

## **Region G Water Use Estimates of BRAA – 2021 State Water Plan**

Following the GMA 12 DFC Planning Meeting held July 24, 2020, there was a question raised regarding Brazos River Alluvium Aquifer (BRAA) water use values used by Region G Water Planning Group (RGWPG) during the current 2021 planning cycle for the 2021 State Water Plan. Specifically, it was asked why BRAA water use estimated for Post Oak Savannah GCD remained static through the 50-year planning period and values for Brazos Valley GCD declined over the same period of time by 4,000+ ac-ft.

The General Manager asked John Seifert to get an explanation from David Dunn, RGWPG contractor/planner. Following are clarifications from both Dunn and John addressing the question.

# Post Oak Savannah GCD - Supply/Demand Surplus

Post Oak Savannah GCD	2020	2030	2040	2050	2060	2070
<b>Groundwater Supply – All Categories</b>						
Brazos River Alluvium Aquifer	29,771	29,771	29,771	29,771	29,771	29,771
Carrizo-Wilcox Aquifer	9,576	8,646	8,143	8,581	8,761	8,730
Queen City Aquifer	303	306	306	306	306	306
Sparta Aquifer	1,496	1,496	1,496	1,496	1,496	1,496
Yegua-Jackson Aquifer	2,992	2,992	2,992	2,992	2,992	2,992
Trinity Aquifer	102	100	98	98	96	94
<b>Groundwater Supply Total</b>	<b>44,240</b>	<b>43,311</b>	<b>42,806</b>	<b>43,244</b>	<b>43,422</b>	<b>43,389</b>
<b>Surface Water Supply – All Categories</b>						
Local Surface Water Supply	4,151	4,151	4,151	4,151	4,151	4,151
Brazos River Authority Little River Lake/Reservoir System	971	959	948	947	934	921
Brazos River Run-of-River	2,834	2,834	2,834	2,834	2,834	2,833
<b>Surface Water Supply Total</b>	<b>7,956</b>	<b>7,944</b>	<b>7,933</b>	<b>7,932</b>	<b>7,919</b>	<b>7,905</b>
<b>Total Supply – All Categories</b>	<b>52,196</b>	<b>51,255</b>	<b>50,739</b>	<b>51,176</b>	<b>51,341</b>	<b>51,294</b>
<b>Total Demand – All Categories</b>	<b>78,472</b>	<b>79,681</b>	<b>79,477</b>	<b>79,364</b>	<b>79,242</b>	<b>79,261</b>
<b>Total Surplus/Need – All Categories</b>	<b>-26,276</b>	<b>-28,426</b>	<b>-28,738</b>	<b>-28,188</b>	<b>-27,901</b>	<b>-27,967</b>

# Brazos Valley GCD - Supply/Demand/Surplus

Brazos Valley GCD	2020	2030	2040	2050	2060	2070
<b>Groundwater Supply – All Categories</b>						
Brazos River Alluvium Aquifer	103,459	100,257	99,931	99,842	99,801	99,778
Carrizo-Wilcox Aquifer	81,530	81,593	81,647	81,685	81,724	81,747
Queen City Aquifer	768	709	709	709	709	709
Sparta Aquifer	5,572	6,616	6,750	6,759	6,771	6,771
Yegua-Jackson Aquifer	3,429	3,429	3,430	3,432	3,433	3,434
<b>Groundwater Supply Total</b>	<b>194,758</b>	<b>192,604</b>	<b>192,467</b>	<b>192,427</b>	<b>192,438</b>	<b>192,439</b>
<b>Surface Water Supply – All Categories</b>						
Brazos River Authority main Stem Lake/Reservoir System	17,379	15,979	14,578	13,177	11,777	10,375
Dansby Power Plant/Bryan Utilities Lake/Reservoir	195	195	195	195	195	195
Local Surface Water Supply	4,291	4,291	4,291	4,291	4,291	4,291
BRA System Operations Permit	21,388	22,816	24,245	25,674	27,102	28,532
Brazos River Run-of-Rive	366	297	228	159	90	21
Twin Oak Lake/Reservoir	2,900	2,872	2,844	2,816	2,788	2,760
<b>Surface Water Supply Total</b>	<b>46,519</b>	<b>46,450</b>	<b>46,381</b>	<b>46,312</b>	<b>46,243</b>	<b>46,174</b>
<b>Total Supply – All Categories</b>	<b>241,277</b>	<b>239,054</b>	<b>238,848</b>	<b>238,739</b>	<b>238,681</b>	<b>238,613</b>
<b>Total Demand – All Categories</b>	<b>227,280</b>	<b>238,047</b>	<b>247,893</b>	<b>257,226</b>	<b>262,514</b>	<b>271,026</b>
<b>Total Surplus/Need – All Categories</b>	<b>13,997</b>	<b>1,007</b>	<b>-9,045</b>	<b>-18,487</b>	<b>-23,833</b>	<b>-32,413</b>



## **Seifert Explanation of Region G Estimated Uses of BRAA Water Supply**

The presentation on Water Needs and Strategies at the last GMA 12 meeting on July 24 included a slide that showed the groundwater supply from the Brazos River Alluvium in the BVGCD was 103,459 acre feet per year in 2020 and was 99,778 acre feet per year by 2070. In the same presentation the Brazos River Alluvium supply in the Post Oak Savannah GCD was estimated at 29,771 acre feet per year in 2020 and 29,771 acre feet per year in 2070. The two slides are attached. The availability numbers were obtained from the Region G Water Plan nearing completion. The estimates are based on the following.

- The estimate for the BVGCD is based on a model run performed by the Texas Water Development Board in 2017 where they used the desired future conditions for the alluvium adopted by the BVGCD in 2016 and with those conditions, the amount of water available was estimated by the model. The model used was the TWDB Brazos River Alluvium model developed in 2016. With the model, a slightly higher amount of water was estimated to be available in 2020 (103,459 acre feet per year) than in 2070 (99,778 acre feet per year). This is because the model was run with a limit on the amount of drawdown that could occur and to not exceed that limit with longer pumping times, the amount of water that was pumped was reduced slightly. Many model simulations are performed with the pumping rate constant and the drawdown increasing with time of pumping. The TWDB simulation was performed with a restriction on drawdown resulting in some variation in the pumping rate.
- The estimated alluvial supply developed by Region G planning also assumed that there was some well pumping capacity limit in Brazos County that limited the amount of groundwater that could be pumped there. With that restriction the pumping amount from Brazos County was 42,298 acre feet per year of the total amounts given above for 2020 and 2070.

- The Region G water planning estimate of the water supply in the Post Oak Savannah GCD is based on the same model simulation but also on an estimate, by the water planners, that the supply is limited by the available pumping capacity of wells in the GCD. With a limitation on pumping due to limited well pumping capacity, a lower supply of 29,771 acre feet per year was estimated for the 2020-2070 period. This amount of supply is substantially below the estimated modeled available groundwater for the GCD of about 76,000 acre feet per year developed during the 2016 cycle of GMA 12 planning.

The circumstance is that State Regional Planning uses some different matrix and assumptions in estimating available supply whether from groundwater or surface water.

## **Region G Planner Explanation of BRAA Estimated Uses**

Attached is a spreadsheet containing some interim computations made to determine groundwater supplies available to entities in the two GCDs in question. These are not the final numbers, as we reduced supply available to Steam-Electric at the very last minute and that change isn't reflected in the attached number. However, they will demonstrate the reason that supplies reduce in some counties and not in others.

The first set of numbers in the table, columns D-I, are the MAG numbers. The Brazos County C-W reflects the MAG x PF and is greater than the base MAG.

The next set of numbers, columns J-O, are the supplies available based on our knowledge of well capacities, from TCEQ and TWDB databases. Those are typically rated capacity x 0.5 x 0.95. The 0.5 reflects adjustment to account for summer peaking. You can't assume the full well capacity is available year round because you have to have some reserve to account for peaking. It's a bit different for irrigation and other uses.

The final set of numbers, columns P-U, are the final allocation of the MAG based on the well capacities and not exceeding the MAG. In instances where the combined well capacities exceed the MAG, the supplies are reduced for all users to just meet the MAG. The Brazos River Alluvium in Robertson County is an example where the supply is limited to the MAG and not on well capacities.

In those cases where supplies are limited by the MAG, then the supplies will follow the pattern of the MAG, i.e., if the MAG changes decade to decade, then the supplies will follow suit. The Brazos River Alluvium is an example, again, of where the MAG decreases over time, the supplies are limited to the MAG, so the supplies follow that pattern and decrease over time.

There are no decreasing supplies in Milam and Burleson Counties (Post Oak) because the well capacities are always less than the MAG, and the MAGs don't change as much as they do in Brazos and Robertson Counties (Brazos Valley). Why? That is how the TWDB modeled the MAGs in order to meet the desired future conditions. As I've said, as a planner, I'd much prefer a static MAG than one that changes. The Carrizo-Wilcox is a prime example, where the MAG decreases from 2020-2030, then increases in 2050-2070. If the MAGs have to change, it is best that they increase over time and not decrease then increase.

Note that the supplies shown are those assigned to Brazos G entities only. In the case of Burleson County, there is a large part of the MAG that is assigned to SAWS through the Vista Ridge project, and doesn't show up as a Brazos G supply.

I hope this addresses your questions. Let me know if you need any more information.

David D. Dunn, PE