

Summer Fish Kills

THE HOW, WHAT AND WHY

During the hot summer months, we receive many calls from pond owners concerned about fish kills. While dead fish are unpleasant (and often smelly), summer fish kills are not uncommon. Here's a brief explanation of what causes them and what you can do to reduce the risk.

What's happening?

Most summer fish kills are caused by low dissolved oxygen in the pond. Several factors contribute to this:

1. Warm water holds less oxygen. As water temperatures rise, the amount of dissolved oxygen the water can hold decreases. This makes fish more vulnerable, especially in ponds that are heavily stocked.
2. Oxygen levels are often lowest at dawn (Figure 1). During the day, phytoplankton and aquatic plants produce oxygen through photosynthesis. At night, photosynthesis stops, but fish, plants, and other aquatic organisms continue using oxygen. By early morning, oxygen levels can become critically low, especially after cloudy nights or mornings.

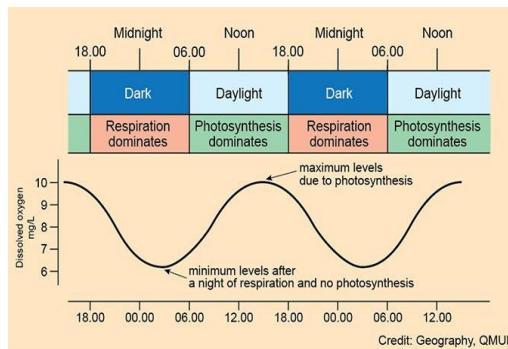


Figure 1. Daily cycles of photosynthesis and Oxygen levels in a pond.



Figure 2. Phytoplankton. Tiny microscopic plants that give a pond a green color. These form the base of a food chain, but blooms of this followed by die off can increase oxygen demands causing fish kills.

3. Algae (primarily phytoplankton) die-offs can worsen the problem. Part of this is natural, but it can be exasperated on cloudy days. These die-offs increase the pond's oxygen demands as bacteria that works on decomposing the phytoplankton also consumes oxygen. Couple the lower oxygen levels at dawn, warmer water holding less oxygen with an increase in the oxygen demand by bacteria working on decomposition and you will end up with a fish kill.

4. Treating too much aquatic vegetation with herbicides can also boost the demands of oxygen. Similar to an algae die-off bacteria use oxygen while decomposing the dead plants. This doesn't mean weeds can't be treated in summer—it simply means treatments should be done carefully.



SUMMER FISH KILLS, QUICK TAKES

- Most summer fish kills are related to low oxygen levels in the pond.
- Low oxygen can be caused by a variety of natural sources: warm water holds less oxygen, oxygen levels fluctuate through the day as part of the photosynthesis cycle and phytoplankton blooms and die-offs can be caused by several cloudy days in a row.
- Treating too much vegetation at once is a way pond owners can inadvertently cause a fish kill. But note: it's not the herbicide, it's the process of weed decomposition that causes the kill.
- Overcrowding is a major factor in causing sudden pond fish kills. Harvest helps!
- Stock properly from the beginning. Use fish recommended by the Kentucky Department of Fish and Wildlife Resource's Fisheries Biologists.
- Treat vegetation properly, only treat a quarter of the pond at a time in the summer months.
- Aeration helps but it's not a complete solution.
- It's unlikely to experience a "complete kill". Contact a fisheries biologist for your next steps.

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Kentucky Department of Fish & Wildlife Resources

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How can we reduce the risk?

1. Harvest fish regularly. Avoid over-crowding. In a productive 1-acre pond, removing some bass and bluegill each year helps maintain a healthier balance and reduces oxygen demand.

- Annually, 40 to 50 percent of the ponds production (in pounds) can be removed.
- A fertile 1-acre pond can support about 100 pounds of Largemouth Bass; and in this case, 25 to 35 pounds of Largemouth Bass should be removed each year (Figure 3).
- That same fertile one-acre pond can support 200 – 300 pounds of Bluegill and 100-150 pounds of Bluegill need to be removed each year (Figure 3).

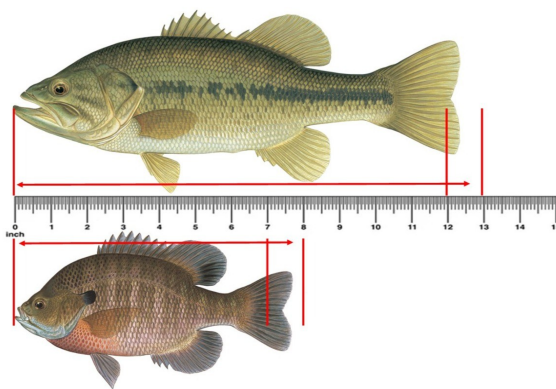


Figure 3. Weights of fish in a farm pond. Top: a 12-13" Largemouth Bass in a fertile pond should weigh about a pound. Bottom: a 7-8" Bluegill in a fertile pond should weigh about a third of a pound.

2. Stock ponds properly.

- KDFWR generally recommends Bluegill, Largemouth Bass, and Channel Catfish for most farm ponds.
- Species such as Hybrid Striped Bass and Rainbow Trout are more susceptible to summer oxygen problems.
- More fish is not always better—avoid overstocking.

3. Treat aquatic vegetation in stages. During hot weather, do not treat more than one-quarter of the pond at a time. Wait 10–14 days before treating another section.

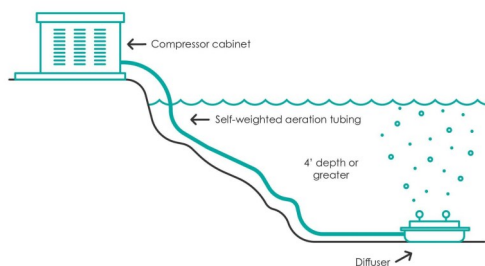


Figure 4. Illustration of a Bottom-diffused aeration system.

4. Use aeration if possible.

- Bottom-diffused aeration systems (Figure 4) generally provide the best oxygen benefits.
- Run aerators 24 hours a day during summer.
- Remember that aeration reduces risk but does not guarantee fish kills won't occur, especially during extreme heat, cloudy weather, large algae die-offs, or in overstocked ponds.

Where do we go from here?

Most summer fish kills are partial kills rather than complete die-offs. The next step is determining what fish remain in the pond and restocking if needed. You can contact a KDFWR fisheries biologist for help completing a Catch-Harvest Log (Figure 5).

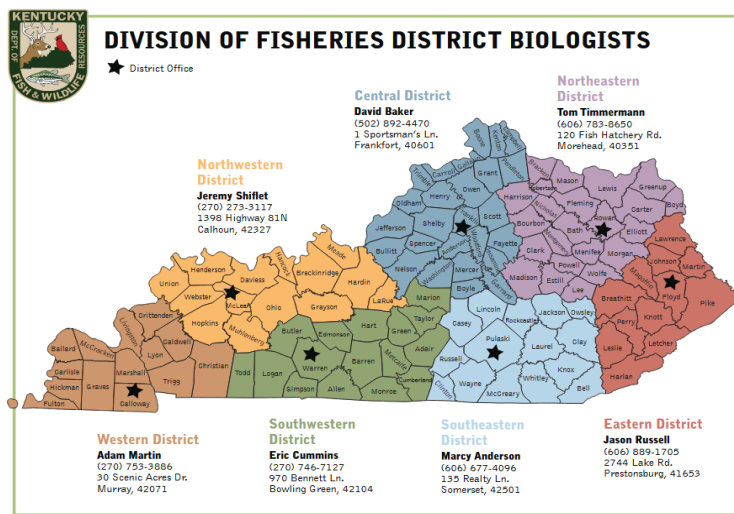


Figure 5. Contact information for KDFWR's District Fisheries Biologists.

Using that information, a biologist can recommend appropriate stocking numbers and fish sizes for your pond.

The consultation is free, although any replacement fish would need to be purchased from a licensed dealer.