

Fort Bend County is underlain by a thick section of unconsolidated lenticular deposits of sand and clay. The deposits include the principal aquifers in the county—the Evangeline aquifer and the overlying Chicot aquifer. Within these aquifers, the interbedded sands and clays are saturated with water almost to the land surface. The sand layers generally are connected laterally, but the clays retard the vertical movement of water, creating confined (artesian) conditions within the aquifer. The sands are fine to medium grained, and the combined layers yield large quantities of water. The clays are principally montmorillonite, the most compressible of the clay minerals.

LAND-SURFACE SUBSIDENCE

Subsidence of the land surface is the consequence of a load being applied to a compressible material. The load, or stress, causing subsidence in Fort Bend County is equal to the decline in artesian pressure (decline in water level times the specific weight of water) caused by groundwater withdrawal. The clay layers are the compressible material.

Average withdrawal of ground water in Fort Bend County during 1986 was about 53 million gallons per day (Gibbs, 1986, p. 10). Larger amounts of ground water have been withdrawn in adjacent Harris and Waller Counties, but since 1977, withdrawals in the three-county area have declined. Maximum ground-water withdrawals in Fort Bend, Harris, and Waller Counties between 1943 and 1977 occurred during 1974 when pumpage was about 506 million gallons per day (Gibbrysch, 1980, p. 21). Subsidence resulted from the ground-water withdrawals in these counties. In Fort Bend County, the largest declines (and the largest load on the clay layers) have been in the eastern part of the county, adjacent to Harris County.

The land-surface subsidence maps (figs. 1 and 2) are based on differences in elevations of bench marks (permanent reference marks), which were determined by conventional surveying methods. Levels to determine elevations were run in 1943, 1973, and 1987 by the National Geodetic Survey and its predecessor agency, the U.S. Coast and Geodetic Survey. Results of the surveys indicate that the maximum subsidence of the land surface in Fort Bend County during 1943–87 was in the far eastern part (adjacent to Harris County), where about 4 feet of subsidence occurred. About 2 of the 4 feet of subsidence occurred during 1973–87. During 1943–87, the land in the far western part of Fort Bend County subsided less than 0.5 foot. Less than 0.25 foot of subsidence was measured in the same region during 1973–87.

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EXPLANATION

— — 0.5 — — **Line of equal land-surface subsidence—Interval 0.5 foot. Datum is land surface**

— — — — — Boundary of study area

- **Data point**—Benchmark where subsidence measured

Figure 1. Map showing approximate land-surface subsidence in Fort Bend County, 1943–87.

APPROXIMATE LAND-SURFACE SUBSIDENCE IN FORT BEND COUNTY,
TEXAS, 1943-87 AND 1973-87

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