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Considerations for Pond and Lake Management

Lakes start to age as soon as they are filled with water. The accumulation of rich organic bottom materials feed the weed and algae growth. The fertile run off and sediments in your watershed end up in your lake. There are several things that can be done to reduce this problem. The goal is to achieve biological or natural control of weed growth and depth loss but sometimes this alone is not enough. Herbicides only add to the problem in the long run and should be relied on for short term or temporary control *only*, because the weeds decay on the bottom and add to the fertilizer that feeds the next crop of weeds and algae. Eventually something must be done to reverse the build up of these bottom materials and other sediments or the entire lake can be reduced to a swamp over many many decades. The organic bottom deposits rob the water of valuable oxygen that fish and other organisms need for health and growth.

Some things that can be done to reduce organic build up and revitalize a pond or lake

1. **Fluctuate the water level** (aerates bottom sediments)
2. **A drain that takes water from the bottom and doubles as a siphon to lower and hold down the water level** (aerates bottom sediments)
3. **Mechanical aeration** (aerates bottom sediments)
4. **Adding bacterial agents that digest organic material** (speeds digestion of bottom sediment)
5. **Stocking weed eating fish** (organic weed control)
6. **Darkening the water by natural or chemical means to reduce light penetration that stimulates weed growth** (organic weed control)

Water level control

Water level control is the single most *effective, efficient, and economical* method of lake management. When water covers a piece of ground, air is cut off from it. The amount

of dissolved oxygen in the water is a tiny fraction of the amount of oxygen in the air (1/17500). Organic materials that enter the water cannot be digested as quickly due to this oxygen starvation. What happens over time is that the bottom of your pond builds up a layer of black smelly material very much like the sludge in a septic tank. When the water level is dropped, it exposes some of this material to the air, sun, and freezing. This allows the material to break down much faster in the air, while drying and freezing kills many of the rooted aquatic weeds. The organic bottom material is what supports the weed and algae growth that causes so much trouble in ponds and lakes. The water level should be dropped to expose as much of the bottom area as practical from October through February. Enough water needs to be left to maintain the fish population through the winter (three or four feet with aeration). The organic material in the remaining pool will continue to decay under the ice and can cause oxygen depletion and a fish kill when heavy snow covers the ice and cuts off light penetration, if aeration is not provided and there is not enough water flow to bring in fresh (aerated) water.

Lowering the water level protects shorelines and emergent structures from ice damage.

Lowering the water level improves fish populations; while the water is down, the fish are pooled together allowing predators to control the smaller fish that have eluded them in shoreline vegetation. This reduces their numbers and prevents overpopulation, while providing more food for the fish that remain. The result is a better balanced and larger individual size fish population.

Lowering the water level discourages muskrats and beaver by exposing their burrows and forces them to move.

Lowering the water provides more productive habitat when the exposed bottom materials are reflooded. The reduced organic material stimulates plankton growth that is the foundation of the fish food chain.

Drain water from the bottom of the pond

It is unfortunate that most ponds were built without any means of lowering the water. [The bottom intake siphon](#)

drain was designed to accomplish this. It removes the low oxygen water first, allowing aerated water to reach the bottom sediments. By reducing dead water areas in lower levels of a pond or lake, more suitable habitat for fish and other aquatic life becomes available. The bottom drain is most effective in ponds and lakes where there is some water flow most of the time. The bottom intake siphon drain takes water from the deepest area of a pond or lake. This water has usually has the lowest oxygen content and in older lakes it is unable to support life. An overflow that takes surface water is actually removing the best, life supporting water from the lake. We design siphon and bottom drains for ponds and lakes that were constructed without any means of controlling the water level. These drains are constructed so that they can be installed with a minimum of excavation, and without draining the lake.

Mechanical Aeration

Mechanical aeration is the single most efficient method of reversing pond and lake aging next to the two previous methods. As ponds and lakes age they fill up with organic bottom sediments from any source that happen to be in the watershed. This material includes fecal wastes, leaves, grass, manufactured fertilizers, etc. Aeration accelerates the decomposition of all of these materials. Aeration increases the dissolved oxygen in the water. This is beneficial in that it speeds the digestion of organic deposits (black, smelly, bottom material) that all lakes accumulate. Aeration reduces weeds and algae growth by providing oxygen to digest the fertile material that they live on. Aeration increases fish habitat, activity and growth. Aeration can prevent both summer and winter fish kills that are due to lack of oxygen. Bottom diffusion aeration is the most efficient and economical method. It gets more oxygen into the water for less money. Air is pumped from a quiet rotary vane compressor to a self cleaning diffuser on the bottom of the lake. The column of rising bubbles circulates water continuously to the surface as it is oxygenated. There is minimal dead bottom water with this kind of aeration. Aerators that move the water into the air (such as fountains) require a great deal more power to operate and don't get as much oxygen into the water, and they have electric lines and moving parts in the water that can become fouled, damaged, or cause injury.

Bottom Muck Digestion

[A bacterial agent](#) that speed up the digestion of organic deposits can be applied to the sediments. This accelerates nature's own digestion process to reduce bottom organic sediments. These agents should only be used with aeration as they accelerate oxygen use and can deplete the oxygen if over used.

Weed Eating fish

[Amur \(grass carp\)](#) are weed eating fish that are native to the Amur river of China and Russia. They are river fish and may leave a pond or lake during a heavy water flow. The points of entrance and exit should be screened with a weir (bar grating) when practical. Any grating must be cleaned regularly. Some situations may require that a few Amur be stocked each year to replace losses due to high water. *Grass carp will not control algae.* They prefer leafy water plants. They do not eat mature cattails. The stocking rate of these fish is 10 to 15 (8" minimum size) per acre. They do not bother other fish or swimmers. They cannot normally be caught on a hook and line, but this does sometimes occur. They have a size potential of 35 to 50 pounds in the midwest. State regulations that require Amur be certified sterile so this is the reason for the high cost (\$10-\$15 each). Amur can be expected to live for 8 to 10 years.

Darkening the water

Dark water reduces light penetration. Good water color is that caused by plankton growth. Phytoplankton (microscopic plants) gives the water a greenish color, while zooplankton (microscopic animals) tends towards a brownish color. Both planktons are present together, as one feeds on the other. Plant plankton feeds the animal plankton, which in turn feeds other organisms that feed fish. Fish fry feed on plankton directly. This natural water color is difficult to achieve and hard to maintain. Reducing light penetration is a factor in limiting weed growth, so the water can be darkened with a dye like [Blue Lagoon](#) and [Lockness SS](#).

Brush and Trees

Brush and trees should not be allowed to grow so close to the water that they shed leaves and branches into the water. This adds to the build-up of organic bottom trash and shortens the life of the pond. Brush up to the water's edge also gives more protection to burrowing animals like muskrats and beaver that can severely damage and even destroy the dam and shoreline.

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