Lone Star Groundwater Conservation District

2023 ARTESIAN HEAD CHANGE UPDATE

FEBRUARY 13, 2024

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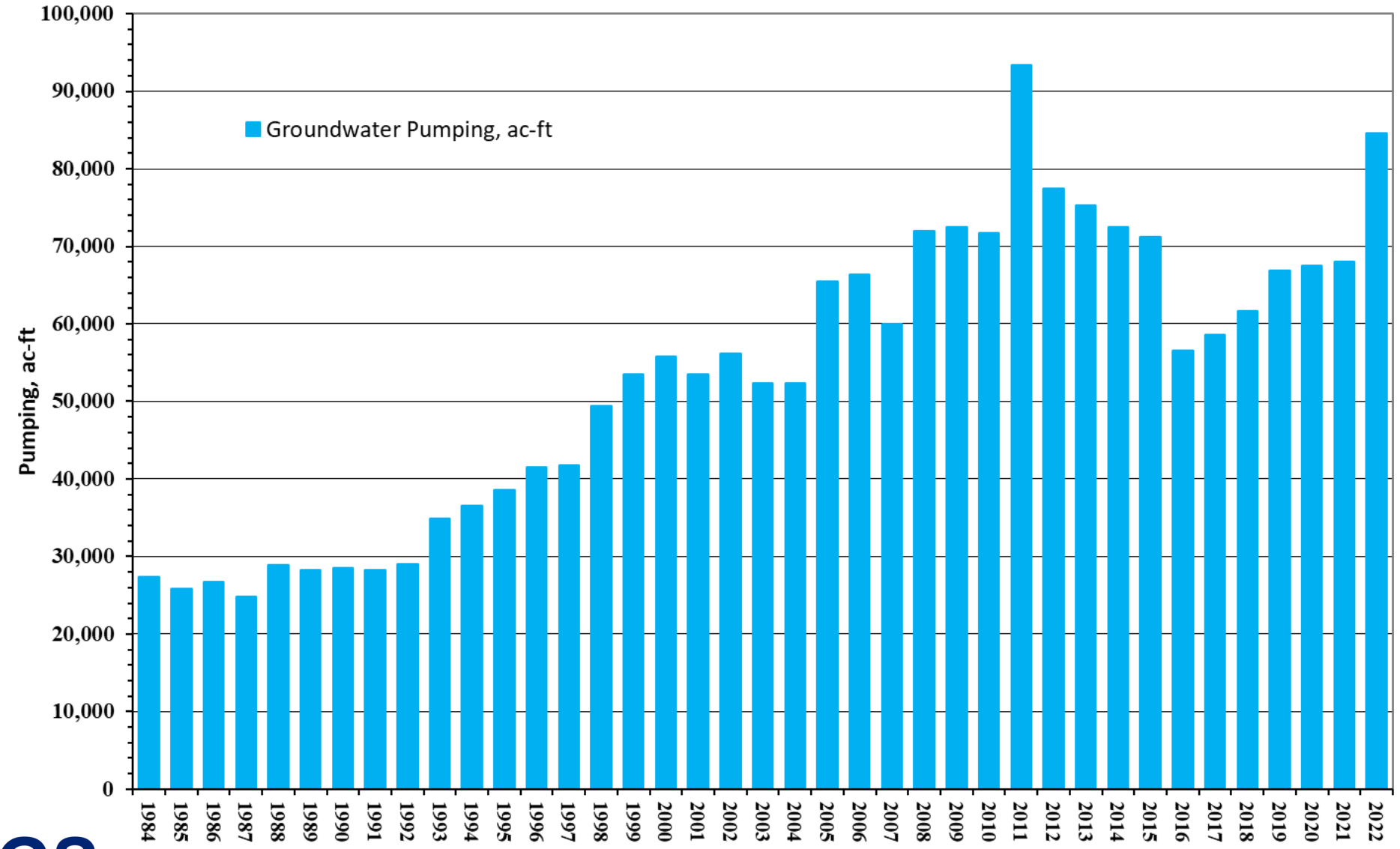
OVERVIEW

- 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

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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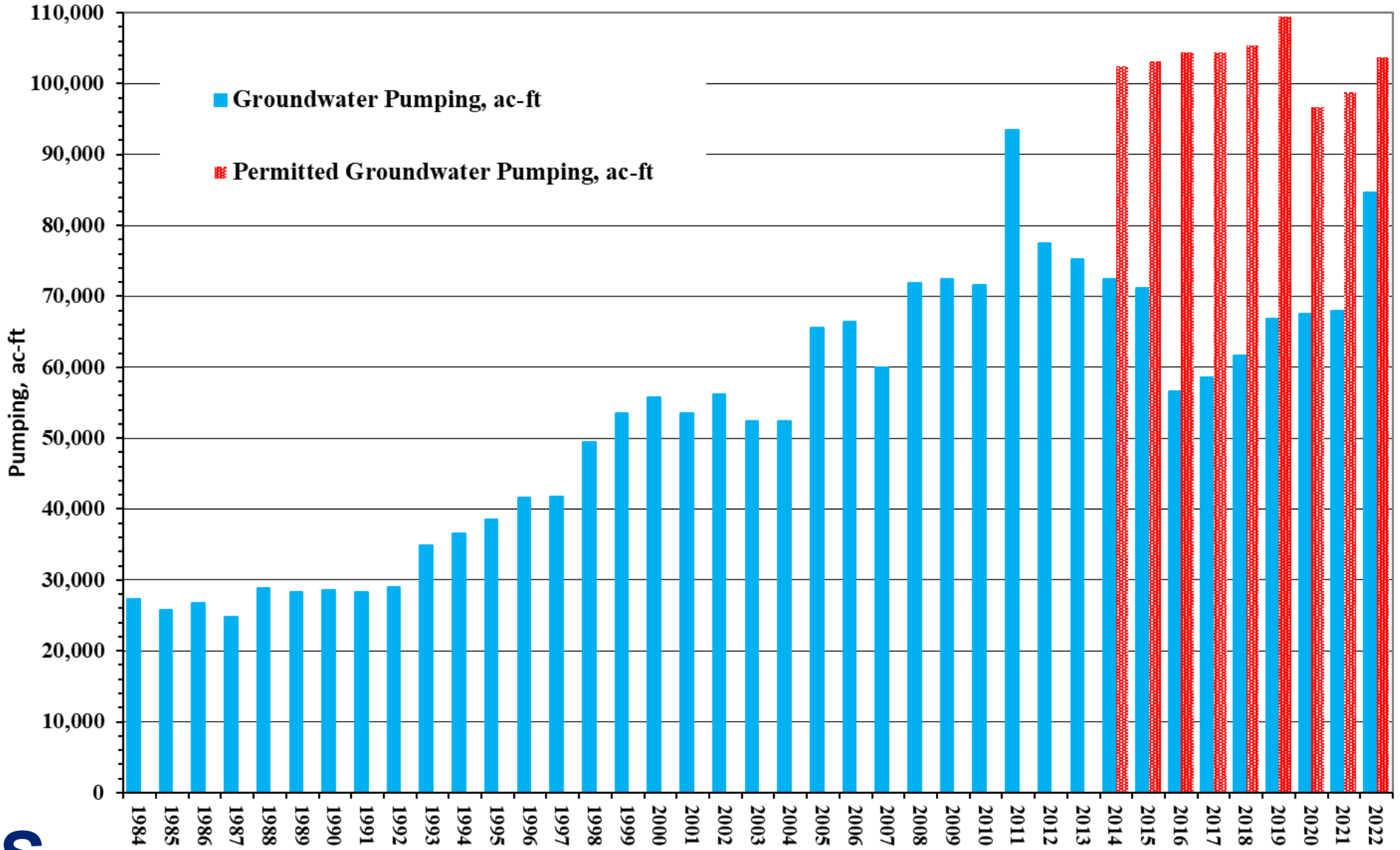

*Combined Pumping from the Chicot, Evangeline, Jasper and Catahoula Aquifers

Source: TWDB and LSGCD

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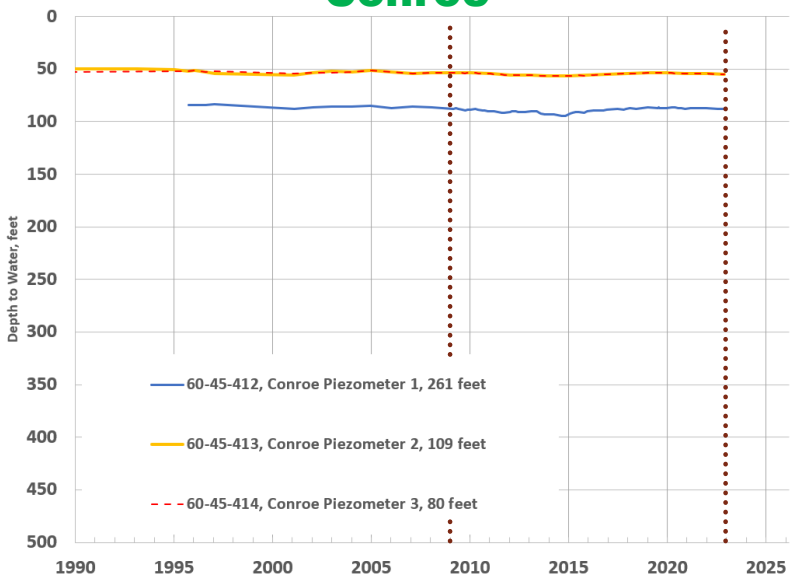
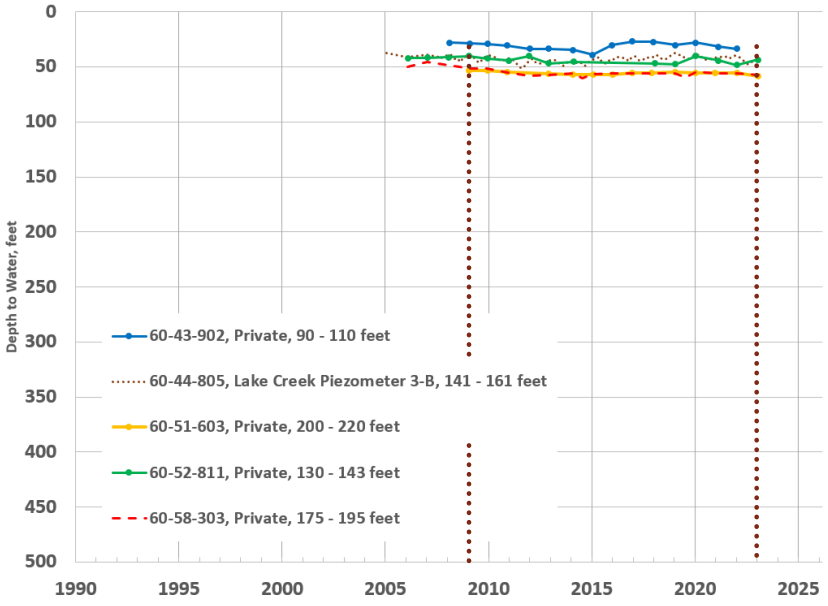
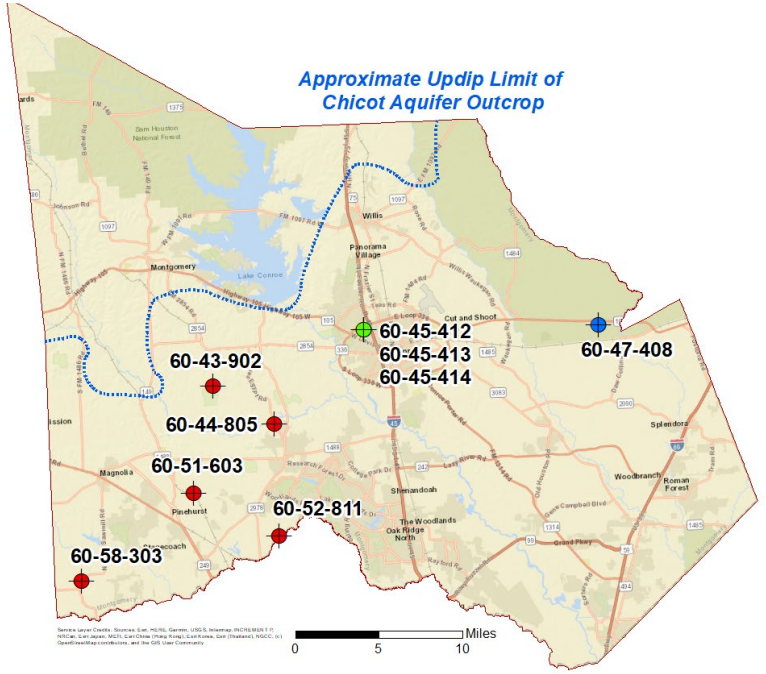
CHICOT AQUIFER HYDROGRAPHS

Conroe



Southwest





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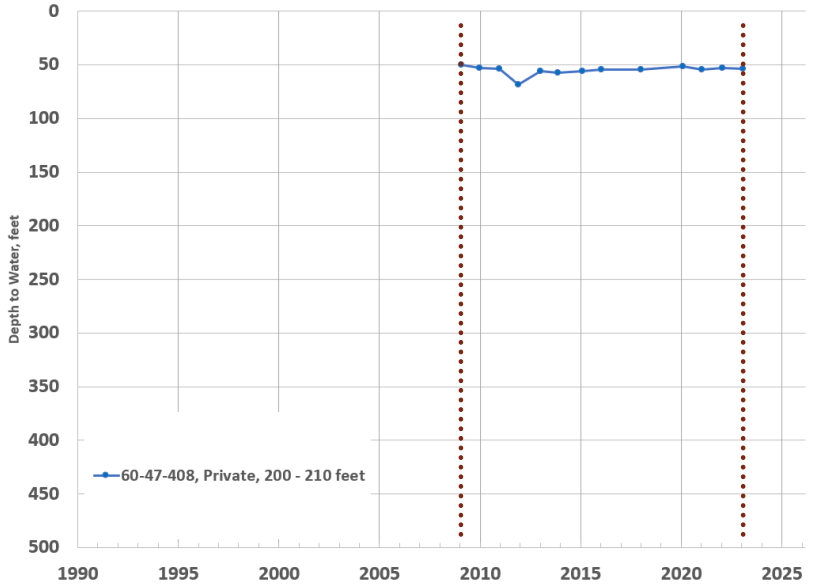
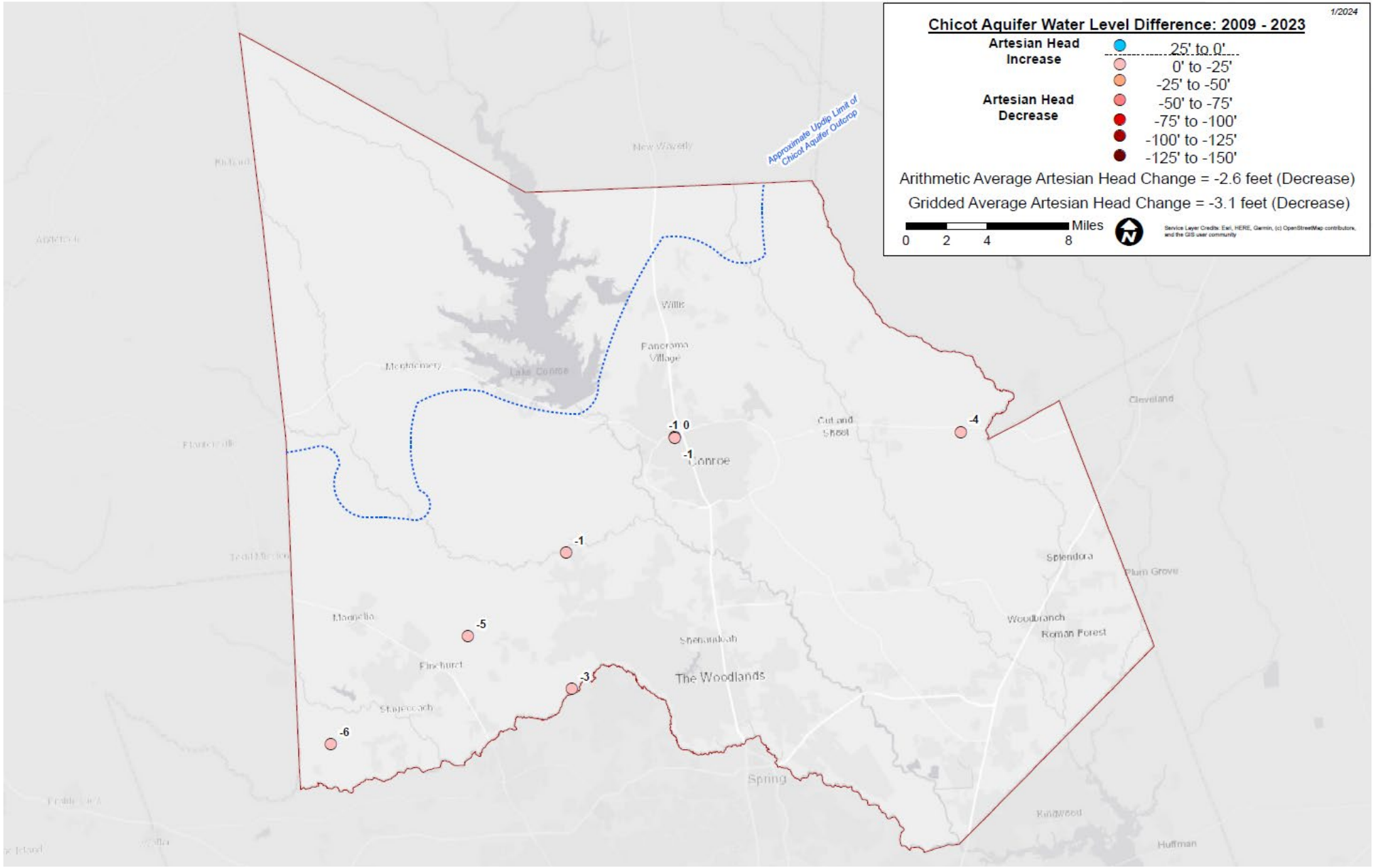


2009 – 2023 CHICOT AQUIFER CHANGE IN ARTESIAN HEAD



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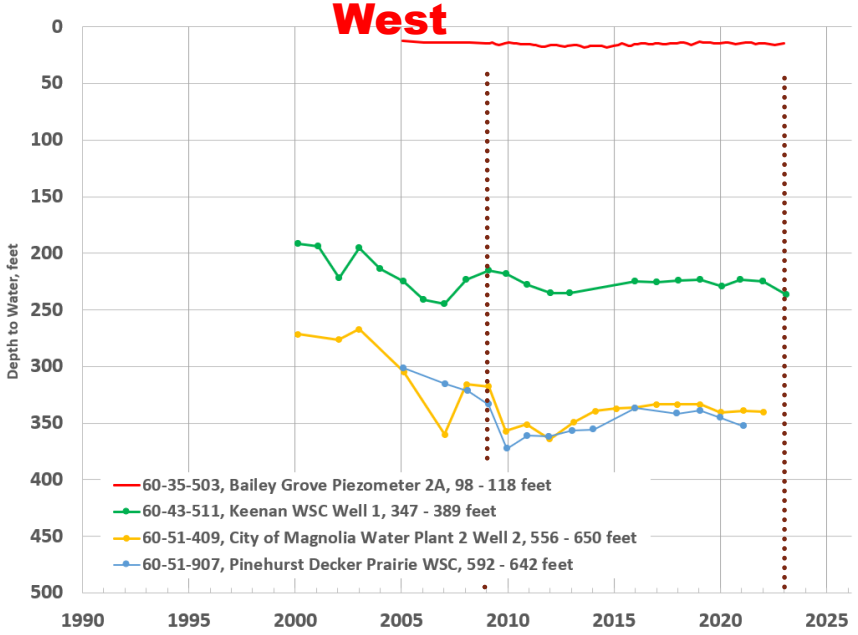
EVANGELINE AQUIFER HYDROGRAPHS (2023)

West



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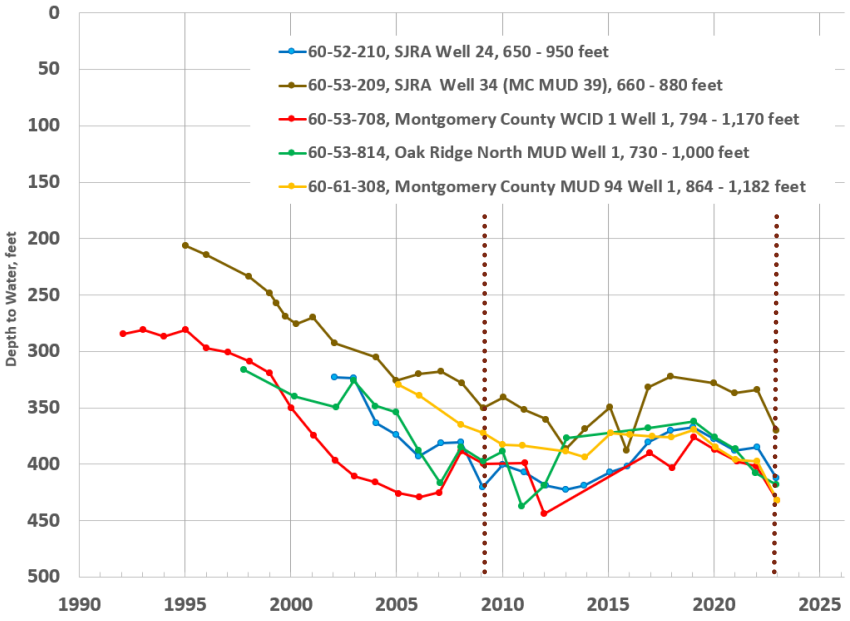

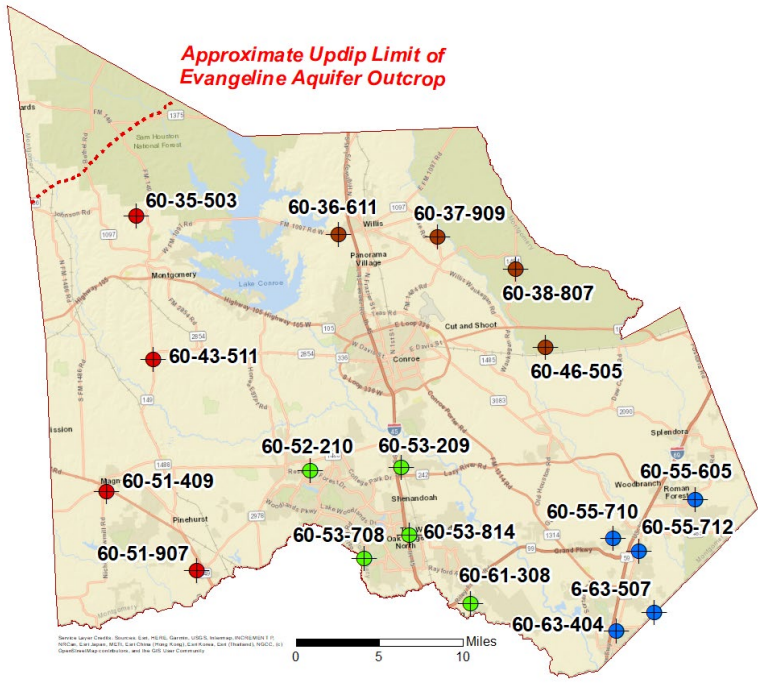

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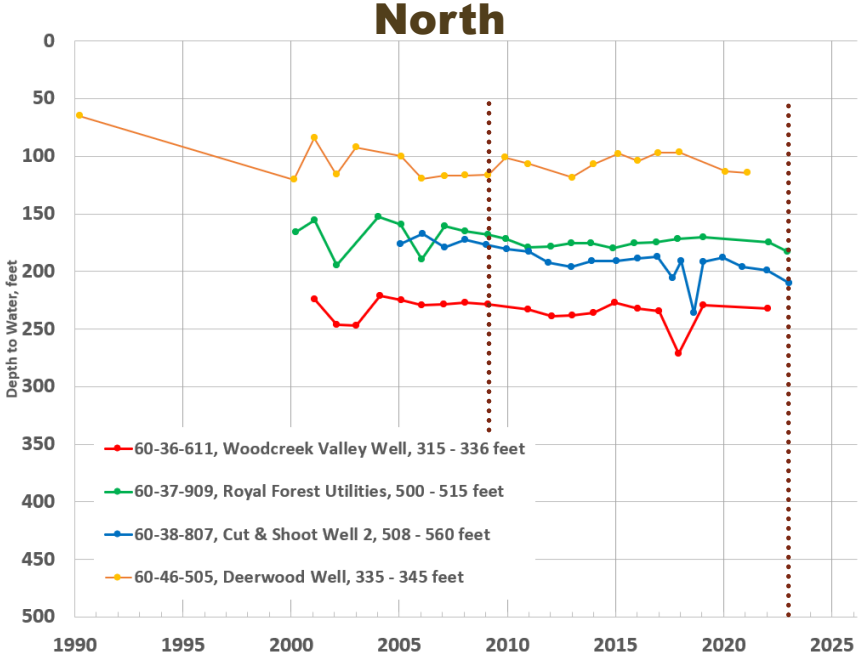

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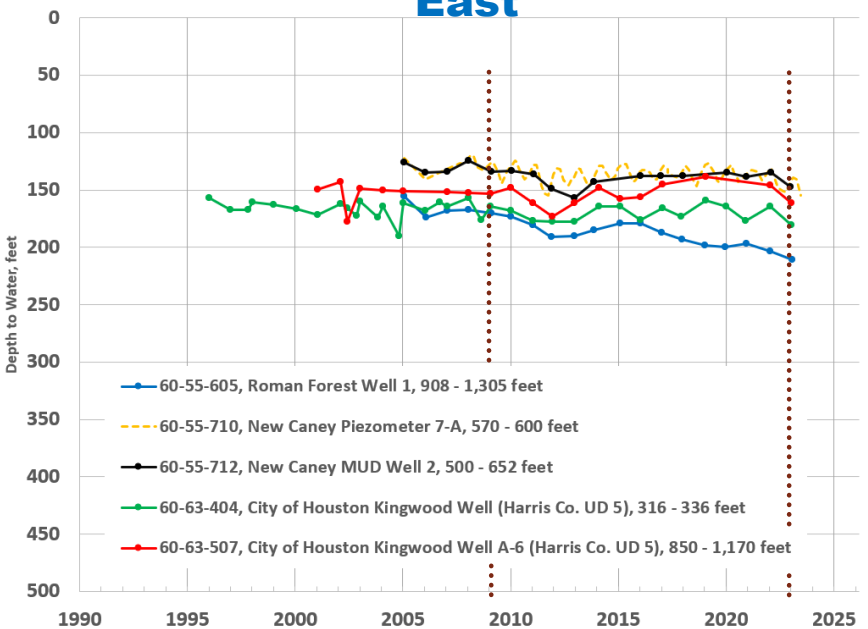
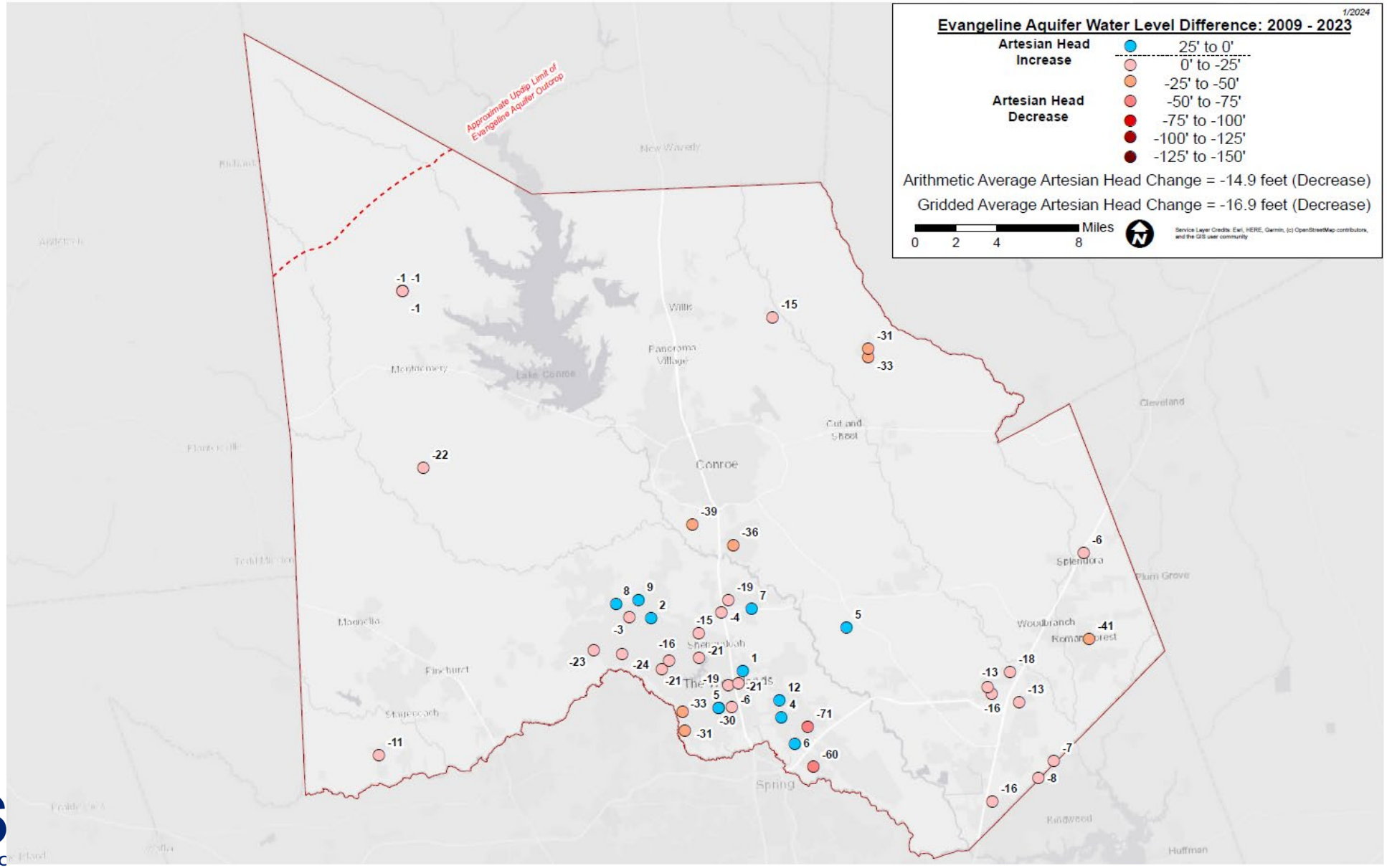


2009 – 2023 EVANGELINE AQUIFER CHANGE IN ARTESIAN HEAD



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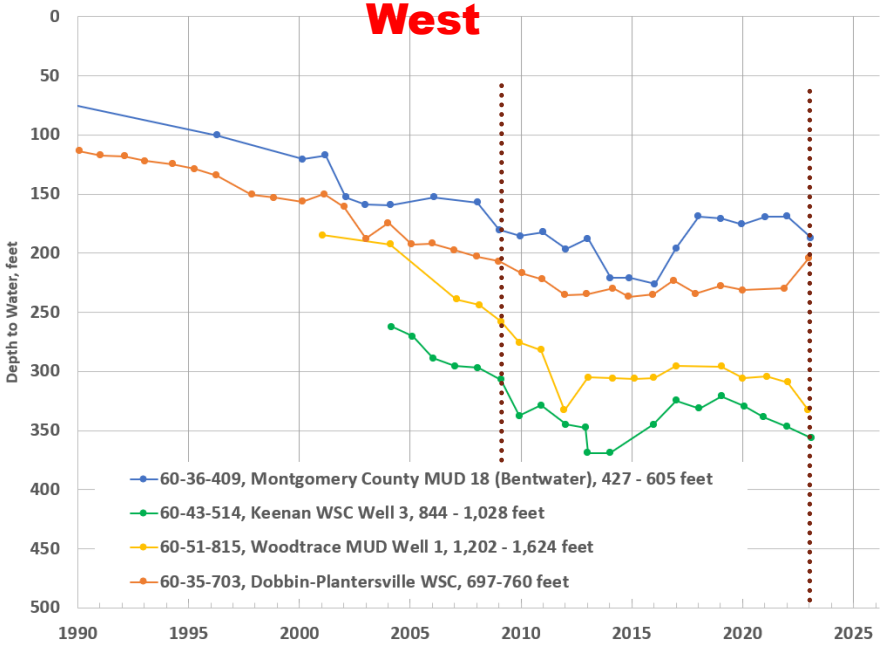
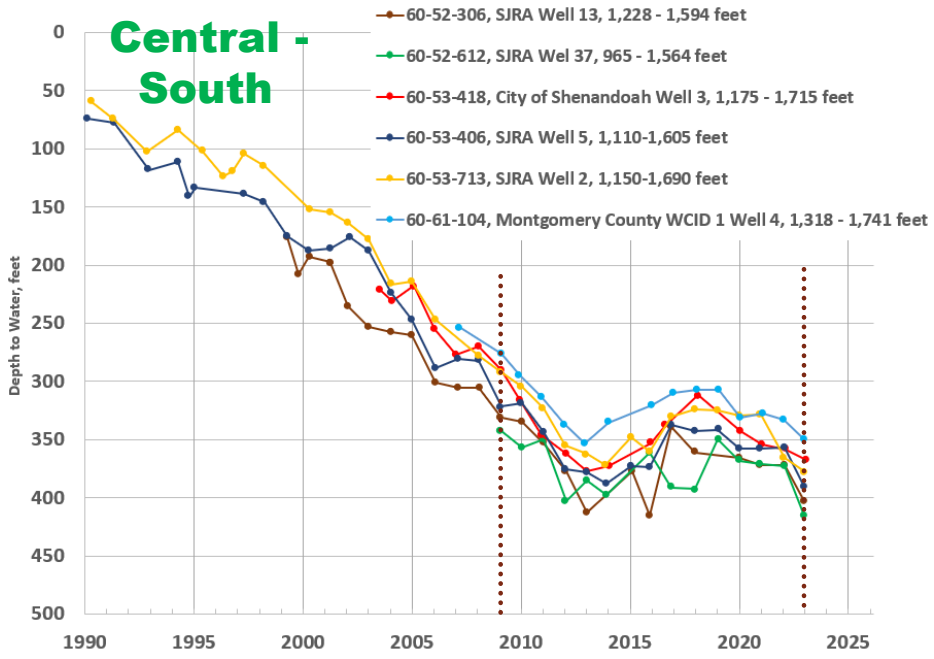
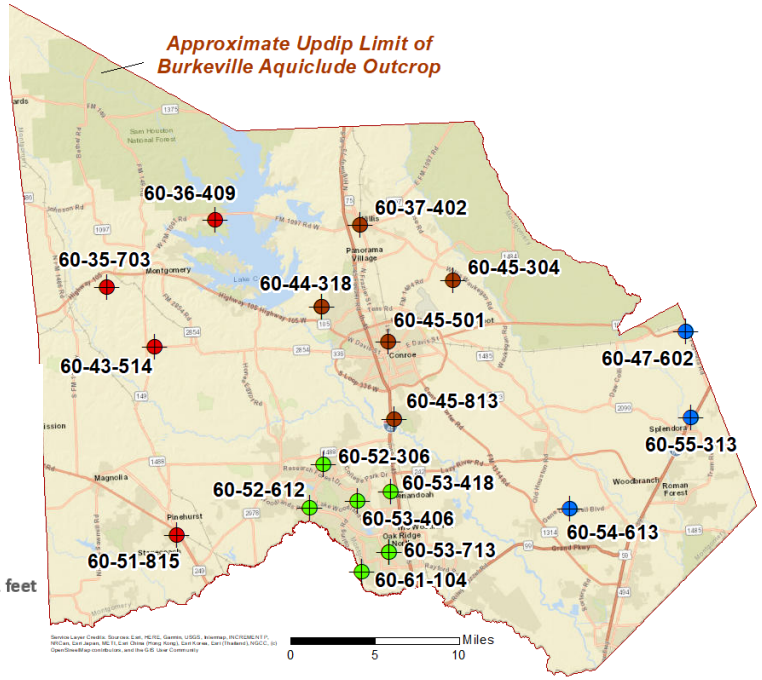
JASPER AQUIFER HYDROGRAPHS

West

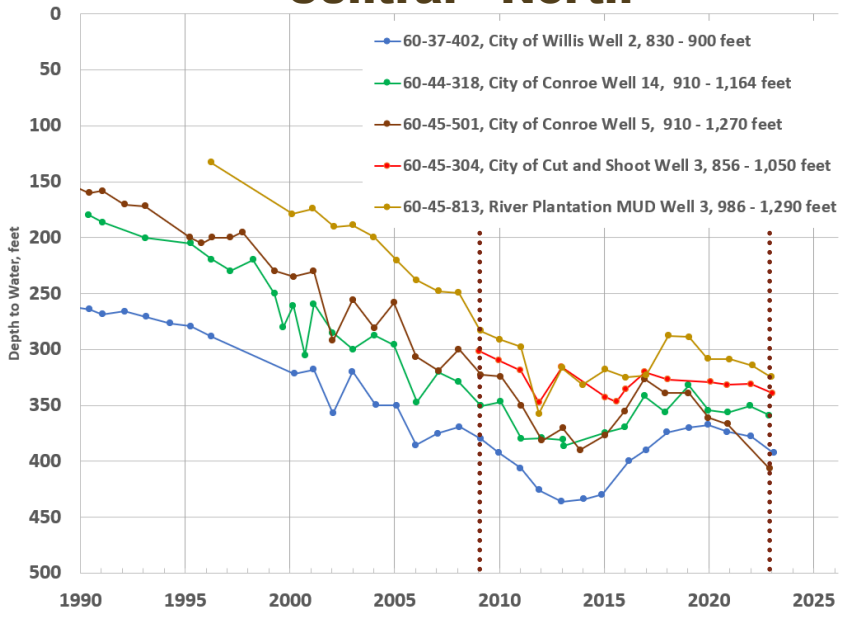


Central - South





Central - North



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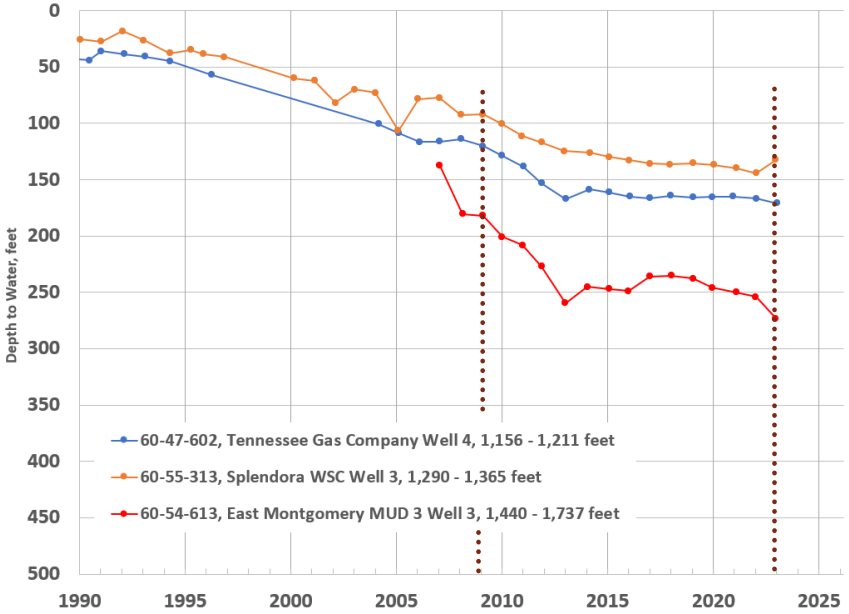
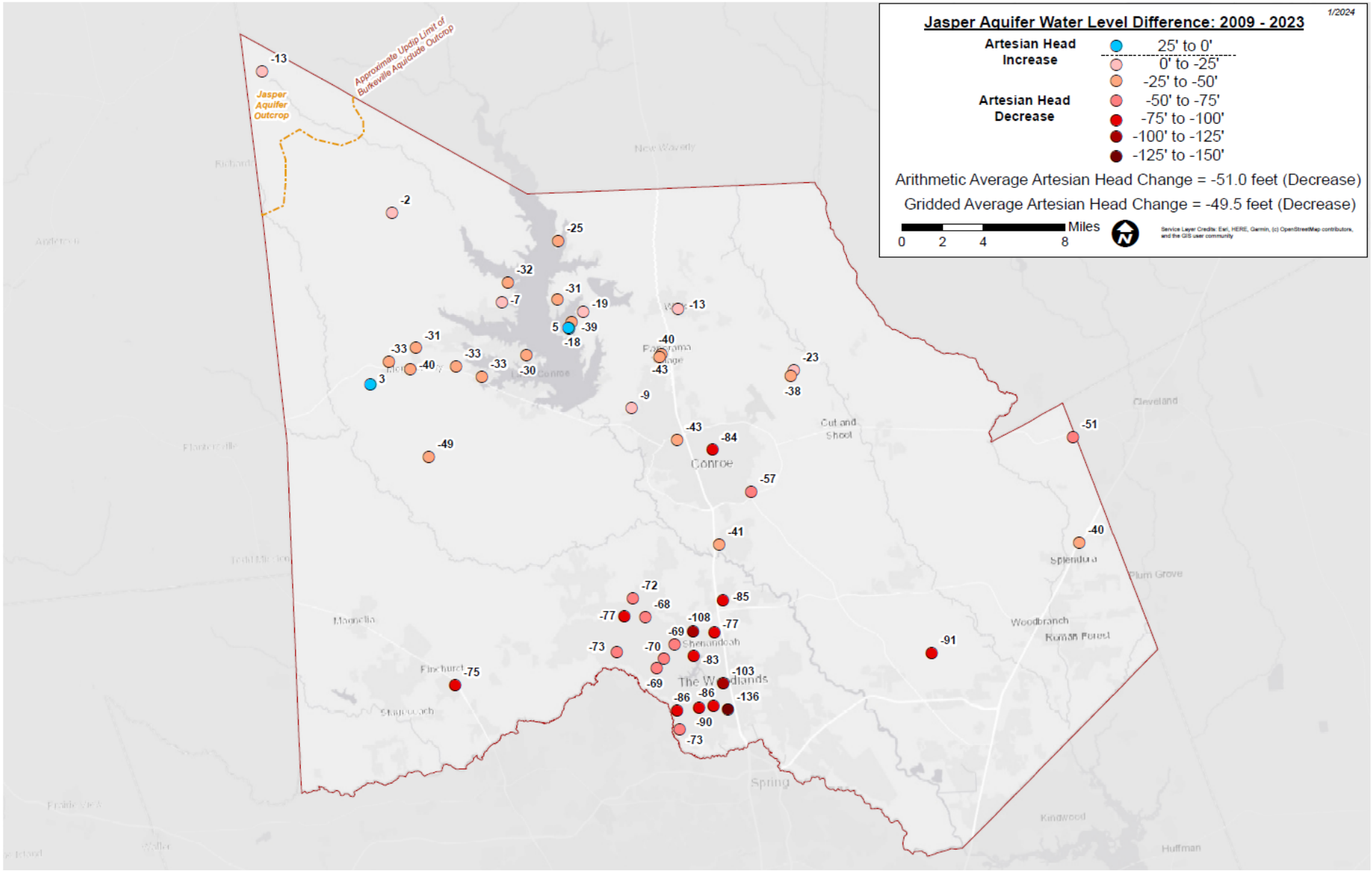


2009 – 2023 JASPER AQUIFER CHANGE IN ARTESIAN HEAD



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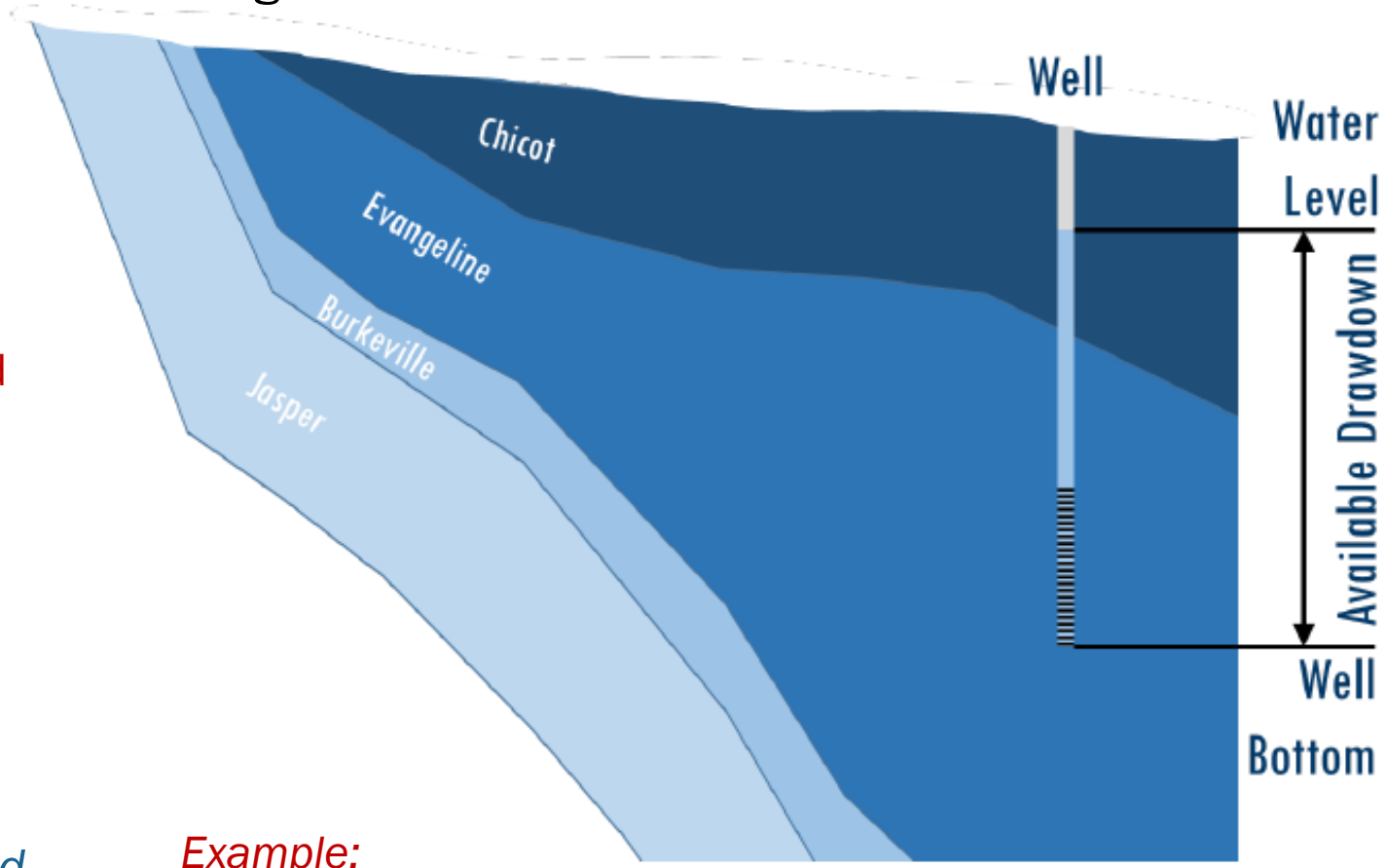
2021 GMA 14 DFC

- *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}-TD)/(WL_{2009}-TD) * 100*
  - *Median available drawdown was evaluated*



Example:

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

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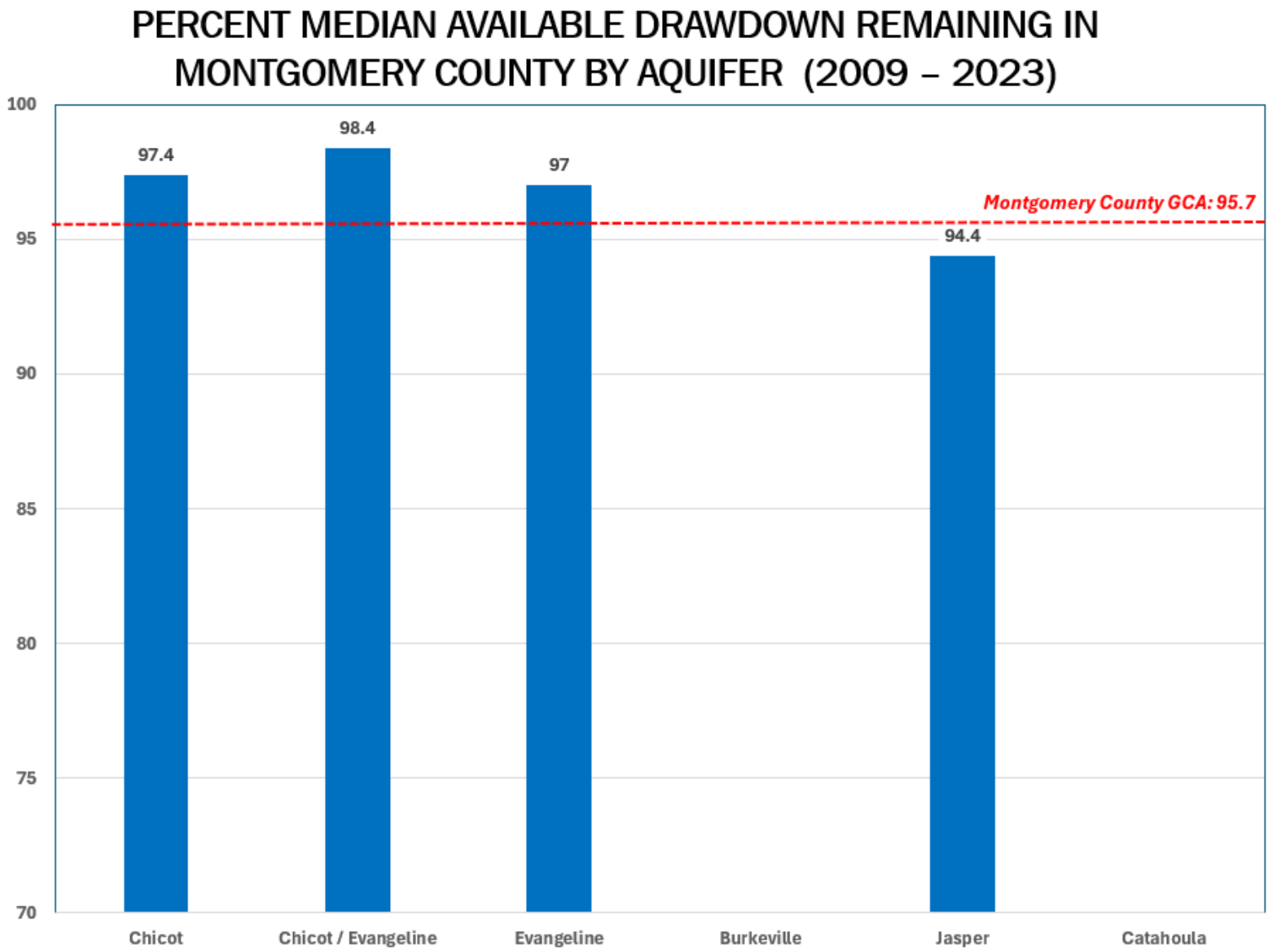
- *Montgomery County:*

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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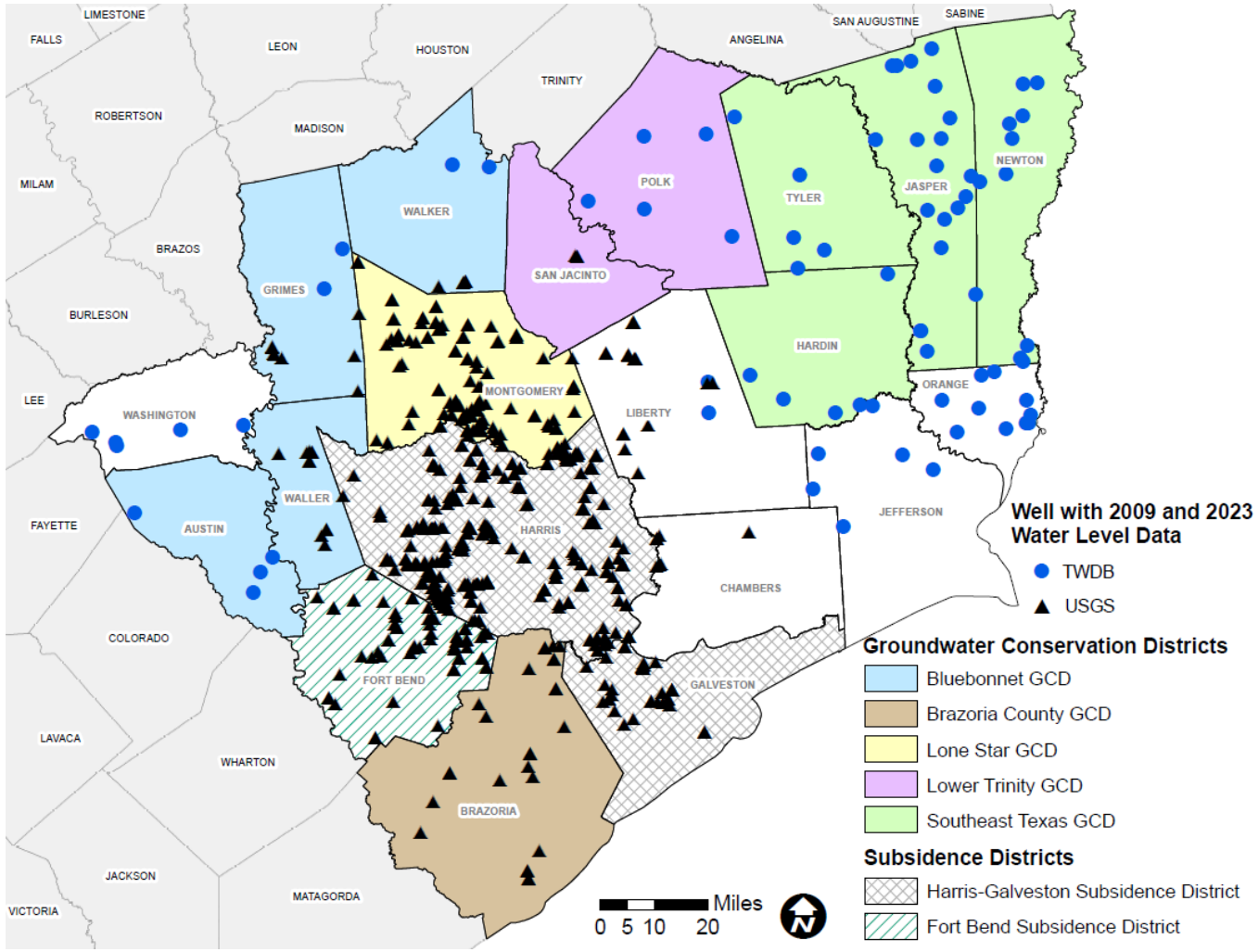
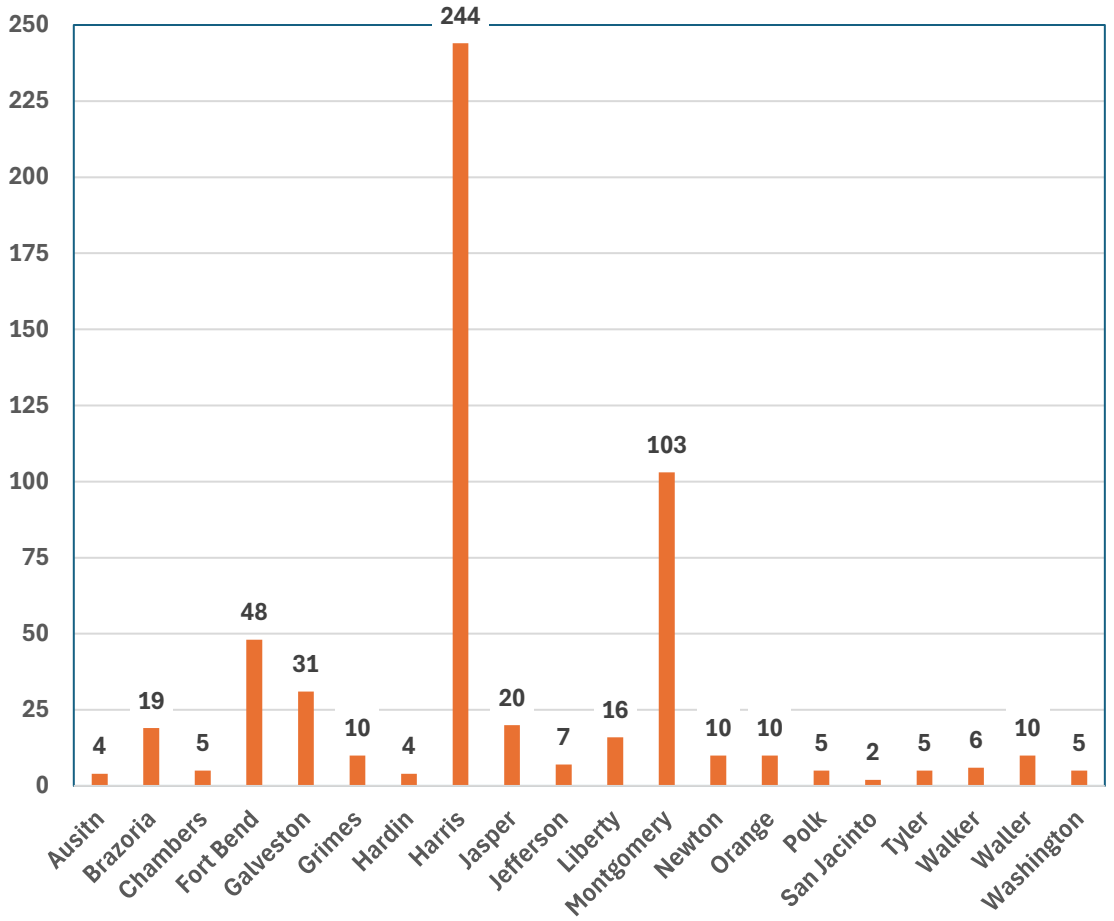
GMA 14 - DATA AVAILABILITY



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



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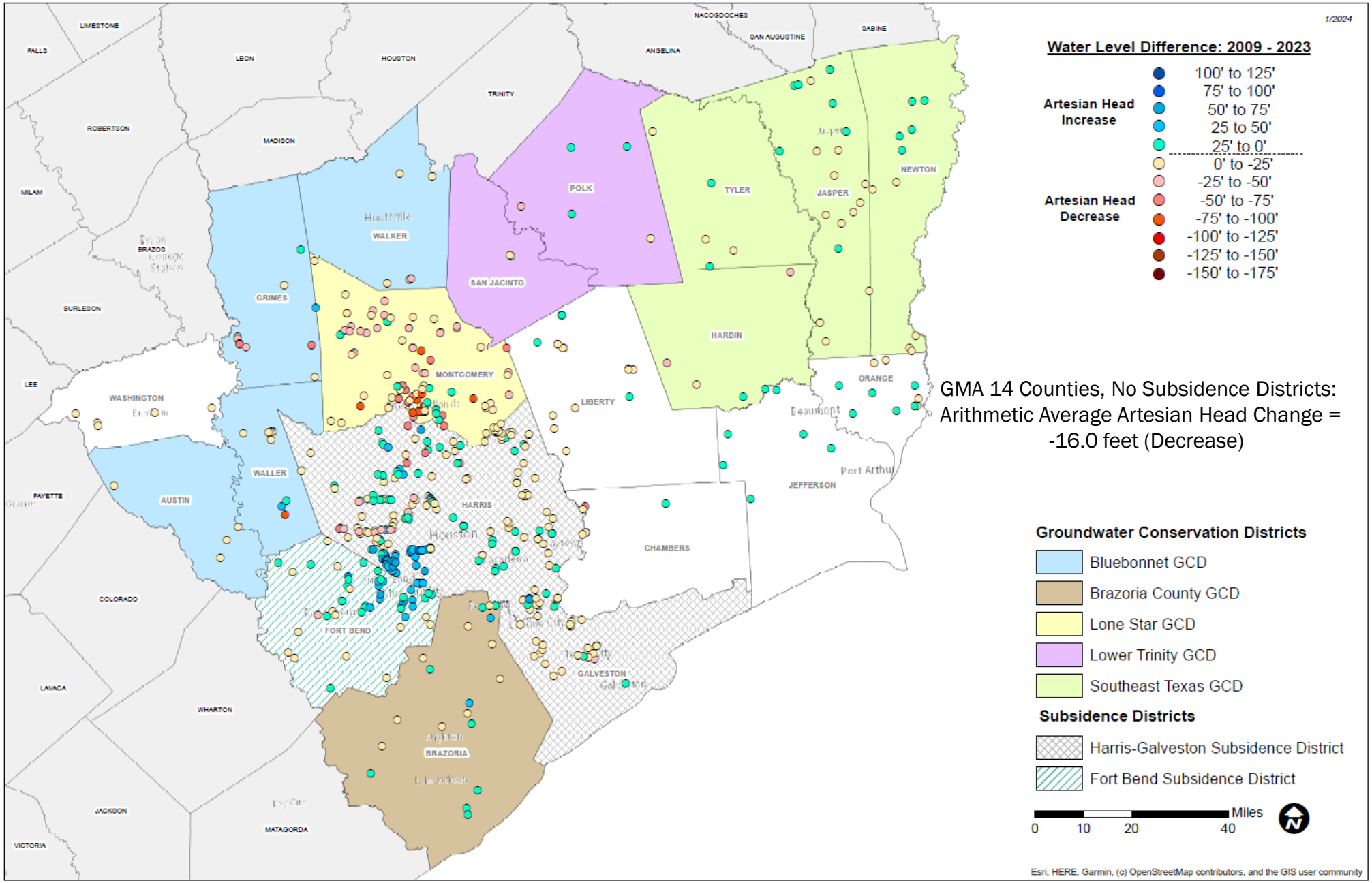
GMA 14 GULF COAST AQUIFER

ALL COUNTIES WITHIN GMA 14



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

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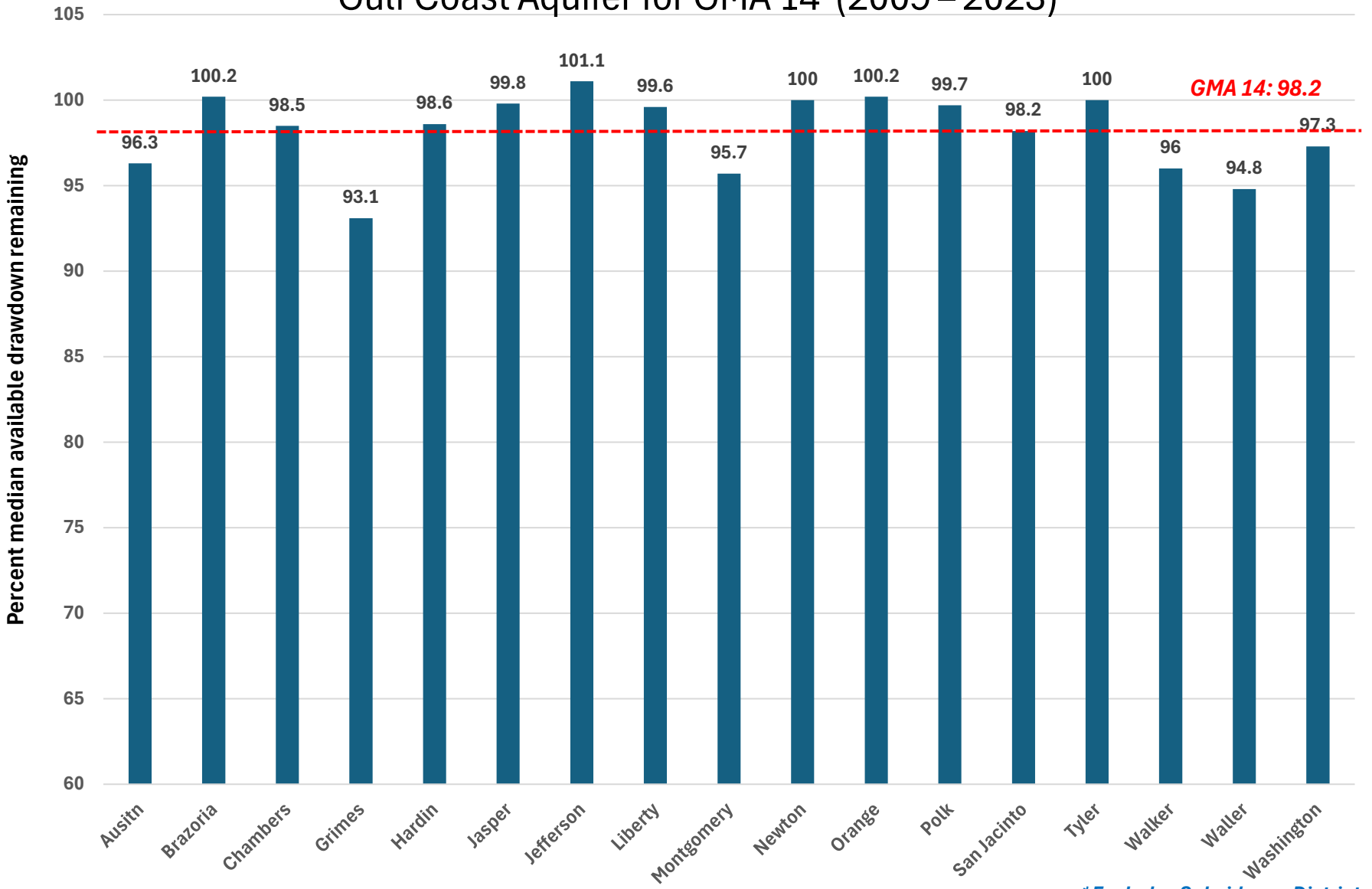
Percent Median Available Drawdown Remaining by County in the Gulf Coast Aquifer for GMA 14 (2009 – 2023)



*Excludes Subsidence Districts

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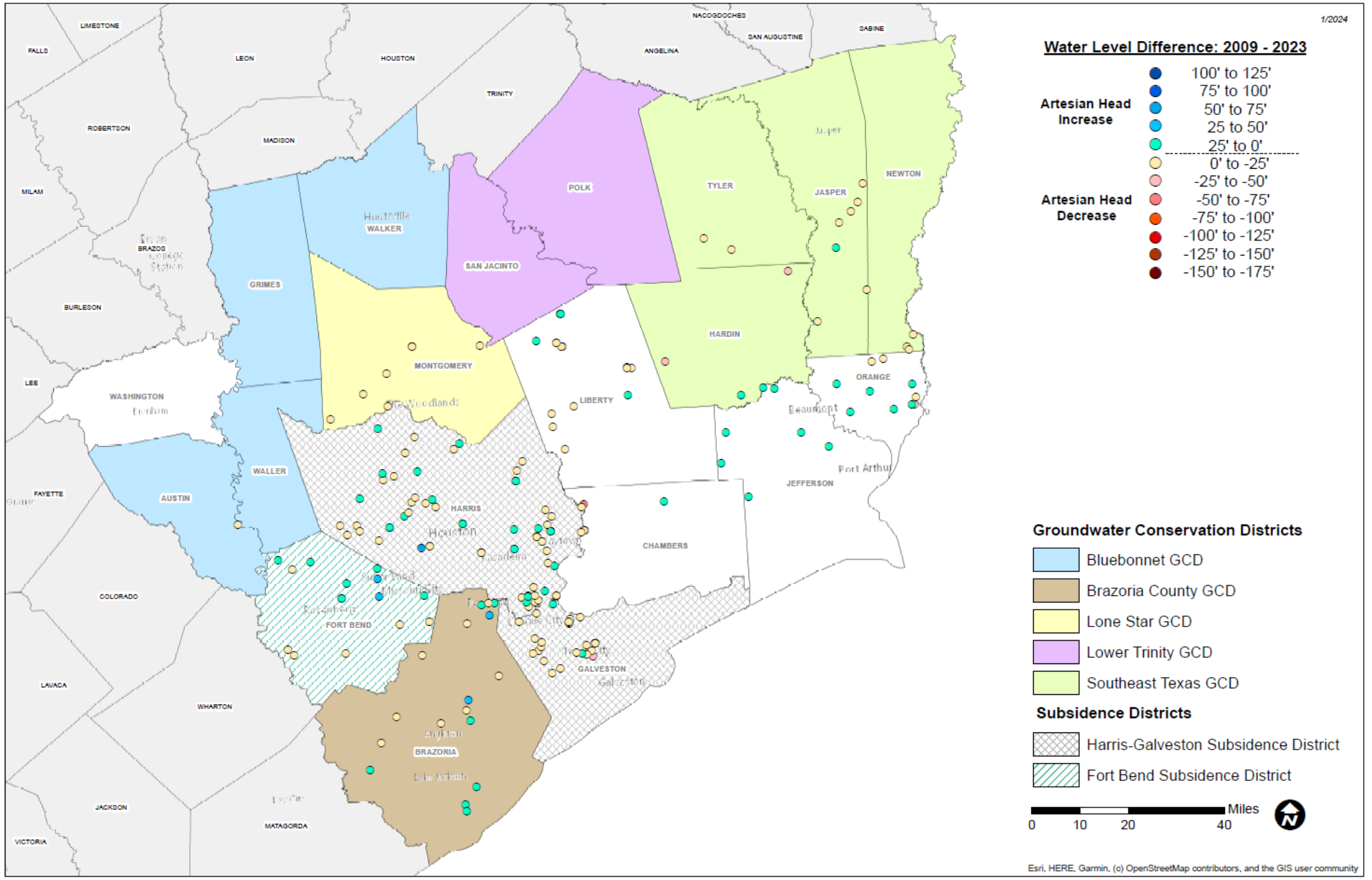
GMA 14

CHICOT AQUIFER



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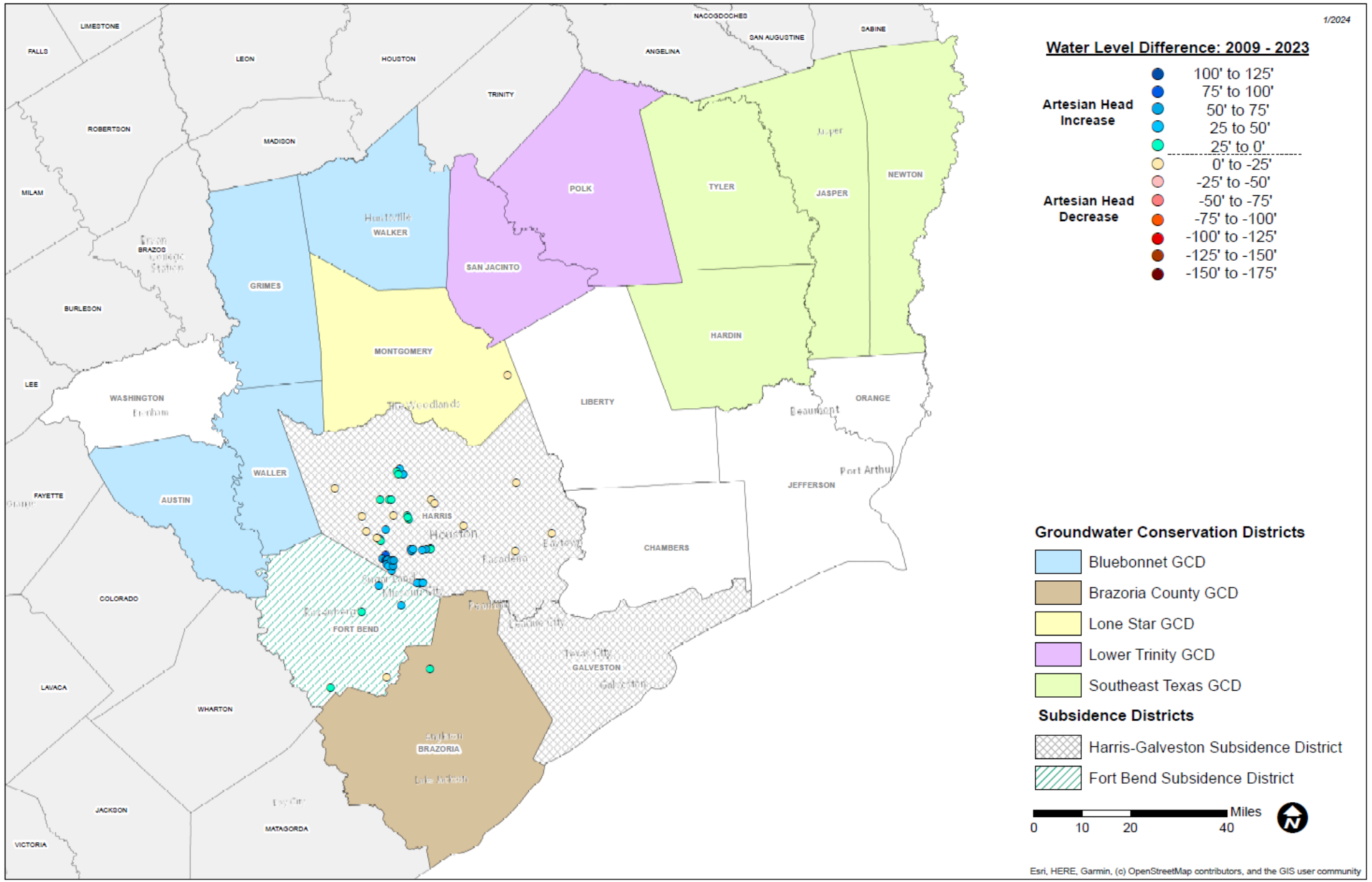
GMA 14

CHICOT / EVANGELINE AQUIFER



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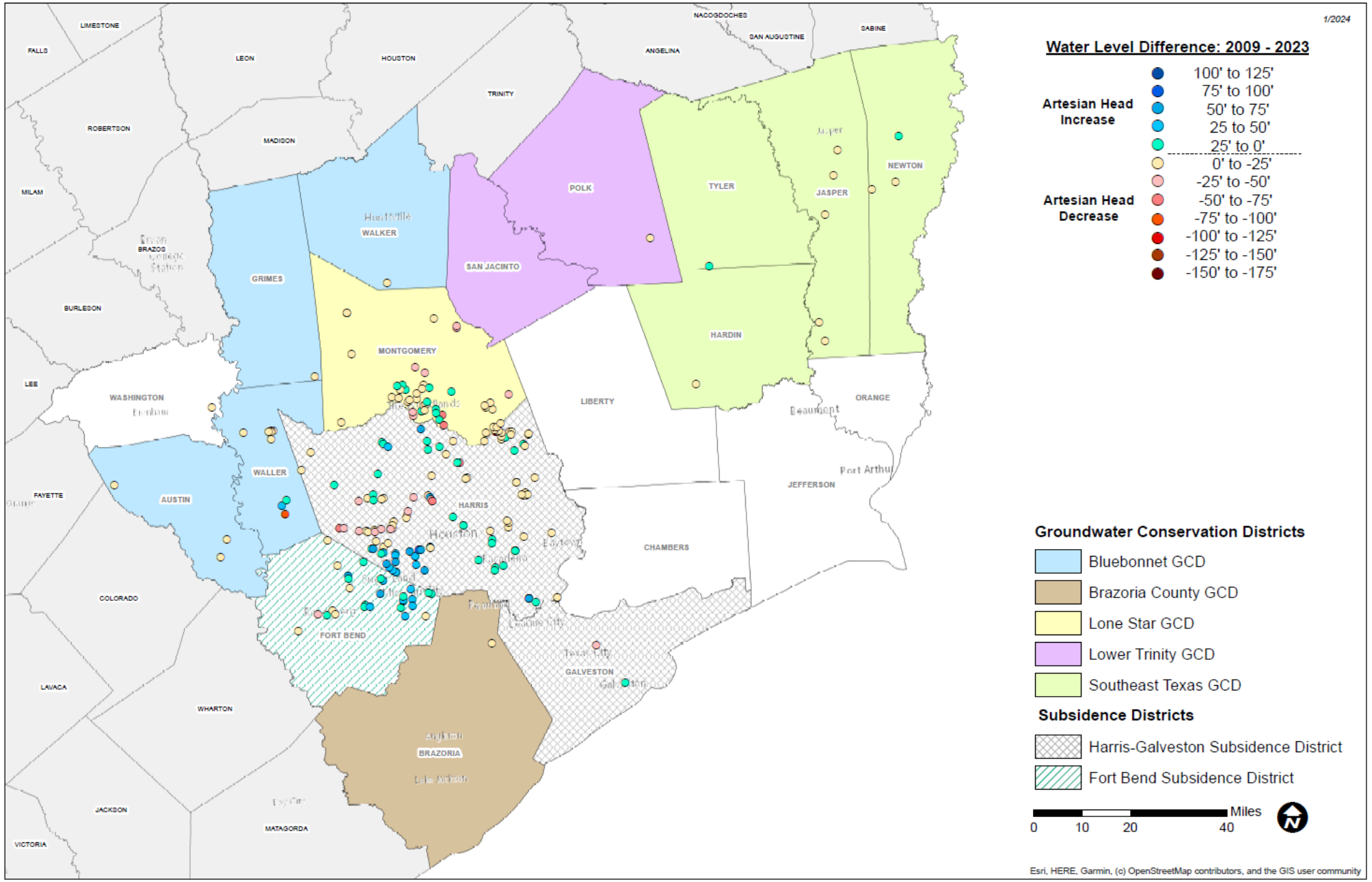
GMA 14

EVANGELINE AQUIFER



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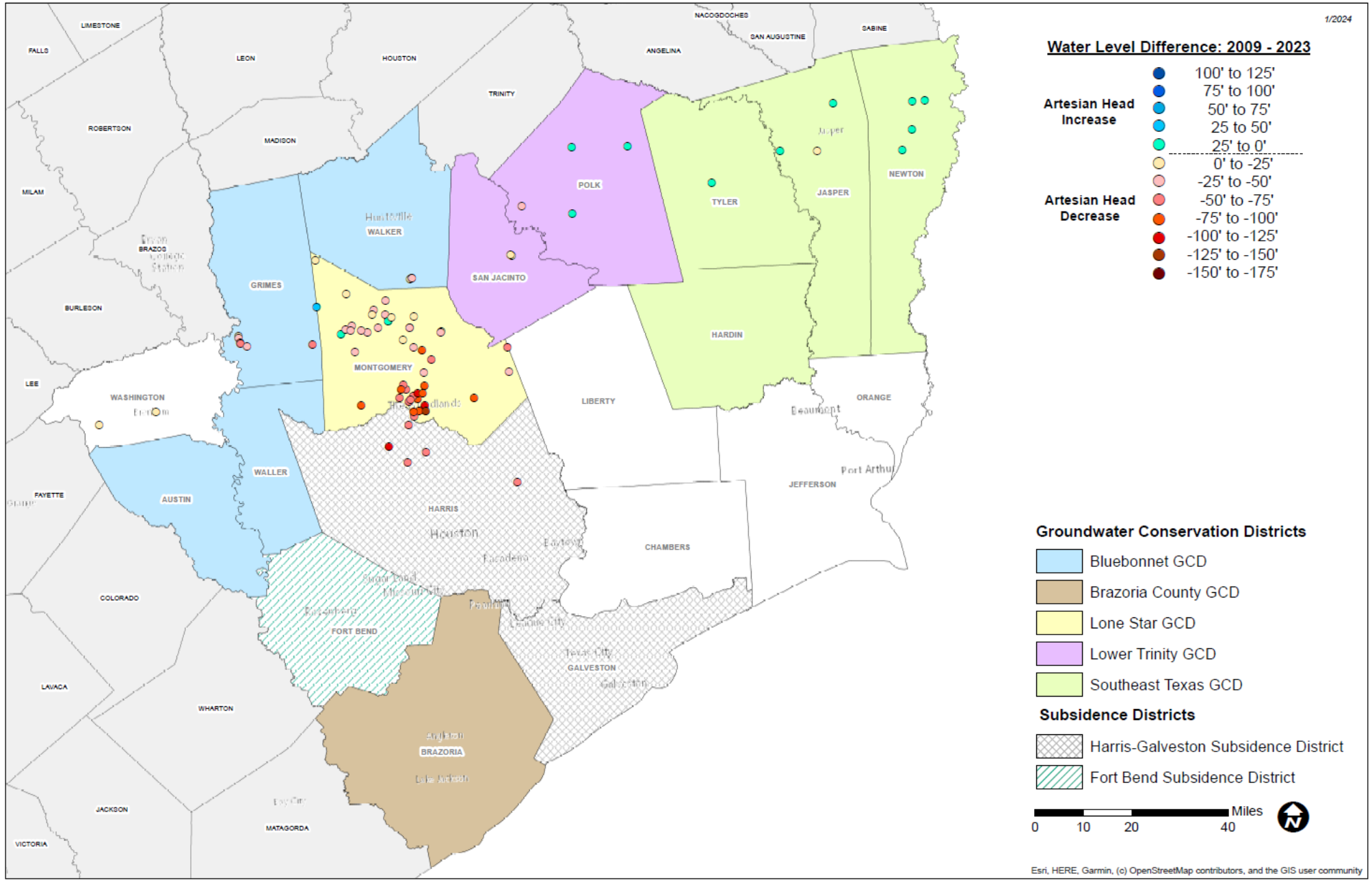
GMA 14

JASPER AQUIFER



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