

Fish Kills

Fish mortality in ponds has many causes. While little can be done to stop fish death once it begins, fish kills may be prevented by understanding the causes.

Oxygen Depletion

The most common cause of fish kills in Ohio is suffocation due to lack of oxygen. This can occur for several different reasons. However, the principle cause of oxygen depletion is the decomposition of organic matter, especially dead plant material. As aquatic vegetation decomposes, either as a result of herbicide use or natural die-off, the process uses oxygen. During the warm summer months, decomposition may use what little dissolved oxygen is in the water, resulting in an insufficient amount for fish. Another cause of oxygen depletion is a phenomenon known as a turnover or inversion. During the late spring and summer, the pond water develops layers as a result of temperature and density differences. Rapid warming in the upper 8-10 feet results in water that is less dense and has a lower oxygen holding capacity than the colder and denser deep water. However, because of photosynthesis and contact with the atmosphere, there is normally enough oxygen to meet the minimum needs of fish. The cooler layer of water in the bottom of the pond has the potential to hold more oxygen than the top layer because it is denser. But the lack of photosynthesis and the decomposition of organic matter actually results in a lower level of dissolved oxygen compared to the top layer. A turnover results when a strong wind, rapid temperature change, or inflow of a large volume of cold water causes the upper layer of water to be replaced by the lower layer of oxygen-deficient water. Fish stay near the surface and, because they cannot get enough oxygen from this new water, die of suffocation.

Prevention

A good aquatic weed control program will prevent the accumulation of large masses of vegetation, which will use a large amount of oxygen when it decomposes. The use of an aerator will help keep the pond water mixed so that layering is minimized and the surface water is well-oxygenated.

Natural Mortality

Although fish may die of natural causes at any time of the year, they are more stressed in the early spring and during spawning season. This makes them more susceptible to unfavorable environmental conditions and diseases. Large fish seem to be more susceptible. Mortality may also be due to old age. Some fish may live up to 10 years, but four to eight years is more common.

Prevention

Little can be done to prevent natural mortality. Year-round pond management practices will provide the best growth conditions for your fish.

Organic Pollution

Run-off from barnyards, cropland, feedlots, septic tanks, and intensively managed turf areas such as golf courses can introduce large quantities of organic matter and nutrients into a pond. The nutrients will contribute to increased growth of aquatic vegetation, which will eventually die and decompose, using oxygen in the process.

Prevention

Divert run-off from these sources so that it does not enter the pond. Use diversion ditches, tiling, embankments, and land grading as needed.

Agricultural Chemicals

Crop production practices commonly involve the use of chemicals to control weeds, disease, and insect pests. Some of these materials, particularly insecticides, may be toxic to fish and other aquatic organisms if they enter the pond in sufficient quantity. This may result from drifting spray or a heavy rain that washes recently applied chemicals into the pond. Only a very small percentage of fish kills in Ohio have been positively attributed to agricultural chemical poisoning.

Prevention

Preventing the introduction of agricultural chemicals is primarily a matter of diverting drain tile and runoff water away from the pond. This is often easier said than done, however, as it may require the mutual efforts of the pond owner and adjacent landowners. If you are planning to build a pond, take time to find out about the land use practices in the watershed that would drain into your pond. To the maximum extent feasible, locate the pond so that it will not receive undesirable runoff.