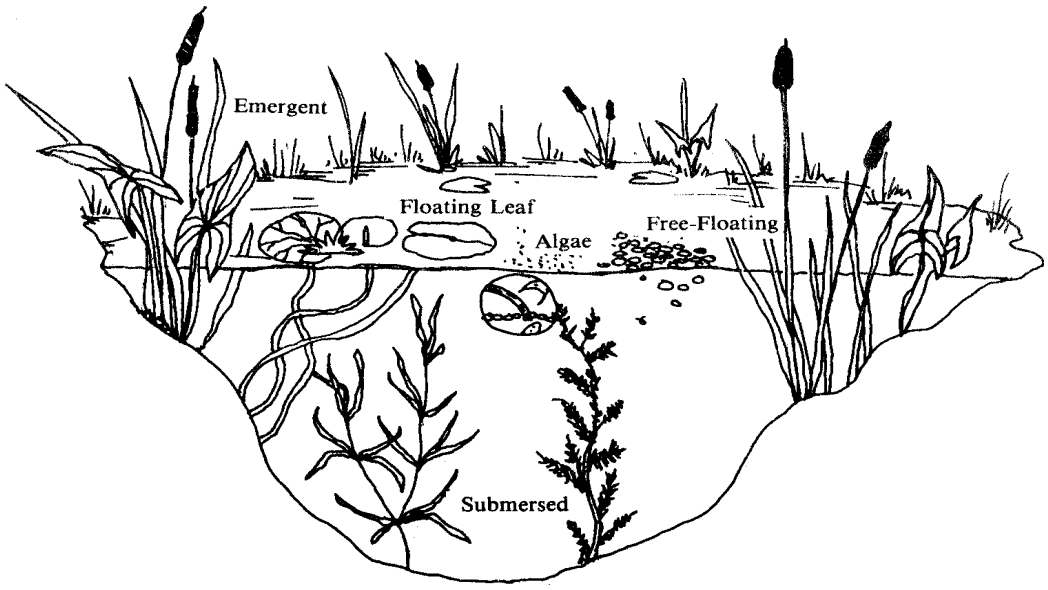
AQUAGUIDE
MISSOURI DEPARTMENT OF CONSERVATION

Submerged Plant Control in Lakes and Ponds



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 under water, 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 in a healthy pond. Refer to our publication "Nuisance Aquatic Plants in Missouri Ponds and Lakes" for more information on the identification of aquatic vegetation and the benefits and drawbacks of having aquatic plants in your pond.

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 not allowing some pond uses, mechanical, biological or chemical control methods should be considered.

MECHANICAL CONTROL

1. 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 a number of places so gasses can escape.

2. BLANKETING

Gravel, sand or clay may be used to "blanket" submerged plants in swimming or fishing areas. Plants 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.

3. WEEDING

Submerged plants can be removed by pulling or raking them out. Although weeding is not a particularly enjoyable task, it may be effective in swimming or fishing areas

4. DEEPENING POND EDGES

Aquatic plants, like all other 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. 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 (a common characteristic of water bodies in the Ozarks), deepening the edges may be impractical as a means of plant control.

5. WATER LEVEL DRAWDOWN

Exposing sediments to prolonged freezing and drying during the months of December, January and February can be very effective in controlling certain aquatic plants, if exposure lasts 2 to 4 weeks. 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, plant roots 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.

6. REMOVING NUTRIENTS

If the pond is old and has become shallow, due to accumulation of black muck on the bottom, it may be necessary to drain, dry and deepen the pond. The black muck is a storehouse of nutrients that fuel the excessive growth of aquatic plants. All excavated material should be removed from the pond's watershed.

7. MINIMIZING NUTRIENT INPUTS

Excess nutrients (nitrogen and phosphorus) should not be allowed to wash into lakes and ponds. Submerged 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 yards, and septic tank seepage. 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.

BIOLOGICAL CONTROL

GRASS CARP (*Ctenopharyngodon idella)*

The grass carp (or white amur) is a plant eating Asian member of the minnow family. Stocked correctly, they can be effective in controlling many submerged plants. See our grass carp Aquaguide.

CHEMICAL CONTROL

DIRECTIONS, RESTRICTIONS AND WARNINGS

ALWAYS READ THE PRODUCT LABEL FOR DIRECTIONS, CURRENT RESTRICTIONS AND WARNINGS. Before using chemicals, you should consider potential contamination of domestic water supplies and the waiting periods for watering livestock, eating fish, swimming and irrigation.

CHEMICAL USE CONSIDERATIONS

1. Aquatic plants must be correctly identified before herbicides can be recommended as different plants require different chemicals for control.
2. Chemicals have the potential of causing a fish kill even though most herbicides will not harm fish. A possible fish kill could result if the entire pond is treated at once. Decaying plants remove dissolved oxygen from the water. Treat no more than one-third of the weeds at 10-day to two-week intervals.
3. Herbicides provide only temporary plant control.
4. Herbicides are usually most effective if applied on young, actively growing plants during the spring when water temperatures are between 65 and 80°F. Study the product label for specific directions.

WHEN TO USE CHEMICALS

1. The pondowner wants to spot treat weeds in a swimming, boat launching or fishing area.
2. Mechanical or biological weed control methods are impractical, either because weeds are too abundant for mechanical control methods or grass carp do not eat the types of plants in the pond.

Currently recommended herbicides for submerged plant control and their suggested retail prices. Though these chemicals have been tested by MDC and have proven reliable other chemicals may be suitable for aquatic weed control.

	AquatholGranular	**Aquathol K**	**Sonar-AS**	**Reward**	**Weedtrine-D**
Coontail (Ceratophyllum spp.)	approved	approved	approved	approved	approved
Elodea (Elodea spp.)	not recommended	not recommended	approved	approved	approved
Naiad (Najas spp.)	approved	approved	approved	approved	approved
Pondweed varieties (Potamogeton spp.)	approved	approved	approved	approved	approved
Water Milfoil varieties (Myriophyllum spp.)	approved	approved	approved	approved	approved
Minimum Quantity Available	40 lb bag	1 gallon	1 pint	1 quart	1 gallon
Price per unit	$105.71	$69.67	$250.00	$122.70	$57.50

Local farm supply stores often carry, or will order, these herbicides. For alternate sources of chemicals, a copy of the product's label, or clarification of this Aquaguide, contact your Fisheries Regional office or visit the MDC web-site at www.conservation.state.mo.us. Other Aquaguides on aquatic weed control are also available.

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revised **RLN 1/99**
FIS 118

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 pond 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 twelve 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 number of 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 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

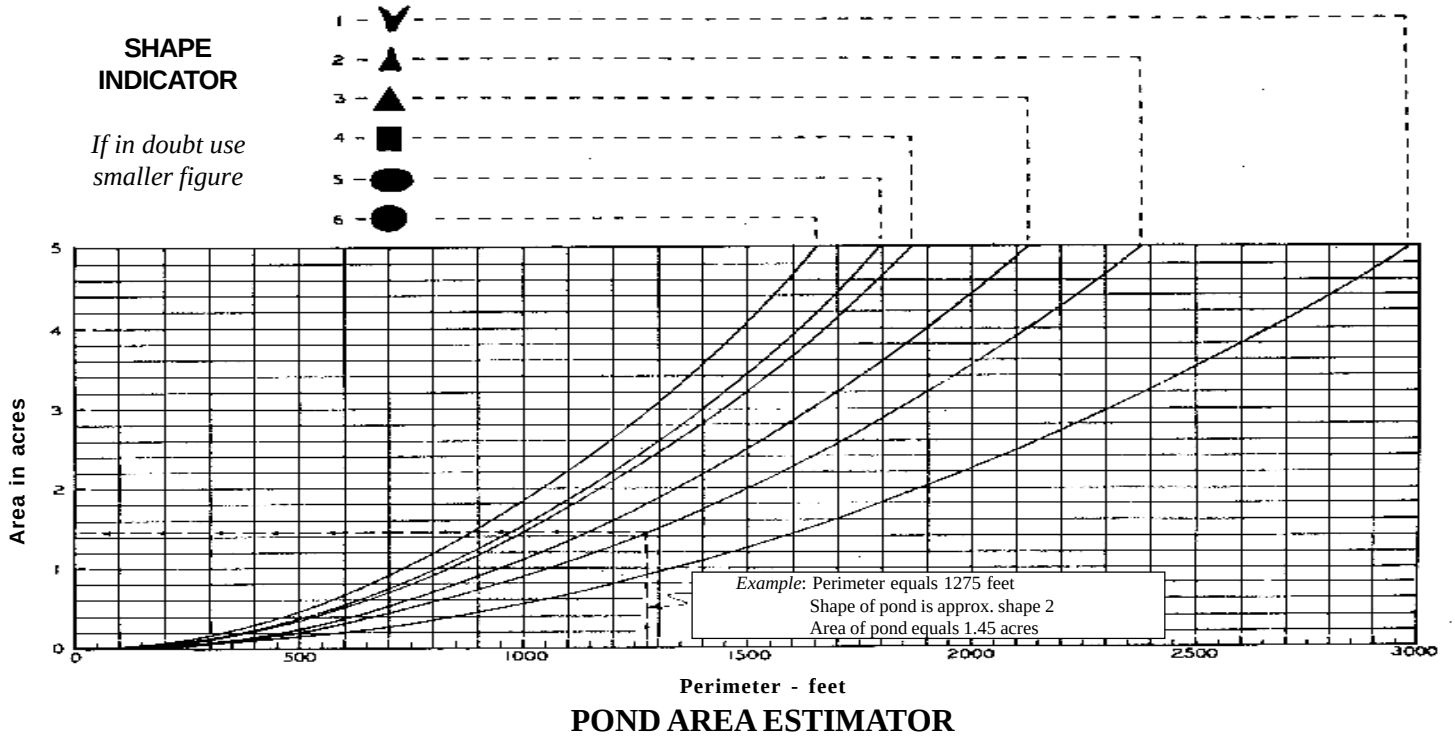
$$\frac{\text{5,000 square feet}}{\text{43,560 (square feet in an acre)}} = 0.115 \text{ acres}$$

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

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

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

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



POND AREA ESTIMATOR