

Preparing Your Pond to Prevent Fish Kill

Are you ready?

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The warm weather is here again, and will become warmer as summer approaches. With this warmth come problems with ponds in Union County. This article is written to help you prevent fish kill. It provides some detail about pond conditions that may lead to fish kill. If you don't understand the technical terms, you may go to the Summary section at the end of the document that provides some advice on preventing fish kill.

Dissolved Oxygen

There are several environmental and pond conditions that contribute to fish kill. The most important one is inadequate dissolved oxygen. Fish require oxygen to respire and convert their food into energy by a biological process called respiration. If there is inadequate concentrations of dissolved oxygen in the pond, then their health would be affected followed by death. The required concentrations of dissolved oxygen for fish depend on whether they are warm water or cold water species. Warm water species require at least 5mg/liter (milligrams/liter) of dissolved oxygen compared to cold water species which require 7mg/liter of dissolved oxygen. Oxygen enters ponds by diffusion from the environment, wind and wave actions as well as by photosynthesis. Photosynthesis is the main source of dissolved oxygen in ponds. It is the process by which plants manufacture their food in the presence of light. Very small aquatic plants called phytoplankton use carbon dioxide to manufacture their food. During this biological process oxygen is produced. During the nights, fish, aquatic organisms and micro-organisms remove oxygen from the pond to convert their food into energy. Consequently, the level of dissolved oxygen declines during the night. The concentration in the ponds is the lowest at dawn. This is the recommended time to take a water sample for analysis of dissolved oxygen. Most of the time there is a balance on how much oxygen is produced and how much is used. However, this balance can be disturbed under some conditions in which oxygen concentration reaches a minimum level for fish to survive. This can happen within a few hours or overnight. It is not unusual to see dead fishes floating in your pond when you get up in the morning.

There are several factors that may reduce the levels of dissolved oxygen in ponds. These are:

- Long periods of hot weather can reduce the levels of oxygen concentrations in ponds. The solubility of oxygen in ponds declines with increasing environmental temperatures.
- Run-off from water sheds can bring turbid water to your ponds. Turbid water reduces the amount of light reaching aquatic plants. This may lead to reduced level of oxygen generated by the photosynthesis.
- Heavy rain and strong wind can create conditions that reduce the levels of dissolved oxygen in the upper layer of a pond. Ponds have upper layers with more dissolved oxygen and lower layers which are deeper, and denser and characterized by lower oxygen concentrations. Heavy rains or storms can suddenly mix these two layers thereby reducing oxygen concentration.
- Furthermore, the amounts of fish a pond can support is limited by the level of dissolved oxygen. Increasing in stocking rates in ponds can deplete the oxygen levels to critical limits that can kill fish. It is important to follow the recommended stocking rates which vary with the species of fish. http://edis.ifas.ufl.edu/topic_a32783890. It may be advisable to have aerators in ponds before the environmental temperatures rise.

Ammonia

The depletion of oxygen in ponds is not the only condition that may be the cause fish kill. Total ammonia nitrogen (TAN) is a contributor to fish kill. In trace amounts it is odorless and colorless. TAN is derived from fish waste, uneaten feeds, debris, dead algae and zoo planktons (small animal life). These produce ammonia during decomposition. TAN is composed of the ionized form (NH_4^+) and the unionized form (NH_3). The unionized form is toxic to fish. The pH and temperature in the pond determine the proportion and form of ammonia that is prevalent at any given time in the pond. If the levels of the unionized form (NH_3) is more than 0.05 mg/l, (milligram per liter) the fish health can be affected. Levels below .03 mg/l can result in fish death. Water analysis is needed to determine if it is present in your pond.

Summary

- Consider aerating your pond, if you are not doing so.
- Avoid excessive feeding. Reduce feeding rate if fishes are dying.
- Avoid over stocking.
- Avoid run-off containing nitrates and phosphate from farmland entering your pond.
- Remove aquatic weeds manually if possible.
- Avoid chemical weed control in ponds if possible during hot summer months.
- Consider using grass carps to control aquatic weeds.



Photo showing dead catfish from a pond in Union County as a result of low level dissolved oxygen.



Photo showing a pond in Union County with algae growth attributed to mainly over-feeding.