

Plant removal (“Eco-Harvesting”) on Forge Pond / Lake Matawanakee  
Summer 2023

Reporting by Friends of Forge Pond

July 3, 2024

Background

Forge Pond / Lake Matawanakee is infested by several non-native or invasive aquatic plant species. These include fanwort (*Cabomba caroliniana*), Eurasian milfoil (*Myriophyllum spicatum*), variable milfoil (*Myriophyllum heterophyllum*), curly-leaf pondweed (*Potamogeton crispus*) and European naiad (*Najas minor*). In the spring and summer of 2023, the lake experienced extraordinary levels of plant growth. Plants attained mid-summer growth levels by late May and invasive plants extended across the lake surface in areas where they aren't normally present. Long-time lake residents confirm that plant growth for the season was worse than any they had ever seen.

To manage the invasive plants, the Friends of Forge Pond and the Littleton Clean Lakes Committee have been conducting winter drawdowns of the lake for about 10 years. The drawdowns have been moderately successful in achieving that goal, but the mild winter weather of recent years has made it difficult to lower the lake level as much as past years and has also drastically reduced the number of below-freezing temperature days, which are needed to control invasive plants. As the effects of climate change continue to be felt, the experience of the recent winters may become more common and additional methods for controlling invasive aquatic plants may become more important.

The physical removal of plants is being investigated to see if it can provide adequate and cost-effective management of the invasive plants. Eco-Harvesting appears to be the best option in this regard. The technique of Eco-Harvesting uses a floating pontoon-boat-like vessel to collect plant material from the surface and near-surface of the lake (Figure 1). The plants are collected using a rotating drum at the front of the vessel, intended to pull the plants from the lake bottom rather than cut or break the plant stems. It is possible that very long or fragile plant stems will be broken. A conveyor belt moves the plant material into a containment hopper in the vessel. To keep plant fragments from drifting away from the vessel and spreading into the lake, (1) the plant material is pinched tightly between the counter-rotating drum and conveyor belt, (2) walls at the sides of the conveyor belt keep the fragments on the belt until they are placed in the hopper, and (3) the hopper walls securely keep the plant matter in the vessel. When the hopper is full, it is unloaded to a trailer on the shore by reversing the conveyor belt. The plant material is trailered away from the site.

Planning

Funding for the 2023 Eco-Harvesting was provided equally by the Littleton Clean Lakes Committee and the Westford Healthy Lakes and Ponds Collaborative. The funding was sufficient for four machine-days of treatment, or 32 machine-hours. This was a very limited budget, given the level of plant growth in the lake.

Originally, the treatments were intended to be done in mid-July, immediately following Eco-Harvesting treatments on Spectacle Pond and Long Lake. But the schedule was delayed to mid-August by the required process to obtain the permits for the treatments. The actual treatment dates were August 20 to 22, 2023. This was recognized as being very late in the season to be doing the plant removal and earlier schedules are planned for subsequent years.

The 2023 Eco-Harvesting treatment, with the limited time available, was designed to serve two objectives:

Objective 1) Provide significant and focused removal of plants in a few areas where invasive plant growth was especially dense and covered a large area. Adjacent areas with heavy plant growth were left untreated for later comparison. It was expected that these areas could be effectively monitored following the treatment to gauge the treatment effectiveness.

Objective 2) Remove plants along the waterfronts of homes and beaches on the lake where there was a lot of invasive plant growth. While quite a bit more Eco-Harvesting would have been needed to fully remove plants along the shoreline, this objective sought to provide some level of relief on all waterfronts having significant plant growth, with the actual level of relief limited by the resources available.

Figure 2 is a map showing the plant cover that was identified by a plant survey performed by TRC in early August. Figure 3 is a map showing the planned Eco-Harvesting treatment areas. These areas are based on the TRC survey, on a separate review of the plant growth in the lake a week prior to the Eco-Harvesting treatment, and on the two objectives for the treatments discussed above. The areas marked as A, B, C, and D are those that were identified to be treated in achieving the first objective.

Because the public boat ramp on Beaver Brook Road was still out of commission in the summer of 2023 due to bridge construction on the road, the only operating boat ramp was Lake Matawanakee Association's ramp in the west end of the lake. To maximize the time the Eco-Harvesting machines would be able to remove plants, arrangements were made to allow the machines to be offloaded on the shore at locations in addition to the LMA ramp. Residents with private trailer access at their shoreline agreed to allow this – one site at the east end of the lake and one at the end of the south bay. This allowed for many additional hours of plant removal over the course of the treatment.

It was planned to dispose of the plant material at the Onyx landscaping supply yard (on the property of Springdell Farm, now doing business as Theo's Market Gardens) on Rte 119, because it is a short distance from the lake. This site was closed on the first day of treatments (Sunday) and the next closest site for disposal was in Acton, which would have resulted in more time spent disposing of the plant material and less time available for removing plants. To avoid this, one of the abutters allowed the plant material harvested on Sunday to be deposited on their lot at the east end of the lake. The Friends of Forge Pond later arranged for this plant material to be taken to the Onyx site.

## Results

Two Eco-Harvesting machines were brought on site, with the intent of having both run for 16 hours over the course of three days, August 20 - 22. Halfway through the first day, one of the machines broke while trying to remove one of the many floating dense reed clumps that had shown up last season. The required repair was more involved than the team was able to perform on-site and required replacement parts to be sent from the manufacturer. As a result, a single machine was used for the remainder of the treatment. It was possible to complete the scheduled treatment over the three days by extending the treatment hours each day.

Figure 4 shows the areas where Eco-Harvesting treatment was carried out on the three treatment days. Equal amounts of machine-hours were spent in the Westford and Littleton portions of the lake over the course of the treatment – i.e., 16 machine-hours in each portion.

The large area of very dense plant growth labeled as “C” in Figure 4 was not identified by the TRC survey, possibly because their monitoring focused on the shallower areas near the shoreline where plants have typically been found. The “C” zone in deeper water was unique to the 2023 season. Surprisingly, although this area was densely populated with plants for over two months during the summer, it was inexplicably clear of plants when the Eco-Harvesting started on August 20. As such, the areas marked as A, B, and D were treated in pursuit of the first objective.

The locations marked as 1, 2, and 3 on Figure 4 are the places where the Eco-Harvesting machines were unloaded to a trailer each day – on the first, second, and third days, respectively.

The results of the limited Eco-Harvesting treatment performed in 2023 were rather inconsistent. Some, but not all, of the large areas where plant growth was especially dense and where Eco-Harvesting was done for Objective 1 stayed relatively plant-free into the fall and seemed to also have fewer plants in spring 2024. Most of the areas along waterfronts where Eco-Harvesting was done for Objective 2 didn’t stay clear for as long after the treatments and no plant reduction was seen for these areas in 2024.

The Eco-Harvester operators claim that, although Eco-Harvesting is not a complete once-and-done solution for invasive lake plants, consistent annual treatments are a practical and economical way to control the plant population. Their assertion is that, while intensive Eco-Harvesting may be required at the outset, after a few years of intensive removal, moderate annual maintenance treatments will suffice. The present effort to evaluate Eco-Harvesting in the summers of 2023 and 2024, and possibly 2025, aims to assess whether this can be true in Forge Pond/Lake Matawanakee.



Figure 1 – Eco-Harvesting machine in operation

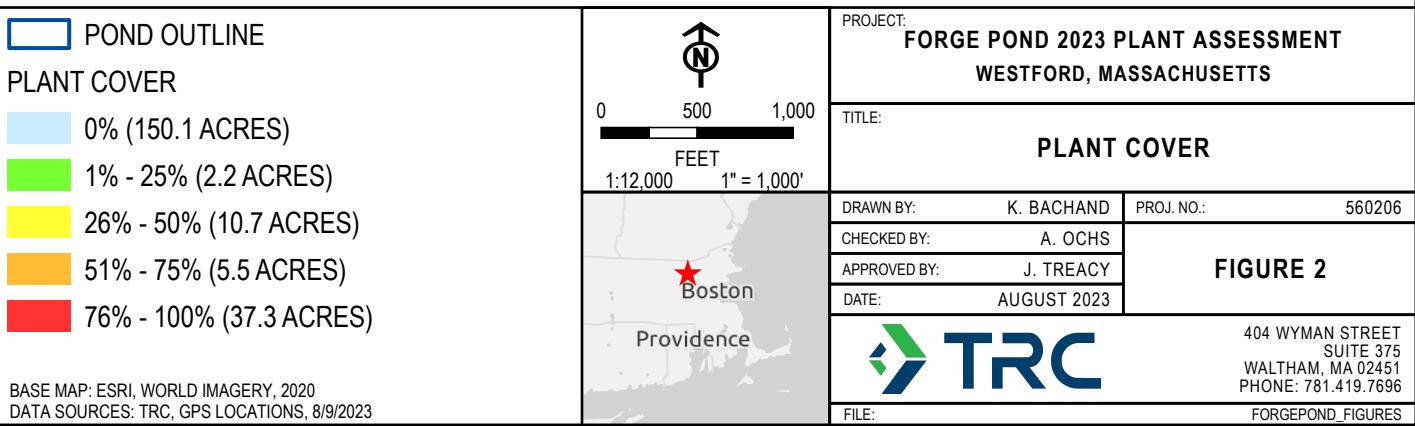
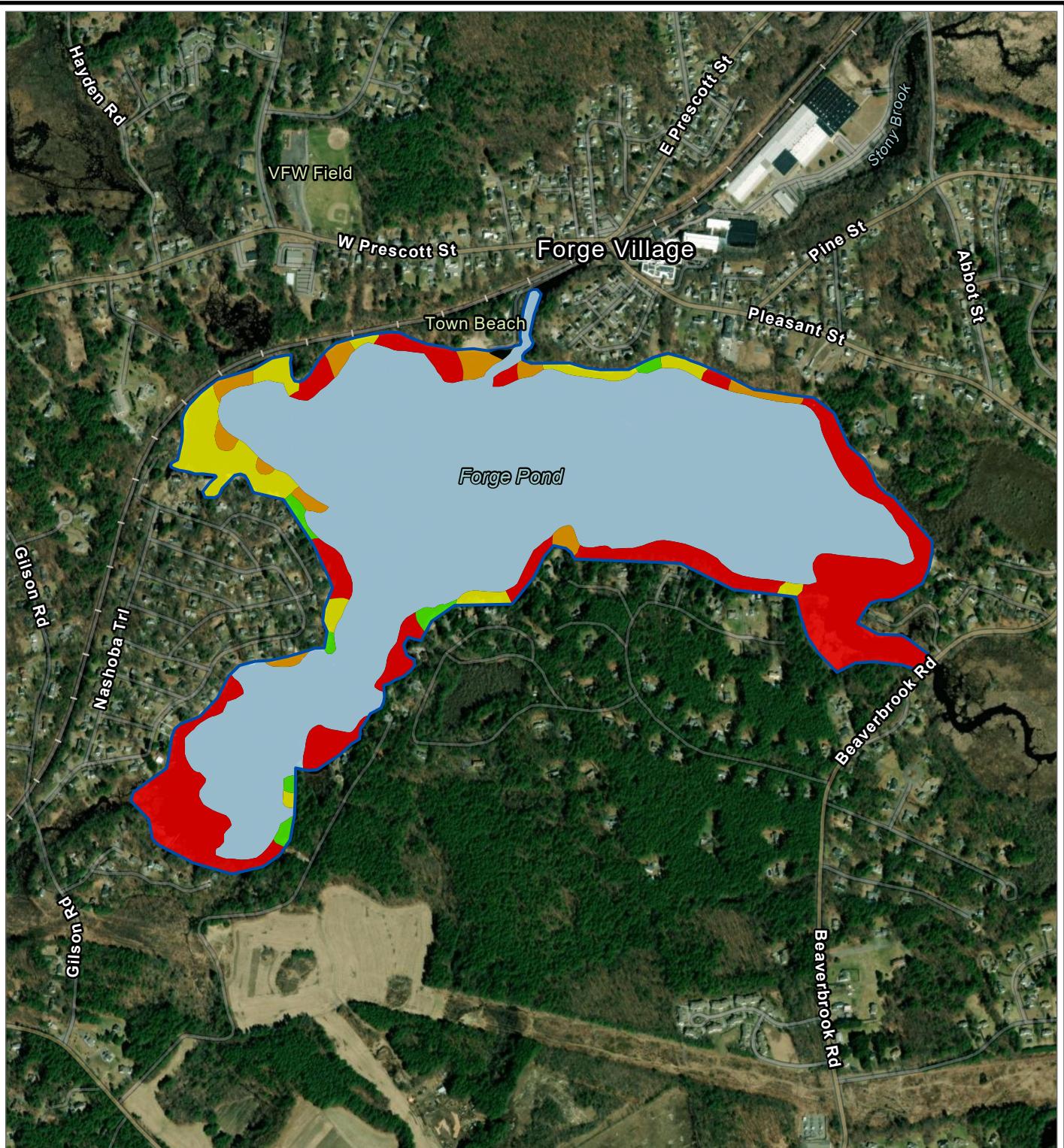


Figure 2 -- Plant survey of Forge Pond / Lake Matawanakee (August 9, 2023)

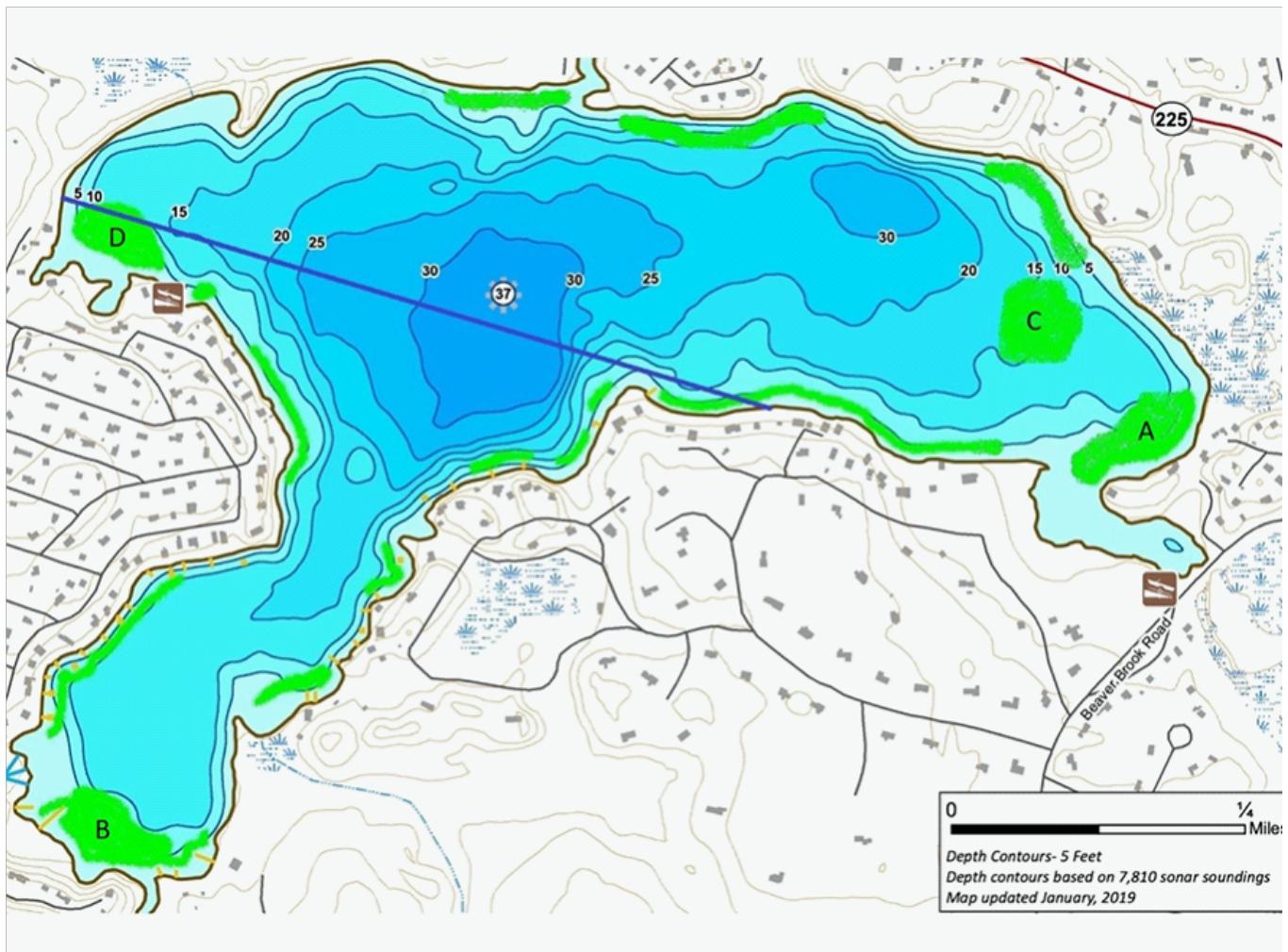


Figure 3 – Planned Eco-Harvesting treatment areas are shown in green

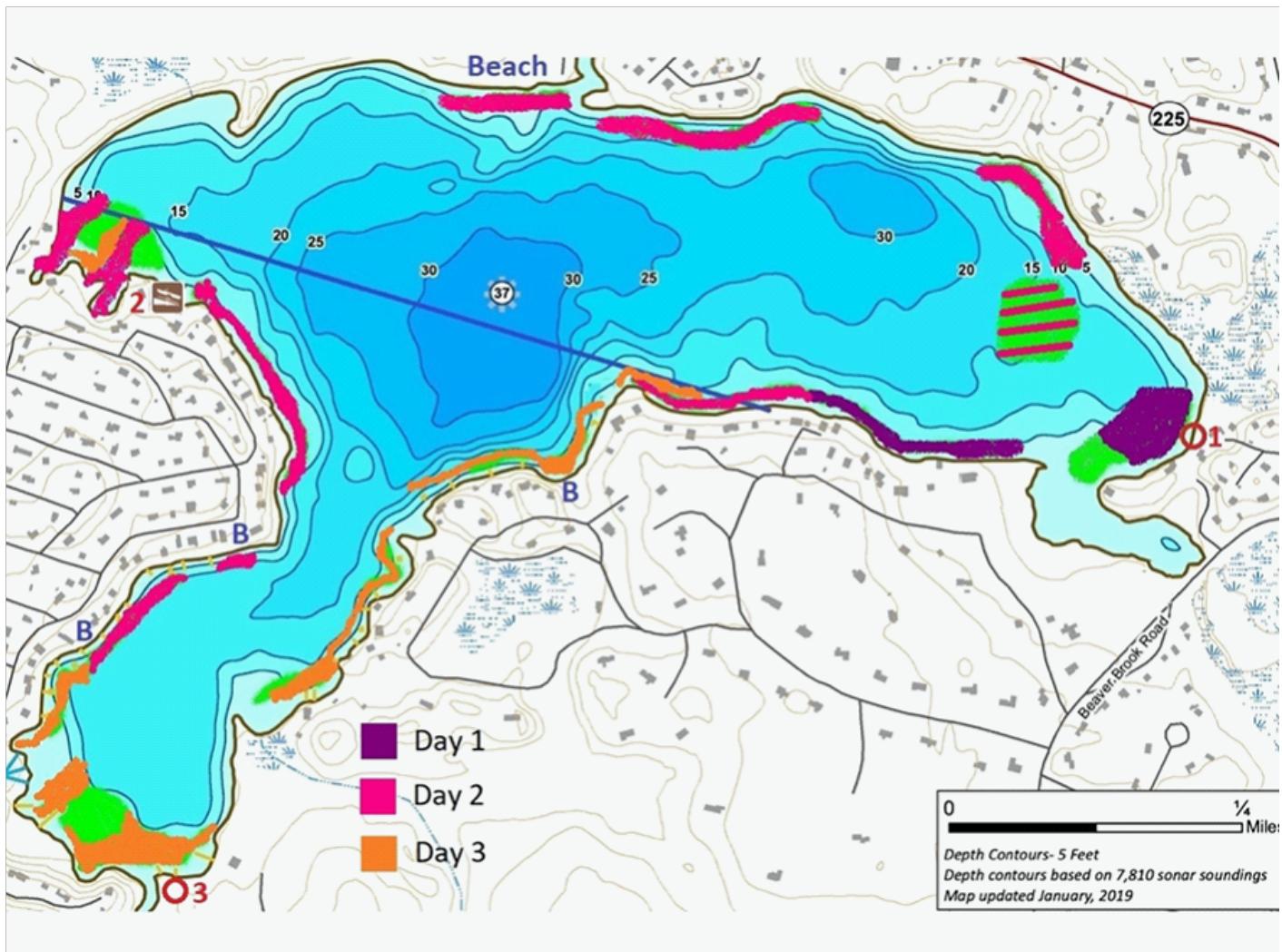


Figure 4 –Eco-Harvesting treatment completed each day