AQUAGUIDE

Missouri Department of Conservation

Submerged Plant Control in Ponds and Lakes

Aquatic plants are a beneficial and necessary part of Missouri ponds and lakes. Without them, most other organisms cannot survive. Plants keep the water oxygenated, provide food, cover and nesting sites, and stabilize the shoreline and pond bottom. Submerged plants grow underwater, are rooted in the bottom and have stems and leaves that grow towards the surface.

Several types of submerged plants are commonly found in Missouri waters. Coontail, elodea, naiad, pondweed and milfoil are examples of submerged plants that can become a nuisance if not controlled. Refer to our publication "Nuisance Aquatic Plants in Missouri Ponds and Lakes" for more information on aquatic vegetation.

Ideally, 10 to 20 percent of a pond's bottom and surface should have aquatic plants. If more than 20 percent of the pond has aquatic plants, or if aquatic vegetation is interfering with some pond uses, mechanical, biological, or chemical control methods should be considered.

Mechanical Control

Shading

Shading areas with large sheets of black plastic (8-millimeter thickness) will kill virtually all aquatic plants under the sheet within 30 days. Float the plastic on the surface and anchor it by fastening the corners to concrete blocks, or sink the sheet over the weed bed with weights. Be sure to puncture the sheet in several places so gasses can escape. Wind and wave action can move and damage plastic. This method can be difficult, cumbersome, and requires daily monitoring.

Water dyes do not kill plants but can be added to inhibit or slow plant growth. Dyes should be added in the spring and periodically retreated to maintain effectiveness. Follow product label for treatment instructions.

Blanketing

Gravel, sand or clay may be used to "blanket" submerged plants. The aquatic plants that get covered will have a difficult time trying to grow through physical barriers such as gravel or sand. However, submerged plants will return to the treated area sooner or later.

Manual

Some aquatic plants can be controlled by pulling, digging, cutting, and raking. The removed vegetation should be disposed of over the dam, or somewhere it cannot get back into the pond. Regardless of whichever approach you try, the process isn't particularly enjoyable and may involve intense physical labor. It, however, may be effective (and cheap) if practiced regularly.

Water Level Drawdown

Drawdowns for controlling nuisance aquatic plants should begin in November, exposing and drying sediments for a minimum of 2-4 weeks to prolonged freezing, through early March. However, both freezing and drying may be difficult to achieve in the typically unpredictable weather of a Missouri winter. If pond sediments remain wet, especially if insulated by a layer of snow, or if freezing for a prolonged period does not occur, plant roots or seeds may not be sufficiently damaged to achieve the desired level of control.

Drain no more water than necessary to expose the unwanted plants and always leave at least eight feet of water in the deepest part of the pond to reduce the chance of a winter fish kill. Keep in mind that if the pond does not reach its normal level by spring and water clarity allows light to penetrate many feet below the surface, aquatic plants may grow even deeper into the pond basin. Additionally, lowering water levels will move small fishes from shallow water refuges to open water where increased predation can occur from adult fish.

This technique is easily done for ponds or lakes with a drainpipe or valve that can be opened and closed as needed. Ponds without this feature will be more difficult to achieve and maintain lower waters levels needed.

Biological Control

Grass Carp (Ctenopharyngodon idella)

The grass carp (or white amur) is a plant eating member of the minnow family, and can be effective in controlling many submerged plants. The fish will rapidly reduce or eliminate desirable aquatic plants, recycle their nutrients, and may lead to increased growth of the problem plants. See our grass carp *Aquaguide* for details on stocking rates and when to stock.

Chemical Control

ALWAYS READ AND FOLLOW THE PRODUCT LABEL FOR PRECAUTIONS, DIRECTIONS, RESTRICTIONS AND WARNINGS.

Herbicide Use Considerations

1. Proper identification of aquatic plants is critical prior to applying herbicide as different aquatic plants require different herbicides for control.
2. Herbicides rarely eradicate aquatic plants and usually provide temporary control. Retreatment each year might be necessary to control the nuisance vegetation.
3. Read herbicide label for personal protective equipment needed, and restrictions associated with watering livestock, swimming, or irrigation and proper application techniques.
4. Treat the target aquatic plants when they are actively growing, and water temperatures are between 65°F and 80°F. (Typically mid-May through late-June)
5. Treat no more than one-third of the target aquatic plants at 10-day to two-week interval. Dying and decaying aquatic plants remove dissolved oxygen from the water through decomposition. A possible fish kill could result if too much of the target aquatic plant is treated at once.
6. Some herbicides require the use of another product called a surfactant in order to be effective. The surfactant, or “sticker” binds the herbicide to the plant leaf and enables it to “work.”

Herbicides can be purchased online or from local farm supply stores.

Common Submerged Aquatic Plants and Herbicides that Provide Control

	Bispyribac	Carfentrazone	Copper Complexes	Diquat	Endothall	Flumioxazin	Fluridone	Imazamox	Imazapyr	Penoxsulam	Triclopyr	2,4-D
Pondweeds	G		G	G	E	G	E	E	G	G		
Coontail			G	E	E	G	E					G
Elodea			G	E		E	E			G		
Milfoils	G	E	G	E	E	G	G	G		E	E	E
Naiads			G	E	E	E	E			G		

E = Excellent G = Good

Notes:

- *Start treating as soon as you notice new growth. The seeds of some plants stay viable for many years.*
- *Using a combination of treatment methods is often the best way for lasting plant control.*

For alternate sources of chemicals and more information on treating aquatic plants, contact your local MDC office or visit **mdc.mo.gov**.

If the above approaches do not work for your situation, or to maintain long term control, you might need to reduce nutrient inputs into your pond or lake. The final approach would be a total pond renovation.

Minimizing Nutrient Inputs

Excess nutrients (nitrogen and phosphorus) should not be allowed to wash into ponds and lakes. Aquatic plants in ponds can grow to nuisance levels in a short time if given the extra nutrients. Sources of nutrients may include runoff from feedlots, fertilized fields or lawns, septic tank seepage, and access by cattle. Nutrients will also accumulate naturally as the pond gets older.

Establishing and maintaining a 100 foot or wider buffer strip of grass and trees around the pond's edge will help filter excess nutrients from runoff water. The construction of small silt retention ponds in the watershed will help settle out nutrients before they enter the pond. Localized nutrient inputs from feedlots or other sources may be avoided by tilling or constructing a water diversion terrace below the nutrient source to direct its runoff away from the pond. Fencing livestock from the pond's edge and watering them from a tank below the dam is also a helpful protective measure. The Natural Resources Conservation Service (NRCS) office for your area can provide information on these and other practices.

Pond Renovation

Aquatic plants cannot live without sunlight. The depth to which aquatic plants can grow in a pond or lake is totally dependent on how deep sunlight penetrates. The clearer the water, the deeper plants will grow. Draining a pond and drying the basin might be necessary to remove years of sedimentation and accumulation of black muck. This material is a storehouse for nutrients and seeds. Deepening many of the pond's shallow areas to a depth below where light penetrates (3 to 4 feet) may reduce the severity of plant problems. Usually, this technique requires that the water level be drawn down and the pond bottom be allowed to dry enough to allow access for a bulldozer or backhoe. If you can see the bottom of your pond or lake past a depth of five feet, deepening the edges may be impractical as a means of plant control.

Coontail *(Ceratophyllum demersum)*

Determination of Acre-Feet to Calculate Total Amount of Herbicide Needed

If the acreage of the area to be treated is known, the number of acre-feet can be determined by multiplying the number of acres by the average depth (average depth = 1/3 of the maximum depth). For example: A two-acre area is to be treated and has an average depth of three feet. The volume of the water is six acre-feet.

2 acres x 3 feet (average depth) = 6 acre-feet

If the dosage of herbicide recommended is 2 gallons of herbicide per acre-foot, the total herbicide needed would be 12 gallons.

6 acre-feet x 2 gal/acre-foot =12 gallons (total herbicide needed)

If the number of acres is not known, it can be estimated by measuring the number of square feet and dividing by 43,560. The square feet in many cases can be closely approximated by multiplying the average width in feet by the average length in feet. For example: A shoreline area is to be treated. The weeded area is 500 feet long and averages 10 feet wide. The total surface area is 5,000 square feet or 0.115 acres.

10 feet x 500 feet = 5,000 square feet

$$\frac{\textbf{5,000 square feet}}{\textbf{43,560 (square feet in an acre)}}$$

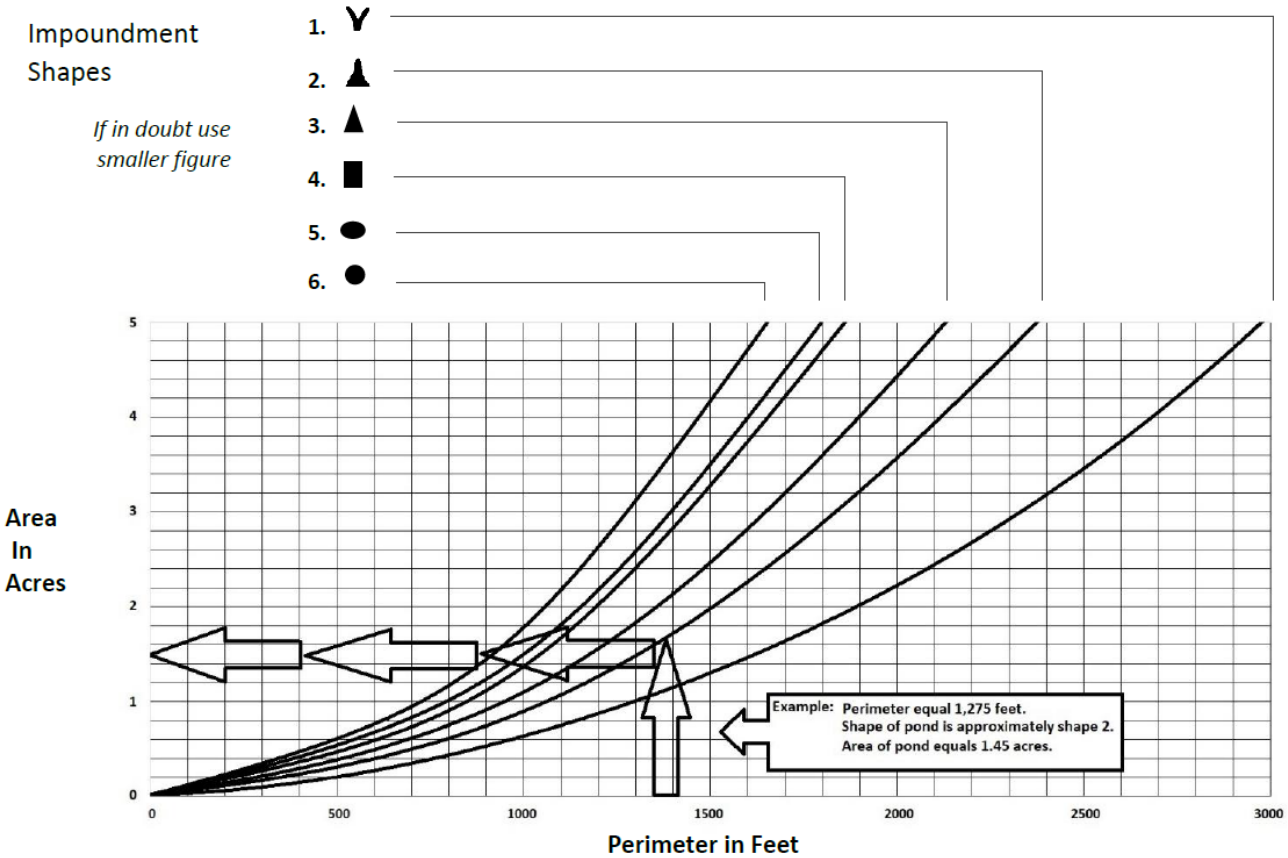
The average depth of water in this shoreline is 1 foot. The total acre-feet is 0.115.

0.115 acres x 1 foot (average depth) = 0.115 acres-feet

If we assume that 4 gal/acre-foot was the recommended dosage, then 0.46 gallons would be needed.

4 gal/acre-foot x 0.115 (acre-feet) = 0.46 gallons (total herbicide needed).

Pond Area Estimator



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