DEPARTMENT OF THE INTERIOR

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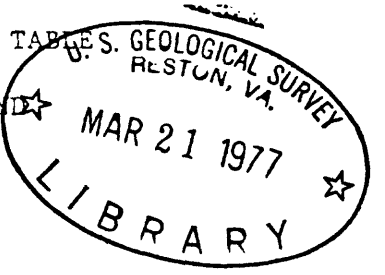
APPROXIMATE DEPTH TO THE WATER TABLE, MONTGOMERY COUNTY, MARYLAND



By

Claire A. Richardson

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APPROXIMATE DEPTH TO THE WATER TABLE

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The map shows the areas where the water table is within 10 feet (3 meters) of the land surface and where it is more than 35 feet (11 meters) below the land surface. Below the water table, voids in the earth materials are filled with water that can move into excavations or wells. Thus, the information shown on this map should be of use to those involved in any kind of construction or waste-disposal activities.

The water table is generally closest to the land surface in valleys and marshes, where it may actually intersect the land surface. Because the water table follows the configuration of the land surface on a subdued scale, its slope is less than the slope of the land surface. Consequently, the depth to the water table is greatest in interstream areas.

The water table fluctuates as water moves into or out of the saturated zone. When precipitation infiltrates into the saturated zone, the water table rises. This process, called "recharge," generally occurs from mid-autumn to mid-spring, when evaporation rates are low, plants use little water, and a higher percentage of the precipitation is free to move downward into the saturated zone. Discharge from the saturated zone occurs throughout the year as ground-water seepage to streams and marshes. During the growing season, particularly in the warm summer months, evaporation rates are high, plants use more water, and a smaller percentage of the precipitation is available for recharge to the saturated zone. Thus, during this time of year the water table declines and is usually lowest in the autumn or winter. Discharge from a pumping well also causes a decline in water levels, but the noticeable effect on the water table is usually limited to a small area immediately adjacent to the well.

Superimposed on the annual cycle of water-level fluctuations are long-term fluctuations caused by climatic conditions. Water levels are highest in wet years, particularly if heavy precipitation occurs during the nongrowing season. The magnitude of water-table fluctuation differs

according to topography and distance from a stream. Thus, the water level in a well located in a valley might fluctuate only a few feet a year, whereas one on a hilltop might fluctuate more than 20 feet (6 meters).

Accompanying the map is a water-level graph (hydrograph) for a well in northern Montgomery County about 2 miles (3 kilometers) southeast of Damascus. The well is located on top of a rise in generally rolling terrain. It is equipped with only a hand pump and is seldom used; the fluctations in water level are due almost entirely to natural causes. Over the total period of record (1949-76), the water table has fluctuated between a high of 17 feet (5 meters) below land surface and a low of 48 feet (15 meters). In the 5-year period represented on the accompanying graph, the annual highs and lows are conspicuous, even though they do not always fall in the same month each year. The graph illustrates the decline in water level that takes place all through the summer, when evapotranspiration rates are at their highest and recharge is at a minimum. However, the total range in water-level fluctuation (and the shape of a hydrograph curve) vary from place to place with the precipitation, the geology, and the topography.

The data used in preparing the depth-to-water map were taken partly from the well records of the U.S. Geological Survey. Most of the water-level data from these records were individual "spot" measurements made at the time that records for the wells were originally obtained in the field. Other measurements were those reported by the well drillers at the time that the wells were drilled. All these measurements were made at various times of year and at times when precipitation had been at, above, or below normal. Where water-level measurements were not available, it was necessary to estimate the depth to the water table on the basis of topography and drainage. Because of the scarcity of data points, by far the largest part of both the 10- and 35-foot depth-to-water lines were drawn by this latter method.

The water table is a dynamic surface and any attempt to portray it on a map can be only a generalization. The range in fluctuation in the hydrograph of well MONT-BE 1 illustrates the difficulty in making and interpreting a water-table map. The graph shows only a 5-year segment of the long-term record, with its approximately 30-foot (9-meter) range in fluctuation. Obviously, any single measurement may be recognized as being in the upper, middle, or lower part of the range. However, a single measurement of a well whose total range is unknown may be misleading and as much as tens of feet different from the water level in that well at another time of year. Also, some readings may represent a local perched water table, rather than the general regional water table. Thus, the user should regard the depth-to-water map as a general guide and not as a precise source of water-level information at a particular site. If it is necessary to have accurate site-specific information on depth to the water table, additional field data would be required.