88-159

WATER FACT SHEET

U.S. GEOLOGICAL SURVEY, DEPARTMENT OF THE INTERIOR

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

GROUND-WATER ISSUES

Ground water is an abundant and important natural resource in California. An average of 16.6 million acre-feet of fresh ground water (20 percent of the total withdrawn in the United States) is withdrawn annually to supply 39 percent of the freshwater used in the State. Of the total fresh ground water withdrawn, 70 percent is used for irrigation, 25 percent for public supply, 2 percent for industrial self-supplies, 1 percent for domestic supplies, 1 percent for mining, and 1 percent for livestock, thermoelectric power, and commercial self-supplies. Ground-water sources supply more than 18 million people (69 percent of the population). The major issues related to ground water in California are:

- Effects of agricultural practices on water quality,
- Saltwater intrusion in central and south coastal aquifers, and
- Conjunctive use of surface and ground water in southern California.

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 in 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 California are conducted by scientists, technicians, and support staff in Sacramento, San Diego, Menlo Park, Bakersfield, Eureka, Loma Linda, Merced, Redding, Salinas, Santa Barbara, Santa Rosa, Santee, and Tahoe City.

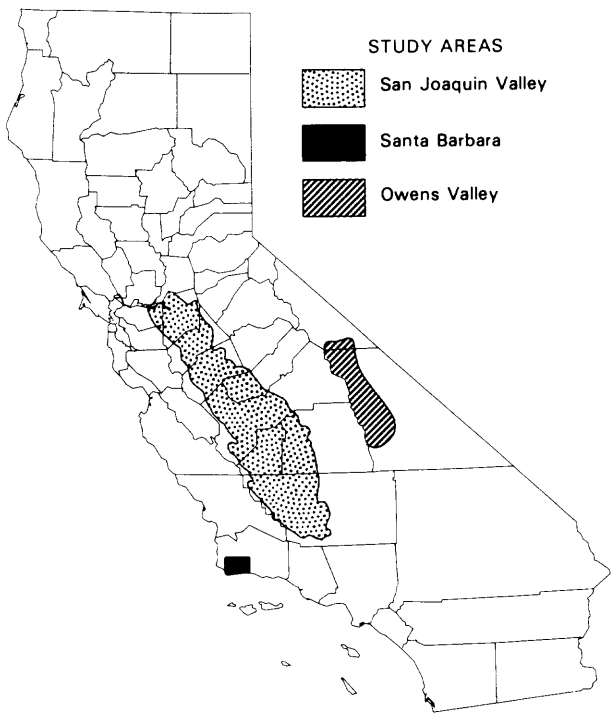
Hydrologic-data stations are maintained at selected locations throughout California to record data on stream discharge and stage, reservoir storage, ground-water levels, well and spring discharge, and the quality of surface and ground water. Water-resources data are stored in the USGS National Water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

During fiscal year 1987, the USGS maintained a network of 979 observation wells to monitor fluctuation of water levels. In addition, 413 wells were sampled to define water quality. Water-level measurements and water-quality analyses are used to define current conditions, changes, and trends at the monitored well. These data also are integrated with other observations for hydrologic research and appraisal investigations.

The USGS has conducted more than 250 hydrologic investigations and published about 2,100 water-resources-related reports in California. The program in fiscal year 1987 consisted of 39 investigations, of which 25 included studies of ground-water quantity and quality. Examples of studies by the USGS that address specific ground-water issues in California are discussed in the following sections.

Ground-water Quality, San Joaquin Valley

The San Joaquin Valley is the most productive agricultural area in the Nation. Intensive agricultural practices have affected ground-water quality. Many concentrations of trace elements in shallow ground water of the western San Joaquin Valley exceed drinking-water and aquatic-life limits. Pesticides may also have caused contamination of some parts of the regional aquifers. Since 1985, the USGS has conducted an investigation in the San Joaquin Valley to assess the distribution of major ions, trace elements, and pesticides; to evaluate historic changes in ground-water chemistry due to increased recharge of irrigation water and overdrafts caused by pumping for irrigation; to determine the regionally important geochemical processes that control trace-element concentrations in ground water; and to evaluate the key hydrologic and pesticide-use factors that affect the degree of contamination of water-table aquifers. This investigation is part of the Regional Aquifer-System Analysis program of the USGS. The investigation is closely coordinated with a comprehensive hydrogeologic and geochemical study to determine the sources, distribution, movement, and fate of trace elements in the western San Joaquin Valley. Data collected since



1985 have been analyzed by the USGS to determine if irrigation water, applied since 1900, has entered the regional aquifer. This information will help water-management agencies determine whether contaminants in shallow ground water could eventually affect regional aquifers.

Saltwater Intrusion at Santa Barbara

Since 1977, the USGS, in cooperation with the city of Santa Barbara, has conducted hydrologic investigations to evaluate the effects of pumpage on the Santa Barbara ground-water basin. These investigations have documented elevated chloride concentrations in near-coastal monitoring wells in the ground-water basin. Wells used for city water supply are in this basin. Since 1986, the cooperative program with the city has continued with a study to determine the extent of the saltwater intrusion. The USGS has installed additional monitoring wells and defined the extent of intrusion. A solute transport model, developed by the USGS, is being used to simulate the movement of saltwater into the freshwater aquifers. The model will enable the city to plan the locations of wells and pumping patterns that will prevent further saltwater intrusion.

Ground-water Management, Owens Valley

In the southern part of the State, the limited surface-water supply has necessitated the intensive use of ground water and caused severe overdraft in some local basins. With increasing demands owing to population growth in southern California, management of local ground-water basins requires the conjunctive use of ground water from the local basins, from local surface runoff, and from water imported from Owens Valley and other sources. In cooperation with the city of Los Angeles and the Inyo County Department of Water, the USGS is developing computer models of the Owens Valley ground-water basin that will be used to plan state-of-the-art ground-water management alternatives. The results of the study will enable the city of Los Angeles and Inyo County to improve management of withdrawals of water from the Owens Valley ground-water basin.

GROUND-WATER MANAGEMENT

In California, ground water is managed by local and regional water agencies. The Department of Water Resources is responsible for statewide water-supply planning. The State Water Resources Control Board and nine Regional Water Quality Control Boards establish and enforce surface- and ground-water-quality standards. Other State agencies monitoring ground water for regulatory purposes are the Departments of Health Services, Food and Agriculture, and Conservation Division of Oil and Gas. The following Federal, State, and local agencies have entered into interagency or cooperative cost-sharing agreements with the USGS to conduct ground-water investigations in California during fiscal year 1988.

California Department of Water Resources
California Regional Water Quality Control Board
  Colorado River Basin Region
  Lahontan Region
  San Diego Region
California State Water Resources Control Board
City of Los Angeles Department of Water and Power
Cities of Merced and Santa Barbara
Fresno Metropolitan Flood Control District
Indian Wells Valley Water District
Inyo County Department of Water
Mojave Water Agency
San Bernardino Valley Municipal Water District
San Diego County Department of Planning and Land Use
San Francisco Water Department
San Luis Obispo County Engineering Department
Santa Ynez River Water Conservation District
U.S. Air Force
U.S. Department of Energy
U.S. Department of the Interior
  Bureau of Indian Affairs
  Bureau of Reclamation
U.S. Navy
  Marine Corps Air Ground Combat Center, Twentynine Palms
  Naval Weapons Center, China Lake
Westlands Water District

SELECTED REFERENCES

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Deverel, S.J., and Fujii, Roger, 1988, Processes affecting the distribution of selenium in shallow ground water of agricultural areas, western San Joaquin Valley, California: Water Resources Research, v. 24, no. 4, p. 516-524.

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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.

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

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