

Benthic barriers (mats, lake blankets, screens, etc.)

Benthic barriers, sometimes called benthic screens, lake blankets or bottom barriers, prevent plant growth by blocking out the light required for growth. The barriers also provide a physical barrier to growth by reducing the space available for expansion. Most aquatic plants under these screens will be controlled if they are light-deprived for at least 30 days (Perkins et al, 1980).

Benthic barriers are made of plastic, fiberglass, nylon, burlap, perforated Mylar, woven synthetics or other non-toxic materials, and are often permeable to gases produced during the degradation of plant material. In some instances sand or gravel have also been used as barriers. Most of these materials come in rolls of various lengths, anywhere from 8 to 75 feet wide, and 3- 10 mm thick. Some, but not all, materials are heavier than water (heavier than water makes for easier submersion but is more difficult to handle.)

In shallow water, barriers can be installed by two or three people from the shore. The roll can also be placed on a small boat and unwound as the boat is rowed away from shore. Overlapping barriers by four to six inches will allow wider areas to be controlled. Barriers should be securely fastened to the bottom with stakes or anchors (weights will work.) Heavy plant growth can make installation difficult; it may be necessary to time the barrier placement with a low growth period, usually in early spring after ice-out. During the summer, barriers can be applied after a harvester has cleared the area (if allowed.)

Benthic barriers should be limited to areas of either intensive use or significant concern, due to the difficulty of installation and cost of the materials. They are most often used around docks, in swimming areas, or to open and maintain boat access channels. Since barriers can be used to control the growth of specific weed beds or geographical areas, they are effective at maintaining native and controlled plant communities.

The screening materials and anchors should be removed at the end of the growing season so that they can be cleaned off and protected against ice damage during the winter, although some lake residents keep the barriers permanently anchored. In deeper water, or in situations where the barriers are to be kept in place all year, the barriers should be periodically cleaned to remove organic material in order to prevent new plants from growing on top of the barriers. With proper maintenance, the screening materials can last several seasons.

- *Target Plants and Non-Target Plants*

Since all aquatic plants require sunlight, benthic barriers will inhibit photosynthesis and will ultimately control (kill) all plants underneath the barriers; as such, it is a non-selective control strategy. However, proper siting of the barriers will result in selectively controlling only those plants under the barrier, not desirable neighboring plants.

- *Advantages*

While benthic barriers do not selectively control the underlying plants, the placement of the mats can effectively provide selective control by limiting the inhibition of photosynthesis to **monoculture** beds of invasive plants and areas of nuisance plant growth. Ecological side effects can be practically insignificant. Benthic barriers do not introduce toxic or hazardous chemicals, and do not involve extensive machinery. Some materials are said to photodegrade in ultraviolet light, but the degradation products are quite innocuous. Although cumbersome to place and anchor, benthic barriers can be applied by laypeople almost as well as by professionals, although the process is greatly simplified and more effective using specially designed (read: expensive) materials and scuba divers.

- *Disadvantages*

The bottom covering may eliminate some species of benthic invertebrates, and it is possible that the barriers may interfere with some warm water fish spawning. However, it does not appear that any other components of the food web are adversely affected. Although this strategy can be used throughout the lake (or at least the littoral zone), the cost of the materials and the difficulties in installation can quickly limit the spatial extent of this method, and permitting issues may become more significant. If target plants are intermixed with desirable native plants, it will be difficult to achieve selective control, particularly since the expansion of these desirable plants will greatly enhance the longevity of this management strategy.

The barriers must be firmly attached to the bottom to prevent boat motors or swimmers from hitting them. Also, anchoring in the area may disrupt the mats.

- *Costs*

Benthic barriers can be applied “on the cheap”. The bottom materials can be comprised of opaque (usually green or black) garden tarps, while PVC frames can be constructed to hold the tarp in place. Rocks can be used to hold the tarps down as weights, while rebar can be used as stakes. Barrier material can range from \$.20 to \$1.25 per sq. ft. For professional installation, the cost of benthic barriers can range from \$10,000 to \$20,000 or more per acre, depending on the choice of screening material and whether the application involves initial installation or re-employment. This may be much higher than the costs for several other physical control methods. The ability to reuse the materials over several years will help to amortize these costs. Scuba divers will be required to install and secure the barriers, at least in water depths over 6 ½ feet. Plots with steep slopes, natural obstructions, or heavy plant growth may require additional assistance.

- *Regulatory Issues*

◊ In Michigan a permit from the MDEQ is required.

Vendors

The following vendor names provided for your information. It is not our intention to endorse or promote specific vendors or products and this list is not comprehensive. If you know of other vendors please let us know so we can add them to our list.

Noweedmat.com

Lakebottomblanket.com

(Taken from a New York State DEQ document)