

Further Information

Fish kills are discussed in OSU Fact Sheet NREM-9206, Common Pond Problems. <http://dasnr22.dasnr.okstate.edu/docushare/dsweb/Get/Document-1849/NREM-9206pweblinks.pdf>

Managing ponds for fishing is discussed in OSU Fact Sheet NREM-9209, Improve Fishing in Your Pond. <http://dasnr22.dasnr.okstate.edu/docushare/dsweb/Get/Document-5621/NREM-9209websurvey.pdf>

Problems common to ponds in neighborhood and urban situations are discussed in OSU Fact Sheet NREM-9210, Neighborhood and Urban Pond Management. <http://dasnr22.dasnr.okstate.edu/docushare/dsweb/Get/Document-7841/NREM-9210web.pdf>

Additional pond factsheets can be found at <http://pods.dasnr.okstate.edu/docushare/dsweb/View/Collection-469>

Boyd, C.E. 1990. Water Quality in Ponds for Aquaculture. Alabama Agricultural Experiment Station, Auburn University.

Fisheries Biologists with the Oklahoma Department of Wildlife Conservation can be a good source of expert assistance with fish and pond management problems:

South Central, Caddo, (580) 924-4087

South East, Wilburton, (918) 297-0153

East Central, Porter, (918) 683-1031

Northeast/Tulsa, Jenks, (918) 299-2334

North Central, Ponca City, (580) 762-2248

North West, Byron, (580) 474-2668

South West, Lawton, (580) 529-2795

Central, Norman, (405) 325-7288

Central, Holdenville, (405) 379-5408

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Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Director of Oklahoma Cooperative Extension Service, Oklahoma State University, Stillwater, Oklahoma. This publication is printed and issued by Oklahoma State University as authorized by the Vice President, Dean, and Director of the Division of Agricultural Sciences and Natural Resources and has been prepared and distributed at a cost of 50 cents per copy. 1012 GH.

Water Quality Testing and Fish Health



L-420

Oklahoma Cooperative Extension Service

Division of Agricultural Sciences
and Natural Resources

Oklahoma State University

Water testing is often considered when a fish kill or fish health problem occurs or when wondering about the suitability of a water body for fish. A properly conducted water test offers a better understanding of pond water suitability and quality, but it is seldom the entire picture. The Irrigation Water Test is the best choice offered by the OSU Soil, Water and Forage Laboratory. Please contact your county Extension office for instructions on sample collection and submission.

Work with a knowledgeable fisheries biologist to get a broader understanding of the problem and some management recommendations. A list of helpful sources is provided at the end.

Do not assume that water testing alone will provide the answer. There are many possible water quality problems and it is impractical to test for all of them. A general battery of water tests, like the Irrigation Water Test, is based around the most commonly encountered issues and will not test for every possible problem.

To reduce the likelihood of pesticide contamination, apply only legal pesticides in accordance with label directions. Since few pond owners own the entire pond watershed, good relations with neighbors are usually needed to help protect a down slope pond.

The **Irrigation Water Test** analyzes the following useful parameters:

Alkalinity and Hardness

In general terms these are measures of calcium carbonate (CaCO_3) equivalents. In a typical water sample, the two values will be close to each other. Alkalinity is the capacity of the water to resist changes in pH. Hardness is based on the concentration of calcium and magnesium.

Waters of low alkalinity can suffer from big daily shifts in pH making conditions stressful for fish. Do not confuse alkalinity with pH – they are different.

- Alkalinity and hardness levels greater than 50 mg/l (or ppm, parts per million) are considered adequate or good for fish.
- If alkalinity is 20 mg/l or less, consider applying agricultural limestone. This usually results in increased fish production (Boyd, 1990). Work with a fisheries biologist to determine proper application procedures.
- Water that is above 1,000 mg/l in hardness and below 50 mg/l in alkalinity is considered gypsum or “gyp” water. It is unsuitable for fish.

pH

In surface waters, pH goes up and down in a daily cycle. There is no ideal pH, but there is a desirable range. As long as pH is between 6.5 and 9.0, it is generally acceptable for fish.

$\text{NO}_3\text{-N}$

High levels of nitrate ($\text{NO}_3\text{-N}$) are seldom a problem for fish, but can indicate past exposure to high levels of nitrite ($\text{NO}_2\text{-N}$). High levels of nitrite are harmful to certain species such as channel catfish.

Electrical Conductivity (EC)

Freshwater normally has a conductivity of between 20 and 1,550 $\mu\text{mho/cm}$ (Boyd, 1990). Electrical conductivity increases with increasing salinity, the amount of salts dissolved in water. Tolerance for high EC and salinity varies with the species of fish and the life stage of the fish (adult, fingerling or fry).

* Other parameters are also reported in the Irrigation Water Test. They can be ignored since they are not generally of use in determining suitability for fish.

The following tests are not available through the OSU Lab but may be important. Some can be done by other labs:

Dissolved Oxygen (DO)

Lack of oxygen is the leading cause of fish kills. A fisheries biologist can generally ask questions to determine if low oxygen or some other problem was the probable cause of a fish kill.

Phosphorus

Excess runoff of phosphorus into ponds from lawns and livestock holding areas fuels the growth of aquatic plants, especially algae. This often leads to a low oxygen fish kill when the plants die and decay. Instead of testing for phosphorus, a general description of activities in the pond watershed is usually enough to pinpoint it as a problem.

Toxic Substances

There are many possible toxic substances. Generally, individual tests are done and can be very expensive.

Toxic Algae

The Oklahoma Animal Disease Diagnostic Lab on the OSU campus tests pond water samples for the presence of toxic algal species. Call (405) 744-6623 for sample requirements before bringing in a sample.