

CONCLUSIONS

The Igneous aquifer system covers 8,200 mi² of Brewster, Jeff Davis and Presidio Counties and is the only source of water for the residents of this mountainous region of Texas. The aquifer system is made up of a series of water-bearing stacked lava flows, ash-flows, and basinfill sediments that are in varying degrees of hydrologic communication.

The depth to groundwater varies from less than 100 ft to nearly 600 ft. The highest water-level elevations are in central Jeff Davis County, and the lowest are in southern Presidio County. Water-level measurements in closely-spaced wells can vary by several hundred feet. Large differences in depth measurements between closely-spaced wells are probably related to sharp variations in topography over relatively short distances and to low porosity and storage capacity of many of the individual igneous flows.

Groundwater flow directions in Jeff Davis County are radial. The systems originate in the upper elevations of the mountain watersheds and then flow outward toward the topographically lower areas of Jeff Davis County and surrounding counties. In Presidio County, the flow systems originate in the mountains that border the Alamito Valley. The systems converge beneath the valley and flow toward the south. Other than discharge to springs and wells, there are no major perennial streams to which groundwater discharges in the study area.

Groundwater is stored primarily in fractures and rubble zones along bedding planes. Much of the recharge to the aquifers is by the infiltration of water through fractures – especially in areas where fractures intersect streams that drain mountain watersheds. Recharge also occurs by the infiltration of rainfall through the coarse-grained alluvial fans that border the mountains. Total recharge within the 8,200-mi² study area might be as much as 171,200 acre-ft per year. The volume of potentially recoverable water in storage within the fractured igneous rocks and the pore spaces of rubble zones might be as much as 47 million acre-ft. However, due to the hydrologically disconnected nature of the aquifer, the actual amount of water that might be expected to be recoverable is most likely much less. Sufficient groundwater exists within the Igneous

aquifer system to meet future water-supply needs of the local area. However, expanded and improved infrastructure may be required.

A principal management issue is the need to avoid excessive pumpage from the municipal wellfields of Alpine, Fort Davis and Marfa. Wells should be spread over as wide an area as possible in order to minimize drawdowns in the wellfields. Plans for new developments outside of municipal supply systems should include assessments of the availability of groundwater. Finally, landowners might consider monitoring springflow as an early indicator of the onset of drought conditions in the region.