**Fish Kills**

A fish kill is an event in which numerous dead fish are suddenly observed in a waterbody. Fish kills can be dramatic and disturbing and appear harmful to the fish population. However, typical fish kills only affect a small percentage of fish in the waterbody. Fish kills may occur for several reasons. The most common cause of fish kills is related to the depletion of dissolved oxygen in shallow waterbodies. Oxygen depletion may be caused in various ways:

- When aquatic organisms die, oxygen is pulled from the water and used in the decay process. Oxygen can become critically reduced during this process, especially in waterbodies that have an abundance of algae. In waterbodies where the concentration of total chlorophyll exceeds 100 micrograms per liter, (indicating a high algae level), a fish kill can be caused by oxygen depletion. This is due to the large quantity of naturally decomposing algae consuming oxygen, thereby reducing oxygen levels.

- Similarly, oxygen depletion can occur when large amounts of aquatic plants die within a short time. To prevent this, herbicide applicators commonly treat only small areas of aquatic plants at one time. Or, they use herbicides that cause plants to die slowly. They also take dissolved oxygen readings prior to herbicide applications as a precaution.

- A fish kill due to oxygen depletion can also be triggered by several days of overcast skies, especially during hot weather. This happens because aquatic plants and algae add oxygen to the water only when there is sufficient sunlight for photosynthesis. However, they consume oxygen all the time in their normal biological processes. When overcast skies persist for several days, oxygen levels become depleted because the plants are using more oxygen than they are producing. Waters are particularly vulnerable when the temperature is high, because warmer water contains less oxygen to start with than cooler water. Fish "gulping" at the surface may be a sign of an oxygen problem.

Some species of fish naturally die in large numbers after spawning or when they are stressed by unusual or harsh weather conditions. The smell of high concentrations of hydrogen sulfide (perhaps from a sulfur-spring or artesian well) may be noticeable.

Most fish kills are due to naturally occurring biological occurrences. Observations are critical in determining the cause of a fish kill. One should write down a description of all living and dead animals in and around the pond (i.e., crayfish, turtles, frogs). Record the number, size and species of dead fish as well as any unusual behavior of live fish, such as swimming near the surface or jumping onto the bank. The following table presents some causes of fish kills.

| Criteria | Oxygen Depletion | Algal Bloom | Pesticide Toxicity | Disease |
|---|---|---|---|---|
| **Fish Behavior** | Gasping, swimming near the surface | Erratic swimming | Erratic swimming | Erratic swimming |
| **Size of Fish** | Large fish die first | Small fish die first | Small fish die first | Any size |
| **Species Selectivity** | None; if oxygen is low, carp and bullheads may survive partial depletion | None; all species affected | Usually one species dies before others | Usually one |
| **Time of Fish Kill** | Nighttime and early morning hours | Bright sun, 9 a.m. – 5 p.m. | Any hour, day or night | During period of stress |
| Plankton**Abundance** | Algae dying | Abundance of one alga species | Pesticide may kill algae | No effect |

| Criteria | Oxygen Depletion | Algal Bloom | Pesticide Toxicity | Disease |
|---|---|---|---|---|
| Dissolved Oxygen | <3 ppm, usually <2 ppm | 12-14 ppm; 8-10 ppm | No effect | No effect |
| **Water** Color | Brown, gray, or black | Dark green, brown or golden | Normal | No effect |

Table 1: From Field Manual for the Investigation of Fish Kills (PDF).

**The Bad News**

- Fish kills occur frequently in Florida and most of them are from natural causes.
- It is difficult to predict when a fish kill will occur.
- Even if a fish kill is predicted, there is not much that can be done to prevent it, especially in larger waterbodies.

**The Good News**

- In the event of a fish kill, you may see a lot of dead fish but there are usually a lot more still alive.
- If water quality declines, there are often many refuges for fish to escape to.
- Because fish lay many eggs, their reproductive potential is usually strong. As a result, their populations are generally able to rebound from a fish kill within a couple of years.

To learn more about naturally occurring fish kills, human induced fish kills, and what you can do if you observe a fish kill, see

- University of Florida/IFAS Lakewatch Circular 107 – Understanding Fish Kills in Florida Freshwater systems (PDF)
- Dissolved Oxygen for Fish Production

A searchable **database** of reported fish kills in Florida is available from the Fish and Wildlife Research Institute of the Florida Fish and Wildlife Conservation Commission (FWC). Search for fish kill data by county or probable cause, or submit a fish kill report.

**Credits:**

University of Florida - IFAS - Center for Aquatic & Invasive Plants, Plant Management in Florida Waters