Management of Groundwater Resources within the Post Oak Savannah GCD

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Milam and Burleson Counties Groundwater Summit
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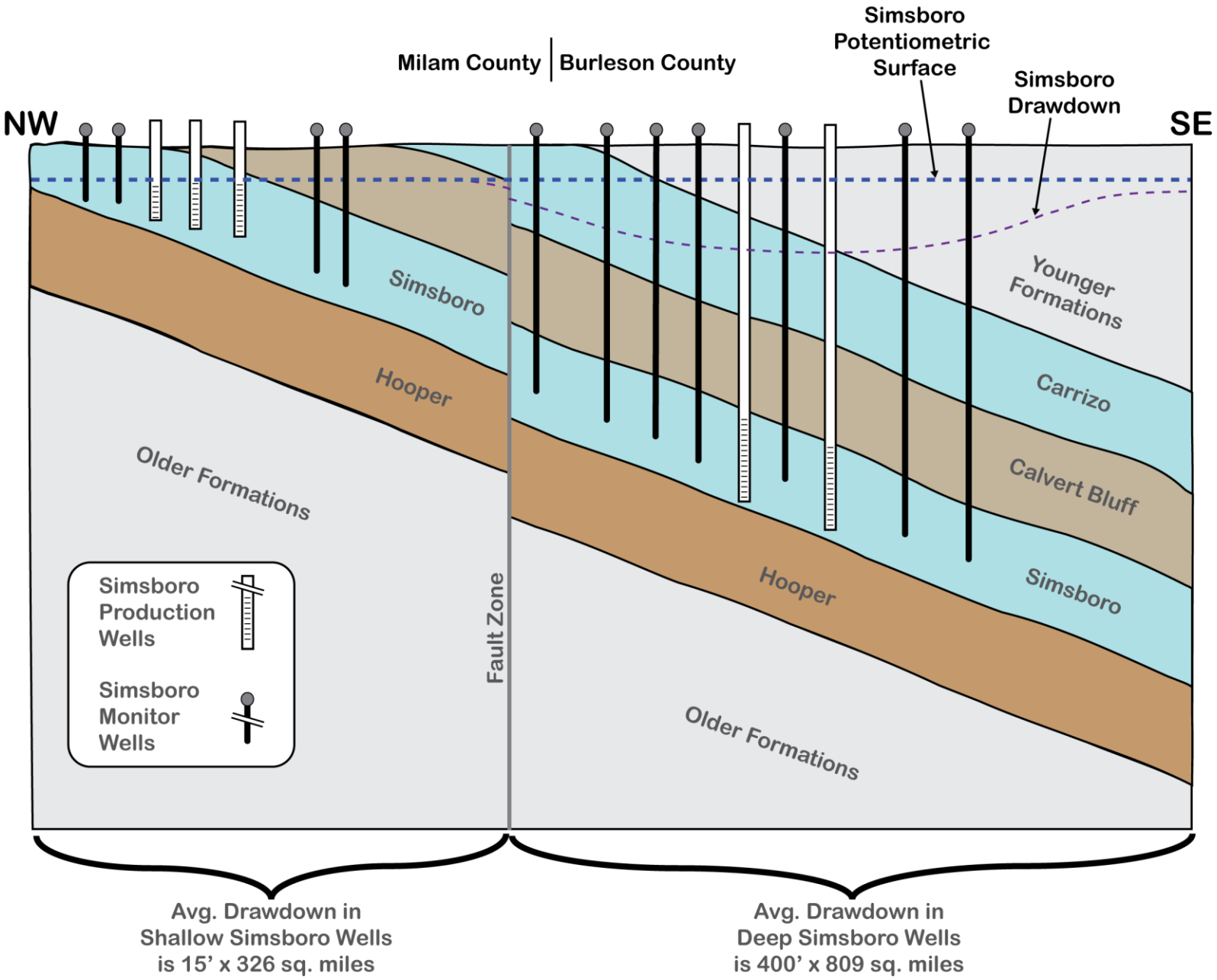
Serving the citizens of Milam and Burleson Counties

Summary of POSGCD Management Strategies

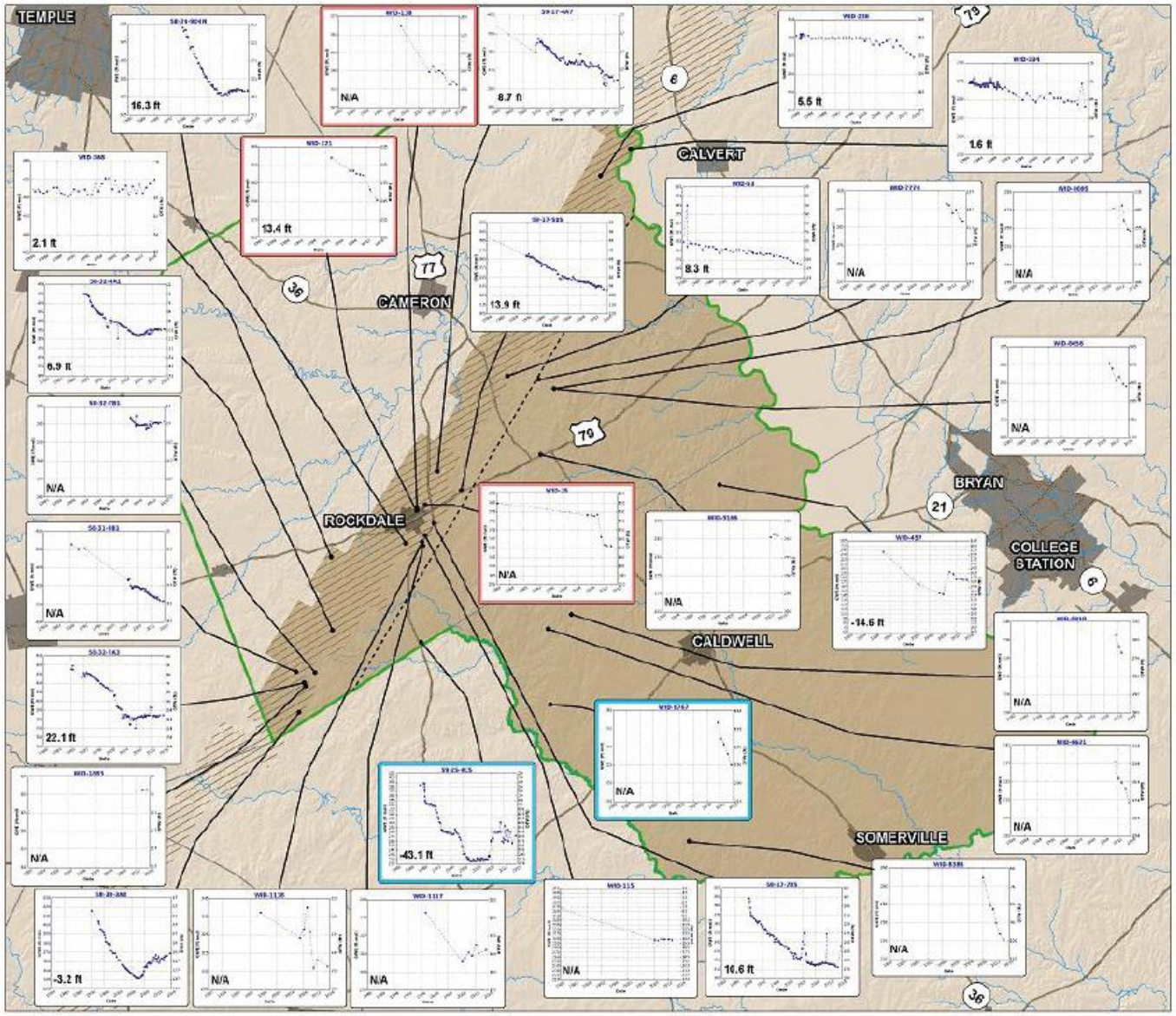
Aquifer/Formation	Over all DFC	DFC- Unconfined Area
Sparta	30	10
Queen City	30	10
Carrizo	65	20
Calvert Bluff (Upper Wilcox)	140	20
Simsboro (Middle Wilcox)	300	20
Hooper (Lower Wilcox)	180	20
Yegua/Jackson	100	15

(These DFCs are expressed as average drawdowns for a 60-year period beginning January 2000 and ending December 2059, for the area covered by each aquifer in Milam and Burleson Counties.)

Schematic Cross Section
Simsboro Drawdown



Hydrographs: Simsboro Example



Simsboro Hydrographs

Post Oak Savannah Groundwater Conservation District

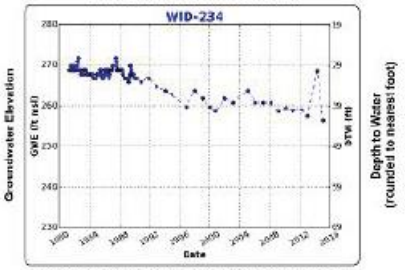
Legend

- POS GCD Boundary
- County lines
- Municipalities
- Unconfined Zone (Simsboro)
- Shallow Zone Extent (Simsboro)
- Simsboro Management Zone
- Major roads
- Rivers
- Well locations

Hydrograph for well screened in both the Simsboro and the Hooper

Hydrograph for well screened in both the Simsboro and the Calvert Bluff

POSGCD Well ID or Alcoa Well Name



Water levels are shown for years 1980 to the end of 2015 (plots generated in October 2016)

Map shown in the GAM coordinate system
North American Datum 1983
Projection: Albers
False Easting: 4921250
False Northing: 19685000
Central Meridian: -100.0
Standard Parallel 1: 27.5
Standard Parallel 2: 35.0
Latitude of Origin: 31.67
Linear Unit: USFoot

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INTERA

Comparison Between DFC and Calculated Average Drawdown

Aquifer	Management Zone	Desired Future Condition Average[1]	Number of Wells with Three-year Average				Average Based on Measured Water Levels in Same Wells in POSGCD from 2000 to 2012				Average Based on Interpolated Points		DFC Compliant[4]	Percent of Average Drawdown of DFC[5]
			2000		2012		Number of Wells	Straight Average	Group by Cluster	Four Zones in Shallow	All 2000 Wells and All 2012 Wells	Only Wells Common to 2000 and 2012[2]		
			POSGCD	All	POSGCD	All								
Sparta	Shallow	10	0		0		0	na	na	na	22.2	**3.6**	likely	36.0%
	Entire	30	3	12	6	27	3	4.6	4.6		33.6	**3.5**	yes	11.7%
Queen City	Shallow	10	4		5		4	2.5	3.0	3	12	**3.1**	yes	31.0%
	Entire	30	5	12	9	24	5	2.8	3.2		17.3	**3.1**	yes	10.3%
Carrizo	Shallow	20	0		1		0	na	na	na	7.7	**6.5**	likely	32.5%
	Entire	65	1	7	4	11	1	10.1	10.1		33.9	**6.7**	yes	10.3%
Calvert Bluff (Upper Wilcox)	Shallow	20	8		17		7	9.2	9.1	11.2	-11.1	**0**	yes	0.0%
	Entire	140	11	18	20	33	11	-1.7	-7.5		-6	**-11.4**	yes	-8.1%
Simsboro (Middle Wilcox)	Shallow	20	12		19		12	8.9	8.6	6	12	**9.6**	yes	48.0%
	Entire	300	14	31	29	71	14	3.5	1.8		20.3	**11.1**	yes	3.7%
Hooper (Lower Wilcox)	Shallow	20	4		9		4	5.9	5.9	5.6	40	**6.2**	yes	31.0%
	Entire	180	5	6	11	25	5	7.4	7.4		84.5	**7.1**	yes	3.9%
Yegua Jackson	Shallow	15	0		0		0	na	na	na	na	**na**	insuff. data	insuff data
	Entire	100	1	9	4	27	1	7.3	7.3		12.3	**16.4**	yes	16.4%
Brazos River Alluvium	Milam	5					0	na					likely	unknown
	Burleson[3]	6					7	4.5	5.0	5.1			yes	81.1%

[1] all DFCs are from Jan. 2000 to Dec. 2059 except the BRAA DFC, which is from Jan. 2010 to Dec. 2059

[2] best estimate of calculated average drawdown from 2000 to 2012

[3] number of wells from 2010 to 2014

[4] likely is based on review of all available data; insuff. data requires additional information

[5] Threshold Level 1 criteria is 60%

POSGCD Groundwater Management

- Protection of water levels
  - Overall Desired Future Conditions
  - Shallow management zones restrictions
  - District Monitor well network
  - Improvements to Groundwater Availability Model
- Respect for Property Rights
  - To produce
  - When not producing**
  - Equitable Treatment of Producers any given day
  - Permittee assumes all risks of groundwater availability

Relevant Factors for Consideration in Permitting of Groundwater Resources

- Chapter 36
- The purpose of the rules of the District;
- The equitable distribution of the resource;
- The economic hardship resulting from grant or denial of application, or the terms prescribed by the permit;
- The potential effect the permit may have on the aquifer, sustainability of the recharge on the aquifer as a whole, and groundwater users;
- The Desired Future Conditions and the estimated Modeled Available Groundwater Values; and
- The Management Goals, Objectives, and Performance Standards

Ways to protect water levels

- Well Spacing
- Contiguous Acreage requirements
- Management Zones
- Production per acre
- Total permitted
- Permit requirements
- Five year reviews
- DFC Process (GMA and District)
- Thresholds and Monitoring

Questions?

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