

## Fish Drinking Water

**How fish relate to our drinking water.**

*By David Alderton*

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As any fishkeeper knows, water quality is vital when it comes to maintaining an aquarium successfully. The behavior of the fish will alter if they are exposed to pollutants in the water. The U.S. Army Center for Environmental Health Research started research in this area in 2000, to safeguard drinking supplies. The resulting commercial system, known as IAC 1090 marketed by the International Automation Corporation, relies on the bluegill (*Lepomis macrochirus*), a member of the sunfish family Centrarchidae, to act as the monitor.

Eight bluegill fish are housed in specially-designed chambers through which water passes. There are electrodes in each of the chambers monitoring the breathing of the fish, as well as their heart rate and swimming patterns. These are connected to a computer, and if noticeable changes are detected in six bluegills within the group, an alarm sounds automatically. Immediate water testing is started and an alert is sent to key personnel.

The exact cause of the problem is not revealed until tests on water quality have been completed. This method has already worked to save toxins from agricultural spillages reaching drinking water. In one case, the fishes' reactions revealed the occurrence of a diesel spillage more than two hours before conventional water monitoring methods picked it up. The system has been employed around major cities including San Francisco, Washington DC and New York City, and could also provide a vital safeguard in the event of an environmental terror attack.

Each bluegill spends three weeks working, before being substituted by another fish. Bluegills are ideally suited to this task, because they are both very sensitive to changes in water quality and also quite sedentary by nature. They are native to North America, where their range extends from Quebec to northern Mexico, and they have also been introduced to Hawaii. Their popular name stems from the distinctive bluish coloring on the sides of their bodies, which also extends around the gills.