Controlling Pond Vegetation

Aquatic Vegetation

Aquatic vegetation is an integral part of the environment within small ponds. Microscopic aquatic plants form the base of the chain and provide dissolved oxygen through photosynthesis. Larger aquatic plants (macrophytes) serve as habitat for aquatic insects and provide cover for small fish. Low to moderate amounts of vegetation (up to 15 to 20 percent coverage) are desirable in a pond. However, extensive growths of aquatic vegetation can cause problems and corrective measures are required. Many Oklahoma ponds and small lakes have been constructed improperly for fish management. These impoundments often have extensive, flat, shallow areas which provide favorable conditions for excessive growth of aquatic vegetation.

Such growth hinders fishing success and usually affords too much protection for small fish. Stunted and imbalanced fish populations are usually associated with excessive aquatic vegetation.

Aquatic weed control, therefore, is an important aspect of fish pond management. Vegetation controls can be placed in three main categories - mechanical, biological, and chemical. Each method has some merit, and one or more may be used in any pond depeding upon kinds of vegetation and water usage.

Mechanical Control

Cutting or pulling plants is sometimes effective, but is usually limited to the shoreline or shallow water species when stand are not to dense.

The most effective control is eliminating shallow areas. Ponds should be drained, the basin reshaped to include no areas less than three feet deep, and the entire shoreline should be graded to a 3:1 slope. Initially, this method is the most expensive, but normally has long lasting effectiveness. Once the proper grade has been established, cattle access should be restricted to protect the slopes. Consult your local Soil Conservation Service office for technical advice about renovating an old fish pond or building a new one.

Biological Control

Aquatic plants can be effectively controlled by adding inorganic fertilizers to the pond water. Fertilizers produce a green phytoplankton “bloom” which shades or decreases light penetration. Higher forms of aquatic life cannot grow without adequate light.

However, this method is labor intensive and may cause severe water quality problems. Improper application of fertilizer can deplete oxygen and cause a fish kill. If fertilization program is being considered, contact personnel with the Department of Wildlife Conservation or Soil Conservation Service to discuss the program in detail.

Perhaps the most effective biological control for aquatic vegetation of fish ponds is stocking grass carp (or white amur). This fish is native to large rivers of Eastern Asia and was brought to the United States in 1963. It has been proven effective for controlling most kinds of submerged vegetation found in Oklahoma ponds.

For general weed control, stock 10 grass carp per vegetated acre. For heavy infestations, 20 fish per acre may be required to obtain effective control. The fish should be at least eight inches long when stocked to minimize predation by adult bass. Grass carp generally will not provide effective control until they reach approximately three pounds. Therefore,

a noticeable reduction in the amount of vegetation should not be expected until the year after stocking. If, after three years, satisfactory control is not achieved, more fish need to be added. Grass carp will not reproduce in ponds. Therefore, periodic restocking (every four to five years) may be necessary to compensate for natural mortality.
Grass carp are available only from private commercial fish producers. A list of fish producers is available from the Department of Wildlife Conservation.
Grass carp readily leave ponds during periods of spillway overflow following heavy rains. Fish that escape will no longer control vegetation in a pond, and they may possibly damage habitat in downstream reservoirs and river systems. Therefore, a spillway barrier design includes horizontal bars or pipes spaced one inch apart which are attached to vertical posts adequately secured in the mouth of the spillway. The horizontal design allows leaves, twigs, and debris to pass through without clogging the barrier.

Chemical Control
Herbicides kill aquatic plants through systemic action (hormones) or upon contract. Currently there are no known chemical which can offer more than temporary control of aquatic plants. The degree and length of time chemicals will hold plants in check is highly variable. Sometimes sufficient control can be obtained with one treatment in early spring, but usually a second or third treatment in mid-summer and fall is necessary.
Before a chemical is applied, aquatic plants must be identified (group or category) and the volume of water to be treated calculated. These produces are important for selecting the correct herbicide and the appropriate amount to safely apply without killing fish.
Application rate is usually given in gallons or pounds of chemical per acre-foot of water. An acre-foot is a volume measurement equaling the area of one acre to a depth of one foot. One acre-foot of water equals 43,560 cubic feet, 326,000 gallons or 2,718,000 pounds.
Acre-feet are computed my multiplying the area (in acres) by the average depth (in feet). A one-acre pond with an average depth of three feet, therefore contain three acre-feet of water. Average depth can be determined by averaging several depth soundings.
Common aquatic plants grow excessively in Oklahoma can be grouped into four categories according to their physical characteristics. These are:

Algae
Planktonic algae bloom occasionally become extremely dense and oxygen may become deplete. Spot treatments with an algaecide will reduce phytoplankton densities and help prevent oxygen depletion which could result in a fish kill.
When phytoplankton blooms do not allow light penetration beyond eight to 10 inches, low dissolved oxygen levels often occur.
Filamentous algae is usually in strands or threads of cells. They usually grow on the pond bottom but often float to the surface where they form scums or floating mats of hairlike strands. Chara and Nitella are algae that grow upward from the pond bottom in a plant form which resembles some submerged plants. They are both distinguished by a characteristic musty odor and a rough or scaly feeling to the touch when growing in limestone waters. These plants are very common and widely distributed.
Filamentous and planktonic algae can usually can be controlled with 0.6 gal/acre ft. of Cutrine-Plus. It can be diluted to 9:1 with water. It is toxic to sheep.

Chara and Nitella can be controlled with Cutrine-Plus in the liquid form can be used at a rate of 1.2 gallons per acre foot. Dilute 9:1 with water. Cutrine-Plus granular is excellent at a rate of 60 pounds per surface are. Both are toxic to sheep.
Before using any chemicals be sure to read the label carefully and follow the recommendations. If you do not understand the restrictions and recommendations, contact the manufacturer directly. Application of herbicides may require certification from the State Department of Agriculture. Call 405-521-3836 for details.

Submerged Plants
Pondweeds, coontail, milfoil, Najas
Submerged plants grow mostly below the surface and are supported by the water. All are attached to the bottom and frequently form dense growth that reaches the surface. Several chemicals have been found effective for most species of this group.
Plants in this group can be controlled with with varoius herbicides.
Watermilfoil can best be controlled with granular 2, 4-D applied at 100 pounds per surface acre or granular Aquathol K applied at 81 pounds per acre foot.
Pondweeds can best be controlled with granular Aquathol K at a rate of 27-54 pounds per acre foot or liquid Aquathol K at a rate of 0.6-1.3 gallon per acre foot.
Najas is best controlled with
Diquat (1:1-ethylene-2:2-bipyridylium dibromide) which also gives good control of most species of this group when used at a rate of 1 gallon per surface acre. Aquathol K in the liquid form can also be applied at a rate of 0.3-1.0 gallon per acre foot or in the granular form at a rate of 80 pounds per acre foot.
Coontail can best be controlled with Diquat at a rate of 2.0 gallons per surface acre, Aquathol K in the liquid form at a rate of 0.6-1.3 gallons per acre foot, or Aquathol K in the granular form at a rate of 54 pounds per acre foot.

Floating leaf plants
Water lilies, duckweed
These are either rooted or non-rooted and float on the surface of the water.
Water lilies are best controlled with 2,4-D (38.9% ae liquid) at a rate of 8 oz in 5 gallons water sprayed on plants or 2-4 pts per acre. Use a polymeric thickener. Rodeo and Pondmaster are not effective on water lilies.

Duckeed can be controlled with Diquat at a rate of 5 oz in 2-6 gallon water sprayed on plants. 2,4-D can be used on duckweed at a rate of 2-4 pints per acre.

Emergent plants
Cattails, smartweeds, bulrushes
Emergent plants grow mostly above the surface and are self-supporting. These plants are less frequently a nuisance. However, in older
ponds they tend to spread and occupy excessive shoreline areas.
Best herbicide results are achieved when plants at least 3 feet tall and actively growing before spikes form.
Cattails can be controlled with Rodeo (53.8% glyphosate). Apply at a rate of 4.5-6.0 pt Rodeo plus surfactant in 3-30 gallons water per surface area. The hand rate is 1 oz Rodeo

plus surfactant per gallon water per surface arce. Best results are achieved in summer or fall when actively growing and at or beyond the early to full bloom stage.
Smartweeds can be controlled with 2,4-D (38.9% ae liquid) at a rate of 2-4 pts per surface area. Use a polmeric thickener.
Chemical control of aquatic plants should be used only when other forms of control prove unsatisfactory. The long-term effects of these chemicals on aquatic environments are still unknown.
However, with proper care and handling none of these chemicals are considered dangerous to fish or other wildlife. Proper protective apparel especially for the hands, eyes and nose, are recommended for persons applying chemicals.

For bulrush:
Mix 2 ounces of 2,4-D (38.9% ae liquid) in one gallon of water. Use polymeric thickner.
or
Mix 100 pound per surface are of 2,4-D granular. Spray directly on plant.
or
Apply Rodeo (53.8% glyphosate) at a rate of 4.5-7.5 pts per purface acre.

For water primrose and smartweed:
Mix two ounces of 2,4-D (38.9%) liquid in one gallon of water. Spray on foliage. Use polymeric thickner.
or
2,4-D granular 100 pounds per acre of plant.
or
Rodeo (53.8% glyphosate) at a rate of 1-1.3 oz plus surfactant per gallon water. Spray on plants.

For water willow:
Mix two ounces of 2,4-D liquid in one gallon of water. Spray on foliage. Use polymeric thickner.
or
2,4-D granular 20 pound per acre.

For More information

Below is a list of sources for more information on controlling pond vegetation as well as other pond management species.

Managing Pond Fisheries in Oklahoma, Oklahoma Department of Wildlife Conservation, 1801 N. Lincoln, Oklahoma City, OK, 73105. $3.00

Cooperative Extension Service, Div. of Agriculture, Oklahoma State university. Contact the Area Aquaculture Specialist, S.E. District, P.O. Box 1378, Ada, OK 74820, 405-332-4100

Fish Division Field Offices

Northwest Region: 580-474-2663, State Fish Hatchery, Rt. 1, Box 535, Bryon, OK 73723

Northcentral Region: 580-762-2248
417 S. Silverdale Lane; Ponca City, 74604-7315

Northeast Region:
918-683-103; Rt. 1, Box 75-B; Porter, 74454-9801

Central Region: Holdenville Hatchery: 405-379-5408; Rt. 3, Box 45; Holdenville, 74848-9517

Southcentral & Southeast Region:
580-924-4087; Rt. 1, Box 188; Caddo, 74729-9749

Southwest Regions: J. A. Manning Hatchery:580-529-2795
HC 32, Box 580; Lawton, 73501-9037

Oklahoma Fishery Research Laboratory: 405-325-7288, 500 E. Constellation, Norman, OK 73072

ODWC Fish Division
405-521-3721