Managing Nuisance Aquatic Plants in Private Ponds

Aquatic plants provide useful habitat for fish, invertebrates, aquatic mammals, and birds. However, too much vegetation in a lake or pond can interfere with boating, fishing, swimming, and other recreational activities. It can also hinder water movement, affect fish populations, and in some cases, reduce water quality. In general, exotic plants are more likely to cause problems than native species, and control measures may be necessary.

Identifying the Problem

For effective control and management, the first step is to identify the plants. Aquatic plants fall into two broad categories—vascular plants and algae.

Vascular aquatic plants have built-in transportation systems for water and nutrients, just as garden plants do. Vascular plants can be further divided into submerged, emergent, floating, and marginal species. Submerged plants are usually attached to the bottom, and most of the plant is underwater. Emergent plants are typically rooted in shallow water with the main body of the plant extending above the surface. Floating species are unrooted and free to drift with wind and current. Marginal species are rooted along the shoreline in heavily saturated soils or shallow water.

Chara, also called muskgrass, is an algae. Photo courtesy of Texas A&M Agrilife Extension AquaPlant website.

Algae include free-floating, single-celled species (phytoplankton) and filamentous species. Phytoplankton are usually beneficial; they form the base of many aquatic food chains. Filamentous algae grow in long strands that may resemble green cotton candy and are often referred to as pond scum or moss. Species such as chara (muskgrass) look like vascular, submerged plants, but are really algae. Chara has a distinctive garlic-like odor when crushed.

Photos, diagrams, and detailed descriptions of aquatic plants can be found in the Pond Manager Diagnostics Tool, provided by the Texas A&M AgriLife Extension Service (http://aquaplant.tamu.edu/). If you still need help identifying plants in a private lake or pond, contact a commercial pond manager or your county Extension agent.

Gaining Control

Management of nuisance aquatic vegetation in public water is regulated under the State Aquatic Vegetation Plan and additional requirements apply. Under these regulations, treatment of aquatic vegetation in creeks on private property, but not in creek impoundments or isolated ponds, would require a treatment proposal be approved by Texas Parks and Wildlife Department. For more information, visit: https://tpwd.texas.gov/landwater/water/environconcerns/nuisance_plants/).

Control options fall into four basic categories—mechanical, environmental, biological, and chemical (i.e., herbicides). Each method has advantages and disadvantages. Factors to consider include effectiveness, cost, availability, ease of application, potential environmental consequences, and whether special permits are required.

Mechanical Control

Draglines, cutters, rakes, booms, mechanical harvesters and bottom barriers are common tools for vegetation management and control. Mechanical controls don't require the introduction of chemicals to the environment, and some people prefer them for that reason. On the other hand, mechanical methods tend to be labor-intensive and costly.

Large floating species such as water hyacinth can be removed by harvesting or shredding. Marginal plants can often be controlled by cutting, especially if cutting starts early in the growing season. Cutting machines may also be used on submerged and emergent vegetation, but regrowth may occur, making it necessary to cut several times in a single growing season. With species like hydrilla, which can grow from fragments, it's important to remove cuttings from the water; otherwise, fragments may take root and grow in areas that were previously uninfested. In small areas, control may be achieved by pulling up young plants in the early spring or raking floating plants from around docks.

Bottom barriers can inhibit the growth of submerged and emergent plant species. Semi-permeable material should be used in order to avoid a buildup of gases underneath the barrier that can lift it off the bottom.

Environmental Control

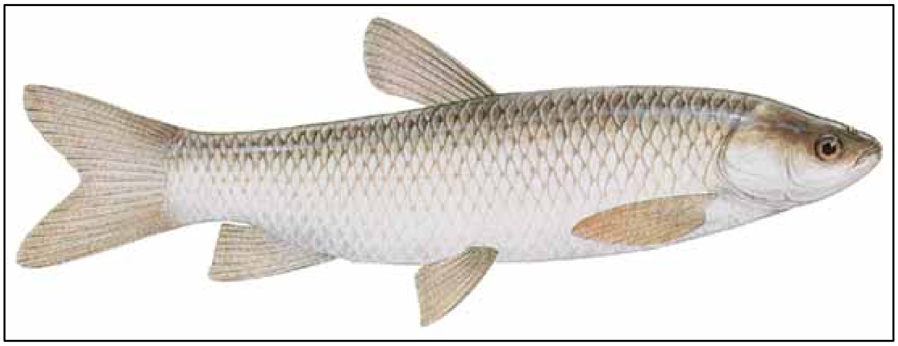
Reshaping the shoreline to eliminate long gradual slopes and reduce the amount of shallow water is one way to reduce shoreline vegetation. Shallow water is especially conducive to plant growth. It warms up first in spring, and sunlight reaches all the way to the bottom, inviting young plants to grow. Lowering the water to allow excess vegetation to dry out or freeze in winter can also be effective. This technique is used in some large, public reservoirs.

Shading is another way to slow plant growth. Plants can't make food without adequate sunlight. Commercially available dyes can be added to the water to inhibit light penetration. This technique should be used early in spring: dyes are less effective when plants are already growing close to the surface.

Fertilizing the pond can also limit light penetration. It stimulates the growth of phytoplankton, which intercept the light rays. Fertilizing has the added advantage of enhancing fish growth. The microscopic algae provide food for many invertebrates, which are eaten in turn by fish. Timing is important, however. Added nutrients can stimulate growth in undesirable plants if the water is allowed to clear, or if plants have grown close to the surface before fertilizer is applied. Therefore, fertilizing should be viewed as an ongoing process. Begin in the spring when water temperatures reach 60°F. Continue as needed to keep underwater visibility at 18 inches or less through the growing season. Stop fertilizing in the fall when the water temperature drops below 70°F. Granular or liquid fertilizers with a high phosphorus content can be used; a 10-34-0 formulation is suggested. Liquid fertilizers are easier to apply and may be up to four times more effective than granular varieties.

Biological Control

Stocking sterile triploid Grass Carp or White Amur (*Ctenopharyngodon idella*) is a popular method of biological control. Young Grass Carp are voracious vegetarians. Under certain conditions, they have been known to eat 50% to 300% of their body weight per day. Feeding rates drop in older fish but remain substantial at 25% per day or more. The Grass Carp's preferred food, hydrilla (*Hydrilla verticillata*) is one of Texas' most problematic submerged plant species. However, these fish will eat nearly anything green, and should be used with the understanding that they could potentially consume all the vegetation in a pond or lake. Because Grass Carp are included on the state list of harmful or potentially harmful exotic species, a permit from TPWD is required for stocking.



How to apply for a permit

Insects have also been used as a biological control to manage some plant species. For example, alligatorweed (*Alternanthera philoxeroides*), can often be controlled by the alligatorweed flea beetle (*Agasicles hygrophila*), which affects only this species. Insects have also been used for control of hydrilla, water hyacinth (*Eichhornia crassipes*), water lettuce (*Pistia stratiotes*), and giant salvinia (*Salvinia molesta*). However, the effectiveness of these biological control insects varies, and they are not widely available for use.

Chemical Control

Farmers have long used herbicides to control weeds in their fields, and there are herbicides that work on aquatic weeds, too. Herbicide is seldom a permanent solution. Many plants have seeds or tubers that are not killed by the chemical and live to sprout another day. However, timing and adjuvants or surfactants can aid in increasing treatment effectiveness. It is also important to select the most effective herbicide for the plants being treated.

Regulatory Requirements

Enforcement of herbicide and pesticide laws is the responsibility of the Texas Department of Agriculture (TDA). Before applying herbicides, read the label carefully and consider checking with a TDA office to ensure compliance with federal and state rules. It is unlawful to apply herbicides in a manner that isn't consistent with the label, such as applying the herbicide at a different rate than what's on the label or to a plant that isn't listed on the label. Even if the active ingredient is the same, it is illegal to use a product/brand that is not registered and approved by the United States Environmental Protection Agency (EPA) for aquatic use to treat aquatic nuisance vegetation.

Use of herbicides containing 2,4-D requires a pesticide applicator's license and additional requirements for these herbicides apply in certain counties under Texas Agriculture Code, Chapter 75 and Special Provisions (Section 11.2). Consult with the Texas Department of Agriculture prior to using any 2,4-D product.

Product specimen labels should be read carefully for water use restrictions, application rates, health and safety precautions, and applicability to the plant species being treated. It is unlawful to apply herbicides in a manner that isn't consistent with the label, such as applying the herbicide at a different rate than what's on the label or to a plant that isn't listed on the label. Improper use of pesticides may endanger people, livestock, and fish and wildlife resources.

Herbicide labels and Safety Data Sheets (SDS) can be found on the National Pesticide Information Center: Label and SDS Databases, which provides a list of searchable databases where you can find product labels and SDS for aquatic herbicides. The CDMS database is also a good source to find these documents.

To report herbicide misuse, call TDA's toll-free Pesticide Hotline at (800) TELL-TDA (800-835-5832).

Enhancing Herbicide Effectiveness

Most herbicides work best when plants are actively growing. They should be applied in the spring after water temperatures reach 60 to 70°F. However, precautions must be taken in warmer months to prevent oxygen depletion. As treated plants decay, the level of dissolved oxygen in the water decreases. If it drops too low, a fish kill can result. To minimize this effect, severe infestations covering more than half the pond should be treated in stages. Treat about a quarter of the pond at one time and wait 10 to 14 days before treating the next section. It is best not to apply herbicides on cloudy days, when oxygen depletion is more likely.

Adjuvants and surfactants are commercially available compounds added to herbicide mixtures that help chemicals disperse more evenly and/or provide better leaf penetration. These additives should be used when recommended on the herbicide label. Adjuvants and surfactants used for aquatic vegetation management must also be brands registered and approved by the EPA for aquatic use.

Helpful Information

Selecting Herbicides

It is important to select the most effective herbicide for the target species. The Pond Manager Diagnostics Tool, provided by the Texas A&M AgriLife Extension Service (http://aquaplant.tamu.edu/), provides helpful information for managing aquatic vegetation and which herbicides may be most effective. The listings provide information on the effective active ingredients, not brand names, and may not include all available aquatic herbicides and formulations. Only those brands registered and approved by the United States Environmental Protection Agency (U.S. EPA) for aquatic use may be legally used to control aquatic vegetation. These herbicide listings do not constitute an endorsement by Texas Parks and Wildlife Department.

When selecting an herbicide, it is important to note that other plant species could be affected. Exercise care when non-target plants are present. Individual products and labels can vary. Follow individual product recommendations to determine effectiveness and application rate and ensure that the product is labeled for the target species. Read and follow all product label recommendations and restrictions—the label is the law!

Estimating the Size of Your Pond

For some methods of vegetation control, you'll need to determine the surface acreage and/or the volume of water in your pond. This information will help:

Basic Terms and Conversion Factors

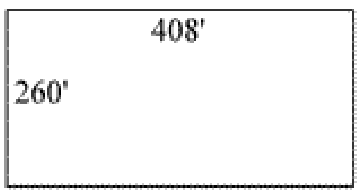
1 acre = 43,560 square feet

1 acre-foot = 1 surface acre 1 foot deep, or 43,560 cubic feet

Total volume in acre-feet = surface area (acres) x average depth (feet)

1 part per million (ppm) of herbicide = 2.7 pounds per acre-foot of water

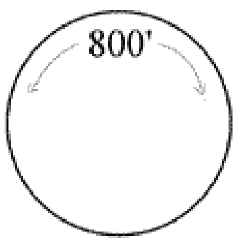
Calculating Surface Acreage



If the pond is rectangular, multiply length by width and divide by 43,560 (the number of square feet in one acre). If the length is 408 feet and the width is 260 feet, the equation would be:

260 feet x 408 feet = 106,080 square feet

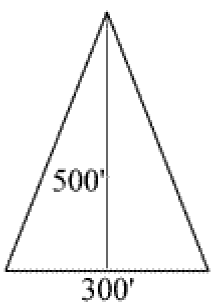
106,080 square feet / 43,560 square feet per acre = 2.44 surface acres



If the pond is circular, the distance circumference of the pond (distance around the shoreline) should be measured in feet. That number should be multiplied by itself and then divided by 547,390. If the pond's circumference is 800 feet, the equation would be:

800 feet x 800 feet = 640,000 square feet

640,000 square feet / 547,390 = 1.17 acres



If the pond is triangular, the base and the height should be measured. Multiply those two numbers, take half of the resulting amount, and divide by 43,560. If the triangle is 300 feet at the base and 500 feet high, the equation would be:

(300 feet x 500 feet) / 2 = 75,000 square feet

75,000 square feet / 43,560 square feet per acre = 1.72 acres

Calculating Average Depth

Make a series of soundings by dropping a weighted line to the bottom in straight rows across the pond 30 to 50 feet apart. Add the depth measurements together and divide by the number of soundings. Begin and end each row with the zero measurement at the shoreline and include these in the total number of soundings made.