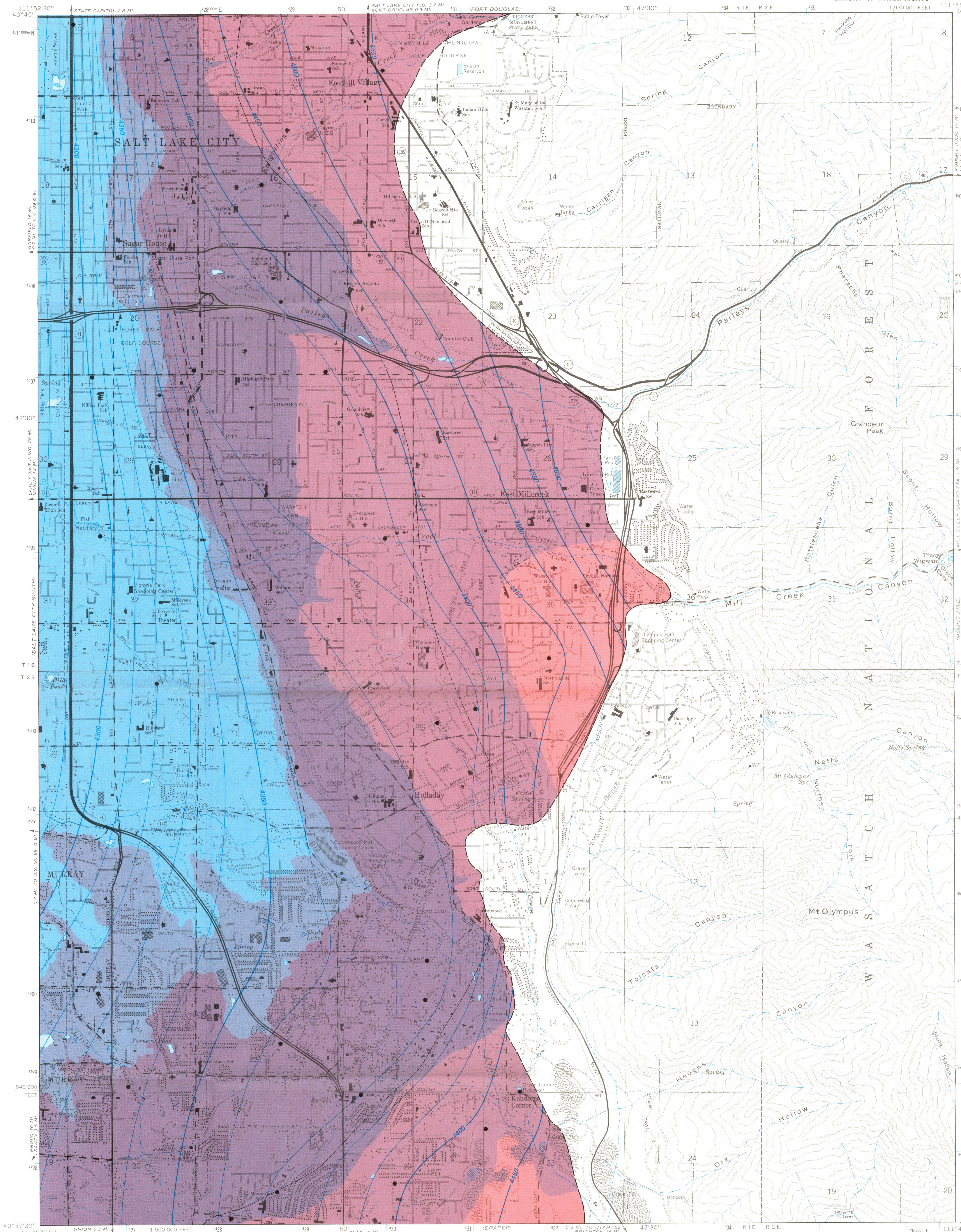
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH THE
UTAH DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WATER RIGHTS



Base from U.S. Geological Survey, 1963
Photorevision as of 1969
10,000-foot grid based on Utah coordinate system, central zone
1,000-meter Universal Transverse Mercator grid ticks, zone 12, shown in blue

APPROXIMATE MEAN DECLINATION, 1973

SCALE 1:24 000

CONTOUR INTERVAL 40 FEET
DOTTED LINES REPRESENT 10-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

QUADRANGLE LOCATION

Interior–Geological Survey, Washington, D. C.–1973–W73210

EXPLANATION

Position of potentiometric surface relative to land surface

- At or above
- 0-20 feet below
- 20-100 feet below
- 100-300 feet below
- 300-500 feet below

● Well used for determining altitude of potentiometric surface

—4500— Contour on the potentiometric surface. Shows approximate altitude of potentiometric surface, February 1972. Contour intervals 10 and 50 feet. Datum is mean sea level

— — — Approximate eastern limit of principal aquifer

- - - - - - - - Approximate boundary between confined and unconfined conditions in the principal aquifer, February 1972

DISCUSSION

The potentiometric surface is an imaginary surface representing the static head of ground water and defined by the levels to which water would rise in tightly cased wells. The potentiometric surface of the principal aquifer within the area of the Sugar House quadrangle ranges from about 20 feet above, to as much as 500 feet below land surface as is shown on the map. The principal aquifer supplied about 4 percent, or 9,000 acre-feet, of the municipal and industrial water used annually in Salt Lake County during 1964-68.

The potentiometric surface of the principal aquifer slopes generally westward toward discharge areas in the western part of the quadrangle and areas farther west. Water in the principal aquifer moves slowly in the direction of the slope. Irregularities in the direction and gradient of slope are caused by unequal additions to or withdrawals of water from the aquifer, and differences in the transmissivity (ability of the aquifer to transmit water) of the aquifer from place to place. The gradient ranges from about 300 feet per mile in the area between Parleys and Mill Creeks near the mountains, to about 10 feet per mile along Big Cottonwood Creek near Holladay.

The position of the potentiometric surface relative to land surface is also shown on the map. By examining the map, the position relative to land surface of the water surface in a well that taps the principal aquifer can be readily determined. Greatest depths to the potentiometric surface are near the mountain front where thick alluvial fan deposits near the mouths of large canyons overlie the aquifer. The gradient of the potentiometric surface is less than the gradient of the land surface, so that the two intersect 2 to 4 miles west of the mountain front. West of the line of intersection, the potentiometric surface is *above* land surface (blue area on the map). In this area, water will flow from wells drilled into the principal aquifer.

The potentiometric surface rises when the rate of recharge to the aquifer exceeds discharge, and falls when discharge exceeds recharge. Consequently, the altitude of the potentiometric surface shown on the map for February 1972 is applicable only for that date. Water-level fluctuations in two wells that tap the principal aquifer are shown by the hydrographs. The well in sec. 16, T. 1 S., R. 1 E. taps the aquifer where the water is unconfined, whereas the well in sec. 9, T. 2 S., R. 1 E. taps the aquifer where the water is confined. Highest yearly water levels in both wells rose from 1967 to 1971, indicating an increase in the amount of water stored in the aquifer. The seasonal fluctuations of about 12 feet in the well in section 9 were caused by seasonal pumping of nearby public-supply wells that obtain confined water from the principal aquifer. Seasonal fluctuations are much smaller in the well in section 16, because it is farther from pumped wells, and water in the aquifer is unconfined at this site.

The contours showing the altitude of the potentiometric surface of the principal aquifer are based primarily on water levels observed during February 1972, in about 25 wells that tap the aquifer in the Sugar House quadrangle. The position of the potentiometric surface relative to land surface was determined by comparing the potentiometric surface with the topography of land surface (shown on the map), and determining the locations of the boundaries between the depth-ranges shown on the map.

Reports in the list of selected references that follow contain other information about the potentiometric surface of the principal aquifer in this and adjacent parts of Jordan Valley, Utah. The basic-data reports and releases contain water-level measurements for 1931-70 and other types of basic data. The interpretive reports contain discussions of various aspects of the occurrence of ground water, water-level fluctuations, and related subjects. Ground-water terms used in this report have been defined by Lohman and others (1972).

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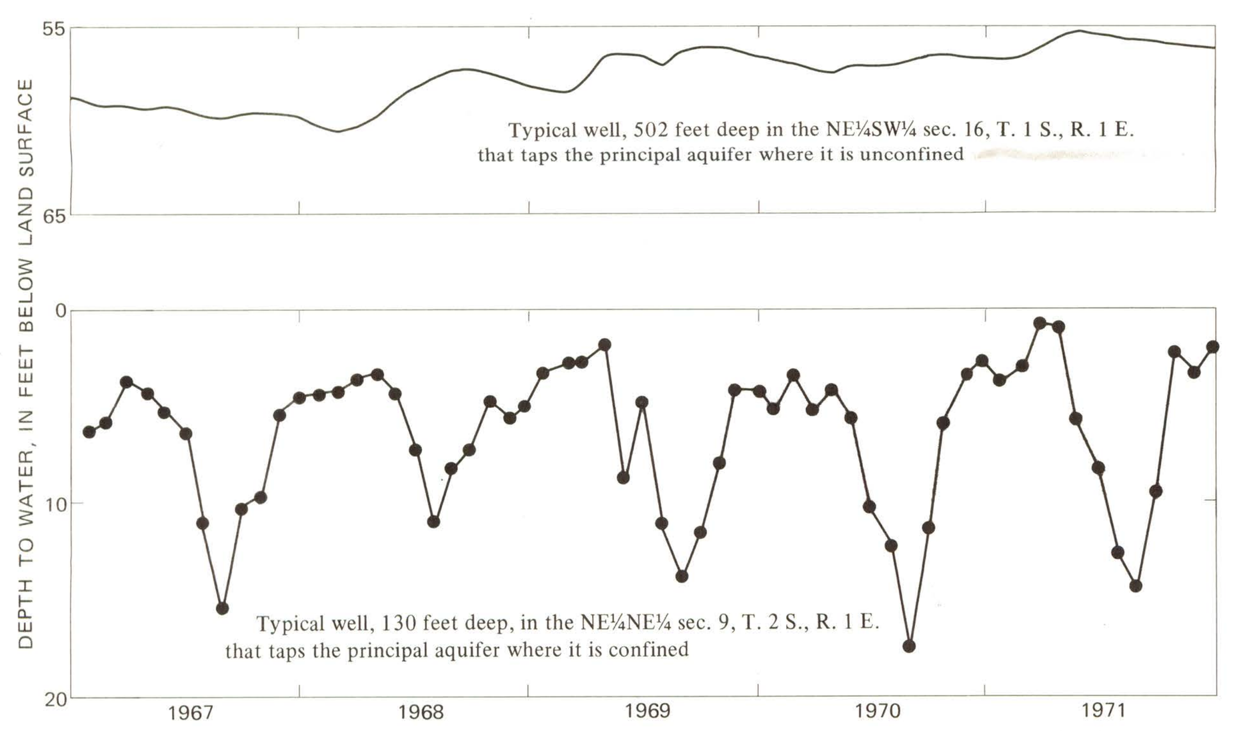

HYDROGRAPHS SHOWING DEPTH TO WATER IN TWO WELLS TAPPING THE PRINCIPAL AQUIFER, 1967-71

MAP SHOWING CONFIGURATION OF THE POTENTIOMETRIC SURFACE OF THE PRINCIPAL AQUIFER AND ITS APPROXIMATE POSITION RELATIVE TO LAND SURFACE, SUGAR HOUSE QUADRANGLE, SALT LAKE COUNTY, UTAH, FEBRUARY 1972

By
R. W. Mower

1973