

Solutions to Common Issues with Retention Ponds

Problem: Algae

Growth of excessive algae is caused by excess nutrients being washed into the pond. Algae can cause unpleasant odors, use up oxygen in the water leading to fish kills, and be generally unsightly.



Solutions:

In most cases, growth of more desirable aquatic and semi-aquatic vegetation in and around the pond will help to utilize nutrients in the pond, thus deterring the growth of algae and other nuisance vegetation. Algae blooms can be removed with a rake, seine, screen or other tool. Adding an aerator and filter fish such as Tilapia, or applications of algaecides can help reduce planktonic algae. Chemical treatments require a professional with the appropriate licensing. A mistake in dosage can be toxic to fish and can have serious impacts downstream. Oxygen depletion and fish kills are distinct hazards when treating large infestations of nuisance vegetation. Furthermore, chemical control is usually temporary and, at best, merely treats the symptoms. Maintenance efforts that emphasize chemical treatments year after year are expensive and can perpetuate nuisance algae and vegetation problems.

Bioaugmentation involves the addition of a special blend of naturally occurring bacteria to the pond or lake. These bacteria compete with algae for nutrients, digest dead organic matter throughout the water column and sludge layer, and eliminate pond odor caused by ammonia and hydrogen sulfide. If considering bioaugmentation, consult a professional. The effectiveness of any bioaugmentation product is greatly enhanced with the use of an aerator.

Problem: Nuisance plants

Aquatic plants growing in ponds and lakes are beneficial for fish and wildlife. They provide food, dissolved oxygen, and spawning and nesting habitat for fish and waterfowl. Aquatic plants can trap excessive nutrients and detoxify chemicals. Aquatic wildflowers such as the water lily are sold and planted to provide floral beauty to garden ponds.

However, dense growths (over 25% of the surface area) of algae and other water plants can seriously interfere with pond recreation and threaten aquatic life. Water plants can restrict swimming, boating, fishing, and other water sports. Water plants can impart unpleasant taste (musty flavor), decaying vegetation emits offensive odors (rotten egg smell), and algae can discolor pond waters. Dense growths of plants can cause night time oxygen depletion and fish kills. Green plants produce oxygen in sunlight, but they consume oxygen at night. Decomposing water weeds can deplete the oxygen supply, resulting in sport fish kills from suffocation. Dense plant growths can provide too much cover, preventing predation, and leading to stunted (small-sized) sport fish populations.

Many pond plants grow aggressively, crowding out beneficial plants and impeding water flow. The main problem plants in this area are:

Submersed: pondweed (curly-leaf and slender), Southern naiad, Egeria, Canadian elodea, Eurasian watermilfoil

Floating: duckweed, water meal, Salvinia, Azolla, watershield, spatterdock/cow lily, water lily

Shoreline: alligatorweed, phragmites, smartweed, parrot feather, cattail



Solutions:

Prevention is the best way to reduce aquatic plant problems. It is cheaper and easier to prevent weed growth than to control weeds in your pond. Soil erosion and fertilizer runoff (including livestock wastes) are the two major causes of water weeds.

Selection of the best treatment or combination of treatments depends on the species of water plant, the extent of the problem, economic considerations, local environmental conditions, and pond uses. First, be sure that you have an aquatic plant problem. Some aquatic plant growths are minor and temporary, and do not require costly weed control actions, thereby saving you worry, time, and money. If aquatic plants cover more than 25% of the pond surface area, you should consider implementing weed control. Second, different types of weeds (algae, floating-leaf weeds, emergent weeds, and submersed weeds) require different treatments.

Aquatic Plant Control Methods

- Dredge and deepen the pond
- Harvest (manual or mechanical removal) weeds
- Manipulate water levels
- Shade, dye
- Install pond bottom liners
- Use biological controls (Check with your county Extension Agent before introducing animals or plants into your pond. Please note that the release of exotic (non-native) animals or plants into Virginia and other states without specific authorization is strictly forbidden by law.)

Use chemical controls. Herbicides (plant poisons) are commonly used to manage land and water plants. Herbicides are relatively easy to apply and may be the only practical method of control in some situations. However, the treatment of weed-infested waters with herbicides must be used with caution. Herbicides can be toxic to fish and other aquatic life. Herbicide treatment can be costly, and may provide only short-term relief from the real problem, usually fertile waters. The five types of herbicides most commonly used in ponds

(Solutions continued)

and lakes include chelated copper, fluridone, glyphosate, 2, 4-D and diquat. Caution must be taken to apply the right herbicide at the correct time, at the correct rate, and in accordance with label instructions.

Chemicals that kill nuisance waterweeds may also kill beneficial water weeds and fish, disrupt aquatic food chains, or have other undesirable side effects. The user is responsible for the downstream effects of herbicide treatments on water supplies, fish, and other aquatic life. Always read and follow the label instructions carefully. Aquatic plant treatments can be complex. Professional aquatic herbicide applicators can be employed to treat pond weed problems.



Phragmites

Problem: Bank Erosion

It is very important to prevent erosion of the visible banks of retention ponds. Areas of bare soil will erode quickly, clogging the basin with soil and threatening its integrity. The roots of woody growth, such as young trees and shrubs, can also destabilize embankments.



Solutions:

The easiest way to prevent erosion is to keep groundcover healthy. Consistent maintenance can control any stray seedlings that take root in an embankment. Woody growth away from the embankment does not generally pose a threat to the stability of the embankment and can play an important role in the health of the vegetative environment. Any bare areas should be re-seeded and stabilized as quickly as possible. For ease of maintenance, trees and shrubs should be planted outside maintenance and access areas.

Coir logs can also be installed to support an eroded bank.



Problem: Mosquitoes

Retention ponds may provide habitat for mosquitoes unless biological or physical controls are developed.



Solutions:

The most effective control technique in retention basins is to prevent stagnant areas. Prompt removal of floating debris helps. In larger basins, it may also be possible to maintain stocks of fish that feed upon mosquito larvae. The wave action created by surface aerators increases oxygen levels and also discourages mosquito breeding.

Problem: Waterfowl

Large aggregations of waterfowl cause significant damage to stormwater ponds. Large groups of ducks, geese, and swans can:

- erode shorelines by trampling and feeding on shoreline plants
- destroy lawns and gardens
- introduce invasive weeds that are stuck to their feathers and carried in their digestive tracts
- deposit large volumes of feces (excrement) that increase algae and weed growth and introduce disease-causing pathogens into the water that threaten the health of residents, pets, and the birds themselves
- make water muddy and cloudy as they sift through the mud for invertebrates and uproot vegetation
- become aggressive with children and pets
- create unsightly conditions when they molt, leaving feces and feathers in yards, on porches and on driveways and roads

Solutions:

The primary reason waterfowl aggregate in stormwater ponds is that their diet is being supplemented by humans. Before any other strategy can be employed, a community that is trying to reduce waterfowl numbers *MUST* curtail all feeding of birds; otherwise, other efforts will be futile.

DETERRENTS: There are numerous products on the market that will upset the behavior of waterfowl and encourage them to move elsewhere. These include decoys of predators and dead birds, noise making devices, motion sensing sprinklers, flashing lights, trip wires, chemical repellents, and more.



Problem: Muskrats and Nutria

Animal burrows will deteriorate the structural integrity of an embankment. Muskrats and nutria, in particular, will burrow tunnels up to six inches in diameter. Existing burrows should be filled as soon as possible.



Solutions:

Muskrats aren't particularly bright animals in terms of avoiding traps, so both live traps and lethal traps can be used very successfully. In terms of the cage traps, these will usually be placed in the shallow parts of your pond or even on the shore of the pond. Some of the lethal traps can actually be placed over the underwater entrance to the burrow, which will then be almost certain to kill the first one to hit the trap. Trapping is the most effective method for controlling muskrats that are causing damage. To be most effective, traps should be placed at underwater entrances that lead to all active bank dens. In terms of baiting your traps, most people will have some success using almost any vegetables, but particularly parsnips and carrots, along with sweet apples and oil of anise.

One- or two-inch galvanized wire placed along the water's edge will discourage muskrats from burrowing.

One of the best things that can be done is to change the pond itself, as muskrats are particularly attracted to bodies of water which are at least six feet deep and have relatively steep banks which can be used to burrow into. A gentle slope into the pond rather than a steep slope will make it very difficult for the muskrat to burrow, which is usually the simplest way of changing a pond to repel muskrats.

Problem: Litter

Regular removal of debris and litter reduces the chance of clogging in outlet structures, trash racks and other components, prevents possible damage to vegetated areas, reduces potential mosquito breeding habitats, maintains facility appearance, and reduces conditions for excessive surface algae.



Problem: Excess Sediment

Retention ponds are designed to hold a certain volume of stormwater runoff, depending on a number of factors. Over time, depending on how well the pond is managed, grass clippings, leaves, and soil become sediment, which accumulates on the pond bottom. Sediment reduces the pond's storage and outflow capacity and can resuspend from the bottom, degrading water quality. For these reasons, sediment will eventually need to be removed.



Solutions:

Sediment removal, also known as dredging, removes the layer of highly enriched materials from the lake's bottom, which helps lower nutrient concentrations in the lake, thus decreasing nuisance algae blooms and improving storage and outflow capacity. Since dredging is usually the largest single cost of retention pond maintenance, it is best to plan ahead to allow for contractual negotiations, as well as adequate funding. Sediment removal should be considered every 5 –15 years for retention ponds.

Proactive measures, such as aquascaping and aeration, can prevent the need to dredge altogether.

Aquascaping is simply landscaping the shoreline of ponds and lakes with aquatic and wetland plants. Ponds and lakes with a landscape design have fewer problems than those without. Vegetation filters polluted runoff and traps sediments. Aquatic plants pump oxygen into the water and create habitats by providing cover and nurseries for fish and other organisms. More importantly, vegetated shorelines help improve water quality.

Aeration is a cost-effective method of enhancing water quality and provides an environmentally friendly alternative to chemical use. Aeration stimulates natural processes that improve water quality. Aeration also keeps dissolved oxygen levels high, which can help prevent fish kills in the summer. By raising oxygen levels, aeration also stimulates aerobic bacteria, which are important for stormwater BMPs, as they digest excess nutrients. Aeration is a science, so when considering an aeration system for your pond or lake, consult an expert. Look for companies that specialize in lake management and aeration. Remember that fountains are NOT aerators. A fountain is a decorative water feature that does not improve water quality. Fountains have no impact on water quality because they use a low volume of water at high pressure. Aerators use a high volume of water at low pressure to circulate water throughout the lake, rather than simply spraying the water into the air.