



# 2021 Lakes and Ponds Annual Report

Norton, Massachusetts



**PREPARED FOR**

Town of Norton Conservation Commission  
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Norton, Massachusetts 02766

**PREPARED BY**

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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 Winnecunnet Pond, Norton Reservoir, and Chartley Pond.

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

## **2021 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 2021 management program

### **Pre-treatment Surveys**

ESS completed pre-treatment/early season vegetation surveys at Winnecunnet Pond, Norton Reservoir, and Chartley Pond, to provide updates on the status of exotic plant infestations in each water body.

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 2021**

<b>Water Body</b>	<b>Survey Dates</b>	<b>Exotic Species Observed</b>
Winnecunnet Pond	May 18, 2021	Variable-leaf Milfoil
Norton Reservoir	May 26-27, 2021	Fanwort Variable-leaf Milfoil Curly-leaf Pondweed Water Chestnut
Chartley Pond	May 18, 2021	Fanwort Variable-leaf Milfoil Water Chestnut

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

## Winnecunnet Pond

The 2021 early season survey at Winnecunnet Pond documented only variable-leaf milfoil (*Myriophyllum heterophyllum*) in Winnecunnet Pond. Regrowth of this target species in the year following a Sonar (fluridone) treatment year was considered undesirable. However, it was not entirely unexpected, as some limited regrowth of this species has occurred in prior years following treatment.

- No fanwort (*Cabomba caroliniana*) was documented in Winnecunnet Pond. However, given the early timing of the survey (May), fanwort would have still been in early growth stages at the time.
- Variable-leaf milfoil covered an estimated total of approximately 58 acres, primarily consisting of sparse beds (Figure 1). This was a **decrease** of 42 acres from pre-treatment conditions in 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 2021.**

- Fanwort covered approximately 81 acres, primarily consisting of sparse beds (Figure 2). This represents an **increase** of 53 acres compared to the pre-treatment survey in 2020. However, most beds were sparse to patchy with only one area of dense growth.
- Variable-leaf milfoil covered an estimated total of 111 acres, primarily consisting of sparse to patchy beds (Figure 3). This represents an **increase** of approximately 3 acres from 2020 pre-treatment conditions. However, most beds were sparse to patchy with only one area of dense growth.
- Curly-leaf pondweed was documented in 58 acres with sparse to patchy beds located mainly in protected coves (Figure 4). Compared to 2020, the total acreage covered was **similar**, even though the distribution of the beds shifted. However, the density of curly-leaf pondweed beds was lower in most of the areas where it was found. Curly-leaf pondweed is an annual species and completes its life cycle by late June or early July in most years. Therefore, it is usually only impacted by management actions that are implemented by May. Additionally, this species reproduces by hardy winter buds (turions), which accumulate at the bottom of the reservoir, forming a sort of “seed bank” that may regenerate plants the following year.
- Water chestnut was found in one bed in the main basin and several additional beds in the sub-basins south of Route 140 (Figure 5). Total water chestnut coverage observed was approximately 7 acres, which represents an **increase** of almost 5 acres from the pre-treatment survey in 2020. However, most of this growth consisted of very sparse beds. Therefore, actual conditions had not degraded as much as suggested by the total acreage.

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**Town of Norton Vegetation Management**  
Norton, Massachusetts

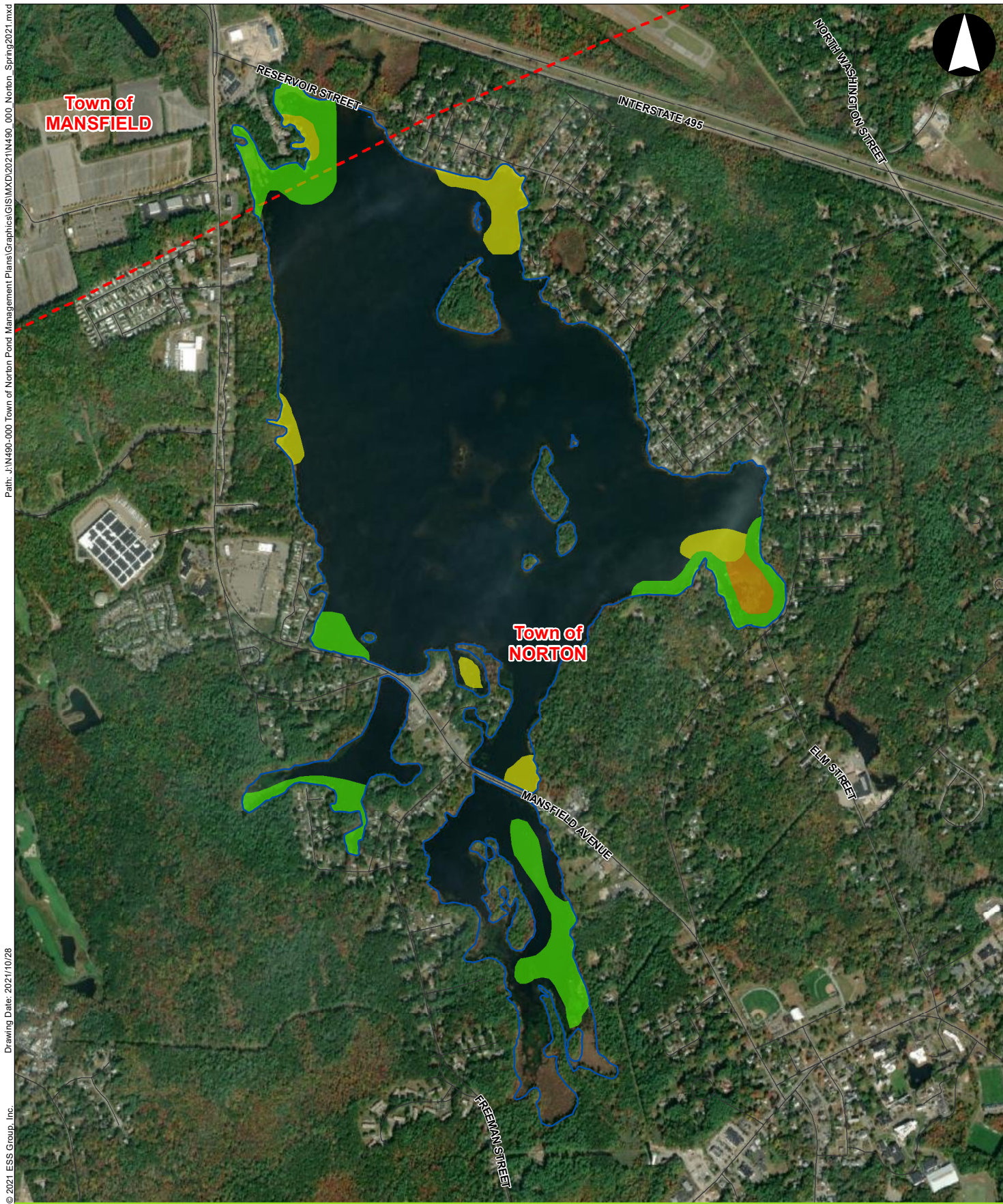
Source: 1) ESRI, World Imagery, 2020  
2) ESS, Coverage Polygons, 2021

- Sparse (10.3 Acres)
- Patchy (5.3 Acres)

- Lake Shoreline
- Town Boundary

**Early Season Variable-Leaf Milfoil Cover**  
**Lake Winnecunnet**  
**June 2, 2021**

**Figure 1**



Path: J:\N490-000 Town of Norton Pond Management Plans\Graphics\GIS\WXD\2021\N490\_000 Norton\_Spring2021.mxd

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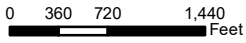


**Town of Norton Vegetation Management**  
Norton, Massachusetts

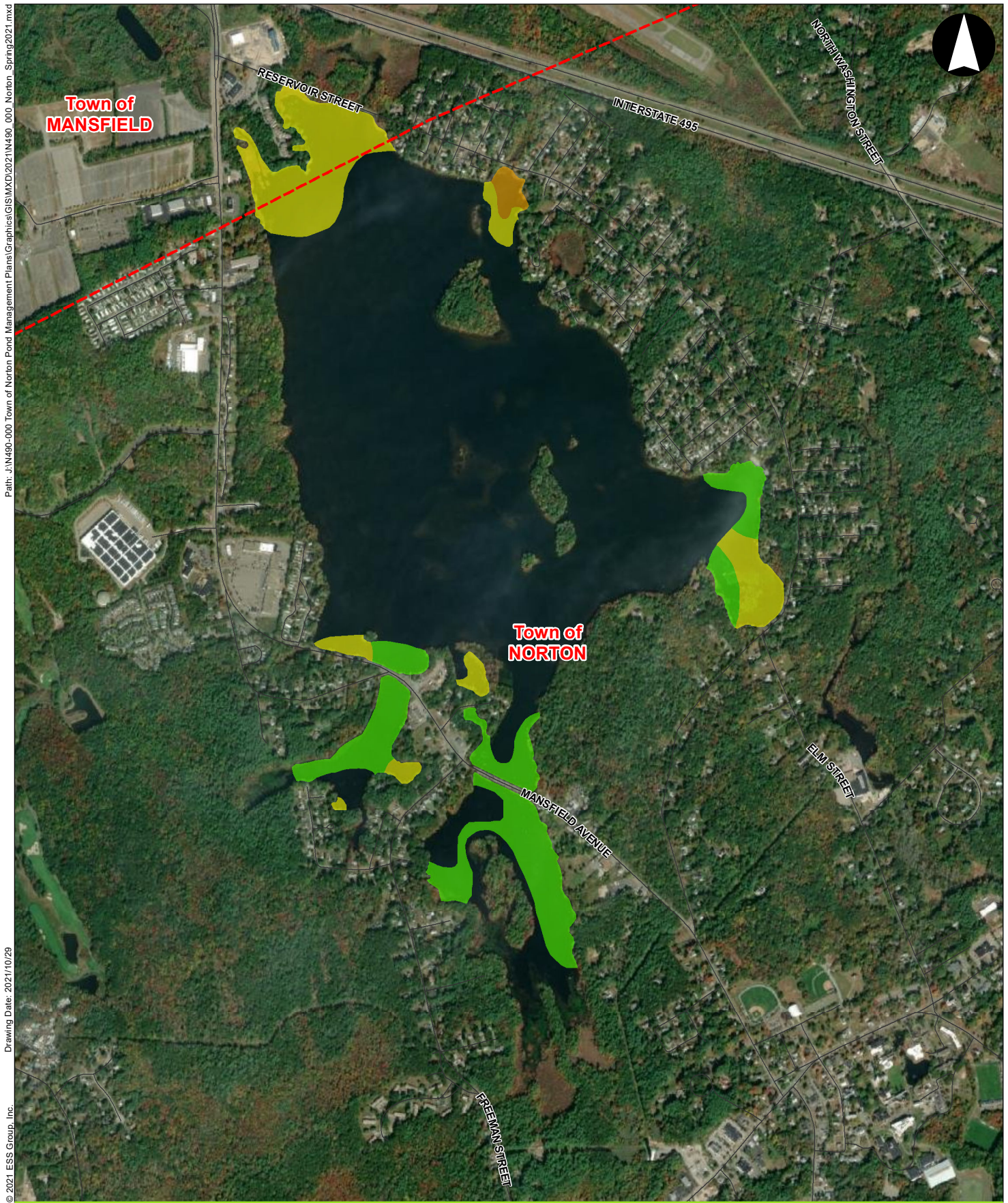
**Pre-Treatment Fanwort Cover**  
**Norton Reservoir**  
**May 26-27, 2021**

Source: 1) ESRI, World Imagery, 2020  
2) ESS, Plant Mapping Data, 2021

- Sparse (53.4 Acres)
- Patchy (22.7 Acres)
- Dense (4.9 Acres)
- Lake Shoreline
- Town Boundary



**Figure 2**



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**Town of Norton Vegetation Management**  
Norton, Massachusetts

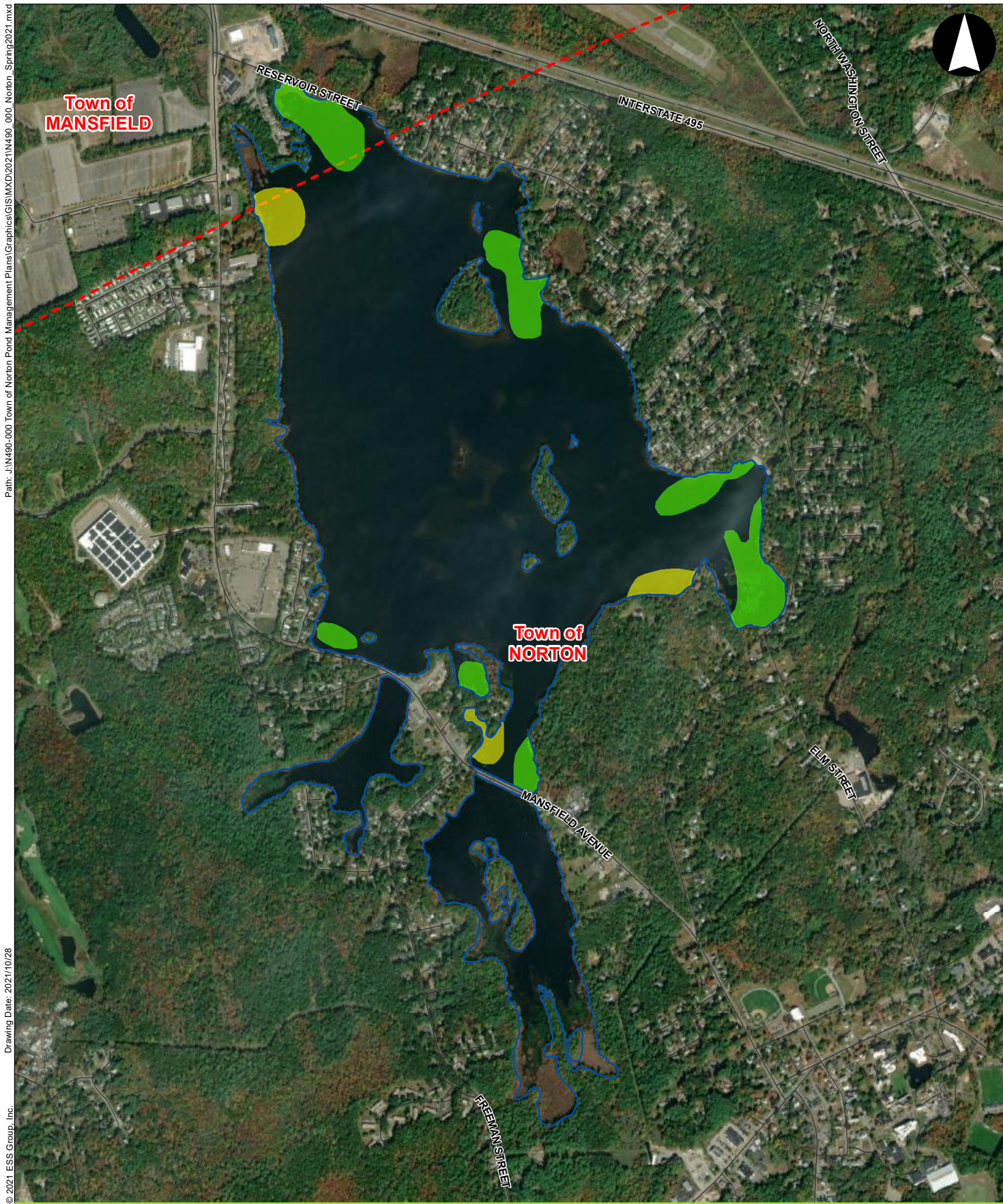
Source: 1) ESRI, World Imagery, 2020  
2) ESS, Plant Mapping Data, 2021

- Sparse (55.6 Acres)
- Patchy (51.9 Acres)
- Dense (3.3 Acres)

**Pre-Treatment Variable-Leaf Milfoil Cover**  
**Norton Reservoir**  
**May 26-27, 2021**

- Shoreline
- Town Boundary

**Figure 3**



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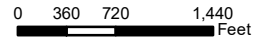
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**Town of Norton Vegetation Management**  
Norton, Massachusetts

**Pre-Treatment Curly-Leaf Pondweed Cover**  
Norton Reservoir  
May 26-27, 2021



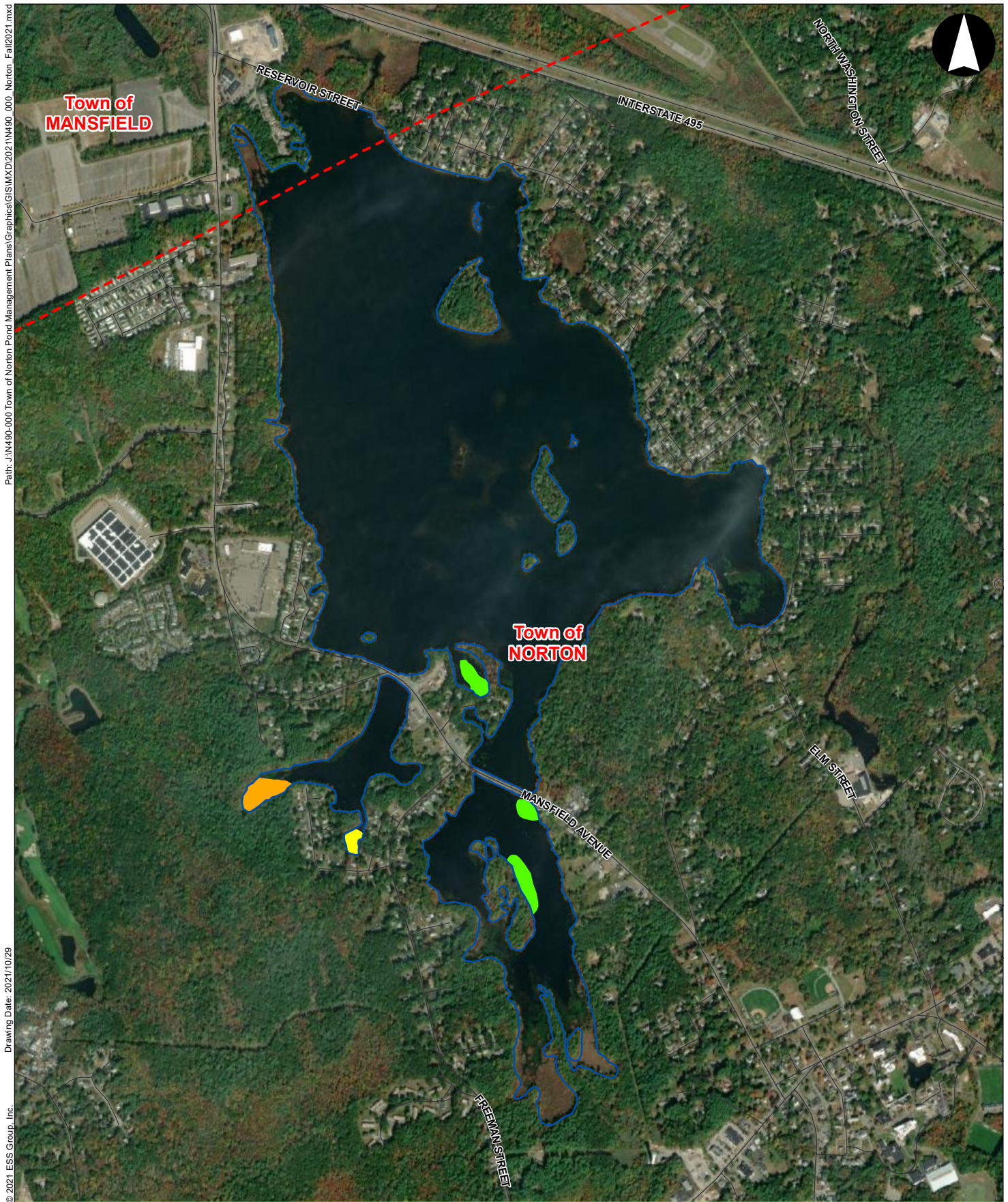
Source: 1) ESRI, World Imagery Data, 2020  
2) ESS, Plant Mapping Data, 2021

- Sparse (44.5 Acres)
- Patchy (13.1 Acres)

- Lake Shoreline
- Town Boundary

Figure 4





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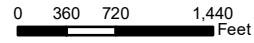


**Town of Norton Vegetation Management**  
Norton, Massachusetts

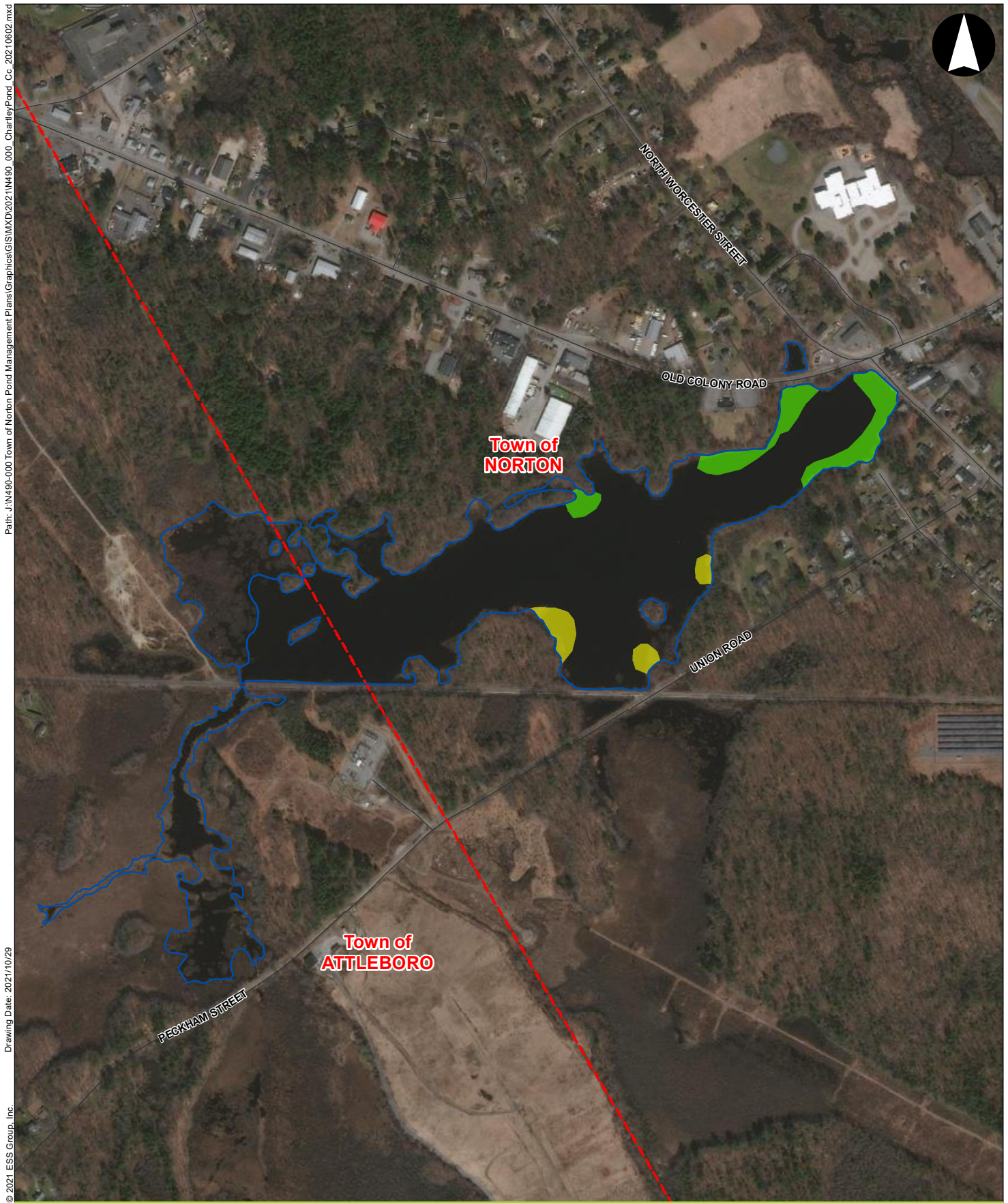
**Pre-Treatment Water Chestnut Cover**  
**Norton Reservoir**  
May 26-27, 2021

Source: 1) ESRI, World Imagery, 2020  
2) ESS, Plant Mapping Data, 2021

- Sparse (4.5 Acres)
- Patchy (1.0 Acres)
- Dense (2.5 Acres)
- Lake Shoreline
- Town Boundary



**Figure 5**



Path: J:\N490-000 Town of Norton Pond Management Plans\Graphics\GIS\MXD\2021\N490\_000\_ChartleyPond\_Cc\_20210602.mxd  
 Drawing Date: 2021/10/29  
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**Town of Norton Vegetation Management**  
 Norton, Massachusetts

**Pre-Treatment Fanwort Cover**  
**Chartley Pond**  
**May 18, 2021**

Source: 1) ESRI, World Imagery, 2020  
 2) ESS, Plant Mapping Data, 2021

- Sparse (3.5 acres)
- Patchy (1.4 acres)
- Dense (0 acres)
- Town Boundary

**Figure 6**



Path: J:\N490-000\_Town of Norton Pond Management\Plans\Graphics\GIS\MXD\2021\N490\_000\_ChartleyPond\_Mh\_20210602.mxd  
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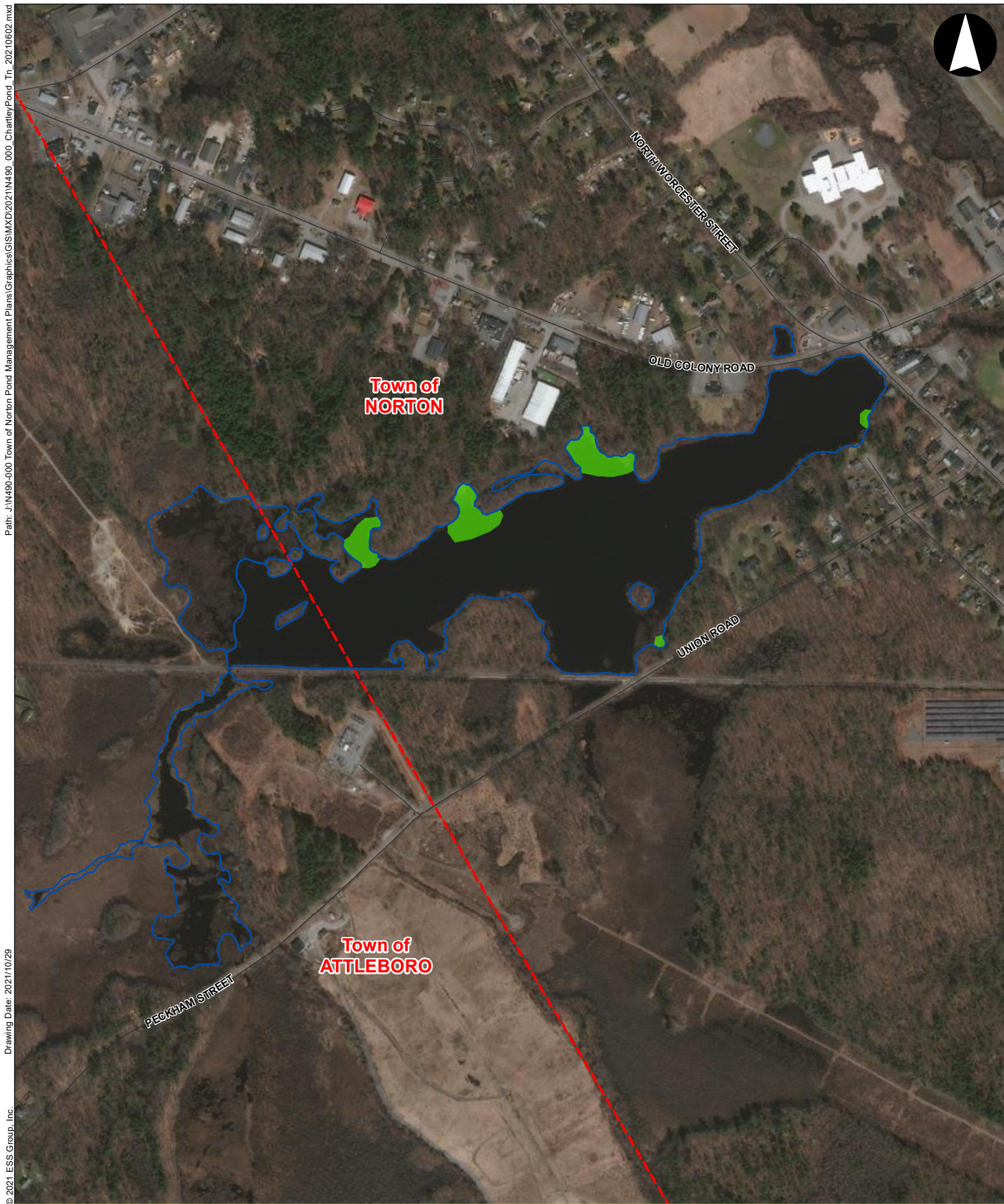
**Town of Norton Vegetation Management**  
 Norton, Massachusetts

**Pre-Treatment Variable-leaf Milfoil Cover**  
 Chartley Pond  
 May 18, 2021

Source: 1) ESRI, World Imagery, 2020  
 2) ESS, Plant Mapping Data, 2021

- Sparse (5.7 acres)
- Patchy (1.4 acres)
- Dense (6.0 acres)
- Town Boundary

**Figure 7**



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**Town of Norton Vegetation Management**  
Norton, Massachusetts

**Pre-Treatment Water Chestnut Cover**  
**Chartley Pond**  
May 18, 2021

Source: 1) ESRI, World Imagery, 2020  
2) ESS, Plant Mapping Data, 2021

- Sparse (2.9 acres)
- Patchy (0 acres)
- Dense (0 acres)
- Town Boundary

**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 2021.**

- Fanwort covered approximately 5 acres of the pond during the 2021 pre-treatment survey (Figure 6). This represents an **increase** of close to 2 acres from early-season growth in 2020.
- Variable-leaf milfoil was documented as sparse to dense beds covering approximately 13 acres of the pond (Figure 7), an **increase** of 7 acres over the 2020 pre-treatment area.
- Water chestnut covered approximately 3 acres of the pond (Figure 8). This represents a **decrease** in of 3 acres growth from pre-treatment conditions in 2020. Additionally, all beds consisted of sparse growth.

### Management Program Description

The overall vegetation management program for the three 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
Chemical Controls	Herbicides	Yes	Yes	Yes
	Algaecides	No	Yes	Yes
Physical Controls	Hand Harvesting	Yes	Yes	Yes
	Diver/Diver Assisted Suction Harvesting	Yes	Yes	Yes
	Benthic Barriers	No	Yes	Yes

The specific elements of the vegetation management program that were implemented in 2021 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 2021**

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

## Areas Managed and Herbicides Used

### Summary of Management Actions

The herbicides approved for use are presented in Table 4.0, along with the acreage and dates of treatment. The acreage and dates of non-herbicide management efforts implemented in 2021 are also included. All management actions were implemented by SOLitude Lake Management (SOLitude).

**Table 4.0. Summary of Management Effort in 2021**

Water Body	Approved Management Action	Trade Name	Used in 2021	Acreage Treated/ Days of Harvesting
Winneconnet Pond	Fluridone	Sonar One and Sonar Genesis	No	0 acres
Norton Reservoir	Fluridone	Sonar One and Sonar Genesis	No	0 acres
	Diquat dibromide	Tribune/Diquat	Yes (Jun & Aug)	90 acres*
	Flumioxazin	Clipper	Yes (Jun & Aug)	90 acres*
	Imazamox	Clearcast	No	0 acres
	Hand harvesting	N/A	Yes (Aug*)	1 day*
Chartley Pond	Fluridone	Sonar One and Sonar Genesis	Yes (Jun-Aug)	30 acres
	Diquat dibromide	Tribune/Diquat	No	0 acres
	Flumioxazin	Clipper	No	0 acres
	Imazamox	Clearcast	No	0 acres
	Hand harvesting	N/A	Yes (Aug*)	1 day

\*Estimated based on correspondence from treatment contractor.

### Summary of Fluridone Monitoring Results

The treatment contractor did not conduct fluridone testing (FasTESTs) at any of the water bodies in 2021. Therefore, there are no fluridone monitoring results to provide in this year's monitoring report.

### Post-Treatment Surveys

ESS completed post-treatment vegetation surveys at Norton Reservoir, and Chartley Pond to provide updates on the status of exotic plant infestations in each water body following completion of the 2021 management program. Although Winneconnet Pond was not treated in 2021, ESS also completed a late-season vegetation survey there to document aquatic plant growth.

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

**Table 5.0. Dates of Post-treatment Surveys in 2021**

Water Body	Survey Dates	Exotic Species Observed
Winnecunnet Pond	September 14, 2021	Fanwort Variable-leaf Milfoil
Norton Reservoir	September 21, 2021	Fanwort Variable-leaf Milfoil Water Chestnut
Chartley Pond	September 15, 2021	Fanwort Variable-leaf Milfoil Water Chestnut

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

### Winnecunnet Pond

Two exotic species were observed in Winnecunnet Pond during the post-treatment surveys: fanwort and variable-leaf milfoil.

- Fanwort covered an estimated total of 3 acres (Figure 9), an **increase** from post-treatment conditions in 2020, when it was not observed. The beds were patchy and located along the northwestern shoreline.
- Variable-leaf milfoil covered an estimated total of 42 acres (Figure 10), an **increase** from post-treatment conditions 2020, when it was not observed. The beds were dense near the shoreline, forming a ring of growth around most of the pond with some incursions of sparse or patchy growth into deeper waters, as well.



### 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 51 acres (Figure 11), a **decrease of approximately 30 acres from pre-treatment conditions and a year-over-year decrease of 3 acres**. The beds located in the main basin of the reservoir were substantially reduced compared to recent years, confined to just a few small and mostly sparse beds. The only portion of Norton Reservoir that experienced an increase in fanwort growth was the southernmost sub-basin to the south of Route 140. However, fanwort growth in this basin was mainly confined to shallower waters.

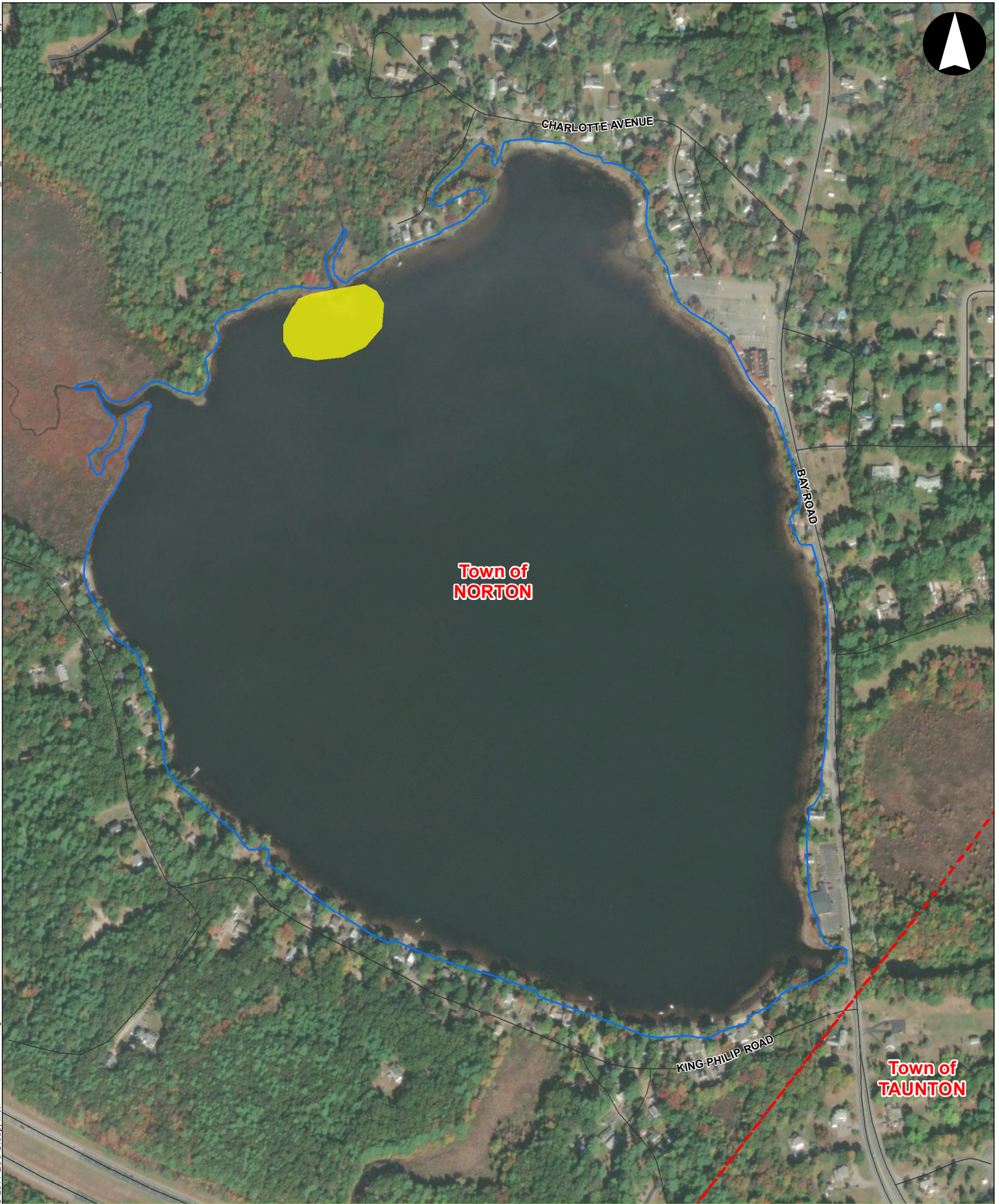
- Variable-leaf milfoil covered an estimated total of 52 acres (Figure 12), a **decrease of approximately 59 acres from pre-treatment conditions and a year-over-year decrease of 48 acres**. As with fanwort, the infestation of variable-leaf milfoil in the main basin was substantially reduced compared to recent years. Growth was also heavily reduced in the two sub-basins to the south of Route 140
- Water chestnut covered an estimated total of 1 acre (Figure 13), a **decrease of approximately 4 acres from pre-treatment conditions and similar year-over-year to 2020**. However, remaining beds were dense, suggesting that hand harvesting efforts were insufficient to address all of the growth in one of the sub-basins south of Route 140.

### 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 11 acres (Figure 14), an **increase from pre-treatment conditions and on a year-over-year basis**. However, the density of the plants within the beds was greatly decreased, resulting in sparse to patchy growth. The remaining beds were mostly confined to shallower waters along the shoreline. Most of the remaining beds were healthy-looking although chlorosis (leaf bleaching) – a sign of fluridone-induced damage – was evident in some of the remaining beds.
- Variable-leaf milfoil covered an estimated total of 12 acres, a **reduction of approximately 1 acre from pre-treatment conditions but a year-over-year increase of 9 acres** (Figure 15). However, the density of the plants within the beds was greatly decreased, resulting in sparse to patchy growth. Most of the remaining beds were also in poor condition, suggesting that the anticipated regrowth of this species in 2022 may be less than currently mapped.
- **Water chestnut was not observed** in portions of Chartley Pond that were reachable with a canoe during the post-treatment surveys, suggesting that hand harvesting efforts have been very effective. Some incidental water chestnut growth remains in the wetland at the western periphery of open water in the pond. Also, given the seedbank established in the pond, water chestnut should be expected to return in 2022.





**Town of Norton Vegetation Management**  
Norton, Massachusetts

**Late Season Fanwort Cover**  
**Lake Winnecunnet**  
**September 14, 2021**



Source: 1) ESRI, World Imagery, 2020  
2) ESS, Coverage Polygons, 2021  
3) MassGIS, Various Layers and Years

- Patchy (3 acres)
- Town Boundary

**Figure 9**



Path: J:\N490-000 Town of Norton Pond Management Plans\Graphics\GIS\MXD\2021\N490\_000\_Winneconnet\_Mh\_Fall2021.mxd

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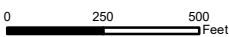


**Town of Norton Vegetation Management**  
Norton, Massachusetts

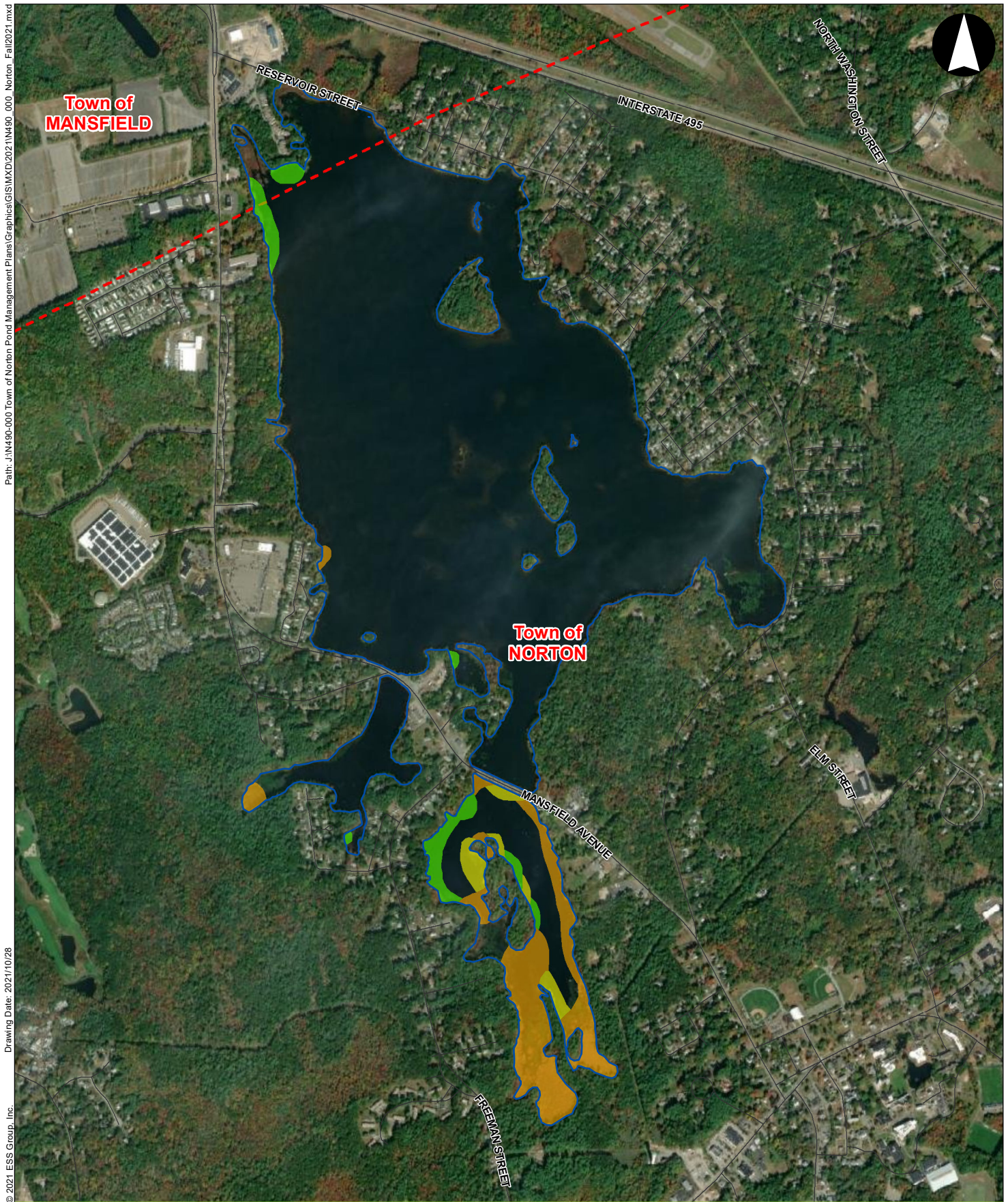
**Late Season Variable-Leaf Milfoil Cover**  
Lake Winnecunnet  
September 14, 2021

Source: 1) ESRI, World Imagery, 2020  
2) ESS, Coverage Polygons, 2021  
3) MassGIS, Various Layers and Years

- Sparse (1.8 acres)
- Patchy (0.6 acres)
- Dense (39.1 acres)
- Town Boundary



**Figure 10**



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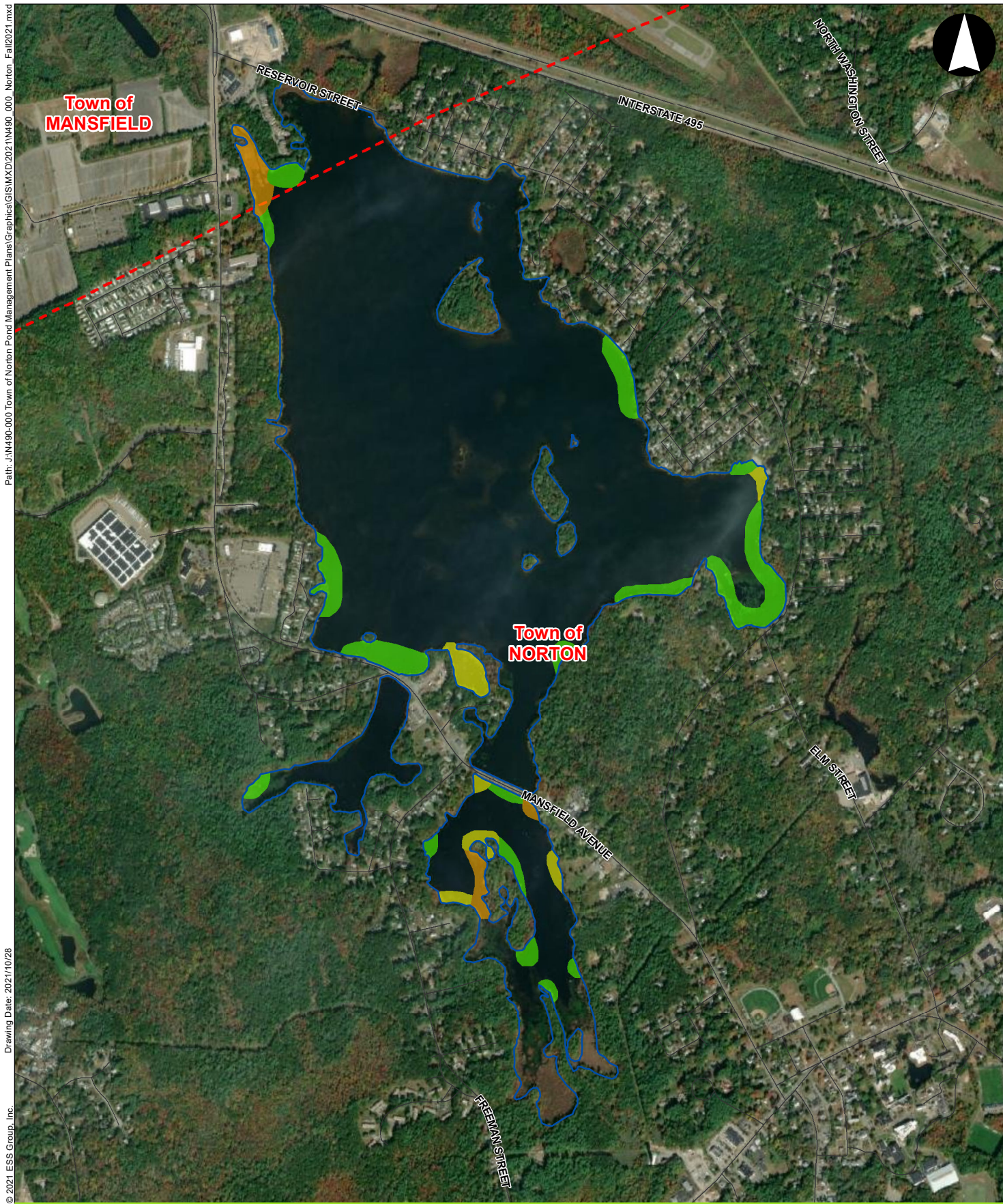
**Town of Norton Vegetation Management**  
Norton, Massachusetts

**Post-Treatment Fanwort Cover**  
**Norton Reservoir**  
**September 21, 2021**

Source: 1) ESRI, World Imagery, 2020  
2) ESS, Plant Mapping Data, 2021

- Sparse (11.3 Acres)
- Patchy (5.7 Acres)
- Dense (33.5 Acres)
- Lake Shoreline
- Town Boundary

**Figure 11**



Path: J:\N495-000 Town of Norton Pond Management Plans\Graphics\GIS\MXD\2021\N495\_000\_Norton\_Fall2021.mxd

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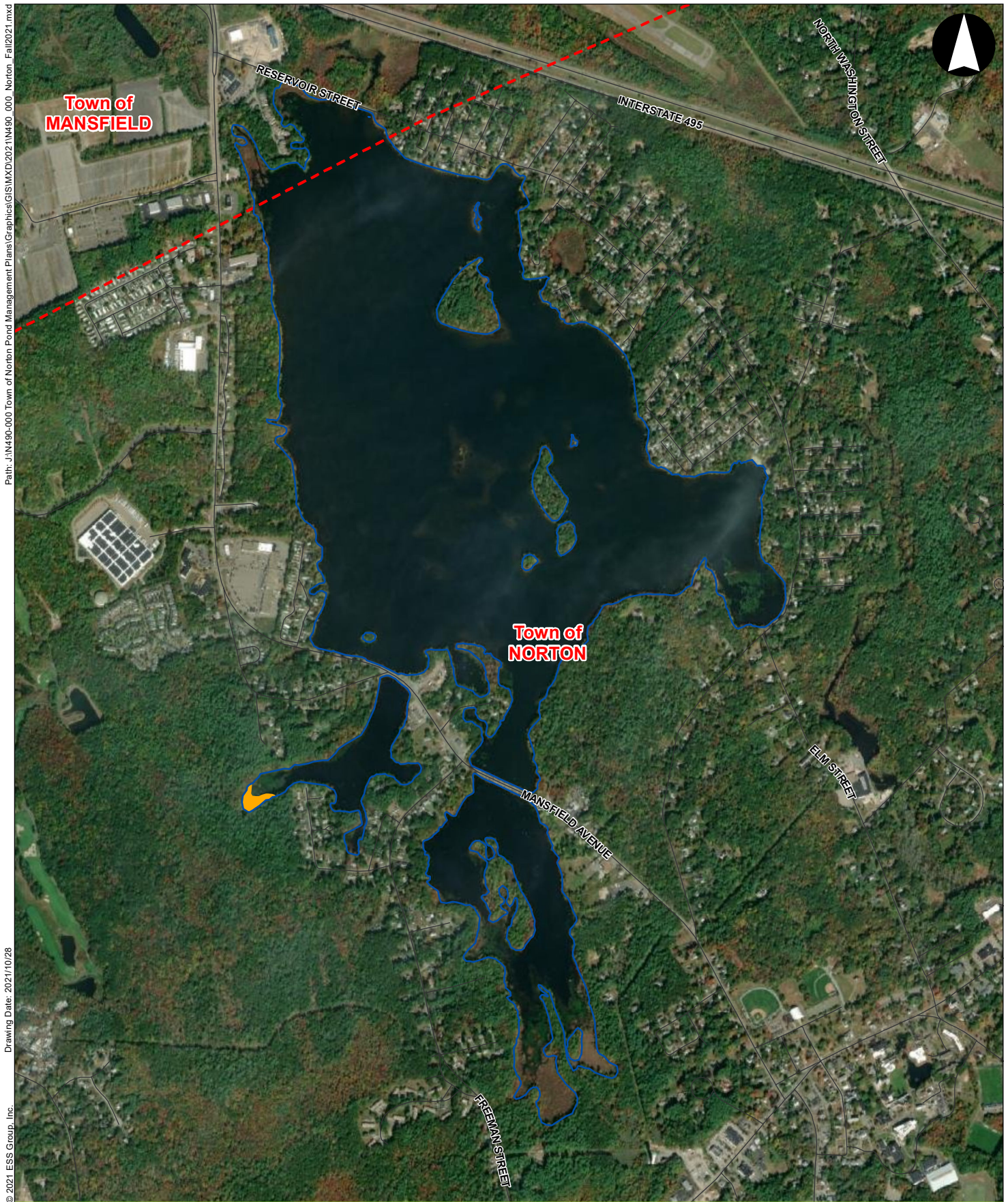
**Town of Norton Vegetation Management**  
Norton, Massachusetts

**Post-Treatment Variable-Leaf Milfoil Cover**  
**Norton Reservoir**  
**September 21, 2021**

Source: 1) ESRI, World Imagery, 2020  
2) ESS, Plant Mapping Data, 2021

- Sparse (36.1 Acres)
- Patchy (8.6 Acres)
- Dense (7.3 Acres)
- Lake Shoreline
- Town Boundary

**Figure 12**



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**Town of Norton Vegetation Management**  
Norton, Massachusetts

**Post-Treatment Water Chestnut Cover**  
**Norton Reservoir**  
**September 21, 2021**

Source: 1) ESRI, World Imagery, 2020  
2) ESS, Plant Mapping Data, 2021

- Dense (1.1 Acres)
- Lake Shoreline
- Town Boundary

**Figure 13**



Path: J:\N490-000 Town of Norton Pond Management Plans\Graphics\GIS\MXD\2021\N490\_000\_Chartley\_Fall2021.mxd

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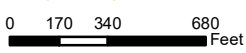


**Town of Norton Vegetation Management**  
Attleboro and Norton, Massachusetts

**Post-Treatment Fanwort Cover**  
**Chartley Pond**  
**September 15, 2021**

Source: 1) ESRI, World Imagery, 2020  
2) ESS, Plant Mapping Data, 2021

- Sparse (1.8 Acres)
- Patchy (9.1 Acres)
- Town Boundary
- N490\_ChartleyPond



**Figure 14**



Path: J:\N496-000 Town of Norton Pond Management Plans\Graphics\GIS\MXD\2021\N496\_000\_Chartley\_Fall2021.mxd

Drawing Date: 2021/10/28

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**Town of Norton Vegetation Management**  
Attleboro and Norton, Massachusetts

Source: 1) ESRI, World Imagery, 2020  
2) ESS, Plant Mapping Data, 2021

- Sparse (7.2 Acres)
- Patchy (4.8 Acres)

**Post-Treatment Variable-Leaf Milfoil Cover**  
**Chartley Pond**  
**September 15, 2021**

- Town Boundary
- Pond Shoreline

**Figure 15**

### Safe Zone Mapping

Safe Zone maps for each pond were established in 2016, prior to initiation of the treatment programs, and re-evaluated by a Commission-approved Wildlife Biologist in subsequent years. Herbicides are not directly applied to Safe Zones. These areas are designated to provide refugia for aquatic life during chemical treatments.

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.

Updated Safe Zones are presented in Figures 16 through 18.

### RECOMMENDATIONS FOR MANAGEMENT IN 2022

Based on the results of the 2021 vegetation management program, ESS recommends the management actions presented in Table 6.0 for 2022. ESS recommends that the selected management contractor work proactively with the Norton Conservation Commission to ensure that the signage and notification process as well as testing for any in-pond management work conducted in 2022 is compliant with permit requirements.

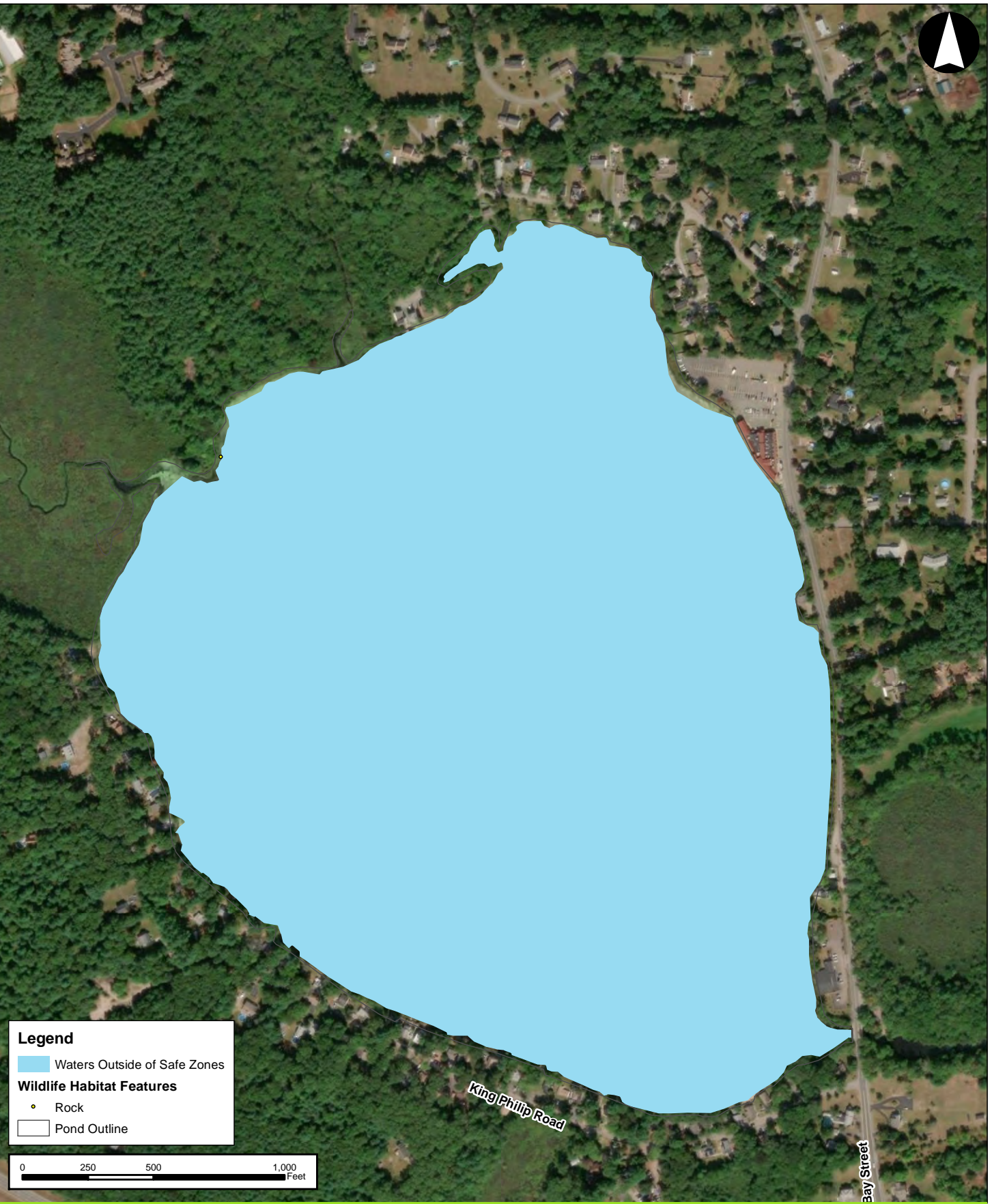
**Table 6.0. Summary of Vegetation Management Recommendations for 2022**

Water Body	Description of Treatment	Primary Timing	Area Anticipated for Treatment	Notes
Winnecunnet Pond	Sonar treatment	Spring and early summer	Whole Pond	Need to obtain new NHESP determination letter before management program can be implemented.
Norton Reservoir	Reward/Clipper spot treatments	Spring to summer	<100 acres	Can be used to hold fanwort and exotic milfoil growth at bay in 2022.
	Hand pulling of water chestnut	June to August	As needed	Likely to need 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 to date.
Chartley Pond	Reward/Clipper spot treatments	Spring to summer	<15 acres	Can be used to hold fanwort and exotic milfoil growth at bay in 2022.
	Hand pulling of water chestnut	June to August	As needed	Likely to need one day of hand pulling to maintain progress to date.
	Algaecide treatment	As needed	As needed	Has not been needed to date.



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  
© 2021 ESS Group, Inc.

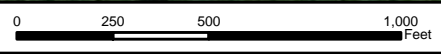


**Legend**

- Waters Outside of Safe Zones

**Wildlife Habitat Features**

- Rock
- Pond Outline



### Town of Norton Vegetation Management Norton, Massachusetts

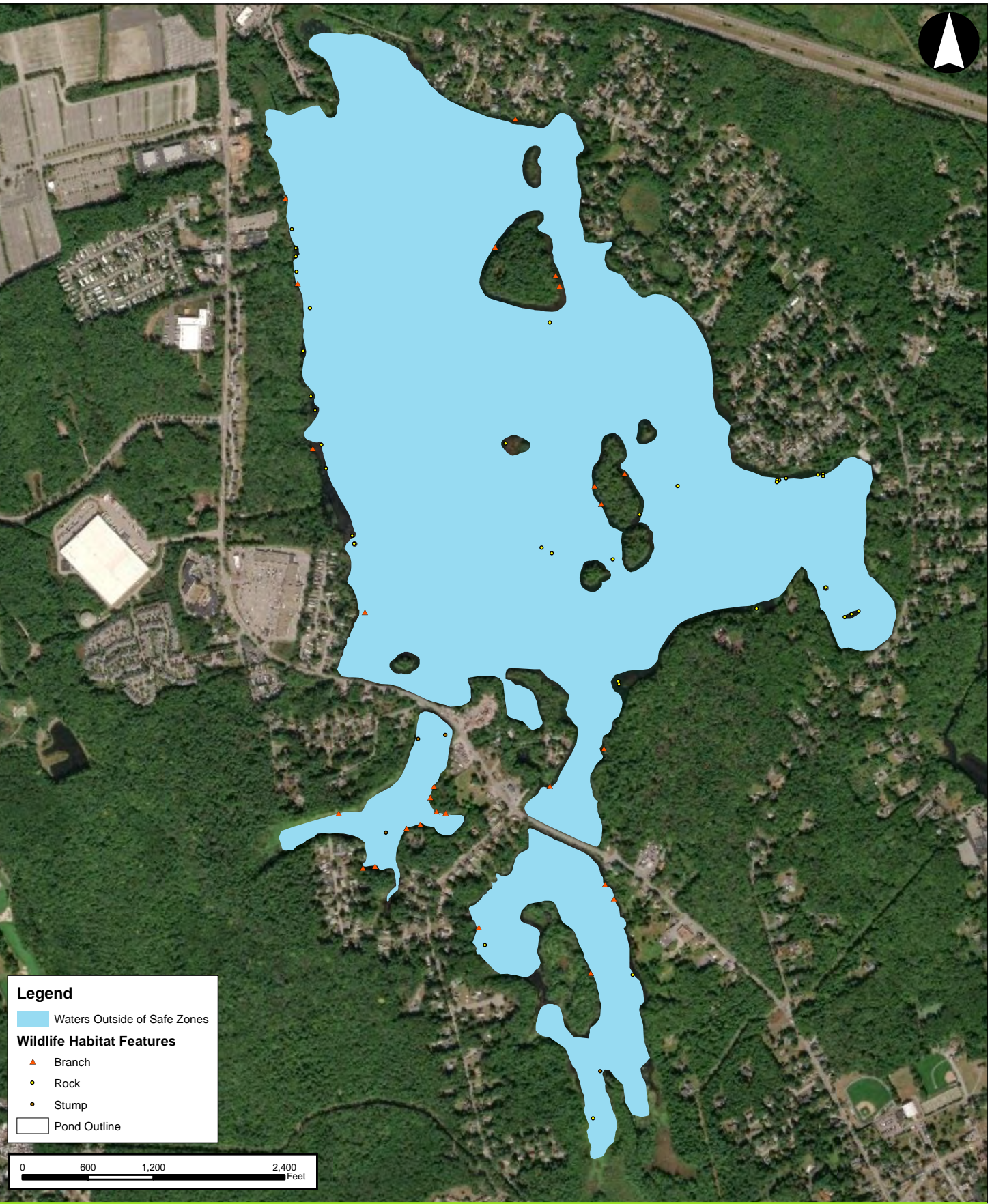
### Wildlife Safe Zones - 2021 Lake Winnecunnet

Source: 1) ESRI, World Imagery, 2017  
2) ESS, GPS Locations, 2021

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 16

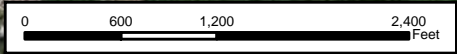


**Legend**

- Waters Outside of Safe Zones

**Wildlife Habitat Features**

- Branch
- Rock
- Stump
- Pond Outline



**Town of Norton Vegetation Management  
Norton, Massachusetts**

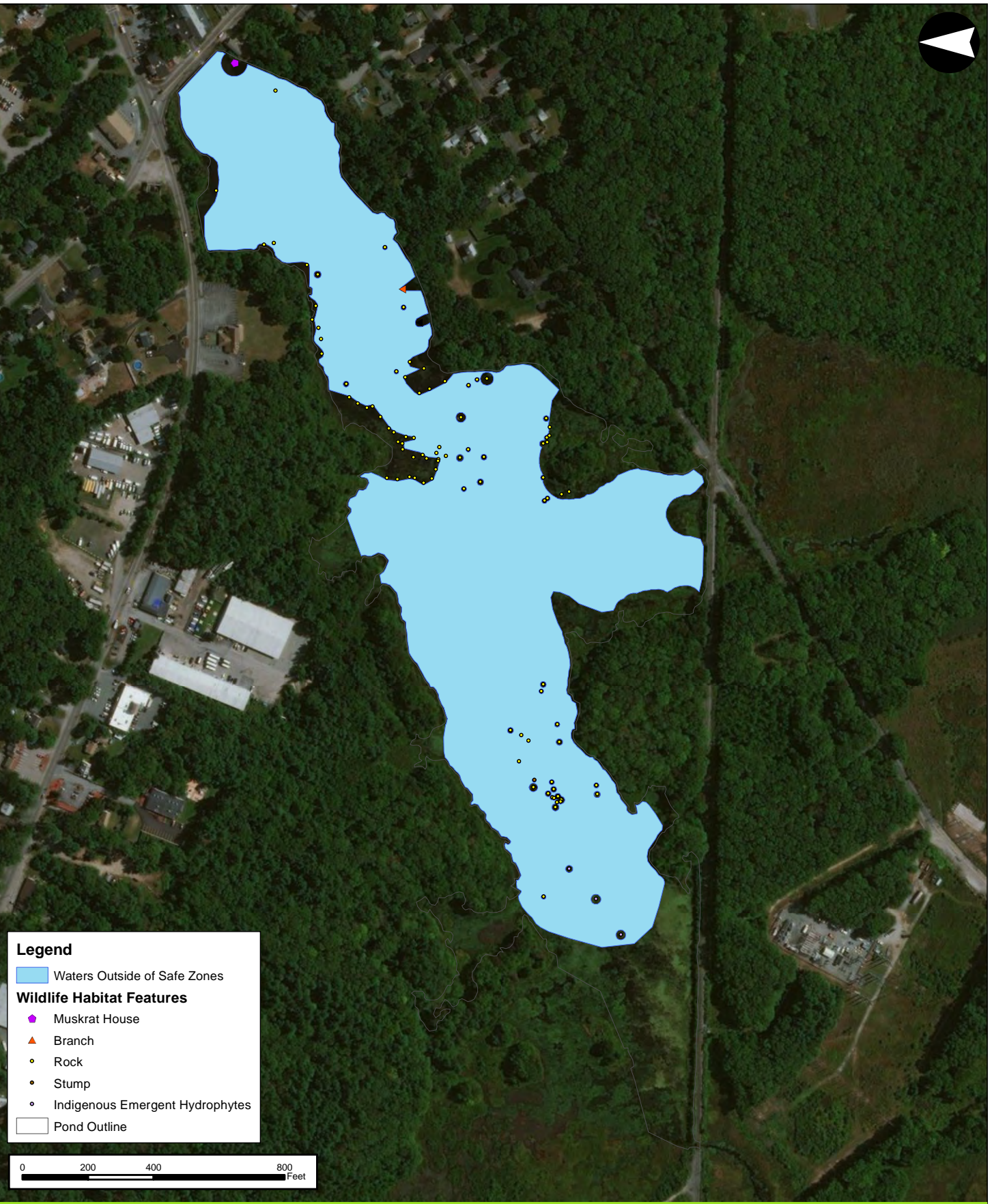
**Wildlife Safe Zones - 2021  
Norton Reservoir**

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.

Source: 1) ESRI, World Imagery, 2017  
2) ESS, GPS Locations, 2021



**Figure 17**

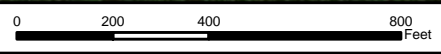


**Legend**

- Waters Outside of Safe Zones

**Wildlife Habitat Features**

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



### Town of Norton Vegetation Management Norton, Massachusetts

### Wildlife Safe Zones - 2021 Chartley Pond

Source: 1) ESRI, World Imagery, 2017  
2) ESS, GPS Locations, 2021

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 18

These recommendations have been adjusted to account for ESS's following post-treatment observations of the ponds in 2021:

- Regrowth of variable-leaf milfoil and, to a lesser extent, fanwort in Winnecunnet Pond.
- Continued but reduced growth of variable-leaf milfoil and fanwort in all basins of Norton Reservoir.
- Continued growth of water chestnut in all basins of Norton Reservoir.
- Continued but reduced growth of variable-leaf milfoil and fanwort in Chartley Pond.
- Strongly reduced growth of water chestnut (but persistence of a seed bank) in Chartley Pond.

Additionally, the Town should take note of the fact that a new filing with NHESP will be required under the Massachusetts Endangered Species Act (MESA) to continue management of Winnecunnet Pond in 2022. This filing is required to obtain a new, valid letter of determination from NHESP, which is incorporated by reference into the Order of Conditions for Winnecunnet Pond. Therefore, should the Town desire to continue with active management of Winnecunnet Pond, action must be taken as soon as possible to allow the NHESP review process to be completed prior to spring 2022.

## **SUMMARY AND CONCLUSIONS**

### **2021 Updates**

Each Order of Conditions associated with the three water bodies was successfully extended in 2021 and now expires in spring 2024. For Norton Reservoir, this includes both the Mansfield and Norton portions.

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 2021, both through application of permitted herbicides, as well as hand harvesting.

Early season conditions in Winnecunnet Pond indicated some regrowth of variable-leaf milfoil. However, Winnecunnet Pond was not actively managed in 2021 and additional regrowth of both this species and fanwort occurred to varying degrees by late summer.

Overall, the vegetation management program implemented in 2021 appeared to result in improvement or maintenance of existing conditions at Norton Reservoir and Chartley Pond. Of particular note, water chestnut was completely cleared from vessel-accessible areas of Chartley Pond in 2021. This is the first time it has been free of late-season water chestnut growth since the beginning of the management program.

### Long-Term Progress to Date

Over the course of the last five 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, although continued effort is needed to maintain control and address new challenges. 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 have largely been kept under control into 2021 through the selection of the most appropriate management tools each year. The vegetation management program has achieved these results to date while maintaining aquatic habitat for native flora and fauna. The recommended management program for 2022 will focus on maintaining the target species reductions achieved through 2021.



**Table 7.0. Extent of Aquatic Invasive Species by Water Body, 2017-2021**

Water Body	Aquatic Invasive Species	Year				
		2017	2018	2019	2020	2021
Winnecunnet Pond	Fanwort	●	○	●	●	●
	Variable-leaf Milfoil	●	●	●	●	●
Norton Reservoir	Curly-leaf Pondweed	○	●	●	●	●
	Eurasian Milfoil	●	○	●	○	○
	Fanwort	●	●	●	●	●
	Swollen Bladderwort	●	●	●	○	○
	Variable-leaf Milfoil	●	●	●	●	●
Chartley Pond	Water Chestnut	○	●	●	●	●
	Fanwort	●	○*	●	●	●
	Swollen Bladderwort	●	○*	○	○	○
	Variable-leaf Milfoil	●	●*	●	●	●
	Water Chestnut	●	●*	●	●	●

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

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

## Looking Ahead to 2022

Multiple management actions are recommended at each of these water bodies for 2022 to ensure that target species control is sustained into the future. A final summary of the recommended actions for 2022 is presented, by pond, below.

### *Winnecunnet Pond*

- A whole lake Sonar treatment is recommended to manage the fanwort and substantial variable-leaf milfoil regrowth observed in 2021.
- However, in order to implement the recommended management at Winnecunnet Pond, the Town will also need to file for project review by NHESP and obtain a “no-take” determination.

### *Norton Reservoir*

- To keep regrowth of variable-leaf milfoil and fanwort at bay, 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.
- Hand harvesting should be used to address regrowth of water chestnut in all active beds of the main basin and each of the sub-basins to the south of Route 140. This should be completed by early August 2022 to prevent seed maturation and drop.
- Diver harvesting or DASH may be useful as a vegetation management method in 2022, primarily to control pioneer infestations of new invasive species, if observed.

### *Chartley Pond*

- To keep regrowth of variable-leaf milfoil and fanwort at bay, 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.
- Hand harvesting should be used to address new growth of water chestnut in 2022. This should be completed by early August to prevent seed maturation and drop, which would erase gains made to date.
- Diver harvesting or DASH may be useful as a vegetation management method in 2022, primarily to control pioneer infestations of new invasive species, if observed.

Finally, 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 2022.



## 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.

ESS Group, Inc. 2016. 2016 Lakes and Ponds Annual Report – Norton, Massachusetts. Prepared for Town of Norton Conservation Commission, October 28, 2016.

ESS Group, Inc. 2017. 2017 Lakes and Ponds Annual Report – Norton, Massachusetts. Prepared for Town of Norton Conservation Commission, October 30, 2017.

ESS Group, Inc. 2018. 2018 Lakes and Ponds Annual Report – Norton, Massachusetts. Prepared for Town of Norton Conservation Commission, October 30, 2018.

ESS Group, Inc. 2019. 2019 Lakes and Ponds Annual Report – Norton, Massachusetts. Prepared for Town of Norton Conservation Commission, October 31, 2019.

ESS Group, Inc. 2020. 2020 Lakes and Ponds Annual Report – Norton, Massachusetts. Prepared for Town of Norton Conservation Commission, October 30, 2020 (Revised November 23, 2020).