

Control of Aquatic Plants: Physical Methods

The most important aspect is in **industry** where aquatic plants get to be a problem in the intakes into power plants and factories. Another big problem area is in **agriculture**, especially irrigation. The plants plug up irrigation ditches causing uneven water flow, etc (this has been a big problem in AZ in the past 50 years). The third big area is in **recreation** such as fishing, boating, swimming, and sailing. There is a lot of money spent on weed control in these areas. Part of the problem with control is that you are going against the natural aging process of the lake.

Reverse natural processes: 1) aging process, 2) excess nutrients from erosion and pollution

Look At The Problem

- 1) Determine the water use: Why do you want to control this water? For what purpose? It is often not necessary to have total elimination.
- 2) Safety of the method(s) going to be used: -safety of the applicator, water users, and the environment
- 3) How effective and for how long is this control method?
 - A) % removal
 - B) Time to do the work (application itself and the time it takes to become effective)
 - C) Longevity
 - D) Cost-benefit analysis
 - E) Side Effects: What other impacts will you have on wildlife, the environment, and people? Erosion and water storage capacity (control usually affects these two things greatly).

Biological controls (Biocontrols)

- 1) ducks and geese eat all of the aquatic weeds
- 2) Tilapia (a fish) - eats the macrophytic growth
- 3) *Ctenopharyngodon idella* (grass carp fish) - most effective method, most common today
 - required to use a triploid grass carp (essentially sterile)
 - can be very expensive: \$10 to \$15 per fish, but they live for 7 to 15 years and eat half their body weight per day. Need about 10-25 fish per acre.
- 4) Aquatic insects - Weevils, beetles (good for emergents)
- 5) Snails - can decimate submerged plants (CAP trial)

Chemical: Aquatic Herbicides- Used in agriculture, water systems, and lakes.

List of approved herbicides for control of algae and aquatic plants:

1. Copper Sulfate and Chelated Copper - Cutrine, Cutrine Plus and Clearigate are commercial brands, this is the oldest chemical method. Chelated means that the copper is bound to an organic molecule, this changes the solubility and alkalinity of the chemical.

Control by chemical methods is very dependent on the waters alkalinity. Copper Sulfate is the best control for algae.

2. 2-4-D - good for the removal of emergent plants such as rushes. This chemical has variable removal days.
3. Diquat - Reward is a brand name. Diquat is good for the removal of algae, floating weeds, and submerged plants. 14 removal days are needed.
4. Endothall - an organic acid used for the removal of algae and submerged plants. Common brand names are Hydrothol and Aquathol. 7-25 removal days are needed. This was a form of control used by SRP in their canal systems.
5. Fluridone - this herbicide is slow acting, it is picked up by the roots and translocated into plants. A brand name is Sonar which is good for the removal of floating weeds, emergents, and submergents. 0 days are needed for drinking, but 30 for irrigation.
6. Simazine - a long lasting herbicide for algae and floating weeds. Aquazine is a brand that is okay for fish consumption, and has a removal period of 365 days.
7. Glyphosate - Rodeo is a brand that is good for the removal of emergents and has 0 removal days.

It is important to always read the label, and follow directions exactly. The EPA sets the standards for removal days and application rates. Removal days apply to swimming, drinking, irrigating, and animal usage. Do not use compounds that are not labeled for aquatic use even if active ingredient is same for land labeled product. Flowing water is much harder to treat. It is best to apply herbicides in the spring, this is when the water is cooler and plants are smaller. Three types of application are discussed, surface acre treatment, acre-foot, and part per million. It is also suggested to treat in quarters to test the chemicals effect. An applicators license may be needed. It is good to try management control first, for example dry down to keep plants from the edges of a lake, and then go in and treat spots in the middle with chemicals.

Physical Methods

- 1) Removal - by hand, rakes, cutting, digging
 - lots of equipment to do this with (special shovels, chains, hooks, etc)
 - good for a small area, but it is hard work
 - problems with rhizomes, tubers and seeds left behind
 - if you pay someone to do it, it can get expensive
- 2) Mechanical - underwater mowers, backhoes, dredges (like for shipping channels)
 - even more expensive but can do bigger areas
 - problem with this: backhoes and dredges tear up the substrate destroying benthic communities and can also release even more nutrients and pollutants that were buried in the soil.

-creates negative wildlife impacts: negative effects on benthic fauna, disrupts spawning
- disposal problem with wet material (maybe used for animal feed, mulch, soil conditioner)

3) Habitat Modification

a) Line or cover the bottom when pond or lake is new, especially if it is a constructed wetland or reservoir. Maybe expensive at first, but over the long run is the cheapest. Can be made with plastic, concrete, or soilcrete, or by dumping sand or gravel on the bottom to cover up the plants.

b) Shading - (often done on smaller bodies of water) plastic sheets or floating covers. People have tried plastic film canisters, soluble dyes, overhanging trees, and swimming rafts

c) Draw down or drying period- dry out shallow areas and kill the plants there. This is done in irrigation systems, farm ponds, recreational lakes, etc.

d) Flood or fill up the water body - kills emergent plants

e) Flushing - knocks loose plants, blast water through. Works well in irrigation ditches.

f) Dredging (from shore or boat) - has a lot of negative impacts. What do you do with the stuff you dredge up?

g) Fertilize water - algae bloom will compete with other aquatic plants, plants will die, and then the algae will die off

h) Weed net screens

4) Management (mostly Watershed Management)

a) don't fertilize slopes of the water body, grassy yards, golf courses

b) maintain septic tanks, reduce nutrient flows

c) prevent dumping or blowing of fireplace ashes, leaves, grass clippings, and other organic matter

d) planting buffer strips - one of the very best things you can do, traps nutrients, shades surface

e) rock lining edges (rip rap) - organic matter gets trapped here instead of going out to the water, reduces runoff and erosion

f) fencing out livestock - keeping waste out as well as animals

g) stop overfeeding fish