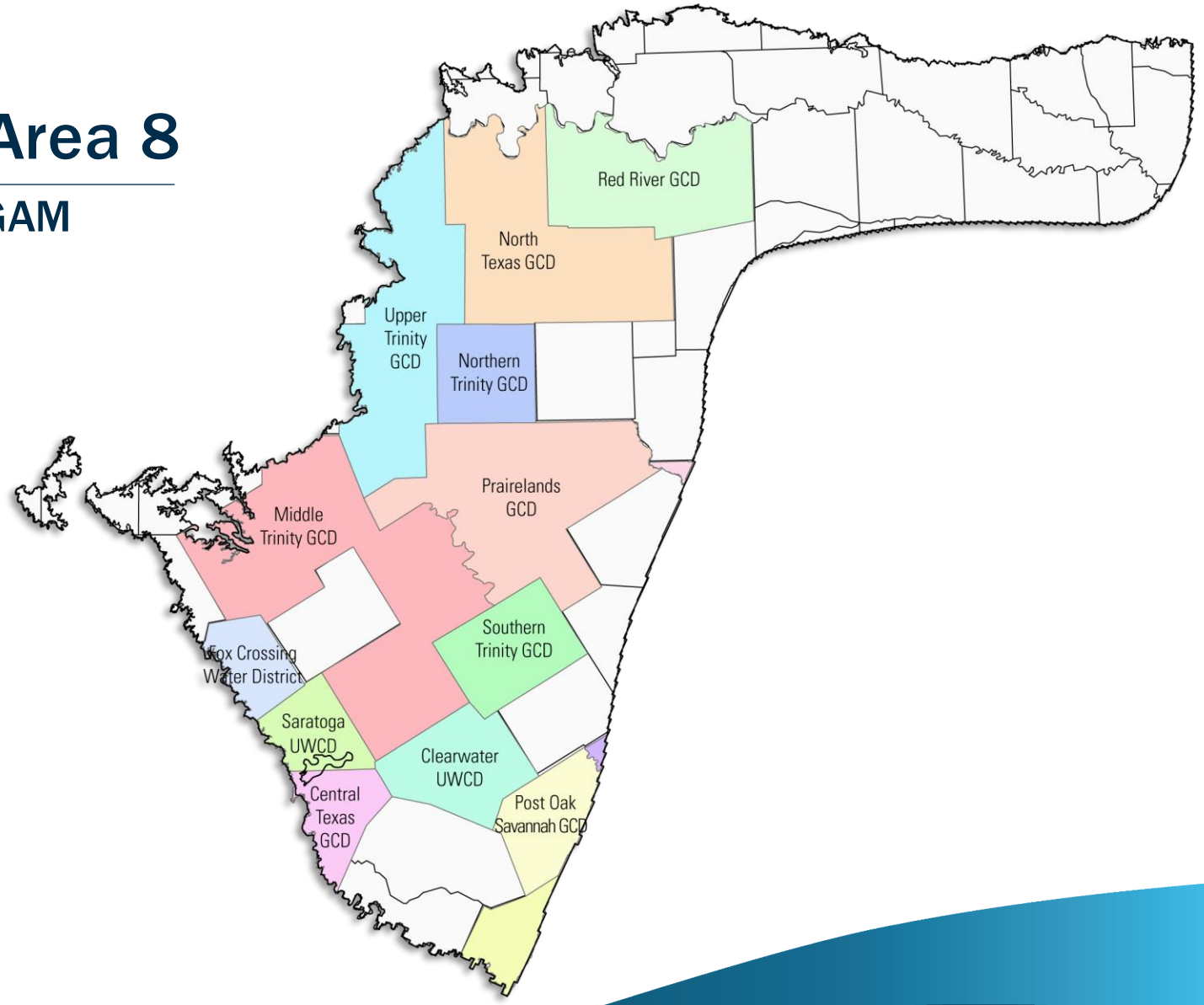
# Groundwater Management Area 8

## Northern Trinity and Woodbine Aquifers GAM update




September 5th, 2024

INTERA

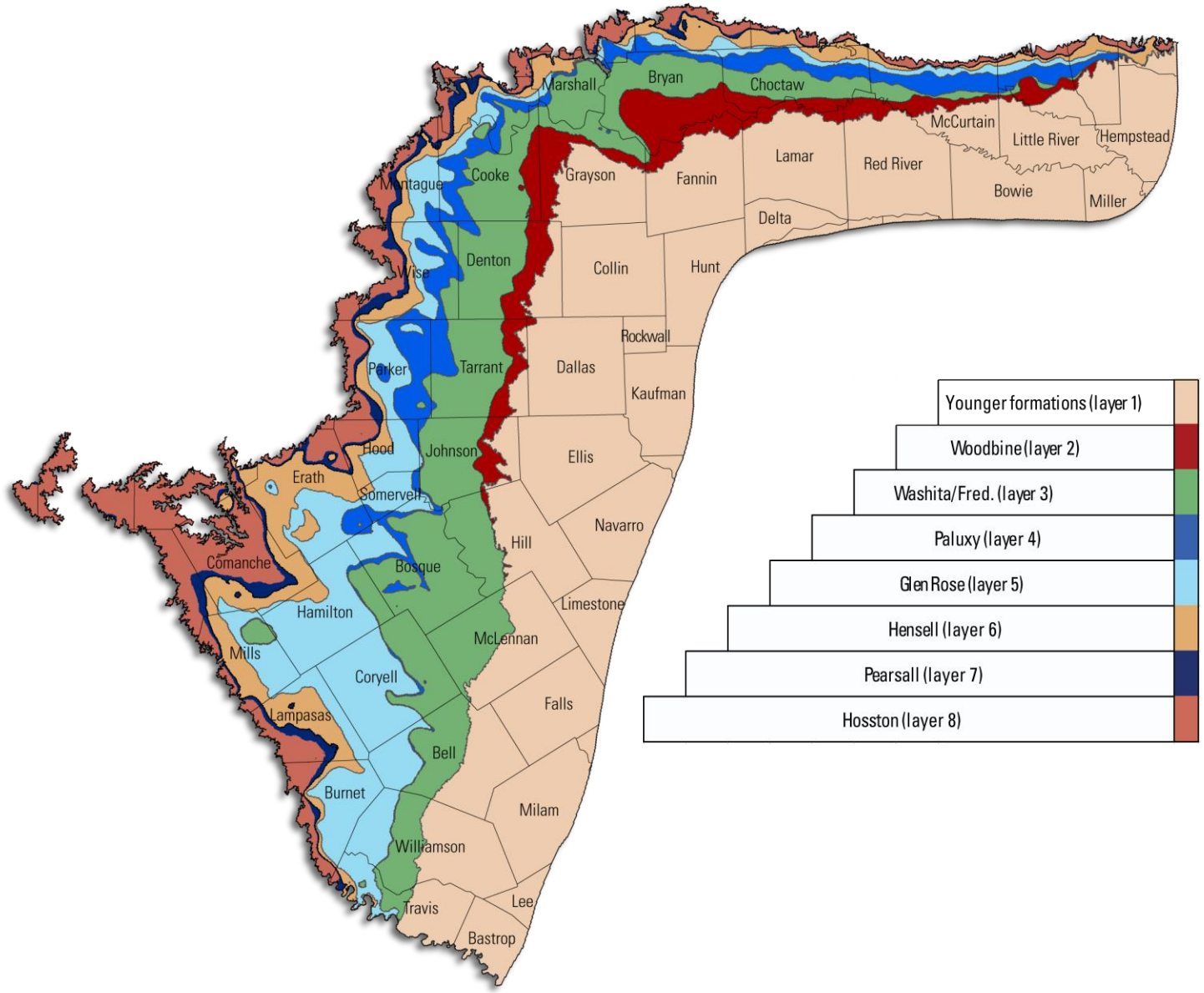
# Configuration

## Layering

- **Layer 1**: Surficial units/younger formations
- **Layer 2**: Woodbine
- **Layer 3**: Washita/Fredericksburg
- **Layer 4**: Paluxy
- **Layer 5**: Glen Rose
- **Layer 6**: Hensell
- **Layer 7**: Pearsall
- **Layer 8**: Hosston
- Pass-through cells used for units that have outcropped (*new feature*)
- Structure update

## Time Discretization

- **1889:** Steady State (Predevelopment)
- **1890–2020:** Annual stress periods
- (extended from the end date of the 2014 model from 2012 to 2020)

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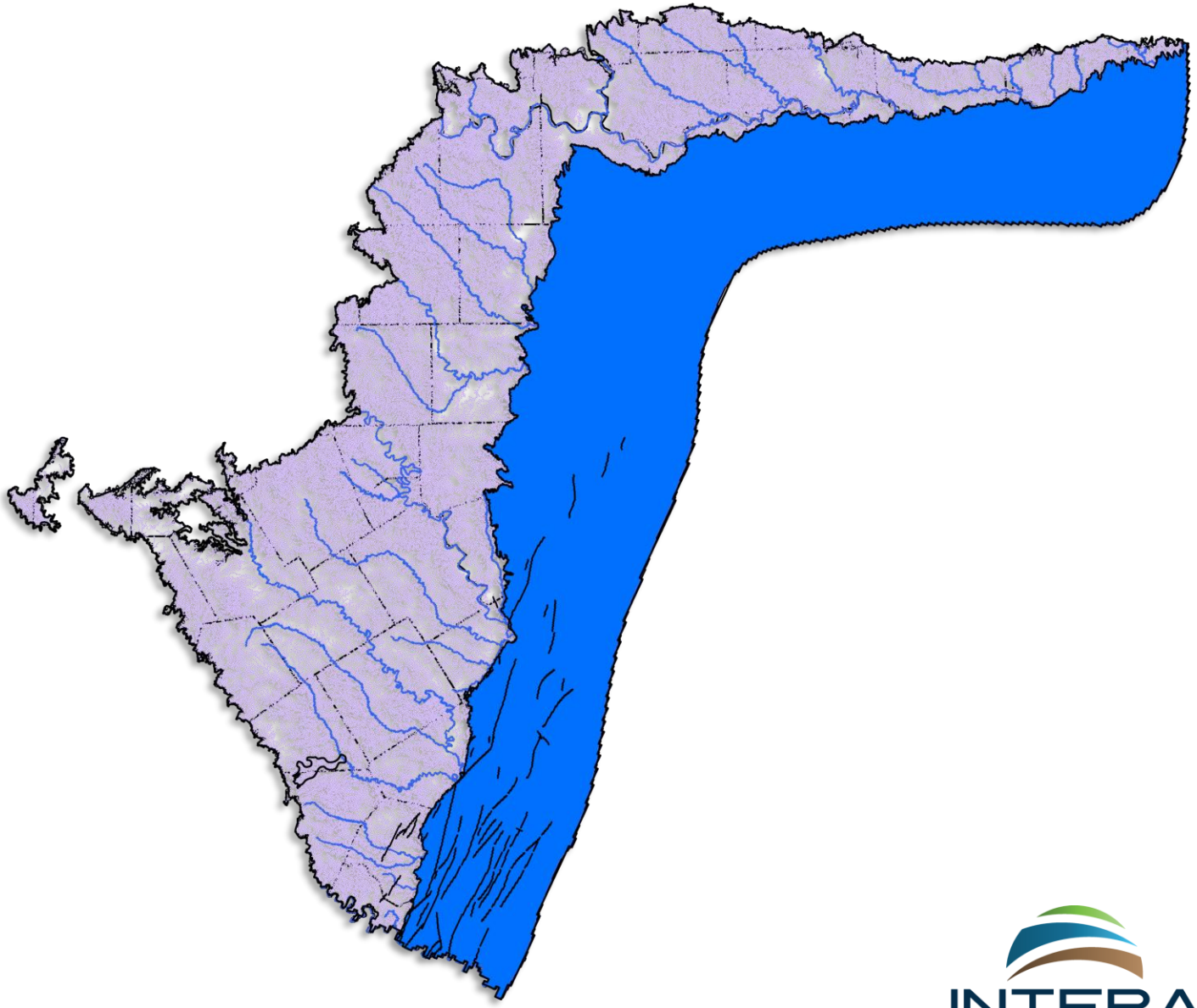
# Model Boundaries

- **River cells:** Younger formations and major rivers (in blue)
- **Drain cells:** Remove excess water from layer 1 and simulate early time flowing wells (in pink)
- **Horizontal Flow Barrier cells:** Represent faults and prevents flow from outcrop to younger formations in layer 1 (in black)



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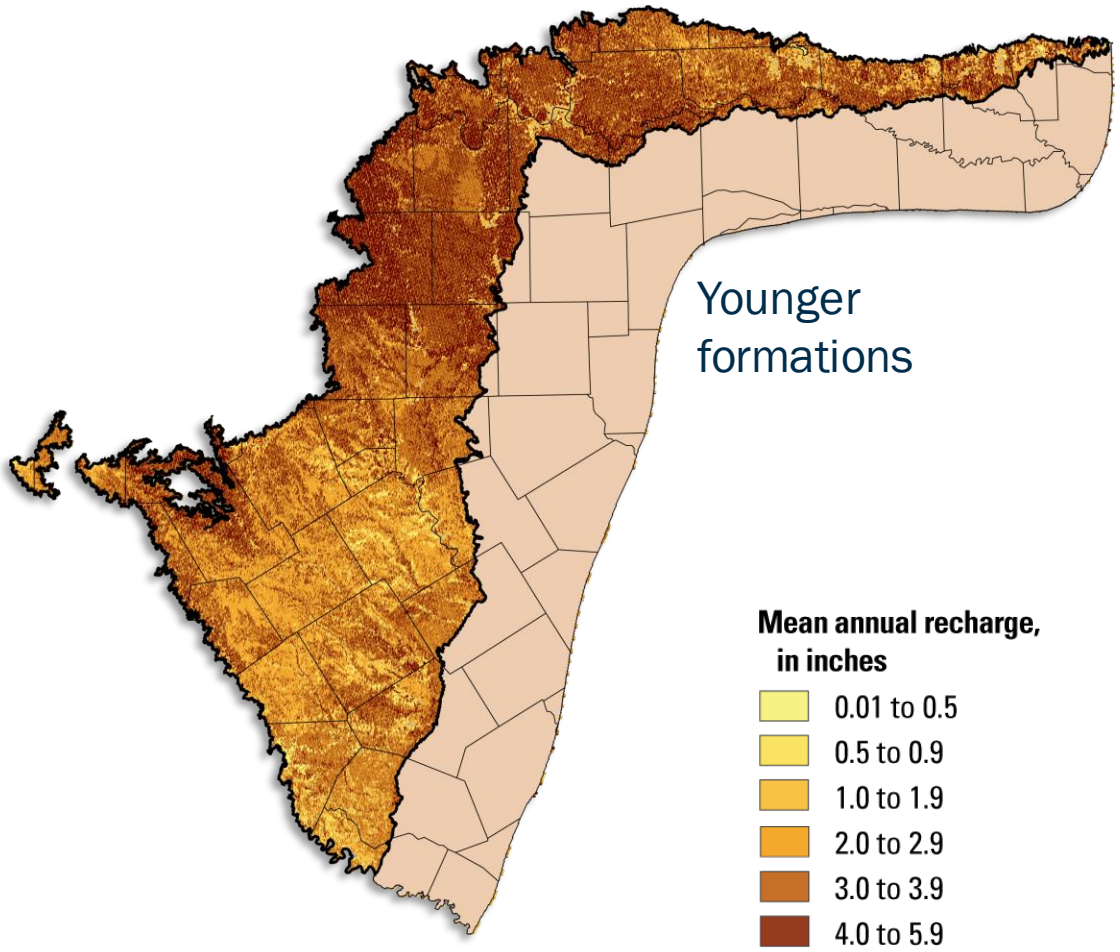
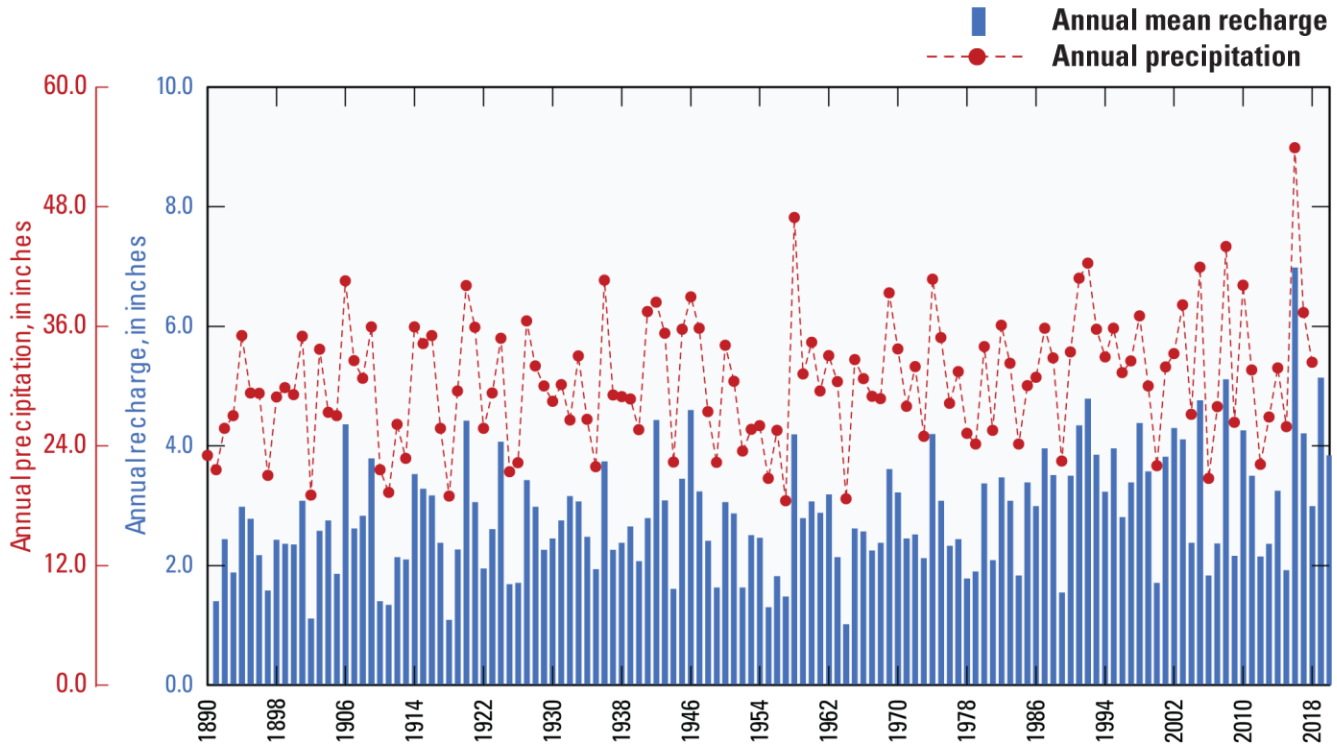
# Recharge

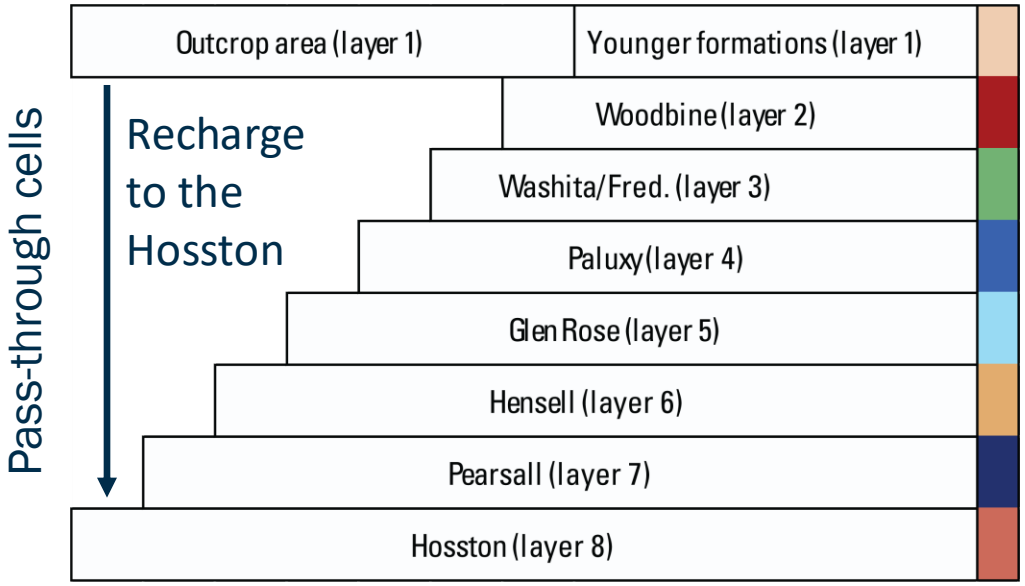


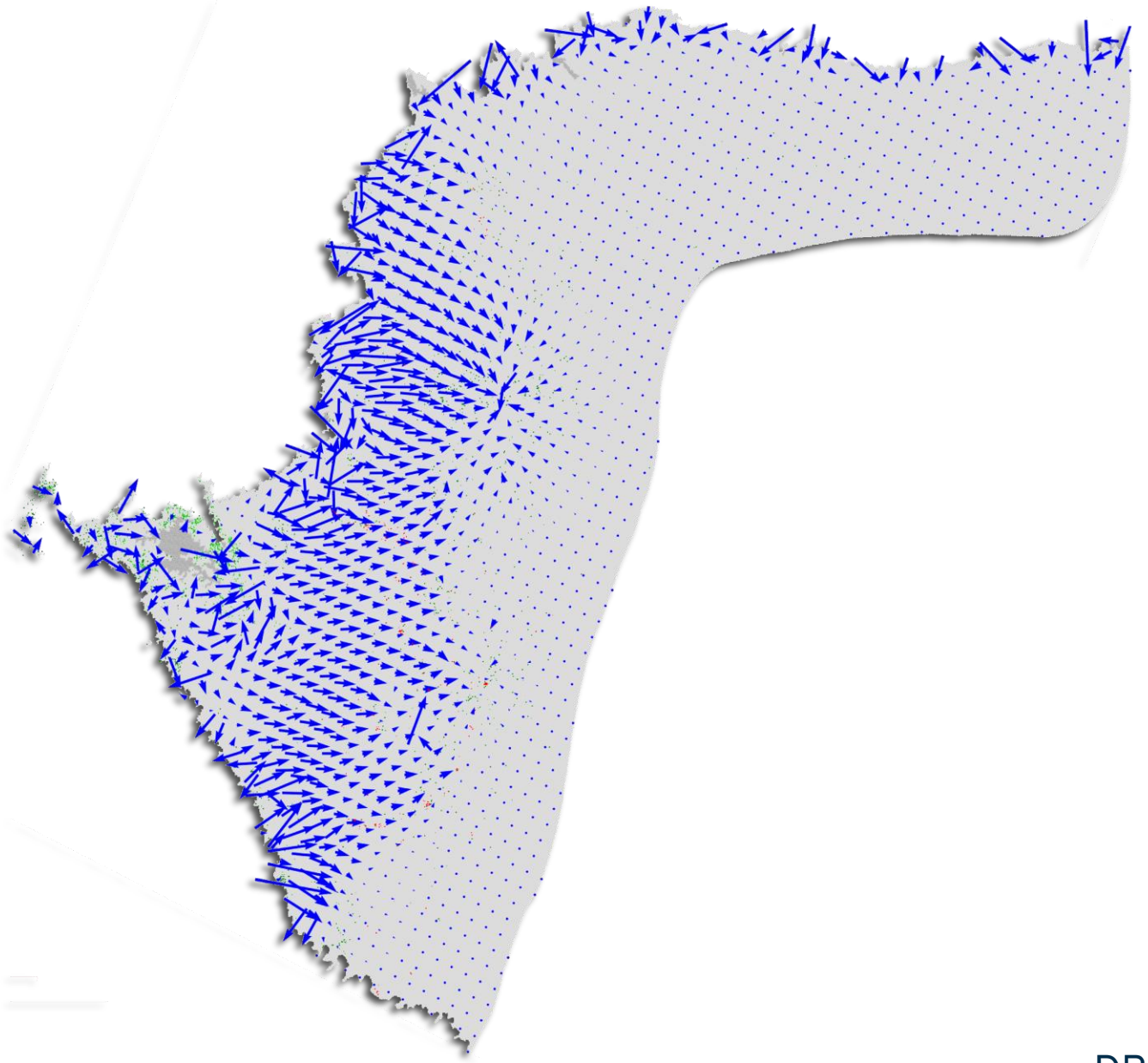

- Spatially distributed recharge obtained from the SWB code (RWH&A).
- Recharge is applied to the highest active cell (typically layer 1) in the model
- Average precipitation of 31 inches/year during 1890–2020. Surficial recharge is ~9% of precipitation



# Groundwater Flow–Hosston

- Groundwater flow shown at right for the Hosston (layer 8)
- Size of the arrows show the magnitude of the groundwater flow
- Recharge moves downdip from surface and to areas of groundwater withdrawal



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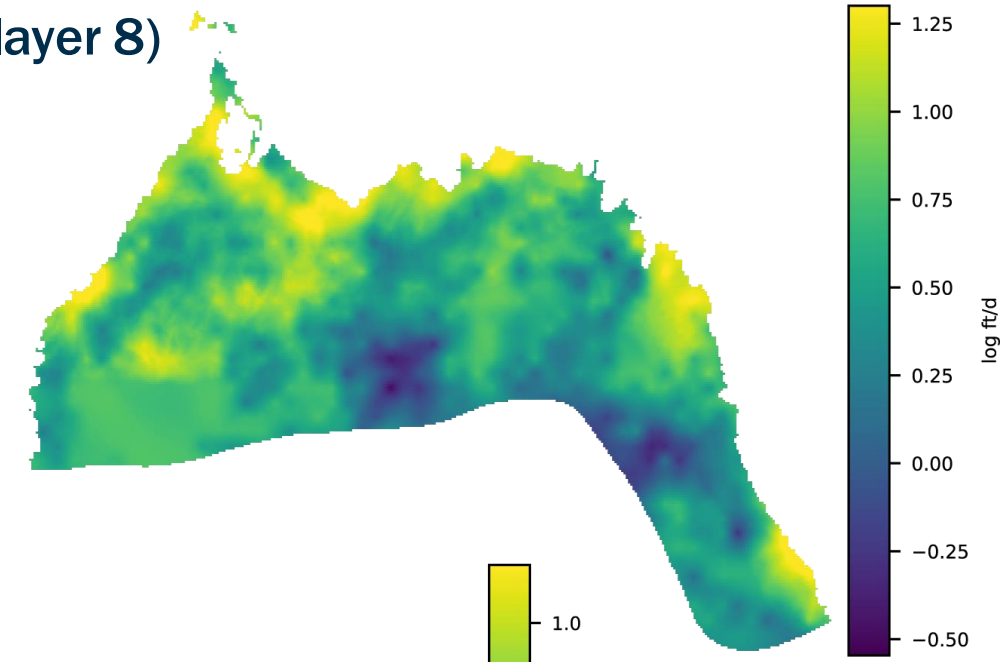
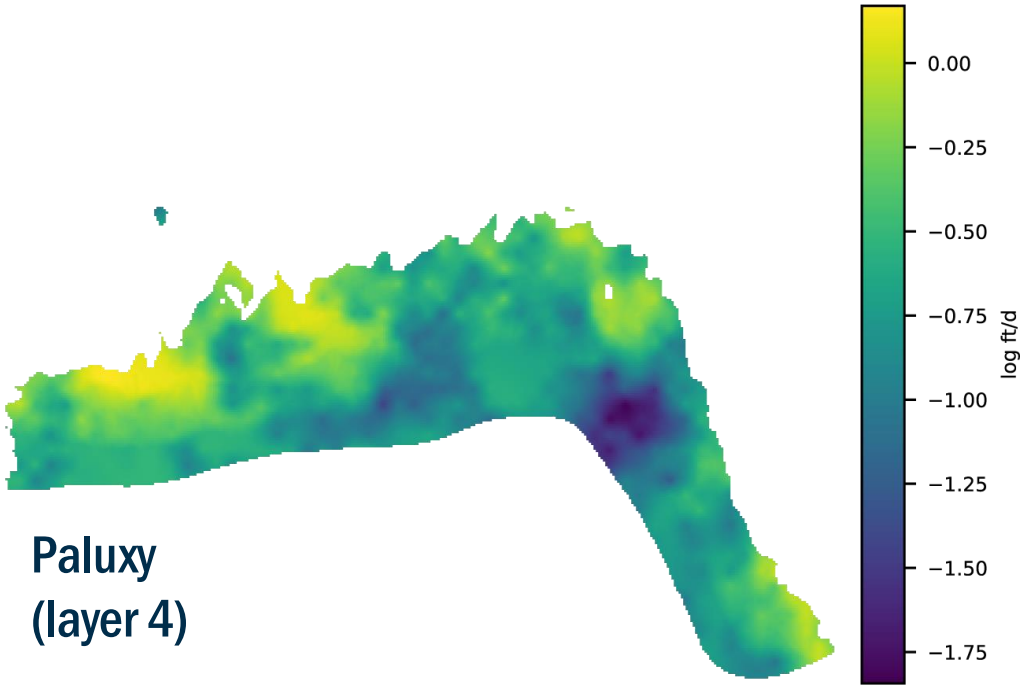
# Model Parameters

## Horizontal Hydraulic Conductivity

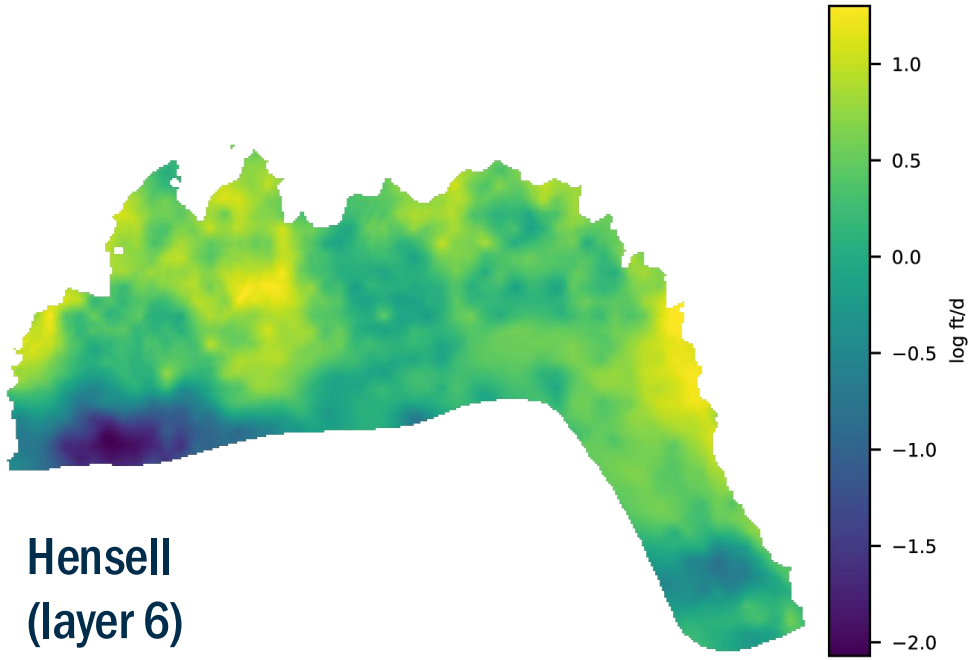
- Working on implementing depth decay
- Values somewhat greater than 2014 model—matching Transmissivity from aquifer tests

Hosston
(layer 8)




Paluxy
(layer 4)




Hensell
(layer 6)

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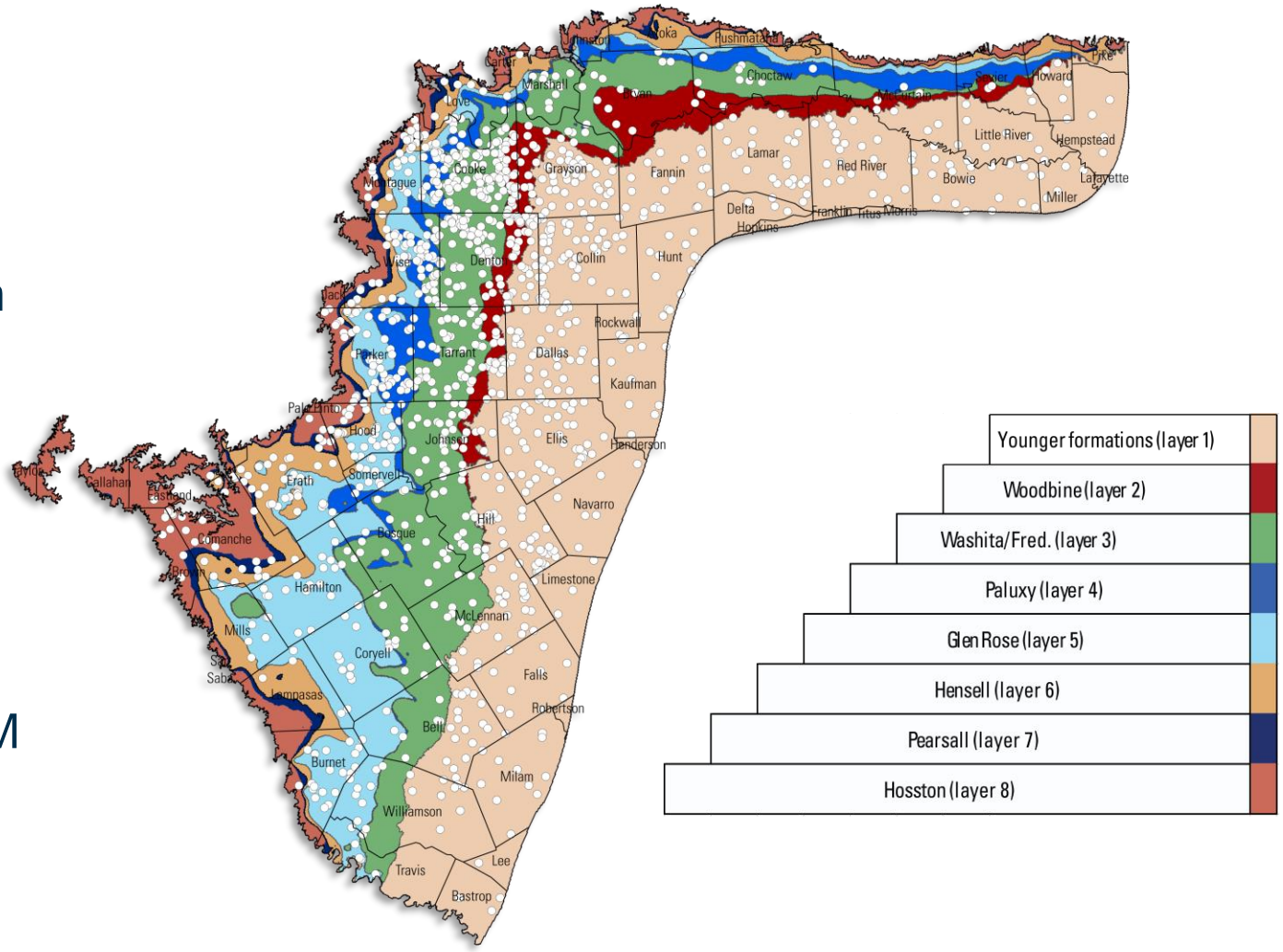
# Structure Update

- Incorporated new data on structure, including 12 geophysical logs in Milam County
- Evaluated pre-picked structure data from GCDs (CUWCD, CTGCD, MTGCD)
- Performed picks from 168 pdfs of geophysical logs from Northern Trinity GCD and UTGCD
- Focused structure update where differences occur between the 2014 GAM and this updated model

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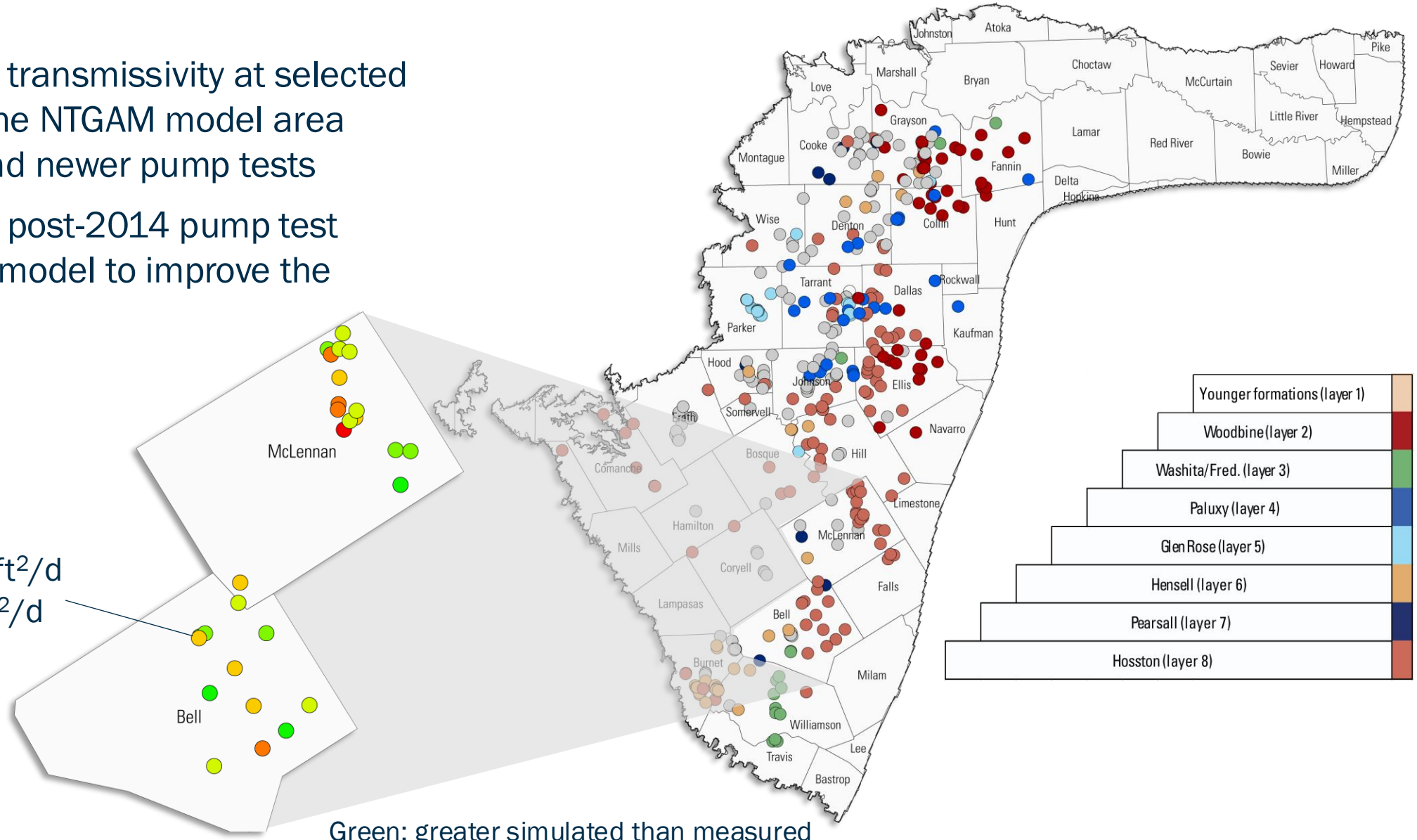
# Transmissivity

- Calibrating to transmissivity at selected locations in the NTGAM model area from 2014 and newer pump tests
- Incorporating post-2014 pump test data into the model to improve the simulation




Measured T: 2,100 $ft^2/d$
Modeled T: 1,819 $ft^2/d$

Green: greater simulated than measured
Red: lower simulated than measured

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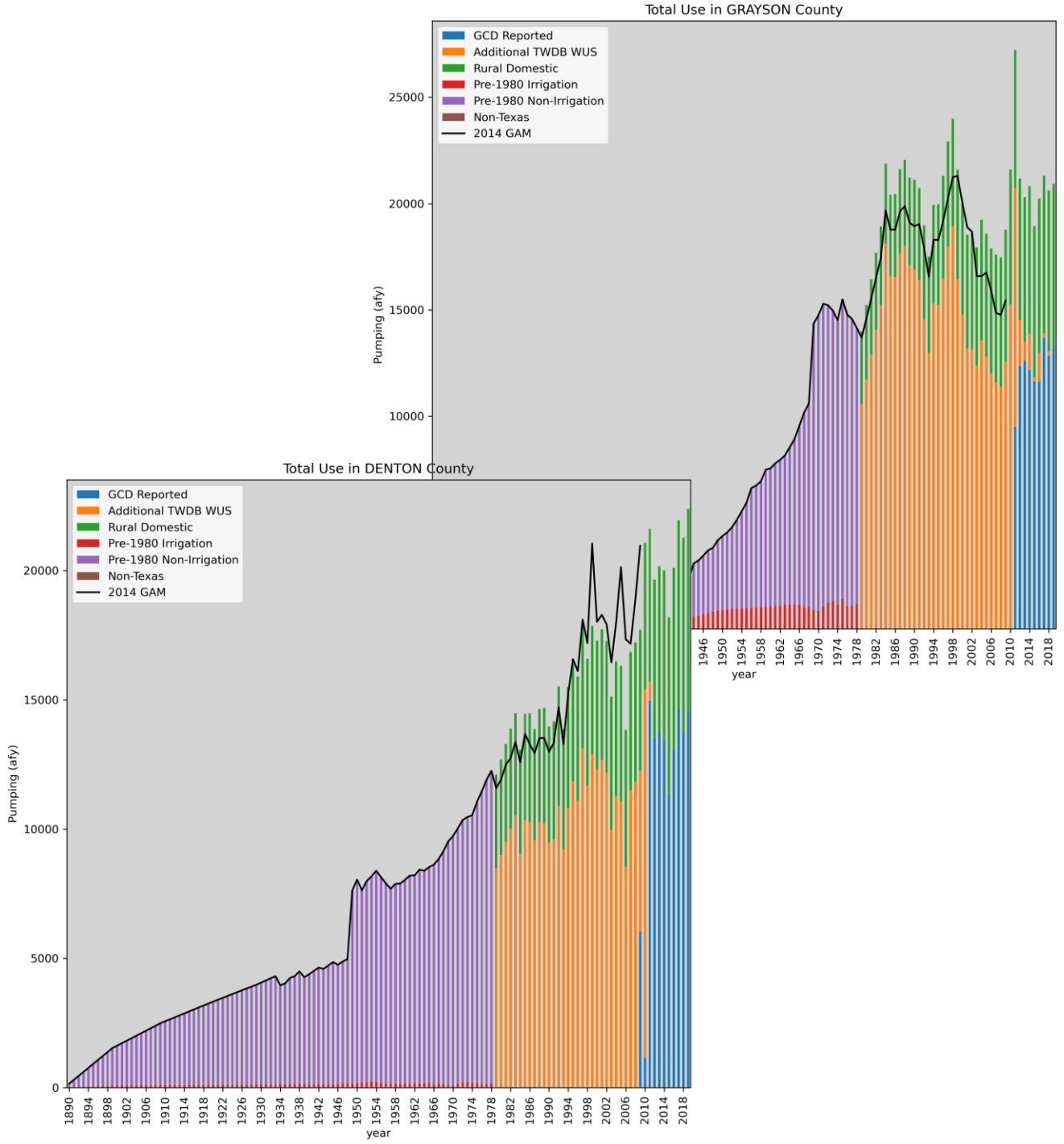
# Water Use

## Domestic GW Use

- Still working on domestic groundwater use in the model.
- Population based on census data
- Use population density threshold to obtain rural use.

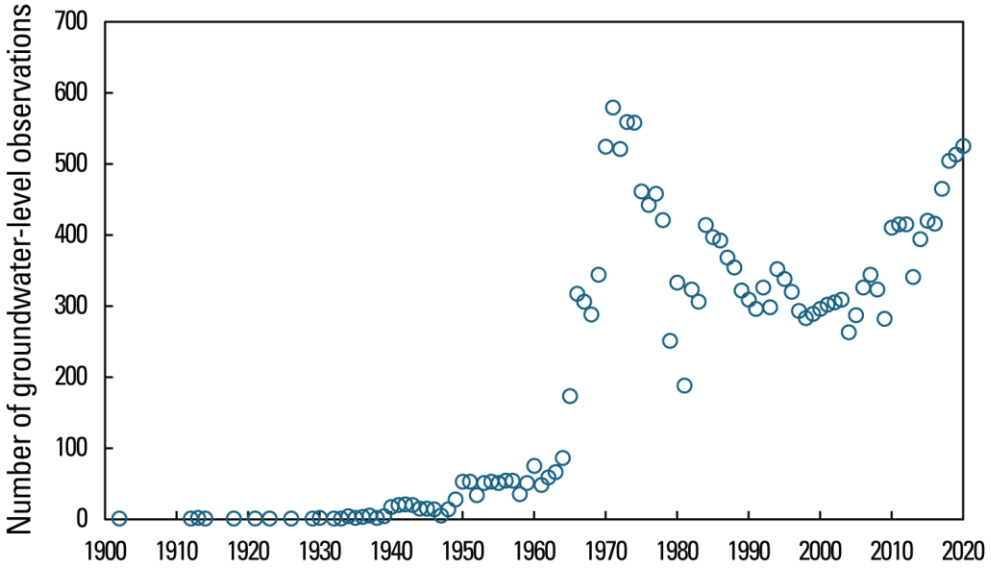
## Layer 1 Water Use

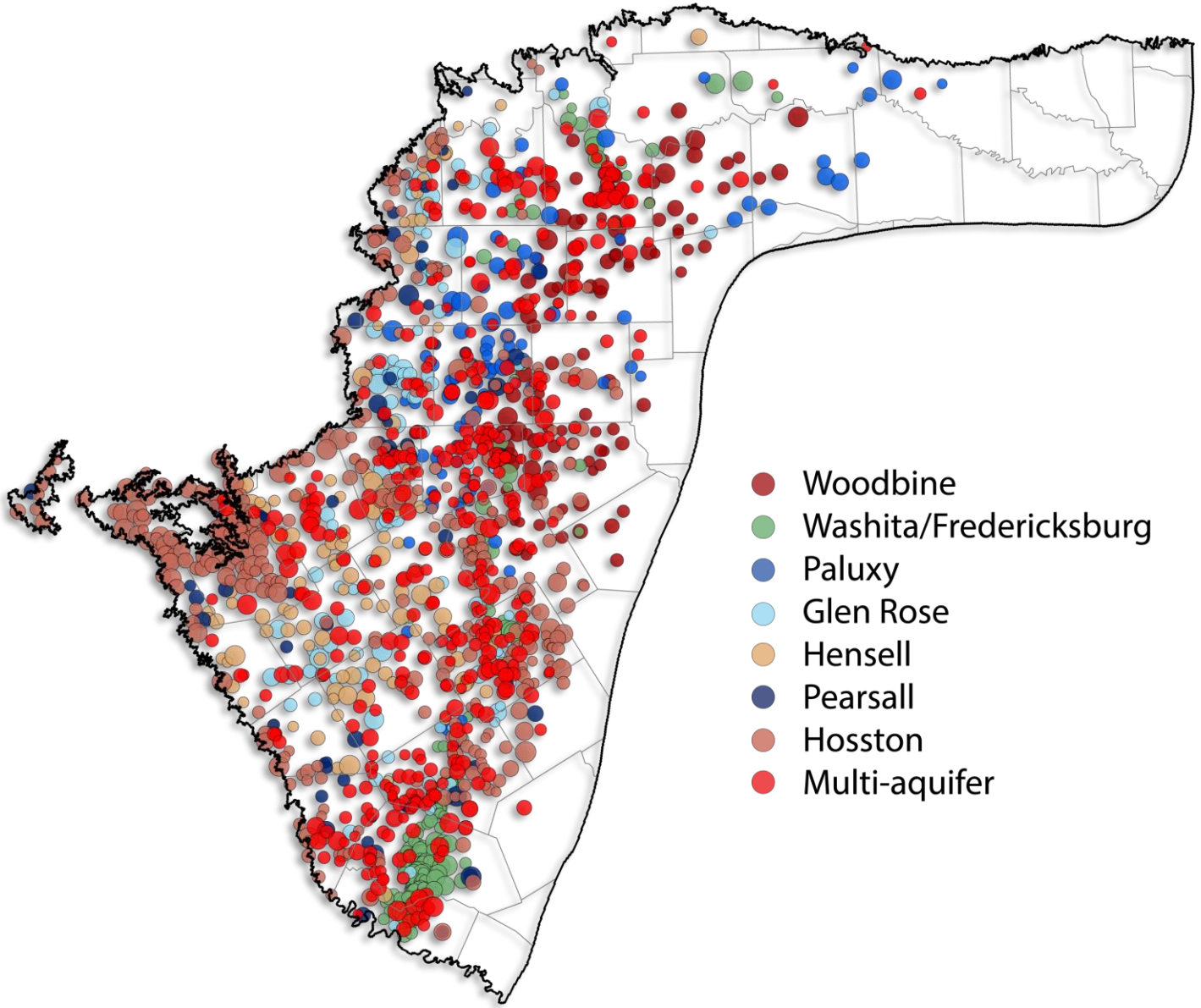
- Groundwater use is simulated in layer 1 just as the 2014 GAM
- Recharge conceptualization—a lot of water moving through layer 1 from recharge points to nearby river and stream cells



# Water Levels

- Greater number of groundwater levels through time as monitoring in the study area has increased
- A programmatic approach was used to prepare groundwater levels used in the model

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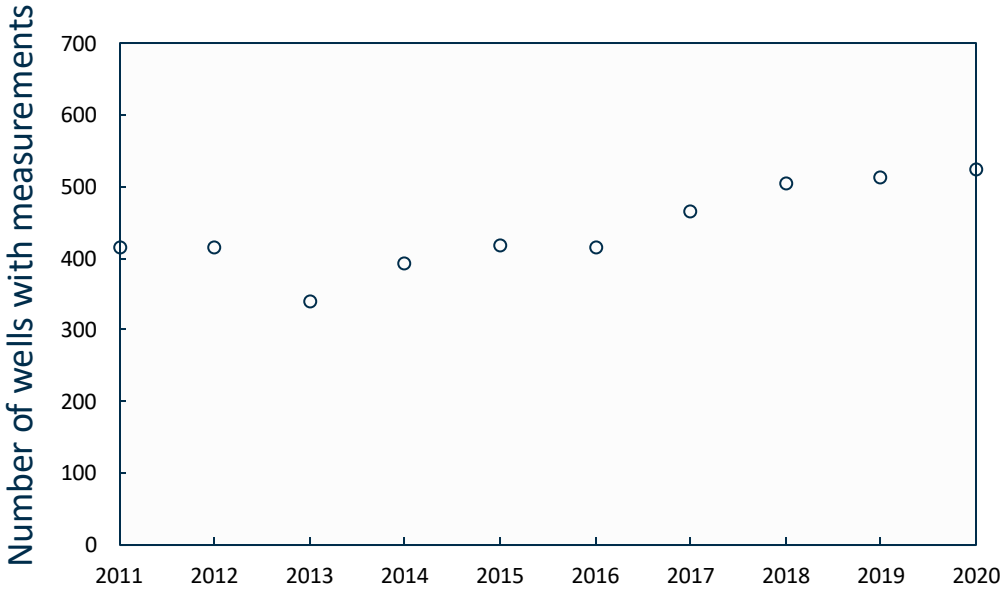
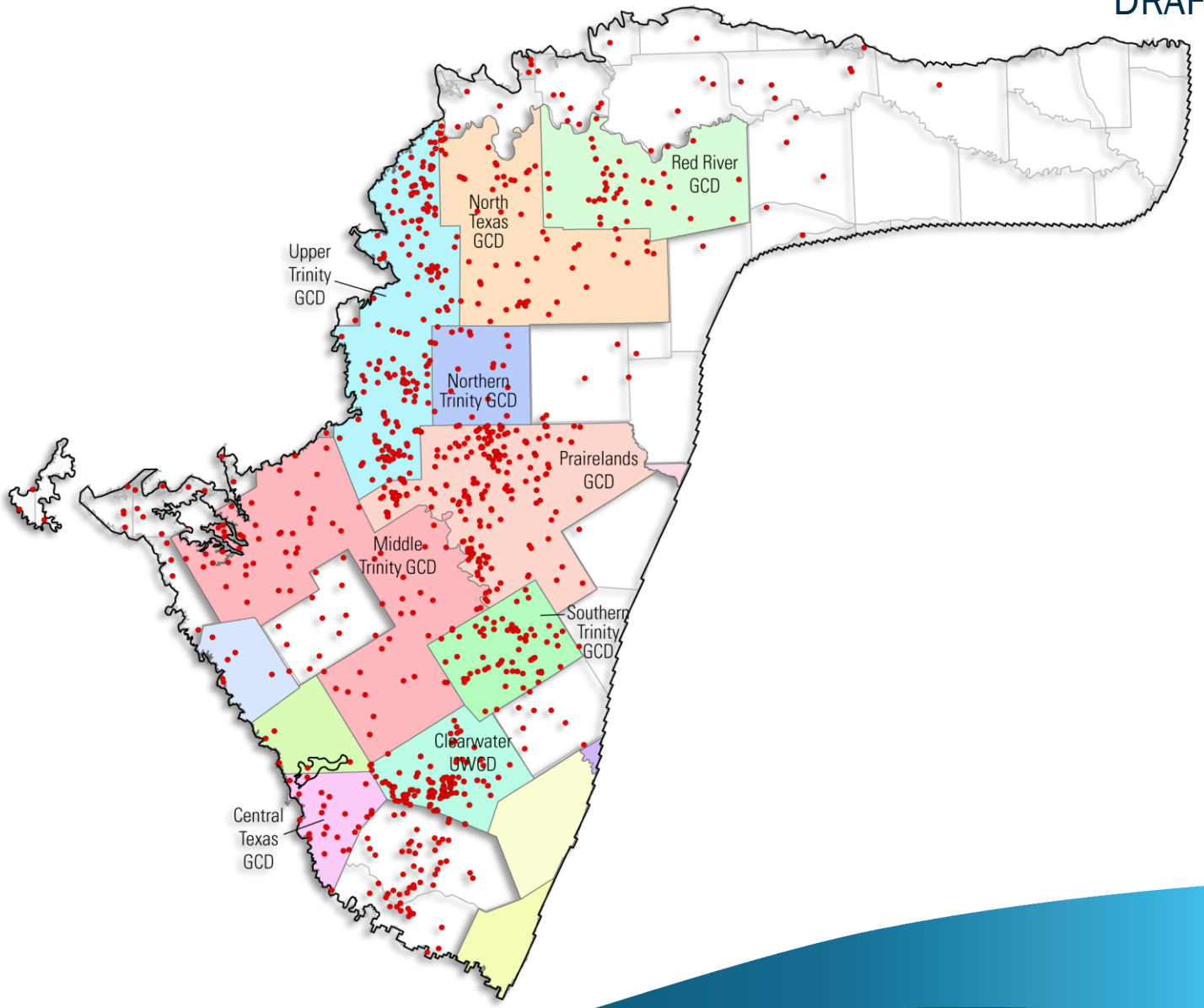
# Water Levels

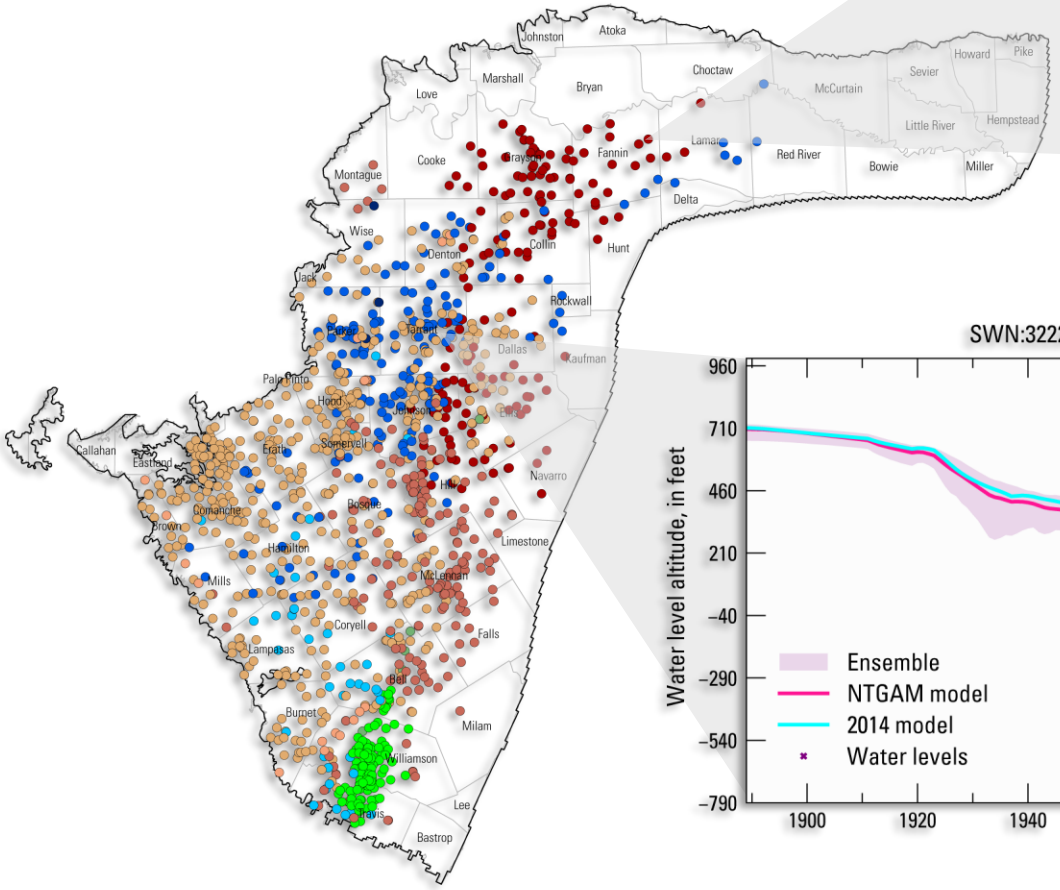
- The model update includes the 2012–2020 time period
- 2012–2020 wells with water levels shown at right
- Data from GCDs and TWDB—checked for duplicates

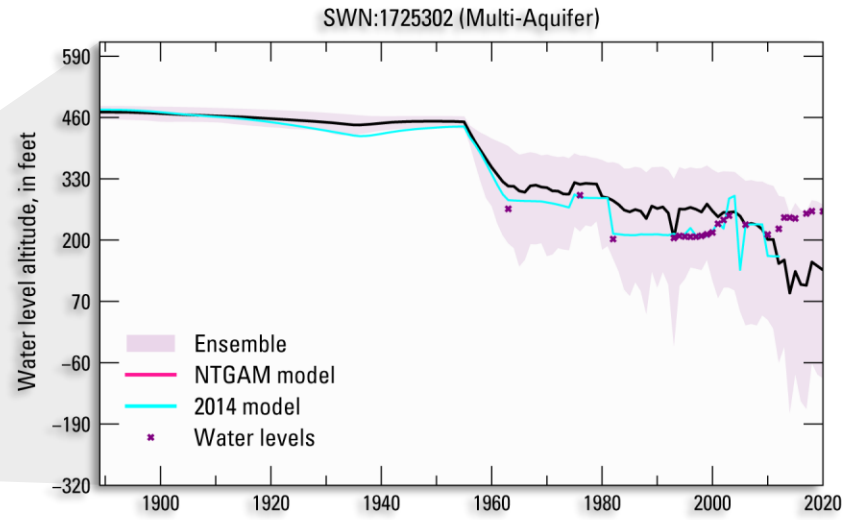


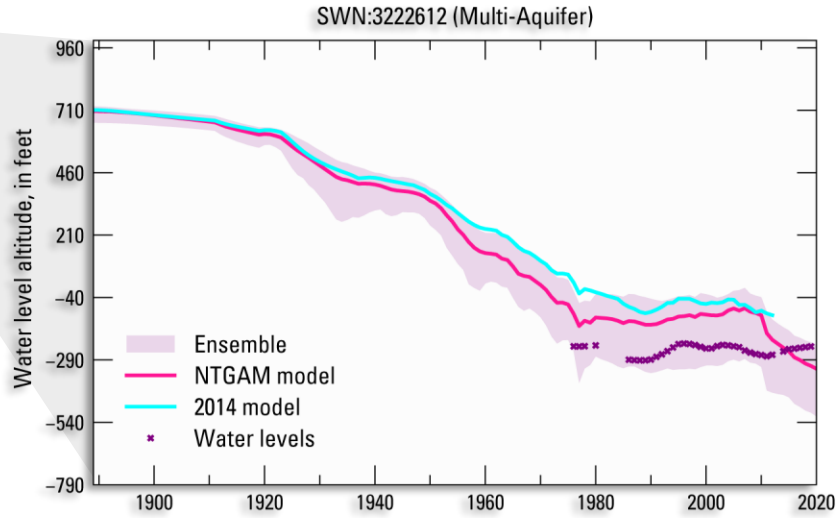
# Calibration Results

- Positive progress with the model calibration to groundwater levels
- Generally replicating the trend of the water level data in most areas




Fannin County




Tarrant County

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# Calibration Results

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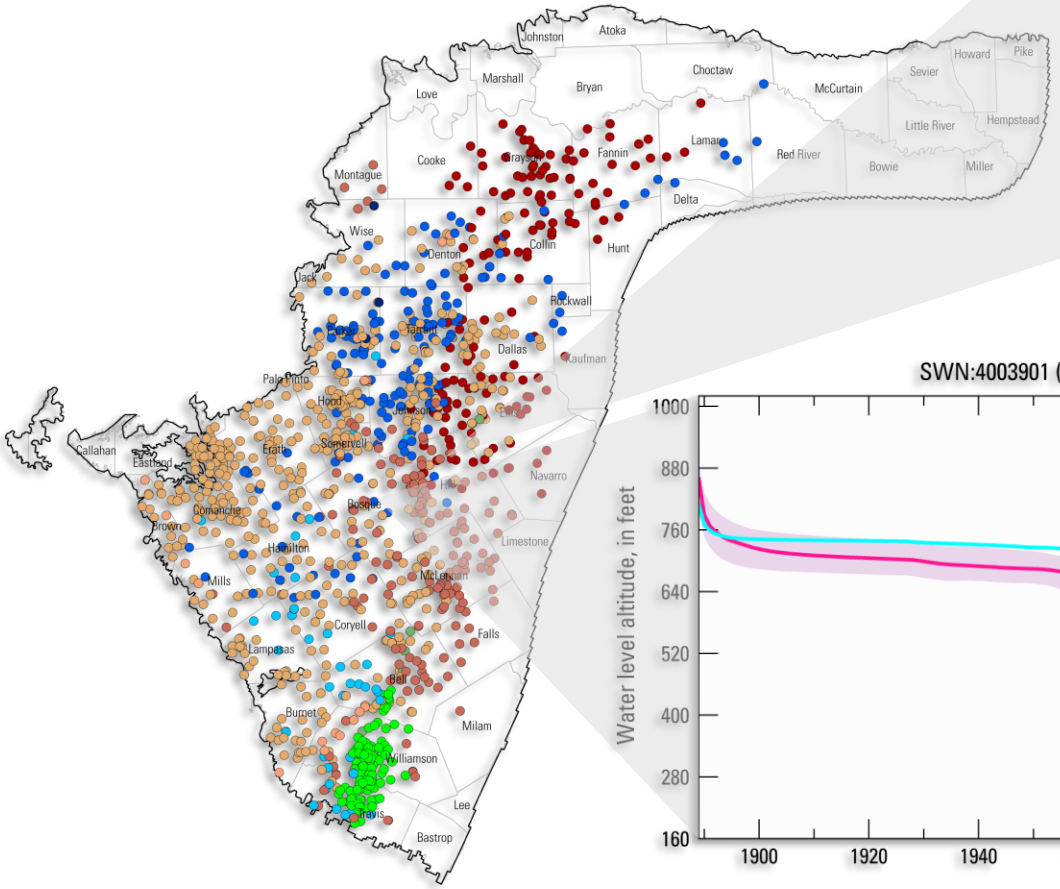
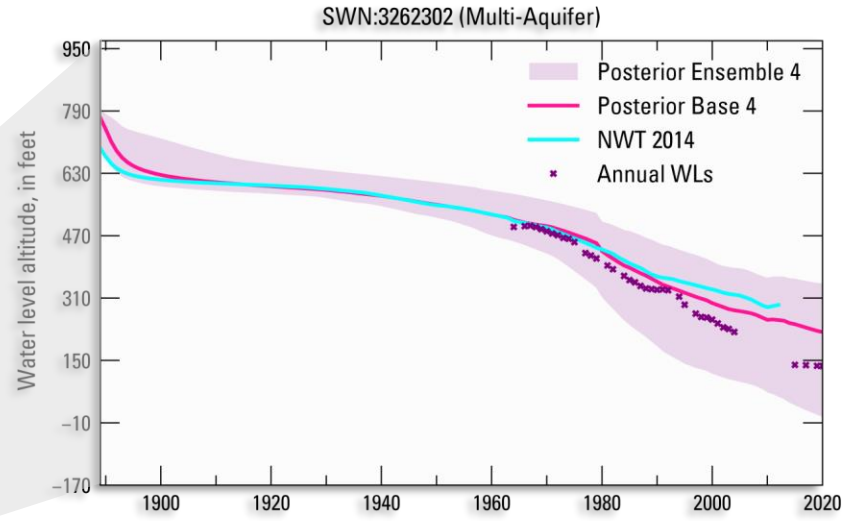
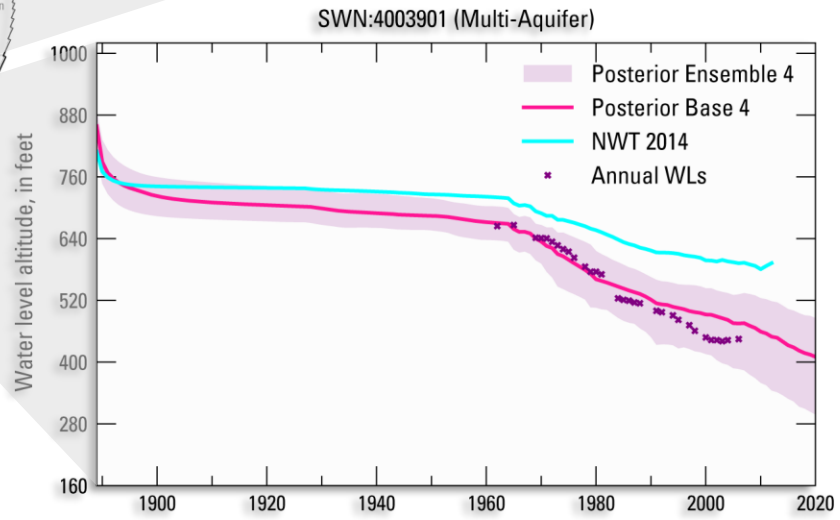



Hill County




Bosque County

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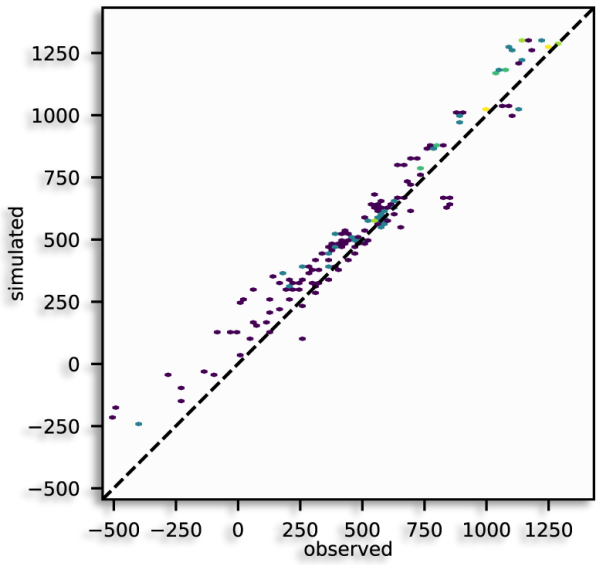
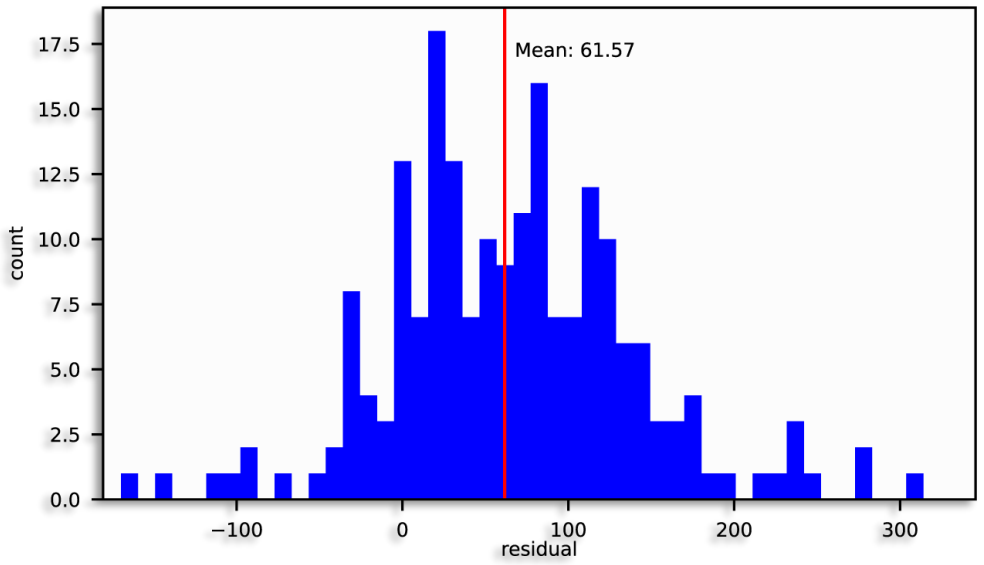
# Calibration Results

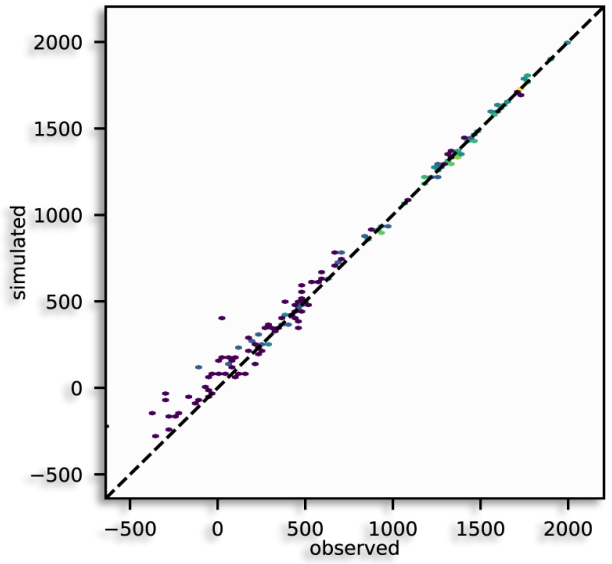
- Focus the calibration on the most accurate water level data
- 90% of the calibration effort focused on wells with screening information
- Water levels with greater uncertainty include: (1) wells without screening information, and (2) airline measurements
- Decadal-scale results at right

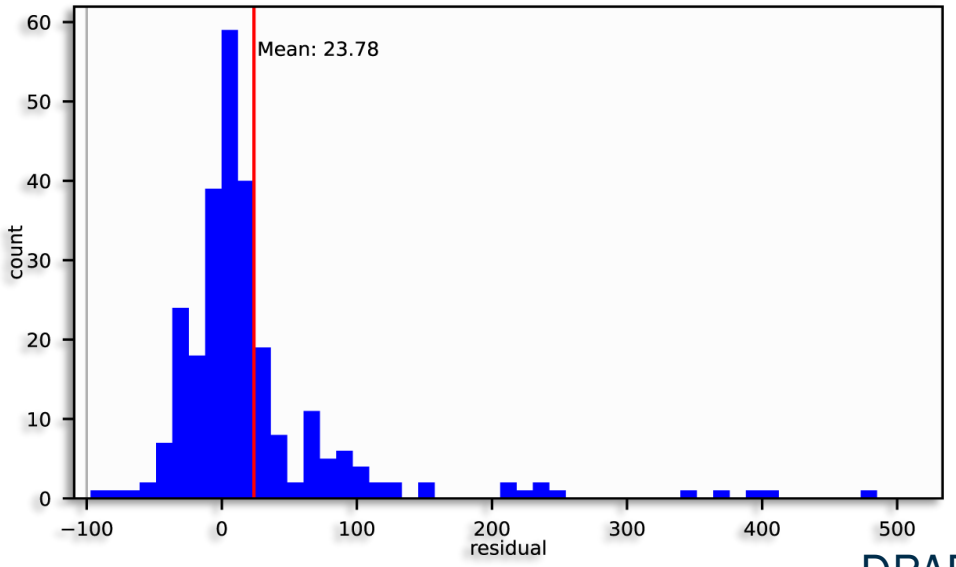
Wells with long-term measurements in multiple units (with screens)




Long-term wells – Hosston (with screens)

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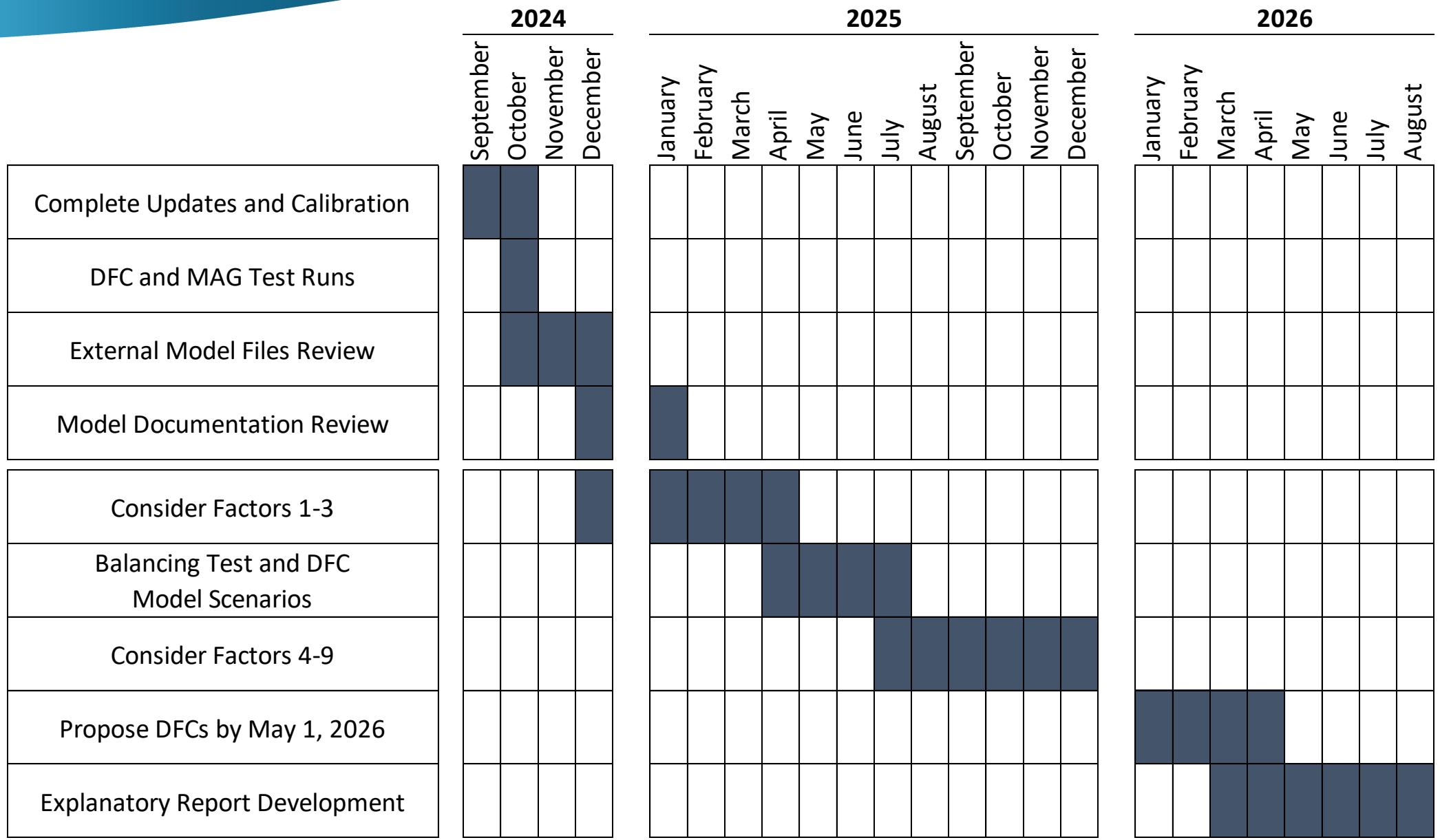
# Project Timeline

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