

Figure 32. Extent of the Queen City-Bigford aquifer and El Pico confining unit outcrops, subsurface extent of the Queen City-Bigford aquifer and El Pico confining unit, and depth of water level in wells completed in the El Pico confining unit, 1996.

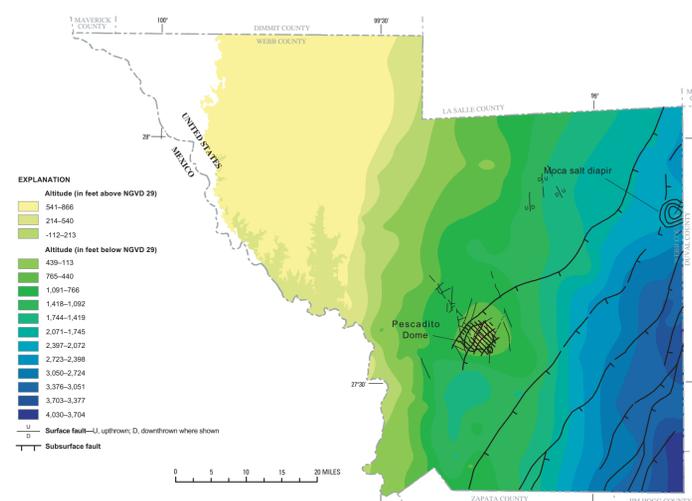


Figure 33. Altitude of the top of the El Pico confining unit.

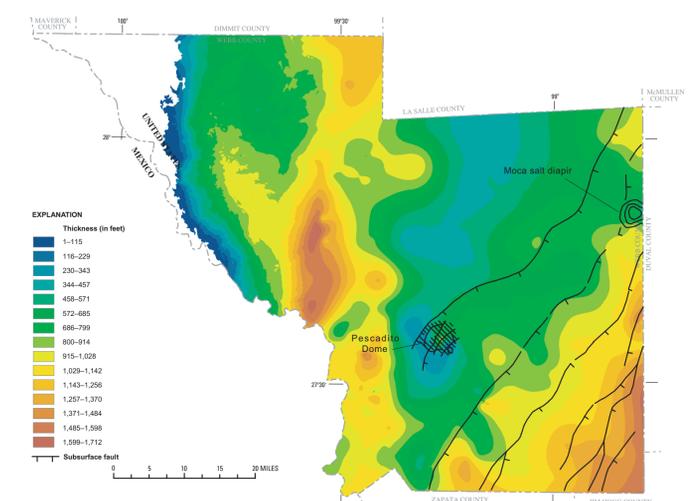


Figure 34. Thickness of the El Pico confining unit.

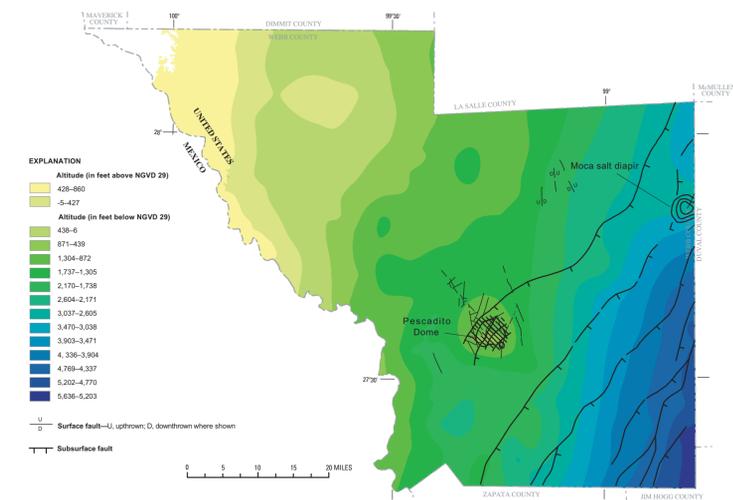


Figure 35. Altitude of the top of the Queen City-Bigford aquifer.

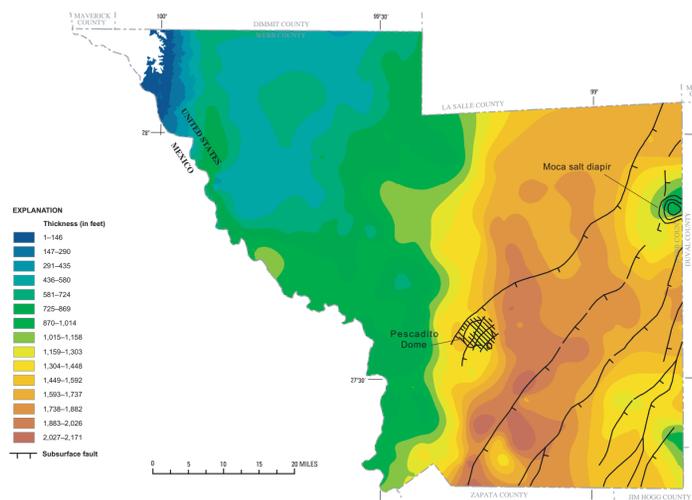


Figure 36. Thickness of the Queen City-Bigford aquifer.

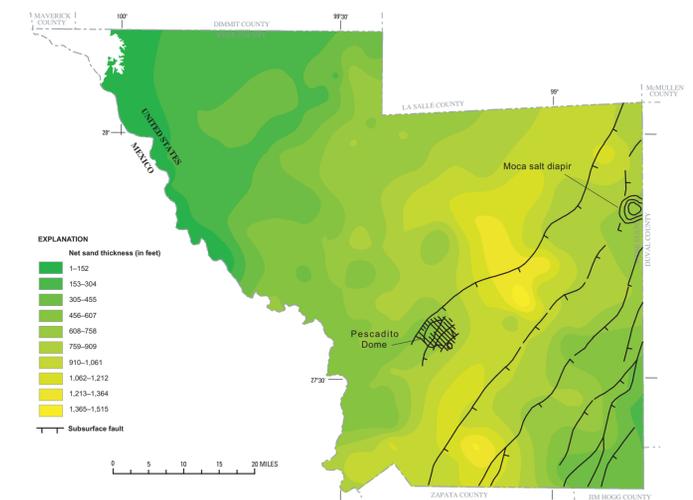


Figure 37. Net sand thickness of the Queen City-Bigford aquifer.

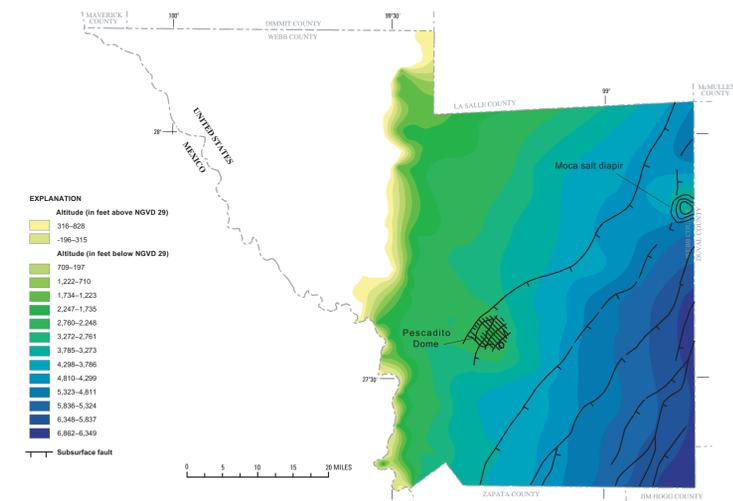


Figure 38. Altitude of the top of the Reklaw confining unit.

El Pico Confining Unit, Queen City-Bigford Aquifer, and Reklaw Confining Unit

The El Pico confining unit, composed of a thick sequence of shales, shaley sands, and coals, separates the Laredo aquifer from the Queen City-Bigford aquifer in Webb County (table 1). In northwestern Webb County, the lower part of the El Pico confining unit consists primarily of clays interbedded with thin lenses of sandstone and lignite that grade into interbedded sandstones as distance downdip increases (Lonsdale and Day, 1937). The basal part of the unit becomes sandy enough downdip to be considered part of the Queen City-Bigford aquifer (fig. 6, where the El Pico Clay transitions into the Queen City Sand). The outcrop of the El Pico confining unit (fig. 32) trends north-south in the county and covers about 700 mi². The average dip of the unit in the county is about 59 ft/mi, and the altitude of the top ranges from about 870 ft above NGVD 29 in the outcrop to about 4,030 ft below NGVD 29 in southeastern Webb County (fig. 33). The El Pico confining unit differs in thickness across the county, ranging from less than 1 ft along the western edge of the outcrop to more than 1,710 ft in southeastern Webb County (fig. 34).

To the west of the El Pico confining unit outcrop is the Queen City-Bigford aquifer outcrop, which covers about 140 mi² (fig. 32). The outcrop of the Queen City-Bigford aquifer is coincident with the outcrop of the Bigford Formation, as the Queen City Sand, the other component of the aquifer, does not crop out in Webb County. The Queen City-Bigford aquifer is composed of repetitive sequences of thick, massive sandstones of the Queen City Sand and the Bigford Formation that are stacked one on top of the other. The altitude of the top of the Queen City-Bigford aquifer ranges from about 860 ft above NGVD 29 in northwestern Webb County to more than 5,630 ft below NGVD 29 in southeastern Webb County (fig. 35). The top of the aquifer in the area around the Pescadito Dome (figs. 5, 35) is influenced by the structure of the dome. The Queen City-Bigford aquifer generally thickens downdip, ranging from less than 1 ft along the western edge of the outcrop to about 2,170 ft in the eastern part of the county (fig. 36). The greatest thickness of the Queen City-Bigford aquifer occurs along a north-south trend in eastern Webb County, paralleling the depositional strike of the rocks that form the aquifer. Similar to the trend in thickness, the greatest net sand thickness follows a generally north-south trend in eastern Webb County, ranging from about 1 to more than 1,510 ft (fig. 37).

Recharge to the Queen City-Bigford aquifer probably occurs mainly by infiltration of precipitation on the outcrops of the El Pico confining unit and Bigford Formation. The amount of recharge to the aquifer through infiltration on the outcrop of the El Pico confining unit probably is less than that on the outcrop of the Bigford Formation because of the relatively greater amount of flow-impeding shale and clay in the confining unit. According to Lonsdale and Day (1937), the El Pico confining unit yields small amounts water (table 1), which might indicate that the unit has some permeability despite its classification as a confining unit. If the effective recharge on the outcrop of the Bigford Formation is assumed to be 5 percent of the average annual rainfall of 20.1 in., and the effective recharge on the outcrop of the El Pico confining unit is one-half that rate, about 45,000 acre-ft/yr of recharge would enter the aquifer in its outcrop.

Once in the saturated zone, water in the Queen City-Bigford aquifer probably moves to the east, following the downdip trend of the component formations. No water-level measurements in wells open to the Queen City-Bigford aquifer were available; however, water-level measurements were available from six wells in the outcrop and shallow subcrop of the El Pico confining unit. The depth to water in those wells ranged from about 125 to 268 ft below land surface (fig. 32). No wells open to the Queen City-Bigford aquifer had data from which to compute specific capacity and transmissivity, and no suitable wells for water-quality sampling were available.

At the base of the Queen City-Bigford aquifer in central and eastern Webb County is the Reklaw confining unit, a marine shale that is equivalent to the basal part of the Bigford Formation (fig. 6; table 1). The Reklaw confining unit, which does not crop out in Webb County, separates the Queen City-Bigford aquifer from the underlying Carrizo aquifer. The top of the Reklaw confining unit ranges from about 830 ft above NGVD 29 in western Webb County to more than 6,860 ft below NGVD 29 in southeastern Webb County (fig. 38). The Reklaw confining unit thickens in the subsurface toward the southeast in Webb County, ranging from about 1 to about 1,050 ft (fig. 39).

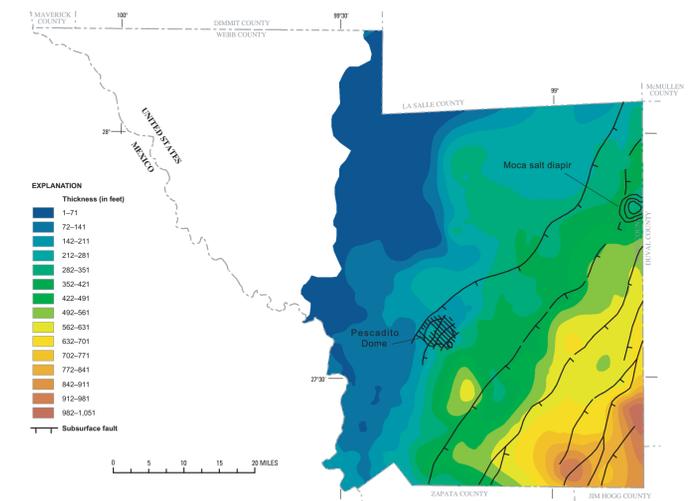


Figure 39. Thickness of the Reklaw confining unit.