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**GROUNDWATER QUALITY IN THE SANTA CLARA RIVER VALLEY, CALIFORNIA**

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**ABSTRACT:** Groundwater quality in the ~460 mi<sup>2</sup> Santa Clara River Valley (SCRV) was investigated for the Priority Basin Project of the GAMA Program, a collaboration with the California State Water Resources Control Board, U.S. Geological Survey, and the Lawrence Livermore National Laboratory. The study was designed to provide a spatially unbiased assessment of the quality of untreated groundwater in the primary aquifer system (those parts of the aquifers corresponding to the perforated intervals of wells listed in the California Department of Public Health (CDPH) database). The assessment is based on water-quality and ancillary data collected in 2007 by the USGS from 42 wells on a spatially distributed grid, 11 additional wells to improve understanding of factors affecting water quality, and water-quality data from the CDPH database. Samples were analyzed for anthropogenic constituents and naturally occurring inorganic constituents. Inorganic constituents were more prevalent and concentrations were higher than for organic constituents. Inorganic constituents with human-health benchmarks were detected at high concentrations in 21%, by area, of the primary aquifer system and moderate in 30 %. Inorganic constituents with high concentrations were nitrate, gross alpha, vanadium, boron, and arsenic. In contrast, organic constituents with human-health benchmarks were not detected at high concentrations in the primary aquifer system, but were moderate in 2.4%. Carbon tetrachloride, trichloroethene, and perchlorate concentrations were detected at moderate concentrations in the primary aquifer system. Chloroform was detected in more than 10% of the primary aquifer system but at low concentrations. Pesticide concentrations were low or not detected in the primary aquifer system. Simazine and atrazine, were detected in more than 10% of the primary aquifer system. This study found that water quality varied spatially primarily in relation to depth, groundwater age, and geochemical conditions. Nitrate and pesticide concentrations were correlated with shallow depths to top-of-perforation and with high dissolved oxygen. Groundwater of modern and mixed ages had higher nitrate than older groundwater. Lower concentrations of total dissolved solids were correlated with higher pH. Manganese and iron concentrations were highest in pre-modern-age groundwater at depth indicating the prevalence of reducing conditions in these aquifer zones.

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