

# Calibration of a Mathematical Model of the Antelope Valley Ground-Water Basin, California

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Muroc subbasin and part of the Lancaster subbasin (pl. 1). In the area where the deep aquifer is overlain by the lacustrine deposits, the aquifer is confined; in other areas it is unconfined.

## GROUND-WATER MOVEMENT

Ground water in the Antelope Valley ground-water basin moves centripetally from the base of the San Gabriel and Tehachapi Mountains toward the north-central part of the Lancaster subbasin (pl. 2). Before the extensive pumping of ground water, the water table for the principal aquifer was near land surface in the north-central part of the Lancaster subbasin, and ground-water discharge occurred because of direct evapotranspiration of ground water in this area. Pumping of ground water and the subsequent increase in depth to the water table stopped this discharge.

Ground water in the Neenach, West Antelope, and Finger Buttes subbasins moves into the Lancaster subbasin. At the western limit of the lacustrine deposits, part of this water moves over the lacustrine deposits and within the principal aquifer, and part moves under the lacustrine deposits and within the deep aquifer.

Ground water in the Buttes and Pearland subbasins also moves into the Lancaster subbasin. The upper surface of the lacustrine deposits is below the path of the inflowing water, however, and this water moves into the Lancaster subbasin **wholly over the top of the lacustrine deposits and within the principal aquifer.**

In the Lancaster subbasin, subsurface discharge of ground water in the principal aquifer is impeded by consolidated rocks on the east and north and by the lacustrine deposits on the northeast. Before the 1940's, ground water in the deep aquifer moved northward out of the Lancaster subbasin, under the lacustrine deposits, and into the North Muroc subbasin. By 1961, the direction of ground-water movement in the deep aquifer had been reversed in the area underlying and immediately south of Rogers Lake, and the direction of ground-water movement there is now southward toward the center of the Lancaster subbasin (pl. 3). North of Rogers Lake, ground water moves from the north Muroc subbasin into Fremont Valley.

Reversal of the direction of ground-water movement in the area south of Rogers Lake was caused for the most part by pumping ground water from the principal aquifer. This pumping also produced significant changes from 1915 to 1961 in water levels in the principal aquifer (pls. 2, 3), especially in the Lancaster subbasin. The main change was the development of areas of low water levels near the west and east sides of the Lancaster subbasin.

Leakage of ground water between the principal and deep aquifers occurs through the lacustrine deposits. Based on hydraulic heads for the principal and deep aquifers that were computed by the mathemat-