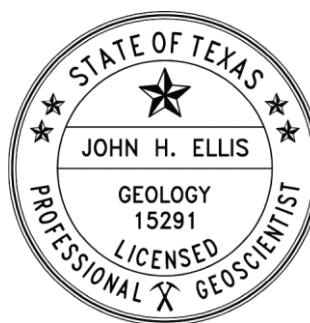




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MEMORANDUM



TO: Harris-Galveston Subsidence District
FROM: John Ellis, PG, INTERA
Ryan Harmon, PhD, INTERA
DATE: July 10, 2026
RE: Comparison of subsidence results – GMA 14 Run 14.3 and HGSD Scenario B6

1.0 Introduction

This technical memorandum documents a model scenario developed to evaluate the effect of the proposed Modeled Available Groundwater (MAG) volumes for Montgomery County, established as part of this round's Joint Planning effort in Groundwater Management Area 14 (GMA 14), on projected land subsidence in Harris, Fort Bend, Montgomery, and surrounding counties. The analysis compares the GMA 14 adjusted 14.3 SD B6 scenario (Hutchison, 2026) against the previously documented HGSD/FBSD Baseline Scenario B6 (Ellis et al. 2025). The HGSD/FBSD B6 scenario represents projected groundwater pumping under the existing regulatory plans and water-provider management strategies of the Harris-Galveston Subsidence District and Fort Bend Subsidence District.

The purpose of the comparison is to evaluate how changes in projected Montgomery County groundwater use affect projected subsidence in the study area. Although the broader GMA 14 joint-planning model files include groundwater-use changes in multiple counties, changes outside Montgomery County were removed from this analysis. Therefore, differences between the GMA 14 adjusted 14.3 B6 scenario and the HGSD/FBSD B6 scenario are attributable to the revised Montgomery County pumping assumptions.

2.0 Well File Translation

The model runs presented in this memorandum were performed using the groundwater availability model for the northern portion of the Gulf Coast Aquifer (GULF 2023). The GULF 2023 model uses MODFLOW 6 with the CSUB package to represent aquifer-system compaction and land subsidence. To isolate the effect of Montgomery County pumping, this memorandum compares the previously documented HGSD/FBSD B6 with a scenario that substitutes only the Montgomery County pumping from the GMA 14 Adjusted 14.3 B6 scenario well file, leaving all other across the model domain equal to pumping rates in HGSD/FBSD B6.

The starting point for this analysis was the well file for the Adjusted Scenario 14.3 SD B6 simulation from the GMA 14 Model Alternative Simulations Draft report (Hutchison, 2026). This scenario projects future pumping toward the MAG across GMA 14, with the increases in eight counties capped at 3.5 times their 2018 pumping to avoid unrealistically large growth (Hutchison, 2026). In the three subsidence district counties (Fort Bend, Galveston, and Harris), pumping follows the HGSD/FBSD B6, which incorporates planned groundwater-to-alternative-water conversions. Because these inputs were built on the GMA 14 Model, the well file could not be transferred directly to the GULF 2023 model. It first had to be transformed to reconcile the temporal discretization differences between the two models.

Both models represent the simulation period using stress periods of differing lengths, and in early time both rely on long, multi-year windows. For example, Stress Period 4 covers five years from 1940 through 1944 in the GULF 2023 model, but the fourteen years from 1926 through 1939 in the GMA 14 model, so the same stress-period number does not refer to the same span of time in each model. Both models then use annual stress periods for several decades beginning in 1970. Beginning in the year 2000, the GULF 2023 model used monthly stress periods, while the GMA 14 model remains annual. Over the predictive period after 2018, both models return to an annual stress period length. Transforming the well file from the GMA 14 model into the GULF 2023 model therefore required remapping each GMA 14 pumping rate onto whichever GULF 2023 stress periods fell within the same interval of time, whether those periods were multi-year, annual, or monthly, so that the total volume of groundwater production over each interval was preserved. Two transformations of the Adjusted Scenario 14.3 SD B6 well file were performed:

- **Montgomery County Only Translation:** Only the portion of the Adjusted Scenario 14.3 SD B6 well file covering the area that encompasses Montgomery County was mapped to the GULF 2023 model. The remainder of the well file (everywhere outside of that area) was left equal to the pumping used in the HGSD/FBSD B6. This translation isolates the influence of the GMA 14 Montgomery County pumping while holding the rest of the model consistent with the District baseline regulatory assumptions.
- **Model-wide Translation:** The entire Adjusted Scenario 14.3 SD B6 well file was mapped to the GULF 2023 model as-is, reproducing the GMA 14 pumping distribution across the full model domain.

Montgomery County was chosen for a dedicated transformation because it represented the largest magnitude change in MAG of any county between the previous round of joint planning and the current round. In the 2021 round, the adopted Montgomery County MAG was 96,873 AFY for the Gulf Coast Aquifer System (Table A.1), distributed among the Chicot (21,030 AFY), Evangeline (39,815 AFY), and Jasper (36,028 AFY) aquifers. The Adjusted Scenario 14.3 SD B6 well file raises Montgomery County pumping to a Gulf Coast Aquifer total of 199,206 AFY (reported as 199,069 AFY by Hutchison, 2026), slightly more than double the 2021 MAG. The reason for the difference between the INTERA calculated total and the reported value is not entirely clear; it may stem from how model cells straddling county lines are assigned, but because the difference is small, it was not investigated further. As summarized in Table 2 and shown in Figure 1, this increase is concentrated in the deeper aquifers: relative to the 2021 MAG, Jasper Aquifer pumping grows from 36,028 to 95,802 AFY (about 2.7 times) and Evangeline Aquifer pumping from 39,815 to 78,911 AFY (about double), while Chicot Aquifer pumping is comparatively sees a small change (21,030 to 24,493 AFY). Because no other county exhibited a change of this magnitude, isolating Montgomery County allowed its influence on subsidence to be evaluated directly while pumping elsewhere was held at the B6 rates. Results and discussion of these two scenarios are presented in the next section.

Table 1. 2021 Modeled Available Groundwater for Montgomery County by Aquifer (acre-feet per year)

Aquifer	2020	2030	2040	2050	2060	2070	2080
Chicot aquifer	20,868	22,117	22,136	23,202	22,878	21,030	21,030
Evangeline aquifer	41,172	41,160	41,397	40,200	40,269	39,815	39,815
Burkeville confining	0	0	0	0	0	0	0
Jasper aquifer	34,925	33,676	33,412	33,527	33,769	36,028	36,028
Gulf Coast Aquifer System	96,965	96,953	96,945	96,929	96,916	96,873	96,873

Source: GAM Run 21-019 – Modeled Available Groundwater for the Gulf Coast Aquifer System in Groundwater Management Area 14 Joint Planning (September 8, 2022). Lone Star GCD, Montgomery County.

Table 2. Comparison of 2021 Modeled Available Groundwater and Adjusted Scenario 14.3 SD B6 Pumping, Montgomery County (acre-feet per year)

Aquifer	2021 MAG (2080)	Adj. Scenario 14.3 SD B6 (2080)	Change (AFY)	Change (factor)
Chicot Aquifer	21,030	24,493	+3,463	1.2
Evangeline Aquifer	39,815	78,911	+39,096	2.0
Jasper Aquifer	36,028	95,802	+59,774	2.7
Gulf Coast Aquifer System	96,873	199,206	+102,333	2.1

2021 MAG values are the 2080 modeled available groundwater for the Gulf Coast Aquifer System from GAM Run 21-019 (September 8, 2022; Table A.1). Adjusted Scenario 14.3 SD B6 values are 2080 pumping by aquifer computed from the GMA 14 Model cell-by-cell budget output (Hutchison, 2026).

Figure 1 shows the resulting pumping through time by aquifer for Montgomery County, with the solid lines representing the HGSD/FBSD B6 pumping and the dashed lines representing the translated GMA 14 Adjusted Scenario 14.3 SD B6 pumping. The discussion here focuses on the predictive period, which begins in 2019, where the two well files diverge sharply and pumping in each file changes in 2020. In the GMA 14 Adjusted Scenario 14.3 SD B6 well file, pumping steps up abruptly in 2020 and is then held constant through 2080, consistent with the constant-future-pumping assumption of the GMA 14 scenario (Hutchison, 2026). By 2080, Montgomery County pumping in this file is concentrated in the Jasper and Evangeline aquifers, at 95,802 and 78,911 AFY, respectively, with smaller contributions from the Chicot (24,493 AFY) and Catahoula (10,868 AFY). By contrast, the GULF 2023 B6 pumping increases gradually across the predictive period in response to projected demand growth, reaching roughly 55,000 to 60,000 acre-feet per year by 2080 in the Chicot, Evangeline, and Jasper aquifers. The result is both greater total Montgomery County pumping and a different vertical distribution of that pumping among aquifer layers in the GMA 14 scenario relative to the GULF 2023 B6. Note that although the Catahoula was not included in the last round Joint Planning MAG, and may not be included in this current (2026) round, it was included in the draft scenarios included in (Hutchison, 2026).

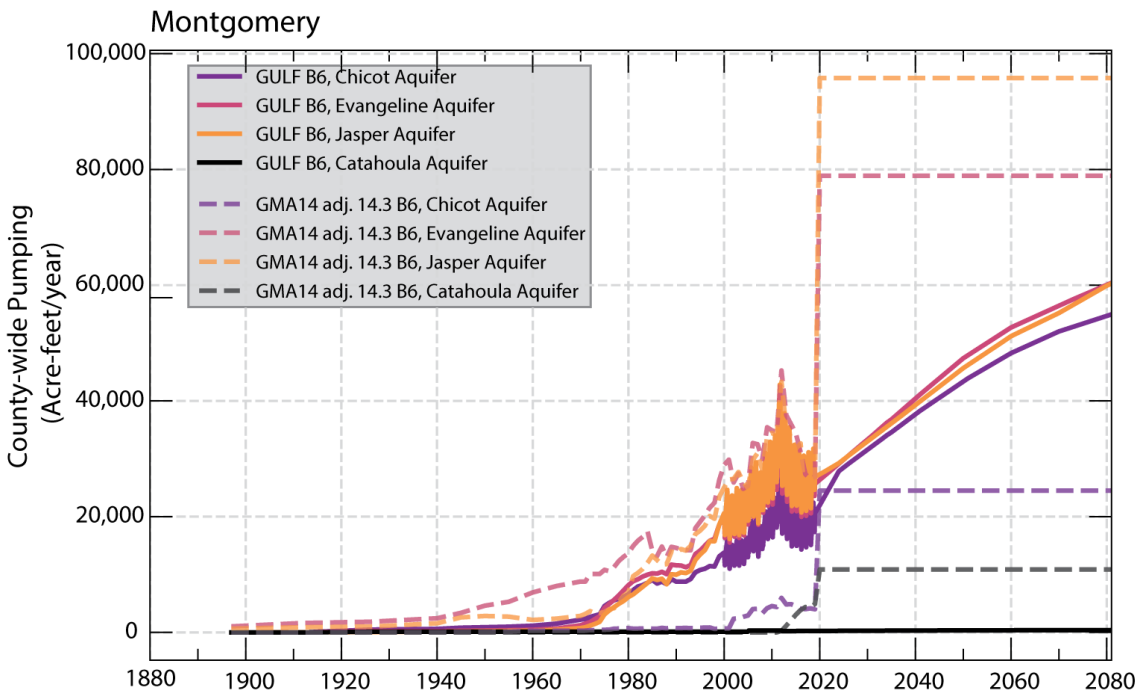


Figure 1 Groundwater pumping through time by aquifer for Montgomery County: GULF 2023 B6 (solid lines) and the translated GMA 14 Adjusted Scenario 14.3 SD B6 (dashed lines), by aquifer (Chicot, Evangeline, Jasper, and Catahoula).

A figure of this type was prepared for each county in the study area. The complete set is provided in the third appendix (Time-Series Map).

3.0 Results

The GMA 14 adjusted 14.3 B6 scenario uses projected groundwater-use assumptions for Montgomery County derived from the GMA 14 joint-planning process. The comparison maps include total projected subsidence for the HGSD/FBSD B6 scenario, total projected subsidence for the GMA 14 adjusted 14.3 B6 scenario, and difference maps calculated as GMA 14 adjusted 14.3 B6 minus HGSD/FBSD B6. Positive values on the difference maps therefore indicate areas where the GMA 14 adjusted 14.3 B6 scenario projects more subsidence than the HGSD/FBSD B6 scenario.

The comparison periods are not perfectly identical because the two model runs use slightly offset start and end dates. The HGSD/FBSD B6 maps are shown for 2025-2050, 2050-2075, and 2025-2085, whereas the GMA 14 adjusted 14.3 B6 maps are shown for 2020-2045, 2045-2070, and 2020-2080. These equal-duration but offset periods provide a reasonable comparison of broad spatial patterns and relative differences between scenarios, but small differences - particularly near-zero or slightly negative values - should not be overinterpreted.

Additionally, an additional difference between the two simulations is the treatment of the transition into predictive pumping conditions. The HGSD/FBSD B6 scenario included a ramp-up period that gradually transitioned from the historical GULF 2023 pumping distribution to the projected demand-based pumping

distribution. In contrast, the GMA 14 adjusted 14.3 scenario was implemented by cutting over directly to the scenario pumping rates. Therefore, some of the differences shown in the early comparison period may reflect both the revised pumping assumptions and the difference in how those pumping assumptions were introduced into the model. This distinction is most relevant for interpreting the magnitude and timing of early-period subsidence differences; however, the broader spatial pattern still indicates where the revised pumping assumptions produce the greatest subsidence response.

3.1 Montgomery County Only Transformation

Figures 2 through 4 show the difference between the GMA 14 adjusted 14.3 B6 scenario and the HGSD/FBSD Baseline Scenario B6. Positive values indicate greater projected subsidence in the GMA 14 adjusted 14.3 B6 scenario. As noted above, the comparison periods are equal-duration but offset by approximately five years; therefore, the difference maps should be interpreted as scenario-comparison maps rather than strictly identical-period subtractions.

Figure 2 shows the subsidence difference between the GMA 14 adjusted 14.3 B6 scenario for 2020-2045 and the HGSD/FBSD B6 scenario for 2025-2050. The maximum difference is approximately 2.43 feet and occurs in southeastern Montgomery County. The area of additional projected subsidence greater than 1 foot is largely confined to Montgomery County, with the 0.25-foot and 0.5-foot contours extending into northern Harris County and nearby portions of Liberty and San Jacinto counties. Across most of central and southern Harris County, Fort Bend County, Galveston County, and Brazoria County, differences are small, indicating that the short-term effect of the revised Montgomery County pumping assumptions decreases substantially with distance from Montgomery County.

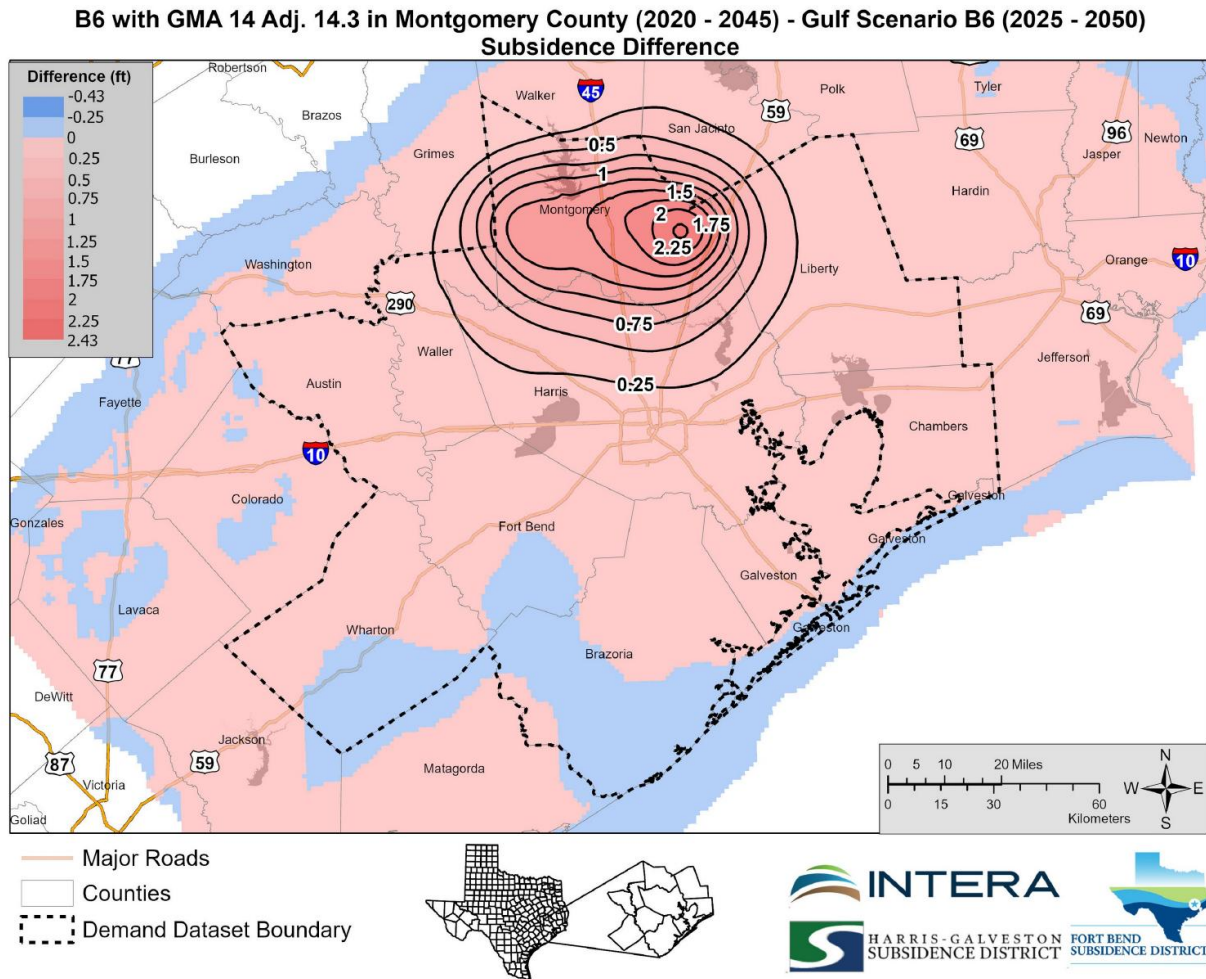


Figure 2 Difference in projected subsidence for the earlier comparison period (2020–2045 and 2025–2050). Positive values indicate greater subsidence in the GMA 14 adjusted 14.3 B6 scenario. Only the portion of the Adjusted Scenario 14.3 SD B6 well file in Montgomery County was used for this analysis.

Figure 3 shows the subsidence difference between the GMA 14 adjusted 14.3 B6 scenario for 2045-2070 and the HGSD/FBSD B6 scenario for 2050-2075. The maximum difference during this later period is approximately 1.3 feet, again centered in southeastern Montgomery County. Compared with the earlier-period difference map, the area of large positive difference is smaller and more localized. The 0.25-foot contour extends into northern Harris County, but most of Harris County south of the northern portion, along with Fort Bend, Galveston, and Brazoria counties, shows little difference between the two scenarios.

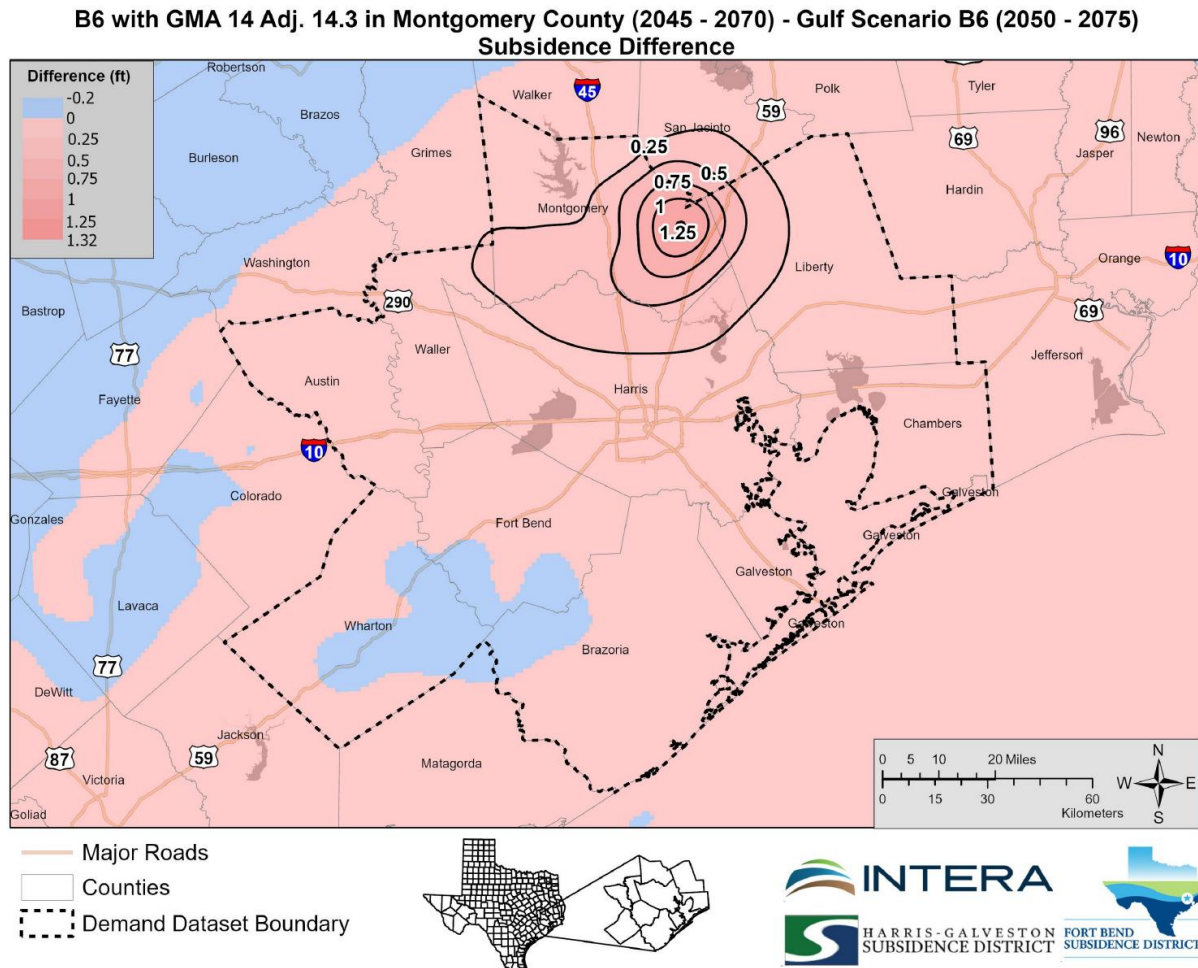


Figure 3 Difference in projected subsidence for the later comparison period (2045–2070 and 2050–2075). Positive values indicate greater subsidence in the GMA 14 adjusted 14.3 B6 scenario. Only the portion of the Adjusted Scenario 14.3 SD B6 well file in Montgomery County was used for this analysis.

Figure 4 shows the cumulative subsidence difference between the GMA 14 adjusted 14.3 B6 scenario for 2020–2080 (the DFC panning period) and the HGSD/FBSD B6 scenario for 2025–2085. This figure provides the clearest indication of the long-term effect of the revised Montgomery County pumping assumptions. The maximum cumulative difference is approximately 4.21 feet and occurs in southeastern Montgomery County. The area of greater than 2 feet of additional projected subsidence is concentrated in Montgomery County, while the 0.25-foot and 0.75-foot contours extend southward into northern Harris County. The cumulative difference decreases rapidly toward central and southern Harris County and is small across most of Fort Bend and Galveston counties.

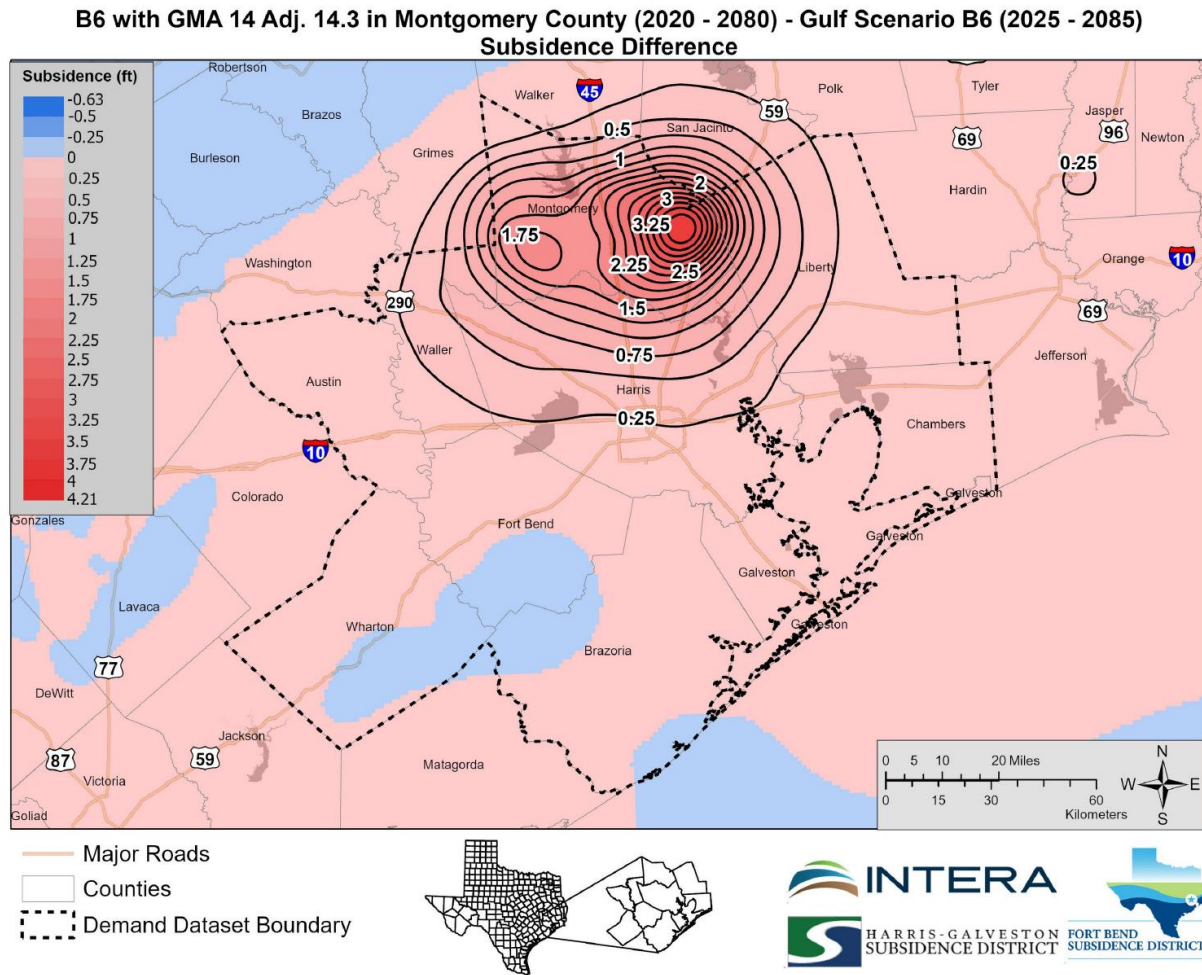


Figure 4 Difference in projected subsidence for the full comparison period (2020–2080 and 2025–2085). Positive values indicate greater subsidence in the GMA 14 adjusted 14.3 B6 scenario. Only the portion of the Adjusted Scenario 14.3 SD B6 well file in Montgomery County was used for this analysis.

3.2 Model-wide transformation

Figure 5 shows the subsidence difference between the model-wide GMA 14 adjusted 14.3 scenario for 2020–2045 and the HGSD/FBSD B6 scenario for 2025–2050. The largest increase remains centered in southeastern Montgomery County, where the maximum difference is approximately 2.4 feet. The area of greater than 1 foot of additional projected subsidence is largely concentrated in Montgomery County, but the 0.25-foot and 0.5-foot difference contours extend into northern Harris County and nearby portions of Liberty, San Jacinto, and Waller counties. This pattern indicates that the revised pumping assumptions continue to produce the strongest effect in Montgomery County, with measurable but diminishing impacts extending southward into HGSD Regulatory Area 3.

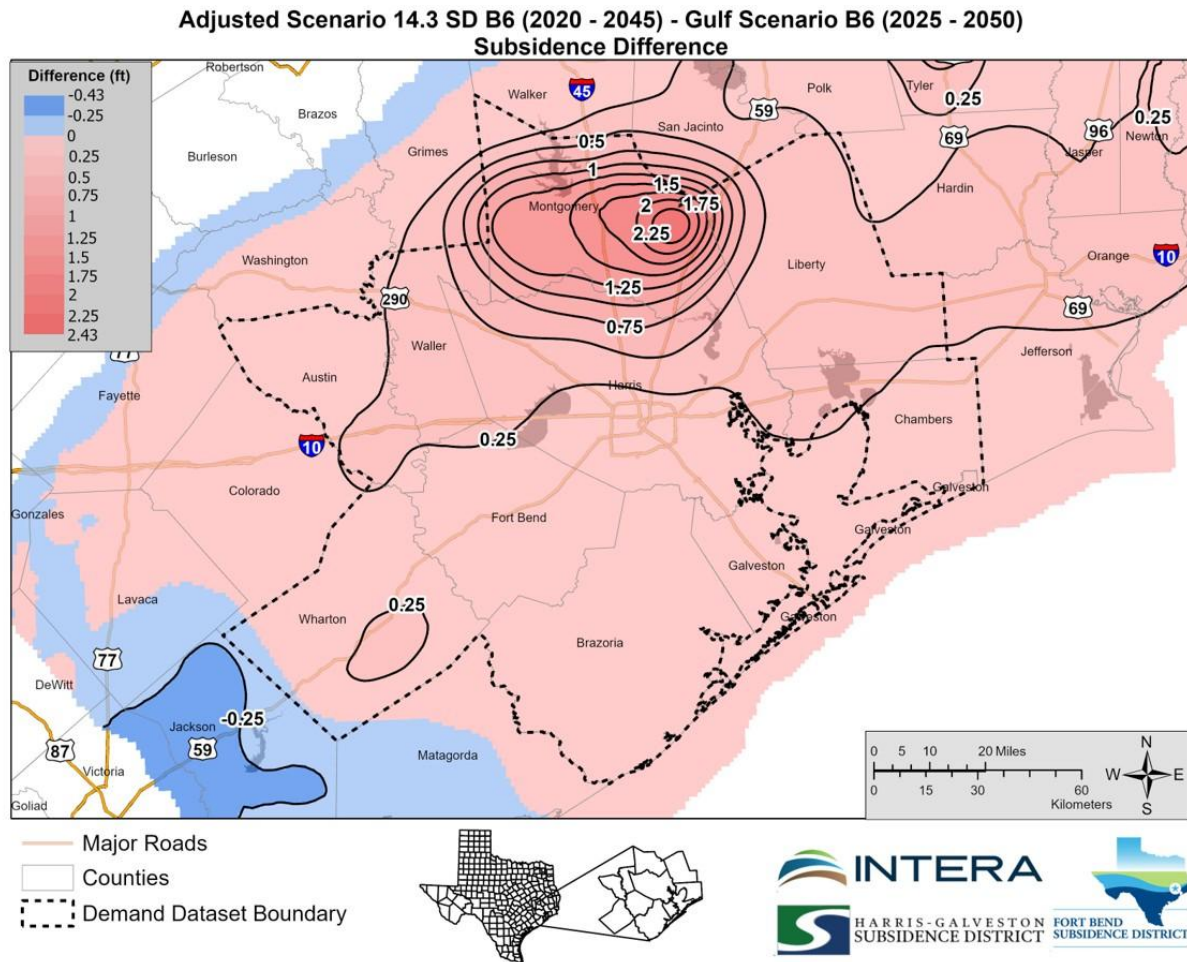


Figure 5 Difference in projected subsidence for the earlier comparison period (2020–2045 and 2025–2050). Positive values indicate greater subsidence in the GMA 14 adjusted 14.3 B6 scenario. The entire Adjusted Scenario 14.3 SD B6 well file was mapped across the model area in this scenario.

Outside of the Montgomery County area, the difference map shows more spatial variability than the Montgomery-only sensitivity comparison. Increased subsidence occurs across much of the eastern and central portions of the study area, including parts of Liberty, Hardin, Jefferson, Chambers, Galveston, Austin, Wharton, Jackson, and Matagorda counties. Less subsidence occurs in portions of Lavaca, Jackson, Matagorda, and western Wharton County. These regional differences reflect the broader model-wide pumping update to MAG values and should not be attributed solely to Montgomery County. Across most of central and southern Harris County, Fort Bend County, Galveston County (the counties with HGSD/FBSD B6 pumping rates), the differences are generally minimal.

Figure 6 shows the subsidence difference between the model-wide GMA 14 adjusted 14.3 scenario for 2045–2070 and the HGSD/FBSD B6 scenario for 2050–2075. As in the earlier period, the largest positive difference remains in southeastern Montgomery County, but the maximum difference is about 1.3 feet. The positive-difference contours are also more localized, with the 0.25-foot contour extending into

northern and central Harris County and the higher-value contours concentrated near the Montgomery–San Jacinto–Liberty county area. This suggests that the incremental effect of the revised pumping assumptions is smaller during the later comparison period than during the earlier period.

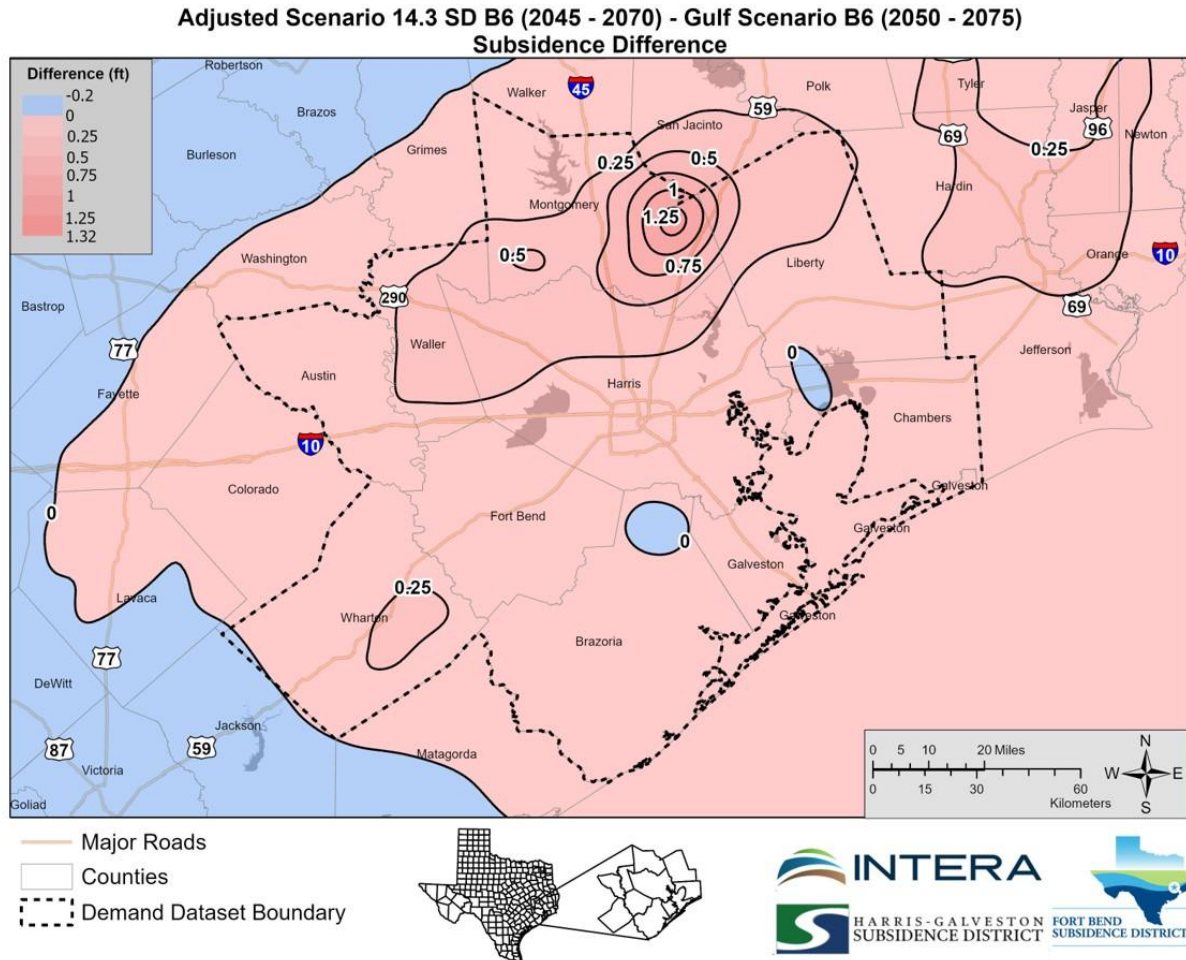


Figure 6 Difference in projected subsidence for the later comparison period (2045–2070 and 2050–2075). Positive values indicate greater subsidence in the GMA 14 adjusted 14.3 B6 scenario. The entire Adjusted Scenario 14.3 SD B6 well file was mapped across the model area in this scenario.

The later-period map (Figure 6) also shows broad model-area variability outside Montgomery County. Negative differences are more prominent in the western and southwestern portions of the mapped area, including parts of Brazos, Burleson, Bastrop, Fayette, Lavaca, Jackson, Wharton, and Brazoria counties. Positive differences remain widespread across parts of the eastern model area, including portions of Liberty, Hardin, Jefferson, Chambers, and Galveston counties. These patterns indicate that the model-wide update changes the spatial distribution of projected subsidence across the broader region, even where the largest absolute difference remains centered in Montgomery County. Within the Districts, the effect is most evident in northern Harris County.

Figure 7 shows the cumulative subsidence difference between the model-wide GMA 14 adjusted 14.3 scenario for 2020–2080 and the HGSD/FBSD B6 scenario for 2025–2085. The cumulative map provides

the clearest expression of the long-term model-wide differences. The maximum cumulative difference is about 4.2 feet and occurs in southeastern Montgomery County. The area of greater than 2 feet of additional projected subsidence is concentrated in Montgomery County, while the 0.25-foot through 1.75-foot contours extend into northern Harris County and adjacent portions of Waller, San Jacinto, and Liberty counties. The cumulative results therefore show that Montgomery County remains the dominant source of increased projected subsidence in the comparison.

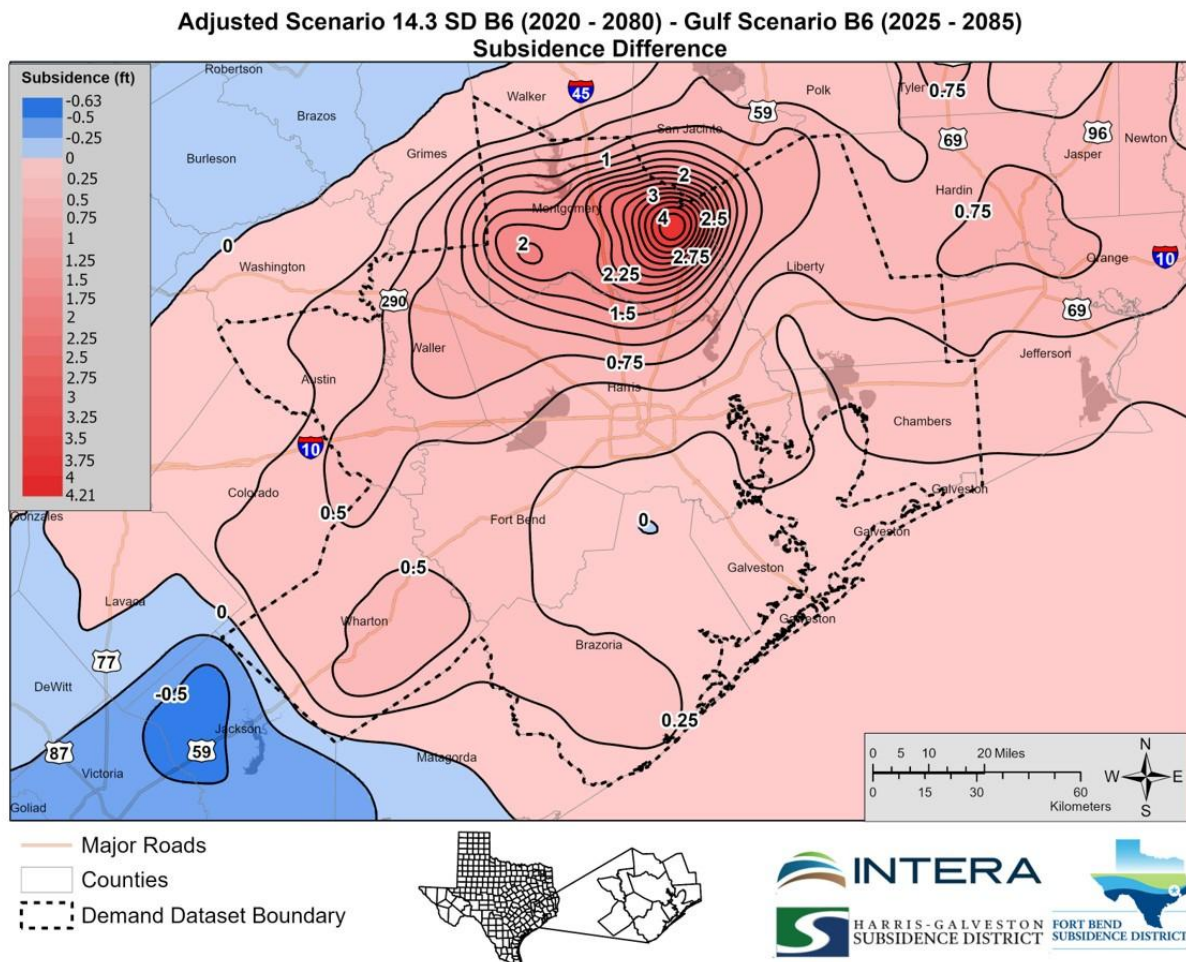


Figure 7 Difference in projected subsidence for the full comparison period (2020–2080 and 2025–2085). Positive values indicate greater subsidence in the GMA 14 adjusted 14.3 B6 scenario. The entire Adjusted Scenario 14.3 SD B6 well file was mapped across the model area in this scenario.

Outside Montgomery County, the cumulative difference map shows both increases and decreases across the model area. Positive differences are present across much of the eastern and southeastern mapped area, including parts of Liberty, Hardin, Jefferson, Chambers, Galveston, and Matagorda counties, with a small localized positive feature in the Jasper/Newton County area. Negative differences are present in portions of Brazos, Burleson, Lavaca, Wharton, Fort Bend, Brazoria, and offshore areas. These broader regional differences are important because they show that the model-wide pumping update affects the distribution of projected subsidence beyond the Montgomery County center of impact. However, the

magnitude of these regional changes is generally much smaller than the cumulative positive difference in Montgomery County and northern Harris County.

3.3 Overall Results

Overall, the model-wide GMA 14 adjusted 14.3 comparison indicates that Montgomery County remains the primary area of increased projected subsidence, even when pumping changes are evaluated across the broader model area. This finding is consistent with the Montgomery County-only sensitivity results, which showed the largest additional projected subsidence centered in southeastern Montgomery County and extending into northern Harris County. In both comparisons, the cumulative difference exceeds 4 feet in Montgomery County, with the greatest effects concentrated near the Montgomery–Harris County boundary and decreasing substantially southward into Harris County. The results therefore indicate that the revised Montgomery County groundwater-use assumptions materially increase projected subsidence in Montgomery County and northern Harris County relative to the HGSD/FBSD Baseline Scenario B6.

The timing of the response is also consistent between the Montgomery County-only and model-wide comparisons. The largest incremental difference occurs during the earlier comparison period, when the maximum difference exceeds 2 feet in Montgomery County. During the later comparison period, the maximum incremental difference decreases to about 1.3 feet and becomes more localized. This pattern suggests that much of the additional subsidence response associated with the revised Montgomery County pumping assumptions occurs earlier in the predictive period, although cumulative effects continue to increase through the full model period. Note that because much of the increase in pumping in Montgomery County is in the Jasper Aquifer, where subsidence per foot of groundwater level decline is lower than in the Chicot or Evangeline Aquifers, the additional subsidence due to the increase pumping is lower than if the increase pumping had been less vertically concentrated.

Outside Montgomery County and northern Harris County, the model-wide comparison shows a more spatially complex response than the Montgomery County-only sensitivity case. Positive and negative subsidence differences occur across multiple counties, including increases in parts of the eastern and southeastern model area and decreases in parts of the western and southwestern model area. These broader regional differences reflect the model-wide pumping update (along with differing parameterization and calibration in the GMA 14 model) and should be interpreted as the combined effect of regional pumping changes rather than the effect of Montgomery County alone. However, the magnitude of these regional changes is generally much smaller than the cumulative positive difference in Montgomery County and northern Harris County. Across most of central and southern Harris County, Fort Bend County, Galveston County, and Brazoria County, differences are comparatively small and generally near zero or localized.

Because the comparison periods are slightly offset between the two scenarios, the results should be interpreted as a scenario-sensitivity comparison rather than a strictly identical-period subtraction. Small differences, particularly near-zero or slightly negative values, should not be overinterpreted. The primary conclusion, however, is clear: the revised Montgomery County pumping assumptions produce the largest and most persistent increase in projected subsidence, with secondary effects in northern Harris County and smaller, more variable changes elsewhere in the model area.

4.0 Summary

This analysis compares the GMA 14 adjusted 14.3 B6 scenario with the previously documented HGSD/FBSD Baseline Scenario B6 to evaluate how revised Montgomery County groundwater-use assumptions affect projected subsidence across the study area. The results indicate that the revised Montgomery County pumping assumptions result in substantially greater projected subsidence in Montgomery County and measurable increases in northern Harris County. The largest cumulative difference between scenarios is approximately 4.21 feet and occurs in southeastern Montgomery County.

The effects of the revised Montgomery County pumping assumptions diminish with distance from Montgomery County. Across most of central and southern Harris County, Fort Bend County, Galveston County, and Brazoria County, the differences between scenarios are relatively small. The results should be interpreted with the caveat that the comparison periods are equal-duration but slightly offset in time; however, the maps provide a reasonable basis for evaluating the broad spatial pattern and relative magnitude of the scenario differences.

5.0 References

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6.0 Appendix

6.1 HGSD/FBSD Baseline Scenario B6

The HGSD/FBSD Baseline Scenario B6 results (Figure 6-1 through 6-3) are included as the comparison condition for this analysis and are documented in Ellis and others (2025). As documented in the previous Task D memorandum, the B6 scenario represents projected groundwater pumping under existing District regulatory plans and water-provider management strategies. The maps below are included to provide context for the GMA 14 adjusted 14.3 B6 results and the difference maps.

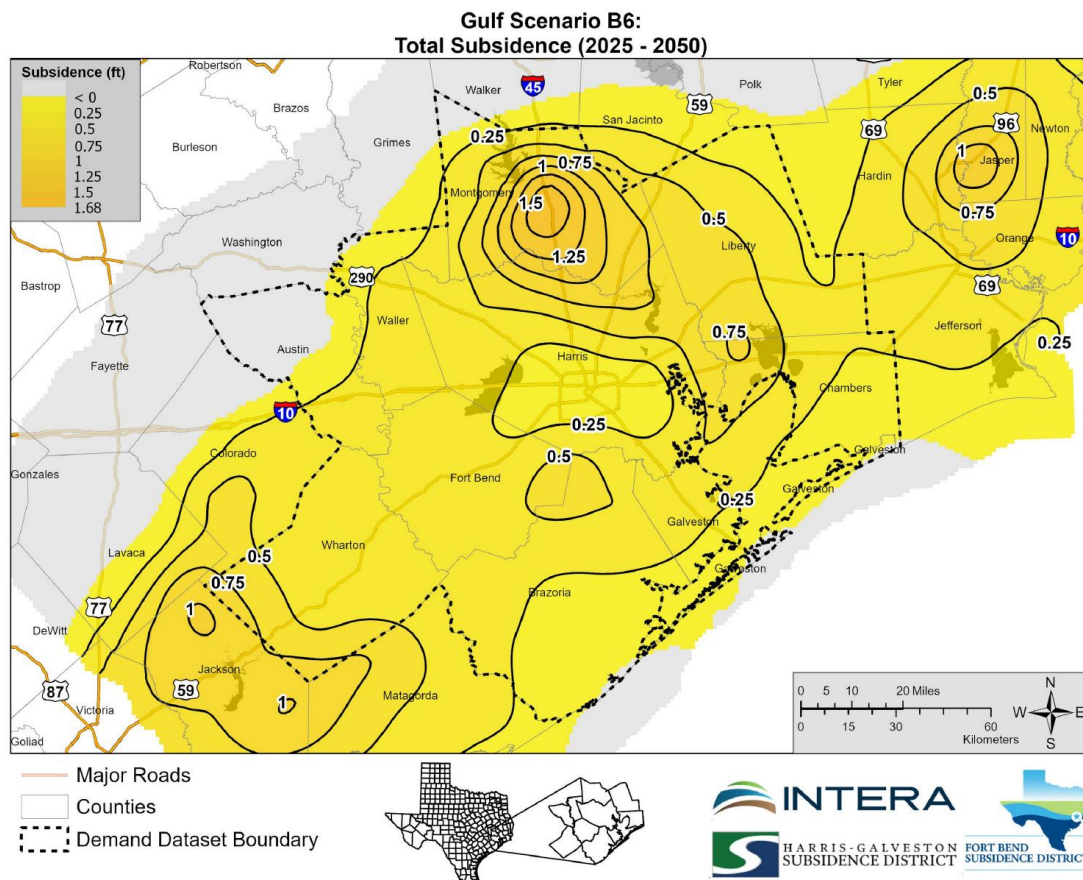


Figure 6-1. HGSD/FBSD Baseline Scenario B6 subsidence for 2025-2050.

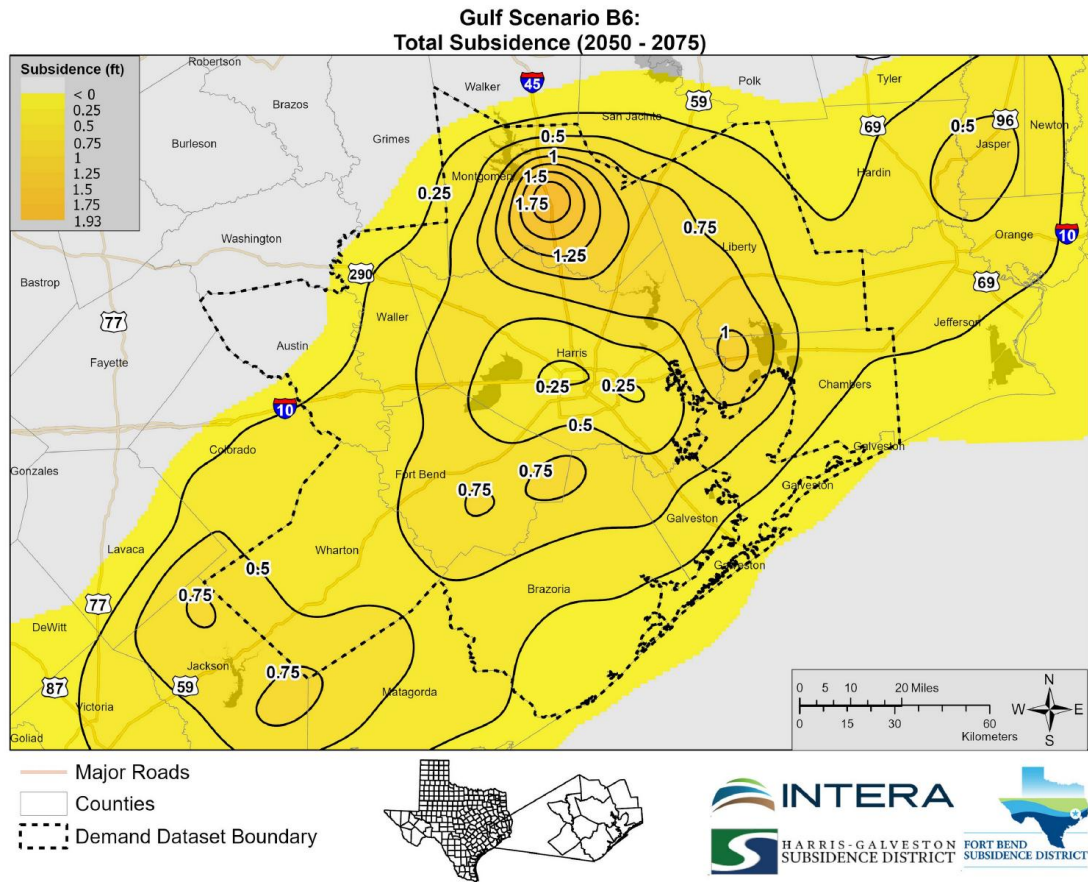


Figure 6-2. HGSD/FBSD Baseline Scenario B6 subsidence for 2050-2075.

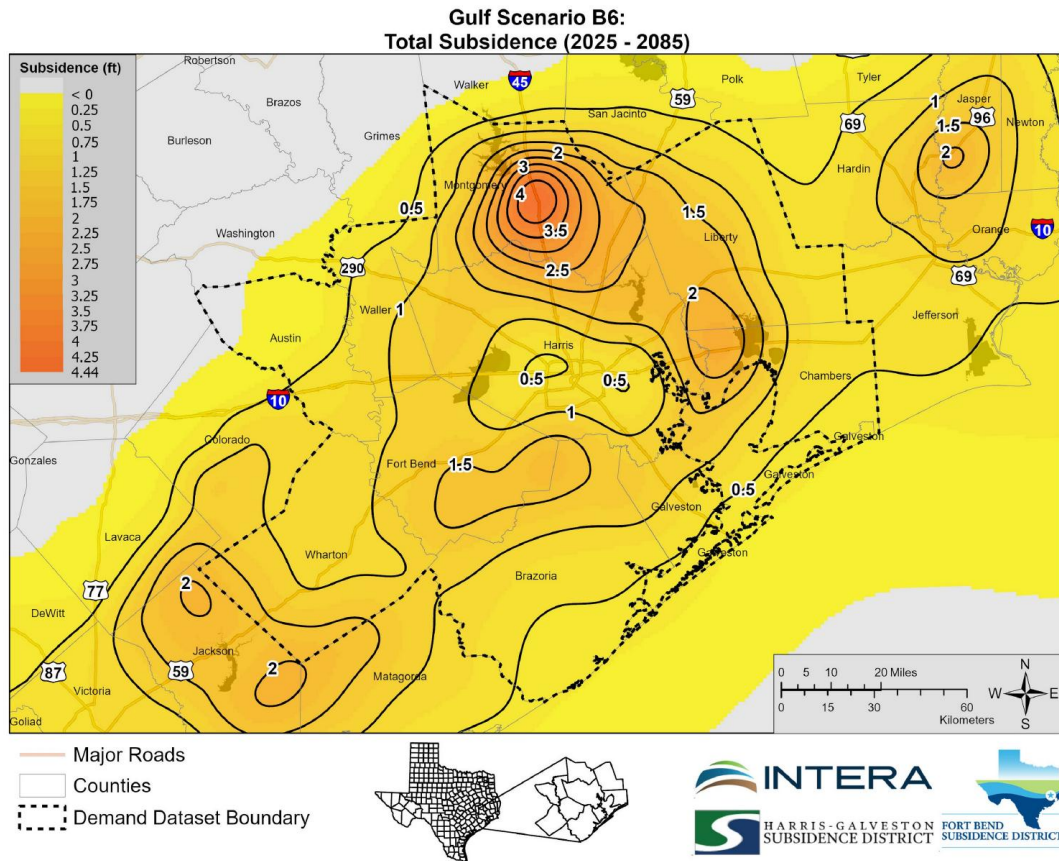


Figure 6-3. HGSD/FBSD Baseline Scenario B6 cumulative subsidence for 2025-2085.

6.2 GMA 14 Adjusted 14.3 B6 Scenario

Figure 6-4 shows the total projected subsidence for the GMA 14 adjusted 14.3 B6 scenario between 2020 and 2045. The greatest projected subsidence occurs in Montgomery County, where the maximum value is approximately 3.35 feet. The area of projected subsidence greater than 2 feet is centered in southeastern Montgomery County, with the 1-foot and 1.5-foot contours extending into northern Harris County and adjacent portions of Liberty and San Jacinto counties. Across most of central and southern Harris County, Fort Bend County, Galveston County, and Brazoria County, projected subsidence during this period is substantially lower, generally less than 0.5 foot, except for localized areas associated with other modeled pumping centers.

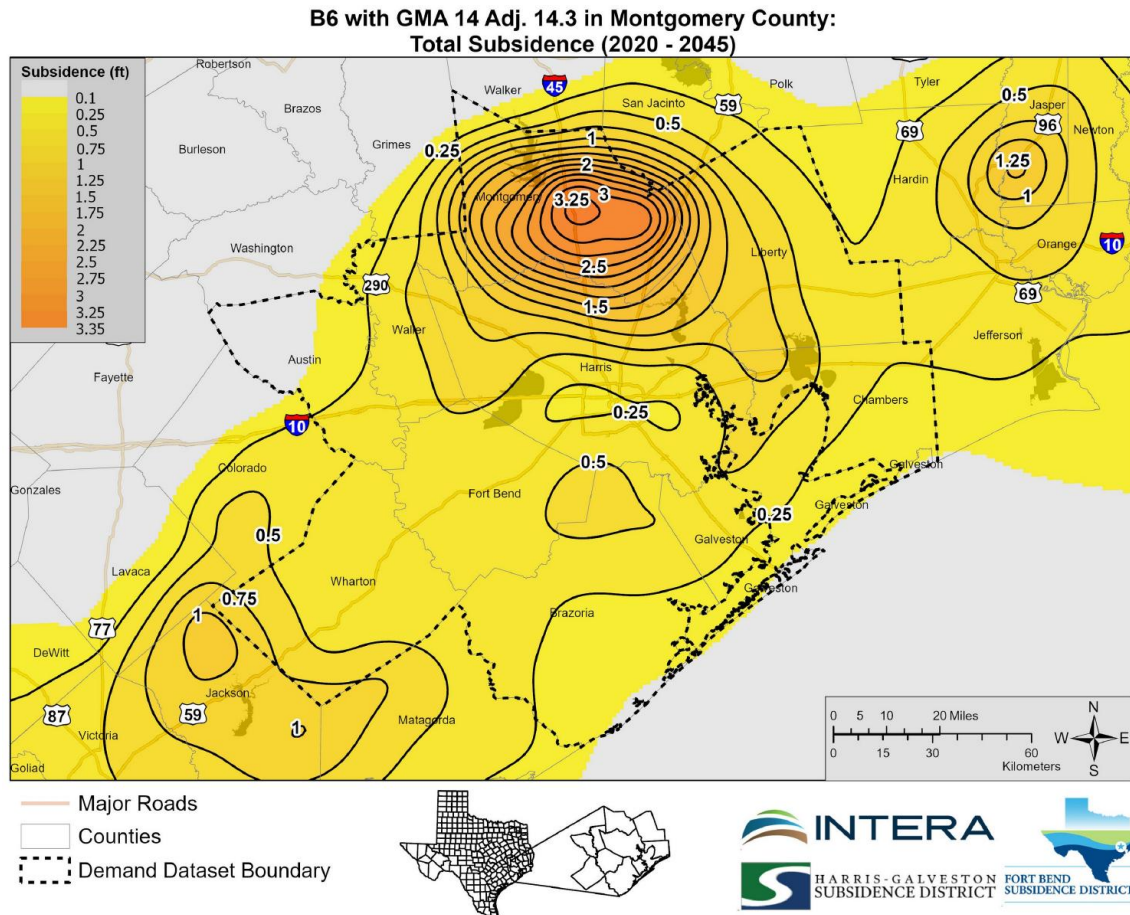


Figure 6-4. GMA 14 adjusted 14.3 B6 subsidence for 2020-2045.

Figure 6-5 shows the total projected subsidence for the GMA 14 adjusted 14.3 B6 scenario between 2045 and 2070. The spatial pattern is similar to the 2020-2045 period, with the largest projected subsidence again centered in southeastern Montgomery County. The maximum projected subsidence during this period is approximately 2.38 feet, which is lower than the maximum for the earlier period. The 1-foot and 1.5-foot contours continue to extend southward from Montgomery County into northern Harris County and eastward toward Liberty County, while much of central and southern Harris County, Fort Bend County, and Galveston County remains below about 0.5 to 0.75 foot of projected subsidence.

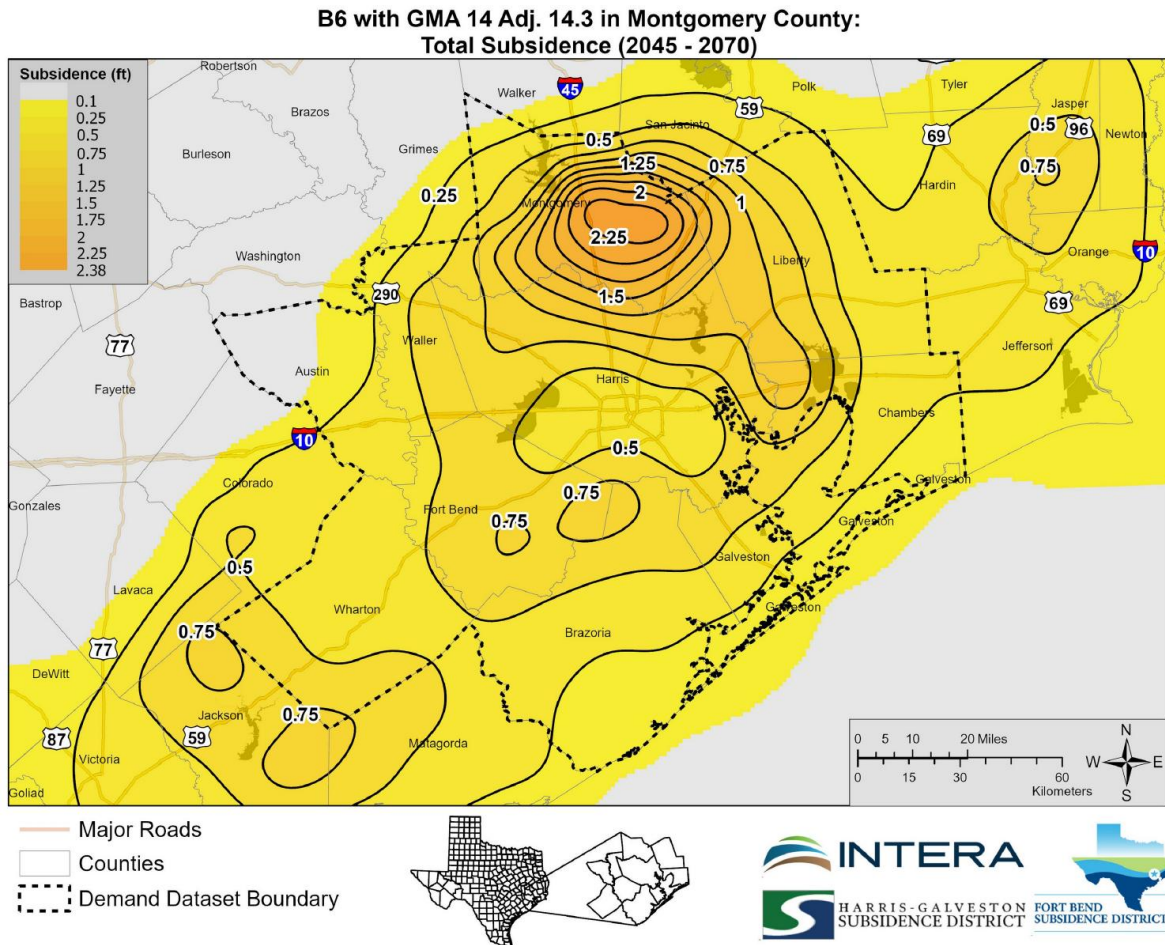


Figure 6-5. GMA 14 adjusted 14.3 B6 subsidence for 2045-2070.

Figure 6-6 shows cumulative projected subsidence for the GMA 14 adjusted 14.3 B6 scenario between 2020 and 2080. The cumulative map emphasizes the long-term effect of the revised Montgomery County pumping assumptions, with a maximum projected subsidence of approximately 6.57 feet in Montgomery County. The area of projected subsidence greater than 4 feet is concentrated in Montgomery County, while the 1-foot and greater contours extend southward into Harris County and eastward toward Liberty County. Fort Bend County and Brazoria County contain localized areas of projected cumulative subsidence greater than 1 foot, but the largest cumulative response remains centered north of the Districts in Montgomery County.

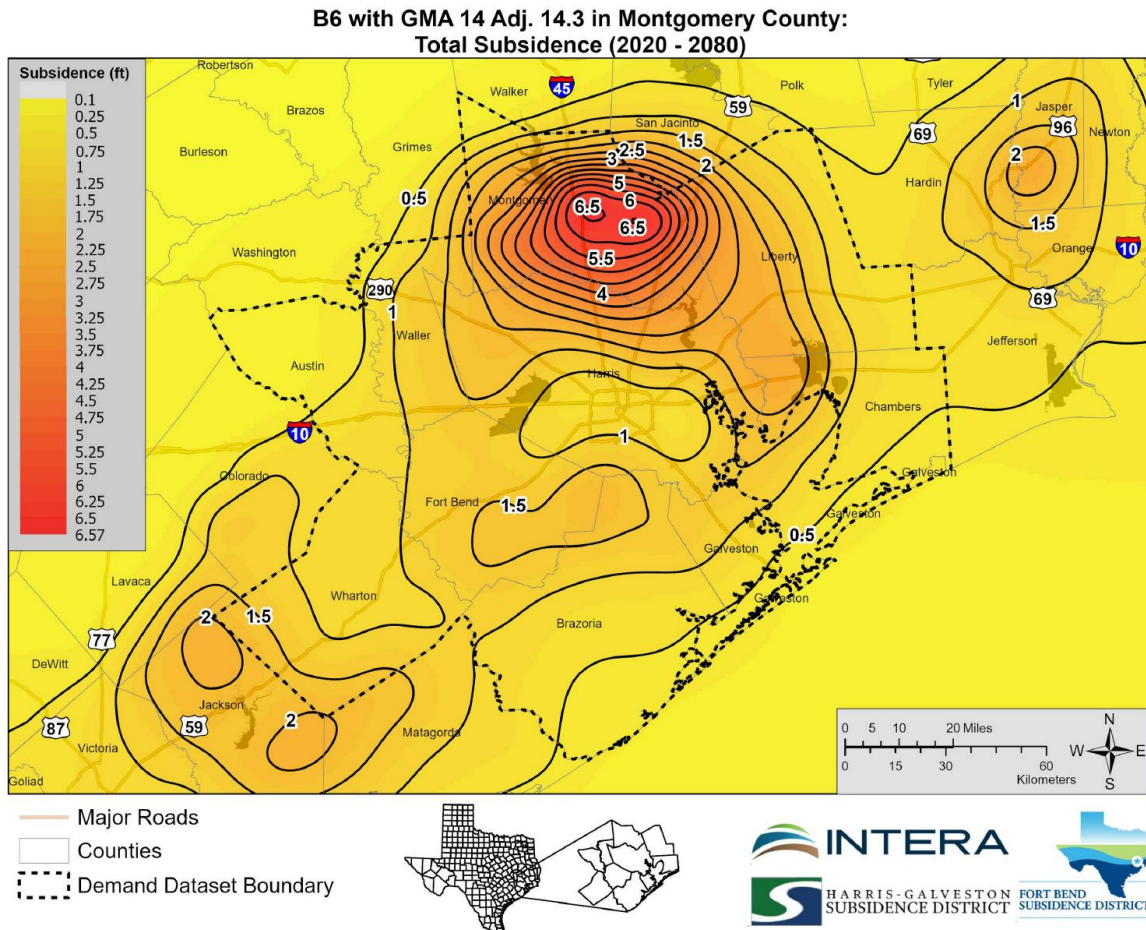


Figure 6-6 GMA 14 adjusted 14.3 B6 cumulative subsidence for 2020-2080.

6.3 Time-Series Maps

The following pages show time-series plots of the pumping used in the GMA 14 model and the GULF model for the compared scenarios (adjusted 14.3 SD B6 versus HGSD/FBSD B6). The pumping time series show county-by-county pumping by aquifer from 1897 through 2080, with the model historical period extending through 2018. The most important feature is the change in how the predictive pumping period is implemented. The HGSD/FBSD B6 scenario generally transitions from late-historical pumping into projected future pumping using a ramp-up approach, while the GMA 14 adjusted 14.3 B6 scenario cuts over abruptly to the scenario pumping rates after the historical period. This is visible in many counties as a near-vertical change in the dashed GMA 14 adjusted 14.3 B6 lines around 2020, followed by generally flat or simplified future pumping rates. This implementation difference is important for interpreting the early-period subsidence maps because some of the early differences between scenarios reflects not only different pumping rates and aquifer distributions, but also the more abrupt transition into predictive pumping conditions in the GMA 14 adjusted 14.3 B6 scenario