GEOHYDROLOGY OF THE DELAWARE BASIN AND VICINITY, TEXAS AND NEW MEXICO

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CONVERSION FACTORS

In this report, measurements are given in inch-pound units only. The following table contains factors for converting to metric units.

Multiply inch-pound units	by	To obtain metric units
inch	25.40	millimeter
foot	0.3048	meter
foot per day	0.3048	meter per day
foot squared per day	0.0929	meter squared per day
foot cubed per day	0.02832	meter cubed per day
mile	1.609	kilometer
acre-feet	1.233×10^3	cubic hectometers
gallon per minute	0.06309	liter per second
gallon per minute per foot	0.2070	liter per second per meter

Chemical concentrations are given in metric units as weight-per-weight units of parts per million (ppm, one milligram of solute per kilogram of solution) and as weight-per-volume units of milligrams per liter (mg/L).

GEOHYDROLOGY OF THE DELAWARE BASIN AND VICINITY, TEXAS AND NEW MEXICO

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ABSTRACT

The Delaware Basin study area includes all or part of Crane, Culberson, Loving, Pecos, Reeves, Ward, and Winkler Counties, Texas, and Eddy and Lea Counties, New Mexico. Major aquifers in the Delaware Basin are the Capitan aquifer, Rustler Formation, Santa Rosa Sandstone (Dockum Group), and aquifers in the Cenozoic alluvium.

The Capitan reef complex (Capitan aquifer) consists of the Capitan and Goat Seep Limestones and includes in ascending order, the Grayburg, Queen, Seven Rivers, Yates, and Tansill Formations of the Artesia Group. Water from the Capitan aquifer is used for domestic and irrigation purposes in Eddy County, New Mexico, and for irrigation and industrial purposes in Texas. Available analyses indicate that dissolved-solids concentrations range from 303 to 31,700 milligrams per liter, chloride concentrations range from 16 to 16,689 milligrams per liter, and fluoride concentrations range from 0.5 to 3.0 milligrams per liter.

The Rustler Formation contains water that generally is not suitable for domestic use because of its salinity. Chloride concentrations range from 15 to 210,000 milligrams per liter, and dissolved-solids concentrations range from 286 to 325,800 milligrams per liter. Fluoride concentrations range from 0.5 to 11.4 milligrams per liter. Water from this aquifer is used for irrigation and stock watering where it is of suitable quality.

The Santa Rosa Sandstone is the principal source of ground water in the western third of Lea County and in the eastern part of Eddy County. In parts of Texas, the Santa Rosa Sandstone and the Cenozoic alluvium are hydraulically connected and are called the Allurosa aquifer. The Santa Rosa Sandstone-Allurosa aquifer is the source of municipal supply for the cities of Barstow, Pecos, Monahans, and Kermit, Texas. Water quality is variable. For those analyses where the Santa Rosa Sandstone is a distinct entity, chloride concentrations range from 10 to 4,800 milligrams per liter, dissolved-solids concentrations range from 205 to 2,990 milligrams per liter, and fluoride concentrations range from 0.4 to 5.0 milligrams per liter.

Water from the Cenozoic alluvium is used extensively for public water supplies, irrigation, industry, livestock watering, and rural-domestic supply throughout the Delaware Basin. The majority of the population in the study area in Texas utilizes this aquifer. The quality of water in the Cenozoic alluvium is variable. Chloride concentrations range from 5 to 7,400 milligrams per liter, dissolved-solids concentrations range from 188 to 15,000 milligrams per liter, and fluoride concentrations range from 0.3 to 10 milligrams per liter. The Cenozoic alluvium is hydraulically connected to Cretaceous units in parts of Reeves and Pecos Counties, Texas; in these areas, the units are considered as one aquifer, the Pecos aquifer.

INTRODUCTION

The Texas League of Women Voters of Odessa, Texas, petitioned the U.S. Environmental Protection Agency in October 1979 to declare or determine if the freshwater aquifers of the Delaware Basin are the sole or principal drinking water sources for that area (section 1424(e), Safe Drinking Water Act of 1974). The aquifers under investigation are aquifers in the Cenozoic alluvium, the Santa Rosa Sandstone, the Rustler Formation, and the Capitan aquifer. The League expressed interest in these aquifers because of the location of the Waste Isolation Pilot Plant project (WIPP) (fig. 1), a proposed storage facility for radioactive wastes in massive Permian salt beds near Carlsbad, New Mexico. There is concern that these aquifers could be contaminated if the facility were breached.

The purpose of this report, prepared in cooperation with the Environmental Protection Agency, is to provide available geohydrologic data and other information that will assist in the decision regarding a sole-source designation for these Delaware Basin aquifers.

According to available data, Loving, Ward, and Winkler Counties in Texas are totally dependent on these aquifers for their drinking water. Crane, Culberson, Pecos, and Reeves Counties, Texas, and Eddy and Lea Counties, New Mexico are partially dependent on these aquifers.

GEOHYDROLOGIC SETTING

The Delaware Basin of western Texas and southeastern New Mexico covers an area of about 12,000 square miles and forms one of the larger subdivisions of the Permian Basin of Texas, New Mexico, Oklahoma, Kansas, and Nebraska. The Delaware Basin includes the area within the Capitan reef complex of Late Permian age, the narrow belt of older and deeper-lying sands in the back reef area, and the reef itself (Maley and Huffington, 1953). The Texas part of the study area includes all or part of Crane, Culberson, Loving, Pecos, Reeves, Ward, and Winkler Counties. Small parts of Brewster, Jeff Davis, and Hudspeth Counties are within the Delaware Basin but are not part of the study area. The southern parts of Eddy and Lea Counties, New Mexico, are within the Delaware Basin and the study area (fig. 1).

Major physiographic features on and around the Delaware Basin are the High Plains on the northeast and east, the Guadalupe Mountains on the northwest, the Salt Flat Bolson and Delaware Mountains on the west, the Apache and Davis Mountains on the southwest, and the Glass Mountains on the south. The topography within the Delaware Basin is mostly a flat to gently sloping plain covered by alluvium from the surrounding higher areas with local outcrops of Permian, Triassic, and Cretaceous rocks forming low hills and ridges. The Pecos River, the main drainage through the basin, enters from the north in Eddy County, New Mexico, and exits to the southeast along the Reeves-Ward County line in Texas.

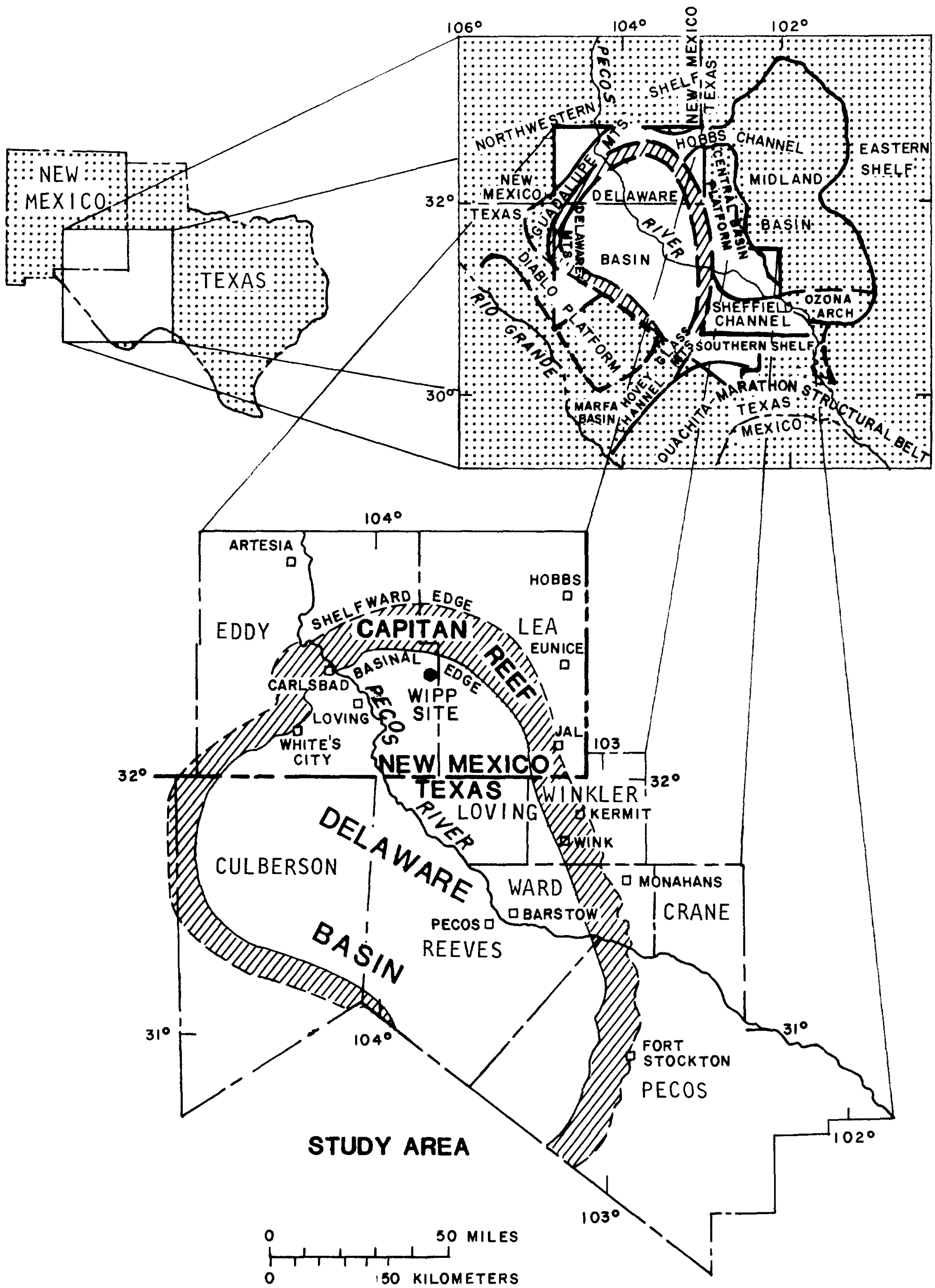


Figure 1.--Location of the Delaware Basin, study area, and regional structural features.

Throughout the Paleozoic Era, the area now called the Delaware Basin was an embayment covered by a shallow sea. During the Early Permian Epoch about 10,000 feet of sediments accumulated, represented by sand, shale, and limestone. In middle Guadalupian time of the Permian Period, a reef (the Capitan Limestone) began forming the Delaware Basin margins. In the Delaware Basin, sandstone and shale beds, also of Guadalupian age, were covered by evaporites and limestone (Castile Formation) of Ochoan age, and these were covered by evaporites interbedded with limestone, dolomite, sand, and shale (Salado and Rustler Formations), also of Ochoan age (figs. 2 and 3).

A transition from the marine environment of the Permian Period to the humid lacustrine (lake), fluvial (stream), and deltaic environments of the Late Triassic Epoch initiated Dockum Group sedimentation. Units of the Dockum Group (in ascending order, the Tecovas Formation, Santa Rosa Sandstone, and Chinle Formation) consist of interbedded sandstone, shale, siltstone, limestone, and conglomerate.

During the Jurassic Period, the area was raised above sea level and was undergoing erosion. The Cretaceous Period was characterized by a slow advancement of the sea from the southeast into the basin and thick sand, shale, and limestone strata were deposited. Cretaceous rocks were eroded from much of the study area but deposits remain in Pecos, Reeves (Hiss, 1976, p. 111), and Culberson Counties (pl. 1). The sea underwent continuous transgressions and regressions in Late Cretaceous to late Tertiary time. During late Tertiary time the Delaware Basin emerged, tilted somewhat to the east, and thick fluvial sediments were deposited. In late Cenozoic time this tilting caused block faulting and buckling of a basin and range type along the western margins of the Delaware Basin (King, 1948, p. 106-108). These faults (pl. 1) sometimes cut earlier structures and exhibit a general northwestern trend (Oriel and others, 1967, p. 60). A transition to a more arid climate in Quaternary time resulted in the deposition of windblown sand. The ongoing depositional processes in late Tertiary through Quaternary time have caused an accumulation of silts, sands, and gravels (Cenozoic alluvium) from surrounding high areas.

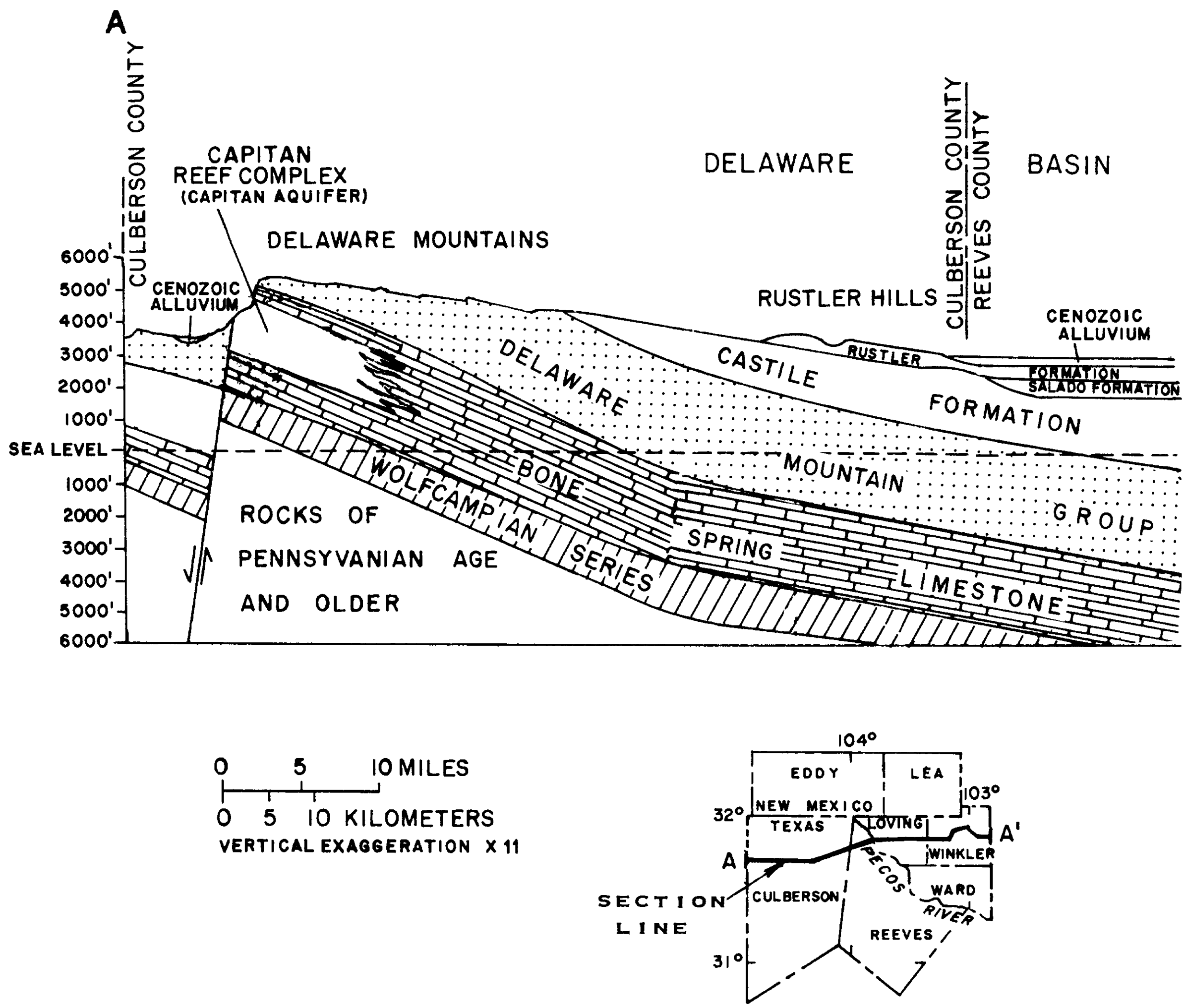
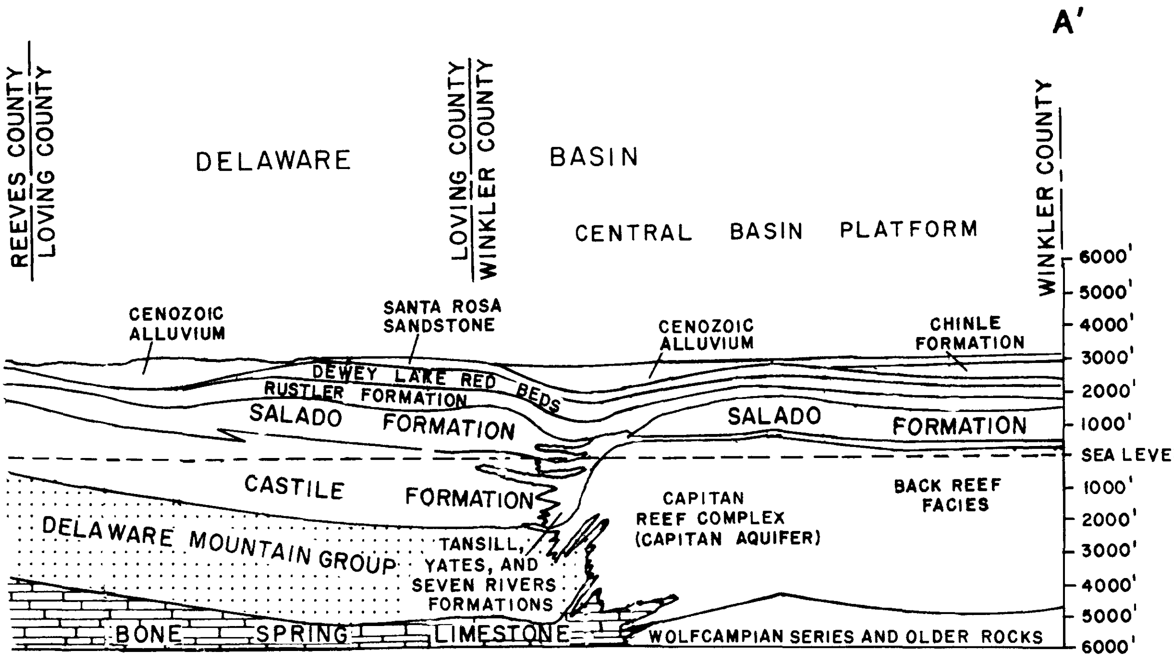


Figure 2.--Generalized east-west geologic section of the Delaware Basin study area.



Modified from West Texas Geological Society, Stratigraphic Problems Committee, 1949.

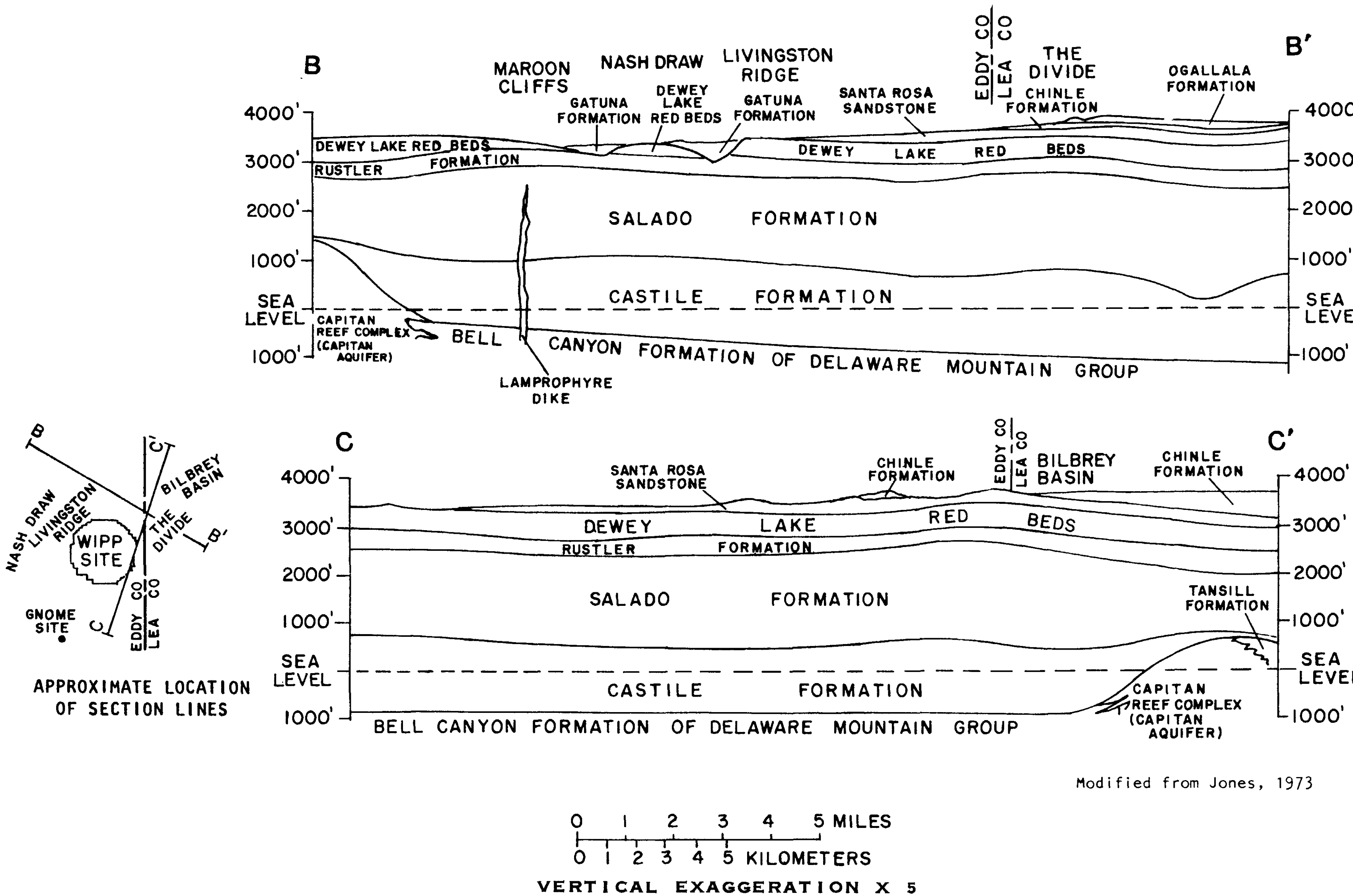


Figure 3.--Generalized geologic sections of the WIPP site and vicinity.

GEOHYDROLOGY OF THE AQUIFERS

The major aquifers in the Delaware Basin study area are the Capitan aquifer, Rustler Formation, Santa Rosa Sandstone (Dockum Group), and aquifers in the Cenozoic alluvium. These aquifers are described in detail in the following sections of the report. Water-bearing properties of these aquifers and other geologic units are summarized in table 10.

Capitan Aquifer

The Capitan aquifer of Permian age is present in all of the counties in the Delaware Basin study area except Crane and Loving Counties, Texas. The basinal edge is inside the extreme eastern and southwestern corners of Reeves County, Texas (pl. 1, fig. 1). The aquifer parallels the edge of the Delaware Basin in an arcuate strip along its northern and eastern margins, extending from the Guadalupe Mountains (southwest of Carlsbad, New Mexico) to the Glass Mountains (southwest of Fort Stockton, Texas). The Capitan aquifer probably is present along the western and southwestern margins of the Delaware Basin. The Capitan aquifer is composed of the Capitan and Goat Seep Limestones, and most or all of the Carlsbad facies of the Artesia Group (Meissner, 1972), including in ascending order the Grayburg, Queen, Seven Rivers, Yates, and Tansill Formations. Lithologically, the aquifer consists of dolomite and limestone strata deposited as reef, fore-reef, and back-reef facies. The location of wells completed in the Capitan aquifer for which data are included in this report is shown on plate 2; well records are listed in table 1.

Structure and Thickness

The thickness of the Capitan aquifer varies considerably (pl. 2); Hiss (1976) describes the Capitan aquifer as being "composed of irregularly shaped and spaced, alternating thick and thin accumulations of carbonate rock." The thicker areas are generally behind the reef front and may be carbonate banks, islands, or mounds that flourished behind the reef crest's protection (Kendall, 1969, p. 2509). On one of these banks or mounds 13 miles northeast of Carlsbad, the Capitan aquifer reaches its maximum thickness of 2,360 feet. Thinner sections represent depressions in the surface of the aquifer and are probably due to nondeposition or erosion in surge channels and submarine canyons rather than structural warping (Hiss, 1976, p. 149).

Ground-Water Occurrence and Use

Within the bounds of the Delaware Basin in New Mexico, the Capitan aquifer is of primary importance to Eddy County, where it is the main source of domestic water for Carlsbad, Happy Valley (a suburb of Carlsbad), and White's City (table 11). The Capitan aquifer is also used extensively for irrigating 2,340 acres near La Huerta, Happy Valley, and Carlsbad (Bjorklund and Motts, 1959, p. 156-159). In Lea County there is only one well that yields potable water from Permian formations, but it is probable that this well penetrates red beds of either Permian or Triassic age and not the Capitan aquifer (Nicholson and Clebsch, 1961, p. 56). Nonpotable water is used for enhanced oil recovery in Lea County, a use which has been declining in recent years. Enhanced oil recovery is a process that involves flooding oil reservoirs with water, gases, and various chemicals to displace residual oil. This decline in use is evidenced by a relatively rapid rise in water levels. Water levels have risen in Lea County at a rate ranging from 5.3 feet per year to 10.2 feet per year between January 1976 and December 1979 (table 12). Ground-water flow in the Capitan aquifer from the north and south converges on an area about 20 miles southeast of San Simon Swale in the vicinity of well 618 (pl. 2).

Water from the Capitan aquifer is used primarily for irrigation and industrial purposes in Texas (table 13). In northern Pecos County, only one well penetrates the Capitan aquifer. It flows at about 1,000 gallons per minute from a producing interval of about 3,200-3,600 feet below land surface. In southern Pecos County, there are a few deep stock wells that tap the aquifer. In Ward and Winkler Counties, the Capitan aquifer yields large quantities of moderately to very saline water, which is used for enhanced recovery of oil.

Recharge and Discharge

The Capitan aquifer is recharged by precipitation on its outcrop in the Guadalupe Mountains and Guadalupe Ridge along the New Mexico-Texas border and by infiltration into the Gilliam Limestone in the Glass Mountains in Brewster and Pecos Counties, Texas. "The Gilliam Limestone is the Glass Mountains equivalent of the Capitan." (King, 1942, p. 655). In the Guadalupe Mountains, recharge is by slow percolation of water through shelf deposits and direct infiltration into a cavernous zone. Surface water also flows directly into the formation through caverns in the area of outcrop adjacent to the reef escarpment near Carlsbad (Bjorklund and Motts, 1959, p. 146-151).

Recharge by surface water was demonstrated by a heavy storm in the Carlsbad vicinity in October 1954. Slightly less than 3 inches of rain fell in the Carlsbad area, but it is believed that much more than 3 inches fell on the limestone uplands west of the city, in the Guadalupe Mountains, and in the Seven Rivers Embayment. Water levels in wells tapping the Capitan aquifer rose substantially over a wide area immediately after the storm. One well, completed in the Capitan aquifer and equipped with a recorder, rose a total of 2.3 feet in 7 days. During and after this storm, most of the ephemeral streams west of Carlsbad in the Pecos River Basin were flowing (Bjorklund and Motts, 1959, p. 147).

A substantial amount of water is recharged to the Capitan aquifer from Lake Avalon northwest of Carlsbad (pl. 1). Bjorklund and Motts (1959) estimated that during most years, 10,000 to 20,000 acre-feet of water leaks through sediments under the lake into the aquifer.

In 1940 about 9,500 acre-feet of water from the Capitan aquifer was discharged naturally by Carlsbad Springs along the Pecos River north of Carlsbad (Hendrickson and Jones, 1952). Flow in the aquifer in the Carlsbad area is generally toward this natural discharge point (pl. 2). Most of the water from the springs is from the Capitan aquifer, but some also originates in alluvium. It is also possible that some highly mineralized water comes from the Rustler Formation in this same area.

According to Bjorklund and Motts (1959, p. 154), in the late 1950's, about 16,000 acre-feet of water was pumped from the Capitan aquifer in Eddy County each year. This water was used for irrigation, stock watering, and for municipal, industrial, and domestic needs.

Total estimated pumpage in Texas in 1960 from the Capitan aquifer was approximately 13,000 acre-feet. Approximately 7,600 acre-feet was used for irrigation and 5,000 acre-feet was used for industrial purposes. Very little water, if any, was used for domestic purposes (Brown and others, 1965, p. M72). Pumpage in 1980 in Culberson County, Texas, was 1,800 acre-feet (table 13).

Aquifer-Test Data

Aquifer-test information for the Capitan aquifer is very sparse. Hydraulic-conductivity values are 2.4 feet per day for well 610 and 16 feet per day for well 611, both of which are in Eddy County, New Mexico (table 6). Hiss (1976, p. 198) calculates that the hydraulic conductivity of the Capitan aquifer along the western margin of the Central Basin platform in Texas and New Mexico (fig. 1) ranges from 1 to 25 feet per day. The average hydraulic conductivity of the aquifer for most of southern Lea County and for east of the Pecos River valley at Carlsbad is about 5.0 feet per day. The hydraulic conductivity in the Capitan aquifer west of the Pecos River at Carlsbad, however, appears to be several orders of magnitude larger (Hale, 1945 and 1946). This wide range of hydraulic conductivity is explained by the physical characteristics of the limestone. If solution cavities are very small or not in communication with one another, hydraulic conductivity will be small; conversely, large solution cavities and channels along joints in the rock will cause the limestone to have a very large hydraulic conductivity. Average values of transmissivity for the Capitan aquifer reported by Hiss (1976, p. 199), from east of Carlsbad around the northern and eastern margins of the Delaware Basin to the Pecos-Brewster County boundary in Texas, range from 10,000 feet squared per day in thick sections to 500 feet squared per day in less permeable incised submarine canyons.

Water Quality

In southern Eddy County, New Mexico, Bjorklund and Motts (1959, p. 275-280) have described three different ranges of water quality in the Capitan aquifer. The freshwater zone contains water with a dissolved-solids concentration of less than 700 milligrams per liter. This zone of the Capitan aquifer extends from the southern part of Carlsbad southwestward for more than 20 miles, possibly as far as McKittrick Canyon in Texas, 40 miles southwest of Carlsbad.

The potable mixed-water zone contains water ranging in dissolved-solids concentration from 700 to 1,700 milligrams per liter. This zone underlies the north and west parts of Carlsbad, the south half of La Huerta, and most of Happy Valley. The water in this zone is a mixture of moderately saline water (dissolved-solids concentration of 3,000 to 10,000 milligrams per liter) moving southwestward from the area of Lake Avalon through the Tansill Formation and Capitan Limestone, and freshwater moving from the Guadalupe Mountains vicinity northeastward through the Capitan aquifer. The water varies in quality depending on the ratio of the mixing.

The nonpotable-water zone contains water with more than 1,700 milligrams per liter dissolved solids. This area is north of the potable mixed-water zone. The nonpotable-water zone underlies the northern parts of Happy Valley and La Huerta and the intervening area to Lake Avalon. It then extends northeastward from the area of Lake Avalon and La Huerta. About 10 miles east of Lake Avalon, in shelf deposits of Guadalupian age north of the Capitan reef complex, water with more than 100,000 milligrams per liter dissolved solids has been reported (Bjorklund and Motts, 1959).

According to available information for Lea County, New Mexico, the quality of water in the Capitan aquifer is very poor. Dissolved-solids concentrations are in the range of 10,000 to 30,000 milligrams per liter.

Much of the water in the Capitan aquifer in Texas is unsuitable for domestic or irrigation use; however, there are a few wells in Culberson and Pecos Counties that can provide water for irrigation of salt-tolerant crops.

Over the entire Delaware Basin, available analyses of water from the Capitan aquifer show that dissolved-solids concentrations range from 303 milligrams per liter in Pecos County to 31,700 milligrams per liter in Eddy County (table 2), chloride concentrations range from 16 milligrams per liter in Pecos County to 16,689 milligrams per liter in Eddy County, and fluoride concentrations range from 0.5 milligram per liter in Eddy County to 3.0 milligrams per liter in Pecos County. Water quality varies widely over relatively small areas, probably because of hydraulic communication with the Pecos River and with formations containing very poor quality water, or possibly because of injected brine (due to enhanced oil recovery) that has migrated into the Capitan aquifer.

Rustler Formation

The Rustler Formation underlies most of the Delaware Basin (pl. 3). The water in the Rustler Formation is mostly used for irrigation, some stock watering, and enhanced recovery of oil. Water from this formation is generally not suitable for domestic use and the quality ranges from slightly saline to brine. The known water-bearing zones in the Rustler Formation in the vicinity of the WIPP site are the Rustler-Salado contact zone and the Magenta and Culebra Dolomite Members (Mercer, 1983). The lithology of the Rustler consists mainly of anhydrite or gypsum and two dolomite marker beds (the Magenta and Culebra Dolomite Members) with a basal zone of sandstone, siltstone, and shale. It can also contain minor amounts of halite and limestone, which may be cavernous in some places. The location of selected wells completed in the Rustler Formation is shown on plate 3; well records are listed in table 1.

Structure and Thickness

The Rustler Formation east of the Capitan reef escarpment overlies both the Salado and Castile Formations; as close as 2 to 3 miles from the escarpment, however, the Rustler directly overlies the Castile rather than the Salado. Toward the center of the basin, the Rustler overlies the Salado conformably and is overlain conformably by the Dewey Lake Red Beds (Jones, 1954, p. 107-112). The structure of the resistant Culebra Dolomite and Magenta Dolomite Members of the Rustler Formation in Eddy County is often greatly distorted. Dissolution, which results in the removal of the underlying soluble beds of salt and anhydrite, causes the dolomite to be irregularly folded. Gypsum and brick-red silt, residues from solutional activity, are interbedded with the dolomite (Bjorklund and Motts, 1959, p. 124-125).

The thickness of the Rustler in Winkler County, Texas, ranges from 300 to 500 feet (Garza and Wesselman, 1959, p. 17). The thickness usually ranges from 200 to 500 feet in Ward County; the depth to the top of the formation ranges from 340 feet in the southeastern corner of the county to 1,900 feet in the Monument Draw trough (White, 1971, p. 14). The range of thickness in Reeves County, Texas, is 280 to 520 feet (Ogilbee and Wesselman, 1962, p. 22).

It was not possible to draw a thickness map of the Rustler Formation because depths to the base of the formation were not available and because of the wide variation in thickness caused by evaporite dissolution.

Ground-Water Occurrence and Use

Water in the Rustler Formation, except in outcrop and collapsed areas, occurs under artesian conditions. Most production is reported to be from solution openings or fractures in the Magenta and Culebra Dolomite Members (Mercer, 1983, p. 1-2). In parts of the formation where there are few solution openings, wells are commonly acidized to increase yield. Water is withdrawn from the basal sand in Pecos and Reeves Counties, but this water is usually very saline and is present in relatively small amounts (Armstrong and McMillion, 1961, p. 34; Ogilbee and Wesselman, 1962, p. 22).

In 1961, there were 31 wells in the Rustler Formation in Pecos County, Texas; of these, 8 wells were used for irrigation, 4 were used for enhanced recovery in oil and gas fields, and the others were used for stock. In some cases the water from flowing wells was allowed to run off and evaporate (Armstrong and McMillion, 1961). It is unlikely that many new wells will be drilled into the Rustler Formation in the northern part of Pecos County because the formation yields water of poor quality (Armstrong and McMillion, 1961, p. 34-35).

There were about 30 irrigation wells penetrating the Rustler Formation in eastern Reeves County in 1962. Nearly all of them were east of Toyah Creek. These wells, completed in the upper part of the formation, produced slightly to moderately saline water (1,000 to 10,000 milligrams per liter dissolved solids) and yielded 500 to 1,000 gallons per minute (Ogilbee and Wesselman, 1962, p. 22-23). Three of the 30 wells are listed in table 1.

Most wells in the Rustler Formation in Ward County yield less than 300 gallons per minute, but some produce as much as 650 gallons per minute. In 1971, five flowing wells near the south-central edge of the county were yielding moderately saline water that was successfully used for irrigation. In the eastern third of the county, however, water from the Rustler is either very saline or brine (dissolved-solids concentration greater than 10,000 milligrams per liter) and is used for enhanced recovery of oil (White, 1971, p. 14).

Most wells drilled into or through the Rustler Formation in Winkler County yield artesian water that is either very saline or brine. This water is used mainly for enhanced oil recovery. Production of water from the Rustler is sporadic because of the irregular occurrence of cavernous openings, but yields of as much as 800 gallons per minute have been reported (Garza and Wesselman, 1959, p. 17).

A few wells draw water from the Rustler in the sandhills area of Crane County. However, it is believed that the water is highly mineralized in all formations of Permian age in Crane County (Shafer, 1956, p. 11).

The only domestic use of water from the Rustler Formation appears to be at Red Bluff in Eddy County, New Mexico, where there is a compressor station on an interstate natural-gas line (Hendrickson and Jones, 1952). About 25 residents use the water from wells tapping the Cenozoic alluvium and/or the Rustler Formation. Data on the Rustler in Eddy County near the WIPP site indicate water quality is variable, but is generally brine (Mercer, 1983).

Recharge and Discharge

Recharge to the Rustler Formation is by precipitation, by seepage from streams where the formation crops out in the Rustler Hills area of northeastern Culberson County (pl. 1), and by inflow from adjacent formations. Some water also percolates into the Rustler from formations of the same age and similar lithology that crop out in the Glass Mountains in Brewster and Pecos Counties, Texas (Ogilbee and Wesselman, 1962, p. 23).

In southeastern Eddy County, just north of Red Bluff Reservoir, an aquifer test was used to demonstrate that there is probably fair to good hydraulic connection between the Rustler Formation and the Pecos River (Reed and Associates, 1975). Transmissivities in the area ranged from 52,377 to 238,754 feet squared per day and storage coefficients ranged from 0.01 to 0.21, with an average value of 0.1. After 8 days of pumping, the cone of depression apparently intercepted sufficient recharge from Red Bluff Reservoir and the Pecos River to cause the rate of water-level decline to decrease. Water levels began rising even with continued pumpage. Rising and falling water levels in the reservoir corresponded with the changing water levels in nearby wells in the Rustler Formation.

Ground-water movement generally is down gradient from recharge areas in the higher elevations to discharge areas along the Pecos River and its tributaries. In the southern part of the region, movement is to the north, probably from a recharge area in the Glass Mountains south of Pecos County, where Permian rocks crop out that are hydraulically connected to the Rustler. Near the Eddy-Lea County line and the WIPP site, the flow in the Rustler Formation is generally to the southwest, and much of the water eventually discharges into the Pecos River at Malaga Bend (Mercer, 1983). In the WIPP site area, the presence of impermeable beds of halite and anhydrite probably restricts vertical flow between the water-bearing zones in the Rustler Formation (Mercer, 1983). Direction of flow throughout the extent of the Rustler Formation in the Delaware Basin can be influenced locally by variations in the potentiometric surface caused by pumping or flowing wells, or by local characteristics of the formation affected by evaporite dissolution and collapse.

Ground water is discharged from the Rustler from wells (some of which flow), naturally by seeps and springs in the outcrop areas, and probably by upward leakage into the overlying strata (Brown and others, 1965, p. 58). A natural discharge point for the Rustler in Eddy County is through a series of springs near Malaga Bend on the Pecos River. Theis and Sayre (1942) estimate that in the Malaga Bend area this discharge increases the sodium chloride content in the river by as much as 342 tons per day with a discharge rate of about 200 gallons per minute (table 14).

Aquifer-Test Data

Aquifer-test data for the Rustler Formation are limited. Specific capacity values for three wells in Ward County range from 1.7 to 8.6 gallons per minute per foot (table 7).

Water was found in only the Culebra Dolomite Member of the Rustler Formation at the Project Gnome site in southern Eddy County. Transmissivities averaged 468 feet squared per day and storage coefficients averaged 2×10^{-5} from the Project Gnome data collected in March 1963 (Cooper and Glanzman, 1971, p. A10-A11).

Geohydrologic studies at and near the proposed WIPP site were begun in 1975 by the U.S. Geological Survey. Aquifer tests were conducted in test holes penetrating three water-bearing zones in the Rustler Formation. Transmissivities for the Magenta Dolomite Member of the Rustler Formation at the WIPP site range from 4 x 10^{-3} to 1 x 10^{-1} foot squared per day, but immediately west of the WIPP site in Nash Draw (pl. 1) transmissivities range from 53 to 375 feet squared per day (Mercer, 1983, p. 1-2). Transmissivities for the Culebra Dolomite Member of the Rustler Formation range from 1 x 10^{-3} to 140 feet squared per day at the WIPP site and from 18 to 1,250 feet squared per day at Nash Draw. At the contact between the Rustler Formation and the Salado Formation, transmissivities range from 3 x 10^{-5} to 5 x 10^{-2} foot squared per day at the WIPP site and from 2 x 10^{-4} to 8 feet squared per day at Nash Draw (Mercer, 1983, p. 2).

Water Quality

Water from the Rustler Formation in New Mexico is generally of poor quality. Water-quality data for the three water-bearing zones in the Rustler in Eddy County at the WIPP site indicate that although water quality is variable, it is mostly brine (Mercer, 1983). Interim studies from Mercer and Orr (1979) provide the following water-quality data from wells in the Rustler at the WIPP site:

Water-bearing zone	Dissolved solids (milligrams per liter)	Chloride (milligrams per liter)	Fluoride (milligrams per liter)
Rustler Formation-Salado Formation contact zone	311,000-325,800	180,000-210,000	--
Culebra Dolomite Member	23,721-118,292	2,800-11,000	0.5-2.0
Magenta Dolomite Member	10,347-29,683	4,100-15,000	1.8-2.0

Water from well 574 (table 3), in Eddy County about a mile southwest of the WIPP site, has a dissolved-solids concentration of 3,860 milligrams per liter, a chloride concentration of 510 milligrams per liter, and a fluoride concentration of 2.4 milligrams per liter. This well probably penetrates either the Magenta Dolomite Member or the Culebra Dolomite Member of the Rustler (Walker, 1979).

Rustler Formation water quality in Texas is extremely variable. The few common characteristics of this water include a high calcium concentration (usually greater than 500 milligrams per liter), low bicarbonate (usually less than 200 milligrams per liter), and a high sulfate to chloride ratio. Hydrogen sulfide is frequently present in the water, but it readily dissipates into the atmosphere after the water reaches the surface. Generally, mineral concentration is highest in the northern part of the study area (Brown and others, 1965, p. M58). In the entire Delaware Basin area, potable Rustler Formation water is almost nonexistent. It can be used for watering stock and for irrigation where the water is satisfactory for these purposes. Dissolved-solids concentrations in water from the Rustler generally range from 286 milligrams per liter in Ward County to 157,000 milligrams per liter in Winkler County, chloride concentrations range from 15 milligrams per liter in Culberson County to 89,700 milligrams per liter in Winkler County, and fluoride concentrations range from 0.5 milligram per liter in Ward County to 11.4 milligrams per liter in Crane County. For the Delaware Basin study area in Texas, average values of these constituents calculated from table 3 are: dissolved solids, 16,110 milligrams per liter for 37 analyses; chloride, 6,472 milligrams per liter for 40 analyses; and fluoride, 2.8 milligrams per liter for 10 analyses.

Santa Rosa Sandstone

The Santa Rosa Sandstone is part of the Dockum Group of Late Triassic age. The Dockum Group consists of, from oldest to youngest, the Tecovas Formation, the Santa Rosa Sandstone, and the Chinle Formation. The Santa Rosa Sandstone is present in parts of every county in the Delaware Basin study area except Culberson.

Lithologically, the Santa Rosa Sandstone usually consists of reddish-brown and gray, medium- to coarse-grained, cross-stratified sandstone. Cementing agents are mainly calcite with some silica. The Santa Rosa sometimes also contains red and green shale, siltstone, claystone, and conglomerate.

The Santa Rosa Sandstone and Chinle Formation in parts of Ward County are hydraulically connected with the Cenozoic alluvium and called the Allurosa aquifer or, in some areas, the Santa Rosa aquifer. A large majority of the population in Ward County uses the Santa Rosa Sandstone, the Allurosa aquifer, or both for public water supply.

The location of wells completed in the Santa Rosa Sandstone is shown on plate 4. Data from these wells are given in tables 1, 4, and 8.

Structure and Thickness

The maximum thickness of the Santa Rosa Sandstone is 520 feet in Ward County, Texas (White, 1971). This maximum thickness, which may include parts of the overlying Chinle Formation and alluvium, is present in a deep trough that developed by dissolution of underlying evaporites. Thicknesses in other areas in the Delaware Basin are affected similarly by other troughs. The approximate values of thickness for the Santa Rosa Sandstone shown on plate 4 do not include the thickness of the Chinle Formation or Cenozoic alluvium.

The Santa Rosa Sandstone in Eddy County, New Mexico, crops out in north-trending scarps a few miles to the west of the Eddy-Lea County line and also in the south-facing scarps of Paduca Breaks in the extreme southwest corner of Lea County (pl. 1). The general dip of the Triassic rocks in Lea County is toward the south and east (Nicholson and Clebsch, 1961, p. 56).

The formations of the Dockum Group in Pecos County, Texas, have not been differentiated (Armstrong and McMillion, 1961). In Reeves County, Texas, however, the Santa Rosa Sandstone has been recognized as a distinct unit of cemented sandstone (Ogilbee and Wesselman, 1962).

The Santa Rosa Sandstone crops out below the rim of the Quito Escarpment in Ward County, Texas (pl. 1). West of the Quito Escarpment in the Pecos trough, the Santa Rosa Sandstone is absent except for local slumpage blocks at the base of the alluvial fill. It is also absent because of erosion in the southeastern corner of the county. The Santa Rosa Sandstone lies near the land surface east of Quito Escarpment, but plunges to depths as great as 1,000 feet in the Monument Draw trough. The Santa Rosa throughout the study area in Texas generally ranges from 100 to 350 feet thick (pl. 4).

Ground-Water Occurrence and Use

The Santa Rosa Sandstone (or in some cases, undifferentiated sandstones of the Dockum Group) in eastern and southeastern Eddy County yields some water for stock purposes. The Triassic Dockum Group and possibly the Permian Dewey Lake Red Beds are the chief sources of ground water in the eastern part of the county in a belt 10 to 20 miles wide along the Lea County border. The quality of water is generally sufficient for stock or domestic use and the depth to water is generally less than 400 feet (Hendrickson and Jones, 1952, p. 75).

The Santa Rosa Sandstone is the principal aquifer in the western third of Lea County and was the principal domestic aquifer at Jal in southeastern Lea County before 1954 (Nicholson and Clebsch, 1961, p. 56-58), at which time the Jal well field was moved because of insufficient production. The new well field is probably completed in the Tertiary Ogallala Formation and Cenozoic alluvium (Dinwiddie, 1963, p. 81). The only community in Lea County that obtains part of its water from Triassic rocks is Oil Center (table 11). According to a local resident, the water from one well is nonpotable because of contamination from nearby oil wells.

The estimated annual pumpage in Texas from the Santa Rosa Sandstone is in excess of 25,000 acre-feet. Of this, irrigation accounts for about 5 percent of total pumpage, municipal supply about 40 percent, industrial supply about 15 percent, and mining about 40 percent (table 13).

According to Armstrong and McMillion (1961, p. 37), the undifferentiated sandstones in the Dockum Group have yielded small amounts of water in Pecos County. However, shallower aquifers provide an ample source; consequently, the Dockum Group has not been widely developed.

The Santa Rosa Sandstone provides the municipal water supply for Pecos in Reeves County, which used approximately 3,600 acre-feet of water in 1980 (Texas Department of Water Resources, 1980). In 1933, Pecos drilled a test well about 10 miles southeast of the city that produced an average of about 500,000 gallons per day for a week. The water from this well was of satisfactory quality for domestic supply, so a pipeline was built and the well was put on-line. Several additional wells were drilled in this area by 1952 to meet additional municipal demands. Another well field was started in 1952 about 2 miles southeast of the original one. There were 17 operational wells by 1959, 7 in the original well field and 10 in the new one. About 1 mile northwest of these two city well fields, the water in the alluvium and the Santa Rosa Sandstone is unsuitable for human consumption because of high sulfate and chloride content. Water of similar poor chemical quality is also found to the north, west, and southwest of the city wells (Ogilbee and Wesselman, 1962, p. 24-25).

The Pecos city wells initially yielded about 200 to 700 gallons per minute each. This relatively high productivity is probably a result of structural deformation, which uplifted and fractured the sandstone in this part of Reeves County. Wells in other areas where the sandstone is not fractured have much lower yields (Ogilbee and Wesselman, 1962, p. 25; Brown and others, 1965, p. M53).

The city of Barstow in southwestern Ward County obtained its water from wells in the Allurosa aquifer until July 1966. These wells were about 4 miles east of the city. However, the quality of the water was poor and steadily deteriorating (Ogilbee and Wesselman, 1962, p. 25,59). Barstow presently purchases water from the city of Pecos. In 1980, Barstow used 193 acre-feet of water (table 11).

Other cities that obtain part of their municipal water supplies from the Santa Rosa Sandstone are Monahans in northeastern Ward County, and Kermit in Winkler County (table 11). The total pumpage of these two cities was about 500 acre-feet in 1980.

Recharge and Discharge

The Santa Rosa Sandstone in Eddy and Lea Counties, New Mexico, is recharged in three ways: by precipitation on sand dunes that overlie the aquifer, by precipitation and runoff directly on the outcrop, and probably by migration of ground water from the overlying Ogallala Formation and Cenozoic alluvium. The direction of flow is generally to the south and southwest, away from these recharge areas in southwestern Lea County (pl. 4). Locally in Lea County, it is possible that the dominating topographic influence on the direction of flow is San Simon Swale. Ground water probably flows toward the Swale from the west, north, and east (Nicholson and Clebsch, 1961, p. 57) and may discharge downward in the collapse structure to other formations.

A main area of recharge to the Santa Rosa Sandstone in Texas is from the Allurosa aquifer along the Pecos River. This recharge is accomplished by percolation and seepage into the aquifer from many sources, including canals along the Pecos River, irrigation of crops, and precipitation. The Cenozoic alluvium and Santa Rosa Sandstone aquifers in Pecos, Reeves, Ward, and Winkler Counties are recharged by approximately 71,000 acre-feet of water per year (Texas Water Development Board, 1977, p. 764-765). The direction of flow in the Santa Rosa Sandstone in Texas is generally to the southeast (pl. 4).

Discharge from the Santa Rosa Sandstone is mainly by the pumping of wells for domestic and irrigation use. Approximately 25,800 acre-feet of water was pumped from the Santa Rosa Sandstone in Texas in 1980 (table 13). Figures are not available for pumpage in New Mexico. Water is also discharged by evapotranspiration where the formation is close to the land surface and by ground-water flow to other formations.

Aquifer-Test Data

The only available aquifer-test data for the Santa Rosa Sandstone are from Winkler County, Texas. Transmissivities range from 350 to 3,200 feet squared per day (table 8).

Water Quality

None of the wells completed in the Santa Rosa Sandstone in Eddy County produce water that is too highly mineralized for use by stock. Probably half of the wells are considered useful for domestic purposes. In a study by Hendrickson and Jones (1952, p. 75), analyses were made on 21 samples of water from wells withdrawing all or part of their water from Triassic sandstones of the Dockum Group in Eddy County. Hardness (as calcium carbonate) ranged from 201 to 3,590 milligrams per liter and was more than 1,000 milligrams per liter in 14 of the 21 samples. Chloride concentration ranged from 17 to 785 milligrams per liter and was more than 200 milligrams per liter in 10 of the samples.

Nicholson and Clebsch (1961, p. 100) reported that the Dockum Group or Santa Rosa Sandstone in southern Lea County generally yields water that is low in silica (9 to 41 milligrams per liter) and that has a wide range of calcium and magnesium concentrations. Only 6 of 17 samples had fluoride concentrations less than 1.5 milligrams per liter. In the seven analyses from Lea County listed in table 4, sodium concentrations range from 131 to 563 milligrams per liter, sulfate concentrations range from 74 to 934 milligrams per liter, and chloride concentrations range from 21 to 252 milligrams per liter.

The water quality in the Santa Rosa Sandstone in Texas is variable, ranging from freshwater to brine, but it generally contains the best quality of water of the aquifers studied. Chloride concentrations range from 10 to 4,800 milligrams per liter, dissolved-solids concentrations range from 205 to 2,990 milligrams per liter, and fluoride concentrations range from 0.4 to 5.0 milligrams per liter (table 4). Average values for these constituents calculated from table 4 are: chloride, 258 milligrams per liter for 37 analyses; dissolved solids, 984 milligrams per liter for 34 analyses; and fluoride, 1.9 milligrams per liter for 27 analyses.

The water in the eastern half of Winkler County in the Santa Rosa Sandstone is more mineralized than the water in the western half (table 4, pl. 4). The area around Kermit has the least mineralization. In a study by Garza and Wesselman (1959, p. 50), three wells in eastern Winkler County had dissolved-solids concentrations ranging from 1,110 to 4,090 milligrams per liter. Samples from wells in the remainder of the county contained less than 1,000 milligrams per liter dissolved solids. In some areas of the county, oilfield waste water may be a cause of ground-water pollution.

Aquifers in Cenozoic Alluvium

Cenozoic water-bearing alluvium and bolson deposits are scattered throughout many areas in Texas and New Mexico. Bolson deposits usually originate as alluvial accumulations washed into a basin or valley from surrounding mountains. Although the alluvium and bolson deposits are completely separated geographically, they have similar geologic and hydrologic characteristics and may be considered together as the aquifers in Cenozoic alluvium (Muller and Price, 1979, p. 25).

The aquifers in Cenozoic alluvium are present in all counties within the Delaware Basin. The lithology is highly variable, consisting of clastics eroded from surrounding uplands, fluvial deposits of the Pecos River and other streams, caliche, gypsite, conglomerates, terrace deposits, windblown sand, and playa deposits. The location of selected wells completed in aquifers in Cenozoic alluvium is shown on plate 5; well records are listed in table 1.

Where the Cenozoic alluvium is hydraulically connected with underlying Cretaceous formations in Pecos County, Texas, the aquifer is called the Pecos aquifer. Similarly, in areas of Ward, Winkler, Reeves, and Pecos Counties, Texas, where the Cenozoic alluvium is hydraulically connected to the Triassic Dockum Group (including the Santa Rosa Sandstone), the aquifer is called the Allurosa aquifer.

Structure and Thickness

The saturated thickness of the Cenozoic alluvium is as much as 1,400 feet (pl. 6). Most of the alluvium is concentrated in two large subbasins or troughs trending north to northwest in the eastern half of the Delaware Basin (Maley and Huffington, 1953, p. 541). A third large subbasin, the Salt Basin in western Culberson County, Texas, contains bolson fill as much as 2,400 feet thick (Gates and others, 1980, p. 33). Based on available geophysical data from the Salt Basin, an average saturated thickness was estimated to be about 1,000 feet (Muller and Price, 1979). An additional shallow-fill area, structurally disconnected from these major troughs, is located in the Carlsbad-Black River drainage area of Eddy County, New Mexico (Maley and Huffington, 1953, p. 541).

The two large troughs were probably formed by the dissolution and collapse of underlying evaporite formations (Maley and Huffington, 1953) and are the result of tectonic-hydrologic interactions. During the late Tertiary, the Delaware Basin was tilted eastward, resulting in surface exposure of lower evaporite sections. The troughs were probably formed by local concentration and consequent downward percolation of surface water, which gradually dissolved the Permian evaporites.

The deposition in the Salt Basin occurred after faulting in the late Cenozoic. The faulting formed structurally high areas (mountain blocks) and structurally low areas (basins such as the Salt Basin). Erosional sediments from the mountain blocks were deposited in the basins and valleys.

Ground-Water Occurrence and Use

Because of the tilting and subsequent erosion of older stratigraphic units, the Cenozoic alluvium lies unconformably on Permian, Triassic, and Cretaceous rocks throughout most of the study area. Saturated deposits in the Triassic Dockum Group (Santa Rosa Sandstone) and the alluvium in Ward, Winkler, Reeves, and Pecos Counties, Texas, are hydraulically connected. This combined aquifer is called the Allurosa aquifer (White, 1971, p. 17). Similarly, in parts of Pecos County, Texas, the Cenozoic alluvium is hydraulically connected with underlying Cretaceous formations. This combined unit is called the Pecos aquifer. Aquifers in the Cenozoic alluvium in the remaining counties of the study area are generally considered as distinct units and are usually under water-table conditions, but artesian conditions may exist locally where clay layers act as confining beds.

Throughout the Delaware Basin, the aquifers in Cenozoic alluvium are extensively used for domestic water supplies, irrigation, industry, and livestock. The Allurosa and Pecos aquifers are a primary source of municipal water. An estimated 248,400 acre-feet of water per year was pumped from the aquifers in Cenozoic alluvium in the Delaware Basin in Texas in 1980 (table 13). Approximately 5 percent of this was for municipal use, 2 percent was for industrial use, 5 percent was withdrawn for mining, and 88 percent was for irrigation. Water from the Cenozoic alluvium is also used in scattered areas throughout New Mexico. A general decline of water levels has been observed in the Carlsbad area; the rate of decline ranges from 0.3 to 4.0 feet per year (table 12) in wells used for industrial and stock purposes (table 1). A saturated thickness map of the Cenozoic alluvium (pl. 6) is provided to illustrate the potential availability of water.

Recharge and Discharge

The Cenozoic alluvium generally is recharged by infiltration of surface water from surrounding uplands and along the channels of ephemeral streams and the Pecos River. Because of the semiarid climate, recharge by infiltration from precipitation is significant only during intense storms of long duration or frequent occurrence when the surface soil attains a maximum moisture content and deep percolation takes place. Such climatic conditions are infrequent but have occurred historically. Muller and Price (1979) estimated the annual effective recharge for the bolson deposits in the Salt Basin and its subareas (Culberson County) to be about 6,000 acre-feet per year. The estimate is based on 1 percent of the mean annual precipitation recharging the aquifers. Dune sands in Crane, Ward, and Winkler Counties, Texas, serve as excellent precipitation-infiltration areas.

The amount of recharge by flow from adjacent formations depends on the hydraulic and lithologic nature of these formations. For example, near Carlsbad, New Mexico, the alluvium is partially recharged by flow from underlying Permian artesian limestone aquifers. Similarly, recharge is greater from formations with high permeability such as Cretaceous limestones and the Pecos aquifer in Texas, which contain solution cavities, sinkholes, fractures, and sand units.

The Pecos River may be providing recharge to the Cenozoic alluvium in parts of Reeves, Ward, and Pecos Counties, Texas. Heavy pumpage for irrigation in central Reeves County and the area around Coyanosa in Pecos County has reversed the gradient of the water table away from the Pecos River (pl. 5). The Pecos River generally becomes more saline as it flows southward through the Delaware Basin (table 14). The river is generally very saline in Pecos and Reeves Counties, which may cause the deterioration of water quality in the Cenozoic alluvium. Wells 353 and 354 in Pecos County and well 404 in Reeves County penetrate the aquifers in Cenozoic alluvium near the areas of heavy pumping. Water from these wells is moderately saline; dissolved-solids concentrations range from 4,217 to 9,760 milligrams per liter (table 5).

Muller and Price (1979) estimated the total annual effective recharge for the Cenozoic alluvium in western Texas to be 70,800 acre-feet. "The methodology. . .was based on an increase in base flow of 34,000 acre-feet (41.9 hm^3) along a segment of the Pecos River between the New Mexico State Line and Girvin (U.S. Geological Survey, 1918; and White, 1971). Additional effective recharge of 36,800 acre-feet (45.4 hm^3) per year was estimated using 60 percent of the Pecos River average annual diversions for irrigation as infiltration into the aquifer." (Muller and Price, 1979, p. 35).

The Rustler Formation may be recharging the Cenozoic alluvium with water of poor quality in northern Reeves County, Texas, where Dewey Lake Red Beds are not separating the two units, as indicated by the higher dissolved-solids concentrations in water in the Cenozoic alluvium in this area. The water is slightly to moderately saline.

Movement of ground water in the bolson deposits in Culberson County is generally from recharge areas around basin margins and the ephemeral-stream channels to areas of discharge in the lower parts of the basin. Ground water moves eastward to the Salt Flats of western Culberson and northeastern Hudspeth Counties where it discharges primarily by evapotranspiration. Where the water table is close to the land surface, evapotranspiration is a source of discharge. Bjorklund and Motts (1959, p. 215) state that "The depths from which plants can lift ground water varies greatly with the species and may be as much as 50 feet." Water-level contours below Salt Flats show that much of the ground water moves into two water-table depressions, one in Wild Horse Flat and one in Michigan Flat (pl. 5), where it is withdrawn for irrigation (Gates and others, 1980).

The most significant discharge of ground water from the Cenozoic alluvium is from the hundreds of wells tapping this unit throughout the study area (pl. 5). Approximately 249,000 acre-feet was withdrawn in this manner in 1980 (table 13).

Aquifer-Test Data

Aquifer characteristics in the Cenozoic alluvium vary widely over the Delaware Basin study area. Transmissivities range from 170 feet squared per day in Winkler County, Texas, to 22,000 feet squared per day in Reeves County, Texas. Hydraulic conductivities range from 1.2 feet per day in Winkler County, Texas, to 294 feet per day in Ward County, Texas (table 9).

Water Quality

Water quality within the aquifers in Cenozoic alluvium and associated aquifers (the Allurosa aquifer and the Pecos aquifer) of the Delaware Basin is highly variable because of the local presence of adjacent evaporite beds (notably gypsum and halite) (Bjorklund and Motts, 1959, p. 290), recharge by highly mineralized irrigation and Pecos River water, and saline intrusion due to extensive pumping in areas where discharge is not balanced by recharge. Dissolved-solids concentrations range from 188 to 15,000 milligrams per liter with an average value of 2,319 milligrams per liter for 315 analyses. Chloride concentrations range from 5 to 7,400 milligrams per liter with an average value of 627 milligrams per liter for 360 analyses. Fluoride concentrations range from 0.3 to 10 milligrams per liter with an average value of 1.8 milligrams per liter for 201 analyses (table 5).

SUMMARY

The Delaware Basin in western Texas and southeastern New Mexico covers an area of about 12,000 square miles and includes all or part of Crane, Culberson, Loving, Pecos, Reeves, Ward, and Winkler Counties, Texas, and part of Eddy and Lea Counties, New Mexico. Major aquifers in the Delaware Basin are the Capitan aquifer, Rustler Formation, Santa Rosa Sandstone, and aquifers in Cenozoic alluvium.

The Capitan aquifer is present in all of the counties in the Delaware Basin except Crane, Loving, and Reeves Counties. It is composed of the Capitan and Goat Seep Limestones and the Artesia Group, which includes in ascending order, the Grayburg, Queen, Seven Rivers, Yates, and Tansill Formations. The aquifer parallels the edge of the Delaware Basin in an arcuate strip along the northern and eastern margins, extending from the Guadalupe Mountains to the Glass Mountains and is probably present along the western and southwestern margins of the Delaware Basin. The thickness is quite variable, with a maximum of about 2,357 feet. The Capitan aquifer is the source of domestic water supply in southern Eddy County and municipal water supply in Carlsbad, Happy Valley, and White's City. It is a source for irrigation water in Eddy County and a few places in Texas. Dissolved-solids concentrations range from 303 milligrams per liter in Pecos County to 31,700 milligrams per liter in Eddy County. Chloride concentrations range from 16 milligrams per liter in Pecos County to 16,689 milligrams per liter in Eddy County. Fluoride concentrations range from 0.5 milligram per liter in Eddy County to 3.0 milligrams per liter in Pecos County. Water quality varies widely over relatively small areas, probably because of hydraulic communication with the Pecos River and with formations containing very poor water or possibly because brine injected for enhanced recovery of oil has migrated into the Capitan aquifer.

The Rustler Formation is present in most of the Delaware Basin. Its thickness in Texas usually ranges from about 200 to 500 feet. Water quality in Texas is generally poor, with dissolved-solids concentrations ranging from 286 milligrams per liter in Ward County to 157,000 milligrams per liter in Winkler County. Chloride concentrations range from 15 milligrams per liter in Culberson County to 89,700 milligrams per liter in Winkler County. Fluoride concentrations range from 0.5 milligram per liter in Ward County to 11.4 milligrams per liter in Crane County. Where the water quality is satisfactory, water can be used for irrigating salt-tolerant crops.

The Santa Rosa Sandstone is present in all or part of each county in the Delaware Basin study area except Culberson County, Texas. The maximum thickness is 520 feet. In the eastern part of Eddy County and the western third of Lea County, New Mexico, the Santa Rosa Sandstone is the principal aquifer. In Texas, where the Santa Rosa Sandstone and the Cenozoic alluvium are hydraulically connected, they are collectively called the Allurosa aquifer. The estimated annual pumpage in Texas from the Santa Rosa Sandstone-Allurosa aquifer is in excess of 25,000 acre-feet. Cities that obtain their municipal water from the aquifer include Barstow, Pecos, Monahans, and Kermit, Texas. Water quality is variable. Where the Santa Rosa Sandstone is a distinct entity, chloride concentrations range from 10 milligrams per liter in Ward and Winkler Counties to 4,800 milligrams per liter in Ward County. Dissolved-solids concentrations range from 205 milligrams per liter in Winkler County to 2,990 milligrams per liter in Winkler County. Fluoride concentrations range from 0.4 milligram per liter in Reeves County to 5.0 milligrams per liter in Crane County.

Aquifers in Cenozoic alluvium are present in every county in the Delaware Basin. They consist of clastic deposits from surrounding uplands, Pecos River and other fluvial deposits, caliche, gypsite, conglomerates, terrace deposits, windblown sand, and playa deposits. The maximum saturated thickness is more than 1,400 feet. The Cenozic alluvium is used extensively throughout most of the Delaware Basin for public water supply, irrigation, industry, livestock, and rural domestic use. The water quality in aquifers in Cenozoic alluvium including the Allurosa aquifer and the Pecos aquifer can be highly variable due to the local presence of evaporite deposits, recharge by highly mineralized water from irrigation and the Pecos River, and saline intrusion caused by extensive pumping. Dissolved-solids concentrations range from 188 to 15,000 milligrams per liter. Chloride concentrations range from 5 to 7,400 milligrams per liter. Fluoride concentrations range from 0.3 to 10 milligrams per liter.

All of the aquifers in the Delaware Basin study area locally contain water that is not suitable for human consumption. The following table shows the four formations or aquifers studied and the average concentrations of dissolved solids, chloride, and fluoride calculated from the samples listed in the water-quality tables.

Constituent	Capitan aquifer	Rustler Formation 1/	Santa Rosa Sandstone	Cenozoic alluvium 2/
Dissolved solids				
Number of analyses	21	37	34	315
Average concentration (mg/L)	8,196	16,110	984	2,319
Chloride				
Number of analyses	21	40	37	360
Average concentration (mg/L)	3,350	6,472	258	627
Fluoride				
Number of analyses	10	10	27	201
Average concentration (mg/L)	1.7	2.8	1.9	1.8

1/ Texas only
2/ Includes Allurosa and Pecos aquifers.

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SUPPLEMENTAL INFORMATION

Glossary of Geohydrologic Terms

(modified from Trauger, 1972)

Acre-foot--The amount of water (325,851 gal) that will cover one acre to a depth of 1 foot.

Aquifer--A rock formation, group of formations, or a part of a formation containing water that can be recovered through wells. An aquifer may be called also a water-bearing bed, formation, or zone.

Artesian water--Ground water that rises above the level at which it is encountered by a well, but which does not necessarily rise to or above the surface of the ground--also called confined water. The rock in which artesian water is found may be called an artesian aquifer, and the well an artesian well, especially if water flows at the surface. Water that is semiconfined is also artesian. A semiconfined aquifer is one that is confined by beds that do not form a perfect seal, thus permitting leakage into or out of the aquifer, depending upon the head relative to the head in overlying and underlying beds.

Bolson--A basin, depression, or wide valley, mostly surrounded by mountains, drained by a system that has no outlet to the sea. Bolson fill is the alluvial detritus that fills a bolson--also commonly called bolson deposits.

Cone of depression--The depression produced in a water table or potentiometric surface by ground-water withdrawals (or artesian flow).

Confined water--The same as artesian water.

Confining bed--A rock formation that will not transmit water readily and which retards or stops the free movement of water underground. Confining beds also have been called aquicludes, aquitards, or semiconfining beds.

Few rocks are completely impermeable--most will transmit some water, though slowly; hence, "aquifer" and "confining bed" are relative terms. A rock formation with a low capacity to transmit water may abut or overlie a very permeable formation, in which case it might act as a dam or as a confining bed. Elsewhere that same formation might provide a small, reliable supply of water to wells, in which case it would be considered an aquifer.

Discharge--Rate of flow at a given instant in terms of volume per unit of time: pumping discharge equals pumping rate, usually given in gallons per minute; stream discharge, usually given in cubic feet per second. In ground-water use, discharge is the movement of water out of an aquifer. Discharge may be natural, as from springs, by seepage, or by evapotranspiration, or it may be artificial, as by constructed drains or from wells.

Drawdown--The lowering of the water table or potentiometric surface caused by ground-water withdrawals (or artesian flow).

Knowledge of the amount of drawdown at a given pumping rate, over a specified length of time, is necessary to estimate the probable long-term effect on the water table or potentiometric surface of withdrawals from the aquifer.

Hydraulic conductivity--The flow rate of water in feet per day (meters per day) through a cross section of one square foot under a hydraulic gradient of unit change in head through the unit length of flow (Bates and Jackson, 1980).

Infiltration--Movement of water through the soil surface into the ground. Infiltration takes place above the water table, as distinguished from percolation, which is the more or less horizontal movement of water in saturated material below the water table.

Intermittent stream--A stream that flows for only a part of the time. Flow generally occurs for several weeks or months during or after seasonal precipitation, due to ground-water discharge, in contrast to the ephemeral stream that flows but a few hours or days following a single storm.

Losing stream--A stream that loses water by infiltration through the bed and bank--sometimes called influent stream.

Milligrams per liter (mg/L)--A measure of the concentration of a substance in a solution. A milligram per liter is one thousandth of a gram (0.001 gram) of a substance in one liter (about 1,000 cubic centimeters) of solution. A milligram per liter (mg/L) is equivalent to 1 part per million (ppm) for concentrations of about 7,000 ppm or less.

Parts per million (ppm)--(See milligrams per liter.)

Perched water--Ground water held or detained above the regional water table by a layer or bed of impermeable or semipermeable rock.

Percolation--(See infiltration.)

Porosity--The ratio of the total volume of pore space (voids in a rock or soil) to its total volume, usually stated as a percentage. Effective porosity is the ratio of the total volume of interconnected voids to the total volume. Unconnected voids contribute to total porosity, but are ineffective in transmitting water through the rock.

Potentiometric surface--The surface which represents the static head, especially in those aquifers in which water is confined under some hydrostatic pressure. As related to an aquifer, it is determined by the levels to which water will rise in tightly cased wells. The water table is a particular potentiometric surface, all points on which are at zero hydrostatic pressure. Syn: piezometric surface; pressure surface.

Pump test--Term commonly (though improperly) used to describe the testing of a well to determine the potential yield; the term "aquifer test" is more appropriate as it is the aquifer, not the pump, that is being tested.

Recharge--Process by which water infiltrates and is added to an aquifer, either directly into the aquifer, or indirectly by way of another rock formation; also, the water itself.

Recharge may be natural, as when precipitation infiltrates to the water table, or artifical, when water is injected through wells or spread over permeable surfaces for the purpose of recharging an aquifer.

Saturated thickness--The thickness of the zone of saturation. (See zone of saturation.)

Soil moisture--Moisture held in the soil zone.

Most precipitation that falls in arid and semiarid lands either evaporates immediately or is held for a relatively short time in the soil zone where, if it is not used by plants, it ultimately is evaporated. Some soil moisture generally is held so tightly by capillary attraction that it is not available to plants and is not evaporated by normal temperatures.

Specific capacity--Yield of a well in gallons per minute per foot of drawdown after a specified period of pumping.

A well yielding 20 gallons per minute with a drawdown of 5 feet has a specific capacity of 4 gallons per minute per foot at that time, at that particular rate of pumping, and at that pumping level. The specific capacity may change with time. It may increase as the formation is opened up by removal of fine material, or it may decrease. Decreases are to be expected more commonly than increases as the aquifer is dewatered and as perforations in the casing or screen or voids in the aquifer become clogged for one reason or another.

Specific yield--ratio of (1) the volume of water a saturated rock will yield by gravity to (2) its own volume, expressed as a ratio or percentage. If the time the material is allowed to drain is known, it should be stated.

If 40 cubic feet of saturated rock yields 3 cubic feet of water by gravity drainage, its specific yield is 3/40 or 0.075 or 7.5 percent.

Static water level--The level at which water stands in a nonpumping well--the prepumping level. Also, the level to which water eventually will return after pumping has stopped, sometimes called the recovery level.

The recovery level may not stand as high as the original or first static level if the water pumped has come from storage and is not replaced by recharge. (See water level.)

Storage coefficient--Volume of water released or taken into storage in an aquifer per square foot of surface area per foot of vertical change in the head. The storage coefficient is approximately equal to the specific yield for nonartesian (unconfined) aquifers. It is much less for confined aquifers because in a confined aquifer it represents the change due to the combined compressibility of the aquifer and water, which is very slight.

Transmissivity--Ability of a rock to transmit water under hydraulic head. The transmissivity is the rate of flow of water at the prevailing temperature, through a vertical unit-wide strip of the aquifer, extending the full height of saturation, under unit hydraulic gradient (1 unit of head per unit of flow distance). In this report, the units used are feet squared per day.

Water level--The surface of still water; the altitude or level of a water surface above or below a given datum.

Water levels in wells fluctuate in response to natural causes and to activities of man. Some fluctuations of water levels can be correlated with variations in atmospheric pressure. Seasonal changes in water levels can result from variations in rates of recharge and discharge. Increased precipitation, death of seasonal vegetation, or reduced ground-water withdrawals can result in a rise in water levels; declines generally begin during and after periods of drought, heavy pumping, reactivated growth of vegetation, or upstream diversion of surface flow.

Fluctuations of water levels must be measured over definite periods of time to determine their causes, to aid in understanding the occurrence and behavior of ground water in an area, and to help determine action for development or conservation of supplies of water.

Water table--Upper surface of the zone of saturation where that surface is not confined and is at atmospheric pressure. Where water is confined in an aquifer, different terminology is used--see potentiometric surface.

Moisture usually occurs some distance above the water table within the capillary fringe. The position of the water table below the land surface can be determined by measuring the depth to water in wells.

Water year--The period October 1 through September 30 of any two successive years, as October 1980 through September 1981.

A period based on the seasonal cycles of rainfall, runoff, and plant growth. Fall and winter precipitation greatly affects the following year's early growth of vegetation because it is stored as soil moisture and snowpack. For realistic consideration of the relation of precipitation to plant growth, as with tree-ring analysis or crop and range predictions, the October through December precipitation must be considered with that falling during the successive spring and summer growing months.

Zone of saturation--Zone in which all the connected interstices or voids in a permeable rock are filled with water under pressure equal to, or greater than, atmospheric pressure. The water table commonly is considered to be at the top of the zone of saturation.

Well-Numbering Systems

New Mexico

The system of numbering wells in New Mexico is based on the common subdivision of public lands into sections. The well number, in addition to designating the well, locates it to the nearest 10-acre tract in the land net (fig. 4).

The well number consists of four parts separated by periods. The first part is the township number, the second part is the range number, and the third part is the section number. Since all the township blocks in the Delaware Basin are south of the New Mexico Base Line and east of the New Mexico Principal Meridian, the letters "S" and "E" indicating direction are not used in this report. Hence, the number 20.35.31 is assigned to any well located in sec. 31, T. 20 S., R. 35 E.

The fourth part of the number consists of three digits that denote the particular 10-acre tract within the section in which the well is located. The method of numbering the tracts within a section is also shown in figure 4. For this purpose the section is divided into four quarters, numbered 1, 2, 3, and 4, in the normal reading order, for the northwest, northeast, southwest, and southeast quarter, respectively. The first digit of the fourth part gives the quarter section, which is a tract of 160 acres. Each quarter is subdivided in the same manner so that the first and second digit together define the 40-acre tract. Finally, the 40-acre tract is divided into four 10-acre tracts and the third digit denotes the 10-acre tract. Thus, well 20.35.31.113 in Lea County is located in the SW¼ of the NW¼ of the NW¼ of section 31, T. 20 S., R. 35 E. Letters a, b, c, ... are added to the last part of the location number to designate the second, third, fourth, and succeeding wells in the same 10-acre tract, or the 10-acre tract can be subdivided further.

If a well cannot be located accurately within a 10-acre tract, a zero is used as the third digit of the fourth part of the well number, and if it cannot be located accurately within a 40-acre tract, zeros are used for both the second and third digits. If the well cannot be located more closely than the section, the fourth part of the well number is omitted.

Texas

In previous Texas publications, many different systems of numbering wells have been used. Guyton and Associates (1958) numbered wells consecutively in one series. Garza and Wesselman (1959) used a 10-minute grid system. The grids were identified by letters of the alphabet, from A to H, starting with the northwest grid and moving in a west-to-east, north-to-south succession. Inside grids, individual wells were numbered consecutively beginning in the northwest corner.

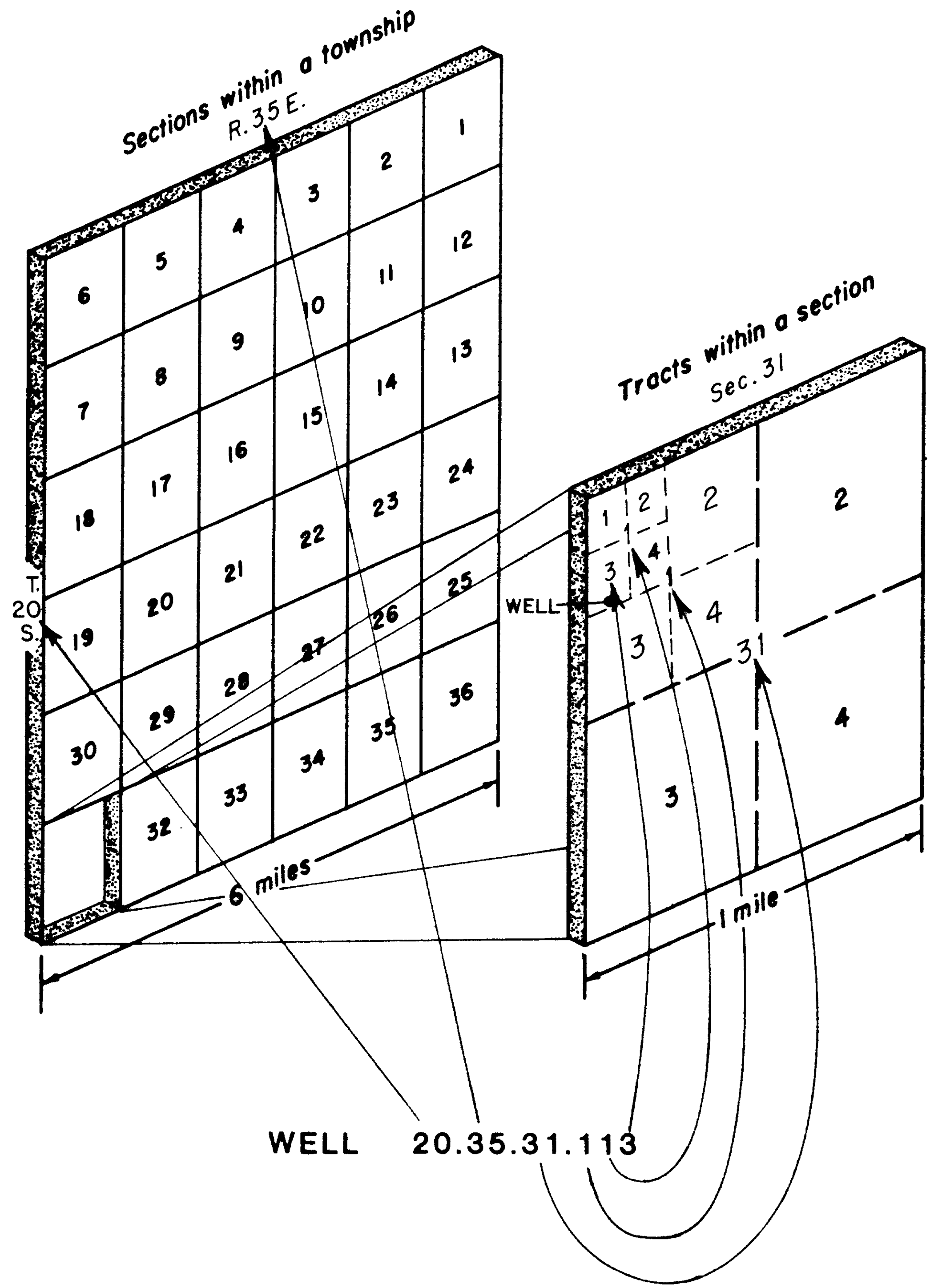

Figure 4.--System of numbering wells in New Mexico.

In order to facilitate the location of wells and to avoid duplication of well numbers, the Texas Department of Water Resources (formerly the Texas Water Development Board and the Texas Water Commission) adopted a statewide well-numbering system. This system is based on division of the State into quadrangles formed by degrees of latitude and longitude, and the division of these quadrangles into smaller ones (fig. 5).

The largest quadrangle, measuring 1 degree of latitude and longitude, is divided into sixty-four 7½-minute quadrangles, each of which is further divided into nine 2½-minute quadrangles. Each 1-degree quadrangle in Texas has been assigned a number for identification. The 7½-minute quadrangles are numbered consecutively from left to right beginning in the upper left-hand corner of the 1-degree quadrangle, and the 2½-minute quadrangles within the 7½-minute quadrangle are similarly numbered. The first two digits of a well number identify the 1-degree quadrangle; the third and fourth digits identify the 7½-minute quadrangle; the fifth digit identifies the 2½-minute quadrangle (Brown and others, 1965, p. M6). For example, well 57-15-701 in figure 5 is the first well located in the seventh section of the 2½-minute quadrangle, which is located in the fifteenth section of the 7½-minute quadrangle that is in the fifty-seventh section of the 1-degree quadrangle.

Well-Numbering System Used in This Report

In this report, a unique set of arbitrary consecutive numbers was used for well designations because of the multiplicity of independent numbering systems used in previous publications. In table 1 of this report, if well information was obtained from two different sources with different numbering systems, the well is listed twice to show both well numbers. Table 1 can be used, therefore, as a limited cross reference to different numbering systems.

Parts per Million and Milligrams per Liter

Because of the wide variation in dates of publication of previous reports and water analyses, an explanation is needed about parts per million (ppm) and milligrams per liter (mg/L). Before 1967, analyses of water quality by the U.S. Geological Survey were expressed in parts per million. In 1967, however, milligrams per liter became the reported unit. Units of concentration are reported in milligrams per liter throughout the text in order to be consistent. Units of concentration in the water-quality tables are listed as they were found in the original source; however, because of duplication of data from one source to another, there is a degree of uncertainty as to what the original units were at the time of analysis. If an analysis published in a report in parts per million is incorporated into a newer report or computerized data base, for example, the units may have been switched to milligrams per liter without using a conversion factor. This introduces negligible error if the dissolved-solids concentration is less than 7,000 parts per million. The reader is cautioned that values of dissolved solids over 7,000 (in either parts per million or milligrams per liter) may not be to the accuracy indicated.

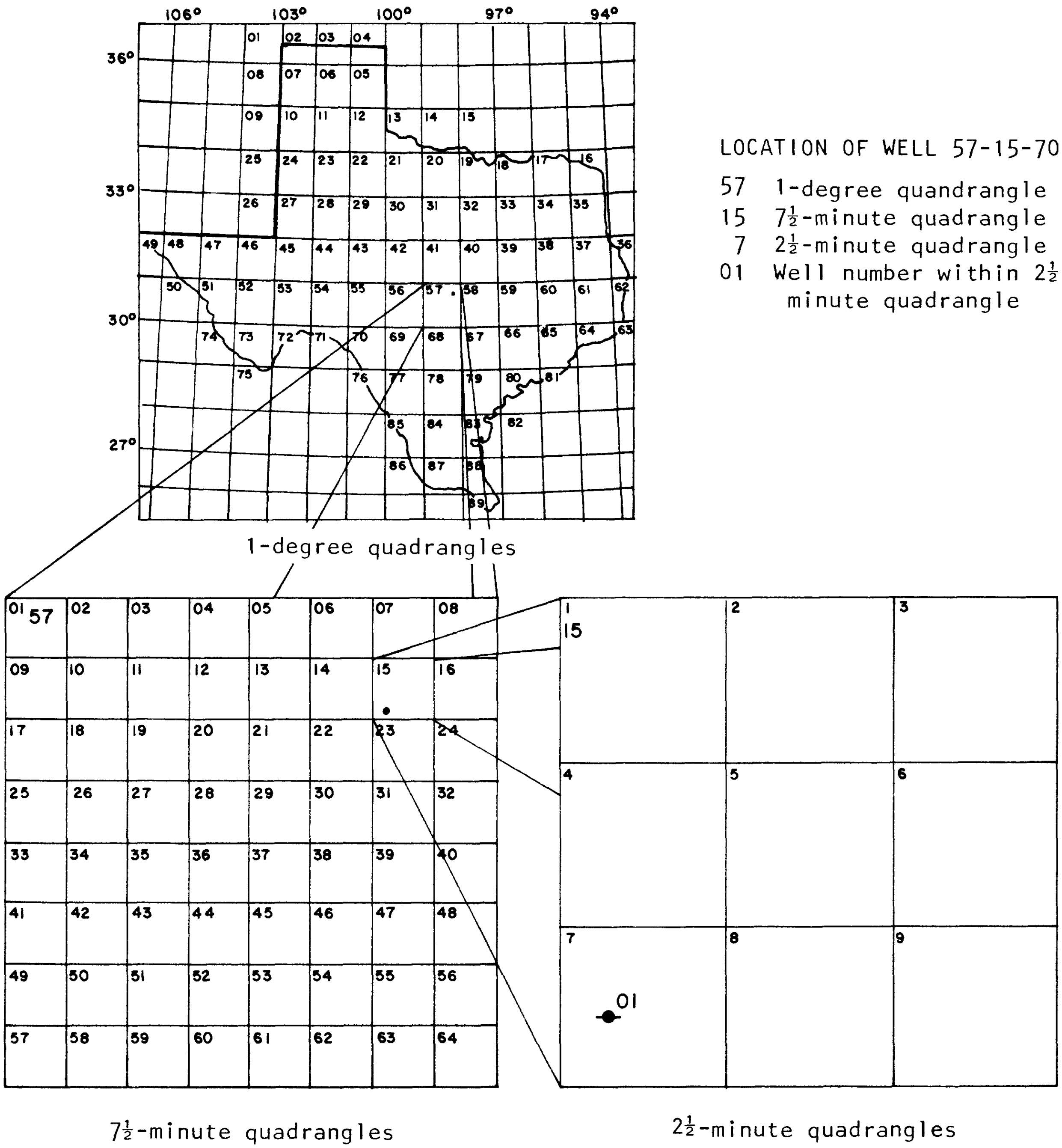

Figure 5.--System of numbering wells in Texas.

Definition of Saline Water

In this report, water that has a dissolved-solids concentration greater than 1,000 milligrams per liter is considered saline; all water containing less than 1,000 milligrams per liter is freshwater. In the following discussion of the degree of salinity, Winslow and Kister (1956, p. 5-6) refer to chemical concentrations in units of parts per million (ppm), which for concentrations less than 7,000 is essentially equivalent to milligrams per liter.

> For the purpose of this report, water containing more than 1,000 ppm of dissolved solids is regarded as saline. This lower limit of dissolved solids was selected because a dissolved-solids content of as much as 1,000 ppm in water is acceptable (though 500 ppm is recommended) to the U.S. Public Health Service in potable water used by interstate carriers (U.S. Public Health Service, 1946). It must be recognized that in many areas of Texas the only available water supply may have a dissolved-solids concentration greatly in excess of 1,000 ppm. Therefore, water discussed in this report will be classified as "slightly saline," "moderately saline," or "very saline," or as "brine," according to the following tabulation.
>
> | Description | Dissolved solids, in parts per million |
> |---|---|
> | Slightly saline | 1,000 to 3,000 |
> | Moderately saline | 3,000 to 10,000 |
> | Very saline | 10,000 to 35,000 |
> | Brine | More than 35,000 |
>
> Water used by many small communities, farms, and ranches is in the slightly saline range. Water of this class has been recognized as somewhat unsatisfactory but generally not harmful. Water containing as much as 3,000 ppm of dissolved solids generally has been considered satisfactory for irrigation, depending on other factors relating to the soil and to crop growth. Water having a dissolved-solids content ranging from 3,000 to 10,000 ppm, herein described as moderately saline, is unsatisfactory for most purposes and is rarely used for domestic supply. Irrigation on the sandy soils of the Pecos Valley in Texas and New Mexico has been carried on with this kind of water for many years, generally with success, although some lands have been abandoned because of salinity problems resulting from irrigation. Natural drainage conditions, however, are particularly favorable in the Pecos Valley for the use of this water, whereas in most other parts of the State and Nation, where drainage conditions are not as favorable, such water could not be used. Experiments have indicated that 10,000 ppm is about the upper limit of salinity that can be tolerated by livestock (Smith, Dott, and Warkentin, 1942, p. 15).

Water containing 10,000 to 35,000 ppm of dissolved solids is classified as very saline. The upper limit of this classification is set approximately at the concentration of sea water. Some of the aquifers in Texas yield varying amounts of water of this class. Closed lakes and basins in which the water is concentrated by evaporation are also capable of yielding supplies of very saline water. . . .

Water having more than 35,000 ppm of dissolved solids is classed as brine; such water probably cannot be demineralized economically at present for general use. In addition to high costs of demineralization, there would be a problem of disposal of salt residues. Brines are used in places for repressuring oilfields, and they are a valuable source of certain minerals.

Table 1.--Water-level records of wells in the Delaware Basin and vicinity, including availabilities of water analyses and aquifer tests

Well index number: A unique arbitrary number assigned to each well for the purpose of this report only. Formation or aquifer: ALVM, Cenozoic alluvium; ARSA, Allurosa aquifer; CPLM, Capitan aquifer; PECO, Pecos aquifer; PUND, Permian undifferentiated; RSLR, Rustler Formation; SNRS, Santa Rosa Sandstone.

Source report--Reference code: Publications from which given data were obtained include: A, Armstrong and McMillion, 1961; AU, Audsley, 1956; B, Bjorklund and Motts, 1959; BR, Brown, Rogers, and Baker, 1965; C, Cooper and Glanzman, 1971; D, Dinwiddie, 1963; G, Guyton and Associates, 1958; GW, Garza and Wesselman, 1959; H, Hendrickson and Jones, 1952; HI, Hiss, 1971; J, Jones and others, 1973; M, Myers, 1969; MU, Muse, 1965; N, Nicholson and Clebsch, 1961; O, Ogilbee and Wesselman, 1962; P, Perkins, Buckner, and Henry, 1972; R, Rayner, 1959; RE, Reeves, 1968; RO, Reed and Associates, 1975; S, Shafer, 1956; T, Texas Department of Water Resources, 1980; U, USGS water quality file of WATSTORE data bank, 1982; US, USGS NM District ground-water data bank, 1982; W, White, 1971; WA, Walker, 1979; WH, White and others, 1980; and WK, Winslow and Kister, 1956.

Well number: Identification number or well location number used in source report.

Depth of well: Depths are given as reported in cited source; there may be discrepancies between reports.

Altitude of well: Altitude of land surface at well, in feet.

Water level below land surface (codes): A, Pumping at time of measurement; B, Pumped recently; R, Reported water level; Q, Measurement questionable; +, Above land surface (artesian well).

Water use code: DO, Domestic well; IN, Industrial well; IR, Irrigation well; OB, Observation well; PU, Public supply well; ST, Stock well; UN, Unused well.

Source of water-quality data: See Source report--Reference code above.

Source of aquifer-test data: See Source report-- Reference code above.

Table 1.-- Water-level records of wells in the Delaware Basin and vicinity, including availabilities of water analyses and aquifer tests - Continued

Well index number	County	Formation or aquifer	Source report: Reference code	Source report: Well number	Depth of well (feet)	Altitude of well (feet)	Altitude of water level (feet)	Water level below land surface (feet)	Date of water-level measurement	Water use code	Source of water-quality data	Source of aquifer-test data
001	EDDY	ALVM	H	20.30.03.223		3175	3169	6.	12-23-48	ST	H	
002	EDDY	ALVM	H	21.25.03.300	47	3296	3270	26.1	08-27-48	DO,ST		
003	EDDY	ALVM	H	21.27.09.330		3220	3139	81.4	01-25-50	ST	H	
004	EDDY	ALVM	H	21.28.18.130		3150	3131	18.9	01-21-50	ST	H	
005	EDDY	ALVM	H	22.24.07.112	73	3950	3901	49.3	02-04-48	ST	H	
006	EDDY	ALVM	H	22.26.35.222	256	3242	3080	161.51	01-18-62	PU	H	
007	EDDY	ALVM	H	22.27.15.113	119	3080	3067	12.7	09-29-47	IR	H	
008	EDDY	ALVM	H	22.27.26.331	158	3095	3059	35.8	08-09-48	IR	H	
009	EDDY	ALVM	H	22.29.33.240	65	3020	2964	56.2	12-17-48	ST	H	
010	EDDY	ALVM	H	23.27.01.342	128	3055	3038	17.4	12-21-48	IR		
011	EDDY	ALVM	H	23.28.20.144	250	3060	3004	56.1	01-13-48	IR	H	
012	EDDY	ALVM	US	24.25.05.443		3790	3777	12.60	01-19-78	DO	H	
013	EDDY	ALVM	H	25.24.31.331	230	3970	3802	168.2	01-19-48	DO,ST		
014	EDDY	ALVM	H	25.25.12.342	65	3410	3377	33.1	12-01-48	DO,ST		
015	EDDY	ALVM	H	26.24.09.331		3775	3710	65.3	01-26-48	UN	H	
016	EDDY	ALVM	H	26.24.28.413	90	3790	3721	68.6	01-22-48	ST	H	
017	LEA	ALVM	N	20.32.01.322	30	3510	3488	21.8	07-01-54	ST		
018	LEA	ALVM	N	20.32.30.142		3530	3520	9.9	06-11-54	UN		
019	LEA	ALVM	N	22.34.12.111	62	3530	3482	48.		DO,ST		
020	LEA	ALVM	N	23.34.01.444	144	3360	3223	137.3	11-25-53	UN		
021	LEA	ALVM	US	24.32.10.344	60	3589	3569	19.93	03-20-81	DO,ST		
022	LEA	ALVM	N	24.33.10.113	36	3595	3570	24.6	11-27-53	ST		
023	LEA	ALVM	N	25.36.23.234	65	3070	3016	53.7	03-31-53	ST		
024	LEA	ALVM	N	25.37.20.310	70	3035	2970	65.	01-18-42	--	N	
025	LEA	ALVM	N	26.33.03.444	180	3315	3212	102.8	07-23-54	--		
026	LEA	ALVM	N	26.35.13.222		2990	2761	229.1	12-12-58	ST	N	
027	LEA	ALVM	N	26.36.19.233	700	2950	2752	198.0		PU		
028	LEA	ALVM	US	26.37.14.122	131	2999	2901	97.91	03-13-81	--		
029	LEA	ALVM	US	23.35.06.331	200	3359	3221	137.94	03-27-81	ST		
030	LEA	ALVM	US	23.35.15.423	60	3475	3432	42.72	03-30-81	ST		
031	LEA	ALVM	US	23.35.18.111	795	3370	3137	233.10	03-30-81	UN		
032	LEA	ALVM	US	23.37.02.422A	70	3296	3232	64.04	03-19-81	ST		
033	LEA	ALVM	US	23.37.31.442	173	3307	3205	101.50	03-25-81	--		
034	LEA	ALVM	US	23.37.36.433	45	3177	3157	20.43	01-21-76	DO,IN		
035	LEA	ALVM	US	24.35.10.133	190	3360	3197	162.96	03-19-81	--		
036	LEA	ALVM	US	24.37.16.423	150	3244	3158	85.86	03-17-81	--		
037	LEA	ALVM	US	24.37.34.412	75	3169	3116	53.05	03-18-81	--		
038	LEA	ALVM	US	25.33.03.233	122	3219	3111	108.04	03-27-81	DO,ST		
039	LEA	ALVM	US	25.36.12.123	80	3208		DRY	76	--		
040	LEA	ALVM	US	25.37.02.344	154	3127	3021	106.16	03-25-81	PU		
041	LEA	ALVM	US	25.37.13.312A	145	3082	3005	77.49	03-30-81	--		
042	LEA	ALVM	US	25.37.24.422	135	3063	2994	69.45	04-30-81	--		

Table 1.-- Water-level records of wells in the Delaware Basin and vicinity, including availabilities of water analyses and aquifer tests - Continued

Well index number	County	Formation or aquifer	Source report: Reference code	Source report: Well number	Depth of well (feet)	Altitude of well (feet)	Altitude of water level (feet)	Water level below land surface (feet)	Date of water-level measurement	Water use code	Source of water-quality data	Source of aquifer-test data
043	LEA	ALVM	US	25.37.33.114	105	3002	2915	86.64	03-26-81	--		
044	LEA	ALVM	US	25.37.36.244	120	3031	2959	72.23	03-25-81	--		
045	LEA	ALVM	US	26.33.27.211	200	3252	3175	76.52	01-08-76	ST		
046	LEA	ALVM	US	26.36.23.222	200	2926	2772	153.78	03-18-81	ST		
047	LEA	ALVM	US	26.37.29.242	115	2946	2858	87.52	03-17-81	ST		
048	LEA	ALVM	US	26.38.29.411	70	2962	2924	37.92	03-19-81	ST		
049	EDDY	ALVM	US	19.26.28.444	357	3294	3217	76.68	01-14-63	--		
050	EDDY	ALVM	US	20.26.03.411	110	3261	3204	57.48	03-16-79	ST		
051	EDDY	ALVM	US	20.26.07.122	120	3315	3199	115.91	03-16-79	DO		
052	EDDY	ALVM	US	21.25.11.332	55			34.66	01-06-78	ST		
053	EDDY	ALVM	US	21.25.33.224	125			8.2	01-06-78	ST		
054	EDDY	ALVM	US	22.26.01.233	245			37.09	01-11-78	PU		
055	EDDY	ALVM	US	22.26.04.111	150			116.10	12-12-78	DO		
056	EDDY	ALVM	US	22.26.24.224	200	3160	3064	96.39	01-16-64	IN		
057	EDDY	ALVM	US	22.26.32.231	140	3325	3230	95.03	01-06-78	ST		
058	EDDY	ALVM	US	22.27.10.111	227	3110	3062	48.11	01-05-66	ST		
059	EDDY	ALVM	US	22.27.10.333	169	3080	3057	22.69	01-17-79	IN	B	
060	EDDY	ALVM	US	22.27.20.111	146	3131	3085	45.79	01-29-75	IN		
061	EDDY	ALVM	US	22.27.22.421	150	3102	3044	58.17	09-18-80	IN		
062	EDDY	ALVM	US	22.27.25.313	200			45.86	01-26-78	IN		
063	EDDY	ALVM	US	22.27.28.133	165	3137	3040	96.72	01-17-79	IN	B	
064	EDDY	ALVM	US	22.27.32.313	200	3170	3011	159.02	01-17-79	IN		
065	EDDY	ALVM	US	22.27.33.441A	200			119.60	01-19-78	--		
066	EDDY	ALVM	US	22.27.36.133	190	3080	3019	61.42	01-23-78	IN		
067	EDDY	ALVM	US	22.28.04.131				53.05	01-20-78	ST		
068	EDDY	ALVM	US	22.28.30.443	200	3042	3017	24.95	01-19-78	DO,ST		
069	EDDY	ALVM	US	23.26.07.312		3420	3397	22.79	01-05-78	ST		
070	EDDY	ALVM	US	23.26.12.344		3250	3050	199.70	01-05-78	ST		
071	EDDY	ALVM	US	23.26.19.133		3445	3271	173.67	01-18-61	ST		
072	EDDY	ALVM	US	23.26.30.244		3495	3404	91.13	01-15-62	ST		
073	EDDY	ALVM	US	23.26.35.114	231	3250	3041	208.57	01-10-61	DO,ST	B	
074	EDDY	ALVM	US	23.27.02.122	186	3085	3021	64.36	01-24-68	IN	B	
075	EDDY	ALVM	US	23.27.06.214	200			171.52	01-10-78	IN		
076	EDDY	ALVM	US	23.27.09.211	200			57.47	08-29-79	IN		
077	EDDY	ALVM	US	23.27.12.233	160	3070	2999	70.93	01-17-79	IN		
078	EDDY	ALVM	US	23.27.14.124	230	3110	3003	106.61	01-17-79	--		
079	EDDY	ALVM	US	23.27.23.223	181	3120	3016	103.76	01-16-75	ST		
080	EDDY	ALVM	US	23.27.26.314		3150	3020	129.94	01-18-79	ST		
081	EDDY	ALVM	US	23.28.05.111	210			49.13	01-18-78	IN	B	
082	EDDY	ALVM	US	23.28.07.131	195			57.12	01-03-78	IN	B	
083	EDDY	ALVM	US	23.28.11.114	100	2990	2976	14.34	01-18-79	IN	B	
084	EDDY	ALVM	US	23.28.14.241	80			47.56	01-03-78	IN		

Table 1.-- Water-level records of wells in the Delaware Basin and vicinity, including availabilities of water analyses and aquifer tests - Continued

Well index number	County	Formation or aquifer	Source report: Reference code	Source report: Well number	Depth of well (feet)	Altitude of well (feet)	Altitude of water level (feet)	Water level below land surface (feet)	Date of water-level measurement	Water use code	Source of water-quality data	Source of aquifer-test data
085	EDDY	ALVM	US	23.28.18.333	287	3083	3006	77.44	01-16-75	IN		
086	EDDY	ALVM	US	23.28.20.144	250	3060	2990	69.50	01-18-79	IN		
087	EDDY	ALVM	US	23.28.23.133	148	3020	2960	60.04	08-29-79	IN	B	
088	EDDY	ALVM	US	23.28.24.134	96	2991	2948	42.90	01-10-75	IN	B	
089	EDDY	ALVM	US	23.28.25.213	80	2980	2942	38.10	01-10-75	--		
090	EDDY	ALVM	US	23.28.31.231	93	3124	3064	60.34	01-04-78	ST	B	
091	EDDY	ALVM	US	23.28.33.141	225	3095	3077	18.48	01-04-78	ST	B	
092	EDDY	ALVM	US	23.28.36.244	75	2960	2925	35.49	01-26-78	IN		
093	EDDY	ALVM	US	23.30.06.424	30	2978	2978	0.0	09-20-72	ST		
094	EDDY	ALVM	US	23.24.14.442	50			26.15	01-19-78	ST		
095	EDDY	ALVM	US	24.23.02.441	58	4047	4011	36.25	10-07-66	ST		
096	EDDY	ALVM	US	24.25.05.413	65	3527	3473	53.80	01-05-78	ST		
097	EDDY	ALVM	US	24.26.24.111		3255	3223	32.36	01-26-66	IN	B	
098	EDDY	ALVM	US	24.26.24.131				23.90	01-22-79	IN		
099	EDDY	ALVM	US	24.26.26.113	53			19.38	01-05-78	IN		
100	EDDY	ALVM	US	24.26.32.123	200	3437	3325	112.05	01-05-78	DO	B	
101	EDDY	ALVM	US	24.27.18.333	35	3103	3073	29.55	01-25-78	DO,ST		
102	EDDY	ALVM	US	24.28.11.442	200	2978	2941	37.19	02-21-78	IN	B	
103	EDDY	ALVM	US	24.28.15.212				5.64	01-18-79	DO		
104	EDDY	ALVM	US	24.28.16.331	161	3048	3010	37.50	07-13-55	IR		
105	EDDY	ALVM	US	24.28.17.142		3058	3031	27.42	01-14-59	IR		
106	EDDY	ALVM	US	24.28.25.123	100	2925	2923	1.90	01-19-62	DO,ST		
107	EDDY	ALVM	US	24.28.26.231	126			27.57	02-21-78	IR		
108	EDDY	ALVM	US	24.31.17.131		3516	3450	65.97	12-02-76	DO,ST		
109	EDDY	ALVM	US	25.24.11.122	50			25.99	01-06-78	ST		
110	EDDY	ALVM	US	25.24.27.421	101	3701	3639	62.30	08-28-79	IR	B	
111	EDDY	ALVM	US	25.24.34.142	170	3714	3644	70.20	05-18-61	IR		
112	EDDY	ALVM	US	25.25.04.444	58	3540	3501	39.09	01-06-78	DO		
113	EDDY	ALVM	US	25.25.12.322		3420	3357	63.08	01-04-78	ST		
114	EDDY	ALVM	US	25.25.16.132	85	3500	3437	62.69	05-13-55	DO,ST	B	
115	EDDY	ALVM	US	25.26.18.444	53	3394	3360	34.42	01-04-78	ST		
116	EDDY	ALVM	US	25.26.19.113	84	3409	3341	67.60	01-03-78	ST		
117	EDDY	ALVM	US	25.27.22.212	33	3074	3051	22.70B	01-12-78	ST		
118	EDDY	ALVM	US	25.28.03.222		2985	2952	32.97	01-03-78	ST		
119	EDDY	ALVM	US	25.28.29.412				20.25	01-12-78	ST		
120	EDDY	ALVM	US	26.24.04.113	128			128.97	02-22-78	ST		
121	EDDY	ALVM	US	26.24.09.443	100	3749	3706	42.95	08-28-79	IR	B	
122	EDDY	ALVM	US	26.24.19.431	196	3885	3803	82.20	02-22-78	DO,ST		
123	EDDY	ALVM	US	26.24.28.313	90			86.62	02-22-78	ST		
124	EDDY	ALVM	US	26.26.12.343				13.35	01-25-78	ST		
125	EDDY	ALVM	US	26.30.05.334	770	3091	2920	171.35	01-28-76	IN		
126	EDDY	ALVM	D	23.26.25.400	170	3210				PU	D	

Table 1.-- Water-level records of wells in the Delaware Basin and vicinity, including availabilities of water analyses and aquifer tests - Continued

Well index number	County	Formation or aquifer	Source report: Reference code	Source report: Well number	Depth of well (feet)	Altitude of well (feet)	Altitude of water level (feet)	Water level below land surface (feet)	Date of water-level measurement	Water use code	Source of water-quality data	Source of aquifer test data
127	EDDY	ALVM	B	21.24.20.440	75	3666	3627	38.9	06-14-54	ST		
128	EDDY	ALVM	B	21.25.18.420		3424	3400	24.1	06-20-54	DO,ST		
129	EDDY	ALVM	B	21.27.19.324	79					--	B	
130	EDDY	ALVM	B	21.27.31.333	25	3116	3097	18.6	02-09-55	IR,OB	B	
131	EDDY	ALVM	B	21.27.32.112A	105	3113	3099	14.4	01-11-55	IR	B	
132	EDDY	ALVM	B	22.27.08.313	90	3100	3075	25.0	01-27-55	IR,OB	B	
133	EDDY	ALVM	B	22.27.15.233	135			25.0	08-12-54	IR	B	
134	EDDY	ALVM	B	22.27.17.124	123	3110	3072	38.3	01-13-55	IR,OB	B	
135	EDDY	ALVM	C	22.28.15.334A	86	3095	3020	75.4	04-17-59	DO,ST		
136	EDDY	ALVM	C	25.30.07.111	386	3170	2907	263.3	03-07-59	ST	C	
137	EDDY	ALVM	C	25.30.12.113	460	3375	2984	391.3	03-25-59	UN		
138	EDDY	ALVM	C	25.30.21.333	298	3200	2934	266.1 A	02-05-59	DO,ST	C	
139	EDDY	ALVM	C	25.31.21.400	400	3340	3022	318.0 A	02-17-59	DO,ST	C	
140	EDDY	ALVM	C	26.31.08.310	310	3230	2943	287.1 A	02-18-59	DO,ST		
141	LEA	ALVM	J	20.32.24.333	67	3555	3517	37.67	09-11-72	UN		
142	LEA	ALVM	J	20.32.27.144	30	3545	3521	23.67	09-18-72	UN		
143	LEA	ALVM	J	20.32.36.214	60	3585	3538	46.60	06-06-55	--		
144	LEA	ALVM	J	20.33.21.111	49	3536	3499	36.90	09-25-72	UN		
145	LEA	ALVM	J	20.34.34.432	96	3770	3680	89.50	10-02-72	ST		
146	EDDY	ALVM	J	21.31.02.221	35	3570	3540	29.80	09-18-72	ST		
147	LEA	ALVM	J	21.33.02.420	94	3770	3690	79.58	09-22-72	ST		
148	LEA	ALVM	J	21.33.18.114	150	3890	3749	140.75	09-12-72	ST		
149	LEA	ALVM	J	21.33.25.421	67	3670	3613	56.58	09-22-72	ST		
150	LOVING	ALVM	G	10	151	2950	2869	81.3	09-12-40	ST	G	
151	LOVING	ALVM	G	25	17	2695	2680	14.7	07-23-40	UN	G	
152	LOVING	ALVM	G	29	60			17.1	09-11-40	ST	G	
153	LOVING	ALVM	BR	46 02 103	160					--	BR	
154	LOVING	ALVM	BR	46 03 501	160					--	BR	
155	LOVING	ALVM	BR	46 11 05	135					--	BR	
156	LOVING	ALVM	WK	R-11	246			28.		--	WK	
157	LOVING	ALVM	T	46 01 301		2892	2838	54.00	11-01-78	--	T	
158	LOVING	ALVM	T	46 01 202	80	2855	2812	42.70	10-17-74	--		
159	LOVING	ALVM	T	46 02 601	300					--	T	
160	LOVING	ALVM	T	46 20 102	84					--	T	
161	LOVING	ALVM	T	46 20 403	53	2673	2661	11.79	11-01-78	--		
162	WINKLER	ALVM	T	26 64 801	80	2976	2939	37.14	10-22-74	--	T	
163	WINKLER	ALVM	T	27 57 801	115	3137	3060	77.46	11-02-78	--		
164	WINKLER	ALVM	T	45 01 201	135	3112	3047	64.94	11-09-77	--	T	
165	WINKLER	ALVM	T	45 01 901	108	3042	2988	53.66	11-03-78	--		
166	WINKLER	ALVM	T	45 10 801	100	2940	2866	73.60	11-04-76	--	T	
167	WINKLER	ALVM	T	46 06 901	125	2839	2738	101.05	11-11-77	--	T	
168	WINKLER	ALVM	T	46 07 402	130	2861	2757	104.00	11-03-76	--	T	

Table 1.-- Water-level records of wells in the Delaware Basin and vicinity, including availabilities of water analyses and aquifer tests - Continued

Well index number	County	Formation or aquifer	Source report: Reference code	Source report: Well number	Depth of well (feet)	Altitude of well (feet)	Altitude of water level (feet)	Water level below land surface (feet)	Date of water-level measurement	Water use code	Source of water-quality data	Source of aquifer-test data
169	WINKLER	ALVM	T	46 07 901	183	2879	2796	83.13	11-02-78	--		
170	WINKLER	ALVM	T	46 08 401	166	2938	2873	65.39	11-02-78	--		
171	WINKLER	ALVM	T	46 15 505	190	2840	2745	94.55	11-03-76	--	T	
172	WINKLER	ALVM	T	46 16 901	120	2805	2734	70.58	11-03-78	--		
173	WINKLER	ALVM	T	46 23 304	210	2784	2716	68.40	11-03-78	--	T	
174	WINKLER	ALVM	T	46 23 905	400			120.9	01-04-58	--	T	
174			M	313956 1030926								M
175	WINKLER	ALVM	T	46 24 301	101	2757	2706	50.73	11-10-77	--	T	
176	WINKLER	ALVM	RE	D-47	166	2938	2875	63.3	01-31-68	IN,PU	GW	
177	WINKLER	ALVM	GW	D-209	140	2886	2815	70.60	10-24-56	DO	GW	
178	WINKLER	ALVM	RE	E-1	135	3112	3045	66.60	12-19-67	UN		
179	WINKLER	ALVM	RE	E-15	120	3051	3017	33.92	12-19-67	PU	RE	
179			GW	E-15							GW	
180	WINKLER	ALVM	GW	F-37	140	2741	2622	119.1	09-21-56	ST	GW	
181	WINKLER	ALVM	RE	G-77	120	2805	2734	70.50	11-29-67	UN		
182	WINKLER	ALVM	GW	G-111	240	2789	2699	90.	09- -56	PU	GW	
182			M	314551 1030936								M
183	WINKLER	ALVM	RE	G-129	101	2756	2702	53.98	11-29-67	ST	GW	
184	WINKLER	ALVM	GW	H-21	105	2838	2774	63.8	02-08-57	UN	GW	
185	WINKLER	ALVM	RE	H-75	40	2710	2680	29.94	11-29-67	UN		
186	WARD	ARSA	T	45 25 604	156	2602				PU	T,W	
187	WARD	ARSA	T	45 25 605	154	2599				PU	T,W	
188	WARD	ARSA	T	46 37 611	100	2561	2546	14.5	10-26-67	IR	W	
189	WARD	ARSA	T	45 26 202	80	2682	2641	41.48	11-07-78	ST	T,W	
190	WARD	ARSA	T	45 26 703	150	2563	2516	47.32	11-09-78	DO	T,W	
191	WARD	ARSA	T	45 34 402	155	2532	2477	55.18	11-09-78	PU	T,W	
192	WARD	ARSA	T	45 34 701	102	2500	2435	64.62	11-09-78	ST	T,W	
193	WARD	ARSA	T	45 42 512	56			24.38	11-09-78	UN		
194	WARD	ARSA	T	46 24 803	242	2706	2562	143.88	11-10-77	UN		
195	WARD	ARSA	T	46 29 201	92	2670	2624	45.89	11-08-78	DO,ST	W	
196	WARD	ARSA	T	46 29 701	115	2600	2582	17.64	11-08-78	--	W	W
197	WARD	ARSA	T	46 29 801	61	2597	2570	27.29	11-08-78	UN		
198	WARD	ARSA	T	46 30 501	141	2670	2571	99.03	11-08-78	ST	T,W	
199	WARD	ARSA	T	46 31 302	300	2675	2567	107.79	11-08-78	UN		
200	WARD	ARSA	T	46 31 401	130	2681	2566	115.32	11-14-77	ST	T,W	
201	WARD	ARSA	T	46 31 601	322	2657	2543	113.69	12-07-72	ST	W	
202	WARD	ARSA	T	46 31 702	160	2662	2569	93.39	11-08-78	DO,ST	T	
203	WARD	ARSA	T	46 32 403	400	2633	2549	83.52	11-08-78	IR	W	W
204	WARD	ARSA	T	46 32 506	250			105.54	12-04-74	UN		
205	WARD	ARSA	T	46 37 101	300	2574	2560	14.06	11-09-76	UN		
206	WARD	ARSA	T	46 37 211	200	2574	2558	16.23	11-08-78	IR		
207	WARD	ARSA	T	46 37 305	80	2572	2555	16.72	11-08-78	IR	T,W	W

Table 1.-- Water-level records of wells in the Delaware Basin and vicinity, including availabilities of water analyses and aquifer tests - Continued

Well index number	County	Formation or aquifer	Source report: Reference code	Source report: Well number	Depth of well (feet)	Altitude of well (feet)	Altitude of water level (feet)	Water level below land surface (feet)	Date of water-level measurement	Water use code	Source of water-quality data	Source of aquifer-test data
208	WARD	ARSA	T	46 38 103	29	2573	2550	22.52	11-08-78	--	T,W	
209	WARD	ARSA	T	46 38 502	80	2568	2542	25.50	11-12-75	UN		
210	WARD	ARSA	T	46 39 604	95	2596	2513	82.59	11-08-78	ST	T,W	
211	WARD	ARSA	T	46 40 205	203	2616	2516	100.22	11-08-78	UN		
212	WARD	ARSA	T	46 40 501	84	2553	2498	54.69	11-08-78	ST	T,W	
213	WARD	ARSA	W	46 40 602	260	2524	2476	48.0	08-15-67	IR	T	
214	WARD	ARSA	W	45 25 305	176	2617	2570	46.6	04-12-67	IN	W	W
215	WARD	ARSA	W	45 33 707	210	2490	2448	41.8	06-08-67	IR	W	W
216	WARD	ARSA	W	45 33 802	220			42.5	08-06-67	IN	W	W
217	WARD	ARSA	W	45 34 401	100	2500	2451	48.66	10-21-67	UN	W	W
218	WARD	ARSA	W	45 34 503	98			45.2	06-20-67	IN		W
218A	WARD	ARSA	W	45 34 504	91			45.7	06-26-67	IN		W
219	WARD	ARSA	W	45 34 505	400			46.5	06-26-67	IN	W	W
220	WARD	ARSA	W	45 34 506	120					IN		W
220A	WARD	ARSA	W	45 34 507	94			45.1	06-26-67	UN		W
221	WARD	ARSA	W	45 42 505	62	2418	2399	18.5	11-06-67	IR	W	W
222	WARD	ARSA	W	46 21 703	228	2720	2620	100. R	02- -63	IN	W	W
223	WARD	ARSA	W	46 23 902	225	2692	2583	108.92	12-30-67	IR	W	W
224	WARD	ARSA	W	46 24 701	386	2697	2573	123.89	12-14-67	UN		W
225	WARD	ARSA	W	46 24 703	385	2697	2579	118. R	06- -57	PU	W	W
225A	WARD	ARSA	W	46 24 704	392	2694	2572	121.7	12-14-67	PU	W	W
226	WARD	ARSA	W	46 29 903	190	2569	2555	14. R	01- -66	IN	W	W
227	WARD	ARSA	W	46 37 110	125	2588	2568	20.2	10-26-67	IR	W	W
228	WARD	ARSA	W	46 37 604	95	2562	2552	9.7	10-27-67	IR	W	W
229	WARD	ARSA	W	46 39 205	142	2625	2537	88.2	11-10-67	DO	W	W
230	WARD	ARSA	W	46 40 308	256	2628	2503	125. R	04-10-67	PU	W	W
231	WARD	ARSA	W	46 40 503	210	2538	2490	48. R	04- -67	IR	W	W
232	WARD	ARSA	W	46 30 301	98	2772	2686	85.7	09-28-67	DO,ST	T,W	
233	WARD	ARSA	W	46 31 101	147	2695	2576	119.3	09-28-67	ST	W	
234	WARD	ARSA	W	46 31 801	300			59.6	11-13-67	IN	W	W
235	WARD	ARSA	W	46 32 204	425	2646	2546	99.9	09-26-67	IN	W	W
236	WARD	ARSA	W	46 32 302	365	2658	2550	107.6	06-07-67	IN	W	
237	WARD	ARSA	W	46 32 603	306	2652	2532	120. R	63	PU	W	W
238	WARD	ARSA	W	46 29 103	60	2641	2606	34.8	11-17-67	ST	W	
239	WARD	ARSA	W	46 29 401	60	2624	2586	37.54	04-20-67	ST	W	
240	WARD	ARSA	W	46 37 404	300	2572	2553	18.70	10-20-67	UN	W	
241	WARD	ARSA	W	46 37 504	97	2562	2549	12.7	11-09-67	IR	W	
242	WARD	ARSA	W	46 39 801	368	2566	2505	60.6	11-10-67	UN	W	
243	WARD	ARSA	W	46 40 901	110	2539	2462	77.4	06-01-67	UN	W	
244	WARD	ARSA	W	45 33 214	330	2565	2491	74.1	08-28-67	IN	W	W
245	WARD	ARSA	W	45 33 507	230	2584	2486	98.0	06-23-67	IR	W	W
246	WARD	ARSA	W	45 33 605	94	2550	2480	69.5	07-19-67	IN	W	

Table 1.-- Water-level records of wells in the Delaware Basin and vicinity, including availabilities of water analyses and aquifer tests - Continued

Well index number	County	Formation or aquifer	Source report: Reference code	Source report: Well number	Depth of well (feet)	Altitude of well (feet)	Altitude of water level (feet)	Water level below land surface (feet)	Date of water-level measurement	Water use code	Source of water-quality data	Source of aquifer-test data
247	WARD	ARSA	W	45 41 202	301	2443	2423	20. R	67	IN	W	
248	WARD	ARSA	W	45 41 301	62	2434	2414	20.4	07-20-67	IN	W	
249	WARD	ARSA	W	45 42 101	58			20.40	05-09-67	UN	W	
250	WARD	ARSA	W	45 42 509	64	2422	2403	19.08	11-06-67	IR	W	
251	WARD	ARSA	G	64	1022	2658				UN		
252	PECOS	PECO	T	45 49 101	555	2575	2421	154.39	12-10-71	IR		
253	PECOS	ALVM	T	46 48 602	520	2526	2433	92.60	01-10-79	IR		
254	PECOS	ALVM	T	46 48 802	779	2556	2444	111.74	01-10-79	IR	T	
255	PECOS	ALVM	T	46 48 902	633	2573	2279	293.64	01-10-79	IR	T	
256	PECOS	ALVM	T	46 55 602	210	2681	2518	162.94	01-10-79	IR	T	
257	PECOS	ALVM	T	46 56 201	865	2623	2248	374.84	01-29-76	IR		
258	PECOS	ALVM	T	46 56 301	568	2618	2290	327.65	01-10-79	IR	T	
259	PECOS	PECO	T	46 56 702	1003	2718	2388	329.50	02-04-70	IR		
260	PECOS	PECO	T	46 56 502	494	2658	2327	331.48	01-29-76	IR	T	
261	PECOS	PECO	A	F-43	902	2688	2485	202.7	01-24-59	IR		
261			T	46 56 901							T	
262	PECOS	PECO	T	46 62 901	180	2893	2740	153.34	02-04-70	ST		
263	PECOS	PECO	T	46 63 302	464	2772	2502	270.38	01-10-79	IR	T	
264	PECOS	PECO	T	46 63 901	300	2919	2661	258.08	01-10-79	--	T	
265	PECOS	PECO	T	46 64 201	500	2745	2524	221.10	12-06-72	IR	T	
266	PECOS	PECO	T	46 64 801	381	2769	2595	173.84	12-09-71	DO,ST	T	
267	PECOS	PECO	T	45 49 401	235	2602	2456	146.35	02-15-77	UN		
268	PECOS	PECO	A	C-103	140	2427	2386	40.9	01-26-59	UN		
268			T	45 50 301							T	
269	PECOS	ALVM	P	46 48 504	448	2525	2422	102.5	01-16-58	IR	P	
270	PECOS	PECO	P	46 56 305	734	2622	2448	173.9	01-27-58	IR	P	
271	PECOS	ALVM	P	46 56 406	289	2688	2526	161.8	02-04-58	IR	P	
272	PECOS	ALVM	P	46 56 507	600	2664	2443	221.4	01-29-58	IR	P	
273	PECOS	ALVM	P	46 56 803	850			218.9	01-26-59	IR	P	
274	PECOS	ALVM	P	46 64 301	500	2741				IR	P	
275	PECOS	PECO	A	A-9	557	2500	2462	38.3	01-20-59	IR	A	
276	PECOS	PECO	T	46 48 503	625	2513	2332	181.37	01-08-74	IR		
277	PECOS	PECO	A	A-63	400	2588	2405	183.0	01-23-59	IR		
278	PECOS	PECO	T	46 56 404	560	2670	2267	403.38	01-29-76	UN		
279	PECOS	PECO	A	A-230	924	2674	2488	185.6	01-30-58	IR		
280	PECOS	PECO	A	B-76	518	2563	2469	94.2	01-20-59	IR	A	
281	PECOS	PECO	A	C-47	92	2388	2369	18.9	01-26-59	UN		
281			T	45 43 804							T	
282	PECOS	PECO	A	C-59	61	2389	2371	17.6	01-28-59	UN		
282			T	45 51 203							T	
283	PECOS	PECO	A	D-41	105	2356	2336	20.2	01-28-59	UN	A	
284	PECOS	PECO	A	D-93	105	2331	2314	16.9	01-28-59	UN	A	

Table 1.-- Water-level records of wells in the Delaware Basin and vicinity, including availabilities of water analyses and aquifer tests - Continued

Well index number	County	Formation or aquifer	Source report: Reference code	Source report: Well number	Depth of well (feet)	Altitude of well (feet)	Altitude of water level (feet)	Water level below land surface (feet)	Date of water-level measurement	Water use code	Source of water-quality data	Source of aquifer-test data
285	PECOS	PECO	A	E-16	159	2890	2752	138.0	04-22-58	UN	A	
286	PECOS	PECO	T	46 63 601	203	2873	2700	172.53	02-04-70	ST	T	
287	PECOS	PECO	A	H-75	70	2658	2634	23.6	04-25-58	ST	A	
288	PECOS	PECO	A	J-30	202	2409	2325	84.2	02-06-58	IR	A	
289	PECOS	PECO	A	K-26	253	2373	2268	105.4	05-29-57	DO,IN	A	
290	PECOS	PECO	T	45 61 601		2335	2214	121.40	01-09-79	--		
291	PECOS	PECO	T	45 62 901		2302	2244	57.66	01-09-79	--		
292	PECOS	PECO	T	45 63 701	138	2303	2241	62.17	01-09-79	IR	T	
293	PECOS	PECO	A	U-15	210	2323	2229	93.7	01-26-59	IR		
293			T	53 06 301							T	
294	PECOS	PECO	T	53 07 201	134	2268	2209	59.03	12-06-71	IR	T	
295	PECOS	PECO	A	N-11	237	2979	2818	160.9	04-17-58	ST		
295			T	52 06 302							T	
296	PECOS	PECO	T	52 06 501	351	3074	2889	185.10	01-09-78	IR		
297	PECOS	PECO	A	N-19	225	3076	2898	178.4	01-21-59	PU		
297			T	52 06 502							T	
298	PECOS	PECO	T	52 07 302	501	2964	2658	306.40	02-16-77	IR	T	
299	PECOS	PECO	T	52 07 601	616	3026	2794	231.50	12-16-71	IR		
300	PECOS	PECO	T	52 07 701	455	3125	2980	144.72	01-28-76	--	T	
301	PECOS	PECO	T	52 07 901	612	3076	2879	196.98	01-08-79	--		
302	PECOS	PECO	A	P-17	401	2946	2873	72.8	01-22-59	ST		
302			T	52 08 301							T	
303	PECOS	PECO	T	52 08 801	200	3086	2973	113.10	02-14-77	ST	T	
304	PECOS	PECO	T	52 16 101	194	3165	2929	235.58	01-16-75	ST	T	
305	PECOS	PECO	T	52 16 301	559	3099	2967	131.55	01-10-78	IR		
306	PECOS	PECO	T	53 01 502	335	2879	2838	41.31	01-09-79	IR	T	
307	PECOS	PECO	T	53 02 102	260	2858	2777	80.50	01-12-78	IR	T	
308	PECOS	PECO	T	53 01 902	180	2981	2883	97.60	01-10-79	PU		
309	PECOS	PECO	T	53 02 404	220	2856	2756	99.54	02-05-70	IR		
310	PECOS	PECO	T	53 02 703	642	2942	2866	76.01	01-11-79	DO	T	
311	PECOS	PECO	T	53 02 901	289	2929	2804	125.22	12-08-72	ST		
312	PECOS	PECO	T	53 03 901	462			157.97	01-09-79	PU	T	
313	PECOS	PECO	T	53 06 501	425	2415	2320	95.21	01-09-79	IR	T	
314	PECOS	PECO	A	V-43	289	2636	2387	248.9	04-16-57	DO	A	
315	PECOS	PECO	A	W-39	90	2187	2131	56.4	05-21-57	ST	A	
316	PECOS	PECO	T	54 10 701	100	2140	2101	39.49	12-06-71	--		
317	PECOS	PECO	T	54 18 401	255	2178	2083	94.53	12-08-72	IR	T	
318	PECOS	PECO	T	52 08 902	290	3001	2907	94.23	02-08-78	UN		
319	PECOS	PECO	T	52 08 908	346	3004	2940	63.78	01-14-75	IR	T	
320	PECOS	PECO	A	M-14	360	3295	2953	342.	10-03-57	ST		
320			T	52 13 301							T	
321	PECOS	PECO	A	X-24	240	3488	3270	218.	05-09-58	DO		

Table 1.-- Water-level records of wells in the Delaware Basin and vicinity, including availabilities of water analyses and aquifer tests - Continued

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321			T	52 13 901							T	
322	PECOS	PECO	T	52 16 601	600	3157	2981	175.76	02-05-70	IR		
323	PECOS	PECO	T	52 16 801	450	3254	3010	243.83	02-05-70	IR	T	
324	PECOS	PECO	T	52 16 901	420	3195	2975	220.22	02-05-70	UN	T	
325	PECOS	PECO	T	53 01 601	149	2882	2760	122.36	01-06-71	UN		
326	PECOS	PECO	T	53 01 701	262	2977	2946	30.94	12-15-71	UN		
327	PECOS	PECO	T	53 09 105	200	3087	2941	145.60	01-09-79	UN		
328	PECOS	PECO	T	53 09 301	210	3012	2886	126.06	01-08-79	IR		
329	PECOS	PECO	T	53 09 402	520	3196	2948	247.91	01-10-78	IR	T	
330	PECOS	PECO	T	53 10 101	227	3025	2856	169.01	01-08-79	IR		
331	PECOS	PECO	A	BB-1	400	3123	2902	221.1	01-26-59	ST		
331			T	53 10 502							T	
332	PECOS	PECO	A	CC-10	375	2998	2795	202.7	07-11-57	DO,ST	A	
332			T	53 12 801							T	
333	PECOS	PECO	A	EE-4	278			258.1	04-15-47	ST	A	
334	PECOS	PECO	A	FF-2	503			440. R	05- -47	ST	A	
335	PECOS	PECO	A	BB-30	450			400. R	11- -46	ST	A	
335			T	53 19 101							T	
336	PECOS	PECO	A	BB-20	340	3400	3090	310. R	58	ST	A	
337	PECOS	PECO	A	DD-33	864	3292	2692	600. R	02- -57	DO,PU		
337			T	53 21 701							T	
338	PECOS	PECO	T	53 22 501	515					ST	T	
339	PECOS	PECO	A	MM-24	585	3470	2900	570. R	02- -57	ST		
339			T	53 28 801							T	
340	PECOS	PECO	A	UU-13	650			560. R	02- -57	ST		
340			T	53 37 501							T	
341	PECOS	PECO	A	RR-5	172	4020	3889	131.2	04-04-58	ST	A	
342	PECOS	PECO	A	VV-24	300	3655	3355	300. R	11- -57	ST	A	
342			T	53 43 901							T	
343	PECOS	PECO	A	UU-32	525	3150	2750	400. R	57	DO,ST	A	
344	PECOS	PECO	A	SS-19	175	3800	3712	87.7	04-22-58	DO,ST	A	
345	PECOS	PECO	A	W-17	432			370. R	04- -47	DO,ST	A	
345			T	54 01 701							T	
346	PECOS	PECO	A	GG-40	210	2270	2174	95.5	03-20-57	DO,ST	A	
346			T	54 09 801							T	
347	PECOS	PECO	T	54 10 703	100					--	T	
348	PECOS	PECO	A	GG-34	303	2478	2225	252.9	05-20-57	ST	A	
349	PECOS	PECO	A	HH-16	300	3543	3361	182.2	05-05-58	DO	A	
350	PECOS	PECO	A	MM-9	920	3286	2681	605. R	58	DO	A	
351	PECOS	PECO	A	NN-5	425	3046	2644	402. R	10- -58	DO,ST	A	
352	PECOS	PECO	A	D-2	87					UN		
352			BR	45 43 09							BR	

Table 1.-- Water-level records of wells in the Delaware Basin and vicinity, including availabilities of water analyses and aquifer tests - Continued

Well index number	County	Formation or aquifer	Source report: Reference code	Source report: Well number	Depth of well (feet)	Altitude of well (feet)	Altitude of water level (feet)	Water level below land surface (feet)	Date of water-level measurement	Water use code	Source of water-quality data	Source of aquifer-test data
353	PECOS	PECO	A	C-120	127	2459	2424	35.3	10-04-57	UN		
353			BR	45 50 05							BR	
354	PECOS	PECO	A	C-180	173			32.4	10-07-57	UN		
354			BR	45 51 05							BR	
355	PECOS	PECO	A	D-88	170			17.0	03-10-49	UN		
355			BR	45 53 04							BR	
356	PECOS	PECO	A	K-14	68	2323	2290	33.0	02-03-47	UN		
356			BR	45 61 06							BR	
357	PECOS	PECO	A	E-7	160			112.8	11-26-46	UN		
357			BR	46 63 01							BR	
358	PECOS	PECO	A	F-92	193			152.7	11-20-57	UN		
358			BR	46 63 06							BR	
359	PECOS	PECO	A	Q-199	203	2983	2878	105. R	05- -59	UN	A	
360	PECOS	PECO	A	HH-15	421	3484	3353	130.8	05-05-58	IR	A	
361	CRANE	ALVM	T	45 27 203	94	2761	2717	44.40	11-16-77	ST	T	
361			S	A-3							A	
362	CRANE	ALVM	T	45 27 901	105	2698	2633	65.10	11-07-78	UN		
363	CRANE	ALVM	T	45 28 701	61	2635	2596	39.20	11-07-78	ST	T	
364	CRANE	ALVM	T	45 29 401		2670	2613	57.40	11-07-78	--	T	
365	CRANE	ALVM	T	45 29 501	93	2695	2642	52.52	12-09-71	--		
366	CRANE	ALVM	T	45 29 601		2725	2677	47.72	11-06-78	--	T	
367	CRANE	ALVM	T	45 30 701		2650	2594	56.22	11-09-76	--	T	
368	CRANE	ALVM	T	45 35 301	157	2521	2447	73.55	12-05-74	--	T	
369	CRANE	ALVM	T	45 35 702		2469	2420	49.47	12-05-69	--	T	
370	CRANE	ALVM	T	45 36 802	234	2477	2414	63.43	11-07-78	IN	T	
371	CRANE	ALVM	T	45 37 203	87	2579	2532	46.82	11-16-77	PU	T	
372	CRANE	ALVM	T	45 37 204	230	2575	2527	48.02	12-05-74	IN		
373	CRANE	ALVM	T	45 44 301	32	2395	2365	30.23	11-16-77	--	T	
374	CRANE	ALVM	T	45 45 501	60	2389	2346	43.27	12-05-74	--	T	
375	CRANE	ALVM	T	45 53 301	45	2340	2315	25.48	07-17-74	--		
376	CRANE	ALVM	T	45 62 101		2508	2485	22.66	11-06-78	--		
377	CRANE	ALVM	S	B-55	83			42. R	02- -54	PU	S	
378	CRANE	ALVM	S	D-12	165			55.30	12-07-56	PU,IN	S	
379	CRANE	ALVM	S	E-59	100			45.6	10-07-54	DO,IN	S	
380	CRANE	ALVM	S	D-2	58			50.0	10-29-54	ST	S	
381	REEVES	ALVM	T	46 25 501	545	3242	3059	183.14	12-19-73	--	T	
382	REEVES	ALVM	T	46 26 401	800	3192	2917	275.30	12-05-72	--	T	
383	REEVES	ALVM	T	46 28 801	519	2660	2541	119.20	01-16-79	IR		
384	REEVES	ALVM	T	46 28 802	300	2626	2584	41.68	01-16-79	IR		
385	REEVES	ALVM	T	46 35 501	865	2784	2393	391.25	12-05-72	UN	T	
386	REEVES	ALVM	T	46 35 702		2819	2573	246.12	02-08-69	ST		
386			O	H-25							O	

Table 1.-- Water-level records of wells in the Delaware Basin and vicinity, including availabilities of water analyses and aquifer tests - Continued

Well index number	County	Formation or aquifer	Source report: Reference code	Source report: Well number	Depth of well (feet)	Altitude of well (feet)	Altitude of water level (feet)	Water level below land surface (feet)	Date of water-level measurement	Water use code	Source of water-quality data	Source of aquifer-test data
387	REEVES	ALVM	T	46 35 801	780	2805	2394	411.00	12-05-72	IR	T	
387			O	H-16							O	
388	REEVES	ALVM	T	46 35 901	550	2766	2392	373.93	02-04-76	IR	T	
389	REEVES	ALVM	T	46 35 902	585	2728	2408	320.16	01-19-78	IR	T	
390	REEVES	ALVM	T	46 35 903	360	2734	2502	231.97	01-17-79	IR		
391	REEVES	ALVM	T	46 36 101	600	2673	2499	173.67	02-02-64	IR		
392	REEVES	ALVM	T	46 36 201	700	2654	2512	142.07	01-16-79	UN		
393	REEVES	ALVM	T	46 36 202	650	2625	2473	151.97	02-07-69	IR	T	
393			M	312959 1033137								M
394	REEVES	ALVM	T	46 36 401	625	2683	2485	197.98	02-23-77	IR		
394			O	J-38							O	
395	REEVES	ALVM	T	46 36 901	550	2627	2513	114.04	01-16-79	IR		
396	REEVES	ALVM	T	46 36 903	520	2631	2477	153.98	01-19-78	IR		
397	REEVES	ALVM	T	46 43 601	509	2719	2336	383.26	12-13-71	UN		
398	REEVES	ALVM	T	46 43 901	800	2756	2427	328.60	02-09-63	IR	T	
399	REEVES	ALVM	T	46 43 902	450	2705	2624	80.65	01-18-78	UN		
400	REEVES	ALVM	T	46 44 101	514	2686	2482	204.48	01-16-79	UN		
401	REEVES	ALVM	T	46 44 203	350	2671	2562	109.17	01-16-79	UN		
402	REEVES	ALVM	O	J-207	545	2661	2442	218.50	02-11-59	IR	O	
402			T	46 44 204							T	
403	REEVES	ALVM	T	46 44 401	576	2698	2432	265.57	01-16-61	IR		
404	REEVES	ALVM	T	46 44 502	545	2652	2533	118.82	02-03-76	IR	T	
405	REEVES	ALVM	T	46 44 602	830	2641	2489	151.52	01-17-78	UN		
406	REEVES	ALVM	T	46 44 701	1055	2691	2386	305.24	01-09-74	IR	T	
407	REEVES	ALVM	T	46 44 704	1406	2694	2442	251.89	01-16-79	IR	T	
408	REEVES	ALVM	T	46 44 803	150	2664	2622	42.19	01-16-79	IR	T	
409	REEVES	ALVM	T	46 45 801	276	2616	2535	80.80	01-15-79	IR		
410	REEVES	ALVM	T	46 46 101		2572	2535	36.79	01-15-79	IR		
411	REEVES	ALVM	T	46 51 202	801			403.20	02-09-62	IR	T	
412	REEVES	ALVM	MU	46 51 301	800	2785	2440	345.00	02-08-62	IR		
413	REEVES	ALVM	T	46 51 601	1400	2804	2481	322.66Q	01-16-79	IR		
414	REEVES	ALVM	T	46 51 903		2844	2546	298.06Q	01-16-79	--		
415	REEVES	ALVM	T	46 52 101	400	2719	2582	137.38	01-18-78	--		
416	REEVES	ALVM	T	46 52 102	150	2711	2669	42.17	01-16-79	--		
417	REEVES	ALVM	T	46 52 204	137	2678	2634	43.50	01-16-79	--		
418	REEVES	ALVM	T	46 52 501	580	2715	2666	48.58Q	01-15-79	--		
419	REEVES	ALVM	MU	46 52 601	319	2717	2589	128.16	02-09-62	--		
420	REEVES	ALVM	T	46 52 703	595	2776	2612	163.67	01-16-79	--		
421	REEVES	ALVM	T	46 55 201	180	2647	2525	121.58	01-15-79	--		
422	REEVES	ALVM	T	46 59 105	386	2999	2643	356.08	01-16-79	--		
423	REEVES	ALVM	T	46 59 201	590	2933	2486	446.72	01-18-78	--		
424	REEVES	ALVM	T	46 59 301	618	2897	2558	339.09Q	01-10-74	--		

Table 1.-- Water-level records of wells in the Delaware Basin and vicinity, including availabilities of water analyses and aquifer tests - Continued

Well index number	County	Formation or aquifer	Source report: Reference code	Source report: Well number	Depth of well (feet)	Altitude of well (feet)	Altitude of water level (feet)	Water level below land surface (feet)	Date of water-level measurement	Water use code	Source of water-quality data	Source of aquifer-test data
425	REEVES	ALVM	T	46 59 401	620	3054	2744	309.75	01-16-79	--		
426	REEVES	ALVM	T	46 59 501	687	2987	2632	354.50Q	12-20-73	--		
427	REEVES	ALVM	T	46 60 201	720	2830	2668	161.65Q	01-16-79	--		
428	REEVES	ALVM	T	46 60 701	700	2880	2643	237.25	01-15-79	--		
429	REEVES	ALVM	T	46 61 201	350	2819	2651	167.75	01-15-79	--		
430	REEVES	ALVM	T	52 03 301	547	2993	2784	209.10	02-22-77	--		
431	REEVES	ALVM	T	52 03 302	400	3024	2679	345.02	01-18-78	--		
432	REEVES	ALVM	O	F-36	250	2597	2576	20.7	07-13-59	UN		
432			M	313018 1033031								M
433	REEVES	ALVM	M	312512 1034106	1005			360.0	08-22-59	--		M
434	REEVES	ALVM	M	311912 1033747	600			370.0	09- -59	--		M
435	REEVES	ALVM	M	312118 1033421	500			287.0	08-14-59	--		M
436	REEVES	ALVM	O	J-94	1045	2695	2199	496.0	08-18-59	--		
436			M	312354 1033608								M
437	REEVES	ALVM	M	310452 1033640	452			259.0	09-10-59	--		M
438	REEVES	ALVM	M	311312 1033354	1080			274.	08- -59	--		M
439	REEVES	ALVM	M	311124 1033237	600			254.10	09-02-59	--		M
440	REEVES	ALVM	M	310457 1033654	600			303.0	09-10-59	--		M
441	CULBERSON	ALVM	T	47 04 501	200					--	T	
442	CULBERSON	ALVM	T	47 13 102						--	T	
443	CULBERSON	ALVM	WH	HL-47-26-102	116	3683	3603	80.4	03-30-72	ST	WH	
444	CULBERSON	ALVM	WH	HL-47-26-701	104	3764	3676	87.5	02-27-73	ST	WH	
445	CULBERSON	ALVM	WH	HL-47-26-901	200	3786	3584	201.8	05-03-72	ST	WH	
446	CULBERSON	ALVM	WH	HL-47-34-102	49	3638	3588	49.6	11-30-72	ST	WH	
447	CULBERSON	ALVM	WH	HL-47-34-901	128	3684	3616	68.3	04-21-72	ST	WH	
448	CULBERSON	ALVM	WH	HL-47-35-701	140	3696	3596	99.6	12-19-72	ST	WH	
449	CULBERSON	ALVM	WH	HL-47-43-101	130	3674	3614	59.9	12-19-72	ST	WH	
450	CULBERSON	ALVM	WH	HL-47-43-502	190	3720	3565	154.58	12-04-72	UN		
451	CULBERSON	ALVM	WH	HL-47-17-602	200	3706	3594	111.8	02-12-74	UN	WH	
452	CULBERSON	ALVM	WH	HL-47-43-202	550	3784	3542	242.45	12-12-72	IR	WH	
500	REEVES	RSLR	T	46 60 902	1450	2952	2648	303.58	01-15-79	--		
501	REEVES	RSLR	T	46 60 202	1625					--	T	
502	REEVES	RSLR	O	L-17	1225	2555				IR		
503	REEVES	RSLR	O	S-14	1400					UN	O	
504	REEVES	RSLR	O	S-51	1366	2726	2469	257.0	01-29-59	IR		
505	REEVES	RSLR	O	V-146	1500	2947	2508	439.2	08-06-59	IR	O	
506	REEVES	RSLR	O	W-12	1400	2788	2635	152.9	01-29-59	UN	O	
507	REEVES	RSLR	O	W-60	5612	2796	2567	229.1	03-18-59	UN	O	
508	REEVES	RSLR	G	90	4916	2632				ST	G	
509	REEVES	RSLR	G	93	1360	2603		+		ST	G	
510	REEVES	RSLR	G	171		2793		+		ST	G	
511	REEVES	RSLR	G	179	910	2648	2633	14.5	05-13-41	UN	G	

Table 1.-- Water-level records of wells in the Delaware Basin and vicinity, including availabilities of water analyses and aquifer tests - Continued

Well index number	County	Formation or aquifer	Source report: Reference code	Source report: Well number	Depth of well (feet)	Altitude of well (feet)	Altitude of water level (feet)	Water level below land surface (feet)	Date of water-level measurement	Water use code	Source of water-quality data	Source of aquifer-test data
512	REEVES	RSLR	G	185		2585		+		ST	G	
513	CRANE	RSLR	S	D-24	461			+	12-12-54	UN	S	
514	CRANE	RSLR	S	E-53	243			8.4	12-05-54	ST	S	
515	CRANE	RSLR	S	E-64	716					IN		
516	CRANE	RSLR	T	45 44 601	550	2378	2326	52.10	11-07-78	--	T	
517	CULBERSON	RSLR	T	47 55 104	270					--	T	
518	CULBERSON	RSLR	T	47 47 701	450					--	T	
519	CULBERSON	RSLR	WK	P-57						--	WK	
520	CULBERSON	RSLR	WK	P-58						--	WK	
521	CULBERSON	RSLR	WK	P-59	451					--	WK	
522	LOVING	RSLR	G	24	194	2750	2662	87.8	12-07-40	IN	G	
523	LOVING	RSLR	G	28	277					IN	G	
524	PECOS	RSLR	A	A-199	1500	2692	2391	301.	01-25-59	IR	A	
525	PECOS	RSLR	A	B-21	761	2440	2370	70.	56	IN		
526	PECOS	RSLR	A	B-22	720	2441	2371	70.	56	IN		
527	PECOS	RSLR	A	P-85	1812	3047		+		IR	A	
528	PECOS	RSLR	A	P-120	1373	3083		+		IR	A	
529	PECOS	RSLR	A	Q-10	2997	2331		+	04-07-58	IR	A	
530	PECOS	RSLR	A	Q-21	3300	2877		+	04-13-46	ST		
531	PECOS	RSLR	A	Q-73	1480			+	01-29-58	IR,ST	A	
532	PECOS	RSLR	A	Q-137	1435			+	04-07-56	IR		
533	PECOS	RSLR	G	76	5326			3.1	11-27-46	ST	G	
539	PECOS	RSLR	T	52 16 608	1600	3195	3016	179.35	01-09-79	--		
540	PECOS	RSLR	T	52 16 609	1975	3192	3000	191.87	01-09-79	--		
541	PECOS	RSLR	AU	F-62	1547			3.6	04-09-56	ST	AU	
542	WARD	RSLR	W	45 17 910	850	2705	2525	180. R	12-17-59	IN		
543	WARD	RSLR	W	45 25 317	965	2610				IR	W	W
544	WARD	RSLR	W	45 26 702	933	2561	2516	45.2	05-12-67	UN	W	
545	WARD	RSLR	W	45 34 703	656	2530	2390	140. R	01- -57	IN		W
546	WARD	RSLR	W	45 41 302	700	2458	2430	27.6	08-16-67	UN		
547	WARD	RSLR	W	45 42 802	491	2410	2371	38.8	05-09-67	IN	W	
548	WARD	RSLR	W	46 30 601	975	2820	2559	261.0	10-02-67	UN		
549	WARD	RSLR	W	46 38 601	4670	2550		+		UN	W	
550	WARD	RSLR	W	46 40 702	1080	1948		+	06-01-67	IR	W	W
551	WARD	RSLR	W	46 40 801	1680	2481		+	06-01-67	UN	W	
552	WARD	RSLR	T	46 30 901	5088					--	T	
553	WARD	RSLR	T	46 32 306	3950					--	T	
554	WARD	RSLR	T	46 32 611	4500					--	T	
555	WARD	RSLR	T	46 40 703	1125					--	T	
556	WINKLER	RSLR	GW	D-160	1234	2880	2505	375.	04- -54	IN	GW	
557	WINKLER	RSLR	GW	D-193	1062	2905				IN	GW	
558	WINKLER	RSLR	GW	D-195	1023	2906	2716	189.9	11-14-56	IN		

Table 1.-- Water-level records of wells in the Delaware Basin and vicinity, including availabilities of water analyses and aquifer tests - Continued

Well index number	County	Formation or aquifer	Source report: Reference code	Source report: Well number	Depth of well (feet)	Altitude of well (feet)	Altitude of water level (feet)	Water level below land surface (feet)	Date of water-level measurement	Water use code	Source of water-quality data	Source of aquifer-test data
559	WINKLER	RSLR	G	98	1100					IN	G	
560	WINKLER	RSLR	G	104	1220					--		
561	WINKLER	RSLR	GW	D-210	1045	2888	2707	181.3	01-31-57	IN		
562	EDDY	RSLR	US	19.29.20.24111		3305	3238	66.87	02-01-71	ST		
563	EDDY	RSLR	US	20.30.31.211				101.04	01-19-77	ST		
564	EDDY	RSLR	US	20.31.16.243	110	3460	3399	61.43	01-15-76	UN		
565	EDDY	RSLR	US	21.27.29.42312A				58.63	01-11-78	DO,ST		
566	EDDY	RSLR	US	21.28.18.13333	25			19.00	01-05-78	UN		
567	EDDY	RSLR	US	21.28.36.12322	241			161.01	01-05-78	UN		
568	EDDY	RSLR	US	21.30.18.33332	176	3220	3085	135.29	01-19-79	UN		
569	EDDY	PUND	US	22.24.36.11421				26.70	01-04-78	UN		
570	EDDY	PUND	US	22.25.27.31133				234.57	01-03-78	UN		
571	EDDY	PUND	US	22.26.09.11231				128.62	05-25-54	ST		
572	EDDY	RSLR	US	22.28.02.11111		3154	3023	130.67	12-16-76	--		
573	EDDY	RSLR	US	22.29.33.24130	70	3020	2967	52.87	01-15-76	ST		
574	EDDY	RSLR	US	23.30.02.44414A	317	3250	2993	256.90	01-19-79	ST	U	
575	EDDY	PUND	US	24.24.04.24144		3690	3453	236.69	01-25-78	ST,IN		
576	EDDY	RSLR	US	24.30.19.42113	451	3200	2969	230.62	01-14-77	ST		
577	EDDY	RSLR	US	25.28.15.23234	70			49.79	02-23-78	ST		
578	EDDY	RSLR	US	25.29.16.44444	200	3025	2860	165.05	01-14-77	ST		
579	EDDY	RSLR	US	25.31.02.23441	1016	3453	3063	390.27	01-28-76	IN		
580	EDDY	RSLR	US	26.23.24.23243	95	4355	4280	74.96	02-21-78	ST		
581	EDDY	RSLR	US	26.28.13.11214		2940	2883	56.75	02-23-78	ST		
582	EDDY	RSLR	US	26.29.16.21323	335	2954	2830	123.62	01-17-78	UN		
583	EDDY	RSLR	US	26.29.22.23300	200	2875	2810	65.47	02-23-78	ST		
584	EDDY	PUND	US	22.23.14.44444		4124	3647	476.88	01-05-78	ST		
585	EDDY	PUND	US	22.23.20.21233				88.08	01-05-78	UN		
586	EDDY	RSLR	US	23.30.34.133144	518	3413	2976	436.56	12-14-76	OB		
587	LEA	RSLR	US	25.37.10.244432	1260	3121	2766	355.49	03-07-78	UN		
588	LEA	RSLR	US	25.37.24.14333	901	3075	2839	235.60	03-07-78	IN		
589	LEA	RSLR	US	24.37.22.31222	1173	3243	2980	263.43	02-26-80	UN		
599	CULBERSON	CPLM	T	47 17 317	600	3758	3584	174.01	01-22-79	--	T	M
600	CULBERSON	CPLM	WH	47 09 903	650	3804	3594	210. R	05- -70	DO,IN	WH	
601	CULBERSON	CPLM	T	47 17 302	377	3800	3634	166.26	01-17-78	UN	T	
602	CULBERSON	CPLM	WH	47 44 701	408	3887	3534	353.20	03-06-72	ST		
603	CULBERSON	CPLM	WH	47 52 201	773	4218	3543	675. R	12- -66	DO,ST	WH	
604	CULBERSON	CPLM	WH	47 52 301	1713	4548	3531	1017. R	12- -73	UN	WH	
605	CULBERSON	CPLM	WH	47 52 602	1650	4594	3526	1068. R	12- -73	UN	WH	
606	CULBERSON	CPLM	WH	47 53 401		5060	3490	1570. R	70	ST	WH	
607	EDDY	CPLM	US	19.31.31.132	4050	3397	2897	500.37	10- -79	OB		
608	EDDY	CPLM	US	20.30.32.341344	2550	3365	3049	316.22	01-01-78	OB	HI	
609	EDDY	CPLM	US	21.26.36.22114	327	3122	3101	21.47	12- -79	OB	HI	

Table 1.-- Water-level records of wells in the Delaware Basin and vicinity, including availabilities of water analyses and aquifer tests - Continued

Well index number	County	Formation or aquifer	Source report: Reference code	Source report: Well number	Depth of well (feet)	Altitude of well (feet)	Altitude of water level (feet)	Water level below land surface (feet)	Date of water-level measurement	Water use code	Source of water-quality data	Source of aquifer-test data
610	EDDY	CPLM	US	21.27.05.414	2500	3280	3084	196.18	11- -78	OB	HI	HI
611	EDDY	CPLM	US	21.28.30.14123	906	3182	3088	93.51	11- -79	OB	HI	HI
612	EDDY	CPLM	US	22.26.03.43333	360	3185	3106	79.09	01-18-79	IR		
614	EDDY	CPLM	US	23.25.24.21333	900	3502	3103	399.05	12- -79	OB		
615	LEA	CPLM	US	19.32.31.110	3650	3518	2890	628.16	09- -77	OB	HI	
616	LEA	CPLM	US	21.34.23.31000	5390	3717	2579	1137.95	12- -79	OB	HI	
617	LEA	CPLM	US	23.25.28.12000	5300	3387	2447	940.11	12- -79	--		
618	LEA	CPLM	US	24.36.20.210	5713	3355	2132	1222.79	12- -79	OB		
619	LEA	CPLM	US	26.36.04.230	5300	2985	2153	832.31	12- -79	OB		
620	EDDY	CPLM	B	21.26.23.133	418	3143	3103	39.52	01-11-55	OB,IR		
621	EDDY	CPLM	B	21.26.25.344		3125	3105	20.13	01-11-55	OB,IR		
622	EDDY	CPLM	B	21.27.19.334	320	3135	3104	31.20	01-19-55	OB,IR		
623	EDDY	CPLM	B	22.26.12.112	206	3134	3105	29.20	01-11-55	OB		
624	EDDY	CPLM	B	23.25.08.222	724	3772	3112	660.		UN		
625	EDDY	CPLM	H	19.27.14.242	152	3455	3347	107.7	09-03-48	DO,ST		
626	EDDY	CPLM	H	24.24.12.123	340	4025	3998	27.0	02-24-48	DO,ST		
627	EDDY	CPLM	H	24.25.25.130	150	3600	3464	136.40	01-02-48	ST		
628	EDDY	CPLM	H	24.25.34.221	1200	3900	3100	800.		PU		
629	EDDY	CPLM	H	24.26.06.322	100	3620	3557	63.40	02-24-48	UN		
630	PECOS	CPLM	G	42	3900	2561		+		IR	G	
630			P	45 49 103							P	
631	PECOS	CPLM	A	HH-23	1209			1164.	04- -46	DO,ST	A	
632	WINKLER	CPLM	G	100	4000	2760	2737	+23.1 R	56	IN	G	
633	CULBERSON	CPLM	T	47 61 401	577					--	T	
634	WARD	CPLM	G	70	4100	2689	2495	+194.	02-20-57	IN		
634			W	46 32 309								W
635	WARD	CPLM	G	71	4100	2689	2539	+150.	06-28-57	IN		
635			W	46 32 307								W
636	WARD	CPLM	G	75	3700	2661	2483	+178.	06-28-57	IN	G	
636			W	46 32 305								W
637	WARD	CPLM	G	77	3775	2644	2443	+201.	06-28-57	IN		
638	WARD	CPLM	G	134	2650					UN	G	
639	WINKLER	CPLM	G	68	3550	2821	2753	68.	06-07-57	IN	G	
640	WINKLER	CPLM	G	72	3550	2826	2759	67.	06-07-57	IN	G	
641	CRANE	SNRS	S	B-6	132	2760				IN	S	
642	CRANE	SNRS	S	B-26	350	2680				IN	S	
643	CRANE	SNRS	S	B-47	700	2660	2571	89.1	11-04-54	UN	S	
644	CRANE	SNRS	S	B-12	585	2765	2568	196.7	11-03-54	UN		
645	CRANE	SNRS	S	C-89	535	2650	2545	105. R	04- -49	UN		
646	CRANE	SNRS	S	E-12	170	2545				PU,IN	S	
647	CRANE	SNRS	S	E-66	267	2540				IN	S	
648	CRANE	SNRS	S	E-77	200	2445	2385	60.4	10-26-54	UN	S	

Table 1.-- Water-level records of wells in the Delaware Basin and vicinity, including availabilities of water analyses and aquifer tests - Continued

Well index number	County	Formation or aquifer	Source report: Reference code	Source report: Well number	Depth of well (feet)	Altitude of well (feet)	Altitude of water level (feet)	Water level below land surface (feet)	Date of water-level measurement	Water use code	Source of water-quality data	Source of aquifer-test data
649	CRANE	SNRS	S	F-46	450	2605	2493	111.6	12-18-54	UN		
650	CRANE	SNRS	S	F-55	397	2560	2538	22. R	01- -52	IN		
651	CRANE	SNRS	T	45 54 501	200	2540	2415	125.22	11-16-77	--		
652	LOVING	SNRS	G	13	173			145.8	09-12-40	ST	G	
653	LOVING	ARSA	T	46 12 802	262	2810	2663	147.25	11-01-78	--	T	
654	LOVING	ARSA	T	46 02 603	238	3000	2872	127.74	11-10-76	--	T	
655	LOVING	ARSA	T	46 12 301	343	3080	2800	279.65	10-21-74	--	T	
656	LOVING	ARSA	T	46 12 401	118	2808	2719	89.16	11-10-76	--	T	
657	LOVING	ARSA	T	46 12 402	173	2808	2670	137.91	11-01-78	--	T	
659	LOVING	ARSA	T	46 22 401	212	2810	2718	91.78	11-01-78	--	T	
660	REEVES	SNRS	O	K-31	170	2633	2523	110.	02- -59	PU	O	
661	REEVES	SNRS	O	L-26	200	2559	2521	38.2	03-10-59	IR	O	
662	REEVES	SNRS	O	L-30	230	2583				UN	O	
663	REEVES	SNRS	O	L-46	160	2636	2548	88.	01- -59	PU	O	
664	REEVES	SNRS	O	R-3	185					UN	O	
665	REEVES	SNRS	O	R-26	83	2683	2621	62.2	03-21-59	ST		
666	REEVES	SNRS	O	R-38	398	2738	2632	105.7	01-28-59	IR	O	
667	REEVES	SNRS	O	S-27	120	2608	2520	88.2	03-20-59	ST	O	
668	REEVES	SNRS	O	S-50	200	2726	2603	123.1	01-29-59	IR	O	
669	REEVES	SNRS	O	W-22	153	2791	2681	110.4	03-17-59	ST	O	
670	REEVES	SNRS	O	W-67	550	2827	2685	142.4	01-22-60	IR		
671	REEVES	SNRS	O	W-95	470	2850	2706	144.0	01-26-59	IR		
672	REEVES	SNRS	T	46 54 701	467	2797	2647	149.72	01-17-78	ST		
673	REEVES	SNRS	T	46 55 201	180	2647	2525	121.58	01-15-79	DO,ST		
674	WARD	SNRS	G	3	176	2770	2633	137.4	01-24-50	ST	G	
675	WARD	SNRS	G	39	275					IR	G	
676	WARD	SNRS	G	96	150			55.0 R		DO,ST	G	
677	WARD	SNRS	G	114	295			104. R	02-11-54	IN		
678	WARD	SNRS	T	45 25 408	667	1945	1812	132.68	11-09-78	--		
679	WARD	SNRS	BR	45 25 03	120					--	BR	
680	WARD	SNRS	BR	46 22 08	151					--	BR	
681	WARD	SNRS	BR	46 30 04	188					--	BR	
682	WARD	SNRS	BR	46 32 06	172					--	BR	
683	WARD	SNRS	BR	46 38 201	95					--	BR	
684	WINKLER	SNRS	GW	C-1	220	2983	2788	195.3	09-07-56	ST	GW	
685	WINKLER	SNRS	GW	D-3	540	2967	2803	164.0	09-12-56	IN	GW	
686	WINKLER	SNRS	RE	D-48	600	2938	2785	153.09	11-29-67	PU,IN		
687	WINKLER	SNRS	T	46 16 201	394	2862	2732	129.85	11-03-78	PU	T	
688	WINKLER	SNRS	GW	F-27	208	2794	2670	123.8	04-01-57	ST	GW	
689	WINKLER	SNRS	T	46 06 801	211	2919	2728	191.04	07-16-75	--	T	
690	WINKLER	SNRS	T	46 14 601	200	2855	2701	154.17	07-15-75	--	T	
691	WINKLER	SNRS	T	46 22 601	128	2775	2662	112.60	11-03-78	--	T	

Table 1.-- Water-level records of wells in the Delaware Basin and vicinity, including availabilities of water analyses and aquifer tests - Concluded

Well index number	County	Formation or aquifer	Source report: Reference code	Source report: Well number	Depth of well (feet)	Altitude of well (feet)	Altitude of water level (feet)	Water level below land surface (feet)	Date of water-level measurement	Water use code	Source of water-quality data	Source of aquifer-test data
692	WINKLER	SNRS	BR	46 07 03						--	BR	
693	WINKLER	SNRS	WA	27 58 801	1200	3365				ST	WA	
694	WINKLER	SNRS	T	46 08 809	440					--	T	
695	WINKLER	SNRS	T	46 16 404	300					--	T	
696	WINKLER	SNRS	M	315046 1030615	405			200.77	08-17-57	--		M
697	WINKLER	SNRS	M	315559 1030620	219			112.0	02-24-57	--		M
698	WINKLER	SNRS	M	315102 1030517	559			125.13	07-25-57	--		M
699	LEA	SNRS	US	23.34.23.42332	500	3374	3139	234.98	12-16-76	ST		
700	LEA	SNRS	US	23.36.16.34341	850	3451	3189	261.86	12-17-70	ST		
701	LEA	SNRS	US	24.34.04.21431	630	3550	3203	346.69	01-21-76	IN		
702	LEA	SNRS	US	24.35.10.11000		3381	3109	271.70	01-15-76	UN		
703	LEA	SNRS	US	24.36.03.333334	530	3396	3219	176.58	01-15-76	IN		
704	LEA	SNRS	US	24.37.21.413344	775	3220	2952	267.58	01-15-76	IN		
705	LEA	SNRS	US	25.36.24.11214	455	3111	2816	295.09	01-15-76	UN		
706	LEA	SNRS	US	25.37.19.44143	245	3042	2847	194.50	03-10-77	UN		
707	LEA	SNRS	US	21.36.09.22222	447	3585	3466	118.76	03-18-68	IN	N	
708	LEA	SNRS	US	22.36.33.23232	1050	3472	3094	378.31	01-21-76	DO,IN		
709	LEA	SNRS	US	23.33.17.42331	550	3701	3230	470.50	12-08-76	ST		
711	LEA	SNRS	N	21.37.33.210	350	3430				UN	N	
712	LEA	SNRS	N	22.36.08.443	1000	3580	2880	700.		IN,DO	N	
713	LEA	SNRS	N	23.34.31.340	678	3620				IN	N	
714	LEA	SNRS	N	24.37.10.123	747	3260	3140	120.	02- -53	IN	N	
715	LEA	SNRS	N	25.37.19.221	500	3110	2826	284.0	11-11-54	UN	N	

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Table 2.--Analyses of water from selected wells in the Capitan aquifer

Well index number: A unique arbitrary number assigned to each well for the purpose of this report only.

Data reference: A, Armstrong and McMillion, 1972; G, Guyton and Associates, 1958; HI, Hiss, 1971; M, Myers, 1969; P, Perkins, Buckner, and Henry, 1972; T, Texas Department of Water Resources, 1980; WH, White and others, 1980.

Sampling depth: Depth from which water sample was obtained.

Units and analysis: ppm, results of chemical analysis in parts per million, except as indicated; mg/L, results of chemical analysis in milligrams per liter, except as indicated.

Sodium: Analyses indicated with a "*" consist of sodium and potassium calculated as sodium. Analyses from the Texas Department of Water Resources (1980) may or may not consist of sodium and potassium calculated as sodium.

Dissolved solids: All dissolved-solids data from the Texas Department of Water Resources (1980) are calculated using bicarbonate converted by computation (multiplying by 0.4917) to an equivalent amount of carbonate, and the carbonate figure is used in the computation of the sum.

Specific conductance: Micromhos per centimeter at 25 degrees Celsius. Values obtained from the Texas Department of Water Resources (1980) are found to be of uncertain accuracy at this time and are not included in this table.

Sodium adsorption ratio (SAR): Milliequivalents per liter.

Table 2.--Analyses of water from selected wells in the Capitan aquifer-Concluded

Well index number	Data reference	County	Depth of well (ft)	Sampling depth (ft)	Date of collection	Units of analysis	Silica (as SiO_2)	Iron (as Fe)	Calcium (as Ca)	Magnesium (as Mg)	Sodium (as Na)	Potassium (as K)	Bicarbonate (as HCO_3)	Sulfate (as SO_4)	Chloride (as Cl)	Fluoride (as F)	Nitrate (as NO_3)	Dissolved solids	Total hardness (as $CaCO_3$)	Specific conductance (micromhos)	pH (standard units)	Percent sodium	Sodium adsorption ratio (SAR)
599	T	Culberson	600	-	8-7-68	mg/L	13	-	160	67	64	-	279	402	107	3	0.4	951	677	-	7.4	17.10	1.0
600	WH	Culberson	650	275-650	5-22-70	mg/L	17	1.1	167	68	74	-	280	500	75	1.1	-	1181	696	1385	7.2	19	1.22
601	T	Culberson	377	-	6-14-67	mg/L	15	-	156	66	83	-	299	411	117	1.4	0.4	996	660	-	7.9	21.46	1.4
603	WH	Culberson	773	733-773	12-12-65	mg/L	19	-	57	36	90	-	233	147	59	2.2	56	580	291	940	7.8	40	2.3
604	WH	Culberson	1722	1163-1722	8-11-70	mg/L	18	-	181	94	478	-	281	690	670	2.0	1.0	2270	840	3280	7.6	55	7.2
605	WH	Culberson	1560	1241-1560	8-11-70	mg/L	18	-	176	88	478	-	272	690	650	2.1	1.5	2240	800	3190	7.7	56	7.4
606	WH	Culberson	-	-	8-13-70	mg/L	18	-	49	35	103	-	190	97	158	0.8	<.4	550	269	984	-	45	2.7
608	HI	Eddy	-	1275	10-22-71	mg/L	-	-	946	507	10,227*	-	7	3220	16,689	-	-	31,700	4450	44,444	4.9	-	-
609	HI	Eddy	-	300	12-6-63	mg/L	15	-	236	70	193*	-	232	659	290	0.5	-	1670	878	2290	7.3	-	2.8
610	HI	Eddy	1170	1007-1170	12-11-68	mg/L	-	-	1400	576	8260*	-	626	3690	13,800	-	-	28,000	5860	39,000	6.4	-	-
611	HI	Eddy	1060	640-1060	8-11-61	mg/L	-	-	1120	388	6400*	-	312	3430	10,300	-	-	22,400	4370	28,600	7.6	-	-
615	HI	Lea	2957	2923-2957	9-26-63	mg/L	9.2	-	1032	537	8530*	-	357	3430	13,210	-	-	27,200	4,688	-	7.8	-	-
616	HI	Lea	4187	4169-4187	10-25-66	mg/L	-	-	1040	302	3190*	-	480	2820	5250	-	-	12,800	3830	18,300	6.7	-	-
630	G	Pecos	3900	-	7-16-56	ppm	-	-	602	153	336	-	281	1830	550	-	-	3690	-	-	7.7	25	-
630	P	Pecos	4000	-	6-27-72	mg/L	22	-	580	145	409	-	157	1750	690	3.0	<0.4	3680	2050	3850	6.8	-	-
631	A	Pecos	1209	-	4-4-46	ppm	-	-	58	30	8.3*	-	296	17	16	-	2.8	303	268	-	-	6	-
632	G	Winkler	4000	-	11-23-56	ppm	4	-	835	313	2599*	-	369	2764	4090	-	-	10,889	3376	-	-	-	-
633	T	Culberson	577	-	3-17-71	mg/L	16	-	161	79	447	-	275	600	630	2.3	4.5	2075	730	-	7.5	57.23	7.2
636	G	Ward	3700	-	1-15-54	ppm	2	-	600	97	483*	-	-	1318	1066	-	-	5475	1900	-	-	-	-
638	G	Ward	2650	-	7-18-50	ppm	12	-	706	171	714*	-	1060	1670	1000	-	-	4790	2460	-	-	-	-
639	G	Winkler	3550	-	11-24-54	ppm	12	-	740	267	2001*	-	385	5450	923	-	-	9586	2950	-	-	-	-

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Table 3.--Analyses of water from selected wells in the Rustler Formation

Well index number: A unique arbitrary number assigned to each well for the purpose of this report only.

Data reference: A, Armstrong and McMillion, 1972; AU, Audsley, 1956; G, Guyton and Associates, 1958; GW, Garza and Wesselman, 1959; O, Ogilbee, Wesselman, and Irelan, 1972; S, Shafer, 1956; T, Texas Department of Water Resources, 1980; U, USGS water quality file of WATSTORE data bank, 1982; W, White, 1971; WK, Winslow and Kister, 1956.

Sampling depth: Depth from which water sample was obtained.

Unit of analysis: ppm, results of chemical analysis in parts per million, except as indicated; mg/L, results of chemical analysis in milligrams per liter, except as indicated.

Sodium: Analyses indicated with a "*" consist of sodium and potassium calculated as sodium. Analysis from the Texas Department of Water Resources (1980) may or may not consist of sodium and potassium calculated as sodium.

Dissolved solids: All dissolved solids data from the Texas Department of Water Resources (1980) are calculated using bicarbonate converted by computation (multiplying by 0.4917) to an equivalent amount of carbonate, and the carbonate figure is used in the computation of the sum.

Specific conductance: In micromhos per centimeter at 25 degrees Celsius. Values obtained from the Texas Department of Water Resources (1980) are found to be of uncertain accuracy at this time and are not included in this table.

Sodium adsoption ration (SAR): Milliequivalents per liter.

Table 3.--Analyses of water from selected wells in the Rustler Formation - Concluded

Well index number	Data reference	County	Depth of well (ft)	Sampling depth (ft)	Date of collection	Unit of analysis	Silica as SiO_2	Iron as Fe	Calcium as Ca	Magnesium as Mg	Sodium as Na	Potassium as K
501	T	Reeves	1,625	-	8-29-59	mg/L	14	-	490	167	206	20.0
503	O	Reeves	1,400	-	7-24-40	ppm	-	-	627	259	208*	-
505	O	Reeves	1,500	-	8-14-59	ppm	16	-	530	186	53	12
506	O	Reeves	1,400	-	1-24-47	ppm	-	-	608	212	40*	-
507	O	Reeves	5,612	-	9-4-40	ppm	-	-	611	224	44*	-
508	G	Reeves	-	1860	-	ppm	-	-	1,015	42	12,057	-
509	G	Reeves	-	1360	6-7-40	ppm	-	-	595	227	170*	-
510	G	Reeves	-	-	9-4-40	ppm	-	-	611	224	44*	-
511	G	Reeves	-	910	10-7-39	ppm	-	-	590	236	31*	-
512	G	Reeves	-	-	7-13-40	ppm	-	-	598	254	124*	-
513	S	Crane	461	-	12-7-54	ppm	41	-	906	224	1,840*	-
514	S	Crane	243	-	10-26-54	ppm	39	-	592	78	67*	-
516	T	Crane	550	-	7-18-74	mg/L	6	-	685	7,250	29,210	-
517	T	Culberson	270	-	10-6-70	mg/L	20	-	411	145	52	-
518	T	Culberson	450	-	10-6-70	mg/L	15	-	122	43	22	-
519 2/	WK	Culberson	-	-	4-19-40	ppm	-	-	615	51	64*	-
520 2/	WK	Culberson	-	-	5-16-40	ppm	-	-	677	166	92*	-
521	WK	Culberson	451	-	5-30-59	ppm	14	-	178	68	105*	-
522	G	Loving	194	-	1-17-40	ppm	-	-	494	166	220*	-
523	G	Loving	277	-	9-27-57	ppm	25	-	-	-	-	-
524	A	Pecos	1,500	-	7-16-56	ppm	17	-	542	211	209	19
527	A	Pecos	1,812	-	4-7-56	ppm	18	-	314	87	195	9.2
528	A	Pecos	1,373	-	3-6-56	ppm	20	-	265	62	214	9.2
529	A	Pecos	2,997	-	4-7-56	ppm	24	-	638	199	143*	-
531	A	Pecos	1,480	-	4-6-56	ppm	15	-	599	230	225*	-
533	G	Pecos	1,374	-	9-6-40	ppm	-	-	566	199	12*	-
541	AU	Pecos	1,547	-	4-9-56	ppm	14	-	573	192	164*	-
543	W	Ward	965	-	3-30-51	mg/L	18	0.9	1,010	638	13,100	19
544	W	Ward	933	-	5-12-67	mg/L	-	-	-	-	-	-
547	W	Ward	491	-	2-4-58	mg/L	8.5	0.34	1,700	981	25,300*	-
549	W	Ward	4,670	-	2-4-26	mg/L	18	0.49	1,020	406	3,380	96
550	W	Ward	1,080	-	6-1-67	mg/L	-	-	-	-	-	-
551	W	Ward	1,680	-	6-1-67	mg/L	-	-	-	-	-	-
552	T	Ward	5,088	-	12-14-67	mg/L	10	-	56	8	36	6.2
553 1/	T	Ward	3,950	-	10-21-65	mg/L	-	-	1,170	366	5,110	-
554 1/	T	Ward	4,500	-	10-21-65	mg/L	-	-	1,350	361	6,240	-
555	T	Ward	1,125	-	6-1-67	mg/L	19	-	580	163	666	-
556	GW	Winkler	1,234	-	9-25-56	ppm	10	-	1,380	1,400	57,400*	-
557	GW	Winkler	1,062	-	1-25-57	ppm	16	-	627	845	4,810*	-
559	G	Winkler	1,100	-	9-20-55	ppm	2	-	786	704	4,157*	-
574	U	Eddy	-	315	9-20-72	mg/L	30	9	580	130	430	23

1/ Well also completed in Capitan aquifer.
2/ Spring.

Bi-car-bon-ate as HCO_3	Sul-fate as SO_4	Chlo-ride as Cl	Fluo-ride as F	Ni-trate as NO_3	Boron as B	Dis-solved solids	Total hard-ness as $CaCO_3$	Spe-cific con-duc-tance (micro-mhos)	pH (stand-ard units)	Per-cent sodi-um	Sodi-um ad-sorp-tion ratio (SAR)
162	1,940	185	-	0.0	0.7	3,102	1,910	-	6.6	18.80	2.0
114	2,510	266	-	0.2	-	3,930	2,630	4,410	-	15	-
165	1,930	44	2.7	0.0	0.44	2,860	2,090	2,980	6.8	5	-
146	2,210	40	-	0.0	-	3,180	2,390	3,210	-	4	-
143	2,210	87	-	0.8	-	3,250	2,450	3,570	-	37	-
610	4,140	17,100	-	-	-	34,659	-	-	-	-	-
77	2,482	99	-	-	-	3,970	2,420	-	-	-	-
143	2,210	87	-	-	-	3,570	2,450	-	-	-	-
110	2,281	32	-	-	-	3,220	2,440	-	-	-	-
111	2,442	122	-	-	-	4,030	-	-	-	-	-
98	2,220	3,390	1.6	-	-	8,670	3,180	12,200	7.4	56	-
101	1,720	44	1.8	3.8	-	2,600	1,800	2,730	7.4	7	-
192	38,010	39,310	11.4	5.3	-	114,582	31,500	-	7.4	66.83	71.5
102	1,490	34	2.1	70.0	-	2,274	1,620	-	7.6	6.51	0.5
162	337	15	1.3	18.0	-	652	478	-	7.8	9.04	0.4
105	1,640	51	-	25	-	2,700	-	2,630	-	7	-
141	2,240	83	-	4.0	-	3,720	-	3,650	-	8	-
270	639	46	-	0.0	-	1,180	724	1,570	7.8	24	-
46	2,116	108	-	-	-	3,130	-	-	-	-	-
-	2,070	91	-	-	-	3,151	1,850	-	-	-	-
145	2,240	197	-	0.0	-	3,510	2,220	3,880	7.2	17	-
192	984	282	-	0.2	0.21	1,980	1,140	2,690	7.3	27	-
225	750	300	-	0.4	0.27	1,730	916	2,430	7.1	33	-
206	2,170	208	-	0.3	-	3,480	2,410	3,850	7.7	11	-
160	2,410	205	-	0.0	-	3,760	2,440	4,110	7.1	17	-
66	2,092	18	-	-	-	3,240	2,230	-	-	-	-
180	2,110	165	-	0.0	-	3,310	2,220	3,620	8.0	14	1.5
116	5,050	19,800	1.7	-	4.4	39,700	5,140	52,000	7.4	85	-
418	1,950	8,400	-	-	-	-	6,950	26,600	8.4	-	-
129	5,450	40,800	-	-	30	74,300	8,280	-	7.4	-	-
133	3,150	5,980	-	-	-	14,100	4,230	-	-	64	-
104	2,610	310	-	-	-	-	2,740	4,620	-	-	-
22	2,600	322	-	-	-	-	2,740	4,630	7.2	-	-
200	30	39	0.5	2.0	-	286	171	-	7.1	30.25	1.1
554	2,560	8,800	-	-	-	18,278	4,430	-	6.7	71.52	33.4
593	2,780	10,700	-	-	-	21,722	4,860	-	6.7	73.66	38.9
105	2,650	510	-	0.9	-	4,640	2,120	-	7.1	40.62	6.2
56	7,140	89,700	2.3	-	-	157,000	9,200	-	6.5	93	260
133	4,320	7,720	2.8	-	-	18,400	5,040	24,500	7.3	67	29
566	3,970	3,179	-	-	-	18,222	4,863	-	-	-	-
111	2,100	510	2.4	-	-	3,860	3,900	4,480	7.9	32	4.2

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Table 4.--Analyses of water from selected wells in the Santa Rosa Sandstone

Well index number: A unique arbitrary number assigned to each well for the purpose of this report only.

Data reference: BR, Brown, Rogers, and Baker, 1965; G, Guyton and Associates, 1958; GW, Garza and Wesselman, 1959; N, Nicholson and Clebsch, 1961; O, Ogilbee, Wesselman, and Ireland, 1972; S, Shafer, 1956; T, Texas Department of Water Resources, 1980; WA, Walker, 1979.

Sampling depth: Depth from which water sample was obtained.

Unit of analysis: ppm, results of chemical analysis in parts per million, except as indicated; mg/L, results of chemical analysis in milligrams per liter, except as indicated.

Sodium: Analyses indicated with a "*" consist of sodium and potassium calculated as sodium. Analyses from the Texas Department of Water Resources (1980) may or may not consist of sodium and potassium calculated as sodium.

Dissolved solids: All dissolved solids data from the Texas Department of Water Resources (1980) are calculated using bicarbonate converted by computation (multiplying by 0.4917) to an equivalent amount of carbonate, and the carbonate figure is used in the computation of the sum.

Specific conductance: Micromhos per centimeter at 25 degrees Celsius. Values obtained from the Texas Department of Water Resources (1980) are found to be of uncertain accuracy at this time and are not included in this table.

Sodium adsorption ratio (SAR): Milliequivalents per liter.

Table 4.--Analyses of water from selected wells in the Santa Rosa Sandstone - Concluded

Well index number	Data reference	County	Depth of well (ft)	Sampling depth (ft)	Date of collection	Unit of analysis	Silica as SiO_2	Iron as Fe	Calcium as Ca	Magnesium as Mg	Sodium as Na	Potassium as K
641	S	Crane	132	-	9-22-54	ppm	45	-	313	56	112*	-
642	S	Crane	350	-	12-13-54	ppm	45	-	46	18	83*	-
643	S	Crane	700	230	9-22-54	ppm	11	-	128	61	654*	-
643	S	Crane	700	675	9-27-54	ppm	9.8	-	88	49	669*	-
646	S	Crane	170	-	12-7-54	ppm	52	-	61	8.1	22*	-
647	S	Crane	267	-	10-26-54	ppm	53	-	53	16	43*	-
648	S	Crane	200	-	10-22-54	ppm	37	-	58	24	115*	-
652	G	Loving	173	-	9-12-40	ppm	-	-	96	30	247*	-
660	O	Reeves	170	-	12-17-58	ppm	32	.00	212	54	130	7.6
663	O	Reeves	160	-	2-27-56	ppm	25	2.2	77	18	73	-
664	O	Reeves	185	-	3-13-59	ppm	-	0.2	63	23	82	-
669	O	Reeves	153	-	3-19-59	ppm	-	0.9	128	34	64	-
674	G	Ward	176	-	4-15-41	ppm	-	-	-	-	-	-
675	G	Ward	275	-	7-11-49	ppm	-	-	-	-	-	-
676	G	Ward	150	-	11-28-39	ppm	-	-	56	30	56*	-
679	BR	Ward	120	-	4-29-41	ppm	-	-	-	7.5	36*	-
680	BR	Ward	151	-	9-20-56	ppm	50	-	51	19	21*	-
681	BR	Ward	188	-	8-21-40	ppm	-	-	321	87	150*	-
682	BR	Ward	172	-	5-3-40	ppm	-	-	78.1	17	66*	-
683	8R	Ward	95	-	10-58	ppm	-	0.1	260	118	156*	-
684	GW	Winkler	220	-	9-7-56	ppm	22	-	75	29	147*	-
685	GW	Winkler	540	-	4-13-57	ppm	13	-	42	38	317*	-
687	T	Winkler	394	-	12-11-72	mg/L	24	-	39	8	24	-
688	GW	Winkler	208	-	9-20-56	ppm	16	-	98	40	184*	-
689	T	Winkler	211	-	7-16-75	mg/L	39	-	81	42	108	-
690	T	Winkler	200	-	7-15-75	mg/L	25	-	77	27	44	-
692	BR	Winkler	-	-	1-12-57	ppm	1.5	-	5.6	5.1	208*	-
693	WA	Winkler	1,200	-	7-27-70	mg/L	5	-	16	14	1,010	-
694	T	Winkler	440	-	1-16-69	mg/L	28	-	38	6	22	-
695	T	Winkler	300	-	8-15-74	mg/L	30	-	95	4	37	-
707	N	Lea	447	-	9-8-58	mg/L	-	-	-	-	-	-
710	N	Lea	-	-	12-9-58	ppm	19	-	10	13	131*	-
711	N	Lea	350	-	8-1-42	ppm	16	-	50	31	563*	-
712	N	Lea	1,000±	-	7-23-53	ppm	-	-	18	6	425*	-
713	N	Lea	678	-	12-4-53	ppm	-	-	32	26	163*	-
714	N	Lea	747	-	3-11-53	ppm	13	-	121	93	402*	-
715	N	Lea	500	-	2-5-53	ppm	12	-	55	49	170*	-

Bicarbonate as HCO_3	Sulfate as SO_4	Chloride as Cl	Fluoride as F	Nitrate as NO_3	Boron as B	Dissolved solids	Total hardness as $CaCO_3$	Specific conductance (micromhos)	pH (standard units)	Percent sodium	Sodium adsorption ratio (SAR)
110	943	100	3.0	42	-	1,670	1,010	2,070	7.4	19	-
205	84	77	1.0	2.5	-	458	189	715	8.0	49	-
330	863	580	1.8	1.5	-	2,460	570	3,520	7.7	71	-
307	892	490	1.6	.2	-	2,350	421	3,480	7.8	78	-
174	32	37	.8	4.8	-	313	186	477	7.8	21	-
186	48	51	5.0	4.6	-	277	198	576	7.7	32	-
226	95	140	2.6	5.4	-	638	243	1,160	7.7	51	-
182	479	175	-	-	-	1,382	-	-	-	-	-
164	329	390	1.2	9.0	0.30	1,250	751	2,020	7.1	27	-
214	141	67	1.2	10	-	554	266	-	7.4	37	-
204	170	67	1.5	11	-	523	253	872	7.3	42	-
248	174	148	0.4	1.8	-	810	460	1,350	7.2	23	-
-	-	38	-	-	-	892	-	-	-	-	-
-	-	4,800	-	-	-	-	-	-	-	-	-
317	79	30	-	-	-	409	-	-	-	-	-
135	69	25	0.8	3.0	-	292	-	47.8	-	-	-
243	25	10	1.6	10	-	309	205	464	7.4	-	-
118	1,165	116	-	15	-	2,030	-	241	-	-	-
186	162	60	-	2.5	-	558	-	-	-	-	-
-	950	185	1.4	9.0	-	1,890	-	3,150	-	-	-
180	395	45	-	4.5	-	816	306	1,200	7.4	51	3.7
343	507	100	-	1.8	-	1,190	262	1,800	7.7	72	8.6
134	41	15	2.1	5.0	-	223	130	-	7.8	28.61	0.9
284	411	102	1.6	0.0	-	1,020	409	1,500	7.2	49	3.9
239	273	97	2.2	3.1	-	762	377	-	7.6	38.52	2.4
232	149	37	2.2	7.0	-	482	305	-	7.5	23.99	1.0
283	129	80	3.4	0.0	-	572	35	974	9.1	-	-
395	1,230	520	3.1	<0.4	-	2,990	99	4,110	8.1	95.7	44.4
144	24	10	2.0	4.4	-	205	119	-	7.7	28.59	0.8
146	80	81	1.2	6.0	-	405	252	-	7.8	24.09	1.0
425	213	64	-	-	-	-	73	1,270	8.1	-	-
306	74	21	1.2	6.4	-	426	80	682	8.0	78	-
360	855	208	1.8	0.5	-	1,900	252	2,850	-	-	-
477	340	200	-	-	-	-	-	-	-	-	-
287	219	52	1.4	0.7	-	635	187	1,030	-	65	-
277	934	252	1.6	1.2	-	1,950	684	2,840	-	56	-
376	280	71	2.6	0.4		825	338	1,320	-	52	-

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Table 5.--Analyses of water from selected wells in aquifers in the Cenozoic alluvium

Well index number: A unique arbitrary number assigned to each well for the purpose of this report only.

Data reference: A, Armstrong and McMillion, 1972; B, Bjorklund and Motts, 1959; Br, Brown, Rogers, and Baker, 1965; C, Cooper and Glanzman, 1971; D, Dinwiddie, 1963; G, Guyton and Associates, 1958; GW, Garza and Wesselman, 1959; H, Hendrickson and Jones, 1952; N, Nicholson and Clebsch, 1961; O, Ogilbee, Wesselman, and Irelan, 1972; P, Perkins, Buckner, and Henry, 1972; RE, Reeves, 1968; S, Shafer, 1956; T, Texas Department of Water Resources, 1980; W, White, 1971; WH, White, Smith, and Fry, 1980; WK, Winslow and Kister, 1956.

Aquifer unit or formation: ALVM, Cenozoic alluvium; ARSA, Allurosa aquifer; CSTL, Castile formation; PECO, Pecos aquifer.

Sampling depth: Depth from which water sample was obtained.

Unit of analysis: ppm, results of chemical analysis in parts per million, except as indicated; mg/L, results of chemical analysis in milligrams per liter, except as indicated.

Sodium: Analyses indicated with a "*" consist of sodium and potassium calculated as sodium. Analysis from the Texas Department of Water Resources (1980) may or may not consist of sodium and potassium calculated as sodium.

Dissolved solids: All dissolved solids data from the Texas Department of Water Resources (1980) are calculated using bicarbonate converted by computation (multiplying by 0.4917) to an equivalent amount of carbonate, and the carbonate figure is used in the computation of the sum.

Specific conductance: Micromhos per centimeter at 25 degrees Celsius. Values obtained from the Texas Department of Water Resources (1980) are found to be of uncertain accuracy at this time and are not included in this table.

Sodium adsorption ration (SAR): Milliequivalents per liter.

Temperature: Water temperature in degrees Celsius at the time sample was obtained.

Well index number	Data reference	County	Aquifer unit or formation	Depth of well (ft)	Sampling depth (ft)	Date of collection	Unit of analysis	Silica as SiO_2	Iron as Fe	Calcium as Ca	Magnesium as Mg	Sodium as Na	Potassium as K
1	H	Eddy	ALVM	-	-	5-1-50	ppm	44	-	632	39	24*	-
3	H	Eddy	ALVM	-	-	1-25-50	ppm	31	-	275	38	.5*	-
4	H	Eddy	ALVM	-	-	1-30-50	ppm	34	-	574	423	747*	-
5	H	Eddy	ALVM	73.5	-	2-4-48	ppm	-	-	382	151	8.3*	-
6	H	Eddy	ALVM	200	-	9-15-50	ppm	-	-	-	-	-	-
7	H	Eddy	ALVM	119	-	4-11-49	ppm	-	-	562	246	483*	-
8	H	Eddy	ALVM	158	-	4-11-49	ppm	-	-	-	-	-	-
9	H	Eddy	ALVM	65	-	12-48	ppm	-	-	230	118	168*	-
11	H	Eddy	ALVM	-	-	12-16-46	ppm	-	-	780	203	897*	-
15	H	Eddy	ALVM	-	-	1-26-48	ppm	-	-	232	83	14*	-
16	H	Eddy	ALVM	90	-	1-28-48	ppm	-	-	84	36	3.7*	-
24	N	Lea	ALVM	70	-	7-18-42	ppm	65	-	102	32	77*	-
26	N	Lea	ALVM	-	-	12-12-58	ppm	-	-	-	-	-	-
59	B	Eddy	ALVM	169	-	2-53	ppm	-	-	550	223	504	-
63	B	Eddy	ALVM	165	-	1-9-53	ppm	-	-	496	198	297	-
73	B	Eddy	ALVM	231	-	1-17-55	ppm	-	-	-	-	-	-
74	B	Eddy	ALVM	186	-	7-17-53	ppm	-	-	496	251	600	-
81	B	Eddy	ALVM	210	-	4-9-53	ppm	-	-	564	206	455	-
82	B	Eddy	ALVM	195	-	9-20-54	ppm	-	-	-	-	-	-
83	B	Eddy	ALVM	100	-	7-16-53	ppm	-	-	740	289	743	-
87	B	Eddy	ALVM	148	-	7-19-48	ppm	-	-	450	125	345*	-
88	B	Eddy	ALVM	96	-	3-5-53	ppm	-	-	528	140	315	-
90	B	Eddy	ALVM, CSTL	93	-	11-1-54	ppm	-	-	-	-	-	-
91	B	Eddy	ALVM?	225	-	3-17-55	ppm	-	-	-	-	-	-
97	B	Eddy	ALVM	-	-	7-15-53	ppm	-	-	466	133	53	-
100	B	Eddy	ALVM, CSTL	200	-	8-3-54	ppm	-	-	-	-	-	-
102	B	Eddy	ALVM	200	-	9-27-54	ppm	-	-	-	-	-	-
102	B	Eddy	ALVM	200	-	9-28-54	ppm	-	-	-	-	-	-
110	B	Eddy	ALVM	101	-	4-6-52	ppm	-	-	-	-	-	-
114	B	Eddy	ALVM	85	-	11-6-53	ppm	-	-	-	-	-	-
121	B	Eddy	ALVM	100	-	7-30-52	ppm	-	-	432	56	25	-
126	D	Eddy	ALVM	170	-	1-18-62	ppm	19	.04	96	28	14*	-
129	B	Eddy	ALVM	79	-	11-10-54	ppm	51	-	699	247	625*	-
130	B	Eddy	ALVM	25	-	1-26-54	ppm	-	-	-	-	-	-
131	B	Eddy	ALVM	105	-	4-7-55	ppm	-	-	-	-	-	-
132	B	Eddy	ALVM	90	-	9-9-54	ppm	-	-	-	-	-	-
133	B	Eddy	ALVM	135	-	4-9-53	ppm	-	-	522	205	432	-
133	B	Eddy	ALVM	135	-	8-16-54	ppm	-	-	-	-	-	-
134	B	Eddy	ALVM	123	-	7-17-53	ppm	-	-	430	127	357	-
136	C	Eddy	ALVM	3B5.6	-	4-14-59	mg/L	5.2	4.2	34	22	106	2.2
138	C	Eddy	ALVM	298.1	-	2-5-59	mg/L	25	.9B	131	40	236	5.0
139	C	Eddy	ALVM	400	-	2-17-59	mg/L	25	3.1	216	54	142	4.6
150	G	Loving	ALVM	151	-	9-12-40	ppm	-	-	296	22	1,086*	-
151	G	Loving	ALVM	17	-	7-23-40	ppm	-	-	626	173	594*	-
152	G	Loving	ALVM	60	-	9-11-40	ppm	-	-	-	-	-	-
153	BR	Loving	ALVM	160	-	9-23-40	ppm	-	-	617	42	91*	-
154	BR	Loving	ALVM	160	-	6-28-61	ppm	-	-	-	-	-	-
155	BR	Loving	ALVM	135	-	7-24-40	ppm	-	-	476	142	316*	-
156	WK	Loving	ALVM	246	-	12-16-40	ppm	-	-	637	248	369*	-
157	T	Loving	ALVM	-	-	8-17-78	mg/L	28	-	796	167	1658	-
159	T	Loving	ALVM	300	-	10-17-74	mg/L	39	-	158	30	40	-
160	T	Loving	ALVM	84	-	8-17-61	mg/L	-	-	562	34	13	6.5
160	T	Loving	ALVM	84	-	10-16-74	mg/L	42	-	660	22	32	-
160	T	Loving	ALVM	84	-	8-18-78	mg/L	44	-	798	26	109	-
162	T	Winkler	ALVM	80	-	10-22-74	mg/L	46	-	175	47	132	-
162	T	Winkler	ALVM	80	-	7-27-79	mg/L	63	-	340	50	216	5.0
164	T	Winkler	ALVM	135	-	12-11-72	mg/L	53	-	281	40	166	-
164	T	Winkler	ALVM	135	-	8-4-74	mg/L	46	-	295	25	158	-
166	T	Winkler	ALVM	100	-	10-24-74	mg/L	39	-	190	20	100	-
167	T	Winkler	ALVM	125	-	7-16-75	mg/L	15	-	52	28	255	-
167	T	Winkler	ALVM	125	-	7-31-79	mg/L	43	-	66	49	309	-
168	T	Winkler	ALVM	-	-	7-16-75	mg/L	37	-	111	52	219	-
168	T	Winkler	ALVM	-	-	7-31-79	mg/L	40	-	109	53	222	-
171	T	Winkler	ALVM	190	-	7-15-75	mg/L	39	-	122	64	483	-
171	T	Winkler	ALVM	190	-	7-31-79	mg/L	48	-	105	54	342	-
173	T	Winkler	ALVM	210	-	4-29-69	mg/L	17	-	96	20	62	-
174	T	Winkler	ALVM	400	-	3-14-57	mg/L	35	-	75	40	367	10.0
175	T	Winkler	ALVM	-	-	12-7-71	mg/L	39	-	86	16	76	-

Bicarbonate as HCO_3	Sulfate as SO_4	Chloride as Cl	Fluoride as F	Nitrate as NO_3	Boron as B	Dissolved solids	Total hardness as $CaCO_3$	Specific conductance (micromhos)	pH (standard units)	Percent sodium	Sodium adsorption ratio (SAR)	Residual sodium carbonate	Temperature (°C)
174	1,540	29	1.1	1.4	-	2,400	1,740	2,490	-	30	-	-	-
229	608	5	.7	17	-	1,090	842	1,370	-	0	-	-	-
237	3,530	642	3.2	15	-	6,090	3,170	6,930	-	34	-	-	-
166	1,360	28	-	.5	-	2,010	1,570	2,310	-	-	-	-	-
440	-	23	-	-	-	-	-	852	-	-	-	-	-
220	1,900	920	-	9.1	-	4,230	2,410	5,740	-	30	-	-	-
240	-	1,080	-	-	-	-	-	6,340	-	-	-	-	-
272	602	406	-	2.2	-	1,660	1,060	2,580	-	-	-	-	-
246	2,140	1,620	-	19	-	5,780	2,780	7,770	-	41	-	-	-
296	647	14	-	18	-	1,150	920	1,520	-	-	-	-	-
252	134	8	-	10	-	400	358	653	-	-	-	-	-
150	145	168	1.3	7.6	-	685	-	1,100	-	-	-	-	-
207	233	73	-	-	-	-	-	978	7.3	-	-	-	-
226	1,963	820	-	-	-	4,286	-	6,000	-	32.3	-	-	-
165	1,589	643	-	-	-	3,388	-	4,200	-	23.9	-	-	-
265	-	14	-	-	-	-	-	946	-	-	-	-	-
213	1,958	959	-	-	-	4,483	-	5,450	-	36.5	-	-	-
238	1,939	731	-	-	-	4,133	-	6,400	-	30.5	-	-	-
231	-	1,120	-	-	-	-	-	6,030	-	-	-	-	-
238	2,573	1,243	-	-	-	5,841	-	6,750	-	34.7	-	-	-
213	1,130	720	-	24	-	2,900	1,640	4,060	7.5	31	3.7	-	-
214	1,411	664	-	-	-	3,272	-	5,000	-	26.6	-	-	-
128	2,130	400	-	-	-	-	-	4,240	-	-	-	-	-
210	7,320	794	-	-	-	-	-	10,700	-	14	2.9	-	-
207	1,570	82	-	-	-	2,514	-	2,600	-	6.3	-	-	-
156	1,550	9	-	-	-	-	-	2,460	-	-	-	-	-
212	1,870	700	-	-	-	-	-	5,010	-	-	-	-	-
194	2,200	3,650	-	-	-	-	-	13,400	-	-	-	-	-
252	621	8	-	-	-	-	-	1,380	-	-	-	-	-
259	527	5	-	-	-	-	-	1,040	-	-	-	-	-
85	1,200	28	-	-	-	1,829	-	2,050	-	40.3	-	-	-
274	112	20	.5	16	-	472	354	703	7.2	8	.3	-	-
304	2,200	1,090	1.8	48	-	5,110	2,760	6,260	-	33	5.2	-	-
201	-	455	-	-	-	-	-	3,510	-	-	-	-	-
240	-	1,110	-	-	-	-	-	6,550	7.1	-	-	-	-
255	-	555	-	-	-	-	-	3,880	-	-	-	-	-
220	1,886	667	-	-	-	3,932	-	6,000	-	30.5	-	-	-
202	-	860	-	-	-	-	-	5,370	-	-	-	-	-
128	1,382	575	-	-	-	3,008	-	3,750	-	32.7	-	-	-
121	188	72	1.8	<.1	-	491	176	843	8.0	-	-	-	21
149	347	370	1.1	5.0	-	1,230	492	2,020	7.6	-	-	-	22
130	794	92	1.4	5.1	-	1,400	761	1,900	7.5	-	-	-	23
127	1,278	177	-	-	-	2,500	-	-	-	-	-	-	-
153	2,241	782	-	-	-	4,820	-	-	-	-	-	-	-
-	-	5,210	-	-	-	12,940	-	-	-	-	-	-	-
50	1,602	131	-	21	-	2,760	-	285	-	-	-	-	-
134	604	390	-	-	-	1,680	800	2,400	7.1	-	-	-	-
71	2,030	203	-	1.0	-	3,520	-	380	-	-	-	-	-
68	2,030	880	-	1.2	-	4,200	2,610	5,430	-	25	-	-	-
141	2,352	2,688	1.6	5.8	-	7,765	2,677	-	7.3	57.43	13.9	0.0	-
161	165	214	2.3	10.0	-	737	520	-	7.3	14.39	0.7	0.0	-
127	1,390	7	1.9	5.3	-	2,082	1,540	-	6.7	1.79	0.1	0.0	-
117	1,430	113	2.3	11.0	-	2,369	1,740	-	7.3	3.85	0.3	0.0	-
113	1,553	436	1.4	18.0	-	3,040	2,100	-	7.4	10.15	1.0	0.0	-
231	500	121	2.1	27.0	-	1,163	630	-	7.7	31.30	2.2	0.0	-
240	952	253	2.4	15.9	-	2,015	1,056	-	7.7	30.70	2.8	0.0	-
220	750	178	2.3	4.0	-	1,582	870	-	7.4	29.43	2.4	0.0	-
215	700	178	3.2	2.9	-	1,513	840	-	7.7	29.06	2.3	0.0	-
149	440	128	1.3	28.0	-	1,019	560	-	7.5	28.10	1.8	0.0	-
454	205	149	4.0	6.0	-	937	245	-	7.7	69.37	7.0	2.5	-
288	486	198	4.8	6.9	-	1,304	368	-	7.9	64.73	7.0	0.0	-
276	560	126	2.5	0.4	-	1,243	492	-	7.8	49.25	4.3	0.0	-
270	562	124	2.6	5.4	-	1,250	493	-	7.8	49.63	4.3	0.0	-
278	920	317	1.9	4.1	-	2,087	570	-	7.7	64.92	8.8	0.0	-
265	676	232	1.8	1.9	-	1,591	483	-	7.8	60.58	6.7	0.0	-
201	116	104	1.7	19.0	-	534	323	-	7.5	29.53	1.5	0.0	-
220	258	492	2.6	3.0	-	1,390	352	-	7.6	68.65	8.5	0.0	-
210	143	82	0.8	1.5	-	547	280	-	7.6	37.09	1.9	0.0	-

Well index number	Data reference	County	Aquifer unit or formation	Depth of well (ft)	Sampling depth (ft)	Date of collection (m-d-y)	Unit of analysis	Silica as SiO_2	Iron as Fe	Calcium as Ca	Magnesium as Mg	Sodium as Na	Potassium as K
176	GW	Winkler	ALVM	166	-	10-17-56	ppm	44	-	94	19	41*	-
177	GW	Winkler	ALVM	140	-	10-24-56	ppm	32	-	39	6.1	22*	-
177	RE	Winkler	ALVM	140	-	12-20-67	mg/L	-	-	-	-	-	-
179	GW	Winkler	ALVM	120	-	11-8-56	ppm	35	-	127	18	65*	-
179	RE	Winkler	ALVM	120	-	12-20-67	mg/L	-	-	-	-	-	-
180	GW	Winkler	ALVM	140	-	9-21-56	ppm	45	-	390	143	592*	-
182	GW	Winkler	ALVM	240	-	9-23-56	ppm	25	-	40	14	50*	-
183	GW	Winkler	ALVM	101	-	4-9-40	ppm	-	-	80	13	72*	-
184	GW	Winkler	ALVM	105	-	2-8-57	ppm	33	-	47	12	61*	-
186	W	Ward	ARSA	156	-	5-25-56	mg/L	-	-	24	4	59*	-
186	W	Ward	ARSA	156	-	9-15-64	mg/L	16	.12	67	11	51*	-
186	W	Ward	ARSA	156	-	6-1-67	mg/L	-	.04	102	18	63*	-
186	W	Ward	ARSA	156	-	1-28-68	mg/L	-	.12	84	12	124*	-
186	T	Ward	ARSA	156	-	5-16-72	mg/L	6	-	35	7	69	-
187	W	Ward	ARSA	154	-	6-1-56	mg/L	-	.02	25	5	62*	-
187	W	Ward	ARSA	154	-	9-15-64	mg/L	13	-	71	17	78*	-
187	W	Ward	ARSA	154	-	6-1-67	mg/L	-	.04	106	19	99*	-
187	W	Ward	ARSA	154	-	1-28-68	mg/L	-	.04	180	28	144*	-
187	T	Ward	ARSA	154	-	5-16-72	mg/L	35	-	101	14	70	-
188	W	Ward	ARSA	100	-	3-31-68	mg/L	25	-	795	280	1,970	23.0
189	W	Ward	ARSA	80	-	5-18-67	mg/L	-	-	-	-	-	-
189	T	Ward	ARSA	80	-	7-23-74	mg/L	28	-	38	5	11	-
190	W	Ward	ARSA	150	-	5-11-67	mg/L	-	-	-	-	-	-
190	T	Ward	ARSA	150	-	7-22-74	mg/L	26	-	204	35	474	-
191	W	Ward	ARSA	155	-	5-13-67	mg/L	45	-	178	52	313	7.9
191	T	Ward	ARSA	155	-	8-24-70	mg/L	43	-	181	50	308	-
191	T	Ward	ARSA	155	-	9-13-74	mg/L	42	-	232	53	371	10.0
192	W	Ward	ARSA	102	-	6-28-67	mg/L	-	-	-	-	-	-
192	T	Ward	ARSA	102	-	7-22-74	mg/L	23	-	277	115	640	-
195	W	Ward	ARSA	92	-	6-22-61	mg/L	-	-	-	-	-	-
195	W	Ward	ARSA	92	-	4-19-67	mg/L	-	-	-	-	-	-
196	W	Ward	ARSA	115	-	5-17-40	mg/L	-	-	476	135	1,240*	-
198	W	Ward	ARSA	141	-	10-3-67	mg/L	-	-	-	-	-	-
198	T	Ward	ARSA	141	-	7-23-74	mg/L	35	-	124	38	35	-
200	W	Ward	ARSA	130	-	8-15-40	mg/L	-	-	286	54	213*	-
200	W	Ward	ARSA	130	-	3-28-68	mg/L	-	-	-	-	-	-
200	T	Ward	ARSA	130	-	7-23-74	mg/L	22	-	390	63	304	-
201	W	Ward	ARSA	322	-	1-26-56	mg/L	31	-	321	140	568	19.0
202	T	Ward	ARSA	160	-	12-14-67	mg/L	28	1.2	54	19	47	2.9
202	T	Ward	ARSA	160	-	7-24-74	mg/L	29	-	54	18	43	-
202	T	Ward	ARSA	160	-	7-26-79	mg/L	32	-	50	23	44	-
203	W	Ward	ARSA	400	-	9-11-67	mg/L	44	-	345	142	598	16.0
207	T,W	Ward	ARSA	80	-	9-21-33	mg/L	-	-	695	221	1,042*	-
207	T	Ward	ARSA	80	-	10-26-67	mg/L	31	-	824	245	1,920	24.0
208	T,W	Ward	ARSA	85	-	3-29-40	mg/L	-	-	660	184	1,020*	-
210	T,W	Ward	ARSA	95	-	11-20-39	mg/L	-	-	262	77	347*	-
210	T	Ward	ARSA	95	-	11-10-67	mg/L	30	-	320	82	318	8.1
212	T,W	Ward	ARSA	84	-	11-28-39	mg/L	-	-	78	31	273*	-
212	W	Ward	ARSA	84	-	6-2-67	mg/L	-	-	-	-	-	-
213	T	Ward	ARSA	260	-	9-27-67	mg/L	30	-	189	94	1,180	19.0
214	W	Ward	ARSA	176	-	8-18-67	mg/L	-	-	-	-	-	-
215	W	Ward	ARSA	210	-	6-22-67	mg/L	36	-	126	40	615	8.2
216	W	Ward	ARSA	220	-	8-13-67	mg/L	33	-	103	27	307	5.6
217	W	Ward	ARSA	100	-	11-2-54	mg/L	62	-	90	29	398*	-
219	W	Ward	ARSA	400	-	6-20-67	mg/L	61	-	150	41	582	7.3
221	W	Ward	ARSA	62	-	4-27-67	mg/L	30	-	855	352	2,540	24
222	W	Ward	ARSA	228	-	3-3-66	mg/L	-	.15	233	53	-	-
223	W	Ward	ARSA	225	-	9-13-67	mg/L	-	-	-	-	-	-
225	W	Ward	ARSA	385	-	9-16-64	mg/L	-	.48	49	15	64*	-
225	W	Ward	ARSA	385	-	6-1-67	mg/L	-	.04	45	18	43*	-
225	W	Ward	ARSA	385	-	1-28-68	mg/L	-	-	52	15	59*	-
225A	W	Ward	ARSA	392	-	10-25-61	mg/L	-	.14	56	16	75*	-
225A	W	Ward	ARSA	392	-	9-16-64	mg/L	-	.20	60	19	69*	-
225A	W	Ward	ARSA	392	-	6-1-67	mg/L	-	.04	60	16	61*	-
225A	W	Ward	ARSA	392	-	1-28-68	mg/L	-	.32	57	17	62*	-
226	W	Ward	ARSA	190	-	10-17-67	mg/L	31	-	1,100	332	3,880	28

Bicarbonate as HCO_3	Sulfate as SO_4	Chloride as Cl	Fluoride as F	Nitrate as NO_3	Boron as B	Dissolved solids	Total hardness as $CaCO_3$	Specific conductance (micromhos)	pH (standard units)	Percent sodium	Sodium adsorption ratio (SAR)	Residual sodium carbonate	Temperature (°C)
192	188	27	1.8	8.7	-	543	313	755	7.5	22	1.0	-	-
146	30	9.5	1.2	3.8	-	209	123	369	7.7	28	.9	-	-
148	28	5.8	-	-	-	-	124	313	7.6	-	-	0.00	-
166	292	59	2.0	5.0	-	729	392	1,010	7.9	26	1.4	-	-
160	266	48	-	-	-	-	382	904	7.6	-	-	0.00	18
85	876	1,320	1.6	2.0	-	3,410	1,560	5,180	7.4	45	6.5	-	-
191	68	22	2.6	2.0	-	318	158	513	7.5	41	1.7	-	-
226	133	60	-	-	-	469	253	-	-	-	-	-	-
203	82	27	2.6	1.5	-	370	166	583	7.7	44	2.0	-	-
177	31	25	2.2	1.4	-	233	78	-	7.9	62.70	2.9	1.31	-
176	78	70	-	-	-	379	216	-	7.7	34.30	1.5	0.0	-
170	176	107	1.5	4.0	-	555	330	-	7.6	29.43	1.5	0.0	-
215	193	111	2.5	5.0	-	637	262	-	7.7	51.01	3.3	0.0	-
43	86	100	1.7	0.4	-	326	116	-	7.4	56.38	2.7	0.0	-
189	31	36	2.6	1.3	-	255	85	-	-	61.91	2.9	1.4	-
185	138	90	-	-	-	497	248	-	7.6	40.71	2.1	0.0	-
165	228	121	1.8	16.0	-	671	343	-	7.7	38.59	2.3	0.0	-
160	379	242	1.4	16.0	-	1,069	560	-	7.6	35.69	2.6	0.0	-
145	199	101	1.5	3.0	-	595	310	-	7.7	32.96	1.7	0.0	-
208	2,820	3,120	-	-	-	9,135	3,140	-	7.1	57.52	15.3	0.0	21
120	51	37	-	94	-	-	220	547	6.9	-	-	0.0	21
98	17	15	0.7	26.0	-	188	117	-	7.3	17.17	0.4	0.0	-
262	107	29	-	-	-	-	172	752	7.2	-	-	.85	21
249	860	426	2.8	19.0	-	2,169	650	-	7.6	61.22	8.0	0.0	-
258	636	325	2.4	2.8	-	1,688	658	2,520	7.1	50.47	5.3	0.0	21
260	620	341	2.3	1.5	-	1,674	660	-	7.6	50.47	5.2	0.0	-
261	770	448	2.5	4.7	-	2,061	800	-	8.0	49.91	5.7	0.0	-
216	1,620	1,030	-	-	-	-	1,600	5,740	7.7	-	-	0.0	-
222	1,180	810	2.7	40.0	-	3,196	1,160	-	7.5	54.46	8.1	0.0	-
192	400	175	-	-	-	-	710	1,530	7.3	-	-	-	22
276	189	144	-	-	-	-	510	1,320	7.2	-	-	0.0	-
191	1,800	1,700	-	4.5	-	5,440	1,740	7,930	-	61	-	-	-
226	49	44	-	-	-	-	304	639	7.7	-	-	0.0	22
201	139	143	1.5	41.0	-	655	466	-	7.6	14.05	0.7	0.0	-
150	407	600	-	7.0	-	1,640	-	2,730	-	33.11	3.0	0.0	-
148	436	740	-	-	-	-	1,060	3,060	7.1	-	-	0.0	21
143	520	860	2.1	19.0	-	2,250	1,230	-	7.2	34.92	3.7	0.0	-
191	668	1,300	-	0.4	-	3,141	1,380	5,050	7.4	46.86	6.6	0.0	-
264	65	14	1.5	15	.20	377	212	-	7.7	32	1.4	.08	-
253	63	14	1.7	17.0	-	364	211	-	8.0	30.94	1.2	0.0	-
259	63	15	1.3	14.9	-	370	218	-	7.6	30.37	1.2	0.0	-
178	800	1,280	-	4.5	-	3,317	1,300	5,120	7.3	47.02	6.8	0.0	-
232	2,250	1,680	-	2.9	-	6,004	2,640	-	-	46.16	8.8	0.0	-
210	2,540	3,180	-	-	-	8,867	3,060	-	7.3	57.44	15.0	0.0	-
162	2,230	1,540	-	5.0	-	5,718	2,400	7,700	-	48.00	9.0	0.0	-
256	1,080	280	-	-	-	2,171	970	2,990	-	43.75	4.8	0.0	-
206	1,160	328	1.9	1.5	-	2,350	1,140	-	7.2	37.63	4.1	0.0	-
265	333	250	-	-	-	1,095	322	1,890	-	64.83	6.6	0.0	-
318	145	77	-	-	-	-	250	1,040	7.6	-	-	.21	23
312	910	1,570	-	3.5	-	4,148	858	-	8.0	74.41	17.5	0.0	-
124	54	178	-	-	-	-	296	876	7.5	-	-	0.0	-
264	396	860	-	2.5	.38	2,210	479	3,660	7.7	73	12	0.0	22
232	358	348	1.7	3.5	.32	1,300	368	2,100	7.6	64	7.0	0.0	21
223	704	198	4.0	3.8	-	1,600	344	2,330	7.7	72	-	-	-
216	1,030	410	-	5.6	.56	2,390	542	3,420	7.6	70	11	.00	21
196	2,740	4,250	-	-	.95	10,900	3,580	15,800	7.1	60	18	-	21
149	702	82	-	-	-	-	800	-	7.3	-	-	-	-
-	-	780	-	-	-	-	-	3,360	-	-	-	-	-
193	70	63	-	-	-	357	185	-	7.6	-	-	-	-
168	72	44	2.1	6.0	-	313	187	616	7.7	-	-	-	-
179	78	60	2.3	3.5	-	358	191	-	7.9	-	-	-	-
174	77	81	2.3	5.3	-	399	205	730	7.8	-	-	-	-
185	56	120	-	-	-	415	228	-	7.5	-	-	-	-
179	83	79	2.3	4.0	-	393	218	-	7.4	-	-	-	-
177	83	81	2.2	2.0	-	391	214	-	7.6	-	-	-	-
170	2,220	7,280	-	-	-	15,000	4,110	21,800	7.6	67	26	.00	21

Well index number	Data reference	County	Aquifer unit or formation	Depth of well (ft)	Sampling depth (ft)	Date of collection (m-d-y)	Unit of analysis	Silica as SiO_2	Iron as Fe	Calcium as Ca	Magnesium as Mg	Sodium as Na	Potassium as K
227	W	Ward	ARSA	125	-	12-16-46	mg/L	-	-	-	-	-	-
227	W	Ward	ARSA	125	-	10-19-67	mg/L	19	-	660	198	1,330	21
228	W	Ward	ARSA	95	-	11-15-67	mg/L	21	-	1,010	368	2,050	18
229	W	Ward	ARSA	142	-	11-7-67	mg/L	47	-	335	62	345	6.4
230	W	Ward	ARSA	256	-	8-22-62	mg/L	-	.04	43	23	201*	-
230	W	Ward	ARSA	256	-	11-19-63	mg/L	-	-	46	22	206*	-
230	W	Ward	ARSA	256	-	6-24-64	mg/L	-	-	49	23	214*	-
230	W	Ward	ARSA	256	-	9-17-65	mg/L	-	-	52	22	221*	-
230	W	Ward	ARSA	256	-	8-17-67	mg/L	41	.00	52	23	228	5.8
231	W	Ward	ARSA	210	-	8-11-67	mg/L	43	-	170	83	485	14
232	T,W	Ward	ARSA	98	-	8-22-40	mg/L	-	-	75	26	20*	-
232	T,W	Ward	ARSA	98	-	9-28-67	mg/L	42	-	76	22	32	2.9
232	T	Ward	ARSA	98	-	9-15-74	mg/L	42	-	83	18	32	-
232	T	Ward	ARSA	98	-	7-26-79	mg/L	44	-	78	27	40	-
233	W	Ward	ARSA	147	-	8-22-40	mg/L	-	-	235	47	42*	-
234	W	Ward	ARSA	300	-	11-13-67	mg/L	83	-	600	158	202	25
235	W	Ward	ARSA	425	-	9-26-67	mg/L	38	-	47	23	70	5.7
236	W	Ward	ARSA	365	-	6-7-67	mg/L	-	-	-	-	-	-
237	W	Ward	ARSA	306	-	6-1-66	mg/L	-	.24	69	18	62*	-
237	W	Ward	ARSA	306	-	9-1-67	mg/L	35	.09	70	18	62	3.7
238	W	Ward	ARSA	60	-	4-19-67	mg/L	-	-	-	-	-	-
239	W	Ward	ARSA	60	-	4-20-67	mg/L	-	-	-	-	-	-
240	W	Ward	ARSA	300	-	9-9-49	mg/L	40	-	344	86	777*	-
241	W	Ward	ARSA	97	-	11-9-67	mg/L	36	-	475	174	924	18
242	W	Ward	ARSA	367	-	11-28-39	mg/L	-	-	-	-	-	-
243	W	Ward	ARSA	110	-	6-1-67	mg/L	-	-	-	-	-	-
244	W	Ward	ARSA	330	-	8-28-67	mg/L	-	-	-	-	-	-
245	W	Ward	ARSA	230	-	6-22-67	mg/L	29	.01	70	22	325	5.3
246	W	Ward	ARSA	94	-	5-1-40	mg/L	-	-	95	31	204*	-
246	W	Ward	ARSA	94	-	7-19-67	mg/L	-	-	-	-	-	-
247	W	Ward	ARSA	301	-	8-7-67	mg/L	-	-	-	-	-	-
248	W	Ward	ARSA	62	-	7-20-67	mg/L	-	-	-	-	-	-
249	W	Ward	ARSA	58	-	6-27-40	mg/L	-	-	751	292	1,920*	-
250	W	Ward	ARSA	64	-	4-27-67	mg/L	27	-	800	298	1,920	29
254	T	Pecos	ARSA	774	-	7-23-75	mg/L	27	-	269	56	255	-
255	T	Pecos	ARSA	633	-	12-10-71	mg/L	13	-	108	23	169	-
256	T	Pecos	ARSA	210	-	7-24-75	mg/L	23	-	90	24	62	-
258	T	Pecos	ARSA	568	-	7-24-75	mg/L	37	-	400	52	231	-
258	T	Pecos	ARSA	568	-	7-12-79	mg/L	30	-	197	35	141	-
260	T	Pecos	PECO	494	-	12-10-71	mg/L	31	-	160	35	122	-
260	T	Pecos	PECO	494	-	4-17-75	mg/L	30	-	207	38	118	-
261	T	Pecos	PECO	902	-	7-21-61	mg/L	19	-	182	34	136	-
263	T	Pecos	PECO	464	-	7-24-75	mg/L	20	-	91	18	108	-
264	T	Pecos	PECO	300	-	7-24-75	mg/L	20	-	115	21	67	-
264	T	Pecos	PECO	300	-	7-11-79	mg/L	21	-	109	19	63	-
265	T	Pecos	PECO	500	-	4-8-58	mg/L	33	-	139	33	160	8.6
265	T	Pecos	PECO	500	-	7-21-61	mg/L	31	-	134	31	174	-
266	T	Pecos	PECO	381	-	7-21-61	mg/L	26	-	151	41	219	-
266	T	Pecos	PECO	381	-	1-21-75	mg/L	31	-	264	48	215	-
268	T	Pecos	PECO	140	-	7-1-49	mg/L	34	-	456	276	1,350	-
268	T	Pecos	PECO	140	-	4-15-75	mg/L	28	-	790	402	1,970	-
268	T	Pecos	PECO	140	-	7-13-79	mg/L	31	-	687	433	1,932	41.0
269	P	Pecos	ALVM	448	-	6-27-72	mg/L	31	-	347	67	270*	-
270	P	Pecos	PECO	734	-	6-27-72	mg/L	32	-	236	38	155*	-
271	P	Pecos	ALVM	289	-	6-26-72	mg/L	23	-	92	24	70*	-
272	P	Pecos	ALVM	600	-	6-26-72	mg/L	30	-	218	34	114*	-
273	P	Pecos	ALVM	850	-	6-26-72	mg/L	17	-	86	19	88*	-
274	P	Pecos	ALVM	500	-	6-27-72	mg/L	31	-	156	37	168*	-
275	A	Pecos	PECO	557	-	3-31-56	ppm	19	-	538	98	868	19
280	A	Pecos	PECO	518	-	8-30-57	ppm	12	.00	108	38	182	-
281	T	Pecos	PECO	92	-	8-13-48	mg/L	31	-	858	292	1,480*	-
282	T	Pecos	PECO	61	-	9-27-46	mg/L	-	-	712	406	2,330*	-
282	T	Pecos	PECO	61	-	6-12-47	mg/L	-	-	-	-	-	-
283	A	Pecos	PECO	105	-	10-22-46	ppm	-	-	650	398	2,140*	-
284	A	Pecos	PECO	105	-	6-12-47	ppm	-	-	627	457	2,730*	-
285	A	Pecos	PECO	159	-	11-21-46	ppm	-	-	81	16	40*	-

Bicarbonate as HCO_3	Sulfate as SO_4	Chloride as Cl	Fluoride as F	Nitrate as NO_3	Boron as B	Dissolved solids	Total hardness as $CaCO_3$	Specific conductance (micromhos)	pH (standard units)	Percent sodium	Sodium adsorption ratio (SAR)	Residual sodium carbonate	Temperature (°C)
109	2,420	2,330	-	-	-	-	-	10,300	-	-	-	-	-
192	2,100	2,170	-	-	.52	6,590	2,460	8,980	7.2	54	12	0.0	21
198	2,790	3,820	-	-	.77	10,200	4,030	14,400	7.0	52	14	0.0	21
144	704	720	-	11	-	2,300	1,090	3,270	7.2	41	4.6	0.0	-
240	259	133	4.0	5.0	-	786	201	1,440	-	-	-	-	-
245	254	141	4.9	3.5	-	797	208	1,550	7.9	-	-	-	-
239	267	147	4.3	4.0	-	826	216	1,590	7.9	-	-	-	-
242	269	153	4.0	5.5	-	846	222	1,610	7.9	-	-	-	-
252	274	161	3.9	4.8	.31	918	224	1,430	7.8	68	6.6	0.0	22
252	528	780	-	3.2	.51	2,230	766	3,560	7.4	57	7.6	0.0	21
207	92	46	-	10.0	-	370	294	673	-	12.88	0.5	0.0	-
210	87	46	2.0	15.0	-	428	280	652	8.0	19.69	0.8	0.0	-
206	86	57	2.0	19.0	-	440	283	665	7.5	19.84	0.8	0.0	-
209	98	70	1.7	19.2	-	480	308	687	7.7	22.15	0.9	0.0	-
150	578	99	-	7.7	-	1,080	-	1,530	-	10	-	-	-
125	2,110	207	-	22	-	3,470	2,150	3,580	7.2	17	1.9	0.0	-
188	85	88	2.6	4.9	-	456	212	740	7.5	41	2.1	0.0	21
178	105	69	-	-	-	-	216	717	7.6	-	-	0.0	24
179	145	57	1.7	3.0	-	444	249	852	7.7	-	-	-	-
188	136	60	2.0	3.2	0.11	482	248	753	7.7	35	1.7	0.0	22
-	-	-	-	-	-	-	-	9,520	-	-	-	-	-
220	1,340	1,200	-	-	-	-	1,960	5,700	7.2	-	-	0.0	-
198	1,140	1,100	-	2.5	-	3,590	1,210	5,190	7.1	58	-	-	-
224	1,490	1,600	-	1.0	.48	4,830	1,900	6,590	7.2	51	9.2	0.0	-
-	-	53	-	-	-	-	-	823	-	-	-	-	-
142	452	1,110	-	-	-	-	570	4,390	6.7	-	-	0.0	22
182	500	555	-	-	-	-	705	2,750	7.4	-	-	0.0	22
234	224	398	2.4	3.5	.27	1,190	265	2,020	7.7	72	8.7	0.0	22
199	361	190	-	1.2	-	980	365	1,570	-	55	-	-	-
100	348	860	-	-	-	-	840	3,360	7.0	-	-	0.0	22
224	3,090	7,400	-	-	-	-	3,360	24,100	7.3	-	-	.00	21
17	810	2,160	-	-	-	-	1,030	7,640	7.7	-	-	.00	-
249	2,620	3,060	-	8.0	-	8,780	3,080	12,500	-	58	-	-	-
152	2,640	3,150	-	-	.62	8,940	3,230	12,900	6.8	56	15	-	21
176	780	299	1.3	49.0	-	1,822	900	-	7.5	38.09	3.6	0.0	-
233	336	118	2.0	0.4	-	883	360	-	7.4	50.24	3.8	0.0	-
224	150	71	1.1	9.0	-	540	322	-	7.6	29.43	1.5	0.0	-
157	930	378	1.7	112.0	-	2,218	1,210	-	7.0	29.30	2.8	0.0	-
192	445	216	1.0	40.4	-	1,199	637	-	7.5	32.55	2.4	0.0	-
207	309	218	0.8	12.0	-	989	540	-	7.3	32.82	2.2	0.0	-
176	421	221	1.1	49.0	-	1,171	670	-	7.6	27.61	1.9	0.0	-
208	424	195	1.2	0.2	0.3	1,093	594	-	7.1	33.24	2.4	0.0	-
255	233	61	1.3	10.0	-	667	304	-	7.8	43.82	2.7	0.0	-
232	145	101	1.0	38.0	-	622	374	-	7.2	28.07	1.5	0.0	-
226	154	95	0.8	27.8	-	600	351	-	7.7	28.13	1.4	0.0	-
241	282	252	1.0	0.5	0.2	1,027	482	-	7.5	41.35	3.1	0.0	-
238	276	252	0.9	0.5	-	1,016	462	-	7.0	45.04	3.5	0.0	-
254	370	300	1.2	3.5	-	1,236	545	-	7.0	46.62	4.0	0.0	-
248	454	449	1.4	15.0	-	1,599	860	-	7.5	35.32	3.1	0.0	-
334	1,890	2,100	-	1.2	1.3	6,272	2,270	-	7.4	56.37	12.3	0.0	-
262	2,740	3,330	4.1	136.0	-	9,528	3,630	-	7.3	54.17	14.2	0.0	-
273	2,900	3,200	2.6	115.3	-	9,476	3,500	-	7.5	54.22	14.2	0.0	-
179	920	383	2.1	50.0	-	2,160	1,140	2,630	7.1	-	-	-	-
194	455	305	1.0	18.0	-	1,340	750	1,740	7.0	-	-	-	-
220	171	75	1.0	20.0	-	580	327	867	7.2	-	-	-	-
153	520	146	1.0	80.0	-	1,220	690	1,590	7.3	-	-	-	-
211	174	102	1.0	<0.4	-	590	294	910	7.3	-	-	-	-
232	342	263	1.1	2.5	-	1,120	540	1,620	7.1	-	-	-	-
180	1,840	1,110	-	112	1.6	4,690	1,750	6,200	7.3	52	-	-	21
225	262	248	1.6	7.3	.28	970	426	1,620	7.4	48	-	-	24
205	2,280	2,780	-	-	.97	7,780	3,340	-	-	48	-	-	-
232	3,060	3,650	-	-	-	10,300	3,450	-	-	60	-	-	-
-	-	3,600	-	-	-	-	-	-	-	-	-	-	-
215	3,100	3,200	-	-	-	9,590	3,260	13,700	-	59	-	-	-
270	3,620	3,820	-	5.5	-	11,400	3,440	15,600	-	63	-	-	-
215	99	50	-	6.0	-	400	268	653	-	24	-	-	-

Well index number	Data reference	County	Aquifer unit or formation	Depth of well (ft)	Sampling depth (ft)	Date of collection (m-d-y)	Unit of analysis	Silica as SiO_2	Iron as Fe	Calcium as Ca	Magnesium as Mg	Sodium as Na	Potassium as K
286	A	Pecos	PECO	203	-	6-15-42	mg/L	-	-	51	18	56	-
286	T	Pecos	PECO	203	-	12-14-71	mg/L	29	-	80	12	43	-
286	T	Pecos	PECO	203	-	4-16-75	mg/L	26	-	78	12	43	-
286	T	Pecos	PECO	203	-	7-11-79	mg/L	31	-	76	15	44	-
287	A	Pecos	PECO	70	-	4-10-46	ppm	-	-	362	192	834*	-
288	A	Pecos	PECO	202	-	1-27-59	ppm	17	-	375	150	678	25
289	A	Pecos	PECO	253	-	1-25-47	ppm	-	-	216	61	164*	-
292	T	Pecos	PECO	138	-	4-11-47	mg/L	-	-	198	69	211*	-
293	T	Pecos	PECO	210	-	7-23-75	mg/L	22	-	650	266	680	-
293	T	Pecos	PECO	210	-	5-12-78	mg/L	22	0.1	605	249	582	-
294	T	Pecos	PECO	134	-	8-2-48	mg/L	42	-	143	63	190*	-
295	T	Pecos	PECO	237	-	9-6-40	mg/L	-	-	86	19	41	-
297	T	Pecos	PECO	225	-	6-18-42	mg/L	-	-	83	19	40*	-
297	T	Pecos	PECO	225	-	5-3-73	mg/L	14	-	93	19	54	-
297	T	Pecos	PECO	225	-	7-11-79	mg/L	16	-	103	20	51	-
298	T	Pecos	PECO	501	-	6-7-73	mg/L	15	-	110	31	79	-
300	T	Pecos	PECO	455	-	7-22-75	mg/L	21	-	140	30	62	-
300	T	Pecos	PECO	455	-	7-11-79	mg/L	29	-	130	45	68	-
302	T	Pecos	PECO	401	-	11-23-46	mg/L	-	-	158	45	178	-
302	T	Pecos	PECO	401	-	5-3-73	mg/L	15	-	109	42	227	-
302	T	Pecos	PECO	401	-	7-11-79	mg/L	18	-	129	39	200	9.0
303	T	Pecos	PECO	200	-	5-5-47	mg/L	-	-	360	106	371	-
304	T	Pecos	PECO	194	-	5-5-47	mg/L	-	-	104	23	86	-
304	T	Pecos	PECO	194	-	7-22-75	mg/L	24	-	144	40	206	-
304	T	Pecos	PECO	194	-	7-11-79	mg/L	25	-	179	46	213	9.0
306	T	Pecos	PECO	335	-	7-24-75	mg/L	29	-	429	236	830	-
307	T	Pecos	PECO	260	-	4-16-47	mg/L	-	-	416	144	537	-
307	T	Pecos	PECO	260	-	12-13-71	mg/L	26	-	478	152	640	-
307	T	Pecos	PECO	260	-	4-15-75	mg/L	27	-	490	148	660	-
307	T	Pecos	PECO	260	-	7-12-79	mg/L	30	-	510	148	706	19.0
310	T	Pecos	PECO	642	-	5-3-73	mg/L	21	-	354	132	610	-
310	T	Pecos	PECO	642	-	7-24-75	mg/L	20	-	256	92	388	-
310	T	Pecos	PECO	642	-	7-12-79	mg/L	30	-	317	120	533	20.0
312	T	Pecos	PECO	462	-	12-10-46	mg/L	-	-	162	55	232	-
312	T	Pecos	PECO	462	-	5-2-73	mg/L	10	-	157	55	231	-
312	T	Pecos	PECO	462	-	7-23-75	mg/L	12	-	165	54	225	-
312	T	Pecos	PECO	462	-	7-23-79	mg/L	13	-	165	54	222	-
313	T	Pecos	PECO	425	-	4-23-48	mg/L	24	-	110	74	324	-
313	T	Pecos	PECO	425	-	5-2-73	mg/L	17	-	203	76	282	-
314	A	Pecos	PECO	289	-	8-7-48	ppm	21	-	58	22	23*	-
315	A	Pecos	PECO	90	-	4-23-47	ppm	-	-	222	106	446*	-
317	T	Pecos	PECO	255	-	4-14-75	mg/L	23	-	84	13	15	-
319	T	Pecos	PECO	346	-	4-23-69	mg/L	25	-	255	106	390	-
319	T	Pecos	PECO	346	-	12-14-71	mg/L	23	-	257	101	399	-
319	T	Pecos	PECO	346	-	7-22-75	mg/L	23	-	259	82	361	-
320	T	Pecos	PECO	360	-	5-7-47	mg/L	-	-	48	13	34	-
320	T	Pecos	PECO	360	-	6-6-73	mg/L	21	-	90	15	37	-
321	T	Pecos	PECO	240	-	5-13-47	mg/L	-	-	121	15	19	-
323	T	Pecos	PECO	450	-	4-10-58	mg/L	27	-	145	45	268	15.0
324	T	Pecos	PECO	420	-	7-22-75	mg/L	19	-	225	80	261	-
329	T	Pecos	PECO	520	-	3-21-56	mg/L	21	-	139	44	222	-
329	T	Pecos	PECO	520	-	6-5-73	mg/L	20	-	262	84	289	-
329	T	Pecos	PECO	520	-	1-14-75	mg/L	21	-	245	71	290	-
331	T	Pecos	PECO	400	-	6-4-73	mg/L	13	-	163	55	210	-
331	T	Pecos	PECO	400	-	7-12-79	mg/L	15	-	166	53	199	9.0
332	A	Pecos	PECO	375	-	5-7-47	ppm	-	-	82	15	21*	-
332	T	Pecos	PECO	375	-	6-4-73	mg/L	16	-	74	16	23	-
333	A	Pecos	PECO	278	-	4-15-47	ppm	-	-	60	12	15*	-
334	A	Pecos	PECO	503	-	5-1-47	ppm	-	-	76	18	3.4*	-
335	A	Pecos	PECO	450	-	6-16-42	ppm	-	-	68	14	14*	-
335	A	Pecos	PECO	450	-	11-14-46	ppm	-	-	-	-	-	-
335	T	Pecos	PECO	450	-	6-4-73	mg/L	17	-	44	15	21	-
336	A	Pecos	PECO	340	-	4-4-58	ppm	15	-	154	45	209*	-
337	T	Pecos	PECO	864	-	6-4-73	mg/L	16	-	122	23	55	-
338	T	Pecos	PECO	515	-	6-5-73	mg/L	12	-	70	14	16	-
339	T	Pecos	PECO	585	-	6-4-73	mg/L	16	-	62	17	18	-

Bicarbonate as HCO_3	Sulfate as SO_4	Chloride as Cl	Fluoride as F	Nitrate as NO_3	Boron as B	Dissolved solids	Total hardness as $CaCO_3$	Specific conductance (micromhos)	pH (standard units)	Percent sodium	Sodium adsorption ratio (SAR)	Residual sodium carbonate	Temperature (°C)
140	106	70	-	0.8	-	370	202	-	-	37.70	1.7	0.0	-
210	87	54	1.0	2.5	-	411	250	-	7.5	27.30	1.1	0.0	-
209	91	54	1.1	4.4	-	412	245	-	7.7	27.71	1.1	0.0	-
214	92	56	0.9	1.6	-	421	251	-	7.7	27.57	1.2	0.0	-
304	1,420	1,260	-	1.2	-	4,220	1,690	-	-	52	-	-	-
283	1,300	1,030	-	46	.32	3,760	1,550	5,240	7.2	48	-	-	-
204	581	265	-	.2	-	1,460	790	2,040	-	31	-	-	-
362	412	360	-	4.0	-	1,431	778	-	-	37.11	3.2	-	-
235	1,150	2,030	1.8	61.0	-	4,976	2,710	-	7.4	35.26	5.6	0.0	-
245	1,072	1,680	1.2	53.0	-	4,384	2,534	-	7.6	33.31	5.0	0.0	-
416	330	242	-	2.5	0.3	1,217	616	-	-	40.15	3.3	0.0	-
217	100	86	-	4.2	-	442	282	-	-	23.35	1.0	0.0	-
242	96	52	-	-	-	408	285	-	-	23.37	-	0.0	-
222	156	59	1.0	8.0	-	513	311	-	7.9	27.46	1.3	0.0	-
232	158	64	0.8	20.7	-	547	340	-	7.5	24.64	1.2	0.0	-
218	198	130	1.1	10.0	-	681	403	-	7.5	29.94	1.7	0.0	-
337	188	94	1.5	9.0	-	711	476	-	7.9	22.19	1.2	0.0	-
332	165	126	1.1	22.2	-	749	508	-	7.7	22.50	1.3	0.0	-
270	310	300	-	0.5	-	1,124	580	-	-	40.06	3.2	0.0	-
179	330	323	1.4	0.4	-	1,135	446	-	7.8	52.61	4.6	0.0	-
257	310	294	1.2	0.1	-	1,126	483	-	8.1	46.83	3.9	0.0	-
277	1,070	525	-	75.0	-	2,643	1,330	-	-	37.68	4.4	0.0	-
245	149	127	-	6.7	-	616	354	-	-	34.56	1.9	0.0	-
182	330	324	1.1	2.2	-	1,160	520	-	7.6	46.10	3.9	0.0	-
239	421	360	0.7	4.6	-	1,375	638	-	7.6	41.71	3.6	0.0	-
285	1,860	1,140	4.0	67.0	-	4,735	2,040	-	7.3	46.93	7.9	0.0	-
308	1,380	780	-	10.0	-	3,418	1,630	-	-	41.74	5.7	0.0	-
261	1,450	1,060	2.3	19.0	-	3,955	1,820	-	7.1	43.36	6.5	0.0	-
272	1,420	1,090	2.5	26.0	-	3,997	1,840	-	7.5	43.94	6.7	0.0	-
289	1,512	1,215	1.8	30.4	-	4,314	1,883	-	7.7	44.62	7.0	0.0	-
367	930	1,040	2.3	27.0	-	3,296	1,430	-	7.5	48.19	7.0	0.0	-
338	650	630	1.8	10.0	-	2,213	1,020	-	7.3	45.34	5.2	0.0	-
398	991	829	1.5	37.7	-	3,074	1,287	-	7.6	46.94	6.4	0.0	-
266	416	342	-	-	-	1,337	630	-	-	44.46	4.0	0.0	-
285	400	346	2.2	0.4	-	1,341	620	-	7.9	44.84	4.0	0.0	-
275	375	346	1.8	0.4	-	1,314	630	-	7.9	43.57	3.8	0.0	-
281	413	347	1.5	0.1	-	1,353	635	-	7.9	43.24	3.8	0.0	-
106	512	470	-	1.2	-	1,567	579	-	-	54.90	5.8	0.0	-
300	570	415	2.2	31.0	-	1,743	820	-	7.7	42.82	4.2	0.0	-
238	54	21	-	4.5	0.15	319	235	560	-	17	-	-	-
322	557	790	-	2.5	-	2,280	990	3,600	-	49	-	-	-
265	26	24	0.7	16.0	-	332	264	-	7.7	11.03	0.4	0.0	-
237	720	670	2.0	19.5	-	2,304	1,070	-	7.6	44.17	5.1	0.0	-
239	770	630	2.0	28.0	-	2,327	1,060	-	7.3	45.09	5.3	0.0	-
246	720	570	1.7	21.0	-	2,158	980	-	7.5	44.39	5.0	0.0	-
114	76	52	-	0.8	-	279	173	-	-	29.91	1.1	0.0	-
244	92	52	0.8	0.4	-	428	289	-	7.6	21.94	0.9	0.0	-
322	45	56	-	18.0	-	432	364	-	-	10.20	0.4	0.0	-
267	384	380	-	-	0.3	1,395	547	-	7.5	50.73	4.9	0.0	-
299	600	431	1.9	1.7	-	1,766	890	-	7.5	38.93	3.8	0.0	-
277	259	302	-	0.2	0.2	1,123	528	-	7.6	47.77	4.2	0.0	-
211	720	474	2.4	38.0	-	1,993	1,000	-	7.4	38.61	3.9	0.0	-
223	650	465	2.1	34.0	-	1,887	900	-	7.4	41.11	4.1	0.0	-
249	466	280	2.0	0.4	-	1,311	630	-	7.5	41.91	3.6	-	-
251	488	276	1.5	0.1	-	1,331	632	-	8.0	40.20	3.4	0.0	-
258	45	32	-	10	-	364	266	574	-	15	-	-	-
245	46	31	1.0	11.0	-	338	252	-	7.8	16.65	0.6	0.0	-
212	22	20	-	9.0	-	275	199	425	-	14	-	-	-
234	36	26	-	6.5	-	330	264	508	-	3	-	-	-
234	34	18	-	5.0	-	304	227	-	-	12	-	-	-
250	37	20	-	-	-	-	-	-	-	-	-	-	-
189	30	22	1.5	0.4	-	243	170	-	7.3	21.03	0.6	0.0	-
264	398	278	-	.0	-	1,230	569	1,940	7.8	44	-	-	-
256	138	111	1.0	25.0	-	616	402	-	7.4	23.06	1.1	0.0	-
235	34	21	1.1	7.0	-	290	232	-	7.6	13.03	0.4	0.0	-
242	31	20	0.8	9.0	-	292	227	-	7.5	14.84	0.5	0.0	-

Well index number	Data reference	County	Aquifer unit or formation	Depth of well (ft)	Sampling depth (ft)	Date of collection (m-d-y)	Unit of analysis	Silica as SiO_2	Iron as Fe	Calcium as Ca	Magnesium as Mg	Sodium as Na	Potassium as K
340	T	Pecos	PECO	650	-	6-4-73	mg/L	16	-	60	11	14	-
341	A	Pecos	PECO	172	-	8-11-50	ppm	19	-	39	65	69*	-
342	A	Pecos	PECO	300	-	10-9-58	ppm	16	-	58	12	19*	-
342	T	Pecos	PECO	300	-	5-17-73	mg/L	17	-	69	15	14	-
343	A	Pecos	PECO	525	-	10-9-58	ppm	16	-	58	8.0	12*	-
344	A	Pecos	PECO	175	-	10-9-58	ppm	19	-	23	11	172*	-
345	A	Pecos	PECO	432	-	4-23-47	ppm	-	-	64	22	14*	-
345	T	Pecos	PECO	432	-	5-2-73	mg/L	16	-	62	24	27	-
346	A	Pecos	PECO	210	-	4-29-47	ppm	-	-	62	26	17*	-
346	T	Pecos	PECO	210	-	5-2-73	mg/L	20	-	61	27	21	-
347	T	Pecos	PECO	100	-	7-23-75	mg/L	26	-	57	26	37	-
347	T	Pecos	PECO	100	-	7-24-79	mg/L	24	-	63	30	14	-
348	A	Pecos	PECO	303	-	4-29-47	ppm	-	-	76	23	8.5*	-
349	A	Pecos	PECO	300	-	5-5-56	ppm	43	-	65	8.0	37*	-
350	A	Pecos	PECO	920	-	10-28-58	ppm	8.6	-	56	24	76*	-
351	A	Pecos	PECO	425	-	10-28-58	ppm	18	-	115	37	164*	-
352	BR	Pecos	PECO	87	-	4-1-41	ppm	-	-	844	301	1,740*	-
353	BR	Pecos	PECO	127	-	9-11-48	ppm	29	-	414	261	1,300*	-
354	BR	Pecos	PECO	173	-	9-20-48	ppm	32	-	595	404	2,250*	-
355	BR	Pecos	PECO	170	-	7-9-48	ppm	46	-	612	527	3,220*	-
356	BR	Pecos	PECO	68	-	2-3-47	ppm	-	-	636	232	992*	-
357	BR	Pecos	PECO	160	-	11-26-46	ppm	-	-	120	21	54*	-
358	BR	Pecos	PECO	193	-	11-25-46	ppm	-	-	43	15	44*	-
359	A	Pecos	PECO	203	-	5-11-50	ppm	24	-	139	51	283*	-
360	A	Pecos	PECO	200	-	3-5-56	ppm	44	-	58	5.3	26	3.7
361	S	Crane	ALVM	94	-	11-17-54	ppm	30	-	502	128	139*	-
361	T	Crane	ALVM	-	-	12-9-71	mg/L	26	-	500	143	133	-
363	S	Crane	ALVM	61	-	9-27-54	ppm	68	-	76	29	51*	-
364	T	Crane	ALVM	-	-	8-16-78	mg/L	57	-	80	8	23	-
366	T	Crane	ALVM	-	-	12-9-71	mg/L	57	-	660	58	38	-
366	T	Crane	ALVM	-	-	8-10-78	mg/L	65	-	710	93	54	-
367	T	Crane	ALVM	-	-	9-12-74	mg/L	13	-	970	940	860	-
367	T	Crane	ALVM	-	-	8-10-78	mg/L	62	-	572	182	171	-
368	T	Crane	ALVM	157	-	7-16-74	mg/L	34	-	48	7	7	-
368	T	Crane	ALVM	157	-	8-15-78	mg/L	40	-	102	13	15	-
369	T	Crane	ALVM	-	-	8-16-78	mg/L	64	-	385	105	1,002	-
370	T	Crane	ALVM	234	-	9-12-74	mg/L	21	-	128	33	71	-
371	T	Crane	ALVM	87	-	9-12-74	mg/L	39	-	170	30	124	-
371	T	Crane	ALVM	87	-	8-16-78	mg/L	56	-	143	25	126	-
373	T	Crane	ALVM	32	-	8-10-78	mg/L	42	-	590	552	1,344	-
374	T	Crane	ALVM	60	-	7-16-74	mg/L	65	-	590	88	252	-
377	S	Crane	ALVM	83	-	10-7-54	ppm	58	0.0	100	20	43	4.5
378	S	Crane	ALVM	165	-	11-16-54	ppm	25	.18	54	10	26*	-
379	S	Crane	ALVM	100	-	11-17-54	ppm	79	-	60	11	37*	-
380	S	Crane	ALVM	58	-	10-29-54	ppm	38	-	110	37	132*	-
381	T	Reeves	ALVM	545	-	9-16-74	mg/L	4	-	277	115	1,000	-
382	T	Reeves	ALVM	800	-	9-16-74	mg/L	16	-	475	97	1,270	-
382	T	Reeves	ALVM	800	-	6-28-79	mg/L	32	-	454	107	1,411	-
385	T	Reeves	ALVM	865	-	6-19-75	mg/L	34	-	479	158	580	-
386	O	Reeves	ALVM	-	-	5-16-40	ppm	-	-	658	96	211*	-
387	O	Reeves	ALVM	780	-	6-2-49	ppm	29	-	510	151	445	-
387	T	Reeves	ALVM	780	-	6-28-72	mg/L	30	-	475	171	433	-
387	T	Reeves	ALVM	780	-	6-25-79	mg/L	31	-	493	178	459	-
388	T	Reeves	ALVM	550	-	12-3-70	mg/L	37	-	466	161	520	1.5
389	T	Reeves	ALVM	585	-	8-3-61	mg/L	31	-	128	41	958	-
389	T	Reeves	ALVM	585	-	1-22-75	mg/L	32	-	329	79	680	-
393	T	Reeves	ALVM	650	-	8-4-61	mg/L	29	-	425	112	631	-
394	O	Reeves	ALVM	182	-	4-11-47	ppm	-	-	472	106	380*	-
394	O	Reeves	ALVM	625	-	4-3-50	ppm	32	-	296	105	715*	-
398	T	Reeves	ALVM	800	-	7-27-59	mg/L	38	-	295	38	412	22.0
398	T	Reeves	ALVM	800	-	8-3-61	mg/L	35	-	282	91	395	-
402	O	Reeves	ALVM	545	-	7-27-59	ppm	34	-	358	100	533	20
402	T	Reeves	ALVM	545	-	6-28-72	mg/L	34	-	730	250	880	-
402	T	Reeves	ALVM	545	-	6-19-75	mg/L	32	-	800	242	1,000	-
404	T	Reeves	ALVM	545	-	8-3-61	mg/L	43	-	395	162	851	-
404	T	Reeves	ALVM	545	-	4-25-75	mg/L	44	-	770	309	1,370	-
406	T	Reeves	ALVM	1,055	-	9-17-74	mg/L	32	-	292	99	402	-

Bicarbonate as HCO_3	Sulfate as SO_4	Chloride as Cl	Fluoride as F	Nitrate as NO_3	Boron as B	Dissolved solids	Total hardness as $CaCO_3$	Specific conductance (micromhos)	pH (standard units)	Percent sodium	Sodium adsorption ratio (SAR)	Residual sodium carbonate	Temperature (°C)
218	20	16	0.9	7.0	-	252	196	-	7.6	13.51	0.4	0.0	-
216	177	103	-	9.9	-	608	365	1,090	8.2	29	-	-	-
247	13	13	-	0.5	-	252	194	437	7.9	17	-	-	-
261	16	16	0.4	13.0	-	288	234	-	7.4	11.52	0.3	0.0	-
211	11	10	.5	4.0	-	224	178	384	7.8	13	-	-	-
488	35	26	-	4.2	-	530	102	849	-	78	-	-	-
238	40	28	-	5.0	-	290	250	550	-	10	-	-	-
235	61	39	1.2	4.9	-	350	255	-	8.3	18.81	0.7	-	-
258	38	30	-	6.5	-	342	262	530	-	13	-	-	-
256	32	38	1.2	13.0	-	339	265	-	8.0	14.78	0.5	0.0	-
221	53	63	1.1	4.0	-	375	249	-	7.6	24.41	1.0	0.0	-
279	41	31	1.0	3.9	-	345	280	-	7.5	9.79	0.3	0.0	-
258	56	22	-	1.5	-	342	284	533	-	6	-	-	-
184	52	16	.8	56	-	386	195	545	7.7	29	-	-	-
157	129	97	1.3	.1	-	482	238	794	8.1	41	-	-	-
272	267	205	1.3	1.2	-	970	439	1,500	7.3	45	-	-	-
222	2,730	2,920	-	-	-	8,640	3,340	-	-	-	-	-	-
338	1,800	1,970	-	6.0	-	5,950	2,110	8,690	-	-	-	-	-
209	3,050	3,330	-	-	-	9,760	3,150	13,500	-	-	-	-	-
263	4,290	4,270	-	-	-	13,100	3,690	17,500	-	-	-	-	-
228	1,960	1,750	-	1.0	-	5,680	2,540	8,090	-	-	-	-	-
224	206	70	-	8.4	-	605	386	875	-	-	-	-	-
109	97	52	-	2.0	-	363	169	628	-	-	-	-	-
272	394	352	1.6	.0	-	1,380	556	2,230	7.5	52	-	-	-
218	20	16	-	6.0	11	298	166	441	7.5	25	-	-	-
137	1,800	50	3.2	21	-	2,740	1,780	3,030	7.5	15	-	-	-
142	1,780	68	3.9	26.0	-	2,749	1,840	-	7.3	13.61	1.3	0.0	-
185	114	50	2.4	90	-	598	308	843	7.6	26	-	-	-
149	11	106	1.0	4.4	-	363	231	-	8.2	17.70	0.6	0.0	-
206	1,610	45	2.7	23.0	-	2,594	1,890	-	7.1	4.20	0.3	0.0	-
160	2,002	65	2.4	33.0	-	3,103	2,158	-	7.9	5.17	0.5	0.0	-
88	6,200	1,210	10.0	7.0	-	10,253	6,270	-	6.8	22.93	4.7	0.0	-
125	1,862	322	3.2	10.0	-	3,245	2,179	-	7.8	14.59	1.5	0.0	-
98	10	49	0.6	1.0	-	204	148	-	7.2	9.29	0.2	0.0	-
96	12	175	0.3	2.9	-	407	308	-	7.8	9.57	0.3	0.0	-
190	1,123	1,618	2.3	6.0	-	4,398	1,394	-	7.5	61.01	11.6	0.0	-
167	114	240	3.2	11.0	-	703	453	-	8.0	25.33	1.4	0.0	-
177	320	237	2.4	0.4	-	1,009	550	-	7.8	33.00	2.3	0.0	-
174	227	250	2.2	0.4	-	915	460	-	8.0	37.35	2.5	0.0	-
279	4,200	1,470	6.9	0.4	-	8,342	3,746	-	8.1	43.85	9.5	0.0	-
122	1,510	394	2.8	93.0	-	3,054	1,830	-	7.5	23.01	2.5	0.0	-
163	205	56	1.6	4.2	-	606	332	841	7.4	22	-	-	-
108	110	18	.4	3.8	-	318	176	469	7.7	24	-	-	-
192	23	58	2.8	3.8	-	390	194	562	7.7	29	-	-	-
206	418	72	1.4	4.8	-	937	426	1,330	7.9	-	-	-	-
92	2,260	680	2.8	1.0	-	4,385	1,170	-	7.3	65.13	12.7	0.0	-
79	2,260	1,340	3.3	3.0	-	5,503	1,590	-	7.2	63.55	13.8	0.0	-
102	2,464	1,400	1.5	0.1	-	5,919	1,574	-	7.2	66.11	15.4	0.0	-
127	1,980	670	3.0	0.4	-	3,966	1,850	-	7.1	40.61	5.8	0.0	-
104	1,750	385	-	55	-	3,210	2,040	3,920	-	18	-	0.0	-
164	1,860	558	-	5.2	-	3,640	1,890	4,600	7.3	34	-	-	-
123	1,830	560	2.5	8.0	-	3,569	1,890	-	7.4	33.27	4.3	0.0	-
128	2,016	560	1.6	8.4	-	3,809	1,964	-	8.0	33.72	4.5	0.0	-
123	1,810	660	2.5	0.4	0.6	3,723	1,830	-	7.3	38.24	5.2	0.0	-
138	1,320	760	-	14.0	-	3,319	488	-	-	81.02	18.8	0.0	-
134	1,390	750	2.1	58.0	-	3,385	1,150	-	7.4	56.34	8.7	0.0	-
180	1,570	780	1.8	6.8	-	3,644	1,520	-	7.3	47.43	7.0	0.0	-
148	1,200	750	-	15	-	3,000	1,610	4,160	-	34	-	-	-
138	1,600	670	-	.5	0.74	3,490	1,170	4,630	7.2	57	-	-	-
214	862	630	-	2.2	0.4	2,404	1,080	-	7.4	49.33	5.9	0.0	-
212	782	660	0.9	20.0	-	2,370	1,080	-	7.3	44.35	5.2	0.0	-
223	839	1,010	0.9	62	0.29	3,070	1,300	4,550	6.6	47	-	-	-
211	1,270	2,290	1.5	116.0	-	5,675	2,840	-	7.1	40.18	7.1	0.0	-
209	1,320	2,390	1.5	150.0	-	6,038	2,990	-	7.2	42.10	7.9	0.0	-
278	1,170	1,450	1.5	8.0	-	4,217	1,650	-	6.8	52.84	9.1	0.0	-
256	1,860	2,790	2.1	35.0	-	7,305	3,210	-	7.3	48.28	10.5	0.0	-
189	690	830	1.6	14.0	-	2,453	1,140	-	7.2	43.50	5.1	0.0	-

Table 5.--Analyses of water from selected wells in aquifers in the Cenozoic alluvium--Concluded

Well index num- ber	Data ref- er- ence	County	Aquifer unit or forma- tion	Depth of well (ft)	Sampling depth (ft)	Date of collec- tion (m-d-y)	Unit of analy- sis	Silica as SiO_2	Iron as Fe	Cal- cium as Ca	Mag- ne- sium as Mg	Sodium as Na	Po- tas- sium as K
4D7	T	Reeves	ALVM	1,406	-	8-3-61	mg/L	33	-	248	74	432	-
407	T	Reeves	ALVM	1,406	-	4-18-75	mg/L	30	-	454	133	600	-
408	T	Reeves	ALVM	150	-	4-25-47	mg/L	-	-	284	105	642	-
411	T	Reeves	ALVM	801	-	8-3-61	mg/L	31	-	248	79	452	-
441	T	Culberson	ALVM	200	-	8-20-67	mg/L	20	-	76	30	16	-
442	T	Culberson	ALVM	-	-	8-20-67	mg/L	20	-	69	38	39	-
443	WH	Culberson	ALVM	116	-	2-28-73	mg/L	-	-	300	120	-	-
444	WH	Culberson	ALVM	104	-	3-28-72	mg/L	-	-	250	370	-	-
445	WH	Culberson	ALVM	200	-	5-3-72	mg/L	-	-	280	91	-	-
446	WH	Culberson	ALVM	49	-	3-28-72	mg/L	-	-	220	77	-	-
447	WH	Culberson	ALVM	128	-	6-30-50	mg/L	28	-	602	37	13	-
447	WH	Culberson	ALVM	128	-	5-16-72	mg/L	-	-	-	-	-	-
448	WH	Culberson	ALVM	140	-	4-2-72	mg/L	-	-	620	100	-	-
449	WH	Culberson	ALVM	130	-	6-30-50	mg/L	38	-	552	45	69	-
449	WH	Culberson	ALVM	130	-	5-2-72	mg/L	-	-	-	-	-	-
451	WH	Culberson	ALVM	200	-	7-26-60	mg/L	25	-	270	71	265	-
452	WH	Culberson	ALVM	550	-	4-28-60	mg/L	18	-	175	98	448	22
452	WH	Culberson	ALVM	550	-	6-18-70	mg/L	20	-	373	64	386	-
653	T	Loving	ARSA	262	-	10-21-74	mg/L	34	-	253	89	117	-
654	T	Loving	ARSA	238	-	8-17-78	mg/L	30	-	545	61	1,053	-
655	T	Loving	ARSA	343	-	8-23-78	mg/L	21	-	323	91	162	-
656	T	Loving	ARSA	118	-	10-16-74	mg/L	53	-	178	36	22	-
657	T	Loving	ARSA	173	-	10-16-74	mg/L	44	-	415	122	97	-
659	T	Loving	ARSA	212	-	10-17-74	mg/L	42	-	68	23	41	-
661	0	Reeves	ARSA	200	-	3-13-59	ppm	-	5.2	82	19	60	-
662	0	Reeves	ARSA	230	-	10-13-58	ppm	-	0.8	69	22	79	-
666	0	Reeves	ARSA	398	-	3-6-59	ppm	31	-	170	36	91	6.4
667	0	Reeves	ARSA	120	-	3-30-59	ppm	-	2.1	82	23	60	-
668	0	Reeves	ARSA	200	-	3-19-59	ppm	32	-	182	46	95	6.2
691	T	Winkler	ARSA	128	-	7-15-75	mg/L	44	-	121	36	90	-

Bicarbonate as HCO_3	Sulfate as SO_4	Chloride as Cl	Fluoride as F	Nitrate as NO_3	Boron as B	Dissolved solids	Total hardness as $CaCO_3$	Specific conductance (micromhos)	pH (standard units)	Percent sodium	Sodium adsorption ratio (SAR)	Residual sodium carbonate	Temperature (°C)
208	782	620	1.0	3.2	-	2,295	924	-	6.8	50.44	6.1	0.0	-
214	920	1,250	1.4	93.0	-	3,586	1,680	-	7.1	43.72	6.3	0.0	-
310	968	900	-	7.0	-	3,058	1,140	-	-	55.04	8.2	0.0	-
247	758	660	0.9	2.8	-	2,353	944	-	6.8	51.02	6.4	0.0	-
329	33	20	0.5	17.0	0.2	374	313	-	7.6	10.00	0.3	0.0	-
309	118	18	0.7	17.0	-	471	328	-	7.6	20.52	0.9	0.0	-
194	990	520	-	-	-	-	1,200	3,350	7.6	-	-	.00	20
198	3,100	2,800	-	-	-	-	2,200	12,200	7.4	-	-	.00	19
196	1,000	920	-	-	-	-	1,100	4,650	7.4	-	-	.00	23
292	600	450	-	-	-	-	870	2,790	7.4	-	-	.00	20
91	1,510	12	-	23	-	2,270	1,650	2,440	7.0	2	.1	.00	-
-	1,400	-	-	-	-	-	-	2,320	-	-	-	-	19
124	2,000	320	-	-	-	-	2,000	4,170	7.3	-	-	.00	20
115	1,540	5.5	-	10	-	2,320	1,560	2,440	7.1	9	.8	.00	-
-	1,600	-	-	-	-	-	-	2,440	-	-	-	-	20
208	720	430	-	19	-	1,900	966	2,760	7.2	37	3.7	.00	21
291	698	630	-	1.0	.48	2,230	840	3,470	7.0	53	6.7	.00	-
215	1,010	550	2.3	13	.40	2,520	1,190	3,300	7.2	41	4.9	.00	-
165	920	75	2.0	21.0	-	1,592	1,000	-	7.5	20.33	1.6	-	-
131	1,400	1,686	1.3	0.5	-	4,841	1,613	-	7.2	58.71	11.4	-	-
116	1,323	50	1.0	12.0	-	2,040	1,184	-	7.7	22.99	2.0	-	-
343	260	47	1.5	21.0	-	787	590	-	7.6	7.47	0.3	-	-
96	1,510	50	3.3	54.0	-	2,342	1,540	-	7.4	12.06	1.0	-	-
298	68	26	2.0	7.0	-	423	264	-	8.0	25.23	1.0	-	-
250	115	76	0.6	<5	-	496	285	826	7.0	32	-	-	-
201	185	63	1.5	9	-	499	263	832	7.3	40	-	-	-
251	247	225	0.4	1.2	0.08	931	572	1,530	7.4	25	-	-	-
190	185	66	2.0	0.2	-	429	300	715	7.7	30	-	-	-
182	536	106	-	36	0.51	1,130	643	1,540	7.8	24	-	-	-
231	242	104	1.5	79.0	-	831	452	-	7.7	30.31	1.8	0.0	-

Table 6.--Aquifer-test data for selected wells in the Capitan aquifer

[Well index number: A unique arbitrary number assigned to each well for the purpose of this report only. Data reference: HI-Hiss, 1973; M-Myers, 1969; W-White, 1971. Transmissivity: feet squared per day. Hydraulic conductivity: feet per day. Interval tested: feet below land surface. Pretest water level: feet below land surface. Discharge: gallons per minute. Specific capacity: gallons per minute per foot of drawdown. "R" indicates reported data.]

Well index number	Data ref-er-ence	County	Date of test	Trans-missivity (ft^2/d)	Hydraulic conduc-tivity (ft/d)	Interval tested (ft)	Pretest water level (ft)	Depth of well (ft)	Discharge (g/m)	Specific capacity (g/m/ft)	Total screened footage (ft)	Remarks
599	M	Culberson	10-28-65	16,000	148	492-600	198.6	600	2000	58.3	108	Recovery of pumped well.
610	HI	Eddy	8-12-69	-	2.4	1007-1170	-	2500	85	-	14	Acidized. Recovery test.
611	HI	Eddy	8-9-61	-	16	640-1060	-	-	100	-	-	
634	W	Ward	6-28-57	-	-	-	-	4100	780 flow	10 R	-	
635	W	Ward	6-28-57	-	-	-	-	4100	640 flow	7.3 R	-	
636	W	Ward	6-28-57	-	-	-	-	3700	704 flow	7.3 R		

Table 7.--Aquifer-test data for selected wells in the Rustler Formation

[Well index number: A unique arbitrary number assigned to each well for the purpose of this report only; Data reference: M, Myers, 1969; W, White, 1971; Pretest water level: feet below land surface; Discharge: gallons per minute; Specific capacity: gallons per minute per foot of drawdown; Length of test: hours]

Well index number	Ref-er-ence data	County	Date of test	Pretest water level (ft)	Depth of well (ft)	Discharge (g/m)	Specific capacity (g/m/ft)	Aquifer thick-ness (ft)	Length of test (hrs)	Remarks
543	W	Ward	3-30-51	158.0	965	600	4.7	200	21	Graph; M, pg. 505.
543	W	Ward	3-30-51	-	965	600	5.4	-	4	
545	W	Ward	1-57	-	656	346	8.6	-	5	
550	W	Ward	6-1-67	-	1080	250	1.7	-	-	

Table 8.--Aquifer-test data for selected wells in the Santa Rosa Sandstone

[Well index number: A unique number assigned to each well for the purpose of this report only; Data reference: M, Myers, 1969; Transmissivity: feet squared per day; Hydraulic conductivity: feet per day; Interval tested: feet below land surface; Pretest water level: feet below land surface; Discharge: gallons per minute; Specific capacity: gallons per minute per foot of drawdown]

Well index number	Data ref-er-ence	County	Date of test	Trans-missivity (ft^2/d)	Storage coeffi-cient	Hydraulic conduc-tivity (ft/d)	Interval tested (ft)	Pretest water level (ft)	Depth of well (ft)	Discharge (g/m)	Specific capacity (g/m/ft)	Total screened footage (ft)
696	M	Winkler	8-17-57	1600	-	9.4	230-405	200.77	405	1200	11.2	175
697	M	Winkler	2-24-57	350	.0001	-	-	112.0	219	126	-	-
698	M	Winkler	7-25-57	3200	.0003	10.8	262-559	125.13	559	1875	-	297

Table 9.--Aquifer-test data for selected wells in aquifers in Cenozoic alluvium

[Well index number: A unique arbitrary number assigned to each well for the purpose of this report only. Data reference: M - Myers, 1969; W - White; Aqufer unit: ALVM, Cenozoic alluvium; ARSA, Allurosa aquifer; Transmissivity: feet squared per day; Hydraulic conductivity: feet per day; Interval tested: feet below land surface; Pretest water level: feet below land surface; Discharge: gallons per minute; Specific capacity: gallons per minute per foot of drawdown and "R" indicates data reported; Length of test: hours.]

Well index number	Data reference	County	Aquifer unit	Date of test	Transmissivity (ft^2/d)	Storage coefficient	Hydraulic conductivity (ft/d)	Interval tested (ft)	Pretest water level (ft)
174	M	Winkler	ALVM	3-11-57	3,300	-	41.3	320-400	180.99
182	M	Winkler	ALVM	4-12-57	170	-	1.2	100-240	154.08
196	W	Ward	ARSA	9-23-41	4,300	0.2	294	-	-
203	W	Ward	ARSA	9-12-67	-	-	-	-	-
207	W	Ward	ARSA	10-25-67	-	-	-	-	-
214	W	Ward	ARSA	3-31-65	-	-	-	-	-
215	W	Ward	ARSA	6-22-67	-	-	-	-	-
216	W	Ward	ARSA	8-14-67	610	-	25	-	-
217	W	Ward	-	-	-	-	-	-	-
218	W	Ward	-	-	-	-	-	-	-
218A	W	Ward	ARSA	10-21-67	1,500	-	38	-	-
219	W	Ward	-	-	-	-	-	-	-
220	W	Ward	-	-	-	-	-	-	-
220A	W	Ward	-	-	-	-	-	-	-
221	W	Ward	ARSA	4-27-67	-	-	-	-	-
222	W	Ward	ARSA	2-26-63	-	-	-	-	-
223	W	Ward	ARSA	9-13-67	-	-	-	-	-
224	W	Ward	ARSA	6-7-57	6,700	.0003	190	-	119.43
224	W	Ward	-	-	-	-	-	-	-
225	W	Ward	ARSA	6-8-57	7,500	-	37	-	-
225A	W	Ward	-	-	-	-	-	-	-
225A	W	Ward	ARSA	6-7-57	8,400	.001	-	-	118.10
225A	W	Ward	ARSA	4-14-67	-	-	-	-	-
226	W	Ward	ARSA	1-66	-	-	-	-	-
227	W	Ward	ARSA	10-19-67	-	-	-	-	-
228	W	Ward	ARSA	11-15-67	-	-	-	-	-
229	W	Ward	ARSA	11-7-67	-	-	-	-	-
230	W	Ward	ARSA	8-12-62	6,600	0.2	52	-	-
230	W	Ward	ARSA	5-29-62	-	-	-	-	-
231	W	Ward	ARSA	8-11-67	-	-	-	-	-
234	W	Ward	ARSA	11-13-67	-	-	-	-	-
235	W	Ward	ARSA	12-57	-	-	-	-	-
235	W	Ward	ARSA	9-26-67	-	-	-	-	-
237	W	Ward	ARSA	63	-	-	-	-	-
244	W	Ward	ARSA	1-6-61	-	-	-	-	-
245	W	Ward	ARSA	6-23-67	-	-	-	-	-
393	M	Reeves	ALVM	8-21-59	4,700	-	8.6	100-650	179.0
432	M	Reeves	ALVM	3-7-50	4,200	.0004	83.0	60-131	18.75
433	M	Reeves	ALVM	8-22-59	4,100	-	7.5	475-1,005	360.0
434	M	Reeves	ALVM	9-59	11,500	-	-	300-600	370.0
435	M	Reeves	ALVM	8-14-59	19,000	-	95.9	300-500	287.0
436	M	Reeves	ALVM	8-18-59	5,300	-	7.1	300-1,045	496.0
437	M	Reeves	ALVM	9-10-59	22,000	-	88.2	200-450	259.0
438	M	Reeves	ALVM	8-59	5,100	-	8.0	437-1,080	274
439	M	Reeves	ALVM	9-2-59	4,800	-	12.0	200-600	254.10
440	M	Reeves	ALVM	9-10-59	6,400	-	18.3	250-600	303.0

Depth of well (ft)	Discharge (g/m)	Specific capacity (g/m/ft)	Total screened footage (ft)	Length of test (hrs)	Draw-down(D) or recov-ery(R) (ft)	Remarks
400	1,010	14.7	80	21	-	Recovery of pumped well. Graph: M, Pg 522.
240	100	1.35	140	2	-	Recovery of pumped well. Graph: M, Pg 526.
115	1,300	81	-	300	16 D	
400	500	17	-	9	30 D	
80	1,450	73	-	4	20 D	
176	125	2.3 R	64	8	55 D	
210	710	6.3	160	720	112 D	
220	490	23	180	44	21 D	
-	-	-	40	-	-	81 day interference test. Wells 218,219 and 220 pumped a combined 90 gpm during test. Declines in water levels were measured in wells 217, 218, 218A, 219, and 220A. Graph: W, P. 29.
-	-	-	-	-	-	
91	-	-	61	1,944	-	
-	-	-	347	-	-	
-	-	-	79	-	-	
-	-	-	58	-	-	
62	1,000	50	40	10	20 D	
228	175	1.8 R	-	6	96 D	
225	160	7.6	80	1	21 D	
386	500	-	35	-	-	Graph: M,Pg 504.
386	-	-	35	-	-	24-hour interference test. Well 225 pumped 500 gpm during test. Declines in water levels were measured in wells 224 and 225A. Graph: W, Pg 505.
385	-	-	203	24	-	
392	-	-	80	-	-	
392	500	-	80	-	-	
392	830	24	80	2	35 D	
190	410	9.3	50	21	44 D	
125	940	67	61	14	14 R	
95	1,160	173	60	3	6.7 D	
142	100	7.1	40	2	14 D	
256	1,050	23	125	-	-	3 1/2 hr recovery test. Well pumped 1050 gpm for 4 hours prior to test.
256	766	23 R	125	-	33 D	Pumped 60% of time for 42 days.
210	870	22	-	2,880	39 D	
300	380	24	-	22	16 D	
425	1,000	26 R	200	48	38 D	
425	810	32	200	.5	25 D	
306	1,500	17 R	100	48	90 D	
330	135	3.4 R	71	4	40 D	
230	685	20	130	6	34 D	
650	380	-	550	-	-	Recovery of pumped well. Graph: M, Pg. 426.
250	843	-	51	-	-	Drawdown in observation well. Graph: M, Pg. 422.
1005	880	-	548	-	-	Recovery of pumped well. Graph: M, Pg. 424.
600	940	-	300	-	-	Recovery of pumped well. Graph: M, Pg. 424.
500	1,300	-	200	-	-	Recovery of pumped well. Graph: M, Pg. 425.
1045	618	-	745	-	-	Recovery of pumped well. Graph: M, Pg. 426.
452	920	-	250	-	-	Recovery of pumped well. Graph: M, Pg. 427.
1080	735	-	643	-	-	Recovery of pumped well. Graph: M, Pg. 428
600	830	-	400	-	-	Recovery of pumped well. Graph: M, Pg. 429.
600	1,470	-	350	-	-	Recovery of pumped well. Graph: M, Pg. 429.

Table 10.--Summary of geologic units and water-bearing properties for the Delaware Basin and vicinity

System	Geologic unit	Thickness in feet (county)	General character	Water-bearing properties
Quaternary and Tertiary	Bolson and alluvium	0-250± (Eddy) 0-400 (Lea) 0-1,050 (Ward) 0-1,050 (Winkler) 0-1,150 (Pecos) 0-200 (Crane) 0-1,000 (Loving) 0-1,550 (Reeves) 0-2,400 (Culberson)	Alluvium, bolson deposits and other surficial deposits (especially caliche, gypsite, conglomerates, fluviatile deposits, terrace deposits, windblown sand, and playa deposits, undivided).	The Cenozoic alluvium in southern Eddy and Lea Counties is a principal domestic aquifer but usually yields less than 30 gallons per minute. The Cenozoic alluvium in Ward, Winkler, Pecos, and Crane Counties is a major aquifer, yielding water at a rate of as much as 1,500 gallons per minute. The water is fresh to moderately saline and locally very saline to brine. Alluvium in Loving and Reeves Counties is a major aquifer that yields as much as 1,500 gallons per minute, but the water is generally saline. The Cenozoic bolson fill in Culberson County generally yields from 400 to 1,400 gallons per minute of fresh to slightly saline water in basin areas.
Tertiary	Ogallala Formation	0-300 (Eddy) 0-300 (Lea) (Not found in Texas in the Delaware Basin)	Fluviatile sand, silt, clay, and gravel capped by caliche.	A major water-bearing formation in southern Lea County. It is unsaturated in many localities. The greatest saturated thickness of 30 feet is west of Monument Draw where yields are as much as 30 gallons per minute; the highest yields, 700 gallons per minute, are obtained from wells east of Jal, New Mexico. The aquifer generally yields freshwater.
Tertiary rocks	Igneous undivided	1,000± (Pecos) 1,500-1,700 (Reeves) 0-3,000 (Culberson)	Major rock types include breccias, basalt, trachyte, rhyolite, andesite, latite, tuffs, and sedimentary rocks derived from volcanic fragments. They form extensive surficial flows and deposits in Culberson and Reeves Counties.	Yields about 0.25 gallon per minute of freshwater to springs in Pecos and Reeves Counties. Volcanics are not known to yield water to wells in Pecos and Reeves Counties. Tertiary volcanic rocks may supply as much as 1,200 gallons per minute of freshwater in southern Culberson County, where the average thickness is 1,000 feet; permeable zones are most common in uppermost beds and may include tuff, well-sorted volcanic clastics, weathered zones above and below volcanic flows, and possibly fractured volcanic-flow rocks.

Table 10.--Summary of geologic units and water-bearing properties for the Delaware Basin and vicinity - Continued

System	Geologic unit	Thickness in feet (county)	General character	Water-bearing properties
Cretaceous	Cretaceous rocks undifferentiated	35± (Lea) 0-150 (Winkler) 1,500± (Pecos) 1,500± (Reeves) 0-3,000 (Culberson)	Limestone with argillaceous, cherty or chalky limestone. Calcareous clay, chert, marl and very fine to coarse, poorly to well-cemented sand, and some siltstone, shale and conglomerate. Eroded away throughout much of the northern and western parts of the study area.	In Lea County there may be small localized saturated areas. In northeastern Winkler County, well yields are less than 50 gallons per minute of freshwater. In much of Pecos County, lower Cretaceous rocks and Cenozoic alluvium are called the Pecos aquifer and yield as much as 2,500 gallons per minute of fresh to very saline water. Cretaceous aquifers yield freshwater to some Pecos County municipal wells, and fresh to very saline water to other wells. In Reeves County, Cretaceous rocks yield 400 to 600 gallons per minute of slightly saline water for irrigation and stock. Cretaceous rocks of the Cox Sandstone in southern Culberson County yield about 200 to 900 gallons per minute of fresh to moderately saline water.
Triassic	Triassic rocks	0-1,000 (Eddy) 0-1,570 (Lea) 690-850 (Crane) 0-450 (Loving) 0-420 (Reeves) 0-1,620± (Winkler) 0-1,500± (Ward) 0-1,500 (Pecos) (undivided from Permian red beds)	Shale, sandstone, siltstone, limestone, and gravel. Mostly micaceous shale and siltstone. Includes rocks in the Dockum Group including the Santa Rosa Sandstone.	The Triassic formations in New Mexico yield 0.2 to 100 gallons per minute of fresh to slightly saline water. Sulfate concentrations for water in Lea County often exceed 250 milligrams per liter, the recommended limit for drinking water (U.S. Public Health Service, 1962). In Crane County, Triassic rocks usually contain highly mineralized waters, but in some places yield as much as 40 gallons per minute of fresh to slightly saline water. In Loving and Ward Counties, wells yield fresh to slightly saline water. Triassic formations other than the Santa Rosa Sandstone in Reeves and Winkler Counties are not known to yield water to wells. Triassic formations in Pecos County yield water locally to wells.

Table 10.--Summary of geologic units and water-bearing properties for the Delaware Basin and vicinity - Continued

System	Geologic unit	Thickness in feet (county)	General character	Water-bearing properties
Triassic	Santa Rosa Sandstone	0-300 (Eddy) 140-300 (Lea) 0-350 (Reeves) 0-520 (Ward) (Includes units in the Allurosa aquifer) 0-350 (Winkler) Undivided from Dockum Group in Pecos and Crane Counties Undifferentiated Triassic rocks in Loving County	Bachman (1980) described the Santa Rosa Sandstone equivalent in Eddy and Lea Counties as a coarse, angular, conglomeratic sandstone with thin to thick beds which interfinger locally with shale. In Texas the Santa Rosa Sandstone or its equivalent is mostly a medium-to coarse-grained crossbedded sandstone conglomerate and some clay, claystone, and siltstone.	Stock wells in the eastern and southeastern parts of Eddy County obtain some slightly saline water from sandstones of the Dockum Group. Before 1954, Jal derived its water from the Santa Rosa Sandstone. Wells in Lea County yield as much as 100 gallons per minute of fresh to slightly saline water. The Santa Rosa Sandstone yields some fresh to slightly saline water to wells on a structural high that crosses the western part of Ward County. The Santa Rosa Sandstone forms the basal unit in the Allurosa aquifer, the major aquifer in Ward County, which also includes parts of the Chinle Formation and Cenozoic alluvium. Wells penetrating the Allurosa aquifer yield 10 to 1,500 gallons per minute of freshwater to brine. In Winkler County most wells completed in the Santa Rosa Sandstone yield from 160 to 400 gallons per minute of fresh to slightly saline water for domestic, industrial, irrigation, and stock use. The Santa Rosa Sandstone yields as much as 700 gallons per minute of freshwater to wells in or near the Pecos well field in Reeves County for public and stock use.
Permian	Undifferentiated Permian rocks	7,100[1]-12,100[2] (Eddy[1]) 8,600-12,900[2] (Lea) 8,150±[4, 6] (Ward) 6,200-11,300[3] (Winkler) 11,900-16,750[2] (Pecos) 5,320-5,600[2,6] (Crane) 9,800-15,050[2] (Reeves) 14,300-16,800[2] (Loving) 5,500-9,500[3] (Culberson)	Sandstone, siltstone, shale, gypsum, anhydrite, halite, dolomite, limestone, and potash minerals.	Sandstone, siltstone, and shale are often much less permeable than the evaporites, which often contain solution cavities and fractures that permit rapid movement of water. Yields from different formations range widely. Water quality ranges from fresh to very saline, and sulfate concentrations commonly range from 500 to 2,600 milligrams per liter, which exceed the standard for public water supply of 250 milligrams per liter (U.S. Public Health Service, 1962).

Table 10.--Summary of geologic units and water-bearing properties for the Delaware Basin and vicinity - Continued

System	Geologic unit	Thickness in feet (county)	General character	Water-bearing properties
Permian	Rustler Formation	200-500 (Eddy) 90-360 (Lea) 200-500 (Ward) 300-500 (Winkler) 0-450 (Pecos) 120-300 (Crane) 200-500 (Loving) 0-200 (Culberson)	In New Mexico, the Rustler consists mainly of anhydrite or gypsum, two dolomite beds (Magenta and Culebra Dolomite Members), minor salt, and a basal zone of sand-stone, siltstone, and shale. In Texas, the Rustler is composed of anhydrite, dolomite, and minor limestone and salt, interbedded with some sand and shale.	Water is often saline to brine. The Rustler Formation yields about 10 to 100 gallons per minute of slightly to moderaterly saline water to some stock, irrigation, industrial and domestic wells in Eddy and Lea Counties. Wells yield from 220 to 650 gallons per minute of moderately to very saline water used mostly for enhanced recovery of oil and some irrigation in Ward County. Wells yield very saline water to brine for enhanced recovery of oil in Winkler County. Wells in Pecos County yield as much as 1,500 gallons per minute of moderately saline water to brine used for stock, irrigation, and enhanced recovery of oil. A few wells in Crane County produce slightly to very saline water. Yields of 500 to 1,000 gallons per minute of slightly to moderately saline water in Reeves County are used for irrigation and stock. In Loving County wells yield moderately saline water for stock and industrial use.
Permian	Capitan reef complex (Capitan aquifer)	200-2,300± (Eddy) 500-2,000 (Lea)[7]	The Capitan reef complex consists of the Capitan and Goat Seep Limestones which form reefs along the edge of the Delaware Basin. The basinward edge of the Capitan reef complex is abrupt but the shelfward edge is gradational and cannot be sharply defined.	The Capitan aquifer yields 300 to 1,000 gallons per minute of fresh-water near Carlsbad and saline water east of Carlsbad in Eddy County. The Capitan aquifer in Lea County is a source of highly mineralized water used for enhanced recovery of oil. Wells yield from less than 50 to 1,300 gallons per minute of moderately to very saline water, primarily for enhanced recovery of oil in Ward, Crane, and Upton Counties.

Table 10.--Summary of geologic units and water-bearing properties for the Delaware Basin and vicinity - Concluded

System	Geologic unit	Thickness in feet (county)	General character	Water-bearing properties
Permian	Capitan reef complex (Capitan aquifer) (continued)	100-2,000 (Ward)[7] 100-1,900 (Winkler) 100-1,860 (Pecos) 500-2,000 (Reeves)	The shelfward edge becomes the Artesia Group, which includes in ascending order the Grayburg, Queen, Seven Rivers, Yates, and Tansill Formations. The reef is composed of limestone, dolomite, and minor amounts of sandstone, siltstone, and shale.	The Capitan aquifer is not known to yield water to wells in Winkler or Reeves Counties. In Pecos County, a few wells yield water from the Capitan aquifer that is generally not potable, but may be used to irrigate salt-tolerant crops. The Capitan is absent in Crane and Loving Counties. The Capitan aquifer commonly yields 400 to 1,200 gallons per minute of fresh to slightly saline water in northwestern and southern Culberson County.
Pennsylvanian through Cambrian	Pennsylvanian through Cambrian rocks undivided	Not studied		The Pennsylvanian through Cambrian rocks are not known to be a significant source of water in Eddy, Lea, Ward, Winkler, Crane, Reeves, and Loving Counties. In Pecos County some formations yield water to wells from weathered zones, weathered joints, and fractures near the surface. Some wells in Culberson County yield moderately saline water.
Precambrian	Precambrian rocks undivided	Not studied	Includes feldspathic sandstone and arkose, metasedimentary, metamorphic, and metaigneous rocks undivided.	In southwestern Culberson County, Precambrian rocks yield some freshwater. Permeable zones are probably in the weathered and fractured zones of the Carrizo Mountains. Precambrian rocks are not known to yield water elsewhere in the study area.

1. Roswell Geological Society, 1953.
2. West Texas Geological Society, Stratigraphic Problems Committee, 1962-63.
3. West Texas Geological Society, Stratigraphic Problems Committee, 1949.
4. White, 1971, p. 1.
5. Shafer, 1956, p. 8.
6. Herald, 1957, various pages.
7. Hiss, 1976, figure 11.

Table 11.-- Public water supplies in the Delaware Basin study area.

County/Water supply	Population	Pumpage 4/ in 1980 (acre-feet)	Water source and remarks
Eddy	51,529 1/		(Only a portion of the county is within the Delaware Basin)
Loving	1,160 2/	--	Cenozoic alluvium
Malaga	300 2/	--	Wells owned by city of Loving
Otis	50 2/	--	Cenozoic alluvium
Otis Water User's Co-op	3,500 2/	--	Do
Red Bluff	25 2/	--	Private wells in Cenozoic alluvium and(or) Rustler Formation
Carlsbad	29,500 2/	--	Carlsbad Limestone of the Capitan aquifer
Happy Valley Co-op	775 1/	--	Capitan aquifer and(or) San Andres Limestone
White's City	250 1/	--	Capitan aquifer
Lea	49,893 1/		(Only a portion of the county is within the Delaware Basin)
Jal	2,671 2/	--	Cenozoic alluvium and Ogallala Formation
Bennet	50 2/	--	Wells owned by city of Jal
Ochoa	abandoned 2/		
Oil Center	270 3/	--	Ogallala Formation and Santa Rosa Sandstone
Crane	3,825 1/		
Crane	3,700 1/	905	Cenozoic alluvium
Phillips Petroleum Co. of Crane and Odessa	125 1/	--	Do
Culberson	3,025 1/		
Van Horn	2,900 1/	614	Do
Pecos	12,025 1/		
Imperial	525 1/	57	Do
Iraan	1,375 1/	357	Pecos aquifer
Sheffield	375 1/	55	Do
Fort Stockton	9,000 1/	2,728	Do

Table 11.-- Public water supplies in the Delaware Basin study area - Concluded.

County/Water supply	Population	Pumpage in 1980 (acre-feet)	Water source and remarks
Reeves	16,372 1/		
Pecos	13,582 1/	3,627	Santa Rosa Sandstone
Balmorea	600 1/	0	Surface water
Toyah	310 1/	0	Do
Ward	12,101 1/		
Monahans	9,000 1/	3,127	Santa Rosa Sandstone
Wickett	750 1/	221	Pecos aquifer
Grandfalls	790 1/	25	Do
Barstow	650 1/	193	Water obtained from city of Pecos
Winkler	9,099 1/		
Kermit	7,800 1/	2,396	Santa Rosa Sandstone
Wink	1,200 1/	246	Pecos aquifer

1/ Data from U.S. Environmental Protection Agency Inventory of Public Water Supplies FY 79.

2/ Data from S.E. Galloway, 1980, (New Mexico State Engineer Office, Roswell, New Mexico), memorandum to F.R. Allen on "Population of communities and sources of water used by communities located within the limits of the 'Delaware Structural Basin' in southeastern New Mexico".

3/ Mr. Van Noy, oral commun., June, 1982.

4/ Pumpage data from Texas Department of Water Resources, 1983.

* Table modified from U.S. Environmental Protection Agency Draft #2, 12-22-80, written commun., 1981, and sources 2 and 4 above.

Table 12.--Water-level trends from water-level data for wells in the Delaware Basin

[Well index number: A unique arbitrary number assigned to each well for the purpose of this report only. Formation or aquifer: ALVM, Cenozoic alluvium; ARSA, Allurosa aquifer; CPLM, Capitan aquifer; PECO, Pecos aquifer; RSLR, Rustler Formation; SNRS, Santa Rosa Sandstone. Approximate rate of change: Calculated from the time range indicated. No net change; there may have been water-level fluctuations, but the water level was approximately the same at the beginning and end of the time range.]

Well index number	Formation or aquifer	County	Area	Trend	Approximate rate of change (ft/yr)	Time range	Comments
61	ALVM	Eddy	6 mi SE of Carlsbad	decline	0.9	1/63 - 2/82	
63	ALVM	Eddy	5 mi SSE of Carlsbad	decline	1.3	1/60 - 1/79	
76	ALVM	Eddy	7 mi SSE of Carlsbad	decline	0.3	1/64 - 2/82	
77	ALVM	Eddy	9 mi SE of Carlsbad	decline	3.8	1/74 - 1/79	
78	ALVM	Eddy	9 mi SSE of Carlsbad	decline	4.0	1/74 - 1/79	Fluctuations very similar to well 77.
79	ALVM	Eddy	10 mi SSE of Carlsbad	-	no net change	1/55 - 1/64	
80	ALVM	Eddy	11 mi SSE of Carlsbad	decline	1.8	1/69 - 1/79	
83	ALVM	Eddy	12 mi SE of Carlsbad	-	no net change	1/60 - 1/79	
86	ALVM	Eddy	10 mi SE of Carlsbad	decline	2.2	1/74 - 1/79	
87	ALVM	Eddy	12 mi SE of Carlsbad	decline	2.2	1/74 - 1/79	Heavier summer pumping in recent years.
110	ALVM	Eddy	6 mi SW of Carlsbad caverns	rise	0.2	1/63 - 1/82	
121	ALVM	Eddy	9 mi SSW of Carlsbad caverns	rise	0.6	1/63 - 1/82	
161	ALVM	Loving	2 mi SSW of Mentone	rise	0.3	12/69 - 11/78	
165	ALVM	Winkler	12 mi ENE of Kermit	rise	0.2	12/73 - 11/78	
169	ALVM	Winkler	5 mi NW of Kermit	decline	0.5	11/75 - 10/78	
170	ALVM	Winkler	7 mi N of Kermit	decline	0.4	10/74 - 10/78	
172	ALVM	Winkler	6 mi SE of Kermit	rise	0.2	12/72 - 11/78	
175	ALVM	Winkler	10 mi SSE of Kermit	decline	0.3	12/72 - 11/77	
193	ARSA	Ward	4 mi SE of Grand Falls	decline	0.7	12/74 - 11/78	
196	ARSA	Ward	6 mi NW of Barstow	decline	2.8	11/75 - 11/78	
203	ARSA	Ward	1 mi N of Pyote	decline	0.2	12/69 - 11/78	
211	ARSA	Ward	4 mi SE of Pyote	decline	0.7	1/71 - 11/78	
223	ARSA	Ward	8 mi N of Pyote	decline	0.2	12/63 - 12/68	
254	ALVM	Pecos	3 mi N of Coyanosa	no trend	-	2/69 - 1/79	Fluctuates widely.
255	ALVM	Pecos	3 mi NE of Coyanosa	rise	10.8	1/74 - 1/79	Low in 1/74.
256	ALVM	Pecos	6 mi SW of Coyanosa	rise	4.0	1/76 - 1/79	
267	PECO	Pecos	4 mi SE of Coyanosa	decline	3.2	12/71 - 2/77	
290	PECO	Pecos	1 mi ESE of Girvin	rise	0.5	1/75 - 1/79	Low in 12/72.
292	PECO	Pecos	10 mi SE of Girvin	rise	3.4	2/69 - 1/79	
296	PECO	Pecos	27 mi W of Fort Stockton	decline	0.6	2/69 - 1/78	Steady decline.
301	PECO	Pecos	16 mi W of Fort Stockton	decline	4.0	1/75 - 1/79	High in about 1/75.
307	PECO	Pecos	6 mi N of Fort Stockton	decline	0.6	1/70 - 1/78	Low in 2/77.
308	PECO	Pecos	In Fort Stockton	no trend	-	2/69 - 1/79	Fluctuates widely each year.
310	PECO	Pecos	2 mi NE of Fort Stockton	no trend	-	1/70 - 1/79	Low in 1/78.
312	PECO	Pecos	14 mi E of Fort Stockton	decline	3.5	12/72 - 1/79	High in 12/72.
313	PECO	Pecos	10 mi SSE of Girvin	no trend	-	2/69 - 1/79	
327	PECO	Pecos	7 mi WSW of Fort Stockton	no trend	-	2/69 - 1/79	Low in 12/73.
362	ALVM	Crane	20 mi NW of Crane	no trend	-	12/69 - 11/78	
363	ALVM	Crane	16 mi NW of Crane	decline	0.7	12/71 - 11/78	
367	ALVM	Crane	10 mi N of Crane	decline	1.5	12/71 - 11/76	
392	ALVM	Reeves	6 mi NW of Pecos	rise	4.9	1/74 - 1/79	
396	ALVM	Reeves	3 mi SW of Pecos	no trend	no net change	12/69 - 1/78	
400	ALVM	Reeves	7 mi SW of Pecos	rise	9.1	12/71 - 1/79	
408	ALVM	Reeves	12 mi S of Pecos	decline	5.0	1/75 - 1/79	High in 1/79.
415	ALVM	Reeves	15 mi SSW of Pecos	no trend	-	1/69 - 1/78	
420	ALVM	Reeves	19 mi S of Pecos	decline	16.2	1/75 - 1/79	High in 1/75. Fluctuations similar to well 408.
422	ALVM	Reeves	25 mi S of Pecos	no trend	no net change	1/70 - 1/79	
427	ALVM	Reeves	23 mi S of Pecos	no trend	no net change	1/71 - 2/77	
500	RSLR	Reeves	28 mi S of Pecos	decline	6.8	12/70 - 1/79	
516	RSLR	Crane	11 mi SW of Crane	rise	8.2	12/74 - 11/78	
540	RSLR	Pecos	11 mi SW of Fort Stockton	rise	3.7	12/72 - 1/79	
574	RSLR	Eddy	23 mi ESE of Carlsbad	rise	0.2	4/59 - 1/77	
601	CPLM	Culberson	9 mi SSW of Signal Peak	decline	1.7	2/73 - 1/78	
609	CPLM	Eddy	2 mi NNW of Carlsbad	no trend	no net change	1/63 - 12/79	
610	CPLM	Eddy	7 mi N of Carlsbad	no trend	no net change	1/67 - 10/78	Fluctuations very similar to well 609.
611	CPLM	Eddy	7 mi ENE of Carlsbad	no trend	no net change	1/63 - 10/79	Fluctuations very similar to well 609.
612	CPLM	Eddy	2 mi W of Carlsbad	no trend	no net change	3/60 - 1/79	
613	CPLM	Eddy	3 mi S of Carlsbad	decline	4.5	1/45 - 1/53	
614	CPLM	Eddy	11 mi SW of Carlsbad	no trend	no net change	1/64 - 12/79	Fluctuations very similar to well 609.
616	CPLM	Lea	46 mi E of Carlsbad	rise	9.7	1/77 - 12/79	Low in 1976.
617	CPLM	Lea	52 mi ESE of Carlsbad	rise	10.2	1/76 - 12/79	Fluctuations very similar to well 616.
618	CPLM	Lea	57 mi ESE of Carlsbad	rise	5.3	1/77 - 12/79	Fluctuations very similar to well 616.
619	CPLM	Lea	61 mi ESE of Carlsbad	rise	9.6	1/75 - 12/79	Fluctuations very similar to well 616.
665	SNRS	Reeves	14 mi SE of Pecos	decline	0.6	1/56 - 2/59	
672	SNRS	Reeves	21 mi SSE of Pecos	no trend	no net change	2/69 - 1/78	High in 12/72.
673	SNRS	Reeves	23 mi SE of Pecos	rise	1.5	12/72 - 1/79	
678	SNRS	Ward	6 mi SW of Monahans	decline	1.9	1/71 - 11/78	
687	SNRS	Winkler	1 mi NE of Kermit	decline	1.7	12/62 - 11/78	

Table 13.-- Ground-water pumpage in 1980 from the Capitan aquifer, Rustler Formation, Santa Rosa Sandstone, and aquifers in Cenozoic alluvium in the Delaware Basin and vicinity in Texas. [a]

[Values are approximate, in acre-feet. Modified from: Texas Department of Water Resources, written commun., 1983.]

Aquifer/County	Municipal	Industrial	Livestock	Irrigation	Mining	Total
Capitan						
Culberson	0	0	0	1,800	0	1,800
Rustler						
Culberson	0	0	58	0	0	58
Reeves	0	0	139	0	0	139
Total	0	0	197	0	0	197
Santa Rosa						
Loving	0	0	11	0	0	11
Reeves	531	0	0	0	0	531
Ward	6,280	3,700	0	600	10,000	20,580
Winkler	2,710	0	0	1,500	499	4,709
Total	9,521	3,700	11	2,100	10,499	25,831
Cenozoic alluvium [b]						
Crane	1,020	0	75	0	1,990	3,085
Culberson	644	6	200	58,200	0	59,050
Loving	10	0	39	0	0	49
Pecos	87	0	0	50,000	0	50,087
Reeves	0	0	800	107,000	0	107,800
Ward	9,300	3,730 [c]	97	600	11,200	24,927
Winkler	332	10	127	3,000	500	3,969
Total	11,393	3,746	1,338	218,800	13,690	248,967

[a] May not include every county for each aquifer.
[b] Includes Pecos aquifer.
[c] Includes use for steam-electric power generation.

Table 14.--Average dissolved-solids concentrations of samples of Pecos River water, Carlsbad, New Mexico, to Girvin, Texas, for water year October 1979 to September 1980

[Data from U.S. Geological Survey, 1981]

Average dissolved-solids concentration (mean) (milligrams per liter)	Location of samples
2,393	Pecos River at Carlsbad, Eddy County, New Mexico
3,789	Pecos River 3.1 miles southeast of Malaga, Eddy County, New Mexico
8,569	Pecos River at Pierce Canyon Crossing, 6.0 miles southeast of Malaga, Eddy County, New Mexico
8,973	Pecos River at Red Bluff, Eddy County, New Mexico
10,690	Pecos River 5.9 miles northeast of Orla, Reeves County, Texas
13,772	Pecos River 3.8 miles northwest of Girvin, Pecos County, Texas

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