

Goldman Sachs **10,000 small businesses** Goldman Sachs is committed to helping 10,000 Small Businesses create jobs and drive economic growth. [▶ LEARN MORE](#)

▶ PROGRESS IS EVERYONE'S BUSINESS



August 12, 2013

HUFF
POST GREEN

Contaminated Water From Medicine Threatens Wild Fish Populations, Study Shows

By JEFF DONN 02/14/13 02:19 PM ET EST [AP](#)

BOSTON -- What happens to fish that swim in waters tainted by traces of drugs that people take? When it's an anti-anxiety drug, they become hyper, anti-social and aggressive, a study found. They even get the munchies.

It may sound funny, but it could threaten the fish population and upset the delicate dynamics of the marine environment, scientists say.

The findings, published online Thursday in the journal *Science*, add to the mounting evidence that minuscule amounts of medicines in rivers and streams can alter the biology and behavior of fish and other marine animals.

"I think people are starting to understand that pharmaceuticals are environmental contaminants," said Dana Kolpin, a researcher for the U.S. Geological Survey who is familiar with the study.

Calling their results alarming, the Swedish researchers who did the study suspect the little drugged fish could become easier targets for bigger fish because they are more likely to venture alone into unfamiliar places.

"We know that in a predator-prey relation, increased boldness and activity combined with decreased sociality ... means you're going to be somebody's lunch quite soon," said Gregory Moller, a toxicologist at the University of Idaho and Washington State University. "It removes the natural balance."

Researchers around the world have been taking a close look at the effects of pharmaceuticals in extremely low concentrations, measured in parts per billion. Such drugs have turned up in waterways in Europe, the U.S. and elsewhere over the past decade.

They come mostly from humans and farm animals; the drugs pass through their bodies in unmetabolized form. These drug traces are then piped to water treatment plants, which are not designed to remove them from the cleaned water that flows back into streams and rivers.

The Associated Press first reported in 2008 that the drinking water of at least 51 million Americans carries low concentrations of many common drugs. The findings were based on questionnaires sent to water utilities, which reported the presence of antibiotics, sedatives, sex hormones and other drugs.

The news reports led to congressional hearings and legislation, more water testing and more public disclosure. To this day, though, there are no mandatory U.S. limits on pharmaceuticals in waterways.

The research team at Sweden's Umea University used minute concentrations of 2 parts per billion of the anti-anxiety drug oxazepam, similar to concentrations found in real waters. The drug belongs to a widely used class of medicines known as benzodiazepines that includes Valium and Librium.

The team put young wild European perch into an aquarium, exposed them to these highly diluted drugs and then carefully measured feeding, schooling, movement and hiding behavior. They found that drug-exposed fish moved more, fed more aggressively, hid less and tended to school less than unexposed fish. On average, the drugged fish were more than twice as active as the others, researcher Micael Jonsson said. The effects were more pronounced at higher drug concentrations.

"Our first thought is, this is like a person diagnosed with ADHD," said Jonsson, referring to attention deficit-hyperactivity disorder. "They become asocial and more active than they should be."

Tomas Brodin, another member of the research team, called the drug's environmental impact a global problem. "We find these concentrations or close to them all over the world, and it's quite possible or even probable that these behavioral effects are taking place as we speak," he said Thursday in Boston at the annual meeting of the American Association for the Advancement of Science.

Most previous research on trace drugs and marine life has focused on biological changes, such as male fish that take on female characteristics. However, a 2009 study found that tiny concentrations of antidepressants made fathead minnows more vulnerable to predators.

It is not clear exactly how long-term drug exposure, beyond the seven days in this study, would affect real fish in real rivers and streams. The Swedish researchers argue that the drug-induced changes could jeopardize populations of this sport and commercial fish, which lives in both fresh and brackish water.

Water toxins specialist Anne McElroy of Stony Brook University in New York agreed: "These lower chronic exposures that may alter things like animals' mating behavior or its ability to catch food or its ability to avoid being eaten – over time, that could really affect a population."

Another possibility, the researchers said, is that more aggressive feeding by the perch on zooplankton could reduce the numbers of these tiny creatures. Since zooplankton feed on algae, a drop in their numbers could allow algae to grow unchecked. That, in turn, could choke other marine life.

The Swedish team said it is highly unlikely people would be harmed by eating such drug-exposed fish. Jonsson said a person would have to eat 4 tons of perch to consume the equivalent of a single pill.

Researchers said more work is needed to develop better ways of removing drugs from water at treatment plants. They also said unused drugs should be brought to take-back programs where they exist, instead of being flushed down the toilet. And they called on pharmaceutical companies to work on "greener" drugs that degrade more easily.

Sandoz, one of three companies approved to sell oxazepam in the U.S., "shares society's desire to protect the environment and takes steps to minimize the environmental impact of its products over their life cycle," spokeswoman Julie Masow said in an emailed statement. She provided no details.

Online:

Overview of the drug: <http://www.nlm.nih.gov/medlineplus/druginfo/meds/a682050.html>