



2020 Lakes and Ponds Annual Report

Norton, Massachusetts



PREPARED FOR

Town of Norton Conservation Commission
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INTRODUCTION

ESS Group, Inc. (ESS) was contracted by the Town of Norton (Town) to complete monitoring and reporting required for compliance with Orders of Conditions (OOCs) issued by the Norton Conservation Commission (the Commission) for management of nuisance vegetation at Winneconnet Pond, Norton Reservoir, Chartley Pond, and Barrowsville Pond.

ESS submits this annual report to the Norton Conservation Commission (the Commission), in compliance with Special Condition 52 in the Norton Reservoir and Barrowsville Pond Orders of Conditions (OOC), Special Condition 47 in the Winneconnet Pond OOC and Special Condition 50 in the Chartley Pond OOC, as amended.

2020 MANAGEMENT PROGRAM

In order to address the aforementioned special conditions, this report is divided into the following elements:

1. Description of conditions during pre-treatment surveys
2. Description of the management program undertaken
3. Areas treated and herbicides used
4. Description of conditions during post-treatment surveys
5. Recommendations for future management
6. Updated Safe Zone mapping in each of the ponds prior to initiation of the 2020 management program

Pre-treatment Surveys

ESS completed pre-treatment/early season vegetation surveys at Winneconnet Pond, Norton Reservoir, and Chartley Pond, to provide updates on the status of exotic plant infestations in each water body. As in 2019, the Town elected not to continue management efforts at Barrowsville Pond. Therefore, ESS did not complete pre-treatment/early season surveys at Barrowsville Pond.

The pre-treatment survey dates and exotic plants observed are summarized in Table 1.0. These surveys were used as a baseline against which to compare conditions following the first season of vegetation management at each pond.

Table 1.0. Dates of Pre-treatment Surveys in 2020

Water Body	Survey Dates	Exotic Species Observed
Winneconnet Pond	May 28, 2020	Fanwort (fragments) Variable-leaf Milfoil
Norton Reservoir	June 1, 2020	Fanwort Variable-leaf Milfoil Curly-leaf Pondweed Water Chestnut
Chartley Pond	June 12, 2020	Fanwort Variable-leaf Milfoil Water Chestnut

More details on pre-treatment conditions are provided, by pond, in the following sections.

Winnecunnet Pond

The 2020 pre-treatment survey at Winnecunnet Pond documented both variable-leaf milfoil (*Myriophyllum heterophyllum*) and fanwort (*Cabomba caroliniana*) in Winnecunnet Pond. This was expected based on results from the 2019 late season surveys, which also indicated the return of both target species.

- Rooted fanwort was not found in Winnecunnet Pond during the pre-treatment survey. However, short fragments were found in several areas of the pond, suggesting that the plant was present. Given the early timing of the survey (May), it is likely that fanwort stem growth was still in early stages at the time, resulting in an underestimate of cover
- Variable-leaf milfoil covered an estimated total of approximately 58 acres, primarily consisting of sparse beds (Figure 1). This was an **increase** of 47 acres from pre-treatment conditions in 2019.

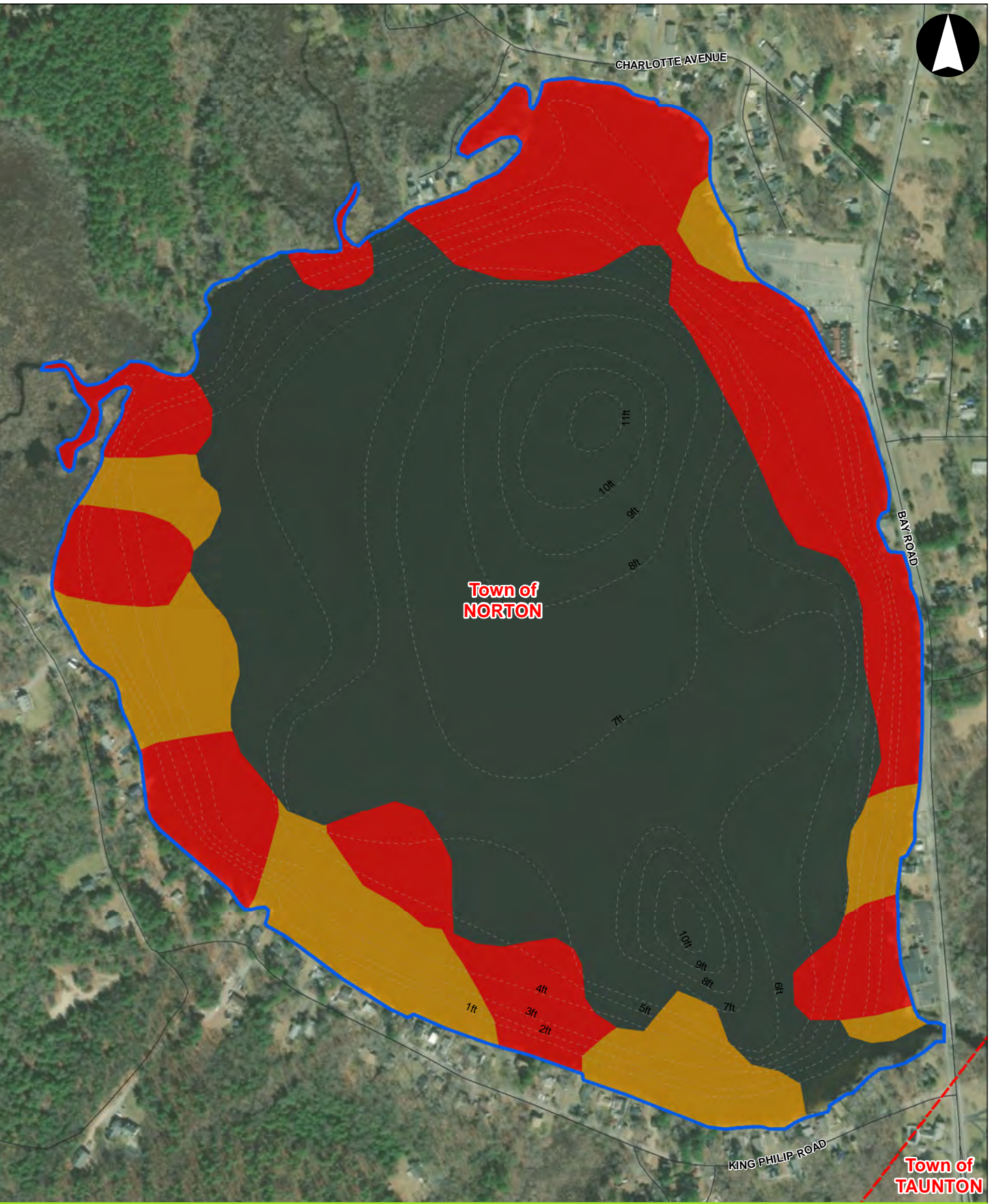


One of the denser variable-leaf milfoil beds at Winnecunnet Pond during pre-treatment monitoring in May 2020..

Norton Reservoir

Four exotic species were observed in Norton Reservoir during the pre-treatment surveys: fanwort, variable-leaf milfoil, curly-leaf pondweed (*Potamogeton crispus*), and water chestnut (*Trapa natans*). **Eurasian milfoil and swollen bladderwort, both previously found at Norton Reservoir, were not observed in 2020.**

- Fanwort covered approximately 28 acres, primarily consisting of sparse beds (Figure 2). This represents a **decrease** of 15 acres compared to the pre-treatment survey in 2019.
- Variable-leaf milfoil covered an estimated total of 107 acres, primarily consisting of sparse to patchy beds (Figure 3). This represents a **decrease** of approximately 52 acres from 2019 pre-treatment conditions. Most beds were sparse to patchy with only a few areas of dense growth.
- Curly-leaf pondweed was documented in 58 acres with densest beds at the northern end of the reservoir and sparse beds along much of the remaining shoreline (Figure 4). Compared to 2019, the total acreage covered was **similar**, even though the distribution of the beds shifted. However, the density of curly-leaf pondweed beds was greater in most of the areas where it was found.
- Water chestnut was found in one bed in the main basin (Figure 5). Total water chestnut coverage observed was approximately 2 acres, which represents a **decrease** of almost 4 acres from the pre-treatment survey in 2019.



Town of Norton Vegetation Management
Norton, Massachusetts

Pre-Treatment Variable-Leaf Milfoil Cover
Lake Winneconnet 2020

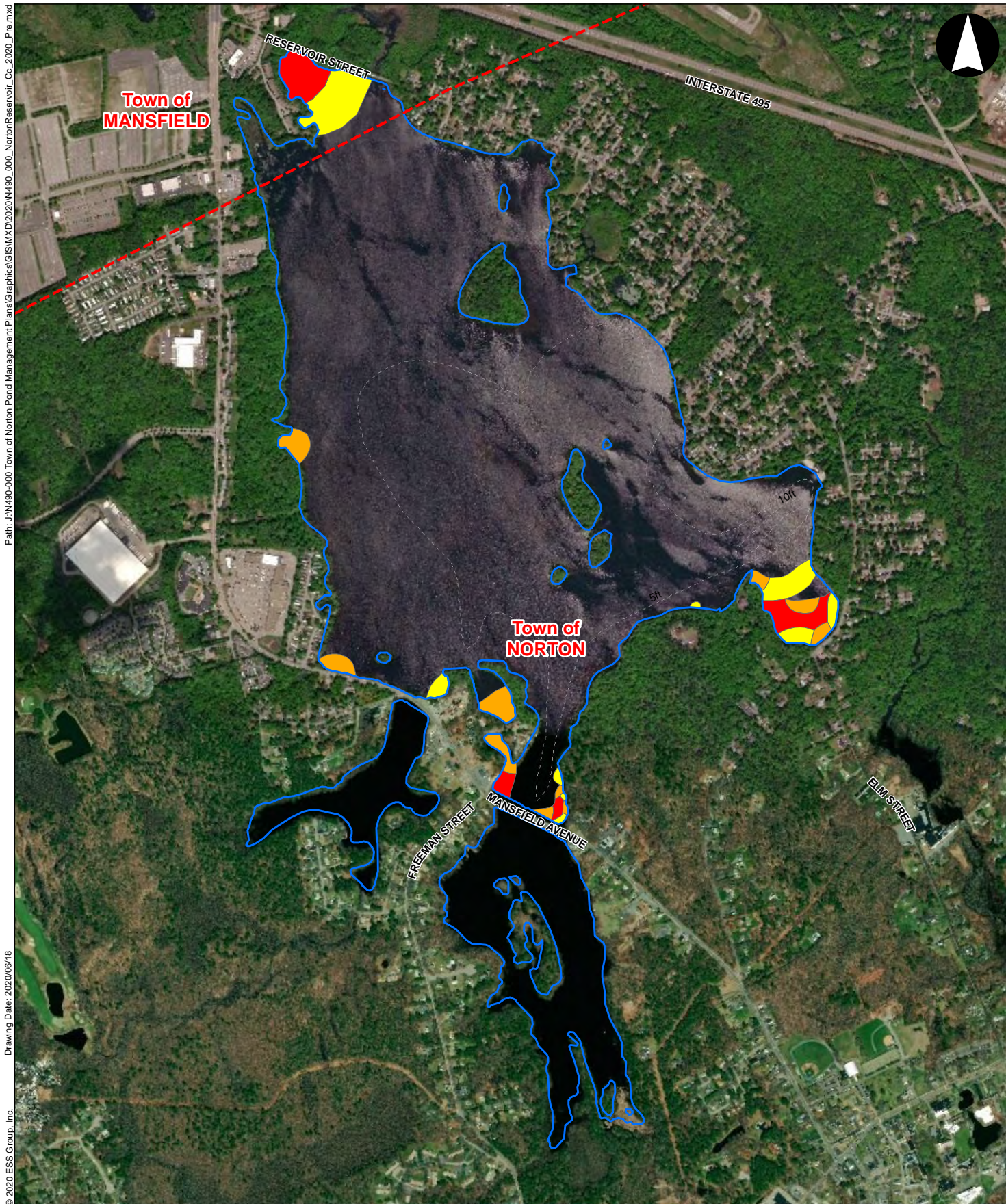
1 inch = 427 feet

Source: 1) ESRI, World Imagery, 2018
2) ESS, GPS Locations, May 2020

Variable-Leaf Milfoil Cover	Town Boundary
Sparse (0 acres)	
Patchy (19.4 acres)	
Dense (38.9 acres)	

0 200 400 Feet

Figure 1



Path: J:\N490-000 Town of Norton Pond Management Plans\Graphics\GIS\MXD\2020\N490_000_NortonReservoir_Cc_2020_Pre.mxd

© 2020 ESS Group, Inc. Drawing Date: 2020/06/18

0 650 1,300 Feet

Town of Norton Vegetation Management
Norton, Massachusetts

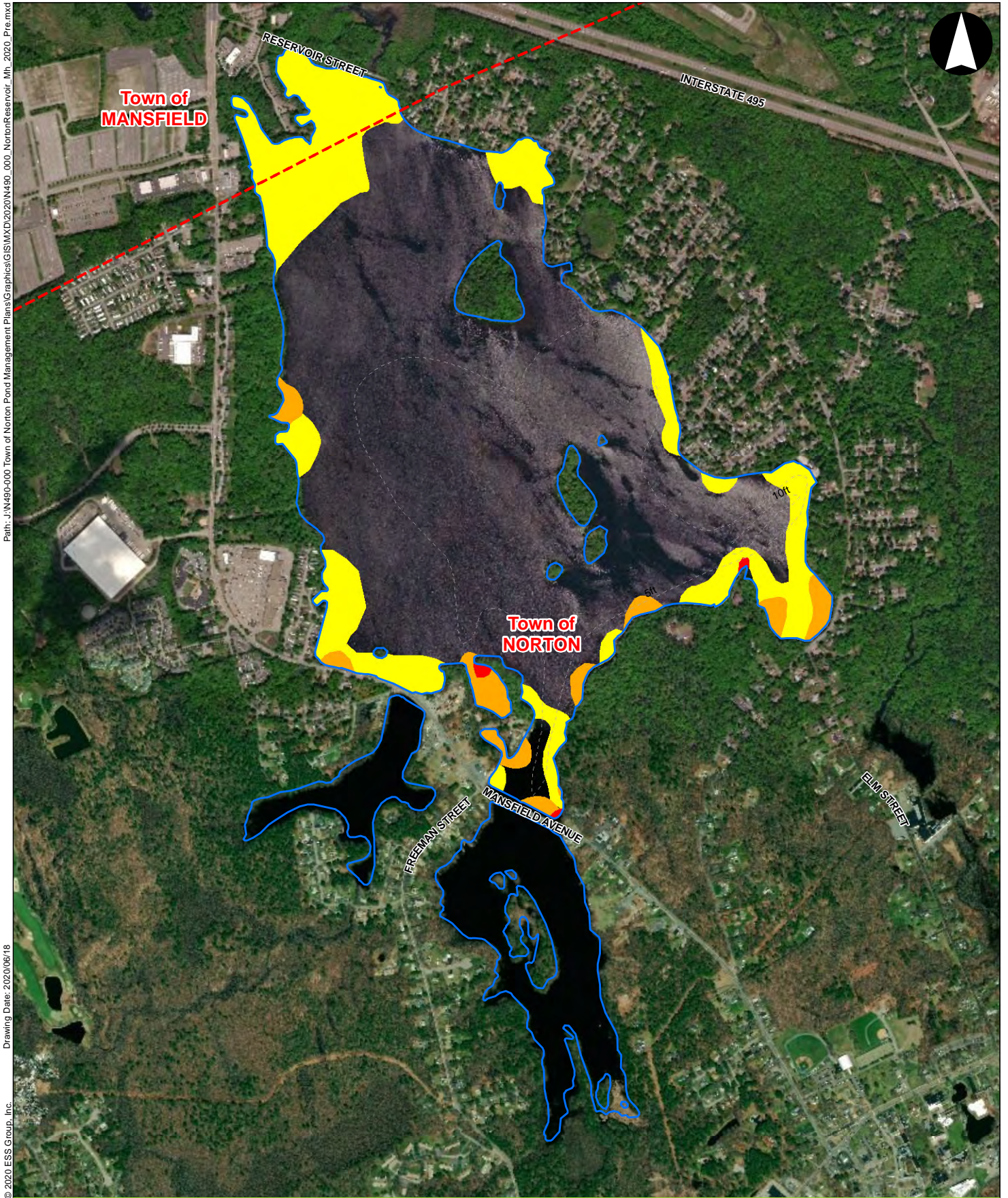
1 inch = 1,300 feet

Source: 1) ESRI, World Imagery, 2019
2) ESS, GPS Locations, 6/4/2020

- Town Boundary
- Fanwort Cover**
- Sparse (11.9 acres)
- Patchy (8.2 acres)
- Dense (8.3 acres)

Pre-treatment Fanwort Cover
Norton Reservoir
2020

Figure 2



Path: J:\N490-000_Town of Norton_Pond Management Plans\Graphics\IS\MXD\2020\N490_000_NortonReservoir_Mh_2020_Pre.mxd

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Town of Norton Vegetation Management
Norton, Massachusetts

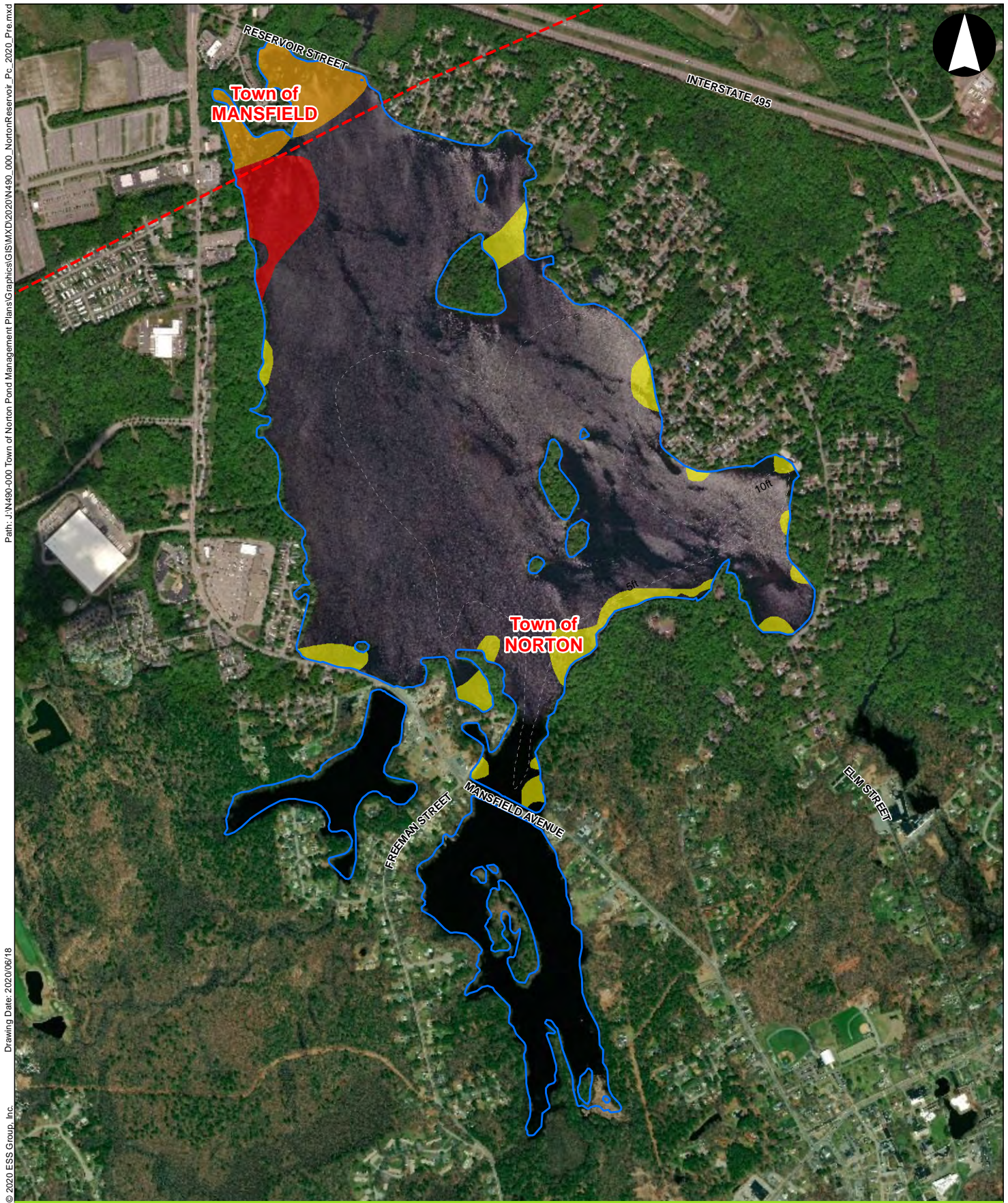
1 inch = 1,300 feet

Source: 1) ESRI, World Imagery, 2019
2) ESS, GPS Locations, 6/4/2020

- Town Boundary
- Variable-leaf Milfoil Cover**
- Sparse (90.2 acres)
- Patchy (15.9 acres)
- Dense (0.8 acres)

Pre-treatment Variable-leaf Milfoil Cover
Norton Reservoir
2020

Figure 3



Path: J:\N490-000 Town of Norton Pond Management Plans\Graphics\GIS\MXD\2020\N490_000_NortonReservoir_Pc_2020_Prc.mxd

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0 650 1,300 Feet

Town of Norton Vegetation Management
Norton, Massachusetts

1 inch = 1,300 feet

Source: 1) ESRI, World Imagery, 2019
2) ESS, GPS Locations, 6/4/2020

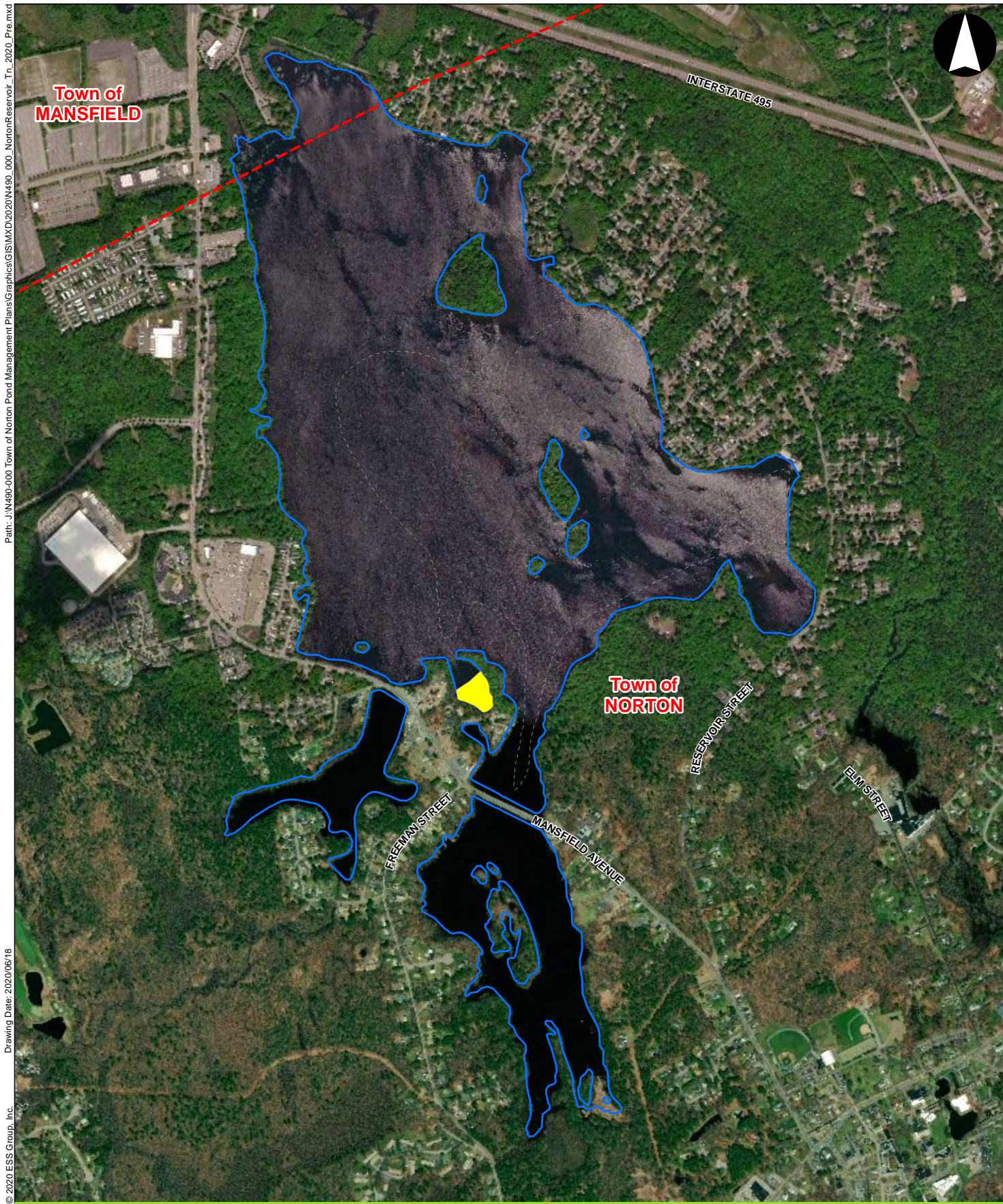
Town Boundary
Town Boundary

Curly-leaf Pondweed Cover

- Sparse (25.2 acre)
- Patchy (17.8 acres)
- Dense (15.1 acres)

Pre-treatment Curly-leaf Pondweed Cover
Norton Reservoir
2020

Figure 4



Path: J:\N490-000 Town of Norton Pond Management Plans\Graphics\GIS\MXD\2020\N490_000_NortonReservoir_Tn_2020_Pre.mxd

Drawing Date: 2020/06/18

0 650 1,300 Feet

Town of Norton Vegetation Management
Norton, Massachusetts

1 inch = 1,300 feet

Source: 1) ESRI, World Imagery, 2019
2) ESS, GPS Locations, 6/4/2020

- Town Boundary
- Water Chestnut Cover
- Sparse (2.0 acres)

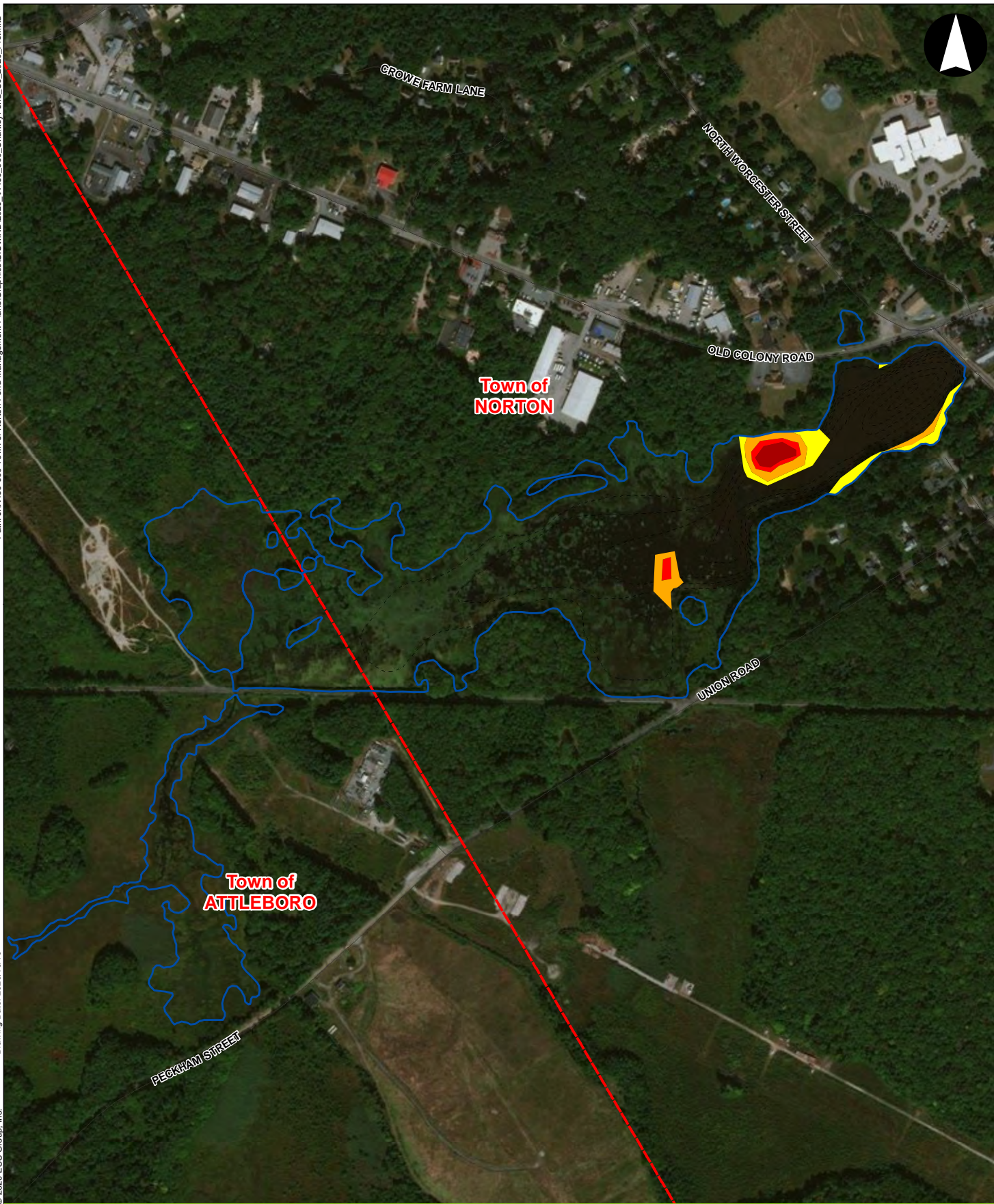
Pre-treatment Water Chestnut Cover
Norton Reservoir
2020

Figure 5

Path: J:\N490-000 Town of Norton Pond Management Plans\Graphics\GIS\MXD\2020_N490_000_ChartleyPond_Cc_2020_Pre.mxd

Drawing Date: 2020/10/16

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Town of Norton Vegetation Management
Norton, Massachusetts

Pre-treatment Fanwort Cover
Chartley Pond
2020

1 inch = 600 feet

Fanwort Cover

- Sparse (1.1 acres)
- Patchy (1.1 acres)
- Dense (0.7 acres)

Town Boundary

Source: 1) ESRI, World Imagery, 2017
2) ESS, Plant Mapping Data, 2020

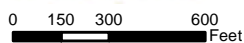
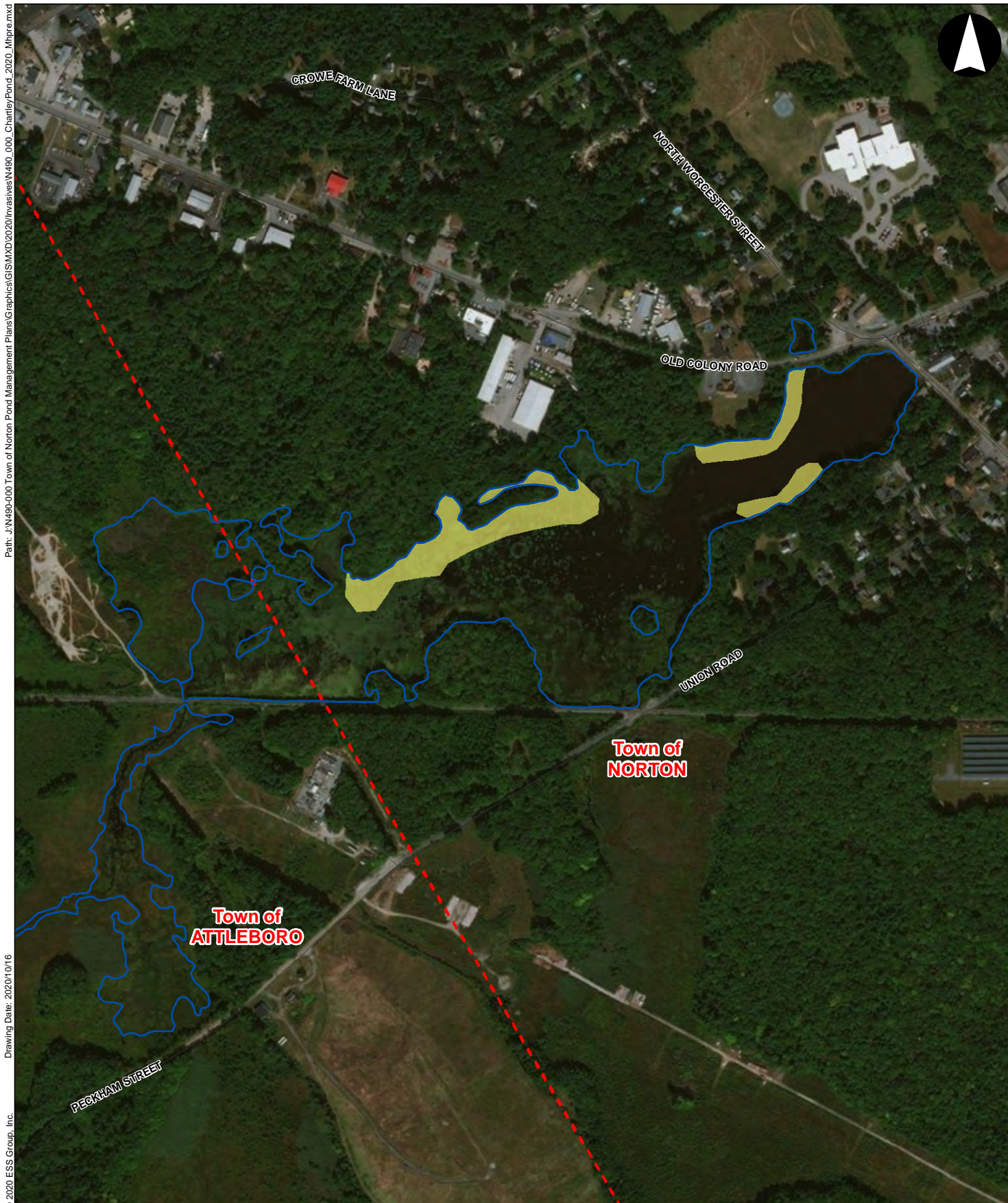


Figure 6



Path: J:\N490-000 Town of Norton Pond Management Plans\Graphics\GIS\MXD\2020\Invasives\N490_000_ChartleyPond_2020_Mhprc.mxd

© 2020 ESS Group, Inc. Drawing Date: 2020/10/16

0 150 300 600 Feet

Town of Norton Vegetation Management
Norton, Massachusetts

1 inch = 600 feet

Source: 1) ESRI, World Imagery, 2017
2) ESS, Plant Mapping Data, 2020

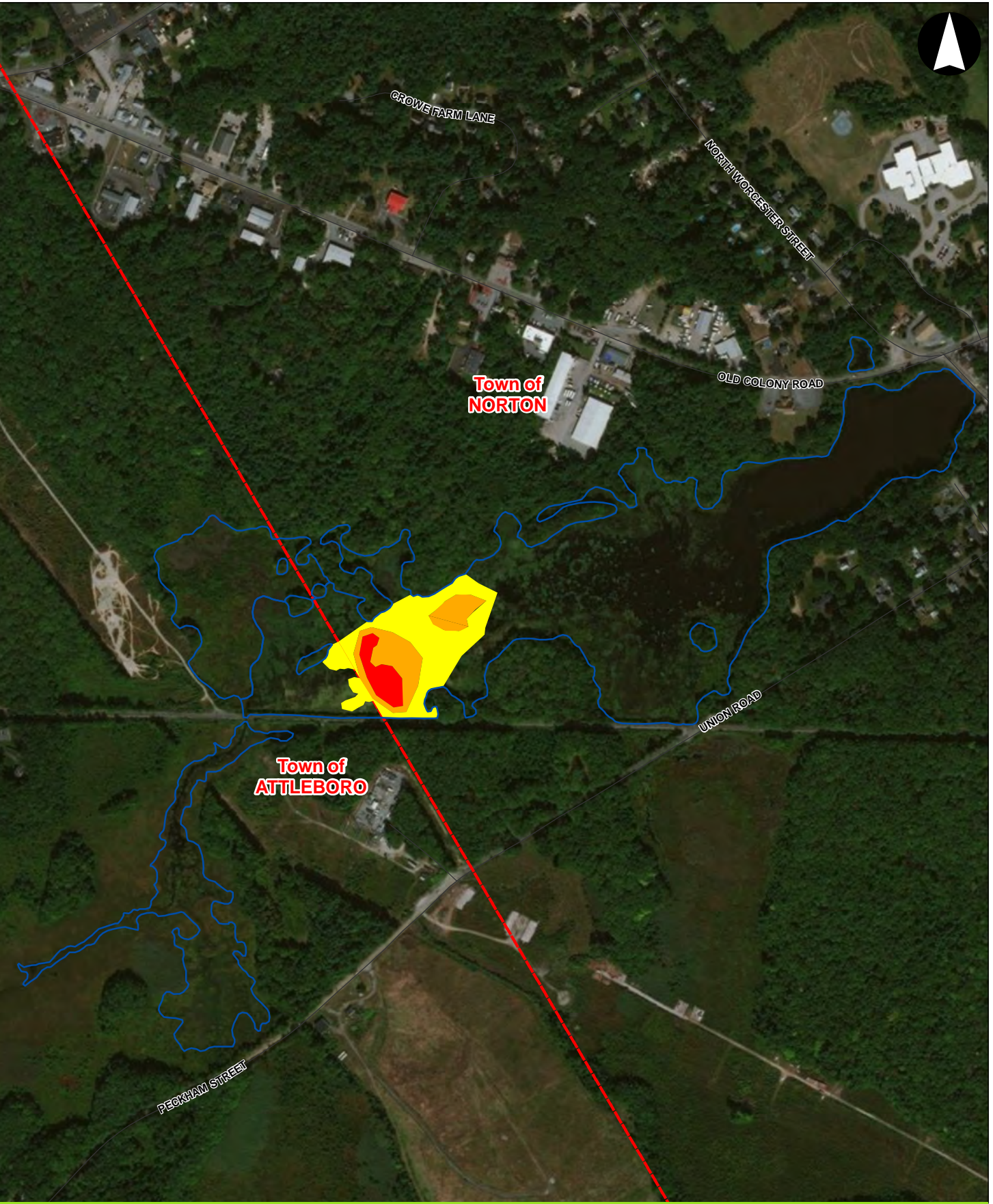
Pre-treatment Variable-Leaf Milfoil Cover
Chartley Pond
2020

Variable-Leaf Milfoil Cover

- Sparse (6.0 acres)
- Patchy (0.0 acres)
- Dense (0.0 acres)

Town Boundary

Figure 7



Town of Norton Vegetation Management
Norton, Massachusetts

1 inch = 600 feet

Source: 1) ESRI, World Imagery, 2017
2) ESS, Plant Mapping Data, 2020

- Water Chestnut Cover**
- Sparse (3.9 acres)
 - Patchy (1.6 acres)
 - Dense (0.6 acres)

Town Boundary

Pre-treatment Water Chestnut Cover
Chartley Pond
2020

Figure 8

Chartley Pond

Three exotic invasive species were observed in Chartley Pond during the pre-treatment surveys: fanwort, variable-leaf milfoil, and water chestnut. **Swollen bladderwort was not observed in 2020.**

- Fanwort covered approximately 3 acres of the pond during the 2020 pre-treatment survey (Figure 6), similar to observations of late-season growth in 2019. However, this represents an **increase** of close to 3 acres from early-season growth in 2019.
- Variable-leaf milfoil was documented as sparse to dense beds covering approximately 6 acres of the pond (Figure 7), a substantial **decrease** from the 18 acres observed prior to treatment in June 2019.
- Water chestnut covered approximately 6 acres of the pond (Figure 8). This represents a substantial **decrease** in growth from pre-treatment conditions in 2019.

Management Program Description

The overall vegetation management program for the four ponds is fully described in the 2015 Vegetation Management Report (ESS 2015), subject to the applicable permit conditions for each pond, as amended. The currently permitted management options for each pond are summarized in Table 2.0.

Table 2.0. Permitted Vegetation Management Program Summary

Action Category	Action	Water Body			
		Winnecunnet Pond	Norton Reservoir	Chartley Pond	Barrowsville Pond
Chemical Controls	Herbicides	Yes	Yes	Yes	Yes
	Algaecides	No	Yes	Yes	Yes
Physical Controls	Hand Harvesting	Yes	Yes	Yes	Yes
	Diver/Diver Assisted Suction Harvesting	Yes	Yes	Yes	Yes
	Benthic Barriers	No	Yes	Yes	Yes

The specific elements of the vegetation management program that were implemented in 2020 are summarized in Table 3.0. Details on herbicide applications are provided in the next section of this report.

Table 3.0. Summary of Vegetation Management Actions Implemented in 2020

Action Category	Action	Water Body			
		Winnecunnet Pond	Norton Reservoir	Chartley Pond	Barrowsville Pond*
Chemical Controls	Herbicides	Yes	Yes	Yes	No
	Algaecides	N/A	No	No	No
Physical Controls	Hand Harvesting	No	Yes	Yes	No
	Diver/Diver Assisted Suction Harvesting	No	No	No	No
	Benthic Barriers	N/A	No	No	No

*Barrowsville Pond was excluded from the 2020 monitoring and management program



Areas Managed and Herbicides Used

Summary of Management Actions

The herbicides approved for use are presented in Table 4.0, along with the acreage actually treated or effort used to otherwise manage each water body in 2020.

Table 4.0. Summary of Management Effort in 2020

Water Body	Approved Management Action	Trade Name	Used in 2020	Acreage Treated/ Days of Harvesting
Winnecunnet Pond	Fluridone	Sonar One and Sonar Genesis	Yes	Entire Pond
Norton Reservoir	Fluridone	Sonar One and Sonar Genesis	Yes	TBD*
	Diquat dibromide	Tribune/Diquat	TBD*	TBD*
	Flumioxazin	Clipper	TBD*	TBD*
	Imazamox	Clearcast	No	0 acres
	Hand harvesting	N/A	TBD*	TBD*
Chartley Pond	Diquat dibromide	Tribune/Diquat	Yes	12 acres
	Flumioxazin	Clipper	Yes	12 acres
	Imazamox	Clearcast	No	0 acres
	Hand harvesting	N/A	TBD*	TBD*

*Awaiting confirmation from the treatment contractor. This information will be provided once it has been made available.

Prior to the start of the management program, ESS provided the 2019 Safe Zone maps to the management program contractor (SOLitude Lake Management [SOLitude]).

ESS is currently unaware of any treatments that were not completed in accordance with the permits issued for each pond or in a manner consistent with product labels.

Summary of Fluridone Monitoring Results

Fluridone monitoring results are still pending from the management program contractor as of the date of this report. This information will be provided once it has been made available.

Post-Treatment Surveys

ESS completed post-treatment vegetation surveys at Winnecunnet Pond, Norton Reservoir, and Chartley Pond to provide updates on the status of exotic plant infestations in each water body following completion of the 2020 management program.

The post-treatment survey dates and exotic plants observed are summarized in Table 5.0.

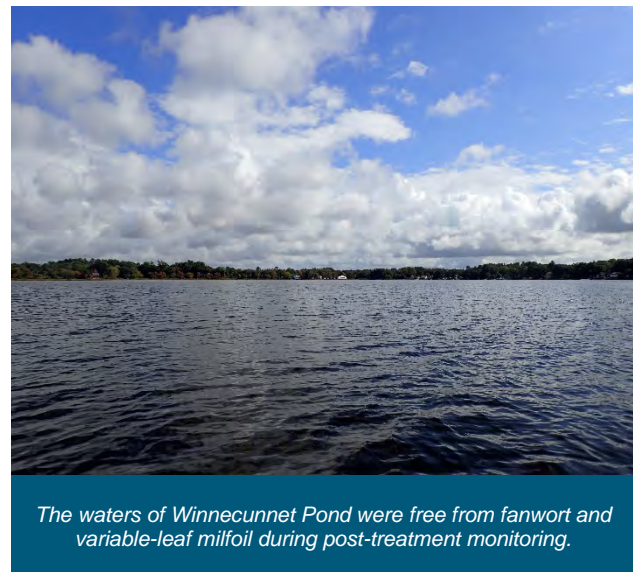
Table 5.0. Dates of Post-treatment Surveys in 2020

Water Body	Survey Dates	Exotic Species Observed
Winnecunnet Pond	October 5, 2020	None
Norton Reservoir	October 7 and 12, 2020	Fanwort Variable-leaf Milfoil Water Chestnut
Chartley Pond	October 5, 2020	Fanwort Variable-leaf Milfoil Water Chestnut

More details on post-treatment conditions are provided, by pond, in the following sections.

Winnecunnet Pond

No target species were observed in Winnecunnet Pond during the late season surveys. This suggests that the 2020 Sonar treatment was highly effective in controlling both fanwort and variable-leaf milfoil within the pond. However, this will need to be verified in 2021 to better assess the potential for regrowth in the spring.



The waters of Winnecunnet Pond were free from fanwort and variable-leaf milfoil during post-treatment monitoring.

Norton Reservoir

Three exotic species were observed in Norton Reservoir during the post-treatment surveys: fanwort, variable-leaf milfoil, and water chestnut. Curly-leaf pondweed, which was observed during the pre-treatment survey, was not observed following treatment. However, this annual species has typically completed its life cycle by early to mid-summer and can be difficult to detect later in the year.

- Fanwort covered an estimated total of 54 acres (Figure 9), an apparent **increase of approximately 26 acres from pre-treatment conditions but a year-over-year decrease of 38 acres**. The beds located in the northern coves of the reservoir were reduced compared to recent years, although the plant was still present. Elsewhere, fanwort beds also appeared to recede from their overall 2019 footprint but were occasionally dense along the shoreline. Most plants were pale and chlorotic but many still retained green growing tips.

- Variable-leaf milfoil covered an estimated total of 100 acres (Figure 10), a **decrease of approximately 7 acres from pre-treatment conditions but a year-over-year increase of 22 acres**. Most remaining beds were in poor to fair condition and sparse to patchy with only a few small beds where the growth remained dense.
- Water chestnut covered an estimated total of 1 acre (Figure 11), a **decrease of approximately 1 acre from pre-treatment conditions and similar year-over-year to 2019**. Remaining beds were sparse.

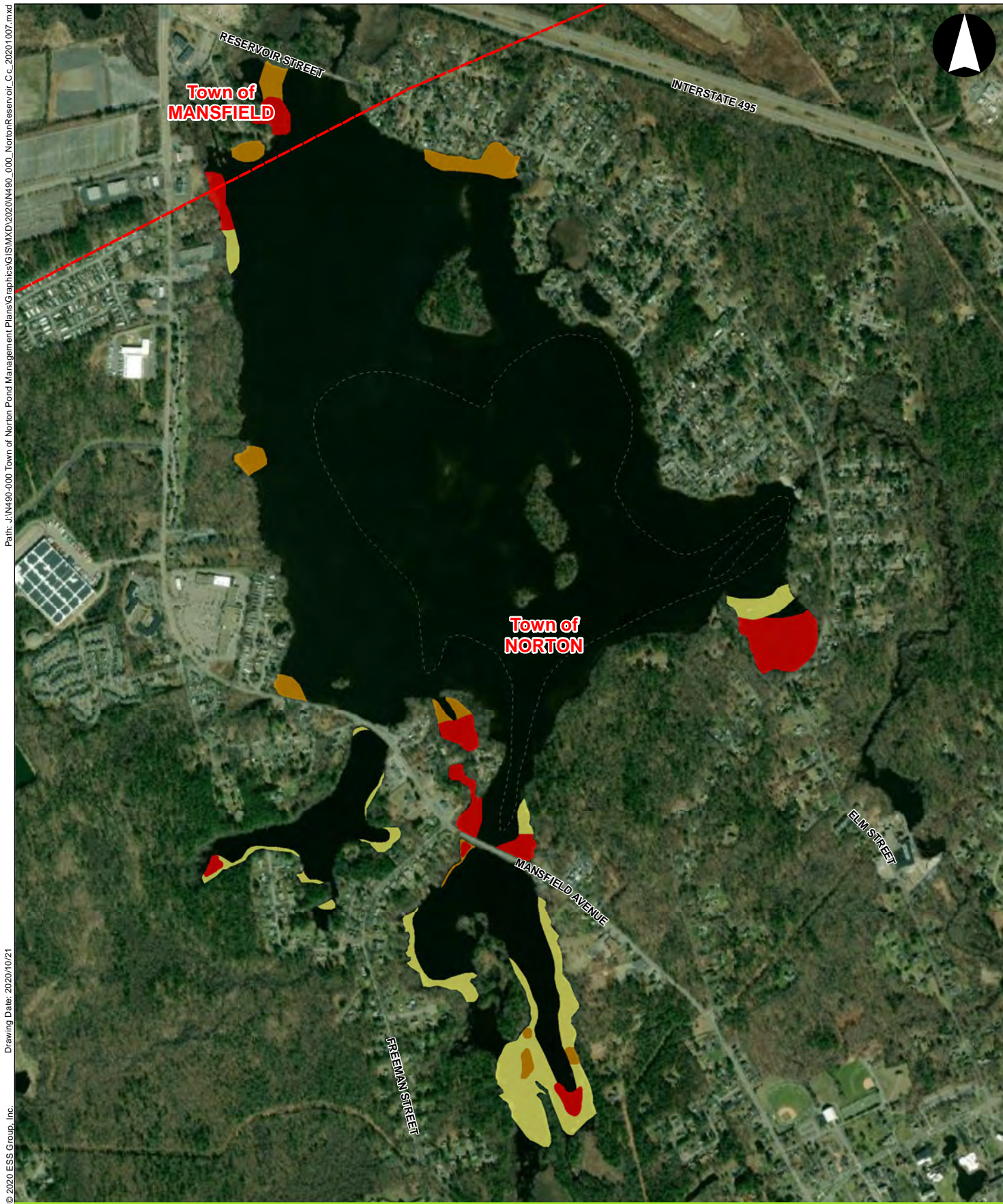
Chartley Pond

Three exotic species were observed in Chartley Pond during the post-treatment surveys: fanwort, variable-leaf milfoil, and water chestnut.

- Fanwort covered an estimated total of 5 acres (Figure 12), an **increase from pre-treatment conditions and year-over-year**. However, the density of the plants within the beds was greatly decreased, resulting in sparse growth. The beds were also less contiguous than in 2019.
- Variable-leaf milfoil covered an estimated total of 3 acres, a **reduction of approximately 6 acres from pre-treatment conditions and also a year-over-year decrease of 6 acres** (Figure 13). The largest area of remaining beds remained in the north-central shoreline of the pond.
- Water chestnut covered an estimated total of 2 acres, a **reduction of approximately 4 acres from pre-treatment conditions** (Figure 14). No beds were observed anywhere in the main portion of the pond. However, an area of sparse plants was observed at the western periphery of open water in the pond.



Water chestnut growth was sparse during post-treatment monitoring at Chartley Pond.



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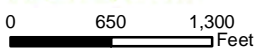
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Town of Norton Vegetation Management
Norton, Massachusetts

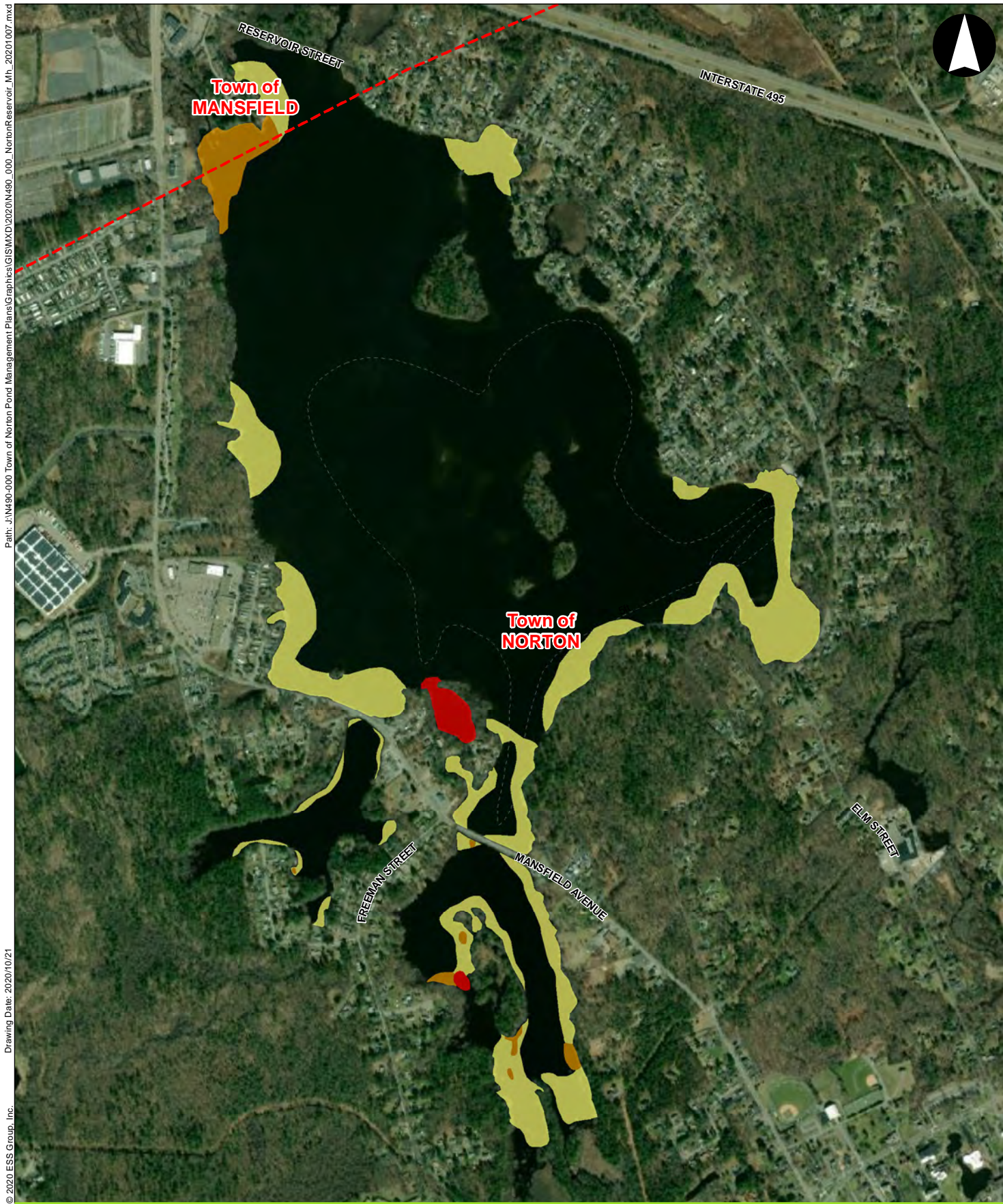
1 inch = 1,239 feet

Source: 1) ESRI, World Imagery, 2019
2) ESS, Plant Mapping Data, 2020



Fanwort Cover
Norton Reservoir
2020

Figure 9



Path: J:\N490-000 Town of Norton Pond Management Plans\Graphes\GIS\MXD\2020\N490_000_NortonReservoir_Mh_20201007.mxd

Drawing Date: 2020/10/21

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0 650 1,300 Feet

Town of Norton Vegetation Management
Norton, Massachusetts

1 inch = 1,221 feet

Source: 1) ESRI, World Imagery, 2019
2) ESS, Plant Mapping Data, 2020

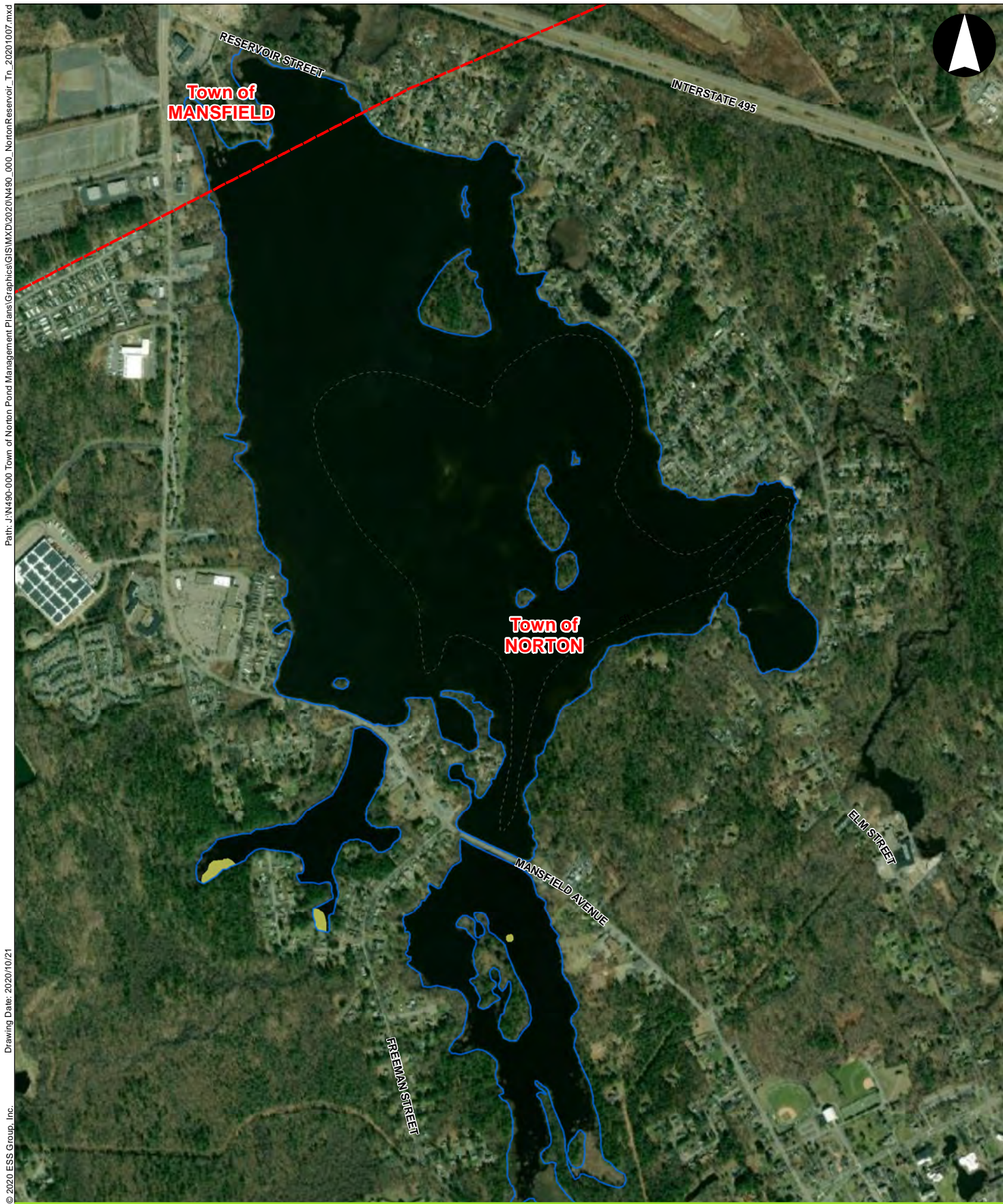
Variable-leaf Milfoil Cover

- Sparse (85.7 acres)
- Patchy (10.2 acres)
- Dense (4.2 acres)

Town Boundary

Variable-leaf Milfoil Cover
Norton Reservoir
2020

Figure 10



Path: J:\N490-000_Town of Norton_Pond Management Plans\Graphics\GIS\MXD\2020\N490_000_NortonReservoir_Tn_20201007.mxd

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1 inch = 1,239 feet

Town of Norton Vegetation Management
Norton, Massachusetts

Source: 1) ESRI, World Imagery, 2019
2) ESS, Plant Mapping Data, 2020

Water Chestnut Cover

- Sparse (1.4 acres)
- Patchy (0 acres)
- Dense (0 acres)

Town Boundary

Water Chestnut Cover
Norton Reservoir
2020

Figure 11



Path: \DCC2\Data\JOB\SS\N490-000_Town of Norton_Pond Management Plans\Graphics\GIS\MXD\2020\N490_000_ChartleyPond_Cc_20201005.mxd

Drawing Date: 2020/10/06

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Town of Norton Vegetation Management
Norton, Massachusetts

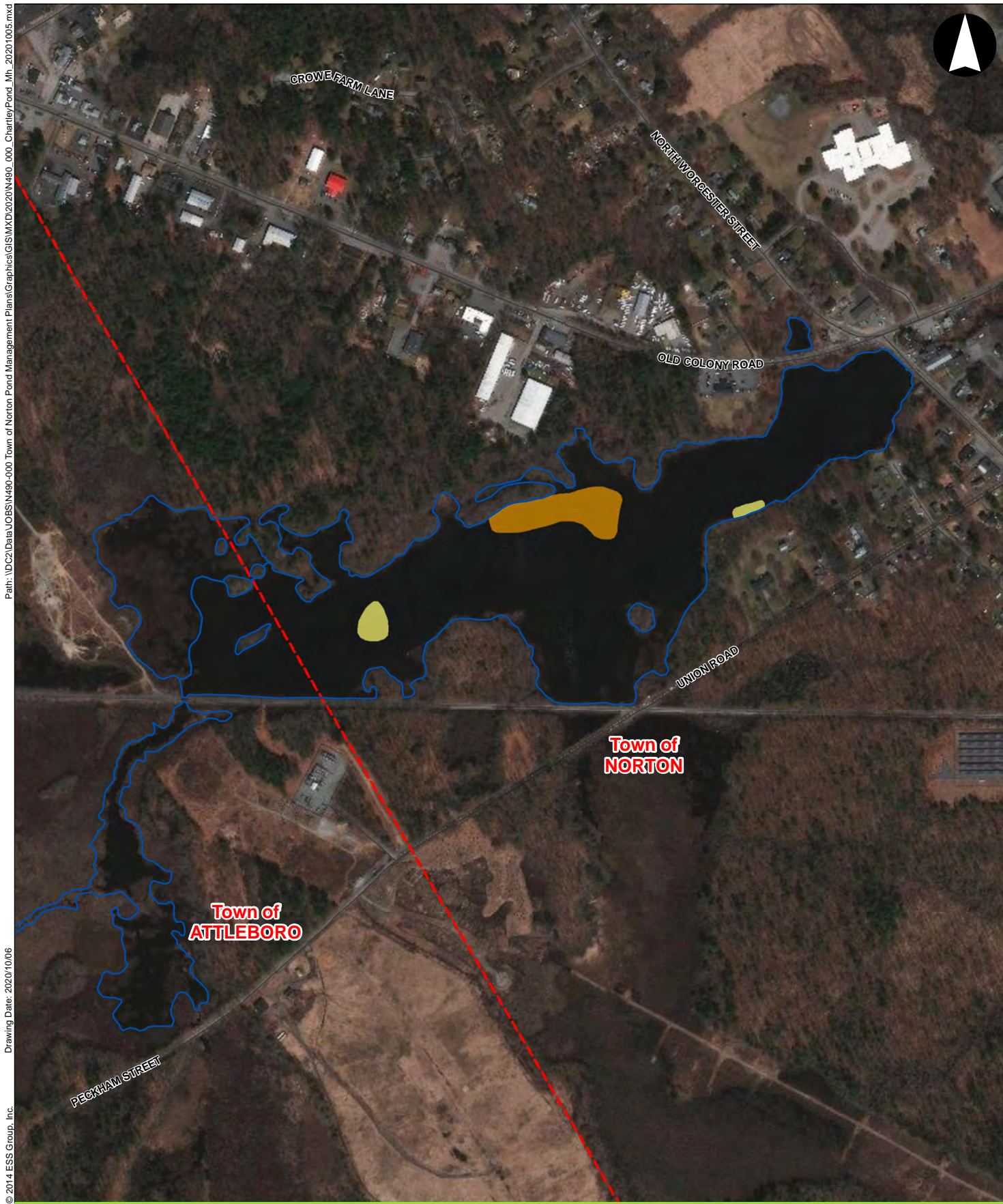
1 inch = 600 feet

Source: 1) ESRI, World Imagery, 2019
2) ESS, Plant Mapping Data, 2020

- | | |
|----------------------|---------------|
| Fanwort Cover | Town Boundary |
| Sparse (4.2 acres) | |
| Patchy (0.8 acres) | |
| Dense (0 acres) | |

Fanwort Cover
Chartley Pond
2020

Figure 12



Path: YDC2\Data\JOBS\N490-000_Town of Norton_Pond Management\Plans\Graphics\GIS\MXD\2020\N490_000_ChartleyPond_Mh_20201005.mxd

Drawing Date: 2020/10/06

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0 150 300 600 Feet

Town of Norton Vegetation Management
Norton, Massachusetts

1 inch = 600 feet

Source: 1) ESRI, World Imagery, 2019
2) ESS, Plant Mapping Data, 2020

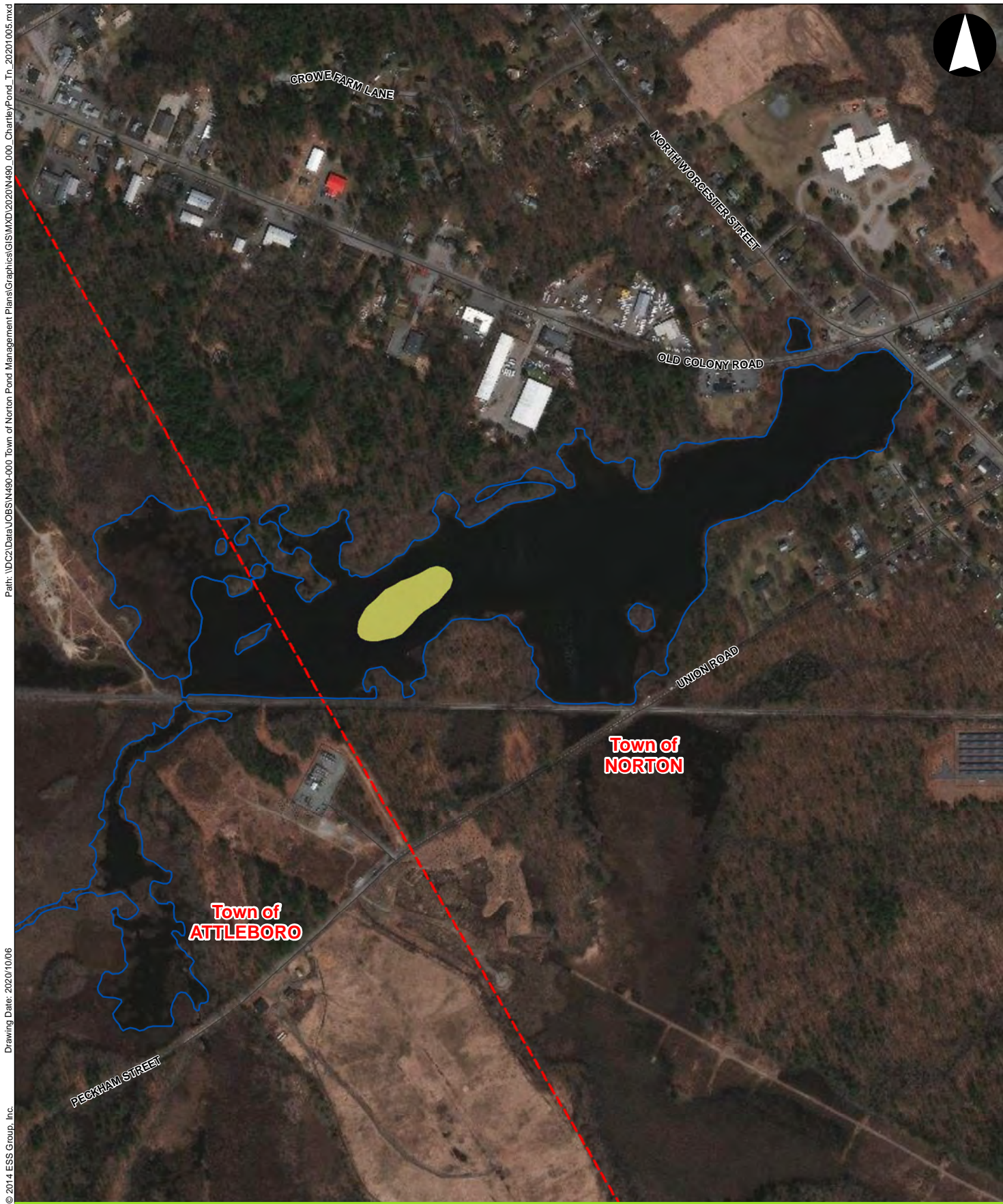
Variable-leaf Milfoil Cover

- Sparse (0.5 acres)
- Patchy (2.1 acres)
- Dense (0 acres)

Town Boundary

Variable-leaf Milfoil Cover
Chartley Pond
2020

Figure 13



Path: \\DC2\Data\UCBS\N490-000_Town of Norton Pond Management Plans\Graphics\GIS\MXD\2020\N490_000_ChartleyPond_Tn_20201005.mxd

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Town of Norton Vegetation Management
Norton, Massachusetts

1 inch = 600 feet

Source: 1) ESRI, World Imagery, 2019
2) ESS, Plant Mapping Data, 2020

- | | |
|-----------------------------|---------------|
| Water Chestnut Cover | Town Boundary |
| Sparse (1.8 acres) | |
| Patchy (0 acres) | |
| Dense (0 acres) | |

Water Chestnut Cover
Chartley Pond
2020

Figure 14

Safe Zone Mapping

Safe Zone maps for each pond were established in 2016, prior to the treatment programs, and re-evaluated by a Commission-approved Wildlife Biologist in subsequent years. Safe Zones include five-foot buffers from the shorelines of each pond, with forty-foot buffers extending from the shorelines of all islands, as well as identification of wildlife habitat features, including muskrat houses, indigenous emergent and aquatic plant beds, as well as protruding rocks, root systems, trunks, stumps, and limbs. Muskrat houses were given a forty-foot buffer, while all other habitat features were given a five-foot buffer.

Safe Zones used in 2020 are presented in Figures 15 through 17.

RECOMMENDATIONS FOR MANAGEMENT IN 2021

Based on the results of the 2020 vegetation management program, ESS recommends the management actions presented in Table 6.0 for 2021. Additionally, ESS recommends that the selected management contractor work proactively with the Norton Conservation Commission to ensure that the signage and notification process for any in-pond management work conducted in 2021 is compliant with permit requirements.

Table 6.0. Summary of Vegetation Management Recommendations for 2021

Water Body	Description of Treatment	Primary Timing	Area Anticipated for Treatment	Notes
Winnecunnet Pond	Diver harvesting or DASH	Summer	<1 acre	Use for response to pioneer infestations of new species or regrowth of small beds of exotic milfoil/fanwort.
Norton Reservoir	Sonar treatment	Spring and early summer	Partial to Whole Pond	2020 results less encouraging than those achieved in 2017 but full outcome may not be evident until spring 2021. Would only potentially recommend partial pond treatment in 2021, if warranted based on conditions and contractor feedback.
	Reward/Clipper spot treatments	Spring to summer	<100 acres	Can be used to touch up any remaining areas of fanwort and exotic milfoil growth.
	Hand pulling of water chestnut	June to August	As needed	Likely to need at least three days of hand pulling to maintain progress to date. Must be pulled before seed drop at end of summer.
	Algaecide treatment	As needed	As needed	Has not been needed.
Chartley Pond	Sonar treatment	Spring and early summer	Whole Pond	Would address regrowth of fanwort for more than one year. Added to permit in 2020.
	Reward/Clipper spot treatments	Spring to summer	15 acres	Unlikely to be needed in 2021 if Sonar applied.



Water Body	Description of Treatment	Primary Timing	Area Anticipated for Treatment	Notes
				Clipper (flumioxazin) added to permit in 2020. Reward/Clipper unlikely to be used in 2021 if Sonar applied.
	Hand pulling of water chestnut	June to August	As needed	Likely to need at least two days of hand pulling to maintain progress to date.
	Algaecide treatment	As needed	As needed	Has not been needed.

These recommendations have been adjusted to account for ESS's following post-treatment observations of the ponds in 2020:

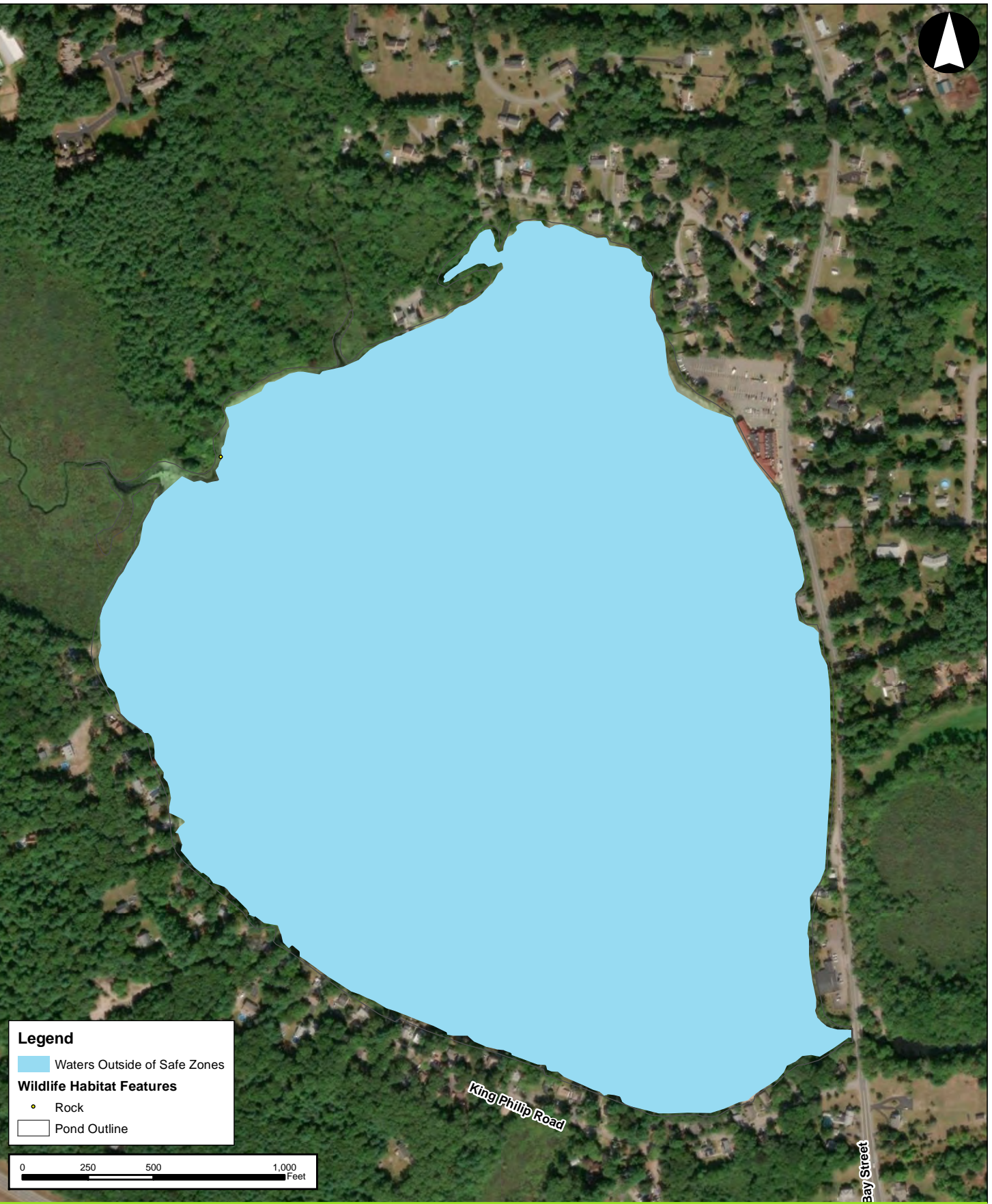
- Excellent control of variable-leaf milfoil and fanwort at Winnecunnet Pond
- Continued growth of variable-leaf milfoil and fanwort in all basins of Norton Reservoir
- Stabilized growth of water chestnut at Norton Reservoir
- Continued growth of variable-leaf milfoil and fanwort at Chartley Pond
- Reduced growth of water chestnut at Chartley Pond

Additionally, the Town should take note of the fact that the Order of Conditions for each water body will expire in spring 2021, unless an extension is requested at least 30 days prior to the expiration date and granted by the Norton Conservation Commission (and Mansfield Conservation Commission for Norton Reservoir). **Therefore, should the Town desire to continue with active management of any of these water bodies, action must be taken in early 2021 to ensure that the work is covered by an active permit.**

Path: J:\N4490-000 Town of Norton Pond Management Plans\Graphics\GIS\MXD\Wildlife safe zones\Wildlife Safe Zones Winnecunnet_2018.mxd

Drawing Date: 2018/10/30

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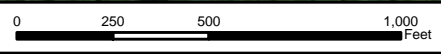


Legend

- Waters Outside of Safe Zones

Wildlife Habitat Features

- Rock
- Pond Outline



Norton Ponds Aquatic Plant Management Program
Norton, Massachusetts

1 inch = 500 feet

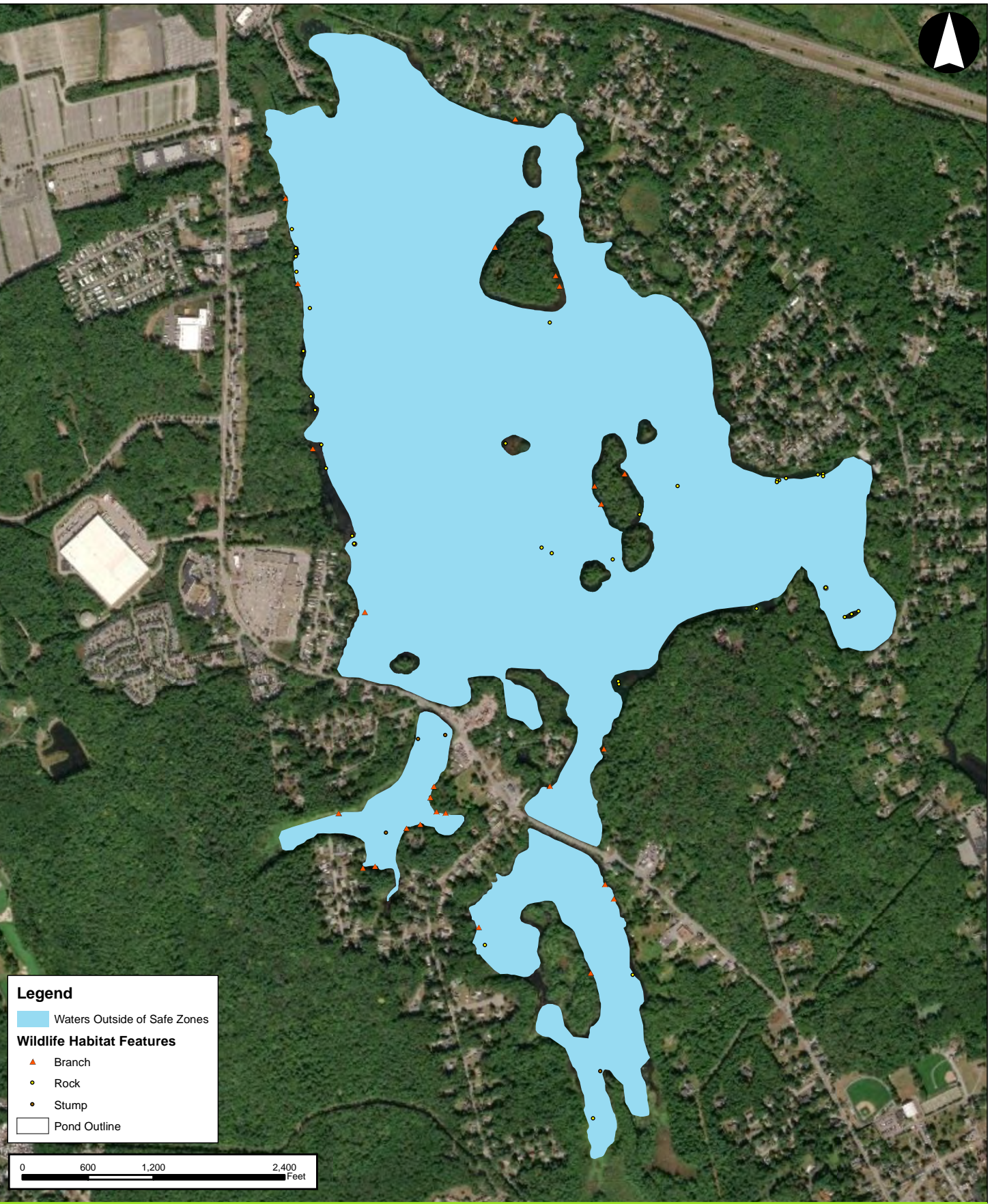
Source: 1) ESRI, World Imagery, 2017
2) ESS, GPS Locations, 2020

Wildlife Safe Zones - 2020
Winnecunnet Pond

Assumes a 5' safe zone around perimeter of the waterbody and around stands of indigenous emergent hydrophytes, stands of indigenous aquatic plants, rocks, trucks, roots, stumps, and limbs. Assumes a 40' safe zone around muskrat houses and islands. See Order of Conditions for additional details.



Figure 15

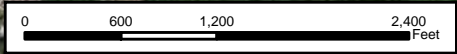


Legend

- Waters Outside of Safe Zones

Wildlife Habitat Features

- Branch
- Rock
- Stump
- Pond Outline



Norton Ponds Aquatic Plant Management Program
Norton, Massachusetts

Wildlife Safe Zones - 2020
Norton Reservoir

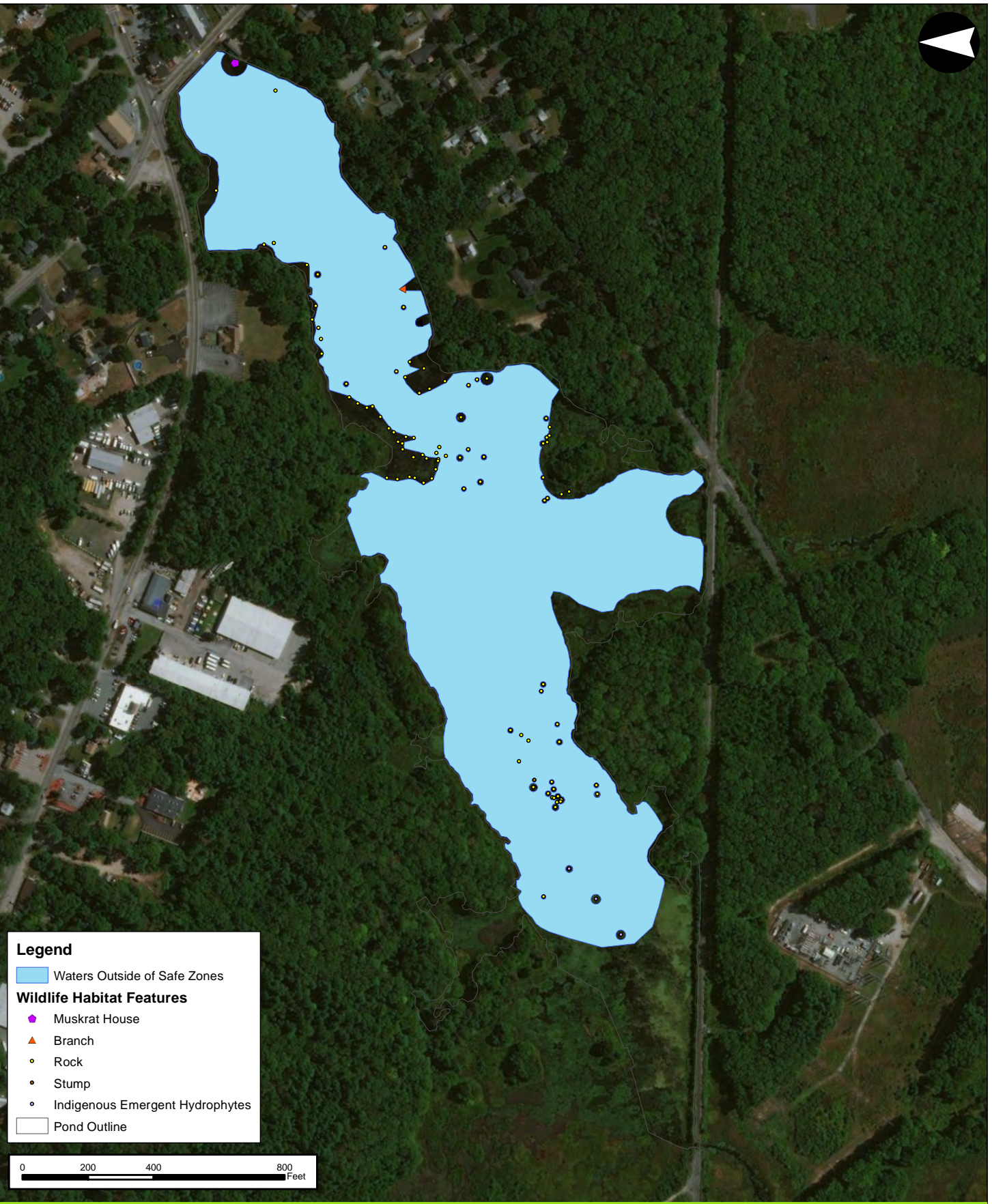
1 inch = 1,200 feet

Source: 1) ESRI, World Imagery, 2017
2) ESS, GPS Locations, 2020

Assumes a 5' safe zone around perimeter of the waterbody and around stands of indigenous emergent hydrophytes, stands of indigenous aquatic plants, rocks, trunks, roots, stumps, and limbs. Assumes a 40' safe zone around muskrat houses and islands. See Order of Conditions for additional details.



Figure 16



Legend

- Waters Outside of Safe Zones

Wildlife Habitat Features

- Muskrat House
- Branch
- Rock
- Stump
- Indigenous Emergent Hydrophytes
- Pond Outline



Norton Ponds Aquatic Plant Management Program Norton, Massachusetts

1 inch = 400 feet

Source: 1) ESRI, World Imagery, 2017
2) ESS, GPS Locations, 2020

Assumes a 5' safe zone around perimeter of the waterbody and around stands of indigenous emergent hydrophytes, stands of indigenous aquatic plants, rocks, trunks, roots, stumps, and limbs. Assumes a 40' safe zone around muskrat houses and islands. See Order of Conditions for additional details.

Wildlife Safe Zones - 2020 Chartley Pond

Figure 17

SUMMARY AND CONCLUSIONS

The vegetation management program implemented in 2020 appeared to result in substantial improvement at Winnecunnet Pond, where a full pond Sonar treatment was applied. Although some standing biomass of fanwort and variable-leaf milfoil was still present during the post-treatment mapping, live plants were not found. This is very similar to the result achieved from a previous Sonar treatment and suggests that Winnecunnet Pond is likely to have minimal regrowth of these target species in 2021.

Additionally, pre-treatment conditions in Norton Reservoir and Chartley Pond were characterized by stable or increased target species growth levels compared to the prior year. Therefore, Norton Reservoir and Chartley Pond were actively managed in 2020, both through application of permitted herbicides, as well as hand harvesting. Multiple management actions are recommended at each of these water bodies for 2021 to ensure that the upward trend in target species growth is reversed and sustained into the future.

In order to implement the recommended management plan, the Town will need to pursue extensions of each Order of Conditions at least 30 days prior to their expiration dates in early 2021. Additionally, this report and associated GIS geodatabase should be shared with the Town's aquatic vegetation management contractor to assist in their preparation for active management of the ponds in 2021.

Over the course of the last four years, the Town's vegetation management program has broadly achieved its goal to reduce aquatic invasive vegetation in Winnecunnet Pond, Norton Reservoir, and Chartley Pond. As indicated in Table 7.0, aquatic invasive vegetation was pervasive in each water body at the initiation of the management program in 2017. Significant reductions in the severity of infestation were achieved by 2018 and most of these infestations were largely kept under control into 2020. The resurgence of some species required a more aggressive management program this year. However, it is expected that this additional effort will result in a return to reduced growth of aquatic invasive species, especially if the recommended actions – many of them maintenance-level – are implemented in 2021.

Table 7.0. Extent of Aquatic Invasive Species by Water Body, 2017-2020

Water Body	Aquatic Invasive Species	Year			
		2017	2018	2019	2020
Winnecunnet Pond	Fanwort	●	○	●	●
	Variable-leaf Milfoil	●	●	●	●
Norton Reservoir	Curly-leaf Pondweed	○	●	●	●
	Eurasian Milfoil	●	○	●	○
	Fanwort	●	●	●	●
	Swollen Bladderwort	●	●	●	○
	Variable-leaf Milfoil	●	●	●	●
	Water Chestnut	○	●	●	●
Chartley Pond	Fanwort	●	○*	●	●
	Swollen Bladderwort	●	○*	○	○
	Variable-leaf Milfoil	●	●*	●	●
	Water Chestnut	●	●*	●	●

●=Extensive, ●=Moderate, ●=Low, ○=Absent

*Pond was drawn down for dam repairs over much of the summer.



A final summary of the recommended actions for 2021 is presented, by pond, below.

Winnecunnet Pond

- Diver harvesting or DASH may be useful as a vegetation management method in 2021, primarily to control pioneer infestations of new invasive species. However, this method could also be used to manage fanwort or variable-leaf milfoil regrowth, particularly if the beds are small (generally less than one acre).

Norton Reservoir

- To address regrowth of variable-leaf milfoil and fanwort, diquat dibromide and/or Clipper may be used as spot treatments. These are contact herbicides that will only need to be applied where regrowth of the target species actually occurs. However, based on the extent of regrowth in 2020, ESS anticipates less than 100 acres of treatments would be necessary.
- A partial-lake Sonar treatment may be warranted if regrowth of fanwort in 2021 is dense but primarily within a well-protected cove or basin that is isolated from currents that would otherwise make it difficult to maintain the appropriate treatment concentration.
- Hand harvesting should be used to address regrowth of water chestnut in 2021. This should be completed by early August, if possible, to prevent seed maturation and drop.
- Diver harvesting or DASH may be useful as a vegetation management method in 2021, primarily to control pioneer infestations of new invasive species.

Chartley Pond

- To address the continued growth of fanwort, a Sonar treatment is recommended for 2021. This treatment will also address remnant beds of variable-leaf milfoil. A successful Sonar treatment may result in two or more seasons of control, especially if other management actions are implemented in future years to sustain the management of these species.
- Diquat dibromide and/or Clipper may be used as spot treatments to control fanwort and variable-leaf milfoil if a Sonar treatment is not implemented. However, these are contact herbicides and will only result in single-season control.
- Hand harvesting should be used to address regrowth of water chestnut in 2021. This should be completed by early August, if possible, to prevent seed maturation and drop.
- Diver harvesting or DASH may be useful as a vegetation management method in 2021, primarily to control pioneer infestations of new invasive species.



REFERENCES

ESS Group, Inc. 2015. Town of Norton Lake/Pond Management Action Plan – Updated Vegetated Management Recommendations. Prepared for Town of Norton, November 25, 2015.

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