

Revised August 12, 2025

Courtney Thompson
Stormwater Engineer
Town of Chelmsford DPW
9 Alpha Road
Chelmsford, MA 01824

**Re: Review of Initial Eco Harvesting Results from Freeman Lake
Chelmsford, Massachusetts**
TRC Project No. 688251.0000.0000

Dear Ms. Thompson,

In response to your request, TRC Environmental Corporation (TRC) has reviewed the materials you provided, which document the process and results of the two-day Eco Harvester event, conducted by the Town's contractor on July 23-24, 2025. These materials include the following documents and media:

- Freeman Lake Eco Harvester Field Log July 2025
- Freeman Lake Eco Harvester Photo Log July 2025
- Plant Fragmentation along Shoreline at Varney Park – Freeman Lake – Photolog
- Freeman Lake Eco Harvester Video Log July 2025

Observations

Nearshore Harvesting Operations

Shore-based photography and video of the Eco Harvester in operation at Freeman Lake suggest that it primarily cleared the floating leaves and petioles of white water lily (*Nymphaea odorata*) in shallow nearshore areas, despite the fact that invasive Eurasian milfoil (*Myriophyllum spicatum*) was the targeted species for management. Removal of water lilies in these areas could allow more light to reach the remaining milfoil plants below, thereby allowing them to grow back quickly and enhancing their chances to outcompete the native plants in these mixed bed areas. As a result, any milfoil control achieved in this area should be expected to be temporary (less than one season) if no further control measures are implemented.

Central Lake Harvesting Operations

The UAS video captured operation of the Eco Harvester in Eurasian milfoil beds of Freeman Lake. These video clips show topped-out Eurasian milfoil growth that is at or very near the water surface at the time of operation. As the Eco Harvester passes through the bed, harvested Eurasian milfoil biomass is visible on the drum and conveyor system. Some of the harvested biomass appears to consist of medium-length strands of Eurasian milfoil that are a few feet in length. These likely represent longer segments of stems and leaves but may also include some intact plants with root crowns. However, much of the harvested biomass appears to consist of short-length segments of Eurasian milfoil. These smaller segments represent fragments that have detached from the main plants and been captured by the drum and conveyor system.

Once the Eco Harvester completes its pass through the bed in one direction, it turns around, offsets slightly from the prior pass, and begins to harvest in the opposite direction. The UAS video captures two things of interest at this point.

First, fragments of Eurasian milfoil are visible floating at the surface. This indicates that fragment release is occurring. Since Eurasian milfoil propagates almost entirely by vegetative fragments, the release of fragments from Eco Harvester operations provides the opportunity for the plant to further colonize available habitats within the lake. Photographs of the Varney Beach area taken subsequent to the harvest show ongoing accumulation of Eurasian milfoil and white water lily fragments nearly two weeks after the Eco Harvester event, despite repeated removal of accumulated biomass by DPW Facilities personnel.

Second, standing stems of Eurasian milfoil are visible below the water surface after the Eco Harvester has completed its harvesting pass. This supports the prior observation that many plants are being partially harvested rather than

removed in their entirety. The practical effect is that the Eurasian milfoil plants in the harvested area have been topped, meaning that regrowth from those plants is likely to occur during the current season.

In light of these observations, the results of Eurasian milfoil harvesting should be expected to be temporary (less than one season), if no further control measures are implemented. Additionally, the fragments that were not collected by the Eco Harvester or removed from the immediate beach area by DPW Facilities staff should be considered viable for growth if they are able to settle in suitable habitats within the lake.

Stockpiled Biomass

Photographs of the removed and stockpiled biomass primarily consist of white water lily. This may be due to greater harvesting effort in the nearshore area in proximity to white water lily beds, higher efficiency of harvest of that species compared to Eurasian milfoil, or both. White water lily plants would also be expected to be more visible in stockpiles because their leaves and petioles are larger and more resistant to desiccation than submerged species like Eurasian milfoil and fanwort.

Foam

It is not known whether the foam observed at the Varney Park beach (most visible in the July 24 pictures) can be directly linked to the Eco Harvester event. Temporary foams can naturally form due to a combination of byproducts from organic matter decay and turbulence-inducing events (e.g., wind). This foam can then accumulate on beaches when the prevailing wind direction is favorable. In the case of Freeman Lake, the disturbance of detritus by Eco Harvester operations could have indirectly contributed to the formation of foams to some degree. However, based on the video and photography reviewed, it cannot at this time be concluded that the Eco Harvester operations directly caused foam to form.

Conclusions

Based on the information provided, it can be concluded that the Eco Harvester event resulted in the removal of some aquatic plant biomass from Freeman Lake, although most of this was associated with native white water lily. Given the short duration of harvest, the species targeted, and the limitations of the harvesting process itself, the benefits of the Eco Harvester event are also likely to be limited. Furthermore, the benefits achieved through biomass removal may be offset by the release of viable fragments and the maintenance required to remove accumulated fragments from the Varney Park beach.

The observations of the 2025 Eco Harvester event also validate and reinforce the recommendations made in the *Freeman Lake Diagnostic and Management Assessment* (TRC 2025) regarding the use of mechanical harvesting (including Eco Harvesting) at Freeman Lake, as follows:

- Mechanical harvesting is a tool best reserved for floating and floating-leaved species, particularly annual species like water chestnut (*Trapa natans*).
- Bycatch of non-target species, including water lilies and other native flora and fauna, may occur because mechanical harvesting is a fairly non-selective tool. In some cases, non-target species may actually be preferentially harvested, as was observed in shallow nearshore portions of Freeman Lake.
- If used to harvest invasive perennial species like Eurasian milfoil or fanwort (*Cabomba caroliniana*), regrowth will occur quickly.
- Fragmentation is a particular risk when mechanical harvesting is used for control of Eurasian milfoil and fanwort. Mechanical harvesting may be counter-productive due to the increased risk of spread.

Based on the results of the 2025 Eco Harvester event, mechanical harvesting (including the use of an Eco Harvester) is not recommended for effective control of Eurasian milfoil or fanwort at Freeman Lake.

Should you have any questions on this, please contact me at (401) 330-1204 or mladewig@trccompanies.com.

Sincerely,

TRC ENVIRONMENTAL CORPORATION



Matt Ladewig, CLM
Project Director