



# Protecting Your Farm's Groundwater Quality

## We All Live Downstream

Farmers usually rely on wells or springs to provide drinking water for both their families and livestock. The water that flows from these wells and springs is groundwater.

Because groundwater is buried beneath the earth's surface, it is sometimes thought that groundwater is protected from contamination. That's not the case. Activities on the land surface, including improper agricultural practices, can harm groundwater quality.

Wells and springs can become contaminated by a variety of substances. On the farm, preventing contamination by nitrate, bacteria, and pesticides deserves special consideration since sources of these contaminants are often present. Health problems for human beings and livestock can arise when these contaminants pollute a water supply.

### **Nitrate**

Nitrate is a form of nitrogen, an essential plant nutrient needed by crops to grow. When fertilizers and/or manure applications create excessive loads in the soil, nitrate can percolate downward through the soil and contaminate groundwater.

Nitrate contamination of water supplies is of concern because of the possible harmful effects on infants less than six months old; they can develop methemoglobinemia (blue-baby disease), sometimes a fatal condition. To protect babies, the drinking water standard has been set at 10 mg/l nitrate nitrogen.

Livestock may also be affected, but at much higher levels. The nitrate level in animal feed should also be considered.

To prevent nitrate contamination of groundwater, manage nitrogen wisely:

- Use a soil test, set realistic crop yield goals, and then fertilize according to crop requirements. Excess fertilizer is not only a contaminant, it is wasted money.
- Remember, manure fertilizer is a resource. Have a manure analysis done and calibrate your spreader; you can then determine the amount of nutrients being applied in manure. This will allow you to adjust your application of commercial fertilizer.
- Avoid over-applying manure on fields close to the barn while neglecting more distant ones.
- Apply nutrients close to the time of plant growth.

### **Bacteria**

Harmful bacteria may be found in sewage or animal manures. On farms, septic systems that discharge effluent into the soil are the usual method for disposing of sewage. Animal wastes may be stored in some manner on the farm and then spread on cropland.

Although the soil usually filters bacteria out of water, occasionally these microorganisms contaminate wells. The most common illnesses associated with drinking bacterially contaminated water are gastrointestinal upsets such as stomach cramps and diarrhea. To maintain health and production, livestock also need water that is free of bacterial contamination.

- Locate wells and springs upslope and away from sources of bacteria such as septic systems, manure storage areas, and feedlots.
- Divert surface water away from wells and springs.
- Ensure that wells are properly sealed, cased, and grouted; follow recommended construction standards for wells and springs.

## **Pesticides**

Pesticides are used on many farms and have the potential to pollute groundwater, especially if they are misused. Improper storage, application or disposal of pesticides may lead to groundwater contamination. Drinking contaminated water may pose health risks for human beings and animals.

Proper use of pesticides is the best way to prevent groundwater contamination:

- Read and follow the label directions on the pesticide container.
- Make sure application equipment, run at least three rinses through it, and spread rinse water over the field where the pesticide was applied or on gravel driveways or parking areas. Don't dump in one spot or spray the rinse water in the same area repeatedly.
- Triple-rinse empty pesticide containers (use this water in the spray tank), punch holes in containers, and dispose of them at approved waste disposal sites.
- Avoid mixing pesticides near wells or other sources of water.
- Consider instituting an integrated Pest Management program; it doesn't rely solely on chemicals for pest control. Biological mechanisms, cultural practices, and timely chemical applications are used to obtain the necessary control.

By wisely managing fertilizers and manure and safely using pesticides, you can avoid the problems and high costs associated with treating a contaminated water supply or finding an alternate source of water for your home and farm. Following proper farming practices will keep Pennsylvania's groundwater free of contaminants; safeguard the health of your family, neighbors, and livestock; and ensure a clean, healthy environment.

For additional information, consult the following publications.

### **County Cooperative Extension Offices:**

[Safeguarding Wells and Springs from Bacterial Contamination, S-345](#)

**The Pennsylvania Chesapeake Bay Education Office (717-238-PACD (7223)):**

[Testing Drinking Water in Agricultural Areas](#)

[Protecting Groundwater is Everybody's Business](#)

**The League of Women Voters, Citizen Education Fund (1-800-692-7281):**

[Groundwater Primer for Pennsylvanians](#)

**Regional Office of the Pennsylvania Department of Environmental Protection:**

[Manure Management for Environmental Protection](#)

Produced by the Pennsylvania Association of Conservation Districts, Inc. with financial support provided by the [Pennsylvania Department of Environmental Protection](#) Chesapeake Bay Program and the Environmental Protection Agency Section 319 Program.