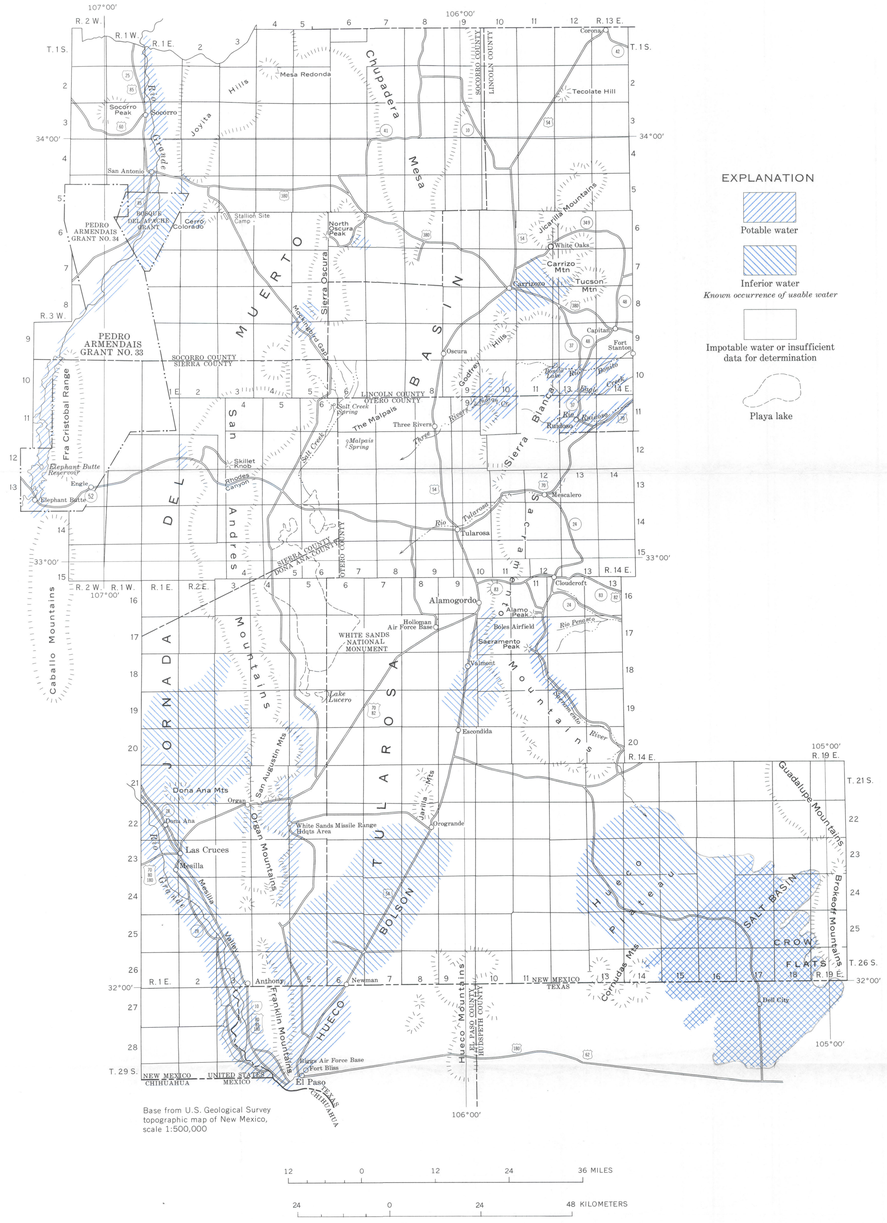

TABLE 1.—GENERALIZED STRATIGRAPHIC SECTION AND WATER-BEARING CHARACTER OF THE ROCKS IN THE TULAROSA BASIN AND ADJOINING AREAS, NEW MEXICO AND TEXAS

Note: Stratigraphy and rock descriptions are based largely on work of Kottlowski and others, 1956

SYSTEM	SERIES	ROCK UNIT	DESCRIPTION	HYDROLOGY
QUATERNARY	Miocene to Pleistocene(?)	Terrace deposits	Covers several square miles west of Sierra Blanca in Otero County, and smaller patches elsewhere in the general area.	Not known to contain water
		Bolson deposits	Upper part Quaternary in age: thickness of Quaternary section not known but probably does not exceed 500 feet in most places: mostly unconsolidated clay, sand, and gravel derived from the surrounding higher areas.	Includes the major aquifers in the region; relatively permeable—particularly the coarse stream-laid deposits along the Rio Grande flood plain, where many irrigation wells yield more than 1,000 gpm; deposits generally contain potable water along the margins of the alluvial basins, but the water becomes increasingly mineralized toward the centers of the basins. In some areas, as in the north-central part of Tularosa Basin, water even in the marginal deposits is highly mineralized.
TERTIARY	Miocene(?)	Santa Fe Group	Sandstone, sand, gravel, loess, and volcanic rocks; thickness not known, occur along the Rio Grande Valley in southern New Mexico.	
		Datil Formation	A thick sequence of volcanic rocks including minor amounts of conglomerate in the Cerro Colorado area; about 1,000 feet thick.	
	Eocene(?)	Love Ranch Formation of Kottlowski and others (1956) and Baca Formation	Love Ranch Formation in the foothills of the San Andres Mountains and along the west side and at the south end of the Organ Mountains; about 2,000 feet thick. Baca Formation is grayish-red conglomeratic sandstone, siltstone, and conglomerate, prominently exposed at the west side of Cerro Colorado; as much as 1,000 feet thick.	
TERTIARY(?)		Cub Mountain Formation of Bodine (1956) and McRae Formation of Kelley and Silver (1952)	Cub Mountain on the eastern, northern, and western flanks of Sierra Blanca and in the outlying hills between Three Rivers and Carrizozo, yellow to gray sandstone, siltstone, and variegated and red shale; 500 to 1,000 feet thick; correlative with part of the McRae Formation between the Caballo Mountains and the Fra Cristobal Range; about 3,000 feet thick.	
CRETACEOUS	Upper	Mesaverde Group	Shale, siltstone, and sandstone and local coalbeds; more than 500 feet thick in the Three Rivers area; and more than 2,000 feet thick in the Caballo Mountains.	
		Mancos Shale	Mostly gray to black and some green shale and some thin limestone and sandstone beds; thickness in the Oscura-Three Rivers area is at least 1,000 feet.	
	Upper and Lower	Dakota Sandstone	Mainly light-gray to white quartzitic sandstone; 50 to possibly 300 feet thick; unit crops out in the Caballo Mountains, in the Carthage coalfield area north of Cerro Colorado, in the Three Rivers and Carrizozo-White Oaks area, at the east side of Sierra Blanca, and caps the prominent cuesta east of The Malpais and southwest of Carrizozo.	Mostly poor aquifers, although some of the sandstone beds of Cretaceous age yield small quantities of generally impotable water to wells in the northeastern part of Tularosa Basin in the vicinity of Carrizozo.
TRIASSIC	Upper	Dockum Group	Red and reddish-purple siltstone, shale, and sandstone; crops out in northern part of region; in scattered outcrops in the vicinity of Carrizozo and south of Three Rivers; at one small locality in the San Andres Mountains, north of Rhodes Canyon; in the ThreeRivers area; and in a relatively large area about 15 miles north of Carrizozo.	
PERMIAN	Upper	San Andres Limestone	Limestone, dolomite, and some sandstone; about 700 feet thick in the Sacramento Mountains; about 600 feet thick in San Andres Mountains.	Yields water to some wells on Chupadera Mesa; water generally impotable in southern part of Chupadera Mesa.
		Glorieta Sandstone / Bone Spring Limestone	Mostly sandstone; several hundred feet thick near Chupadera Mesa; thins to less than 50 feet at south end of village of Corona.	Gray to black limestone; 1,600 feet thick in Guadalupe Mountains; thickness not known in Crow Flats-Dell City area.
		Yeso Formation	Gypsum, red shale and sandstone, and limestone; a few hundred to about 4,000 feet thick.	May furnish some water to wells on Chupadera Mesa mostly from fracture zones. An aquifer in some areas but water generally impotable.
	Lower	Abo Sandstone / Hueco Limestone	Mostly red shale and sandstone; reported about 1,400 feet thick in subsurface northwest of Carrizozo. Mostly limestone; about 1,500 feet thick in Hueco Mountains; thins to about 300 feet at north end of San Andres Mountains; absent in northern Sierra Oscura.	Forms the principal aquifer in the Crow Flats-Dell City area; probably underlies bolson deposits in northern part of Jornada del Muerto and in most of Tularosa Basin. Not important as an aquifer.
		Bursum Formation	Mostly arkose, limestone, and interbedded shale; interfingers with Pennsylvanian rocks to the north and with Permian rocks in Sacramento Mountains; about 300 feet thick in San Andres Mountains and about 400 feet in Sacramento Mountains near Tularosa.	Yield relatively small quantities of water to a few stock and domestic wells in northern part of Tularosa Basin.
PENNSYLVANIAN	Lower	Magdalena Group / Madera Limestone	Mainly clastic in lower part; massively bedded limestone and interbedded shale in upper part; about 3,000 feet thick in San Andres and Sacramento Mountains; thins to less than 1,000 feet at north end of Sierra Oscura.	Yields small quantities of water to stock and domestic wells in vicinity of Organ and along east slope of the Oscura Mountains; water generally has high carbonate hardness but is potable.
		Sandia Formation		Not important as an aquifer.
MISSISSIPPIAN	Upper	Helms Formation	Sand, shale, and limestone; maximum thickness of about 1,400 feet; however total thickness differs widely because of the thinning or absence of strata from place to place.	do.
		Rancheria Formation of Laudon and Bowsher (1949)		
		Las Cruces Formation of Laudon and Bowsher (1949)		
		Kelly Limestone		
	Lower	Lake Valley Limestone: Dona Ana Member, Arcente Member, Tierra Blanca Member, Nunn Member, Alamogordo Member, Andrecito Member	of Laudon and Bowsher (1949)	
		Caballero Formation of Laudon and Bowsher (1949)		
DEVONIAN		Sedimentary rocks, undivided	Thin units of shale, siltstone, and limestone; aggregate thickness about 100 feet in Sacramento Mountains and about 80 feet in San Andres Mountains.	do.
SILURIAN		Fusselman Dolomite	Relatively pure massively bedded dolomite; about 1,000 feet thick in Franklin Mountains and about 100 feet thick in Sacramento and San Andres Mountains; absent in northeastern part of Sacramento Mountains; pinches out about 6 miles south of Rhodes Canyon in San Andres Mountains.	do.
ORDOVICIAN	Upper	Montoya Dolomite	A lower massive cherty dolomite unit about 225 feet thick and an upper limestone unit about 200 feet thick.	
	Lower	El Paso Limestone	Mainly massive limestone and dolomite; about 1,600 feet thick in Franklin Mountains; 420 feet thick in Sacramento Mountains; and 40 feet thick at Mockingbird Gap at the north end of the San Andres Mountains.	
CAMBRIAN	Upper	Bliss Sandstone	Basal sandstone unit, contains much quartzite and some shale; about 225 feet thick in Franklin Mountains; 6 to 120 feet thick in Sacramento Mountains; pinches out in central part of Sierra Oscura.	do.

IGNEOUS ROCK UNIT	DESCRIPTION	HYDROLOGY
Extrusive and intrusive rocks	Present in many places in the region; along flanks of Sierra Blanca, volcanic extrusive rocks are cut by dikes; crests of several hills south of Carrizozo and near Oscura are composed of sills; basalt flows cover large areas in northern part of Tularosa Basin.	Intrusive igneous rocks generally are relatively impermeable, are poor aquifers, and are barriers to the movement of water, except where they are fractured or weathered; do not readily absorb precipitation but are major areas from which water runs off to adjacent areas where it becomes available for ground-water recharge; a few springs discharge from these rocks, and the water from the springs generally is not highly mineralized; some basalt flows are extremely permeable and constitute major recharge areas because precipitation is readily absorbed before much of it evaporates; more recent basalt flows, such as those in the northern parts of Tularosa Basin and Jornada del Muerto, support very little vegetation that might intercept precipitation before it reaches the water table.

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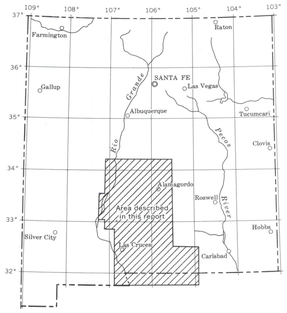

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By
E. H. Herrick and L. V. Davis

1965

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