

GMA 12

Discussion of the Brazos River Alluvium Aquifer

by

GMA 12 Consultant Team

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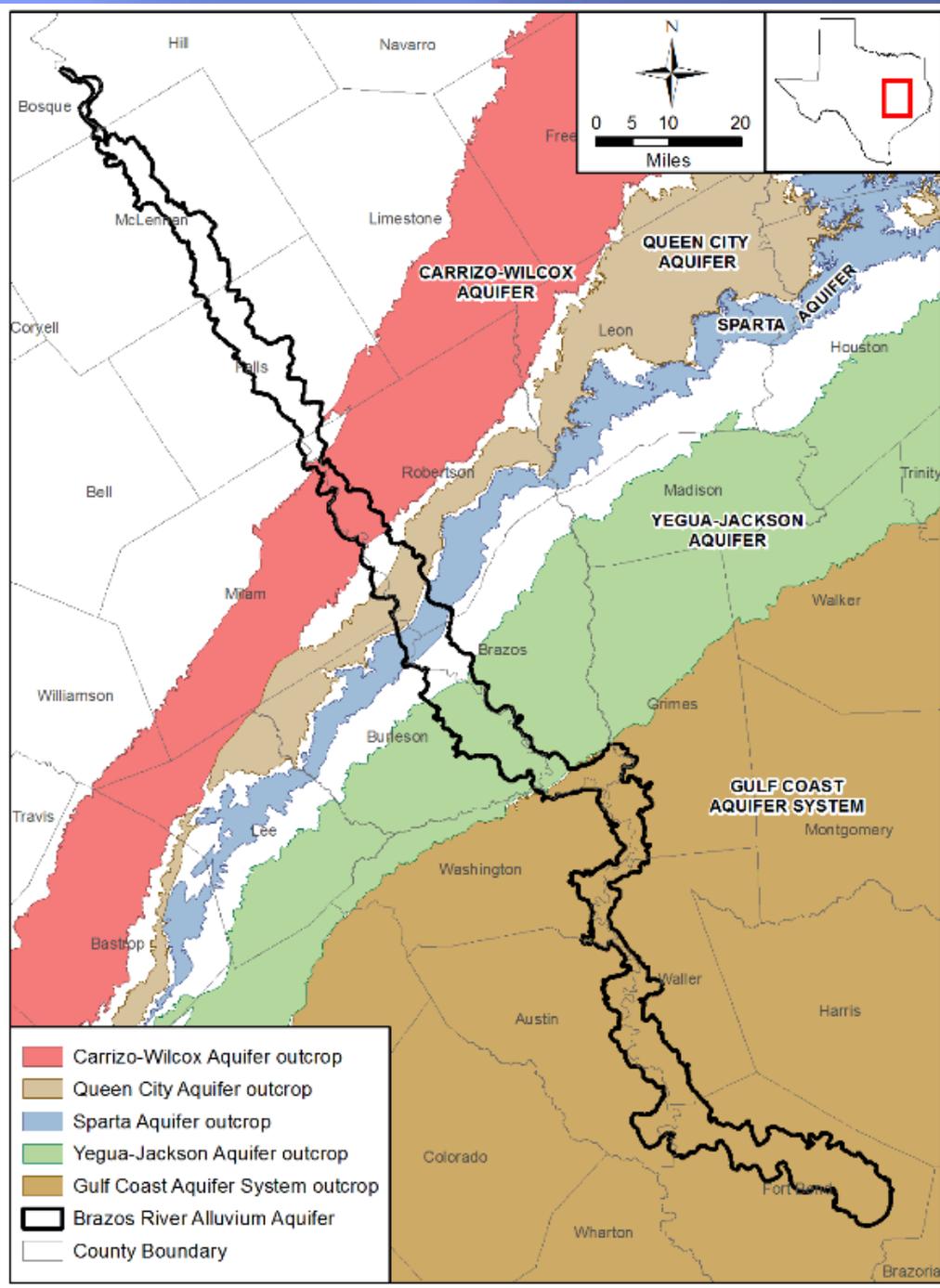
November 15, 2019

Brazos River Alluvium

Development of DFCs

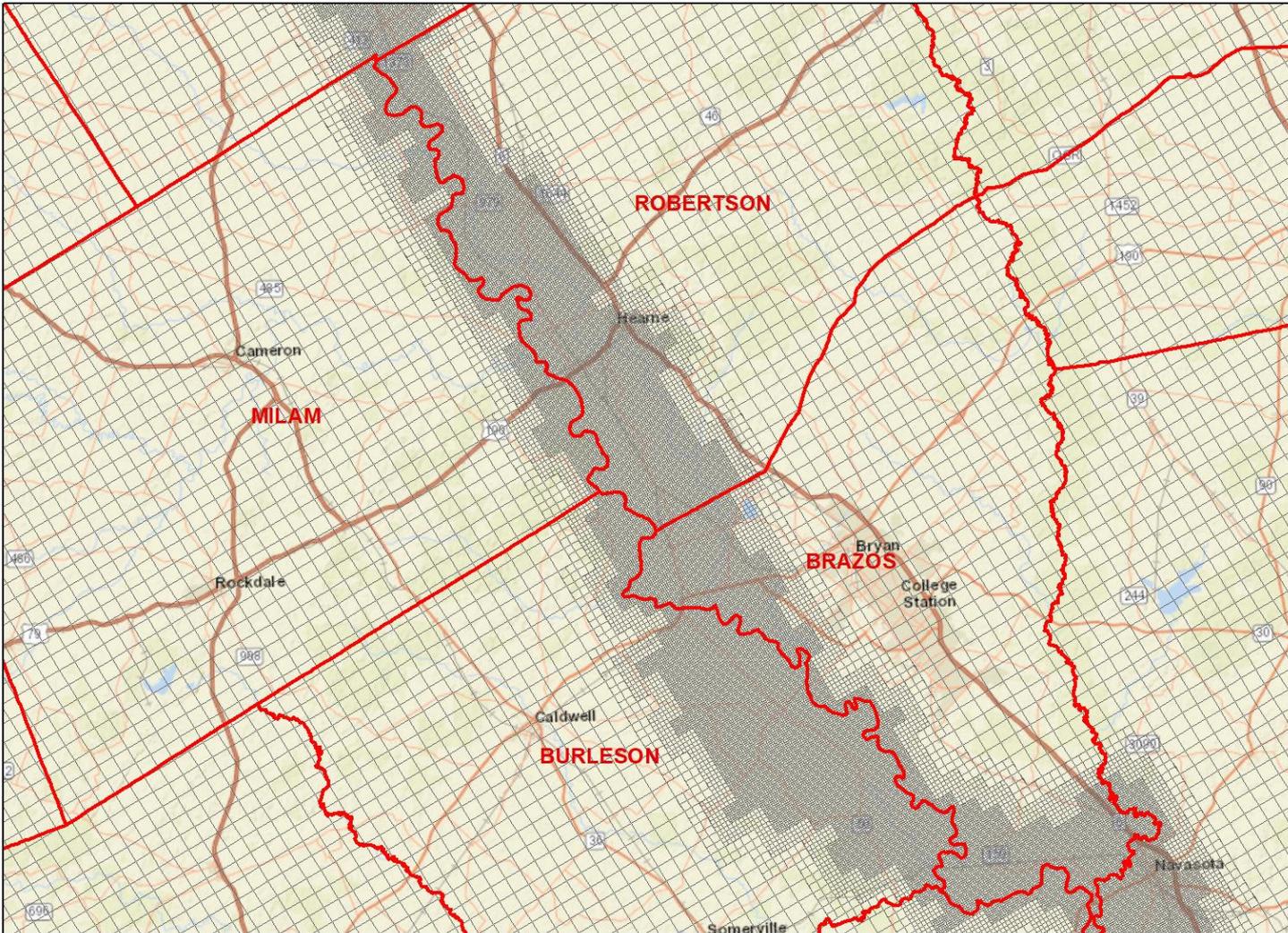
- ▣ Use the Brazos River Alluvium Aquifer GAM completed in 2016, the same GAM used to develop MAGS in the GMA 12 2016 planning cycle
- ▣ Develop distribution of pumping consistent with areas of irrigated agriculture in Milam, Burleson, Robertson and Brazos counties
- ▣ Consider pumping history in the counties and past effects of pumping when developing future DFCs

Extent of Brazos River Alluvium Model



*From: Final Numerical Model Report for the
Brazos River Alluvium Aquifer Groundwater
Availability Model, August 2016*

Model Grid for the BRAA GAM

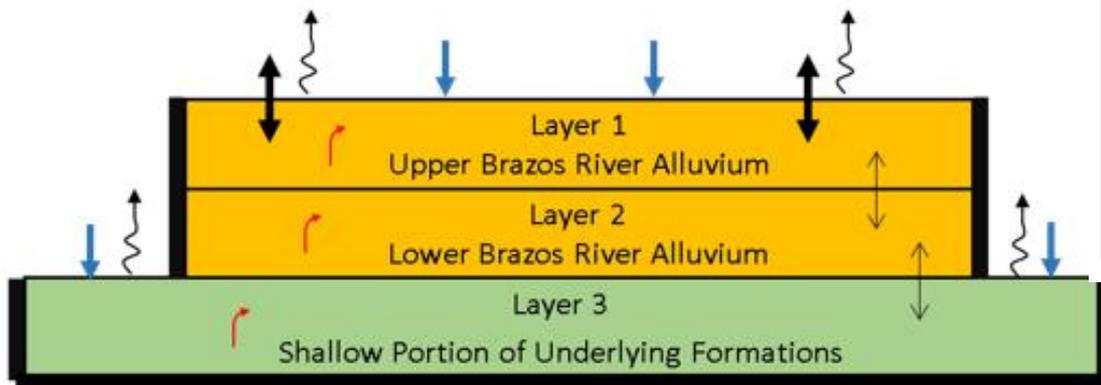
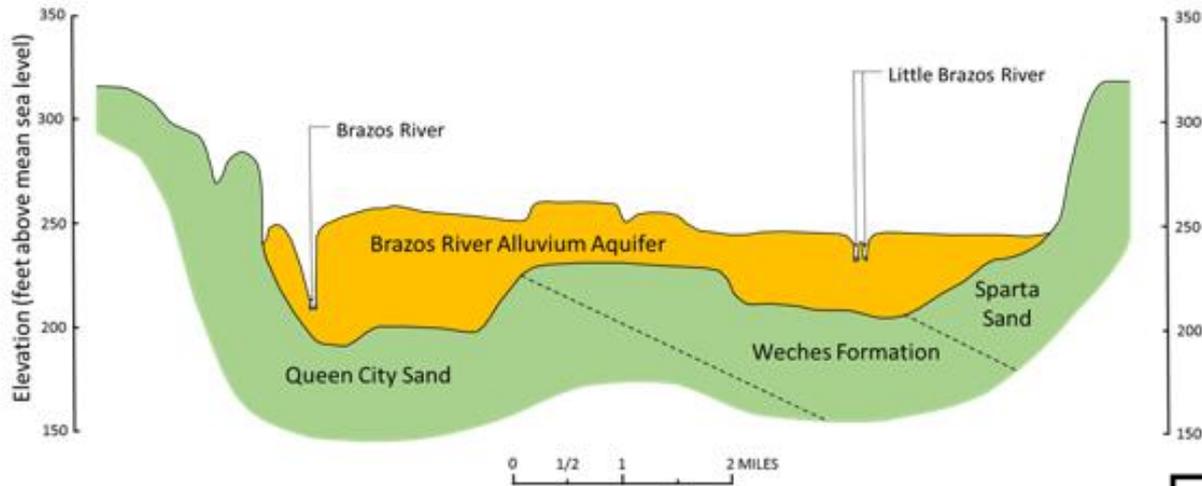


0 2.5 5 10 Miles



Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

Model Layer in BRAA GAM

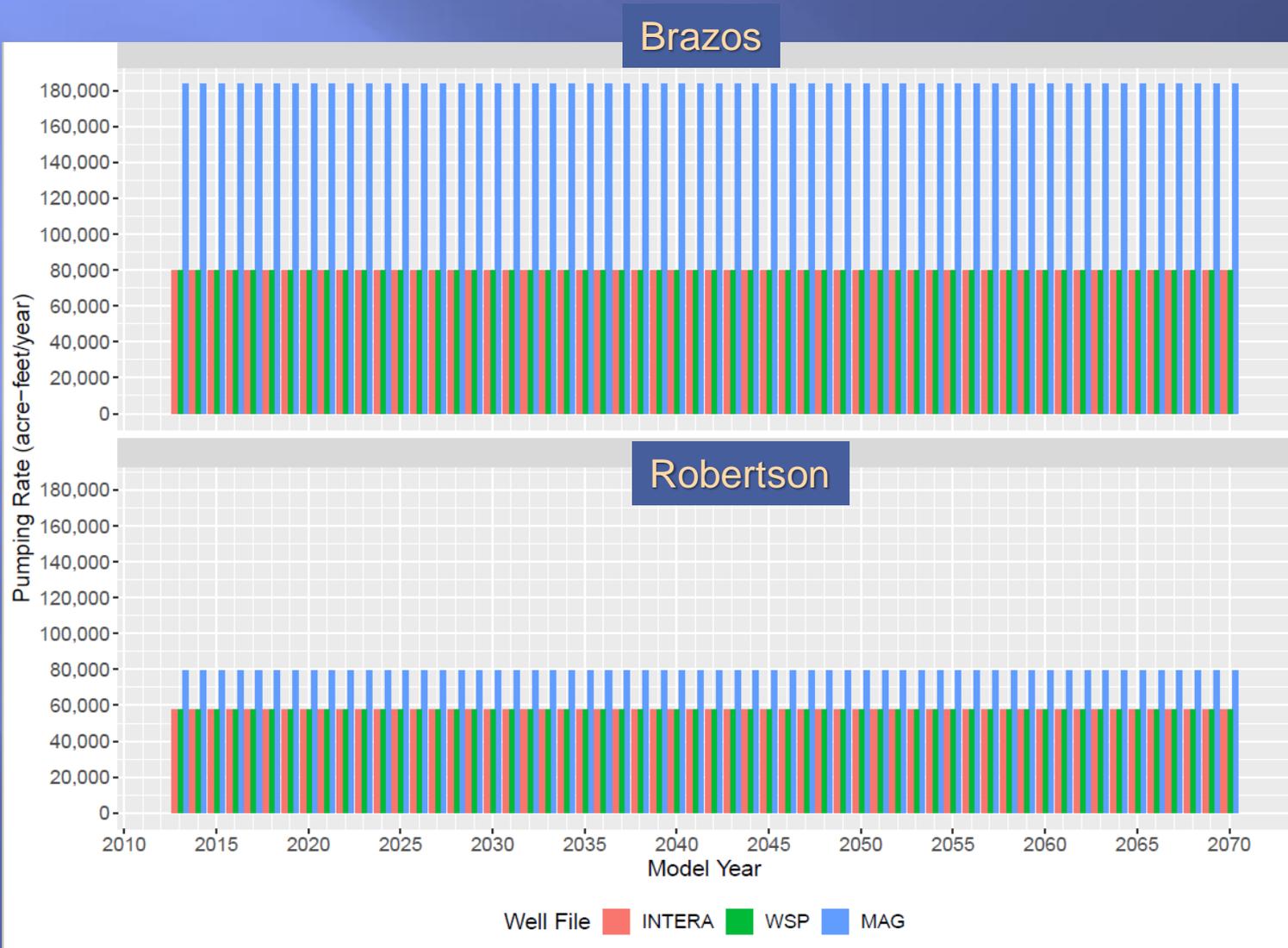


- Recharge
- ↔ Stream-Aquifer Interaction
- ↗ Evapotranspiration/Spring Discharge
- ↔ Cross-Formational Flow
- █ No-Flow Boundary
- ↪ Pumping

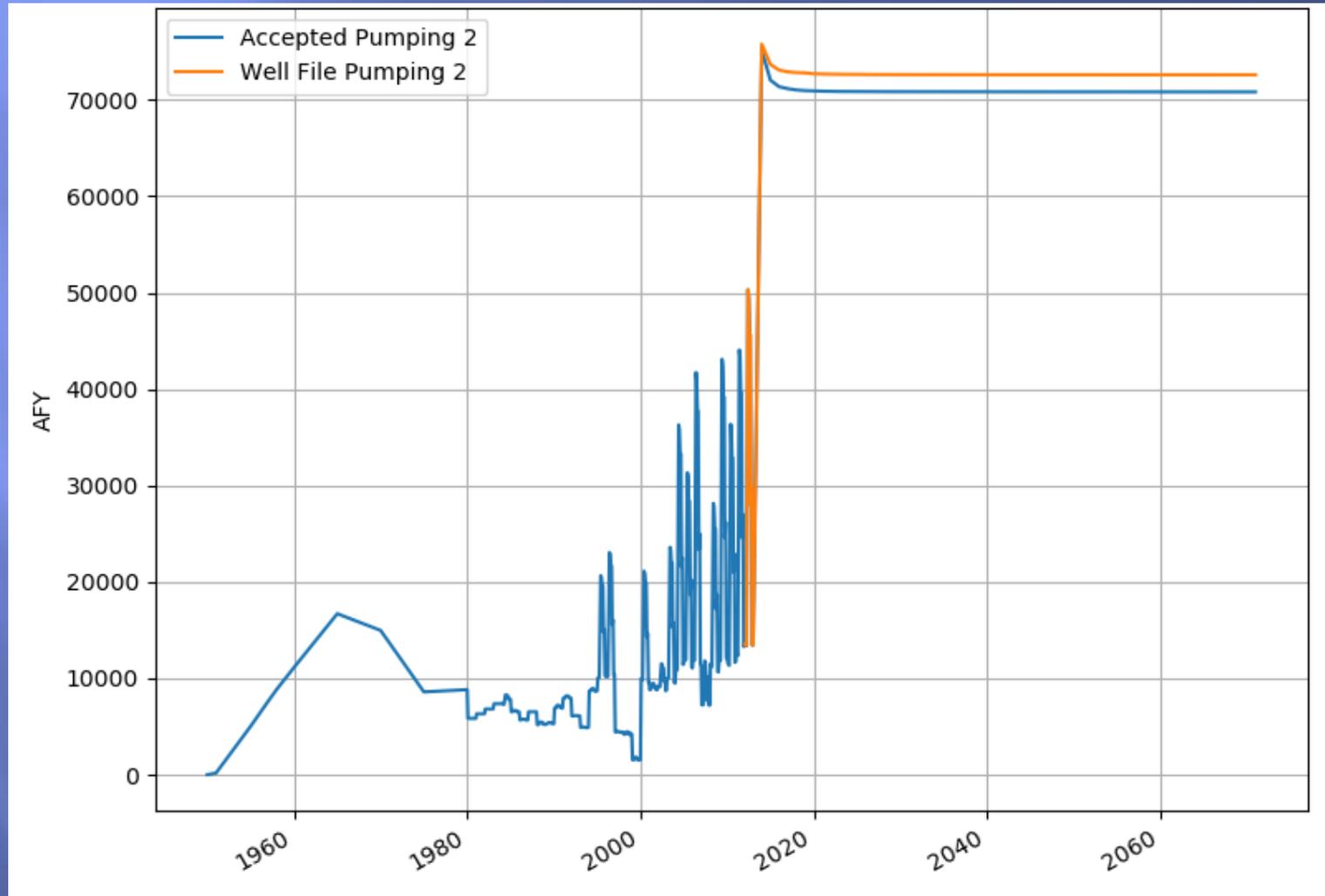
Modified TWDB MAG Run

- ▣ Reduced pumping in wells where initial pumping rates could not be sustained
- ▣ Avoided adding future pumping in same grid cells that include a river node
- ▣ Keep all the same hydraulic boundaries used by TWDB MAG Run

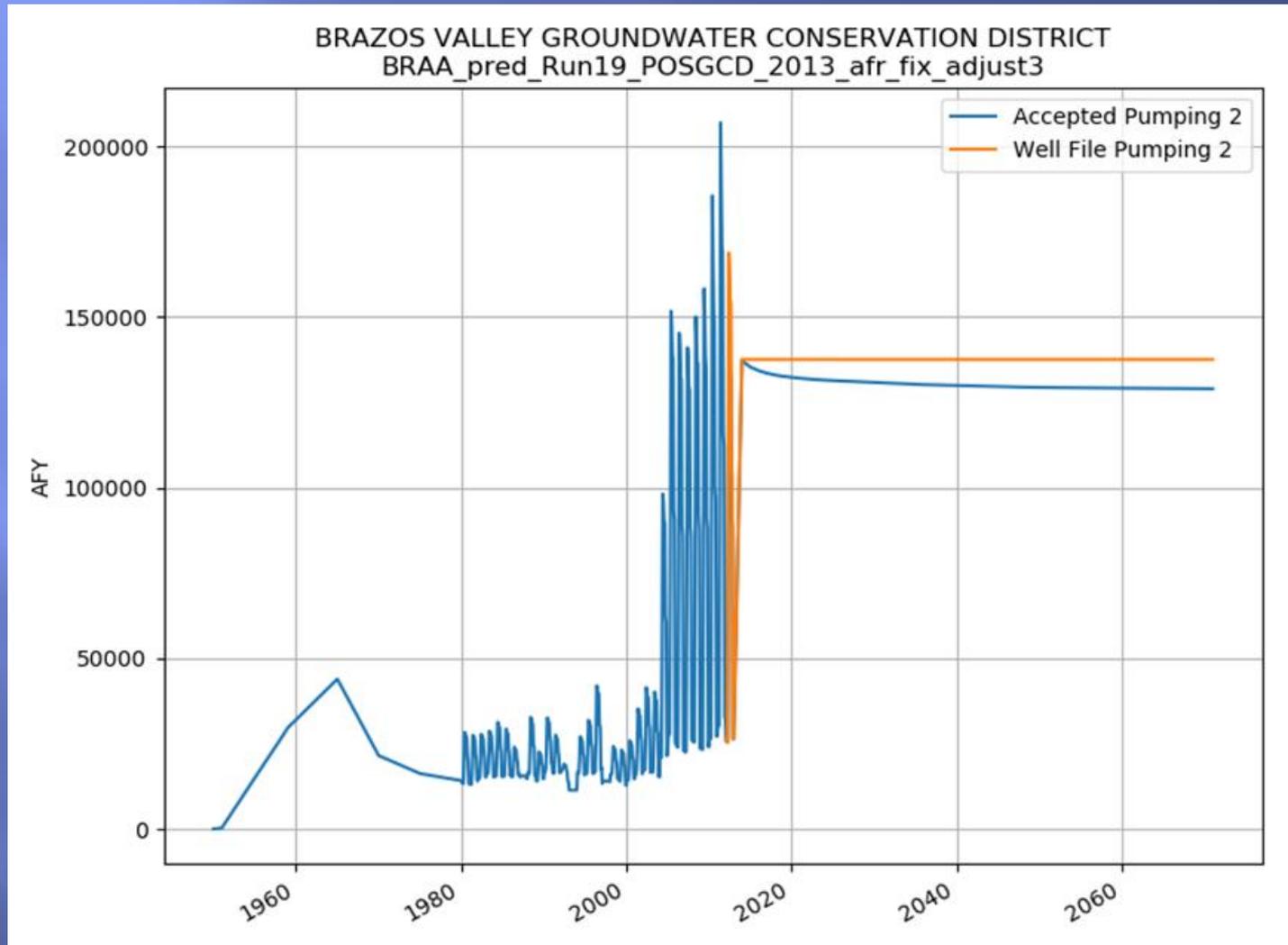
Comparison of Well Files For BVGCD



Comparison of Input and Output Pumping by District: POSGCD

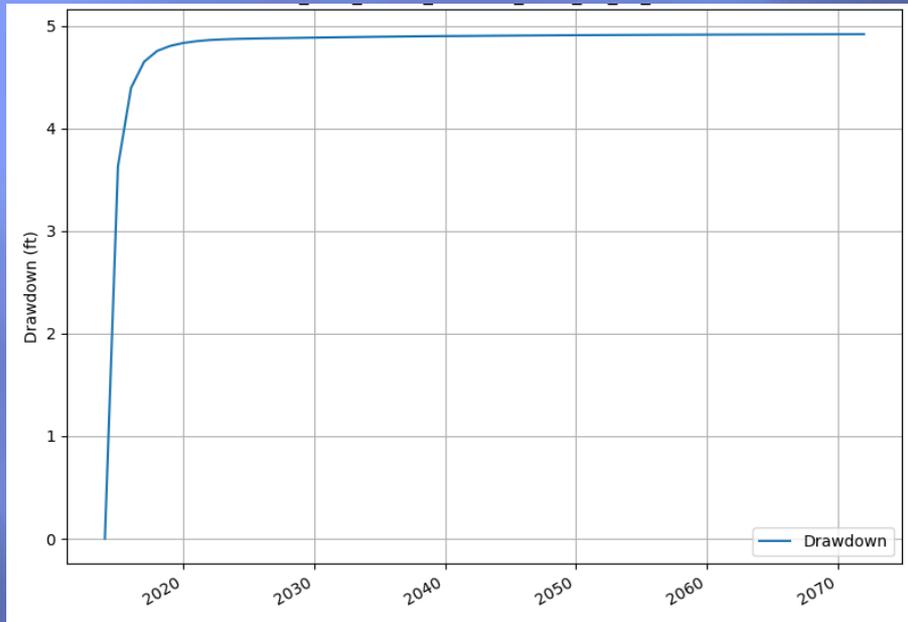


Comparison of Input and Output Pumping by District: BVGCD

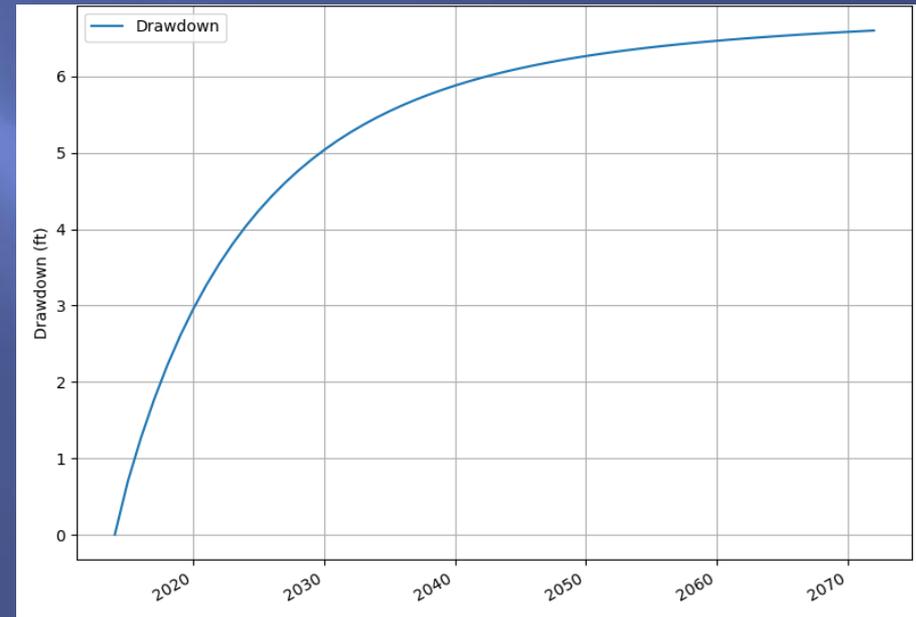


Average Drawdown in Alluvium: POSGCD

Milam

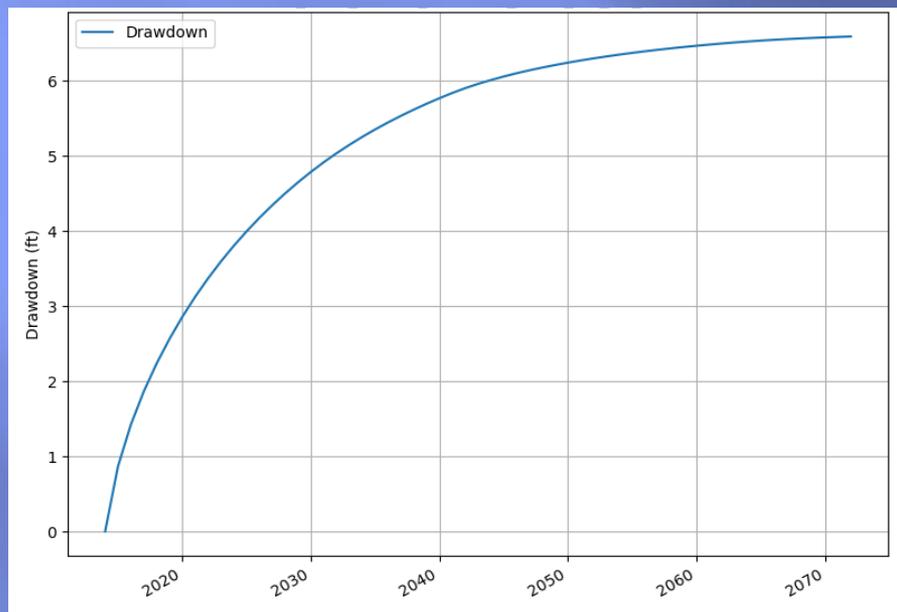


Burleson

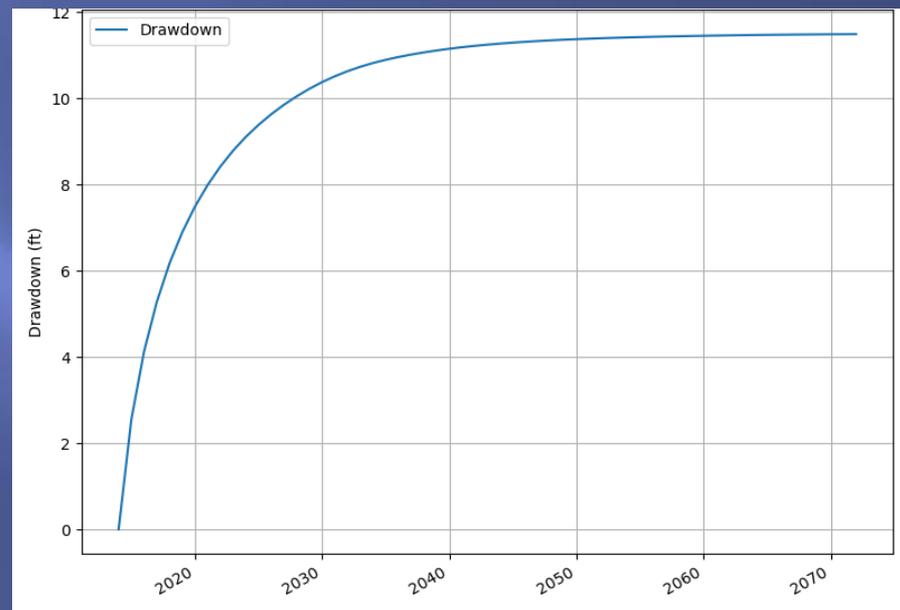


Average Drawdown in Alluvium: BVGCD

Robertson



Brazos



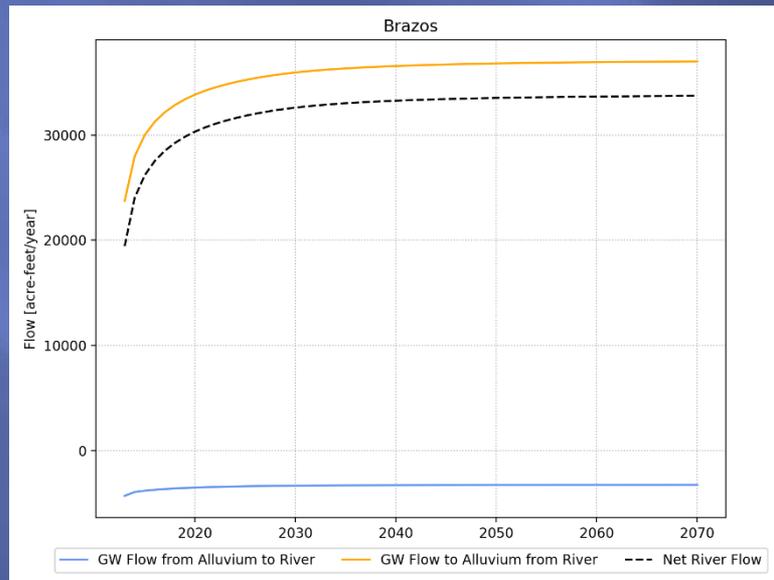
Reduction in Saturated Thickness

North Zone: 30%

South Zone: 44%

Surface Water-Groundwater Interaction

County	Flow From Alluvium to River (AFY)		Flow From River to Alluvium (AFY)		Net Flow (AFY)		Reduction in GW Contribution to River Flow (AFY) from 2013 to 2070
	2013	2070	2013	2070	2013	2070	
Milam	-1,158	-741	28,676	33,235	27,518	32,494	4,976
Robertson	-1,049	-711	22,288	27,245	21,240	26,534	5,294
Brazos	-4,305	-3,268	23,738	36,996	19,433	33,728	14,295
Burleson	-2,804	-1,851	22,194	34,206	19,391	32,355	12,964



Summary

- ▣ Current Simulation Closely Reproduces DFCs
- ▣ Resulting MAGs
 - Milam – 38,626 AFY
 - Burleson – 32,306 AFY
 - Robertson – 52,903 AFY
 - Brazos -76,038 AFY
- ▣ Approximately 37,500 AFY of the 200,00 AFY pumped in 2070 is from a reduction of groundwater contribution to river flow in 2012