Nitrate concentrations of ground water increasing in many areas of the United States

September 17 2008

Nitrate is the most common chemical contaminant in the world's ground water, including in aquifers used for drinking-water supply. Nitrate in drinking water of the United States is regulated by the U.S. Environmental Protection Agency (USEPA) because of concerns related to infant health and possible cancer risks. Use of man-made synthetic fertilizers has steadily increased since World War II, raising the potential for increased nitrate contamination of the nation's ground water, despite efforts in recent decades to improve land-management practices.

Monitoring nitrate trends in ground water through time is important in determining how quickly ground-water systems respond to changes in chemical use and best management practices.

One of the first nationwide studies of nitrate trends in ground water of the United States was recently completed by scientists at the U.S. Geological Survey (USGS), as part of that agency's federally-funded National Water-Quality Assessment (NAWQA) Program. In particular, monitoring data collected by NAWQA across the country in multiple aquifers were analyzed to characterize near-decadal trends in nitrate concentrations in ground water between 1988 and 2004. Results from the study were published in a companion supplement to the September-October issue of the *Journal of Environmental Quality.*

Decadal-scale changes of nitrate concentrations were evaluated in ground water samples collected from 495 wells in 24 well networks across the United States in predominantly agricultural areas. A well

network is a set of about 30 randomly-selected wells designed to examine ground-water quality in a particular region. Each well network was sampled once during 1988? and resampled once during 2000?.

Findings show statistically significant increases in concentrations of nitrate in 7 of the 24 well networks. Median nitrate concentrations of three of those seven well networks increased above the USEPA maximum contaminant level of 10 parts per million. Concentrations decreased in one network located in the Willamette Valley of Oregon. The study included estimates of the age of the ground water (that is, time since the water recharged to the aquifer); nitrate concentrations in ground water increased in response to the increased use of fertilizers since World War II.

"This study highlights the importance of maintaining long-term ground-water monitoring programs in the nation, because sustained monitoring provides critical information on changes of our nation's ground-water quality, and whether pollution prevention programs are effective in protecting this nation's ground water," said Michael Rupert, a hydrologist with the USGS.

Source: American Society of Agronomy