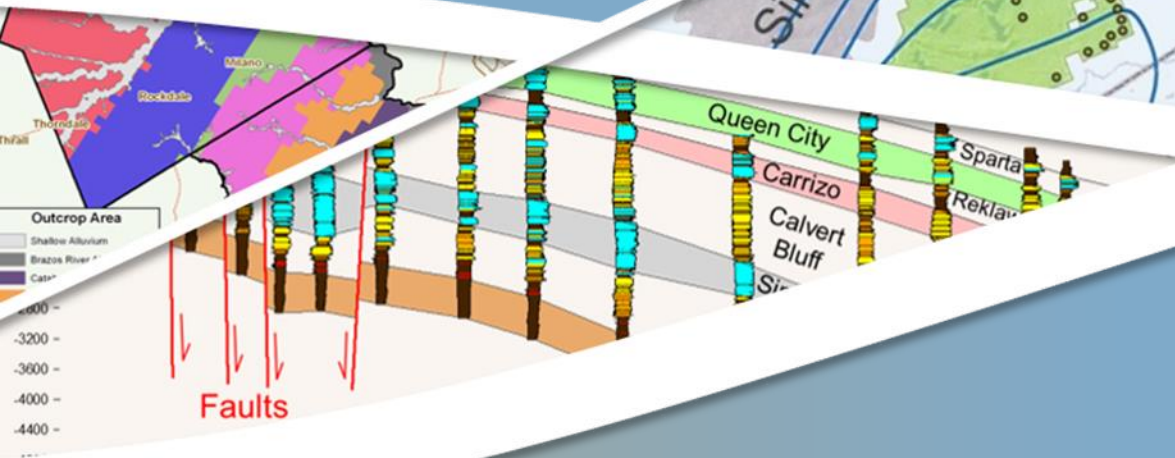


State of the Aquifers and Monitoring Update: Compliance Assessment



Presented By:
Steve Young,
Lakin Beal



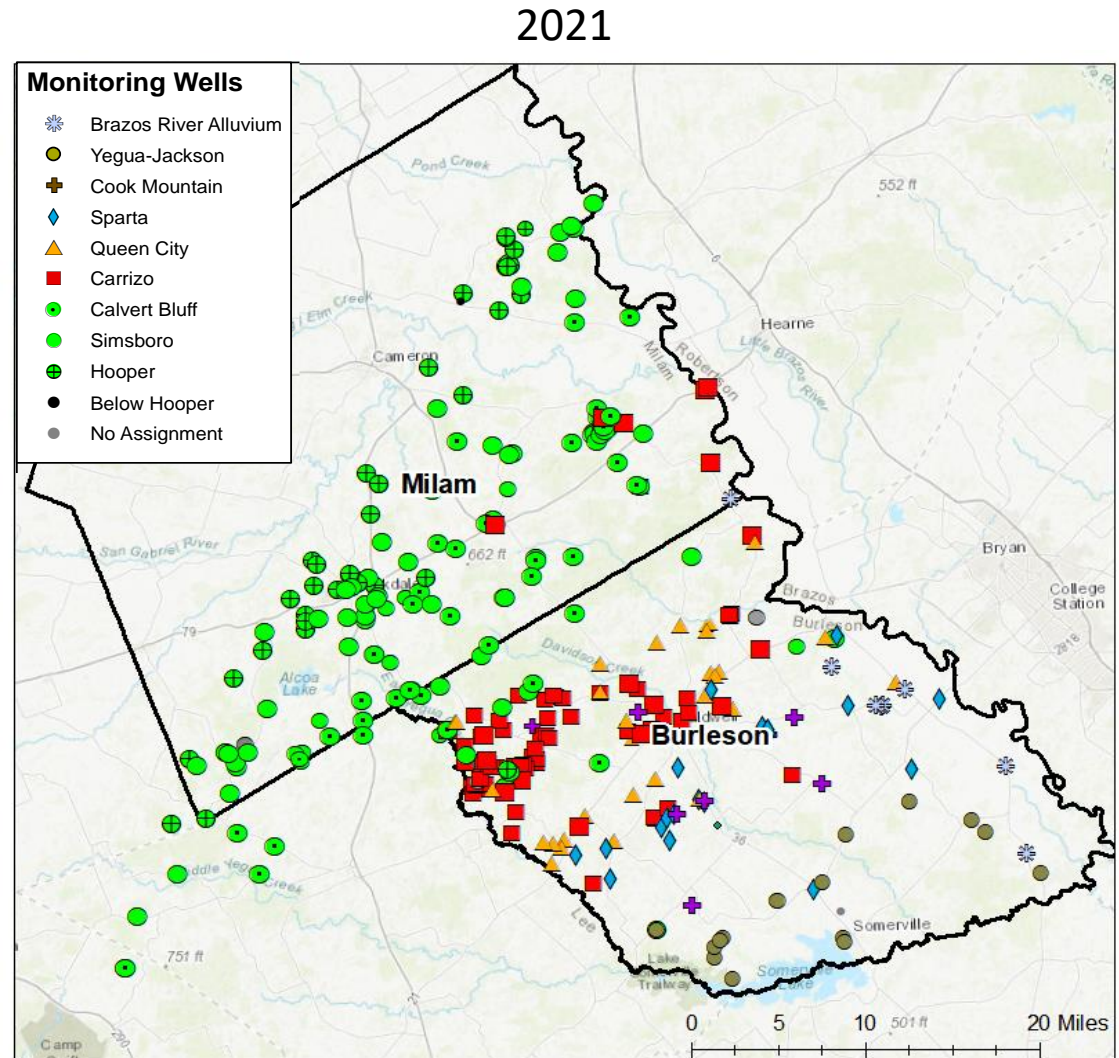
August 12, 2021

Outline

- Monitoring Well Network
- Complaint Evaluation
- Threshold Exceedances
- Guidance Document
- Water level maps for 2021 Simsboro and Carrizo Aquifers

Monitoring Network : ~2021

Aquifer	# of Wells
BRAA	7
Yegua-Jackson	15
Cook Mountain	8
Sparta	20
Queen City	29
Carrizo	82
Calvert Bluff	49
Simsboro	47
Hooper	37
Below Hooper	2
No Assignment	3
TOTAL	299



Desired Future Condition (DFC) Assessment

Management Zone	DFC	Drawdown from 2000 to 2010	Drawdown from 2000 to 2015	Drawdown from 2000 to 2016	Drawdown from 2000 to 2017	Drawdown from 2000 to 2018	Drawdown from 2000 to 2019	Drawdown from 2000 to 2020	Drawdown from 2000 to 2021
		Calculated Drawdown (% of DFC)	Calculated Drawdown (% of DFC)	Calculated Drawdown (% of DFC)	Calculated Drawdown (% of DFC)	Calculated Drawdown (% of DFC)	Calculated Drawdown (% of DFC)	Calculated Drawdown (% of DFC)	Calculated Drawdown (% of DFC)
Yegua Jackson	100	27.5 27.5%	22.3 22.3%	22.2 22.2%	21.0 21.0%	19.2 19.2%	18.1 18.1%	17.1 17.1%	17.8 17.80%
Sparta	28	1.4 5.0%	6.9 24.8%	8.6 30.6%	12.3 43.8%	14.5 51.8%	15.0 53.4%	13.8 49.3%	14.3 51.20%
Queen City	30	0.9 3.0%	2.7 8.9%	1.3 4.4%	1.6 5.5%	2.4 8.0%	3.9 13.0%	4.4 14.6%	4.2 14.10%
Carrizo	67	-11.1 -16.6%	-4.3 -6.4%	-3.8 -5.7%	18.1 27.0%	17.3 25.8%	44.1 65.9%	45.5 67.9%	48.2 71.90%
Calvert Bluff (Upper Wilcox)	149	-29.9 -20.1%	-34.6 -23.2%	-19.0 -12.7%	-27.0 -18.1%	-28.3 -19.0%	-28.4 -19.1%	-57.8 -38.8%	-56.5 -37.90%
Simsboro (Middle Wilcox)	318	5.0 1.6%	14.9 4.7%	19.0 6.0%	24.7 7.8%	22.4 7.0%	28.3 8.9%	30.3 9.5%	32 10.10%
Hooper (Lower Wilcox)	205	5.4 2.6%	-1.3 -0.6%	2.2 1.0%	3.6 1.8%	-0.7 -0.3%	-0.5 -0.2%	3.0 1.5%	10.7 5.20%

Threshold 1 = 50% of DFC

Threshold 2 = 60% of DFC

Threshold 3 = 75% of DFC

Protective Drawdown Limit (PDL) Assessment

Management Zone	PDL	Drawdown from 2000 to 2015	Drawdown from 2000 to 2016	Drawdown from 2000 to 2017	Drawdown from 2000 to 2018	Drawdown from 2000 to 2019	Drawdown from 2001 to 2020	Drawdown from 2000 to 2021
		Calculated Drawdown (% of DFC)	Calculated Drawdown (% of DFC)	Calculated Drawdown (% of DFC)	Calculated Drawdown (% of DFC)	Calculated Drawdown (% of DFC)	Calculated Drawdown (% of DFC)	Calculated Drawdown (% of DFC)
Yegua Jackson	20	4.40 22%	0.93 5%	1.46 7%	1.60 8%	3.63 18%	4.07 20%	1.2 6%
Sparta	20	4.3 21%	2.6 13%	2.1 11%	2.7 13%	4.2 21%	4.7 24%	1.6 8%
Queen City	20	4.4 22%	2.6 13%	1.6 8%	1.2 6%	1.9 10%	2.2 11%	0.03 0%
Carrizo	20	6.1 31%	4.3 21%	1.9 10%	1.0 5%	1.1 6%	1.1 6%	0.66 3%
Calvert Bluff (Upper Wilcox)	20	7.3 37%	6.1 30%	3.5 18%	2.3 11%	1.4 7%	0.8 4%	0.96 5%
Simsboro (Middle Wilcox)	20	7.6 38%	6.6 33%	5.8 29%	3.2 16%	1.8 9%	1.0 5%	0.87 4%
Hooper (Lower Wilcox)	20	8.1 40%	7.3 37%	6.7 33%	3.3 17%	2.6 13%	2.3 12%	2.2 11%

Threshold 1 = 50% of PDL

Threshold 2 = 60% of PDL

Threshold 3 = 75% of PDL

POSGCD Rules: Section 16 Thresholds

Threshold 1

Perform studies to improve quantification of pumping effects, characterization of aquifer, and prediction of changes in future water levels

Threshold 2

Re-evaluate the Management Plan and rules regarding management zones, collection and analysis of monitoring data, and DFCs.

Threshold 3

1. Conduct public hearing to discuss aquifer conditions. Develop a Response Action Work Plan to achieve DFCs and PDLs.

2. If drawdowns are exceeded, the maximum water production permitted per acre for the Management Zone and the water authorized to be produced under any permit issued by the District for that zone will be reduced.

Reports

GANA Report

Groundwater Assistance Program Annual Needs Assessment

Objective: Evaluate the potential of *water wells* going “dry” based on *simulated water levels* from GMA 12 DFC simulations

CR Report

Evaluation of Compliance Goals Based on Monitored Water Levels

Objective: Evaluate compliance to *DFC's and PDL's* based on interpretation of *measured water levels*

MS Report

Assessment of Management Strategies for Water Availability and Production

Objective: Using best science to:

- 1) predict year that Rule 16 thresholds may occur
- 2) evaluate timing for production cutbacks to achieve management goals
- 3) assess the need for adjusting maximum allowable production of 2 ac-ft/ac
- 4) assess effectiveness of current management strategies for achieving management goals
- 5) identify possible changes in management strategies to help achieve management goals

GANA = Groundwater Assistance Program Annual Needs Assessment

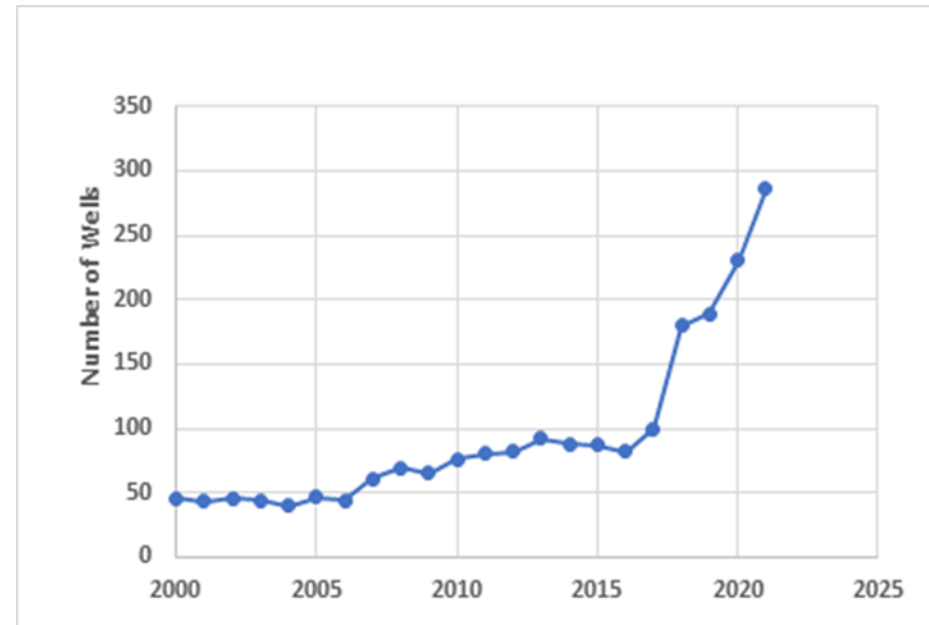
CR = Compliance Report

MS = Management Strategies

Guidance Document for Collection and Analysis of Monitoring Water Levels

- **Monitoring Network**

- New Wells
- Location
- Aquifer Assignment
- Map
- Well Diagrams

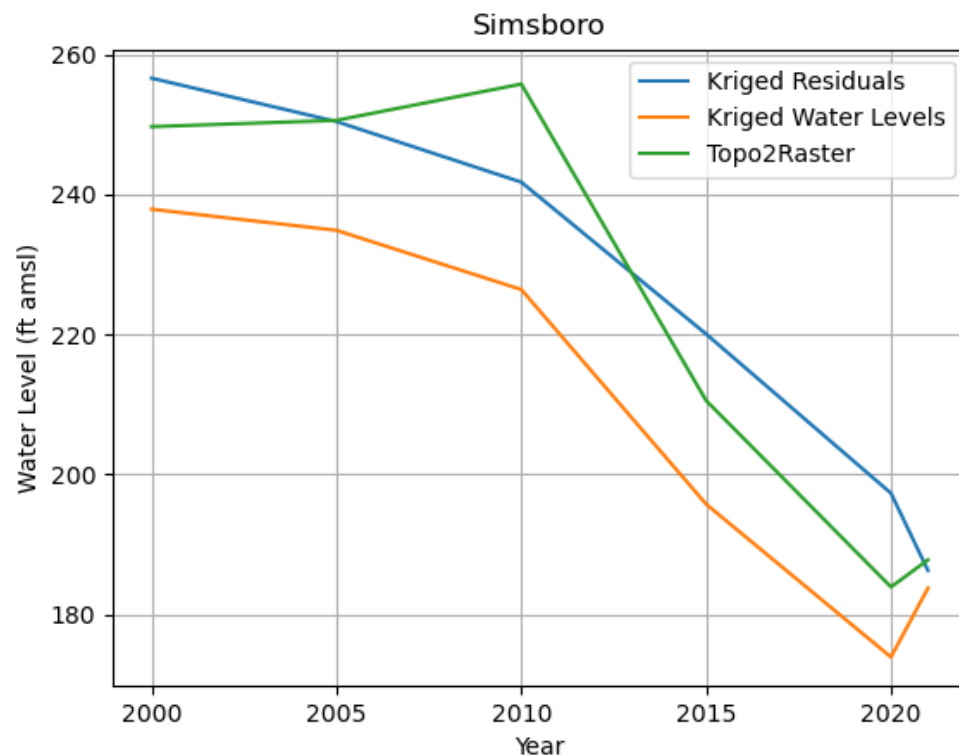


- **Compliance Calculations**

- Evaluations updated through 2021
- Additional explanations & discussions
- Two additional options for evaluating

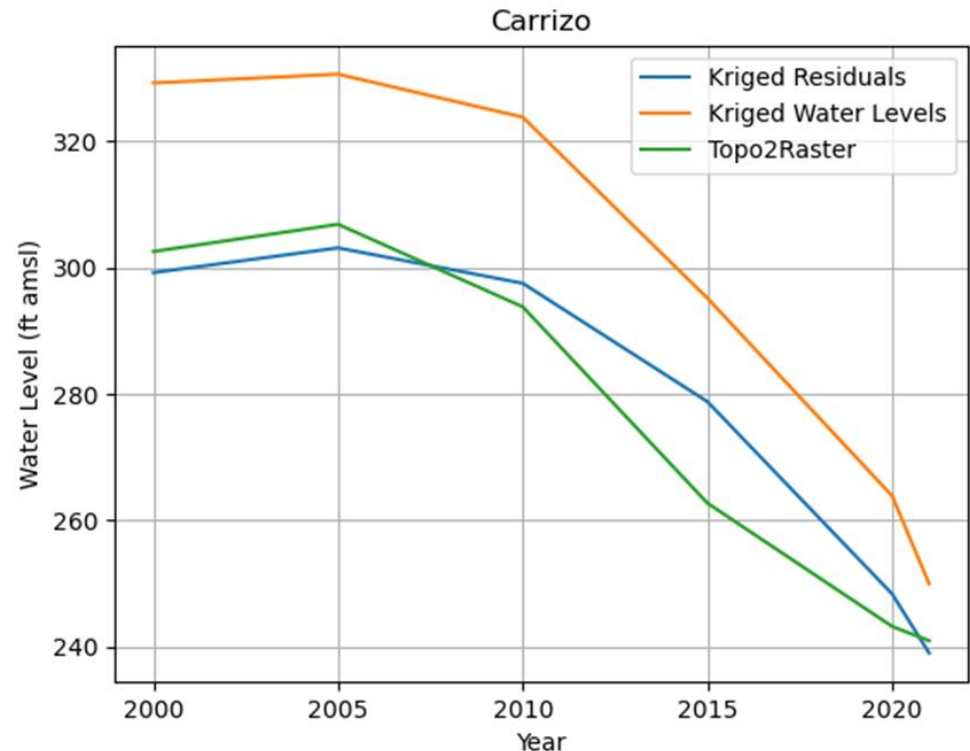
Comparison of Three Methods: Simsboro

Simsboro			
Method	Year	Avg. Water Level (ft amsl)	Drawdown (ft) Since 2000
Kriged Residuals	2000	257	0
	2005	250	6
	2010	242	15
	2015	220	37
	2020	197	59
	2021	186	70
Kriged Water Levels	2000	238	0
	2005	235	3
	2010	226	11
	2015	196	42
	2020	174	64
	2021	184	54
Topo2Raster	2000	250	0
	2005	251	-1
	2010	256	-6
	2015	211	39
	2020	184	66
	2021	188	62



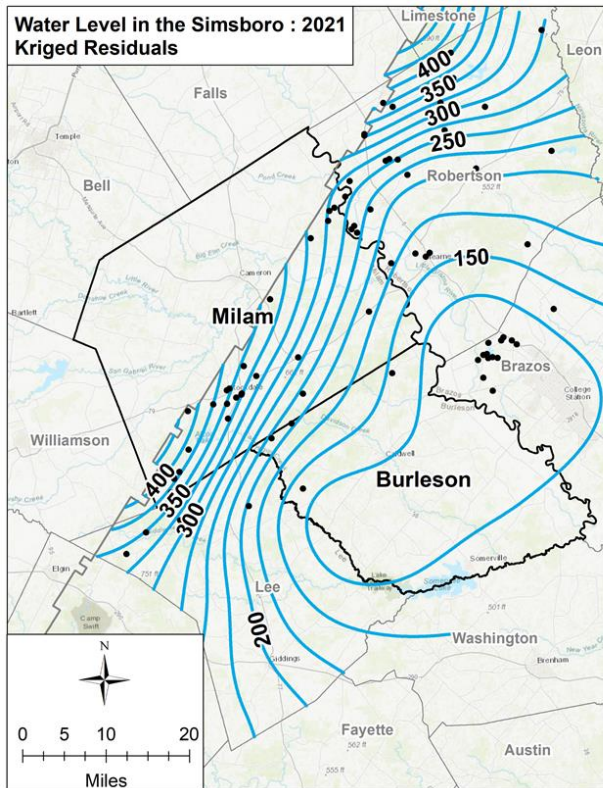
Comparison of Three Methods: Carrizo

Carrizo			
Method	Year	Avg. Water Level (ft amsl)	Drawdown (ft) Since 2000
Kriged Residuals	2000	299	0
	2005	303	-4
	2010	298	2
	2015	279	20
	2020	248	51
	2021	239	60
Kriged Water Levels	2000	329	0
	2005	331	-1
	2010	324	5
	2015	295	34
	2020	264	65
	2021	250	79
Topo2Raster	2000	303	0
	2005	307	-4
	2010	294	9
	2015	263	40
	2020	243	59
	2021	241	62

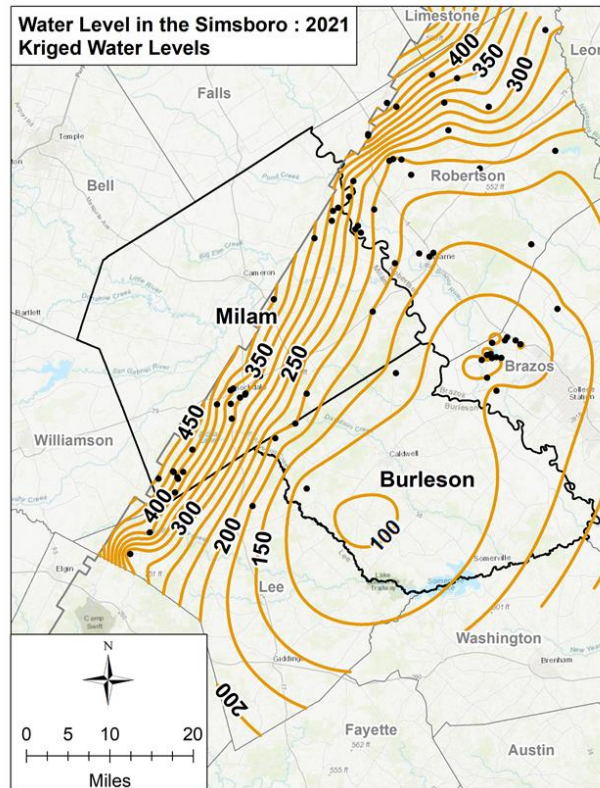


Contours of Simsboro Water Level

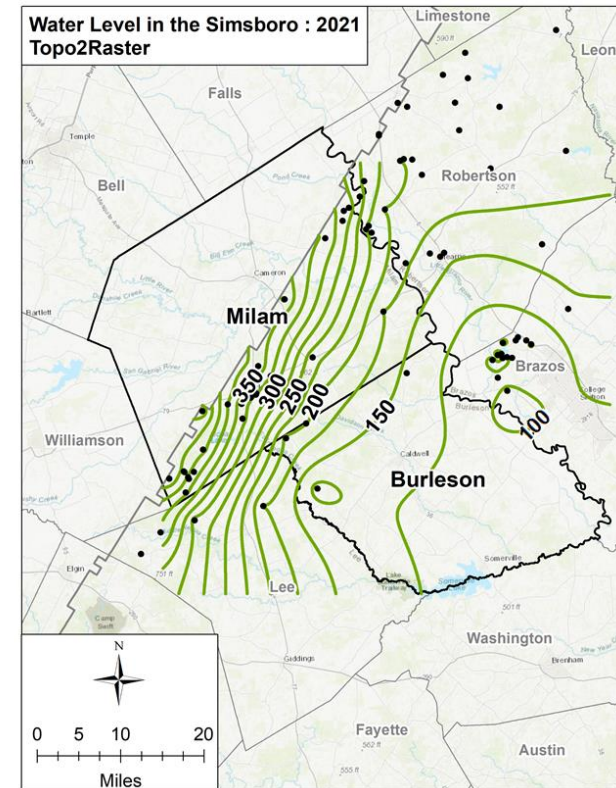
Average WL = 186 (ft, msl)



Average WL = 184 (ft, msl)

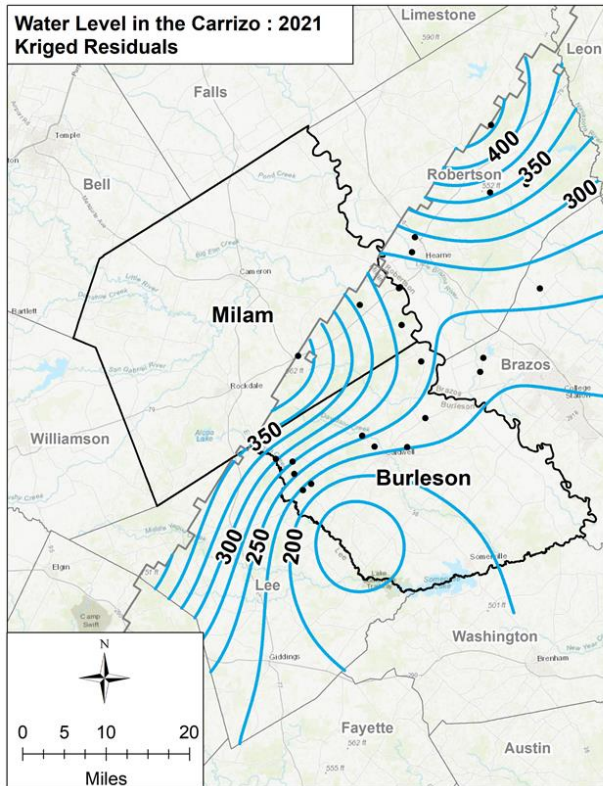


Average WL = 188 (ft, msl)

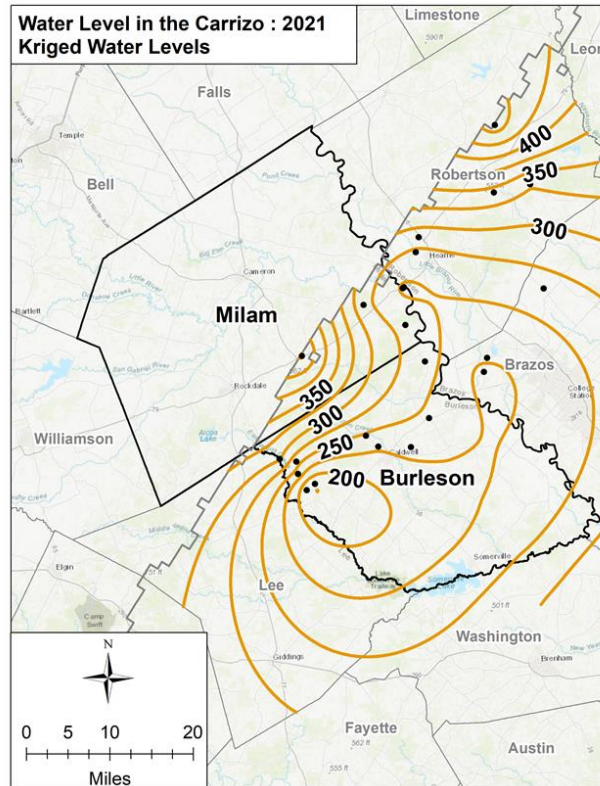


Contours of Carrizo Water Level

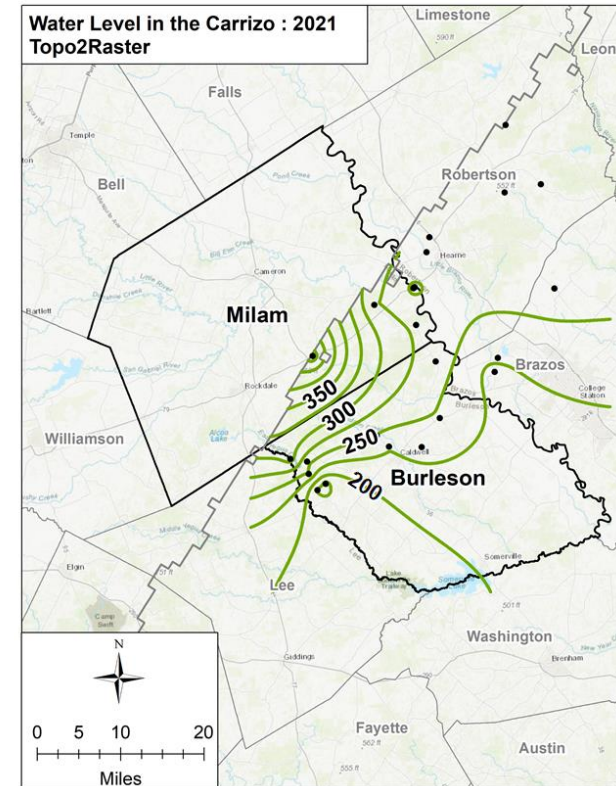
Average WL = 239 (ft, msl)



Average WL = 250 (ft, msl)



Average WL = 241 (ft, msl)





Questions ?