
News Release

U.S. Department of the Interior
U.S. Geological Survey

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Heavily used pesticides found in more than 90 percent of stream samples in southwestern Ohio

Note to Editors: Photos are available at http://oh.water.usgs.gov/miam/MIAM_NAWQA_SUM_RPT/

Atrazine and metolachlor, herbicides that are heavily used on agricultural land, were detected in more than 90 percent of samples from 5 streams in southwestern Ohio, whereas insecticides (such as diazinon) commonly used by homeowners were frequently detected in an urban stream, according to findings released by the U.S. Geological Survey (USGS). At least one pesticide was detected in all streams, sometimes at concentrations at or above drinking-water standards or guidelines for protecting aquatic life.

As part of a nationwide study, USGS scientists collected samples in the Great and Little Miami River Basins in southwestern Ohio and southeastern Indiana from 1999 to 2001. The study was one of 15 for which summary reports were released today, and one of 51 regional studies conducted since 1991 by the USGS National Water-Quality Assessment (NAWQA) Program.

“Herbicide degradates, or breakdown products, were the largest group of pesticides found in streams and ground water,” reported Gary Rowe, USGS project chief. “Although most water-quality sampling programs do not consider degradates, we would have missed an important piece of the picture if we hadn’t analyzed for them.”

Other key findings in southwestern Ohio and southeastern Indiana include:

- In 29 small stream basins that drain areas of various land uses, USGS scientists found that insecticide concentrations increased as the amount of urban land increased.
 - Polychlorinated biphenyls (PCBs) and organochlorine insecticides, such as DDT and chlordane, continue to persist in fish tissue even though their use was canceled or restricted in the 1970s and 1980s. Many of these chemicals were detected at concentrations at or near the maximum concentrations found nationwide by the NAWQA Program.
 - Very low concentrations of one or more pesticides were detected in 63 percent of the ground-water samples from 96 wells; however, none of the concentrations exceeded drinking-water standards or guidelines. Most pesticide concentrations detected in ground water were less than 0.5 microgram per liter, or about 0.5 part per billion. Compared to other types of wells (domestic wells and shallow monitoring wells in urban and agricultural areas), more pesticides were detected in public-supply wells near streams. Pumping of these high-capacity public-supply wells probably induces infiltration of water from the stream, which is the most likely source of pesticides.
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- Besides pesticides, the NAWQA study examined concentrations of nutrients (forms of nitrogen and phosphorus), household chemicals and pharmaceuticals, arsenic, and radon in the Great and Little Miami River Basins. (Note to editors: See the attached “additional information” section for details about those chemicals.)
- Streams draining agricultural land in the Great and Little Miami River Basins had the highest average concentration of nitrogen, whereas streams draining a mix of land uses had the highest average concentration of phosphorus. Runoff of commercial fertilizer and manure applied to agricultural lands is a major source of nitrogen to area streams, whereas wastewater-treatment discharges at Dayton and downstream from Dayton are a significant source of phosphorus.
- Nitrate concentrations in 10 of 104 ground-water samples exceeded the USEPA drinking-water standard of 10 milligrams per liter, or about 10 parts per million. Concentrations of nitrate in water from shallow monitoring wells in agricultural areas were the highest among area wells and among the highest in the Nation as sampled by the USGS NAWQA Program.
- About half of the 116 household chemicals and pharmaceuticals analyzed for were detected in streams, but were at low concentrations (usually less than 0.5 microgram per liter). These chemicals include caffeine, acetaminophen, cholesterol, trimethoprim (an antibiotic), triclosan (a disinfectant/antibacterial chemical), and NPEO₂ (a surfactant or anti-foaming agent in detergents). Fewer of these chemicals (16) were detected, also at very low concentrations, in shallow ground water from monitoring wells in urban areas.
- Concentrations of radon were greater than 300 picocuries per liter, the proposed USEPA drinking-water standard, in 70 percent of the ground-water samples. Five of 104 ground-water samples exceeded the revised (in 2002) USEPA drinking-water standard of 10 micrograms per liter for arsenic.

Copies of the USGS report, "Water Quality in the Great and Little Miami River Basins, Ohio and Indiana, 1999–2001," published as USGS Circular 1229, are available free of charge by writing the USGS Branch of Information Services, Box 25286, Denver Federal Center, Denver, CO 80225, or by calling 1–888–ASK–USGS (1–888–275–8747). The report will soon be available on the World Wide Web at <http://water.usgs.gov/pubs/circ/2004/1229/>.

The USGS assessment is part of a national program currently releasing results on streams and ground water in 15 major river basins and aquifer systems. Findings of regional and national interest are highlighted in a separate report, "Water Quality in the Nation's Streams and Aquifers—Overview of Selected Findings, 1991–2001," which is available on the Web at <http://water.usgs.gov/pubs/circ/2004/1265/>. Check the status and availability of these reports on the NAWQA Web site (<http://water.usgs.gov/nawqa/nawqasum/>) as well as accessibility to other publications and national data sets and maps.

The USGS serves the Nation by providing reliable scientific information to describe and understand the Earth; minimize loss of life and property from natural disasters; manage water, biological, energy, and mineral resources; and enhance and protect our quality of life.

*** USGS ***

(Note to editors: See attached “additional information” for more details about chemicals discussed in this USGS water-quality report. This news release can be viewed online at http://oh.water.usgs.gov/miam/MIAM_NAWQA_SUM_RPT/. Photos can be downloaded from this Web site. Electronic copies of the text are available by request.)

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Additional information about chemicals discussed in the USGS water-quality report

Nutrients

The term "nutrients" sounds like a good thing. Unfortunately, elevated concentrations of nutrients (nitrogen and phosphorus) in streams can have substantial environmental and economic consequences, in addition to human health concerns. Ingestion of drinking water with high nitrate concentrations can cause low oxygen levels in the blood of infants, a potentially fatal condition known as methemoglobinemia, or "blue baby syndrome." Because of these health concerns, the U.S. Environmental Protection Agency (USEPA) set the drinking-water standard for nitrate at 10 milligrams per liter.

Elevated nutrient concentrations can lead to excessive and unsightly growth of algae and other aquatic plants, which can clog water-intake pipes and filters and can interfere with recreational activities such as fishing, swimming, and boating. The decay of plants often results in foul odors, bad taste, and low dissolved oxygen concentrations in water (or hypoxia, which can cause fish kills).

Excessive growth of algae was found in some large streams with elevated nutrients and very little shade in the Great and Little Miami River Basins.

Household chemicals and pharmaceuticals in streams and ground water

Human health and safety have improved through everyday use of household and pharmaceutical chemicals, but these chemicals get into our water supplies when they are disposed of in wastewater. As a result, many of these chemicals have been found at very low concentrations in streams across the country.

It is generally unknown what effects many of these chemicals may have on humans or aquatic life at low concentrations, although several are known or suspected endocrine disruptors. The endocrine system controls growth, sexual development, and reproduction in animals. Endocrine disruptors are chemicals that interfere with or mimic natural hormones and have the potential to cause reproductive or developmental impairment in animals.

Arsenic and radon

Arsenic in drinking water has been linked to multiple health problems, including bladder, lung, and skin cancer; cardiovascular disease; diabetes; and neurological dysfunction. Radon is a colorless and odorless radioactive gas that forms during the decay of natural uranium in rocks and soil. Radon gas is carried in water pumped from wells and is released to the air as the water is agitated during domestic uses such as cooking or showering. Breathing radon increases the risk of lung cancer. Most public-waters supplies that use ground water aerate the water during treatment, causing the radon gas to disperse in the air and radon concentrations in treated water to drop well below the proposed drinking-water standard.