U.S. Fish and Wildlife Service photo via AFP/Getty Images

Modern day "canaries": Bluegill fish are being used as biosensors to monitor drinking water supplies in metropolitan areas. The small fish are sensitive to traces of chemicals and react in ways that can be monitored.

Toxin-sensitive bluegills pull duty in war on terror

Help safeguard water supplies in 3 major cities

By John Ritter
USA TODAY

SAN FRANCISCO — One of the latest weapons in the war on terrorism is the common bluegill, a freshwater fish found in lakes and streams across the USA.

Three of the nation's most inviting terrorist targets — New York City; Washington, D.C.; and San Francisco — are using a system that deploys these small edible fish to detect toxic substances in municipal water if sabotaged by terrorists.

Bluegills are sensitive to traces of pesticides, cyanide, mercury, phosphates and other poisons and react in ways that can be monitored. If computers, wired to sensors in the water, record elevated heart rates or note fish swimming erratically in their tank or showing other signs of stress, the system triggers water sampling and e-mail alerts to water-quality officials.

People familiar with the technology, developed by the Army, compare it to the old-fashioned use of canaries in coal mines to warn miners of danger.

"It's a winning combination of nature and high technology," says Susan Leal, general manager of San Francisco's Public Utilities Commission, which delivers water to 2.4 million Bay Area customers. "Anti-terrorism is a reality today, and it's going to be a reality for the foreseeable future."

New York City has been testing the system, on loan from the Army, since October 2002. "We are seeking to expand it," says Ian Michaels, a spokesman for the city's Department of Environmental Protection, manager of the water consumed by 9 million people. "Because it's a security issue we would not have sought publicity about this."

The Metropolitan Washington Council of Governments confirmed that the system is being used in the region but couldn't provide details, says Jim Shell, a water resources planner.

More than a dozen other cities have ordered the Intelligent Aquatic BioMonitoring System, which starts at $45,000, says Bill Lawler, co-founder of the Poway, Calif., company that helped design and now manufactures it. San Francisco has ordered two more for undisclosed locations, Leal says.

The system is one of many means cities use to monitor water quality — "part of a layered defense," Lawler says. "The fish start alarming at such minute amounts of toxicity that it gives utility operators a big jump."

Bluegills are ideal "canaries" because they're hardy, prolific and eat almost anything, says John McKosker, a senior scientist at the California Academy of Sciences in San Francisco.

"What you want is a fish that doesn't die because the handler is clumsy, and most people aren't good at keeping fish," McKosker says. "If you had something like salmon or rainbow trout, it doesn't take much to kill them."

Though sensitive to chemicals, bluegills can tolerate big swings in water temperature and oxygen levels. Most other fish can't.

In Army tests of 27 toxic substances, bluegills detected every one, Lawler says.

However, McKosker says, "I wouldn't bet my survival on this yet. There might be some toxicant the fish is insensitive to that we're very sensitive to. But so far that hasn't been demonstrated."