



Integrated Systems for Controlling Aquatic Weeds

By Paul R. Beaty, Ph.D.

Sports turf managers handle a wide range of duties beyond maintenance of athletic fields. In many cases the manager of an athletic facility or complex also maintains the surrounding grounds, which may include a lake, pond or irrigation reservoir. Those who have worked in the golf industry are well aware that when spring arrives, those once pristine lakes begin to brew with animal and plant life that, if left unchecked, can become a significant problem. How can managers who are responsible for the care of these lakes, ponds and reservoirs deal with the potential problems of aquatic weeds?

Plants require three things for growth — light, nutrients and heat. In the fall, reduced light and cooler temperatures result in slower plant growth and less of nutrients. However, nutrients continue to accumulate, especially in bodies of water that receive runoff from lush landscape areas.

As day length increases and temperatures rise, managers should keep a close eye on all bodies of water. When water temperatures reach the high 60s, explosive algal growth can occur.

Don't Bomb It

What's the solution to this explosive growth? A common response is to purchase some algicide or herbicide and treat heavily, applying the "a little is good, a lot must be better" theory. However, "bombing" may be exactly the wrong thing to do. Killing the bloom only produces decaying algal cells that release stored nitrogen and phosphorus. Another species of algae is most likely waiting to use these nutrients, and the process may become a vicious cycle. Of course, if the situation gets too ugly, chemical treatment may be necessary, but a light treatment will suffice; don't bomb it!

The goal is to allow non-offensive plants to grow and utilize nutrients that enter the system. One management technique involves planting several kinds of algae and some emergent vegetation, so the aquascape can absorb

the incoming nutrients.

Plants and fish remove nitrogen and phosphorus from the system. Unless chlorine or bromine is used to maintain a sterile environment, something is going to grow. The more herbicides and algicides are used, the more resistant certain plants will become.

Harvesting can be mechanical or biological. Mechanical control can mean using a floating aquatic weed harvester, which may cost more than \$100,000, or it can be as simple as raking excess plant and algal growth out of the pond for use as compost.

Nutrients are going to enter the system no matter what you do. Removing them is better than killing plants or algae, which release these nutrients to promote the growth of something else.

Biological control is an environmentally popular concept. Some areas of the country allow use of a species of fish called the grass carp or white amur (*Ctenopharyngodon cidella*); however, in some areas, use of this fish is illegal. Sterile varieties of the grass carp are available to prevent reproduction and overpopulation, which could create other environmental problems.

These herbivores are an incredible tool for lake and pond harvesting. Rooted plants are a favorite meal, and even grass clippings will be cleaned from the surface.

Other fish filter plankton from green water or gobble up midge larvae before they become a nuisance. Microscopic zooplankton are beneficial in keeping the pond from getting green by eating smaller plant cells. Snails graze bottom surfaces and eat organic material. Basically, anything that lives and grows in the system without itself becoming a problem is beneficial. An aquascape that contains plants and fish requires surprisingly little control.

I strongly believe that chemicals should only be used when absolutely necessary. Chemical control is usually very expensive compared to biological methods. In addition, it's not easy to load the spray rig,

boat, etc., and do a treatment. Why not let animals do the work for you?

No Ultimate Answers

Aeration is another technique of aquatic weed control that is widely promoted. Oxygenation occurs at the air-water interface. If the water is moving, aeration occurs. Even shallow ponds usually are adequately aerated by wind action.

Do floating fountains oxygenate the pond? Those that draw water from the bottom of the pond are the best, as they move more water to the surface.

Systems that inject compressed air to the bottom of the pond can be useful. The rising bubbles move a great deal of water to the surface, where it can be naturally aerified. The amount of oxygen absorbed from the bubbles is negligible in shallow features.

What about ozone or activated oxygen? A lot of money is being invested into these systems, but the systems I have seen require a lot of maintenance. In addition, ozone is toxic to anything alive. Although ozone has applications in spas and sewage treatment, I do not think it is compatible with living systems.

Some say bacteria are the answer. They have the unique ability to consume organic detritus and eliminate it. However, the scientific community believes if conditions are right, bacteria are readily available and are capable of incredibly rapid reproduction. Why spend a lot of money to add them?

Basically, an aquascape can be treated in two ways. The first and most expensive is to treat it like a swimming pool and keep it sterile. However, if you do not like or cannot afford the sterile look, use plants and animals to absorb the nutrients that enter the system through irrigation runoff, direct fertilization or from the atmosphere. Help them so they can help you. □

Editors Note: Dr. Paul Beaty is the owner of Southwest Aquatics, a lake-management service headquartered in Palm Desert, CA.