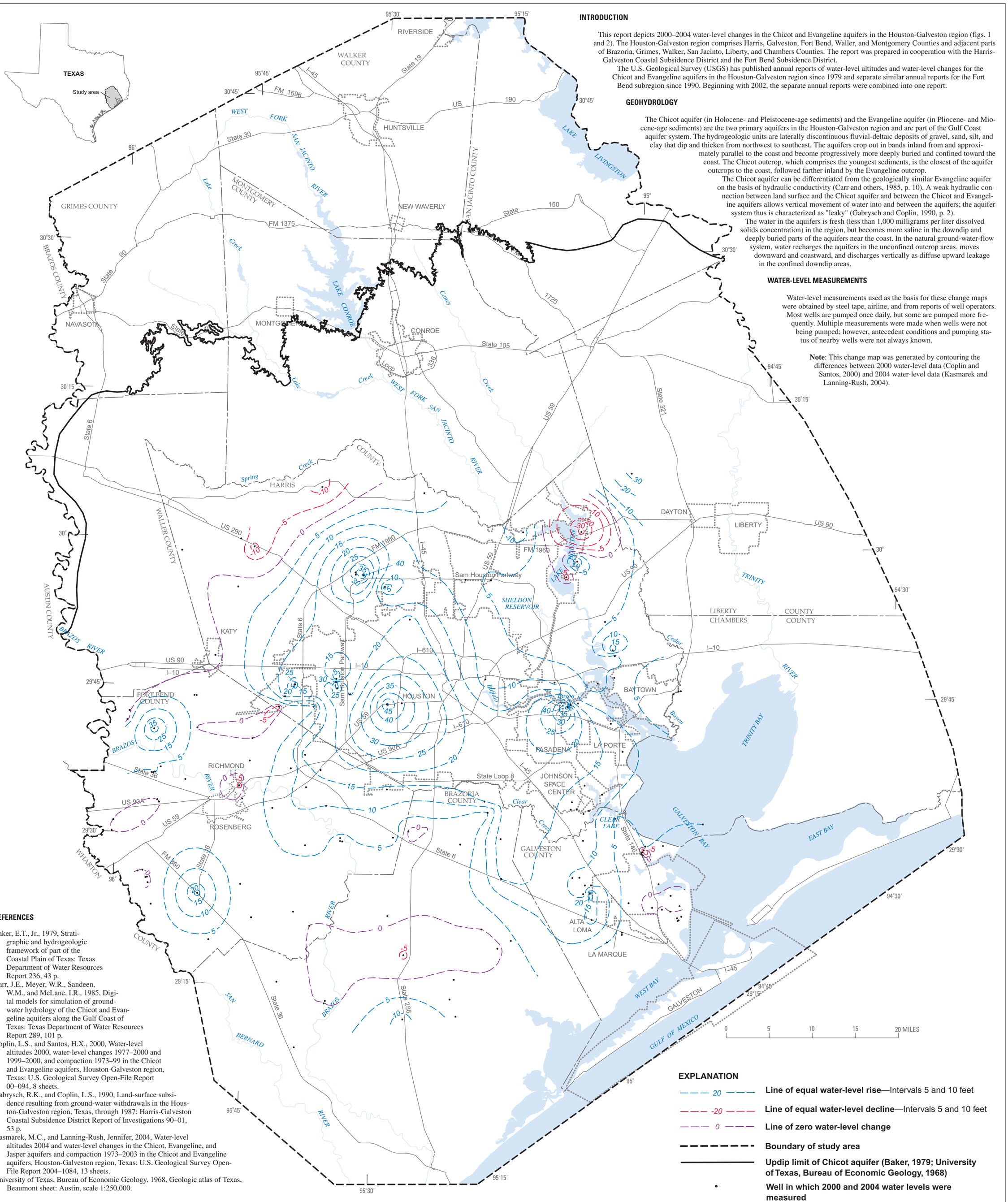
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

IN COOPERATION WITH THE
HARRIS-GALVESTON COASTAL SUBSIDENCE DISTRICT
AND FORT BEND SUBSIDENCE DISTRICT

OPEN-FILE REPORT 2004–1407
Approximate water-level changes, Chicot aquifer, 2000–2004—SHEET 1 OF 2
Kasmarek, M.C., 2004, Water-level changes 2000–2004 in the Chicot and Evangeline aquifers, Houston-Galveston region, Texas



INTRODUCTION

This report depicts 2000–2004 water-level changes in the Chicot and Evangeline aquifers in the Houston-Galveston region (figs. 1 and 2). The Houston-Galveston region comprises Harris, Galveston, Fort Bend, Waller, and Montgomery Counties and adjacent parts of Brazoria, Grimes, Walker, San Jacinto, Liberty, and Chambers Counties. The report was prepared in cooperation with the Harris-Galveston Coastal Subsidence District and the Fort Bend Subsidence District.

The U.S. Geological Survey (USGS) has published annual reports of water-level altitudes and water-level changes for the Chicot and Evangeline aquifers in the Houston-Galveston region since 1979 and separate similar annual reports for the Fort Bend subregion since 1990. Beginning with 2002, the separate annual reports were combined into one report.

GEOHYDROLOGY

The Chicot aquifer (in Holocene- and Pleistocene-age sediments) and the Evangeline aquifer (in Pliocene- and Miocene-age sediments) are the two primary aquifers in the Houston-Galveston region and are part of the Gulf Coast aquifer system. The hydrogeologic units are laterally discontinuous fluvial-deltaic deposits of gravel, sand, silt, and clay that dip and thicken from northwest to southeast. The aquifers crop out in bands inland from and approximately parallel to the coast and become progressively more deeply buried and confined toward the coast. The Chicot outcrop, which comprises the youngest sediments, is the closest of the aquifer outcrops to the coast, followed farther inland by the Evangeline outcrop.

The Chicot aquifer can be differentiated from the geologically similar Evangeline aquifer on the basis of hydraulic conductivity (Carr and others, 1985, p. 10). A weak hydraulic connection between land surface and the Chicot aquifer and between the Chicot and Evangeline aquifers allows vertical movement of water into and between the aquifers; the aquifer system thus is characterized as "leaky" (Gabrysch and Coplin, 1990, p. 2).

The water in the aquifers is fresh (less than 1,000 milligrams per liter dissolved solids concentration) in the region, but becomes more saline in the downdip and deeply buried parts of the aquifers near the coast. In the natural ground-water-flow system, water recharges the aquifers in the unconfined outcrop areas, moves downward and coastward, and discharges vertically as diffuse upward leakage in the confined downdip areas.

WATER-LEVEL MEASUREMENTS

Water-level measurements used as the basis for these change maps were obtained by steel tape, airline, and from reports of well operators. Most wells are pumped once daily, but some are pumped more frequently. Multiple measurements were made when wells were not being pumped; however, antecedent conditions and pumping status of nearby wells were not always known.

Note: This change map was generated by contouring the differences between 2000 water-level data (Coplin and Santos, 2000) and 2004 water-level data (Kasmarek and Lanning-Rush, 2004).

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Coplin, L.S., and Santos, H.X., 2000, Water-level altitudes 2000, water-level changes 1977–2000 and 1999–2000, and compaction 1973–99 in the Chicot and Evangeline aquifers, Houston-Galveston region, Texas: U.S. Geological Survey Open-File Report 00–094, 8 sheets.

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EXPLANATION

- 20 — **Line of equal water-level rise**—Intervals 5 and 10 feet
- -20 — **Line of equal water-level decline**—Intervals 5 and 10 feet
- 0 — **Line of zero water-level change**
- **Boundary of study area**
- **Updip limit of Chicot aquifer (Baker, 1979; University of Texas, Bureau of Economic Geology, 1968)**
- **Well in which 2000 and 2004 water levels were measured**

Figure 1. Map showing approximate water-level changes in the Chicot aquifer, Houston-Galveston region, Texas, 2000–2004.

Base from U.S. Geological Survey
Digital data, 1:100,000
Universal Transverse Mercator projection
Zone 15

WATER-LEVEL CHANGES 2000–2004 IN THE CHICOT AND EVANGELINE AQUIFERS, HOUSTON-GALVESTON REGION, TEXAS

By
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