

# **Post Oak Savannah GCD Information Package For GMA 12**

**Presented at:  
GMA 12 Meeting  
June 6, 2014  
Milano Civic Center  
Milano, TX**

**(Check for the Update on POSGCD web site on the GMA 12 link for  
updates, modifications, and corrections)**

**Water Budget for the Central Portion of the Carrizo-Wilcox,  
Queen City and Sparta Aquifers by County in the GAM  
(1980, 1990, 1999)**

Burleson	1980								1990								1999								
	Sparta	Weches	Queen City	Reklaw	Carrizo	Calvert Bluff	Simsboro	Hooper	Sparta	Weches	Queen City	Reklaw	Carrizo	Calvert Bluff	Simsboro	Hooper	Sparta	Weches	Queen City	Reklaw	Carrizo	Calvert Bluff	Simsboro	Hooper	
<b>Inflow</b>																									
Recharge	6,729	662	4,107	17	0	0	0	0	9,598	1,066	6,470	28	0	0	0	0	5,276	589	3,539	14	0	0	0	0	0
Net Vertical Leakage Upper	-	-	-	-	-	-	636	-	-	-	-	-	-	-	913	-	-	-	-	-	-	130	1,364	-	-
Net Vertical Leakage Lower	2,448	2,382	2,110	1,642	171	-	1,003	-	1,359	1,269	1,005	763	111	-	1,249	-	862	870	604	370	-	-	1,573	-	-
Net Lateral Flow From Brazos	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	28	-	-	-	-	-	-	-	-
Net Lateral Flow From Lee	-	-	392	50	1,447	1,012	4,328	1,820	-	-	398	53	1,540	1,090	4,801	1,977	-	-	389	54	1,613	1,198	4,989	2,144	
Net Lateral Flow From Milam	-	-	96	143	1,176	706	84	269	-	-	180	152	1,254	809	82	325	-	-	111	149	1,247	928	381	422	
Net Lateral Flow From Robertson	54	1	57	-	-	-	-	-	18	-	37	-	-	-	-	-	37	-	39	-	-	-	-	-	
Net Lateral Flow From Washington	119	35	20	20	126	123	902	391	167	51	47	42	265	144	1,099	422	176	56	57	51	327	186	1,381	472	
<b>Total Inflow</b>	<b>9,350</b>	<b>3,080</b>	<b>6,782</b>	<b>1,872</b>	<b>2,920</b>	<b>1,841</b>	<b>6,953</b>	<b>2,480</b>	<b>11,142</b>	<b>2,386</b>	<b>8,137</b>	<b>1,038</b>	<b>3,170</b>	<b>2,043</b>	<b>8,144</b>	<b>2,724</b>	<b>6,379</b>	<b>1,515</b>	<b>4,739</b>	<b>638</b>	<b>3,187</b>	<b>2,442</b>	<b>9,688</b>	<b>3,038</b>	
<b>Outflow</b>																									
Wells	413	0	175	0	1,658	22	19	12	445	0	135	0	1,862	25	12	8	611	0	251	0	1,991	23	0	0	0
Drains	751	0	653	0	0	0	0	0	306	0	192	0	0	0	0	0	170	0	64	0	0	0	0	0	0
Evapotranspiration	2,764	0	4,921	0	0	0	0	0	1,549	0	1,968	0	0	0	0	0	750	0	1,531	0	0	0	0	0	0
Net Stream Leakage	12,412	244	7,146	106	0	0	0	0	2,329	151	3,274	104	0	0	0	0	2,972	282	3,793	115	0	0	0	0	0
Net Head Dep Bounds	3,403	0	0	0	0	0	0	0	2,860	0	0	0	0	0	0	0	2,472	0	0	0	0	0	0	0	0
Net Vertical Leakage Upper	-	2,448	2,382	2,110	1,642	171	-	1,003	-	1,359	1,269	1,005	763	111	-	1,249	-	862	870	604	370	-	-	1,573	
Net Vertical Leakage Lower	-	-	-	-	-	636	-	-	-	-	-	-	-	913	-	-	-	-	-	-	130	1,364	-	-	
Net Lateral Flow To Brazos	204	21	430	34	1,140	1,001	6,346	1,366	140	11	301	27	951	969	7,417	1,390	-	6	255	26	980	1,040	8,813	1,418	
Net Lateral Flow To Lee	773	38	-	-	-	-	-	-	664	33	-	-	-	-	-	-	582	30	-	-	-	-	-	-	
Net Lateral Flow To Robertson	-	-	-	5	54	74	622	128	-	2	-	6	50	76	767	127	-	1	-	6	47	82	939	127	
<b>Total Outflow</b>	<b>20,720</b>	<b>2,751</b>	<b>15,707</b>	<b>2,255</b>	<b>4,494</b>	<b>1,904</b>	<b>6,987</b>	<b>2,509</b>	<b>8,293</b>	<b>1,556</b>	<b>7,139</b>	<b>1,142</b>	<b>3,626</b>	<b>2,094</b>	<b>8,196</b>	<b>2,774</b>	<b>7,557</b>	<b>1,181</b>	<b>6,764</b>	<b>751</b>	<b>3,518</b>	<b>2,509</b>	<b>9,752</b>	<b>3,118</b>	
<b>Inflow - Outflow</b>	<b>-11,370</b>	<b>329</b>	<b>-8,925</b>	<b>-383</b>	<b>-1,574</b>	<b>-63</b>	<b>-34</b>	<b>-29</b>	<b>2,849</b>	<b>830</b>	<b>998</b>	<b>-104</b>	<b>-456</b>	<b>-51</b>	<b>-52</b>	<b>-50</b>	<b>-1,178</b>	<b>334</b>	<b>-2,025</b>	<b>-113</b>	<b>-331</b>	<b>-67</b>	<b>-64</b>	<b>-80</b>	
<b>Storage Change</b>	<b>-11,369</b>	<b>329</b>	<b>-8,925</b>	<b>-382</b>	<b>-1,575</b>	<b>-65</b>	<b>-33</b>	<b>-29</b>	<b>2,850</b>	<b>830</b>	<b>999</b>	<b>-101</b>	<b>-457</b>	<b>-52</b>	<b>-52</b>	<b>-50</b>	<b>-1,177</b>	<b>335</b>	<b>-2,024</b>	<b>-114</b>	<b>-332</b>	<b>-65</b>	<b>-64</b>	<b>-80</b>	
<b>Model Error</b>	<b>-1</b>	<b>0</b>	<b>0</b>	<b>-1</b>	<b>1</b>	<b>2</b>	<b>-1</b>	<b>0</b>	<b>-1</b>	<b>0</b>	<b>-1</b>	<b>-3</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>-1</b>	<b>-1</b>	<b>-1</b>	<b>1</b>	<b>1</b>	<b>-2</b>	<b>0</b>	<b>0</b>	
<b>Model Error (percent)</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.04%</b>	<b>0.02%</b>	<b>0.10%</b>	<b>0.01%</b>	<b>0.00%</b>	<b>0.01%</b>	<b>0.00%</b>	<b>0.01%</b>	<b>0.26%</b>	<b>0.03%</b>	<b>0.05%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.01%</b>	<b>0.06%</b>	<b>0.01%</b>	<b>0.13%</b>	<b>0.03%</b>	<b>0.08%</b>	<b>0.00%</b>	<b>0.00%</b>	

**Water Budget for the Central Portion of the Carrizo-Wilcox,  
Queen City and Sparta Aquifers by County in the GAM  
(1980, 1990, 1999)**

Milam	1980								1990								1999								
	Sparta	Weches	Queen City	Reklaw	Carrizo	Calvert			Sparta	Weches	Queen City	Reklaw	Carrizo	Calvert			Sparta	Weches	Queen City	Reklaw	Carrizo	Calvert			
						Bluff	Simsboro	Hooper						Bluff	Simsboro	Hooper						Bluff	Simsboro	Hooper	
<b>Inflow</b>																									
Recharge	-	-	3,816	1,174	3,665	6,585	11,184	2,085	-	-	5,471	1,626	5,538	10,587	17,938	3,314	-	-	3,333	1,065	3,399	6,027	10,134	1,942	
Net Vertical Leakage Upper	-	-	0	193	86	324	1,049	-	-	-	0	318	345	361	2,714	-	-	-	0	341	493	417	4,369	-	
Net Vertical Leakage Lower	-	-	-	-	-	-	99	-	-	-	-	-	-	-	386	-	-	-	-	-	-	-	771	-	
Net Lateral Flow From Robertson	-	-	101	-	-	693	-	-	-	-	183	-	-	318	-	-	-	-	125	-	-	465	-	-	
Net Lateral Flow From Williamson	-	-	-	-	-	-	42	514	-	-	-	-	-	-	59	496	-	-	-	-	-	-	262	520	
<b>Total Inflow</b>	-	-	<b>3,917</b>	<b>1,367</b>	<b>3,751</b>	<b>7,602</b>	<b>12,374</b>	<b>2,599</b>	-	-	<b>5,654</b>	<b>1,944</b>	<b>5,883</b>	<b>11,266</b>	<b>21,097</b>	<b>3,810</b>	-	-	<b>3,458</b>	<b>1,406</b>	<b>3,892</b>	<b>6,909</b>	<b>15,536</b>	<b>2,462</b>	
<b>Outflow</b>																									
Wells	-	-	26	0	123	177	2,128	380	-	-	29	0	150	209	14,541	454	-	-	28	0	177	214	22,977	552	
Drains	-	-	1,856	0	0	0	0	0	-	-	488	0	0	0	0	0	-	-	256	0	0	0	0	0	
Evapotranspiration	-	-	9,537	0	2,730	1,175	769	718	-	-	6,498	27	2,481	955	219	665	-	-	2,586	21	1,688	282	0	441	
Net Stream Leakage	-	-	10,850	765	479	11,450	16,361	2,234	-	-	5,350	501	374	7,471	10,266	1,516	-	-	3,303	727	518	6,876	11,594	1,794	
Net Vertical Leakage Upper	-	-	-	-	-	-	-	99	-	-	-	-	-	-	-	386	-	-	-	-	-	-	-	771	
Net Vertical Leakage Lower	-	-	193	86	324	1,049	-	-	-	-	318	345	361	2,714	-	-	-	-	341	493	417	4,369	-	-	
Net Lateral Flow To Burleson	-	-	96	143	1,176	706	84	269	-	-	180	152	1,254	809	82	325	-	-	111	149	1,247	928	381	422	
Net Lateral Flow To Lee	-	-	-	-	111	25	2,480	640	-	-	-	-	134	58	1,839	704	-	-	-	-	141	88	4,542	877	
Net Lateral Flow To Robertson	-	-	-	72	701	-	2,011	79	-	-	-	67	582	-	2,792	167	-	-	-	73	590	-	3,686	279	
<b>Total Outflow</b>	-	-	<b>22,558</b>	<b>1,066</b>	<b>5,644</b>	<b>14,582</b>	<b>23,833</b>	<b>4,419</b>	-	-	<b>12,863</b>	<b>1,092</b>	<b>5,336</b>	<b>12,216</b>	<b>29,739</b>	<b>4,217</b>	-	-	<b>6,625</b>	<b>1,463</b>	<b>4,778</b>	<b>12,757</b>	<b>43,180</b>	<b>5,136</b>	
<b>Inflow - Outflow</b>	-	-	-18,641	301	-1,893	-6,980	-11,459	-1,820	-	-	-7,209	852	547	-950	-8,642	-407	-	-	-3,167	-57	-886	-5,848	-27,644	-2,674	
<b>Storage Change</b>	-	-	-18,643	302	-1,892	-6,979	-11,459	-1,818	-	-	-7,209	851	545	-950	-8,641	-409	-	-	-3,168	-56	-885	-5,847	-27,644	-2,673	
<b>Model Error</b>	-	-	2	-1	-1	-1	0	-2	-	-	0	1	2	0	-1	2	-	-	1	-1	-1	-1	0	-1	
<b>Model Error (percent)</b>	-	-	0.01%	0.05%	0.02%	0.01%	0.00%	0.04%	-	-	0.00%	0.05%	0.03%	0.00%	0.00%	0.04%	-	-	0.01%	0.06%	0.02%	0.01%	0.00%	0.02%	

**Burleson County  
TWDB Historical Pumping**

<b>Year</b>	<b>Pumping Type</b>	<b>Brazos River Alluvium</b>	<b>Sparta</b>	<b>Queen City</b>	<b>Carrizo-Wilcox</b>	<b>Yegua-Jackson</b>	<b>Other</b>	<b>Unknown</b>	<b>Total</b>
2011	Irrigation	21,119	82		164		816		22,182
	Livestock		187	187	18		71	116	579
	Manufacturing							111	111
	Mining					248			248
	Municipal		435	607	1,331		136	838	3,348
	Total		21,119	704	794	1,513	248	1,024	1,064
2010	Irrigation	17,851	69		139		690		18,749
	Livestock		182	182	17		69	113	563
	Manufacturing							111	111
	Mining					17			17
	Municipal		353	503	1,002		123	765	2,746
	Total		17,851	605	685	1,158	17	882	988
2009	Irrigation	21,796	85		169		842		22,893
	Livestock		115	115	11		44	71	356
	Manufacturing							111	111
	Mining					42			42
	Municipal		256	563	828		112	820	2,579
	Total		21,796	456	678	1,008	42	998	1,002

**Milam County  
TWDB Historical Pumping**

<b>Year</b>	<b>Pumping Type</b>	<b>Brazos River Alluvium</b>	<b>Queen City</b>	<b>Carrizo- Wilcox</b>	<b>Other</b>	<b>Unknown</b>	<b>Total</b>
<b>2011</b>	Irrigation		754	1,883	2,637		5,274
	Livestock		23	435	138		596
	Manufacturing			13,716			13,716
	Mining					32	32
	Municipal		25	2,314	177		2,516
	Total			802	18,348	2,952	32
<b>2010</b>	Irrigation		274	686	960		1,920
	Livestock		23	433	137		593
	Manufacturing			12,653			12,653
	Mining					15	15
	Municipal		25	3,892	174		4,091
	Total			322	17,664	1,271	15
<b>2009</b>	Irrigation		373	933	1,307		2,613
	Livestock		21	403	127		551
	Manufacturing			11,665			11,665
	Mining					0	0
	Municipal		17	3,958	120		4,095
	Total			411	16,959	1,554	0

<b>Burleson County</b>							
<b>Values from 2012 and 2017 State Water Plan (SWP)</b>							
<b>Supply Water Management Strategy (WMS), and Demands</b>							
	<b>2010</b>	<b>2020</b>	<b>2030</b>	<b>2040</b>	<b>2050</b>	<b>2060</b>	<b>2070</b>
<b>Current Modeled Available Groundwater (MAG)</b>							
BRAZOS RIVER ALLUVIUM AQUIFER	22,056	22,056	22,056	22,056	22,056	22,056	
CARRIZO-WILCOX AQUIFER	3,750	23,249	28,047	32,518	36,492	38,701	
QUEEN CITY AQUIFER	382	415	446	446	446	446	
SPARTA AQUIFER	1,570	2,245	4,041	5,612	6,734	6,734	
YEGUA-JACKSON AQUIFER	12,923	12,923	12,923	12,923	12,923	12,923	
<b>GW Pumping in 2012 SWP (supply + WMS)</b>	<b>14,843</b>	<b>14,843</b>	<b>15,143</b>	<b>37,588</b>	<b>46,241</b>	<b>46,241</b>	
BRAZOS RIVER ALLUVIUM AQUIFER	9,400	9,400	9,400	9,400	9,400	9,400	
CARRIZO-WILCOX AQUIFER	4,072	4,072	4,372	26,817	35,470	35,470	
QUEEN CITY AQUIFER	293	293	293	293	293	293	
SPARTA AQUIFER	1,049	1,049	1,049	1,049	1,049	1,049	
YEGUA-JACKSON AQUIFER	29	29	29	29	29	29	
BRAZOS RIVER ALLUVIUM AQUIFER	63%	63%	62%	25%	20%	20%	
CARRIZO-WILCOX AQUIFER	27%	27%	29%	71%	77%	77%	
QUEEN CITY AQUIFER	2%	2%	2%	1%	1%	1%	
SPARTA AQUIFER	7%	7%	7%	3%	2%	2%	
YEGUA-JACKSON AQUIFER	0.2%	0.2%	0.2%	0.1%	0.1%	0.1%	
<b>GW Pumping in 2012 SWP (supply only)</b>	<b>14,443</b>	<b>14,443</b>	<b>14,443</b>	<b>14,443</b>	<b>14,443</b>	<b>14,443</b>	
BRAZOS RIVER ALLUVIUM AQUIFER	9,400	9,400	9,400	9,400	9,400	9,400	
CARRIZO-WILCOX AQUIFER	3672	3672	3672	3672	3672	3672	
QUEEN CITY AQUIFER	293	293	293	293	293	293	
SPARTA AQUIFER	1,049	1,049	1,049	1,049	1,049	1,049	
YEGUA-JACKSON AQUIFER	29	29	29	29	29	29	
<b>GW Pumping in 2012 SWP (WMS only)</b>	<b>400</b>	<b>400</b>	<b>700</b>	<b>23,145</b>	<b>31,798</b>	<b>31,798</b>	
CARRIZO-WILCOX AQUIFER	400	400	700	23145	31798	31798	
CARRIZO-WILCOX AQUIFER	3%	3%	5%	62%	69%	69%	
<b>Total Demand in 2012 SWP</b>	<b>21,779</b>	<b>21,291</b>	<b>20,771</b>	<b>20,279</b>	<b>19,702</b>	<b>19,168</b>	
GW Pumping % of Demand in 2012 SWP	68%	70%	73%	185%	235%	241%	
<b>Total Demand in 2017 SWP</b>		<b>28,395</b>	<b>28,510</b>	<b>27,374</b>	<b>26,136</b>	<b>24,929</b>	<b>24,022</b>
<b>Projected GW Pumping in 2017 SWP</b>		<b>19,796</b>	<b>20,785</b>	<b>50,739</b>	<b>61,342</b>	<b>60,139</b>	<b>57,951</b>
BRAZOS RIVER ALLUVIUM AQUIFER		12,536	12,902	12,689	12,470	12,225	11,780
CARRIZO-WILCOX AQUIFER		5,431	6,001	36,199	47,053	46,131	44,452
QUEEN CITY AQUIFER		391	402	396	389	381	367
SPARTA AQUIFER		1,399	1,440	1,416	1,392	1,364	1,315
YEGUA-JACKSON AQUIFER		39	40	39	38	38	36
<b>Total Demand in 2017 SWP</b>		<b>28,395</b>	<b>28,510</b>	<b>27,374</b>	<b>26,136</b>	<b>24,929</b>	<b>24,022</b>
IRRIGATION		22,855	21,904	21,057	20,115	19,216	18,469
LIVESTOCK		1,508	1,508	1,508	1,508	1,508	1,508
MANUFACTURING		139	161	183	203	221	241
MINING		995	1,923	1,512	1,100	686	428
MUNICIPAL		2,898	3,014	3,114	3,210	3,298	3,376
STEAM ELECTRIC POWER		0	0	0	0	0	0

<b>Milam County</b>							
<b>Values from 2012 and 2017 State Water Plan (SWP)</b>							
<b>Supply Water Management Strategy (WMS), and Demands</b>							
	<b>2010</b>	<b>2020</b>	<b>2030</b>	<b>2040</b>	<b>2050</b>	<b>2060</b>	<b>2070</b>
<b>Modeled Available Groundwater</b>	<b>41,601</b>	<b>27,346</b>	<b>23,632</b>	<b>22,538</b>	<b>24,785</b>	<b>25,745</b>	
BRAZOS RIVER ALLUVIUM AQUIFER	3,082	3,082	3,082	3,082	3,082	3,082	
CARRIZO-WILCOX AQUIFER	38,183	23,923	20,206	19,112	21,359	22,319	
QUEEN CITY AQUIFER	48	53	56	56	56	56	
SPARTA AQUIFER							
TRINITY	288	288	288	288	288	288	
YEGUA-JACKSON AQUIFER							
<b>Groundwater Pumping in 2012 SWP (supply + WMS)</b>	<b>20,189</b>	<b>20,189</b>	<b>20,189</b>	<b>19,447</b>	<b>19,560</b>	<b>19,560</b>	
BRAZOS RIVER ALLUVIUM AQUIFER							
CARRIZO-WILCOX AQUIFER	20,189	20,189	20,189	19,447	19,560	19,560	
QUEEN CITY AQUIFER							
SPARTA AQUIFER							
YEGUA-JACKSON AQUIFER							
BRAZOS RIVER ALLUVIUM AQUIFER	0%	0%	0%	0%	0%	0%	
CARRIZO-WILCOX AQUIFER	100%	100%	100%	100%	100%	100%	
QUEEN CITY AQUIFER	0%	0%	0%	0%	0%	0%	
SPARTA AQUIFER	0%	0%	0%	0%	0%	0%	
YEGUA-JACKSON AQUIFER	0%	0%	0%	0%	0%	0%	
<b>Groundwater Pumping in 2012 SWP (supply only)</b>	<b>20,089</b>	<b>20,089</b>	<b>20,089</b>	<b>19,447</b>	<b>17,947</b>	<b>17,947</b>	
BRAZOS RIVER ALLUVIUM AQUIFER							
CARRIZO-WILCOX AQUIFER	20,089	20,089	20,089	19,447	17,947	17,947	
QUEEN CITY AQUIFER							
SPARTA AQUIFER							
YEGUA-JACKSON AQUIFER							
<b>Groundwater Pumping in 2012 SWP (WMS only)</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>0</b>	<b>1,613</b>	<b>1,613</b>	
CARRIZO-WILCOX AQUIFER	100	100	100	0	1613	1613	
CARRIZO-WILCOX AQUIFER	0.5%	0.5%	0.5%	0.0%	8%	8%	
<b>Total Demand in 2012 SWP</b>	<b>32,451</b>	<b>34,172</b>	<b>34,326</b>	<b>33,400</b>	<b>36,933</b>	<b>36,934</b>	
GW Pumping % of Demand in 2012 SWP	62%	59%	59%	58%	49%	53%	
<b>Total Demand in 2017 SWP</b>		<b>43,518</b>	<b>43,633</b>	<b>43,689</b>	<b>52,809</b>	<b>52,955</b>	<b>53,101</b>
<b>Projected GW Pumping in 2017 SWP</b>		<b>25,711</b>	<b>25,663</b>	<b>25,438</b>	<b>25,663</b>	<b>28,045</b>	<b>28,122</b>
BRAZOS RIVER ALLUVIUM AQUIFER		0	0	0	0	0	0
CARRIZO-WILCOX AQUIFER		25,711	25,663	25,438	25,663	28,045	28,122
QUEEN CITY AQUIFER		0	0	0	0	0	0
SPARTA AQUIFER		0	0	0	0	0	0
YEGUA-JACKSON AQUIFER		0	0	0	0	0	0
<b>Total Demand in 2017 SWP</b>		<b>43,518</b>	<b>43,633</b>	<b>43,689</b>	<b>52,809</b>	<b>52,955</b>	<b>53,101</b>
IRRIGATION		5,081	5,040	4,995	4,956	4,915	4,875
LIVESTOCK		1,822	1,822	1,822	1,822	1,822	1,822
MANUFACTURING		12	12	12	14	14	14
MINING		14	14	14	14	14	14
MUNICIPAL		4,566	4,722	4,823	5,014	5,201	5,387
STEAM ELECTRIC POWER		32,023	32,023	32,023	40,989	40,989	40,989

<b>Burleson County</b>		
<b>Model Available Groundwater (MAG) in AFY</b>		
<b>Total Estimated Recoverable Storage (TERS) in AF</b>		
		<b>2060</b>
<b>Current Modeled Available Groundwater (MAG)</b>		
BRAZOS RIVER ALLUVIUM AQUIFER	22,056	
CARRIZO-WILCOX AQUIFER	38,701	
QUEEN CITY AQUIFER	446	
SPARTA AQUIFER	6,734	
YEGUA-JACKSON AQUIFER	12,923	
Total	80,860	
<b>Total Storage (acre-ft)</b>		
BRAZOS RIVER ALLUVIUM AQUIFER	450,000	245.07%
CARRIZO-WILCOX AQUIFER	120,000,000	1.61%
QUEEN CITY AQUIFER	29,000,000	0.08%
SPARTA AQUIFER	16,000,000	2.10%
YEGUA-JACKSON AQUIFER	27,000,000	2.39%
Total	192,450,000	2.10%
<b>Total Storage Estimated Storate (25%)</b>		
BRAZOS RIVER ALLUVIUM AQUIFER	112,500	980.27%
CARRIZO-WILCOX AQUIFER	30,000,000	6.45%
QUEEN CITY AQUIFER	7,250,000	0.31%
SPARTA AQUIFER	4,000,000	8.42%
YEGUA-JACKSON AQUIFER	6,750,000	9.57%
Total	48,112,500	8.40%
<b>Total Storage Estimated Storate (75%)</b>		
BRAZOS RIVER ALLUVIUM AQUIFER	337,500	326.76%
CARRIZO-WILCOX AQUIFER	90,000,000	2.15%
QUEEN CITY AQUIFER	21,750,000	0.10%
SPARTA AQUIFER	12,000,000	2.81%
YEGUA-JACKSON AQUIFER	20,250,000	3.19%
Total	144,337,500	2.80%



<b>Milam County</b>		
<b>Model Available Groundwater (MAG) in AFY</b>		
<b>Total Estimated Recoverable Storage (TERS) in AF</b>		
	<b>2060</b>	
<b>Modeled Available Groundwater (AFY)</b>		
BRAZOS RIVER ALLUVIUM AQUIFER	3,082	
CARRIZO-WILCOX AQUIFER	22,319	
QUEEN CITY AQUIFER	56	
SPARTA AQUIFER		
YEGUA-JACKSON AQUIFER		
Total	25,457	
<b>Total Storage</b>		
		<b>MAG*50/TS</b>
BRAZOS RIVER ALLUVIUM AQUIFER	28,000	550.36%
CARRIZO-WILCOX AQUIFER	47,000,000	2.37%
QUEEN CITY AQUIFER	650,000	0.43%
SPARTA AQUIFER		
YEGUA-JACKSON AQUIFER		
Total	47,678,000	2.67%
<b>Total Storage Estimated Storate (25%)</b>		
		<b>MAG*50/TERS</b>
BRAZOS RIVER ALLUVIUM AQUIFER	7,000	2201.43%
CARRIZO-WILCOX AQUIFER	11,750,000	9.50%
QUEEN CITY AQUIFER	162,500	1.72%
SPARTA AQUIFER		
YEGUA-JACKSON AQUIFER		
Total	11,919,500	
<b>Total Storage Estimated Storate (75%)</b>		
		<b>MAG*50/TERS</b>
BRAZOS RIVER ALLUVIUM AQUIFER	21,000	733.81%
CARRIZO-WILCOX AQUIFER	35,250,000	3.17%
QUEEN CITY AQUIFER	487,500	0.57%
SPARTA AQUIFER		
YEGUA-JACKSON AQUIFER		
Total	35,758,500	3.56%

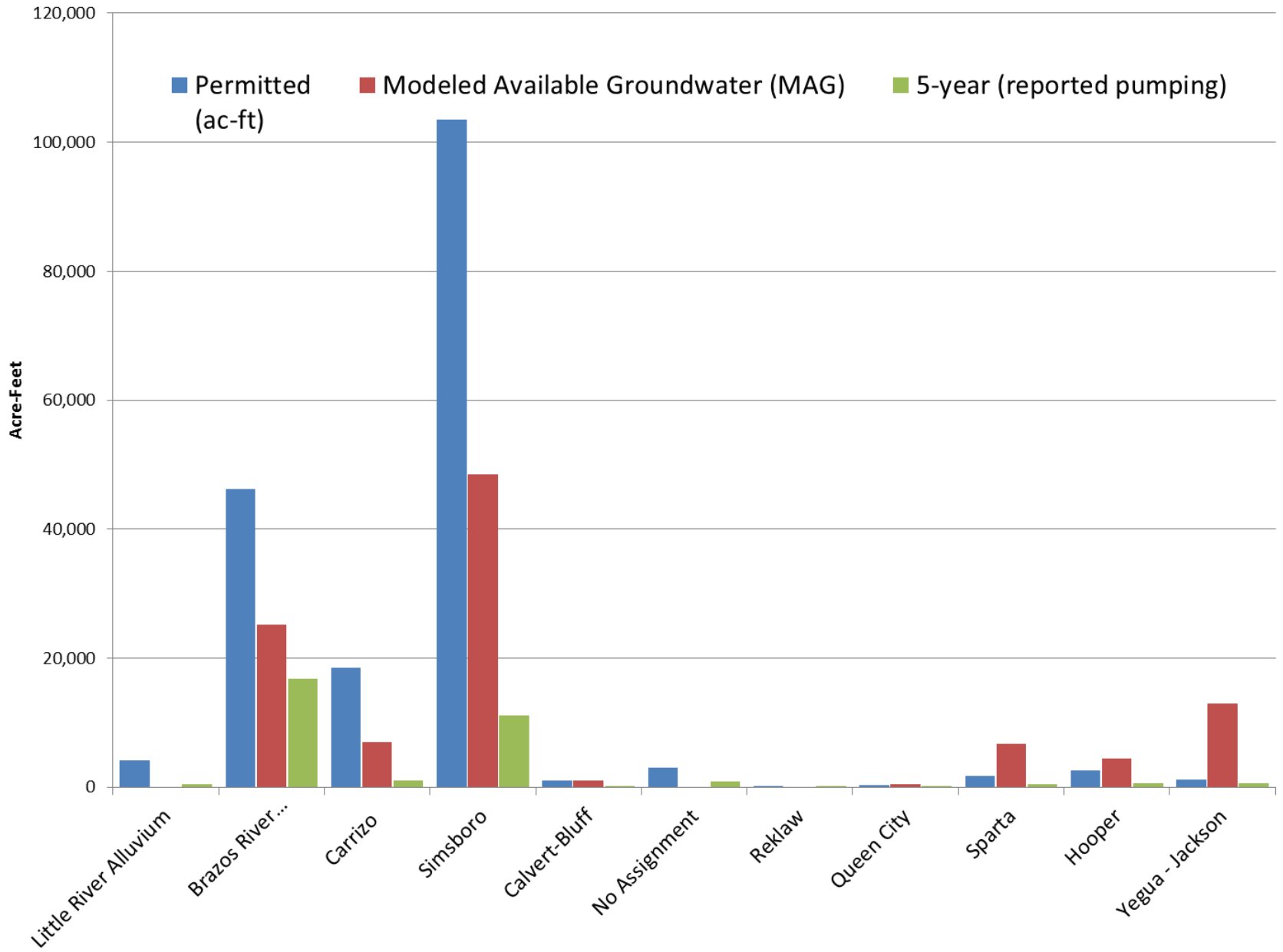
**Summary of Permitted and Monitoring Wells in Post Oak Savannah GCD (as of 2013)**

<b>Aquifer</b>	<b>Number Wells</b>	<b>Number Permits</b>	<b>% Wells in Aquifer that are Permitted</b>	<b>% of Permitted Wells in Aquifer</b>	<b>Monitor Wells</b>
<i>Brazos River Alluvium</i>	773	336	43%	49%	7
<i>Sparta</i>	813	28	3%	4%	7
<i>Queen City</i>	789	10	1%	1%	8
<i>Carrizo-Wilcox</i>	1651	196	49%	29%	48
<i>Carrizo</i>	261	42	16%	6%	8
<i>Calvert Bluff</i>	436	10	2%	1%	5
<i>Simsboro</i>	468	123	26%	18%	29
<i>Hooper</i>	486	21	4%	3%	6
<i>Yegua-Jackson</i>	1676	29	2%	4%	3
<i>No Assignment</i>	2967	88	3%	13%	-
<b>Total</b>	<b>8669</b>	<b>687</b>	-	<b>100%</b>	<b>73</b>

**Summary of Permitted and Monitoring Wells in Post Oak Savannah GCD  
(note: Carrizo-Wilcox Permits are broken out by individual aquifers)**

<b>Permit Type</b>	<b>Little River</b>	<b>BRA</b>	<b>Sparta</b>	<b>Queen City</b>	<b>Carrizo-Wilcox</b>	<b><i>Carrizo</i></b>	<b><i>Calvert Bluff</i></b>	<b><i>Simsboro</i></b>	<b><i>Hooper</i></b>	<b>Yegua-Jackson</b>	<b>Not Assigned</b>	<b>Total</b>
Historic Use	661	38,525	550	94	26,303	2,611	895	21,018	1,779	343	1,425	<b>67,902</b>
Operation	3,914	7,888	1,241	223	99,167	15,911	165	82,245	846	839	8,856	<b>122,128</b>
<b>Total</b>	<b>4,575</b>	<b>46,413</b>	<b>1,792</b>	<b>317</b>	<b>125,470</b>	<b>18,522</b>	<b>1,060</b>	<b>103,263</b>	<b>2,625</b>	<b>1,182</b>	<b>10,282</b>	<b>190,030</b>

# POSGCD Resource Summary



## Comparison of Report Pumping and Permit

Aquifer	2008		2009		2010		2011		2012		5-yr Avg (reported pumping)
	Count	Sum	Count	Sum	Count	Sum	Count	Sum	Count	Sum	
Little River Alluvium	11	381	11	514	11	558	12	641	12	524	523.6
Brazos River Alluvium	192	14,256	172	10,507	241	18,708	277	24,448	257	15,850	16,753.8
Carrizo	30	848	29	446	34	1,052	39	1,773	39	1,329	1,089.6
Simsboro	44	3,614	108	11,165	109	10,954	56	17,355	113	12,545	11,126.6
Calvert-Bluff	5	201	6	222	7	186	6	256	7	158	204.6
No Assignment	19	428	24	764	40	808	43	1,822	39	1,003	965.0
Reklaw	1	0	2	4	2	4	1	0	1	0	1.6
Queen City	5	164	5	194	9	205	7	225	7	186	194.8
Sparta	9	243	8	334	17	563	20	678	18	754	514.4
Hooper	11	521	14	590	17	648	17	912	20	624	659.0
Yegua - Jackson	17	425	14	337	25	451	30	1,066	29	645	584.8

Aquifer	No. Permits	Permitted (ac-ft)	% Permitted
Little River Alluvium	23	4,129.78	2.26%
Brazos River Alluvium	331	46,279.19	25.36%
Carrizo	42	18,521.85	10.15%
Simsboro	122	103,517.35	56.72%
Calvert-Bluff	9	1,034.98	0.57%
No Assignment	59	3,046.14	1.67%
Reklaw	3	40.36	0.02%
Queen City	10	320.37	0.18%
Sparta	27	1,800.70	0.99%
Hooper	21	2,624.91	1.44%
Yegua - Jackson	29	1,181.61	0.65%

% Produced <sup>†</sup> (5-yr avg.)
13%
36%
6%
11%
20%
32%
4%
61%
29%
25%
49%

Modeled Available Groundwater (MAG)	% Produced <sup>‡</sup> (5-yr avg.)
N/A	N/A
25,138	67%
7,059	15%
48,501	23%
1,038	20%
-	-
-	-
502	39%
6,734	8%
4,422	15%
12,923	5%

<sup>†</sup> Percentage of 5-year average reported pumping as compared to total permitted.

<sup>‡</sup> Percentage of 5-year average reported pumping as compared to the MAG.

GMA-12 Meeting  
June 24, 2009  
Milano Community and Civic Center

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 9<sup>th</sup> POSGCD Board Meeting. This methodology calculates an average drawdown using the following parameters:

- Average drawdown in unconfined portion of the aquifer
- Allowable percent decline in the artesian pressure in the confined portion of the aquifer
- Maximum allowable drawdown in the confined portion of the aquifer
- Area of the unconfined portion of the aquifer
- Area of the confined portion of the aquifer

POSGCD selected a DFC metric that is tied directly to a water levels because water levels can be used to address a wide-range of key management issues if the proper field measurements and analysis are performed. Among these key management issues are the following:

- Amount of protection for existing pumping wells (water level comparison to well screen intervals and pump locations)
- Volumetric change in aquifer storage (change in water level multiplied by aquifer storativity)

- Groundwater-surface water interaction (estimated flow exchange based on comparisons between groundwater levels and stream level and stream bottom)
- Groundwater flow directions and rates (application of Darcy's Law )
- Improvements to on-going evaluation of GAMs (additions of additional calibration targets)

Throughout the next several months, POSGCD will evaluate the preliminary DFCs with respect to stakeholder concerns, information and model results generated by the joint-planning process, databases and analysis being performed by POSGCD staff and consultants. On-going work by POSGCD includes the updates to its monitoring program, development of its well database, a review of historical and future pumping estimates, a review of existing data on surface-water groundwater interactions, analyses of GAM simulations, and analyses of geohydrologic data such as water levels, water quality parameters, and pumping test results.

## Hooper Aquifer

### Example Calculation of a DFC Based on Drawdown(DD) Criteria for the Unconfined and Confined Regions

Conditions			Desired Future Conditions - Drawdown
			Aquifer
DD in Unconfined Area	% Decline in artesian pressure	Max DD in Confined Area	Hooper
10	0.25	200	164
15	0.25	200	164
20	0.25	200	165
25	0.25	200	165
20	0.25	100	88
20	0.25	150	127
20	0.25	200	165
20	0.25	250	201
20	0.25	300	236
20	0.33	100	89
20	0.33	150	129
20	0.33	200	169
20	0.33	250	207
20	0.33	300	243
Area (sq. miles) based on 2000 heads		Confined	1116
		Unconfined	124
Average head (ft) 2000		Confined	312.0
		Unconfined	369.9
Storage Volume (acre-ft) 2000		Confined	53,443,897
		Unconfined	1,401,128
Storage Volume (acre-ft) 2060		Confined	53,412,122
		Unconfined	1,156,350
Total Withdrawn (acre-ft)			276,552



# **MONITORING NETWORK**

## **WATER LEVEL TRENDS**

**GMA 12 MEETING**  
**JUNE 6, 2014**



# Monitor Well Count

## as of 12/31/2013

Aquifer	Management Zone	
	Shallow	Deep
<i>Hooper</i>	6	0
<i>Simsboro</i>	12	17
<i>Calvert Bluff</i>	5	0
<i>Carrizo</i>	4	4
<i>Queen City</i>	5	3
<i>Sparta</i>	0	7
<i>Yegua-Jackson</i>	N/A	3
<i>Brazos River Alluvium</i>	7	N/A



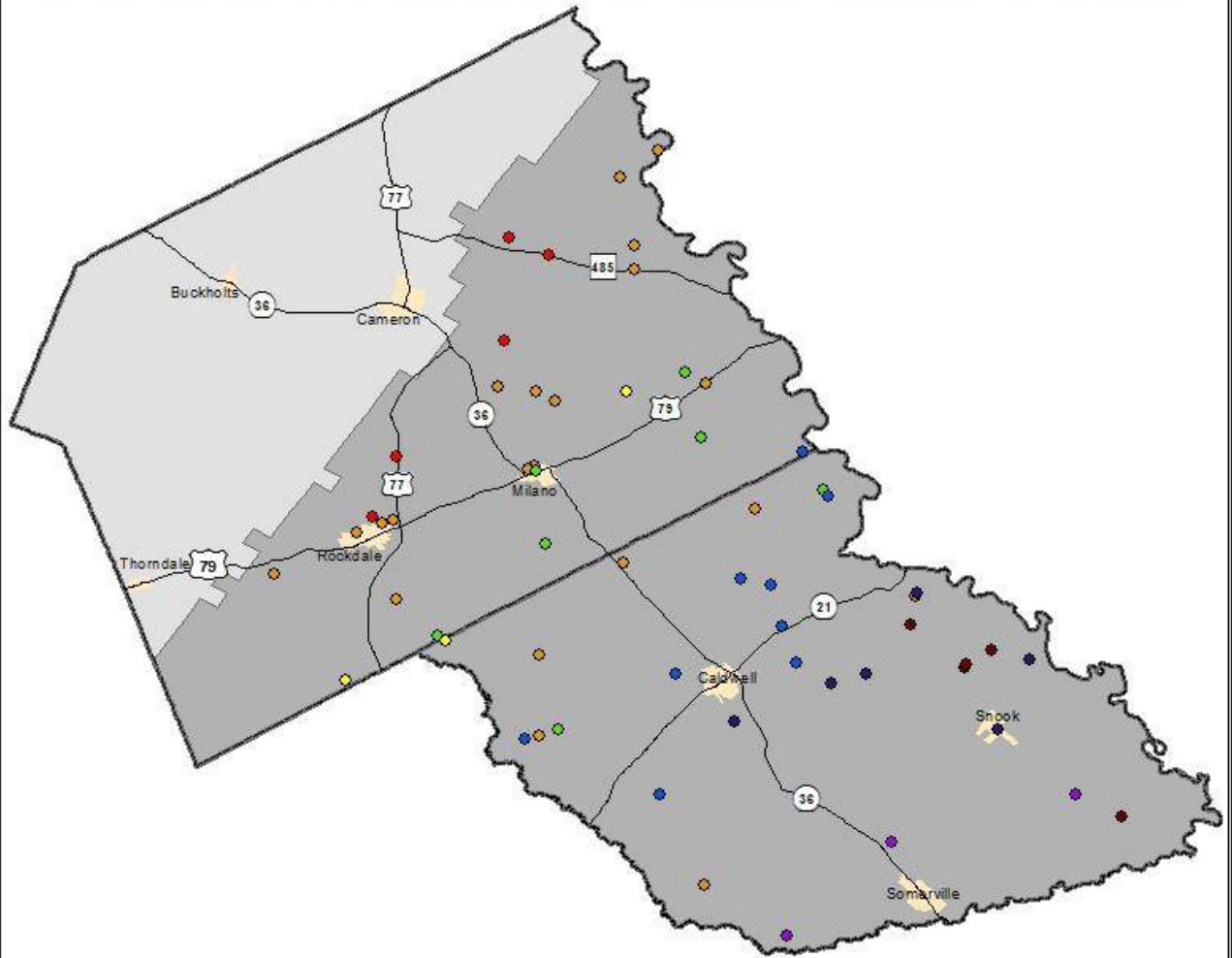
# Summary

- 73 monitoring wells
  - 60 incidental wells
  - 13 continual wells
- Preliminary Analysis:

Aquifer	Zone	# wells	Water Levels				Trend Last Five (5) Years
			Mean	Max	Min	Range	
Hooper	Shallow	6	354	401	239	162	<i>relatively constant, most wells dropping ~5 ft.</i>
Simsboro	Shallow	12	309	471	212	259	<i>relatively constant, most wells dropping ~2-10 ft, a couple dropped &gt;10 ft</i>
Simsboro	Deep	17	248	328	116	212	<i>some wells dropping, but several raising as much as 30 ft.</i>
Calvert Bluff	Shallow	5	329	411	254	158	<i>Mixed results, No apparent trend</i>
Carrizo	Shallow	4	330	458	268	190	<i>relatively constant, mostly dropping ~2-6 ft.</i>
Carrizo	Deep	4	303	319	273	46	<i>relatively constant, mostly dropping ~2-6 ft.</i>
Queen City	Shallow	5	299	352	251	101	<i>relatively constant, a couple wells dropping ~10 ft.</i>
Queen City	Deep	3	302	321	291	30	<i>need more data, but trending downward</i>
Sparta	Deep	7	251	294	173	121	<i>relatively constant, mostly dropping no more than ~10 ft.</i>
Yegua-Jackson		3	209	220	199	22	<i>Mixed results, No apparent trend</i>
Brazos River Alluvium		7	210	246	172	74	<i>Relatively constant, dropping ~10 ft.</i>

\*Note: Data is preliminary and needs to be checked and verified

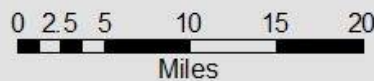
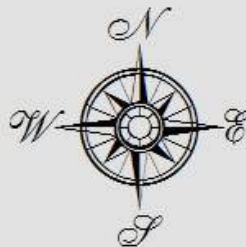
# POST OAK SAVANNAH GCD MONITORING NETWORK



## Monitor Wells

- Hooper
- Simsboro
- Calvert Bluff
- Carrizo
- Queen City
- Sparta
- Yegua - Jackson
- Brazos River Alluvium

- Management Zone
- District Boundary



**DISCLAIMER**  
 This map was created by Post Oak Savannah GCD to illustrate the location of wells in the District's Monitoring Network that were reported to TWDB in 2014. The scale and location of all mapped data are approximate.

Map prepared by Bobby Bazan  
 6 June, 2014  
 POSGCD - Water Resources Specialist