

## News Release

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

**Address:**

Maryland-Delaware-D.C. District  
1289 McD Drive  
Dover, DE 19901

**Email and Homepage:**

[jmdenver@usgs.gov](mailto:jmdenver@usgs.gov)  
<http://md.water.usgs.gov/>

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**Contact:**

Judy Denver

**Phone:**

(302) 734-2506 x229

**Fax:**

(302) 734-2964

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### Nitrates and Pesticides are Common in Delmarva Peninsula Ground Water and Streams

Many different chemicals from human sources, including nutrients, pesticides, and volatile organic compounds (VOCs), are in the shallow ground water and streams of the Delmarva Peninsula, according to a recent study by the U.S. Geological Survey (USGS). With the exception of nitrate, most of the chemical concentrations are below existing water-quality standards, but many of the chemicals detected do not have such standards or guidelines.

Nitrate exceeded the Federal drinking-water standard of 10 milligrams per liter (mg/L) in one-third of 29 wells sampled at depths common to domestic wells (median depth 45 feet). Nitrate concentrations in water samples from these depths have increased since the late 1980s, probably because of increased use of nitrogen fertilizers. Only one water sample exceeded 10 mg/L in untreated water samples from 30 deeper public water-supply wells (median depth 80 feet) in Delaware.

According to Judy Denver, USGS hydrologist in charge of the 3-year water quality study, "Nitrate in domestic wells is of concern because, unlike public-supply wells, most domestic wells are not monitored regularly and many homeowners are unaware of potential water-quality problems. Drinking water with high nitrate concentrations can cause health problems for infants."



USGS technician Deb Bringman, collects ground-water sample for chemical analysis.

Concentrations of nutrients and herbicides in streams and shallow ground water in agricultural areas of the Delmarva Peninsula were some of the highest measured in the Nation by the USGS, including in intensively agricultural areas of the Midwest.

More than 85 percent of the well-water samples had at least 3 pesticides, with up to 15 different compounds detected in untreated water from one well. Most of the mixtures contained pesticides used on crops (metolachlor, atrazine, and alachlor) and their degradates; similar mixtures were found in stream samples and in untreated water from public water-supply wells, which also contained herbicides and insecticides commonly used in urban areas (including carbofuran, dieldrin, lindane, prometon, and tebuthiuron).

Very low concentrations (all below existing water-quality standards) of 34 VOCs were detected in untreated water from public-supply wells in Delaware and the part of the aquifer used for domestic supply. Chloroform was the most frequently detected VOC; the solvent tetrachloroethene and the gasoline additive MTBE (methyl *tert*-butyl ether) were also detected in over half of the samples from public-supply wells. Multiple compounds were detected in many wells.

As Denver notes, "There is little information about the potential additive or synergistic effect on human health and aquatic life of low levels of multiple compounds in streams and drinking water."

The interconnectedness of streams and ground water is apparent in a setting such as the Delmarva Peninsula. The combination of sandy soils, permeable aquifer materials, and shallow water table means that nitrate and pesticides move easily from the land surface into shallow ground water. And, as Denver explains, "Ground water provides over one-half of the flow to most streams. Nitrate and pesticides, including pesticide degradates, that are discharged from ground water to streams today probably leached into the shallow ground-water system years and even decades ago because ground water moves so slowly." Unfortunately, this means that today's land-use management practices for improving water quality on the Peninsula may not be apparent for some time to come.

Copies of the USGS report, "Water Quality in the Delmarva Peninsula, Delaware, Maryland, and Virginia, 1999-2001," published as USGS Circular 1228, are available by writing the USGS Branch of Information Services, Box 25286, Denver Federal Center, Denver, CO 80225 (or by calling 1-888-ASK-USGS). The report also can be accessed on the World Wide Web at [http://water.usgs.gov/nawqa/nawqa\\_sumr.html](http://water.usgs.gov/nawqa/nawqa_sumr.html).

The USGS assessment is part of a national program currently releasing results of scientific investigation on streams and ground water in 14 additional 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." The status and availability of these reports can be found on the NAWQA website (<http://water.usgs.gov/nawqa/>), and 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.

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