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WATER FACT SHEET

U.S. GEOLOGICAL SURVEY, DEPARTMENT OF THE INTERIOR

GROUND-WATER ACTIVITIES OF THE U.S. GEOLOGICAL SURVEY: AN OVERVIEW

INTRODUCTION

Ground water is among the Nation's most important natural resources. It is the source of drinking water for more than half of the total population and irrigation water for a multibillion-dollar agricultural industry. Development of ground-water resources has steadily progressed during the last century, accompanied by a gradually shifting emphasis from exploration for new supplies to management of existing supplies. That shift has occurred partly because much is now known about the distribution, physical characteristics, and potential yield of aquifer systems (water-bearing rocks), and partly because the ground-water resource has become highly developed. The increased development in places has resulted in significant water-level declines, high pumping costs, and, in some cases, irreversible depletion of ground water.

During the past decade, there has been a growing public awareness that ground water can be contaminated by toxic or hazardous industrial, domestic, and agricultural chemicals and byproducts. The need to define the extent, nature, and degree of contamination, as well as the effects of the contaminants, now dominates the national concern.

The United States Geological Survey (USGS) is the principal source of scientific and technical expertise in the earth sciences within the Department of the Interior and the Federal government. Its activities span a wide range of earth-science research investigations and services in the fields of geology, hydrology, and cartography, and represent the continuing pursuit of a long-standing scientific mission. The USGS does not manage, regulate, or formulate policy related to ground water. As a result, it has been able, for more than 100 years, to provide water managers and policymakers technically sound and unbiased data and reports that describe the occurrence and quality of ground water.

More than one-third of the Geological Survey's total resources are directed toward water-related programs. The hydrologic professional staff of some 1,700 hydrologists, geologists, engineers, chemists, and biologists (the largest such group in the United States) is currently conducting field investigations in the 50 States, Puerto Rico, and the Trust Territories. These investigations are conducted at the "grass-roots" level. The work-force is located at four regional offices, three research centers, 43 District Offices that largely coincide with State boundaries, and more than 150 field offices.

Total funding for USGS water-related programs in fiscal year 1987 was about $267 million. A little more than half of this amount came from directly appropriated funds, while the remainder came from funds for programs conducted and paid for by various agencies at State, local, and Federal levels throughout the country. Almost half of those expenditures were for ground-water investigations. In recent years, the major emphasis in the USGS ground-water work has shifted dramatically from ground-water availability to ground-water quality.

GROUND-WATER PROGRAMS

The primary goal of the USGS ground-water programs is to develop technical and scientific information that will benefit others at all levels of government and in the private sector. This information supports water-resources planning and decision-making for issues such as allocation, design, construction, legislation, and regulation. The work ranges from the collection of basic hydrologic data, through a wide variety of applied research field studies, to basic research in the laboratory and in the field. In fiscal year 1987, this effort consisted of about 500 separate projects funded at more than $100 million.

The following are brief descriptions of selected USGS programs, particularly as they relate to ground-water activities.

- The Federal-State Cooperative Water Resources Program operates with 50-50 cost-share funding for the conduct of studies that meet State and local needs and also serve the national interest. The program has been active for nearly a century. Many ground-water studies have been conducted in each of the 50 States, Puerto Rico, and the Trust Territories. The publications produced by this program are the major source of information about the extent and character of the Nation's aquifers, and the occurrence, nature, and chemical quality of ground water. In addition to areal and interpretive studies, the Cooperative Program also provides funds for the collection of ground-water data. In fiscal year 1987, for example, the program supported the collection of water-level data from more than 28,000 wells, and selected water-quality constituents were determined from samples collected at almost 8,000 of these wells. Information obtained from over 900,000 wells is maintained by the USGS in computer files that can be readily accessed for information.

- The Regional Aquifer-System Analysis Program (the RASA Program) is the systematic study of a number of regional ground-water systems that together cover much of the country and represent a significant portion of the Nation's total water supply. Twenty-eight regional systems have been designated for study under the program. Twenty studies have been

completed or are in progress. The objectives of the RASA Program are to provide an understanding of ground-water flow systems and water-quality distributions on a regional scale, to provide predictive capabilities through the use of computer simulation, and to provide a regional hydrogeologic framework for more detailed local investigations.

- The Nuclear-Waste Hydrology Program provides for research and field studies to develop information for the use of other government agencies in managing the disposal of nuclear wastes. The USGS studies the environment of potential sites and the processes affecting the transport and containment of radioactive waste materials.

- The Toxic Waste—Ground-Water Contamination Program addresses nonradioactive contaminants in ground water, such as effluent from landfills or accidental spills. The program is designed to improve the understanding of the hydrogeologic setting, and the hydraulic, chemical, and microbiologic processes that control the movement, alteration, and fate of contaminants in ground water.

- The National Water-Quality Assessment Program is in a developmental phase. If the program becomes operational, it will provide a scientific basis for evaluating the effectiveness of water-quality management programs and for predicting the water-quality impacts of changing land-, water-, and waste-management practices. The program will provide nationally consistent descriptions of ground-water quality, define long-term trends in water quality, and identify relations between water quality and human activities.

- The National Research Program conducts basic and applied research to increase the understanding of the fundamental hydrologic processes that control the movement of water and chemical constituents in the Nation's ground-water systems. Ground-water research projects characterize aquifer systems, identify chemical or geochemical processes, and develop computer simulation techniques that increase confidence in predictive capabilities. Many elements of the National Research Program are deeply involved with problem-oriented studies in the Federal-State Cooperative, RASA, and Hazardous-Waste Programs.

- The Other Federal Agencies Program supports the missions of other Federal agencies through the conduct of field investigations, data collection, and research. For example, with funding support from the U.S. Department of Energy, the USGS has the primary responsibility for evaluating the geology and hydrology of the candidate nuclear waste repository site at Yucca Mountain, Nevada.

- The National Water-Use Information Program collects, stores, analyzes, and disseminates water-use information in a cooperative effort in 49 States and Puerto Rico.

- The State Water Resources Research Institutes and Research Grants Programs coordinate the conduct of water-related research, technology dvelopment, and information transfer at 54 Institutes located in a university or college in each State, the District of Columbia, Guam, Puerto Rico, and the U.S. Virgin Islands. Each Institute receives limited matching Federal funds for its efforts to resolve critical State water problems. Research-grants proposals are solicited annually by the USGS from the public and private sectors. Grants are awarded on the basis of peer review and panel recommendations.

- The ground-water clearinghouse activities of the USGS draw upon various programs, such as the National Water Data Exchange and the Water Resources Scientific Information Center, that collect and disseminate water-resources information. A computerized network links more than 200 offices nationwide, permitting efficient access to ground-water information.

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