88-119

WATER FACT SHEET

U.S. GEOLOGICAL SURVEY, DEPARTMENT OF THE INTERIOR

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

GROUND-WATER ISSUES

Ground water is an important natural resource in Nevada. In 1985, ground water provided 24 percent of the total water withdrawn, and supplied about 40 percent of the State's population; in many localities, ground water provided the entire supply. Surface-water supplies in Nevada, the most arid State in the Nation, have been fully appropriated. Further population growth or industrial development must rely either on ground-water sources or on the reallocation of water supplies. Irrigation, the largest use of ground water, accounted for about 82 percent of total ground-water withdrawal. Public supply and self-supplied domestic use accounted for about 12 percent of the ground water withdrawn, and self-supplied industrial and mining use was about 3 percent. The major issues related to ground water in Nevada are:

- Ground-water availability;
- Natural and artificial ground-water recharge;
- Underground storage of hazardous wastes;
- Organic and inorganic trace constituents in ground water; and
- Geothermal ground-water systems.

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 knowledge and understanding of the Nation's water resources. Activities of the Water Resources Division in Nevada are carried out by about 100 scientists, technicians, and support staff at offices in Carson City, Las Vegas, and Elko.

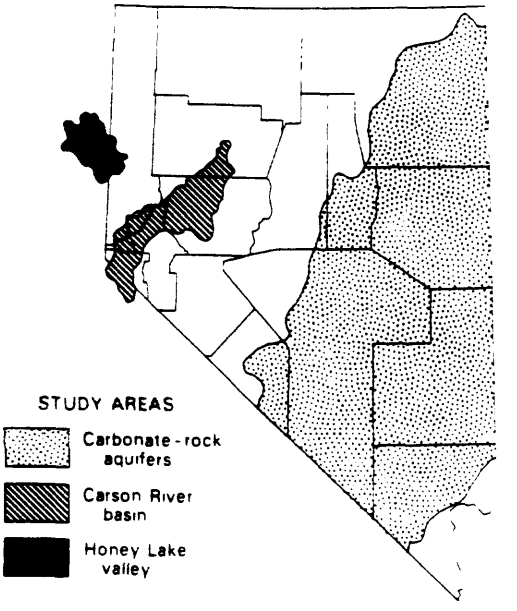
Hydrologic-data stations are maintained by the USGS at selected locations throughout Nevada to obtain records on ground-water levels, spring discharge, stream discharge and stage, reservoir and lake storage, and the quality of ground water and surface water. Water-resources data are stored in the USGS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

Since about 1945, the USGS has monitored ground-water levels in Nevada, using a statewide network of observation wells. The USGS ground-water data base for Nevada currently (1988) contains information from more than 9,000 well sites, including about 70,000 water-level measurements. Water-level measurements in wells are used to monitor ground-water trends and to identify directions of ground-water flow; however, they must be integrated with other observations and investigations to be relevant and useful.

The USGS has published about 300 reports on ground water in Nevada since 1904. The USGS is actively conducting 30 hydrologic investigations in Nevada, of which 18 are related to ground-water quantity and quality. These investigations will provide information needed to answer hydrologic questions that are specific to the State's major ground-water issues. Some of these investigations will provide information on statewide, multistate, and national hydrologic problems. Three examples of ongoing ground-water studies by the USGS that are designed to address specific ground-water issues in Nevada are discussed in the following sections.

Carbonate-Rock Aquifers in Eastern and Southern Nevada

Population growth in the Las Vegas area during the last 40 years has resulted in demands for water far beyond the sustainable yield of the sand-and-gravel aquifers that underlie Las Vegas Valley. Since as early as 1965, carbonate-rock aquifers have been recognized as potential sources of additional ground water. (The carbonate-rock aquifers are thick sequences of fractured limestone and dolomite rocks that underlie most



of the mountains and valleys in eastern and southern Nevada.) The USGS is currently studying the water resources of these carbonate-rock aquifers. The studies include efforts by the U.S. Bureau of Reclamation and the University of Nevada's Desert Research Institute, and are being made in cooperation with the State and the Las Vegas Valley Water District. Studies to date have focused on southern Nevada in an effort to determine the potential of the aquifers to help meet the future water needs of Las Vegas. Among the activities to date are specialized mapping of surficial geology (on site and from satellite imagery), geophysical measurements, drilling and testing of exploration wells, investigations of water use by native plants, collection and synthesis of basic hydrologic data, and investigations of the chemistry of water in the aquifers. Results of all the activities are being summarized for use by water managers of the Nevada Department of Conservation and Natural Resources, the as Vegas Valley Water District, and the Clark County Department of Comprehensive Planning.

Ground-Water Quality in the Carson River Basin, Nevada-California

In 1986, the USGS began a program to assess the quality of the Nation's ground- and surface-water resources. This program, called the National Water-Quality Assessment program, is designed to acquire and interpret information about a wide range of water-quality issues. One of the pilot projects in this program is a study of ground-water quality in the Carson River basin of western Nevada and eastern California. The 3,980-square-mile study area consists of a headwaters area and six alluvial valleys interconnected by the Carson River. Ground water is stored primarily in deposits of gravel, sand, silt, and clay that have accumulated in the deep bedrock basins underlying each valley. Principal water-quality issues are related to concern over the potential contamination of drinking-water supplies from natural and agricultural sources, and as a result of rapid urban, suburban, and industrial growth.

Ground Water in Honey Lake Valley, Nevada-California

The Reno-Sparks area in western Nevada is one of the fastest-growing population centers in the United States. Nearly all economically available surface water and ground water in the vicinity already has been allocated, and more distant basins are being sought to supply the water needed for continued growth. The Nevada part of Honey Lake Valley, about 50 miles north of Reno, is being considered as a possible source of ground water. The USGS, in cooperation with the Nevada Department of Conservation and Natural Resources and the California Department of Water Resources, began a detailed investigation of the water resources of Honey Lake Valley in 1987. The study elements include the hydrogeologic "framework' of the ground-water flow system, the storage and movement of ground water within that system, and the rates of ground-water replenishment and depletion. A computer model of the ground-water flow system will be used to determine the direction and magnitude of ground-water flow at the Nevada-California border. The model also will be used to guide further data collection and to estimate the possible effects of various water-management alternatives.

GROUND-WATER MANAGEMENT

The principal State agencies responsible for ground-water management in Nevada are the Division of Water Resources and Division of Environmental Protection, Department of Conservation and Natural Resources. The Division of Water Resources is responsible for the administration of water law in Nevada, and the Division of Environmental Protection is responsible for coordinating efforts to protect the quality of the State's water resources. Both agencies use ground-water data and the results of ground-water studies provided by the USGS. During 1987-88, the following Federal, State, and local agencies entered into cost-sharing agreements with the USGS to make ground-water investigations in Nevada:

Carson City Public Works Department
Douglas County
Elko County
Las Vegas Valley Water District
Mackay School of Mines, University of Nevada
Nevada Bureau of Mines and Geology
Nevada Department of Conservation and Natural Resources
  Division of Environmental Protection
  Division of Water Resources
Nevada Senate Interim Finance Committee
U.S. Bureau of Land Management
U.S. Bureau of Reclamation

SELECTED REFERENCES

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

_____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.

_____1986, National water summary 1985—Hydrologic events and surface-water resources: U.S. Geological Survey Water-Supply Paper 2300, 506 p.

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

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Open-File Report 88-119

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