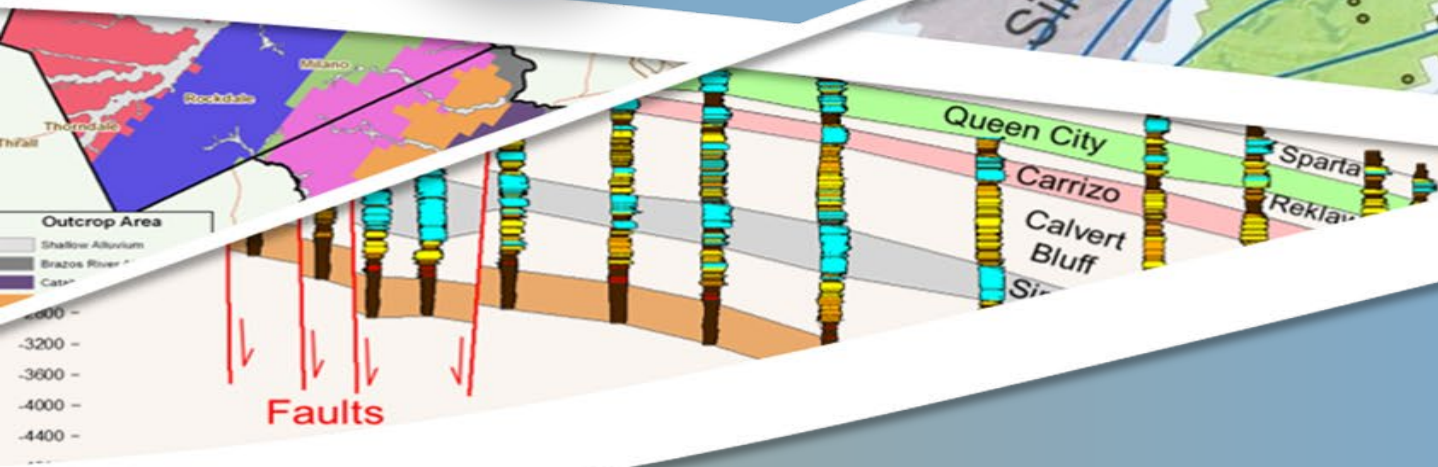


DFC Committee: November 12, 2024

Presented To: DFC
Committee



Presented By:

Agenda

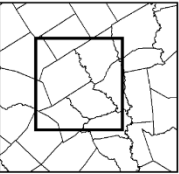
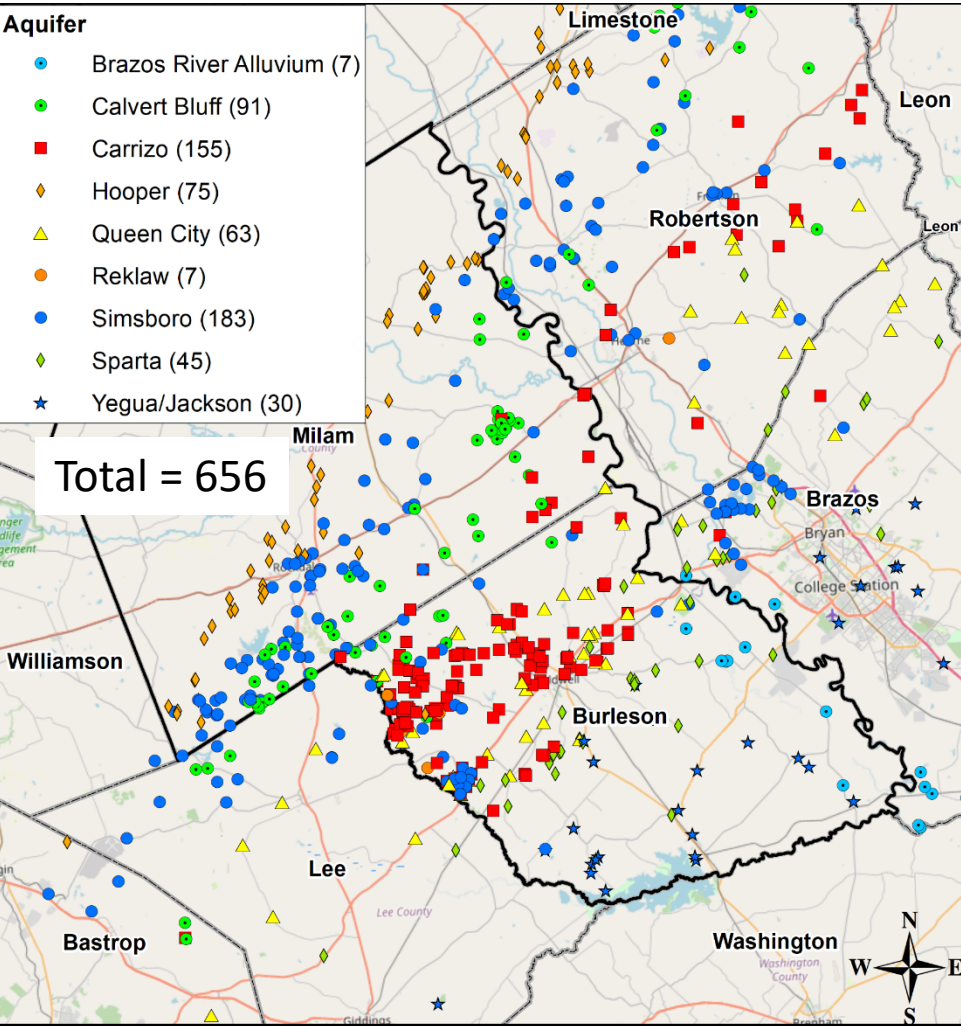
- Preliminary Results for Protective Drawdown Limits (PDL) and Desired Future Conditions (DFC) Compliance Evaluations
- Updated Geologic Model
- POSGCD Operational Model

Preliminary Results for PDL and DFC Compliance Evaluations

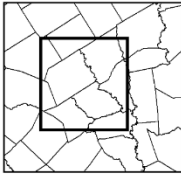
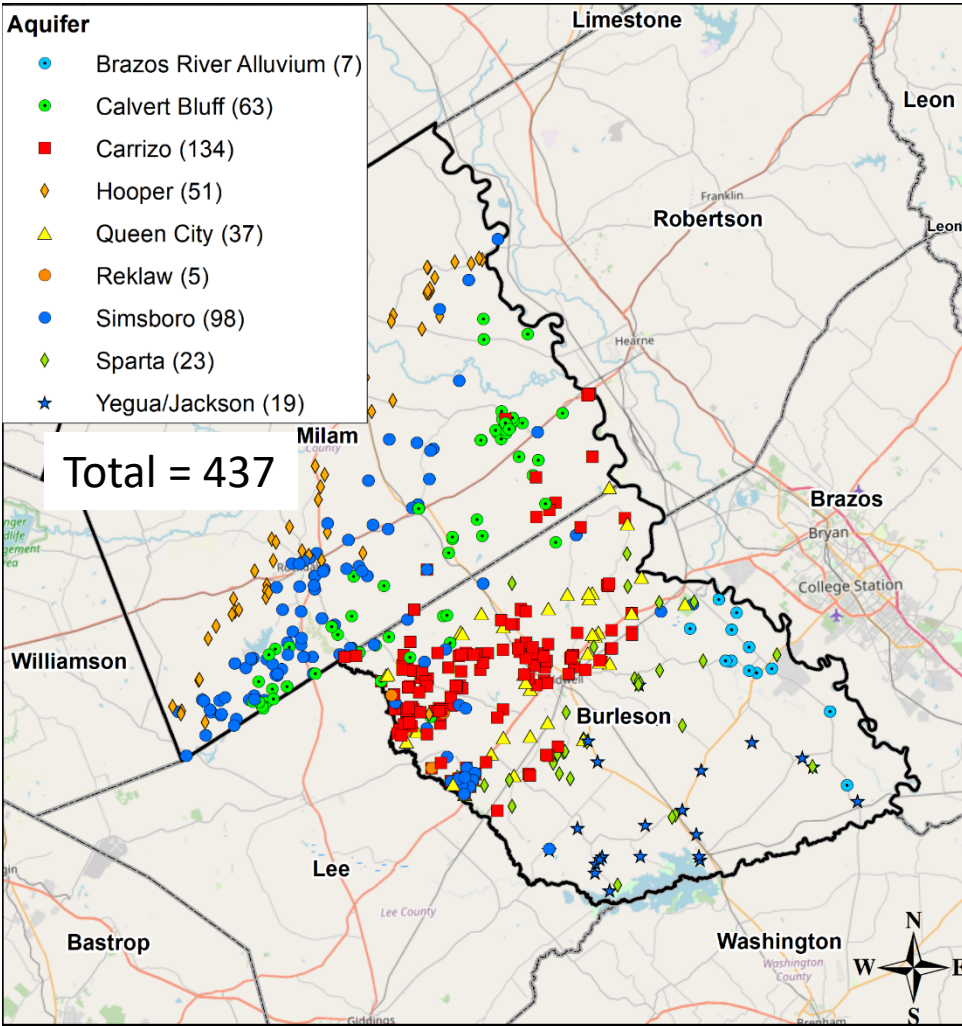
Discussion Topics

- Monitoring Wells
- Management Zones (DFCs) and Management Areas(PDLs)
- Compliance Evaluations
- Comparison of Interpolation Routines

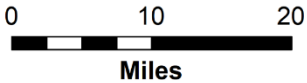
Current Well Monitoring Network



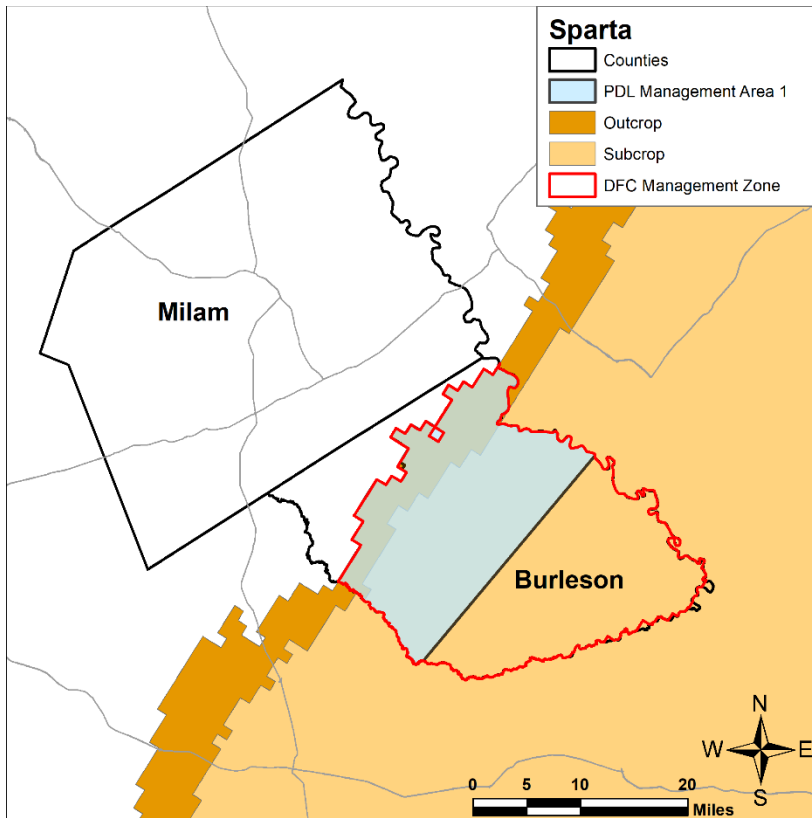
**2024 DFC
Monitoring
Well Network**



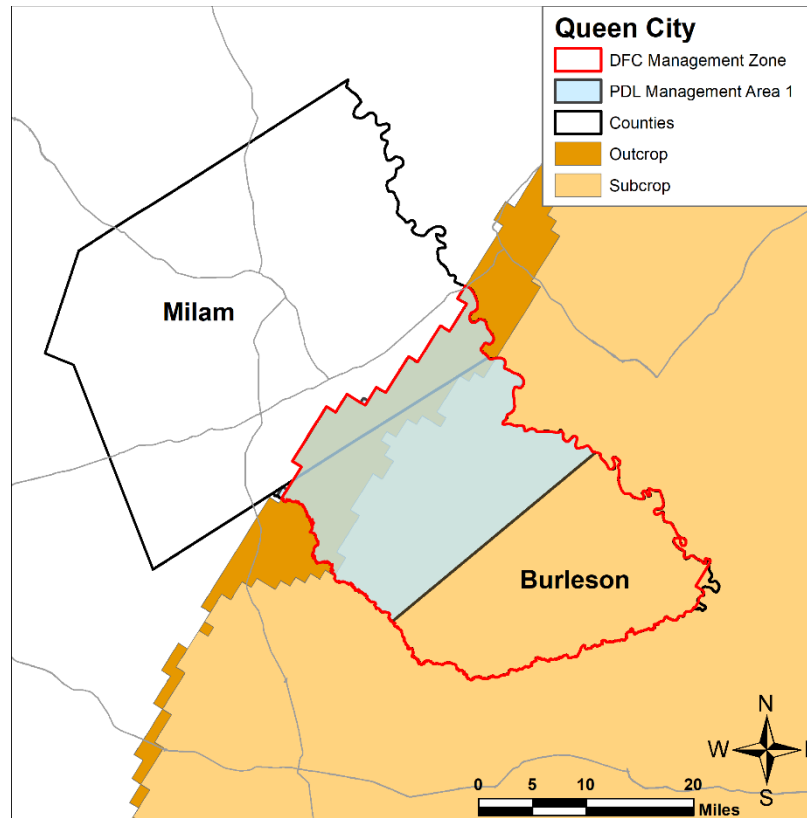
**2024 POSGCD
Monitoring
Well Network**



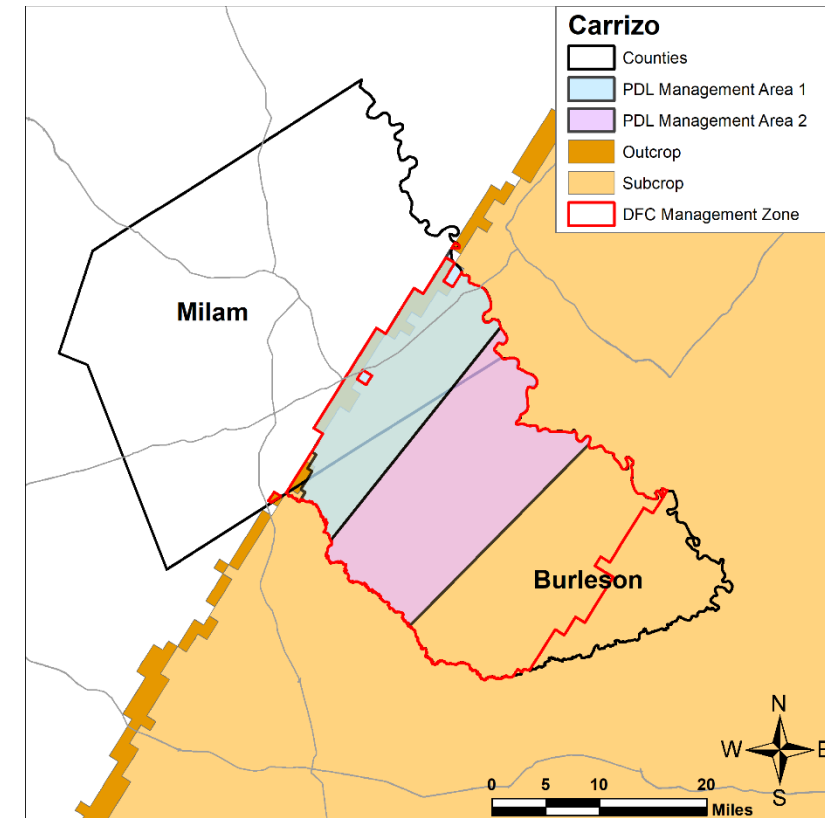
DFC Management Zones and PDL Management Areas



Sparta
1 DFC Zone
1 PDL Area

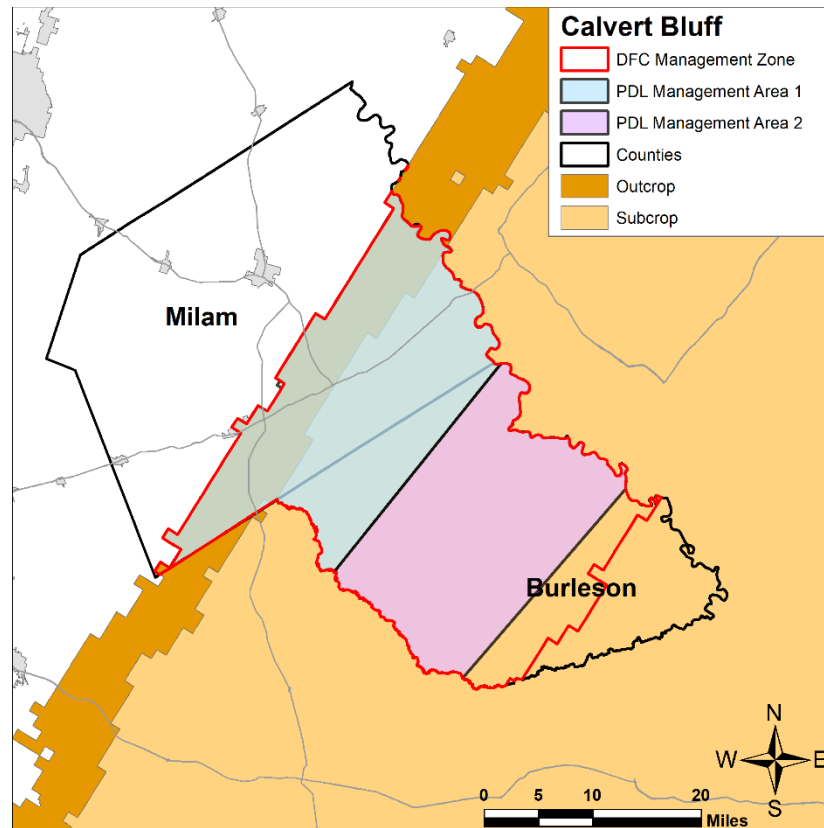


Queen City
1 DFC Zone
1 PDL Area

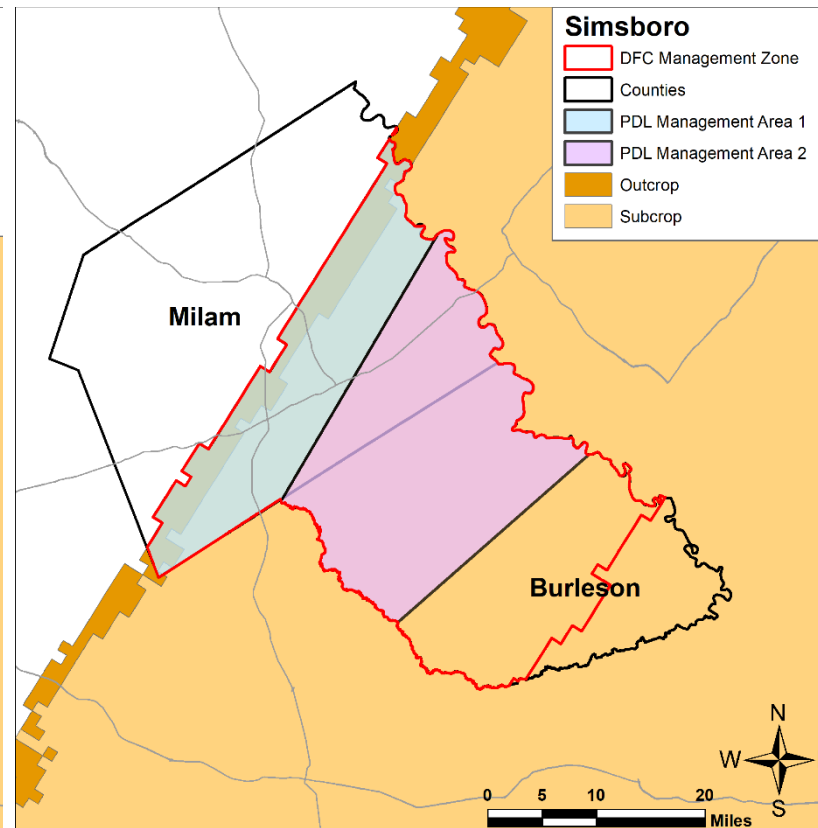


Carrizo
1 DFC Zone
2 PDL Areas

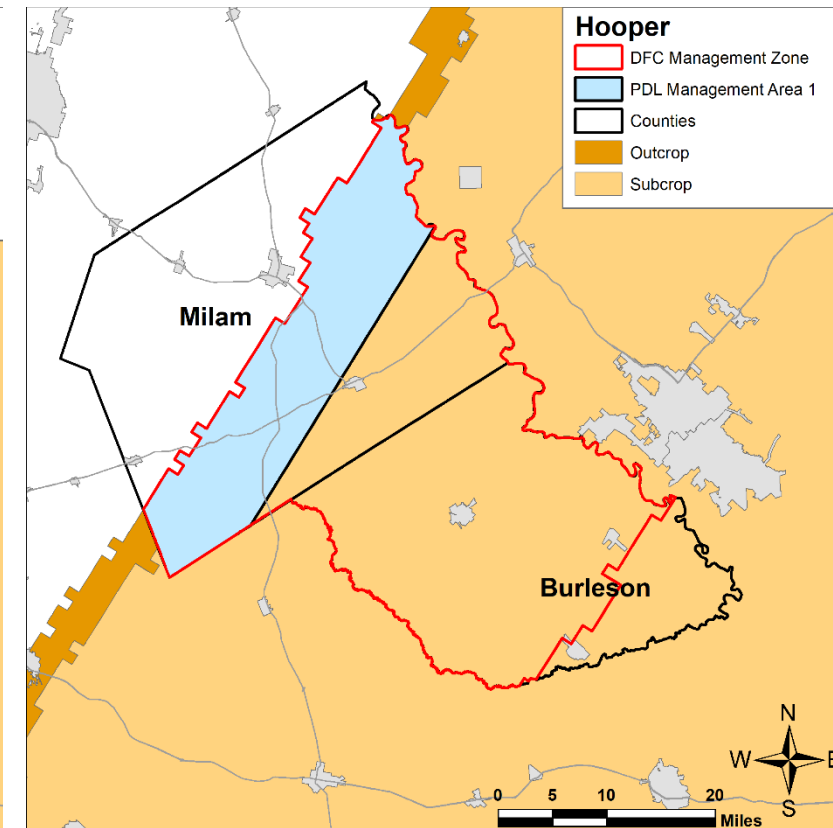
DFC Management Zones and PDL Management Areas



Calvert Bluff
1 DFC Zone
2 PDL Areas



Simsboro
1 DFC Zone
2 PDL Areas



Hooper
1 DFC Zone
1 PDL Area

Preliminary Results for DFC Compliance Evaluation

Management Zone	DFC	Drawdown from 2011 to 2023
Aquifer	Feet of Drawdown 2011 - 2070	Average Drawdown
		Percent of DFC
		Threshold Exceeded for: T2R, KWL, KRS

Interpolation Method

T2R – Topo to Raster

KWL – Kriging

KRS - Kriging combined with
OPMAN Results

Management Zone	DFC	Drawdown from 2011 to 2023	Drawdown from 2011 to 2024
Sparta	32	19.1	18.5
		59.7%	57.8%
		-, 3, -	-, 3, 1
Queen City	30	17.7	17.1
		59.0%	57.0%
		-, 3, -	-, 3, -
Carrizo	146	90.5	98.4
		62.0%	67.3%
		2, 2, 1	2, 2, 2
Calvert Bluff (Upper Wilcox)	156	46.9	50.5
		30.1%	32.4%
		-, -, -	-, -, -
Simsboro (Middle Wilcox)	278	97.7	104.4
		35.1%	37.6%
		-, -, -	-, -, -
Hooper (Lower Wilcox)	178	60.2	62.7
		33.8%	35.2%
		1, -, -	1, -, -

Management Zone		2010 to 2023	2010 to 2024
		Avg. Drawdown (ft) (% of DFC)	
		Drawdown values from the T2R, and KWL	
Yegua-Jackson	61	4.9	6.1
		8%	10%
		-, -	-, -

Thresholds

Level 1 – 50%

Level 2 – 60%

Level 3 – 75%

Preliminary Results for PDL Compliance Evaluation

Management Zone	PDL	Drawdown from 2011 to 2023
Aquifer	Feet of Drawdown 2011 - 2070	Average Drawdown
		Percent of PDL
		Threshold Exceeded for: T2R, KWL, KRS

Interpolation Method

T2R – Topo to Raster

KWL – Kriging

KRS - Kriging combined with
OPMAN Results

Management Area		PDL	Drawdown (ft) from 2011 to 2023	Drawdown (ft) from 2011 to 2024
Sparta	Area 1	28	6.2	9.5
			22.1%	34.0%
			-, -, -	-, 2, 1
Queen City	Area 1	75	6.0	6.6
			8.0%	8.8%
			-, -, -	-, -, -
Carrizo	Area 1	75	30.1	31.7
			40.1%	42.3%
			-, -, 2	-, -, 2
	Area 2	175	122.7	128.3
			70.1%	73.3%
			2, 2, 2	2, 3, 2
Calvert Bluff (Upper Wilcox)	Area 1	88	31.9	34.7
			36.3%	39.4%
			-, -, -	-, -, 1
	Area 2	223	62.6	66.8
			28.1%	30.0%
			-, -, -	-, -, -
Simsboro (Middle Wilcox)	Area 1	91	6.9	8.3
			7.6%	9.1%
			-, -, -	-, -, -
	Area 2	335	125.6	134.1
			37.5%	40.0%
			-, -, -	-, -, -
Hooper (Lower Wilcox)	Area 1	54	12.6	13.7
			23.3%	25.4%
			-, -, -	-, -, -

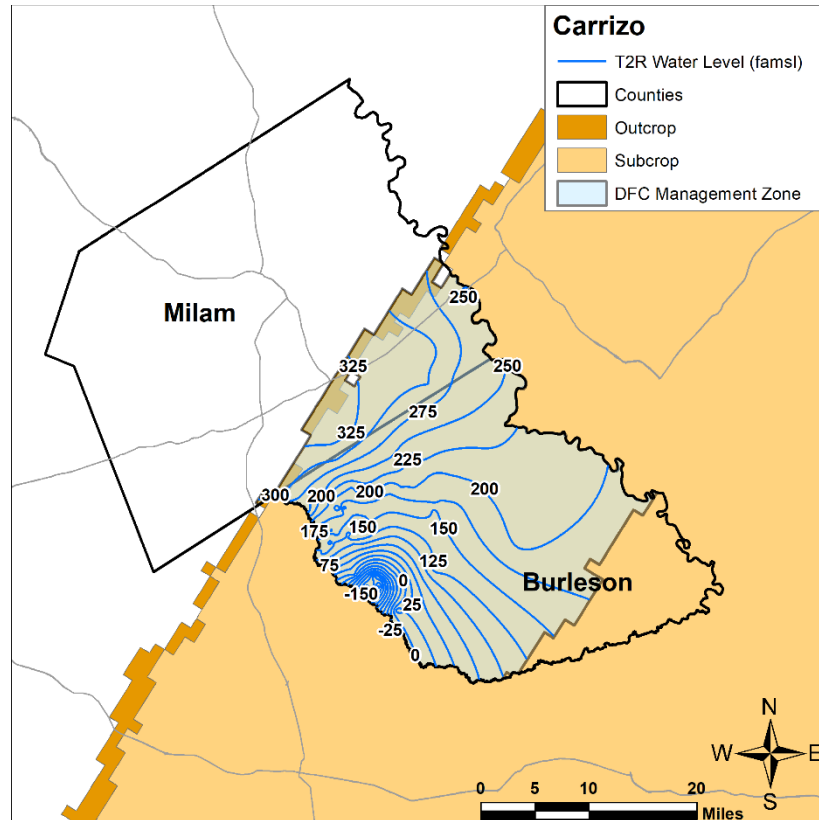
Thresholds

Level 1 – 50%

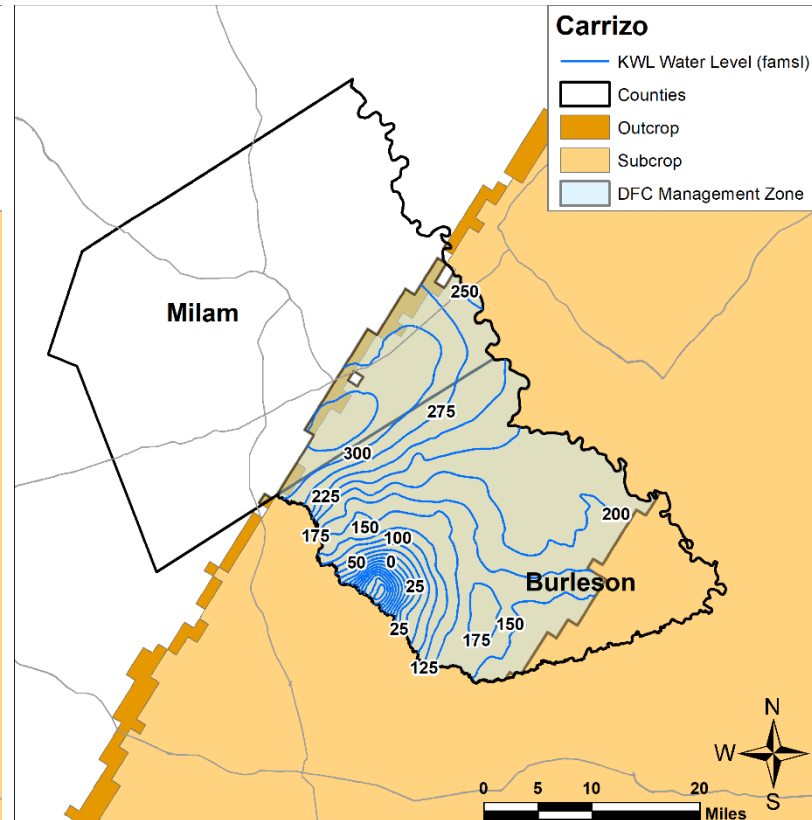
Level 2 – 60%

Level 3 – 75%

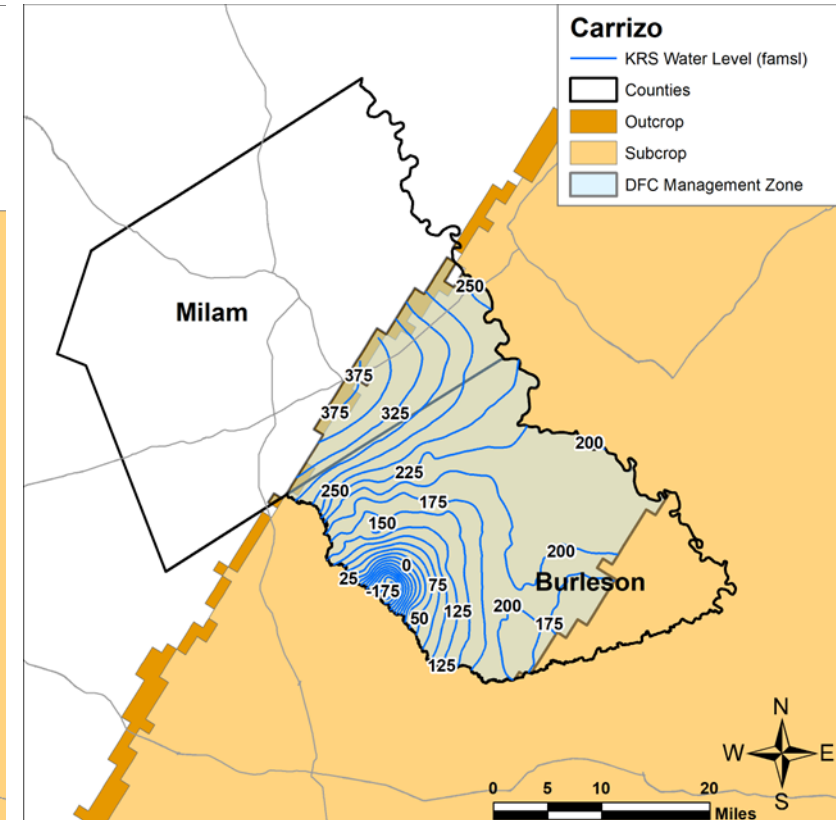
Carrizo Preliminary 2024 Measured Water Levels Contours



Average Water Level = 195.7 ft, amsl



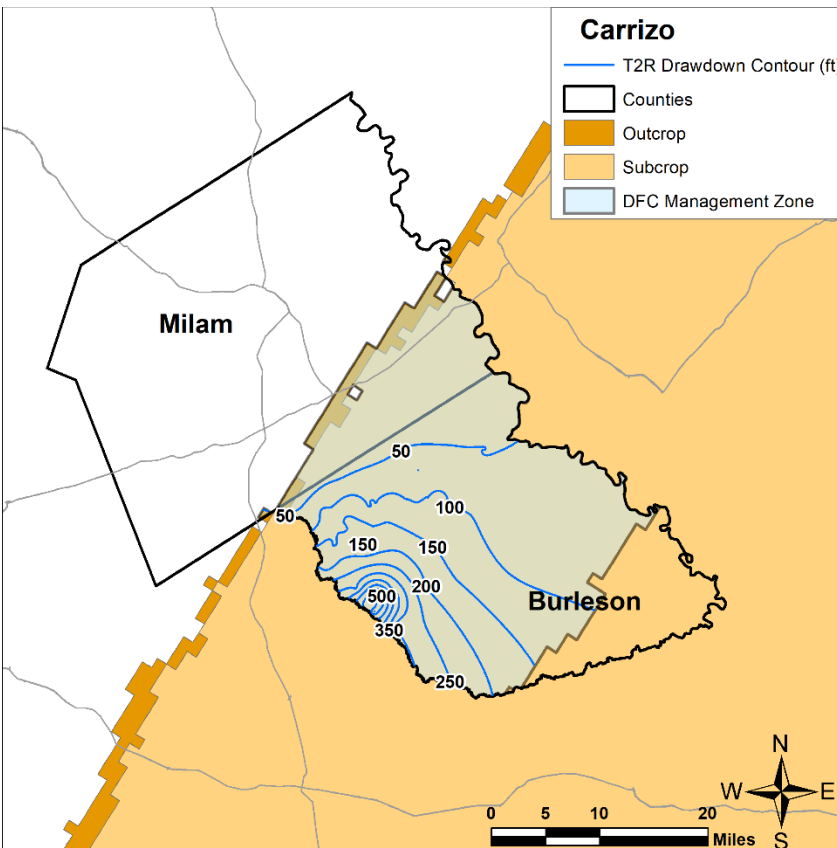
Average Water Level = 203.5 ft, amsl



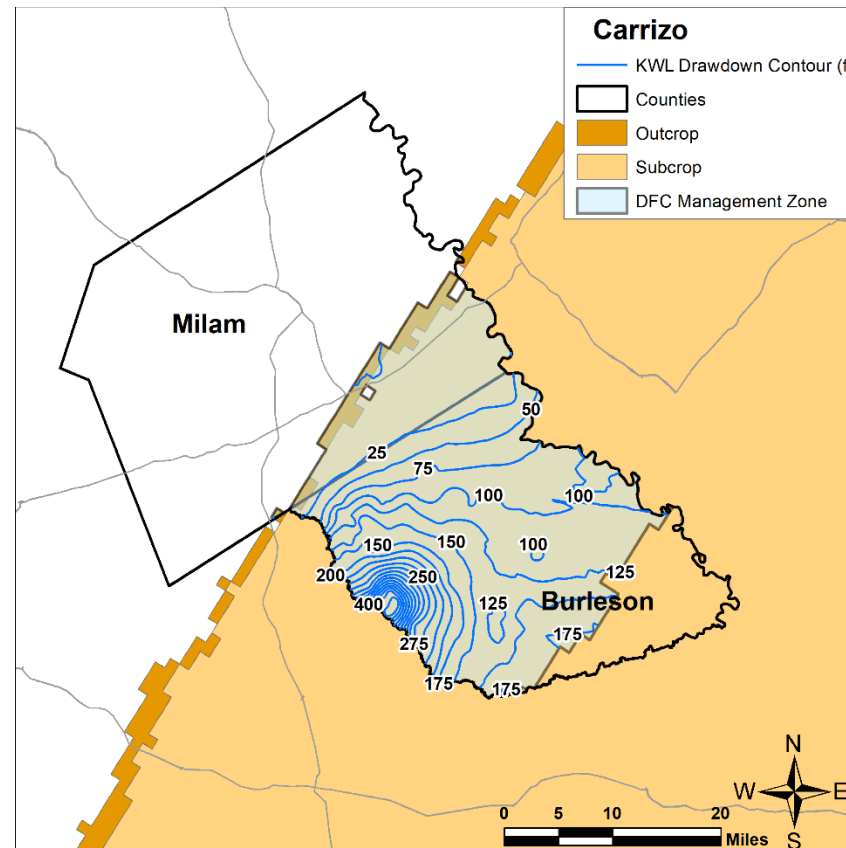
Average Water Level = 209.1 ft, amsl

amsl = above mean sea level

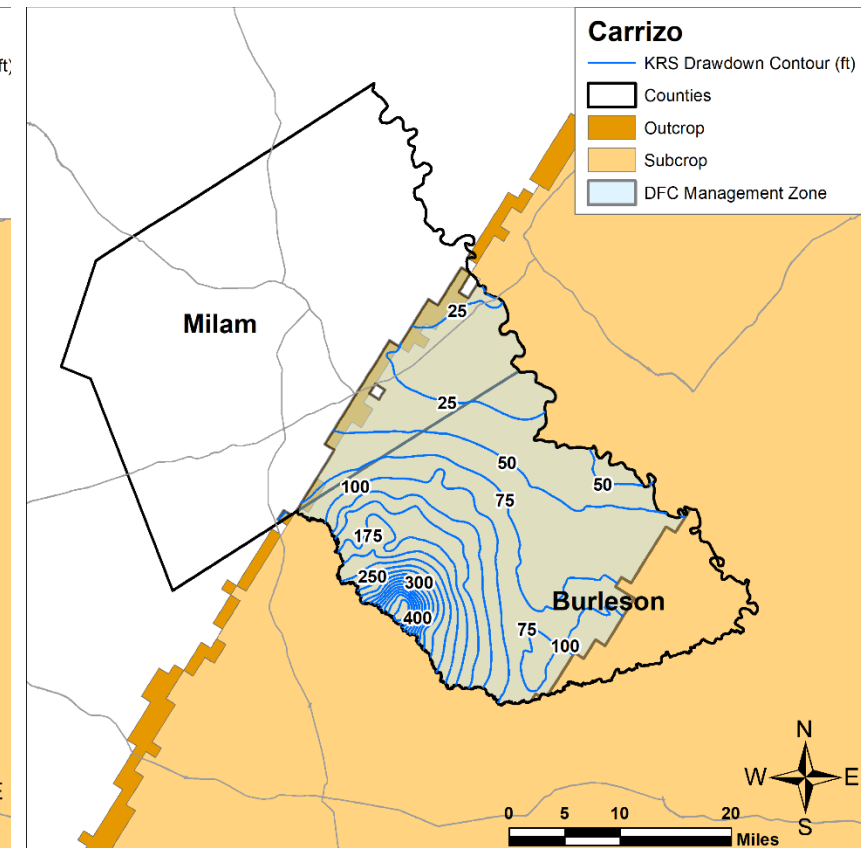
Carrizo Preliminary 2024 Measured Drawdown Contours



Average Drawdown = 98.1 feet

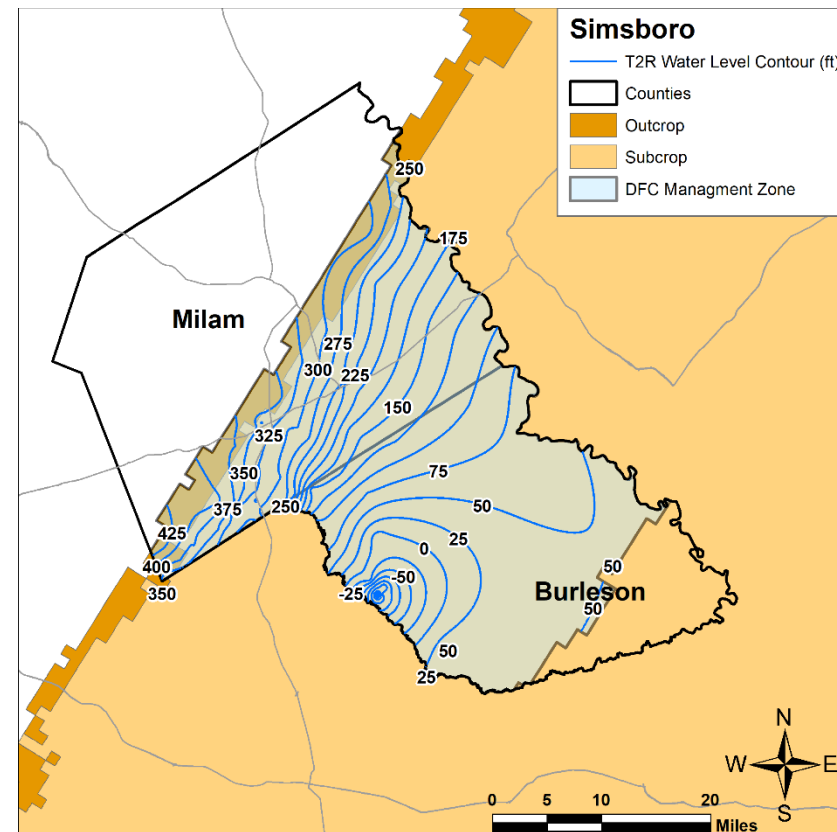


Average Drawdown = 103.8 feet

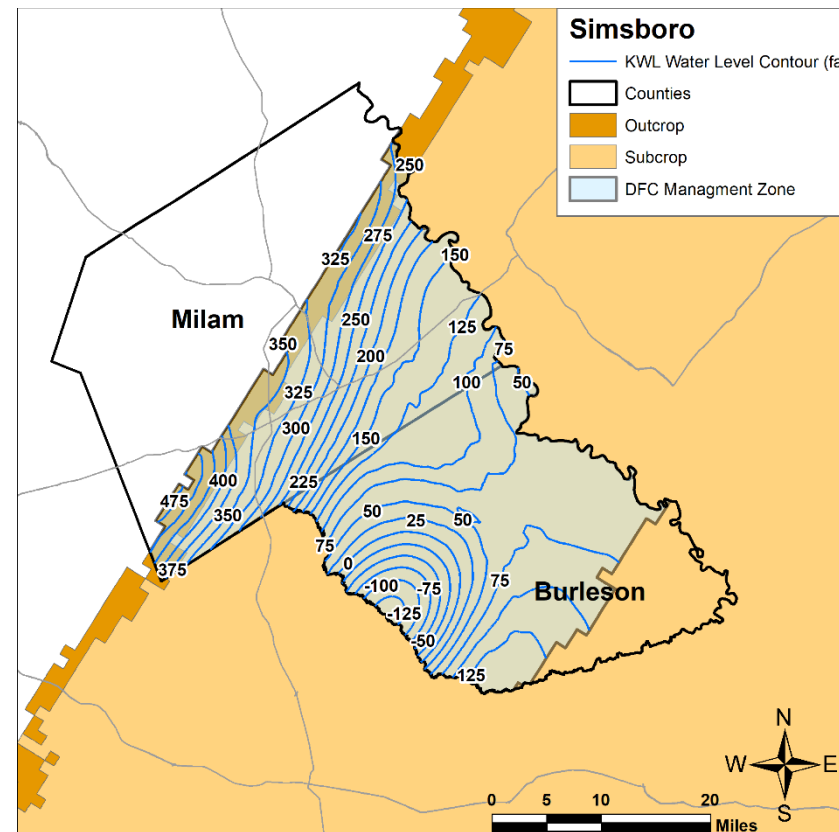


Average Drawdown= 93.2 feet

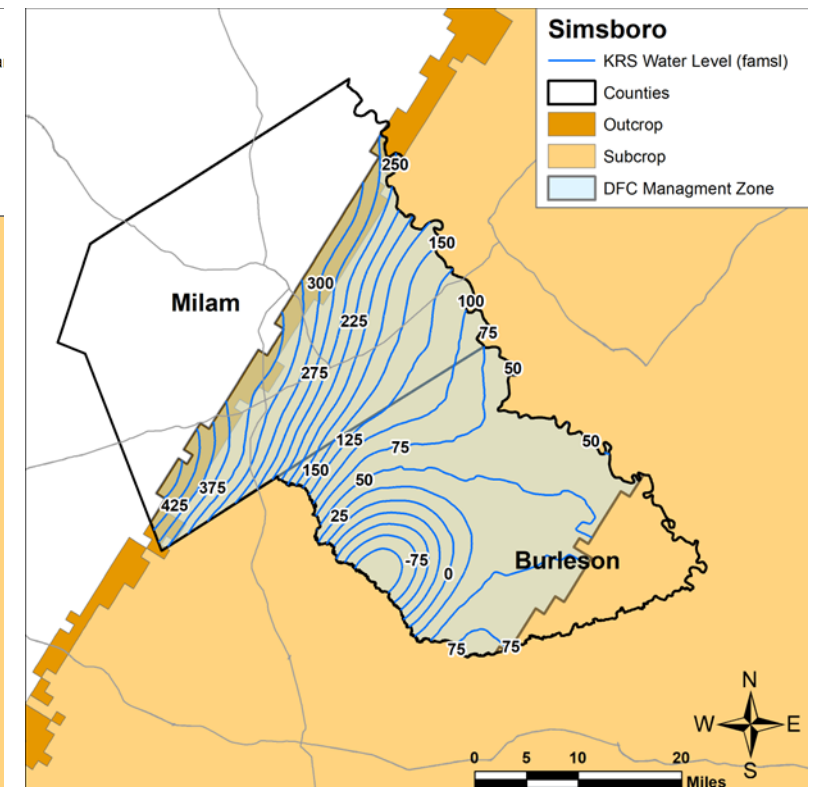
Simsboro Preliminary 2024 Measured Water Levels Contours



Average Water Level = 139.0 ft, amsl



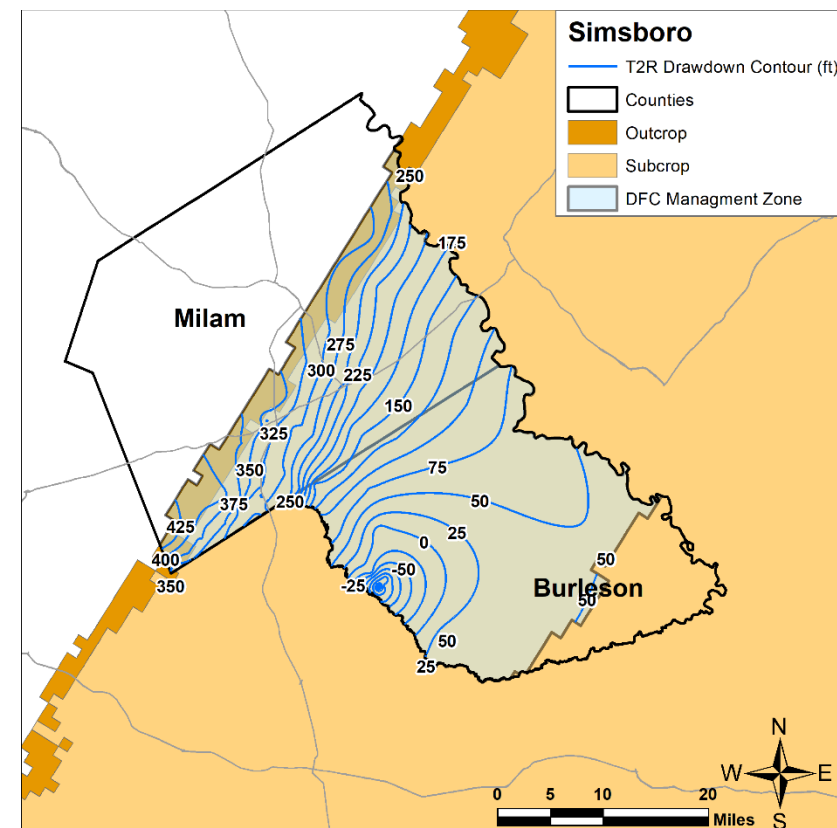
Average Water Level = 146.4 ft, amsl



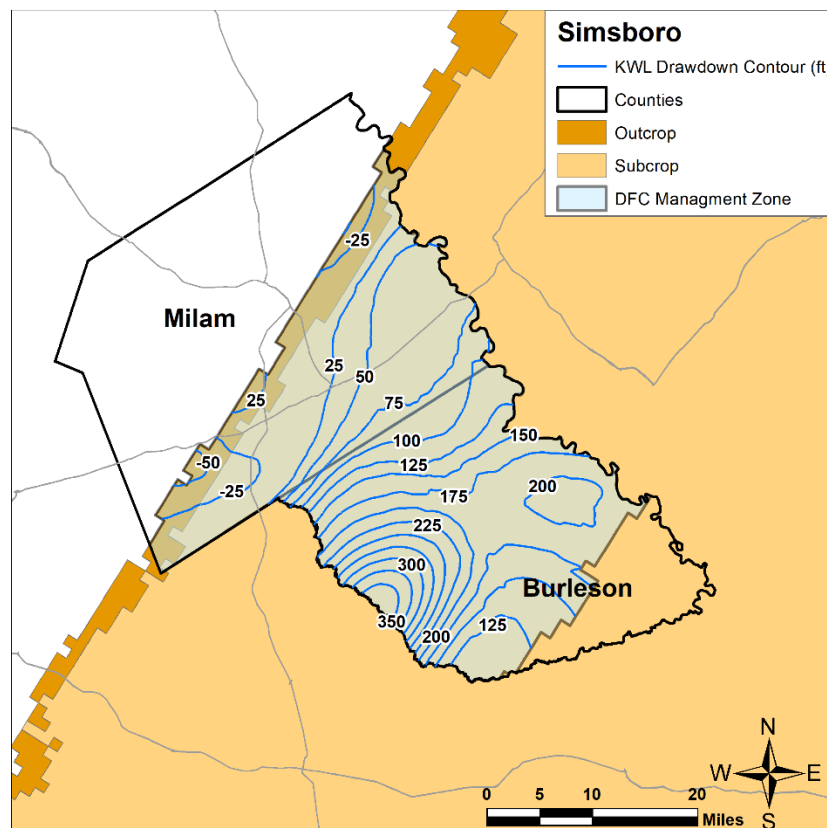
Average Water Level = 135.7 ft, amsl

amsl = above mean sea level

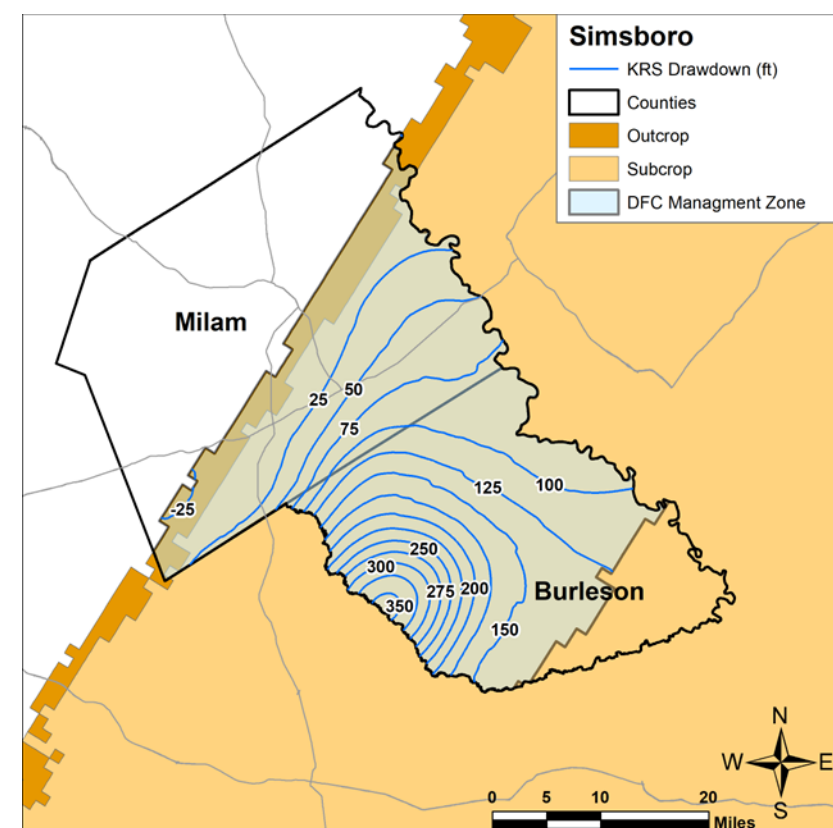
Simsboro Preliminary 2024 Measured Drawdown Contours



Average Drawdown = 100.9 feet



Average Drawdown = 110.4 feet



Average Drawdown= 102.0 feet

Updated Geologic Model

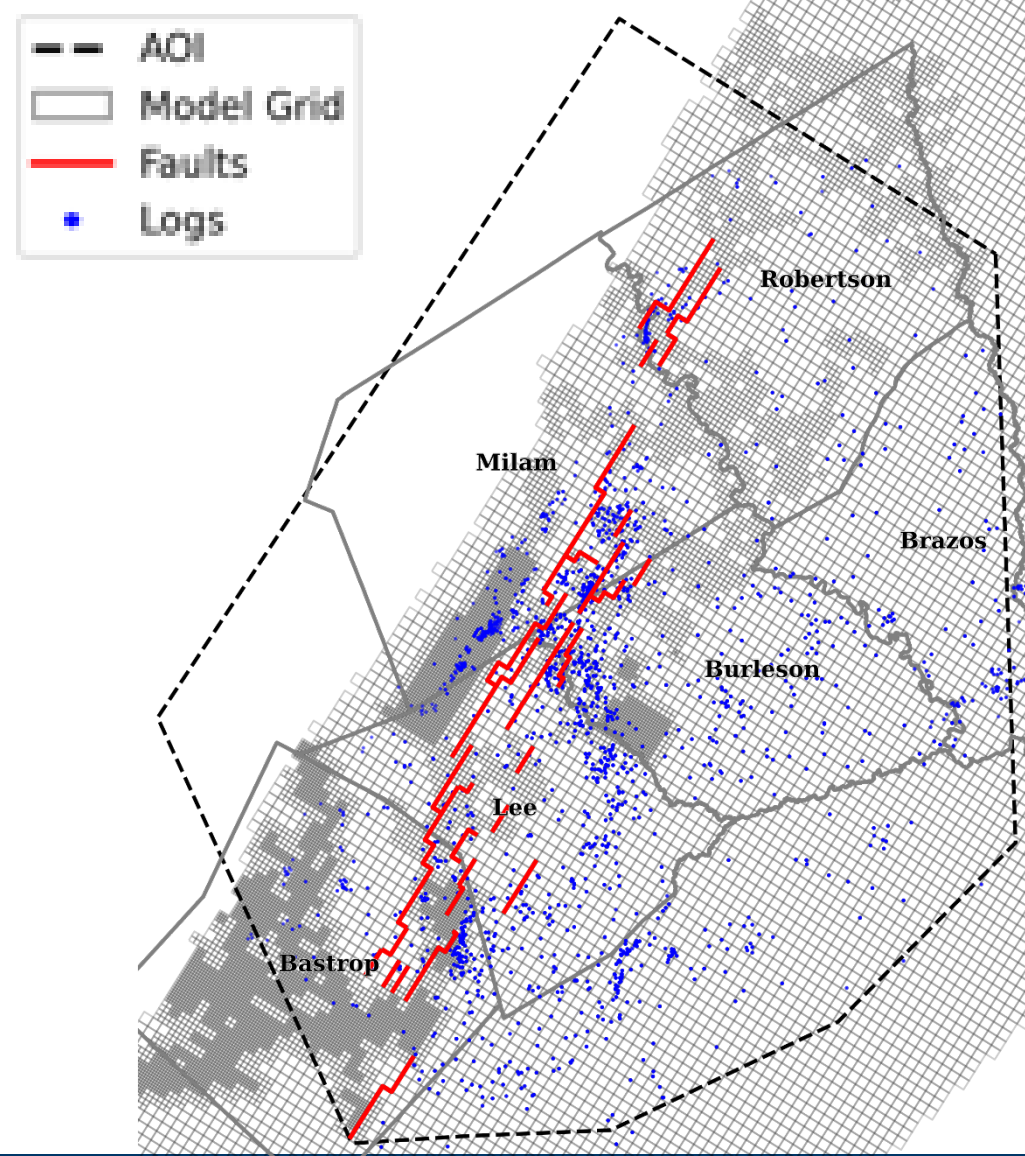
Discussion Topics

- Geophysical Logs
- Geologic Faults
- Approach for Updating Aquifer Surfaces
- Changes to District Aquifer Assignments to Wells
- Inclusion of Lignite Aquifer Layer

Geophysical Logs

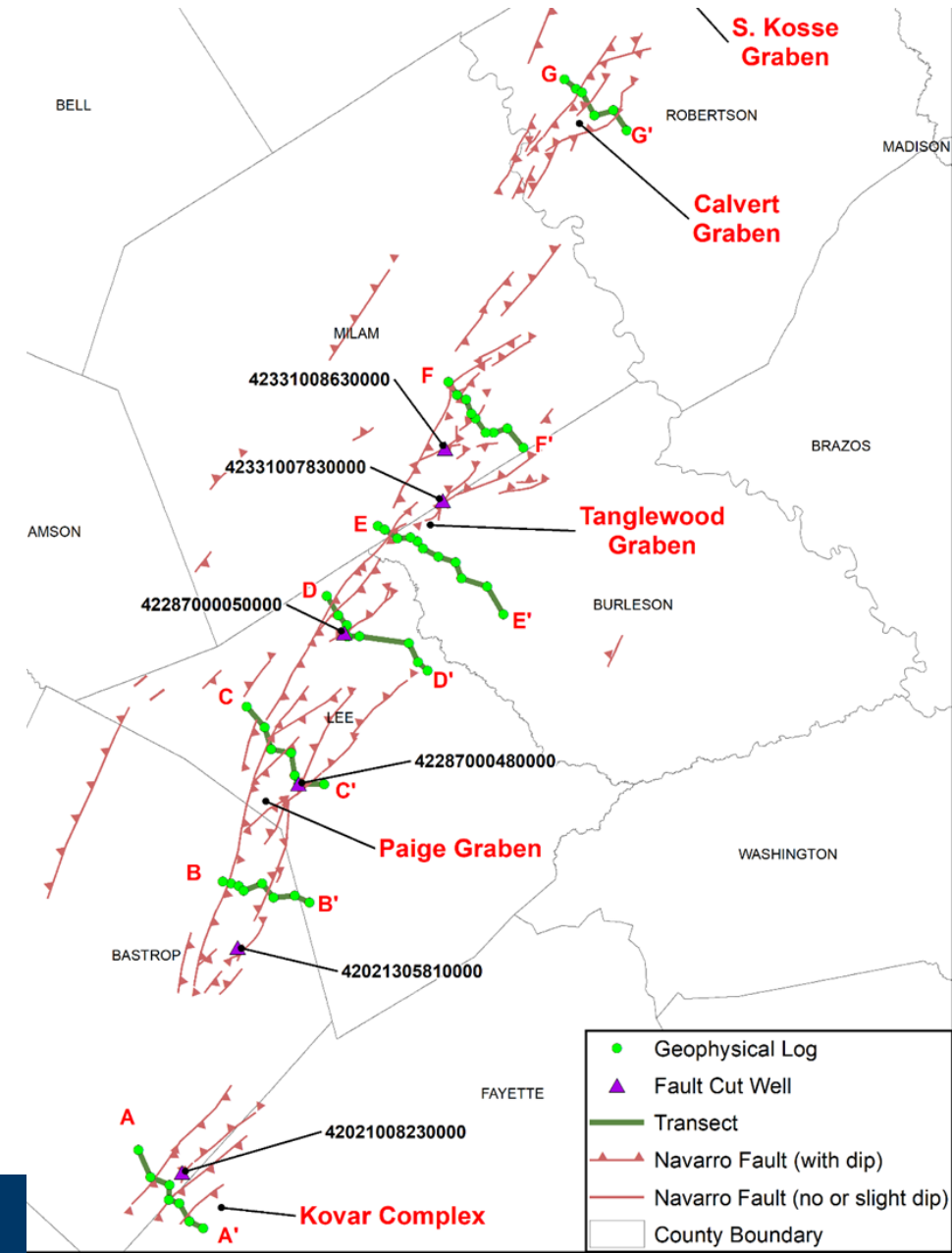
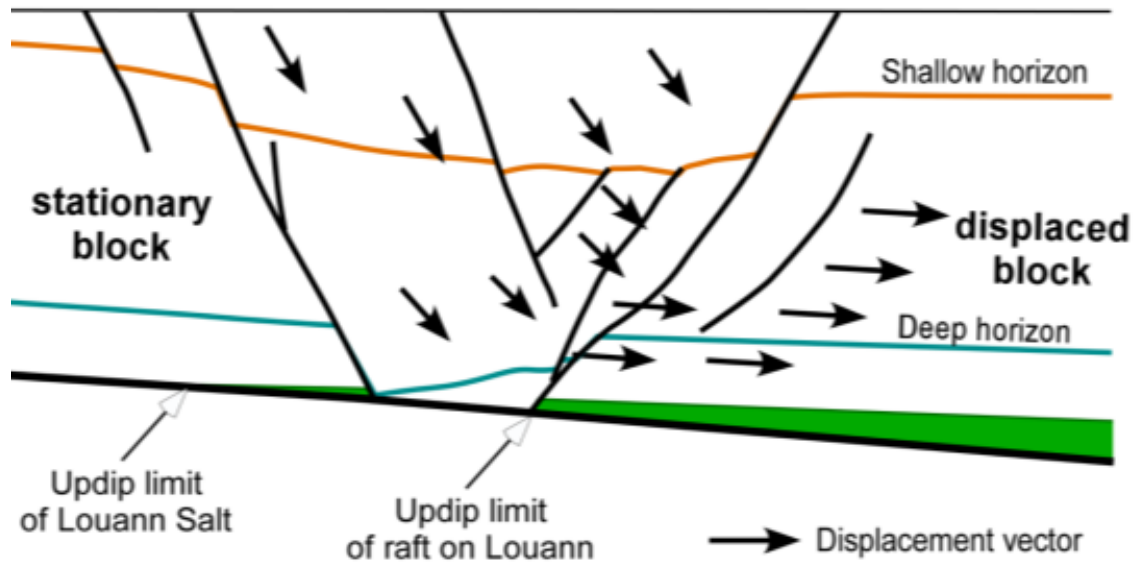
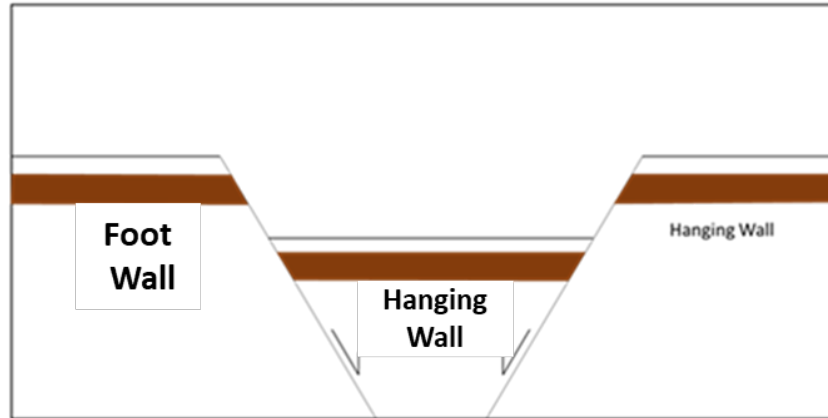
- Grid cells
 - Refine near major pumping centers
- Model Layers
 - Changes to outcrops to provide better transitions to confined regions

1600 logs

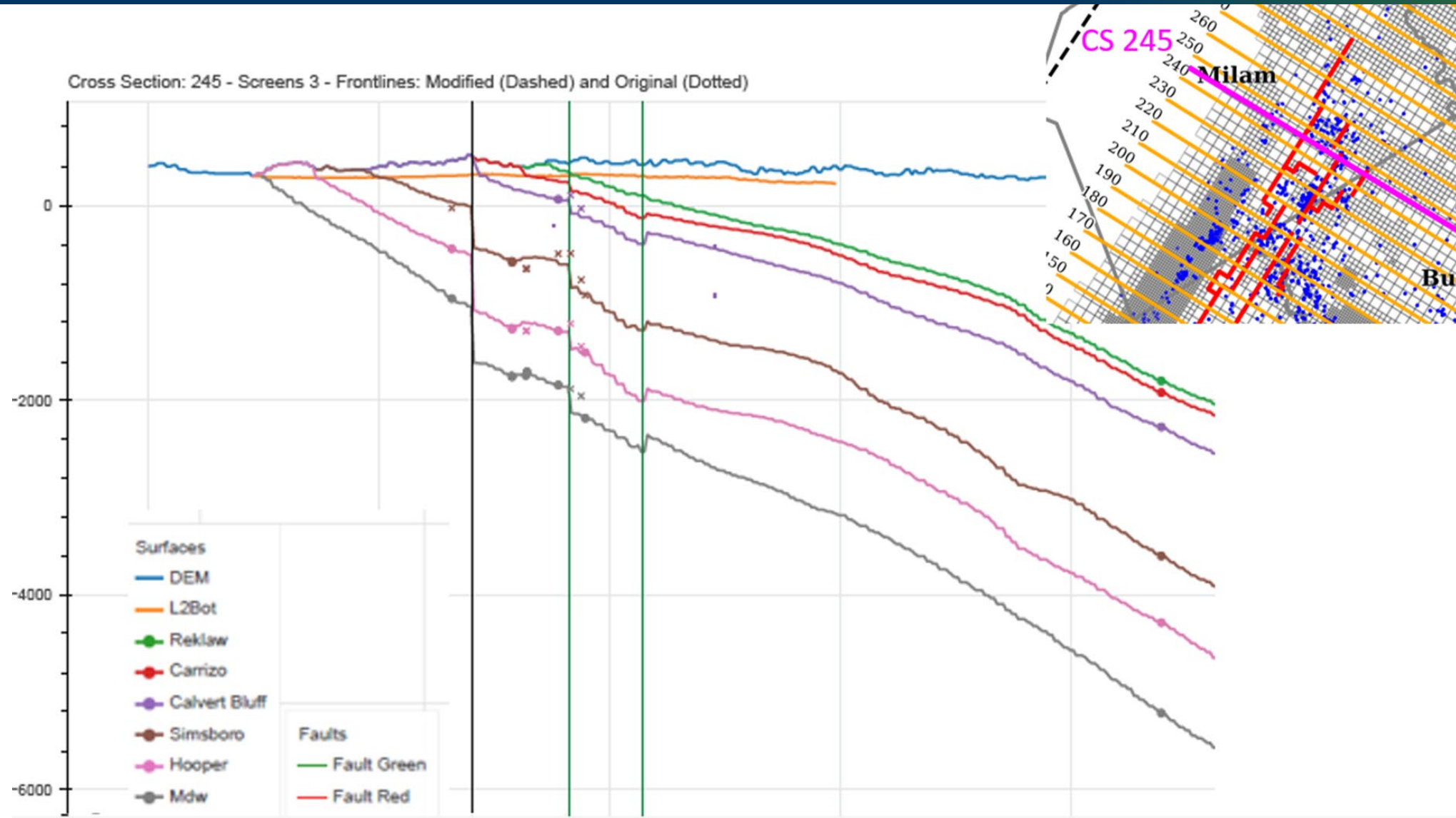


Milano Fault Zone

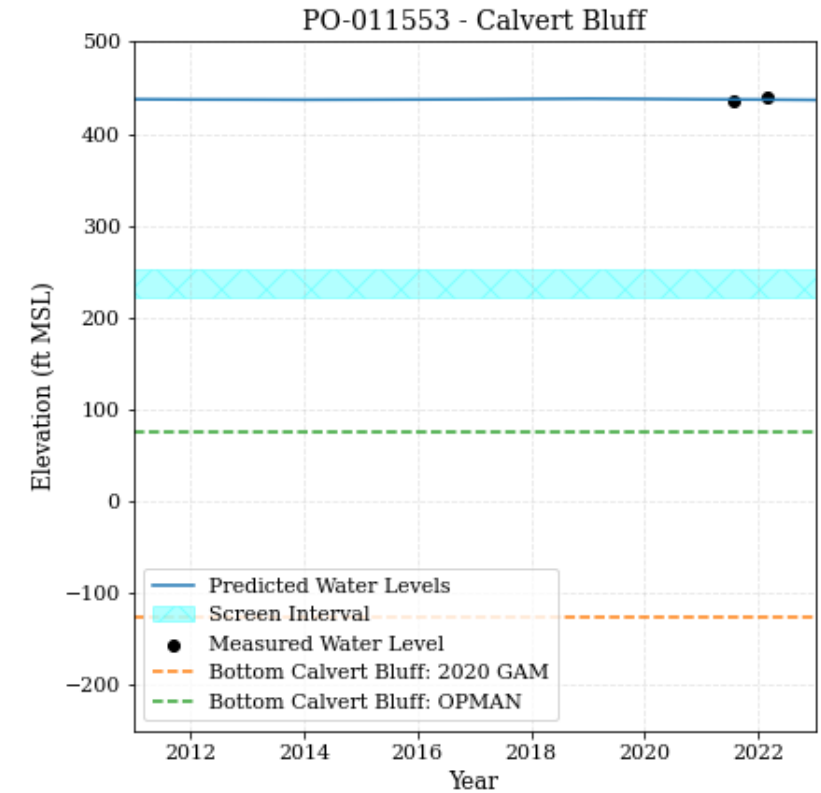
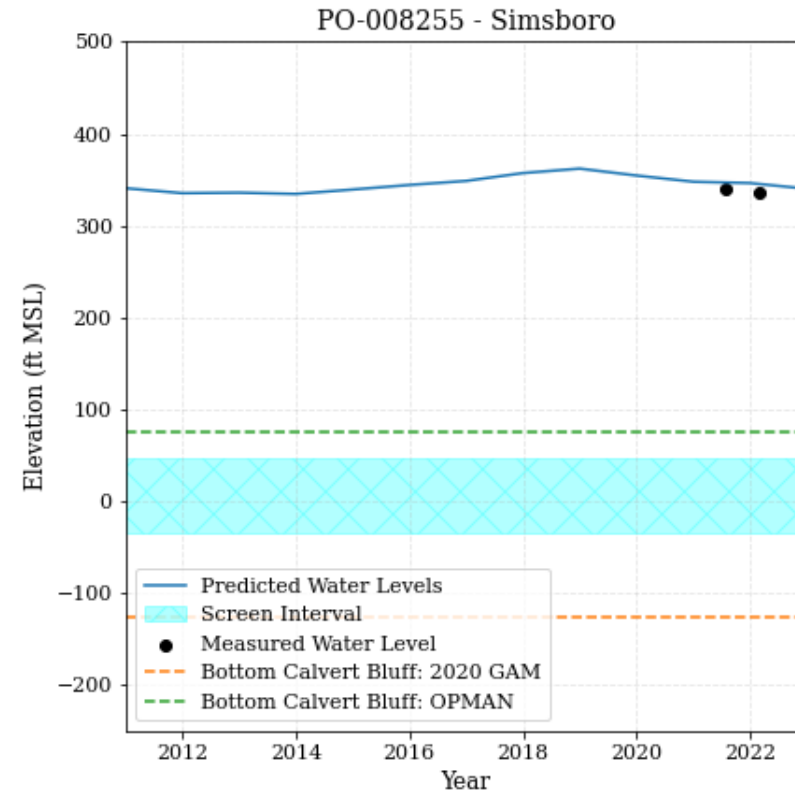
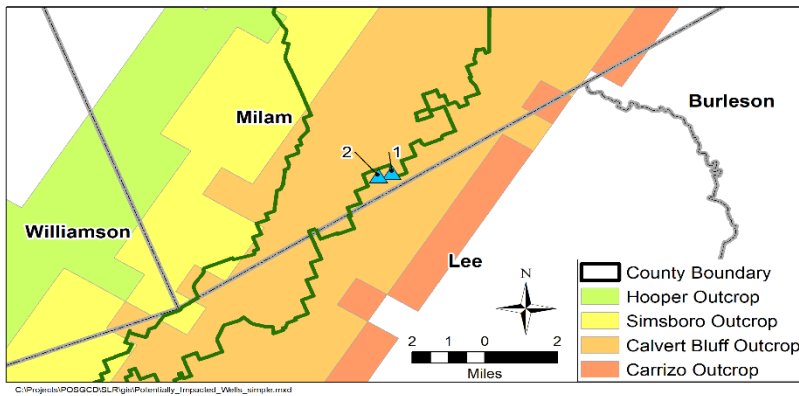
Idealized Graben fault



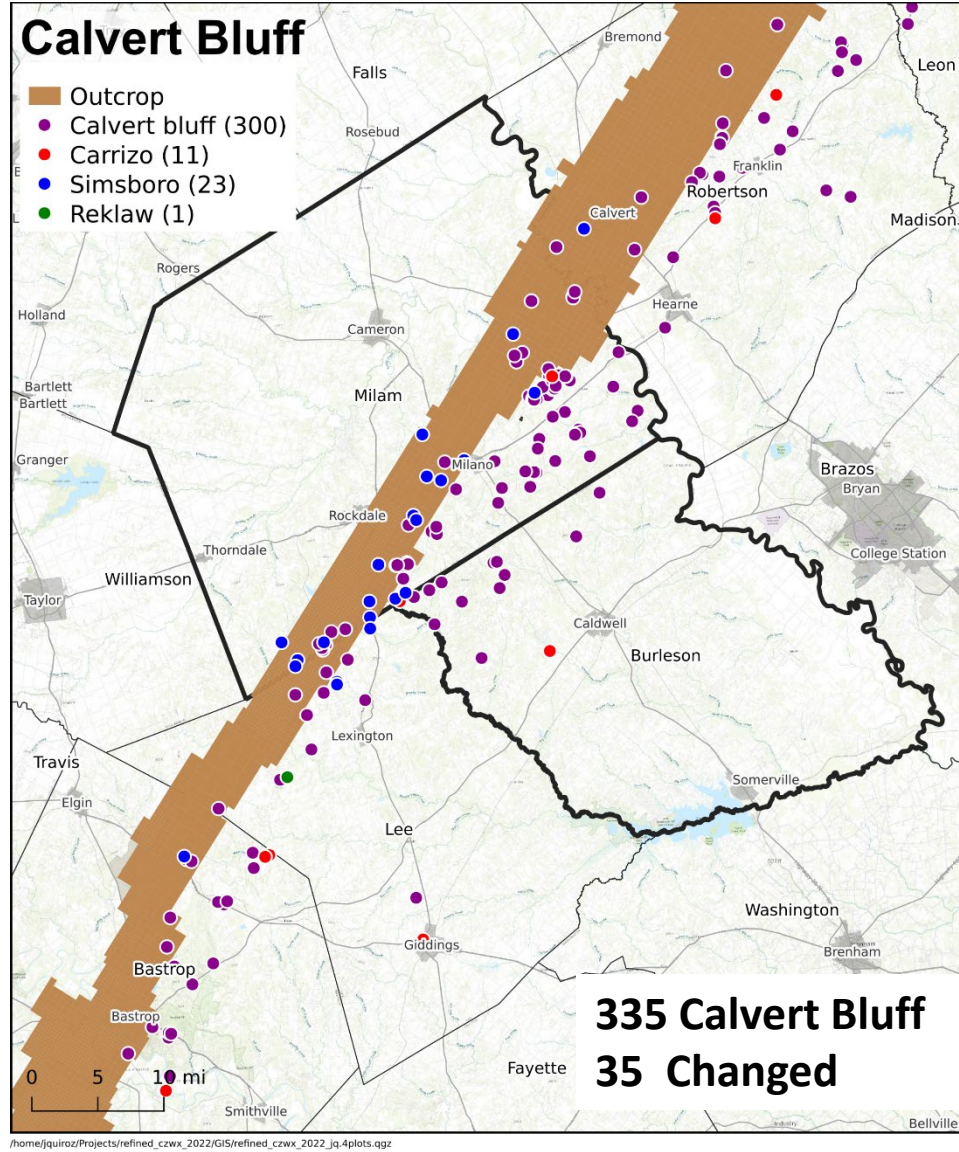
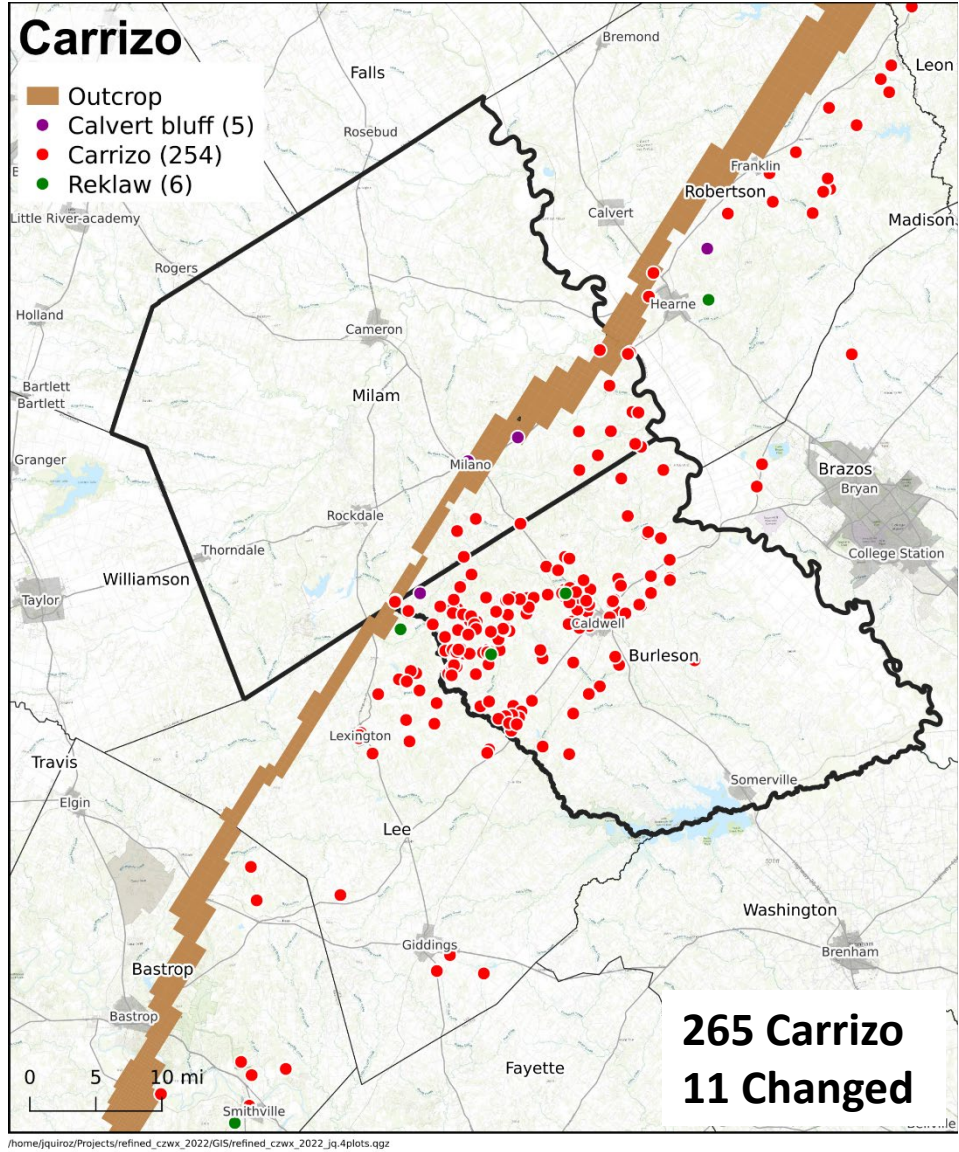
Approach for Updating Aquifer Layers



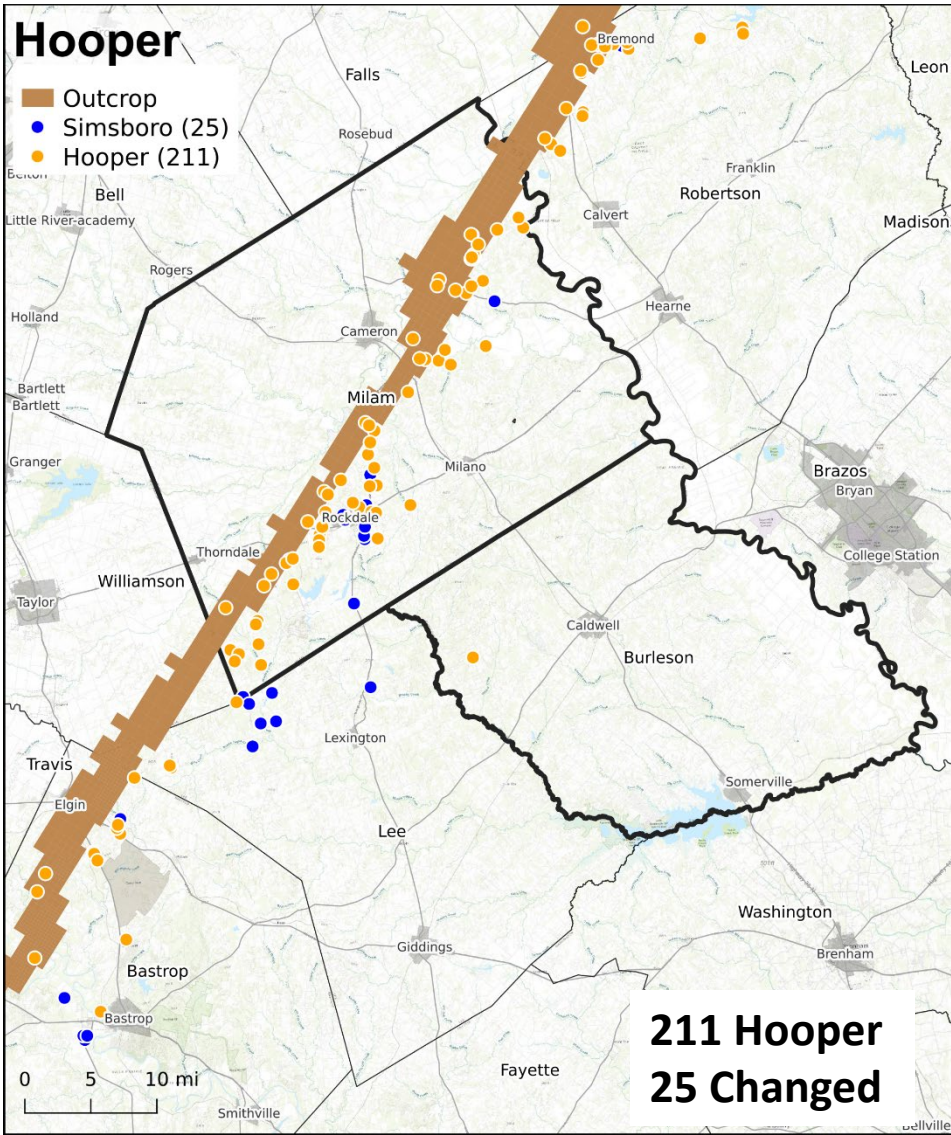
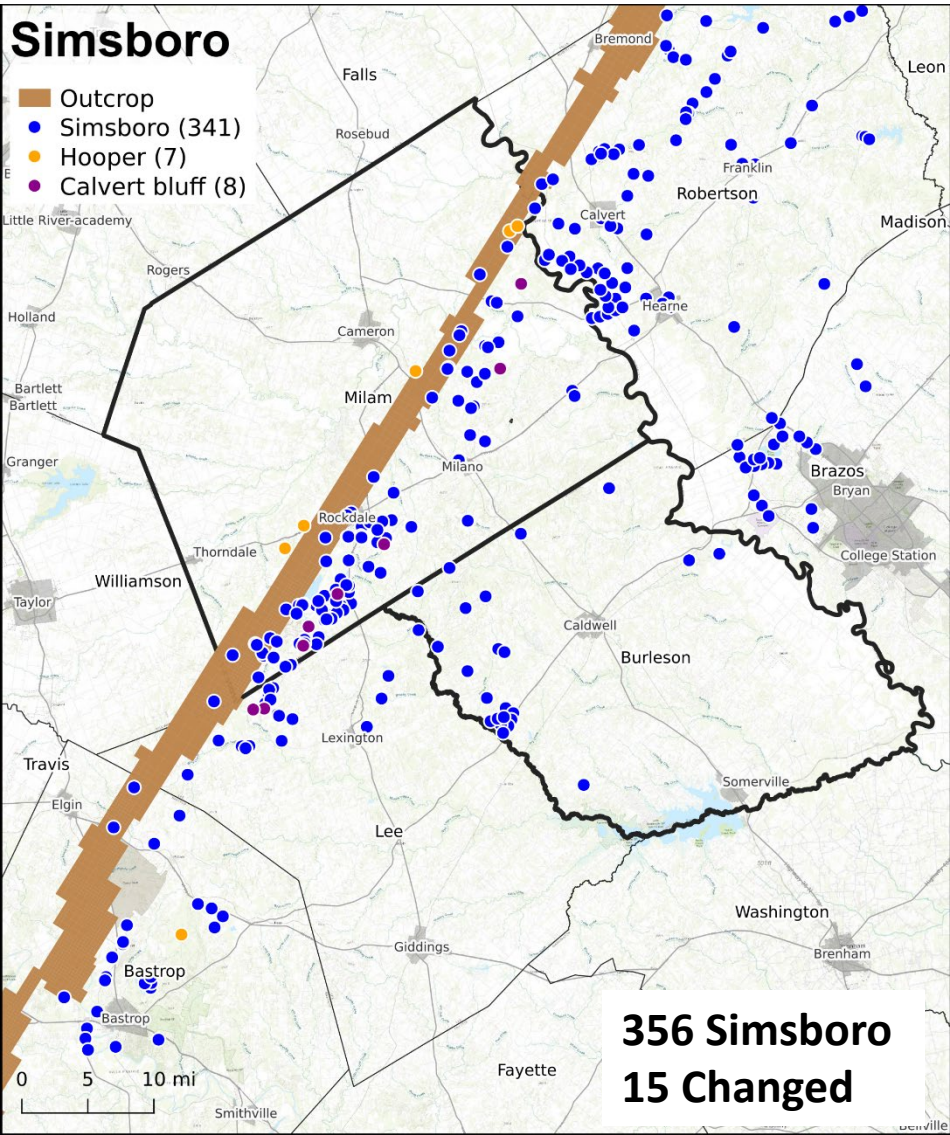
Difference in Water Levels in Adjacent Aquifers: Calvert Bluff and Simsboro



Changes to District Aquifer Assignments: Carrizo & Calvert Bluff



Changes to District Aquifer Assignments: Simsboro & Hooper



Occurrence of Lignite Layers at the Bottom of the Calvert Bluff

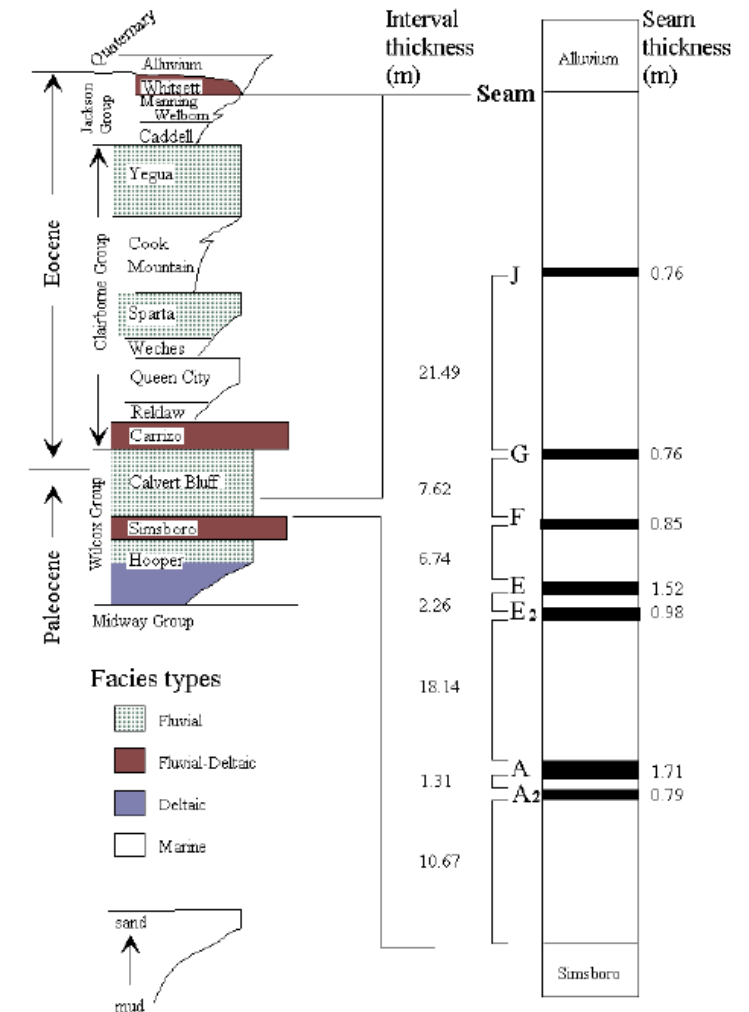
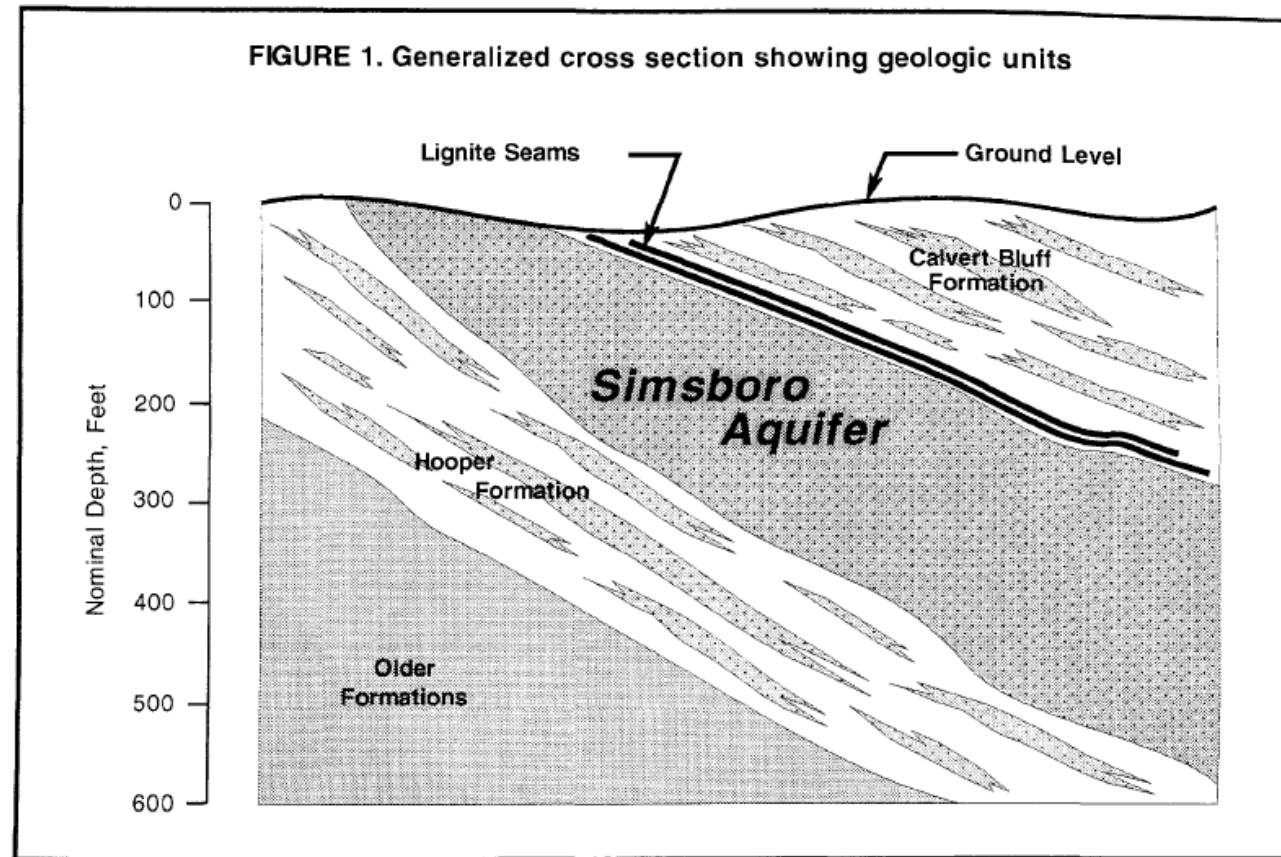
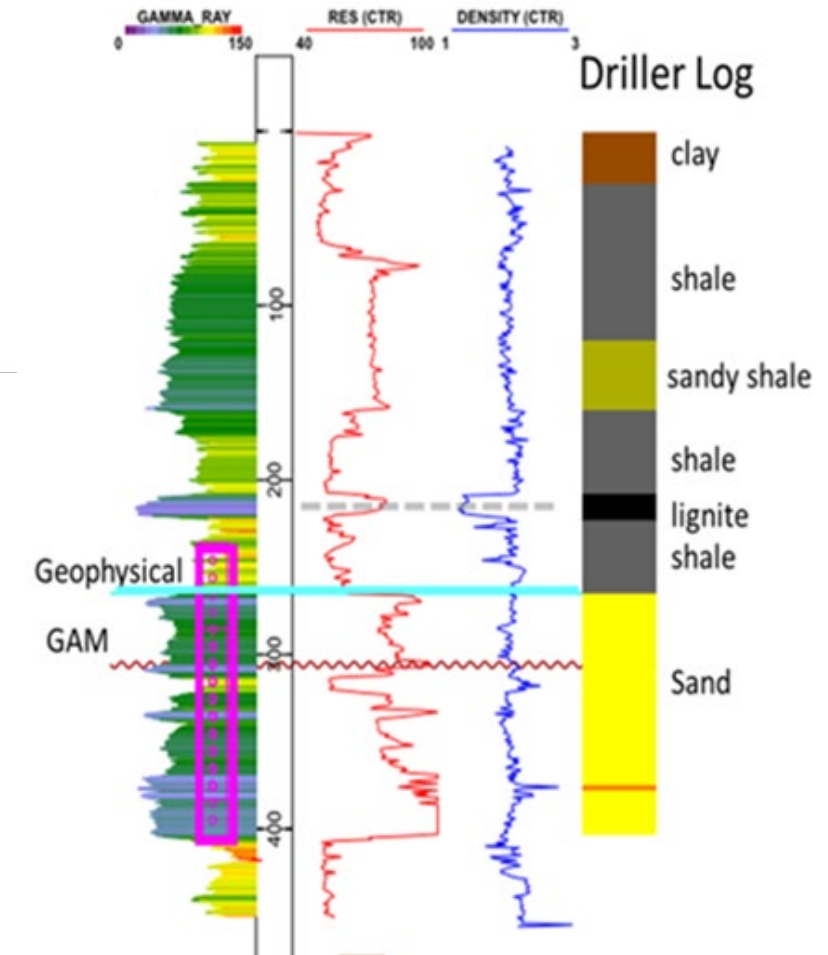
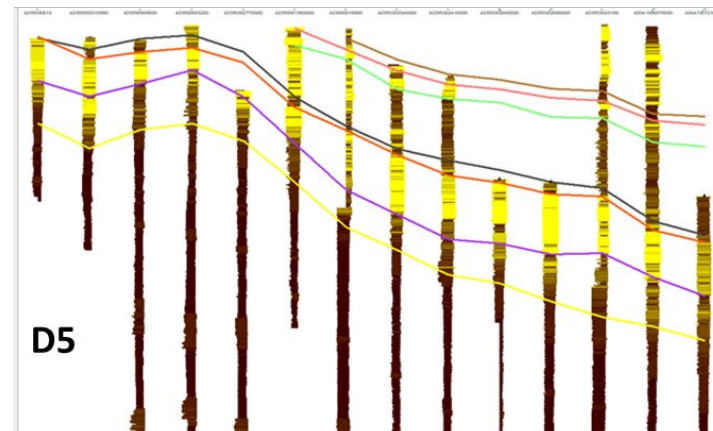
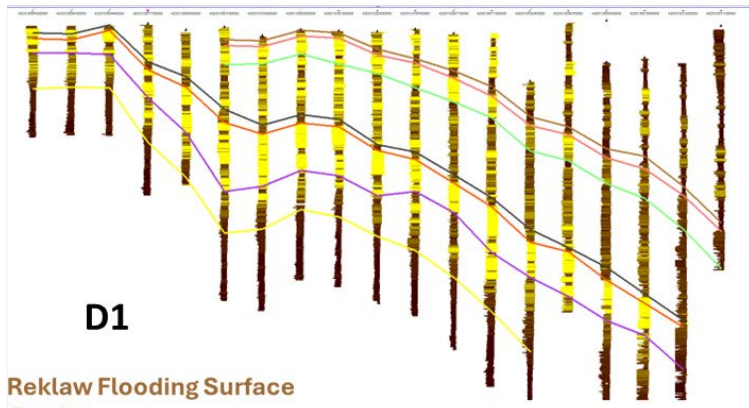
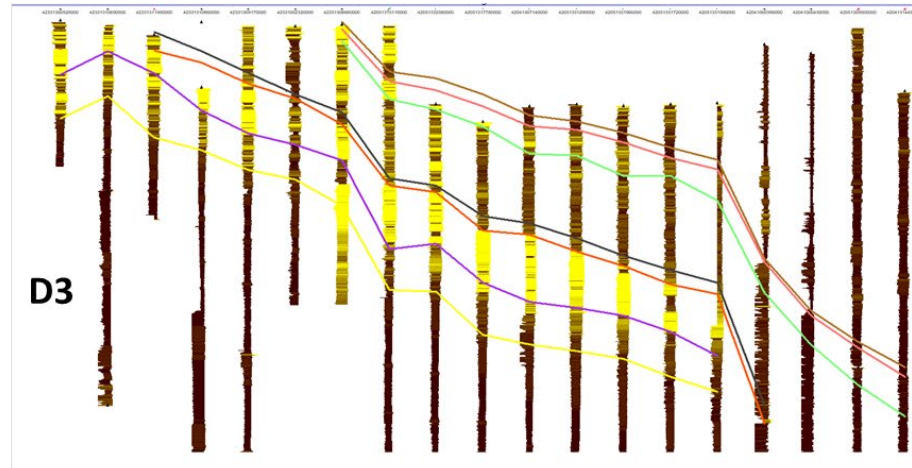
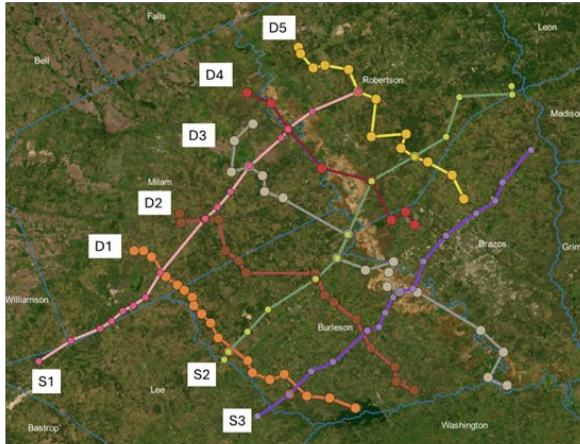


Figure 2. Generalized stratigraphic section of the Calvert mine area. Modified after Kaiser and ot

Mapping Lignite at Base of Calvert Bluff



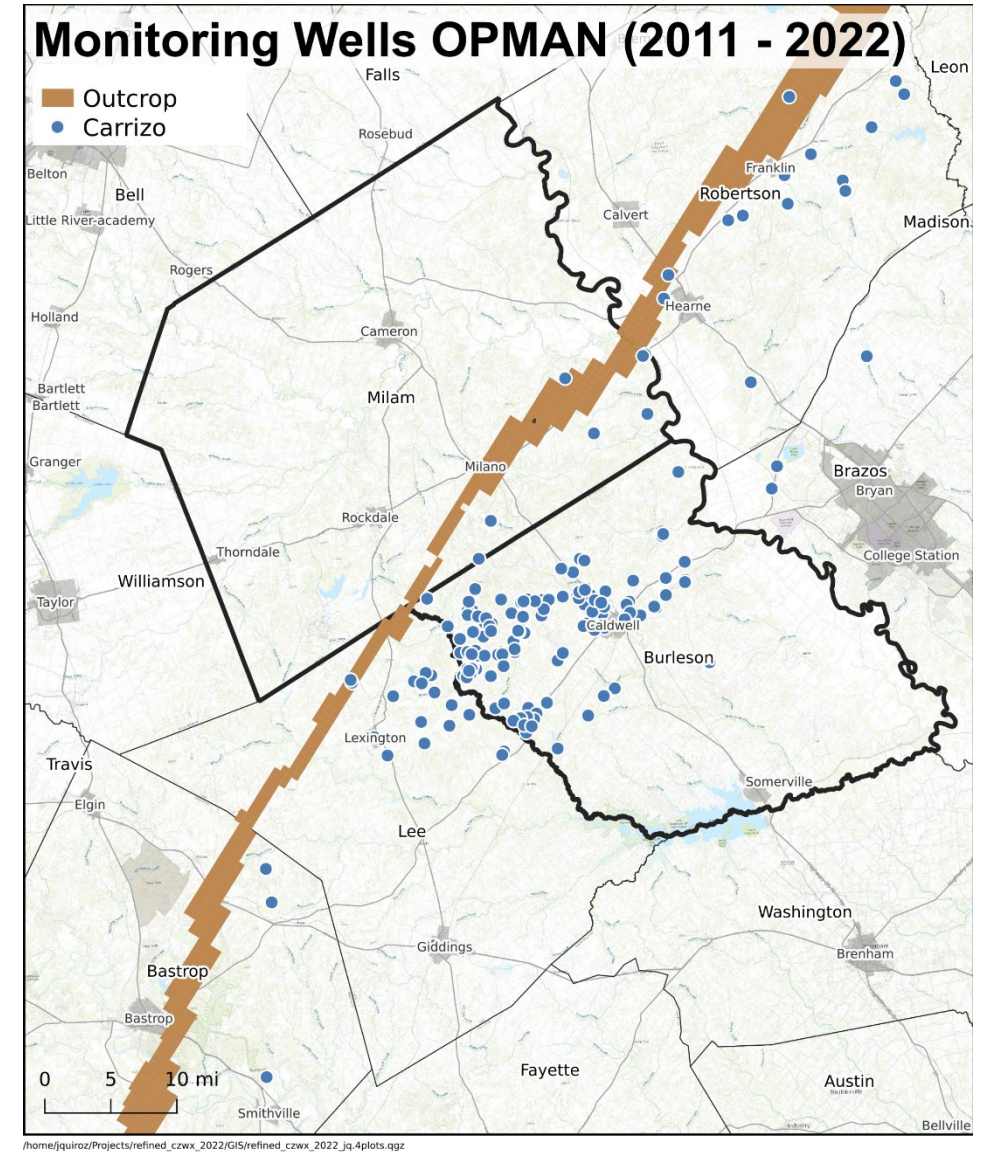
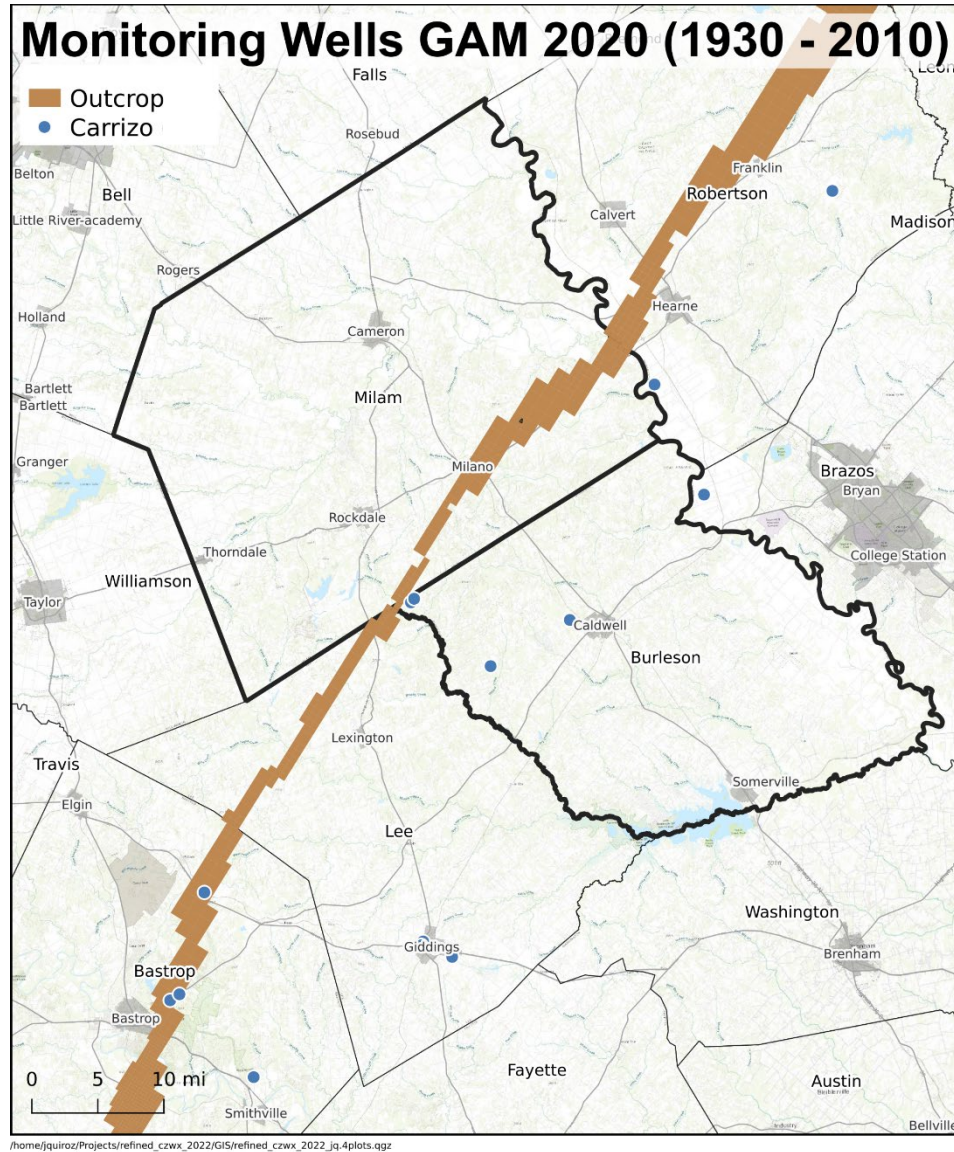
Reklaw Flooding Surface
 Carrizo
 Calvert Bluff
 Simsboro Coal Seam
 Simsboro
 Hooper
 Midway

Update on POSGCD Operational Model

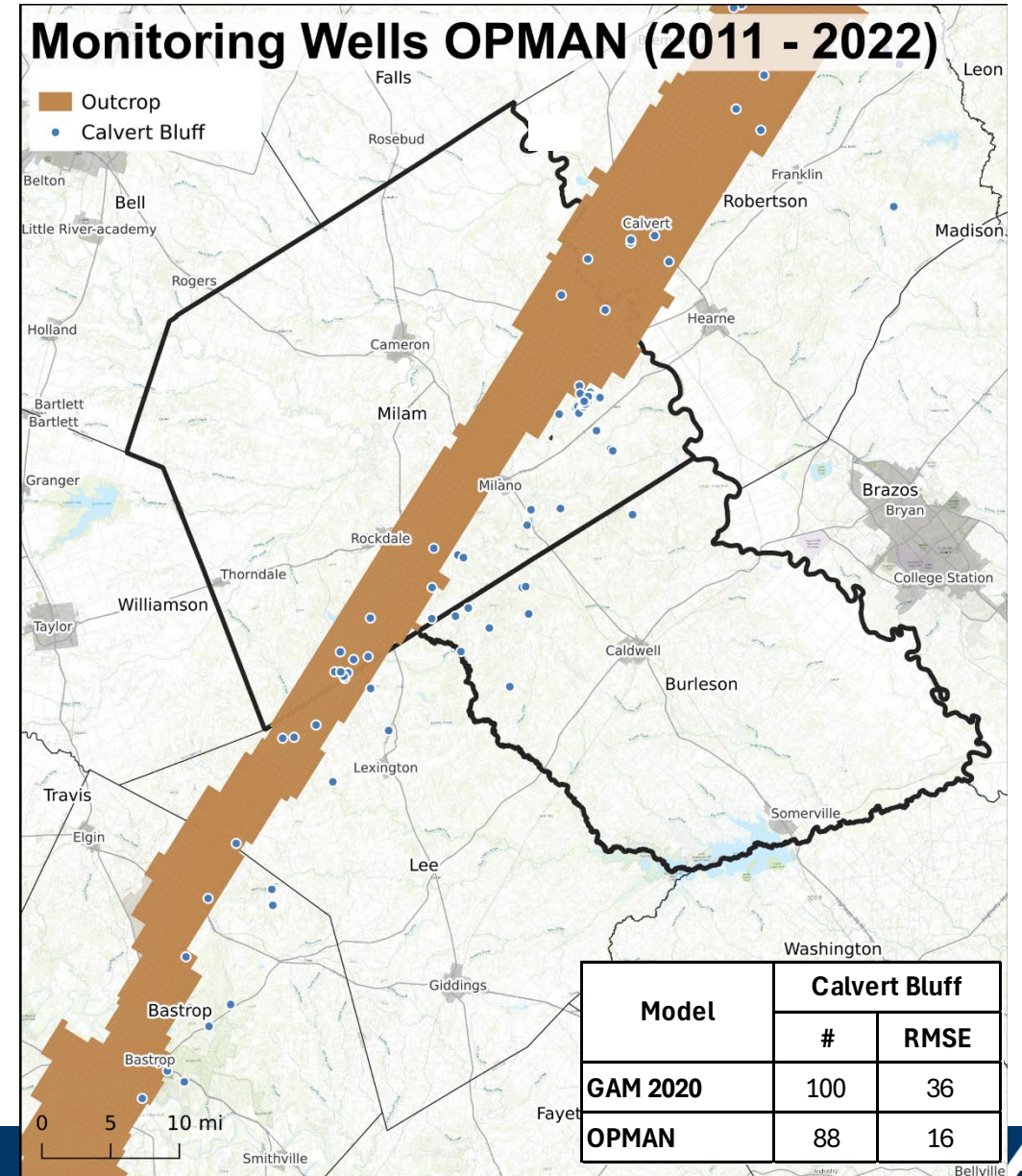
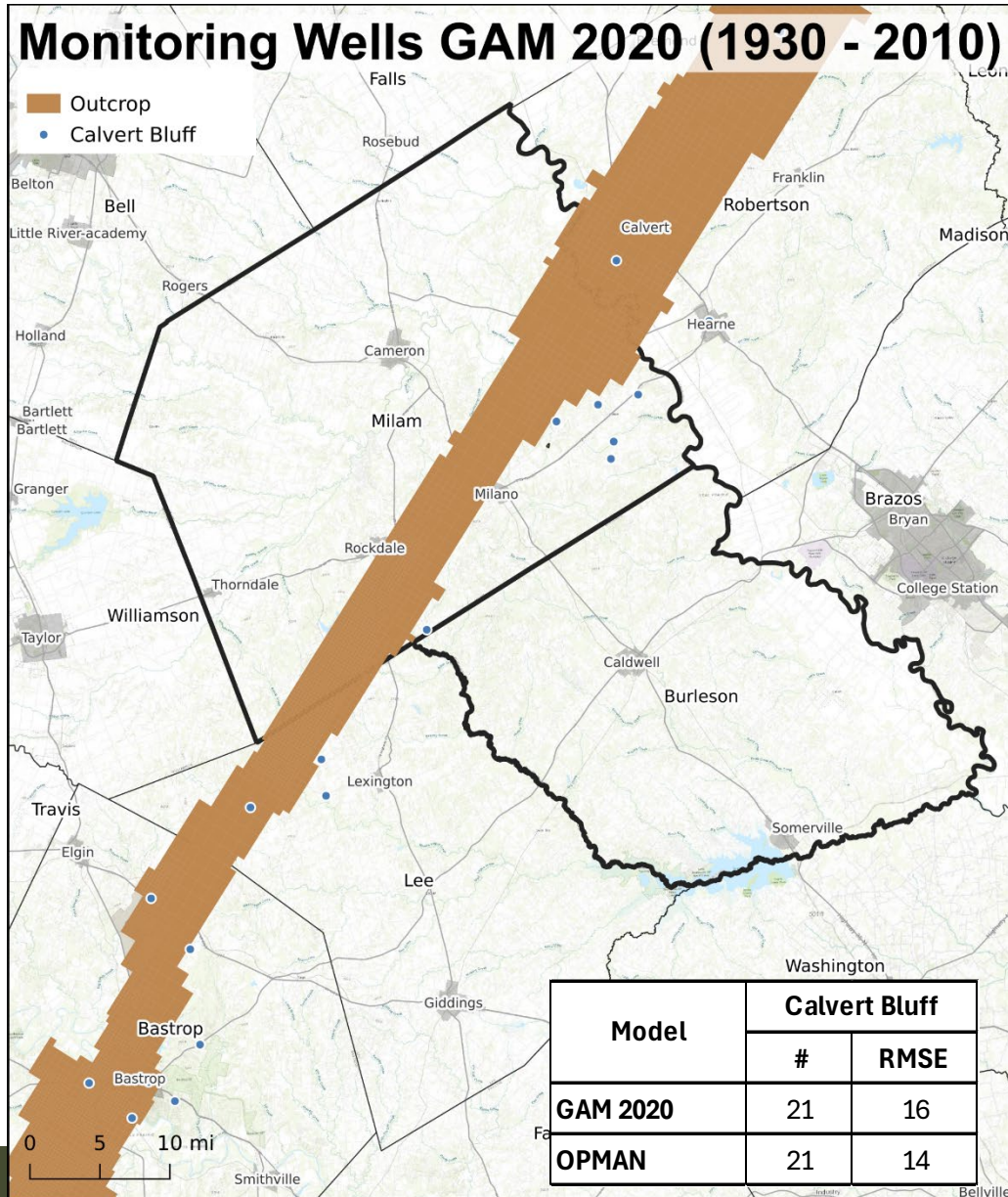
Discussion Topics

- Expansion of Calibration Period for Water Levels from 2010 to 2022
- Simulation of Vista Ridge Production for 3 years (2020, 2021, 2022)
- Simulation of Aquifer Pumping Tests

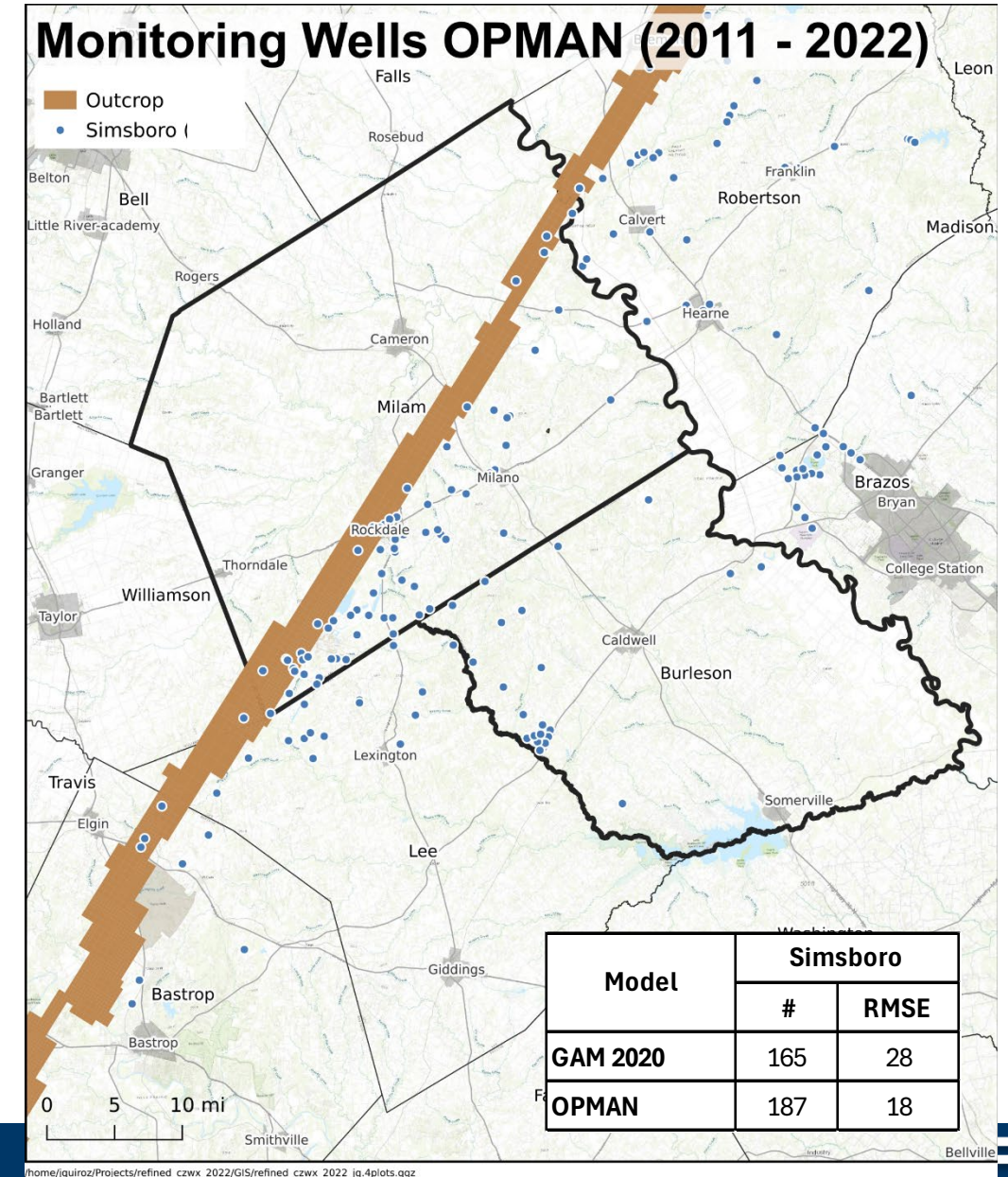
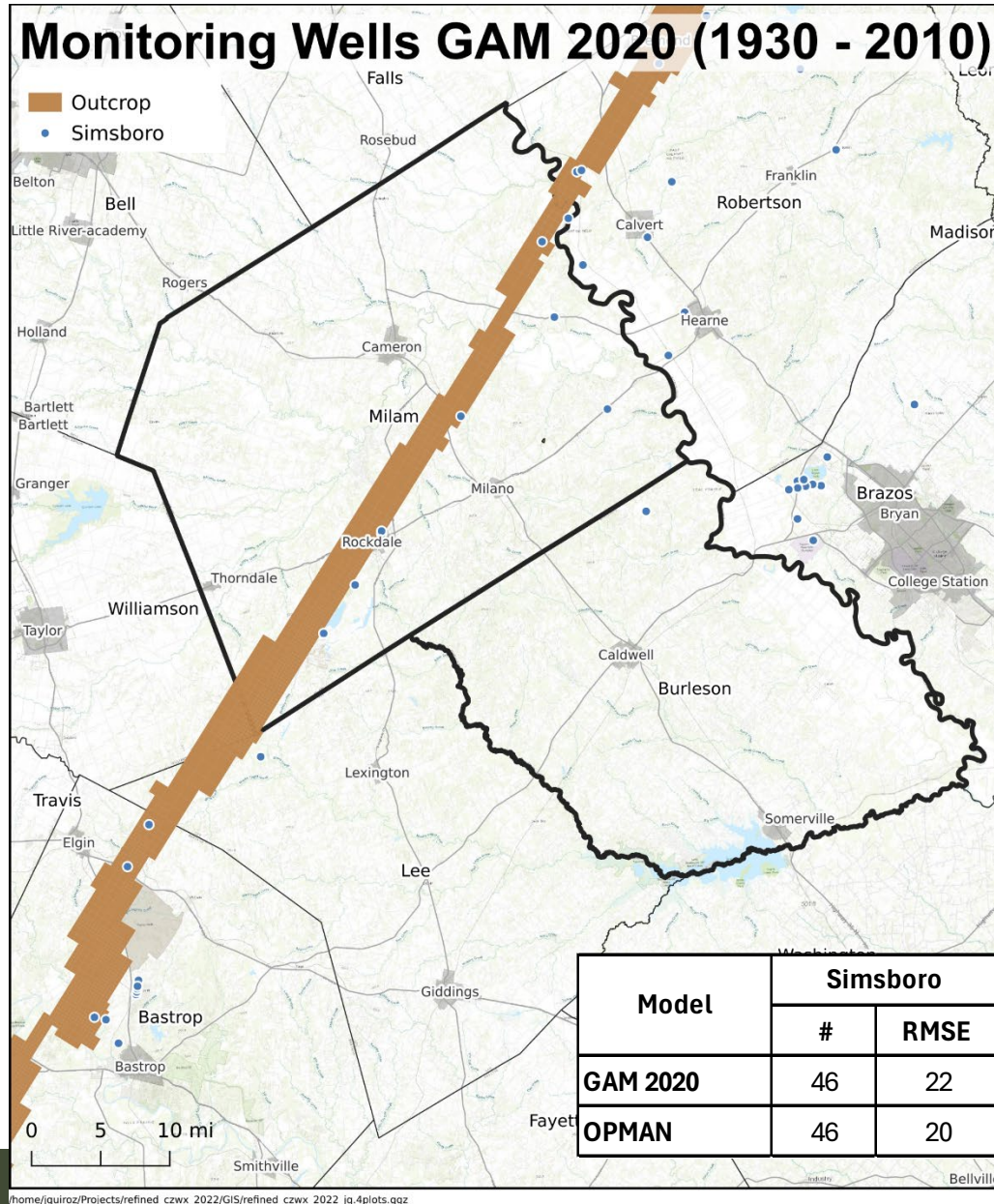
Monitoring Wells GAM 2020 vs OPMAN - Carrizo



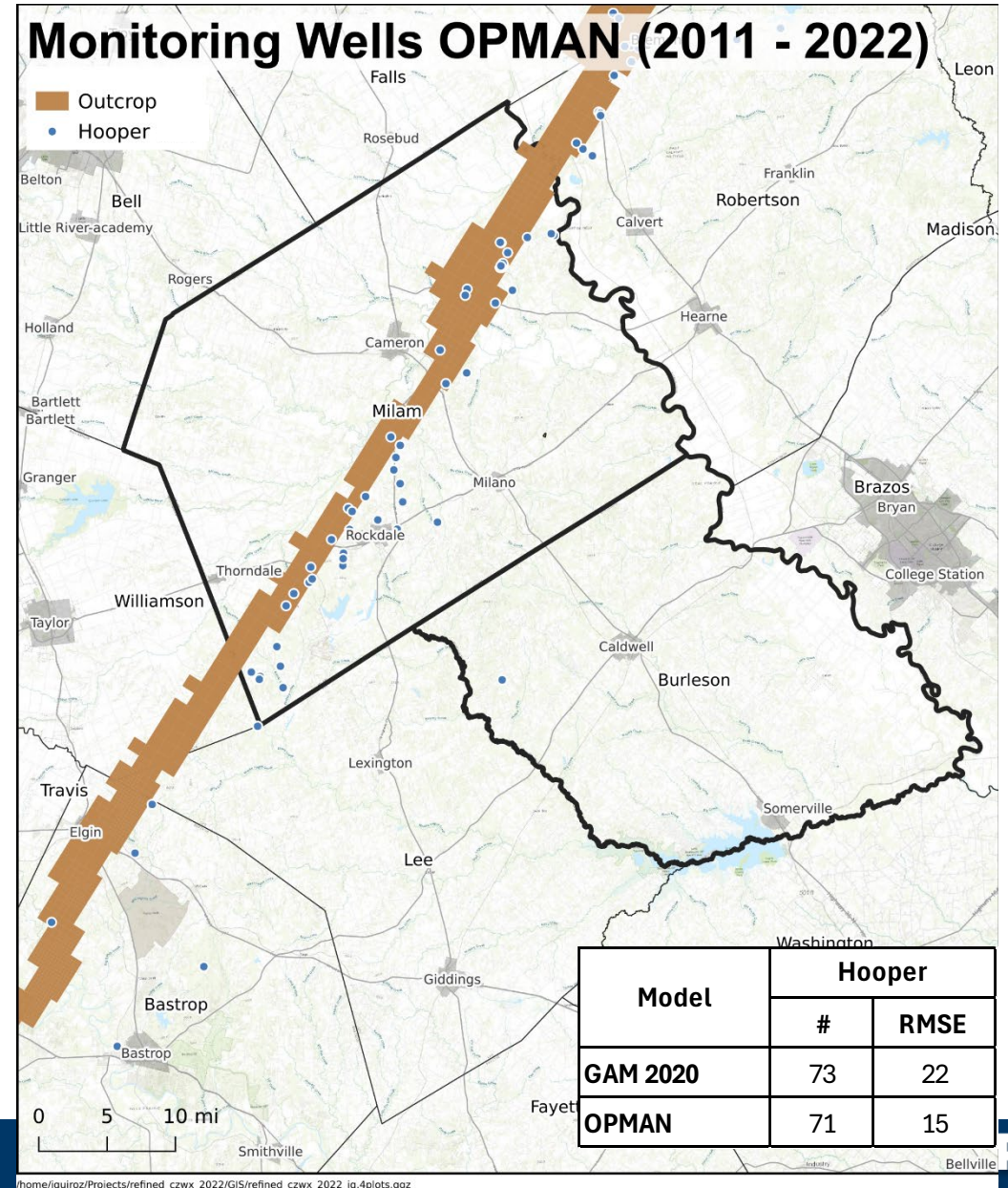
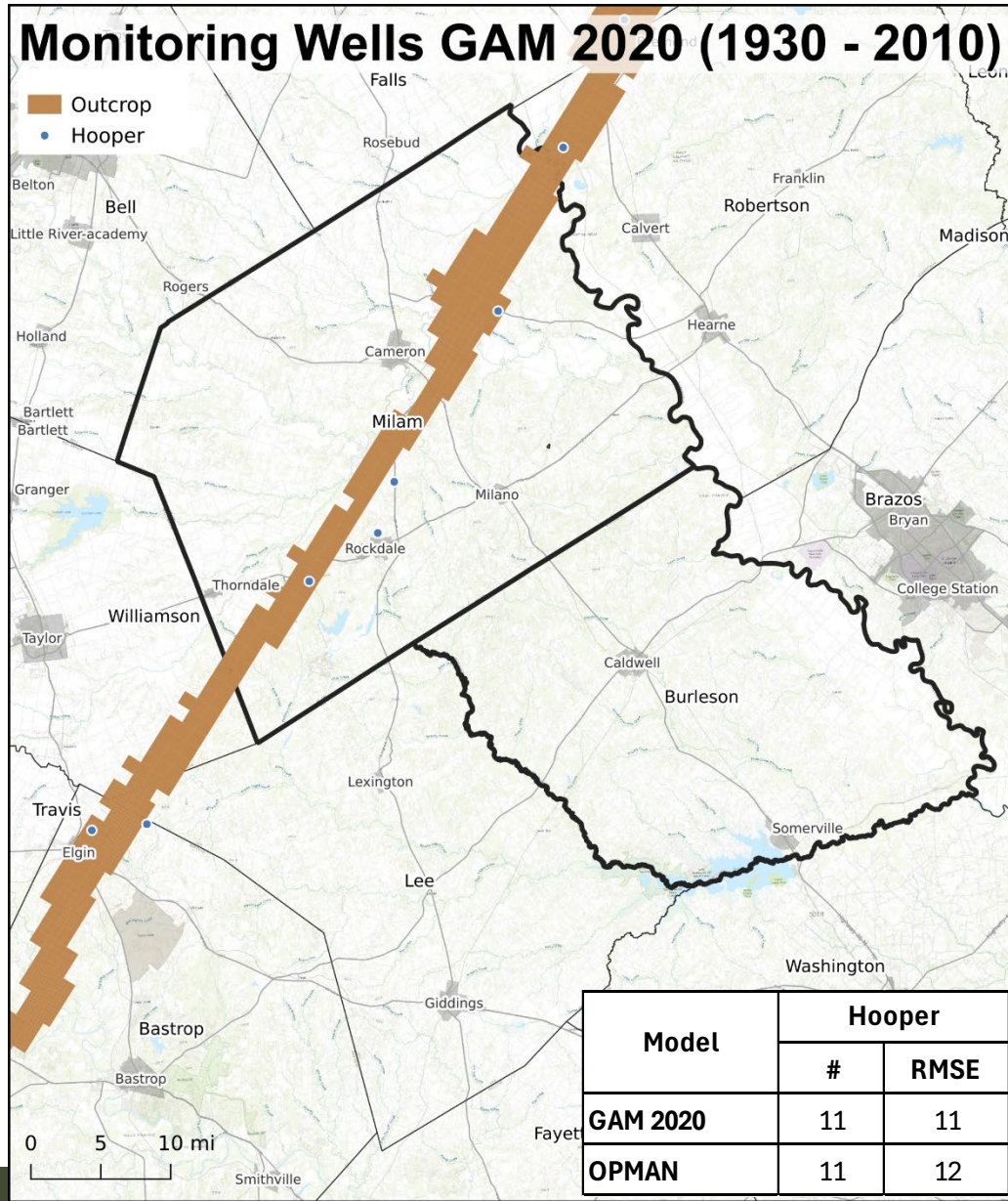
Monitoring Wells GAM 2020 vs OPMAN – Calvert Bluff



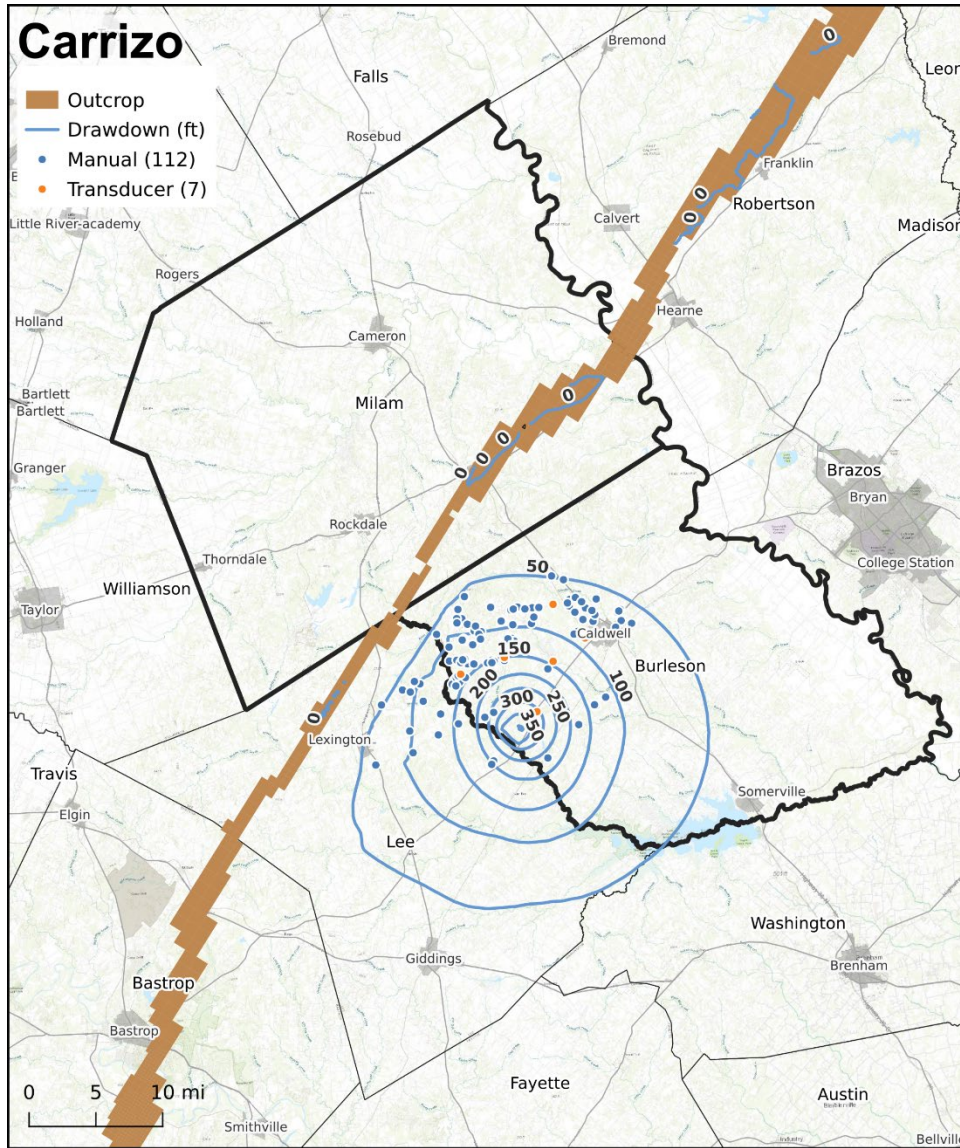
Monitoring Wells GAM 2020 vs OPMAN – Simsboro



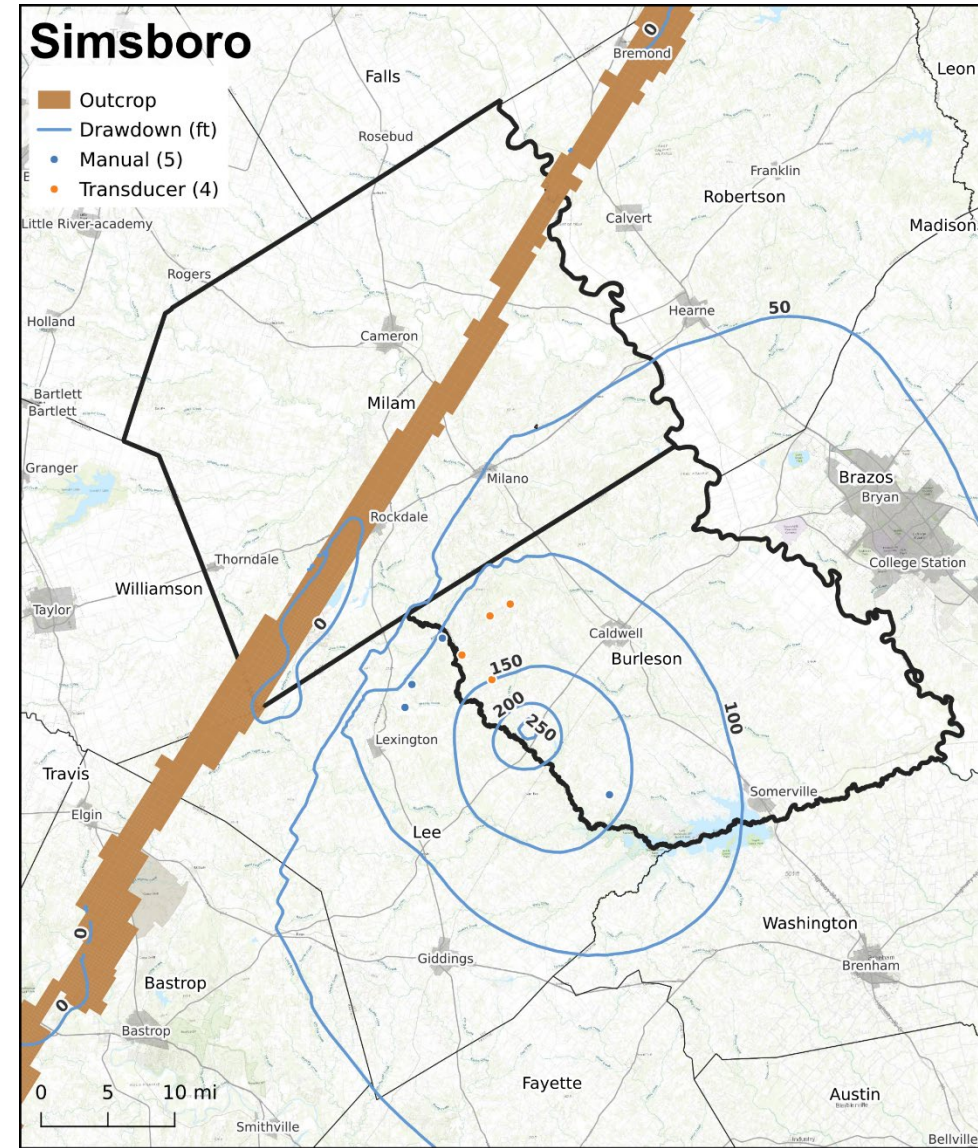
Monitoring Wells GAM 2020 vs OPMAN – Hooper



Drawdown in Vicinity of Vista Ridge: 2020 to 2022

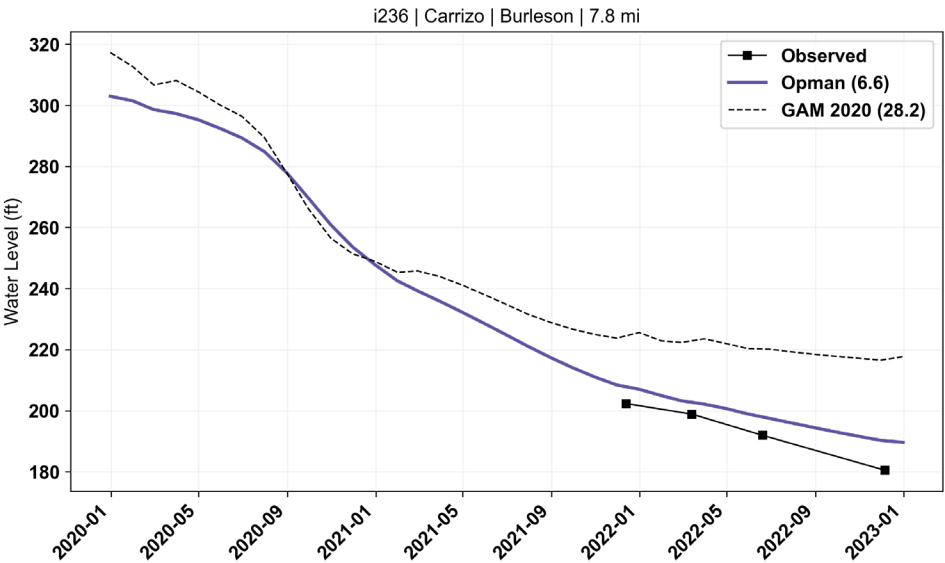
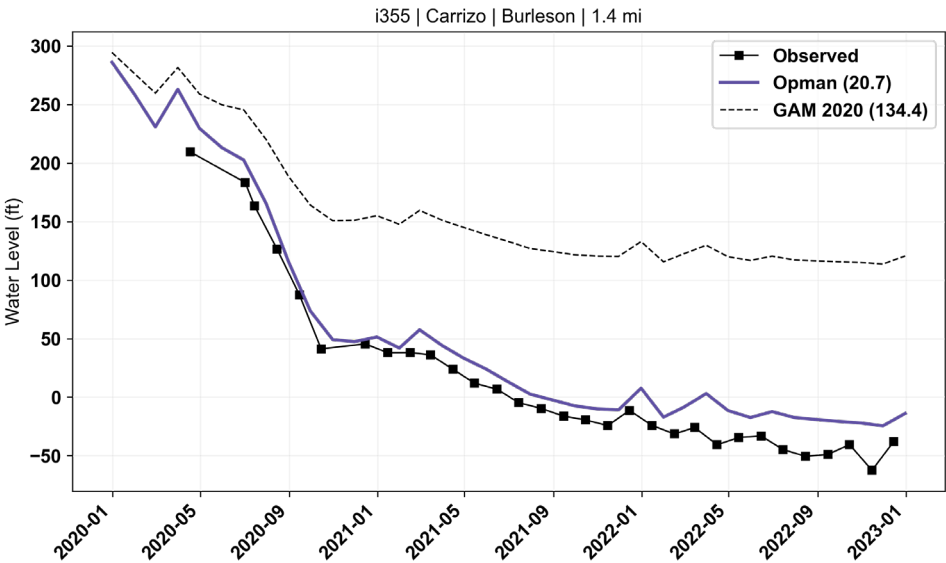
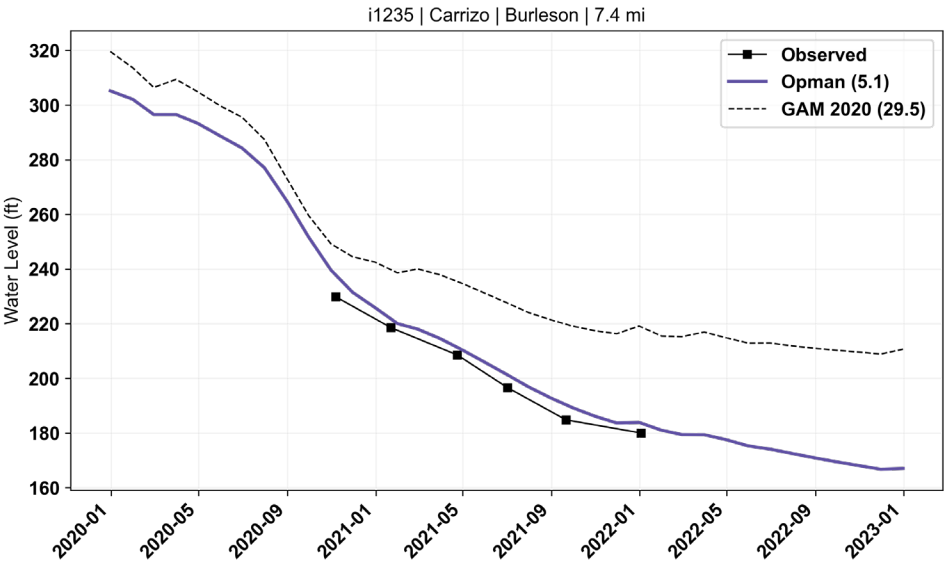
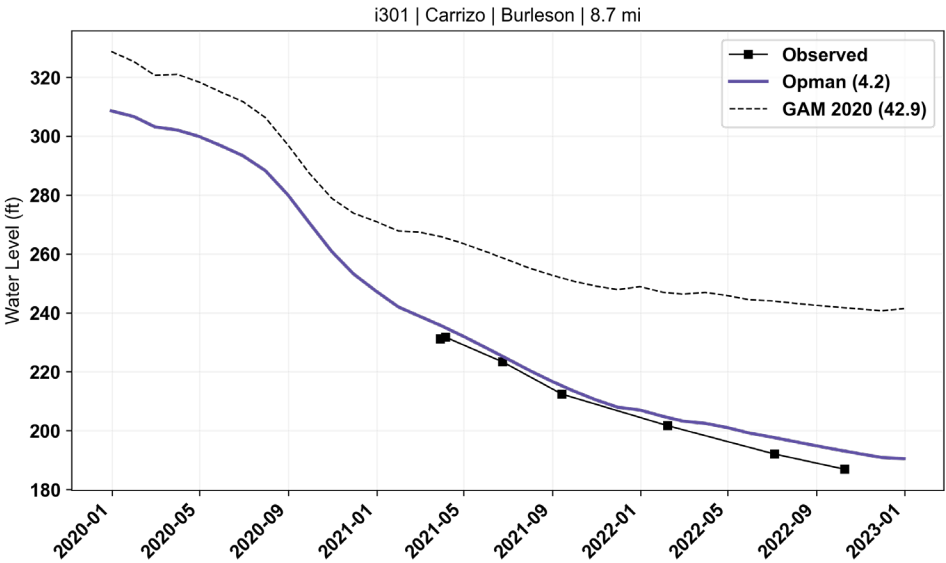


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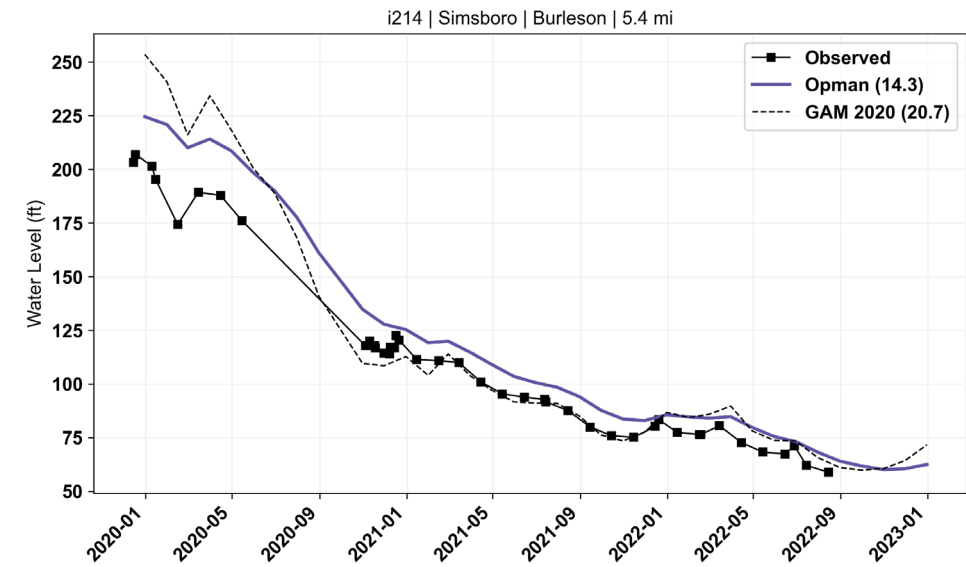
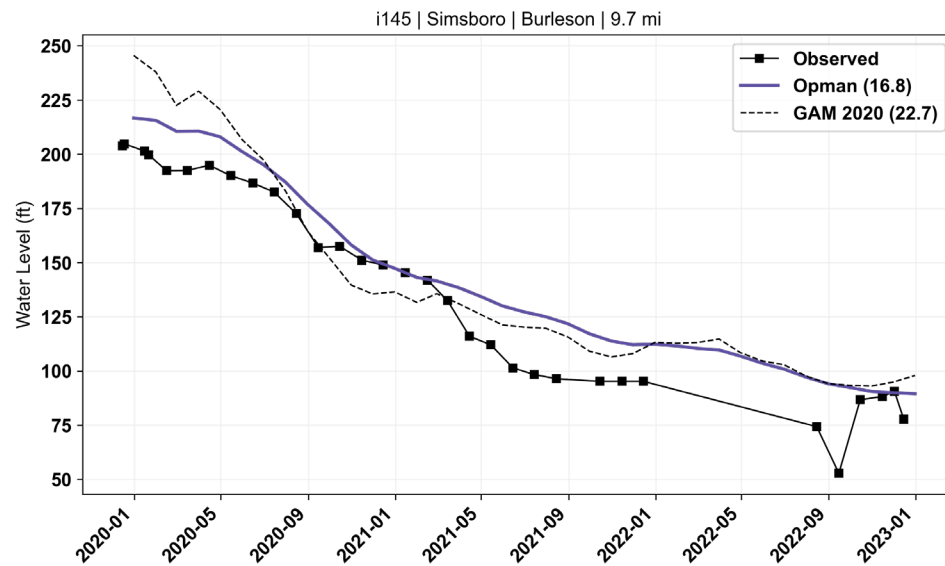
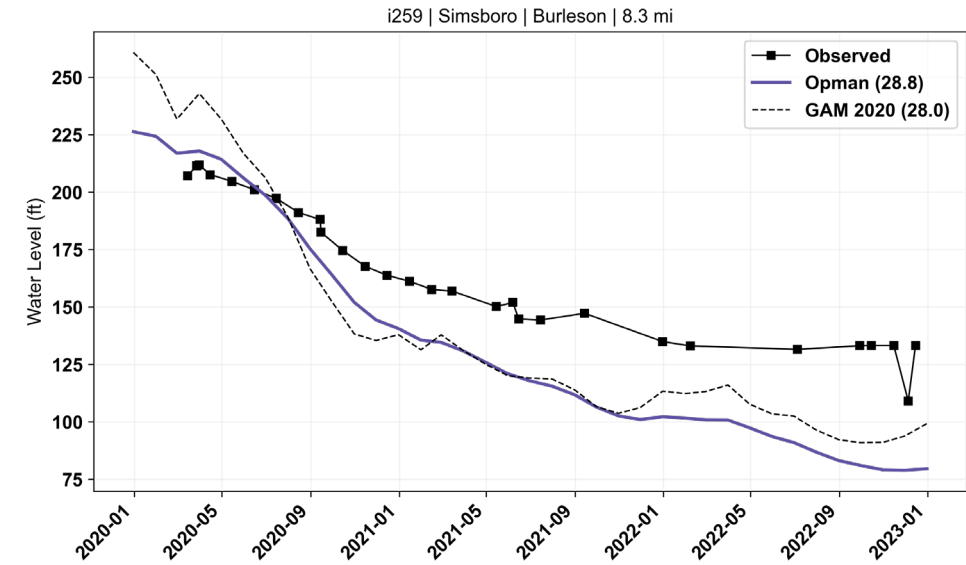
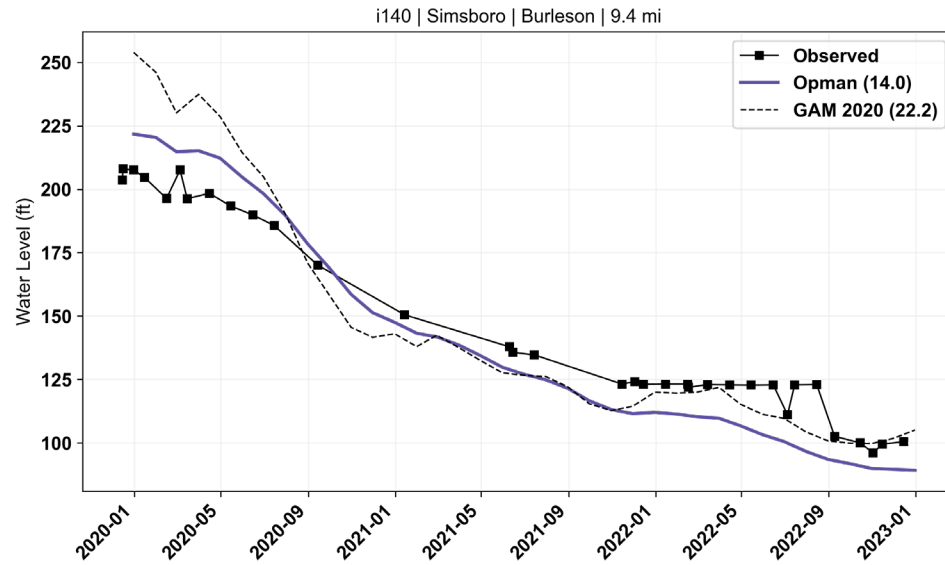


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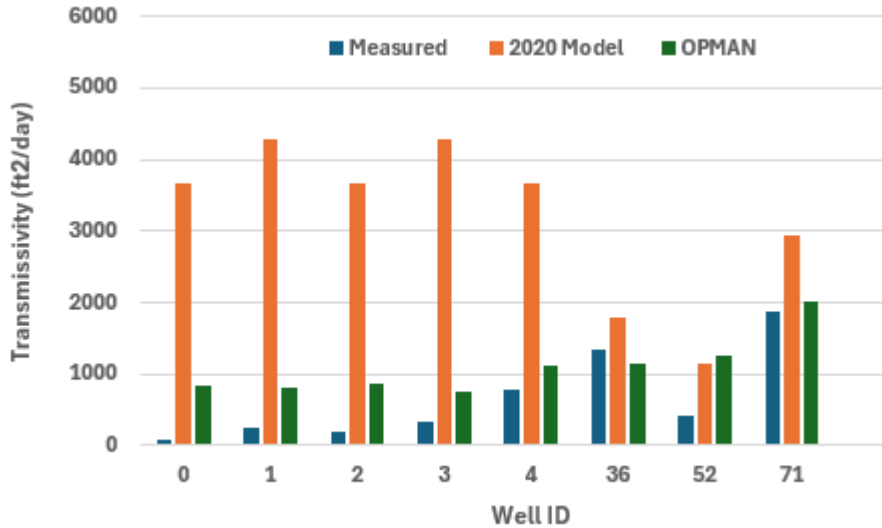
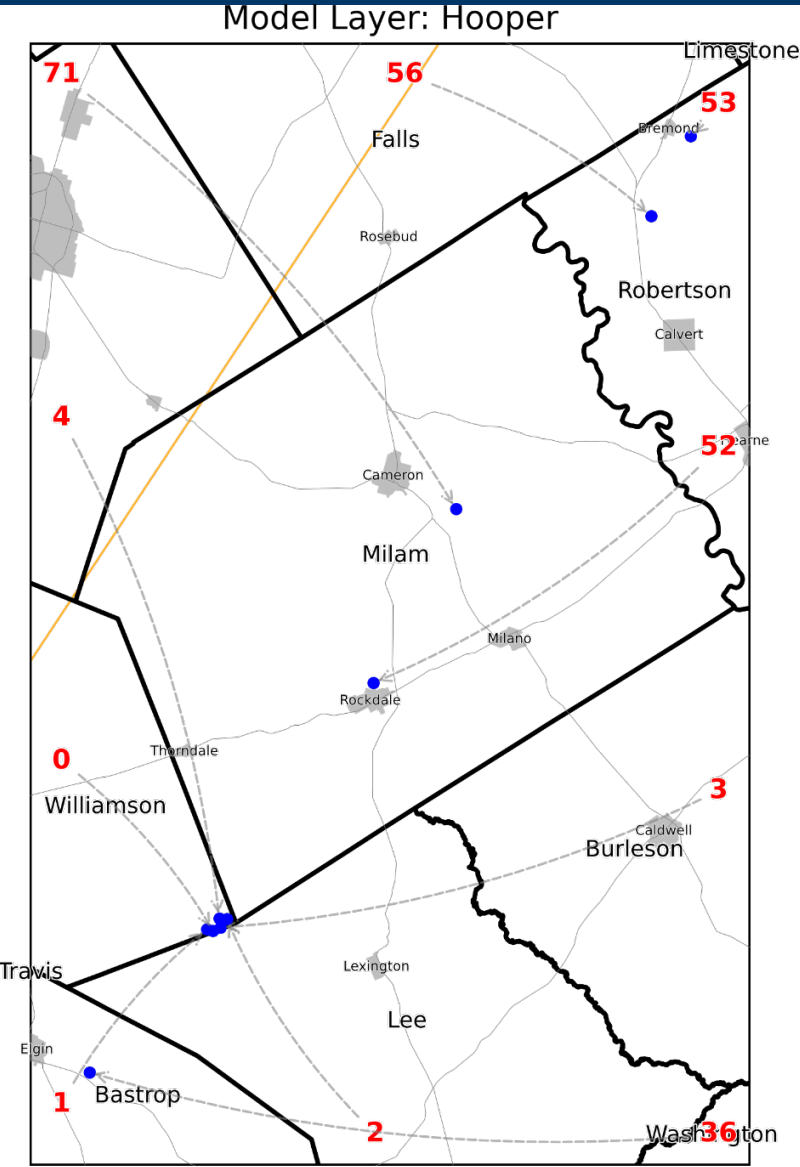
Vista Ridge Simulation: Carrizo Wells



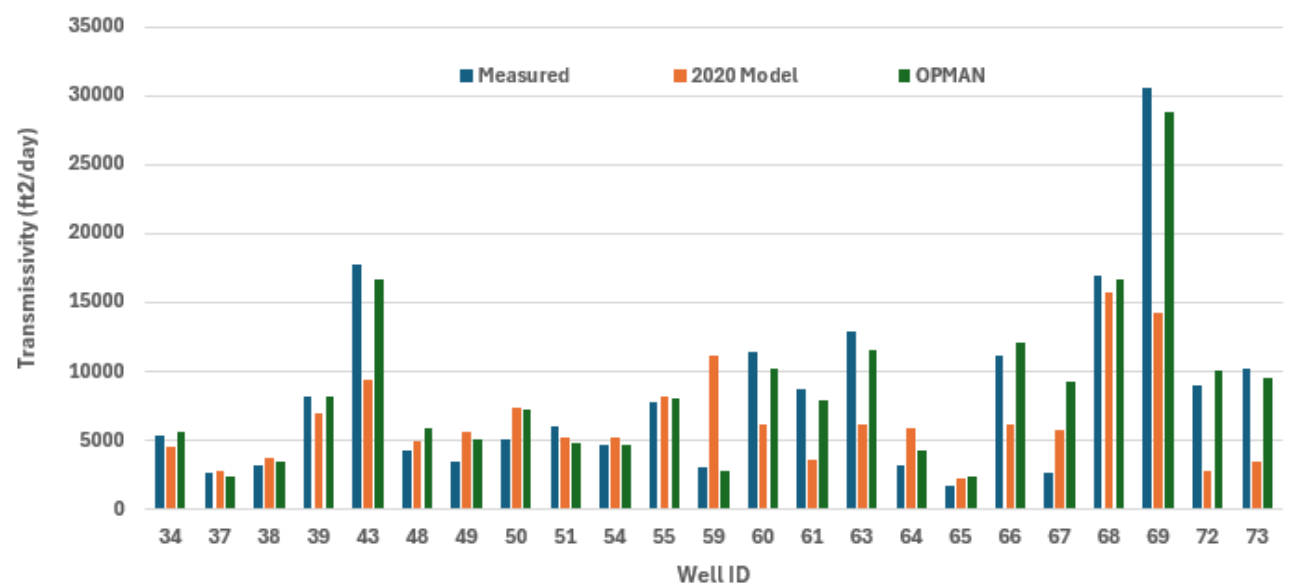
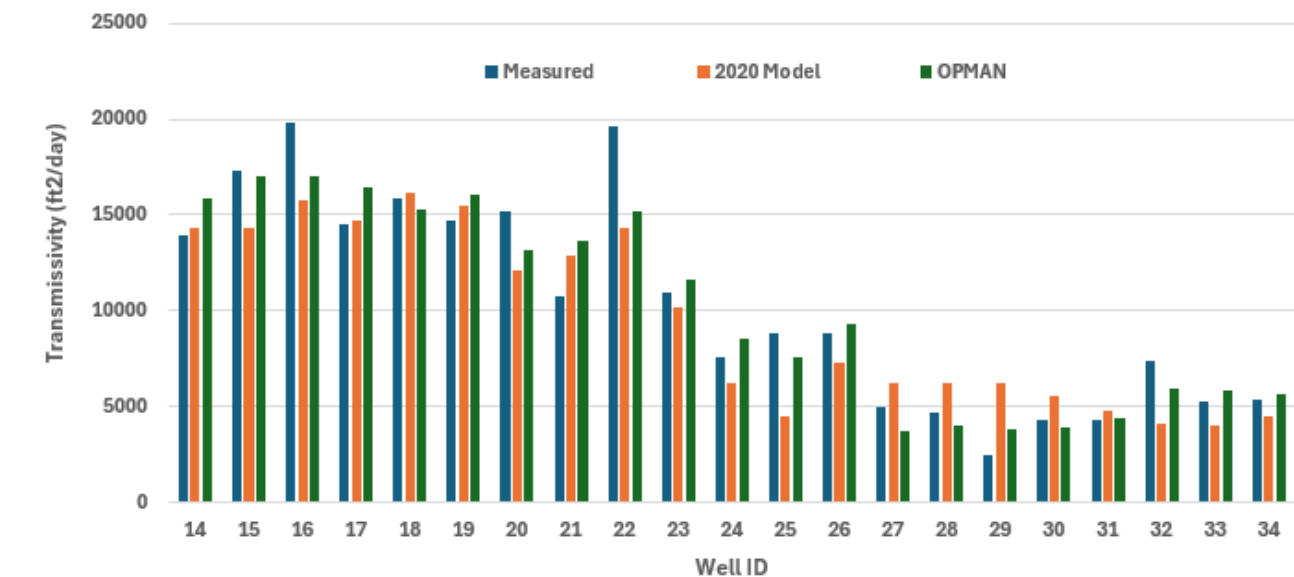
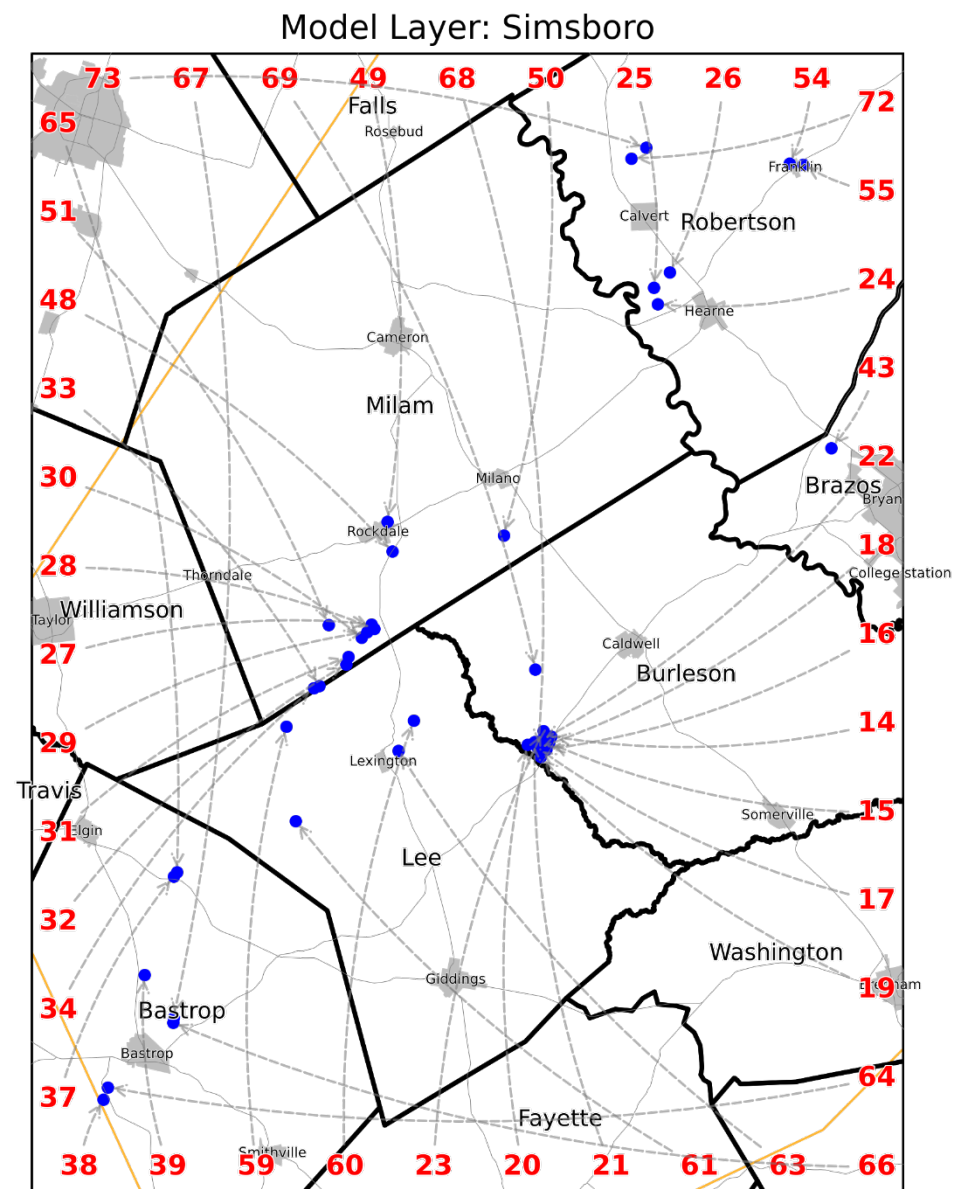
Vista Ridge Simulation: Simsboro Wells



Simulation of Single Well Aquifer Pumping Tests - Hooper

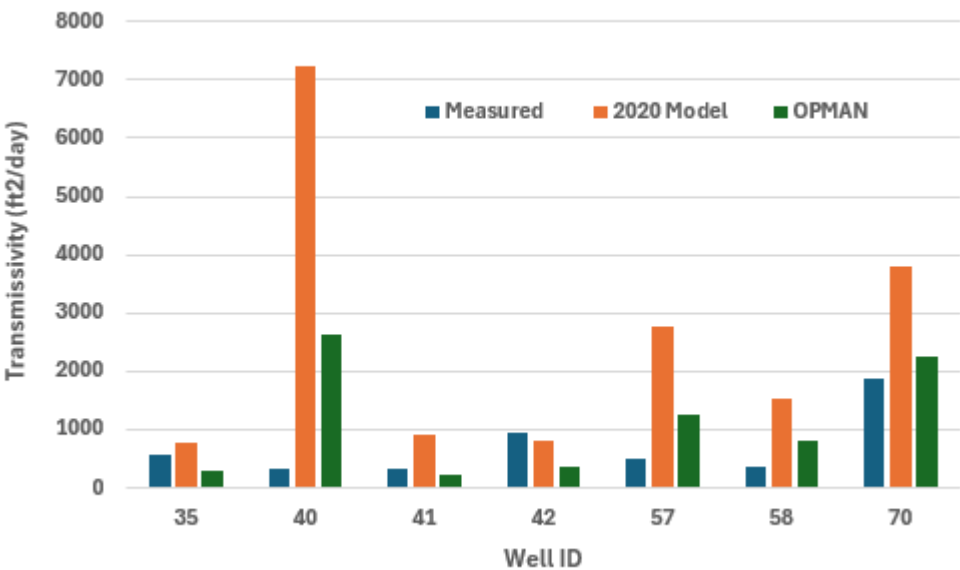
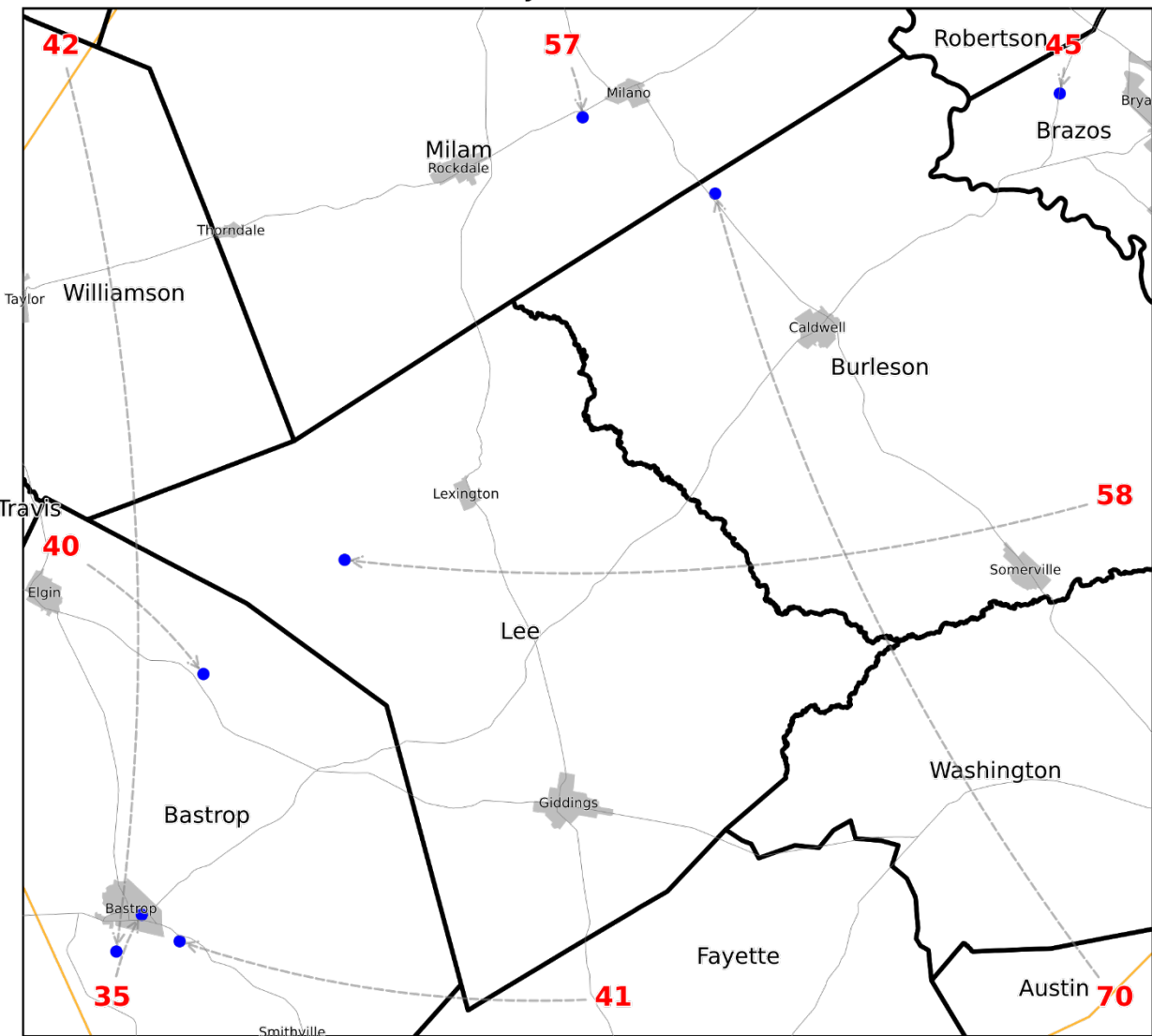


Simulation of Single Well Aquifer Pumping Tests - Simsboro

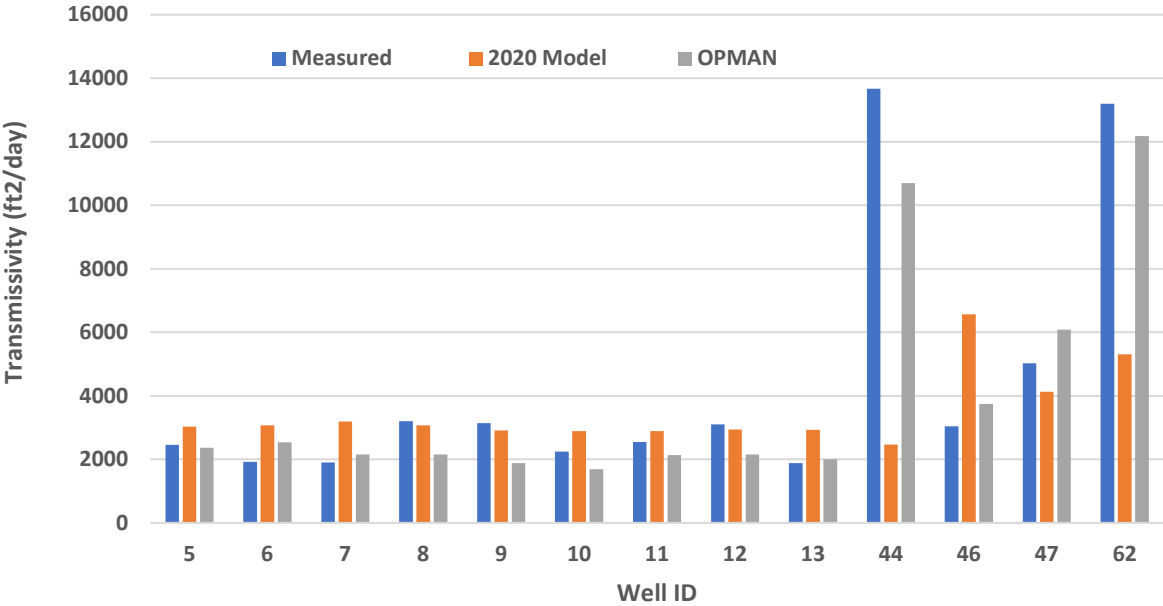
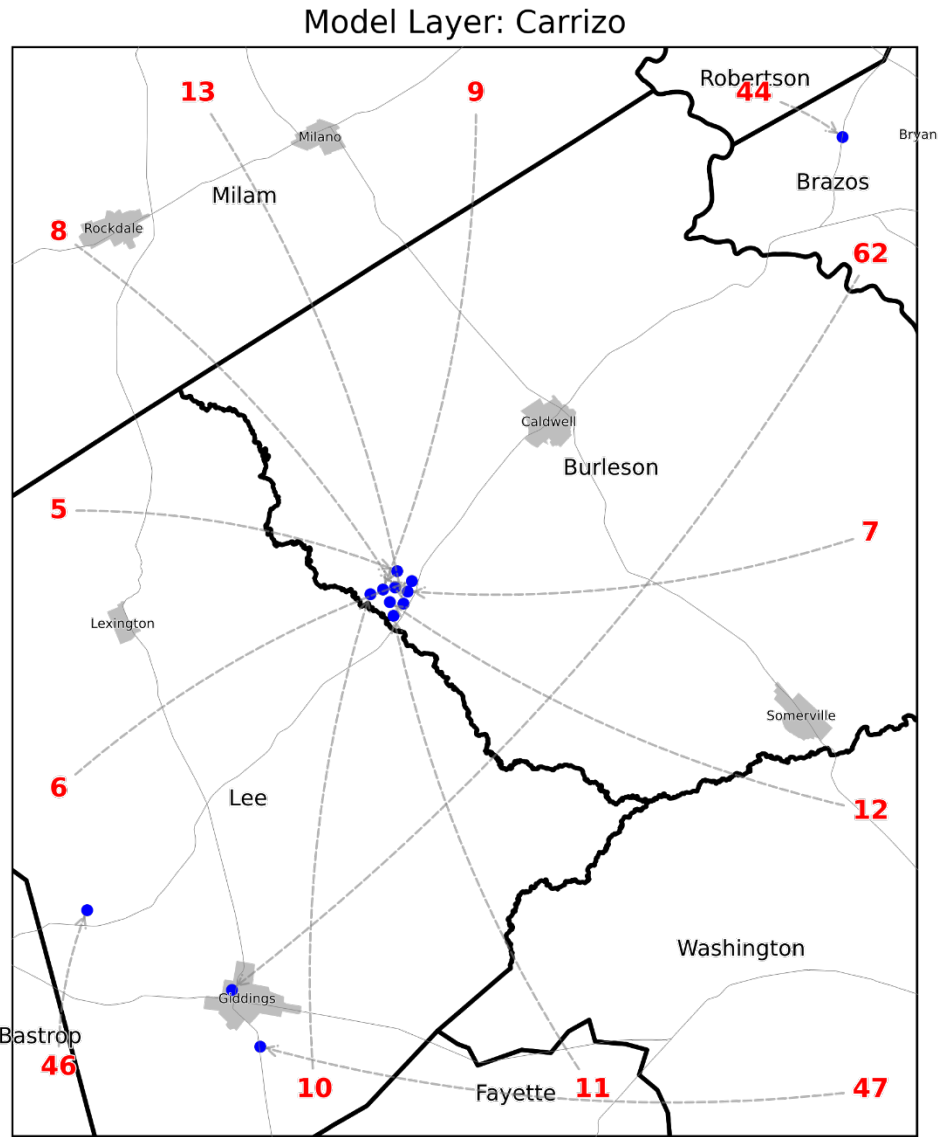


Simulation of Single Well Aquifer Pumping Tests– Calvert Bluff

Model Layer: Calvert Bluff



Simulation of Single Well Aquifer Pumping Tests - Carrizo



Question

Questions