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A Summary of Land-surface Subsidence in the Houston-Galveston Region, Texas

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Land-surface subsidence, resulting from the lowering of water levels that commonly accompanies ground-water development, has occurred in many places in the world. One of the places where subsidence has been critical is the Houston-Galveston region of Texas. Because of subsidence, the low-lying areas near Galveston Bay and the Gulf of Mexico have been further subjected to inundation by tidal water; some land is submerged by normal tides, and much more land is subjected to inundation during unusual tidal events caused by storms and hurricanes. Also, some evacuation routes would be inundated by high tides long before a hurricane would make landfall.

The Goose Creek oil field, the site of the first subsidence caused by fluid withdrawal described in the literature, is located in

Baytown. The field was drilled in 1917, and by 1925 up to 3 feet of subsidence was measured. Much of the oil field became submerged by water from Galveston Bay as result of the subsidence, and the state of Texas, which owns submerged land, claimed title to the oil field. The courts were convinced by evidence presented that the human activity of withdrawing oil, gas, water, and sand had caused the subsidence and ruled in favor of the defendants.

The most recent data on subsidence in the region was collected in 1987. Between 1906 and 1987, about 3,640 square miles of land surface had subsided more than 1 foot. The maximum subsidence to 1987 was 10 feet.

The Harris-Galveston Coastal Subsidence

District, created in 1975, is currently measuring subsidence with a network of benchmarks established in 1987 for use with global positioning systems (GPS). ■

Robert K. Gabrysch graduated from the University of Texas in 1956 with a degree in Civil Engineering, and began working for the Groundwater Branch of the U.S. Geological Survey that same year. Except for two years of military service, he worked for the USGS until his retirement in October 1993. All of his work for the Survey has been in water resources investigations in various regions of Texas. He has over 45 publications dealing with groundwater in the coastal region, groundwater hydraulics, and land-surface subsidence. He has provided consulting services to the Subsidence District since August 1994.