



Agricultural Sources of Contaminants in Groundwater

Daryl Buchholz, Extension Agronomy

In agriculture, pesticides and plant nutrients can enter the groundwater and contaminate it. These chemicals may reach large enough levels to become harmful to animals and people. So we must understand how contamination may occur and how it can be avoided. With good management practices, we can keep the groundwater from becoming contaminated by agricultural chemicals.

Agricultural Sources of Contamination

The following substances used on the farm have the potential to contaminate groundwater:

1. Livestock Waste – a major source of plant nutrients like nitrogen and phosphorous
2. Fuels and Solvents
3. Pesticides:
 - a. herbicides – used to control weeds
 - b. insecticides – used to control insects
 - c. fungicides – used to control plant diseases
4. Chemical Fertilizers
 - a. nitrogen
 - b. phosphorus



How Do These Chemicals Become Groundwater Contaminants?

1. Animal wastes from confinement areas can potentially be a serious contaminant to well water. The contaminants are in the forms of microscopic pathogens (bacteria) and plant nutrients. Plant nutrient contaminants are predominantly nitrates and, to lesser degree, phosphates. Animal waste contaminants can enter groundwater through poorly constructed wells, or percolation through soil layers.
2. Spills or leaks of fuels, solvents, and pesticides are often most reasonable explanations of well water contamination. The most common source of well contamination is inadequate well construction and maintenance. They combine to literally pour contaminants down the well into the groundwater.
3. Plant nutrients from fertilizers and animal wastes are identical. Fertilizer spills near a well pose a contamination threat. To a much lesser degree, percolation of nitrates through soil layers to the groundwater can stem from land application of animal wastes or fertilizers.

Note that nitrogen does occur naturally. Commonly grown legume plants, such as soybeans and alfalfa, produce nitrogen. This nitrogen also changes into nitrate. One cannot distinguish between these naturally occurring sources of nitrates and those added by fertilizers or animal wastes.

Nitrates can contaminate groundwater if more nitrate is applied to the soil than the plants and soil can use.

This publication was written by Karen DeFelice, former associate extension agronomist; Nyle Wollenhaupt, former state extension agronomist; and Daryl Buchholz, state extension agronomist. This material is based upon work supported by the United States Department of Agriculture, Extension Service, under special project number 89-EWQI-1-9203.



■ Issued in furtherance of Cooperative Extension Work Acts of May 8 and June 30, 1914 in cooperation with the United States Department of Agriculture. Gail L. Imig, Director, Cooperative Extension Service, University of Missouri and Lincoln University, Columbia, Missouri 65211. ■ An equal opportunity institution.