Lone Star Groundwater Conservation District

2023 ARTESIAN HEAD CHANGE UPDATE

FEBRUARY 13, 2024

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OVERVIEW

- Historical Groundwater Pumping in Montgomery County
- Update on Artesian Head Change in Montgomery County
  - Historical Hydrographs
  - Geographic locations of Artesian Head Change
- Assessment of Artesian Head Change
  - Available Water Level Data from the TWDB and USGS
    - Wells have measured data from both 2009 and 2023
      - Montgomery County
      - GMA 14
- Discussion of another approach comparing measured and simulated drawdowns within GMA 14

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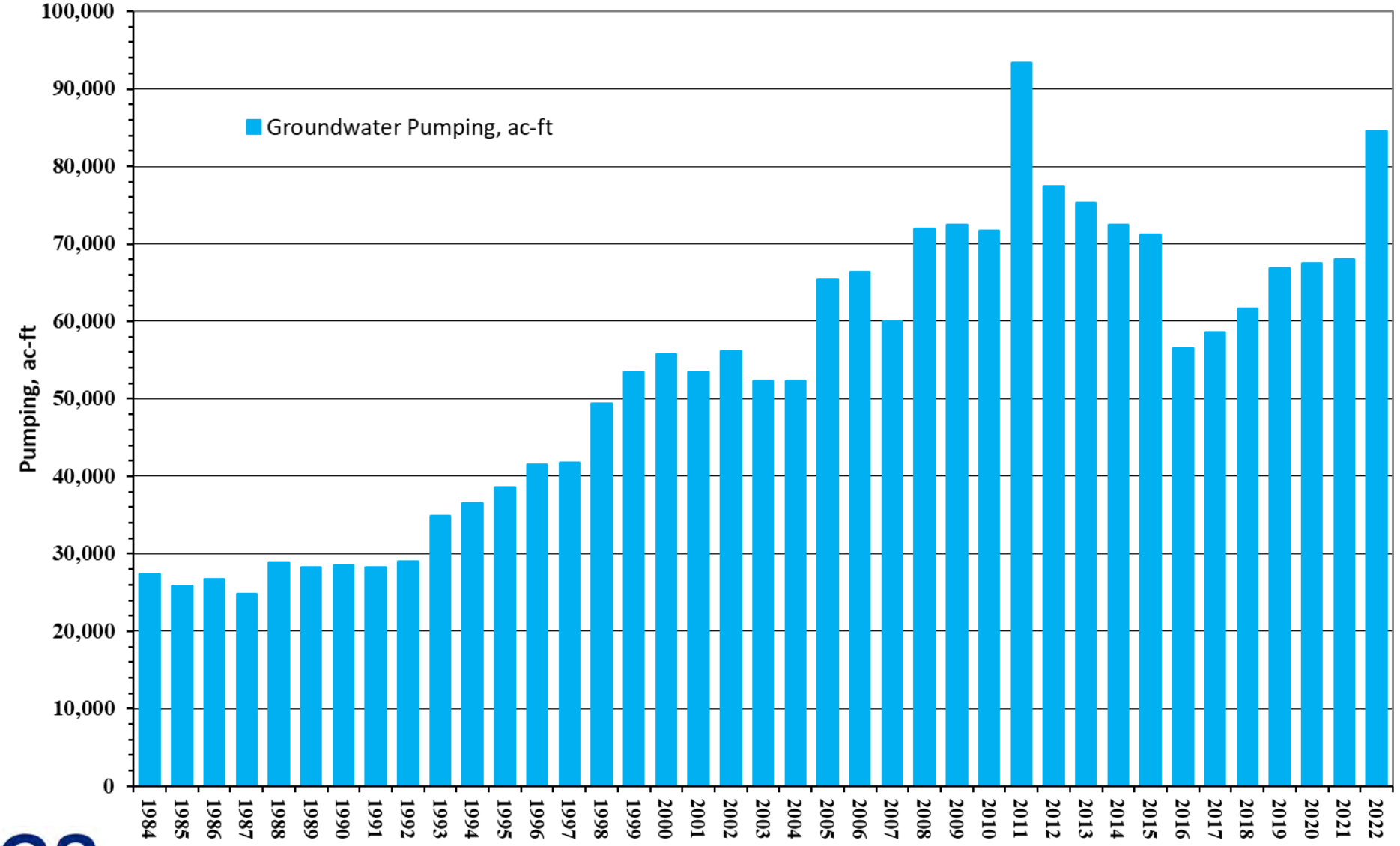
HISTORICAL MONTGOMERY COUNTY PUMPING



2021 - 2022 Change in Pumping: ~24% Increase

2021: 67,998 ac-ft
2022: 84,600 ac-ft

Combined Pumping from the Chicot, Evangeline, Jasper and Catahoula Aquifers

Source: TWDB and LSGCD

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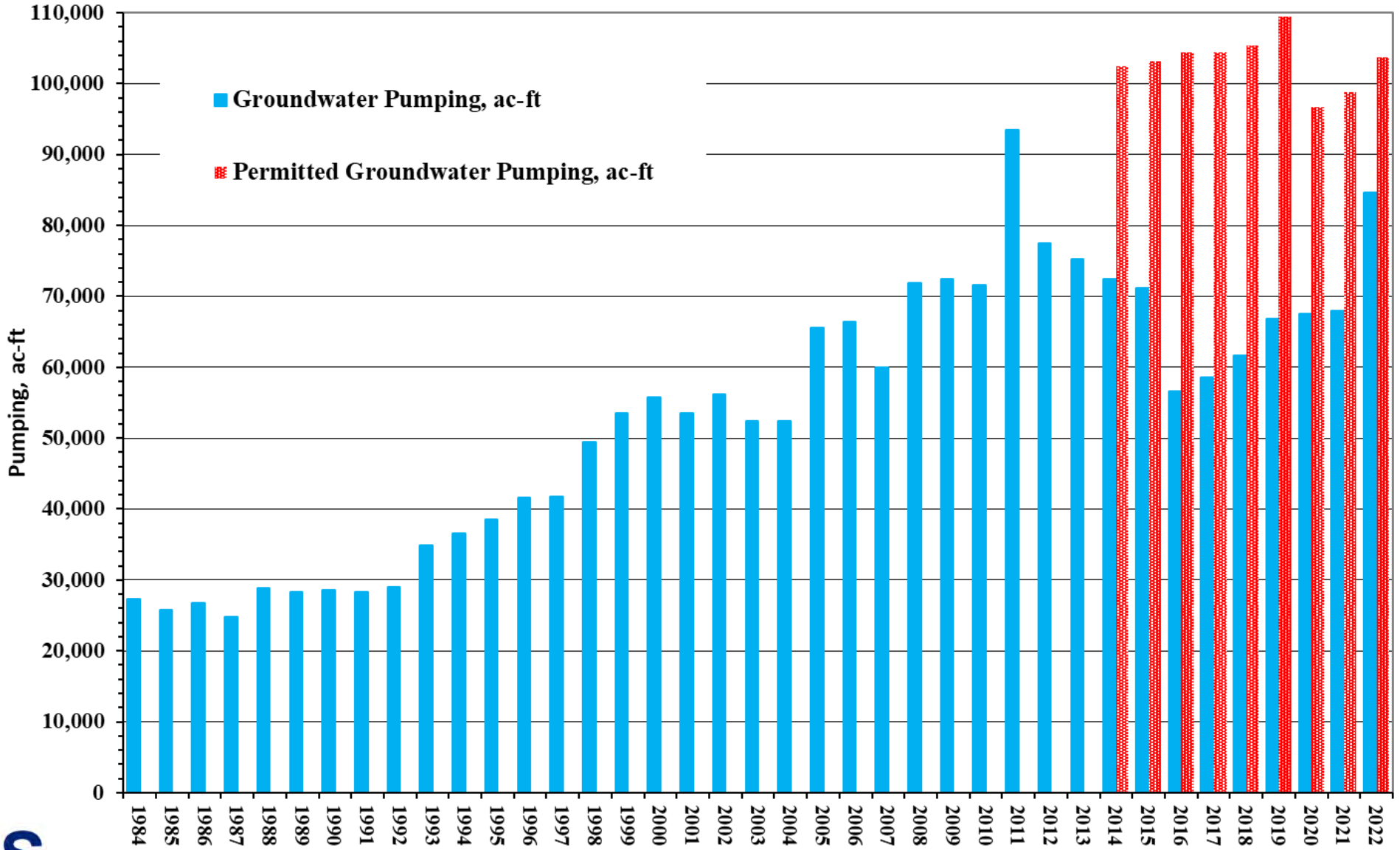

*Combined Pumping from the Chicot, Evangeline, Jasper and Catahoula Aquifers

Source: TWDB and LSGCD

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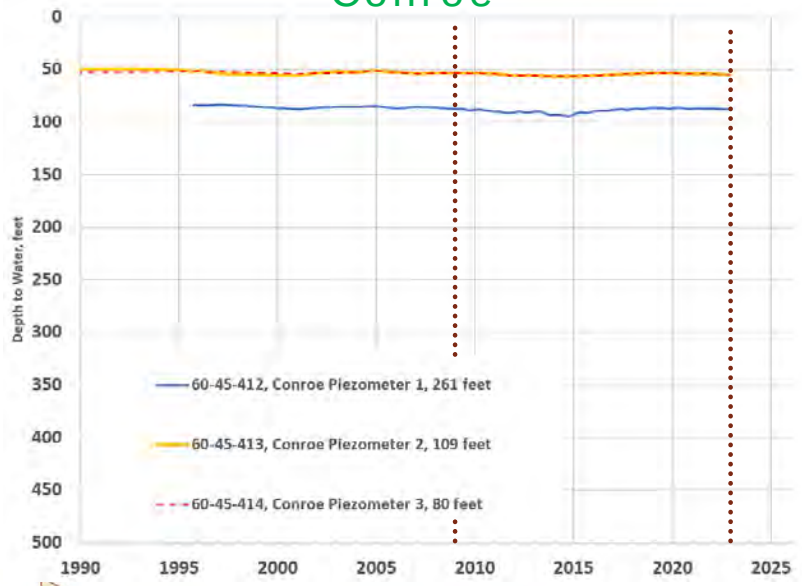
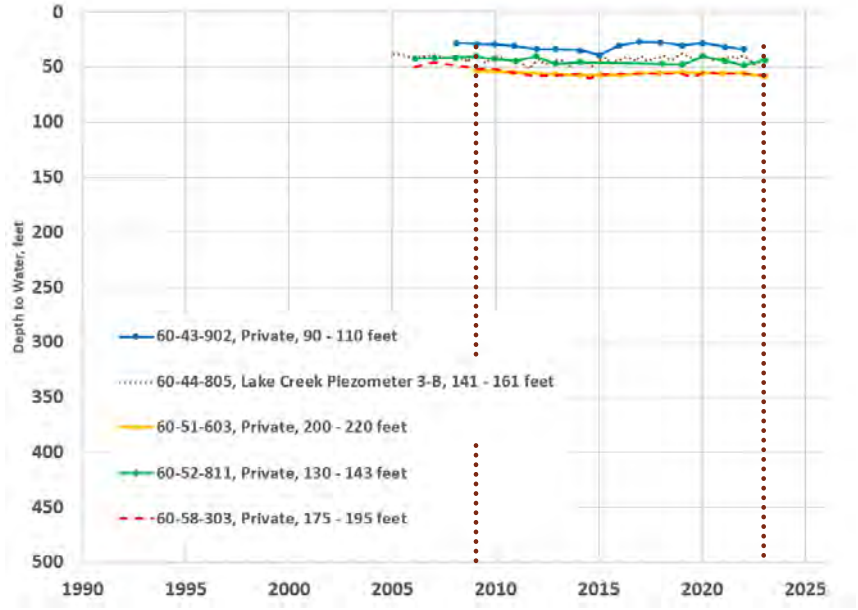
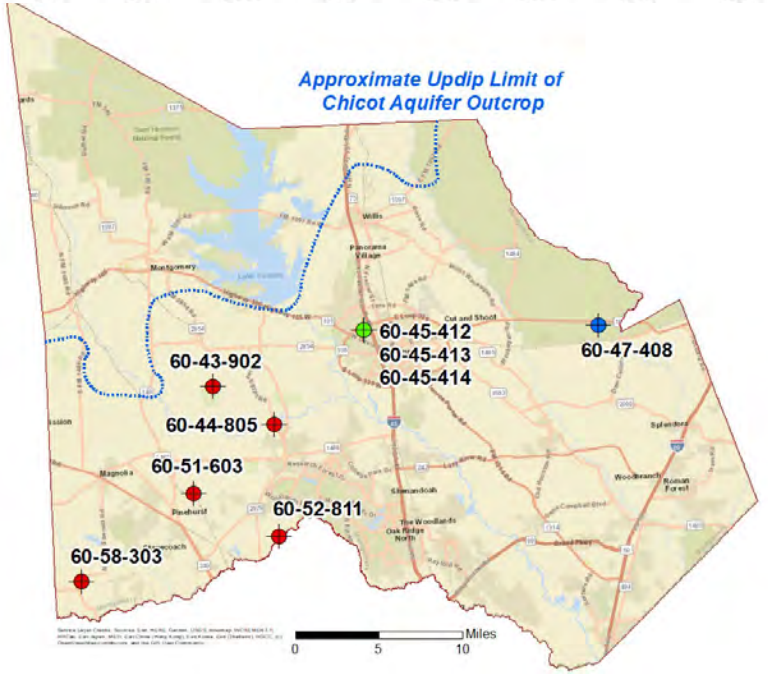
CHICOT AQUIFER HYDROGRAPHS

Conroe



Southwest





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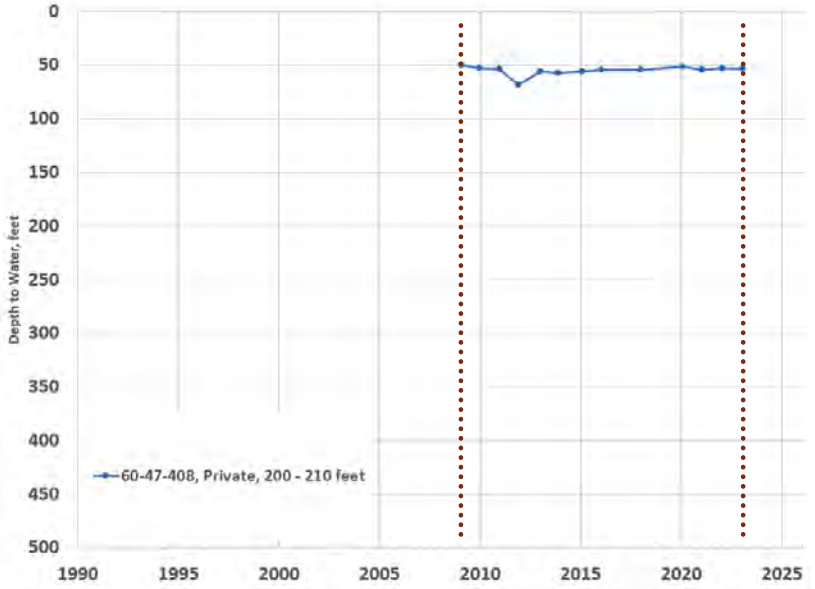
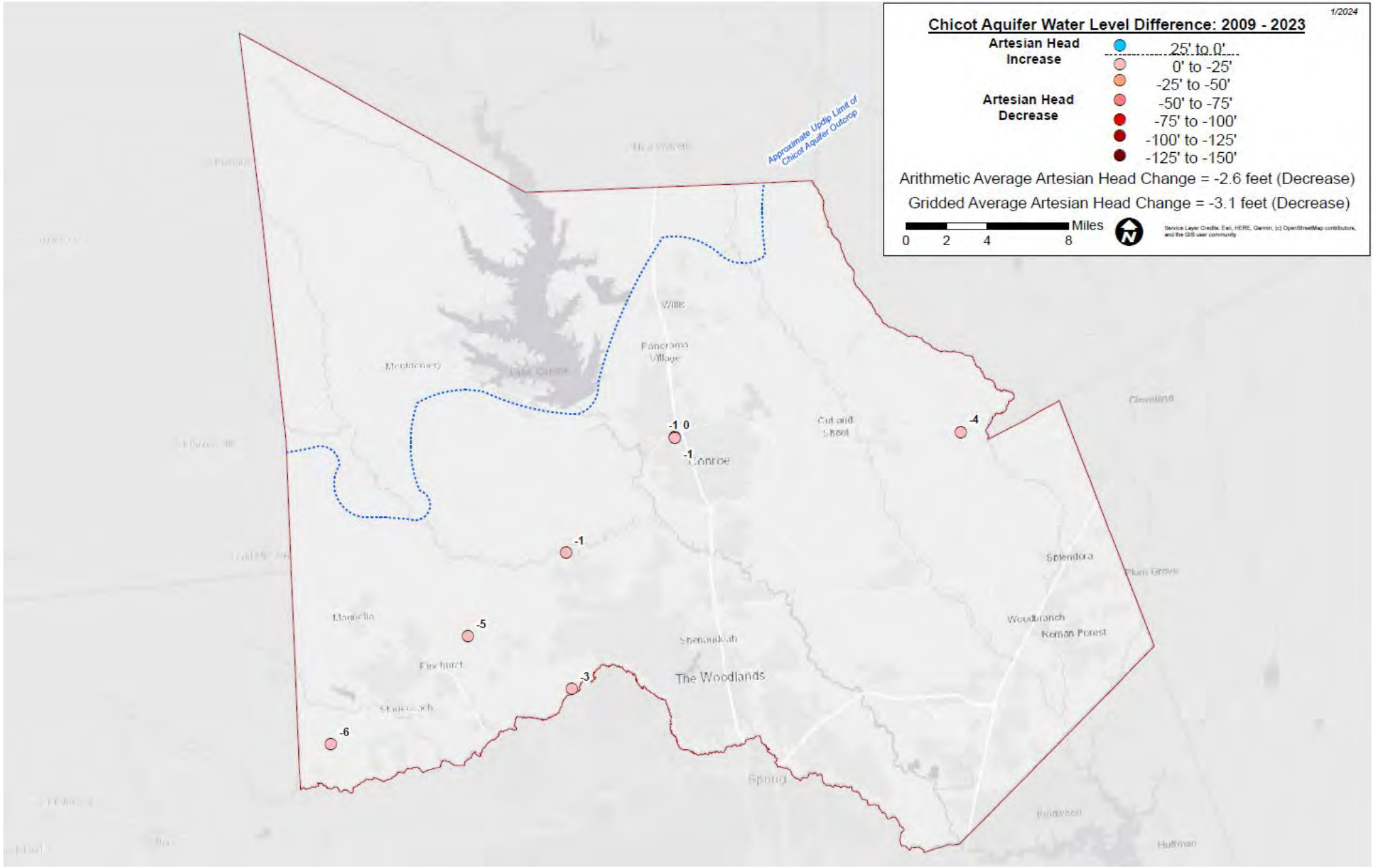


2009 – 2023 CHICOT AQUIFER CHANGE IN ARTESIAN HEAD



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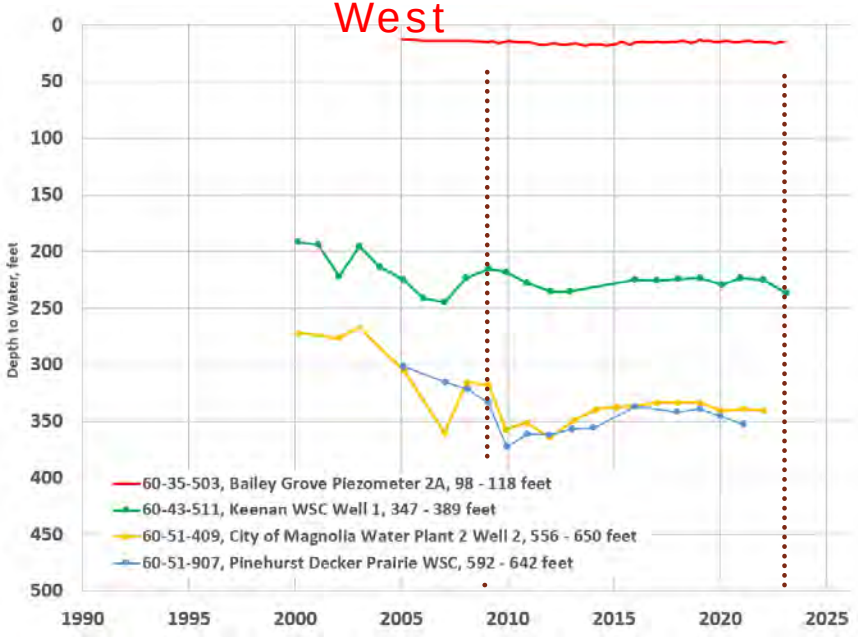
EVANGELINE AQUIFER HYDROGRAPHS (2023)

West



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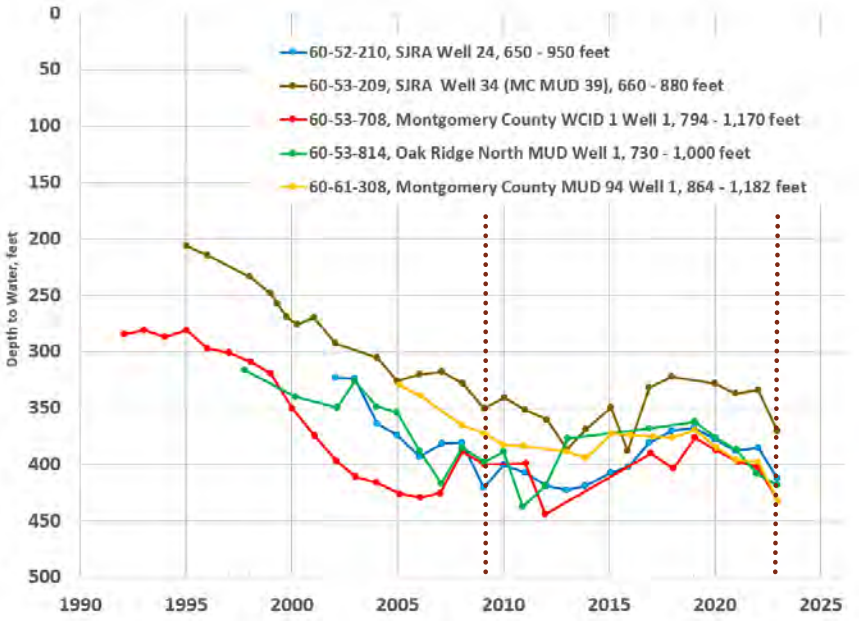

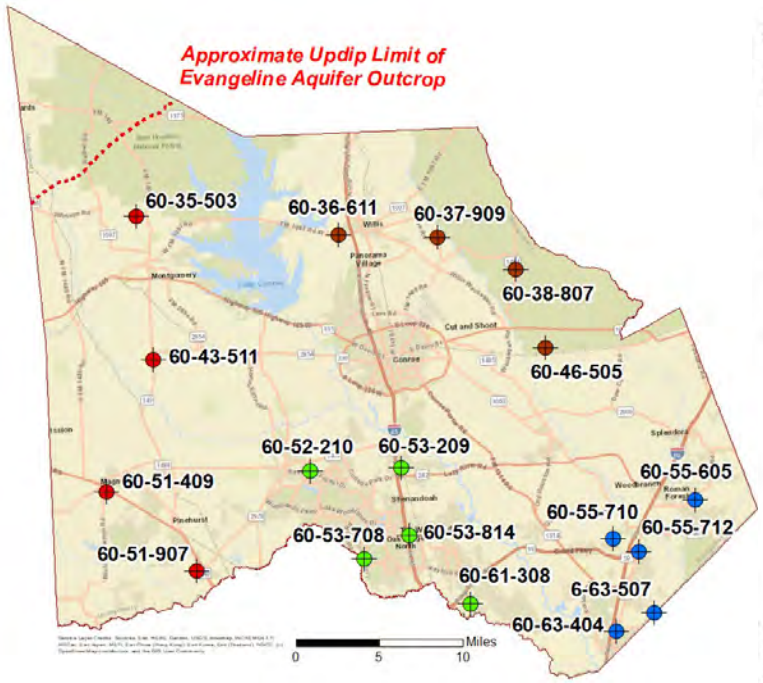

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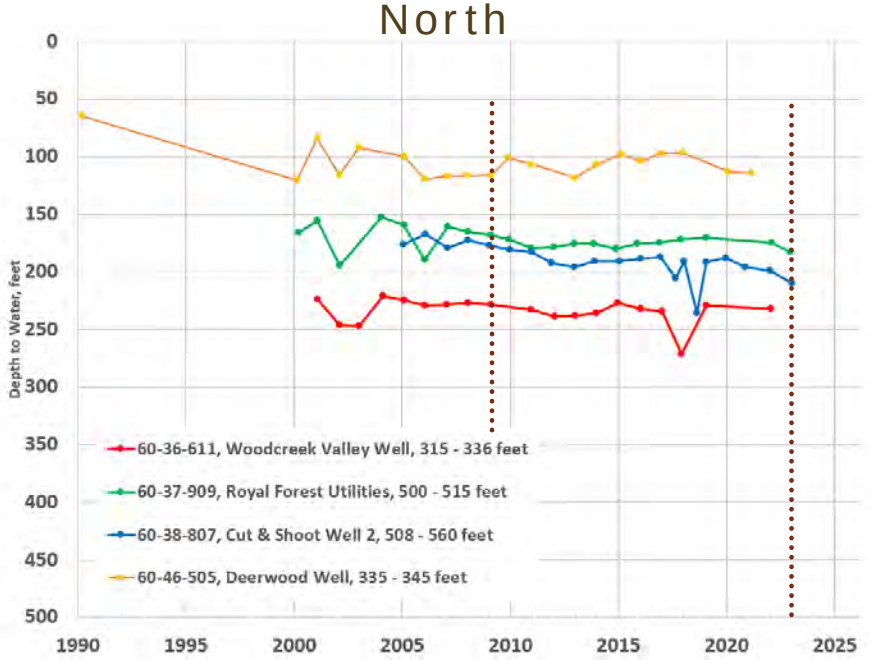

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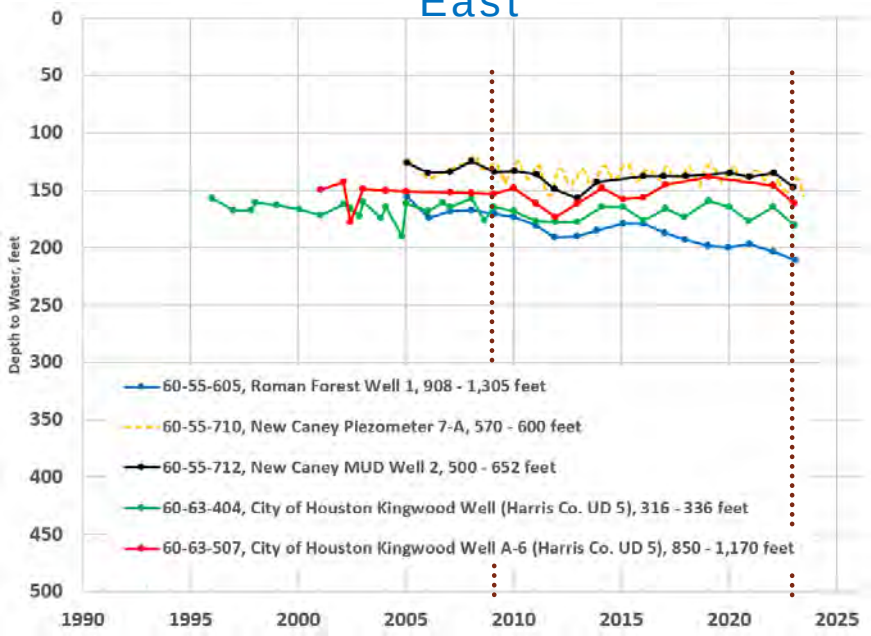
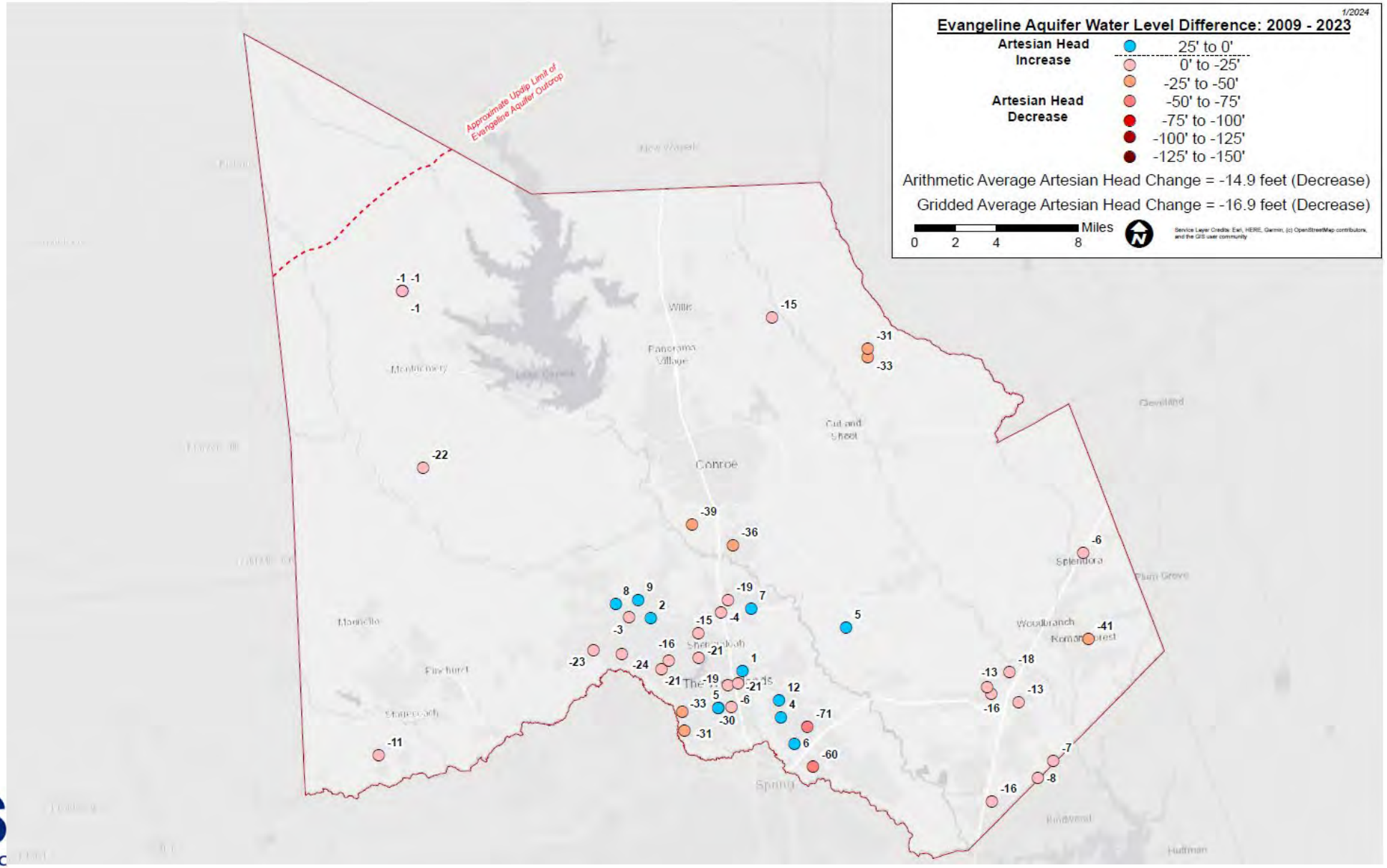


2009 – 2023 EVANGELINE AQUIFER CHANGE IN ARTESIAN HEAD



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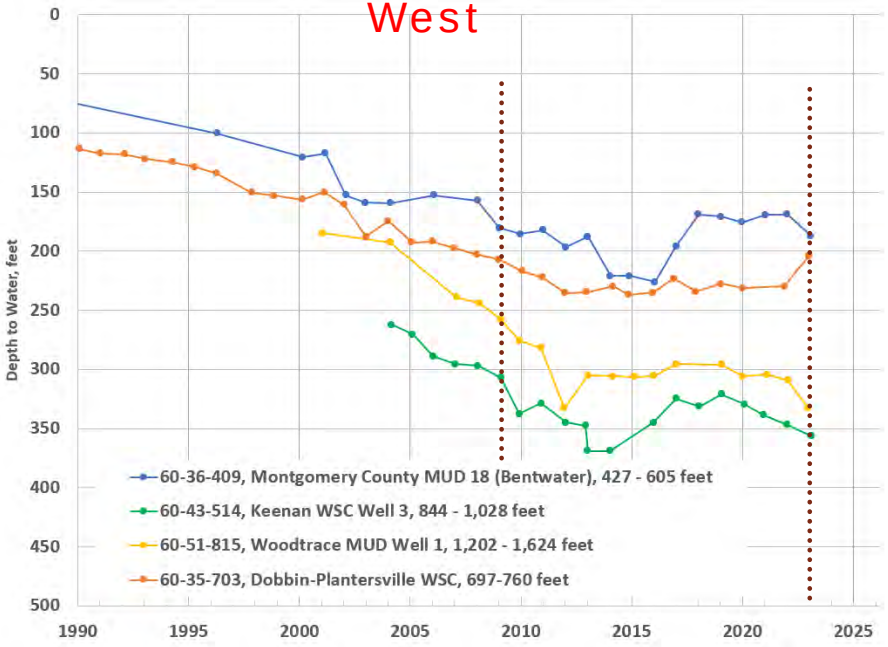
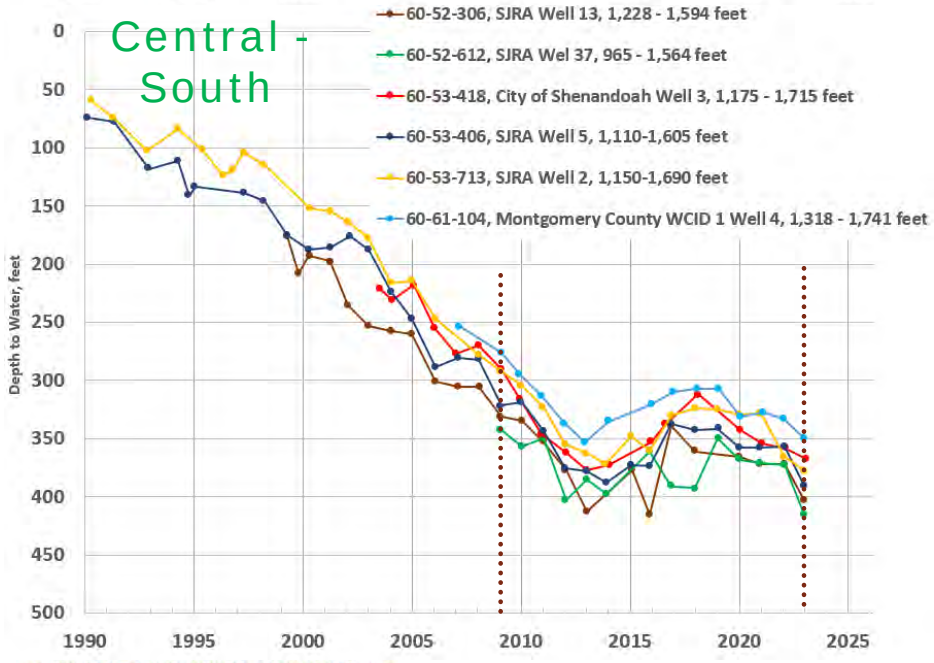
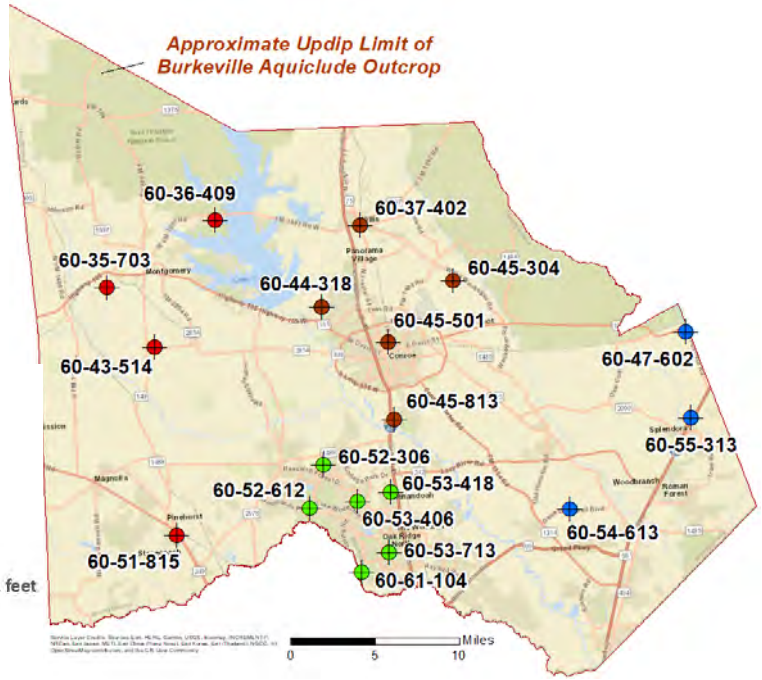
JASPER AQUIFER HYDROGRAPHS

West

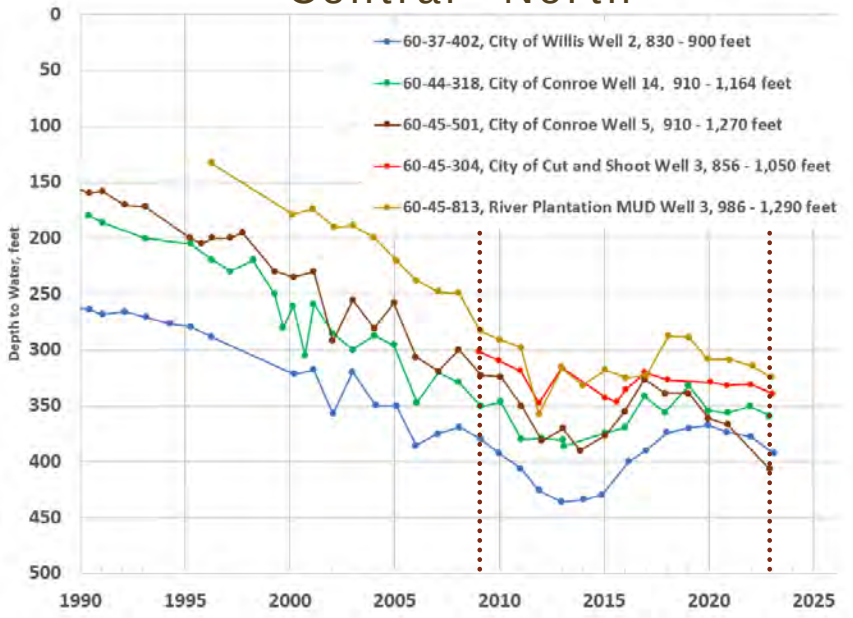


Central - South





Central - North



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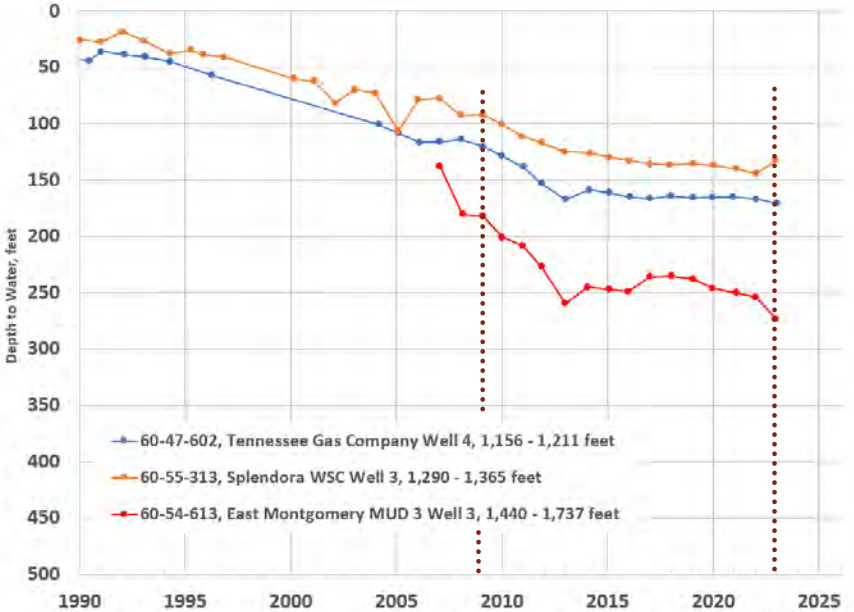
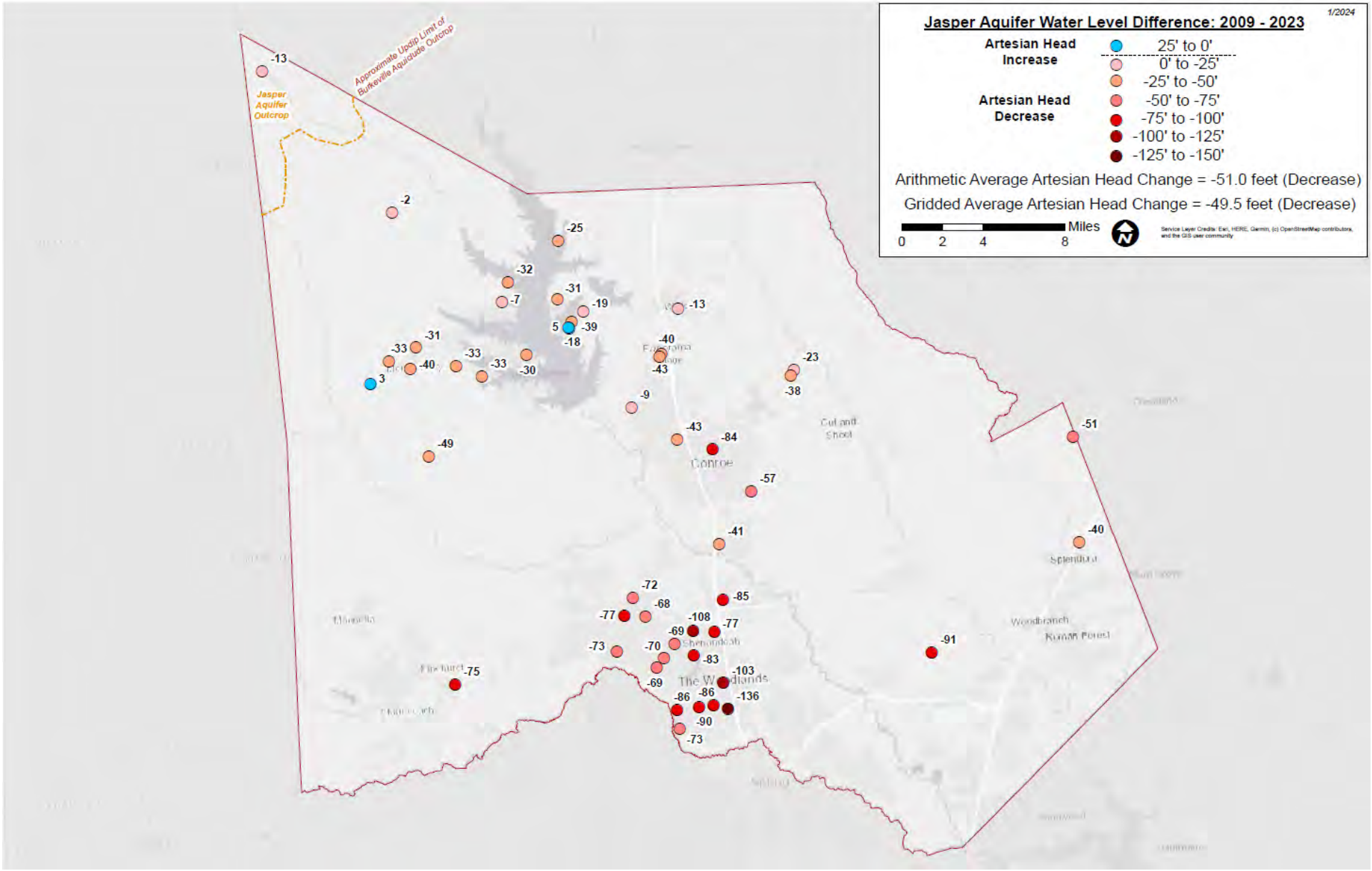


2009 – 2023 JASPER AQUIFER CHANGE IN ARTESIAN HEAD



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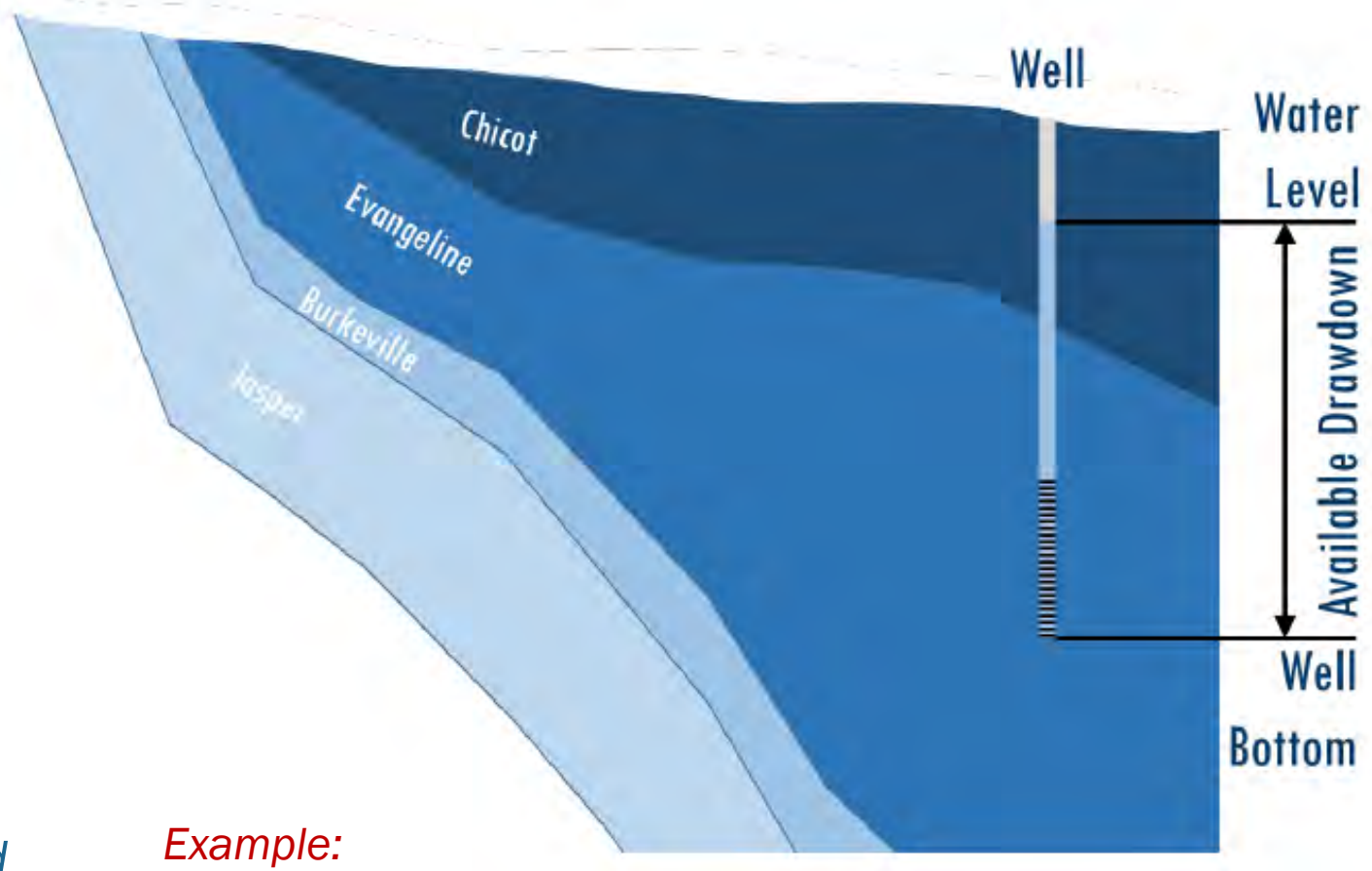
2021 GMA 14 DFC

- *In each county in Groundwater Management Area 14, no less than 70 percent median available drawdown remaining in 2080* ***or no more than an average of 1.0 additional foot of subsidence between 2009 and 2080.*** *(1/5/2022)*

- Montgomery County:
  - Data must be available in both 2009 and 2023
    - Shallowest water level between October and March
      - 2009 (10/2008 – 3/2009)
      - 2023 (10/2022 – 3/2023)

- Methodology:
  - *$(WL_{2023}\text{-}TD)/(WL_{2009}\text{-}TD) * 100$*
  - *Median available drawdown was evaluated*



Example:

- *$(WL_{2023}\text{-}TD)/(WL_{2009}\text{-}TD) * 100$*
- *(347.7'-1,090'/308.0'-1,090') = 0.949 (94.9%)*

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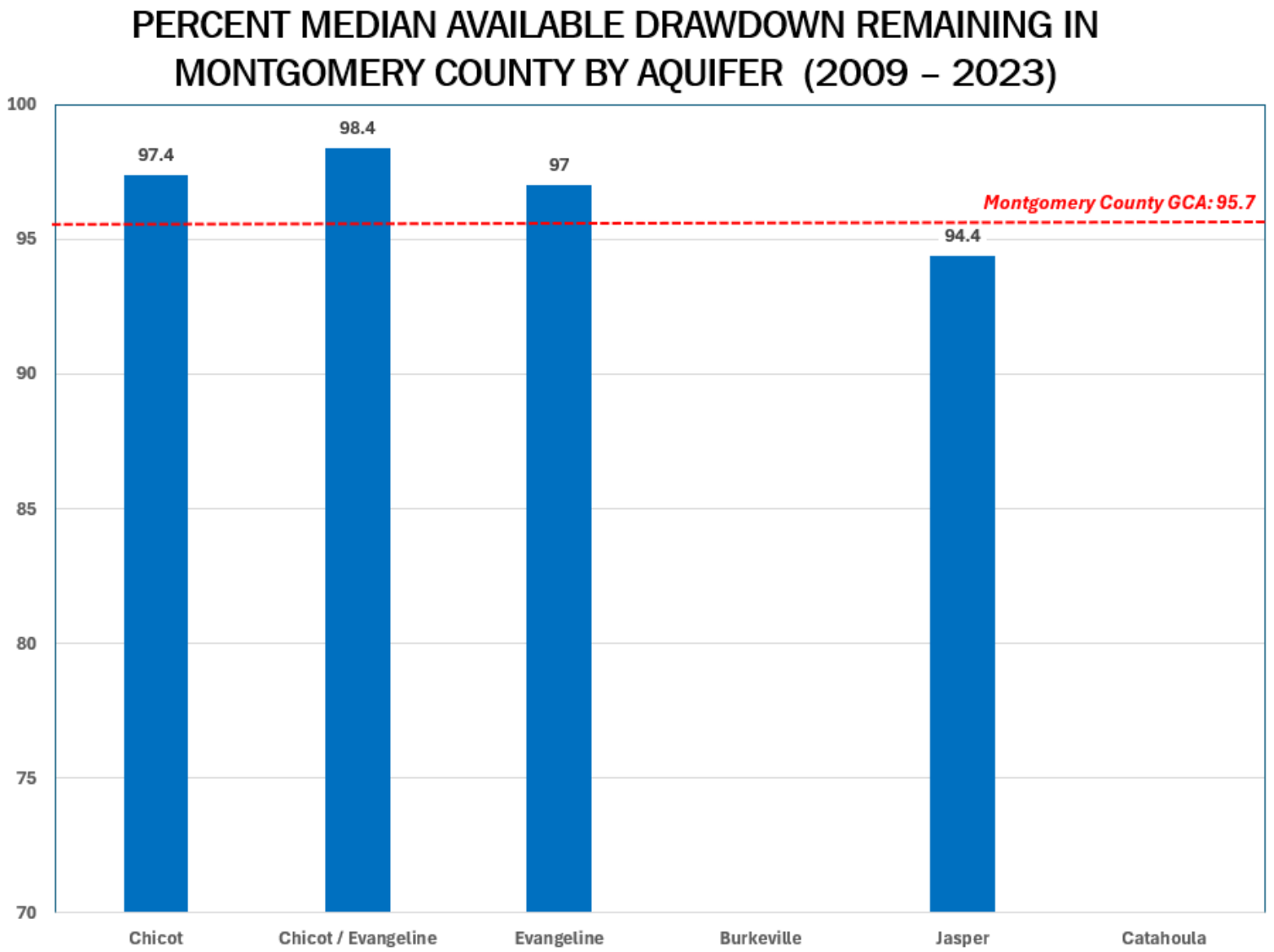
- *Montgomery County:*

Median Available Drawdown Remaining (2009 – 2023):

- *Gulf Coast Aquifer: **95.7%***
- *Methodology:*
  - *$(WL_{2023}\text{-}TD)/(WL_{2009}\text{-}TD) * 100$*
  - *Median Available Drawdown was Evaluated*
  - *103 Wells in Montgomery County with 2009 and 2023 Water Level Measurements*



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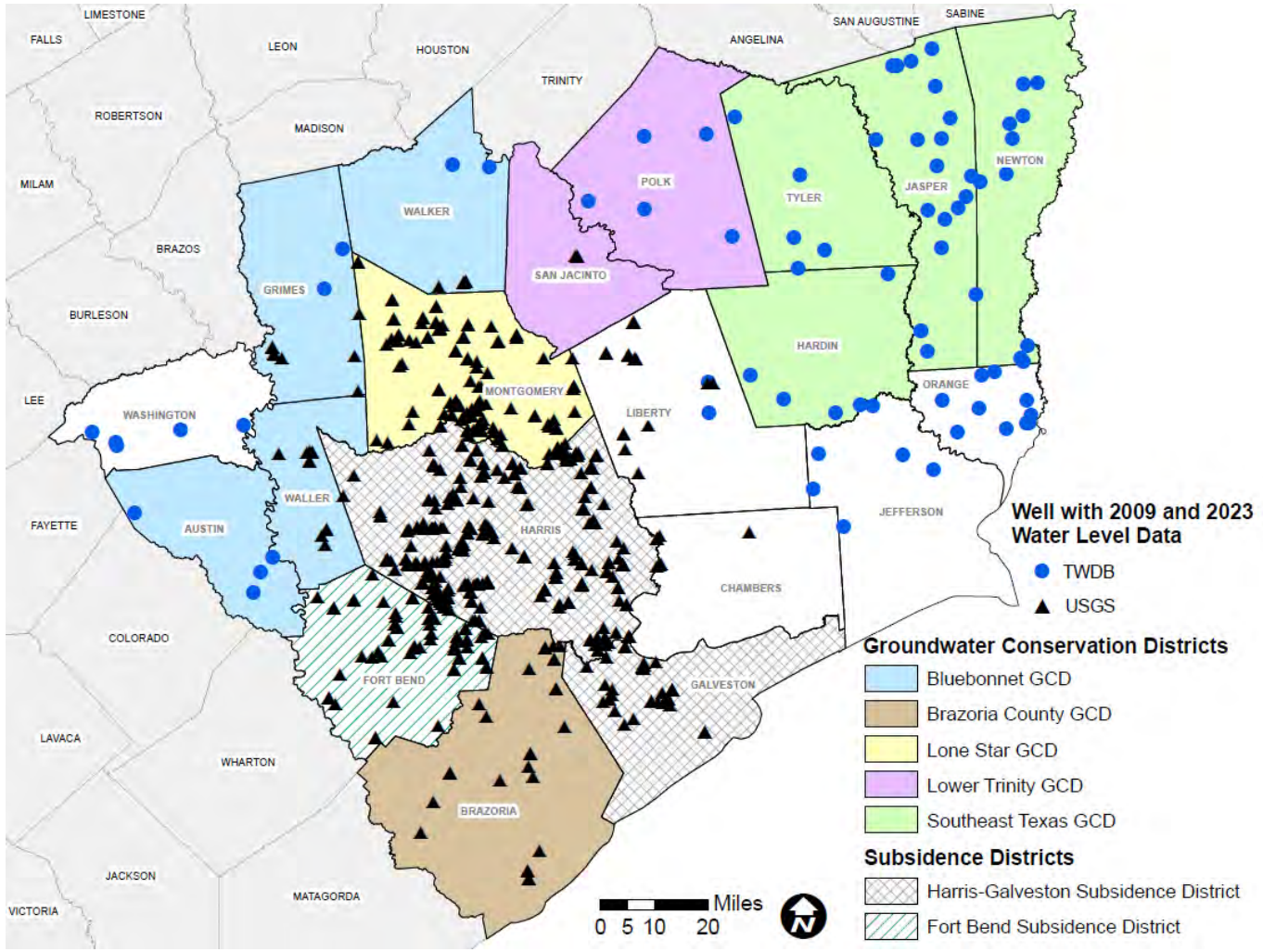
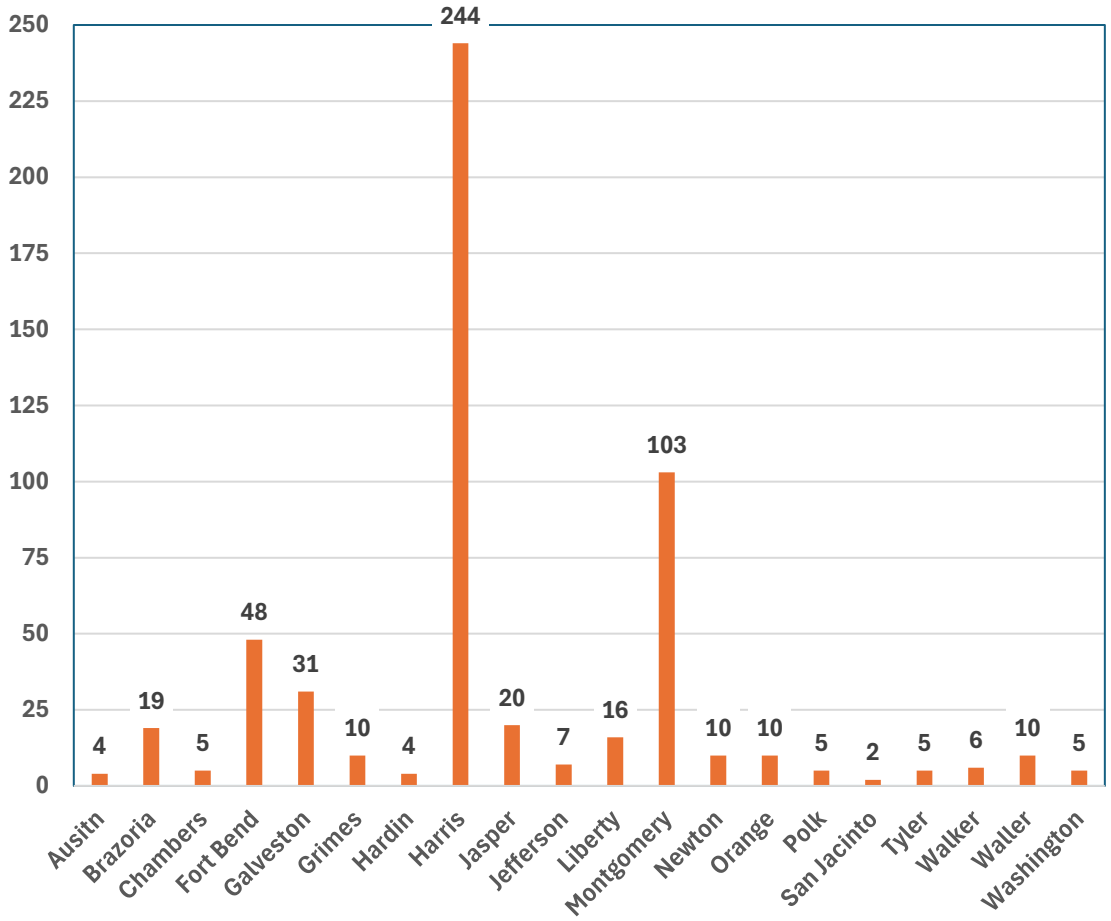
GMA 14 - DATA AVAILABILITY



Number of Wells with Static Water Level Data in 2009 and 2023



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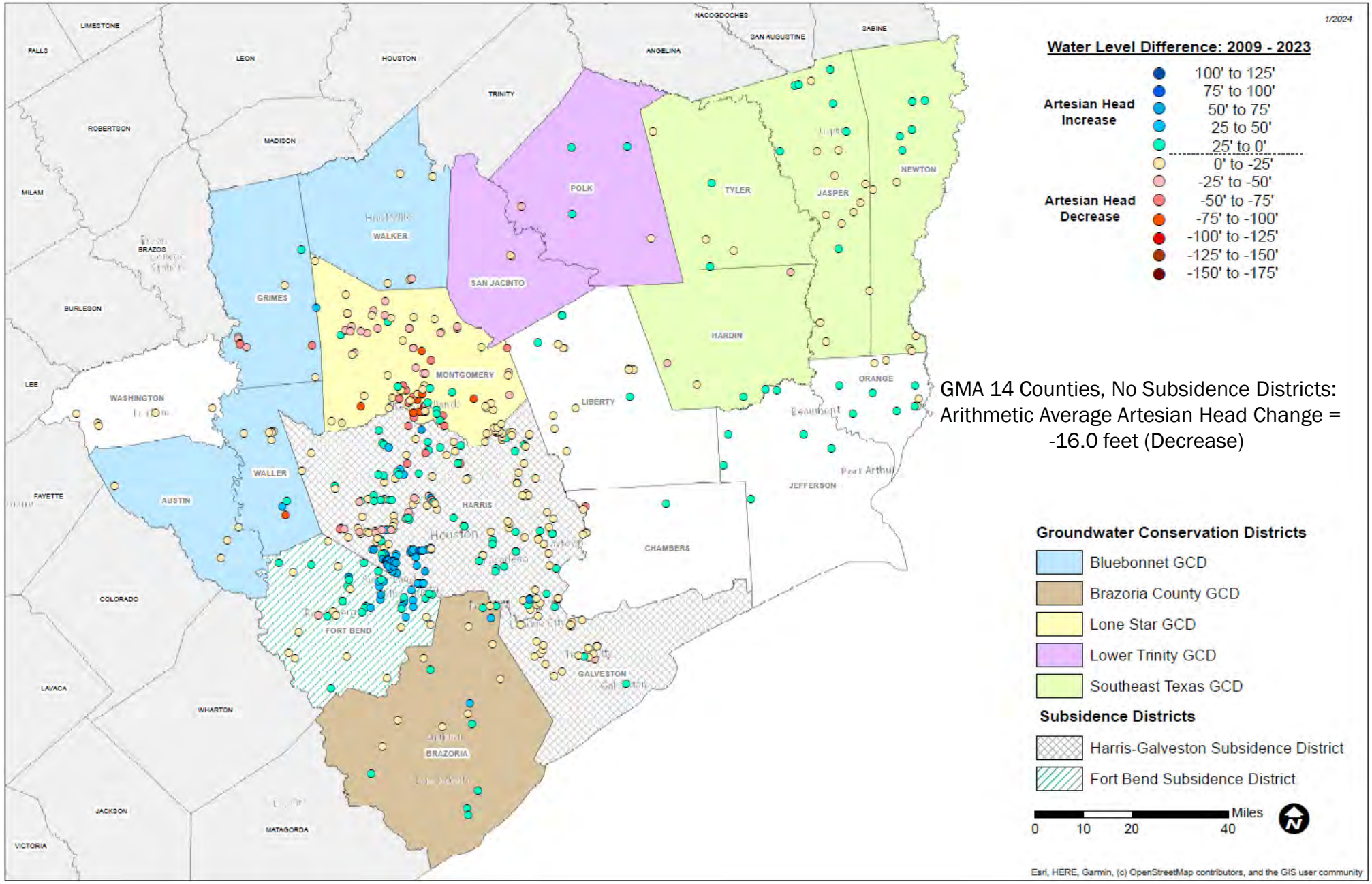
GMA 14 GULF COAST AQUIFER

ALL COUNTIES WITHIN GMA 14



GMA 14 Counties, No Subsidence Districts: Arithmetic Average Artesian Head Change = -16.0 feet (Decrease)

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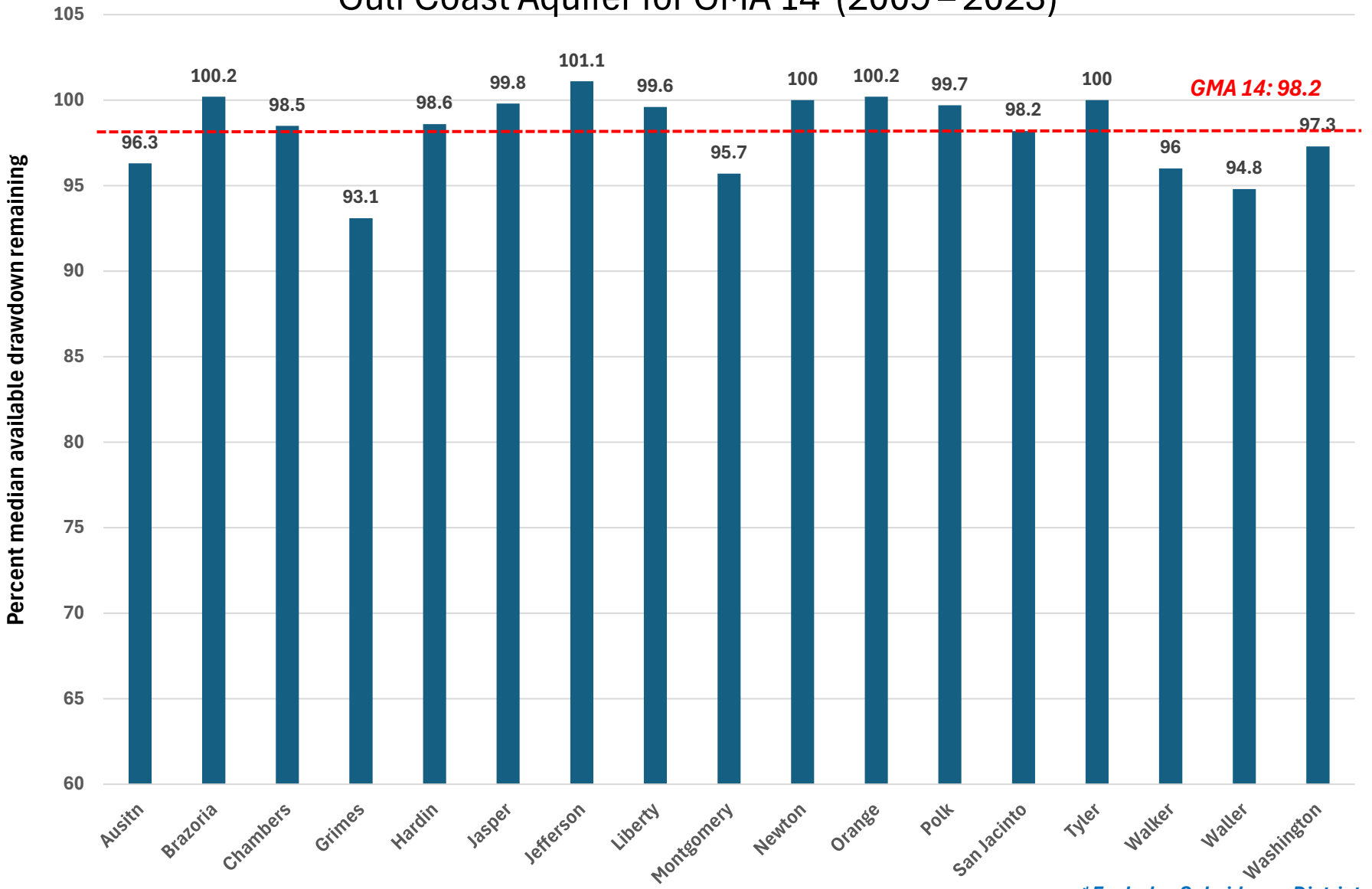
Percent Median Available Drawdown Remaining by County in the Gulf Coast Aquifer for GMA 14 (2009 – 2023)



*Excludes Subsidence Districts

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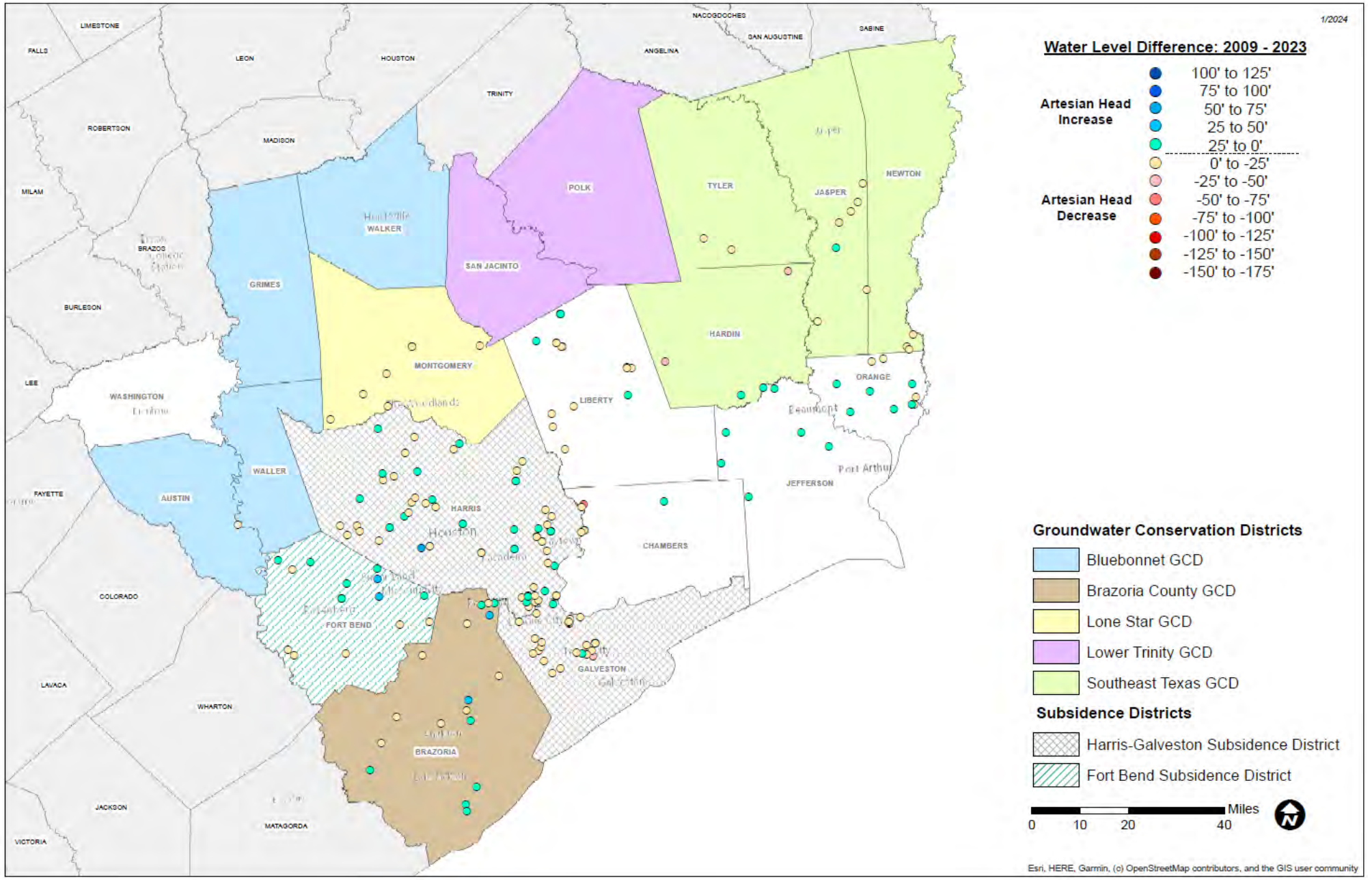
GMA 14

CHICOT AQUIFER



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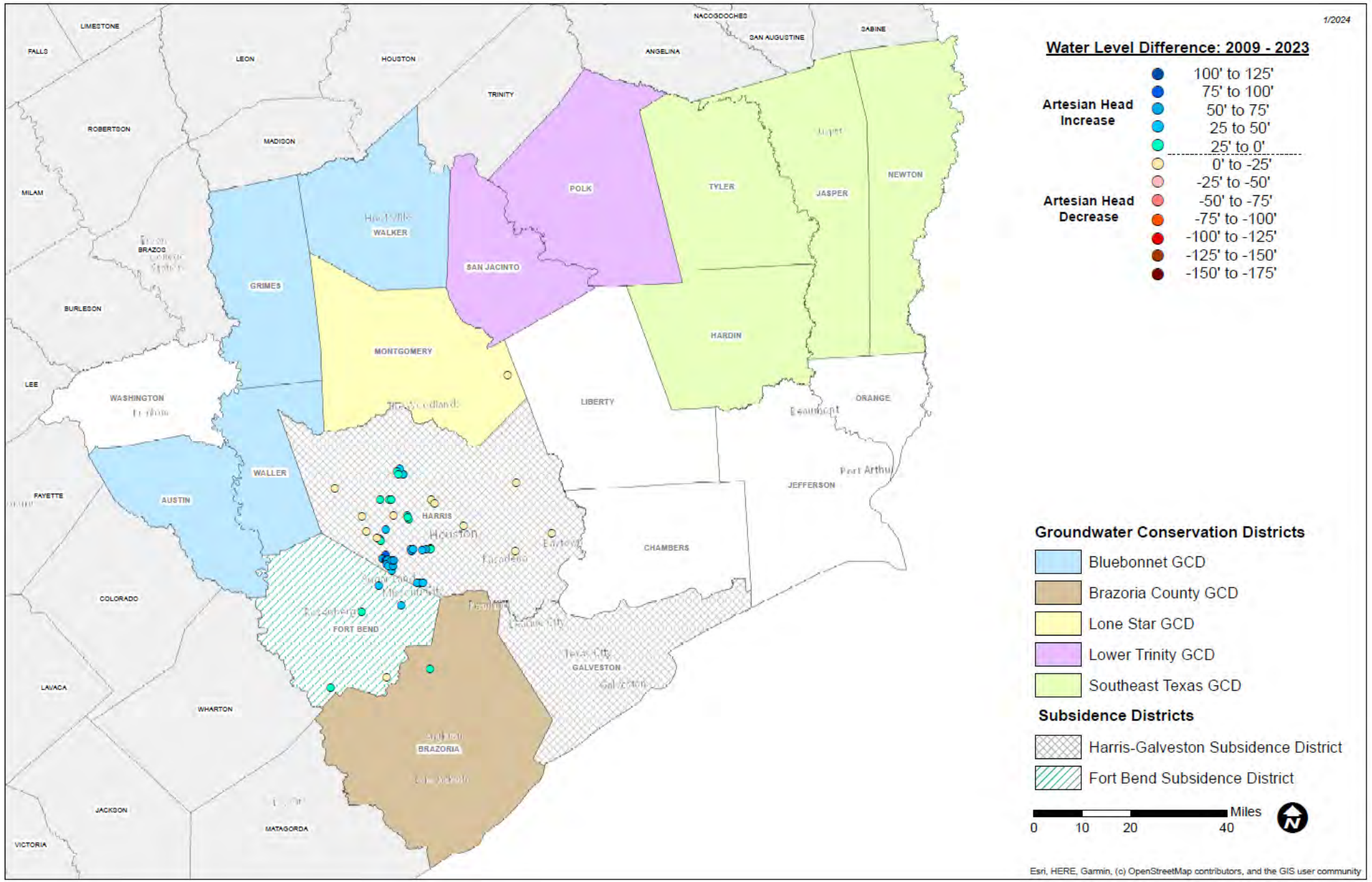
GMA 14

CHICOT / EVANGELINE AQUIFER



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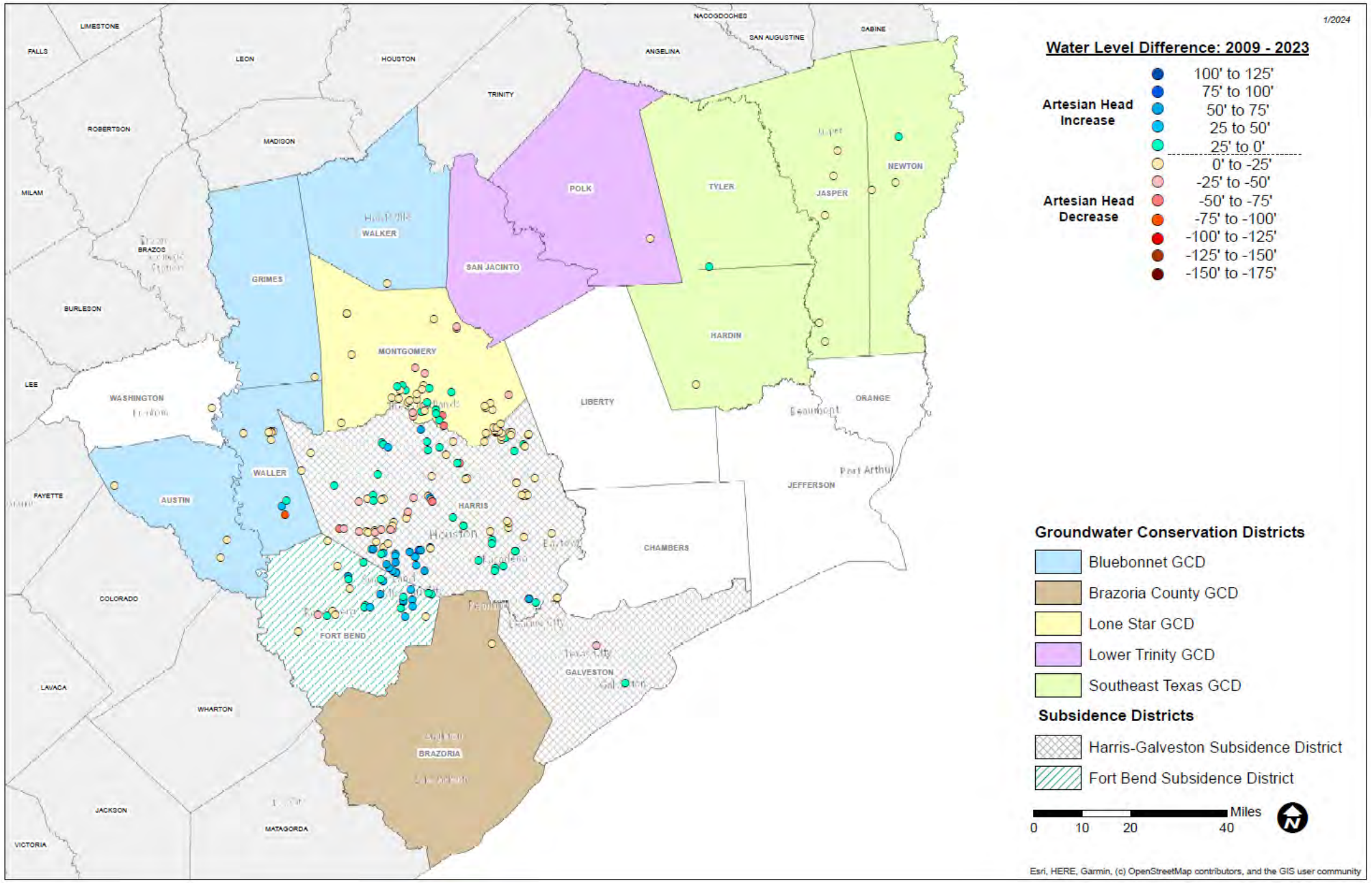
GMA 14

EVANGELINE AQUIFER



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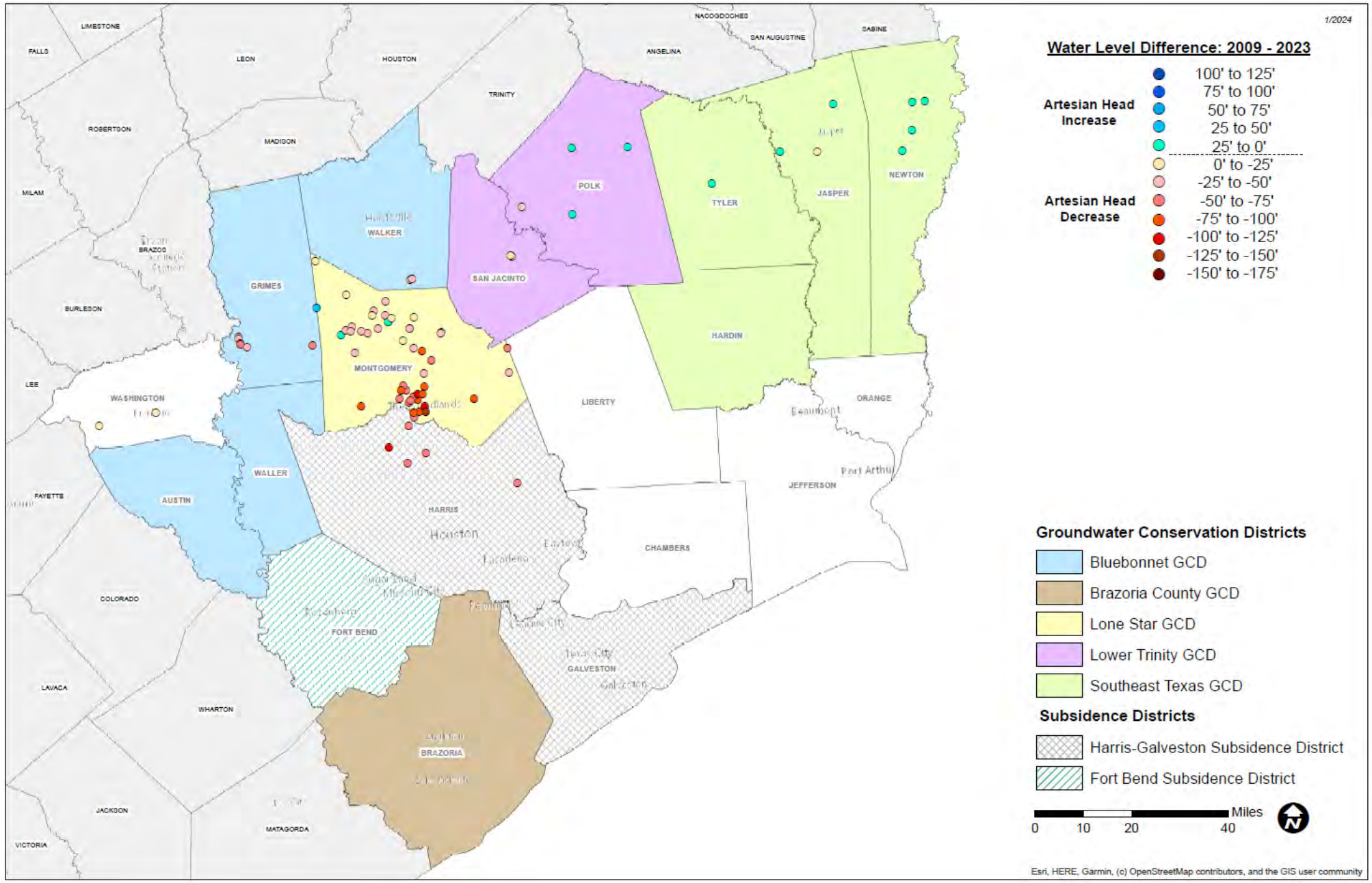
GMA 14

JASPER AQUIFER



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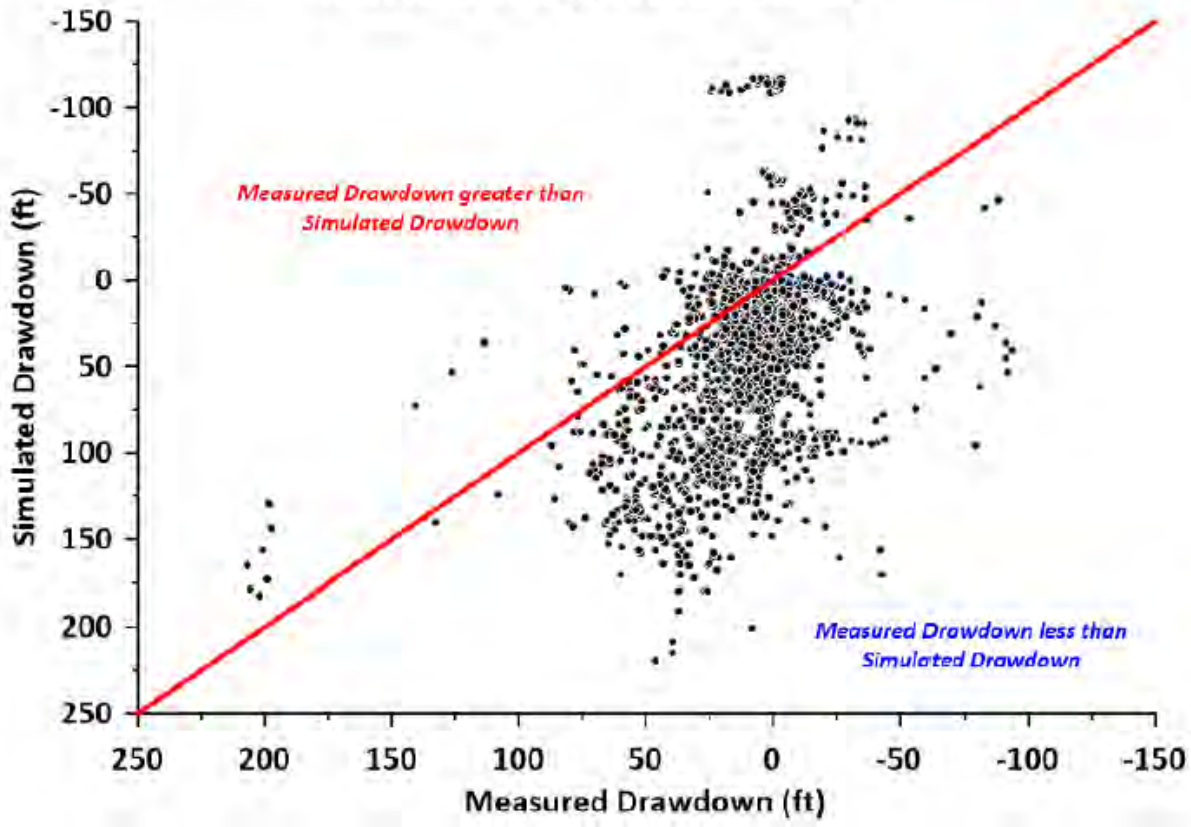
Comparison of Measured Drawdown with Simulated Drawdowns from the Desired Future Conditions Adopted in 2021 in Groundwater Management Area 14: 2010 to 2022

Prepared for:
Zach Holland
General Manager
Bluebonnet Groundwater Conservation District
P.O. Box 269
Navasota, TX 77868-0269

Prepared by:
William R. Hutchison, Ph.D., P.E., P.G.
Independent Groundwater Consultant
9305 Jamaica Beach
Jamaica Beach, TX 77554
512-745-0599
billhutch@texasgw.com

Measured Drawdown vs. Simulated Drawdown in GMA 14 (2010 to 2022)
Excluded Layer 3 and Excluded Subsidence District Wells
2009 Base Year (2,717 Data Points)



- Summary of Results:
  - Overall, the comparison of actual drawdown data and simulated drawdown data from the HAGM simulation used as part of the joint planning process shows that current actual drawdowns are consistent with the 2021 desired future condition statement.

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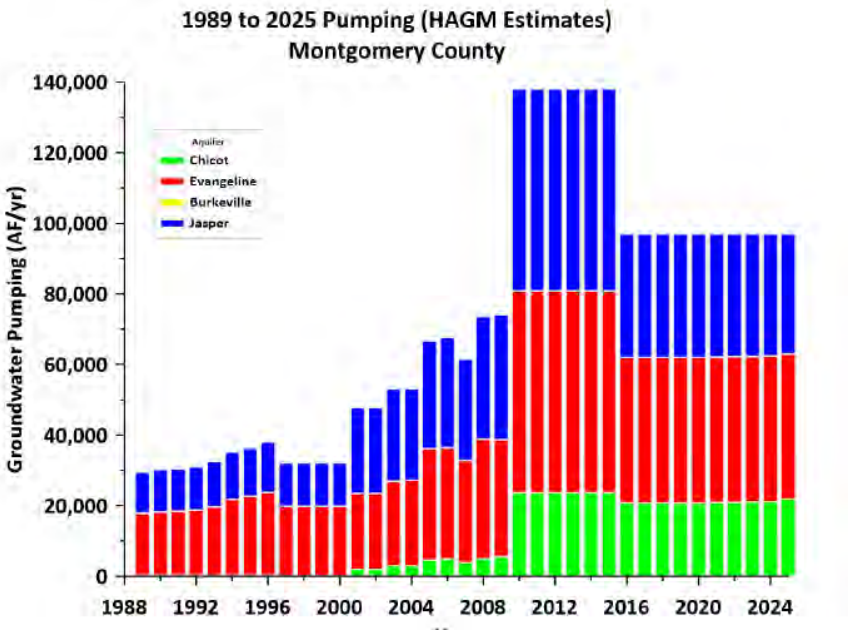
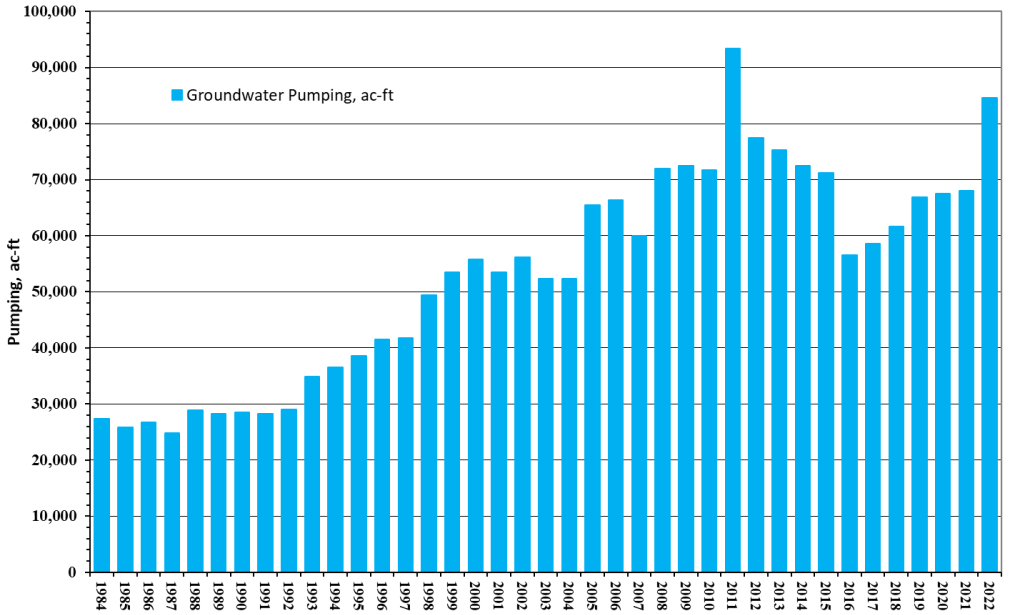
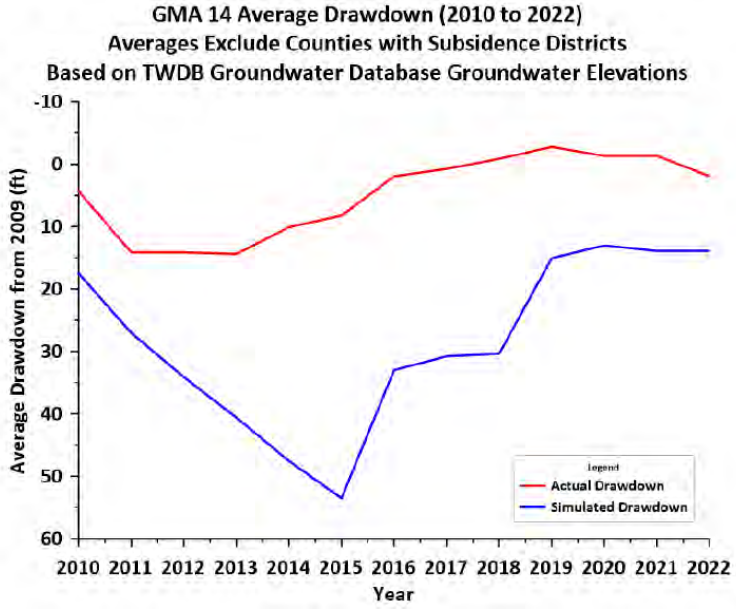
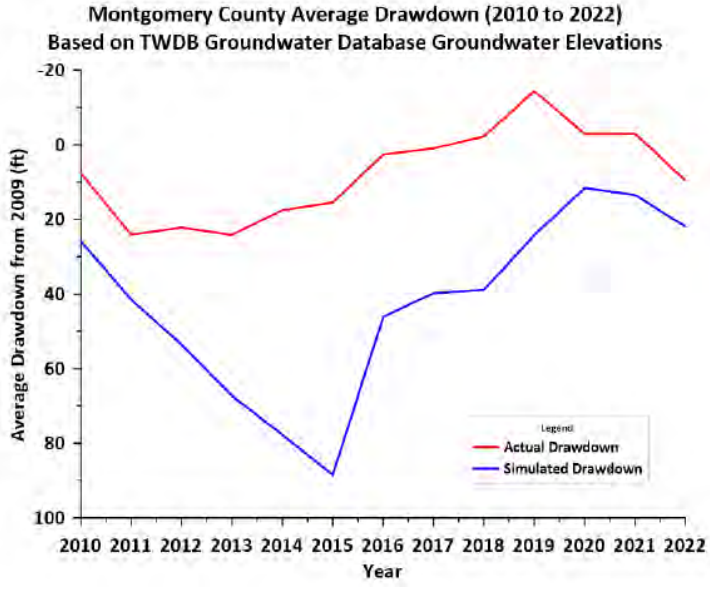
HISTORICAL MONTGOMERY COUNTY PUMPING









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