Proposed POSGCD Run PS4-4



Presented to: GMA 12 Meeting
Milano, Texas

November 9, 2026

Presented by:

INTERA

Outline

- Summary of POSGCD Relevant Comments
- Rationale for Generating Additional DFC Simulation
- Development of Production Rates in Proposed PS4-4

INTERA

POSGCD Summary Report of Comments [TWC § 36.108(D-2)(1)-(3)]

- Relevant Comments
  - The proposed DFCs should be based on a single model pumping file.
  - The proposed DFCs were not selected with a confirmed model scenario.
  - The proposed DFCs do not allow enough aquifer drawdown.
  - The proposed DFCs will cause too much aquifer drawdown.
  - The proposed DFCs should account for public utilities' use of the water.
  - The positive socioeconomic impacts of groundwater production must be considered in DFC adoption.

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  - Plans for mitigation only address the "highest practicable" part of the balancing test in Texas Water Code § 36.108(d-2).
  - DFCs that impact the ability to use a permit constitute a regulatory taking of private property.
  - The proposed DFCs do not achieve the balance set forth in Texas Water Code § 36.108(d-2).
  - The proposed DFCs should account for impacts in neighboring groundwater conservation districts.

INTERA

Rationale for POSGVD Proposed Run PS4-4

- Technical Considerations for Developing PS4-4
  - No DFC Run Generates Proposed DFCs
  - Run PS4-8v2.8 Carrizo-Wilcox DFCs are significantly greater than POSGCD's current DFCS
  - OPMAN simulations indicate that GAM significantly underestimates drawdown for Carrizo-Wilcox Aquifer
  - DFC Run PS4-2v8 predicts significant adverse socioeconomic impacts in POSGCD

- POSGCD Board Request for POSGCD DFCs

GCD	Aquifer	Current DFCs (2070)	Board Acceptable (Extension to 2080)	PS4-2v8 DFCs (Jan 2011 to Dec 2079)
POSGCD	Carrizo	146	152	170
	Calvert Bluff	156	164	189
	Simsboro	278	288	369
	Hooper	178	190	236

- LPGCD Consideration
  - Would support POSGCD Run if both Carrizo and Simsboro Production were Reduced and LPGCD Pumping File was not altered

INTERA

Run PS4-2v8 DFCs are significantly greater than POSGCD's current DFCs

INTERA

POSGCD DFCs (Recap)

INTERA First Proposed DFC *

POSGCD Preliminary Desired Future Conditions Statement

The POSGCD Board adopted preliminary DFCs for five aquifers in Table 1 during their Board meeting on February 10, 2009. These preliminary DFCs were recommended by the POSGCD DFC Committee, who had been working on the recommendations since September 2008.

Table 1: Preliminary POSGCDs DFCs for Five Aquifers

Aquifer	Average Drawdown (ft) Across the District from 2000 to 2060
Sparta	30
Queen City	40
Carrizo	120
Calvert Bluff	150
Simsboro	300
Hooper	180

The DFC committee developed the average drawdown in Table 1 using a methodology that URS has presented in several POSGCD meetings including a September 3rd POSGCD Stakeholder Meeting and September 9th POSGCD Board Meeting. This methodology calculates an average drawdown using the following parameters:

Comparison of POSGCD DFCs

GCD	Aquifer	DFC		Difference (ft)
		Proposed (02/10/2009)	Current * (2011-2070)	
POSGCD	Sparta	30	32	2
	Queen City	40	30	-10
	Carrizo*	120	146	26
	Calvert Bluff	150	156	6
	Simsboro	300	278	-22
	Hooper	180	178	-2
* POSGCD was outvoted 4-1 to keep lower POSGCD Carrizo Pumping to lower DFC				

Aquifer	DFC			Difference (c-b) (ft)
	(a)Current * (2011-2070)	(b)Board Acceptable Extension to 2080	(c)PS2-4v8* (2011-2080)	
Carrizo	146	152	170	18
Calvert Bluff	156	164	189	25
Simsboro	278	**288**	**369**	81
Hooper	178	190	236	46

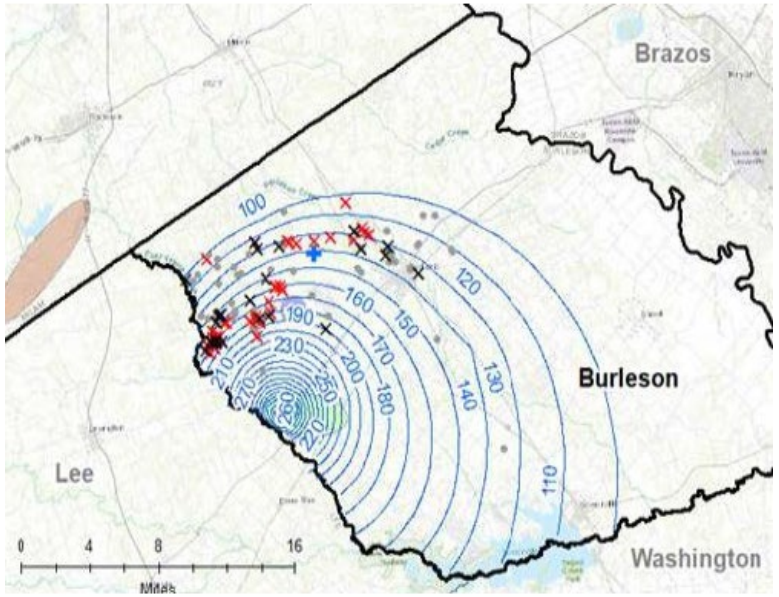
INTERA- first set of proposed DFC presented 11/04/2021

INTERA 04/16/2026 presentation

Third Joint Planning Cycle Vote on POSGCD Request to Reduce Production in the GAM Pumping File

In, 2021, GMA 12 voted 4–1 (with POSGCD opposing) that POSGCD not reduce its pumping rates in Carrizo because its well file contained "known" pumping. Also, the vote continue full permit after its 30-year renewal period ends in 2044.

POSGCD has provided well assistance to more than 100 Carrizo wells to date



POSGCD Carrizo Production (AFY)	Impacted* Wells		
	2029	2039	2049
18,200	71	114	141
12,200	36	69	97

* Impacted define as water level drops to less than 15 feet above pump setting

* Additional wells from 2021 to listed year

INTERA 04/16/2026 & June 14, 2021 presentation

Third Joint Planning Cycle Vote on POSGCD Request to Reduce Production in the GAM Pumping File

- DFC committee selected 120 ft drawdown for the entire Carrizo Aquifer based on scenario outlined in orange

- Information used to guide the decision[1]
  - Permitted & exempt Wells
  - Future wells locations
  - GMA 12 Pumping
  - GAM Predictive Simulations
  - Sustainability (water balance)

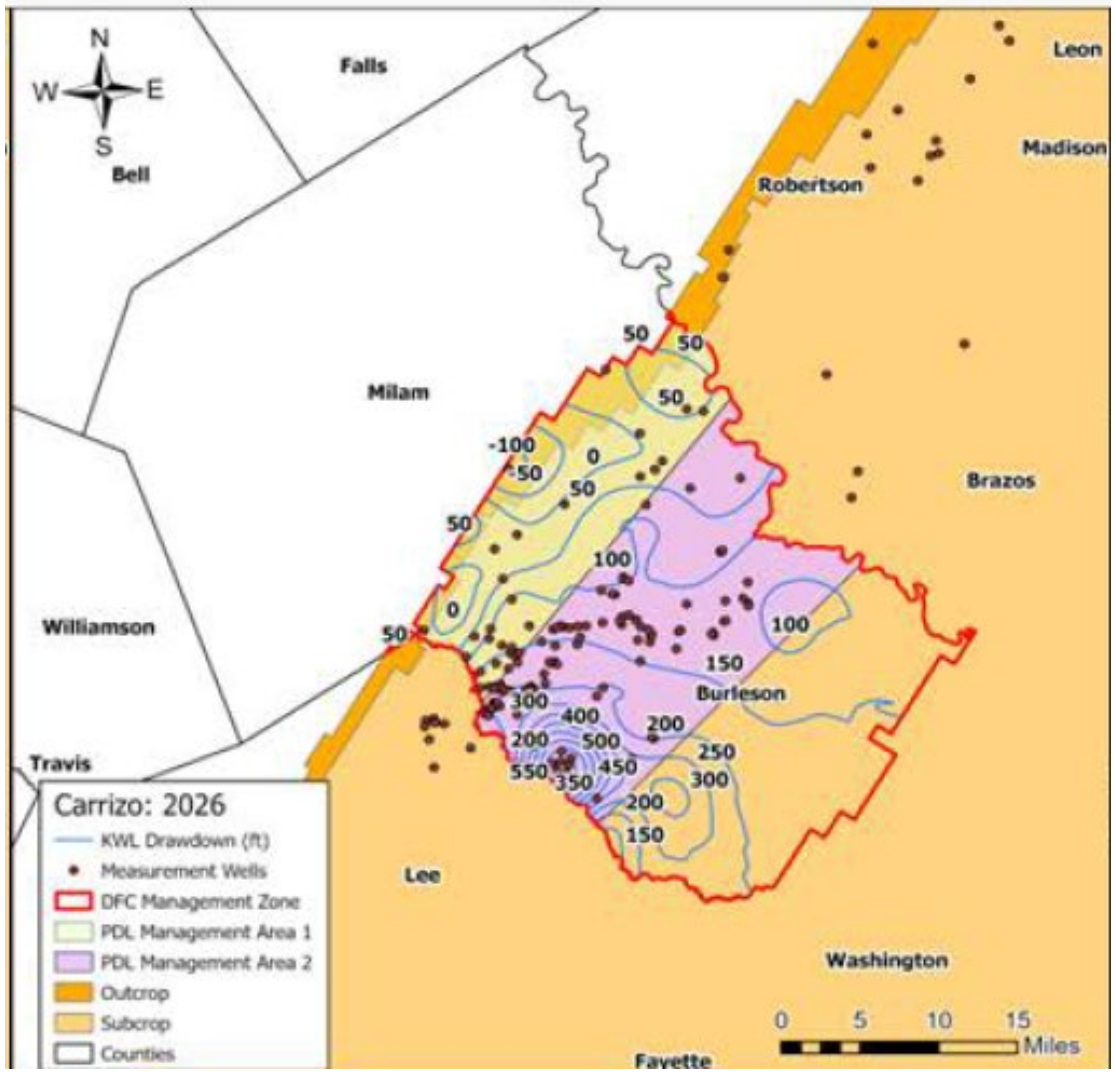
Carrizo Aquifer

Conditions			Desired Future Conditions - Drawdown
			Aquifer
DD in Unconfined Area	% Decline in artesian pressure	Max DD in Confined Area	Carrizo
5	0.25	150	119
10	0.25	150	119
15	0.25	150	119
20	0.25	150	120
15	0.25	100	85
15	0.25	125	103
15	0.25	150	119
15	0.25	175	135
15	0.25	200	149
15	0.33	100	88
15	0.33	125	107
15	0.33	150	125
15	0.33	175	142
15	0.33	200	159

2025 Results of DFC Compliance Evaluations*

Management Zone	2070 DFC (ft)	Avg. Drawdown (ft) / % of DFC	Threshold Level Exceeded
Sparta	32	7.8 (24.2%)	-
Queen City	30	-0.2 (-0.6%)	-
Carrizo	146	111.2 (76.1%)	3
Calvert Bluff	156	59.4 (38.1%)	-
Simsboro	278	121.1 (43.6%)	-
Hooper	178	78.6 (44.2%)	-
Yegua-Jackson	61	2.6 (4.3%)	-

Management Area		2070 PDL (ft)	Avg. Drawdown (ft) / % of DFC	Threshold Level Exceeded
Sparta	Area 1	28	5.5 (19.6%)	-
Queen City	Area 1	19	-3.4 (-18.1%)	-
Carrizo	Area 1	75	30.4 (40.5%)	-
	Area 2	175	138.9 (79.4%)	3
Calvert Bluff (Upper Wilcox)	Area 1	88	39.2 (44.5%)	-
	Area 2	223	81.2 (36.4%)	-
Simsboro (Middle Wilcox)	Area 1	91	8.9 (9.8%)	-
	Area 2	335	152.0 (45.4%)	-
Hooper (Lower Wilcox)	Area 1	54	4.0 (7.5%)	-



Level 1= 50%; Level 2=60%; Level 3=75%

* 2026 POSGCD Compliance Report

Comparison of Current MAGs and Permitted Amounts

Current Modeled Available Groundwater (MAG)*

GCD	Carrizo	Calvert Bluff	Simsboro	Hooper	Total
LPGCD	12,973	5,560	81,815	3,275	103,623
POSGCD	18,194	4,758	79,379	3,124	105,455
METGCD	10,522	4,218	6,865	5,248	26,853
BVGCD	5,495	1,724	147,145	2,137	156,501
FCGCD	5,151	na	na	na	5,151
TOTAL	52,335	16,260	315,204	13,784	397,583

Permitted Amount

GCD	Carrizo	Calvert Bluff	Simsboro	Hooper	Total
LPGCD	24,126	5,437	129,379	2,864	161,806
POSGCD	18,444	7,114	115,532	2,177	143,266
METGCD	1,536	5,071	1,886	2,312	10,805
BVGCD	10,537	1,619	335,540	1,921	349,616
FCGCD	3,362	na	na	na	3,362
TOTAL	58,005	19,240	582,337	9,273	665,493

Est. Modeled Available Groundwater (MAG) for PS4-2v8

GCD	Carrizo	Calvert Bluff	Simsboro	Hooper	Total
LPGCD	12,358	3,780	53,194	2,255	71,587
POSGCD	15,169	2,337	95,166	1,763	114,435
METGCD	10,522	4,218	6,865	5,248	26,853
BVGCD	5,495	1,724	190,150	2,137	199,506
FCGCD	5,151	na	na	na	5,151
TOTAL	48,695	12,059	345,375	11,403	417,532

Simsboro (Permitted – Current MAG)= 267,133 afy

- BVGCD (70%)
- LPGCD (18%)
- LPGCD (12%)

*INTERA presented 03/17/2026

Summary

- Permitted Production in Carrizo-Wilcox Aquifer
  - BVGCD has highest at 349,616 afy
  - LPGCD has second highest at 161,806 afy
  - POSGCD has third highest at 143,266 afy
- POSGCD has tried to set DFCs based on aquifer conditions and not permits
  - Management approach is that permits should adapt to DFCs
  - Management approach is not DFCs should continually change based on permits
- POSGCD Current DFCs in 2026
  - Close to DFCs set in 2009 with the exception of Carrizo, In 2021, GMA 12 out voted POSGCD to prevent a reduction in Carrizo production
  - POSGCD decreased Carrizo pumping from PS3-12 in PS4-2v8 but DFC nevertheless increased from 146 ft to 170 ft
  - A DFC of 170 ft will reduce Carrizo Threshold Level to Level 2, which delays possible curtailment for several years
- POSGCD Simsboro DFCs for PS4-2v8
  - 91 ft (32%) increase from current DFC
  - 81 ft (28%) increase from acceptable limits set by POSGCD Board
  - Major concerns because BVGCD has 335,540 afy of permits and only 190,150 afy accounted for

POSGCD's OPMAN indicates GAM significantly underestimates drawdown for Carrizo-Wilcox Aquifer

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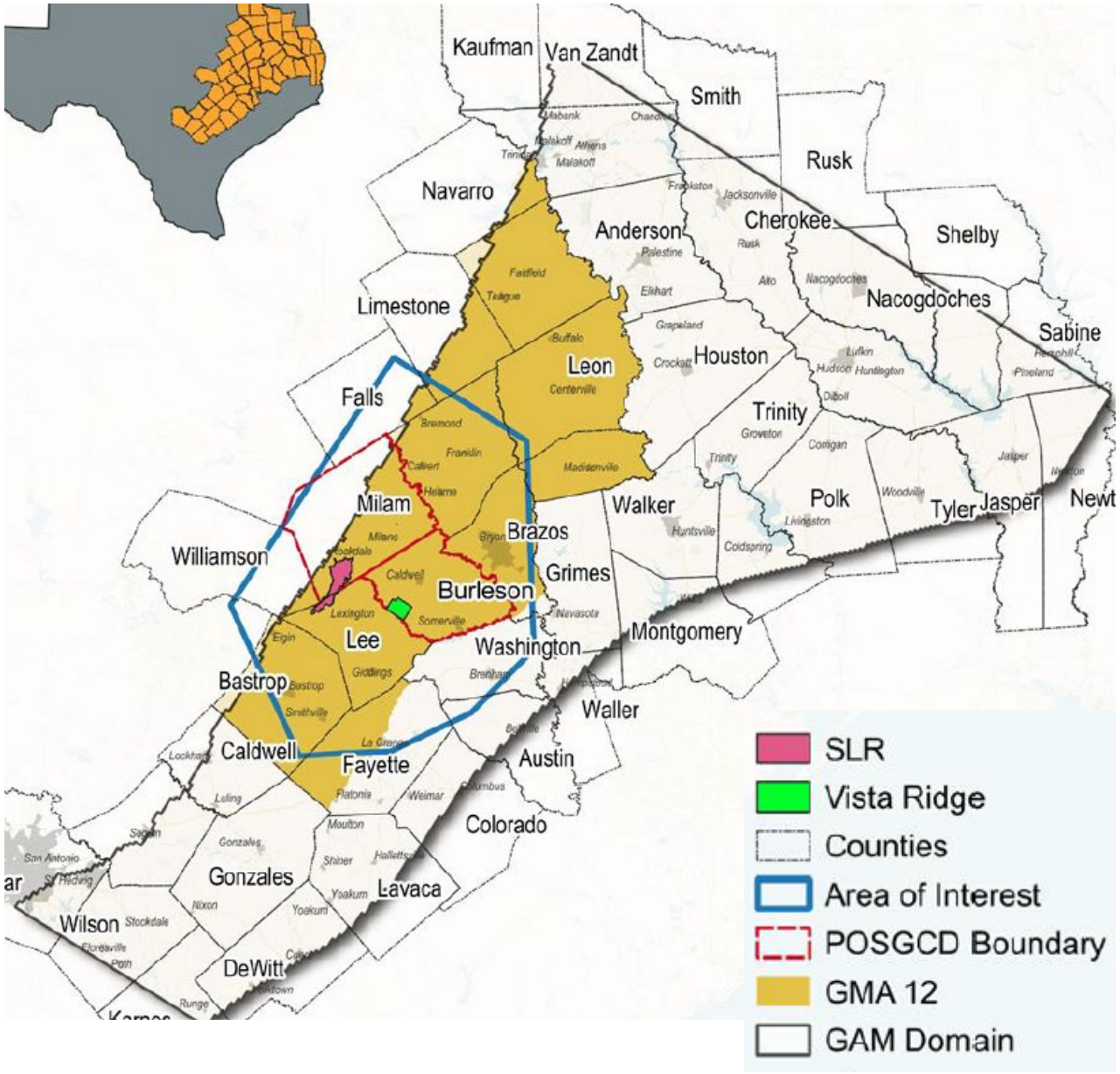
Development of OPMAN: Reclamation Grant

- Objective
  - Enhance GAM to develop an **OP**erations and **MAN**agement Model (**OPMAN**)
  - Apply OPMAN to help guide management decisions
  - Curtailment of permits to achieve management goals
  - Apply OPMAN to investigate long-term sustainability
- OPMAN (Blue Polygon)
  - Update geology
  - Extend historical calibration (1930 to 2021)
  - Simulate >50 aquifer pumping tests
  - Simulate three years of Vista Ridge Pumping
  - Incorporate predictive uncertainty



Calibration of OPMAN vs. 2020 GAM*

Average Difference Between Measured and Modeled Water Levels

Aquifer	Well Count	RMSE (ft) for Hydraulic Heads from 1930 to 2022		
		OPMAN	2020 GAM w/ S-19_3g	2020 GAM w/ OPMAN Pumpage
Carrizo	190 (711)	16	29	35
Calvert Bluff	107 (770)	16	33	34
Simsboro	211 (1834)	17	28	32
Hooper	81 (660)	14	21	20
Carrizo-Wilcox	589 (3975)	16	28	32

Average Difference Between Measured and Modeled Transmissivity Values from Aquifer Pumping Tests

Aquifer	Number of Tests	Average Percent Difference Between Simulated and Observed Transmissivity	
		OPMAN	2020 GAM
Carrizo	11	5%	41%
Calvert Bluff	8	8%	125%
Simsboro	42	3%	42%
Hooper	10	17%	321%

OPMAN significantly better than GAM in matching measured historical water levels since 1930, transmissivities from aquifer pumping tests, and drawdown in observations wells in vicinity of Vista Ridge

*INTERA Reclamation Report on OPMAN

Comparison of DFCs Predicted by GAM and OPMAN

Scenario	Model	Year	DFC (drawdown(ft)from Dec 2010)					
			Sparta	Queen City	Carrizo	Calvert Bluff	Simsboro	Hooper
PS4-2	GAM	2070	45	28	161	178	351	217
		2080	47	30	**169**	190	**367**	235
		2125	50	34	191	222	411	278
	OPMAN	2070	45	29	197	201	451	354
		2080	48	32	**207**	218	**479**	381
		2125	52	37	234	264	550	443

Simsboro 2080

- OPMAN is 112 ft (30%) greater

Carrizo 2080

-OPMAN is 38 ft (23%) greater

*INTERA presented 10/10/2025

Summary

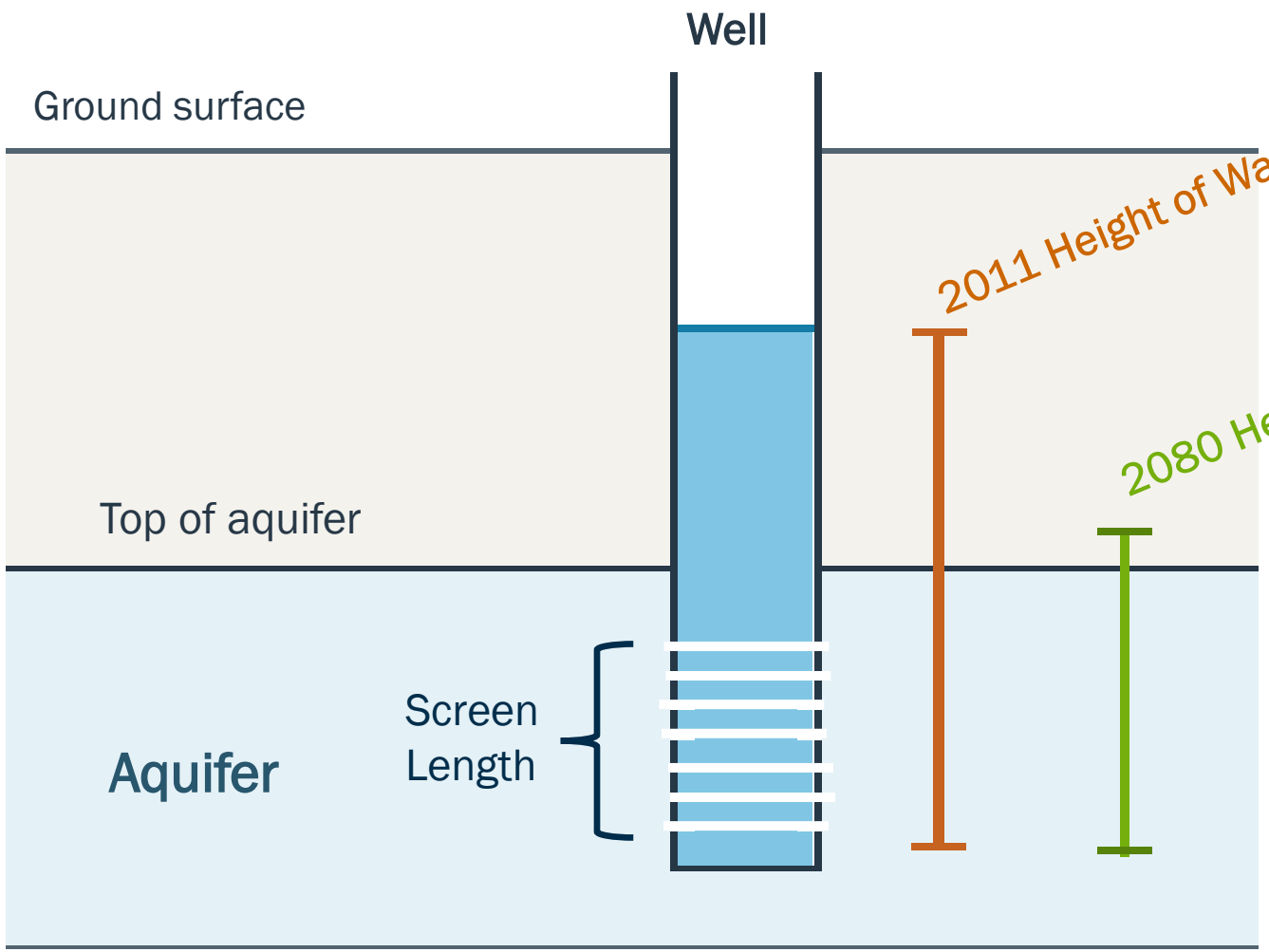
- OPMAN is a Better Calibrated Model than the 2020 GAM
  - Water Levels
  - Transmissivity Values

- OPMAN Predictions for DFC Runs
  - About 30% greater for POSGCD drawdown in Simsboro
  - About 23% greater for POSGCD drawdowns in Carrizo,

DFC Run PS4-2v8 predicts significant adverse socioeconomic impacts in POSGD

INTERA

Schematic of a Water Column in a Well in 2011 and 2080



Scenario 1.
Δh = (100-60) = 40 ft
% decrease = (40/100)=40%

Scenario 2
If water level is below screen, the we well is considered DRY

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2011-2080 POSGCD Simsboro –PS4-2-v8

GAM

2011 Water Column (ft)	Total Wells	Outcrop	0-10%	10-20%	20-30%	30-40%	40-50%	50-60%	60-70%	70-80%	80-90%	90-100%	100%+
0-20	21	14											21
20-40	28	17									3	1	24
40-60	50	29		1		1	2	6	3	3	3		31
60-80	50	26				2	5	6	6	1		2	28
80-100	36	21			4	4	6	1	2	1	2	2	14
100-150	70	6		1	2	8	3	6	8	2	4	4	32
150-200	51	1	4	3	2	6	4	2	3	1	4	11	11
200-250	36	1	2	3	6	6	4	5	1	6	2	0	1
250-500	197	1	1	13	52	27	21	32	19	10	12	4	6
500+	106			10	43	29	6	16	2				
TOTAL	645	116	7	31	109	83	51	74	44	24	30	24	168

Impact on 645 Simsboro Wells

Dry – 168 (26%)
>50% - 364 (56%)

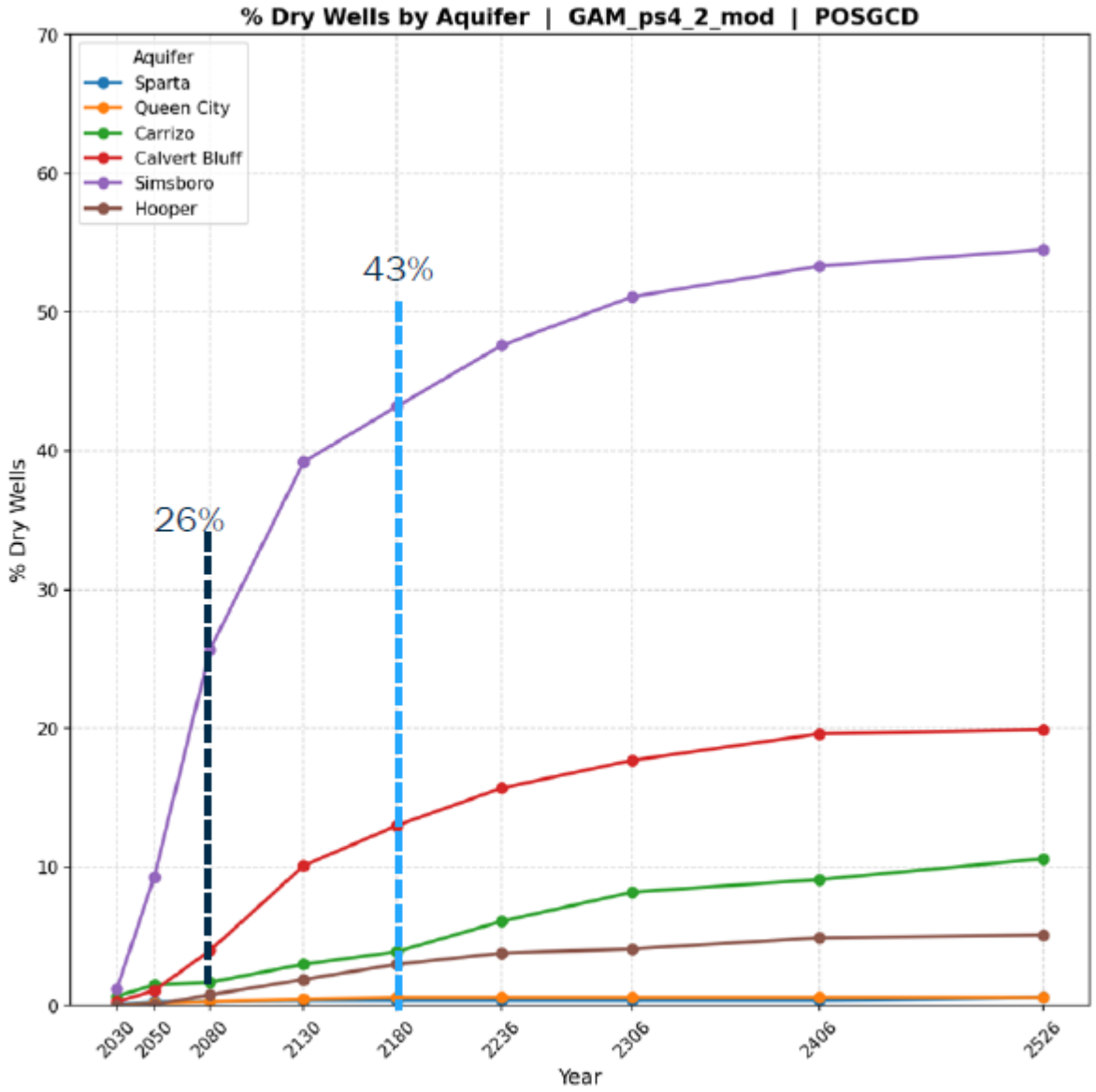
OPMAN

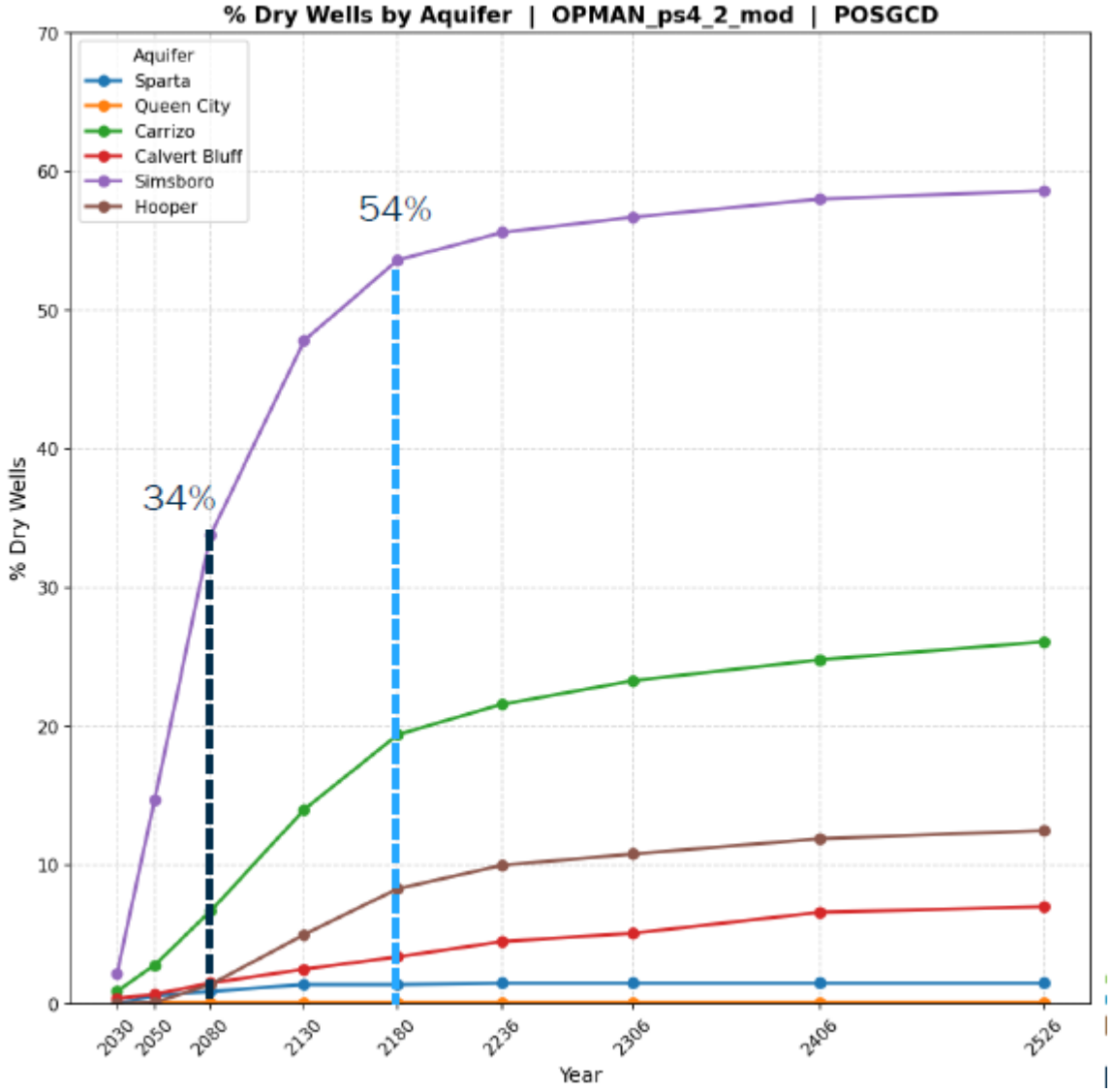
2011 Water Column (ft)	Total Wells	Outcrop	0-10%	10-20%	20-30%	30-40%	40-50%	50-60%	60-70%	70-80%	80-90%	90-100%	100%+
0-20	15	13											15
20-40	34	24				1		1	1				31
40-60	43	23	1		3	3	2		1			1	32
60-80	44	20		3	3	1		4	1	2		1	29
80-100	47	12		2	1		3	3		2	1	1	34
100-150	69	6		4	4	1	6	3	3		4	7	37
150-200	48	2			3	3	2	5	5	6	4	5	15
200-250	51				4	4	3	12	8	6	1	1	12
250-500	191	1	2	55	20	19	25	17	14	13	10	5	11
500+	98		5	44	30	6	4		4	5			
TOTAL	640	101	8	108	68	38	45	45	37	34	20	21	216

Well Impact

Dry – 216 (34%)
>50% - 373 (58%)

Simulated Impacts on Wells*





GAM Simulated Water Budget for PS4-2v8

1929 (GAM)

Aquifer	Lateral Flow				Recharge	ET	Surface Water	Pumping	Storage	GHB	Vertical Flow
	LPGCD	BVGCD	METGCD	FCGCD							
Sparta	95	15	0	0	7,554	0	-3,026	0	0	-529	-3,396
Queen City	-737	-211	0	0	13,142	0	-9,891	0	0	0	3,576
Carrizo	742	-1,765	0	0	3,553	0	-3,773	0	0	0	420
Calvert Bluff	237	43	0	0	18,992	-399	-20,327	0	0	0	4,733
Simsboro	**1,377**	**-1,973**	**0**	**0**	**12,316**	**0**	**-6,974**	**0**	**0**	**0**	**-3,956**
Hooper	-44	81	0	0	8,897	-208	-6,278	0	0	0	-2,266
Total	1,670	-3,809	0	0	64,452	-607	-50,269	0	0	-529	-889

2000 (GAM)

Aquifer	Lateral Flow				Recharge	ET	Surface Water	Pumping	Storage	GHB	Vertical Flow
	LPGCD	BVGCD	METGCD	FCGCD							
Sparta	-112	-496	0	0	8,474	0	-1,166	-901	-769	-844	-3,872
Queen City	-938	-1,010	0	0	15,869	0	-8,264	-658	-3,071	0	3,597
Carrizo	961	-2,195	0	0	4,744	0	-2,697	-1,091	-830	0	-169
Calvert Bluff	270	-739	0	0	25,274	-16	-5,117	-736	-2,336	0	-14,605
Simsboro	730	-15,275	0	0	16,953	0	-2,016	-25,105	4,754	0	19,354
Hooper	-18	-423	0	0	13,142	-167	-4,516	-561	-3,744	0	-3,988
Total	893	-20,138	0	0	84,456	-184	-23,777	-29,051	-5,997	-844	317

2080 (GAM)

Aquifer	Lateral Flow				Recharge	ET	Surface Water	Pumping	Storage	GHB	Vertical Flow
	LPGCD	BVGCD	METGCD	FCGCD							
Sparta	5	409	0	0	7,554	0	43	-5,477	636	1,109	-4,531
Queen City	-833	-1,495	0	0	13,142	0	-5,914	-1,242	395	0	484
Carrizo	6,684	-219	0	0	3,553	0	3,871	-15,178	4,618	0	-7,977
Calvert Bluff	690	-4,095	0	0	18,992	0	34,328	-2,333	15,141	0	-66,318
Simsboro	**17,849**	**-63,314**	**0**	**0**	**12,316**	**0**	**11,308**	**-94,799**	**22,045**	**0**	**89,329**
Hooper	-745	-1,271	0	0	8,897	-75	-1,423	-1,764	3,255	0	-7,669
Total	23,649	-69,984	0	0	64,452	-75	42,213	-120,793	46,089	1,109	3,318

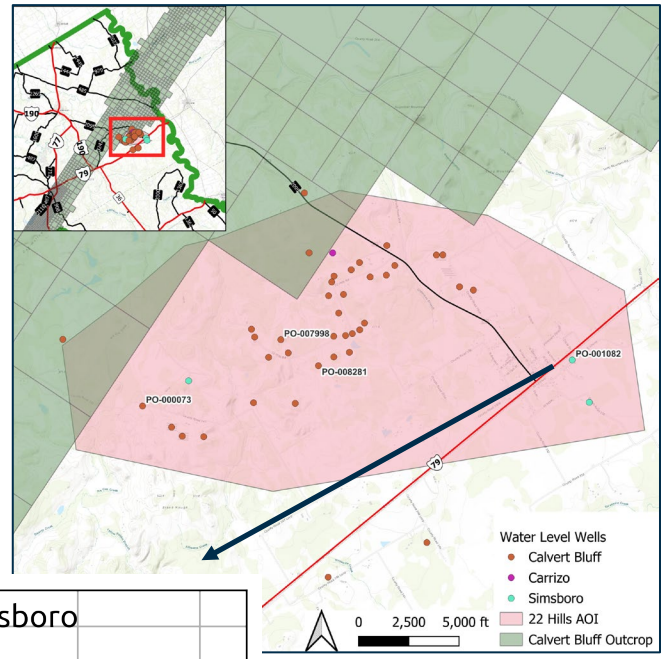
From 1930 to 2000
Additional Lateral Flow
Loss = 13,948 afy

From 2000 to 2080
Additional Lateral Flow
Loss = 30,920 afy

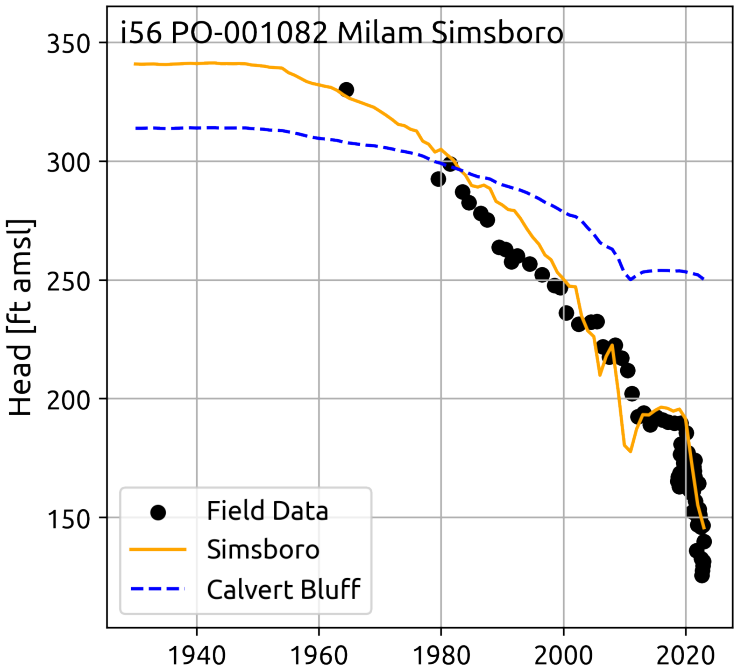
From 1930 to 2080
Additional Total
Lateral Flow
Loss = 44,869 afy

INTERA

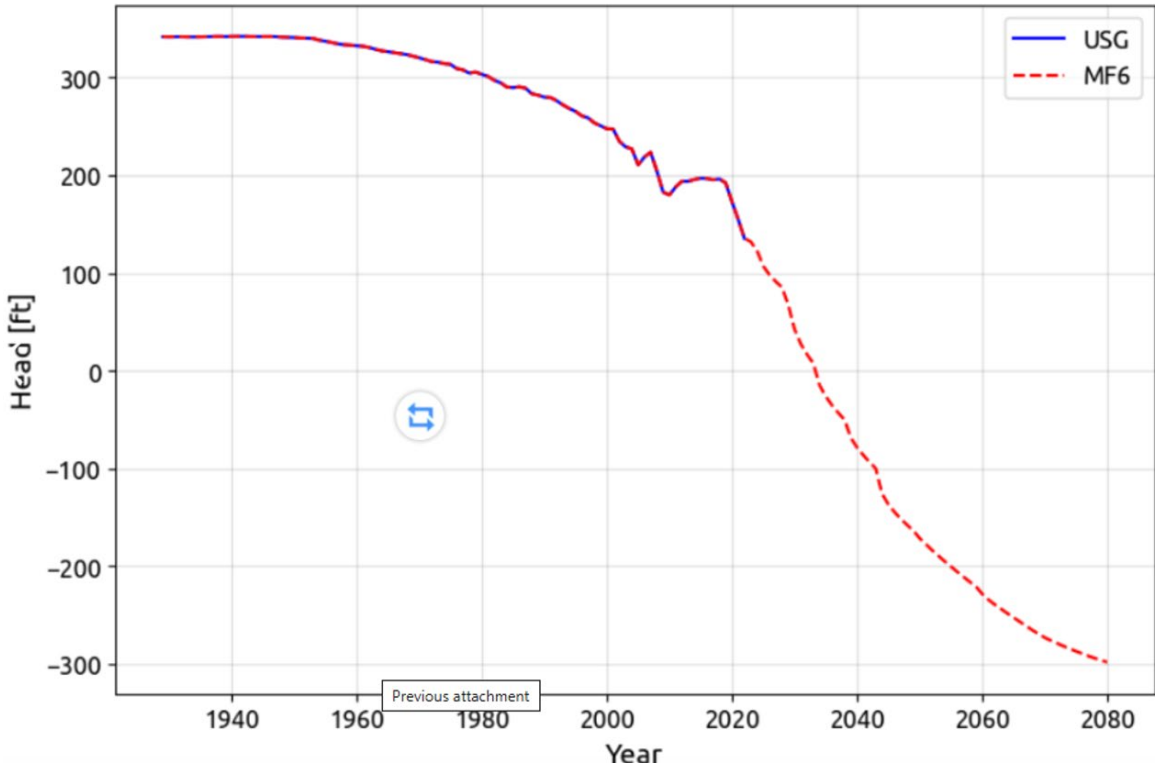
OPMAN Simulation at the Gause Well



Calibration



Prediction Using PS4-2v8



- 1929 to 2020: drawdown ~150 ft (POSGCD 9%, VR-0%, Well-0.1%, BVGCD SB -86%)
- 2020 to 2080: drawdown ~ 488 ft (POSGCD 12%, VR-15%, Well-0.1%, BVGCD SB – 73%)

Summary

- Production in PS4-2v8 Predicts Significant Impacts to Simsboro Wells before 2080
  - Before 2080
    - GAM: 168 dry wells, 364 wells lose 50% of water column
    - OPMAN: 216 dry wells, 373 wells lose 50% of water column
  - Before 2180
    - GAM: 43% wells go dry
    - OPMAN: 54% of well go dry

- Hills 22 Area (near Gause well)
  - 1920 to 2030; ~85% drawdown from BVGCD production
  - 2020 to 2080: ~73% drawdown from BVGCD production

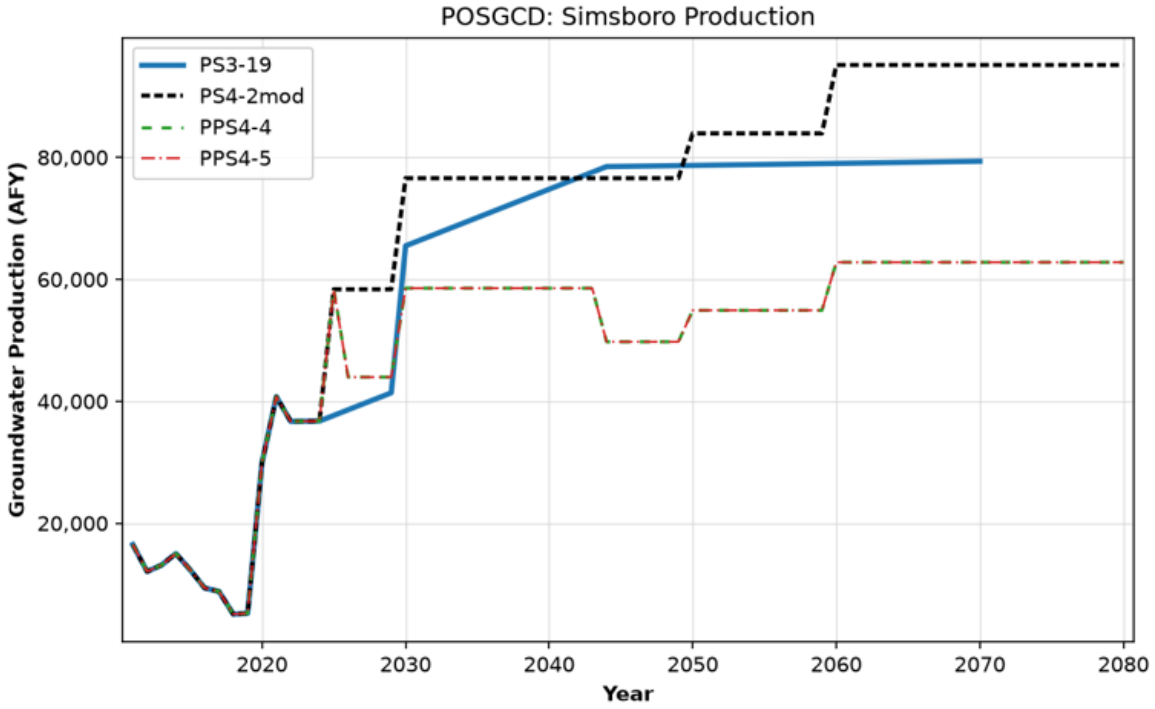
- Simsboro Flow Budget (GAM simulation) from LPGCD to BVGCD
  - 1930 to 2080: Net addition flow loss = 45,000 afy to BVGCD

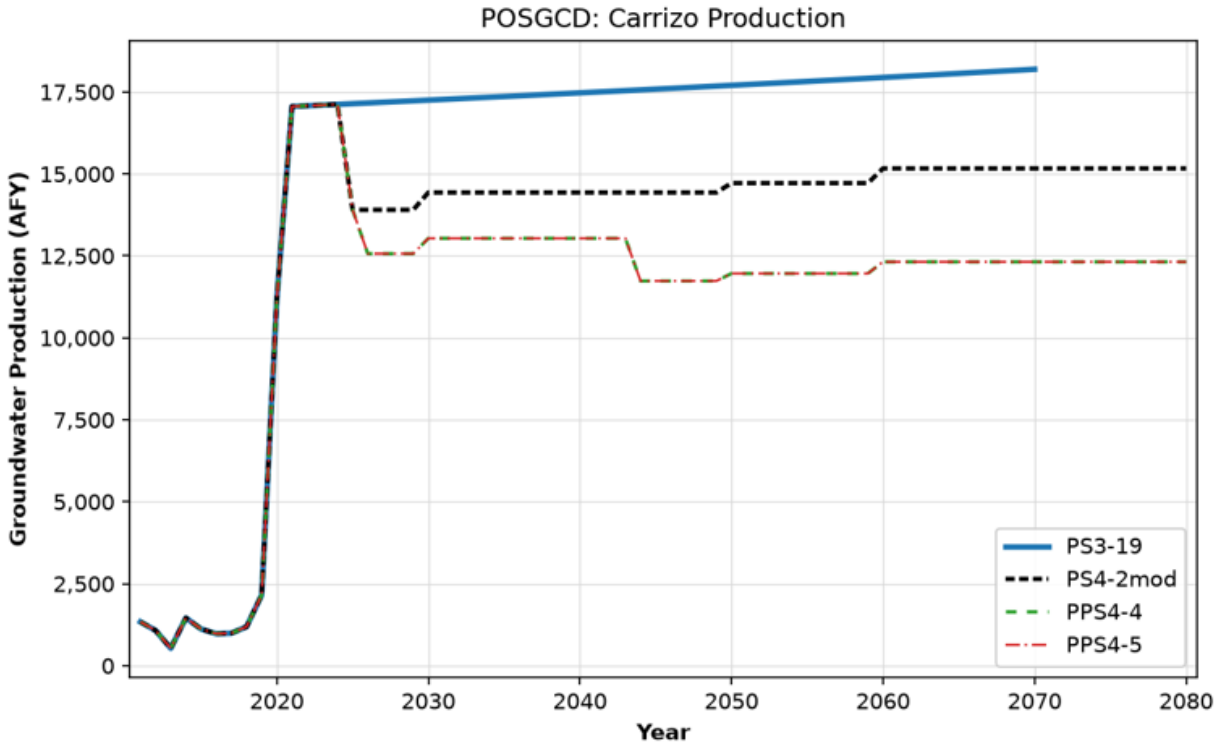
Development of Production Rates in Proposed PS4-4

Development of Proposed PS4-4

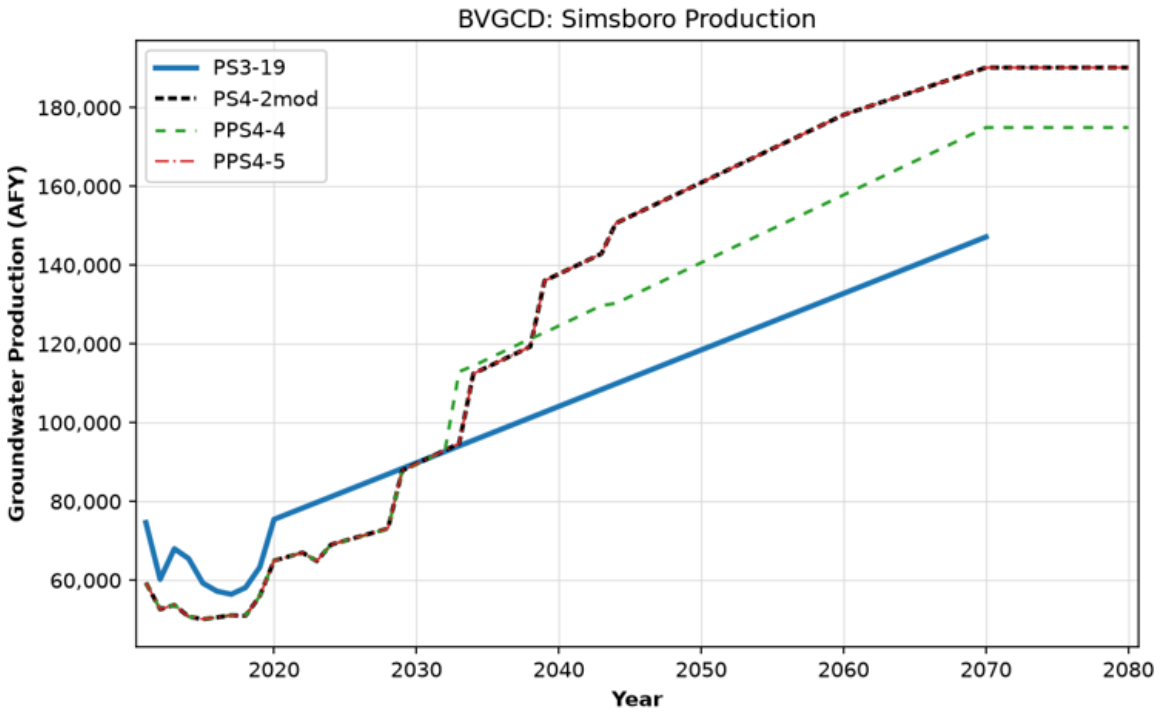
- Assumptions
  - Achieve POSGCD Board Carrizo and Simsboro DFC Goals
  - GAM Underpredicts Drawdown
    - Simsboro by ~30%
    - Carrizo by ~25%
  - Work with LPGCD Request on a New Run
    - Reduce Carrizo & Simsboro Pumping
    - Do not Reduce LPGCD Pumping
  - Minimize POSGCD Reductions to Percent That GAM Underestimates Drawdowns
  - Minimize Changes to BVGCD
    - No changes for at least two DFC planning cycles
    - BVGCD 2080 is about 110,000 afy greater than current pumping

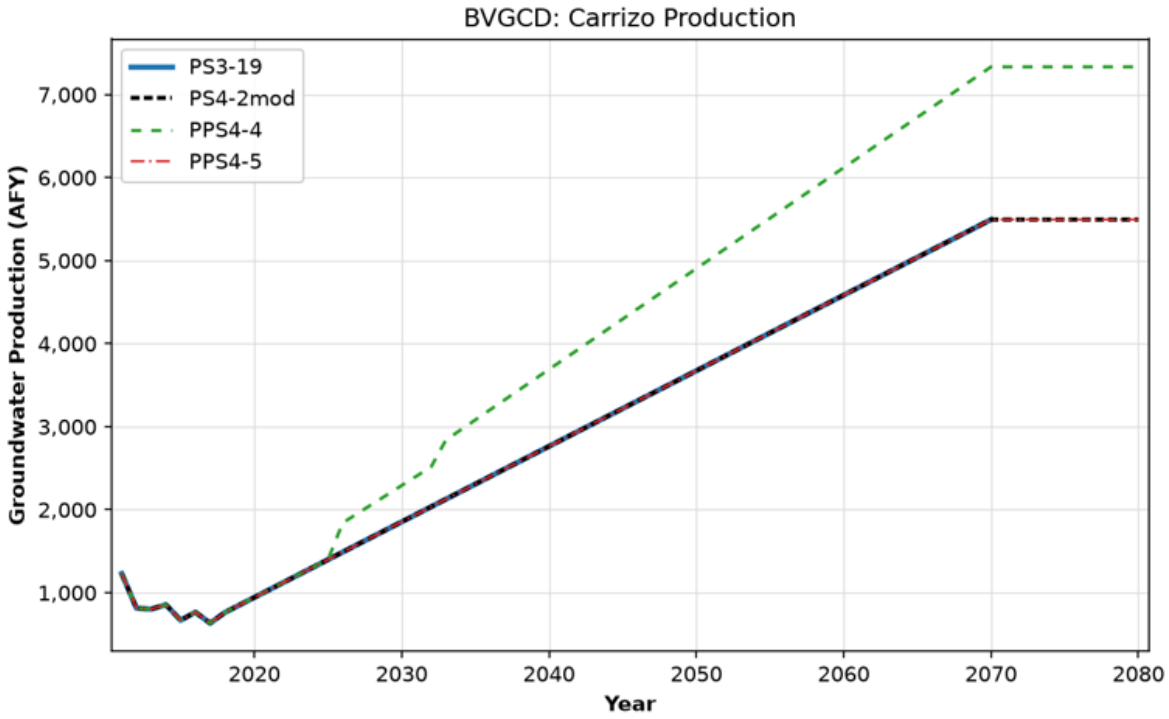
POSGCD Production



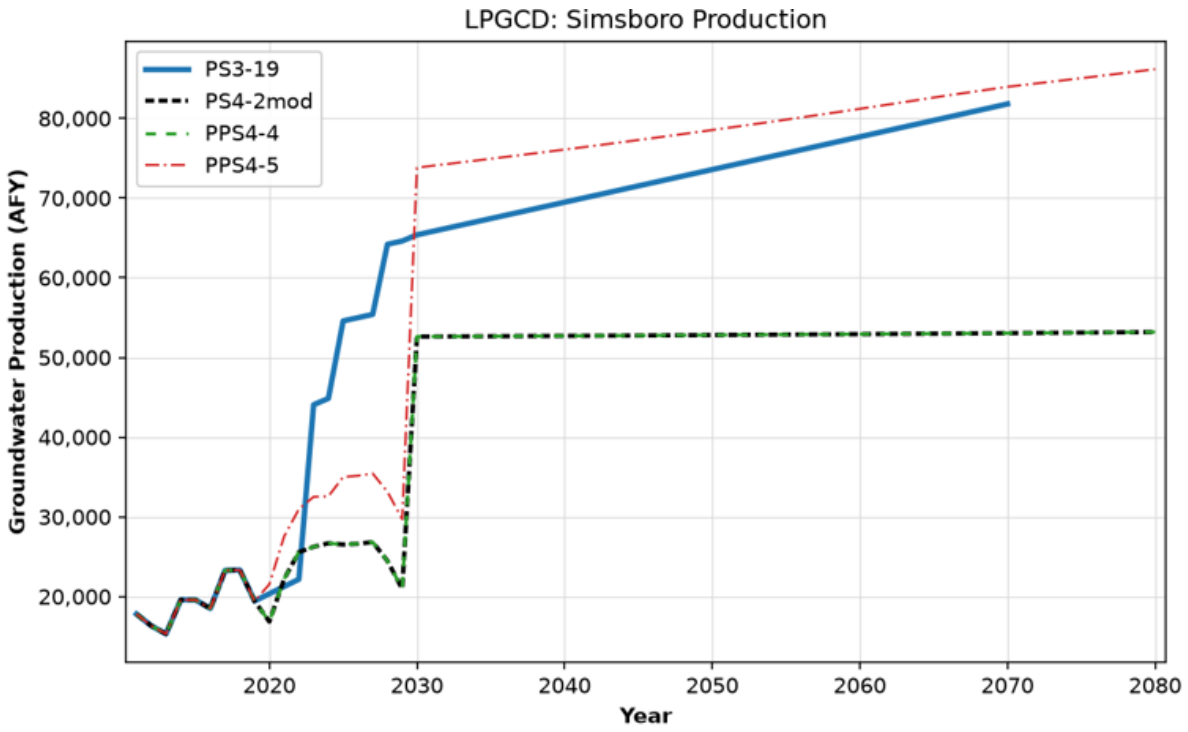


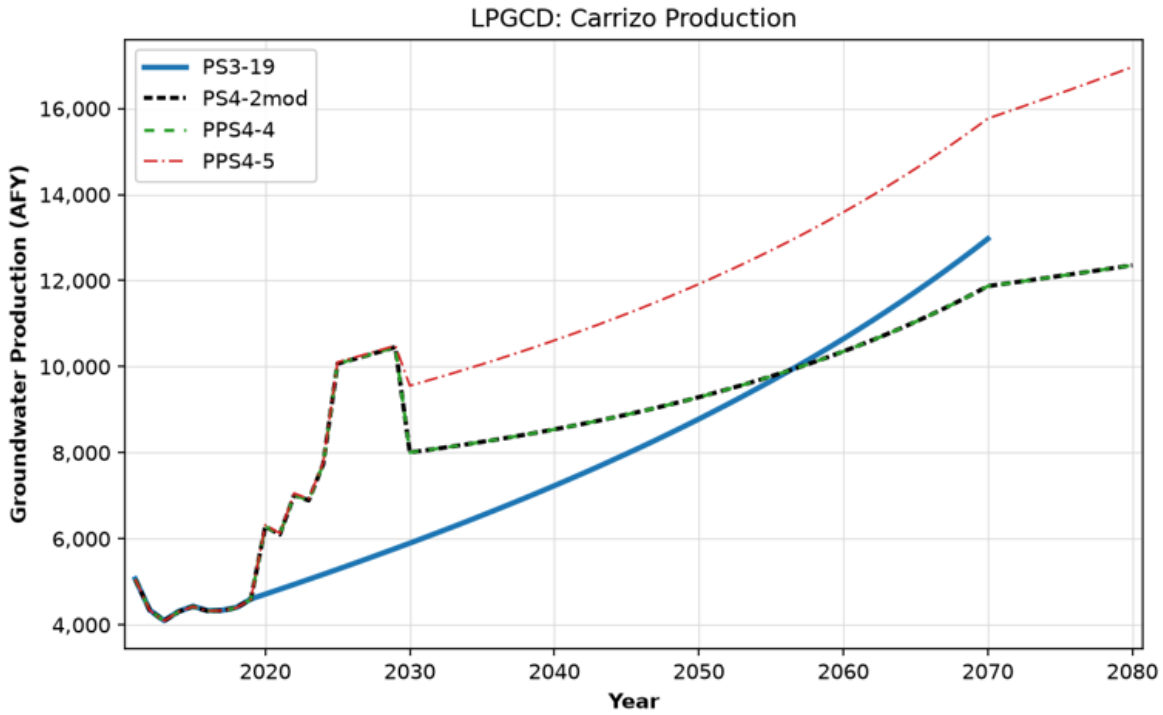
BVGCD Production





LPGCD Production





Questions

INTERA