

## *Facts about Land Subsidence*

### *What is land subsidence?*

Land subsidence is sinking of the land surface. The elevation of the land surface is lowered by compressing the many layers of clay beneath the land surface. In the greater Houston area, land subsidence is caused by the withdrawal of groundwater. When we pump large amounts of groundwater from the aquifers beneath us, we pull water out of the many layers of clay, which allows the clay to compact under the weight of everything above them. In other parts of the world, other things can cause subsidence besides the pumping of groundwater, such as oil and gas withdrawals and even coal mining. Some natural land subsidence occurs over long periods of time, due to the natural settling of sediments left over from millions of years ago, but nothing compared to the rates of subsidence caused by us.



### *What harm is there in subsidence?*

In the low elevation areas, generally nearest the coast, land subsidence from 1906 to current of as much as 10 feet has been recorded ([Map of Subsidence 1906-2000](#)). When the elevation of your house is only 10 feet above sea-level and you lose 10 feet of elevation because of subsidence, your house is now under water. The



Brownwood Subdivision in the City of Baytown is a perfect example of the effects of subsidence in coastal areas. Brownwood is now mostly underwater and has been turned into a nature center by the City of Baytown. Further inland, subsidence is not as evident because the relationship to sea-level is not as apparent, but still of great concern. The land surface of the greater Houston area is very flat and therefore prone to flooding. We also get a lot of rain in the average year, and sometimes a lot of rain when a tropical storm or hurricane moves through. Flooding has always been a major issue in the area. By continuing to over pump groundwater, we potentially change drainage patterns of creeks and bayous, increasing flow into some areas and decreasing flow out of those areas. From 1978 to 2000, as much as 5 feet of subsidence has been measured in northwest Harris County ([Map of Subsidence 1978-2000](#)).

### *How can subsidence be stopped?*

Very simply put, subsidence will be stopped when we quit pumping too much groundwater. However, the conversion from groundwater to alternative sources of water (surface water, treated effluent, etc.) is not as simple. Many of the cities, industries, and others in the coastal areas converted years ago to surface water, at considerable costs. The area has considerable supplies of surface water, through the development of Lake Livingston on the Trinity River, Lake Houston and Lake Conroe on the San Jacinto River, and the Brazos River.

Author: [Tom Michel](#)

Courtesy of Harris Galveston Subsidence District.