88-117

WATER FACT SHEET

U.S. GEOLOGICAL SURVEY, DEPARTMENT OF THE INTERIOR

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

GROUND-WATER ISSUES

Although farmlands have been irrigated on the Snake River Plain in southern Idaho since the late 1800's, it was not until after about 1945 that the vast aquifers in that part of the State were developed to supplement surface-water supplies. Since that time, development of ground-water resources has increased steadily; by 1980, 1 million acres on the Snake River Plain were irrigated with about 2 billion gallons per day of water withdrawn from about 5,300 wells. Statewide, ground-water withdrawal in 1985 was 4.8 billion gallons per day. Ground water is used extensively throughout the State for public, industrial, domestic, and agricultural supply. Agriculture, the principal use of the resource, accounted for 91 percent of all ground-water withdrawals during 1985. Because of heavy use of the resource between 1971 and 1982, water-level declines of as much as 53 feet were observed in 75 percent of 361 observation wells statewide. Declines of more than 10 feet were most common in or near areas of intensive agricultural development. The major issues related to ground water in Idaho are:

- Availability of supplies,
- Chemical quality, and
- Contamination by hazardous wastes.

U.S. GEOLOGICAL SURVEY PROGRAMS

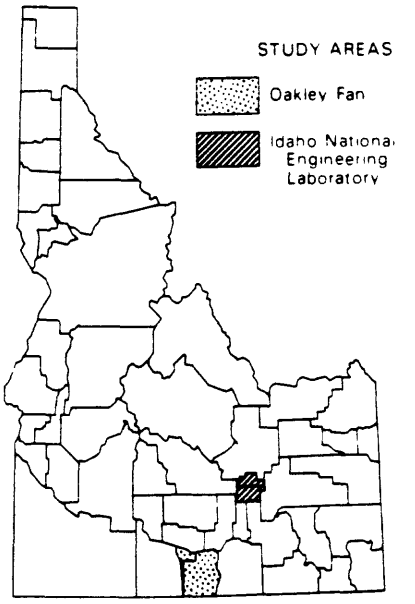
The U.S. Geological Survey (USGS) was established by an act of Congress on March 3, 1879, to provide a permanent Federal agency to conduct systematic and scientific classification of the public lands. Since its founding, the research and fact-finding role of the USGS has evolved to meet the changing needs of the Nation. The USGS has become the Federal government's largest earth-science research agency, the Nation's largest civilian map-making agency, and the primary source of data on the Nation's surface- and ground-water resources.

The USGS maintains stations for the collection of hydrologic data at selected locations throughout Idaho. Data collected from this statewide network include stream discharge and stage, reservoir and lake storage, ground-water levels, well and spring discharge, and quality of surface and ground water. The data are stored in the USGS National Water Data Storage and Retrieval System. These data are used by planners and others involved in making decisions that affect Idaho's water resources.

In Idaho, the USGS has conducted numerous investigations that cover a wide range of hydrology, but generally have been directed toward ground-water quantity and quality. The investigations provide information about specific water issues and assist water users to manage the resource. Three examples of ground-water studies by the USGS are discussed in the following sections.

Artificial Recharge in the Oakley Fan Area

Eight areas in Idaho have been designated by the Idaho Department of Water Resources (IDWR) as "Critical Ground-Water Areas." Areas so designated have shown prominent declines in ground-water levels and are closed to further unrestricted ground-water development. The Oakley Fan area in south-central Idaho includes four such critical areas. Between 1976 and 1984, water levels declined an average of about 5 feet per year; pumping lifts commonly were about 400 feet, and as much as 600 feet. The U.S. Bureau of Reclamation (BOR) proposed the Oakley Fan area for artificial recharge demonstration studies beginning in 1989 as part of the BOR High Plains States Groundwater Demonstration Program. A study was needed, therefore, to define the complex hydrology of the area so that a ground-water model could be developed and calibrated before proposed artificial-recharge studies began. In cooperation with the Southwest Irrigation District, the USGS measured 500 wells in the Oakley Fan area during 1984. Using all available hydrologic information, the USGS developed a ground-water flow model of the aquifers in the fan area. When artificial



recharge studies are made, the response of the aquifer predicted by the model will be compared with actual water-level measurements in observation wells. Then the model will be used by water managers to simulate the effects of alternative water-management plans for the area.

Statewide Ground-water Quality

Between 1975 and 1983, the USGS, in cooperation with the IDWR, began a program to appraise the State's major aquifers and to define ground-water quality. By 1983, studies were completed and reports written for seven areas. In 1987, in cooperation with the Idaho Department of Health and Welfare, a study was begun to investigate water quality in principal aquifers of the State and to determine the susceptibility of the aquifers to contamination from human activities. During 1987, 172 water samples were collected from wells in three heavily irrigated agricultural areas in south-central Idaho. The samples were analyzed for selected constituents. The concentration of dissolved nitrate as nitrogen exceeded the State's standard of 10 milligrams per liter (mg/L) in 13 percent of the samples; the concentration was 76 mg/L in one sample. Three other agricultural areas have been selected for sampling in 1988. The results of this study will assist State water managers to decide whether to implement further studies in these areas or to take regulatory action.

Subsurface Waste Disposal

A small part of the vast Snake River Plain aquifer underlies and is the source of water for the Idaho National Engineering Laboratory (INEL). In this area, the aquifer also serves as a repository for small quantities of low-level radioactive- and chemical-aqueous wastes, generated by activities at INEL, that were either injected directly into the aquifer through an injection well or discharged to surface ponds. Since 1984, the injection well has been used only during emergencies; however, ponded aqueous waste infiltrates the soil and may eventually percolate downward to the aquifer. Wastes that reach the aquifer are downgradient from the part of the aquifer that supplies water to the INEL, and move toward the southern boundary of the INEL. The USGS, in cooperation with the U.S. Department of Energy, has developed an extensive network to collect geohydrologic, hydraulic, geochemical, and radioisotope data at the INEL. Numerous interpretive studies by the USGS describe the temporal and spatial distribution of radioactive- and chemical-waste solutes and the processes that control their concentration and migration rates, including dispersion, adsorption, dilution, radioactive decay, and chemical reactions. A continuing data-collection program provides the information needed to support future geohydrologic research. This research will assist managers in resolving problems concerning migration and disposition of radioactive and chemical waste.

GROUND-WATER MANAGEMENT

Management of ground-water resources and the protection of these resources from wastes and contamination in Idaho are the responsibilities of the IDWR and the Department of Health and Welfare, Division of Environment. The IDWR has authority to assess ground-water resources, to issue well permits, and to regulate injection wells. The Department of Health and Welfare manages the quality of ground water in Idaho and is responsible for implementing most State statutes and federally-delegated authority for implementing water-quality standards. Both agencies use results of ground-water studies provided by the USGS. During 1987 and 1988, the following Federal, State, and local agencies entered into interagency or cooperative cost-sharing agreements with the USGS to collect hydrologic data or conduct ground-water investigations in Idaho:

City of Boise
College of Southern Idaho
Idaho Department of Fish and Game
Idaho Department of Health and Welfare
  Division of Environment
Idaho Department of Water Resources
  Water District 01
National Park Service
Shoshone-Bannock Tribes
Shoshone County
Southwest Irrigation District
State of Idaho
  Office of the Governor
Sun Valley Water and Sewer District
Teton County
U.S. Air Force
U.S. Army Corps of Engineers
U.S. Department of Energy
  Bonneville Power Administration
  Idaho Federal Energy Commission
  Idaho National Engineering Laboratory
  Washington Federal Energy Commission
U.S. Department of the Interior
  Bureau of Land Management
  Bureau of Reclamation

SELECTED REFERENCES

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U.S Bureau of Reclamation, 1987, High Plains States groundwater demonstration program: U.S. Bureau of Reclamation, Phase I report, December, 1987, 245 p.

U.S Geological Survey, 1984, National water summary 1983—Hydrologic events and issues: U.S. Geological Survey Water-Supply Paper 2250, 243 p.

———1987, Activities of the U.S. Geological Survey, Water Resources Division—Status of Idaho projects, fiscal year 1984: U.S. Geological Survey Open-File Report 87-115, 60 p.

Yee, J.J.S., and Souza, W.R., 1984, Quality of ground water in Idaho: U.S. Geological Survey Water-Supply Paper 2270, 53 p.

Young, H.W., and Norvitch, R.F., 1983, Ground-water level trends in Idaho, 1971–82: U.S. Geological Survey Water-Resources Investigations Report 83-4285, 28 p.

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

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230 Collins Road
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University of Idaho
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