CAFB PFAS
Curry County
water Supply
2/20/19

Curry County lies within the Southern High Plains, a subdivision of the Great Plains physiographic province. In New Mexico, the Southern High Plains aquifer is part of a larger aquifer system that extends from South Dakota to Texas known as the Ogallala aquifer. This is the only source of water in the region. The Ogallala aquifer in New Mexico is composed of hydraulically connected geologic units of late Tertiary or Quaternary age and is underlain by rocks of Triassic, Jurassic, and Cretaceous age. The San Andreas Formation, the Artesia Group, the Dockum Group which is comprised of the Santa Rosa Sandstone, Chinle Formation, and the Redondo Formation, the Southern High Plains Aquifer (also known as the Ogallala Aquifer), and the Blackwater Draw Formation form the lithology of the region.

The Ogallala Formation and its caprock of caliche is largely covered by Quaternary deposits of sand, silt, and minor gravel deposited by eolian and alluvial processes, which are named the Blackwater Draw formation. This unit averages 10–30 ft thick, but locally can be as much as 80 feet thick. Younger Quaternary dunes and sand hills sit atop the Blackwater Draw and Ogallala Formations in the Portales Valley.

The Ogallala Formation is an unconfined aquifer and lies unconformably atop the upper unit of the eastward-dipping Chinle Formation. The Ogallala Formation consists of eolian sand and silt and fluvial and lacustrine sand, silt, clay, and gravel and can range in thickness from 30 to 600 feet in eastern New Mexico. Drilling logs indicate the top of the unconfined aquifer is typically between 80 to 150 feet below land surface with aquifer thickness from 5 to 40 feet. The aquifer is typically underlain by a clay layer, which is the top of the Chinle Formation and consists of low permeability redbeds known as the Redonda Formation. Groundwater analyses indicate that there may be some mixing of groundwater and a possible connection between the Ogallala Formation and the deeper, confined aquifer of the Chinle Formation or they may have similar recharge areas.

The Triassic Chinle Group consists of gravel, sandstone, siltstone, mudstone, shale, and conglomerate and ranges in thickness from 0 to 400 feet in eastern New Mexico. The Chinle Formation has informally been divided into upper and lower units. The low permeability horizons limit vertical groundwater movement making the more permeable sandstones act as confined or semi-confined hydrologic units. Groundwater located in the sandstone and conglomerate units is re-coverable with the highest yields coming from the coarsest grained deposits located at the middle and base of the group. Typically, the water-bearing sandstones are locally referred to as the Santa Rosa Aquifer. The most permeable units of interest to both oil and gas as well as water resource potential are the dominant sandstone of the Cuervo member of the Chinle Formation and the dominant sandstones of the upper and lower units of the Santa Rosa Sandstone. The upper and lower units of the Santa Rosa are separated by a generally low permeability red mudstone unit. The water quality in the aquifer is generally poor—with freshwater in outcrop areas in the east and brine in the western subsurface portions of the aquifer—and the water is very hard. Saltwater found in the upper Chinle Formation aquifer likely originates in the adjacent Pecos River Basin and crosses beneath or possibly through the hydrologic divide of the Western Caprock Escarpment. The Dockum formation does not contribute significant water to the Ogallala Formation Aquifer; where upward leakage from bedrock into the Ogallala Formation Aquifer does occur, the water is mineralized and of poor quality. Water encountered in a test well drilled to 1,660 ft in Triassic bedrock between Clovis

and Portales had extremely high total dissolved solids and was unsuitable for municipal supply. There is very little information regarding groundwater from the Dockum in New Mexico; however, groundwater from the Dockum in Texas is generally of poor quality. Water quality is relatively fresh in the outcrop areas, where total dissolved solids (TDS) are generally less than 1,000 milligrams per liter [mg/L], it is moderately saline (TDS between 3,000 and 10,000 mg/L) over most of the confined parts of the aquifer, and becomes brine with TDS concentrations exceeding 60,000 mg/L in the deepest parts of the confined aquifer. Deep pumping depths, poor water quality, low yields, and declining water levels have generally discouraged its use except locally. In 2010, a 1,790 ft deep exploratory well was drilled into the Dockum by New Mexico-American Water (NMAW), now operating as EPCOR Water. EPCOR is a private company that provides municipal water for the City of Clovis. The well was located southeast of Clovis in NE ¼ of Section 22, T1N R36E, in Roosevelt County just south of the Roosevelt – Curry County line. The well was drilled through the lower sandstone unit of the Santa Rosa Sandstone at the base of the Dockum Group. The top of the Triassic redbeds of the Dockum Group was encountered at a depth of 340 ft and the Dockum Group was found to be about 1,360 ft thick. The well was drilled under artesian specifications, indicating that confined aquifers were expected to be penetrated. The three most promising water-bearing zones of the Dockum were individually tested. The estimated combined yield of all three test zones was 165 gpm; however, the water quality was poor, ranging from saline to brine and would have to be treated.

The Permian age Artesia Group immediately underlies the Dockum Group and separates the Dockum Group from the Permian age San Andres Formation. The Artesia Group of formations consists of low permeability red mudstone, fine-grained sandstone and anhydrite, and has little water supply potential. The San Andres Formation immediately underlies the Artesia Group. It is up to 1,200 feet thick and consists of Permian age limestone with beds of dolomite, fine to medium grained sandstone, mudstone, gypsum, anhydrite, and salt. The limestone, dolomite, and sandstone strata of the San Andres have the potential to be more permeable than the strata of the Artesia Group. The San Andres is buried at a depth of about 2,500 feet beneath the ground surface. At such depths and without the driving forces of significant surface topography, groundwater movement is likely to be very slow resulting in only minor dissolution and high TDS. The most permeable parts of the formation are likely to be fracture zones possibly enhanced by minor dissolution. The fracture zones may also be clay-filled, limiting their permeability. The San Andres' location below the low permeability units of the Artesia Group further restrict groundwater movement. Beneath the San Andres is a series of sedimentary shales, limestones, conglomerates, and sandstones. The granitic basement rocks are encountered at a depth of about 7,000 feet.

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