PESTICIDES IN GROUND WATER

Synthetic organic pesticides are used to control weeds, insects, and other organisms in a wide variety of agricultural and nonagricultural settings. The use of pesticides has helped to make the United States the world’s largest producer of food (Barbash and Resek, 1996). Pesticide use, however, has also been accompanied by concerns about potential adverse effects on the environment and human health. A potential pathway for the transport of pesticides is through hydrologic systems, which supply water for both humans and natural ecosystems. Water is one of the primary ways pesticides are transported from an application area to other locations in the environment (fig. 1) (Barbash and Resek, 1996).

Pesticide contamination of ground water is a national issue because of the widespread use of pesticides, the expense and difficulty of remediating ground water, and the fact that ground water is used for drinking water by about 50 percent of the Nation’s population. Although application rates and the variety of pesticides used may be greater in urban areas, concern over their presence in ground water is especially acute in rural agricultural areas where more than 95 percent of the population rely upon this resource for drinking water (Solley and others, 1998).

WYOMING’S PESTICIDE MANAGEMENT PLAN

The Ground-water and Pesticide Strategy Committee (GPSC) has developed the generic State Management Plan for Pesticides in Ground Water for the State of Wyoming (SMP) (Wyoming Ground-water and Pesticides Strategy Committee, 1999). Wyoming was required by the U.S. Environmental Protection Agency to have developed an SMP in order for individuals and organizations to continue using certain pesticides in the state. The SMP includes information relating to individuals and organizations involved with implementation of the SMP, methods of preventing ground-water contamination, ground-water...
monitoring, and the responses required if pesticides are detected in ground water.

One critical part of the SMP is ground-water monitoring. This ground-water monitoring program has two phases. The first phase, baseline monitoring, is designed to determine what pesticides, if any, have leached into the county’s ground water. The second phase, problem identification monitoring, is used to gather additional information about the ground water near wells having significant pesticide detections.

Baseline monitoring is prioritized by a county rank and the vulnerability of the county’s ground water to pesticides. During development of the SMP, the GPSC evaluated each county in Wyoming to determine the potential vulnerability of the county’s ground water to pesticides. Each county was ranked according to the extent of cropland and urban areas in the county, and the amount of pesticides sold within the county in 1991 (Wyoming Ground-water and Pesticide Strategy Committee, 1999). The vulnerability map created by the Spatial Data and Visualization Center (Hammerlink and Arneson, 1998) identifies ground water found in unconsolidated Quaternary deposits (primarily alluvial and terrace deposits) and the mountainous areas throughout the county most vulnerable to pesticides (shown as red or yellow on fig. 2). The mountainous areas were not sampled, because although the hydrogeology makes the ground water susceptible to contamination, land use does not create a large potential for contamination and because sampling locations were not available in these areas.

Twelve sites were selected in Teton County (fig. 3) for baseline monitoring. All sites were located in Snake River or Buffalo Fork alluvium. All sites were sampled in late summer or fall 2001 and spring 2002. None of the 18 focal pesticides was detected in Teton County (table 1). One non-focal pesticide was detected in 3 of 12 sites sampled in Teton County; the concentrations were less than 1/1000 of the applicable drinking-water standard (U.S. Environmental Protection Agency, 2002) (table 1).

![Image](image-url)
The only detected pesticide in Teton County was prometon (detected in 5 out of 24 samples). Prometon is the active ingredient in Pramitol, a general-use pesticide, and its detection is typically associated with urban land use (Barbash and others, 1999). Prometon was also the most commonly detected pesticide in Sheridan, Crook, Johnson, and Natrona Counties.

**DATA DISTRIBUTION AND AVAILABILITY**

The sampling results have been provided to local groups interested in pesticides in ground water in Teton County. The information can be used by citizens and local governments to help understand current conditions. Analytical results of the Teton County sampling can be found in Swanson and others (2002) and Swanson and others (2003), or on the internet at [http://waterdata.usgs.gov/wy/nwis/qwdata](http://waterdata.usgs.gov/wy/nwis/qwdata). Analytical results and fact sheets for all counties sampled to date are available from the U.S. Geological Survey in Cheyenne by phone, email, and on the internet at [http://wy.water.usgs.gov/projects/pesticide/](http://wy.water.usgs.gov/projects/pesticide/).

**REFERENCES**


Figure 3. Location of wells sampled in Teton County, Wyoming, and notation of pesticide detection in each well.


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