

ABSTRACT

A detailed study of this single-aquifer system was made over a period of approximately two years, with the view of quantifying its safe yield and designing a management strategy for development of the groundwater resource.

Area-wide exploratory drilling, execution and analysis of long-duration pumping tests, monitoring of static and pumping water levels, chemical and bacteriological examination of the groundwater, and hydrometeorological surveys, form the basis of this hydrogeologic investigation.

The aquifer is comprised entirely of intercalated volcanoclastics and fractured lava flows. The southern 1.5-square-miles of aquifer, defined by land between 0-100 feet topographic elevation, has transmissivities with order of magnitude 10^5 and 10^6 gpd/ft, and specific yield of about 12%; this contrasts sharply with aquifer properties in the north of the catchment (land above the 100-foot topographic level) where transmissivities are in the order of 10^3 and 10^4 gpd/ft, and specific yield an average 1.5%. Because of the necessity to restrict the maximum drawdown to a designed height above mean sea level, in keeping with the safe-yield concept, the effective storage of the aquifer is very limited - a mere 5.0×10^8 gallons. About 20-25% of the mean annual rainfall of 51.1 inches replenishes the aquifer which has a safe yield of 2.5 million gallons per day.

The bacteriological quality of the water is satisfactory; the chemical quality of this essentially sodium-bicarbonate water makes

it generally suitable for most purposes. Noteworthy is the adverse effect saline intrusion and encroachment have on water quality south of Pond Estate, resulting in its unsuitability for domestic purpose and questionable for irrigation.

For effective management of this limited and pollution-prone groundwater resource, complete State control or State ownership appears necessary. A properly constituted, autonomous or semi-autonomous Agency should be charged with the full responsibility of managing and developing the catchment on a sound hydrogeological basis.