DESIRED FUTURE CONDITION EXPLANATORY REPORT FOR GROUNDWATER MANAGEMENT AREA 12

This report was considered and approved by the member districts of Groundwater Management Area 12 on January 28, 2022.

Member Districts:

Brazos Valley Groundwater Conservation District
Fayette County Groundwater Conservation District
Lost Pines Groundwater Conservation District
Mid-East Texas Groundwater Conservation District
Post Oak Savannah Groundwater Conservation District

Prepared by:

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INTERA Incorporated, Austin, TX
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January 28, 2022

Certification

This report documents the work of the following licensed Texas professional geoscientists and engineers:

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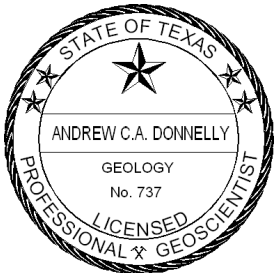

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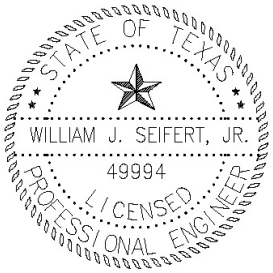

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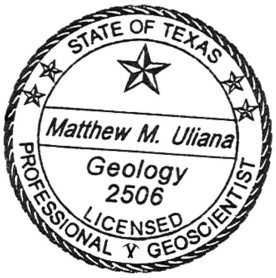

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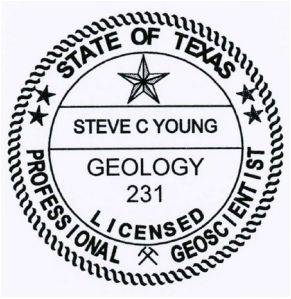

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Date

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Acronyms and Abbreviations

ac-ft/yr	acre-feet per year
DBS&A	Daniel B. Stephens & Associates, Inc.
DFCs	desired future conditions
GAM	groundwater availability model
GCD	Groundwater Conservation District
GMA	Groundwater Management Area
gpm	gallons per minute
HB	House Bill
INTERA	INTERA Incorporated
IO models	input/output models
MAG	modeled available groundwater
mg/L	milligrams per liter
PS	potential scenarios
RWPG	regional water planning group
SAM	social accounting matrix
TDS	total dissolved solids
TERS	total estimated recoverable storage
TWDB	Texas Water Development Board
WSC	Water Supply Corporation

1. Introduction

1.1 GMA 12

Groundwater management areas (GMAs) were created "in order to provide for the conservation, preservation, protection, recharging, and prevention of waste of the groundwater, and of groundwater reservoirs or their subdivisions, and to control subsidence caused by withdrawal of water from those groundwater reservoirs or their subdivisions, consistent with the objectives of Section 59, Article XVI, Texas Constitution . . ." (Texas Water Code §35.001). The responsibility for GMA delineation was delegated to the Texas Water Development Board (TWDB) (Section 35.004, Chapter 35, Title 2, Texas Water Code). The initial GMA delineations were adopted on December 15, 2002, and are modified as necessary according to agency rules. There are 16 GMAs in Texas. Figure 1-1 shows the boundaries of these 16 GMAs, including GMA 12.

GMAs consist of all groundwater conservation districts (GCDs) located within the GMA boundary. Figure 1-2 shows the location of the five GCDs that are contained wholly or in part within the boundary of GMA 12: Brazos Valley GCD, Fayette County GCD, Lost Pines GCD, Mid-East Texas GCD, and Post Oak Savannah GCD. The GMA area may also include counties that are not included in a GCD. GMA 12 includes portions of four counties that are not associated with GCDs: Falls, Limestone, Navarro, and Williamson counties.

Portions of three major aquifers, as defined by TWDB, fall within GMA 12: the Gulf Coast Aquifer, the Carrizo-Wilcox Aquifer, and the Trinity Aquifer. Figure 1-3 shows the outlines of the major aquifers within GMA 12. The Carrizo-Wilcox Aquifer is by far the most extensive and important aquifer in the region, occurring in all five GCDs and providing significant quantities of groundwater across the GMA. The other two major aquifers that occur within GMA 12 only occur in a very limited area within the GMA; the Gulf Coast Aquifer only outcrops in a very small area in the southernmost portion of Brazos County, along the southeast boundary of GMA 12, and the Trinity Aquifer subcrop only exists in a small area along the northwest GMA 12 boundary in Bastrop, Lee, and Williamson counties.

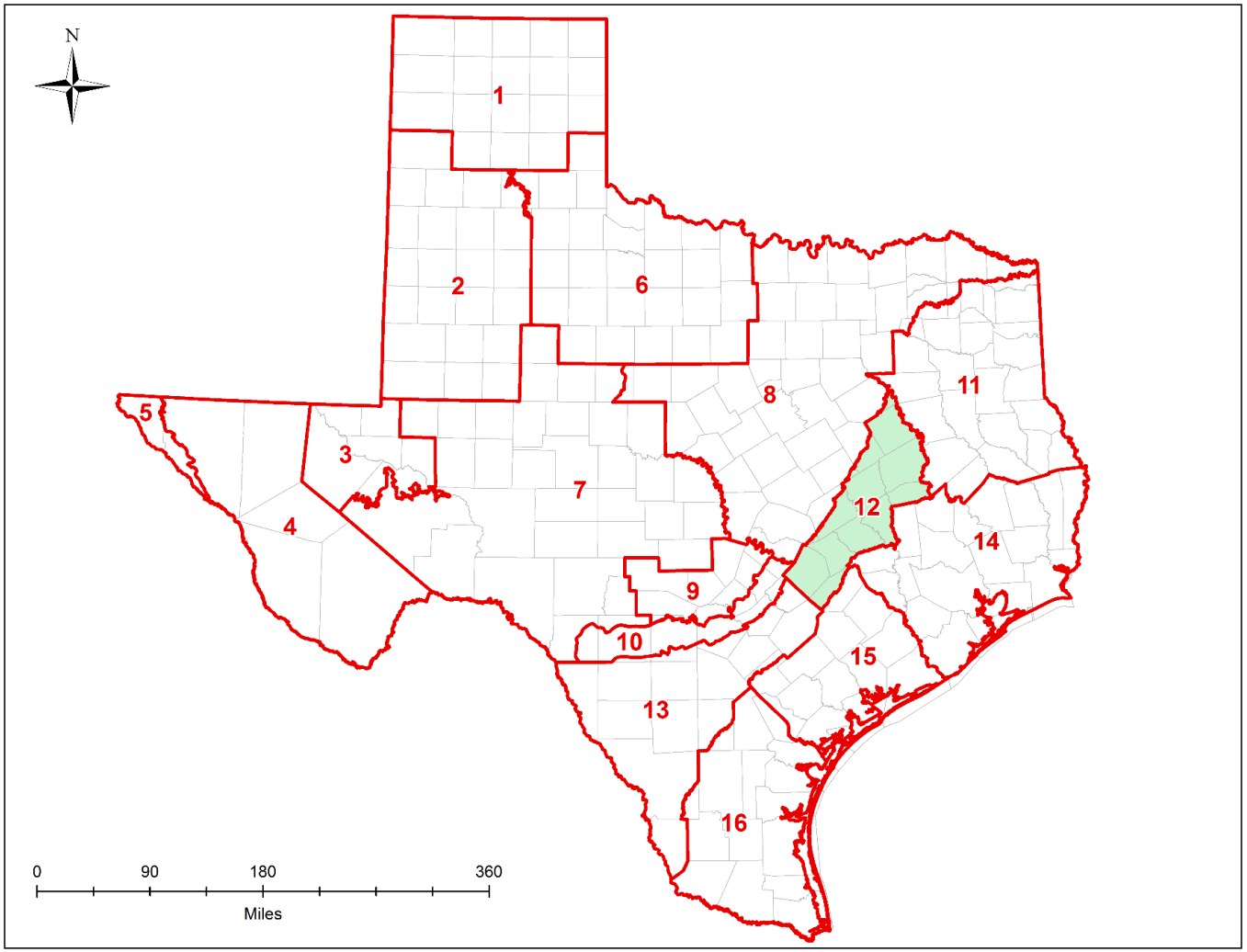

Figure 1-1. Groundwater Management Areas in Texas

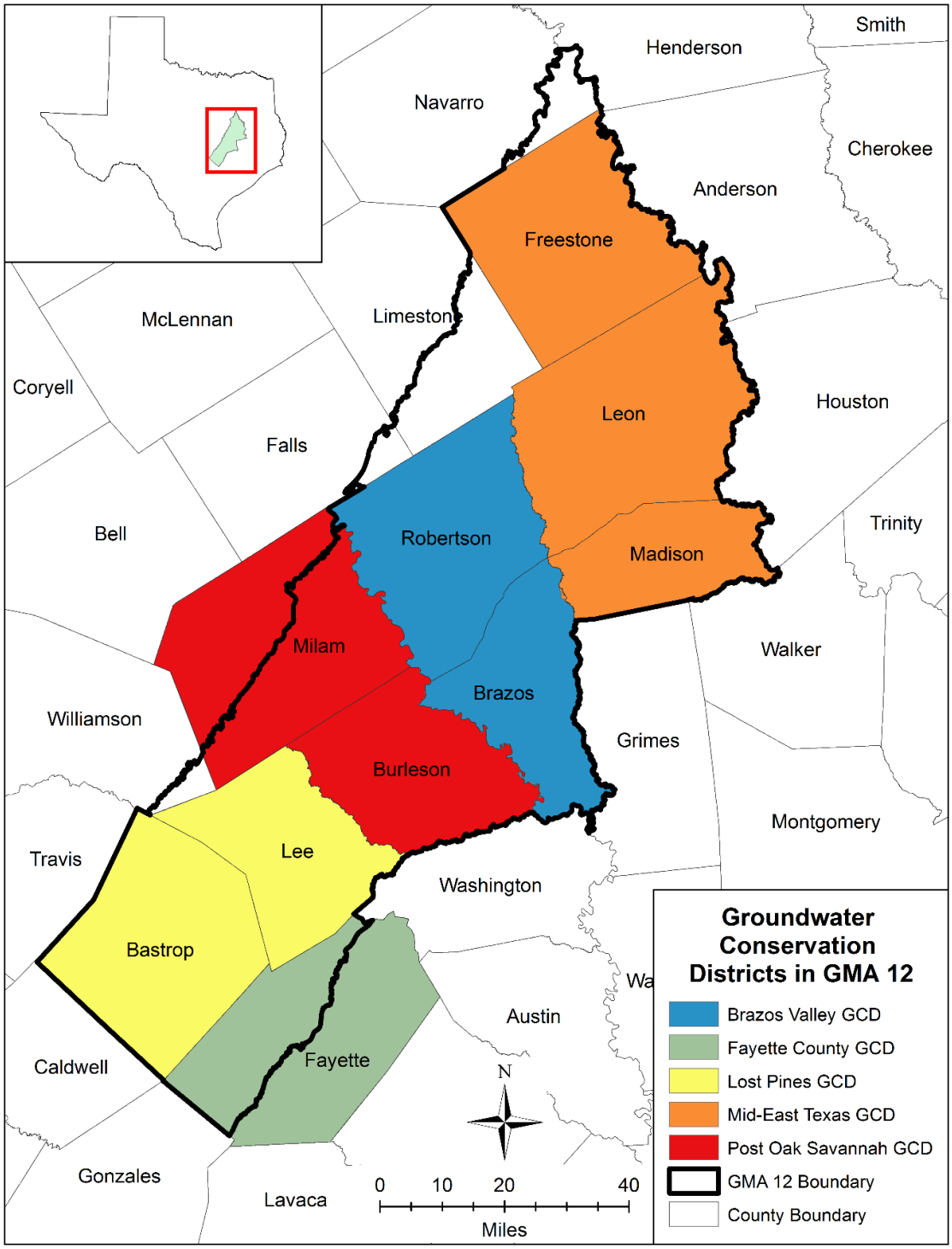

Figure 1-2. Groundwater Conservation Districts in GMA 12

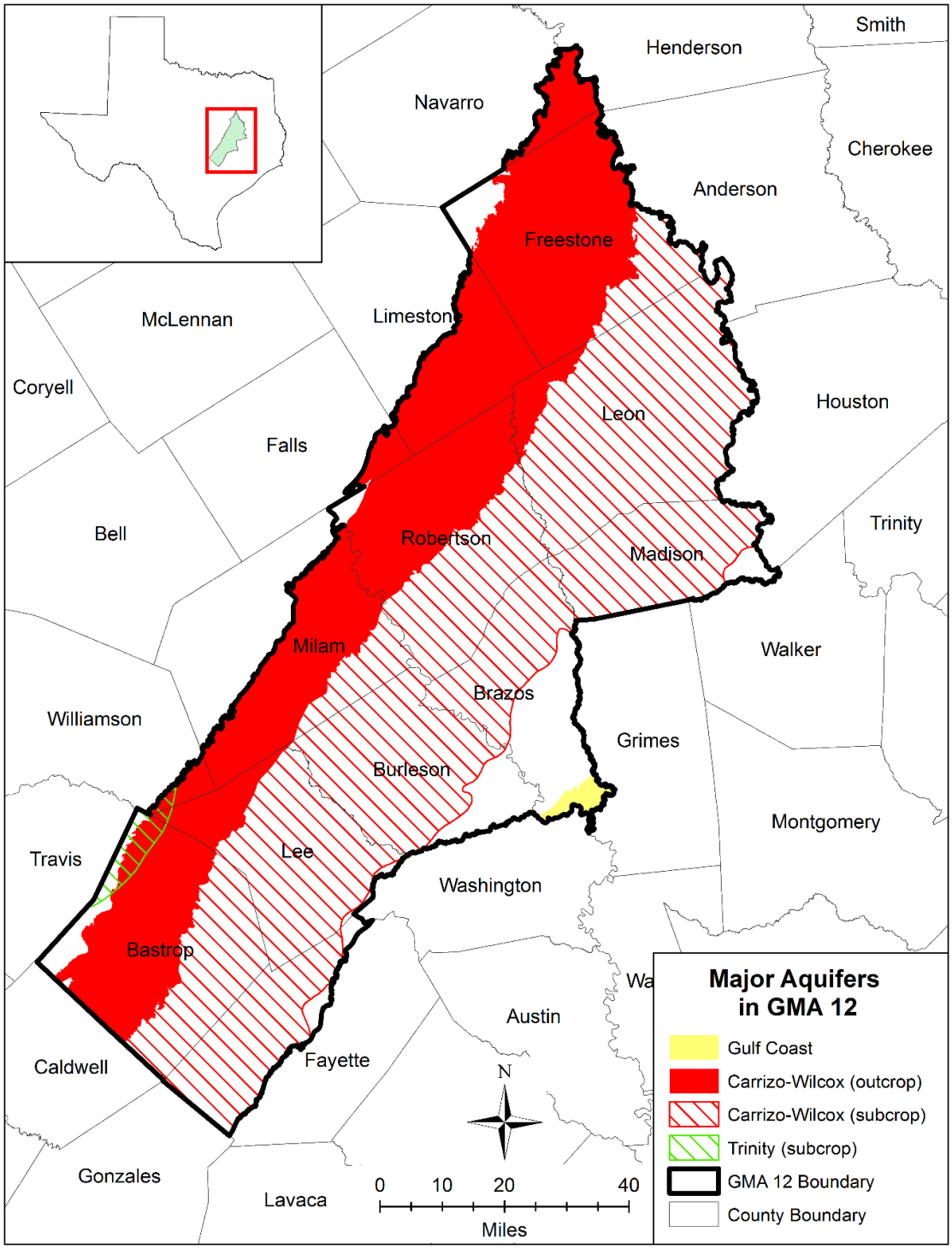

Figure 1-3. Major Aquifers in GMA 12

In addition to these major aquifers, portions of four minor aquifers, as defined by TWDB, are also present within GMA 12: the Brazos River Alluvium Aquifer, the Queen City Aquifer, the Sparta Aquifer, and the Yegua-Jackson Aquifer. Figure 1-4 shows the outlines of the minor aquifers within GMA 12. All minor aquifers are used as water supply sources within GMA 12. Table 1-1 is a stratigraphic column showing the relative ages of the aquifers.

In this report, the Carrizo-Wilcox Aquifer is subdivided into four major hydrogeologic units, from youngest to oldest: the Carrizo Aquifer, the Calvert Bluff Aquifer (Upper Wilcox Aquifer), the Simsboro Aquifer (Middle Wilcox Aquifer), and the Hooper Aquifer (Lower Wilcox Aquifer), as shown in Table 1-1.

GMA 12 includes all or part of 14 Texas counties: Bastrop, Brazos, Burleson, Falls, Fayette, Freestone, Lee, Leon, Limestone, Madison, Milam, Navarro, Robertson, and Williamson counties. Table 1-2 lists the 14 counties and their area and population projections. As of the 2020 Census, these counties had a population of about 1,181,495, which is projected to grow to almost 3 million by 2070. Most of this growth will occur in Williamson County, of which only a small portion falls within the GMA 12 boundary. However, even excluding Williamson County, the population of GMA 12 is expected to more than double by 2070, and this growing population and the accompanying water demand could have significant implications for groundwater resources GMA 12. After Williamson County, the most populated and fastest growing counties are Bastrop County, whose population values include fast-growing suburbs of Austin, and Brazos County, which contains the fast-growing Bryan/College Station area.

1.2 Joint Groundwater Planning Process

The joint groundwater planning process was first adopted by the Texas Legislature with the passage of House Bill (HB) 1763 in 2005. One of the requirements of HB 1763 is that, where two or more GCDs are located within the same boundaries of a GMA, the GCDs shall establish desired future conditions (DFCs) for all relevant aquifers in the GMA by no later than September 1, 2010 and every five years thereafter. The deadline for proposing DFCs for adoption for the third round of joint groundwater planning was May 1, 2021. The deadline for approving final DFCs for the third round of joint groundwater planning was January 5, 2022.

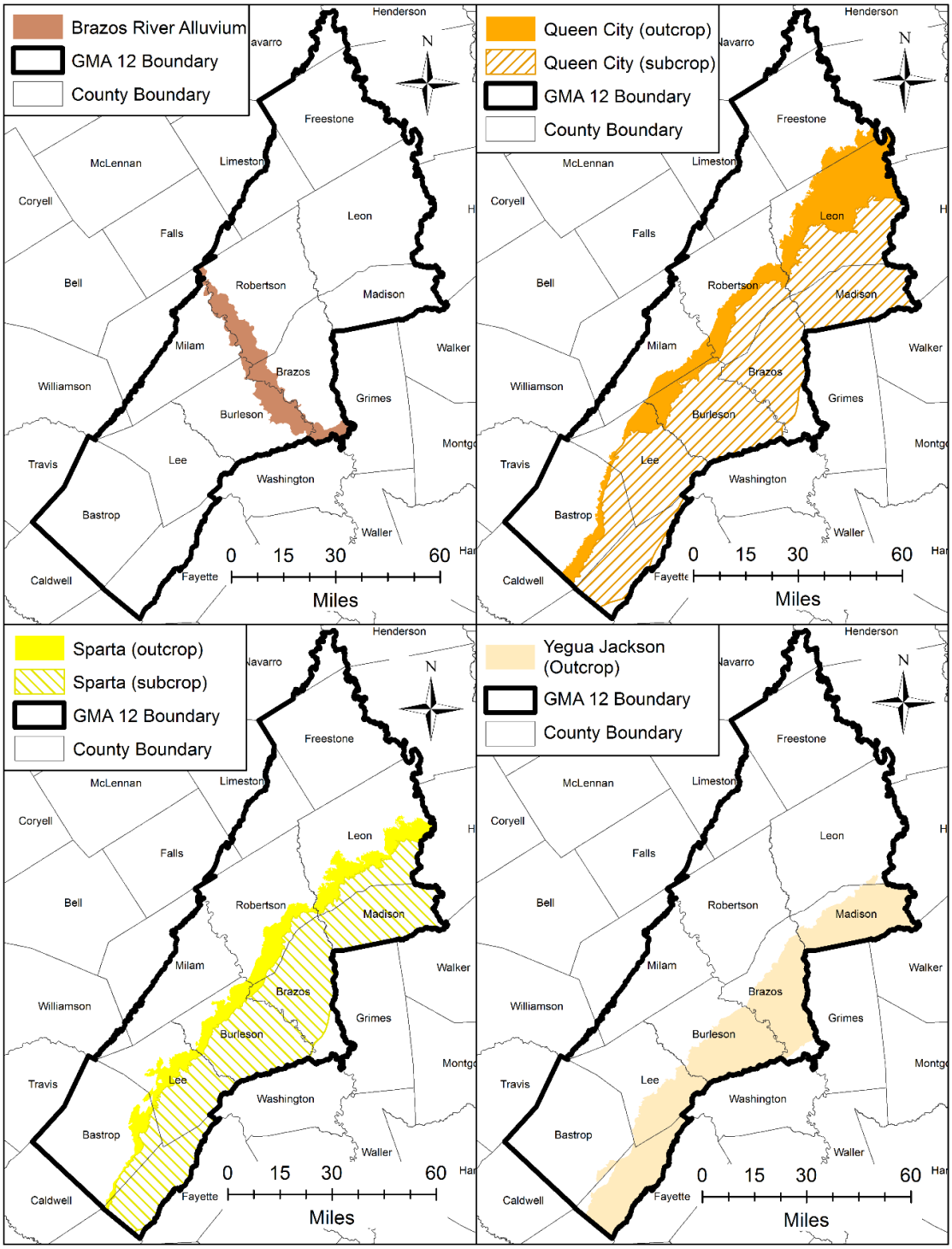

Figure 1-4. Minor Aquifers in GMA 12

Table 1-1. A Simplified Stratigraphic Column for GMA 12

System	Series	Geologic Unit	Hydrogeologic Unit
Quaternary		Brazos River Alluvium	Brazos River Alluvium Aquifer
Tertiary	Upper Eocene	Jackson Group	Yegua-Jackson Aquifer
	Middle Eocene	Yegua Formation	
		Cook Mountain Formation	confining unit
		Sparta Sand	Sparta Aquifer
		Weches Formation	confining unit
		Queen City Sand	Queen City Aquifer
		Reklaw Formation	confining unit
		Carrizo Sand	Carrizo- Wilcox Aquifer
	Lower Eocene	Calvert Bluff Fm. (*Upper Wilcox*)	
		Simsboro Fm. (*Middle Wilcox*)	
	Upper Paleocene	Hooper Fm. (*Lower Wilcox*)	

Table 1-2. Population Projection from the 2017 State Water Plan

Name	Area [1] (square miles)	Population 2020 [2]	Population 2030	Population 2040	Population 2050	Population 2060	Population 2070
Bastrop	896	97,216	125,559	164,648	217,608	289,140	384,244
Brazos	590	233,849	264,665	302,997	349,894	400,135	455,529
Burleson	678	17,642	19,946	20,838	21,735	22,442	23,022
Falls	774	16,968	20,397	20,610	20,126	20,736	21,364
Fayette	959	24,435	32,384	35,108	37,351	39,119	40,476
Freestone	892	19,435	21,077	22,947	31,142	44,475	73,287
Lee	634	17,478	21,511	22,877	23,375	23,709	23,889
Leon	1,081	15,719	19,536	20,603	22,071	23,340	24,582
Limestone	933	22,146	26,615	27,817	29,134	30,206	31,152
Madison	472	13,455	15,817	16,786	17,872	18,886	19,877
Milam	1,022	24,754	27,793	28,896	30,300	31,501	32,629
Navarro	1,086	52,624	57,032	61,667	71,452	86,952	107,814
Robertson	865	16,757	20,150	21,801	23,525	25,174	26,771
Williamson	1,137	609,017	794,478	987,495	1,195,374	1,431,101	1,675,901
TOTAL		***1,216,703***	***1,466,963***	***1,755,090***	***2,090,959***	***2,486,916***	***2,940,537***

[1] Calculated from the Stratmap county shapefile from TNRIS; [2] from the 2020 Census

DFCs are defined in Title 31, Part 10, §356.10 (6) of the Texas Administrative Code as "the desired, quantified condition of groundwater resources (such as water levels, spring flows, or volumes) within a management area at one or more specified future times as defined by participating groundwater conservation districts within a groundwater management area as part of the joint planning process." Once DFCs are adopted, the Executive Administrator of the TWDB calculates the modeled available groundwater (MAG) for the aquifers, which is the estimated amount of pumping that will achieve the DFC, and these values are used in regional water planning.

If a GMA includes more than one GCD, the GCDs must engage in a joint groundwater planning process, including at least an annual meeting. Among the requirements for the joint planning process is to adopt DFCs for the management area and, in doing so, consider the following nine factors identified in TWC § 36.108 (d):

1. Aquifer uses or conditions within the management area, including conditions that differ substantially from one geographic are to another
2. The water supply needs and water management strategies included in the state water plan
3. Hydrological conditions, including for each aquifer in the management area the total estimated recoverable storage as provided by the executive administrator, and the average annual recharge, inflows, and discharge
4. Other environmental impacts, including impacts on spring flow and other interactions between groundwater and surface water
5. The impact on subsidence
6. Socioeconomic impacts reasonably expected to occur
7. The impact on the interests and rights in private property, including ownership and the rights of management area landowners and their lessees
8. The feasibility of achieving the DFC
9. Any other information relevant to the specific DFCs

After the DFCs are adopted by a GMA, the TWDB determines MAGs based on the adopted DFCs. A MAG is defined in Title 31, Part 10, §356.10 (13) of the Texas Administrative Code as "the amount of water that the executive administrator determines may be produced on an average annual basis to achieve a desired future condition."

1.3 GMA 12 Joint Planning

The joint groundwater planning process established by HB 1763 in 2005 and amended by Senate Bill 660 in 2011 is a public, transparent process, where all planning decisions are made in open, publicly noticed meetings in accordance with provisions contained in Texas Water Code Chapter 36. From 2018 to 2021, GMA 12 convened 21 times at the dates listed in Table 1-3. All of the meetings were open to the public and were held at the Post Oak Savannah GCD office in Milano, Texas or, during the COVID-19 pandemic of 2020 to 2021, were held virtually. All meeting notices were posted at least 10 days in advance of the meeting and included an invitation to submit comments, questions, and requests for additional information to the Post Oak Savannah GCD.

Table 1-3 lists the dates and the major discussion topics of the GMA 12 joint planning meetings from 2018 to 2021. Appendix A provides the agenda for all of the GMA 12 meetings. Appendix B provides the minutes for all of the GMA 12 meetings. The GCDs that are members of GMA 12 retain hydrogeologic consultants for GCD-level management and modeling. INTERA Incorporated (INTERA) serves as the consultant for Post Oak Savannah GCD and Mid-East Texas GCD, Daniel B. Stephens & Associates, Inc. (DBS&A) serves as the consultant for Lost Pines GCD and Fayette County GCD, and Groundwater Consultants, LLC (GWC) serves as the consultant for Brazos Valley GCD.

During the GMA 12 meeting on April 20, 2021, GMA 12 proposed the DFCs for adoption. As required by Texas Water Code Section 36.108 (d-2), the proposed DFCs were subsequently mailed to the individual GCDs in GMA 12. A copy of the resolution for proposed DFCs is included as Appendix C. A period of not less than 90 days was provided by each GCD to allow for public comments on the proposed DFCs. During this comment period, each GCD held a public hearing on the proposed DFCs. Table 1-4 lists the dates on which each GCD conducted a public hearing on the proposed DFCs. Notices and minutes for these public hearings are included in Appendix D.

Table 1-3. GMA 12 Meeting Convened from 2018 to 2021

Meeting Date	Quorum Present	Major Discussion Topics
May 11, 2018	Yes	Presentation on the update on Central Carrizo-Wilcox/Queen City-Sparta GAM; Presentation and discussion of MAG peaking factors for BVGCD; Presentations and discussion on monitoring and management strategies protecting DFCs
October 9, 2018	Yes	Presentation on the update on Central Carrizo-Wilcox/Queen City-Sparta GAM; Presentation and discussion of comparison of old vs. new GAM results with PS-12 pumpage; Presentation and discussion of MAG peaking factors for METGCD
January 29, 2019	Yes	Presentation and discussion on a summary of the impacts of the updated GAM and path forward for GMA 12; Presentation and discussion of the possible use of DFC monitoring zones by LPGCD; Discussion on pumping files to be used to evaluate DFC compliance and protective drawdown limits (PDLs); Presentation and discussion of POSGCD DFCs and PDLs; Discussion of Explanatory Report organization; Presentation and discussion on Brazos River Alluvium and GW-SW interactions
May 30, 2019	Yes	Presentation and discussion on monitoring conducted by POSGCD; Presentation on the pumpage in BVGCD from the Brazos River Alluvium; Presentation and discussion on estimated future pumpage in FCGCD and LPGCD; Presentation and discussion on the review Brazos River Alluvium DFCs and MAGs; Presentation and discussion on POSGCD pumpage and permits; Discussion of six future pumping scenarios proposed by GMA 12
August 2, 2019	Yes	Presentation and discussion on a review preliminary GAM run results (S-1 to S-6); Presentation and discussion on an LCRA groundwater-surface water study; Comments from Environmental Stewardship on proposed DFCs
September 24, 2019	Yes	Presentation and discussion on results of S-7 and S-8 pumping scenarios; Presentation and discussion on development of Brazos River Alluvium DFCs; Declaration of Gulf Coast Aquifer as non-relevant; Presentation and discussion on Yegua-Jackson GAM and DFCs; Discussion of future pumping scenarios; Summary by environmental Stewardship on proposed DFCs in GMA 12
November 15, 2019	Yes	Presentation and discussion on results of S-9 pumping scenario; Presentation and discussion on Yegua-Jackson GAM and DFCs; Presentation and discussion on Brazos River Alluvium GAM; Review and discussion of draft white paper on efforts of GMA 12 to use best available science; Discussion of compatibility of DFCs

Table 1-3 (cont.)

Meeting Date	Quorum Present	Major Discussion Topics
January 29, 2020	Yes	Presentation and discussion on Hydrologic Conditions factor; Presentation and discussion on sensitivity analysis of Carrizo-Wilcox GAM and results of Yegua-Jackson pumping scenario; Finalization of a white paper on the State of GMA 12
July 24, 2020	Yes	VIRTUAL MEETING- Presentation and discussion on Aquifer Uses and Conditions factor; Presentation and discussion on Water Supply Needs and Water Management Strategies factor; Presentation and discussion on Subsidence factor; Presentation and discussion on proposed GAM modification
September 18, 2020	Yes	VIRTUAL MEETING- Discuss update of Central Carrizo-Wilcox/Queen City-Sparta GAM; Presentation and discussion on LCRA-RW Harden GW-SW study; Presentation and discussion on environmental Impacts factor; Presentation and discussion on Private Property Rights factor; Presentation and discussion on Vista Ridge pumping and water levels;
October 22, 2020	Yes	VIRTUAL MEETING- Presentation and discussion on an update of impacts of Vista Ridge project; Discussion on the update on progress of Central Carrizo-Wilcox/Queen City-Sparta GAM with TWDB; Presentation and discussion on Socioeconomic impacts factor; Presentation and discussion on results of future pumping scenarios S-7 with updated model
December 10, 2020	Yes	VIRTUAL MEETING- Discussion on progress of Central Carrizo-Wilcox/Queen City-Sparta GAM update with TWDB; Presentation and discussion by Environmental Stewardship on surface water-groundwater interactions; Presentation and discussion on GMA 12 schedule; Discussion on comments received by GMA 12 stakeholders
January 15, 2021	Yes	VIRTUAL MEETING- Discussion of DFCs and variances; Presentation and discussion on GAM run results, including results of S-10; Presentation and discussion on Yegua-Jackson GAM run results; Discussion and approval of proposed DFCs for the Yegua-Jackson Aquifer; Discussion on non-relevant aquifers in GMA 12
February 12, 2021	Yes	VIRTUAL MEETING- Presentation by SAWDF on "GMA 12 DFC Considerations"; Presentation and discussion on GAM run results, including results of S-11; Discussion of variances; Presentation and discussion on proposed DFCs for the Brazos River Alluvium; Declaration of LPGCD non-relevant aquifers in GMA 12; Presentation by TWDB on BRACS data collection in the Upper Coastal Plains; Presentation and discussion on GMA 12 DFCs and Carrizo pumpage in POSGCD

Table 1-3 (cont.)

Meeting Date	Quorum Present	Major Discussion Topics
March 18, 2021	Yes	VIRTUAL MEETING- Presentation and discussion on GAM run results, including results of S-12 and S-13; Consider proposed DFCs for all aquifers in GMA 12; Approve DFCs for Brazos River Alluvium and Yegua-Jackson Aquifers; Discussion of expressions of DFCs and variances; Declaration of Wilcox aquifers in FCGCD as non-relevant
April 20, 2021	Yes	VIRTUAL MEETING- Presentation and discussion on GW-SW interaction with respect to Run S-13; Presentation by Environmental Stewardship discussing current and proposed DFCs and DFCs to protect groundwater discharges to streams; Discuss and reconsider proposed DFCs for all aquifers in GMA 12; Discuss past and future pumping scenarios for the Carrizo-Wilcox
June 24, 2021	Yes	Presentation and discussion on POSGCD concerns on DFC planning; Discussion of requirements of Chapter 36 for adopting DFCs
October 6, 2021	Yes	Presentation and discussion on a proposed GAM update by POSGCD; Presentation on POSGCD permitting and rules; Presentation on POSGCD approach for developing DFCs
October 13, 2021	Yes	Presentation and discussion on results of GAM Run S-15; Discussion on DFCs for all aquifers in GMA 12
November 12, 2021	Yes	Presentation and discussion on results of GAM Runs S-19 and S-20; Preliminary adoption of DFCs for Sparta, Queen City, Carrizo, Calvert Bluff, Simsboro, and Hooper Aquifers using results of Run S-19
November 30, 2021	Yes	Final adoption of GMA 12 DFCs (with drawdowns from GAM Run S-19)
January 21, 2022	Yes	Review of draft Explanatory Report
January 28, 2022	Yes	Approval of final Explanatory Report

Table 1-4. Public Hearings Conducted by the GCDs Regarding the Proposed DFCs

GCD	Public Hearing Date
Brazos Valley GCD	June 10, 2021
Fayette County GCD	July 12, 2021
Lost Pines GCD	August 18, 2021
Mid-East Texas GCD	June 22, 2021
Post Oak Savannah GCD	July 13, 2021

2. GMA 12 Desired Future Conditions

2.1 Sparta, Queen City, Carrizo, Calvert Bluff, Simsboro, and Hooper Aquifers

The Sparta, Queen City, and Carrizo aquifers are present and used in all GCDs within GMA 12. Therefore, all GCDs submitted DFCs for these aquifers. The Calvert Bluff, Simsboro, and Hooper aquifers are present in all GCDs but not used in Fayette County. Therefore, GMA 12 declared these aquifers not relevant for Fayette County, and Fayette County GCD did not submit a DFC for these aquifers. For the purpose of establishing and evaluating DFCs, the updated groundwater availability model (GAM) for the Queen City and Sparta Aquifers (INTERA and others, 2020) was used to determine the compatibility and physical possibility of the DFCs proposed by each GCD. Note that this GAM also includes the Carrizo-Wilcox Aquifer. The DFCs proposed by each GCD for these six aquifers are provided in Table 2-1, as well as the DFC adopted by GMA 12 as a whole. The DFC is based on the average drawdown from January 2011 through December 2070, except for Brazos Valley GCD, which uses a DFC based on the average drawdown from January 2000 through December 2070.

Table 2-1. Adopted DFCs for the Sparta, Queen City, Carrizo, Calvert Bluff, Simsboro, and Hooper Aquifers

GCD or County	Average Aquifer Drawdown (feet) measured from January 2011 through December 2070					
	Sparta	Queen City	Carrizo	Calvert Bluff	Simsboro	Hooper
Brazos Valley GCD *	53	44	84	111	262	167
Fayette County GCD **	43	73	140	Declared as non-relevant		
Lost Pines GCD	22	28	134	132	240	138
Mid-East Texas GCD	25	20	48	57	76	69
Post Oak Savannah GCD	32	30	146	156	278	178
Falls County	—	—	—	—	7	3
Limestone County	—	—	—	2	3	3
Navarro County	—	—	—	0	1	0
Williamson County	—	—	—	25	31	24
GMA 12	***33***	***32***	***96***	***98***	***169***	***110***

***** Brazos Valley GCD DFCs are for 2000 through December 2070.

** Fayette County GCD DFCs are for all of Fayette County.

2.2 Yegua-Jackson Aquifer

The Yegua-Jackson Aquifer is present in all GCDs in GMA 12. Lost Pines GCD did not propose a DFC because the district has declared the Yegua-Jackson Aquifer as a non-relevant aquifer. The DFCs proposed by each GCD for the Yegua-Jackson Aquifer are provided in Table 2-2, as well as the DFC adopted by GMA 12 as a whole. For the purpose of establishing and evaluating DFCs, the GAM for the Yegua-Jackson Aquifer (Deeds and others, 2010) was used to determine the compatibility and physical possibility of the DFCs submitted by each GCD. The DFC is based on the average drawdown from January 2010 through December 2069.

2.3 Brazos Alluvium Aquifer

In GMA 12, the Brazos River Alluvium Aquifer is only present in Post Oak Savannah GCD and the Brazos Valley GCD. For this reason, GMA 12 adopted DFCs at a county level in these two GCDs, as shown in Table 2-3. DFCs for the Brazos River Alluvium Aquifer were not adopted for the entire GMA 12, as that would not be applicable.

Table 2-2. Adopted DFCs for the Yegua-Jackson Aquifer

GCD	Average Aquifer Drawdown (feet) measured from January 2010 through December 2069
Brazos Valley GCD	67
Fayette County GCD	81
Lost Pines GCD	—
Mid-East Texas GCD	8
Post Oak Savannah GCD	61
GMA 12	***55***

Table 2-3. Adopted DFCs for the Brazos River Alluvium Aquifer

GCD	County	Brazos River Alluvium Aquifer
Brazos Valley	Brazos and Robertson	North of State Highway 21: Percent saturation shall average at least 30% of total well depth from January 2013 to December 2069. South of State Highway 21: Percent saturation shall average at least 40% of total well depth from January 2013 to December 2069.
Post Oak Savannah	Burleson	A decrease in 6 feet in the average saturated thickness over the period from January 2010 to December 2069.
	Milam	A decrease of 5 feet in average saturated thickness over the period from January 2010 to December 2069.

2.4 Non-Relevant Areas of Aquifers

There are four areas where aquifers were declared non-relevant during the current cycle of joint groundwater planning. The Trinity Aquifer was declared non-relevant in Bastrop, Lee, and Williamson counties because of its small areal coverage, great depth, poor water quality, and lack of use. The Yegua-Jackson Aquifer was declared non-relevant in Lost Pines GCD because it has a minimal amount of exempt pumpage within the district. The Wilcox portion of the Carrizo-Wilcox Aquifer was declared non-relevant in Fayette County GCD because of the poor water quality, the great depth to these units, and the lack of use. The Gulf Coast aquifer was declared non-relevant in Brazos Valley GCD because it is thin, can only provide water in small quantities, and is very limited in areal extent.

3. Policy Justification

The adoption of DFCs by GCDs, pursuant to the requirements and procedures set forth in Texas Water Code Chapter 36, is an important policy-making function. DFCs are planning goals that state the desired conditions of the groundwater resources in the future in order to promote better long-term management of those resources. GCDs are authorized to use different approaches in developing and adopting DFCs based on local conditions and the consideration of other statutory criteria as set forth in Texas Water Code Section 36.108.

As part of their evaluation of DFCs, GMA 12 considered the nine factors listed in Texas Water Code Section 36.108(d). In addition to these nine factors, GMA 12 evaluated whether the DFCs provided a balance between the highest practicable level of groundwater production and the conservation, preservation, protection and recharging, and prevention of waste of groundwater in GMA 12. While much of this process was guided by scientific analysis including predictions from groundwater availability models, the actual creation of DFCs requires a blending of both science and policy. Policy is able to consider the limitations and uncertainty inherent in groundwater availability models, and provide guidance for and define the bounds of what these scientific tools can reasonably be expected to accomplish.

In evaluating the DFCs, GMA 12 and the individual districts recognize that (1) the production capability of the aquifers varies significantly across GMA 12, (2) historical groundwater production is significantly different across GMA 12, and (3) the importance of groundwater production to the social-economic livelihood of an area is significantly varied among the districts. As a result of this recognition, a key GMA 12 policy decision was to allow districts to set different DFCs for the portion of an aquifer within their boundaries, as long as the different DFCs could be shown to be physically possible. The allowance of different DFCs among the districts is justified for several reasons. First, the Texas Water Code Section 36.108(d)(1) authorizes the adoption of different DFCs for different geographic areas over the same aquifer based on the boundaries of political subdivisions. The statute expressly and specifically directs GCDs "to consider uses or conditions of an aquifer within the management area, including conditions that differ substantially from one geographic area to another when developing and adopting DFCs for:

1. each aquifer, subdivision of an aquifer, or geologic strata located in whole or in part within the boundaries of the management area, or

2. each geographic area overlying an aquifer in whole or in part or subdivision of an aquifer within the boundaries of the management area."

The legislature's addition of the phrase "in whole or in part" makes it clear that GCDs may establish a "different" DFC for a geographic area that does not cover the entire aquifer but only part of that aquifer. In establishing DFCs, GMA 12 has used county and GCD boundaries to define "geographic areas." By statute, GCDs cannot regulate outside of their district boundary, and the rules that they pass in order to regulate the management of groundwater only apply within their boundaries. Therefore, GMA 12 recognized that in order to facilitate responsible management of groundwater resources, GMAs should develop separate DFCs for each GCD within the GMA.

Each GMA 12 GCD compiled all relevant comments received during the 90-day public comment period regarding the proposed DFCs and suggested revisions to the proposed DFCs and the basis for the revisions. The comments received and the GMA's responses to them are summarized in Section 7 and provided in Appendices S through W.

Based on public comments, District Representatives of GMA 12 considered and approved limited changes to the proposed DFCs. The DFCs that GMA 12 considered and proposed for final adoption, inclusive of all non-substantive changes, provided acceptable drawdown levels in the various aquifers on a county-by county basis and across the entire GMA 12 area.

4. Technical Justification

4.1 Central Queen City-Sparta Groundwater Availability Model

The proposed DFCs for the Sparta, Queen City, Calvert, Simsboro, and Hooper aquifers were developed based on simulations of future pumping scenarios using the updated GAM for the Central Queen City-Sparta/Carrizo-Wilcox Aquifers (INTERA and others, 2020). Groundwater availability models are integrated tool for the assessment of water management strategies to directly benefit state planners, regional water planning groups and groundwater conservation districts. The updated GAM supersedes the GAM of the Central Carrizo-Wilcox Aquifer (Dutton and others, 2003) and the GAMs of the Central Queen City-Sparta/Carrizo-Wilcox Aquifers (Young and others, 2018; Kelley and others, 2004). The GAM (INTERA and others, 2020) used in the current cycle of joint groundwater planning was calibrated for the time period from 1930

through the end of 2010, and is a minor update of the GAM developed by Young and others (2018).

As explained by Young and others (2018) the large grid cells that were used to develop the model prevents accurate model predictions at specific locations such as a particular well. The GAM documentation (Young and others, 2018) also states that "the GAM is accurate at a scale of tens of miles, which is adequate to understand groundwater availability at the regional scale."

The current GAM (INTERA and others, 2020) simulates groundwater flow using the ten model layers shown on Figure 4-1, which is a conceptual "block diagram" of groundwater flow paths simulated by the GAM. The model simulates varying degrees of vertical interaction between aquifers, which can result in pumping effects in a particular aquifer spreading to the aquifers above or below. The magnitude of this effect will vary substantially based on the aquifer hydraulic parameters assigned to aquifers in the GAM. As with all models, there are limitations to the current GAM, but it is the best tool available for estimating the effects of pumping the relevant aquifers in GMA 12. Several different potential pumping scenarios were developed and considered by GMA 12 from 2019 to 2021. These pumping scenarios helped GMA 12 to predict the impact that varying amounts of pumping would have on future water levels across the GMA.

4.2 Potential Pumping Scenarios Using Queen City-Sparta GAM

Modeling simulations were performed for the period from 2011 to 2070 using the GAM. Because the GAM calibration/verification ended in 2010, the simulations started where the calibrated model ended and continued through the planning period defined by the TWDB guidelines.

Several future pumping scenarios from 2011 to 2070 were used by the GMA to predict water level change. The first pumping scenario was named PS-1. PS-1 was generated by combining pumping files that were created by each GCDs for their counties and possibly nearby counties not associated with a GCD in GMA 15. Well File PS-1 served as the baseline pumpage for their district, and all subsequent well files were based on the initial version. After the development of the initial predictive pumping file, different pumping scenarios were developed to evaluate the impacts of varying amounts of pumpage in the GMA on water levels in each GCD. Specific predictive pumping scenarios were also developed to evaluate varying amounts of production from the Carrizo Aquifer in POSGCD and from the Simsboro Aquifer in LPGCD, among others. The impact of pumping outside of the GMA (in GMA 13) was also evaluated. The results of these simulations were presented to the GMA meetings held from 2019 to 2021.

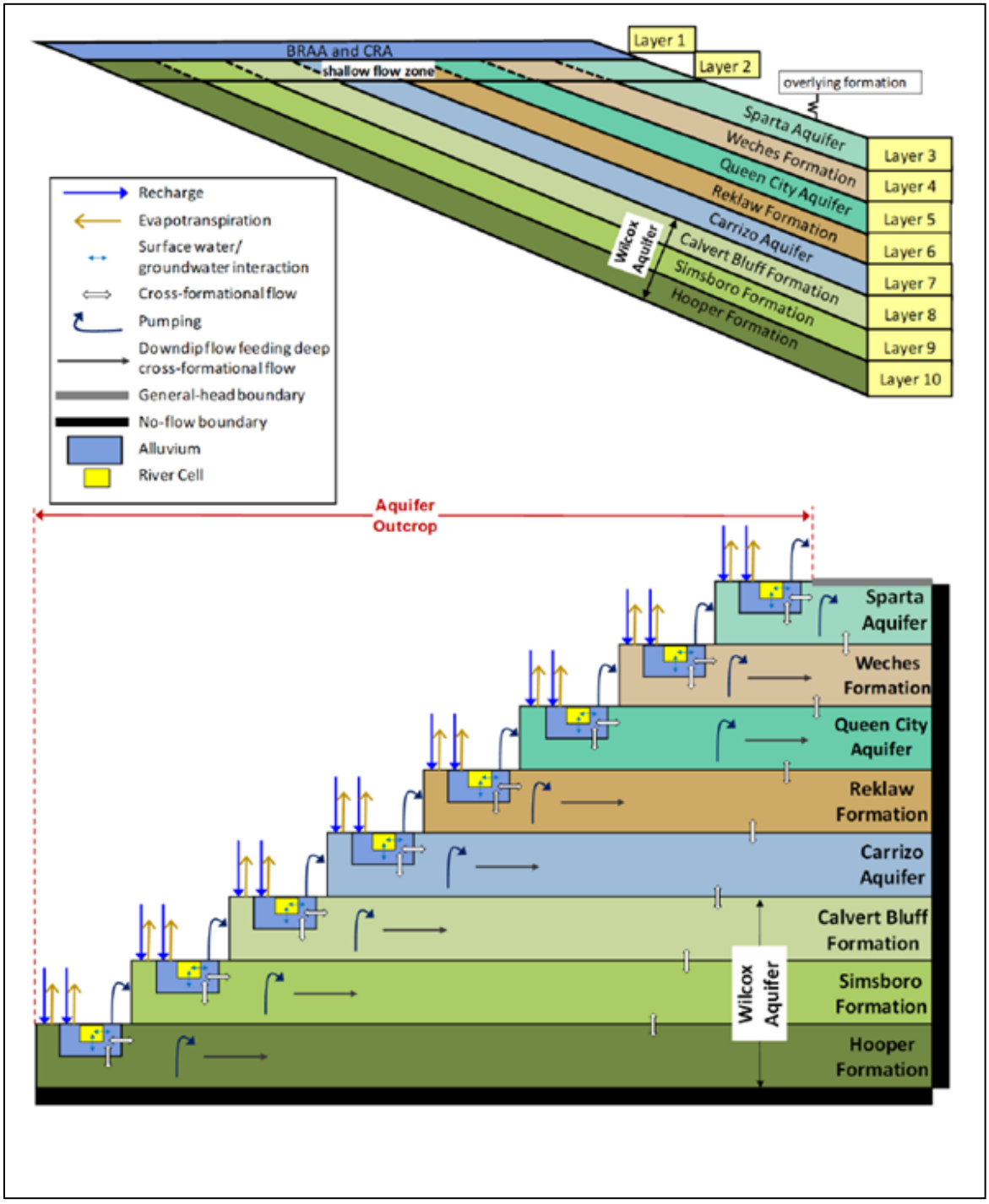

Figure 4-1. Conceptual Flow Model of the Sparta, Queen City, and Carrizo-Wilcox Aquifers (from Young and others, 2018, Figure 3.5a)

All of the simulation results showed substantial changes in the predicted drawdowns within GMA 12 in one or more aquifers in a GCD from the DFCs that were approved in 2017. This occurred for several reasons. First, the amount of pumping that occurred for some aquifers in the GCDs changed significantly from the current MAGs for the aquifers. Second, the updated GAM contains significantly different properties for most of the faults and the aquifers than the GAM used in the 2017 joint planning period. The results of a GAM simulation S-19 were adopted by GAM 12 to support the adopted DFCs was presented to GMA 12 on November 12, 2021. A copy of that presentation is included in Appendix E. Table 4-1 provides the average drawdowns simulated using S-19.

Table 4-1. Average Aquifer Drawdown calculated for Sparta, Queen City, Carrizo, Calvert Bluff, Simsboro, and Hooper Aquifers using S-19

GCD or County	Average Aquifer Drawdown (feet) measured from January 2011 through December 2070					
	Sparta	Queen City	Carrizo	Calvert Bluff	Simsboro	Hooper
Brazos Valley GCD	47	40	72	89	195	136
Fayette County GCD	43	73	140	Declared as non-relevant		
Lost Pines GCD	22	28	134	132	240	138
Mid-East Texas GCD	25	20	48	57	76	69
Post Oak Savannah GCD	32	30	162	156	278	178
Falls County	--	--	--	--	7	3
Limestone County	--	--	--	2	3	3
Navarro County	--	--	--	0	1	0
Williamson County	--	--	--	25	31	24
GMA 12	***33***	***32***	***96***	***98***	***169***	***110***

4.3 Yegua-Jackson GAM

The proposed DFCs for the Yegua-Jackson Aquifer were developed based on simulations of future pumping scenarios using the GAM for the Yegua-Jackson (Deeds and others, 2010). The Yegua-Jackson Aquifer is a minor aquifer in Texas that is primarily used for rural domestic water uses and to a lesser degree for irrigation, public supply, and industrial uses. The hydrogeological framework of the aquifer system and its location in the state are shown in Figure 4-2. The GAM was developed using MODFLOW 2000 and consists of five layers. The conceptual model representation is shown in Figure 4-3.

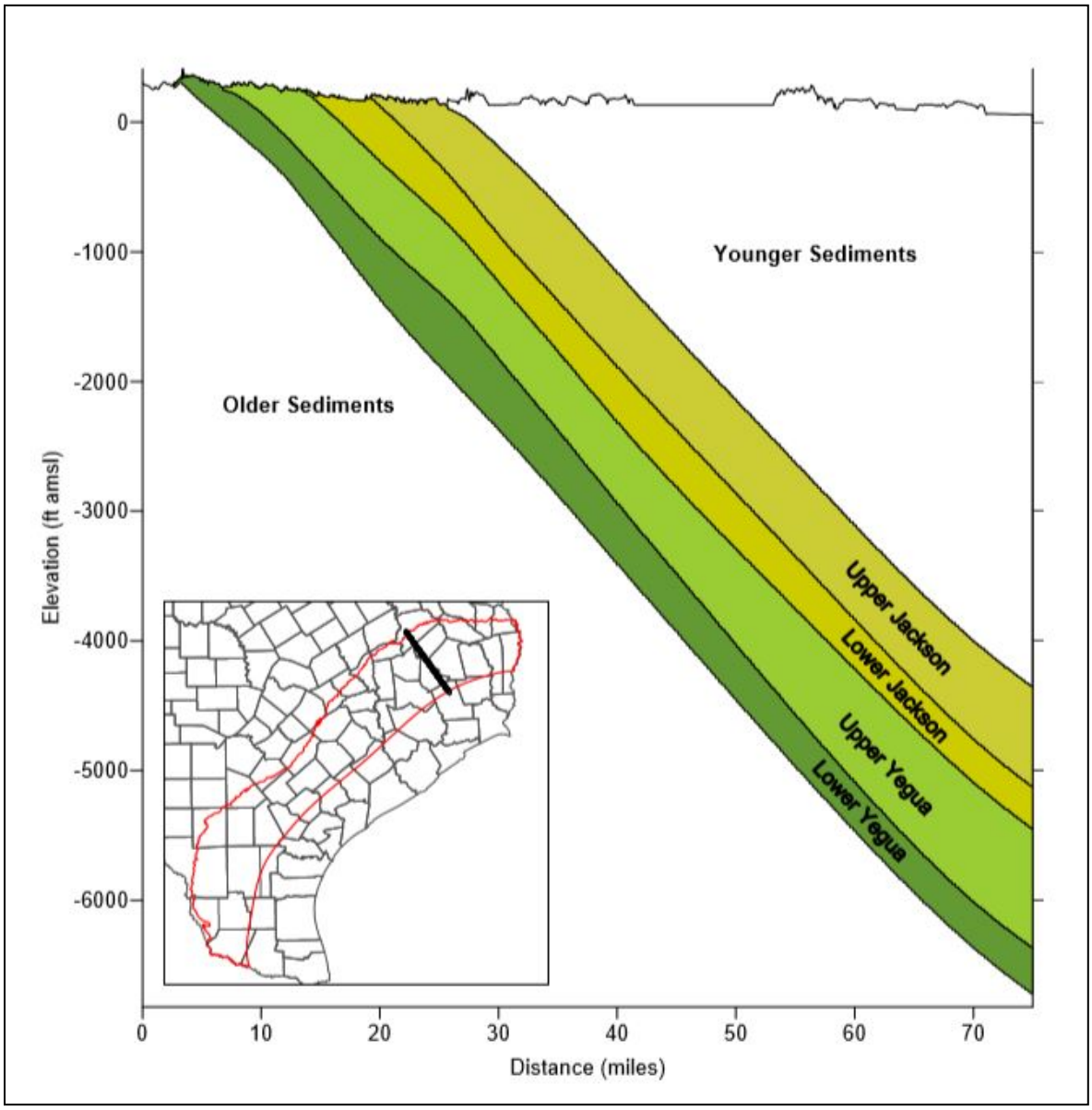

Figure 4-2. Yegua-Jackson Aquifer System and Location (from Deeds and others, 2010, Figure 2.4)

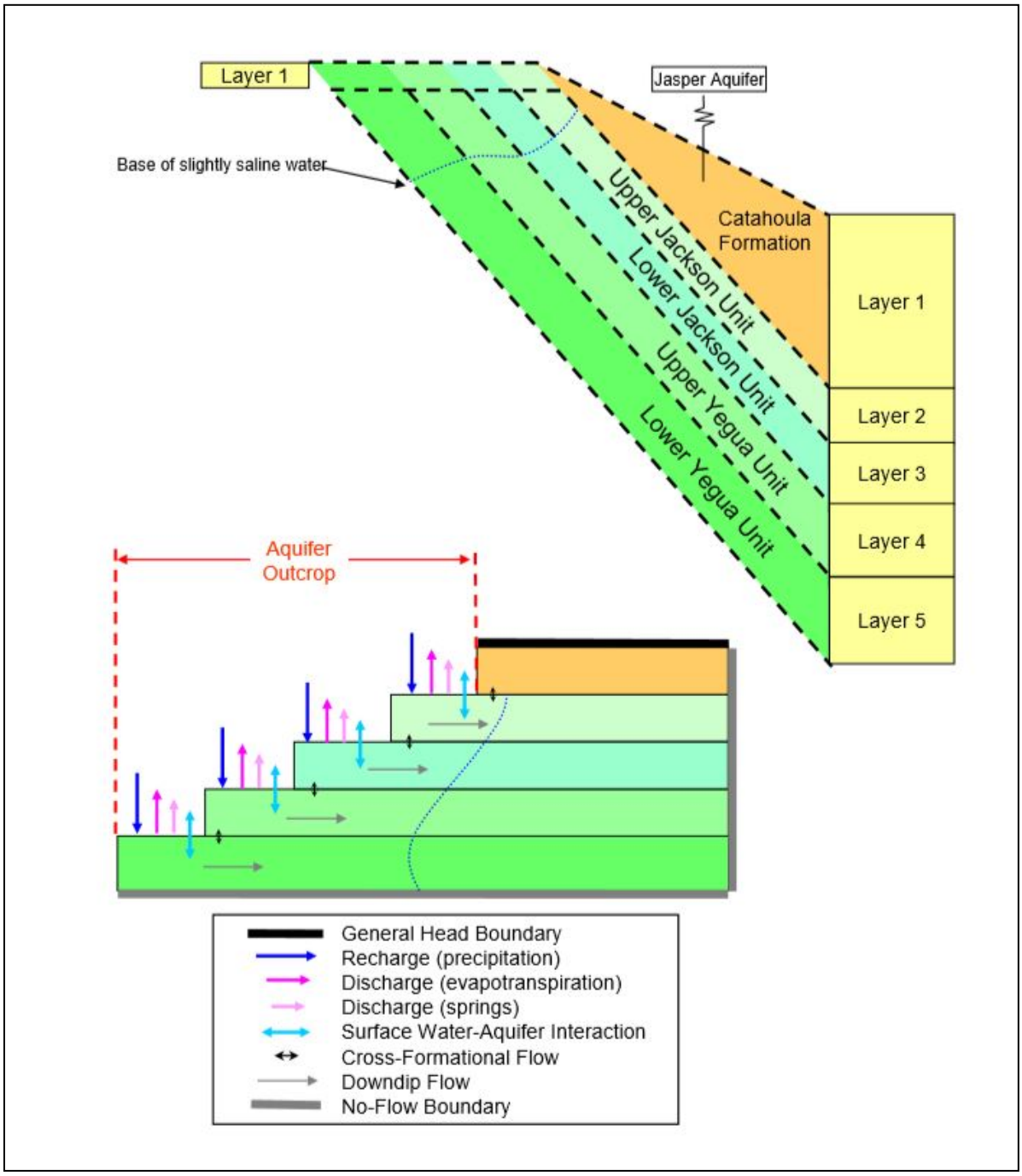

Figure 4-3. Conceptual Flow Model of the Yegua-Jackson Aquifer (from Deeds and others, 2010, Figure 5.0.1)

The first layer represents the shallow outcrop section of the Yegua-Jackson Aquifer and Catahoula Formation. The remaining layers represent, from top to bottom, the Upper Jackson Unit, the Lower Jackson Unit, the Upper Yegua Unit, and the Lower Yegua Unit. The model was calibrated for two time periods, one representing pre-development conditions (prior to 1900) and the other representing transient conditions (1980 through 1997). Because each model grid block covers 1 square mile, the applicability of the model is limited to regional-scale assessments of groundwater availability. The groundwater pumping and hydraulic properties are averaged over the area of model grid blocks, so at the current scale of the model, it is not capable of predicting aquifer responses at specific locations such as pumping wells. However, the model is applicable for simulating aquifer response at a scale of a few to tens of miles, which is appropriate for the regional planning needs of GMA 12.

4.4 Potential Pumping Scenario Using Yegua-Jackson GAM

The GCDs that comprise GMA 12 developed estimates of potential uses that could occur in the upcoming decades based on existing use and projected future demands. Two well files were developed and the simulation performed to develop DFCs for the period from 2010 through December 2069. The GAM simulations that used the two well files are named YGJK-PS1 and YGJK-PS-2.

Results from GAM Run YGJK-PS1 were presented to GMA 12 during the meeting on November 15, 2019. The future pumping in the well file was nearly identical to the well file used to generate the DFCs in the previous joint planning session. A concern with the GAM Run YGJK-PS1 was that annual production amounts in GMA 12 from 2010 to 2018 were significantly greater than the recorded historical pumping amounts. To address this concern, GAM Run YGJK-PS2 was created wherein the pumping rates from 2010 to 2020 were changed to better reflect historical pumping and the estimates for pumping after 2020 were revised. Results from GAM Run YGJK-PS2 were presented to GMA 12 during the meeting on January 29, 2020. During the meeting, plots of the annual production rates from 2000 to 2070 by GCDs were shown. Table 4-2 provides the average drawdowns simulated using YGJK-PS2.

Table 4-2 Average Aquifer Drawdown Calculated for Yegua-Jackson Aquifer using YGJK-PS2

GCD or County	Average Aquifer Drawdown (feet) measured from January 2010 through December 2069
Brazos Valley GCD	61
Fayette County GCD	81
Lost Pines GCD	39
Mid-East Texas GCD	8
Post Oak Savannah GCD	61
GMA 12	***55***

4.5 Brazos River Alluvium GAM

The proposed DFCs for the Brazos River Alluvium Aquifer (BRAA) were developed based on simulations of future pumping scenarios using the GAM for the BRAA (Ewing and Jigmond, 2016). The BRAA consists of the floodplain and terrace deposits of the Brazos River. The aquifer extends from Bosque and Hill counties in the northwest to Fort Bend County in the southeast portion of the study area. Figure 4-4 shows aerial footprint of the BRAA in GMA 12 and across the rest of Texas. The BRAA is a minor aquifer in Texas that is primarily used for irrigation in GMA 12.

The BRAA GAM was developed using MODFLOW-USG (Panday and others, 2013). Figure 4-5 provides a west to east cross-section through GMA 12, along with a conceptual block diagram illustrating aquifer layering and sources and sinks for groundwater. The BRAA GAM consists of three layers. Model Layer 1 and Model Layer 2 represent the upper and the lower sections of the Brazos River Alluvium. Model Layer 3 represents the shallow portions of the formations and aquifers underlying the BRAA. The BRAA GAM uses a numerical grid that consists of grid cells that vary from 660 feet square throughout the footprint of the Brazos River Alluvium Aquifer to 5,280 feet square over the majority of the Brazos River Basin.

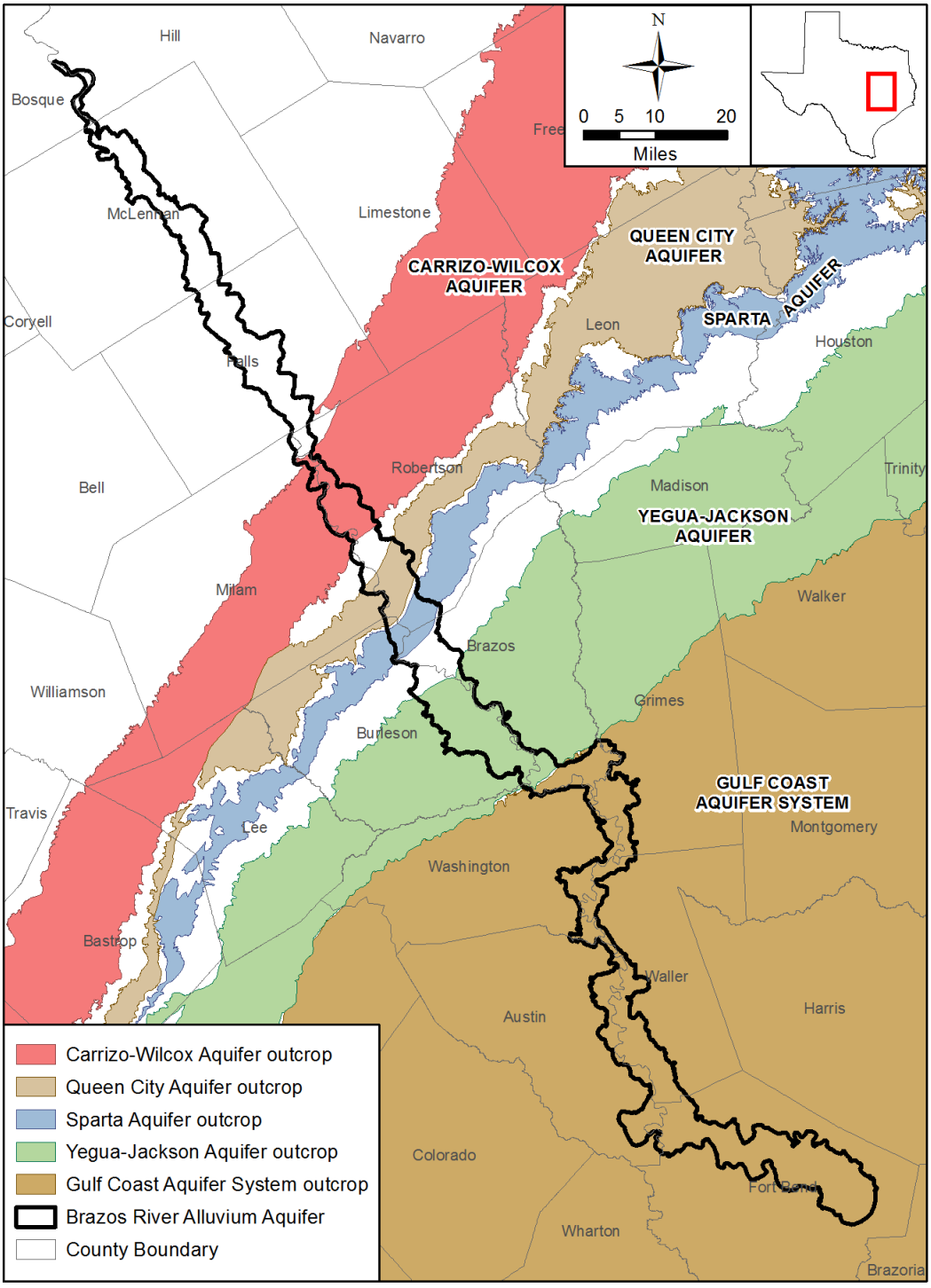

Figure 4-4. Extent of the Brazos River Alluvium Aquifer Groundwater Availability Model (from Ewing and Jigmond, 2016, Figure 1.0.3)

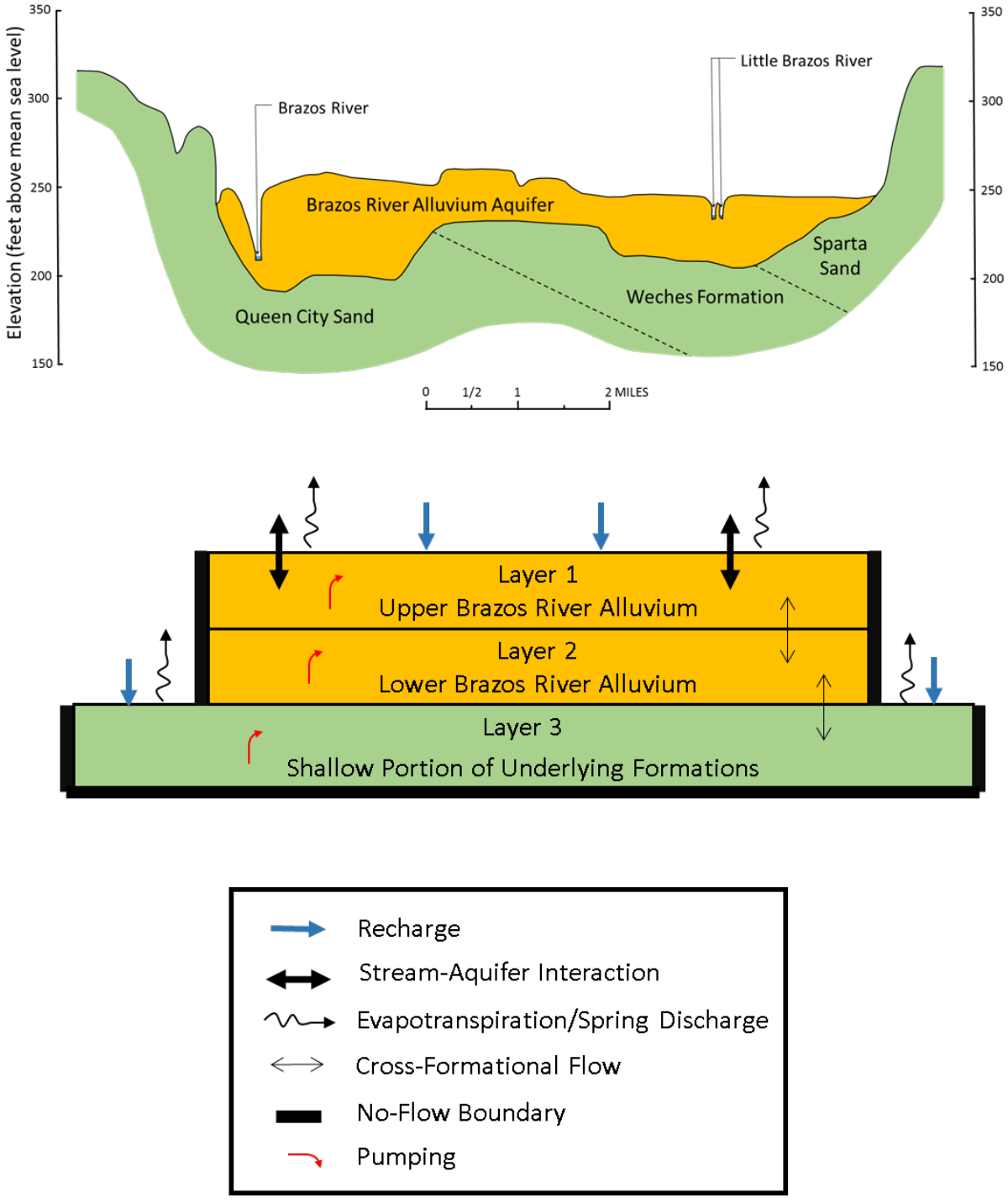

Figure 4-5. Conceptual Groundwater Flow Model (Cross-Sectional View) for the Brazos River Alluvium Aquifer (from Ewing and Jigmond, 2016, Figure 2.0.1)

The BRAA GAM was calibrated using a steady-state stress period that represents predevelopment conditions prior to 1950 and a transient period from 1950 until 2012. From 1950 to 1980, the model uses annual time periods. After 1980, the GAM was calibrated using monthly time periods. In the transient calibration period, discharge to the Brazos River is highly variable from year to year because of the variability in flows within the Brazos River. Nevertheless, a simple trend analysis indicates that discharge from the Brazos River Alluvium Aquifer to perennial streams is decreasing over time.

4.6 Potential Pumping of Brazos River Alluvium

The Brazos River Alluvium Aquifer is primarily used for irrigation in Brazos, Burleson, and Robertson counties and to a much lesser degree for domestic and stock use. The largest volume of pumping occurs during the growing season from about April through September. Outside of the growing season (approximately half the year), there is a very limited amount of pumping from the aquifer. DFCs were developed for the Brazos River Alluvium Aquifer based on static water-level changes that have occurred in screened wells over the past approximately 60 years. The DFCs are based on allowing aquifer users to lower static water levels in wells to essentially the deepest levels previously recorded, as groundwater was still available for pumping when those levels were reached.

The future pumping scenario was created by slightly modifying the pumping well that the TWDB developed to generate a MAG based on the DFCs that GMA 12 adopted for the BRAA in 2017 (Wade, 2017). The MAG was developed based on the following conditions:

- Average streamflow and recharge conditions were assumed for the predictive modeling period of 2013 through 2070.
- The pumping distribution during the predictive model years (2013 through 2070) is based on the average pumping distribution from the last year of the historical model (2012).
- Dry cells do not occur in the groundwater availability model for the Brazos River Alluvium Aquifer; however, pumping is reduced by the model code (MODFLOW USG) to prevent model cells from going dry during the simulation. All reported modeled available groundwater values are extracted from the budget output files rather than from the well file input package and reflect what was actually pumping in the model.
- A tolerance of 1 foot or 5 percent (whichever was greater) was assumed when comparing desired future conditions to average saturated thickness decline or percent saturation values.

GMA 12 modified by pumping rates by adjusting pumping to accommodate two changes. One change was to reduce the pumping from grid cells where the initial pumping rates could not be sustained. The other change was to avoid adding future pumping in the same grid cells that included a river node. The development of the annual production rates was discussed in GMA 12 meetings that occurred on November 15, 2019 and on February 12, 2021. At both meetings, the graphs were provided to show that the change in water levels over time achieved the DFCs expressed in Table 2-3. For accounting purposes, the GMA 12 consultants named the modification of the TWDB MAG simulation that was used to help develop the BRAA DFCs as GAM Run BRAA PS-1.

In 2070, the annual production in the well file for Milam County, Burleson County, Robertson County, and Brazos counties are approximately 38,626 acre-feet per year (ac-ft/yr), 32,306 ac-ft/yr, 52,903 ac-ft/yr, and 76,038 ac-ft/yr, respectively. As a result of the future pumping, the GAM predicts that over the period from 2013 to 2070 the amount of groundwater that contributes to river flow in the four counties is reduced by 37,500 ac-ft/yr. Table 4-3 provides the water balance flow components used to calculate the 37,500 ac-ft/yr. It should be noted that pumping in Brazos and Robertson counties from the BRAA has averaged about 81,000 ac-ft/yr over the last 10 years compared to an assumed pumping of 128,941 ac-ft/yr in the simulation.

Table 4-3. Simulated Changes in the Surface Water-Groundwater Exchange in GAM 12 between the BRAA and the Brazos River in 2013 and 2070

County	Flow from Alluvium to River (ac-ft/yr)		Flow from River to Alluvium (ac-ft/yr)		Net Flow (ac-ft/yr)		Reduction in Groundwater Contribution to River Flow (ac-ft/yr)
	2013	2070	2013	2070	2013	2070	
Milam	-1,158	-741	28,676	33,235	27,518	32,494	4,976
Robertson	-1,049	-741	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

4.7 Use of Groundwater Availability Models

The joint groundwater planning process in GMA 12 involved using the three GAMs discussed above in evaluating potential DFCs for the aquifers while also considering the nine factors required by Texas Water Code §36.108(d) (1-8). As discussed previously, several model simulations were performed before adopting desired future conditions for the aquifers.

In using GAMs in the process of developing DFCs, it is necessary to have the amount and areal distribution of pumping as inputs in order to evaluate drawdown values for the various aquifers over a prescribed time. The GAM applications involved an iterative approach that included running several predictive pumping scenarios with the model and then evaluating the results in the process of developing DFCs. This process helps the GMA understand the impacts of varying amounts of pumpage on the aquifers over time. GMA 12's approach is similar to the process undertaken by many GMAs across the state, where GMAs evaluated the relationship between pumping and DFCs prior to finalizing the DFCs. DFCs are policy decisions being made by the GMAs, and it is reasonable and prudent for GMAs to want to understand the ramifications of major policy decisions prior to adopting these policies.

In the case of groundwater management, a scientific method that can include the use of GAMs can be used to understand the relationship between groundwater pumping and drawdown or groundwater pumping and the effects on flow between aquifers. The GAMs are a tool that can be used to run various simulations to better understand the cause and effect relationships within a groundwater system as they relate to groundwater management. A substantial amount of the consideration of the nine statutory factors involves understanding the effects or impacts of DFCs. The effects can include drawdowns, environmental factors, socioeconomic and private property rights. The use of GAMs in the iterative process of the development of DFCs for groundwater management is an effective method for developing information that is a consideration by GMAs or districts as they develop DFCs.

5. Factors Considered for the Desired Future Conditions

This section summarizes some of the information considered by GMA 12 in deliberations and discussions of the DFCs.

5.1 Aquifer Uses and Conditions

Texas Water Code Section 36.108 (d)(1) requires that, during the joint-planning process, GCDs shall consider "aquifer uses or conditions within the management area, including conditions that differ substantially from one geographic area to another." On July 24, 2020, a presentation titled "GMA 12 Aquifer Uses and Conditions Consideration Discussion" was given by GMA 12's hydrogeological consultants. This presentation is included as Appendix L. The following section

provides additional information about the aquifer uses or conditions of each major and minor aquifer present within GMA 12 for which DFCs were developed. These aquifers include:

- Carrizo-Wilcox Aquifer, which includes the Carrizo, Calvert Bluff, Simsboro, and Hooper hydrostratigraphic units
- Queen City Aquifer
- Sparta Aquifer
- Yegua-Jackson Aquifer
- Brazos River Alluvium Aquifer

The outcrop for each of these aquifers is shown in Figure 5-1. With the exception of the Brazos River Alluvium, which is a shallow alluvial unit present along the Brazos River, these formations all outcrop from southwest to northeast and dip to the southeast toward the Gulf of Mexico.

Water uses, as defined by the TWDB, include:

- Municipal: includes city-owned, districts, water supply corporations, or other private utilities supplying residential, commercial (non-goods-producing businesses), and institutional (schools, governmental operations), as well as non-surveyed municipal (rural domestic)
- Manufacturing: refers to process water use reported by large manufacturing plants. This is also sometimes referred to as "industrial"
- Livestock
- Irrigated agriculture
- Mining: includes water used in the mining of oil, gas, coal, sand, gravel, and other materials
- Steam-Electric Power: refers to consumptive use of water by large power generation plants

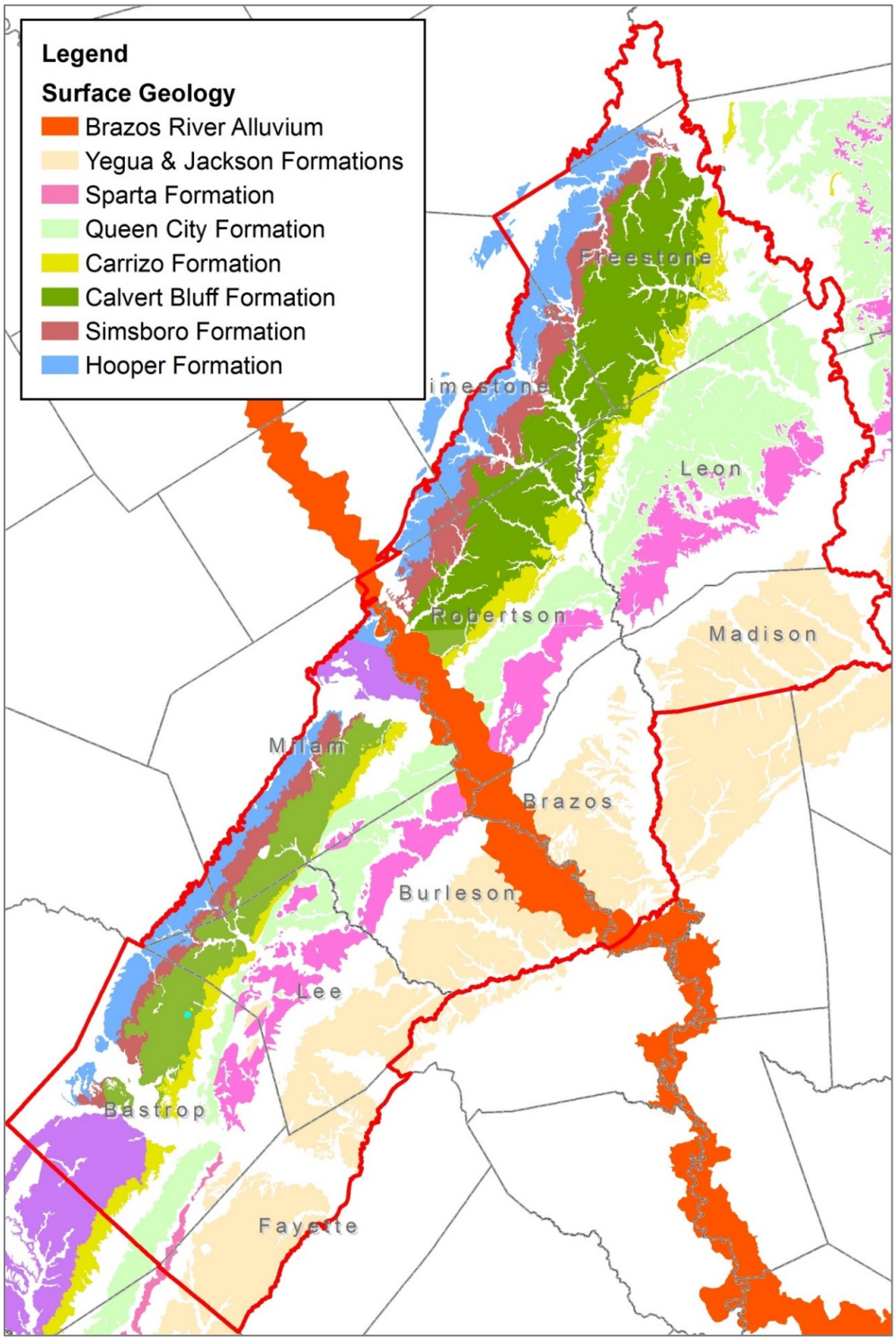

Figure 5-1. Surface Geology of GMA 12

Within GMA 12, groundwater comprises a significant amount of the total water used. Table 5-1 summarizes the approximate percent of each type of water use that is supplied by groundwater. This table shows that groundwater is the major supplier of water for irrigation, mining, and municipal uses across the GMA, and is a significant supplier for livestock and manufacturing.

Table 5-1 Estimated Historical Overall Water Use Met with Groundwater

Purpose	Lost Pines GCD	Post Oak Savannah GCD	Brazos Valley GCD	Mid-East Texas GCD	Fayette County GCD
Irrigation	100%	99%	90%	100%	90%
Livestock	25%	30%	20%	10%	75%
Manufacturing	100%	89%	100%	0%	30%
Mining	95+%	95+%	80%	50%	60%
Municipal	100%	67%	95%	100%	100%
Steam-Electric	75%	0%	25%	0%	0%

The total reported groundwater production for each GCD in GMA 12 in 2018 is shown in Table 5-2. This table shows the metered/reported volume of groundwater from each of the aquifers. It should be noted that the Fayette County GCD is a member of two different GMAs, and a large portion of Fayette County's overall groundwater production occurs within GMA 15, and therefore is not included in Table 5-2.

Table 5-2. 2018 Metered/Reported Groundwater Production (in acre-feet)

Formation	Lost Pines GCD	Post Oak Savannah GCD	Brazos Valley GCD	Mid-East Texas GCD	Fayette County GCD
Colorado/Brazos River Alluvium	1,252	9,801	127,241	NA	55
Yegua-Jackson	0	152	1,183	9	965
Sparta	225	958	4,309	2,356	0
Queen City	249	313	118	585	163
Carrizo	2,834	1,067	758	1,102	166
Calvert Bluff	1,050	412	193	5,175	NA
Simsboro	18,704	4,932	58,297	1,213	NA
Hooper	677	361	809	3,685	NA
Carrizo-Wilcox	*23,264*	*6,773*	*60,058*	*11,174*	*0*
TOTAL	***24,991***	***17,996***	***192,908***	***14,123***	***1,349***

NA- Not applicable because the aquifer is either not present or not used in that district.

5.1.1 Carrizo-Wilcox Aquifer

The Carrizo-Wilcox is a major aquifer present across GMA 12, as shown in Figure 5-2. Although the Carrizo-Wilcox is considered a single aquifer system by the TWDB, the individual aquifer units within the Carrizo-Wilcox are used differently within GMA 12 and so they are each summarized separately below. The overall use from the whole Carrizo-Wilcox Aquifer is summarized in Table 5-3. As shown, the Carrizo-Wilcox is heavily used for municipal purposes throughout much of GMA 12, with a few counties also using it extensively for manufacturing, mining, or irrigation.

Table 5-3. Total Estimated Groundwater Production from the Carrizo-Wilcox Aquifer in 2019 (in acre-feet)

County	Municipal	Manufacturing	Mining	Steam Electric	Irrigation	Livestock	Total
Bastrop	13,228	301	25	5,494	5,455	149	24,652
Brazos	34,273	1.398	0	0	0	0	35,671
Burleson	981	0	0	0	105	10	1,096
Fayette	264	76	0	0	0	8	348
Freestone	1,637	50	0	0	405	138	2,230
Lee	6,277	0	523	0	574	132	7,506
Leon	1,889	660	13	0	304	74	2,940
Madison	99	0	0	0	305	57	461
Milam	2,002	0	0	0	1,616	366	3,984
Robertson	3,165	39	2,969	5,226	7,418	290	19,107

Source: Texas Water Development Board web site, District production records, and District estimates.

* Mining estimate includes Oil & Gas water use as well as surface mining water use reported by the Railroad Commission of Texas (RRC) at the Jewett Mine 32F/47A and the Big Brown Mine for dewatering/pressurization.

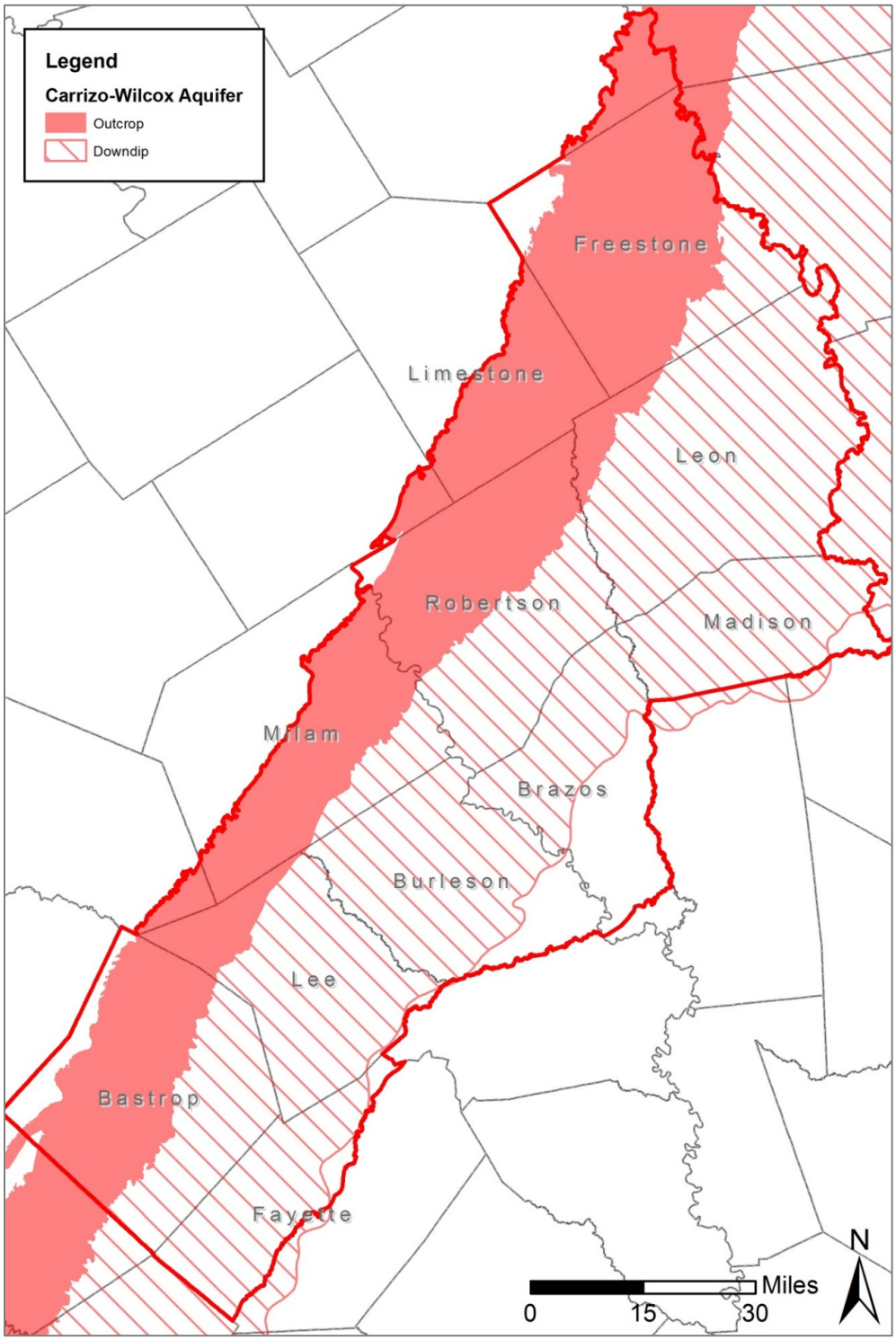

Figure 5-2. Extent of Carrizo-Wilcox Aquifer within GMA 12

Carrizo Aquifer: The Carrizo Formation is the uppermost hydrostratigraphic unit within the Carrizo-Wilcox Aquifer, and is present through the middle of GMA 12, as shown in Figure 5-3. There has historically been moderate production from the Carrizo across much of GMA 12. Groundwater from the Carrizo is produced from wells shown in Figure 5-3, with some wells up to 2,000 feet deep. Groundwater produced from the Carrizo is primarily used for domestic, livestock, and municipal purposes. Lesser amounts of water from the Carrizo are used for irrigation purposes. Some significant users of water from the Carrizo include the cities of Giddings, College Station, and Smithville, Aqua Water Supply Cooperative (WSC), Lee County WSC, Texas A&M University, the Texas Department of Criminal Justice Ferguson Unit, and several rural WSCs.

Calvert Bluff Aquifer: The Calvert Bluff Formation is found below the Carrizo and is the uppermost of the three Wilcox hydrostratigraphic units within the Carrizo-Wilcox Aquifer. The Calvert Bluff is present through the middle of GMA 12, as shown in Figure 5-4. There has historically been moderate production from the Calvert Bluff across much of GMA 12. Groundwater from the Calvert Bluff is produced from wells shown in Figure 5-4, with most of the wells shallow (less than 800 feet deep). Groundwater produced from the Calvert Bluff is primarily used for domestic and livestock purposes. Lesser amounts of water from the Calvert Bluff is used for municipal and oil and gas drilling purposes. Some significant users of water from the Calvert Bluff include the Bastrop County WCID#2, numerous WSCs in the Mid-East Texas GCD, Nucor Steel, and numerous landowners using the aquifer for domestic and livestock purposes.

Simsboro Aquifer: The Simsboro Formation is found below the Calvert Bluff and is the middle of three Wilcox hydrostratigraphic units within the Carrizo-Wilcox Aquifer. The Simsboro is present through the middle of GMA 12, as shown in Figure 5-5. There has historically been significant production from the Simsboro across much of GMA 12. Groundwater from the Simsboro is produced from wells shown in Figure 5-5, with some of these wells very deep (up to 3,000 feet). The Simsboro can be a very productive aquifer in about the western three-quarters of the GMA, making it the target for groundwater development projects in many areas of GMA 12. Groundwater produced from the Simsboro is primarily used for municipal purposes as well as historically for mine depressurization. Lesser amounts of water from the Simsboro are used for industrial, livestock, and irrigation purposes. Some significant users of water from the Simsboro include the cities of Bryan/College Station and Elgin, Manville and Aqua WSCs, several WSCs in Mid-East Texas GCD, the LCRA, Texas A&M University, NRG Texas Power, Major Oak Power, and landowners throughout the GMA.

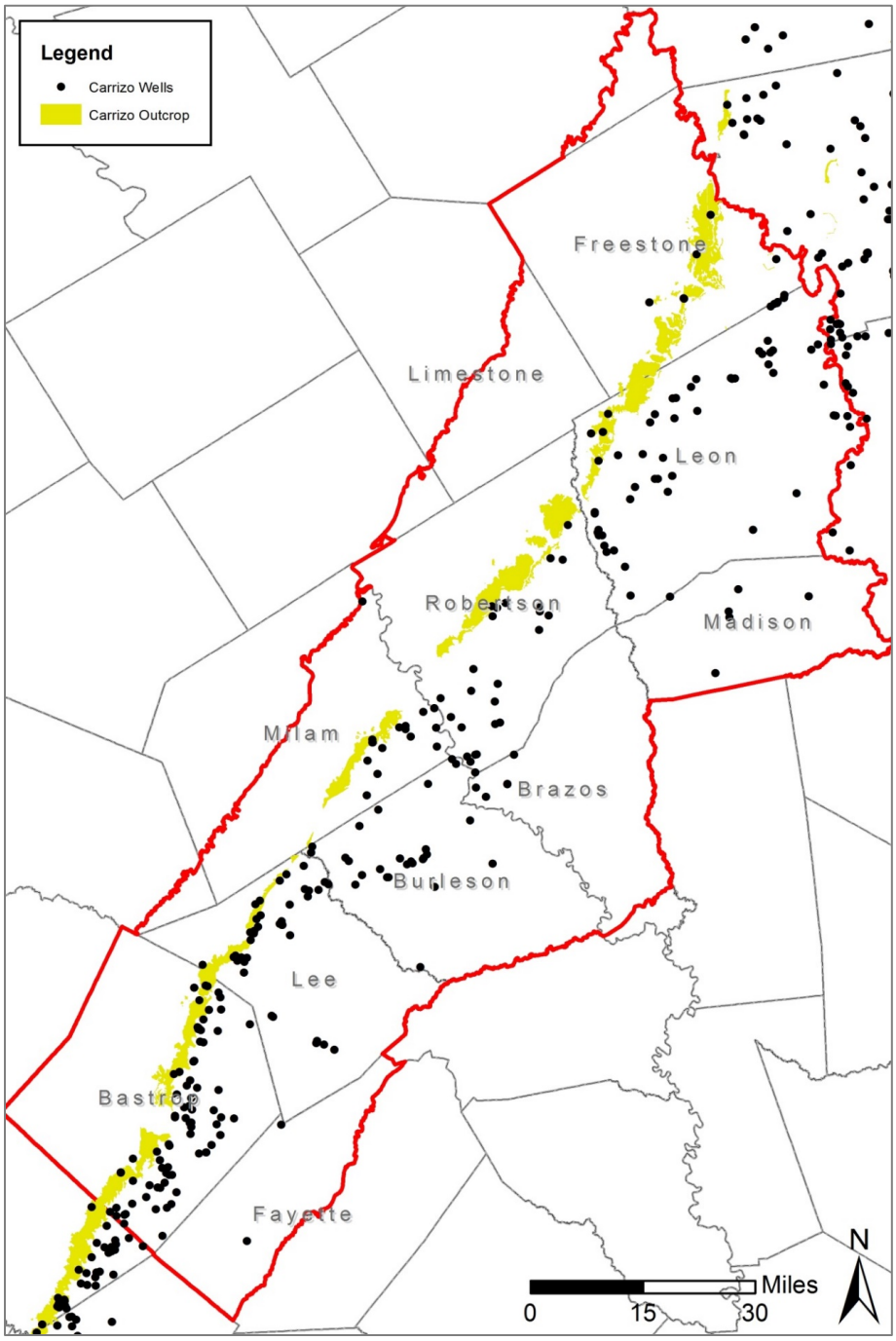

Figure 5-3. Extent of Carrizo Aquifer within GMA 12

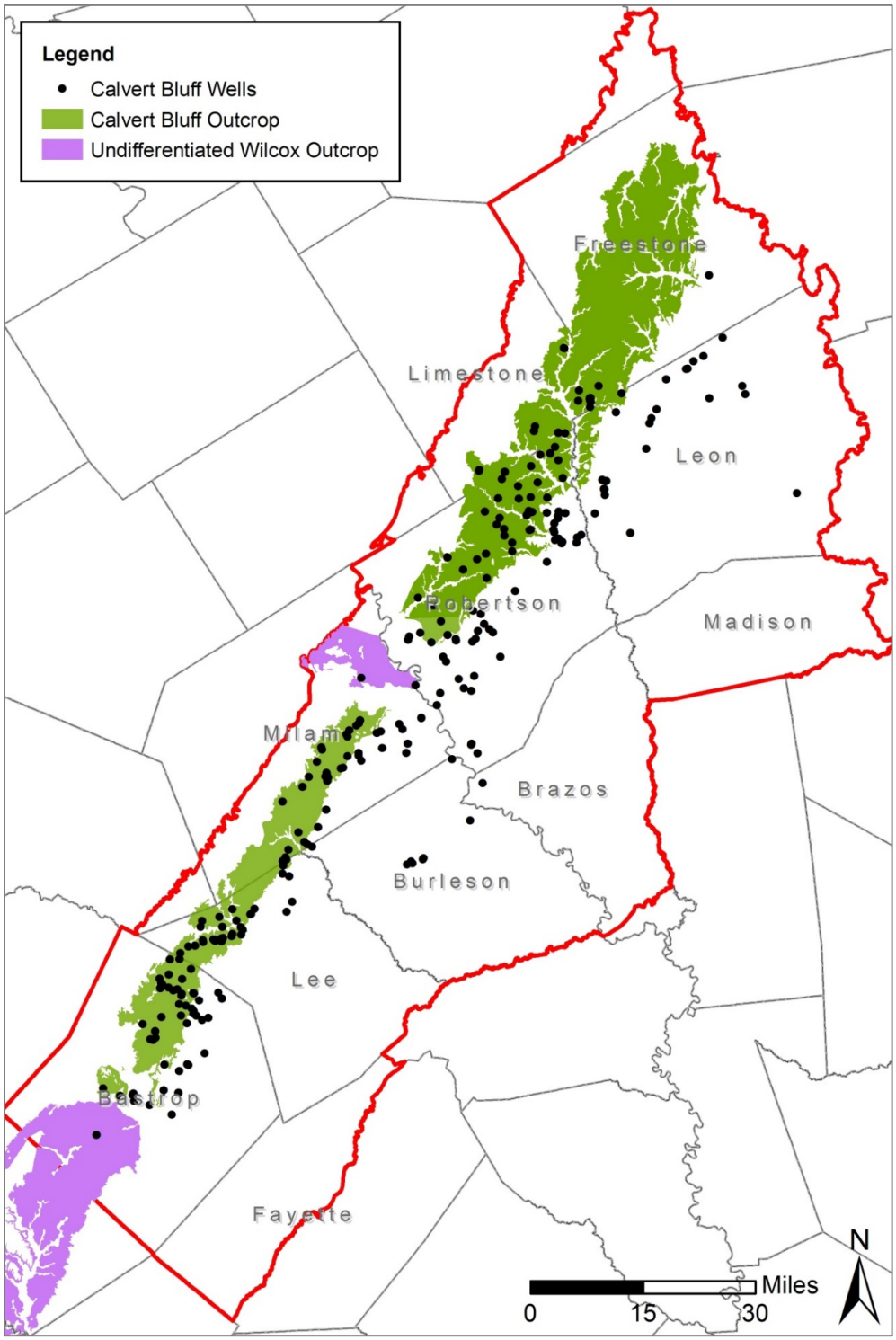

Figure 5-4. Extent of Calvert Bluff Aquifer within GMA 12

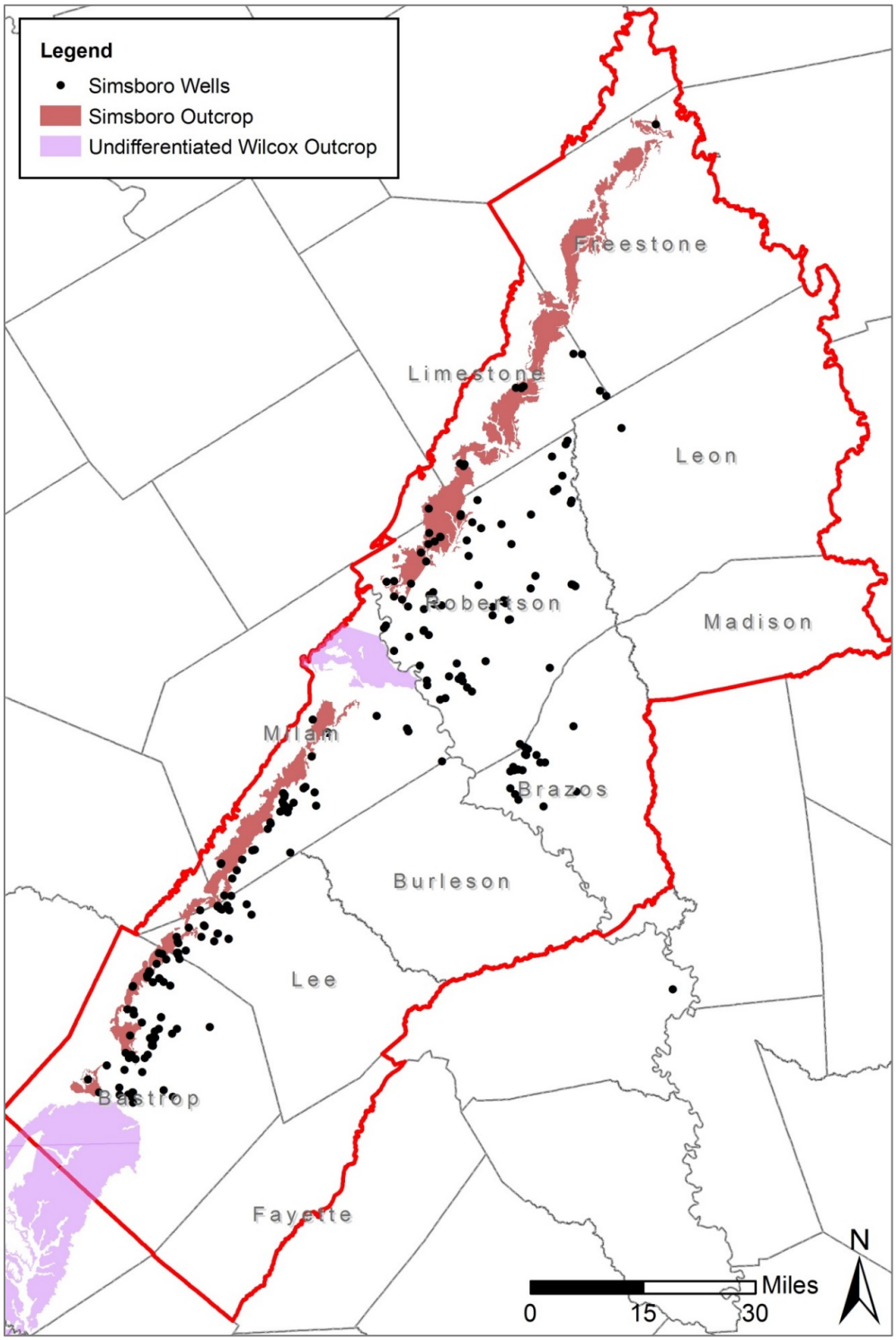

Figure 5-5. Extent of Simsboro Aquifer within GMA 12

Hooper Aquifer: The Hooper Formation is found below the Simsboro and is the lowermost of the three Wilcox hydrostratigraphic units within the Carrizo-Wilcox Aquifer. The Hooper is present across the northwestern edge of GMA 12, as shown in Figure 5-6. There has historically been little production from the Hooper across much of GMA 12. Groundwater from the Hooper is produced from wells shown in Figure 5-6, with most of the wells shallow (less than 500 feet deep) in and near the Hooper outcrop. Groundwater produced from the Hooper is primarily used for domestic and livestock purposes. Lesser amounts of water from the Hooper are used for municipal and power generation purposes. Some significant users of water from the Hooper include the cities of Bremond, Fairfield, Hutto, and Teague, and the TDCJ Boyd Unit.

5.1.2 Queen City Aquifer

The Queen City Aquifer is a minor aquifer present through the middle of GMA 12, as shown in Figure 5-7. Groundwater production from the Queen City in 2019 is summarized in Table 5-4. As shown in this table, there is only limited use across most of GMA 12. Groundwater from the Queen City is primarily produced from shallow to moderately deep wells, with most wells less than 1,000 feet deep, but a few up to 2,000 feet. Groundwater produced from the Queen City is primarily used for domestic/municipal, livestock, and irrigation purposes. Some significant users of water from the Queen City include some rural WSCs in Mid-East Texas GCD, the Town of Lincoln, and numerous landowners for livestock and domestic purposes.

Table 5-4. Total Estimated Groundwater Production from the Queen City Aquifer in 2019 (in acre-feet)

County	Municipal	Manufacturing	Mining	Steam Electric	Irrigation	Livestock	Total
Bastrop	5	0	0	0	1,095	33	1,133
Brazos	65	0	268	0	0	31	364
Burleson	410	0	0	0	0	102	512
Fayette	103	0	0	0	0	0	103
Freestone	7	0	0	0	0	10	17
Lee	214	0	0	0	568	149	931
Leon	285	62	0	0	0	44	391
Madison	52	0	0	0	0	0	52
Milam	9	0	0	0	647	19	675
Robertson	0	0	0	0	68	75	143

Source: Texas Water Development Board web site, District production records, and District estimates.

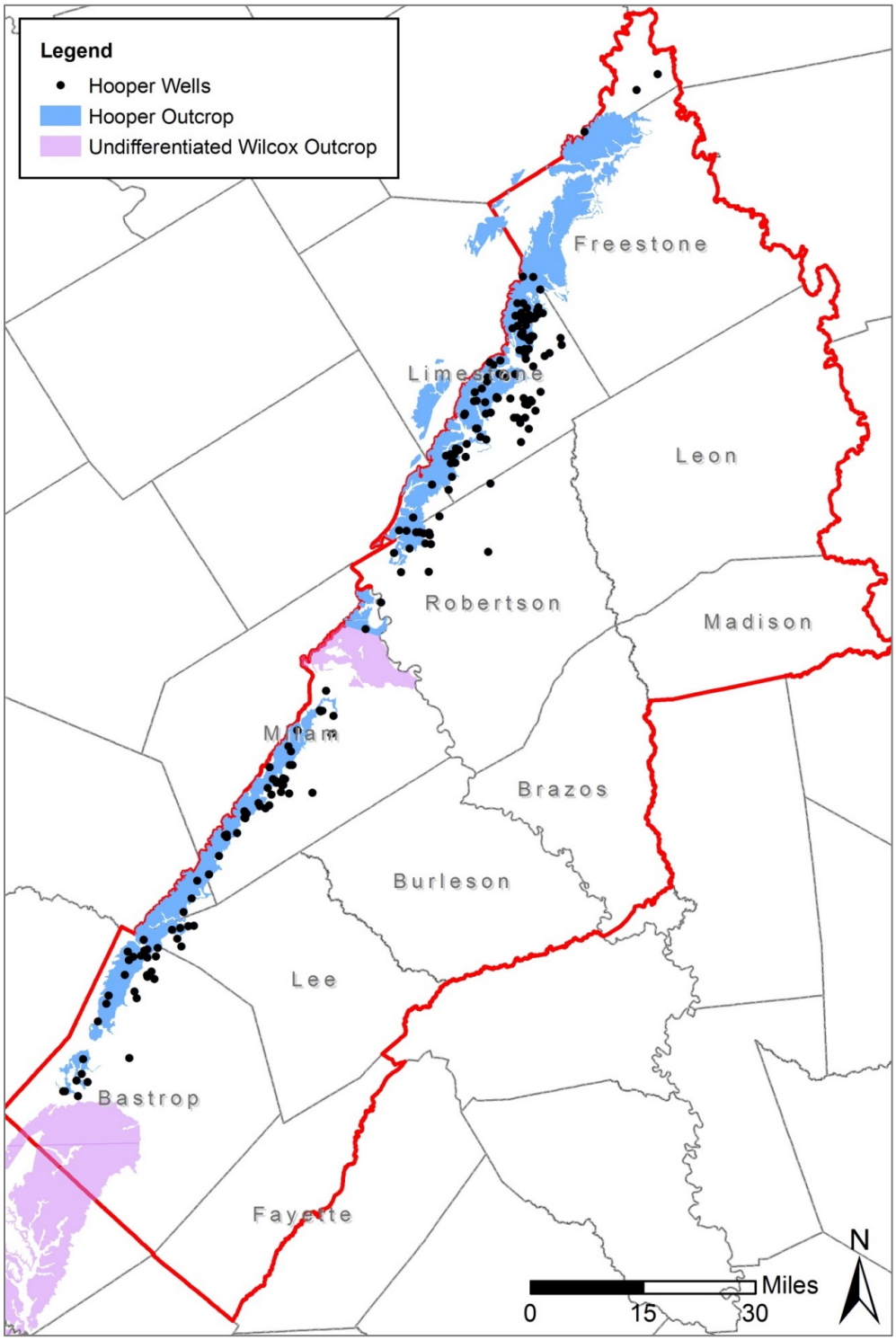

Figure 5-6. Extent of Hooper Aquifer within GMA 12

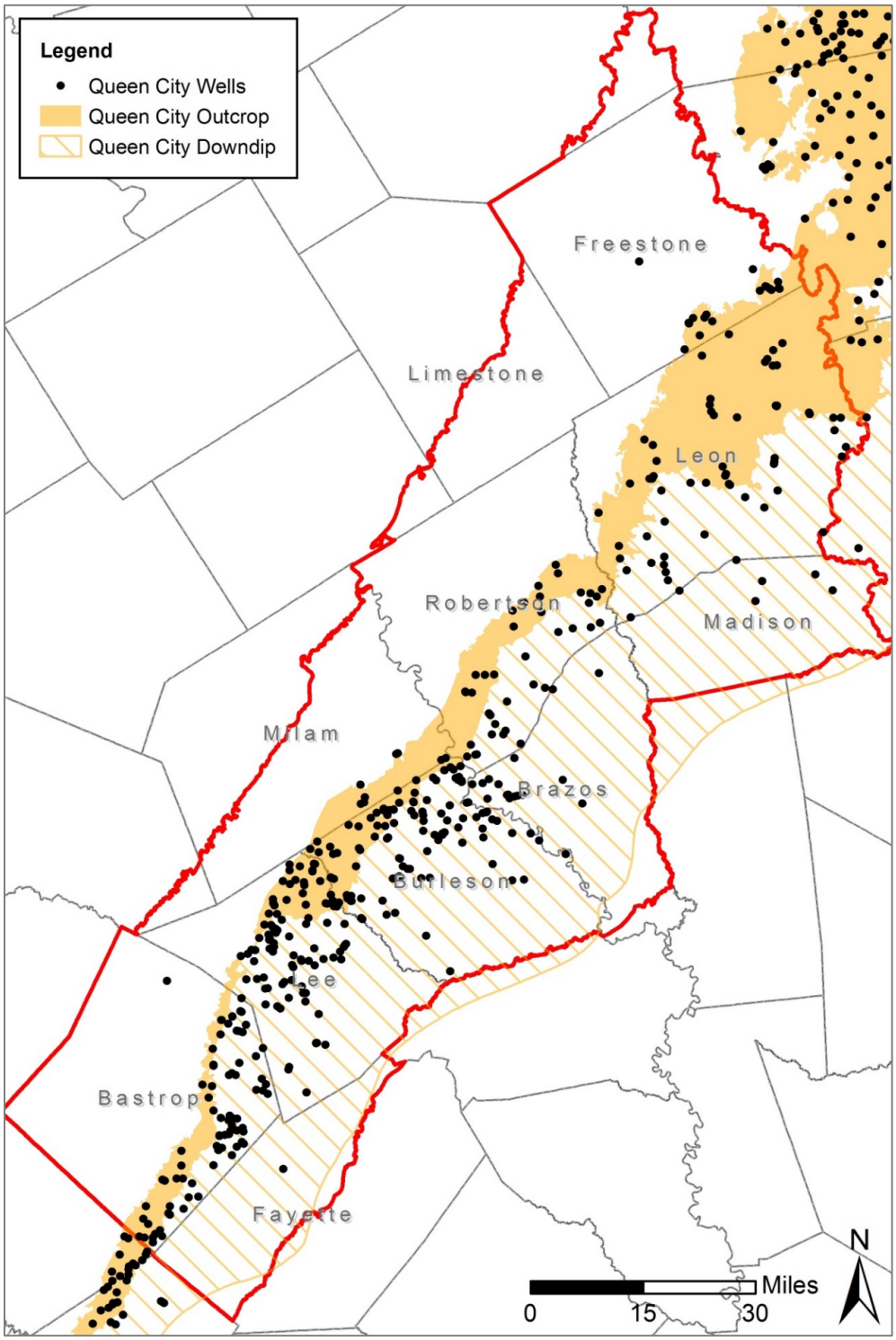

Figure 5-7. Extent of Queen City Aquifer within GMA 12

5.1.3 Sparta Aquifer

The Sparta Aquifer is a minor aquifer present through the middle of GMA 12, as shown in Figure 5-8. Groundwater production from the Sparta in 2019 is summarized in Table 5-5. As shown in this table, there is some use from this aquifer in Brazos, Burleson, and Madison counties, with significantly less use from this aquifer in the rest of the GMA. Groundwater from the Sparta is primarily produced from shallow to moderately deep wells, with most wells less than 1,000 feet deep, but a few up to 2,000 feet. Groundwater produced from the Sparta is primarily used for domestic/municipal, livestock, and irrigation purposes. It is also used for manufacturing in a few counties. Some significant users of water from the Sparta include the City of Madisonville and several municipalities and WSCs in Brazos and Lee counties.

Table 5-5. Total Estimated Groundwater Production from the Sparta Aquifer in 2019 (in acre-feet)

County	Municipal	Manufacturing	Mining	Steam Electric	Irrigation	Livestock	Total
Bastrop	1	0	0	0	260	24	285
Brazos	2,377	0	764	62	570	115	3,888
Burleson	734	3	0	0	0	63	800
Fayette	96	0	0	0	176	10	282
Lee	202	0	0	0	0	51	253
Leon	23	0	0	0	0	8	31
Madison	2,753	0	0	0	185	25	2,963
Robertson	19	5	0	0	104	76	204

Source: Texas Water Development Board web site, District production records, and District estimates.

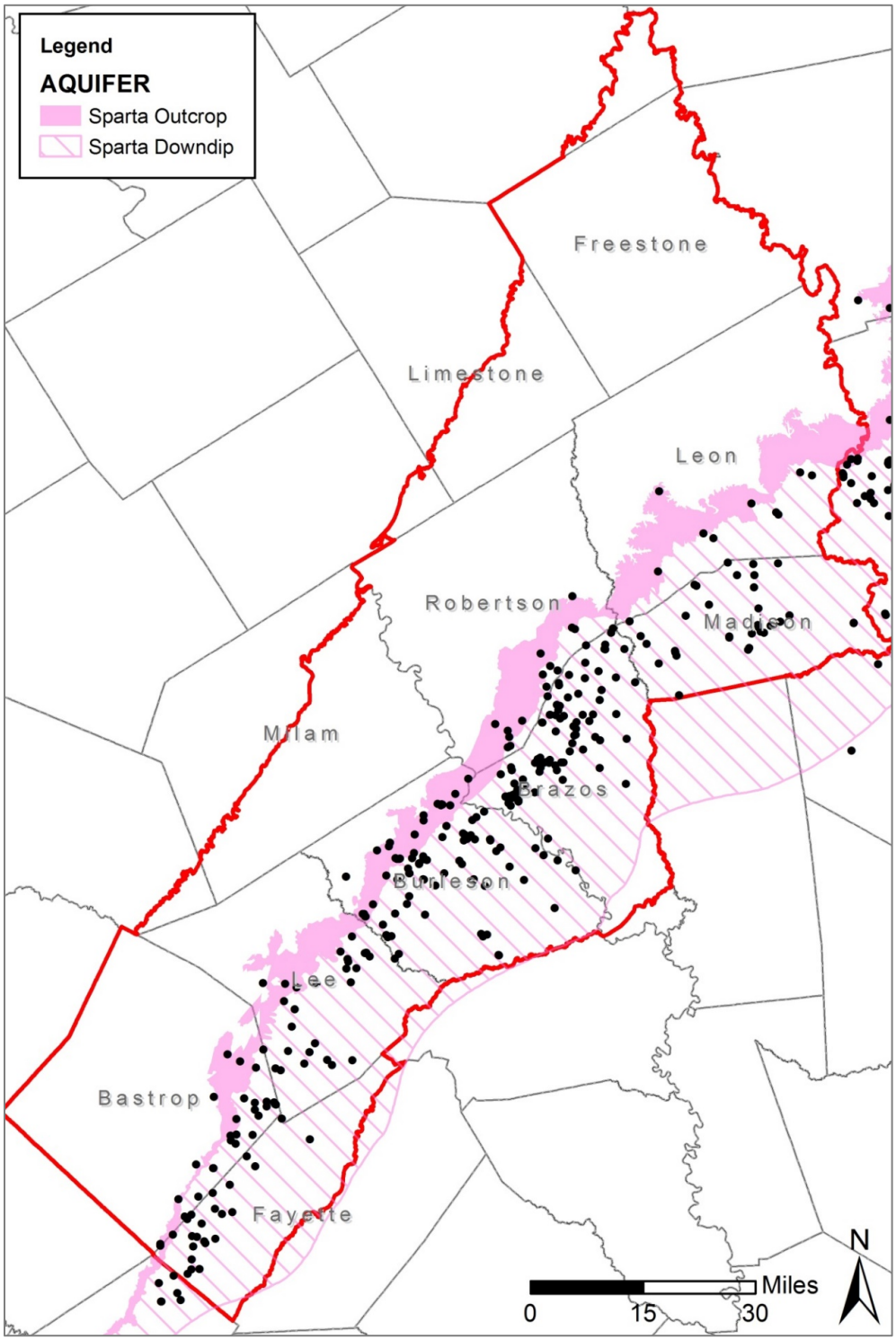

Figure 5-8. Extent of Sparta Aquifer within GMA 12

5.1.4 Yegua-Jackson Aquifer

The Yegua-Jackson Aquifer is a minor aquifer present in the southeastern third of GMA 12, as shown in Figure 5-9. Groundwater production from the Yegua-Jackson in 2019 is summarized in Table 5-6. As shown in this table, there is some production from this aquifer in Brazos and Fayette counties, with significantly less production from this aquifer in the rest of the GMA. Groundwater from the Yegua-Jackson is primarily produced from shallow wells, and is largely used for domestic/municipal, livestock, and irrigation purposes. Lesser amounts of water from the Yegua-Jackson are used for mining (oil and gas drilling). Some significant users of water from the Yegua-Jackson include several municipalities in Fayette County and golf course irrigation and some industrial users in Brazos Valley GCD.

Table 5-6 Total Estimated Groundwater Production from the Yegua-Jackson Aquifer in 2019 (in acre-feet)

County	Municipal	Manufacturing	Mining	Steam Electric Power	Irrigation	Livestock	Total
Bastrop	0	0	0	0	0	3	3
Brazos	717	286	0	0	262	254	1,519
Burleson	281	0	0	0	52	102	435
Fayette	1,183	0	0	0	161	30	1,374
Lee	1	0	0	0	0	28	29
Madison	157	0	0	0	0	19	176

Source: Texas Water Development Board web site, District production records, and District estimates.

5.1.5 Brazos River Alluvium Aquifer

The Brazos River Alluvium Aquifer is a minor aquifer present along the Brazos River between Brazos Valley GCD (Brazos and Robertson counties) and Post Oak Savannah GCD (Burleson and Milam counties), as shown in Figure 5-10. Groundwater is produced from the Brazos River Alluvium entirely from very shallow (less than 100 feet) wells, and is used almost entirely for irrigation purposes. Overall reported use is much higher in Brazos Valley GCD than in Post Oak Savannah GCD, as shown in Table 5-7.

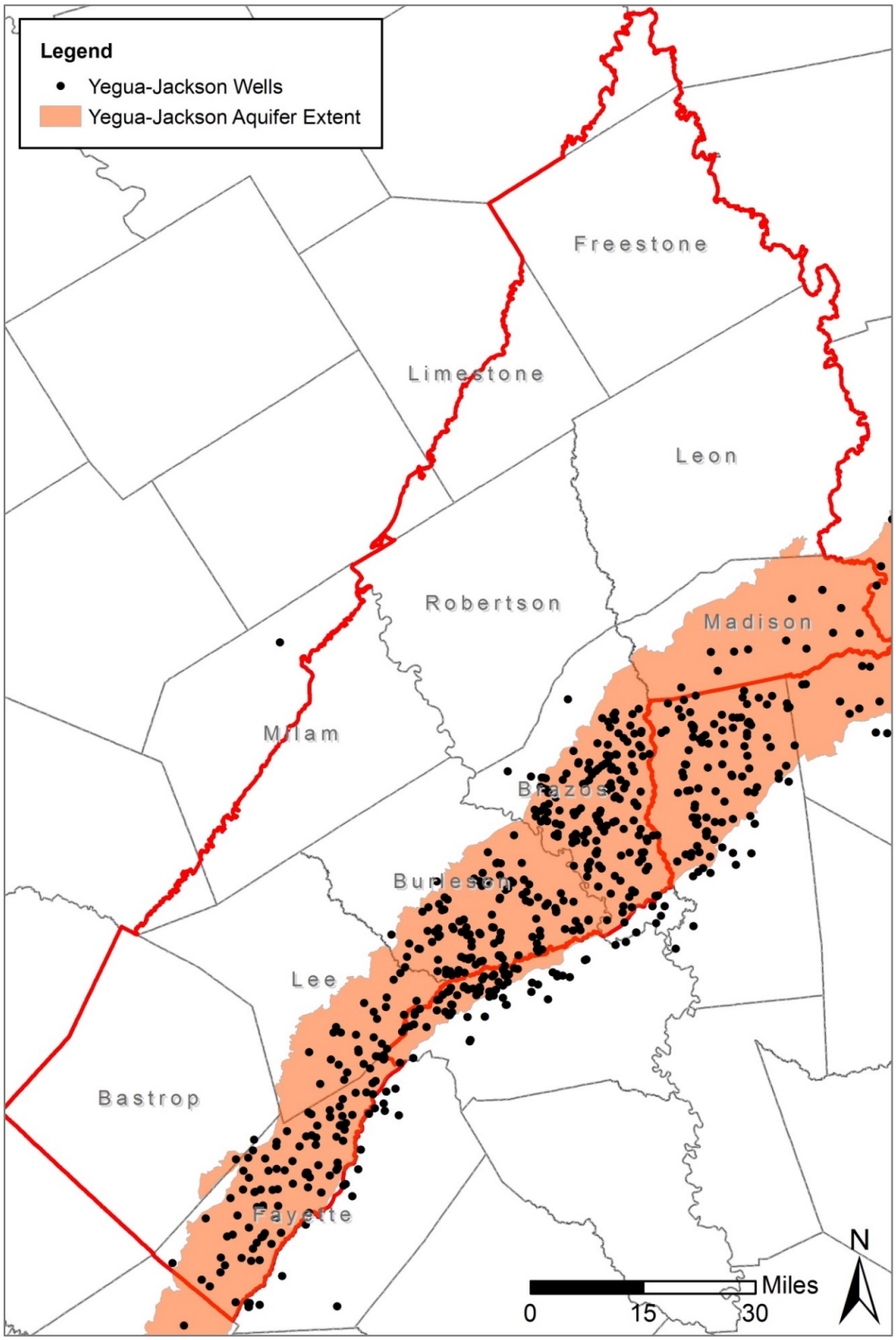

Figure 5-9. Extent of Yegua-Jackson Aquifer within GMA 12

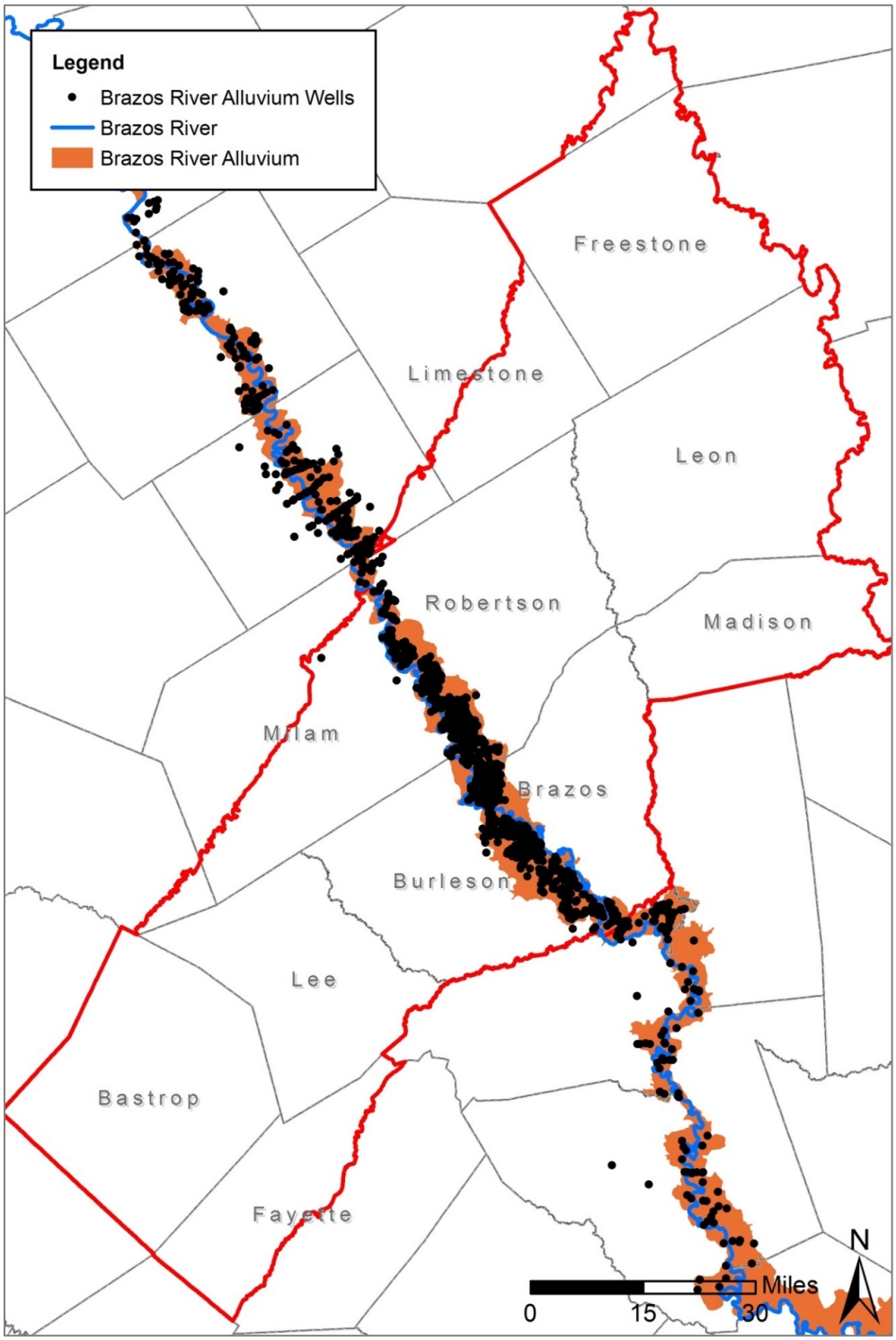

Figure 5-10. Extent of Brazos River Alluvium Aquifer within GMA 12

Table 5-7. Total Estimated Groundwater Production from the Brazos River Alluvium Aquifer in 2019 (in acre-feet)

County	Municipal	Manufacturing	Mining	Steam Electric Power	Irrigation	Livestock	Total
Brazos	0	0	0	0	31,085	0	31,085
Burleson	0	0	0	0	13,490	0	13,490
Robertson	0	0	0	0	52,760	89	52,849

Source: Texas Water Development Board web site

5.1.6 Trinity Aquifer

The Trinity Aquifer is present in GMA 12 only in a very small area in Bastrop, Lee, and Williamson counties. There is no historical use within GMA 12, and no known wells within the GMA. It is found only at very great depths, and was declared "not relevant" for the purposes of joint planning in GMA 12 on February 12, 2021.

5.2 Water Supply Needs and Water Management Strategies

Texas Water Code Section 36.108 (d)(2) requires that, during the joint-planning process, GCDs shall consider "the water supply needs and water management strategies included in the state water plan." For the current joint-planning process, GMA 12 relied on the draft 2021 Regional Water Plans for Regions G, K, C, and H to provide estimates of future water needs and water management strategies within the GMA. It should be noted that during the development of the proposed DFCs, the 2022 State Water Plan was not available and the draft regional water plans was the most current available information. The State Water Plan is a combination of regional water plans created by regional planning groups across the state. Portions of GMA 12 fall within Regional Water Planning Areas C, G, H, and K. GCD representatives from GMA 12 regularly attended the planning meetings for areas C, G, H, and K, and thus were able to provide some insight into the unpublished (at the time) 2022 State Water Plan for consideration during the DFC development process.

The overall water needs for a region, as defined within the Texas State Water Plan, are the demands that cannot be met with existing supplies. The "demands" are based on water demand projections developed during the water planning process for the six major water use sectors: municipal, manufacturing, mining, steam-electric, irrigation, and livestock. Existing supplies may be inadequate to satisfy projected demands due to natural conditions (e.g., sustainable supply of an aquifer or firm yield of a reservoir) or infrastructure limitations (e.g., inadequate diversion,

treatment, or transmission capacity). On July 24, 2020, a presentation titled "GMA 12: Needs and Strategies" was given by GMA 12's hydrogeological consultants. This presentation is included as Appendix M. The presentation discussed the supply, demand, surplus/need, and water management strategies for each groundwater conservation district in GMA 12.

A review of the water management strategies within a region gives some insight into the potential future supply for meeting identified needs. Table 5-8 provides Regional Planning Values for 2070 for the five GCDs that comprise GMA 12. The total groundwater and surface water supplies for the five GCDs are 471,714 ac-ft/yr, of which 65 percent are groundwater supplies. The projected 2070 water demand for the five GCD is 554,103 ac-ft/yr and the 2070 projected water need is 111,375 ac ft/yr. The proposed water management strategies identify projects for the five GCDs will generate 111,551 ac-ft/yr of water in 2070. Thus, the management strategies provide sufficient additional water to meet the projected needs for the five GCDs.

For 2070, the regional water plans presume that the groundwater source and the groundwater strategies for the five GMA 12 GCDs are 305,401 ac-ft/yr and 33,401 ac-ft/yr, respectively. The sum of the groundwater sources and water strategies is 338,783 ac-ft/yr. Table 5-9 lists the amounts of the current operating permits in the five GCDs. These permits total 635,671 ac-ft/yr. Thus, GMA 12 GCDs currently have allocated approximately 300,000 ac-ft/yr more than is anticipated by the regional plans to meet groundwater demands.

Based on this review, GMA 12 determined that the proposed DFCs are not anticipated to have a significant impact on the water supplies, water supply needs, or water management strategies of the 2022 State Water Plan. This evaluation of water supply was considered during the GMA 12 deliberations on how to provide a balance between the highest practicable level of groundwater production and the conservation, preservation, protection, recharging and prevention of waste of groundwater in the management area.

Table 5-8. Regional Water Plan Amounts for Supplies, Demands, and Strategies in 2070 for GMA 12 GCDs (in acre-feet)

	Post Oak Savannah GCD	Mid-East Texas GCD	Lost Pines GCD	Fayette County GCD	Brazos Valley GCD
SUPPLY (Groundwater & Surface Water)					
Other	960	2,923	3,592	878	585
Irrigation	33,052	1,483	5,448	1,022	107,825
Livestock	4,151	5,517	2,351	1,982	4,291
Manufacturing	125	945	223	402	7,475
Mining	2,089	1,840	476	1,629	17,327
Municipal	10,917	7,419	58,723	4,774	54,803
Steam Electric Power	-	24,980	10,288	44,912	46,307
TOTAL	***51,294***	***45,107***	***81,101***	***55,599***	***238,613***
DEMAND					
Other	954	4,555	3,592	1,606	528
Irrigation	33,306	1,183	5,448	828	119,410
Livestock	4,151	5,517	2,351	1,726	4,291
Manufacturing	130	1,088	223	442	1,831
Mining	442	6,410	476	350	12,814
Municipal	8,024	10,984	58,723	4,383	85,865
Steam Electric Power	32,254	34,432	10,288	49,211	46,287
TOTAL	***79,261***	***64,169***	***81,101***	***58,546***	***271,026***
SURPLUS/NEED					
Other	6	-1,632	1	-728	57
Irrigation	-254	300	231	194	-11,585
Livestock	-	-	42	256	-
Manufacturing	-5	-143	10	-40	5,644
Mining	1,647	-4,570	5,044	1,279	4,513
Municipal	2,893	-3,565	-34,314	391	-31,062
Steam Electric Power	-32,254	-9,452	-	-4,299	20
TOTAL	***-27,967***	***-19,062***	***-28,986***	***-2,947***	***-32,413***

Table 5-9. Existing Operating Permits for Groundwater Production in GMA 12

Groundwater Conservation District	Existing Permits
Brazos Valley GCD	259,457
Fayette County GCD	36,179
Lost Pines GCD	138,084
Mid-East Texas GCD	19,787
Post Oak Savannah GCD	161,968
Total	***615,205***

5.3 Hydrological Conditions

Texas Water Code Section 36.108 (d)(3) requires that, during the joint-planning process, GCDs shall consider "hydrological conditions, including for each aquifer in the management area the total estimated recoverable storage as provided by the executive administrator, and the average annual recharge, inflows, and discharge." On January 29, 2020, a presentation titled "GMA 12: Hydrological Conditions Consideration Discussion" was given by GMA 12's hydrogeological consultants. This presentation is included as Appendix N. The presentation discussed the hydrologic conditions in each aquifer in GMA 12. This section summarizes the hydrological conditions for each of the major and minor aquifers present within GMA 12 for which DFCs were developed. These aquifers include:

- Carrizo-Wilcox Aquifer, which includes the Carrizo, Calvert Bluff, Simsboro, and Hooper hydrostratigraphic units
- Queen City Aquifer
- Sparta Aquifer
- Yegua-Jackson Aquifer
- Brazos River Alluvium Aquifer

In this section, we also will provide a discussion on the total estimated recoverable storage (TERS) values provided by the TWDB to GMA 12, as well as the annual average recharge, inflows, and discharge estimates provided to each GCD in the GMA by the TWDB in support of the development of each GCD's management plan.

5.3.1 Geology and Hydrogeology

The aquifers for which DFCs were developed in GMA 12 consists of, from oldest to youngest, the Carrizo-Wilcox, Queen City, Sparta, Yegua-Jackson, and Brazos River Alluvium aquifers. The outcrop for each of these aquifers is shown in Figure 5-1. With the exception of the Brazos River Alluvium, which is a shallow alluvial unit present along the Brazos River, these formations are composed of layers of partially consolidated sands, silts, and clays and all outcrop from southwest to northeast, and dip to the southeast towards the Gulf of Mexico.

5.3.1.1 Carrizo-Wilcox Aquifer

The largest and most productive unit in GMA 12 is the Carrizo-Wilcox Aquifer. This aquifer system contains four separate and distinct hydrostratigraphic units within most of GMA 12. From oldest to youngest, the hydrostratigraphic units comprising the Carrizo-Wilcox Aquifer are the Hooper, Simsboro, Calvert Bluff, and Carrizo aquifers. These individual aquifers are identifiable through most of GMA 12 where the Simsboro is present as a hydrostratigraphic unit and acts as a readily identifiable divider. However, the Simsboro is absent south of the Colorado River and north of the Trinity River, so the Hooper and Calvert Bluff sediments there are simply lumped together as undifferentiated Wilcox Group sediments. Figure 5-11 shows a generic cross-section of the Carrizo-Wilcox Aquifer in the GMA 12 area. Each of the hydrostratigraphic units within the Carrizo-Wilcox Aquifer System is described separately below.

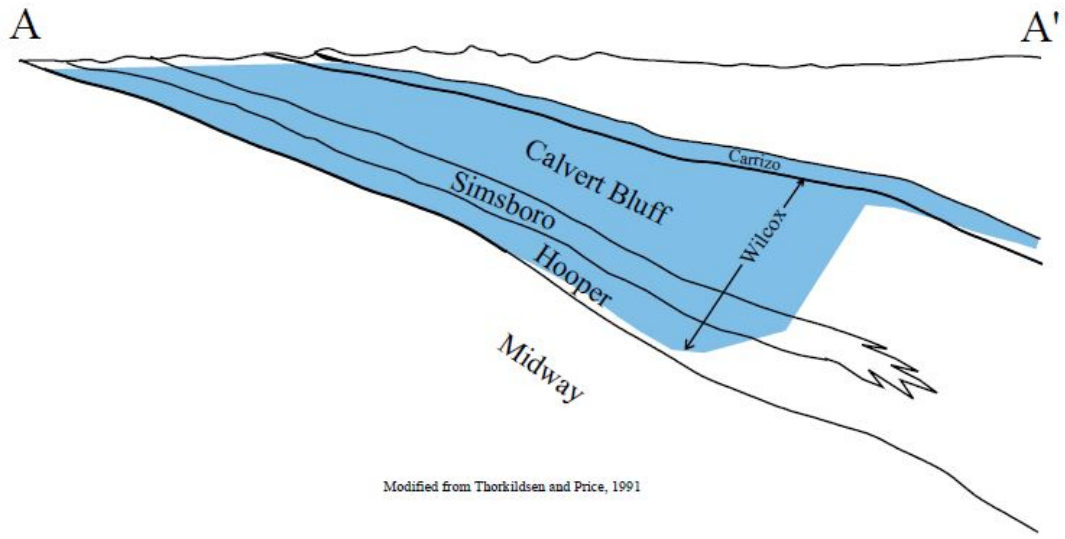

Figure 5-11. Generic Cross-Section of the Carrizo-Wilcox Aquifer in GMA 12 (modified from Ashworth and Hopkins, 1995)

Carrizo Formation: The uppermost hydrostratigraphic unit in the Carrizo-Wilcox Aquifer is the Carrizo Formation. This hydrostratigraphic unit consists of fine to coarse-grained massive, well-sorted sand (Thorkildsen and Price, 1991; Rogers, 1967). The Carrizo occurs under unconfined conditions in the outcrop area and under confined conditions downdip. As with the three Wilcox hydrostratigraphic units, most groundwater development in the Carrizo Formation occurs in and near the outcrop, but fresh groundwater has been produced from the Carrizo as far downdip as Fayette County, as shown in Figure 5-3. The Carrizo is also a much more extensive unit, with significant production occurring from it across the state. The Carrizo is a highly productive unit to the south in GMA 12, where water developers have installed and are planning on installing large-volume well fields. Water quality in the Carrizo Aquifer has typically been considered fresh to moderately saline. A recently installed municipal well by the Fayette Water Supply Corporation produces significant quantities of groundwater at over 1,200 gallons per minute (gpm) with a total dissolved solids (TDS) concentration of approximately 230 milligrams per liter (mg/L).

Calvert Bluff Formation: The Calvert Bluff Formation is the uppermost of the three Wilcox units and is found directly below the Carrizo. This hydrostratigraphic unit consists of fine- to coarse-grained sandstones interbedded with varying amounts of finer grained sediments as well as some lignite beds (Thorkildsen and Price, 1991). The Calvert Bluff can be up to 2,000 feet thick, and although not as productive as the Simsboro, it can be very productive in limited areas (Thorkildsen and Price, 1991). Most of the development of groundwater from the Calvert Bluff is in the area within about 8 to 10 miles of the outcrop, as shown in Figure 5-4. A few deeper wells are found in the downdip areas, but most wells producing from this unit are relatively shallow.

Simsboro Formation: The next aquifer below the Calvert Bluff is the Simsboro Formation. This hydrostratigraphic unit is identifiable as a separate unit only in GMA 12. The Simsboro is composed of fine- to coarse-grained sand with only small amounts of finer sediments (Thorkildsen and Price, 1991). The Simsboro can be up to 800 feet thick and highly productive. The Simsboro is well developed in and near the outcrop, but it is also highly productive and mainly used downdip (Figure 5-5), with many high capacity wells completed to screen depths of 1,000 to 3,000 feet. Most of the Wilcox pumpage in GMA 12 is from the Simsboro, and it is the unit that is typically targeted for groundwater development in the region.

Hooper Formation: The oldest and deepest unit producing groundwater in GMA 12 is the Hooper Formation. This hydrostratigraphic unit is below the Simsboro and is the deepest of the three main hydrostratigraphic units that make up the Wilcox Aquifer in the region. The Hooper

consists primarily of mudstone with some fine- to medium-grained sandstone. In GMA 12 the Hooper can be more than 1,300 feet thick, but is generally less than 500 feet thick in the updip areas where groundwater development typically occurs (Thorkildsen and Price, 1991). It is the least productive of the hydrostratigraphic units within the Carrizo-Wilcox Aquifer, with most development occurring in and near the outcrop, as shown in Figure 5-6. In some areas, however, the Hooper can be moderately productive.

5.3.1.2 Queen City Aquifer

Above the Carrizo-Wilcox Aquifer, separated by the Reklaw Formation, is the Queen City Aquifer. This aquifer is formed by the Queen City Sand, which is a loosely cemented, Tertiary-aged, very-fine-grained sandstone interbedded with silt and silty shale (LBG-Guyton, 2003; George and others, 2011; Kelley and others, 2004; Follett, 1974). Like the other aquifers in the GMA, the Queen City Aquifer occurs under unconfined conditions in the outcrop area and under confined conditions downdip. And as with the other GMA 12 aquifers, much of the groundwater development in the Queen City has occurred in and near the outcrop, but some development in the downdip areas also has occurred, as shown in Figure 5-7. Recharge occurs within the outcrop areas. Water quality in the Queen City Aquifer is mostly fresh to slightly saline within GMA 12, with increasing salinity farther downdip. The Queen City Aquifer can yield small to moderate quantities of water to wells.

5.3.1.3 Sparta Aquifer

Above the Queen City Aquifer, separated by the Weches Formation, is the Sparta Aquifer. This aquifer is formed by the Sparta Sand, which is a massive to cross-bedded, generally well-sorted, fine- to medium-grained sand with some thin interbeds of clay and silt throughout. The Sparta Aquifer occurs under unconfined conditions in the outcrop area and under confined conditions downdip. Recharge occurs within the outcrop areas. Fresh water usually occurs in and near the outcrop areas, and water quality deteriorates with depth. Much of the development of groundwater resources from the Sparta has occurred in and near the outcrop, with some wells producing water in the downdip areas within about 15 miles of the outcrop, as shown in Figure 5-8. The saturated thickness of the Sparta aquifer averages about 120 feet and will yield small to moderate quantities of fresh to moderately saline water to wells in GMA 12 (LBG-Guyton, 2003; George and others, 2011; Kelley and others, 2004; Follett, 1974).

5.3.1.4 Yegua-Jackson Aquifer

The uppermost of the dipping coastal aquifers in GMA 12 is the Yegua-Jackson Aquifer. This aquifer is formed by the Yegua Formation and the Jackson Group, which consist of beds of clay,

silt, sand, and shale, with some lignite and gypsum. The Yegua-Jackson Aquifer outcrops through most of the lower third of GMA 12, as shown in Figure 5-9. The aquifer occurs under water table conditions in the outcrop areas and artesian conditions in the deeper portions of the aquifer. Water quality in the Yegua-Jackson is highly variable due to the nature of the sediments that make up the aquifer matrix. Fresh to moderately saline groundwater can be found in many areas, but the groundwater generally becomes more saline with increasing depth. The more productive sand units within the Yegua-Jackson tend to pinch out farther downdip, and the overall productivity of the aquifer decreases. The Yegua-Jackson Aquifer can yield small to moderate quantities of groundwater to wells in GMA 12 (LBG-Guyton, 2003; George and others, 2011; Rogers, 1967).

5.3.1.5 Brazos River Alluvium Aquifer

The Brazos River Alluvium Aquifer occurs along the Brazos River between the Post Oak Savannah and Brazos Valley GCDs. The aquifer is present in the shallow floodplain deposits of the Brazos River that range from clay to gravels or large cobbles. The aquifer is typically less than 100 feet thick and only occurs under unconfined conditions and is hydraulically connected to the Brazos River. It is typically also in hydraulic connection with underlying aquifers where the alluvial sediments overlie the outcrops of those aquifers. The Brazos River Alluvium Aquifer only occurs within about five miles of the Brazos River, as shown in Figure 5-10.

5.3.2 Total Estimated Recoverable Storage (TERS)

Part of the evaluation of the hydrological conditions of the aquifers within a GMA is the TERS value provided by the TWDB. The TWDB defines "recoverable" as the estimated amount of groundwater that accounts for recovery scenarios that range from 25% to 75% of the total amount of groundwater in storage.

It is important to note that the TERS is solely based on how much water is present in the subsurface within the "official" aquifer extents defined by the TWDB according to the regional GAM or other method used to estimate the storage. If an aquifer had an active model cell within an area in the GAM, it was included in the TERS calculations regardless of whether or not it could actually produce water for water supply purposes. The process does not consider water quality, meaning that brackish or even saline groundwater present in an aquifer is included in the total. TERS is a "one-size-fits-all" definition of groundwater based solely on GAM parameters, when in reality the actual amount of recoverable groundwater will vary based on the aquifer type and other conditions.

A good example of this is the Carrizo-Wilcox Aquifer in Fayette County. According to the TWDB TERS report to GMA 12 (Wade and Shi, 2014), there is 95,000,000 acre-feet of water in storage in the Carrizo-Wilcox in Fayette County, as shown in Table 5-10.

Table 5-10. Total Estimated Recoverable Storage (TERS) in the Carrizo-Wilcox Aquifer in Fayette County

Hydrostratigraphic Unit	Total Storage (acre-feet)
Carrizo	20,000,000
Calvert Bluff	36,000,000
Simsboro	14,000,000
Hooper	25,000,000
Total	***95,000,000***

The TWDB TERS report states that there is 75,000,000 acre-feet of water in storage in the Wilcox portion of the Carrizo-Wilcox Aquifer in Fayette County. In reality, there are no wells in the Wilcox portion of the Carrizo-Wilcox Aquifer in Fayette County. All three Wilcox hydrologic units were declared "not relevant" by the GMA because these units are too deep and contain water that is too poor quality to be usable for water supply purposes.

For realistic planning purposes, the Carrizo is the only hydrostratigraphic unit within the Carrizo-Wilcox aquifer in Fayette County that is actually suitable for water supply purposes. Therefore, the stated TERS for the Carrizo-Wilcox Aquifer in Fayette County of 95,000,000 acre-feet is misleading. In reality, the true amount of groundwater storage available for water supply purposes is probably at most 20,000,000 acre-feet, with part of that amount being brackish groundwater, which is significantly less than the 95,000,000 acre-feet estimated in Wade and Shi (2014).

The TERS for GMA 12 were provided by the TWDB in GAM Task 13-035 (Wade and Shi, 2014). This report is provided in Appendix F. Table 5-11 summarizes the total amount of groundwater in storage according to the estimates made by the TWDB and provided in that report. It should be noted that although a new GAM was developed for the GMA 12 area for the Sparta, Queen City, and Carrizo-Wilcox Aquifers, updated TERS values have not been provided by the TWDB at the time of this report.

Table 5-11. Total Amount of Groundwater in Storage (TERS) (in acre-feet) in GMA 12

County	Trinity	Carrizo-Wilcox	Queen City	Sparta	Yegua-Jackson	Gulf Coast	Brazos River Alluvium
Bastrop	9,000,000	98,000,000	9,500,000	2,500,000	290,000	--	--
Brazos	--	69,000,000	25,000,000	4,250,000	30,000,000	450,000	290,000
Burleson	--	120,000,000	29,000,000	4,000,000	27,000,000	--	450,000
Falls	--	820,000	--	--	--	--	140
Fayette	--	95,000,000	4,750,000	12,000,000	27,000,000	--	--
Freestone	--	46,000,000	290,000	--	--	--	--
Lee	500,000	130,000,000	23,000,000	10,000,000	10,000,000	--	--
Leon	--	180,000,000	25,000,000	4,600,000	76,000	--	--
Limestone	--	12,000,000	--	--	--	--	--
Madison	--	110,000,000	20,000,000	16,000,000	15,000,000	--	--
Milam	--	47,000,000	650,000	--	--	--	28,000
Navarro	--	1,000,000	--	--	--	--	--
Robertson	--	110,000,000	8,800,000	1,300,000	--	--	270,000
Williamson	1,600,000	500,000	--	--	--	--	--
TOTAL	***11,100,000***	***1,019,320,000***	***160,240,000***	***79,400,000***	***109,366,000***	***450,000***	***1,038,140***

5.3.3 Average Annual Recharge, Inflows, and Discharge

A required component for characterizing the hydrological conditions of aquifers within a GMA is estimating values for average annual recharge, inflows, and discharge for each aquifer. These values were provided by the TWDB to each GCD within GMA 12 as "GAM Run" reports in support of the development of district management plans. The following reports were provided for the GMA 12 area by the TWDB:

- Fayette County GCD - GAM Run 17-019 (Shi, 2018)
- Lost Pines GCD - GAM Run 16-014 (Wade, 2017)
- Post Oak Savannah GCD - GAM Run 16-015 (Ballew, 2017)
- Brazos Valley GCD - GAM Run 18-021 (Wade, 2019)
- Mid-East Texas GCD - GAM Run 18-020 (Wade, 2019)

These TWDB reports are provided in Appendix G through Appendix K. The values of the annual average recharge, inflows, and discharge compiled from these reports were provided to GMA 12 in a presentation on January 29, 2020 entitled "GMA 12: Hydrological Conditions Consideration Discussion." This presentation is included as Appendix N.

Values for the Brazos River Alluvium Aquifer were not provided by the TWDB and are therefore not included in this report.

5.4 Environmental Factors

Texas Water Code §36.108 (d)(4) requires that, during the joint-planning process, districts shall consider "other environmental impacts, including impacts on spring flow and other interactions between groundwater and surface water."

Groundwater pumping causes the hydraulic pressure in the pumped well and in the surrounding aquifer to decline. If the pumping is sufficiently large and sufficiently long, the decline in hydraulic pressure can spread into the shallow groundwater flow system near a spring or surface water body. If this occurs, the water level in the aquifer decreases and hydraulic gradient between the groundwater and the surface water body changes. If the water flowed from the aquifer to a spring or a surface water body prior to pumping, then groundwater pumping will lessen or reverse the hydraulic gradient. A decrease in the hydraulic gradient from the groundwater system to the surface water system can cause a reduction in spring flow or a reduction in stream baseflow. A complete reversal of the hydraulic gradient causes the flow direction to change, resulting in flow from the stream or surface water body into the aquifer. In the case of springs, if the pumping causes the water level to drop below land surface, and the regional flow system is the only source of water to the spring, then the spring will stop flowing.

The process by which pumping can impact the direction and magnitude of the flows between groundwater and surface water was discussed in a GMA 12 meeting on September 18, 2020. A presentation was prepared and presented by the hydrogeological consultants to member districts of GMA 12 and is titled "Presentation to GMA-12: Environmental Impact Considerations." This presentation is included as Appendix O. As explained in the presentation, the groundwater availability models used to set the GMA 12 DFCs are suitable for developing some qualitative relationships between pumping and groundwater-surface water exchange. However, the GAMs are not suitable for developing quantitative relationship between pumping and groundwater-surface water exchange without refinement in their representation of changing surface water levels over time and subsequent validation using measured field data.

5.5 Subsidence

Texas Water Code Section 36.108 (d)(5) requires that, during the joint-planning process, GCDs shall consider "the impact on subsidence." This section details the potential impact of the DFCs on subsidence within GMA 12. The process by which pumping can cause subsidence was discussed in a GMA 12 meeting on July 24, 2020. A presentation was prepared and presented by the hydrogeological consultants to member districts of GMA 12 and is titled "Evaluation of the Potential Impact of Subsidence in GMA 12." This presentation is included as Appendix P.

The potential for significant measurable subsidence is generally related to the age of the sediments and the depth of sediment burial (Gabrysch, 1984). This is because fine grained sedimentary strata will naturally experience compaction over geologic time as more sediment is deposited above the layers and as the layers are more deeply buried. The aquifers that provide water in GMA 12 are composed of essentially unconsolidated layers of sand, clay, shale, and minor amounts of gravel. Sand and clay layers are interbedded throughout most of the aquifers within the GMA, with some layers consisting of mostly clay with minor amounts of sand (e.g., the Hooper Formation) and others with thick sand layers and minor amounts of clay (e.g., the Simsboro Formation). In these types of aquifers, land subsidence can occur when pumping from wells results in large decreases in artesian hydraulic head that in turn cause depressurization of the clay layers and a subsequent release of water and vertical compaction of the clays. The vertical compaction of the clay layers, if sufficiently large, will be associated with an equivalent lowering of land surface elevation.

Land surface subsidence within the state of Texas has been identified and measured in the Houston-Galveston area (Gabrysch, 1984; Holdahl et al., 1898) as well as in parts of far West Texas (Chi and Reilinger, 1984). Although the Gulf Coast formations in the Houston-Galveston area are lithologically similar to those in GMA 12, they are much younger (typically less than 5 million years old), meaning that the clay strata have not experienced much natural consolidation. Therefore, the Gulf Coast sediments are more susceptible to significant pumping-related dewatering and vertical compaction than the sediments in the GMA 12 area.

The aquifers that provide water in GMA 12 are substantially older (33 to 55 million years old) than the Gulf Coast formations in the Houston-Galveston area (Dutton et al., 2003). The clay and shale strata within the aquifers of GMA 12 have already experienced considerable natural compaction and are therefore considered to have a low risk of pumping-related consolidation. In addition, subsidence has not been identified anywhere within GMA 12, despite large-scale pumping and associated drawdowns in several major pumping centers including Bastrop and

the Bryan-College Station area (Huang et al., 2012). Based on the age of the aquifers in GMA 12 and the lack of previously observed subsidence despite significant pumping, the overall risk of subsidence within GMA 12 is assumed to be slight.

The subsidence risk report recently produced for the TWDB (Furnans et al, 2017) uses a scoring system for a list of risk factors to assign a total weighted risk for subsidence to the major and minor aquifers of Texas. This report assigns a high subsidence risk to the Yegua-Jackson and Carrizo-Wilcox aquifers and a medium subsidence risk to the Queen City and Sparta aquifers. These total risk values are based on a set of factors (clay thickness and extent, overall lithology, current water levels, predicted water level trends) that attempt to provide an a priori estimate of the potential for subsidence, but do not account for any current observed subsidence within the specific aquifers. As previously stated, there have been no reports of observable subsidence anywhere within the districts of GMA12, even in areas with significant pumping-related drawdowns. Based on the age and nature of the formations within GMA12 and the lack of previously observed subsidence, the overall risk of subsidence within GMA 12 is assumed to be negligible. Therefore, the proposed DFCs are not expected to have any negative impact on subsidence within GMA 12.

5.6 Socioeconomics

Texas Water Code Section 36.108 (d)(6) requires that, during the joint-planning process, GCDs shall consider "socioeconomic impacts reasonably expected to occur." The following is a discussion of GMA 12's consideration of the sixth factor listed in Subsection 36.108 (d) of the Texas Water Code to be discussed in the Explanatory Report (ER), and a review of how the relevant aquifer DFCs within GMA 12, impact this factor. The GMA considered socioeconomic impacts reasonably expected to occur as a result of the proposed DFCs for relevant aquifers. The consideration of socioeconomic impacts as part of state water planning, both at the regional and state level, has been an element of the planning process dating back to the 1990s.

5.6.1 Regional Planning Assessment of Socioeconomic Impact

During each five-year planning cycle, regional water planning groups (RWPGs) evaluate population projections, water demand projections, and existing water supplies. Each planning group then identifies water shortages under drought of record conditions, a critical component to both the regional water plans (RWPs) and the State Water Plan. Determining and evaluating both short- and long-term water supply needs help us to better understand "how the needs for water could affect communities throughout the State during average precipitation periods and

during a severe drought and to plan for meeting those needs" (TWDB, 2012). In addition, water management strategies are developed and recommended by the planning groups to address the potential shortages identified. The goal of the water planning process is to ensure that entities have adequate water supplies in times of drought. In order to reach this goal, the TWDB, which is statutorily responsible for administering the regional water planning process, provides guidance within the Texas Administrative Water Code.

The analysis performed by the TWDB consists of a series of point estimates of one-year droughts at 10-year intervals. The socioeconomic impact analysis attempts to measure the impacts on water user groups should the identified water supply needs not be met. For this socioeconomic impact analysis, multiple impacts are examined including:

- Sales income and tax revenue
- Jobs
- Population
- School enrollment

The regional water planning process and the development of the State Water Plan are governed differently statutorily than the GMA's joint planning process. The processes for both the regional water plans and the State Water Plan are directed by 31 Texas Administrative Code Chapter 357, which requires planning groups to use the results of the socioeconomic impact analysis provided by the TWDB and the data developed within the joint planning process by the GMAs. In contrast, the joint planning process is governed by the Texas Water Code Chapter 36, which has a different directive provided to GMAs and GCDs in Subsection 36.108(d). This directive requires GCDs to consider the socioeconomic impacts reasonably expected to occur prior to adopting a proposed DFC, and then for an adopted DFC, the Explanatory Report developed in support of the joint planning process, should document that the nine factors were considered.

5.6.2 Other Considerations of Socioeconomic Impacts

The method used by the TWDB for evaluating social and economic impacts for not meeting shortages considers the demand side. This analysis concentrates on impacts or benefits of providing water to people, business and the environment. To develop economic baselines, the most widely used tools are input/output models (IO models) combined with social accounting matrices (SAMs). These are referred to as IO/SAM models. These tools formed the basis for estimating agriculture (irrigation and livestock water uses), and industry (manufacturing, mining, steam-electric, and commercial business activity for municipal water uses).

The socioeconomic impact analyses provided by the TWDB to Regions C, G, H and K regional planning groups for the 2021 Regional Water Plans (Ellis 2019 and 2020 were considered as part of the GMA 12 deliberations on socioeconomic impacts reasonably expected to occur as a result of the proposed DFCs for relevant aquifers in GMA 12. Those documents illustrate the regional impacts of not meeting water supply needs within a region for specific water user groups. Figures 5-12 and 5-13 illustrate the socioeconomic impacts of not meeting water supply needs in Region G based on the 2021 Region G Regional Water Plan. As shown on Figure 5-12, lost income within the region could reach about $12 billion by 2060 on an annual basis. Similarly, Figure 5-13 illustrates that there could be a loss in population of about 20,000 people by 2060 if the projected water demands are not met. For full analysis, see Norvell and Shaw (2010).

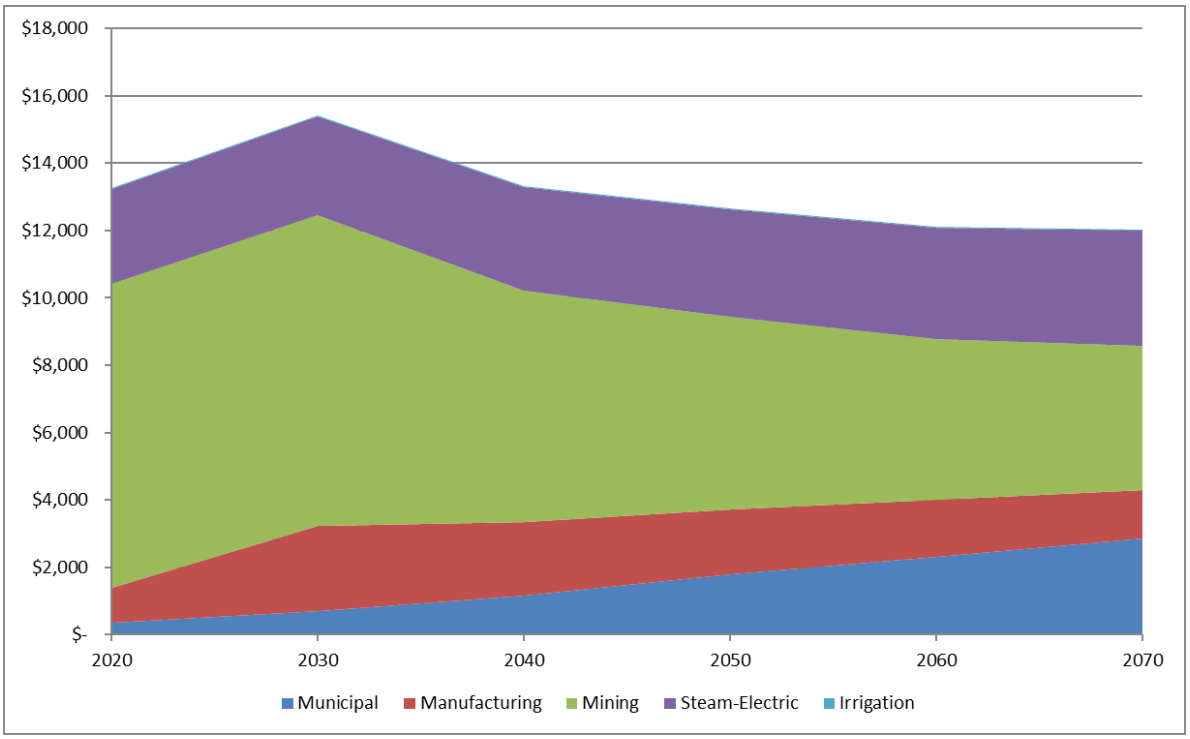

Figure 5-12. Socioeconomic Impacts Analysis – 2011 Brazos G Regional Water Plan Lost Income by Sector (millions of $)

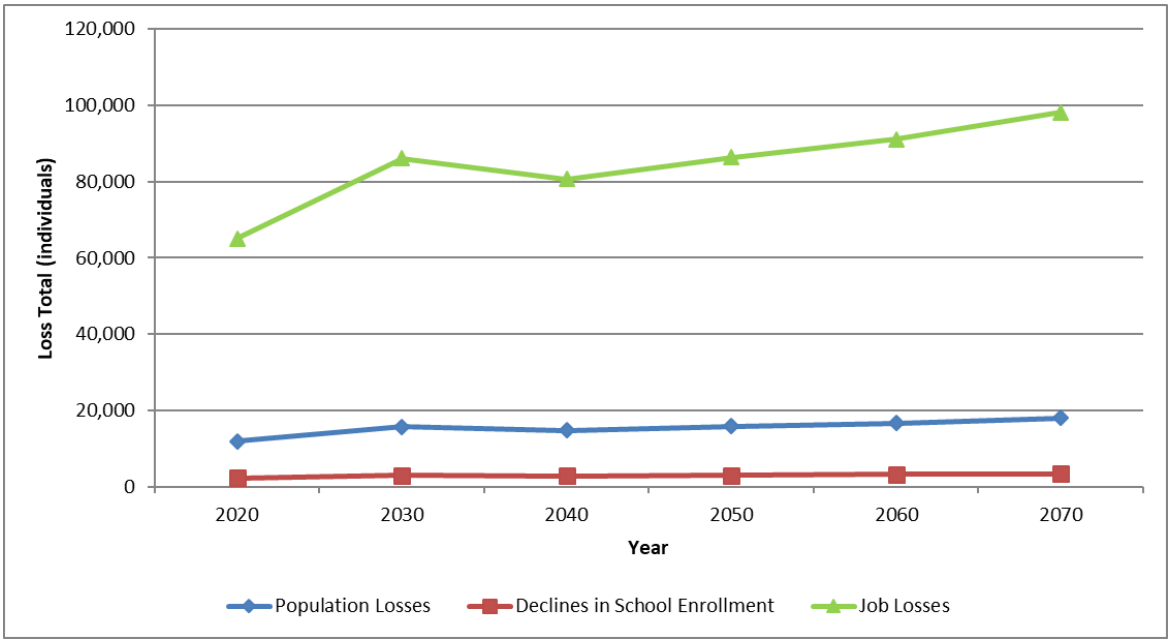

Figure 5-13. Social Impacts of Water Shortages in Region G

5.6.3 Socioeconomic Considerations in GMA 12

The requirement that districts shall consider the socioeconomic impacts before voting on the desired futures conditions of the aquifers was added to the statues of joint planning with the passage of Senate Bill 660 in 2011. As part of their continued efforts to meet the "balance test" described in Subsection 36.108 (d-2) of the Texas Water Code, GMA 12 has considered socioeconomic impacts for this (second) third round of joint planning.

The potential socioeconomic impacts reasonably expected to occur due to DFCs were discussed in a GMA 12 meeting on October 22, 2020. A presentation was prepared and presented by the hydrogeological consultants to member districts of GMA 12 and is titled "GMA 12 Socioeconomic Impacts Considerations." This presentation is included as Appendix Q. GMA 12 held numerous meetings during the (second) third cycle of joint planning that provided opportunities for unrestricted public comment regarding socioeconomic impacts or the potential for them to occur. In this manner, district representatives were able to obtain stakeholder input from across GMA 12's geographical boundaries from a variety of interest areas such as recreation, real estate, commerce, irrigation and agriculture, political subdivisions, environmental groups, private property, tourism, cities, groundwater developers, river authorities and others. From a qualitative perspective, GMA 12 realizes that both positive and

negative socioeconomic impacts may potentially result from the implementation of the proposed DFCs. In their deliberations while creating DFCs, district representatives aimed to achieve a balance of the positive and negative impacts.

GMA 12 examined the following socioeconomic considerations that would potentially have a positive impact upon the adoption of the proposed DFCs:

- Proposed DFCs in some areas of the GMA may reduce or eliminate the costs of lowering pumps or constructing new wells.
- Proposed DFCs may serve to sustain or enhance economic growth due to assurances provided by diversified water portfolios.
- Proposed DFCs may result in a short-term reduction in utility rates due to reduction in cost of regional water management strategy implementation.
- Proposed DFCs should help ensure part or all of a long-term supply for an area.

Comparatively, the following socioeconomic considerations were identified as potentially having a negative impact upon the adoption of the proposed DFCs:

- Proposed DFCs may require conversion of part or all of a supply to an alternative supply or supplies, which may have increased costs associated with infrastructure, operation and maintenance.
- Proposed DFCs in some areas of the GMA may result in significant but unquantified production cost increases due to continuing to lower water levels in wells or lowered pumping rates from wells.
- Alternatives to proposed DFCs may result in a reduced groundwater supply being available on a long-term basis.
- Proposed DFCs may require the lowering of well pumps and/or constructing deeper new wells.

5.6.4 Impacts of Major and Minor Aquifer DFCs on Socioeconomic Impacts Reasonably Expected to Occur

There are many challenges involved with directly assessing socioeconomic impacts likely to occur for the major and minor aquifer DFCs within GMA 12. Numerous factors can feasibly contribute to potential economic or social impacts of water planning on the water user. Regional

DFCs are one factor to be considered, and are not a guarantee for social or economic stability, development opportunities or prosperity to any user.

Although DFCs are an important variable in establishing a framework for setting long-term water management plans and practices, they are not the only variable to be studied. Other factors to be considered are the occurrence of drought and demographic shifts. Both of these factors play a role in impacting the outcome of how water is managed economically and socially.

By setting DFCs for the Carrizo-Wilcox, Queen City, Sparta, Yegua-Jackson, and Brazos River Alluvium aquifers that meet current demands and achieve a balance in providing water availability for growth and preservation, GMA 12 believes these DFCs meet the "balance test" prescribed by Subsection 36.108 (d 2) of the Texas Water Code.

5.7 Private Property Rights

Texas Water Code Section 36.108 (d)(7) requires that, during the joint-planning process, GCDs shall consider "the impact on the interests and rights in private property, including ownership and the rights of management area landowners and their lessees and assigns in groundwater as recognized under Section 36.002." GMA 12 recognizes that the primary method by which private property rights are protected in GMA 12 is through each GCD's management plan and groundwater rules. Because the local hydrogeological conditions, environmental, and socioeconomic factors vary across GMA 12, the manner in which GCDs protect private property rights may vary among the GCDs.

GMA 12 members considered private property rights during the DFC development process in several ways. GMA 12 members reviewed the component GCDs' management plans to insure they appropriately address private property rights. Groundwater Management Area 12 also had a presentation on the private property rights impact from DFCs on September 18, 2020 (Appendix R). This presentation included discussion on recent court cases involving groundwater and private property rights as well as the potential consequences that imposing too lax or too restrictive DFCs can have on personal property rights. A keystone to all discussions regarding private property rights was the Texas Water Code Section 36.002, which reads as follows:

> "Sec. 36.002. OWNERSHIP OF GROUNDWATER.
>
> (a) The legislature recognizes that a landowner owns the groundwater below the surface of the landowner's land as real property.

(b) The groundwater ownership and rights described by this section entitle the landowner, including a landowner's lessees, heirs, or assigns, to:

(1) drill for and produce the groundwater below the surface of real property, subject to Subsection (d), without causing waste or malicious drainage of other property or negligently causing subsidence; and

(2) have any other right recognized under common law.

(b-1) The groundwater ownership and rights described by this section do not:

(1) entitle a landowner, including a landowner's lessees, heirs, or assigns, to the right to capture a specific amount of groundwater below the surface of that landowner's land; or

(2) affect the existence of common law defenses or other defenses to liability under the rule of capture.

(c) Nothing in this code shall be construed as granting the authority to deprive or divest a landowner, including a landowner's lessees, heirs, or assigns, of the groundwater ownership and rights described by this section.

(d) This section does not:

(1) prohibit a district from limiting or prohibiting the drilling of a well by a landowner for failure or inability to comply with minimum well spacing or tract size requirements adopted by the district;

(2) affect the ability of a district to regulate groundwater production as authorized under Section 36.113, 36.116, or 36.122 or otherwise under this chapter or a special law governing a district; or

(3) require that a rule adopted by a district allocate to each landowner a proportionate share of available groundwater for production from the aquifer based on the number of acres owned by the landowner.

(e) This section does not affect the ability to regulate groundwater in any manner authorized under:

(1) Chapter 626, Acts of the 73rd Legislature, Regular Session, 1993, for the Edwards Aquifer Authority;

(2) Chapter 8801, Special District Local Laws Code, for the Harris-Galveston Subsidence District; and

(3) Chapter 8834, Special District Local Laws Code, for the Fort Bend Subsidence District.

Based on a review of the GCDs' individual management plans and related factors, GMA 12 members do not anticipate that the adoption of the GMA 12 DFCs will significantly affect personal property rights associated with groundwater during the planning horizon. In crafting

DFCs, GMA 12 aimed to balance property interests and rights that are benefitted by the use of groundwater in the present, near future and long term and those benefitted by preservation, or leaving groundwater in place. The DFCs adopted by GMA 12 are consistent with protecting property rights of landowners who are currently pumping groundwater and landowners who have chosen to conserve groundwater by not pumping. All current and projected uses, as defined in the Regions C, G, H, and K plans, were considered in developing the adopted desired future conditions. By setting DFCs for the GMA 12 that meet current demands and achieve a balance in providing water availability for growth and preservation, GMA 12 believes the adopted DFCs meet the "balance test" prescribed by Subsection 36.108 (d-2), Texas Water Code.

5.8 Feasibility of Achieving the Proposed Desired Future Conditions

Texas Water Code Section 36.108 (d)(8) requires that GCDs, during the joint groundwater planning process, to consider the feasibility of achieving the proposed DFC(s). This requirement was added to the joint groundwater planning process with the passage of Senate Bill 660 by the 82nd Texas Legislature in 2011. This consideration can be traced back to 2007, when the TWDB adopted rules that provided guidance for petitions contesting the reasonableness of an adopted DFC. Under these 2007 rules, the TWDB required that an adopted DFC must be physically possible from a hydrological perspective.

From 2010 to 2011, the TWDB reviewed multiple petitions regarding the reasonableness of adopted DFCs in GMAs. Their evaluation of whether or not an adopted DFC was physically possible was based on whether or not the DFC(s) could be reasonably simulated using the TWDB's adopted GAM for the aquifer(s) in question. This approach presumes that, if a GAM simulation, which is based the physical laws of hydrology as incorporated in the mathematical model, can generate the DFC condition by implementing a future pumping scenario then the DFCs can be deemed to be physically possible and compatible

While GMA 12 recognizes that the GAMs represent the best science for understanding the groundwater flow systems in GAM 12, they also recognize that the GAMs have been demonstrated to contain error and uncertainty. As such, GMA 12's philosophy for both the previous and the current joint planning periods was that DFCs are feasible if they can be generated by a GAM within a reasonable tolerance. The factors used to determine what "a reasonable tolerance" means for GMA 12 include:

- GMA predictive uncertainty/error
- Errors in starting 2000 or 2010 water level conditions
- Errors in the aquifer hydraulic properties
- Uncertainty in future environmental conditions (for example, recharge and rivers levels)
- Uncertainty in future pumping rates and locations
- Non-uniqueness of model calibration

5.9 Any Other Relevant Information

Texas Water Code Section 36.108 (d)(9) requires that, during the joint-planning process, GCDs shall consider "any other information relevant to the specific desired future conditions." A significant amount of additional relevant information was presented during the 21 joint groundwater planning meetings held by GMA 12 from 2018 to 2021. Table 1-3 summarizes the presentations given to GMA 12 and all presentations and other material are available on the GMA 12 website (https://posgcd.org/agendas-minutes/gma-12-agendas-minutes/).

6. Other Desired Future Conditions Considered

Texas Water Code Section 36.108(d-3)(4) requires that, during the joint groundwater planning process, GCDs shall "list other desired future condition options considered, if any, and the reasons why those options were not adopted." Several different pumping scenarios and corresponding DFCs were considered by GMA 12 during the third round of joint groundwater planning, which primarily focused on two different aquifers- the Carrizo and the Simsboro Aquifer. This section provides a description of other DFCs that were considered by GMA 12.

6.1 Proposed Desired Future Conditions

The initial set of proposed DFCs adopted by GMA 12 are documented in a memorandum in Appendix C. The memorandum is dated April 22, 2021 and the DFCs adopted on that date are shown in Tables 6-1, 6-2, and 6-3.

Table 6-1. Proposed DFCs for GMA 12 for the Sparta, Queen City, Carrizo, Calvert Bluff, Simsboro, and Hooper Aquifers [1,2]

GCD	Average Aquifer Drawdown (feet) from January 2011 through December 2070					
	Sparta	Queen City	Carrizo	Calvert Bluff	Simsboro	Hooper
Brazos Valley GCD	50	43	84	116	261	178
Fayette County GCD	40	65	122	Declared as non-relevant		
Lost Pines GCD	22	28	137	154	311	173
Mid-East Texas GCD	25	21	49	59	81	73
Post Oak Savannah GCD	32	31	172	179	336	214

[1] The proposed DFCs are based on Run 12 for the Updated Groundwater Availability Model for the central portion of the Sparta, Queen City, and Carrizo-Wilcox Aquifers (INTERA and others, 2020). Fayette County GCD did not propose a DFC for the Calvert Bluff, SImsboro, or the Hooper Aquifers because the district declared these three aquifers as non-relevant aquifers.

[2] Districts may adopt Proposed DFCs within a range of 10% above or below the values in the aquifers listed in Table 6-1 (modified from Table 1 in Appendix C)

Table 6-2. Proposed DFCs for GMA 12 for the Yegua-Jackson Aquifer [1]

GCD	Average Drawdown (feet) from January 2010 to December, 2069
Brazos Valley	61
Post Oak Savannah	61
Mid-East Texas	8
Fayette County	81

[1]The proposed DFCs are based on Run YGJK-PS2 for the Groundwater Water Availability Model for the Yegua-Jackson Aquifer. Lost Pines GCD did not propose a DFC for the Yegua-Jackson Aquifer because the district declared the Yegua-Jackson Aquifer as a non-relevant aquifer.

Table 6-3. Proposed DFCs for GMA 12 for the Brazos River Alluvium [1]

County	Desired Future Condition Statement
Milam County	A decrease of 5 feet in the average saturated thickness over the period from January 1, 2010 to December 31, 2069. The baseline average saturated thickness for 2010 is estimated at 24.5 feet and is based on an analysis of historical water level data and well depth values
Burleson County	A decrease of 6 feet in the average saturated thickness over the period from January 1, 2010 to December 31, 2069. The baseline average saturated thickness for 2010 is estimated at 38.5 feet and is based on an analysis of historical water level data and well depth values.
Brazos and Robertson Counties	Percent saturation above well depth shall average at least 30 percent for wells located north of State Highway 21 and 40 percent for wells located south of State Highway 21. If the percent saturation criteria are reached for three consecutive years then the DFC would be reached.

[1] The proposed DFCs remain the same as the current DFCs. The DFCs were checked with Run 2 for the Brazos River Alluvium GAM (Ewing and Jigmond, 2016)

The proposed DFCs for the six aquifers in Table 6-1 are based on GAM Run S-12. On March 18, 2021 GMA 12 voted to develop a resolution and to formally adopt the proposed DFCs. The 2070 production rates for each of the six aquifers in GAM Run S-12 either reached or exceeded the permitted aquifer pumping except for the portion of the Simsboro and the Carrizo aquifers in POSGCD. GAM Run S-12 evolved from GAM Run S-7 based on suggestions made by POSGCD and BVGCD. The suggestions led to the development of GAM Runs S-10, S-11, and S-13. The suggestions were all accepted by GMA 12 except for a POSGCD request to reduce the maximum production from the Carrizo Aquifer in POSGCD from 18,207 ac-ft/yr to 12,000 ac-ft/yr in the final simulation to determine proposed DFCs.

POSGCD's request to reduce the Carrizo Aquifer in POSGCD from 18,207 ac-ft/yr to 12,000 ac-ft/yr was based on analysis and model simulations performed by POSGCD. Selected results of POSGCD analysis were presented and discussed in several GMA 12 meetings GMA 12's primary rational for not accepting POSGCD request to lower the DFC for the Carrizo Aquifer was centered on the concept of "known pumping." "Known pumping" was a term used by some of the GCDs in GMA 12 to refer to permitted pumping that had occurred or would occur in the near future. "Known pumping" was a type of permitted pumping that a majority of GCDs in GMA 12 believes should be included in the pumping file for a DFC Run. POSGCD was requesting to reduce the production associated with a Vista Ridge project to less than the project was

planning to pump from the Carrizo in 2022. Because this Vista Ridge Carrizo pumping was already planned to occur the GCDs besides POSGCD considered the Vista Ridge permitted pumping from the Carrizo as "known pumping."

In response to GMA 12 not seconding their motions to lower the DFC for the Carrizo aquifer in POSGCD, POSGCD prepared a position paper that was sent to four other GCDs in GMA 12. Appendix S contains the POSGCD paper. Out of the four GCDs that received a copy of POSGCD position paper, only BVGCD provided a written response. Appendix T contains a copy of BVGCD written response.

The proposed DFC for Yegua-Jackson Aquifer in Table 6-2 were discussed and tentatively agreed on during GMA 12 meetings on January 29, 2020. On March 18, 2021 GMA 12 voted to develop a resolution to formally adopt the proposed DFCs. No alternative DFCs were considered or proposed by a GCD prior to April 22, 2021.

The proposed DFC for Brazos River Alluvium Aquifer in Table 6-3 were discussed and tentatively agreed on November 15, 2019 and February 12, 2021. On March 18, 2021 GMA 12 voted to develop a resolution to adopt the proposed DFCs. No alternative DFCs were proposed by a GCD prior to April 22, 2021.

6.2 Adopted Desired Future Conditions

The proposed DFCs for the six aquifers in Table 6-1 were not adopted by GMA 12. During the comment period for the proposed DFCs, it was determined that the pumping file constructed in 2018 or 2019 did not include pumping for two groundwater development projects located in the southeast part of Caldwell and the east part of Gonzales counties. These projects began the construction and equipping of wells approximately eighteen months ago, and are permitted to produce a combined 31,320 ac-ft/yr from the Carrizo Aquifer. To account for pumping from these two projects on drawdown in GMA 12, GAM Run S-19 was created. The DFCs adopted by GMA 12 for the six aquifers listed in Table 6-1 were modified to account for the drawdown impacts caused by the two projects in GMA 13.

After receiving comments on the proposed DFCs, the Board of Directors for Lost Pines GCD voted to not support the proposed DFC for the Simsboro Aquifer in Table 6-1. Subsequently, Lost Pines GCD evaluated several modifications of GAM Run S-12 where the total pumpage in the Simsboro Aquifer was reduced, resulting in lower drawdowns. A drawdown of 182 feet in Lost Pines GCD in the Simsboro Aquifer resulted from a total pumping similar to the current

modeled available groundwater totals for the district of between 30,000 and 35,000 ac-ft/yr, and these drawdowns, shown in Table 6-4, were presented to GMA 12 for consideration on November 12, 2021. GMA 12 did not accept the drawdowns shown in Table 6-4, but did agree to an average drawdown for LPGCD for the Simsboro Aquifer of 240 feet by 2070. This is the same as the DFC adopted by LPGCD and GMA 12 in the last round of GMA 12 planning in 2017.

Table 6-4. Drawdowns from 2011 to 2070 Considered for Reduced Simsboro Pumpage in Lost Pines GCD in GAM Run S-20

GCD	Average Aquifer Drawdown (ft) measured from January 2011 through December 2070					
	Sparta	Queen City	Carrizo	Calvert Bluff	Simsboro	Hooper
Brazos Valley GCD	47	39	70	86	188	131
Fayette County GCD	42	70	134	Declared as non-relevant		
Lost Pines GCD	22	27	125	110	182	106
Mid-East Texas GCD	25	20	47	56	74	68
Post Oak Savannah GCD	32	30	158	147	258	163

The proposed DFCs for the Yegua Jackson Aquifer in Table 6-2 were slightly modified by GMA 12 before they were adopted. The adopted DFCs were based on the same GAM Run as were the proposed DFCs, but were adjusted to include a 10% increase in the DFC value for BVGCD. The 10% increase was the maximum amount allowed by a 10% variance allowed by GMA 12 from the predictions from a GAM DFC simulation.

The proposed DFC for the Brazos River Alluvium Aquifer in Table 6-3 were adopted by GMA 12. No other DFCs were considered by GMA 12 for the BRAA other than the proposed DFCs.

7. Recommendations and Comments Received

This section provides a summary of the comments received by GMA 12 and GMA 12 member GCDs on the proposed DFCs and during the minimum 90-day period for public comment on the DFCs proposed by GMA 12. Comments received by GMA 12 or GMA 12-member GCDs on the proposed DFCs during the 90-day comment period, and the full text of the comments and GMA 12's response to the comments are provided in Appendices S through W. Only specific comments on the proposed DFCs are addressed in this report.

7.1 Comments Received by Brazos Valley GCD

Comments received by the Brazos Valley GCD and responses to these comments are provided in Appendix U. Only written comments made directly to the Brazos Valley GCD on proposed DFCs with application to at least the Brazos Valley GCD are included.

7.2 Comments Received by Fayette County GCD

Comments received by the Fayette County GCD and responses to these comments are provided in Appendix V. Only comments made directly to the Fayette County GCD on proposed DFCs for Fayette County are included.

7.3 Comments Received by Lost Pines GCD

Comments received by the Lost Pines GCD and responses to these comments are provided in Appendix W. Comments made directly to the Lost Pines GCD on proposed DFCs for Bastrop and Lee Counties, as well as comments made to GMA 12 by Lost Pines GCD stakeholders, are included.

7.4 Comments Received by Mid-East Texas GCD

No comments were received by the Mid-East Texas GCD related to the proposed DFCs for that district.

7.5 Comments Received by Post Oak Savannah GCD

Comments received by the Post Oak Savannah GCD and responses to these comments are provided in Appendix X. Only comments made directly to the Post Oak Savannah GCD on proposed DFCs for Burleson and Milam Counties are included.

7.6 Comments Received from Texas Water Development Board

No comments were received from the Texas Water Development Board.

8. Summary

The initial DFCs were approved by GMA 12 on November 12, 2021 and with minor revision the finals DFCs were approved by GMA 12 on November 30, 2021. This report provides a review of the GMA 12 area, the technical and policy justifications for the adopted DFCs, and the nine factors that were considered during the development of the DFCs, as required by Section 36.108(d)(1-8) of the Texas Water Code. This report also includes comments and alternative DFCs that were proposed by stakeholders in the GMA, and GMA 12's responses to these comments.

8.1 Summary of DFCs

The final DFCs adopted by GMA 12 are summarized in Tables 8-1 through 8-3.

Table 8-1. Final Adopted DFCs for the Sparta, Queen City, Carrizo, Calvert Bluff, Simsboro, and Hooper Aquifers

GCD or County	Average Aquifer Drawdown (feet) measured from January 2011 through December 2070					
	Sparta	Queen City	Carrizo	Calvert Bluff	Simsboro	Hooper
Brazos Valley GCD*	53	44	84	111	262	167
Fayette County GCD**	43	73	140	Declared as non-relevant		
Lost Pines GCD	22	28	134	132	240	138
Mid-East Texas GCD	25	20	48	57	76	69
Post Oak Savannah GCD	32	30	146	156	278	178
Falls County	--	--	--	--	7	3
Limestone County	--	--	--	2	3	3
Navarro County	--	--	--	0	1	0
Williamson County	--	--	--	25	31	24
GMA 12	***33***	***32***	***96***	***98***	***169***	***110***

*Brazos Valley GCD DFCs are for 2000 through December 2070

**Fayette County GCD DFCs are for all of Fayette County

Table 8-2. Final Adopted DFCs for the Yegua-Jackson Aquifer

GCD or County	Average Aquifer Drawdown (feet) measured from January 2010 through December 2069
Brazos Valley GCD	67
Fayette County GCD	81
Lost Pines GCD	--
Mid-East Texas GCD	8
Post Oak Savannah GCD	61
GMA 12	***55***

Table 8-3. Final Adopted DFCs for the Brazos River Alluvium Aquifer.

GCD	County	Brazos River Alluvium Aquifer
Brazos Valley	Brazos and Robertson	North of State Highway 21: Percent saturation shall average at least 30% of total well depth from January 2013 to December 2069. South of State Highway 21: Percent saturation shall average at least 40% of total well depth from January 2013 to December 2069.
Post Oak Savannah	Burleson	A decrease in 6 feet in the average saturated thickness over the period from January 2010 to December 2069.
	Milam	A decrease of 5 feet in average saturated thickness over the period from January 2010 to December 2069

8.2 Rationale and Justification for DFC Selection

The newly adopted DFCs are different from current DFCs in several of the aquifers, specifically the Sparta, Queen City, and Carrizo-Wilcox (including the Carrizo, Calvert Bluff, Simsboro, and Hooper) aquifers. The use of the updated Queen City/Sparta/Carrizo-Wilcox GAM significantly changed the drawdowns calculated by the model, which required changes to the DFCs in order for them to be deemed feasible. The DFCs for the Yegua-Jackson and Brazos River Alluvium aquifers are very similar to the previous DFCs adopted by GMA 12.

Section 5 of this Explanatory Report provides a discussion of the nine factors that were considered during the development of the initially proposed DFCs. In addition to these nine factors, GMA 12 received a significant amount of additional relevant information in meetings

held from 2018 to 2021. GMA 12 also considered other factors, including stakeholder comments and an assessment of achieving a balance between groundwater production and preservation.

GMA 12's decision to adopt DFCs was based on a variety of factors, including the nine required factors as well as additional information provided to the GMA at joint planning meetings held from 2018 to 2021 and input from stakeholders during the public comment period after the initial DFCs were proposed. GMA 12 attempted to adopt DFCs that provided a reasonable balance between groundwater production and conservation, preservation, and protection of groundwater.

GMA 12 reconsidered and adjusted the DFC for the Simsboro Aquifer in the Lost Pines GCD. Originally proposed to be 311 feet of drawdown from 2010 to 2070, GMA 12 ultimately adopted a DFC of 240 feet of drawdown. This DFC was the same as the previous DFC of 240 feet that was adopted during the second round of joint groundwater planning in 2016.

In GMA 12's resolution to adopt the final DFCs, POSGCD voted in favor for the DFCs with the caveat that it objected to the process. The rationale for POSGCD voting is that although they agreed with the DFCs the district did not support the process used to develop the DFCs. POSGCD objections are described in their position paper, which is presented as Appendix S.

9. References

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APPENDIX A

AGENDAS FOR GMA 12 JOINT GROUNDWATER PLANNING MEETINGS FROM 2018 TO 2021

NOTICE OF MEETING
GROUNDWATER MANAGEMENT AREA 12
May 11, 2018 – 10:00 a.m.
Post Oak Savannah GCD Offices
310 East Ave. C (Highway 79)
Milano, Texas

AGENDA

Notice is hereby given that the groundwater conservation districts located wholly or partially within Groundwater Management Area (GMA) 12, as designated by the Texas Water Development Board, consisting of the Post Oak Savannah Groundwater Conservation District (GCD), Fayette County GCD, Lost Pines GCD, Mid-East Texas GCD, and Brazos Valley GCD, will hold a ***Joint Planning meeting at 10:00 a.m. on Friday, May 11, 2018,*** in the Post Oak Savannah GCD Offices, located at 310 East Ave. C (Highway 79), Milano, Texas. The meeting will be open to the public.

The subjects to be discussed or considered, or upon which any formal action may be taken, are as listed below. Items may or may not be taken in the same order as shown on this meeting notice.

1. Invocation
2. Call meeting to order and establish quorum
3. Welcome and introductions
4. Minutes of September 20, 2017 GMA 12 Meeting
5. Report from Intera, Inc. on Update on Central Carrizo-Wilcox/Queen City-Sparta Groundwater Availability Model
6. Discussion and possible action on the approval of a 1.30 Modeled Available Groundwater Peaking Factor for Brazos County in response to a proposed groundwater project for the City of College Station.
7. Update from Groundwater Conservation Districts (GCDs) of GMA 12 on joint planning and compliance with Chapter 36.108, State Water Code
8. Compliance with DFCs by GMA 12 and GCDs of GMA 12
9. Identification of Management Strategies regarding production of groundwater to protect against exceeding Desired Future Conditions (DFCs)
10. Collection, evaluation, and reporting of groundwater production
11. Collection, evaluation, and reporting of water levels in water wells
12. Rules of GCDs in GMA 12 with regard to registration of exempt wells and permitting of production
13. Discussion on possible common website for GMA 12 to house all information and data
14. Petition for Inquiry filed by Fred Russell with Texas Commission on Environmental Quality
15. Public Comment
16. Agenda items and Date for next meeting
17. Adjourn

Signed this 12th day of April, 2018.

Gary Westbrook, General Manager, POSGCD
310 East Avenue C, Milano, Texas 76556
Phone: 512-455-9900

***Questions, requests for additional information, or comments concerning the subjects listed above may be submitted to the person posting this notice.*

NOTICE OF MEETING
GROUNDWATER MANAGEMENT AREA 12
October 9, 2018 – 10:00 a.m.
Post Oak Savannah GCD Offices
310 East Ave. C (Highway 79)
Milano, Texas

AGENDA

Notice is hereby given that the groundwater conservation districts located wholly or partially within Groundwater Management Area (GMA) 12, as designated by the Texas Water Development Board, consisting of the Post Oak Savannah Groundwater Conservation District (GCD), Fayette County GCD, Lost Pines GCD, Mid-East Texas GCD, and Brazos Valley GCD, will hold a ***Joint Planning meeting at 10:00 a.m. on Tuesday, October 9, 2018,*** in the Post Oak Savannah GCD Offices, located at 310 East Ave. C (Highway 79), Milano, Texas. The meeting will be open to the public.

The subjects to be discussed or considered, or upon which any formal action may be taken, are as listed below. Items may or may not be taken in the same order as shown on this meeting notice.

1. Invocation
2. Call meeting to order and establish quorum
3. Welcome and introductions
4. Minutes of May 11, 2018 GMA 12 Meeting
5. Report from Intera, Inc. on Update on Central Carrizo-Wilcox/Queen City-Sparta Groundwater Availability Model
6. Report from GMA 12 consultants regarding comparisons of simulated drawdowns based on the Run 12 well file produced by the previous Central Carrizo-Wilcox/Queen City-Sparta Groundwater Availability Model and the updated Central Carrizo-Wilcox/Queen City-Sparta Groundwater Availability Model
7. Discussion and possible action on the approval of a 1.17 Modeled Available Groundwater Peaking Factor for the Sparta Aquifer in Madison County in response to a proposal from Region H.
8. Update from Groundwater Conservation Districts (GCDs) of GMA 12 on joint planning and compliance with Chapter 36.108, State Water Code
9. Discussion on possible common website for GMA 12 to house all information and data
10. Public Comment
11. Agenda items and Date for next meeting
12. Adjourn

Signed this 26th day of September, 2018.

Gary Westbrook, General Manager, POSGCD
310 East Avenue C, Milano, Texas 76556
Phone: 512-455-9900

***Questions, requests for additional information, or comments concerning the subjects listed above may be submitted to the person posting this notice.*

NOTICE OF MEETING
GROUNDWATER MANAGEMENT AREA 12
January 29, 2019 – 9:00 a.m.
Post Oak Savannah GCD Offices
310 East Ave. C (Highway 79)
Milano, Texas

AGENDA

Notice is hereby given that the groundwater conservation districts located wholly or partially within Groundwater Management Area (GMA) 12, as designated by the Texas Water Development Board, consisting of the Post Oak Savannah Groundwater Conservation District (GCD), Fayette County GCD, Lost Pines GCD, Mid-East Texas GCD, and Brazos Valley GCD, will hold a ***Joint Planning meeting at 9:00 a.m. on Tuesday, January 29, 2019,*** in the Post Oak Savannah GCD Offices, located at 310 East Ave. C (Highway 79), Milano, Texas. The meeting will be open to the public.

The subjects to be discussed or considered, or upon which any formal action may be taken, are as listed below. Items may or may not be taken in the same order as shown on this meeting notice.

1. Invocation
2. Call meeting to order and establish quorum
3. Welcome and introductions
4. Minutes of October 9, 2018 GMA 12 Meeting
5. Review of updated Central Carrizo-Wilcox Groundwater Availability Model (GAM)
6. Lost Pines GCD Report on Desired Future Conditions (DFCs) Evaluation Runs of Groundwater Management Area 12 (GMA12)
7. Consider Update of Pumping Files to be used for Joint Planning in GMA12 and Evaluation of Compliance with DFCs and Protective Drawdown Limits (PDLs)
8. Consider options for expression of DFCs and PDLs
9. Possible Changes in GMA 12 DFCs
10. Texas Water Development Board Groundwater Availability Model (GAM) Run 17-030 MAG
11. GMA 12 Explanatory Report Organization and Technical Discussion
12. Approach for Developing GMA 12 Explanatory Report for current round of Joint Planning
13. Schedule for revision and/or adoption of DFCs for GMA 12 for current round of Joint Planning
14. Update from Groundwater Conservation Districts (GCDs) of GMA 12 on joint planning and compliance with Chapter 36.108, State Water Code
15. Discussion on possible common website for GMA 12 to house all information and data
16. Representation for GMA 12 to Region H Water Planning Group
17. Public Comment
18. Agenda items and Date for next meeting
19. Adjourn

Signed this 10th day of January, 2019.

Gary Westbrook, General Manager, POSGCD
310 East Avenue C, Milano, Texas 76556
Phone: 512-455-9900

***Questions, requests for additional information, or comments concerning the subjects listed above may be submitted to the person posting this notice.*

NOTICE OF MEETING
GROUNDWATER MANAGEMENT AREA 12
May 30, 2019 – 10:00 a.m.
Post Oak Savannah GCD Offices
310 East Ave. C (Highway 79)
Milano, Texas

AGENDA

Notice is hereby given that the groundwater conservation districts located wholly or partially within Groundwater Management Area (GMA) 12, as designated by the Texas Water Development Board, consisting of the Post Oak Savannah Groundwater Conservation District (GCD), Fayette County GCD, Lost Pines GCD, Mid-East Texas GCD, and Brazos Valley GCD, will hold a ***Joint Planning meeting at 10:00 a.m. on Thursday, May 30, 2019,*** in the Post Oak Savannah GCD Offices, located at 310 East Ave. C (Highway 79), Milano, Texas. The meeting will be open to the public.

The subjects to be discussed or considered, or upon which any formal action may be taken, are as listed below. Items may or may not be taken in the same order as shown on this meeting notice.

1. Invocation
2. Call meeting to order and establish quorum
3. Welcome and introductions
4. Minutes of January 29, 2019 GMA 12 Meeting
5. Update from Groundwater Conservation Districts (GCDs) of GMA 12 on joint planning, water level monitoring, and compliance with Chapter 36.108, State Water Code
6. Texas Water Development Board Groundwater Availability Model (GAM) Run 17-030 MAG and TWDB determination of MAG for Brazos River Alluvium
7. Development of two future pumping scenarios using the Sparta/Queen City/Carrizo-Wilcox GAM and results of the predicted water levels
8. Update and possible action on legislation that relates to the joint planning process including but not limited to similar rules
9. Public Comment
10. Agenda items and Date for next meeting
11. Adjourn

Signed this 14th day of May, 2019.

Gary Westbrook, General Manager, POSGCD
310 East Avenue C, Milano, Texas 76556
Phone: 512-455-9900

***Questions, requests for additional information, or comments concerning the subjects listed above may be submitted to the person posting this notice.*

NOTICE OF MEETING
GROUNDWATER MANAGEMENT AREA 12
August 2, 2019 – 10:00 a.m.
Post Oak Savannah GCD Offices
310 East Ave. C (Highway 79)
Milano, Texas

AGENDA

Notice is hereby given that the groundwater conservation districts located wholly or partially within Groundwater Management Area (GMA) 12, as designated by the Texas Water Development Board, consisting of the Post Oak Savannah Groundwater Conservation District (GCD), Fayette County GCD, Lost Pines GCD, Mid-East Texas GCD, and Brazos Valley GCD, will hold a ***Joint Planning meeting at 10:00 a.m. on Friday, August 2, 2019,*** in the Post Oak Savannah GCD Offices, located at 310 East Ave. C (Highway 79), Milano, Texas. The meeting will be open to the public.

The subjects to be discussed or considered, or upon which any formal action may be taken, are as listed below. Items may or may not be taken in the same order as shown on this meeting notice.

1. Invocation
2. Pledge of Allegiance
3. Call meeting to order and establish quorum
4. Welcome and introductions
5. Public Comment on Agenda Items
6. Minutes of May 30, 2019 Groundwater Management Area 12 (GMA12) Meeting
7. Status update on Texas Water Development Board Study on Groundwater-Surface Water Interaction
8. Update from Groundwater Conservation Districts (GCDs) of GMA 12 on joint planning, water level monitoring, and compliance with Chapter 36.108, State Water Code
9. Discussion of comments received from stakeholders
10. Evaluation and discussion of future pumping scenarios using the Sparta/Queen City/Carrizo-Wilcox GAM and results, including predicted water levels and water budgets
11. Discussion on expressions of Desired Future Conditions (DFCs) and compatibility between GCDs in GMA 12
12. Public Comment on non-agenda items
13. Agenda items and Date for next meeting
14. Adjourn

Signed this 9th day of July, 2019.

Gary Westbrook

Gary Westbrook, General Manager, POSGCD
310 East Avenue C, Milano, Texas 76556
Phone: 512-455-9900

***Questions, requests for additional information, or comments concerning the subjects listed above may be submitted to the person posting this notice.*

NOTICE OF MEETING
GROUNDWATER MANAGEMENT AREA 12
September 24, 2019 – 10:00 a.m.
Post Oak Savannah GCD Offices
310 East Ave. C (Highway 79)
Milano, Texas

AGENDA

Notice is hereby given that the groundwater conservation districts located wholly or partially within Groundwater Management Area (GMA) 12, as designated by the Texas Water Development Board, consisting of the Post Oak Savannah Groundwater Conservation District (GCD), Fayette County GCD, Lost Pines GCD, Mid-East Texas GCD, and Brazos Valley GCD, will hold a ***Joint Planning meeting at 10:00 a.m. on Tuesday, September 24, 2019,*** in the Post Oak Savannah GCD Offices, located at 310 East Ave. C (Highway 79), Milano, Texas. The meeting will be open to the public.

The subjects to be discussed or considered, or upon which any formal action may be taken, are as listed below. Items may or may not be taken in the same order as shown on this meeting notice.

1. Invocation
2. Pledge of Allegiance
3. Call meeting to order and establish quorum
4. Welcome and introductions
5. Public Comment on Agenda Items
6. Minutes of August 2, 2019 Groundwater Management Area 12 (GMA12) Meeting
7. Update from Groundwater Conservation Districts (GCDs) of GMA 12 on joint planning, water level monitoring, and compliance with Chapter 36.108, State Water Code
8. Discussion of efforts of GCDs of GMA 12 in use of Groundwater Availability Modeling and Best Available Science in consideration and adoption of Desired Future Conditions (DFCs) and management of shared aquifers
9. Discussion on expressions of Desired Future Conditions (DFCs) and compatibility between GCDs in GMA 12
10. Discussion of comments received from stakeholders
11. Declare the Gulf Coast Aquifer non-relevant as it applies to groundwater management in the Brazos Valley GCD
12. Discussion and instruction to consultants concerning Joint Planning in GMA 12 for the Yegua-Jackson Aquifer
13. Discussion and instruction to consultants concerning Joint Planning in GMA 12 for the Brazos River Alluvium Aquifer
14. Evaluation and discussion of future pumping scenarios using the Sparta/Queen City/Carrizo-Wilcox GAM and results, including predicted water levels and water budgets
15. Public Comment on non-agenda items
16. Agenda items and Date for next meeting
17. Adjourn

Signed this 5th day of September, 2019.

Gary Westbrook

Gary Westbrook, General Manager, POSGCD
310 East Avenue C, Milano, Texas 76556
Phone: 512-455-9900

***Questions, requests for additional information, or comments concerning the subjects listed above may be submitted to the person posting this notice.*

NOTICE OF MEETING
GROUNDWATER MANAGEMENT AREA 12
November 15, 2019 – 10:00 a.m.
Post Oak Savannah GCD Offices
310 East Ave. C (Highway 79)
Milano, Texas

AGENDA

Notice is hereby given that the groundwater conservation districts located wholly or partially within Groundwater Management Area (GMA) 12, as designated by the Texas Water Development Board, consisting of the Post Oak Savannah Groundwater Conservation District (GCD), Fayette County GCD, Lost Pines GCD, Mid-East Texas GCD, and Brazos Valley GCD, will hold a ***Joint Planning meeting at 10:00 a.m. on Friday, November 15, 2019,*** in the Post Oak Savannah GCD Offices, located at 310 East Ave. C (Highway 79), Milano, Texas. The meeting will be open to the public.

The subjects to be discussed or considered, or upon which any formal action may be taken, are as listed below. Items may or may not be taken in the same order as shown on this meeting notice.

1. Invocation
2. Pledge of Allegiance
3. Call meeting to order and establish quorum
4. Welcome and introductions
5. Public Comment on Agenda Items
6. Minutes of September 24, 2019 Groundwater Management Area 12 (GMA12) Meeting
7. Update from Groundwater Conservation Districts (GCDs) of GMA 12 on joint planning, water level monitoring, and compliance with Chapter 36.108, State Water Code
8. Review white draft paper on efforts of GCDs of GMA 12 in use of Groundwater Availability Modeling and Best Available Science in consideration and adoption of Desired Future Conditions (DFCs) and management of shared aquifers
9. Discussion on expressions of Desired Future Conditions (DFCs) and compatibility between GCDs in GMA 12
10. Discussion of comments received from stakeholders
11. Discussion and instruction to consultants concerning Joint Planning in GMA 12 for the Yegua-Jackson Aquifer
12. Discussion and instruction to consultants concerning Joint Planning in GMA 12 for the Brazos River Alluvium Aquifer
13. Evaluation and discussion of future pumping scenarios using the Sparta/Queen City/Carrizo-Wilcox GAM and results, including predicted water levels and water budgets
14. Update from Texas Water Development Board
15. Public Comment on non-agenda items
16. Agenda items and Date for next meeting
17. Adjourn

Signed this 4th day of November, 2019.

Gary Westbrook

Gary Westbrook, General Manager, POSGCD
310 East Avenue C, Milano, Texas 76556
Phone: 512-455-9900

***Questions, requests for additional information, or comments concerning the subjects listed above may be submitted to the person posting this notice.*

NOTICE OF MEETING
GROUNDWATER MANAGEMENT AREA 12
January 29, 2020 – 10:00 a.m.
Post Oak Savannah GCD Offices
310 East Ave. C (Highway 79)
Milano, Texas

AGENDA

Notice is hereby given that the groundwater conservation districts located wholly or partially within Groundwater Management Area (GMA) 12, as designated by the Texas Water Development Board, consisting of the Post Oak Savannah Groundwater Conservation District (GCD), Fayette County GCD, Lost Pines GCD, Mid-East Texas GCD, and Brazos Valley GCD, will hold a ***Joint Planning meeting at 10:00 a.m. on Wednesday, January 29, 2020,*** in the Post Oak Savannah GCD Offices, located at 310 East Ave. C (Highway 79), Milano, Texas. The meeting will be open to the public.

The subjects to be discussed or considered, or upon which any formal action may be taken, are as listed below. Items may or may not be taken in the same order as shown on this meeting notice.

1. Invocation
2. Pledge of Allegiance
3. Call meeting to order and establish quorum
4. Welcome and introductions
5. Public Comment on Agenda Items
6. Minutes of November 15, 2019 Groundwater Management Area 12 (GMA12) Meeting
7. Update from Groundwater Conservation Districts (GCDs) of GMA 12 on joint planning, water level monitoring, and compliance with Chapter 36.108, State Water Code
8. Review and possible adoption of white draft paper on efforts of GCDs of GMA 12 in use of Groundwater Availability Modeling and Best Available Science in consideration and adoption of Desired Future Conditions (DFCs) and management of shared aquifers
9. Discussion on expressions of Desired Future Conditions (DFCs) and compatibility between GCDs in GMA 12
10. Discussion of comments received from stakeholders
11. Discussion and instruction to consultants concerning Joint Planning in GMA 12 for the Yegua-Jackson Aquifer
12. Discussion and instruction to consultants concerning Joint Planning in GMA 12 for the Brazos River Alluvium Aquifer
13. Evaluation and discussion of future pumping scenarios using the Sparta/Queen City/Carrizo-Wilcox GAM and results, including predicted water levels and water budgets, and instruction to consultants concerning Joint Planning in GMA 12
14. Discuss requirements of Chapter 36.108(d) in adopting Desired Future Conditions: hydrological conditions, including for each aquifer in the management area the total estimated recoverable storage as provided by the executive administrator, and the average annual recharge, inflows, and discharge;
15. Public Comment on non-agenda items
16. Update from Texas Water Development Board
17. Agenda items and Date for next meeting
18. Adjourn

Signed this 17th day of January, 2020.

Gary Westbrook, General Manager, POSGCD
310 East Avenue C, Milano, Texas 76556
Phone: 512-455-9900

***Questions, requests for additional information, or comments concerning the subjects listed above may be submitted to the person posting this notice.*

NOTICE OF MEETING
GROUNDWATER MANAGEMENT AREA 12
July 24, 2020 – 10:00 a.m.

AGENDA

Notice is hereby given that the groundwater conservation districts located wholly or partially within Groundwater Management Area (GMA) 12, as designated by the Texas Water Development Board, consisting of the Post Oak Savannah Groundwater Conservation District (GCD), Fayette County GCD, Lost Pines GCD, Mid-East Texas GCD, and Brazos Valley GCD, will hold a ***Joint Planning meeting at 10:00 a.m. on Friday, July 24, 2020***.

Notice is hereby given that, in accordance with Governor Abbott's March 16, 2020, action to temporarily suspend certain provisions of the Texas Open Meetings Act, a Joint Planning Meeting will be held via telephone and video conference call beginning at 10:00 a.m. on July 24, 2020. Any member of the public who wishes to participate remotely may do so through the remote access options provided below.

Please join the meeting from your computer, tablet or smartphone at:
https://global.gotomeeting.com/join/879334989

You can also dial in using your phone:
United States: +1 (872) 240-3212
Access Code: 879-334-989

The subjects to be discussed or considered, or upon which any formal action may be taken, are as listed below. Items may or may not be taken in the same order as shown on this meeting notice.

1. Invocation
2. Pledge of Allegiance
3. Call meeting to order and establish quorum
4. Welcome and introductions
5. Public Comment on Agenda Items
6. Minutes of January 29, 2020 Groundwater Management Area 12 (GMA12) Meeting
7. Update from Groundwater Conservation Districts (GCDs) of GMA 12 on joint planning, water level monitoring, and compliance with Chapter 36.108, State Water Code
8. Discussion on expressions of Desired Future Conditions (DFCs) and compatibility between GCDs in GMA 12
9. Discussion of comments received from stakeholders
10. Evaluation and discussion of future pumping scenarios using the Sparta/Queen City/Carrizo-Wilcox GAM and results, including predicted water levels and water budgets, and instruction to consultants concerning Joint Planning in GMA 12
11. Discuss requirements of Chapter 36.108(d) in adopting Desired Future Conditions:
    a. aquifer uses or conditions within the management area, including conditions that differ substantially from one geographic area to another;
    b. the water supply needs and water management strategies included in the state water plan;
    c. the impact on subsidence.
12. Public Comment on non-agenda items
13. Update from Texas Water Development Board
14. Agenda items and Date for next meeting
15. Adjourn

Signed this 1st day of July, 2020.

Gary Westbrook, General Manager, POSGCD
310 East Avenue C, Milano, Texas 76556
Phone: 512-455-9900

***Questions, requests for additional information, or comments concerning the subjects listed above may be submitted to the person posting this notice.*

NOTICE OF MEETING
GROUNDWATER MANAGEMENT AREA 12
September 18, 2020 – 10:00 a.m.

AGENDA

Notice is hereby given that the groundwater conservation districts located wholly or partially within Groundwater Management Area (GMA) 12, as designated by the Texas Water Development Board, consisting of the Post Oak Savannah Groundwater Conservation District (GCD), Fayette County GCD, Lost Pines GCD, Mid-East Texas GCD, and Brazos Valley GCD, will hold a ***Joint Planning meeting at 10:00 a.m. on Friday, September 18, 2020***.

Notice is hereby given that, in accordance with Governor Abbott's March 16, 2020, action to temporarily suspend certain provisions of the Texas Open Meetings Act, a Joint Planning Meeting will be held via telephone and video conference call beginning at 10:00 a.m. on September 18, 2020. Any member of the public who wishes to participate remotely may do so through the remote access options provided below.

Please join the meeting from your computer, tablet or smartphone at:
https://global.gotomeeting.com/join/673772797

You can also dial in using your phone:
United States: (872) 240-3412
Access Code: 673-772-797

The subjects to be discussed or considered, or upon which any formal action may be taken, are as listed below. Items may or may not be taken in the same order as shown on this meeting notice.

1. Invocation
2. Pledge of Allegiance
3. Call meeting to order and establish quorum
4. Welcome and introductions
5. Public Comment on Agenda Items
6. Minutes of July 24, 2020 Groundwater Management Area 12 (GMA12) Meeting
7. Report from Lower Colorado River Authority on Groundwater – Surface Water Study
8. Update from Groundwater Conservation Districts (GCDs) of GMA 12 on joint planning, water level monitoring, and compliance with Chapter 36.108, State Water Code
9. Discussion on expressions of Desired Future Conditions (DFCs) and compatibility between GCDs in GMA 12
10. Discussion of comments received from stakeholders
11. Consider Update and process for updating the Sparta/Queen City/Carrizo-Wilcox Groundwater Availability Model (GAM)
12. Evaluation and discussion of future pumping scenarios using the Sparta/Queen City/Carrizo-Wilcox GAM and results, including predicted water levels and water budgets, and instruction to consultants concerning Joint Planning in GMA 12
13. Discuss requirements of Chapter 36.108(d) in adopting Desired Future Conditions:
    a. other environmental impacts, including impacts on spring flow and other interactions between groundwater and surface water;
    b. the impact on the interests and rights in private property, including ownership and the rights of management area landowners and their lessees and assigns in groundwater as recognized under Section 36.002;
14. Public Comment on non-agenda items
15. Update from Texas Water Development Board
16. Agenda items and Date for next meeting
17. Adjourn

Signed this 2nd day of September, 2020.

Gary Westbrook, General Manager, POSGCD
310 East Avenue C, Milano, Texas 76556
Phone: 512-455-9900

***Questions, requests for additional information, or comments concerning the subjects listed above may be submitted to the person posting this notice.*

NOTICE OF MEETING
GROUNDWATER MANAGEMENT AREA 12
October 22, 2020 – 10:00 a.m.

AGENDA

Notice is hereby given that the groundwater conservation districts located wholly or partially within Groundwater Management Area (GMA) 12, as designated by the Texas Water Development Board, consisting of the Post Oak Savannah Groundwater Conservation District (GCD), Fayette County GCD, Lost Pines GCD, Mid-East Texas GCD, and Brazos Valley GCD, will hold a ***Joint Planning meeting at 10:00 a.m. on Thursday, October 22, 2020***.

Notice is hereby given that, in accordance with Governor Abbott's March 16, 2020, action to temporarily suspend certain provisions of the Texas Open Meetings Act, a Joint Planning Meeting will be held via telephone and video conference call beginning at 10:00 a.m. on October 22, 2020. Any member of the public who wishes to participate remotely may do so through the remote access options provided below.

Please join the meeting from your computer, tablet or smartphone at:
https://global.gotomeeting.com/join/460801021
You can also dial in using your phone:
United States: +1 (872) 240-3311
Access Code: 460-801-021

The subjects to be discussed or considered, or upon which any formal action may be taken, are as listed below. Items may or may not be taken in the same order as shown on this meeting notice.

1. Invocation
2. Pledge of Allegiance
3. Call meeting to order and establish quorum
4. Welcome and introductions
5. Public Comment on Agenda Items
6. Minutes of September 18, 2020 Groundwater Management Area 12 (GMA12) Meeting
7. Update from Groundwater Conservation Districts (GCDs) of GMA 12 on joint planning, water level monitoring, and compliance with Chapter 36.108, State Water Code
8. Discussion on expressions of Desired Future Conditions (DFCs) and compatibility between GCDs in GMA 12
9. Discussion of comments received from stakeholders
10. Update on progress of updating Sparta/Queen City/Carrizo-Wilcox Groundwater Availability Model (GAM)
11. Evaluation, discussion and consideration of future pumping scenarios using an updated Sparta/Queen City/Carrizo-Wilcox GAM and results, including predicted water levels and water budgets
12. Discuss requirements of Chapter 36.108(d) in adopting Desired Future Conditions:
    a. other socioeconomic impacts reasonably expected to occur;
    b. any other information relevant to the specific desired future conditions.
13. Public Comment on non-agenda items
14. Update from Texas Water Development Board
15. Agenda items and Date for next meeting
16. Adjourn

Signed this 6th day of October, 2020.

Gary Westbrook, General Manager
Post Oak Savannah GCD, 310 E. Ave. C, Milano, TX 76556
Phone: 512-455-9900 Fax: 512-455-9909
Email: gwestbrook@posgcd.org

***Questions, requests for additional information, or comments concerning the subjects listed above may be submitted to the person posting this notice.*

NOTICE OF MEETING
GROUNDWATER MANAGEMENT AREA 12
December 10, 2020 – 10:00 a.m.

AGENDA

Notice is hereby given that the groundwater conservation districts located wholly or partially within Groundwater Management Area (GMA) 12, as designated by the Texas Water Development Board, consisting of the Post Oak Savannah Groundwater Conservation District (GCD), Fayette County GCD, Lost Pines GCD, Mid-East Texas GCD, and Brazos Valley GCD, will hold a ***Joint Planning meeting at 10:00 a.m. on Thursday, December 10, 2020***.

Notice is hereby given that, in accordance with Governor Abbott's March 16, 2020, action to temporarily suspend certain provisions of the Texas Open Meetings Act, a Joint Planning Meeting will be held via telephone and video conference call beginning at 10:00 a.m. on December 10, 2020. Any member of the public who wishes to participate remotely may do so through the remote access options provided below.

Please join the meeting from your computer, tablet or smartphone at:
https://global.gotomeeting.com/join/773107709
You can also dial in using your phone:
United States: +1 (872) 240-3311
Access Code: 773-107-709

The subjects to be discussed or considered, or upon which any formal action may be taken, are as listed below. Items may or may not be taken in the same order as shown on this meeting notice.

1. Invocation
2. Pledge of Allegiance
3. Call meeting to order and establish quorum
4. Welcome and introductions
5. Public Comment on Agenda Items
6. Minutes of October 22, 2020 Groundwater Management Area 12 (GMA12) Meeting
7. Update from Groundwater Conservation Districts (GCDs) of GMA 12 on joint planning, water level monitoring, and compliance with Chapter 36.108, State Water Code
8. Discussion on expressions of Desired Future Conditions (DFCs) and compatibility between GCDs in GMA 12
9. Discussion of comments received from stakeholders
10. Update on progress of updating Sparta/Queen City/Carrizo-Wilcox Groundwater Availability Model (GAM)
11. Evaluation, discussion and consideration of future pumping scenarios using an updated Sparta/Queen City/Carrizo-Wilcox GAM and results, including predicted water levels and water budgets
12. Discuss requirements of Chapter 36.108(d) in adopting Desired Future Conditions: any other information relevant to the specific desired future conditions.
13. Schedule and process moving forward for adoption of Desired Future Conditions
14. Public Comment on non-agenda items
15. Update from Texas Water Development Board
16. Agenda items and Date for next meeting
17. Adjourn

Signed this 17th day of November, 2020.

Gary Westbrook, General Manager
Post Oak Savannah GCD, 310 E. Ave. C, Milano, TX 76556
Phone: 512-455-9900 Fax: 512-455-9909
Email: gwestbrook@posgcd.org

***Questions, requests for additional information, or comments concerning the subjects listed above may be submitted to the person posting this notice.*

NOTICE OF MEETING
GROUNDWATER MANAGEMENT AREA 12
January 15, 2021 – 10:00 a.m.

AGENDA

Notice is hereby given that the groundwater conservation districts located wholly or partially within Groundwater Management Area (GMA) 12, as designated by the Texas Water Development Board, consisting of the Post Oak Savannah Groundwater Conservation District (GCD), Fayette County GCD, Lost Pines GCD, Mid-East Texas GCD, and Brazos Valley GCD, will hold a ***Joint Planning meeting at 10:00 a.m. on Friday, January 15, 2021***.

Notice is hereby given that, in accordance with Governor Abbott's March 16, 2020, action to temporarily suspend certain provisions of the Texas Open Meetings Act, a Joint Planning Meeting will be held via telephone and video conference call beginning at 10:00 a.m. on January 15, 2021. Any member of the public who wishes to participate remotely may do so through the remote access options provided below.

Please join the meeting from your computer, tablet or smartphone at:
https://global.gotomeeting.com/join/320233885
You can also dial in using your phone:
United States: (646) 749-3122
Access Code: 320-233-885

The subjects to be discussed or considered, or upon which any formal action may be taken, are as listed below. Items may or may not be taken in the same order as shown on this meeting notice.

1. Invocation
2. Pledge of Allegiance
3. Call meeting to order and establish quorum
4. Welcome and introductions
5. Public Comment on Agenda Items
6. Minutes of December 12, 2020 Groundwater Management Area 12 (GMA12) Meeting
7. Update from Groundwater Conservation Districts (GCDs) of GMA 12 on joint planning, water level monitoring, and compliance with Chapter 36.108, State Water Code
8. Discussion on expressions of Desired Future Conditions (DFCs) and compatibility, including acceptable variances in values between GCDs in GMA 12
9. Discussion of comments received from stakeholders
10. Evaluation, discussion and consideration of past and future pumping scenarios using the Sparta/Queen City/Carrizo-Wilcox Groundwater Availability Model (GAM) and results, including predicted water levels and water budgets
11. Discuss requirements of Chapter 36.108(d) in adopting Desired Future Conditions: any other information relevant to the specific DFCs.
12. Consider Proposed DFCs for Brazos Alluvium and Yegua-Jackson Aquifers in GMA 12
13. Declaration of Non-Relevant aquifers by GCDs in GMA 12 for current round of joint planning
14. Schedule and process moving forward for adoption of DFCs
15. Public Comment on non-agenda items
16. Update from Texas Water Development Board
17. Agenda items and Date for next meeting
18. Adjourn

Signed this 30th day of December 2020.

Gary Westbrook, General Manager
Post Oak Savannah GCD, 310 E. Ave. C, Milano, TX 76556
Phone: 512-455-9900 Fax: 512-455-9909
Email: gwestbrook@posgcd.org

***Questions, requests for additional information, or comments concerning the subjects listed above may be submitted to the person posting this notice.*

NOTICE OF MEETING
GROUNDWATER MANAGEMENT AREA 12
February 12, 2021 – 10:00 a.m.

AGENDA

Notice is hereby given that, in accordance with Governor Abbott's March 16, 2020, action to temporarily suspend certain provisions of the Texas Open Meetings Act, the groundwater conservation districts located wholly or partially within Groundwater Management Area (GMA) 12, as designated by the Texas Water Development Board, consisting of the Post Oak Savannah Groundwater Conservation District (GCD), Fayette County GCD, Lost Pines GCD, Mid-East Texas GCD, and Brazos Valley GCD, will hold a ***Joint Planning meeting via telephone and video conference call at 10:00 a.m. on Friday, February 12, 2021***. Any member of the public who wishes to participate remotely may do so through the remote access options provided below.

Please join the meeting from your computer, tablet or smartphone at:
https://global.gotomeeting.com/join/176076885
You can also dial in using your phone:
United States: +1 (646) 749-3122
Access Code: 176-076-885

The subjects to be discussed or considered, or upon which any formal action may be taken, are as listed below. Items may or may not be taken in the same order as shown on this meeting notice.

1. Invocation
2. Pledge of Allegiance
3. Call meeting to order and establish quorum
4. Welcome and introductions
5. Public Comment on Agenda Items
6. Minutes of January 15, 2020 Groundwater Management Area 12 (GMA12) Meeting
7. Update from Groundwater Conservation Districts (GCDs) of GMA 12 on joint planning, water level monitoring, and compliance with Chapter 36.108, State Water Code
8. Discussion on expressions of Desired Future Conditions (DFCs) and compatibility, including acceptable variances in values between GCDs in GMA 12
9. Discussion of comments received from stakeholders
10. Evaluation, discussion and consideration of past and future pumping scenarios using the Sparta/Queen City/Carrizo-Wilcox Groundwater Availability Model (GAM) and results, including predicted water levels and water budgets
11. Discuss requirements of Chapter 36.108(d) in adopting Desired Future Conditions:
    (a) the feasibility of achieving the desired future conditions
    (b) any other information relevant to the specific DFCs
12. Consider Proposed DFCs for Brazos Alluvium Aquifer in GMA 12
13. Update on Proposed DFCs for Yegua-Jackson Aquifer in GMA 12
14. Declaration of Non-Relevant aquifers by GCDs in GMA 12 for current round of joint planning
15. Schedule and process moving forward for adoption of DFCs
16. Public Comment on non-agenda items
17. Update from Texas Water Development Board
18. Agenda items and Date for next meeting
19. Adjourn

Signed this 28th day of January 2021.

Gary Westbrook, General Manager
Post Oak Savannah GCD, 310 E. Ave. C, Milano, TX 76556
Phone: 512-455-9900 Fax: 512-455-9909
Email: gwestbrook@posgcd.org

***Questions, requests for additional information, or comments concerning the subjects listed above may be submitted to the person posting this notice.*

NOTICE OF MEETING
GROUNDWATER MANAGEMENT AREA 12
March 18, 2021 – 10:00 a.m.

AGENDA

Notice is hereby given that, in accordance with Governor Abbott's March 16, 2020, action to temporarily suspend certain provisions of the Texas Open Meetings Act, the groundwater conservation districts located wholly or partially within Groundwater Management Area (GMA) 12, as designated by the Texas Water Development Board, consisting of the Post Oak Savannah Groundwater Conservation District (GCD), Fayette County GCD, Lost Pines GCD, Mid-East Texas GCD, and Brazos Valley GCD, will hold a ***Joint Planning meeting via telephone and video conference call at 10:00 a.m. on Thursday, March 18, 2021***. Any member of the public who wishes to participate remotely may do so through the remote access options provided below.

Please join the meeting from your computer, tablet or smartphone at:
https://global.gotomeeting.com/join/400538117
You can also dial in using your phone:
United States: +1 (786) 535-3211
Access Code: 400-538-117

The subjects to be discussed or considered, or upon which any formal action may be taken, are as listed below. Items may or may not be taken in the same order as shown on this meeting notice.

1. Invocation
2. Pledge of Allegiance
3. Call meeting to order and establish quorum
4. Welcome and introductions
5. Public Comment on Agenda Items
6. Minutes of February 12, 2020 Groundwater Management Area 12 (GMA12) Meeting
7. Update from Groundwater Conservation Districts (GCDs) of GMA 12 on joint planning, water level monitoring, and compliance with Chapter 36.108, State Water Code
8. Discussion of comments received from stakeholders
9. Evaluation, discussion and consideration of past and future pumping scenarios using the Sparta/Queen City/Carrizo-Wilcox Groundwater Availability Model (GAM) and results, including predicted water levels and water budgets
10. Consider Proposed DFCs for aquifers in GMA 12
    (a) Sparta
    (b) Queen City
    (c) Carrizo
    (d) Calvert Bluff
    (e) Simsboro
    (f) Hooper
    (g) Yegua-Jackson
    (h) Brazos River Alluvium
11. Discussion and consideration of expressions of Desired Future Conditions and compatibility, including acceptable variances in values between GCDs in GMA 12
12. Discuss requirements of Chapter 36.108(d) in adopting Desired Future Conditions:
    (a) the feasibility of achieving the desired future conditions
    (b) any other information relevant to the specific DFCs
13. Declaration of Non-Relevant aquifers by GCDs in GMA 12 for current round of joint planning
14. Schedule and process moving forward for adoption of DFCs
15. Public Comment on non-agenda items
16. Update from Texas Water Development Board
17. Agenda items and Date for next meeting
18. Adjourn

Signed this 3rd day of March 2021.

_____

Gary Westbrook, General Manager
Post Oak Savannah GCD, 310 E. Ave. C, Milano, TX 76556
Phone: 512-455-9900 Fax: 512-455-9909
Email: gwestbrook@posgcd.org

***Questions, requests for additional information, or comments concerning the subjects listed above may be submitted to the person posting this notice.*

NOTICE OF MEETING
GROUNDWATER MANAGEMENT AREA 12
April 20, 2021 – 10:00 a.m.

AGENDA

Notice is hereby given that the groundwater conservation districts located wholly or partially within Groundwater Management Area (GMA) 12, as designated by the Texas Water Development Board, consisting of the Post Oak Savannah Groundwater Conservation District (GCD), Fayette County GCD, Lost Pines GCD, Mid-East Texas GCD, and Brazos Valley GCD, will hold a ***Joint Planning meeting via telephone and video conference call at 10:00 a.m. on Tuesday, April 20, 2021***. ***In consideration of concerns regarding the Coronavirus Disease (COVID-19), this meeting will be held virtually. Members of the public are encouraged to attend virtually and listen, observe, or actively participate during this meeting, and may join this meeting from their computer, tablet or smartphone through the remote access options provided below:***

Please join the meeting from your computer, tablet or smartphone at:
https://global.gotomeeting.com/join/678916637
You can also dial in using your phone:
United States: +1 (872) 240-3212
Access Code: 678-916-637

The subjects to be discussed or considered, or upon which any formal action may be taken, are as listed below. Items may or may not be taken in the same order as shown on this meeting notice.

1. Invocation
2. Pledge of Allegiance
3. Call meeting to order and establish quorum
4. Welcome and introductions
5. Public Comment on Agenda Items
6. Minutes of March 18, 2020 Groundwater Management Area 12 (GMA12) Meeting
7. Update from Groundwater Conservation Districts (GCDs) of GMA 12 on joint planning, water level monitoring, and compliance with Chapter 36.108, State Water Code
8. Discussion and considerations of comments received from stakeholders
9. Discuss requirements of Chapter 36.108(d) in adopting Desired Future Conditions:
    a. other environmental impacts, including impacts on spring flow and other interactions between groundwater and surface water;
    b. any other information relevant to the specific DFCs.
10. Evaluation, discussion and consideration of past and future pumping scenarios using the Sparta/Queen City/Carrizo-Wilcox Groundwater Availability Model (GAM) and results, including predicted water levels and water budgets
11. Discussion and possible reconsideration of Proposed DFCs for aquifers in GMA 12 as adopted at March 18, 2021 GMA 12 Meeting
    (a) Sparta
    (b) Queen City
    (c) Carrizo
    (d) Calvert Bluff
    (e) Simsboro
    (f) Hooper
    (g) Yegua-Jackson
    (h) Brazos River Alluvium
12. Discussion and possible reconsideration of expressions of Desired Future Conditions and compatibility, including acceptable variances in values between GCDs in GMA 12 as adopted at March 18, 2021 GMA 12 Meeting
13. Schedule and process moving forward for adoption of DFCs
14. Public Comment on non-agenda items
15. Update from Texas Water Development Board
16. Agenda items and Date for next meeting
17. Adjourn

Signed this 8th day of April 2021.

Gary Westbrook, General Manager
Post Oak Savannah GCD, 310 E. Ave. C, Milano, TX 76556
Phone: 512-455-9900 Fax: 512-455-9909
Email: gwestbrook@posgcd.org

***Questions, requests for additional information, or comments concerning the subjects listed above may be submitted to the person posting this notice.*

NOTICE OF MEETING
GROUNDWATER MANAGEMENT AREA 12
June 24, 2021 – 10:00 a.m.

AGENDA

Notice is hereby given that the groundwater conservation districts (GCDs) located wholly or partially within Groundwater Management Area (GMA) 12, as designated by the Texas Water Development Board, consisting of the Post Oak Savannah Groundwater Conservation District (GCD), Fayette County GCD, Lost Pines GCD, Mid-East Texas GCD, and Brazos Valley GCD, will hold a ***Joint Planning meeting at 10:00 a.m. on Thursday, June 24, 2021,*** in the Post Oak Savannah GCD Offices, located at 310 East Ave. C (Highway 79), Milano, Texas.

In consideration of concerns regarding the Coronavirus Disease (COVID-19), the District Offices will be open to the GMA Members, Staff, Consultants and public who wish to attend in person, while others may attend virtually. Members of the public who wish to attend virtually and listen, observe, or actively participate during this meeting may join this meeting from their computer, tablet or smartphone at:

https://global.gotomeeting.com/join/708781789

You may also dial in for audio only using your phone at:

United States: +1 (571) 317-3122

Access Code: 708-781-789

The subjects to be discussed or considered, or upon which any formal action may be taken, are as listed below. Items may or may not be taken in the same order as shown on this meeting notice.

1. Invocation
2. Pledge of Allegiance
3. Call meeting to order and establish quorum
4. Welcome and introductions
5. Public Comment on Agenda Items
6. Minutes of April 20, 2021 Groundwater Management Area 12 (GMA12) Meeting
7. Discussion of past, current, and future processes for adoption of Desired Future Conditions (DFCs)
8. Discuss requirements of Chapter 36.108 in adopting DFCs
9. Evaluation and discussion of past and future pumping scenarios using the Sparta/Queen City/Carrizo-Wilcox Groundwater Availability Model (GAM) and results, including predicted water levels and water budgets
10. Public Comment on non-agenda items
11. Update from Texas Water Development Board
12. Agenda items and Date for next meeting
13. Adjourn

Signed this 11th day of June 2021.

Gary Westbrook, General Manager
Post Oak Savannah GCD, 310 E. Ave. C, Milano, TX 76556
Phone: 512-455-9900 Fax: 512-455-9909
Email: gwestbrook@posgcd.org

***Questions, requests for additional information, or comments concerning the subjects listed above may be submitted to the person posting this notice.*

NOTICE OF MEETING
GROUNDWATER MANAGEMENT AREA 12
October 6, 2021 – 10:00 a.m.

AGENDA

Notice is hereby given that the groundwater conservation districts (GCDs) located wholly or partially within Groundwater Management Area (GMA) 12, as designated by the Texas Water Development Board, consisting of the Post Oak Savannah Groundwater Conservation District (GCD), Fayette County GCD, Lost Pines GCD, Mid-East Texas GCD, and Brazos Valley GCD, will hold a ***Joint Planning meeting at 10:00 a.m. on Wednesday, October 6, 2021,*** in the Post Oak Savannah GCD Offices, located at 310 East Ave. C (Highway 79), Milano, Texas.

In consideration of concerns regarding the Coronavirus Disease (COVID-19), the District Offices will be open to the GMA Members, Staff, Consultants and public who wish to attend in person, while others may attend virtually. Members of the public who wish to attend virtually and listen, observe, or actively participate during this meeting may join this meeting from their computer, tablet or smartphone at:

https://global.gotomeeting.com/join/151217877

You may also dial in for audio only using your phone at:

United States: +1 (872) 240-3212

Access Code: 151-217-877

The subjects to be discussed or considered, or upon which any formal action may be taken, are as listed below. Items may or may not be taken in the same order as shown on this meeting notice.

1. Invocation
2. Pledge of Allegiance
3. Call meeting to order and establish quorum
4. Welcome and introductions
5. Public Comment on Agenda Items
6. Minutes of June 24, 2021 Groundwater Management Area 12 (GMA12) Meeting
7. Discussion and comparison of Management Plans, Rules, and Management Strategies of the Districts in GMA 12 as required by Chapter 36.108
8. Discussion of past, current, and future processes for adoption of Desired Future Conditions (DFCs) and affects of these processes on management of groundwater in the Districts in GMA 12
9. Discussion of requirements of Chapter 36.108 in adopting DFCs
10. Evaluation and discussion of past and future pumping files and scenarios using the Sparta/Queen City/Carrizo-Wilcox Groundwater Availability Model (GAM) and results, including predicted water levels and water budgets
11. Public Comment on non-agenda items
12. Update from Texas Water Development Board
13. Agenda items and Date for next meeting
14. Adjourn

Signed this 24th day of September 2021.

_____

Gary Westbrook, General Manager
Post Oak Savannah GCD, 310 E. Ave. C, Milano, TX 76556
Phone: 512-455-9900 Fax: 512-455-9909
Email: gwestbrook@posgcd.org

***Questions, requests for additional information, or comments concerning the subjects listed above may be submitted to the person posting this notice.*

NOTICE OF MEETING
GROUNDWATER MANAGEMENT AREA 12
October 13, 2021 – 10:00 a.m.

AGENDA

Notice is hereby given that the groundwater conservation districts (GCDs) located wholly or partially within Groundwater Management Area (GMA) 12, as designated by the Texas Water Development Board, consisting of the Post Oak Savannah Groundwater Conservation District (GCD), Fayette County GCD, Lost Pines GCD, Mid-East Texas GCD, and Brazos Valley GCD, will hold a ***Joint Planning meeting at 10:00 a.m. on Wednesday, October 13, 2021,*** in the Post Oak Savannah GCD Offices, located at 310 East Ave. C (Highway 79), Milano, Texas.

In consideration of concerns regarding the Coronavirus Disease (COVID-19), the District Offices will be open to the GMA 12 Members, Staff, Consultants and public who wish to attend in person, while others may attend virtually. Members of the public who wish to attend virtually and listen, observe, or actively participate during this meeting may join this meeting from their computer, tablet or smartphone at:

https://global.gotomeeting.com/join/701312157

You may also dial in for audio only using your phone at:

United States: +1 (646) 749-3122

Access Code: 701-312-157

The subjects to be discussed or considered, or upon which any formal action may be taken, are as listed below. Items may or may not be taken in the same order as shown on this meeting notice.

1. Invocation
2. Pledge of Allegiance
3. Call meeting to order and establish quorum
4. Welcome and introductions
5. Public Comment on Agenda Items
6. Minutes of October 6, 2021 Groundwater Management Area 12 (GMA12) Meeting
7. Discussion of comments received from stakeholders during this round of joint planning to adopt Desired Future Conditions (DFCs)
8. Evaluation, discussion and consideration of past and future pumping scenarios using the Sparta/Queen City/Carrizo-Wilcox Groundwater Availability Model (GAM) and results, including predicted water levels and water budgets
9. Discuss requirements of Chapter 36.108(d) in adopting DFCs
10. Discussion and consideration of expressions of DFCs and compatibility, including acceptable variances in values between GCDs in GMA 12
11. Discussion and possible action on adoption of Desired Future Conditions (DFCs) for aquifers in GMA 12
    - (a) Sparta
    - (b) Queen City
    - (c) Carrizo
    - (d) Calvert Bluff
    - (e) Simsboro
    - (f) Hooper
    - (g) Yegua-Jackson
    - (h) Brazos River Alluvium
12. Schedule and process moving forward for adoption of DFCs
13. Public Comment on non-agenda items
14. Update from Texas Water Development Board
15. Agenda items and Date for next meeting
16. Adjourn

Signed this 30th day of September 2021.

_____

Gary Westbrook, General Manager
Post Oak Savannah GCD, 310 E. Ave. C, Milano, TX 76556
Phone: 512-455-9900 Fax: 512-455-9909
Email: gwestbrook@posgcd.org

***Questions, requests for additional information, or comments concerning the subjects listed above may be submitted to the person posting this notice.*

NOTICE OF MEETING
GROUNDWATER MANAGEMENT AREA 12
November 12, 2021 – 10:00 a.m.

AGENDA

Notice is hereby given that the groundwater conservation districts (GCDs) located wholly or partially within Groundwater Management Area (GMA) 12, as designated by the Texas Water Development Board, consisting of the Post Oak Savannah Groundwater Conservation District (GCD), Fayette County GCD, Lost Pines GCD, Mid-East Texas GCD, and Brazos Valley GCD, will hold a ***Joint Planning meeting at 10:00 a.m. on Friday, November 12, 2021,*** in the Post Oak Savannah GCD Offices, located at 310 East Ave. C (Highway 79), Milano, Texas.

In consideration of concerns regarding the Coronavirus Disease (COVID-19), the District Offices will be open to the GMA 12 Members, Staff, Consultants and public who wish to attend in person, while others may attend virtually. Members of the public who wish to attend virtually and listen, observe, or actively participate during this meeting may join this meeting from their computer, tablet or smartphone at:

https://global.gotomeeting.com/join/772456021

You may also dial in for audio only using your phone at:

United States: +1 (872) 240-3212

Access Code: 772-456-021

The subjects to be discussed or considered, or upon which any formal action may be taken, are as listed below. Items may or may not be taken in the same order as shown on this meeting notice.

1. Invocation
2. Pledge of Allegiance
3. Call meeting to order and establish quorum
4. Welcome and introductions
5. Public Comment on Agenda Items
6. Minutes of October 13, 2021 Groundwater Management Area 12 (GMA12) Meeting
7. Discussion of and possible action on comments received from stakeholders and summary reports during this round of joint planning to adopt Desired Future Conditions (DFCs)
8. Evaluation, discussion and consideration of past and future pumping scenarios using the Sparta/Queen City/Carrizo-Wilcox Groundwater Availability Model (GAM) and results, including predicted water levels and water budgets
9. Discuss requirements of Chapter 36.108(d) in adopting DFCs
10. Discussion and consideration of expressions of DFCs and compatibility, including acceptable variances in values between GCDs in GMA 12
11. Discussion and possible action on approving resolution for adoption of Desired Future Conditions (DFCs) for relevant aquifers in GMA 12
    (a) Sparta
    (b) Queen City
    (c) Carrizo
    (d) Calvert Bluff
    (e) Simsboro
    (f) Hooper
    (g) Yegua-Jackson
    (h) Brazos River Alluvium
12. Schedule and process moving forward if necessary for adoption of DFCs
13. Public Comment on non-agenda items
14. Update from Texas Water Development Board
15. Agenda items and Date for next meeting
16. Adjourn

Signed this 18th day of October 2021.

_____

Gary Westbrook, General Manager
Post Oak Savannah GCD, 310 E. Ave. C, Milano, TX 76556
Phone: 512-455-9900 Fax: 512-455-9909
Email: gwestbrook@posgcd.org

***Questions, requests for additional information, or comments concerning the subjects listed above may be submitted to the person posting this notice.*

NOTICE OF MEETING
GROUNDWATER MANAGEMENT AREA 12
November 30, 2021 – 10:00 a.m.

AGENDA

Notice is hereby given that the groundwater conservation districts (GCDs) located wholly or partially within Groundwater Management Area (GMA) 12, as designated by the Texas Water Development Board, consisting of the Post Oak Savannah Groundwater Conservation District (GCD), Fayette County GCD, Lost Pines GCD, Mid-East Texas GCD, and Brazos Valley GCD, will hold a ***Joint Planning meeting at 10:00 a.m. on Tuesday, November 30, 2021,*** in the Post Oak Savannah GCD Offices, located at 310 East Ave. C (Highway 79), Milano, Texas.

In consideration of concerns regarding the Coronavirus Disease (COVID-19), the District Offices will be open to the GMA 12 Members, Staff, Consultants and public who wish to attend in person, while others may attend virtually. Members of the public who wish to attend virtually and listen, observe, or actively participate during this meeting may join this meeting from their computer, tablet or smartphone at:

https://global.gotomeeting.com/join/855403981

You may also dial in for audio only using your phone at:

United States: +1 (872) 240-3412

Access Code: 855-403-981

The subjects to be discussed or considered, or upon which any formal action may be taken, are as listed below. Items may or may not be taken in the same order as shown on this meeting notice.

1. Invocation
2. Pledge of Allegiance
3. Call meeting to order and establish quorum
4. Welcome and introductions
5. Public Comment on Agenda Items
6. Minutes of November 12, 2021 Groundwater Management Area 12 (GMA12) Meeting
7. Discussion and possible action on finalizing and approving resolution for adoption of Desired Future Conditions (DFCs) for relevant aquifers in GMA 12 authorized at November 12, 2021 GMA 12 Meeting
    - (a) Sparta
    - (b) Queen City
    - (c) Carrizo
    - (d) Calvert Bluff
    - (e) Simsboro
    - (f) Hooper
    - (g) Yegua-Jackson
    - (h) Brazos River Alluvium
8. Schedule and process moving forward if necessary for adoption of DFCs
9. Public Comment on non-agenda items
10. Update from Texas Water Development Board
11. Agenda items and Date for next meeting
12. Adjourn

Signed this 15th day of November 2021.

Gary Westbrook, General Manager
Post Oak Savannah GCD, 310 E. Ave. C, Milano, TX 76556
Phone: 512-455-9900 Fax: 512-455-9909
Email: gwestbrook@posgcd.org

***Questions, requests for additional information, or comments concerning the subjects listed above may be submitted to the person posting this notice.*

NOTICE OF MEETING
GROUNDWATER MANAGEMENT AREA 12
January 21, 2022 – 10:00 a.m.

AGENDA

Notice is hereby given that the groundwater conservation districts (GCDs) located wholly or partially within Groundwater Management Area (GMA) 12, as designated by the Texas Water Development Board, consisting of the Post Oak Savannah Groundwater Conservation District (GCD), Fayette County GCD, Lost Pines GCD, Mid-East Texas GCD, and Brazos Valley GCD, will hold a ***Joint Planning meeting at 10:00 a.m. on Friday, January 21, 2022,*** in the Post Oak Savannah GCD Offices, located at 310 East Ave. C (Highway 79), Milano, Texas.

In consideration of concerns regarding the Coronavirus Disease (COVID-19), the District Offices will be open to the GMA 12 Members, Staff, Consultants and public who wish to attend in person, while others may attend virtually. Members of the public who wish to attend virtually and listen, observe, or actively participate during this meeting may join this meeting from their computer, tablet or smartphone at:

https://global.gotomeeting.com/join/470744333

You may also dial in for audio only using your phone at:

United States: +1 (646) 749-3122

Access Code: 470-744-333

The subjects to be discussed or considered, or upon which any formal action may be taken, are as listed below. Items may or may not be taken in the same order as shown on this meeting notice.

1. Invocation
2. Pledge of Allegiance
3. Call meeting to order and establish quorum
4. Welcome and introductions
5. Public Comment on Agenda Items
6. Minutes of November 30, 2021 Groundwater Management Area 12 (GMA12) Meeting
7. Discussion of and possible action on Explanatory Report to be submitted to the Texas Water Development Board during the most recent round of joint planning to adopt Desired Future Conditions (DFCs)
8. Schedule and process moving forward
9. Public Comment on non-agenda items
10. Update from Texas Water Development Board
11. Agenda items and Date for next meeting
12. Adjourn

Signed this 10th day of January 2022.

_____

Gary Westbrook, General Manager
Post Oak Savannah GCD, 310 E. Ave. C, Milano, TX 76556
Phone: 512-455-9900 Fax: 512-455-9909
Email: gwestbrook@posgcd.org

***Questions, requests for additional information, or comments concerning the subjects listed above may be submitted to the person posting this notice.*

NOTICE OF MEETING
GROUNDWATER MANAGEMENT AREA 12
January 28, 2022 – 10:00 a.m.

AGENDA

Notice is hereby given that the groundwater conservation districts (GCDs) located wholly or partially within Groundwater Management Area (GMA) 12, as designated by the Texas Water Development Board, consisting of the Post Oak Savannah Groundwater Conservation District (GCD), Fayette County GCD, Lost Pines GCD, Mid-East Texas GCD, and Brazos Valley GCD, will hold a ***Joint Planning meeting at 10:00 a.m. on Friday, January 28, 2022,*** in the Post Oak Savannah GCD Offices, located at 310 East Ave. C (Highway 79), Milano, Texas.

In consideration of concerns regarding the Coronavirus Disease (COVID-19), the District Offices will be open to the GMA 12 Members, Staff, Consultants and public who wish to attend in person, while others may attend virtually. Members of the public who wish to attend virtually and listen, observe, or actively participate during this meeting may join this meeting from their computer, tablet or smartphone at:

https://global.gotomeeting.com/join/704961493

You may also dial in for audio only using your phone at:

United States: +1 (646) 749-3122

Access Code: 704-961-493

The subjects to be discussed or considered, or upon which any formal action may be taken, are as listed below. Items may or may not be taken in the same order as shown on this meeting notice.

1. Invocation
2. Pledge of Allegiance
3. Call meeting to order and establish quorum
4. Welcome and introductions
5. Public Comment on Agenda Items
6. Minutes of January 21, 2022 Groundwater Management Area 12 (GMA12) Meeting
7. Discussion of, and possible action on, Desired Future Conditions (DFCs), Explanatory Report, and accompanying information to be submitted to the Texas Water Development Board for the most recent round of joint planning to adopt DFCs for GMA 12
8. Schedule and process moving forward
9. Public Comment on non-agenda items
10. Update from Texas Water Development Board
11. Agenda items and Date for next meeting
12. Adjourn

Signed this 13th day of January 2022.

_____

Gary Westbrook, General Manager
Post Oak Savannah GCD, 310 E. Ave. C, Milano, TX 76556
Phone: 512-455-9900 Fax: 512-455-9909
Email: gwestbrook@posgcd.org

***Questions, requests for additional information, or comments concerning the subjects listed above may be submitted to the person posting this notice.*

APPENDIX B

MINUTES FOR GMA 12 JOINT GROUNDWATER PLANNING MEETINGS FROM 2018 TO 2021

GROUNDWATER MANAGEMENT AREA 12 MEETING
May 11, 2018 – 10:00 am
Post Oak Savannah GCD Offices
310 East Avenue C
Milano, Texas

GMA 12 Members Present

Gary Westbrook	POSGCD
Jim Totten	LPGCD
David Van Dresar	FCGCD
David Bailey	METGCD
Alan Day	BVGCD

GMA 12 Members Absent
None

Others Present	**Entity**
Gary Westbrook	POSGCD
Elaine Gerren	POSGCD
Bobby Bazan	POSGCD
Doug Box	POSGCD
John Seifert	WSP
Steve Young	Intera
Andy Donnelly	DBS&A
Larry French	TWDB
Jean Perez	TWDB
Blaire Parker	SAWS
James Bene'	RW Harden
Matt Uliana	Intera
Mike Keester	LRE Water, LLC
Mike Kubina	R. W. Harden
Jordan Furnans	LRE Water, LLC
Dave Coleman	City of College Station
Alan Gibbs	City of College Station
David Dunn	HDR / Brazos G
Becky Goetsch	POSGCD
Sidney Youngblood	POSGCD

MINUTES

1. **Invocation**
   Invocation was given by David Bailey, and the Pledge of Allegiance was led By Gary Westbrook at 10:13 a.m.

2. **Call meeting to order and establish quorum**
   Gary Westbrook, serving as chair for this meeting, called the meeting to order by at 10:14 a.m.

3. **Welcome and introductions**
   Each District and their voting representative introduced themselves.

4. **Minutes of September 20, 2017 GMA 12 Meeting**
   The minutes of the September 20, 2017 meeting were presented. A motion was made by Alan Day to approve the minutes. The motion was 2nd by David Bailey. The motion passed unanimously.

5. **Report from Intera, Inc. on Update on Central Carrizo-Wilcox/Queen City-Sparta Groundwater Availability Model**
   A presentation was given on this item by Dr. Steve Young of Intera, Inc. He noted the draft of the GAM should be available by the end of Summer. John Seifert of WSP asked what were the most improved areas of the GAM. Dr. Young responded that the ability of the GAM to evaluate groundwater-surface water interactions was greatly enhanced, and that hydraulic conductivity and accuracy of faults were also greatly improved. He further noted improvements to accuracy of recharge, improved historical pumping, as well as the addition of pumping values from the Brazos Alluvium GAM.

6. **Discussion and possible action on the approval of a 1.30 Modeled Available Groundwater Peaking Factor for Brazos County in response to a proposed groundwater project for the City of College Station.**
   Alan Day of Brazos Valley GCD introduced this item and reported that the BVGCD Board had approved a 1.2 MAG Peak Factor at its board meeting on May 10, 2018, and that Brazos Region G Water Planning Group (BGRWPG) had approved either a 1.2 or 1.3 MAG Peak Factor at its meeting of May 9, 2018. He noted GMA 12 would also need to approve one of these values for the request of the City of College Station to be presented to the Texas Water Development Board. David Dunn of HDR Engineering, consultant of BGRWPG presented information approved by that group, and John Seifert of WSP and David Coleman representing the City of College Station also presented discussion for the group. After discussion, a motion was made by Alan Day to approve a 1.2 MAG Peak Factor for Brazos County in response to the proposed groundwater project for the City of College Station. David Van Dresar seconded. After further discussion, the motion passed unanimously.

7. **Update from Groundwater Conservation Districts (GCDs) of GMA 12 on joint planning and compliance with Chapter 36.108, State Water Code**
   Mr. Westbrook opened agenda item 7 and 8 simultaneously. Each District representative gave a report on compliance with Chapter 36.108, and also on evaluations performed in each District for compliance with DFCs. Mr. Day presented a report from a recent BVGCD meeting entitled, "Aquifer Desired Future Conditions Update." Mr. Westbrook called attention to a recent presentation available on the POSGCD website, and given at a recent POSGCD meeting, addressing this issue as well. It was agreed all GCDs were in compliance with individual DFCs, and the GMA was in compliance with overall DFCs.

8. **Compliance with DFCs by GMA 12 and GCDs of GMA 12**
   This item was opened and discussed with agenda item 7 above.

9. **Identification of Management Strategies regarding production of groundwater to protect against exceeding Desired Future Conditions (DFCs)**
   Mr. Day handed out portions of the BVGCD Rules and Management Plan regarding this item. Mr. Westbrook discussed Section 16 of the POSGCD Rules, and the POSGCD Management Plan with regard to this item. Mr. Van Dresar also addressed FCGCD Rules and their use of identified Depletion Areas. All agreed on the importance of rules which protected against exceeding DFCs.

10. **Collection, evaluation, and reporting of groundwater production**
    Each member of GMA 12 reported on the method and frequency of requirements of reporting production in their GCD. It was noted and agreed that all GCDs in GMA 12 had nearly identical requirements.

11. **Collection, evaluation, and reporting of water levels in water wells**
    Each member of GMA 12 reported on the methodology of collection, evaluation, and reporting of water levels in their GCD. Specifically, Mr. Westbrook and Mr. Day noted existing documents either in draft form or already adopted by their Boards which outlined this, while Mr. Van Dresar, Mr. Totten, and Mr. Bailey agreed their methodologies were consistent with what Mr. Day and Mr. Westbrook described. It was agreed that all GCDs in GMA 12 were using nearly identical methodologies.

12. **Rules of GCDs in GMA 12 with regard to registration of exempt wells and permitting of production**
    All representatives discussed exempt well status and noted their similarities, while also discussing permitting of production. It was agreed there were many similarities and several differences in permitting due to aquifer characteristics and aquifer uses as outlined and allowed in Chapter 36, Texas Water Code.

13. **Discussion on possible common website for GMA 12 to house all information and data**
    After discussion, Mr. Day agreed to investigate possibilities with Halff, Inc. and report back to the GMA.

14. **Petition for Inquiry filed by Fred Russell with Texas Commission on Environmental Quality**
    Mr. Westbrook reported this item had been dismissed by unanimous vote of the TCEQ Commissioners, and all supporting documentation could be found on the POSGCD website at www.posgcd.org .

15. **Public Comment**
    Mr. Westbrook recognized the representatives of the Texas Water Development Board and invited them to address the group. Mr. Larry French thanked the GMA representatives for the opportunity but had nothing new to add.

    Jordan Furnans addressed the GMA and noted a new subsidence study which had been completed for the entire State of Texas and invited all to look into it.

    It was also noted some GMAs provided an opportunity for public comment at both the beginning and end of meetings.

16. **Agenda items and Date for next meeting**
    After brief discussion, it was agreed these agenda items would be identified prior to the next meeting.

17. Adjourn

The meeting was adjourned at 12:44 pm.

THE ABOVE MINUTES OF THE MEETING OF GROUNDWATER MANAGEMENT AREA 12 HELD ON MAY 11, 2018, WERE APPROVED AND ADOPTED BY GMA 12 ON ???????, 2018

ATTEST:

Mid-East Texas Groundwater Conservation District

Fayette County Groundwater Conservation District

Brazos Valley Groundwater Conservation District

Lost Pines Groundwater Conservation District

Post Oak Savannah Groundwater Conservation District

GROUNDWATER MANAGEMENT AREA 12 MEETING
October 9, 2018 – 10:00 am
Post Oak Savannah GCD Offices
310 East Avenue C
Milano, Texas

GMA 12 Members Present

Gary Westbrook	POSGCD
Jim Totten	LPGCD
David Van Dresar	FCGCD
David Bailey	METGCD
Alan Day	BVGCD

GMA 12 Members Absent
None

Others Present	**Entity**
Elaine Gerren	POSGCD
Bobby Bazan	POSGCD
Doug Box	POSGCD
John Seifert	WSP
Steve Young	Intera
Andy Donnelly	DBS&A
Natalie Ballew	TWDB
Blaire Parker	SAWS
James Bene'	RW Harden
Pat Reilly	Blue Water
Mike Keester	LRE Water, LLC
D.R. Gosnami	R. W. Harden
James Beach	WSP
Steve Box	Environmental Stewardship
Stephen Maldonado	City of College Station
David Dunn	HDR / Brazos G
Nathan Ausley	Self
Shan Rutherford	Terrill & Waldrop
Gary Mechler	City of College Station
Barbara Boulware	The Knight Law Firm
Steve & Dorothy Mayer	Self
Bill Riley	
Eddy Young	Major Oak Power

MINUTES

1. **Invocation**
   Invocation was given by David Bailey.

2. **Call meeting to order and establish quorum**
   Gary Westbrook, serving as chair for this meeting, called the meeting to order by at 10:00 a.m. and noted that all voting members of GMA 12 were present.

3. **Welcome and introductions**
   Each District and their voting representative introduced themselves.

4. **Minutes of May 11, 2018 GMA 12 Meeting**
   The minutes of the May 11, 2018 meeting were presented. After brief discussion, a motion was made by Alan Day to approve the minutes. The motion was 2nd by David Van Dresar. The motion passed unanimously.

5. **Report from Intera, Inc. on Update on Central Carrizo-Wilcox/Queen City-Sparta Groundwater Availability Model**
   A presentation was given on this item by Dr. Steve Young of Intera, Inc. entitled "Update to the Carrizzo-Wilcox Groundwater Availability Model (GAM)". Dr. Young answered several questions from the audience.

6. **Report from GMA 12 consultants regarding comparisons of simulated drawdowns based on the Run 12 well file produced by the previous Central Carrizo-Wilcox City-Sparta Groundwater Availability Model and the updates Central Carrizo-Wilcox/Queen City-Sparta Groundwater Availability Model**
   Andy Donnelly gave a presentation entitled, "Differences Between the Previous and Updated GAM. He stated that there could be different methods used moving forward to run this new GAM as compared to the previous GAM. A report will be sent to the Texas Water Development Board by month's end. A representative of TWDB noted that TWDB probably will not provide comment, but might request methodology from GMA 12 concerning use of the updated GAM in GMA 12 work. Gary Westbrook reminded that even though the consultants of GMA 12 member Districts would need to discuss use of the updated GAM further, all discussions and decisions will be made in public meetings properly posted and discussed according to the requirements of the Texas Open Meetings Act.

7. **Discussion and possible action on the approval of a 1.17 Modeled Available Groundwater Peaking Factor for the Sparta Aquifer in Madison County in response to a proposal from Region H**
   David Bailey gave a presentation which was given to the Mid- East Texas GCD board by Freese and Nichols entitled, "Consideration of a MAG Peaking Factor for the 2021 Region H Regional Water Plan." Mr. Bailey explained the presentation and stated the METGCD Board had approved the request. A motion was made by David Bailey to approve a 1.17 Modeled Available Groundwater Peaking Factor for the Sparta Aquifer in Madison County in response to a proposal from Region H. The motion was 2nd by Alan Day. The motion carried unanimously.

8. **Update from Groundwater Conservation Districts' (GCDs) of GMA 12 on joint planning and compliance with Chapter 36.108, State Water Code**
   Gary Westbrook provided a summary of the recent work by POSGCD including adoption of a guidance document for methodology in monitoring and DFC Compliance. He further noted the District's Monitoring

Well network was at 200 monitoring wells and he stated based on a report provided at an earlier DFC Committee meeting of the District, Post Oak Savannah GCD is compliant with DFCs and its management plan. Alan Day reviewed the process at the Brazos Valley GCD stating BVGCD was also compliant and was complimentary of POSGCD staff taking input on their compliance ddocument. He also stated BVGCD is awaiting approval from TWDB of the District's recently revised Management Plan. David Van Dresar with the Fayette County GCD stated that FCGCD is also waiting approval of their Management Plan from TWDB. Jim Totten with the Lost Pines GCD stated that they are considering using a Hybrid of the POSGCD shallow management zone restrictions on drawdown for established DFC Compliance. David Bailey noted METGCD is acquiring additional monitoring wells.

9. **Discussion on possible common website for GMA 12 to house all information and data**
Alan Day provided discussion on possible work from Halff, Inc. to provide a common website committed to storing and making available to the public all monitoring information from each GCD in GMA 12. After discussion, Mr. Day agreed to invite Erin Halff, Inc. to the next GMA 12 meeting for further discussion.

10. **Public Comment**
Mr. Westbrook invited public comment from all in attendance. No Public Comment was offered.

11. **Agenda items and Date for next meeting**
All agreed the target a meeting for early January 2019. Also, agenda items for that meeting would include possible common website for GMA 12, discussion of options and methodology for describing and measurement of compliance for DFCs, discussion of options and methodology for running the updated GAM, and any additional items deemed appropriate to GMA 12 at that time.

12. **Adjourn**
The meeting was adjourned at 11:33 pm.

THE ABOVE MINUTES OF THE MEETING OF GROUNDWATER MANAGEMENT AREA 12 HELD ON OCTOBER 9, WERE APPROVED AND ADOPTED BY GMA 12 ON _____, 2019.

ATTEST:

_____
Mid-East Texas Groundwater Conservation District

_____
Fayette County Groundwater Conservation District

_____
Brazos Valley Groundwater Conservation District

Lost Pines Groundwater Conservation District

Post Oak Savannah Groundwater Conservation District

GROUNDWATER MANAGEMENT AREA 12 MEETING
January 29, 2019 – 9:00 am
Post Oak Savannah GCD Offices
310 East Avenue C
Milano, Texas

GMA 12 Members Present

Gary Westbrook	POSGCD
Jim Totten	LPGCD
David Van Dresar	FCGCD
David Bailey	METGCD
Alan Day	BVGCD

GMA 12 Members Absent
None

Others Present	**Entity**
Elaine Gerren	POSGCD
Bobby Bazan	POSGCD
Doug Box	POSGCD
John Seifert	GCI
Steve Young	Intera
Andy Donnelly	DBS&A
Natalie Ballew	TWDB
James Bene'	RW Harden
James Beach	WSP
Steve Box	Environmental Stewardship
David Coyer	Halff
Erin Atkinson	Halff
Shan Rutherford	Terrill & Waldrop
Bill Riley	Self
Rebecca Batchelder	LCRA
David Wheelock	LCRA
George Rice	Self
Eddie McCarthy	McCarthy & McCarthy
Steven Siebert	SAWS
Darren Thompson	SAWS
Amy Muttoni	BRA

Al Braden	Austin
Mike Thornhill	TGI
Jevon Harding	Intera
Becky Goetsch	POSGCD
Bob Harden	HHE
Meagan Haas	BVGCD
Mike McCloud	
Monique Norman	

MINUTES

1. **Invocation**
   Invocation was given by David Bailey.

2. **Call meeting to order and establish quorum**
   Gary Westbrook, serving as chair for this meeting, called the meeting to order at 9:03 a.m. and noted that all voting members of GMA 12 were present.

3. **Welcome and introductions**
   Each District voting representative introduced themself.

4. **Minutes of October 19, 2018 GMA 12 Meeting**
   The minutes of the October 19, 2018 meeting were presented for action. After brief discussion, a motion was made by David Van Dresar to approve the minutes. The motion was 2nd by Jim Totten. The motion passed unanimously.

5. **Review of updated Central Carrizo-Wilcox Groundwater Availability Model (GAM)**
   Andy Donnelly of Daniel B Stephens and Associates noted that discussion of the topic of Agenda item 6 would be included in his presentation, and he would cover Agenda item 5, 6, and 13 at this time. Chairman Westbrook noted that these items would be opened and discussed simultaneously. The presentation was entitled, "Summary of the Impacts of the Revised GAM and the Path Forward." During the presentation, Mike McCloud asked about the accuracy of predicted impacts by the new model. This was discussed at length, with explanations of the purpose of the original GAM, and work of the GCDs in GMA 12 working together to improve the GAM. This included evaluations and comparisons between the old and new versions of the GAM. Steve Box asked about the improvements to the groundwater-surface water features of the new model.

6. **Lost Pines GCD Report on Desired Future Conditions (DFCs) Evaluation Runs of Groundwater Management Area 12 (GMA12)**
   This item was covered in Agenda item 5.

7. **Consider Update of Pumping Files to be used for Joint Planning in GMA12 and Evaluation of Compliance with DFCs and Protective Drawdown Limits (PDLs)**

Chairman Westbrook noted that the title and discussion included Protective Drawdown Limits as currently used by POSGCD in their Rules and Management Plan.
A presentation entitled, "POSGCD Monitoring Update" was then given by Jevon Harding of Intera, with assistance from Bobby Bazan of POSGCD. Ms. Harding then gave another presentation entitled, "POSGCD Update: DFC Compliance," which included a summary of the current POSGCD methodology for measuring water levels and for determining compliance with PDLs and DFCs.
Mr. Westbrook noted the similarities between the adopted documents of POSGCD and BVGCD which govern these items in the two districts, and noted that all GCDs in GMA 12 follow the same methodologies for measuring water levels which are consistent with those used by the Texas Water Development Board (TWDB) and the United States Geological Survey (USGS). Mr. Day echoed those thoughts, adding discussion of the similarities of the Rules of the two districts.

Mr. Day noted that this same practice of review for compliance was performed annually by BVGCD, and that all results of monitoring could be found on the District's website. He also noted the winter water level measurements would begin in March.

Both Mr. Bailey of METGCD and Mr. Van Dresar of FCGCD stated that both used the same practice and methodology as discussed by POSGCD and BVGCD, and noted their annual measurements and evaluations would begin soon.

Mr. Totten briefly discussed the LPGCD monitoring efforts, and agreed that LPGCD followed the same methods for measurement of water level as discussed.

Mr. Westbrook thanked the representatives for their updates, and noted this item would remain on future GMA 12 agendas so each GCD could give updates as appropriate to them, and as this practice of discussion of DFCs and compliance is required by statute.

The representatives then discussed use of pumping files in the previous round of joint planning and efforts by each to update and evaluate those pumping files using the new GAM. Mr. Westbrook briefly discussed the recent decisions of the POSGCD Board to proceed in a similar fashion to the last round by updating the pumping files and then considering multiple model runs. Mr. Totten noted that LPGCD would prefer to use the same DFCs as adopted previously, noting the new GAM yielded more water available than the previous version. Mr. Day concurred that BVGCD preferred to begin using the same DFCs for the Wilcox Group and use numbers yielded by the updated GAM for the Carrizo, Sparta, Queen City, and Yegua-Jackson aquifers. This item was discussed at length with the consensus being that each GCD would continue to update their pumping files through 2018, and return that information to their consultant for inclusion in an updated pumping file to be used by the team of consultants for work moving forward, and this updated pumping information needed to be completed in the next 30-60 days.

8. Consider options for expression of DFCs and PDLs

Mr. Westbrook noted that past discussion at the GMA had included a possible future conversion in the way DFCs are expressed in joint planning. He offered that the POSGCD Board had approved moving forward with expressing DFCs in terms of water levels compared to Mean Sea Level (MSL) instead of water levels as a drawdown compared to previous water levels, as currently used. He provided discussion of the benefits to this approach, which included being able to use monitoring information from wells which were newly added to the POSGCD monitoring network much sooner than the current methods allowed. After discussion and questions about using this approach, it was determined no change would be considered at this time.

Mr. Westbrook also asked if the members desired to consider any other methods by which DFCs for GMA 12 might be expressed in future rounds of joint planning. The possibility of focusing on the shallow parts of the aquifers was discussed, which included discussion of the use of POSGCD's PDLs. Also discussed were methods used by other GMAs, including expression of DFCs as a percentage of saturated thickness. It was agreed no changes would be forthcoming at this time, and to continue these discussions at later GMA 12 meetings as more information was gathered.

Mr. Totten then discussed the adjustments approved by the LPGCD Board to change monitoring and expression of DFCs to a much narrower area than currently defined. Mr. Totten and Mr. Donnelly provided discussion on this new approach, which would be very similar in some respects to the PDLs used at POSGCD.

Mr. Day noted that BVGCD has re-adopted the use of reduction of artesian head averaged across the District as the means by which DFCs will be expressed, and this will be the starting point for this round of planning for BVGCD.

9. **Possible Changes in GMA 12 DFCs**
As a result of discussion under the previous agenda item, it was agreed no changes would be considered at this meeting, and that the current process would continue on schedule as outlined earlier in the meeting.

10. **Texas Water Development Board Groundwater Availability Model (GAM) Run 17-030 MAG**
A presentation entitled, "Simulated Surface water-Groundwater Interaction for Brazos River Alluvium was then given by Dr. Steve Young of Intera. Mr. Young discussed the similarities and differences of surface water and groundwater interactions in the newly finished Central Carrizo GAM and the Brazos River Alluvium GAM. Questions of accuracy of pumping data and resulting Modeled Available Groundwater was also discussed. Mr. Steve Box encouraged moving forward with improvements to accuracy so aquifer contributions to rivers during drought might be maintained. Discussion followed concerning the necessary balance between these contributions and respect for the private property rights of landowners who would need that same water for crop production, as well as rule of capture. All agreed to the importance of continuing to improve the information and properly considering this balance.

11. **GMA 12 Explanatory Report Organization and Technical Discussion**
Mr. Westbrook provided a brief summary of how the last explanatory report had been organized, with each GCD using their consultant to respond to comments received and questions raised during the process, with all information complied into one report. Mr. Box stated he desired more feedback from his comments given during this process during the last round of joint planning. This issue was discussed, and resolved, with all agreeing the tool developed by GMA 12 consultants for use by citizens in the GMA to file comment was well thought out and very useful.

12. **Approach for Developing GMA 12 Explanatory Report for current round of Joint Planning**
After further discussion of the success of the previous process for developing the Explanatory Report, a motion was made by Mr. Day for the GCDs in GMA 12 to follow the process for the current round of joint planning for development of the Explanatory Report. Mr. Bailey seconded the motion. The motion carried unanimously.

13. **Schedule for revision and/or adoption of DFCs for GMA 12 for current round of Joint Planning**
Mr. Westbrook noted that Mr. Donnelly had covered this item in agenda item 5, and asked if anyone would like to revisit the draft schedule at this time. No one asked to return to the item.

14. **Update from Groundwater Conservation Districts (GCDs) of GMA 12 on joint planning and compliance with Chapter 36.108, State Water Code**
Mr. Westbrook noted this item would be a mainstay on GMA 12 agendas so that updates could be given and discussed at necessary and appropriate. He then noted that this topic had been addressed earlier in the meeting during agenda item 7, and asked if any of the GCDs had any further discussion to offer at this time. No further discussion was offered.

15. **Discussion on possible common website for GMA 12 to house all information and data**
Mr. Day gave a brief summary of past discussions on this topic and invited Erin Atkinson with Halff, Inc. to provide discussion on this topic. All agreed there could be great value in creating and maintaining a single website to house all vital documents and records of GMA 12 as well as a single map providing water level measurements and additional science based information. After questions and discussion with Mr. Atkinson, it was agreed Mr. Atkinson would return to the next GMA 12 meeting with a scope of work, product description, and cost estimate to meet the needs of the GMA for this purpose.

16. **Representation for GMA 12 to Region H Water Planning Group**
Mr. Bailey explained the alternate for this position had retired from his Board and the METGCD Board had nominated Board member Jim Nash to fill this vacancy. Mr. Bailey further noted METGCD was the only GMA 12 GCD in Region H. A motion was then made by Mr. Bailey to nominate Mr. Nash for this position. The motion was seconded by Mr. Day. The motion passed unanimously.

17. **Public Comment**
Mr. Westbrook invited public comment from all in attendance. No Public Comment was offered. He then thanked all in attendance for their participation in the meeting, recognizing their cooperation and the orderly and considerate manner in which questions were asked and discussion had taken place on agenda items as the meeting progressed. He noted this participation had included no fewer than 8 of the public in attendance this day.

18. **Agenda items and Date for next meeting**
After discussion, it was agreed the next meeting of GMA 12 would be held May 14, with time and agenda items to be determined at a later date.

19. **Adjourn**
The meeting was adjourned at 12:24 pm.

THE ABOVE MINUTES OF THE MEETING OF GROUNDWATER MANAGEMENT AREA 12 HELD ON JANUARY 29, 2019, WERE APPROVED AND ADOPTED BY GMA 12 ON _____, 2019.

ATTEST:

_____
Mid-East Texas Groundwater Conservation District

Fayette County Groundwater Conservation District

Brazos Valley Groundwater Conservation District

Lost Pines Groundwater Conservation District

Post Oak Savannah Groundwater Conservation District

GROUNDWATER MANAGEMENT AREA 12 MEETING
May 30, 2019 – 10:00 am
Post Oak Savannah GCD Offices
310 East Avenue C
Milano, Texas

GMA 12 Members Present

Gary Westbrook	POSGCD
Jim Totten	LPGCD
David Van Dresar	FCGCD
David Bailey	METGCD
Alan Day	BVGCD

GMA 12 Members Absent
None

Others Present	**Entity**
Elaine Gerren	POSGCD
Pat Reilly	Blue Water
Jennifer Nations	City of College Station
Bobby Bazan	POSGCD
Doug Box	POSGCD
Ralph Sifuentes	POSGCD
John Seifert	WSP
Steve Young	Intera
Andy Donnelly	DBS&A
Natalie Ballew	TWDB
James Bene'	RW Harden
Steve Box	Environmental Stewardship
Shan Rutherford	Terrill & Waldrop
Rebecca Botchelder	LCRA
George Rice	Environmental Stewardship
Larry Rose	Self
Nathan Ausley	Self
Sheril Smith	LPGCD
Bob Wilson	POSGCD
Sidney Youngblood	POSGCD
Shirley Wade	TWDB
Becky Goetsch	POSGCD
David Teuscher	Self

MINUTES

1. **Invocation**
   The invocation was given by David Bailey. Doug Box lead the pledges to the flags of the United States and Texas.

2. **Call meeting to order and establish quorum**
   Gary Westbrook, serving as chair for this meeting, called the meeting to order at 10:00 a.m. and noted that all voting members of GMA 12 were present.

3. **Welcome and introductions**
   Each of the five District voting representatives introduced themselves.

4. **Minutes of January 29, 2019 GMA 12 Meeting**
   The minutes of the January 29, 2019 meeting were presented. After brief discussion, a motion was made by David Van Dresar to approve the minutes. The motion was 2nd by Jim Totten. The motion passed unanimously.

5. **Update from Groundwater Conservation Districts (GCDs) of GMA 12 on joint planning, water level monitoring, and compliance with Chapter 36.108, State Water Code**
   Mr. Westbrook invited Bobby Bazan to give a monitoring report on behalf of POSGCD. Mr. Bazan reported the District now had 215 total monitoring wells and had confirmed 187 water level measurements for the annual monitoring efforts. He reported 33 of these were equipped with continuous measurement devices, and further noted there were quite a few wells which were not yet accessible due to the amount of rainfall this Spring. Mr. Day reported that BVGCD had measured water levels in 158 wells this Spring, and handed out a report which is provided monthly to their Board which includes the amounts of water permitted and pumped in each aquifer, as well as an electronic copy of the newly adopted BVGCD Management Plan. He also noted since December the District had issued approximately 27,000 acre feet of water from the Simsboro aquifer. Mr. VanDresar announced FCGCD has completed 66% of Spring measurements, and the District was adding continuous measurement equipment in unused wells. Mr. Bailey noted METGCD was using both measurements obtained by himself and from the Texas Water Development Board, and had completed Spring measurements. H also noted the desire for his district to add additional wells to their monitoring network in the Sparta and Hooper. Mr. Totten stated LPGCD was working with WellIntel to transfer data and service from their current wells to a new format and system. Mr. Westbrook, Mr. Day, and Mr. Bailey discussed recent meetings with the Texas Commission on Environmental Quality (TCEQ) and Luminant regarding the recent report from Environmental Integrity on deposits of coal ash and possible contamination of groundwater near those deposits at coal burning plants in Texas.

6. **Texas Water Development Board Groundwater Availability Model (GAM) Run 17-030 MAG and TWDB determination of MAG for Brazos River Alluvium**
   Mr. Westbrook reminded all in attendance of the information on this item as presented and discussed at the January 29 GMA 12 meeting. Steve Young of Intera then presented a report entitled Review of DFCs and MAGs- Brazos River Alluvium. Mr. Young raised concerns about the volume of water listed as MAG, and noted meetings with staff from the Texas Water Development Board (TWDB) to resolve these concerns. He reported TWDB staff was agreeable to consultants representing GCDs in GMA 12 providing methodology to run the GAM during this current round of planning. John Seifert agreed with

concerns raised by Mr. Young and method for resolution moving forward into this round of planning. Steve Box referenced the LCRA study and asked about similarity. Alan Day referenced and discussed a recent study published by Baylor University concerning migration of surface water into the alluvial formations, and noted that study was posted on the BVGCD website. After discussion, Dr. Young and Mr. Seifert agreed to continue discussions with TWDB staff and return recommendations to the POSGCD and BVGCD Boards. No further action was taken.

7. **Development of two future pumping scenarios using the Sparta/Queen City/Carrizo-Wilcox GAM and results of the predicted water levels**

Mr. Seifert reviewed pumping scenarios of the last round of planning. Pumping for the last round was updated through 2010, and for this round could be updated through 2017 or 2018. Mr. Day submitted a report on amounts of permits and production presented to the BVGCD Board. Dr. Young presented a report entitled "POSGCD" Reported Pumping and Operating Permits." James Bene and George Rice asked when updated pumping files for GMA 12 could be obtained. Mr. Westbrook stated as soon as they were completed and became public they would be available to the public. Mr. Day asked about how the new GAM accounted for droughts. Dr. Young explained. Andy Donnelly reported on updated pumping files for FCGCD and LPGCD, and noted that these files made assumptions on ramped up pumping for the future but these did not consider DFCs. David Bailey noted METGCD pumping file had been updated also, but their consultant was not able to be in attendance at this meeting.

After discussion, Mr. Day moved to use pumping updated through 2018. Mr. VanDresar seconded. The motion passed unanimously.

Discussion ensued on which year to use for calibration. Jim Totten moved to use 2010 for the year of calibration. Mr. Bailey seconded. The motion passed unanimously.

Mr. Totten asked if the consultants would verify production in neighboring GCDs outside of the GMA. Mr. Donnelly confirmed this would be accomplished.

Mr. Day asked to discuss possible GAM runs to consider moving forward in this round of planning. After discussion, Mr. Totten moved and Mr. Day seconded, to run two GAM scenarios, both with the variation of adding a drought of record period in the 2030 decade. The first run would include total permitted amounts produced each year beginning in 2020 through the end of the period, and the second would include estimated ramped up production. Mr. Westbrook asked for discussion. It was noted this would actually yield four separate GAM runs for consideration. After further discussion, Mr. Westbrook moved to amend the motion by adding an additional basic GAM run, also to include a variation of including the drought of record in the 2030 decade, with modeled production at 50% of the ramped up GAM run. Mr. Day seconded the motion to amend. It was agreed this would yield two additional GAM runs to be considered, for a total of six GMA runs to be considered. After discussion, the motion to amend passed. Mr. Westbrook then called for discussion on the amended motion. After brief discussion, Mr. Westbrook called for the vote on the amended motion. The motion passed unanimously.

Mr. Westbrook then asked for further instruction to the consultants. After discussion, Mr. Totten moved, and Mr. Van Dresar seconded, to have the consultants produce and return full water budgets and effects of drawdown on aquifer conditions, expressed by county, district, and GMA. After brief discussion, the motion passed unanimously.

8. **Update and possible action on legislation that relates to the joint planning process including but not limited to similar rules**

Mr. Westbrook then addressed recent legislation which had been filed in this legislative session. After discussion, no action was taken.

9. **Public Comment**

Mr. Westbrook invited comment from the public. No comment was offered. All agreed this was a result of the public being allowed to participate with questions and comment on agenda items as the meeting progressed.

10. **Review of Agenda items and Date for next meeting**
    After discussion, it was agreed the consultants should be able to accomplish their work by late July, and as they neared completion of this work the GMA members would determine a meeting date and agenda items.

11. **Adjourn**
    The meeting was adjourned at 12:32 pm.

THE ABOVE MINUTES OF THE MEETING OF GROUNDWATER MANAGEMENT AREA 12 HELD ON MAY 30, 2019, WERE APPROVED AND ADOPTED BY GMA 12 ON August 2 **, 2019.**

ATTEST:

Mid-East Texas Groundwater Conservation District

Fayette County Groundwater Conservation District

Brazos Valley Groundwater Conservation District

Lost Pines Groundwater Conservation District

Post Oak Savannah Groundwater Conservation District

GROUNDWATER MANAGEMENT AREA 12 MEETING

August 2, 2019 – 10:00 am

Post Oak Savannah GCD Offices

310 East Avenue C

Milano, Texas

GMA 12 Members Present

Gary Westbrook	POSGCD
Jim Totten	LPGCD
David Van Dresar	FCGCD
David Bailey	METGCD
Alan Day	BVGCD

GMA 12 Members Absent

None

Others Present	**Entity**
Elaine Gerren	POSGCD
Bobby Bazan	POSGCD
Doug Box	POSGCD
John Seifert	WSP
Jevon Harding	Intera
James Bene'	RW Harden
Rebecca Batchelder	Lower Colorado River Authority (LCRA)
George Rice	Environmental Stewardship
Sidney Youngblood	POSGCD
Aaron Abel	Brazos River Authority (BRA)
James Beach	WSP
Paul Kirby	DBSA
Amy Muttoni	BRA
Robert Bradley	TWDB
Blaire Parker	SAWS
Andy	LPGCD
Matt Uliana	Intera / METGCD
Bill Riley	Self

MINUTES

1. **Invocation**
   The invocation was given by David Van Dresar.

2. **Pledge of Allegiance**
   Alan Day lead the pledges to the flags of the United States and Texas.

3. **Call meeting to order and establish quorum**
   Gary Westbrook, serving as chair for this meeting, called the meeting to order at 10:05 a.m. and noted that all voting members of GMA 12 were present.

4. **Welcome and introductions**
   Each of the five District voting representatives introduced themselves.

5. **Public Comment on Agenda Items**
   Mr. Westbrook invited public comment on agenda items. There was no public comment offered on the Agenda Items.

6. **Minutes of May 30, 2019 GMA 12 Meeting**
   The minutes of the May 30, 2019 meeting were presented. After brief discussion, a motion was made by Alan Day to approve the minutes. The motion was 2nd by David Van Dresar. The motion passed unanimously.

7. **Status Update on Texas Water Development Board Study on Groundwater-Surface Water interaction**
   Rebecca Batchelder of the LCRA gave a brief summary of the study and introduced James Bene' with R.W. Hardin, and Assoc. as the consultant in charge of the study. Mr. Bene' presented a slideshow on the Study including the purpose of the Study, GAM Limitations, Study Goals, Study Area, and he discussed Test Site # 1, which had proved unsuitable. He stated that they are currently looking for other test sites. A question was asked by George Rice wanting to know how many sites had been selected. Mr. Bene indicated that was ongoing work. James Beach commented on how to discern between the sites. No action was taken.

8. **Update from Groundwater Conservation Districts (GCDs) of GMA 12 on joint planning, water level monitoring, and compliance with Chapter 36.108, State Water Code**
   Mr. Westbrook stated that the Post Oak Savannah GCD will review the annual evaluations on DFC and PDL compliance at the next DFC Committee and Board Meeting, both on August 6, 2019. Alan Day stated that the Brazos Valley GCD will start their Summer measurements the 3rd week in August. David Bailey with the Mid-East Texas GCD stated METGCD had completed measurements in April. Jim Totten of the Lost Pines GCD stated LPGCD is converting to Wellntel for these purposes. David Van Dresar noted that Fayette County GCD was continuing current monitoring practices. No action was taken.

9. **Discussion of comments received from stakeholders**
A letter of June 25, 2019 from Environmental Stewardship was presented for discussion. Mr. Seifert gave a brief and overview of the request, and reported on how the request was being considered in ongoing GMA 12 work. No further action was taken.

10. **Evaluation and discussion of future pumping scenarios using the Sparta/Queen City/Carrizo Wilcox GAM and results including predicted water levels and water budgets**
Mr. Seifert presented a slideshow on the preliminary Modeling results for the Sparta, Queen City, and Carrizo Wilcox Aquifers. Mr. Seifert reminded all that in previous GMA 12 meetings it had been indicated that the GCDs desired to maintain DFCs consistent with the currently adopted DFCs. Mr. Westbrook commented that the pumping files were preliminary and some would need to be updated. Mr. Seifert agreed, and then noted the three different model runs as outlined by GMA 12 at the previous meeting, and discussed each as runs named S1, S2, and S3. He then reminded the GMA had instructed the addition of two periods of drought, which had been added to each of these GAM runs by adding the periods during 2026-2030 and 2051-2060. He then noted the three GAM runs which included the additional drought periods as S4-S6, respectively. He also noted nearly identical results for GAM runs with and without the drought periods included.

Discussion of the three primary GAM runs ensued. Mr. Westbrook noted necessary adjustments to POSGCD pumping files and estimated ramp-up times. Mr. Seifert noted a next run could be selected from the first three and returned with updated pumping information, and which could then be considered at the next meeting. He also noted this run could be considered as GAM Run S4. Mr. Totten asked when this run would be completed and available for consideration. Mr. Siefert was unsure, but estimated maybe 2-3 months. George Rice asked when the pumping files for the next GAM run will be available. Mr. Siefert estimated 2-3 weeks after the updates were made to the files. Mr. Rice asked if the pumping shown included all proposed projects? Mr. Siefert stated, yes the total in the Simsboro went from 37,000 to 130,000 acre feet per year in Lost Pines GCD. James Bene' asked who to contact for these new files. John Siefert replied himself or Andy Donnelly will have the files. After discussion, a motion was made by David Van Dresar for each District to make adjustments to their pumping files in GAM Run S2 and the consultants perform a new run as S4 and return for consideration by early October. The motion was 2nd by Alan Day. Mr. Westbrook asked for discussion. None was offered. The motion carried unanimously.

11. **Discussion on expressions of Desired Future Conditions (DFC's) and compatibility between GCD's in GMA 12**
Mr. Westbrook noted several differences in expression of DFCs among the GCDs in the GMA, most specifically POSGCD's conversion from water levels as expressed as drawdown compared to previous water levels, to water level expressed in comparison to mean sea level (MSL), as well as POSGCD's use of restrictions on water level change in the shallow parts of the District's aquifers. All agreed this would need to be considered as this work progressed.

12. **Public Comment on non-agenda items**
Mr. Westbrook invited comment from the public. Robert Bradley requested that an agenda item be included in the future for updates form the Texas Water Development Board (TWDB). He further noted there may be more rigorous GCD Management Plan reviews which may require additional information even when plans are considered administratively complete. He also updated all on recent legislative activities and the increases in the budget and staffing of TWDB related to scientific work.

13. **Agenda items and Date for next meeting**

The GMA will consider the next GAM Run S4 as returned by the consultants as well as any additional items as appropriate at that time, and an update from TWDB as requested. Date to be determined.

14. Adjourn

The meeting was adjourned at 11:49 pm.

THE ABOVE MINUTES OF THE MEETING OF GROUNDWATER MANAGEMENT AREA 12 HELD ON AUGUST 2, 2019, WERE APPROVED AND ADOPTED BY GMA 12 ON September 24 **, 2019.**

ATTEST:

L. O. M. Burley

Mid-East Texas Groundwater Conservation District

Fayette County Groundwater Conservation District

Brazos Valley Groundwater Conservation District

Lost Pines Groundwater Conservation District

Post Oak Savannah Groundwater Conservation District

GROUNDWATER MANAGEMENT AREA 12 MEETING
September 24, 2019 – 10:00 am
Post Oak Savannah GCD Offices
310 East Avenue C
Milano, Texas

GMA 12 Members Present

Gary Westbrook	POSGCD
Jim Totten	LPGCD
David Van Dresar	FCGCD
David Bailey	METGCD
Alan Day	BVGCD

GMA 12 Members Absent

None

Others Present	**Entity**
Elaine Gerren	POSGCD
Bobby Bazan	POSGCD
Doug Box	POSGCD
John Seifert	GWC
Ross Kushnereit	Intera
Steve Box	Environmental Stewardship
Rebecca Batchelder	Lower Colorado River Authority (LCRA)
George Rice	Environmental Stewardship
Sidney Youngblood	POSGCD
Natalie Ballew	TWDB
Blaire Parker	SAWS
James Beach	WSP
Barbara McWhirter	
Steve Young	Intera
Andy Donnelly	DBS&A
Sheril Smith	LPGCD
Becky Goetsch	POSGCD

MINUTES

1. **Invocation**
   The invocation was given by Alan Day.

2. **Pledge of Allegiance**
   David Bailey led the pledges to the flags of the United States and Texas.

3. **Call meeting to order and establish quorum**
   Gary Westbrook, serving as chair for this meeting, called the meeting to order at 10:08 a.m. and noted that all voting members of GMA 12 were present.

4. **Welcome and introductions**
   Each of the five District voting representatives introduced themselves.

5. **Public Comment on Agenda Items**
   Mr. Westbrook invited public comment on agenda items. There was no public comment offered on the Agenda Items.

6. **Minutes of August 2 2019 GMA 12 Meeting**
   The minutes of the August 2, 2019 meeting were presented. After brief discussion, a motion was made by David Van Dresar to approve the minutes. The motion was 2nd by David Bailey. The motion passed unanimously.

7. **Update from Groundwater Conservation Districts (GCDs) of GMA 12 on joint planning, water level monitoring, and compliance with Chapter 36.108, State Water Code**
   Alan Day stated that the Brazos Valley GCD had completed their summer measurements and was updating their website for monitoring results. He also noted there had been no change to date in production trends in BVGCD. David Bailey with the Mid-East Texas GCD stated METGCD had received approval of their newly submitted groundwater management plan. Jim Totten of the Lost Pines GCD stated LPGCD has converted 4 monitoring wells to date to the new Wellntel systems. No action was taken.

8. **Discussion of efforts of GCDs of GMA 12 in use of Groundwater Availability Modeling and Best Available Science in consideration and adoption of Desired Future Conditions (DFCs) and management of shared aquifers**
   Mr. Westbrook introduced this agenda item and discussed merits of considering this effort in light of legislation filed over the past two sessions dealing with similar rules of GCDs in GMAs. Mr. Day further explained the possible uses of a very brief and concise white paper to outline and discuss how GCDs in GMA 12 have used science in development of DFCs. He noted the document would be used to discuss these practices with legislators and the public, and volunteered to develop the document. Mr. Van Dresar and Mr. Bailey agreed this would be useful. Mr. Totten noted he did not share the optimism of other members of GMA 12 with regard to use at the legislature, but agreed the exercise would be a worthwhile effort. After further discussion, Mr. Day moved, and Mr. Van Dresar seconded, to have Mr. Day develop an executive summary of a white paper for this purpose and return it for consideration by members of GMA 12. The motion carried unanimously.

9. **Discussion on expressions of Desired Future Conditions (DFC's) and compatibility between GCD's in GMA 12**

Mr. Westbrook reminded of several differences in expression of DFCs among the GCDs in the GMA. Mr. Day asked if DFCs from the GCDs could be expressed in differing ways. Steve Young of Intera stated it had been accomplished in other GMAs. Natalie Ballew of the Texas Water Development Board agreed different expressions could be converted to be consistent as other GMAs have already done. All agreed to continue to consider as work progressed.

10. **Discussion of comments received from stakeholders**

Mr. Westbrook invited Steve Box of Environmental Stewardship to give a summary of his comments entitled, "Proposed Desired Future Condition(s) for Aquifer(s) in GMA 12," submitted and dated September 22, 2019. Mr. Box thanked the representatives of GMA 12 for the opportunity to provide comments and requested answers to questions in the document as available from GMA 12. Mr. Box also noted he appreciates access to the pumping file for the S7 GAM Run. He stated he believed the GAM runs should be updated with more accurate drought of record data. He noted concern specifically in the Travis County area and noted that the drought of record had actually changed from the 1950s for some areas. He noted the current GAM is much better than the previous GAM. He noted evaluations performed. Mr. Day asked Mr. Box if the evaluations were just in the Lost Pines area or for the entire GMA 12. Mr. Box answered he thought just the Lost Pines area. After further discussion, no action was taken and consultants will review comments for future discussion.

11. **Declare the Gulf Coast Aquifer non-relevant as it applies to groundwater management in the Brazos Valley GCD**

Mr. Day stated Brazos Valley GCD desired to continue to declare the Gulf Coast Aquifer non-relevant for the current planning cycle as in the previous cycle. After brief discussion, Mr. Day presented a recommendation to that affect. David Bailey moved, and David Van Dresar seconded, to declare Gulf Coast Aquifer non-relevant as it applies to groundwater management in the Brazos Valley GCD for this round of joint planning. The motion carried unanimously.

12. **Discussion and instruction to consultants concerning Joint Planning in GMA 12 for the Yegua-Jackson Aquifer**

Dr. Steve Young of Intera gave a presentation entitled, "Yegua-Jackson Aquifer". After discussion it was agreed by the GMA 12 representatives it would be consistent with previous practice to update the pumping files for the Yegua Jackson from 2010 to 2018 and proceed with evaluations. Mr. Westbrook added he would like to review this with his Board and return to this item at the next meeting. All agreed to do the same.

13. **Discussion and instruction to consultants concerning Joint Planning in GMA 12 for the Brazos River Alluvium Aquifer**

Mr. Andy Donnelly gave a presentation entitled, "Brazos River Alluvium." He outlined work performed by consultants from POSGCD and BVGCD, as well as discussions with TWDB on concerns of modeling and setting DFCs. It was agreed that the representatives of both POSGCD and BVGCD would discuss this with their respective Boards and return with recommendations.

14. **Evaluation and discussion of future pumping scenarios using the Sparta/Queen City/Carrizo Wilcox GAM and results including predicted water levels and water budgets**

Mr. Andy Donnelly gave a presentation entitled "Preliminary QC/Sparta/C-W Modeling Results." He explained he had incorporated corrections into GAM Run S7, as identified at the last GMA 12 meeting. He then incorporated reductions in pumping for each GCD in order for current DFCs in the individual GCDs to be met. This additional GAM Run was labeled S8. After discussion it was determined each GCD representative would return to their Board to review the work and receive direction, then come back together at the next

meeting to discuss next steps. Mr. Box requested GAM Run S7 be made available. After discussion, a motion was made by Mr. Day to make the pumping files for corrected GAM Run S7, and any derivations made, available to the public. Jim Totten seconded the motion. The motion carried unanimously.

15. Public Comment on non-agenda items

Mr. Westbrook invited comment from the public. Natalie Ballew requested that an agenda item be included in the future for updates form the Texas Water Development Board (TWDB). No further comments were offered.

16. Agenda items and Date for next meeting

The agenda items are as referenced above and to be determined. The next meeting date was set for November 15, 2019.

17. Adjourn

The meeting was adjourned at 11:49 pm.

THE ABOVE MINUTES OF THE MEETING OF GROUNDWATER MANAGEMENT AREA 12 HELD ON SEPTEMBER 24, 2019, WERE APPROVED AND ADOPTED BY GMA 12 ON November 15th**, 2019.**

ATTEST:

Mid-East Texas Groundwater Conservation District

Fayette County Groundwater Conservation District

Brazos Valley Groundwater Conservation District

Lost Pines Groundwater Conservation District

Post Oak Savannah Groundwater Conservation District

GROUNDWATER MANAGEMENT AREA 12 MEETING
November 15, 2019 – 10:00 am
Post Oak Savannah GCD Offices
310 East Avenue C
Milano, Texas

GMA 12 Members Present

Gary Westbrook	POSGCD
Jim Totten	LPGCD
David Van Dresar	FCGCD
David Bailey	METGCD
Alan Day	BVGCD

GMA 12 Members Absent
None

Others Present	**Entity**
Elaine Gerren	POSGCD
Bobby Bazan	POSGCD
Doug Box	POSGCD
John Seifert	WSP
Steve Young	Intera
James Bene'	RW Harden
Rebecca Batchelder	Lower Colorado River Authority (LCRA)
Steven Wise	POSGCD
Paul Kirby	DBSA
Blaire Parker	SAWS
Sheril Smith	LPGCD
Natalie Ballew	TWDB
Bill Riley	Self
Andy Donnelly	DBS&A
Steve Box	Environmental Stewardship
Jennifer D. Nations	City of College Station
Ross Kushnereit	Intera

MINUTES

1. **Invocation**
   The invocation was given by Gary Westbrook.

2. **Pledge of Allegiance**
   Alan Day lead the pledges to the flags of the United States and Texas.

3. **Call meeting to order and establish quorum**
   Gary Westbrook, serving as chair for this meeting, called the meeting to order at 10:05 a.m. and noted that all voting members of GMA 12 were present.

4. **Welcome and introductions**
   Each of the five District voting representatives introduced themselves.

5. **Public Comment on Agenda Items**
   Mr. Westbrook invited public comment on agenda items. Steven Wise, Chair of the Post Oak Savannah GCD DFC Committee said it is evident to him that there will be challenges in adopting DFCs during this round of DFC planning. He stated that he hopes all districts will have consideration of their neighbors and have cooperation at all levels. There will be tough decisions to be made in management of the aquifers in GMA 12.

6. **Minutes of September 24, 2019 GMA 12 Meeting**
   The minutes of the May 30, 2019 meeting were presented. After brief discussion, a motion was made by David Van Dresar to approve the minutes. The motion was 2nd by Alan Day. The motion passed unanimously.

7. **Update from Groundwater Conservation Districts (GCDs) of GMA 12 on joint planning, water level monitoring, and compliance with Chapter 36.108, State Water Code**
   Mr. Westbrook stated that the Post Oak Savannah GCD had no update to add to previous meeting report. Alan Day stated that the Brazos Valley GCD had start their Summer measurements and that they were about 60% complete. He also noted recent amendments to BVGCD Rules. David Bailey with the Mid-East Texas GCD stated METGCD will conduct their annual measurements in November and December. Jim Totten stated the Lost Pines GCD Board voted to make the Yegua-Jackson Aquifer non-relevant for this round of joint planning in GMA 12. David Van Dresar noted that the Fayette County GCD Board voted to make the Wilcox Aquifer non-relevant for this round of joint planning in GMA 12. No action was taken.

8. **Review White draft paper on efforts of GCD's of GMA12 in use of Groundwater Availability Modeling and Best Available Science in consideration and adoption of Desired Future Conditions (DFC's) and management of shared Aquifers.**
   Alan Day presented a draft of work completed to date and asked for comments. All agreed it was important to finish this document so that legislators and their staff, as well the general public would have it as a resource. Mr. Day noted the length of the current draft and difficulty to adequately cover this topic with the necessary details in one page. Mr. Totten suggested finishing the current document with necessary details and crafting an executive summary to fulfill the need to have a concise document. Then both documents could be used. It was agreed all would consider the draft document and send any comments by December 15, 2019, to Mr. Day who would incorporate the comments into the document and return to the GMA for discussion.

9. **Discussion on expressions of Desired Future Conditions (DFC's) and compatibility between GCD's in GMA 12**
   Mr. Westbrook noted this item would be opened with agenda items 11-13.

10. **Discussion of comments received from stakeholders**
    No new comments were received from stakeholders since the last GMA 12 meeting. After discussion, all agreed to be sure the current GMA 12 Stakeholder Submission form, entitled, "Proposed Desired Future Condition(s) for Aquifer(s) in GMA 12" was posted to their websites.

11. **Discussion and instruction to consultants concerning Joint Planning in GMA 12 for the Yegua-Jackson Aquifer**
    Items # 11-13 were opened together. This presentation was given by members of the GMA 12 Consultant team.

12. **Discussion and instruction to consultants concerning Joint Planning in GMA 12 for the Brazos River Alluvium Aquifer**
    This presentation was given by members of the GMA 12 Consultant team. Differences between the Brazos River Alluvium GAM and the new Central Queen City-Sparta/Carrizo-Wilcox GAM were discussed along with differences in accuracies. Steve Box inquired as to accounting of river cells. Ross Kushnereit of Intera clarified surface water features were included in layer 1. After discussion it was agreed by Mr. Day and Mr. Westbrook to continue to work with their consultants and TWDB to make necessary corrections to yield more reliable information for joint planning.

13. **Evaluation and discussion of future pumping scenarios using the Sparta/Queen City/Carrizo-Wilcox GAM and results, including predicted water levels and water budgets**
    This presentation was given by members of the GMA 12 Consultant team. Questions and discussion was encouraged during this presentation. Consultants noted when considering results of this work, there are choices to make moving forward. Those choices deal with the uncertainty of the predictions and the allowances adopted into DFC statements, improvements to hydraulic properties of the GAM, and effects on conditions at the boundaries of the GAM. Mr. Westbrook clarified and echoed the need for flexibility to add accuracy as it is accepted not all pumping included in the future predictive scenarios will take place in the areas and in the amounts anticipated. John Seifert asked what kinds of DFCs and variations would be acceptable to the GCDs. Mr. Day noted BVGCD asked how other GCDs felt about the PS9 GAM run for establishing DFCs. Mr. Westbrook noted concerns with the values for the Carrizo and Sparta aquifers and stated his directors are concerned about increases in values for DFCs. Mr. Wise echoed these concerns and stated the POSGCD DFC Committee had a very high preference to avoiding any increases in drawdowns as DFCs. Mr. Day stated he did not believe BVGCD was contributing to impacts in the Carrizo and noted most of the pumping in the simulations was in POSGCD. He also noted the need for flexibility as he did not feel like there was enough information on when permitted production in LPGCD would realized. Mr. Day assured everyone that BVGCD would work cooperatively with all GCDs in GMA 12. Mr. Wise addressed the possibility of increasing values of DFCs and asked if DFCs continue to be changed when would the GMA members take a stance?
    David Van Dresar stated that reductions and restrictions on production in FCGCD as outlined in the review of PS9 would not be acceptable as FCGCD is dependent on the availability of that water. David Bailey questioned if these restrictions in PS9 were realistic. Mr. Westbrook stated PS9 was presented at the request of POSGCD to begin earnest discussions about the process and projected impacts on the aquifers across the GMA. Steve

Young reminded the GMA 12 representatives of the need to evaluate the GAM in terms of accuracy of hydraulic conditions in their own GCDs.

James Bene inquired about the concerns of DFC numbers increasing or decreasing, and noted the DFC of 318 feet for the Simsboro for POSGCD was based on an evaluation from a now obsolete model, and that the GMA now has improved data and an improved model to work with.

Steve Box expressed concerns about the DFCs being based on demands and how aquifers would perform. He asked how available water would be accounted for with an increase in MAG.

Mr. Westbrook encouraged each GCD to consider the results of each of these GAM runs with respect to the impacts on their aquifers and the shallow parts of those aquifers in each of their districts, as well as to producers who depend on these aquifers.

Mr. Box reminded of the need to consider in stream flows in these GAM runs. Mr. Westbrook then reminded of the need to consider the impacts of the GAM runs from the new GAM as compared to previous GAM runs from the previous GAM and determine whether different results indicate a similar aquifer condition. Mr. Day noted that BVGCD was okay with S7 results for establishing DFCs. Jim Totten stated LPGCD desired no change in DFCs at this time.

It was agreed all would return to their GCD boards to consider the new information and discuss further at the next GMA 12 meeting.

14. Update from Texas Water Development Board

Natalie Ballew of the Texas Water Development Board (TWDB) noted that Rebecca Storm had been named as new Groundwater Monitoring Director. She also stated the current GMA 12 Stakeholder Submission form, entitled, "Proposed Desired Future Condition(s) for Aquifer(s) in GMA 12" could be posted to the TWDB website page dedicated to GMA 12. Mr. Westbrook agreed to forward that document. Ms. Ballew also noted the State Water Plan subsequent to the one now being prepared would extend to the year 2080, and that GMAs across the state might give some consideration to developing DFCs through the year 2080.

15. Public Comment on non-agenda items

Mr. Westbrook invited comment from the public. No comment was offered.

16. **Agenda items and Date for next meeting**

17. Adjourn

The meeting was adjourned at 12:22 pm.

THE ABOVE MINUTES OF THE MEETING OF GROUNDWATER MANAGEMENT AREA 12 HELD ON NOVEMBER 15TH, 2019, WERE APPROVED AND ADOPTED BY GMA 12 ON _____, 2020.

_____

ATTEST:

Mid-East Texas Groundwater Conservation District

Fayette County Groundwater Conservation District

Brazos Valley Groundwater Conservation District

Lost Pines Groundwater Conservation District

Post Oak Savannah Groundwater Conservation District

GROUNDWATER MANAGEMENT AREA 12 MEETING
January 29, 2020 – 10:00 am
Post Oak Savannah GCD Offices
310 East Avenue C
Milano, Texas

GMA 12 Members Present

Gary Westbrook	POSGCD
Jim Totten	LPGCD
David Van Dresar	FCGCD
David Bailey	METGCD
Alan Day	BVGCD

GMA 12 Members Absent
None

Others Present	**Entity**
Elaine Gerren	POSGCD
Bobby Bazan	POSGCD
Doug Box	POSGCD
John Seifert	WSP
Steve Young	Intera
James Bene'	RW Harden
Rebecca Batchelder	Lower Colorado River Authority (LCRA)
Becky Goetsch	POSGCD
Jaclyn Robertson	TWRI
Paul Kirby	DBSA
Blaire Parker	SAWS
Natalie Ballew	TWDB
Bill Riley	Self
Andy Donnelly	DBS&A
Steve Box	Environmental Stewardship
Shan Rutherford	Terrill & Waldrop
Barbara Boulware Wells	The Knight Law Firm
Larry French	TWDB

MINUTES

1. **Invocation**
   The invocation was given by David Van Dresar.

2. **Pledge of Allegiance**
   Alan Day lead the pledges to the flags of the United States and Texas.

3. **Call meeting to order and establish quorum**
   Gary Westbrook, serving as chair for this meeting, called the meeting to order at 10:05 a.m. and noted that all voting members of GMA 12 were present.

4. **Welcome and introductions**
   Mr. Westbrook welcomed everyone to the meeting and encouraged them to sign in. Each of the five District voting representatives introduced themselves.

5. **Public Comment on Agenda Items**
   Mr. Westbrook reminded everyone the GMA encouraged comment and questions on each item as it is opened and discussed, but also would invite public comment on agenda items at this time if anyone desired. No Public Comment was given.

6. **Minutes of September 24, 2019 GMA 12 Meeting**
   The minutes of the September 24, 2019 meeting were presented. After brief discussion, a motion was made by Alan Day to approve the minutes. The motion was 2nd by David Van Dresar. The motion passed unanimously.

7. **Update from Groundwater Conservation Districts (GCDs) of GMA 12 on joint planning, water level monitoring, and compliance with Chapter 36.108, State Water Code**
   David Bailey with the Mid-East Texas GCD provided a handout of recent work performed by METGCD on DFC compliance. This document identified issues in the Sparta aquifer. He stated that the TWDB had monitored wells in METGCD, but there were not enough wells for good coverage and evaluation in the Sparta, but that more wells will be added soon and they will evaluate again as more information is available. Alan Day stated that the Brazos Valley GCD reviewed their most recent compliance report in May 2019, and would have it updated in May 2020. He also noted that according to their rules this only has to be done every three years but that they do it every year. Gary Westbrook stated that the Post Oak Savannah had given their report to their board in August 2019, and the POSGCD DFC Committee reviewed more recent information on compliance in January 2020. He stated this information was posted to the District's website. He asked Bobby Bazan Water Resource Manager for the District for an update on monitoring. Bobby Bazan stated that the District had 241 monitoring wells at the end of 2019, and that all wells are monitored at least annually, with approximately 30 wells having transducers installed for daily measurements. He also stated POSGCD has updated the production reporting to include an online submission. We will start doing some production flow meter verification in February to eventually verify each permitted well. Alan Day questioned the accuracy of the well intel devices POSGCD was using in some wells. Bobby Bazan stated that they are accurate but did require some work of calibration and that manual measurements are still being done as a verification. David Van Dresar stated that the Fayette County GCD had completed their monitoring and are compiling the information on water levels to bring to the FCGCD Board in March. Jim Totten stated the Lost Pines GCD will begin their spring measurements soon. No action was taken.

8. **Review and possible adoption of White draft paper on efforts of GCD's of GMA12 in use of Groundwater Availability Modeling and Best Available Science in consideration and adoption of Desired Future Conditions (DFC's) and management of shared Aquifers.**
Alan Day requested that this item be moved to the end of the Agenda. After returning to this item, Mr. Day presented the paper for discussion. After discussion, and minor amendments, Mr. Day moved to approve the amended document for publishing. Mr. Totten seconded. The motion passed unanimously. Mr. Van Dresar moved to approve the amended Executive Summary of the paper for publishing. Mr. Bailey seconded. The motion passed unanimously.

9. **Discussion on expressions of Desired Future Conditions (DFC's) and compatibility between GCD's in GMA 12**
Mr. Westbrook stated that this will be combined with later agenda item for discussion. No action was taken.

10. **Discussion of comments received from stakeholders**
Mr. Westbrook asked if any of the districts had received any new comments from stakeholders since the last GMA 12 meeting. All agreed there had been no new submissions received.

11. **Discussion and instruction to consultants concerning Joint Planning in GMA 12 for the Yegua-Jackson Aquifer**
Steve Young with Intera gave a slide presentation. After discussion no action was taken.

12. **Discussion and instruction to consultants concerning Joint Planning in GMA 12 for the Brazos River Alluvium Aquifer**
Steve Young with Intera gave a slide presentation. Members of the GMA briefly discussed issues with the MAG derived from the last round of DFCs, as well as possible solutions to these issues. Gary Westbrook asked Natalie Ballew and Larry French if they had any comments to add. There were none. It was agreed that consultants from BVGCD and POSGCD would continue to work to find solutions to consider. No action was taken.

13. **Evaluation and discussion of future pumping scenarios using the Sparta/Queen City/Carrizo-Wilcox GAM and results, including predicted water levels and water budgets**
Mid- East Texas stated that they are okay with S7 but were concerned with S9 due to the reduction in the MAG and that the Sparta was their main concern. Brazos Valley GCD met in January 2020 and agreed to allow the new GAM to determine the DFC's and that S7 was preferred by them, but concerned with the Simsboro smaller DFC's. The Brazos Valley GCD Board is set to discuss in February. Post Oak Savannah GCD stated that they prefer modifications similar to S9 GAM run, and had concerns with the Carrizo and Sparta, and were sensitive that this caused difficulty for Mid-East Texas and Fayette County GCD. Fayette County stated that they prefer S7 due to issues with the reduction of the MAG in the Sparta. Lost Pines stated that they need more discussion with their DFC Committee, but prefer S7, and that they could live with the reduction in the Carrizo. After discussion it was agreed to come back and discuss again at a later GMA 12 meeting after each district had a chance to consider further.

14. **Discuss requirements of Chapter 36.108(d) in adopting Desired Future Conditions: hydrological conditions, including for each aquifer in the management area the total estimated recoverable storage as provided by the executive administrator, and the average annual recharge, inflows, and discharge.**
Gary Westbrook introduced Andy Donnelly and informed the members that the presentation was already on the Post Oak Savannah GCD website. The presentation provided updates based on the

new GAM. Questions of clarification and discussion on the presentation was held. It was noted the member GCDs were required to include much of this information in their management plans.

15. **Public Comment on non-agenda items**
Mr. Westbrook invited comment from the public. No comment was offered.

16. **Update from Texas Water Development Board**
Natalie Ballew of the Texas Water Development Board (TWDB)said there were tools for socio-economic evaluations. Mr. Totten said this needed to be brought back to the next GMA 12 meeting for further discussion.

17. **Agenda items and Date for next meeting**
The next GMA 12 meeting will be scheduled for March 26, 2020. Agenda items will include unresolved items from this agenda as well as continuation of consideration of the nine factors included in Section 36.108(d) of the Texas Water Code, including aquifer uses or conditions, supply needs and management strategies, subsidence impacts, and private property rights.

18. **Adjourn**
The meeting was adjourned at 12:43 pm.

THE ABOVE MINUTES OF THE MEETING OF GROUNDWATER MANAGEMENT AREA 12 HELD ON JANUARY 29, 2020, WERE APPROVED AND ADOPTED BY GMA 12 ON July 24**, 2020.**

ATTEST:

Mid-East Texas Groundwater Conservation District

Fayette County Groundwater Conservation District

Brazos Valley Groundwater Conservation District

Lost Pines Groundwater Conservation District

Post Oak ~~Savannah~~ Groundwater Conservation District

GROUNDWATER MANAGEMENT AREA 12 MEETING
This meeting was held virtually and the meeting recording may be viewed at https://posgcd.org/gma-12-agendas-minutes/

July 24, 2020 – 10:00 am

GMA 12 Members Present

Gary Westbrook	POSGCD
Jim Totten	LPGCD
David Van Dresar	FCGCD
David Bailey	METGCD
Alan Day	BVGCD

GMA 12 Members Absent

None

Others Present	**Entity**
Doug Box	POSGCD
Bobby Bazan	POSGCD
John Seifert	WSP
Steve Young	Intera
Darren Thompson	SAWS
Rebecca Batchelder	Lower Colorado River Authority (LCRA)
David Stratta	BVGCD
Blaire Parker	SAWS
Natalie Ballew	TWDB
Megan Haas	BVGCD
Andy Donnelly	DBS&A
Steve Box	Environmental Stewardship
Robert Bradley	TWDB
James Beach	WSP
Larry French	TWDB
Bob Harden	Harden
Steven Siebert	SAWS
Jayson Barfknecht	City of Bryan
Cindy Ridgeway	TWDB
Shirley Wade	TWDB
Matt Uliana	Intera
Lyn Clancy	LCRA

MINUTES

1. **Invocation**
   The invocation was given by David Bailey.

2. **Pledge of Allegiance**
   David Van Dresar lead the pledges to the flags of the United States and Texas.

3. **Call meeting to order and establish quorum**
   Gary Westbrook, serving as chair for this meeting, called the meeting to order at 10:03 a.m. and noted that all voting members of GMA 12 were present online.

4. **Welcome and introductions**
   Mr. Westbrook welcomed everyone to the virtual meeting and thanked them for their attendance.

5. **Public Comment on Agenda Items**
   Mr. Westbrook reminded everyone the GMA encouraged comment and questions on each item and invited public comment on agenda items at this time. No Public Comment was offered.

6. **Minutes of January 29, 2020 Groundwater Management Area (GMA 12) Meeting**
   Mr. Westbrook asked for consideration of the minutes of the January 29, 2020 meeting. After brief discussion, a motion was made by David Van Dresar to approve the minutes. The motion was 2nd by Jim Totten. Mr. Westbrook noted that due to the nature of virtual meetings it might be more efficient to ask for dissenting votes than to ask for verbal votes or perform role call votes, so he would proceed in that manner unless there was a desire from the voting members to do otherwise. All agreed. Mr. Westbrook asked for dissenting votes. There were none. The motion passed unanimously.

7. **Update from Groundwater Conservation Districts (GCDs) of GMA 12 on joint planning, water level monitoring, and compliance with Chapter 36.108, State Water Code**
   Mr. Westbrook reported POSGCD had completed its early Spring water level measurements and some additional measurements, and was now evaluating the monitoring wells in its network for information quality assurance and control (QA/QC).
   Mr. Day reported BVGCD had finished its second round of water level measurements and is evaluating certain areas for the addition of wells, as well as evaluating information of certain wells.
   Mr. Bailey reported adding monitor wells in the Simsboro, Calvert Bluff, and Hooper formations.
   Mr. Totten reported 95% completion of Spring measurements being completed and performing QA/QC on information of monitoring wells.
   Mr. Van Dresar reported completion of measurements prior to the pandemic with additional work to resume in the Fall.

8. **Discussion on expressions of Desired Future Conditions (DFC's) and compatibility between GCD's in GMA 12**
   Mr. Westbrook stated that this is a constant agenda item and there was no specific information reported on this item.

9. **Discussion of comments received from stakeholders**

Mr. Westbrook asked if any of the districts had received any new comments from stakeholders since the last GMA 12 meeting. All agreed there had been no new submissions received. Mr. Westbrook reminded all that the form created specifically for submitting comments to GMA 12 could be easily accessed on the posgcd.org website at the top of the GMA 12 page.

10. **Evaluation and discussion of future pumping scenarios using the Sparta/Queen City/Carrizo-Wilcox GAM and results, including predicted water levels and water budgets, and instruction to consultants concerning Joint Planning in GMA 12**

Mr. Westbrook introduced this item and reminded that GMA 12 consultants had been instructed to consider possible improvements to the GAM where localized information might prove useful to improve accuracy in the GAM. He invited Dr. Steve Young with Intera to report on communications with the Texas Water Development Board (TWDB) on this subject. Dr. Young gave a presentation entitled, "Proposed Modifications to the Central Portion of the Sparta/Queen City/Carrizo-Wilcox GAM". He discussed differences of the results of actual production and monitoring versus GAM predictions in the area of the Vista Ridge well field, as well as possible improvements to the GAM in that area. He also addressed the comments received from TWDB on the process of improvements to the GAM in that area. Mr. Westbrook invited Larry French of TWDB to provide comment and discussion on required steps to complete this task. Mr. Westbrook then asked if anyone else on the meeting had any questions. No questions were offered. After questions and discussion from GMA 12 representatives, Mr. Day moved to submit the new information and a request for improvements and updates to the GAM to TWDB. Mr. Totten seconded the motion. Mr. Westbrook asked for discussion. With none offered he called for the vote and asked if there were any GMA 12 representatives who with a dissenting vote. None were offered. The motion passed unanimously.

11. **Discuss requirements of Chapter 36.108(d) in adopting Desired Future Conditions:**

    a. **aquifer uses or conditions within the management area, including conditions that differ substantially from one geographic area to another;**

Mr. Westbrook invited Andy Donnelly of DBS&A to present information on this agenda item for consideration by the GMA. Mr. Donnelly gave a presentation entitled: "Aquifer Uses and Conditions Consideration Discussion." Mr. Westbrook invited questions and discussion from the GMA 12 representatives.

    b. the water supply needs and water management strategies included in the state water plan;

Mr. Westbrook invited Steve Young of Intera to present information on this agenda item for consideration by the GMA. Dr. Young gave a presentation entitled: "GMA 12: Needs and Strategies." Mr. Westbrook invited questions and discussion from the GMA 12 representatives.

    c. the impact on subsidence.

Mr. Westbrook invited Matt Uliana of Intera to present information on this agenda item for consideration by the GMA. Mr. Uliana gave a presentation entitled: "Evaluation of the Potential Impact of Subsidence in GMA 12." Mr. Westbrook invited questions and discussion from the GMA 12 representatives.

12. **Public Comment on non-agenda items**

Mr. Westbrook invited comment from the public. No comment was offered.

13. **Update from Texas Water Development Board**

Natalie Ballew of the Texas Water Development Board (TWDB) reported TWDB had recently updated the guidance documents and submission checklist for the GMA process and now includes information for non-relevant aquifers, and these documents are available on the TWDB website. She also reported new educational videos available on the TWDB website under "Texas Water News Room."

14. **Agenda items and Date for next meeting**
The next GMA 12 meeting will be scheduled for late August-September, 2020. Agenda items will include continuation of discussion of improvements to the GAM, any unresolved items from this agenda, and continuation of consideration of the nine factors included in Section 36.108(d) of the Texas Water Code.

15. **Adjourn**
The meeting was adjourned at 11:20 am.

THE ABOVE MINUTES OF THE MEETING OF GROUNDWATER MANAGEMENT AREA 12 HELD ON JULY 24, 2020, WERE APPROVED AND ADOPTED BY GMA 12 ON SEPTEMBER 18, 2020.

ATTEST:

Mid-East Texas Groundwater Conservation District

Fayette County Groundwater Conservation District

Brazos Valley Groundwater Conservation District

Lost Pines Groundwater Conservation District

Post Oak Savannah Groundwater Conservation District

GROUNDWATER MANAGEMENT AREA 12 MEETING
This meeting was held virtually and the meeting recording may be viewed at https://posgcd.org/gma-12-agendas-minutes/

September 18, 2020 – 10:00 am

GMA 12 Members Present

Gary Westbrook	POSGCD
Jim Totten	LPGCD
David Van Dresar	FCGCD
David Bailey	METGCD
Alan Day	BVGCD

GMA 12 Members Absent
None

Others Present	**Entity**
+12546976256	
+15124613179	
+19792503221	
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Aaron Abel	aaron.abel@brazos.org
Amy Muttoni	amy.muttoni@brazos.org
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Bobby Bazan	bbazan@posgcd.org
Darren Thompson	dthompson@saws.org
David Wheelock	david.wheelock@lcra.org
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James Beach	james.beach@wsp.com
Jean Perez	
Jennifer Nations	jnations@cstx.gov
Jim Mathews	
John Hofmann	john.hofmann@lcra.org
Larry French	Larry.French@twdb.texas.gov
Leah Martinsson	julia@texasgroundwater.org

Lyn Clancy	lclancy@lcra.org
Monica Masters	monica.masters@lcra.org
Monique Norman	
Natalie Ballew	TWDB
Rebecca Batchelder	rebecca.batchelder@lcra.org
Robert Bradley	robert.bradley@twdb.texas.gov
Ron	
Ron Anderson	ron.anderson@lcra.org
Shan Rutherford	
Steve Box	Steve.Box@att.net
Steve Young	syoung@intera.com
Steven Siebert	SAWS
Tom Fenstemaker	tom.fenstemaker@rwharden.com
Vanessa Puig-Williams	vpuigwilliams@edf.org
William Seifert	john@wjs-groundwater.cc
Yujuin Yang	yujuin.yang@brazos.org

MINUTES

1. **Invocation**
   The invocation was given by Alan Day.

2. **Pledge of Allegiance**
   Gary Westbrook lead the pledges to the flags of the United States and Texas.

3. **Call meeting to order and establish quorum**
   Gary Westbrook, serving as chair for this meeting, called the meeting to order at 10:04 a.m. and noted that all voting members of GMA 12 were present online.

4. **Welcome and introductions**
   Mr. Westbrook welcomed everyone to the virtual meeting and thanked them for their attendance.

5. **Public Comment on Agenda Items**
   Mr. Westbrook reminded everyone the GMA encouraged comment and questions on each item and invited public comment on agenda items at this time.
   Andy Wier requested the members of GMA 12 to consider landowner's rights and environmental impacts throughout the process of adopting DFCs.
   Steve Box stated he appreciated being able to ask questions and comment during presentations as they are given.

6. **Minutes of July 24, 2020 Groundwater Management Area (GMA 12) Meeting**

Mr. Westbrook asked for consideration of the minutes of the January 29, 2020 meeting. After brief discussion, a motion was made by Alan Day to approve the minutes as presented. The motion was 2nd by David Van Dresar. Mr. Westbrook noted that due to the nature of virtual meetings it might be more efficient to ask for dissenting votes than to ask for verbal votes or perform role call votes, so he would proceed in that manner unless there was a desire from the voting members to do otherwise. All agreed. Mr. Westbrook asked for dissenting votes. There were none. The motion passed unanimously.

7. **Report from Lower Colorado River Authority on Groundwater – Surface Water Study**
Mr. Westbrook invited Rebecca Batchelder with LCRA and Tom Fenstemaker with R.W. Harden and Assoc. to give this report. After brief discussion, including questions from GMA members as well as those in attendance, the GMA 12 members thanked Ms. Batchelder and Mr. Fenstemaker for their report. No action was taken.

8. **Update from Groundwater Conservation Districts (GCDs) of GMA 12 on joint planning, water level monitoring, and compliance with Chapter 36.108, State Water Code**
Mr. Westbrook invited Steve Young of Intera to give a report on changes in water levels in the Carrizo and Simsboro Aquifers since the beginning of pumping in the Vista Ridge project, and noted this report had been presented to the POSGCD Board at their regular Board meeting on September 8, 2020. He also noted that this and all presentations from the GMA 12 Meeting would be posted to the POSGCD website. Following brief discussion, Mr. Westbrook also noted POSGCD was engaged in their water level measurements for the Fall. Mr. Day reported BVGCD was approximately 60% complete with its late Summer round of water level measurements.
No further reports were given.

9. **Discussion on expressions of Desired Future Conditions (DFC's) and compatibility between GCD's in GMA 12**
Mr. Westbrook stated that this is a constant agenda item and there was no specific information reported on this item.

10. **Discussion of comments received from stakeholders**
Mr. Westbrook asked if any of the districts had received any new comments from stakeholders since the last GMA 12 meeting. All agreed there had been no new submissions received. Mr. Westbrook reminded all that the form created specifically for submitting comments to GMA 12 could be easily accessed on the posgcd.org website at the top of the GMA 12 page.

11. **Consider update and process for updating the Sparta/Queen City/Carrizo-Wilcox Groundwater Availability Model (GAM)**
Mr. Westbrook reported that following the actions taken at the July 24, 2020 GMA 12 Meeting, the GMA 12 consultants had conferred and draft responses to requests were sent to the Texas Water Development Board (TWDB) as needed for the purpose of making minor updates to the GAM in specific areas where sufficient data existed. Mr. Westbrook noted another response had been recived from TWDB for several additional clarifications. He also reminded all that the process to update the GAM would be a public process and invited Larry French of TWDB to comment. Mr. French agreed, and stated TWDB would be prepared to move forward pending receiving of the additional information requested. Mr. Day asked if this information was available to the public. Mr. Westbrook answered that it was. Mr. Day then moved that GMA 12 move proceed and complete this work promptly. Mr. Van Dresar seconded the motion. Mr. Westbrook asked for dissenting votes. There were none. The motion passed unanimously.

12. **Evaluation and discussion of future pumping scenarios using the Sparta/Queen City/Carrizo-Wilcox GAM and results, including predicted water levels and water budgets, and instruction to consultants concerning Joint**

Planning in GMA 12
Mr. Westbrook noted there was nothing to consider on this item at this meeting.

13. **Discuss requirements of Chapter 36.108(d) in adopting Desired Future Conditions:**
    a. **other environmental impacts, including impacts on spring flow and other interactions between groundwater and surface water;**

Mr. Westbrook invited Dr. Steve Young of Intera to present information on this agenda item for consideration by the GMA. Dr. Young gave a presentation entitled: "Consideration for Environmental Impacts." Mr. Westbrook invited questions and discussion from the GMA 12 representatives, and then others attending the meeting. Steve Box noted challenges in this process and encouraged GMA 12 members to put steps in place to protect environmental flows. After a brief time of questions and answers, no action was taken.

b. the impact on the interests and rights in private property, including ownership and the rights of management area landowners and their lessees and assigns in groundwater as recognized under Section 36.002;

Mr. Westbrook invited Monique Norman to present information on this agenda item for consideration by the GMA. Ms. Norman gave a presentation entitled: "Consideration of the impact on the interests and rights in private property in the adoption of Desired Future Conditions." Mr. Westbrook invited questions and discussion from the GMA 12 representatives, and then others attending the meeting.
Mr. Box asked about additional discussions of these topics at GMA 12 meetings. Ms. Norman stated this does not preclude additional discussions. Mr. Westbrook stated this is a beginning point for discussions. Mr. Totten advised that some discussions and considerations should be more appropriate to occur at the GCD level instead of the GMA as they involved individual GCD management of the resources. He stated DFCs do not drive impacts, but rather how DFC are implemented in each GCD determines impacts on property rights. All GMA representatives voiced agreement. After a brief time of questions and answers, no action was taken.

14. **Public Comment on non-agenda items**
Mr. Westbrook invited comment from the public.

Steve Box inquired about the timeline and previous presentations given to the GMA. Mr. Westbrook and Mr. Day answered these questions and referred Mr. Box to the website for review of previous presentations.

Andy Wier encouraged the GCDs of GMA 12 to move to a method of monitoring water levels which would be consistent across the GMA.

15. **Update from Texas Water Development Board**
Natalie Ballew of the Texas Water Development Board (TWDB) reported "nothing new" and thanked the GMA representatives for their efforts.

16. **Agenda items and Date for next meeting**
Mr. Westbrook asked Mr. French about the timeline for completion of updates to the GAM. Mr. French estimated the entire process would be complete in two months. Mr. Day asked if the GMA should move forward with consideration of GAM runs using an updated GAM in anticipation of the update being approved since the time for completion of this round of joint planning was growing short. After discussion it was agreed to consider GAM Runs using an updated GAM at the next GMA meeting. It was also agreed the next GMA 12 meeting will be scheduled for late October 22, 2020. Additional agenda items will include continuation of consideration of the nine factors included in Section 36.108(d) of the Texas Water Code.

17. Adjourn

The meeting was adjourned at 1:02 pm.

THE ABOVE MINUTES OF THE MEETING OF GROUNDWATER MANAGEMENT AREA 12 HELD ON SEPTEMBER 18, 2020, WERE APPROVED AND ADOPTED BY GMA 12 ON OCTOBER 22, 2020.

ATTEST:

Mid-East Texas Groundwater Conservation District

Fayette County Groundwater Conservation District

Brazos Valley Groundwater Conservation District

Lost Pines Groundwater Conservation District

Post Oak Savannah Groundwater Conservation District

GROUNDWATER MANAGEMENT AREA 12 MEETING
This meeting was held virtually and the meeting recording may be viewed at
https://posgcd.org/gma-12-agendas-minutes/

October 22, 2020 – 10:00 am

GMA 12 Members Present

Gary Westbrook	POSGCD
Jim Totten	LPGCD
David Van Dresar	FCGCD
David Bailey	METGCD
Alan Day	BVGCD

GMA 12 Members Absent

None

Others Present	Entity
Alan Day	Brazos Valley GCD
Amy Muttoni	
Andy Donnelly	GEO Logic
Andy Wier	
David Bailey	Mid-East Texas GCD
Doug Box	Post Oak Savannah GCD
Elaine Gerren	Post Oak Savannah GCD
Gary Westbrook	Post Oak Savannah GCD
George Rice	Post Oak Savannah GCD
JAMES BENE	R.W. Harden
Jean Perez	
Jennifer White	TWDB
Kathleen Jackson	TWDB
Larry French	TWDB
Liz Ferry	R.W. Harden
Natalie Ballew	TWDB
Robert Bradley	TWDB
Steve Box	Self
William Seifert	WJS Groundwater
Steve young	Intera

MINUTES

1. **Invocation**
   The invocation was given by David Bailey.

2. **Pledge of Allegiance**
   Jim Totten led the pledges to the flags of the United States and Texas.

3. **Call meeting to order and establish quorum**
   Gary Westbrook, serving as chair for this meeting, called the meeting to order at 10:00 a.m. and noted that all voting members of GMA 12 were present online.

4. **Welcome and introductions**
   Mr. Westbrook welcomed everyone to the virtual meeting and thanked them for their attendance.

5. **Public Comment on Agenda Items**
   Mr. Westbrook reminded everyone the GMA encouraged comment and questions on each item and invited public comment on agenda items at this time. No Public comment was offered.

6. **Minutes of September 18, 2020 Groundwater Management Area (GMA 12) Meeting**
   Mr. Westbrook asked for consideration of the minutes of the September 18, 2020 meeting. After brief discussion, a motion was made by Alan Day to approve the minutes as presented. The motion was 2nd by David Van Dresar. Mr. Westbrook noted that due to the nature of virtual meetings it might be more efficient to ask for dissenting votes than to ask for verbal votes or perform roll call votes, so he would proceed in that manner unless there was a desire from the voting members to do otherwise. All agreed. Mr. Westbrook asked for dissenting votes. There were none. The motion passed unanimously.

7. **Update from Groundwater Conservation Districts (GCDs) of GMA 12 on joint planning, water level monitoring, and compliance with Chapter 36.108, State Water Code**
   Mr. Westbrook invited Steve Young of Intera to give a report on changes in water levels in the Carrizo and Simsboro Aquifers since the beginning of pumping in the Vista Ridge project, and noted this report had been presented to the POSGCD Board at their regular Board meeting on September 8, 2020. He also noted that this and all presentations from the GMA 12 Meeting would be posted to the POSGCD website. Following brief discussion, Mr. Westbrook also noted POSGCD was engaged in their water level measurements for the Fall and was 1/3 of the way compete. Mr. Day reported BVGCD has approximately164 wells to measure and has measured 155 to date and will be complete with its late Summer round of water level measurements soon. Mid-East Texas will do their measurements in November and December and Jim Totten will begin at the end of the month. Fayette county is installing static well monitoring systems and will begin fall measurements next month.

8. **Discussion on expressions of Desired Future Conditions (DFC's) and compatibility between GCD's in GMA 12**
   Mr. Westbrook stated that this is a constant agenda item and there was no specific information reported on this item. Alan Day has asked to hear from all Districts where we are going. Brazos valley will maintain their current position. POSGCD will ??? Jim Totten said they will implement their DFS with drawdown areas

where their exempt wells are location and looking at district wide averages as well. Fayette county will continue the same as in the past as well as Mid East Texas also.

9. **Discussion of comments received from stakeholders**
   Mr. Westbrook asked if any of the districts had received any new comments from stakeholders since the last GMA 12 meeting. All agreed there had been no new submissions received. Steve Box requested to speak and his sound was not verifiable. He was asked to call in to try to get him later in the meeting.

10. **Update on progress for updating the Sparta/Queen City/Carrizo-Wilcox Groundwater Availability Model (GAM)**
    Mr. Westbrook asked Larry French to provide an update on this item. He stated they were able to incorporate information on the Vista Ridge information to their website available for public comment and will ??? Steve Young stated that the TWDB has been very responsive. Mr. French stated that they are commitment to make sure the models have the best data available. GW said that the Post Oak Savannah GCD has funds in their budget available for the gam work and improvement.

11. **Evaluation and discussion of future pumping scenarios using the Sparta/Queen City/Carrizo-Wilcox GAM and results, including predicted water levels and water budgets, and instruction to consultants concerning Joint Planning in GMA 12**
    Mr. Westbrook turned this item over to Steve Young for a presentation titled S-7 Results for GAM 2018 and GAM 2020. Comment was given by John Siefert Stating this model is valuable throughout the entire GMA. Gary Westbrook stating that we are trying to keep the science updated to make the model better. No further comment was made.

12. **Discuss requirements of Chapter 36.108(d) in adopting Desired Future Conditions:**
    a. **other socioeconomic impacts reasonably expected to occur;**
       Mr. Westbrook turned the meeting over to John Siefert with a presentation on socioeconomic impacts reasonably expected to occur. Comment from David Bailey stating that the Big Brown plant no longer exist. Jim Totten asked if he could provide a county by county breakdown. John Siefert stated that there is a county by county breakdown in the graphs. Gary Westbrook offered comment to any participants. None was offered.

    b. **any other information relevant to the specific desired future conditions**
       Mr. Westbrook invited questions and discussion from the GMA 12 representatives, and then others attending the meeting. No comment was offered.

Steve Box was able to join the meeting to discuss Item # 9 stating he is finishing up his report on environmental impacts and request to have discussion on this during the next meeting.

13. **Public Comment on non-agenda items**
    Mr. Westbrook invited comment from the public. No public comment was offered.

14. **Update from Texas Water Development Board**
    Kathleen Jackson of the Texas Water Development Board (TWDB) thanked the committee and the District's for all their efforts in obtaining measurements and providing data and stepping forth and investing in getting additional data to update the models for making the best decisions moving forward. She provided and update on State Flood Planning and said they have been given the charge to participate in the first flood

14. Update from Texas Water Development Board

Director Kathleen Jackson of the Texas Water Development Board (TWDB) thanked the GMA and the Districts for all their efforts in obtaining measurements and providing data and stepping forth and investing in getting additional data to update the models for making the best decisions moving forward. She then provided an update on State Flood Planning. She is excited that the information and science data is coming together. Gary Westbrook thanked the TWDB for all of their support. Natalie Ballew stated that Andy Weinberg had been hired. Alan Day asked Larry French for a schedule for TWDB to review comments received on the GAM update and finish the process for final adoption. Mr. French responded the process could be completed during the November-December time frame, and possibly extend into January.

15. Agenda items and Date for next meeting

Mr. Westbrook asked if a meeting would be needed before January, 2021. It was agreed the next GMA 12 meeting will be scheduled for mid-December, 2020. Agenda items will include standard items with any other information relevant to specific DFCs, as well as comments from stakeholders. Steve Box stated he would have comments to the GMA during the next two weeks. James Bene stated that he understands that Post Oak Savannah GCD is not happy with the simulation model predictions and he is suggesting that a December meeting will be good to consider substantial changes to the pumping model. Gary Westbrook suggested that Mr. Bene should address this with the Distric first, then at the GMA. Mr. Box stated that he thought a December meeting would be appropriate so that his data can be considered.

16. Adjourn

The meeting was adjourned at 11:27 pm.

THE ABOVE MINUTES OF THE MEETING OF GROUNDWATER MANAGEMENT AREA 12 HELD ON OCTOBER 22, 2020, WERE APPROVED AND ADOPTED BY GMA 12 ON DECEMBER 10, 2020.

ATTEST:

Mid-East Texas Groundwater Conservation District

Fayette County Groundwater Conservation District

Brazos Valley Groundwater Conservation District

Lost Pines Groundwater Conservation District

Post Oak Savannah Groundwater Conservation District

GROUNDWATER MANAGEMENT AREA 12 MEETING
This meeting was held virtually and the meeting recording may be viewed at
https://posgcd.org/gma-12-agendas-minutes/

December 10, 2020 – 10:00 am

GMA 12 Members Present

Gary Westbrook	POSGCD
Jim Totten	LPGCD
David Van Dresar	FCGCD
David Bailey	METGCD
Alan Day	BVGCD

GMA 12 Members Absent

None

Others Present		Entity
George Rice		Environmental Stewardship
Steve Box		Environmental Stewardship
John Seifert		WJS Groundwater
Steve Young		Intera
Andy Donnelly		GEO-Logic
Bruce Nichols		SBC Global
Matthew Uliana	SAWS	
Doug Box		Post Oak Savannah GCD
Elaine Gerren		Post Oak Savannah GCD
Gary Westbrook		Post Oak Savannah GCD
Blaire Parker		SAWS
JAMES BENE		R.W. Harden
Darren Thompson		SAWS
Jennifer Nations		CSTX
David Wheelock		LCRA
Larry French		TWDB
David Wheelock		
Liz Ferry		R.W. Harden
Natalie Ballew		TWDB
Micaela Pedrazas		LRE Water
Eric Allmon		
Blair Parker		SAWS
City of College Station		
Steven Siebert		
Ross Cummings		Blue Water
Shan Rutherford		
Barbara Boulware-Wells		Knight & Partners
Matthew Uliana		
Jim Mathews		
Steve Young		Intera
Andy Donnelly		GEO-Logic

Jaclyn Robertson	Texas A&M
Joseph Trungale	Trungale Engineering
Matthew Uliana	SAWS

MINUTES

1. **Invocation**
   The invocation was given by Alan Day.

2. **Pledge of Allegiance**
   David Bailey led the pledges to the flags of the United States and Texas.

3. **Call meeting to order and establish quorum**
   Gary Westbrook, serving as chair for this meeting, called the meeting to order at 10:00 a.m. and noted that all voting members of GMA 12 were present online.

4. **Welcome and introductions**
   Mr. Westbrook welcomed everyone to the virtual meeting and thanked them for their attendance.

5. **Public Comment on Agenda Items**
   Mr. Westbrook reminded everyone the GMA encouraged comment and questions on each item and invited public comment on agenda items at this time. No Public comment was offered.

6. **Minutes of October 22, 2020 Groundwater Management Area (GMA 12) Meeting**
   Mr. Westbrook asked for consideration of the minutes of the October 22, 2020 meeting. After brief discussion, a motion was made by Alan Day to approve the minutes as presented. The motion was 2nd by David Van Dresar. Mr. Westbrook ask for dissenting votes, there were none. The motion passed unanimously.

7. **Update from Groundwater Conservation Districts (GCDs) of GMA 12 on joint planning, water level monitoring, and compliance with Chapter 36.108, State Water Code**
   Mr. Westbrook asked for updated from any other Districts. Brazos Valley GCD stated that they had just begun their late fall readings on our water levels and had installed one continuous sonic device on one of our wells and we are getting good data from that. Mid-East Texas stated that their annual measurements would be complete next week. Lost Pines GCD reported that their fall monitoring is completed and they will continue to getting back into the Northern Lee County to look at the Carrizo Wilcox, the Calvert Bluff, and the Simsboro. Wells that they have not picked up in the past with hoping to add 20 more wells. Fayette county has begun their fall winter monitoring of water levels and will continue for the next month. Post Oak Savannah GCD has wrapped up their quarterly measurements and are doing extra monitoring work by the Vista Ridge well field and North and West of there, finding wells in that area that were not registered with the District or that we did not have complete information on and it has been very interesting to see the model track what was predicted as far as production and monitoring. We have 280-290 Monitor wells with 50 devices sonic, acoustic or transducers installed. All of this information is on our website and we would be glad to share it with anyone interested. Mr. Westbrook ask for questions or comments. None was given.

8. **Discussion on expressions of Desired Future Conditions (DFC's) and compatibility between GCD's in GMA 12**

Mr. Westbrook stated that the Post Oak Savannah GCD would like to stay with something consistent as the last round. Alan Day stated that they currently prefer for the variance to stay as they were for the last round which was 5% on the Simsboro, 10 on the other aquifers and no variance on the BRA. Lost Pines GCD stated they had not discussed variances that their focus has been model outputs and DFC's the variance is the last thing looked at. Fayette county wants to express the DFC's in the manner as the last round. Alan Day stated that they want to use the year 2000 as a beginning point for the expression of the DFC's and going through the year 2070. He thinks that soon we need to have an agenda items that discusses the variance.

9. **Discussion of comments received from stakeholders**

Mr. Westbrook asked if any of the districts had received any new comments from stakeholders since the last GMA 12 meeting. Mr. Westbrook has received 2 that he knows of. Steve Box gave a slideshow presentation "Summary on Environmental Stewardship" on the interaction of the groundwater and the surface water in the GMA 12. Environmental Stewardship ask the GMA 12 to consider the below items:

- Monitor impacts of groundwater pumping on the mainstem of the Colorado River and its tributaries
- Perform certain hydrograph separation studies to evaluate groundwater flow contributions to the Colorado River and its tributaries under drought conditions;
- Seek to establish criteria to qualitatively and quantitatively evaluate the impacts of reduced contributions of groundwater to baseflows into rivers and streams;
- Seek to establish factors to be considered in evaluating whether impacts on surface water resulting from reduced contributions of groundwater have become unreasonable, requiring remedial action;
- Adopt DFCs which include the current DFC parameters, while adding DFC parameters specifically focused on surface water dynamics.
    1) Maintain subsistence flow in the Colorado River at the Bastrop Gage 100% of the time; and,
    2) Maintain base-dry and base-average flow in the Colorado River at the Bastrop Gage during the spring (March - June).
    - Develop a DFC for the Colorado Alluvium Aquifer which includes a surface water component.

Environmental Stewardship requests that it be placed on the agenda for the next GMA-12 meeting, so that it may present a summary of these comments and respond to any questions about them. Gary Westbrook asked Mr. Trundal or George if they had anything to add and they did not, but will answer any questions. Gary Westbrook thanks for the presentation and ask for any questions. Alan Day asked whose responsibility at this time is it to manage the environmental stream flows as set by the committees? Steve Box comments that these are managed in the LCRA water management plan for the Highland Lakes. They can request to be exempt or relieved of those responsibilities. Colorado and Lavaca Bay Stake Holder Committee has an oversite responsibility and are tasked with establishing these standards. He thinks we need to look farther than that and the legislature set these standards to achieve or to move toward these targets and at that level TCEQ has a responsibility, but if you read the legislation, they request that others participate at a volunteer basis to make sure we do what we can to meet these standards. Joe Uliana said that sound right to him and that it is complicated and the standards are designed to be used by TCEQ in making decision in granting new water rights. Alan day asked if we have low environment flow at any of the gauges along the Brazos or Colorado river over this time would be a River Authority that has responsibility to release enough water for environmental flow? Joe states that for tributaries there is usually no place to release water into the tributaries so they are not protected by that type of action. We need to do more studies on the tributaries to understand the relationship with the groundwater. The tributaries are reliant on the groundwater flow. Alan Day agrees that more field studies are needed.

Andy Donnelly said we need to think about concepts that have been proposed and he needs time to formulate thoughts and questions.

James Bene filed comment with the Post Oak Savannah and these comments have been posted on the website. Shan Rutherford said the written comments speak for themselves. Blue Water Vista Ridge thinks

there seems to be a movement to modify the S7 to remove some of the know Carrizo Wilcox pumpage associate with the Vista Ridge Field and we feel that is inappropriate to remove this. It is a well know contracted public water supply and part of the state water plan and we have heard no good reason why that would be considered. Alan Day stated that the Carrizo wells were online and ask what is the estimated production for the wells? He asked if they will they use the complete 15000AF. Shan stated that they will use the 15,000 AF per year and that these were meant to be turned on and left on for decades. Mr. Westbrook ask for any additional comments from Stakeholders today. There were no additional comments.

10. **Update on progress for updating the Sparta/Queen City/Carrizo-Wilcox Groundwater Availability Model (GAM)**
Mr. Westbrook asked Larry French TWDB to provide an update on this item. Larry French stated that back in July you voted to request the TWDB consider revising the model in a small area associated with the Vista Ridge project and analysis of water level data and other data. The review was completed in early October and the draft report was posted to the TWDB website and asked for stakeholder comments. This initiated a 30-day comment period. They received two request one from R.W. Hardin and associates and from and the Brazos River Authority. These were referred back to Intera for evaluation of the comments. The comment period ended November 9th and by November 19th the responses and comments had been prepared and the responses were submitted to us and the final report was release by Intera and posted on the Post Oak website for review. The agency has decided to accept the proposed revisions to the model which would represent an improvement to the existing model. This will be beneficial to have a better representation and we are approving it and will provide written memo that documents that. They are commitment to make sure the models have the best data available. He thanks everyone for their participation. This leaves us with a better model than at the beginning of the year. Mr. Westbrook ask for questions. No questions were offered.

11. **Evaluation and discussion of future pumping scenarios using the Sparta/Queen City/Carrizo-Wilcox GAM and results, including predicted water levels and water budgets**
Brazos Valley GCD is good on their pump files as submitted and run through S7 with no changes or revisions. Lost Pines said they have no revisions pending on the S7 pump files. Mid-East Texas has no revisions and S7 looks to be accurate. Fayette County has not seen any differences so the current state of the cinereous is adequate for their needs. They will start discussing DFC's with their board in January. Post Oak Savannah GCD has had a Desired Future Conditions meeting. The recording and all of the presentations have been posted on the website and draft minutes will be available soon. Steve Young stated that in the Queen City Sparta we are looking at increasing the pumping. He also added that the District is looking at increasing the DFC. John Siefert said that schedule wise these have to completed by the first of May so in terms of additional simulations we need those done as quickly as possible to allow for time to get all of the data in. BVGCD is fortunate to have long historical pumping data to aid them. He thinks that if we have know pumping it is important to put that in the model. Mr. Westbrook states that this boils down to the balance of property rights and protecting existing users. Mr. Westbrook ask for further comments and there were none.

12. **Discuss requirements of Chapter 36.108(d) in adopting Desired Future Conditions:**
    a. **any other information relevant to the specific desired future conditions**
    No information was offered.

13. **Schedule and process moving forward for adoption of Desired Future Conditions**
Andy Donnelly said the consultants wanted to have a schedule. He has put together a GMA 12 Timeline and offered that as a guide line for moving forward with looking at a May 1, 2021 deadline. Alan Day asked if we could nail down the variance that we will use before the January meeting.

14. **Public Comment on non-agenda items**
Mr. Westbrook invited comment from the public. No public comment was offered.

15. **Update from Texas Water Development Board**
Mr. Westbrook asked Natalie Ballew of the Texas Water Development Board (TWDB) for comment and she stated that she has no further comments to add from Larry's previous comments.

16. **Agenda items and Date for next meeting**

Mr. Westbrook ask for January meeting to be after the POSGCD board meeting of January 12, 2021. Alan Day suggest January 15, 2021 for the next meeting. All are in agreement for this date. Agenda items for the next meeting will be the last 5 items that we have been through, items 11-15. Steve young ask for the tentative agreement for the model runs for the Brazos River Alluvium and the Yegua Jackson and consider adopting something for those 2 Aquifers and bring back for the Board to look at. John Siefert said we agreed on the Yegua Jackson simulations and DFC's already and we are close on the Brazos River Alluvium. Alan day stated that we have discussed but have not adopted the nonrelevant aquifers.

17. **Adjourn**

The meeting was adjourned at 11:59 am

THE ABOVE MINUTES OF THE MEETING OF GROUNDWATER MANAGEMENT AREA 12 HELD ON DECEMBER 10, 2020, WERE APPROVED AND ADOPTED BY GMA 12 ON JANUARY 15, 2021.

ATTEST:

_____

Mid-East Texas Groundwater Conservation District

_____

Fayette County Groundwater Conservation District

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Brazos Valley Groundwater Conservation District

_____

Lost Pines Groundwater Conservation District

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Post Oak Savannah Groundwater Conservation District

Jackson simulations and DFC's already and we are close on the Brazos River Alluvium. Alan day stated that we have discussed but have not adopted the nonrelevant aquifers.

17. Adjourn

The meeting was adjourned at 11:59 am

THE ABOVE MINUTES OF THE MEETING OF GROUNDWATER MANAGEMENT AREA 12 HELD ON DECEMBER 10, 2020, WERE APPROVED AND ADOPTED BY GMA 12 ON JANUARY 15, 2021.

ATTEST:

Mid-East Texas Groundwater Conservation District

Fayette County Groundwater Conservation District

Brazos Valley Groundwater Conservation District

Lost Pines Groundwater Conservation District

Post Oak Savannah Groundwater Conservation District

GROUNDWATER MANAGEMENT AREA 12 MEETING
This meeting was held virtually and the meeting recording may be viewed at
https://posgcd.org/gma-12-agendas-minutes/

January 15, 2021 – 10:00 am

GMA 12 Members Present

Gary Westbrook	POSGCD
Jim Totten	LPGCD
David Van Dresar	FCGCD
David Bailey	METGCD
Alan Day	BVGCD

GMA 12 Members Absent

None

Others Present	**Entity**
Steve Box	Environmental Stewardship
John Seifert	WJS Groundwater
Steve Young	Intera
Andy Donnelly	GEO-Logic
Jim Mathews	
Doug Box	Post Oak Savannah GCD
Elaine Gerren	Post Oak Savannah GCD
Gary Westbrook	Post Oak Savannah GCD
Blaire Parker	SAWS
JAMES BENE	R.W. Harden
Darren Thompson	SAWS
Jennifer Nations	CSTX
David Wheelock	LCRA
Larry French	TWDB
David Wheelock	
Liz Ferry	R.W. Harden
Natalie Ballew	TWDB
Jaclyn Robertson	Texas A&M
Eric Allmon	
Bob Harden	
Steven Siebert	
Judith McGeary	Farm & Ranch Freedom
Shan Rutherford	
Barbara Boulware-Wells	Knight & Partners
Bobby Bazan	Post Oak Savannah GCD
James Beach	
Jayson Barfknecht	Bryan, Texas
Jean Perez	

Matthew Uliana	SAWS
Natasha J. Martin	
Robert Bradley	TWDB
Steven Allen	
Ron Anderson	LCRA
Xu Fong	
Stephen Allen	TWDB
Jennifer Windscheffel	
Joseph Tungale	Tungale Engineering

MINUTES

1. **Invocation**
   The invocation was given by David Bailey.

2. **Pledge of Allegiance**
   Alan Day led the pledges to the flags of the United States and Texas.

3. **Call meeting to order and establish quorum**
   Gary Westbrook, serving as chair for this meeting, called the meeting to order at 10:00 a.m. and noted that all voting members of GMA 12 were present online.

4. **Welcome and introductions**
   Mr. Westbrook welcomed everyone to the virtual meeting and thanked them for their attendance.

5. **Public Comment on Agenda Items**
   Mr. Westbrook reminded everyone the GMA encouraged comment and questions on each item and invited public comment on agenda items at this time. James Bene would like to comment on the new simulation when we get to that.

6. **Minutes of October 22, 2020 Groundwater Management Area (GMA 12) Meeting**
   Mr. Westbrook asked for consideration of the minutes of the December, 2020 meeting. After brief discussion, a motion was made by David Van Dresar to approve the minutes as presented. The motion was 2nd by Alan Day. Mr. Westbrook ask for comment and dissenting votes, there were none. The motion passed unanimously.

7. **Update from Groundwater Conservation Districts (GCDs) of GMA 12 on joint planning, water level monitoring, and compliance with Chapter 36.108, State Water Code**
   Mr. Westbrook stated that their compliance report was on their website and asked for updated from any other Districts. Brazos Valley GCD stated that they had just begun their late fall readings on our water levels and should finish next week, and they have installed their first continuous sonic device on one of their wells and it is working quite well. Mr. Westbrook ask for questions or comments. None was given.

8. **Discussion on expressions of Desired Future Conditions (DFC's) and compatibility, including acceptable variances in values between GCD's in GMA 12**

Mr. Westbrook asked if there were any specific statement or actions any Districts would like to make. Alan Day stated that when it comes down to time to determine Brazos Valley would like to remain with the same 5% in the Simsboro variance and 10% in the ????? No further comment was given.

9. **Discussion of comments received from stakeholders**

Mr. Westbrook asked if any of the districts had received any new comments from stakeholders other than Blue Water/Vista Ridge and the Environmental Stewardship. No other comments were received. Gary Westbrook asked James Bene if they had any further comments. He asked if there was going to a presentation on simulation 9, Mr. Bene stated he would rather speak after the presentation. Gary Westbrook asked Steve Box with Environmental Stewardship for comment, he stated he wanted to wait for Item # 10. Eric Allmon made comment to follow up on the written comments. They are asking for the DFC's to address the surface water to groundwater interaction and all water rights with respect to private right and permitted rights.

Mr. Westbrook ask for any additional comments from Stakeholders today. There were no additional comments.

10. **Evaluation and discussion and consideration of past and future pumping scenarios using the Sparta/Queen City/Carrizo-Wilcox Groundwater Availability Model (GAM) and results, including predicted water levels and water budgets**

A presentation was given by Steve Young titled Submission for S-9 for GMA 12 Submission. He stated that S-9 will be modified to S-10. Mr. Westbrook stated that The Post Oak Savannah has been doing in-depth evaluation of the Carrizo Aquifers and the long-term effects. All the information is on their website along with several presentations. The Post Oak Savannah DFC Committee presented results to our Board and the Board recommended that the GMA consider the S-9 submission. Comment was provided by Alan Day with the Brazos Valley GCD stating that they have all know pumping in S-7 and he said that this is the case for all Districts and he said it does not make sense to change unless there is a curtailment in place. He stated this would create a false number if anything else is used. He wants all know pumping to be included. Mr. Westbrook ask for further comments and there were none. Public comment was given by Steve Young with Intera stating that on the Sparta if our DFC is reduced to 17, we could not make that and we would be in violation. For the run we have run this out to 2070, and to make clear that the know pumping does not go past 2050. Alan Day commented that all permits in all GCD's come up for renewal and know pumping is to be included in all rounds of planning. Comment was given by James Bene stating that his comments mirror those of Alan Day's. He stated that the work that has been done to get the accuracy of the GAM, that if we accept S-9 it intentionally omits know pumpage and then you are introducing significant errors that negates all the effort that you spent to improve the model. He feels that S-9 is a step backwards and that we already have a more accurate data set than the S-9 model. Post Oak is very aware that the threshold for the Carrizo DFC will be met quickly. He urges to disregard simulation S-9 and to move forward with S-7. Steve Box with Environmental Stewardship presented a slideshow GMA 12 DFCs with comments based the various simulations and the impact on the DFCs. They believe in the new GAM and this need to be the guide until we have better data to rely on. He said he is requesting that when going through the future analysis the consultants need to provide the predicted impacts on the Colorado River and the Colorado River Tributaries and the impact on surface water. Alan Day commented that he appreciates Environmental Stewardship and their participation. He said the model we have now is not a surface water groundwater interaction and it would be irresponsible to develop a surface water DFC without quantitate numbers. Steve Box responded that he disagrees that this not a groundwater surface water model, he said they have spent numerous amounts of money to get this model. John Siefert stated that we see these quantities and they are measurable entities, he asked how do you measure the changes or changes of flow in the surface water. Steve Box agrees that on a quantitative basis this model has become more useful and accurate over time. Alan Day made a motion that we accept do an additional S-10 run using the proposed value brought by POSGCD excluding the revisions proposed to the Carrizo values, leaving the Carrizo values as they are in S-7 inserting them into S-10. Jim Totten clarified the motion to make the

modification except for the Carrizo changes. Jim Totten has 2nd the motion. Jim Totten stated we are up against a deadline and this needs to be addressed today and David VanDressar and David Bailey agree. Gary Westbrook made a motion to amend the motion to include changes in the Carrizo with all the other changes Post Oak has included. The motion died for lack of a 2nd. David VanDresar shared the concern of Post Oak Savannah but he does not want to wait to discuss DFCs with his board. The motion carried 4 to 1 with Gary Westbrook with Post Oak Savannah opposing.

11. **Discuss requirements of Chapter 36.108(d) in adopting Desired Future Conditions: any other information relevant to the specific DFC's**
Gary Westbrook asked for any presentations on this item. Gary Westbrook reverted back to item # 10 and ask if there would be an interest in reconsidering the motion that was passed. No interest was expressed.

12. **Consider Proposed DFC's for Brazos River Alluvium and Yegua-Jackson Aquifers in GMA 12**
A presentation was given by Steve Young with Intera. Jim Totten with Lost Pines ask for clarification that Lost Pines did declare Yegua Jackson non relevant for this cycle. Alan Day moved that GMA 12 adopt the proposed desired future conditions and use the PS-2 run for the Yegua Jackson for final adoption. The motion was 2nd by David Bailey with Mid-East Texas. The motion carried unanimously. The 90-day comment period will begin today. ??? clarifies these are subject to the 10% verification allowance. David VanDresar asked if we voted to adopt these? Gary Westbrook provided an overview of the 90-day process. The presentation for the Brazos River Alluvium will be brought back at a later date.

13. **Declaration of Non-Relevant aquifers by GCD's in GMA 12 for current round of joint planning**
There are no presentations. Gary Westbrook asked for comments. Jim Totten stated that Lost Pines had voted and declared that the Trinity and the Yegua Jackson are non-relevant for the runs. Gary Westbrook asked for a copy of their minutes declaring this. David VanDresar Fayette county will be preparing statements for the Wilcox Aquifer for the GMA 12. This item will be brought back on the next agenda to receive comments and clarifications on the non-relevant aquifers.

14. **Schedule and process moving forward for adoption of DFCs**
Gary Westbrook asked if we were on schedule for the next meeting. Alan Day asked the Hydrologist if the runs will be ready. Steve Young clarified that they will be ready next week. No action was taken.

15. **Public Comment on non-agenda items**
Mr. Westbrook invited comment from the public. No public comment was offered.

16. **Update from Texas Water Development Board**
Mr. Westbrook asked Natalie Ballew of the Texas Water Development Board (TWDB) for comment and she stated that she has one update that the TWDB has released a new legislative report for a statewide survey to help panners identify locations for aquifer storage recovery projects. Alan Day asked if we know when the TWDB director will take up the adoption of the revision that we did to our GAM? She stated that she did not think that required board action on their part.

17. **Agenda items and Date for next meeting**
Mr. Westbrook ask for agenda items for the next meeting. He asked if we could address the last item of the feasibility of Desired Future Conditions. The next meeting will be scheduled for February 12th @ 10 am.

18. **Adjourn**
The meeting was adjourned at 11:57 am

THE ABOVE MINUTES OF THE MEETING OF GROUNDWATER MANAGEMENT AREA 12 HELD ON JANUARY 15, 2021, WERE APPROVED AND ADOPTED BY GMA 12 ON FEBRUARY 12, 2021.

ATTEST:

Mid-East Texas Groundwater Conservation District

Fayette County Groundwater Conservation District

Brazos Valley Groundwater Conservation District

Lost Pines Groundwater Conservation District

Post Oak Savannah Groundwater Conservation District

GROUNDWATER MANAGEMENT AREA 12 MEETING
This meeting was held virtually and the meeting recording may be viewed at
https://posgcd.org/gma-12-agendas-minutes/

February 12, 2021 – 10:00 am

GMA 12 Members Present	
Gary Westbrook	POSGCD
Jim Totten	LPGCD
David Van Dresar	FCGCD
David Bailey	METGCD
Alan Day	BVGCD

GMA 12 Members absent
None

Others Present	**Entity**
Steve Box	Environmental Stewardship
John Seifert	Groundwater Consultants, LLC
Steve Young	Intera
Doug Box	POSGCD
Elaine Gerren	POSGCD
Bobby Bazan	POSGCD
Blaire Parker	SAWS
Darren Thompson	SAWS
James Bene	R.W. Harden, & Assoc.
Jennifer Nations	City of College Station
David Wheelock	LCRA
Sydney Weitkunat	TWDB
Liz Ferry	R.W. Harden, & Assoc.
Natalie Ballew	TWDB
Jaclyn Robertson	TAMU AgriLife
Eric Allmon	
Steven Seibert	SAWS
Shirley Wade	TWDB
Shan Rutherford	Terrill, Waldrop
Barbara Boulware-Wells	The Knight Firm, LLC
Robert Bradley	TWDB
James Beach	
Jayson Barfknecht	City of Bryan
Jean Perez	TWDB
George Rice	
Andy Wier	SAWDF
Grayson Dowlearn	TWDB
Kristie Laughlin	TWDB
Lyn Clancy	LCRA
Olga Bauer	TWDB
Milam County Landowner	
Radu B.	
Robert Bradley	TWDB

MINUTES

1. **Invocation**
   The invocation was given by Alan Day.

2. **Pledge of Allegiance**
   David Bailey led the pledges to the flags of the United States and Texas.

3. **Call meeting to order and establish quorum**
   Gary Westbrook, serving as chair for this meeting, called the meeting to order at 10:05 a.m. and noted that all voting members of GMA 12 were present online.

4. **Welcome and introductions**
   Mr. Westbrook welcomed everyone to the virtual meeting and thanked them for their attendance.

5. **Public Comment on Agenda Items**
   Mr. Westbrook reminded everyone the GMA encouraged comment and questions on each item and invited public comment on agenda items at this time. No public comment was offered.

6. **Minutes of January 15, 2021 Groundwater Management Area (GMA 12) Meeting**
   Mr. Westbrook asked for consideration of the minutes of the January 15, 2021 meeting. After brief discussion, a motion was made by Alan Day to approve the minutes as presented. The motion was 2nd by David VanDresar. Mr. Westbrook ask for comment and dissenting votes, there were none. The motion passed unanimously.

7. **Update from Groundwater Conservation Districts (GCDs) of GMA 12 on joint planning, water level monitoring, and compliance with Chapter 36.108, State Water Code**
   Mr. Westbrook stated that POSGCD is continuing Winter/Spring measurements and are approximately 50% complete. He asked for updated from any other Districts. Alan Day with Brazos Valley GCD stated they had completed their late fall measurements and they would begin their next round in the middle of March. Mr. Westbrook ask if any other GCDs in GMA 12 had any additional reports. No additional reports were offered. Mr. Westbrook asked for questions or comments from anyone else. There were no comments or questions.

8. **Discussion on expressions of Desired Future Conditions (DFC's) and compatibility, including acceptable variances in values between GCD's in GMA 12**
   Mr. Westbrook asked if there were any specific statements or additional discussion or actions any Districts would like to make on this item at this time. No comment or discussion was given.

9. **Discussion of comments received from stakeholders**
   Mr. Westbrook stated that comments had been recived from the Simsboro Aquifer Defense Fund (SAWDF) and are posted on the POSGCD website. Andy Weir representing SAWDF gave a presentation titled "SAWDF GMA12 DFC Considerations." Mr. Westbrook asked if there were any questions or comments. Mr. Day thanked Mr. Weir for the presentation and asked if it is SAWDF's position is that no wells within the Carrizo Aquifer would be allowed to go dry or be mitigated? He said they would wish to preserve and protect the water as much as possible. Mr. Day asked if it should be the responsibility of the GCD's to protect every well? Andy stated that mitigation is reasonable and it should be decided at a GMA level. Mr. Day asked if the information provided was broken down by decade level or 50-year horizon level. He stated that it was based on the S-7 GAM Run.

10. **Evaluation and discussion and consideration of past and future pumping scenarios using the Sparta/Queen City/Carrizo-Wilcox Groundwater Availability Model (GAM) and results, including predicted water levels and water budgets**

A presentation was given by Steve Young with Intera titled "GMA 12 GAM Runs S-7, S-20, and S-11 for Sparta, Queen City, and Carrizo-Wilcox Aquifers." He stated GMA 12 had instructed the consultants to prepare this presentation and he compared the results of the three GAM Runs.

Next, a presentation was given by Mr. Westbrook titled, "GMA 12 Desired Future Conditions." Mr. Day asked that the one slide be corrected to state the S-11 was requested by GMA 12. Mr. Westbrook stated the POSGCD Board requested the S-10 GAM run be used for consideration of DFCs for GMA 12. Discussion of the use of the 10% variance for values of DFCs ensued. A motion was made by Mr. Westbrook to move forward with the values of the S-10 GAM Run for consideration of DFCs for GMA 12. The motion died for a lack of a second. Mr. Van Dresar stated he would like time to consider this information and vote on this at the next meeting. After brief discussion, all GMA 12 members agreed to discuss this at the next meeting.

Steve Box noted there was no report on the consideration of the impacts to surface water in this report and requested a water budget for the three GAM Runs which included surface water impacts.

11. **Discuss requirements of Chapter 36.108(d) in adopting Desired Future Conditions:**
    a. **The feasibility of achieving the desired future conditions**
    b. **Any other information relevant to the specific DFC's**

Mr. Westbrook noted these items would be more appropriate to be considered at the next GMA 12 meeting. All agreed.

12. **Consider Proposed DFC's for Brazos Alluvium Aquifers in GMA 12**

A presentation was given by Steve Young with Intera. Both POSGCD and BVGCD desire to maintain current DFCs from the previous joint planning cycle. Mr. Westbrook suggested this item be discussed at a future meeting and acted on at the same time as other DFCs for other aquifers in the GMA. All agreed.

13. **Update on Proposed DFC's for Yegua-Jackson Aquifer in GMA 12**

Mr. Westbrook stated that even though proposed DFCs for the Yegua-Jackson had been approved at the previous GMA 12 meeting, he would delay mailing the notices to each GCD if all were in agreement, so the process might be simplified for all. He stated he would like to send out the necessary information on this action at the same time as the other DFCs for other aquifers in the GMA. All agreed.

14. **Declaration of Non-Relevant aquifers by GCD's in GMA 12 for current round of joint planning**

Mr. Day stated BVGCD had declared the Gulf Coast Aquifer non-relevant in 2019 and had presented GMA 12 with that documentation. Mr. VanDresar stated they have for the last 2 cycles stated the Wilcox portion has been non-relevant for Fayette County GCD and he will provide this information again for this cycle at the next GMA 12 meeting. A motion was made by Jim Totten to approve the submission of Lost Pines GCD declaring the Yegua Jackson and Trinity Aquifers non-relevant for joint planning within the Lost Pines GCD. The motion was 2nd by Alan Day. The motion passed unanimously.

15. **Schedule and process moving forward for adoption of DFCs**

Mr. Westbrook asked if there were any updates to the schedule or process. No information was give and no action was taken.

16. **Public Comment on non-agenda items**

Mr. Westbrook invited comment from the public on non-agenda items. No public comment was offered.

17. **Update from Texas Water Development Board**

Mr. Westbrook asked Natalie Ballew of the Texas Water Development Board (TWDB) for an update. She stated in January the TWDB adopted the 2021 State Regional Water Plans, and also adopted rules to amend brackish groundwater production zones and published the Priority Groundwater Management Area Legislative Report. She then Ms. Sydney Weitkunat who gave a presentation titled "Brackish Groundwater Data Collection Upper Coastal Plain: Sparta Aquifer, East Texas."

18. **Agenda items and Date for next meeting**

Mr. Westbrook reviewed the agenda items for the next meeting. The next meeting was scheduled for March 18th @ 10 am. Mr. Westbrook thanked all for their attendance and participation.

19. **Adjourn**

The meeting was adjourned at 12:34 am

THE ABOVE MINUTES OF THE MEETING OF GROUNDWATER MANAGEMENT AREA 12 HELD ON FEBRUARY 12, 2021, WERE APPROVED AND ADOPTED BY GMA 12 ON MARCH 18, 2021.

ATTEST:

Mid-East Texas Groundwater Conservation District

Fayette County Groundwater Conservation District

Brazos Valley Groundwater Conservation District

Lost Pines Groundwater Conservation District

Post Oak Savannah Groundwater Conservation District

GROUNDWATER MANAGEMENT AREA 12 MEETING
This meeting was held virtually, and the meeting recording may be viewed at
https://posgcd.org/gma-12-agendas-minutes/

March 18, 2021 – 10:00 am

GMA 12 Members Present

Gary Westbrook	POSGCD
Jim Totten	LPGCD
David Van Dresar	FCGCD
David Bailey	METGCD
Alan Day	BVGCD

GMA 12 Members absent
None

Others Present	**Entity**
Steve Box	Environmental Stewardship
John Seifert	Groundwater Consultants, LLC
Ross Kushnereit	Intera
Andy Donnelly	DB Stephens
Doug Box	POSGCD
Bobby Bazan	POSGCD
Blaire Parker	SAWS
Jennifer Nations	City of College Station
David Wheelock	LCRA
Liz Ferry	R.W. Harden, & Assoc.
Natalie Ballew	TWDB
Jaclyn Robertson	TAMU AgriLife
Steven Seibert	SAWS
Shan Rutherford	Terrill, Waldrop
Barbara Boulware-Wells	The Knight Firm, LLC
James Beach	
George Rice	
Andy Wier	SAWDF
Lyn Clancy	LCRA
Jim Matthews	
Craig Andrews	POSGCD

MINUTES

1. **Invocation**
   The invocation was given by David Bailey.

2. **Pledge of Allegiance**
   Alan Day led the pledges to the flags of the United States and Texas.

3. **Call meeting to order and establish quorum**

Gary Westbrook, serving as chair for this meeting, called the meeting to order at 10:05 a.m. and noted that all voting members of GMA 12 were present online.

4. **Welcome and introductions**
Mr. Westbrook welcomed everyone to the virtual meeting and thanked them for their attendance.

5. **Public Comment on Agenda Items**
Mr. Westbrook reminded everyone the GMA encouraged comment and questions on each item and invited public comment on agenda items at this time. No public comment was offered.

6. **Minutes of January 15, 2021 Groundwater Management Area (GMA 12) Meeting**
Mr. Westbrook asked for consideration of the minutes of the February 12, 2021 meeting. After brief discussion, a motion was made by Alan Day to approve the minutes as presented. The motion was 2nd by Jim Totten. Mr. Westbrook ask for comment and dissenting votes, there were none. The motion passed unanimously.

7. **Update from Groundwater Conservation Districts (GCDs) of GMA 12 on joint planning, water level monitoring, and compliance with Chapter 36.108, State Water Code**
Mr. Totten reported Lost Pines would be completing Spring measurements during April. Mr. Day reported Brazos Valley GCD stated they were approximately 60% complete and should complete their Spring measurements next week. Mr. Westbrook stated that POSGCD would complete Winter/Spring measurements soon and are nearing 300 total monitoring wells. Mr. Westbrook ask if any other GCDs in GMA 12 had any additional reports. No additional reports were offered. Mr. Westbrook asked for questions or comments from anyone else. There were no comments or questions.

Mr. Westbrook asked if there were any specific statements or additional discussion or actions any Districts would like to make on this item at this time. No comment or discussion was given.

8. **Discussion of comments received from stakeholders**
Mr. Westbrook stated that comments had been recived from Steve Box with Environmental Stewardship (ES) and invited Mr. Box to review those comments. Mr. Box stated the proposed DFCs favored development over conservation, and stated there was a lack of critical data to ensure no damage was done to stakeholders, and he would offer a way forward until that data could be developed. On behalf of ES Mr. Box requested GMA 12 to adopt the previous DFCs from 2017. Mr. Westbrook asked if there were any questions or comments for Mr. Box. None were offered. Mr. Westbrook asked if there were any questions or comments on previous submissions from stakeholders. None were offered.

9. **Evaluation, discussion and consideration of past and future pumping scenarios using the Sparta/Queen City/Carrizo-Wilcox Groundwater Availability Model (GAM) and results, including predicted water levels and water budgets**
A presentation was given by John Seifert on behalf of BVGCD entitled, "Simulation Results for S-11 and S-12. Mr. Day requested an amendment to the pumping file for BVGCD to include an additional 4000 acre feet per year, with the total Simsboro production in 2070 being 147,000 acre feet. He then offered proposed DFCs and variances as adopted by the BVGCD Board.

Next, a presentation was given by Ross Kushnereit of Intera entitled, DFC Runs for GAM Runs S-10, S-11, S-12, and S-13 for Sparta, Queen City, and Carrizo-Wilcox Aquifers. Mr. Kushnereit discussed groundwater-surface water interactions in the presentation, as well as making all files available with publication of a link. He also discussed additional work performed on behalf of POSGCD in comparing differences in the four GAM Runs. Mr. Westbrook requested the Districts of GMA 12 to use the S-13 run to consider DFCs for this round of

joint planning and stated all District would be within 10% of values expressed in S-12 as requested by BVGCD with the exception of Lost Pines' value in the Carrizo, and that value would be lowered. He also discussed benefits of this proposed action and stated no district in GMA 12 had ever been forced to accept a different pumping file for establishing DFCs than it had chosen. Mr. Totten stated this was a different process than followed in the past. Mr. Westbrook stated in the past GCDs in GMA 12 had established their own individual pumping files for GAM runs and this was a change in process. He also stated this would force POSGCD to manage differently than its adopted Management Plan and would lead to escalating DFCs in the future. After much discussion, the meeting recessed from 11:49 until 11:55 am, and then resumed with agenda item 10.

10. Consider Proposed DFCs for aquifers in GMA 12

(a) Sparta
(b) Queen City
(c) Carrizo
(d) Calvert Bluff
(e) Simsboro
(f) Hooper
(g) Yegua-Jackson
(h) Brazos River Alluvium

After discussion, Mr. Day moved to ratify the previous action taken to adopt Proposed Desired Future Conditions (DFCs) for the Yegua- Jackson aquifer. Mr. Bailey seconded. The motion passed unanimously.

After discussion, Mr. Day moved to adopt values for the Brazos River Alluvium as previously discussed during the February 12 GMA 12 meeting. The motion was seconded by Mr. VanDresar. With a roll call vote all voted in favor of the motion and it passed unanimously.

After discussion, Mr. Day moved to use GAM Run S-12 to develop Proposed DFCs for the Sparta, Queen City, Carrizo, Calvert Bluff, Simsboro, and Hooper aquifers of GMA 12. The motion was seconded by Mr. Totten. Mr. Westbrook called the roll for vote. Mr. Day voted yes. Mr. Bailey voted yes. Mr. Totten voted yes. Mr. Van Dresar voted yes. Mr. Westbrook voted no.

Mr. Westbrook stated he appreciated the discussion and debate but was disappointed at the outcome of selection of Proposed DFCs.

11. Discussion on expressions of Desired Future Conditions (DFC's) and compatibility, including acceptable variances in values between GCD's in GMA 12

After discussion, Mr. Day moved to set compatibility, including acceptable variances of DFCs for each GCD in GMA 12, at 10% above or below values expressed in the S-12 GAM Run. The motion was seconded by Mr. Totten. The motion passed unanimously.

12. Discuss requirements of Chapter 36.108(d) in adopting Desired Future Conditions:

a. **The feasibility of achieving the desired future conditions**
b. **Any other information relevant to the specific DFC's**

Mr. Westbrook asked if there were any presentations or discussion on these items. None was offered.

13. Declaration of Non-Relevant aquifers by GCD's in GMA 12 for current round of joint planning

Mr. VanDresar presented documentation from the Fayette County GCD and moved to declare the Wilcox portion of the Carrizo-Wilcox non-relevant for this round of joint planning for Fayette County GCD. The motion was seconded by Mr. Day. The motion passed unanimously.

Mr. Totten noted previous approval of the submission of Lost Pines GCD declaring the Yegua Jackson and Trinity Aquifers non-relevant for joint planning within the Lost Pines GCD.

Mr. Day noted previous approval of the submission of Brazos Valley GCD declaring the Gulf Coast Aquifer non-relevant for joint planning in BVGCD in 2019.

14. Schedule and process moving forward for adoption of DFCs

Mr. Westbrook reviewed the process moving forward. After brief discussion, no action was taken.

15. Public Comment on non-agenda items

Mr. Westbrook invited comment from the public on non-agenda items. No public comment was offered.

16. Update from Texas Water Development Board

Mr. Westbrook asked Natalie Ballew of the Texas Water Development Board (TWDB) for an update. She provided a brief update on approval of the Central Carrizo-Wilcox/Queen City-Sparta Groundwater Availability Model.

17. Agenda items and Date for next meeting

After brief discussion it was agreed the next meeting would be scheduled as appropriate. Mr. Westbrook thanked all for their attendance and participation.

18. Adjourn

The meeting was adjourned at 12:41 pm

THE ABOVE MINUTES OF THE MEETING OF GROUNDWATER MANAGEMENT AREA 12 HELD ON MARCH 18, 2021, WERE APPROVED AND ADOPTED BY GMA 12 ON APRIL 20, 2021.

ATTEST:

Mid-East Texas Groundwater Conservation District

Fayette County Groundwater Conservation District

Brazos Valley Groundwater Conservation District

Lost Pines Groundwater Conservation District

Post Oak Savannah Groundwater Conservation District

GROUNDWATER MANAGEMENT AREA 12 MEETING
This meeting was held virtually and the meeting recording may be viewed at
https://posgcd.org/gma-12-agendas-minutes/

April 20, 2021 – 10:00 am

GMA 12 Members Present	
Gary Westbrook	POSGCD
Jim Totten	LPGCD
David Van Dresar	FCGCD
David Bailey	METGCD
Alan Day	BVGCD

GMA 12 Members absent
None

Others Present	**Entity**
Steve Box	Environmental Stewardship
John Seifert	Groundwater Consultants, LLC
Steve Young	Intera
Ross Kushnereit	Intera
Phil Cook	
Andy Donnelly	DB Stephens
Doug Box	POSGCD
Bobby Bazan	POSGCD
Elaine Gerren	POSGCD
James Bene	RW Harden, & Assoc.
Darren Thompson	SAWS
Jennifer Nations	City of College Station
David Wheelock	LCRA
Liz Ferry	R.W. Harden, & Assoc.
Becky Shirley	
Jayson Barfknecht	City of Bryan
Natalie Ballew	TWDB
Jaclyn Robertson	TAMU AgriLife
Steven Seibert	SAWS
Eric Allmon	
Shan Rutherford	Terrill, Waldrop
Barbara Boulware-Wells	The Knight Firm, LLC
Shirley Wade	TWDB
George Rice	
Andy Wier	SAWDF
Lyn Clancy	LCRA
Jim Matthews	
Joe Trungale	Trungale Engineering
Jordan Aldridge	POSGCD
Linda Curtis	
Robert Bradley	TWDB

Stefan Schuster EPCOR
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512-321-4964
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979-676-0523

MINUTES

1. **Invocation**
   The invocation was given by Gary Westbrook.

2. **Pledge of Allegiance**
   Doug Box led the pledges to the flags of the United States and Texas.

3. **Call meeting to order and establish quorum**
   Gary Westbrook, serving as chair for this meeting, called the meeting to order at 10:05 a.m. and noted that all voting members of GMA 12 were present online.

4. **Welcome and introductions**
   Mr. Westbrook welcomed everyone to the virtual meeting and thanked them for their attendance.

5. **Public Comment on Agenda Items**
   Mr. Westbrook reminded everyone the GMA encouraged comment and questions on each item and invited public comment on agenda items at this time. No public comment was offered.

6. **Minutes of March 18, 2021 Groundwater Management Area (GMA 12) Meeting**
   Mr. Westbrook asked for consideration of the minutes of the March 18, 2021 meeting. After brief discussion, a motion was made by David Van Dresser to approve the minutes as presented. The motion was 2nd by Jim Totten. The motion passed unanimously.

7. **Update from Groundwater Conservation Districts (GCDs) of GMA 12 on joint planning, water level monitoring, and compliance with Chapter 36.108, State Water Code**
   Mr. Westbrook stated that POSGCD has completed their Spring water level measurements and are posting monthly updates on the POSGCD website about the work being performed under the District's Groundwater Well Assistance Program (GWAP). He also stated both the 2019 and 2020 GWAP Annual Needs Assessment (GANA) had also been approved and posted on the POSGCD website.
   Mr. Day reported that BVGCD had finished their Spring measurements and John Siefert gave their annual update on compliance with DFCs to their Board, and they are completely in compliance.
   No other updates were given.

8. **Discussion and considerations of comments received from stakeholders**
   For the purposes of discussion, Agenda Items 8, 9, and 10 were opened simultaneously. Dr. Steve Young with Intera gave a presentation entitled, "SW-GW Interaction and Cross-Flow for Run 13." Brief discussion ensued. Andy Weir with SAWDF gave a presentation entitled, "GMA-12 DFC Considerations." Dr. Young asked if

Mr. Weir could provide a copy of the excel spreadsheet and to also explain the negative numbers under B on the spreadsheet. Andy Weir gave an explanation of the calculations.

Steve Box with Environmental Stewardship gave a presentation entitled, "GMA-12 DFC's Environmental Stewardship's Proposal, Discussion of Current and Proposed DFC's." Joe Trungale gave a presentation entitled, "Ecological impacts of reduced surface water flows due to groundwater pumping." Steve Box with Environmental Stewardship stated that the results of the groundwater pumping will result in unreasonable pumping and provided the "2021 ES Proposal." A presentation entitled, "DFCs to Protect Groundwater Discharges to Streams" was given by George Rice, and Mr. Rice continued to discuss Environmental Stewardship's recommendations. Steve Box then provided more detail about the field data needed. Lengthy discussion ensued on these topics. Mr. Westbrook asked if there were any further questions. There were no additional comments received.

9. **Discuss requirements of Chapter 36.108(d) in adopting Desired Future Conditions:**
   a. other environmental impacts, including impacts on spring flow and other interactions between groundwater and surface water;
   b. any other information relevant to the specific DFCs.

10. **Evaluation, discussion and consideration of past and future pumping scenarios using the Sparta/Queen City/Carrizo-Wilcox Groundwater Availability Model (GAM) and results, including predicted water levels and water budgets**

    The meeting recessed for a brief break @ 12:10 p.m.
    The meeting returned from recess @ 12:15 p.m.

11. **Discussion and possible reconsideration of Proposed DFCs for aquifers in GMA 12 as adopted at March 18, 2021 GMA 12 Meeting**
    (a) Sparta
    (b) Queen City
    (c) Carrizo
    (d) Calvert Bluff
    (e) Simsboro
    (f) Hooper
    (g) Yegua-Jackson
    (h) Brazos River Alluvium

    Mr. Westbrook noted that Proposed DFCs for these aquifers had been adopted at the previous meeting and the GMA had arranged this meeting as requested by Environmental Stewardship. Mr. Westbrook asked if there was any further discussion or any action on this item. There was no discussion offered on this item and no action taken.

12. **Discussion and possible reconsideration of expressions of Desired Future Conditions and compatibility, including acceptable variances in values between GCDs in GMA 12 as adopted at March 18, 2021 GMA 12 Meeting**
    Mr. Westbrook asked if there was any further discussion or any action on this item. There was no discussion offered on this item and no action taken.

13. **Schedule and process moving forward for adoption of DFCs**
    Mr. Westbrook provided a brief review of the process moving forward and asked for any additional comments or questions. There were none.

14. **Public Comment on non-agenda items**

Mr. Westbrook invited comment from the public. Andy Weir asked for contour maps and decadal impacts to be published by all districts in GMA 12 when posting the required notices for the 90-day comment period. Mr. Westbrook encouraged Mr. Wier to make those requests to each district individually. No further comments were offered.

15. **Update from Texas Water Development Board**
Mr. Westbrook asked Natalie Ballew of the Texas Water Development Board (TWDB) for updates and she provided a short update stating that TWDB has published the draft of the State Water Plan with the public hearing set for May 24, 2021 using Go to Meeting. Comments will be received until May 26, 2012.

16. **Agenda items and Date for next meeting**
Mr. Westbrook asked for the GMA to meet during the next two months to discuss concerns over the process used to establish DFCs. After discussion, all agreed to meet on June 24th at 10:00 am to discuss setting up a firm process for establishing DFCs for GMA 12 moving forward.

17. **Adjourn**
The meeting was adjourned at 12:29 p.m.

THE ABOVE MINUTES OF THE MEETING OF GROUNDWATER MANAGEMENT AREA 12 HELD ON APRIL 20, 2021, WERE APPROVED AND ADOPTED BY GMA 12 ON JUNE 24TH, 2021.

ATTEST:

Mid-East Texas Groundwater Conservation District

Fayette County Groundwater Conservation District

Brazos Valley Groundwater Conservation District

Lost Pines Groundwater Conservation District

Post Oak Savannah Groundwater Conservation District

GROUNDWATER MANAGEMENT AREA 12 MEETING
This meeting was held in person with virtual attendance and participation.
The meeting recording may be viewed at
https://posgcd.org/gma-12-agendas-minutes/

June 24, 2021 – 10:00 am

GMA 12 Members Present in person

Gary Westbrook	POSGCD
Jim Totten	LPGCD
David Van Dresar	FCGCD
David Bailey	METGCD
Alan Day	BVGCD

GMA 12 Members absent
None

Others Present in person	**Entity**
Steve Box	Environmental Stewardship
John Seifert	Groundwater Consultants, LLC
Andy Donnelly	DB Stephens
Doug Box	POSGCD
Bobby Bazan	POSGCD
Becky Goetsch	POSGCD
Jim Briggs	Utility Management Consulting
Natalie Ballew	TWDB
Doug Fike	Greathouse

Others Present online

Steve Young	Intera
Ross Kushnereit	Intera
Phil Cook	LPGCD
James Bene	RW Harden, & Assoc.
Darren Thompson	SAWS
David Wheelock	LCRA
Liz Ferry	R.W. Harden, & Assoc.
Steven Seibert	SAWS
Eric Allmon	Perales, Allmon, & Ice, P.C.
Barbara Boulware-Wells	The Knight Firm, LLC
Shirley Wade	TWDB
Andy Wier	SAWDF
Lyn Clancy	LCRA
Jim Matthews	
Linda Curtis	
Robert Bradley	TWDB
Amy Muttoni	
Blaire Parker	SAWS
Craig Andrews	POSGCD
Ed McCarthy	ERM Law Firm
Francisco Hernandez	

Greg Ellis — Ellis Law Firm
James Beach — Advanced Groundwater Solutions
Linda Adair
William Riley
254-761-3167
512-461-3179
512-468-8789

MINUTES

1. **Invocation**
   The invocation was given by Gary Westbrook.

2. **Pledge of Allegiance**
   Alan Day led the pledges to the flags of the United States and Texas.

3. **Call meeting to order and establish quorum**
   Gary Westbrook, serving as chair for this meeting, called the meeting to order at 10:06 a.m. and noted that all voting members of GMA 12 were present in person.

4. **Welcome and introductions**
   Mr. Westbrook welcomed everyone to the hybrid meeting, both available in person and with virtual attendance and participation, and thanked them for their attendance.

5. **Public Comment on Agenda Items**
   Mr. Westbrook reminded everyone the GMA encouraged comment and questions on each item and invited public comment on agenda items at this time.

   Steve Box of Environmental Stewardship discussed comments he submitted the previous day. Mr. Westbrook thanked Mr. Box for his discussion and informed everyone the submitted comments were available on the POSGCD website.

   Andy Wier of the Simsboro Aquifer Defense Fund (SAWDF), attending online, briefly discussed options for the GMA to consider in adoption of DFCs and encouraged the GMA members to review recent articles from the Texas Water Journal and The Baker Institute for Public Policy. Mr. Westbrook thanked Mr. Wier for his discussion and asked Mr. Wier to send the articles so POSGCD could make them available on the POSGCD website.

   Mr. Westbrook asked for additional comments. Linda Adair, attending online, asked if she could ask questions later. Mr. Westbrook assured her she would be able to do so.

   Mr. Westbrook asked for additional comments. No additional comments were offered.

6. **Minutes of April 20, 2021 Groundwater Management Area (GMA 12) Meeting**

Mr. Westbrook asked for consideration of the minutes. After brief discussion, a motion was made by David Bailey to approve the minutes as presented. The motion was 2nd by Jim Totten. The motion passed unanimously.

7. **Discussion of past, current, and future processes for adoption of Desired Future Conditions (DFCs)**
Mr. Westbrook asked the GMA members if they were agreeable to open agenda items 7, 8, and 9 simultaneously so all items might be able to be discussed in a more fluid effort. All agreed.

8. **Discuss requirements of Chapter 36.108 in adopting DFCs**

9. **Evaluation and discussion of past and future pumping scenarios using the Sparta/Queen City/Carrizo-Wilcox Groundwater Availability Model (GAM) and results, including predicted water levels and water budgets**

Mr. Westbrook reminded all that the purpose of this meeting was to review the processes used to date in setting DFCs and to discuss the process moving forward. He again thanked the districts of GMA 12 for meeting today to have this discussion.

He then stated he would present discussion of the past GMA 12 DFC adoption efforts from POSGCD's perspective and encouraged questions and discussion as he covered the material. He then gave a presentation entitled, "POSGCD Discussion Regarding Proposed Desired Future Conditions." Mr. Westbrook covered the material, answering questions for clarification as well as for discussion. He then expressed POSGCD's concerns, as identified in the presentation, with the current process. After extended discussion, all GMA 12 members agreed this was a valuable effort and agreed to meet again to continue the discussions.

10. **Public Comment on non-agenda items**
Mr. Westbrook invited comment on non-agenda items.
Linda Adair asked about concerns in GMA 12 related to subsidence. He stated that a presentation had been given to the GMA at an earlier meeting on that concern, and he invited Andy Donnelly to answer the question. Mr. Donnelly responded with clarification.

Ms. Adair then asked about data available concerning prevention of waste. Mr. Westbrook stated that since the previous question was an agenda item an answer could be given, but this question was not an agenda item so it could not be discussed. He then invited her to contact him after the meeting to be able to provide that information. He thanked her for her questions.

Mr. Westbrook invited additional comment on non-agenda items.

No further comments were offered.

11. **Update from Texas Water Development Board**
Mr. Westbrook invited Natalie Ballew of the Texas Water Development Board (TWDB) to discuss any updates from TWDB. Ms. Ballew informed the GMA TWDB is developing guidelines for the process of amending a brackish groundwater production zone and would soon publish a draft and seek input from GCDs possibly by the end of Summer.

12. **Agenda items and Date for next meeting**
Mr. Westbrook invited discussion on topics to discuss at the next GMA 12 meeting to discuss the process of developing DFCs in GMA 12. Topics discussed included Regional Planning, review and comparison of Management Plans and strategies as required in Chapter 36.108, TWC, methodology discussed during this meeting and effects on of that methodology on individual districts, and updates from GMA 12 consultants.

Mr. Totten requested these discussions on future process of adoption of DFCs for the next joint planning cycle be clearly defined as separate from the current round of joint planning and take place in separate meetings. All agreed.

13. Adjourn

The meeting was adjourned at 12:05 p.m.

THE ABOVE MINUTES OF THE MEETING OF GROUNDWATER MANAGEMENT AREA 12 HELD ON JUNE 24, 2021, WERE APPROVED AND ADOPTED BY GMA 12 ON 10-6-, 2021.

ATTEST:

Mid-East Texas Groundwater Conservation District

Fayette County Groundwater Conservation District

Brazos Valley Groundwater Conservation District

Lost Pines Groundwater Conservation District

Post Oak Savannah Groundwater Conservation District

GROUNDWATER MANAGEMENT AREA 12 MEETING
This meeting was held in person with virtual attendance and participation.
The meeting recording may be viewed at
https://posgcd.org/gma-12-agendas-minutes/

October 6, 2021 – 10:00 am

GMA 12 Members Present in person

Gary Westbrook	POSGCD
Jim Totten	LPGCD
David Van Dresar	FCGCD
David Bailey	METGCD
Alan Day	BVGCD

GMA 12 Members absent
None

Others Present in person	**Entity**
Steve Young	Intera
John Seifert	Groundwater Consultants, LLC
Andy Donnelly	DB Stephens
Doug Box	POSGCD
Bobby Bazan	POSGCD
Billy Sherrill	Lost Pines GCD
Andy Wier	SAWDF
Natalie Ballew	TWDB
Monique Norman	BVGCD, FCGCD
Shan Rutherford	Terrill & Waldrop

Others Present online

Jevon Harding	TWDB
Jean Perez	TWDB
Ki Cha	TWDB
Darren Thompson	SAWS
Paul Brandenburg	BRA
Paul K	
Sheril Smith	Lost Pines GCD
Steven Seibert	SAWS
Stefan Schuster	EPCOR
Lyn Clancy	LCRA
Robert Bradley	TWDB
Shirley Wade Williams	TWDB
James Beach	Advanced Groundwater Solutions
956-735-1782	
512-461-3179	
512-608-8342	

MINUTES

1. **Invocation**
   The invocation was given by Billy Sherrill.

2. **Pledge of Allegiance**
   Billy Sherrill led the pledges to the flags of the United States and Texas.

3. **Call meeting to order and establish quorum**
   Gary Westbrook, serving as chair for this meeting, called the meeting to order at 10:05 a.m. and noted that all voting members of GMA 12 were present in person.

4. **Welcome and introductions**
   Mr. Westbrook welcomed everyone to the hybrid meeting, both available in person and with virtual attendance and participation and thanked them for their attendance. He then reminded all that the purpose of this meeting was to review the processes used to date in setting DFCs and to discuss the process moving forward.

5. **Public Comment on Agenda Items**
   Mr. Westbrook reminded everyone the GMA encouraged comment and questions on each item. He then invited public comment on agenda items from those in person at this time.

   Andy Wier of the Simsboro Aquifer Defense Fund (SAWDF) briefly discussed Agenda Item 8 and suggested the districts in the GMA to survey landowner's wells in their districts and evaluate the impacts. He also encouraged additional considerations of groundwater-surface water impacts in adoption of DFCs. He requested a different methodology for naming pumping files.

   No additional comments were offered from those attending in person.

   Mr. Westbrook asked for comments from those attending virtually. No comments were offered.

6. **Minutes of April 20, 2021 Groundwater Management Area (GMA 12) Meeting**
   Mr. Westbrook asked for consideration of the minutes. After brief discussion, a motion was made by Jim Totten to approve the minutes as presented. The motion was 2nd by David Bailey. The motion passed unanimously.

7. **Discussion and comparison of Management Plans, Rules, and Management Strategies of the Districts in GMA 12 as required by Chapter 36.108**
   Mr. Westbrook asked the GMA members if they were agreeable to open agenda items 7, 8, 9, and 10 simultaneously so all items might be able to be discussed in a more fluid effort. All agreed.

   Mr. Westbrook invited statements from each district representative in GMA 12 on the management plan and rules of each GCD. Each statement was discussed. These items included but were not limited to required spacing of wells from other wells, required spacing of wells from property lines, limits on production of Exempt wells, maximum limits of production for non-exempt wells including requirements of contiguous acreage, and rules concerning curtailment.

Presentations were provided by Dr. Steve Young of Intera on behalf of POSGCD. Those discussions are entitled, "Update on POSGCD Aquifer Science: Groundwater Modeling", Review of POSGCD Management Plan and Rules," and, "Review of POSGCD Approach for Developing DFCs." Questions were invited and points in all three presentations were discussed.

The process used for the current round of planning, including creation of pumping files and the methodology for use of those files was discussed. The process for development of the pumping files and methodology to be used to develop DFCs in the next round of joint planning was discussed at length. Mr. Totten agreed to write a draft of what that process would look like for the upcoming round of joint planning. After additional discussion, all district representatives agreed to return later this year or early next year to review this work and continue discussions.

8. **Discussion of past, current, and future processes for adoption of Desired Future Conditions (DFCs) and affects of these processes on management of groundwater in the Districts in GMA 12**

9. **Discuss requirements of Chapter 36.108 in adopting DFCs**

10. **Evaluation and discussion of past and future pumping scenarios using the Sparta/Queen City/Carrizo-Wilcox Groundwater Availability Model (GAM) and results, including predicted water levels and water budgets**

11. **Public Comment on non-agenda items**
    Mr. Westbrook invited additional comment on non-agenda items. No comments were offered.

12. **Update from Texas Water Development Board**
    Mr. Westbrook invited Natalie Ballew of the Texas Water Development Board (TWDB) to discuss any updates from TWDB. Ms. Ballew informed the district representatives the 2022 State Water Plan is available on the TWDB website, as well as updated maps.

13. **Agenda items and Date for next meeting**
    After brief discussion it was agreed to continue this discussion at the next GMA 12 meeting one week from today.

14. **Adjourn**
    The meeting was adjourned at 12:35 p.m.

THE ABOVE MINUTES OF THE MEETING OF GROUNDWATER MANAGEMENT AREA 12 HELD ON OCTOBER 6, 2021, WERE APPROVED AND ADOPTED BY GMA 12 ON 10-13-, **2021.**

ATTEST:

Mid-East Texas Groundwater Conservation District

Fayette County Groundwater Conservation District

Brazos Valley Groundwater Conservation District

Lost Pines Groundwater Conservation District

Post Oak Savannah Groundwater Conservation District

GROUNDWATER MANAGEMENT AREA 12 MEETING
This meeting was held in person with virtual attendance and participation.
The meeting recording may be viewed at
https://posgcd.org/gma-12-agendas-minutes/

October 13, 2021 – 10:00 am

GMA 12 Members Present in person

Gary Westbrook	POSGCD
Jim Totten	LPGCD
David Van Dresar	FCGCD
David Bailey	METGCD
Alan Day	BVGCD

GMA 12 Members absent
None

Others Present in person	**Entity**
Steve Young	Intera
John Seifert	Groundwater Consultants, LLC
Andy Donnelly	DB Stephens
Doug Box	POSGCD
Bobby Bazan	POSGCD
Elaine Gerren	POSGCD
Billy Sherrill	Lost Pines GCD
Monique Norman	BVGCD, FCGCD
Shan Rutherford	Terrill & Waldrop
Robert Bradley	TWDB
Phil Cook	Lost Pines GCD
Sheril Smith	Lost Pines GCD
Herbert Cook	Lost Pines GCD
John De Gomez	Landowner

Others Present online

512-461-3179	
512-608-8342	
512-636-4036	
512-971-3684	
979-676-0523	
Andy Weir	SAWDF
Barbara Boulware-Wells	The Knight Law Firm
Blaire Parker	SAWS
James Bene	R.W. Harden
Jean Perez	TWDB
Jennifer Nations	City of College Station
Jim Matthews	
Judith McGeary	Farm & Ranch Freedom Alliance
Justin Thompson	
Linda Curtis	League of Independent Voters
Liz Ferry	R.W. Harden

Natalie Ballew	WDB
Paul Brandenburg	BRA
Paul Kirby	GEO-Logic
Robert Bradley	TWDB
Julie Rueckheim	
Shan Rutherford	Terrell & Waldrop
Shirley Wade	TWDB
Stefan Schuster	EPCOR
Steve Box	Environmental Stewardship
Steven Siebert	SAWS
Theresa Budd	R.W. Harden
Travis Brown	
Visitor	

MINUTES

1. **Invocation**
   The invocation was given by Gary Westbrook

2. **Pledge of Allegiance**
   Gary Westbrook led the pledges to the flags of the United States and Texas.

3. **Call meeting to order and establish quorum**
   Gary Westbrook, serving as chair for this meeting, called the meeting to order at 10:08 a.m. and noted that all voting members of GMA 12 were present in person.

4. **Welcome and introductions**
   Mr. Westbrook welcomed everyone to the hybrid meeting, both available in person and with virtual attendance and participation and thanked them for their attendance.

5. **Public Comment on Agenda Items**
   Mr. Westbrook reminded everyone the GMA encouraged comment and questions on each item. He then invited public comment on agenda items from those in person at this time.

   John De Gomes purchased land in 2011. He had his well measured in the year 2013-2015 by the Lost Pines GCD. He stated that his groundwater level has reduced by 20'. He is concerned about the reduction of water levels.

   No additional comments were offered from those attending in person.

   Mr. Westbrook asked for comments from those attending virtually. No comments were offered.

6. **Minutes of October 6, 2021 Groundwater Management Area (GMA 12) Meeting**
   Mr. Westbrook asked for consideration of the minutes. After brief discussion, a motion was made by Alan Day to approve the minutes as corrected. The motion was 2nd by Jim Totten. The motion passed unanimously.

7. **Discussion of comments received from stakeholders during this round of joint planning to adopt Desired Future Conditions (DFC's)**
   Discussion and updates were given by each District. Mr. Day submitted a summary of comments received on behalf of BVGCD. After additional discussion, all district representatives agreed to prepare summaries of comments received and submit at the next meeting.

8. **Evaluation, discussion and consideration of past and future pumping scenarios using the Sparta/Queen City/Carrizo-Wilcox Groundwater Availability Model (GAM) and results, including predicted water levels and water budgets**
   Items # 8-11 were opened simultaneously.
   Lost Pines GCD gave a presentation entitled, "GMA 12 S-15 Model Results" in which Andy Donnelly of D.B. Stephens discussed updates to the pumping file submitted for previous modeling by the Lost Pines GCD along with additions of pumping from other locations included in the GAM, but outside the area covered by the GCDs in GMA 12. He discussed differences in impacts from previous model runs considered by GMA 12. The topics addressed in the presentation were discussed in detail and Mr. Donnelly answered additional questions. Following discussion Mr. Donnelly agreed to make additional small changes in the pumping files in the S-15 GAM Run and return that information to the GMA in the form of a new GAM Run to be known as S-19 for consideration in adoption of DFCs.

9. **Discuss requirements of Chapter 36.108(d) in adopting DFC's**

10. **Discussion and consideration of expressions of DFC's and compatibility, including acceptable variances in values between GCD's in GMA 12**

11. **Discussion and possible action on adoption of Desired Future Conditions (DFC's) for aquifers in GMA 12**
    (a) Sparta
    (b) Queen City
    (c) Carrizo
    (d) Calvert Bluff
    (e) Simsboro
    (f) Hooper
    (g) Yegua-Jackson
    (h) Brazos River Alluvium

12. **Schedule and process moving forward for adoption of DFC's**
    After discussion it was agreed to have the next meeting on November 12th to review the summary of comments from each district.

13. **Public Comment on non-agenda items**
    Mr. Westbrook invited additional comment on non-agenda items. No comments were offered.

14. **Update from Texas Water Development Board**
    Mr. Westbrook invited Robert Bradley of the Texas Water Development Board (TWDB) to discuss any updates from TWDB. Mr. Bradley stated there were no new updates.

15. **Agenda items and Date for next meeting**
    An Agenda with items similar to this one will be prepared for the next meeting to be scheduled November 12, 2021 at 10:00 am.

16. **Adjourn**

The meeting was adjourned at 11:41 p.m.

THE ABOVE MINUTES OF THE MEETING OF GROUNDWATER MANAGEMENT AREA 12 HELD ON OCTOBER 13, 2021, WERE APPROVED AND ADOPTED BY GMA 12 ON NOVEMBER 12, 2021.

ATTEST:

Mid-East Texas Groundwater Conservation District

Fayette County Groundwater Conservation District

Brazos Valley Groundwater Conservation District

Lost Pines Groundwater Conservation District

Post Oak Savannah Groundwater Conservation District

GROUNDWATER MANAGEMENT AREA 12 MEETING
This meeting was held in person with virtual attendance and participation.
The meeting recording may be viewed at
https://posgcd.org/gma-12-agendas-minutes/

November 12, 2021 – 10:00 am

GMA 12 Members Present in Person

Gary Westbrook	POSGCD
Jim Totten	LPGCD
David Van Dresar	FCGCD
David Bailey	METGCD
Alan Day	BVGCD

GMA 12 Members Absent
None

Others Present in person	**Entity**
Larry French	TWDB
John Seifert	Groundwater Consultants, LLC
Andy Donnelly	DB Stephens
Monique Norman	BVGCD, FCGCD
Shan Rutherford	Terrill & Waldrop
Phil Cook	Lost Pines GCD
Sheril Smith	Lost Pines GCD
John DeGomez	Landowner
Nancy McKee	Self
Ronnie McKee	Self
Don Hardy	Self
Steve Box	Environmental Stewardship
Bill Rhodes	Self
Andy Wier	SAWDF
Steve Young	INTERA
James Bene	R.W. Harden
Barbara Boulware-Wells	The Knight Law Firm, LLP

Others Present online

Blaire Parker	SAWS
Doug Box	POSGCD
Doug M	
George Rice	Groundwater Hydrologist
James Beach	Advanced Groundwater Solutions

James Bene	R.W. Harden
Jennifer Nations	City of College Station
Jevon Harding	TWDB
Jim Harris	
Jon King	BRA
Leah Martinsson	TAGD
Linda Curtis	League of Independent Voters
Liz Ferry	R.W. Harden
Mike Wiles	
Natasha Martin	LPGCD
Paul Brandenburg	BRA
Peggy	
Shirley Wade	TWDB
Stefan Schuster	EPCOR
Steven Siebert	SAWS
Suzanne Ragan	
512-461-3179	
512-608-8342	

MINUTES

1. **Invocation**
   The invocation was given by Gary Westbrook.

2. **Pledge of Allegiance**
   Alan Day led the pledges to the flags of the United States and Texas.

3. **Call meeting to order and establish quorum**
   Mr. Westbrook, serving as chair for this meeting, called the meeting to order at 10:05 a.m. and noted that all voting members of GMA 12 were present in person.

4. **Welcome and introductions**
   Mr. Westbrook welcomed everyone to the hybrid meeting, both available in person and with virtual attendance and participation and thanked them for their attendance. He then introduced the members of GMA 12 and Larry French of the Texas Water Development Board.

5. **Public Comment on Agenda Items**
   Mr. Westbrook reminded everyone the GMA encouraged comment and questions on each item. He then invited public comment on agenda items from those in person at this time.

James Bene expressed concerns about the Lost Pines S-19 and S-20 project being a radical departure from S-12 and that adoption of DFCs using values from the S-20 GAM run would require another 90-day posting for comments.

Shane Rutherford shared similar concerns to those of James Bene.

Nancy McKee owns a well and states since Vista Ridge pumping, her water level in her well has dropped 72.8' as of 9/22/2021. She dropped her pump 100' and she has concerns over an eventual dry well.

Andy Wier with Simsboro Aquifer Water Defense Fund states that the economic impact of the future drawdowns on production from wells with depths of 200' or less are not receiving due consideration in the process. He would like that countered. He also stated it is the desire of Lost Pines Board to go with S-20 scenario.

Monique Norman, legal council of Brazos Valley GCD and Fayette GCD, provided clarification on a statement made by Mr. Wier regarding whether or not due consideration was given by the BVGVD and GCGCD to domestic wells. Ms. Norman also reiterated that GMA 12 is in compliance with 36.108 and are at the point to adopt the DFCs. .

Don Hardy is a Lee County resident who owns a 44 acre lake with a spring that has run for 100 years. Mr. Hardy expressed concerns over the pumping affecting Lost Pines GCD area.

John DeGomez purchased a ranch in 2011 and has a 940' well. His well water level has dropped almost 20' since Vista Ridge Project came online. Mr. DeGomez expressed concern over this drop and requests very cautious steps be taken going forward with granting of permits to take water out of aquifers over which he is situated.

No additional comments were made by those attending in person or online.

6. **Minutes of October 13, 2021 Groundwater Management Area (GMA 12) Meeting**
After brief discussion, Alan Day moved to approve the minutes as presented. Jim Totten seconded the motion. The motion passed unanimously.

7. **Discussion of and possible action on comments received from stakeholders and summary reports during this round of joint planning to adopt Desired Future Conditions (DFCs)**
Mr. Westbrook noted that all summary reports from each GCD in GMA 12 had been received and would be posted to the GMA 12 page on the POSGCD website. He then asked for discussion on the summary reports. The GMs discussed whether changes to the proposed DFCs would require an additional notice and posting before action. After discussion of TWC 36.108 it was agreed there is no requirement for a new posting to consider different DFCs. After further discussion, no action was taken.

8. **Evaluation, discussion, and consideration of past and future pumping scenarios using the Sparta/Queen City/Carrizo-Wilcox Groundwater Availability Model (GAM) and results, including predicted water levels and water budgets**
Mr. Westbrook invited Andy Donnelly to address GMA 12. Mr. Donnelly gave a presentation entitled, "GMA12- S-12, S-19, and S-20 Model Results." After discussion, and questions of Mr. Donnelly Mr. Westbrook opened Agenda items 9, 10, and 11 simultaneously.

9. **Discuss requirements of Chapter 36.108(d) in adopting DFCs**

10. **Discussion and consideration of expressions of DFCs and compatibility, including acceptable variances in values between GCDs in GMA 12**

11. **Discussion and possible action on adoption of Desired Future Conditions (DFCs) for aquifers in GMA 12**
(a) Sparta
(b) Queen City
(c) Carrizo
(d) Calvert Bluff
(e) Simsboro
(f) Hooper
(g) Yegua-Jackson
(h) Brazos River Alluvium

After discussion, Alan Day moved and David Bailey seconded to use values in S-19 GAM Run with previously adopted 10% variance for use in adoption of DFCs in the Sparta, Queen City, Carrizo, Calvert Bluff, Simsboro, and Hooper Aquifers in GMA 12. Mr. Westbrook stated that POSGCD still has great concern about the process used during this round of joint planning to adopt DFCs and would be voting today on all actions with objection against the process used. He further noted that POSGCD looked forward to continued discussions of improving the process in preparation for the next round of joint planning. After discussion which included the values of the S-20 GAM Run, Mr. Day withdrew his motion. Mr. Bailey concurred with withdrawing the motion. Mr. Westbrook stated the motion had been withdrawn.

After discussion, a motion was made by Jim Totten and seconded by Gary Westbrook to use values in S-20 GAM Run with previously adopted 10% variance for use in adoption of DFCs in the Sparta, Queen City, Carrizo, Calvert Bluff, Simsboro, and Hooper Aquifers in GMA 12. Mr. Westbrook asked each member for their vote. Voting in favor were Mr. Totten and Mr. Westbrook. Voting against the motion were Mr. Van Dresar, Mr. Bailey, and Mr. Day. Mr. Westbrook stated the motion had failed 2-3.

After discussion, Mr. Day moved and Mr. Bailey seconded to use values in S-19 GAM Run with the previously adopted 10% variance for use in adoption of DFCs in the Sparta, Queen City, Carrizo, Calvert Bluff, Simsboro, and Hooper Aquifers in GMA 12. Mr.

Westbrook again reminded all of POSGCD's concerns and objection of the process followed to date. Mr. Westbrook asked each member for their vote. Voting in favor were Mr. Westbrook, Mr. Van Dresar, Mr. Bailey, and Mr. Day. Voting against the motion was Mr. Totten. Mr. Westbrook stated the motion had passed 4-1, reaching the necessary 2/3 vote required to adopt DFCs.

After discussion, Mr. Van Dresar moved and Mr. Day seconded, to adopt the proposed DFCs as noticed with the previously adopted 10% variance for use in adoption of DFCs for the Yegua-Jackson Aquifer in GMA 12. Mr. Westbrook asked each member for their vote. Voting in favor were Mr. Westbrook, Mr. Totten, Mr. VanDresar, Mr. Bailey, and Mr. Day. Mr. Westbrook stated the motion had passed 5-0, reaching the necessary 2/3 vote required to adopt DFCs.

After discussion, Mr. Westbrook moved and Mr. Day seconded, to adopt the proposed DFCs as noticed with the previously adopted 10% variance for use in adoption of DFCs for the Brazos River Alluvium Aquifer in GMA 12. Mr. Westbrook asked each member for their vote. Voting in favor were Mr. Westbrook, Mr. Totten, Mr. Van Dresar, Mr. Bailey, and Mr. Day. Mr. Westbrook stated the motion had passed 5-0, reaching the necessary 2/3 vote required to adopt DFCs.

After discussion of the previous motion to adopt DFCs for the Sparta, Queen City, Carrizo, Calvert Bluff, Simsboro, and Hooper Aquifers in GMA 12, it was noted that the values expressed in the S-19 GAM Run contained values for all GCDs in GMA 12 for the time period of years 2010 through 2070, and that the DFCs for BVGCD should be expressed from the year 2000 through 2070, while all other GCDs in GMA 12 would use the time period of the year 2010 through 2070.

After discussion, John Seifert, representing BVGCD addressed the values to be used for BVGCD for the corrected time period. He stated those values from the S-19 GAM Run, corrected for BVGCD for years 2000-2070 were as follows: Sparta 49, Queen City 42, Carrizo 80, Calvert Bluff 108, Simsboro 243, and Hooper 163.

After discussion, Mr. Day moved to rescind the previous motion to adopt the DFCs for the Sparta, Queen City, Carrizo, Calvert Bluff, Simsboro, and Hooper Aquifers in GMA 12 so that the appropriate adjustments to the values for BVGCD could be included in the motion as explained. Mr. Bailey seconded that motion to rescind the previous motion. The motion to rescind passed unanimously.

After discussion and clarification, Mr. Day moved and Mr. Bailey seconded to use values in S-19 GAM Run, with corrected values for BVGCD for the time period year 2000-2070 as identified by Mr. Siefert, and with the previously adopted 10% variance for use in adoption of DFCs in the Sparta, Queen City, Carrizo, Calvert Bluff, Simsboro, and Hooper Aquifers in GMA 12. Again, Mr. Westbrook expressed concerns and protest against the process on behalf of POSGCD. Mr. Westbrook asked each member for their vote. Voting in favor were Mr. Westbrook, Mr. Van Dresar, Mr. Bailey, and Mr. Day. Voting against the motion was Mr. Totten. Mr. Westbrook stated the motion had passed 4-1, reaching the necessary 2/3 vote required to adopt DFCs.

After further discussion it was agreed GMA 12 would schedule another meeting to consider adoption of a formal resolution with the approved values to submit to the Texas Water Development Board.

12. **Schedule and process moving forward for adoption of DFCs**
The schedule and process for moving forward was discussed.

13. **Public Comment on non-agenda items**
Mr. Westbrook invited additional comment on non-agenda items. No comments were offered.

14. **Update from Texas Water Development Board**
Mr. Westbrook invited Larry French of the Texas Water Development Board (TWDB) to discuss any updates from TWDB. Mr. French provided updates on the Recorded Well Program, Texas Sunset Commission review of TWDB and noted the committee is seeking public comment until December 15, 2021. Mr. French also stated the highlights of the Water for Texas '21 Conference are on the TWDB website and that Cindy Ridgeway will be retiring in about a month.

15. **Agenda items and Date for next meeting**
An Agenda similar to this one will be prepared for the next meeting to be scheduled November 30, 2021 at 10:00 am.

16. **Adjourn**
The meeting was adjourned at 12:03 pm.

THE ABOVE MINUTES OF THE MEETING OF GROUNDWATER MANAGEMENT AREA 12 HELD ON ~~OCTOBER 13~~ November 12, 2021, WERE APPROVED AND ADOPTED BY GMA 12 ON November 30th, 2021.

ATTEST:

Mid-East Texas Groundwater Conservation District

Fayette County Groundwater Conservation District

Brazos Valley Groundwater Conservation District

Lost Pines Groundwater Conservation District

Post Oak Savannah Groundwater Conservation District

GROUNDWATER MANAGEMENT AREA 12 MEETING
This meeting was held in person with virtual attendance and participation.
The meeting recording may be viewed at
https://posgcd.org/gma-12-agendas-minutes/

November 30, 2021 – 10:00 am

GMA 12 Members Present in Person

Gary Westbrook	POSGCD
Jim Totten	LPGCD
David Van Dresar	FCGCD
David Bailey	METGCD
Alan Day	BVGCD

GMA 12 Members Absent
None

Others Present in person	**Entity**
John Seifert	Groundwater Consultants, LLC
John DeGomez	Landowner
Don Hardy	Self
Steve Box	Environmental Stewardship
Bill Rhodes	Self
Andy Wier	SAWDF
Natalie Ballew	TWDB
Paul Kirby	DB Stephens
Billy Sherrill	Lee County Landowner
Steve Young	Intera
Barbara Boulware-Wells	The Knight Law Firm

Others Present online

Andrew Donnelly	
Blaire Parker	SAWS
Doug Box	POSGCD
James Bené	R.W. Harden
Jim Mathews	
Lyn Clancy	
Paul Brandenburg	BRA
Robert Bradley	
Sarah Gruen	
Shan Rutherford	Terrill & Waldrop
Sheril Smith	
Shirley Wade	
Stefan Schuster	EPCOR
Steven Siebert	SAWS

Theresa Budd
512-608-8342
512-771-7171
512-922-3082
512-971-3684

MINUTES

1. **Invocation**
   The invocation was given by David Bailey.

2. **Pledge of Allegiance**
   Alan Day led the pledges to the flags of the United States and Texas.

3. **Call meeting to order and establish quorum**
   Gary Westbrook, serving as chair for this meeting, called the meeting to order at 10:06 am and noted that all voting members of GMA 12 were present in person.

4. **Welcome and introductions**
   GM Westbrook welcomed everyone to the hybrid meeting, both available in person and with virtual attendance and participation and thanked them for their attendance. Gary Westbrook introduced each of the voting representatives of the districts in GMA 12. Jim Totten introduced LPGCD Board Member Billy Sherrill and Gary Westbrook introduced Natalie Ballew with TWDB.

5. **Public Comment on Agenda Items**
   Mr. Westbrook reminded everyone the GMA encouraged comment and questions on each item. He then invited public comment on agenda items from those in person at this time.

   John DeGomez purchased a ranch in 2011 and has a 960' well. Mr. DeGomez's well was gauged at approximately 166'. He had his wells measured again in August; they were gauged at 183.3' which is almost a 20-foot drop. This loss has causes Mr. DeGomez great concern. Jim Totten visited Mr. DeGomez in October and measured the well once again, resulting in another 4.1' loss. Mr. DeGomez is concerned about where the water has gone and the future of his well.

   No additional comments were made by those attending in person or online.

6. **Minutes of November 12, 2021 Groundwater Management Area (GMA 12) Meeting**
   Mr. Westbrook stated there were necessary corrections to the draft minutes which had been previously circulated. He added attendees to the minutes that were accidentally left

off and made corrections to the public comment section. Section #7 on the agenda was edited to reflect correct information. Section #11 on the agenda was edited to change the wording per advice of counsel. After discussion, Alan Day moved to accept the changes to the November 12th GMA 12 Meeting Minutes and approve as corrected. That motion was seconded by Jim Totten. The motion carried unanimously.

7. **Discussion of and possible action on finalizing and approving resolution for adoption of Desired Future Conditions (DFCs) for relevant aquifers in GMA 12 authorized at November 12, 2021 GMA 12 Meeting**
   - **(a) Sparta**
   - **(b) Queen City**
   - **(c) Carrizo**
   - **(d) Calvert Bluff**
   - **(e) Simsboro**
   - **(f) Hooper**
   - **(g) Yegua-Jackson**
   - **(h) Brazos River Alluvium**

   Mr. Westbrook introduced the draft resolution which had been prepared by the GMA 12 consultant team to reflect actions taken at the November 12, 2021 GMA 12 meeting. he then discussed recommended amendments to DFCs, dates, and clarifying language in applicable areas. He then referenced the summary table clarifying the November 12th GMA meeting minutes and process. After discussion, a recess was called at 10:28 am to allow for finalizing the resolution with the discussed amendments so it could be approved and signed at this meeting. The meeting reconvened at 10:49 am. After review of the amended resolution, questions for clarification were briefly discussed regarding values used from the last round of joint planning. Jim Totten posed questions regarding how variances apply. Mr. Westbrook and Alan Day provided clarification. Natalie Ballew of the Texas Water Development Board and Barbara Boulware-Wells, General Counsel representing POSGCD, provided further clarification. Jim Totten requested, and a recess was granted, at 11:00 am. The meeting reconvened at 11:12 am. Jim Totten and Steve Box had questions regarding the timeline for the Modeled Available Groundwater and Ms. Ballew advised.

   After discussion, David Van Dresar moved to accept and approve the amendments to the draft resolution and adopt the resolution as presented in the final draft before the members. Mr. Day seconded the motion. The motion passed unanimously.

8. **Schedule and process moving forward for adoption of DFCs**

   Much of the schedule and process moving forward was previously discussed during Agenda Item 7 by Ms. Ballew and Ms. Boulware-Wells. Ms. Ballew clarified that the requirement in statute that an explanatory report be presented to the TWDB within 60 days of adoption of DFCs begins today, November 30, 2021.

9. **Public Comment on non-agenda items**

   Andy Wier owns a Simsboro well. He wanted to bring to the attention of the board two recent reports. One report is from Robert Mace, where he looks at the use of aquifers in Texas. Mr. Weir states that the report from Robert Mace should be the guiding document

for DFCs and the best way to protect aquifers is to protect domestic and livestock wells. The second report is from Environmental Defense Fund.

John DeGomez posed a question in regards to the water requirements for the new Samsung plant coming to Taylor and how the new plant will affect his well.

No additional comments were made by those attending in person or online.

10. **Update from Texas Water Development Board**
    Ms. Ballew with TWDB did not provide any additional updates at this time.

11. **Agenda items and Date for next meeting**
    After discussion it was agreed an Agenda with appropriate content will be prepared for the next meeting to be scheduled sometime in Mid-January to consider the draft of the explanatory report for GMA 12.

12. **Adjourn**
    The meeting was adjourned at 11:28 am.

THE ABOVE MINUTES OF THE MEETING OF GROUNDWATER MANAGEMENT AREA 12 HELD ON NOVEMBER 30TH, WERE APPROVED AND ADOPTED BY GMA 12 ON 1/21/2022, ~~2021~~.

ATTEST:

Mid-East Texas Groundwater Conservation District

Fayette County Groundwater Conservation District

Brazos Valley Groundwater Conservation District

Lost Pines Groundwater Conservation District

Post Oak ~~Savannah~~ Groundwater Conservation District

GROUNDWATER MANAGEMENT AREA 12 MEETING
This meeting was held in person with virtual attendance and participation.
The meeting recording may be viewed at
https://posgcd.org/gma-12-agendas-minutes/

January 21, 2022 – 10:00 am

GMA 12 Members Present in Person

Gary Westbrook	POSGCD
Jim Totten	LPGCD
David Van Dresar	FCGCD
David Bailey	METGCD
Alan Day	BVGCD

GMA 12 Members Absent
None

Others Present in person	**Entity**
John Seifert	Groundwater Consultants, LLC
Paul Kirby	DB Stephens
Billy Sherrill	Lee County Landowner/Lost Pines GCD
Natasha Martin	Lost Pines GCD
Michael Simmang	Lost Pines GCD
Doug Box	POSGCD
Bobby Bazan	POSGCD
Courtney Gentry	POSGCD

Others Present online

Natalie Ballew	TWDB
Steve Box	Environmental Stewardship
Andrew Donnelly	Landowner
James Bené	R.W. Harden
Steve Young	Intera
Shan Rutherford	Terrill & Waldrop
Craig Andrews	POSGCD
Jeff Fisher	POSGCD
David Lynch	
Jennifer Nations	
Ron Anderson	
Wendi Pyle	FCGCD
AB	
646-961-3272	

MINUTES

1. **Invocation**
   The invocation was given by David Bailey.

2. **Pledge of Allegiance**
   Alan Day led the pledges to the flags of the United States and Texas.

3. **Call meeting to order and establish quorum**
   Gary Westbrook, serving as chair for this meeting, called the meeting to order at 10:03 am and noted that all voting members of GMA 12 were present in person.

4. **Welcome and introductions**
   GM Westbrook welcomed everyone to the hybrid meeting, both available in person and with virtual attendance and participation and thanked them for their attendance. Mr. Westbrook introduced the voting representatives of the districts in GMA 12. Mr. Westbrook introduced Natalie Ballew with TWDB attending online.

5. **Public Comment on Agenda Items**
   Mr. Westbrook reminded everyone the GMA encouraged comment and questions on each item. He invited public comment on agenda items from those attending in person. He also invited public comment from anyone attending online. No comments were made by those attending in person or online.

6. **Minutes of November 30, 2021 Groundwater Management Area (GMA 12) Meeting**
   Mr. Westbrook presented the minutes from the November 30, 2021 GMA 12 meeting and asked if there were any additions or corrections to the minutes. Jim Totten moved to approve the November 30, 2021 GMA 12 Meeting Minutes as presented. That motion was seconded by Alan Day. The motion carried unanimously.

7. **Discussion of and possible action on Explanatory Report to be submitted to the Texas Water Development Board during the most recent round of joint planning to adopt Desired Future Conditions (DFCs)**
   A presentation was given by John Seifert on behalf of the GMA 12 consultants. This presentation was a brief summary of the GMA 12 DFC Explanatory Report. Questions were welcomed by Mr. Seifert after his presentation was completed.

   David Van Dresar noted that the references to the appendices did not match and requested that be addressed before the finalized report is approved.

   Mr. Day asked if corrections had been made to match two tables referencing DFC values. Mr. Seifert noted this issue had been addressed.

   Mr. Totten requested to wait to approve the explanatory report after corrections had been made and Mr. Day requested a deadline be provided for any additional comments

or corrections so the report could be approved and adopted at the January 28, 2022 GMA 12 meeting.

Mr. Westbrook requested public comment before any action was taken. Steve Box stated he was interested in seeing a draft of the explanatory report before any action is taken. Mr. Westbrook stated the current draft is available on the POSGCD website. Mr. Box stated he would like to make comment on the draft report.

Natasha Martin, on behalf of Lost Pines GCD, stated that the statute does not require the GMA to accept comments on the Explanatory Report.

Mr. Westbrook invited further public comment. No additional comments were made.

After discussion, Mr. Day moved that the Draft Explanatory Report be reviewed by all and any corrections or comments be forwarded to Andy Donnelly by end of business next Tuesday, January 25, 2022 so corrections could be made to the report for consideration at the January 28, 2022 GMA 12 meeting. Mr. Van Dresar seconded this motion. The motion passed unanimously. There was no further discussion on this agenda item.

8. **Schedule and process moving forward**
   Mr. Westbrook asked for discussion on this item. All agreed to wait to discuss at the next GMA 12 meeting of January 28, 2022.

9. **Public Comment on non-agenda items**
   Mr. Westbrook invited public comment on non-agenda items. There were no comments offered by anyone attending in person or online.

10. **Update from Texas Water Development Board**
    Natalie Ballew gave the updates for the TWDB. Cindy Ridgeway has retired and Darren Hardwick is the new groundwater modeling manager.

    TWDB is considering expanding the amount of information given to the Districts in management plan runs to include a full water budget. More information on this will be presented at the TAGD business meeting in February.

    TWDB is working on a webpage on how to submit groundwater data to the Water Development Board. This will likely be out in a week or two.

    Natalie welcomed any questions on her updates. No questions were asked.

11. **Agenda items and Date for next meeting**
    The next GMA 12 Meeting will be Friday, January 28th, 2022 and the agenda is already posted.

12. **Adjourn**
    The meeting was adjourned at 10:35 am.

THE ABOVE MINUTES OF THE MEETING OF GROUNDWATER MANAGEMENT AREA 12 HELD ON JANUARY 21, 2022 WERE APPROVED AND ADOPTED BY GMA 12 ON JANUARY 28, 2022.

ATTEST:

____

Mid-East Texas Groundwater Conservation District

____

Fayette County Groundwater Conservation District

____

Brazos Valley Groundwater Conservation District

____

Lost Pines Groundwater Conservation District

____

Post Oak Savannah Groundwater Conservation District

APPENDIX C

GMA 12 RESOLUTION FOR PROPOSED DFCS DATED APRIL 22, 2021

Post Oak Savannah Groundwater Conservation District

310 East Avenue C
P. O. Box 92
Milano, Texas 76556

Phone: 512-455-9900
Fax: 512-455-9909
Website: www.posgcd.org

Gary Westbrook, General Manager

April 22, 2021

To: Groundwater Conservation Districts located in Groundwater Management Area 12

Re: Proposed Desired Future Conditions (DFCs)

The purpose of this packet is to fulfill requirements as set forth in Section 36.108, Texas Water Code (TWC), which requires proposed DFCs to be adopted not later than May 1, 2021, and then published for public hearings by each Groundwater Conservation District (GCD) in Groundwater Management Area 12 (GMA 12). Please refer to Section 36.108, TWC, for specific requirements of this section.

Tables 1, 2, and 3 list the DFCs proposed by GMA 12 during a GMA 12 meeting held on March 18, 2021, which had been properly noticed and posted as a public meeting. Please see attached signed minutes from that meeting.

Table 1. GMA 12 DFCs proposed for the Sparta, Queen City, Carrizo, Calvert Bluff, Simsboro, and Hooper aquifers.[1] Districts may adopt Proposed DFCs within a range of 10% above or below the values in the aquifers listed in Table 1.

GCD	Average Drawdown (ft) for Entire Aquifer						Time Period for Average Drawdown
	Sparta	Queen City	Carrizo	Calvert Bluff	Simsboro	Hooper	
Lost Pines	22	28	137	154	311	173	1/1/2010 to 12/31/2069
Brazos Valley	50	43	84	116	261	178	1/1/2000 to 12/31/2069
Post Oak Savannah	32	31	172	179	336	214	1/1/2010 to 12/31/2069
Mid-East Texas	25	21	49	59	81	73	1/1/2010 to 12/31/2069
Fayette County	40	65	122	na	na	an	1/1/2010 to 12/31/2069

[1] the proposed DFCs are based on Run 12 for the Updated Groundwater Availability Model for the central portion of the Sparta, Queen City, and Carrizo-Wilcox Aquifers (INTERA and others, 2020). Fayette County GCD did not propose a DFC for the Calvert Bluff, SImsboro, or the Hooper Aquifers because the district declared these three aquifers as non-relevant aquifers.

Table 2. GMA 12 DFCs proposed for the Yegua-Jackson Aquifer.[2] Districts may adopt Proposed DFCs within a range of 10% above or below the values in the aquifers listed in Table 2.

GCD	Average Drawdown (ft) for Entire Aquifer	Time Period for Average Drawdown
Brazos Valley	61	1/1/2000 to 12/31/2069
Post Oak Savannah	100	1/1/2010 to 12/31/2069
Mid-East Texas	7	1/1/2010 to 12/31/2069
Fayette County	77	1/1/2010 to 12/31/2069

[2] the proposed DFCs are based on Run 2 for the Groundwater Water Availability Model for the Yegua-Jackson Aquifer (INTERA and others, 2020). Lost Pines GCD did propose a DFC for the Yegua-Jackson Aquifer because the district declared the Yegua-Jackson Aquifer as a non-relevant aquifer.

Table 3. GMA 12 DFCs proposed for the Brazos River Alluvium.[3]

County	Desired Future Condition Statement
Milam County	A decrease of 5 feet in the average saturated thickness over the period from January 1, 2010 to December 31, 2069. The baseline average saturated thickness for 2010 is estimated at 24.5 feet and is based on an analysis of historical water level data and well depth values
Burleson County	A decrease of 6 feet in the average saturated thickness over the period from January 1, 2010 to December 31, 2069. The baseline average saturated thickness for 2010 is estimated at 38.5 feet and is based on an analysis of historical water level data and well depth values.
Brazos and Robertson Counties	Percent saturation above well depth shall average at least 30 percent for wells located north of State Highway 21 and 40 percent for wells located south of State Highway 21. If the percent saturation criteria are reached for three consecutive years then the DFC would be reached.

[3]the proposed DFCs remain the same as the current DFCs. The DFCs were checked with Run 2 for the Brazos River Alluvium GAM (Ewing and Jigmond, 2016)

References:

Deeds, N.E., T. Yan, A. Singh, T.L. Jones, V.A. Kelley, P.R. Knox, and S.C. Young. 2010. Groundwater availability model for the Yegua-Jackson Aquifer: Final report prepared for the Texas Water Development Board by INTERA, Inc., 582 p.

Ewing, J.E., and M. Jigmond. 2016. Final Numerical Model Report for the Brazos River Alluvium Aquifer Groundwater Availability Model, prepared for the Texas Water Development Board, August 2016.

INTERA, D.B. Stephens, and Groundwater Consultants, LLC. (2020). GMA 12 Update to the Groundwater Availability Model for the Central Portion of the Sparta, Queen City, and Carrizo-Wilcox Aquifers. prepared for the Groundwater Management Area 12 Members. November, 2020.

APPENDIX D

NOTICES AND MINUTES OF GCD PUBLIC HEARINGS ON PROPOSED GMA 12 DFCS

Agenda

BRAZOS VALLEY GROUNDWATER CONSERVATION DISTRICT
Regular Board Meeting
VIRTUAL ZOOM MEETING
June 10, 2021 – 2:00 p.m.

Notice is hereby given that the Board of Directors of the Brazos Valley Groundwater Conservation District will hold a Regular Board meeting on Thursday, June 10, 2021 at 2:00 p.m.
Due to recent concerns regarding COVID-19, this meeting will be held virtually.

You may join this free video-conference meeting from your computer, tablet or smartphone at:
https://zoom.us/j/91857196638

You can also dial in for audio only using your phone on either of these numbers:
+13462487799 US (Houston)
+16699006833 US (San Jose)

The Meeting ID # is:
918 5719 6638#

How to access the meeting using a computer or tablet
How to access the meeting using a smartphone

If you are new to Zoom meetings, you can download the app now and be ready when the meeting starts:
Website- zoom.us

You may participate with public comments during the meeting using a phone, computer or tablet simply by "raising your hand." Public comments will be taken at the beginning of the meeting during the public comment section on the agenda or during discussion of the agenda item. Public Comment will be limited to 3 minutes per person on each agenda item requested.

Call meeting to order
Pledge of Allegiance
Declare quorum present
Public Comment
- a) Non-agenda items
- b) Agenda items

1. Discussion and possible action on the Minutes of the May 13, 2021 Regular Board Meeting.
2. Review, discussion, and ratification of invoices paid for services rendered for the month of May 2021.
3. Financial Report – May 2021

4. Discussion and possible action relating to public comments received addressing the proposed 2021 Desired Future Conditions for the Sparta, Queen City, Carrizo, Calvert Bluff, Simsboro, Hooper, Yegua-Jackson, and Brazos River Alluvium aquifers.

5. Discussion and possible action on groundwater legislation filed for consideration during the 87th Legislative Session

6. Discussion and possible action on restarting in-person board meetings, public permit hearings, and public hearings

7. General Manager's Report

    a) Drought Monitor Report
    b) Wells permitted pursuant to District Rule 8.3(j)
    c) GMA 12 DFC Update
    d) District Business & Activities
    e) Management Plan Update

8. Discussion and possible future agenda items.

9. Adjourn

Signed this 4th day of June 2021

Alan M. Day, General Manager

The Board of Directors may meet in closed session, pursuant to the Texas Open Meetings Act, Texas Government Code §§ 551.071-551.076, to:

(1) consult with attorney ;
(2) deliberate regarding the purchase, exchange, lease, or value of real property if deliberation in an open meeting would have a detrimental effect on the position of the District in negotiations with a third person;
(3) deliberate a negotiated contract for a prospective gift or donation to the District if deliberation in an open meeting would have a detrimental effect on the position of the District in negotiations with a third person;
(4) to deliberate the appointment, employment, evaluation, reassignment, duties, discipline or dismissal of a Board member or District employee;
(5) to receive information from employees or question employees, but not deliberate public business or agency policy that affects public business; and
(6) to deliberate the deployment or specific occasions for implementation of security personnel or devices.

The Board may also meet in open session on these matters as required by the Texas Open Meetings Act, Texas Government Code § 551.102.

** **Agenda items may be taken out of order at the discretion of the Board Chairman**

Minutes

BRAZOS VALLEY GROUNDWATER CONSERVATION DISTRICT

Public Hearing for Comments, Public Permit Hearing and Regular Board Meeting

VIRTUAL ZOOM MEETING

Thursday, June 10, 2021 at 2:00 p.m.

Pete Brien, called the meeting to order at 2:00 p.m.

Directors present:	Pete Brien	Vice-President
	David Stratta	Treasurer
	Jayson Barfknecht	Secretary
	Mark Carrabba	Director
	Gary Mechler	Director
	Linda Pecina	Director
Absent:	Stephen Cast	President
	Chris Zeig	Director
Staff present:	Alan M. Day	General Manager
	Cynthia Lopez	Office Manager
	Megan Haas	Education Coordinator/WRS
	Monique Norman	Attorney
	John Seifert	Hydrologist

Public Hearing for Comments - Proposed Desired Future Conditions for Area Aquifers

Comments received from:
Steve Box, Environmental Stewardship
Michelle Gangnes

Public Permit Hearing

Call Permit Hearing to order
Roll call of members present
Declare a Quorum

1. Discussion and possible action on the following **Historic Use & Operating Permit Corrections:**

- **One (1) existing well for Michael & Carolyn Lampe- Well #1 (BVHU-0152)** located at N 30.91818878° W 96.31282056° 0.38 miles NE of the intersection of Nichols Road and Edge Cut Off Road in Brazos County for Agricultural use. General Manager seeks to amend the existing permit to properly identify the aquifer of origin. The well produces from the Queen City Aquifer.

- **One (1) existing well for Michael & Carolyn Lampe- Well #2 (BVHU-0153)** located at

N 30.91828986° W 96.31293191° 0.39 miles NE of the intersection of Nichols Road and Edge Cut Off Road in Brazos County for Agricultural use. General Manager seeks to amend the existing permit to properly identify the aquifer of origin. The well produces from the Queen City Aquifer.

- **One (1) existing well for Michael & Carolyn Lampe- Well #3 (BVOP-0275)** located at N 30.91728918° W 96.31168617° 0.41 miles ENE of the intersection of Nichols Road and Edge Cut Off Road in Brazos County for Agricultural use. General Manager seeks to amend the existing permit to properly identify the aquifer of origin. The well produces from the Queen City Aquifer.

- **One (1) existing well for Michael & Carolyn Lampe- Well #4 (BVOP-0276)** located at N 30.91728918° W 96.31033756° 0.46 miles E of the intersection of Nichols Road and Edge Cut Off Road in Brazos County for Agricultural use. General Manager seeks to amend the existing permit to properly identify the aquifer of origin. The well produces from the Queen City Aquifer.

A motion was made by David Stratta, second by Mark Carrabba to approve the corrections to four (4) existing permits for Michael & Carolyn Lampe properly identifying the aquifer of origin as the Queen City Aquifer on all permits. A roll-call vote was taken. The motion passed unanimously.

2. Discussion and possible action on the following **Drilling/Operating Permit Applications:**

- **One (1) new well for Midwest Poultry Services, LP - Well #1 (BVDO-0280)** – Located at: N 30.796414° W 96.246658° 0.31 miles ESE of the intersection of Fickey Road and E SH-21 in Brazos County for **Agricultural** use. The well will produce from the Sparta Aquifer.

- **One (1) new well for Midwest Poultry Services, LP - Well #2 (BVDO-0281)** – Located at: N 30.795081° W 96.246800° 0.37 miles SE of the intersection of Fickey Road and E SH-21 in Brazos County for **Agricultural** use. The well will produce from the Sparta Aquifer.

- **One (1) new well for Midwest Poultry Services, LP - Well #3 (BVDO-0282)** – Located at: N 30.792236° W 96.246731° 0.54 miles SSE of the intersection of Fickey Road and E SH-21 in Brazos County for **Agricultural** use. The well will produce from the Sparta Aquifer.

A motion was made by Mark Carrabba, second by David Stratta to approve the (3) three new permits for Midwest Poultry Services, LP for Drilling/Operating permits in the Sparta Aquifer. A roll-call vote was taken. The motion passed unanimously.

3. Adjourn Permit Hearing

Regular Board Meeting

Call meeting to order
Pledge of Allegiance
Public Comment
a) Non-agenda items – No comments
b) Agenda items – No comments

1. Discussion and possible action on the Minutes of the May 13, 2021 Regular Board Meeting. **A motion was made by Jayson Barfknecht, second by Linda Pecina to approve the Minutes of the May 13,**

2021 Regular Board Meeting as presented. A roll-call vote was taken. The motion passed unanimously.

2. Review, discussion, and ratification of invoices paid for services rendered for the month of May 2021. **A motion was made by Gary Mechler, second by Jayson Barknecht to approve the ratification of invoices paid for services rendered for the month of May 2021. A roll-call was taken. The motion passed unanimously.**

3. Financial Report – May 2021 **A motion was made by Linda Pecina, second by Mark Carrabba to approve the Financial Reports for the month of May 2021 as presented. A roll-call was taken. The motion passed 5-1 with David Stratta opposing.**

4. Discussion and possible action relating to public comments received addressing the proposed 2021 Desired Future Conditions for the Sparta, Queen City, Carrizo, Calvert Bluff, Simsboro, Hooper, Yegua-Jackson, and Brazos River Alluvium aquifers. **No action taken**.

5. Discussion and possible action on groundwater legislation filed for consideration during the 87th Legislative Session. **No action taken.**

6. Discussion and possible action on restarting in-person board meetings, public permit hearings, and public hearings. **No action taken. General Manager will contact the Board President to express the desire of the Board members present to resume in-person meetings.**

7. General Manager's Report
   a) Drought Monitor Report
   b) Wells permitted pursuant to District Rule 8.3(j)
   c) GMA 12 DFC Update
   d) District Business & Activities
   e) Management Plan Update

8. Discussion and possible future agenda items.

9. Adjourn @ 4:05 p.m.

Signed this 8th day of July 2021

Jayson Barfknecht

Jayson Barfknecht, Secretary

The Bo Board of Directors may meet in closed session, pursuant to the Texas Open Meetings Act, Texas Government Code §§ 551.071-551.076, to:

(1) consult with attorney ;
(2) deliberate regarding the purchase, exchange, lease, or value of real property if deliberation in an open meeting would have a detrimental effect on the position of the District in negotiations with a third person;
(3) deliberate a negotiated contract for a prospective gift or donation to the District if deliberation in an open meeting would have a detrimental effect on the position of the District in negotiations with a third person;
(4) to deliberate the appointment, employment, evaluation, reassignment, duties, discipline or dismissal of a Board member or District employee;
(5) to receive information from employees or question employees, but not deliberate public business or agency policy that affects public business; and
(6) to deliberate the deployment or specific occasions for implementation of security personnel or devices.

The Board may also meet in open session on these matters as required by the Texas Open Meetings Act, Texas Government Code § 551.102.

** **Agenda items may be taken out of order at the discretion of the Board Chairman**

Fayette County Groundwater Conservation District

255 Svoboda Lane, Room 115
La Grange, Texas 78945
Telephone: (979) 968-3135
Fax: (979) 968-3194

FILED
MAY 24 2021
9:20 AM
Brenda Fietsam
BRENDA FIETSAM
CO. CLERK, FAYETTE CO., TEXAS

NOTICE OF PUBLIC HEARING ON PROPOSED DESIRED FUTURE CONDITIONS ADOPTED BY GROUNDWATER MANAGEMENT AREA 12

Notice is hereby given that a public hearing by the Fayette County Groundwater Conservation District will be held on the **12th day of July 2021, at 9:30 a.m.** in the **Fayette County Agricultural Building, 255 Svoboda Lane, Conference Room 104, La Grange, Texas**, at which time the following subjects will be discussed, to wit:

The Fayette County Groundwater Conservation District is currently receiving public comments on the proposed desired future conditions for the area aquifers that were recently adopted by Groundwater Management Area 12 under §36.108, Texas Water Code. Groundwater Management Area 12 includes the groundwater conservation districts as follows: Brazos Valley GCD, Fayette County GCD, Lost Pines GCD, Mid-East Texas GCD, and Post Oak Savannah GCD. The proposed desired future conditions and supporting materials for the area aquifers are available at the District's office at 255 Svoboda Lane, Room 115, La Grange, TX 78945 or on the District's website at www.fayettecountygroundwater.com. The District will hold a public hearing on the proposed desired future conditions on July 12, 2021 at 9:30 a.m., at the Fayette County Agricultural Building, 255 Svoboda Lane, Conference Room 104, La Grange, Texas. Public comments will be accepted by the District through August 23, 2021, at the District office, by mail or email, or at the public hearing. For more information, please call David Van Dresar, Fayette County GCD General Manager, at (979) 968-3135.

Proposed Desired Future Conditions for Fayette County Groundwater Conservation District in GMA 12 are:

Aquifer	Sparta	Queen City	Carrizo	Wilcox (All portions)	Yegua Jackson
Average Drawdown (in feet) 01/01/2010 to 12/31/2069	40	65	122	N/A (Fayette County GCD has declared this aquifer non-relevant for planning purposes)	77

Public Hearing to be held on Monday, July 12, 2021 at 9:30 a.m., in Conference Room 104, located in the Fayette County Agricultural Building, 255 Svoboda Lane, La Grange, Texas, 78945.

Agenda items may be considered, deliberated and/or acted upon in a different order then set forth above.

At any time during the meeting and in compliance with the Texas Open Meetings Act, Chapter 551, Government Code, Vernon's Texas Codes, Annotated, the Fayette County Groundwater Conservation District Board may meet in executive session on any of the above agenda items for consultation concerning attorney-client matters (§551.071); deliberation regarding real property (§551.072); deliberation regarding prospective gifts §551.073 ; personnel matters (§551.074); and deliberation regarding security devices (§551.076). Any subject discussed in executive session may be subject to action during an open meeting.

Fayette County
Groundwater Conservation District

255 Svoboda Lane, Room 115
La Grange, Texas 78945
Telephone: (979) 968-3135
Fax: (979) 968-3194

MINUTES
Of the July 12, 2021
Public Hearing to Accept Public Comments on the Proposed Desired Future Conditions for Groundwater Management Area 12 and Groundwater Management Area 15

Directors Present: Cynthia Rodibaugh, Leo Wick, Sr., Terry Hays, Harvey Hayek, Robert Leer
Directors Absent: None
Others Present: David A. Van Dresar, General Manager; Wendi Pyle, Administrative Assistant; Monique Norman, Legal Counsel; Paul Kirby, Daniel B. Stephens & Associates; Grover Slade of Muldoon, Bob Duncan of Flatonia, Jim Merryman of Round Top, Mike Turner of La Grange, Larry Ripper of La Grange, H. Mercer of Round Top, Linda Curtis of Bastrop, Andy Weir of Bastrop, Pat Topping of West Point, Bob Horn of Schulenburg, Keith Sharp of Round Top, Carol and Roger Daniels of La Grange, Leonard Schulze and Wendy McCredie of La Grange, Bill Bishop of La Grange, Kent Babcock of La Grange, Dianne Raef of Flatonia, Steve Box of Bastrop, James Elias of La Grange, Stan Eilers of Fayetteville, Jill Eilers of Fayetteville, Lemae Higgs of Schulenburg, Wallace Brown of Schulenburg, Wanda Brown of Schulenburg, Myrlene Jack of Elgin, Andy Behlen of the Fayette County Record, Bill Keating of La Grange, L.J. Calley of Fayetteville, Jeff Parker of La Grange, Edwin Barta of Flatonia, Michele Gangnes of Lexington, Michael Mazoch of Schulenburg, Susan Ragan of Paige, Bert Cole of Muldoon

The Public Hearing was called to order by President Wick at 9:33 a.m., on July 12, 2021, at the Fayette County Agricultural Building Conference Room 104 located at 255 Svoboda Lane, in La Grange, Texas.

President Wick, read aloud the purpose of the public hearing and stated that the speakers were allowed five minutes to speak. President Wick called for comments regarding GMA 12 first.

Of the 37 members of the public present, eight persons signed the list to speak to the board.

President Wick call Linda Curtis to speak first. Ms. Curtis provided written comments to the board. Ms. Curtis stated she is a resident of Bastrop County and her affiliations. Ms. Curtis discussed socioeconomic impacts that are reasonably expected to occur when adopting desired future conditions. Ms. Curtis asked the board to consider all criteria, including socioeconomic impacts, prior to developing the desired future conditions. Ms. Curtis discussed growth in San Antonio and the Vista Ridge pipeline

project in Burleson County. She stated that San Antonio didn't need the Vista Ridge water when it began its plan to be the fastest growing city in central Texas and it doesn't need it now. Ms. Curtis stated that rural landowners and their aquifers are paying the price. Ms. Curtis said that people are leaving Austin to eastern counties and more people are moving to central Texas especially from California. She stated the board can see the folly in sacrificing the aquifers in central Texas for real estate development in drier areas calling it the California Water Model. If we damage the aquifers everyone loses. Ms. Curtis again asked the board to reconsider the desired future conditions with a deeper look at the socioeconomic impact.

President Wick called on Andy Weir to speak. Mr. Weir provided written comment. Mr. Weir stated that he is a Bastrop County resident in the Lost Pines GCD. He stated that he has been participating, for the last year and a half, in the desired future conditions process in GMA 12 as a member of the Simsboro Aquifer Water Defense Fund, a non-profit working with land owners in Milam, Burleson, Lee, and Bastrop counties. Mr. Weir stated that he got involved in the process because he has a 700 foot deep well and a large utility bought the property across the road from him and want to put in eight municipal wells. This would drop the water in his well 300 feet. Mr. Weir stated that there has to be some sort of balance between production and water rights and conservation of the aquifer. Mr. Weir stated that he has mapped out the hydrology of the aquifers and the trend is we are slowly dewatering them. Mr. Weir advised the board that, though Fayette County GCD is a small part of GMA 12, we are part of the decision making process and we should care about it. Mr. Weir stated that the decision making process has been deficient. Mr. Weir informed the board of a discussion at the last GMA 12 meeting and quoted a statement made that we have become too reliant on the computer model, it is not being used to evaluate; it is being used to make the decision. He stated that this has been known about since 2016. Mr. Weir stated that only permits, on the books in every district, were put into the computer with no regard to the harm of other municipal wells, domestic and livestock wells, of the Colorado River. He stated that no one asked to take out so many acre feet for domestic and livestock wells, or so many acre feet for the Colorado River, or so many acre feet because the aquifer doesn't recharge that fast. Mr. Weir stated the he has looked at the trends and the model and found that the water levels will be below the top of the formations as the years go by and the people that drilled into that will not be able to get water. Mr. Weir pointed to an article in the Fayette County Record regarding a comment from staff stating the when the population in the state is going to double, you can't protect a 200 foot well that was maybe drilled in the 70's. Mr. Weir presented a list in the Fayette County GCD of 104 wells that are located in GMA 12 that are 200 feet or less. He stated that there are 1200 wells in the GMA 12 part of the county. Mr. Weir stated that staff saying that those people have no groundwater rights, they are not to be considered in these desired future conditions and he feels that is wrong. He stated that the state law, the water code, doesn't talk about the depth of your well; either you have water rights or you don't. Mr. Weir stated let's honor all of them, let's ask those other questions. He asked the board to reject the desired future conditions proposed and stated we can do a better job.

President Wick called on Pat Topping to speak. She did not wish to speak.

President Wick called on Steve Box to speak. Mr. Box provided written comments. Mr. Box introduced himself and stated that he was with Environmental Stewardship. Mr. Box reminded the board of his presentation at the meeting in June where he addressed the technical reasons why, based on predictive damages to the surface water, he requested the board to reject the proposed desired future conditions and send them back for revision. Mr. Box stated that he wanted to address a common issue facing the members of GMA 12, though resolving the common issue will not resolve or mitigate the issues related to surface waters that was discussed last month. Mr. Box stated the management policies and practices

within GMA 12 districts are in a state of flux largely due to challenging and novel issues faced by some of those districts. Mr. Box said that an important concept has been overlooked leading to an error that is embedded in the proposed desired future condition that is based on pumping file S-12. Mr. Box spoke on comments made at a Brazos Valley GCD hearing regarding the standard that all districts use the same criteria used in setting the pumping in the pumping file used to set the desired future conditions in all five districts is not necessarily and imperative of the joint planning process. Mr. Box stated that the logical conclusion is that each district and board should be able to make the decision on whether the district include all permits in the pumping file, without the consideration being dictated by the other districts. He said districts are not required to be homogenous in their plans, pumping file, and curtailment strategies, under the water code. He added that joint planning under the water code is supposed to help all districts accomplish their individual management goals as reflected in their management plans. Mr. Box spoke on how the districts, as a joint planning body only, are to consider the effectiveness of the individual management plans of the other districts for conserving and protecting the groundwater and preventing waste, how the individual district's management goals achieve that district's desired future condition, how those desired future conditions impact the planning of the entire management area, and the effectiveness of these measures in managing in the management area in general. Mr. Box stated that groundwater districts, not the groundwater management area, are the state's preferred managers of the groundwater. Mr. Box said it was inappropriate for districts, as a group, to require all districts to take a uniform approach across all the districts to the pumping file upon which the desired future conditions are based. He stated each district is responsible to its on electorate to adopt its own pumping and curtailment strategy, so the pumping file should reflect each district's own approach. Nothing about participating in the GMA is intended to undermine the autonomy of the districts. Mr. Box added that it certainly includes all the districts to balance pumping against the conservation, while retaining their ability to curtail or slow down when damage is imminent. Mr. Box stated that instead of that happening four of the districts inappropriately imposed their will onto the fifth district rather than reaching a workable and agreeable resolution that works for all the districts. Mr. Box said the reasons behind the other for districts doing so were never clearly articulated, however the threat of litigation clearly seemed to play a role. Mr. Box pointed to a letter from Vista Ridge to Post Oak Savannah GCD as a cause. Mr. Box then spoke on Post Oak Savannah GCD giving its plea to the other districts why it was opposed to using the S-12 pumping file. Mr. Box stated that Post Oak Savannah GCD will not be able to do any management because you can't curtail until you approach those desired future conditions because these new desired future conditions would have to be allowed. Mr. Box stated the in the vote that followed the other four districts inappropriately forced their will on Post Oak Savannah and eliminated Post Oak Savannah's ability to curtail the Vista Ridge project even though, after only six months pumping, dozens of domestic wells in Burleson and Lee counties are being damaged. He stated that damage to the aquifers in the counties will continue for many decades unless these desired future conditions are revised. Mr. Box stated that their overarching concern is that unresolved management policies developed rapidly over the last nine months and resulted in the districts' inappropriately imposing requirements on another district. These flawed policies are embedded in the proposed desired future conditions and will have serious, immediate, and future consequences on management policies within the individual districts. Most urgently the impact of changes in management policies that have direct negative impacts on the ability of districts to manage curtailment of pumping needs to be resolved and agreed policies adopted by the individual districts before the new desired future conditions are adopted. Mr. Box respectfully requested the board to reject the proposed desired future conditions and remand them back to the GMA representatives for further revisions.

President Wick called on Keith Sharp to speak. Mr. Sharp passed.

President Wick called on Leonard Shulze to speak. Mr. Shulze passed.

President Wick called on Susan Ragan to speak. Ms. Ragan passed.

President Wick called on Bert Cole to speak. Ms. Cole introduced herself of Muldoon. Ms. Cole stated that this is her first meeting to attend and she is trying to learn how to participate. Ms. Cole stated that they have a very small ranch and they are entirely dependent upon their well. She is concerned that she is one of the ones that they may consider no water rights for. Ms. Cole stated that this is an important factor in their living here. Ms. Cole stated the she appreciated the board's concern in representing all of us. Ms. Cole stated that she hoped the board would reject this.

President Wick called on any speakers for GMA 15. There were no comments for GMA 15.

Mr. Van Dresar advised the board that three additional comments have been received, to date, and reminded those present that the comment period is open until August 23. He invited written or called in comments for either of the GMAs.

There being no further comments or questions, President Wick asked for a motion to adjourn. Mr. Leer made the motion to adjourn the public hearing. Mr. Hays seconded the motion and the motion carried. President Wick adjourned the public hearing at 10:03 a.m.

Leo Wick, Sr., President

Cynthia Rodibaugh, Secretary Treasurer

LOST PINES GROUNDWATER CONSERVATION DISTRICT

Board Meeting
Wednesday, August 18, 2021 – 6:00 p.m.
Bastrop Convention & Exhibit Center
1408 Chestnut Street
Bastrop, TX 78602

IN-PERSON AND REMOTE ATTENDANCE OPTIONS

INSTRUCTIONS FOR REMOTE PARTICIPATION ARE ATTACHED

IN PERSON*/TELEPHONIC/VIDEO CONFERENCE MEETING PURSUANT TO THE OFFICE OF THE GOVERNOR'S TEMPORARY SUSPENSION OF CERTAIN OPEN MEETINGS ACT LAWS DUE TO THE NOVEL CORONAVIRUS

***NOTE: IN PERSON ATTENDANCE IS LIMITED TO THE FIRST 80 PEOPLE**

The subjects to be discussed or considered, or upon which any formal actions may be taken, are as listed below. Items may or may not be taken in the same order as shown on the meeting notice.

1) Call to Order – President Michael Talbot
2) Welcome and Introductions.
3) Virtual and In Person Public comments – limit 3 minutes each person.
   a) Non-agenda items
   b) Agenda Items
4) Public Hearing to receive public comments on the proposed Desired Future Conditions for the area aquifers that were recently adopted by Groundwater Management Area 12 (GMA 12) under Texas Water Code §36.108. GMA12 includes the groundwater conservation districts as follows: Brazos Valley Groundwater Conservation District, Fayette County Groundwater Conservation District, Lost Pines Groundwater Conservation District, Mid-East Texas Groundwater Conservation District, and Post Oak Savannah Groundwater Conservation District.
5) Discussion and consideration of agenda calendar and events.

Adjourn.

Date: _____ _____
Peggy Campion, Secretary

Note on Executive Session: The Board may recess into Executive Session to consult with its attorneys regarding any posted matter in which the Board may seek the advice of its attorneys under Government Code 551.071 or for any action on the agenda for which a closed session is permitted by law, and will reconvene in open session for any appropriate action on any matter considered in Executive Session.

Note on Public Comments: The Board will receive comments from the public on any matters within the jurisdiction of the Lost Pines Groundwater Conservation District. However, the Board will not hear public comments related to any contested case hearing or other litigation matter that is subject to a prohibition on ex parte communications (including a contested permitting matter) between the conclusion of the public hearing for such matter and the date the Board considers a proposal for decision or renders a final decision on the matter. The Board will not take action on public comments, but may request that matters addressed during public comments be placed on a future agenda for consideration.

Persons with disabilities who plan to attend the District's agenda and who may need auxiliary aids or services such as interpreters for persons who are deaf or hearing impaired, readers, large print, or Braille are requested to contact Peggy Campion, Assistant Secretary, at 512-360-5088 at least two (2) work days prior to the agenda, so that appropriate arrangements can be made. Persons who desire the assistance of an interpreter in conjunction with their oral presentation at this district agenda are requested to contact Peggy Campion, Assistant Secretary, at 512-360-5088 at least five (5) days prior to the agenda so that appropriate arrangements can be made.

{INSTRUCTIONS FOR REMOTE PARTICIPATION IN THE MEETING FOLLOW}

LOST PINES GROUNDWATER CONSERVATION DISTRICT

Public Hearing
Wednesday, August 18, 2021 – 6:00 p.m.

INSTRUCTIONS FOR REMOTE ATTENDANCE VIA THE PUBLICLY ACCESSIBLE WEBINAR LINK OR TELEPHONE CONFERENCE CALL

Information on how to participate in the public meeting remotely is provided below. The agenda for this board meeting immediately precedes these instructions for participation. You can provide written public comment in advance of the meeting to lpgcd@lostpineswater.org or live during the meeting via the webinar link or conference call number provided below.

INSTRUCTIONS FOR MEETING PARTICIPATION AND ATTENDANCE

Audio and Video Conference Opens at 5:50 PM

The Meeting will begin at 6:00 PM

Participation via the audio and video conference will be allowed in the board meeting during public comment or any posted agenda item. If you plan to make public comment during any portion of the meeting, please do the following:

1. Contact the District at 512-360-5088 or lpgcd@lostpineswater.org to register as a speaker during public comment or on any agenda item by noon on Tuesday, August 17th. Please indicate whether you would like to speak during public comment and/or a specific item on the agenda. Any person participating in the meeting must be recognized and identified by the presiding officer before they speak.

2. Log in to the Zoom video conference *OR* dial in to the conference call using the information below:

Zoom Meeting Link:
https://us02web.zoom.us/j/86967611544?pwd=Tld6SlRScnVDdnROVjM0ZHdhWVloUT09
Meeting ID: 869 6761 1544

Telephone conference:
Phone number: Dial +1 346 248 7799
Meeting ID: 869 6761 1544 #
Passcode: 833583 (if prompted)
You may be prompted for a passcode. Press # to bypass entering a passcode.

3. Persons with disabilities who plan to attend the District's agenda and who may need auxiliary aids or services such as interpreters for persons who are deaf or hearing impaired, readers, large print, or Braille are requested to contact Peggy Campion, Assistant Secretary, at 512-360-5088 at least two (2) work days prior to the agenda, so that appropriate arrangements can be made. Persons who desire the assistance of an interpreter in conjunction with their oral presentation at this district agenda are requested to contact Peggy Campion, Assistant Secretary, at 512-360-5088 at least five (5) days prior to the agenda so that appropriate arrangements can be made.

LOST PINES GROUNDWATER CONSERVATION DISTRICT

Board Meeting
Wednesday, August 18, 2021 – 6:00 p.m.
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   a) Non-agenda items
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5) Discussion and consideration of agenda calendar and events.

Adjourn.

Date: August 13, 2021

Peggy Campion, Secretary

FILED AND RECORDED

AUG 13 2021

SHARON BLASIG
COUNTY CLERK, LEE COUNTY, TEXAS

FILED

AUG 13 2021 8:56 AM

Rose Pietsch
Bastrop County Clerk

3746394.v1

Note on Executive Session: The Board may recess into Executive Session to consult with its attorneys regarding any posted matter in which the Board may seek the advice of its attorneys under Government Code 551.071 or for any action on the agenda for which a closed session is permitted by law, and will reconvene in open session for any appropriate action on any matter considered in Executive Session.

Note on Public Comments: The Board will receive comments from the public on any matters within the jurisdiction of the Lost Pines Groundwater Conservation District. However, the Board will not hear public comments related to any contested case hearing or other litigation matter that is subject to a prohibition on ex parte communications (including a contested permitting matter) between the conclusion of the public hearing for such matter and the date the Board considers a proposal for decision or renders a final decision on the matter. The Board will not take action on public comments, but may request that matters addressed during public comments be placed on a future agenda for consideration.

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{INSTRUCTIONS FOR REMOTE PARTICIPATION IN THE MEETING FOLLOW}

FILED AND RECORDED

AUG 13 2021

SHARON BLASIG
COUNTY CLERK, LEE COUNTY, TEXAS

LOST PINES GROUNDWATER CONSERVATION DISTRICT

Public Hearing
Wednesday, August 18, 2021 – 6:00 p.m.

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Meeting ID: 869 6761 1544

Telephone conference:
Phone number: Dial +1 346 248 7799
Meeting ID: 869 6761 1544 #
Passcode: 833583 (if prompted)
You may be prompted for a passcode. Press # to bypass entering a passcode.

3. Persons with disabilities who plan to attend the District's agenda and who may need auxiliary aids or services such as interpreters for persons who are deaf or hearing impaired, readers, large print, or Braille are requested to contact Peggy Campion, Assistant Secretary, at 512-360-5088 at least two (2) work days prior to the agenda, so that appropriate arrangements can be made. Persons who desire the assistance of an interpreter in conjunction with their oral presentation at this district agenda are requested to contact Peggy Campion, Assistant Secretary, at 512-360-5088 at least five (5) days prior to the agenda so that appropriate arrangements can be made.

FILED AND RECORDED

AUG 13 2021

SHARON BLASIG
COUNTY CLERK, LEE COUNTY, TEXAS

Lost Pines Groundwater Conservation District

Board of Directors Agenda Minutes

Wednesday, August 18, 2021

The Board of Directors convened at 6:10 p.m. in an in person/telephonic/video conference meeting pursuant to public notice having been given, pursuant to the Office of the Governor's temporary suspension of certain open meetings act laws due to the novel coronavirus. The following members of the Board attending in person were: President Michael Talbot; Secretary-Treasurer Michael Simmang; Directors: Herbert Cook, Phil Cook, David Fleming, Billy Sherrill and Carl Steinbach. Vice-President Smith and Directors Kathryn Rogers and Larry Schatte attended virtually.

Staff members present: Jim Totten, General Manager; and Peggy Campion.

Consultants present: Natasha Martin, District Counsel and Andy Donnelly, Hydrogeologist.

1. President Talbot called the meeting to order.

2. Welcome and introductions.

3. *Public Comments.* President Talbot explained the process in which public comments would be heard. The Board heard comments from the public on non-agenda items.

4. *Public hearing to receive public comments on the proposed Desired Future Conditions for the area aquifers that were recently adopted by Groundwater Management Area 12 (GMA 12) under Texas Water Code 36.108. GMA 12 includes the groundwater conservation districts as follows: Brazos Valley Groundwater Conservation District, Fayette County Groundwater Conservation District, Lost Pines Groundwater Conservation District, Mid-East Texas Groundwater Conservation District, and Post Oak Savannah Groundwater Conservation District.* President Talbot opened the public hearing and called for public comments. The Board heard comments from Linda Curtis, Judith McGeary, Steve Chamberlain, Nancy McKee, Hugh Brown, Ernest Bogart, Andrew Weir, Kermit Heaton, Barbara Bogart, Allison Jones, John DeGomez, Bill Rhodes and Terry Wilson. At the conclusion of public comments, Linda Curtis asked if public comments could be submitted in writing after the Board meeting. Based on advice from District Counsel, President Talbot said the deadline to submit written comments was the close of the public hearing. General Manager Totten also stated that all written comments would be sent to the Board members. Director Fleming then moved to close the public hearing. Director Steinbach seconded the motion, which carried unanimously.

5) *Discussion and consideration of agenda calendar and events.* There were none at this time.

President Talbot adjourned the meeting at 7:19 p.m.

Approved:

Sheril Smith, President

Michael Simmang, Secretary-Treasurer

MID-EAST TEXAS GROUNDWATER CONSERVATION DISTRICT

Board Meeting/Public Hearing
Tuesday, June 22, 2021, at 6:00 PM
Freestone County Courthouse
County Courtroom
Fairfield, Texas

COPY
Original Filed
AT 1:58 O'CLOCK P M
JUN 17 2021
SUSANNE MORRIS, Madison County Clerk
BY Heidi Ellis DEPUTY
Copies NOT Compared HEIDI ELLIS

AGENDA

The subjects to be discussed or considered, or upon which any formal actions may be taken, are as listed below. Items may or may not be taken in the same order as shown on the meeting notice.

1. Call to Order for Public Hearing to receive report from District Hydrologist and comments regarding the proposed Desired Future Conditions for Groundwater Management Area 12.
2. Adjournment of Public Hearing for Agenda Item #1.
3. Call to Order for Public Hearing to receive comments regarding the consideration of Water Well Drilling Operating Permits for NSE Lonestar, LLC in Freestone County.
4. Adjournment of Public Hearing for Agenda Item #3.
5. Call to Order for Board Meeting by presiding officer.
6. Review and Action of Minutes of April 27, 2021, Board of Directors Meeting/Public Hearing.
7. Public Comments. *
8. Consideration and possible action on Water Well Drilling/Operating Permits requested by NSE Lonestar, LLC for three (3) water wells located in Freestone County approximately 3.5 miles north of Fairfield on the 1,414.1-acre Outlaw Ranch to produce groundwater for the beneficial purpose of aquaculture/irrigation at a cumulative rate of 950 gallons per minute. The total requested annual volume of groundwater to be produced is 1,534.44 acre-feet. This is a refilling of previously submitted applications that have expired.
9. Manager's Report of District activity since April 27, 2021, and upcoming events:
   a. Texas Alliance of Groundwater Districts (TAGD) Committee meetings via webinar – May 11 & 17, 2021.
   b. TAGD Business Meeting, Austin – June 8-9, 2021.
   c. District Reports: Drought Report, Investment Report, Well Registration/Permit Report
   d. Upcoming Events: GMA 12 Joint Planning meeting, Milano – 6/24/2021; 10th Annual Groundwater Summit, San Antonio – 8/31-9/3/2021.
10. Bills received and current financial status.
11. Set date, time, and location of next meeting.
12. Adjourn.

Signed this 17th day of June 2021.

David M. Bailey, General Manager
101 W. Main Ste B-22, Madisonville Texas
Phone: (936) 348-3212

The Mid-East Texas Groundwater Conservation District is committed to compliance with the Americans with Disabilities Act (ADA). Reasonable accommodations and equal opportunity for effective communications will be provided upon request. Please contact the district office at 936-348-3212 at least 24 hours in advance if accommodation is needed.

During the meeting, the Board reserves the right to go into closed session for any of the following purposes: real estate, consultation with an attorney, or personnel matters under V.T.C.A., Government Code Sections 551.072, 551.071, and 551.074, respectively, or for any item on the above agenda for which a closed session is permitted by law.

*Public comments will be limited to three (3) minutes from each individual desiring to speak. Board members are prohibited by law from discussing matters presented under this item, except for placement on a future agenda.

MINUTES
MID-EAST TEXAS GROUNDWATER CONSERVATION DISTRICT
DIRECTORS MEETING/PUBLIC HEARING
June 22, 2021, 6:00 PM
Fairfield, Texas

Members present:
John Fryer, President
George Holleman, Vice President
William Parten, Secretary
Elyse Schill, Director
Clyde Woods, Director
Jim Nash, Director
Clark Osborne, Director

Also present:
David Bailey, General Manager
Matt Uliana, Hydrogeologist
Greg Ellis, Attorney
several guest (see attached list)

President Fryer opened with a brief introduction of board members along with Greg Ellis, attorney for the District, Matt Uliana, Hydrogeologist, and David Bailey, General Manager for the District.

A Public Hearing was called to order by President Fryer at 6:01 pm to hear an explanation of the Groundwater Management Area (GMA) 12 Joint Planning as it relates to proposed Desired Future Conditions (DFC) and to receive comments during and after Dr. Uliana's presentation. Written comments were presented to the board from Miriam Vaughn and Elena Solimano of Perales, Allmon & Ice, P.C. Verbal comments were provided by the following individuals in attendance at the public hearing pertaining to the proposed DFCs: Anita Bradley, Russell Rantt, David Walker, Lisa Robertson, Andy Wier, Tim Telton, Linda Curtis, and Ken Sessions. A further explanation of the DFC process was provided by Greg Ellis.

After hearing all public comments and explanations regarding the proposed DFC's as approved by GMA 12, the public hearing portion of the meeting was adjourned at 7:02 pm.

Next, President Fryer called to order a public hearing at 7:03 pm to receive comments regarding the consideration of Water Well Drilling/Operating permits submitted by NSE Lonestar, LLC for three (3) water wells located in Freestone County approximately 3.5 miles north of Fairfield in Freestone County. The wells would be located on a 1,414.1-acre tract owned by Ossie and Cynthia Outlaw to produce groundwater for the beneficial purpose of aquaculture/irrigation at a cumulative rate of 950 gallons per minute (316.67 gpm/well) from the Hooper layer of the Wilcox Aquifer group. The total requested annual volume of groundwater to be produced is 1,534.44-acre feet. This is a refilling of a previously submitted applications that have expired. A presentation of the Hydrogeologic Assessment Report submitted with the applications was provided by Matthew Uliana with Intera, Inc to explain the technical aspects of the application. Next, Raine Cotton with NSE Lonestar, LLC provided a presentation of the company and a review of the operations of this facility used for salmon production. During and after these presentations, questions and comments were offered from the audience by the following individuals: Linda Brantley, Russell Rantt, David Walker, Amy Sessions, Andy Wier, Shawn

Gray, Chris Wibble, Lisa Robertson, Bill Bonner, John Harper, Ken Sessions, Ben Black, Glen Collier, Johnny Robinson, Clyde Ridge, Jr., Jerry Don McLeod, Heather Marfell and Ryan Mathison. Clarification of legal issues regarding this application was provided by Greg Ellis. Additionally, prior to the meeting the district received by email requests for contested case hearing on this permit application from City of Teague (Public Work Director), City of Teague (City Administrator/City Secretary), Kirvin Water Supply, City of Streetman, and South Freestone County Water Supply Corporation. All requests for contested case hearing were emailed to the district before 5:00 pm on the date of the hearing, June 22, 2021. Additionally, written protests were provided to the board at the hearing from Bill Bonner and John Harper. These written protests were provided after 6:00 pm. With no further comments the public hearing on the NSE Lonestar, LLC permit applications was adjourned at 8:45 pm.

After the public hearing noted above was adjourned Pres. Fryer called for the board to go into close session for consultation with the attorney for the district, Greg Ellis at 8:46 pm.

The board of directors came out of closed session at 8:55 pm.

The regular board meeting was then called to order by Pres. Fryer at 8:56 pm.

The minutes of the Directors Meeting/Public Hearing held on April 27, 2021, were then reviewed. A motion was made by Secretary Parten to approve the minutes as written. Motion was seconded by Dir. Osborne, and the motion passed unanimously upon a called vote.

The floor was open for public comments by Pres. Fryer. No comments were offered.

The next item on the agenda was the consideration and possible action regarding Water Well Drilling/Operating Permits submitted NSE Lonestar, LLC for three (3) water wells located in Freestone County approximately 3.5 miles north of Fairfield on the 1,414.10-acre Outlaw Ranch to produce groundwater for the beneficial purpose of aquaculture/irrigation at a cumulative rate of 950 gallons per minute. The total requested annual volume of groundwater to be produced is 1,533.44-acre feet. This is a refiling of previously submitted applications that have expired. Upon a recommendation by the district's attorney resulting from discussions held in executive session, this matter is being referred to a contested case hearing. A brief explanation of the contested case hearing process was provided by Mr. Ellis. Dir. Schill then made a motion to refer this matter to a preliminary hearing as a contested case and instruct staff to find the necessary professional assistance for the hearing. The motion was seconded by Sec. Parten, and the motion passed by a unanimous vote.

Manager's Report was then submitted by David Bailey, General Manager of District activities since April 27, 2021. Highlights of the report are listed below:

- Texas Alliance of Groundwater Districts (TAGD) Committee meeting via webinar on May 11 and May 17, 2021.
- TAGD Business Meeting held in Austin on June 8-9, 2021.
- District Reports: Staff presented the following reports to the Board: Drought Report, Investment Report and Legislative Report.

- Upcoming events: GMA 12 Joint Planning Meeting, Milano – 6/24/2021; 10th Annual Groundwater Summit, San Antonio – 8/31-9/3/2021.

The Board then reviewed the financial reports and agreed that the reports were in order and that all payments were justified. A listing of the bills approved for payment is attached. The bills and financial records as presented were approved with a motion by Dir. Schill. Motion was seconded by Sec. Parten, and motion passed unanimously.

The date, time and place of the next regular meeting were tentatively set for **August 24, 2021, at 6:00 PM in Centerville**.

With no further business, the meeting was adjourned at 9:19 pm.

Minutes approved by the Board of Directors (date) August 24, 2021

Secretary/Treasurer

William Parten

President

~~**John Fryer**~~
George Volkman

Post Oak Savannah Groundwater Conservation District

Public Hearings and Board Meeting
July 13, 2021 – 5:30 p.m.
Post Oak Savannah GCD Offices
310 East Ave. C
Milano, Texas

AGENDA

Notice is hereby given that the Board of Directors of the Post Oak Savannah Groundwater Conservation District will hold public hearings and a regular meeting on Monday, July 13, 2021, at 5:30 pm.

In consideration of concerns regarding the Coronavirus Disease (COVID-19), the District Offices will be open to the Directors, Staff, Consultants and public who wish to attend in person, while others may attend virtually. Members of the public who wish to attend virtually and listen, observe, or actively participate during this meeting may join this meeting from their computer, tablet or smartphone at:

https://global.gotomeeting.com/join/923880797

You may also dial in for audio only using your phone at:

United States: +1 (872) 240-3212

Access Code: 923-880-797

To actively participate with virtual public comment in the meeting, please email the General Manager with your name and the topic or agenda item you wish to address at gwestbrook@posgcd.org by 3:00 pm, July 13, 2021. Please remember Public Comment is limited to 3 minutes per person.

The subjects to be discussed or considered, or upon which any formal action may be taken, are as listed below. Items may or may not be taken in the same order as shown on this meeting notice.

1. Pledge of Allegiance
2. Invocation
3. Call to Order and establish quorum
4. Public Comment
5. Public Hearing on Rules Section 1.1 Definition of Terms, Section 1.1.2 Ownership Interest Conflict or Question, Section 4.2 Exceptions to Spacing Requirements, Section 4.3 Monitoring Requirements, Section 5 Production Limitations, Section 7.7 Permits Issued by the District, Section 7.15 Operating Permits, Section 11 Metering and Measuring, Section 13.1 Waste, Section 15.4 Penalties for Non-Compliance, Section 16.4 Actions Based on Monitoring Results, Section 16.6 Adjusting Maximum Production Permitted.
6. Public Hearing on Proposed Desired Future Conditions of Groundwater Management Area 12
7. **Consent Agenda**

   All of the following items on the Consent Agenda are considered to be self-explanatory by the Board and will be enacted with one motion. There will be no separate discussion of these items unless a Board Member requests.

   a) Minutes of June 7, 2021 Board Meeting
   b) OSHA Staff Training of July 6, 2021
   c) Approval of Speakers and topics for 2021 Milam and Burleson Counties Groundwater Summit
   d) Tinker Water Education Program Report
   e) Review of Recent Education Efforts and Activities
   f) Bills received, current financial status, Investment Officer Report.
   g) Receive report from General Manager on recent District activities and take appropriate actions.
      1. Permit applications filed with the District and Hearing Dates; Emergency Permits Granted
      2. Well Drilling activities: registrations, applications, completions, plugging, inspections
      3. Groundwater Well Assistance Program (GWAP) Update: investigations and corrective actions taken
      4. Recent and future District presentations and activities
         a. Texas Water Conservation Association (TWCA) Conference of June 9-11, 2021
         b. Texas Alliance of Groundwater Districts (TAGD) Meetings of June 8-9, 2021
         c. Texas Aquifers Conference of June 30-July 1, 2021
         d. June 1 – August 31 Enrollment period for Aquifer Conservancy Program
         e. Texas Alliance of Groundwater Districts (TAGD) Groundwater Summit of Aug. 30-Sep. 1
         f. Milam and Burleson Counties Groundwater Summit August 12, 2021
         g. Texas Groundwater Association Conference of August 2-4, 2021

8. **Regular Agenda**

a) Consider Amendments to the Rules Section 1.1 Definition of Terms, Section 1.1.2 Ownership Interest Conflict or Question, Section 4.2 Exceptions to Spacing Requirements, Section 4.3 Monitoring Requirements, Section 5 Production Limitations, Section 7.7 Permits Issued by the District, Section 7.15 Operating Permits, Section 11 Metering and Measuring, Section 13.1 Waste, Section 15.4 Penalties for Non-Compliance, Section 16.4 Actions Based on Monitoring Results, Section 16.6 Adjusting Maximum Production Permitted.

b) Public Hearings to be held on August 27, 2021: This note is a correction of this incorrect date on this agenda. The Public Hearings will be held July 27, 2021 at 3:00 pm at the District's offices. This note was added 7-14-21.

1. Application filed by ALCOA to amend permit POS-D&O-0148
2. Application filed by ALCOA to acquire a permit to transport water out of the District

c) Joint planning process and Desired Future Conditions (DFCs), groundwater resources in the District, and future process for evaluating District DFCs for Groundwater Management Area 12 (GMA 12) and Groundwater Management Area 8 (GMA 8)

9. Dates, locations, and times of future meetings
10. Adjourn Board Meeting

Signed this 9th day of July, 2021

_____

Gary Westbrook, General Manager

The Post Oak Savannah Groundwater Conservation District is committed to compliance with the Americans with Disabilities Act (ADA). Reasonable accommodations and equal opportunity for effective communications will be provided upon request. Please contact the District office at 512-455-9900 at least 24 hours in advance if accommodation is needed.

[1] During the meeting, the Board reserves the right to go into executive session for any of the following purposes: real estate, litigation, or personnel matters under V.T.C.A., Government Code Sections 551.072, 551.071, and 551.074, respectively, or for any item on the above agenda for which an executive session is permitted by law.

[1] Public comments will be limited to three (3) minutes from each individual desiring to speak. The public comment period will be limited to one hour. Board members are prohibited by law from discussing matters presented under this item, except for placement on a future agenda.

POST OAK SAVANNAH GROUNDWATER CONSERVATION DISTRICT
Board of Directors Meeting
POSGCD District Offices
310 East Avenue C
Milano, TX 76556
July 13, 2021 – 5:30 p.m.

MINUTES

Directors Present
Sidney Youngblood – in person
Becky Goetsch – in person
Lee Alford – in person
Tommy Tietjen – in person
Jay Wilder – in person
Bob Wilson – In person
Ed Savage – in person
Steven Wise – in person
Dana McClaren – via telephone
Ward Roddam – via telephone

Directors Absent
None

Staff Present
Gary Westbrook – in person
Bobby Bazan – in person
Doug Box – in person
Elaine Gerren – in person
Craig Andrews – via telephone
Jordan – Aldridge – via telephone
Barbara Boulware-Wells- in person

Others Present (in person)	Entity
Kermit Heaton	Self
Judith McGeary	Farm and Ranch Freedom Alliance & Self
Alan Gardenhire	Self
Pamela Hornby	Self
Andy Wier	SAWDF & Self
Andy Hovorak	Burleson County Landowner
Nathan Ausley	Burleson County Landowner

Others Present (online)	Entity
Michelle Ganges	League of Independent Voters
Jaclyn Robertson	Texas A&M AgriLife
Amy Hinnant	Burleson County Landowner
Blaire Parker	SAWS
James Bene	RW Harden
Jay Davis	KRXT Radio
Linda Adair	Burleson County Landowner

Linda Curtis	SAWDF
Stefan Schuster	EPCOR
Steve Young	Intera
Charles McGregor	KRXT Radio
512-430-0944	
512-468-8789	
713-516-4474	
Visitor	

1.) Pledge of Allegiance

Steven Wise led the Pledge of Allegiance to the United States and Texas flags

2.) Invocation

Gary Westbrook gave the invocation.

3.) Call to Order and establish quorum

The Board meeting was called to order at 5:36 p.m. by President Sidney Youngblood. He declared a quorum had been established, with directors verified by general counsel and staff to be in attendance in person.

President Youngblood recognized past POSGCD Board members in attendance, Nathan Ausley and Andy Hovarak, and thanked them for their past service and for their attendance.

4.) Public Comment

President Youngblood asked GM Westbrook if anyone had requested to speak under this agenda item. GM Westbrook stated that no one requested to speak.

5.) Public Hearing on Rules Section 1.1 Definition of Terms, Section 1.1.2 Ownership Interest Conflict or Question, Section 4.2 Exceptions to Spacing Requirements, Section 4.3 Monitoring Requirements, Section 5 Production Limitations, Section 7.7 Permits Issued by the District, Section 7.15 Operating Permits, Section 11 Metering and Measuring, Section 13.1 Waste, Section 15.4 Penalties for Non-Compliance, Section 16.4 Actions Based on Monitoring Results, Section 16.6 Adjusting Maximum Production Permitted.

President Youngblood opened the public hearing at 5:40 and gave clarification on the Rule amendments being proposed. Rules Committee Chair Director Goetsch was asked for opening comments. She stated that we have reviewed and studied the changes and are ready to consider the amendments. She asked General Manager Gary Westbrook to go over the proposed amendments, and he reviewed each recommended amendment. Mr. Westbrook noted that previously discussed amendments to Section 5 had been removed at the last meeting. Allen Gardenhire asked for clarification on Rule 11.3. Mr. Westbrook confirmed the amendment was still recommended. Mr. Westbrook then stated he did not have any requests to speak on the amendments.

President Youngblood asked if anyone online wished to make comments on the draft amendments to the Rules. No one offered comment. He then asked if anyone present would like to address the Board. Again, no one offered comment.

The public hearing was closed at 5:54.

6.) Public Hearing on Proposed Desired Future Conditions of Groundwater Management Area 12

President Youngblood opened this hearing at 5:54 and asked DFC Committee Chair Director Steven Wise if he had any comments. Director Wise did not.

GM Westbrook provided a summary and discussion on the DFC process and the District's concerns. Mr. Westbrook reviewed the process and then a document which the District will be filing as comments on the Proposed DFCs for GMA 12 with the other GCDs in GMA 12.

President Youngblood then invited comment from those in attendance online and in person.

Comments were made by the following people.

1.) Andy Hovorak asked which other Districts were in favor of increasing the DFCs for the Carrizo aquifers. GM Westbrook stated that all the other Districts in the GMA12 voted for it, but that we did not. Mr. Hovarak thanked the Board for opposing the increase.
2.) GM Westbrook read comments received by e-mail from Ms. Pavlas urging the district to reject the proposed DFC's for GMA12.
3.) Linda Curtis – via online – Ms. Curtis thanked the board and said she is eating her words due to saying that Mr. Westbrook was jerry rigging the DFC's. She asked for socio-economic impacts to be considered when considering the DFC's and to add the socio-economic impacts of the cost of growth. She urged the Board to reject the proposed DFC's for GMA12.
4.) Judith McGeary – She stated that she is pleased with the POSGCD's position of the vote against the Proposed DFC's and urged the district to hold on to this stance. She stated she has been involved with the District in crafting its Rules for curtailment and maintaining the current DFCs are important. She also has attended meetings of the District for years and has heard many times GM Westbrook, the Board, and even Vista Ridge state that all permits could be curtailed under the Rules to meet the management goals of the District. She stated that any threats of a lawsuit over curtailment of permits by Vista Ridge would not be successful and the GMA should not consider that threat in adopting DFCs.
5.) Andy Weir – Bastrop County landowner representing himself and he is also a member of SAWDF. He is asking the Post Oak Savannah GCD to reject the proposed DFC's being considered by GMA12 stating the nine factors in Chapter 36.108 have not been properly discussed and considered.
6.) Steve Box – Executive Director of Environmental Stewardship is concerned about the impact the Proposed DFC's will have on the future. He asks that the DFCs include more protection for surface water. He is requesting that the proposed DFCs be rejected and sent back to the GMA12 for revisions.
7.) Kermit Heaton – Landowner & well owner in Bastrop County. He stated he is here is asking Post Oak Savannah to reject the DFC's that have been proposed. He does not want to wait until it is too late to speak.

Director Becky Goetsch asked if any of the speakers had presented to any other Districts in GMA 12. Most had presented to other Districts in GMA 12.
President Youngblood then asked if anyone else would like to provide comments. No one else offered comment.
The public hearing closed at 6:56 p.m.

7.) Consent Agenda

All of the following items on the Consent Agenda are considered to be self-explanatory by the Board and will be enacted with one motion. There will be no separate discussion of these items unless a Board Member requests.

a) Minutes of June 7, 2021 Board Meeting
b) OSHA Staff Training of July 6, 2021
c) Approval of Speakers and topics for 2021 Milam and Burleson Counties Groundwater Summit
d) Tinker Water Education Program Report
e) Review of Recent Education Efforts and Activities
f) Bills received, current financial status, Investment Officer Report.
g) Receive report from General Manager on recent District activities and take appropriate actions.
1. Permit applications filed with the District and Hearing Dates; Emergency Permits Granted
2. Well Drilling activities: registrations, applications, completions, plugging, inspections
3. Groundwater Well Assistance Program (GWAP) Update: investigations and corrective actions taken
4. Recent and future District presentations and activities
a. Texas Water Conservation Association (TWCA) Conference of June 9-11, 2021
b. Texas Alliance of Groundwater Districts (TAGD) Meetings of June 8-9, 2021
c. Texas Aquifers Conference of June 30-July 1, 2021
d. June 1 – August 31 Enrollment period for Aquifer Conservancy Program
e. Texas Alliance of Groundwater Districts (TAGD) Groundwater Summit of Aug. 30-Sep. 1
f. Milam and Burleson Counties Groundwater Summit August 12, 2021

g. Texas Groundwater Association Conference of August 2-4, 2021

Board President Sidney Youngblood opened the Consent Agenda for discussion and action. A motion was made by Director Wise to approve the Consent Agenda. The motion was 2nd by Director Tommy Tietjen. The motion passed unanimously.

8.) Regular Agenda

a) Consider Amendments to the Rules Section 1.1 Definition of Terms, Section 1.1.2 Ownership Interest Conflict or Question, Section 4.2 Exceptions to Spacing Requirements, Section 4.3 Monitoring Requirements, Section 5 Production Limitations, Section 7.7 Permits Issued by the District, Section 7.15 Operating Permits, Section 11 Metering and Measuring, Section 13.1 Waste, Section 15.4 Penalties for Non-Compliance, Section 16.4 Actions Based on Monitoring Results, Section 16.6 Adjusting Maximum Production Permitted.

President Sidney Youngblood asked for any discussion on this item. After brief discussion, a motion was made by Director Timmy Tietjen to approve the amendments as presented, without Section 5. The motion was 2nd by Director Becky Goetsch. The motion passed unanimously.

b) Public Hearings to be held on August 27, 2021: GM Westbrook clarified these hearings will be held July 27, 2021, and not August 27, 2021, as listed on the agenda.

1. **Application filed by ALCOA to amend permit POS-D&O-0148**
2. **Application filed by ALCOA to acquire a permit to transport water out of the district**

GM Westbrook provided clarification and a presentation outlining the application submitted by ALCOA and clarified that the date on tonight's agenda is incorrect and that the hearing will be held on July 27,2021 at the POSGCD offices at 3:00 pm.

c) Joint planning process and Desired Future Conditions (DFCs), groundwater resources in the District, and future process for evaluating District DFCs for Groundwater Management Area 12 (GMA 12) and Groundwater Management Area 8 (GMA 8)

GMA 8 will have a GMA meeting on the July 20, 2021, to consider the proposed Desired Future Conditions that were adopted for GMA 8, and possibly take appropriate action.

9. Dates, locations, and times of future meetings

President Youngblood stated the next regularly scheduled meeting would be August 10, 2021 at 5:30 at the District Office. GM Westbrook reminded all that we will have the Hearings on July 27th and the Milam and Burleson Counties Groundwater Summit on August 12th, 2021.

10. Adjourn Board Meeting

Director Wise moved to adjourn the meeting. The meeting was adjourned at 7:09 pm

THE ABOVE MINUTES OF THE MEETING OF THE BOARD OF DIRECTORS OF THE POST OAK SAVANNAH GROUNDWATER CONSERVATION DISTRICT HELD ON JULY 13, 2020, WERE APPROVED AND ADOPTED BY THAT BOARD ON AUGUST 10, 2021.

Sidney Youngblood, President

Attest:

Gary Westbrook, Assistant Board Secretary

Date 8/10/2021

APPENDIX E

NOVEMBER 12, 2021 PRESENTATION "GMA 12: S-12, S-19, AND S-20 MODEL RESULTS"

GMA 12

S-12, S-19, and S-20 Model Results

by

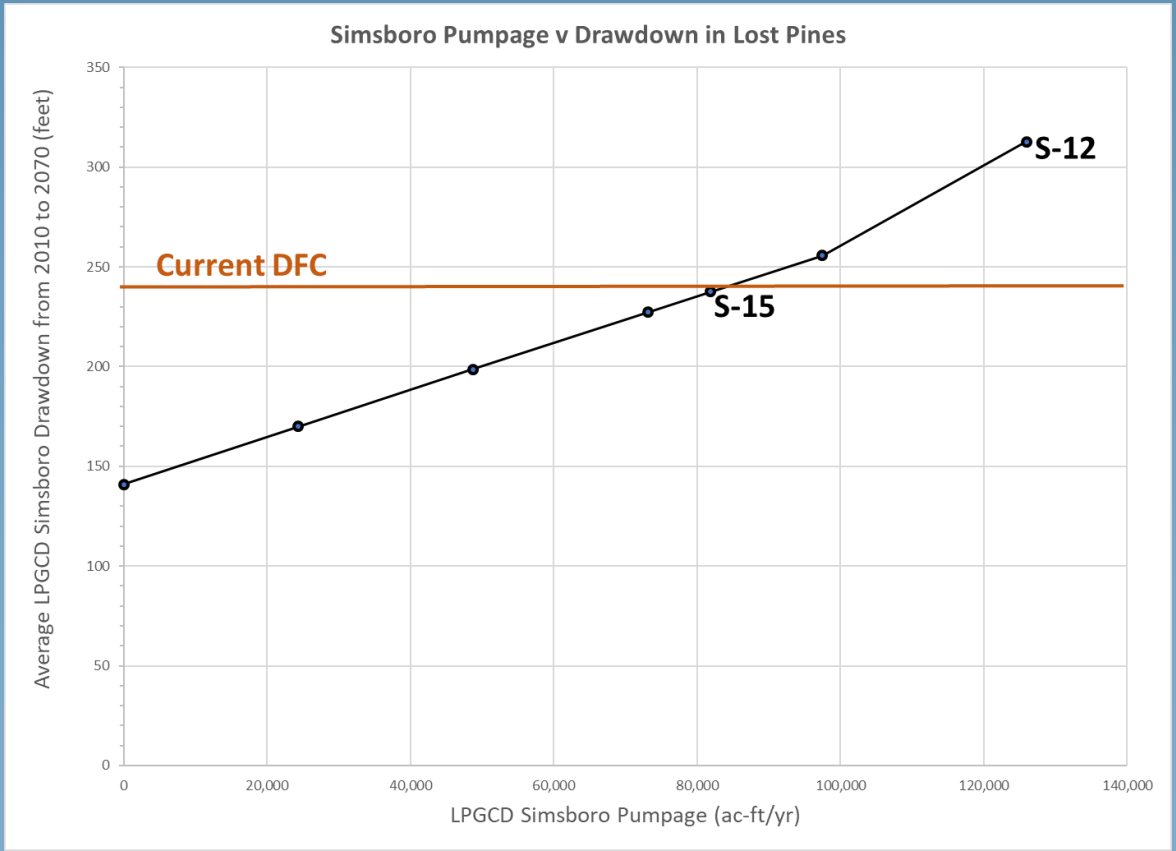
Andy Donnelly

Daniel B. Stephens & Associates

November 12, 2021

LPGCD Simsboro DFC

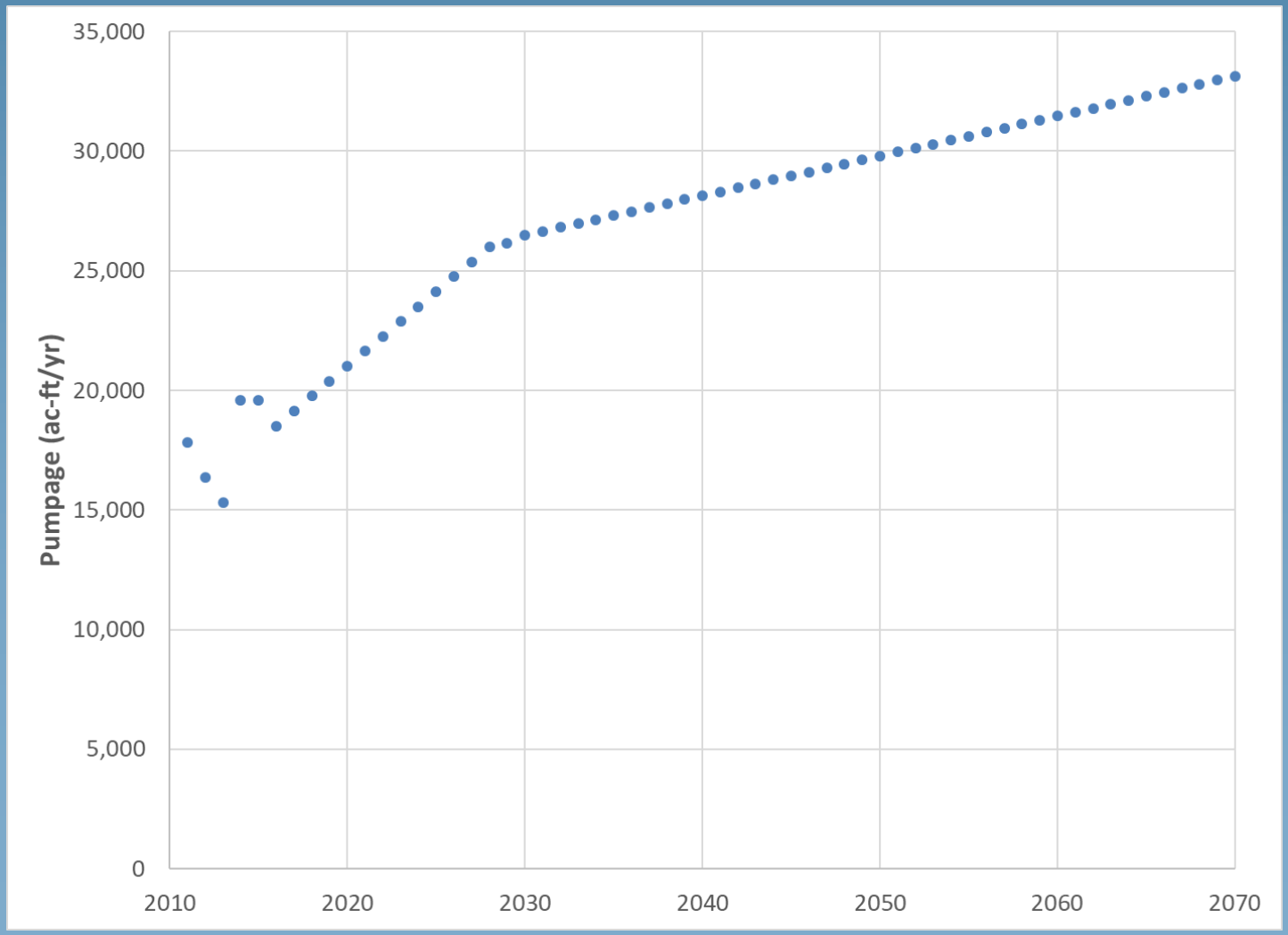
- Drawdown in S-12 for the Simsboro is 313 feet
- Drawdown in S-15/19 for the Simsboro is 240 feet



LPGCD Simsboro DFC

- LPGCD Board wants to keep the Simsboro pumpage at 2017 MAGs, not 2017 DFC
- Modified S-12 to reduce the LPGCD Simsboro pumpage
  - Removed Gatehouse permitted pumpage
  - Reduced remaining Simsboro pumpage equally by 66%
  - LPGCD Simsboro pumpage = 33,136 ac-ft/yr in 2070
- Included GBRA and ARWA at 50%

S-20 LPGCD Simsboro Pumpage



Results

- All results are drawdowns (in feet) from 2010 to 2070
- Note that S-19 and S-20 have included GBRA and ARWA, which is not included in S-12, and therefore FCGCD has greater drawdowns for S-19 and S-20

S-12 Pumpage in 2070

	Sparta	Queen City	Carrizo	Calvert Bluff	Simsboro	Hooper
LPGCD	2,766	1,774	12,981	5,563	**125,958**	3,273
POSGCD	4,105	7,838	18,205	4,761	79,427	3,126
BVGCD	13,161	1,269	5,498	1,726	147,233	2,139
METGCD	3,381	1,616	10,528	4,222	6,870	5,251
FCGCD	2,853	2,813	5,155	0	0	0

All pumpages are in acre-feet/year in 2070

S-12 Drawdown in 2070

	Sparta	Queen City	Carrizo	Calvert Bluff	Simsboro	Hooper
LPGCD	22	28	139	156	313	174
POSGCD	32	31	172	180	339	216
BVGCD	48	41	76	97	216	153
METGCD	25	21	49	60	82	74
FCGCD	40	66	123	149	251	142

All results are in feet of drawdown from 2010 to 2070

S-19 Pumpage in 2070

	Sparta	Queen City	Carrizo	Calvert Bluff	Simsboro	Hooper
LPGCD	2,766	1,774	12,981	5,563	**81,864**	3,273
POSGCD	4,105	7,838	18,205	4,761	79,427	3,126
BVGCD	13,161	1,269	5,498	1,726	147,233	2,139
METGCD	3,381	1,616	10,528	4,222	6,870	5,251
FCGCD	2,853	2,813	5,155	0	0	0

All pumpages are in acre-feet/year in 2070

S-19 Drawdown in 2070

	Sparta	Queen City	Carrizo	Calvert Bluff	Simsboro	Hooper
LPGCD	22	28	134	132	240	138
POSGCD	32	30	162	156	278	178
BVGCD	47	40	72	89	195	136
METGCD	25	20	48	57	76	69
FCGCD	43	73	140	141	207	120

All results are in feet of drawdown from 2010 to 2070

S-20 Pumpage in 2070

	Sparta	Queen City	Carrizo	Calvert Bluff	Simsboro	Hooper
LPGCD	2,766	1,774	12,981	5,563	**33,136**	3,273
POSGCD	4,105	7,838	18,205	4,761	79,427	3,126
BVGCD	13,161	1,269	5,498	1,726	147,233	2,139
METGCD	3,381	1,616	10,528	4,222	6,870	5,251
FCGCD	2,853	2,813	5,155	0	0	0

All pumpages are in acre-feet/year in 2070

S-20 Drawdown in 2070

	Sparta	Queen City	Carrizo	Calvert Bluff	Simsboro	Hooper
LPGCD	22	27	125	110	182	106
POSGCD	32	30	158	147	258	163
BVGCD	47	39	70	86	188	131
METGCD	25	20	47	56	74	68
FCGCD	42	70	134	126	178	99

All results are in feet of drawdown from 2010 to 2070

S-12 / S-19 / S-20

- S-12 does not have GBRA and ARWA included, S-19 and S-20 do
- LPGCD Simsboro Pumpage (in 2070):
  - S-12 = 125,958 ac-ft/yr
  - S-19 = 81,864 ac-ft/yr
  - S-20 = 33,136 ac-ft/yr
- No other differences

S-12 / S-19 / S-20

	Sparta	Queen City	Carrizo	Calvert Bluff	Simsboro	Hooper
LPGCD	22	28	139	156	313	174
POSGCD	32	31	172	180	339	216
BVGCD	48	41	76	97	216	153
METGCD	25	21	49	60	82	74
FCGCD	40	66	123	149	251	142

	Sparta	Queen City	Carrizo	Calvert Bluff	Simsboro	Hooper
LPGCD	22	28	134	132	240	138
POSGCD	32	30	162	156	278	178
BVGCD	47	40	72	89	195	136
METGCD	25	20	48	57	76	69
FCGCD	43	73	140	141	207	120

	Sparta	Queen City	Carrizo	Calvert Bluff	Simsboro	Hooper
LPGCD	22	27	125	110	182	106
POSGCD	32	30	158	147	258	163
BVGCD	47	39	70	86	188	131
METGCD	25	20	47	56	74	68
FCGCD	42	70	134	126	178	99

All results are in feet of drawdown from 2010 to 2070

S-12 / S-19 / S-20

S-12 minus S-19

	Sparta	Queen City	Carrizo	Calvert Bluff	Simsboro	Hooper
LPGCD	0.1	-0.1	4.5	23.8	73.0	36.1
POSGCD	0.3	0.6	10.1	24.3	61.2	38.7
BVGCD	0.9	1.1	4.1	8.4	21.3	16.6
METGCD	0.6	0.7	1.8	3.2	5.6	4.8
FCGCD	-2.3	-7.0	-17.0	7.3	43.3	22.8

S-12 minus S-20

	Sparta	Queen City	Carrizo	Calvert Bluff	Simsboro	Hooper
LPGCD	0.7	1.1	13.7	46.1	130.3	68.6
POSGCD	0.6	0.9	14.8	32.8	81.0	53.4
BVGCD	1.3	1.6	5.7	11.1	28.1	22.1
METGCD	0.8	0.9	2.5	4.2	7.5	6.3
FCGCD	-1.5	-4.8	-10.7	22.4	72.4	43.8

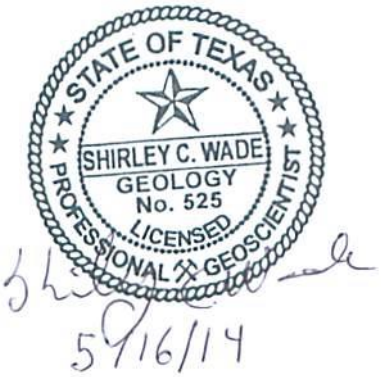
All results are in feet of drawdown from 2010 to 2070

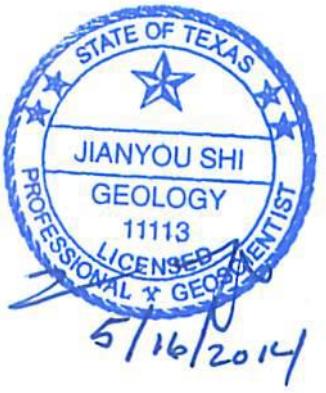
APPENDIX F

TERS FOR GMA 12 (GAM TASK 13-035_v2)

GAM Task 13-035 Version 2: Total Estimated Recoverable Storage for Aquifers in Groundwater Management Area 12

by Shirley Wade, Ph.D., P.G. and Jerry Shi, Ph.D., P.G.
Texas Water Development Board
Groundwater Resources Division
(512) 936-0883
May 16, 2014





The seals appearing on this document were authorized by Shirley C. Wade, P.G. 525, and Jianyou (Jerry) Shi, P.G. 11113 on May 16, 2014.

The total estimated recoverable storage in this report was calculated as follows: the Trinity Aquifer (Jerry Shi), and the Carrizo-Wilcox, Queen City, Sparta, Yegua-Jackson, Gulf Coast, and Brazos River Alluvium aquifers (Shirley Wade).

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GAM TASK 13-035 VERSION 2: TOTAL ESTIMATED RECOVERABLE STORAGE FOR AQUIFERS IN GROUNDWATER MANAGEMENT AREA 12

by Shirley Wade, Ph.D., P.G. and Jerry Shi, Ph.D., P.G.
Texas Water Development Board
Groundwater Resources Division
(512) 936-0883
May 16, 2014

EXECUTIVE SUMMARY:

Texas Water Code, §36.108 (d) (Texas Water Code, 2011) states that, before voting on the proposed desired future conditions for a relevant aquifer within a groundwater management area, the groundwater conservation districts shall consider the total estimated recoverable storage as provided by the executive administrator of the Texas Water Development Board (TWDB) along with other factors listed in §36.108(d). Texas Administrative Code Rule §356.10 (Texas Administrative Code, 2011) defines the total estimated recoverable storage as the estimated amount of groundwater within an aquifer that accounts for recovery scenarios that range between 25 percent and 75 percent of the porosity-adjusted aquifer volume.

This report discusses the methods, assumptions, and results of an analysis to estimate the total recoverable storage for the Trinity, Carrizo-Wilcox, Queen City, Sparta, Yegua-Jackson, Brazos River Alluvium, and Gulf Coast aquifers within Groundwater Management Area 12. Tables 1 through 14 summarize the total estimated recoverable storage required by the statute. Figures 2 through 8 indicate the official extent of the aquifers in Groundwater Management Area 12 used to estimate the total recoverable storage. Tables 15 through 22 summarize total estimated recoverable storage for the Carrizo-Wilcox Aquifer by model layer, as requested by the coordinator for Groundwater Management Area 12.

On November 25, 2013, the TWDB Executive Administrator approved a boundary change between Groundwater Management Areas 12 and 14. That boundary change consisted of removing a small portion of Brazos County from Groundwater Management Area 14 and assigning it to Groundwater Management Area 12 such that Brazos County is now completely within Groundwater Management Area 12. This report (version 2) reflects those changes.

Updates to this report from version 1 include, (1) addition of total estimated recoverable storage volumes for the Gulf Coast Aquifer System, (2) updates to total estimated recoverable storage volumes for the Brazos River Alluvium Aquifer, and (3) updates to all maps showing the boundary of Groundwater Management Area 12.

DEFINITION OF TOTAL ESTIMATED RECOVERABLE STORAGE:

The total estimated recoverable storage is defined as the estimated amount of groundwater within an aquifer that accounts for recovery scenarios that range between 25 percent and 75 percent of the porosity-adjusted aquifer volume. In other words, we assume that only 25 to 75 percent of groundwater held within an aquifer can be removed by pumping.

The total recoverable storage was estimated for the portion of the aquifer within Groundwater Management Area 12 that lies within the official lateral aquifer boundaries as delineated by George and others (2011). Total estimated recoverable storage values may include a mixture of water quality types, including fresh, brackish, and saline groundwater, because the available data and the existing groundwater availability models do not permit the differentiation between different water quality types. The total estimated recoverable storage values do not take into account the effects of land surface subsidence, degradation of water quality, or any changes to surface water-groundwater interaction that may occur as the result of extracting groundwater from the aquifer.

METHODS:

To estimate the total recoverable storage of an aquifer, we first calculated the total storage in an aquifer within the official aquifer boundary. The total storage is the volume of groundwater removed by pumping that completely drains the aquifer.

Aquifers can be either unconfined or confined (Figure 1). A well screened in an unconfined aquifer will have a water level equal to the water level outside the well or in the aquifer. Thus, unconfined aquifers have water levels within the aquifers. A confined aquifer is bounded by low permeable geologic units at the top and bottom, and the aquifer is under hydraulic pressure above the ambient atmospheric pressure. The water level at a well screened in a confined aquifer will be above the top of the aquifer. As a result, calculation of

total storage is also different between unconfined and confined aquifers. For an unconfined aquifer, the total storage is equal to the volume of groundwater removed by pumping that makes the water level fall to the aquifer bottom. For a confined aquifer, the total storage contains two parts. The first part is the groundwater released from the aquifer when the water level falls from above the top of the aquifer to the top of the aquifer. The reduction of hydraulic pressure in the aquifer by pumping causes expansion of groundwater and deformation of aquifer solids. The aquifer is still fully saturated to this point. The second part, just like unconfined aquifer, is the groundwater released from the aquifer when the water level falls from the top to the bottom of the aquifer. Given the same aquifer area and water level drop, the amount of water released in the second part is much greater than the first part. The difference is quantified by two parameters: storativity related to confined aquifers and specific yield related to unconfined aquifers. For example, storativity values range from 10^{-5} to 10^{-3} for most confined aquifers, while the specific yield values can be 0.01 to 0.3 for most unconfined aquifers. The equations for calculating the total storage are presented below:

- for unconfined aquifers

$$Total\ Storage\ = V_{drained} = Area \times S_y \times (Water\ Level - Bottom)$$

- for confined aquifers

$$Total\ Storage\ = V_{confined} + V_{drained}$$

  - confined part

$$V_{confined} = Area \times [\,S \times (Water\ Level - Top)]$$

or

$$V_{confined} = Area \times [\,S_s \times (\mathrm{Top} - \mathrm{Bottom}) \times (Water\ Level - Top)]$$

  - unconfined part

$$V_{drained} = Area \times \left[S_y \times (Top - Bottom)\right]$$

where:

- $V_{drained}$ = storage volume due to water draining from the formation (acre-feet)
- $V_{confined}$ = storage volume due to elastic properties of the aquifer and water(acre-feet)
- *Area* = area of aquifer (acre)

- *Water Level* = groundwater elevation (feet above mean sea level)
- *Top* = elevation of aquifer top (feet above mean sea level)
- *Bottom* = elevation of aquifer bottom (feet above mean sea level)
- S_y = specific yield (no units)
- S_s = specific storage (1/feet)
- *S* = storativity or storage coefficient (no units)

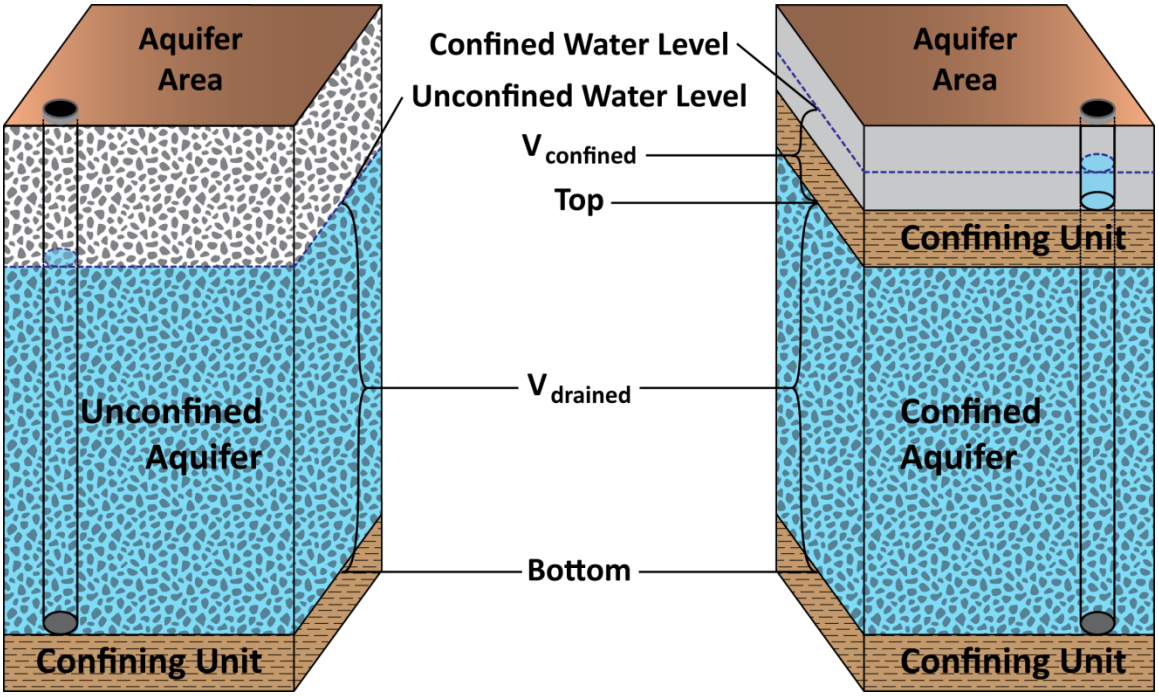

FIGURE 1. SCHEMATIC GRAPH SHOWING THE DIFFERENCE BETWEEN UNCONFINED AND CONFINED AQUIFERS.

As presented in the equations, calculation of the total storage requires data, such as aquifer top, aquifer bottom, aquifer storage properties, and water level. For the Trinity, Carrizo-Wilcox, Queen City, Sparta, Yegua-Jackson, and Gulf Coast aquifers we extracted this information from existing groundwater availability model input and output files on a cell-by-cell basis.

For the Brazos River Alluvium Aquifer, which does not yet have a groundwater availability model, we used an analytical approach. For each county, ArcMAP™ was used to estimate the Brazos River Alluvium Aquifer thickness (assuming base of the alluvium and land surface) and average water table depth. Average Brazos River Alluvium Aquifer saturated thickness for

each county was then calculated from average thickness minus average water table depth. Finally we estimated the total storage of the Brazos River Alluvium Aquifer from average saturated thickness multiplied with area and an assumed specific yield value.

The recoverable storage for each of the aquifers listed above was the product of its total storage and an estimated factor ranging from 25 percent to 75 percent.

PARAMETERS AND ASSUMPTIONS:

Trinity Aquifer

- We used version 1.01 of the groundwater availability model for the northern part of the Trinity Aquifer and the Woodbine Aquifer to estimate the total recoverable storage for the Trinity Aquifer. The Woodbine Aquifer is not present in Groundwater Management Area 12. See Bené and others (2004) for assumptions and limitations of the groundwater availability model.
- This groundwater availability model includes seven layers which generally represent the Woodbine Aquifer (Layer 1), the Washita and Fredericksburg Confining Unit (Layer 2), the Paluxy Aquifer Unit of the Trinity Aquifer (Layer 3), the Glen Rose Confining Unit of the Trinity Aquifer (Layer 4), the Hensell Sand Aquifer Unit of the Trinity Aquifer (Layer 5), the Twin Mountains Confining Units of the Trinity Aquifer (Layer 6), and the Hosston Aquifer Unit of the Trinity Aquifer (Layer 7). To develop the estimates for the total estimated recoverable storage, we used Layers 3 through 7 (the Trinity Aquifer).
- The down-dip boundary of the model is considered the Luling-Mexia-Talco Fault Zone, which probably allows minimal groundwater flow across the fault zone (Bené and others, 2004). The groundwater in the official extent of the northern portion of the Trinity Aquifer aquifers ranges from fresh to moderately saline (brackish) in composition (Bené and others, 2004).

Carrizo-Wilcox, Queen City, and Sparta aquifers

- We used version 2.02 of the groundwater availability model for the central part of the Carrizo-Wilcox, Queen City, and Sparta aquifers to estimate the total recoverable

storage for the Carrizo-Wilcox, Queen City, and Sparta aquifers. See Dutton and others (2003) and Kelley and others (2004) for assumptions and limitations of the groundwater availability model.

- This groundwater availability model includes eight layers which generally represent the Sparta Aquifer (Layer 1), the Weches Confining Unit (Layer 2), the Queen City Aquifer (Layer 3), the Reklaw Confining Unit (Layer 4), the Carrizo Formation (Layer 5), the Upper Wilcox Formation or Calvert Bluff Formation (Layer 6), the Middle Wilcox Formation or Simsboro Formation (Layer 7), and the Lower Wilcox Formation or Hooper Formation (Layer 8). To develop the estimates for the total estimated recoverable storage, we used Layer 1 (Sparta Aquifer), Layer 3 (Queen City Aquifer), and Layers 5 through 8 (Carrizo-Wilcox Aquifer system).
- The down-dip boundary of the model is based on the location of the Wilcox Growth Fault Zone, which is considered to be a barrier to flow (Kelley and others, 2004). This boundary is relatively deep and in the portion of the aquifer that is characterized as brackish to saline; consequently, the model includes parts of the formation beyond potable portions of the aquifer (Dutton and others, 2003). The groundwater in the official extent of the Carrizo-Wilcox, Queen City, and Sparta aquifers ranges from fresh to brackish in composition (Kelley and others, 2004).

Yegua-Jackson Aquifer and the Catahoula Formation portion of the Gulf Coast Aquifer System

- We used version 1.01 of the groundwater availability model for the Yegua-Jackson Aquifer to estimate the total recoverable storage of the Yegua-Jackson Aquifer. See Deeds and others (2010) for assumptions and limitations of the groundwater availability model.
- This groundwater availability model includes five layers which represent the outcrop section for the Yegua-Jackson Aquifer and the Catahoula Formation and other younger overlying units (Layer 1), the upper portion of the Jackson Group (Layer 2), the lower portion of the Jackson Group (Layer 3), the upper portion of the Yegua Group (Layer 4), and the lower portion of the Yegua Group (Layer 5). To develop the estimates for the total estimated recoverable storage in the Yegua-Jackson Aquifer, we used layers

1 through 5; however, we only used model cells in Layer 1 that represent the outcrop area of the Yegua-Jackson Aquifer.

- The down-dip boundary for the Yegua-Jackson Aquifer in this model was set to approximately coincide with the extent of the available geologic data, well beyond any active portion (groundwater use) of the aquifer (Deeds and others, 2010). Consequently, the model extends into zones of brackish and saline groundwater. The groundwater in the official extent of the Yegua-Jackson Aquifer ranges from fresh to brackish in composition (Deeds and others, 2010).

Gulf Coast Aquifer System

- We used version 3.01 of the groundwater availability model for the northern portion of the Gulf Coast Aquifer system for this analysis. See Kasmarek (2013) for assumptions and limitations of the model.
- The model has four layers which represent the Chicot Aquifer (Layer 1), the Evangeline Aquifer (Layer 2), the Burkeville confining unit (Layer 3), and the Jasper Aquifer and parts of the Catahoula Formation in direct hydrologic communication with the Jasper Aquifer (Layer 4).
- The southeastern boundary of flow in each hydrogeologic unit of the model was set at the down-dip limit of freshwater (up to 10,000 milligrams per liter of total dissolved solids; Kasmarek, 2013).

Brazos River Alluvium Aquifer

- The Brazos River Alluvium Aquifer is under water table conditions in most places (George and others, 2011).
- The thickness of the Brazos River Alluvium Aquifer is based on a U.S. Geological Survey electromagnetic and resistivity imaging project (Shah and others, 2007).
- Water levels are from the TWDB groundwater database http://www.twdb.texas.gov/groundwater/data/gwdbrpt.asp accessed in July 2013. The three latest years of water level data were used to estimate the average water table depth for each county.
- We used a specific yield value of 0.15 from Cronin and others (1967).

RESULTS:

Tables 1 through 14 summarize the total estimated recoverable storage required by statute. Tables 15 through 22 in Appendix A summarize the total estimated recoverable storage for the formations making up the Carrizo-Wilcox Aquifer: the Hooper, the Simsboro, the Calvert Bluff, and the Carrizo formations. The county and groundwater conservation district total storage estimates are rounded to two significant digits. Figures 2 through 7 indicate the extent of the groundwater availability models in Groundwater Management Area 12 for the Trinity, Carrizo-Wilcox, Queen City, Sparta, Yegua-Jackson, and Gulf Coast aquifers from which the storage information was extracted. Figure 8 indicates the extent of the Brazos River Alluvium Aquifer in Groundwater Management Area 12 used to estimate the total recoverable storage. Figures 9 through 12 in Appendix A indicate the extent of the groundwater availability model for the central portion of the Carrizo-Wilcox Aquifer from which the storage information for the Hooper, Simsboro, Calvert Bluff, and Carrizo formations was extracted.

TABLE 1. TOTAL ESTIMATED RECOVERABLE STORAGE BY COUNTY FOR THE TRINITY AQUIFER WITHIN GROUNDWATER MANAGEMENT AREA 12. COUNTY TOTAL ESTIMATES ARE ROUNDED TO TWO SIGNIFICANT DIGITS.

County	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
Bastrop	9,000,000	2,250,000	6,750,000
Lee	500,000	125,000	375,000
Williamson	1,600,000	400,000	1,200,000
Total	**11,100,000**	**2,775,000**	**8,325,000**

TABLE 2. TOTAL ESTIMATED RECOVERABLE STORAGE BY GROUNDWATER CONSERVATION DISTRICT[1] FOR THE TRINITY AQUIFER WITHIN GROUNDWATER MANAGEMENT AREA 12. GROUNDWATER CONSERVATION DISTRICT TOTAL ESTIMATES ARE ROUNDED TO TWO SIGNIFICANT DIGITS.

Groundwater Conservation District (GCD)	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
No District	1,600,000	400,000	1,200,000
Lost Pines GCD	9,500,000	2,375,000	7,125,000
Total	**11,100,000**	**2,775,000**	**8,325,000**

[1] The total estimated recoverable storage values by groundwater conservation district and county for an aquifer may not be the same because the numbers have been rounded to two significant digits.

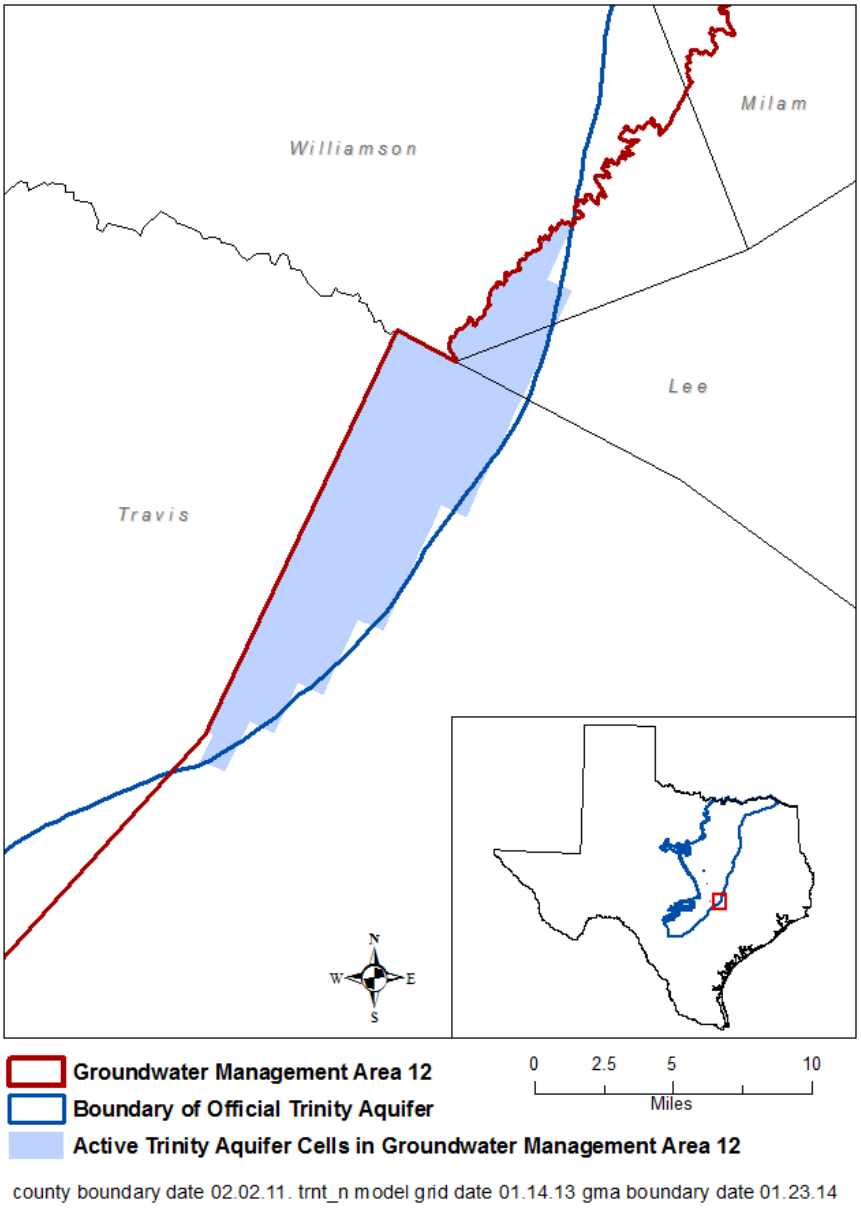

FIGURE 2. AREA OF THE TRINITY AQUIFER USED TO ESTIMATE TOTAL RECOVERABLE STORAGE (TABLES 1 AND 2) WITHIN GROUNDWATER MANAGEMENT AREA 12.

TABLE 3. TOTAL ESTIMATED RECOVERABLE STORAGE BY COUNTY FOR THE CARRIZO-WILCOX AQUIFER WITHIN GROUNDWATER MANAGEMENT AREA 12. COUNTY TOTAL ESTIMATES ARE ROUNDED TO TWO SIGNIFICANT DIGITS.

County	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
Bastrop	98,000,000	24,500,000	73,500,000
Brazos	69,000,000	17,250,000	51,750,000
Burleson	120,000,000	30,000,000	90,000,000
Falls	820,000	205,000	615,000
Fayette	95,000,000	23,750,000	71,250,000
Freestone	46,000,000	11,500,000	34,500,000
Lee	130,000,000	32,500,000	97,500,000
Leon	180,000,000	45,000,000	135,000,000
Limestone	12,000,000	3,000,000	9,000,000
Madison	110,000,000	27,500,000	82,500,000
Milam	47,000,000	11,750,000	35,250,000
Navarro	1,000,000	250,000	750,000
Robertson	110,000,000	27,500,000	82,500,000
Williamson	500,000	125,000	375,000
Total	1,019,320,000	254,830,000	764,490,000

TABLE 4. TOTAL ESTIMATED RECOVERABLE STORAGE BY GROUNDWATER CONSERVATION DISTRICT [2] FOR THE CARRIZO-WILCOX AQUIFER WITHIN GROUNDWATER MANAGEMENT AREA 12. GROUNDWATER CONSERVATION DISTRICT TOTAL ESTIMATES ARE ROUNDED TO TWO SIGNIFICANT DIGITS.

Groundwater Conservation District (GCD)	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
No District	14,000,000	3,500,000	10,500,000
Brazos Valley GCD	180,000,000	45,000,000	135,000,000
Fayette County GCD	95,000,000	23,750,000	71,250,000
Lost Pines GCD	220,000,000	55,000,000	165,000,000
Mid-East Texas GCD	340,000,000	85,000,000	255,000,000
Post Oak Savannah GCD	170,000,000	42,500,000	127,500,000
Total	1,019,000,000	254,750,000	764,250,000

[2] The total estimated recoverable storage values by groundwater conservation district and county for an aquifer may not be the same because the numbers have been rounded to two significant digits.

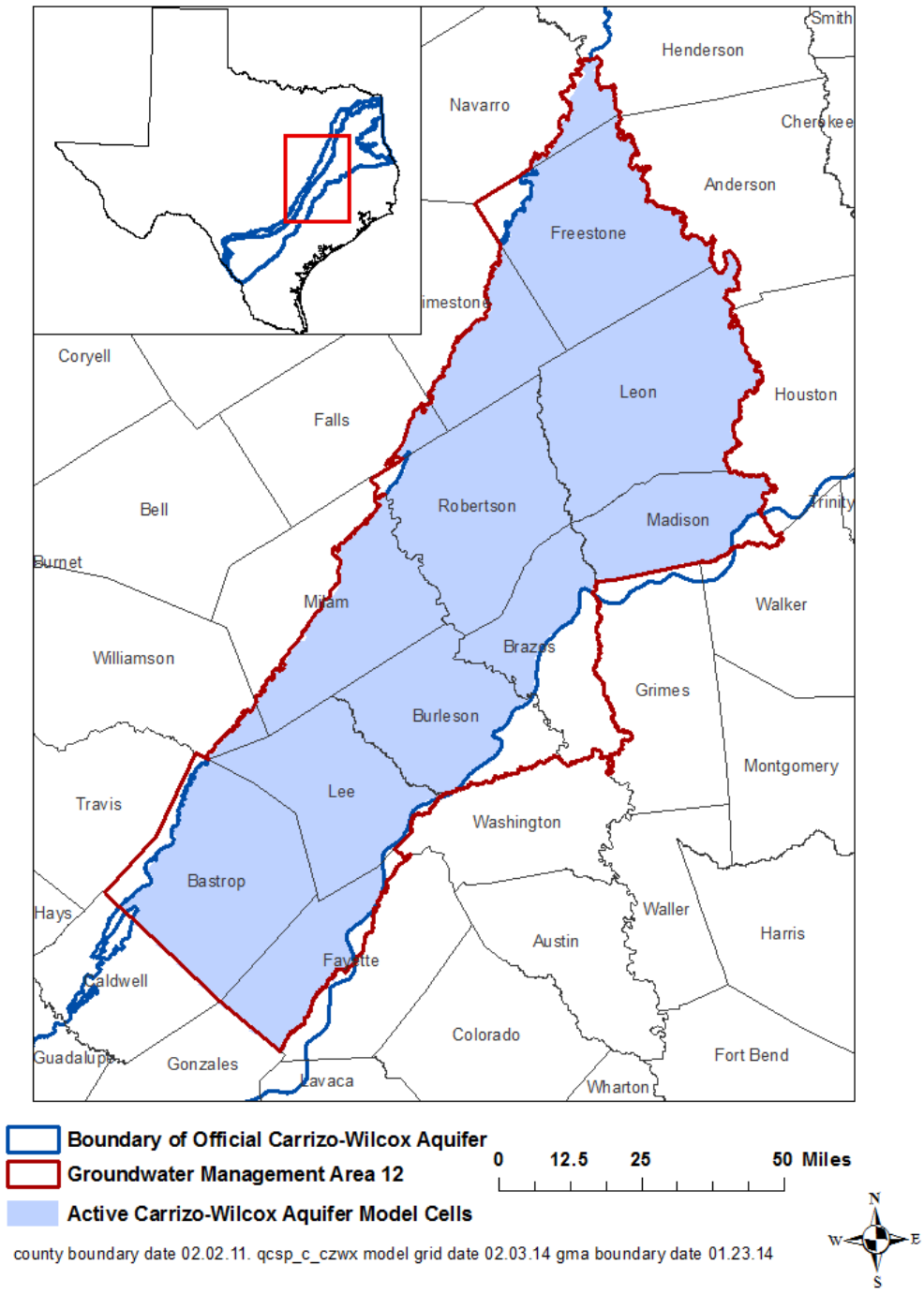

FIGURE 3. EXTENT OF THE GROUNDWATER AVAILABILITY MODEL FOR THE CENTRAL PART OF THE CARRIZO-WILCOX, QUEEN CITY, AND SPARTA AQUIFERS USED TO ESTIMATE TOTAL RECOVERABLE STORAGE FOR THE CARRIZO-WILCOX AQUIFER (TABLES 3 AND 4) WITHIN GROUNDWATER MANAGEMENT AREA 12.

TABLE 5. TOTAL ESTIMATED RECOVERABLE STORAGE BY COUNTY FOR THE QUEEN CITY AQUIFER WITHIN GROUNDWATER MANAGEMENT AREA 12. COUNTY TOTAL ESTIMATES ARE ROUNDED TO TWO SIGNIFICANT DIGITS.

County	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
Bastrop	9,500,000	2,375,000	7,125,000
Brazos	25,000,000	6,250,000	18,750,000
Burleson	29,000,000	7,250,000	21,750,000
Fayette	19,000,000	4,750,000	14,250,000
Freestone	290,000	72,500	217,500
Lee	23,000,000	5,750,000	17,250,000
Leon	25,000,000	6,250,000	18,750,000
Madison	20,000,000	5,000,000	15,000,000
Milam	650,000	162,500	487,500
Robertson	8,800,000	2,200,000	6,600,000
Total	160,240,000	40,060,000	120,180,000

TABLE 6. TOTAL ESTIMATED RECOVERABLE STORAGE BY GROUNDWATER CONSERVATION DISTRICT[3] FOR THE QUEEN CITY AQUIFER WITHIN GROUNDWATER MANAGEMENT AREA 12. GROUNDWATER CONSERVATION DISTRICT TOTAL ESTIMATES ARE ROUNDED TO TWO SIGNIFICANT DIGITS.

Groundwater Conservation District (GCD)	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
Brazos Valley GCD	34,000,000	8,500,000	25,500,000
Fayette County GCD	19,000,000	4,750,000	14,250,000
Lost Pines GCD	32,000,000	8,000,000	24,000,000
Mid-East Texas GCD	45,000,000	11,250,000	33,750,000
Post Oak Savannah GCD	30,000,000	7,500,000	22,500,000
Total	160,000,000	40,000,000	120,000,000

[3] The total estimated recoverable storage values by groundwater conservation district and county for an aquifer may not be the same because the numbers have been rounded to two significant digits.

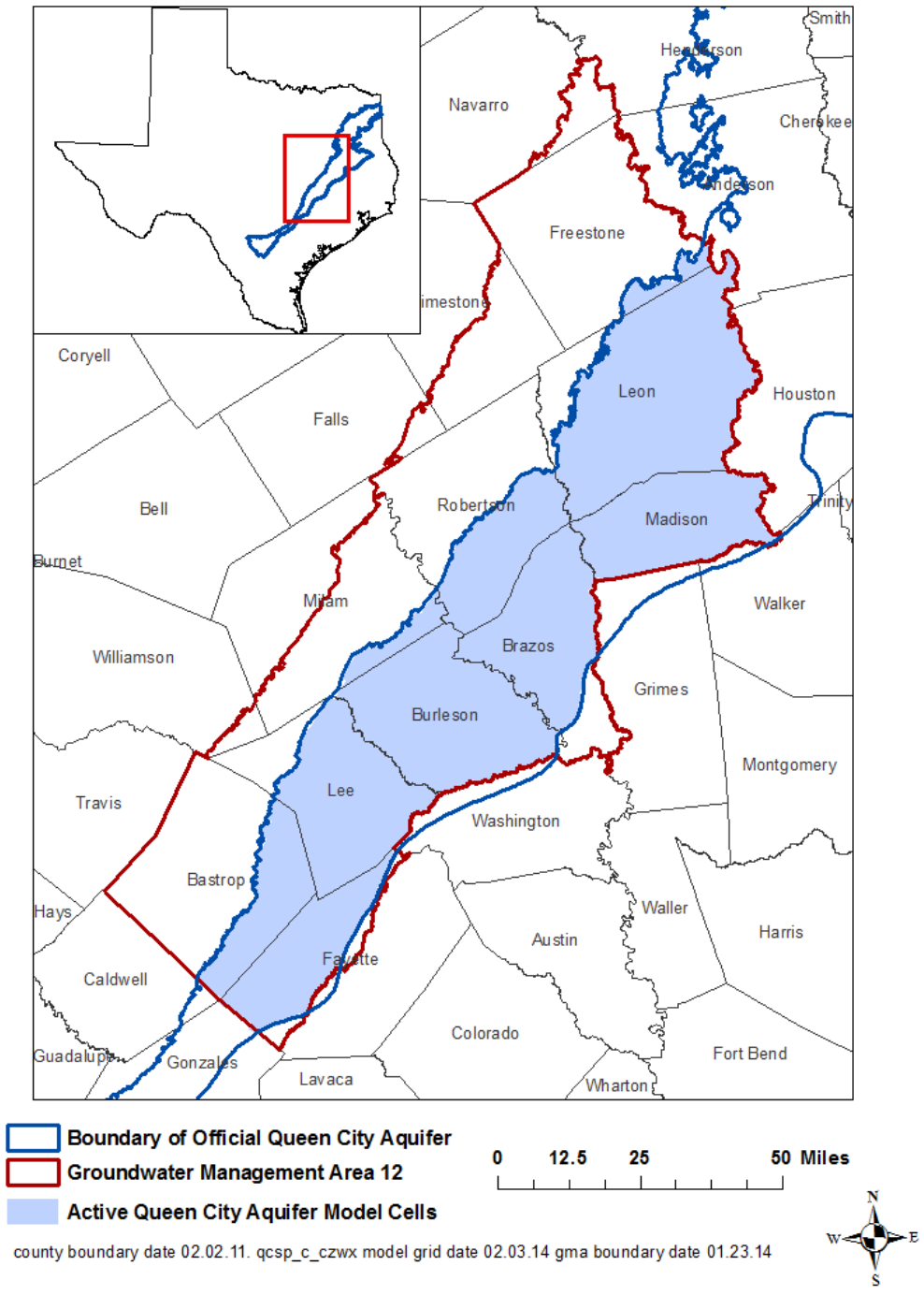

FIGURE 4. EXTENT OF THE GROUNDWATER AVAILABILITY MODEL FOR THE CENTRAL PART OF THE CARRIZO-WILCOX, QUEEN CITY, AND SPARTA AQUIFERS USED TO ESTIMATE TOTAL RECOVERABLE STORAGE FOR THE QUEEN CITY AQUIFER (TABLES 5 AND 6) WITHIN GROUNDWATER MANAGEMENT AREA 12.

TABLE 7. TOTAL ESTIMATED RECOVERABLE STORAGE BY COUNTY FOR THE SPARTA AQUIFER WITHIN GROUNDWATER MANAGEMENT AREA 12. COUNTY TOTAL ESTIMATES ARE ROUNDED TO TWO SIGNIFICANT DIGITS.

County	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
Bastrop	2,500,000	625,000	1,875,000
Brazos	17,000,000	4,250,000	12,750,000
Burleson	16,000,000	4,000,000	12,000,000
Fayette	12,000,000	3,000,000	9,000,000
Lee	10,000,000	2,500,000	7,500,000
Leon	4,600,000	1,150,000	3,450,000
Madison	16,000,000	4,000,000	12,000,000
Robertson	1,300,000	325,000	975,000
Total	79,400,000	19,850,000	59,550,000

TABLE 8. TOTAL ESTIMATED RECOVERABLE STORAGE BY GROUNDWATER CONSERVATION DISTRICT[4] FOR THE SPARTA AQUIFER WITHIN GROUNDWATER MANAGEMENT AREA 12. GROUNDWATER CONSERVATION DISTRICT TOTAL ESTIMATES ARE ROUNDED TO TWO SIGNIFICANT DIGITS.

Groundwater Conservation District (GCD)	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
Brazos Valley GCD	18,000,000	4,500,000	13,500,000
Fayette County GCD	12,000,000	3,000,000	9,000,000
Lost Pines GCD	13,000,000	3,250,000	9,750,000
Mid-East Texas GCD	21,000,000	5,250,000	15,750,000
Post Oak Savannah GCD	16,000,000	4,000,000	12,000,000
Total	80,000,000	20,000,000	60,000,000

[4] The total estimated recoverable storage values by groundwater conservation district and county for an aquifer may not be the same because the numbers have been rounded to two significant digits.

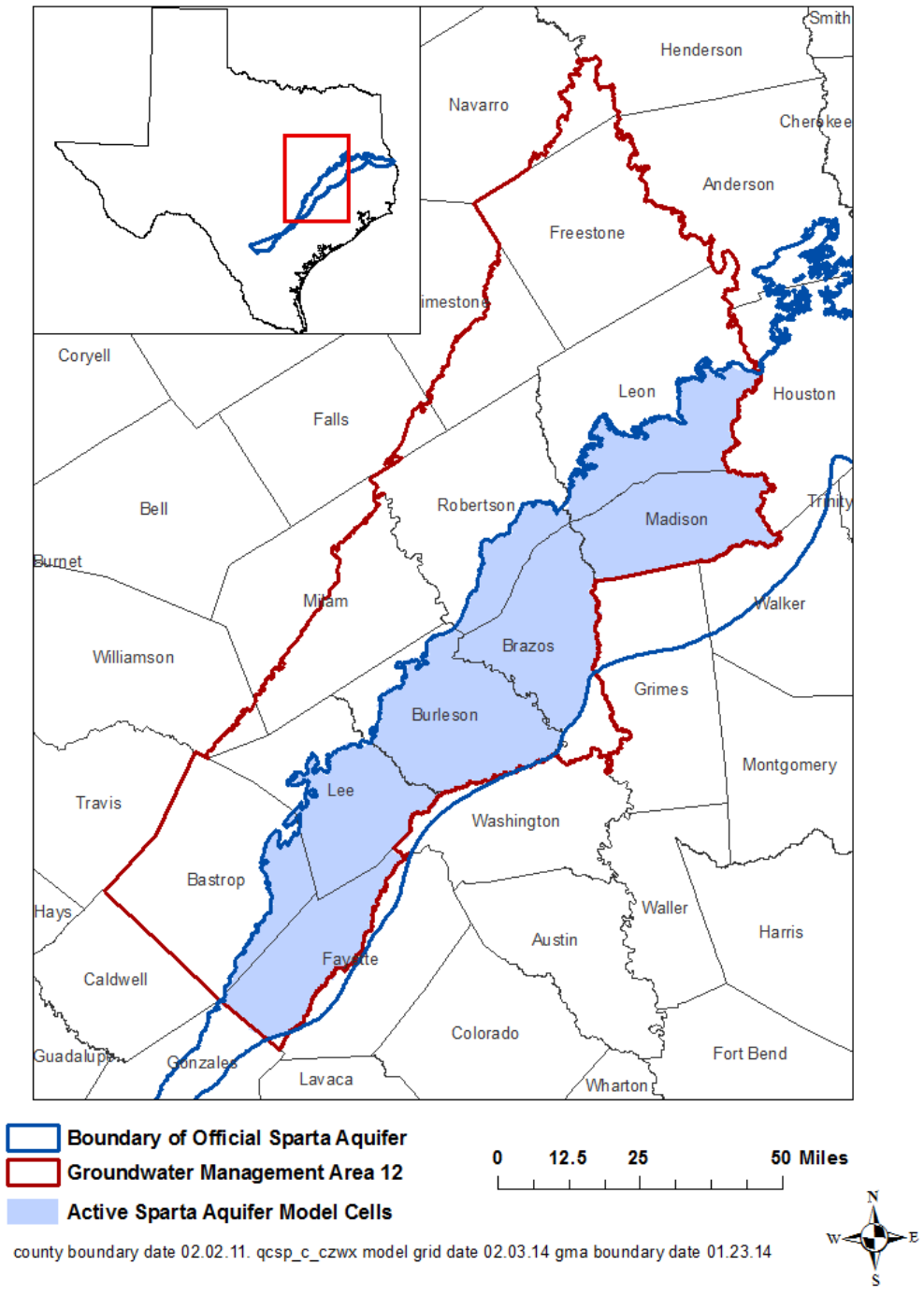

FIGURE 5. EXTENT OF THE GROUNDWATER AVAILABILITY MODEL FOR THE CENTRAL PART OF THE CARRIZO-WILCOX, QUEEN CITY, AND SPARTA AQUIFERS USED TO ESTIMATE TOTAL RECOVERABLE STORAGE FOR THE SPARTA AQUIFER (TABLES 7 AND 8) WITHIN GROUNDWATER MANAGEMENT AREA 12.

TABLE 9. TOTAL ESTIMATED RECOVERABLE STORAGE BY COUNTY FOR THE YEGUA-JACKSON AQUIFER WITHIN GROUNDWATER MANAGEMENT AREA 12. COUNTY TOTAL ESTIMATES ARE ROUNDED TO TWO SIGNIFICANT DIGITS.

County	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
Bastrop	290,000	72,500	217,500
Brazos	30,000,000	7,500,000	22,500,000
Burleson	27,000,000	6,750,000	20,250,000
Fayette	27,000,000	6,750,000	20,250,000
Lee	10,000,000	2,500,000	7,500,000
Leon	76,000	19,000	57,000
Madison	15,000,000	3,750,000	11,250,000
Total	109,366,000	27,341,500	82,024,500

TABLE 10. TOTAL ESTIMATED RECOVERABLE STORAGE BY GROUNDWATER CONSERVATION DISTRICT[5] FOR THE YEGUA-JACKSON AQUIFER WITHIN GROUNDWATER MANAGEMENT AREA 12. GROUNDWATER CONSERVATION DISTRICT TOTAL ESTIMATES ARE ROUNDED TO TWO SIGNIFICANT DIGITS.

Groundwater Conservation District (GCD)	*Total Storage (acre-feet)*	*25percent of Total Storage (acre-feet)*	*75percent of Total Storage (acre-feet)*
Brazos Valley GCD	30,000,000	7,500,000	22,500,000
Fayette County GCD	27,000,000	6,750,000	20,250,000
Lost Pines GCD	10,000,000	2,500,000	7,500,000
Mid-East Texas GCD	15,000,000	3,750,000	11,250,000
Post Oak Savannah GCD	27,000,000	6,750,000	20,250,000
Total	109,000,000	27,250,000	81,750,000

[5] The total estimated recoverable storages values by groundwater conservation district and county for an aquifer may not be the same because the numbers have been rounded to two significant digits.

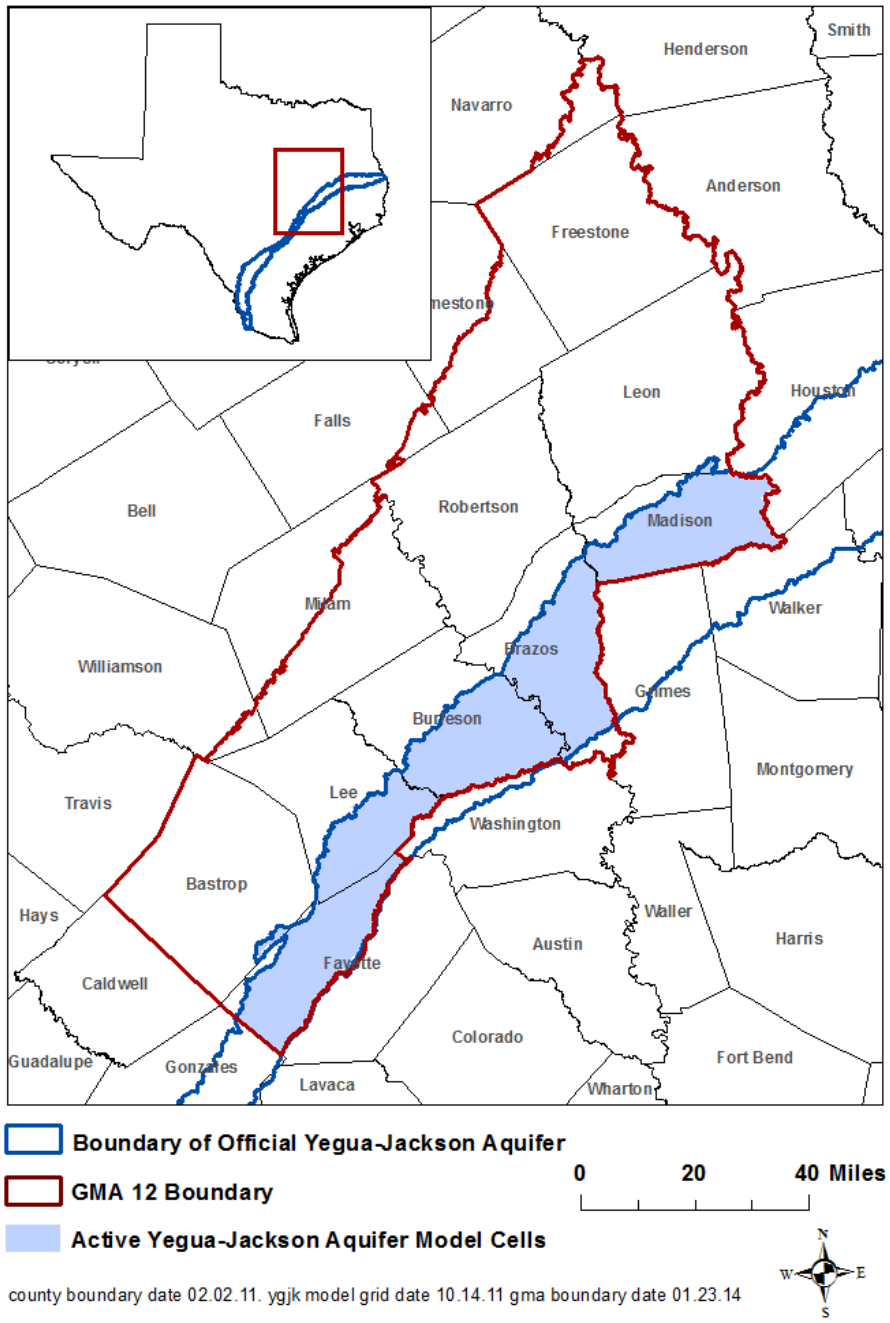

FIGURE 6. EXTENT OF THE GROUNDWATER AVAILABILITY MODEL FOR THE YEGUA-JACKSON AQUIFER USED TO ESTIMATE TOTAL RECOVERABLE STORAGE (TABLES 9 AND 10) FOR THE YEGUA-JACKSON AQUIFER WITHIN GROUNDWATER MANAGEMENT AREA 12.

TABLE 11. TOTAL ESTIMATED RECOVERABLE STORAGE BY COUNTY FOR THE GULF COAST AQUIFER SYSTEM WITHIN GROUNDWATER MANAGEMENT AREA 12. COUNTY TOTAL ESTIMATES ARE ROUNDED TO TWO SIGNIFICANT DIGITS.

County	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
Brazos	450,000	112,500	337,500
Total	450,000	112,500	337,500

TABLE 12. TOTAL ESTIMATED RECOVERABLE STORAGE BY GROUNDWATER CONSERVATION DISTRICT[6] FOR THE GULF COAST AQUIFER SYSTEM WITHIN GROUNDWATER MANAGEMENT AREA 12. GROUNDWATER CONSERVATION DISTRICT TOTAL ESTIMATES ARE ROUNDED TO TWO SIGNIFICANT DIGITS.

Groundwater Conservation District (GCD)	*Total Storage (acre-feet)*	*25percent of Total Storage (acre-feet)*	*75percent of Total Storage (acre-feet)*
Brazos Valley GCD	450,000	112,500	337,500
Total	450,000	112,500	337,500

[6] The total estimated recoverable storages values by groundwater conservation district and county for an aquifer may not be the same because the numbers have been rounded to two significant digits.

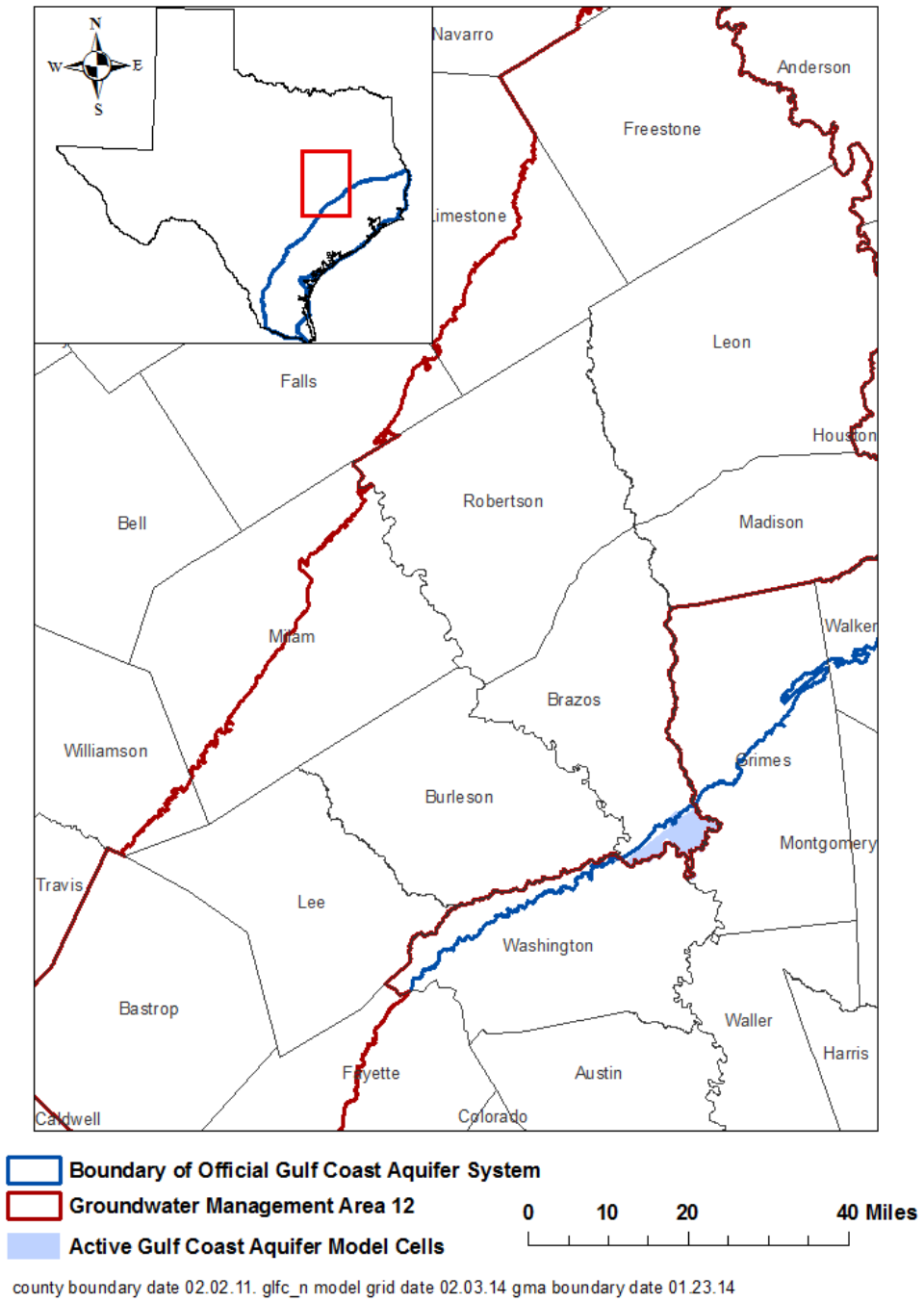

FIGURE 7. AREA USED TO ESTIMATE TOTAL RECOVERABLE STORAGE (TABLES 11 AND 12) FOR THE GULF COAST AQUIFER SYSTEM WITHIN GROUNDWATER MANAGEMENT AREA 12.

TABLE 13. TOTAL ESTIMATED RECOVERABLE STORAGE BY COUNTY FOR THE BRAZOS RIVER ALLUVIUM AQUIFER WITHIN GROUNDWATER MANAGEMENT AREA 12. COUNTY TOTAL ESTIMATES ARE ROUNDED TO TWO SIGNIFICANT DIGITS.

County	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
Brazos	290,000	72,500	217,500
Burleson	450,000	112,500	337,500
Falls	140	35	105
Milam	28,000	7,000	21,000
Robertson	270,000	67,500	202,500
Total	1,038,140	259,535	778,605

TABLE 14. TOTAL ESTIMATED RECOVERABLE STORAGE BY GROUNDWATER CONSERVATION DISTRICT[7] FOR THE BRAZOS RIVER ALLUVIUM AQUIFER WITHIN GROUNDWATER MANAGEMENT AREA 12. GROUNDWATER CONSERVATION DISTRICT TOTAL ESTIMATES ARE ROUNDED TO TWO SIGNIFICANT DIGITS.

Groundwater Conservation District (GCD)	*Total Storage (acre-feet)*	*25percent of Total Storage (acre-feet)*	*75percent of Total Storage (acre-feet)*
No district	140	35	105
Brazos Valley GCD	560,000	140,000	420,000
Post Oak Savannah GCD	480,000	120,000	360,000
Total	1,040,140	260,035	780,105

[7] The total estimated recoverable storages values by groundwater conservation district and county for an aquifer may not be the same because the numbers have been rounded to two significant digits.

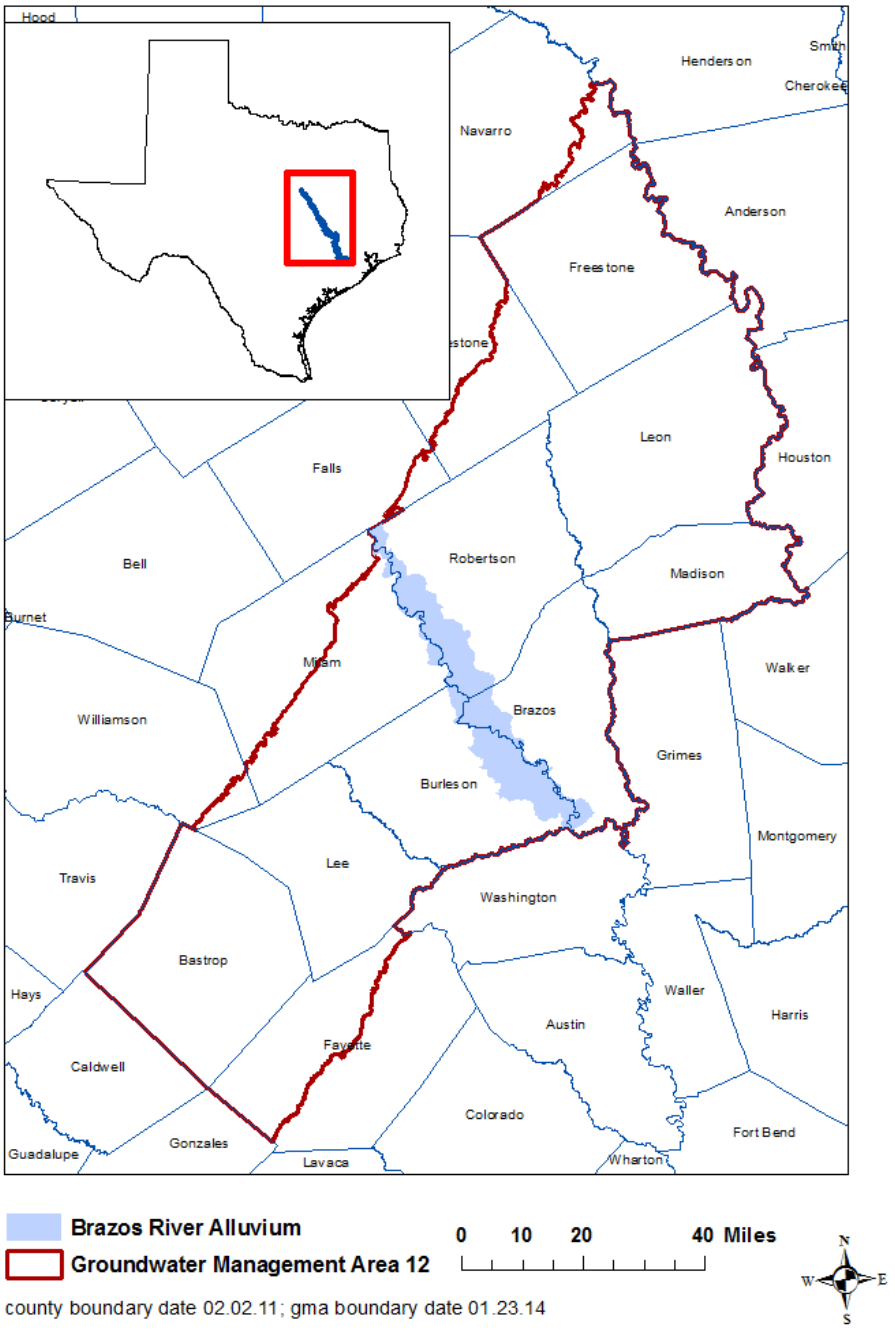

FIGURE 8. AREA USED TO ESTIMATE TOTAL RECOVERABLE STORAGE (TABLES 13 AND 14) FOR THE BRAZOS RIVER ALLUVIUM AQUIFER WITHIN GROUNDWATER MANAGEMENT AREA 12.

LIMITATIONS

The groundwater models used in completing this analysis are the best available scientific tools that can be used to meet the stated objective(s). To the extent that this analysis will be used for planning purposes and/or regulatory purposes related to pumping in the past and into the future, it is important to recognize the assumptions and limitations associated with the use of the results. In reviewing the use of models in environmental regulatory decision making, the National Research Council (2007) noted:

> *"Models will always be constrained by computational limitations, assumptions, and knowledge gaps. They can best be viewed as tools to help inform decisions rather than as machines to generate truth or make decisions. Scientific advances will never make it possible to build a perfect model that accounts for every aspect of reality or to prove that a given model is correct in all respects for a particular regulatory application. These characteristics make evaluation of a regulatory model more complex than solely a comparison of measurement data with model results."*

Because the application of the groundwater model was designed to address regional scale questions, the results are most effective on a regional scale. The TWDB makes no warranties or representations relating to the actual conditions of any aquifer at a particular location or at a particular time.

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APPENDIX A Total Estimated Recoverable Storage for the Hooper, Simsboro, Calvert Bluff, and Carrizo Formations of the Carrizo-Wilcox Aquifer

TABLE 15. TOTAL ESTIMATED RECOVERABLE STORAGE BY COUNTY FOR THE HOOPER FORMATION WITHIN GROUNDWATER MANAGEMENT AREA 12. COUNTY TOTAL ESTIMATES ARE ROUNDED TO TWO SIGNIFICANT DIGITS.

County	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
Bastrop	35,000,000	8,750,000	26,250,000
Brazos	18,000,000	4,500,000	13,500,000
Burleson	30,000,000	7,500,000	22,500,000
Falls	760,000	190,000	570,000
Fayette	25,000,000	6,250,000	18,750,000
Freestone	17,000,000	4,250,000	12,750,000
Lee	34,000,000	8,500,000	25,500,000
Leon	42,000,000	10,500,000	31,500,000
Limestone	7,200,000	1,800,000	5,400,000
Madison	32,000,000	8,000,000	24,000,000
Milam	15,000,000	3,750,000	11,250,000
Navarro	850,000	212,500	637,500
Robertson	31,000,000	7,750,000	23,250,000
Williamson	450,000	112,500	337,500
Total	288,260,000	72,065,000	216,195,000

TABLE 16. TOTAL ESTIMATED RECOVERABLE STORAGE BY GROUNDWATER CONSERVATION DISTRICT[8] FOR THE HOOPER FORMATION WITHIN GROUNDWATER MANAGEMENT AREA 12. GROUNDWATER CONSERVATION DISTRICT TOTAL ESTIMATES ARE ROUNDED TO TWO SIGNIFICANT DIGITS.

Groundwater Conservation District (GCD)	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
No District	9,300,000	2,325,000	6,975,000
Brazos Valley GCD	49,000,000	12,250,000	36,750,000
Fayette County GCD	25,000,000	6,250,000	18,750,000
Lost Pines GCD	68,000,000	17,000,000	51,000,000
Mid-East Texas GCD	92,000,000	23,000,000	69,000,000
Post Oak Savannah GCD	45,000,000	11,250,000	33,750,000
Total	288,300,000	72,075,000	216,225,000

[8] The total estimated recoverable storage values by groundwater conservation district and county for an aquifer may not be the same because the numbers have been rounded to two significant digits.

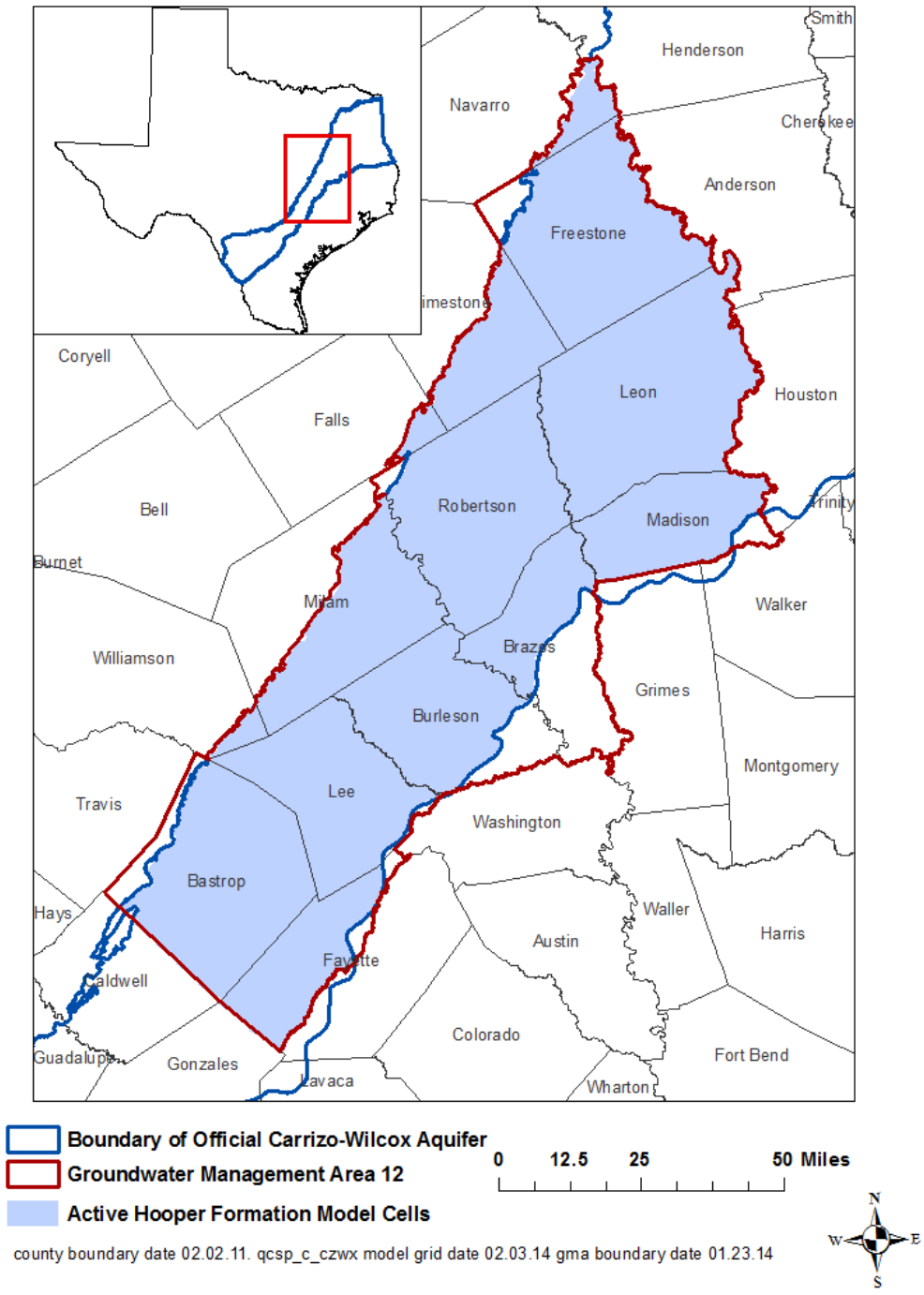

FIGURE 9. EXTENT OF THE GROUNDWATER AVAILABILITY MODEL FOR THE CENTRAL PART OF THE CARRIZO-WILCOX, QUEEN CITY, AND SPARTA AQUIFERS USED TO ESTIMATE TOTAL RECOVERABLE STORAGE FOR THE HOOPER FORMATION (TABLES 15 AND 16) WITHIN GROUNDWATER MANAGEMENT AREA 12.

TABLE 17. TOTAL ESTIMATED RECOVERABLE STORAGE BY COUNTY FOR THE SIMSBORO FORMATION WITHIN GROUNDWATER MANAGEMENT AREA 12. COUNTY TOTAL ESTIMATES ARE ROUNDED TO TWO SIGNIFICANT DIGITS.

County	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
Bastrop	18,000,000	4,500,000	13,500,000
Brazos	19,000,000	4,750,000	14,250,000
Burleson	30,000,000	7,500,000	22,500,000
Falls	66,000	16,500	49,500
Fayette	14,000,000	3,500,000	10,500,000
Freestone	9,600,000	2,400,000	7,200,000
Lee	28,000,000	7,000,000	21,000,000
Leon	35,000,000	8,750,000	26,250,000
Limestone	3,100,000	775,000	2,325,000
Madison	19,000,000	4,750,000	14,250,000
Milam	17,000,000	4,250,000	12,750,000
Navarro	140,000	35,000	105,000
Robertson	36,000,000	9,000,000	27,000,000
Williamson	49,000	12,250	36,750
Total	228,955,000	57,238,750	171,716,250

TABLE 18. TOTAL ESTIMATED RECOVERABLE STORAGE BY GROUNDWATER CONSERVATION DISTRICT[9] FOR THE SIMSBORO FORMATION WITHIN GROUNDWATER MANAGEMENT AREA 12. GROUNDWATER CONSERVATION DISTRICT TOTAL ESTIMATES ARE ROUNDED TO TWO SIGNIFICANT DIGITS.

Groundwater Conservation District (GCD)	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
No District	3,400,000	850,000	2,550,000
Brazos Valley GCD	55,000,000	13,750,000	41,250,000
Fayette County GCD	14,000,000	3,500,000	10,500,000
Lost Pines GCD	46,000,000	11,500,000	34,500,000
Mid-East Texas GCD	64,000,000	16,000,000	48,000,000
Post Oak Savannah GCD	47,000,000	11,750,000	35,250,000
Total	229,400,000	57,350,000	172,050,000

[9] The total estimated recoverable storage values by groundwater conservation district and county for an aquifer may not be the same because the numbers have been rounded to two significant digits.

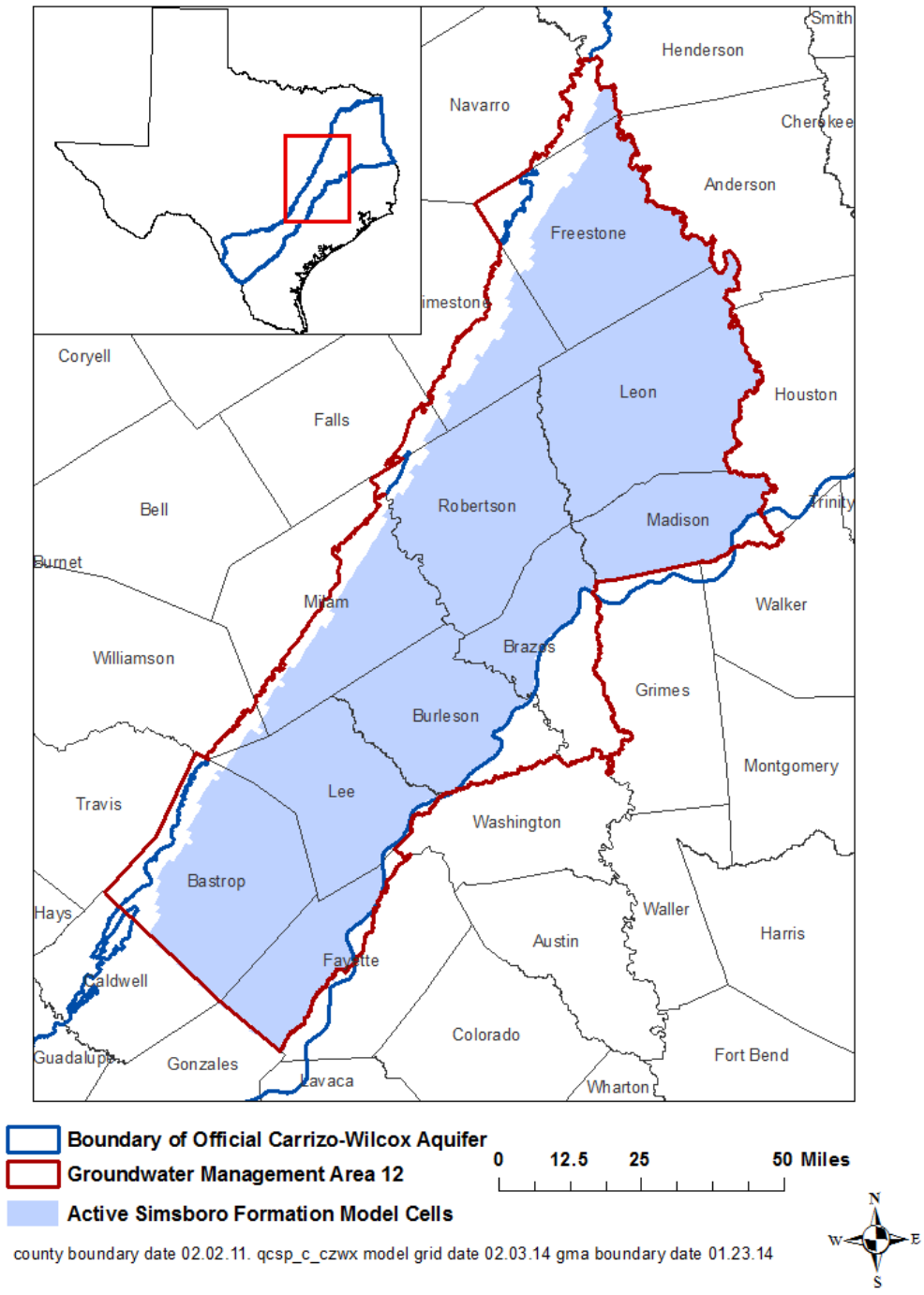

FIGURE 10. EXTENT OF THE GROUNDWATER AVAILABILITY MODEL FOR THE CENTRAL PART OF THE CARRIZO-WILCOX, QUEEN CITY, AND SPARTA AQUIFERS USED TO ESTIMATE TOTAL RECOVERABLE STORAGE FOR THE SIMSBORO FORMATION (TABLES 17 AND 18) WITHIN GROUNDWATER MANAGEMENT AREA 12.

TABLE 19. TOTAL ESTIMATED RECOVERABLE STORAGE BY COUNTY FOR THE CALVERT BLUFF FORMATION WITHIN GROUNDWATER MANAGEMENT AREA 12. COUNTY TOTAL ESTIMATES ARE ROUNDED TO TWO SIGNIFICANT DIGITS.

County	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
Bastrop	33,000,000	8,250,000	24,750,000
Brazos	22,000,000	5,500,000	16,500,000
Burleson	40,000,000	10,000,000	30,000,000
Falls	0	0	0
Fayette	36,000,000	9,000,000	27,000,000
Freestone	17,000,000	4,250,000	12,750,000
Lee	43,000,000	10,750,000	32,250,000
Leon	81,000,000	20,250,000	60,750,000
Limestone	1,300,000	325,000	975,000
Madison	51,000,000	12,750,000	38,250,000
Milam	12,000,000	3,000,000	9,000,000
Navarro	39,000	9,750	29,250
Robertson	32,000,000	8,000,000	24,000,000
Williamson	1,800	450	1,350
Total	368,340,800	92,085,200	276,255,600

TABLE 20. TOTAL ESTIMATED RECOVERABLE STORAGE BY GROUNDWATER CONSERVATION DISTRICT[10] FOR THE CALVERT BLUFF FORMATION WITHIN GROUNDWATER MANAGEMENT AREA 12. GROUNDWATER CONSERVATION DISTRICT TOTAL ESTIMATES ARE ROUNDED TO TWO SIGNIFICANT DIGITS.

Groundwater Conservation District (GCD)	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
No District	1,400,000	350,000	1,050,000
Brazos Valley GCD	54,000,000	13,500,000	40,500,000
Fayette County GCD	36,000,000	9,000,000	27,000,000
Lost Pines GCD	77,000,000	19,250,000	57,750,000
Mid-East Texas GCD	150,000,000	37,500,000	112,500,000
Post Oak Savannah GCD	52,000,000	13,000,000	39,000,000
Total	370,400,000	92,600,000	277,800,000

[10] The total estimated recoverable storage values by groundwater conservation district and county for an aquifer may not be the same because the numbers have been rounded to two significant digits.

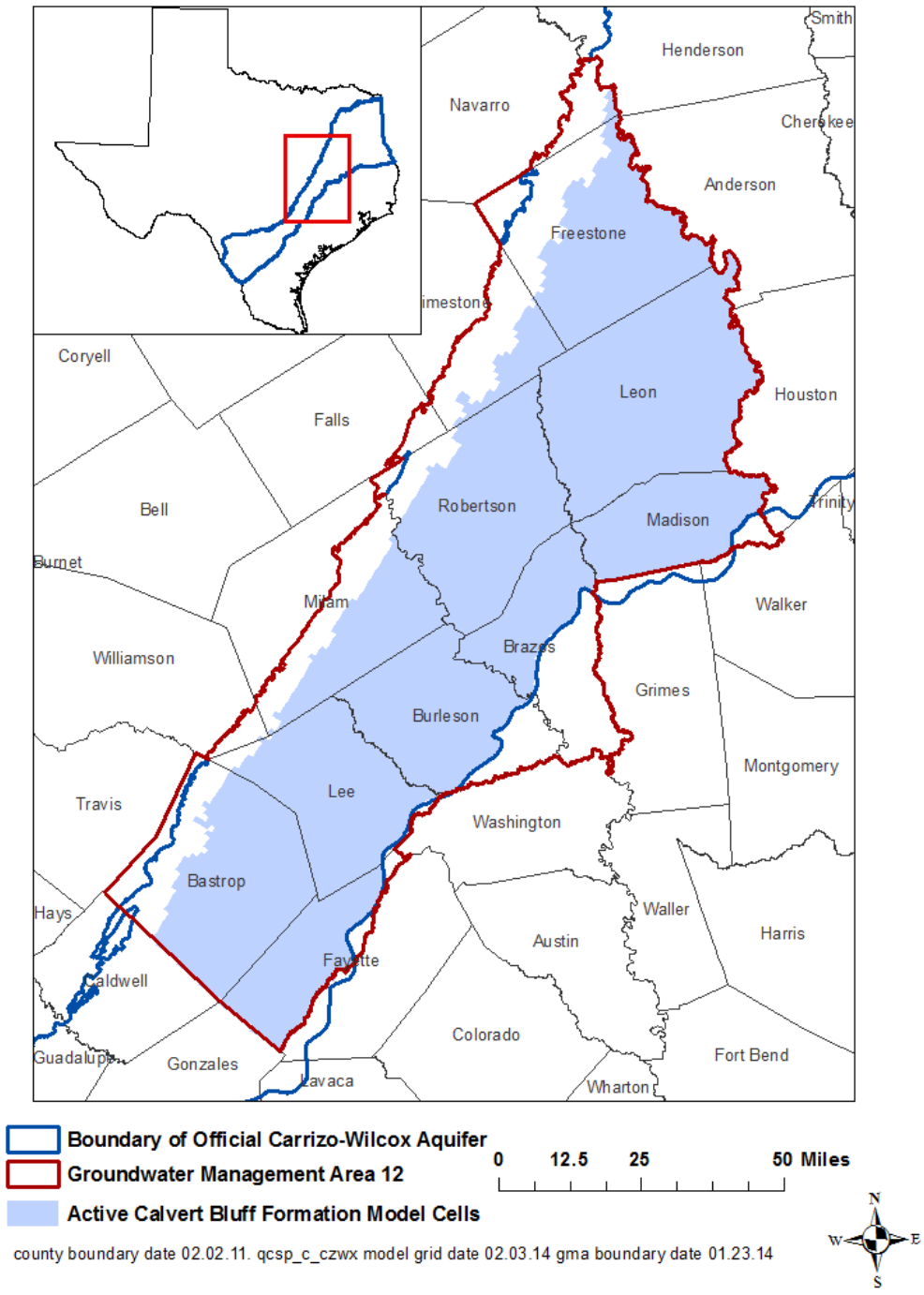

FIGURE 11. EXTENT OF THE GROUNDWATER AVAILABILITY MODEL FOR THE CENTRAL PART OF THE CARRIZO-WILCOX, QUEEN CITY, AND SPARTA AQUIFERS USED TO ESTIMATE TOTAL RECOVERABLE STORAGE FOR THE CALVERT BLUFF FORMATION (TABLES 19 AND 20) WITHIN GROUNDWATER MANAGEMENT AREA 12.

TABLE 21. TOTAL ESTIMATED RECOVERABLE STORAGE BY COUNTY FOR THE CARRIZO FORMATION WITHIN GROUNDWATER MANAGEMENT AREA 12. COUNTY TOTAL ESTIMATES ARE ROUNDED TO TWO SIGNIFICANT DIGITS.

County	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
Bastrop	12,000,000	3,000,000	9,000,000
Brazos	9,800,000	2,450,000	7,350,000
Burleson	21,000,000	5,250,000	15,750,000
Falls	0	0	0
Fayette	20,000,000	5,000,000	15,000,000
Freestone	2,000,000	500,000	1,500,000
Lee	21,000,000	5,250,000	15,750,000
Leon	20,000,000	5,000,000	15,000,000
Limestone	0	0	0
Madison	9,500,000	2,375,000	7,125,000
Milam	2,900,000	725,000	2,175,000
Navarro	0	0	0
Robertson	9,500,000	2,375,000	7,125,000
Williamson	0	0	0
Total	127,700,000	31,925,000	95,775,000

TABLE 22. TOTAL ESTIMATED RECOVERABLE STORAGE BY GROUNDWATER CONSERVATION DISTRICT[11] FOR THE CARRIZO FORMATION WITHIN GROUNDWATER MANAGEMENT AREA 12. GROUNDWATER CONSERVATION DISTRICT TOTAL ESTIMATES ARE ROUNDED TO TWO SIGNIFICANT DIGITS.

Groundwater Conservation District (GCD)	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
No District	0	0	0
Brazos Valley GCD	19,000,000	4,750,000	14,250,000
Fayette County GCD	20,000,000	5,000,000	15,000,000
Lost Pines GCD	33,000,000	8,250,000	24,750,000
Mid-East Texas GCD	31,000,000	7,750,000	23,250,000
Post Oak Savannah GCD	23,000,000	5,750,000	17,250,000
Total	126,000,000	31,500,000	94,500,000

[11] The total estimated recoverable storage values by groundwater conservation district and county for an aquifer may not be the same because the numbers have been rounded to two significant digits.

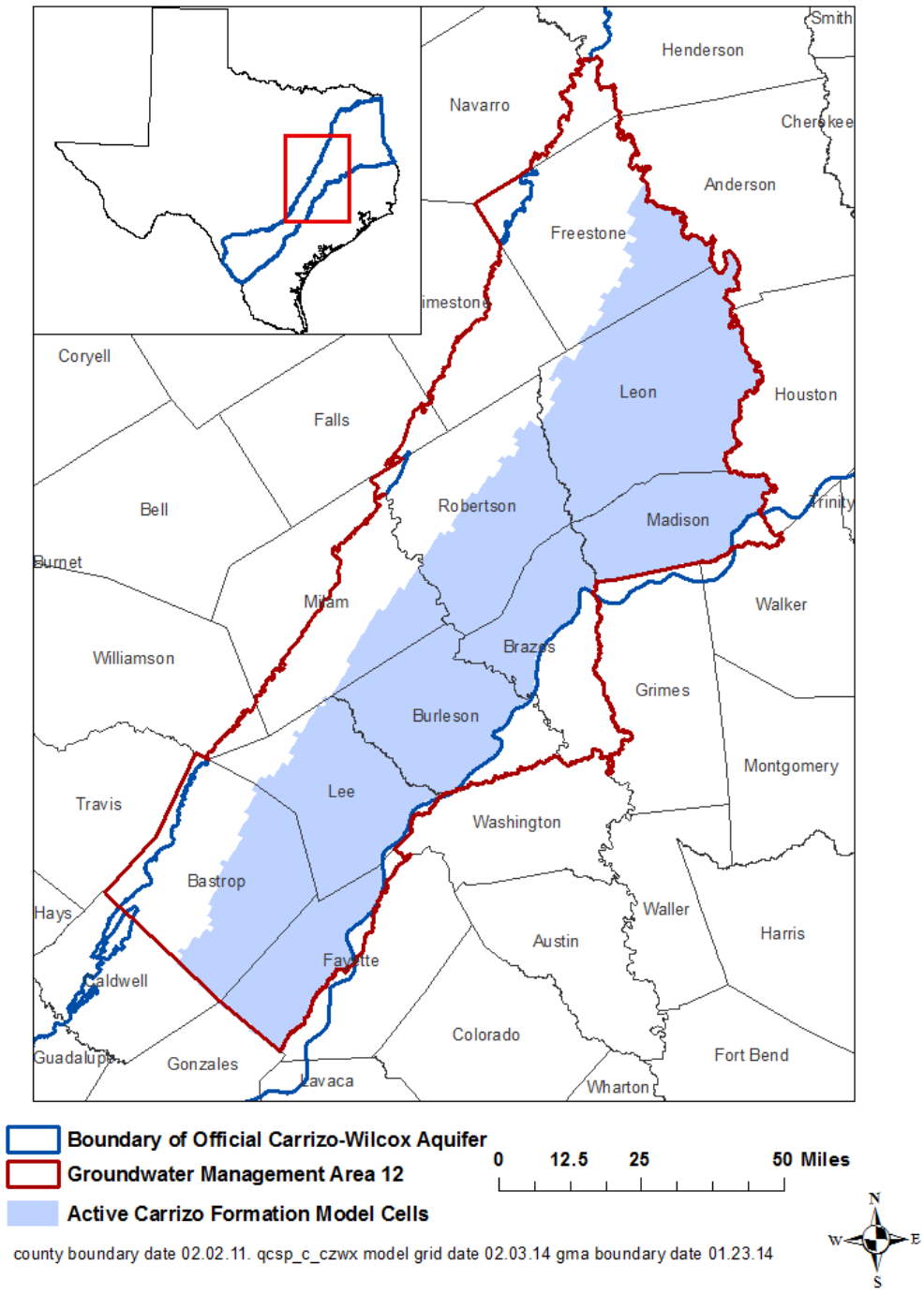

FIGURE 12. EXTENT OF THE GROUNDWATER AVAILABILITY MODEL FOR THE CENTRAL PART OF THE CARRIZO-WILCOX, QUEEN CITY, AND SPARTA AQUIFERS USED TO ESTIMATE TOTAL RECOVERABLE STORAGE FOR THE CARRIZO FORMATION (TABLES 21 AND 22) WITHIN GROUNDWATER MANAGEMENT AREA 12.

APPENDIX G

GAM RUN 18-021 FOR BRAZOS VALLEY GCD

GAM Run 18-021: Brazos Valley Groundwater Conservation District Groundwater Management Plan

Shirley C. Wade, Ph.D., P.G.
Texas Water Development Board
Groundwater Division
Groundwater Availability Modeling Department
512-936-0883
January 25, 2019

Shirley C. Wade
1/25/19

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GAM RUN 18-021: BRAZOS VALLEY GROUNDWATER CONSERVATION DISTRICT GROUNDWATER MANAGEMENT PLAN

Shirley C. Wade, Ph.D., P.G.
Texas Water Development Board
Groundwater Division
Groundwater Availability Modeling Department
512-936-0883
January 25, 2019

EXECUTIVE SUMMARY:

Texas State Water Code, Section 36.1071, Subsection (h) (Texas Water Code, 2011), states that, in developing its groundwater management plan, a groundwater conservation district shall use groundwater availability modeling information provided by the Executive Administrator of the Texas Water Development Board (TWDB) in conjunction with any available site-specific information provided by the district for review and comment to the Executive Administrator.

The TWDB provides data and information to the Brazos Valley Groundwater Conservation District in two parts. Part 1 is the Estimated Historical Water Use/State Water Plan dataset report, which will be provided to you separately by the TWDB Groundwater Technical Assistance Department. Please direct questions about the water data report to Mr. Stephen Allen at 512-463-7317 or stephen.allen@twdb.texas.gov. Part 2 is the required groundwater availability modeling information and this information includes:

1. the annual amount of recharge from precipitation, if any, to the groundwater resources within the district;
2. for each aquifer within the district, the annual volume of water that discharges from the aquifer to springs and any surface-water bodies, including lakes, streams, and rivers; and
3. the annual volume of flow into and out of the district within each aquifer and between aquifers in the district.

The groundwater management plan for the Brazos Valley Groundwater Conservation District should be adopted by the district on or before December 13, 2019 and submitted to the Executive Administrator of the TWDB on or before January 12, 2020. The current

management plan for the Brazos Valley Groundwater Conservation District expires on March 12, 2020.

We used four groundwater availability models to estimate the management plan information for the aquifers within the Brazos Valley Groundwater Conservation District. Information for the Carrizo-Wilcox, Queen City, and Sparta aquifers is from version 3.01 of the groundwater availability model for the central part of the Carrizo-Wilcox, Queen City, and Sparta aquifers (Young and others, 2018). Information for the Yegua-Jackson Aquifer is from version 1.01 of the groundwater availability model for the Yegua-Jackson Aquifer (Deeds and others, 2010). Information for the Gulf Coast Aquifer System is from version 3.01 of the groundwater availability model for the northern portion of the Gulf Coast Aquifer System (Kasmarek, 2013). Information for the Brazos River Alluvium Aquifer is from version 1.01 of the groundwater availability model for the Brazos River Alluvium Aquifer (Ewing and Jigmond, 2016).

This report replaces the results of GAM Run 18-019 (Wade, 2018). GAM Run 18-021 includes results from the newly released and updated groundwater availability model for the Carrizo-Wilcox, Queen City, and Sparta aquifers (Young and others, 2018). Tables 1 through 6 summarize the groundwater availability model data required by statute and Figures 1 through 6 show the area of the models from which the values in the tables were extracted. If, after review of the figures, the Brazos Valley Groundwater Conservation District determines that the district boundaries used in the assessment do not reflect current conditions, please notify the TWDB at your earliest convenience.

METHODS:

In accordance with the provisions of the Texas State Water Code, Section 36.1071, Subsection (h), the four groundwater availability models mentioned above were used to estimate information for the Brazos Valley Groundwater Conservation District management plan. Water budgets were extracted for the historical model periods for the Carrizo-Wilcox, Queen City, and Sparta aquifers (1980 through 2010), Yegua-Jackson Aquifer (1980 through 1997), Gulf Coast Aquifer System (1980 through 2009) and Brazos River Alluvium Aquifer (1980 through 2012) using ZONEBUDGET Version 3.01 (Harbaugh, 2009) or ZONEBUDGET-USG (Panday and others, 2013) as applicable. The average annual water budget values for recharge, surface-water outflow, inflow to the district, and outflow from the district for the aquifers within the district are summarized in this report.

PARAMETERS AND ASSUMPTIONS:

Carrizo-Wilcox, Queen City, and Sparta aquifers

- We used version 3.01 of the groundwater availability model for the central part of the Carrizo-Wilcox, Queen City, and Sparta aquifers. See Young and others (2018) for assumptions and limitations of the groundwater availability model for the central part of the Carrizo-Wilcox, Queen City, and Sparta aquifers.

- This groundwater availability model includes ten layers, which represent the Colorado or Brazos River Alluvium (Layer 1), the outcrop and shallow flow zone of all of the underlying aquifers (Layer 2), the Sparta Aquifer (Layer 3), the Weches Formation confining unit (Layer 4), the Queen City Aquifer (Layer 5), the Reklaw Formation confining unit (Layer 6), the Carrizo Formation (Layer 7), the Calvert Bluff Formation (Layer 8), the Simsboro Formation (Layer 9), and the Hooper Formation (Layer 10).

- Individual water budgets for the district were determined for the Sparta Aquifer (Layers 2 and 3), the Queen City Aquifer (Layers 2 and 5), and the Carrizo-Wilcox Aquifer (Layers 2 and 7 through 10, collectively).

- The model was run with MODFLOW-USG (unstructured grid; Panday and others, 2013).

Yegua-Jackson Aquifer

- We used version 1.01 of the groundwater availability model for the Yegua-Jackson Aquifer. See Deeds and others (2010) for assumptions and limitations of the groundwater availability model.

- This groundwater availability model includes five layers, which represent the outcrop of the Yegua-Jackson Aquifer and younger overlying units—the Catahoula Formation (Layer 1), the upper portion of the Jackson Group (Layer 2), the lower portion of the Jackson Group (Layer 3), the upper portion of the Yegua Group (Layer 4), and the lower portion of the Yegua Group (Layer 5).

- An overall water budget for the district was determined for the Yegua-Jackson Aquifer (Layer 1 through Layer 5, collectively, for the portions of the model that represent the Yegua-Jackson Aquifer).

- The model was run with MODFLOW-2000 (Harbaugh and others, 2000).

Gulf Coast Aquifer System

- We used version 3.01 of the groundwater availability model for the northern portion of the Gulf Coast Aquifer System for this analysis. See Kasmarek (2013) for assumptions and limitations of the model.
- The model has four layers, which represent the Chicot Aquifer (Layer 1), the Evangeline Aquifer (Layer 2), the Burkeville Confining Unit (Layer 3), and the Jasper Aquifer and parts of the Catahoula Formation in direct hydrologic communication with the Jasper Aquifer (Layer 4).
- Water budgets for the district were determined for the Gulf Coast Aquifer System (Layers 1 through 4 collectively).
- The model was run with MODFLOW-2000 (Harbaugh and others, 2000).
- Because this model assumes a no-flow boundary condition at the base we used version 1.01 of the groundwater availability model for the Yegua-Jackson Aquifer to investigate groundwater flows between the Catahoula Formation and the base of the Gulf Coast Aquifer System. See Deeds and others (2010) for assumptions and limitations of the groundwater availability model for the Yegua-Jackson Aquifer.

Brazos River Alluvium Aquifer

- We used version 1.01 of the groundwater availability model for the Brazos River Alluvium Aquifer released on December 16, 2016. See Ewing and Jigmond (2016) for assumptions and limitations of the model.
- The groundwater availability model for the Brazos River Alluvium Aquifer contains three layers. Layers 1 and 2 represent the Brazos River Alluvium Aquifer and Layer 3 represents the surficial portions of the Carrizo-Wilcox, Queen City, Sparta, Yegua-Jackson, and Gulf Coast aquifers as well as various geologic units of the Cretaceous System.
- In the Brazos Valley Groundwater Conservation District flow between underlying aquifers and the Brazos River Alluvium Aquifer is represented by flow between model layers 2 and 3.
- Perennial rivers and streams were simulated using the MODFLOW Streamflow-Routing package and ephemeral streams were simulated using the MODFLOW River package. Springs were simulated using the MODFLOW Drain package.

- The model was run with MODFLOW-USG (unstructured grid; Panday and others, 2013).

RESULTS:

A groundwater budget summarizes the amount of water entering and leaving the aquifers according to the groundwater availability model. Selected groundwater budget components listed below were extracted from the groundwater availability model results for the Carrizo-Wilcox, Queen City, Sparta, Yegua-Jackson, and Brazos River Alluvium aquifers and the Gulf Coast Aquifer System, located within Brazos Valley Groundwater Conservation District and averaged over the historical calibration periods, as shown in Tables 1 through 6.

1. Precipitation recharge—the areally distributed recharge sourced from precipitation falling on the outcrop areas of the aquifers (where the aquifer is exposed at land surface) within the district.

2. Surface-water outflow—the total water discharging from the aquifer (outflow) to surface-water features such as streams, reservoirs, and springs.

3. Flow into and out of district—the lateral flow within the aquifer between the district and adjacent counties.

4. Flow between aquifers—the net vertical flow between the aquifer and adjacent aquifers or confining units. This flow is controlled by the relative water levels in each aquifer and aquifer properties of each aquifer or confining unit that define the amount of leakage that occurs.

The information needed for the district's management plan is summarized in Tables 1 through 6. It is important to note that sub-regional water budgets are not exact. This is due to the size of the model cells and the approach used to extract data from the model. To avoid double accounting, a model cell that straddles a political boundary, such as a district or county boundary, is assigned to one side of the boundary based on the location of the centroid of the model cell. For example, if a cell contains two counties, the cell is assigned to the county where the centroid of the cell is located.

TABLE 1. SUMMARIZED INFORMATION FOR THE CARRIZO-WILCOX AQUIFER FOR BRAZOS VALLEY GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Carrizo-Wilcox Aquifer	47,122
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Carrizo-Wilcox Aquifer	54,520
Estimated annual volume of flow into the district within each aquifer in the district	Carrizo-Wilcox Aquifer	32,600
Estimated annual volume of flow out of the district within each aquifer in the district	Carrizo-Wilcox Aquifer	10,109
Estimated net annual volume of flow between each aquifer in the district	Flow into the Carrizo-Wilcox Aquifer from downdip Carrizo-Wilcox units	2,537
	Flow from the Carrizo-Wilcox Aquifer into the overlying Reklaw Confining Unit	1,951
	Flow into the Queen City Aquifer from the Carrizo-Wilcox Aquifer	95
	Flow from the Carrizo-Wilcox Aquifer into the Brazos River Alluvium Aquifer[1]	2,290

[1] Flow based on water budget from the groundwater availability model for the Brazos River Alluvium. The historical period used for averaging was 1980 through 2012.

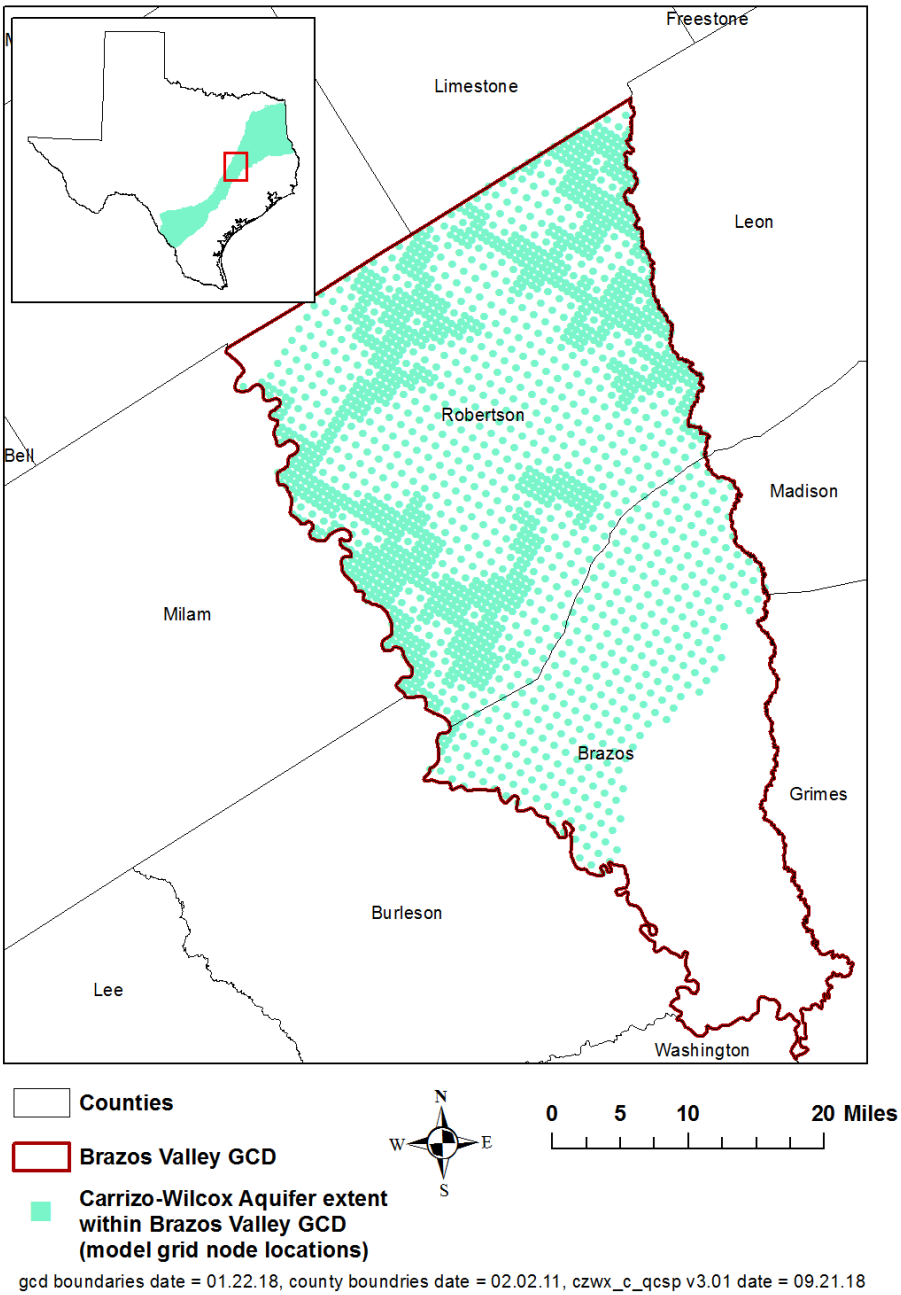

FIGURE 1. AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE CARRIZO-WILCOX AQUIFER FROM WHICH THE INFORMATION IN TABLE 1 WAS EXTRACTED (THE AQUIFER SYSTEM EXTENT WITHIN THE DISTRICT BOUNDARY).

TABLE 2. SUMMARIZED INFORMATION FOR THE QUEEN CITY AQUIFER FOR BRAZOS VALLEY GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Queen City Aquifer	10,391
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Queen City Aquifer	11,123
Estimated annual volume of flow into the district within each aquifer in the district	Queen City Aquifer	3,046
Estimated annual volume of flow out of the district within each aquifer in the district	Queen City Aquifer	1,211
Estimated net annual volume of flow between each aquifer in the district	Flow into the Queen City Aquifer from the Carrizo-Wilcox Aquifer	95
	Flow into the Queen City Aquifer from the underlying Reklaw Confining Unit	1,896
	Flow into the Queen City Aquifer from downdip Queen City units	30
	Flow from the Queen City Aquifer into the overlying Weches Confining Unit	2,818
	Flow from the Queen City Aquifer into the Sparta Aquifer	205
	Flow from the Queen City Aquifer into the Brazos River Alluvium Aquifer[2]	6,288

[2] Flow based on water budget from the groundwater availability model for the Brazos River Alluvium. The historical period used for averaging was 1980 through 2012.

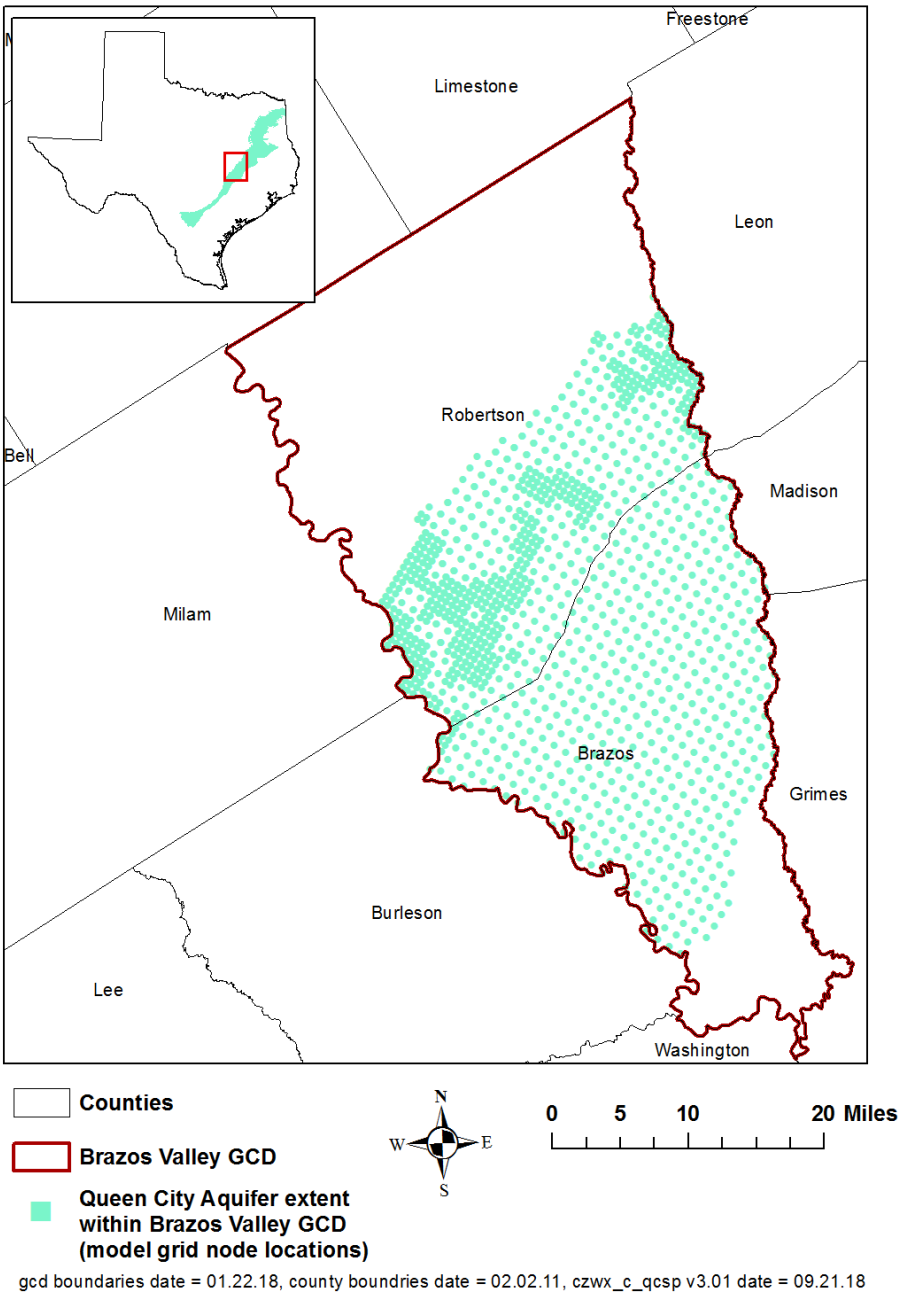

FIGURE 2. AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE QUEEN CITY AQUIFER FROM WHICH THE INFORMATION IN TABLE 2 WAS EXTRACTED (THE AQUIFER SYSTEM EXTENT WITHIN THE DISTRICT BOUNDARY).

TABLE 3. SUMMARIZED INFORMATION FOR THE SPARTA AQUIFER FOR BRAZOS VALLEY GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Sparta Aquifer	8,568
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Sparta Aquifer	12,874
Estimated annual volume of flow into the district within each aquifer in the district	Sparta Aquifer	1,415
Estimated annual volume of flow out of the district within each aquifer in the district	Sparta Aquifer	347
Estimated net annual volume of flow between each aquifer in the district	Flow from the Queen City Aquifer into the Sparta Aquifer	205
	Flow into the Sparta Aquifer from the underlying Weches Confining Unit	2,542
	Flow from the Sparta Aquifer into downdip Sparta units	8
	Flow from the Sparta Aquifer into overlying units	149
	Flow from the Sparta Aquifer into the Brazos River Alluvium Aquifer[3]	3,870

[3] Flow based on water budget from the groundwater availability model for the Brazos River Alluvium. The historical period used for averaging was 1980 through 2012.

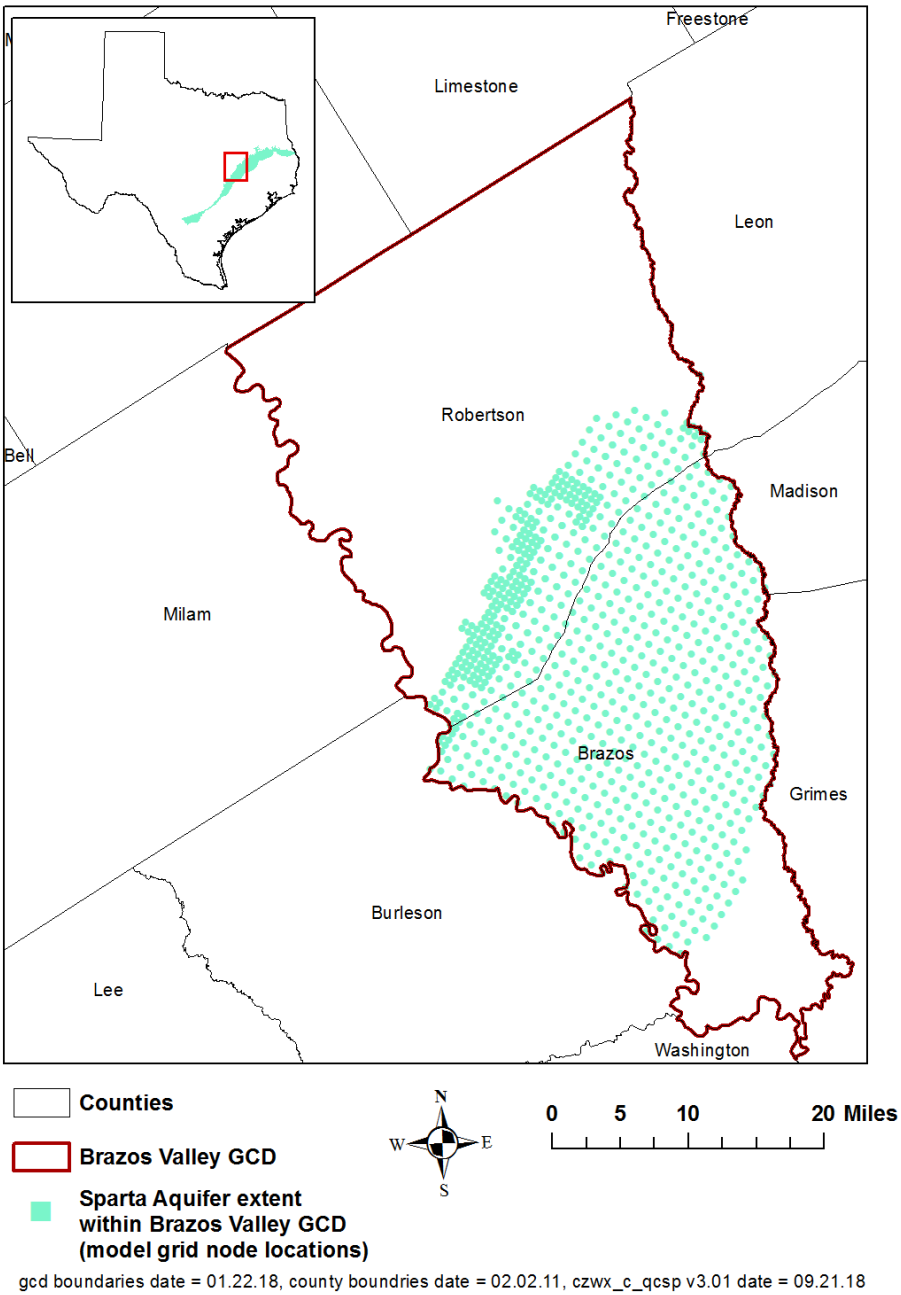

FIGURE 3. AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE SPARTA AQUIFER FROM WHICH THE INFORMATION IN TABLE 3 WAS EXTRACTED (THE AQUIFER SYSTEM EXTENT WITHIN THE DISTRICT BOUNDARY).

TABLE 4. SUMMARIZED INFORMATION FOR THE YEGUA-JACKSON AQUIFER FOR BRAZOS VALLEY GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Yegua-Jackson Aquifer	26,512
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Yegua-Jackson Aquifer	39,287
Estimated annual volume of flow into the district within each aquifer in the district	Yegua-Jackson Aquifer	12,069
Estimated annual volume of flow out of the district within each aquifer in the district	Yegua-Jackson Aquifer	9,923
Estimated net annual volume of flow between each aquifer in the district	Flow into the Yegua-Jackson Aquifer from the Catahoula and younger units	17
	Flow from the confined portion of the Yegua and Jackson groups into the Yegua-Jackson Aquifer	134
	Flow from the Yegua-Jackson Aquifer into the Brazos River Alluvium Aquifer[4]	2,399

[4] Flow based on water budget from the groundwater availability model for the Brazos River Alluvium. The historical period used for averaging was 1980 through 2012.

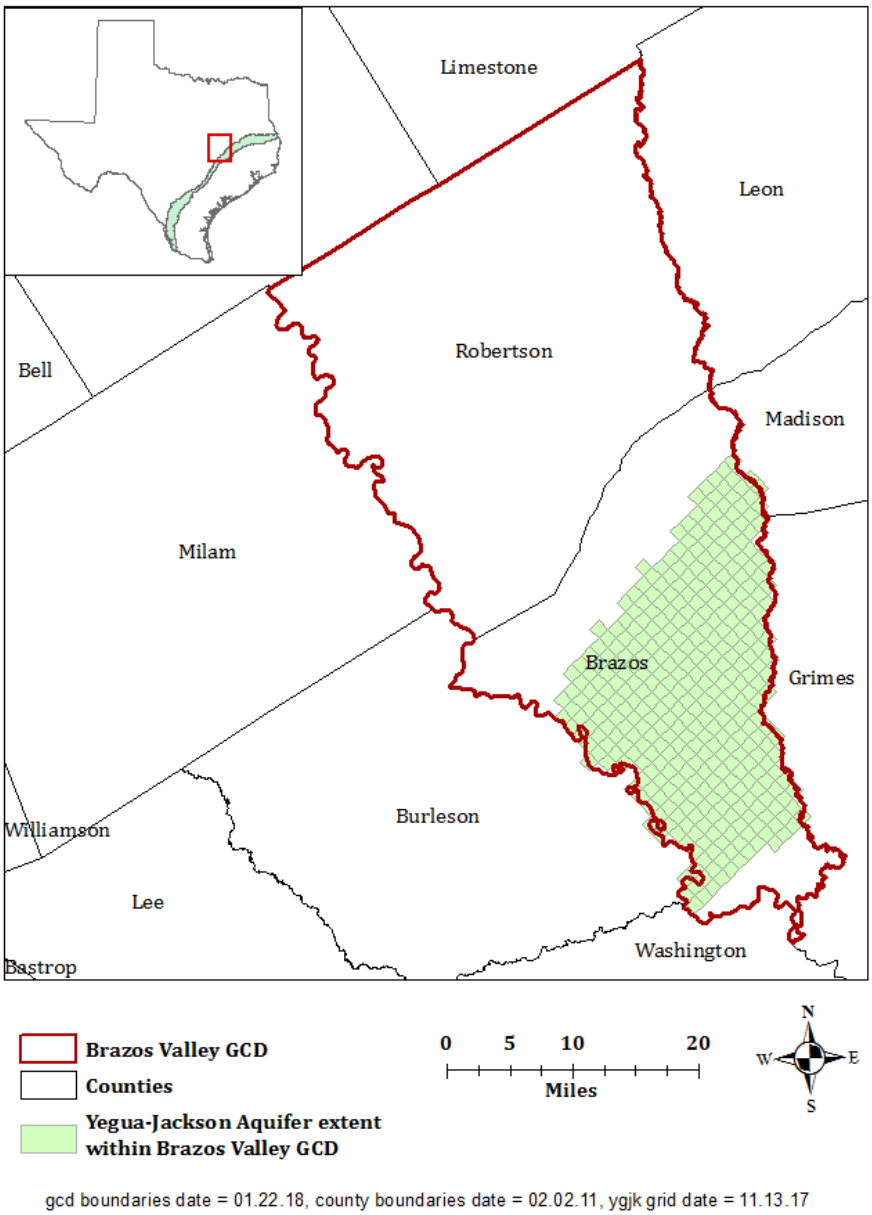

FIGURE 4. AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE YEGUA-JACKSON AQUIFER FROM WHICH THE INFORMATION IN TABLE 4 WAS EXTRACTED (THE AQUIFER SYSTEM EXTENT WITHIN THE DISTRICT BOUNDARY).

TABLE 5. SUMMARIZED INFORMATION FOR THE GULF COAST AQUIFER SYSTEM FOR BRAZOS VALLEY GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Gulf Coast Aquifer System	40
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Gulf Coast Aquifer System	255
Estimated annual volume of flow into the district within each aquifer in the district	Gulf Coast Aquifer System	332
Estimated annual volume of flow out of the district within each aquifer in the district	Gulf Coast Aquifer System	48
Estimated net annual volume of flow between each aquifer in the district	Flow into the Catahoula unit from the Jasper Aquifer[5]	46
	Flow from the Gulf Coast Aquifer System into the Brazos River Alluvium[6]	2,154

[5] Based on the general head boundary flux from the groundwater availability model for the Yegua-Jackson Aquifer. A part of the flow between the Catahoula confining system and the Jasper Aquifer represents flow between the Gulf Coast Aquifer System and deeper units and part represents flow within the Gulf Coast Aquifer System.

[6] Flow based on water budget from the groundwater availability model for the Brazos River Alluvium. The historical period used for averaging was 1980 through 2012.

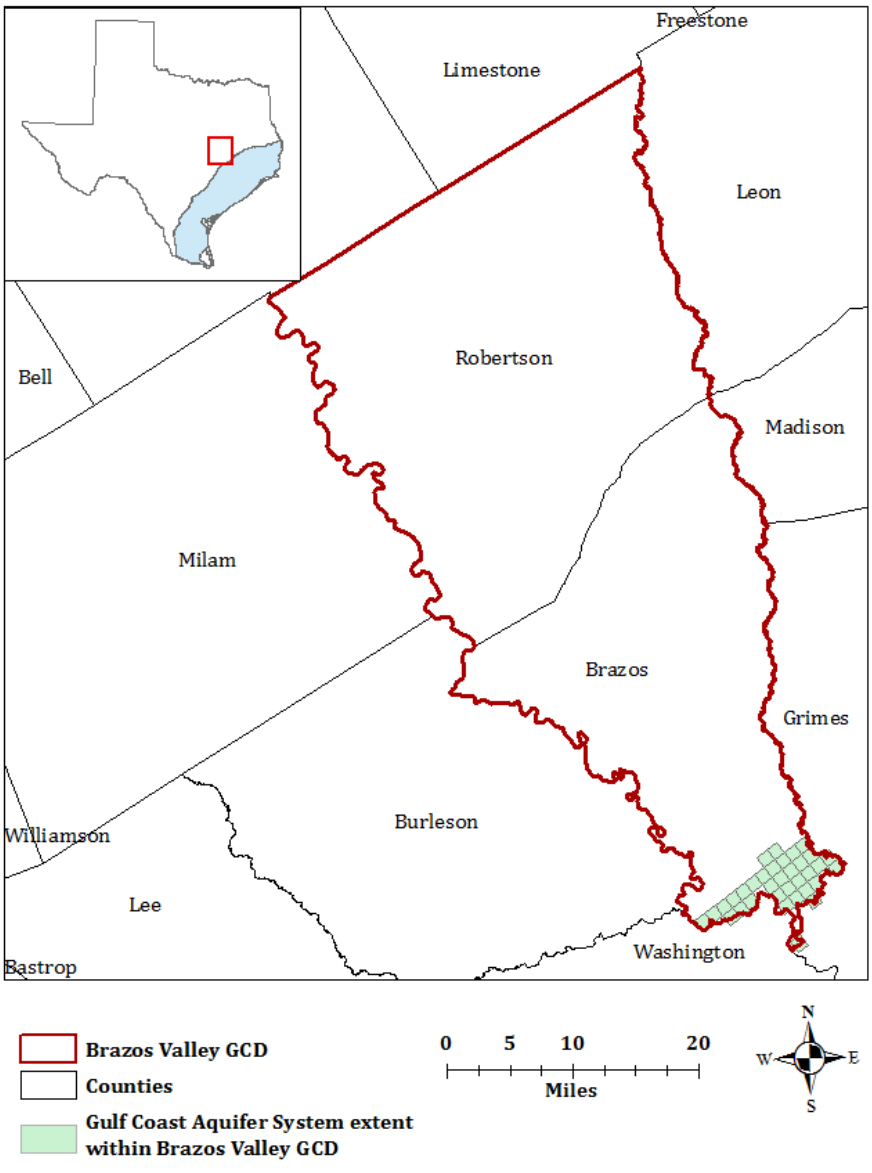

FIGURE 5. AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE GULF COAST AQUIFER SYSTEM FROM WHICH THE INFORMATION IN TABLE 5 WAS EXTRACTED (THE AQUIFER SYSTEM EXTENT WITHIN THE DISTRICT BOUNDARY).

TABLE 6. SUMMARIZED INFORMATION FOR THE BRAZOS RIVER ALLUVIUM AQUIFER FOR BRAZOS VALLEY GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Brazos River Alluvium Aquifer	23,333
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Brazos River Alluvium Aquifer	33,859
Estimated annual volume of flow into the district within each aquifer in the district	Brazos River Alluvium Aquifer	24,447
Estimated annual volume of flow out of the district within each aquifer in the district	Brazos River Alluvium Aquifer	20,432
Estimated net annual volume of flow between each aquifer in the district	Flow from the Carrizo-Wilcox Aquifer into the Brazos River Alluvium Aquifer	2,290
	Flow from the Queen City Aquifer into the Brazos River Alluvium Aquifer	6,288
	Flow from the Sparta Aquifer into the Brazos River Alluvium Aquifer	3,870
	Flow from the Yegua-Jackson Aquifer into the Brazos River Alluvium Aquifer	2,399
	Flow from the Gulf Coast Aquifer System into the Brazos River Alluvium	2,154

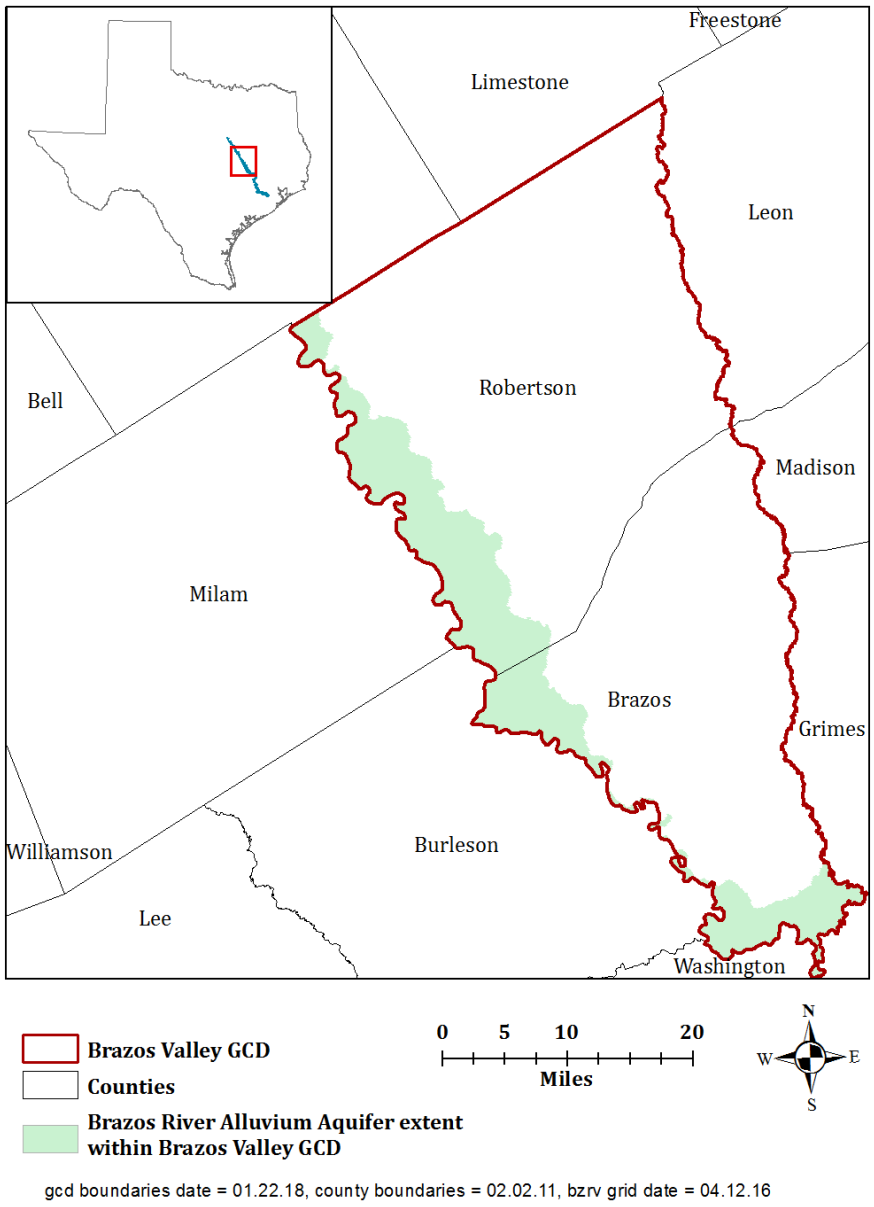

FIGURE 6. AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE BRAZOS RIVER ALLUVIUM AQUIFER FROM WHICH THE INFORMATION IN TABLE 6 WAS EXTRACTED (THE AQUIFER SYSTEM EXTENT WITHIN THE DISTRICT BOUNDARY).

LIMITATIONS:

The groundwater models used in completing this analysis are the best available scientific tools that can be used to meet the stated objectives. To the extent that this analysis will be used for planning purposes and/or regulatory purposes related to pumping in the past and into the future, it is important to recognize the assumptions and limitations associated with the use of the results. In reviewing the use of models in environmental regulatory decision making, the National Research Council (2007) noted:

> *"Models will always be constrained by computational limitations, assumptions, and knowledge gaps. They can best be viewed as tools to help inform decisions rather than as machines to generate truth or make decisions. Scientific advances will never make it possible to build a perfect model that accounts for every aspect of reality or to prove that a given model is correct in all respects for a particular regulatory application. These characteristics make evaluation of a regulatory model more complex than solely a comparison of measurement data with model results."*

A key aspect of using the groundwater model to evaluate historical groundwater flow conditions includes the assumptions about the location in the aquifer where historical pumping was placed. Understanding the amount and location of historical pumping is as important as evaluating the volume of groundwater flow into and out of the district, between aquifers within the district (as applicable), interactions with surface water (as applicable), recharge to the aquifer system (as applicable), and other metrics that describe the impacts of that pumping. In addition, assumptions regarding precipitation, recharge, and interaction with streams are specific to particular historical time periods.

Because the application of the groundwater models was designed to address regional-scale questions, the results are most effective on a regional scale. The TWDB makes no warranties or representations related to the actual conditions of any aquifer at a particular location or at a particular time.

It is important for groundwater conservation districts to monitor groundwater pumping and overall conditions of the aquifer. Because of the limitations of the groundwater model and the assumptions in this analysis, it is important that the groundwater conservation districts work with the TWDB to refine this analysis in the future given the reality of how the aquifer responds to the actual amount and location of pumping now and in the future. Historical precipitation patterns also need to be placed in context as future climatic conditions, such as dry and wet year precipitation patterns, may differ and affect groundwater flow conditions.

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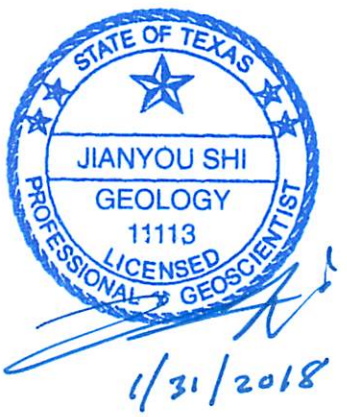
Wade, S. C., 2018, GAM Run 18-019: Brazos Valley Groundwater Conservation District Management Plan, 22 p., http://www.twdb.texas.gov/groundwater/docs/GAMruns/GR18-019.pdf

APPENDIX H

GAM RUN 17-019 FOR FAYETTE COUNTY GCD

GAM Run 17-019: Fayette County Groundwater Conservation District Management Plan

Jerry Shi, Ph.D., P.G.
Texas Water Development Board
Groundwater Division
Groundwater Availability Modeling Department
(512) 463-5076
January 31, 2018



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GAM RUN 17-019: FAYETTE COUNTY GROUNDWATER CONSERVATION DISTRICT MANAGEMENT PLAN

Jerry Shi, Ph.D., P.G.
Texas Water Development Board
Groundwater Division
Groundwater Availability Modeling Department
(512) 463-5076
January 31, 2018

EXECUTIVE SUMMARY:

Texas Water Code, Section 36.1071, Subsection (h), states that, in developing its groundwater management plan, a groundwater conservation district shall use groundwater availability modeling information provided by the Executive Administrator of the Texas Water Development Board (TWDB) in conjunction with any available site-specific information provided by the district for review and comment to the Executive Administrator.

The TWDB provides data and information to the Fayette County Groundwater Conservation District in two parts. Part 1 is the Estimated Historical Water Use/State Water Plan dataset report, which will be provided to you separately by the TWDB Groundwater Technical Assistance Department. Please direct questions about the water data report to Mr. Stephen Allen at (512) 463-7317 or stephen.allen@twdb.texas.gov. Part 2 is the required groundwater availability modeling information and this information includes:

1. the annual amount of recharge from precipitation, if any, to the groundwater resources within the district;

2. for each aquifer within the district, the annual volume of water that discharges from the aquifer to any surface-water bodies, including lakes, streams, rivers, and springs; and

3. the annual volume of flow into and out of the district within each aquifer and between aquifers in the district.

The groundwater management plan for the Fayette County Groundwater Conservation District should be adopted by the district on or before September 3, 2018, and submitted to the Executive Administrator of the TWDB on or before October 3, 2018. The current

management plan for the Fayette County Groundwater Conservation District expires on December 2, 2018.

The management plan information for the aquifers within Fayette County Groundwater Conservation District was extracted from three groundwater availability models:

1. the groundwater availability model for the central Gulf Coast Aquifer System (Chowdhury and others, 2004);
2. the groundwater availability model for the central part of the Carrizo-Wilcox, Queen-City, and Sparta aquifers (Dutton and others, 2003; Kelley and others, 2004); and
3. the groundwater availability model for the Yegua-Jackson Aquifer (Deeds and others, 2010).

This report replaces the results of GAM Run 13-002 (Wade, 2013). GAM Run 17-019 meets current standards set after the release of GAM Run 13-002. Tables 1 through 5 summarize the groundwater availability model data required by statute and Figures 1 through 5 show the area of the models from which the values in the tables were extracted. If after review of the figures, the Fayette County Groundwater Conservation District determines that the district boundaries used in the assessment do not reflect current conditions, please notify the TWDB at your earliest convenience.

METHODS:

In accordance with the provisions of the Texas Water Code, Section 36.1071, Subsection (h), groundwater availability models for the central portion of the Gulf Coast Aquifer System (1981 through 1999); the Queen City and Sparta aquifers, which includes the Carrizo-Wilcox Aquifer (1981 through 1999); and the Yegua-Jackson Aquifer (1980 through 1997) were run for this analysis. Water budgets for each year of the transient model periods were extracted using ZONEBUDGET Version 3.01 (Harbaugh, 2009). The average annual water budget values for recharge, surface water outflow, inflow to the district, outflow from the district, net cross-formation flow between aquifers, and net flow between aquifer and its brackish portion located within the district are summarized in this report.

PARAMETERS AND ASSUMPTIONS:

Carrizo-Wilcox, Queen City, and Sparta Aquifers

- Version 2.02 of the groundwater availability model for the central part of the Carrizo-Wilcox, Queen City, and Sparta aquifers was used for this analysis. See Dutton and others (2003) and Kelley and others (2004) for assumptions and limitations of the groundwater availability model.
- This groundwater availability model includes eight layers, which generally represent the Sparta Aquifer (Layer 1), the Weches Formation confining unit (Layer 2), the Queen City Aquifer (Layer 3), the Reklaw Formation confining unit (Layer 4), the Carrizo Formation (Layer 5), the Calvert Bluff Formation (Layer 6), the Simsboro Formation (Layer 7), and the Hooper Formation (Layer 8).
- Individual water budgets for the district were determined for the Sparta Aquifer (Layer 1), the Queen City Aquifer (Layer 3), and the Carrizo-Wilcox Aquifer (Layers 5 through 8, collectively).
- The model was run with MODFLOW-96 (Harbaugh and McDonald, 1996).

Yegua-Jackson Aquifer

- Version 1.01 of the groundwater availability model for the Yegua-Jackson Aquifer was used for this analysis. See Deeds and others (2010) for assumptions and limitations of the groundwater availability model.
- This groundwater availability model includes five layers which represent the outcrop of the Yegua-Jackson Aquifer and younger overlying units—the Catahoula Formation (Layer 1), the upper portion of the Jackson Group (Layer 2), the lower portion of the Jackson Group (Layer 3), the upper portion of the Yegua Group (Layer 4), and the lower portion of the Yegua Group (Layer 5).
- The model was run with MODFLOW-2000 (Harbaugh and others, 2000).
- An overall water budget for the district was determined for the Yegua-Jackson Aquifer (Layer 1 through Layer 5, collectively, for the portions of the model that represent the Yegua-Jackson Aquifer).

Gulf Coast Aquifer System

- Version 1.01 of the groundwater availability model for the Central Gulf Coast Aquifer System was used for this analysis. See Chowdhury and others (2004) and Waterstone Environmental Hydrology and Engineering, Inc. and Parsons (2003) for assumptions and limitations of the groundwater availability model.
- The model has four layers which represent the Chicot Aquifer (Layer 1), the Evangeline Aquifer (Layer 2), the Burkeville Confining Unit (Layer 3), and the Jasper Aquifer and parts of the Catahoula Formation in direct hydrologic communication with the Jasper Aquifer (Layer 4).
- The model was run with MODFLOW-96 (Harbaugh and McDonald, 1996).
- Water budgets for the district were determined for the Gulf Coast Aquifer System (Layers 1 through 4 collectively).

RESULTS:

A groundwater budget summarizes the amount of water entering and leaving the aquifer according to the groundwater availability model. Selected groundwater budget components listed below were extracted from the model results for the aquifers located within the district and averaged over the duration of the calibration and verification portion of the model runs in the district. The components of the modified budget shown in tables 1 through 5 include:

- Precipitation recharge—the areally distributed recharge sourced from precipitation falling on the outcrop areas of the aquifers (where the aquifer is exposed at land surface) within the district.
- Surface-water outflow—the total water discharging from the aquifer (outflow) to surface-water features such as streams, reservoirs, and springs.
- Flow into and out of district—the lateral flow within the aquifer between the district and adjacent counties.
- Flow between aquifers—the net vertical flow between the aquifer and adjacent aquifers or confining units. This flow is controlled by the relative water levels in each aquifer and aquifer properties of each aquifer or confining unit that define the amount of leakage that occurs.

The information needed for the district's management plan is summarized in Tables 1 through 5. It is important to note that sub-regional water budgets are not exact. This is due to the size of the model cells and the approach used to extract data from the model. To avoid double accounting, a model cell that straddles a political boundary, such as district or county boundaries, is assigned to one side of the boundary based on the location of the centroid of the model cell. For example, if a cell contains two counties, the cell is assigned to the county where the centroid of the cell is located (Figures 1 through 5).

TABLE 1: SUMMARIZED INFORMATION FOR THE CARRIZO-WILCOX AQUIFER THAT IS NEEDED FOR FAYETTE COUNTY GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Management Plan requirement	***Aquifer or confining unit***	***Results***
Estimated annual amount of recharge from precipitation to the district	Carrizo-Wilcox Aquifer	0
Estimated annual volume of water that discharges from the aquifer to springs and any surface water body including lakes, streams, and rivers	Carrizo-Wilcox Aquifer	0
Estimated annual volume of flow into the district within each aquifer in the district	Carrizo-Wilcox Aquifer	7,133
Estimated annual volume of flow out of the district within each aquifer in the district	Carrizo-Wilcox Aquifer	2,980
Estimated net annual volume of flow between each aquifer in the district	From the Carrizo-Wilcox Aquifer into the Reklaw Confining Unit	217
	From the Carrizo-Wilcox Aquifer into its brackish portion	4,090

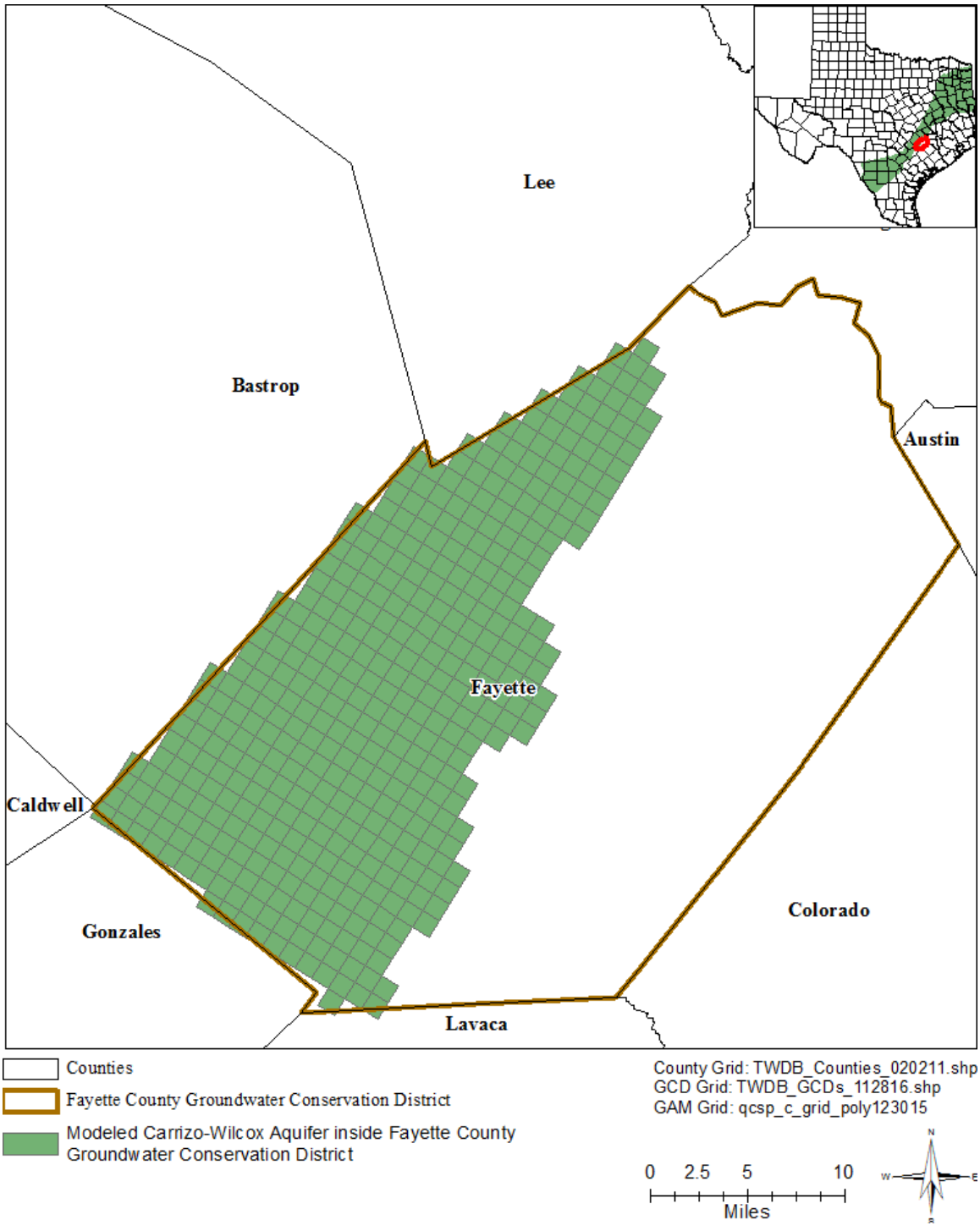

FIGURE 1: AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE CENTRAL PORTION OF THE CARRIZO-WILCOX, QUEEN CITY, AND SPARTA AQUIFERS FROM WHICH THE INFORMATION IN TABLE 1 WAS EXTRACTED (THE CARRIZO-WILCOX AQUIFER EXTENT WITHIN THE DISTRICT BOUNDARY).

TABLE 2: SUMMARIZED INFORMATION FOR THE QUEEN CITY AQUIFER THAT IS NEEDED FOR FAYETTE COUNTY GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Management Plan requirement	***Aquifer or confining unit***	***Results***
Estimated annual amount of recharge from precipitation to the district	Queen City Aquifer	0
Estimated annual volume of water that discharges from the aquifer to springs and any surface water body including lakes, streams, and rivers	Queen City Aquifer	0
Estimated annual volume of flow into the district within each aquifer in the district	Queen City Aquifer	1,932
Estimated annual volume of flow out of the district within each aquifer in the district	Queen City Aquifer	505
Estimated net annual volume of flow between each aquifer in the district	From the Queen City Aquifer into the Weches Confining Unit	1,417
	From the Reklaw Confining Unit into the Queen City Aquifer	181
	From the Queen City Aquifer into its brackish portion	79

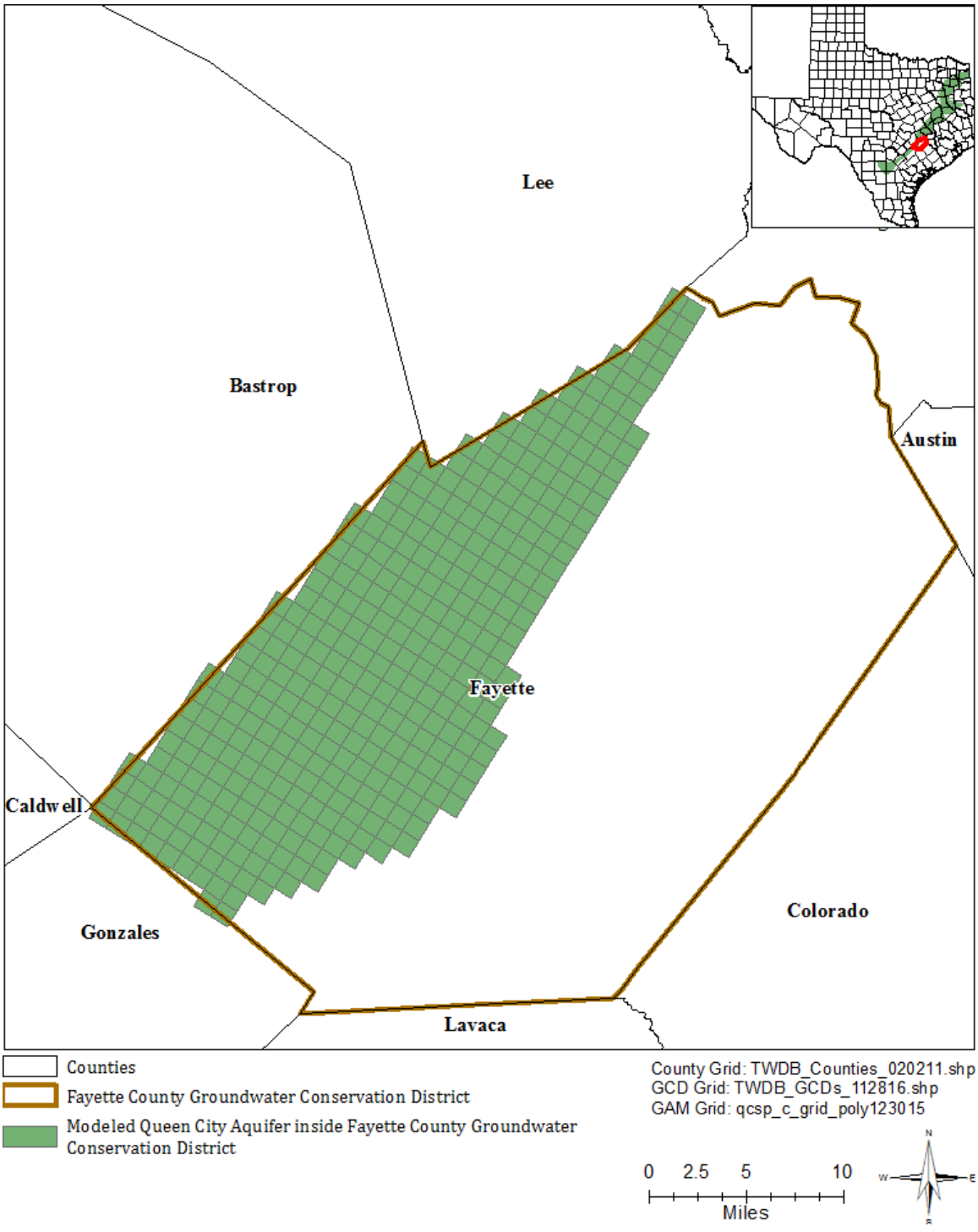

FIGURE 2: AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE CENTRAL PORTION OF THE CARRIZO-WILCOX, QUEEN CITY, AND SPARTA AQUIFERS FROM WHICH THE INFORMATION IN TABLE 2 WAS EXTRACTED (THE QUEEN CITY AQUIFER EXTENT WITHIN THE DISTRICT BOUNDARY).

TABLE 3: SUMMARIZED INFORMATION FOR THE SPARTA AQUIFER THAT IS NEEDED FOR FAYETTE COUNTY GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Management Plan requirement	***Aquifer***	***Results***
Estimated annual amount of recharge from precipitation to the district	Sparta Aquifer	382
Estimated annual volume of water that discharges from the aquifer to springs and any surface water body including lakes, streams, and rivers	Sparta Aquifer	0
Estimated annual volume of flow into the district within each aquifer in the district	Sparta Aquifer	516
Estimated annual volume of flow out of the district within each aquifer in the district	Sparta Aquifer	197
Estimated net annual volume of flow between each aquifer in the district	From the Sparta Aquifer into the overlying younger units	1,666
	From the Weches Confining Unit into the Sparta Aquifer	1,522
	From the Sparta Aquifer into its brackish portion	15

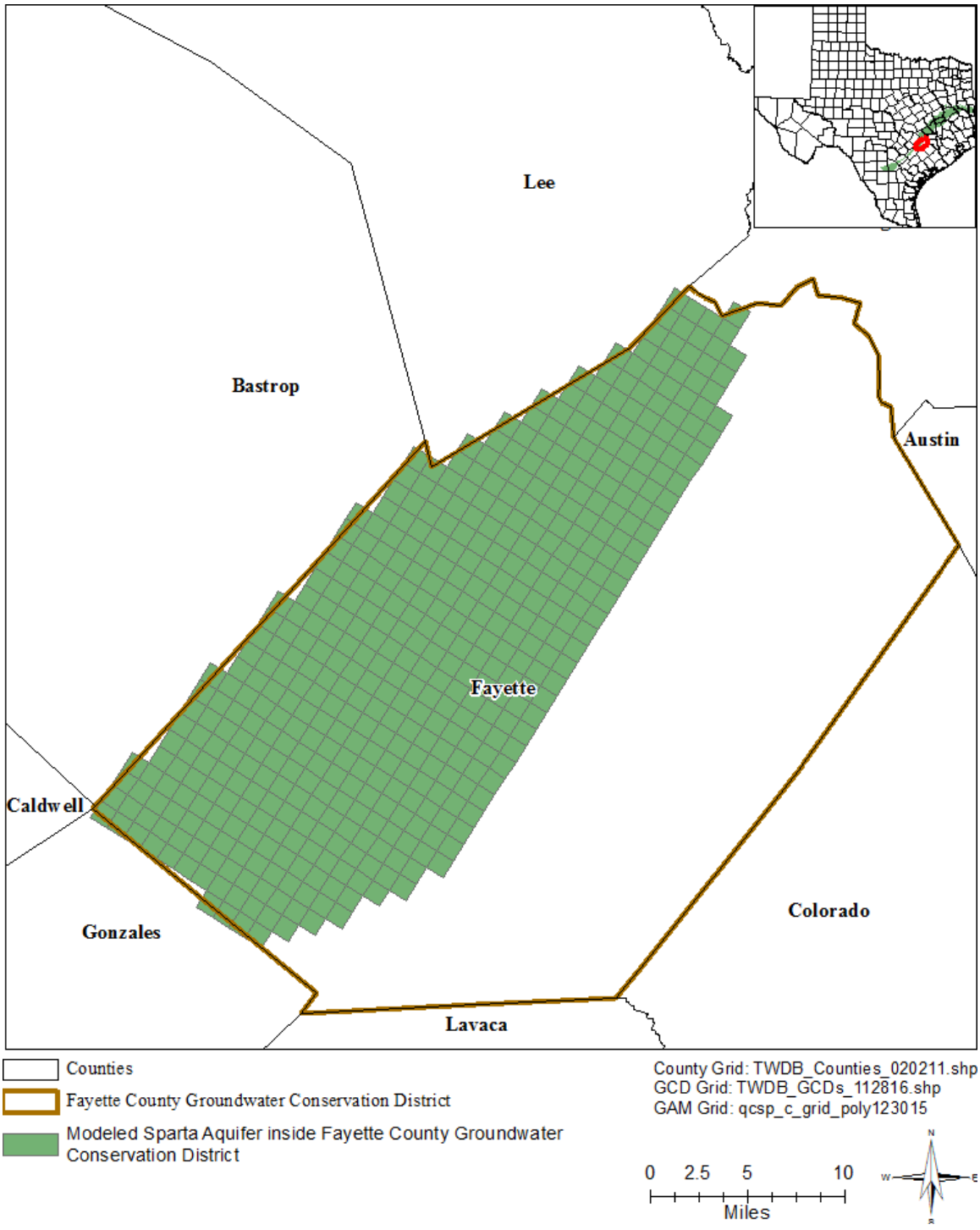

FIGURE 3: AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE CENTRAL PORTION OF THE CARRIZO-WILCOX, QUEEN CITY, AND SPARTA AQUIFERS FROM WHICH THE INFORMATION IN TABLE 3 WAS EXTRACTED (THE SPARTA AQUIFER EXTENT WITHIN THE DISTRICT BOUNDARY).

TABLE 4: SUMMARIZED INFORMATION FOR THE YEGUA-JACKSON AQUIFER THAT IS NEEDED FOR FAYETTE COUNTY GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Management Plan requirement	***Aquifer or confining unit***	***Results***
Estimated annual amount of recharge from precipitation to the district	Yegua-Jackson Aquifer	47,304
Estimated annual volume of water that discharges from the aquifer to springs and any surface water body including lakes, streams, and rivers	Yegua-Jackson Aquifer	59,161
Estimated annual volume of flow into the district within each aquifer in the district	Yegua-Jackson Aquifer	9,885
Estimated annual volume of flow out of the district within each aquifer in the district	Yegua-Jackson Aquifer	7,045
Estimated net annual volume of flow between each aquifer in the district	From the Yegua-Jackson Aquifer into the Catahoula Formation	18
	From the Yegua-Jackson Aquifer into its brackish portion	193

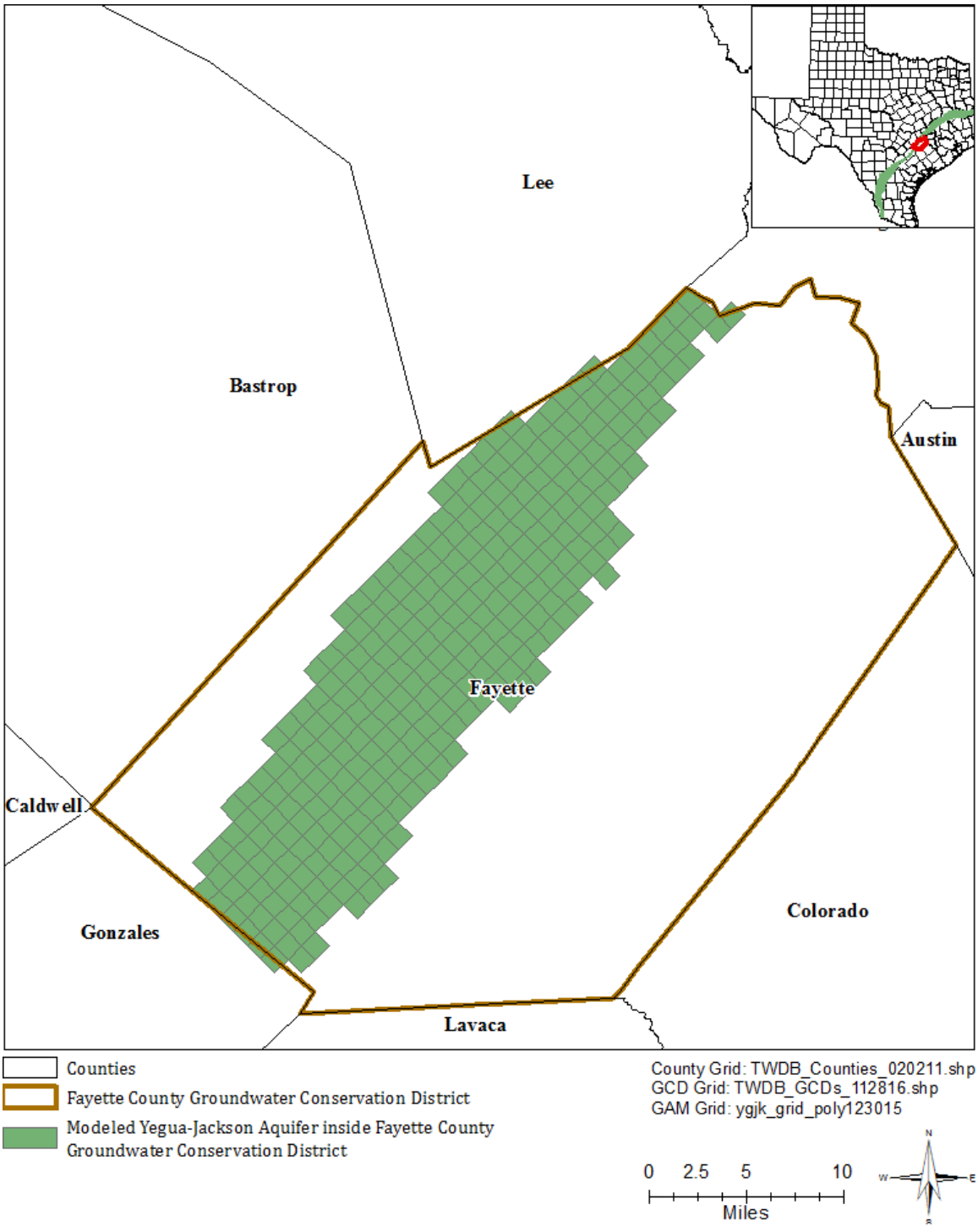

FIGURE 4: AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE YEGUA-JACKSON AQUIFER FROM WHICH THE INFORMATION IN TABLE 4 WAS EXTRACTED (THE AQUIFER EXTENT WITHIN THE DISTRICT BOUNDARY).

TABLE 5: SUMMARIZED INFORMATION FOR THE GULF COAST AQUIFER SYSTEM THAT IS NEEDED FOR FAYETTE COUNTY GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Management Plan requirement	***Aquifer or confining unit***	***Results***
Estimated annual amount of recharge from precipitation to the district	Gulf Coast Aquifer System	1,955
Estimated annual volume of water that discharges from the aquifer to springs and any surface water body including lakes, streams, and rivers	Gulf Coast Aquifer System	982
Estimated annual volume of flow into the district within each aquifer in the district	Gulf Coast Aquifer System	279
Estimated annual volume of flow out of the district within each aquifer in the district	Gulf Coast Aquifer System	1,375
Estimated net annual volume of flow between each aquifer in the district	From the Yegua-Jackson Aquifer into the Catahoula Formation	18*

*. Estimated from the groundwater availability model for the Yegua-Jackson Aquifer.

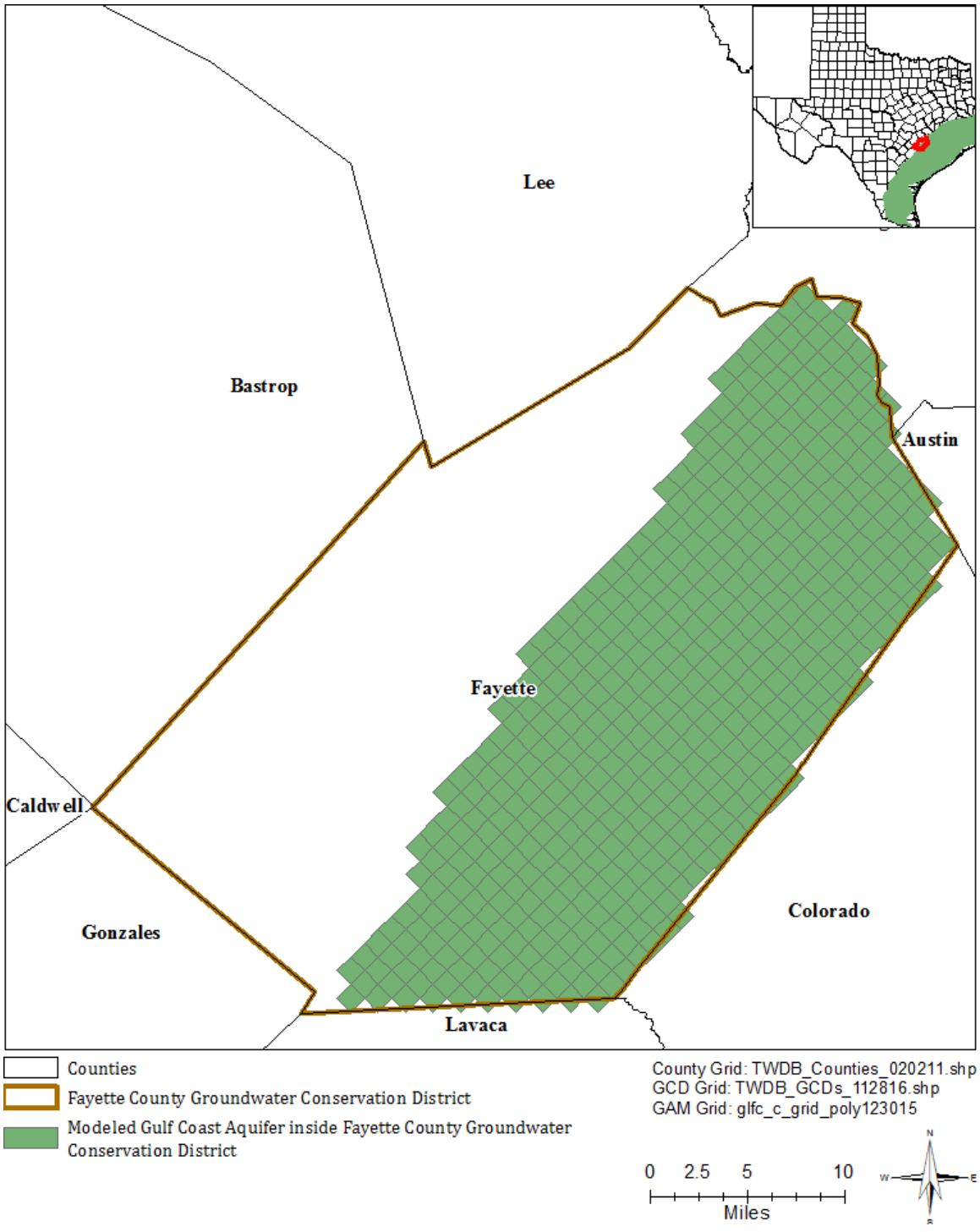

FIGURE 5: AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE GULF COAST AQUIFER SYSTEM FROM WHICH THE INFORMATION IN TABLE 5 WAS EXTRACTED (THE AQUIFER SYSTEM EXTENT WITHIN THE DISTRICT BOUNDARY).

LIMITATIONS:

The groundwater models used in completing this analysis are the best available scientific tools that can be used to meet the stated objectives. To the extent that this analysis will be used for planning purposes and/or regulatory purposes related to pumping in the past and into the future, it is important to recognize the assumptions and limitations associated with the use of the results. In reviewing the use of models in environmental regulatory decision making, the National Research Council (2007) noted:

> *"Models will always be constrained by computational limitations, assumptions, and knowledge gaps. They can best be viewed as tools to help inform decisions rather than as machines to generate truth or make decisions. Scientific advances will never make it possible to build a perfect model that accounts for every aspect of reality or to prove that a given model is correct in all respects for a particular regulatory application. These characteristics make evaluation of a regulatory model more complex than solely a comparison of measurement data with model results."*

A key aspect of using the groundwater model to evaluate historic groundwater flow conditions includes the assumptions about the location in the aquifer where historic pumping was placed. Understanding the amount and location of historic pumping is as important as evaluating the volume of groundwater flow into and out of the district, between aquifers within the district (as applicable), interactions with surface-water (as applicable), recharge to the aquifer system (as applicable), and other metrics that describe the impacts of that pumping. In addition, assumptions regarding precipitation, recharge, and interaction with streams are specific to particular historic time periods.

Because the application of the groundwater models was designed to address regional-scale questions, the results are most effective on a regional scale. The TWDB makes no warranties or representations related to the actual conditions of any aquifer at a particular location or at a particular time.

It is important for groundwater conservation districts to monitor groundwater pumping and overall conditions of the aquifer. Because of the limitations of the groundwater model and the assumptions in this analysis, it is important that the groundwater conservation districts work with the TWDB to refine this analysis in the future given the reality of how the aquifer responds to the actual amount and location of pumping now and in the future. Historic precipitation patterns also need to be placed in context as future climatic conditions, such as dry and wet year precipitation patterns, may differ and affect groundwater flow conditions.

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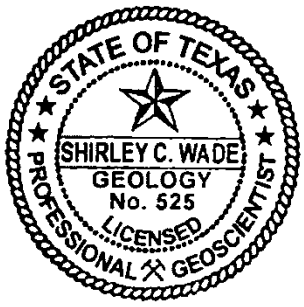
APPENDIX I

GAM RUN 16-014 FOR LOST PINES GCD

GAM RUN 16-014: LOST PINES GROUNDWATER CONSERVATION DISTRICT GROUNDWATER MANAGEMENT PLAN

Shirley C. Wade, Ph.D., P.G.
Texas Water Development Board
Groundwater Division
Groundwater Availability Modeling Section
(512) 936-0883
March 6, 2017



Shirley C. Wade
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GAM RUN 16-014: LOST PINES GROUNDWATER CONSERVATION DISTRICT GROUNDWATER MANAGEMENT PLAN

Shirley C. Wade, Ph.D., P.G.
Texas Water Development Board
Groundwater Division
Groundwater Availability Modeling Section
(512) 936-0883
March 6, 2017

EXECUTIVE SUMMARY:

Texas State Water Code, Section 36.1071, Subsection (h) (Texas Water Code, 2015), states that, in developing its groundwater management plan, a groundwater conservation district shall use groundwater availability modeling information provided by the Executive Administrator of the Texas Water Development Board (TWDB) in conjunction with any available site-specific information provided by the district for review and comment to the Executive Administrator.

The TWDB provides data and information to the Lost Pines Groundwater Conservation District in two parts. Part 1 is the Estimated Historical Water Use/State Water Plan dataset report, which will be provided to you separately by the TWDB Groundwater Technical Assistance Section. Please direct questions about the water data report to Mr. Stephen Allen at (512) 463-7317 or stephen.allen@twdb.texas.gov. Part 2 is the required groundwater availability modeling information and this information includes

1. the annual amount of recharge from precipitation, if any, to the groundwater resources within the district;

2. for each aquifer within the district, the annual volume of water that discharges from the aquifer to springs and any surface-water bodies, including lakes, streams, and rivers; and

3. the annual volume of flow into and out of the district within each aquifer and between aquifers in the district.

The groundwater management plan for the Lost Pines Groundwater Conservation District should be adopted by the district on or before August 9, 2017, and submitted to the Executive Administrator of the TWDB on or before September 8, 2017. The current

management plan for the Lost Pines Groundwater Conservation District expires on November 7, 2017.

We used three groundwater availability models to estimate the management plan information for the aquifers within the Lost Pines Groundwater Conservation District. Information for the Trinity Aquifer is from the groundwater availability model (version 2.01) for the northern portion of the Trinity and Woodbine aquifers (Kelley and others, 2014). Information for the Carrizo-Wilcox, Queen City, and Sparta aquifers is from version 2.02 of the groundwater availability model for the central part of the Carrizo-Wilcox, Queen City, and Sparta aquifers (Kelley and others, 2004). Information for the Yegua-Jackson Aquifer is from version 1.01 of the groundwater availability model for the Yegua-Jackson Aquifer (Deeds and others, 2010).

This report replaces the results of GAM Run 10-014 (Hassan, 2010). GAM Run 16-014 meets current standards set after the release of GAM Run 10-014 and includes results from the recently released groundwater availability model for the northern portion of the Trinity and Woodbine aquifers (Kelley and others, 2014). Tables 1 through 5 summarize the groundwater availability model data required by statute and Figures 1 through 5 show the area of the models from which the values in the tables were extracted. If after review of the figures, the Lost Pines Groundwater Conservation District determines that the district boundaries used in the assessment do not reflect current conditions, please notify the TWDB at your earliest convenience.

METHODS:

In accordance with the provisions of the Texas State Water Code, Section 36.1071, Subsection (h), the three groundwater availability models mentioned above were used to estimate information for the Lost Pines Groundwater Conservation District management plan. Water budgets were extracted for the historical model periods (Trinity Aquifer— 1980 through 2012, Carrizo-Wilcox, Queen City, and Sparta aquifers— 1980 through 1999, and Yegua-Jackson Aquifer—1980 through 1997) using ZONEBUDGET Version 3.01 (Harbaugh, 2009). The average annual water budget values for recharge, surface-water outflow, inflow to the district, and outflow from the district for the aquifers within the district are summarized in this report.

PARAMETERS AND ASSUMPTIONS:

Trinity Aquifer

- We used version 2.01 of the groundwater availability model for the northern portion of the Trinity and Woodbine aquifers. See Kelley and others (2014) for assumptions and limitations of the model.
- The groundwater availability model for the northern portion of the Trinity and Woodbine aquifers contains eight layers: Layer 1 (the surficial outcrop area of the units in layers 2 through 8 and units younger than Woodbine Aquifer), Layer 2 (Woodbine Aquifer and pass-through cells), Layer 3 (Washita and Fredericksburg, Edwards (Balcones Fault Zone), and pass-through cells), and Layers 4 through 8 (Trinity Aquifer).
- The Woodbine Aquifer does not exist within the Lost Pines Groundwater Conservation District and thus water budgets for this aquifer were not calculated or included for this report.
- The model was run with MODFLOW-NWT (Niswonger and others, 2011).

Carrizo-Wilcox, Queen City, and Sparta aquifers

- We used version 2.02 of the groundwater availability model for the central part of the Carrizo-Wilcox, Queen City, and Sparta aquifers. See Dutton and others (2003) and Kelley and others (2004) for assumptions and limitations of the groundwater availability model for the central part of the Carrizo-Wilcox, Queen City, and Sparta aquifers.
- This groundwater availability model includes eight layers which generally represent the Sparta Aquifer (Layer 1), the Weches Formation confining unit (Layer 2), the Queen City Aquifer (Layer 3), the Reklaw Formation confining unit (Layer 4), the Carrizo Formation (Layer 5), the Calvert Bluff Formation (Layer 6), the Simsboro Formation (Layer 7), and the Hooper Formation (Layer 8). Individual water budgets for the district were determined for the Sparta Aquifer (Layer 1), the Queen City Aquifer (Layer 3), and the Carrizo-Wilcox Aquifer (Layer 5 through Layer 8, collectively).
- The model was run with MODFLOW-96 (Harbaugh and McDonald, 1996).

Yegua-Jackson Aquifer

- We used version 1.01 of the groundwater availability model for the Yegua-Jackson Aquifer. See Deeds and others (2010) for assumptions and limitations of the groundwater availability model.
- This groundwater availability model includes five layers which represent the outcrop of the Yegua-Jackson Aquifer and younger overlying units—the Catahoula Formation (Layer 1), the upper portion of the Jackson Group (Layer 2), the lower portion of the Jackson Group (Layer 3), the upper portion of the Yegua Group (Layer 4), and the lower portion of the Yegua Group (Layer 5).
- An overall water budget for the district was determined for the Yegua-Jackson Aquifer (Layer 1 through Layer 5, collectively, for the portions of the model that represent the Yegua-Jackson Aquifer).
- The model was run with MODFLOW-2000 (Harbaugh and others, 2000).

RESULTS:

A groundwater budget summarizes the amount of water entering and leaving the aquifer according to the groundwater availability model. Selected groundwater budget components listed below were extracted from the three groundwater availability models covering the aquifers within Lost Pines Groundwater Conservation District and averaged over the historical calibration periods.

1. Precipitation recharge—the areally distributed recharge sourced from precipitation falling on the outcrop areas of the aquifers (where the aquifer is exposed at land surface) within the district.
2. Surface-water outflow—the total water discharging from the aquifer (outflow) to surface-water features such as streams, reservoirs, and springs.
3. Flow into and out of district—the lateral flow within the aquifer between the district and adjacent counties.
4. Flow between aquifers—the net vertical flow between the aquifer and adjacent aquifers or confining units. This flow is controlled by the relative water levels in each aquifer and aquifer properties of each aquifer or confining unit that define the amount of leakage that occurs.

The information needed for the district's management plan is summarized in Tables 1 through 5. It is important to note that sub-regional water budgets are not exact. This is due to the size of the model cells and the approach used to extract data from the model. To avoid double accounting, a model cell that straddles a political boundary, such as a district or county boundary, is assigned to one side of the boundary based on the location of the centroid of the model cell. For example, if a cell contains two counties, the cell is assigned to the county where the centroid of the cell is located.

TABLE 1: SUMMARIZED INFORMATION FOR THE TRINITY AQUIFER FOR THE LOST PINES GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Trinity Aquifer	0
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Trinity Aquifer	0
Estimated annual volume of flow into the district within each aquifer in the district	Trinity Aquifer	355
Estimated annual volume of flow out of the district within each aquifer in the district	Trinity Aquifer	136
Estimated net annual volume of flow between each aquifer in the district	Flow from the Trinity Aquifer into overlying units	2
	Flow to underlying formations	NA[1]

[1] Not available because the model assumes a no-flow boundary condition at the base.

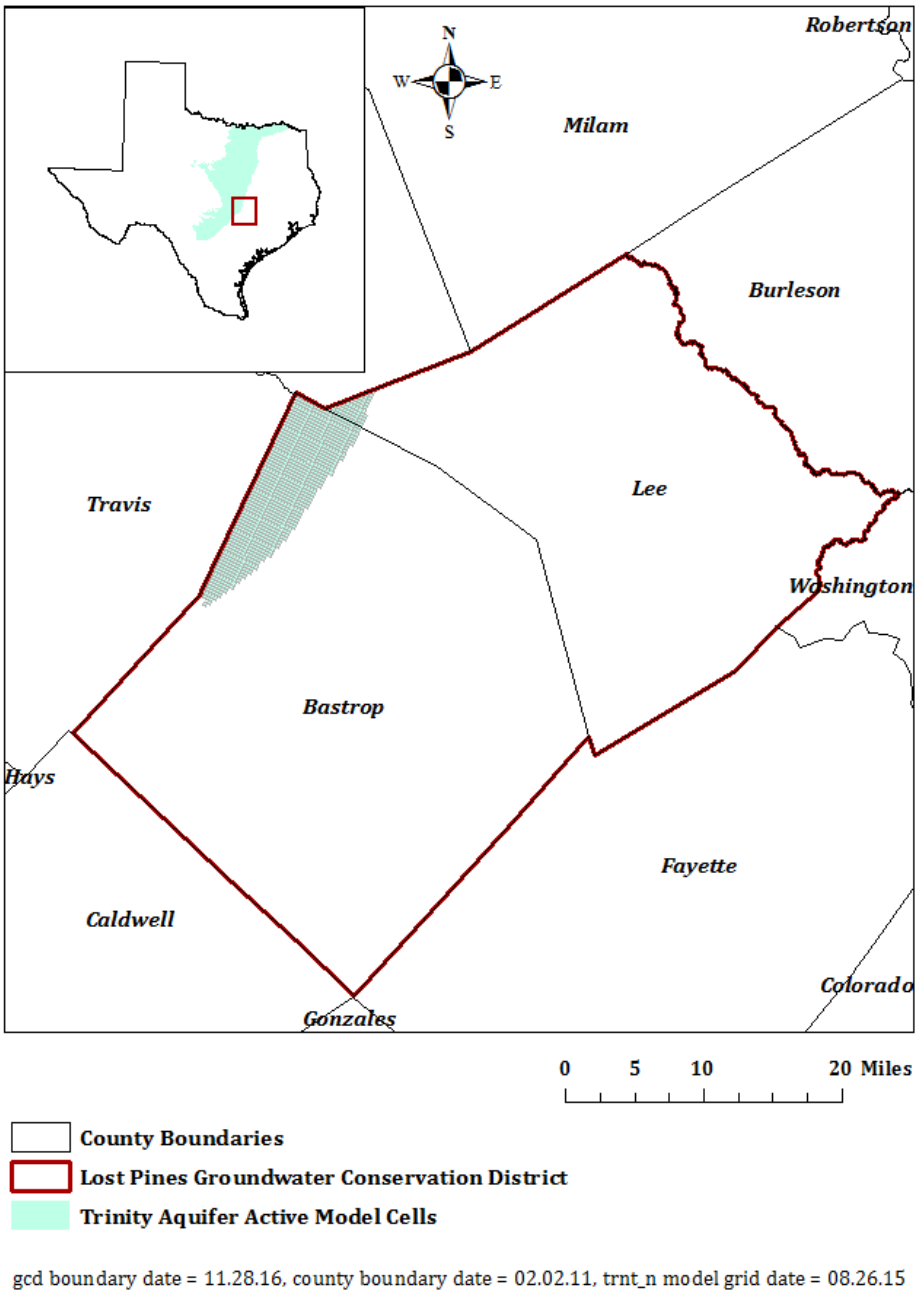

FIGURE 1: AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE TRINITY AQUIFER FROM WHICH THE INFORMATION IN TABLE 1 WAS EXTRACTED (THE AQUIFER SYSTEM EXTENT WITHIN THE DISTRICT BOUNDARY).

TABLE 2: SUMMARIZED INFORMATION FOR THE CARRIZO-WILCOX AQUIFER FOR THE LOST PINES GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Carrizo-Wilcox Aquifer	29,602
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Carrizo-Wilcox Aquifer	32,781
Estimated annual volume of flow into the district within each aquifer in the district	Carrizo-Wilcox Aquifer	12,660
Estimated annual volume of flow out of the district within each aquifer in the district	Carrizo-Wilcox Aquifer	17,538
Estimated net annual volume of flow between each aquifer in the district	Flow into the Carrizo-Wilcox Aquifer from overlying units	1,313
	Flow to underlying formations	NA[2]

[2] Not available because the model assumes a no-flow boundary condition at the base.

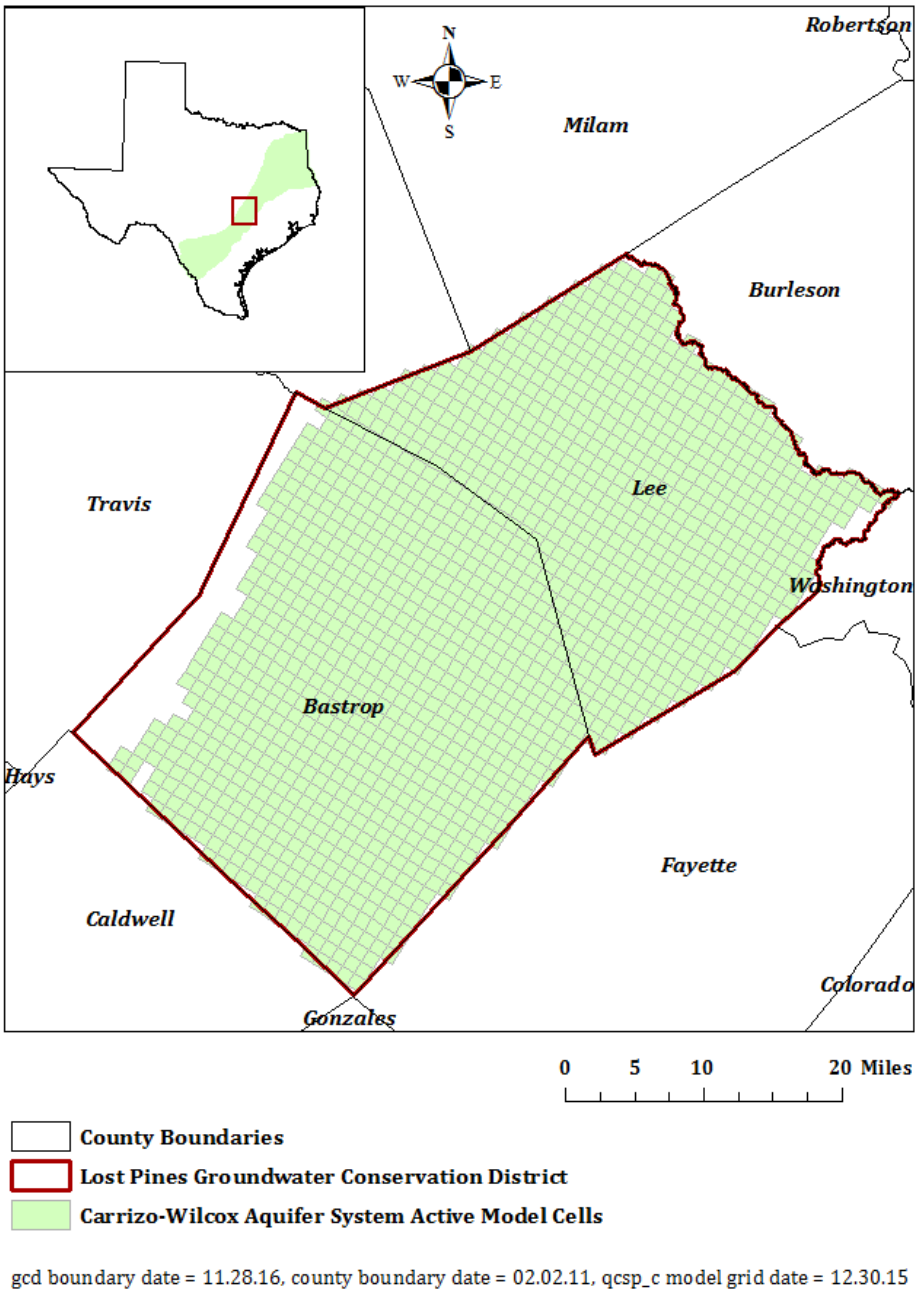

FIGURE 2: AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE CARRIZO-WILCOX AQUIFER FROM WHICH THE INFORMATION IN TABLE 2 WAS EXTRACTED (THE AQUIFER EXTENT WITHIN THE DISTRICT BOUNDARY).

TABLE 3: SUMMARIZED INFORMATION FOR THE QUEEN CITY AQUIFER FOR THE LOST PINES GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Queen City Aquifer	7,255
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Queen City Aquifer	5,488
Estimated annual volume of flow into the district within each aquifer in the district	Queen City Aquifer	516
Estimated annual volume of flow out of the district within each aquifer in the district	Queen City Aquifer	2,610
Estimated net annual volume of flow between each aquifer in the district	Flow from the Queen City Aquifer into overlying units	934
	From Queen City Aquifer into underlying formations	167

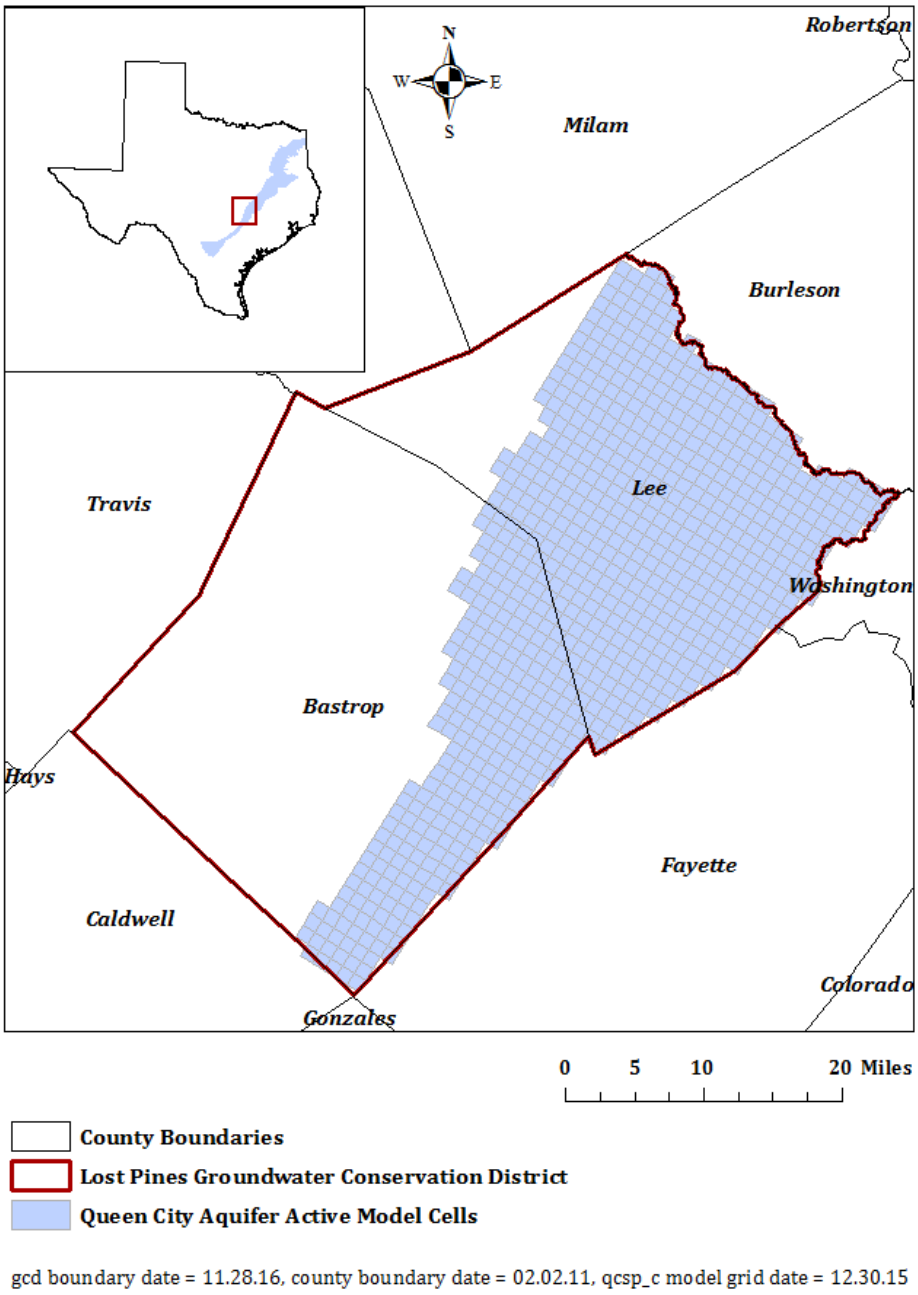

FIGURE 3: AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE QUEEN CITY AQUIFER FROM WHICH THE INFORMATION IN TABLE 3 WAS EXTRACTED (THE AQUIFER EXTENT WITHIN THE DISTRICT BOUNDARY).

TABLE 4: SUMMARIZED INFORMATION FOR THE SPARTA AQUIFER FOR THE LOST PINES GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Sparta Aquifer	10,142
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Sparta Aquifer	4,564
Estimated annual volume of flow into the district within each aquifer in the district	Sparta Aquifer	915
Estimated annual volume of flow out of the district within each aquifer in the district	Sparta Aquifer	593
Estimated net annual volume of flow between each aquifer in the district	Flow into the Sparta Aquifer from underlying units	957
	Flow from the Sparta Aquifer into overlying units	883

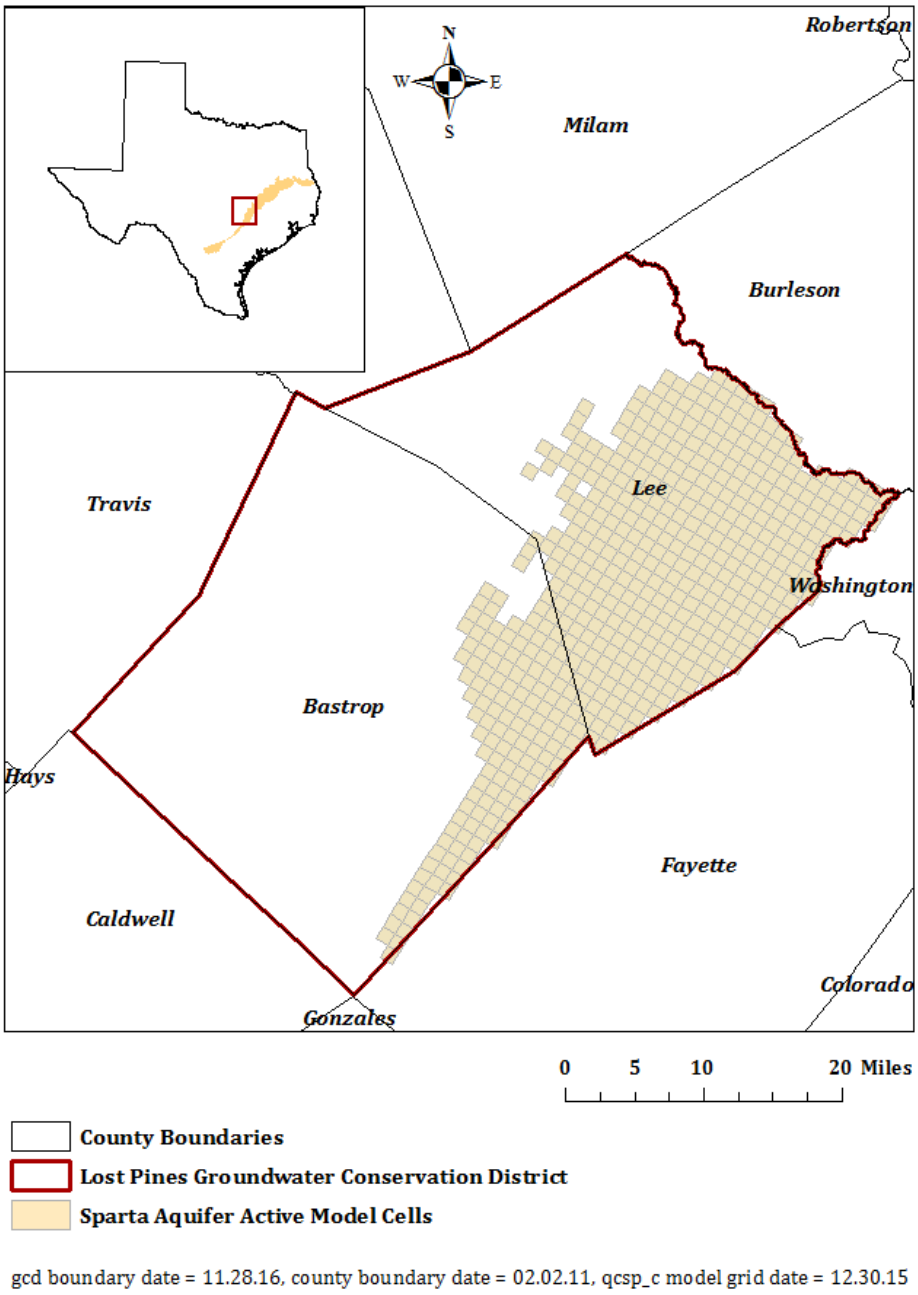

FIGURE 4: AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE SPARTA AQUIFER FROM WHICH THE INFORMATION IN TABLE 4 WAS EXTRACTED (THE AQUIFER EXTENT WITHIN THE DISTRICT BOUNDARY).

TABLE 5: SUMMARIZED INFORMATION FOR THE YEGUA-JACKSON AQUIFER FOR THE LOST PINES GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Yegua-Jackson Aquifer	38,860
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Yegua-Jackson Aquifer	35,781
Estimated annual volume of flow into the district within each aquifer in the district	Yegua-Jackson Aquifer	5,882
Estimated annual volume of flow out of the district within each aquifer in the district	Yegua-Jackson Aquifer	10,154
Estimated net annual volume of flow between each aquifer in the district	Flow to underlying formations	NA[3]

[3] Not available because the model assumes a no-flow boundary condition at the base.

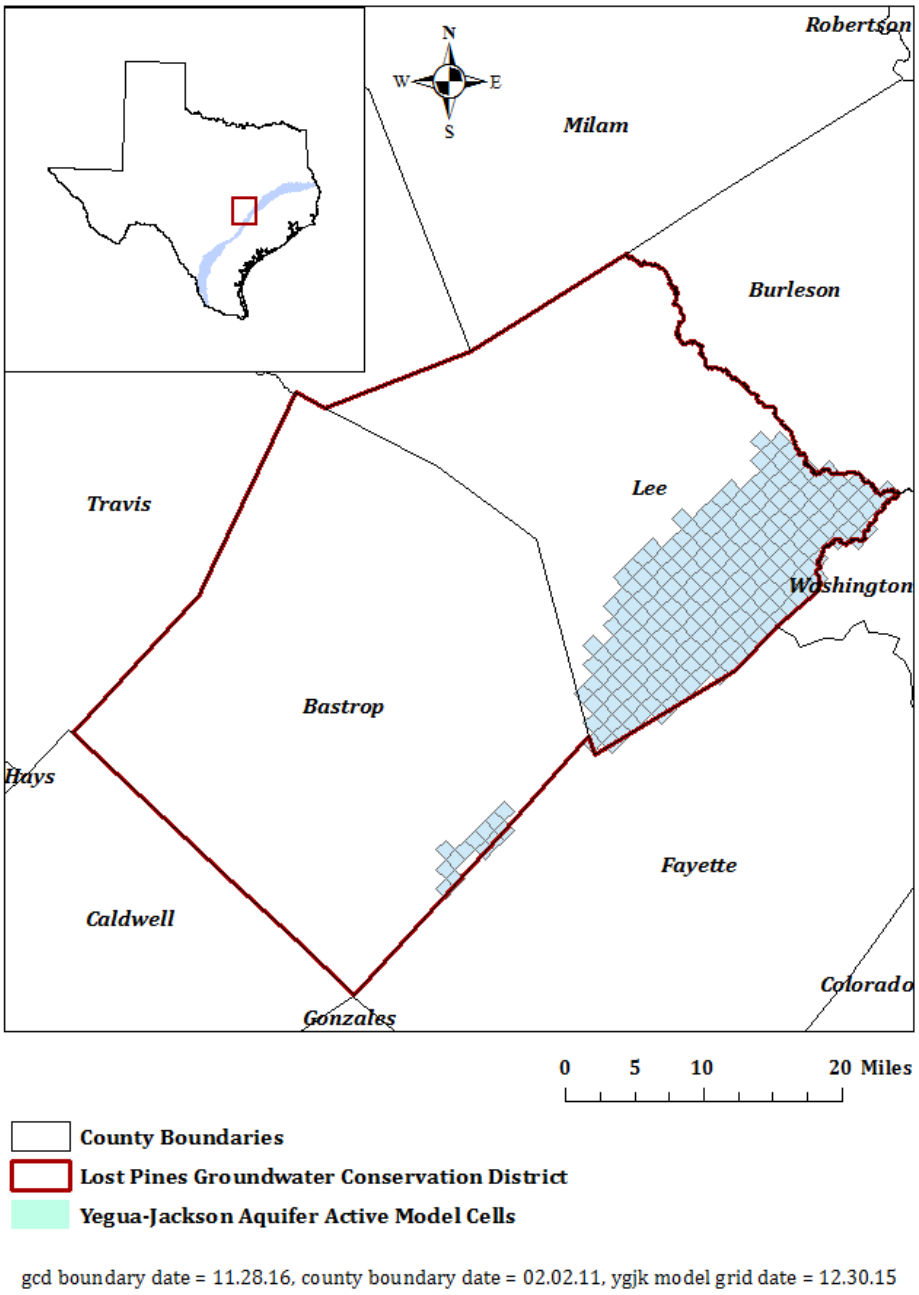

FIGURE 5: AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE YEGUA-JACKSON AQUIFER FROM WHICH THE INFORMATION IN TABLE 5 WAS EXTRACTED (THE AQUIFER EXTENT WITHIN THE DISTRICT BOUNDARY).

LIMITATIONS:

The groundwater models used in completing this analysis are the best available scientific tools that can be used to meet the stated objectives. To the extent that this analysis will be used for planning purposes and/or regulatory purposes related to pumping in the past and into the future, it is important to recognize the assumptions and limitations associated with the use of the results. In reviewing the use of models in environmental regulatory decision making, the National Research Council (2007) noted:

> *"Models will always be constrained by computational limitations, assumptions, and knowledge gaps. They can best be viewed as tools to help inform decisions rather than as machines to generate truth or make decisions. Scientific advances will never make it possible to build a perfect model that accounts for every aspect of reality or to prove that a given model is correct in all respects for a particular regulatory application. These characteristics make evaluation of a regulatory model more complex than solely a comparison of measurement data with model results."*

A key aspect of using the groundwater model to evaluate historic groundwater flow conditions includes the assumptions about the location in the aquifer where historic pumping was placed. Understanding the amount and location of historic pumping is as important as evaluating the volume of groundwater flow into and out of the district, between aquifers within the district (as applicable), interactions with surface water (as applicable), recharge to the Aquifer System (as applicable), and other metrics that describe the impacts of that pumping. In addition, assumptions regarding precipitation, recharge, and interaction with streams are specific to particular historic time periods.

Because the application of the groundwater models was designed to address regional-scale questions, the results are most effective on a regional scale. The TWDB makes no warranties or representations related to the actual conditions of any aquifer at a particular location or at a particular time.

It is important for groundwater conservation districts to monitor groundwater pumping and overall conditions of the aquifer. Because of the limitations of the groundwater model and the assumptions in this analysis, it is important that the groundwater conservation districts work with the TWDB to refine this analysis in the future given the reality of how the aquifer responds to the actual amount and location of pumping now and in the future. Historic precipitation patterns also need to be placed in context as future climatic conditions, such as dry and wet year precipitation patterns, may differ and affect groundwater flow conditions.

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APPENDIX J

GAM RUN 18-020 FOR MID-EAST TEXAS GCD

GAM Run 18-020: Mid-East Texas Groundwater Conservation District Groundwater Management Plan

Shirley C. Wade, Ph.D., P.G.
Texas Water Development Board
Groundwater Division
Groundwater Availability Modeling Department
512-936-0883
February 11, 2019

Shirley C. Wade
2/11/19

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GAM RUN 18-020: MID-EAST TEXAS GROUNDWATER CONSERVATION DISTRICT GROUNDWATER MANAGEMENT PLAN

Shirley C. Wade, Ph.D., P.G.
Texas Water Development Board
Groundwater Division
Groundwater Availability Modeling Department
512-936-0883
February 11, 2019

EXECUTIVE SUMMARY:

Texas State Water Code, Section 36.1071, Subsection (h) (Texas Water Code, 2011), states that, in developing its groundwater management plan, a groundwater conservation district shall use groundwater availability modeling information provided by the Executive Administrator of the Texas Water Development Board (TWDB) in conjunction with any available site-specific information provided by the district for review and comment to the Executive Administrator.

The TWDB provides data and information to the Mid-East Texas Groundwater Conservation District in two parts. Part 1 is the Estimated Historical Water Use/State Water Plan dataset report, which will be provided to you separately by the TWDB Groundwater Technical Assistance Department. Please direct questions about the water data report to Mr. Stephen Allen at 512-463-7317 or stephen.allen@twdb.texas.gov. Part 2 is the required groundwater availability modeling information and this information includes:

1. the annual amount of recharge from precipitation, if any, to the groundwater resources within the district;
2. for each aquifer within the district, the annual volume of water that discharges from the aquifer to springs and any surface-water bodies, including lakes, streams, and rivers; and
3. the annual volume of flow into and out of the district within each aquifer and between aquifers in the district.

The groundwater management plan for the Mid-East Texas Groundwater Conservation District should be adopted by the district on or before May 6, 2019 and submitted to the

Executive Administrator of the TWDB on or before June 5, 2019. The current management plan for the Mid-East Texas Groundwater Conservation District expires on August 4, 2019.

We used two groundwater availability models to estimate the management plan information for the aquifers within the Mid-East Texas Groundwater Conservation District. Information for the Carrizo-Wilcox, Queen City, and Sparta aquifers is from version 3.01 of the groundwater availability model for the central part of the Carrizo-Wilcox, Queen City, and Sparta aquifers (Young and others, 2018). Information for the Yegua-Jackson Aquifer is from version 1.01 of the groundwater availability model for the Yegua-Jackson Aquifer (Deeds and others, 2010).

This report replaces the results of GAM Run 13-024 (Jones, 2013). GAM Run 18-020 includes results from the newly released and updated groundwater availability model for the Carrizo-Wilcox, Queen City, and Sparta aquifers (Young and others, 2018). Tables 1 through 4 summarize the groundwater availability model data required by statute and Figures 1 through 4 show the area of the models from which the values in the tables were extracted. If, after review of the figures, the Mid-East Texas Groundwater Conservation District determines that the district boundaries used in the assessment do not reflect current conditions, please notify the TWDB at your earliest convenience.

METHODS:

In accordance with the provisions of the Texas State Water Code, Section 36.1071, Subsection (h), the two groundwater availability models mentioned above were used to estimate information for the Mid-East Texas Groundwater Conservation District management plan. Water budgets were extracted for the historical model periods for the Carrizo-Wilcox, Queen City, and Sparta aquifers (1980 through 2010) and Yegua-Jackson Aquifer (1980 through 1997) using ZONEBUDGET Version 3.01 (Harbaugh, 2009) or ZONEBUDGET-USG (Panday and others, 2013) as applicable. The average annual water budget values for recharge, surface-water outflow, inflow to the district, and outflow from the district for the aquifers within the district are summarized in this report.

PARAMETERS AND ASSUMPTIONS:

Carrizo-Wilcox, Queen City, and Sparta aquifers

- We used version 3.01 of the groundwater availability model for the central part of the Carrizo-Wilcox, Queen City, and Sparta aquifers. See Young and others (2018) for assumptions and limitations of the groundwater availability model for the central part of the Carrizo-Wilcox, Queen City, and Sparta aquifers.

- This groundwater availability model includes ten layers, which represent the Colorado or Brazos River Alluvium (Layer 1), the outcrop and shallow flow zone of all of the underlying aquifers (Layer 2), the Sparta Aquifer (Layer 3), the Weches Formation confining unit (Layer 4), the Queen City Aquifer (Layer 5), the Reklaw Formation confining unit (Layer 6), the Carrizo Formation (Layer 7), the Calvert Bluff Formation (Layer 8), the Simsboro Formation (Layer 9), and the Hooper Formation (Layer 10).

- Individual water budgets for the district were determined for the Sparta Aquifer (Layers 2 and 3), the Queen City Aquifer (Layers 2 and 5), and the Carrizo-Wilcox Aquifer (Layers 2 and 7 through 10, collectively).

- The model was run with MODFLOW-USG (unstructured grid; Panday and others, 2013).

Yegua-Jackson Aquifer

- We used version 1.01 of the groundwater availability model for the Yegua-Jackson Aquifer. See Deeds and others (2010) for assumptions and limitations of the groundwater availability model.

- This groundwater availability model includes five layers, which represent the outcrop of the Yegua-Jackson Aquifer and younger overlying units—the Catahoula Formation (Layer 1), the upper portion of the Jackson Group (Layer 2), the lower portion of the Jackson Group (Layer 3), the upper portion of the Yegua Group (Layer 4), and the lower portion of the Yegua Group (Layer 5).

- An overall water budget for the district was determined for the Yegua-Jackson Aquifer (Layer 1 through Layer 5, collectively, for the portions of the model that represent the Yegua-Jackson Aquifer).

- The model was run with MODFLOW-2000 (Harbaugh and others, 2000).

RESULTS:

A groundwater budget summarizes the amount of water entering and leaving the aquifers according to the groundwater availability model. Selected groundwater budget components listed below were extracted from the groundwater availability model results for the Carrizo-Wilcox, Queen City, Sparta, and Yegua-Jackson aquifers over the historical calibration periods, as shown in Tables 1 through 4.

1. Precipitation recharge—the areally distributed recharge sourced from precipitation falling on the outcrop areas of the aquifers (where the aquifer is exposed at land surface) within the district.

2. Surface-water outflow—the total water discharging from the aquifer (outflow) to surface-water features such as streams, reservoirs, and springs.

3. Flow into and out of district—the lateral flow within the aquifer between the district and adjacent counties.

4. Flow between aquifers—the net vertical flow between the aquifer and adjacent aquifers or confining units. This flow is controlled by the relative water levels in each aquifer and aquifer properties of each aquifer or confining unit that define the amount of leakage that occurs.

The information needed for the district's management plan is summarized in Tables 1 through 4. It is important to note that sub-regional water budgets are not exact. This is due to the size of the model cells and the approach used to extract data from the model. To avoid double accounting, a model cell that straddles a political boundary, such as a district or county boundary, is assigned to one side of the boundary based on the location of the centroid of the model cell. For example, if a cell contains two counties, the cell is assigned to the county where the centroid of the cell is located.

TABLE 1. SUMMARIZED INFORMATION FOR THE CARRIZO-WILCOX AQUIFER FOR MID-EAST TEXAS GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Carrizo-Wilcox Aquifer	105,777
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Carrizo-Wilcox Aquifer	113,293
Estimated annual volume of flow into the district within each aquifer in the district	Carrizo-Wilcox Aquifer	17,377
Estimated annual volume of flow out of the district within each aquifer in the district	Carrizo-Wilcox Aquifer	20,772
Estimated net annual volume of flow between each aquifer in the district	Flow from the Carrizo-Wilcox Aquifer into downdip Carrizo-Wilcox units	523
	Flow into the Carrizo-Wilcox Aquifer from the overlying Reklaw Confining Unit	1,491
	Flow into the Queen City Aquifer from the Carrizo-Wilcox Aquifer	1,394

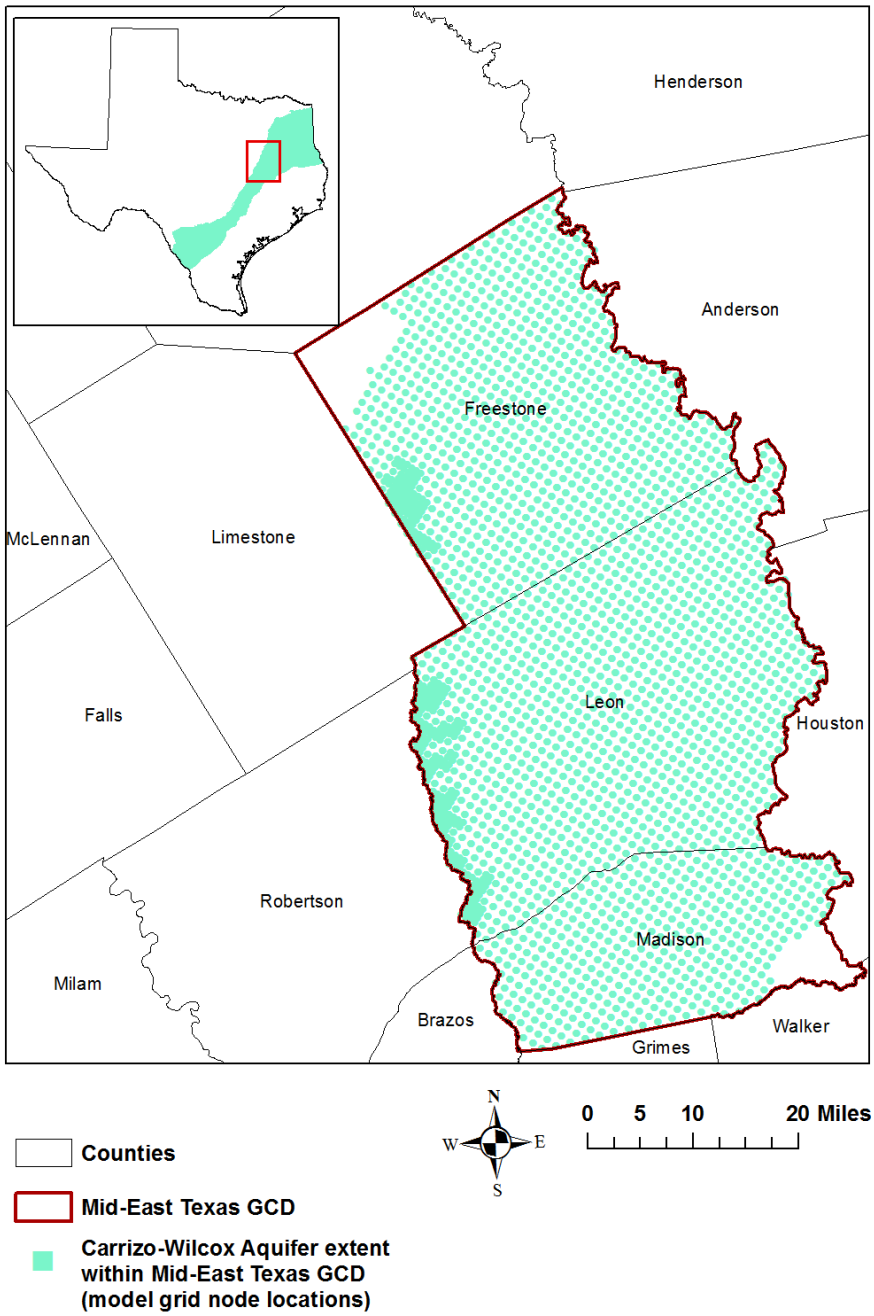

FIGURE 1. AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE CARRIZO-WILCOX AQUIFER FROM WHICH THE INFORMATION IN TABLE 1 WAS EXTRACTED (THE AQUIFER SYSTEM EXTENT WITHIN THE DISTRICT BOUNDARY).

TABLE 2. SUMMARIZED INFORMATION FOR THE QUEEN CITY AQUIFER FOR MID-EAST TEXAS GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Queen City Aquifer	69,600
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Queen City Aquifer	74,582
Estimated annual volume of flow into the district within each aquifer in the district	Queen City Aquifer	4,417
Estimated annual volume of flow out of the district within each aquifer in the district	Queen City Aquifer	3,886
Estimated net annual volume of flow between each aquifer in the district	Flow into the Queen City Aquifer from the Carrizo-Wilcox Aquifer	1,394
	Flow into the Queen City Aquifer from the underlying Reklaw Confining Unit	445
	Flow into the Queen City Aquifer from downdip Queen City units	11
	Flow from the Queen City Aquifer into the overlying Weches Confining Unit	872
	Flow into the Queen City Aquifer from the Sparta Aquifer	802

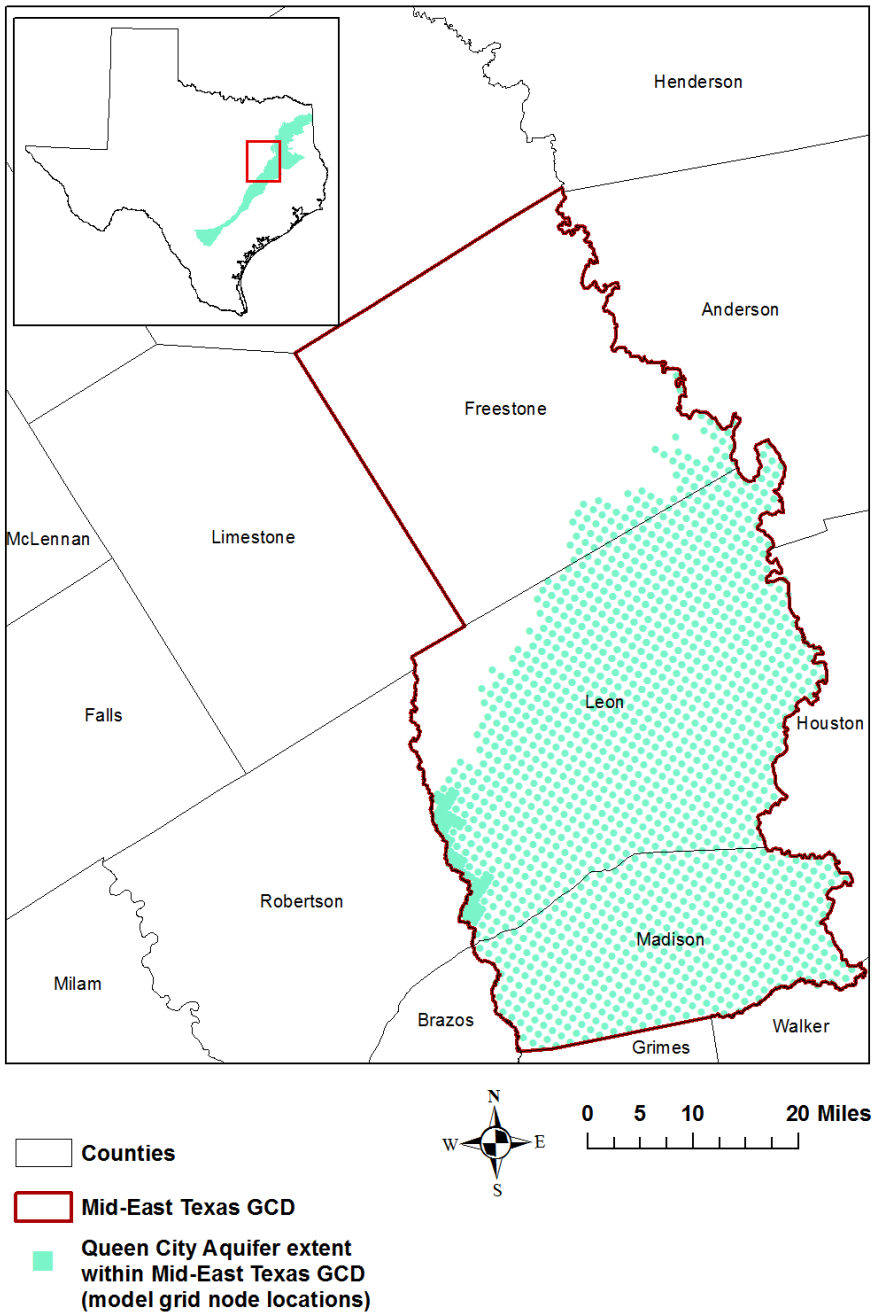

FIGURE 2. AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE QUEEN CITY AQUIFER FROM WHICH THE INFORMATION IN TABLE 2 WAS EXTRACTED (THE AQUIFER SYSTEM EXTENT WITHIN THE DISTRICT BOUNDARY).

TABLE 3. SUMMARIZED INFORMATION FOR THE SPARTA AQUIFER FOR MID-EAST TEXAS GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Sparta Aquifer	21,332
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Sparta Aquifer	24,201
Estimated annual volume of flow into the district within each aquifer in the district	Sparta Aquifer	1,459
Estimated annual volume of flow out of the district within each aquifer in the district	Sparta Aquifer	1,513
Estimated net annual volume of flow between each aquifer in the district	Flow into the Queen City Aquifer from the Sparta Aquifer	725
	Flow into the Sparta Aquifer from the underlying Weches Confining Unit	949
	Flow from the Sparta Aquifer into overlying units	850

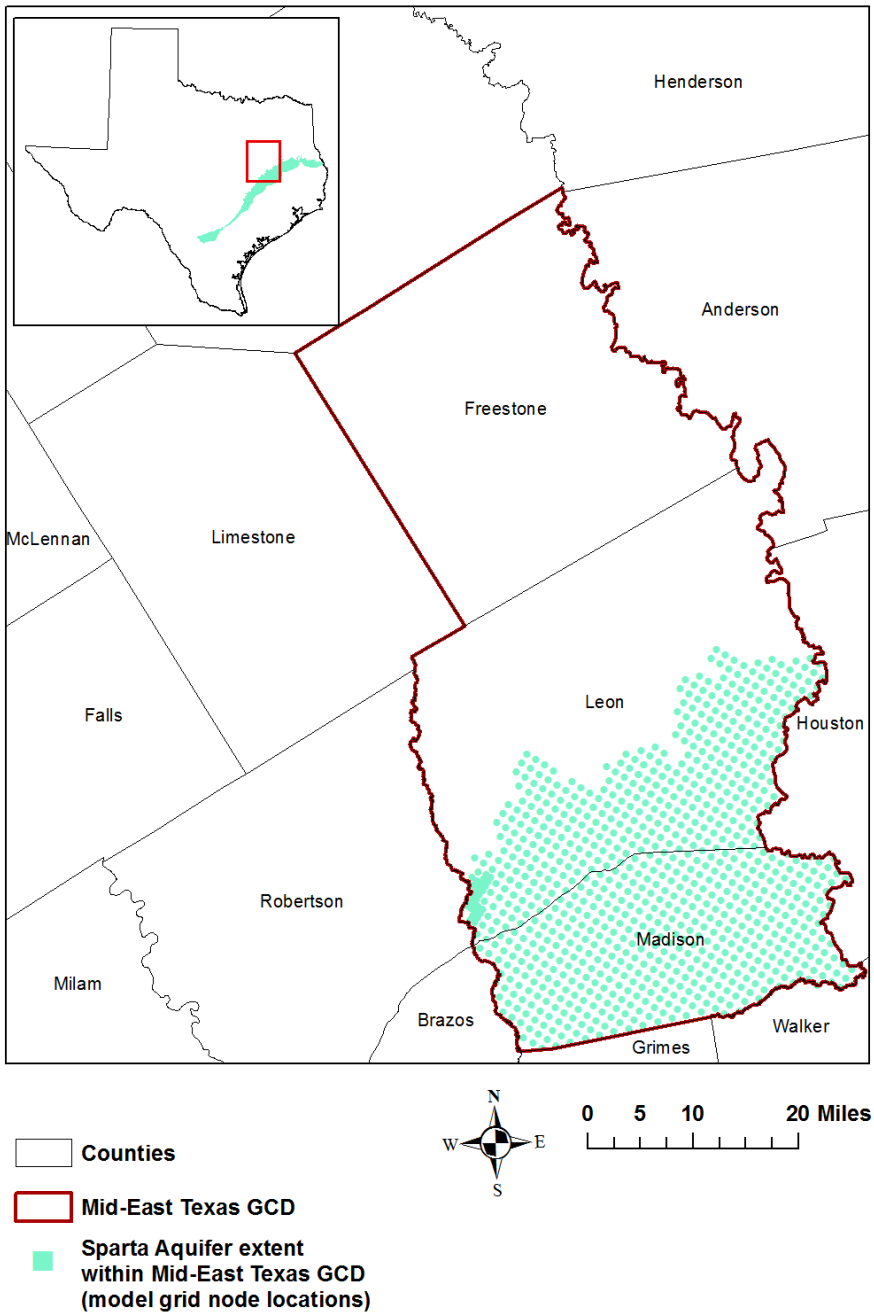

FIGURE 3. AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE SPARTA AQUIFER FROM WHICH THE INFORMATION IN TABLE 3 WAS EXTRACTED (THE AQUIFER SYSTEM EXTENT WITHIN THE DISTRICT BOUNDARY).

TABLE 4. SUMMARIZED INFORMATION FOR THE YEGUA-JACKSON AQUIFER FOR MID-EAST TEXAS GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Yegua-Jackson Aquifer	31,137
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Yegua-Jackson Aquifer	46,448
Estimated annual volume of flow into the district within each aquifer in the district	Yegua-Jackson Aquifer	15,344
Estimated annual volume of flow out of the district within each aquifer in the district	Yegua-Jackson Aquifer	10,411
Estimated net annual volume of flow between each aquifer in the district	Yegua-Jackson Aquifer	0[1]

[1] The model assumptions include no groundwater flow between the Yegua-Jackson Aquifer and underlying units.

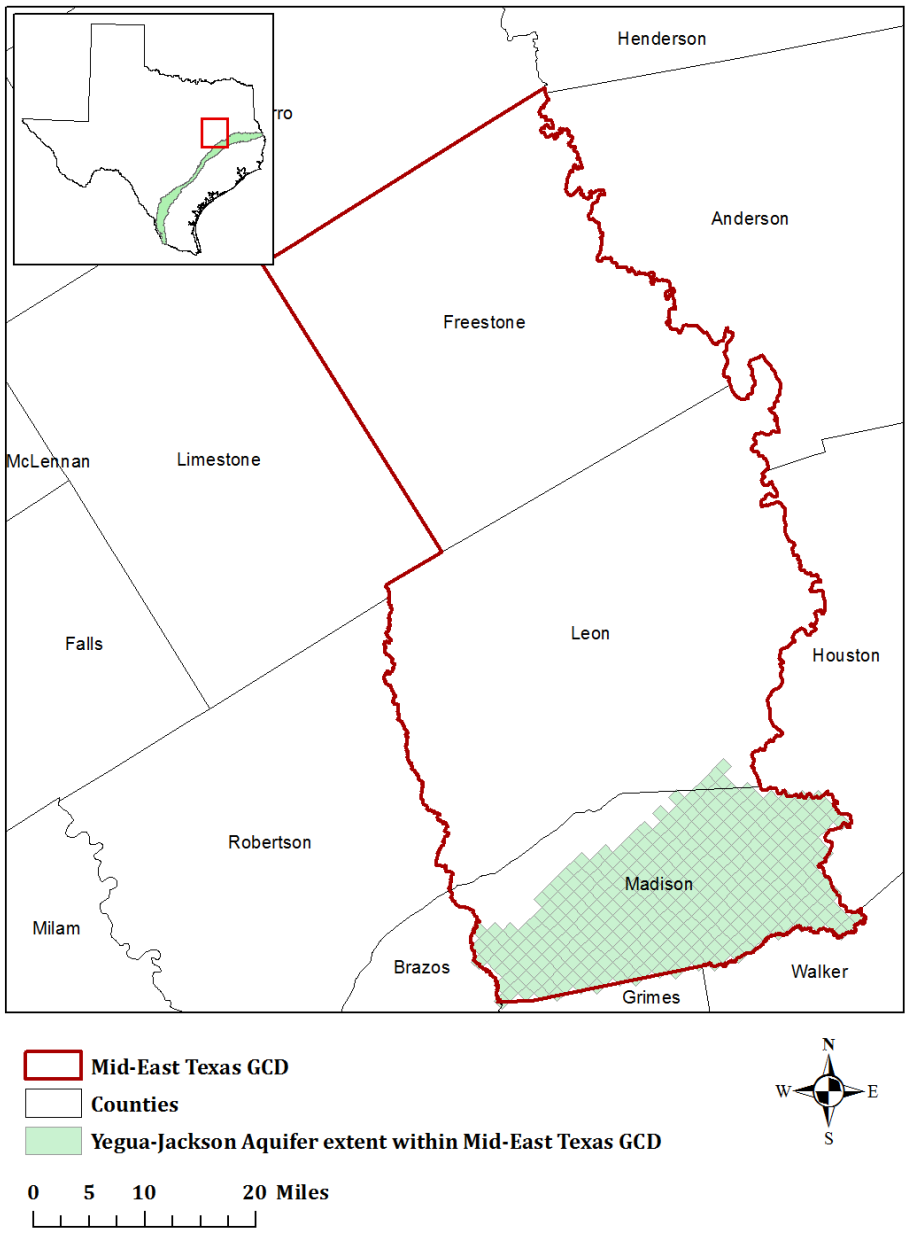

FIGURE 4. AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE YEGUA-JACKSON AQUIFER FROM WHICH THE INFORMATION IN TABLE 4 WAS EXTRACTED (THE AQUIFER SYSTEM EXTENT WITHIN THE DISTRICT BOUNDARY).

LIMITATIONS:

The groundwater models used in completing this analysis are the best available scientific tools that can be used to meet the stated objectives. To the extent that this analysis will be used for planning purposes and/or regulatory purposes related to pumping in the past and into the future, it is important to recognize the assumptions and limitations associated with the use of the results. In reviewing the use of models in environmental regulatory decision making, the National Research Council (2007) noted:

> *"Models will always be constrained by computational limitations, assumptions, and knowledge gaps. They can best be viewed as tools to help inform decisions rather than as machines to generate truth or make decisions. Scientific advances will never make it possible to build a perfect model that accounts for every aspect of reality or to prove that a given model is correct in all respects for a particular regulatory application. These characteristics make evaluation of a regulatory model more complex than solely a comparison of measurement data with model results."*

A key aspect of using the groundwater model to evaluate historical groundwater flow conditions includes the assumptions about the location in the aquifer where historical pumping was placed. Understanding the amount and location of historical pumping is as important as evaluating the volume of groundwater flow into and out of the district, between aquifers within the district (as applicable), interactions with surface water (as applicable), recharge to the aquifer system (as applicable), and other metrics that describe the impacts of that pumping. In addition, assumptions regarding precipitation, recharge, and interaction with streams are specific to particular historical time periods.

Because the application of the groundwater models was designed to address regional-scale questions, the results are most effective on a regional scale. The TWDB makes no warranties or representations related to the actual conditions of any aquifer at a particular location or at a particular time.

It is important for groundwater conservation districts to monitor groundwater pumping and overall conditions of the aquifer. Because of the limitations of the groundwater model and the assumptions in this analysis, it is important that the groundwater conservation districts work with the TWDB to refine this analysis in the future given the reality of how the aquifer responds to the actual amount and location of pumping now and in the future. Historical precipitation patterns also need to be placed in context as future climatic conditions, such as dry and wet year precipitation patterns, may differ and affect groundwater flow conditions.

REFERENCES:

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Harbaugh, A. W., Banta, E. R., Hill, M. C., and McDonald, M. G., 2000, MODFLOW-2000, the U.S. Geological Survey modular ground-water model -- User guide to modularization concepts and the Ground-Water Flow Process: U.S. Geological Survey Open-File Report 00-92, 121 p.

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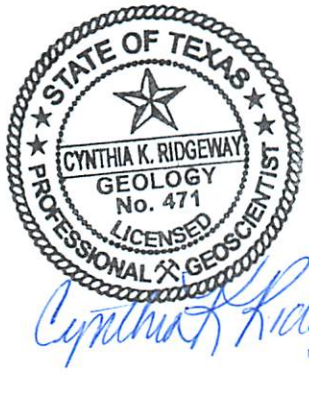
APPENDIX K

GAM RUN 16-015 FOR POST OAK SAVANNAH GCD

GAM Run 16-015: Post Oak Savannah Groundwater Conservation District Groundwater Management Plan

Natalie Ballew, GIT
Texas Water Development Board
Groundwater Division
Groundwater Availability Modeling Department
512-463-2779
August 31, 2017



Cynthia K. Ridgeway is the Manager of the Groundwater Availability Modeling Section and is responsible for oversight of work performed by Natalie Ballew under her direct supervision. The seal appearing on this document was authorized by Cynthia K. Ridgeway, P.G. 471 on August 31, 2017.

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GAM RUN 16-015: POST OAK SAVANNAH GROUNDWATER CONSERVATION DISTRICT GROUNDWATER MANAGEMENT PLAN

Natalie Ballew, GIT
Texas Water Development Board
Groundwater Division
Groundwater Availability Modeling Department
512-463-2779
August 31, 2017

EXECUTIVE SUMMARY:

Texas State Water Code, Section 36.1071, Subsection (h) (Texas Water Code, 2015), states that, in developing its groundwater management plan, a groundwater conservation district shall use groundwater availability modeling information provided by the Executive Administrator of the Texas Water Development Board (TWDB) in conjunction with any available site-specific information provided by the district for review and comment to the Executive Administrator.

The TWDB provides data and information to the Post Oak Savannah Groundwater Conservation District in two parts. Part 1 is the Estimated Historical Water Use/State Water Plan dataset report, which will be provided to you separately by the TWDB Groundwater Technical Assistance Department. Please direct questions about the water data report to Mr. Stephen Allen at 512-463-7317 or stephen.allen@twdb.texas.gov. Part 2 is the required groundwater availability modeling information and this information includes

1. the annual amount of recharge from precipitation, if any, to the groundwater resources within the district;
2. for each aquifer within the district, the annual volume of water that discharges from the aquifer to springs and any surface-water bodies, including lakes, streams, and rivers; and
3. the annual volume of flow into and out of the district within each aquifer and between aquifers in the district.

The groundwater management plan for the Post Oak Savannah Groundwater Conservation District should be adopted by the district on or before September 18, 2017, and submitted to the Executive Administrator of the TWDB on or before October 18, 2017. The current

management plan for the Post Oak Savannah Groundwater Conservation District expires on December 17, 2017.

We used four groundwater availability models to estimate the management plan information for the aquifers within the Post Oak Savannah Groundwater Conservation District. Information for the Trinity Aquifer is from version 2.01 of the groundwater availability model for the northern portion of the Trinity and Woodbine aquifers (Kelley and others, 2014). Information for the Carrizo-Wilcox, Queen City, and Sparta aquifers is from version 2.02 of the groundwater availability model for the central part of the Carrizo-Wilcox, Queen City, and Sparta aquifers (Kelley and others, 2004). Information for the Yegua-Jackson Aquifer is from version 1.01 of the groundwater availability model for the Yegua-Jackson Aquifer (Deeds and others, 2010). Information for the Brazos River Alluvium Aquifer is from version 1.01 of the groundwater availability model for the Brazos River Alluvium Aquifer (Ewing and Jigmond, 2016).

This report replaces the results of GAM Run 10-029 (Aschenbach, 2011). GAM Run 16-015 meets current standards set after the release of GAM Run 10-029 and includes results from recently released groundwater availability models for the northern portion of the Trinity and Woodbine aquifers (Kelley and others, 2014) and for the Brazos River Alluvium Aquifer (Ewing and Jigmond, 2016). Tables 1 through 6 summarize the groundwater availability model data required by statute and Figures 1 through 6 show the area of the model from which the values in the tables were extracted. If, after review of the figures, the Post Oak Savannah Groundwater Conservation District determines that the district boundaries used in the assessment do not reflect current conditions, please notify the TWDB at your earliest convenience.

METHODS:

In accordance with the provisions of the Texas State Water Code, Section 36.1071, Subsection (h), the four groundwater availability models mentioned above were used to estimate information for the Post Oak Savannah Groundwater Conservation District management plan. Water budgets were extracted for the historical model periods for the Trinity Aquifer (1980 through 2012), Carrizo-Wilcox, Queen City, and Sparta aquifers (1980 through 1999), Yegua-Jackson Aquifer (1980 through 1997) using ZONEBUDGET Version 3.01 (Harbaugh, 2009). The water budget for the Brazos River Alluvium Aquifer was extracted for the historical model period (1980 through 2012) using ZONEBUDGET-USG (Panday and others, 2013). The average annual water budget values for recharge, surface-water outflow, inflow to the district, and outflow from the district for the aquifers within the district are summarized in this report.

PARAMETERS AND ASSUMPTIONS:

Trinity Aquifer

- We used version 2.01 of the groundwater availability model for the northern portion of the Trinity and Woodbine aquifers. See Kelley and others (2014) for assumptions and limitations of the model.
- The groundwater availability model for the northern portion of the Trinity and Woodbine aquifers contains eight layers: Layer 1 (the surficial outcrop area of the units in layers 2 through 8 and units younger than Woodbine Aquifer), Layer 2 (Woodbine Aquifer and pass-through cells), Layer 3 (Washita and Fredericksburg, Edwards [Balcones Fault Zone], and pass-through cells), and Layers 4 through 8 (Trinity Aquifer).
- The Woodbine Aquifer does not exist within the Post Oak Savannah Groundwater Conservation District; water budgets for this aquifer were not calculated for this report.
- The model was run with MODFLOW-NWT (Niswonger and others, 2011).

Carrizo-Wilcox, Queen City, and Sparta aquifers

- We used version 2.02 of the groundwater availability model for the central part of the Carrizo-Wilcox, Queen City, and Sparta aquifers. See Dutton and others (2003) and Kelley and others (2004) for assumptions and limitations of the groundwater availability model for the central part of the Carrizo-Wilcox, Queen City, and Sparta aquifers.
- This groundwater availability model includes eight layers, which generally represent the Sparta Aquifer (Layer 1), the Weches Formation confining unit (Layer 2), the Queen City Aquifer (Layer 3), the Reklaw Formation confining unit (Layer 4), the Carrizo Formation (Layer 5), the Calvert Bluff Formation (Layer 6), the Simsboro Formation (Layer 7), and the Hooper Formation (Layer 8).
- Individual water budgets for the district were determined for the Sparta Aquifer (Layer 1), the Queen City Aquifer (Layer 3), and the Carrizo-Wilcox Aquifer (Layers 5 through 8, collectively).
- The model was run with MODFLOW-96 (Harbaugh and McDonald, 1996).

Yegua-Jackson Aquifer

- We used version 1.01 of the groundwater availability model for the Yegua-Jackson Aquifer. See Deeds and others (2010) for assumptions and limitations of the groundwater availability model.
- This groundwater availability model includes five layers which represent the outcrop of the Yegua-Jackson Aquifer and younger overlying units—the Catahoula Formation (Layer 1), the upper portion of the Jackson Group (Layer 2), the lower portion of the Jackson Group (Layer 3), the upper portion of the Yegua Group (Layer 4), and the lower portion of the Yegua Group (Layer 5).
- An overall water budget for the district was determined for the Yegua-Jackson Aquifer (Layer 1 through Layer 5, collectively, for the portions of the model that represent the Yegua-Jackson Aquifer).
- The model was run with MODFLOW-2000 (Harbaugh and others, 2000).

Brazos River Alluvium Aquifer

- We used version 1.01 of the groundwater availability model for the Brazos River Alluvium Aquifer released on December 16, 2016. See Ewing and Jigmond (2016) for assumptions and limitations of the model.
- The groundwater availability model for the Brazos River Alluvium Aquifer contains three layers. Layers 1 and 2 represent the Brazos River Alluvium Aquifer and Layer 3 represents the surficial portions of the Carrizo-Wilcox, Queen City, Sparta, Yegua-Jackson, and Gulf Coast aquifers as well as various geologic units of the Cretaceous System.
- Perennial rivers and streams were simulated using the MODFLOW Streamflow-Routing package and ephemeral streams were simulated using the MODFLOW River package. Springs were simulated using the MODFLOW Drain package.
- The model was run with MODFLOW-USG (unstructured grid; Panday and others, 2013).

RESULTS:

A groundwater budget summarizes the amount of water entering and leaving the aquifers according to the groundwater availability model. Selected groundwater budget

components listed below were extracted from the groundwater availability model results for the Trinity, Carrizo-Wilcox, Queen City, Sparta, Yegua-Jackson, and Brazos River Alluvium aquifers located within Post Oak Savannah Groundwater Conservation District and averaged over the historical calibration periods, as shown in Tables 1 through 6.

1. Precipitation recharge—the areally distributed recharge sourced from precipitation falling on the outcrop areas of the aquifers (where the aquifer is exposed at land surface) within the district.

2. Surface-water outflow—the total water discharging from the aquifer (outflow) to surface-water features such as streams, reservoirs, and springs.

3. Flow into and out of district—the lateral flow within the aquifer between the district and adjacent counties.

4. Flow between aquifers—the net vertical flow between the aquifer and adjacent aquifers or confining units. This flow is controlled by the relative water levels in each aquifer and aquifer properties of each aquifer or confining unit that define the amount of leakage that occurs.

The information needed for the district's management plan is summarized in Tables 1 through 6. It is important to note that sub-regional water budgets are not exact. This is due to the size of the model cells and the approach used to extract data from the model. To avoid double accounting, a model cell that straddles a political boundary, such as a district or county boundary, is assigned to one side of the boundary based on the location of the centroid of the model cell. For example, if a cell contains two counties, the cell is assigned to the county where the centroid of the cell is located.

TABLE 1. SUMMARIZED INFORMATION FOR THE TRINITY AQUIFER FOR POST OAK SAVANNAH GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Trinity Aquifer	0
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Trinity Aquifer	0
Estimated annual volume of flow into the district within each aquifer in the district	Trinity Aquifer	740
Estimated annual volume of flow out of the district within each aquifer in the district	Trinity Aquifer	382
Estimated net annual volume of flow between each aquifer in the district		NA[1]

[1] Not available because the model assumes a no-flow boundary condition at the base.

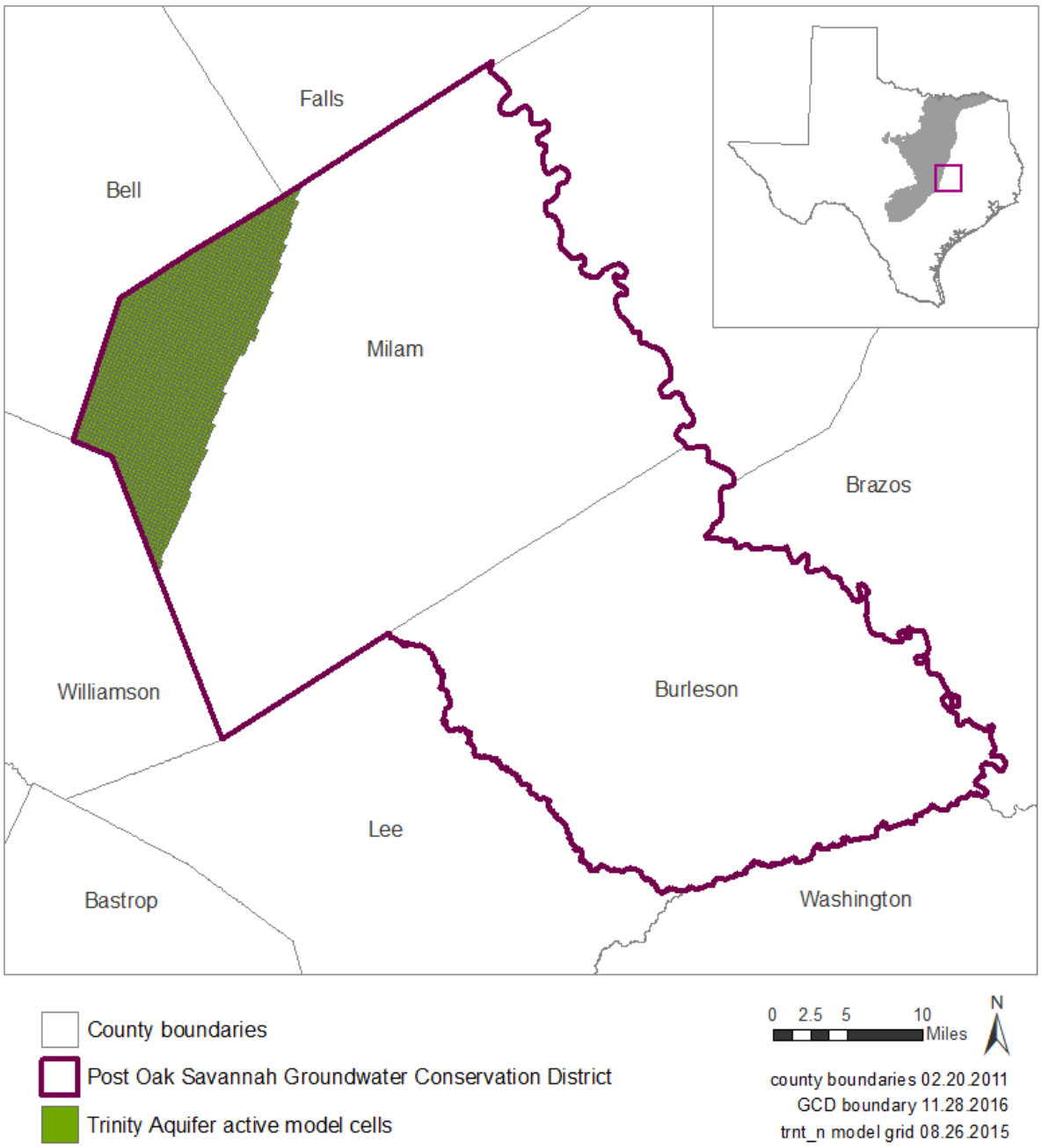

FIGURE 1. AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE TRINITY AQUIFER FROM WHICH THE INFORMATION IN TABLE 1 WAS EXTRACTED (THE AQUIFER SYSTEM EXTENT WITHIN THE DISTRICT BOUNDARY).

TABLE 2. SUMMARIZED INFORMATION FOR THE CARRIZO-WILCOX AQUIFER FOR POST OAK SAVANNAH GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Carrizo-Wilcox Aquifer	26,266
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Carrizo-Wilcox Aquifer	29,010
Estimated annual volume of flow into the district within each aquifer in the district	Carrizo-Wilcox Aquifer	19,237
Estimated annual volume of flow out of the district within each aquifer in the district	Carrizo-Wilcox Aquifer	25,823
Estimated net annual volume of flow between each aquifer in the district	Carrizo-Wilcox Aquifer into the overlying Reklaw Confining Unit	237

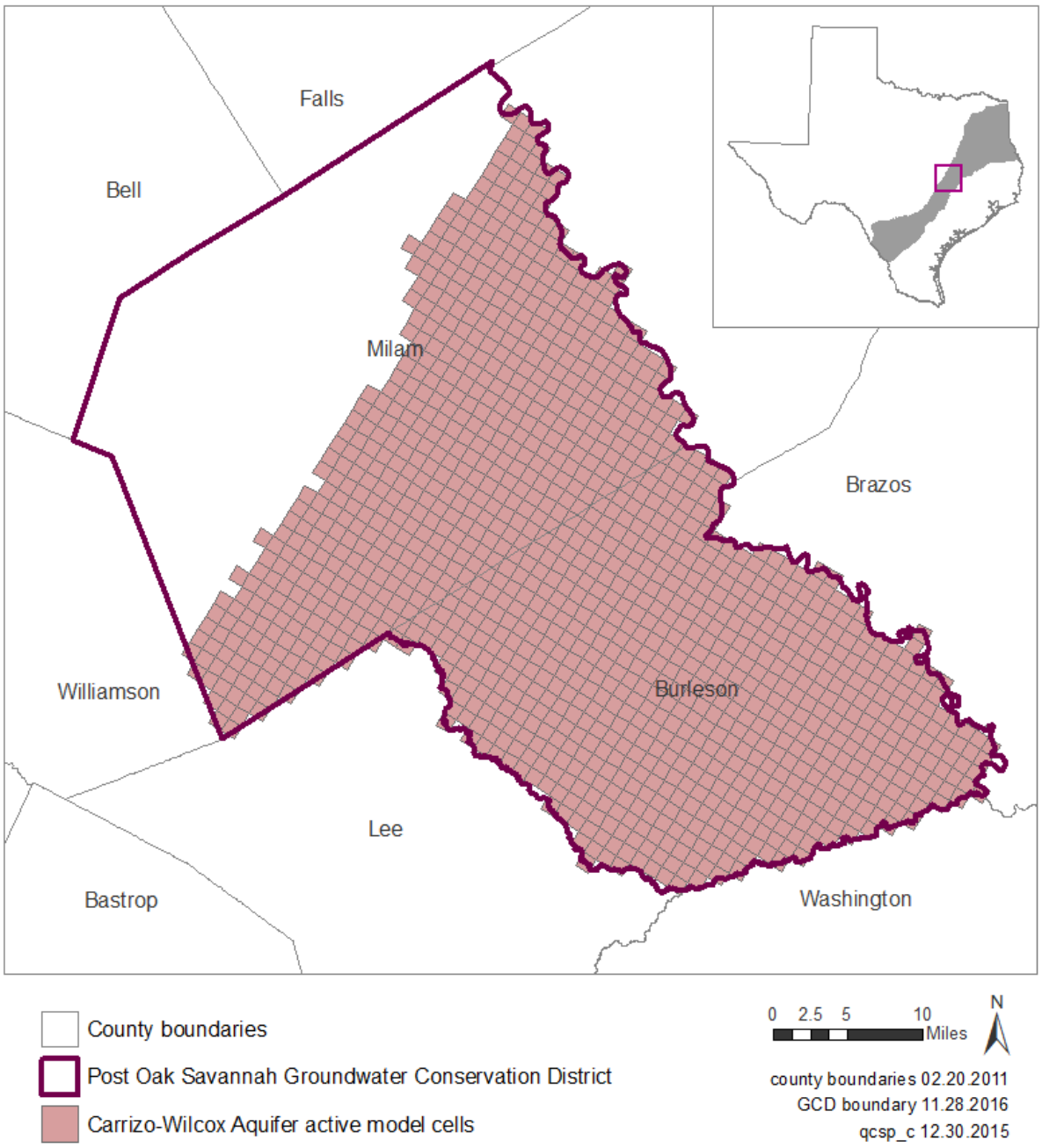

FIGURE 2. AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE CARRIZO-WILCOX AQUIFER FROM WHICH THE INFORMATION IN TABLE 2 WAS EXTRACTED (THE AQUIFER SYSTEM EXTENT WITHIN THE DISTRICT BOUNDARY).

TABLE 3. SUMMARIZED INFORMATION FOR THE QUEEN CITY AQUIFER FOR POST OAK SAVANNAH GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Queen City Aquifer	8,811
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Queen City Aquifer	12,030
Estimated annual volume of flow into the district within each aquifer in the district	Queen City Aquifer	1,343
Estimated annual volume of flow out of the district within each aquifer in the district	Queen City Aquifer	965
Estimated net annual volume of flow between each aquifer in the district	Queen City Aquifer into the Overlying Weches Confining Unit	1,448
	Reklaw Confining Unit and adjacent underlying areas into the Queen City Aquifer	866

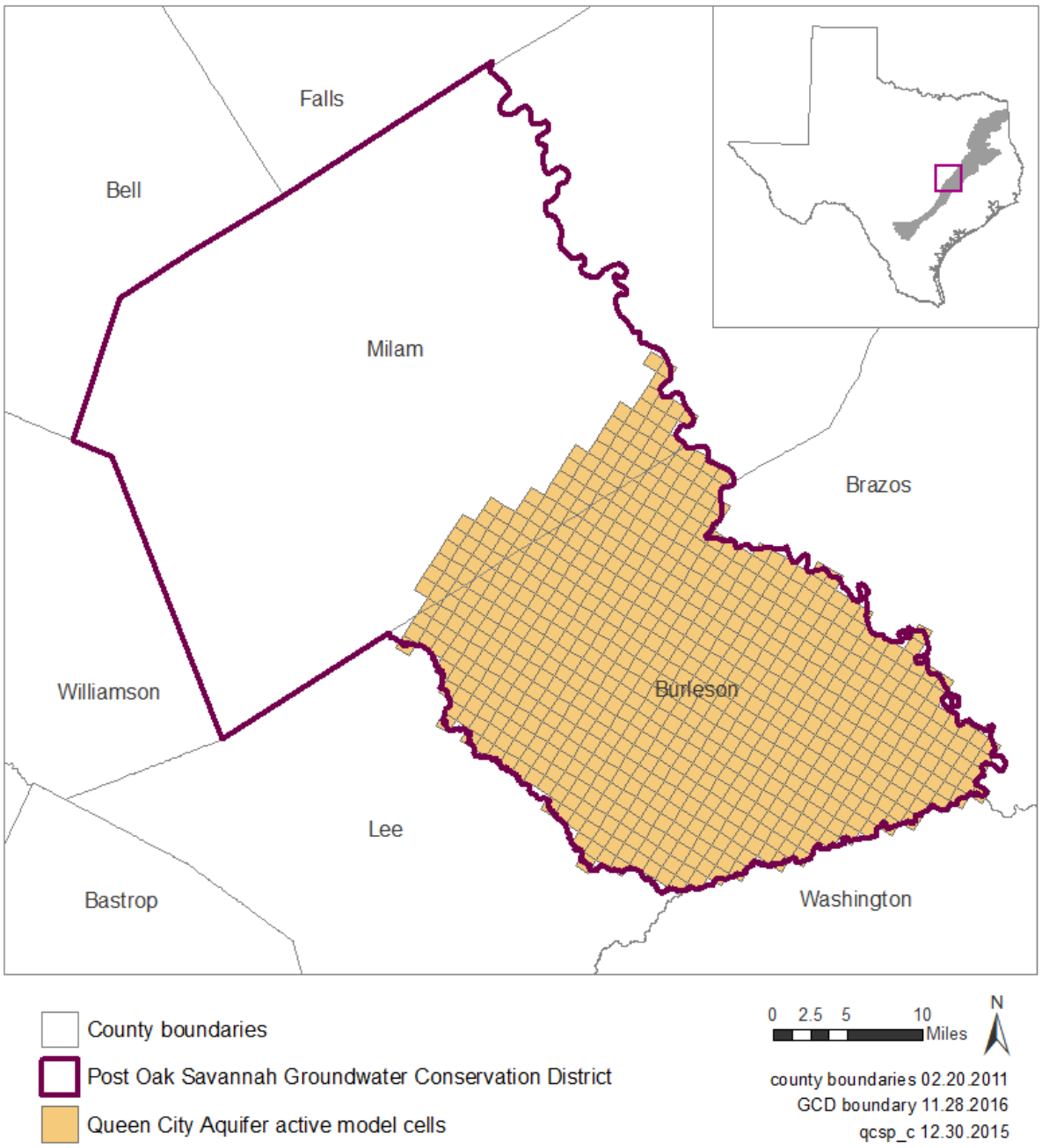

FIGURE 3. AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE QUEEN CITY AQUIFER FROM WHICH THE INFORMATION IN TABLE 3 WAS EXTRACTED (THE AQUIFER SYSTEM EXTENT WITHIN THE DISTRICT BOUNDARY).

TABLE 4. SUMMARIZED INFORMATION FOR THE SPARTA AQUIFER FOR POST OAK SAVANNAH GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Sparta Aquifer	7,423
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Sparta Aquifer	4,808
Estimated annual volume of flow into the district within each aquifer in the district	Sparta Aquifer	763
Estimated annual volume of flow out of the district within each aquifer in the district	Sparta Aquifer	1,228
Estimated net annual volume of flow between each aquifer in the district	Weches Confining Unit and adjacent underlying areas into the Sparta Aquifer	1,583

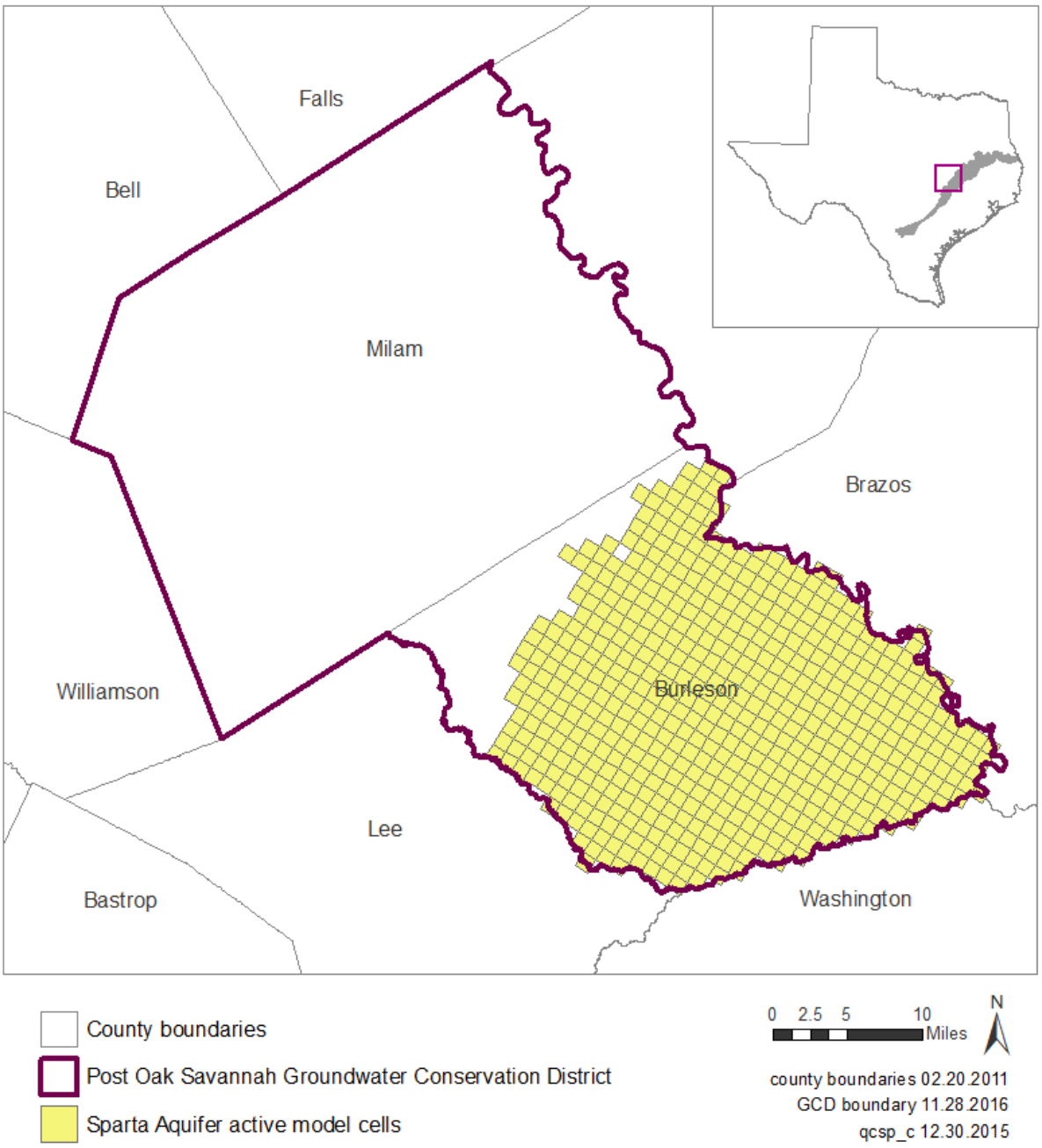

FIGURE 4. AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE SPARTA AQUIFER FROM WHICH THE INFORMATION IN TABLE 4 WAS EXTRACTED (THE AQUIFER SYSTEM EXTENT WITHIN THE DISTRICT BOUNDARY).

TABLE 5. SUMMARIZED INFORMATION FOR THE YEGUA-JACKSON AQUIFER FOR POST OAK SAVANNAH GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Yegua-Jackson Aquifer	22,459
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Yegua-Jackson Aquifer	13,932
Estimated annual volume of flow into the district within each aquifer in the district	Yegua-Jackson Aquifer	5,087
Estimated annual volume of flow out of the district within each aquifer in the district	Yegua-Jackson Aquifer	8,690
Estimated net annual volume of flow between each aquifer in the district	Yegua-Jackson Aquifer	NA[2]

[2] Not available because the model assumes a no-flow boundary condition at the base.

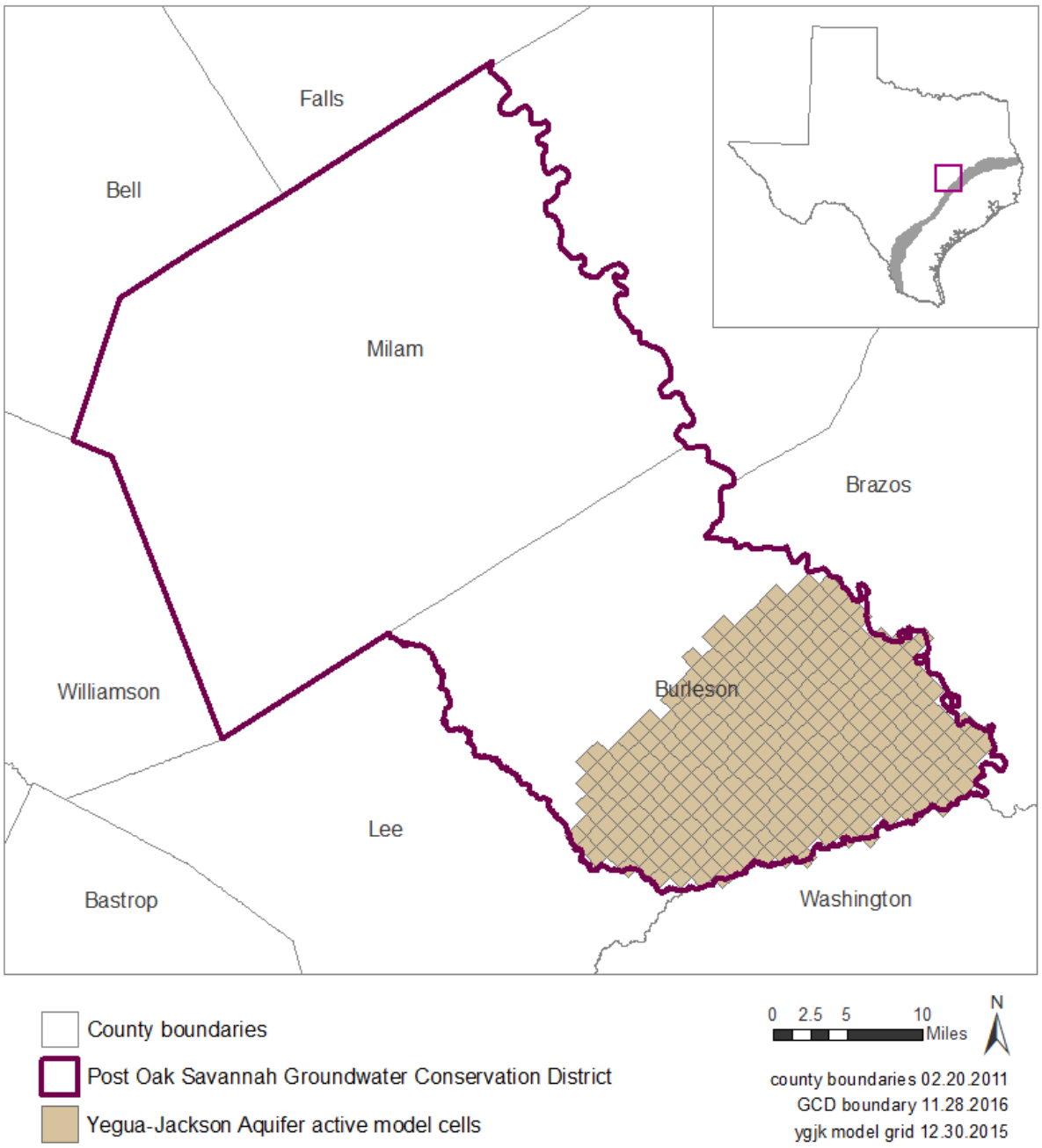

FIGURE 5. AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE YEGUA-JACKSON AQUIFER FROM WHICH THE INFORMATION IN TABLE 5 WAS EXTRACTED (THE AQUIFER SYSTEM EXTENT WITHIN THE DISTRICT BOUNDARY).

TABLE 6. SUMMARIZED INFORMATION FOR THE BRAZOS RIVER ALLUVIUM AQUIFER FOR POST OAK SAVANNAH GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Brazos River Alluvium Aquifer	15,510
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Brazos River Alluvium Aquifer	25,447
Estimated annual volume of flow into the district within each aquifer in the district	Brazos River Alluvium Aquifer	15,181
Estimated annual volume of flow out of the district within each aquifer in the district	Brazos River Alluvium Aquifer	19,706
Estimated net annual volume of flow between each aquifer in the district	Flow into the Brazos River Alluvium Aquifer from underlying formations and geological units	9,532

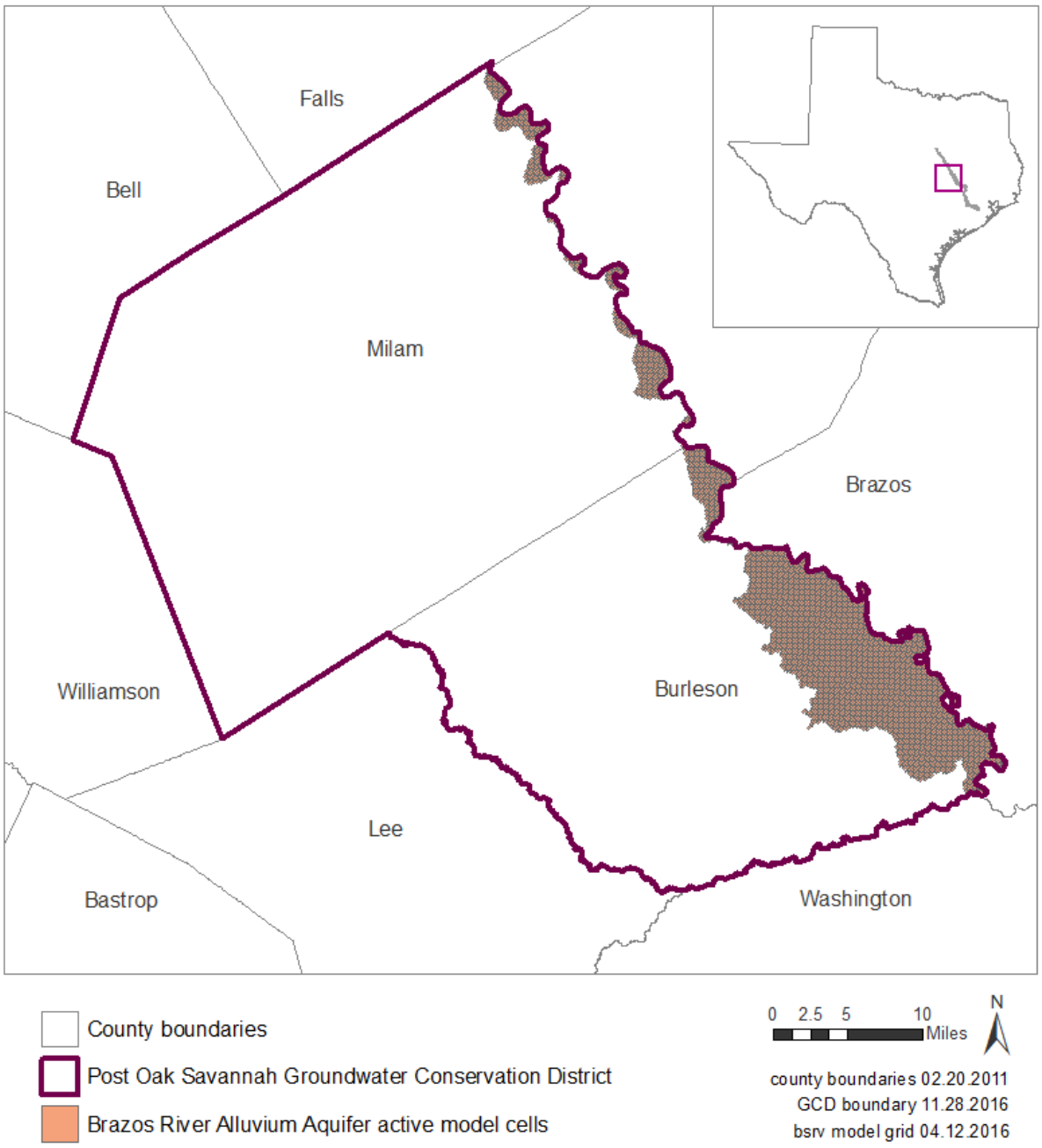

FIGURE 6. AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE BRAZOS RIVER ALLUVIUM AQUIFER FROM WHICH THE INFORMATION IN TABLE 6 WAS EXTRACTED (THE AQUIFER SYSTEM EXTENT WITHIN THE DISTRICT BOUNDARY).

LIMITATIONS:

The groundwater models used in completing this analysis are the best available scientific tools that can be used to meet the stated objectives. To the extent that this analysis will be used for planning purposes and/or regulatory purposes related to pumping in the past and into the future, it is important to recognize the assumptions and limitations associated with the use of the results. In reviewing the use of models in environmental regulatory decision making, the National Research Council (2007) noted:

> *"Models will always be constrained by computational limitations, assumptions, and knowledge gaps. They can best be viewed as tools to help inform decisions rather than as machines to generate truth or make decisions. Scientific advances will never make it possible to build a perfect model that accounts for every aspect of reality or to prove that a given model is correct in all respects for a particular regulatory application. These characteristics make evaluation of a regulatory model more complex than solely a comparison of measurement data with model results."*

A key aspect of using the groundwater model to evaluate historic groundwater flow conditions includes the assumptions about the location in the aquifer where historic pumping was placed. Understanding the amount and location of historic pumping is as important as evaluating the volume of groundwater flow into and out of the district, between aquifers within the district (as applicable), interactions with surface water (as applicable), recharge to the aquifer system (as applicable), and other metrics that describe the impacts of that pumping. In addition, assumptions regarding precipitation, recharge, and interaction with streams are specific to particular historic time periods.

Because the application of the groundwater models was designed to address regional-scale questions, the results are most effective on a regional scale. The TWDB makes no warranties or representations related to the actual conditions of any aquifer at a particular location or at a particular time.

It is important for groundwater conservation districts to monitor groundwater pumping and overall conditions of the aquifer. Because of the limitations of the groundwater model and the assumptions in this analysis, it is important that the groundwater conservation districts work with the TWDB to refine this analysis in the future given the reality of how the aquifer responds to the actual amount and location of pumping now and in the future. Historic precipitation patterns also need to be placed in context as future climatic conditions, such as dry and wet year precipitation patterns, may differ and affect groundwater flow conditions.

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APPENDIX L

JULY 24, 2020 PRESENTATION "AQUIFER USES AND CONDITIONS CONSIDERATION DISCUSSION"

GMA 12

Aquifer Uses and Conditions Consideration Discussion

by

GMA 12 Consultant Team

Daniel B. Stephens & Associates
Intera
Ground Water Consultants, LLC

July 24, 2020

TWC Section 36.108 (d)

- Before voting on the proposed desired future conditions … the districts shall consider:
  - **Aquifer uses and conditions**
  - Needs and strategies
  - Hydrologic conditions
  - Environmental impacts
  - Subsidence
  - Socioeconomic impacts
  - Private property rights
  - Feasibility
  - Anything else

TWC Section 36.108 (d-2)

- The desired future conditions … must provide a balance between the highest practicable level of groundwater production and the conservation, preservation, protection, recharging, and prevention of waste of groundwater … in the management area.

Consideration 1

- Aquifer uses or conditions within the management area, including conditions that differ substantially from one geographic area to another.

Aquifers

- Carrizo-Wilcox (including Carrizo, Calvert Bluff, Simsboro, and Hooper)
- Queen City
- Sparta
- Yegua-Jackson
- Brazos River Alluvium
- Trinity
- Gulf Coast

Aquifer Uses

- Includes the following per TWDB:
  - **Municipal**- city-owned, districts, WSCs, or private utilities supplying residential, commercial (non-goods-producing businesses), and institutional, and non-surveyed municipal (rural domestic)
  - **Manufacturing**- process water use reported by large manufacturing plants
  - **Livestock**
  - **Irrigation**
  - **Mining**- includes water used in the mining of oil, gas, coal, sand, gravel, and other materials
  - **Steam-Electric**- consumptive use of water by large power generation plants

Estimated Groundwater Use

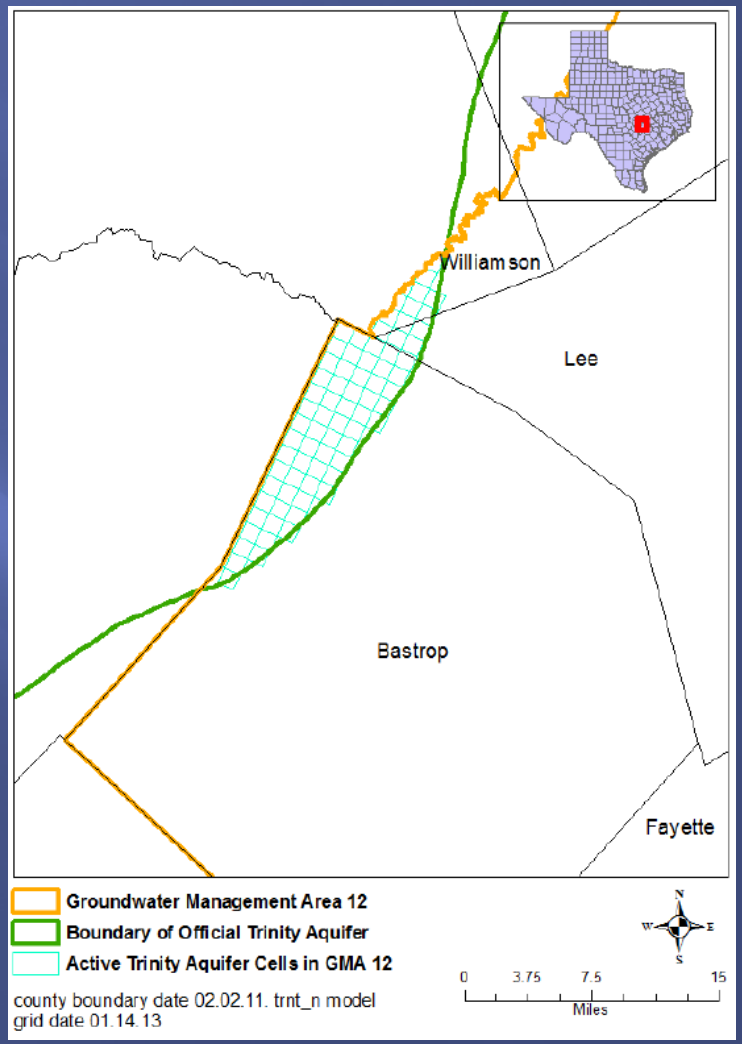
	Estimated Water Use Met With Groundwater				
	LPGCD	POSGCD	BVGCD	METGCD	FCGCD
Irrigation	100%	99%	90%	100%	90%
Livestock	25%	30%	20%	10%	75%
Manufacturing	100%	89%	100%	0%	30%
Mining	95+%	95+%	80%	50%	60%
Municipal	100%	67%	95%	100%	100%
Steam-Electric Power	75%	0%	25%	0%	0%

2018 Reported Production

2018 Metered/Reported Groundwater Production (acre-feet)					
	LPGCD	POSGCD	BVGCD	METGCD	FCGCD
Colorado/Brazos River Alluvium	1,252	9,801	142,853	NA	55
Yegua-Jackson	0	152	1,183	9	965
Sparta	225	958	4,309	2,356	0
Queen City	249	313	118	585	163
Carrizo	2,834	1,067	758	1,102	166
Calvert Bluff	1,050	412	193	5,175	NA
Simsboro	18,704	4,932	58,297	1,213	NA
Hooper	677	361	809	3,685	NA
Carrizo-Wilcox	*23,264*	*6,773*	*60,058*	*11,174*	*0*
TOTAL	24,991	17,996	208,520	14,123	1,349

Trinity Aquifer

- Major Aquifer
- Present only in Bastrop, Lee, and Williamson Counties
- No historic use in GMA
- No known wells in GMA
- Very deep in GMA (>3,000 feet)
- Not relevant

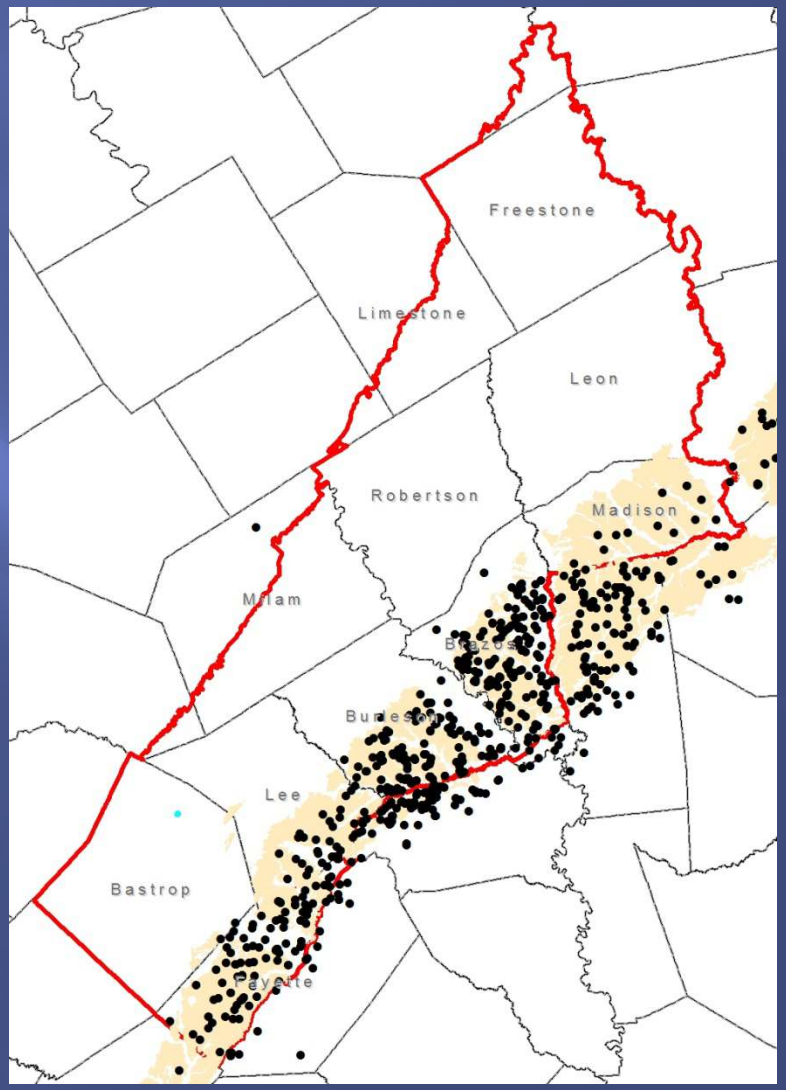


Gulf Coast Aquifer System

- Major Aquifer
- Present in only the very southern part of Brazos County
- Minor historic use in GMA
- Not relevant

Yegua-Jackson Aquifer

- Minor Aquifer
- Present across GMA 12
- Moderate historic use
- Numerous wells
- Wells tend to be shallow to moderate depth
- Not relevant in LPGCD
- DFCs in 2016 for other GCDs



Well data from TWDB groundwater database

Yegua-Jackson Uses

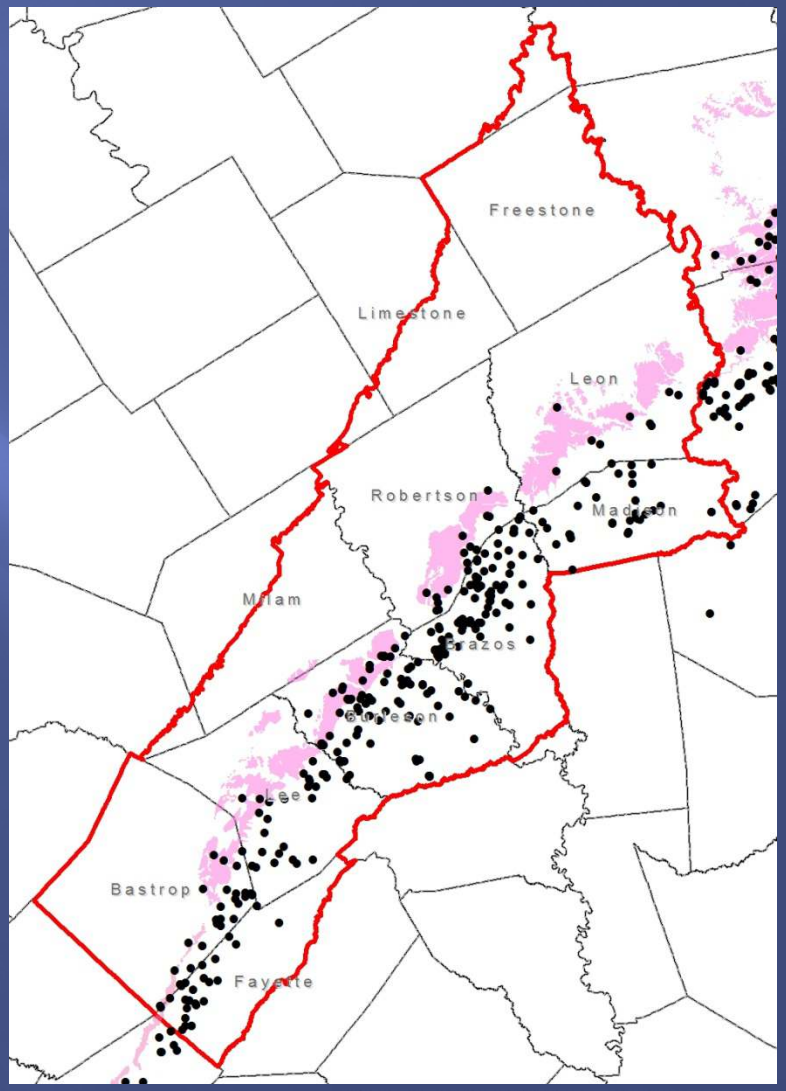
- Groundwater primarily produced from wells less than 600 feet deep
- Groundwater primarily used for domestic, irrigation and livestock purposes
- Some used for municipal, industrial, and oil and gas drilling
- Some significant users:
  - Several municipalities in Fayette County (La Grange, Schulenburg, Flatonia, Fayette WSC, etc.)
  - Past rig supply in Madison County (declining)
  - Golf course irrigation and some industrial use in BVGCD

2018 Yegua-Jackson Uses

Approximate Yegua-Jackson 2018 Groundwater Use (Percent)					
	LPGCD	POSGCD	BVGCD	METGCD	FCGCD
Irrigation	0%	17%	20%	20%	15%
Livestock	50%	22%	<5%	20%	10%
Manufacturing	0%	0%	25%	0%	0%
Mining	0%	0%	<5%	40%	0%
Municipal	50%	61%	55%	20%	75%
Steam-Electric Power	0%	0%	0%	0%	0%

Sparta Aquifer

- Minor Aquifer
- Present across GMA 12
- Limited historic use
- Numerous wells
- Wells are shallow to moderately deep
- DFCs in 2016



Well data from TWDB groundwater database

Sparta Uses

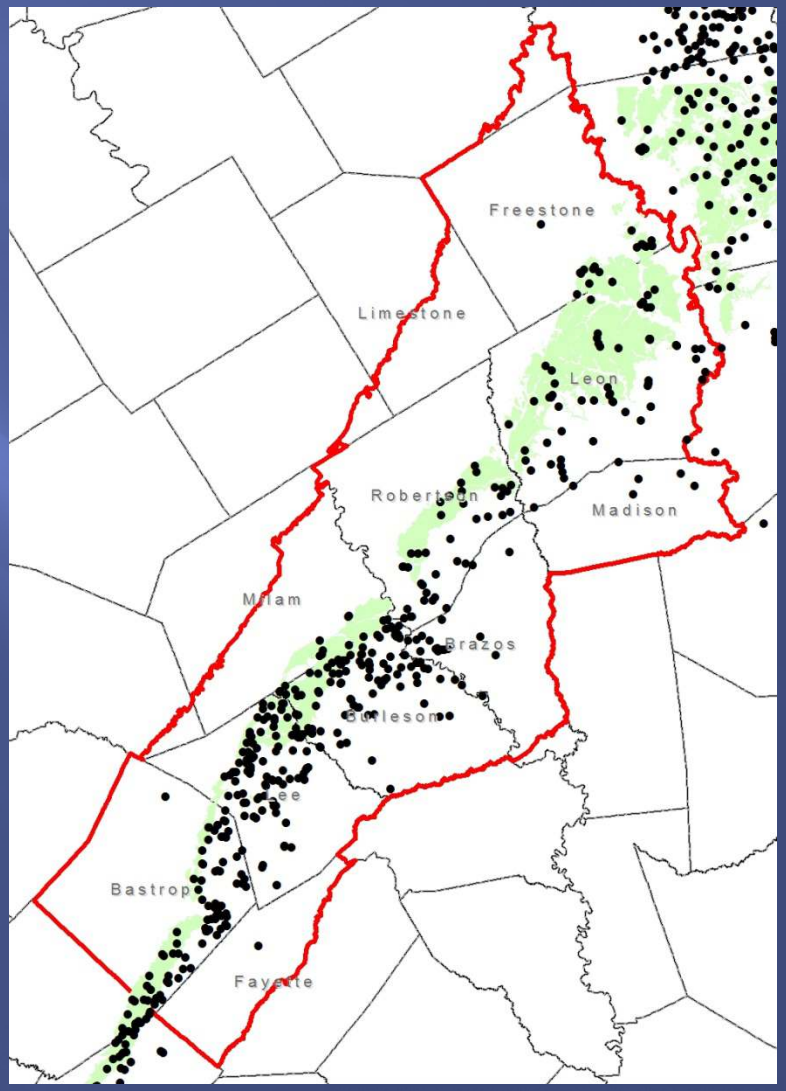
- Groundwater primarily produced from shallow to moderately deep wells (most less than 1000 feet, a few up to 2,000 feet deep)
- Groundwater primarily used for municipal, domestic, and livestock
- Some used for industrial, irrigation, and oil and gas well drilling
- Some significant users:
  - City of Madisonville
  - WSCs and municipal use in Brazos and Lee Counties

2018 Sparta Uses

Approximate Sparta 2018 Groundwater Use (Percent)					
	LPGCD	POSGCD	BVGCD	METGCD	FCGCD
Irrigation	45%	0%	15%	<5%	40%
Livestock	10%	8%	5%	<5%	10%
Manufacturing	0%	1%	0%	0%	0%
Mining	0%	0%	15%	0%	0%
Municipal	45%	91%	65%	95+%	50%
Steam-Electric Power	0%	0%	<5%	0%	0%

Queen City Aquifer

- Minor Aquifer
- Present across GMA 12
- Low to moderate historic use
- Numerous wells
- Wells are shallow to moderately deep
- DFCs in 2016



Well data from TWDB groundwater database

Queen City Uses

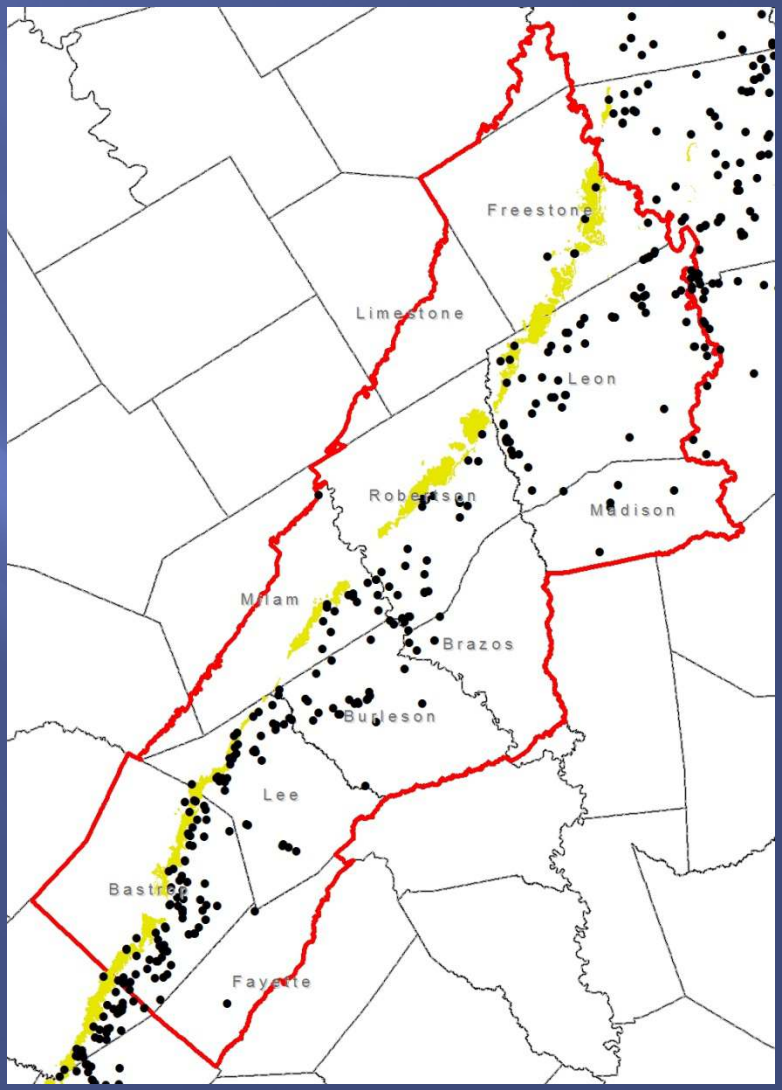
- Groundwater primarily produced from shallow to moderately deep wells (mostly less than 1000 feet deep)
- Groundwater primarily used for irrigation, domestic, and livestock
- Some used for municipal
- Some significant users:
  - Rural WSCs in METGCD
  - Town of Lincoln, Lee County WSC
  - Landowners for livestock and domestic purposes

2018 Queen City Uses

Approximate Queen City 2018 Groundwater Use (Percent)					
	LPGCD	POSGCD	BVGCD	METGCD	FCGCD
Irrigation	60%	0%	5%	0%	5%
Livestock	15%	14%	<5%	5%	5%
Manufacturing	0%	0%	0%	10%	0%
Mining	0%	0%	40+%	0%	0%
Municipal	25%	86%	50+%	85%	90%
Steam-Electric Power	0%	0%	0%	0%	0%

Carrizo Aquifer

- Part of Carrizo-Wilcox, which is a major aquifer
- Present across GMA 12
- Moderate historic use
- Moderate number of wells
- Wells can be deep
- DFCs in 2016



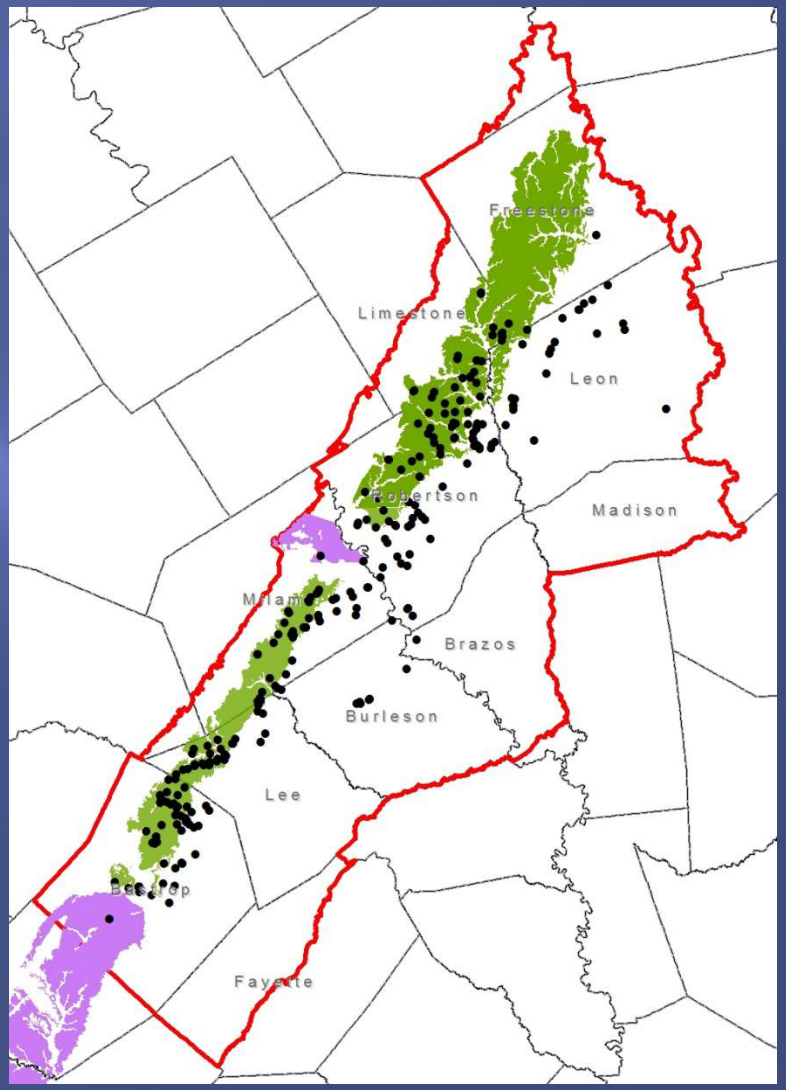
Well data from TWDB groundwater database

Carrizo Uses

- Wells up to about 2,500 feet in depth
- Groundwater primarily used for municipal, domestic, and livestock
- Some used for irrigation
- Some significant users:
  - Cities of Giddings, Smithville
  - Fayette WSC, Aqua WSC, Lee County WSC
  - TDCJ Ferguson unit (~1,350 ac-ft/yr)
  - Rural WSCs (~300 ac-ft/yr)
  - Texas A&M University and College Station
  - SAWS Vista Ridge project

Calvert Bluff Aquifer

- Part of Carrizo-Wilcox, which is a major aquifer
- Present across much of GMA 12
- Moderate historic use
- Moderate number of wells
- Most wells are shallow
- DFCs in 2016



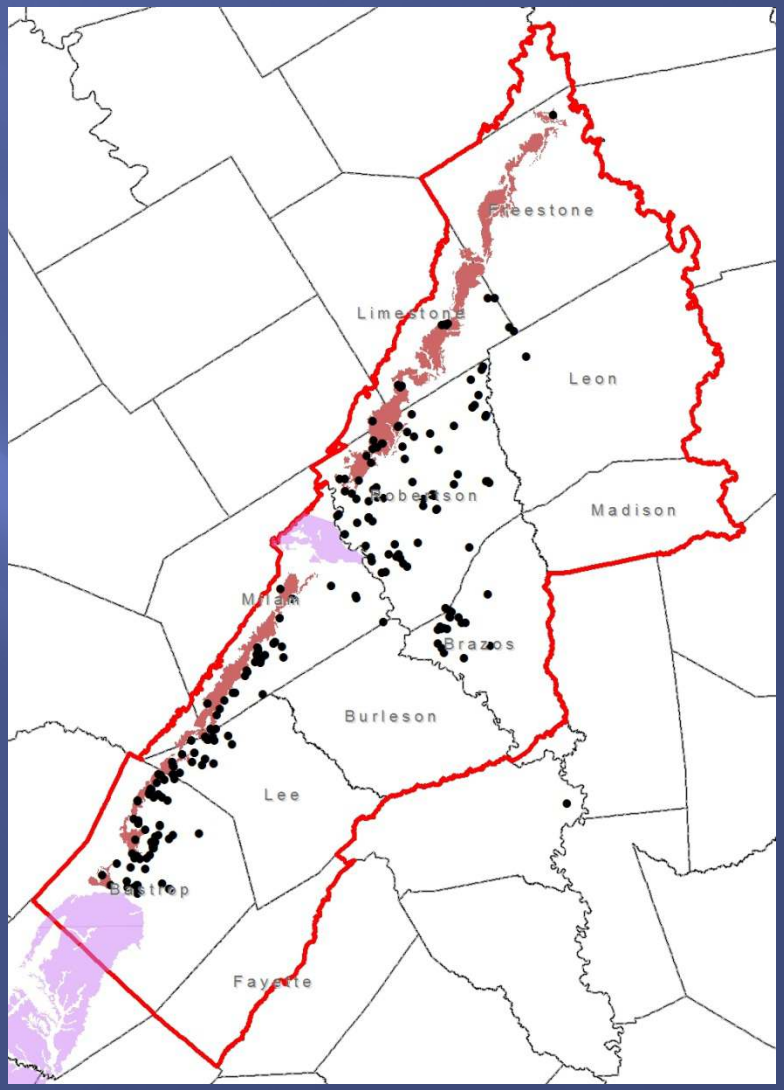
Well data from TWDB groundwater database

Calvert Bluff Uses

- Groundwater mostly produced from shallow wells (mostly less than 800 feet deep)
- Groundwater primarily used for livestock and domestic purposes
- Some used for municipal, oil and gas drilling
- Some significant users:
  - Bastrop County WCID#2, numerous METGCD WSCs
  - Nucor Steel (600 ac-ft/yr)
  - Land and livestock owners

Simsboro Aquifer

- Part of Carrizo-Wilcox, which is a major aquifer
- Present across much of GMA 12
- Significant historic use
- Moderate number of wells
- Wells can be very deep
- DFCs in 2016



Well data from TWDB groundwater database

Simsboro Uses

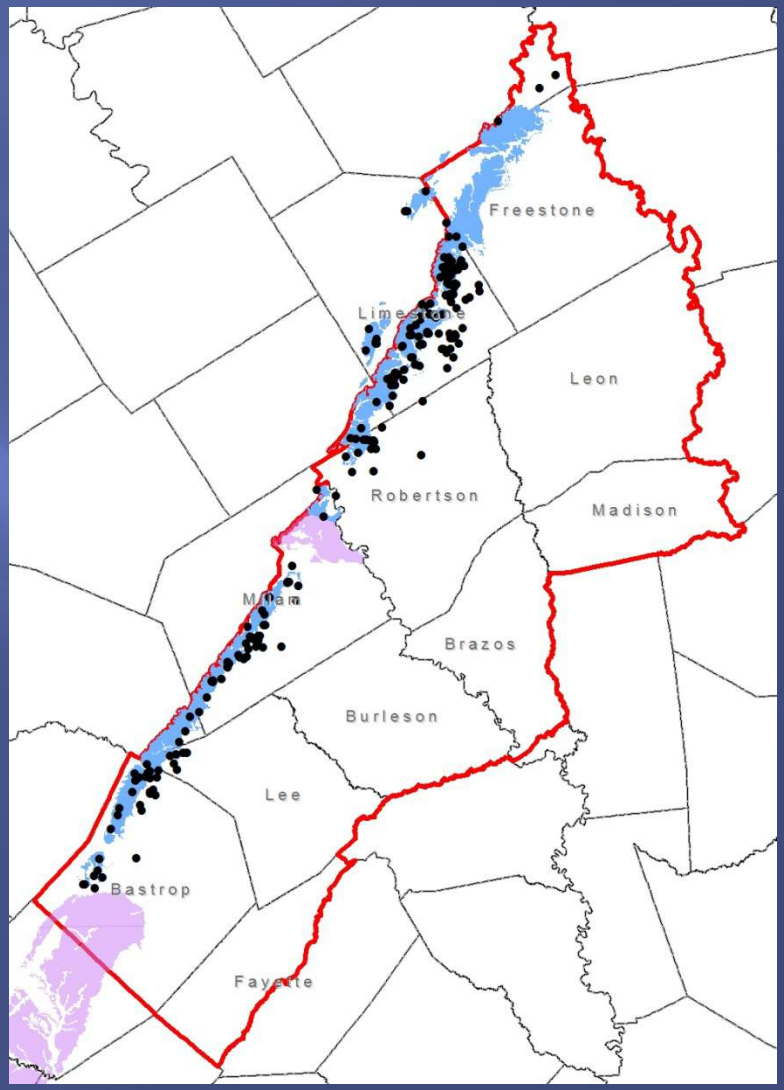
- Groundwater produced from wells up to 3,000 feet deep
- Groundwater primarily used for municipal, irrigation, and mine depressuring
- Some used for livestock and industrial

Simsboro Uses

- Some significant users:
  - Manville WSC, Aqua WSC, several METGCD WSCs
  - LCRA
  - Cities of Bryan/College Station, Elgin, Hearne, and Franklin
  - Texas A&M University
  - NRG, Texas Power LLC and OPTIM ENERGY
  - Landowners
- Large water projects
  - Forestar
  - End Op
  - SAWS Vista Ridge project

Hooper Aquifer

- Part of Carrizo-Wilcox, which is a major aquifer
- Present across much of GMA 12
- Low historic use
- Moderate number of wells
- Wells are shallow
- DFCs in 2016



Well data from TWDB groundwater database

Hooper Uses

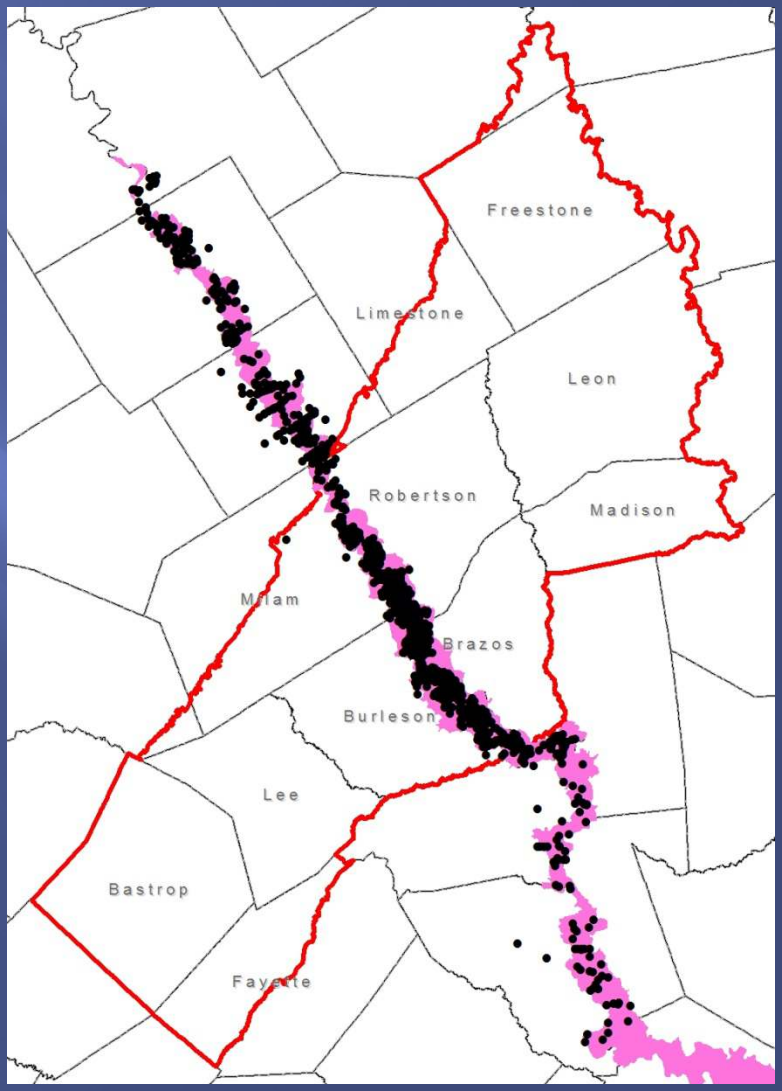
- Groundwater primarily produced from shallow wells- mostly less than 500 feet deep
- Groundwater primarily used for domestic and livestock purposes
- Some used for power generation and municipal purposes
- Some significant users:
  - Cities of Fairfield, Teague
  - TDCJ Boyd Unit
  - City of Bremond in Robertson County

2018 Carrizo-Wilcox Uses

Approximate Carrizo-Wilcox 2018 Groundwater Use (Percent)					
	LPGCD	POSGCD	BVGCD	METGCD	FCGCD
Irrigation	10%	34%	25%	10%	95+%
Livestock	<5%	7%	<5%	5%	0%
Manufacturing	<5%	5%	<5%	10%	0%
Mining	<1%	0%	5%	10%	0%
Municipal	80-85%	59%	55+%	65%	0%*
Steam-Electric Power	0%	0%	10%	0%	0%

Brazos River Alluvium Aquifer

- Minor Aquifer
- Localized in GMA 12
- Moderate historic use
- Numerous wells
- Wells are very shallow
- DFCs in 2016



Well data from TWDB groundwater database

Brazos River Alluvium Uses

- Groundwater primarily produced from very shallow wells (less than 100 feet deep)
- Groundwater primarily almost exclusively used for irrigation in the Brazos River Bottom
  - Crops
    - Corn
    - Cotton
    - Soybeans
    - Hay
    - Grain sorghum
- Small amount of domestic and livestock use

2018 Brazos River Alluvium Uses

Approximate Brazos River Alluvium 2018 Groundwater Use (Percent)					
	LPGCD	POSGCD	BVGCD	METGCD	FCGCD
Irrigation	NA	100%	95+%	NA	NA
Livestock	NA	0%	<5%	NA	NA
Manufacturing	NA	0%	0%	NA	NA
Mining	NA	0%	0%	NA	NA
Municipal	NA	0%	0%	NA	NA
Steam-Electric Power	NA	0%	0%	NA	NA

Summary

- GMA 12 relies heavily on groundwater for all uses
- Over 50% of groundwater is used for municipal purposes in most of the GMA (other than Brazos River Alluvium)

Estimated 2018 Water Use Met With Groundwater					
	LPGCD	POSGCD	BVGCD	METGCD	FCGCD
Irrigation	100%	99%	90%	100%	90%
Livestock	25%	30%	20%	10%	75%
Manufacturing	100%	89%	100%	0%	30%
Mining	95+%	95+%	80%	50%	60%
Municipal	100%	67%	95%	100%	100%
Steam-Electric Power	75%	0%	25%	0%	0%

Summary

- In much of the GMA, most groundwater production is from the Carrizo-Wilcox, especially the Simsboro (other than Brazos River Alluvium)

	2018 Metered/Reported Groundwater Production (acre-feet)				
	LPGCD	POSGCD	BVGCD	METGCD	FCGCD
Colorado/Brazos River Alluvium	1,252*	9,801	142,853	NA	55
Yegua-Jackson	0	152	1,183	9	965
Sparta	225	958	4,309	2,356	0
Queen City	249	313	118	585	163
Carrizo	2,834	1,067	758	1,102	166
Calvert Bluff	1,050	412	193	5,175	NA
Simsboro	18,704	4,932	58,297	1,213	NA
Hooper	677	361	809	3,685	NA
Carrizo-Wilcox	*23,264*	*6,773*	*60,058*	*11,174*	*0*
TOTAL	24,991	17,996	208,520	14,123	1,349

QUESTIONS?

APPENDIX M

JULY 24, 2020 PRESENTATION "GMA-12: NEEDS AND STRATEGIES"

GMA-12: Needs and Strategies

Presented By:
GMA 12 Consultant Team

July 24, 2020

TWC Section 36.108 (d)

Before voting on the proposed desired future conditions **… the districts shall consider:**

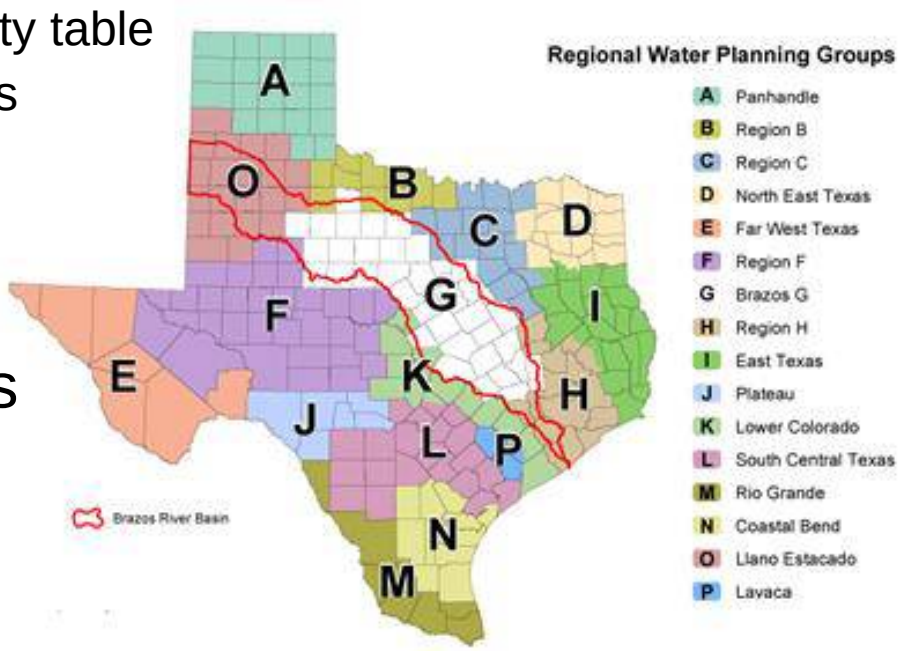
- Aquifer uses and conditions
- Needs and strategies
- Hydrologic conditions
- Environmental impacts
- Subsidence
- Socioeconomic impacts
- Private property rights
- Feasibility
- Anything else

Approach

Obtained from Draft 2021 Regional Water Plans for Regions G, K, C & H

- Supply – WUG Existing Water Supply table
- Demand – WUG Demand table
- Surplus/Need – WUG Needs/Surplus table
- Availability – Source Availability table
- Water Management Strategies

- Permit Data from GCDs
- MAGs from TWDB reports



Approach

- Water Use Group (WUG) Assignments
  - Used category consistent with WUG given in the 2021 Draft Regional Water Plans
    - Irrigation
    - Livestock
    - Manufacturing
    - Mining
    - Steam Electric Power
    - County-Other
  - Assigned category of Municipal
    - City WUGs
    - Water supply WUGs
- All values reported in acre-feet per year (AFY)

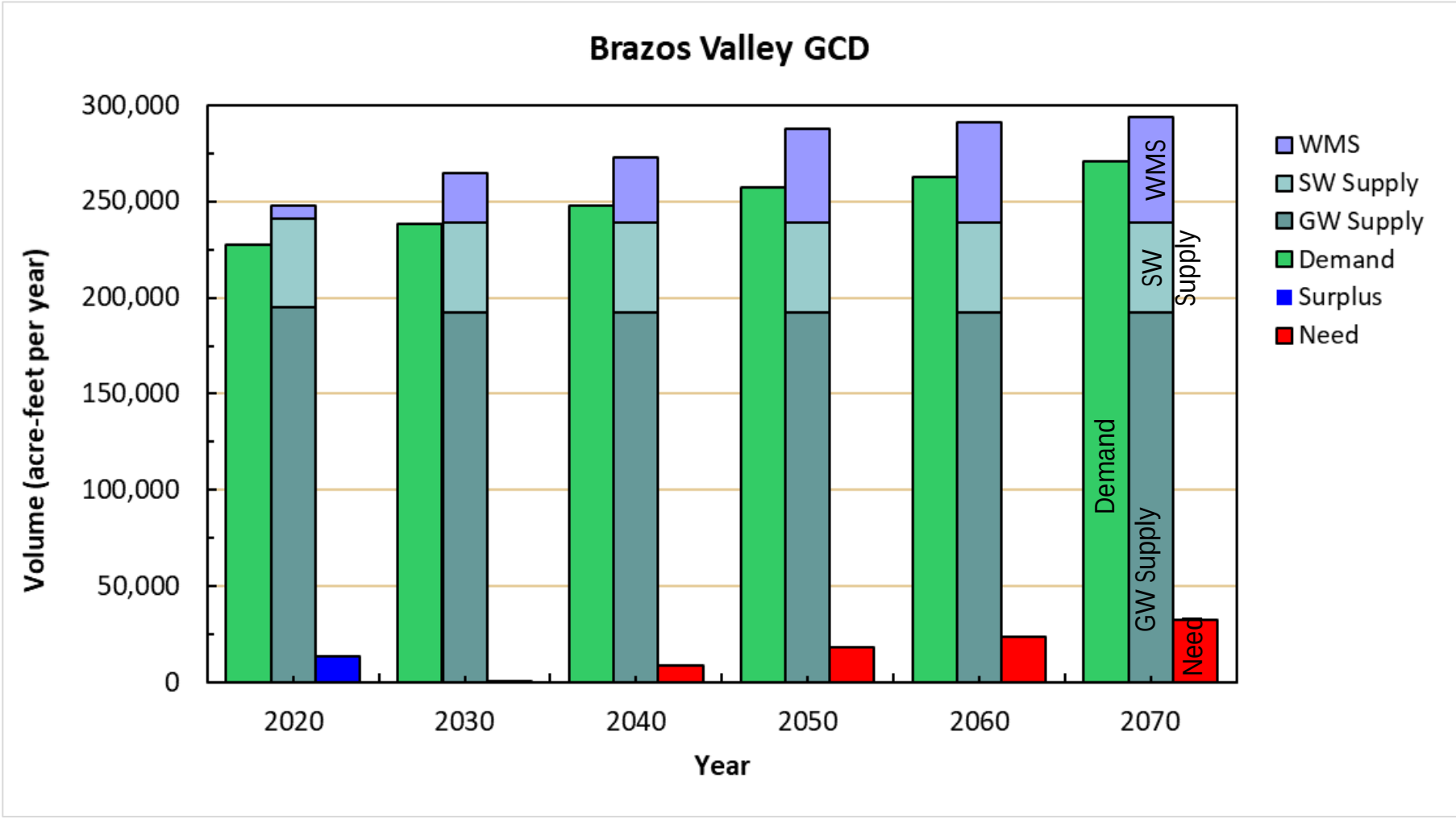
Definitions

- Supply
  - The amount of water that can be produced with current permits, current contracts, and existing infrastructure during drought
- Demand (Net)
  - Demand of the WUG during a drought after plumbing code savings are subtracted
- Surplus/Need
  - Difference between supply and demand
- Water Management Strategies
  - Water supply projects designed to meet needs for additional water supplies during drought
  - Some are associated with demand reduction or making supplies physically or legally available to users
- Availability
  - Maximum amount of water available during a drought, regardless of whether the supply is physically or legally available

Information Provided For Each GCD

1.	Supply/Demand/Surplus-Need	Bar Chart
2.	Supply/Demand/Surplus-Need • by Water Use Group (WUG)	Table
3.	Groundwater – Surface Water Supply • by sources	Table
4.	Water Management Strategies • by categories • by WUG	Table
5.	Water Management Strategies • by projects	Table
6.	Permits Amounts • by aquifer	Pie Chart
7.	Supply Permits Amounts • by aquifer	Bar Chart

Brazos Valley GCD - Supply/Demand/Surplus



Brazos Valley GCD – Supply/Demand/Surplus

	2020	2030	2040	2050	2060	2070
SUPPLY – Groundwater & Surface Water						
County	585	585	585	585	585	585
Irrigation	111,832	108,572	108,185	108,027	107,917	107,825
Livestock	4,291	4,291	4,291	4,291	4,291	4,291
Manufacturing	7,084	7,433	7,475	7,475	7,475	7,475
Mining	17,327	17,327	17,327	17,327	17,327	17,327
Municipal	53,872	54,541	54,678	54,727	54,779	54,803
Steam Electric Power	46,286	46,305	46,307	46,307	46,307	46,307
Total Supply	*241,277*	*239,054*	*238,848*	*238,739*	*238,681*	*238,613*
DEMAND						
County	545	538	535	531	529	528
Irrigation	118,425	118,425	118,949	119,409	119,410	119,410
Livestock	4,291	4,291	4,291	4,291	4,291	4,291
Manufacturing	1,821	1,831	1,831	1,831	1,831	1,831
Mining	11,001	13,363	13,433	13,144	12,923	12,814
Municipal	44,910	53,312	62,567	71,733	77,243	85,865
Steam Electric Power	46,287	46,287	46,287	46,287	46,287	46,287
Total Demand	*227,280*	*238,047*	*247,893*	*257,226*	*262,514*	*271,026*
SURPLUS/NEED						
County	40	47	50	54	56	57
Irrigation	-6,593	-9,853	-10,764	-11,382	-11,493	-11,585
Livestock	-	-	-	-	-	-
Manufacturing	5,263	5,602	5,644	5,644	5,644	5,644
Mining	6,326	3,964	3,894	4,183	4,404	4,513
Municipal	8,962	1,229	-7,889	-17,006	-22,464	-31,062
Steam Electric Power	-1	18	20	20	20	20
Total Surplus/Need	*13,997*	*1,007*	*-9,045*	*-18,487*	*-23,833*	*-32,413*

Brazos Valley GCD - Supply/Demand/Surplus

Brazos Valley GCD	2020	2030	2040	2050	2060	2070
Groundwater Supply – All Categories						
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
Groundwater Supply Total	*194,758*	*192,604*	*192,467*	*192,427*	*192,438*	*192,439*
Surface Water Supply – All Categories						
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
Surface Water Supply Total	*46,519*	*46,450*	*46,381*	*46,312*	*46,243*	*46,174*
Total Supply – All Categories	241,277	239,054	238,848	238,739	238,681	238,613
Total Demand – All Categories	*227,280*	*238,047*	*247,893*	*257,226*	*262,514*	*271,026*
Total Surplus/Need – All Categories	*13,997*	*1,007*	*-9,045*	*-18,487*	*-23,833*	*-32,413*

Brazos Valley GCD - Water Management Strategies

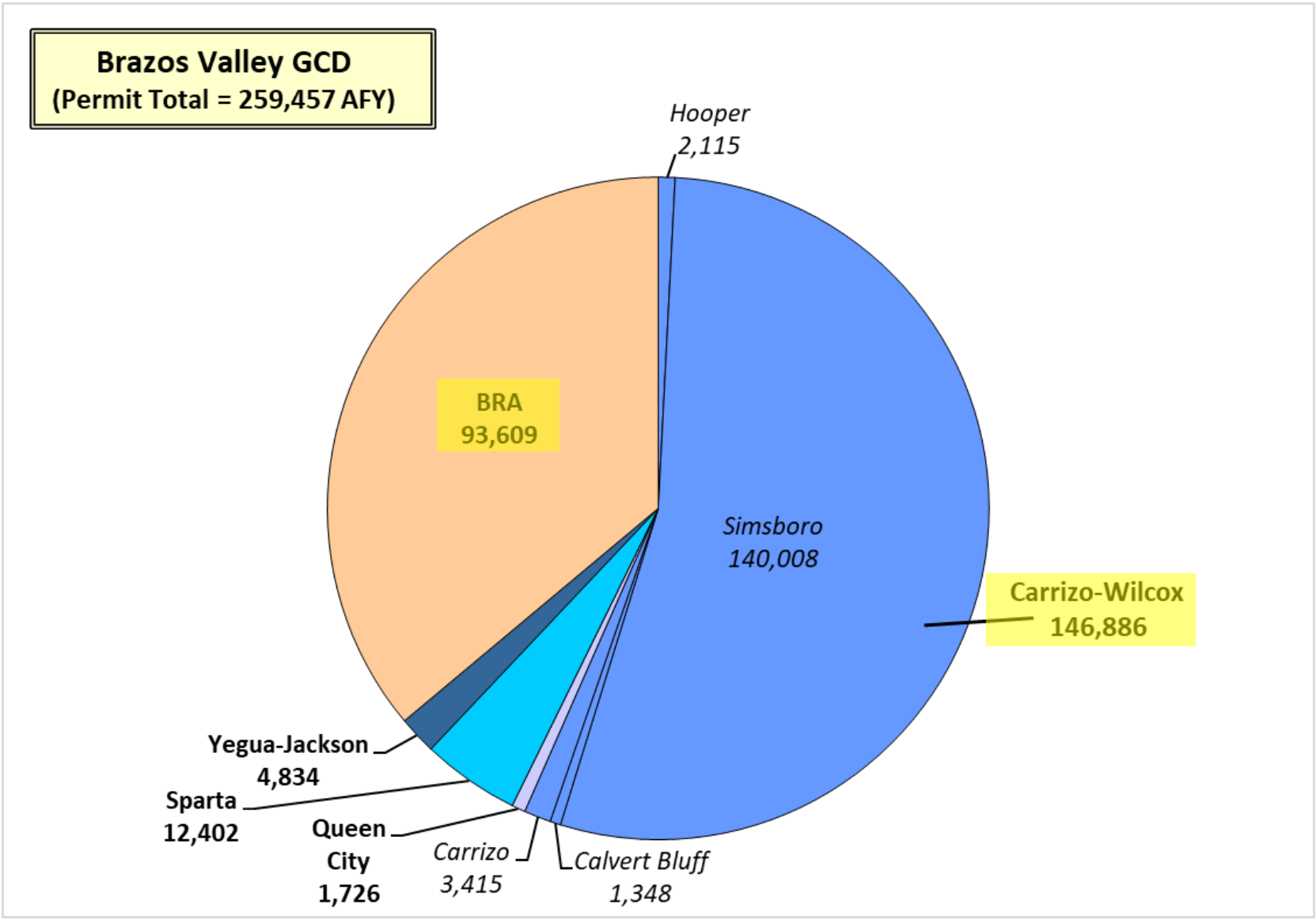
	2020	2030	2040	2050	2060	2070
Groundwater WMS – All Categories						
CARRIZO-WILCOX AQUIFER	2,950	8,989	14,423	19,184	19,585	19,885
SIMSBORO - BRAZOS COUNTY ASR	-	6,000	6,000	6,000	8,500	10,500
Conservation WMS – All Categories						
MUNICIPAL CONSERVATION	-	2,606	3,335	3,961	4,740	5,721
IRRIGATION CONSERVATION	2,375	3,959	5,579	5,612	5,612	5,612
Direct Reuse WMS – All Categories						
DIRECT NON-POTABLE REUSE	1,308	4,360	4,742	4,843	4,685	4,666
PURCHASE FROM WALNUT CREEK MINE-REUSE	-	-	-	9,000	9,000	9,000
Total WMS – All Categories	6,633	25,914	34,079	48,600	52,122	55,384
Total Supply + WMS – All Categories	247,910	264,968	272,927	287,339	290,803	293,997

	2020	2030	2040	2050	2060	2070
Water Management Strategy						
County-Other	-	-	-	-	-	-
Irrigation	2,375	3,959	5,579	5,612	5,612	5,612
Livestock	-	-	-	-	-	-
Manufacturing	1,200	300	500	800	1,100	1,400
Mining	-	-	-	-	-	-
Municipal	2,453	21,050	27,395	32,583	35,805	38,767
Steam Electric Power	605	605	605	9,605	9,605	9,605
Total WMS	*6,633*	*25,914*	*34,079*	*48,600*	*52,122*	*55,384*

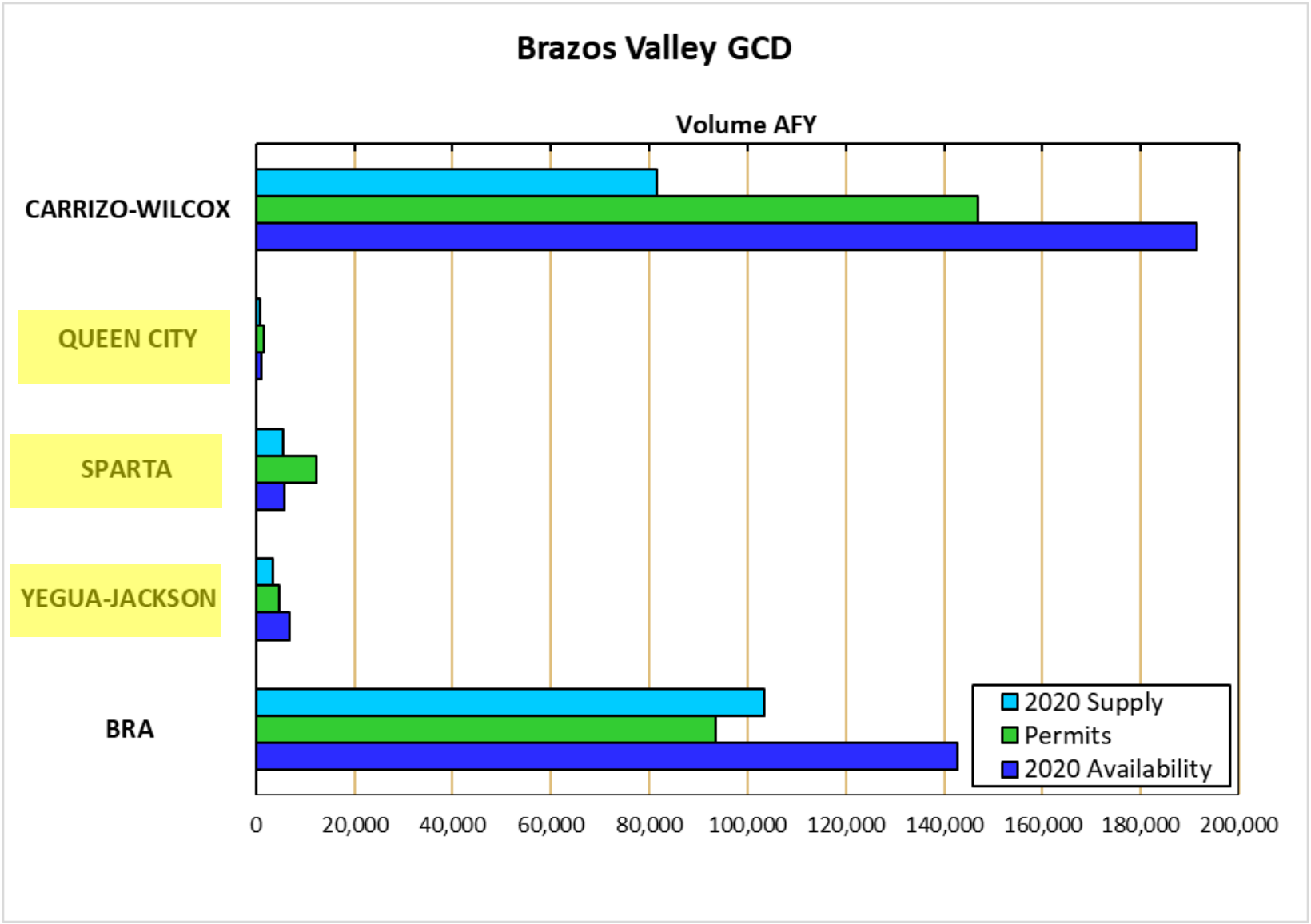
Brazos Valley GCD - Water Management Strategies

Sponsor Entity	Water Management Strategy	Type	Source County	Recipient County	2020	2030	2040	2050	2060	2070
BRYAN	CARRIZO AQUIFER DEVELOPMENT	Groundwater	BRAZOS	Brazos	-	7,501	7,501	7,501	7,501	7,501
BRYAN	MUNICIPAL WATER CONSERVATION	Conservation	BRAZOS	Brazos	-	1,311	1,606	1,719	1,988	2,489
BRYAN	REUSE- BRYAN MIRAMONT	Reuse	BRAZOS	Brazos	600	600	600	600	600	600
BRYAN	SIMSBORO - BRAZOS COUNTY ASR	Groundwater	BRAZOS	Brazos	-	6,000	6,000	6,000	8,500	10,500
COLLEGE STATION	CARRIZO AQUIFER DEVELOPMENT	Groundwater	BRAZOS	Brazos	-	-	5,234	9,695	9,796	9,796
COLLEGE STATION	MUNICIPAL WATER CONSERVATION	Conservation	BRAZOS	Brazos	-	234	-	-	-	-
COLLEGE STATION	REUSE- COLLEGE STATION	Reuse	BRAZOS	Brazos	103	3,155	3,537	3,638	3,480	3,461
MANUFACTURING, BRAZOS	TEXAS A&M REDUCTION TO BRAZOS MANUFACTURING	Groundwater	BRAZOS	Brazos	1,200	300	500	800	1,100	1,400
STEAM ELECTRIC POWER, BRAZOS	REUSE- BRYAN (OPTION 1)	Reuse	BRAZOS	Brazos	605	605	605	605	605	605
TEXAS A&M UNIVERSITY	CARRIZO AQUIFER DEVELOPMENT	Groundwater	BRAZOS	Brazos	1,200	638	638	638	638	638
TEXAS A&M UNIVERSITY	MUNICIPAL WATER CONSERVATION	Conservation	BRAZOS	Brazos	-	560	1,072	1,557	2,006	2,415
WELLBORN SUD	MUNICIPAL WATER CONSERVATION	Conservation	BRAZOS	Brazos	-	212	296	311	342	376
BREMOND	MUNICIPAL WATER CONSERVATION	Conservation	ROBERTSON	Robertson	-	13	21	21	23	24
HEARNE	MUNICIPAL WATER CONSERVATION	Conservation	ROBERTSON	Robertson	-	43	22	19	17	17
IRRIGATION, ROBERTSON	IRRIGATION WATER CONSERVATION	Conservation	ROBERTSON	Robertson	2,375	3,959	5,579	5,612	5,612	5,612
ROBERTSON COUNTY WSC	CARRIZO AQUIFER DEVELOPMENT	Groundwater	ROBERTSON	Robertson	550	550	550	550	550	550
STEAM ELECTRIC POWER, ROBERTSON	PURCHASE FROM WALNUT CREEK MINE-REUSE	Reuse	ROBERTSON	Robertson	-	-	-	9,000	9,000	9,000
TWIN CREEK WSC	MUNICIPAL WATER CONSERVATION	Conservation	ROBERTSON	Robertson	-	21	23	23	23	25
WELLBORN SUD	MUNICIPAL WATER CONSERVATION	Conservation	ROBERTSON	Robertson	-	212	296	311	342	376
Total					6,633	25,914	34,079	48,600	52,122	55,384

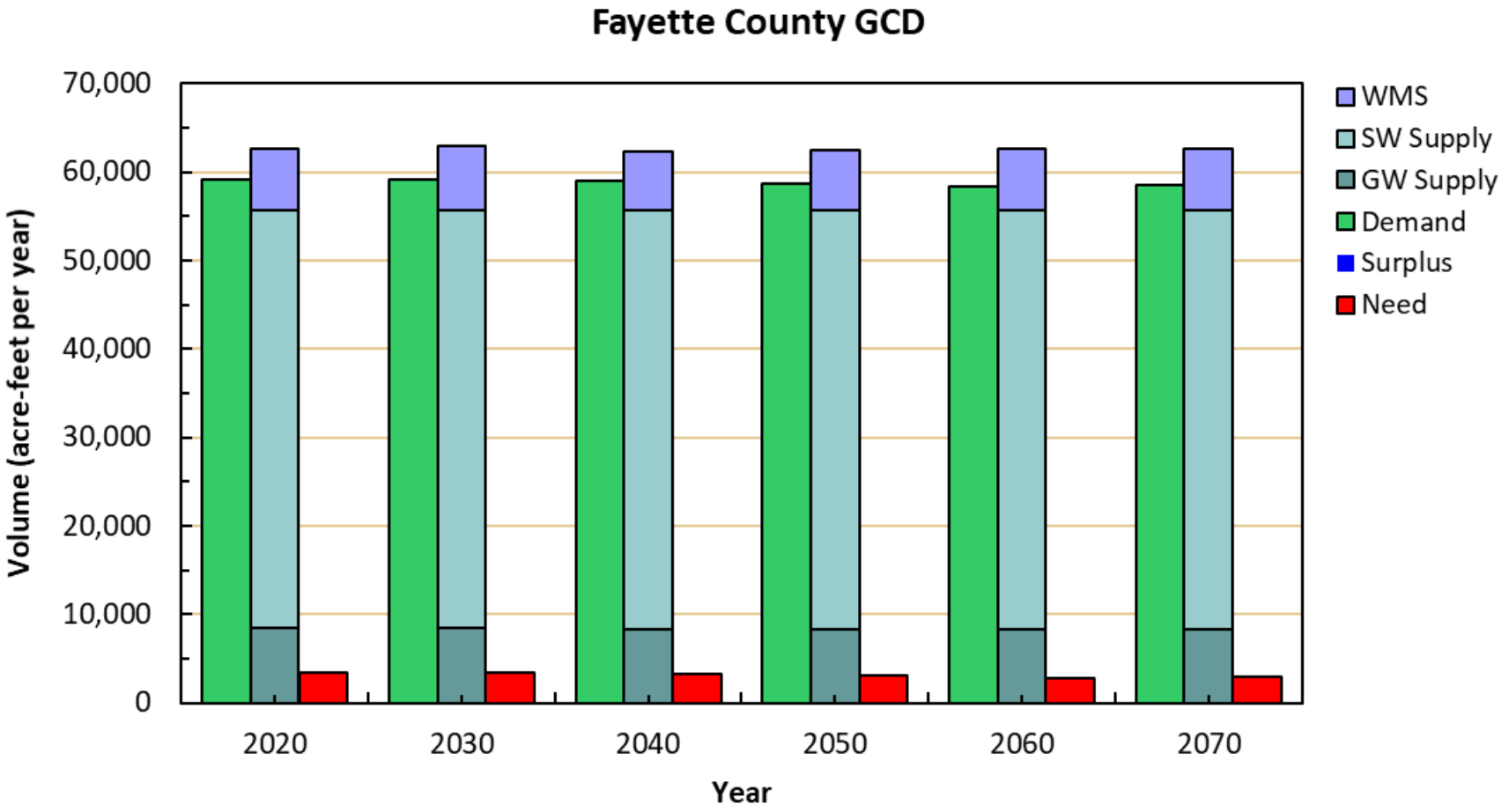
Brazos Valley GCD - Permits



Brazos Valley GCD - Supply & Permits



Fayette County GCD - Supply/Demand/ Surplus-Needs



Fayette County GCD - Supply/Demand/ Surplus-Needs

	2020	2030	2040	2050	2060	2070
SUPPLY – Groundwater & Surface Water						
County	878	878	878	878	878	878
Irrigation	1,022	1,022	1,022	1,022	1,022	1,022
Livestock	1,982	1,982	1,982	1,982	1,982	1,982
Manufacturing	402	402	402	402	402	402
Mining	1,799	1,730	1,650	1,629	1,629	1,629
Municipal	4,752	4,763	4,769	4,778	4,780	4,774
Steam Electric Power	44,912	44,912	44,912	44,912	44,912	44,912
Total Supply	*55,747*	*55,689*	*55,615*	*55,603*	*55,605*	*55,599*
DEMAND						
County	1,238	1,370	1,444	1,509	1,566	1,606
Irrigation	828	828	828	828	828	828
Livestock	1,726	1,726	1,726	1,726	1,726	1,726
Manufacturing	396	442	442	442	442	442
Mining	2,526	2,032	1,465	918	359	350
Municipal	3,226	3,575	3,817	4,034	4,225	4,383
Steam Electric Power	49,211	49,211	49,211	49,211	49,211	49,211
Total Demand	*59,151*	*59,184*	*58,933*	*58,668*	*58,357*	*58,546*
SURPLUS/NEED						
County	-360	-492	-566	-631	-688	-728
Irrigation	194	194	194	194	194	194
Livestock	256	256	256	256	256	256
Manufacturing	6	-40	-40	-40	-40	-40
Mining	-727	-302	185	711	1,270	1,279
Municipal	1,526	1,188	952	744	555	391
Steam Electric Power	-4,299	-4,299	-4,299	-4,299	-4,299	-4,299
Total Surplus/Need	*-3,404*	*-3,495*	*-3,318*	*-3,065*	*-2,752*	*-2,947*

Fayette County GCD - Supply/Demand/ Surplus-Needs

Fayette County GCD	2020	2030	2040	2050	2060	2070
Groundwater Supply – All Categories						
Carrizo-Wilcox Aquifer	569	568	563	559	546	524
Gulf Coast Aquifer	1,940	1,952	1,944	1,937	1,953	1,971
Other Aquifer	834	834	834	834	834	834
Queen City Aquifer	19	19	19	19	19	18
Sparta Aquifer	1,256	1,256	1,256	1,255	1,254	1,253
Trinity Aquifer	3,866	3,797	3,736	3,736	3,736	3,736
Groundwater Supply Total	*8,484*	*8,426*	*8,352*	*8,340*	*8,342*	*8,336*
Surface Water Supply – All Categories						
Colorado River Run-of-River	930	930	930	930	930	930
Highland Lakes Lake/Reservoir System	44,543	44,543	44,543	44,543	44,543	44,543
Local Surface Water Supply	1,790	1,790	1,790	1,790	1,790	1,790
Surface Water Supply Total	*47,263*	*47,263*	*47,263*	*47,263*	*47,263*	*47,263*
Total Supply – All Categories	55,747	55,689	55,615	55,603	55,605	55,599
Total Demand – All Categories	*59,151*	*59,184*	*58,933*	*58,668*	*58,357*	*58,546*
Total Surplus/Need – All Categories	*-3,404*	*-3,495*	*-3,318*	*-3,065*	*-2,752*	*-2,947*

Fayette County GCD - Water Management Strategies

	2020	2030	2040	2050	2060	2070
Groundwater WMS – All Categories						
CARRIZO-WILCOX AQUIFER	-	0	0	0	0	0
GULF COAST AQUIFER SYSTEM	1	1	20	41	41	41
SPARTA AQUIFER	400	440	498	545	580	604
YEGUA-JACKSON AQUIFER	760	860	100	100	100	100
Surface Water WMS – All Categories						
BRAZOS RUN-OF- RIVER	-	-	1	2	5	8
Conservation WMS – All Categories						
DROUGHT MANAGEMENT	730	750	749	767	799	825
LCRA - ENHANCED MUNICIPAL AND INDUSTRIAL CONSERVATION	480	560	640	720	720	720
MUNICIPAL CONSERVATION	180	273	358	390	406	419
MUNICIPAL WATER CONSERVATION	0	0	0	0	0	0
Direct Reuse WMS – All Categories						
COLORADO INDIRECT REUSE	4,300	4,300	4,300	4,300	4,300	4,301
Total WMS – All Categories	6,852	7,184	6,667	6,866	6,952	7,019
Total Supply + WMS – All Categories	62,599	62,873	62,282	62,469	62,557	62,618

	2020	2030	2040	2050	2060	2070
Water Management Strategy						
County-Other	590	618	679	742	780	808
Irrigation	-	-	-	-	-	-
Livestock	-	-	-	-	-	-
Manufacturing	-	100	100	100	100	100
Mining	760	760	-	-	-	-
Municipal	722	846	948	1004	1052	1091
Steam Electric Power	4,780	4,860	4,940	5,020	5,020	5,020
Total WMS	*6,852*	*7,184*	*6,667*	*6,866*	*6,952*	*7,019*

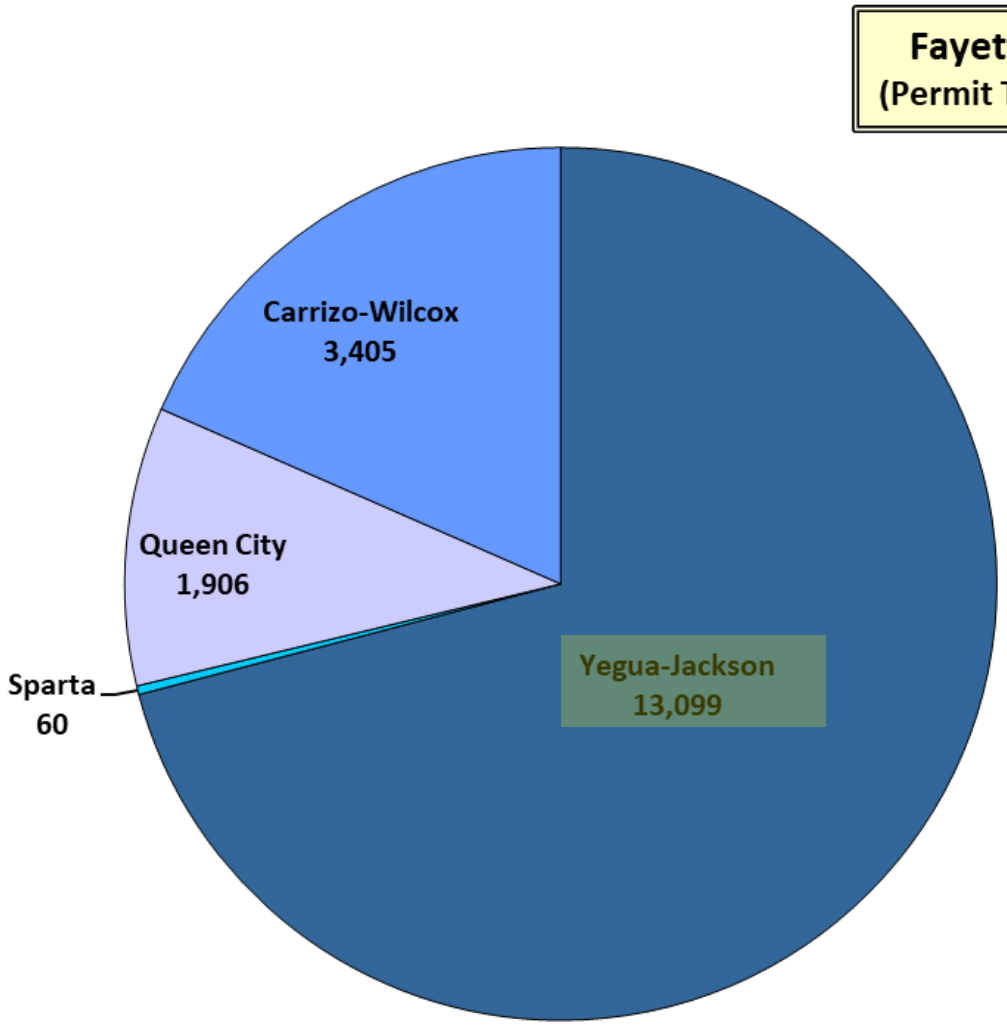
Fayette County GCD - Water Management Strategies

Sponsor Entity	Water Management Strategy	Type	Source County	Recipient County	2020	2030	2040	2050	2060	2070
AQUA WSC*	DOWNSTREAM RETURN FLOWS	Reuse	FAYETTE	Fayette	-	-	-	-	-	1
AQUA WSC*	DROUGHT MANAGEMENT	Conservation	FAYETTE	Fayette	1	1	2	2	2	3
AQUA WSC*	EXPANDED USE OF LOCAL GROUNDWATER	Groundwater	BASTROP	Fayette	-	0	0	0	0	0
AQUA WSC*	LCRA - IMPORT RETURN FLOWS FROM WILLIAMSON COUNTY	Surface Water	RIVER	Fayette	-	-	1	2	5	8
AQUA WSC*	MUNICIPAL CONSERVATION	Conservation	FAYETTE	Fayette	0	0	0	0	-	-
AQUA WSC*	MUNICIPAL WATER CONSERVATION	Conservation	FAYETTE	Fayette	0	0	0	0	0	0
COUNTY-OTHER, FAYETTE	DEVELOPMENT OF NEW GROUNDWATER SUPPLIES	Groundwater	FAYETTE	Fayette	400	400	400	400	400	400
COUNTY-OTHER, FAYETTE	DROUGHT MANAGEMENT	Conservation	FAYETTE	Fayette	189	177	161	156	159	163
COUNTY-OTHER, FAYETTE	EXPANDED USE OF LOCAL GROUNDWATER	Groundwater	FAYETTE	Fayette	1	1	20	41	41	41
COUNTY-OTHER, FAYETTE	EXPANDED USE OF LOCAL GROUNDWATER	Groundwater	FAYETTE	Fayette	-	40	98	145	180	204
FAYETTE WSC	DROUGHT MANAGEMENT	Conservation	FAYETTE	Fayette	144	149	151	155	161	166
FLATONIA	DROUGHT MANAGEMENT	Conservation	FAYETTE	Fayette	63	65	64	69	72	74
FLATONIA	MUNICIPAL CONSERVATION	Conservation	FAYETTE	Fayette	31	63	90	92	96	99
LA GRANGE	DROUGHT MANAGEMENT	Conservation	FAYETTE	Fayette	174	196	213	226	237	245
LA GRANGE	MUNICIPAL CONSERVATION	Conservation	FAYETTE	Fayette	86	82	69	63	64	66
LEE COUNTY WSC*	DROUGHT MANAGEMENT	Conservation	FAYETTE	Fayette	25	24	23	22	23	23
MANUFACTURING, FAYETTE	DEVELOPMENT OF NEW GROUNDWATER SUPPLIES	Groundwater	FAYETTE	Fayette	-	100	100	100	100	100

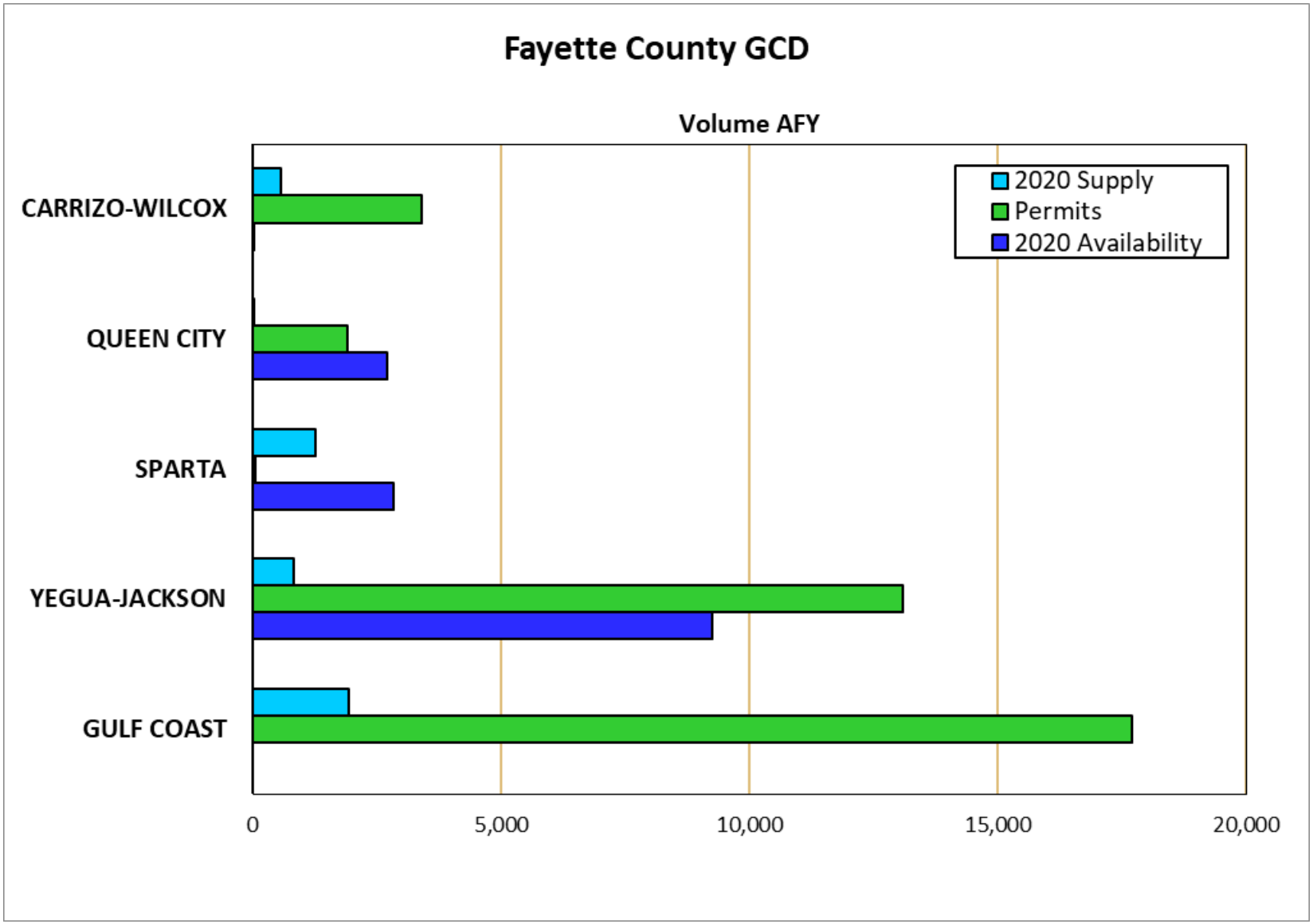
Fayette County GCD - Water Management Strategies

Sponsor Entity	Water Management Strategy	Type	Source County	Recipient County	2020	2030	2040	2050	2060	2070
MINING, FAYETTE	EXPANDED USE OF LOCAL GROUNDWATER	Groundwater	FAYETTE	Fayette	760	760	-	-	-	-
SCHULENBURG	DROUGHT MANAGEMENT	Conservation	FAYETTE	Fayette	128	131	128	130	136	141
SCHULENBURG	MUNICIPAL CONSERVATION	Conservation	FAYETTE	Fayette	63	128	199	235	246	254
STEAM ELECTRIC POWER, FAYETTE	AUSTIN RETURN FLOWS	Reuse	FAYETTE	Fayette	4,300	4,300	4,300	4,300	4,300	4,300
STEAM ELECTRIC POWER, FAYETTE	LCRA - ENHANCED MUNICIPAL AND INDUSTRIAL CONSERVATION	Conservation	FAYETTE	Fayette	480	560	640	720	720	720
WEST END WSC*	DROUGHT MANAGEMENT	Conservation	FAYETTE	Fayette	7	7	8	8	9	10
Total					6,852	7,184	6,667	6,866	6,952	7,019

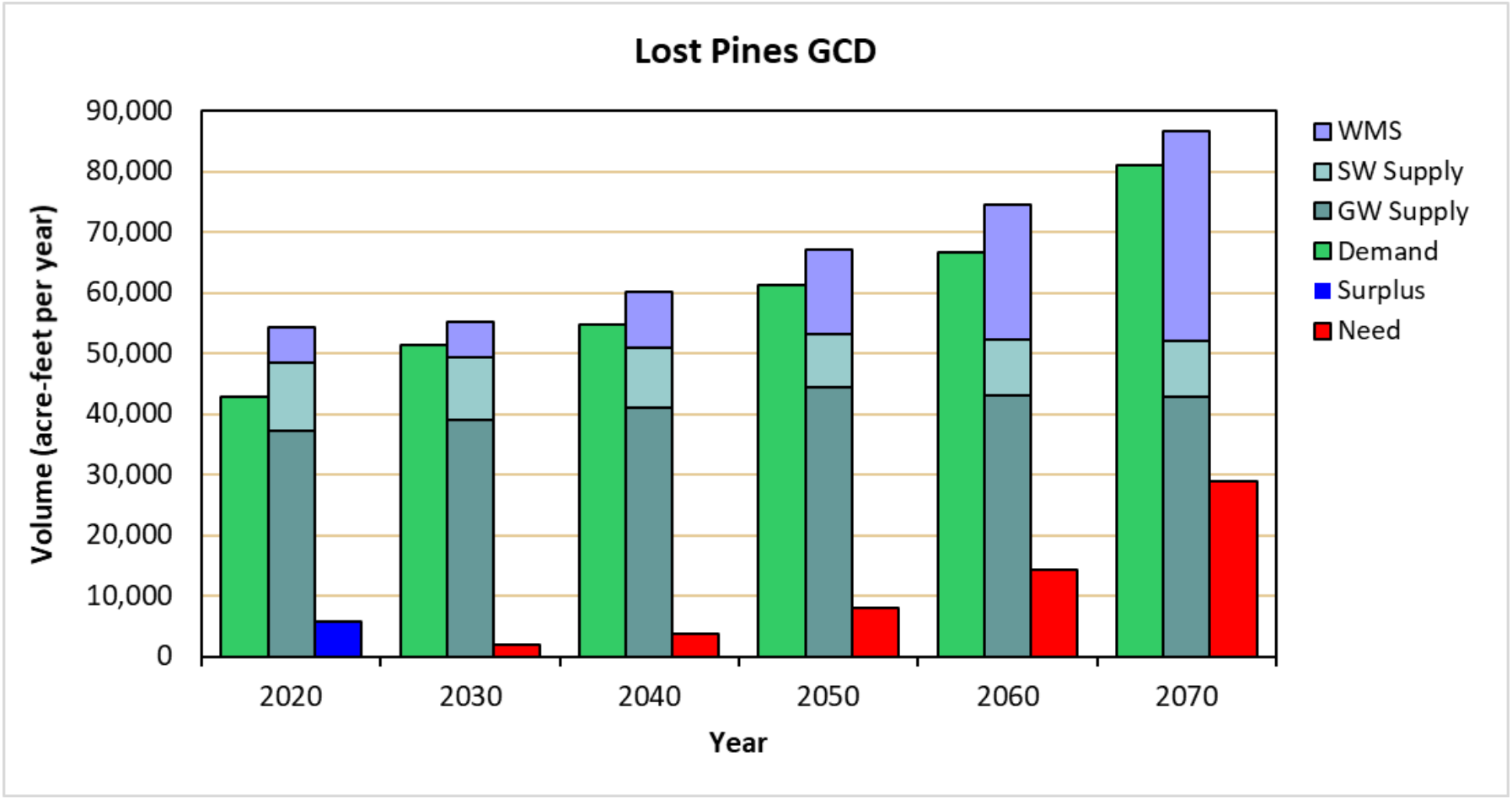
Fayette County GCD - Permits



Fayette County GCD - Supply/Permits/ Availability



Lost Pines GCD - Supply/Demand/Surplus-Needs



Lost Pines GCD - Supply/Demand/Surplus-Needs

	2020	2030	2040	2050	2060	2070
SUPPLY – Groundwater & Surface Water						
County	1,586	1,783	2,050	2,418	2,921	3,593
Irrigation	5,719	5,721	5,706	5,693	5,679	5,679
Livestock	2,393	2,393	2,393	2,393	2,393	2,393
Manufacturing	228	229	230	231	232	233
Mining	5,615	5,675	5,748	5,856	5,536	5,520
Municipal	22,635	23,332	24,591	26,346	25,205	24,409
Steam Electric Power	10,288	10,288	10,288	10,288	10,288	10,288
Total Supply	*48,464*	*49,421*	*51,006*	*53,225*	*52,254*	*52,115*
DEMAND						
County	1,551	1,758	2,033	2,407	2,915	3,592
Irrigation	5,448	5,448	5,448	5,448	5,448	5,448
Livestock	2,351	2,351	2,351	2,351	2,351	2,351
Manufacturing	195	223	223	223	223	223
Mining	6,064	9,993	7,498	5,998	399	476
Municipal	16,916	21,298	26,922	34,535	44,922	58,723
Steam Electric Power	10,288	10,288	10,288	10,288	10,288	10,288
Total Demand	*42,813*	*51,359*	*54,763*	*61,250*	*66,546*	*81,101*
SURPLUS/NEED						
County	35	25	17	11	6	1
Irrigation	271	273	258	245	231	231
Livestock	42	42	42	42	42	42
Manufacturing	33	6	7	8	9	10
Mining	-449	-4,318	-1,750	-142	5,137	5,044
Municipal	5,719	2,034	-2,331	-8,189	-19,717	-34,314
Steam Electric Power	-	-	-	-	-	-
Total Surplus/Need	*5,651*	*-1,938*	*-3,757*	*-8,025*	*-14,292*	*-28,986*

Lost Pines GCD - Supply/Demand/Surplus-Needs

Lost Pines GCD	2020	2030	2040	2050	2060	2070
Groundwater Supply – All Categories						
Carrizo-Wilcox Aquifer	29,737	31,606	33,706	37,069	35,790	35,540
Queen City Aquifer	1,233	1,235	1,220	1,207	1,194	1,195
Sparta Aquifer	794	794	794	795	796	797
Other Aquifer	5,340	5,340	5,340	5,340	5,340	5,340
Groundwater Supply Total	*37,104*	*38,975*	*41,060*	*44,411*	*43,120*	*42,872*
Surface Water Supply – All Categories						
Highland Lakes Lake/Reservoir System	9,273	8,360	7,860	6,726	7,046	7,155
Local Surface Water Supply	2,086	2,085	2,085	2,087	2,087	2,087
Brazos Run-of-River	1	1	1	1	1	1
Surface Water Supply Total	*11,360*	*10,446*	*9,946*	*8,814*	*9,134*	*9,243*
Total Supply – All Categories	48,464	49,421	51,006	53,225	52,254	52,115
Total Demand – All Categories	*42,813*	*51,359*	*54,763*	*61,250*	*66,546*	*81,101*
Total Surplus/Need – All Categories	*5,651*	*-1,938*	*-3,757*	*-8,025*	*-14,292*	*-28,986*

Lost Pines GCD - Water Management Strategies

	2020	2030	2040	2050	2060	2070
Groundwater WMS – All Categories						
CARRIZO-WILCOX AQUIFER	180	17	12	11	11	14
GULF COAST AQUIFER SYSTEM	1	1	20	41	41	41
SPARTA AQUIFER	400	440	498	545	580	604
YEGUA-JACKSON AQUIFER	760	860	100	100	100	100
Surface Water WMS – All Categories						
BRAZOS RUN-OF- RIVER	-	-	1	2	5	8
Conservation WMS – All Categories						
DROUGHT MANAGEMENT	730	750	749	767	799	825
LCRA - ENHANCED MUNICIPAL AND INDUSTRIAL CONSERVATION	480	560	640	720	720	720
MUNICIPAL CONSERVATION	180	401	587	651	668	683
INDUSTRIAL CONSERVATION	95	159	-	-	-	-
Direct Reuse WMS – All Categories						
COLORADO INDIRECT REUSE	4,300	4,300	4,300	4,300	4,300	4,301
Total WMS – All Categories	7,127	7,488	6,907	7,137	7,225	7,297
Total Supply + WMS – All Categories	55,591	56,909	57,913	60,362	59,479	59,412

	2020	2030	2040	2050	2060	2070
Water Management Strategy						
County-Other	1,330	386	487	557	661	806
Irrigation	-	-	-	-	-	-
Livestock	-	-	-	-	-	-
Manufacturing	-	-	-	-	-	-
Mining	277	412	308	233	-	-
Municipal	4,235	4,833	8,364	12,893	21,611	33,616
Steam Electric Power	55	64	73	82	82	82
Total WMS	*5,897*	*5,696*	*9,232*	*13,765*	*22,354*	*34,504*

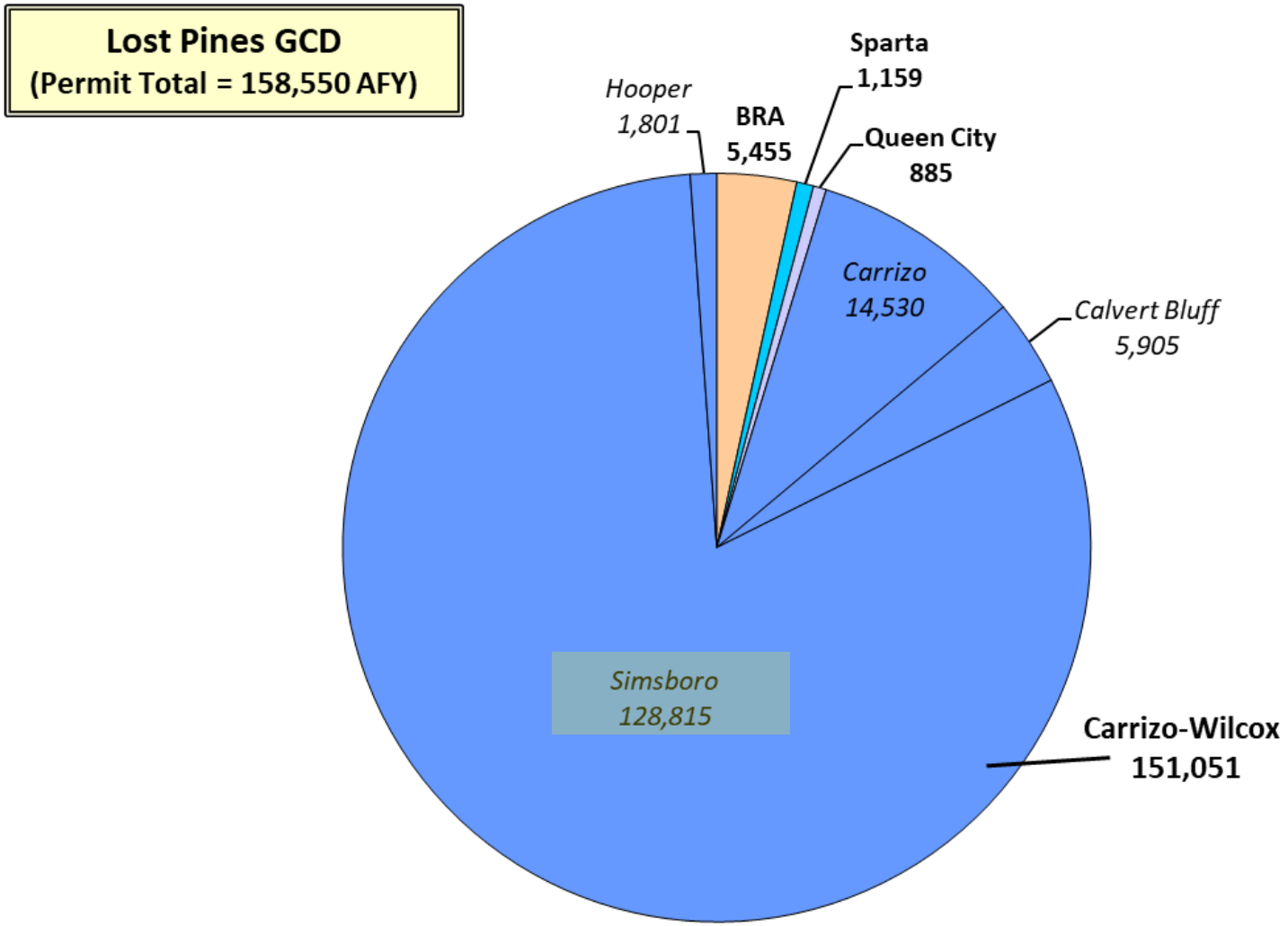
Lost Pines GCD – Water Management Strategies

Sponsor Entity	Water Management Strategy	Type	Source County	Recipient County	2020	2030	2040	2050	2060	2070
AQUA WSC*	MUNICIPAL WATER CONSERVATION	Conservation	LEE	Lee	-	11	4	-	-	-
AQUA WSC*	MUNICIPAL WATER CONSERVATION	Conservation	LEE	Lee	-	1	1	1	1	1
GIDDINGS	MUNICIPAL WATER CONSERVATION	Conservation	LEE	Lee	-	95	199	237	238	240
LEXINGTON	MUNICIPAL WATER CONSERVATION	Conservation	LEE	Lee	-	20	23	21	21	21
MINING, LEE	CARRIZO AQUIFER DEVELOPMENT	Groundwater	LEE	Lee	180	10	-	-	-	-
MINING, LEE	INDUSTRIAL WATER CONSERVATION	Conservation	LEE	Lee	95	159	-	-	-	-
SOUTHWEST MILAM WSC	CARRIZO AQUIFER DEVELOPMENT	Groundwater	LEE	Lee	-	7	12	10	11	14
SOUTHWEST MILAM WSC	MUNICIPAL WATER CONSERVATION	Conservation	LEE	Lee	-	1	2	2	2	2
AQUA WSC*	DOWNSTREAM RETURN FLOWS	Reuse	BASTROP	Bastrop	-	-	-	-	-	1,005
AQUA WSC*	DROUGHT MANAGEMENT	Conservation	BASTROP	Bastrop	1,758	2,252	2,959	3,789	4,854	6,236
AQUA WSC*	EXPANDED USE OF LOCAL GROUNDWATER	Groundwater	BASTROP	Bastrop	-	264	306	482	685	670
AQUA WSC*	LCRA - IMPORT RETURN FLOWS FROM WILLIAMSON COUNTY	Surface Water	RIVER	Bastrop	-	-	2,189	5,261	10,274	15,742
AQUA WSC*	MUNICIPAL CONSERVATION	Conservation	BASTROP	Bastrop	414	241	112	32	-	-
AQUA WSC*	MUNICIPAL WATER CONSERVATION	Conservation	BASTROP	Bastrop	7	11	18	26	39	53
BASTROP	DROUGHT MANAGEMENT	Conservation	BASTROP	Bastrop	66	372	471	631	849	1,143
BASTROP	LCRA - IMPORT RETURN FLOWS FROM WILLIAMSON COUNTY	Surface Water	RIVER	Bastrop	145	-	-	-	1,000	2,500
BASTROP	MUNICIPAL CONSERVATION	Conservation	BASTROP	Bastrop	1,109	184	355	433	558	744
BASTROP COUNTY WCID 2	DROUGHT MANAGEMENT	Conservation	BASTROP	Bastrop	66	24	35	49	68	94
BASTROP COUNTY WCID 2	LCRA - IMPORT RETURN FLOWS FROM WILLIAMSON COUNTY	Surface Water	RIVER	Bastrop	145	-	-	-	-	500
COUNTY-OTHER, BASTROP	DROUGHT MANAGEMENT	Conservation	BASTROP	Bastrop	66	258	283	332	398	489

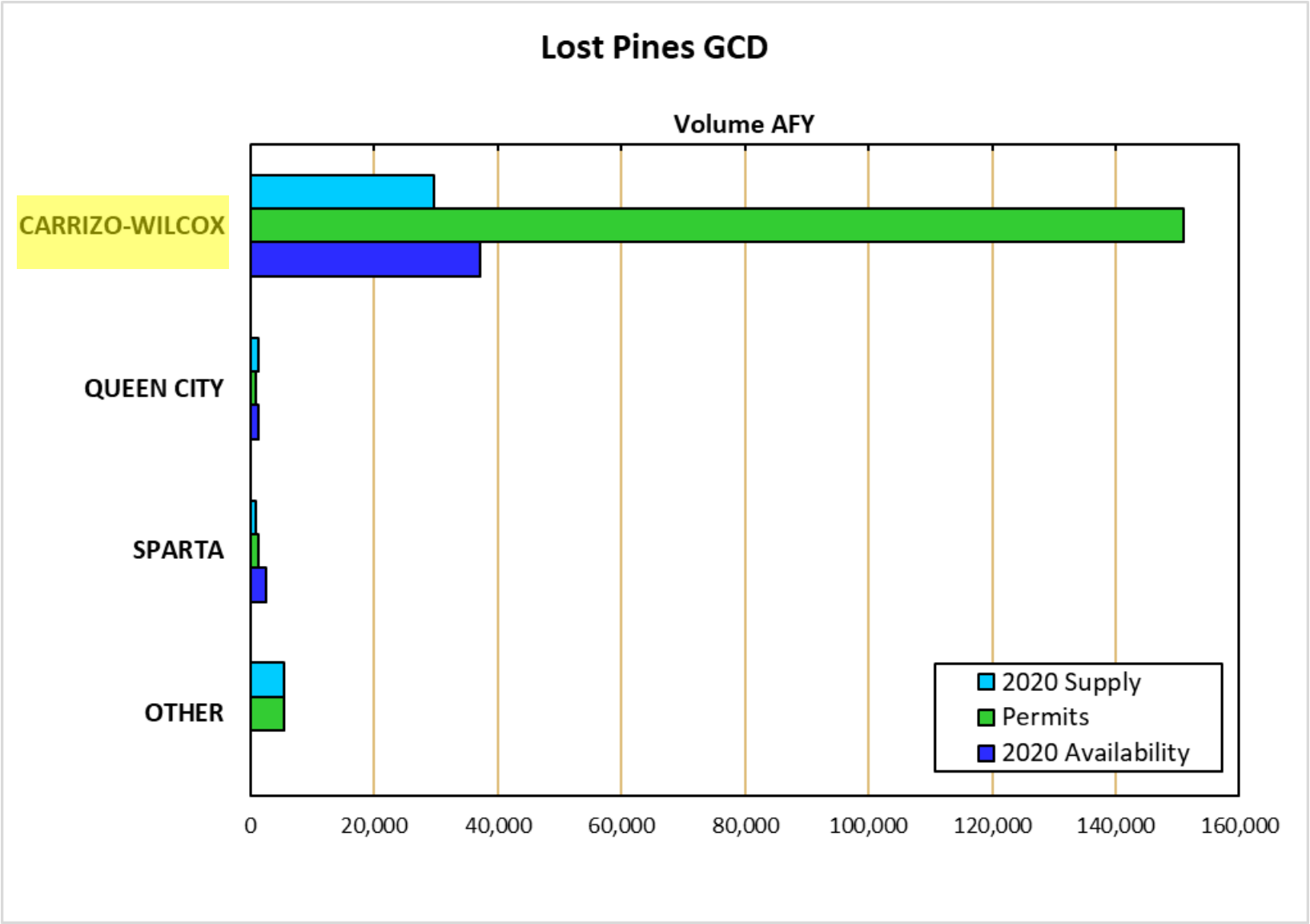
Lost Pines GCD – Water Management Strategies

Sponsor Entity	Water Management Strategy	Type	Source County	Recipient County	2020	2030	2040	2050	2060	2070
COUNTY-OTHER, BASTROP	MUNICIPAL CONSERVATION	Conservation	BASTROP	Bastrop	1,264	128	204	225	263	317
CREEDMOOR-MAHA WSC*	DROUGHT MANAGEMENT	Conservation	BASTROP	Bastrop	3	4	11	12	14	17
CREEDMOOR-MAHA WSC*	EDWARDS / MIDDLE TRINITY ASR	Groundwater	HAYS	Bastrop	-	31	88	93	100	107
CREEDMOOR-MAHA WSC*	MUNICIPAL CONSERVATION	Conservation	BASTROP	Bastrop	3	4	18	30	34	39
CREEDMOOR-MAHA WSC*	WATER PURCHASE AMENDMENT - CREEDMOOR-MAHA WSC	Groundwater	BASTROP	Bastrop	-	-	102	108	115	124
ELGIN	DEVELOPMENT OF NEW GROUNDWATER SUPPLIES	Groundwater	TRAVIS	Bastrop	-	-	-	-	768	772
ELGIN	DEVELOPMENT OF NEW GROUNDWATER SUPPLIES	Groundwater	TRAVIS	Bastrop	-	-	-	-	-	570
ELGIN	DROUGHT MANAGEMENT	Conservation	BASTROP	Bastrop	213	213	197	152	190	236
ELGIN	EXPANDED USE OF LOCAL GROUNDWATER	Groundwater	BASTROP	Bastrop	-	-	-	-	38	37
ELGIN	MUNICIPAL CONSERVATION	Conservation	BASTROP	Bastrop	66	119	224	390	480	594
LEE COUNTY WSC*	DROUGHT MANAGEMENT	Conservation	BASTROP	Bastrop	17	19	22	26	35	45
MINING, BASTROP	MINING CONSERVATION	Conservation	BASTROP	Bastrop	2	243	308	233	-	-
POLONIA WSC*	DROUGHT MANAGEMENT	Conservation	BASTROP	Bastrop	3	4	4	5	6	8
SMITHVILLE	DEVELOPMENT OF NEW GROUNDWATER SUPPLIES	Groundwater	FAYETTE	Bastrop	-	700	700	700	700	700
SMITHVILLE	DROUGHT MANAGEMENT	Conservation	BASTROP	Bastrop	150	198	259	343	456	606
SMITHVILLE	LCRA - IMPORT RETURN FLOWS FROM WILLIAMSON COUNTY	Surface Water	RIVER	Bastrop	-	-	-	-	-	700
SMITHVILLE	MUNICIPAL CONSERVATION	Conservation	BASTROP	Bastrop	69	59	54	59	75	97
STEAM ELECTRIC POWER, BASTROP	LCRA - ENHANCED MUNICIPAL AND INDUSTRIAL CONSERVATION	Conservation	BASTROP	Bastrop	55	64	73	82	82	82
Total					5,897	5,695	9,232	13,765	22,354	34,504

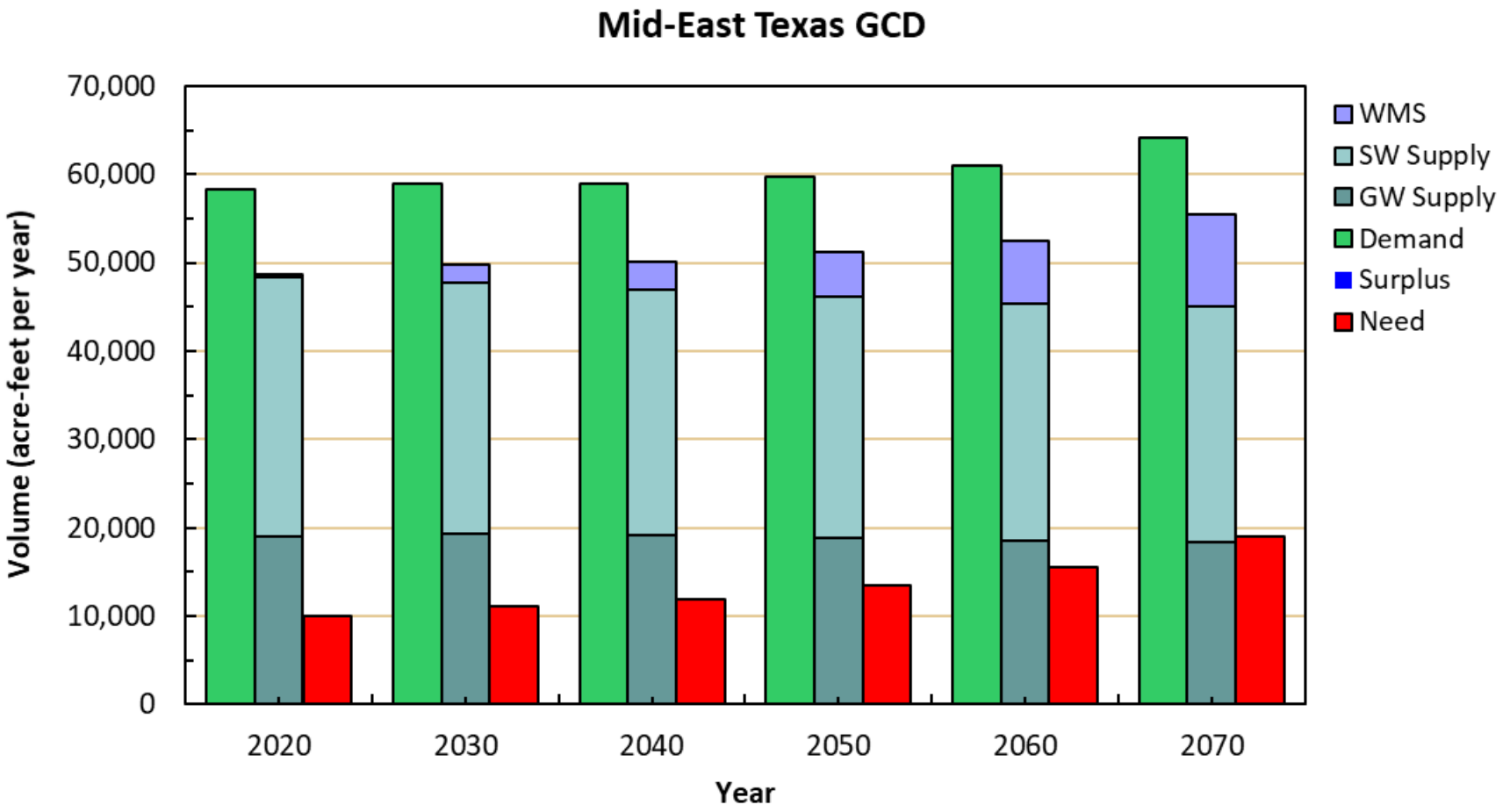
Lost Pines GCD - Permits



Lost Pines GCD - Supply/Permits/Availability



Mid-East Texas GCD - Supply/Demand/ Surplus-Needs



Mid-East Texas GCD - Supply/Demand/ Surplus-Needs

	2020	2030	2040	2050	2060	2070
SUPPLY – Groundwater & Surface Water						
County	2,497	2,533	2,560	2,634	2,746	2,923
Irrigation	1,483	1,483	1,483	1,483	1,483	1,483
Livestock	5,517	5,517	5,517	5,517	5,517	5,517
Manufacturing	923	945	945	945	945	945
Mining	4,011	4,011	3,686	3,080	2,320	1,840
Municipal	6,285	6,470	6,641	6,894	7,156	7,419
Steam Electric Power	27,662	26,867	26,197	25,683	25,307	24,980
Total Supply	*48,378*	*47,826*	*47,029*	*46,236*	*45,474*	*45,107*
DEMAND						
County	1,988	2,008	1,996	2,144	2,822	4,555
Irrigation	1,183	1,183	1,183	1,183	1,183	1,183
Livestock	5,517	5,517	5,517	5,517	5,517	5,517
Manufacturing	865	1,088	1,088	1,088	1,088	1,088
Mining	8,346	8,568	8,082	7,354	6,664	6,410
Municipal	5,992	6,195	6,631	8,049	9,240	10,984
Steam Electric Power	34,432	34,432	34,432	34,432	34,432	34,432
Total Demand	*58,323*	*58,991*	*58,929*	*59,767*	*60,946*	*64,169*
SURPLUS/NEED						
County	509	525	564	490	-76	-1,632
Irrigation	300	300	300	300	300	300
Livestock	-	-	-	-	-	-
Manufacturing	58	-143	-143	-143	-143	-143
Mining	-4,335	-4,557	-4,396	-4,274	-4,344	-4,570
Municipal	293	275	10	-1,155	-2,084	-3,565
Steam Electric Power	-6,770	-7,565	-8,235	-8,749	-9,125	-9,452
Total Surplus/Need	*-9,945*	*-11,165*	*-11,900*	*-13,531*	*-15,472*	*-19,062*

Mid-East Texas GCD - Supply/Demand/ Surplus-Needs

Mid-East Teas GCD	2020	2030	2040	2050	2060	2070
Groundwater Supply – All Categories						
Carrizo-Wilcox Aquifer	15,344	15,479	15,250	14,813	14,222	13,909
Queen City Aquifer	553	551	553	561	568	576
Sparta Aquifer	2,842	2,949	3,051	3,193	3,340	3,491
Yegua-Jackson Aquifer	329	333	336	340	345	350
Groundwater Supply Total	*19,068*	*19,312*	*19,190*	*18,907*	*18,475*	*18,326*
Surface Water Supply – All Categories						
Fairfield Lake/Reservoir	870	870	870	870	870	870
Livingston-Wallisville Lake/Reservoir System	20,000	20,000	20,000	20,000	20,000	20,000
Local Surface Water Supply	1,163	1,163	1,163	1,163	1,163	1,163
Navarro Mills Lake/Reservoir	35	34	30	33	72	162
Richland Chambers Lake/Reservoir	7	7	6	7	14	33
Trinity Run-of-River	455	455	455	455	455	455
TRWD Lake/Reservoir System	6,722	5,927	5,257	4,743	4,367	4,040
Surface Water Supply Total	*29,252*	*28,456*	*27,781*	*27,271*	*26,941*	*26,723*
Reuse Supply	58	58	58	58	58	58
Total Supply – All Categories	*48,378*	*47,826*	*47,029*	*46,236*	*45,474*	*45,107*
Total Demand – All Categories	*58,323*	*58,991*	*58,929*	*59,767*	*60,946*	*64,169*
Total Surplus/Need – All Categories	*-9,945*	*-11,165*	*-11,900*	*-13,531*	*-15,472*	*-19,062*

Mid-East Texas GCD - Water Management Strategies

	2020	2030	2040	2050	2060	2070
Groundwater WMS – All Categories						
CARRIZO-WILCOX AQUIFER	39	778	1,118	1,451	1,974	2,639
QUEEN CITY AQUIFER	-	-	76	78	105	144
TRINITY AQUIFER ASR	-	16	36	36	50	68
Surface Water WMS – All Categories						
MARVIN NICHOLS LAKE/RESERVOIR	-	-	-	1,226	1,662	2,278
TEHUACANA LAKE/RESERVOIR	-	-	152	155	210	286
TRWD LAKE/RESERVOIR SYSTEM	4	20	23	28	52	119
WRIGHT PATMAN LAKE/RESERVOIR	-	-	-	-	-	770
RICHLAND CHAMBERS LAKE/RESERVOIR NON- SYSTEM PORTION	-	-	-	3	17	72
Conservation WMS – All Categories						
MUNICIPAL CONSERVATION	162	265	292	337	377	441
WATER LOSS REDUCTION	42	123	205	289	372	456
CONSERVATION	19	34	51	109	173	279
CONSERVATION, IRRIGATION RESTRICTIONS	18	21	28	83	105	135
CONSERVATION, WATER LOSS CONTROL	32	72	74	97	117	137
Direct Reuse WMS – All Categories						
TRINITY INDIRECT REUSE	-	763	1,027	1,186	1,788	2,567
Total WMS – All Categories	316	2,092	3,082	5,078	7,002	10,391
Total Supply + WMS – All Categories	48,694	49,918	50,111	51,314	52,476	55,498

	2020	2030	2040	2050	2060	2070
Water Management Strategy						
County-Other	75	143	187	593	1,205	2,820
Irrigation	-	-	-	-	-	-
Livestock	-	-	-	-	-	-
Manufacturing	-	150	150	150	150	150
Mining	-	600	600	600	600	600
Municipal	237	400	676	1,752	2,688	4,135
Steam Electric Power	4	799	1,469	1,983	2,359	2,686
Total WMS	*316*	*2,092*	*3,082*	*5,078*	*7,002*	*10,391*

Mid-East Texas GCD - Water Management Strategies

Sponsor Entity	Water Management Strategy	Type	Source County	Recipient County	2020	2030	2040	2050	2060	2070
BUFFALO	MUNICIPAL CONSERVATION	Conservation	LEON	Leon	11	19	23	24	25	26
BUFFALO	WATER LOSS REDUCTION	Conservation	LEON	Leon	4	11	17	24	29	35
CENTERVILLE	MUNICIPAL CONSERVATION	Conservation	LEON	Leon	7	15	18	20	22	23
CONCORD-ROBBINS WSC	MUNICIPAL CONSERVATION	Conservation	LEON	Leon	13	17	3	-	-	-
COUNTY-OTHER, LEON	MUNICIPAL CONSERVATION	Conservation	LEON	Leon	10	15	15	17	17	18
COUNTY-OTHER, LEON	WATER LOSS REDUCTION	Conservation	LEON	Leon	3	8	12	15	16	17
FLO COMMUNITY WSC*	MUNICIPAL CONSERVATION	Conservation	LEON	Leon	10	17	21	26	32	41
FLO COMMUNITY WSC*	WATER LOSS REDUCTION	Conservation	LEON	Leon	5	17	31	47	64	84
HILLTOP LAKES WSC	MUNICIPAL CONSERVATION	Conservation	LEON	Leon	8	13	15	17	19	22
JEWETT	MUNICIPAL CONSERVATION	Conservation	LEON	Leon	8	14	17	21	24	28
MANUFACTURING, LEON	EXPANDED USE OF GROUNDWATER, LEON COUNTY	Groundwater	LEON	Leon	-	150	150	150	150	150
MINING, LEON	EXPANDED USE OF GROUNDWATER, LEON COUNTY	Groundwater	LEON	Leon	-	200	200	200	200	200
NORMANGEE	MUNICIPAL CONSERVATION	Conservation	LEON	Leon	2	4	5	5	6	6
SOUTHEAST WSC	MUNICIPAL CONSERVATION	Conservation	LEON	Leon	10	18	21	26	30	38
SOUTHEAST WSC	WATER LOSS REDUCTION	Conservation	LEON	Leon	3	9	15	21	28	35
COUNTY-OTHER, MADISON	MUNICIPAL CONSERVATION	Conservation	MADISON	Madison	43	69	79	94	107	132
COUNTY-OTHER, MADISON	WATER LOSS REDUCTION	Conservation	MADISON	Madison	16	46	77	109	141	173
MADISON COUNTY WSC	MUNICIPAL CONSERVATION	Conservation	MADISON	Madison	5	8	9	11	13	15
MADISON COUNTY WSC	WATER LOSS REDUCTION	Conservation	MADISON	Madison	1	1	1	1	2	2
MADISONVILLE	MUNICIPAL CONSERVATION	Conservation	MADISON	Madison	26	42	50	57	61	66

Mid-East Texas GCD - Water Management Strategies

Sponsor Entity	Water Management Strategy	Type	Source County	Recipient County	2020	2030	2040	2050	2060	2070
MADISONVILLE	WATER LOSS REDUCTION	Conservation	MADISON	Madison	9	27	44	62	80	98
MINING, MADISON	EXPANDED USE OF GROUNDWATER, MADISON COUNTY	Groundwater	MADISON	Madison	-	400	400	400	400	400
NORMANGEE	MUNICIPAL CONSERVATION	Conservation	MADISON	Madison	2	4	5	5	6	6
NORTH ZULCH MUD	MUNICIPAL CONSERVATION	Conservation	MADISON	Madison	7	11	12	14	16	20
NORTH ZULCH MUD	WATER LOSS REDUCTION	Conservation	MADISON	Madison	1	4	8	10	12	12
BUTLER WSC	CONSERVATION	Conservation	FREESTONE	Freestone	1	1	2	3	4	4
BUTLER WSC	CONSERVATION, WATER LOSS CONTROL	Conservation	FREESTONE	Freestone	1	1	-	-	-	-
COUNTY-OTHER, FREESTONE	CONSERVATION	Conservation	FREESTONE	Freestone	1	3	4	6	18	54
COUNTY-OTHER, FREESTONE	CONSERVATION, WATER LOSS CONTROL	Conservation	FREESTONE	Freestone	2	2	-	-	-	-
COUNTY-OTHER, FREESTONE	CORSICANA - HALBERT/RICHLAND CHAMBERS WTP	Surface Water	RESERVOIR	Freestone	-	-	-	3	17	72
COUNTY-OTHER, FREESTONE	INTEGRATED PIPELINE	Reuse	FREESTONE	Freestone	-	-	-	109	282	632
COUNTY-OTHER, FREESTONE	MARVIN NICHOLS (328) STRATEGY FOR NTMWD, TRWD, AND UTRWD	Surface Water	RESERVOIR	Freestone	-	-	-	149	362	822
COUNTY-OTHER, FREESTONE	TRWD - AQUIFER STORAGE AND RECOVERY PILOT	Groundwater	TARRANT	Freestone	-	-	-	4	11	25
COUNTY-OTHER, FREESTONE	TRWD - CARRIZO-WILCOX GROUNDWATER	Groundwater	FREESTONE	Freestone	-	-	-	2	6	13
COUNTY-OTHER, FREESTONE	TRWD - CARRIZO-WILCOX GROUNDWATER	Groundwater	ANDERSON	Freestone	-	-	-	17	41	92
COUNTY-OTHER, FREESTONE	TRWD - CARRIZO-WILCOX GROUNDWATER	Groundwater	ANDERSON	Freestone	-	-	-	10	22	52
COUNTY-OTHER, FREESTONE	TRWD - REUSE FROM TRA CENTRAL WWTP	Reuse	FREESTONE	Freestone	-	-	-	36	108	294

Mid-East Texas GCD - Water Management Strategies

Sponsor Entity	Water Management Strategy	Type	Source County	Recipient County	2020	2030	2040	2050	2060	2070
COUNTY-OTHER, FREESTONE	TRWD - TEHUACANA	Surface Water	RESERVOIR	Freestone	-	-	-	19	46	103
COUNTY-OTHER, FREESTONE	TRWD - UNALLOCATED SUPPLY UTILIZATION	Surface Water	RESERVOIR	Freestone	-	-	-	3	11	43
COUNTY-OTHER, FREESTONE	WRIGHT PATMAN REALLOCATION FOR NTMWD, TRWD, AND UTRWD	Surface Water	RESERVOIR	Freestone	-	-	-	-	-	278
FAIRFIELD	CONSERVATION	Conservation	FREESTONE	Freestone	3	6	10	49	79	119
FAIRFIELD	CONSERVATION, IRRIGATION RESTRICTIONS	Conservation	FREESTONE	Freestone	-	-	-	47	62	84
FAIRFIELD	CONSERVATION, WATER LOSS CONTROL	Conservation	FREESTONE	Freestone	5	5	-	-	-	-
FAIRFIELD	INTEGRATED PIPELINE	Reuse	FREESTONE	Freestone	-	-	-	165	263	399
FAIRFIELD	MARVIN NICHOLS (328) STRATEGY FOR NTMWD, TRWD, AND UTRWD	Surface Water	RESERVOIR	Freestone	-	-	-	229	339	518
FAIRFIELD	TRWD - AQUIFER STORAGE AND RECOVERY PILOT	Groundwater	TARRANT	Freestone	-	-	-	7	10	15
FAIRFIELD	TRWD - CARRIZO-WILCOX GROUNDWATER	Groundwater	FREESTONE	Freestone	-	-	-	4	5	8
FAIRFIELD	TRWD - CARRIZO-WILCOX GROUNDWATER	Groundwater	ANDERSON	Freestone	-	-	-	26	38	58
FAIRFIELD	TRWD - CARRIZO-WILCOX GROUNDWATER	Groundwater	ANDERSON	Freestone	-	-	-	14	22	33
FAIRFIELD	TRWD - REUSE FROM TRA CENTRAL WWTP	Reuse	FREESTONE	Freestone	-	-	-	55	101	185
FAIRFIELD	TRWD - TEHUACANA	Surface Water	RESERVOIR	Freestone	-	-	-	29	43	65
FAIRFIELD	TRWD - UNALLOCATED SUPPLY UTILIZATION	Surface Water	RESERVOIR	Freestone	-	-	-	5	11	27
FAIRFIELD	WRIGHT PATMAN REALLOCATION FOR NTMWD, TRWD, AND UTRWD	Surface Water	RESERVOIR	Freestone	-	-	-	-	-	175
FLO COMMUNITY WSC*	CONSERVATION	Conservation	FREESTONE	Freestone	-	-	1	1	1	1

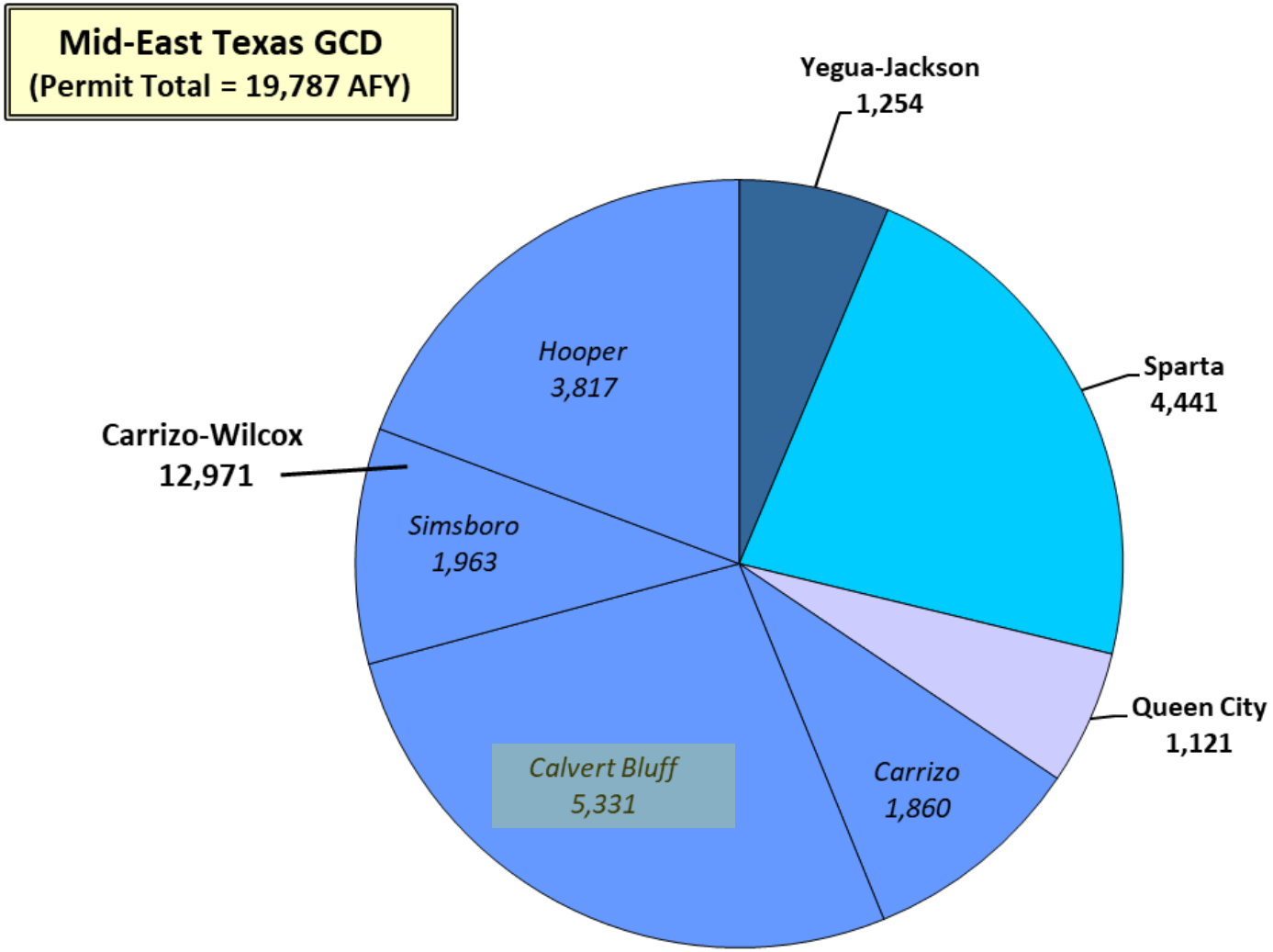
Mid-East Texas GCD - Water Management Strategies

Sponsor Entity	Water Management Strategy	Type	Source County	Recipient County	2020	2030	2040	2050	2060	2070
PLEASANT GROVE WSC	CONSERVATION	Conservation	FREESTONE	Freestone	-	1	1	2	4	7
PLEASANT GROVE WSC	CONSERVATION, WATER LOSS CONTROL	Conservation	FREESTONE	Freestone	1	1	-	-	-	-
PLEASANT GROVE WSC	PLEASANT GROVE WSC - NEW WELL(S) IN CARRIZO- WILCOX AQUIFER	Groundwater	FREESTONE	Freestone	-	-	-	-	-	24
POINT ENTERPRISE WSC*	CONSERVATION	Conservation	FREESTONE	Freestone	-	1	1	1	1	1
SOUTH FREESTONE COUNTY WSC	CONSERVATION	Conservation	FREESTONE	Freestone	1	2	3	5	8	16
SOUTH FREESTONE COUNTY WSC	CONSERVATION, WATER LOSS CONTROL	Conservation	FREESTONE	Freestone	1	1	-	-	-	-
SOUTH FREESTONE COUNTY WSC	SOUTH FREESTONE COUNTY WSC - NEW WELL (S) IN CARRIZO-WILCOX AQUIFER	Groundwater	FREESTONE	Freestone	16	11	23	110	255	571
STEAM ELECTRIC POWER, FREESTONE	INTEGRATED PIPELINE	Reuse	FREESTONE	Freestone	-	635	810	619	747	721
STEAM ELECTRIC POWER, FREESTONE	MARVIN NICHOLS (328) STRATEGY FOR NTMWD, TRWD, AND UTRWD	Surface Water	RESERVOIR	Freestone	-	-	-	848	961	938
STEAM ELECTRIC POWER, FREESTONE	TRWD - AQUIFER STORAGE AND RECOVERY PILOT	Groundwater	TARRANT	Freestone	-	16	36	25	29	28
STEAM ELECTRIC POWER, FREESTONE	TRWD - CARRIZO-WILCOX GROUNDWATER	Groundwater	FREESTONE	Freestone	-	-	19	13	15	15
STEAM ELECTRIC POWER, FREESTONE	TRWD - CARRIZO-WILCOX GROUNDWATER	Groundwater	ANDERSON	Freestone	-	-	136	95	108	105

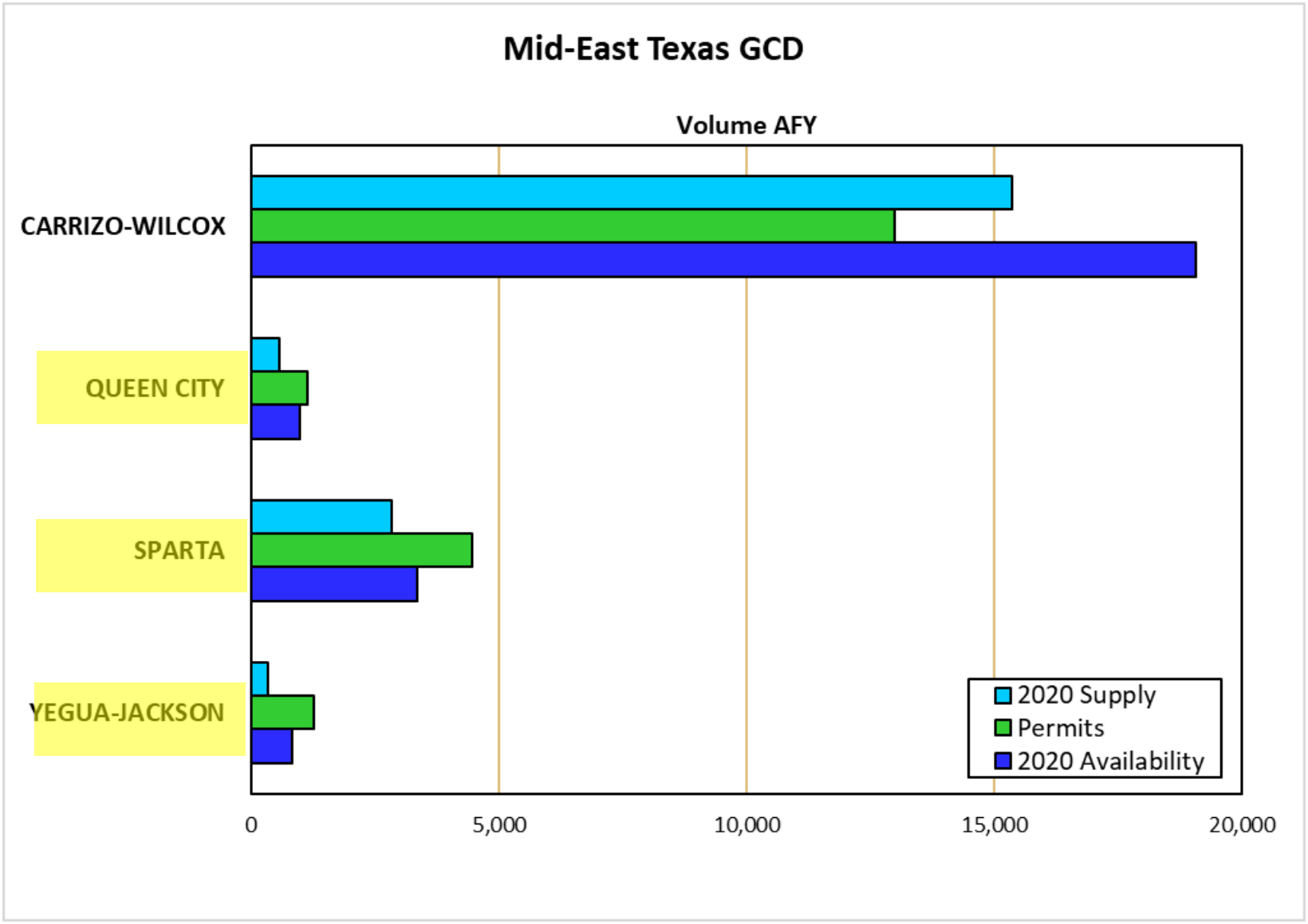
Mid-East Texas GCD - Water Management Strategies

Sponsor Entity	Water Management Strategy	Type	Source County	Recipient County	2020	2030	2040	2050	2060	2070
STEAM ELECTRIC POWER, FREESTONE	TRWD - CARRIZO-WILCOX GROUNDWATER	Groundwater	ANDERSON	Freestone	-	-	76	54	61	59
STEAM ELECTRIC POWER, FREESTONE	TRWD - REUSE FROM TRA CENTRAL WWTP	Reuse	FREESTONE	Freestone	-	128	217	202	287	336
STEAM ELECTRIC POWER, FREESTONE	TRWD - TEHUACANA	Surface Water	RESERVOIR	Freestone	-	-	152	107	121	118
STEAM ELECTRIC POWER, FREESTONE	TRWD - UNALLOCATED SUPPLY UTILIZATION	Surface Water	RESERVOIR	Freestone	4	20	23	20	30	49
STEAM ELECTRIC POWER, FREESTONE	WRIGHT PATMAN REALLOCATION FOR NTMWD, TRWD, AND UTRWD	Surface Water	RESERVOIR	Freestone	-	-	-	-	-	317
TEAGUE	CONSERVATION	Conservation	FREESTONE	Freestone	12	19	27	40	53	70
TEAGUE	CONSERVATION, IRRIGATION RESTRICTIONS	Conservation	FREESTONE	Freestone	18	21	28	36	43	51
TEAGUE	CONSERVATION, WATER LOSS CONTROL	Conservation	FREESTONE	Freestone	21	61	74	97	117	137
TEAGUE	TEAGUE - NEW WELL(S) IN CARRIZO-WILCOX AQUIFER	Groundwater	FREESTONE	Freestone	13	-	169	409	613	822
WORTHAM	CONSERVATION	Conservation	FREESTONE	Freestone	1	1	2	2	5	7
WORTHAM	CONSERVATION, WATER LOSS CONTROL	Conservation	FREESTONE	Freestone	1	1	-	-	-	-
WORTHAM	CARRIZO AQUIFER DEVELOPMENT	Groundwater	LIMESTONE	Freestone	10	17	21	25	143	181
Total					316	2,092	3,082	5,078	7,002	10,391

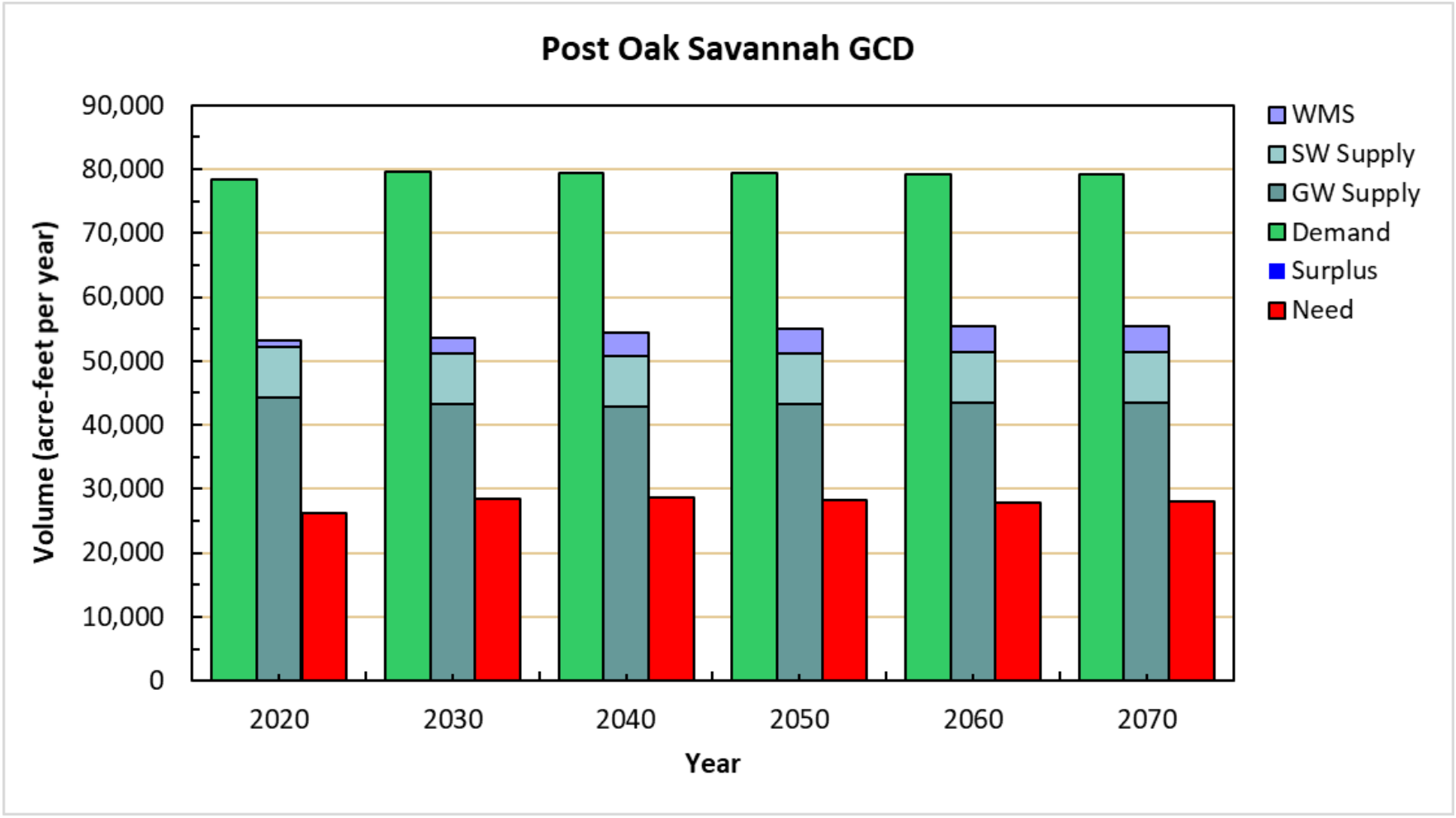
Mid-East Texas GCD - Permits



Mid-East Texas GCD - Supply/Permits/ Availability



Post Oak Savannah GCD - Supply/Demand Surplus



Post Oak Savannah GCD - Supply/Demand Surplus

	2020	2030	2040	2050	2060	2070
SUPPLY – Groundwater & Surface Water						
County	960	960	960	960	960	960
Irrigation	33,198	32,855	32,754	32,963	33,052	33,052
Livestock	4,151	4,151	4,151	4,151	4,151	4,151
Manufacturing	125	125	125	125	125	125
Mining	2,094	2,082	2,079	2,086	2,089	2,089
Municipal	11,668	11,082	10,670	10,891	10,964	10,917
Steam Electric Power	-	-	-	-	-	-
Total Supply	*52,196*	*51,255*	*50,739*	*51,176*	*51,341*	*51,294*
DEMAND						
County	762	818	844	905	934	954
Irrigation	33,306	33,306	33,306	33,306	33,306	33,306
Livestock	4,151	4,151	4,151	4,151	4,151	4,151
Manufacturing	129	130	130	130	130	130
Mining	1,009	1,937	1,526	1,114	700	442
Municipal	6,861	7,085	7,266	7,504	7,767	8,024
Steam Electric Power	32,254	32,254	32,254	32,254	32,254	32,254
Total Demand	*78,472*	*79,681*	*79,477*	*79,364*	*79,242*	*79,261*
SURPLUS/NEED						
County	198	142	116	55	26	6
Irrigation	-108	-451	-552	-343	-254	-254
Livestock	-	-	-	-	-	-
Manufacturing	-4	-5	-5	-5	-5	-5
Mining	1,085	145	553	972	1,389	1,647
Municipal	4,807	3,997	3,404	3,387	3,197	2,893
Steam Electric Power	-32,254	-32,254	-32,254	-32,254	-32,254	-32,254
Total Surplus/Need	*-26,276*	*-28,426*	*-28,738*	*-28,188*	*-27,901*	*-27,967*

Post Oak Savannah GCD - Supply/Demand Surplus

Post Oak Savannah GCD	2020	2030	2040	2050	2060	2070
Groundwater Supply – All Categories						
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
Groundwater Supply Total	*44,240*	*43,311*	*42,806*	*43,244*	*43,422*	*43,389*
Surface Water Supply – All Categories						
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
Surface Water Supply Total	*7,956*	*7,944*	*7,933*	*7,932*	*7,919*	*7,905*
Total Supply – All Categories	52,196	51,255	50,739	51,176	51,341	51,294
Total Demand – All Categories	*78,472*	*79,681*	*79,477*	*79,364*	*79,242*	*79,261*
Total Surplus/Need – All Categories	*-26,276*	*-28,426*	*-28,738*	*-28,188*	*-27,901*	*-27,967*

Post Oak Savannah GCD - Water Management Strategies

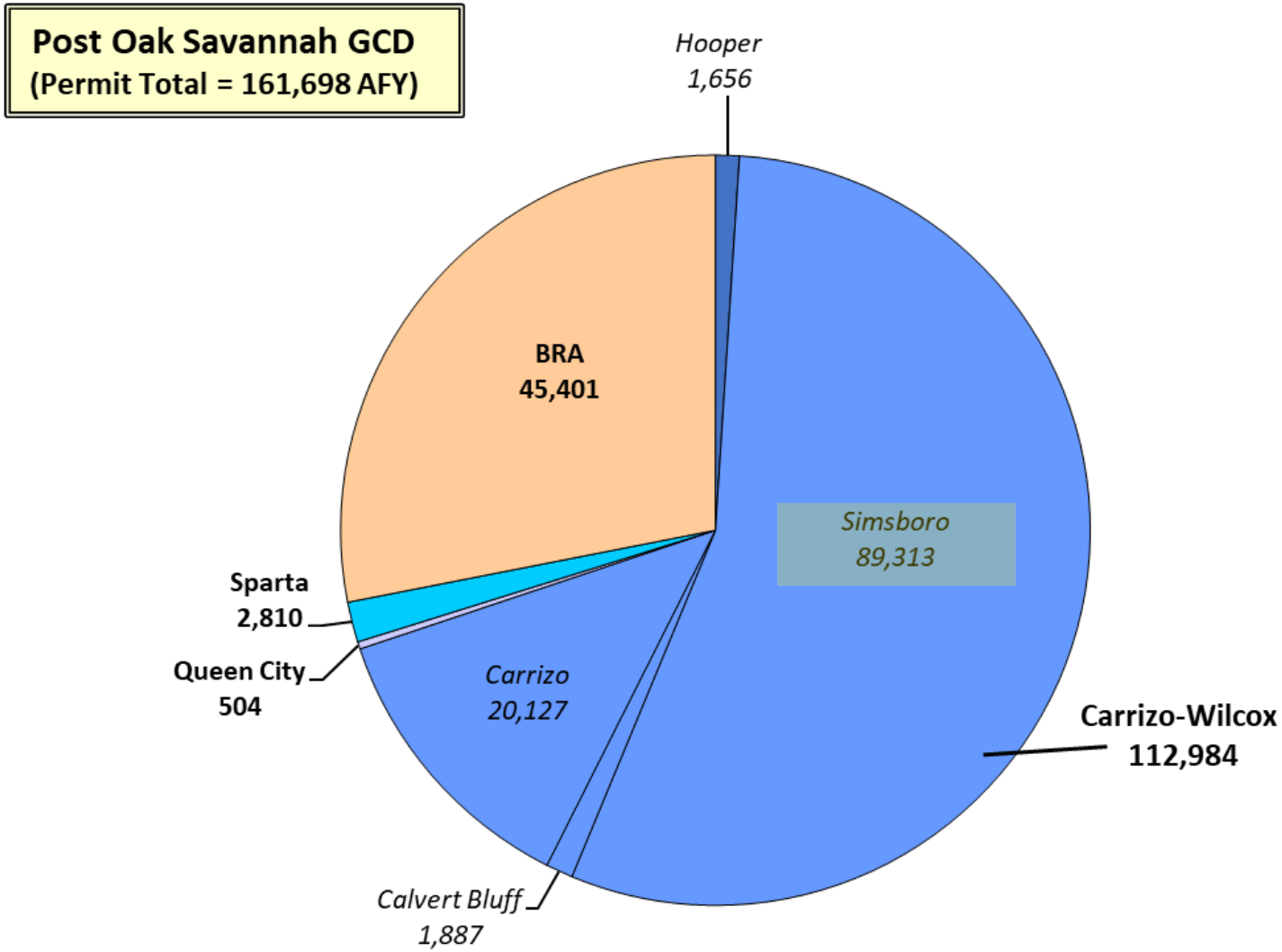
	2020	2030	2040	2050	2060	2070
Groundwater WMS – All Categories						
CARRIZO-WILCOX AQUIFER	79	350	694	598	618	737
SPARTA AQUIFER	25	25	25	25	25	25
Conservation WMS – All Categories						
INDUSTRIAL CONSERVATION	4	6	8	8	8	8
IRRIGATION CONSERVATION	999	1,665	2,331	2,331	2,331	2,331
MUNICIPAL CONSERVATION	-	361	698	941	1,092	1,152
Total WMS – All Categories	1,107	2,407	3,756	3,903	4,074	4,253
Total Supply + WMS – All Categories	53,303	53,662	54,495	55,079	55,415	55,547

	2020	2030	2040	2050	2060	2070
Water Management Strategy						
County-Other	-	-	-	-	-	-
Irrigation	999	1,665	2,331	2,331	2,331	2,331
Livestock	-	-	-	-	-	-
Manufacturing	29	31	33	33	33	33
Mining	-	-	-	-	-	-
Municipal	79	711	1,392	1,539	1,710	1,889
Steam Electric Power	-	-	-	-	-	-
Total WMS	*1,107*	*2,407*	*3,756*	*3,903*	*4,074*	*4,253*

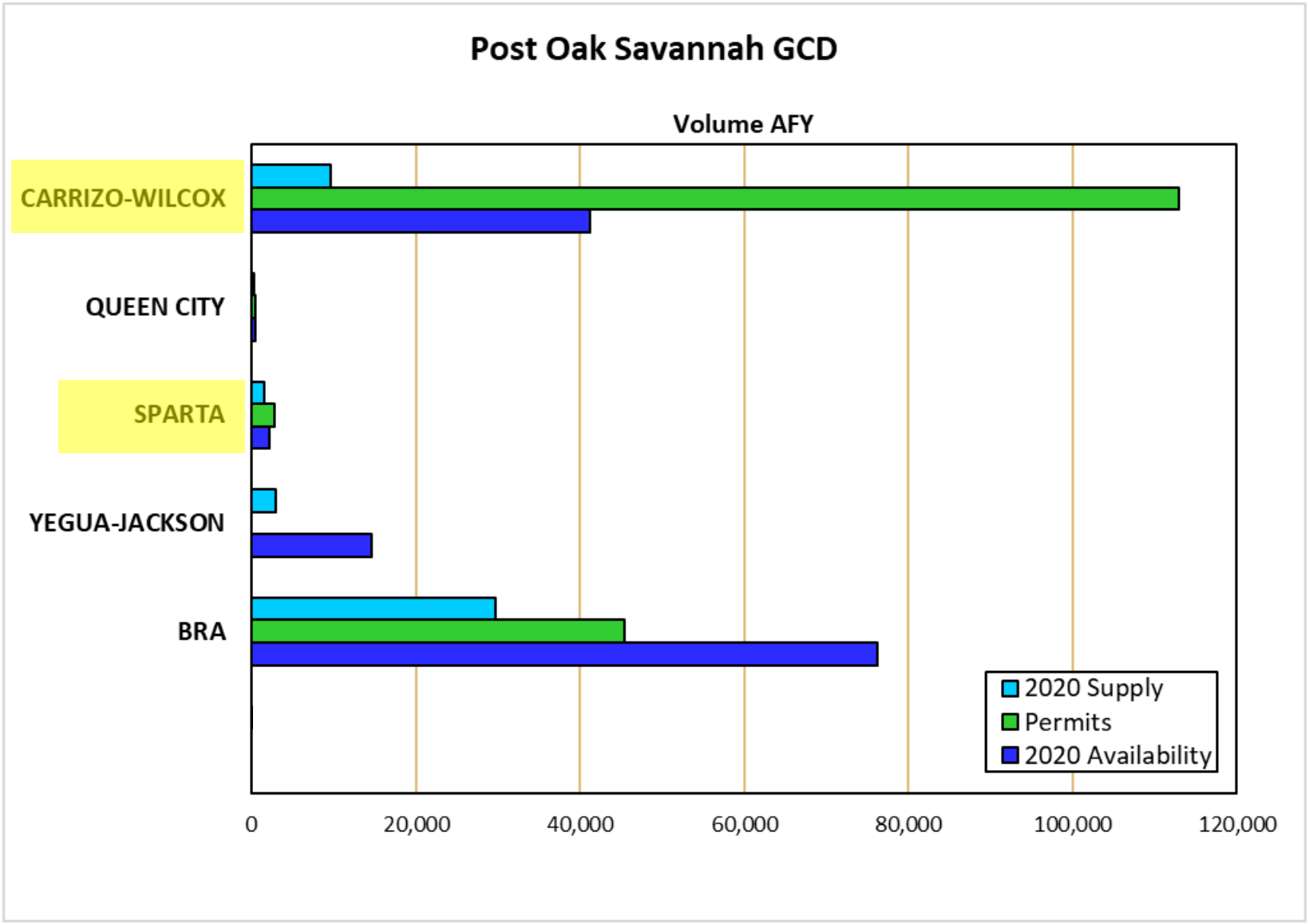
Post Oak Savannah GCD - Water Management Strategies

Sponsor Entity	Water Management Strategy	Type	Source County	Recipient County	2020	2030	2040	2050	2060	2070
CALDWELL	MUNICIPAL WATER CONSERVATION	Conservation	BURLESON	Burleson	-	83	167	239	242	246
IRRIGATION, BURLESON	IRRIGATION WATER CONSERVATION	Conservation	BURLESON	Burleson	804	1,340	1,876	1,876	1,876	1,876
MANUFACTURING, BURLESON	INDUSTRIAL WATER CONSERVATION	Conservation	BURLESON	Burleson	4	6	8	8	8	8
MANUFACTURING, BURLESON	SPARTA AQUIFER DEVELOPMENT	Groundwater	BURLESON	Burleson	25	25	25	25	25	25
SNOOK	MUNICIPAL WATER CONSERVATION	Conservation	BURLESON	Burleson	-	25	50	78	104	129
SOMERVILLE	MUNICIPAL WATER CONSERVATION	Conservation	BURLESON	Burleson	-	20	25	27	29	31
SOUTHWEST MILAM WSC	CARRIZO AQUIFER DEVELOPMENT	Groundwater	LEE	Burleson	-	17	29	27	29	38
SOUTHWEST MILAM WSC	MUNICIPAL WATER CONSERVATION	Conservation	BURLESON	Burleson	-	2	4	5	5	6
BELL MILAM FALLS WSC	MUNICIPAL WATER CONSERVATION	Conservation	MILAM	Milam	-	1	1	1	1	1
CAMERON	MUNICIPAL WATER CONSERVATION	Conservation	MILAM	Milam	-	107	218	339	449	465
IRRIGATION, MILAM	IRRIGATION WATER CONSERVATION	Conservation	MILAM	Milam	195	325	455	455	455	455
NORTH MILAM WSC	MUNICIPAL WATER CONSERVATION	Conservation	MILAM	Milam	-	18	19	18	18	18
ROCKDALE	CARRIZO AQUIFER DEVELOPMENT	Groundwater	LEE	Milam	79	200	433	360	360	400
ROCKDALE	MUNICIPAL WATER CONSERVATION	Conservation	MILAM	Milam	-	89	180	198	202	209
SOUTHWEST MILAM WSC	CARRIZO AQUIFER DEVELOPMENT	Groundwater	LEE	Milam	-	133	232	211	229	299
SOUTHWEST MILAM WSC	MUNICIPAL WATER CONSERVATION	Conservation	MILAM	Milam	-	16	34	37	42	47
Total					1,107	2,407	3,756	3,903	4,074	4,253

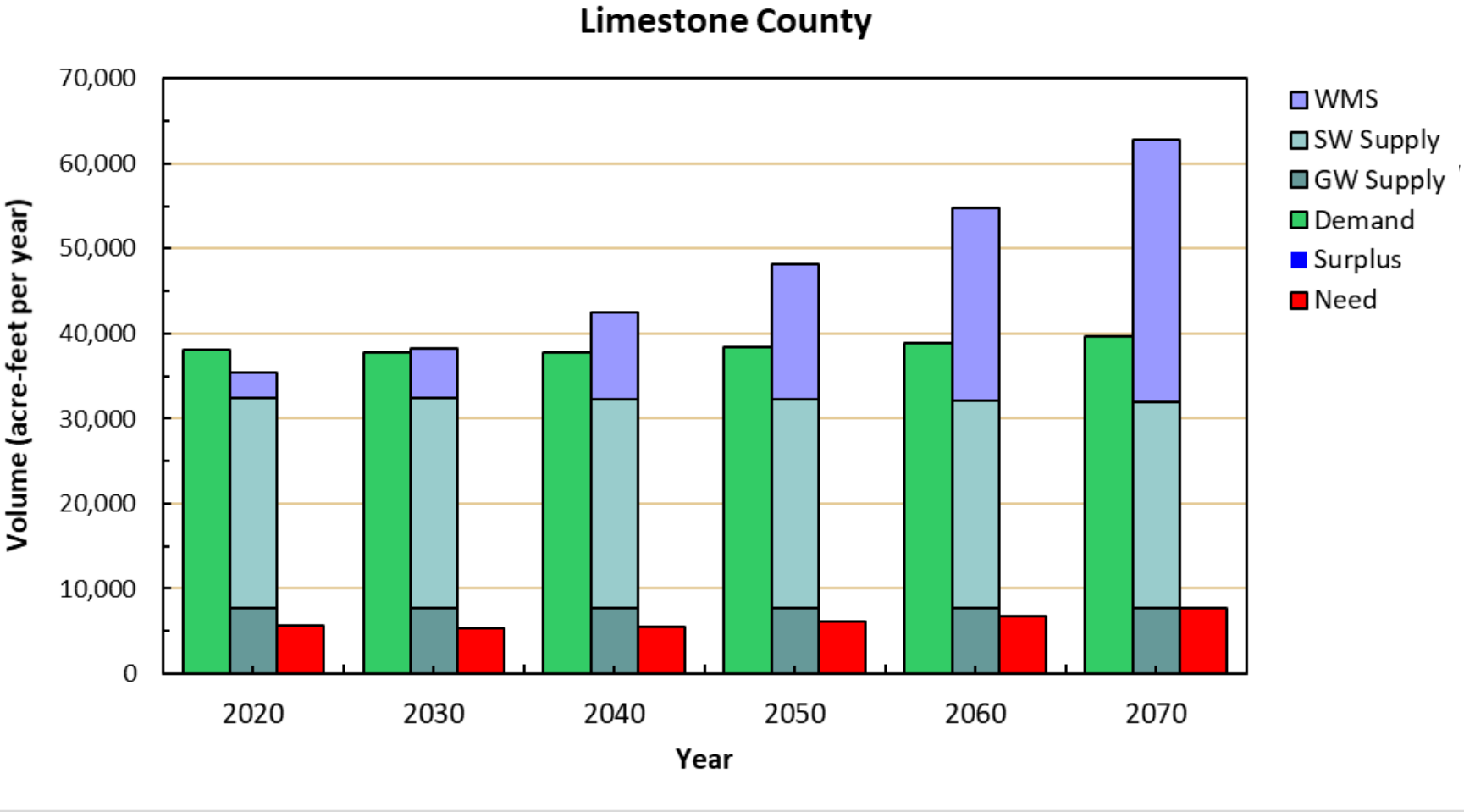
Post Oak Savannah GCD - Permits



Post Oak Savannah GCD - Supply/Permits/ Availability



Limestone County - Supply/Demand/ Surplus-Needs



Limestone County - Supply/Demand/ Surplus-Needs

	2020	2030	2040	2050	2060	2070
SUPPLY – Groundwater & Surface Water						
County	518	518	518	518	518	518
Irrigation	35	35	35	35	35	35
Livestock	1,670	1,670	1,670	1,670	1,670	1,670
Manufacturing	62	63	63	63	64	64
Mining	3,158	3,158	3,158	3,158	3,158	3,158
Municipal	4,478	4,394	4,324	4,220	4,113	3,993
Steam Electric Power	22,548	22,548	22,548	22,548	22,548	22,548
Total Supply	*32,469*	*32,386*	*32,316*	*32,212*	*32,106*	*31,986*
DEMAND						
County	311	287	275	273	266	282
Irrigation	7	7	7	7	7	7
Livestock	1,670	1,670	1,670	1,670	1,670	1,670
Manufacturing	321	377	377	377	377	377
Mining	10,317	9,925	9,865	10,339	10,805	11,425
Municipal	2,503	2,595	2,663	2,754	2,856	2,922
Steam Electric Power	22,936	22,936	22,936	22,936	22,936	22,936
Total Demand	*38,065*	*37,797*	*37,793*	*38,356*	*38,917*	*39,619*
SURPLUS/NEED						
County	207	231	243	245	252	236
Irrigation	28	28	28	28	28	28
Livestock	-	-	-	-	-	-
Manufacturing	-259	-314	-314)	-314	-313	-313
Mining	-7,159	-6,767	-6,707)	-7,181	-7,647	-8,267
Municipal	1,975	1,799	1,661	1,466	1,257	1,071
Steam Electric Power	-388	-388	-388)	-388	-388	-388
Total Surplus/Need	*-5,596*	*-5,411*	*-5,477)*	*-6,144*	*-6,811*	*-7,633*

Limestone County - Supply/Demand/ Surplus-Needs

Limestone County	2020	2030	2040	2050	2060	2070
Groundwater Supply – All Categories						
Carrizo-Wilcox Aquifer	7,004	7,008	7,012	7,016	7,016	7,015
Trinity Aquifer	666	663	666	663	665	664
Groundwater Supply Total	*7,670*	*7,671*	*7,678*	*7,679*	*7,681*	*7,679*
Surface Water Supply – All Categories						
Brazos River Authority Little River Lake/Reservoir System	21,837	21,837	21,837	21,837	21,837	21,837
Brazos Run-of-River	14	14	14	14	14	14
Local Surface Water Supply	1,670	1,670	1,670	1,670	1,670	1,670
Mexia Lake/Reservoir	1,100	1,000	900	800	700	600
Navasota River Run-of-River	172	188	210	206	198	180
Richland Chambers Lake/Reservoir	6	6	7	6	6	6
Surface Water Supply Total	*24,799*	*24,715*	*24,638*	*24,533*	*24,425*	*24,307*
Total Supply – All Categories	32,469	32,386	32,316	32,212	32,106	31,986
Total Demand – All Categories	*38,065*	*37,797*	*37,793*	*38,356*	*38,917*	*39,619*
Total Surplus/Need – All Categories	*-5,596*	*-5,411*	*-5,477*	*-6,144*	*-6,811*	*-7,633*

Limestone County - Water Management Strategies

	2020	2030	2040	2050	2060	2070
Groundwater WMS – All Categories						
CARRIZO-WILCOX AQUIFER	857	857	858	857	896	858
TRINITY AQUIFER ASR	1	1	1	1	1	1
Surface Water WMS – All Categories						
BRAZOS RUN-OF- RIVER	1	1	1	1	1	1
GROESBECK OFF- CHANNEL LAKE/RESERVOIR	1,755	1,755	1,755	1,755	1,755	1,755
LAKE CREEK LAKE/RESERVOIR	-	-	-	2,430	7,963	7,129
RICHLAND CHAMBERS LAKE/RESERVOIR NON- SYSTEM PORTION	-	-	1	20	39	59
Conservation WMS – All Categories						
CONSERVATION	-	-	-	-	1	1
INDUSTRIAL WATER CONSERVATION	320	515	717	750	782	826
MUNICIPAL WATER CONSERVATION	-	26	41	62	83	104
REDUCE DEMAND THROUGH ALTERNATIVE COOLING	-	-	-	-	1,213	10,121
Direct Reuse WMS – All Categories						
DIRECT NON-POTABLE REUSE	-	2,730	6,842	10,000	10,000	10,000
Total WMS – All Categories	2,934	5,886	10,215	15,877	22,735	30,856
Total Supply + WMS – All Categories	35,403	38,272	42,531	48,089	54,841	62,842

	2020	2030	2040	2050	2060	2070
Water Management Strategy						
County-Other	-	-	-	-	-	-
Irrigation	-	-	-	-	-	-
Livestock	-	-	-	-	-	-
Manufacturing	324	333	340	340	340	340
Mining	310	496	691	724	756	800
Municipal	1,912	1,939	1,954	1,995	2,075	2,078
Steam Electric Power	388	3,118	7,230	12,818	19,564	27,638
Total WMS	*2,934*	*5,886*	*10,215*	*15,877*	*22,735*	*30,856*

Limestone County - Water Management Strategies

Sponsor Entity	Water Management Strategy	Type	Source County	Recipient County	2020	2030	2040	2050	2060	2070
BISTONE MUNICIPAL WATER SUPPLY DISTRICT	MUNICIPAL WATER CONSERVATION	Conservation	LIMESTONE	Limestone	-	20	40	62	83	104
COOLIDGE	MUNICIPAL WATER CONSERVATION	Conservation	LIMESTONE	Limestone	-	4	-	-	-	-
GROESBECK	GROESBECK OCR	Surface Water	RESERVOIR	Limestone	1,755	1,755	1,755	1,755	1,755	1,755
MANUFACTURING, LIMESTONE	CARRIZO AQUIFER DEVELOPMENT	Groundwater	LIMESTONE	Limestone	314	314	314	314	314	314
MANUFACTURING, LIMESTONE	INDUSTRIAL WATER CONSERVATION	Conservation	LIMESTONE	Limestone	10	19	26	26	26	26
MART	PURCHASE WATER FROM CITY OF WACO	Surface Water	RIVER	Limestone	1	1	1	1	1	1
MART	TRINITY - MCLENNAN COUNTY ASR	Groundwater	MCLENNAN	Limestone	1	1	1	1	1	1
MEXIA	CARRIZO AQUIFER DEVELOPMENT	Groundwater	LIMESTONE	Limestone	-	-	-	-	39	1
MINING, LIMESTONE	INDUSTRIAL WATER CONSERVATION	Conservation	LIMESTONE	Limestone	310	496	691	724	756	800
POINT ENTERPRISE WSC*	CONSERVATION	Conservation	LIMESTONE	Limestone	-	-	-	-	1	1
POST OAK SUD*	CORSICANA - HALBERT/RICHLAND CHAMBERS WTP	Surface Water	RESERVOIR	Limestone	-	-	1	20	39	59
PRAIRIE HILL WSC	MUNICIPAL WATER CONSERVATION	Conservation	LIMESTONE	Limestone	-	2	1	-	-	-
PRAIRIE HILL WSC	WTP UPGRADE FOR ARSENIC REMOVAL (FALLS AND LIMESTONE COUNTY)	Groundwater	LIMESTONE	Limestone	155	155	156	155	155	155
STEAM ELECTRIC POWER, LIMESTONE	CARRIZO AQUIFER DEVELOPMENT	Groundwater	LIMESTONE	Limestone	388	388	388	388	388	388
STEAM ELECTRIC POWER, LIMESTONE	MCLENNAN CO. SE REDUCTION TO LIMESTONE CO. SE	Reuse	LIMESTONE	Limestone	-	2,730	6,842	10,000	10,000	10,000

Limestone County - Water Management Strategies

Sponsor Entity	Water Management Strategy	Type	Source County	Recipient County	2020	2030	2040	2050	2060	2070
STEAM ELECTRIC POWER, LIMESTONE	MCLENNAN CO. SE REDUCTION TO LIMESTONE CO. SE	Surface Water	RESERVOIR	Limestone	-	-	-	2,430	7,963	7,129
STEAM ELECTRIC POWER, LIMESTONE	REDUCE DEMAND THROUGH ALTERNATIVE COOLING	Conservation	LIMESTONE	Limestone	-	-	-	-	1,213	10,121
Total					2,934	5,886	10,215	15,877	22,735	30,856

Management Strategy Types - All

Water Management Strategy	Brazos Valley GCD	Fayette GCD	Lost Pines GCD	Middle East GCD	Post Oak Savannah GCD	Limestone
CONSERVATION				x		x
CONSERVATION, IRRIGATION RESTRICTIONS				x		
CONSERVATION, WATER LOSS CONTROL				x		
DROUGHT MANAGEMENT		x	x			
INDUSTRIAL CONSERVATION			x		x	x
IRRIGATION CONSERVATION	x				x	
LCRA - ENHANCED MUNICIPAL AND INDUSTRIAL CONSERVATION		x	x			
MUNICIPAL CONSERVATION	x	x	x	x	x	x
REDUCE DEMAND THROUGH ALTERNATIVE COOLING						x
WATER LOSS REDUCTION				x		
CARRIZO-WILCOX AQUIFER	x	x	x	x	x	x
GULF COAST AQUIFER SYSTEM		x	x			
QUEEN CITY AQUIFER				x		
SIMSBORO - BRAZOS COUNTY ASR	x					
SPARTA AQUIFER		x	x		x	
TRINITY AQUIFER ASR				x		x
YEGUA-JACKSON AQUIFER		x	x			
COLORADO INDIRECT REUSE		x	x			
DIRECT NON-POTABLE REUSE	x					x
PURCHASE FROM WALNUT CREEK MINE-REUSE	x					
TRINITY INDIRECT REUSE				x		
BRAZOS RUN-OF- RIVER		x	x			x
GROESBECK OFF- CHANNEL LAKE/RESERVOIR						x
LAKE CREEK LAKE/RESERVOIR						x
MARVIN NICHOLS LAKE/RESERVOIR				x		
RICHLAND CHAMBERS LAKE/RESERVOIR NON- SYSTEM PORTION				x		x
TEHUACANA LAKE/RESERVOIR				x		
TRWD LAKE/RESERVOIR SYSTEM				x		
WRIGHT PATMAN LAKE/RESERVOIR				x		


Questions?

APPENDIX N

JANUARY 29, 2020 PRESENTATION "HYDROLOGICAL CONDITIONS CONSIDERATION DISCUSSION"

GMA 12

Hydrological Conditions Consideration Discussion

by

GMA 12 Consultant Team

Daniel B. Stephens & Associates

Intera

W. John Seifert

January 29, 2020

TWC Section 36.108 (d)

- Before voting on the proposed desired future conditions … the districts shall consider:
  - Aquifer uses and conditions
  - Needs and strategies
  - **Hydrologic conditions**
  - Environmental impacts
  - Subsidence
  - Socioeconomic impacts
  - Private property rights
  - Feasibility
  - Anything else

TWC Section 36.108 (d-2)

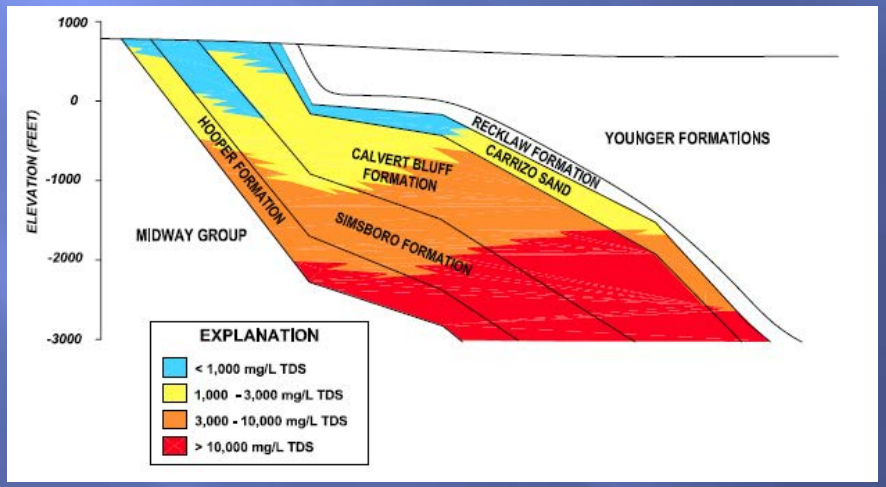
- The desired future conditions … must provide a balance between the highest practicable level of groundwater production and the conservation, preservation, protection, recharging, and prevention of waste of groundwater … in the management area.

Consideration 3

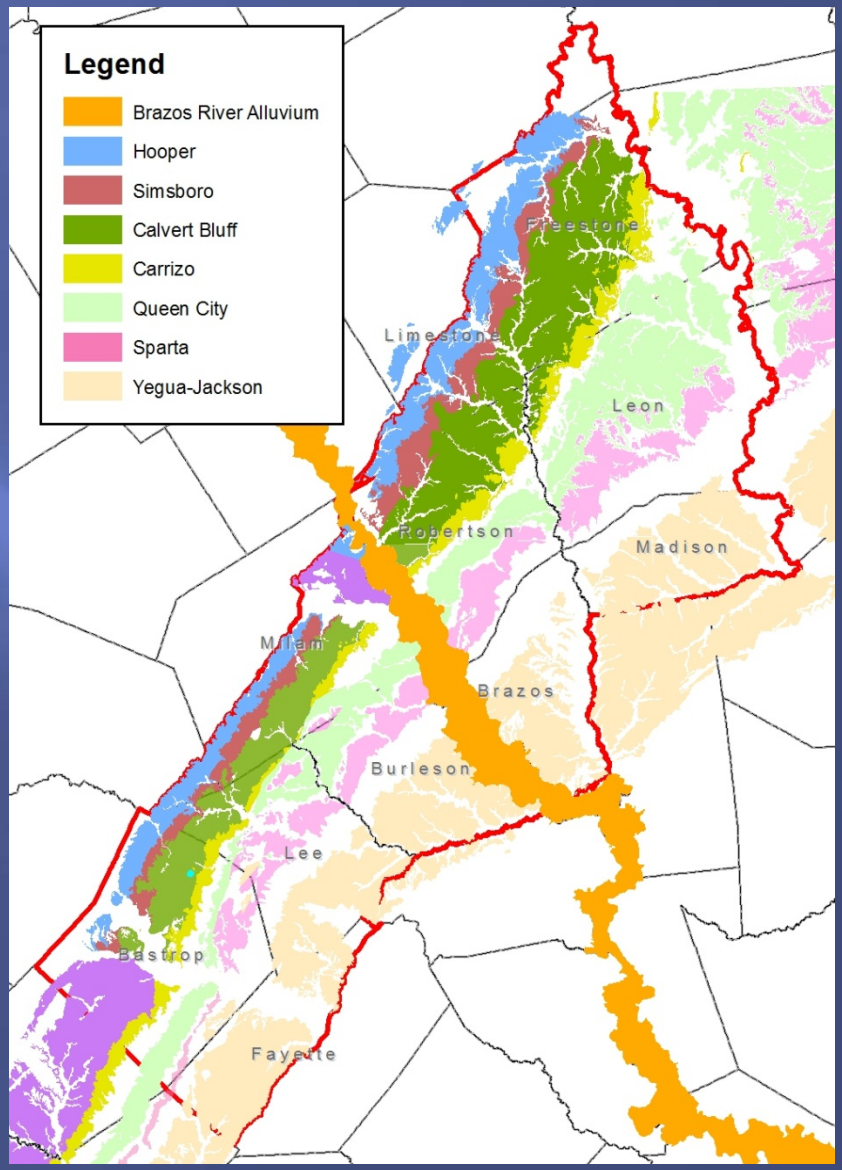
- Describe the hydrological conditions, including for each aquifer in the management area the total estimated recoverable storage (TERS) as provided by the executive administrator, and the average annual recharge, inflows, and discharge

Hydrological Conditions

- Aquifer outcrops extend from NE to SW
- Dip towards the coast



from LBG-Guyton (2003)

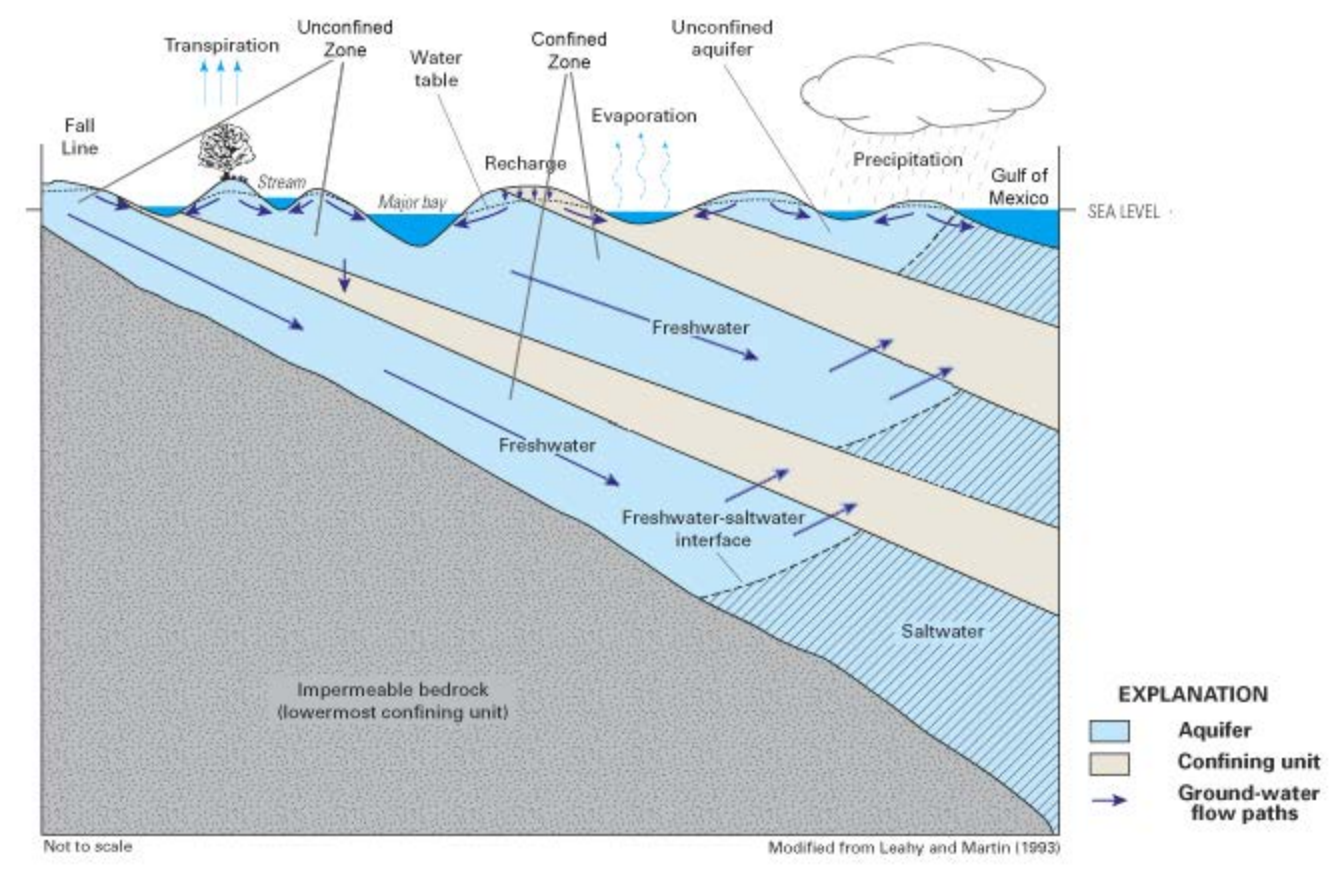


Hydrological Conditions

- Unconfined in outcrop, confined downdip
- Most pumpage and large projects are in the confined section
- Water quality transitions downdip with increase in total dissolved solids content of water
- Faults!

Hydrological Conditions

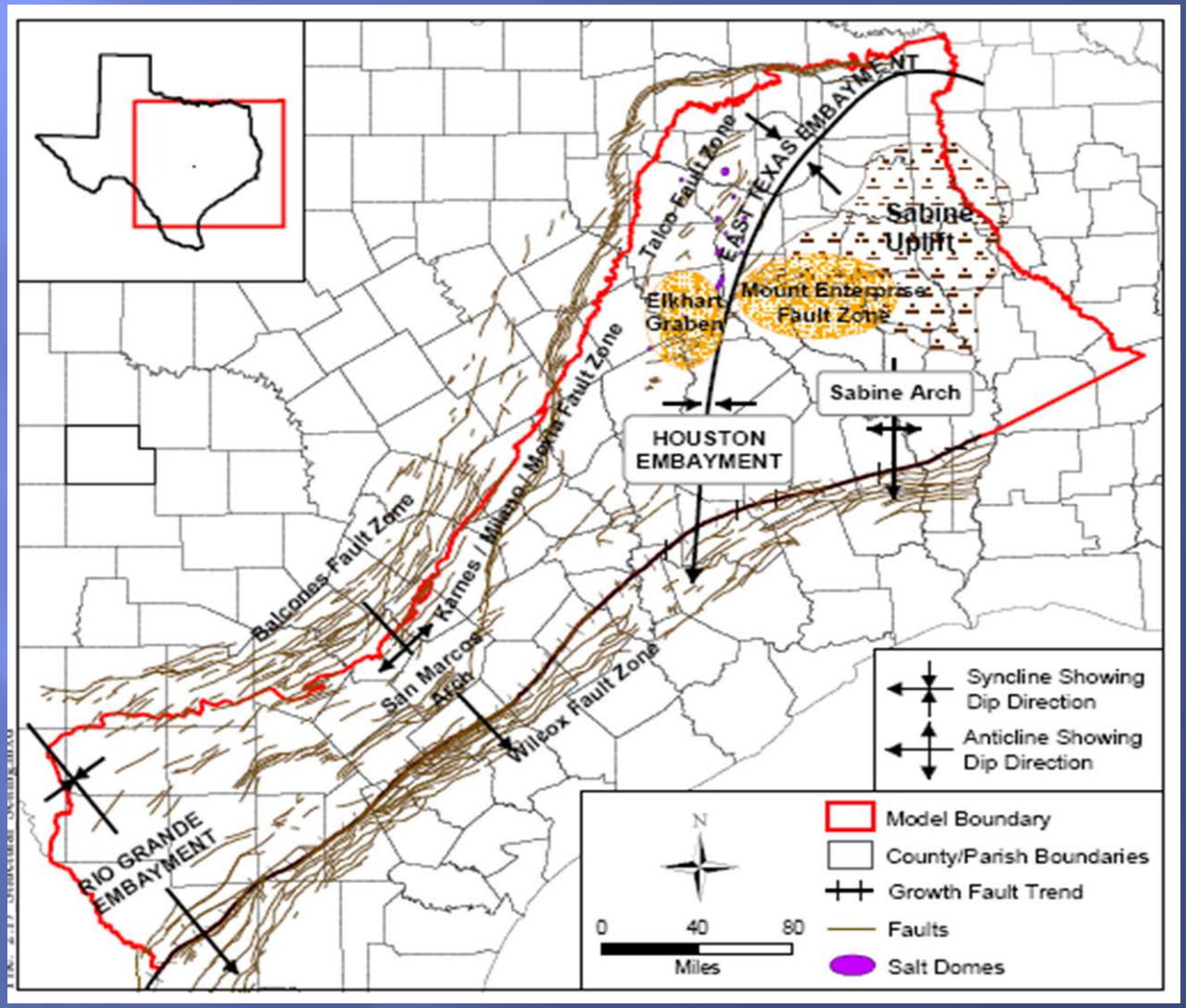
- Unconfined in outcrop, confined downdip



Faults

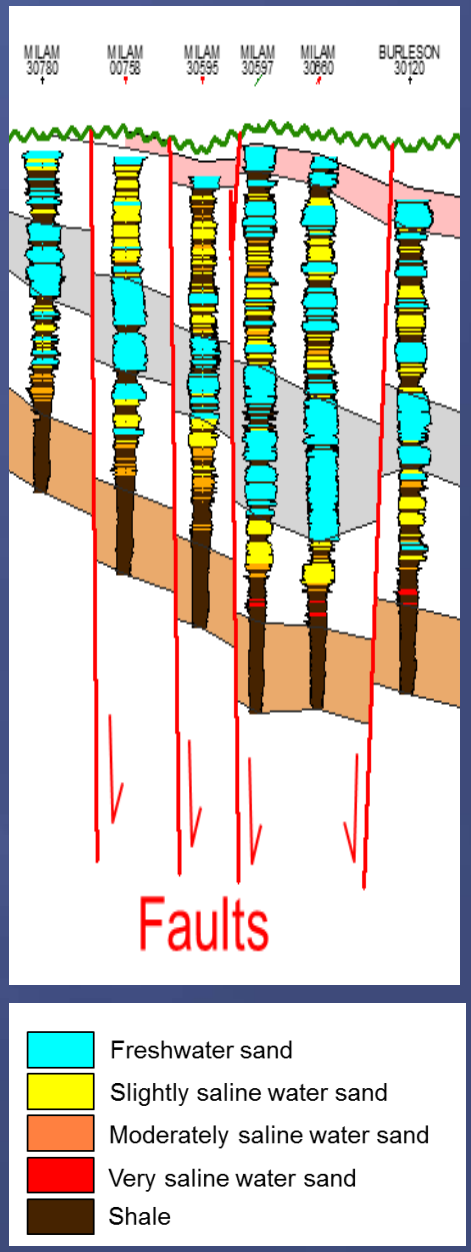
- Impact of faulting on groundwater flow in part of GMA 12 is an important consideration
- Impacts of faults on the flow system were revised in the recently updated GAM
- Impacts of faults on groundwater flow substantially less with updated model compared to previous model

Major Fault Zones



Impact of Faults on Groundwater Flow

- Mexia-Talco Fault Zone created after sediments for Sparta, Queen City, and Carrizo-Wilcox Aquifers had been deposited
- Sediment thicknesses should be comparable on both sides of a fault
- Updated model and empirical data show that the effects of faults on groundwater flow not as significant as previously estimated



Yegua-Jackson Conditions

- Water is produced from the Yegua Formation and the Jackson Group and generally treat these together as one aquifer unit
- Groundwater primarily produced from shallow wells, most <1000 feet deep
- Variable water quality due to composition of sediments in the formations
- Fairly consistent aquifer conditions across the extent of the aquifer within GMA 12
- Not a highly productive aquifer anywhere within GMA 12

Jackson Hydraulic Conductivity

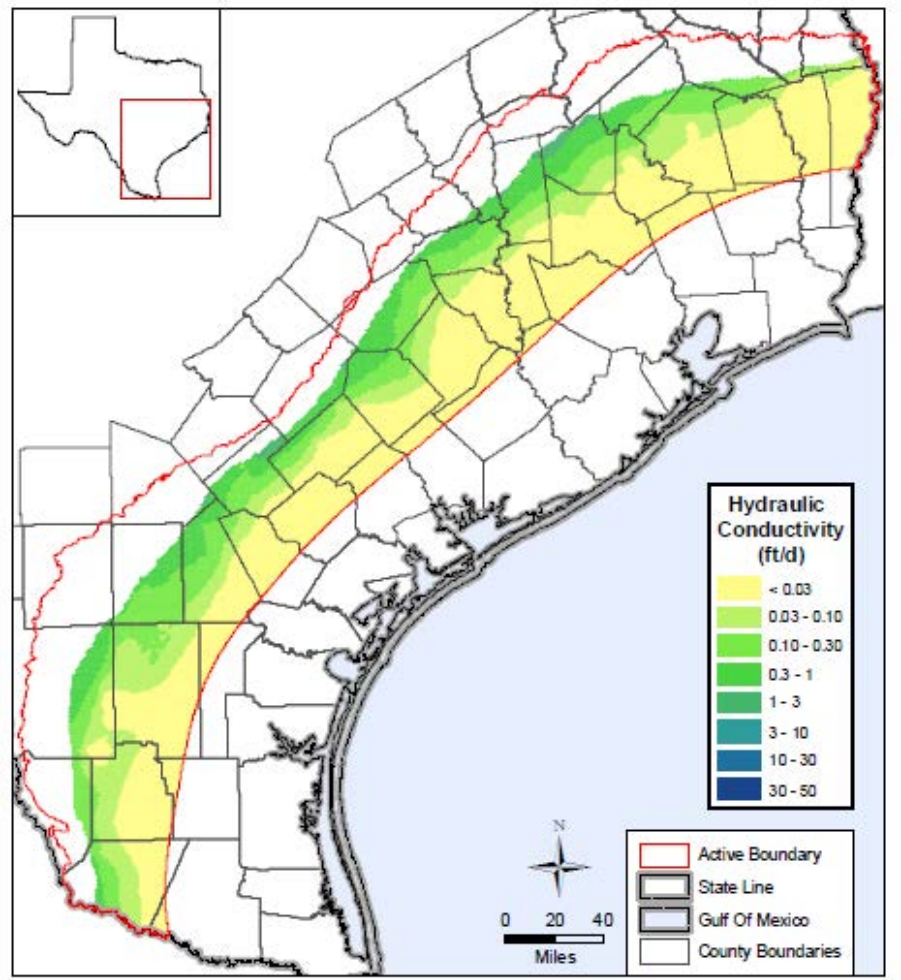


Figure 8.1.2 Horizontal hydraulic conductivity in feet per day of the Upper Jackson Unit subcrop.

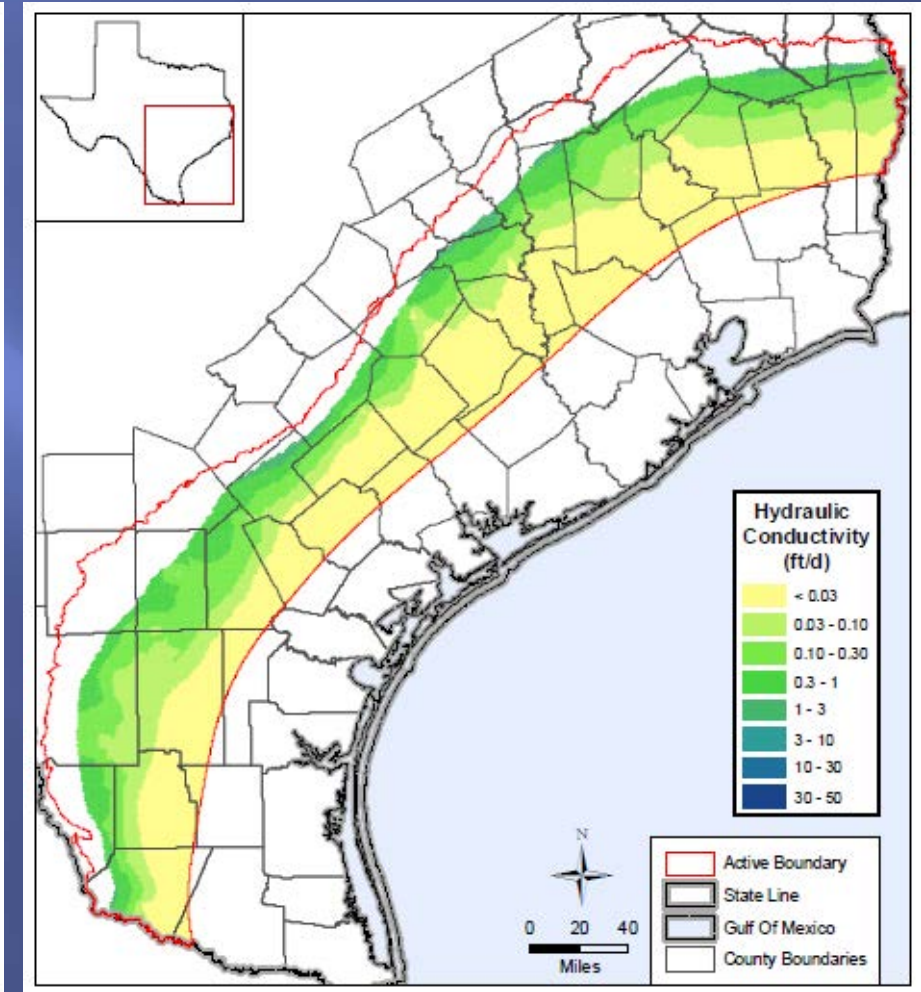


Figure 8.1.3 Horizontal hydraulic conductivity in feet per day of the Lower Jackson Unit subcrop.

Yegua Hydraulic Conductivity

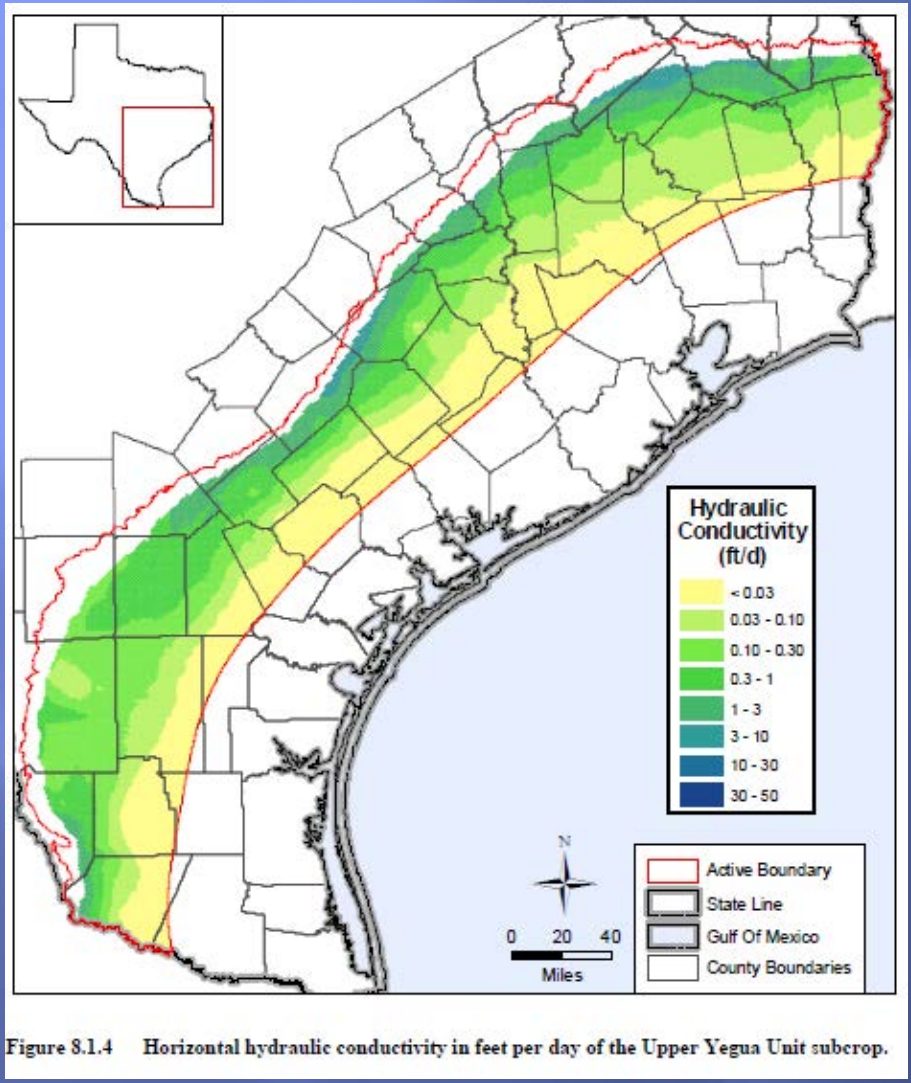


Figure 8.1.4 Horizontal hydraulic conductivity in feet per day of the Upper Yegua Unit subcrop.

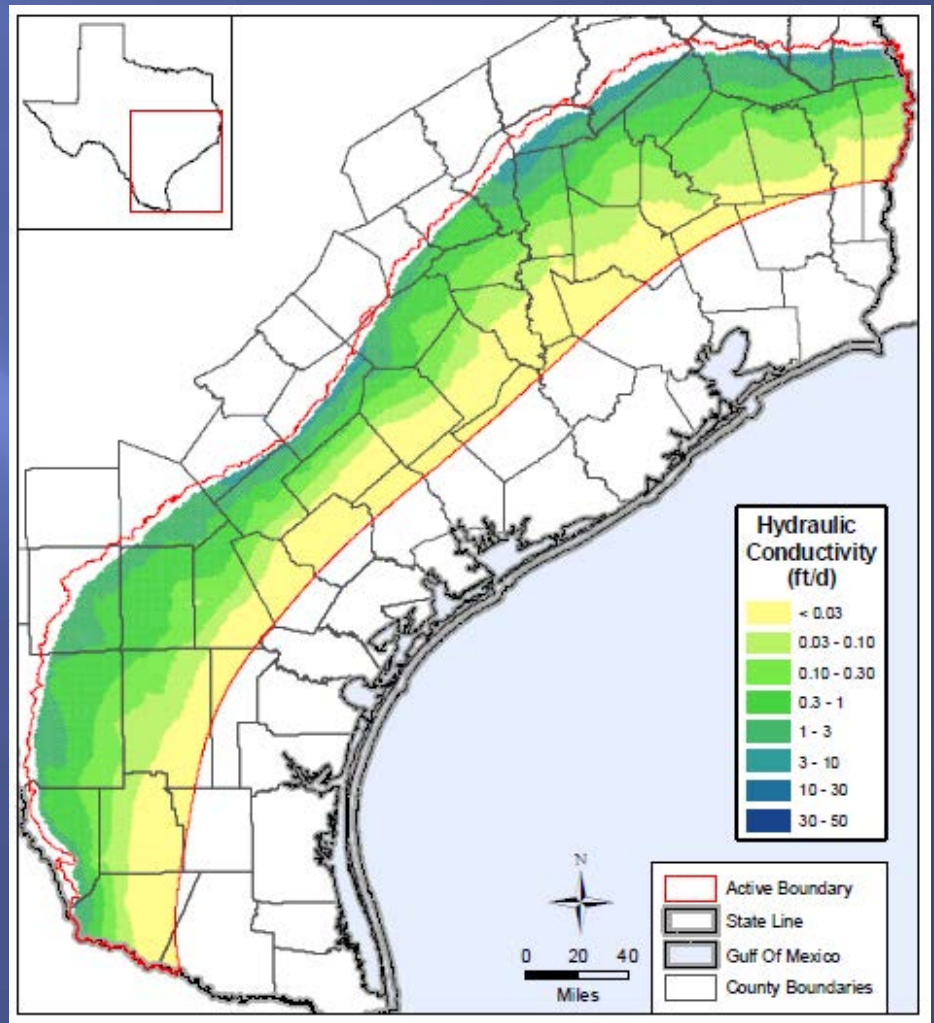
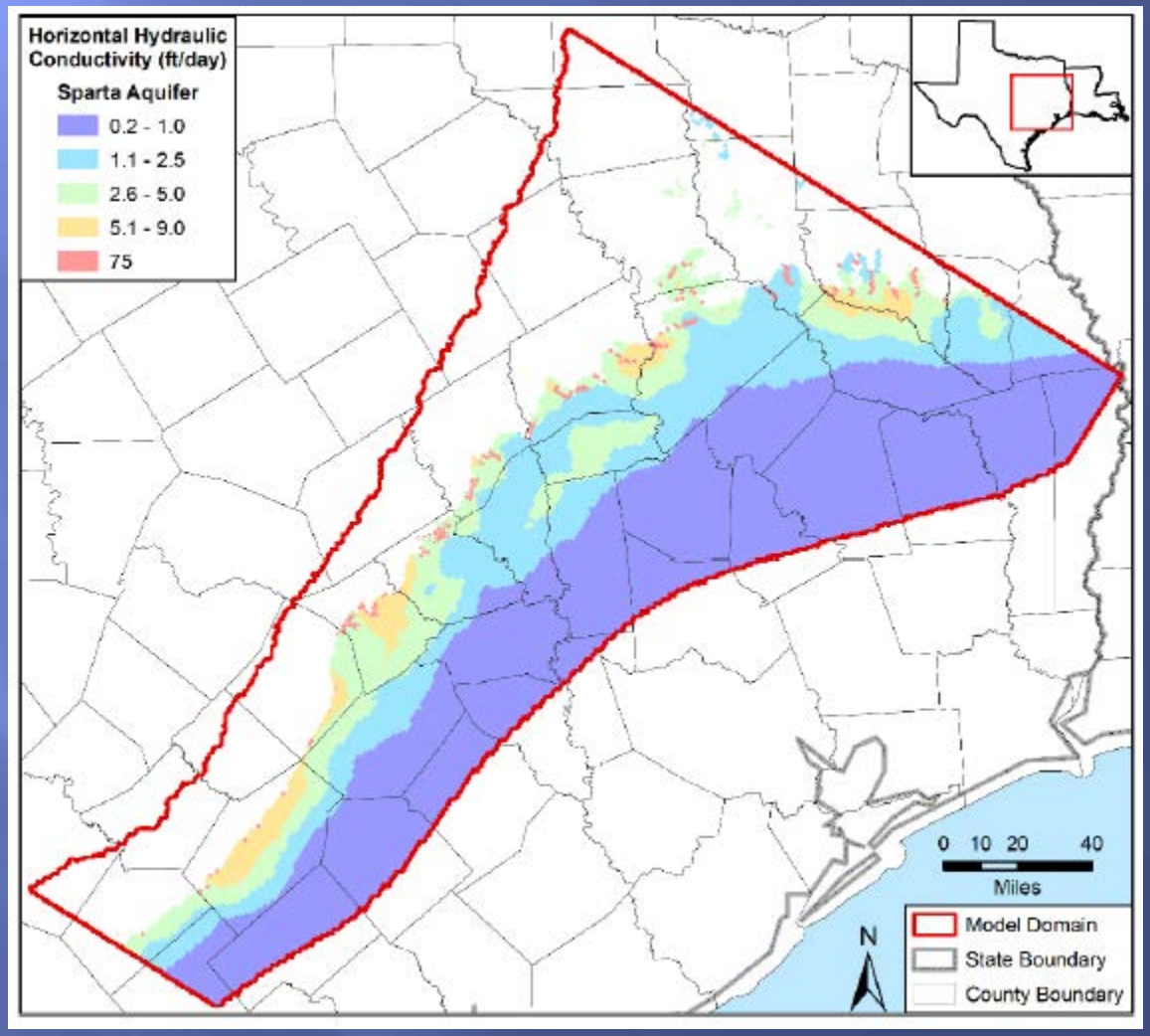


Figure 8.1.5 Horizontal hydraulic conductivity in feet per day of the Lower Yegua Unit subcrop.

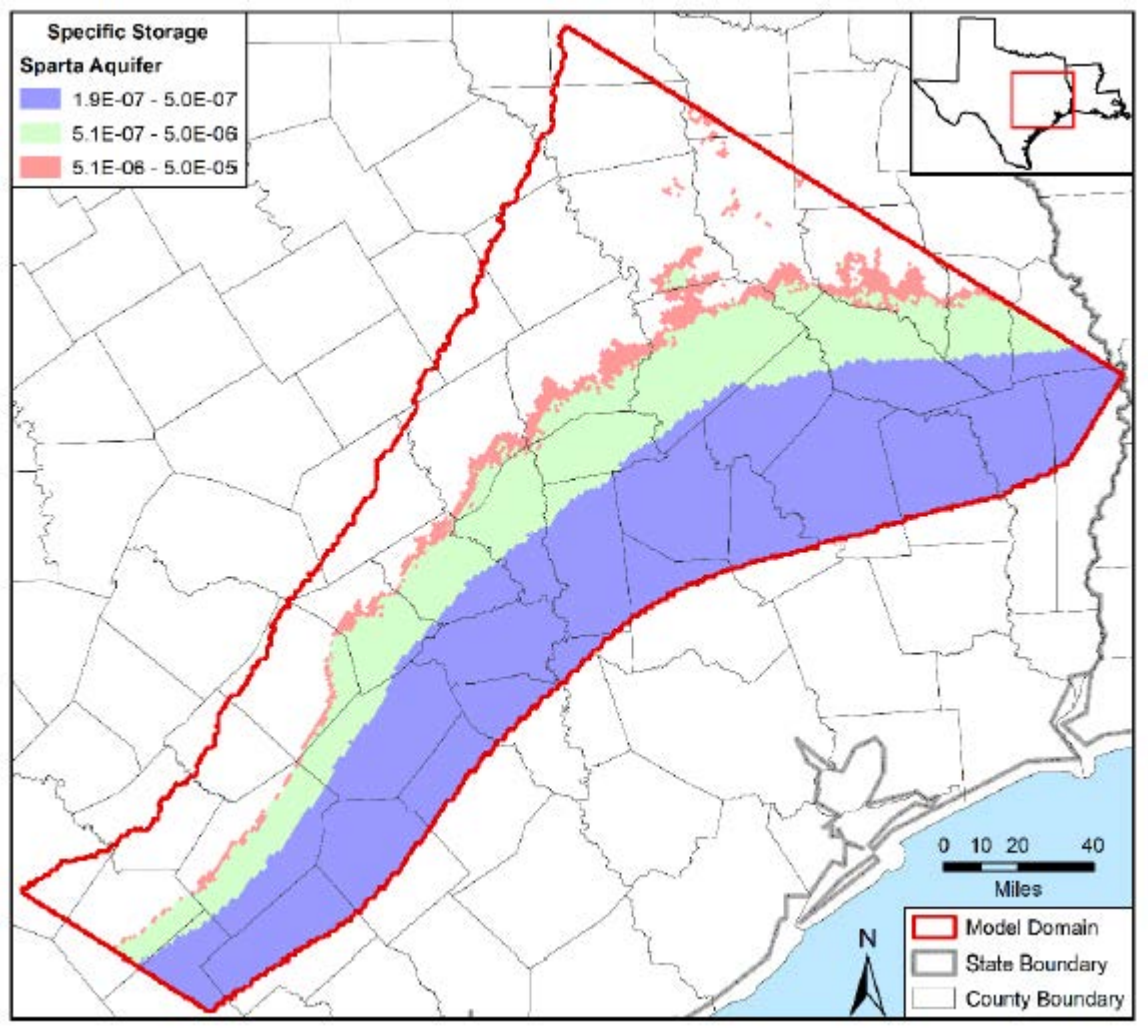
Sparta Conditions

- Water is produced from the Sparta Formation of the Clairborne Group
- Sand-rich formation interbedded with silt and clay
- Groundwater primarily produced from shallow to moderately deep wells (most <1000 feet deep, a few up to 2,000 feet deep)
- Water quality usually fresh in and near outcrop, deteriorates downdip
- More prolific towards the northeastern parts of GMA 12
- Can produce small to moderate quantities of water in GMA 12

Sparta Hydraulic Conductivity



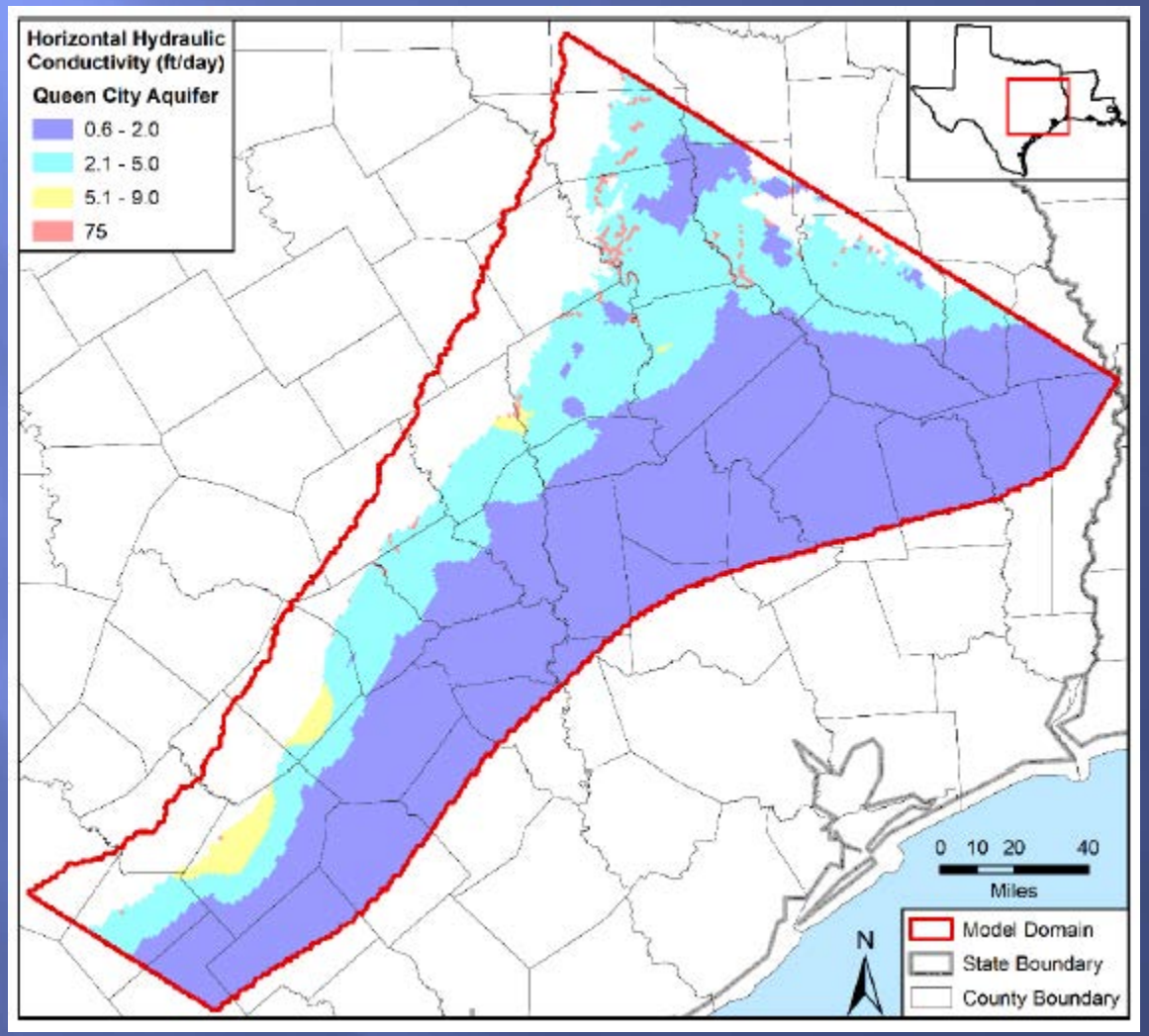
Sparta Specific Storage



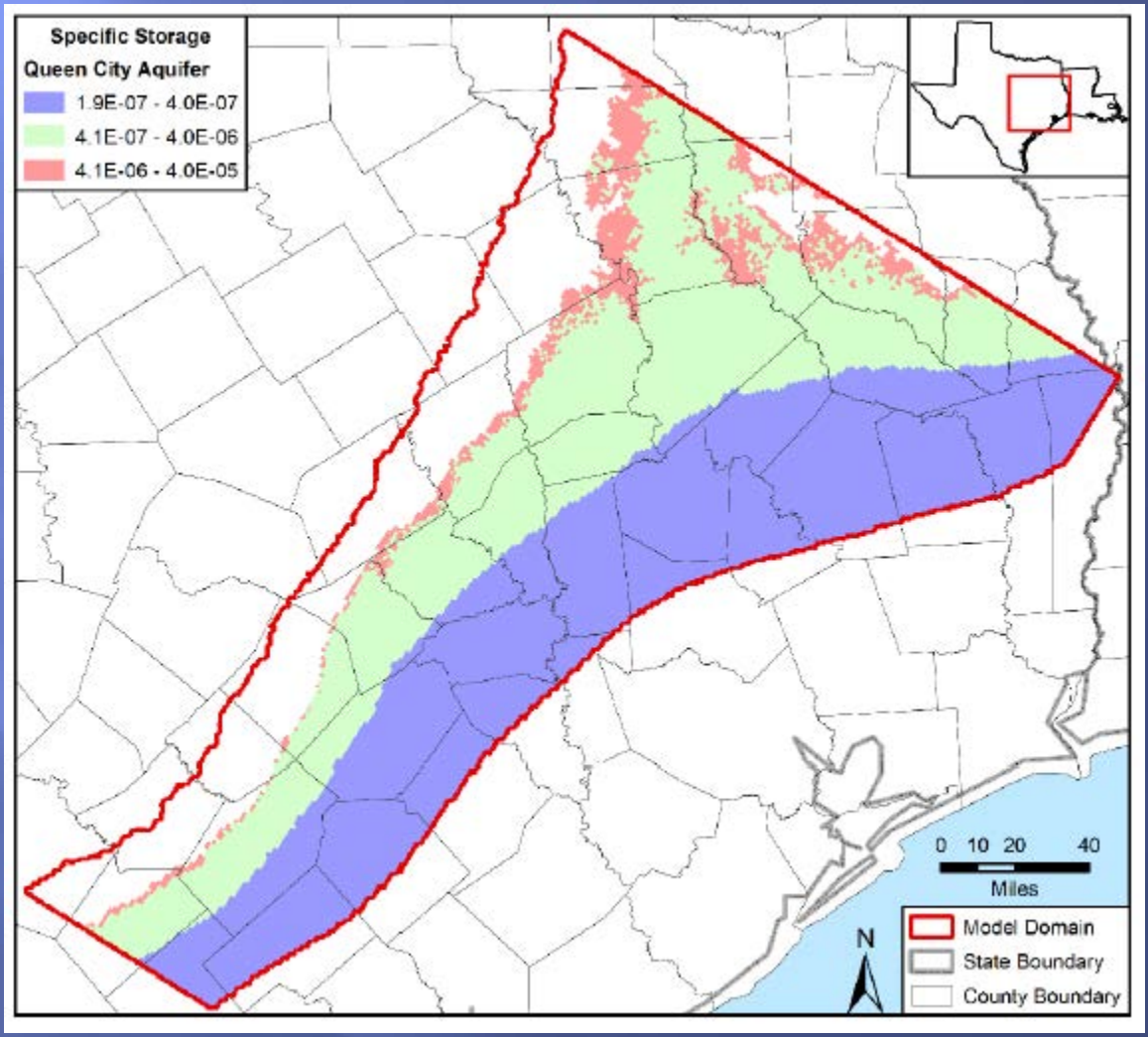
Queen City Conditions

- Water is produced from the Queen City Formation
- Water stored in sand, loosely cemented sandstone, and interbedded clay
- Water quality generally fresh, deteriorates downdip
- Fairly consistent aquifer conditions across the extent of the aquifer within GMA 12
- Can produce small to moderate quantities of water in GMA 12

Queen City Hydraulic Conductivity



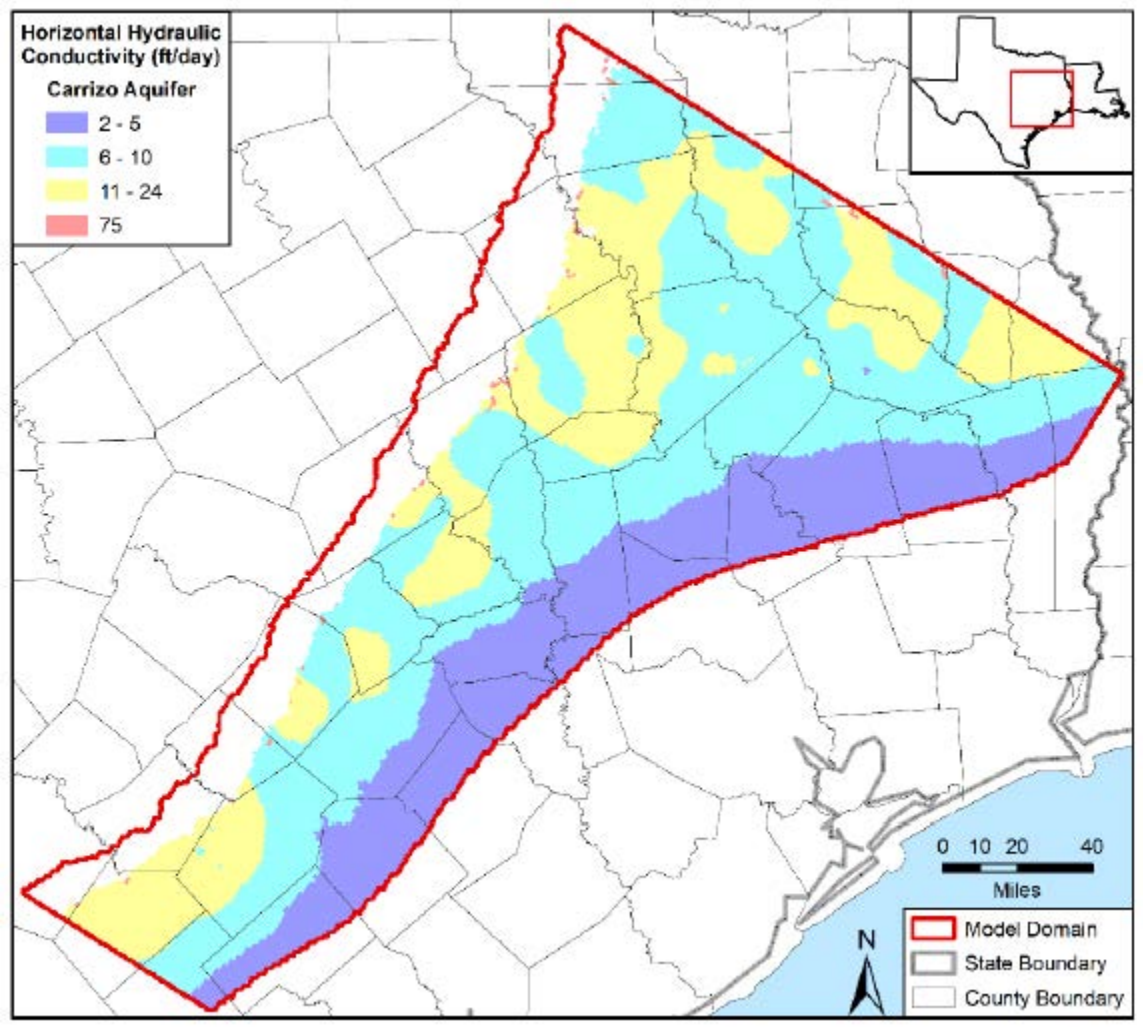
Queen City Specific Storage



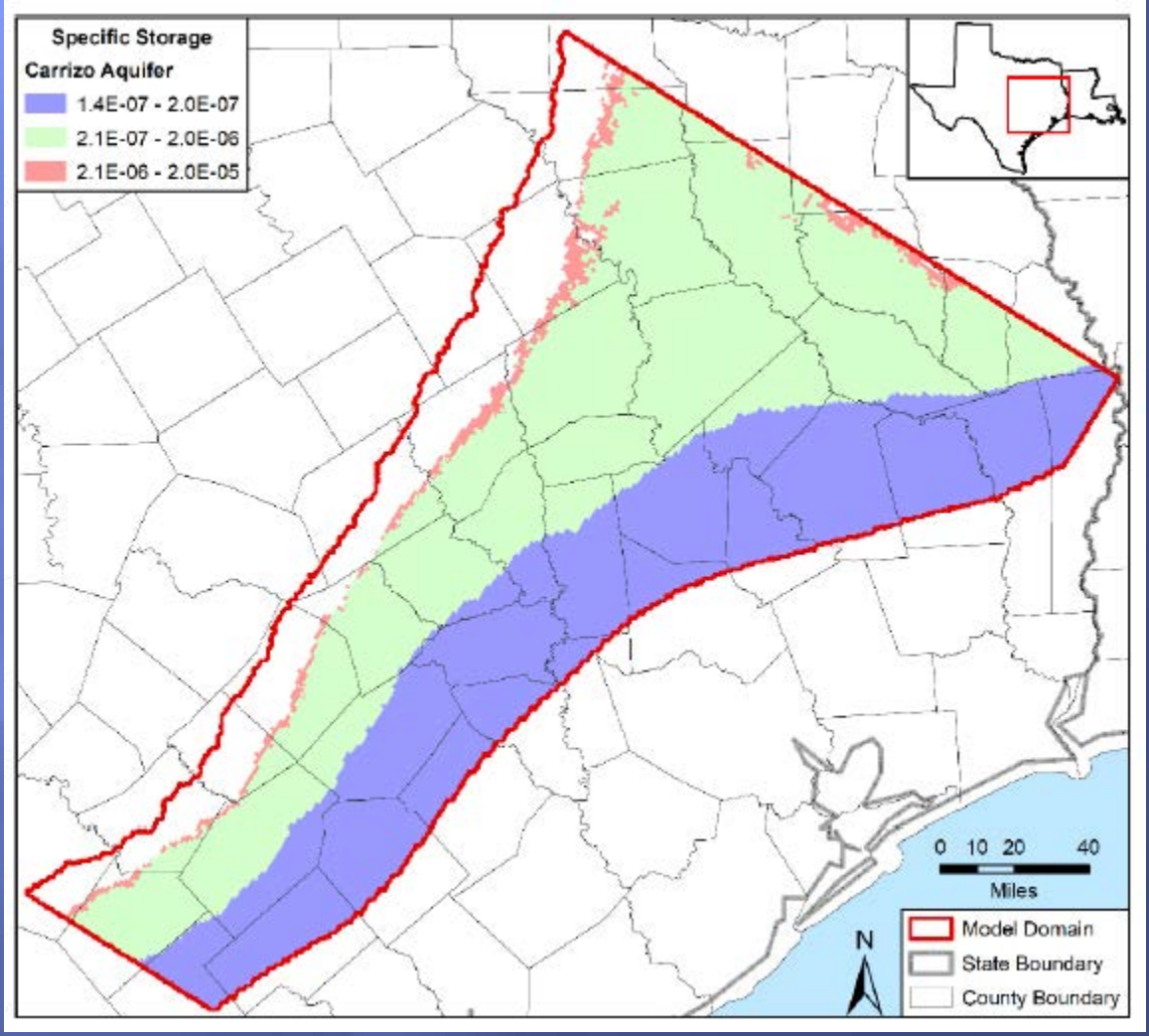
Carrizo Conditions

- Water is produced from the Carrizo Formation, which is hydrologically connected to upper unit of Wilcox and thus is referred to as the "Carrizo-Wilcox Aquifer"
- Sand-rich formation interbedded with silt and clay. Sand thicknesses 100-200 feet and more laterally continuous.
- Water quality generally fresh, deteriorates downdip
- Is a prolific aquifer in parts of GMA 12 and less productive in other areas within GMA 12
- Extremely productive aquifer to the southwest of GMA 12 in GMA 13.

Carrizo Hydraulic Conductivity



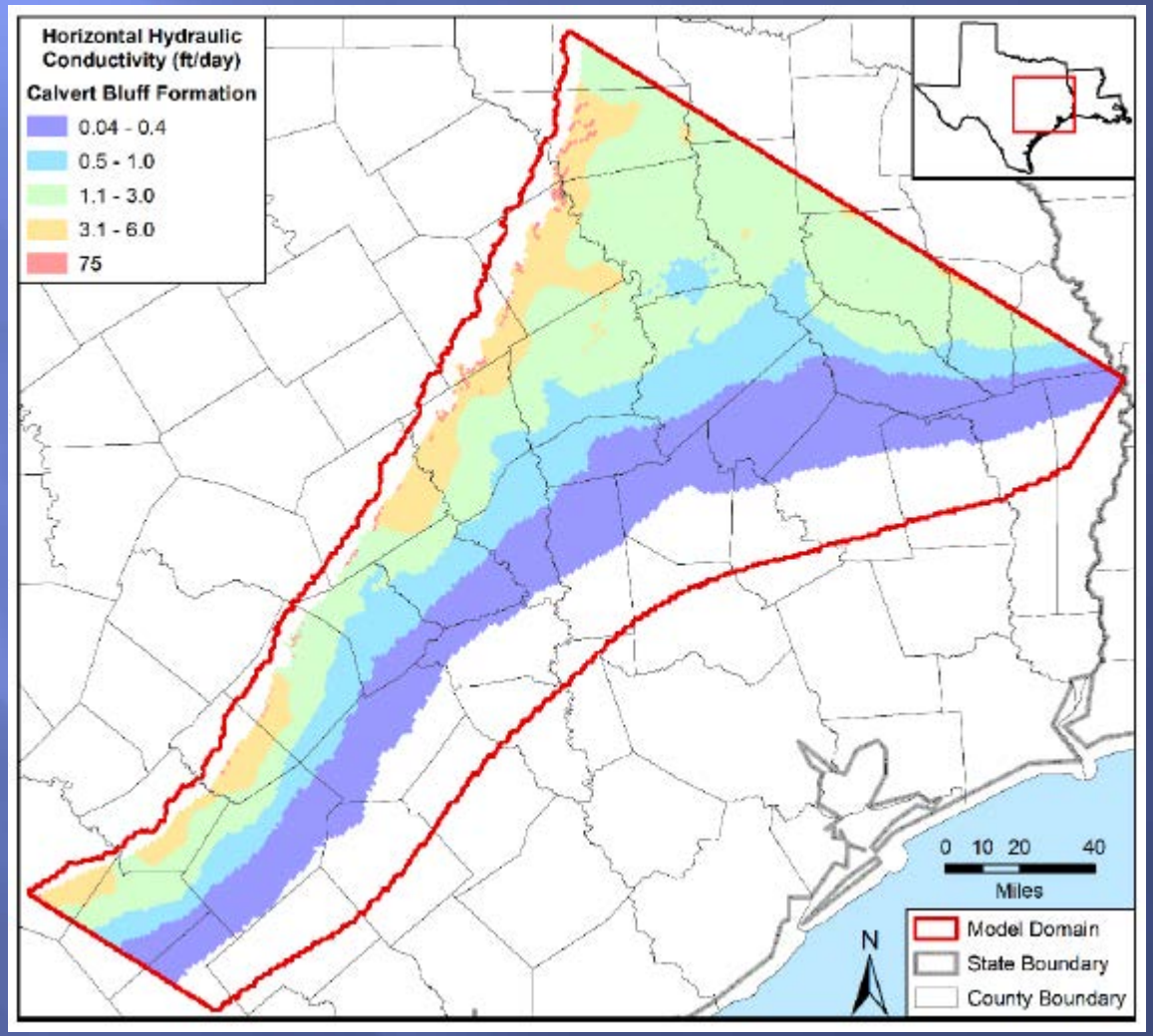
Carrizo Specific Storage



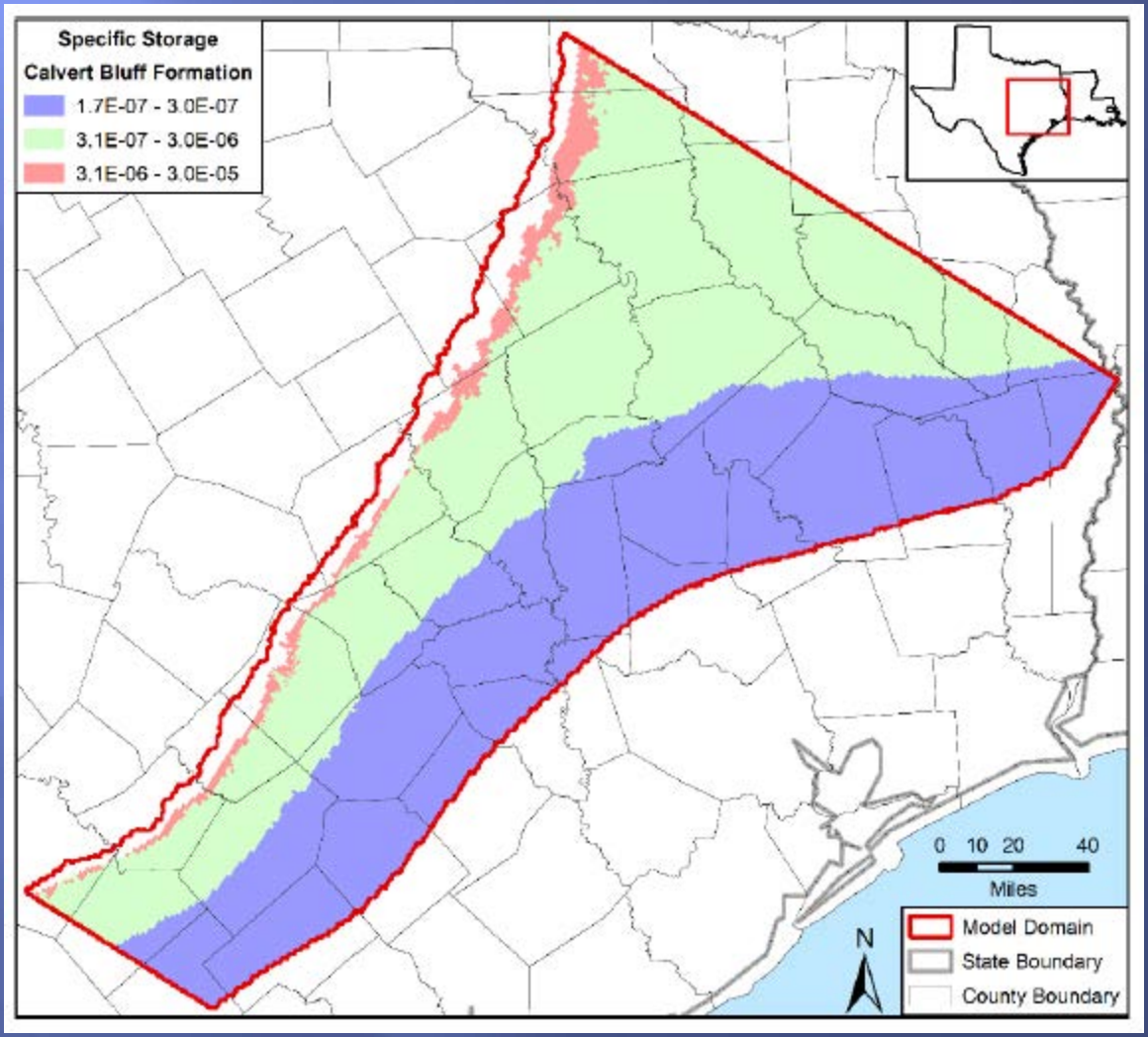
Calvert Bluff Conditions

- Water is produced from the Calvert Bluff Formation the upper unit of the Wilcox Group
- Consists mostly of lower permeability clays and lignites. Sands, where present, can be productive. Very thick formation.
- Water quality usually fresh in and near outcrop, deteriorates downdip
- Fairly consistent across the GMA 12
- Can produce low to moderate quantities of water in GMA 12

Calvert Bluff Hydraulic Conductivity



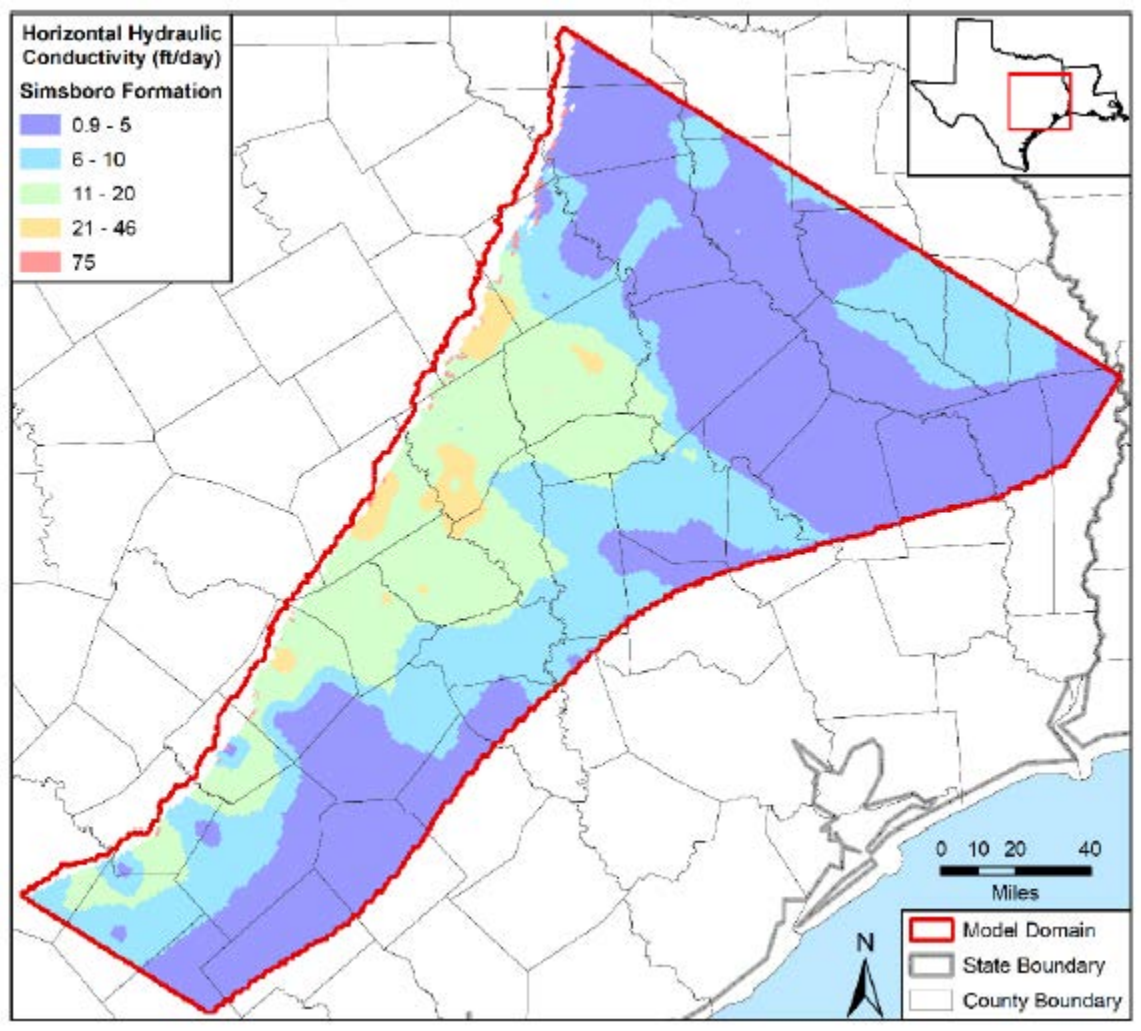
Calvert Bluff Specific Storage



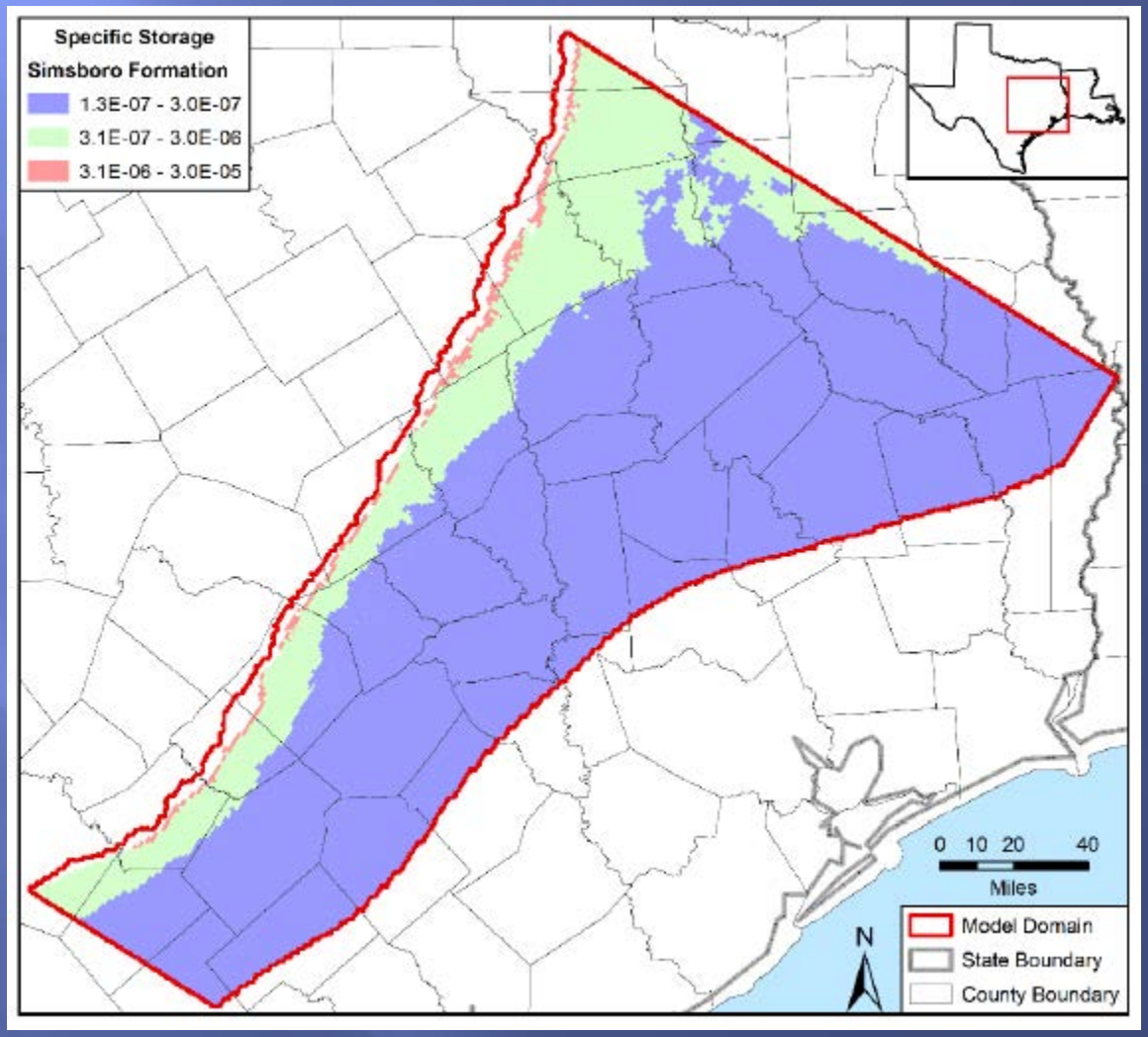
Simsboro Conditions

- Water is produced from the Simsboro Formation, the middle unit of the Wilcox Group
- Predominantly sand-rich formation. Can have more than 500 feet of sandstone. Thick sands extend well downdip, make up 80% of the formation
- Defined as a separate unit in most of the GMA 12
- Water quality generally fresh, deteriorates farther downdip
- Presently greater utilization in the central portion of GMA 12 where it supports areas with substantial pumping
- Extremely productive aquifer within GMA 12

Simsboro Hydraulic Conductivity



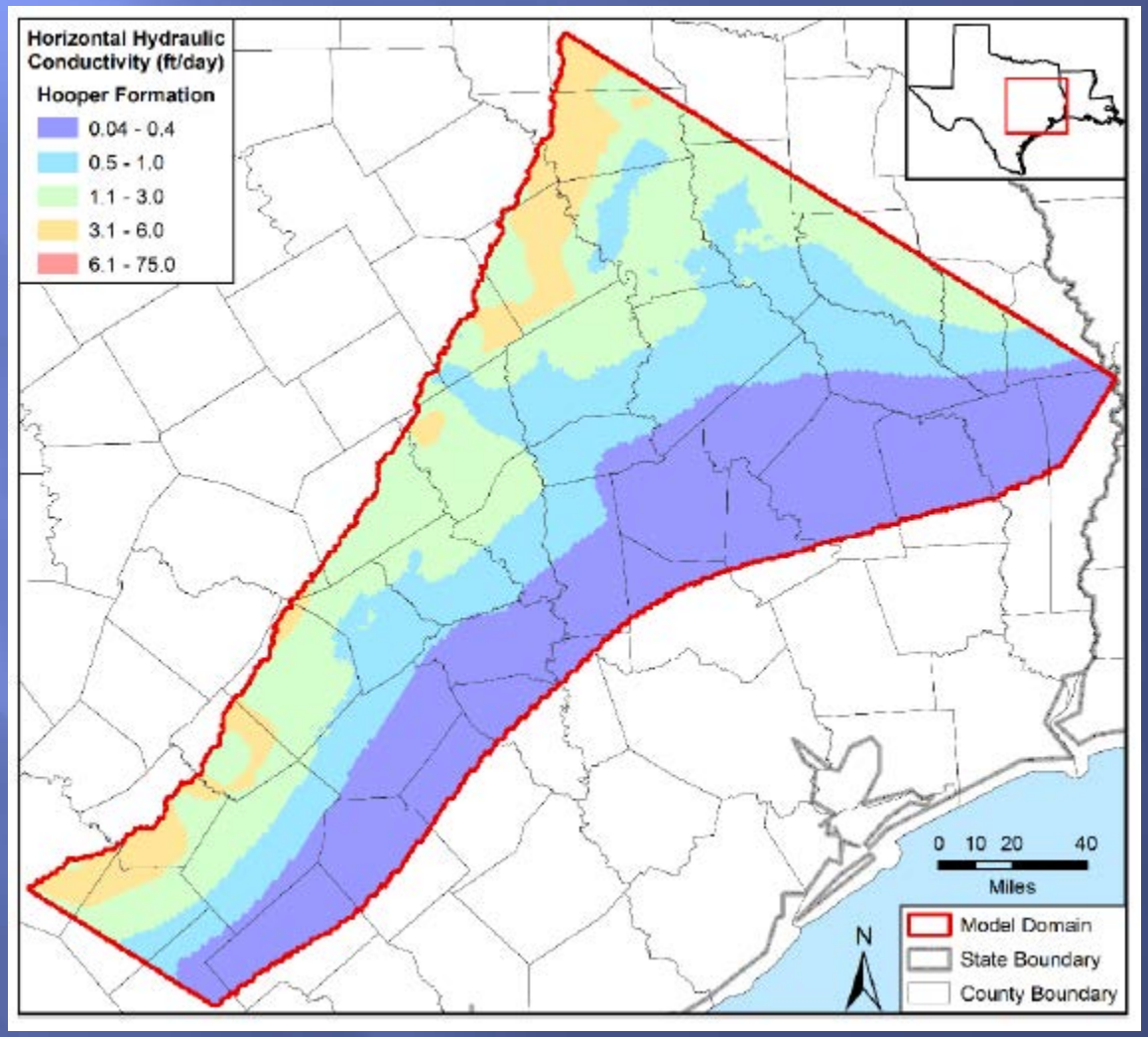
Simsboro Specific Storage



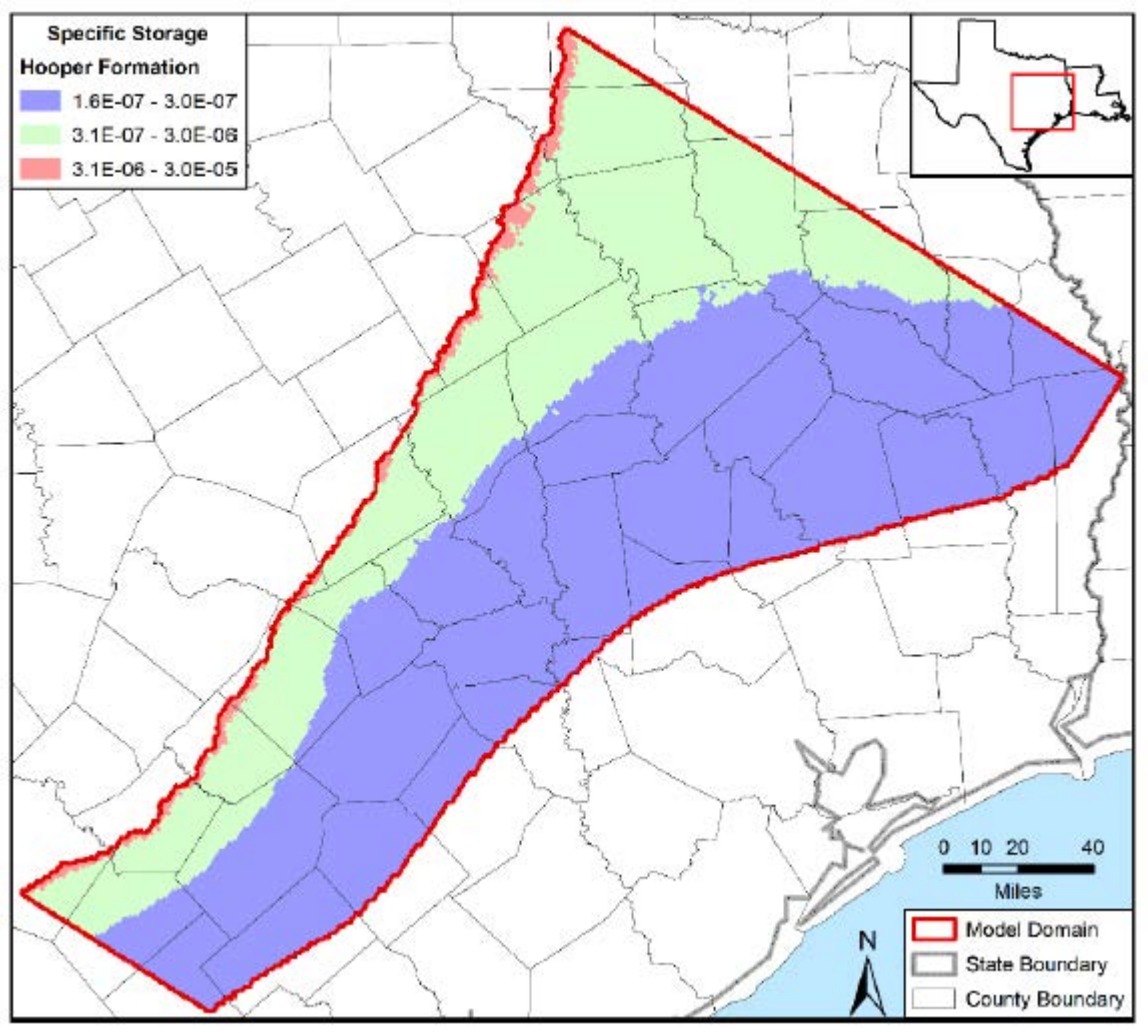
Hooper Conditions

- Water is produced from the Hooper Formation, the lower unit of the Wilcox Group
- Made up of interbedded shales and sandstones with minor amounts of lignite, generally 20-40% sand, can be higher locally. Sand thickness limited in most of the downdip areas.
- Water quality usually fresh in and near outcrop, deteriorates downdip
- Not a highly productive aquifer in most areas of GMA 12

Hooper Hydraulic Conductivity



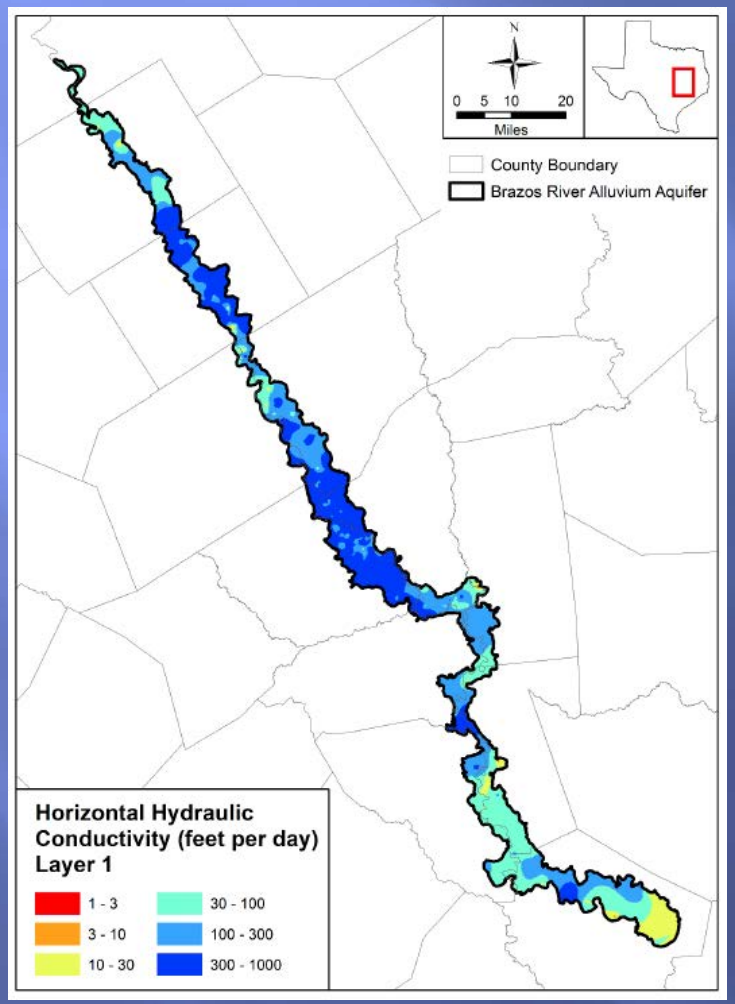
Hooper Specific Storage

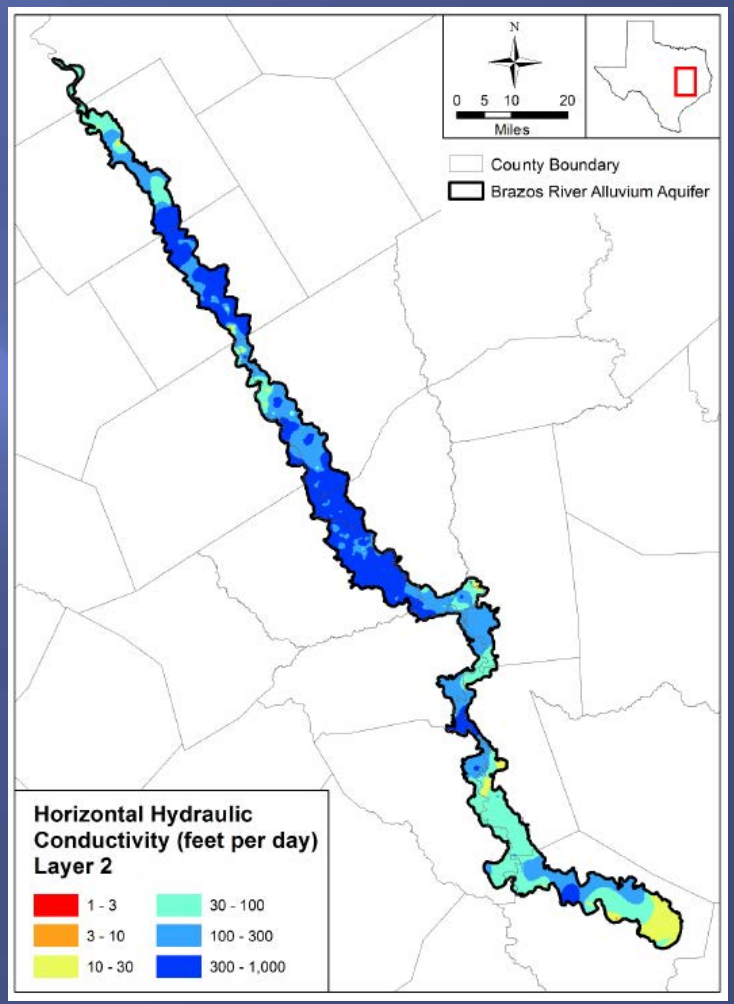


Brazos River Alluvium Conditions

- Water is produced from the alluvium deposited by the Brazos River normally within a few miles of the river
- Wells are shallow (<100 feet)
- Water quality usually fresh, some pockets of poorer quality water exist
- Fairly consistent aquifer conditions across the extent of the aquifer within GMA 12
- Can be fairly productive
- Vast majority of water produced from the aquifer is for irrigation

Brazos River Alluvium Hydraulic Conductivity





Total Estimated Recoverable Storage (TERS)

- Required to be evaluated as part of the DFC process
- Provided by the TWDB in GAM Task 13-035 Version 2 report dated May 16, 2014
- "Recoverable" is defined as the estimated amount of groundwater that accounts for recovery scenarios that range from 25% to 75% of the total storage
- Total storage = L x W x H x Storage coefficient

Total Estimated Recoverable Storage (TERS)

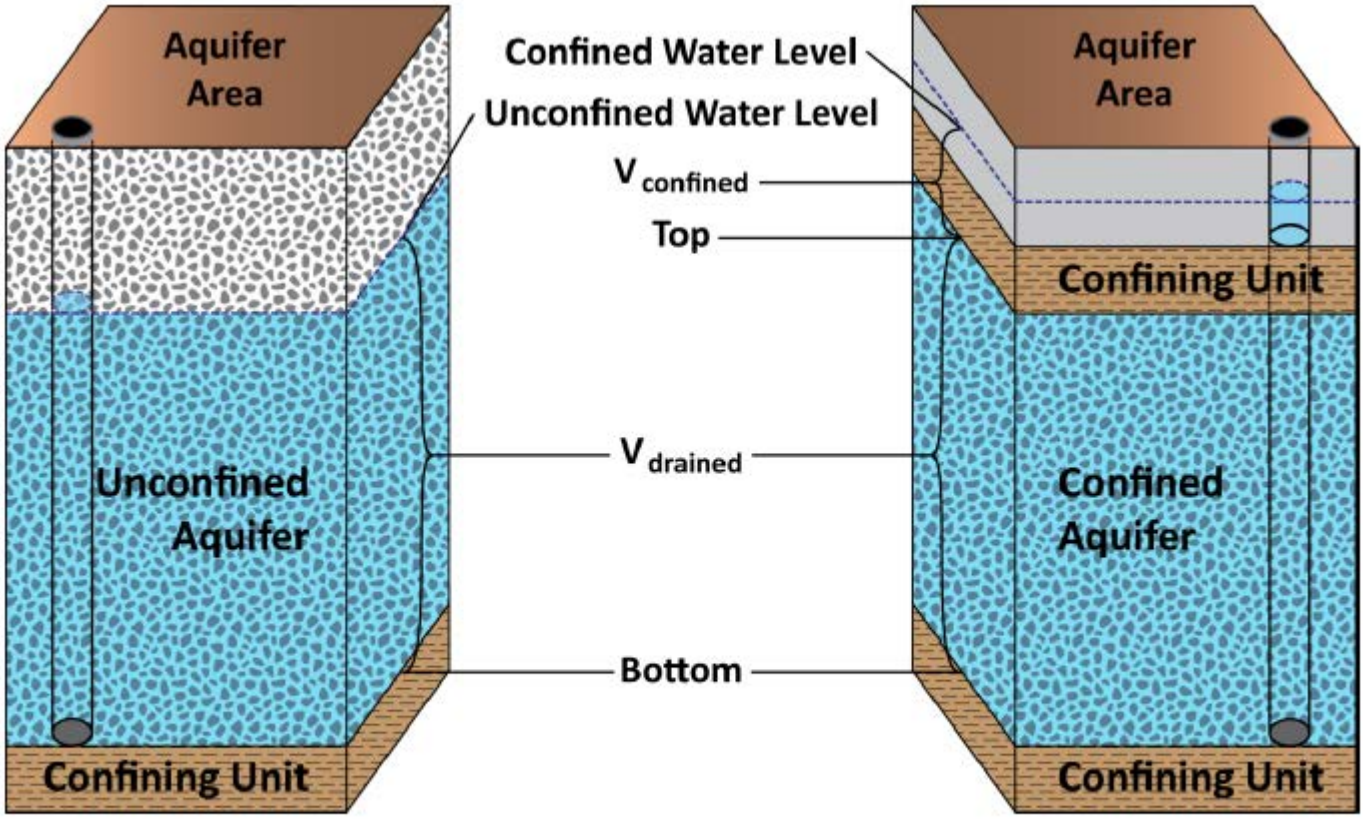


FIGURE 1. SCHEMATIC GRAPH SHOWING THE DIFFERENCE BETWEEN UNCONFINED AND CONFINED AQUIFERS.

Total Estimated Recoverable Storage (TERS)

- Estimates have been restricted based on the "official" aquifer extents per the TWDB
- Does not account for subsidence potential
- Does not account for impact on surface water
- Does not account for water quality variations

Total Estimated Recoverable Storage (TERS)

- Solely based on how much water is present and how much might be pumped out based on TWDB definition of 25% to 75%
- One-size-fits-all definition of "recoverable". How much is actually recoverable may actually vary based on aquifer type
- Vast majority of water is stored in confined areas of aquifers in GMA 12

Trinity Aquifer TERS by County

County	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
Bastrop	9,000,000	2,250,000	6,750,000
Lee	500,000	125,000	375,000
Williamson	1,600,000	400,000	1,200,000
Total	**11,100,000**	**2,775,000**	**8,325,000**

Source: TWDB GAM Task 13-035 Report (Wade and Shi, 2013)

Trinity Aquifer TERS by GCD

Groundwater Conservation District (GCD)	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
No District	1,600,000	400,000	1,200,000
Lost Pines GCD	9,500,000	2,375,000	7,125,000
Total	**11,100,000**	**2,775,000**	**8,325,000**

Source: TWDB GAM Task 13-035 Report (Wade and Shi, 2013)

Carrizo-Wilcox Aquifer TERS by County

County	Total Storage (acre-feet)	25 percent of Total Storage (acre-feet)	75 percent of Total Storage (acre-feet)
Bastrop	98,000,000	24,500,000	73,500,000
Brazos	69,000,000	17,250,000	51,750,000
Burleson	120,000,000	30,000,000	90,000,000
Falls	820,000	205,000	615,000
Fayette	95,000,000	23,750,000	71,250,000
Freestone	46,000,000	11,500,000	34,500,000
Lee	130,000,000	32,500,000	97,500,000
Leon	180,000,000	45,000,000	135,000,000
Limestone	12,000,000	3,000,000	9,000,000
Madison	110,000,000	27,500,000	82,500,000
Milam	47,000,000	11,750,000	35,250,000
Navarro	1,000,000	250,000	750,000
Robertson	110,000,000	27,500,000	82,500,000
Williamson	500,000	125,000	375,000
Total	1,019,320,000	254,830,000	764,490,000

Source: TWDB GAM Task 13-035 Report (Wade and Shi, 2013)

Carrizo-Wilcox Aquifer TERS by GCD

Groundwater Conservation District (GCD)	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
No District	14,000,000	3,500,000	10,500,000
Brazos Valley GCD	180,000,000	45,000,000	135,000,000
Fayette County GCD	95,000,000	23,750,000	71,250,000
Lost Pines GCD	220,000,000	55,000,000	165,000,000
Mid-East Texas GCD	340,000,000	85,000,000	255,000,000
Post Oak Savannah GCD	170,000,000	42,500,000	127,500,000
Total	1,019,000,000	254,750,000	764,250,000

Source: TWDB GAM Task 13-035 Report (Wade and Shi, 2013)

Queen City Aquifer TERS by County

County	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
Bastrop	9,500,000	2,375,000	7,125,000
Brazos	25,000,000	6,250,000	18,750,000
Burleson	29,000,000	7,250,000	21,750,000
Fayette	19,000,000	4,750,000	14,250,000
Freestone	290,000	72,500	217,500
Lee	23,000,000	5,750,000	17,250,000
Leon	25,000,000	6,250,000	18,750,000
Madison	20,000,000	5,000,000	15,000,000
Milam	650,000	162,500	487,500
Robertson	8,800,000	2,200,000	6,600,000
Total	160,240,000	40,060,000	120,180,000

Source: TWDB GAM Task 13-035 Report (Wade and Shi, 2013)

Queen City Aquifer TERS by GCD

Groundwater Conservation District (GCD)	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
Brazos Valley GCD	34,000,000	8,500,000	25,500,000
Fayette County GCD	19,000,000	4,750,000	14,250,000
Lost Pines GCD	32,000,000	8,000,000	24,000,000
Mid-East Texas GCD	45,000,000	11,250,000	33,750,000
Post Oak Savannah GCD	30,000,000	7,500,000	22,500,000
Total	160,000,000	40,000,000	120,000,000

Source: TWDB GAM Task 13-035 Report (Wade and Shi, 2013)

Sparta Aquifer TERS by County

County	Total Storage (acre-feet)	25 percent of Total Storage (acre-feet)	75 percent of Total Storage (acre-feet)
Bastrop	2,500,000	625,000	1,875,000
Brazos	17,000,000	4,250,000	12,750,000
Burleson	16,000,000	4,000,000	12,000,000
Fayette	12,000,000	3,000,000	9,000,000
Lee	10,000,000	2,500,000	7,500,000
Leon	4,600,000	1,150,000	3,450,000
Madison	16,000,000	4,000,000	12,000,000
Robertson	1,300,000	325,000	975,000
Total	79,400,000	19,850,000	59,550,000

Source: TWDB GAM Task 13-035 Report (Wade and Shi, 2013)

Sparta Aquifer TERS by GCD

Groundwater Conservation District (GCD)	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
Brazos Valley GCD	18,000,000	4,500,000	13,500,000
Fayette County GCD	12,000,000	3,000,000	9,000,000
Lost Pines GCD	13,000,000	3,250,000	9,750,000
Mid-East Texas GCD	21,000,000	5,250,000	15,750,000
Post Oak Savannah GCD	16,000,000	4,000,000	12,000,000
Total	80,000,000	20,000,000	60,000,000

Source: TWDB GAM Task 13-035 Report (Wade and Shi, 2013)

Yegua-Jackson Aquifer TERS by County

County	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
Bastrop	290,000	72,500	217,500
Brazos	30,000,000	7,500,000	22,500,000
Burleson	27,000,000	6,750,000	20,250,000
Fayette	27,000,000	6,750,000	20,250,000
Lee	10,000,000	2,500,000	7,500,000
Leon	76,000	19,000	57,000
Madison	15,000,000	3,750,000	11,250,000
Total	109,366,000	27,341,500	82,024,500

Source: TWDB GAM Task 13-035 Report (Wade and Shi, 2013)

Yegua-Jackson Aquifer TERS by GCD

Groundwater Conservation District (GCD)	*Total Storage (acre-feet)*	*25percent of Total Storage (acre-feet)*	*75percent of Total Storage (acre-feet)*
Brazos Valley GCD	30,000,000	7,500,000	22,500,000
Fayette County GCD	27,000,000	6,750,000	20,250,000
Lost Pines GCD	10,000,000	2,500,000	7,500,000
Mid-East Texas GCD	15,000,000	3,750,000	11,250,000
Post Oak Savannah GCD	27,000,000	6,750,000	20,250,000
Total	109,000,000	27,250,000	81,750,000

Source: TWDB GAM Task 13-035 Report (Wade and Shi, 2013)

Brazos River Alluvium Aquifer TERS by County

County	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
Brazos	290,000	72,500	217,500
Burleson	450,000	112,500	337,500
Falls	140	35	105
Milam	28,000	7,000	21,000
Robertson	270,000	67,500	202,500
Total	1,038,140	259,535	778,605

Source: TWDB GAM Task 13-035 Report (Wade and Shi, 2013)

Brazos River Alluvium Aquifer TERS by GCD

Groundwater Conservation District (GCD)	*Total Storage (acre-feet)*	*25percent of Total Storage (acre-feet)*	*75percent of Total Storage (acre-feet)*
No district	140	35	105
Brazos Valley GCD	560,000	140,000	420,000
Post Oak Savannah GCD	480,000	120,000	360,000
Total	1,040,140	260,035	780,105

Source: TWDB GAM Task 13-035 Report (Wade and Shi, 2013)

Gulf Coast Aquifer TERS by County

County	Total Storage (acre-feet)	25 percent of Total Storage (acre-feet)	75 percent of Total Storage (acre-feet)
Brazos	450,000	112,500	337,500
Total	450,000	112,500	337,500

Source: TWDB GAM Task 13-035 Report (Wade and Shi, 2013)

Annual Recharge, Inflows, and Discharge

- Provided by the TWDB in GAM Run reports in support of management plan development
- Fayette County GCD = GAM Run 17-019
- Lost Pines GCD = GAM Run 16-014
- Post Oak Savannah GCD = GAM Run 16-015
- Brazos Valley GCD = GAM Run 18-021
- Mid-East Texas GCD = GAM Run 18-020

Fayette County GCD
Sparta Aquifer

Management Plan requirement	*Aquifer*	*Results*
Estimated annual amount of recharge from precipitation to the district	Sparta Aquifer	382
Estimated annual volume of water that discharges from the aquifer to springs and any surface water body including lakes, streams, and rivers	Sparta Aquifer	0
Estimated annual volume of flow into the district within each aquifer in the district	Sparta Aquifer	516
Estimated annual volume of flow out of the district within each aquifer in the district	Sparta Aquifer	197
Estimated net annual volume of flow between each aquifer in the district	From the Sparta Aquifer into the overlying younger units	1,666
	From the Weches Confining Unit into the Sparta Aquifer	1,522
	From the Sparta Aquifer into its brackish portion	15

Units are in Acre Feet per Year

Fayette County GCD
Queen City Aquifer

Management Plan requirement	*Aquifer or confining unit*	*Results*
Estimated annual amount of recharge from precipitation to the district	Queen City Aquifer	0
Estimated annual volume of water that discharges from the aquifer to springs and any surface water body including lakes, streams, and rivers	Queen City Aquifer	0
Estimated annual volume of flow into the district within each aquifer in the district	Queen City Aquifer	1,932
Estimated annual volume of flow out of the district within each aquifer in the district	Queen City Aquifer	505
Estimated net annual volume of flow between each aquifer in the district	From the Queen City Aquifer into the Weches Confining Unit	1,417
	From the Reklaw Confining Unit into the Queen City Aquifer	181
	From the Queen City Aquifer into its brackish portion	79

Fayette County GCD
Carrizo-Wilcox Aquifer

Management Plan requirement	*Aquifer or confining unit*	*Results*
Estimated annual amount of recharge from precipitation to the district	Carrizo-Wilcox Aquifer	0
Estimated annual volume of water that discharges from the aquifer to springs and any surface water body including lakes, streams, and rivers	Carrizo-Wilcox Aquifer	0
Estimated annual volume of flow into the district within each aquifer in the district	Carrizo-Wilcox Aquifer	7,133
Estimated annual volume of flow out of the district within each aquifer in the district	Carrizo-Wilcox Aquifer	2,980
Estimated net annual volume of flow between each aquifer in the district	From the Carrizo-Wilcox Aquifer into the Reklaw Confining Unit	217
	From the Carrizo-Wilcox Aquifer into its brackish portion	4,090

Suggest units be in larger print size

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Fayette County GCD
Yegua-Jackson Aquifer

Management Plan requirement	*Aquifer or confining unit*	*Results*
Estimated annual amount of recharge from precipitation to the district	Yegua-Jackson Aquifer	47,304
Estimated annual volume of water that discharges from the aquifer to springs and any surface water body including lakes, streams, and rivers	Yegua-Jackson Aquifer	59,161
Estimated annual volume of flow into the district within each aquifer in the district	Yegua-Jackson Aquifer	9,885
Estimated annual volume of flow out of the district within each aquifer in the district	Yegua-Jackson Aquifer	7,045
Estimated net annual volume of flow between each aquifer in the district	From the Yegua-Jackson Aquifer into the Catahoula Formation	18
	From the Yegua-Jackson Aquifer into its brackish portion	193

Units are in acre-feet per year

Lost Pines GCD
Sparta Aquifer

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Sparta Aquifer	10,142
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Sparta Aquifer	4,564
Estimated annual volume of flow into the district within each aquifer in the district	Sparta Aquifer	915
Estimated annual volume of flow out of the district within each aquifer in the district	Sparta Aquifer	593
Estimated net annual volume of flow between each aquifer in the district	Flow into the Sparta Aquifer from underlying units	957
	Flow from the Sparta Aquifer into overlying units	883

Units are in acre-feet per year

Lost Pines GCD
Queen City Aquifer

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Queen City Aquifer	7,255
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Queen City Aquifer	5,488
Estimated annual volume of flow into the district within each aquifer in the district	Queen City Aquifer	516
Estimated annual volume of flow out of the district within each aquifer in the district	Queen City Aquifer	2,610
Estimated net annual volume of flow between each aquifer in the district	Flow from the Queen City Aquifer into overlying units	934
	From Queen City Aquifer into underlying formations	167

Units are in acre-feet per year

Lost Pines GCD
Carrizo-Wilcox Aquifer

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Carrizo-Wilcox Aquifer	29,602
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Carrizo-Wilcox Aquifer	32,781
Estimated annual volume of flow into the district within each aquifer in the district	Carrizo-Wilcox Aquifer	12,660
Estimated annual volume of flow out of the district within each aquifer in the district	Carrizo-Wilcox Aquifer	17,538
Estimated net annual volume of flow between each aquifer in the district	Flow into the Carrizo-Wilcox Aquifer from overlying units	1,313
	Flow to underlying formations	NA[2]

Units are in acre-feet per year

Lost Pines GCD
Trinity Aquifer

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Trinity Aquifer	0
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Trinity Aquifer	0
Estimated annual volume of flow into the district within each aquifer in the district	Trinity Aquifer	355
Estimated annual volume of flow out of the district within each aquifer in the district	Trinity Aquifer	136
Estimated net annual volume of flow between each aquifer in the district	Flow from the Trinity Aquifer into overlying units	2
	Flow to underlying formations	NA[1]

Units are in acre-feet per year

Lost Pines GCD
Yegua-Jackson Aquifer

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Yegua-Jackson Aquifer	38,860
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Yegua-Jackson Aquifer	35,781
Estimated annual volume of flow into the district within each aquifer in the district	Yegua-Jackson Aquifer	5,882
Estimated annual volume of flow out of the district within each aquifer in the district	Yegua-Jackson Aquifer	10,154
Estimated net annual volume of flow between each aquifer in the district	Flow to underlying formations	NA[3]

Units are in acre-feet per year

Post-Oak Savannah GCD Trinity Aquifer

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Trinity Aquifer	0
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Trinity Aquifer	0
Estimated annual volume of flow into the district within each aquifer in the district	Trinity Aquifer	740
Estimated annual volume of flow out of the district within each aquifer in the district	Trinity Aquifer	382
Estimated net annual volume of flow between each aquifer in the district		NA[1]

Units are in acre-feet per year

Post-Oak Savannah GCD Sparta Aquifer

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Sparta Aquifer	7,423
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Sparta Aquifer	4,808
Estimated annual volume of flow into the district within each aquifer in the district	Sparta Aquifer	763
Estimated annual volume of flow out of the district within each aquifer in the district	Sparta Aquifer	1,228
Estimated net annual volume of flow between each aquifer in the district	Weches Confining Unit and adjacent underlying areas into the Sparta Aquifer	1,583

Units are in acre-feet per year

Post-Oak Savannah GCD Queen City Aquifer

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Queen City Aquifer	8,811
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Queen City Aquifer	12,030
Estimated annual volume of flow into the district within each aquifer in the district	Queen City Aquifer	1,343
Estimated annual volume of flow out of the district within each aquifer in the district	Queen City Aquifer	965
Estimated net annual volume of flow between each aquifer in the district	Queen City Aquifer into the Overlying Weches Confining Unit	1,448
	Reklaw Confining Unit and adjacent underlying areas into the Queen City Aquifer	866

Units are in acre-feet per year

Post-Oak Savannah GCD Carrizo-Wilcox Aquifer

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Carrizo-Wilcox Aquifer	26,266
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Carrizo-Wilcox Aquifer	29,010
Estimated annual volume of flow into the district within each aquifer in the district	Carrizo-Wilcox Aquifer	19,237
Estimated annual volume of flow out of the district within each aquifer in the district	Carrizo-Wilcox Aquifer	25,823
Estimated net annual volume of flow between each aquifer in the district	Carrizo-Wilcox Aquifer into the overlying Reklaw Confining Unit	237

Units are in acre-feet per year

Post-Oak Savannah GCD Yegua-Jackson Aquifer

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Yegua-Jackson Aquifer	22,459
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Yegua-Jackson Aquifer	13,932
Estimated annual volume of flow into the district within each aquifer in the district	Yegua-Jackson Aquifer	5,087
Estimated annual volume of flow out of the district within each aquifer in the district	Yegua-Jackson Aquifer	8,690
Estimated net annual volume of flow between each aquifer in the district	Yegua-Jackson Aquifer	NA[2]

Units are in acre-feet per year

Post-Oak Savannah GCD
Brazos River Alluvium Aquifer

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Brazos River Alluvium Aquifer	15,510
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Brazos River Alluvium Aquifer	25,447
Estimated annual volume of flow into the district within each aquifer in the district	Brazos River Alluvium Aquifer	15,181
Estimated annual volume of flow out of the district within each aquifer in the district	Brazos River Alluvium Aquifer	19,706
Estimated net annual volume of flow between each aquifer in the district	Flow into the Brazos River Alluvium Aquifer from underlying formations and geological units	9,532

Units are in acre-feet per year

Brazos Valley GCD
Carrizo-Wilcox Aquifer

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Carrizo-Wilcox Aquifer	47,122
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Carrizo-Wilcox Aquifer	54,520
Estimated annual volume of flow into the district within each aquifer in the district	Carrizo-Wilcox Aquifer	32,600
Estimated annual volume of flow out of the district within each aquifer in the district	Carrizo-Wilcox Aquifer	10,109
Estimated net annual volume of flow between each aquifer in the district	Flow into the Carrizo-Wilcox Aquifer from downdip Carrizo-Wilcox units	2,537
	Flow from the Carrizo-Wilcox Aquifer into the overlying Reklaw Confining Unit	1,951
	Flow into the Queen City Aquifer from the Carrizo-Wilcox Aquifer	95
	Flow from the Carrizo-Wilcox Aquifer into the Brazos River Alluvium Aquifer[1]	2,290

Units are in acre-feet per year

Brazos Valley GCD
Queen City Aquifer

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Queen City Aquifer	10,391
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Queen City Aquifer	11,123
Estimated annual volume of flow into the district within each aquifer in the district	Queen City Aquifer	3,046
Estimated annual volume of flow out of the district within each aquifer in the district	Queen City Aquifer	1,211
Estimated net annual volume of flow between each aquifer in the district	Flow into the Queen City Aquifer from the Carrizo-Wilcox Aquifer	95
	Flow into the Queen City Aquifer from the underlying Reklaw Confining Unit	1,896
	Flow into the Queen City Aquifer from downdip Queen City units	30
	Flow from the Queen City Aquifer into the overlying Weches Confining Unit	2,818
	Flow from the Queen City Aquifer into the Sparta Aquifer	205
	Flow from the Queen City Aquifer into the Brazos River Alluvium Aquifer[2]	6,288

Units are in acre-feet per year

Brazos Valley GCD
Sparta Aquifer

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Sparta Aquifer	8,568
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Sparta Aquifer	12,874
Estimated annual volume of flow into the district within each aquifer in the district	Sparta Aquifer	1,415
Estimated annual volume of flow out of the district within each aquifer in the district	Sparta Aquifer	347
Estimated net annual volume of flow between each aquifer in the district	Flow from the Queen City Aquifer into the Sparta Aquifer	205
	Flow into the Sparta Aquifer from the underlying Weches Confining Unit	2,542
	Flow from the Sparta Aquifer into downdip Sparta units	8
	Flow from the Sparta Aquifer into overlying units	149
	Flow from the Sparta Aquifer into the Brazos River Alluvium Aquifer[3]	3,870

Units are in acre-feet per year

Brazos Valley GCD
Yegua-Jackson Aquifer

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Yegua-Jackson Aquifer	26,512
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Yegua-Jackson Aquifer	39,287
Estimated annual volume of flow into the district within each aquifer in the district	Yegua-Jackson Aquifer	12,069
Estimated annual volume of flow out of the district within each aquifer in the district	Yegua-Jackson Aquifer	9,923
Estimated net annual volume of flow between each aquifer in the district	Flow into the Yegua-Jackson Aquifer from the Catahoula and younger units	17
	Flow from the confined portion of the Yegua and Jackson groups into the Yegua-Jackson Aquifer	134
	Flow from the Yegua-Jackson Aquifer into the Brazos River Alluvium Aquifer[4]	2,399

Units are in acre-feet per year

Brazos Valley GCD
Brazos River Alluvium Aquifer

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Brazos River Alluvium Aquifer	23,333
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Brazos River Alluvium Aquifer	33,859
Estimated annual volume of flow into the district within each aquifer in the district	Brazos River Alluvium Aquifer	24,447
Estimated annual volume of flow out of the district within each aquifer in the district	Brazos River Alluvium Aquifer	20,432
Estimated net annual volume of flow between each aquifer in the district	Flow from the Carrizo-Wilcox Aquifer into the Brazos River Alluvium Aquifer	2,290
	Flow from the Queen City Aquifer into the Brazos River Alluvium Aquifer	6,288
	Flow from the Sparta Aquifer into the Brazos River Alluvium Aquifer	3,870
	Flow from the Yegua-Jackson Aquifer into the Brazos River Alluvium Aquifer	2,399
	Flow from the Gulf Coast Aquifer System into the Brazos River Alluvium	2,154

Units are in acre-feet per year

Brazos Valley GCD
Gulf Coast Aquifer

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Gulf Coast Aquifer System	40
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Gulf Coast Aquifer System	255
Estimated annual volume of flow into the district within each aquifer in the district	Gulf Coast Aquifer System	332
Estimated annual volume of flow out of the district within each aquifer in the district	Gulf Coast Aquifer System	48
Estimated net annual volume of flow between each aquifer in the district	Flow into the Catahoula unit from the Jasper Aquifer[5]	46
	Flow from the Gulf Coast Aquifer System into the Brazos River Alluvium[6]	2,154

Units are in acre-feet per year

Mid-East Texas GCD Carrizo-Wilcox Aquifer

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Carrizo-Wilcox Aquifer	105,777
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Carrizo-Wilcox Aquifer	113,293
Estimated annual volume of flow into the district within each aquifer in the district	Carrizo-Wilcox Aquifer	17,377
Estimated annual volume of flow out of the district within each aquifer in the district	Carrizo-Wilcox Aquifer	20,772
Estimated net annual volume of flow between each aquifer in the district	Flow from the Carrizo-Wilcox Aquifer into downdip Carrizo-Wilcox units	523
	Flow into the Carrizo-Wilcox Aquifer from the overlying Reklaw Confining Unit	1,491
	Flow into the Queen City Aquifer from the Carrizo-Wilcox Aquifer	1,394

Units are in acre-feet per year

Mid-East Texas GCD
Queen City Aquifer

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Queen City Aquifer	69,600
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Queen City Aquifer	74,582
Estimated annual volume of flow into the district within each aquifer in the district	Queen City Aquifer	4,417
Estimated annual volume of flow out of the district within each aquifer in the district	Queen City Aquifer	3,886
Estimated net annual volume of flow between each aquifer in the district	Flow into the Queen City Aquifer from the Carrizo-Wilcox Aquifer	1,394
	Flow into the Queen City Aquifer from the underlying Reklaw Confining Unit	445
	Flow into the Queen City Aquifer from downdip Queen City units	11
	Flow from the Queen City Aquifer into the overlying Weches Confining Unit	872
	Flow into the Queen City Aquifer from the Sparta Aquifer	802

Units are in acre-feet per year

Mid-East Texas GCD
Sparta Aquifer

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Sparta Aquifer	21,332
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Sparta Aquifer	24,201
Estimated annual volume of flow into the district within each aquifer in the district	Sparta Aquifer	1,459
Estimated annual volume of flow out of the district within each aquifer in the district	Sparta Aquifer	1,513
Estimated net annual volume of flow between each aquifer in the district	Flow into the Queen City Aquifer from the Sparta Aquifer	725
	Flow into the Sparta Aquifer from the underlying Weches Confining Unit	949
	Flow from the Sparta Aquifer into overlying units	850

Units are in acre-feet per year

Mid-East Texas GCD Carrizo-Wilcox Aquifer

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Yegua-Jackson Aquifer	31,137
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Yegua-Jackson Aquifer	46,448
Estimated annual volume of flow into the district within each aquifer in the district	Yegua-Jackson Aquifer	15,344
Estimated annual volume of flow out of the district within each aquifer in the district	Yegua-Jackson Aquifer	10,411
Estimated net annual volume of flow between each aquifer in the district	Yegua-Jackson Aquifer	0[1]

Units are in acre-feet per year

QUESTIONS?

Tentative GMA 12 Schedule

- **Tentative GMA 12 schedule for the GMA to consider**
- January 29, 2020- Additional Y-J and BRA GAM runs and discussion; begin discussion of nine factors (hydrologic conditions); get direction on Carrizo-Wilcox model runs; discuss draft White Paper regarding groundwater management/planning;
- April, 2020- Continue discussion of nine factors (Supplies/Needs/WMS; Aquifer Uses & Conditions; Subsidence); present and discuss results of any new modeling scenarios; get direction on new modeling scenarios; discuss potential DFCs for certain aquifers;

Tentative GMA 12 Schedule

- July, 2020- Continue discussion of nine factors (socioeconomic and environmental considerations; private property rights); present and discuss results of any new modeling scenarios; get direction on new modeling scenarios if needed; discuss potential DFCs;
- Fall 2020- Discuss and finalize proposed DFCs, discuss DFC feasibility factor (have to have specific proposed DFCs to complete this factor analysis);
- Winter 2020-2021- Individual GCDs meet, discuss, and formally approve/adopt proposed DFCs;

Tentative GMA 12 Schedule

- Spring 2021- GMA 12 meeting to discuss outcome of individual GCD meetings and potentially adopt proposed DFCs
- Mid-April, 2021- GMA 12 meeting to adopt proposed DFCs if not done previously
- May 1, 2021- Deadline for proposed DFC submittal to TWDB (this is a Saturday, so plan on submitting by Friday, April 30, 2021)
- Summer 2021- GCDs receive public comments and hold public hearings
- Fall 2021- GMA 12 meets and reviews and discusses public comment received

Tentative GMA 12 Schedule

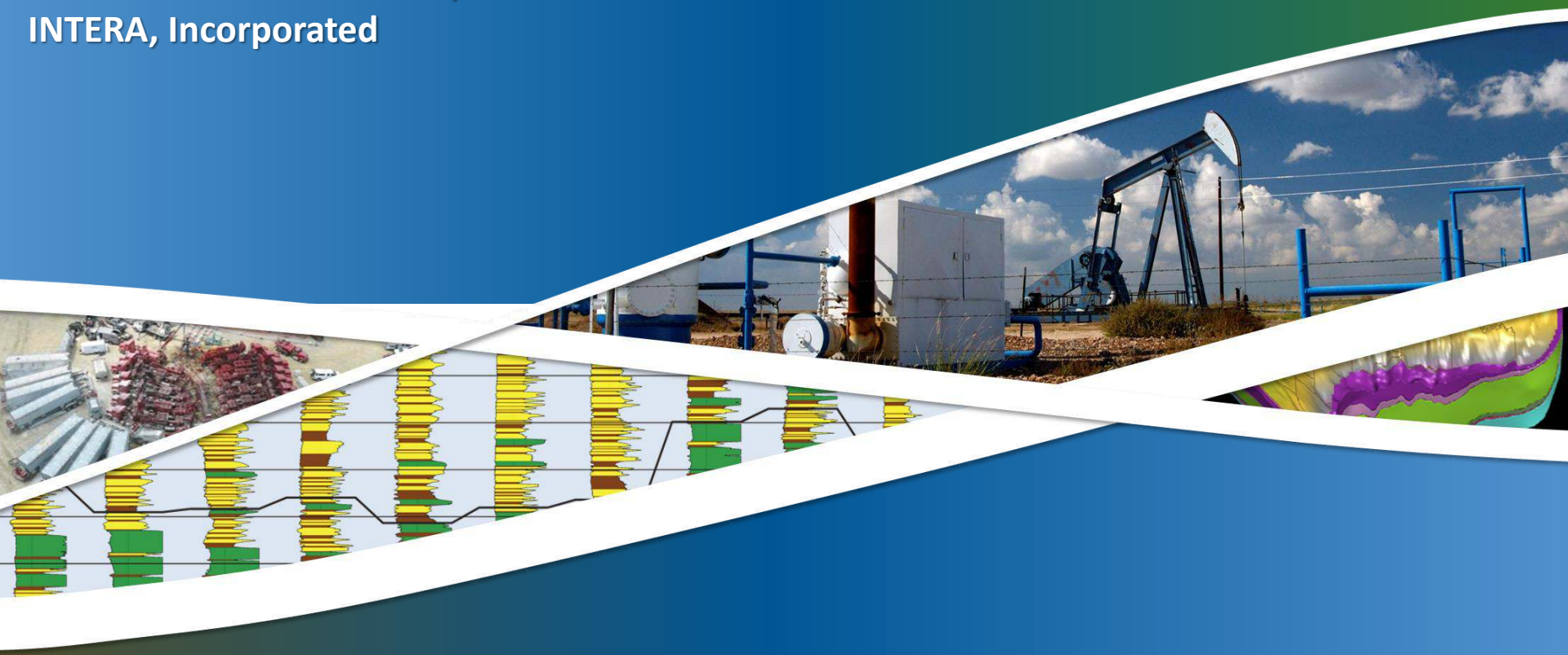
- Winter 2021- GMA 12 meeting to adopt final DFCs, discuss draft Explanatory Report
- Jan. 5, 2022- Deadline for final DFC adoption
- Spring 2022- Adopt final Explanatory Report

APPENDIX O

SEPTEMBER 18, 2020 PRESENTATION "PRESENTATION TO GMA-12: CONSIDERATION FOR ENVIRONMENTAL IMPACTS"

PRESENTATION TO GMA-12: Consideration for Environmental Impacts

By consultants for the:
Daniel B. Stephens & Associates
Ground Water Consultants, LLC
INTERA, Incorporated



September 18, 2020

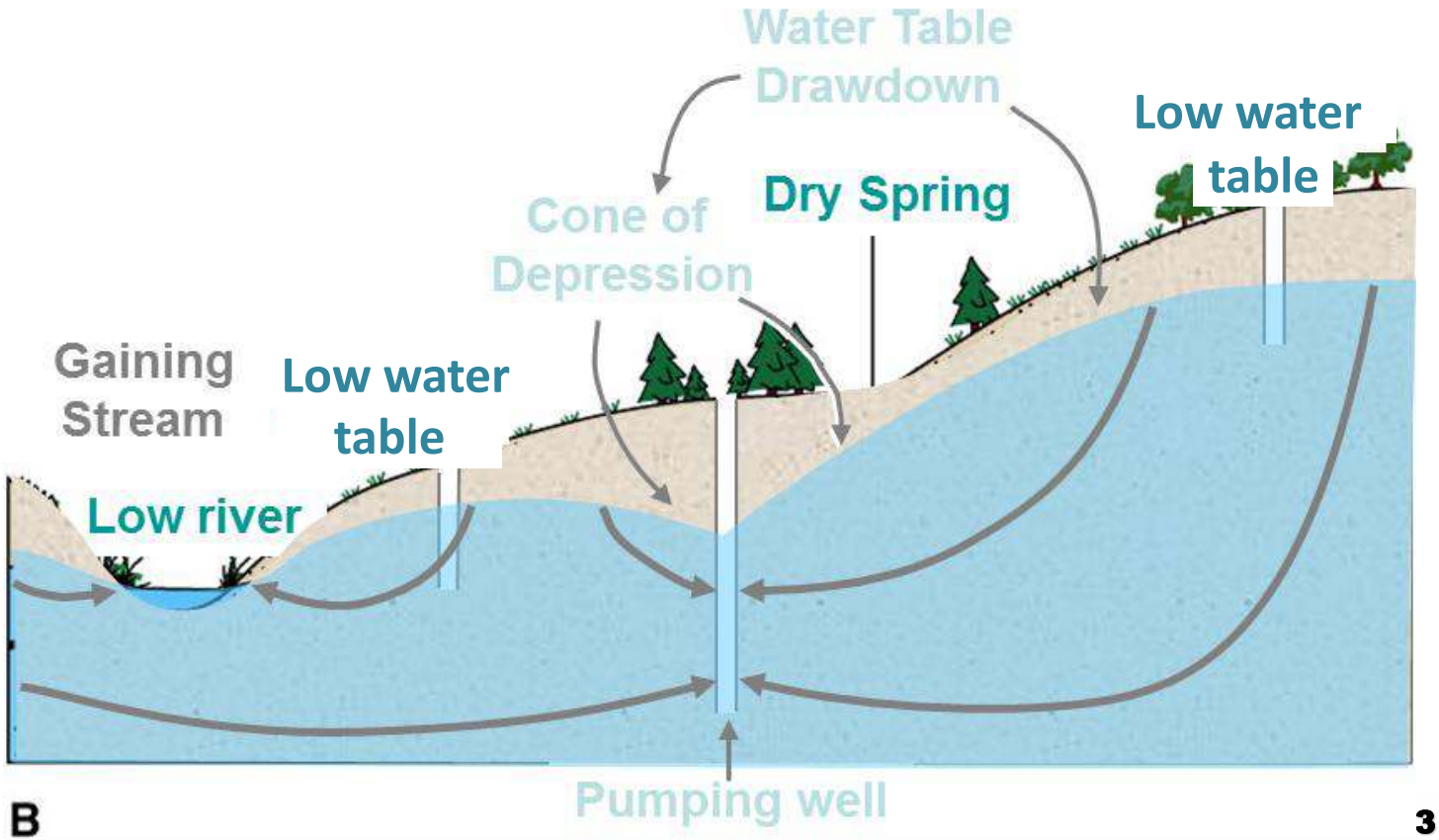
OUTLINE FOR CONSIDERATIONS FOR ENVIRONMENTAL IMPACTS

- Introduction to Shallow Groundwater Flow Systems
  - Springs
  - GW-SW interaction
- Brazos River Alluvium Aquifer GAM
  - Model overview
  - Simulated SW-GW interaction for Brazos River
- Sparta/Queen City/Carrizo-Wilcox GAM
  - Model overview
  - Simulated SW-GW interaction for Brazos River and Colorado River
- Springs in GMA 12
- Summary of Environmental Issues or Topic

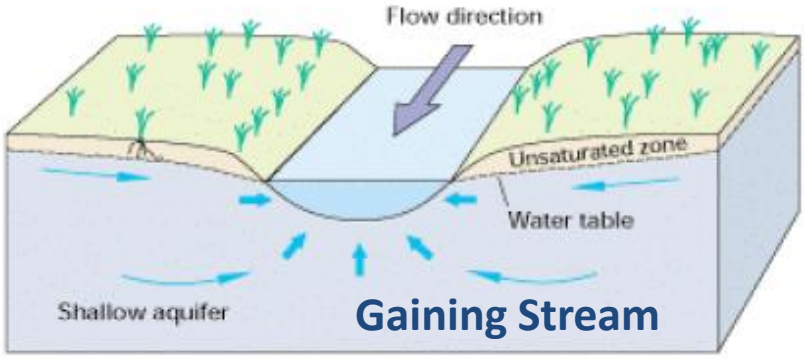
EXAMPLES OF HOW PUMPING CAN CAUSE ENVIRONMENTAL IMPACTS

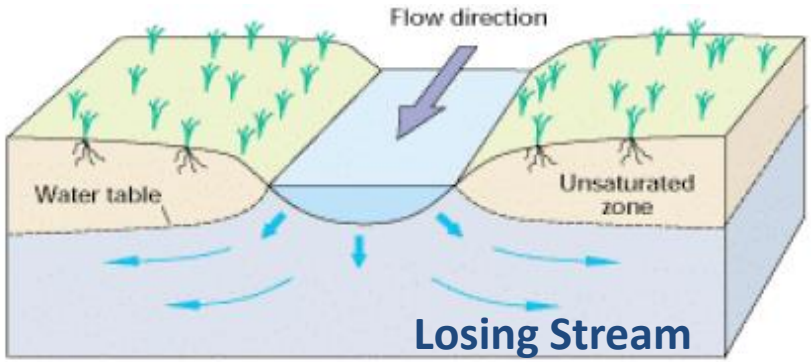
- **Reduced flows to rivers**
- **Withdrawal from rivers (losing streams)**
- **Reduced spring flows**
- **Dried springs**
- **Lowered water table (vegetation impact)**

Caused by lower of water levels



CONCEPT OF GAINING AND LOSING STREAMS





USGS Circular 1186, 1999

- Gaining:
  - Net discharge of groundwater to surface water "base flow"
- Losing:
  - Net discharge of surface water to groundwater "recharge"

The TCEQ rules define baseflow as "*[t]he portion of streamflow uninfluenced by recent rainfall or flood runoff and is comprised of springflow, seepage, discharge from artesian wells or other groundwater sources, and the delayed drainage of large lakes and swamps.*

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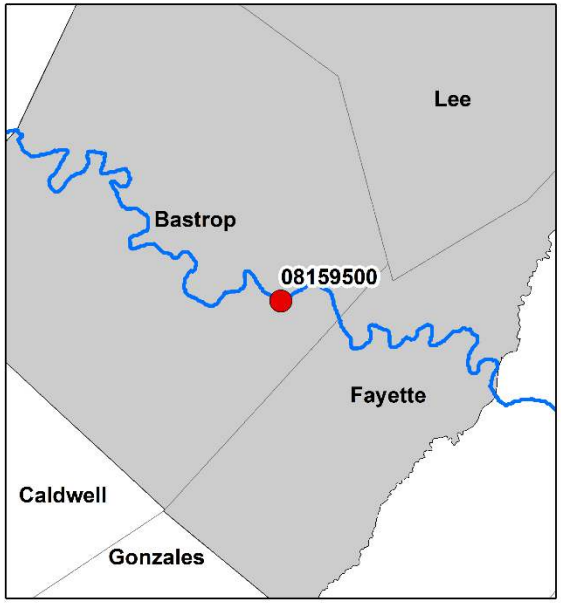
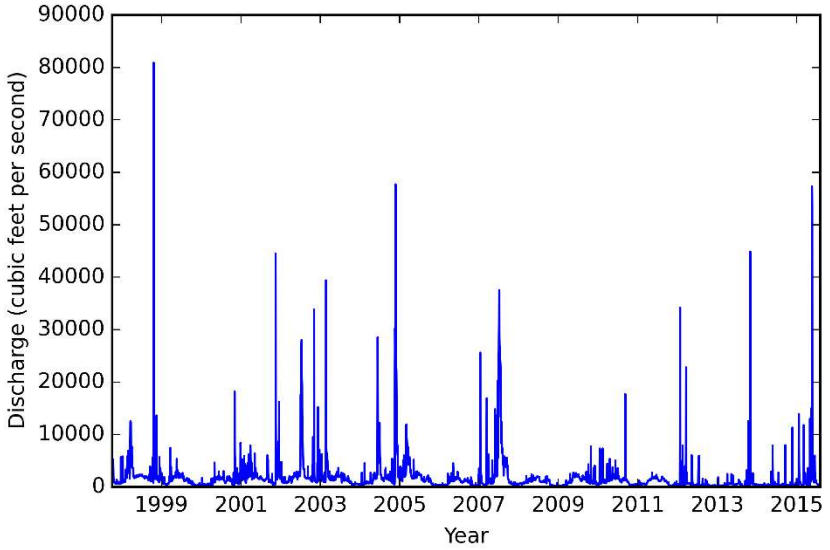
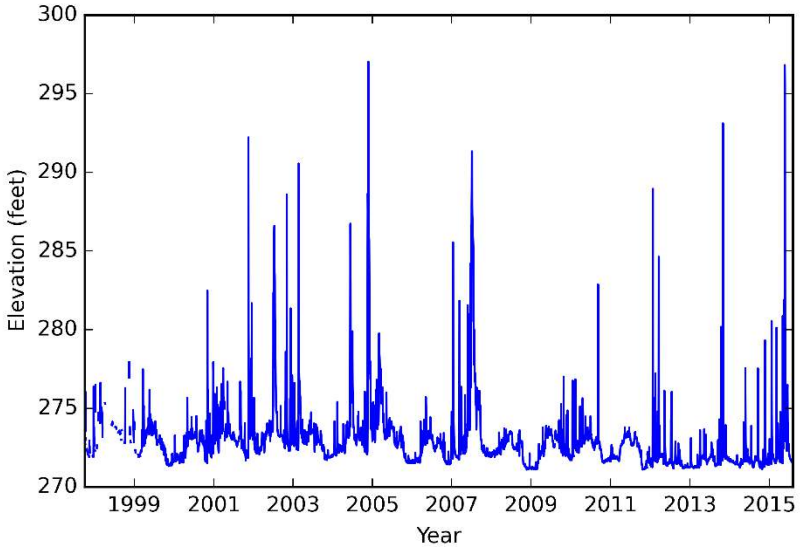
STREAM DATA FROM THE COLORADO RIVER



Example Gage on Colorado River

Average annual flow is 1.4 million acre-ft/yr
(~ 1,900 cfs)

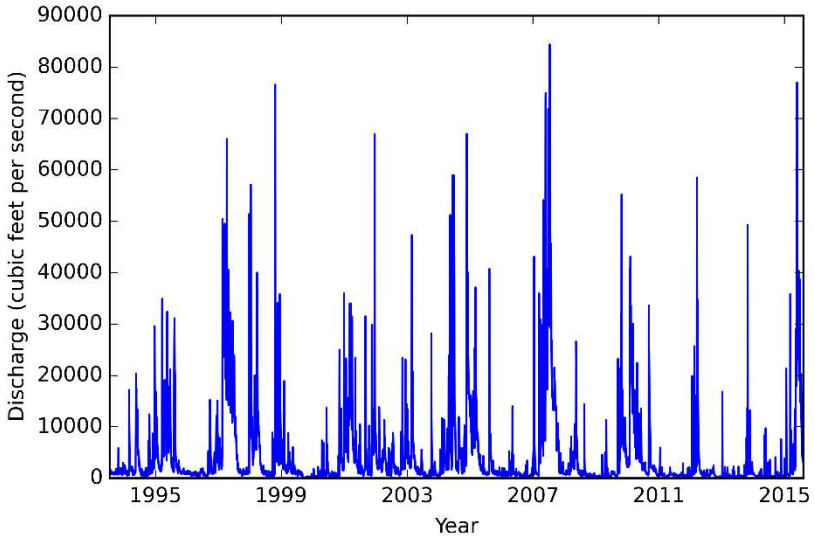


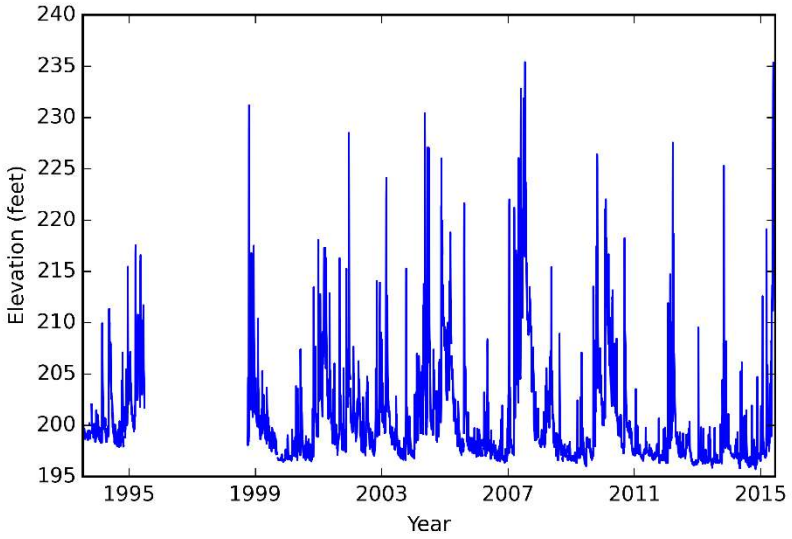


STREAM DATA FROM THE BRAZOS RIVER

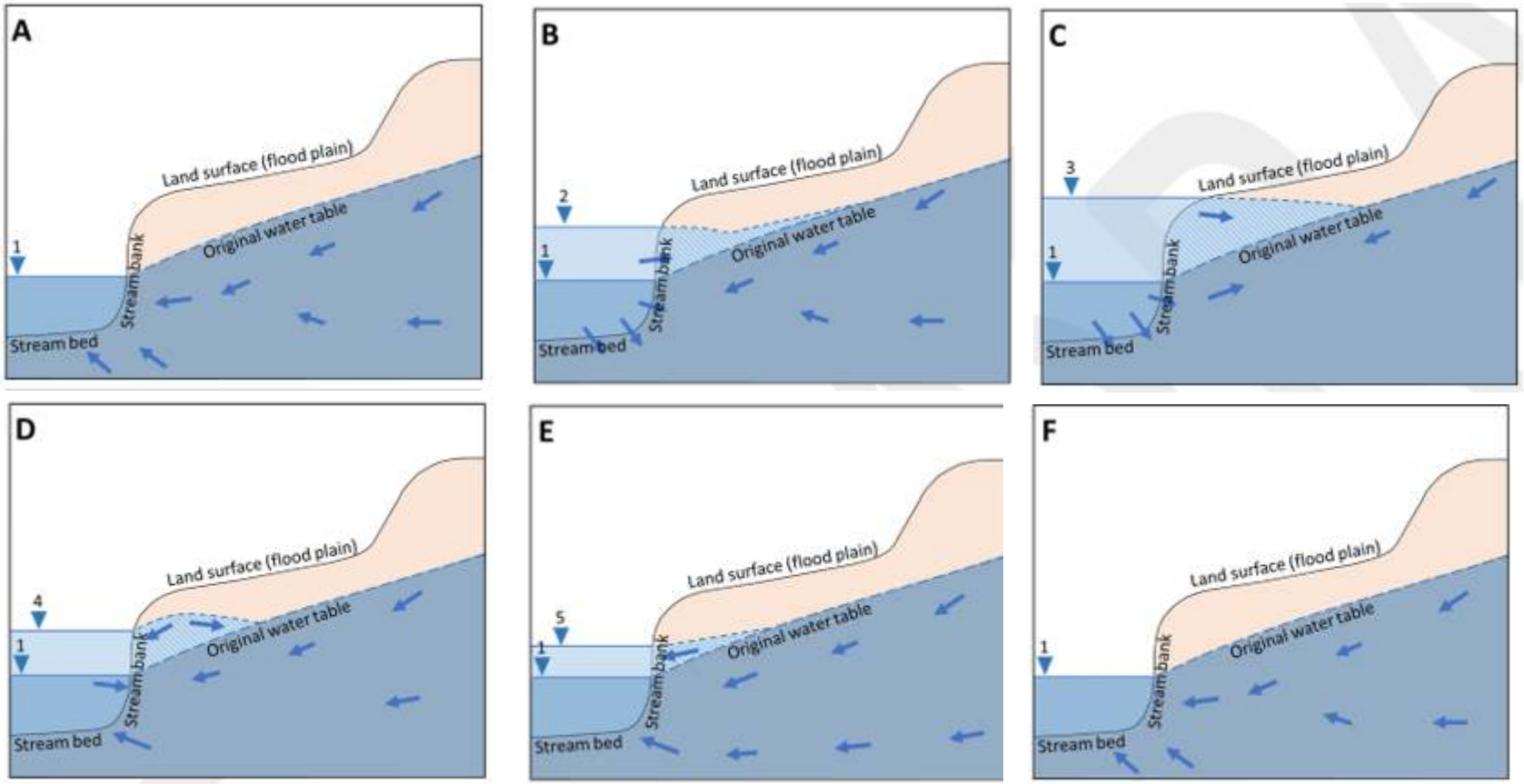
Example Gage on Brazos River

Average annual flow is 3.5 million acre-ft/yr
(~ 4,890 cfs)





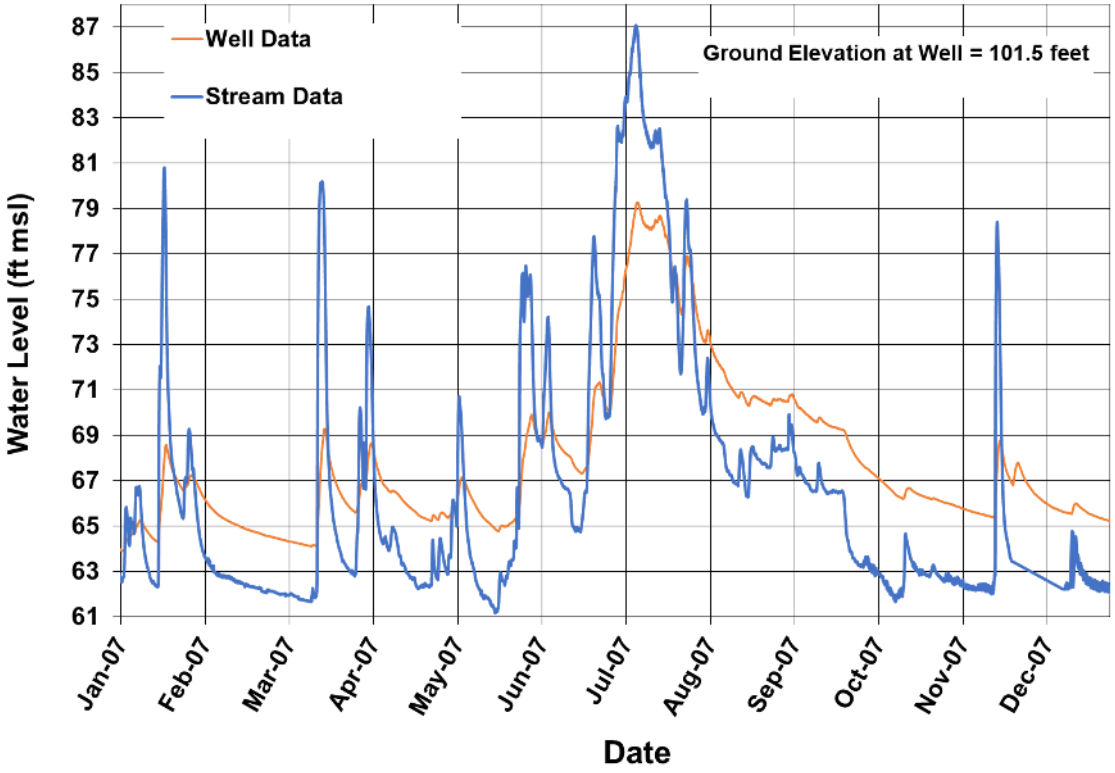
SCHEMATIC OF PROCESSES AFFECTING BANK STORAGE AND BANK FLOW



*From Young and others (2017)

EVIDENCE OF BANK STORAGE AND BANK FLOW IN ALLUVIUM

Comparison of water levels in river gauge and groundwater well near City of Wharton (Young and others, 2018)

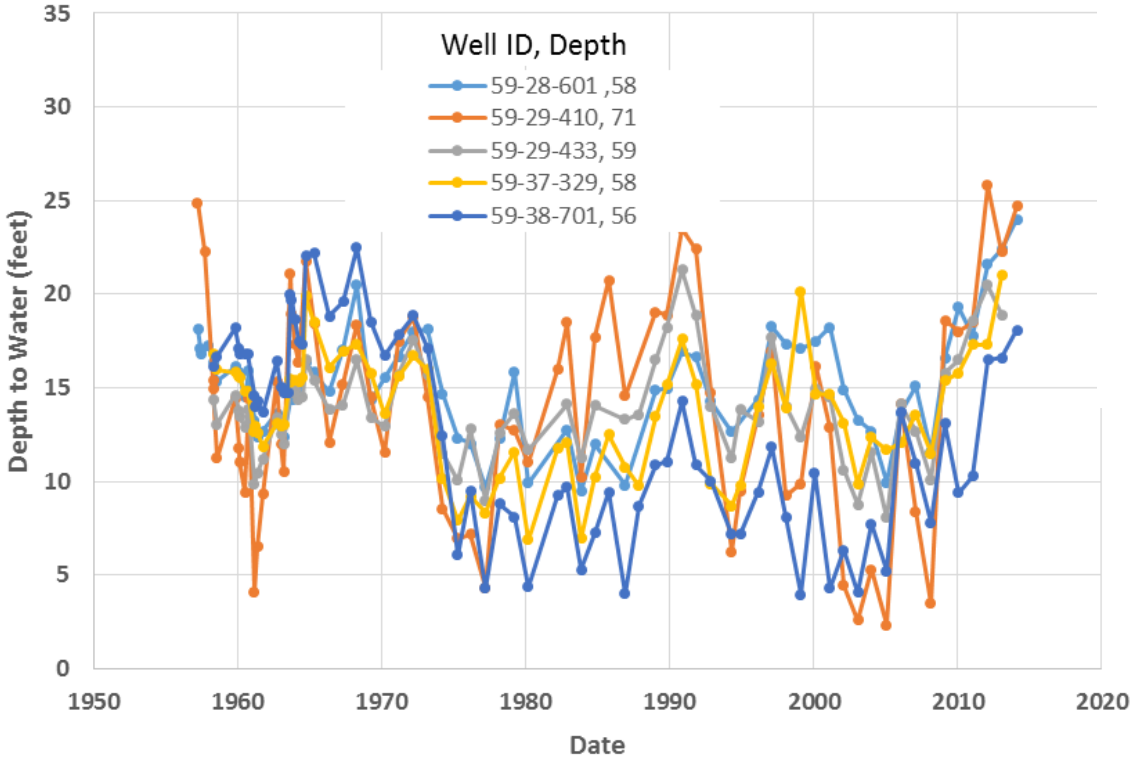


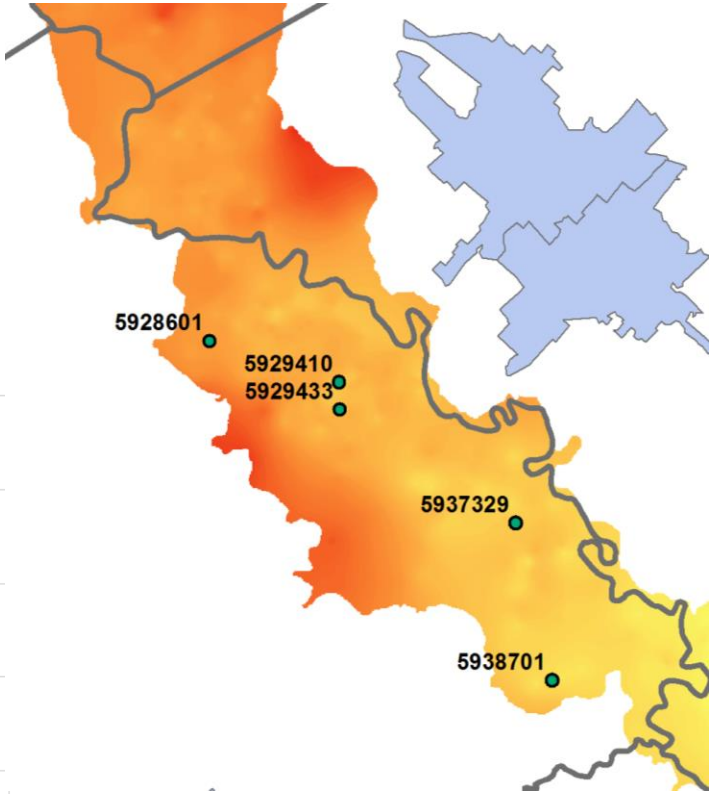
Note: well is located about 200 feet from river

Comparison of Isotopes in groundwater in Burleson County and surface water in Brazos River

This study involved the analysis of water levels and water quality in the Brazos River and groundwater in Burleson County. Over a four-month post-flood event period, Rhodes and others (2017) estimated that 96% of the groundwater that flowed to the Brazos River from the aquifer was from bank storage or water in temporary residence

EVIDENCE OF LIMITED PERSISTANCE FOR LOW WATER LEVEL CONDITIONS IN ALLUVIUM





POTENTIALLY IMPORTANT CHARACTERISTICS OF ALLUVIAL DEPOSITS AFFECTING GW-SW INTERACTION

- Transient and dynamic nature of water levels in rivers that occurs at time scales much smaller than 1 year
- Bank storage in alluvium during times of high river levels
- Bank flow from alluvium during after times of high river levels
- Short persistence (less than a few years) of low water levels in alluvium

APPLICATION OF THE BRAA AND SP/QC/CW GAMs FOR SIMULATING GW-SW EXCHANGE

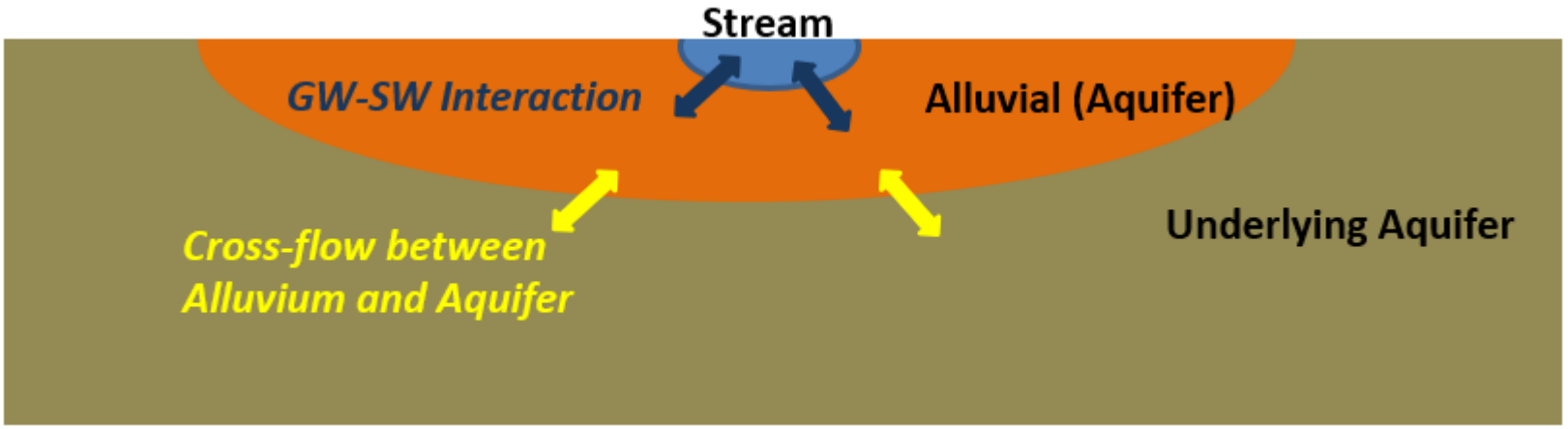
- Strengths
  - provide a better shallow ground flows zones than previous GAMs
  - explicitly account for the impact of alluvium on GW-SW interactions
  - grid refinement near streams to improve representation of river cells and wells
- Short-comings
  - Hydraulic properties of stream beds are largely unknown
  - Equations and do not account for potentially important processes such as unsaturated flow and bank flow
  - Input data and calibration targets are based on time intervals of 1-year, but GW-SW interactions are driven by processes that occur on time scale of hours to days
  - GAM predictions have not been validated with field data

APPLICATION OF THE BRAA AND SP/QC/CW GAMs FOR SIMULATING GW-SW EXCHANGE (con't)

- Given careful application and analysis, GAMs are suitable for developing some qualitative relationship between pumping and GW-SW exchange

- Without refinement in their representation of changing surface water levels and subsequent validation using measured field data, GAMs are not suitable for developing quantitative relationship between pumping and GW-SW exchange

WATER BUDGET FOR GW-SW EXCHANGE THAT IS SIMULATED BY THE GAMS

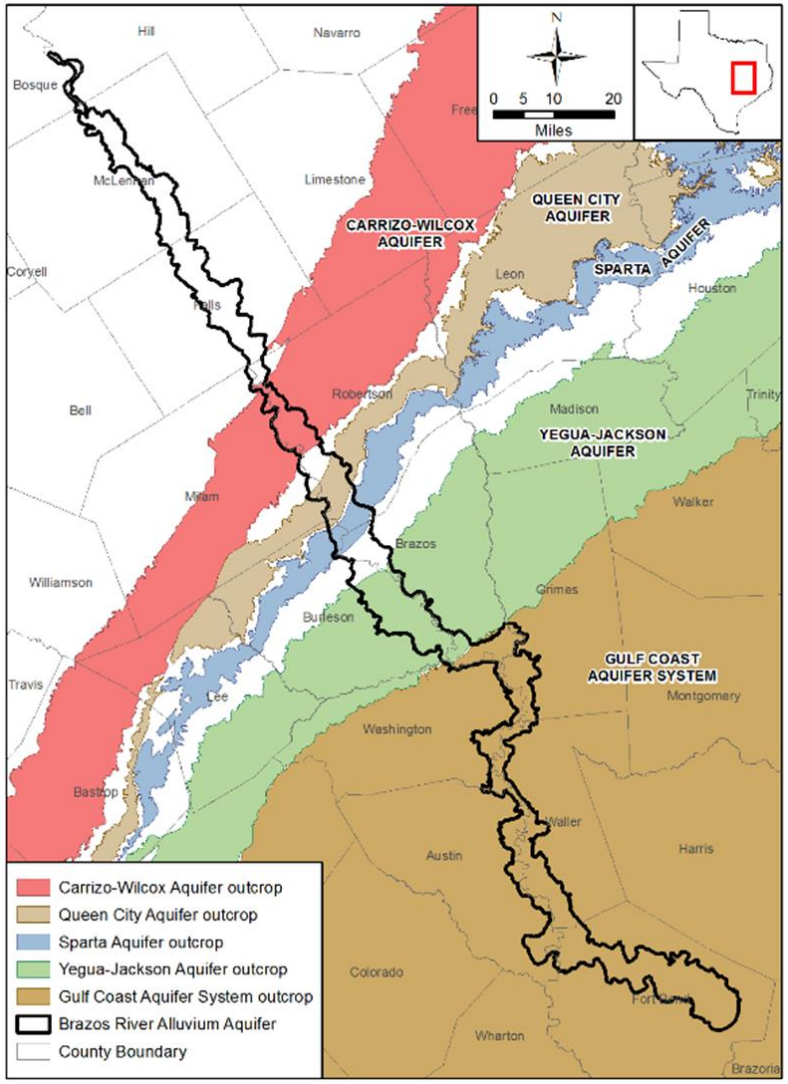


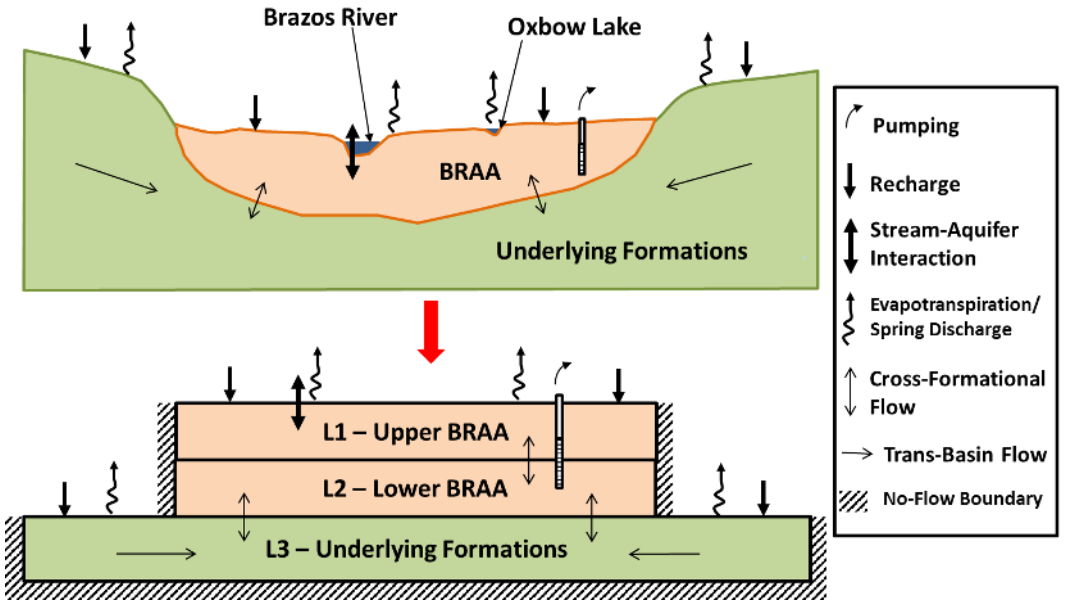
GW-SW Interaction

Flow from Aquifer to Stream is Negative
Flow From Stream to Aquifer is Positive

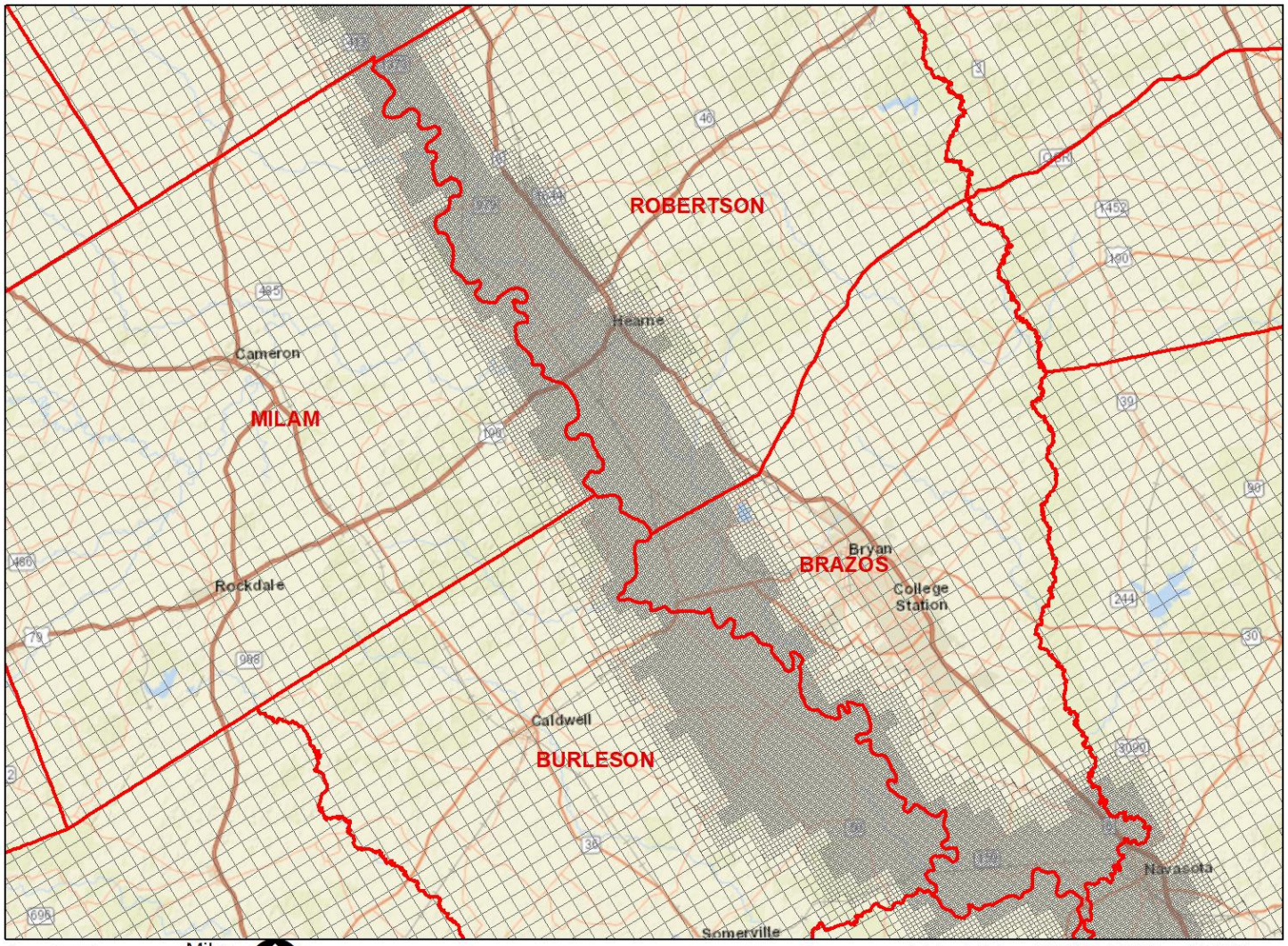
Positive Net Flow Stream Flow = Losing Stream
Negative Net Flow Stream Flow = Gaining Stream

CONCEPTUAL MODEL FOR THE BRAZOS RIVER ALLUVIAL AQUIFER (BRAA) GAM

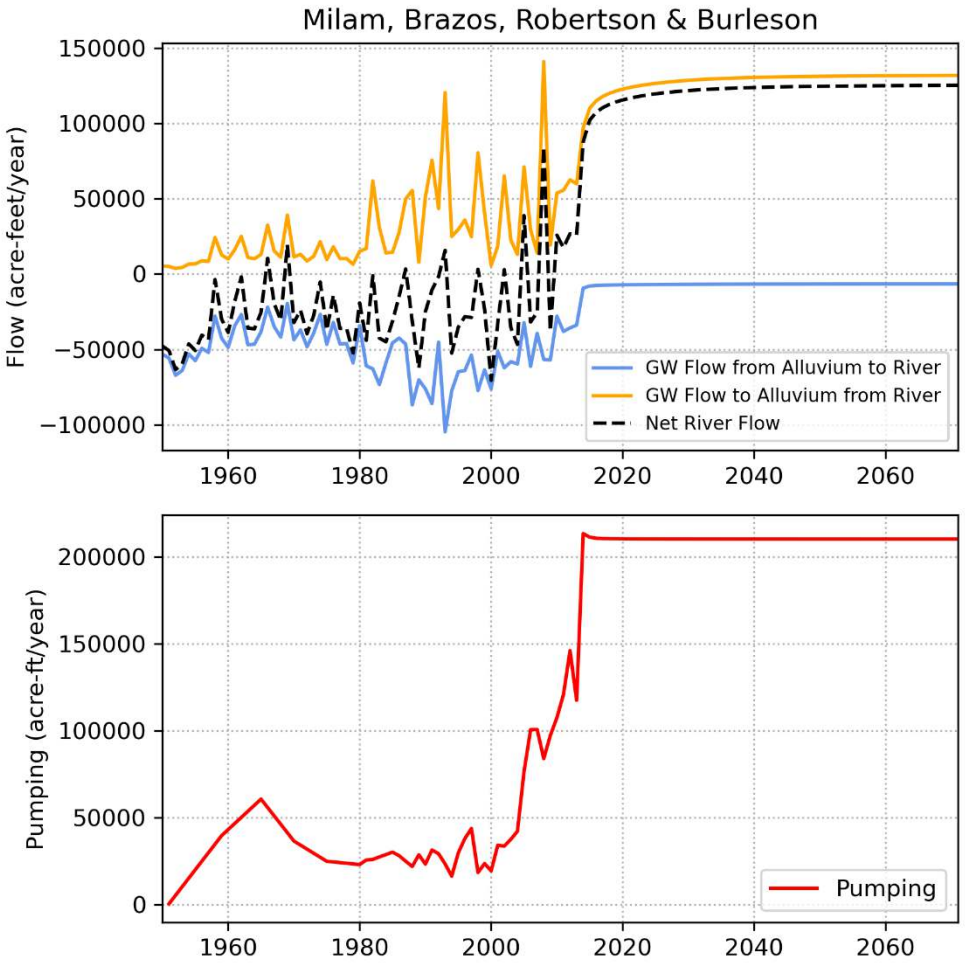




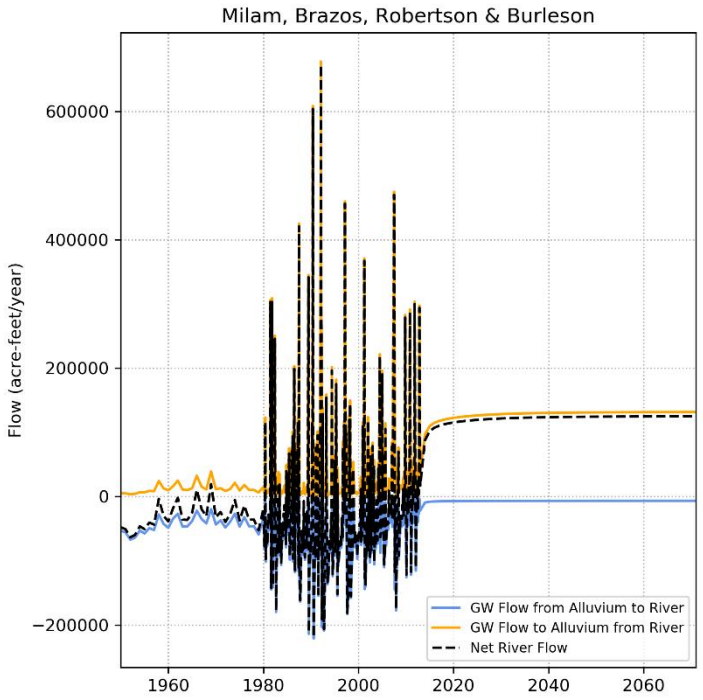
MODEL GRID FOR THE BRAA



BRAA GAM SIMULATED WATER BALANCE: GMA 12



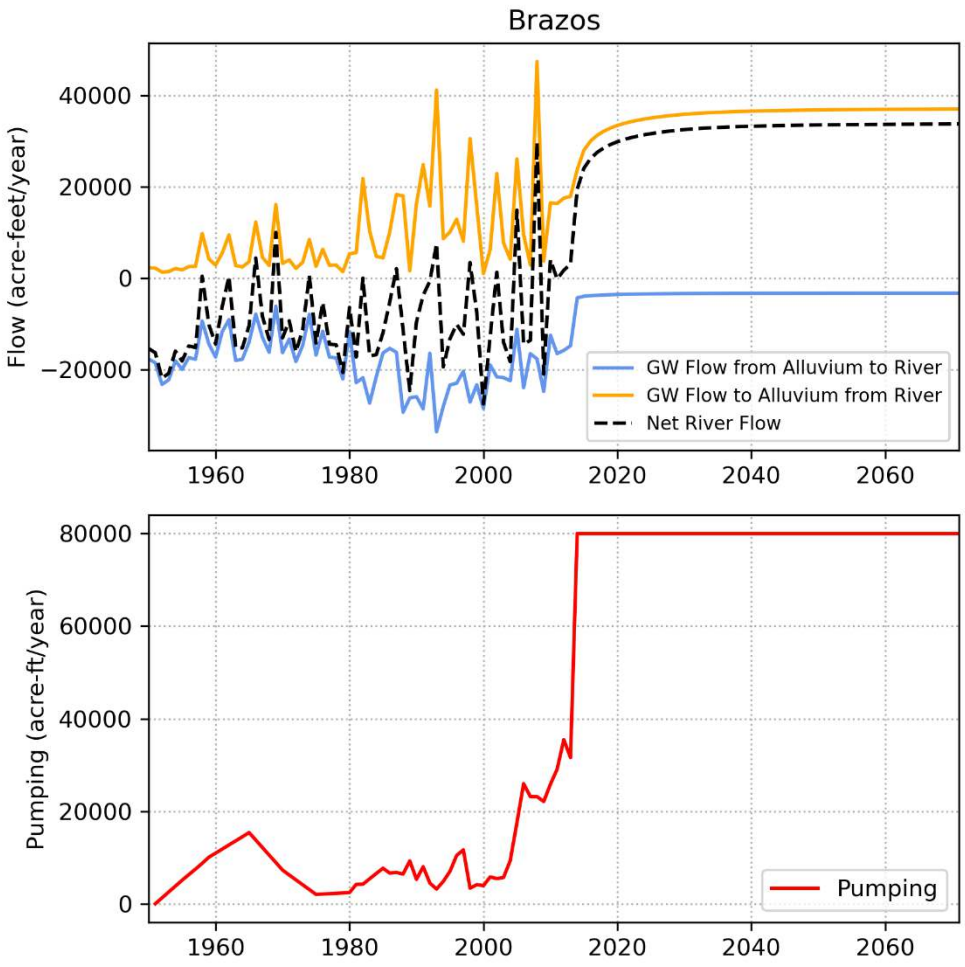
Year	Net GW Flow (acft/yr)
2010	4,399
2070	125,111
Differerence	120,712

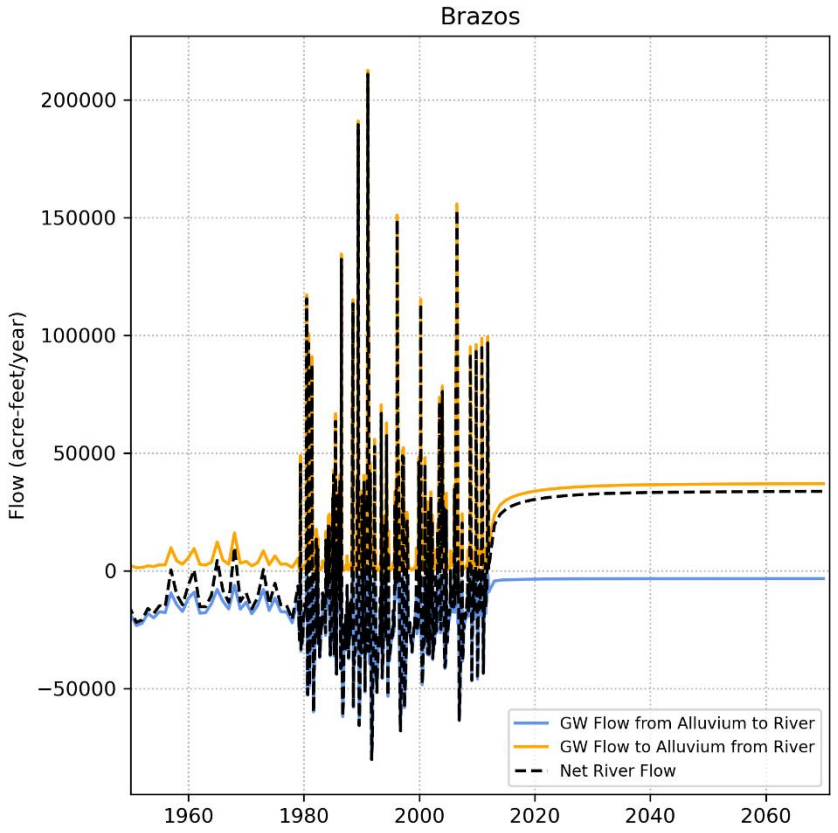


Note: over 200,000 AFY pumping continuously from 2010 to 2070

BRAA GAM SIMULATED WATER BALANCE: BRAZOS

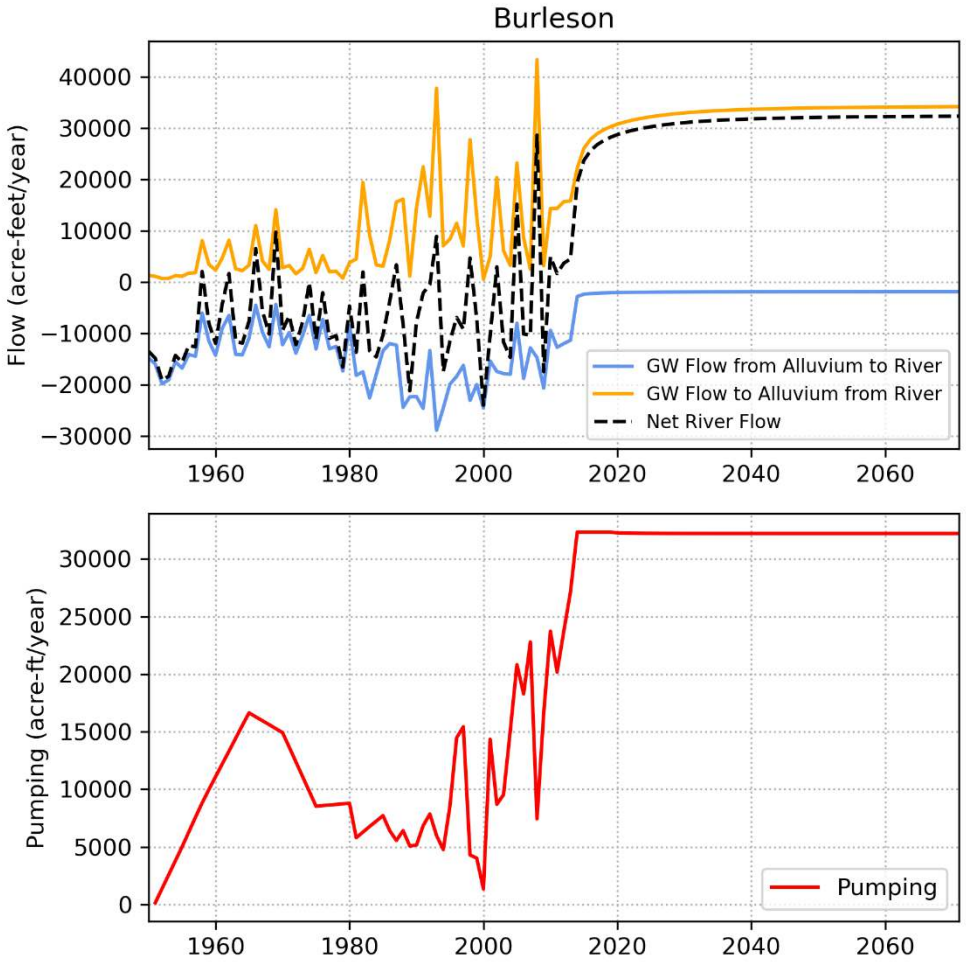
Year	Net GW Flow (acft/yr)
2010	-3,247
2070	33,728
Differerence	36,975

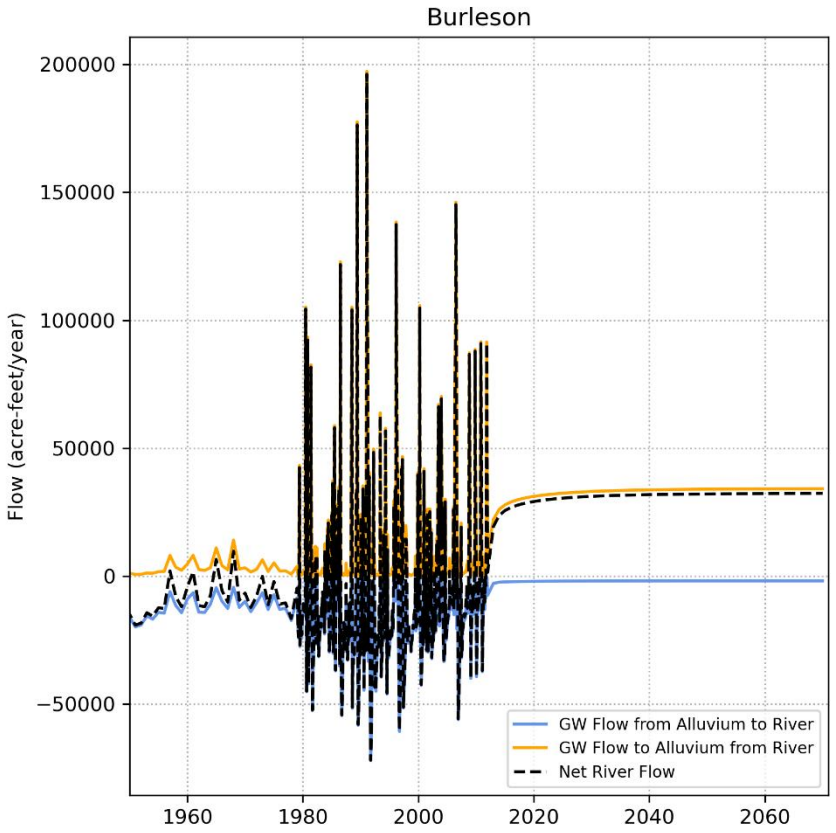




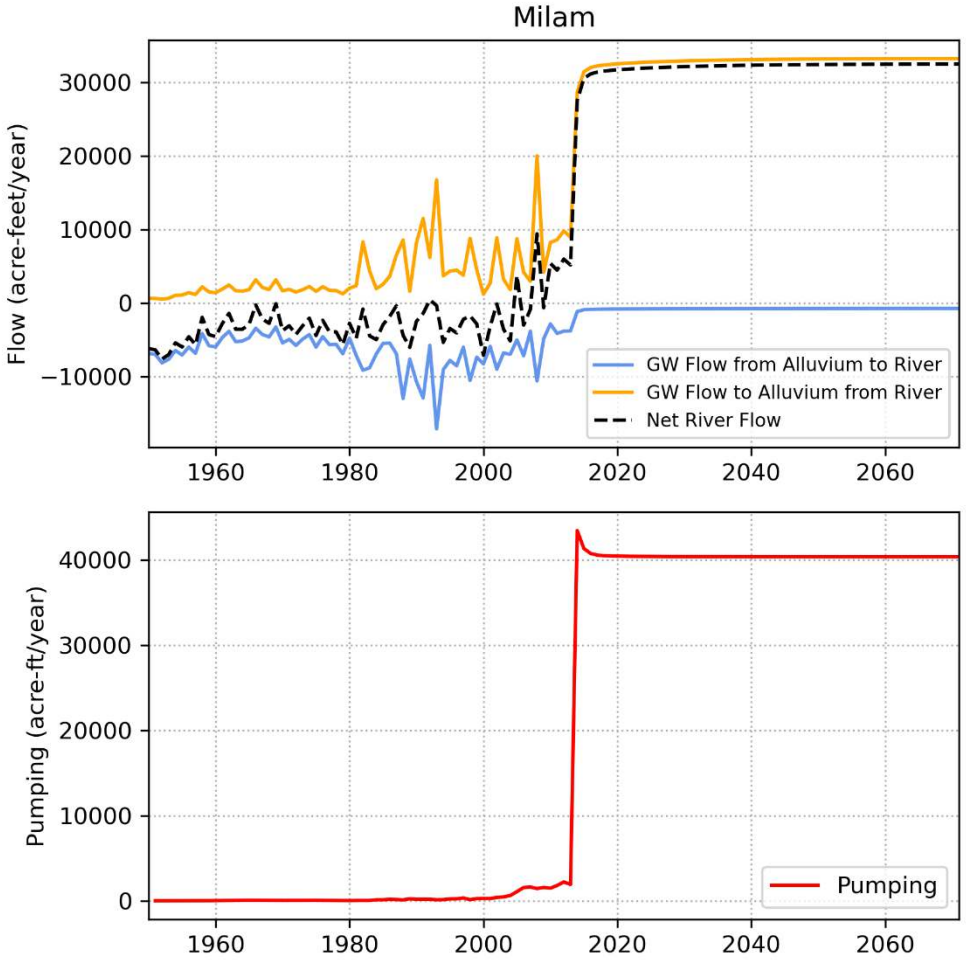
BRAA GAM SIMULATED WATER BALANCE: BURLESON

Year	Net GW Flow (acft/yr)
2010	-2,267
2070	32,355
Differerence	34,622

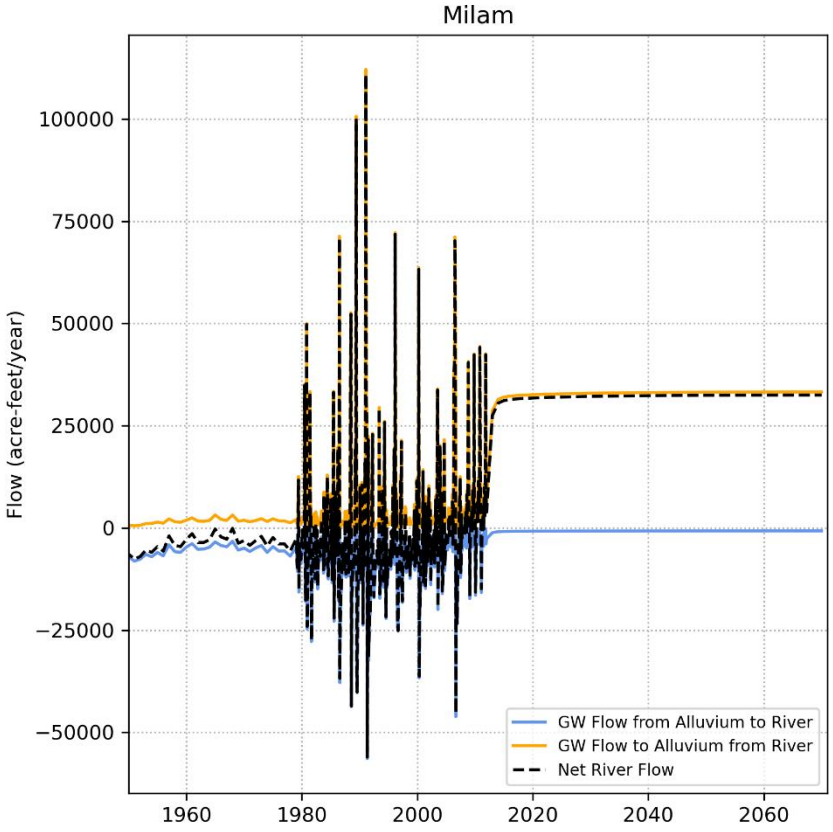




BRAA GAM SIMULATED WATER BALANCE: MILAM

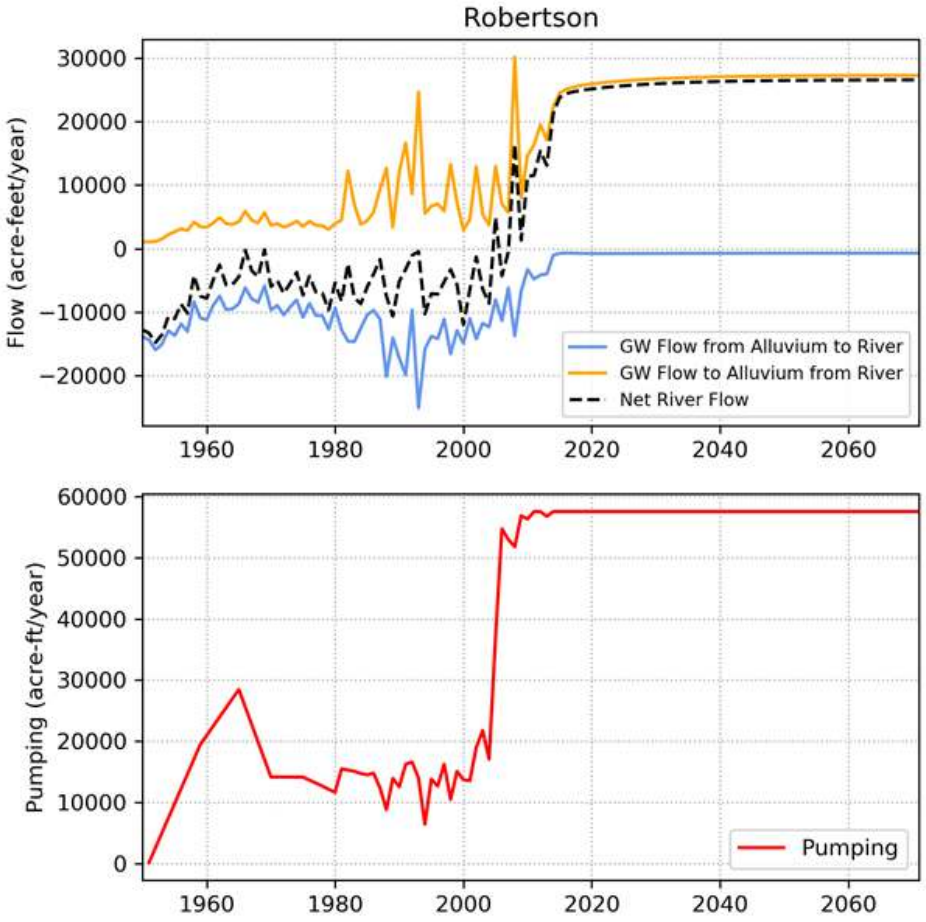


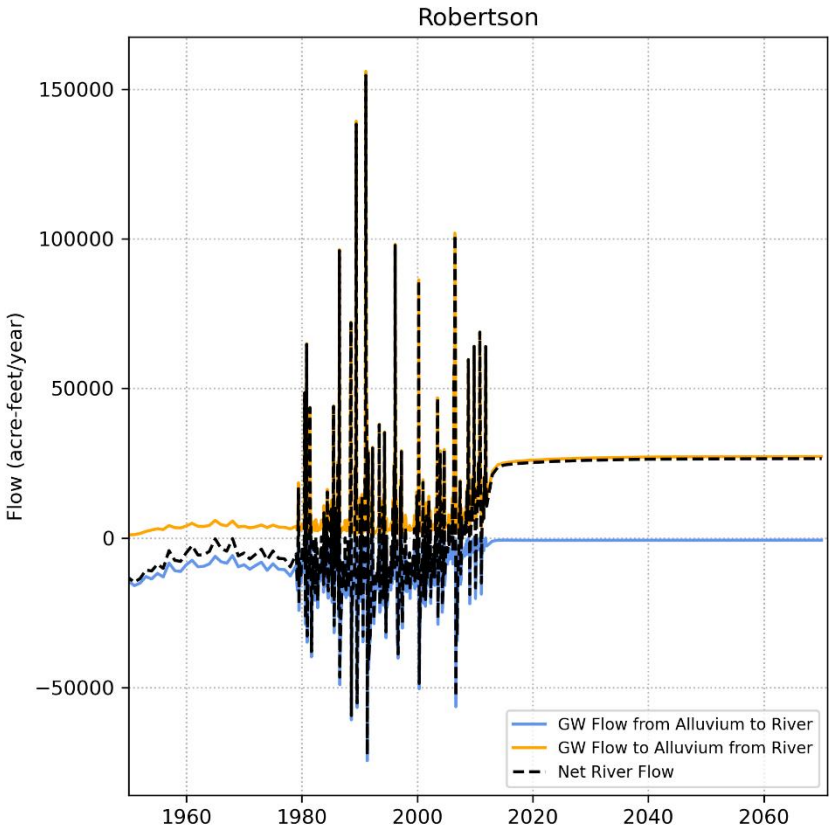
Year	Net GW Flow (acft/yr)
2010	2,429
2070	32,494
Differerence	30,065



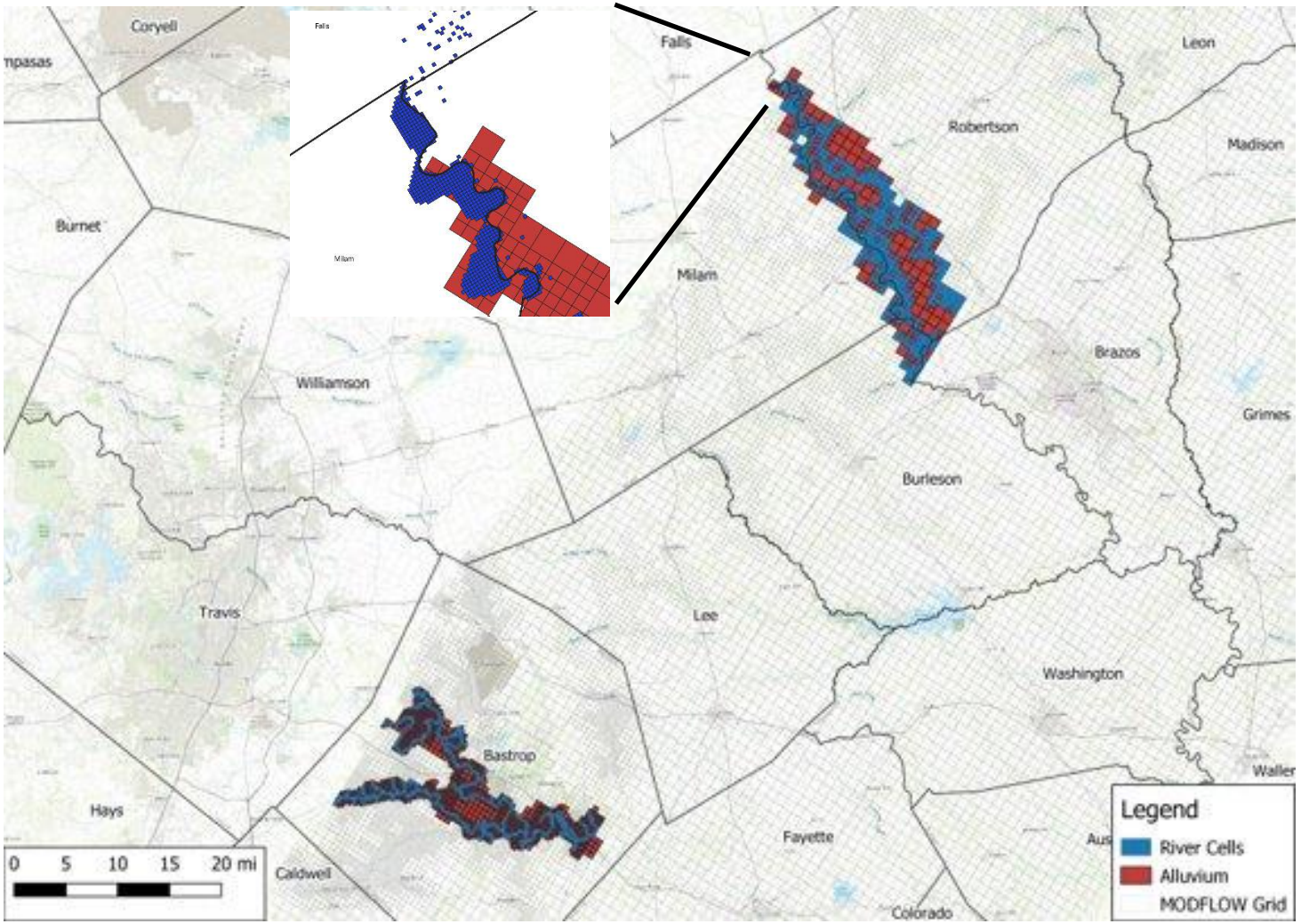
BRAA GAM SIMULATED WATER BALANCE: ROBERTSON

Year	Net GW Flow (acft/yr)
2010	7,484
2070	26,534
Differerence	19,050





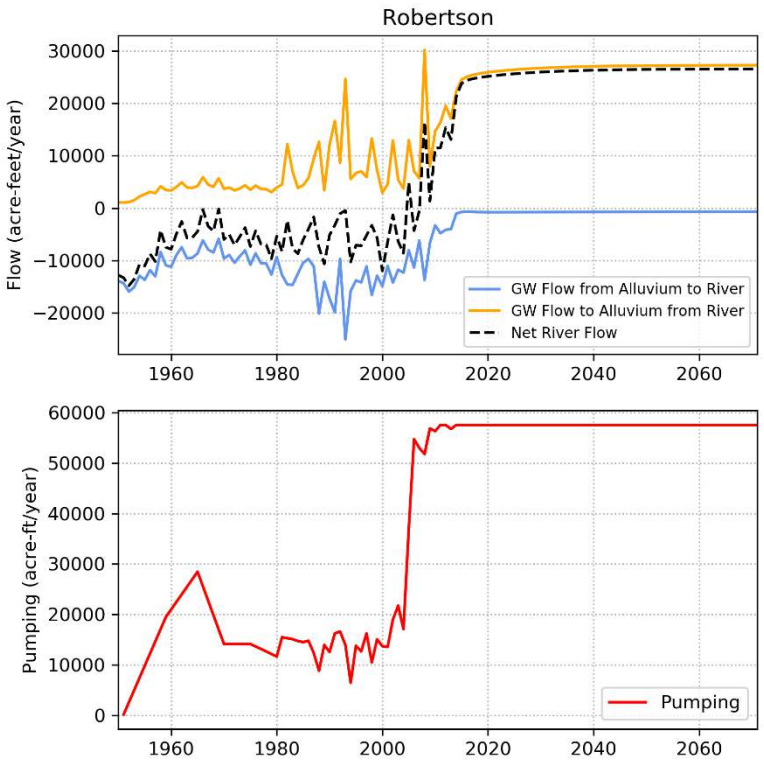
LOCATION OF ALLUVIUM IN SPARTA/QUEEN CITY/CARRIZO WILCOX GAM



COMPARISON OF GAM SIMULATIONS FOR ROBERTSON COUNTY

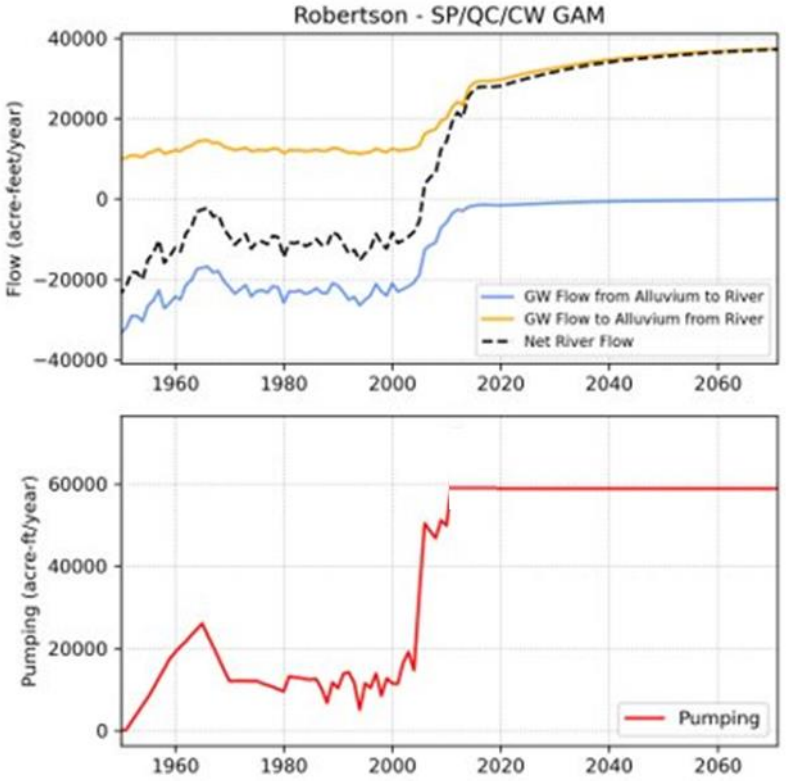
BRAA GAM

Year	Net GW Flow (acft/yr)
2010	7,484
2070	26,534
Differerence	19,050



SP/QC/CW GAM

Year	Net GW Flow (acft/yr)
2010	14,285
2070	37,198
Differerence	22,913

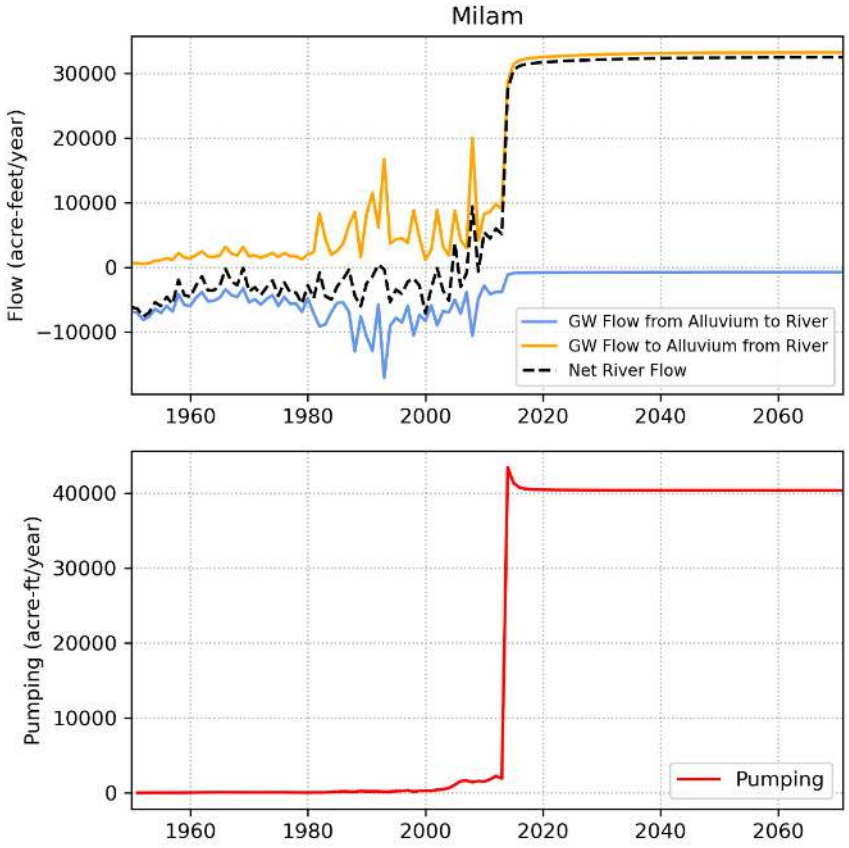


Note: pumping is from alluvium

COMPARISON OF GAM SIMULATIONS FOR MILAM COUNTY

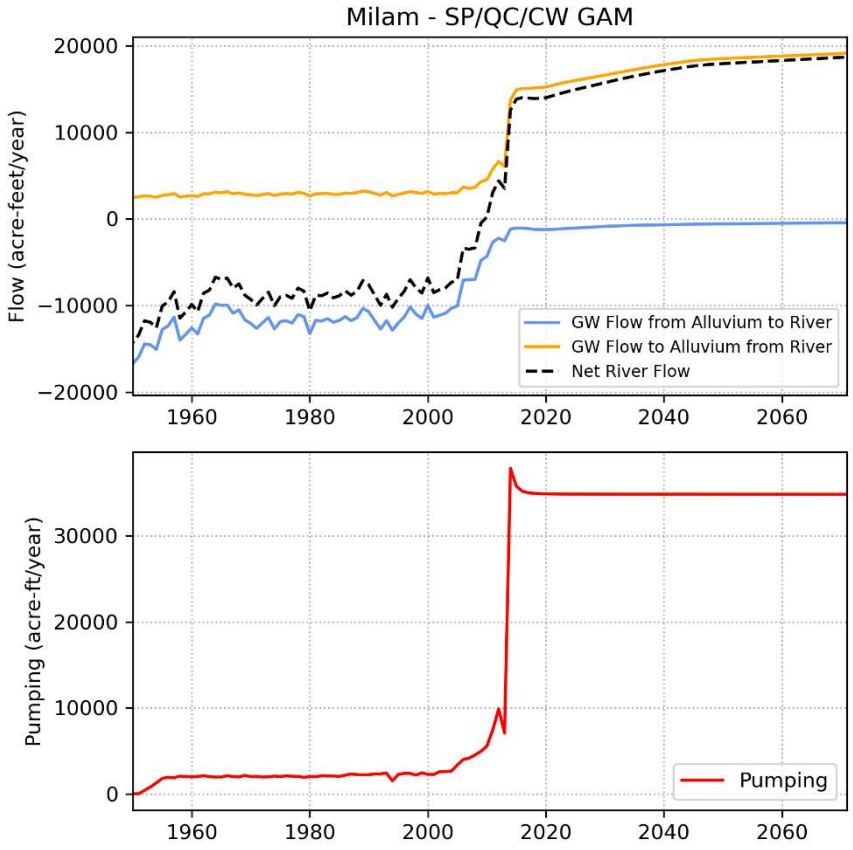
BRAA GAM

Year	Net GW Flow (acft/yr)
2010	2,429
2070	32,494
Differerence	30,065



SP/QC/CW GAM

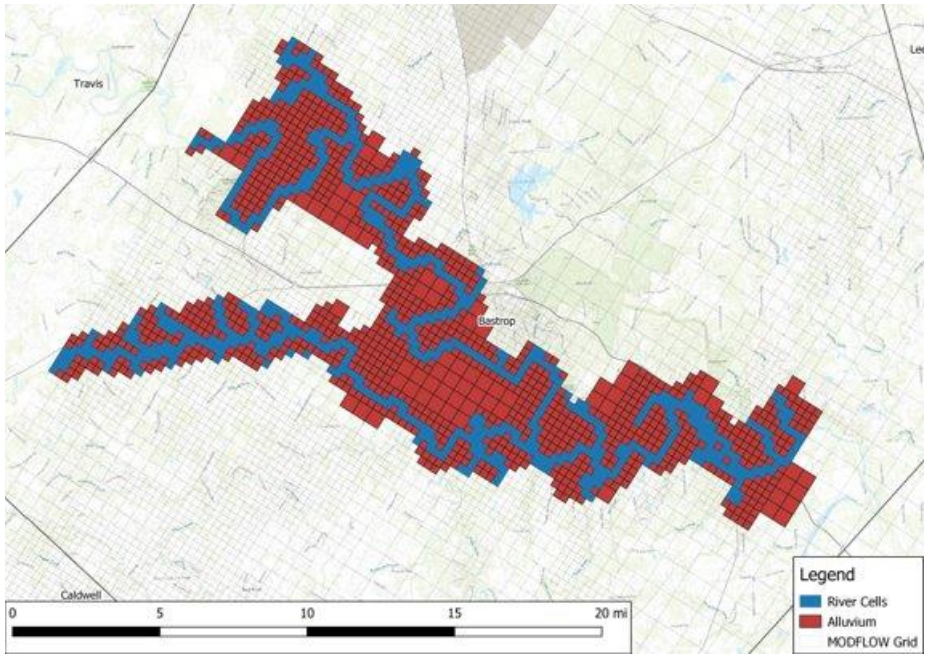
Year	Net GW Flow (acft/yr)
2010	199
2070	18,702
Differerence	18,503

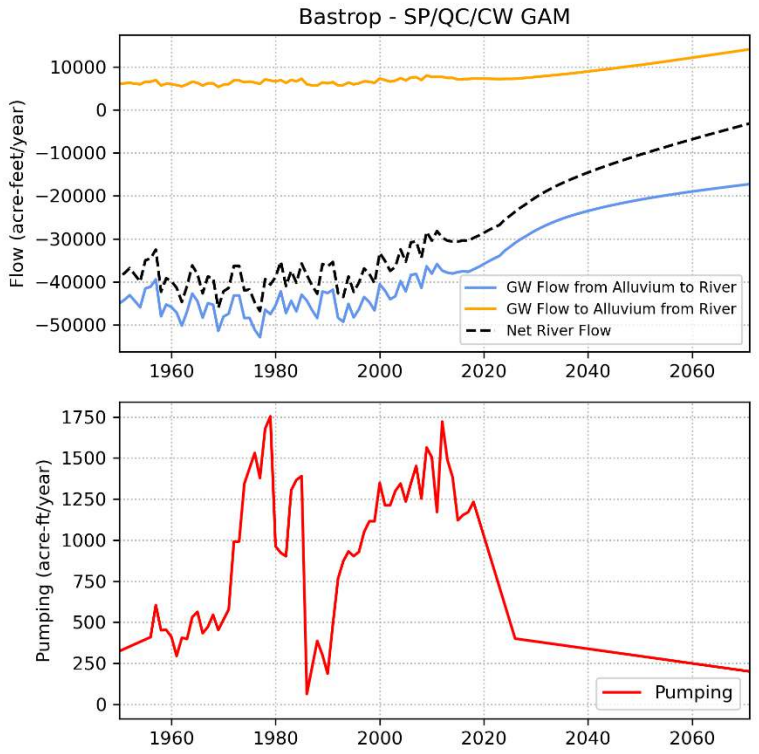


Note: pumping is from alluvium

SP/QC/CW GAM SIMULATED WATER BALANCE: IN BASTROP

Year	Net GW Flow (acft/yr)
2010	-30,413
2070	-3,167
Differerence	27,246





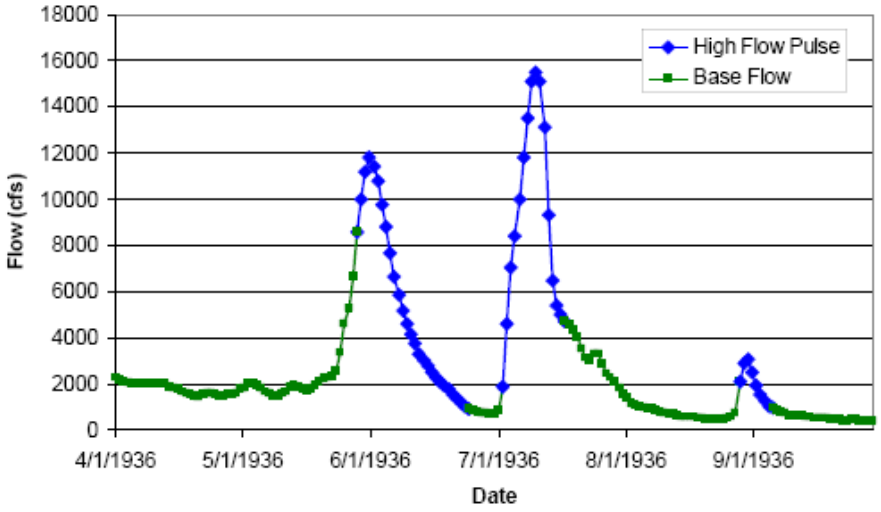
Note: pumping is from alluvium

SUMMARY OF SW-GW EXCHANGE SIMULATED FROM 2010-2070 FOR STREAM-ALLUVIUM INTERACTIONS

- GAMs have been developed to include shallow flow system that include alluvium for Colorado Rivers and Brazos Rivers
- GAMs have not yet been updated to accurately simulate the important transient and dynamic nature of GW-SW exchange
- Insufficient field data exists to accurately provide a framework for interpreting GAM results and assessing importance of bank storage
- GAMs results indicate that large increases in pumping will reduce the amount of groundwater that flows from the alluvium to the rivers

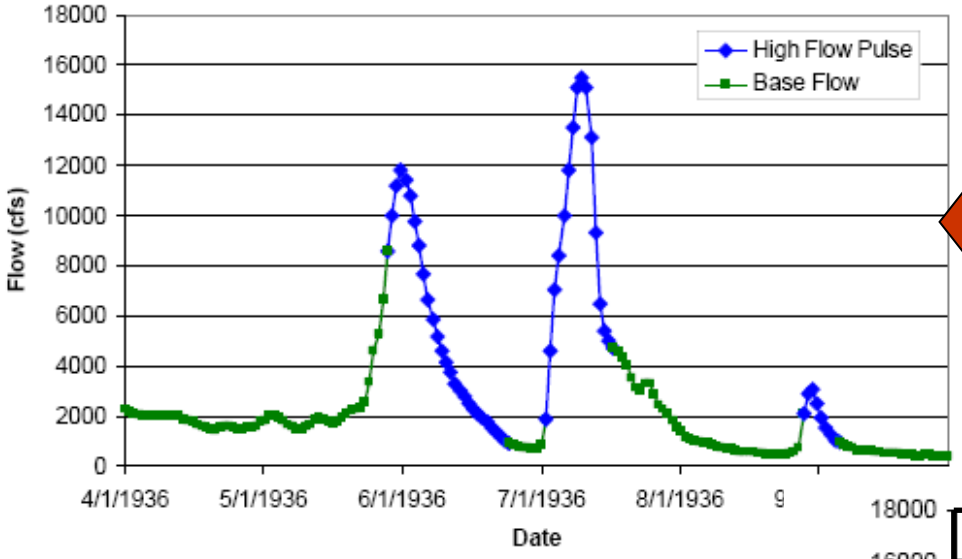
TCEQ INSTREAM FLOW PROGRAM MONITORS RIVER FLOW CONDITIONS

- Perform statistical analysis of flow data to identify one of five river flow regimes per day using a computer program
  - Indicators of Hydrological Alterations (IHA)
  - Hydrology-based Environmental Flow Regime (HEFR)
- Source of river water is not a factor in determining flow regimes
- Groundwater could be an important component of subsistence and critical flow regimes in some basins



Regime	Hydrologic Condition
Overbank Flows	NA
High-Pulse Flows	Wet
	Average
	Dry
Base Flows	Wet
	Average
	Dry
Subsistence Flows	Subsistence
Critical Flows	Critical

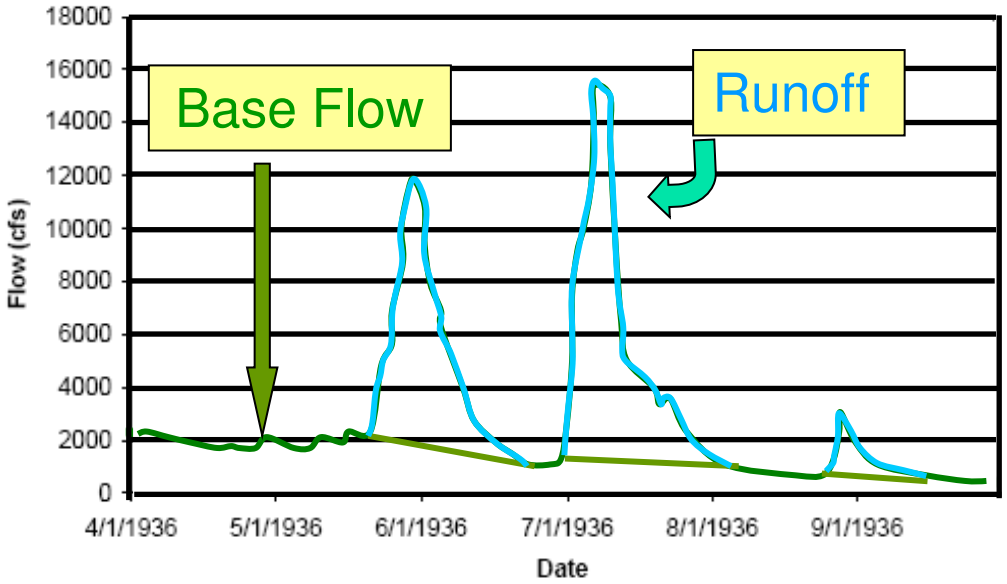
TCEQ InSTREAM PROGRAM ANALYSIS OF HYDROGRAPHS MEASURED AT RIVER GAUGES



TCEQ hydrograph separation segregates hydrograph into different flow regimes – one for each day

Does not attempt to segregate groundwater discharge

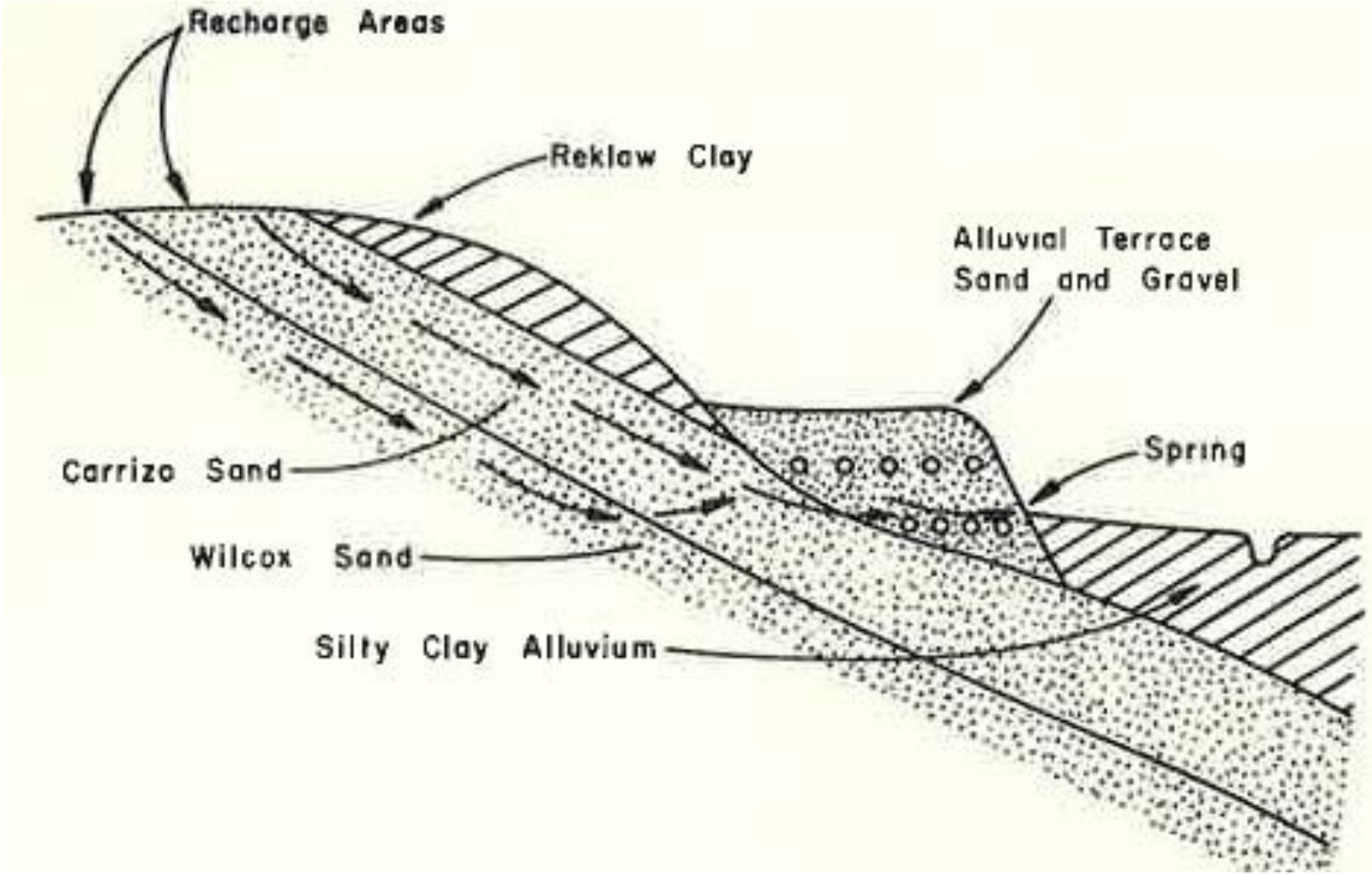
Groundwater hydrograph Separation segregates hydrograph into groundwater discharge and runoff



REQUIREMENTS FOR A SPRING TO OCCUR IN THE GEOLOGICAL FORMATIONS IN GMA 12

- Aquifer to deliver water to a spring
- Sufficiently large recharge area
- Sufficient hydraulic pressure gradient between recharge and discharge area to cause flow
- Water table intersected by ground surface

EXAMPLE SCENARIO FOR SPRINGS OR SEEP IN GMA 12

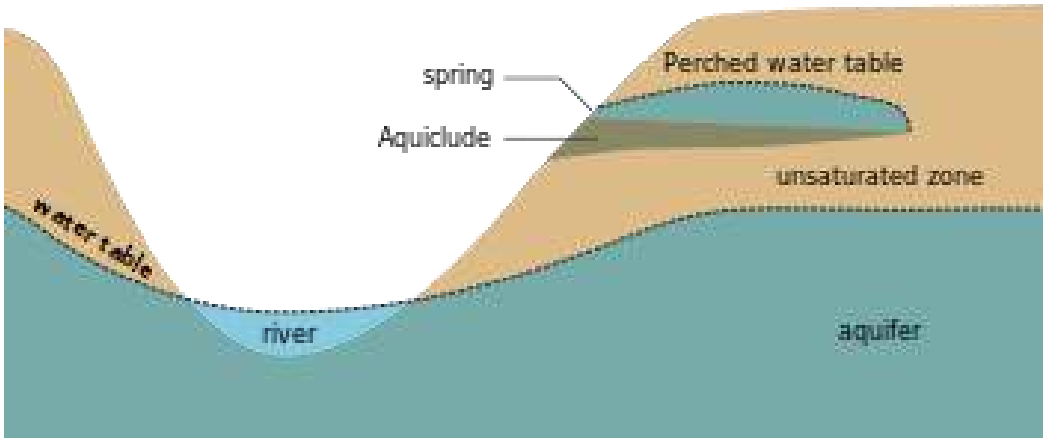


Schematic of a spring in Carrizo-Wilcox sand and terrace sand and gravel (1981, Brune)

SPRINGS OR SEEP ASSOCIATED WITH A PERCHED WATER TABLE

A perched water table is a water-bearing unit that occurs above the regional water table, in the unsaturated zone where there is an impermeable layer of sediment (aquiclude) above the main water table/aquifer.

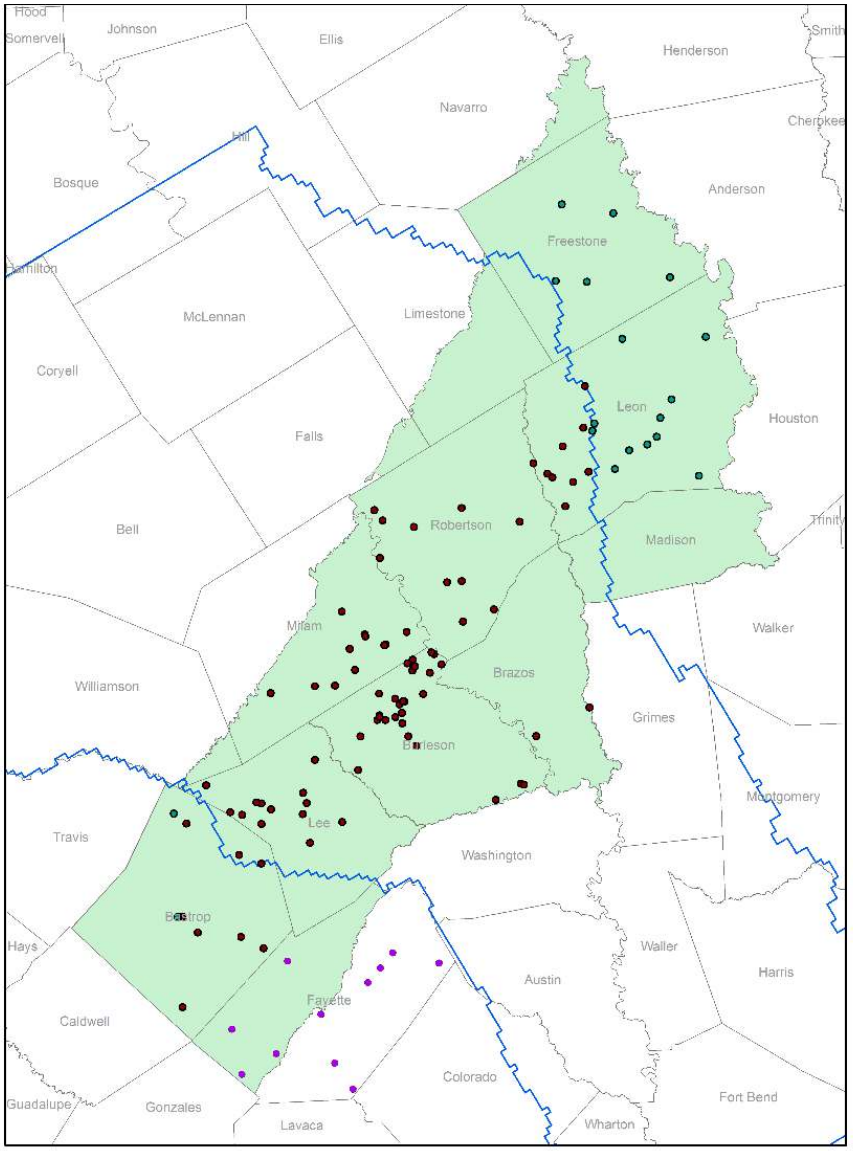
If a perched aquifer's flow intersects the Earth's dry surface, at a valley wall for example, the water is discharged as a spring



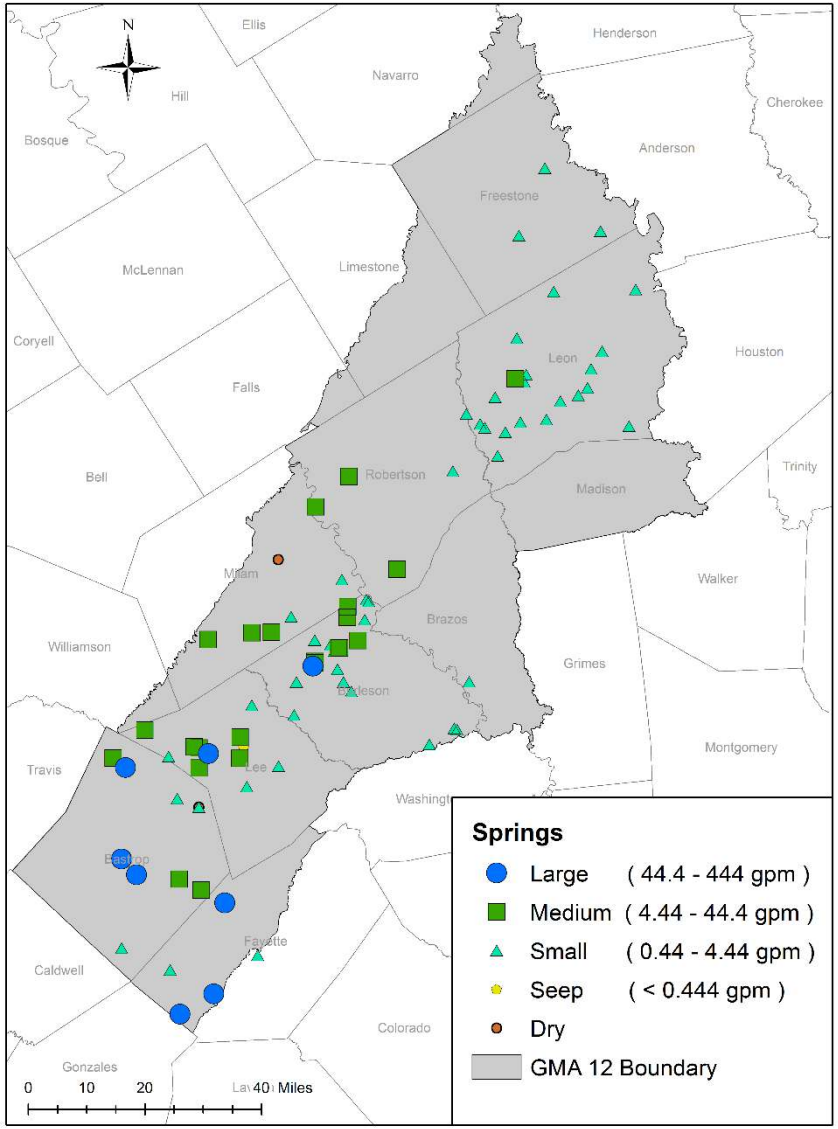
Schematic of a spring connected to a perched water table (2015,https://en.wikipedia.org/wiki/Water_table)

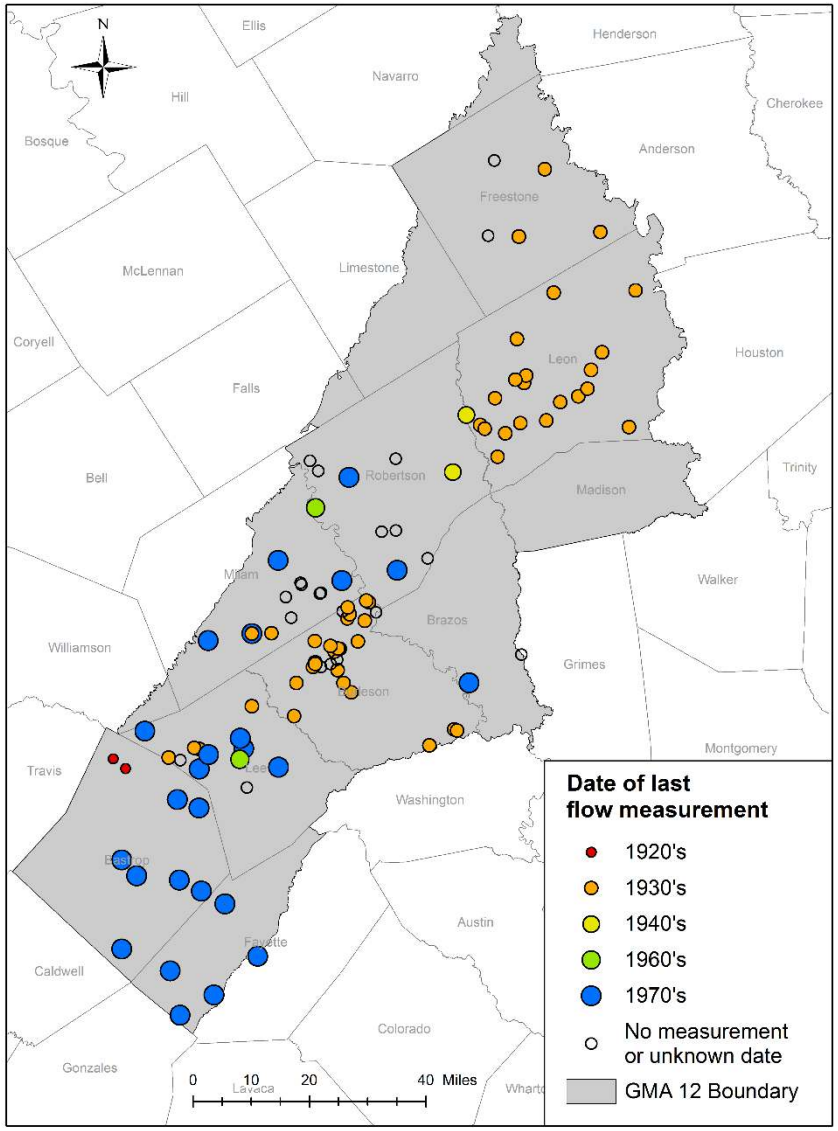
IDENTIFIED SPRING IN GMA 12

- Sources
  - Springs of Texas, Volume 1 (2002, Brune)
  - Database of historically documented springs and spring flow measurements in Texas(2003, Heitmuller and Reece)
  - No springs identified in GMA 12 that are tied to endangered species
  - TWDB Groundwater Database (March, 2014)



IDENTIFIED SPRINGs IN GMA 12 (CONT.)





SUMMARY OF KEY ENVIRONMENTAL ISSUES

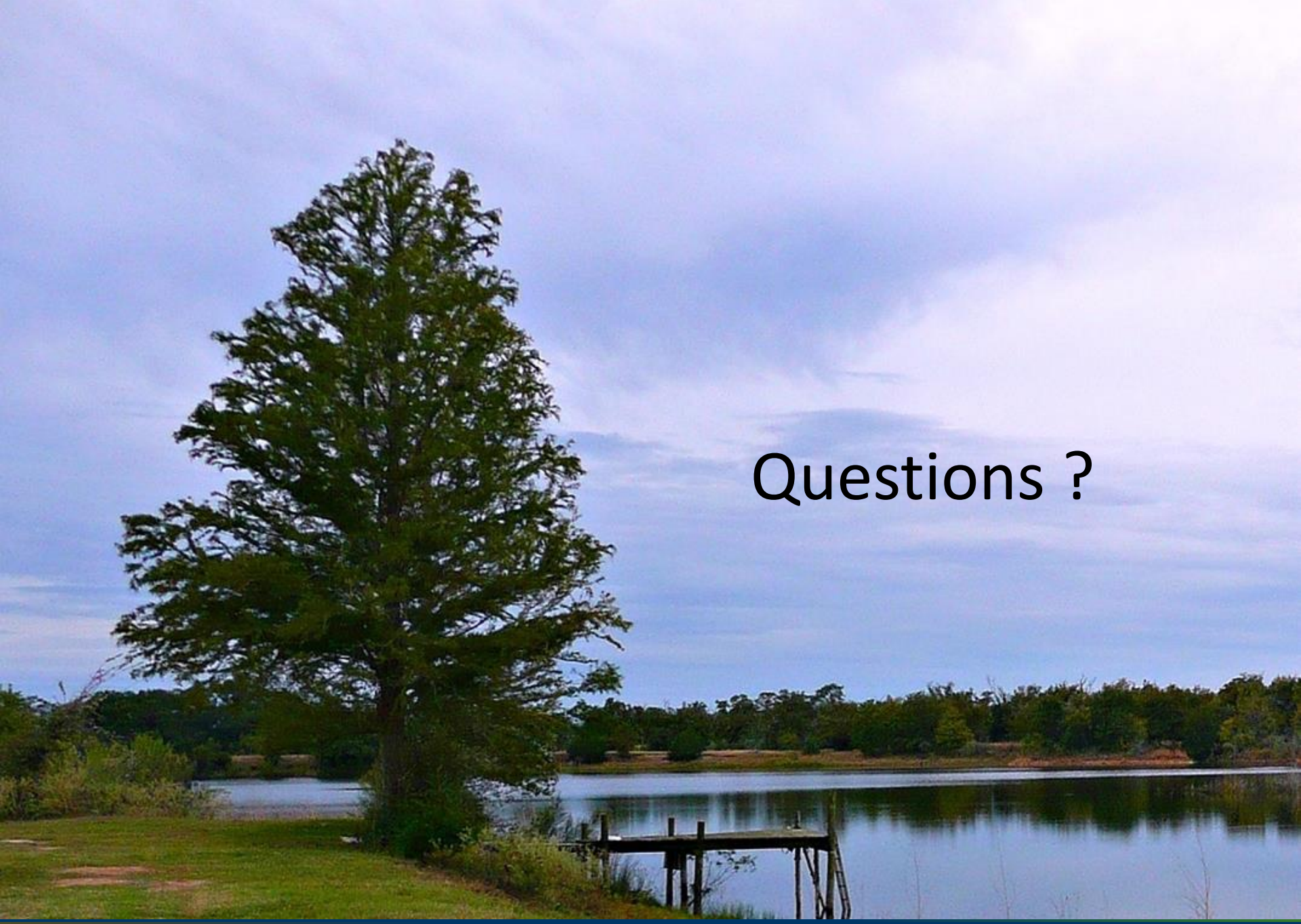
- Spring flow and SW-GW interaction are two potential environmental issues of interest in GMA 12
- Springs are typically controlled by localized site-specific topographic, hydrologic, and geological conditions
- SW-GW interactions largely controlled by local hydraulic gradients over time scales of hours to days and in the immediately vicinity of stream/aquifer contact
- Collection of representative data on SW-GW interaction and spring flow is time consuming, relatively expensive, and difficult to perform. Very limited data exists in GMA 12.

MEASURED SPRING FLOW: SUMMARY POINTS

- Extremely limited spring flow data collected since 1970s
- GMA 12 GAMs are not suitable for quantitative analysis for specific springs or for GW-SW exchange
- TCEQ Environmental Instream Flow program established to protect the health of the Colorado and Brazos Rivers

SUMMARY OF KEY ENVIRONMENTAL ISSUES

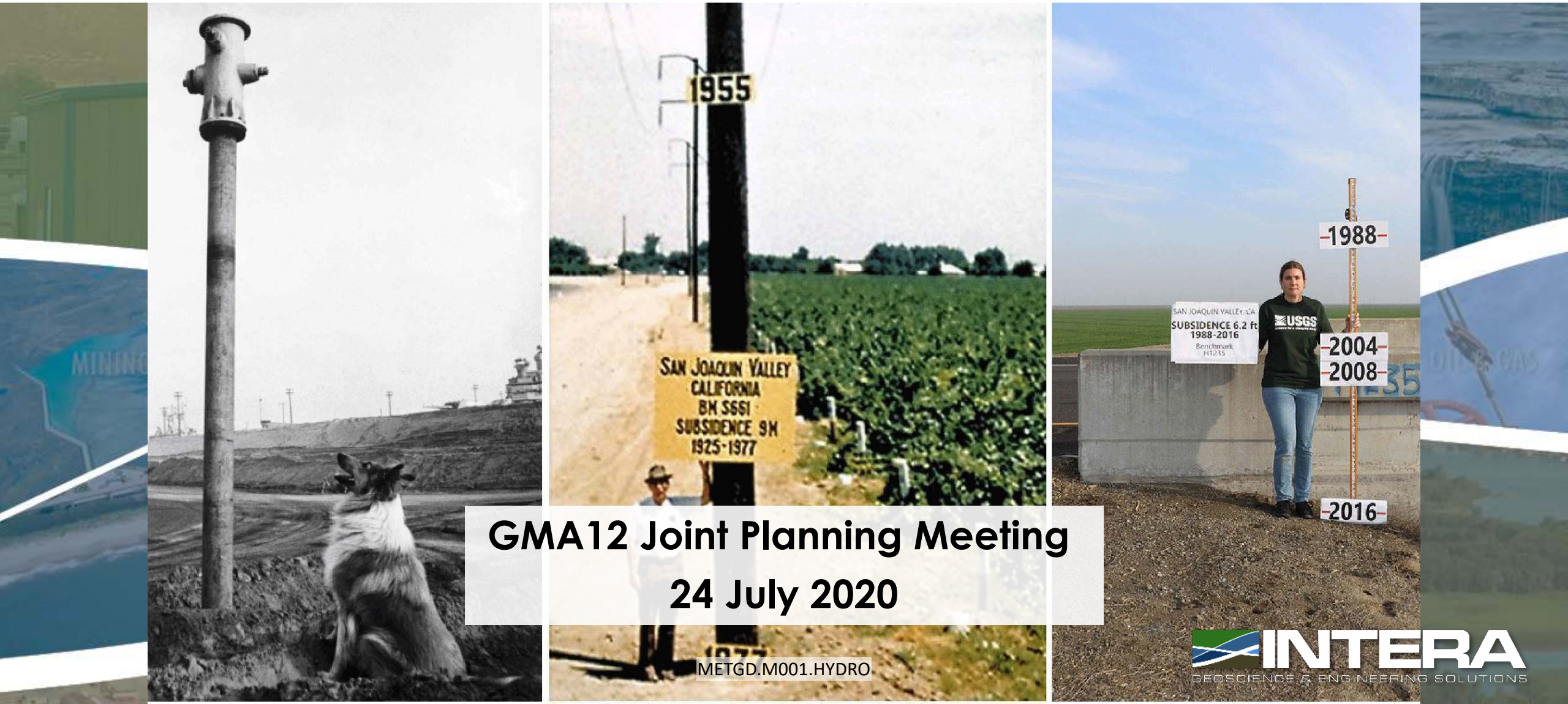
- River authorities are currently managing in-stream flows in Colorado and Brazos rivers
- The evaluation river gage hydrographs by the TCEQ Instream Flow program does not quantify GW flow
- Groundwater flow into streams can be an important contributor for helping river authorities maintain critical or subsistence flows


Questions ?

APPENDIX P

JULY 24, 2020 PRESENTATION "EVALUATION OF THE POTENTIAL IMPACT OF SUBSIDENCE IN GMA12"

Evaluation of the Potential Impact of Subsidence in GMA12



GMA12 Joint Planning Meeting

24 July 2020

METGD.M001.HYDRO

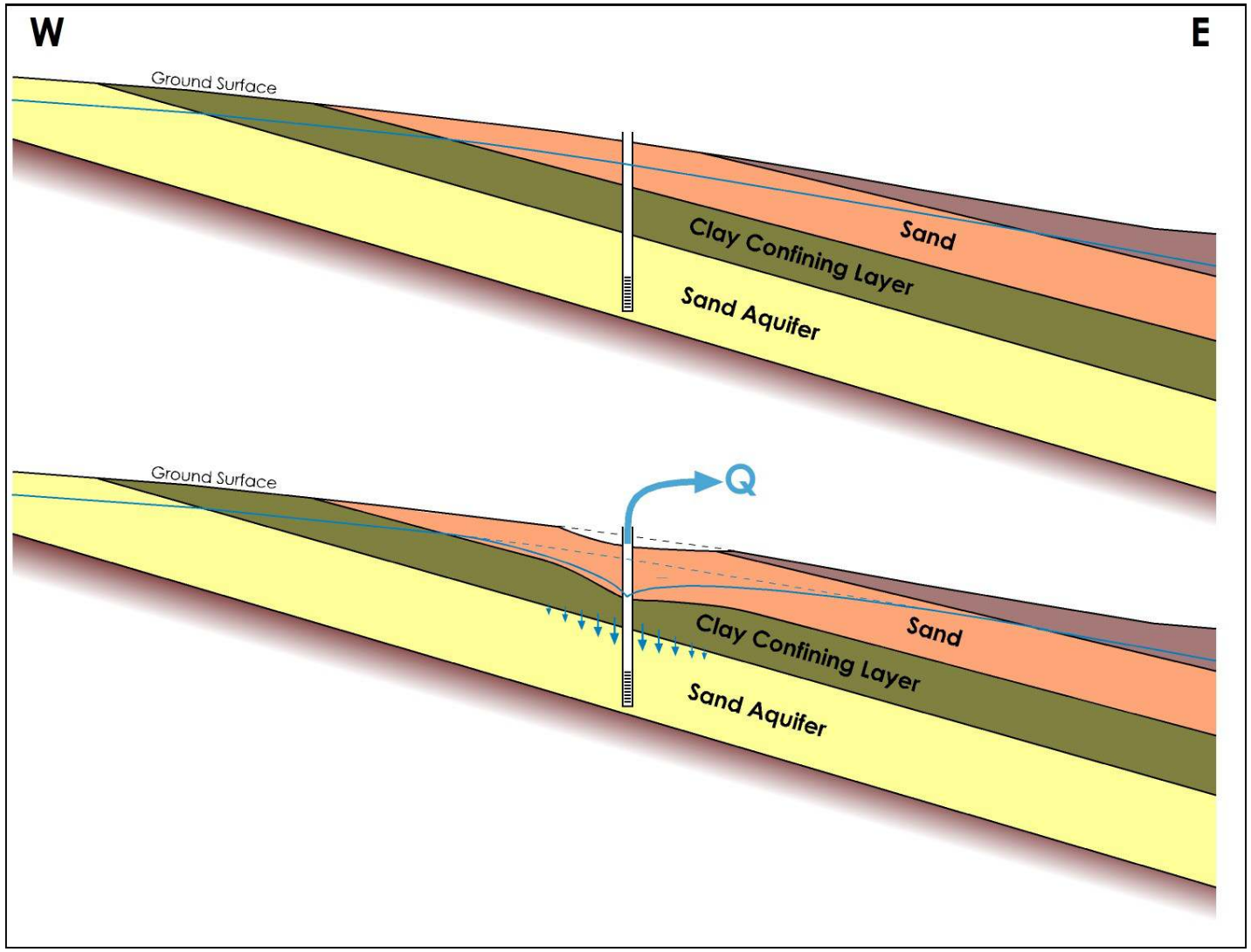
INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS

Desired Future Conditions: Nine Factors

- **Texas Water Code § 36.108(d) requires that GCDs consider a list of specific factors related to**
  - aquifer conditions
  - water management strategies,
  - potential scientific and socio-economic impacts
  - feasibility of achieving the DFCs

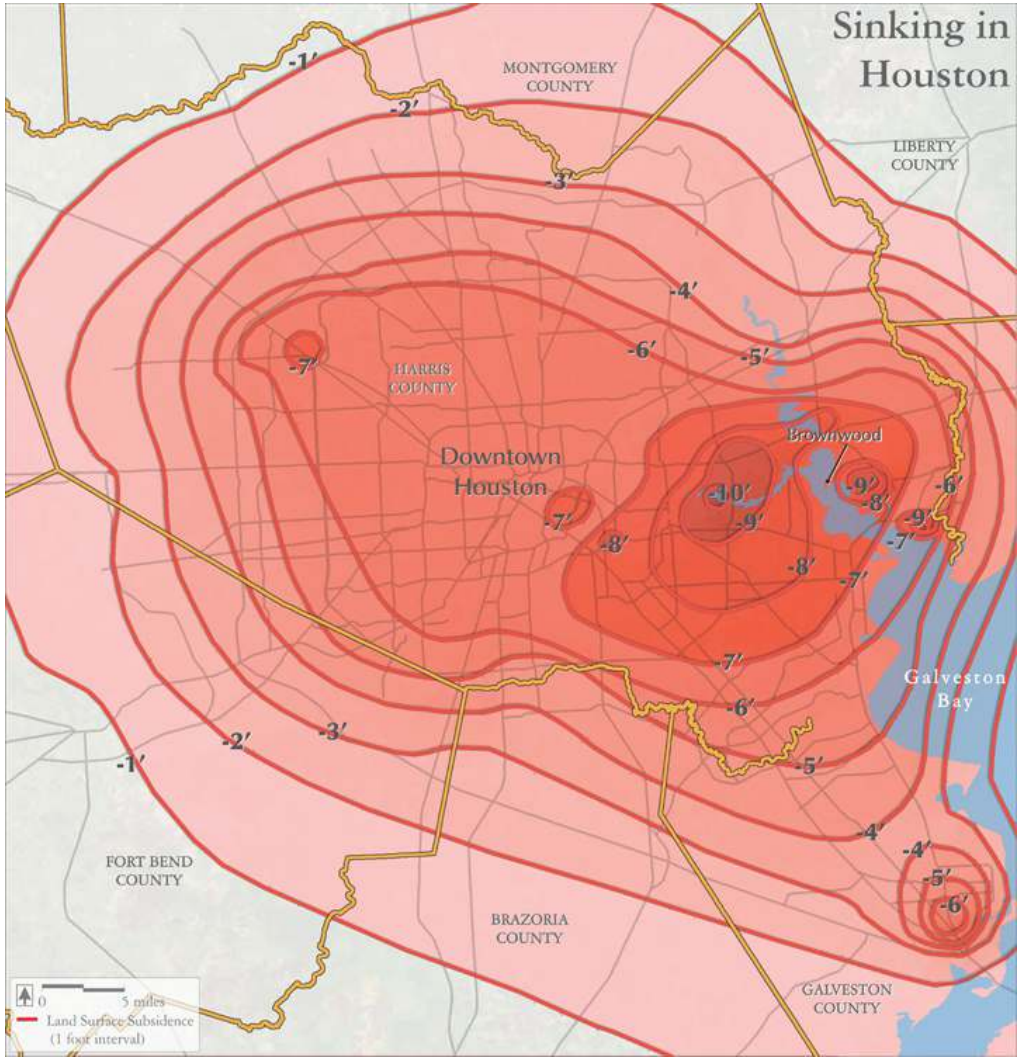
- **This presentation discusses the potential impact of the DFCs on subsidence in GMA12**

Pumping-induced subsidence



Observed subsidence in Texas

- **Considerable subsidence has been observed in Harris and Galveston counties**
- **No measurable subsidence observed within GMA12**
- **Function of depositional setting & relative age of sediments**
  - Gulf Coast (1-4 my) still "inflated" with water
  - Clairborne/Wilcox clays (+40 my) already compacted



Conclusion for GMA12

- **No observed historic subsidence**
- **Low risk of subsidence in future**

APPENDIX Q

OCTOBER 22, 2020 PRESENTATION "GMA12 SOCIOECONOMIC IMPACTS CONSIDERATIONS"

GMA12 SOCIOECONOMIC IMPACTS CONSIDERATIONS

Presented
by
GMA 12 Consultant Team
Daniel B. Stephens & Associates
INTERA Incorporated
Ground Water Consultants, LLC

October 22, 2020

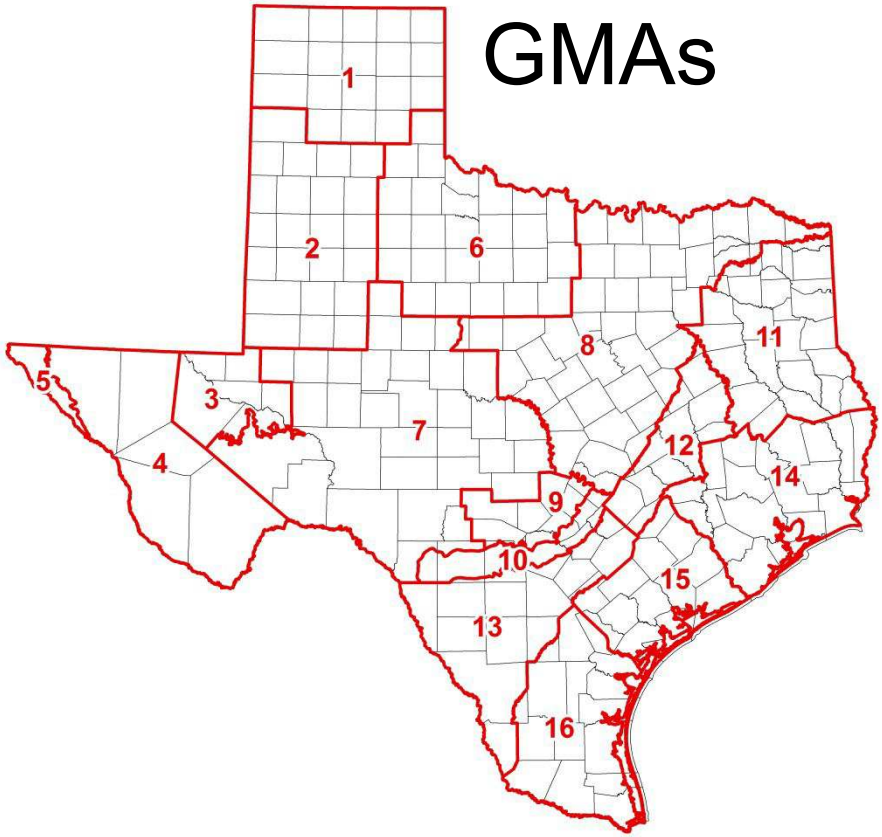
TWC Section 36.108 (d)

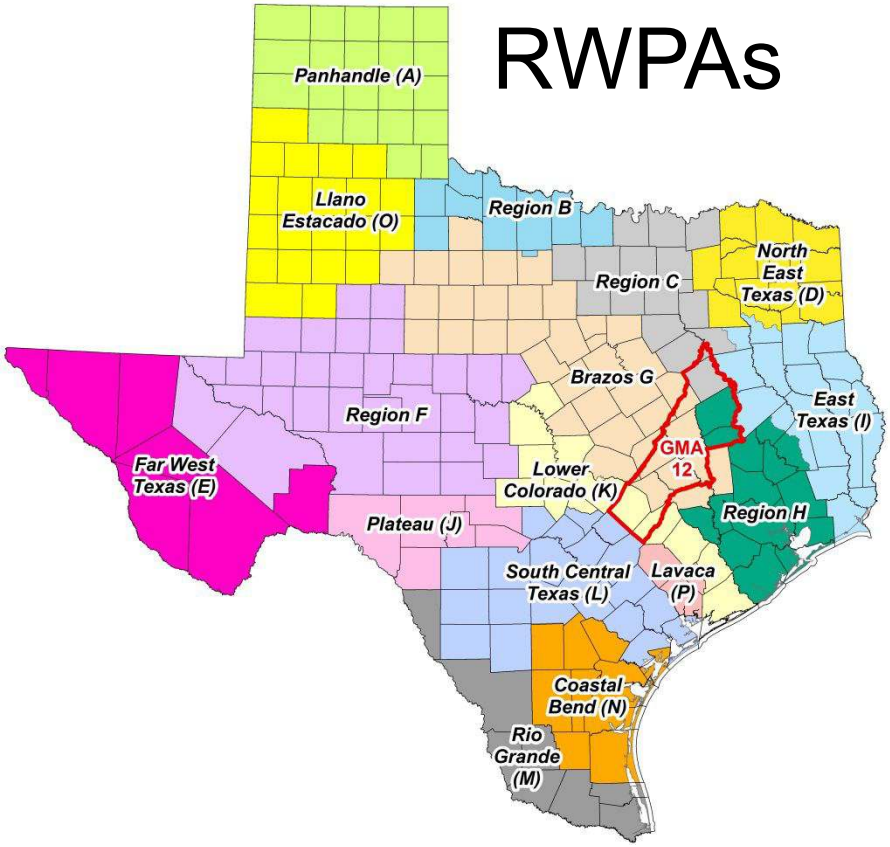
- Before voting on proposed desired future conditions . . . the districts shall consider:
  - Aquifer uses and conditions
  - Needs and strategies
  - Hydrogeologic conditions
  - Environmental impacts
  - Subsidence
  - **Socioeconomic impacts**
  - Private Property rights
  - Feasibility
  - Any other relevant information

One of Today's Considerations

- TWC Section 36.108 (d) (6) – socioeconomic impacts reasonably expected to occur

Regional Planning





Socioeconomic Impacts and Water Planning in Texas – A Brief History

- Texas Water Code Chapter 16.051 (a) the board shall prepare, develop, formulate, and adopt a comprehensive state water plan that …shall provide for…further economic development (companion provision in TWC Chapter 16.053 (a, b) for regional water plans).
- Texas Administrative Code (TAC), Title 31, Chapter 357.7 (4)(A) states, *"The executive administrator shall provide available technical assistance to the regional water planning groups, upon request, on water supply and demand analysis, including methods to evaluate the social and economic impacts of not meeting needs."*

Socioeconomic Impacts and Water Planning in Texas – A Brief History (cont.)

- TAC, Title 31, Chapter 357.40 (a) RWPs shall include a quantitative description of the socioeconomic impacts of not meeting the identified water needs pursuant to §357.33 (c) of this title (relating to Needs Analysis: Comparison of Water Supplies and Demands).

Socioeconomic Impacts Analysis

- Executed by TWDB at request of RWPGs
- Uses water supply needs from Regional Water Plan
- Analysis attempts to measure the impacts in the event that water user groups do not meet their identified water supply needs associated with normal and drought conditions
- Multiple impacts examined
  - Sales, income and tax revenue
  - Jobs
  - Population
  - School enrollment
- Results of analysis are incorporated into final Regional Water Plan

Socioeconomic Impacts Analysis, cont.

Socioeconomic impact of not meeting water supply needs vs. impact of proposed desired future conditions

- Regional Water Planning (from TWDB)
  - Generate Input-Output Models combined with Social Accounting Models (IO/SAM) and develop economic baselines. Utilizes IMPLAN (Impact for Planning Analysis) software.
    - Economic baseline developed for counties, planning regions, and the state based on variables for 528 economic sectors as follows:

Water Supply Needs and DFCs

Socioeconomic impact of not meeting water supply needs vs. impact of proposed desired future conditions

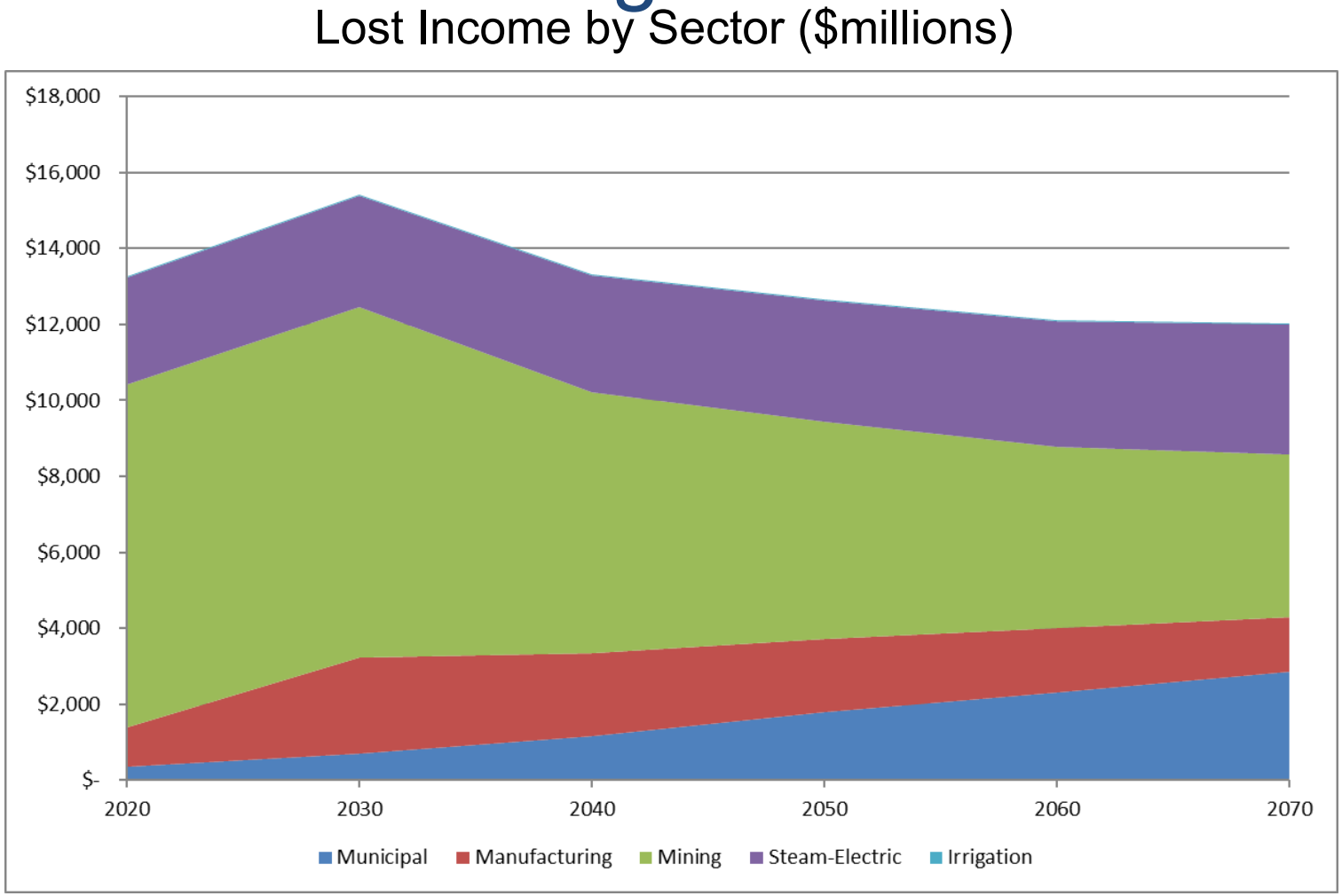
- Output – total production of goods and services measured by gross sales revenues
- Final sales – sales to end user in Texas (a region) and exports out of region
- Employment – number of full and part-time jobs required by a given industry
- Regional income – total payroll cost paid by industries, corporate income, rental income, and interest payments
- Business taxes – sales, excise, fees, licenses and other taxes paid during normal operations

Water Supply Needs and DFCs, cont.

Socioeconomic impact of not meeting water supply needs vs. impact of proposed desired future conditions

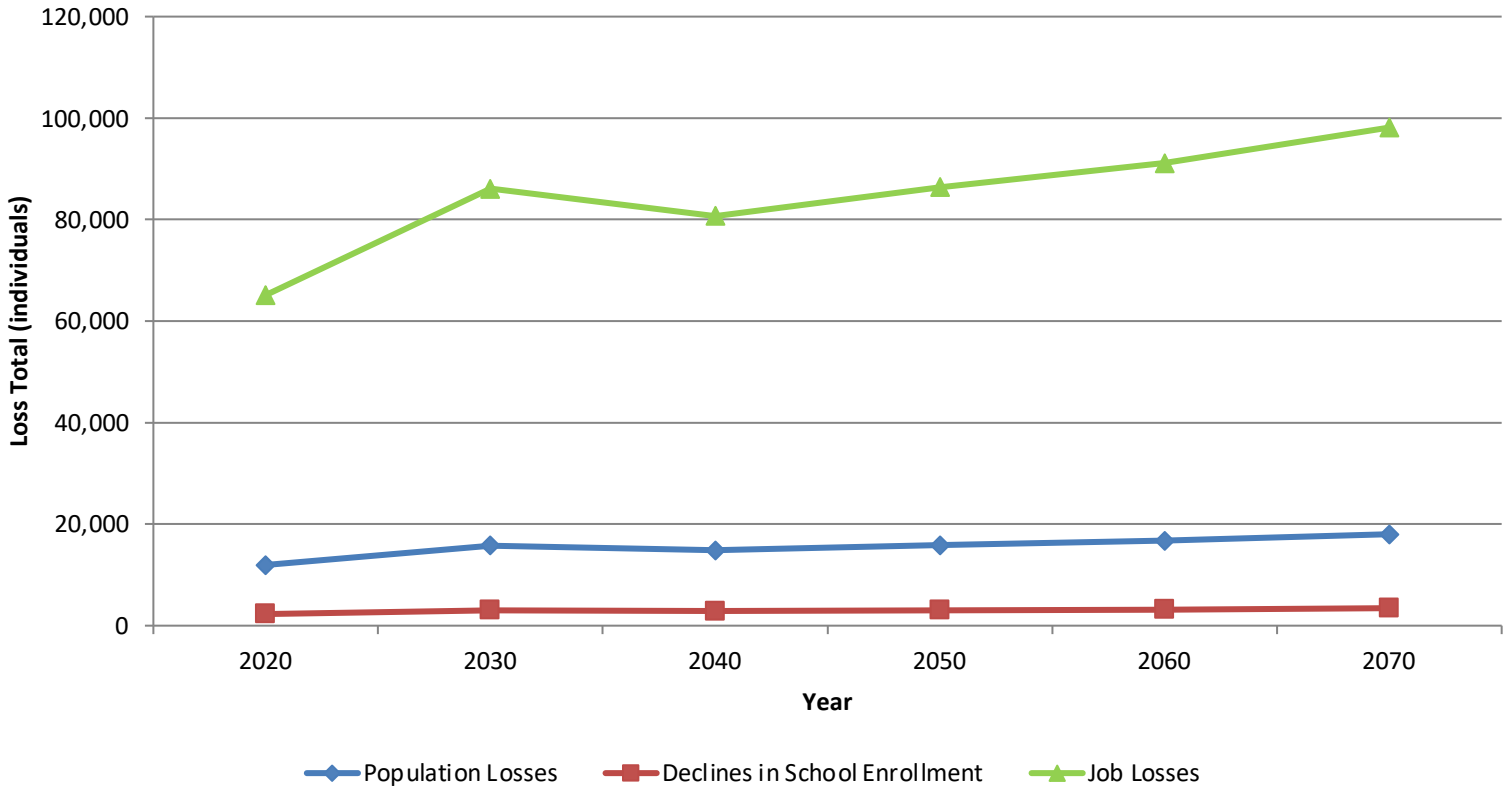
- Regional Water Planning (from TWDB – cont.)
  - Estimate direct and indirect impacts to business, industry and agriculture
  - Impact associated with domestic water usage
- While useful for planning purposes, socioeconomic impacts developed for regional water planning do not represent a benefit-cost analysis
- Analysis is executed for water user groups with needs for additional water supply.

Socioeconomic Impacts Analysis – 2021 Brazos G Regional Water Plan



For full analysis, see TWDB correspondence submitted by Dr. John R. Ellis, dated November, 2019 titled "Socioeconomic Impacts of Projected Water Shortages for the Brazos G (Region G) Regional Water Planning Area

Social Impacts of Water Shortages in Region G



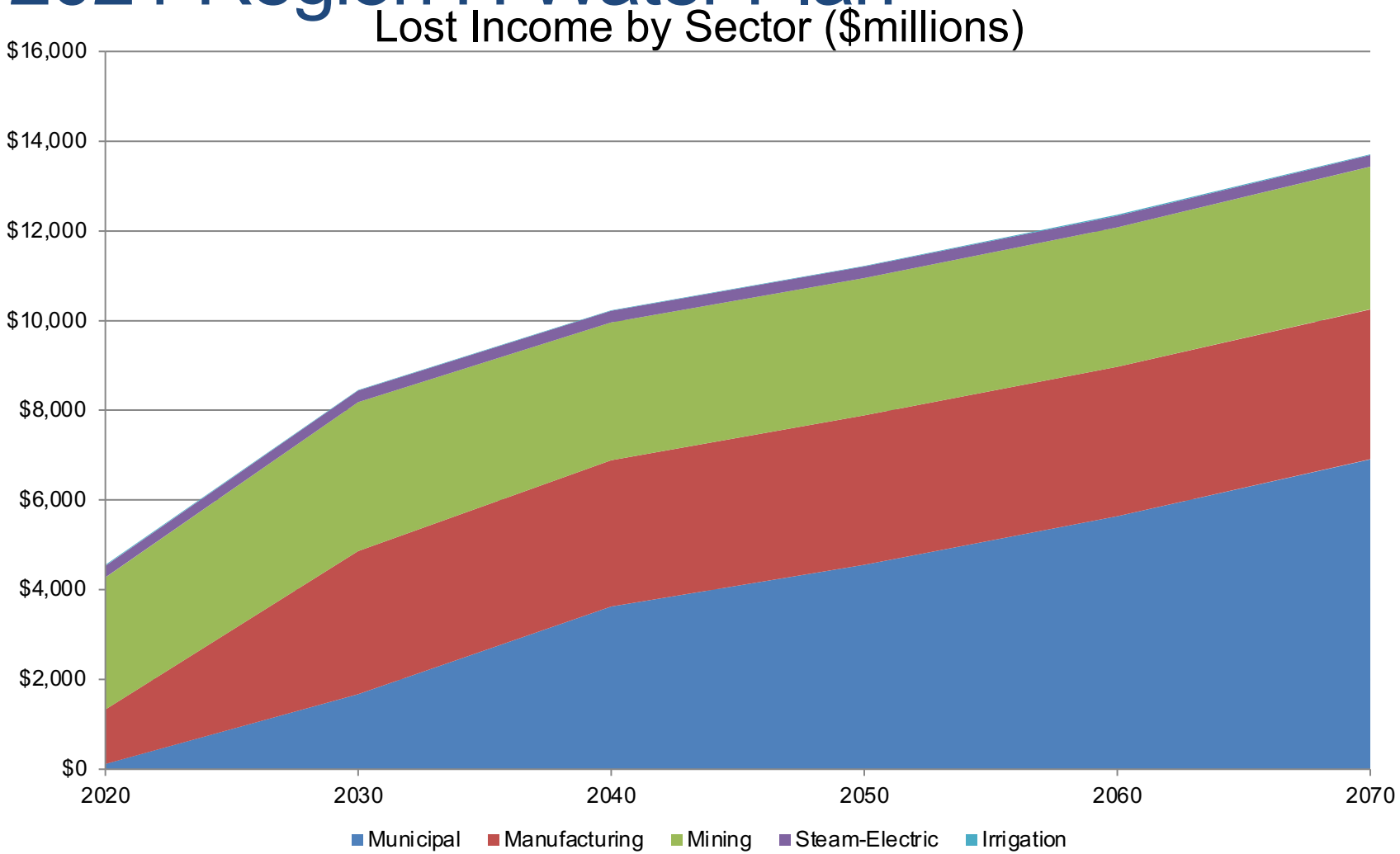
For full analysis, see TWDB correspondence submitted by Dr. John R. Ellis, dated November, 2019, titled "Socioeconomic Impacts of Projected Water Shortages for the Brazos G (Region G) Regional Water Planning Area

Examples of Impacts by County for the Brazos G Regional Water Planning Area

MUNICIPAL ($millions)	2010	2020	2030	2040	2050	2060
Bryan						
Consumer Surplus	$ -	$ 0.17	$ 0.95	$ 3.44	$ 10.25	$ 30.89
Employment Loss	0	129	930	2,660	4,966	7,919
Income Loss	$ -	$ 6.75	$ 48.53	$ 138.83	$ 259.24	$ 413.37
Tax Loss	$ -	$ 0.70	$ 5.01	$ 14.32	$ 26.74	$ 42.64
Utility Revenue Loss	$ -	$ 4.49	$ 10.85	$ 19.03	$ 29.19	$ 46.55
Utility Tax Loss	$ -	$ 0.09	$ 0.22	$ 0.38	$ 0.58	$ 0.93
College Station						
Consumer Surplus	$ -	$ 0.60	$ 4.70	$ 13.59	$ 13.45	$ 13.40
Employment Loss	0	300	1,854	3,355	3,340	3,336
Income Loss	$ -	$ 15.67	$ 96.79	$ 175.10	$ 174.36	$ 174.11
Tax Loss	$ -	$ 1.62	$ 9.98	$ 18.06	$ 17.99	$ 17.96
Utility Revenue Loss	$ -	$ 7.94	$ 20.19	$ 30.56	$ 30.43	$ 30.39
Utility Tax Loss	$ -	$ 0.16	$ 0.40	$ 0.61	$ 0.61	$ 0.61
Southwest Milam WSC						
Consumer Surplus	$ -	$ 0.01	$ 0.03	$ 0.02	$ 0.03	$ 0.04
Employment Loss	0	0	1	0	1	1
Income Loss	$ -	$ 0.01	$ 0.03	$ 0.02	$ 0.03	$ 0.05
Tax Loss	$ -	$ 0.00	$ 0.00	$ 0.00	$ 0.00	$ 0.01
Utility Revenue Loss	$ -	$ 0.08	$ 0.14	$ 0.12	$ 0.14	$ 0.18
Utility Tax Loss	$ -	$ 0.00	$ 0.00	$ 0.00	$ 0.00	$ 0.00

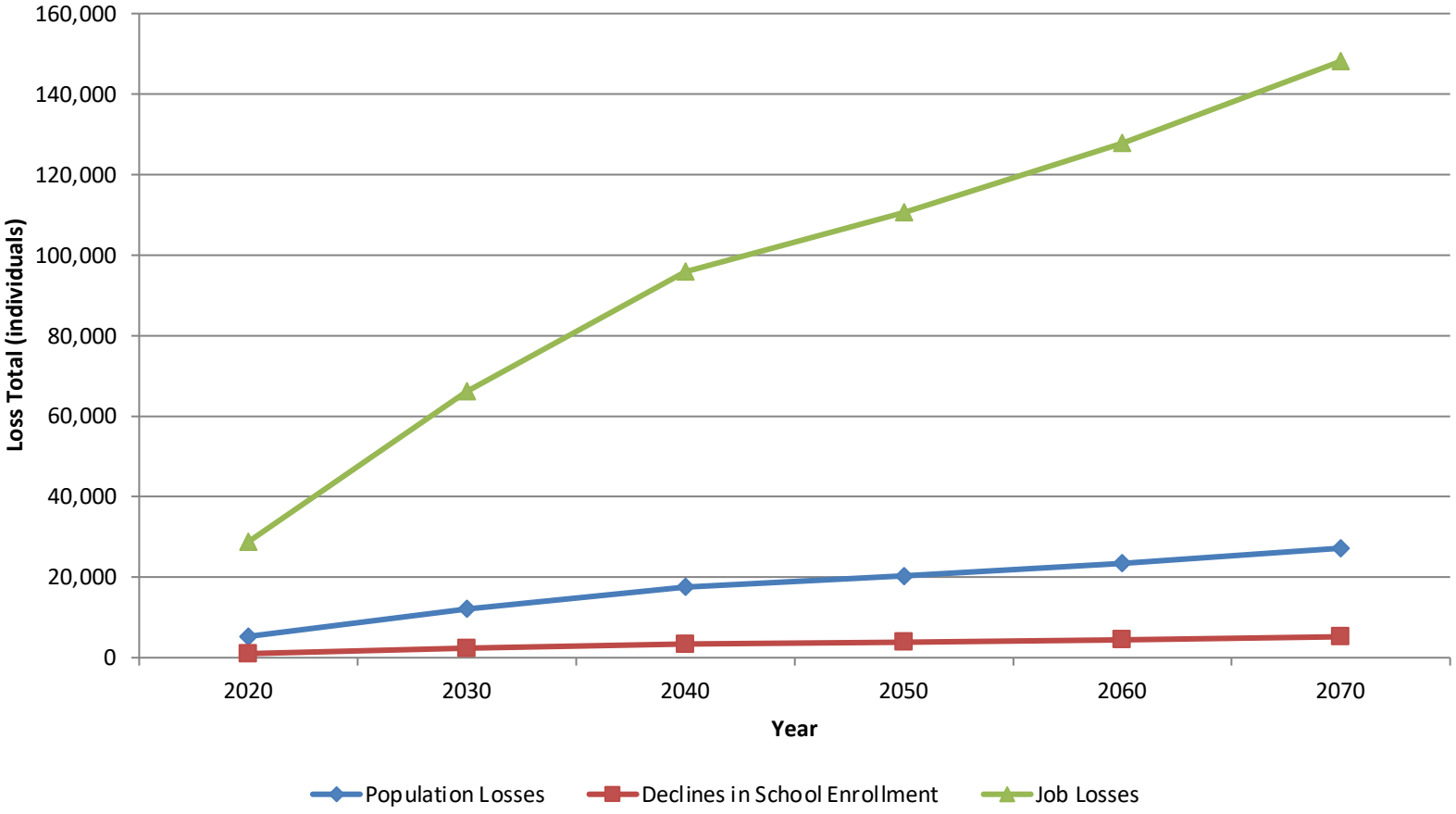
WUG level detail on socioeconomic impacts for the 2021 Region Water Plans provided by TWDB Dr. John R. Ellis, October 2020

Socioeconomic Impacts Analysis – 2021 Region H Water Plan



For full analysis, see TWDB correspondence submitted by Dr. John R. Ellis, dated November, 2019, titled "Socioeconomic Impacts of Projected Water Shortages for the Region H Regional Water Planning Area

Social Impacts of Water Shortages in Region H



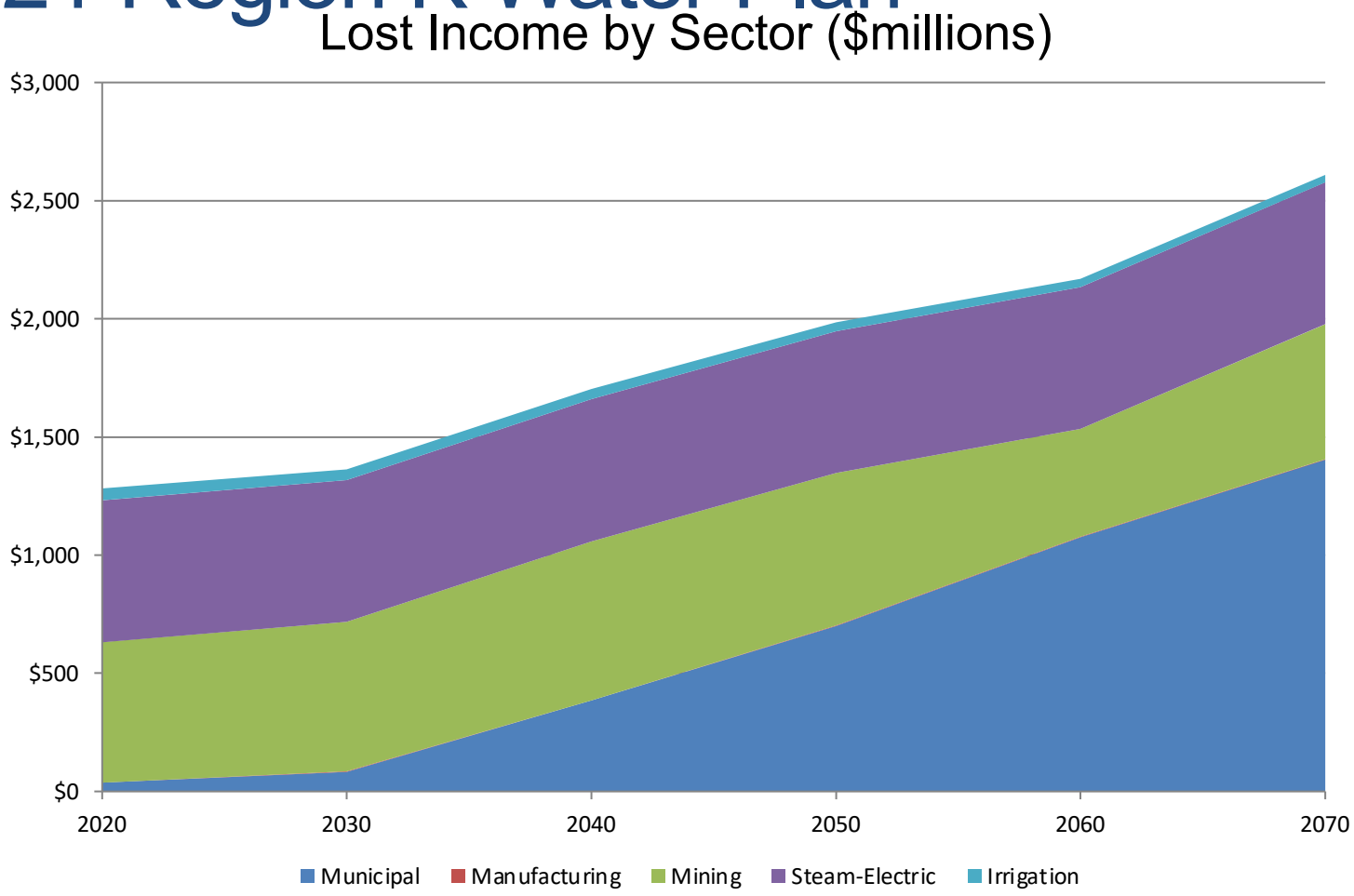
For full analysis, see TWDB correspondence submitted by Dr. John R. Ellis, dated November, 2019, titled "Socioeconomic Impacts of Projected Water Shortages for the Region H Regional Water Planning Area

Examples of Impacts by County for the Region H Regional Water Planning Area

MANUFACTURING ($millions)						
	2010	2020	2030	2040	2050	2060
Leon County						
Employment Loss	0	74	74	74	74	74
Income Loss	$ -	$ 9.25	$ 9.25	$ 9.25	$ 9.25	$ 9.25
Tax Loss	$ -	$ 0.85	$ 0.85	$ 0.85	$ 0.85	$ 0.85
MINING ($millions)						
	2010	2020	2030	2040	2050	2060
Madison County						
Employment Loss	0	2,096	414	0	0	0
Income Loss	$ -	$ 334.73	$ 66.03	$ -	$ -	$ -
Tax Loss	$ -	$ 46.82	$ 9.24	$ -	$ -	$ -

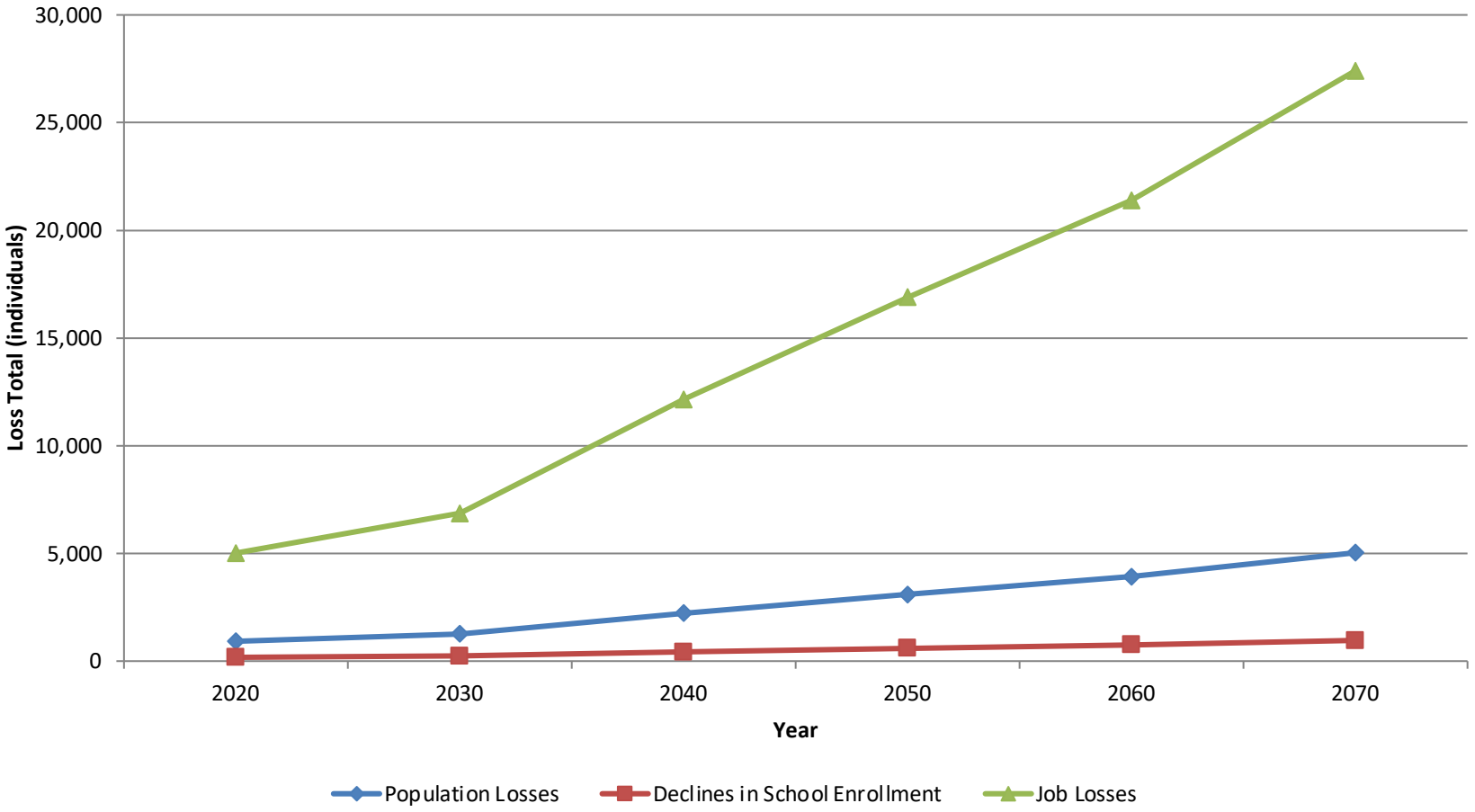
WUG level detail on socioeconomic impacts for the 2021 Region Water Plans provided by TWDB Dr. John R. Ellis, October 2020

Socioeconomic Impacts Analysis – 2021 Region K Water Plan



For full analysis, see TWDB correspondence submitted by Dr. John R. Ellis, dated November 2019, titled "Socioeconomic Impacts of Projected Water Shortages for the Lower Colorado (Region K) Regional Water Planning Area

Social Impacts of Water Shortages in Region K



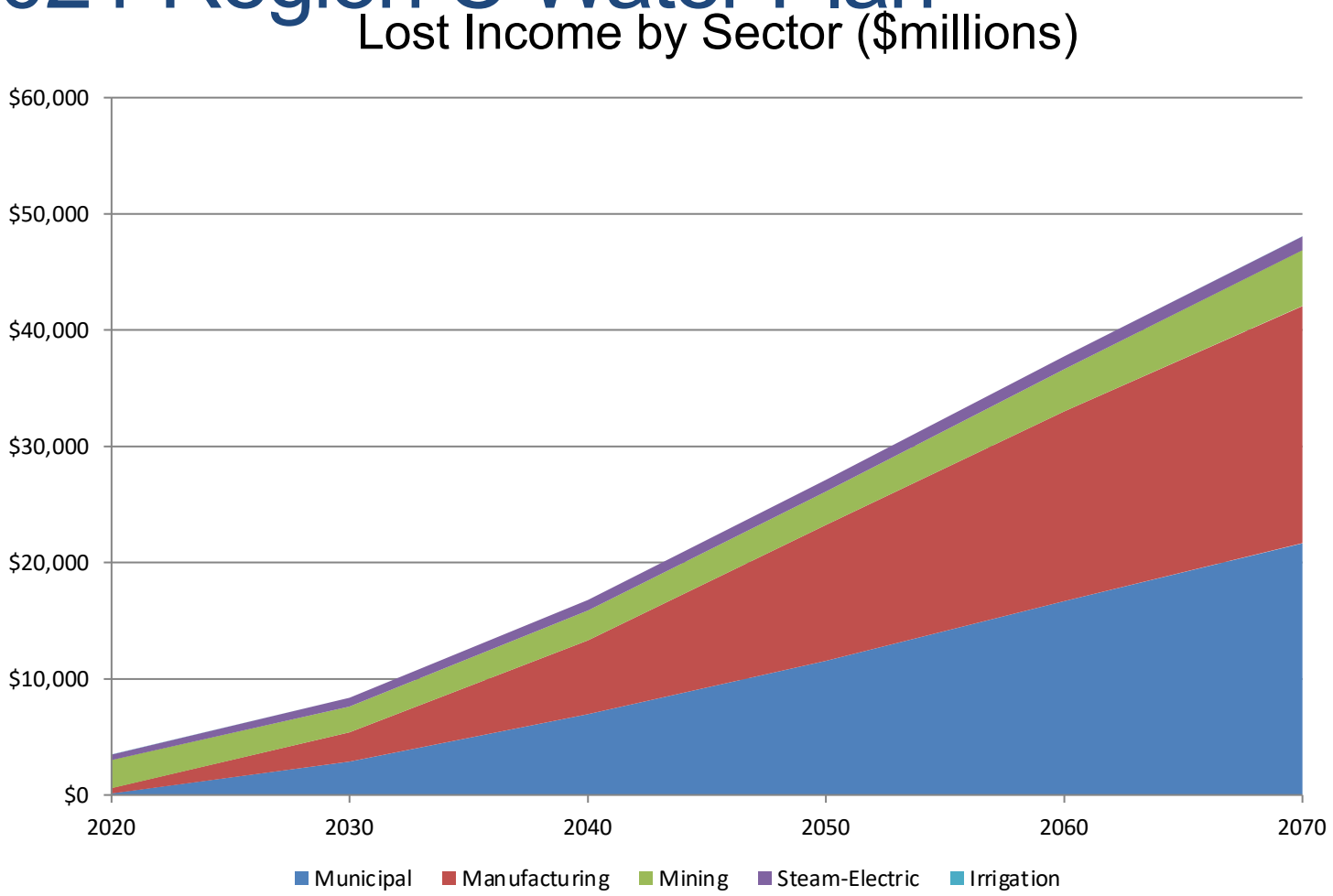
For full analysis, see TWDB correspondence submitted by Dr. John R. Ellis, dated November 2019, titled "Socioeconomic Impacts of Projected Water Shortages for the Lower Colorado (Region K) Regional Water Planning Area

Examples of Impacts by County for the Region K Regional Water Planning Area

MUNICIPAL ($millions)	2010	2020	2030	2040	2050	2060
Aqua WSC						
Consumer Surplus	$ 0.01	$ 1.51	$ 6.60	$ 19.57	$ 87.19	$ 262.64
Employment Loss	0	80	299	620	1,122	1,753
Income Loss	$ -	$ 5.09	$ 18.92	$ 39.19	$ 70.94	$ 110.80
Tax Loss	$ -	$ 0.44	$ 1.63	$ 3.37	$ 6.10	$ 9.53
Utility Revenue Loss	$ 0.85	$ 10.61	$ 21.67	$ 35.10	$ 63.54	$ 99.23
Utility Tax Loss	$ 0.02	$ 0.21	$ 0.43	$ 0.70	$ 1.27	$ 1.98
Austin						
Consumer Surplus	$ -	$ -	$ -	$ -	$ -	$ 0.71
Utility Revenue Loss	$ -	$ -	$ -	$ -	$ -	$ 55.99
Utility Tax Loss	$ -	$ -	$ -	$ -	$ -	$ 1.12
Barton Creek West						
Consumer Surplus	$ 0.39	$ 0.93	$ 1.69	$ 2.43	$ 3.15	$ 4.12
Employment Loss	12	18	23	27	30	33
Income Loss	$ 0.78	$ 1.12	$ 1.45	$ 1.69	$ 1.88	$ 2.11
Tax Loss	$ 0.07	$ 0.10	$ 0.12	$ 0.15	$ 0.16	$ 0.18
Utility Revenue Loss	$ 0.60	$ 0.86	$ 1.11	$ 1.30	$ 1.44	$ 1.62
Utility Tax Loss	$ 0.00	$ 0.01	$ 0.01	$ 0.01	$ 0.01	$ 0.01
Bastrop						
Consumer Surplus	$ -	$ -	$ 0.40	$ 3.59	$ 14.72	$ 44.46
Employment Loss	0	0	301	1,427	2,582	4,118
Income Loss	$ -	$ -	$ 19.06	$ 90.20	$ 163.19	$ 260.31
Tax Loss	$ -	$ -	$ 1.64	$ 7.75	$ 14.03	$ 22.38
Utility Revenue Loss	$ -	$ -	$ 3.46	$ 8.51	$ 15.40	$ 24.56
Utility Tax Loss	$ -	$ -	$ 0.04	$ 0.09	$ 0.16	$ 0.26
Bastrop County WCID #2						
Consumer Surplus	$ -	$ -	$ -	$ -	$ 0.24	$ 2.77
Employment Loss	0	0	0	0	3	17
Income Loss	$ -	$ -	$ -	$ -	$ 0.21	$ 1.06
Tax Loss	$ -	$ -	$ -	$ -	$ 0.02	$ 0.09
Utility Revenue Loss	$ -	$ -	$ -	$ -	$ 1.25	$ 3.33
Utility Tax Loss	$ -	$ -	$ -	$ -	$ 0.01	$ 0.04

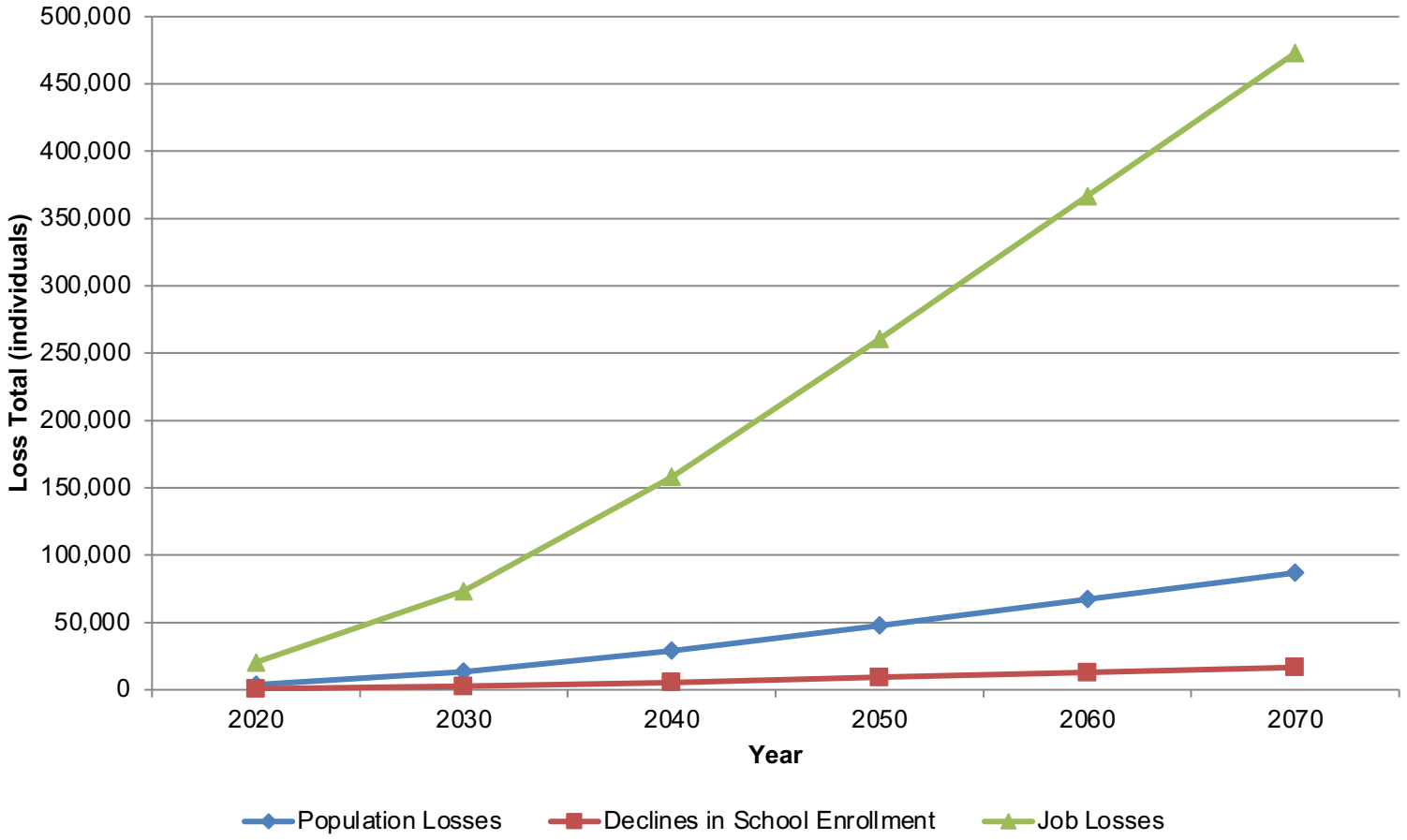
WUG level detail on socioeconomic impacts for the 2021 Region Water Plans provided by TWDB Dr. John R. Ellis, October 2020

Socioeconomic Impacts Analysis – 2021 Region C Water Plan



For full analysis, see TWDB correspondence submitted by Dr. John R. Ellis, dated November, 2019, titled "Socioeconomic Impacts of Projected Water Shortages for the Region C Regional Water Planning Area

Social Impacts of Water Shortages in Region C



For full analysis, see TWDB correspondence submitted by Dr. John R. Ellis, dated November, 2019, titled "Socioeconomic Impacts of Projected Water Shortages for the Region C Regional Water Planning Area

Examples of Impacts by County for the Region C Regional Water Planning Area

STEAM-ELECTRIC ($millions)	2010	2020	2030	2040	2050	2060
Freestone County						
Income Loss	$ 483.46	$ 541.70	$ 589.21	$ 630.66	$ 660.81	$ 684.82

MUNICIPAL ($millions)	2010	2020	2030	2040	2050	2060
Fairfield						
Consumer Surplus	$ -	$ -	$ -	$ 1.33	$ 3.91	$ 14.34
Employment Loss	0	0	0	139	239	415
Income Loss	$ -	$ -	$ -	$ 9.83	$ 16.92	$ 29.31
Tax Loss	$ -	$ -	$ -	$ 0.77	$ 1.32	$ 2.30
Utility Revenue Loss	$ -	$ -	$ -	$ 3.20	$ 4.94	$ 8.57
Utility Tax Loss	$ -	$ -	$ -	$ 0.03	$ 0.05	$ 0.09

WUG level detail on socioeconomic impacts for the 2021 Region Water Plans provided by TWDB Dr. John R. Ellis, October 2020

Potential Socioeconomic Impact of Proposed DFCs (cont.)

- TWC Chapter 36.108(d) and (d)(6) states, "the districts shall consider groundwater availability models and other data or information for the management area and shall propose for adoption desired future conditions for the relevant aquifers within the management area. Before voting on the proposed desired future conditions of the aquifers…the districts shall consider **socioeconomic impacts reasonably expected to occur**;"
- Proposed DFCs are descriptions of specific times (decadal) of groundwater development effects in a management area.
- This requirement was added to the requirements of joint planning with the passage of Senate Bill 660 in 2011.

Potential Socioeconomic Impact of Proposed DFCs (cont.)

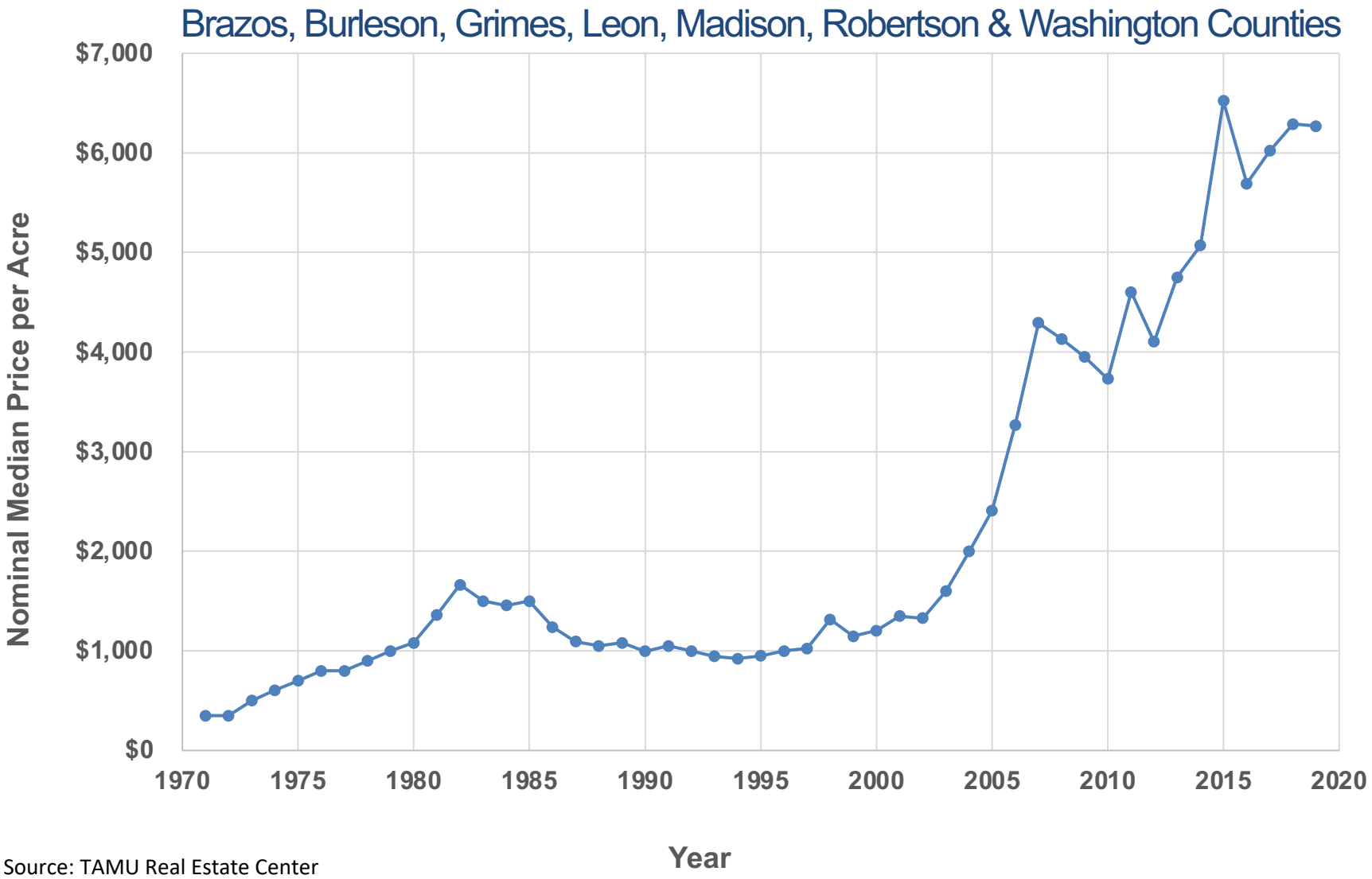
- From a qualitative perspective, both positive and negative socioeconomic impacts may potentially result from implementation of proposed DFCs.
  - Proposed DFCs may require conversion of part or all of a supply to an alternative supply or supplies, which may have increased costs associated with infrastructure, operation and maintenance.
  - Proposed DFCs may reduce the costs of groundwater pumping equipment or new well construction
  - Proposed DFCs should help ensure part or all of a long-term supply for an area.

Potential Socioeconomic Impact of Proposed DFCs (cont.)

- Proposed DFCs may serve to sustain/enhance economic growth due to assurances provided by an adequate and/or diversified water portfolio.
- Alternatives to proposed DFCs may result in short-term reduction in utility rates due to reduction in cost of water management strategy implementation.
- Alternatives to proposed DFCs may result in significant but unquantified production costs due to lower pumping rates from wells or continuing lower water levels in wells.
- Alternatives to proposed DFCs may result in a reduced or larger groundwater supply being available on a long-term basis.

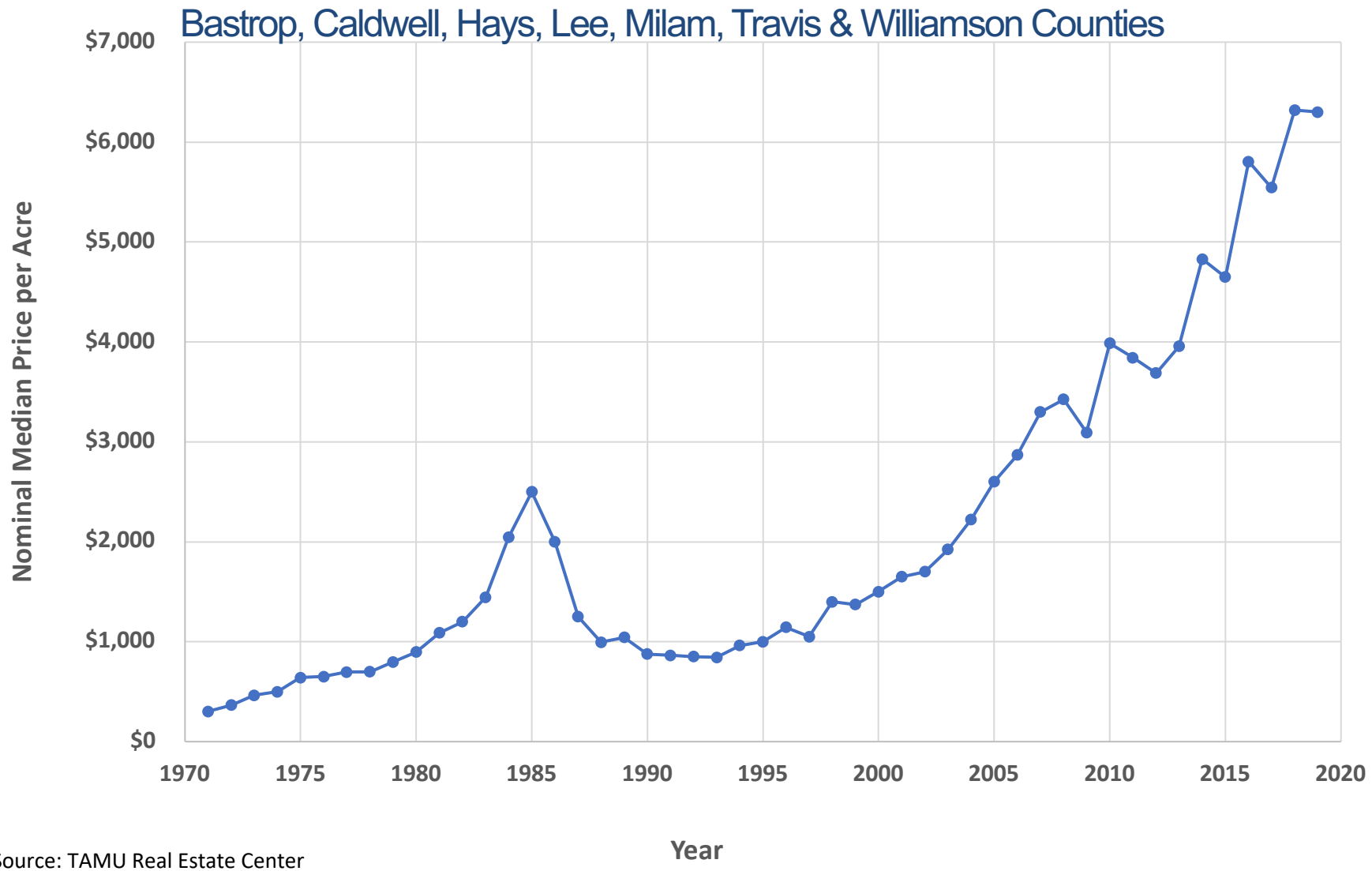

Questions
Thank you!

Rural Land Price Data – Brazos (LMA 27)



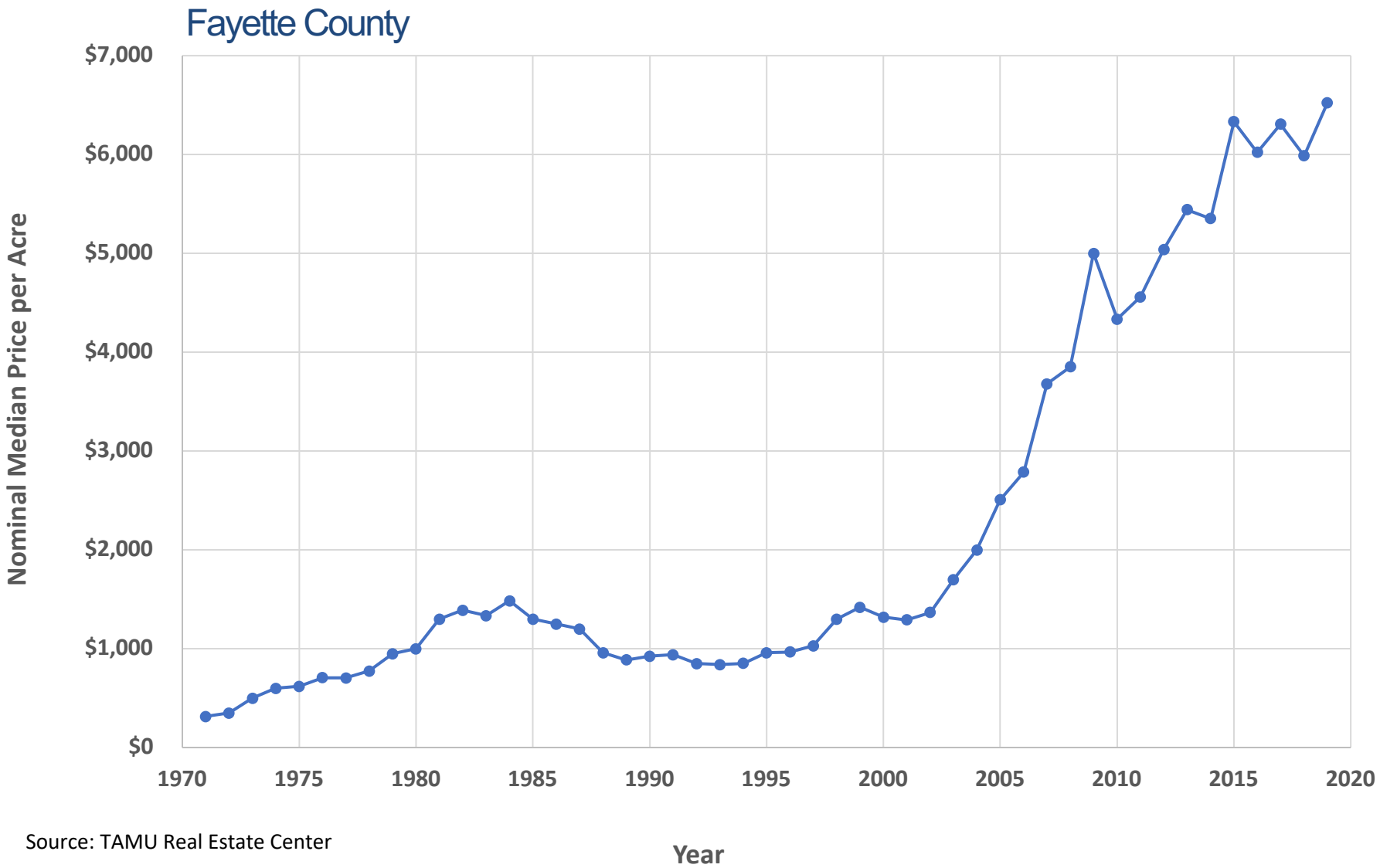
Source: TAMU Real Estate Center

Rural Land Price Data – Blacklands South (LMA 26)



Source: TAMU Real Estate Center

Rural Land Price Data – Coastal Prairie North (LMA 19)



Source: TAMU Real Estate Center

APPENDIX R

SEPTEMBER 18, 2020 PRESENTATION "GROUNDWATER MANAGEMENT AREA 12: CONSIDERATION OF THE IMPACT ON THE INTERESTS AND RIGHTS IN PRIVATE PROPERTY IN THE ADOPTION OF DESIRED FUTURE CONDITIONS OF AQUIFERS"

Groundwater Management Area 12: Consideration of the Impact on the Interests and Rights in Private Property in the Adoption of Desired Future Conditions of Aquifers

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Attorney at Law
P.O. Box 50245
Austin, Texas 78763

512.459.9428
Fax 512.459.8671
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Required DFC considerations in Section 36.108(c):

(d) …the districts shall consider groundwater availability models and other data or information for the management area and shall propose for adoption desired future conditions for the relevant aquifers within the management area. Before voting on the proposed desired future conditions of the aquifers under Subsection (d-2), the districts shall consider:

(1) aquifer uses or conditions within the management area, including conditions that differ substantially from one geographic area to another;

(2) the water supply needs and water management strategies included in the state water plan;

(3) hydrological conditions, including for each aquifer in the management area the total estimated recoverable storage as provided by the executive administrator, and the average annual recharge, inflows, and discharge;

(4) other environmental impacts, including impacts on spring flow and other interactions between groundwater and surface water;

(5) the impact on subsidence;

(6) socioeconomic impacts reasonably expected to occur;

(7) the impact on the interests and rights in private property, including ownership and the rights of management area landowners and their lessees and assigns in groundwater as recognized under Section 36.002;

(8) the feasibility of achieving the desired future condition; and

(9) any other information relevant to the specific desired future conditions.

(d-2) The desired future conditions proposed under Subsection (d) must provide a balance between the highest practicable level of groundwater production and the conservation, preservation, protection, recharging, and prevention of waste of groundwater and control of subsidence in the management area. This subsection does not prohibit the establishment of desired future conditions that provide for the reasonable long-term management of groundwater resources consistent with the management goals under Section 36.1071(a).

GMA 12's consideration of the impact of proposed DFCs on the interests and rights in private property, is one of many considerations that the GMA must make in developing a DFC that **provides a balance between the highest practicable level of groundwater production and the conservation.**

In the first round of DFCs, the impact of the DFC on private property was one of TWDB's considerations to determine if the DFC was reasonable.

Since then, Texas has further defined groundwater property rights—in both statute and case law.

And amended §36.108 to require an Explanatory Report that documents the nine considerations, including the "impact on the interests and rights in private property."

Explanatory Report Required

GMAs are required to document their consideration of the §36.108(d) factors (including impacts on private property) in an explanatory report that will be given to the TWDB with the proposed DFCs submittal package.

Under 36.109(d-3) the explanatory report shall:

(1) identify each desired future condition;
(2) provide the policy and technical justifications for each desired future condition;
(3) include documentation that the factors under Subsection (d) were considered by the districts and a discussion of how the adopted desired future conditions impact each factor;
(4) list other desired future condition options considered, if any, and the reasons why those options were not adopted; and
(5) discuss reasons why recommendations made by advisory committees and relevant public comments received by the districts were or were not incorporated into the desired future conditions.

MONIQUE NORMAN
ATTORNEY AT LAW

In 2011, the 82nd Texas Legislature modified groundwater law by redefining the ownership of groundwater:

Sec. 36.002. OWNERSHIP OF GROUNDWATER. (a) The legislature recognizes that a landowner owns the groundwater below the surface of the landowner's land as real property.

(b) The groundwater ownership and rights described by this section[:[~~(1)~~] entitle the landowner, including a landowner's lessees, heirs, or assigns, to:

(1) drill for and produce the groundwater below the surface of real property, subject to Subsection (d), without causing waste or malicious drainage of other property or negligently causing subsidence; and

(2) have any other right recognized under common law.

(b-1) The groundwater ownership and rights described by this section do [~~, but does~~] not:

(1) entitle a landowner, including a landowner's lessees, heirs, or assigns, to the right to capture a specific amount of groundwater below the surface of that landowner's land; or [~~and~~]

(2) [~~do not~~] affect the existence of common law defenses or other defenses to liability under the rule of capture.

(c) Nothing in this code shall be construed as granting the authority to deprive or divest a landowner, including a landowner's lessees, heirs, or assigns, of the groundwater ownership and rights described by this section.

MONIQUE NORMAN
ATTORNEY AT LAW

Sec. 36.002. OWNERSHIP OF GROUNDWATER.

(d) This section does not:

(1) prohibit a district from limiting or prohibiting the drilling of a well by a landowner for failure or inability to comply with minimum well spacing or tract size requirements adopted by the district;

(2) affect the ability of a district to manage groundwater production as authorized under Section 36.113, 36.116, or 36.122 or otherwise under this chapter or a special law governing a district; or

(3) require that a rule adopted by a district allocate to each landowner a proportionate share of available groundwater for production from the aquifer based on the number of acres owned by the landowner.

MONIQUE NORMAN
ATTORNEY AT LAW

In 2012, the Texas Supreme Court affirmed the Texas Legislature's recognition of groundwater as a real property right in the case of The Edwards Aquifer Authority v. Burrell Day and Joel McDaniel.

- The Texas Supreme Court ruled that, under both the common law and the Section 36.002 of the Texas Water Code, a landowner owns the groundwater under his land "in place" as a property right that cannot be taken for public use without adequate compensation guaranteed by the Takings Clause of the Texas Constitution.

- The State is empowered to regulate groundwater production.

- Regulation is essential to groundwater conservation and use.

What does this change in groundwater ownership law mean?

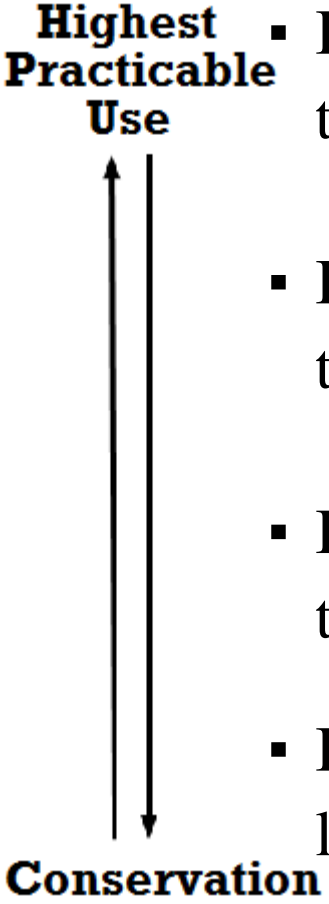
- Texas now recognizes both Rule of Capture and groundwater ownership as a real property right.
- Therefore, landowners have a statutory right to pump groundwater; although not a correlative right to pump a specific amount of groundwater.
- The tort preclusion aspects of Rule of Capture remain as they do in common law. Therefore, you cannot sue your neighbor for pumping your well dry in most circumstances.
- Recognizes that owners of groundwater rights must comply with groundwater district management if they are within the boundaries of a groundwater conservation district.
- Opens the door for a groundwater rights owner to challenge a groundwater district's rules and/or permits based on constitutional regulatory takings grounds.
- Lawyers can stop fighting over if groundwater is a property right and start fight over how much regulation constitutes a takings.

Consideration of Potential DFC Impacts

- "Considerations" analyze how property rights could be impacted.
- Impacts ≠ takings in this process

  - this is NOT a takings impact analysis
- A GMA must consider the rights of all owners of private property, including all owners of groundwater within the GMA. All interests, whether they favor highest practicable use or conservation, have property rights under the law.
- Impacts may be viewed as both restricting and enhancing property rights.
- Rules adopted by a District to achieve a DFC may have a potential impact on property rights

Major GMA 12 Interests in Groundwater Rights

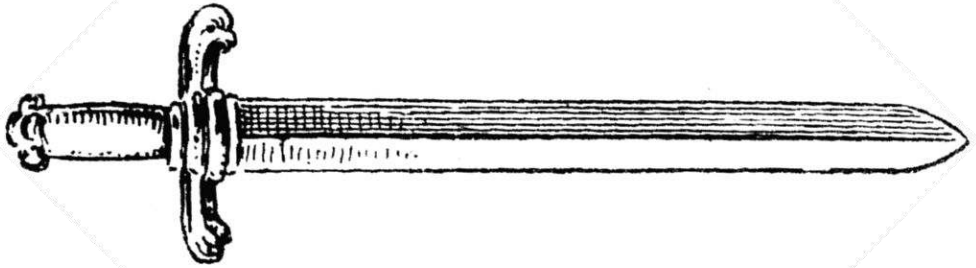


- Interests and rights that are benefitted or enhanced by the present use of groundwater.
- Interests and rights that are benefitted or enhanced by the use of groundwater in the near future.
- Interests and rights that are benefitted or enhanced by the ability to use groundwater over the long-term.
- Interests and rights that are benefitted or enhanced by leaving a significant amount of groundwater in place.

MONIQUE NORMAN
ATTORNEY AT LAW

How DFCs May Impact Interests in Real Property Including Groundwater

- A DFC that allows for lower aquifer levels could favorably impact property interests identified on the "highest practicable use" in the balance; while negatively impacting interests identified as "conservation"



- A DFC that aims for a higher aquifer levels could favorably impact property interests identified as "conservation" in the balance; while negatively impacting interests identified as "highest practicable use"

Potential Impacts by District Rules to Achieve DFCs

Existing Rules that implement DFCs adopted by GMA 12 impact or affect private property rights by setting well spacing requirements and production limits.

Spacing Requirements impact where well owners can drill wells. Spacing requirements also impact neighboring property right holders by reducing interference between wells.

Production limitations currently exist in GMA 12 districts. These Rules are designed to prolong the groundwater supply and reduce impact on surrounding groundwater rights.

Potential impacts on property rights of DFCs favoring "highest practicable production":

- lenient production restrictions that allow existing users to produce more groundwater with less acreage.
- may allow groundwater supply and levels to meet needs.
- may endanger water supply and needs of future users.
- may increase interference between groundwater right owners.

Potential impacts on property rights of DFCs favoring conservation, preservation, protection and recharging:

- increased production limits may require existing users to reduce groundwater production or acquire additional groundwater rights.

- may extend groundwater supply and levels to meet future needs.

- may extend the productive life of the aquifer.

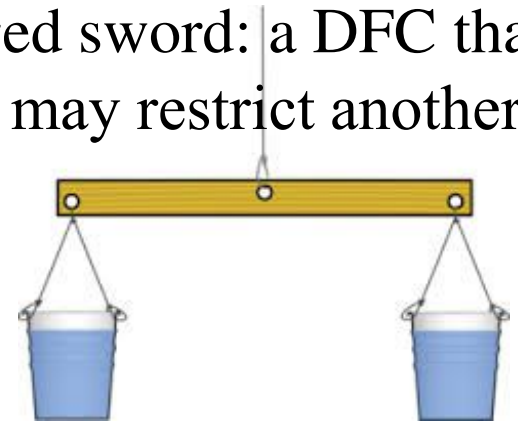
- may minimize interference between groundwater right owners.

Takeaway?

- Consideration of impact on Private Property Rights is one of many factors that have to be weighed to provide a balance between the highest practicable level of groundwater production and the conservation to provide for the reasonable long-term management of groundwater resources

- An impact does not mean a taking

- Impacts are a double-edged sword: a DFC that may benefit one property right owner may restrict another…hence the balancing act.



MONIQUE NORMAN
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APPENDIX S

POST OAK SAVANNAH GCD POSITION PAPER ON GMA 12 PROPOSED DFCS FOR THE 3RD JOINT PLANNING CYCLE

Post Oak Savannah Groundwater Conservation District
Position Paper on GMA 12
Proposed DFCs for the 3rd Joint Planning Cycle

Submitted to the Brazos Valley Groundwater Conservation District, Mid-East Texas Groundwater Conservation District, Lost Pines Groundwater Conservation District, and Fayette County Groundwater Conservation District as part of the joint planning process for providing comments on Proposed Desired Future Conditions

July 14, 2021

1.0 Review of the GMA 12 Joint Planning Process

On September 2005, House Bill 1763 became law and mandated that the groundwater conservation districts (GCDs) in Groundwater Management Areas (GMA) develop desired future conditions (DFCs). The Texas Water Code (TWC) requires GMAs to develop DFCs every 5 years. Texas is currently in their 3rd joint planning cycle. The discussion below summarizes key issues associated with the three joint planning cycles.

1st Joint Planning Cycle: During the first joint planning cycle, POSGCD presented its initial set of proposed DFCs listed in below in Table 1 to GMA 12 on May 26, 2010. These proposed DFCs were developed without using a groundwater availability model (GAM). Rather, the proposed DFCs were determined using equations in an Excel spreadsheet. Input to the Excel spreadsheet included values of drawdown for the unconfined and confined portions of each aquifer that were deemed to be consistent with the goals and objectives of the POSGCD Management Plan by POSGCD DFC committee.

Table 1 Initial set of DFCs Proposed by POSGD to GMA 12

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

During the process of working with GMA 12 member GCDs to develop a set of District DFCs that were deemed to be compatible and physically possible, POSGCD adjusted the values of the DFCs for the Queen City, Carrizo, and Calvert Bluff aquifers to the values shown in Table 2.

2nd Joint Planning Cycle: During the second joint planning cycle, GMA 12 performed several bookend GAM simulations to investigate the sensitivity of drawdowns to different assumptions regarding how to include permitted production in a DFC model simulation. After the bookend simulations were completed, POSGCD proposed to change their current DFCs as little as necessary while still meeting the requirements for DFC in TWC §36.108 (d) and §36.108 (d-2).

Table 2 shows that the adopted DFCs for POSGCD are very similar for the 1st and 2nd joint planning cycles.

Table 2 GMA 12 Adopted DFCs for POSGCD during the 1st and 2nd Joint Planning Cycles

Aquifer	1st Planning Cycle		2nd Planning Cycle	
	Simulated Drawdown (ft) from Jan 2000 to Dec 2059	2059 Production in GAM simulation (acre-feet/year)	Simulated Drawdown (ft) from Jan 2000 to Dec 2069	2069 Production in GAM simulation (acre-feet/year)
Sparta	30	6,734	28	6,375
Queen City	30	502	30	504
Carrizo	65	7,059	67	7,058
Calvert Bluff	140	1,038	149	1,036
Simsboro	300	48,501	318	48,503
Hooper	180	4,422	205	4,422
Total		68,256		68,258

3rd Joint Planning Cycle: During the third joint planning cycle, GMA 12 performed several bookend GAM simulations in 2019. These bookend GAM simulations were similar to those performed in the 2nd Joint Planning Cycle. GMA 12 also adopted the use of an updated GAM for the Sparta, Queen City, Carrizo, Calvert Bluff, Simsboro and Hooper aquifers. The updated GAM produced notably different drawdown responses to future pumping for all of the aquifers as a result of changes in the hydraulic properties of the aquifers. A significant finding from using the updated GAM was that POSGCD could not achieve its current DFC for the Carrizo Aquifer in 2069 even if it stopped all pumping in the Carrizo from 2010 to 2069.

In the winter of 2020, POSGCD determined that an appropriate DFC for the Carrizo for POSGCD to implement its management strategies and achieve it management goals would be an average drawdown of about 145 feet in 2070. The analysis used to support the drawdown of 145 feet was based on multiple considerations, including:

- assumptions used to develop the proposed DFCs in Table 1
- the exceedance of a level 2 threshold in POSGCD Rule 16.4 in 2020 for the Carrizo Aquifer
- DFC requirements listed in the Texas Water Code (TWC)

On January 15, 2021, POSGCD requested that GMA 12 support a DFC of about 145 feet of drawdown in 2070 for the portion of the Carrizo Aquifer in POSGCD. A simulation with the updated GAM indicated that to achieve a DFC of 145 feet of drawdown, the maximum production from the Carrizo Aquifer in Milam and Burleson counties must be limited to approximately 12,000 acre-feet per year. On January 19, 2021, POSGCD Director Steven Wise sent a letter to the Board of the Directors of Brazos Valley GCD, Lost Pines GCD, Fayette County GCD, and Mid East Texas GCD to request their support in a lowering POSGCD maximum production rate in the Carrizo Aquifer from 18,205 AFY to 12,000 AFY. Among the points made by Director Wise supporting a lower production rate are:

- Since approximately August of this past year, we have been apprised of 28 wells – 26 of which are in the Carrizo – which needed their pumps lowered or the well redrilled. We have measured water levels in approximately 20 additional Carrizo wells located in the District. Of those, about 10 will need servicing in the next couple of months.
- Based on results from modeling and field studies, POSGCD estimates that if the Carrizo pumping is not reduced below 18,205 AFY, there could be as many as 140 Carrizo wells in our district that will need to have their pumps lowered or wells redrilled by 2050.
- As a result of these concerns, POSGCD will be asking Districts in the next GMA 12 meeting to support a modification of run S-7 to set a maximum production rate of 12,000 AFY in the Carrizo for POSGCD. This change will result is less drawdown in the Carrizo across the entire GMA and result in management of the aquifer consistent with intentions of our Board.
- It is important to note that we are not requesting any of the pumping files for other GCDs in GMA 12 to be changed, and no DFCs for any of the districts in GMA 12 will be increased in the Carrizo Aquifer.

In a vote of 4 to 1 (with POSGCD being the 1 nay vote), GMA 12 approved the proposed DFCs listed in **Table 3** for POSGCD. The DFCs listed in Table 3 are based on drawdown predicted from GAM run S-12 (Scenario 12), which included a maximum Carrizo production rate of 18,206 AFY in 2070. In developing the pumping for GAM Run S12, GMA 12 used the Carrizo pumping from GAM Run S-7, which was one of the bookend GAM simulations developed by GMA 12 in 2019. GMA 12's rationale for using the Carrizo pumping of 18,206 AFY in 2070 was that it included "known pumping."

Table 3 GMA 12 Proposed DFCs for POSGCD for the 3rd Joint Planning Cycle

Aquifer	3rd Planning Cycle	
	Simulated Drawdown from Jan 2010 to Dec 2069	2069 Production in GAM simulation (acre-feet/year)
Sparta	32	4,105
Queen City	31	7,838
Carrizo	172	18,206
Calvert Bluff	179	4,761
Simsboro	336	79,433
Hooper	214	3,126
Total		117,469

2.0 Rationale of POSGCD's Position on Proposed Carrizo DFCs

POSGCD assessed the process used to develop the proposed DFCs for the Carrizo Aquifer to be unreasonable because it does not meet the requirements set out in Chapter 36 of the TWC for establishing DFCs. The discussion below provides the rationale and support for POSGCD's position. The discussion is divided into the following three subject areas of concern.

- Development and Use of GAM Run S12
- Chapter 36 of the Texas Water Code requirements for establishing DFCs
- POSGCD Management Strategies, Policies, and Rules to locally manage groundwater

Development and Use of the GAM Run S12: The pumping rates used to define the GAM runs for GMA 12 are prepared by the Districts' Consultants under directions provided by the GMA 12 members. The POSGCD pumping rate of 18,205 AFY in GMA Run S12 for the Carrizo Aquifer is based on the pumping rates developed by the GCD Consultants for GMA Runs S1 and S7, which were presented in GMA meetings in August 2019 and September 2019, respectively. GAM runs S1 and S7 were developed by the GCD consultants to represent production from existing permits.

All of the pumping rates for the GMA 12 GAM Runs prior to 2021 were generated through a process whereby each GCD was responsible for developing the pumping rates over time for their counties and the GCD hydrogeologic consultants merged the pumping rates into a single file. Also prior to 2021 each GCD created their pumping rates independently of each other. In 2021, GMA 12 voted to accept GAM Run S12 and to prevent POSGCD from reducing the Carrizo pumping in Milam and Burleson counties because, ostensibly, any reduction in the POSGCD Carrizo pumping would prevent the Run S12 from representing "known pumping." In particular, several GCDs specifically identified the need to include the "known pumping" for the Vista Ridge project. Among the concerns that POSGCD has with GMA 12's requirement that "known pumping" needs to be included in a GAM Run used for supporting and justifying the proposed DFCs are:

- GMA 12 has not defined "known pumping" nor have the GMA consultants discussed a workable definition or meaning for "known pumping" and to date this discussion has only been applied to one GCD and one aquifer in the GMA.
- If GMA 12 is to include "known pumping" in GAM runs then GMA 12 needs to have written protocols for how "known pumping" will be represented and documented in a GAM pumping file. More importantly, GMA 12 would need to show that the incorporation of 'known pumping" is consistent with the requirements and intent of Chapter 36 in TWC for establishing DFCs. Currently, GMA 12 has no written protocols for determining how any pumping will be presented in its GAM simulations.
- The vast majority of the pumping rates in GAM Run S12 are based on GAM Run S7. Run S7 developed by the GCD consultants used permitted pumping amounts and the assumption that permits would be remain in full effect through 2070 even though the term of many permits expires decades prior to 2070.
- If GAM runs are to include "known pumping" and GAM runs are used to establish DFCs that exist 50 years into the future, then the process ensures drawdown-based DFCs will gradually get larger with each 5-year planning cycle if no curtailment can be affected and production increases as existing permits reach their limits and new permits are granted. Such a process wherein DFCs would tend to gradually increase over time will prevent POSGCD (or really any of the GCD's) from effectively managing groundwater using their existing policies and strategies or developing new ones as necessary.

Chapter 36 of the Texas Water Code requirements for establishing DFCs: The TWC lists two key requirements for DFCs. TWC §36.108 (d) states that the districts shall consider nine factors when

developing the DFCs, which are listed in the statute. Section 36.108 (d-2) states that DFCs "must provide a balance between the highest practicable level of groundwater production and the conservation, preservation, protection, recharging, and prevention of waste of groundwater and control of subsidence." Among the concerns that POSGCD has with the GMA 12 process used to develop the proposed DFC are the following:

- POSGCD used the results from its 2020 GANA report (Young and others, 2020) and related groundwater model simulations to determine that an appropriate DFC would be 145 feet of average drawdown in the Carrizo aquifer to achieve the *balance* described in TWC §36.108 (d-2). Results of this analysis were provided to GMA 12 through POSGCD presentations and were sent to each GCD by Director Wise. The previously mentioned 4-1 vote by GMA 12 essentially disregarded POSGCD's analysis. Therefore GMA 12 did not achieve an appropriate "balance" and provided no basis for why the DFC should be raised from 145 feet to 172 feet.
- GMA 12 has not yet provided any evidence or discussion to show that the proposed DFCs in Table 3 achieve the balance required in TWC §36.108 (d-2).
- TWC §36.108 (d) states that the districts ***shall*** consider nine factors before voting on the proposed DFCs. GMA 12 consultants' presented information on these nine factors. However, the nine factors were not included in the discussion when determining the Carrizo DFC in 2070 for POSGCD. Instead, GMA 12 voted to use the drawdowns predicted from GAM Run S12 as the overriding factor for the establishing the 2070 DFC for the Carrizo for POSGCD.
- The GMA 12's discussion of the nine factors did not address the potential 140 Carrizo wells in POSGCD that will need to be redrilled or have pumps lowered by 2050 if the "known pumping" is used to determine the Carrizo DFC for POSGCD. POSGCD therefore argues that GMA 12 did not meet the intent of the TWC §36.108 (d) requirement to consider *all* nine factors, which include the socioeconomic impacts as well as impacts to the interest and rights in private property.

<u>POSGCD Management Strategies, Policies, and Rules to Locally Manage Groundwater</u>: POSGCD's management strategy based on draw down and water level decline has been crafted and refined since 2005. Part of POSGCD's management strategy includes evaluating water levels relative to existing well screens. Studies have reviewed these management strategies and found merit. These strategies have undergone challenges and scrutiny – not once but twice – at TCEQ through the petition process.

The GCDs in GMA 12 have different approaches for establishing DFCs, demonstrating compliance with DFCs, and managing groundwater to achieve a DFC. As a result of these different approaches, the DFC process must account for and accommodate *all* the different approaches to the extent that is practicable and consistent with TWC statutes and with judicial rulings related to groundwater management.

Prior to, and throughout the Joint Planning Process, POSGCD has used drawdown-based conditions to guide groundwater management strategies and decisions. These conditions have been, and continue to be, primarily determined using a multi-decision process that avoids using a GAM to determine a DFC from pumping inputs. The multi-decision process allows POSGCD the

option of selecting the same, or similar DFCs for adjacent DFC planning cycles even if production and/or permitted pumping increases over time. Among the concerns that POSGCD has with the GMA 12 process used to develop the proposed DFC are the following:

- Introducing the undefined term of "known pumping" as a factor and considering it "in perpetuity" at this juncture; this approach makes it such an overriding factor, it creates a situation wherein POSGCD's long term management strategies have been made virtually obsolete.
- Use of this "known pumping" as a factor – even an overriding factor – to be considered is NOT one of the nine factors that the GCDs are required per TWC 36.108, and as such is potentially a misapplication of state law.
- Inputting "known pumping" which appears to some GCDs to equate to permitted pumping in perpetuity in the joint planning process to determine a DFC is not consistent with the underlying principles for groundwater management as set out in TWC Sec. 36.108.
- Prior to, and throughout the Joint Planning Process, POSGCD has included curtailment of groundwater production as the key management strategy in achieving the "balance" of conservation and production/protection of groundwater and property rights therein. POSGCD's rules tie the District's authorization for curtailment to reaching thresholds that are expressed as a percentage of the DFCs. In order for POSGCD to properly maintain its well-established management strategies, GMA 12 needs to develop a methodology that allows a District to achieve (or maintain) a DFC for a set period of time. The GMA 12 recent process of incorporating "known pumping" used to create the proposed DFC is not conducive for managing toward a specific DFC; rather, this new GMA 12 process with this additional factor is conducive for adjusting a DFC to allow current production and permitted production to continue, or perhaps expand, indefinitely.
- The proposed DFCs are for a time that is approximately 50 years into the future. GMA 12's proposed methodology would require that "known pumping," associated with all permits, be continued for such 50-year period in a GAM Run no matter what the term associated with the permit. This creates a situation where DFCs will tend to favor higher drawdowns and indirectly handicap a GCD's ability to implement curtailment if the GCD's rules for curtailment require that the 2070 DFC not be exceeded.
- GMA 12 has adopted a 10% variance between the average drawdown predicted by a GAM Run and a DFC. POSGCD demonstrated to the GCDs within GMA 12 that the 10% variance would be sufficient for all GCDs to keep their proposed DFCs in Table 3 for the Carrizo for a modified GMA 12 Run and that POSGCD's Carrizo maximum pumping rate could be reduced to about 12,000 AFY. As a result of the previously mentioned 4-1 vote, GMA 12 representatives did not accept the modifications presented by POSGCD.

3.0 Summary

Based on the foregoing, POSGCD assesses the process used to develop the proposed DFCs for the Carrizo Aquifer to not be reasonable. Further, and perhaps more importantly, the process does not meet the requirements set out in Chapter 36 of the TWC for establishing DFCs. POSGCD supports its evaluation based on the above set-out discussions with the three subject areas of concern.

- Development and Use of GAM Run S12
- Chapter 36 of the Texas Water Code requirements for establishing DFCs
- POSGCD Management Strategies, Policies, and Rules to locally manage groundwater.

Attempting to give reason to GMA 12's rejection of the POSGCD-suggested solution supports the notion that the end goal of the 3rd joint planning cycle is more about developing precedents for enforcing an unwritten rule of including the undefined term "known pumping" into GMA methods used to develop DFCs together with an idea that such undefined term is perpetual rather than adopting DFCs that assist all Districts with achieving their management goals. Such actions may require one District to curtail unnecessarily while others benefit from such curtailment. Such rejection also seems to belie what true "management" and the nine requirements set out in 36.108(d) mean to those Districts within GMA 12.

APPENDIX T

BRAZOS VALLEY GCD WRITTEN RESPONSE TO POST OAK SAVANNAH GCD POSITION PAPER ON PROPOSED DFCS

BRAZOS VALLEY GROUNDWATER CONSERVATION DISTRICT

P.O. BOX 528 · HEARNE, TX 77859 · (979) 279-9350

HTTPS://BRAZOSVALLEYGCD.ORG

August 5, 2021

Post Oak Savannah GCD Board of Directors,

The Brazos Valley Groundwater Conservation District ("BVGCD") supports Groundwater Management Area 12's ("GMA 12") recognition and inclusion of its constituent groundwater districts' local management and permitting. The desired future conditions ("DFCs") adopted under Section 36.108 of the Texas Water Code, are a joint planning tool of the management area that must include in its planning numbers the groundwater permits issued by each groundwater district that are currently in effect, as well as known production. Groundwater planning is not effective unless it includes known and permitted groundwater production, just as planning a financial budget is not effective unless it includes all known and planned spending. Transparency and inclusion of all known and planned production are vital to water planning for GMA 12 and Texas.

Inclusion of all the groundwater districts' permitting and production numbers in the planning model runs recognizes districts' local control, groundwater management, permitting, and production. The request of Post Oak Groundwater Conservation District (POSGCD) to use a Groundwater Availability Model ("GAM") run that does not include all known permitting and production in all districts is not only troubling for transparency and accuracy issues, but also for the precedence that it sets in the GMA of not acknowledging each district's local permitting. Although POSGCD this time is voluntarily asking GMA 12 to disregard permits that it has issued, it is concerning that the precedent would be set for the permits issued by the constituent districts to be involuntarily disregarded by the GMA in the future. The implication of granting the POSGCD request is for GMA 12 to adopt a policy to amend its districts' permits.

In developing DFCs, GMA 12 must consider nine factors, for which at least four incorporate known permitting and production in the GMA:

(1) aquifer uses or conditions within the management area, including conditions that differ substantially from one geographic area to another;

(2) the water supply needs and water management strategies included in the state water plan;

***

(6) socioeconomic impacts reasonably expected to occur;

(7) the impact on the interests and rights in private property, including ownership and the rights of management area landowners and their lessees and assigns in groundwater as recognized under Section 36.002;

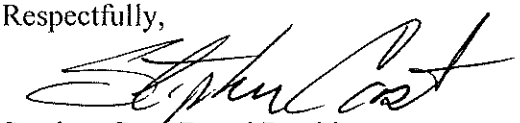
Tex. Water Code §36.108(d).

If POSGCD or any other district would like to adjust the numbers in the GAM runs for the DFCs, then they can locally address their permitting and production under their authority granted by Chapter 36 of the Texas Water Code. Groundwater districts currently have the authority to amend their existing permits. A district is authorized to amend permits for the "operation of, or production of groundwater from, wells or pumps that may be necessary to prevent waste and achieve water conservation, minimize as far as practicable the drawdown of the water table or the reduction of artesian pressure, lessen interference between wells, or control and prevent subsidence." Tex. Water Code §36.113(f). The POSGCD may amend its permits and then the GMA 12 would recognize its new permitting numbers in the next round of joint planning and DFC establishment.

Further, POSGCD could amend its rules to either change the groundwater production rate allowed or could amend its curtailment rule to decrease the trigger threshold and require curtailment earlier under the current DFCs. And, POSGCD could use its rules allowing management zones that are authorized by Section 36.116(d) of the Water Code to address the unique effects of its Carrizo Aquifer permitted production. Groundwater districts have many tools to address groundwater production and their existing permits under the local control of Chapter 36. However, POSGCD has not availed itself of any of these options. Instead, POSGCD commenced a campaign to GMA 12 in January 2021, at the end of this DFC joint planning cycle, to have the GMA use numbers only in the Carrizo Aquifer and only for POSGCD that do not reflect its issued permits and known production, while all other input numbers for the aquifers for all of the other districts reflect the issued permits inclusive of known production.

Instead of amending its permits and then submitting those new numbers to the GMA, POSGCD is taking a backwards approach by advocating for GMA 12 to use permitting and production numbers that do not reflect the current reality. The POSGCD could then use the new DFCs to force permit amendments within its district. The joint planning process is a bottom-up joint water planning tool, not top down. The GMA 12 recognizes all of its districts local management and permitting and will continue to do so. GMA member districts should not be put in a position to replace local management, as they are being asked to do.

Respectfully,



Stephen Cast, Board President
Brazos Valley Groundwater Conservation District

APPENDIX U

GMA 12'S RESPONSES TO COMMENTS FOR BRAZOS VALLEY GCD

Brazos Valley GCD Response to Comments

In this section, the Brazos Valley GCD provides responses made to the Brazos Valley GCD. Comments addressed to GMA 12 or all of the individual member GCDs of GMA 12 are addressed in responses to comments in other GCDs in this report.

Response to Comments- Nelda Calhoun

Mrs. Nelda Calhoun provided comments in an email addressed to the Brazos Valley GCD on June 8, 2021. GMA 12 has reviewed her comments and provides the following response.

In her email she expressed concerns regarding outside circumstances and groundwater management approaches affecting the manner of groundwater management by the Brazos Valley GCD. The Brazos Valley GCD was part of the decision making process within GMA 12 and able to propose aquifer desired future conditions for future decades that are consistent with the directives from the Brazos Valley GCD board of directors maintaining local control/management of the groundwater resources.

Response to Comments- Melanie Pavlas

Ms Melanie Palvas of Bastrop, Texas on behalf of the Pines & Prairie Land Trust submitted comments on July 13, 2021 regarding the desired future conditions (DFCs) being consider by GMA 12. Her main comment was that the DFCs being considered did not have the required balance between protecting and conserving the water resource and development of the resource.

The GMA realizes that reaching a balance between aquifer protection and conservation and development is a difficult task. The GMA was mindful of the requirement provided in (Chapter 36.108 (d-3) regarding reaching a balance and heard and considered other comments in this regard. In the Lost Pines GCD the DFC for the Simsboro Aquifer was 311 feet in July 2021 and subsequently was lowered to 240 feet, the same DFC as adopted in the 2016 cycle of GMA planning. The lower DFC results in groundwater pumping from the Simsboro Aquifer having substantially less effect on flows in streams than the 311 foot DFC.

Alan Day

From: Nelda Calhoun <nelcalhoun@gmail.com>
Sent: Wednesday, June 16, 2021 9:58 AM
To: Alan Day
Subject: Meeting June 8 2021

Follow Up Flag: Follow up
Flag Status: Flagged

To honorable board members and manager Allen Day, I would be writing a formal letter but due to technical difficulties this will have to do. My husband and I listen to your public meeting by zoom together and was questioning why was the counties of Burleson and Miliam so interested in our future ground water speculation? Have not those counties surrendered to the selling of water rights ? Like Blue water ships the water to San Antonio? For years massive pumping has left them dry and they envy us because we are sitting on the deepest water aquifer. Do not let the Post oak savanna water district bully us. Let's be the grand water stewards of the state. We have to be for our children's future.

From:	Melanie Pavlas
To:	Cynthia Lopez
Cc:	Alan Day
Subject:	Proposed DFCs
Date:	Tuesday, July 13, 2021 1:32:20 PM
Attachments:	image001.png

Mr. Cast,
On behalf of Pines and Prairies Land Trust, I am contacting you about the proposed Desired Future Conditions and to urge you to reject them. We understand the difficult role you have taken and commend you for it. However, our groundwater, communities, rivers, springs and streams (and the people and wildlife that need them) depend on achieving a balance between conserving and protecting of our water resources (both groundwater and surface water systems) and the development of those resources. Putting those resources at risk puts our lives and our landscapes at risk. And while we understand that balance can be difficult to manage, we also believe it undoubtedly can be done.

Good planning requires agreement on management policies to guide the development of Desired Future Conditions. The districts were unable to agree on unified management policies workable for all the districts and unfortunately, have provided proposed DFCs based on controversial and flawed principles. As a result, the proposed DFCs for GMA-12 protect only permit holders — the big pumpers — by adopting drawdowns that allow them to pump to the limits of their permits, while local domestic and livestock wells are left high and dry and our local ecosystems suffer.

Whether or not a groundwater district mitigates failed local wells or not, the proposed DFCs unreasonably impact our aquifers. Likewise, the proposed DFCs will deprive our surface water systems of the inflows from aquifers that they depend on.

It is your duty to do the work to achieve the required balance and we trust and support you to do just that.

Sincerely,

Melanie Pavlas
Executive Director
PO Box 737 (mailing)
1018 Main St., Ste. B
Bastrop, TX 78602

APPENDIX V

GMA 12'S RESPONSES TO COMMENTS FOR FAYETTE COUNTY GCD

Fayette County GCD Response to Comments

In this section, the Fayette County GCD provides responses to comments made specifically to the Fayette County GCD. Comments addressed to GMA 12 or all of the individual member GCDs of GMA 12 are addressed in response to comments in other GCDs in this report.

Response to Comments- Dianne Wassenich

Ms. Wassenich states that drawdowns beyond what rains can support is not sustainable.

Ms. Wassenich does not describe what she means by sustainable nor how these comments relate to the proposed DFCs, and therefore we have no response at this time.

Response to Comments- Renate Suitt, Grover Shade, Miriam Vaughn

The listed individuals commented that the proposed DFCs should be rejected due to the negative effect it would have on groundwater and surface water.

Unfortunately, simply rejecting the proposed DFCs is not an option. GMA 12 is required by statute (Chapter 36.108 (d-3)) to adopt final DFCs by January 5, 2022. If the DFCs that were proposed by GMA 12 on April 24, 2021 are rejected, they have to be replaced with alternative DFCs. None of the comments being addressed in this response proposed specific alternatives to the DFCs they want rejected, and we have no response to these comments other than GMA 12 is required to adopt DFCs and does not have the option to simply reject the proposed DFCs.

Response to Comments- John Cosson

Mr. Cosson commented that he supports a very conservative approach toward drawdown, and discussed the use of a variable of +/- 10%.

The use of the variance of 10% for DFCs adopted by GMA 12 does not impact the actual DFC that is adopted. We are unsure what Mr. Cosson wants beyond a conservative approach to joint groundwater planning and therefore we have no response at this time.

Response to Comments- Environmental Stewardship

Mr. Steve Box, on behalf of Environmental Stewardship, submitted comments and gave a presentation regarding the proposed DFCs. This discussion was not specific to Fayette County and was similar to

comments submitted to other GCDs within GMA 12, and therefore we have no response at this time to these comments.

Response to Comments- SAWDF

SAWDF gave a presentation regarding the proposed DFCs. This presentation focused on Lost Pines GCD and in particular the situation in the Carrizo Aquifer in northern Lee County. No particular comment in this presentation was directed to the DFCs adopted by FCGCD for Fayette County, and therefore we have no response at this time to these comments.

Wendi Pyle

From: Dianne Wassenich <dianne@sanmarcosriver.org>
Sent: Monday, July 12, 2021 9:26 AM
To: david@fayettecountygroundwater.com; wendi@fayettecountygroundwater.com; cinfo@fayettecountygroundwater.com
Subject: public hearing today 9:30 a.m.

Dear David, Leo and all the board members:

I am so sorry I cannot be at your public hearing this morning at 9:30. I wanted to see you in person to tell you how important I think it is for you to protect our groundwater in our area and keep the Desired Future Conditions sustainable and adequate to have springs continue to flow to maintain the flow in the river, and for our farms. My brothers and a sister and I own a farm that was our grandparents' farm in your district, and we need those wells to remain healthy and usable! A draw down or mining of our aquifer, beyond what rains can support in recharge is just not sustainable. With climate changing so much, we can expect droughts worse than the 50's coming our way soon. The landowners like us who have domestic and livestock wells, will be the ones left hanging when water development removes large quantities of water, if permitted to do so beyond what the aquifer can yield. I beg you to think of your future generations of your own family and how they would survive if their wells are drawn down, springs dry up and the Colorado does not even have enough flow. Please listen to those who are doing the modeling and science to help you plan a sustainable future.

My grandfather lived through the 50's drought and had a well starting in the 1920's. We can see how much the aquifer has changed already, and hope you are listening to the warnings of what is in our future if sustainable DFC's are not put in place, for all those in our county who depend on you to protect our important water for the future.
Thanks, Dianne Wassenich 512 787 6392
(I live in San Marcos and my siblings live in other counties, but we all care very much about Fayette County water.)

--
Dianne Wassenich
512-787-6392

Wendi Pyle

From: Renate Suitt <bluesuitt77@gmail.com>
Sent: Wednesday, July 28, 2021 5:29 PM
To: wendi@fayettecountygroundwater.com
Subject: DFC

Mr. Leo Wick Sr.
Board President of Fayette County Groundwater Conservation District Fayette County

I would urge you and the Board of Directors to reject the proposed DFC. This plan would have a tremendous negative impact on our groundwater, rivers and other waters. We know that the groundwater will not replenish itself under the current conditions with our rain deficit and hot weather.

Please do not allow these big companies to draw down water that we need here for our communities and next generations, for our farmers and their livestock/agriculture and for our general needs.

Thank you for making the right decision.

Renate Suitt
705 Water Street
Bastrop, Tx 78602
512-308-1553

Comments to
Fayette County GCD Board
Regarding Proposed DFCs
July 12, 2021

Steve Box, Executive Director
Environmental Stewardship

Last month I addressed the technical reasons why -- based on predicted damage to surface waters -- we are requesting that the Proposed DFCs be rejected and sent back for revision. Today I want to address an issue that is common to all of the groundwater districts within GMA-12, and how GMA-12, collectively, and each member district, individually, has responded.

For the record, I want to be clear that resolution of the issue that is common to all groundwater districts discussed here is necessary but will not resolve or mitigate the issue related to surface waters we discussed with you last month.

Let's face it, management policies and practices within each member district of GMA-12 are in a state of flux, largely because of the magnitude of challenging, and novel, issues faced by some of those districts. Ultimately, all five districts may face these challenges, and it behooves them all to approach the issue from a commonality of interest.

Unfortunately, in this round of joint planning, an important concept has been overlooked, leading to an error that is embedded in the Proposed DFCs based on pumping file S-12.

Ms. Monique Norman, legal counsel to the Brazos Valley Groundwater Conservation District (BVGCD) and Fayette County Groundwater Conservation District (FCGCD), isolated the primary issue for GMA-12 districts in her recent comments at the Brazos Valley DFC hearing. Although she assured BVGCD that Post Oak Savannah GCD's (POSGCD) issues were not Brazos Valley's issues, she did seem to say that that *using a uniform standard that requires all districts to use the same criteria in setting the amount of their pumping in the pumping file used to set the DFCs for all five district is not necessarily an imperative of the joint planning process. "The legitimate question for this Board", she said, "is do we include all permits in the pumping file?"*

The logical conclusion is that each individual Board should be able to make the same decision -- does this district include all permits in the pumping file -- without this consideration being dictated by the other districts. That is to say, *homogeneity* in GMA-12 district management plans – as well as in their management goals and *pumping curtailment strategies* ---is not required under the Water Code.

Per the Texas Water Code, joint planning among districts is supposed to help all of the districts accomplish their *individual* management goals, as reflected in their management plans. Stated another way, the Code does not require "GMA-12" --- which TWDB does not consider to be a legal entity --- to be the tail that wags the dog. Instead, it is the other way around.

The district representatives, as a joint planning body only are to consider the effectiveness of the individual district management plans for conserving and protecting groundwater and preventing waste. They are to consider how the *individual district's* management goals achieve that district's desired future conditions established during the planning process, how those DFCs impact on planning throughout the management area, and the effectiveness of these measures in the

management area generally[1]. **Groundwater districts, not groundwater management areas, are the state's preferred managers of groundwater.**

In this round of joint planning in GMA-12, it was inappropriate for the districts as a group to require that the member districts take a uniform approach across all of the districts to the pumping file -- the file upon which the desired future conditions are based. Each district is entitled to respond to its electorate to adopt its own pumping and curtailment strategy[2]. So, the pumping file for each district should reflect its own approach. It makes perfect sense to be different from one district to another, just as aquifer conditions, aquifer demands, and local impacts may differ widely.

Using different strategies (assumptions) for the different pumping files for different districts is what the law commands, to be respectful of districts as the *local* groundwater management entities. Nothing about participating in a GMA is intended to undermine the autonomy of each district.

Certainly, this includes the ability for all of the districts to balance pumping against conservation while retaining their ability to curtail (slow down pumping) when damage is imminent Instead, the GMA districts voted to have each district's DFCs conform to a single pumping file, S-12.

The standards for developing desired future conditions in this round of review resulted in the representatives from four of the districts *inappropriately* imposing their will on the fifth district, rather than reaching a workable and agreeable resolution that works for all of the districts. It should be noted that the other four districts' reasons for imposing their will on the fifth district were never clearly articulated; however, the threats of litigation by Blue Water Vista Ridge certainly seemed to play a role.

The impetus for this error *seems to have been* sparked by a threatening letter from Paul Terrill, lawyer for Blue Water Vista Ridge, to Gary Westbrook, general manager of the Post Oak Savannah GCD. The letter, which was copied to all GMA-12 member districts, concerned Blue Water Vista Ridge's demands for how Post Oak Savannah GCD's Desired Future Conditions should be determined. Their demands coincided with pumping file S-12.

After a discussion of alternative pumping files at the March 18, 2021 meeting, Mr. Westbrook, as Post Oak Savannah's representative, indicated that his district was not in favor of using the S-12 pumping file -- a file that he said rendered the management plan they had been using for over a decade inoperable for purposes of curtailing pumping -- as the pumping file that would establish GMA-wide DFCs, or specifically as the pumping file that Post Oak Savannah GCD would be required to use to set its DFC.

The four other district representatives voted to use the S-12 model run, GMA-wide, thereby imposing their will on Post Oak Savannah GCD.

In his plea to maintain Post Oak's management policy, Mr. Westbrook told the other District Representatives, and I quote "***This is management we have had in place for over a decade that we believe tracks our mission statement considering conservation is important while recognizing that property rights are important."***

---

[1] Texas Water Code, Chapter 36.108(c)(1-4)

[2] EAA v Day, p 30. While districts have broad statutory authority,[109] their activities remain under the local electorate's supervision.[110] Groundwater conservation districts have little supervision beyond the local level. Districts are also required to participate in joint planning within designated groundwater management areas ("GMAs").[113]

"We respectfully request that you allow us to manage the Carrizo as we have always desired. Once we set the precedent, and I believe [adopting DFCs based on the S-12 run] would be a precedent, it will be hard to undo. If our DFC is raised so much higher [as is being demanded of Post Oak], then really, <u>we won't be able to do any management.</u> You can't curtail until you approach those desired future conditions because these [new S-12] DFCs would have to be allowed. (emphasis added)

In the vote that followed, the four districts that seemed concerned about being drawn into a lawsuit if Blue Water Vista Ridge sued Post Oak, *inappropriately* forced their will on Post Oak Savannah GCD.[3] **They *<u>essentially eliminated</u>* Post Oak's ability to curtail the Vista Ridge project even though, after only about six months of pumping, dozens of landowners' domestic wells in Burleson and Lee Counties are being continuously damaged, having already incurred thousands of dollars to repair, with predictions of unquantified future damages .**

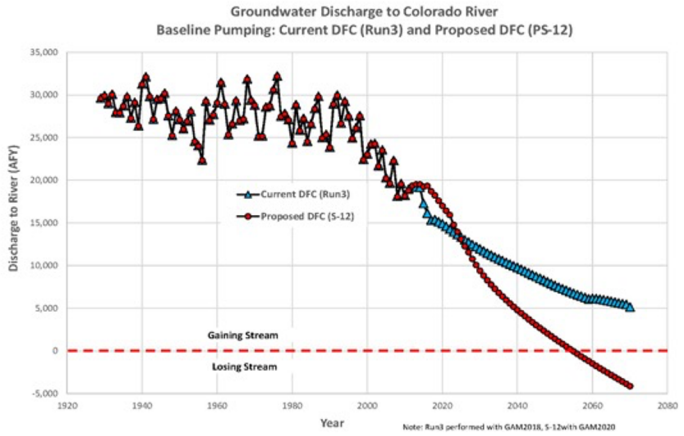
Worse, the damage to the aquifers in these counties will continue for many decades unless the Proposed DFCs are rejected and revised.

Our over-arching concern is that unresolved management policies developed rapidly over the last nine months and resulted in the districts *inappropriately* imposing requirements on another district. These flawed policies, instigated at the GMA-12 joint-planning level, are embedded in the Proposed DFCs and will have serious immediate and future consequences on management policies within the individual districts. Most urgently, the impact of changes in management policies that have a direct negative impact on the ability of districts to manage curtailment of pumping be resolved, and agreed policies be adopted by the districts <u>*before*</u> new DFCs are adopted.

We respectfully request that this Board reject the proposed desired future conditions and remand them back to the GMA-12 representatives for revision.

[3] "inappropriately" -- it was not the district representatives place to force management policies on Post Oak, <u>and</u> fear of litigation is never an appropriate reason for adopting any management policy, establishing DFC, or generally, for conducting the business of a GCD.

Proposed DFCs
Environmental Stewardship's Concerns and Requests



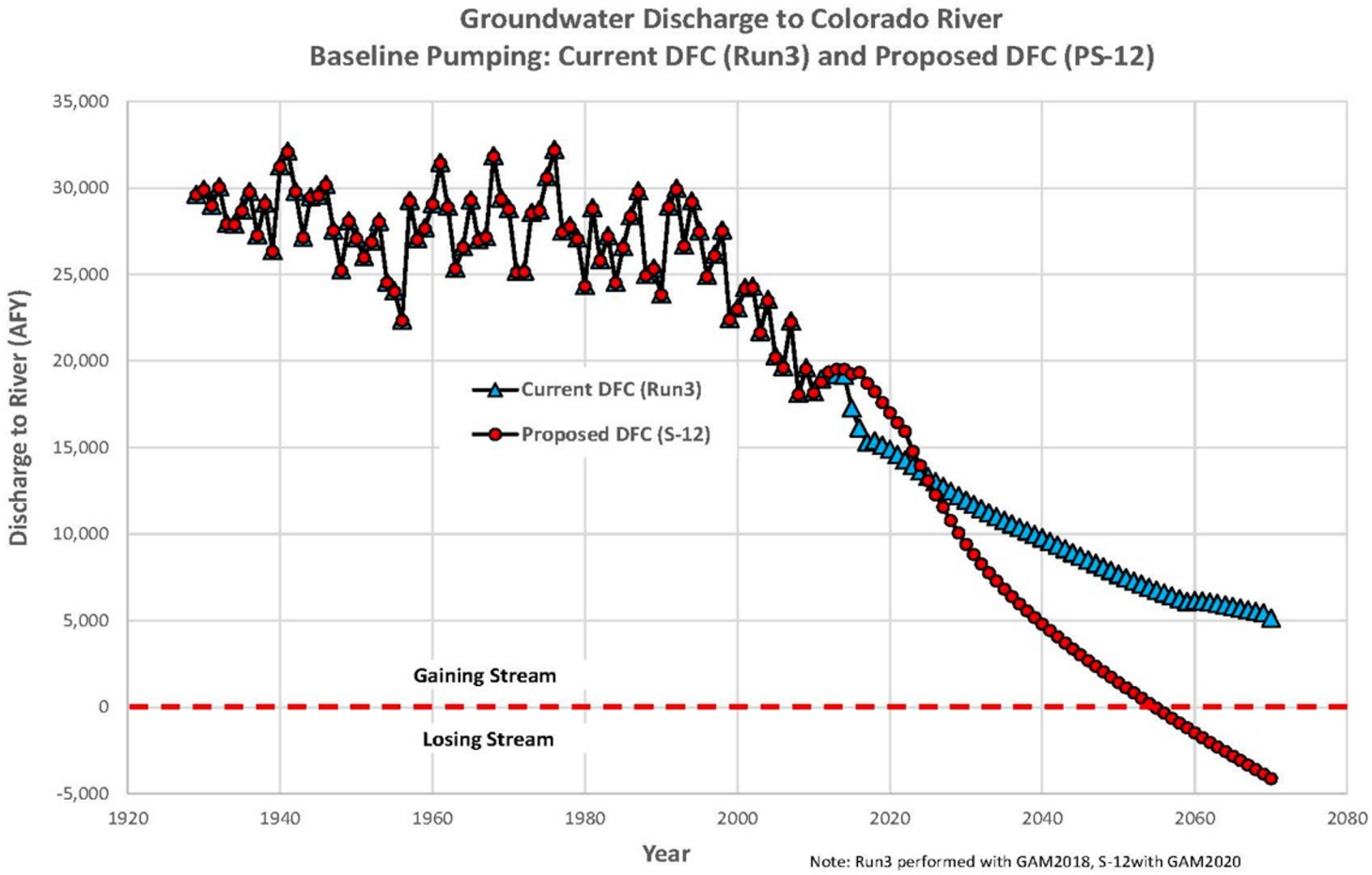
Presented to
Fayette County Groundwater Conservation District Board of Directors
June 7, 2021, La Grange, TX

Environmental Stewardship
A Sustainable Ecosphere
TM

Environmental-Stewardship.org

IMPACT OF PUMPING
ON OUTFLOWS TO MAIN STEM COLORADO RIVER

Adopted 2017 DFCs vs. Proposed DFCs:



Predicted reduction of discharge of groundwater into the mainstream Colorado River due to Current DFC Run 3 and Proposed DFCs S-12 (George Rice, New GAMs).

IMPACT OF PUMPING
ON OUTFLOWS TO MAIN STEM COLORADO RIVER

Discharge to Colorado River - AFY (1)				
Year	Pre-Development	Early Pumping	Current DFC	Proposed S-12
1930	29,600			
1995	27,500			
2011		18,700		
2070			5,150	-4,100
Change from 1930	**-2,100**	**-8,800**	**-22,350**	**-31,600**
	-7%	**-37%**	**-83%**	**-114%**

(1) Data From Rice Current vs Proposed DFC Graph

SURFACE WATER MODELING PREDICTS UNREASONABLE IMPACTS OF GROUNDWATER PUMPING ON THE COLORADO RIVER

- **Used established environmental flow standards to evaluate the impact of groundwater pumping on the Colorado River.**

- **The environmental flows legislation (Senate Bill 3), established that *maintaining the biological soundness of the state's rivers, lakes, bays, and estuaries is of great importance to the public's economic health and general well-being*.**

Joe Trungale

Ecological impacts of reduced surface water flows due to groundwater pumping

Joe Trungale
Trungale Engineering
Presentation to GMA-12
April 20, 2021

Click Here for Video

Impacts on Surface Waters

- **Water in the Colorado River at Bastrop and below has, for all intents and purposes, been fully appropriated; *i.e.* no more water remains available for future appropriation as a water right.**
  - Any reductions in flows negatively impact existing water rights holders.
  - Groundwater pumping appears to create a gradual reduction of reliable streamflows, over a relatively long period of time.
- **The reduction in flows impact the ecological health of the Colorado River.**
  - Instream flow standards were adopted for the Colorado Rivers that included subsistence, base, high flow pulse, and bankfull flows necessary to maintain a sound environment for the Colorado River.
  - Subsistence flows should be considered “hands off flows” with the goal that flows should be met 100% of the time.
- **Environmental flow standards are not being met at recommended frequencies, and additional groundwater pumping will likely result in further reduction in these attainment frequencies.**
  - Attainment frequencies need to be met below Bastrop during spring when the *base dry and base average flows* are important to maintain the spawning habitat for the Blue Sucker.

Impacts on Surface Waters

In Summary:

- The effect of the Proposed S-12 DFCs on the Colorado River is *unreasonable* because:
  - It causes the relationship between the river and the aquifers to reverse, and
  - it increases the shortfalls in meeting environmental flow targets.

- Since the flows in the river are already often below levels needed to maintain the ecological health of the river, any additional pumping that causes further reduction in stream flows is *unreasonable*.

Your Questions Please!

Eric Allmon

Role of non-exempt pumping in development of desired future conditions

Eric Allmon
Perales, Allmon & Ice P.C.
Presentation to Fayette County GCD

Your Questions Please!

Our Request

We are asking the Board to manage our aquifers responsibly by rejecting these *Proposed DFCs* in favor of DFCs based on:

- **sustainable management of the aquifers,**
- **protection of exempt landowner domestic and livestock wells, and**
- **maintaining the resilience of the Colorado River to drought**

Our Request

- **There is plenty of time to revise DFCs**
  - **Revisions based on public comment mandated by statute**
  - **GMA has until January 5, 2022**
- **Start with Scenario Run S-3**
  - **Represents Currently Adopted DFCs**
    - **Pumping file from Old GAM adjusted to run on New GAM**
  - **Run New GAM using S-3 pumping.**

Environmental-Stewardship.org
512-300-6609
info@envstewardship.org

David Van Dresar

From: Grover & Sue Shade <gns.shaderanch@gmail.com>
Sent: Sunday, July 25, 2021 4:47 PM
To: Fayette County GWCD
Subject: Desired Future Conditions

As a 50 year resident of Fayette County and owner of land and a water well I urge the FGWCD Board members to vote to reject the Desired Future Conditions under consideration.
Sincerely,

Grover Shade
Shade Ranch
8427 W. Old Lockhart Rd.
Muldoon, Tx 78949

Wendi Pyle

From: Brad Cosson <jbcosson@yahoo.com>
Sent: Monday, July 12, 2021 7:21 AM
To: info@fayettecountygroundwater.com
Subject: Public Hearing July 12, 2021

I will be unable to attend the Public Hearing today.

I do reside in Fayette County and have an exempt well and am concerned about water availability and quality.

I have reviewed some of the information available on your website. My support is for a very conservative approach toward draw down. Somewhere in the information I read, there was mention of a variable of plus or minus 10%. I do hope that Fayette is supportive of the least amount of draw down in the proposed management plan.

Thank you for your considerations!

John B Cosson

GMA-12 Proposed DFCs

Presented by

GMA-12 Proposed DFCs

- Proposed DFCs are 'reverse engineered' with a formula that only accommodates non-exempt permits.
- The '9 Considerations' are not incorporated in this formula

  Aquifer conditions, State Water Plan, water budgets/sustainability, environmental impacts, subsidence, socio-economic impacts, private property rights, feasibility, other issues.

GMA-12 Proposed DFCs

"must provide a **balance** between the highest practicable level of groundwater production and the conservation, preservation, protection, recharging, and prevention of waste of groundwater and control of subsidence in the management area."

GMA-12 Proposed DFCs

Is this formula balanced?!

GMA-12 Proposed DFCs

- The GAM is designed to 'evaluate' proposed DFCs or proposed permits.
- Using the GAM to 'calculate' the DFCs is not an appropriate use of 'best available science.'

GMA-12 Proposed DFCs

Expressing the DFCs as a 'district-wide' average obscures the real-world impact

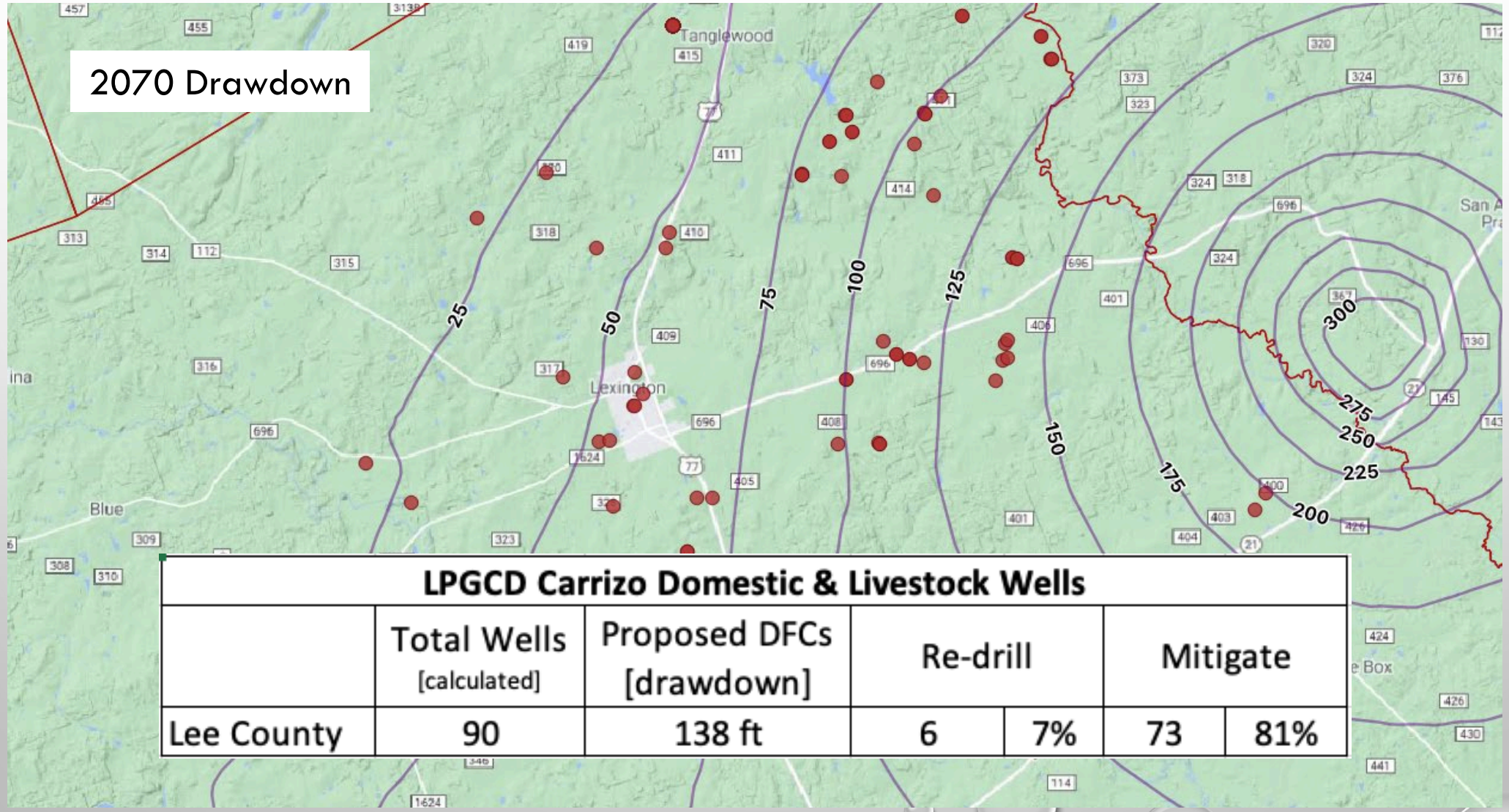
PS12						
Aquifer	Sparta	Queen City	Carrizo	Calvert Bluff	Simsboro	Hooper
LostPines	22.2	27.5	137.4	154.5	310.8	172.7
BrazosValley	47.3	40.3	75.1	95.9	213.3	151.1
PostOak	32.1	30.6	171.8	178.8	336.1	214.1
Mid-East	25.3	20.9	49.0	59.5	81.0	73.3
Fayette	40.1	65.0	122.1	147.2	249.0	141.0

LPGCD Proposed DFCs

Expressing the DFCs as a 'district-wide' average obscures the real-world impact

PS12						
Aquifer	Sparta	Queen City	Carrizo	Calvert Bluff	Simsboro	Hooper
LostPines	22.2	27.5	137.4	154.5	310.8	172.7
BrazosValley	47.3	40.3	75.1	95.9	213.3	151.1
PostOak	32.1	30.6	171.8	178.8	336.1	214.1
Mid-East	25.3	20.9	49.0	59.5	81.0	73.3
Fayette	40.1	65.0	122.1	147.2	249.0	141.0

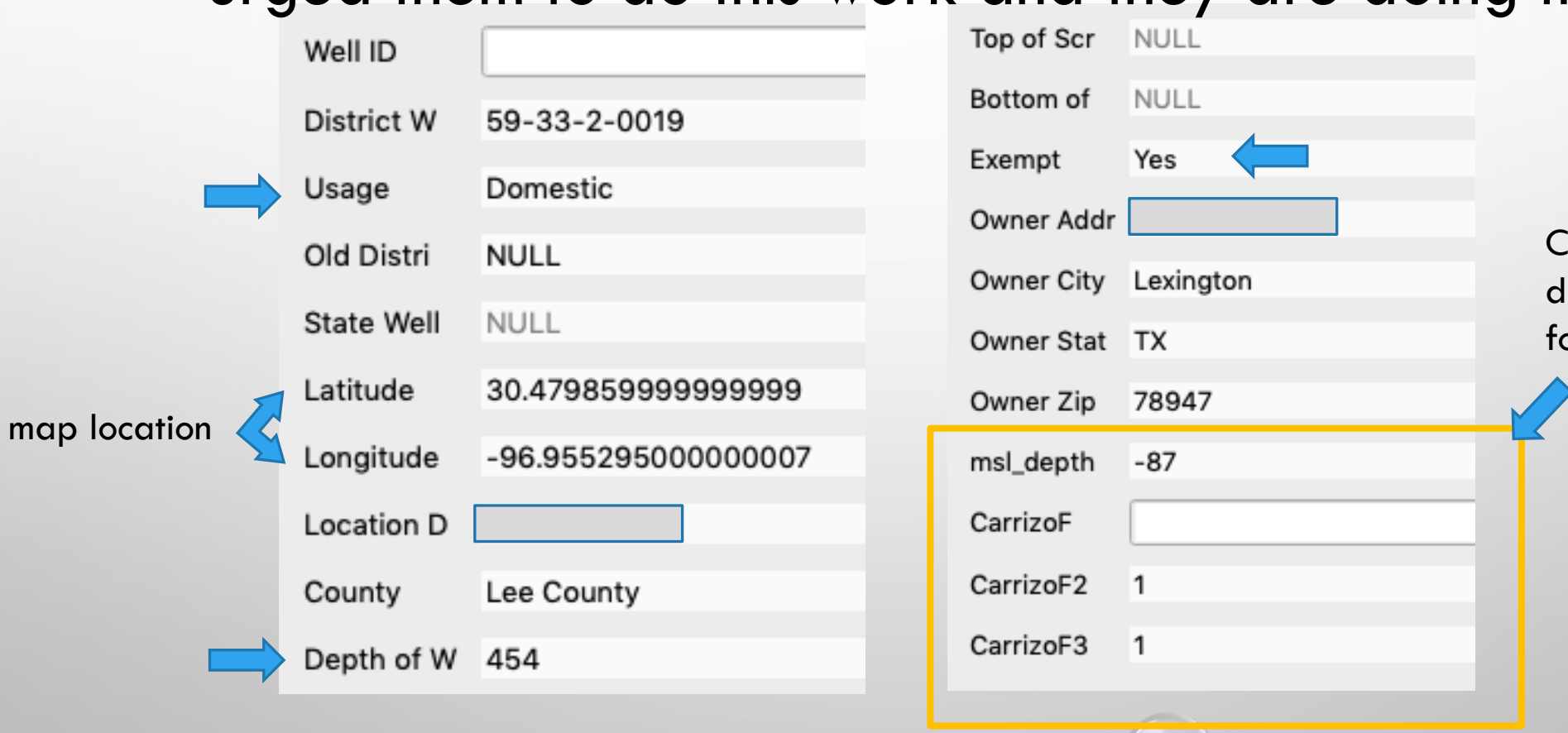
CARRIZO REALITY IN LPGCD (SAWDF)



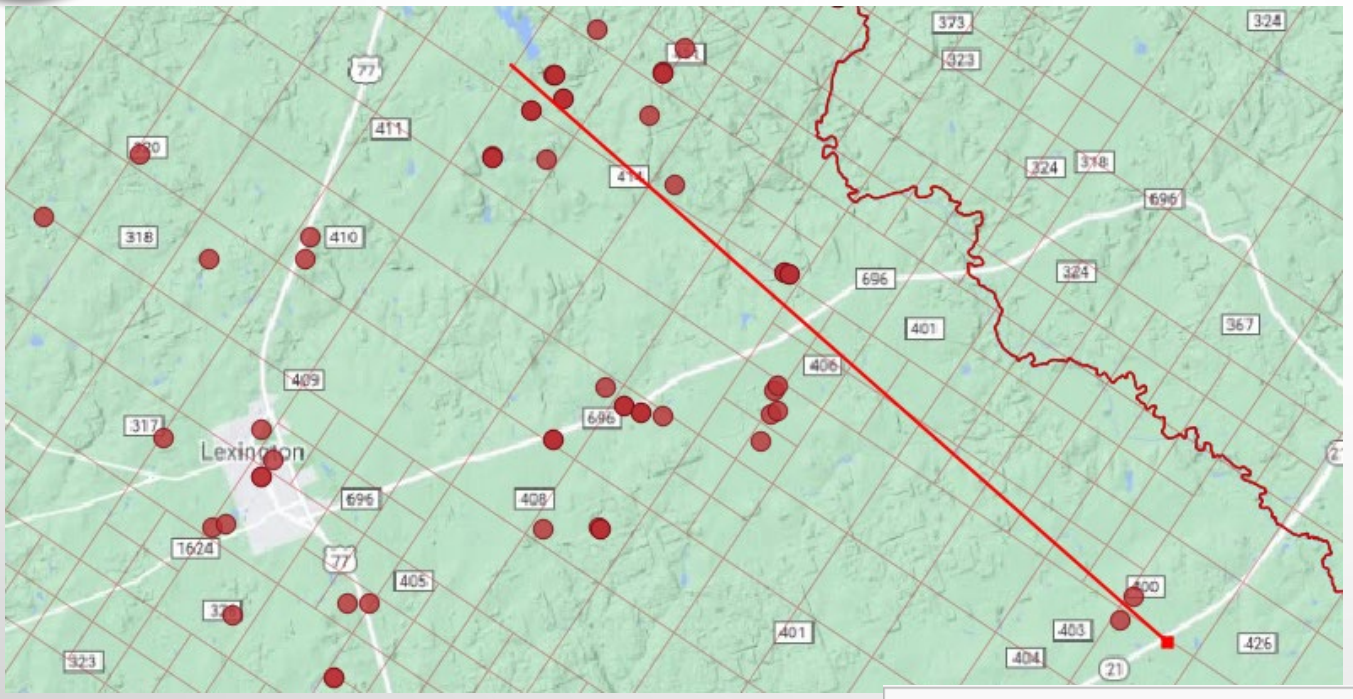
LPGCD Carrizo Domestic & Livestock Wells						
	Total Wells [calculated]	Proposed DFCs [drawdown]	Re-drill		Mitigate	
Lee County	90	138 ft	6	7%	73	81%

CARRIZO REALITY IN LPGCD

LPGCD has info on most of the wells in the District, we urged them to do this work and they are doing it!

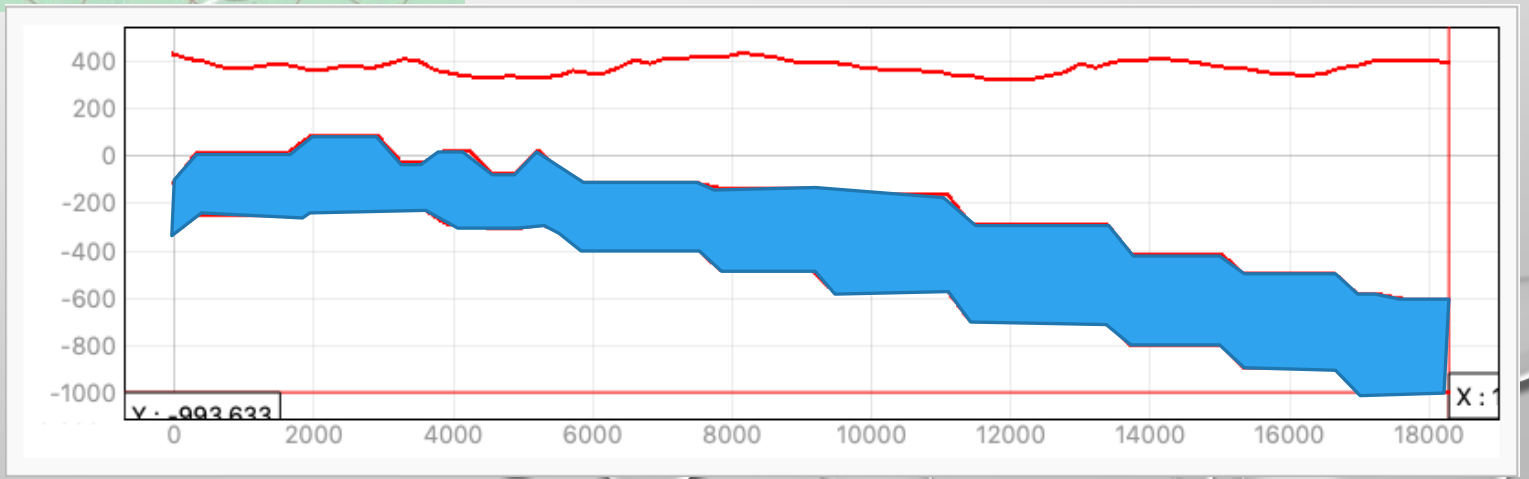


CARRIZO REALITY



Geographic Information System [GIS] software allows you to map exempt wells in each aquifer formation.

Modflow grid has top and bottom of aquifer formations



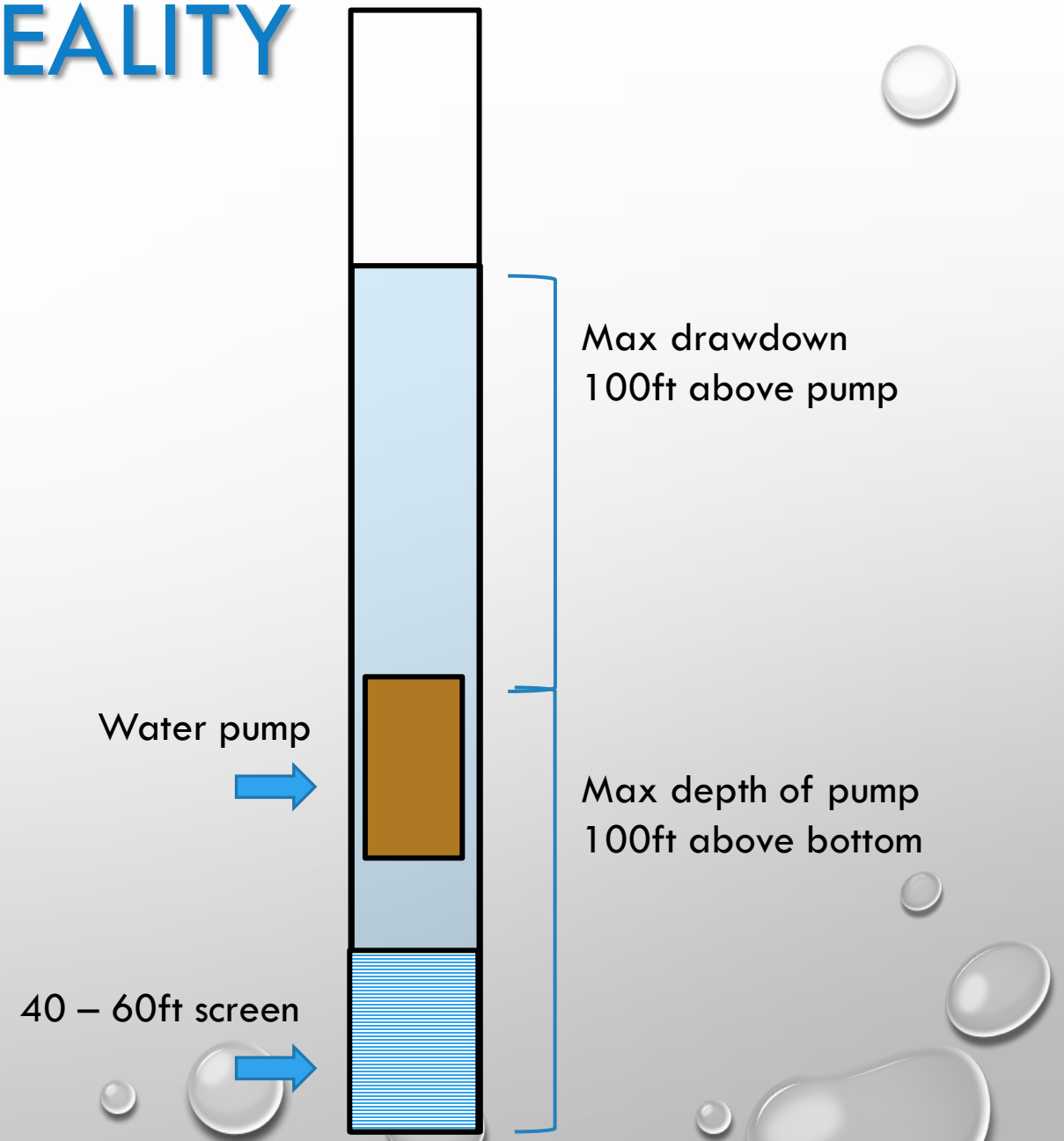
CARRIZO REALITY

Typical Exempt water well

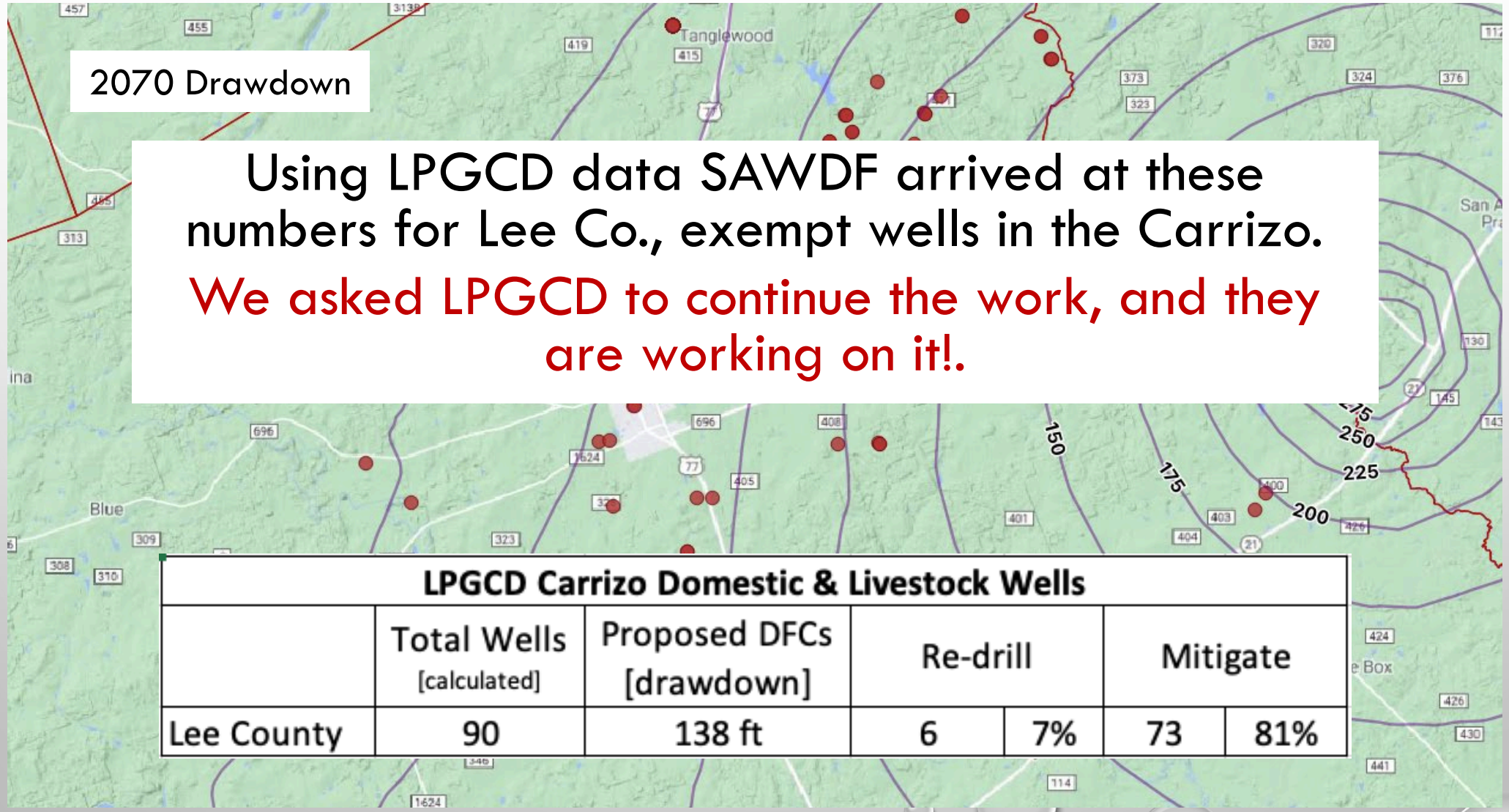
- Minimum 100ft water above the pump to keep from sucking in air when pump is running
- Maximum depth of pump is approximately 100ft from the bottom of the well

With information from the GAM and LPGCD files you can calculate:

- **Mitigation** - need to move the pump when DD lowers water over the pump head by 50ft
- **Re-drill** – with the pump at maximum depth there is insufficient water to keep the pump from sucking in air



CARRIZO REALITY



Using LPGCD data SAWDF arrived at these numbers for Lee Co., exempt wells in the Carrizo.

We asked LPGCD to continue the work, and they are working on it!.

LPGCD Carrizo Domestic & Livestock Wells						
	Total Wells [calculated]	Proposed DFCs [drawdown]	Re-drill		Mitigate	
Lee County	90	138 ft	6	7%	73	81%

CARRIZO REALITY IN LPGCD

- SAWDF'S calculation of 90 Carrizo wells in LPGCD became 150 wells by LPGCD's calculation as of 5/26/2021.
- For purposes of planning for well assistance, LPGCD assumed 150 wells would require mitigation.
- LPGCD estimating an average cost of $3500 per well; local driller who has remediated at least 27 wells, says $3,500 is a "band-aid", short-term fix.

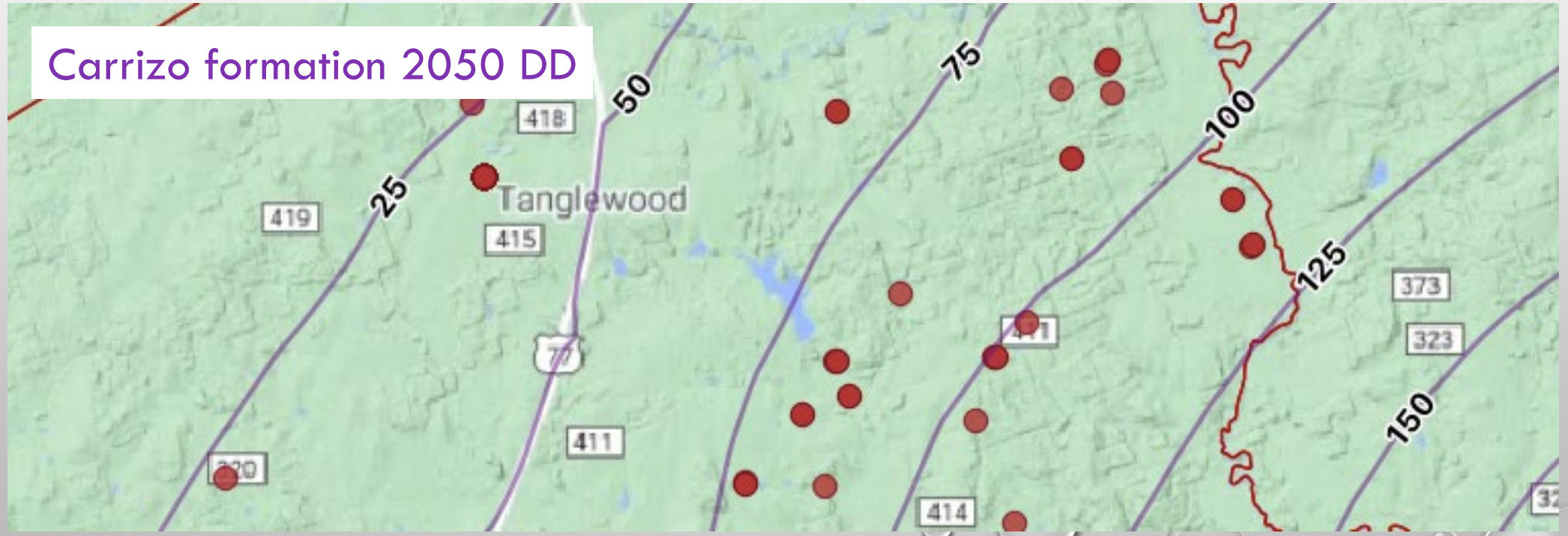
GMA-12 Proposed DFCs
Public Comment Period

In order to receive **informed** comments from the public, FCGCD should clearly state that the Proposed DFCs do not balance conservation and protection against development, to the detriment of exempt domestic and livestock wells (and the Colorado River).

FCGCD Proposed DFCs

Public Comment Period

Publish contour maps, by decade, showing drawdown in each aquifer/formation with plotted wells.



FCGCD Proposed DFCs
Public Comment Period

Reveal to the public how many exempt wells may need to be mitigated if the Proposed DFCs are adopted,

and include the District's mitigation policy, if any.

LPGCD Carrizo Domestic & Livestock Wells						
	Total Wells [calculated]	Proposed DFCs [drawdown]	Re-drill		Mitigate	
Lee County	90	138 ft	6	7%	73	81%

FCGCD Proposed DFCs
Explanatory Report

- Clearly state what the FCGCD considers to be reasonable/unreasonable impact on domestic and livestock wells and how, under the proposed DFCs, the District demonstrates protection of property rights and mitigates damage to landowner wells.

FCGCD Proposed DFCs
Explanatory Report

- Provide an accounting of the total loss in appraised value for all properties that will lose groundwater due to permitted pumping, and why the District considers this reasonable and not a ‘taking.’

FCGCD Proposed DFCs
Explanatory Report

- Clearly state how the FCGCD has determined that permitted pumping in the proposed DFCs can be sustained without damaging the aquifers or causing subsidence.

FCGCD Proposed DFCs
Management Plan

The Management Plan for FCGCD should include on-going assessment of impacts on exempt wells:

- Measured water levels
- Mitigation, if any
- Socio-economic impact on property value and business operations; i.e. livestock, farming.

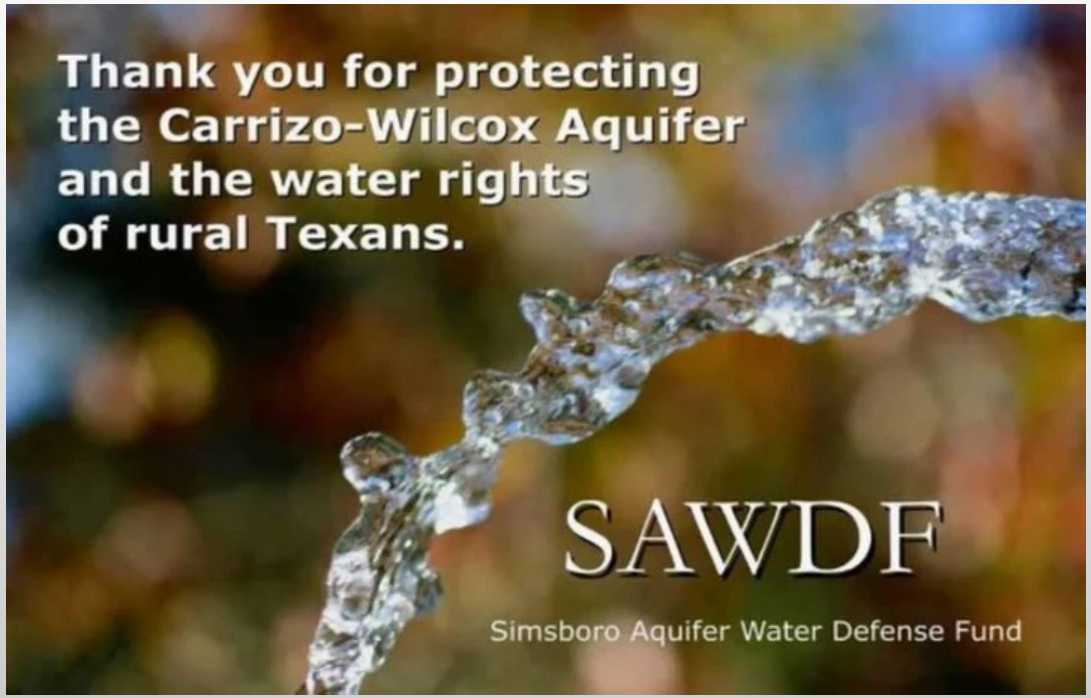
FCGCD Future DFCs

Develop a new methodology for proposed DFCs

- Evaluate and incorporate 'sustainable' groundwater production for each aquifer/formation.
- Consult agricultural extension agents, county appraisal districts, Chambers of Commerce, Economic Development corps, City Managers, etc. for impacts in the District.
- Use the GAM to *evaluate* impact of proposed DFC, not *calculate* the DFCs.

THANK YOU!

THE SAWDF BOARD OF DIRECTORS



APPENDIX W

GMA 12'S RESPONSES TO COMMENTS FOR LOST PINES GCD

Lost Pines GCD Response to Comments

Response to Comments- Bastrop County, Texas Commissioners Court and Lee County, Texas Commissioners Court

The Bastrop and Lee County Commissioners Courts submitted nearly identical comments (in the form of resolutions) stating that the proposed DFCs do not establish the required balance between development and conservation/protection of groundwater. The Commissioners Courts comment that the DFCs proposed by GMA 12 for the Carrizo-Wilcox, Sparta, and Queen City Aquifers are not adequately supported by documentation showing that the statutory factors were considered. They state that GMA 12 should reject the proposed DFCs and maintain the current DFCs.

As noted during presentations and discussions in both GMA 12 and Lost Pines GCD Board of Directors meetings, the current DFCs cannot be maintained for all aquifers due to the use of the updated Groundwater Availability Model (GAM), Texas Water Development Board's recommended model. This new model calculates significantly different drawdowns even when using the same pumpage as an input, such that the current DFCs, in the form of drawdowns, cannot be matched for the Sparta, Queen City, and Carrizo Aquifers. These are the same aquifers for which the Commissioners Courts and other commenters opposed the proposed DFCs. The opposition should be directed at the updated model which made it technically impossible to maintain the current DFC or drawdown. However, the current DFCs can be maintained for the Calvert Bluff, Simsboro, and Hooper Aquifers, but the amount of pumpage used to maintain the current DFCs will be significantly higher than the current modeled available groundwater (MAGs).

As discussed in Lost Pines GCD Board of Directors meetings, the Simsboro Aquifer is the most heavily utilized aquifer within the District and the one with the most permits in the District and GMA 12. As such, GMA 12's approach focused on maintaining the current DFC for the Simsboro to balance conservation/protection with production from the most heavily used resource in GMA 12. Maintaining the current DFC in the Simsboro Aquifer made it impossible to maintain the current DFCs in the other five aquifers, but the district representatives decided that because the Simsboro Aquifer is the focus of joint groundwater planning in the Lost Pines GCD and GMA 12, we should make maintaining the DFC for this aquifer our priority. For the other five aquifers (the Sparta, Queen City, Carrizo, Calvert Bluff, and Hooper Aquifers) GMA 12 maintained pumpage similar to the current MAGs when determining DFCs.

Based on comments received during the public comment period, including these from the two Commissioner's Courts, the proposed DFC of 311 feet of drawdown for the Simsboro Aquifer was changed to 240 feet of drawdown, which is the current DFC for the Simsboro Aquifer. This was adopted as the final DFC for the Simsboro Aquifer by GMA 12 on November 30th, 2021. As noted above, GMA 12 maintained a similar level of pumpage for the other five aquifers as the existing MAGs for each of these aquifers, and the drawdowns predicted by the model were adopted as the final DFCs.

In summary, the proposed DFC for the Simsboro Aquifer of 311 feet was rejected and the current DFC of 240 feet was adopted, as consistent with the resolutions of the two Commissioners Courts. The DFCs for the remaining five aquifers were determined using similar pumpage as the current MAGs. The final DFCs for these five aquifers were driven by the use of the new GAM, the adoption of 240 feet of drawdown as the final DFC for the Simsboro Aquifer, and pumpage occurring outside of the Lost Pines GCD.

Response to Comments- Ernie Harkins, Miriam Vaughn, Michael MacLeod, Kelton McMillan, Terry Johnson, Lisa Olson, Frieda Gress, Kermit Heaton, and Judith McGeary

The listed individuals commented that the proposed DFCs should be rejected for a variety of reasons, mainly that they unreasonably impact the groundwater resources in Bastrop and Lee Counties and encourage development, fail to protect our rivers, springs, and streams, and ultimately do not seek to balance development and conservation. Some individuals comment that new or modified DFCs must be based on sustainable management of the aquifers, protecting local wells and property rights, and protecting surface waters.

Unfortunately, simply rejecting the proposed DFCs is not an option. GMA 12 is required by statute (Chapter 36.108 (d-3)) to adopt final DFCs by January 5, 2022. If the DFCs that were proposed by GMA 12 on April 24, 2021 are rejected, they have to be replaced with alternative DFCs. None of the comments being addressed in this response proposed specific alternatives to the DFCs.

However, as noted in the response to comments by the Lee and Bastrop County Commissioners Court, GMA 12 has changed the proposed DFC for the Simsboro Aquifer in Lost Pines GCD from the proposed value of 311 feet to 240 feet of drawdown, which is the current DFC for the Simsboro Aquifer. GMA 12 decided that rejecting the proposed DFC and maintaining the current DFC for the Simsboro Aquifer accomplishes what the commenters were seeking when asking that the proposed DFCs be rejected.

1.0

2.0 RESPONSE TO COMMENTS- LINDA CURTIS

Ms. Linda Curtis commented that the Lost Pines GCD should re-evaluate the socio-economic impacts reasonably expected to occur before adopting DFCs, in order to consider the socio-economic impacts of subsidizing growth by moving water for real estate development.

Socio-economic impacts is one of nine statutory factors that was considered by GMA 12 when developing DFCs. All of these nine factors must be considered equally during the DFC joint planning process. GMA 12understands that the socio-economic analysis used in the joint groundwater planning process stems from the regional water planning process, which focuses solely on an economic analysis of not producing sufficient water to meet demands. This analysis has not historically balanced the impact of producing water from the GMA 12 area with meeting the projected demand. GMA 12

evaluates its review of the statutory factors with each planning cycle and will review options for balancing the socio-economic impacts analysis in the upcoming round. The joint groundwater planning process is not encouraging growth, it is simply a planning process.

Joint groundwater planning conducted by GMA 12 and other groundwater management areas around the state is a water planning exercise. Members of the GMA must consider numerous factors and come up with some kind of balance between the development of groundwater resources within the GMA, and the conservation and preservation of groundwater.

Response to Comments- Michele Anderson

Ms. Michele Anderson commented on a proposed development in Bastrop County by Alton Butler and how they might relate to environmental and socio-economic impacts.

These comments are not relevant to the development of the proposed DFCs and we have no response at this time.

Response to Comments- Michele Gagnes (on behalf of SAWDF)

Ms. Michele Gagnes commented that SAWDF requests that the Lost Pines GCD reject the proposed DFCs and develop revised DFCs based on three specific criteria, outlined in the SAWDF comments submitted on August 18, 2021 and previously on May 19, 2021. These comments are lengthy, contain a significant amount of information, and refer to other presentations and submittals that were not included in the comments. The responses here will address the relevant comments submitted by SAWDF.

SAWDF focuses on the groundwater conditions in Lee County. GMA 12 has determined that the impacts from the Vista Ridge project authorized by Post Oak Savannah GCD in Burleson County are real and ongoing, in particular in the Carrizo Aquifer in northern Lee County. These conditions are the direct result of pumpage in neighboring Burleson County, and not from the joint groundwater planning process. Because the pumpage causing the impacts is allowed under the Vista Ridge permit, these conditions will continue despite what DFCs are adopted by the Lost Pines GCD. Permitted groundwater production or producers in Post Oak Savannah GCD are outside the jurisdiction of Lost Pines GCD. The only thing that will improve conditions in northern Lee County would be the reduction in pumping from the Carrizo Aquifer by the Vista Ridge project, which is only within the control of Post Oak Savannah GCD. The DFC process will not exacerbate the landowner's situation, and rejecting the proposed DFCs will not provide relief to the problem.

SAWDF also discusses surface water issues. These comments refer to those made by Environmental Stewardship and will be addressed in our response to their comments.

SAWDF commented that the Lost Pines GCD has decided to almost double the allowable drawdowns that are the currently expressed DFC. As noted in responses above, many of the DFCs have changed due to the use of a new model. The Sparta and Queen City DFCs for example, have increased from 5 and 15 feet, respectively, to 22 and 28 feet respectively. While these DFCs have increased significantly, this is not due to a change in pumpage, it is solely due to the use of a new model to estimate drawdowns. The GMA and Lost Pines GCD must adopt new DFCs for these aquifers. If Lost Pines GCD were to vote to maintain the current DFCs for these aquifers of 5 and 15 feet, the DFCs would be rejected by the Texas Water Development Board as not feasible because they could not be replicated in a predictive model run.

The proposed DFCs for the three Wilcox aquifers- the Calvert Bluff, Simsboro, and Hooper- do not almost double from the current DFCs. The proposed DFCs for these three aquifers increased from the current DFCs of 100, 240, and 165 feet of drawdown respectively to 154, 311, and 173 feet, none of which are double the current DFC. After receiving comments on the proposed DFCs, the final adopted DFCs for the Calvert Bluff, Simsboro, and Hooper Aquifers was 132, 240, and 138 feet respectively. The DFC for the Calvert Bluff is slightly higher than the current DFC, while the DFC for the Hooper is slightly lower. Importantly, the final DFC for the Simsboro Aquifer, which is the most critical and heavily used aquifer in the Lost Pines GCD, remains the same at 240 feet of drawdown.

The DFC for the Carrizo Aquifer has increased substantially, and is approximately double the current DFC. The Carrizo DFC increased from the current value of 62 feet of drawdown to 134 feet in the final adopted DFCs. This is due to two reasons- the use of the new GAM and the increased pumpage in Post Oak Savannah GCD discussed above. GMA 12 decided to include this pumpage in the final model simulation and therefore the drawdowns in the Carrizo Aquifer in the Lost Pines GCD was also impacted. The inclusion of pumpage outside of GMA 12 in Caldwell and Gonzales Counties has also increased this drawdown for the Lost Pines GCD. The pumpage used in the Lost Pines GCD is similar to the current MAGs, and so the higher DFC is not due to changes within the Lost Pines district.

SAWDF commented that GMA 12 needs to have a new mindset- that we will determine both how much we want to pump, and how much we are determined to conserve. It is important to note that GMAs do not directly determine how much pumpage will occur from the aquifers they manage. GMAs only determine what they want their aquifer to “look like” in the future, and this is done through the adoption of desired future conditions, which for GMA 12 is a drawdown value for each aquifer present within the GMA. Based on the adopted DFCs, the TWDB determines the pumpage possible to achieve this desired future condition. Although the GMA does incorporate model runs into the evaluation process, and thus usually “knows the answer” prior to the adoption of DFCs, this does not mean that the GMA adopts pumping amounts from each aquifer. While this is a subtle distinction, it is especially important for GMA 12 in this third round of planning due to the use of the updated GAM, which significantly changes the drawdowns calculated compared to the previous version of this model. Some stakeholders want the GMA to “maintain the current DFCs”, while they appear to mean maintain the current pumping or Modeled Available Groundwater (MAG). This has resulted in significant confusion for anyone that does not fully understand the difference between the DFCs/drawdown and the

MAGs/pumping. By state law, the GMA only adopts a future condition of the aquifer, not the pumping which may lead to that future condition.

The most common theme to the comments by SAWDF center on the impacts being observed in wells in Northern Lee County as a direct result of the Vista Ridge project. While these impacts are real and undoubtedly due to the initiation of this project, the problem is best resolved through regulatory permitting and enforcement mechanisms available to groundwater districts in Texas under Chapter 36. Additional remedies may be available on a district-by-district basis depending on each district's rules. The situation with Vista Ridge must be addressed within Post Oak Savannah GCD.

In summary, comments from stakeholders, including SAWDF, were heard by the Lost Pines GCD and GMA 12 and the Simsboro Aquifer DFC was revised from the proposed value of 311 feet of drawdown down to the current DFC of 240 feet of drawdown. Other DFCs for the Lost Pines GCD were driven by the selected Simsboro DFC and the calculations of the updated GAM for the other aquifers using similar pumpage to the current MAGs.

Response to Comments- LCRA

LCRA provided comments to the Lost Pines GCD related to proposed DFC zones, inconsistent DFCs, and surface water impacts.

LCRA commented that the implementation of the DFC zones may be premature because of a lack of detail as to how this will be implemented, how the boundaries were determined, and how the DFC values in the zones were derived. They also ask how the Board intends on regulating pumpage within the District if a zone-specific DFC is not achieved. They also note that several recent permits include language related to phased production that uses a formula that relies on a DFC not a potential DFC zone.

The Lost Pines GCD general manager and hydrogeologist have presented the concept of DFC zones in multiple Lost Pines GCD board meetings and GMA 12 meetings starting in 2018. However, these DFC Zones have not formally been proposed or considered by Lost Pines GCD or GMA 12. The background behind these zones and how the boundaries were determined was discussed in these presentations. Essentially, DFC zones, if adopted, would more accurately represent the DFCs within the District. For example, when determining whether the DFC can be achieved, the DFC Zones would eliminate the deep, downdip portions of the aquifer where groundwater production is not occurring from the calculation of the DFC, and areas where water level monitoring can never occur due to the lack of wells to measure. The method of calculating drawdowns in these zones is identical to the method for calculating drawdowns on a county or GCD-wide basis, except that the area used to calculate these averages is limited to the DFC zone area. There are not multiple zones for any particular aquifer managed by the district, rather the GCD-wide average is simply limited in geographic extent compared to a GCD-wide calculation.

Regulation of pumpage would be exactly the same as regulation of pumpage if a district-wide DFC were maintained. As noted above, there are not multiple DFC zones for an aquifer, just a single value, as there would be with a district-wide DFC.

Regarding the language in recent permits that relies on a district-wide DFC, it is correct that when the permits were written, the DFC was a district-wide calculation. That continues to be true as DFC zones have not been adopted at this time. If a DFC zone approach is adopted and implemented by the District, permits with DFC-related conditions will be addressed consistently by the District and amended if necessary in accordance with the District's rules and Chapter 36

Regarding inconsistent DFCs, LCRA refers to stakeholder or community effort to retain the current MAGs for the Simsboro Aquifer. However, this was not accepted by GMA 12, and the current DFC of 240 feet of drawdown was adopted as the final DFC for the Simsboro Aquifer in the Lost Pines GCD. Maintaining the current DFC of 240 feet of drawdown in the Simsboro Aquifer is consistent with respect to previous DFCs adopted for the Simsboro by both the Lost Pines GCD and GMA 12.

Regarding the impacts to surface water, GMA 12 agrees that the interactions between surface water and groundwater, especially regional aquifer contributions to specific surface water resources, is complex. GMA 12 has no response to this comment as it pertains to the efforts of other stakeholders to criticize the process, rather than to the adopted DFCs themselves.

Response to Comments- Nancy McKee

Ms. Nancy McKee commented that the Vista Ridge production was having a negative effect on actual water level declines in Burleson and Lee Counties resulting from actual pumpage from a single permit. Ms. McKee commented that DFCs are calculated on "regions" which spread out usage and do not define a particular problem area, and therefore the information is flawed. Ms. McKee suggested that a proposed DFC zone would have corrected this issue but noted that no DFC zones were included in the proposed DFCs. She also suggested that the DFCs do not adequately consider aquifer recharge. Lastly, she comments on whether GMA 12 reviewed the impact of the DFCs on the Colorado River and directs the district to Environmental Stewardships comments. Responses to surface water impacts is provided in response to Environmental Stewardship's comments, and responses to the other topics raised by Ms. McKee is below.

While these impacts are real and undoubtedly due to the initiation of the Vista Ridge project, the problem is best resolved through regulatory permitting and enforcement mechanisms available to groundwater districts in Texas under Chapter 36. Additional remedies may be available on a district-by-district basis depending on each district's rules. The situation with Vista Ridge must be addressed within Post Oak Savannah GCD, the district with jurisdiction over the Vista Ridge permit. Neither the Lost Pines GCD nor GMA 12 has the ability to limit the pumpage within the Post Oak Savannah GCD. The process of establishing DFCs is a planning tool only.

Regarding the use of DFC zones as a tool to address impacts from the Vista Ridge production, this method of calculating and assessing the DFC would have no effect on the actual impacts being observed from the Vista Ridge project. Because Vista Ridge is regulated by Post Oak Savannah GCD, any DFC zone adopted in Lost Pines GCD would not have any foreseeable impact on Vista Ridge's permit or pumpage. For DFC zones to reduce impacts from Vista Ridge, they would need to be adopted and implemented in Post Oak Savannah GCD.

Ms. McKee comments on the use of the term "proposed" in connection with aquifer recharge in the joint planning process. GMA 12 has not used this term with respect to recharge. Nor is recharge calculated by GMA 12. Recharge is an input, or the inflow of water to an underground formation, and is estimated based on several factors, including precipitation, soil types, topography, etc. Historic recharge estimates are made based on the available historic data, and future recharge is estimated by averaging these historical recharge estimates.

Based on this comment, other similar comments received, and consideration of the statutory factors, the Lost Pines GCD and GMA 12 voted to change the DFC for the Simsboro Aquifer from the 311 feet of drawdown that was proposed to 240 feet of drawdown that was adopted on November 30th, 2021. This drawdown represents the same DFC for the Simsboro Aquifer as is currently in place.

Response to Comments- Steve Box/Environmental Stewardship

Mr. Box provided extensive comments on behalf of Environmental Stewardship, some in partnership with SAWDF, on the currently proposed DFCs. As with many comments, Mr. Box requested that the proposed DFCs be rejected and revised based on three criteria: sustainable management of the aquifers; protection of the Colorado River; and protection of landowner domestic and livestock wells.

As was noted above with other stakeholder comments, these comments use the term DFCs (i.e., drawdowns) and MAGs (i.e., pumpage) incorrectly with respect to how they are incorporated in the joint groundwater planning process. Mr. Rice's model runs estimate impacts using the current MAGs in the updated GAM, not the currently adopted DFCs. Because GMA 12 does not adopt pumping as part of the joint groundwater planning process, and instead adopts only DFCs, Mr. Rice's runs are not an appropriate starting point for evaluating the current DFCs. Using the current MAGs would only be valid for evaluating the impact of the updated GAM on water levels calculated during predictive model runs. Instead of using the MAGs, the starting point for this round of planning are the DFCs adopted by GMA 12 in the second round of planning. GMA 12 appropriately assessed whether the second round DFCs can or will be maintained in the third round of planning, and if not, what changes are needed and why. GMA 12 also must assess whether the DFCs, and any changes proposed, meet the requirements of Chapter 36 for the development of DFCs. GMA 12 is not required to make these assessments based on the MAGs.

Regarding the balance that GMA 12 must achieve, it is incorrect to state that a balance is not achieved if "aquifer depletion is driven only by the desire for development". GMA 12 and its member GCDs cannot prioritize any use over another, as long as the groundwater produced is put to beneficial use.

After receiving comments from Environmental Stewardship and similar comments from other stakeholders in the Lost Pines GCD, the Lost Pines Board and GMA 12 decided to reject the proposed DFC for the Simsboro Aquifer of 311 feet and retain the current DFC of 240 feet. This DFC is the most critical for the Lost Pines GCD because the Simsboro is by far the most heavily utilized aquifer in the District. The DFCs for the other aquifers were estimated based on the pumpage input into the model and pumpage included for other districts in the region, and these DFCs may differ from the current DFCs due to the use of the new model and adjusted production in the Simsboro.

By retaining the current DFC of 240 feet in the Simsboro, impacts on surface water should largely be the same as with the current DFC despite the increase in pumpage required to produce 240 feet of drawdown with the new GAM. This is because impacts to surface water are not driven by groundwater pumpage, but rather impacts to surface water are due to changes in groundwater levels, which are due in large part to pumpage. This is an important distinction for GMA 12 due to the introduction of the updated GAM into the process in this third round of joint groundwater planning. This is because the new GAM allows more groundwater pumping to achieve the same overall average drawdowns in the Simsboro Aquifer within the Lost Pines GCD. But because the average changes in water levels across the District are the same, this equates to roughly the same impact to surface water despite the additional pumpage that is allowed. There will be some differences due to variations in localized water levels within the District, but overall the impacts should be similar.

Environmental Stewardship also provided a legal analysis on the role of non-exempt pumping in development of DFCs. Environmental Stewardship comments that Lost Pines GCD must take a balanced approach to considering the statutory factors when determining the DFCs. Environmental Stewardship opposes the position from other stakeholders that the DFCs be set at a level that allows for the maximum production from non-exempt permits issued by the districts. Environmental Stewardship suggests that some stakeholders would have GMA 12 determine the DFCs based on the concept of reverse engineering, determining the pumpage and setting the DFC accordingly.

GMA 12 is required to adopt DFCs that provide a balance between the highest practicable level of groundwater production and the conservation, preservation, protection, recharging, and prevention of waste of groundwater and control of subsidence in the management area. GMA 12 used statutory factors to strike such a balance keeping in mind that one beneficial use of groundwater cannot be weighted over another under Chapter 36.

GMA 12 did not reverse engineer the proposed DFCs. As explained in response to other comments, pumpage was not the driving factor for developing the proposed DFCs. As explained in response to other comments, pumpage is not an appropriate starting point, but rather the DFCs from the previous round are the appropriate starting point and a review of whether the factors require changes to the existing DFCs. Unlike Environmental Stewardship's analysis by Dr. Rice, which used pumpage as a starting point, GMA 12 did not reverse engineer the proposed DFCs. This is evidenced by the fact that the DFC finally adopted for the Simsboro Aquifer in the Lost Pines GCD was a result of the District and GMA 12 wanting to retain the current DFC of 240 feet of drawdown, and not a set amount of pumping from the Simsboro Aquifer.

Environmental Stewardship also suggests that consideration of all property rights warrants more limited DFCs than proposed. Relying on the 5th Circuit's decision in Stratta v. Roe, Environmental Stewardship comments that all landowners' rights are equal regardless of whether the landowner is a non-exempt pumper, possessed a water well, or a pumping permit. Environmental Stewardship suggests that the proposed DFCs do not allow all landowners equal access to their fair share of groundwater in conflict with the Stratta case and Chapter 36. GMA 12 considered the statutory factor with respect to private property rights, and also considered that Chapter 36 protects the landowners' right to groundwater in place. The right to groundwater in place under Chapter 36 gives no express right to an amount of groundwater.

Environmental Stewardship suggested potential takings claim based on adoption of the proposed DFCs would not be ripe without a demonstration of an actual injury as a result of the DFC. Because regulatory takings are determined on a case-by-case basis, including whether an injury is immediate and not conjecture as pointed out by Environmental Stewardship, GMA 12 does not find this comment relevant to the development of the proposed DFCs and does not respond to this comment at this time.

LEE COUNTY, TEXAS

RESOLUTION NO. 2021-XX-XX-X

A RESOLUTION OF THE LEE COUNTY, TEXAS COMMISSIONERS COURT TO THE LOST PINES GROUNDWATER CONSERVATION DISTRICT REGARDING ADOPTION OF NEW OR AMENDED DESIRED FUTURE CONDITIONS

WHEREAS, the Conservation Amendment of the Texas Constitution makes clear that the conservation and development of the natural resources of Texas, including its water, are public rights and duties, and authorizes the Legislature to create conservation districts to accomplish these purposes; and

WHEREAS, Chapter 36 of the Texas Water Code empowers groundwater conservation districts to protect property rights, balance conservation of groundwater against groundwater pumping to meet the needs of this state, and use the best available science to guide conservation and development of groundwater; and

WHEREAS, the Texas Water Code requires groundwater districts, grouped into Groundwater Management Areas (GMAs), to periodically plan how to manage our groundwater resources for the future, to include adopting new or amended descriptions of the "future desired condition" of our aquifers (Desired Future Conditions, or DFCs) that are compatible throughout the management area; and

WHEREAS, the Texas Water Code requires that the DFCs must balance groundwater production with the conservation, protection, recharging, and prevention of waste of groundwater, and control of subsidence; and

WHEREAS, the Texas Water Code requires GMAs, when setting DFCs, to document impacts on aquifer conditions, water supply needs, hydrological conditions, spring flows, interactions between groundwater and surface water, socioeconomic conditions, property rights, groundwater availability model run results, and other relevant factors, to demonstrate the required balance will be maintained between production, and the conservation and protection of groundwater; and

WHEREAS, Lee County is in the Lost Pines Groundwater Conservation District (LPGCD), which is a member of Groundwater Management Area 12 (GMA 12); and

WHEREAS, Lee County residents within LPGCD rely on the Carrizo-Wilcox, Sparta, and Queen City Aquifers located in LPGCD to maintain their economic, human and environmental needs; and

WHEREAS, the proposed Desired Future Conditions for the Carrizo-Wilcox, Sparta, and Queen City Aquifers are not adequately supported by documentation of factors required to be considered under the Texas Water Code; and

WHEREAS, the proposed DFCs will significantly increase (depending on the formation; from 30-340%,) the allowable drawdowns for water levels in the Carrizo-Wilcox, Sparta and Queen City Aquifers within LPGCD; and

WHEREAS, significant increases in drawdown in the Carrizo-Wilcox Aquifer by LPGCD and other GMA-12 member districts threaten surface waters and their ecosystems by reducing groundwater inflows; and

WHEREAS, sudden and significant failures of domestic and livestock wells already have occurred in the Carrizo-Wilcox Aquifer in Lee County and neighboring Post Oak Savannah Groundwater Conservation District during 2020-2021; and

WHEREAS, significantly increased allowable drawdowns in the Carrizo-Wilcox impairs the ability of individual districts to appropriately manage production within the district by moving the thresholds for such management rules; and

WHEREAS, each district is required to hold at least one public hearing and receive public comments for a minimum 90-day period, before taking a final vote on the proposed DFCs; and

WHEREAS, the Lee County, Texas Commissioners Court may submit comments to LPGCD and fellow districts within GMA 12 through the end of the public comment period on August 18, 2021;

NOW, THEREFORE, BE IT RESOLVED by the Lee County, Texas Commissioners Court:

We find that the proposed Desired Future Conditions do not establish the required balance between development of groundwater resources, and conservation and protection of those resources.

We support conservation and sustainable management of our aquifers and not management to depletion (mining) of their waters.

On behalf of the citizens of Lee County, we request that LPGCD and other GMA-12 member districts reject the proposed 2022 DFCs and instead maintain the current DFCs to protect the aquifers during the next five years.

At the least, Lee County, Texas requests that any new or amended DFCs should not significantly increase the allowable drawdowns in the aquifers over those in the current DFCs.

PASSED AND APPROVED THIS 9th DAY OF AUGUST, 2021,
with 4 ayes, 0 nays, and 0 abstentions.

Paul E Fischer, County Judge

Mark Matthijetz, Commissioner, Pct. 1

Richard Wagner, Commissioner, Pct. 2

Absent
Alan Turner, Commissioner, Pct. 3

Steven Knobloch, Commissioner, Pct. 4

Sharon Blasig
Sharon Blasig, County Clerk
Lee County, Texas

lpgcd@lostpineswater.org

From: comments@lostpineswater.org
Sent: Thursday, August 19, 2021 1:27 PM
To: Lost Pines Water Conservation District
Subject: FWD: DFC Comments from Ernie Harkins

From: ernie harkins <ehark78602@gmail.com>
Sent: 8/18/21 8:53 PM
To: comments@lostpineswater.org
Subject: DFC Comments from Ernie Harkins

re: 3 a) Can we please fix the sound system so it facilitates rather than hampers the communications.

re: 3b) Seems about time to recall what the real goal of the various water districts was when they were authorized: to control the water extraction such that it is more or less equal to the recharge rate. So there's water far into the indefinite future.

That is the real DESIRED future condition.

Some of the various boards have been effectively coopted to be facilitators of the rape of the resource, while others were really trying to to be good stewards.

The current plan seems to be tilted toward the former rather than the latter, effectively a plan to fail to control the outgo. Don't these people have grandchildren?

It may be that the proposed plan will create a very real "tipping point", such that there will be no practical way to slow down the outgo once the pipes and pumps are in place.

Reject the current DFC plan and remember the basic goal of the board's very existence.

And let's come up with better mitigation schemes so that all affected landowners may have some help deepening their wells. Something like the oil severance tax, at a very low rate would seem to be entirely feasible for the boards to enact, to create an ongoing "Mitigation Fund".

thanks, Ernie Harkins (Bastrop County)

lpgcd@lostpineswater.org

From: comments@lostpineswater.org
Sent: Thursday, August 19, 2021 1:25 PM
To: Lost Pines Water Conservation District
Subject: Fwd: Proposed Desired Future Conditions (DFCs)

From: James Totten <jtotten@lostpineswater.org>
Sent: 5/25/21 1:40 PM
To: comments@lostpineswater.org
Subject: Fwd: Proposed Desired Future Conditions (DFCs)

-------- Forwarded Message --------
Subject: Proposed Desired Future Conditions (DFCs)
Date: Tue, 25 May 2021 09:38:36 -0600
From: Miriam Vaughn <vaughnmiriam@gmail.com>
To: mike.talbot4@gmail.com
CC: James Totten <jtotten@lostpineswater.org>, lpgcd@lostpineswater.org

Dear Mr. Talbot and Lost Pines Ground Water District Board of Directors,

Thank you for volunteering for this critical position as stewards of our ground water and river ecosystem health. It is so important to the health of the environment and economic viability of our communities. I appreciate you are in a very stressful position with threats of litigation, and companies wanting to market the valuable water resources. Your challenges continue but this is your opportunity.

You must choose between what is good enough to get by and what is right to do. The proposed DFCs will ultimately deplete ground water and flowing streams. Please reject the proposed re-adopt the current DFC's until such time dependable sustainable solutions for aquifer management are agreed upon.

Please find the courage to adopt DFC's that will protect, long term, the environment and current landowners' water access and install monitoring wells to verify the effectiveness.

Sincerely,

mcv
Miriam Vaughn
200 Bishop St.
Smithville, TX 78957

lpgcd@lostpineswater.org

From: comments@lostpineswater.org
Sent: Thursday, August 19, 2021 1:24 PM
To: Lost Pines Water Conservation District
Subject: FWD: Proposed DFCs

From: "Jim Totten" <jtotten@lostpineswater.org>
Sent: 5/19/21 1:43 PM
To: "comments@lostpineswater.org" <comments@lostpineswater.org>
Subject: FWD: Proposed DFCs

From: Michael MacLeod <mcmacleod47@gmail.com>
Sent: 5/19/21 1:40 PM
To: mike.talbot4@gmail.com
Cc: jtotten@lostpineswater.org, lpgcd@lostpineswater.org
Subject: Proposed DFCs

As a 35 year landowner and 20 year resident of Bastrop County with a functioning agricultural well, I strongly oppose the unwarranted and unwise adoption of the proposed changes to the Desired Future Conditions (DFCs) for our aquifers. The water in our aquifers is a precious resource which should be protected and conserved, not given away to outside interests for their own profit, and not exported to support the growth of economies outside of the County, for example San Antonio.

If we Texans learned one lesson from the pandemic, it is to "follow the science". In this case the best science tells us that pumping to the proposed DFCs will have numerous adverse effects: 1) it will further degrade the existing wells of many landowners; 2) it is likely to result in significant destructive subsidence in the District, and 3) it will destroy the water balance and ecology of the Colorado River. Indeed it will cause a complete reversal of the historical flow of groundwater into the River, and instead remove water from the River.

Please act in accordance with the name of your organization and **CONSERVE** the water in our aquifers, don't deplete it.

Sincerely yours,
Michael C. MacLeod, PhD

Lost Pines Groundwater Conservation District Hearing, August 18, 2021
Linda Curtis, League of Independent Voters of Texas • 512.657.2089 • LIVTexas.org

My name is Linda Curtis. I am a founder of the all-volunteer, non-partisan League of Independent Voters.

One of the nine required criteria for you all to establish the desired future conditions is "socio-economic impacts reasonably expected to occur." I hope you will go back to the drawing board before adopting DFCs, in order to consider the socio-economic impacts of subsidizing growth by moving water for real estate development.

Hyper-in-migration growth along the I-35 corridor is bringing big-city problems like intransigent poverty, crime, and homelessness. Many are fleeing to the outer counties, including Bastrop and Lee. We all know this.

The question is, what can we do about it now that the barn door has been wide open for so long. No one can close it now.

I grew up in Miami, Florida, where we paved over paradise for the almighty dollar. I moved to Austin in 1992 and have been here in Bastrop County since 2002. In 2007, I started working with a dear friend in Austin, visionary developer Brian Rodgers. Brian spent nearly a decade trying to reason with Austin's political and real estate leaders to implement measures to make growth pay for itself. His work was respected but largely rejected for fear that it might slow growth even just a tad. As he prepared for his first mayoral race, Steve Adler called on Brian Rodgers to advise him on how to manage growth. Not long after Adler became Mayor, it became clear who his real mentor was -- Kirk Watson -- the regional leader for those development interests, water marketers, and the LCRA leadership working together to press the pedal to the metal to subsidize growth. Democrats Watson, Adler and Mark Rose, with their Republican cohort, Joe Beal, have wreaked havoc. They have employed complicated fee waivers, foolish subsidies for projects like the Domain luxury-shopping mall, and free public land for a privately owned soccer stadium we call the "Austin sucker stadium." And they have all worked water deals to the great detriment of their constituents or ratepayers here in the Lost Pines.

The bottom line is our water districts should not be encouraging the profiteering yahoos up and down the I-35 corridor by participating in these reckless schemes with the most precious resource on the planet.

Besides, Board members, you really have no choice. Mother Nature is beautiful, but she can be pretty ugly, as being witnessed by folks out West where water was mismanaged for 100 years. She will move on these aquifers and already is, as landowner wells are the canary in the coalmine sacrificed for the deeply mistaken Vista Ridge pipeline – the essence of the California water model of moving masses of water for real estate development. Don't press your -- OUR luck!

Thank you, board members, for *your* volunteerism and for listening.

Lost Pines Groundwater Conservation District Hearing, August 18, 2021

Michele Anderson • (512) 906-9042 • michele.sheri.anderson@gmail.com

Good evening. My name is Michele Anderson and I lived in the City of Austin for 16 years prior to relocating to Bastrop last year. I have been an active member of the Bastrop community and I am currently leading the opposition to Alton Butler's proposed development of 552-acres of land previously designated for low-density residential housing. Should Mr. Butler's proposed development receive full and final approval by the City of Bastrop, he will be one of the largest consumers of water in the city. His proposal provides for an 18-hole golf course, hotel, ancillary housing, hotel, restaurant, bar, concert venue, swimming pool, indoor/outdoor movie theatre, market, bakery, car wash, working ranch, and the list goes on.

I'm not sure which of the nine categories you all have to consider in setting the desired future conditions that my comments fall into, but I think they must be relevant to environmental and socio-economic impacts.

Earlier this week, the LA Times reported, "Just one day after U.S. officials declared the first water shortage on the Colorado River, the Metropolitan Water District of Southern California has issued a water supply alert calling on the region to conserve vital resources and prepare for continued drought. The declaration marks a call for regional agencies and consumers to voluntarily reduce their water consumption in order to mitigate the need for more severe restrictions. The Metropolitan Water District of Southern California supplies water to roughly 19 million people."

I assume you all have seen the drought maps for the U.S. Texas is on the same side of the map for California and Arizona where cutbacks on agriculture were recently made. Though this is a history-making decision, it is also not surprising given the 100 years of decisions made that brought the great West to this place of scarcity, cutbacks and ruin.

I am personally disgusted by the partisan political wars over the words, "climate change." Most regular people understand that the climate is changing. It always has and always will. The real dispute, of course, is what to do about it.

If ever there was a time to get out of our corners and stop fighting over climate change and huddle, this is it. We need to be on the side of nature – what nourishes us and not those who feed off of us and our resources – like water, which is to both be conserved AND shared.

It is my most fervent hope that you will give honest consideration to myself and others who have come to you with their concerns and opinions. We come to you with our genuine concerns about the future and the only benefit we hope to gain is a legacy of responsible growth and water management for generations to come. Thank you for your service and thoughtful consideration of our concerns.

-------- Forwarded Message --------
Subject: DFC Comments for SAWDF
Date: Wed, 18 Aug 2021 18:38:59 +0000 (UTC)
From: Michele Gangnes <mggangnes@aol.com>
Reply-To: Michele Gangnes <mggangnes@aol.com>
To: comments@lostpineswater.org <comments@lostpineswater.org>, jtotten@lostpineswater.org <jtotten@lostpineswater.org>, mike.talbot.4@gmail.com <mike.talbot.4@gmail.com>
CC: ebogart@obrlaw.net <ebogart@obrlaw.net>, george@wittawanch.com <george@wittawanch.com>, travisbrown983@gmail.com <travisbrown983@gmail.com>, awier.tx@gmail.com <awier.tx@gmail.com>, steve.box@att.net <steve.box@att.net>, jorje44@yahoo.com <jorje44@yahoo.com>

Good afternoon, President Talbot and Mr. Totten,

Attached please find the collective comments of the Simsboro Aquifer Water Defense Fund on the proposed GMA-12 DFC. Here is an explanatory excerpt from our attached comment letter, dated August 18, 2021:

Mike Talbot, President
Members of Board of Directors
Lost Pines Groundwater Conservation District

Re: **Simsboro Aquifer Water Defense Fund (SAWDF) Comments ---Public Comment Process for Proposed 2022 Desired Future Conditions (DFC)**

President Talbot and Board Members:

Three months ago, the Simsboro Aquifer Water Defense Fund submitted written comments and slides to the board when you invited SAWDF and Environmental Stewardship to make a presentation about our concerns with the proposed 2022 Desired Future Conditions.

We are resubmitting SAWDF's May 19, 2021 comments and slides along with this updated summary of our comments. Within our May 19, 2021 comments are

embedded links for documents and comments SAWDF presented to GMA-12, which also should be considered incorporated by reference in today's comments.

Thank you for including all of these materials in the District's collection of official public comments.
In addition, today, SAWDF joins Environmental Stewardship's August 18, 2021 comments (Environmental Stewardship's Comments to Lost Pines GCD Board of Directors Regarding Revised Desired Future Conditions), **specifically to request that the District reject the DFCs currently proposed, and seek to develop revised DFCs based on three specific criteria. We further urge that our joint comments offer the District a roadmap for accomplishing these three goals by developing a "conservation bookend" or "conservation standard".**

Please share these materials with your board, and let me know any questions or concerns.

Thank you and best regards,
Michele

Michele G. Gangnes, Director
Simsboro Aquifer Water Defense Fund
https://www.simsborowaterdefensefund.org
P.O. Box 931
Elgin, TX 78621
512.461.3179 (V/T)

lpgcd@lostpineswater.org

From: Kelton McMillan <keltonmcmillan@gmail.com>
Sent: Wednesday, August 18, 2021 10:11 AM
To: lpgcd@lostpineswater.org
Subject: Desired Future conditions

Conservation is the name. Aquifer mining is the game. Two contradicting narratives if you ask me. It is the responsibility of the conservation districts to ensure that the water in the district is used/consumed conservatively. IT IS IN THE NAME. There have already been reported negative impacts to the local wells in the zones of the Vista Ridge Pipeline within less than a year of pumping. The LCRA permit will no doubt cause a similar negative impact in a different region on YALLS watch. One group of people cannot suffer or lose while another group wins. A win/lose scenario is not good enough. People's livelihoods are at stake. A win/win scenario is the only acceptable scenario. Until we can figure that out we must go back to the drawing board.

I urge you, The Lost Pines Water Conservation district, to REJECT the current proposed DFCs. On behalf of the people, landowners and the aquifer itself, it is yalls duty to ensure the CONSERVATION of the water. We need to use our aquifer water CONSERVATIVELY. Wells pulling up only air after 10 months of pumping is not conservative pumping.

It is clear that the far reaching municipality of San Antonio only has their own interest in mind. They don't care if people 150 miles away LOSE if it means they WIN. That is why we have water conservation districts. It is extremely irresponsible for the city of San Antonio to continue to push for growth when they do not have a steady water supply. I think that should be public message #1 from all city officials but it is not. They urge people to continue to move and build in a water restricted region. THAT DOES NOT MAKE SENSE. Instead of making regular public announcements of the water crisis in San Antonio to inform the people, they engage in water farming practices that negatively impact other regions of Texas. That is not solving a problem, that is kicking the can down the road. With the water situation as it is in San Antonio more people should be moving out than moving in. Why? Because in 20 years the water situation will be even worse. You cannot beat mother nature and grow a massive city with no steady water supply. That is a failure of the San Antonio government to not see the big 100+ year picture.

Again, I urge you, The Lost Pines Water Conservation district, to REJECT the current proposed DFCs. On behalf of the people, landowners and the aquifer itself, it is yalls duty to ensure the CONSERVATION of the water. We need to use our aquifer water CONSERVATIVELY. Even in the event of helping San Antonio with water, it must be done conservatively. Win/Win.

Thanks
Kelton McMillan
4th generation Texan
30 year Elgin Tx resident.

Paul Pape
Bastrop County Judge

RESOLUTION OF THE BASTROP COUNTY, TEXAS COMMISSIONERS COURT TO THE LOST PINES GROUNDWATER CONSERVATION DISTRICT REGARDING DESIRED FUTURE CONDITIONS

WHEREAS, the Conservation Amendment of the Texas Constitution makes clear that the conservation and development of the natural resources of Texas, including its water, are public rights and duties, and authorizes the Legislature to create conservation districts to accomplish these purposes; and

WHEREAS, Chapter 36 of the Texas Water Code empowers groundwater conservation districts to protect property rights, balance conservation of groundwater against groundwater pumping to meet the needs of this state, and use the best available science to guide conservation and development of groundwater; and

WHEREAS, the Texas Water Code requires groundwater districts be grouped into Groundwater Management Areas (GMAs) to periodically plan how to manage groundwater resources for the future, including adopting new or amended descriptions of the "future desired condition" of our aquifers (Desired Future Conditions, or DFCs) at specified times; and

WHEREAS, the Texas Water Code requires that the DFCs balance groundwater production with the conservation, protection, recharging, and prevention of waste of groundwater, and control of subsidence; and

WHEREAS, the Texas Water Code requires GMAs, when setting DFCs, to document impacts on aquifer conditions, water supply needs, hydrological conditions, spring flows, interactions between groundwater and surface water, socioeconomic conditions, property rights, groundwater availability model run results, and other relevant factors, to demonstrate the required balance will be maintained between production and the conservation and protection of groundwater; and

WHEREAS, Bastrop County is in the Lost Pines Groundwater Conservation District (LPGCD), which is a member of Groundwater Management Area 12 (GMA 12); and

WHEREAS, Bastrop County residents within LPGCD rely on the Carizzo-Wilcox, Sparta, Queen City, and Colorado Alluvium Aquifers, and the Colorado River to maintain their economic, human and environmental needs; however, proposed Desired Future Conditions for the Carizzo-Wilcox, Sparta, and Queen City Aquifers are not adequately supported by documentation of factors required to be considered under the Texas Water Code; and

WHEREAS, the proposed DFCs will significantly increase the allowable drawdowns for water levels (ranging from 30-340% depending on the formation) in the Carrizo-Wilcox, Sparta and Queen City Aquifers within the Lost Pine district; and

WHEREAS, significant increases in drawdown in the Carrizo-Wilcox Aquifer by GMA-12 member districts threaten the Colorado River and its ecosystem by reducing groundwater inflows to the river and the Colorado Alluvium Aquifer; and

WHEREAS, sudden and significant failures of domestic and livestock wells already have occurred in the Carrizo-Wilcox Aquifer in at least two GMA-12 member districts during 2020-2021; and

WHEREAS, significantly increased allowable drawdowns in the Carrizo-Wilcox impairs the ability of individual districts to appropriately manage production within the district by moving the thresholds for existing management rules; and

WHEREAS, each district is required to hold at least one public hearing and receive public comments for a minimum 90-day period, before taking a final vote on the proposed DFCs; and interested parties may submit comments to LPGCD and fellow districts within GMA 12 through the end of the public comment period of August 23, 2021;

NOW, THEREFORE, BE IT RESOLVED by the Bastrop County, Texas Commissioners Court:

We support conservation of the aquifers under Bastrop County, not mining. We find that the proposed Desired Future Conditions do not establish or maintain the required balance between development of groundwater resources, and conservation and protection of those resources.

On behalf of the citizens of Bastrop County, we request that LPGCD and the other GMA-12 member districts reject the proposed 2022 DFCs and instead maintain the current DFCs to protect the aquifers during the next five years.

At the very least, we request that any new or amended DFCs not significantly increase the allowable drawdowns in the aquifers over those in the current DFCs.

PASSED AND APPROVED this the 26th day of July, 2021, with 5 ayes, 0 nays, and 0 abstentions.

Paul Pape

Paul Pape, County Judge

Attest:

Rose Pietsch

Rose Pietsch, County Clerk

LCRA
ENERGY • WATER • COMMUNITY SERVICES

August 17, 2021

Via electronic mail

Lost Pines Groundwater Conservation District
P.O. Box 1027
Smithville, Texas 78957
email: lpgcd@lostpineswater.org

Re: Proposed Revisions to the Desired Future Conditions for the Lost Pines Groundwater Conservation District

Dear Chairman Talbot and Members of the Board:

The Lower Colorado River Authority (LCRA) appreciates the opportunity to provide comments on the Board's consideration of potential revisions to the Desired Future Conditions (DFCs) that would apply within the Lost Pines Groundwater Conservation District (District). As an entity holding and seeking permits from the District, and as a regional water provider with significant responsibility for ensuring the long-term availability of water supply to central Texas, LCRA has an interest in responsible development, management, and efficient use of the water resources in this region, including groundwater. In that capacity, LCRA offers the following comments and questions regarding the proposed revisions to the District's DFCs.

(1) Proposed DFC Zones

District staff is proposing that the District adopt DFCs for specific "DFC Zones" within Bastrop and Lee counties, rather than adopt a district-wide DFC. LCRA understands that the intent of this approach is to focus on assessing DFC compliance within the areas where most of the monitoring wells and pumping is occurring. Due to the lack of any detail as to how the approach would actually be implemented, how the specific boundaries were delineated, and how the proposed DFC values for each zone were derived, LCRA believes this approach may be premature. Specific areas for consideration that need to be more fully addressed include:

(1) How does the Board intend to regulate pumping within the District if a zone-specific DFC is not achieved? Large permitted wells located outside of the Zone could have a substantial impact on drawdown within the DFC Zone.

(2) Several larger, more recent permits include language related to phased production that uses a formula that was developed in reliance on the continued existence of a district-wide DFC and requires use of both historic and future water level data and assumptions of exempt pumping, much of which derives from district-wide information or data gathered outside of the proposed DFC zones. There is nothing in

the proposal that discusses if or how these permits would be affected if the District does not adopt a District-wide DFC.

(2) Inconsistent DFCs

LCRA is aware of efforts encouraging the Board to vote to retain the current DFCs even though the proposed DFCs rely on a much more robust version of the groundwater availability model (GAM) for this region and even though GMA-12 used the same general approach to its assumptions for baseline pumping that it used in the last round of planning (i.e. by including permitting pumping). While LCRA appreciates that several factors play into the Board's consideration of an appropriate DFC, to ignore the best available science and retain the old DFCs has serious implications for all groundwater users within the District. For example, other districts within GMA-12 may adopt new DFCs based on the new GAM and pumping assumptions that will allow more drawdown to occur. That drawdown will extend beyond those districts into the Lost Pines District, which could mean the current Lost Pines DFC is reached sooner and in-district users could face curtailment. This type of significant inconsistency between districts within the same GMA creates the exact problem that joint planning was intended to avoid.

(3) DFCs and Surface Water Impacts

LCRA is aware of efforts by Environmental Stewardship urging the Board to retain the existing DFCs, asserting that the new DFCs will dewater the Colorado River or otherwise impair the ecological health of the river. Quite simply, these claims are based on a grossly oversimplified analysis of the very complex interactions between surface water and groundwater. They further rely on seriously flawed and extreme assumptions about how water in the Colorado River will be managed in the future. As a steward of the Colorado River with a longstanding commitment to provide water for environmental flow needs, LCRA has a demonstrated commitment to protecting this resource. To be clear, LCRA agrees that an improved understanding of groundwater-surface water interactions is important and has supported significant research efforts in this area. In the meantime, however, Environmental Stewardship's exaggerated claims should not be used to inform the Board's decision on the proposed DFCs in this round of planning.

Please feel free to contact me at (512) 578-7083 or 800-776-5272, ext. 7083 if you have any questions or would like to discuss any of the comments provided.

Sincerely,

John B. Hofmann
Executive Vice President, Water

lpgcd@lostpineswater.org

From: Terry Johnson <lktwj@aol.com>
Sent: Sunday, August 15, 2021 7:18 PM
To: lpgcd@lostpineswater.org
Subject: SPAM-LOW: Opposition To Desired Future Conditions For Water Management

Hello Lost Pines Water,

Please see my comments below.

I oppose the Desired Future Conditions (DFC) which is pending.

I support water conservation and sustainable management of ground water in our area and surrounding counties. Our surrounding counties are growing and we will need additional water for our area as well.

Additionally, the City of San Antonio needs to invest in new water reservoirs for their area instead of piping it from our area. If this proposal is not stopped, I fear surrounding counties may run out of water. If San Antonio cannot supply water themselves for their current residents, then they need to stop building homes until they can supply enough water from their area to meet current demand. Piping water from this area is not the answer.

Terry Johnson
Elgin, TX

lpgcd@lostpineswater.org

From:	Lisa Olson <ladolson63@gmail.com>
Sent:	Sunday, August 15, 2021 6:20 AM
To:	mike.talbot4@gmail.com
Cc:	info@envstewardship.org; jtotten@lostpineswater.org; lpgcd@lostpineswater.org
Subject:	Reject Proposed DFCs

I am deeply concerned about the proposal to allow the San Antonio's Vista Ridge water pipeline from Burleson to Bexar county which would impact our communities' access to water. We have a well which provides all of our water needs that is already impacted by the Alcoa mining occurring in our area. We need the GCD to conserve our water resources in consideration to the many rural homes, ranches and farms which utilize these resources.

- **Please vote to reject the proposed DFCs because they will unreasonably impact our groundwater, our communities, and our rivers, springs, and streams. You still have time to do what the law requires you to do: achieve a balance between the conservation and protection of our water resources — our groundwater and our surface water systems — and the development of those resources.**
- **Good planning requires agreement on management policies to guide the development of Desired Future Conditions. The districts were unable to agree on unified management policies workable for all the districts and have provided proposed DFCs based on controversial and flawed principles.**
- **The proposed DFCs for GMA-12 protect only permit holders — the big pumpers — by adopting drawdowns that allow them to pump to the limits of their permits, while local domestic and livestock wells are left high and dry. Whether or not a groundwater district mitigates failed local wells or not, the proposed DFCs unreasonably impact our aquifers. Likewise, the proposed DFCs will deprive our surface water systems of the inflows from aquifers that they depend on. It is your duty to do the work to achieve the required balance!**

We appreciate your continued oversight into conserving our water resources.

Regards,

Travis & Lisa Olson
1093 Private Road 7023
Elgin, Texas 78621

lpgcd@lostpineswater.org

From: Ms. G NoitacudE <ms.g@noitacude.com>
Sent: Saturday, August 14, 2021 9:03 PM
To: mike.talbot4@gmail.com
Cc: info@envstewardship.org; jtotten@lostpineswater.org; lpgcd@lostpineswater.org
Subject: please reject proposed DFCs

Dear Board President,

Please vote to reject the proposed Desired Future Conditions (DFCs) for GMA-12.

You probably know all the reasons why the DFCs are wrong, including:

- The proposed DFCs fail to protect our groundwater, rivers, springs, and streams -- and the communities that depend on them.
- The law requires you to seek a balance between the conservation and protection of our water resources and the 'development' of those resources. (You know you can't just *make* water fall from the sky, right?)
- The purpose of defining the Desired Future Conditions is to enable good planning based on well-aligned management policies. But if the districts have not really agreed nor examined the differences, then the proposed DFCs must be flawed.
- The current proposed DFCs clearly have a priority to serve the big permit holders (water barons), to allow them to pump to the limits of their permits, while local domestic and livestock wells have no protections.
- Overall, the proposed DFCs are going to over-draw from our aquifers and impact surface water systems as well.

Please do your duty. We are watching.

Sincerely,
Frieda Gress
102 Old Austin Trail
Elgin, Texas 78621
Bastrop County
voter@NoitacudE.com

Kermit D. Heaton
363 Paint Creek South Road
Paige, TX 78659
972-345-8800
Derfrosch1@me.com

July 30, 2021

Brazos Valley GCB Board of Directors
Fayette County GCD Board of Directors
Lost Pines GCD Board of Directors
Mid-East Texas GCD Board of Directors
Post Oak Savannah GCD Board of Directors

Re: Proposed Desired Future Conditions for Aquifers in GMA 12

I am a land and agricultural well owner in Bastrop County. I want to take advantage of the public comments period for the currently Proposed Desired Future Conditions (DFCs) for the next five (5) year period starting January, 2022. These proposed DFCs for all 5 GCDs in the GAM 12 affect the aquifers and surface waters I depend on for my lively hood, not to mention the future for my children and grandchildren.

Please vote to reject the proposed DFCs because they will unreasonably impact all of our groundwater, our communities, and our rivers, springs, and streams. There is still time to do what the law requires: to achieve a balance between the conservation and protection of our water resources and the development of these resources.

The proposed DFCs for GMA 12 protect only the big pumpers by allowing them to pump to the limits of their permits, while local domestic and agricultural wells like mine are left to go dry; or even worse, to possibly be contaminated when the aquifer levels recede. The proposed DFCs will also deprive the surface water systems that depend on inflows from the aquifers. These proposed DFCs will prevent you from fulfilling your responsibilities to balance groundwater production with the conservation, protection, recharging, and prevention of waste of groundwater and control of subsidence.

Sudden and significant failures of domestic and agricultural wells already have occurred in the Carrizo-Wilcox Aquifer in a least two GMA 12 member districts during 2020 and 2021, within the initial commencement of only 6 months of pumping from one (1) large pumper. New DFCs or modifications to the proposed DFCs must be provided so the districts can manage the aquifers in a way that is sustainable, and balances pumping against the conservation and protections of aquifers and surface waters, AND while retaining your ability to slow down pumping when damage is imminent or considered likely.

New or modified DFCs must be based on:

1. **SUSTAINABLE and effective management of the aquifers**
2. **PROTECTING domestic and agricultural wells and all land owners' property rights**
3. **Sustaining the resilience of the surface waters**

Further discussions:

It can become too late to save our aquifers if we allow the 'tipping point' to be reached before we can take corrective actions to insure conservation for ourselves and our posterity. It takes hundreds of years to recharge our aquifers. If we allow our aquifers to be damaged, then our surface waters will be damaged and Central Texas will be a wasteland for 100's of years.

The proposed DFCs favor big pumpers, hopefully by accident and NOT by design. Water developers (water pirates) are perverting the Texas groundwater laws and regulations from the original intent, which had served Texas well for decades. The original intent and actual results to date helped turn arid and semi-arid lands into productive, growing communities, which could now be destroyed if the groundwater and surface waters are not properly sustained. The taking of peoples' water, contrary to the intent of Texas laws is simply tyranny! Again, this was not the intent of the Texas laws and regulations. These water pirates are perverting Texas water laws for their own personal benefit to the detriment of Texas. These water pirates act like they are the nobility and the rest of us are just serfs to submit our property, our needs, our futures, etc. to their noble coffers.

Please, do not succumb to the real and implied threats of litigation from any bullying big pumpers! If their threats succeed; they will be just like every bully, they will only get worse in the future.

There is time to correct and/or modify the proposed DFCs. The regulations provide for modifications AFTER the public comment period. Those who say there is no time to change the proposed DFCs must think the public comment period is really just a sham and that all of us serfs and GCD Boards were planned to be ignored anyway.

Summary:

Sustainable management; not aquifer mining by our 'nobility' can be attained with new or modified DFCs.

Sincerely Yours,

Kermit D. Heaton

Kermit D. Heaton

lpgcd@lostpineswater.org

From: comments@lostpineswater.org
Sent: Thursday, August 19, 2021 1:25 PM
To: Lost Pines Water Conservation District
Subject: FWD: Comments on proposed DFCs

From: Judith <judith@farmandranchfreedom.org>
Sent: 8/16/21 8:54 AM
To: comments@lostpineswater.org
Subject: Comments on proposed DFCs

I sent these comments earlier, but I think it may have been before the formal comment period opened, so I am re-sending them now.

Dear Lost Pines GCD:

As a landowner and an attorney, I urge you to reject the proposed DFCs.

The proposed DFCs prioritize the interests of large commercial pumpers at the expense of every other interested party: domestic well owners, small local businesses, anyone who relies on surface waters (which are connected to groundwater), our environment, and all future users.

This approach ignores the clear statutory requirements of Chapter 36 of the Texas Water Code, which direct GCDs to balance production with conservation and preservation of our water resources. In setting the DFCs, GCDs are supposed to consider nine factors, including the impacts on all landowners, surface waters, and the environment.

Instead of addressing these factors, the proposed DFCs look at one element alone -- what is needed to allow all current pumpers to continue pumping unabated.

This is not only inconsistent with Chapter 36, but it appears to be a response to baseless threats. I have read the letter sent by Vista Ridge to the GCDs, and it is apparent that Vista Ridge seeks to intimidate the GCDs into setting the DFCs at such a level that it, and other large commercial pumpers, will never have to reduce their pumping.

I believe that attorneys representing other landowners have already provided information on the likelihood of a takings challenge against the DFCs being dismissed for lack of ripeness. So I will instead briefly comment on the merits of such a takings claim.

One of the factors courts look at in a takings claim is whether the party claiming a taking had "reasonable, investment-backed expectations" that their use of the property would be allowed. Thus, for example, a landowners' investment in irrigation wells is relevant evidence.

But simply spending money to build wells does not meet this test. **The expectation must be "reasonable."**

As a frequent attendee of the Post Oak Savannah GCD meetings, I have repeatedly heard statements that indicated that Vista Ridge believed that the groundwater models were overly conservative and that its pumping would not result in exceedance of the DFCs that existed when its permit was granted.

There have also been repeated public statements that Vista Ridge was informed at the time its permit was granted that it would face cutbacks if necessary to avoid exceeding the DFCs. The Vista Ridge permit has been amended twice in recent years, and the potential for its pumping to be reduced based on DFC exceedance was repeated each time.

In other words, Vista Ridge **cannot** have a **reasonable** expectation that the DFCs would be increased to avoid the need for cutbacks. The claim could not withstand the sort of inquiry that occurs in a court case during discovery or a trial. Vista Ridge's best hope to allow its pumping to continue unabated is to avoid such a court case by convincing the districts within GMA-12 to sacrifice all other interests in setting new DFCs.

I urge you not to cave to these tactics. Please reject the proposed DFCs and develop revised DFCs that comply with the statutory directives to consider all the affected interests.

Sincerely,
Judith McGeary
P.O. Box 809
Cameron, TX 76520
Judith@FarmAndRanchFreedom.org
512-484-8821 (cell)

Lost Pines Groundwater Conservation District
Post Oak Savannah Groundwater Conservation District
Brazos Valley Groundwater Conservation District
Mid-East Texas Groundwater Conservation District
Fayette County Groundwater Conservation District

July 21, 2021

Dear Boards of the GMA-12 Groundwater Conservation Districts:

As a landowner and an attorney, I urge you to reject the proposed DFCs.

The proposed DFCs prioritize the interests of large commercial pumpers at the expense of every other interested party: domestic well owners, small local businesses, anyone who relies on surface waters (which are connected to groundwater), our environment, and all future users.

This approach ignores the clear statutory requirements of Chapter 36 of the Texas Water Code, which direct GCDs to balance production with conservation and preservation of our water resources. In setting the DFCs, GCDs are supposed to consider nine factors, including the impacts on all landowners, surface waters, and the environment.

Instead of addressing these factors, the proposed DFCs look at one element alone – what is needed to allow all current pumpers to continue pumping unabated.

This is not only inconsistent with Chapter 36, but it appears to be a response to baseless threats. I have read the letter sent by Vista Ridge to the GCDs, and it is apparent that Vista Ridge seeks to intimidate the GCDs into setting the DFCs at such a level that it, and other large commercial pumpers, will never have to reduce their pumping.

I believe that attorneys representing other landowners have already provided information on the likelihood of a takings challenge against the DFCs being dismissed for lack of ripeness. So I will instead briefly comment on the merits of such a takings claim.

One of the factors courts look at in a takings claim is whether the party claiming a taking had "reasonable, investment-backed expectations" that their use of the property would be allowed. Thus, for example, a landowners' investment in irrigation wells is relevant evidence.

But simply spending money to build wells does not meet this test. **The expectation must be "reasonable."**

As a frequent attendee of the Post Oak Savannah GCD meetings, I have repeatedly heard statements that indicated that Vista Ridge believed that the groundwater models were overly conservative and that its pumping would not result in exceedance of the DFCs that existed when its permit was granted.

There have also been repeated public statements that Vista Ridge was informed at the time its permit was granted that it would face cutbacks if necessary to avoid exceeding the DFCs. The Vista Ridge permit has been amended twice in recent years, and the potential for its pumping to be reduced based on DFC exceedance was repeated each time.

In other words, Vista Ridge **cannot** have a **reasonable** expectation that the DFCs would be increased to avoid the need for cutbacks. The claim could not withstand the sort of inquiry that occurs in a court case during discovery or a trial. Vista Ridge's best hope to allow its pumping to continue unabated is to avoid such a court case by convincing the districts within GMA-12 to sacrifice all other interests in setting new DFCs.

I urge you not to cave to these tactics. Please reject the proposed DFCs and develop revised DFCs that comply with the statutory directives to consider all the affected interests.

Sincerely,

Judith McGeary
P.O. Box 809
Cameron, TX 76520
Judith@FarmAndRanchFreedom.org
512-484-8821 (cell)

Cc: Simsboro Aquifer Water Defense Fund
Environmental Stewardship

August 9, 2021

To:
Lost Pines GCD Board of Directors
P. O. Box 1027
Smithville, Tx. 78957

Re: Proposed Desired Future Conditions for Aquifers in GMA 12

Dear Board of Directors:

My name is Nancy McKee, I live in Lee County, under the jurisdiction of the Lost Pines Conservation Groundwater District. Thank you for allowing me to provide my comments/concerns regard the upcoming vote on the Desired Future Conditions (DFCs).

On July 21st the Lost Pines Board conducted a DFC workshop. They very graciously opened it to the public. In a way, this was a bad thing because it exposed to us landowners the absurd process for finalizing a 5-year plan.

1) I believe practically everyone is now very well aware of the deleterious impact Vista Ridge has and is having in Burleson and Lee counties wells since their inception of pumping April 2020. Actual pumpage; actual water levels; reports received as to the actual current condition of water levels and water wells in various areas is not included in formulating the proposed DFCs. Considerations are calculated based on hydrologist reports; science (which is not proven and therefore is theory); and proposed

recharging of the aquifer, as predicted from nature (and still is proposed as who can predict the future water conditions; draught; years of plentiful rain, etc.). I realize prior to this there really was no actual major pumpage and therefore no real-time stats. However, this past year we have experienced the ravages of major drawdowns in our county and those drawdowns were conducted in a neighboring district; and the losses are from one permit (San Antonio).

2) DFCs are calculated on "regions" which spread out water usage and do not define a particular problem area; i.e., those experiencing major water losses. So the information is flawed. A proposed DFC zone was recommended that would correct this issue, but is not included in the DFC you have been provided for vote.

As an example - as of June 2021, the water level in my well has dropped some 63'; however, in other areas of my region, there has been no lowering of water levels. A DFC zone would capture this information in certain areas, and I would think allow better forecasts of water wells and aquifer levels. In other words, specific details of the impact major pumping has caused; the areas effected and the pattern of losses for the future.

3) Proposed recharging of the aquifer is, just what it says, "proposed" and based on computer modules by former DFCs. This is not a true refléction the rate the aquifers are recharging. It bears no proof and no guarantee our aquifer will be recharged - at least in my lifetime. Once the aquifer is compromised, there will be no turning back. So it would seem to me the way of calculating recharge isn't working.

4) No where do I see addressed how the lowering of aquifers is going to effect our rivers and streams. There are other areas in Texas where rivers have all but dried up. When the aquifer lowers at such drastic rates, nature provides that the aquifer draws from the rivers nearby. One doesn't have to think too long to have a clear vision of what will eventually happen to our great Colorado River. I refer your attention to Mr. Steve Box's letter dated July 22, 2021, page 3, directed to each of the GMA 12 boards which describes what has and is now happening to the Colorado River. This consideration is an absolute when developing a 5-year plan.

We do not have the luxury of doing business as usual. I believe we've all heard the definition of insanity, but I think it bears repeating. Insanity is doing the same thing over and over and expecting a different result. The DFCs are screaming out for a correct and true calculation.

In determining all the above I have to ask: how can there be a legitimate plan for five years if no one is willing to consider reality? "For which one of you, when he wants to build a tower, does not first sit down and calculate the cost to see if he has enough to complete it?" Luke 14:28

So I ask each one of you, can you honestly say you have calculated the cost without benefit of real time figures? Or are you content to trust in theories and later say "oopsy, I didn't see that one coming." While it has been said the DFC is but a "planning tool," there is no way you can rely on any kind of planning when it is based on theories, proposals or a computer spreadsheet. (And oh by the way, the computer spreadsheet is only giving information a computer technician has fed into it.) Our

water is too precious, too necessary to sustain life and too vulnerable to withstand the ravaging of our aquifers because Board members choose to ignore the true information in calculating a 5-year plan. To ignore the information is to intentionally remain in darkness on the issues.

The Lost Pines GCD stated "Responsibilities" on your home page says, "Their charge is to determine how best to protect the underground aquifer from over pumping so that there will be enough water for everyone, now and in the future."

So let me ask you a question in light of all this - what is the legacy to which your Board wants to be known? I would hope the members would be steadfast to uphold their responsibilities statement. I would hope the members would desire, actually demand <u>all</u> truth when planning something so very critical.

You, as a groundwater district board have been given the authority to say THIS DFC IS NOT RIGHT. I, therefore, respectfully request and quite honestly expect you to vote <u>against</u> the DFCs as proposed and return them to the GMA for a complete revision, one that includes reality stats.

Sincerely,

Nancy McKee

Nancy McKee
1914 County Road 411
Lexington, TX 78947

lpgcd@lostpineswater.org

From: James Totten <jtotten@lostpineswater.org>
Sent: Wednesday, August 18, 2021 11:04 AM
To: lpgcd@lostpineswater.org
Subject: Fwd: ES and SAWDF supplemental comments on Proposed DFCs.
Attachments: ES Comments to LPGCD Board 18Aug21-FINAL2.pdf; Attached Message Part.htm

-------- Forwarded Message --------
Subject:ES and SAWDF supplemental comments on Proposed DFCs.
Date: Wed, 18 Aug 2021 11:17:29 -0400
From: Steve Box <executive.director@envstewardship.org>
To: Michael Talbot <mike.talbot.4@gmail.com>
CC: James Totten <jtotten@lostpineswater.org>, Eric Allmon <eallmon@txenvirolaw.com>, Marisa Perales <marisa@txenvirolaw.com>, Michele Gangnes <mggangnes@aol.com>, George Rice <jorje44@yahoo.com>, Andrew Wier <awier.tx@gmail.com>

President Talbot and Board,

Please find attached Environmental Stewardship and SAWDF's supplementary comments on the proposed DFCs.

Environmental Stewardship and SAWDF are requesting that the District reject the DFCs currently proposed and seek to develop revised DFCs.

The consideration of a revision to the currently-adopted DFCs requires a sound understanding of the consequences of the currently-adopted DFCs.
To aid in that understanding, Environmental Stewardship retained George Rice to develop a "conservation bookend" to establish a baseline for additional modeling. Mr. Rice's initial work on that project is provided in the attached document. The final report will be provided when GMA-12 resumes its work.

Mr. Rice's work confirms the integral connection between surface water resources and groundwater management within Lost Pines GCD and GMA 12. Any decision that allows or enables increased pumping of groundwater has the potential to reduce the reliability of surface water flows. The DFC now before the District fails to adequately account for that connection, and should be rejected so that a DFC can be developed that is informed by serious consideration of sustainable management of the aquifers.

Please distribute these coments to the other board member and add them to the official record. Also add me to the list for oral comments. I will try to be online for comments tonight but may not be able to do so because of internet issues while traveling.

Respectfully,

Environmental Stewardship's
Supplemental Comments to Lost Pines GCD Board of Directors
Regarding Revised Desired Future Condition
August 18, 2021

Environmental Stewardship & Simsboro Aquifer Water Defense Fund (SAWDF) Request:

Environmental Stewardship and SAWDF are requesting that the District reject the DFCs currently proposed, and seek to develop revised DFCs based on the following three criteria:

1. Sustainable management of the aquifers consistent with the District's Management Plan so that those resources can continue to be used by future generations,
2. Preservation of the resilience of the Colorado River to drought conditions by maintaining its gaining relationship with the aquifers, and
3. Protection of exempt landowner domestic and livestock wells

The consideration of a revision to the currently-adopted DFCs requires a sound understanding of the consequences of the currently-adopted DFCs. To aid in that understanding, Environmental Stewardship retained George Rice to develop a "conservation bookend" or "conservation standard" using GAM DFCRun3 (S-3) pumping file and the methodology recently used by neighboring GMA-11 to establish a baseline for additional modeling. GAM DFCRun3 best represents the drawdowns, impacts on surface waters, and impacts on domestic wells that would be expected from the pumping anticipated under the currently adopted 2017 DFCs. Because Mr. Rice will utilize the new GAM to develop this bookend, the resulting drawdowns will not precisely match the adopted drawdowns that resulted from using the same amount of pumping in the old GAM. None-the-less, the starting point -- the same specific amount of pumping demand as was used in the currently adopted DFCs – will provide a defensible starting point for understanding the amount of conservation needed to protect surface waters and domestic wells.

As a reminder, **the essence of conservation and preservation of an aquifer resource is that the rate at which we deplete our aquifers must be in balance with the protection of the aquifer and its associated surface waters.** The conservation and preservation of an aquifer resource is not achieved if aquifer depletion is driven only by the desire for development, against which we simply wait for damage to the ecosystem's sustainability before attempting to bring it back "in balance" **Only when a definite "conservation standard" describing a sustainable ecosystem is established — an ecosystem that is preserved in perpetuity — can we then determine how much of that aquifer we can develop in balance with the conservation standard.**

In the GMA-11 process, the results of a base simulation (Technical Memorandum 20-05[1]) was developed. Using that baseline and with the desire to provide a steady pumping rate for use in regional water planning, GMA 11 ran an additional set of simulations that resulted in a constant

[1] Hutchison, William R, Ph.D., P.E., P.G. December 30, 2020. GMA 11 Technical Memorandum 20-05. Base Simulation for Joint Planning with Updated Groundwater Availability Model for the Sparta, Queen City, and Carrizo-Wilcox Aquifers

pumping scenario for each county-river basin-aquifer unit in GMA 11. Technical Memorandum 21-01[2] Draft 2 reports on the development and results of the 33 iterations used to reach a constant pumping scenario[3] that would be expected to be sustained if the model were run for a longer period. The process is discussed in GMA-11's Explanatory Report (Draft 2)[4]. All these GMA-11 documents are available on its public information[5] Google Drive.

To ultimately accomplish the objectives in criteria 1 and 2 above -- sustainable management while protecting the resilience of surface water through a drought of record and establish a conservation bookend -- different limitations will be placed on GAM DFCRun3. The pumping rates in GMA 12 will be adjusted so that the discharge of groundwater to the Colorado River is approximately equal to average rate for the period 2001 – 2010.[6] That work will provide a conservation bookend to be used in balancing conservation and development relative to consideration #4 as DFCs are developed.

Rice Studies (Initial Report):

Initial work performed by Mr. Rice can inform the District's current consideration of next steps in the DFC process. In preparation for the conservation bookend GAM run, Mr. Rice developed water budgets for Lost Pines GCD and GMA-12 as a whole. These two runs provide a model for what can be done for each District to set individual district conservation standards.

The GAM2020 model was run to produce water balances for two areas: the Lost Pines GCD and GMA 12. The pumping file DFCRun3.WEL was used for both runs. Water balances were prepared for two time periods; period 1 (2001 – 2010) and period 2 (2061 – 2070). As would be expected, the outflow from both areas increased between period 1 and period 2.

In the Lost Pines GCD, the increased outflow was due to increased pumping and to an increase in the amount of groundwater flowing into neighboring counties. In GMA 12, almost all the increased outflow was due to increased pumping. For both areas, the largest source of water for the increased outflow was a reduction in the amount of groundwater discharged to streams. For the Lost Pines GCD, the reduction in discharge to streams accounted for 63% of the increased outflow. For GMA 12, the reduction in discharge to streams accounted for 77% of the increased outflow.

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[2] Hutchison, William R, Ph.D., P.E., P.G. February 28, 2021. GMA 11 Technical Memorandum 21-01Draft 2. March 4, 2021. Adjusted Pumping Simulations for Joint Planning with Updated Groundwater Availability Model for the Sparta, Queen City, and Carrizo-Wilcox Aquifers.

[3] Note: This scenario did not include the protection of surface waters and resulted in a pumping quantity that sources 54% of the water from surface waters (Induced inflow from the alluvium). The final proposed DFCs sources 72% of the pumped water from surface waters.

[4] Hutchison, William R, Ph.D., P.E., P.G. February 28, 2021. Desired Future Condition Explanatory Report (Draft 2) Carrizo-Wilcox/Queen City/Sparta Aquifers for Groundwater Management Area 11.

[5] GMA-11 public information google drive
https://drive.google.com/drive/folders/1ronw7ke38_lU4BHGEHbQQ0j9D7fYmFr?usp=sharing

[6] A gaining relationship to the aquifers.

In the Lost Pines GCD, the net amount of water derived from storage increased between periods 1 and 2. This increase accounts for about 8% of the increased outflows from Lost Pines.

In GMA-12, on the other hand, the amount of water derived from storage decreases between periods 1 and 2. This decrease represents about 13% of the increase in outflows. Thus, water that had previously come from storage must come from another source. That source is primarily a reduction in the amount of groundwater discharged to streams.

In the LPGCD, net outflow to wells in period 1 is about 27% of total outflows. In period 2 it is about 50% of total outflows. In GMA-12, net outflow to wells in period 1 is about 30% of total outflows. In period 2 it is about 61% of total outflows.

In the Lost Pines GCD, net groundwater discharges to streams decreased by approximately 36,000 AFY. In GMA-12, they decreased by almost 150,000 AFY

Details of the water balances for Lost Pines GCD and GMA 12 are presented in appendices 1 and 2, respectively.

Key Consequences of Initial Studies

Mr. Rice's preliminary work confirms the integral connection between surface water resources and groundwater management within Lost Pines GCD and GMA 12. Any decision that allows or enables increased pumping of groundwater has the potential to reduce the reliability of surface water flows. The DFC now before the District fails to adequately account for that connection, and should be rejected so that a DFC can be developed that is informed by serious consideration of sustainable management of the aquifers.

APPENDIX 1: Water Budget for Lost Pines GCD.

Water Balance for LPGCD
GAM2020 Results
Pumping file = DFCRun3.WEL

The GAM2020 model was run using the pumping file DFCRun3.WEL. The results for two periods were examined: period 1 (2001 – 2010) and period 2 (2061 – 2070). Tables 1 and 2 list the predicted inflows and outflows for each period.

Some of the flow components are both inflows and outflows. This is the case for streams. Some stream nodes are losing water to the underlying aquifers (inflow) while others are receiving discharge from the aquifers (outflows). For the storage component, the GAM treats water released from storage is an inflow, and water that enters storage is an outflow. Net inflows and outflows are shown in tables 3 and 4.

Table A1-1
LPGCD Inflows

Component	Period 1 2001-2010 (AFY)	Period 2 2061-2070 (AFY)	Difference P2 – P1 (AFY)
Streams	78342	87638	9296
Overlying Units	91	266	175
Recharge	76941	86466	9525
POSGCD	9059	16090	7031
Caldwell Co.	3095	3175	80
Fayette Co.	1563	2056	493
Williamson Co.	3498	3666	168
Washington Co.	431	1244	813
From Storage	25725	21496	-4229
Sum	198745	222097	23352

Table A1-2
LPGCD Outflows

Component	Period 1 2001-2010 (AFY)	Period 2 2061-2070 (AFY)	Difference P2 – P1 (AFY)
Wells	26680	55274	28594
Drains	9707	3837	-5871
Streams	128001	100892	-27109
ET	261	196	-65
Overlying Units	3576	2590	-986
POSGCD	12076	26046	13970
Caldwell Co.	604	10968	10364
Fayette Co.	7434	20701	13267
Williamson Co.	271	222	-50
Washington Co.	1021	1316	295
To Storage	9015	59	-8956
Sum	198646	222097	23453

Inflows and outflows balance (within 1%) for both periods, as well as for the difference between the periods.

Table A1-3
Net Inflows

Component	Period 1 2001-2010 (AFY)	Period 2 2061-2070 (AFY)	Difference P2 – P1 (AFY)
Recharge	76941	86466	9525
Williamson Co.	3227	3444	217
From Storage	16710	21437	4727
Sum	99369	111347	14469

Table A1-4
Net Outflows

Component	Period 1 2001-2010 (AFY)	Period 2 2061-2070 (AFY)	Difference P2 – P1 (AFY)
Wells	26680	55274	28594
Drains	9707	3837	-5871
Streams	49659	13254	-36405
ET	261	196	-65
Overlying Units	3485	2324	-1161
POSGCD	3017	9956	6939
Caldwell Co	-2491	7793	10284
Fayette Co.	5871	18645	12,774
Washington Co.	590	72	-518
Sum	99270	111351	14571

Again, the inflows and outflows balance (within 1%).

Components Contributing to Increased Outflows

Between periods 1 and 2, outflows from LPGCD increased by about 58,000 AFY. The majority of this increase was due to increased pumping and flows to the surrounding counties. The increased outflows were largely offset by decreases in outflows to streams and drains. The increased outflows, and the sources contributing to the increase are shown in tables 5 through 8.

Table A1-5
Increased Outflows, Period 1 – Period 2

Component	Increase from P1 to P2 (AFY)
Wells	28,594
To surrounding counties	29262
Sum	57,856

Table A1-6
Increased Inflow, Period 1 – Period 2

Component	Increase from P1 to P2 (AFY)	Percentage of Increased Outflows
Recharge	9525	16.5

Table A1-7
Decreased Outflows, Period 1 – Period 2

Component	Decrease from P1 to P2 (AFY)	Percentage of Increased Outflows
Discharge to Streams	36405	62.9
Discharge to Drains	5871	10.1
ET	65	0.1
To Overlying Units	1161	2.0

Table A1-8
Increased Contribution from Storage

Component	Increase from P1 to P2 (AFY)	Percentage of Increased Outflows
From Storage	4727	8.17

Total Percent = 99.8

Note that most of the increased outflow is provided not by increased inflows, but by a decrease in outflows from other components, primarily from streams. This is caused by pumping capturing some of the groundwater that would otherwise be discharged to the streams. The increased recharge is due to the fact that after 2010, recharge in the GAM is held to a constant value. Prior to 2010, recharge varies yearly.

APPENDIX 2: Water Budget for GMA-12

GAM2020 Results
Water Balance for GMA 12
Pumping file = DFCRun3.WEL

The GAM2020 model was run using the pumping file DFCRun3.WEL. The results for two periods were examined: period 1 (2001 – 2010) and period 2 (2061 – 2070). Tables 1 and 2 list the predicted inflows and outflows for each period.

Some of the flow components are both inflows and outflows. This is the case for streams. Some stream nodes are losing water to the underlying aquifers (inflow) while others are receiving discharge from the aquifers (outflows). For the storage component, the GAM treats water released from storage is an inflow, and water that enters storage is an outflow. Net inflows and outflows are shown in tables 3 and 4.

Table A2-1
GMA 12 Inflows

Component	Period 1 2001-2010 (AFY)	Period 2 2061-2070 (AFY)	Difference P2 – P1 (AFY)
Streams	283515	332328	48813
Overlying Units	1195	5104	3909
Recharge	483041	526795	43754
Outside GMA12	21078	32276	11198
From Storage	74307	50021	-24286
Sum	863136	946524	83388

Table A2-2
GMA 12 Outflows

Component	Period 1 2001-2010 (AFY)	Period 2 2061-2070 (AFY)	Difference P2 – P1 (AFY)
Wells	167618	351071	183453
Drains	88476	73689	-14787
Streams	566552	466513	-100039
ET	3603	2707	-896
Overlying Units	10309	5081	-5228
Outside GMA12	26589	47462	20873
Sum	863147	946523	83376

Inflows and outflows balance (within 1%) for both periods, as well as for the difference between the periods.

Table A2- 3
Net Inflows

Component	Period 1 2001-2010 (AFY)	Period 2 2061-2070 (AFY)	Difference P2 – P1 (AFY)
Recharge	483041	526795	43754
From Storage	74307	50021	-24286
Sum	557348	576816	19468

Table A2-4
Net Outflows

Component	Period 1 2001-2010 (AFY)	Period 2 2061-2070 (AFY)	Difference P2 – P1 (AFY)
Wells	167618	351071	183453
Drains	88476	73689	-14787
Streams	283,037	134,185	-148,852
ET	3603	2707	-896
Overlying Units	9114	-23	-9137
Outside GMA12	5511	15186	9675
Sum	557359	576815	19456

Again, the inflows and outflows balance.

Components Contributing to Increased Outflows

Between periods 1 and 2, outflows from GMA 12 increased by over 190,000 AFY. The majority of this increase was due to increased pumping, with a relatively small amount due to increased groundwater flows to areas outside of GMA 12. The increased outflows, and the sources contributing to the increase are shown in tables 5 through 8.

Table A2-5
Increased Outflows, Period 1 – Period 2

Component	Increase from P1 to P2 (AFY)
Wells	183,453
To outside GMA 12	9675
Sum	193,128

Table A2-6
Increased Inflow, Period 1 – Period 2

Component	Increase from P1 to P2 (AFY)	Percentage of Increased Outflows
Recharge	43,754	22.7

Table A2-7
Decreased Outflows, Period 1 – Period 2

Component	Decrease from P1 to P2 (AFY)	Percentage of Increased Outflows
Discharge to Streams	148,852	77.1
Discharge to Drains	14,778	7.7
Discharge to Overlying Units	9137	4.7
ET	896	0.5

Table A2-8
Decreased Contribution from Storage

Component	Decrease from P1 to P2 (AFY)	Percentage of Increased Outflows
From Storage	24,286	-12.6

Total Percent = 100.1

Note that most of the increased outflow is provided not by increased inflows, but by a decrease in outflows from other components, primarily from streams. This is caused by pumping capturing some of the groundwater that would otherwise be discharged to the streams. The increased recharge is due to the fact that after 2010, recharge in the GAM is held to a constant value. Prior to 2010, recharge varies yearly.

Supplemental Comments to
Post Oak Savannah and Lost Pines GCD Board of Directors
Regarding Revised Desired Future Condition
by
Environmental Stewardship and Simsboro Aquifer Water Defense Fund

September 8, 2021

OUR REQUEST

Environmental Stewardship & Simsboro Aquifer Water Defense Fund (SAWDF) request that the Districts reject the DFCs currently proposed for the Carrizo Wilcox Aquifer Group so that GMA-12 can revisit and, to the extent necessary, revise the proposed DFCs.

Environmental Stewardship & SAWDF are seeking to have DFCs developed that provide a stable basis for allocating future pumping and that follow these three criteria:

1. Sustainable management of the aquifers consistent with the District's Management Plan so that those resources can continue to be used by future generations,
2. Preservation of the resilience of the Colorado and Brazos Rivers to drought conditions by maintaining a gaining relationship with the aquifers, and
3. Protection of exempt landowner domestic and livestock wells.

INTRODUCTION

Consideration of revisions to the *currently adopted* DFCs requires a sound understanding of the consequences of the currently adopted DFCs and the consequences of the proposed DFCs. To aid in that understanding, Environmental Stewardship retained George Rice to develop a "conservation standard" or "conservation bookend" using GAM DFC Run3 (S-3) pumping file and the methodology recently used by neighboring GMA-11 to establish a baseline for additional modeling. GAM DFC Run3 best represents the drawdowns, impacts on surface waters, and impacts on domestic wells that would be expected from the pumping anticipated under the currently adopted 2017 DFCs. Because Mr. Rice used the new GAM to develop this standard, the resulting drawdowns will not precisely match the adopted drawdowns that resulted from using the same amount of pumping in the old GAM. Nonetheless, the starting point -- the same specific amount of pumping demand as was used in the currently adopted DFCs – will provide a defensible starting point for understanding the amount of conservation needed to protect surface waters and domestic wells.

As a reminder, **the essence of conservation and preservation of an aquifer resource is that the rate at which we deplete our aquifers must be in balance with the long-term protection of the aquifer and its associated surface waters.** The conservation and preservation of an aquifer resource is not achieved if aquifer depletion is driven only by the desire for development, against which we simply wait for damage to the ecosystem's sustainability before attempting to bring it back "in balance" **Only when a definite "conservation standard" describing a sustainable ecosystem is established — an ecosystem that is preserved in perpetuity — can we then determine how much of that aquifer we can develop in balance with the conservation standard.**

In the GMA-11 process, the results of a base simulation (Technical Memorandum 20-05[1]) was developed. Using that baseline and with the desire to provide a steady pumping rate for use in regional

[1] Hutchison, William R, Ph.D., P.E., P.G. December 30, 2020. GMA 11 Technical Memorandum 20-05. Base Simulation

water planning, GMA 11 ran an additional set of simulations that resulted in a constant pumping scenario for each county-river basin-aquifer unit in GMA 11. Technical Memorandum 21-01[2] Draft 2 reports on the development and results of the 33 iterations used to reach a constant pumping scenario[3] that would be expected to be sustained if the model were run for a longer period. The process is discussed in GMA-11's Explanatory Report (Draft 2)[4]. All of these GMA-11 documents are available on its public information[5] Google Drive.

To ultimately accomplish the objectives in criteria 1 and 2 above -- sustainable management while protecting the resilience of surface water through a drought of record and establishing a conservation standard -- different limitations will be placed on GAM DFCRun3. The pumping rates in GMA 12 have been adjusted so that the discharge of groundwater to the Colorado River for the Lost Pines District is approximately equal to the average rate for the period 2001 – 2010.[6] A similar conservation standard was developed for all surface waters in GMA-12. This work provides conservation standards for both Lost Pines and GMA-12 to be used in balancing conservation and development relative to consideration #4 as DFCs are developed.

CONSERVATION STANDARDS FOR GMA-12 AND LOST PINES GCD

A. Rice Studies (Initial Report):

Initial work performed by Mr. Rice can inform the GMA District's current consideration of next steps in the DFC process. In preparation for the conservation standard GAM run, Mr. Rice developed water budgets for Lost Pines GCD and GMA-12 as a whole. These two runs provide a model for what can be done for each District in GMA-12 to set individual district conservation standards.

The GAM 2020 model was run to produce water balances for two areas: the Lost Pines GCD and GMA 12. The pumping file DFCRun3.WEL was used for both runs. Water balances were prepared for two time periods; period 1 (2001 – 2010) and period 2 (2061 – 2070). As would be expected, the outflow from both areas increased between period 1 and period 2.

In the Lost Pines GCD, the increased outflow was due to increased pumping and to an increase in the amount of groundwater flowing into neighboring counties. In GMA 12, almost all the increased outflow was due to increased pumping. For both areas, the largest source of water for the increased outflow was a reduction in the amount of groundwater discharged to streams. For the Lost Pines GCD, the reduction in discharge to streams accounted for 63% of the increased outflow. For GMA 12, the reduction in discharge to streams accounted for 77% of the increased outflow.

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for Joint Planning with Updated Groundwater Availability Model for the Sparta, Queen City, and Carrizo-Wilcox Aquifers

[2] Hutchison, William R, Ph.D., P.E., P.G. February 28, 2021. GMA 11 Technical Memorandum 21-01Draft 2. March 4, 2021. Adjusted Pumping Simulations for Joint Planning with Updated Groundwater Availability Model for the Sparta, Queen City, and Carrizo-Wilcox Aquifers.

[3] Note: This scenario did not include the protection of surface waters and resulted in a pumping quantity that sources 54% of the water from surface waters (Induced inflow from the alluvium). The final proposed DFCs sources 72% of the pumped water from surface waters.

[4] Hutchison, William R, Ph.D., P.E., P.G. February 28, 2021. Desired Future Condition Explanatory Report (Draft 2) Carrizo-Wilcox/Queen City/Sparta Aquifers for Groundwater Management Area 11.

[5] GMA-11 public information google drive https://drive.google.com/drive/folders/1ronw7ke38_lU4BHGEHbQQ0j9D7fYmFr?usp=sharing

[6] A gaining relationship to the aquifers.

In the Lost Pines GCD, the net amount of water derived from storage increased between periods 1 and 2. This increase accounts for about 8% of the increased outflows from Lost Pines.

In GMA-12, on the other hand, the amount of water derived from storage decreases between periods 1 and 2. This decrease represents about 13% of the increase in outflows. Thus, water that had previously come from storage must come from another source. That source is primarily a reduction in the amount of groundwater discharged to streams.

In the LPGCD, net outflow to wells in period 1 is about 27% of total outflows. In period 2 it is about 50% of total outflows. In GMA-12, net outflow to wells in period 1 is about 30% of total outflows. In period 2 it is about 61% of total outflows.

In the Lost Pines GCD, net groundwater discharges to streams decreased by approximately 36,000 AFY. In GMA-12, they decreased by almost 150,000 AFY

Details of the water balances for Lost Pines GCD and GMA 12 are presented in appendices 1 and 2, respectively.

Key Consequences of Initial Studies

Mr. Rice's preliminary work confirms the integral connection between surface water resources and groundwater management within Lost Pines GCD and GMA 12. Any decision that allows or enables increased pumping of groundwater has the potential to reduce the reliability of surface water flows. The DFC now before the District fail to adequately account for that connection, and should be rejected so that a DFC can be developed that is informed by serious consideration of sustainable management of the aquifers.

B. Estimated pumping limits that protect outflows to surface waters at 2001-2010 average level of discharge to the Colorado River Main Stem in Lost Pines District, and all surface waters for GMA-12.

The following graph (Figure A3-1 from Appendix 3) estimates that pumping would need to be reduced by about 90% from the DFCRun3 pumping rate to restore groundwater discharge to the Colorado River to the 2001-2010 average discharge rate of 21,100 AFY. However, a repeat of the 2001-2010 pumping rate after 2019 gets close to restoring discharges to the target rate, demonstrating that there may be other ways to reach the objective other than a uniform reduction in pumping. By 2070 the pumping rate in DFCRun3 is approximately 355,000 AFY.

Comparing the results above with those using pumping file S-12 (Figure A3-4 in Appendix 3) gave an unexpected result -- a 90% reduction in pumping resulted in a discharge rate greater than 21,100 AFY. Rice notes that the distribution of pumping in the two files is different and this may have influenced the results. Pumping file DFCRun3 has over 70,000 wells after 2020, whereas the number of wells in S-12 after 2020 is about 24,000. This difference in distribution of wells may account for this unexpected result but needs to be better understood. Pumping file S-12 has an approximate pumping rate of 547,000 AFY by 2070.

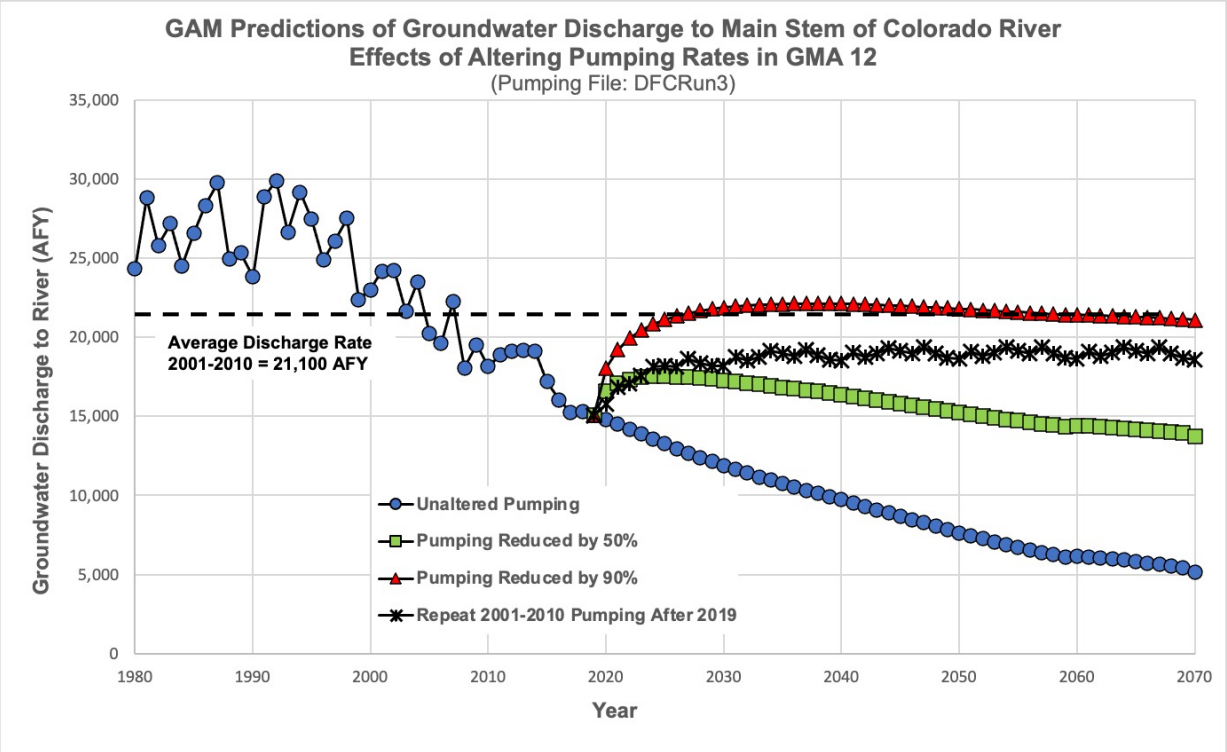

Figure A3-1. Effects of Reduced Pumping on Groundwater Discharge to the Colorado River (Pumping File DFCRun3).

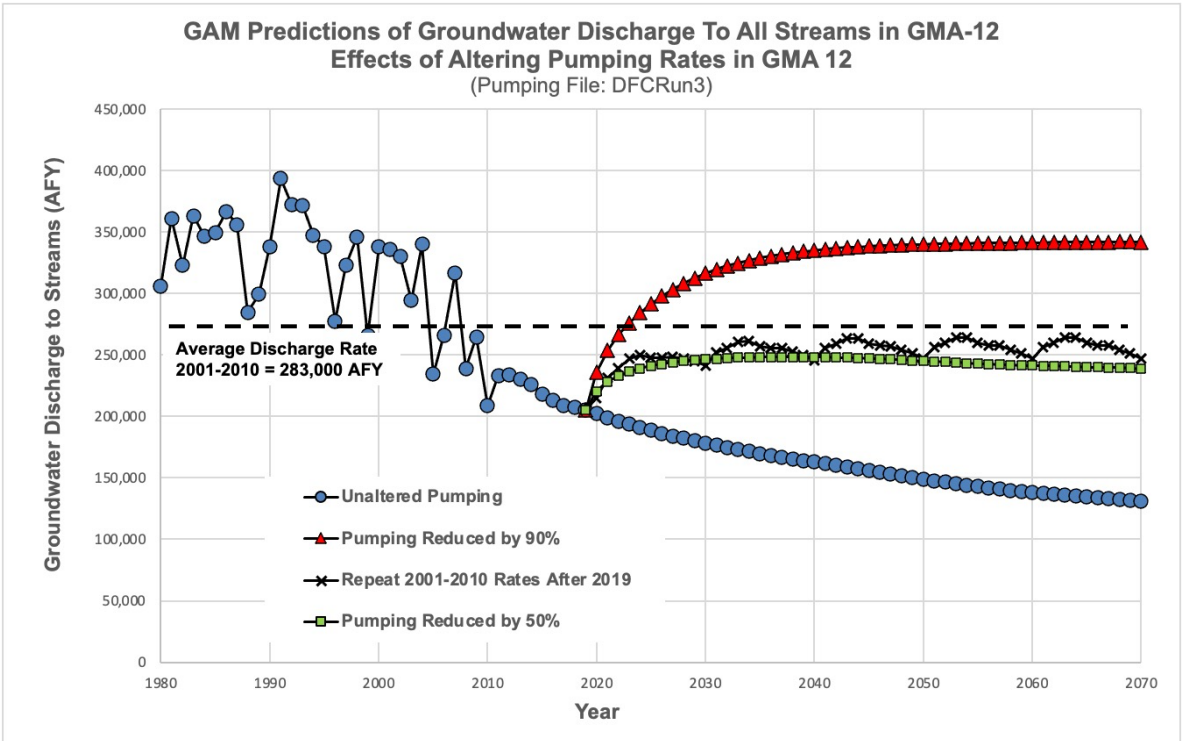

Figure A3-2 Effects of Reduced Pumping on Groundwater Discharge to All Streams in GMA-12 (Pumping File DFCRun3)

Figure A3-2 above predicts the effects of reduced pumping on *all streams* in GMA-12. In this analysis a 90% reduction in pumping restores the discharges to a rate approaching the historical pre-developmental period. Again, it appears that the distribution in pumping throughout GMA-12 may have an influence on how much reduction is needed to accomplish a desired target rate.

Pumping rates for the above analyses are provided in figures A3-3 and A3-5 (Appendix 3).

Key Results: of Reduced Pumping Studies

These studies provide a method for estimating the amount of pumping that can be made available for permitted and exempt pumping once a conservation standard is agreed upon by the Districts and stakeholders. It appears that several variables need to be investigated to provide efficient allocation of groundwater between conservation and development. Each district can use these analytical methods to develop a conservation standard that is physically possible and allows for the development of stable and achievable DFCs to quantify current and future pumping limits.

IMPACTS ON DOMESTIC & LIVESTOCK WELLS IN GMA-12

The third criteria important for stable DFCs is protection of exempt domestic and livestock wells. All the counties in GMA-12 are classified as rural, and their citizens and economies depend on these exempt wells to meet their freshwater needs.

Completed Depth of Exempt Wells
A note about exempt wells. These are small bore wells that produce anywhere from 5-50 gallons per minute. The cost of drilling an exempt well runs from $30-$40 per foot. As you can imagine, when a driller reaches a good 60-80 feet of water-bearing sand, the landowner usually chooses to stop drilling to save money. So, exempt wells may not be completed in the bottom of an aquifer/formation.

Pump depth in Exempt Wells
A typical pump may draw the water level in the well pipe down by 50 feet or more when running for a length of time. While the location of the pump depends on the refresh rate of the well, a good rule of thumb for a submersible pump is 100 feet below the surface of the water. The pump must stay submerged to keep from overheating and damaging the well.

Criteria for Negative Impact/Mitigation
This is important when evaluating negative effects on exempt wells. If the pump is only 100 feet below the surface of the water, and it will draw down 50 feet while running, then the landowner can only sustain 50 feet of permanent drawdown before the well needs to be mitigated. In this report SAWDF uses predicted drawdown of "50 feet or greater" as the criteria for determining when a well will require mitigation.

Data Set for this Report[7]
For this report, SAWDF downloaded two databases from the TWDB; Groundwater Database [GWDB] and the State Driller Report Database [SDRDB] which are updated nightly.

[7] www.twdb.texas.gov/groundwater/data/gwdbrpt.asp & www.twdb.texas.gov/groundwater/data/drillersdb.asp

Approximately 50% of **all** wells in GMA-12 are labeled as domestic or livestock wells.

GMA-12 Wells	All Purposes	Domestic Stock	Percent
LPGCD	4,279	2,788	65%
POSGCD	3,685	1,957	53%
BVGCD	5,226	1,692	32%
METGCD	5,656	2,075	37%
FCGCD	1,136	784	69%
	19,982	9,296	47%

More than half of these exempt wells are completed in the Sparta, Queen City, or Carrizo-Wilcox aquifers as modeled in the GAM2020 used by GMA-12 to evaluate the DFC.

Geographic Information Software [GIS]
SAWDF employed GIS software to map the location of the wells from the TWDB databases and overlay the predicted drawdowns in each aquifer/formation from Run S-12 of the GAM2020. The results are in the table below.

	GMA-12 Wells [within Modflow grid]	Domestic Stock	Drawdown >= 50 ft	Percent Impacted
	Sparta	783	244	31%
	Queen City	1,130	104	9%
Wilcox Group	Carrizo	467	325	70%
Wilcox Group	Calvert Bluff	1,304	735	56%
Wilcox Group	Simsboro	352	246	70%
	Hooper	848	156	18%
	TOTAL	4,884	1,810	**37%**

POSGCD is acutely aware of the impacts on exempt wells in the Carrizo formation and is taking action to address the DFC for this formation. **The data above suggests the need to also apply the same analysis to the Wilcox group where impacts in the Calvert Bluff and Simsboro formations exceed 50%**.

More than 50% of exempt wells completed in the Wilcox Group in three districts may require mitigation, as the tables below indicate.

Wilcox Group

LPGCD Wells [within Modflow grid]	Domestic Stock	Drawdown >= 50 ft	Percent Impacted
Carrizo	202	143	71%
Calvert Bluff	512	240	47%
Simsboro	163	100	61%
Hooper	345	80	23%
TOTAL	**1,222**	**563**	**46%**

Wilcox Group

POSGCD Wells [within Modflow grid]	Domestic Stock	Drawdown >= 50 ft	Percent Impacted
Carrizo	107	102	95%
Calvert Bluff	218	216	99%
Simsboro	65	61	94%
Hooper	225	71	32%
TOTAL	**615**	**450**	**73%**

Wilcox Group

BVGCD Wells [within Modflow grid]	Domestic Stock	Drawdown >= 50 ft	Percent Impacted
Carrizo	46	28	61%
Calvert Bluff	247	186	75%
Simsboro	94	78	83%
Hooper	139	5	4%
TOTAL	**526**	**297**	**56%**

Aquifer Uses

Among other considerations, Section 36.108(d)(1) directs the joint planning process to acknowledge "*aquifer uses or conditions within the management area, including conditions that differ substantially from one geographic area to another*.

GMA-12 members have noted, on multiple occasions, that only POSGCD and LPGCD have issued export permits for groundwater produced from the Carrizo-Wilcox Aquifer. Both the magnitude of the permits and their use, to serve population growth in other regions of Texas, are "substantially

different" from the other districts in GMA-12. These "substantial differences" in "aquifer uses" must be acknowledged by GMA-12.

Private Property Rights
Section 36.108(d)(7) also directs the joint planning process to consider *"the impact on the interests and rights in private property, including ownership and the rights of management area landowners and their leases and assigns in groundwater as recognized under Section 36.002"*. This includes both those who wish to conserve their water and those who produce it or lease their water rights to other producers.

1,462 domestic or livestock wells in the Carrizo-Wilcox Aquifer are predicted to require mitigation under the proposed DFCs. These landowners will suffer a loss of 50 feet or more in groundwater. This is groundwater that will never be recovered, which diminishes property values and creates financial hardship on landowners and livestock operations.

Achievable DFCs
The GMA-12 joint planning process has been dominated by a focus on "maximum production" as the standard for achieving the DFC. SAWDF and Environmental Stewardship have provided the necessary research to enable GMA-12 to change the focus and establish a new standard, one focused on achieving a DFC that gives balance to management of groundwater.

SAWDF urges each of these districts to reject the proposed Desired Future Conditions and explore pumping scenarios that support:

1. Sustainable management of the aquifers consistent with the District's Management Plan so that those resources can continue to be used by future generations,
2. Preservation of the resilience of the Colorado and Brazos Rivers to drought conditions by maintaining a gaining relationship with the aquifers, and
3. Protection of exempt landowner domestic and livestock wells.

APPENDIX 1: Water Balance for LPGCD (DRAFT REPORT)

The GAM2020 model was run using the pumping file DFCRun3.WEL. The results for two periods were examined: period 1 (2001 – 2010) and period 2 (2061 – 2070). Tables A1 -1 and A1-2 list the predicted inflows and outflows for each period.

Some of the flow components are both inflows and outflows. This is the case for streams. Some stream nodes are losing water to the underlying aquifers (inflow) while others are receiving discharge from the aquifers (outflows).[8] For the storage component, the GAM treats water released from storage is an inflow, and water that enters storage is an outflow. Net inflows and outflows are shown in tables A1-3 and A1-4.

Table A1-1
LPGCD Inflows

Component	Period 1 2001-2010 (AFY)	Period 2 2061-2070 (AFY)	Difference P2 – P1 (AFY)
Streams	78342	87638	9296
Overlying Units	91	266	175
Recharge	76941	86466	9525
POSGCD	9059	16090	7031
Caldwell Co.	3095	3175	80
Fayette Co.	1563	2056	493
Williamson Co.	3498	3666	168
Washington Co.	431	1244	813
From Storage	25725	21496	-4229
Sum	198745	222097	23352

[8] Note that the stream values in this section are for all streams in the LPGCD, not only for the Colorado River and its tributaries.

Table A1-2
LPGCD Outflows

Component	Period 1 2001-2010 (AFY)	Period 2 2061-2070 (AFY)	Difference P2 – P1 (AFY)
Wells	26680	55274	28594
Drains	9707	3837	-5871
Streams	128001	100892	-27109
ET	261	196	-65
Overlying Units	3576	2590	-986
POSGCD	12076	26046	13970
Caldwell Co.	604	10968	10364
Fayette Co.	7434	20701	13267
Williamson Co.	271	222	-50
Washington Co.	1021	1316	295
To Storage	9015	59	-8956
Sum	198646	222097	23453

Inflows and outflows balance (within 1%) for both periods, as well as for the difference between the periods (compare tables A1-1 and A1-2).

Table A1-3
Net Inflows

Component	Period 1 2001-2010 (AFY)	Period 2 2061-2070 (AFY)	Difference P2 – P1 (AFY)
Recharge	76941	86466	9525
Williamson Co.	3227	3444	217
From Storage	16710	21437	4727
Sum	99369	111347	14469

Table A1-4
Net Outflows

Component	Period 1 2001-2010 (AFY)	Period 2 2061-2070 (AFY)	Difference P2 – P1 (AFY)
Wells	26680	55274	28594
Drains	9707	3837	-5871
Streams	49659	13254	-36405
ET	261	196	-65
Overlying Units	3485	2324	-1161
POSGCD	3017	9956	6939
Caldwell Co	-2491	7793	10284
Fayette Co.	5871	18645	12,774
Washington Co.	590	72	-518
Sum	99270	111351	14571

Again, the inflows and outflows balance (within 1%).

Components Contributing to Increased Outflows

Between periods 1 and 2, outflows from LPGCD increased by about 58,000 AFY. The majority of this increase was due to increased pumping and flows to the surrounding counties. The increased outflows were largely offset by decreases in outflows to streams and drains. The increased outflows, and the sources contributing to the increase are shown in tables A1-5 through A1-8.

Table A1-5
Increased Outflows, Period 1 – Period 2

Component	Increase from P1 to P2 (AFY)
Wells	28594
To surrounding counties	29262
Sum	57856

Table A1-6
Increased Inflow, Period 1 – Period 2

Component	Increase from P1 to P2 (AFY)	Percentage of Increased Outflows
Recharge	9525	16.5

Table A1-7
Decreased Outflows, Period 1 – Period 2

Component	Decrease from P1 to P2 (AFY)	Percentage of Increased Outflows
Discharge to Streams	36405	62.9
Discharge to Drains	5871	10.1
ET	65	0.1
To Overlying Units	1161	2.0

Table A1-8
Increased Contribution from Storage

Component	Increase from P1 to P2 (AFY)	Percentage of Increased Outflows
From Storage	4727	8.17

Total Percent = 99.8

Note that most of the increased outflow is balanced not by increased inflows, but by a decrease in outflows from other components, primarily from streams. This is caused by pumping capturing some of the groundwater that would otherwise be discharged to the streams. The increased recharge is due to the fact that after 2010, recharge in the GAM is held to a constant value. Prior to 2010, recharge varies yearly.

APPENDIX 2: Water Balance for GMA-12 (DRAFT REPORT)

The same type of water balance performed for the LPGCD (appendix 1) was also performed for GMA 12.

Table A2-1
GMA 12 Inflows

Component	Period 1 2001-2010 (AFY)	Period 2 2061-2070 (AFY)	Difference P2 – P1 (AFY)
Streams	283515	332328	48813
Overlying Units	1195	5104	3909
Recharge	483041	526795	43754
Outside GMA12	21078	32276	11198
From Storage	74307	50021	-24286
Sum	863136	946524	83388

Table A2-2
GMA 12 Outflows

Component	Period 1 2001-2010 (AFY)	Period 2 2061-2070 (AFY)	Difference P2 – P1 (AFY)
Wells	167618	351071	183453
Drains	88476	73689	-14787
Streams	566552	466513	-100039
ET	3603	2707	-896
Overlying Units	10309	5081	-5228
Outside GMA12	26589	47462	20873
Sum	863147	946523	83376

Inflows and outflows balance (within 1%) for both periods, as well as for the difference between the periods (compare tables A2-1 and A2-2).

Table A2-3
Net Inflows

Component	Period 1 2001-2010 (AFY)	Period 2 2061-2070 (AFY)	Difference P2 – P1 (AFY)
Recharge	483041	526795	43754
From Storage	74307	50021	-24286
Sum	557348	576816	19468

Table A2-4
Net Outflows

Component	Period 1 2001-2010 (AFY)	Period 2 2061-2070 (AFY)	Difference P2 – P1 (AFY)
Wells	167618	351071	183453
Drains	88476	73689	-14787
Streams	283,037	134,185	-148852
ET	3603	2707	-896
Overlying Units	9114	-23	-9137
Outside GMA12	5511	15186	9675
Sum	557359	576815	19456

Again, the inflows and outflows balance.

Components Contributing to Increased Outflows

Between periods 1 and 2, outflows from GMA 12 increased by over 190,000 AFY. The majority of this increase was due to increased pumping, with a relatively small amount due to increased groundwater flows to areas outside of GMA 12. The increased outflows, and the sources contributing to the increase are shown in tables A2-5 through A2-8.

Table A2-5
Increased Outflows, Period 1 – Period 2

Component	Increase from P1 to P2 (AFY)
Wells	183,453
To outside GMA 12	9675
Sum	193,128

Table A2-6
Increased Inflow, Period 1 – Period 2

Component	Increase from P1 to P2 (AFY)	Percentage of Increased Outflows
Recharge	43,754	22.7

Table A2-7
Decreased Outflows, Period 1 – Period 2

Component	Decrease from P1 to P2 (AFY)	Percentage of Increased Outflows
Discharge to Streams	148,852	77.1
Discharge to Drains	14,778	7.7
Discharge to Overlying Units	9137	4.7
ET	896	0.5

Table A2-8
Decreased Contribution from Storage

Component	Decrease from P1 to P2 (AFY)	Percentage of Increased Outflows
From Storage	24,286	-12.6

Total Percent = 100.1

Note that most of the increased outflow is balanced not by increased inflows, but by a decrease in outflows from other components, primarily from streams. This is caused by pumping capturing some of the groundwater that would otherwise be discharged to the streams. The increased recharge is due to the fact that after 2010, recharge in the GAM is held to a constant value. Prior to 2010, recharge varies yearly.

APPENDIX 3: Effects of Reducing Pumping in GMA-12 (DRAFT REPORT)

Pumping file DFCRun3

Between 2001 and 2010, the average discharge of groundwater to the main stem of the Colorado River was approximately 21,000 AFY. This value is based on a GAM2020 run using the pumping file DFCRun3. GAM runs predict that groundwater pumping will cause discharges to the Colorado River to decline. Between 2061 and 2070, the average predicted discharge rate is approximately 5700 AFY.

The question addressed in this appendix is: How much would pumping have to be reduced to restore groundwater discharges to the earlier rate, approximately 21,000 AFY?

To answer this question, pumping rates throughout GMA-12 were reduced by varying amounts. The reductions started in 2020. As shown in figure A3-1, a reduction of 90% would result in an average discharge of 21,000 AFY between 2061 and 2070. The results of reducing pumping by 50% are also shown.

There may be ways, other than a uniform reduction in pumping, to restore discharges to a desired level. Figure A3-1 also shows the results for a scenario where the pumping rates from 2001 to 2010 were repeated for each decade from 2020 to 2070.

Figure A3-2 shows the effects of reduced pumping on all streams in GMA-12, not just the main stem of the Colorado River.

Figure A3-3 shows pumping rates for: unaltered DFCRun3 pumping, a 90 percent reduction in pumping, and the repetition of the pumping rates from 2001 to 2010.

Pumping file S-12

The same type of analysis described above was performed using the S-12 pumping file. The major difference between the pumping files is the amount pumped in GMA-12. By 2070, the pumping rate in DFCRUN3 is approximately 355,000 AFY. For S-12 the rate in 2070 is about 547,000 AFY.

As shown in figure A3-4, a 90 percent reduction in S-12 pumping results in a discharge greater than 21,000 AFY. This result is unexpected because the pumping rate for S-12 is greater than that for DFCRun3. However, the distribution of pumping in the two files is different. In pumping file DFCRun3, the number of wells after 2020 is over 70,000. In S-12, the number of wells after 2020 is approximately 24,000. This difference in the distribution of wells may account for this unexpected result.

Figure A3-5 shows pumping rates for unaltered S-12 pumping, and a 90 percent reduction in pumping.

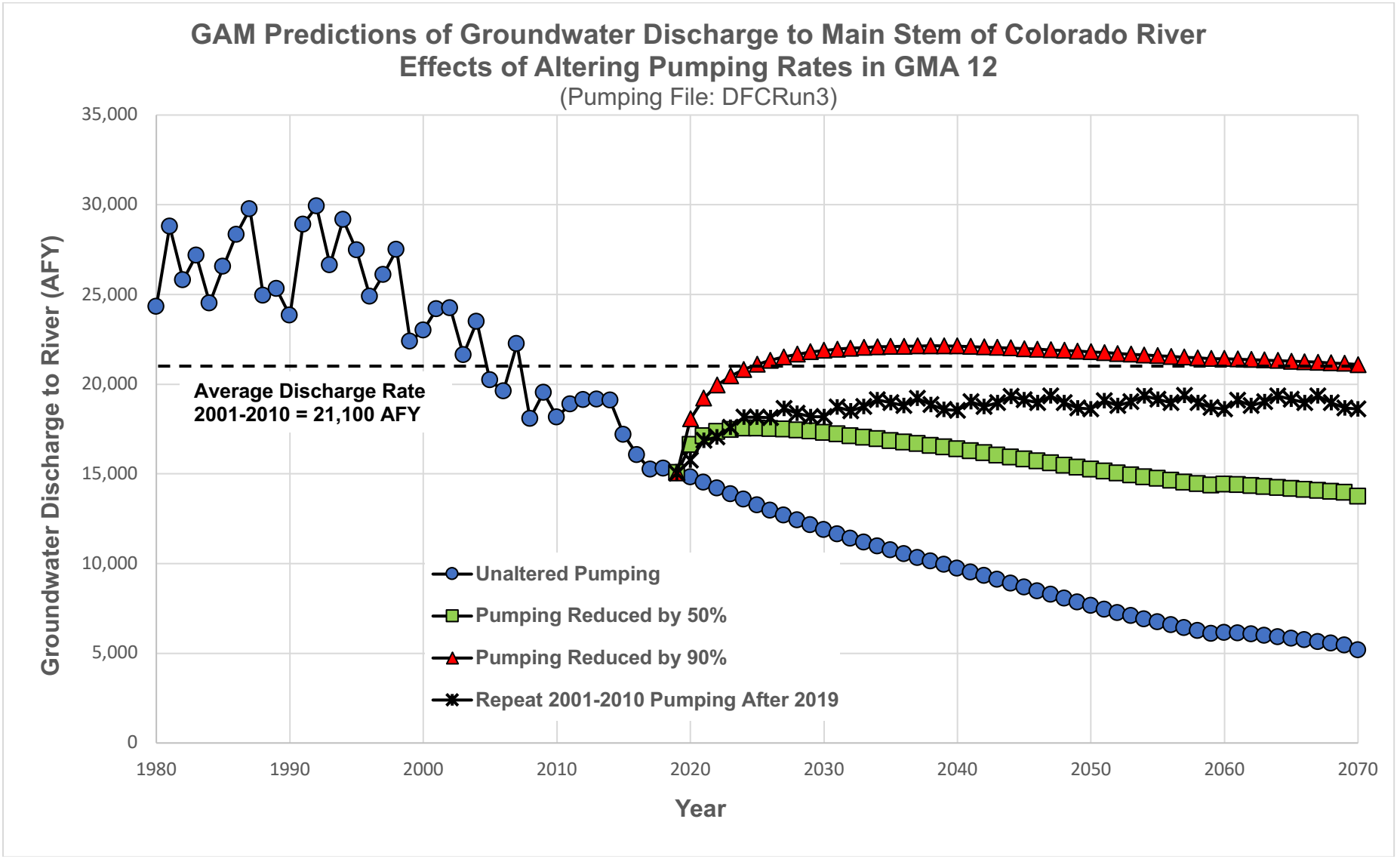

Figure A3-1
Pumping File DFCRun3, Effects of Reduced Pumping on Groundwater Discharge to the Colorado River

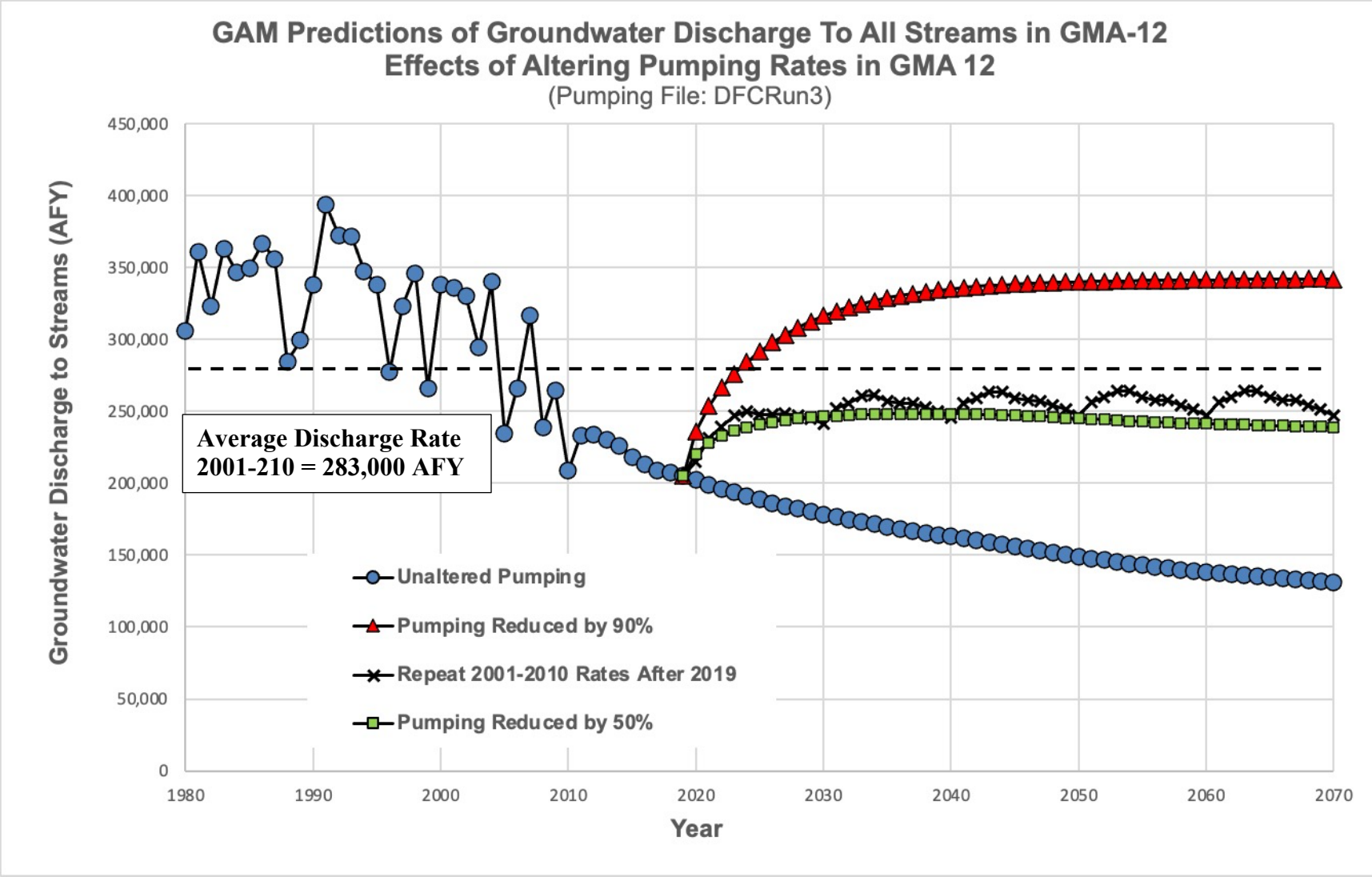

Figure A3-2
Pumping File DFCRun3, Effects of Reduced Pumping on Groundwater Discharge to All Streams in GMA-12

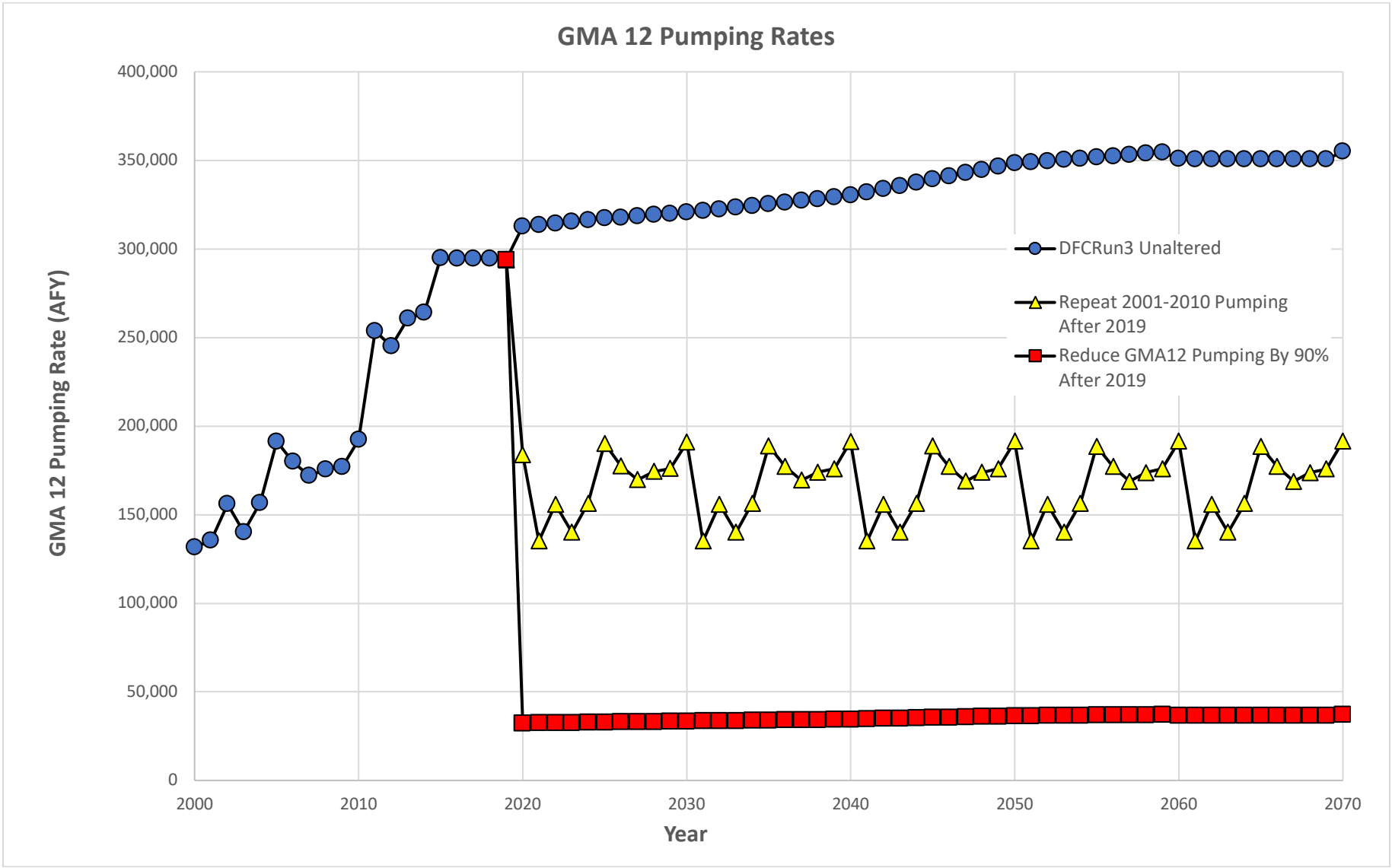

Figure A3-3
DFCRun3 Pumping Rates in GMA-12

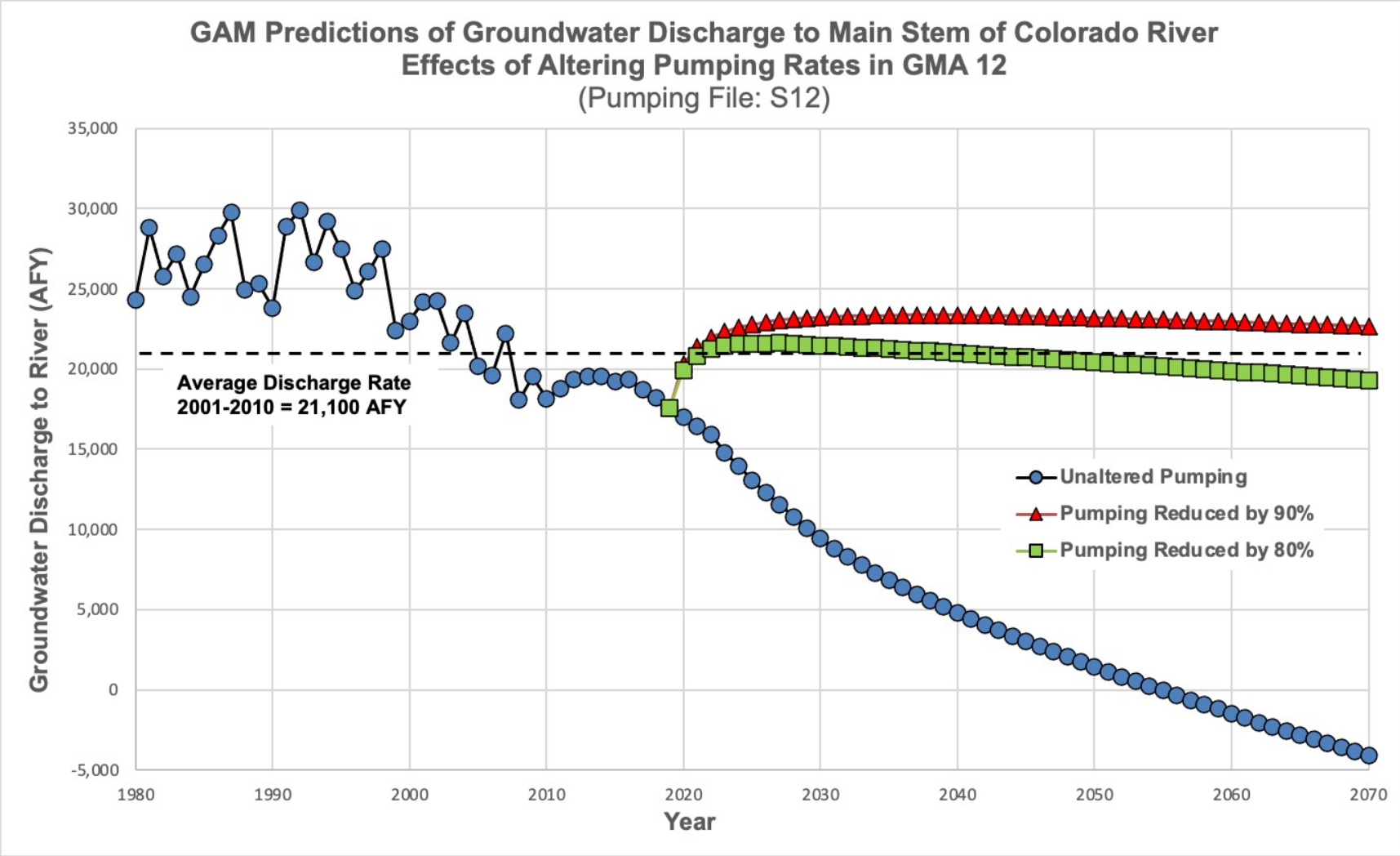

Figure A3-4
Pumping File S-12, Effects of Reduced Pumping on Groundwater Discharge to the Colorado River

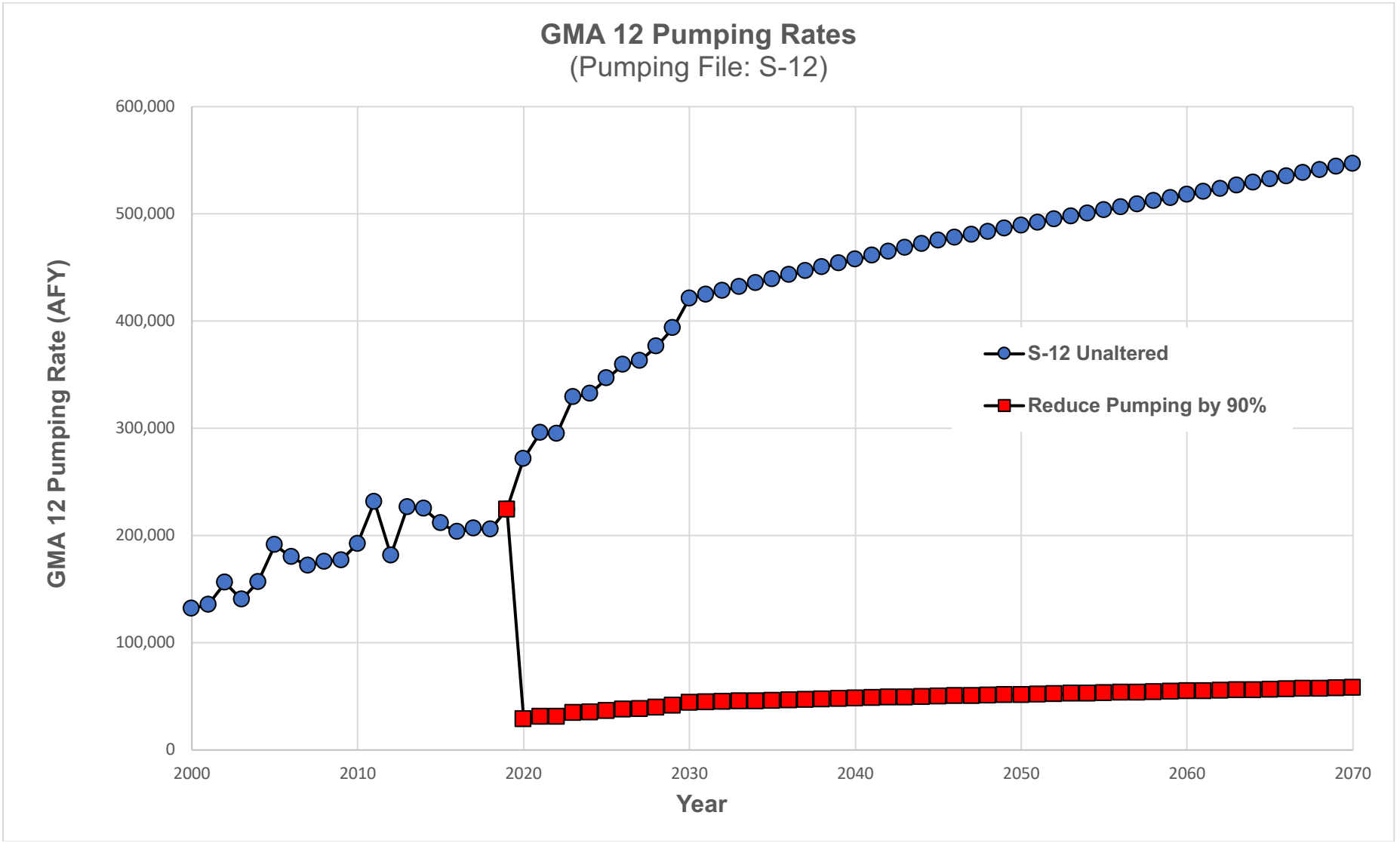

Figure A3-5
S-12 Pumping Rates in GMA-12

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August 18, 2021

VIA EMAIL to comments@lostpineswater.org and jtotten@lostpineswater.org

Mike Talbot, President
Members of Board of Directors
Lost Pines Groundwater Conservation District

Re: **Simsboro Aquifer Water Defense Fund (SAWDF) Comments --- Public Comment Process for Proposed 2022 Desired Future Conditions (DFC)**

President Talbot and Board Members:

Three months ago, the Simsboro Aquifer Water Defense Fund submitted written comments and slides to the board when you invited SAWDF and Environmental Stewardship to make a presentation about our concerns with the proposed 2022 Desired Future Conditions.

We are resubmitting SAWDF's May 18, 2021 comments and slides along with this updated summary of our comments. Within our May 18, 2021 comments are embedded links for documents and comments SAWDF presented to GMA-12, which also should be considered incorporated by reference in today's comments.

Thank you for including all of these materials in the District's collection of official public comments.

In addition, today, SAWDF joins Environmental Stewardship's August 18, 2021 comments (Environmental Stewardship's Comments to Lost Pines GCD Board of Directors Regarding Revised Desired Future Conditions), **specifically to request that the District reject the DFCs currently proposed, and seek to develop revised DFCs based on three specific criteria. We further urge that our joint comments offer the District a roadmap for accomplishing these three goals by developing a "conservation bookend" or "conservation standard".**

The three criteria include:

1. Sustainable management of the aquifers consistent with the District's Management Plan so that those resources can continue to be used by future generations,
2. Preservation of the resilience of the Colorado River to drought conditions by maintaining its gaining relationship with the aquifers, and
3. Protection of exempt landowner domestic and livestock wells.

As far as the "conservation standard" is concerned, SAWDF's past comments to GMA-12 and to Lost Pines were centered around this concept:

> We urge [instead] a new mindset that could start with GMA-12 --- that we are not going to allow managed depletion (mining) of our aquifers, and that we will determine not only how much we want to pump <u>but also how much we are determined to conserve</u> (emphasis added). We must at least have two reference points at opposite ends of the spectrum if we are to find the "balance" between development and conservation that the Conservation Amendment to the Texas Constitution mandates... What we and our supporters want most, is for our state policymakers, legislators, and regulators to decide that ultimate sustainability requires that our natural resources remain resilient along the way --- that our aquifers can still spring back while they are being stressed by massive pumping. We understand that development will occur, but maintaining resiliency of natural resources assures that we are achieving sustainable development of natural resources.[1]

[1]SAWDF May 19, 2021 comments, pp. 5-6

While Environmental Stewardship's comments focus on Criteria 2. above, SAWDF continues to focus on Criteria 3. Of course, Criteria 1. is the paramount concern for each organization, which, if not achieved, will preclude realization of the other two goals. We contend that the proposed DFC are not based on and, in fact, will prevent the realization of Criteria 1.

If you reject the proposed DFC in favor of establishing the required balance between development of groundwater resources, and conservation and protection of those resources, you will be supporting all three criteria, instead of depleting (mining) our aquifers.

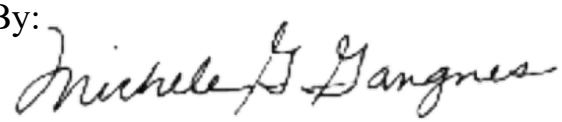
The District is rightly concerned with the shortness of time left to finish your work. Your rejection of the proposed DFC would mean you and the other GMA-12 districts have until January 5, 2022 to finish your work. We believe Mr. Rice's report, along with the GMA-11 resources included in ES's comments, will greatly assist your need to essentially "fast track" but still apply the requisite due diligence in revising the proposed DFC, including revisions that will advance the achievement of Criteria 3.

As SAWDF has offered in the past, we stand ready to assist the development of a conservation standard and achievement of these criteria any way we can, for the benefit of our aquifers, and for the benefit of present and future landowners, and their property rights, communities and ecosystems.

As always, we appreciate your willingness to serve your community, and to listen to your constituents.

Sincerely,

`SIMSBORO AQUIFER WATER DEFENSE FUND

By: 

Michele G. Gangnes for Board members, Andrew Wier, Ernest Bogart, George Witta, Travis Brown, and Michele Gangnes

W/enclosures

LPGCD Proposed DFCs

Presented by

LPGCD Proposed DFCs

- Proposed DFCs are ‘reverse engineered’ with a formula that only accommodates permits.
- The ‘9 Considerations’ are not incorporated in this formula

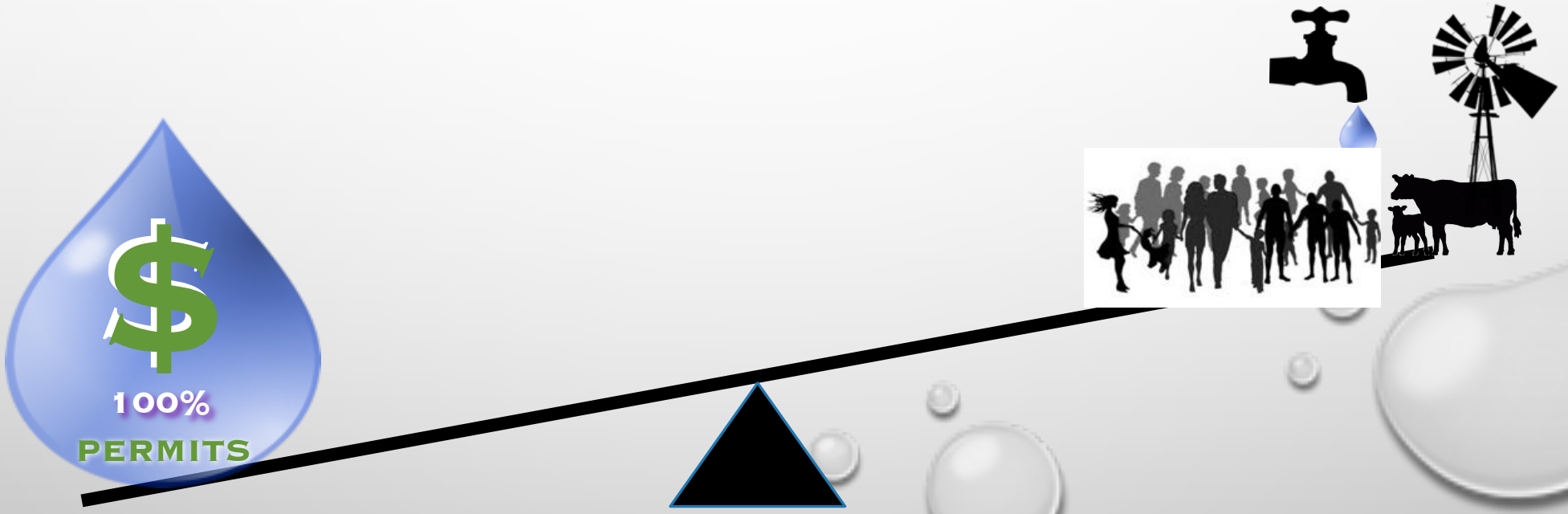
  Aquifer conditions, State Water Plan, water budgets/sustainability, environmental impacts, subsidence, socio-economic impacts, private property rights, feasibility, other issues.

LPGCD Proposed DFCs

"must provide a **balance** between the highest practicable level of groundwater production and the conservation, preservation, protection, recharging, and prevention of waste of groundwater and control of subsidence in the management area."

LPGCD Proposed DFCs

Is this formula balanced!



LPGCD Proposed DFCs

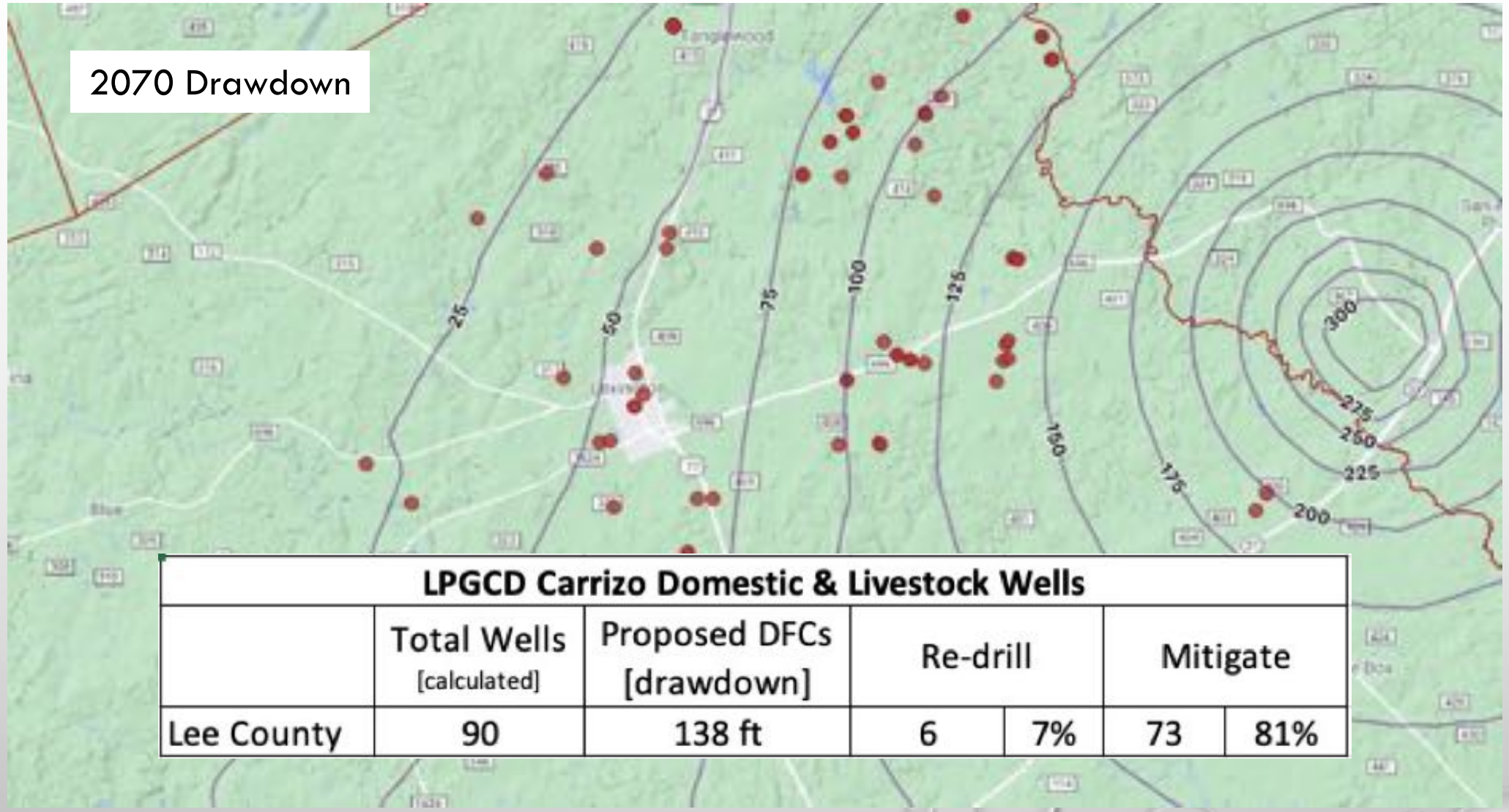
- The GAM is designed to 'evaluate' proposed DFCs or proposed permits.
- Using the GAM to 'calculate' the DFCs is not an appropriate use of 'best available science.'

LPGCD Proposed DFCs

Expressing the DFCs as a 'district-wide' average obscures the real-world impact of permits.

	Current DFC (feet)	Current MAG in 2070	S-3 Drawdown in 2070 (feet)	S-3 Pumpage in 2070 (acre-feet)
Sparta	5	2,393	11	2,710
Queen City	15	1,315	14	1,744
Carrizo	62	12,052	73	10,837
Calvert Bluff	100	3,984	81	4,047
Simsboro	240	30,303	161	71,295
Hooper	165	1,255	88	2,732

CARRIZO REALITY



LPGCD Carrizo Domestic & Livestock Wells						
	Total Wells [calculated]	Proposed DFCs [drawdown]	Re-drill		Mitigate	
Lee County	90	138 ft	6	7%	73	81%

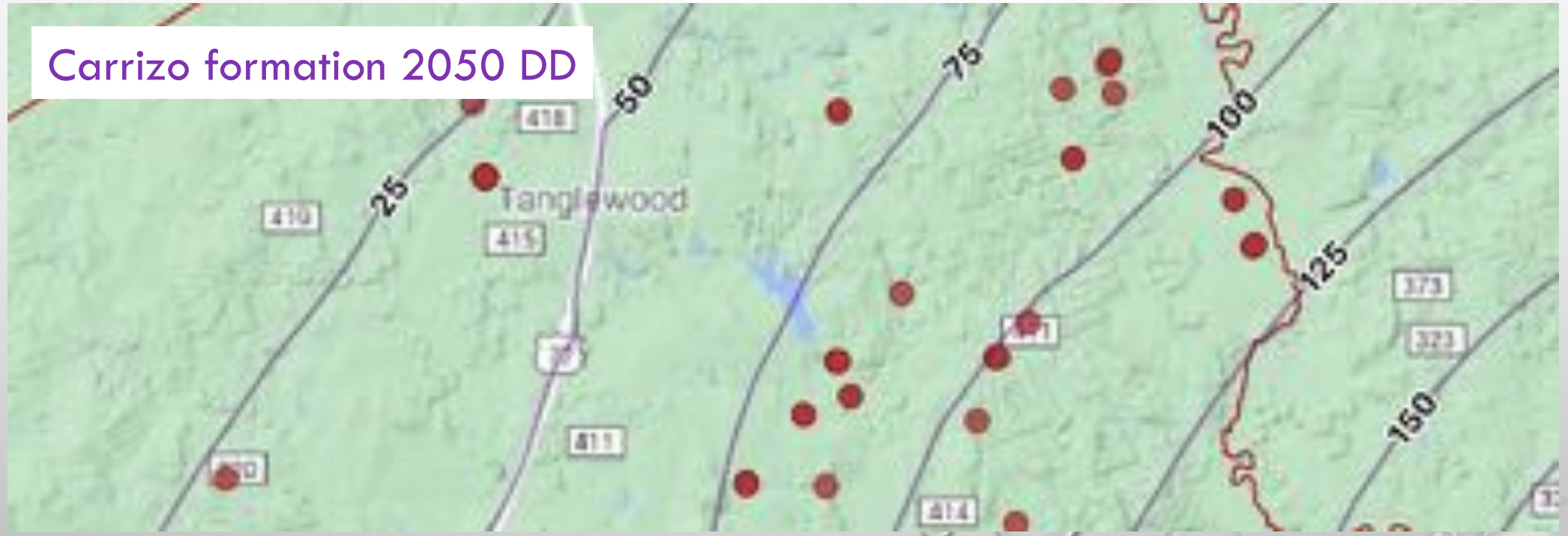
LPGCD Proposed DFCs
Public Comment Period

Clearly state that the Proposed DFCs are:

- 100% permitted production vs
- 0% for domestic & livestock wells

LPGCD Proposed DFCs
Public Comment Period

Publish contour maps, by decade, showing drawdown in each aquifer/formation with plotted exempt wells.



LPGCD Proposed DFCs
Public Comment Period

Reveal to the public how many exempt wells may need to be mitigated if the Proposed DFCs are adopted, and include the District's mitigation policy, if any.

LPGCD Carrizo Domestic & Livestock Wells						
	Total Wells [calculated]	Proposed DFCs [drawdown]	Re-drill		Mitigate	
Lee County	90	138 ft	6	7%	73	81%

LPGCD Proposed DFCs
Explanatory Report

- Clearly state what the LPGCD considers to be reasonable/unreasonable impact on domestic and livestock wells and how, under the proposed DFCs, the District demonstrates protection of property rights and mitigates damage to landowner wells.
- Provide an accounting of the total loss in appraised value, by county, for all properties that will lose groundwater due to permitted pumping, and why the District considers this reasonable and not a 'taking.'
- Clearly state how the LPGCD has determined the permitted pumping in the DFCs can be sustained without damaging the aquifers or causing subsidence.

LPGCD Proposed DFCs
Management Plan

The Management Plan for LPGCD should include on-going assessment of impacts on exempt wells:

- Measured water levels
- Mitigation, if any
- Socio-economic impact on property value and business operations; i.e. livestock, farming.

LPGCD Future DFCs

Develop a new methodology for proposed DFCs

- Evaluate and incorporate 'sustainable' groundwater production for each aquifer/formation.
- Consult agricultural extension agents, county appraisal districts, Chambers of Commerce, Economic Development corps, City Managers, etc. for impacts in the District.
- Use the GAM to *evaluate* impact of proposed DFCs.

SIMSBORO AQUIFER WATER
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Michele G. Gangnes, Esq.
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512-461-3179 (V/T)

May 19, 2021

Mike Talbot, President
Members of Board of Directors
Lost Pines Groundwater Water Conservation District

Re: Simsboro Aquifer Water Defense Fund (SAWDF) Preliminary Comments on Proposed 2022 Desired Future Conditions (DFC)

President Talbot and Board Members:

SAWDF is an Elgin-based, Texas non-profit corporation and a qualified 501c3 organization, dedicated to the protection of aquifers and private property rights in groundwater. I am authorized by the Board of Directors of SAWDF to present these comments and accompanying slides to you. I will also present the slides and an edited version of these same comments at tonight's board meeting, with the hope that we might have a dialogue about the issues we raise.

We appreciate the opportunity to present our concerns about the proposed DFC, and we look forward to resolving issues through mutually beneficial dialogue whenever possible.

In addition to being a founding board member of SAWDF, I am a Lee County landowner and a semi-retired attorney on Emeritus status with the State Bar of Texas --- that just means I am old but still licensed to practice. However, I am not a water lawyer, and I have not been engaged as

legal counsel either for SAWDF or any other person interested in these comments. The opinions expressed here or tonight are those of SAWDF.

The only decision SAWDF has made on the subject of legal representation is that we have decided not to hire counsel, at this time. We also reserve the right to submit additional comments to you during the 90-day public comment period associated with the proposed Desired Future Conditions (DFC), but please also consider this letter as public comment, delivered during the official comment period.

Three purposes for SAWDF's request to address the board

The purpose of this letter, and our presentation tonight, is three-fold. One, we hope to inform you ---and the audience---more fully of conditions on the ground in Lee County, and what the future looks like from the landowner perspective, if your proposed DFC stand.[1]

By now you have received Mr. Eric Allmon's letter of May 18 as legal counsel to Environmental Stewardship. We refer you to Mr. Allmon's reference to the *Stratta v. Roe* case in the Brazos Valley Groundwater Conservation District for an important discussion, *inter alia,* of the rights of *all* landowners, whether they have wells or not.

Our second purpose is to *broaden* your awareness of your potential legal peril if you continue to pursue the proposed DFCs adopted at GMA-12.

Again, Mr. Allmon's discussion of your ability to survive a "takings or statutory" challenge by a non-exempt permittee, based on your DFC, is instructive. It should be noted that we are not offering legal advice to either the district or our landowner constituents, but we do not necessarily agree with all of his conclusions as they might pertain to exempt (rather than non-exempt) well owners who have already incurred damage under the *current* DFC, or to landowners generally.

There are landowners, including exempt well owners in Lee County, whose ability to produce water, their property values and their agri-businesses have already been damaged by another district's official permitting action. These impacts on exempt well owners are current and measurable, not hypothetical, and their loss of water can be extrapolated more broadly to landowners in the same area, whether they have a well or not, because the water levels beneath them have been diminished.[2]

[1] My remarks to the board tonight will be abbreviated, so please read this letter in its entirety.

[2] We also emphasize that well owners and landowners who have already been impacted by a certain district's regulatory action are not, through this letter or by reason of any viewpoint of SAWDF, prejudiced by anything SAWDF says, nor have they waived or otherwise had their legal rights addressed or affected.

Our third purpose is to urge that the Lost Pines district not exacerbate its landowners' situation through the DFC process, but rather try to be part of the solution by rejecting the proposed DFC.

SAWDF's public purpose, and the public's expectations

SAWDF was founded by veterans of several organized efforts over the last two decades to protect the central portion of the Carrizo-Wilcox Aquifer. We have shown our ability, and our supporters' ability, to marshal considerable resources to support and assist legal and other actions to ensure the public right and our government's duty to conserve and protect our aquifers in perpetuity, and to preserve landowners' property rights and access to their own groundwater.

Whether or not they support SAWDF, there are many owners of the almost one million acres in our two counties who look to you to protect their investments that depend on access to water, and to share their priorities of passing on healthy and protected natural resources to our future generations.

In SAWDF's opinion, they are correct in believing their considerable investments in a certain way of life , individually and collectively, should be valued with as much care and deference as is shown to the speculative investment expectations of non-resident water marketers in profit-based export enterprises that, in the scheme of things, return relatively little of value to the local community.[3]

SAWDF's concerns

We also note that SAWDF's board members have worked with Mr. Allmon or members of his firm for two decades on our local water issues. We trust his judgment and his advice, and we hope you will seriously consider his May 18 letter to you.

Our concerns are largely summarized by Mr. Allmon's letter, with the caveat that we intend to restrict our comments to landowner and well owner concerns only. However, SAWDF is also very concerned about the surface water issues raised by Environmental Stewardship.

We concur with Mr. Allmon's statement that ES's concerns with spring flow and aquifer discharge, and SAWDF's concerns with impacts on private property, are "competing interests, and the furtherance of one will often come at the expense of the other. Balancing these

[3] While that statement may seem to ignore the fees paid by water marketers to the groundwater district, landowners are justified in inquiring into how that money benefits them, especially when they realize the relative value of the water they stand to lose from under their property ---and from their property values! Bottom line, the comparison we have drawn here is a perfect example of the balancing of interests required in the DFC process.

interests is a value judgment, purposefully delegated to districts primarily responsible to their local electorates."

In this particular instance, however, the interests of the constituents of the two organizations are more alike than different or competing, because the two natural resources we all seek to protect ------surface water and aquifers ----are at risk, but have not been adequately considered.

SAWDF's challenge to the Lost Pines District

With all due respect, it doesn't take a lawyer, or even a hydrologist, to figure out there is something wrong with the picture you have painted –or the corner you have painted yourself into for future ---with your current proposed DFC.

You as a board, as well as individually, must be able to defend your decisions and your reasons for making them --- and then you have to live with the consequences to your future ability to adapt to changing conditions.

It is one thing to claim that you have the ability to cut back pumping when necessary, and quite another to allow maximum pumping by reverse-engineering your DFC, so that, hopefully, you never have to actually exercise your authority to regulate pumping, no matter the collateral damage to exempt wells and other landowners.

And we hope you are not just going through the motions when you hear from our two organizations, because we intend to defend *our* proposal for revising your proposed DFC.

At the same time, we challenge *you* to defend your decision to almost double the allowable drawdowns that are the currently expressed DFC, an action that

- *is not warranted under the Texas Water Code;*
- *is not warranted by demonstrable conditions on the ground in this district;*
- *will unreasonably impact natural resources, including aquifers and surface waters;*
- *will unreasonably affect private property rights;*
- *will have unreasonable socio-economic impacts on our local communities;*
- *will set precedent that will prevent the planning process from being the adaptive exercise it is meant to be, to allow effective management of groundwater;*
- *has nothing to do with an application of the best available science; and*
- *can only be explained as an apparent capitulation to threats of litigation by non-exempt pumpers, resulting in 100% protection for their projected drawdowns, and virtually zero*

(0%) protection for exempt well owners and other environmental, social and economic interests

The unreasonable socio-economic impacts and the unreasonable impacts on our aquifers are exposed by *data in two of the five GMA-12 districts that were not contemplated, and accordingly not considered in the prior DFC review.*[4]

SAWDF's past contribution to the current DFC review

In February 2021, SAWDF formally asked the GMA-12 districts to consider the impacts being suffered by wells in northeastern Lee County and in Burleson County, within six months of Vista Ridge's commencement of 60-years of water supply commitments to San Antonio from a cluster of Carrizo and Simsboro wells in Burleson County. The numbers of affected wells has grown since then, according to at least one well driller who works in both counties.[5]

SAWDF also joined in Environmental Stewardship's tandem request for formal consideration of unreasonable surface water impacts of that same pumping. Both organizations are of course also highly concerned about future impacts of at least three mega-groundwater projects planned for the Lost Pines district, and likely to be concentrated in Lee County. SAWS' and Alcoa's assertion of similarly large amounts of mega-water rights in Milam, Lee and Bastrop counties must also be considered.

Cumulatively, this is the situation that caused my reference to "painting yourselves into a corner" for the future.

The written comments submitted by SAWDF to GMA-12 are available here. Those comments were centered around these concepts:

> We urge [instead] a new mindset that could start with GMA-12 --- that we are not going to allow managed depletion (mining) of our aquifers, and that we will determine not only how much we want to pump but also how much we are determined to conserve.

[4] During the February GMA-12 meeting, my colleague and SAWDF board member Andy Wier had a dialogue with one of the general managers on GMA-12, who wanted to know if SAWDF's position is that no well should be damaged. In the course of that discussion, Andy simply asked GM Day of the Brazos Valley GCD whether his district's non-exempt projects supply water locally or for export, simply because Andy knew it was the former in BVGCD, and that in Lost Pines it is the latter. Mr. Day interjected that it doesn't matter because districts cannot "discriminate" against export projects. We accept that premise in the permitting process, but it is not discrimination to fully flesh out the Sec. 36.108 factors for the DFC process. BVGCD's locally-destined water projects tremendously benefit the socio-economic situation in Brazos and even Robertson counties, while the export projects that are permitted in the Post Oak GCD and the Lost Pines GCD are virtually 100% export projects. That means the water permanently leaves the aquifer, with the attendant managed depletion risks, and then permanently leaves the donor region, never to return in quantity or economic/social benefit.

[5] In addition to the obvious impairment of wells, there must be consideration of the diminished water levels generally, in the two formations in the near-term, and in other formations longer term.

> We must at least have two reference points at opposite ends of the spectrum if we are to find the "balance" between development and conservation that the Conservation Amendment to the Texas Constitution mandates... What we and our supporters want most, is for our state policymakers, legislators, and regulators to decide that ultimate sustainability requires that our natural resources remain resilient along the way --- that our aquifers can still spring back while they are being stressed by massive pumping. We understand that development will occur, but maintaining resiliency of natural resources assures that we are achieving sustainable development of natural resources.

The video of the February 2021 GMA-12 meeting, that includes SAWDF Director Andy Wier's commentary on his slides, may be found here.

Mr. Wier's slides were updated for GMA-12 in April 2021, after the member districts had summarily voted in March 2021 to almost double the drawdowns that are the expression of GMA-wide and district-specific Desired Future Conditions through the year 2070. Again, the revised slides and Mr. Wier's commentary on them appears in the GMA-12 video, here.

Lost Pines has a choice to make, and the opportunity to make it

For you as a board to conclude, as I at least inferred from statements made at GMA-12 and other indications, that you had "no choice" but to adopt these particular DFC is troubling enough. But if you also believe you cannot now review them for possible revisions, you would be patently wrong.

If that were the case, there would be no need for the planning process and most definitely no room for public participation --- and yet, Tex. Water Code Section 36.108 sets out multiple factors you must *document* that you have "considered" when you set the DFC every five years. Mr. Allmon sets out those factors, and I could not improve on his discussion of what you are statutorily required to do with those factors!

In short, the Water Code does not specify one single factor that overrides all others, thus giving you no choice but to consider *only* that factor as your "marching orders". But that is exactly what you have done.

Interestingly, you and the other members of GMA-12, *except the district where the 800-pound gorilla pumps for San Antonio,* seem all too eager to cave in to the gorilla's threats.

Only you can decide if you are carrying out your duties or whether, instead, you are making decisions for reasons that are not set out in the Water Code, thus, for the *wrong* reasons.

For example, fear of litigation is not even a factor you may consider, much less make the basis for your decision. Further, using the groundwater availability model (GAM) to actually *calculate*

the Desired Future Conditions rather than as a tool to inform and evaluate your deliberations on balanced DFC, is not warranted.

In the meantime, there is hard data related to factors of equal weight with those Vista Ridge is hanging over your head. We believe you have inappropriately considered them, or possibly totally ignored them.

At the end of this evening's meeting, we intend for you to:

- appreciate the gravity of the path you are traveling;
- be convinced that you are not using the best available science and are ignoring hard data in your planning work;
- be concerned you are knowingly setting up *your* local well owners and the Colorado River system for unreasonable impacts as a *direct result* of *your decisions;* and
- be concerned you are setting up a situation that will result in further imminent threats to, and confiscation of, private property within the district, without compensation.

We hope you realize that you should not just go through the motions tonight or for the remainder of the public process. Please consider Texas Water Code Section 36.108(d-2) when you hear our suggestions and recommendations. Section 36.108(d-2) reads in pertinent part*:*

> After the close of the public comment period, the district shall compile for consideration at the next joint planning meeting a summary of relevant comments received, any suggested revisions to the proposed desired future conditions, and the basis for the revisions.

We intend to offer our accumulated "relevant comments" and arguments in favor of them, to induce you to reject the proposed DFC. We urge you to submit credible revisions to the proposed DFC back to GMA-12 at the end of the public comment period this summer.

<u>SAWDF's challenges Lost Pines to fully inform its constituents</u>

In the meantime, we challenge you to follow our suggestions in the attached slides and provide useful and complete information to the public during the comment period.

We also continue to offer additional input, over and above this letter and our slides, that might prove helpful. SAWDF Director Andy Wier has more than once made this offer --- you need to take him up on it. I promise you, you will at least increase your credibility with your constituents!

If you have the discipline and diligence to get this done, you will have ample time to accomplish it before your January 2022 deadline.

Additional concerns expressed by landowners in the district

I have personally volunteered a lot of time to Lee and Bastrop counties' water issues since 1999, but I don't have a registered exempt well. However, many of my close, as well as distant neighbors do, and several have reached out to me for answers.

Some well owners apparently feel your general manager and hydrologist are not responsive, and do not appear to appreciate the level of concern in the community, or the magnitude of damages to exempt wells from the owners' perspectives.

You must keep in mind these well owners had no way of knowing that a well that had functioned just fine for years would suddenly be out of water. It is understandable they would want answers, when something as fundamental as water supply for valuable land and valuable improvements, acquired with their life savings, suddenly becomes insecure.

Some well owners with problems have worked with well drillers who are familiar with the situation in Burleson County, where the Post Oak Groundwater Conservation District's well assistance program leaders were calling for lowering pumps as much as 100 feet deeper than current drawdowns would require to get back in water. Not surprisingly, the level of anxiety rises with the level of uncertainty about how much additional drawdown will occur and how soon.

Of course, they are savvy enough to know what water means to the biggest investments of their lives. Now, because of their recent experience, they have become savvy enough to understand that the "average drawdowns" across the county to express the DFC are very misleading, depending on an exempt well's relative proximity to a mega-project like Vista Ridge. (More on that subject appears in our slides.)

What your proposed DFC may do, and in some cases *will* do, to their ability to continue on their land as planned, and to pursue livelihoods that are connected to land and dependent on groundwater, will be of great concern to an ever-growing number of landowners, especially in Lee County.

Well owners' most frequent questions include "Don't we have a groundwater district to handle this? Aren't they supposed to be protecting our local water supply? Why aren't we hearing from them ---and why didn't we hear from them before this happened and when we will find out what's going to happen next week or next year?" Currently, I don't have satisfactory answers for them, and you haven't offered any.

Once they began to realize what the Desired Future Conditions represent, and that you are proposing to one hundred percent protect non-exempt permits and zero percent protect many exempt domestic and livestock wells (and local groundwater levels generally), their questions

and viewpoints became a lot more pessimistic about their groundwater district's motives and methods.

But the comments I get are almost always tempered with concern for the future of our local aquifers, despite the perceived infringement of property rights and the financial burden some residents are experiencing.

Those are the dualities of interest that SAWDF as an organization shares with them --- the protection of both aquifers and private property rights --- because more often than not, those interests coincide.

And I also daresay there is not one landowner who wants to trade the health and future sustainability of an aquifer for money, i.e. mitigation.

They understand that local groundwater districts, as the state's preferred regulators of groundwater, have put them in the position of needing mitigation by allowing drawdowns that will otherwise consume their wells and deplete water levels for the foreseeable future, if not permanently. It is not difficult to interpret this as an admission by the districts that the aquifer is being "managed to depletion" (i.e. mined), rather than sustained.

They realize YOU are not figuring out where that breaking point between depletion and sustainability is, and that you are currently making no attempt to find the constitutionally-mandated balance between conservation and protection of resources, versus their development.

Ultimately, if not reversed, your actions rightly will be seen as taken for the wrong reasons; as instrumental in sacrificing resiliency and sustainability of a precious natural resource; and as promoting what should be an impermissible confiscation of their private property.

Bottom line, they don't want to hear you say you have no choice other than to protect mega-projects at the expense of the domestic and livestock wells upon which they depend. Deepening the allowable drawdown to accommodate full realization of mega-permits at the expense of local communities will simply be unacceptable.

<u>SAWDF's specific suggestions for district action</u>

We hope you will carefully consider the slides that accompany this letter. My colleague Andy Wier put together a different set of slides from those SAWDF previously provided to GMA-12.

He has put a lot of thought into what you might do to test your resolve – and, frankly, for you to test your constituents' *informed* reaction to your proposed DFC that accommodate no aquifer and no person, other than non-exempt permittees.

We hope we will have convinced you to not only address landowners' questions, but also to honestly re-focus on the proposed DFC and ask yourselves, and ask your staff and consultants, why you proposed them in the first place.

We recommend that your starting point be the realization that the GAM is not the appropriate tool to *calculate* Desired Future Conditions. The GAM does not make value judgments, nor is it capable of the discrete weighing of the §36.108 factors.

You must do that, it's your job to strive for the constitutionally mandated balance between conservation and development. It is one thing to be assisted by the GAM and the pumping files in *evaluating* the relative impacts, but using it to simply calculate one set of drawdowns based on only one factor is a ludicrous distortion of the requirements of the Water Code. In our opinion, misuse of a tool as important as the GAM is clearly not an application of the best available science.

We further suggest that the district apply our methodology of calculating the numbers of exempt wells that will be impacted by different GAM runs, because the numbers *will vary from run to run* (for example, the wells impacted under GAM Run S-3 will be fewer than under S-12.) This work is feasible and useful!

Again, SAWDF will volunteer to help your staff refine the methodology, which will give them data on many of the nine considerations. Then you as board members can more effectively balance the damage to exempt wells, groundwater property rights, rural economies, and surface water resources, against permitted pumping.

The lop-sided "see saw" in our Slide 4 illustrates the total absence of balance that will result if you persist in ignoring the other eight factors and consider only permitted production.

Please explain to the public why our proposal is not a logical and compelling adaptation of the planning process to assure you are using newly developed data, applying the best available science, and deliberately and carefully seeking the required balance.

<u>SAWDF is doing the district's work</u>

Lastly, I want to reiterate how much time and effort Director Wier has devoted to doing the district's work for you. You should take him up on his offer to help further --- but we also point out there is a tipping point where SAWDF's patience with this Board, to direct staff to aggressively pursue the nine considerations, will run out. SAWDF will simply produce the data and maps with the banner "This is what the Lost Pines district and GMA-12 do not want you to know!"

Frankly, there is more than one forum in which landowners may seek answers and hold someone accountable; however,. SAWDF will always seek a collaborative result in the best interests of all, including the district, if possible.

That is why SAWDF (through the Lee and Bastrop county landowners who volunteer on our board) asked to address you on your board agenda. For a long time, we have wanted to help open a dialogue between landowners, specifically exempt well owners, and the district.

Conclusion

Above all else, the greatest imperative now is for the district to reject the GMA-12 proposed Desired Future Conditions, due to the unreasonable impacts that will otherwise result from a process that does not incorporate a balanced consideration of all factors you are legally required to consider. We urge you to replace them with Desired Future Conditions that provide for*:*

- sustainable management of our aquifers,
- protection of exempt domestic and livestock wells, and
- maintaining the resilience of the Colorado River in times of drought.

Thank you for the opportunity to participate in tonight's meeting.

Respectfully submitted,

Michele G. Gangnes

cc w/encl.:
Judge Paul Fischer, Lee County
Judge Paul Pape, Bastrop County
Rep. John Cyrier
Sen. Lois Kolkhorst
Sen. Sarah Eckhardt

Comments to Lost Pines Groundwater Conservation District
Regarding Proposed Desired Future Conditions

August 18, 2021

Good evening President Talbot and board members. My name is Andy Wier. I am a resident of Bastrop County. I have a domestic water well in the Simsboro formation of the Carrizo Wilcox Aquifer. I am a member of the board of directors for the Simsboro Aquifer Water Defense Fund, SAWDF, and I am here tonight to ask the board to reject the proposed Desired Future Conditions.

SAWDF works to educate and organize landowners in defense of their groundwater rights. I have a 30-second video, that I hope, will help you to empathize with landowners and to better understand the immense role you play as the Lost Pines Groundwater Conservation District.

"Water Grab" [0:36] [https://youtu.be/Ku2Q81KzhIo]

LPGCD is all that stands between the "big straws" and landowners in Lee and Bastrop counties! The Texas Legislature has given you the duty to balance the production of groundwater for the state's needs, on one side, and the health of the aquifer & surface waters, and the rights of landowners to use and conserve the groundwater on the other side.

All the fresh water in Bastrop and Lee counties—municipal or domestic wells— comes from groundwater. The citizens in Bastrop and Lee counties are counting on you to reject the proposed DFCs, as demonstrated by the resolutions unanimously adopted by the Commissioners Courts in both Bastrop and Lee Counties.

The Post Oak Savanah Groundwater Conservation District will vote to reject the proposed DFCs and invites you and the other GMA-12 districts to re-engage in joint planning to address deficiencies in the proposed DFCs.

Over the last year you have heard me comment, on behalf of SAWDF, about how the proposed DFCs lack due diligence of the "nine considerations," despite stakeholder input, by SAWDF and Environmental Stewardship, that demonstrated how to investigate many of those considerations methodically and scientifically.

- Notably, Environmental Stewardship demonstrated that the proposed DFCs would reverse the relationship between the Colorado and the Carrizo-Wilcox from a "gaining stream" to a "losing stream." That is a change by which we all lose!

- SAWDF demonstrated that 71% of the domestic & livestock wells in the Carrizo formation will require mitigation and 7% will need to be re-drilled. That analysis was confirmed by the District and resulted in the mitigation program that you have endeavored to establish, to the tune of $500,000.

SAWDF asked that the District to use this same methodology to determine the number of domestic and livestock wells in other formations that will be negatively impacted by the proposed DFCs. The District has not done this evaluation. A conservative evaluation by SAWDF estimates that more than 600 domestic and livestock wells will be affected, at a cost of more than $2 million dollars to the District.

- What will be the impact on surface waters; i.e. springs and seeps, creeks and streams, and the Colorado and Brazos rivers? *You heard from a Lee County resident, last month, who noted that his spring has dried up for the first time in his memory.*
- What is the impact on the aquifer itself? *Earlier this year I presented evidence that water levels will fall below the top of some confined formations in the aquifer. I met online with President Talbot, Jim Totten and District Hydrologist Andy Donnelly to review the trends I noted.*
- What is the economic impact to Bastrop and Lee counties when livestock or irrigation wells run dry? *During the recent drought herds were cut dramatically.*
- What is the impact to land values and the resulting decline in county tax revenue? *This year saw the first appraisal protests based on the value of groundwater lost.*
- When you attended the DFC workshop last month, how many of the nine considerations were addressed?
- In the DFC packet you received, where are the nine considerations addressed?

The law requires you to investigate those questions and to be held accountable for the results. Will you take a sworn oath and say that you have done the due diligence necessary to adopt the proposed Desired Future Conditions? You will have to do so if the DFCs are formally challenged.

The only people losing water, right now, are landowners. Please think long and hard. Are you willing to swear you directed your staff to adequately assess the impacts on landowner property rights and damage to the aquifer and surface waters?

I urge you to reject the proposed DFCs because you will be hard pressed to “walk them back” in the next 5-year cycle of planning. The DFCs you adopt will be used by the Texas Water Development Board to generate Modelled Available Groundwater [MAG] estimates that are given to Regional Planning Groups and incorporated into the State Water Plan. Those numbers become the new demands you are asked to fulfill in the next round of planning. Please go slow.

Last, revising the proposed DFCs is feasible. SAWDF and Environmental Stewardship presented a new research paper, today, that will help the District and GMA-12 to fast-track revised DFCs that are based on:

- Sustainable management of the aquifers
- Resilience of the Colorado River during drought, and
- Protection of exempt wells and landowner property rights

Thank you.

APPENDIX X

GMA 12'S RESPONSES TO COMMENTS FOR POST OAK SAVANNAH GCD

3.0 POSGCD DFC COMMENTS RECEIVED – SUMMARY OF COMMENTS

POSGCD's public comment period on the proposed desired future conditions (DFCs) occurred from April 23, 2021 to July 23, 2021. On July 13, 2021 POSGCD conducted a Public Hearing for the for the purpose of receiving public comments on the proposed DFCs for the area aquifers that were recently adopted by Groundwater Management Area (GMA) 12 under §36.108, Texas Water Code. This section provides the public comments that POSGCD received during public comment period and responses to the public comments.

3.1 Comments Received during the Public Comment Period

POSGCD reviewed the public comments and identified 13 key issues. These 13 issues are provided in **Table 1**. Section 1.3 provides a copy of the comments received by POSGCD during the comment period. **Table 2** lists the public comments by entity and summaries their key points of concern. Section 1.2 provides responses to the public comments listed in Table 2.

Table 1 Key Issues Discussed in the Public Comments

ID	Description of Key Issue
1	Reject the DFCs (no reference to a specific aquifer)
2	Reject the DFCs for the Carrizo Wilcox Aquifer Group
3	Adopt DFCs protective of domestic wells/current landowners access to water
4	Adopt DFCs that are consistent with sustainability
5	Adopt DFCs that will not deplete streams and/or will protect streams
6	Adopt DFCs that balance production and conservation & protection
7	Current DFCs Designed to Allow Current Pumpers to continue unabated
8	DFC Process did not satisfy §TWC 36.108 (c) & TWC 36.108 (d)
9	Adopt DFCs that are based on DFC Run 3 for the Carrizo-Wilcox Aquifer
10	DFC impacts on Land Subsidence
11	Requirement to Include all Districts all Known Permitting and Production in GAM Run for Establish the Proposed DFCs

Table 2 Public Comments Received by POSGCD from April 23, 2021 to July 23, 2021

ID	Entity	Date in 2021	Recipient of Comments	Key Issues[1]
1	Environmental Stewardship	22-Jul	all five GCDs	1, 3, 4, 5, 6, 8, 9
2	Environmental Stewardship & Simsboro Aquifer Water Defense Fund	23-Jun	all five GCDs	2, 3, 4, 5, 6
3	Judith McGeary	21-Jul	all five GCDs	6,7
4	Pamela Hornby	23-Jul	POSGCD	1,3,,5
5	Pines and Prairies	13-Jul	POSGCD	3,5,6
6	Dianne Wassenich	23-Jul	POSGCD	1,3,4
7	Miriam Vaugh	25-May	POSGCD	1,3,4,5
8	Linda Adair[2]	24-Jun	POSGCD	10

[1] see Table 1 look up description of key issue associated with each number

[2] Linda Adair provided verbal comments during the POSGCD Board Meeting

3.2 Response to Comments

POSGCD has prepared responses to the public comment listed in Table 1. The comments are organized and presented in the order in which they are listed in the Table 1.

3.2.1 POSGCD Response to Public Comment Document #1 in Table 1

Mr. Steve Box and Mr. Andrew Wier provided written comments to all five GMA 12 groundwater conservation districts (GCDs) on July 22, 2021 on behalf of Environmental Stewardship (ES) and Simsboro Aquifer Water Defense Fund (SAWDF), respectively. In coordination with GMA 12, POSGCD reviewed the comments and has the following response:

In their email, Mr. Box and Mr. Wier propose that the DFC achieve a balance between conservation and development of ground water in perpetuity while protecting our aquifers as we found them and respecting the ownership rights of landowners. In addition, Mr. Box and Mr. Wier request that the DFCs be achieved in such a manner to produce the following three outcomes:

- Sustainable management of the aquifers (as described above, not just sustainable pumping),
- Maintain the resilience of the Colorado River to drought conditions by maintaining its gaining relationship with the aquifers, and
- Protection of exempt landowner domestic and livestock wells.

A considerable portion of the comment letter address how the DFCs affects the exchange between the flow in the Colorado River and the underlying aquifers. Because the Colorado River crosses through GMA 12 only in Bastrop County, POSGCD believes that Lost Pines Groundwater Conservation District is better suited to speak on behalf of GMA 12 about specific issues associated with the Colorado River. In regard to the potential importance of the DFC process, POSGCD believes that surface water - groundwater exchange is an important environmental issue. To help provide improve the science

associated with this issue, POSGCD has provided financial support to Lower Colorado River Authority field study of surface water-groundwater exchange on the Colorado River. To help understand the effect of pumping on surface water -groundwater exchange, POSGCD has helped prepared several GMA 12 discussions regarding surface water-groundwater exchange for both the Colorado River and the Brazos River.

Mr. Box and Mr. Wier request that sustainable management of the aquifers should be a DFC goal but they do not provide sufficient information and rationale for GMA 12 to evaluate whether the proposed DFCs support sustainable management. Moreover, they do not provide a working definition of sustainable management of the aquifer for GMA 12. GMA 12 developed their proposed DFCs to address the requirements in Chapter 36. Chapter 36 does not mention sustainable management as a consideration. Moreover, Chapter 36 requires the proposed DFCs to achieve a balance between conservation and production of groundwater. That balance may or may not be consistent with how Mr. Box and Mr. Wier would define the criteria that needs to be meet in order to achieve sustainable management. As a result of comments about sustainable management, POSGCD is currently working toward improving the science associated with developing and managing toward sustainable production. The comment letter suggests that the proposed DFCs do not adequately protect exempt landowner domestic and livestock wells. POSGCD agrees with several points in the comment letter and believes that POSGCD has made an honest and transparent effort in considering such impacts in setting its DFCs. For instance, as part of its Groundwater Assistance Program Annual Needs Reports, POSGCD evaluates the change in water level caused by future pumping scenario for every exempt well in the Sparta, Queen City, Carrizo, Calvert Bluff, Simsboro, and Hooper aquifers. In addition, POSGCD made several presentations as part of a unsuccessful campaign to have GMA 12 adopt a production rate in the Carrizo in the final GAM DFC run that was below the production rate used to establish the proposed DFCs.

3.2.2 POSGCD RESPONSE TO PUBLIC COMMENT DOCUMENT #2 IN TABLE 1

Mr. Steve Box and Mr. Andrew Wier provide written comments to all five GMA 12 GCDs on June 23, 2021 on behalf of ES and SAWDF, respectively. In coordination with GMA 12, POSGCD reviewed the comments and has the following response:

The comment letter reiterates the main points identified in Public Comment Document #1. POSGCD's response to these points are the same as those provided in Public Comment Document #1.

In addition, the Mr. Box and Mr. Wier stated that they observed "reverse engineering" of the DFCs by using production rates in the GAM Runs that were developed by Regional Water Planning Groups. First, no DFC Runs were based on production associated with Regional Planning Groups – the production rates associated with the majority of the DFCs runs were largely driven by considerations for either drawdown amounts or production associated with exempt and non-exempt pumping. With respect to developing its DFCs, POSGCD ardently argues that POSGCD has not "reversed engineered" its DFCs and supports its position by referring several POSGCD presentation to GMA 12 that provides a chronology of the POSGCD DFCs and explains the science and policies used to develop previous DFCs and the proposed DFCs.

3.2.3 POSGCD Response to Public Comment Document #3 in Table 1

Ms. Judith McGeary provided written comments to all five GMA 12 GCDs on July 21, 2021. In coordination with GMA 12, POSGCD reviewed the comments and has the following response:

In her email, Ms. McGeary states that, in proposing the DFCs, the GMA ignored the Chapter 36 requirement to balance production with conservation and preservation of our water resources and that the GMA did not consider the nine factors identified in TWC 36.108(d) and instead only looked at one consideration – what is needed to allow all current pumpers to pumping unabated. Throughout the entire DFC process, both POSGCD and the GMA were mindful of achieving the balance required by Chapter 36.108 (d-2) and considering the nine factors. POSGCD position paper in Appendix S discusses the presentation related to reducing pumping in the Carrizo Aquifer and LPGCD proposals to reduce proposed DFC for the Simsboro Aquifer is evidence that the GMA consider and worked towards achieving a balance between production and conservation. Evidence that the GMA consider the nine factors is the presentations and discussions that focused on the nine factors.

3.2.4 POSGCD Response to Public Comment Document #4 in Table 1

Ms. Pamela Hornby provided written comments to POSGCD on July 23, 2021. In coordination with GMA 12, POSGCD reviewed the comments and has the following response:

In her email, Ms. Hornby requests that POSGCD rejects the proposed DFCs and to develop a plan that will protect not only our groundwater, but also our communities, rivers, springs, & values of our properties. Ms. Hornby's request to reject the proposed DFCs for all eight aquifers consisted of a few sentences and did not provide rationale for doing so nor an alternative set of replacement DFCs. In regard to developing a plan to protect groundwater resources, POSGCD is continually revising their rules, management strategies, and programs to provide prudent management and stewardship of the districts groundwater resources outside its GMA 12 activities. We encourage Ms. Hornby to become engage in future public POSGCD meetings.

3.2.5 POSGCD Response to Public Comment Document #5 in Table 1

Ms. Melanie Pavlas provided written comments to POSGCD on July 13, 2021 on behalf of Pines and Prairies Land Trust. In coordination with GMA 12, POSGCD reviewed the comments and has the following response:

In her email, Ms. Pavlas requests that POSGCD reject the proposed DFCs. Among her rationale for the request is that the proposed DFCs protect only permit holders — the big pumpers — by allowing them to pump to the limits of their permits, while local domestic and livestock wells are left high and dry. Information provided POSGCD clearly shows that the POSGCD proposed DFCs were based on production rates that are considerably less than the current permit amounts in the two most productive aquifers. In GMA Run S-12, the Carrizo production rate in 2070 for POSGCD is 84% of current permits and the Simsboro production is 2070 for POSGCD is 76% of current permits. In addition, none of the DFC GAM simulation indicated a threat to the groundwater supply for domestic wells before 2070. Another reason

that Ms. Pavlas cites for rejecting the DFCs is that the proposed DFCs will deprive our surface water systems of the inflows from aquifers that they depend on. However, Ms. Pavlas does not provide any data or calculations to support her conclusion. Ms. Pavlas also states that the proposed DFCs unreasonably impacts our aquifers without defining the meaning or unreasonable impacts. Throughout the DFC process both POSGCD and GMA 12 remained cognizant of the need to provide a balance between groundwater conservation and production and we believe that we have achieved such a balance.

3.2.6 POSGCD Response to Public Comment Document #6 in Table 1

Ms. Dianne Wassenich provided written comments to POSGCD on July 23, 2021. In coordination with GMA 12, POSGCD reviewed the comments and has the following response:

In her email, Ms. Wassenich requests that POSGCD reject the proposed DFCs and to develop DFCs in a way that is sustainable, protects domestic wells and the Colorado River, and achieves a balance of uses and protections of groundwater and surface water connected to the groundwater. With the exception to the protection of the Colorado River, Ms. Wassenich requests are aligned with the goals set forth in POSGCD position paper in Appendix S. The Colorado River crosses through GMA 12 in Bastrop County; thus, the protection of the Colorado is dependent on the DFCs that lie outside of POSGCD authority. POSGCD believes that the DFCs are sustainable but that the production associated with achieve the DFCs in 2070 may not be sustainable after 2070. POSGCD is currently working toward improving the science associated with developing and managing toward sustainable production.

3.2.7 POSGCD Response to Public Comment Document #7 in Table 1

Ms. Linda Adair provided verbal comments during a POSGCD Board meeting on June 24, 2021. In coordination with GMA 12, POSGCD reviewed the comments and has the following response:

During the POSGCD Board meeting, Ms. Adair expressed concerns about land subsidence in response to the lowering of groundwater pressure caused by pumping. During the meeting, Mr. Westbrook explained that GMA 12 had a presentation on the potential for land subsidence and her concerns had by addressed. He also mentioned that because land subsidence was not a agenda item it could not be discussed in this Board meeting.

3.3 Public Comment Document

The public comments are provided in the order as listed in Table 1.

3.3.1 PUBLIC COMMENT DOCUMENT #1 IN TABLE 1 (12 PAGES)

Proposed Desired Future Condition(s) for Aquifer(s) in GMA 12

Environmental Stewardship
Comments To District Boards
Submitted July 22, 2021

From:
Steve Box, Executive Director
Environmental Stewardship
P.O. Box 1423, Bastrop, TX 78602
512-300-6609
Executive.Director@envstewardship.org

To:
Brazos Valley GCD Board of Directors
Fayette County GCD Board of Directors
Lost Pines GCD Board of Directors
Mid-East Texas GCD Board of Directors
Post Oak Savannah GCD Board of Directors

Dear Board of Directors,

I want to thank you for allowing us the opportunity to share our concerns about the Proposed Desired Future Conditions with you. Environmental Stewardship's primary concerns relate to the predicted impacts of the new Proposed DFCs based on Run S-12 on surface waters as compared to the predicted impacts of the Currently Adopted DFCs on the Colorado River. Our second concern, which is addressed by the Simsboro Aquifer Water Defense Fund (SAWDF), is the impact of the, now active, Vista Ridge pumping on exempt domestic and irrigation wells in Burleson and Lee Counties. Landowners have, within six months of the initiated pumping, been experiencing damage to their wells.

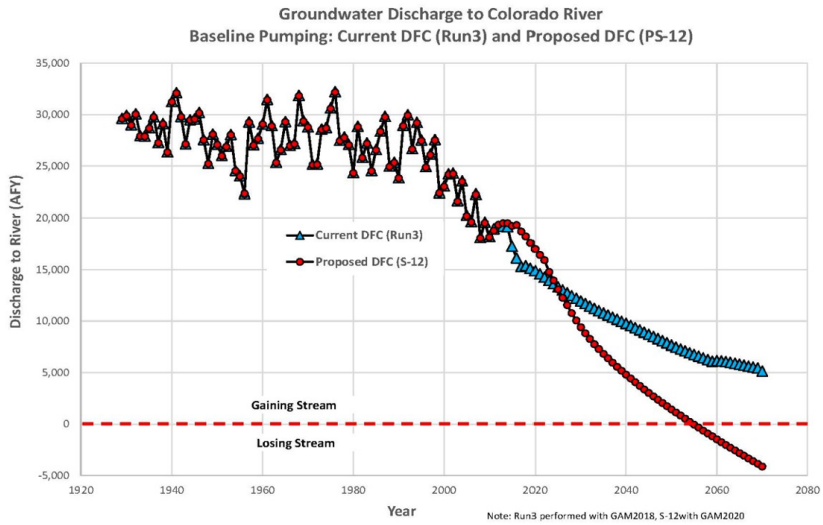
When domestic wells are being impacted in this manner, the aquifers that supply water to these wells are likewise being impacted. Furthermore, the negative impact of this current pumping, along with proposed permitted pumping, stems from the same hydrological conditions that impact outflows of groundwater to surface waters such as the Colorado and Brazos rivers and their tributaries. As such, it is incumbent on the districts to take adaptive management actions to remedy this situation rather than to approve very significant increase in the amount of pumping without understanding the nature of the fundamental problems that exist.

Our over-arching concern relates to the GMA-12 management policies that have rapidly evolved over the last 9 months. These policies, which are imbedded in the Proposed DFCs, will have serious immediate and future consequences on management policies within the joint-planning process. Such policies should help all the districts manage the development of the aquifers in a way that is sustainable, and balances pumping against the conservation and protection of surface waters and aquifers, while retaining their ability to curtail (slow down pumping) when the damage is imminent **Most urgently, the impact of changes in management policies that have a negative impact on the ability of Districts to curtail pumping need to be resolved, and agreed by the districts, prior to new DFCs being adopted.**

It is for these reasons that we respectfully ask that your Board reject the Proposed DFCs and remand them back to the GMA for revision.

IMPACT OF PUMPING ON OUTFLOWS TO MAIN STEM COLORADO RIVER

Adopted 2017 DFCs vs. Proposed DFCs:



Predicted reduction of discharge of groundwater into the mainstream Colorado River due to Current DFC Run 3 and Proposed DFCs S-12 (George Rice, New GAMs).

This graphic represents the impacts that are predicted by the new GAM. The graph shows the relationship between the pumping associated with each DFC and the impact on outflows to the Colorado River

- Blue is the Currently Adopted 2017 DFCs as depicted by Run 3 using the NEW GAM.
- Red is the Proposed DFCs based on Scenario S-12.
- The Historical Calibration period is from 1930 to 1995
- The Developmental Period is 1995-2070
- Gaining Stream vs Losing Stream Redline

Comparing the two runs we see that the greater the amount of groundwater being pumped, the greater the reduction in discharge from the aquifers to the main stem of the Colorado River. This trend toward reversing the groundwater-surface water relationship over the next 50 years is undisputed. This is an example of how the model serves to demonstrate the difference between these two runs, in this case the two DFCs. The key difference is that the Current DFCs do not cause the relationship between the river and the aquifer to reverse, whereas the S-12 Scenario causes the river to change from a gaining to a losing stream somewhere in the 2050-60 timeframe.

IMPACT OF PUMPING
ON OUTFLOWS TO MAIN STEM COLORADO RIVER

Discharge to Colorado River - AFY (1)				
Year	Pre-Development	Early Pumping	Current DFC	Proposed S-12
1930	29,600			
1995	27,500			
2011		18,700		
2070			5,150	-4,100
Change from 1930	**-2,100**	**-8,800**	**-22,350**	**-31,600**
	-7%	**-37%**	**-83%**	**-114%**

(1) Data From Rice Current vs Proposed DFC Graph

This table gives a quantitative view of the predictions from an historic perspective. It is very clear that the early pumping -- from around 1995 to 2011 -- caused considerable impact on the river; about a 37% decline in discharge to the Colorado River compared to 1930. Following that early unregulated pumping time period is the Current DFC time period. This is the regulated joint-planning phase where desired future conditions are being established. **In the currently adopted DFCs column the predicted decrease in discharges to the Colorado River is whopping *83% less discharge* than the historical outflows.**

In the Proposed DFCs column, the predicted decrease in discharge is an additional 31% more that the Current DFCs. This results in a devastating *114% less discharge than historic flows and reverses the relationship between the river and the aquifers.*

- Whereas the quantity of pumping in the 2017 adopted DFCs is predicted to cause a significant decrease in outflows to the river; an impact that may be unreasonable in-and-of itself,
- The Proposed DFCs are predicted to decrease outflow to the point that the Colorado River LOSES water to the aquifers. **This is an impact that Environmental Stewardship sees as a *bright line between what is reasonable and what is unreasonable.***

Hydrologically, this is a complete reversal in the flow of groundwater and surface water relationship. At this point the river starts contributing water to the aquifer on an on-going basis. This sets up hydrological conditions for the RIVER could go dry during drought periods. But more certainly, it sets up condition where the river will lose its biological and ecological resilience that enables it to bounce back to being an ecologically sound environment after a serious drought.

The Proposed DFCs based on Scenario Run S-12 cross the bright line and are unreasonable.

At the December 2020 GMA-12 meeting, Environmental Stewardship provided the GMA Representatives with the results of an analysis of the impacts of current and proposed pumping on the Colorado River from the perspective a surface water scientist - Joe Trungale – using surface water modeling techniques. Mr. Truangale used the environmental flow standards as a means of evaluating the impact of reduce groundwater discharges to the Colorado River.

This evaluation also predicted unreasonable impact of groundwater pumping on the Colorado River.

Senate Bill 3, the basis for the environmental flow standards, established that maintaining the biological soundness of the state's surface waters is of great importance to the economic health and general well-being of Texans.

In summary:

- The Colorado River at Bastrop and below is fully appropriated to surface water right holders. As such, ***any decrease in flow due to reduced groundwater discharge will negatively impact these permit holders.***

- ***Such reductions in flow also impact the ecological health of the river and its ability to recover from drought conditions***. As you might recall, the lower Colorado basin was intensively studied during the LCRA/SAWS project by many different scientists and engineers. These were major studies making this basin one of the most studied basins in the State. Based on these studies instream flow standards were set at several gages on the river – including Bastrop. The intent is that these standards be maintained at recommended frequencies year round.

- These standards are not being met at recommended frequencies, and ***any reduction in flow due to groundwater pumping will likely result in future reductions in these frequencies, damaging the ecology of the river. Such damage to the ecology of the river is a trend in the wrong direction, and we consider this to be an unreasonable impact.***

Environmental Stewardship has demonstrated, from a groundwater availability perspective and from a surface water availability perspective, that the predicted pumping will likely result in *unreasonable* impacts to the Colorado River. Certainly, the Proposed S-12 DFCs cross the line into unreasonable territory and should be *rejected.* If not outright rejected, the potential of unreasonable harm must be recognized and dealt with.

As such, it is our view that the only reasonable option is to r*eject* the Proposed DFCs and *remand* the process back to the GMA Representatives to develop DFCs using the Currently Adopted DFCs as the basis for setting DFCs that are not predicted to cross this hydrologically and ecologically unreasonable line of impact.

II. MANAGEMENT POLICIES AND PRACTICES: THE ROLE OF NON-EXMEPT PUMPING IN DEVELOPMENT OF DESIRED FUTURE CONDITIONS

Management policies and practices are in a state of flux in Groundwater Management Area 12. Joint planning among districts is supposed to help all of the districts manage the development of the aquifers in a way that balances pumping against the conservation and protection of aquifers, while retaining their ability to curtail (slow down pumping) when the damage is imminent However, the standards for developing desired future conditions in GMA-12 are changing, yet there is no agreement between the District Representatives on the changes. As a result, the representatives from four of the districts have imposed their will on the fifth district rather than reaching a workable and agreeable

resolution of the issues involved. Certainly, this does not help all of the districts achieve the joint planning objectives.

Per the Texas Water Code, joint planning among districts is supposed to help all of the districts accomplish their *individual* management goals, as reflected in their management plans. Stated another way, the Code does not require "GMA-12" --- which TWDB does not consider to be a legal entity --- to be the tail that wags the dog. Instead, it is the other way around.

The Code directs that the district representatives, as a joint planning body only, are to *consider the effectiveness of the individual district management plans for conserving and protecting groundwater and preventing waste.* They are to do this by considering how the *individual district's management goals achieve that district's desired future conditions, how those DFCs impact on planning throughout the management area, and how effective these measures in the management area generally*[1]. **Groundwater districts, not groundwater management areas, are the state's preferred regulatory managers of groundwater.**

Unfortunately, in this round of joint planning, an important concept has been overlooked, leading to an *error* that is embedded in the Proposed DFCs based on pumping file S-12.

In this round of joint planning in GMA-12, it was inappropriate for the districts, as a group, to require that the member districts take a uniform approach across all the districts to the pumping file -- the file upon which the desired future conditions are based. Each district is entitled to respond to its electorate to adopt its own pumping and curtailment strategy[2]. So, the pumping file for each district should reflect its own approach. It makes perfect sense to be different from one district to another, just as aquifer conditions, aquifer demands, and local impacts may differ widely.

Using different strategies (assumptions) for the different pumping files for different districts is what the law commands, to be respectful of districts as the *local* groundwater management entities. **Nothing about participating in a GMA is intended to undermine the autonomy of each district.**

Certainly, this includes the ability for all of the districts to balance pumping against conservation while retaining their ability to curtail (slow down pumping) when damage is imminent. Instead, the GMA districts voted to have each district's DFCs conform to a single pumping file configuration, and that configuration is embedded in S-12.

An important policy discussion took place at the March 18 meeting of the GMA-12 District Representatives leading to a 4-1 vote on the new Proposed DFCs. The representatives took up a discussion of the controversial GAM Run S-12 and whether to use it as the base run for the proposed DFCs. Much of the controversy over the appropriate pumping file to be used was sparked by a November 10, 2020, threatening letter from Paul M. Terrill III[3] to Gary Westbrook regarding Blue Water Vista Ridge Desired Future Conditions.

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[1] Texas Water Code, Chapter 36.108(c)(1-4)

[2] EAA v Day, p 30. While districts have broad statutory authority,[109] their activities remain under the local electorate's supervision.[110] Groundwater conservation districts have little supervision beyond the local level. Districts are also required to participate in joint planning within designated groundwater management areas ("GMAs").[113]

[3] Terrill III, Paul M., November 10, 2020, to Gary Westbrook, General Manager, Post Oak Savannah GCD re: Blue Water Vista Ridge – Desired Future Conditions. https://www.environmental-stewardship.org/wp-content/uploads/2021/04/JamesBeneBluewaterComments_2020-11-10-BWVR-to-POSGCD-re-DFCs.pdf

After discussion they voted to use the S-12 model that was favored by 4 of the 5 District Representative. Post Oak GCD, the District that received the letter, voted against the S-12 pumping file. Though the subject had been discussed during several of the previous meetings, below is a summary of the 33 minute discussion during the March 18, 2021, meeting. And here is a link to a video of the discussion so you can hear it "live" if you prefer; jump to time 8:20 in the video.

In his plea to maintain Post Oak's manage policy, Mr. Westbrook, told the other District Representatives, "**This is management we have had in place for over a decade that we believe tracks our mission statement considering conservation is important while recognizing that property rights are important.**

We also recognize the balance that is required in considering the property rights of those who wish to produce as well as the property rights of those who wish to conserve for the future. We are very very adamant about our belief that when we are required, at the GMA level, to consider all nine factors, that we believe our approach does give more consideration to conservation than just putting everything in a pumping file and rolling forward.

We respectfully request that you allow us to manage the Carrizo as we have always desired. Once we set the precedent, and I believe this would be a precedent, it will be hard to undo. If our DFC is raised so much higher, then really, we won't be able to do any management. You can't curtail until you approach those desired future conditions because these [new] DFCs would have to be allowed.

By law you can't go past them, but you have to allow them. And so that is the whole point to the challenge of this pumping file issue, is that once we determine that this is the file that is going to be used, then **the [new] number that comes back is 178 ft of drawdown. And so now, another 100 wells have to be mitigated. So that is another social-economic impact to landowners, and that is the balance we are trying to achieve, but we can't achieve it if you force us into that 18,000 acre-feet per year [S-12] pumping file. The last round [desired future condition] was not 18,000 acre-feet per year in the Carrizo but was a much smaller number [7,000 acre-feet per year per Steve Young."]**

Environmental Stewardship has verified, through direct observation of the values in the pumping file associated with the currently adopted DFCs, that Post Oak Savannah's pumping from the Carrizo Aquifer was as listed in the following table.

Pumping from the Carrizo Aquifer (AFY)
Post Oak Savannah GCD

Year	DFCRun3	S-12
2020	4706	11,191
2040	6119	17,459
2070	7060	18,158

Per George Rice, 4/12/2021

In the vote that followed the above discussion, the four districts that were concerned about being drawn into a lawsuit if Blue Water sued Post Oak, forced their will on Post Oak Savannah GCD. In doing so, they essentially eliminated Post Oak's ability to curtail the Vista Ridge project even though, after only about six months of pumping at the higher withdrawal rate, dozens of landowner's domestic wells in Burleson and Lee Counties are being damaged, costing 10's of thousands of dollars to repair.

Worse, the damage to the aquifers in these counties continues, and will continue, for many decades unless the Proposed DFCs are rejected and revised.

When domestic wells are being impacted in this manner, the aquifers that supply water to these wells are likewise being impacted. Likewise, the negative impact of this current pumping, along with proposed permitted pumping, stems from the same hydrological conditions that impact outflows of groundwater to surface waters such as the Colorado and Brazos rivers. As such, it is incumbent on the districts to protect these resources by taking adaptive management actions to remedy this situation rather than to approve double the amount of pumping without understanding the nature of the fundamental problems that exist.

The over-arching concern is the unresolved management policies that have rapidly evolved within the jurisdiction of the five groundwater conservation districts, over the last 9 months. These policies, reflected in the Proposed DFCs, will have serious immediate and future consequences on management policies within the joint-planning process. Most urgently, the impact of changes in management policies that have a direct negative impact on the ability of Districts to manage curtailment of pumping when the DFCs are exceeded need to be resolved and agreed policies adopted before future DFCs are adopted. As such it is imperative that the Proposed S-12 DFCs are rejected and sent back to the GMA for revisions.

Since much of what drove the decision and decision to force Post Oak GCD to use the S-12 GAM run was the threats of litigation, Environmental Stewardship requested that its legal counselor, Eric Allmon, prepare a letter on the role of non-exempt pumping in the development of desired future conditions. The main point of the letter is to address the issue of the threats of litigation that seem to be driving the position by some that the DFCs must include 100% of all permitted pumping in order to avoid litigation. Mr. Allmon lays out the legal framework and court findings that support the position that the DFCs must *balance* conservation and protection of the aquifers and the 9 factors required to be considered against development in order to sustain the DFCs against litigation by water marketers and others.

We encourage you to read Mr. Allmon's letter[4] and take it to heart as you deliberate on the adoption of DFCs. This brief was provided to all of the GMA-12 District Representatives and their respective Board of Directors on June 3, 2021.

III. OUR REQUEST

We are asking you, as the Board of Directors in your respective Districts to *reject* these Proposed DFCs in favor of DFCs based on:

- **sustainable management of the aquifers,**
- **maintaining the resilience of the Colorado River to drought, and**
- **protection of exempt landowner domestic and livestock wells.**

It is important that you recognize that there is plenty of time to revise the DFCs. In fact, the statutes mandate revisions based on public comments. The GMA has until January 5, 2022, to make and submit revisions. We are requesting that the revisions be based on Scenario Run S-3 which represents the currently adopted DFCs. In this scenario, the pumping file from the old GAM was modified slightly to be able to be run on the new GAM. The following section provides information on our expectations regarding revisions to the DFCs.

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[4] Allmon, Eric, Perales, Allmon & Ice, P.C. June 3, 2021. Initially addressed to Sidney Youngblood, President, Post Oak Savannah GCD, and provided to all District Boards by email from Elena M. Solimano, on the same date. https://www.environmental-stewardship.org/wp-content/uploads/2021/05/2021.06.03-ES-DFC-Letter.pdf

IV. RECOMMENDATIONS FOR REVISING DFCs

In a *resilient* sustainability model that takes into consideration the ecology of the region, the amount of groundwater that can be pumped must be greater than or equal to the amount required to meet both human and environmental needs for the foreseeable future. As such, a major consideration is to determine the amount of groundwater and surface water needed to sustain both human demands and environmental health[5]. Based on this total demand, the amount of groundwater that can be *sustainably pumped* must be such that the surface waters are also conserved and protected while also protecting the property rights of exempt domestic wells. Modeling consistently demonstrates that the majority of the groundwater pumped originates as surface water. Only a minor portion of the water pumped is sourced from groundwater storage.

Proposed Desired Future Condition(s):

Guiding Principles:

In conformance with the Conservation Amendment of the Texas Constitution, it is the duty of Groundwater Conservation Districts to conserve and preserve the natural resources of the state -- our groundwater, our rivers, our springs, and our bays ... our ecosystems — by passing laws, rules, and for the purposes of this effort, adopting desired future conditions, that achieve a balance between conservation and development of those resources *in perpetuity*. To protect our aquifers as we found them while respecting the ownership rights of landowners.

Though the ability to preserve an aquifer for future generations is not totally in our control — its rate of replenishment, and its hydrologic characteristics, are largely a function of Mother Nature and must be accepted and respected — development of an aquifer, and ultimate depletion of an aquifer and/or the surface water and ecosystems which depend on groundwater, *is the voluntary human action in which we are currently engaged.*

The essence of conservation and preservation of an aquifer resource is that the rate at which we deplete our aquifers must be in balance with the protection of the aquifer and its associated surface waters. That the depletion is not driven only by the desire for development, against which we simply wait for damage to the ecosystem's sustainability before attempting to bring it back "in balance". Only when a definite "conservation standard" describing a sustainable ecosystem is established — an ecosystem that is preserved in perpetuity — can we then determine how much of that aquifer we can develop in balance with the conservation standard.

Since the inception of the DFC joint planning process, GMA-12 has always started by exploring the production-side of the balance bar. ES and SAWDF request that GMA-12 begin the next joint planning process by exploring conservation and protection of the existing ecosystem *for the common good of future generations.*

[5] A sound ecological environment as defined in Senate Bill 3.

As a practical matter, GMA-12 should use the best science available, along with the GAM, to predict the amount of groundwater that can be continuously pumped over many centuries[6] without damaging the surface waters from which much of the water pumped is ultimately sourced[7]. In modeling these conditions, GMA-12 is required to fully consider the nine (9) items prescribed by the legislature while seeking to satisfy the mandate to maximize groundwater pumping to the extent possible while *balancing* the development of the groundwater resources against the requirement to conserve and protect.

ES & SAWDF Request:

When we next review and adopt DFCs, Environmental Stewardship and SAWDF will be requesting that the DFCs be revised in such a way to be based on the following three criteria:

1. Sustainable management of the aquifers (as described above, not just sustainable pumping),
2. Maintain the resilience of the Colorado River to drought conditions by maintaining its gaining relationship with the aquifers, and
3. Protection of exempt landowner domestic and livestock wells.

As a starting point, ES & SAWDF are requesting that the GMA representatives make a GAM Run using S-3 pumping file and the methodology recently used by neighboring GMA-11 to establish a baseline for additional modeling. In the GMA-11 process, the results of a base simulation (Technical Memorandum 20-05[8]) was developed for the purpose. Based on the baseline and a desire to provide a steady pumping rate for use in regional water planning, GMA 11 ran an additional set of simulations that resulted in a constant pumping scenario for each county-river basin-aquifer unit in GMA 11. Technical Memorandum 21-01[9] Draft 2 reports on the development and results of the 33 iterations used to reach a constant pumping scenario[10] that would be expected to be sustained[11] if the model were

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[6] TWDB used a 500-year time to estimate the maximum sustainable pumping level for the first adopted 2011 DFCs. June 13, 2012. Memorandum to TWD Board of Directors. SUBJECT: Briefing, discussion, and possible action on appeals of the reasonableness of the Desired Future Conditions adopted by the groundwater conservation districts in Groundwater Management Area 12 for the Sparta, Queen City, Carrizo-Wilcox, Calvert Bluff, Simsboro, Hooper, Yegua-Jackson, and Brazos River Alluvium aquifers, page 17.

[7] GMA-11 Explanatory Report cited herein predicts that 72% of the groundwater pumped will ultimately come from surface water sources (alluvium) .

[8] Hutchison, William R, Ph.D., P.E., P.G. December 30, 2020. GMA 11 Technical Memorandum 20-05. Base Simulation for Joint Planning with Updated Groundwater Availability Model for the Sparta, Queen City, and Carrizo-Wilcox Aquifers

[9] Hutchison, William R, Ph.D., P.E., P.G. February 28, 2021. GMA 11 Technical Memorandum 21-01Draft 2. March 4, 2021. Adjusted Pumping Simulations for Joint Planning with Updated Groundwater Availability Model for the Sparta, Queen City, and Carrizo-Wilcox Aquifers.

[10] Note: This scenario did not include the protection of surface waters and resulted in a pumping quantity that sources 54% of the water from surface waters (Induced inflow from the alluvium). The final proposed DFCs sources 72% of the pumped water from surface waters.

[11] Per Hutchison: The result of the simulations is constant pumping from 2014 to 2080. Tables 2, 3, and 4 of the Tech Memo 21-01 show it tabular form (the last two columns show the results of Scenario 33) for each county-aquifer unit. This is in contrast to the Base Scenario that has several instances of pumping reductions from 2014 to 2070. Maybe your definition of "sustainable" pumping and my use of "constant" pumping are not the same thing. My definition of constant pumping is simply 2014 to 2080 as simulated for the joint planning process. Based on the model results, I believe that this level of pumping would remain unchanged if I kept running the model, although I have not actually run the model beyond 2080. There is no specific reason I can think of that would suddenly cause the pumping rate to drop if the model was run for any number of years.

run for a longer period of time. The process is discussed in GMA-11's Explanatory Report (Draft 2)[12]. All these GMA-11 documents are available on its public information[13] Google Drive.

To accomplish the objectives in criteria1 and 2 above -- sustainable manage while protecting the resilience of surface water through a drought of record and establish a conservation bookend -- different limitation would be placed on GAM Run 3. Rather than keeping pumping steady through the planning periods, as was done in GMA-11 to meet its objective, outflows to surface waters would be held constant at the 2011outflow rate[14] throughout the planning period by adjusting pumping in the districts. This will establish a conservation bookend to be used in balancing conservation and development relative to consideration #4 as DFCs are developed.

To accomplish the objective in criteria 3 above -- a methodology will need to be developed that estimate impacts on shallow domestic wells that places additional limitation on GAM Run 3.

[12] Hutchison, William R, Ph.D., P.E., P.G. February 28, 2021. Desired Future Condition Explanatory Report (Draft 2) Carrizo-Wilcox/Queen City/Sparta Aquifers for Groundwater Management Area 11.

[13] GMA-11 public information google drive
https://drive.google.com/drive/folders/1ronw7ke38_lU4BHGEHbQQ0j9D7fYmFr?usp=sharing

[14] A gaining relationship to the aquifers.

Proposed AQUIFER DFCs and Measuring/Calculating Method

Please be as detailed as possible in describing your proposed DFC. Include the quantifiable value and a description of the method for measuring or calculating the value. Attach additional pages as needed.

Aquifer	Proposed DFC and Measuring/Calculating Method
Carrizo Aquifer	ES requests that the districts develop DFCs based on DFC Run 3 (New GAM) that are sustainable with respect to long-term management of the aquifer where the amount of pumping, whether or not permitted, is determined by a process that protects surface waters and exempt domestic wells.
Calvert Bluff Aquifer	ES requests that the districts develop DFCs based on DFC Run 3 (New GAM) that are sustainable with respect to long-term management of the aquifer where the amount of pumping, whether or not permitted, is determined by a process that protects surface waters and exempt domestic wells.
Simsboro Aquifer	ES requests that the districts develop DFCs based on DFC Run 3 (New GAM) that are sustainable with respect to long-term management of the aquifer where the amount of pumping, whether or not permitted, is determined by a process that protects surface waters and exempt domestic wells.
Hooper Aquifer	ES requests that the districts develop DFCs based on DFC Run 3 (New GAM) that are sustainable with respect to long-term management of the aquifer where the amount of pumping, whether or not permitted, is determined by a process that protects surface waters and exempt domestic wells.
Queen City Aquifer	
Sparta Aquifer	
Yegua-Jackson Aquifer	
Brazos Alluvium Aquifer	
Colorado Alluvium Aquifer	ES requests that the districts initiate the development of DFCs for this aquifer in anticipation of adopting such DFCs during the next planning cycle.

Consideration of Proposed Desired Future Condition(s)

The Texas Water Code requires that the GMA develop DFCs that "provide a balance between the highest practicable level of groundwater production and the conservation, preservation, protection, recharging, and prevention of waste of groundwater and control of subsidence in the management area." In the space below, or on additional attached pages, please provide your considerations with regard to the nine items that must be considered, per the Texas Water Code, for the proposed DFC(s).

CONSIDERATION 4 – "Other environmental impacts, including impacts on spring flow and other interactions between groundwater and surface water:"

Please see introductory letter to GMA-12 Representatives.

CONSIDERATION 7 – "The impact on the interests and rights in private property, including ownership and the rights of management area landowners and their lessees and assigns in groundwater:"

Please see introductory letter to GMA-12 Representatives.

3.3.2 PUBLIC COMMENT #2 DOCUMENT IN TABLE 2 (5 PAGES)

Proposed Desired Future Condition(s):

In conformance with the Conservation Amendment of the Texas Constitution, it is the duty of Groundwater Conservation Districts to conserve and preserve the natural resources of the state -- our groundwater, our rivers, our springs, and our bays ... our ecosystems — by passing laws, rules, and for the purposes of this effort, adopting desired future conditions, that achieve a balance between conservation and development of those resources *in perpetuity*. To protect our aquifers as we found them while respecting the ownership rights of landowners.

Though the ability to preserve an aquifer for future generations is not totally in our control — its rate of replenishment, and its hydrologic characteristics, are largely a function of Mother Nature and must be accepted and respected — development of an aquifer, and ultimate depletion of an aquifer and/or the surface water and ecosystems which depend on groundwater, *is the voluntary human action in which we are currently engaged.*

The essence of conservation and preservation of an aquifer resource is that the rate at which we deplete our aquifers must be in balance with the protection of the aquifer and its associated surface waters. That the depletion is not driven only by the desire for development, against which we simply wait for damage to the ecosystem's sustainability before attempting to bring it back "in balance". Only when a definite "conservation standard" describing a sustainable ecosystem is established — an ecosystem that is preserved in perpetuity — can we then determine how much of that aquifer we can develop in balance with the conservation standard.

Since the inception of the DFC joint planning process, GMA-12 has always started by exploring the production-side of the balance bar. ES and SAWDF request that GMA-12 begin the next joint planning process by exploring conservation and protection of the existing ecosystem *for the common good of future generations.*

As a practical matter, GMA-12 should use the best science available, along with the GAM, to predict the amount of groundwater that can be continuously pumped over many centuries[2] without damaging the surface waters from which much of the water pumped is ultimately sourced[3]. In modeling these conditions, GMA-12 is required to fully consider the nine (9) items prescribed by the legislature while seeking to satisfy the mandate to maximize groundwater pumping to the extent possible while *balancing* the development of the groundwater resources against the requirement to conserve and protect.

So, where do we go from here?

ES & SAWDF Request:

When we next review and adopt DFCs, Environmental Stewardship and SAWDF will be requesting that the DFCs be revised in such a way to be based on the following three criteria:

1. Sustainable management of the aquifers (as described above, not just sustainable pumping),
2. Maintain the resilience of the Colorado River to drought conditions by maintaining its gaining relationship with the aquifers, and
3. Protection of exempt landowner domestic and livestock wells.

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[2] TWDB used a 500-year time to estimate the maximum sustainable pumping level for the first adopted 2011 DFCs. June 13, 2012. Memorandum to TWD Board of Directors. SUBJECT: Briefing, discussion, and possible action on appeals of the reasonableness of the Desired Future Conditions adopted by the groundwater conservation districts in Groundwater Management Area 12 for the Sparta, Queen City, Carrizo-Wilcox, Calvert Bluff, Simsboro, Hooper, Yegua-Jackson, and Brazos River Alluvium aquifers, page 17.

[3] GMA-11 Explanatory Report cited herein predicts that 72% of the groundwater pumped will ultimately come from surface water sources (alluvium) .

As a starting point, ES & SAWDF are requesting that the GMA representatives do a GAM Run using S-3 and the methodology recently used by neighboring GMA-11 to establish a baseline for additional modeling. In the GMA-11 process, the results of a base simulation (Technical Memorandum 20-05[4]) was developed for this purpose. Based on the baseline and a recommendation, GMA 11 ran an additional set of simulations that would result in a constant pumping scenario for each county-river basin-aquifer unit in GMA 11. Technical Memorandum 21-01[5] Draft 2 reports on the development and results of the 33 iterations used to reach a constant pumping scenario[6] that would be expected to be sustained[7] if the model were run for a longer period of time. The process is discussed in GMA-11's Explanatory Report (Draft 2)[8]. All these GMA-11 documents are available on its public information[9] Google Drive.

To accomplish the objective in criteria 2 above -- which was not include in the GMA-11 process -- an additional limitation would need to be placed on GAM Run 3 to maintain the outflow to the alluvium (as surface water is defined in the tables within these reports) at an outflow volume adequate to maintain the gaining relationship of the Colorado River through a repeat of the recent drought of record (personal communications with author of the reports). This initial run could then be used as the base simulation to develop a proposed DFC using a methodology like that used by GMA-11.

To accomplish the objective in criteria 3 above -- which was not included in the GMA-11 process -- and additional limitation would need to be placed on GAM Run 3. At this time we do not have a method of limiting the run to offer but will work on this to see if there is a method of doing this in the GAM or if it needs to be done another way.

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[4] Hutchison, William R, Ph.D., P.E., P.G. December 30, 2020. GMA 11 Technical Memorandum 20-05. Base Simulation for Joint Planning with Updated Groundwater Availability Model for the Sparta, Queen City, and Carrizo-Wilcox Aquifers

[5] Hutchison, William R, Ph.D., P.E., P.G. February 28, 2021. GMA 11 Technical Memorandum 21-01Draft 2. March 4, 2021. Adjusted Pumping Simulations for Joint Planning with Updated Groundwater Availability Model for the Sparta, Queen City, and Carrizo-Wilcox Aquifers.

[6] Note: This scenario did not include the protection of surface waters and resulted in a pumping quantity that sources 54% of the water from surface waters (Induced inflow from the alluvium). The final proposed DFCs sources 72% of the pumped water from surface waters.

[7] Per Hutchison: The result of the simulations is constant pumping from 2014 to 2080. Tables 2, 3, and 4 of the Tech Memo 21-01 show it tabular form (the last two columns show the results of Scenario 33) for each county-aquifer unit. This is in contrast to the Base Scenario that has several instances of pumping reductions from 2014 to 2070. Maybe your definition of "sustainable" pumping and my use of "constant" pumping are not the same thing. My definition of constant pumping is simply 2014 to 2080 as simulated for the joint planning process. Based on the model results, I believe that this level of pumping would remain unchanged if I kept running the model, although I have not actually run the model beyond 2080. There is no specific reason I can think of that would suddenly cause the pumping rate to drop if the model was run for any number of years.

[8] Hutchison, William R, Ph.D., P.E., P.G. February 28, 2021. Desired Future Condition Explanatory Report (Draft 2) Carrizo-Wilcox/Queen City/Sparta Aquifers for Groundwater Management Area 11.

[9] GMA-11 public information google drive
https://drive.google.com/drive/folders/1ronw7ke38_lU4BHGEHbQQ0j9D7fYmFr?usp=sharing

Proposed AQUIFER DFCs and Measuring/Calculating Method

Please be as detailed as possible in describing your proposed DFC. Include the quantifiable value and a description of the method for measuring or calculating the value. Attach additional pages as needed.

Aquifer	Proposed DFC and Measuring/Calculating Method
Carrizo Aquifer	ES requests that the Districts develop DFCs based on DFC Run 3 (New GAM) that are sustainable with respect to long-term management of the aquifer where the amount of pumping, whether or not permitted, is determined by a process that protects surface waters and exempt domestic wells.
Calvert Bluff Aquifer	ES requests that the Districts develop DFCs based on DFC Run 3 (New GAM) that are sustainable with respect to long-term management of the aquifer where the amount of pumping, whether or not permitted, is determined by a process that protects surface waters and exempt domestic wells.
Simsboro Aquifer	ES requests that the Districts develop DFCs based on DFC Run 3 (New GAM) that are sustainable with respect to long-term management of the aquifer where the amount of pumping, whether or not permitted, is determined by a process that protects surface waters and exempt domestic wells.
Hooper Aquifer	ES requests that the Districts develop DFCs based on DFC Run 3 (New GAM) that are sustainable with respect to long-term management of the aquifer where the amount of pumping, whether or not permitted, is determined by a process that protects surface waters and exempt domestic wells.
Queen City Aquifer	
Sparta Aquifer	
Yegua-Jackson Aquifer	
Brazos Alluvium Aquifer	
Colorado Alluvium Aquifer	ES requests that the Districts initiate the development of DFCs for this aquifer in anticipation of adopting such DFCs during the next planning cycle.

Consideration of Proposed Desired Future Condition(s)

The Texas Water Code requires that the GMA develop DFCs that "provide a balance between the highest practicable level of groundwater production and the conservation, preservation, protection, recharging, and prevention of waste of groundwater and control of subsidence in the management area." In the space below, or on additional attached pages, please provide your considerations with regard to the nine items that must be considered, per the Texas Water Code, for the proposed DFC(s).

CONSIDERATION 4 – "Other environmental impacts, including impacts on spring flow and other interactions between groundwater and surface water:"

Please see introductory letter to GMA-12 Representatives.

CONSIDERATION 7 – "The impact on the interests and rights in private property, including ownership and the rights of management area landowners and their lessees and assigns in groundwater:"

Please see introductory letter to GMA-12 Representatives.

Proposed Desired Future Condition(s) for Aquifer(s) in GMA 12

Environmental Stewardship (ES) and
Simsboro Aquifer Water Defense Fund (SAWDF)
Considerations 4
Submitted June 23, 2021

Contact Information
Name: Steve Box, Executive Director
Address: P.O. Box 1423, Bastrop, TX 78602
Phone: 512-300-6609
Email: Executive.Director@envstewardship.org
Representing: Environmental Stewardship

Name: Andrew Wier, Director
Address: P.O. Box 931, Elgin, TX 78621
Phone: (512) 426-5002
Email: awier.tx@gmail.com
Representing: Simsboro Aquifer Water Defense Fund

Dear District Representatives,

For nearly 15 years Environmental Stewardship has participated in the joint planning process as a stakeholder with primary interest in protecting the surface water resources of our region from the impacts of over-pumping of the aquifers. During the first round of developing desired future conditions (DFCs) we observed the "reverse engineering" of the DFCs as the demands developed by the Regional Water Planning Groups were simply plugged into the groundwater availability model (old GAM) to represent the supply side of the balancing equation without first using the GAM and other scientific information available to determine what amount of groundwater could be *sustainably produced* from the aquifers over the next several hundred years — in perpetuity. Without such knowledge, it is impossible to know whether the predicted supply of available groundwater will be available to meet the demands of the region.

In a *resilient* sustainability model that takes into consideration the ecology of the region, the amount of groundwater that can be pumped must be greater than or equal to the amount required to meet both human and environmental needs for the foreseeable future. As such, a major consideration is to determine the amount of groundwater and surface water needed to sustain both human demands and environmental health[1]. Based on this total demand, the amount of groundwater that can be *sustainably pumped* must be such that the surface waters are also conserved and protected while also protecting the property rights of exempt domestic wells.

Based on this premise, Environmental Stewardship developed the following description of the DFC process that has been shared with District representatives over the past several years. **It is time for this approach to the development of DFCs to be given serious consideration by using the GAM and other scientific information to develop a base scenario starting point.**

[1] A sound ecological environment as defined in Senate Bill 3.

Public Comment Document #3 in Table 2 (1.5 pages)

Lost Pines Groundwater Conservation District
Post Oak Savannah Groundwater Conservation District
Brazos Valley Groundwater Conservation District
Mid-East Texas Groundwater Conservation District
Fayette County Groundwater Conservation District

July 21, 2021

Dear Boards of the GMA-12 Groundwater Conservation Districts:

As a landowner and an attorney, I urge you to reject the proposed DFCs.

The proposed DFCs prioritize the interests of large commercial pumpers at the expense of every other interested party: domestic well owners, small local businesses, anyone who relies on surface waters (which are connected to groundwater), our environment, and all future users.

This approach ignores the clear statutory requirements of Chapter 36 of the Texas Water Code, which direct GCDs to balance production with conservation and preservation of our water resources. In setting the DFCs, GCDs are supposed to consider nine factors, including the impacts on all landowners, surface waters, and the environment.

Instead of addressing these factors, the proposed DFCs look at one element alone – what is needed to allow all current pumpers to continue pumping unabated.

This is not only inconsistent with Chapter 36, but it appears to be a response to baseless threats. I have read the letter sent by Vista Ridge to the GCDs, and it is apparent that Vista Ridge seeks to intimidate the GCDs into setting the DFCs at such a level that it, and other large commercial pumpers, will never have to reduce their pumping.

I believe that attorneys representing other landowners have already provided information on the likelihood of a takings challenge against the DFCs being dismissed for lack of ripeness. So I will instead briefly comment on the merits of such a takings claim.

One of the factors courts look at in a takings claim is whether the party claiming a taking had "reasonable, investment-backed expectations" that their use of the property would be allowed. Thus, for example, a landowners' investment in irrigation wells is relevant evidence.

But simply spending money to build wells does not meet this test. **The expectation must be "reasonable."**

As a frequent attendee of the Post Oak Savannah GCD meetings, I have repeatedly heard statements that indicated that Vista Ridge believed that the groundwater models were overly conservative and that its pumping would not result in exceedance of the DFCs that existed when its permit was granted.

There have also been repeated public statements that Vista Ridge was informed at the time its permit was granted that it would face cutbacks if necessary to avoid exceeding the DFCs. The Vista Ridge permit has been amended twice in recent years, and the potential for its pumping to be reduced based on DFC exceedance was repeated each time.

In other words, Vista Ridge **cannot** have a **reasonable** expectation that the DFCs would be increased to avoid the need for cutbacks. The claim could not withstand the sort of inquiry that occurs in a court case during discovery or a trial. Vista Ridge's best hope to allow its pumping to continue unabated is to avoid such a court case by convincing the districts within GMA-12 to sacrifice all other interests in setting new DFCs.

I urge you not to cave to these tactics. Please reject the proposed DFCs and develop revised DFCs that comply with the statutory directives to consider all the affected interests.

Sincerely,
Judith McGeary
P.O. Box 809
Cameron, TX 76520
Judith@FarmAndRanchFreedom.org
512-484-8821 (cell)

Cc: Simsboro Aquifer Water Defense Fund
Environmental Stewardship

3.3.3 PUBLIC COMMENT DOCUMENT #4 IN TABLE 2 (0.5 PAGE)

Monday, July 26, 2021 at 11:26:59 AM Central Daylight Time

Subject: Proposed DFCs
Date: Friday, July 23, 2021 at 2:00:51 PM Central Daylight Time
From: Pamela Hornby
To: admin@posgcd.org
CC: gwestbrook@posgcd.org

Dear Mr. Youngblood,

I have been a property owner in Southeastern Milam county for close to 30 years now and in the last 5 years I have been increasingly concerned about my well either going dry or having to lower my pump. I became very concerned when I recently learned about the proposed DFCs for my groundwater district. And I was so happy
to attend the POSGCD Public Hearing on July 13, 2021 & learn that the board is seriously considering rejecting the proposed DFC's for the GMA 12.

Please reject these proposed DFC's and come up with a plan that will protect not only our groundwater, but our communities, rivers, springs & value of our properties.
My well is my only source of water, without it my place is worthless, so please do the right thing.

Thank you !

Pamela Hornby
Gause, TX

3.3.4 PUBLIC COMMENT DOCUMENT #5 IN TABLE 2 (1 PAGE)

Tuesday, July 13, 2021 at 1:39:10 PM Central Daylight Time

Subject: Proposed DFCs
Date: Tuesday, July 13, 2021 at 1:32:10 PM Central Daylight Time
From: Melanie Pavlas
To: admin@posgcd.org
CC: gwestbrook@posgcd.org
Attachments: image001.png

President Youngblood,
On behalf of Pines and Prairies Land Trust, I am contacting you about the proposed Desired Future Conditions and to urge you to reject them. We understand the difficult role you have taken and commend you for it. However, our groundwater, communities, rivers, springs and streams (and the people and wildlife that need them) depend on achieving a balance between conserving and protecting of our water resources (both groundwater and surface water systems) and the development of those resources. Putting those resources at risk puts our lives and our landscapes at risk. And while we understand that balance can be difficult to manage, we also believe it undoubtedly can be done.

Good planning requires agreement on management policies to guide the development of Desired Future Conditions. The districts were unable to agree on unified management policies workable for all the districts and unfortunately, have provided proposed DFCs based on controversial and flawed principles. As a result, the proposed DFCs for GMA-12 protect only permit holders — the big pumpers — by adopting drawdowns that allow them to pump to the limits of their permits, while local domestic and livestock wells are left high and dry and our local ecosystems suffer.

Whether or not a groundwater district mitigates failed local wells or not, the proposed DFCs unreasonably impact our aquifers. Likewise, the proposed DFCs will deprive our surface water systems of the inflows from aquifers that they depend on.

It is your duty to do the work to achieve the required balance and we trust and support you to do just that.

Sincerely,

Melanie Pavlas
Executive Director

PO Box 737 (mailing)
1018 Main St., Ste. B
Bastrop, TX 78602
512-308-1911
www.pplt.org

she/her

3.3.5 PUBLIC COMMENT DOCUMENT #6 IN TABLE 2 (1 PAGE)

Monday, July 26, 2021 at 11:23:44 AM Central Daylight Time

Subject: public comment on DFC's for GMA 12
Date: Friday, July 23, 2021 at 4:28:46 PM Central Daylight Time
From: Dianne Wassenich
To: admin@posgcd.org, gwestbrook@posgcd.org

Dear Mr. Youngblood and Mr. Westbrook, and the board of POSGCD:

Please reject the flawed and unreasonable proposed DFC of GMA 12 and send the DFC back to them to revise in a way that is sustainable, and protects our domestic wells and the Colorado River. You still have time in your process to do this revision and achieve a balance of uses and protections of the groundwater and the surface waters connected to the groundwater. Your districts in GMA 12 need to agree on management that works for all the districts, protecting all of them.

I am sorry I could not be at your public hearings. I wanted to see you in person to tell you how important I think it is for you to protect our groundwater in our area and keep the Desired Future Conditions sustainable and adequate to have springs continue to flow to maintain the flow in the river, and for our farm. My brothers and a sister and I own a farm that was our grandparents' farm in Fayette County,and then my parents owned it and left it to us. We need our wells to remain healthy and usable! A draw down or mining of our aquifer, beyond what rains can support in recharge is just not sustainable. With climate changing so much, we can expect droughts worse than the 50's to come our way soon.

The landowners like us who have domestic and livestock wells, will be the ones left hanging when water development removes large quantities of water, if permitted to do so beyond what the aquifer can yield. I beg you to think of your future generations of your own family and how they would survive if their wells are drawn down, springs dry up and the Colorado does not even have enough flow. Please listen to those with Environmental Stewardship who are doing the modeling and science to help you plan a sustainable water future. Use their modeling and information to assist you.

My grandfather lived through the 50's drought and had a well starting in the 1920's. We can see how much the aquifer has changed already, and hope you are listening to the warnings of what is in our future if sustainable DFC's are not put in place, for all those in our region who depend on you to protect our important water for the future.

Thank you for allowing me to comment, I hope it helps you,
Dianne Wassenich 512 787 6392
(I live in San Marcos and my siblings live in other counties, downstream near the Colorado River, but we all care very much about the aquifer that is below all the counties of GMA 12.)

3.3.6 PUBLIC COMMENT DOCUMENT #7 IN TABLE 2 (0.5 PAGE)

Wednesday, May 26, 2021 at 3:06:50 PM Central Daylight Time

Subject: Proposed DFCs
Date: Tuesday, May 25, 2021 at 10:53:56 AM Central Daylight Time
From: Miriam Vaughn
To: admin@posgcd.org
CC: gwestbrook@posgcd.org, admin@posgcd.org

Dear Post Oak Savannah Groundwater Conservation District Board President,

Thank you for volunteering for this critical position as stewards of our ground water and river ecosystem health. It is so important to the health of the environment and economic viability of our communities. I appreciate you are in a very stressful position with threats of litigation, and companies wanting to market the valuable water resources. Your challenges continue but this is your opportunity.

You must choose between what is good enough to get by and what is right to do. The proposed DFCs will ultimately deplete ground water and flowing streams. Please reject the proposed re-adopt the current DFC's until such time dependable sustainable solutions for aquifer management are agreed upon.

Please find the courage to adopt DFC's that will protect, long term, the environment and current landowners' water access and install monitoring wells to verify the effectiveness.

Sincerely,

mcv
Miriam Vaughn
200 Bishop St.
Smithville, TX 78957
512 237-1148