1993

Utah water quality: Utah ground water

Howard M. Deer  
*Utah State University*

R. C. Peralta  
*Utah State University*

Robert W. Hill  
*Utah State University*

Follow this and additional works at: [https://digitalcommons.usu.edu/cee_facpub](https://digitalcommons.usu.edu/cee_facpub)

Part of the [Civil and Environmental Engineering Commons](https://digitalcommons.usu.edu/cee_facpub)

Recommended Citation

Ground water is important to the economic and physical well-being of the people of Utah. About 95% of Utah's fresh water is ground water. It provides more than 70% of the state's drinking water and is a major source of water for agriculture and irrigation (see table below). Like lakes and streams, ground water can be polluted by human activities. The many possible sources of contaminants include mining activities, landfills, septic systems, fertilizers, pesticides and municipal, agricultural and industrial wastes. Hazardous substances can move through the soil into ground water potentially causing health problems for humans and animals. Although, there have been a few localized incidents of ground water contamination in Utah, generally, Utah's ground water is believed to be of acceptable quality; especially if it is obtained from an approved water system or from a properly installed and maintained private well. To date most of Utah's ground water contamination problems have not been directly associated with agriculture or agricultural chemicals.

### Utah Ground Water

<table>
<thead>
<tr>
<th>Ground Water Use</th>
<th>Percent of Ground Water Use</th>
<th>Dependent on Ground Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irrigation</td>
<td>44%</td>
<td>10%</td>
</tr>
<tr>
<td>Public Supply</td>
<td>35%</td>
<td>66%</td>
</tr>
<tr>
<td>Industrial</td>
<td>11%</td>
<td>14%</td>
</tr>
<tr>
<td>Rural Domestic</td>
<td>5%</td>
<td>90%</td>
</tr>
<tr>
<td>Rural Livestock</td>
<td>5%</td>
<td>80%</td>
</tr>
</tbody>
</table>

*Utah Water Users Conference, 1987*

### Ground Water Contamination

Ground water and surface water are interrelated. In fact, they are parts of the same natural water system, the hydrologic cycle. Water that falls as rain or snow runs into streams or lakes, evaporates, or soaks into the soil. Some of the water that enters the soil is taken up by plant roots and some gradually seeps downward, filling spaces and cracks in the underlying layers of soil, gravel and rock. The water in these deep, saturated layers is the ground water. The water seeping down through the soil can carry with it contaminants such as water-soluble nutrients, minerals, and other substances in or on the soil. This process is known as leaching.

Many contaminants are minerals that may naturally occur in water and generally do not cause health problems, since they usually occur in very small amounts. More often they impart undesirable properties such as unpleasant taste, odor or hardness to the water.

Some contaminants are living organisms. Soil bacteria cause the most common odor, taste, and discoloration problems. Occasionally bacteria, which indicate insanitary conditions, are present and are indicators of the possible presence of disease-causing microorganisms.
While held securely to soil particles, contaminants are prevented from moving very slowly. In contrast to this is a problem, since continued leakage in one spot will lead to gradually increasing levels of contaminants. On the other hand, this slow movement of contaminants will not be confined to a small area. In addition, the limited spread increases the possibility that the water can be treated and the aquifers restored, at least partially. Thus, restoration is generally a large and costly undertaking.

Whether contaminants that leach into the ground water pose a hazard to humans or animals depends on the toxicity and concentration of the compounds. In time, contaminants form films on the soil. This can be a serious hazard to the environment. Other microorganisms. The compounds eventually result from the breakdown process are usually non-toxic.

For a contaminant to leach into ground water and present a hazard it must move through the soil and it must resist breakdown into non-toxic compounds. This is generally not a common occurrence. The soil's characteristics and the nature and amount of water applied through precipitation and/or irrigation work together to determine the movement and breakdown of contaminants in the soil.

Soils

Soil characteristics determine how a contaminant breaks down and whether it leaches into ground water. There are many factors which influence soil characteristics. The size and shape of the soil particles, how much water is available, and the type of organic matter and root systems all affect the movement of water and the breakdown of contaminants.

Both soil moisture and temperature can affect chemical breakdown. If cold rain or irrigation water cools the soil, breakdown reactions can be slowed. It can also wash pesticides off plants and into the soil, removing them from sunlight which might otherwise promote breakdown. Too much water can wash leachable-soluble chemicals beyond plant roots, resulting in ground water contamination.

Well Water Testing

About 90% of the rural population of Utah depends on ground water as the primary source of drinking water. Many of these individuals, especially those residing in rural areas, have their own wells. In light of recent reports of ground water contamination in many states, much concern exists about the safety of well water.

No regulations govern water quality in private wells. There is a need for monitoring of contaminants and no requirements for tests to be made at regular time intervals. However, health agencies do make recommendations on the suitability of well water based on standards established for public drinking water supplies.

Tests of well water have to be very specific. It is not possible to test one well and determine what the contaminants are in other wells in that area. Thus, it is up to the well owner to decide if particular tests should be performed.

If the well owner finds that the well should not be used, there are three basic alternatives: install a new well; connect with a public system (if available); use bottled water; install filters; or move to another area.

Drilling a new well into the same aquifer may not solve the problem if the contaminant has polluted all or most of the aquifer or if the source of contamination has not been identified. It is also expensive. Connecting with a public system will only work if one is close enough. Bottled water is generally just a temporary solution. In addition to that, the quality of bottled water is not always certain. Installation of filters may appear to be an attractive solution but these devices are unsanitized and very ineffective; they require careful maintenance and generally lack malfunction indicators. The last solution, moving to another location, is a drastic one but may be necessary in extreme situations.

Water Analysis Laboratories

If you believe that you have a water problem, contact your local health department. In some cases you may find it necessary to obtain your own analysis.

The following list of certified laboratories can conduct various water analyses. Contact the laboratory for instructions on how to submit samples. These laboratories have been certified by the Utah Department of Health to perform various environmental chemical and microbiological analyses.

American West Analytical Laboratories
453 West 3600 South
Salt Lake City, Utah 84115
266-5858

Central Valley Water Reclamation Lab
800 West Central Valley Rd
Salt Lake City, Utah 84119
973-9100

Chemtech
6100 South Strathmore Avenue
Murray, Utah 84107
262-7299

DataChem Laboratories
960 West LaVoy Drive
Salt Lake City, Utah 84123
286-7700

Ford Chemical Laboratory
40 West Louise Avenue
Salt Lake City, Utah 84115
466-8761

Mountain States Analytical
1645 West 2200 South
Salt Lake City, Utah 84119
973-0305

Southern Utah State Water Laboratory
351 West Center Street
Cedar City, Utah 84720
586-7914

Utah State University
Salt, Plant, and Water Analysis Laboratory
Logan, Utah 84322-4930
750-2217

For Further Information

More extensive information on ground water and on drinking water in Utah can be obtained from the following:

Department of Agriculture
- Division of Environmental Quality 538-7179

Department of Health
- Division of Drinking Water - Sanitation 538-6159
- Division of Water Pollution Control 538-6146

Department of Natural Resources
- Division of Water Resources 538-7230