HARRIS-GALVESTON SUBSIDENCE DISTRICT

Groundwater Withdrawal and Land Subsidence in Harris and Galveston Counties for the 2025 Calendar Year

EXECUTIVE SUMMARY

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Harris-Galveston Subsidence District Report 2026-01

Executive Summary

In 1975, the Texas Legislature created the Harris-Galveston Subsidence District (HGSD) to prevent further subsidence in Harris and Galveston counties. Since then, HGSD has been successful in mitigating subsidence through groundwater regulation, advanced science and research, regional collaboration, and award-winning water conservation programs. Each year, the HGSD publishes an Annual Groundwater Report to provide the latest information on subsidence in the region. A public hearing was held on April 30, 2026, at 9:00 a.m. at HGSD's office in Friendswood, TX (pursuant to HGSD Resolution No. 2026-1146 passed on February 11, 2026) to present the findings of HGSD's 50th Annual Groundwater Report for the 2025 calendar year. The executive summary provides an overview of the information presented during the public hearing.

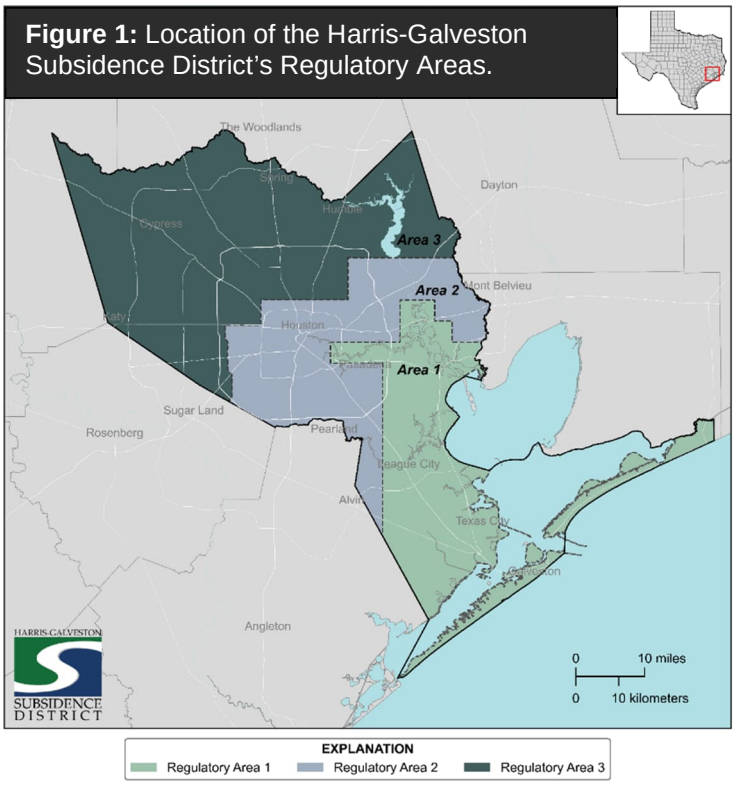
Description of Study Area

Harris and Galveston counties withdraw groundwater from the Gulf Coast Aquifer System, which includes two primary water-bearing units: the shallow Chicot-Evangeline (undifferentiated) aquifers and the deeper Jasper aquifer. A very small percentage of the total groundwater withdrawn within HGSD comes from the Jasper aquifer; consequently, most of the subsidence is attributable to clay compaction in the Chicot-Evangeline (undifferentiated).

HGSD uses an adaptive management strategy to prevent subsidence through a Regulatory Plan that requires permittees to convert to alternative water supplies and reduce their reliance on groundwater. The Regulatory Plan divides HGSD into three regulatory areas (**Figure 1**).

These regulatory areas share the goal of reducing overall groundwater withdrawal; however, each area's groundwater withdrawals will be reduced to a specific percentage of its total water demand by a designated date, based on the availability of alternative water supplies and water demand.

Figure 1: Location of the Harris-Galveston Subsidence District's Regulatory Areas.



Regulatory Area One: No more than 10% of Total Water Demand (TWD) may be sourced from groundwater.

Regulatory Area Two: No more than 20% of TWD may be sourced from groundwater unless operating within an approved Groundwater Reduction Plan (GRP).

Regulatory Area Three: No more than 20% of TWD may be sourced from groundwater. Permittees operating within an approved GRP may use no more than 40% of TWD from groundwater beginning in 2025 and no more than 20% of TWD sourced from groundwater by 2035.

Climate

Annual variations in precipitation can significantly impact the amount of water used in HGSD. For example, during periods of excessive rainfall, total water demand can decline, whereas during droughts, groundwater use can increase as surface water supplies deplete, leading to declining groundwater levels.

For the first half of 2025, the cumulative precipitation totals remained slightly above or below average for each station except in Sugar Land (**Figure 2**). Some minor storm events kept precipitation totals close to normal from May through July, but rainfall from these events never pushed any station more than a few inches above normal. In August, precipitation totals began to drop sharply and lasted through the remainder of the year. The greatest departure from normal was measured at the Baytown climate station, with almost 2 feet below normal (**Figure 2**).

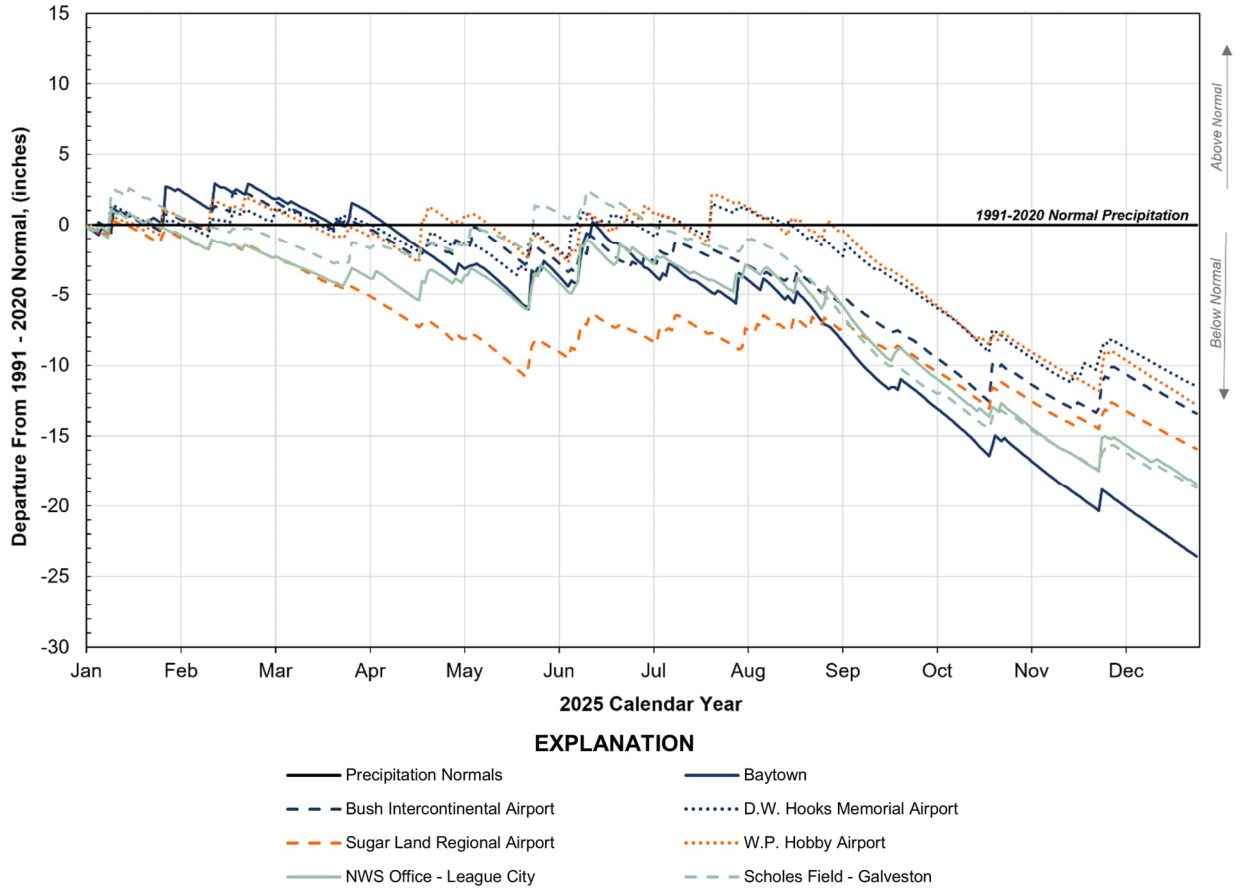


Figure 2: Cumulative 2025 precipitation departure from 1991-2020 normals precipitation, in inches, at select NWS climate stations within and surrounding HGSD. Source: https://www.ncei.noaa.gov/access.

Water Use

Each year, permittees are required to submit annual pumpage reports that include information regarding their total water demand, water use, and water supplies. The data from these reports are collected and presented in the Annual Groundwater Report. The overall groundwater use within HGSD in 2025 is 232.8 MGD, marking a 2% decrease from 2024. Approximately 83% of groundwater use within HGSD occurs in Regulatory Area Three, where the regulatory conversion timeline will not be completed until 2035 (**Figure 3**). The three primary uses of water are public supply, industrial, and irrigation. Groundwater used for public supply remains the largest category at about 212.5 MGD, accounting for approximately 91% of all groundwater used in HGSD.

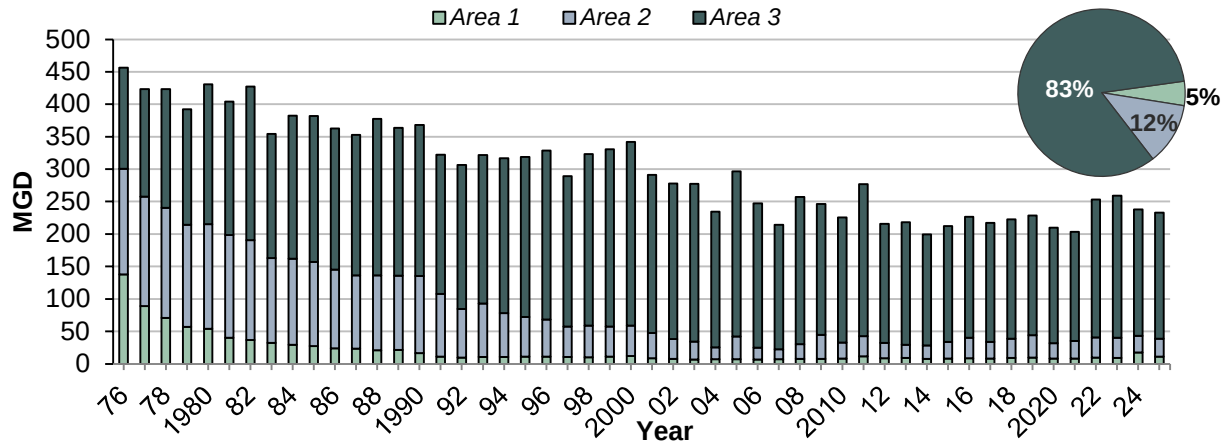


Figure 3: Groundwater withdrawals, in million gallons per day (MGD), by regulatory area from 1976 to 2025.

The primary alternative water supply for this region is surface water from three river basins: the Brazos, San Jacinto, and Trinity. In 2025, the total alternative water used was 869.7 MGD, with the Trinity River remaining the single largest source at 68% of the total, providing about 588.5 MGD in surface water supply. Groundwater remains the second-largest source of water supply, accounting for approximately 21% of total water demand. The total water demand for HGSD was 1,102.6 MGD in 2025, which is 1% more than the previous year (**Figure 4**).

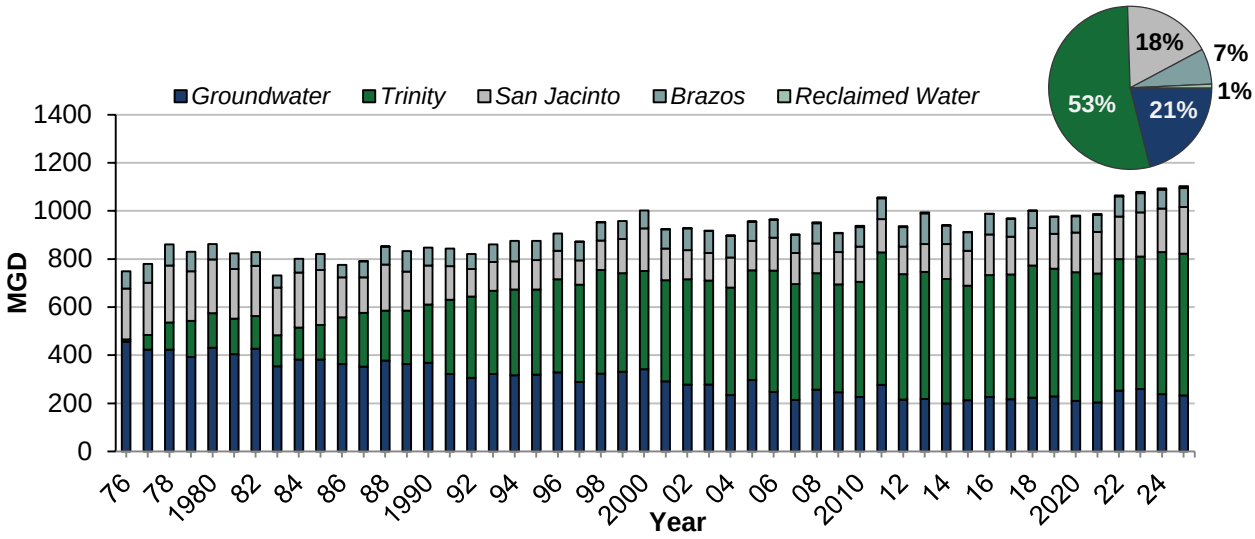


Figure 4: Total water use in HGSD, in million gallons per day (MGD), by source water from 1976 to 2025.

Groundwater Levels

Since 1975, the United States Geological Survey (USGS) has measured the potentiometric water level in hundreds of wells throughout southeast Texas in cooperation with HGSD through a joint funding agreement with additional cities, subsidence districts, and groundwater conservation districts. These data are used to monitor water levels in the Chicot/Evangeline (undifferentiated) and Jasper aquifers and to evaluate historical water-level trends. Since water level is the best measure of pressure in the aquifer, this information is also crucial for understanding how groundwater pumping may depressurize the aquifer and the resulting impacts on land subsidence.

The change in water level in the Chicot-Evangeline (undifferentiated) aquifer from 1977 to 2026 highlights the impact of HGSD's regulation on the aquifer (**Figure 5**). Generally, Regulatory Areas One and Two have seen a substantial rise in water levels of over 200 feet (61 meters) in the Chicot-Evangeline (undifferentiated) aquifer, as measured in areas such as the Houston Ship Channel. The area of rise results from the reduction in groundwater use required by HGSD's Regulatory Plan. Conversely, in Regulatory Area Three, water levels were consistently lower than the 1977 benchmark levels, with declines of over 300 feet (91 meters) in the Chicot-Evangeline (undifferentiated) aquifer. The greatest historical declines in water level were measured in south-central Montgomery County, with over 400 feet (122 meters) around The Woodlands.

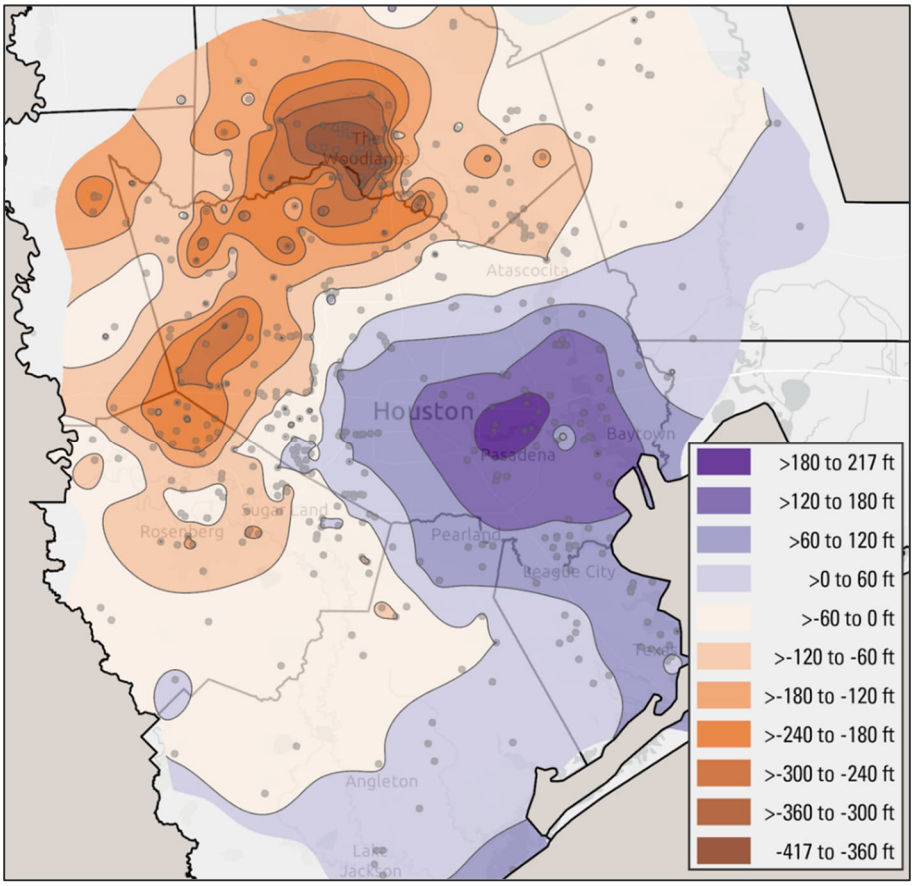


Figure 5: Potentiometric water level change at wells screened in the Chicot-Evangeline (undifferentiated) aquifer, Houston region, Texas, from 1977 to 2026 (Source: USGS provisional data – preliminary and subject to change).

Subsidence

HGSD developed a subsidence monitoring network using global positioning system (GPS) technology to monitor land-surface deformation within and around HGSD. This network involves collaboration among GPS station operators, including the Fort Bend Subsidence District, the University of Houston, the Brazoria County Groundwater Conservation District, the Texas Department of Transportation, and other local entities. In 2025, the subsidence monitoring network collected data from almost 190 GPS stations throughout southeast Texas.

HGSD estimates the average annual subsidence rate as the linear regression of the change in ellipsoidal height (i.e., the vertical movement measured by the GPS stations) over the five most recent years. The subsidence rates observed from 2021 to 2025 in Regulatory Area One are stable, since it has reached the full regulatory conversion requirement, and Chicot-Evangeline (undifferentiated) water levels have risen (**Figure 6**). Subsidence rates are generally above half a centimeter per year throughout Regulatory Area Three, as groundwater remains the primary water source and Chicot-Evangeline (undifferentiated) water levels have declined significantly. The highest subsidence rate was measured at a GPS station in the Katy and Fulshear area, exceeding 3 centimeters per year.

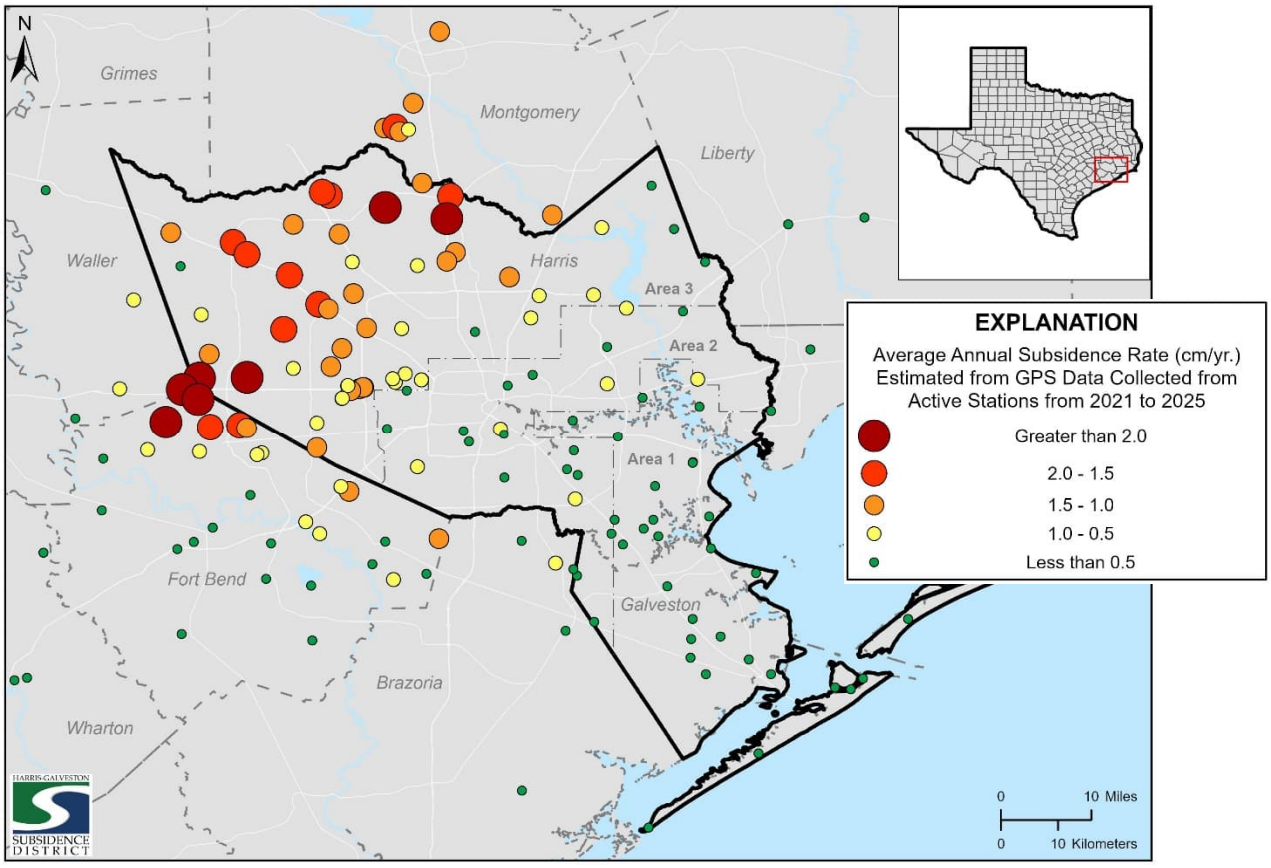


Figure 6: Annual subsidence rate, measured in centimeters per year, from 2021 to 2025, referenced to GOM25 and estimated from three or more years of GPS data collected from active GPS stations in Harris, Galveston, and surrounding counties, Texas.

HGSD has sponsored research by Southern Methodist University and industry experts to use another remote-sensing methodology, interferometric synthetic aperture radar (InSAR), to

evaluate land-surface changes in the Houston-Galveston region. InSAR-derived land surface deformation complements HGSD's subsidence monitoring network by providing data in between GPS stations. Results from InSAR-derived subsidence rates closely resemble rates calculated from the GPS stations, such that Regulatory Area One shows minimal subsidence to uplift, whereas western and northern portions of Regulatory Area Three have subsidence rates greater than one centimeter per year (**Figure 7**).

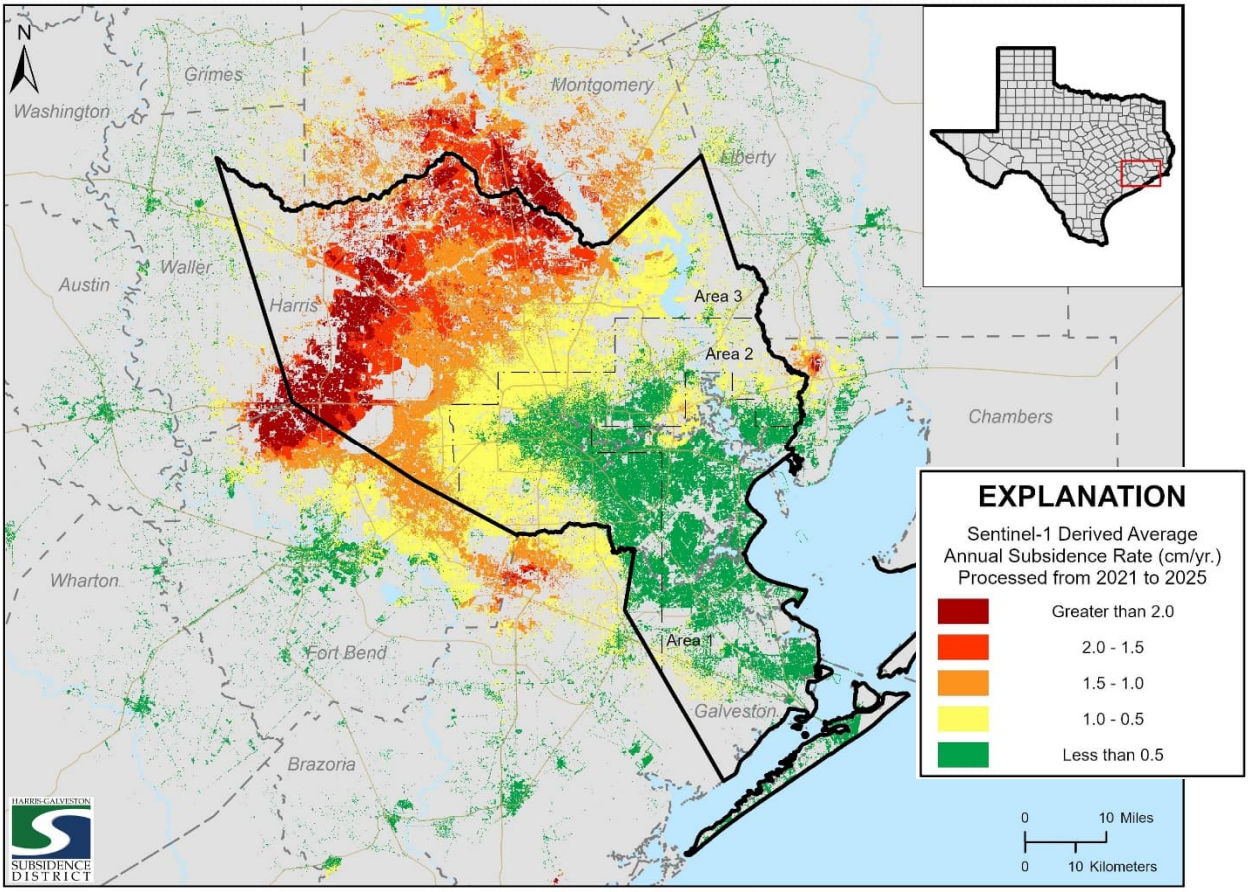


Figure 7. Interferometric Synthetic Aperture Radar (InSAR)-derived annual subsidence rate, calculated in centimeters per year, estimated from Sentinel-1 data and averaged from 2021 through 2025.

Conclusion

The results of the Annual Groundwater Report highlight HGSD's subsidence mitigation efforts. In areas that have reduced reliance on groundwater and fully converted to alternative water supplies, such as Regulatory Areas One and Two, little to no subsidence occurs; whereas Regulatory Area Three and other areas that still rely on groundwater as a primary water source, subsidence continues. Regional collaboration and long-term water planning to provide additional alternative water supplies are vital to minimize subsidence in the region.