WATER FACT SHEET

U.S. GEOLOGICAL SURVEY, DEPARTMENT OF THE INTERIOR

U.S. GEOLOGICAL SURVEY GROUND-WATER STUDIES IN UTAH

GROUND-WATER ISSUES

Ground water is an important natural resource in Utah. In the basins west of the Wasatch Front, and in many other parts of Utah, ground water is the primary source of water. In many of the basins of the western desert and in parts of the Colorado Plateau, ground water is the only reliable source of water. Along the Wasatch Front to the north and south of Salt Lake City, in the Uinta Basin, and in the Sevier River drainage, surface water is the primary source of water.

Ground-water sources supply about 20 percent of all water used in Utah and about 63 percent of the water for public supply. Of the total amount of ground water used, 44 percent is for irrigation, 35 percent is for public supply, 11 percent is for industry, 5 percent is for rural domestic supplies, and 5 percent is for livestock. The major issues related to ground water in Utah are:

- Development of additional ground-water supplies while protecting existing water rights and minimizing effects on water levels, water quality, and streamflow, and
- Protection of ground-water resources from contamination by pollutants from various types of land-use and waste-disposal practices.

U.S. GEOLOGICAL SURVEY PROGRAMS

The U.S. Geological Survey (USGS), established in 1879, is the principal source of scientific and technical expertise in the earth sciences within the Federal government. USGS activities include research and services in the fields of geology, hydrology, and cartography. The mission of the Water Resources Division of the USGS is to develop and disseminate scientific information on the Nation's water resources. The activities of the Water Resources Division in Utah are conducted by scientists, technicians, and support staff in offices in Salt Lake City, Cedar City, and Moab.

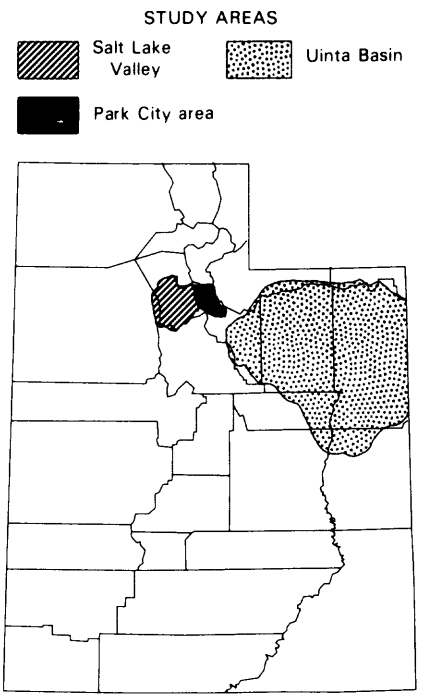
Hydrologic-data stations are maintained at selected locations throughout Utah to record data on stream discharge and stage, reservoir and lake storage, ground-water levels, well and spring discharge, and the quality of surface and ground water. Water-resources data are stored in the USGS National Water Data Storage and Retrieval System data base. These data are used by water planners and others involved in decisions that affect Utah's water resources.

During 1987, the USGS, in cooperation with State agencies, maintained a network of about 1,100 observation wells to monitor fluctuations in water levels, and about 200 observation wells to monitor water quality. Water-level measurements in wells and chemical analyses of water from wells are used to monitor trends in ground water; however, they need to be evaluated along with other observations and results of ground-water investigations to be most relevant and useful.

The USGS has conducted about 190 hydrologic investigations in Utah. During fiscal year 1987, the USGS entered into agreements with 16 Federal, State, and local agencies involving 24 hydrologic investigations in Utah; 16 of these included studies of ground-water quantity and quality. Three examples of ground-water studies by the USGS that were designed to address specific ground-water issues in Utah are discussed in the following sections.

Ground Water in the Salt Lake Valley

Concern about the potential effects of increased ground-water development in the Salt Lake Valley led to a study by the USGS during 1981–85 in cooperation with the Utah Division of Water Rights (UDWR), the Salt Lake County Water Conservancy District, Central Utah Water Conservancy District, Salt Lake City Department of Public Utilities, five cities, and three local water agencies. During the study, the USGS evaluated ground-water levels, recharge, withdrawals, and water quality. The study included the development of a computer model capable of simulating the valley's ground-water system. The model can be used to predict changes in water levels resulting from changes in ground-water withdrawals or recharge, and to help estimate changes in ground-water quality. The results of this study have been used by the UDWR. The UDWR also has used the computer model to evaluate the effects of ground-water pumpage



on water levels. The model will be used to determine effects of alternative pumpage plans on water-level declines and encroachment of saline or contaminated water.

Availability and Contamination of Water in the Park City Area

Park City is a rapidly-growing winter-recreation and year-around residential area in the Wasatch Range about 30 miles east of Salt Lake City. The area includes the site of the proposed Jordanelle reservoir, a planned part of the Central Utah Project. The surface water of the area, most of which is part of the Weber River drainage, is appropriated for use downstream. Future residential and recreation development in the area will require additional water supplies. In cooperation with the UDWR, the USGS investigated the water resources of the Park City area, with emphasis on ground water, from 1982 through 1985 to determine the hydrologic characteristics of geologic units, to obtain improved estimates of recharge, movement, and discharge of ground water, and to define ground-water quality. Results of the study indicated that two consolidated-rock units have the potential to yield large quantities of water. Increased withdrawals of ground water, however, may decrease the flow of springs and streams, lower water levels in wells, and allow the encroachment of contaminated water into aquifers containing freshwater. The construction and filling of the proposed Jordanelle reservoir may require increased pumping to dewater mines in the Park City area. The USGS, in cooperation with the Utah Division of Environmental Health, Park City, and the U.S. Environmental Protection Agency, also investigated possible ground- and surface-water contamination in a residential and commercial development on the east side of Park City. Much of that area is underlain by mill tailings that contain elevated concentrations of arsenic, cadmium, mercury, and lead. The USGS supervised drilling of 18 test wells in the valley fill, measured ground-water levels, and collected water samples for chemical analyses. The information from this study will be used to determine the direction of ground-water flow, and whether metals are being leached from the tailings and moving into ground or surface water.

Saline Ground Water in the Uinta Basin

The Utah Division of Oil, Gas, and Mining (UDOGM) needed to know the depth to the base of moderately-saline ground water (dissolved solids of 3,000 to 10,000 milligrams per liter) in order to specify the depth above which ground water needs to be protected from reinjected oil-and-gas brine and from activities associated with drilling. (Moderately-saline water is considered to be potentially treatable for municipal and industrial use.) During 1984-86, the USGS, in cooperation with the UDOGM, used water-quality data and geophysical logs to prepare a map of the altitude of the base of moderately-saline water. The map showed that a mound of very saline water occurs in much of the Uinta Basin, with its upper surface locally at or near the land surface. The map will be used by the State in their programs of underground-injection control and ground-water protection.

GROUND-WATER MANAGEMENT

Several State agencies are responsible for ground-water management, protection, and planning. The Utah Department of Natural Resources, Division of Water Rights, administers the appropriation, apportionment, measurement, and distribution of water, and licenses and regulates well drillers. The Utah Department of Health, Division of Environmental Health, which oversees the quality of water for public supply and other uses, is responsible for ground-water-quality protection, and regulates the disposal of solid and hazardous waste. The Utah Department of Natural Resources, Division of Water Resources, is responsible for the overall planning and management of water-resources development. The Utah Department of Natural Resources, Division of Oil, Gas, and Mining, is responsible for the regulation of the disposal of oil-field wastes, and the protection of ground-water from adverse affects of the extraction of energy and mineral resources.

All of these agencies, as well as other State and county agencies, cities, and water-conservancy districts, use data and the results of ground-water studies conducted by the USGS. During fiscal year 1988, the following Federal and State agencies entered into interagency or cooperative cost-sharing agreements with the USGS to conduct ground-water investigations in Utah:

U.S. Air Force
U.S. Bureau of Land Management
Utah Department of Health
  Division of Environmental Health
Utah Department of Natural Resources
  Division of Water Rights
  Division of Water Resources
  Division of Oil, Gas, and Mining
Utah Department of Transportation

SELECTED REFERENCES

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Holmes, W.F., Thompson, K.R., and Enright, Michael, 1986, Water resources of the Park City area, Utah, with emphasis on ground water: Utah Department of Natural Resources Technical Publication No. 85, 81 p.

Howells, Lewis, Longson, M.S., and Hunt, G.L., 1987, Base of moderately saline water in the Uinta Basin, Utah, and methods used in determining its position: Utah Department of Natural Resources Technical Publication No. 92, 59 p.

U.S. Geological Survey, 1985, National water summary 1984—Hydrologic events, selected water-quality trends, and ground-water resources: U.S. Geological Survey Water-Supply Paper 2275, 467 p.

Waddell, K.M., Seiler, R.L., Santini, Melissa, and Solomon, D.K., 1987, Ground-water conditions in Salt Lake Valley, Utah, 1969-83, and predicted effects of increased withdrawals from wells: Utah Department of Natural Resources Technical Publication No. 87, 69 p.

Waddell, K.M., Seiler, R.L., and Solomon, D.K., 1987, Chemical quality of ground water in Salt Lake Valley, Utah, 1969-85: Utah Department of Natural Resources Technical Publication No. 89, 56 p.

Information on technical reports and data related to ground water in Utah can be obtained from:

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