

The ground-water supplies of the El Paso area, Texas

by

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The data collected during an intensive investigation of the ground-water supplies of the El Paso area and the interpretations resulting from their study were released by the Geological Survey of the U. S. Department of the Interior in 1937. Further data and conclusions were released in February 1940. The present memorandum is chiefly a restatement of the conclusions contained in earlier releases, but contains some additional data.

During the period from 1904 to 1935 about 300,000 acre-feet of water was pumped from wells in the El Paso area. It was estimated from several lines of evidence that from a fourth to a third of this water was removed from storage -- in other words, that the total amount of water contained in the ground-water reservoir was reduced during the period by about 75,000 to 100,000 acre-feet. It was estimated that the remainder of the water pumped during the period (about 200,000 to 225,000 acre-feet) was derived from recharge of the sand and gravel deposits during the period. This recharge was caused by water falling as rain, chiefly along the east sides of the Franklin and Organ Mountains but also perhaps along the slopes of the nearby mountains in Mexico. During the early years of pumping in the area, most of the water was taken from storage, but as the cone of depression became larger, an increasing proportion of the water was obtained by recovery of recharge.

During the three-year period from 1936 to 1938, inclusive, the total pumpage from all wells in the area was about 55,000 acre-feet, or an average

of about 16,000,000 gallons a day. The water level declined somewhat during the three-year period, and the reduction in storage indicated by this decline was computed to have been about 10,000 acre-feet, or an average of about 3,000,000 gallons a day. According to this computation about 45,000 acre-feet, or an average of about 13,000,000 gallons a day, was obtained during the three-year period by recharge. In 1939, the average pumpage was about 18,000,000 gallons a day.

The only source of a large ground-water supply of suitable quality in the area is in the beds of sand and gravel beneath a belt of country adjacent to the east side of the Franklin and Organ Mountains, extending from the El Paso Valley northward about 35 miles to the north end of the Organ Mountains.

The increasing mineralization of the water from many of the wells in the El Paso Valley near El Paso suggests that the quantity of water that can be taken from the valley and immediately adjacent part of the mesa will decrease rather than increase. Farther downstream from El Paso almost no potable water has been found in wells in the Valley. Some wells of fairly large yield may be obtained on the terraces between the Franklin Mountains and the Mesilla Valley, as, for example, the well at the Federal Detention Farm at La Tuna. Although the supply at this farm is believed to be perennial, the indications are that these terraces would not yield supplies of the magnitude required by El Paso. Only a few wells within the Mesilla Valley, near El Paso, yield potable water, and in most of these, the quantity is small. West of the Mesilla Valley, on La Mesa, according to the available well records, the water-bearing sands are fine and not abundant and the static water level is quite low.

In the last few years the El Paso Water Department has sunk a considerable number of test wells in an area extending as far as 5 miles east and 12

miles north of the Mesa pumping plant. In early all of the test wells, considerable thicknesses of water-bearing sand have been encountered. In general, the quality of the water is good to a depth of 900 feet or more. However, mineralized water has been encountered in the sand and gravel deposits beneath the mesa in several wells at depths of more than 900 feet and in a few wells at depths less than 900 feet. Thus in the line of test wells east of the Mesa field, the mineralized water was encountered at progressively shallower depths toward the east, and in well 19, about 5 miles east of the Mesa pumping plant, it was found at 650 feet below the surface. In the line of test wells to the north the mineralized water remained low except in well 31, about 10 miles north of the Mesa pumping plant, in which fairly good water was found to a depth of 507 feet, but progressively more highly mineralized water was found below that depth. In the test wells both south and north of No. 31 good water was found to greater depths.

The total amount of potable ground water in storage in the area east of the Franklin and Organ Mountains is large. For examples, computations have been made, on the basis of the available data, as to the amount of water that could be taken from storage by drilling wells along a line extending 10 miles north of the Mesa plant and pumping them until the static water level has declined an amount equal to the decline that has occurred in the water level in the Mesa well field. These computations indicate that the yield from storage would, under the postulated conditions, amount to about 130,000 acre-feet. If spread over a period of 20 years, this would amount to 6,000,000 gallons a day.

It is problematic whether the recovery from recharge would be substantially increased by any development to the north such as is postulated

above. However, if the recovery from recharge could be maintained at 13,000,000 gallons a day and the withdrawal from storage at 6,000,000 gallons a day, it would be possible to obtain an average of 19,000,000 gallons a day during the 20-year period.

The quantities obtained from the computations are only rough approximations. However, they indicate, on the one hand, that a large supply of potable ground water is perennially available in the El Paso area, but, on the other hand, that the supply is probably not perennially adequate for the needs of the area at the present rate of use unless it is supplemented to some extent by a surface-water supply.