

Potential Factors that Affect Water Quality in Southwest Basin-fill Aquifers

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ABSTRACT

Ground water is an important water supply for many basins of the arid and semiarid southwestern United States because of limited water resources. Stresses such as withdrawals from wells and artificial recharge imposed on a ground-water system can result in water-quality changes such as increased dissolved-solids concentrations or increased detection frequencies for volatile organic compounds and pesticides. The National Water Quality Assessment (NAWQA) Program of the U.S. Geological Survey has studied the water quality of selected basin-fill aquifers in the southwest to assess status and trends and to gain a better understanding of the factors that affect water quality in these basins.

A regional study is currently underway to characterize the potential natural and human factors that affect water quality in basin-fill aquifers across the southwest. The conceptual ground-water flow system, changes to a system caused by development, and the relation to water quality will be described and synthesized for about 10 to 15 basins studied by NAWQA. Similarities and differences between the basins and how they fit on a gradient of factors such as precipitation, population, and water use will be determined. This study will provide information about how water quality is affected by various processes and factors in areas that have been studied and will provide a basis for extrapolation to areas with similar characteristics but with less water-quality data or hydrogeologic information available.

Principal aquifers included in the regional analysis of the southwest are the Basin and Range basin-fill aquifers in Nevada, Utah, and Arizona; the Rio Grande aquifer system in New Mexico; and the Coastal Basin and Central Valley aquifer systems in California. These principal aquifers consist primarily of unconsolidated to semi-consolidated basin-fill deposits, have undergone varying degrees of water development, and may eventually face many of the same water-quality issues.