

**SOURCES OF GROUNDWATER RECHARGING THE PRINCIPAL  
ALLUVIAL AQUIFERS IN LAS VEGAS VALLEY, NEVADA -  
GOOD EVIDENCE FOR DISCHARGE FROM BURIED BEDROCK FAULT  
STRUCTURES**

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**ABSTRACT**

Isotopic and chemical analyses of 33 samples collected from the deep or principal alluvial aquifers in Las Vegas Valley indicate that regional discharge from a carbonate bedrock aquifer is occurring in the vicinity of the Las Vegas Shear Zone and all along the axis of the Las Vegas Valley into the main well field located at the west central part of the valley.  $\delta D$  and  $\delta^{18}O$  data indicate at least two and perhaps three water masses in Las Vegas Valley. The alluvial fans that blanket the western edge of the basin contain isotopically heavier calcium-sulfate type water that recharge the principal alluvial aquifers by relatively short flow paths. An isotopically lighter calcium-bicarbonate type water exists in the northern neck of the valley. The isotopically lighter calcium-bicarbonate water may represent discharge from a regional carbonate flow system into the valley via the Las Vegas Shear Zone.  $\delta^{13}C$  data suggest that regional discharge is occurring all along the axis of the valley into and beneath the main well field. Radiocarbon age dates also indicate that groundwater from a more regional source is discharging all along the axis of the valley. Based on these data, flow from the underlying carbonate formations is probably occurring in Las Vegas Valley, most likely upward from bedrock fault structures underlying the valley's alluvial deposits. This is supported by comparison of the extent of the upward flows in the valley with geophysical data indicating buried bedrock escarpments.