11527	1-3	2	0.0002
31	MyrSpi		Point	6/28/2022	41.33136	-73.11539	1-3	2	0.0002
32	MyrSpi		Point	6/28/2022	41.33043	-73.11145	1-3	2	0.0002
33	MyrSpi		Point	6/28/2022	41.33058	-73.11131	1-3	2	0.0002
34	MyrSpi		Point	6/28/2022	41.33020	-73.11106	1-3	2	0.0002
35	MyrSpi		Point	6/28/2022	41.33041	-73.11082	1-3	2	0.0002
36	MyrSpi		Point	6/28/2022	41.33038	-73.11114	1-3	2	0.0002
37	MyrSpi		Point	6/28/2022	41.33000	-73.11031	1-3	2	0.0002
38	MyrSpi		Point	6/28/2022	41.32944	-73.10858	1-3	2	0.0002
39	MyrSpi		Point	6/28/2022	41.32967	-73.10965	1-3	2	0.0002
40	MyrSpi		Point	6/28/2022	41.32979	-73.10940	1-3	2	0.0002
41	MyrSpi		Point	6/28/2022	41.32916	-73.10765	1-3	2	0.0002
42	MyrSpi		Point	6/28/2022	41.32895	-73.10697	1-3	2	0.0002
43	MyrSpi		Point	6/28/2022	41.32831	-73.10562	1-3	2	0.0002
44	MyrSpi		Point	6/28/2022	41.32805	-73.10513	1-3	2	0.0002
45	MyrSpi		Point	6/28/2022	41.32734	-73.10325	1-3	2	0.0002
46	MyrSpi		Point	6/28/2022	41.32722	-73.10304	1-3	2	0.0002
47	MyrSpi		Patch	6/28/2022	41.34005	-73.12099	0-2	2	0.0508
48	MyrSpi		Patch	6/28/2022	41.34153	-73.12195	0-2	2	0.1932
49	MyrSpi		Patch	6/28/2022	41.33223	-73.11664	0-1	3	0.2647
50	MyrSpi		Patch	6/28/2022	41.33999	-73.12342	0-1	3	0.7779

Appendix Lake Housatonic Invasive Plant Location data (2 of 9)

FID	Invasive Plant Name	Notes	Type	Date	Latitude	Longitude	Depth (m)	Abundance	Area (acres)
51	MyrSpi		Patch	6/28/2022	41.33770	-73.11743	0-2	2	1.0854
52	PotCri		Point	6/28/2022	41.33913	-73.12243	0-1	2	0.0002
53	PotCri		Point	6/28/2022	41.33889	-73.12223	0-1	2	0.0002
54	PotCri		Point	6/28/2022	41.33845	-73.12186	0-1	1	0.0002
55	PotCri		Point	6/28/2022	41.33803	-73.12162	0-1	1	0.0002
56	PotCri		Point	6/28/2022	41.33790	-73.12152	0-1	1	0.0002
57	PotCri		Point	6/28/2022	41.33764	-73.12133	0-1	1	0.0002
58	PotCri		Point	6/28/2022	41.33637	-73.12044	0-1	1	0.0002
59	PotCri		Point	6/28/2022	41.33632	-73.12037	0-1	3	0.0002
60	PotCri		Point	6/28/2022	41.33606	-73.12019	0-1	2	0.0002
61	PotCri		Point	6/28/2022	41.33573	-73.11985	0-1	2	0.0002
62	PotCri		Point	6/28/2022	41.33550	-73.11959	0-1	2	0.0002
63	PotCri		Point	6/28/2022	41.33534	-73.11944	0-1	3	0.0002
64	PotCri		Point	6/28/2022	41.33509	-73.11920	0-1	2	0.0002
65	PotCri		Point	6/28/2022	41.33421	-73.11827	0-1	4	0.0002
66	PotCri		Point	6/28/2022	41.33406	-73.11807	0-1	4	0.0002
67	PotCri		Point	6/28/2022	41.33368	-73.11773	0-1	3	0.0002
68	PotCri		Point	6/28/2022	41.33360	-73.11764	0-1	2	0.0002
69	PotCri		Point	6/28/2022	41.33328	-73.11741	0-1	1	0.0002
70	PotCri		Point	6/28/2022	41.33303	-73.11715	0-1	3	0.0002
71	PotCri		Point	6/28/2022	41.33299	-73.11712	0-1	3	0.0002
72	PotCri		Point	6/28/2022	41.33276	-73.11696	0-1	2	0.0002
73	PotCri		Point	6/28/2022	41.33211	-73.11634	0-1	3	0.0002
74	PotCri		Point	6/28/2022	41.33193	-73.11608	0-1	3	0.0002
75	PotCri		Point	6/28/2022	41.33188	-73.11598	0-1	3	0.0002
76	PotCri		Point	6/28/2022	41.33013	-73.11316	0-1	3	0.0002
77	PotCri		Point	6/28/2022	41.32944	-73.11214	0-1	1	0.0002
78	PotCri		Point	6/28/2022	41.32783	-73.10957	0-1	3	0.0002
79	PotCri		Point	6/28/2022	41.34604	-73.12665	0-1	1	0.0002
80	PotCri		Point	6/28/2022	41.34615	-73.12676	0-1	2	0.0002
81	PotCri		Point	6/28/2022	41.34622	-73.12695	0-1	1	0.0002
82	PotCri		Point	6/28/2022	41.34753	-73.12892	0-1	3	0.0002
83	PotCri		Point	6/28/2022	41.34792	-73.12962	0-1	3	0.0002
84	PotCri		Point	6/28/2022	41.34797	-73.12971	0-1	3	0.0002
85	PotCri		Point	6/28/2022	41.35332	-73.13895	0-1	3	0.0002
86	PotCri		Point	6/28/2022	41.35360	-73.13897	0-1	2	0.0002
87	PotCri		Point	6/28/2022	41.35403	-73.13905	0-1	2	0.0002
88	PotCri		Point	6/28/2022	41.35417	-73.13919	0-1	2	0.0002
89	PotCri		Point	6/28/2022	41.35432	-73.13918	0-1	3	0.0002
90	PotCri		Point	6/28/2022	41.35446	-73.13924	0-1	4	0.0002
91	PotCri		Point	6/28/2022	41.35449	-73.13926	0-1	4	0.0002
92	PotCri		Point	6/28/2022	41.35470	-73.13921	0-1	3	0.0002
93	PotCri		Point	6/28/2022	41.35477	-73.13929	0-1	3	0.0002
94	PotCri		Point	6/28/2022	41.35673	-73.13950	0-1	2	0.0002
95	PotCri		Point	6/28/2022	41.35965	-73.13994	0-2	3	0.0002
96	PotCri		Point	6/28/2022	41.36012	-73.14018	0-2	2	0.0002
97	PotCri		Point	6/28/2022	41.36021	-73.14018	0-2	3	0.0002
98	PotCri		Point	6/28/2022	41.36028	-73.14014	0-2	2	0.0002
99	PotCri		Point	6/28/2022	41.36079	-73.14044	0-1	3	0.0002
100	PotCri		Point	6/28/2022	41.36102	-73.14038	0-1	3	0.0002

Appendix Lake Housatonic Invasive Plant Location data (3 of 9)

FID	Invasive Plant Name	Notes	Type	Date	Latitude	Longitude	Depth (m)	Abundance	Area (acres)
101	PotCri		Point	6/28/2022	41.36419	-73.14325	0-2	1	0.0002
102	PotCri		Point	6/28/2022	41.37600	-73.15627	0-2	3	0.0002
103	PotCri		Point	6/28/2022	41.37619	-73.15645	0-2	2	0.0002
104	PotCri		Point	6/28/2022	41.37621	-73.15647	0-2	2	0.0002
105	PotCri		Point	6/28/2022	41.37627	-73.15652	0-2	2	0.0002
106	PotCri		Point	6/28/2022	41.34253	-73.12226	0-2	2	0.0002
107	PotCri		Point	6/28/2022	41.34237	-73.12231	1-3	2	0.0002
108	PotCri		Point	6/28/2022	41.34200	-73.12220	1-3	3	0.0002
109	PotCri		Point	6/28/2022	41.34514	-73.12340	1-3	2	0.0002
110	PotCri		Point	6/28/2022	41.34533	-73.12352	1-3	2	0.0002
111	PotCri		Point	6/28/2022	41.35013	-73.13192	0-1	2	0.0002
112	PotCri		Point	6/28/2022	41.35141	-73.13520	1-3	2	0.0002
113	PotCri		Point	6/28/2022	41.35371	-73.13681	1-3	2	0.0002
114	PotCri		Point	6/28/2022	41.35493	-73.13706	0-2	1	0.0002
115	PotCri		Point	6/28/2022	41.36430	-73.14107	0-2	2	0.0002
116	PotCri		Point	6/28/2022	41.36608	-73.14422	1-3	2	0.0002
117	PotCri		Point	6/28/2022	41.36681	-73.14544	1-3	2	0.0002
118	PotCri		Point	6/28/2022	41.36686	-73.14554	1-3	2	0.0002
119	PotCri		Point	6/28/2022	41.36694	-73.14572	1-3	2	0.0002
120	PotCri		Point	6/28/2022	41.36814	-73.14728	1-3	2	0.0002
121	PotCri		Point	6/28/2022	41.37033	-73.15024	1-3	2	0.0002
122	PotCri		Point	6/28/2022	41.37766	-73.15735	0-1	2	0.0002
123	PotCri		Point	6/28/2022	41.38096	-73.15764	0-1	2	0.0002
124	PotCri		Point	6/28/2022	41.34040	-73.12134	1-3	3	0.0002
125	PotCri		Point	6/28/2022	41.34023	-73.12110	1-3	3	0.0002
126	PotCri		Point	6/28/2022	41.34021	-73.12105	1-3	3	0.0002
127	PotCri		Patch	6/28/2022	41.37635	-73.15663	0-2	4	0.0130
128	PotCri		Patch	6/28/2022	41.34462	-73.12494	1-3	2	0.0489
129	PotCri		Patch	6/28/2022	41.34005	-73.12099	0-2	2	0.0508
130	PotCri		Patch	6/28/2022	41.33385	-73.11790	0-1	4	0.0590
131	PotCri		Patch	6/28/2022	41.34171	-73.12356	1-3	2	0.1335
132	PotCri		Patch	6/28/2022	41.33246	-73.11660	1-3	3	0.1469
133	PotCri		Patch	6/28/2022	41.34153	-73.12195	0-2	2	0.1932
134	PotCri		Patch	6/28/2022	41.38148	-73.15865	0-2	3	0.2792
135	PotCri		Patch	6/28/2022	41.33154	-73.11559	1-3	2	0.3156
136	PotCri		Patch	6/28/2022	41.33999	-73.12342	0-1	3	0.7779
137	PotCri		Patch	6/28/2022	41.32947	-73.10876	1-3	3	5.7780
138	PotCri		Patch	6/28/2022	41.33685	-73.11752	0-2	3	10.8608
139	ValAme		Point	6/28/2022	41.33540	-73.11939	0-1	3	0.0002
140	ValAme		Point	6/28/2022	41.33504	-73.11910	0-1	3	0.0002
141	ValAme		Point	6/28/2022	41.33426	-73.11835	0-1	3	0.0002
142	ValAme		Point	6/28/2022	41.33192	-73.11607	0-1	3	0.0002
143	ValAme		Point	6/28/2022	41.33182	-73.11595	0-1	3	0.0002
144	ValAme		Point	6/28/2022	41.32645	-73.10708	0-1	3	0.0002
145	ValAme		Point	6/28/2022	41.34737	-73.12867	0-1	3	0.0002
146	ValAme		Point	6/28/2022	41.35329	-73.13891	0-1	3	0.0002
147	ValAme		Point	6/28/2022	41.35338	-73.13895	0-1	3	0.0002
148	ValAme		Point	6/28/2022	41.35370	-73.13901	0-1	3	0.0002
149	ValAme		Point	6/28/2022	41.35596	-73.13938	0-1	2	0.0002
150	ValAme		Point	6/28/2022	41.36263	-73.14139	0-1	4	0.0002

Appendix Lake Housatonic Invasive Plant Location data (4 of 9)

FID	Invasive Plant Name	Notes	Type	Date	Latitude	Longitude	Depth (m)	Abundance	Area (acres)
151	ValAme		Point	6/28/2022	41.36269	-73.14143	0-1	4	0.0002
152	ValAme		Point	6/28/2022	41.36518	-73.14476	0-2	2	0.0002
153	ValAme		Point	6/28/2022	41.37613	-73.15638	0-2	3	0.0002
154	ValAme		Point	6/28/2022	41.38184	-73.15846	0-2	3	0.0002
155	ValAme		Point	6/28/2022	41.34300	-73.12219	0-2	2	0.0002
156	ValAme		Point	6/28/2022	41.34199	-73.12220	1-3	2	0.0002
157	ValAme		Point	6/28/2022	41.34058	-73.12141	1-3	2	0.0002
158	ValAme		Point	6/28/2022	41.34041	-73.12134	1-3	2	0.0002
159	ValAme		Point	6/28/2022	41.34021	-73.12106	1-3	2	0.0002
160	ValAme		Point	6/28/2022	41.34021	-73.12109	1-3	2	0.0002
161	ValAme		Point	6/28/2022	41.34378	-73.12238	1-3	2	0.0002
162	ValAme		Point	6/28/2022	41.34465	-73.12299	1-3	2	0.0002
163	ValAme		Point	6/28/2022	41.34485	-73.12313	1-3	2	0.0002
164	ValAme		Point	6/28/2022	41.34495	-73.12319	1-3	2	0.0002
165	ValAme		Point	6/28/2022	41.34497	-73.12323	1-3	2	0.0002
166	ValAme		Point	6/28/2022	41.34509	-73.12332	1-3	2	0.0002
167	ValAme		Point	6/28/2022	41.34512	-73.12334	1-3	2	0.0002
168	ValAme		Point	6/28/2022	41.34544	-73.12368	1-3	2	0.0002
169	ValAme		Point	6/28/2022	41.34549	-73.12372	1-3	2	0.0002
170	ValAme		Point	6/28/2022	41.34668	-73.12479	1-3	2	0.0002
171	ValAme		Point	6/28/2022	41.34756	-73.12573	1-3	2	0.0002
172	ValAme		Point	6/28/2022	41.34769	-73.12597	1-3	2	0.0002
173	ValAme		Point	6/28/2022	41.34947	-73.12961	0-1	2	0.0002
174	ValAme		Point	6/28/2022	41.35075	-73.13374	0-1	2	0.0002
175	ValAme		Point	6/28/2022	41.35089	-73.13403	0-1	2	0.0002
176	ValAme		Point	6/28/2022	41.35106	-73.13447	0-1	2	0.0002
177	ValAme		Point	6/28/2022	41.35123	-73.13486	0-1	2	0.0002
178	ValAme		Point	6/28/2022	41.35140	-73.13519	0-1	2	0.0002
179	ValAme		Point	6/28/2022	41.35154	-73.13546	1-3	2	0.0002
180	ValAme		Point	6/28/2022	41.36436	-73.14133	0-2	2	0.0002
181	ValAme		Point	6/28/2022	41.36433	-73.14146	1-3	2	0.0002
182	ValAme		Point	6/28/2022	41.36451	-73.14176	1-3	2	0.0002
183	ValAme		Point	6/28/2022	41.36509	-73.14273	1-3	2	0.0002
184	ValAme		Point	6/28/2022	41.36515	-73.14286	1-3	2	0.0002
185	ValAme		Point	6/28/2022	41.36607	-73.14434	1-3	2	0.0002
186	ValAme		Point	6/28/2022	41.36651	-73.14489	1-3	2	0.0002
187	ValAme		Point	6/28/2022	41.36648	-73.14488	1-3	2	0.0002
188	ValAme		Point	6/28/2022	41.36645	-73.14488	1-3	2	0.0002
189	ValAme		Point	6/28/2022	41.36798	-73.14715	1-3	2	0.0002
190	ValAme		Point	6/28/2022	41.36816	-73.14725	1-3	2	0.0002
191	ValAme		Point	6/28/2022	41.36967	-73.14950	1-3	2	0.0002
192	ValAme		Point	6/28/2022	41.36979	-73.14961	1-3	2	0.0002
193	ValAme		Point	6/28/2022	41.37034	-73.15024	1-3	2	0.0002
194	ValAme		Point	6/28/2022	41.37366	-73.15310	1-3	2	0.0002
195	ValAme		Point	6/28/2022	41.38097	-73.15766	0-1	2	0.0002
196	ValAme		Point	6/28/2022	41.33243	-73.11688	0-1	2	0.0002
197	ValAme		Point	6/28/2022	41.33228	-73.11664	0-1	2	0.0002
198	ValAme		Point	6/28/2022	41.33225	-73.11675	0-1	2	0.0002
199	ValAme		Point	6/28/2022	41.33236	-73.11677	0-1	2	0.0002
200	ValAme		Point	6/28/2022	41.33212	-73.11662	0-1	2	0.0002

Appendix Lake Housatonic Invasive Plant Location data (5 of 9)

FID	Invasive Plant Name	Notes	Type	Date	Latitude	Longitude	Depth (m)	Abundance	Area (acres)
201	ValAme		Point	6/28/2022	41.33203	-73.11637	0-1	2	0.0002
202	ValAme		Point	6/28/2022	41.33214	-73.11649	0-1	2	0.0002
203	ValAme		Point	6/28/2022	41.33202	-73.11650	0-1	2	0.0002
204	ValAme		Point	6/28/2022	41.33217	-73.11658	0-1	2	0.0002
205	ValAme		Patch	6/28/2022	41.34462	-73.12494	1-3	2	0.0489
206	ValAme		Patch	6/28/2022	41.34005	-73.12099	0-2	2	0.0508
207	ValAme		Patch	6/28/2022	41.34171	-73.12356	1-3	2	0.1335
208	ValAme		Patch	6/28/2022	41.34153	-73.12195	0-2	2	0.1932
209	ValAme		Patch	6/28/2022	41.33154	-73.11559	1-3	3	0.3156
210	ValAme		Patch	6/28/2022	41.33999	-73.12342	0-1	2	0.7779
211	ValAme		Patch	6/28/2022	41.33781	-73.11695	0-2	4	2.2938
212	MyrSpi		Point	9/10/2022	41.37729	-73.15715	1-3	2	0.0002
213	MyrSpi		Point	9/10/2022	41.37731	-73.15703	1-3	2	0.0002
214	MyrSpi		Point	9/10/2022	41.37727	-73.15698	1-3	2	0.0002
215	MyrSpi		Point	9/10/2022	41.37705	-73.15661	1-3	2	0.0002
216	MyrSpi		Point	9/10/2022	41.37701	-73.15656	1-3	2	0.0002
217	MyrSpi		Point	9/10/2022	41.37696	-73.15642	1-3	2	0.0002
218	MyrSpi		Point	9/10/2022	41.37681	-73.15621	1-3	2	0.0002
219	MyrSpi		Point	9/10/2022	41.37660	-73.15584	1-3	2	0.0002
220	MyrSpi		Point	9/10/2022	41.37658	-73.15581	1-3	2	0.0002
221	MyrSpi		Point	9/10/2022	41.37655	-73.15576	1-3	2	0.0002
222	MyrSpi		Point	9/10/2022	41.37649	-73.15569	1-3	2	0.0002
223	MyrSpi		Point	9/10/2022	41.37920	-73.15873	1-3	2	0.0002
224	MyrSpi		Point	9/10/2022	41.38221	-73.15831	0-2	2	0.0002
225	MyrSpi		Point	9/10/2022	41.38203	-73.15843	0-2	2	0.0002
226	MyrSpi		Point	9/10/2022	41.38200	-73.15846	0-2	2	0.0002
227	MyrSpi		Point	9/10/2022	41.38198	-73.15847	0-2	2	0.0002
228	MyrSpi		Point	9/10/2022	41.38195	-73.15848	0-2	2	0.0002
229	MyrSpi		Point	9/10/2022	41.38193	-73.15848	0-2	2	0.0002
230	MyrSpi		Point	9/10/2022	41.38192	-73.15847	0-2	2	0.0002
231	MyrSpi		Point	9/10/2022	41.38188	-73.15848	0-2	2	0.0002
232	MyrSpi		Point	9/10/2022	41.37647	-73.15678	0-2	2	0.0002
233	MyrSpi		Point	9/10/2022	41.37636	-73.15674	0-2	2	0.0002
234	ValAme		Point	9/10/2022	41.33775	-73.12145	1-3	2	0.0002
235	ValAme		Point	9/10/2022	41.33684	-73.12074	1-3	2	0.0002
236	ValAme		Point	9/10/2022	41.33658	-73.12052	1-3	2	0.0002
237	ValAme		Point	9/10/2022	41.33653	-73.12047	1-3	2	0.0002
238	ValAme		Point	9/10/2022	41.32991	-73.11282	1-3	2	0.0002
239	ValAme		Point	9/10/2022	41.32987	-73.11279	1-3	2	0.0002
240	ValAme		Point	9/10/2022	41.32913	-73.11157	1-3	2	0.0002
241	ValAme		Point	9/10/2022	41.32815	-73.11012	1-3	2	0.0002
242	ValAme		Point	9/10/2022	41.32746	-73.10898	1-3	2	0.0002
243	ValAme		Point	9/10/2022	41.32744	-73.10898	1-3	2	0.0002
244	ValAme		Point	9/10/2022	41.32651	-73.10724	1-3	2	0.0002
245	ValAme		Point	9/10/2022	41.32543	-73.10467	1-3	2	0.0002
246	ValAme		Point	9/10/2022	41.32539	-73.10465	1-3	2	0.0002
247	ValAme		Point	9/10/2022	41.33189	-73.11360	1-3	2	0.0002
248	ValAme		Point	9/10/2022	41.33198	-73.11380	1-3	2	0.0002
249	ValAme		Point	9/10/2022	41.33204	-73.11382	1-3	2	0.0002
250	ValAme		Point	9/10/2022	41.33224	-73.11420	1-3	2	0.0002

Appendix Lake Housatonic Invasive Plant Location data (6 of 9)

FID	Invasive Plant Name	Notes	Type	Date	Latitude	Longitude	Depth (m)	Abundance	Area (acres)
251	ValAme		Point	9/10/2022	41.33226	-73.11422	1-3	2	0.0002
252	ValAme		Point	9/10/2022	41.33238	-73.11435	1-3	4	0.0002
253	ValAme		Point	9/10/2022	41.33243	-73.11441	1-3	4	0.0002
254	ValAme		Point	9/10/2022	41.33245	-73.11446	1-3	4	0.0002
255	ValAme		Point	9/10/2022	41.33262	-73.11465	1-3	2	0.0002
256	ValAme		Point	9/10/2022	41.33267	-73.11472	1-3	2	0.0002
257	ValAme		Point	9/10/2022	41.33272	-73.11478	1-3	2	0.0002
258	ValAme		Point	9/10/2022	41.33282	-73.11490	1-3	2	0.0002
259	ValAme		Point	9/10/2022	41.33326	-73.11532	1-3	2	0.0002
260	ValAme		Point	9/10/2022	41.33331	-73.11539	1-3	2	0.0002
261	ValAme		Point	9/10/2022	41.33345	-73.11555	1-3	2	0.0002
262	ValAme		Point	9/10/2022	41.33349	-73.11559	1-3	2	0.0002
263	ValAme		Point	9/10/2022	41.33354	-73.11561	1-3	2	0.0002
264	ValAme		Point	9/10/2022	41.33397	-73.11604	1-3	2	0.0002
265	ValAme		Point	9/10/2022	41.33403	-73.11604	1-3	2	0.0002
266	ValAme		Point	9/10/2022	41.33408	-73.11611	1-3	2	0.0002
267	ValAme		Point	9/10/2022	41.33413	-73.11613	1-3	2	0.0002
268	ValAme		Point	9/10/2022	41.33425	-73.11620	1-3	2	0.0002
269	ValAme		Point	9/10/2022	41.33434	-73.11624	1-3	2	0.0002
270	ValAme		Point	9/10/2022	41.33441	-73.11628	1-3	2	0.0002
271	ValAme		Point	9/10/2022	41.33463	-73.11632	1-3	2	0.0002
272	ValAme		Point	9/10/2022	41.33469	-73.11634	1-3	2	0.0002
273	ValAme		Point	9/10/2022	41.33530	-73.11648	1-3	2	0.0002
274	ValAme		Point	9/10/2022	41.33534	-73.11648	1-3	2	0.0002
275	ValAme		Point	9/10/2022	41.33540	-73.11645	1-3	2	0.0002
276	ValAme		Point	9/10/2022	41.33546	-73.11644	1-3	2	0.0002
277	ValAme		Point	9/10/2022	41.34205	-73.12223	1-3	2	0.0002
278	ValAme		Point	9/10/2022	41.34242	-73.12229	1-3	2	0.0002
279	ValAme		Point	9/10/2022	41.34247	-73.12228	1-3	2	0.0002
280	ValAme		Point	9/10/2022	41.34276	-73.12224	1-3	2	0.0002
281	ValAme		Point	9/10/2022	41.34284	-73.12225	1-3	2	0.0002
282	ValAme		Point	9/10/2022	41.34304	-73.12216	1-3	2	0.0002
283	ValAme		Point	9/10/2022	41.34308	-73.12214	1-3	2	0.0002
284	ValAme		Point	9/10/2022	41.34312	-73.12216	1-3	2	0.0002
285	ValAme		Point	9/10/2022	41.34369	-73.12236	1-3	2	0.0002
286	ValAme		Point	9/10/2022	41.34372	-73.12238	1-3	2	0.0002
287	ValAme		Point	9/10/2022	41.34381	-73.12239	1-3	2	0.0002
288	ValAme		Point	9/10/2022	41.34384	-73.12240	1-3	2	0.0002
289	ValAme		Point	9/10/2022	41.34388	-73.12242	1-3	2	0.0002
290	ValAme		Point	9/10/2022	41.34393	-73.12246	1-3	2	0.0002
291	ValAme		Point	9/10/2022	41.34422	-73.12269	1-3	2	0.0002
292	ValAme		Point	9/10/2022	41.34427	-73.12272	1-3	2	0.0002
293	ValAme		Point	9/10/2022	41.34431	-73.12276	1-3	2	0.0002
294	ValAme		Point	9/10/2022	41.34433	-73.12280	1-3	2	0.0002
295	ValAme		Point	9/10/2022	41.34435	-73.12285	1-3	2	0.0002
296	ValAme		Point	9/10/2022	41.34455	-73.12300	1-3	3	0.0002
297	ValAme		Point	9/10/2022	41.34461	-73.12298	1-3	3	0.0002
298	ValAme		Point	9/10/2022	41.34464	-73.12299	1-3	3	0.0002
299	ValAme		Point	9/10/2022	41.34468	-73.12301	1-3	3	0.0002
300	ValAme		Point	9/10/2022	41.34484	-73.12317	1-3	3	0.0002

Appendix Lake Housatonic Invasive Plant Location data (7 of 9)

FID	Invasive Plant Name	Notes	Type	Date	Latitude	Longitude	Depth (m)	Abundance	Area (acres)
301	ValAme		Point	9/10/2022	41.34489	-73.12317	1-3	3	0.0002
302	ValAme		Point	9/10/2022	41.34492	-73.12318	1-3	3	0.0002
303	ValAme		Point	9/10/2022	41.34496	-73.12321	1-3	3	0.0002
304	ValAme		Point	9/10/2022	41.34500	-73.12324	1-3	3	0.0002
305	ValAme		Point	9/10/2022	41.34503	-73.12328	1-3	3	0.0002
306	ValAme		Point	9/10/2022	41.34505	-73.12330	1-3	3	0.0002
307	ValAme		Point	9/10/2022	41.34507	-73.12333	1-3	3	0.0002
308	ValAme		Point	9/10/2022	41.34528	-73.12354	1-3	3	0.0002
309	ValAme		Point	9/10/2022	41.34532	-73.12355	1-3	3	0.0002
310	ValAme		Point	9/10/2022	41.34544	-73.12365	1-3	3	0.0002
311	ValAme		Point	9/10/2022	41.34550	-73.12371	1-3	3	0.0002
312	ValAme		Point	9/10/2022	41.34598	-73.12428	1-3	3	0.0002
313	ValAme		Point	9/10/2022	41.34602	-73.12429	1-3	3	0.0002
314	ValAme		Point	9/10/2022	41.34604	-73.12432	1-3	3	0.0002
315	ValAme		Point	9/10/2022	41.34615	-73.12440	1-3	3	0.0002
316	ValAme		Point	9/10/2022	41.34619	-73.12441	1-3	3	0.0002
317	ValAme		Point	9/10/2022	41.34622	-73.12443	1-3	3	0.0002
318	ValAme		Point	9/10/2022	41.34773	-73.12607	1-3	3	0.0002
319	ValAme		Point	9/10/2022	41.34788	-73.12641	1-3	3	0.0002
320	ValAme		Point	9/10/2022	41.34790	-73.12645	1-3	3	0.0002
321	ValAme		Point	9/10/2022	41.34817	-73.12716	1-3	3	0.0002
322	ValAme		Point	9/10/2022	41.34878	-73.12832	1-3	3	0.0002
323	ValAme		Point	9/10/2022	41.34894	-73.12868	1-3	3	0.0002
324	ValAme		Point	9/10/2022	41.34903	-73.12885	1-3	3	0.0002
325	ValAme		Point	9/10/2022	41.34908	-73.12898	1-3	3	0.0002
326	ValAme		Point	9/10/2022	41.34912	-73.12908	1-3	3	0.0002
327	ValAme		Point	9/10/2022	41.34994	-73.13140	1-3	3	0.0002
328	ValAme		Point	9/10/2022	41.34997	-73.13145	1-3	3	0.0002
329	ValAme		Point	9/10/2022	41.35000	-73.13148	1-3	3	0.0002
330	ValAme		Point	9/10/2022	41.35002	-73.13154	1-3	3	0.0002
331	ValAme		Point	9/10/2022	41.35010	-73.13183	1-3	3	0.0002
332	ValAme		Point	9/10/2022	41.35014	-73.13190	1-3	3	0.0002
333	ValAme		Point	9/10/2022	41.35016	-73.13194	1-3	3	0.0002
334	ValAme		Point	9/10/2022	41.35062	-73.13343	0-1	3	0.0002
335	ValAme		Point	9/10/2022	41.35065	-73.13350	0-2	3	0.0002
336	ValAme		Point	9/10/2022	41.35376	-73.13685	1-3	3	0.0002
337	ValAme		Point	9/10/2022	41.38374	-73.15876	0-2	2	0.0002
338	ValAme		Point	9/10/2022	41.38279	-73.15837	0-2	2	0.0002
339	ValAme		Point	9/10/2022	41.38267	-73.15834	0-2	2	0.0002
340	ValAme		Point	9/10/2022	41.38246	-73.15828	0-2	2	0.0002
341	ValAme		Point	9/10/2022	41.36951	-73.15075	0-2	2	0.0002
342	ValAme		Point	9/10/2022	41.36949	-73.15077	0-2	2	0.0002
343	ValAme		Point	9/10/2022	41.36948	-73.15066	0-2	2	0.0002
344	ValAme		Point	9/10/2022	41.36936	-73.15048	0-2	2	0.0002
345	ValAme		Point	9/10/2022	41.36933	-73.15049	0-2	2	0.0002
346	ValAme		Point	9/10/2022	41.36649	-73.14691	0-2	2	0.0002
347	ValAme		Point	9/10/2022	41.35683	-73.13954	0-2	2	0.0002
348	ValAme		Point	9/10/2022	41.35678	-73.13952	0-2	2	0.0002
349	ValAme		Point	9/10/2022	41.35647	-73.13950	0-2	3	0.0002
350	ValAme		Point	9/10/2022	41.35536	-73.13944	0-2	3	0.0002

Appendix Lake Housatonic Invasive Plant Location data (8 of 9)

FID	Invasive Plant Name	Notes	Type	Date	Latitude	Longitude	Depth (m)	Abundance	Area (acres)
351	ValAme		Point	9/10/2022	41.35531	-73.13944	0-2	3	0.0002
352	ValAme		Point	9/10/2022	41.35527	-73.13944	0-2	3	0.0002
353	ValAme		Point	9/10/2022	41.35520	-73.13943	0-2	3	0.0002
354	ValAme		Point	9/10/2022	41.34879	-73.13134	0-2	3	0.0002
355	ValAme		Point	9/10/2022	41.34881	-73.13133	0-2	3	0.0002
356	ValAme		Patch	9/10/2022	41.34422	-73.12469	1-3	4	0.0092
357	ValAme		Patch	9/10/2022	41.37382	-73.15467	1-3	3	0.0094
358	ValAme		Patch	9/10/2022	41.35581	-73.13946	1-3	3	0.0096
359	ValAme		Patch	9/10/2022	41.35914	-73.13802	1-3	3	0.0103
360	ValAme		Patch	9/10/2022	41.36742	-73.14642	1-3	3	0.0112
361	ValAme		Patch	9/10/2022	41.37348	-73.15431	1-3	3	0.0119
362	ValAme		Patch	9/10/2022	41.37336	-73.15417	1-3	3	0.0125
363	ValAme		Patch	9/10/2022	41.37398	-73.15482	1-3	3	0.0133
364	ValAme		Patch	9/10/2022	41.35592	-73.13947	1-3	3	0.0136
365	ValAme		Patch	9/10/2022	41.34551	-73.12579	1-3	4	0.0140
366	ValAme		Patch	9/10/2022	41.34537	-73.12567	1-3	4	0.0146
367	ValAme		Patch	9/10/2022	41.36002	-73.13800	1-3	3	0.0151
368	ValAme		Patch	9/10/2022	41.36706	-73.14760	1-3	3	0.0159
369	ValAme		Patch	9/10/2022	41.34818	-73.13017	1-3	4	0.0166
370	ValAme		Patch	9/10/2022	41.37169	-73.15296	1-3	3	0.0196
371	ValAme		Patch	9/10/2022	41.36240	-73.13875	1-3	3	0.0202
372	ValAme		Patch	9/10/2022	41.34708	-73.12826	1-3	4	0.0209
373	ValAme		Patch	9/10/2022	41.36809	-73.14875	1-3	3	0.0214
374	ValAme		Patch	9/10/2022	41.33534	-73.11943	0-2	3	0.0281
375	ValAme		Patch	9/10/2022	41.33015	-73.11331	0-2	3	0.0285
376	ValAme		Patch	9/10/2022	41.36971	-73.15105	1-3	3	0.0299
377	ValAme		Patch	9/10/2022	41.33890	-73.12227	0-2	3	0.0306
378	ValAme		Patch	9/10/2022	41.34438	-73.12480	1-3	4	0.0354
379	ValAme		Patch	9/10/2022	41.33552	-73.11961	0-2	3	0.0381
380	ValAme		Patch	9/10/2022	41.36531	-73.14506	1-3	3	0.0382
381	ValAme		Patch	9/10/2022	41.36770	-73.14675	1-3	3	0.0403
382	ValAme		Patch	9/10/2022	41.38099	-73.15769	1-3	4	0.0407
383	ValAme		Patch	9/10/2022	41.37189	-73.15313	1-3	3	0.0413
384	ValAme		Patch	9/10/2022	41.37287	-73.15379	1-3	3	0.0413
385	ValAme		Patch	9/10/2022	41.36732	-73.14789	1-3	3	0.0421
386	ValAme		Patch	9/10/2022	41.35967	-73.13802	1-3	3	0.0423
387	ValAme		Patch	9/10/2022	41.33467	-73.11875	0-2	3	0.0460
388	ValAme		Patch	9/10/2022	41.37420	-73.15507	1-3	3	0.0475
389	ValAme		Patch	9/10/2022	41.33957	-73.12251	1-3	4	0.0489
390	ValAme		Patch	9/10/2022	41.34800	-73.12972	1-3	4	0.0499
391	ValAme		Patch	9/10/2022	41.34849	-73.13076	1-3	4	0.0507
392	ValAme		Patch	9/10/2022	41.33579	-73.11991	0-2	3	0.0562
393	ValAme		Patch	9/10/2022	41.36776	-73.14836	1-3	3	0.0585
394	ValAme		Patch	9/10/2022	41.34660	-73.12757	1-3	4	0.0635
395	ValAme		Patch	9/10/2022	41.34474	-73.12506	1-3	4	0.0641
396	ValAme		Patch	9/10/2022	41.35841	-73.13801	1-3	3	0.0655
397	ValAme		Patch	9/10/2022	41.34606	-73.12666	1-3	4	0.0723
398	ValAme		Patch	9/10/2022	41.33508	-73.11920	0-2	3	0.0747
399	ValAme		Patch	9/10/2022	41.36853	-73.14923	1-3	3	0.0777
400	ValAme		Patch	9/10/2022	41.36295	-73.13931	1-3	3	0.0850

Appendix Lake Housatonic Invasive Plant Location data (9 of 9)

FID	Invasive Plant Name	Notes	Type	Date	Latitude	Longitude	Depth (m)	Abundance	Area (acres)
401	ValAme		Patch	9/10/2022	41.33930	-73.12261	0-2	3	0.0957
402	ValAme		Patch	9/10/2022	41.33621	-73.12030	0-2	3	0.0990
403	ValAme		Patch	9/10/2022	41.36900	-73.15004	1-3	3	0.1139
404	ValAme		Patch	9/10/2022	41.37447	-73.15531	1-3	3	0.1229
405	ValAme		Patch	9/10/2022	41.37237	-73.15348	1-3	3	0.1304
406	ValAme		Patch	9/10/2022	41.34954	-73.12985	1-3	4	0.1425
407	ValAme		Patch	9/10/2022	41.34160	-73.12195	1-3	4	0.1790
408	ValAme		Patch	9/10/2022	41.34739	-73.12872	1-3	4	0.2273
409	ValAme		Patch	9/10/2022	41.36102	-73.13828	1-3	3	0.3201
410	ValAme		Patch	9/10/2022	41.33402	-73.11813	0-2	3	0.3306
411	ValAme		Patch	9/10/2022	41.36822	-73.14742	1-3	3	0.3362
412	ValAme		Patch	9/10/2022	41.36586	-73.14587	1-3	3	0.3491
413	ValAme		Patch	9/10/2022	41.35507	-73.13715	1-3	3	0.3627
414	ValAme		Patch	9/10/2022	41.35660	-73.13754	1-3	3	0.4108
415	ValAme		Patch	9/10/2022	41.32713	-73.10278	0-2	4	0.4144
416	ValAme		Patch	9/10/2022	41.38147	-73.15867	1-3	3	0.4277
417	ValAme		Patch	9/10/2022	41.35116	-73.13476	1-3	3	0.6489
418	ValAme		Patch	9/10/2022	41.35376	-73.13908	1-3	3	1.0244
419	ValAme		Patch	9/10/2022	41.34306	-73.12400	1-3	4	1.0378
420	ValAme		Patch	9/10/2022	41.33202	-73.11619	0-2	5	1.7777
421	ValAme		Patch	9/10/2022	41.36493	-73.14237	1-3	3	2.6895
422	ValAme		Patch	9/10/2022	41.34052	-73.12351	0-2	4	3.4963
423	ValAme		Patch	9/10/2022	41.36201	-73.14152	1-3	3	4.4578
424	ValAme		Patch	9/10/2022	41.37318	-73.15287	1-3	3	4.8479
425	ValAme		Patch	9/10/2022	41.33727	-73.11787	0-1	4	12.0618
426	ValAme	PotAmp Within	Patch	9/10/2022	41.32838	-73.10684	1-3	4	14.2762

Transect Data

Appendix Lake Housatonic June Transect Data (1 of 2)

Transect	Distance from Shore			Surveyor	Latitude	Longitude	Date	Depth (m)	Substrate	CerDem	EloNut	MyrSpi	PotCri	PotIll	PotNod	PotPer	PotPus	SagSpp	ValAme	ZosDub
	Point	(m)	(m)																	
1	1	0.5	Summer Stebbins	41.33724	-73.11611	6/29/2022	0.1	Organic	0	0	0	0	0	0	0	0	0	2	0	0
1	2	5	Summer Stebbins	41.33723	-73.11618	6/29/2022	0.2	Organic	0	2	0	0	0	0	0	0	0	0	0	0
1	3	10	Summer Stebbins	41.33724	-73.11627	6/29/2022	1.0	Muck	0	2	0	0	0	0	0	0	0	0	0	0
1	4	20	Summer Stebbins	41.33720	-73.11632	6/29/2022	1.1	Muck	0	2	0	0	0	0	0	0	0	0	0	1
1	5	30	Summer Stebbins	41.33717	-73.11645	6/29/2022	1.1	Muck	0	2	0	2	0	0	0	0	0	0	2	0
1	6	40	Summer Stebbins	41.33715	-73.11659	6/29/2022	1.1	Muck	0	2	2	3	0	0	0	0	2	0	3	0
1	7	50	Summer Stebbins	41.33710	-73.11673	6/29/2022	0.6	Muck	0	2	2	3	0	0	3	2	0	2	0	0
1	8	60	Summer Stebbins	41.33706	-73.11682	6/29/2022	0.5	Muck	0	2	3	2	0	0	3	2	0	2	0	0
1	9	70	Summer Stebbins	41.33704	-73.11691	6/29/2022	0.5	Muck	0	2	4	0	0	0	0	2	0	0	0	0
1	10	80	Summer Stebbins	41.33699	-73.11699	6/29/2022	0.5	Muck	0	2	5	0	0	0	0	2	0	0	0	0
2	1	0.5	Summer Stebbins	41.33204	-73.11659	6/30/2022	0.1	Sand	0	0	0	0	0	0	0	0	0	0	2	0
2	2	5	Summer Stebbins	41.33206	-73.11653	6/30/2022	0.2	Sand	0	2	0	2	0	0	2	3	0	2	1	0
2	3	10	Summer Stebbins	41.33207	-73.11647	6/30/2022	0.5	Sand	0	2	2	2	0	0	3	3	0	0	0	0
2	4	20	Summer Stebbins	41.33212	-73.11632	6/30/2022	0.9	Sand	2	0	2	2	0	0	0	0	0	0	2	0
2	5	30	Summer Stebbins	41.33221	-73.11630	6/30/2022	2.7	Silt	0	0	0	0	0	0	0	0	0	0	0	0
2	6	40	Summer Stebbins	41.33222	-73.11615	6/30/2022	3.8	Silt	0	0	0	0	0	0	0	0	0	0	0	0
2	7	50	Summer Stebbins	41.33227	-73.11609	6/30/2022	4.7	Silt	0	0	0	0	0	0	0	0	0	0	0	0
2	8	60	Summer Stebbins	41.33235	-73.11602	6/30/2022	5.0	Silt	0	0	0	0	0	0	0	0	0	0	0	0
2	9	70	Summer Stebbins	41.33241	-73.11591	6/30/2022	5.0	Silt	0	0	0	0	0	0	0	0	0	0	0	0
2	10	80	Summer Stebbins	41.33248	-73.11584	6/30/2022	5.2	Silt	0	0	0	0	0	0	0	0	0	0	0	0
3	1	0.5	Summer Stebbins	41.32987	-73.10907	6/30/2022	1.0	Silt	0	0	0	0	0	0	2	0	0	0	0	0
3	2	5	Summer Stebbins	41.32984	-73.10902	6/30/2022	1.0	Silt	2	3	0	0	0	0	2	0	0	0	0	0
3	3	10	Summer Stebbins	41.32981	-73.10906	6/30/2022	1.4	Organic	0	0	0	0	0	0	0	0	0	0	0	0
3	4	20	Summer Stebbins	41.32972	-73.10922	6/30/2022	1.4	Organic	2	0	0	3	0	0	0	2	0	0	0	0
3	5	30	Summer Stebbins	41.32962	-73.10926	6/30/2022	1.5	Silt	0	2	0	3	0	0	0	2	0	0	2	0
3	6	40	Summer Stebbins	41.32954	-73.10934	6/30/2022	1.8	Silt	2	0	0	3	0	0	0	0	0	0	2	0
3	7	50	Summer Stebbins	41.32948	-73.10939	6/30/2022	1.9	Silt	0	0	0	4	0	0	0	0	0	0	0	0
3	8	60	Summer Stebbins	41.32936	-73.10939	6/30/2022	2.3	Silt	0	0	0	2	0	0	0	0	0	0	0	0
3	9	70	Summer Stebbins	41.32932	-73.10948	6/30/2022	2.6	Silt	0	0	0	0	0	0	0	0	0	0	0	0
3	10	80	Summer Stebbins	41.32924	-73.10949	6/30/2022	2.7	Silt	0	0	0	0	0	0	0	0	0	0	0	0
4	1	0.5	Summer Stebbins	41.34109	-73.12362	6/30/2022	0.1	Sand	0	0	0	0	0	0	0	0	0	0	0	1
4	2	5	Summer Stebbins	41.34108	-73.12354	6/30/2022	0.2	Sand	0	2	1	1	0	0	3	0	0	0	0	0
4	3	10	Summer Stebbins	41.34107	-73.12347	6/30/2022	1.0	Sand	0	0	1	0	0	0	0	0	0	2	0	0
4	4	20	Summer Stebbins	41.34111	-73.12334	6/30/2022	1.7	Sand	2	2	1	2	0	0	0	0	0	2	2	0
4	5	30	Summer Stebbins	41.34117	-73.12323	6/30/2022	2.6	Silt	0	0	0	0	0	0	0	0	0	0	0	0
4	6	40	Summer Stebbins	41.34120	-73.12310	6/30/2022	4.3	Silt	0	0	0	0	0	0	0	0	0	0	0	0
4	7	50	Summer Stebbins	41.34122	-73.12297	6/30/2022	4.7	Silt	0	0	0	0	0	0	0	0	0	0	0	0
4	8	60	Summer Stebbins	41.34122	-73.12289	6/30/2022	4.9	Silt	0	0	0	0	0	0	0	0	0	0	0	0
4	9	70	Summer Stebbins	41.34127	-73.12279	6/30/2022	5.1	Silt	0	0	0	0	0	0	0	0	0	0	0	0
4	10	80	Summer Stebbins	41.34135	-73.12271	6/30/2022	5.3	Silt	0	0	0	0	0	0	0	0	0	0	0	0
5	1	0.5	Summer Stebbins	41.34808	-73.12673	6/29/2022	0.1	Gravel	0	0	0	0	0	0	0	0	0	0	0	0
5	2	5	Summer Stebbins	41.34804	-73.12675	6/29/2022	1.2	Silt	0	0	0	2	0	0	0	1	0	2	3	0
5	3	10	Summer Stebbins	41.34800	-73.12679	6/29/2022	4.4	Silt	0	0	0	0	0	0	0	0	0	0	0	0
5	4	20	Summer Stebbins	41.34794	-73.12688	6/29/2022	4.1	Silt	0	0	0	0	0	0	0	0	0	0	0	0
5	5	30	Summer Stebbins	41.34785	-73.12689	6/29/2022	3.9	Silt	0	0	0	0	0	0	0	0	0	0	0	0
5	6	40	Summer Stebbins	41.34775	-73.12695	6/29/2022	3.7	Silt	0	0	0	0	0	0	0	0	0	0	0	0
5	7	50	Summer Stebbins	41.34768	-73.12704	6/29/2022	3.8	Silt	0	0	0	0	0	0	0	0	0	0	0	0
5	8	60	Summer Stebbins	41.34763	-73.12712	6/29/2022	3.9	Silt	0	0	0	0	0	0	0	0	0	0	0	0
5	9	70	Summer Stebbins	41.34756	-73.12722	6/29/2022	3.9	Silt	0	0	0	0	0	0	0	0	0	0	0	0
5	10	80	Summer Stebbins	41.34750	-73.12731	6/29/2022	3.9	Silt	0	0	0	0	0	0	0	0	0	0	0	0

Appendix Lake Housatonic June Transect Data (2 of 2)

Transect	Distance from Shore			Surveyor	Latitude	Longitude	Date	Depth (m)	Substrate	CerDem	EloNut	MyrSpi	PotCri	PotIll	PotNod	PotPer	PotPus	SagSpp	ValAme	ZosDub
	Point	(m)	(m)																	
6	1	1	1	Summer Stebbins	41.34870	-73.13127	44741	0.1	Gravel	0	0	0	0	0	0	0	0	0	0	0
6	2	5	5	Summer Stebbins	41.34874	-73.13125	6/29/2022	0.8	Gravel	0	0	0	0	0	0	0	0	0	0	0
6	3	10	10	Summer Stebbins	41.34872	-73.13119	6/29/2022	0.9	Gravel	0	0	0	0	0	0	0	0	0	2	3
6	4	20	20	Summer Stebbins	41.34881	-73.13107	6/29/2022	4.6	Silt	0	0	0	0	0	0	0	0	0	0	0
6	5	30	30	Summer Stebbins	41.34886	-73.13095	6/29/2022	4.6	Silt	0	0	0	0	0	0	0	0	0	0	0
6	6	40	40	Summer Stebbins	41.34891	-73.13085	6/29/2022	5.0	Silt	0	0	0	0	0	0	0	0	0	0	0
6	7	50	50	Summer Stebbins	41.34896	-73.13074	6/29/2022	5.0	Silt	0	0	0	0	0	0	0	0	0	0	0
6	8	60	60	Summer Stebbins	41.34900	-73.13064	6/29/2022	5.0	Silt	0	0	0	0	0	0	0	0	0	0	0
6	9	70	70	Summer Stebbins	41.34905	-73.13055	6/29/2022	5.0	Silt	0	0	0	0	0	0	0	0	0	0	0
6	10	80	80	Summer Stebbins	41.34912	-73.13048	6/29/2022	4.8	Silt	0	0	0	0	0	0	0	0	0	0	0
7	1	0.5	0.5	Summer Stebbins	41.35851	-73.13801	6/29/2022	0.1	Gravel	0	0	0	0	0	0	0	0	0	0	0
7	2	5	5	Summer Stebbins	41.35851	-73.13802	6/29/2022	1.9	Gravel	0	0	0	0	0	0	0	0	0	2	3
7	3	10	10	Summer Stebbins	41.35851	-73.13809	6/29/2022	3.5	Silt	0	0	0	0	0	0	0	0	0	0	0
7	4	20	20	Summer Stebbins	41.35851	-73.13821	6/29/2022	4.5	Silt	0	0	0	0	0	0	0	0	0	0	0
7	5	30	30	Summer Stebbins	41.35850	-73.13832	6/29/2022	4.2	Silt	0	0	0	0	0	0	0	0	0	0	0
7	6	40	40	Summer Stebbins	41.35849	-73.13846	6/29/2022	3.5	Silt	0	0	0	0	0	0	0	0	0	0	0
7	7	50	50	Summer Stebbins	41.35848	-73.13856	6/29/2022	3.5	Silt	0	0	0	0	0	0	0	0	0	0	0
7	8	60	60	Summer Stebbins	41.35846	-73.13868	6/29/2022	3.5	Silt	0	0	0	0	0	0	0	0	0	0	0
7	9	70	70	Summer Stebbins	41.35844	-73.13880	6/29/2022	3.8	Silt	0	0	0	0	0	0	0	0	0	0	0
7	10	80	80	Summer Stebbins	41.35843	-73.13889	6/29/2022	3.9	Silt	0	0	0	0	0	0	0	0	0	0	0
8	1	0.5	0.5	Summer Stebbins	41.36268	-73.14185	6/29/2022	0.1	Sand	0	0	0	0	0	0	0	0	0	0	0
8	2	5	5	Summer Stebbins	41.36271	-73.14179	6/29/2022	0.2	Sand	0	0	0	0	0	0	3	2	0	0	0
8	3	10	10	Summer Stebbins	41.36275	-73.14174	6/29/2022	0.7	Gravel	0	0	0	0	0	0	0	0	0	3	3
8	4	20	20	Summer Stebbins	41.36278	-73.14164	6/29/2022	1.4	Silt	0	0	0	0	4	2	0	3	0	3	3
8	5	30	30	Summer Stebbins	41.36284	-73.14148	6/29/2022	2.6	Silt	0	0	0	0	0	0	0	0	0	0	0
8	6	40	40	Summer Stebbins	41.36291	-73.14143	6/29/2022	2.6	Silt	0	0	0	0	0	0	0	0	0	0	2
8	7	50	50	Summer Stebbins	41.36296	-73.14131	6/29/2022	2.6	Silt	0	0	0	0	0	4	0	0	0	0	2
8	8	60	60	Summer Stebbins	41.36297	-73.14123	6/29/2022	2.4	Silt	0	0	0	1	0	4	0	2	0	2	2
8	9	70	70	Summer Stebbins	41.36303	-73.14112	6/29/2022	2.1	Silt	0	0	0	1	0	4	0	2	0	2	2
8	10	80	80	Summer Stebbins	41.36312	-73.14104	6/29/2022	2.1	Silt	0	0	0	0	0	4	0	2	0	2	2
9	1	0.5	0.5	Summer Stebbins	41.36909	-73.14838	6/29/2022	0.1	Gravel	0	0	0	0	0	0	0	0	0	0	0
9	2	5	5	Summer Stebbins	41.36903	-73.14844	6/29/2022	1.4	Silt	0	0	0	0	0	0	0	0	0	2	2
9	3	10	10	Summer Stebbins	41.36896	-73.14845	6/29/2022	3.1	Silt	0	0	0	0	0	0	0	0	0	0	0
9	4	20	20	Summer Stebbins	41.36890	-73.14856	6/29/2022	3.2	Silt	0	0	0	0	0	0	0	0	0	0	0
9	5	30	30	Summer Stebbins	41.36887	-73.14861	6/29/2022	3.2	Silt	0	0	0	0	0	0	0	0	0	0	0
9	6	40	40	Summer Stebbins	41.36884	-73.14875	6/29/2022	3.2	Silt	0	0	0	0	0	0	0	0	0	0	0
9	7	50	50	Summer Stebbins	41.36879	-73.14883	6/29/2022	3.4	Silt	0	0	0	0	0	0	0	0	0	0	0
9	8	60	60	Summer Stebbins	41.36871	-73.14891	6/29/2022	3.4	Silt	0	0	0	0	0	0	0	0	0	1	0
9	9	70	70	Summer Stebbins	41.36863	-73.14899	6/29/2022	3.4	Silt	0	0	0	0	0	0	0	0	0	0	0
9	10	80	80	Summer Stebbins	41.36856	-73.14907	6/29/2022	3.1	Silt	0	0	0	0	0	0	0	1	0	0	0
10	1	0.5	0.5	Summer Stebbins	41.37631	-73.15683	6/29/2022	0.2	Sand	0	0	0	0	0	0	0	0	0	0	0
10	2	5	5	Summer Stebbins	41.37639	-73.15677	6/29/2022	0.4	Sand	0	0	1	0	0	0	3	2	0	1	0
10	3	10	10	Summer Stebbins	41.37642	-73.15674	6/29/2022	1.4	Sand	0	0	2	3	0	0	0	3	0	2	0
10	4	20	20	Summer Stebbins	41.37647	-73.15663	6/29/2022	2.4	Silt	0	0	0	1	0	0	0	1	0	0	0
10	5	30	30	Summer Stebbins	41.37650	-73.15650	6/29/2022	4.4	Silt	0	0	0	0	0	0	0	0	0	0	0
10	6	40	40	Summer Stebbins	41.37652	-73.15640	6/29/2022	4.8	Silt	0	0	0	0	0	0	0	0	0	0	0
10	7	50	50	Summer Stebbins	41.37656	-73.15631	6/29/2022	3.8	Silt	0	0	0	0	0	0	0	0	0	0	0
10	8	60	60	Summer Stebbins	41.37658	-73.15619	6/29/2022	3.3	Silt	0	0	0	0	0	0	0	0	0	0	0
10	9	70	70	Summer Stebbins	41.37662	-73.15602	6/29/2022	3.3	Silt	0	0	0	0	0	2	0	0	0	1	0
10	10	80	80	Summer Stebbins	41.37668	-73.15601	6/29/2022	1.3	Silt	0	0	0	0	0	3	2	0	0	3	0

Appendix Lake Housatonic September Transect Data (1 of 2)

Transect	Point	Distance from Shore		Surveyor	Latitude	Longitude	Date	Depth (m)	Substrate	CerDem	EleSpp	MyrSpi	NajMin	PotAmp	PotCri	PotEpi	PotGra	PotNod	PotPer	PotZos	SpiPol	ValAme	ZosDub
		(m)	(m)																				
1	1	0.5		Greg Bugbee	41.33733	-73.11613	9/12/2022	0.1	Muck	2	0	0	0	0	0	0	0	0	0	0	2	4	0
1	2	5		Greg Bugbee	41.33728	-73.11623	9/12/2022	1.2	Muck	2	0	0	0	0	0	0	0	0	0	0	2	4	0
1	3	10		Greg Bugbee	41.33731	-73.11625	9/12/2022	1.2	Muck	2	0	0	0	1	0	0	0	0	0	0	2	2	0
1	4	20		Greg Bugbee	41.33729	-73.11636	9/12/2022	1.5	Muck	2	0	0	0	1	0	0	0	0	0	2	2	0	0
1	5	30		Greg Bugbee	41.33724	-73.11647	9/12/2022	1.5	Muck	0	0	0	0	0	0	0	0	0	0	2	0	0	0
1	6	40		Greg Bugbee	41.33720	-73.11658	9/12/2022	1.5	Muck	2	0	0	0	0	0	0	0	0	0	2	4	0	0
1	7	50		Greg Bugbee	41.33713	-73.11667	9/12/2022	1.5	Muck	2	0	2	0	0	0	0	0	0	0	2	4	0	0
1	8	60		Greg Bugbee	41.33708	-73.11676	9/12/2022	1.5	Muck	2	0	2	0	0	2	0	0	0	2	0	2	4	0
1	9	70		Greg Bugbee	41.33706	-73.11687	9/12/2022	1.5	Muck	2	0	2	0	0	2	0	0	0	2	0	2	4	0
1	10	70		Greg Bugbee	41.33698	-73.11700	9/12/2022	1.5	Muck	2	0	4	2	0	2	0	2	0	2	0	2	4	0
2	1	0.5		Greg Bugbee	41.33191	-73.11645	9/12/2022	0.0	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2	0.5		Greg Bugbee	41.33195	-73.11642	9/12/2022	0.1	Sand	0	0	0	0	0	0	0	0	0	0	0	0	1	0
2	3	10		Greg Bugbee	41.33201	-73.11642	9/12/2022	0.3	Sand	0	2	0	0	0	0	0	3	0	0	0	0	2	0
2	4	20		Greg Bugbee	41.33208	-73.11637	9/12/2022	0.7	Sand	0	0	2	0	0	0	0	4	0	0	0	0	4	0
2	5	30		Greg Bugbee	41.33215	-73.11628	9/12/2022	1.6	Sand	0	0	0	0	0	0	0	0	0	0	0	0	4	0
2	6	40		Greg Bugbee	41.33222	-73.11619	9/12/2022	3.5	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	7	50		Greg Bugbee	41.33227	-73.11607	9/12/2022	5.0	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	8	60		Greg Bugbee	41.33230	-73.11594	9/12/2022	5.8	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	9	70		Greg Bugbee	41.33232	-73.11580	9/12/2022	5.5	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	10	80		Greg Bugbee	41.33234	-73.11568	9/12/2022	5.7	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	1	0.5		Greg Bugbee	41.32992	-73.10903	9/12/2022	0.1	Gravel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	2	5		Greg Bugbee	41.32986	-73.10907	9/12/2022	1.6	Gravel	0	0	0	0	0	0	0	0	0	0	0	0	2	0
3	3	10		Greg Bugbee	41.32981	-73.10914	9/12/2022	2.1	Sand	0	0	0	0	0	0	0	0	0	0	0	0	2	0
3	4	10		Greg Bugbee	41.32973	-73.10918	9/12/2022	2.1	Sand	3	0	0	0	0	0	0	0	0	0	0	0	3	0
3	5	30		Greg Bugbee	41.32965	-73.10922	9/12/2022	2.1	Sand	3	0	0	0	0	0	0	0	0	0	0	0	3	0
3	6	40		Greg Bugbee	41.32960	-73.10932	9/12/2022	2.3	Sand	0	0	0	0	0	0	0	0	0	0	0	0	3	0
3	7	50		Greg Bugbee	41.32948	-73.10934	9/12/2022	2.4	Sand	0	0	0	0	0	0	0	0	0	0	0	0	3	0
3	8	60		Greg Bugbee	41.32941	-73.10938	9/12/2022	2.6	Sand	0	0	0	0	0	0	0	0	0	0	0	0	2	0
3	9	70		Greg Bugbee	41.32931	-73.10938	9/12/2022	3.0	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	10	80		Greg Bugbee	41.32923	-73.10944	9/12/2022	3.2	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	1	0.5		Greg Bugbee	41.34108	-73.12361	9/12/2022	0.1	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	2	5		Greg Bugbee	41.34111	-73.12356	9/12/2022	1.0	Sand	0	0	0	0	0	0	0	3	2	0	0	0	2	0
4	3	10		Greg Bugbee	41.34115	-73.12353	9/12/2022	1.0	Sand	0	0	0	0	0	0	2	3	2	0	0	0	2	0
4	4	20		Greg Bugbee	41.34114	-73.12338	9/12/2022	1.5	Sand	1	0	0	2	0	0	0	0	2	0	0	0	3	0
4	5	30		Greg Bugbee	41.34118	-73.12328	9/12/2022	2.6	Sand	0	0	0	0	0	0	0	0	2	0	0	0	0	0
4	6	40		Greg Bugbee	41.34122	-73.12316	9/12/2022	4.4	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	7	50		Greg Bugbee	41.34124	-73.12302	9/12/2022	5.1	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	8	60		Greg Bugbee	41.34124	-73.12292	9/12/2022	5.4	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	9	70		Greg Bugbee	41.34125	-73.12283	9/12/2022	5.5	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	10	80		Greg Bugbee	41.34123	-73.12269	9/12/2022	5.8	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	1	0.5		Greg Bugbee	41.34808	-73.12675	9/12/2022	0.1	Gravel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	2	5		Greg Bugbee	41.34802	-73.12673	9/12/2022	3.0	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	3	10		Greg Bugbee	41.34797	-73.12677	9/12/2022	4.7	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	4	20		Greg Bugbee	41.34789	-73.12681	9/12/2022	4.8	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5	30		Greg Bugbee	41.34780	-73.12687	9/12/2022	4.2	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	6	40		Greg Bugbee	41.34775	-73.12696	9/12/2022	4.2	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	7	50		Greg Bugbee	41.34767	-73.12703	9/12/2022	4.1	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	8	60		Greg Bugbee	41.34759	-73.12712	9/12/2022	4.3	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	9	70		Greg Bugbee	41.34753	-73.12722	9/12/2022	4.3	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	10	80		Greg Bugbee	41.34747	-73.12726	9/12/2022	4.3	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix Lake Housatonic September Transect Data (2 of 2)

Transect	Distance from Shore			Surveyor	Latitude	Longitude	Date	Depth (m)	Substrate	CerDem	EleSpp	MyrSpi	NajMin	PotAmp	PotCri	PotEpi	PotGra	PotNod	PotPer	PotZos	SpiPol	ValAme	ZosDub
	Point	(m)	(m)																				
6	1	1	Greg Bugbee	41.34870	-73.13127	44816	0.1	Gravel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	2	5	Greg Bugbee	41.34870	-73.13124	9/12/2022	1.8	Gravel	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
6	3	10	Greg Bugbee	41.34879	-73.13123	9/12/2022	4.0	Gravel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	4	20	Greg Bugbee	41.34885	-73.13119	9/12/2022	5.4	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	5	30	Greg Bugbee	41.34893	-73.13112	9/12/2022	5.4	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	6	40	Greg Bugbee	41.34901	-73.13109	9/12/2022	5.8	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	7	50	Greg Bugbee	41.34909	-73.13103	9/12/2022	5.8	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	8	60	Greg Bugbee	41.34916	-73.13092	9/12/2022	5.6	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	9	70	Greg Bugbee	41.34920	-73.13086	9/12/2022	5.2	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	10	80	Greg Bugbee	41.34929	-73.13073	9/12/2022	5.1	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	1	0.5	Greg Bugbee	41.35854	-73.13795	9/12/2022	0.1	Gravel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	2	5	Greg Bugbee	41.35855	-73.13801	9/12/2022	2.0	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
7	3	10	Greg Bugbee	41.35853	-73.13806	9/12/2022	3.0	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	4	20	Greg Bugbee	41.35843	-73.13821	9/12/2022	4.6	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	5	30	Greg Bugbee	41.35841	-73.13832	9/12/2022	4.6	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	6	40	Greg Bugbee	41.35838	-73.13837	9/12/2022	4.7	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	7	50	Greg Bugbee	41.35841	-73.13854	9/12/2022	4.0	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	8	60	Greg Bugbee	41.35839	-73.13865	9/12/2022	4.1	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	9	70	Greg Bugbee	41.35840	-73.13879	9/12/2022	4.3	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	10	80	Greg Bugbee	41.35839	-73.13890	9/12/2022	4.2	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	1	0.5	Greg Bugbee	41.36267	-73.14175	9/12/2022	0.1	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	2	5	Greg Bugbee	41.36271	-73.14170	9/12/2022	1.0	Muck	0	0	0	0	0	0	0	1	0	0	0	0	0	3	0
8	3	10	Greg Bugbee	41.36275	-73.14167	9/12/2022	1.8	Muck	0	0	0	0	0	0	0	2	0	0	0	0	0	3	0
8	4	20	Greg Bugbee	41.36281	-73.14159	9/12/2022	1.9	Sand	2	0	0	0	0	0	1	2	0	0	0	0	0	3	0
8	5	30	Greg Bugbee	41.36286	-73.14152	9/12/2022	3.2	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	6	40	Greg Bugbee	41.36289	-73.14136	9/12/2022	3.0	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	7	50	Greg Bugbee	41.36293	-73.14124	9/12/2022	3.0	Sand	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
8	8	60	Greg Bugbee	41.36299	-73.14112	9/12/2022	2.6	Sand	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
8	9	70	Greg Bugbee	41.36303	-73.14106	9/12/2022	2.6	Sand	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
8	10	80	Greg Bugbee	41.36313	-73.14099	9/12/2022	2.5	Sand	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
9	1	0.5	Greg Bugbee	41.36911	-73.14851	9/12/2022	0.1	Gravel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	2	5	Greg Bugbee	41.36910	-73.14854	9/12/2022	1.5	Gravel	0	0	0	0	0	0	0	2	0	0	0	0	0	3	2
9	3	10	Greg Bugbee	41.36903	-73.14852	9/12/2022	3.0	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	4	20	Greg Bugbee	41.36900	-73.14864	9/12/2022	3.6	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	5	30	Greg Bugbee	41.36887	-73.14869	9/12/2022	3.6	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	6	40	Greg Bugbee	41.36881	-73.14879	9/12/2022	3.6	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	7	50	Greg Bugbee	41.36874	-73.14891	9/12/2022	3.8	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	8	60	Greg Bugbee	41.36868	-73.14897	9/12/2022	3.8	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	9	70	Greg Bugbee	41.36861	-73.14902	9/12/2022	3.8	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	10	80	Greg Bugbee	41.36856	-73.14915	9/12/2022	3.8	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	1	0.5	Greg Bugbee	41.37633	-73.15674	9/12/2022	0.1	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	2	5	Greg Bugbee	41.37636	-73.15669	9/12/2022	1.4	Sand	0	0	2	0	0	0	0	0	0	3	0	0	0	3	0
10	3	10	Greg Bugbee	41.37640	-73.15663	9/12/2022	2.2	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	4	20	Greg Bugbee	41.37644	-73.15654	9/12/2022	3.6	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	5	30	Greg Bugbee	41.37652	-73.15647	9/12/2022	5.0	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	6	40	Greg Bugbee	41.37658	-73.15638	9/12/2022	5.0	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	7	50	Greg Bugbee	41.37662	-73.15628	9/12/2022	4.0	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	8	60	Greg Bugbee	41.37666	-73.15615	9/12/2022	3.3	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	9	70	Greg Bugbee	41.37674	-73.15602	9/12/2022	1.8	Sand	0	0	0	0	0	0	0	3	0	0	1	0	2	0	0

Notes