



Water Quality UPDATE

Newsletter of Extension Water Quality Programs

September 2004

Unusually cool weather in Oklahoma has provided a break from normal summertime threats to water quality. But a few problems could still arise, especially in small ponds. To help protect these areas, this UPDATE compiles pond management tips from previous articles by Mitch Fram and Marley Beem.

Dissolved Oxygen: How Low Can You Go?

Dissolved oxygen (D.O.) levels are crucial to healthy aquatic habitat. Fish require 2-3ppm of D.O. to survive. Low D.O. is the most common cause of fish kills, especially in ponds. Since water can hold less oxygen as its temperature rises, summer is the most likely time for D.O. stress.

Late in the season, it is unlikely that a few hot days will increase water temperatures enough to make a difference. However, cloudy days with little sunlight could force aquatic plants to switch from photosynthesis (oxygen-producing) to respiration (oxygen-using). This could trigger a chain of events leading to a fish kill.

There are warning signs that this could occur. Observe ponds frequently, especially during prolonged cloudy, windless spells. Dawn is the best time to check, since D.O. declines through the night and increases with sunlight. Watch for:

- ◆ **Murky, deep green-colored water**
Ponds that look like "pea soup" have too much algae. Blooms and die-offs in the algae population can rapidly deplete D.O. levels.
- ◆ **Water that suddenly turns clear and brown**
This is an indicator of low D.O. It means a fish kill may be under-way or may occur within hours.
- ◆ **Fish "piping" (gulping), for air near the surface**
This is an indicator of stress.
- ◆ **Death of a few fish, particularly large ones**
Bigger fish, especially sensitive species like largemouth bass, are often the first to go; a few casualties may mean a fish kill is imminent.
- ◆ **Offensive odors**
This may indicate that algae die off is occurring; decomposition of the dead algae will lower D.O.
- ◆ **Declining D.O., or D.O. less than 3 ppm**
D.O. test kits are available from several companies for under \$50. Tests should be run at dawn.

Large numbers of dead fish mean it is probably too late to correct a problem. However, if some of these warning signs are observed soon enough, corrective emergency measures may help.

The first step is to stop organic material from entering the pond. Withdraw livestock from the area, and stop feeding fish. The most effective treatment is to quickly add a large volume of fresh water to the pond.

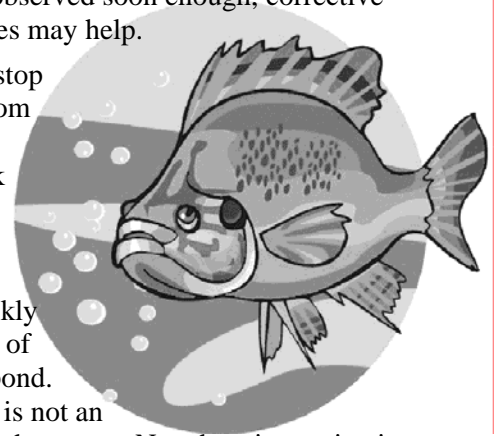
Unfortunately, this is not an option for most pond owners. Next best is to mix air into the water already in the pond.

On a small pond, a fountain can help. Use a gas or electric utility pump with a 1½-inch or larger outlet. Situate the intake a few feet below the water surface, but not on the pond bottom. Use a short length of polyethylene pipe to create a discharge spout. Direct the stream of water into the air so it falls back onto the pond away from shore. Squeeze the end of the spout with a vise-grip or clamp to create a spray pattern that more effectively aerates the water.

Such a fountain gives fish an immediate refuge of oxygenated water to get them through the critical period. Operate it through the night, if possible. Running an outboard motor or brush hog partially submerged at the pond's edge may also help.

If a toxic spill or animal waste discharge is suspected, immediately call the Oklahoma Dep't of Wildlife Conservation - Natural Resources Division (405.521.4616) or the Oklahoma Dep't of Agriculture - Agricultural Environmental Management Services Division (405.522.5492).

Additional information on pond and stream management problems is available from local County OSU Extension offices.



The Basics on Pond Algae and Its Control

Algae are a normal, beneficial part of pond life and form the base of the pond food chain. Many different forms exist:

- ◆ Large, submerged algae may look like higher plants, but do not have true roots or leaves. They have a musky odor and may feel gritty, due to calcium deposits.
- ◆ Filamentous algae, (“pond moss”), start growth on the bottom, but float up to form green mats on the surface.
- ◆ Planktonic algae are microscopic and stay suspended in the water, giving it an olive-to-green tint.

Healthy ponds can contain all algae forms. However, some management decisions— or lack of them — can result in blooms (overgrowth) of algae. In fact, algae are the most common nuisance aquatic vegetation in ponds.

Too much algae upsets the pond ecosystem and can deplete oxygen reserves in the water. Natural die-off of an algae bloom adds food for bacteria, using even more oxygen. Low D.O. levels (see *first page*) can result.



When algae blooms occur, people always ask what herbicide to use. Herbicides can provide immediate, albeit temporary, control. Before use however, consult OSU Extension and/or Langston University Fisheries Extension professionals for positive identification of the problem and specific treatment recommendations.

Alternative control measures that might be suggested include:

- ◆ *A dipnet or small seine* - can be used to remove filamentous algae; helpful if only a small portion of the pond is affected.
- ◆ *Grass carp* - can eat filamentous algae and submerged plants; this may take 1-2 seasons for control and desirable aquatic vegetation may be lost. (Initially, stock 10 fish/ac; at least 8-10” long if large bass are present.)
- ◆ *Aquashade® or other approved water dyes* - temporarily reduces sunlight penetration and slows the rate of algae growth.

The effectiveness of each of these methods depends on specific conditions of the pond. It is important to remember that such measures only treat the symptom; too much algae. Long-term solutions need to address the cause, too many nutrients. For example:

- ◆ Prevent excessive nutrients from entering the pond by:
 - not applying fertilizer or manure near ponds or waterways
 - leaving a 100 ft vegetated buffer around the pond to filter runoff
 - maintaining septic systems in proper working order
- ◆ Prevent cattle-induced erosion close to, or in, ponds by:
 - fencing livestock out (contact OSU Extension for information on livestock watering alternatives)
 - placing minerals and feeding areas away from ponds and waterways

Please email propst@okstate.edu if you would like to receive these articles as a Word document.

Oklahoma Cooperative Extension Service Water Quality Programs
Biosystems & Agricultural Engineering ◆ 218 Agriculture Hall ◆ Oklahoma State University ◆ Stillwater, Oklahoma ◆ 74078-6021
Tel: 405/744-5653 ◆ FAX: 405/744-6059 ◆ Email: smolen@okstate.edu

Michael D. Smolen, Coordinator
OCES Water Quality Programs

Timothy L. Propst, Editor
Water Quality Update

Oklahoma State University, U.S. Department of Agriculture, State and Local governments cooperating. Oklahoma Cooperative Extension Service offers its programs to all eligible persons regardless of race, color, national origin, religion, sex, age or disability and is an Equal Opportunity Employer.