



News Release

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Nitrate and Phosphorus Levels in Eastern Iowa Streams are Among the Highest in the Nation

A three-year study of water quality in rivers and streams in eastern Iowa shows that nitrogen and phosphorus concentrations in the area rank among the highest of those sampled in the Corn Belt and the nation by the U.S. Geological Survey (USGS). That's one of the findings in a recently released report which shows that while surface water contains high levels of nitrogen and phosphorus which can degrade the environment, ground water used for human consumption is generally safe and clean.

Rivers and Streams

Nitrate, the most common form of nitrogen in water and a plant nutrient, frequently exceeded drinking water-standards in rivers and streams during late spring and early summer soon after spring fertilizer application. The greatest nitrate concentrations occurred in medium-sized streams draining basins with large amounts of corn and soybean production and in streams draining basins with dense concentrations of large-scale animal feeding operations. In contrast, nitrate concentrations were lowest in basins that had the greatest amounts of pasture, grassland, and forested land.

Concentrations of nitrogen and phosphorus in the aquatic environment commonly exceed levels at which excessive growth of algae occurs and other nuisance plants thrive in streams. Such growth can clog water intake pipes and filters and interfere with recreational activities, such as fishing, swimming and boating. The subsequent decay of the algae can result in foul odors, bad taste in drinking water and low dissolved oxygen in aquatic habitats -- oxygen that is necessary for fish and other aquatic life to survive.

Nitrogen and phosphorus, two naturally occurring nutrients, are applied as fertilizer to increase crop yields and to enhance the appearance of residential lawns, city parks, and golf courses. Nitrogen and phosphorus also originate from human and animal waste.

Steve Kalkhoff, the USGS project manager, said "The large amounts of nitrogen and phosphorus that are transported to the Mississippi River from eastern Iowa streams represent both an economic loss to farmers and a potential environmental threat to downstream waters." The losses represent a potential loss in crop yield or the cost of additional fertilizer needed to compensate for that flushed from the fields. Nutrients transported from the Eastern Iowa Basins to the Mississippi River likely reach the Gulf of Mexico where they contribute to eutrophication and hypoxia.

Ground Water

The USGS report shows ground water in eastern Iowa used for drinking water is generally of good quality and usually meets federal and state standards. However, as with streams, local challenges may occur, particularly related to the presence of nitrate in shallow susceptible aquifers. Although nitrogen and phosphorus are prevalent in ground water, concentrations are substantially lower compared to those in rivers and streams. Nitrate concentrations exceed drinking-water standards most commonly in the shallow parts of the more susceptible alluvial aquifers in agricultural areas. In contrast, deeper bedrock aquifer systems, which are generally protected by thick clay and shale layers, have very low nitrogen concentrations.

High levels of nitrate in shallow ground water also may serve as an "early warning" of possible future contamination of older underlying ground water, which is a common source for public water supply.

These results and other information about water-quality conditions and selected aquatic biota in the basin are presented in the recently released USGS report. Results described in the USGS report are based on analysis of monthly samples collected at 12 stream locations and from 124 wells in the Wapsipicon, Cedar, Iowa, and Skunk River Basins. The USGS Iowa District, based in Iowa City, Iowa, deployed a team of eight scientists including hydrologists, geochemists, and biologists, to assess the water quality, aquatic life, and riparian habitat at selected locations in the eastern Iowa River Basins. They also assessed the ground-water quality in a large part of the basin.

The report titled, Water Quality in the Eastern Iowa Basins, Iowa and Minnesota, 1996-98, published as USGS Circular 1210 is available on the World Wide Web as downloadable portable document file (PDF) at: <http://iowa.usgs.gov/nawqa/reports.html> or in printed form (single copies of the report are available free of charge) from: Branch of Information Services, P.O. Box 25286, Denver, CO 80225, or by fax request to: 303-202-4693. Please specify USGS report C-1210.

This study is part of a National program, currently releasing results on streams and ground water in 15 other major river basins throughout the Nation. Check the status and availability of the individual basin reports on the NAWQA (National Water-Quality Assessment) Website (<http://water.usgs.gov/nawqa>), as well as accessibility to other NAWQA publications and National data sets and maps.

As the Nation's largest water, earth and biological science and civilian mapping agency, the USGS works in cooperation with more than 2,000 organizations across the country to provide reliable, impartial, scientific information to resource managers, planners, and other customers. This information is gathered in every State by USGS scientists to minimize the loss of life and property from natural disasters, contribute to the sound conservation, economic and physical development of the nation's natural resources, and enhance the quality of life by monitoring water, biological, energy and mineral resources.

USGS

(Note to Editors: See attached "highlights" for further information on the USGS water-quality report.)

Selected highlights and implications of the USGS water-quality report:

* MORE THAN JUST ETHANOL—Ethanol is commonly added to gasoline in Iowa to produce a cleaner burning fuel. However, MTBE (Methyl *tert*-butyl ether), a gasoline additive used to enhance the octane content, has been found to be a contaminant of shallow ground water in urban areas of eastern Iowa. MTBE was found more frequently than other gasoline compounds suggesting that this compound is more persistent and is more mobile in groundwater than other gasoline compounds.

* IT'S ALL RELATIVE--The types and relative levels of concentrations of nutrients and pesticides found in shallow ground water are closely linked to land use and the chemicals applied in each setting. Some of the highest concentrations of nitrogen and herbicides, including those most heavily used (such as atrazine, metolachlor, and acetochlor) were detected in USGS samples collected from shallow ground water in agricultural areas. Concentrations of pesticides in urban ground water were lower than in agricultural areas, but the total number of pesticides was greater.

* LINGERING LEGACY--The mixtures of contaminants found in the Eastern Iowa Basins include chemicals that are no longer in use, such as DDT, which was banned in the early 1970's. These persistent insecticides still are found at elevated levels in fish and streambed sediment at many sites sampled in eastern Iowa. But there is good news in that there has been a reduction in concentrations of these organochlorine insecticides in sediment. Concentrations of DDT and chlordane in sediments also have decreased, as indicated in sediment-core samples from the Coralville Reservoir.

* TIMING IS EVERYTHING--Seasonal patterns in water quality of streams emerged in most basins in eastern Iowa. The patterns reflect many factors, but mainly the timing and amount of chemical use. Other influences are the frequency and magnitude of runoff from rainstorms or snowmelt. Specific land-management practices, such as tile drainage also affect water quality. Concentrations of nutrients and pesticides are highest during runoff following chemical applications. The seasonal nature of these factors dictates the timing of elevated concentrations in drinking-water sources and aquatic habitats and serve as a guide in developing water management strategies.

* LAY OF THE LAND MATTERS--Local geography and natural features, including topography, geology, soils, hydrology and climate, affect the occurrence of nutrients and pesticides in water. Land-management practices such as tile drainage and conservation strategies also result in varying degrees of contamination throughout the State, the USGS report said.

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