2020 Aquatic Plant Management Report
Hamilton Reservoir
Holland, Massachusetts

Report Prepared by: SŌLitude Lake Management
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Shrewsbury, MA 01545

Report Prepared for: Lake Oversight Committee
Town of Holland
27 Sturbridge Road
Holland, MA 01521

In accordance with the existing aquatic plant management contract between SŌLitude Lake Management and the Town of Holland - Lake Oversight Committee for Hamilton Reservoir, the following document serves to provide this year's treatment and survey results and the management recommendations for next season.

All management activities were consistent with the Order of Conditions (DEP File #184-0335), and the License to Apply Chemicals issued by the MA DEP – Office of Watershed Management (#WM04-0000025); and with the permit issued by CT DEEP – (AQUA-2019-095).

PRE-MANAGEMENT INSPECTION

On May 21st, a SŌLitude Biologist surveyed the Hamilton Reservoir littoral zone. The objective of the survey was to document the density and distribution of variable watermilfoil (*Myriophyllum heterophyllum*) and fanwort (*Cabomba caroliniana*), making note of nuisance and native plant species. As in the past, techniques that were employed to locate and identify the submersed vegetation included the use of a "throw-rake", Aqua-Vu underwater system, and visual surface observations. The areas where watermilfoil was found were mapped and estimates of cover were recorded (**Figure 1 & 2**).

Watermilfoil at this time in the north basin was observed at trace to sparse abundances. Fanwort remained isolated in the northern most cove next to the boat launch in trace densities. Treatment areas were determined based off results from the 2019 post-management inspection and the 2020 pre-management inspection.

Watermilfoil density was moderate for the majority of the 2020 season; however, its distribution has remained consistent, being observed in the same historical areas of both the north and south basins. In total, the overall watermilfoil infestation occupied roughly 30-35 acres this season. The native vegetation assemblage was dominated by slender naiad (*Najas flexilis)*, watershield (*Brasenia schreberi)*, ribbon-leaf pondweed (*Potamogeton epihydrus)*, common bladderwort (*Utricularia vulgaris)*, tapegrass (*Vallisneria americana*), stonewort (*Nitella spp.*), Robbin's pondweed (*Potamogeton robbinsii*), and snail-seed pondweed (*Potamogeton bicupulatus*).

MID-SEASON INSPECTION

On July 14th, a SŌLitude Biologist performed a mid-season inspection for tapegrass, floating-leaved species, fanwort, and variable watermilfoil. The objectives of this survey were to record the efficacy of the initial watermilfoil treatment conducted on June 17th, and to document the density and distributions of the above-mentioned species in preparation for possible secondary treatment. The variable watermilfoil in the very southern end of the lake did display some minor regrowth but overall, the treatment provided excellent control (**Figure 3 & 4**).

Tapegrass and Water shield were present in trace to moderate patches along the shorelines in the northern and southern basin. Fanwort, observed in trace patches during the late May survey, was now present in the water column within the cove adjacent to the boat ramp and in a moderate patch just outside of the cove, displaying obvious movement from where its original growth was observed. It is within the Lake Oversee Committee's best interest to aggressively manage this species while the growth is still minimal.

HERBICIDE TREATMENTS

Three herbicide treatment events were conducted in 2020. The first treatment conducted on June 17th with Tribune (active ingredient: diquat) targeted areas of variable milfoil growth observed during the early season survey plus several additional areas that were found on the day of treatment. A total of 35 acres were treated. The second treatment was conducted on August 17th with Tribune and Nautique (Chelated copper) herbicides targeting areas of nuisance tapegrass, pondweeds and any re-growth or new areas of milfoil observed in the mid-season survey. At this time, the boat ramp cove was also treated with diquat and Red Eagle (flumioxazin) for control of fanwort. Approximately 20-acres were treated during this effort. Finally, on September 14th, areas of floating leaf plants (mostly watershield) were treated in selected areas of both basins using the AquaPro (glyphosate) herbicide. As in the past, notification was given to the Town, the Association and all other required parties prior to each treatment. In addition to this notification, the shorelines of the reservoir were thoroughly posted by the HRA with printed signs, warning of the pending treatment and any use or re-entry restrictions.

POST-MANAGEMENT INSPECTION

On October 5th, a SŌLitude Biologist performed a post-management inspection of Hamilton Reservoir. The objectives of this survey were to record the efficacy of the 2020 herbicide treatments, as well as evaluate management techniques for the 2021 season and beyond.

The survey displayed decreased watermilfoil growth in both the North & South Basin. The observed plants largely consisted of low-biomass regrowth, which had re-appeared since the July treatment. Diquat is a contact herbicide that has minimal impact on the plant's root structure; therefore, regrowth of this species is to be expected. A healthy assemblage of native species remained well represented throughout the entirety of the littoral zone and were seldom present in sufficient quantities. Dominant native species included slender naiad, common bladderwort, yellow and white waterlily, and watershield. In smaller quantities existed tapegrass and several pondweed species (thin-leaf pondweed, Robbin's pondweed, and ribbon-leaf pondweed) (**Figure 5 & 6**).

Although the fanwort infestation near the boat ramp was treated in July, unfortunately, additional growth was identified to have traveled to a south-eastern location in the northern basin.

MANAGEMENT RECOMMENDATIONS FOR 2021

We recommend continuing with the monitoring and management program at Hamilton Reservoir. Over the last couple of years or so, we have discussed moving to use of a new systemic herbicide for the milfoil, ProcellaCOR, which will provide multiple seasons of milfoil control versus the diquat herbicide that has been used in the past. While the cost is significantly higher, we understand that this new treatment approach may be funded in 2021. Desirable open-water conditions can be achieved via area selective herbicide treatments in 2020, while maintaining valuable vegetative diversity within the ecosystem.

It is also recommended that the past water quality program be re-instituted for the 2021 season. Two sample rounds were performed during the 2019 season but was interrupted mid-season due to funding. If funding is an issue, we can further discuss the monitoring program to slim it down to meet funding needs.

It is also recommended to continue to monitor for invasive fanwort throughout the lake and conduct herbicide treatment as needed. Since its initial discovery in the lake in 2017, management has consisted of diver handpulling and herbicide treatment which has limited its spread until this year. Annual monitoring of this species should continue to ensure spread of this species is minmized. Spot-treating with the flumioxazin herbicide, followed by post-treatment hand-harvesting, would be the best mode of action to stifle regrowth. Any new infestation should be dealt with aggressively, as fanwort is a persistent plant that spreads primarily through fragmentation and rhizomes.

If you have any questions or require any additional information please do not hesitate to contact the office. We look forward to working with you in the 2021 season.

Figure 1: Upper Hamilton May Density and Distribution of Variable Watermilfoil

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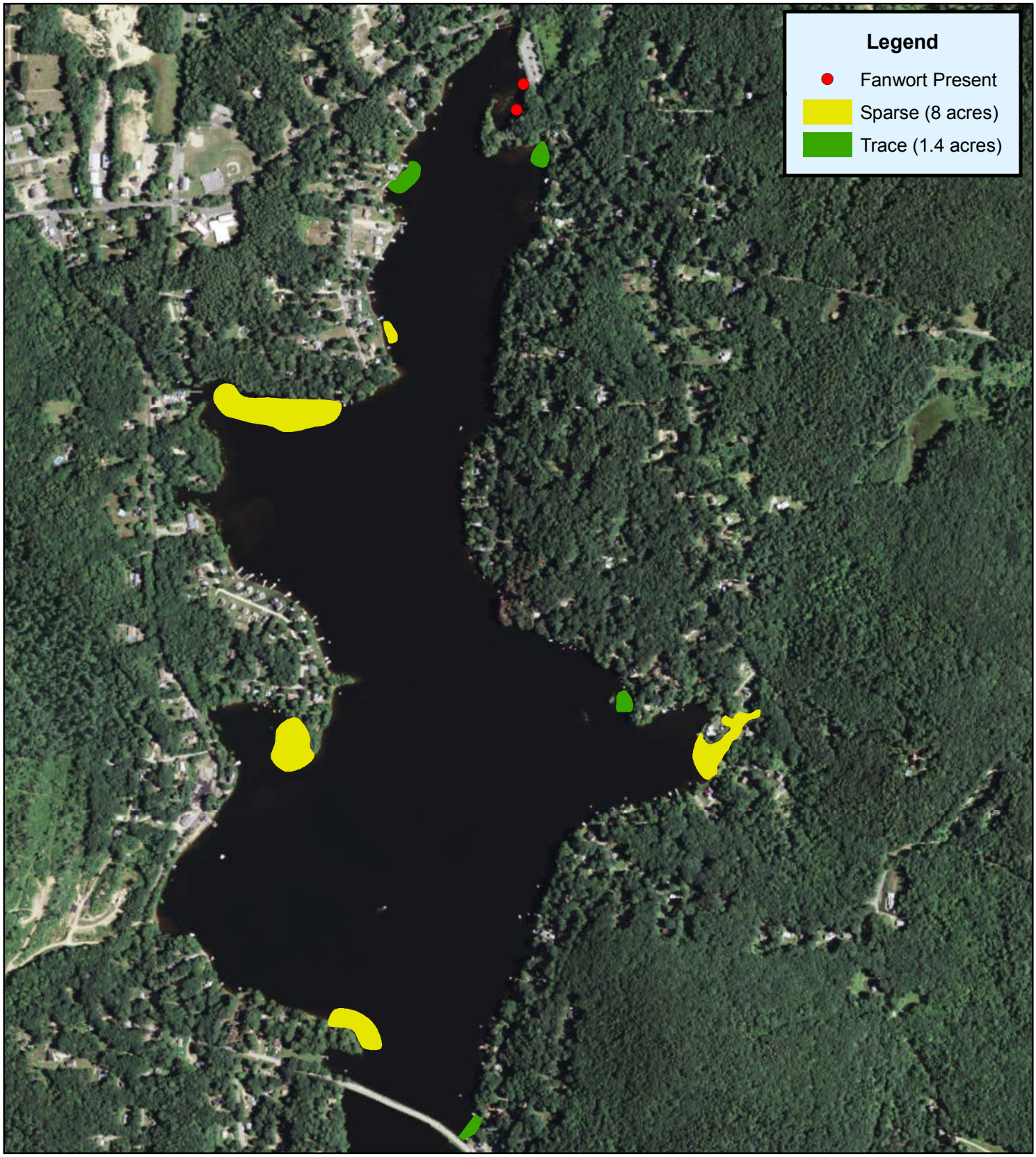
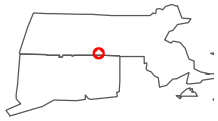


Hamilton Reservoir
Holland, MA



Upper Hamilton Reservoir

0 550 1,100 2,200

1:10,326 Feet

N

Map Date: 05/21/2020
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Figure 2: Lower Hamilton May Density and Distribution of Variable Watermilfoil

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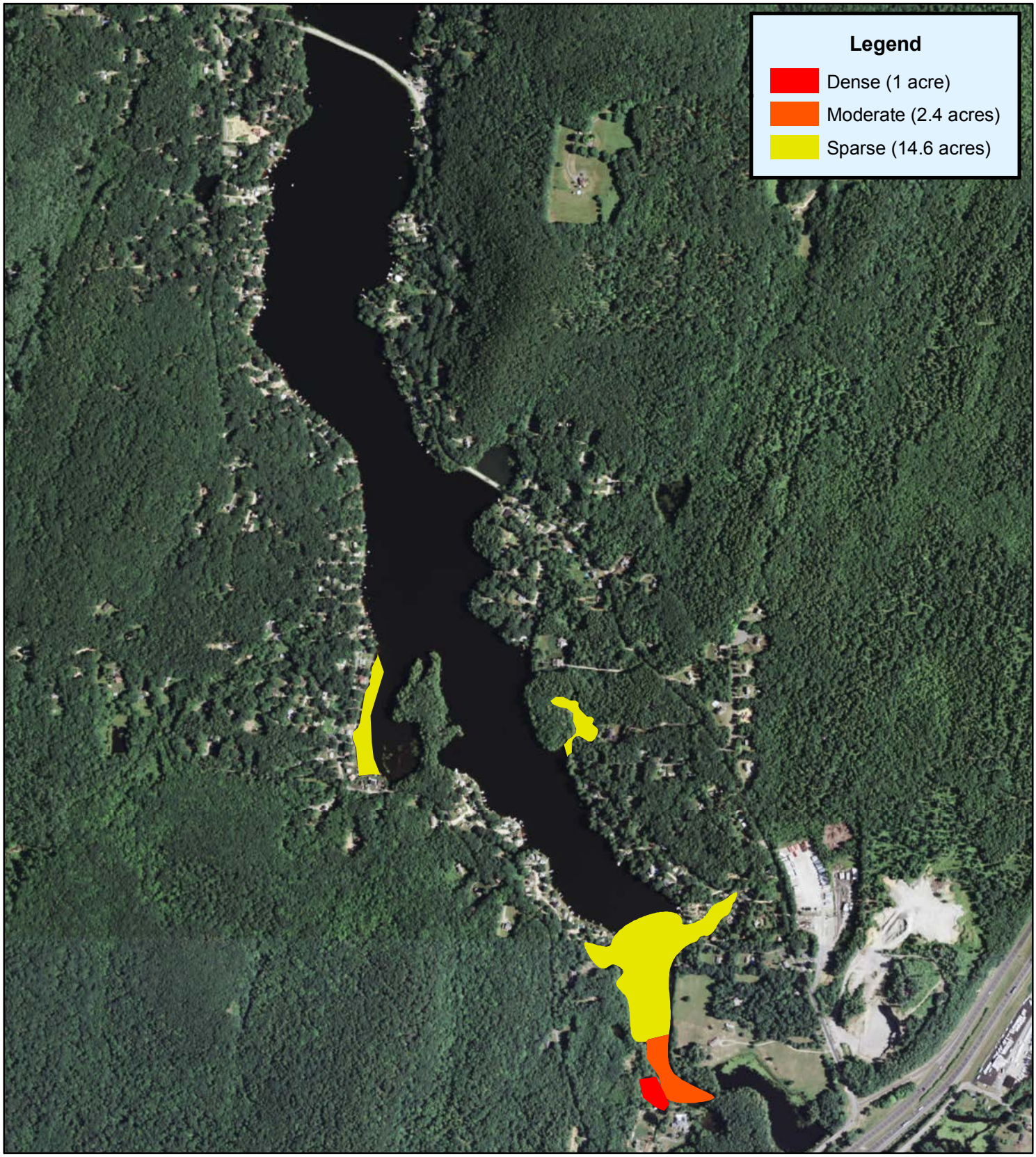
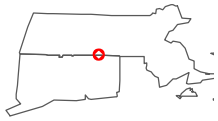


Hamilton Reservoir
Holland, MA



Lower Hamilton Reservoir

0 625 1,250 2,500

1:12,500 Feet

N

Map Date: 05/21/2020
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Figure 3: Upper Hamilton July Density and Distribution of Target Vegetation

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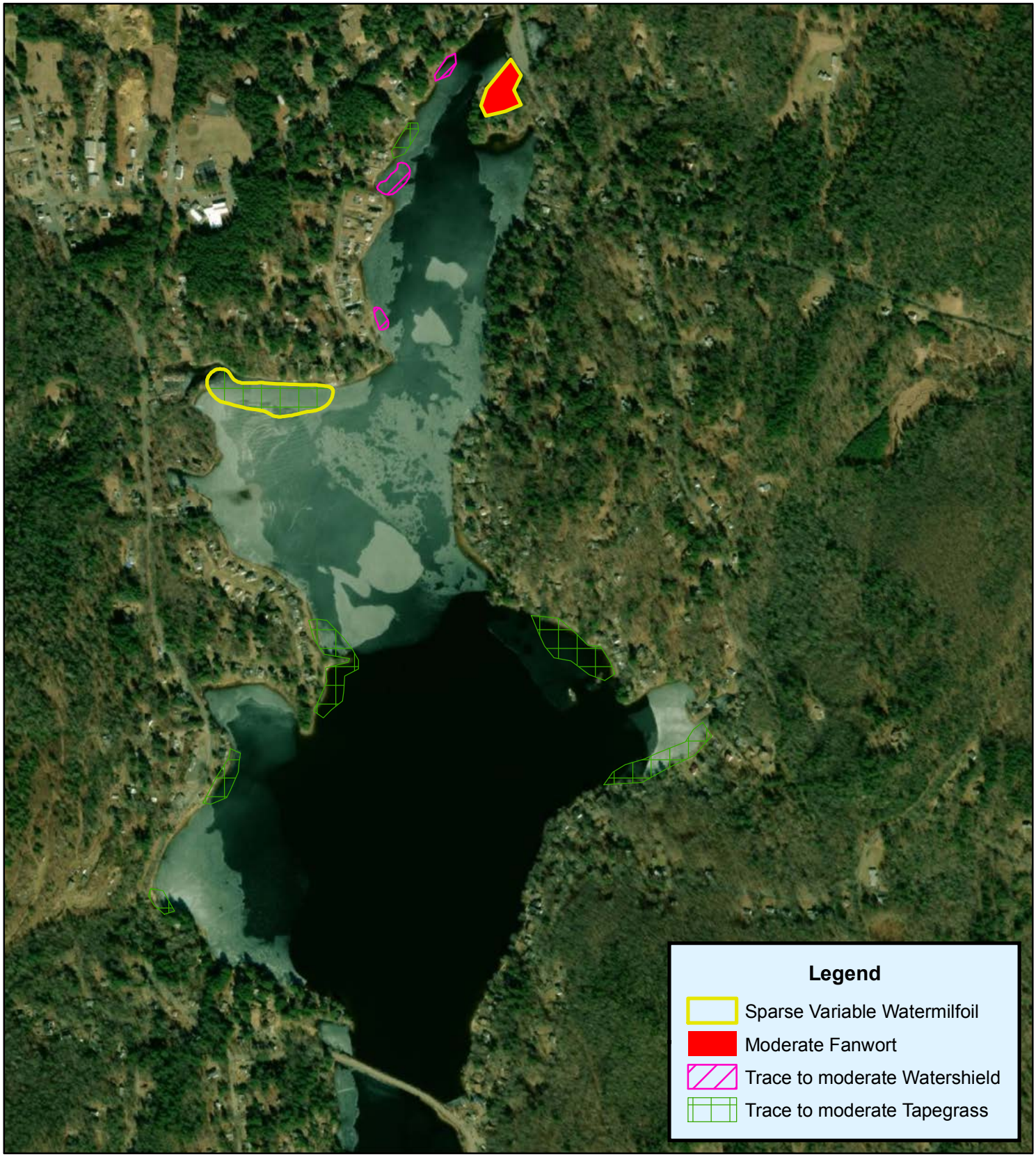

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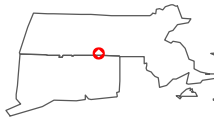

Lower Hamilton Reservoir

0 495 990 1,980

1:10,500 Feet

N

Map Date: 07/14/2020
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Figure 4: Lower Hamilton May Density and Distribution of Target Vegetation

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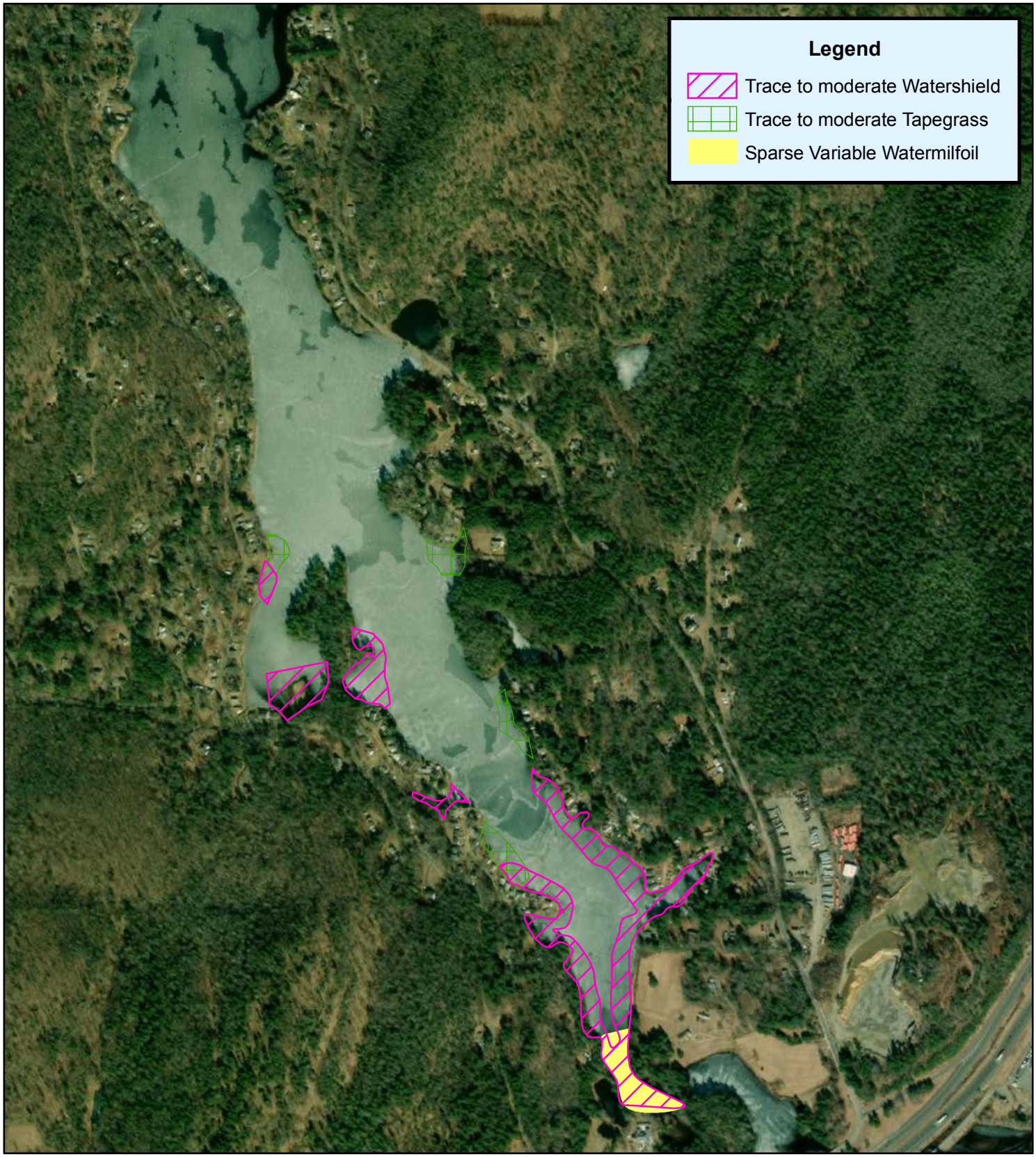

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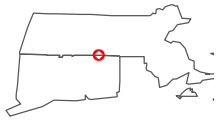

Lower Hamilton Reservoir

0 480 960 1,920

1:10,137 Feet

N

Map Date: 07/14/2020
Prepared by: ALM
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Figure 5: Upper Hamilton Post-Management Density and Distribution of Target Vegetation

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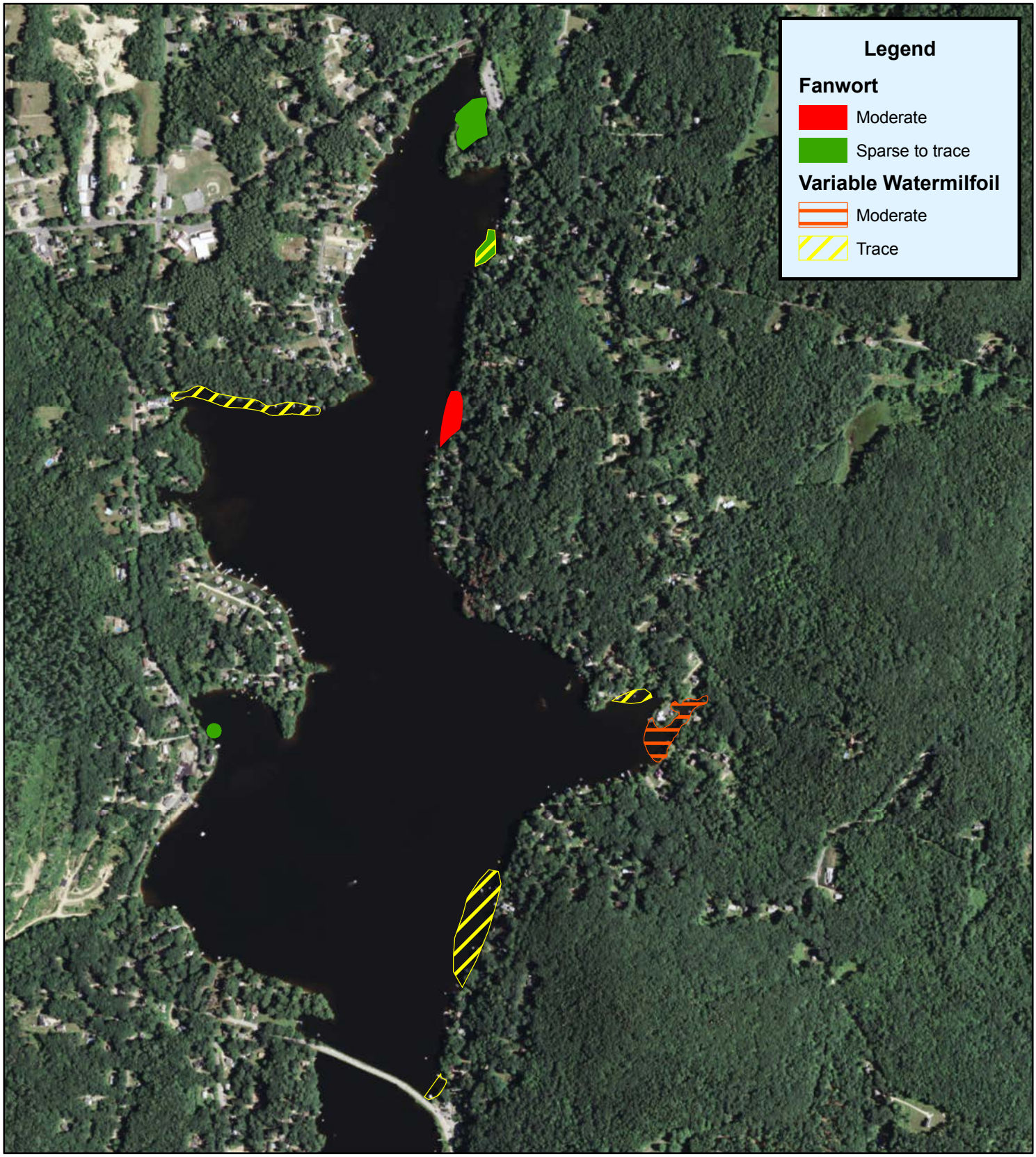

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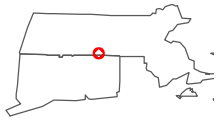

Upper Hamilton Reservoir

0 500 1,000 2,000

1:11,000 Feet

N

Map Date: 11/20/2020
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Figure 6: Lower Hamilton Post-Management Density and Distribution of Target Vegetation

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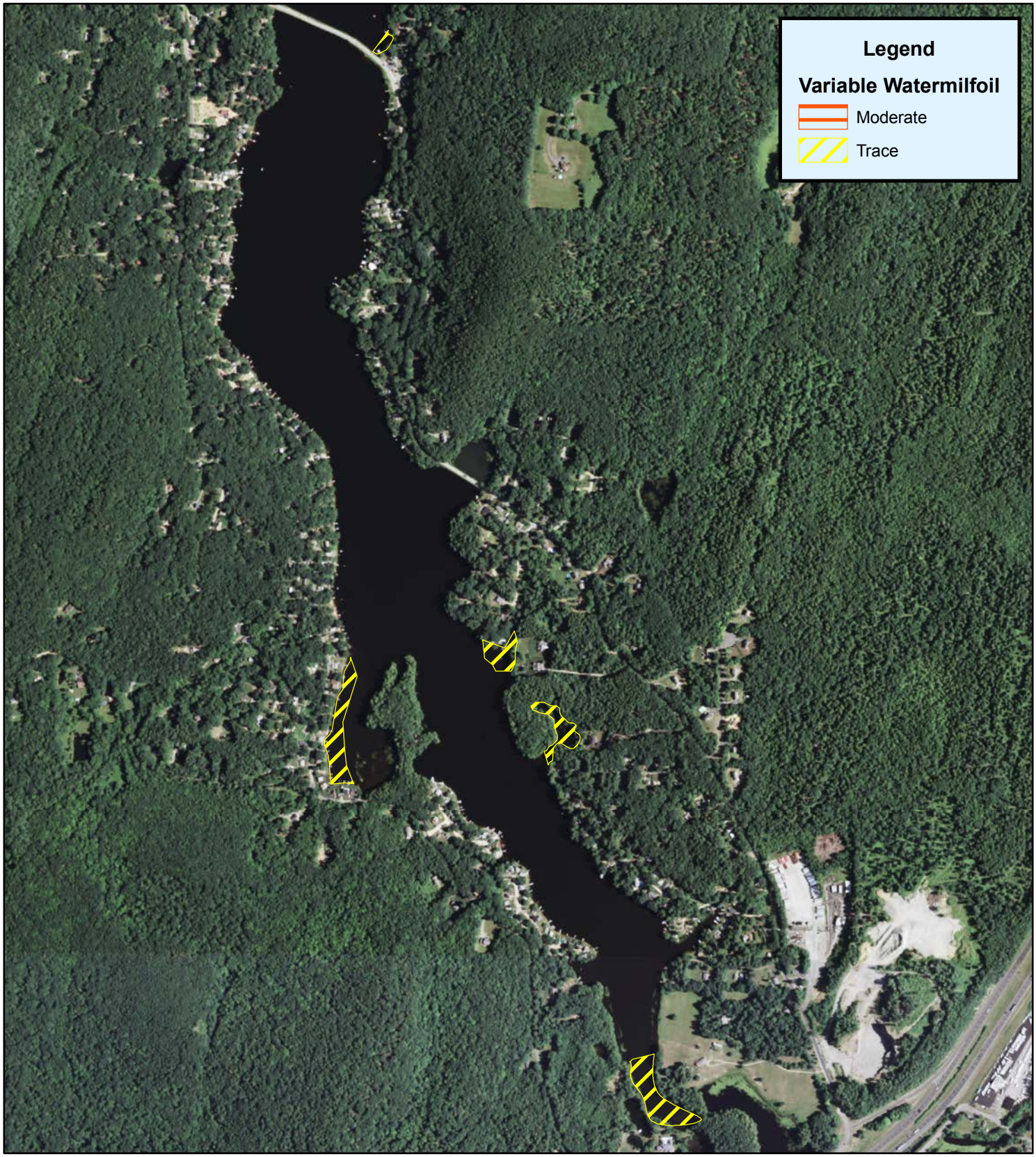

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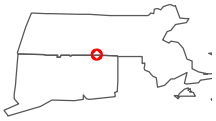

Lower Hamilton Reservoir

0 500 1,000 2,000

1:12,000 Feet

N

Map Date: 11/20/2020
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