

THICKNESS AND SATURATED THICKNESS OF THE OGALLALA FORMATION AND THE OVERLYING DEPOSITS

The deposits overlying the Ogallala Formation are dune sand and alluvium. Differences in thickness of the Ogallala and overlying deposits are caused by erosion of the older red-bed surface before the Ogallala and overlying rocks were deposited and by erosion of the present land surface. Maximum thickness is more than 700 feet in the northwest corner of the county (see map).

The saturated thickness is that part of the Ogallala Formation and overlying deposits which is below the water table. The saturated thickness generally is dependent upon the position of the water table relative to the underlying Permian bedrock surface, as shown on geologic sections A-A' and B-B'. Locally, the saturated thickness may vary by the amount of water-table decline caused by pumping. The saturated thickness is an important factor in evaluating the ground-water potential of an area. Generally, if the transmissivity (ability of an aquifer to transmit water) is constant and the same well-completion method is used, well yield is proportional to the saturated thickness. However, improper well completion or low transmissivity may reduce well yields.

Much information is available from test holes. The thickness of saturation and a description of some of the physical properties of the aquifer are the two factors most commonly determined from a test-hole program. Generally, the coarser the aquifer material the higher the transmissivity. The test-hole information is used to predict the probable success and the most favorable drill site for a production well.

GEOLOGIC SECTIONS

The sections illustrate the following: (1) sequence, thickness, and configuration of selected surface and subsurface geologic units, (2) selected correlative horizons within the red beds, and (3) relation between total thickness and saturated thickness of the Ogallala Formation as determined by the position of the water table in January 1968.

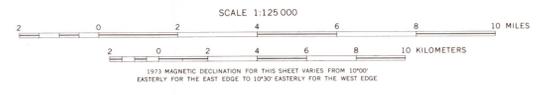
The salt zone in the Flowerpot Shale consists generally of salt-bearing shale near the base, that grades upward into relatively pure salt near the top. The salt zone commonly is 350 feet thick, but may be nearly 500 feet thick or terminate abruptly as a result of solution and collapse. The top of the salt zone is at the base of the Blaine Gypsum.

Removal of salt from the Flowerpot by migrating ground water prior to or during deposition of the Ogallala resulted in general subsidence of the Permian surface in eastern Texas County. By contrast, the Permian surface in most of Beaver County is at a higher elevation because of the presence of a residual salt body. Therefore, the salt in the Flowerpot Shale is responsible indirectly for the thickness of deposition of the Ogallala Formation in much of Beaver County.

Permian rocks crop out along the stream channels where streams have eroded the relatively thin cover of Ogallala. Leaching of evaporites from the Permian outcrops has significantly increased the concentration of dissolved solids in the surface waters of Beaver County.

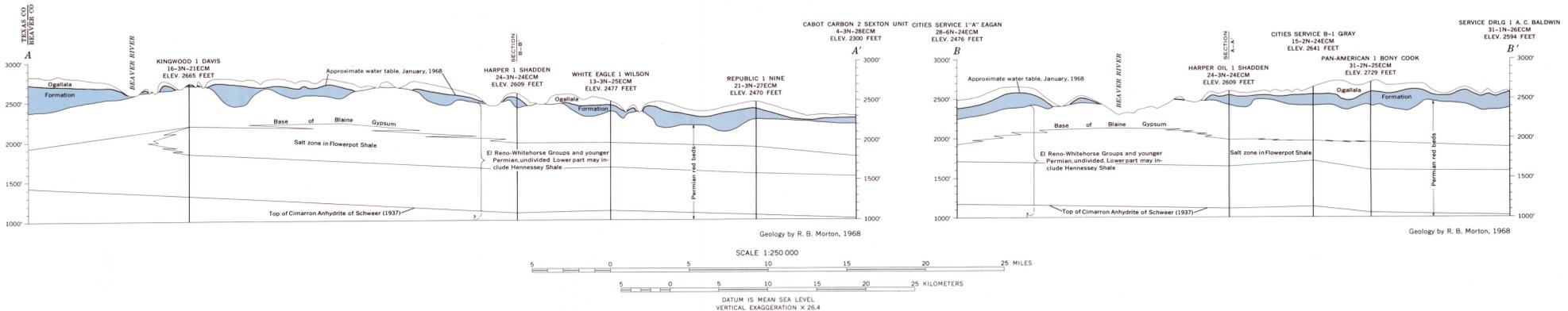
Dune sand, alluvium, and terrace deposits are not shown on the geologic sections.

MAP SHOWING APPROXIMATE THICKNESS AND SATURATED THICKNESS OF THE OGALLALA FORMATION AND OVERLYING DEPOSITS, JANUARY, 1968

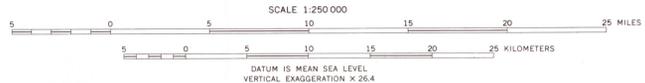


Base modified from Oklahoma Highway Department map
Drainage from U.S. Department of Agriculture
aerial photographs, 1941

Hydrology by R. B. Morton
and R. L. Goemaat, 1968



GEOLOGIC SECTIONS



RECONNAISSANCE OF THE WATER RESOURCES OF BEAVER COUNTY, OKLAHOMA

By
R. B. Morton and R. L. Goemaat
1973