

Freeman Lake Eco Harvester Field Log July 2025

Treatment Event Overview & Background Information

The Town of Chelmsford hired C&D Underwater Maintenance to perform a 2-day pilot test Eco Harvester treatment event. The goal of this event was to evaluate the effectiveness of using an Eco Harvester to mechanically harvest and remove invasive aquatic plant species, predominantly Eurasian milfoil (invasive), from Freeman Lake. If effective, Eco Harvesting could become one component of the multifaceted integrated management program the Town is currently in the process of implementing at Freeman Lake.

The treatment of invasive aquatic vegetation at Freeman Lake has been a longstanding need. In the fall of 2021, the Town allocated funding for the management of Freeman Lake. In June 2022, the Conservation Commission issued an Order of Conditions for the Town to treat the lake, but it was appealed by a group of residents. In 2023 to 2024, the Town funded a \$60,000+ comprehensive diagnostic and management assessment of the lake, performed by TRC.

As part of the TRC assessment, a quantitative survey conducted in June of 2024 revealed the presence of 12 native and 3 non-native invasive species – Eurasian milfoil (invasive), Fanwort, and Water Chestnut. The TRC study documented that approximately 19.2 acres of the lake contained aquatic plant coverage, with a majority of the vegetation covering more than 75% of the lake bottom. Non-native Eurasian milfoil (invasive), fanwort, and water chestnut impose negative impacts largely due to their dense foliage. TRC reported that most aquatic plant beds were characterized by biovolumes exceeding 50% of the water column. The excessive plant cover can reduce fish density and has the ability to interfere with oxygen exchange within the lake. The competitive, vegetative growth also reduces light for benthic organisms and healthy assemblages of native vegetation.

The conditions described in the TRC report are not conducive to a healthy aquatic ecosystem and require management to improve water quality and habitat. Based on the findings of the assessment, TRC provided in-lake management recommendations for Freeman Lake. While mechanical harvesting was not recommended as a long-term control method for Eurasian milfoil (invasive)—due to its inability to fully remove the plant and its tendency to fragment and spread the species, potentially exacerbating the infestation—the Town opted to conduct a 2-day Eco Harvester pilot test. This decision was influenced by strong public support for the Eco Harvester and claims that it causes less fragmentation compared to traditional harvesters. A successful pilot test would result in the removal of substantial Eurasian milfoil (invasive) biomass with little to no fragmentation and minimal disturbance to native species, but even under ideal conditions, Eco Harvesting is akin to



mowing the lawn; because it does not remove the root crown, it allows for rapid regrowth within the same season and does not provide lasting control. Also, mechanical harvesting is a non-selective method, meaning that non-target, native plants (and associated aquatic animal life) in the managed area will also be impacted.

Eco Harvesters are able to remove entire Water Chestnut plants, but the Water Chestnut populations at Freeman Lake are still relatively sparse and manageable through hand harvesting. Volunteers harvested Water Chestnut plants prior to the Eco Harvester event, so Water Chestnut plants were not targeted during this treatment event.

Field Log - July 23, 2025

0800 – C&D Underwater Maintenance arrived onsite at Shore Drive boat launch with Eco Harvester watercraft.

The Eco Harvester watercraft storage capacity is 4 ft x 11 ft and up to ~2.5 ft high. Each load is ~3-4 cu yds.

0812 – Eco Harvester in Freeman Lake. Began harvesting along Northeastern shore.

0830 – C&D dump trailer positioned on Varney Beach.

0945 – Eco Harvester empties 1st load of harvested vegetation into dump trailer; ~3 cu yds. The harvested material appears to be predominantly water lily (native) plants; sparse fragments of Eurasian milfoil (invasive) observed.

0947 – Dump trailer unloads harvested vegetation in designated area at 40 Swain Road.





Figure 1. First load from Eco Harvester being stockpiled at 40 Swain Road.

0950 – Eco Harvester continues to harvest vegetation along Northeastern shore.

1000 – DPW Facilities employees onsite to rake beach. Raked material is placed in dump trailer.

1040 – Eco Harvester empties 2nd load of vegetation into dump trailer. The harvested material appears to be predominantly water lily (native) plants; sparse fragments of Eurasian milfoil (invasive) observed. Eco Harvester continues back on water. Operating along the Northwestern shoreline.

1130 – Eco Harvester empties 3rd load of vegetation into dump trailer. The harvested material appears to be predominantly water lily (native) plants; sparse fragments of Eurasian milfoil (invasive) observed. Eco Harvester begins operating in the middle of lake. Dump trailer emptied at 40 Swain Road.

1300 – Eco Harvester empties 4th load of vegetation into dump trailer. The harvested material appears to be predominantly water lily (native) plants; sparse fragments of Eurasian milfoil (invasive) observed. Eco Harvester begins harvesting in Southern portion of lake.

1440 – Eco Harvester empties 5th load of vegetation into dump trailer. The harvested material appears to be predominantly water lily (native) plants; sparse fragments of Eurasian milfoil (invasive) observed. Dump trailer emptied at 40 Swain Road. Harvester operating in the central portion of lake.

1500 – BOH notifies DPW that Freeman Lake water sample collected on 7/22/25 has elevated levels of E. Coli and the waterbody is shut down for swimming, but harvesting operations can continue.

1515 – Camera drone flown above Eco Harvester while it operates in middle of lake. Significant fragmentation observed and submerged milfoil plants visible behind Eco Harvester.

1550 – Eco Harvester empties 6th load of vegetation into dump trailer. Dump trailer emptied at 40 Swain Road.

1622 – Eco Harvester docked at residential dock overnight. Daily total of approx. 18 – 24 cu yds of vegetation harvested. DPW offsite.



July 24, 2025

0800 – DPW onsite at Varney Beach. C&D onsite. The Eco Harvester already operating in the central/Southern portion of lake. Upon arriving onsite, DPW observed significant fragmented plant material (mainly Eurasian milfoil (invasive), but some water lily (native) fragments also observed) along shoreline, as well as yellowish foam along shoreline that was not present yesterday.



Figure 2. Fragmented plant material along shoreline



Figure 3. Milfoil fragments along shoreline



Figure 4. Foam and fragmented plant material along shoreline



Figure 5. Foam along shoreline

0844 - Eco Harvester empties 1st load of harvested vegetation into dump trailer. The harvested material appears to be predominantly water lily (native) plants; sparse fragments of Eurasian milfoil (invasive) observed.



Figure 6. First load of vegetation harvested on 7/24/25

0950 – CT onsite to 40 Swain Road to evaluate biomass that was harvested and stockpiled there yesterday. Piles are predominantly composed of water lilies. Sifted through stockpiles looking for milfoil plants. Removed milfoil plants from piles to look for evidence of roots in harvested material – no milfoil roots were observed. Longest segment of milfoil observed in the piles ~2 ft long, suggesting fragmentation of milfoil plants by the Eco Harvester.

1030 – Eco Harvester empties 2nd load of harvested vegetation into dump trailer. The harvested material appears to be predominantly water lily (native) plants; sparse fragments of Eurasian milfoil (invasive) observed. Dump trailer emptied at 40 Swain Road.

1105 – Eco Harvester empties 3rd load of harvested vegetation into dump trailer. The harvested material appears to be predominantly water lily (native) plants; no fragments of Eurasian milfoil (invasive) observed.

1215 – Eco Harvester empties 4th load of harvested vegetation into dump trailer. The harvested material appears to be predominantly water lily (native) plants; sparse fragments of Eurasian milfoil (invasive) observed. Dump trailer emptied at 40 Swain Road.

1335 – Eco Harvester comes to shore to refuel.

1410 – Eco Harvester empties 5th load of harvested vegetation into dump trailer. The harvested material appears to be predominantly water lily (native) plants; sparse fragments of Eurasian milfoil (invasive) observed.

1430 – DPW Facilities employees onsite to rake beach.

15:00 – Aerial imagery showing the persistence of submerged milfoil plants following mechanical treatment using Eco Harvester.



Figure 7. Submerged milfoil plants observed post-Eco Harvester treatment

1535 – Eco Harvester empties 6th load of harvested vegetation into dump trailer. The harvested material appears to be predominantly water lily (native) plants; sparse fragments of Eurasian milfoil (invasive) observed. Dump trailer emptied at 40 Swain Road. Daily total of approx. 18 – 24 cu yds of vegetation harvested. Total harvested vegetation approx. 36 – 48 cu yds.

1540 – Eco Harvester to Shore Drive boat launch to be trailered.

1620 – Eco Harvester loaded onto trailer.

1635 – C&D offsite. CT to 40 Swain Road to evaluate harvested vegetation piles. Harvested vegetation predominantly composed of water lily (native) plants. The only stockpile that consisted primarily of milfoil plants was the material raked from the shoreline by Facilities. CT sifts through piles; no milfoil roots observed; unable to find milfoil fragment longer than ~2 ft.





Figure 8. Stockpiles at 40 Swain Road



Figure 9. Stockpiled material at 40 Swain Road



Figure 10. Stockpiled material at 40 Swain Road



Figure 81. Longest segment of milfoil DPW was able to find in the harvested stockpiles

July 28, 2025

0930 – Chelmsford Board of Health (BOH) Senior Health Inspector, Mark Masiello, visually identifies Cyanobacteria algal bloom at Freeman Lake. Freeman Lake closed to all water activities until further notice.

The occurrence of an algal bloom shortly after the Eco Harvester treatment event is notable. The treatment involved significant agitation and disturbance of the water column, which may have contributed to the bloom. However, a direct link between the two events has not been established and may be coincidental.



Figure 12. Cyanobacteria algal bloom documented by BOH