Brief summary of benthic mat pilot project
on Forge Pond/Lake Matawanakee
Summer 2022

A benthic mat is a physical barrier, like a tarp, placed on the lake bottom to prevent plant growth in the covered area. It prevents plant growth by blocking the light required for growth. A mat also provides a physical barrier to growth, reduces the space available for expansion, and prevents plants from germinating.

The objectives of this pilot project are to learn how well benthic mats work in controlling nuisance plants in waterfront areas in front of homes on Lake Matawanakee/Forge Pond and to understand what the experience is for participants installing, maintaining, and removing the mats.

Benthic mats were used at seven sites on the lake, four in Littleton and three in Westford.

Three types of mats were used:

3 sites used burlap mats held down by burlap bags filled with stones
3 sites used commercially available polyethylene mats held down by steel reinforcing bars
1 site used a standard polyethylene tarp held in place with sandbags

Mats were put in place between late May and mid-July. Mats at three sites were moved once or twice. The burlap mats are being left in place indefinitely, to eventually decompose and become part of the lake bottom. The other mats had all their elements removed from the lake by October 1.

The mats at all sites were successful at eliminating plants from the area covered by the mat. Mats were in place for between 1 month and 4 months over the summer. When mats were removed from an area, the lakebed under them had no plants remaining and no plant debris. After the mat was removed, plants slowly began to regrow in the previously covered area. At one site, the plants were about 2 inches tall one month after removal and about 5 inches tall after two months. Burlap mats that remained in place occasionally had a plant or two growing in the silt that began to collect on the mat, and these were easily removed by hand. Participants with burlap mats found no instances of pieces breaking off and drifting away from the mat. Areas adjacent to the mats didn't seem to be affected by the mat and plant growth around the mats seemed to be the same as it would have been without the mat.

Operations with the mats generally required planning, actions by several people, and, in some cases, a fair amount of effort and patience. Installation needed preparation of the mat system and two or three people working in the water for one to three hours. At sites where the mat was moved, it was relatively easy to drag it from one location to another, partly because the lake bottom was smooth. Removing mats was not difficult in most cases, but hard work at one site. Overall, participants' experience was quite varied, as some felt that using the mats was at times laborious and a big effort while others found the process to be easy.

All participants have decided to use the benthic mats again next summer.

<u>Lessons learned</u>

- Benthic mats do a very good job of eradicating plants in the area they cover. After the mat is removed, plants begin to grow in this area, but growth is slower than usual over the remaining summer season.
- Leaving a benthic mat in place for about one month results in the area under it being generally clear of plants.
- All three types of mats used this summer all seemed to have similar effectiveness.
- Ease of mat installation varied among the sites. The commercially available mats with metal re-bars used as anchors simplified placement because the mat didn't float around during placement and no separate anchors had to be placed. Narrow mats were easier to position than wide mats. Other factors making installation more difficult included deep water (more than 5 ft) and poor visibility, especially when silt is stirred up. It is easier to install the mats before significant plant growth has occurred in the installation area.
- Burlap mats did not have any pieces break off during the first year.

- Some of the polyethylene mats were permanently stained after use. Not sure if this will affect how quickly they deteriorate.
- At some sites, placing the warning buoys at the edge of the mat interfered with waterfront activities so their placement was adjusted to avoid this while still alerting people to the presence and location of the mat.
- Most participants found the requested 600 sq ft maximum mat area did not provide a large enough weed-free area to be useable and thus would like to be able to expand that area next year.

Looking ahead to 2023

Many of the participants felt the 600 sq ft mat size currently allowed is not sufficient to provide the desired clearing of plants, and would be interested in using larger mats in the future. We would like to see if there is an increased mat size that would be considered as a minor change in the current Orders of Conditions, such that it could be adopted without the need for an amended Notice of Intent.

For reference, the state's *Generic Environmental Impact Report on Eutrophication and Aquatic Plant Management in Massachusetts* identifies benthic mats as appropriate for plant management in lakes when covering up to 10% of the lake area. If benthic mats of 2,000 sq ft were used at the 7 current sites, this would amount to 0.16% of the lake area. If benthic mats of 2,000 sq ft were eventually used on up to 25 waterfronts (about one quarter of the developed lots on the lake) this would amount to 0.6% of the lake area.