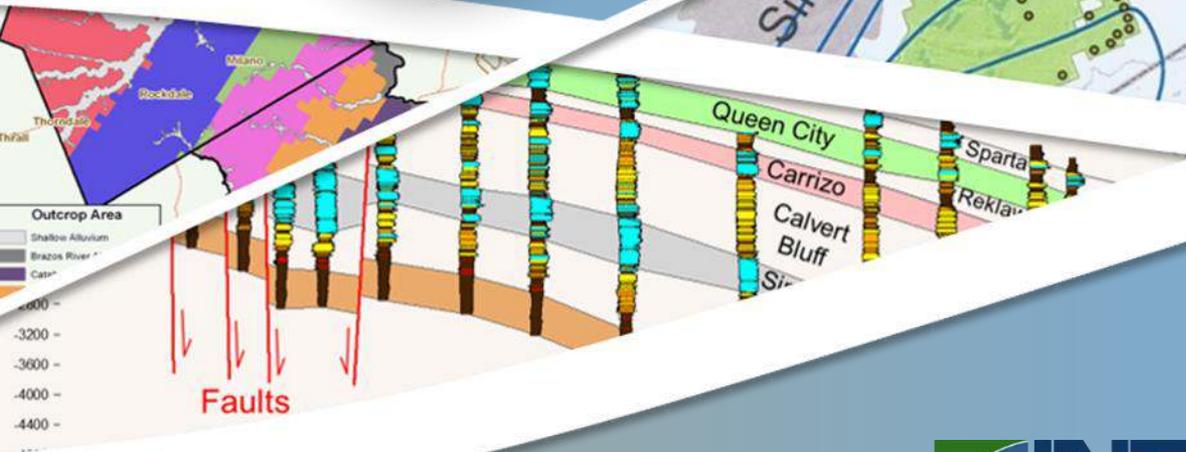


Preliminary Results for the GWAP Annual Needs Assessments

Presented To:



Presented By:

Steve Young
Ross Kushnereit
Jevon Harding
Lakin Beal



November 9, 2020

Outline

- Eligible Wells
- Pumping Scenario S-7, S-7a, S-7b
- Location of “Dry wells” in 2029
- Drawdowns at Eligible Wells at 3yrs, 7 yrs, 10 yrs, and 20 yrs
- Tally of Priority Wells
 - High-Priority: water level below pump elevation at 2029
 - Moderate-Priority: more than 125 feet of drawdown from 2019 to 2029
- Update on Rule 16.4 Thresholds

Eligible Wells

Aquifer	Exempt			Permitted: Low Capacity			Total Wells
	Pump Elev	No Pump Elev	Total	Pump Elev	No Pump Elev	Total	
Sparta	114	822	936	38	0	38	974
Queen City	125	711	836	56	6	62	898
Carrizo	75	203	278	44	3	47	325
Calvert Bluff	150	374	524	132	14	146	670
Simsboro	49	316	365	42	4	46	411
Hooper	140	521	661	132	13	145	806
Total	653	2,947	3,600	444	40	484	4,084

Summary of Simulated Impacts (S-7a)

Wells with Pump Elevations

Formation	Pump Dry in 2019	Pump Dry in 2022	Pump Dry in 2029
Sparta	1	1	2
Queen City	4	4	5
Carrizo	5	27	40
Calvert Bluff	2	3	4
Simsboro	9	9	9
Hooper	4	4	4
TOTAL	25	48	64

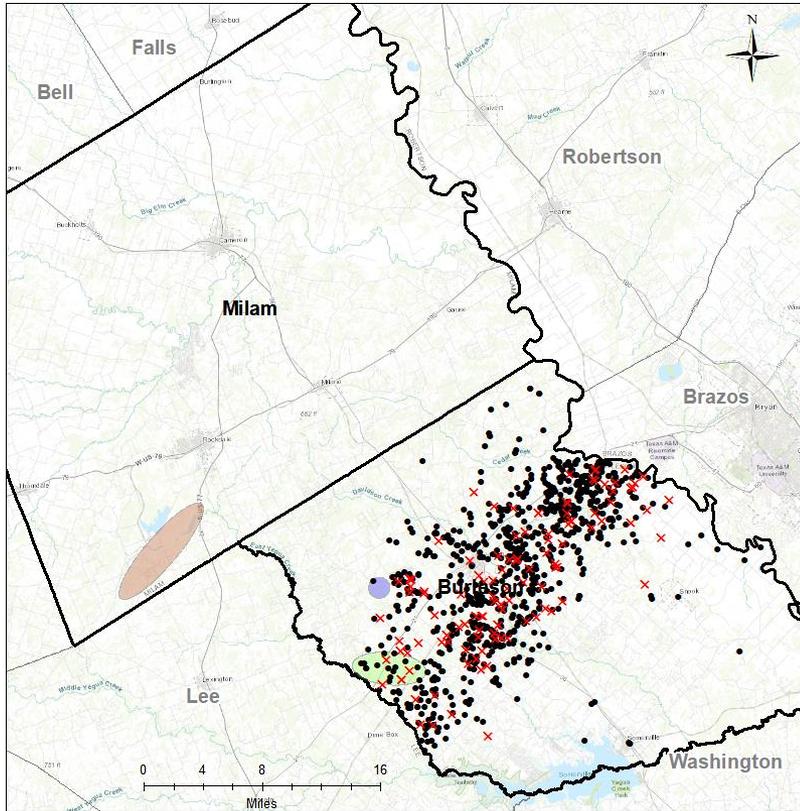
Note: Numbers are cumulative

Wells without Pump Elevations

Formation	Wells With DD >60 ft in 3 Years	Wells With DD >120 ft in 10 Years
Sparta	0	0
Queen City	0	0
Carrizo	89	103
Calvert Bluff	5	5
Simsboro	2	4
Hooper	0	1
TOTAL	96	113

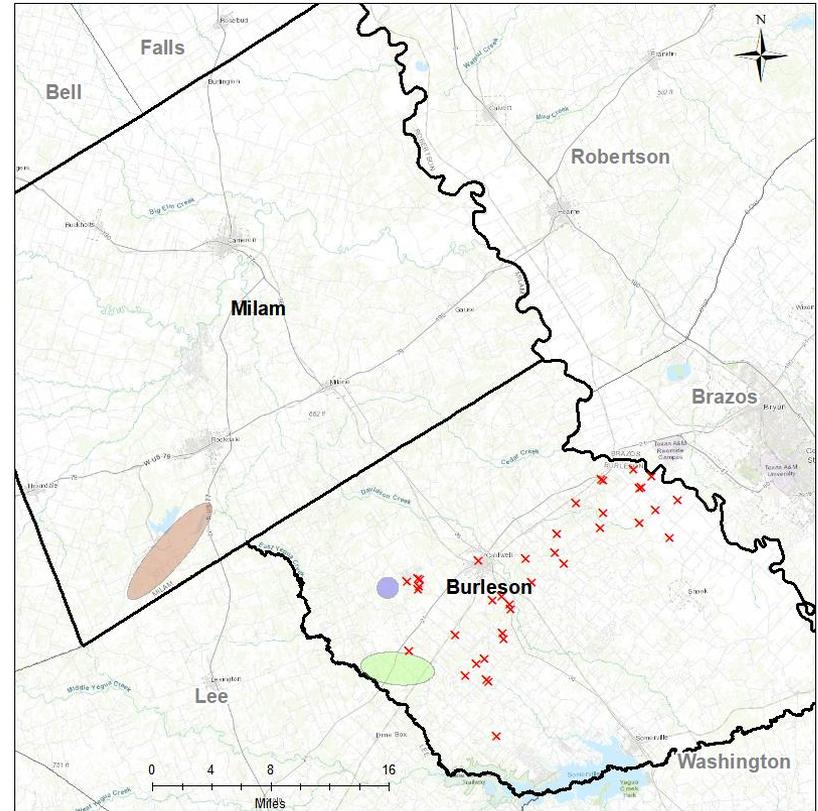
Note: Numbers are not cumulative

Sparta: Distribution of Eligible Wells



Sparta

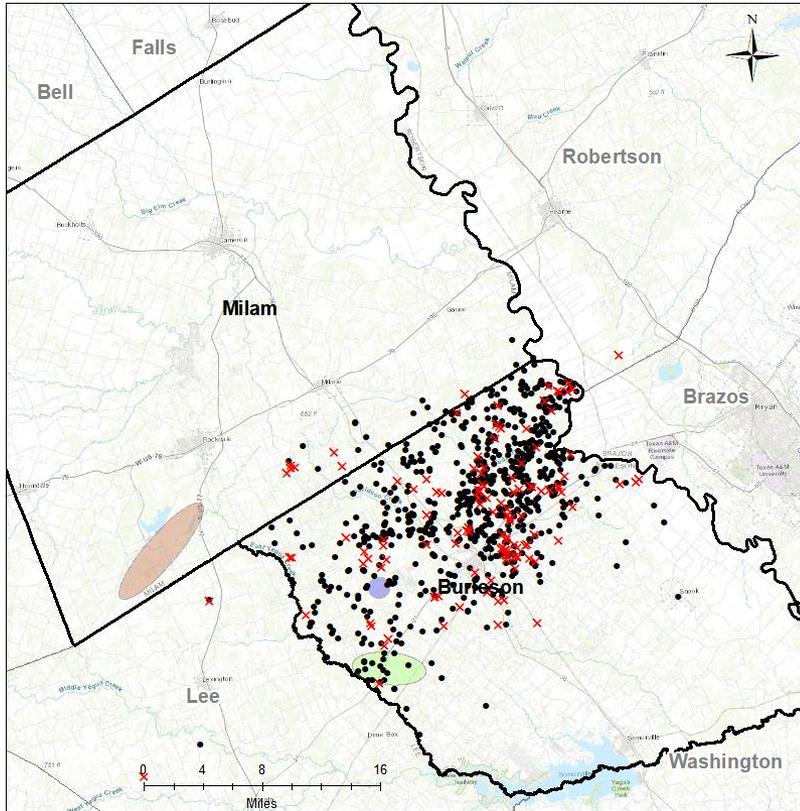
- POSGCD Boundary
- County Line
- 130 Well Field
- ALCOA Well Field
- Vista Ridge Well Field
- Exempt with Pump Depth (n=114)
- Exempt without Pump Depth (n=822)



Sparta

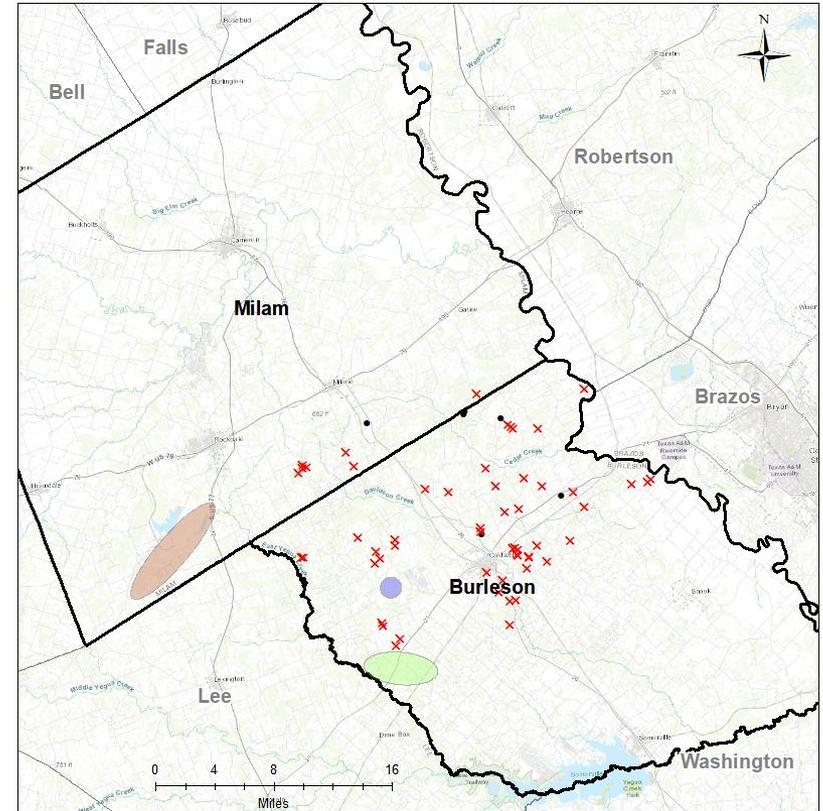
- POSGCD Boundary
- County Line
- 130 Well Field
- ALCOA Well Field
- Vista Ridge Well Field
- Low Capacity with Pump Depth (n=38)

Queen City: Distribution of Eligible Wells



Queen City

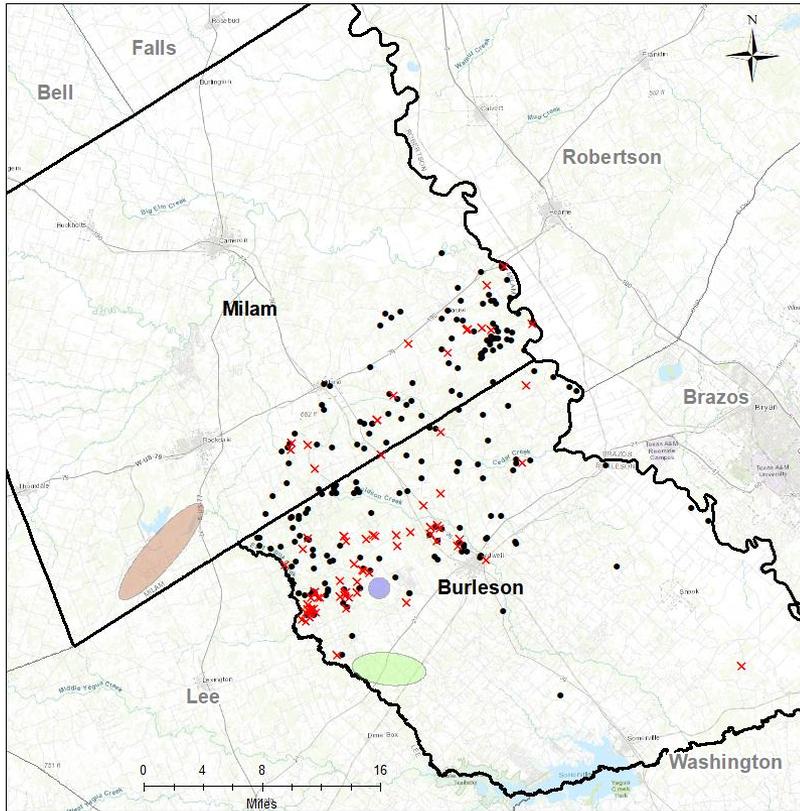
- POSGCD Boundary
- County Line
- 130 Well Field
- ALCOA Well Field
- Vista Ridge Well Field
- Exempt with Pump Depth (n=125)
- Exempt without Pump Depth (n=711)



Queen City

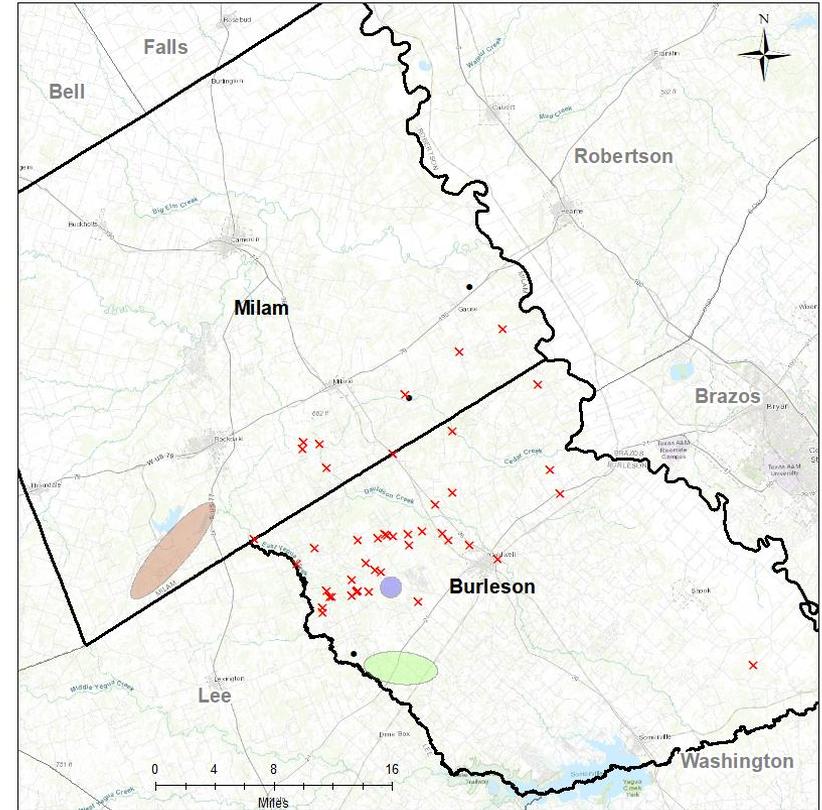
- POSGCD Boundary
- County Line
- 130 Well Field
- ALCOA Well Field
- Vista Ridge Well Field
- Low Capacity with Pump Depth (n=56)
- Low Capacity without Pump Depth (n=6)

Carrizo: Distribution of Eligible Wells



Carrizo

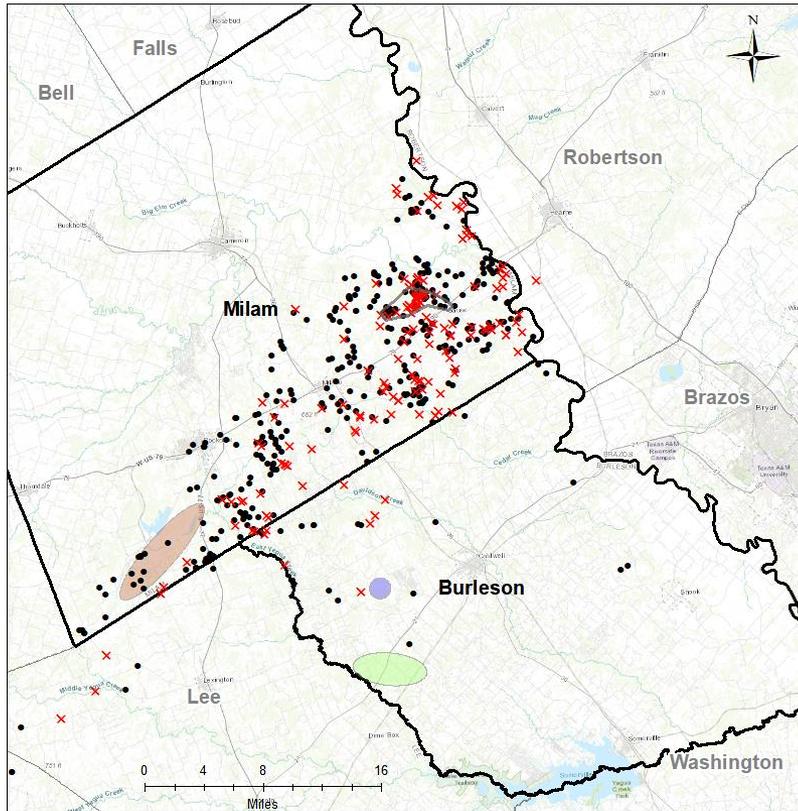
- POSGCD Boundary
- County Line
- 130 Well Field
- ALCOA Well Field
- Vista Ridge Well Field
- Exempt with Pump Depth (n=75)
- Exempt without Pump Depth (n=203)



Carrizo

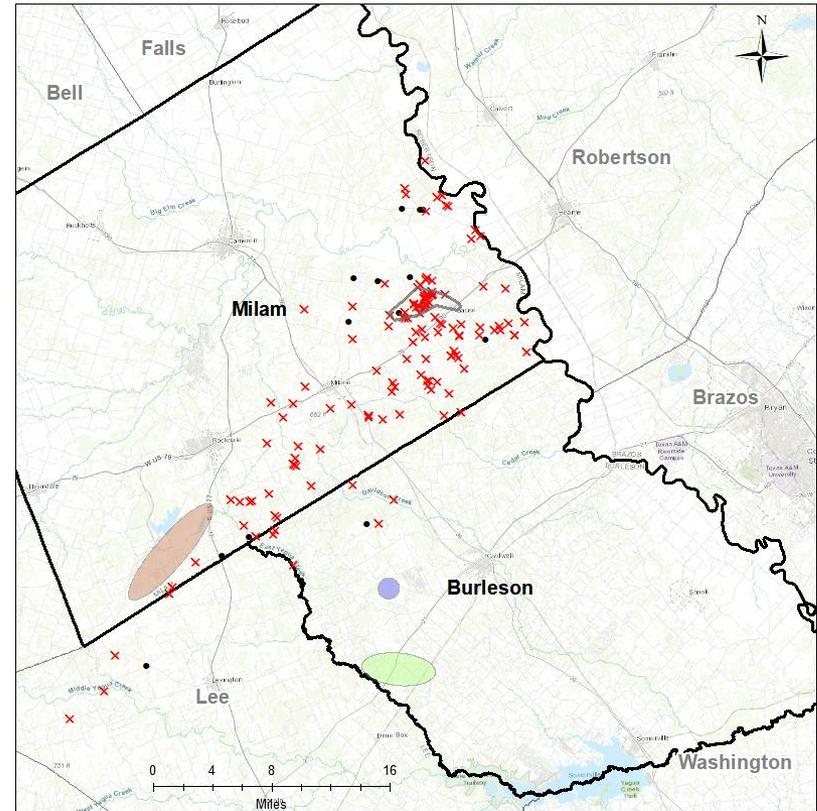
- POSGCD Boundary
- County Line
- 130 Well Field
- ALCOA Well Field
- Vista Ridge Well Field
- Low Capacity with Pump Depth (n=44)
- Low Capacity without Pump Depth (n=3)

Calvert Bluff: Distribution of Eligible Wells



Calvert Bluff

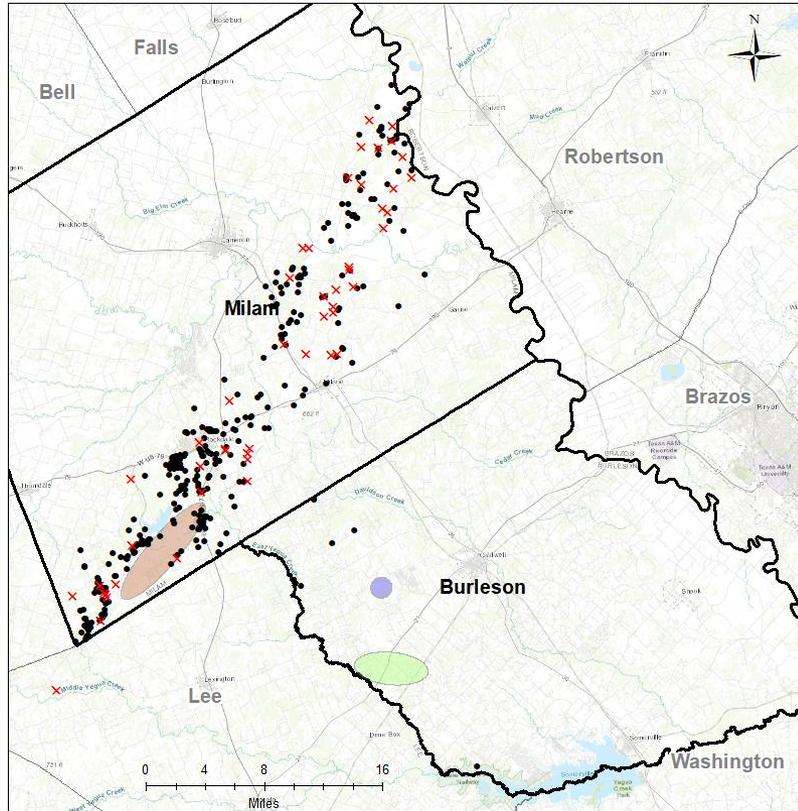
- POSGCD Boundary
- County Line
- 22 Hills Area of Interest
- 130 Well Field
- ALCOA Well Field
- Vista Ridge Well Field
- Exempt with Pump Depth (n=150)
- Exempt without Pump Depth (n=374)



Calvert Bluff

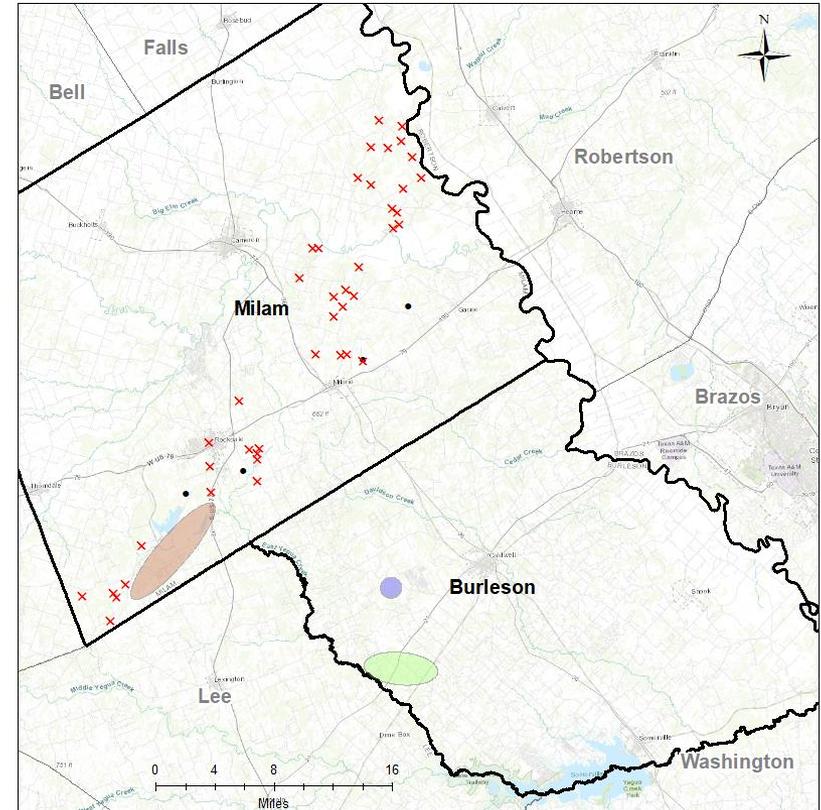
- POSGCD Boundary
- County Line
- 22 Hills Area of Interest
- 130 Well Field
- ALCOA Well Field
- Vista Ridge Well Field
- Low Capacity with Pump Depth (n=132)
- Low Capacity without Pump Depth (n=14)

Simsboro: Distribution of Eligible Wells



Simsboro

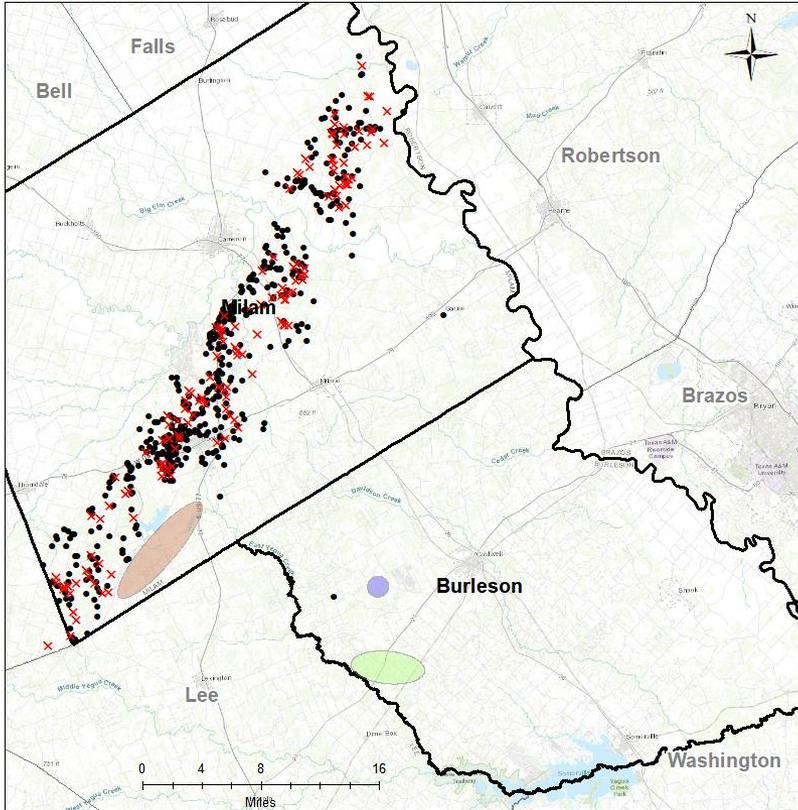
- POSGCD Boundary
- County Line
- 130 Well Field
- ALCOA Well Field
- Vista Ridge Well Field
- Exempt with Pump Depth (n=49)
- Exempt without Pump Depth (n=316)



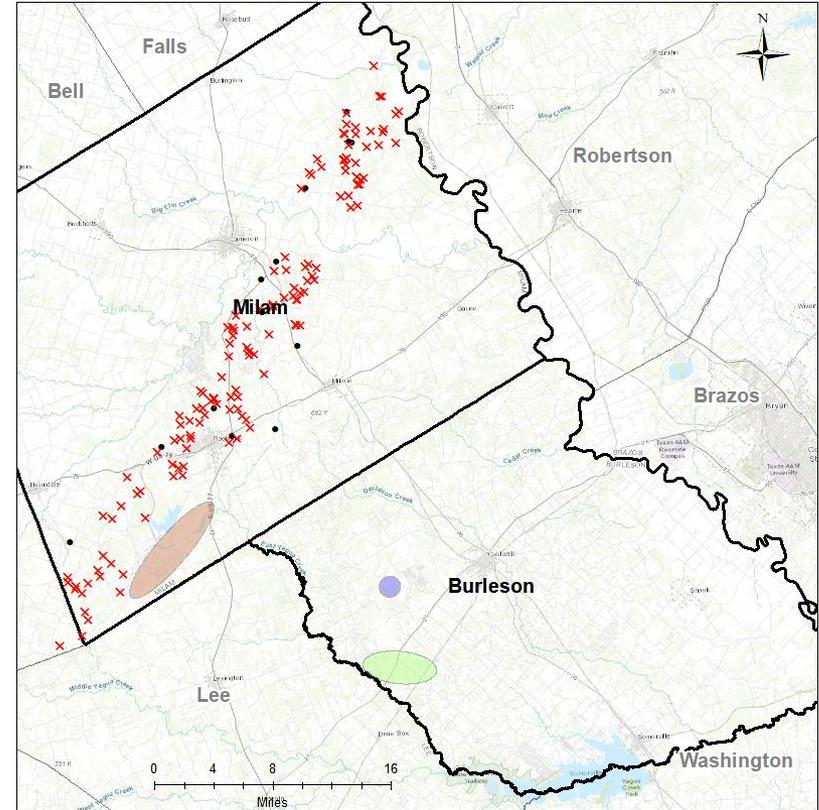
Simsboro

- POSGCD Boundary
- County Line
- 130 Well Field
- ALCOA Well Field
- Vista Ridge Well Field
- Low Capacity with Pump Depth (n=42)
- Low Capacity without Pump Depth (n=4)

Hooper: Distribution of Eligible Wells



- Hooper**
- POSGCD Boundary
 - County Line
 - 130 Well Field
 - ALCOA Well Field
 - Vista Ridge Well Field
 - Exempt with Pump Depth (n=140)
 - Exempt without Pump Depth (n=521)

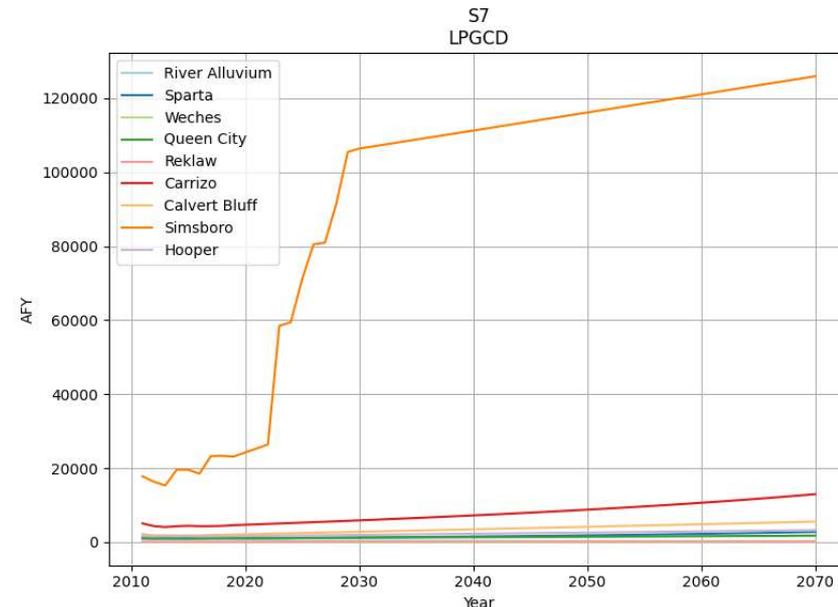
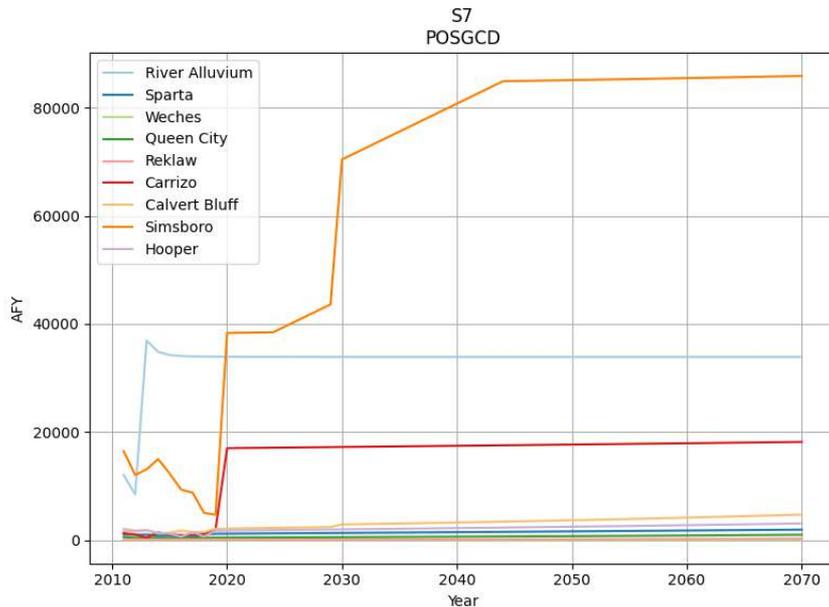
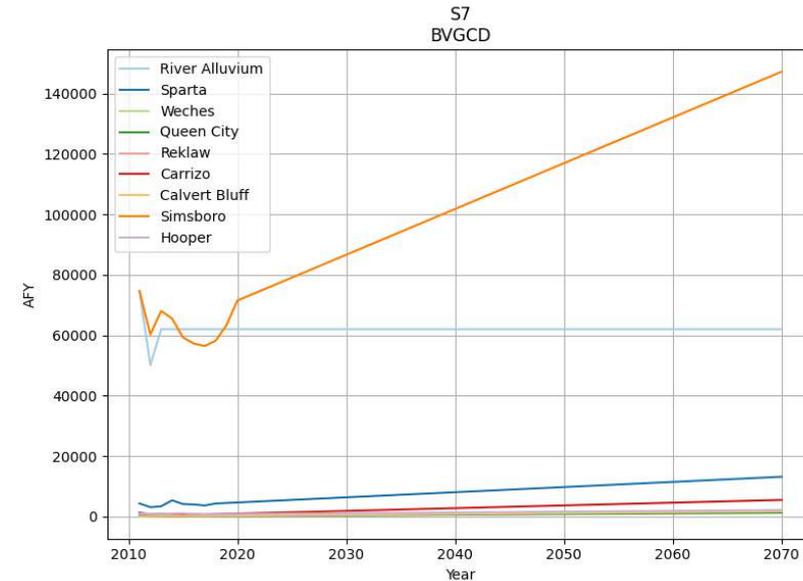


- Hooper**
- POSGCD Boundary
 - County Line
 - 130 Well Field
 - ALCOA Well Field
 - Vista Ridge Well Field
 - Low Capacity with Pump Depth (n=132)
 - Low Capacity without Pump Depth (n=13)

Pumping Rates for S-7, S-7a, S-7b

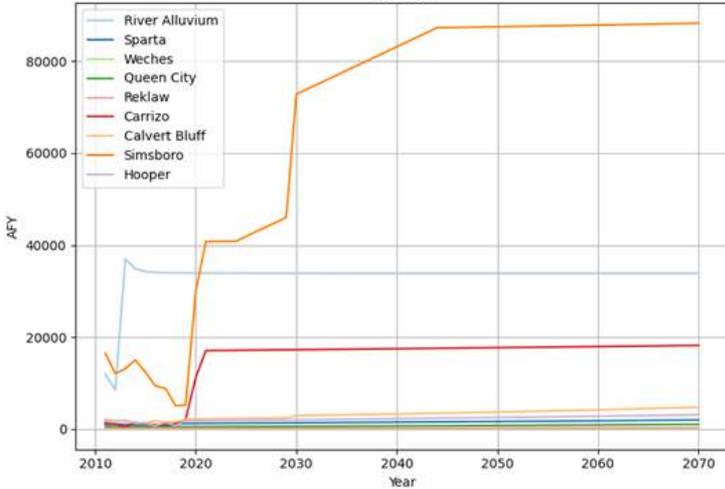
Pump Rates for S-7

Aquifer	Production Rates (AFY) for 2070							
	POSGCD		LPGCD		BVGCD		TOTAL	
	MAG	S-7	MAG	S-7	MAG	S-7	MAG	S-7
Sparta	6,735	1,983	2,393	2,766	9,019	13,161	18,147	17,910
Queen City	504	1,045	1,315	1,774	1,200	1,269	3,019	4,088
Carrizo	7,058	18,205	12,052	12,981	5,494	5,498	24,604	36,684
Calvert Bluff	1,036	4,761	3,984	5,563	1,757	1,726	6,777	12,050
Simsboro	48,503	85,855	30,303	125,958	96,198	147,235	175,004	359,048
Hooper	4,422	3,126	1,255	3,273	2,000	2,139	7,677	8,538

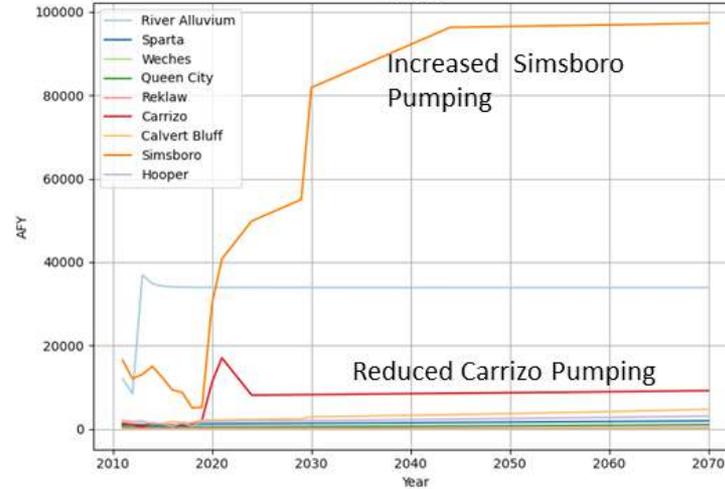


Simsboro & Carrizo Pumping Rates for S-7a & S-7b

S7a
POSGCD



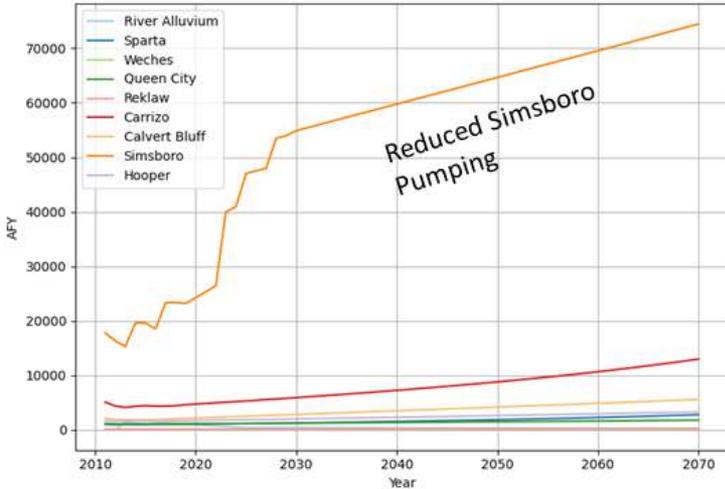
S7b
POSGCD



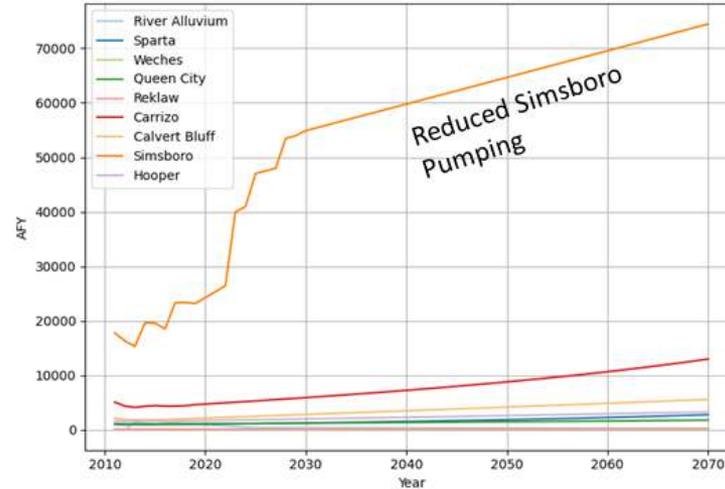
Carrizo Pumping
(acre-ft/yr)

- 1.) 2020 - 15,000
- 2.) 2021- 15,000
- 3.) 2022 - 12,000
- 4.) 2023 - 9,000

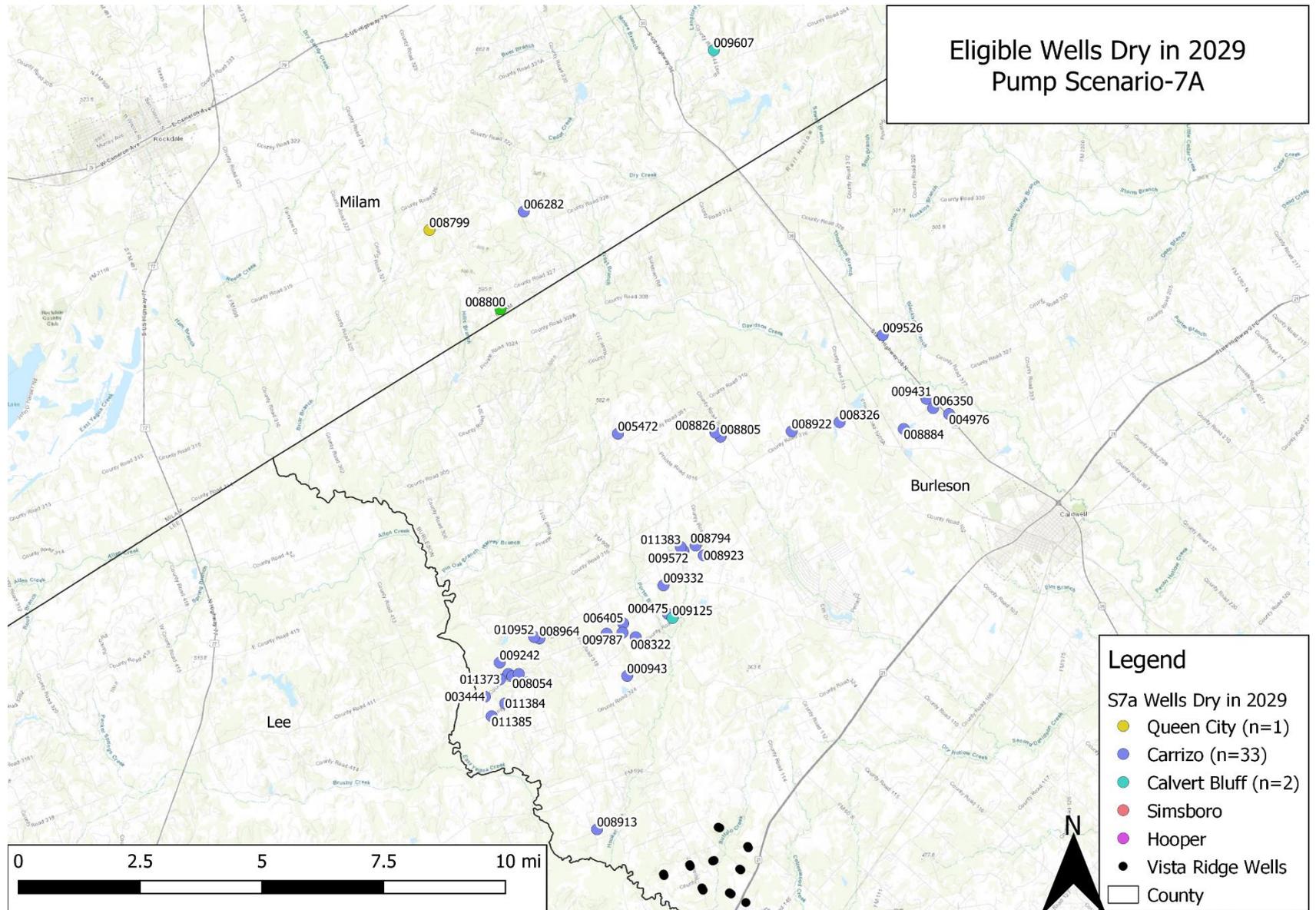
S7a
LPGCD



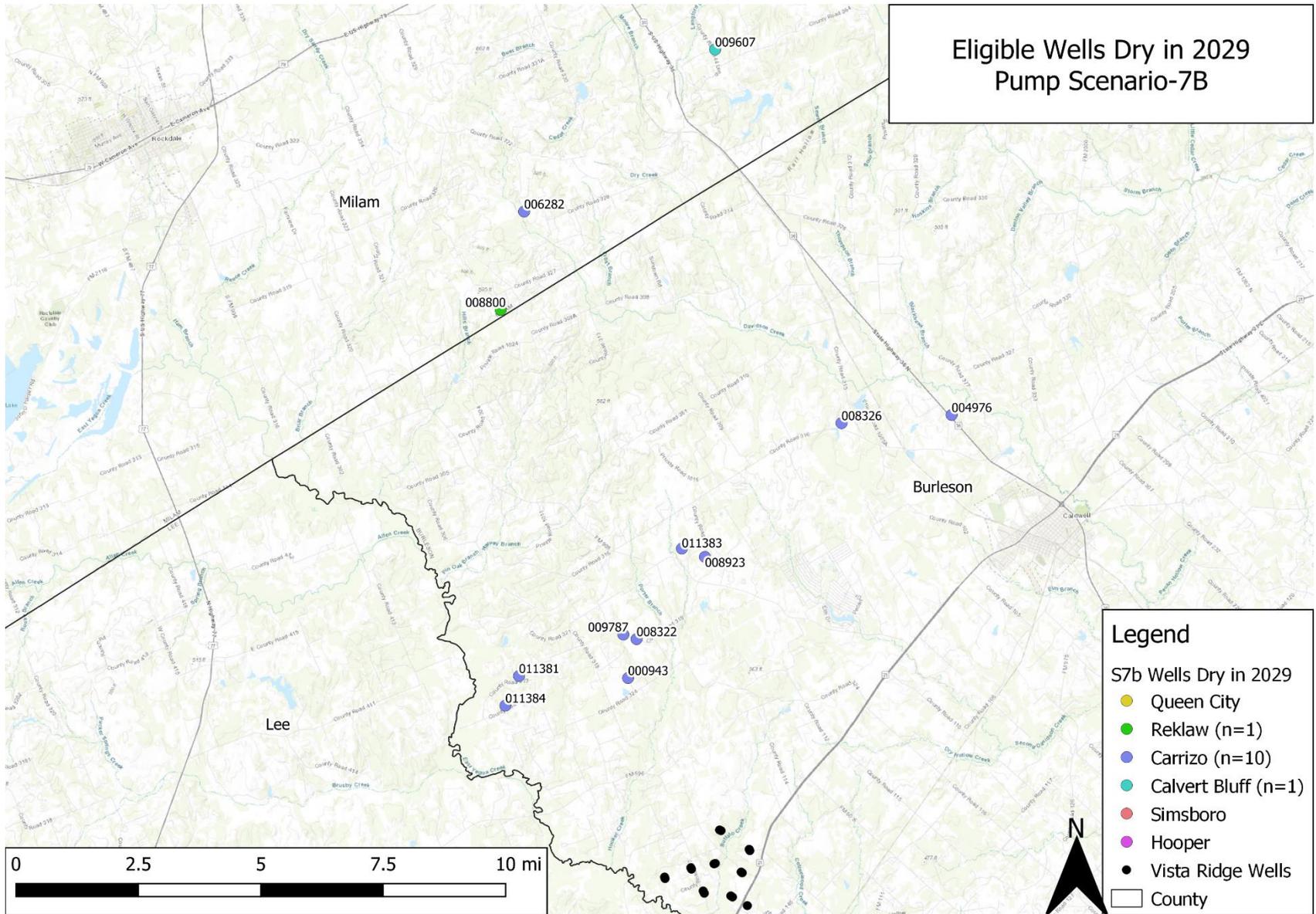
S7b
LPGCD



Wells Dry for S-7a

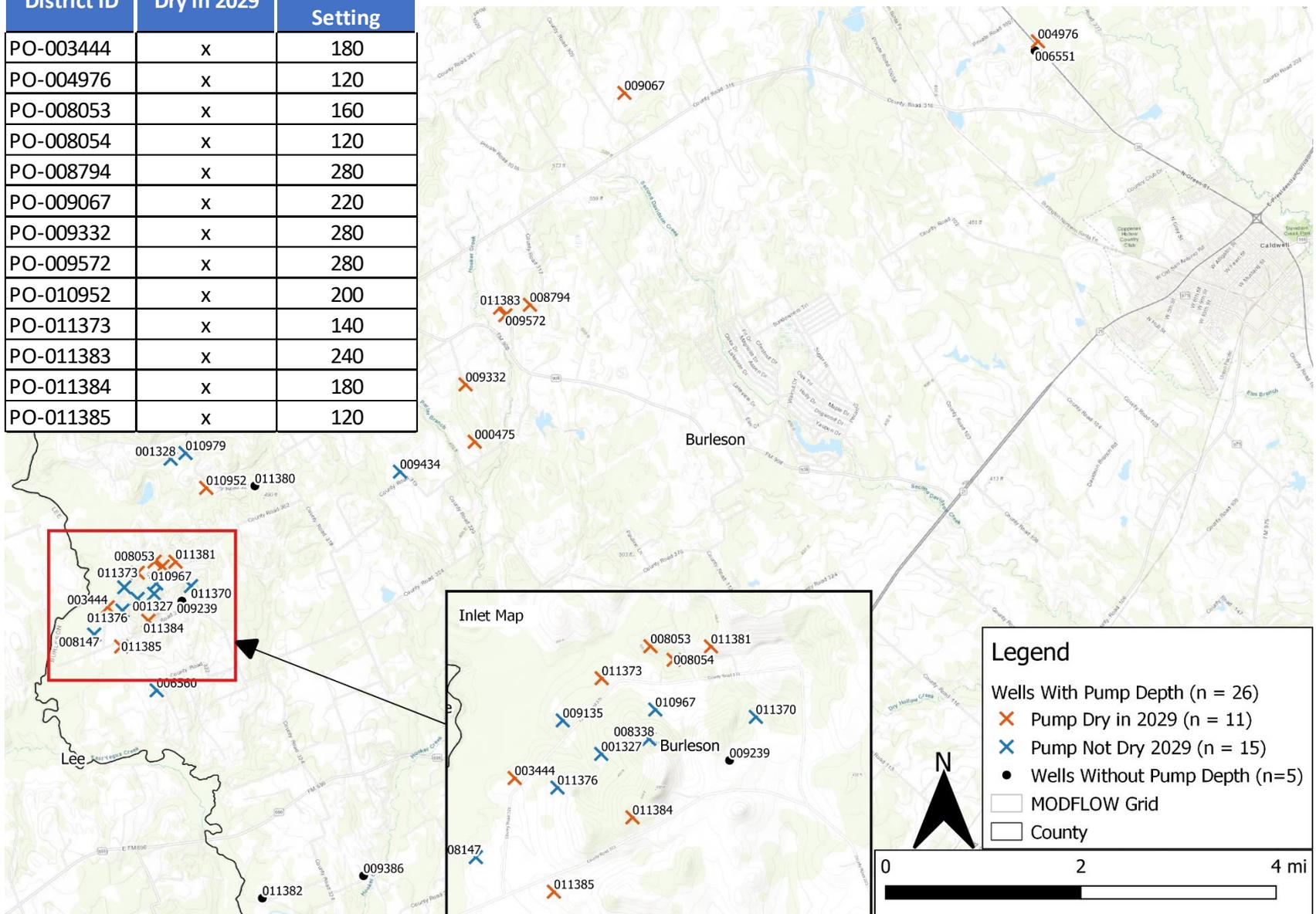


Wells Dry for S-7b



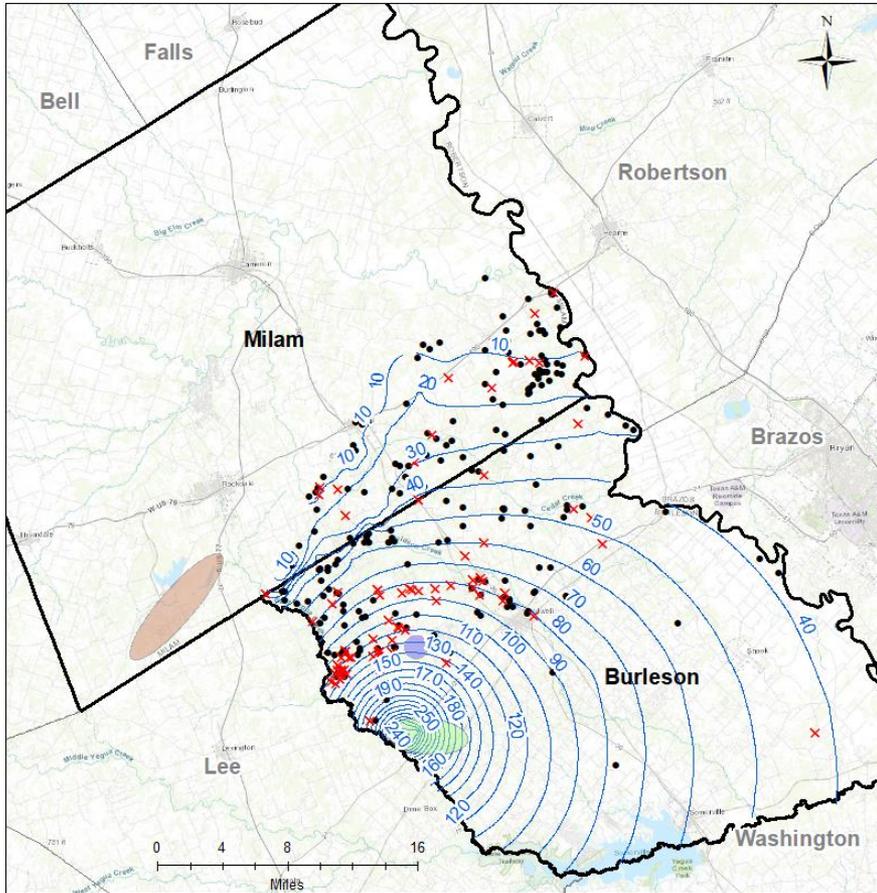
Location of Bobby's Top 13 Wells

District ID	Dry in 2029	Pump Setting
PO-003444	X	180
PO-004976	X	120
PO-008053	X	160
PO-008054	X	120
PO-008794	X	280
PO-009067	X	220
PO-009332	X	280
PO-009572	X	280
PO-010952	X	200
PO-011373	X	140
PO-011383	X	240
PO-011384	X	180
PO-011385	X	120



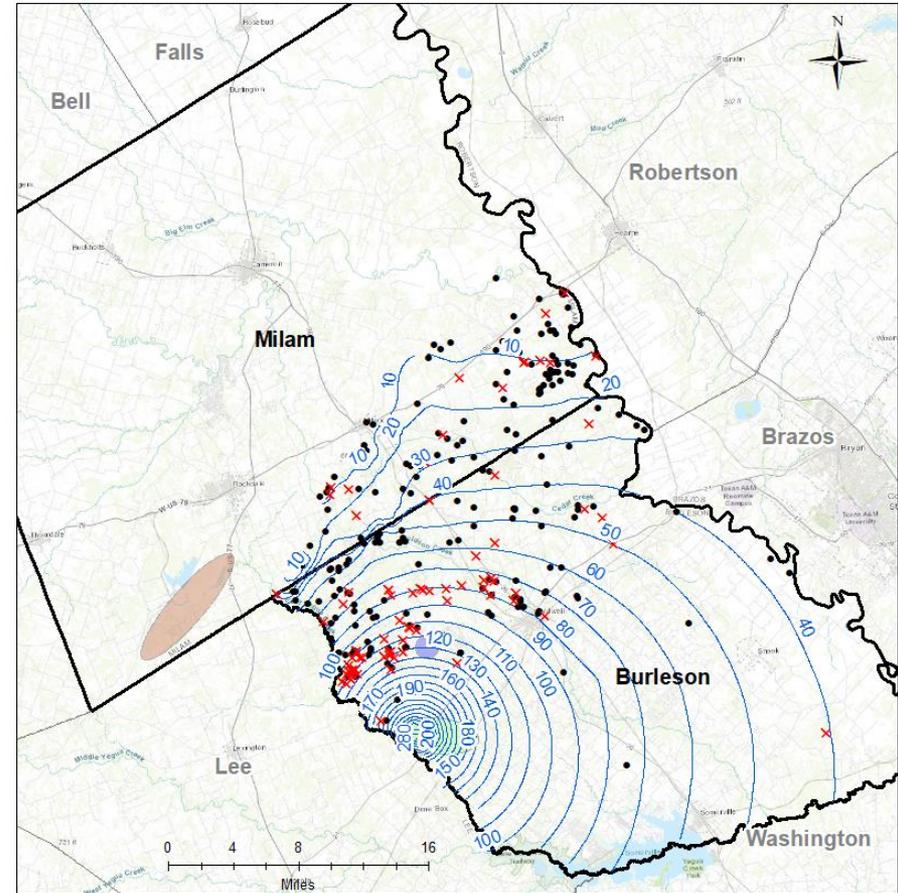
Contours of Drawdown at 3 years and 10 years for S-7a and S-7b for Carrizo and Simsboro

Carrizo Wells at 3 years for S-7a and S-7b



Carrizo

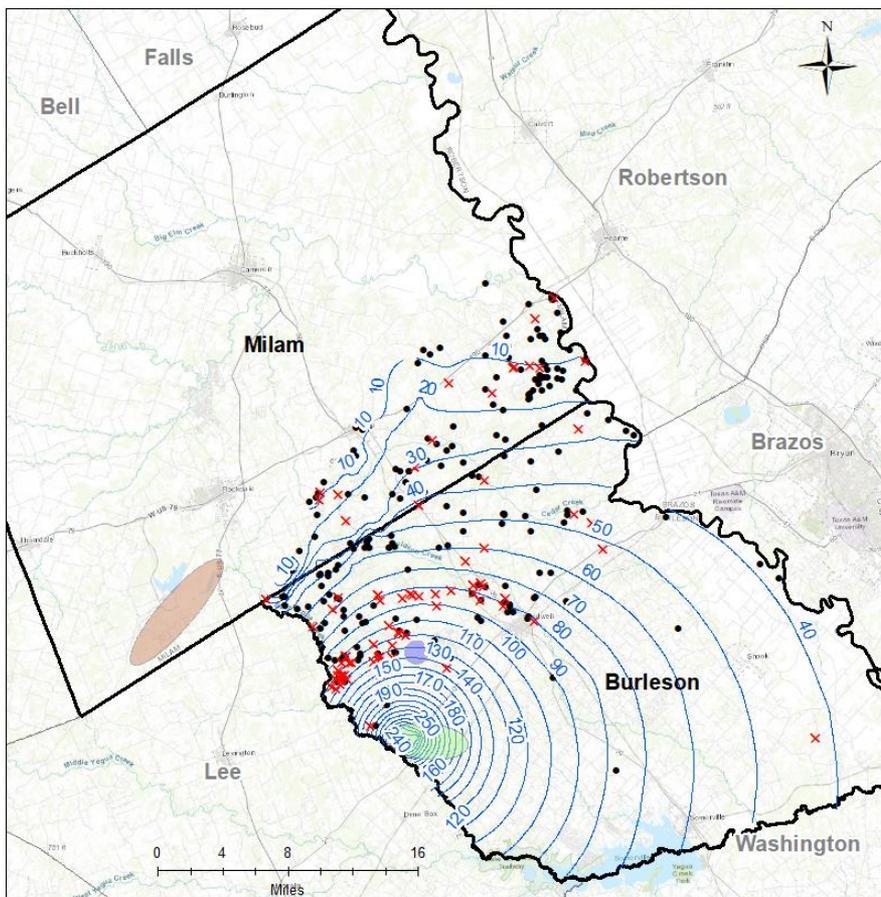
- 130 Well Field
- ALCOA Well Field
- Vista Ridge Well Field
- POSGCD Boundary
- County Line
- x Eligible with Pump Depth (n=79)
- Eligible without Pump Depth (n=203)
- 3 Year Drawdown



Carrizo

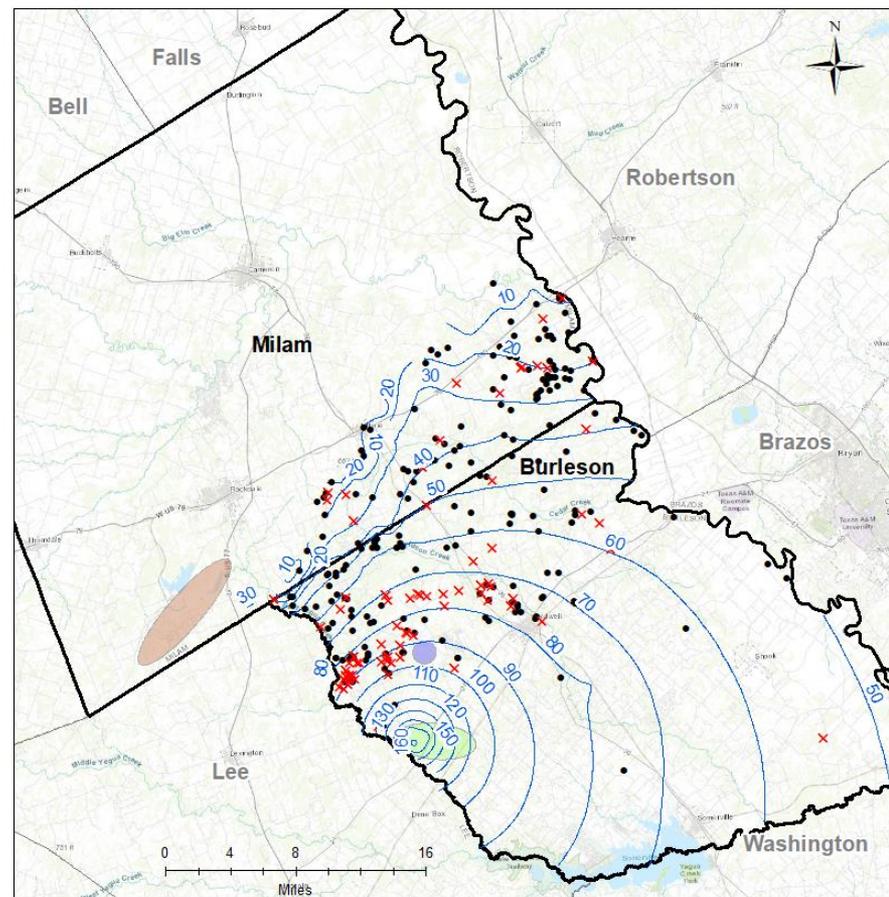
- 130 Well Field
- ALCOA Well Field
- Vista Ridge Well Field
- POSGCD Boundary
- County Line
- x Eligible with Pump Depth (n=79)
- Eligible without Pump Depth (n=203)
- 3 Year Drawdown

Carrizo Wells at 10 years for S-7a and S-7b



Carrizo

- 130 Well Field
- ALCOA Well Field
- Vista Ridge Well Field
- POSGCD Boundary
- County Line
- x Eligible with Pump Depth (n=79)
- Eligible without Pump Depth (n=203)
- 10 Year Drawdown

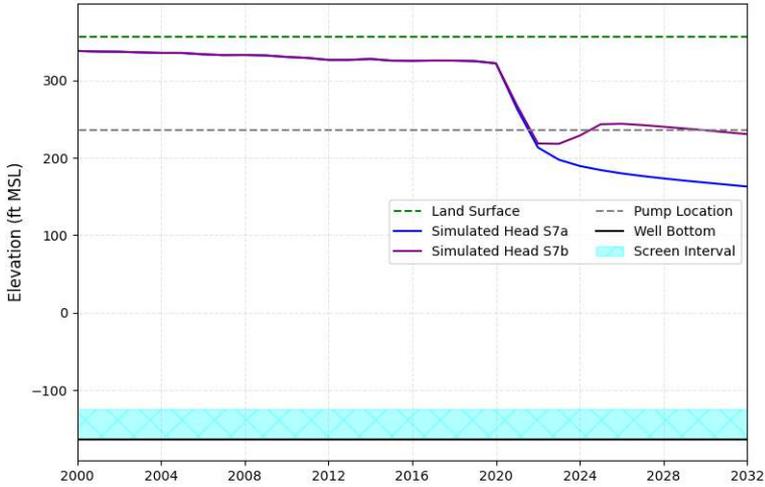


Carrizo

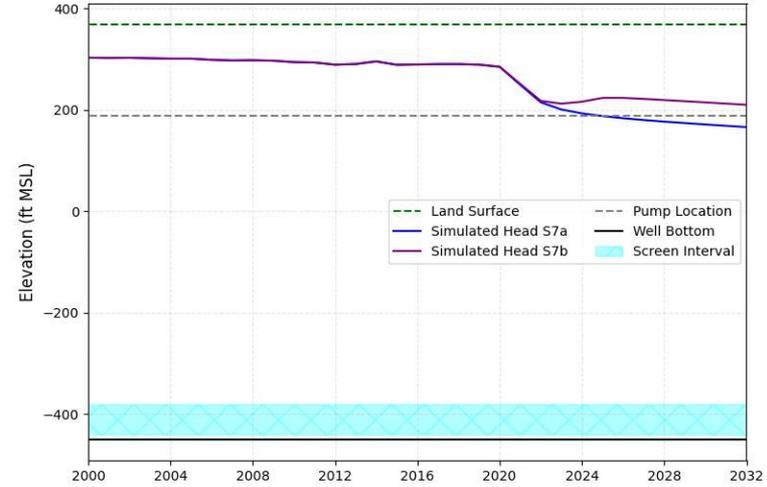
- 130 Well Field
- ALCOA Well Field
- Vista Ridge Well Field
- POSGCD Boundary
- County Line
- x Eligible with Pump Depth (n=79)
- Eligible without Pump Depth (n=203)
- 10 Year Drawdown

Simulated Hydrographs for S-7a & S-7b

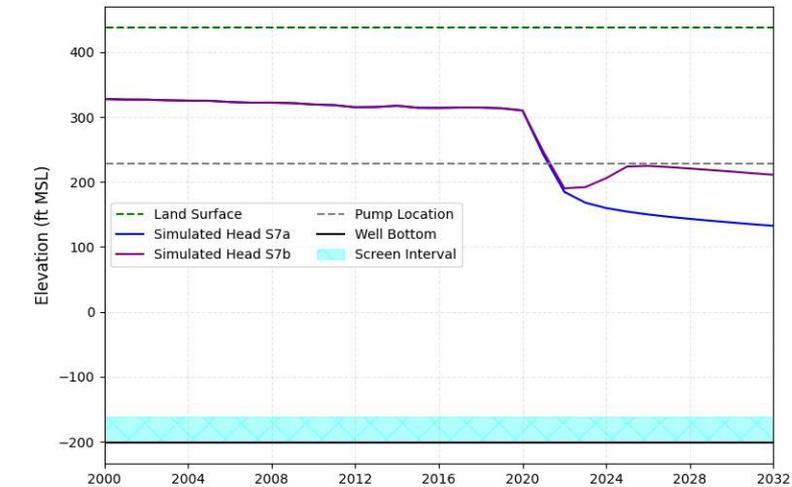
Carrizo, PO-008054
Exempt: Yes, Monitored: No



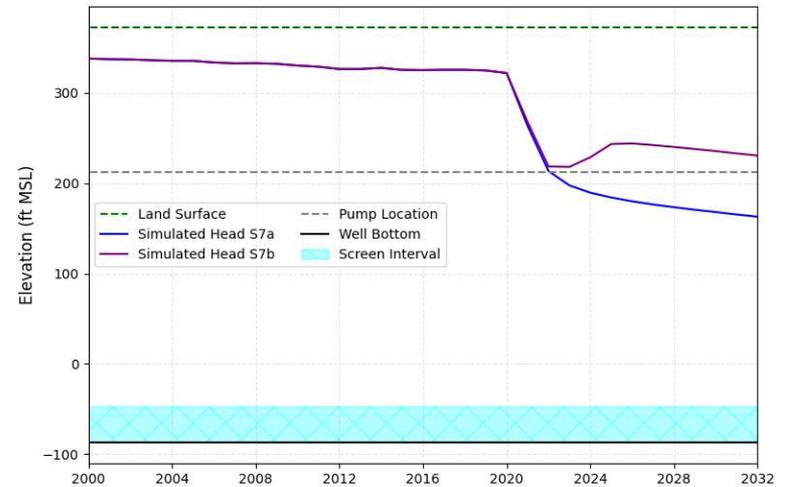
Carrizo, PO-006350
Exempt: Yes, Monitored: No



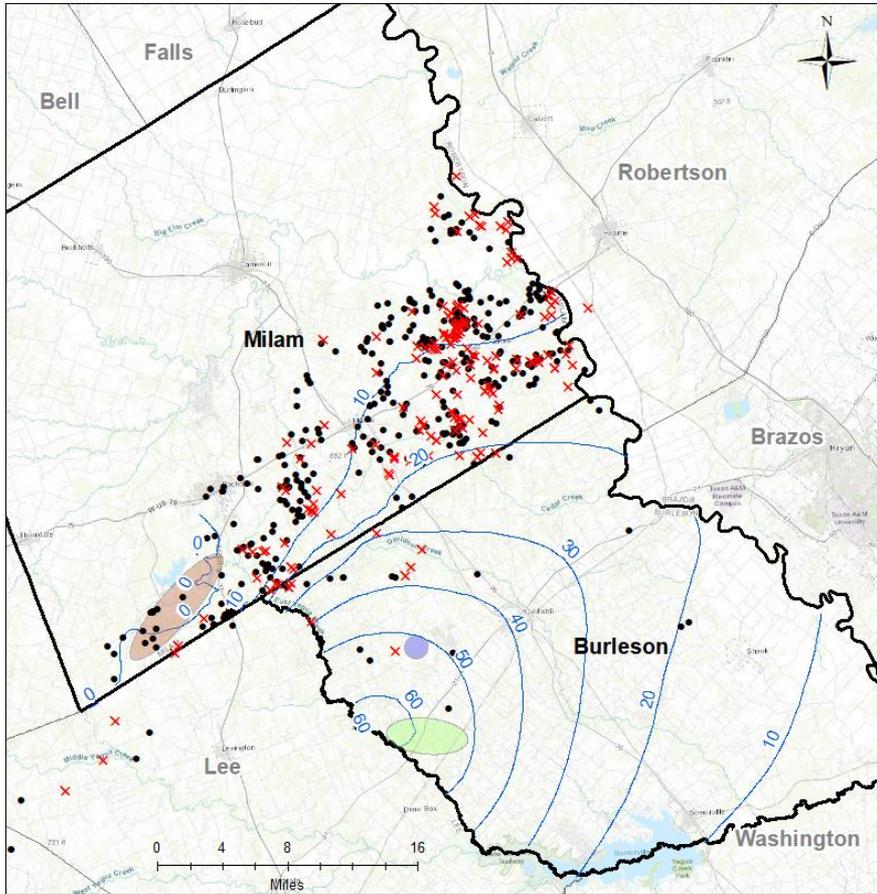
Carrizo, PO-008322
Exempt: Yes, Monitored: No



Carrizo, PO-008053
Exempt: Yes, Monitored: No

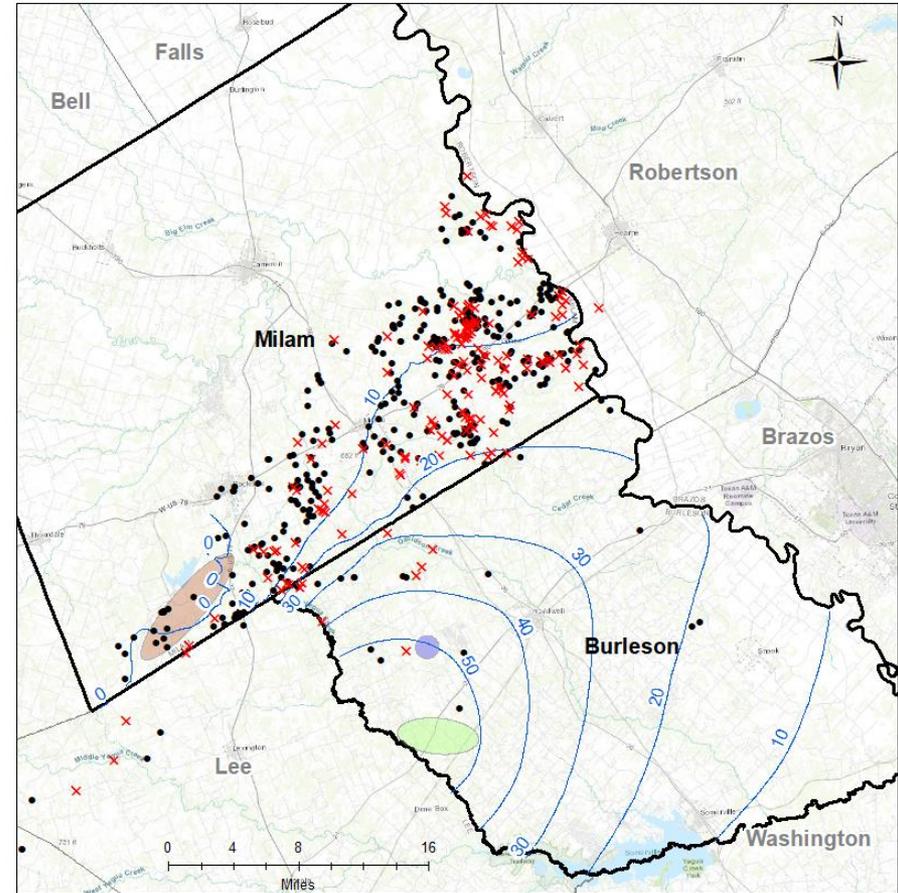


Calvert Bluff Wells at 3 years for S-7a and S-7b



Calvert Bluff

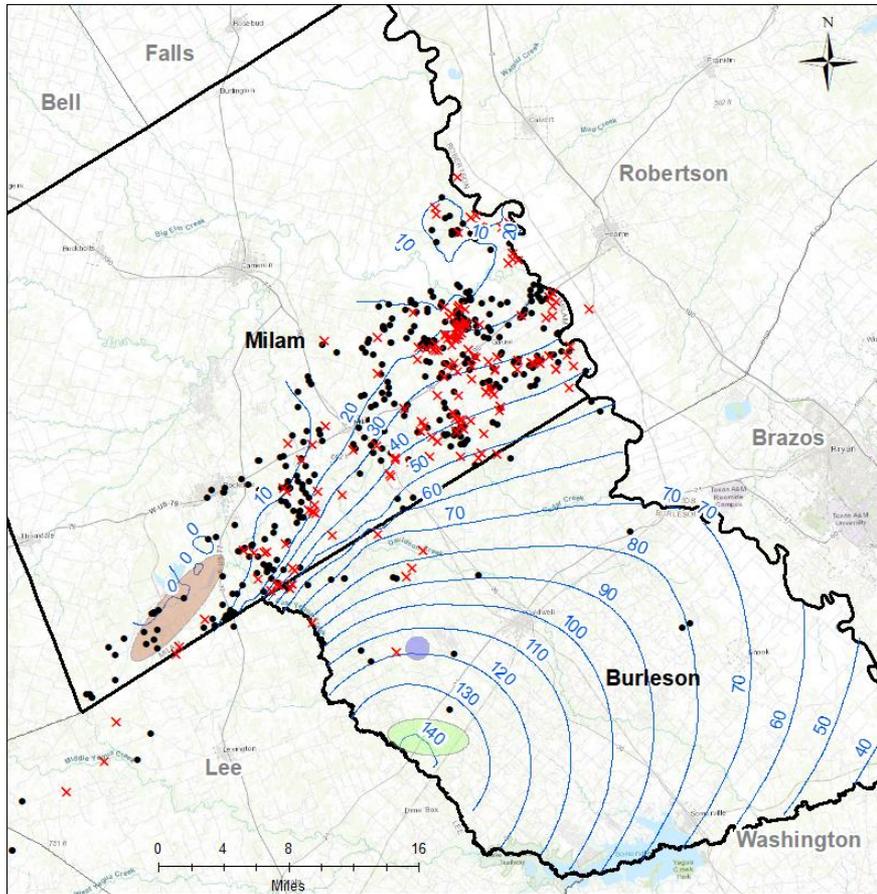
- 130 Well Field
- ALCOA Well Field
- Vista Ridge Well Field
- POSGCD Boundary
- County Line
- x Eligible with Pump Depth (n=164)
- Eligible without Pump Depth (n=376)
- 3 Year Drawdown



Calvert Bluff

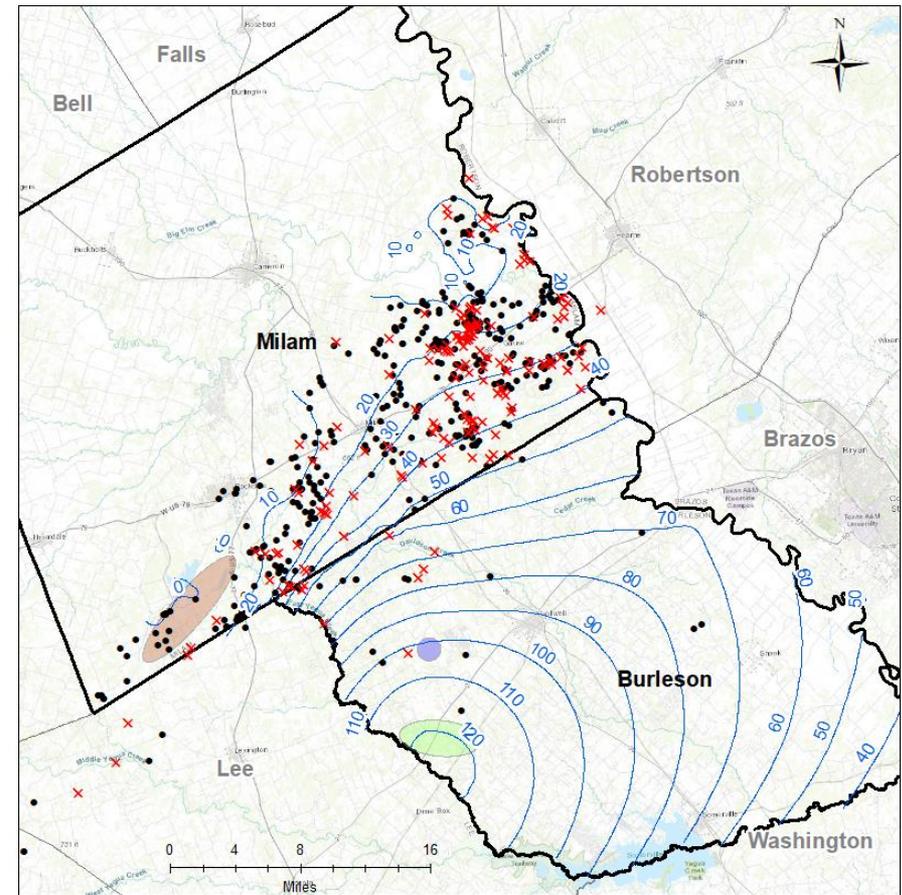
- 130 Well Field
- ALCOA Well Field
- Vista Ridge Well Field
- POSGCD Boundary
- County Line
- x Eligible with Pump Depth (n=164)
- Eligible without Pump Depth (n=376)
- 3 Year Drawdown

Calvert Bluff Wells at 10 years for S-7a and S-7b



Calvert Bluff

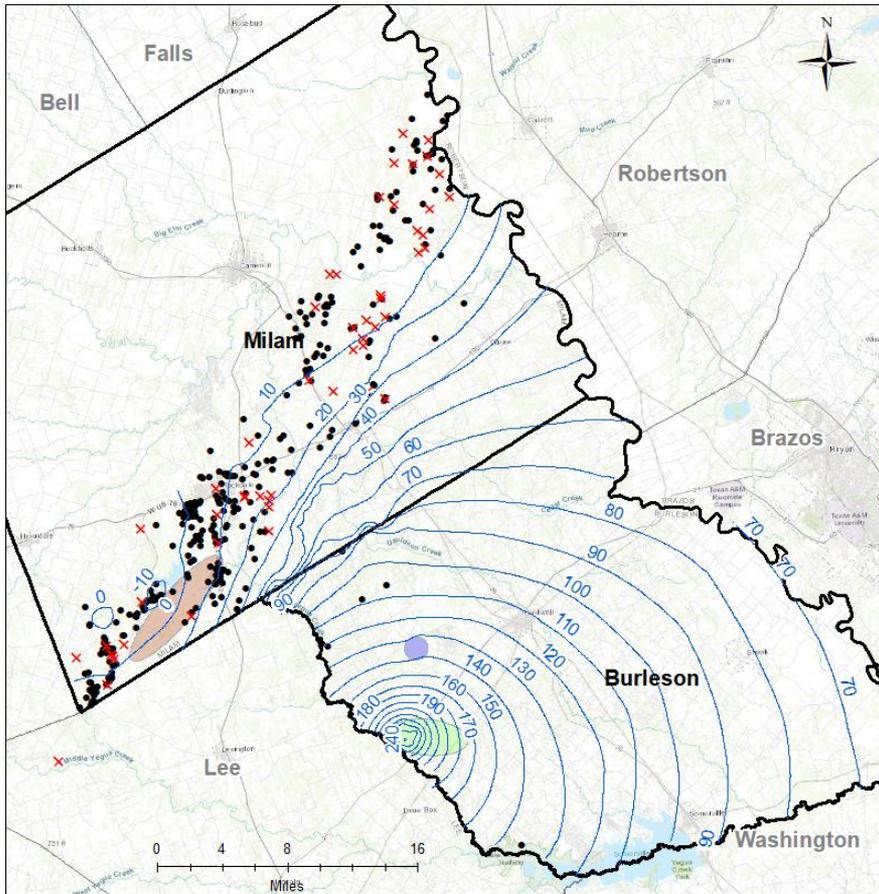
- 130 Well Field
- ALCOA Well Field
- Vista Ridge Well Field
- POSGCD Boundary
- County Line
- x Eligible with Pump Depth (n=164)
- Eligible without Pump Depth (n=376)
- 10 Year Drawdown



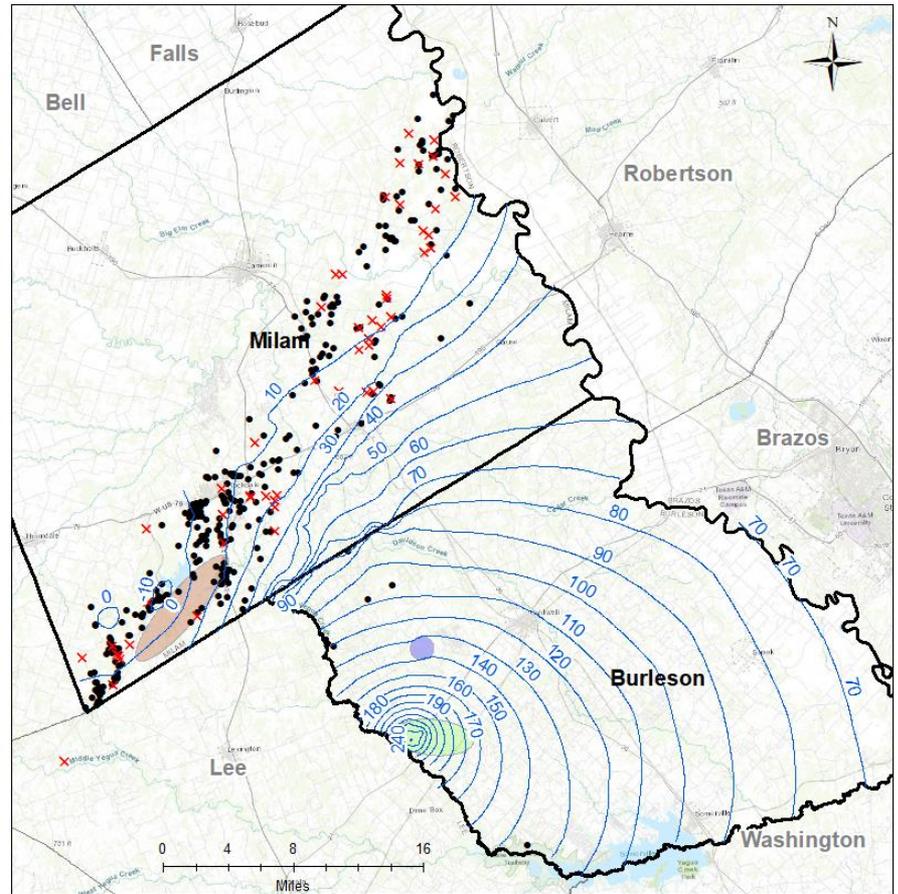
Calvert Bluff

- 130 Well Field
- ALCOA Well Field
- Vista Ridge Well Field
- POSGCD Boundary
- County Line
- x Eligible with Pump Depth (n=164)
- Eligible without Pump Depth (n=376)
- 10 Year Drawdown

Simsboro Wells at 3 years for S-7a and S-7b

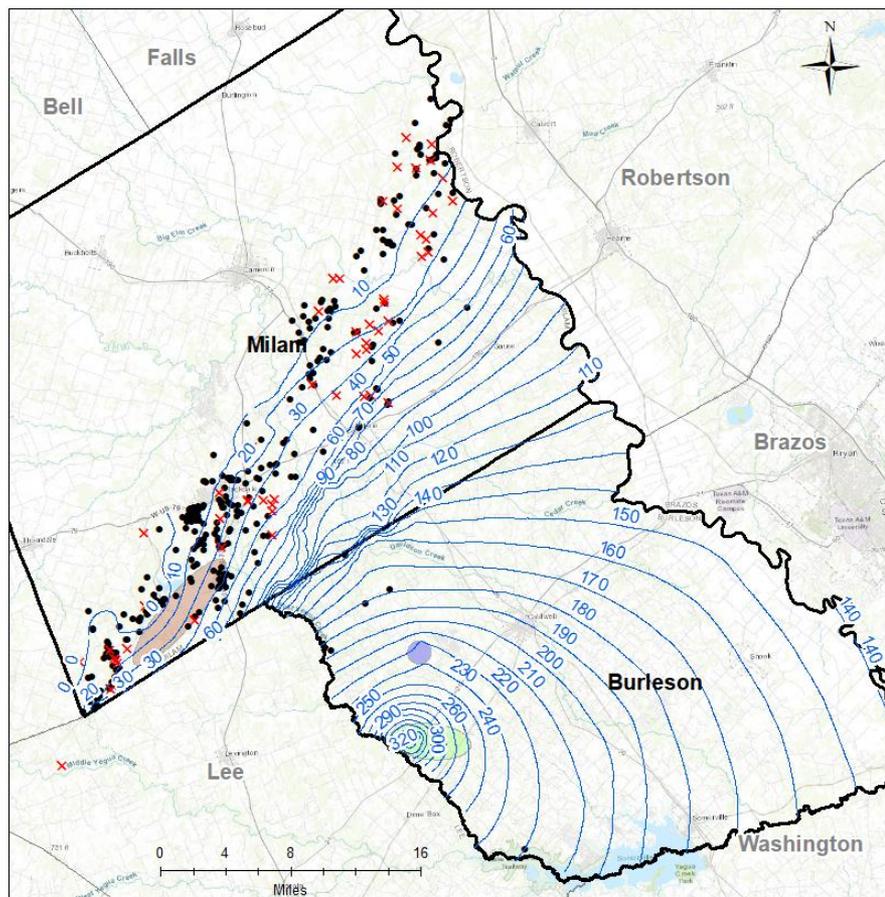


- Simsboro**
- 130 Well Field
 - ALCOA Well Field
 - Vista Ridge Well Field
 - POSGCD Boundary
 - County Line
 - x Eligible with Pump Depth (n=53)
 - Eligible without Pump Depth (n=318)
 - 3 Year Drawdown



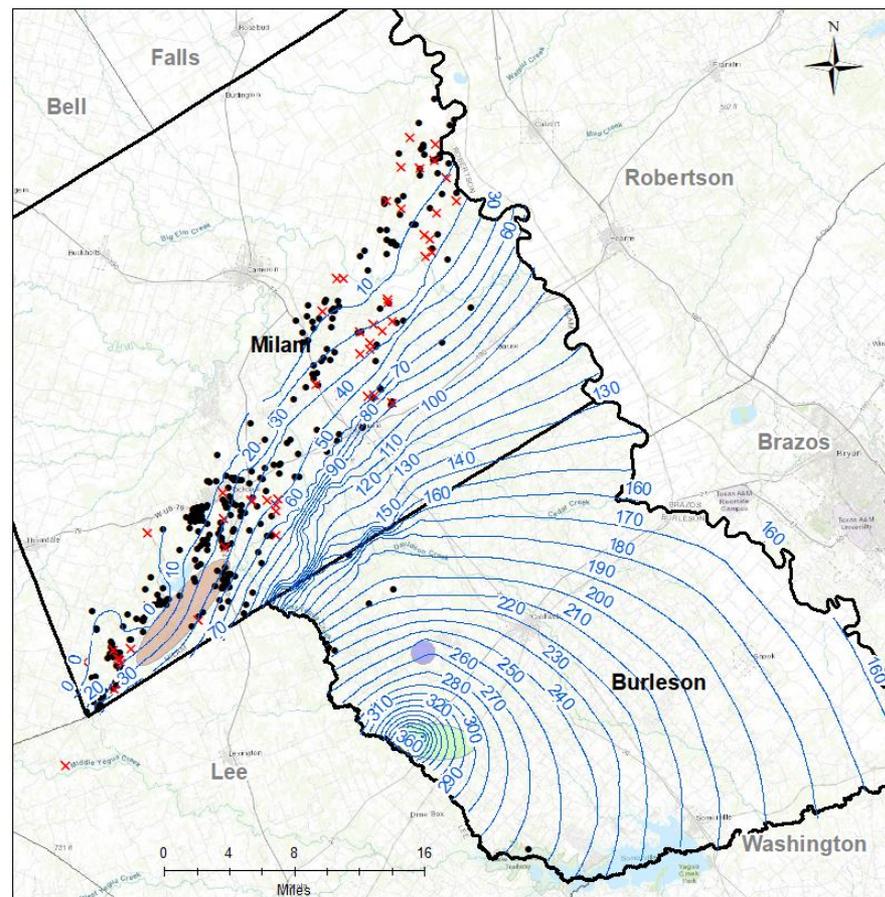
- Simsboro**
- 130 Well Field
 - ALCOA Well Field
 - Vista Ridge Well Field
 - POSGCD Boundary
 - County Line
 - x Eligible with Pump Depth (n=53)
 - Eligible without Pump Depth (n=318)
 - 3 Year Drawdown

Carrizo Wells at 10 years for S-7a and S-7b



Simsboro

- 130 Well Field
- ALCOA Well Field
- Vista Ridge Well Field
- POSGCD Boundary
- County Line
- x Eligible with Pump Depth (n=53)
- Eligible without Pump Depth (n=318)
- 10 Year Drawdown



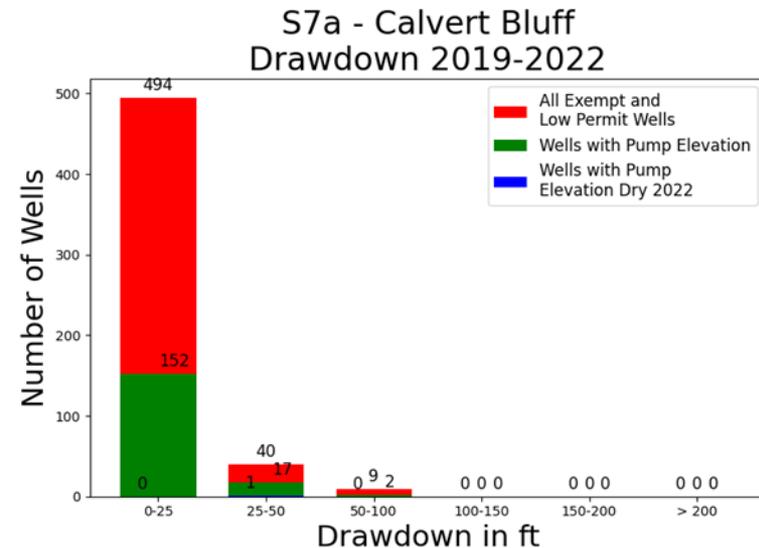
Simsboro

- 130 Well Field
- ALCOA Well Field
- Vista Ridge Well Field
- POSGCD Boundary
- County Line
- x Eligible with Pump Depth (n=53)
- Eligible without Pump Depth (n=318)
- 10 Year Drawdown

Drawdowns at Eligible Wells with and without Pump Elevation at 3 years, 7 years, 10 years, and 20 years

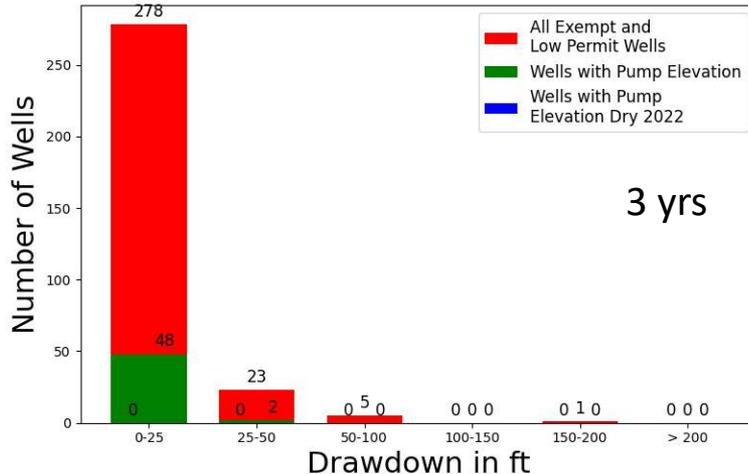
Information to be Plotted

- Four plots: Pumping duration since 2019
 - 3 yrs, 7 years, 10 years, 20 years
- X-Axis: Amount of Drawdown for the pumping period
 - 0 to 25 ft, 25 to 50 ft, 50 to 100 ft, 100 to 200 ft, >200 ft
- Y-Axis: Number of wells
- Well Groups
 - Eligible wells with pump elevation that go dry
 - Eligible wells with pump elevation that do not go dry
 - All eligible wells

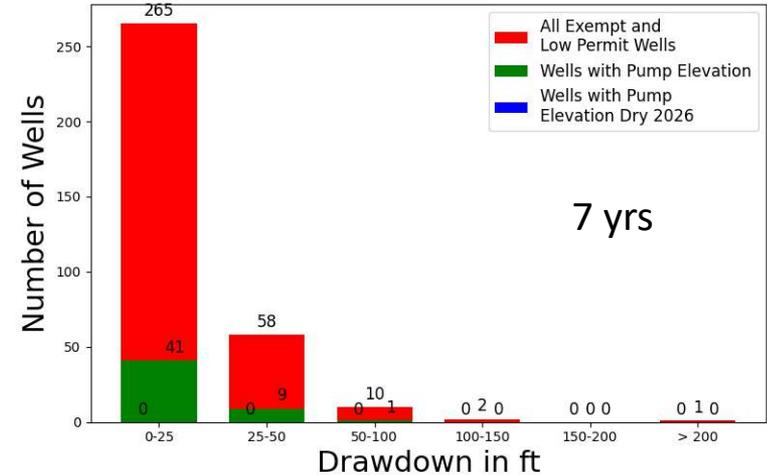


Simsboro: Drawdowns From S-7a

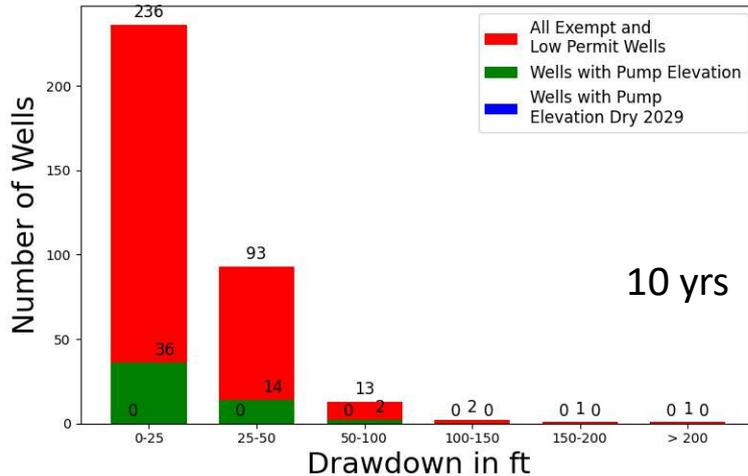
S7a - Simsboro
Drawdown 2019-2022



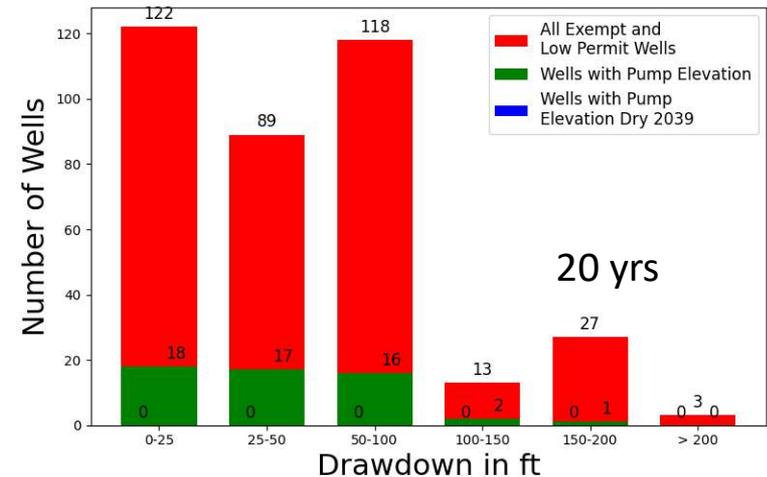
S7a - Simsboro
Drawdown 2019-2026



Drawdown 2019-2029

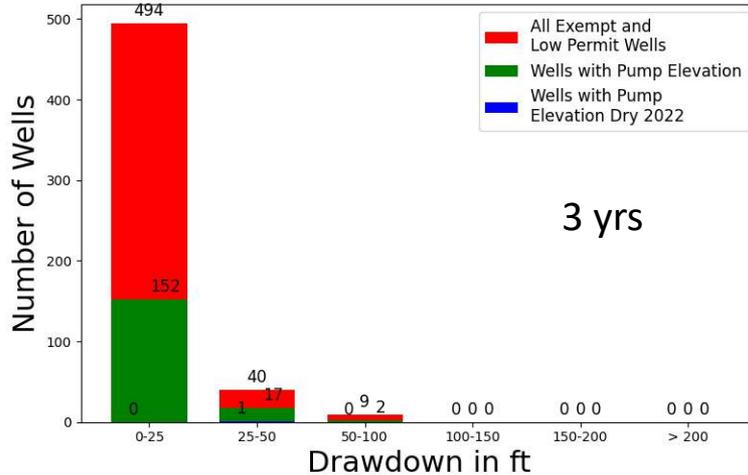


S7a - Simsboro
Drawdown 2019-2039

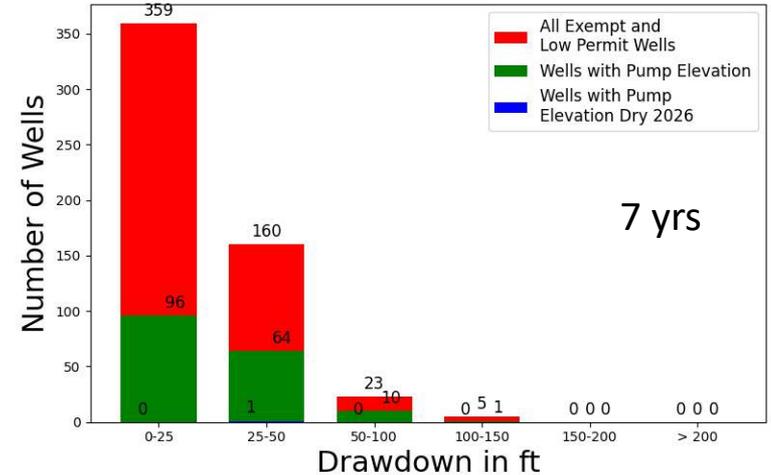


Calvert Bluff : Drawdowns From S-7a

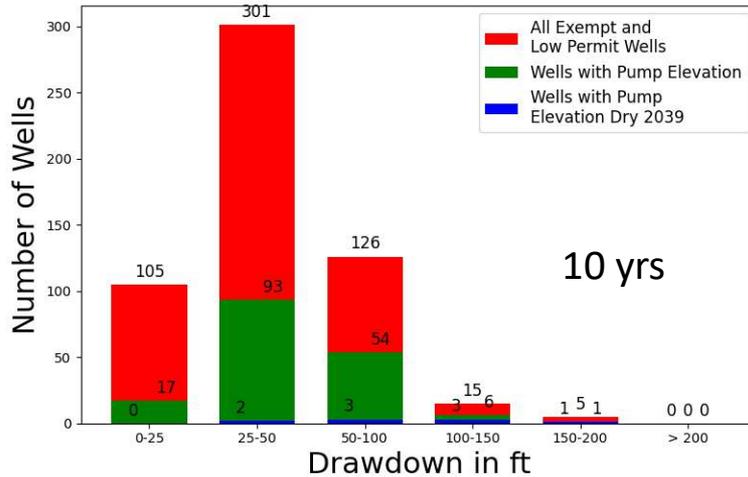
S7a - Calvert Bluff
Drawdown 2019-2022



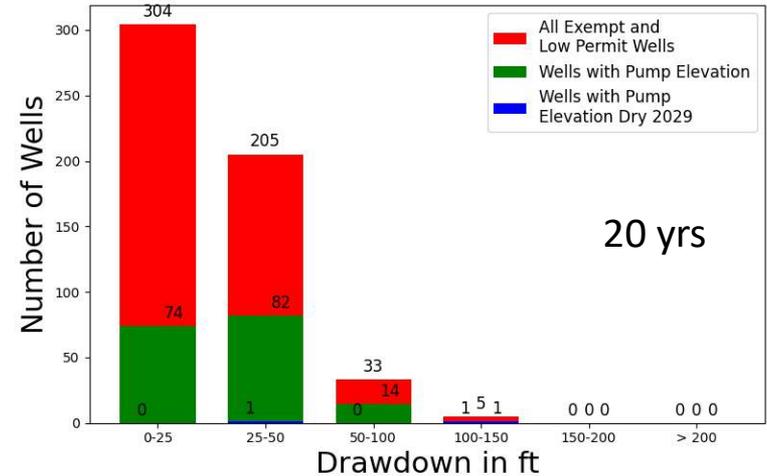
S7a - Calvert Bluff
Drawdown 2019-2026



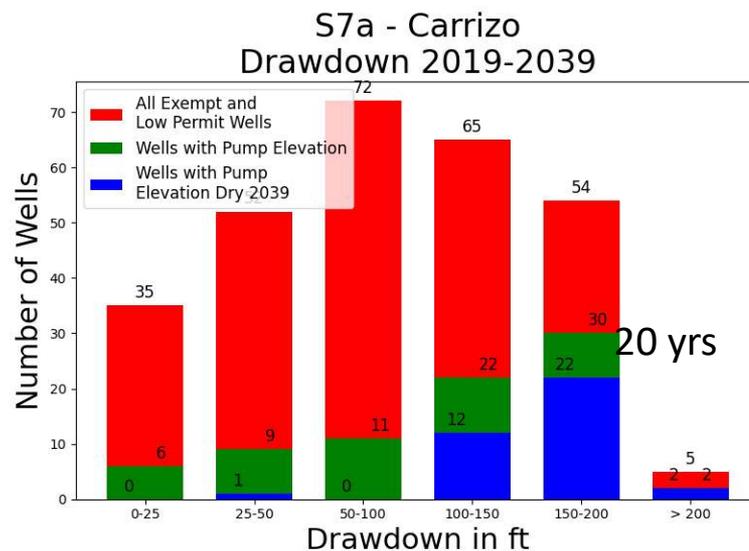
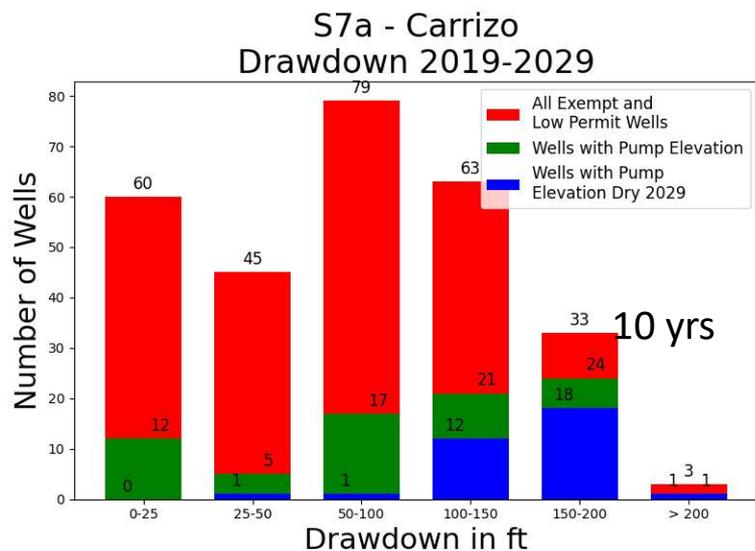
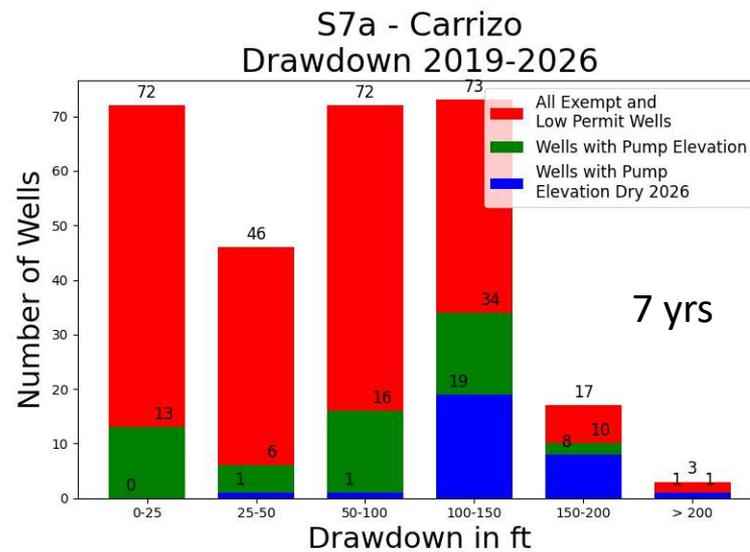
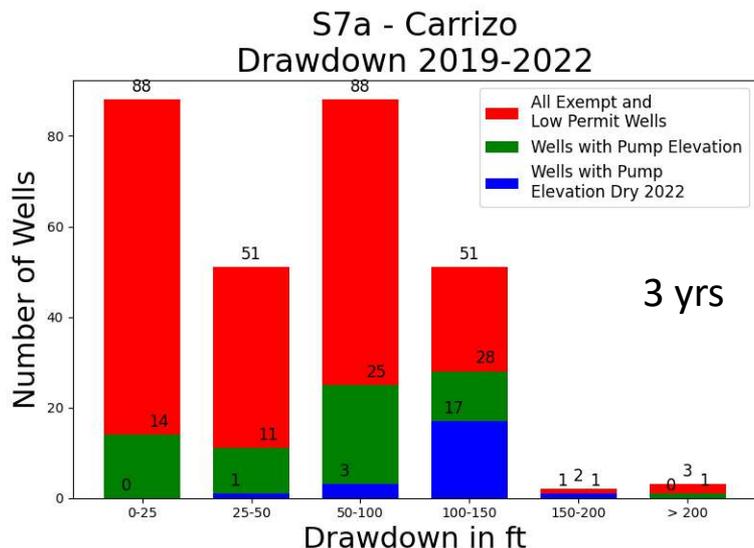
S7a - Calvert Bluff
Drawdown 2019-2039



S7a - Calvert Bluff
Drawdown 2019-2029

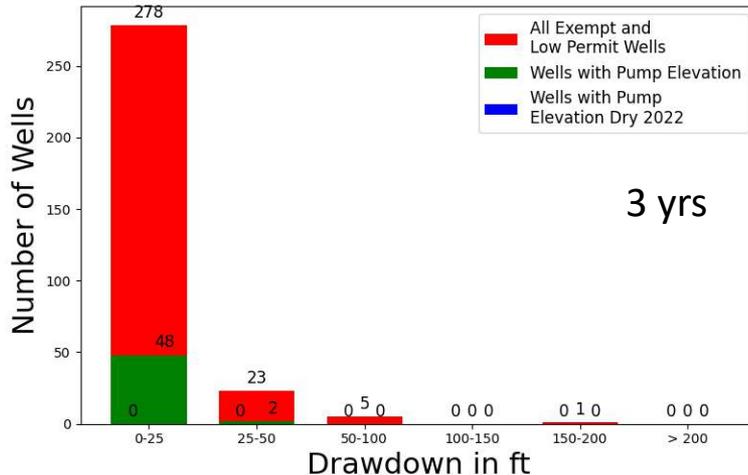


Carrizo: Drawdowns From S-7a

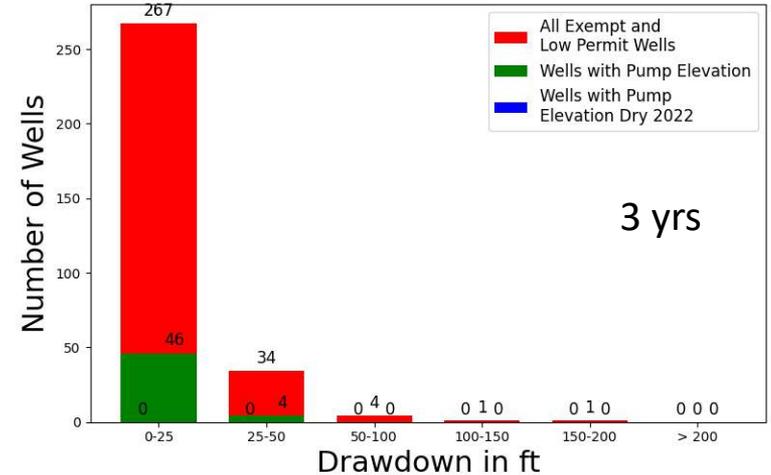


Simsboro: Drawdowns From S-7a and S-7b

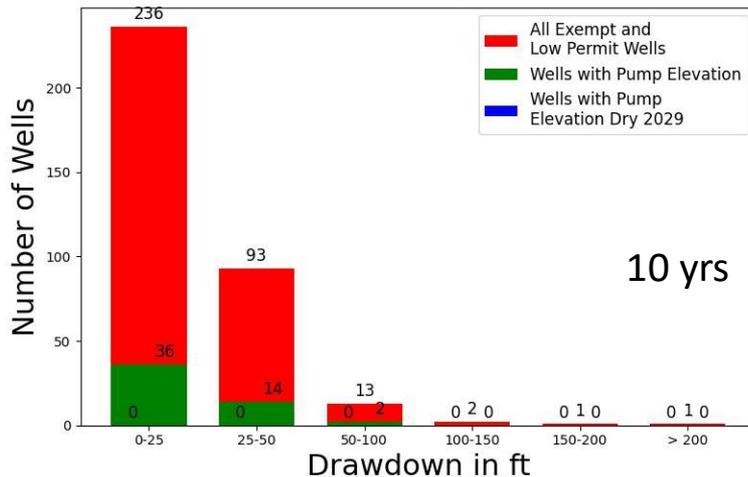
S7a - Simsboro
Drawdown 2019-2022



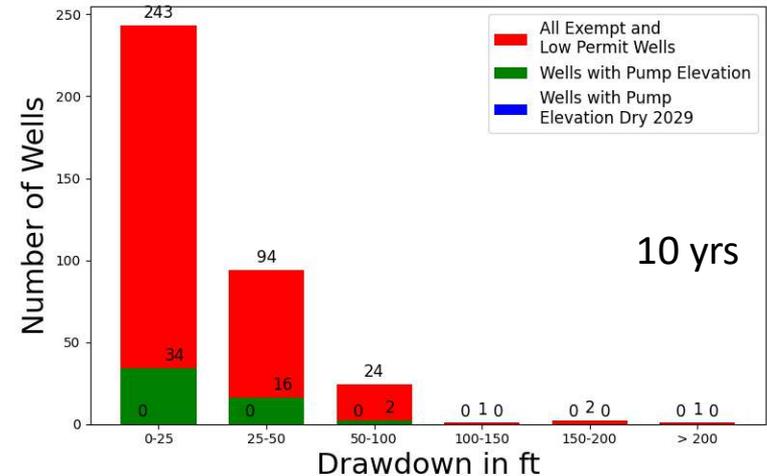
S7b - Simsboro
Drawdown 2019-2022



S7a - Simsboro
Drawdown 2019-2029

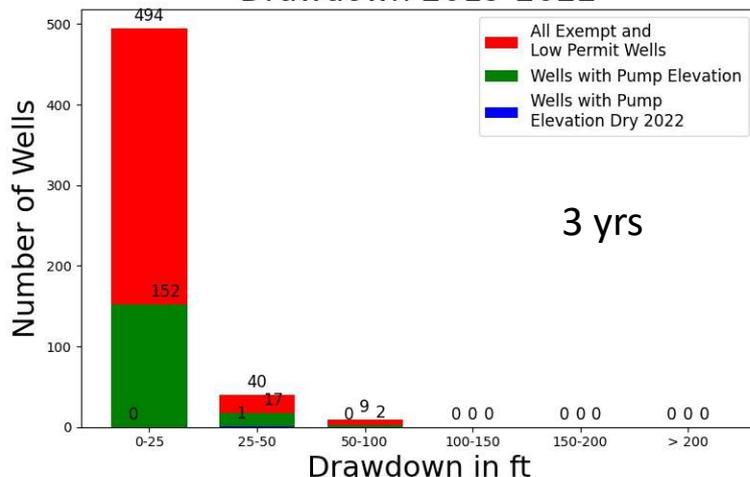


S7b - Simsboro
Drawdown 2019-2029

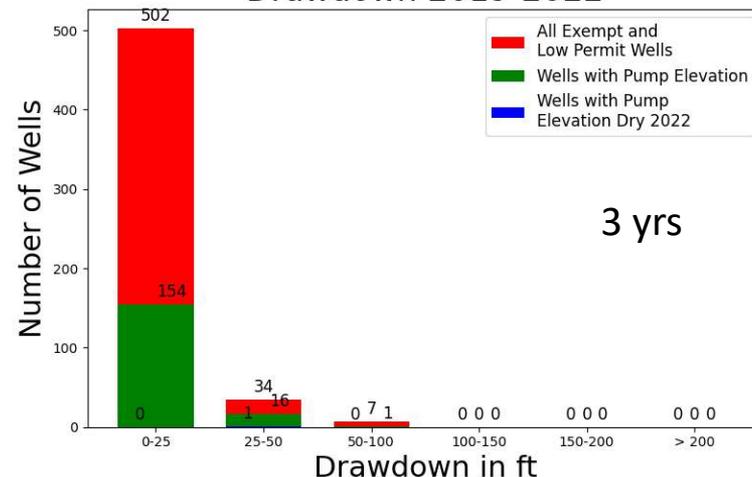


Calvert Bluff : Drawdowns From S-7a and S-7b

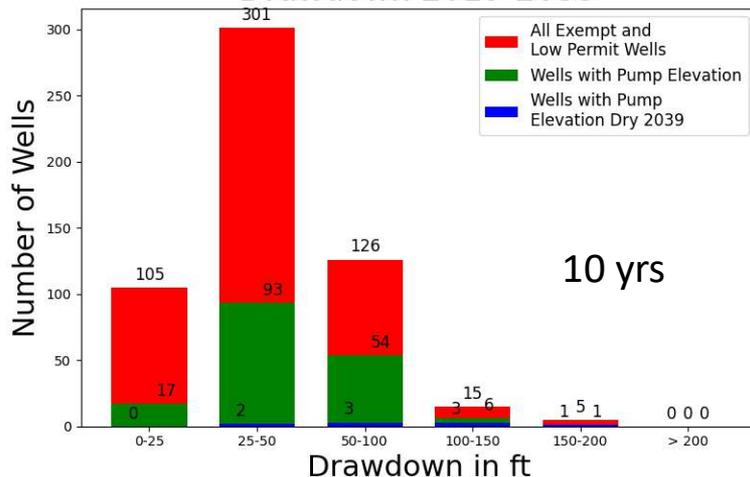
S7a - Calvert Bluff
Drawdown 2019-2022



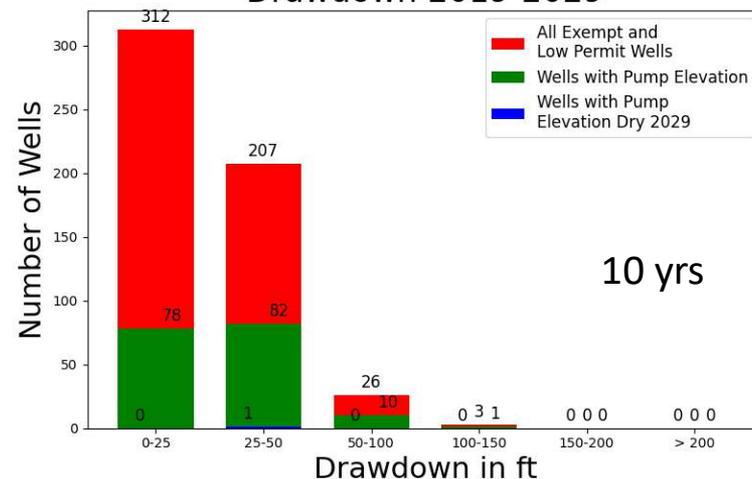
S7b - Calvert Bluff
Drawdown 2019-2022



S7a - Calvert Bluff
Drawdown 2019-2039

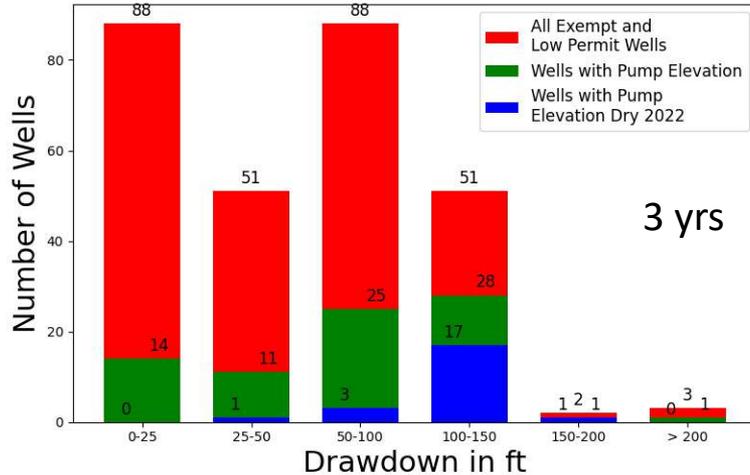


S7b - Calvert Bluff
Drawdown 2019-2029

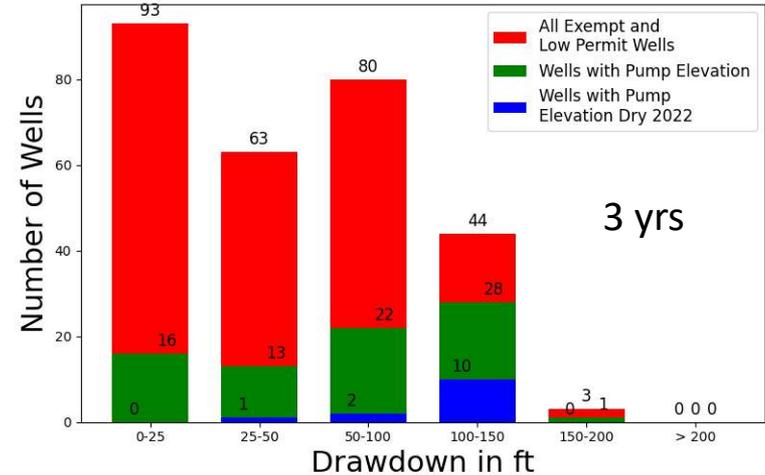


Carrizo: Drawdowns From S-7a and S-7b

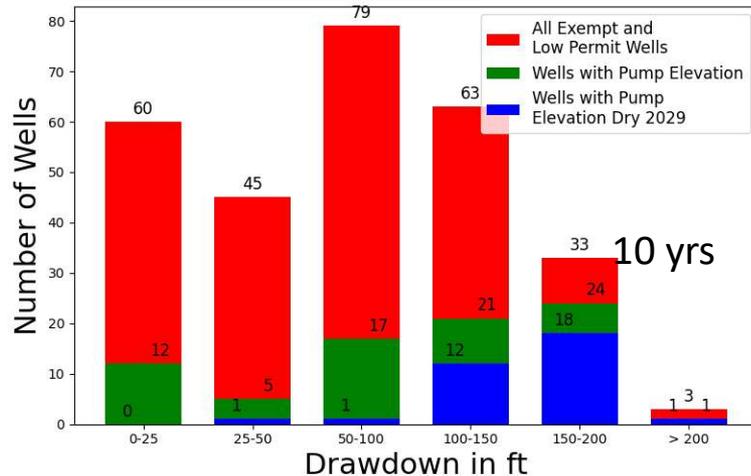
S7a - Carrizo
Drawdown 2019-2022



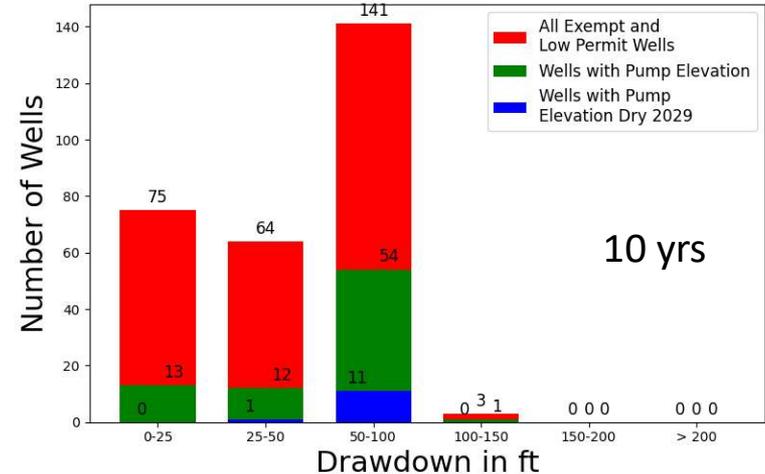
S7b - Carrizo
Drawdown 2019-2022



S7a - Carrizo
Drawdown 2019-2029

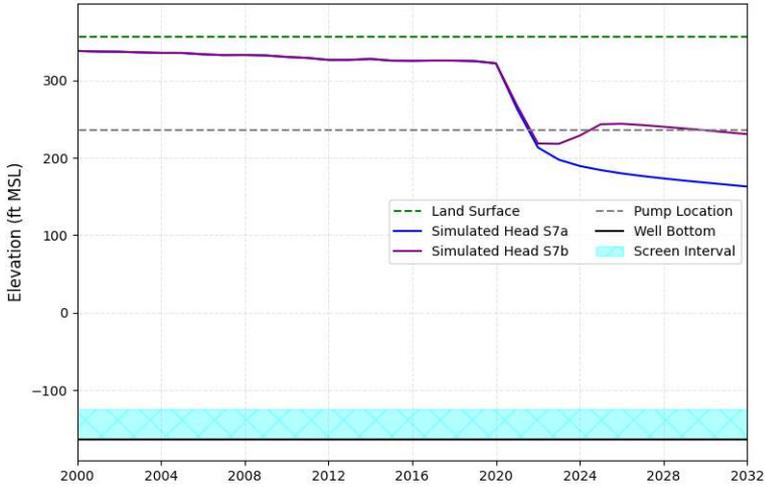


S7b - Carrizo
Drawdown 2019-2029

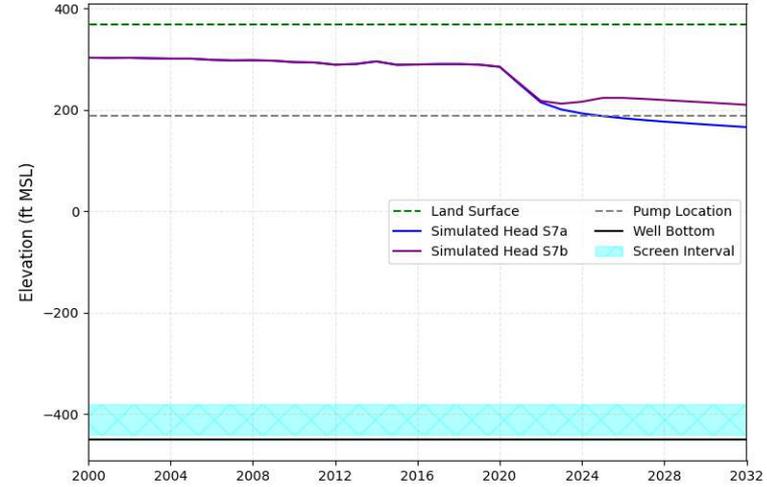


Simulated Hydrographs for S-7a & S-7b

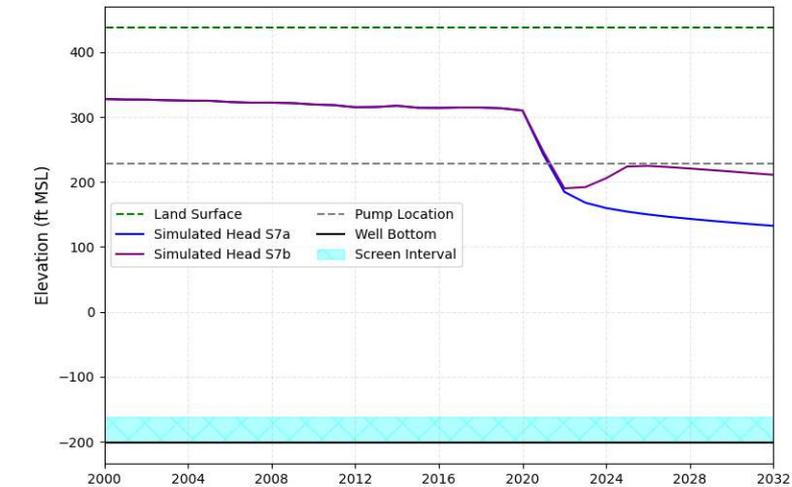
Carrizo, PO-008054
Exempt: Yes, Monitored: No



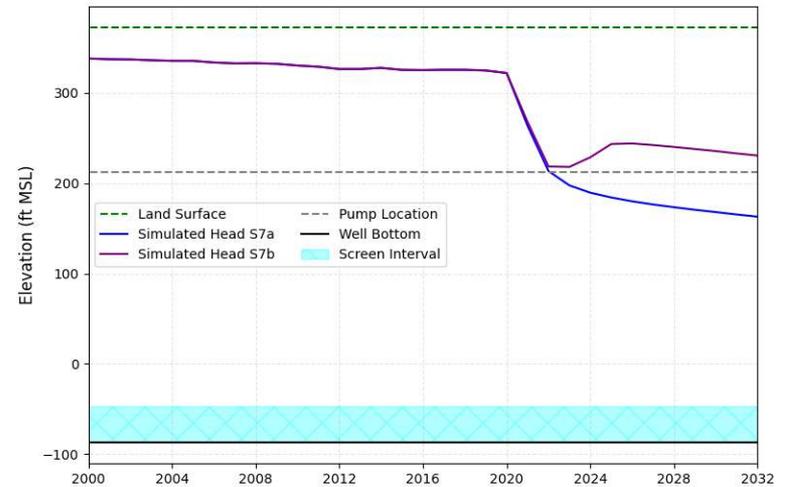
Carrizo, PO-006350
Exempt: Yes, Monitored: No



Carrizo, PO-008322
Exempt: Yes, Monitored: No



Carrizo, PO-008053
Exempt: Yes, Monitored: No



Tally of High-Priority and Moderate-Priority Wells

Modeled Impacts at Eligible Wells with Pump

S-7a

Formation	Pump Dry in 2019	Pump Dry in 2022	Pump Dry in 2029
Sparta	1	1	2
Queen City	4	4	5
Carrizo	5	27	40
Calvert Bluff	2	3	4
Simsboro	9	9	9
Hooper	4	4	4
TOTAL	25	48	64

S-7b

Formation	Pump Dry in 2019	Pump Dry in 2022	Pump Dry in 2029
Sparta	1	1	1
Queen City	4	4	4
Carrizo	5	17	17
Calvert Bluff	2	3	3
Simsboro	9	9	9
Hooper	4	4	4
TOTAL	25	38	38

Note: Numbers are cumulative

Rule 16.4 Actions Based on Monitoring Results

POSGCD Rules: Section 16 Thresholds

Criteria	Threshold Level		
	1	2	3
Total annual production	> 60% of MAG in Management Plan	>70% of MAG in Management Plan	NA
Average drawdown in Section 7 of Management Plan	> 50% of PDLs		> 75% of PDLs
	> 50% of DFCs	> 60% of DFCs	> 75% of DFCs
Average drawdown in Shallow Management Zone	> 50% of PDLs	>60% of PDLs	NA
Projected Average drawdowns calculated with a District	> PDLs in 15 years	NA	NA
	> DFC in 15 years	NA	NA

- 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.

POSGCD Rules: Section 16 Thresholds

Threshold	Description	Aquifer
Level 1	> 60% of MAG in Management Plan	Queen City
Level 1	> 50% of DFCs	Sparta
Level 1	> PDLs in 15 years	Carrizo
Level 1	> PDLs in 15 years	Calvert Bluff
Level 1	> PDLs in 15 years	Simboro
Level 2*	> 70% of MAG in Management Plan	Queen City

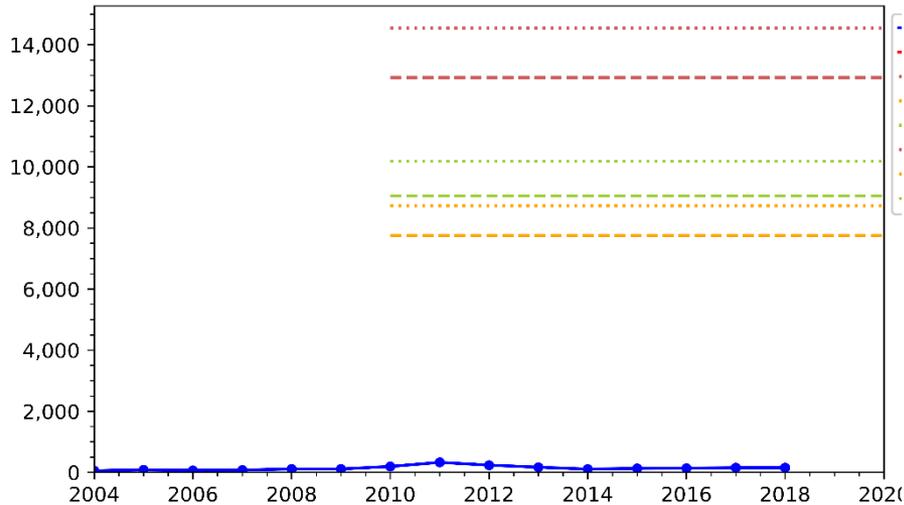
* based on anticipated 2020 pumping

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	<ol style="list-style-type: none"> 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.

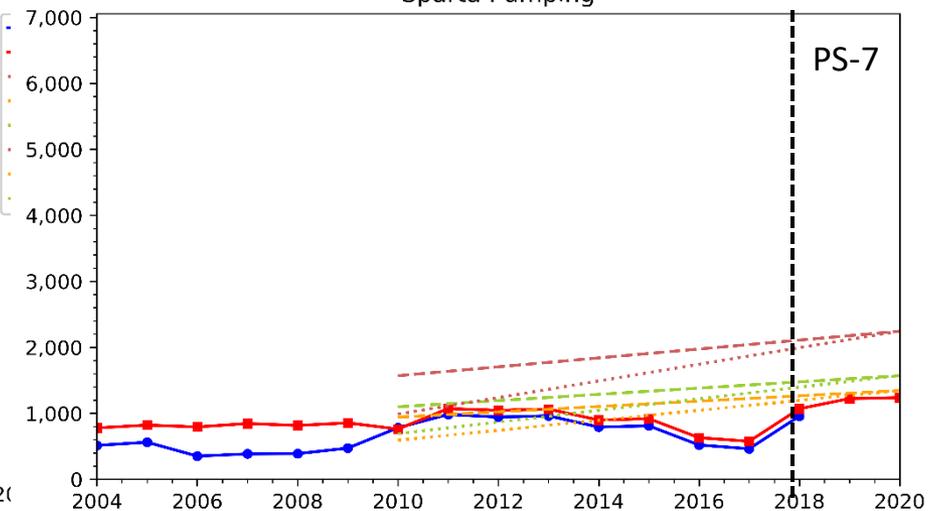
Note: From April 30 DFC committee meeting

Compliance with POSGCD DFCs

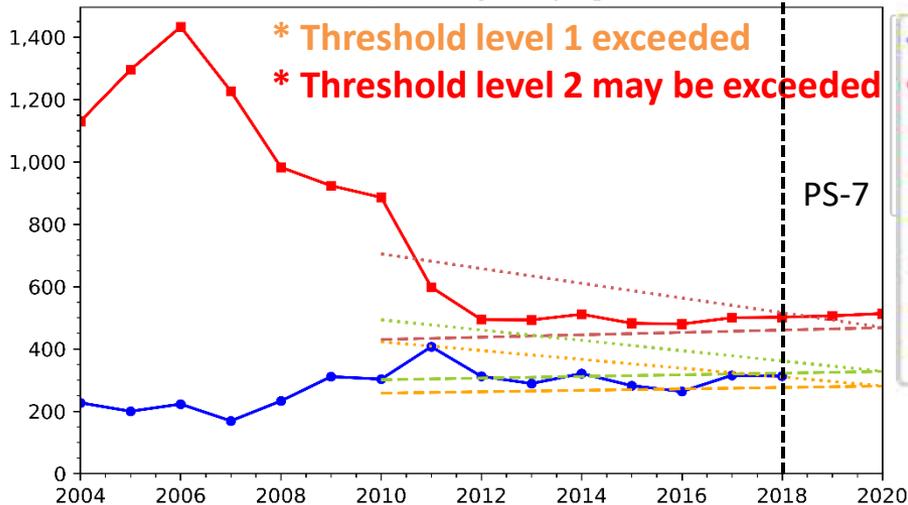
Yegua-Jackson Pumping



Sparta Pumping



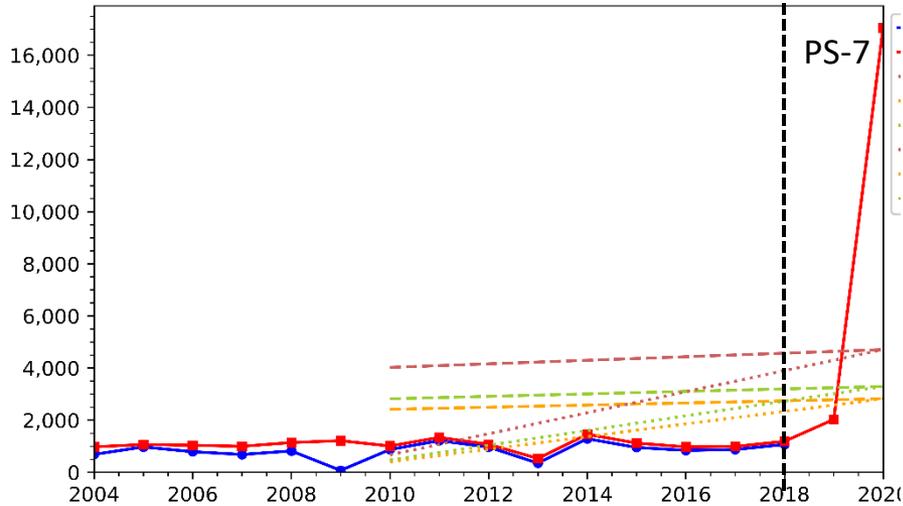
Queen City Pumping



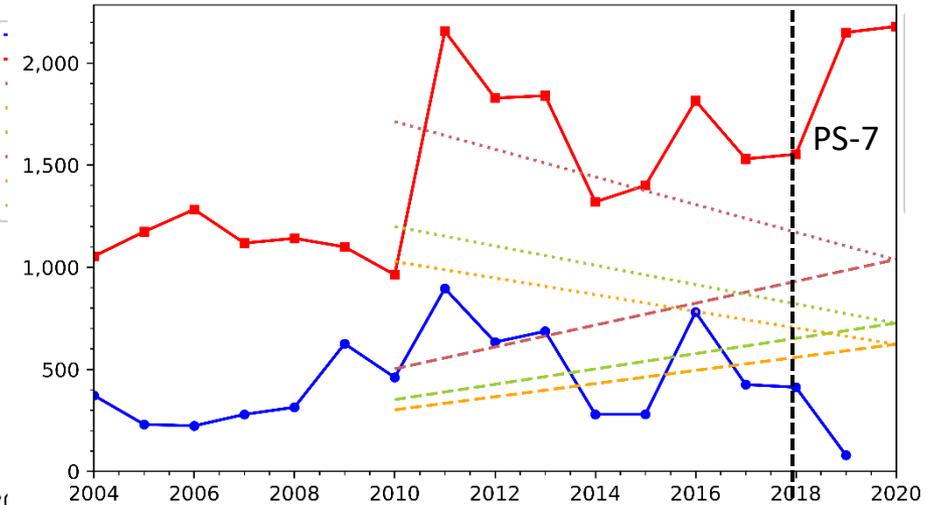
- POSGCD Reported Pumping
- POSGCD Modeled Pumping (S7)
- Management Plan MAG
- Management Plan MAG - Threshold 1 (60%)
- Management Plan MAG - Threshold 2 (70%)
- ⋯ Joint Planning MAG
- ⋯ Joint Planning MAG - Threshold 1 (60%)
- ⋯ Joint Planning MAG - Threshold 2 (70%)

Compliance with POSGCD DFCs

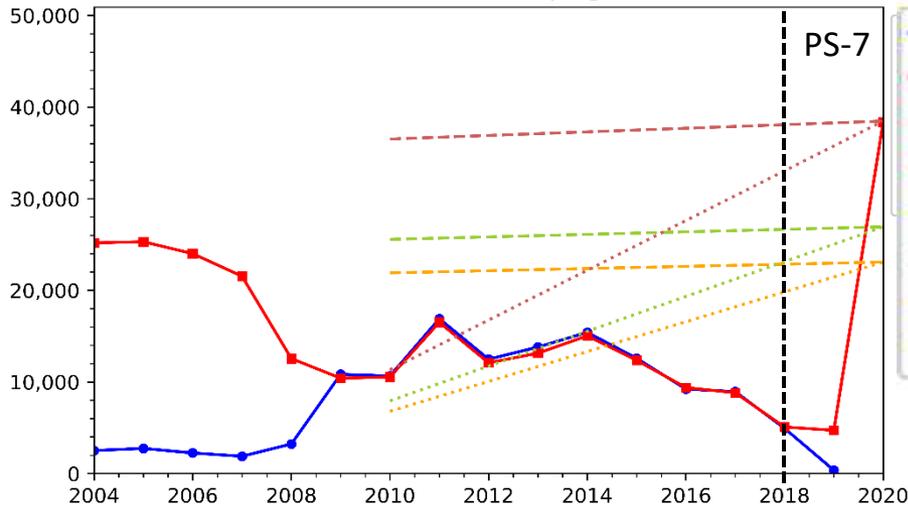
Carrizo Pumping



Calvert Bluff Pumping



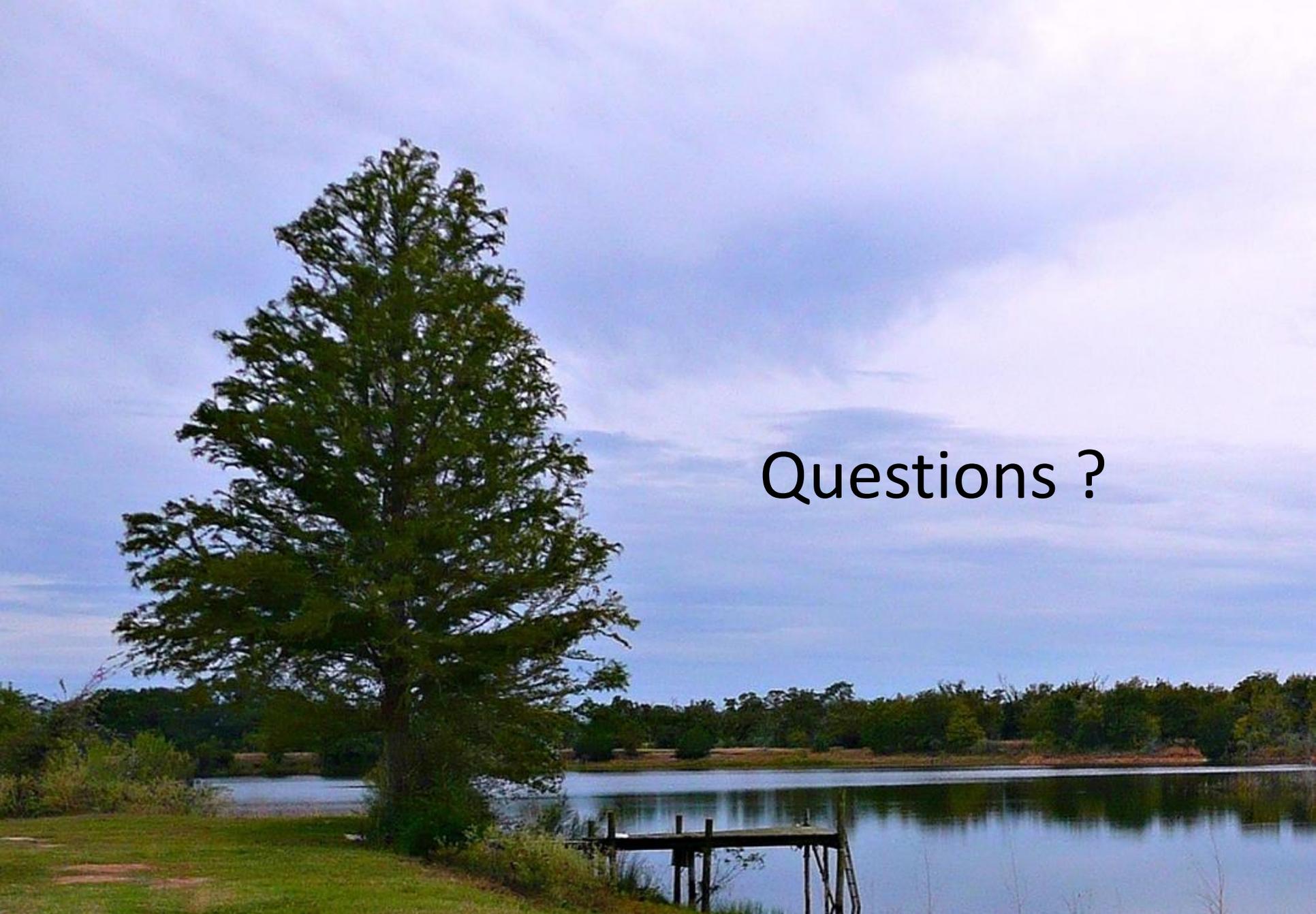
Simsboro Pumping



- POSGCD Reported Pumping
- POSGCD Modeled Pumping (S7)
- - Management Plan MAG
- - Management Plan MAG - Threshold 1 (60%)
- - Management Plan MAG - Threshold 2 (70%)
- ⋯ Joint Planning MAG
- ⋯ Joint Planning MAG - Threshold 1 (60%)
- ⋯ Joint Planning MAG - Threshold 2 (70%)

Update on Vista Ridge Pumping

Aquifer	MAG 2020 (AFY)	MAG 2020 (60%) (AFY)	MAG 2020 (70%) (AFY)	Cumulative 2020 VR Through Sept (AF)
Sparta	2,245	1,347	1,572	
Queen City	468	281	328	
Carrizo	4,706	2,824	3,294	5,378
Calvert Bluff	1,038	623	727	
Simsboro	38,468	23,081	26,928	15,593
Hooper	2,960	1,776	2,072	

A scenic landscape featuring a large, lush green tree on the left side of the frame. In the foreground, a wooden dock extends into a calm body of water. The background shows a line of trees and a sky filled with soft, white clouds. The overall atmosphere is peaceful and natural.

Questions ?