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PETITION FOR INQUIRY	§	BEFORE THE	CHIEF CLERKS OFFICE
	§	TEXAS COMMISSION ON	
FILED BY	§	ENVIRONMENTAL QUALITY	
	§		
FRED C. RUSSELL	§	DOCKET NO. 2018-0194-MIS	

**RESPONSE OF THE POST OAK SAVANNAH GROUNDWATER  
CONSERVATION DISTRICT TO THE PETITION FOR INQUIRY  
FILED BY FRED C. RUSSELL**

**Introduction**

The Post Oak Savannah Groundwater Conservation District ("District")<sup>1</sup> files this Response ("Response") to the Petition for Inquiry ("Petition") filed by Fred C. Russell ("Petitioner") and thereby responds to Mr. Russell's two cited reasons for such Petition, to-wit: 1. The groundwater in the management area is not adequately protected by the rules adopted by the District; and 2. The groundwater in the management area is not adequately protected due to the failure of the District to enforce substantial compliance with its rules and abide by their District Mission.

**Petition for Inquiry**

Texas Water Code §36.3011 allows an owner of land within a management area to file a Petition with the Texas Commission on Environmental Quality ("TCEQ") requesting an inquiry into specific actions of a groundwater conservation district ("GCD"). As stated above, the two reasons given by Petitioner for his filed Inquiry were:

1. The groundwater in the management area is not adequately protected by the rules adopted by the District; and
2. The groundwater in the management area is not adequately protected due to the failure of the District to enforce substantial compliance with its rules and abide by their District Mission.

By way of explanation of sorts, Petitioner includes Rule 1.2, Purpose of Rules, as well as the District's Mission. Within his question related to Rule 1.2, Purpose of the Rules, Petitioner inquires about how the District will protect the Simsboro and Carrizo Aquifer when the Vista Ridge Regional Supply Project will exceed the Modeled Available Groundwater (MAG) in pumping the very first year of production. The Petitioner's second inquiry asks why a comprehensive well assistance plan be established protecting all landowners, both big and small, from large commercial water producers.

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<sup>1</sup> Sec. 36.001, Texas Water Code, defines district as follows: "District" means any district or authority created under Section 52, Article III, or Section 59, Article XVI, Texas Constitution, that has (lie authority to regulate the spacing of water wells, the production from water wells, or both. [Emphasis Added]

In explaining his concerns, Petitioner notes that the District adopted on January 9, 2018, the Groundwater Well Assistance Program ("GWAP") and then proceeds to outline several queries specifically related to the GWAP; apparently the heart of his issue.

**District's Background to Petitioner's Stated Reasons and Questions for Filing**

As noted in a similar Petition for Inquiry filed by Curtis Chubb in 2015, the District has, from its inception and long before the decisions in the Day and Bragg<sup>2</sup> cases and the more recent amendments of Section 36.002, Texas Water Code<sup>3</sup>,... emphasized the fact that conserving and protecting the aquifers requires actual management of the aquifers to realize the benefits and values of the resource, and the rights of the owners of the water on an on-going basis, while assuring the aquifers are a viable resource for not only a planning period of fifty years but thereafter into the future. The District has accomplished, and continues to accomplish, its goals and duties to conserve and protect the aquifers by adopting and enforcing Rules and a Management Plan that secures the ability of the District to manage water production and the aquifers, protect the property rights of landowners and provide water for the State of Texas, and the State needs groundwater that can be produced on a sustainable basis without damage to or depletion of the aquifers. The owners of land that overlie an aquifer are entitled to an equitable share of the water that can be produced from the aquifer underlying their property on a long-term and sustainable basis without damage to or impairment of the aquifers. Neither is there a compelling reason to restrict groundwater production to less than the two acre feet/acre until actual groundwater production from an aquifer begins to approach the Modeled Available Groundwater ("MAG")<sup>4</sup> and/or conditions in the aquifer approach the adopted Desired Future Conditions ("DFCs") and, eventually, in the long term, actual sustainable yield established for that aquifer. The District views its mission as being one to protect and conserve the aquifers by managing the aquifers and production in a manner to avoid harm to the aquifers, sustain the long-term viability and production of the aquifers, and permit the State and landowners to benefit from the long-term availability of a sustainable supply of groundwater.

The Petitioner continues to refuse to understand the purpose of the MAG and the fact that it is the

<sup>2</sup> Edwards Aquifer Authority v. Day (Tex. 2012) 369 SW 3<sup>rd</sup> 814; Edwards Aquifer Authority v. Bragg (CA San Antonio 2013) 421 SW 3<sup>rd</sup> 118.

<sup>3</sup> In pertinent part, Sec. 36.002, Texas Water Code, (a) The legislates recognizes that a landowner owns the groundwater below the surface of the landowner's land as real property, [Emphasis Added]

(b) The groundwater ownership and rights described by this section:

(1) entitle the landowner ... to drill for and produce the groundwater below the surface of real property ... without causing waste or malicious drainage of other property or negligently causing subsidence ...

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

(d) This section does not: ...

(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; [Emphasis Added]

<sup>4</sup> Sec. 36.01, Tex. Water Code, defines the MAG as follows: "Modeled available groundwater" means the amount of water that the executive administrator determines may be produced on an average annual basis to achieve a desired future condition established under Section 36.108. [Emphasis Added]

predicted estimated production that can be produced every year over a period of 50 years to accomplish the DFCs in 2060. He simply disagrees with the District's approach of permitting the production of groundwater subject to the reserved authority to limit and decrease the volume of permitted production as more landowners seek production permits, production otherwise increases, or monitoring of the groundwater and aquifers evidences that authorized production should be limited to benefit the aquifer or assure the long-term sustainable yield of the aquifer is accurate.

The Rules of the District and all drilling, operating and production permits issued by the District provide that permitted groundwater production can be modified and reduced as needed to protect the aquifers and achieve the DFCs.<sup>5</sup> The District has "...the ability to implement specific management strategies, such as curtailment..."<sup>6</sup> This District's management approach is in part based on this authority and absent an identified issue regarding a specific permit application, the Rules allow permits to be issued for the annual production of up to two acre feet/acre of groundwater until such time as total groundwater production, the monitored water levels in the aquifers, modeled available groundwater and other factors indicate that permitted production should be decreased to assure accomplishment of the adopted DFCs.

The District Rules were designed and are enforced to prevent a "land rush" for production permits and avoid management of permit production based on priority hi time of permits. From its inception, the District has adopted and enforced rules that allow each landowner to obtain a production permit for a proportionate share of the groundwater that can be then produced from aquifers that underlie his/her land surface, without damage to the aquifers.<sup>7</sup> The District realizes and understands that at some future time the production currently permitted by the District per acre will be reduced, and may thereafter be reduced further as necessary to accomplish the DFCs. For example, if at some future date the permitted production per acre has been reduced to one acre foot/acre, or less, and the owner/lessee of a large number of acres applies for a permit, the then permitted acre feet/acre will be reduced by the amount necessary to enable the issuance of the new permit at the newly established ratio of acre feet/acre, and all outstanding permits will be gradually thereafter reduced to the newly established ratio of acre feet/acre.

Section 16 of the Rules provides for the monitoring of water production and the aquifers, requires investigation and study at specific threshold points and, as do other rules, gives notice that the District has the authority and will take action in order to comply with the DFCs. Section 16 does not limit the District to any specific steps or actions, rather it preserves the general authority of the Board to base its actions on the whole of the available information resulting from additional studies and investigation, and give more or less weight to individual studies, reports and development, including, but not limited to, the pace of the changing conditions.

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<sup>5</sup> Regardless of the DFCs that are adopted in future years, the District's Rules, Management Plan and strategy will accomplish those DFCs.

<sup>6</sup> See: Exhibit "A"

<sup>7</sup> There is no first in time priority for permits. A permit issued in 2010 will be on equal footing with a permit that is issued in 2020.

By way of example of how the District continues to both internally review and externally review and ensure that the data used for the DFCs is accurate the District requested a review of the MAGs by the Texas Water Development Board ("TWDB") of the modeling it was based upon. The TWDB undertook a review of the District's MAGs for Groundwater Management Area 12, an area which includes the Carrizo-Wilcox aquifer, last fall and provided a report dated December 1, 2017. The report reviews the modeling as part of a review of the Desired Future Conditions explanatory report that was filed with TWDB on October 6, 2017, again for Groundwater Management Area 12. The review by TWDB found that the explanatory reports and other supporting files and materials for Groundwater Management Area 12 were administratively complete on October 31, 2017. As noted in the report "...Groundwater Management Area 12 considers the desired future conditions to be compatible and physically possible if the difference between the modeled drawdown results and the desired future condition drawdown targets are within a 10 percent or a 5-foot variance, whichever is greater, for the Carrizo-Wilcox, Queen City, and Sparta aquifers, with the exception of the Simsboro aquifer, which was held within a 5 percent or a 5-foot variance, whichever is greater [Daniel B. Stephens and Associates and others, 2017]. The results noted in the report show that the District's present modeling support the DFCs which the District has adopted for the various aquifers in the Groundwater Management Area 12. Intra, the District's engineering firm, further reviewed the report and stated that the "MAG report is consistent with the current POSGCD and GMA12 DFCs. No changes are recommended." The report is attached hereto as Exhibit "B", along with Intra's letter.

#### **Response to Petitioner's Stated Reasons for Filing the Inquiry**

Petitioner cites Section 36.3011, Texas Water Code as the basis for requesting the inquiry, claiming the groundwater is not adequately protected by the rules adopted and further claiming that the failure of the District to enforce substantial compliance with its rules and abide by the Mission also does not protect the groundwater. An abbreviated review of the District's Rules and related actions easily negates Petitioner's claims.

(1) [T]he groundwater in the management area is not adequately protected by the rules adopted by a district.

The District's Management Plan and Rules provides a comprehensive regulatory and monitoring program designed to allow landowners, the local economies and the State to realize the benefits of the groundwater available within the District on a long-term sustainable basis. Until such time as production reaches 70% of the MAG, or 60% of the DFCs, or projected water level drawdowns indicate the DFC for 2060 will be exceeded within fifteen (15) years, the District will generally issue appropriate permits for up to two acre feet/acre of groundwater production. However, the Rules *specifically provide* for the Board to lessen the production per acre based on other relevant factors *and to amend, modify and reduce the production authorized for each permittee* as needed to give proper consideration to the MAG and comply with the DFCs. The Rules further allow landowners to obtain new permits after a reduction in the volume of production permitted per acre of land overlying an aquifer, or within a specific Management Zone, even though filing an additional permit may result in a further reduction of the production authorized under previously issued permits. In this manner,

the DFCs can be achieved while at the same time permitting each owner of groundwater to share equitably in the volume of groundwater that may be produced within the District with compliance with the DFCs and the protection, conservation and long-term preservation of the aquifers and water supply.

The District's Rules currently total 91 pages, with the last review and amendment being done in September 2017. The Rules are a living document<sup>8</sup> that is amended and modified regularly to address new information and issues. No one Rule fully protects the groundwater that is within the District; however the Rules *as a whole* very substantially protect the groundwater and the management of groundwater within the District. The District's Rules are available on the District's website at [www.posgcd.org](http://www.posgcd.org).

(2) [T]he groundwater in the management area is not adequately protected due to the failure of a district to enforce substantial compliance with its rules.

Selected quotes taken out of context do not establish the District's failure to enforce substantial compliance with the Rules. The District enforces the Rules administratively as written, and has otherwise enforced the Rules both by administrative fines<sup>9</sup> and obtaining civil judgments.<sup>10</sup>

The District finds it difficult to ascertain what Petitioner's primary complaint with respect to this point is as he then turns the discussion into a full on discussion concerning the Groundwater Well Assistance Program ("GWAP").

Permitting the production of groundwater until total production approaches 70% of the MAG or water levels reach 60% of the DFCs, or projected drawdown will exceed the DFCs within 15 years, benefits both the State, the landowners and the local economies. It is also important to note the Rules also provide for the protection of the aquifers and groundwater in multiple other respects. The District's Rules, Management Plan and on-going application of those to the business of the District are specifically designed to consider the MAG and comply with the DFC requirements to attain a future balance that will reach a sustainable, level of water production and preserve the benefits of the aquifers for future generations.

The Petitioner's reliance upon excerpts from general statements regarding "approving all permits" does not support either of his stated reasons for filing the petition. Although a material majority of the permit applications to date have been granted, all permit applications have simply not been granted and some have never even progressed to a hearing before the Board. One threshold is that an applicant must control the water rights to apply for and be granted a permit. Equally so, the "hear say" quote of an underground water conservation district is not relevant and is also very likely not a true statement. The regulations set forth in Section 16 give the District the authority to exercise

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<sup>8</sup> For example, recent amendments to the Rules added requirements for the vertical spacing of wells, to the traditional requirement for horizontal spacing, for the Yegua Jackson Management Zone.

<sup>9</sup> As an example, See Exhibits "C-1" and "C-2" - imposition and payment of an administratively imposed fine;

<sup>10</sup> Exhibit "D" is a final judgement issued by a district court in a case filed by the District.

judgement and discretion based on the facts and information presented to reduce the groundwater production authorized by previously issued permits and to lower the permitted production per acre for all permits issued thereafter. Further, that action is not limited to a one-time event and may be repeated based on consideration of the MAG, actual groundwater production, monitored water levels, etc. and compliance with the DFCs. For convenience, a copy of Sections 16 and 17 of the Rules is attached as Exhibit "E."

The District's Management Plan, adopted December 5, 2017 and attached as Exhibit "F," is approved by the Texas Water Development Board and is the appropriate location for the management plans, actions and reporting Petitioner desires to be included in the Rules. The District currently has one hundred fifty one (151) monitoring wells – well over the stated intent in the Management Plan to have at least 100 monitor wells maintained in a monitoring well network across management zones and aquifers.<sup>11</sup> The number of monitoring wells is increasing annually due to the District (i) working with well owners to enable use of existing wells for groundwater monitoring; (ii) converting others wells to monitor groundwater; (iii) accepting the donation of wells; (iv) contracting to have a monitoring well drilled, and installed; and (v) requiring wells that will have a capacity of 1000 GPM to install monitoring equipment.<sup>12</sup> The Board regularly reviews the number, location, operation and increase of the monitoring wells and receives an annual report on the measured water levels.<sup>13</sup> The location of each monitoring well is shown on the District's monitoring maps. Both the Management Plan and the map are public records and may be obtained directly from the District Office or by visiting the District's website [www.posgcd.org](http://www.posgcd.org).

The Board has the on-going authority to adopt, modify and amend the Rules and the Management Plan, and Section 16, within the Rules, is written to enable the Board to take such general or specific action as warranted, based on the specific facts and conditions then applicable. Sections 16.3 and 16.4 provide for the General Manager and the Board to monitor, obtain and review the analysis of the data provided and take specific actions based upon the totality of the information provided; the Management Plan, at Section 10, states, in pertinent part, that: "The monitoring of the wells will be performed under the direction of the general manager, by trained personnel using a Standard Operation Procedure adopted by the District."

First, it is important to note, the Rules as a whole are adopted to enable the District to accomplish the duties and purposes of the District as set forth in State law and the Management Plan. Critical to the overall understanding of the District's operations is that no one rule, standing alone, is relied upon to accomplish the duties, purposes, obligations and goals of the District. The Rules must be interpreted and applied as a whole and it is not necessary to repeat and incorporate the provisions of all other rules into every rule adopted by the District.

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<sup>11</sup> See, Section 16.1 Efficient Use of Groundwater, *Groundwater Management Plan, adopted December 5, 2017*.

<sup>12</sup> See: Rule 5.1.1

<sup>13</sup> Exhibit "G", The Annual Report 2017, is available on the District's website along with past Reports at [www.posgcd.org](http://www.posgcd.org), and should be given consideration.

The DFCs are adopted and amended at least every five years by the GMA to establish and revise the conditions desired fifty years in the future. The ability of the District to: (a) reduce existing production authorized by previously issued permits by two (2) percent annually; and (b) issue all subsequent permits to authorize the production of the lowered number of acre feet/acre would seem sufficient to enable the District to comply with the DFCs. Ample time is available to the District to make these adjustments, as evidenced in the attached Exhibit "H" adopted by GMA 12 and showing the predicted drawdown in the aquifers over a period of fifty (50) years. However, "[i]f the Board finds it is necessary to reduce the maximum allowable production per acre, or the permitted production for any Management Zone, by a greater percentage or more quickly than is provided in Rule 16.7(3), to accomplish the desired future conditions, preserve and conserve groundwater or protect groundwater users within a Management Zone, or to implement reductions required under Rule 16.5, the Board shall establish a schedule for a phased reduction in the maximum allowable production or permitted production for the zone. [Amended July 12, 2005] [Amended May 3, 2017]"<sup>14</sup>

In addition to the Rules and Section 16 specifically, the permits issued by the District include the following sentence: "The Rules are incorporated herein *in their entirety* by reference, as if set forth herein verbatim, including but not limited to the Rules providing for reducing permitted production." [Emphasis added]. This (or an almost identical provision) has been in the District permits from the beginning of the District, and continues. As an example, see some of the recent permits issued to Abengoa Vista Ridge LLC ("Abengoa") attached as Exhibits "I-1" and "I-2." These permits were transferred and assigned to Abengoa by Blue Water Vista Ridge LLC ("Blue Water") in furtherance of the agreement by Abengoa to deliver 50,000 acre feet of water annually to the City of San Antonio Water Supply system ("SAWS"). Consistent with the permit wording, as but one example, the attorney for Blue Water has stated publicly on the record and in writing that Blue Water understands the District can reduce the permitted production per acre foot (See: Exhibit "J"), and SAWS has stated both privately and publicly that it recognizes the District can, and will not dispute if the District does reduce the permitted production per acre. (See: Exhibit "K").

The public statements and representations referenced above are only examples of many such communications and statements on the record by permittees. Each permit, as applicable, references the prior holders of the permit and the following paragraph from the Abengoa Operating Permit (with appropriate names substituted in other permits) is included in all permits:

"The Rules are incorporated herein in their entirety by reference, as if set forth herein verbatim, including but not limited to the Rules providing for reducing permitted production. The Permittee shall comply with the Rules and each requirement thereof in operating, maintaining, repairing and altering each of the Wells and the Well System. All applications pursuant to which the related original permits and prior amended permits, and this Amended Permit, have been issued, and all written agreements and acknowledgments executed by the Permittee, and/or by BWVR, Blue Water, or Layne, are incorporated into this Amended

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<sup>14</sup> See, Rule 16.7.4

Permit. This Amended Permit is granted on the basis of, and contingent upon, the accuracy of the information supplied in the application, agreements and acknowledgments on file with the District. A finding that false information was supplied to the District in the permitting process for tire Wells is grounds for revocation of this Permit.”<sup>15</sup>

#### Response to Basis for the Petition - GWAP

As stated before, Petitioner's primary issue seems to rest with the District's GWAP. From the District's reading of Chapter 36, TCEQ does not have the authority to evaluate or even consider the District's GWAP program. The District's well assistance program is a voluntary program to provide assistance to small well owners affected by groundwater production in the District's area.

Even if it were a program that TCEQ had authority over, the enabling legislation established the maximum combined production and transportation fee per thousand gallons of groundwater transported outside the boundaries of the District at \$0.17 per thousand gallons of groundwater. However, statutorily, the District is still required to adhere to Section 36.205, Texas Water Code that requires that in establishing fees, a district may not unreasonably exceed the cost to the district of performing the administrative function for which the fee is charged or for providing the services outside the district. So while Petitioner desires for the District to raise its fees to the allowed \$0.17 per thousand gallons of groundwater transported, the District in legislatively adopting a fee that is one-half that, has determined that presently, that represents the cost to the District. It is unlikely that TCEQ would review and substitute its findings that the District MUST raise such fees.

In the Petitioner's Introduction, Petitioner states that “[s]ince November, 2015, he has written editorials, made oral presentations to the Director's Board and sent emails to the Directors concerning the District's extreme position regarding, in part, the District's Mission Statement ‘to protect groundwater users’ in the Post Oak Savannah GCD.” He concludes, disingenuously, “[i]n most cases I was completely ignored.” A cursory review of the District's records and recollections reflect that Petitioner has sent approximately 54 emails to the Directors or staff with at least ten of those comments being formally forwarded to the DFC Committee for consideration. Eleven responses have been sent from the General Manager, along with approximately 50 phone conversations with Petitioner and the General Manager. At least five face-to-face meetings have occurred between Petitioner and the District's staff and/or Board members, along with at least one personal visit from the Board President to the Petitioner's home. Petitioner has, additionally, filed two information requests which have been responded to completely by staff. Of particular note, Petitioner was specifically given and requested to offer modifications to the draft GWAP program in January, 2017; Petitioner did provide input which was considered and in some respects included in the final program.

Despite his strong beliefs, guest editorials and opposition, Petitioner has apparently not made a sufficient effort to understand the policies, operation and planning of the District. For example, the Petition for Inquiry seems to ignore the contents and provisions of the Management Plan.

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<sup>15</sup> See, Rule 7.1.4

The District has made it clear from its inception that while all owners of groundwater will be entitled to make application for a permit, to receive a permit they must be compliant with the Rules. But that permit, as stated previously, is not given without regard to surrounding and ever changing conditions. The wording of several Threshold Levels in Rule 16.4 gives the Board such ability to modify: "Threshold Level 1 will be reached ..." as groundwater production increases the permitted production per acre will be decreased and once that process begins it will likely be repeated. As an example, the District's Rules and policies envision that a landowner may apply for his/her first permit 50+ years in the future and obtain a permit to produce groundwater for the then permitted production per acre, and that permit may result in a reduction in the production then authorized for all previously issued permits. As an overly simple example, if the acreage within the District that overlies an aquifer is 790,000 acres and the then current MAG for the aquifer is 106,605 acre/feet, and every eligible landowner obtains a permit for production, the permitted groundwater production per acre would be reduced to approximately .1349 acre feet/acre.<sup>16</sup>

Blue Water may have plans to produce "the amount of groundwater that they desire." However, it is doubtful they think they have unilateral rights to such water with the District's rules discussed above blocking their ability to achieve their goal if it is to the detriment of the District overall, the MAGs or the DFCs. See the discussion above regarding permit wording, public statements and representations, and Exhibits I-1, I-2, J and K. The permit content, volume of public statements on the record and admissions by permittees, including Blue Water and SAWS, are material.<sup>17</sup> The District is unable to determine how the Petitioner calculated the MAG will be exceeded on the first day of pumping with regard to those permits. This argument seems to simply be a regurgitation of the argument presented to the TCEQ by Curtis Chubb in 2015 that was asked and reviewed and found to be lacking.

#### Response to Petitioner's Concluding Notes

The District has in fact created rules to allow everyone to pump a sustainable amount of groundwater. The aquifers have existed for many years, remain relatively underutilized, and are capable of producing immediate benefits, without harm to the aquifers, under the District's Rules and Management Plan that provide for compliance with the DFCs and consideration of the MAG. Both the short-term and long-term benefits of the aquifers are much greater under the District's rules than had the District adopted rules that would continue to delay the benefits of a material portion of the sustainable yield until such time as all landowners obtain permits.<sup>18</sup> Restricting the use of the sustainable yield serves no public purpose and is an expensive option. Every year the sustainable yield is utilized produces added economic benefits for the landowners, the local economies and the

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<sup>16</sup> Even were the MAG exceeded during the first year of production from Blue Water and SAWS, the DFCs account for 15 previous years where the MAG has not been produced, and therefore, the DFCs are still safe far into the future. The Petitioner, still fails to comprehend the most basic understanding of the aquifers of the District as well as the fundamentals of hydrology and groundwater modeling.

<sup>17</sup> Rule 7.1.4 provides in part that a finding that false information has been provided is grounds for immediate revocation of the permits. In addition, several material legal issues would arise were the permittees to disavow their oral and written representation on the record when requesting issuance of the permits, e.g. waiver, estoppel, etc.

<sup>18</sup> Although a matter of speculation, were the District to adopt the regulations proposed by Petitioner benefits to the landowners, the local economies and the State would be unnecessarily delayed without any benefit to the aquifers.

State, Regulating production as opposed to limiting permits allows the State the benefits of the sustainable yield without delay or damage to the aquifers. Permitting landowners to produce or sell groundwater owned by them in greater volume than will be permitted at some point in the future does no harm to the aquifers and benefits the public.

The MAG is not an annual cap, and was never intended to be! The District manages based on actual aquifer conditions as determined by on-going monitoring of water levels, groundwater production estimates, hydro-geologic studies, and a variety of other information and resources. This flexible management allows the District to regulate in an ongoing equitable manner, regardless of activities affecting water levels which happen outside the District, over which the District has no regulatory authority. A primary responsibility of the District is to manage the groundwater and aquifers to comply with the year 2060 DFCs and the Rules and management of the District will accomplish that responsibility. The management of the aquifers based on actual aquifer conditions instead of estimated availability based on modeled results such as the MAG is supported by both the applicable law and hydro-geologic analysis. The hydro-geologic assessments and predictive simulations consistently over predict aquifer drawdowns as shown in the report entitled "Comments Regarding Predictive Simulations 1 through 4 and Preliminary Evaluation of Potential DFCs for the Simsboro Aquifer," dated March 27, 2015, by Steven Young PhD, PE, PG of Intera Geosciences & Engineering Solutions, The report ("Preliminary Evaluation Study") is available on the District's website: [www.posgcd.org](http://www.posgcd.org) and more specifically as follows: [www.posgcd.org/wp-content/uploads/2015/04/GMA12jnarch\\_27\\_INTERA.pdf](http://www.posgcd.org/wp-content/uploads/2015/04/GMA12jnarch_27_INTERA.pdf).<sup>19</sup>

Petitioner's Concluding Notes seeking to require management of the aquifers based on the MAG is inconsistent with State law and do not support the Petition for Inquiry.

### Conclusion and Request for Relief

The Post Oak Savannah Groundwater Conservation District requests that:

- (1) TCEQ dismiss the Petition for Inquiry pursuant to *Tex. Water Code, Section 36.3011(c)(1)*;
- (2) TCEQ deny all other relief requested by the Petitioner; and

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<sup>19</sup> The application and use of this and similar studies is mandated, effective September 1, 2015, by Chapter 36. In pertinent part, the provisions adopted during the 2015 legislative session amended Sec. 36.0015 to provide that: "In this section 'best available science' means conclusions that are logically and reasonably derived using statistical or quantitative data, techniques, analyses, and studies that are publicly available to reviewing scientists and can be employed to address a specific scientific question." Section 36.0015 requires the use of best available science.

- (3) TCEQ grant any further relief to which the District may be entitled.

Respectfully submitted

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By: 

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ATTORNEYS FOR POST OAK SAVANNAH  
GROUNDWATER CONSERVATION DISTRICT

**CERTIFICATE OF SERVICE**

I hereby certify that a true and correct copy of the Response of the Post Oak Savannah Groundwater Conservation District to the Petition for Inquiry filed by Fred C. Russell, Docket No. 2018-0194-MIS, by email or first class mail on this the 20<sup>th</sup> day of March, 2018, to the representatives listed on the attached Mailing List:



Barbara Boulware

Mailing List  
TCEQ Docket No. 2018-0194-MIS  
Petition for Inquiry filed by Fred C. Russell  
seeking a review of Post Oak Savannah Groundwater Conservation District

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For Bluebonnet Groundwater Conservation District

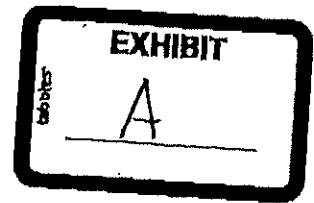
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## **Governor Abbott Vetos House Bill 2647**

Saturday, June 20, 2015 • Austin, Texas • Veto Statement

Pursuant to Article IV, Section 74, of the Texas Constitution, I, Greg Abbott, Governor of Texas, do hereby disapprove of and veto House Bill No. 2647 as passed by the Eighty-Fourth Texas Legislature, Regular Session, because of the following objections:

Texas landowners have a constitutionally protected right to access the groundwater under their property. Government action affecting that vested right must be based only on very careful deliberation, which ideally should take place at the local level based on local needs and concerns. Statewide groundwater rules are less able to take vitally important local interests into account.

Under current law, local groundwater conservation districts have the ability to implement specific management strategies, such as curtailment, that prioritize certain users as deemed appropriate after local deliberation. House Bill 2647 eliminates local discretion by mandating the preferential treatment of certain types of groundwater use over other important uses. If one class of landowners is automatically exempt from curtailment, others will have to bear an unequal burden when water is scarce. Enshrining in state law the rule that groundwater conservation districts will give priority to one class of water users could result in the abridgement of other users' groundwater rights. Groundwater management should be based on sound science and public input at the local level, not on one size-fits-all state mandates like House Bill 2647.

Since the Eighty-Fourth Texas Legislature, Regular Session, by its adjournment has prevented the return of this bill, I am filing these objections in the office of the Secretary of State and giving notice thereof by this public proclamation according to the aforementioned constitutional provision.

**GREG ABBOTT**  
Governor

Received  
Mar. 20. 2018 5:00PM

Mar 20 2018 05:06pm

No. 0090 P. 16



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**GAM RUN 17-030 MAG:  
MODELED AVAILABLE GROUNDWATER FOR THE  
CARRIZO-WILCOX, QUEEN CITY, SPARTA,  
YEGUA-JACKSON, AND BRAZOS RIVER ALLUVIUM  
AQUIFERS IN  
GROUNDWATER MANAGEMENT AREA 12**

Shirley C. Wade, Ph.D., P.G. and Natalie Ballew, GIT  
Texas Water Development Board  
Groundwater Division  
Groundwater Availability Modeling Department  
(512) 936-0883  
December 1, 2017

*This document is released for the purpose of interim review under the authority of Shirley C. Wade, P.G. 525 on December 1, 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 for interim review by Cynthia K. Ridgeway, P.G. 471 on December 1, 2017.*

Received  
Mar. 20. 2018 5:00PM

Mar 20 2018 05:06pm

No. 0090 P. 18

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# **GAM RUN 17-030 MAG: MODELED AVAILABLE GROUNDWATER FOR THE CARRIZO-WILCOX, QUEEN CITY, SPARTA, YEGUA-JACKSON, AND BRAZOS RIVER ALLUVIUM AQUIFERS IN GROUNDWATER MANAGEMENT AREA 12**

Shirley C. Wade, Ph.D., P.G. and Natalie Ballew, GIT  
Texas Water Development Board  
Groundwater Division  
Groundwater Availability Modeling Department  
(512) 936-0883  
December 1, 2017

## ***EXECUTIVE SUMMARY:***

This report presents modeled available groundwater for Groundwater Management Area 12 for the Carrizo-Wilcox, Queen City, Sparta, Yegua-Jackson, and Brazos River Alluvium aquifers by decade for the groundwater conservation districts (Tables 4 through 11 respectively) and for use in the regional water planning process (Tables 12 through 19 respectively). The total modeled available groundwater estimates for the Carrizo-Wilcox Aquifer range from approximately 135,000 acre-feet per year in 2010 to approximately 260,000 acre-feet per year in 2069 (Tables 4 through 7). The modeled available groundwater estimates for the Queen City Aquifer range from approximately 3,000 acre-feet per year in 2010 to approximately 7,000 acre-feet per year in 2069 (Table 8). The modeled available groundwater estimates for the Sparta Aquifer range from approximately 8,000 acre-feet per year in 2010 to approximately 24,000 acre-feet per year in 2069 (Table 9). The estimates were extracted from results of a model run using the groundwater availability model for the central part of the Carrizo-Wilcox, Queen City, and Sparta aquifers (version 2.02). District representatives in Groundwater Management Area 12 prepared and approved the model run files that meet the desired future condition adopted for the Carrizo-Wilcox, Queen City, and Sparta Aquifers. The files were submitted to the Executive Administrator of the Texas Water Development Board (TWDB) on October 6, 2017, as part of the resubmittal of the Desired Future Conditions Explanatory Report for Groundwater Management Area 12.

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The modeled available groundwater estimates for the Yegua-Jackson Aquifer range from approximately 31,000 acre-feet per year in 2010 to 27,000 acre-feet per year in 2069 (Table 10). The estimates were extracted from results of a model run using the groundwater availability model for the Yegua-Jackson Aquifer (version 1.01). District representatives prepared and approved the model run files that meet the desired future conditions adopted for the Yegua-Jackson Aquifer. The files were submitted to the Executive Administrator of the TWDB on July 5, 2017, as part of Groundwater Management Area 12's original submittal of the Explanatory Report.

The modeled available groundwater estimates for the Brazos River Alluvium Aquifer range from approximately 269,000 acre-feet per year in 2013 to approximately 214,000 acre-feet per year in 2070 (Table 11). The estimates were extracted from results of a model run using the groundwater availability model for the Brazos River Alluvium Aquifer (version 1.01). The model run was developed to meet the desired future conditions adopted by district representatives of Groundwater Management Area 12 for the Brazos River Alluvium Aquifer.

The Executive Administrator of the TWDB determined that the explanatory reports and other supporting files and materials for Groundwater Management Area 12 were administratively complete on October 31, 2017.

***REQUESTOR:***

Mr. Gary Westbrook, coordinator of Groundwater Management Area 12.

***DESCRIPTION OF REQUEST:***

In a letter dated October 5, 2017, Gary Westbrook, on behalf of Groundwater Management Area 12, provided the TWDB with the desired future conditions of the Carrizo-Wilcox (Hooper, Simsboro, Calvert Bluff, and Carrizo), Queen City, Sparta, Yegua-Jackson, and Brazos River Alluvium aquifers adopted by the groundwater conservation districts in Groundwater Management Area 12. The desired future conditions for the Carrizo-Wilcox, Queen City, and Sparta aquifers are expressed as average drawdowns in feet from January 2000 through December 2069 (Table 1).

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**TABLE 1** ADOPTED DESIRED FUTURE CONDITIONS FOR THE CARRIZO-WILCOX, QUEEN CITY, AND SPARTA AQUIFERS IN GROUNDWATER MANAGEMENT AREA 12. VALUES ARE AVERAGE AQUIFER DRAWDOWN IN FEET FROM JANUARY 2000 THROUGH DECEMBER 2069 (DANIEL B. STEPHENS AND ASSOCIATES AND OTHERS, 2017).

Groundwater Conservation District (GCD) or County	Sparta	Queen City	Carrizo	Calvert Bluff	Simsboro	Hooper
Brazos Valley GCD	12	12	61	125	295	207
Fayette County GCD	47*	64*	110*	NR	NR	NR
Lost Pines GCD	5	15	62	100	240	165
Mid-East Texas GCD	5	2	80	90	138	125
Post Oak Savannah GCD	28	30	67	149	318	205
Falls County	NP	NP	NP	NP	-2	27
Limestone County	NP	NP	NP	11	50	50
Navarro County	NP	NP	NP	-1	3	3
Williamson County	NP	NP	NP	-11	47	69
GMA12	16	16	75	114	228	168

\*Fayette County GCD desired future conditions are for all of Fayette County.

NR = Not relevant; NP = Not present

The desired future condition for Fayette County Groundwater Conservation District is for all of Fayette County including both Groundwater Management Areas 12 and 15. The Calvert Bluff, Simsboro, and Hooper aquifers occur in Fayette County but are not used so they were declared non-relevant (NR in Table 1). The Sparta, Queen City, and Carrizo aquifers do not occur (NP in Table 1) in Falls, Limestone, Navarro, and Williamson counties. The Calvert Bluff Aquifer does not occur in Falls County.

Groundwater availability models are regional in scale and are developed with data from many sources with differing levels of confidence (refer to the Limitations section at the end of this report). Therefore, groundwater availability models — like all numerical models — generate predictions that contain some uncertainty. Considering this situation, Groundwater Management Area 12 considers the desired future conditions to be compatible and physically possible if the difference between the modeled drawdown results and the desired future condition drawdown targets are within a 10 percent or a 5-foot variance, whichever is greater, for the Carrizo-Wilcox, Queen City, and Sparta aquifers

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with the exception of the Simsboro aquifer, which was held within a 5 percent or a 5-foot variance, whichever is greater (Daniel B. Stephens and Associates and others, 2017).

The desired future conditions for the Yegua-Jackson Aquifer are average drawdowns in feet from January 2010 through December 2069 (Table 2). The desired future condition for Fayette County Groundwater Conservation District is for all of Fayette County including both Groundwater Management Areas 12 and 15.

**TABLE 2**      **ADOPTED DESIRED FUTURE CONDITIONS FOR THE YEGUA-JACKSON AQUIFER IN GROUNDWATER MANAGEMENT AREA 12. VALUES ARE AVERAGE AQUIFER DRAWDOWN IN FEET FROM JANUARY 2010 THROUGH DECEMBER 2069 (DANIEL B. STEPHENS AND ASSOCIATES AND OTHERS, 2017).**

Groundwater Conservation District (GCD)	Yegua	Jackson	Yegua-Jackson
Brazos Valley GCD	70	114	NA
Fayette County GCD	NA	NA	77*
Lost Pines GCD	NR	NR	NR
Mid-East Texas GCD	NA	NA	7
Post Oak Savannah GCD	NA	NA	100
GMA-12	NA	NA	65

\*Fayette County GCD desired future conditions are for all of Fayette County.

NR = Not relevant; NA = Not applicable

Brazos Valley Groundwater Conservation District manages the Yegua and Jackson aquifers separately and adopted two separate desired future conditions. The other groundwater conservation districts manage the Yegua-Jackson Aquifer as a single-unit and adopted single desired future conditions for their districts. Lost Pines Groundwater Conservation District has declared the Yegua-Jackson Aquifer not relevant in their district. As with the Carrizo-Wilcox aquifers, Groundwater Management Area 12 considers the desired future conditions to be compatible and physically possible if the difference between the modeled drawdown results and the desired future condition drawdown targets are within a 10 percent or a 5-foot variance, whichever is greater, for the Yegua-Jackson Aquifer (Daniel B. Stephens and Associates and others, 2017).

In Groundwater Management Area 12 the desired future conditions for the Brazos River Alluvium consist of percent saturation values or decrease in saturated thickness for the Brazos Valley and Post Oak Savannah Groundwater Conservation Districts, respectively (Table 3).

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**TABLE 3 ADOPTED DESIRED FUTURE CONDITIONS FOR THE BRAZOS RIVER ALLUVIUM AQUIFER FOR GROUNDWATER MANAGEMENT AREA 12. (DANIEL B. STEPHENS AND ASSOCIATES AND OTHERS, 2017).**

Groundwater Conservation District	County	Desired Future Condition
Brazos Valley	Brazos and Robertson	North of State Highway 21: Percent saturation shall average at least 30 percent of total well depth.  South of State Highway 21: Percent Saturation shall average at least 40 percent of total well depth.
Post Oak Savannah	Burleson	A decrease in 6 feet in the average saturated thickness over the period from 2010 to 2070.
Post Oak Savannah	Milam	A decrease in 5 feet in average saturated thickness over the period from 2010 to 2070.

TWDB staff reviewed the model files associated with the desired future conditions, requested clarification on certain technical elements of the files, and received clarification on procedures and assumptions from Groundwater Management Area 12 in Appendix V of the re-submittal of the Explanatory Report on October 6, 2017, and via email on November 3, 2017. Questions for the Carrizo-Wilcox, Queen City, Sparta, and Yegua-Jackson aquifers included whether drawdown averages and modeled available groundwater values were based on official aquifer extent or model extent, whether desired future conditions for Fayette County were for all of the county or for only the Groundwater Management Area 12 part, whether to include dry cells (dry cells are explained in the Methods section) in drawdown averaging, and which stress periods to use for drawdown calculations. In addition, the original model file submission for the Carrizo-Wilcox, Queen City, and Sparta aquifers (July 6, 2017) did not match the desired future conditions for the Lost Pines Groundwater Conservation District. The revised model files for the Carrizo-Wilcox, Queen City, and Sparta aquifers submitted on October 6, 2017, did match the desired future conditions for all of the groundwater conservation districts (Table 1) within the specified variance. All clarifications are included in the Parameters and Assumptions Section of this report.

Groundwater Management Area 12 did not submit model files for the Brazos River Alluvium Aquifer, so the TWDB developed a predictive scenario using the calibrated historical groundwater availability model of the Brazos River Alluvium Aquifer. The TWDB received clarification from Groundwater Management Area 12 on September 18, 2017, that

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the assumptions used for the predictive scenario were acceptable. Groundwater Management Area 12 provided additional clarification to the TWDB on November 3, 2017, that the small portion of the Brazos River Alluvium located in Falls County was considered not relevant for Groundwater Management Area 12.

## **METHODS:**

We ran the groundwater availability model for the central part of the Carrizo-Wilcox, Queen City, and Sparta aquifers (Figures 1 through 4) using the model files prepared and approved by districts in Groundwater Management Area 12 and submitted with the explanatory report (Daniel B. Stephens and Associates and others, 2017). Model-estimated water levels were extracted and drawdowns were calculated for the year 2069 (stress period 95). Average drawdown was calculated for each groundwater conservation district for each individual aquifer. The calculated drawdown average was compared with the desired future conditions (Table 1) to verify that the pumping scenario achieved the desired future conditions within 10 percent or 5-foot variance (5 percent or 5-foot variance for the Simsboro Aquifer).

As noted in the clarifications, cells that became dry during the simulation were excluded from the drawdown averaging. Dry cells occur during a model run when the simulated water level in a cell falls below the bottom of the cell, and when this occurs the cell is deactivated. If high pumpage is the primary factor for a cell going dry, the models are implying that the pumping may create drawdowns that may locally partially dewater the aquifer. This typically is simulated in the shallow or thin portions of the unconfined area of the aquifers. In the groundwater availability models used for Groundwater Management Area 12, when a model deactivates a cell, that cell is inactive for the rest of the simulation. It is important to identify why a cell went dry and address the causes. In reality, the aquifer will probably not go dry because pumping will become uneconomical before the aquifer is fully dewatered in any particular area.

The groundwater availability model for the Yegua-Jackson Aquifer (Figures 5 and 6) was run using the model files submitted on July 26, 2017, and drawdowns were calculated for the year 2069. Average drawdowns were calculated for Brazos Valley, Fayette County, Mid-East Texas and Post Oak Savannah Groundwater Conservation Districts. For Brazos Valley Groundwater Conservation District separate drawdown averages were calculated for the Yegua and Jackson Aquifers. For the other districts average drawdown was calculated for all layers combined. Based on clarifications, the reference period (or starting point) for drawdown calculation was stress period 39 (January 2010). As specified in the clarifications, cells that became dry during the simulation were excluded from the averaging. The calculated drawdown averages were compared with the desired future to

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production patterns, the estimated amount of pumping exempt from permitting, existing permits, and a reasonable estimate of actual groundwater production under existing permits.

### **PARAMETERS AND ASSUMPTIONS:**

This section describes the parameters and assumptions for the modeled available groundwater estimates:

#### **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 Confining Unit (Layer 2), the Queen City Aquifer (Layer 3), the Reklaw Confining Unit (Layer 4), the Carrizo (Layer 5), the Calvert Bluff (Layer 6), the Simsboro (Layer 7), and the Hooper (Layer 8).
- The model was run with MODFLOW-96 (Harbaugh and McDonald, 1996).
- Drawdowns were based on water levels in December 2069 (stress period 95) and water levels in January 2000 (stress period 25).
- Drawdown averages and modeled available groundwater values were based on the extent of the model area within Groundwater Management Area 12 rather than the official aquifer boundaries.
- The drawdown average for Fayette County Groundwater Conservation District was based on all of Fayette County including areas in Groundwater Management Areas 12 and 15.
- Drawdowns for cells where water levels dropped below the base elevation of the cell causing the cell to become inactive (dry cells) were excluded from the averaging.
- Modeled available groundwater values are extracted from the model output files and do not include pumping in dry cells or inactive cells.

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verify that the pumping scenario achieved the desired future conditions (Table 2) within 10 percent or 5-foot variance.

We developed a predictive model scenario for the Brazos River Alluvium Aquifer based on the calibrated historical groundwater availability model. We extended the model period from 2012 to 2070 by adding 58 annual stress periods and we used average recharge and average streamflow for 2013 to 2070. The pumping distribution for 2013 through 2070 is based on the average annual pumping for 2012 and the pumping amounts were adjusted uniformly within each groundwater conservation district to achieve the desired future conditions (Table 3).

We calculated the average percent saturation of the aquifer for the two areas within Brazos Valley Groundwater Conservation District by determining the ratio of the saturated thickness to the total alluvium thickness for each model cell in 2070 and averaging the ratios for all cells within the groundwater district areas (north of Highway 21 and south of Highway 21). The total alluvium thickness was used as an estimate for total well depth. The decrease in average saturated thickness in Post Oak Savannah Groundwater Conservation District was calculated by subtracting the average saturated thickness in 2070 from the average saturated thickness in 2010. The desired future conditions were achieved within one foot or one percentage point with the exception that it was not possible to decrease percent saturation in the Brazos Valley Groundwater Conservation District south of Highway 21 below 45 percent, because the model would not converge with additional pumping.

The modeled available groundwater values for aquifers in Groundwater Management Area 12 were determined by extracting pumping rates by decade from the model results using ZONEBUDGET Version 3.01 (Harbaugh, 2009). Tables 4 through 11 present the modeled available groundwater values (annual pumping rates to achieve the desired future conditions) for each aquifer by county and groundwater conservation district. Tables 12 through 19 present the modeled available groundwater (annual pumping rates to achieve the desired future conditions) for each aquifer by county, river basin, and regional water planning area.

### **Modeled Available Groundwater and Permitting**

As defined in Chapter 36 of the Texas Water Code (2011), "modeled available groundwater" is the estimated average amount of water that may be produced annually to achieve a desired future condition. Groundwater conservation districts are required to consider modeled available groundwater, along with several other factors, when issuing permits in order to manage groundwater production to achieve the desired future condition(s). The other factors districts must consider include annual precipitation and

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- A tolerance of 10 percent (5 percent for the Simsboro) or 5 feet was assumed when comparing desired future conditions (Table 1, average drawdown values per county) to model drawdown results.
- Estimates of modeled available groundwater from the model simulation were rounded to whole numbers.

#### **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).
- The model was run with MODFLOW-2000 (Harbaugh and others, 2000).
- The end of the calibration period was extended from 1997 to 2009 (Oliver, 2010).
- Drawdowns were based on water levels in December 2069 (stress period 99) and water levels from December 2009/January 2000 (stress period 39).
- Drawdown averages and modeled available groundwater values were based on the extent of the model area within Groundwater Management Area 12 rather than the official aquifer boundaries.
- The drawdown average for Fayette County Groundwater Conservation District was based on all of Fayette County including areas in Groundwater Management Area 12 and Groundwater Management Area 15.
- Drawdown for cells where water levels dropped below the base elevation of the cell causing the cell to become inactive (dry cells) were excluded from the averaging.
- Modeled available groundwater values are extracted from the model output files and do not include pumping in dry cells or inactive cells.
- A tolerance of 10 percent or 5 feet was assumed when comparing desired future conditions (Table 2, average drawdown values per county) to model drawdown results.

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- Estimates of modeled available groundwater from the model simulation were rounded to whole numbers.

#### **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.
- The model was run with MODFLOW-USG (unstructured grid; Panday and others, 2013).
- 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.
- 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 one foot or 5 percent (whichever was greater) was assumed when comparing desired future conditions to average saturated thickness decline or percent saturation values.
- Estimates of modeled available groundwater from the model simulation were rounded to whole numbers.

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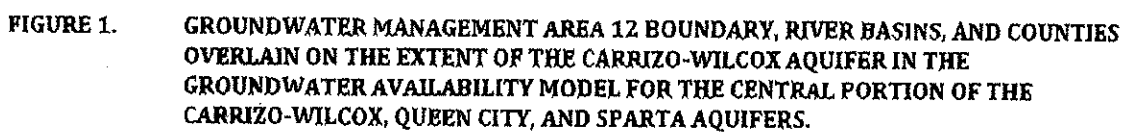
## **RESULTS:**

The modeled available groundwater estimates for the Carrizo-Wilcox Aquifer range from approximately 135,000 acre-feet per year in 2010 to approximately 260,000 acre-feet per year in 2069 (Tables 4 through 7). The modeled available groundwater estimates for the Queen City Aquifer range from approximately 3,000 acre-feet per year in 2010 to approximately 7,000 acre-feet per year in 2069 (Table 8). The modeled available groundwater estimates for the Sparta Aquifer range from approximately 8,000 acre-feet per year in 2010 to approximately 24,000 acre-feet per year in 2069 (Table 9). The modeled available groundwater is summarized by groundwater conservation district and county for the Hooper, Simsboro, Calvert Bluff, Carrizo, Queen City, and Sparta aquifers (Tables 4, 5, 6, 7, 8, and 9 respectively). The modeled available groundwater has also been summarized by county, river basin, and regional water planning area for use in the regional water planning process for the Hooper, Simsboro, Calvert Bluff, Carrizo, Queen City, and Sparta aquifers (Tables 12, 13, 14, 15, 16, and 17 respectively). Small differences in values between table summaries are due to rounding.

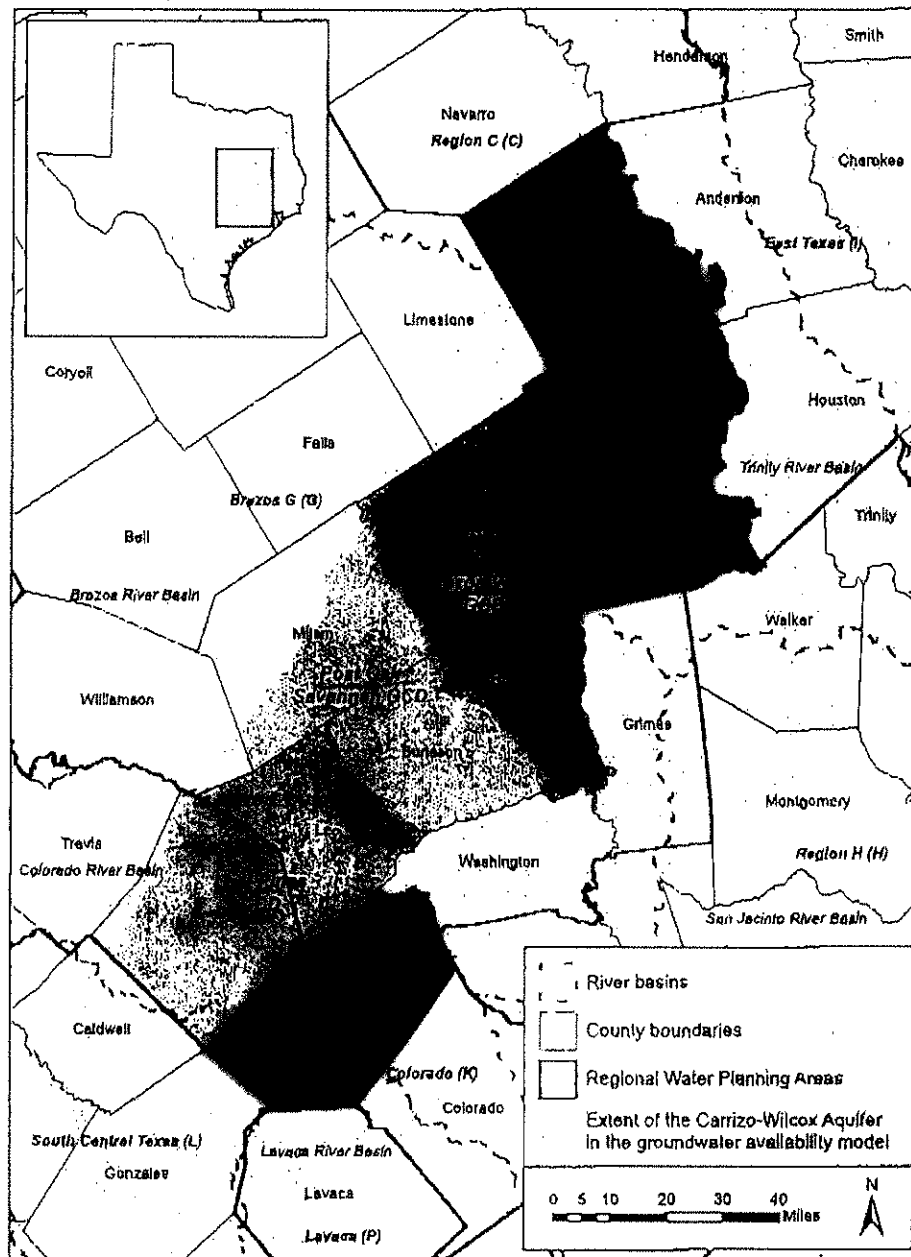
The modeled available groundwater estimates for the Yegua-Jackson Aquifer range from approximately 31,000 acre-feet per year in 2010 to 27,000 acre-feet per year in 2069 (Table 10). The modeled available groundwater for the Yegua-Jackson Aquifer is summarized by groundwater conservation district and county (Table 10) and by county, river basin, and regional water planning area for use in the regional water planning process (Table 18). Small differences in values between table summaries are due to rounding.

The modeled available groundwater estimates for the Brazos River Alluvium Aquifer range from approximately 269,000 acre-feet per year in 2013 to 214,000 acre-feet per year in 2070 (Table 11). The modeled available groundwater for the Brazos River Alluvium Aquifer is summarized by groundwater conservation district and county (Table 11) and by county, river basin, and regional water planning area for use in the regional water planning process (Table 19). Small differences in values between table summaries are due to rounding.

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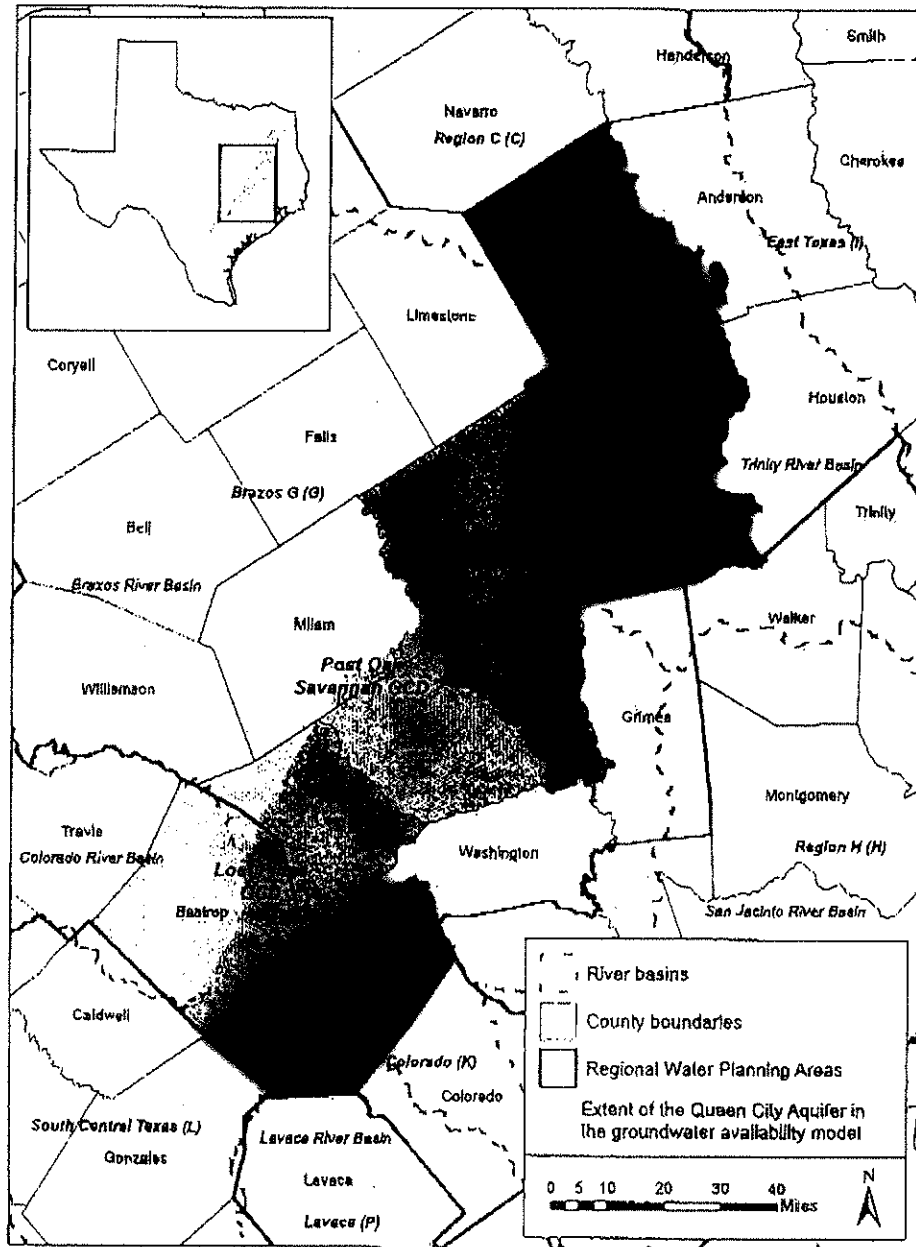


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**FIGURE 2. REGIONAL WATER PLANNING AREAS, RIVER BASINS, GROUNDWATER CONSERVATION DISTRICTS (GCDs), AND COUNTIES OVERLAIN ON THE EXTENT OF THE CARRIZO-WILCOX AQUIFER IN THE GROUNDWATER AVAILABILITY MODEL FOR THE CENTRAL PORTION OF THE CARRIZO-WILCOX, QUEEN CITY, AND SPARTA AQUIFERS.**

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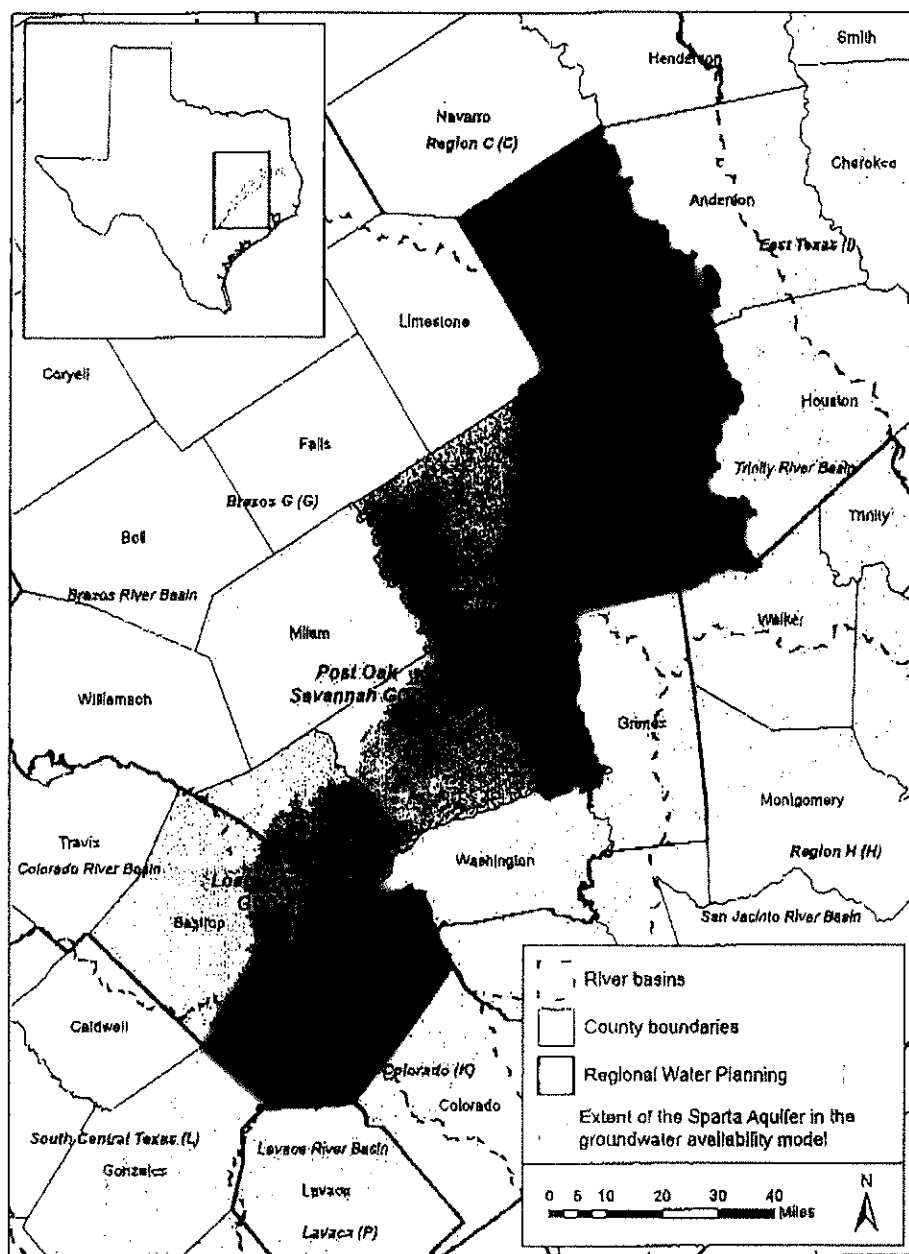


**FIGURE 3. REGIONAL WATER PLANNING AREAS), RIVER BASINS, GROUNDWATER CONSERVATION DISTRICTS (GCDs), AND COUNTIES OVERLAIN ON THE EXTENT OF THE QUEEN CITY AQUIFER IN THE GROUNDWATER AVAILABILITY MODEL FOR THE CENTRAL PORTION OF THE CARRIZO-WILCOX, QUEEN CITY, AND SPARTA AQUIFERS.**

*GAM Run 17-030 MAG: Modeled Available Groundwater for the Carrizo-Wilcox, Queen City, Sparta, Yegua-Jackson, and Brazos River Alluvium aquifers in Groundwater Management Area 12*

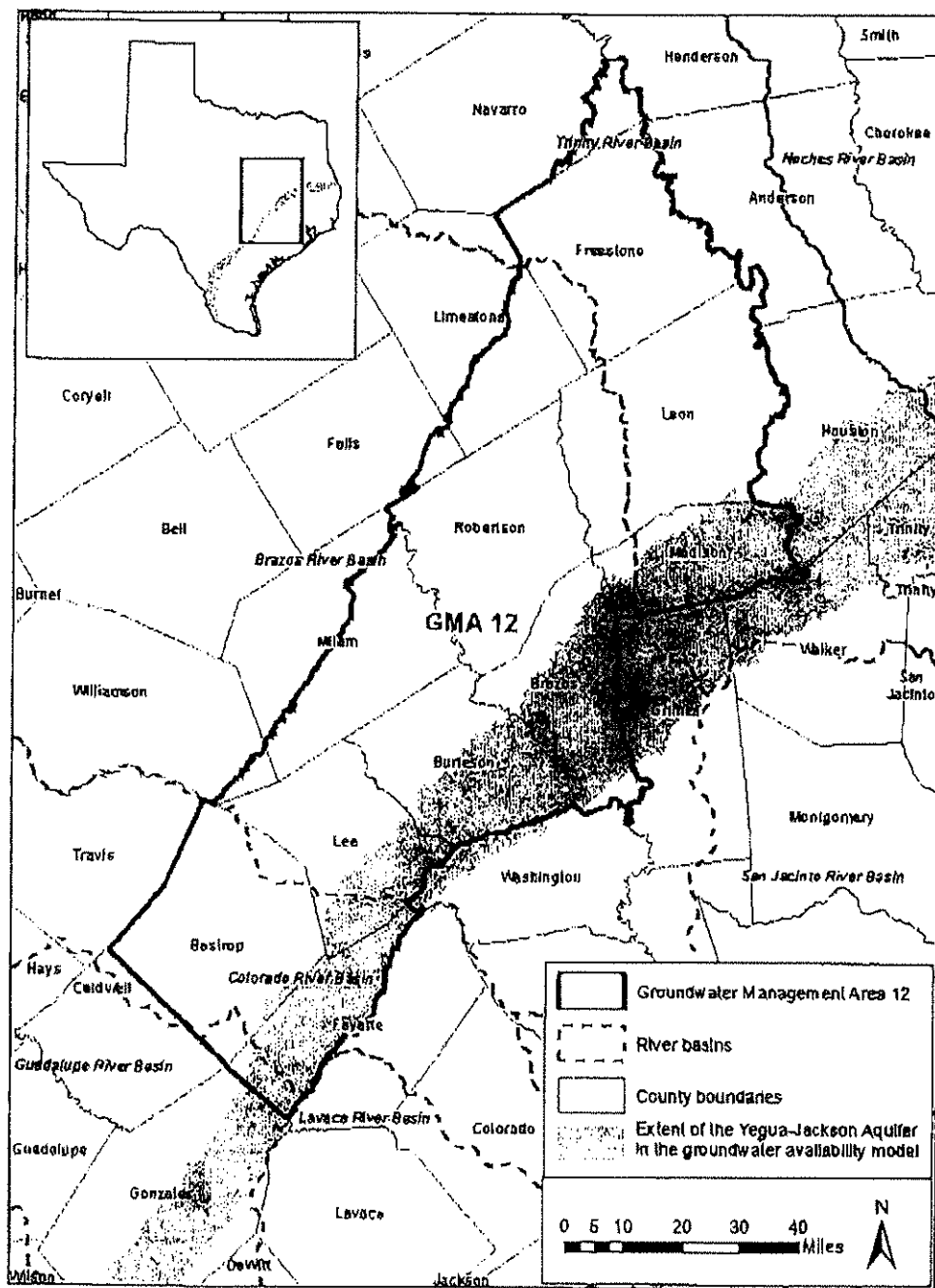
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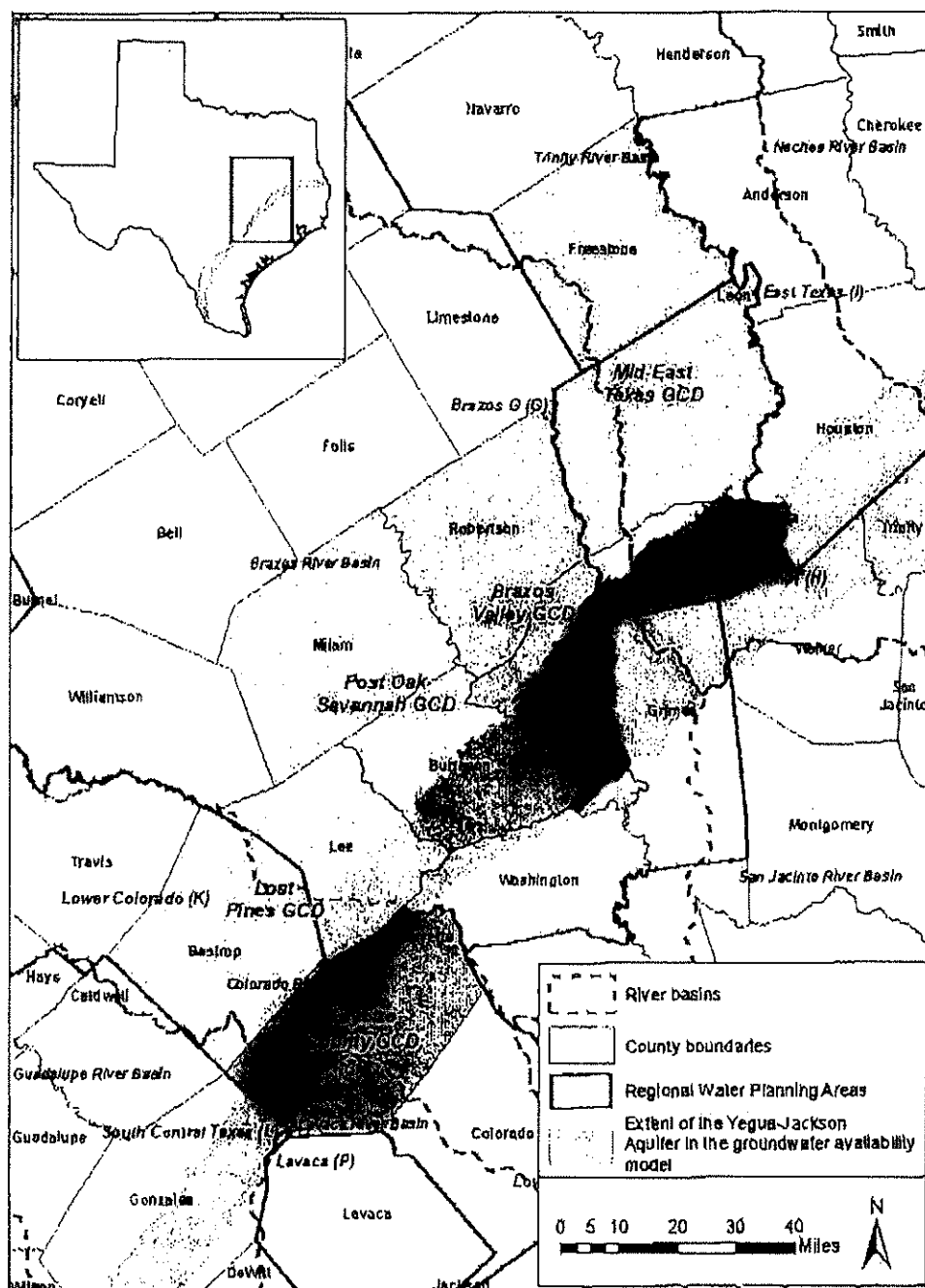
**FIGURE 4. REGIONAL WATER PLANNING AREAS, RIVER BASINS, GROUNDWATER CONSERVATION DISTRICTS (GCDs), AND COUNTIES OVERLAIN ON THE EXTENT OF THE SPARTA AQUIFER IN THE GROUNDWATER AVAILABILITY MODEL FOR THE CENTRAL PORTION OF THE CARRIZO-WILCOX, QUEEN CITY, AND SPARTA AQUIFERS.**

*GAM Run 17-030 MAG: Modeled Available Groundwater for the Carrizo-Wilcox, Queen City, Sparta, Yegua-Jackson, and Brazos River Alluvium aquifers in Groundwater Management Area 12*  
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**FIGURE 5. GROUNDWATER MANAGEMENT AREA 12 BOUNDARY, RIVER BASINS, AND COUNTIES OVERLAIN ON THE EXTENT OF THE YEGUA-JACKSON AQUIFER IN THE GROUNDWATER AVAILABILITY MODEL.**

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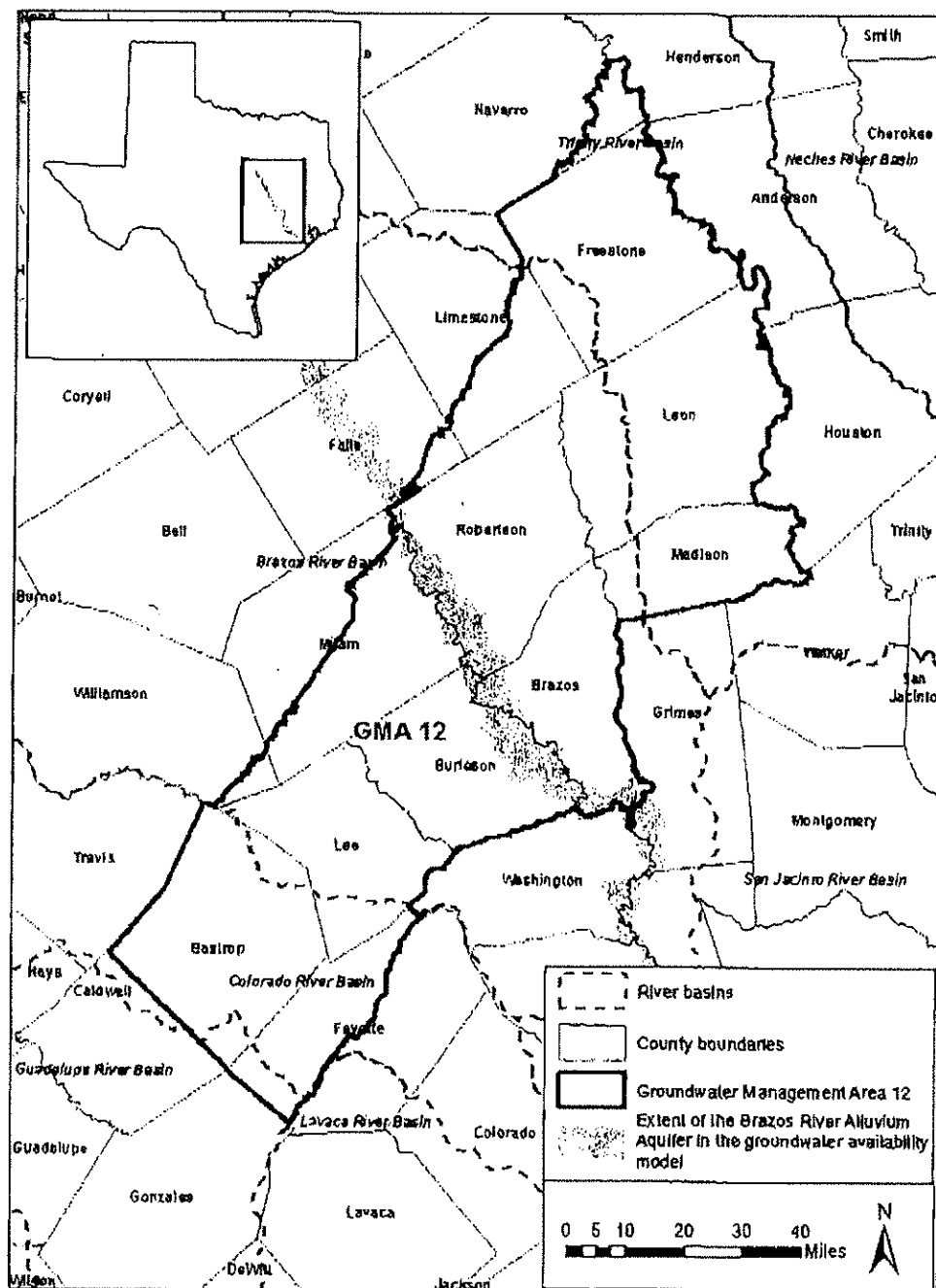


**FIGURE 6. REGIONAL WATER PLANNING AREAS, RIVER BASINS, GROUNDWATER CONSERVATION DISTRICTS (GCDs), AND COUNTIES OVERLAIN ON THE EXTENT OF THE YEGUA-JACKSON AQUIFER IN THE GROUNDWATER AVAILABILITY MODEL.**

*GAM Run 17-030 MAG: Modeled Available Groundwater for the Carrizo-Wilcox, Queen City, Sparta, Yegua-Jackson, and Brazos River Alluvium aquifers in Groundwater Management Area 12*

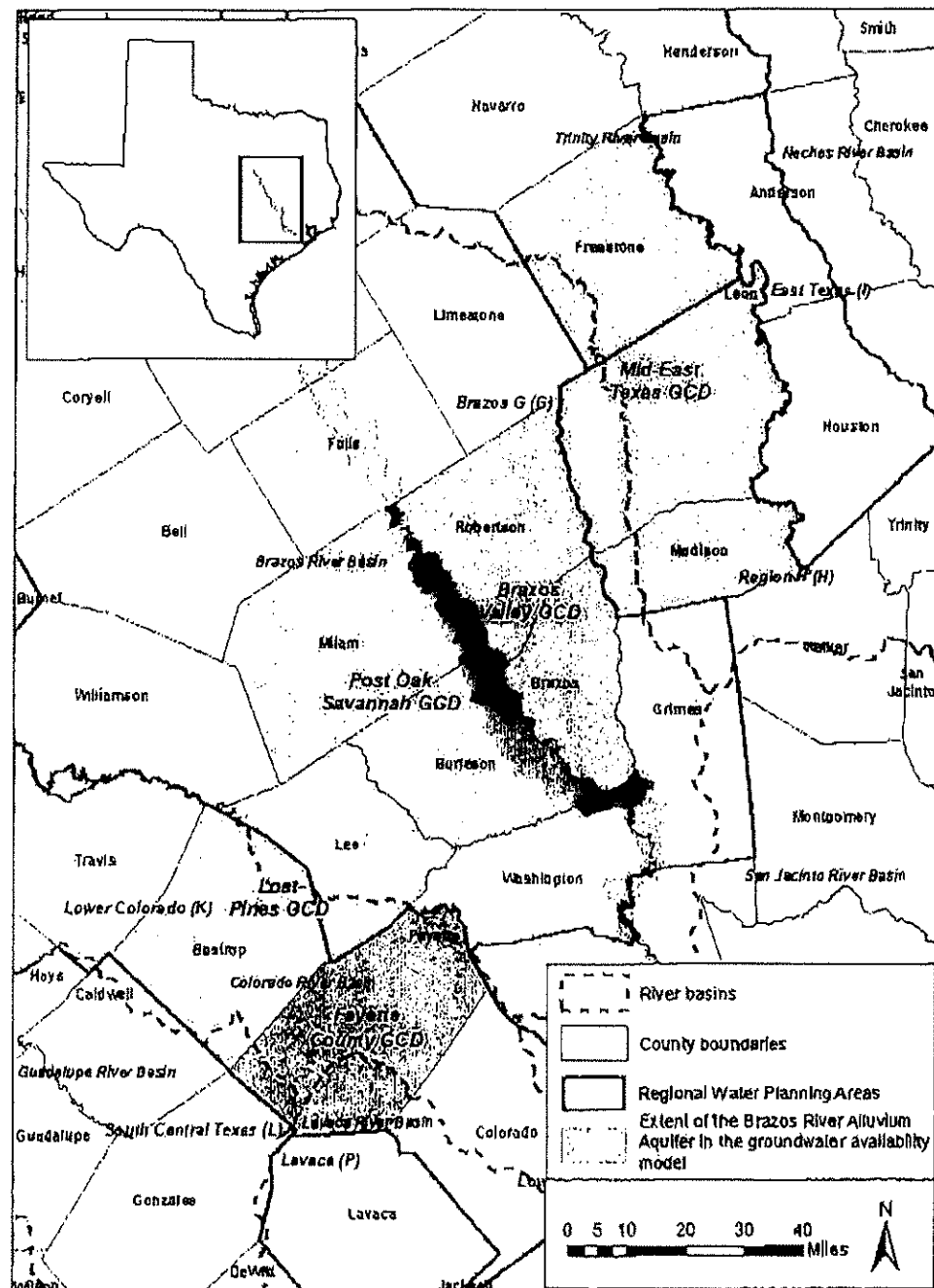
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**FIGURE 7. GROUNDWATER MANAGEMENT AREA 12 BOUNDARY, RIVER BASINS, AND COUNTIES OVERLAIN ON THE EXTENT OF THE BRAZOS RIVER ALLUVIUM AQUIFER IN THE GROUNDWATER AVAILABILITY MODEL.**

*GAM Run 17-030 MAG: Modeled Available Groundwater for the Carrizo-Wilcox, Queen City, Sparta, Yegua-Jackson, and Brazos River Alluvium aquifers in Groundwater Management Area 12*  
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**FIGURE 8. REGIONAL WATER PLANNING AREAS, RIVER BASINS, GROUNDWATER CONSERVATION DISTRICTS (GCDs), AND COUNTIES OVERLAIN ON THE EXTENT OF THE BRAZOS RIVER ALLUVIUM AQUIFER IN THE GROUNDWATER AVAILABILITY MODEL.**

TABLE 4 MODELED AVAILABLE GROUNDWATER FOR THE HOOPER AQUIFER IN GROUNDWATER MANAGEMENT AREA 12  
 SUMMARIZED BY GROUNDWATER CONSERVATION DISTRICT (GCD) AND COUNTY FOR EACH DECADE BETWEEN 2010 AND  
 2069. VALUES ARE IN ACRE-Feet PER YEAR.

Groundwater Conservation District	County	Aquifer	2010	2020	2030	2040	2050	2060	2069
Brazos Valley GCD	Brazos	Hooper	0	0	0	0	0	0	0
Brazos Valley GCD	Robertson	Hooper	836	1,446	1,884	1,942	2,000	2,000	2,000
Brazos Valley GCD Total <sup>1</sup>		Hooper	836	1,447	1,884	1,942	2,000	2,000	2,000
Fayette County GCD <sup>1,2</sup>	Fayette	Hooper	NR	NR	NR	NR	NR	NR	NR
Lost Pines GCD	Bastrop	Hooper	357	651	781	953	1,176	1,179	1,139
Lost Pines GCD	Lee	Hooper	17	62	76	95	119	117	116
Lost Pines GCD Total <sup>1</sup>		Hooper	374	713	857	1,048	1,295	1,296	1,255
Mid-East Texas GCD	Freestone	Hooper	3,006	4,341	4,578	4,814	5,051	5,288	5,501
Mid-East Texas GCD	Leon	Hooper	0	0	0	0	0	0	0
Mid-East Texas GCD	Madison	Hooper	0	0	0	0	0	0	0
Mid-East Texas GCD Total <sup>1</sup>		Hooper	3,006	4,341	4,578	4,814	5,051	5,288	5,501
Post Oak Savannah GCD	Burleson	Hooper	19	1,085	1,515	1,623	1,623	1,623	1,623
Post Oak Savannah GCD	Milam	Hooper	5,366	1,874	2,623	2,811	2,811	2,800	2,800
Post Oak Savannah GCD Total <sup>1</sup>		Hooper	5,385	2,960	4,139	4,433	4,433	4,422	4,422

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No District-County	Falls	Hooper	726	727	734	741	749	749	749
No District-County	Limestone	Hooper	1,488	1,382	1,410	1,444	1,496	1,496	1,414
No District-County	Navarro	Hooper	16	11	11	11	11	11	11
No District-County	Williamson	Hooper	5	5	5	5	5	5	5
No District-County Total <sup>1</sup>		Hooper	2,235	2,125	2,160	2,201	2,261	2,261	2,178
GMA 12 Total <sup>1</sup>		Hooper	11,836	11,586	13,617	14,439	15,040	15,267	15,357

1. Individual estimates are rounded and may not always sum up to the total value displayed.

2. NR: Groundwater Management Area 12 declared the Hooper Aquifer not relevant in these areas.

TABLE 5 MODELED AVAILABLE GROUNDWATER FOR THE SIMSBORO AQUIFER IN GROUNDWATER MANAGEMENT AREA 12  
 SUMMARIZED BY GROUNDWATER CONSERVATION DISTRICT (GCD) AND COUNTY FOR EACH DECADE BETWEEN 2010 AND 2069. VALUES ARE IN ACRE-FEET PER YEAR.

Groundwater Conservation District	County	Aquifer	2010	2020	2030	2040	2050	2060	2069
Brazos Valley GCD	Brazos	Simsboro	35,086	41,115	44,120	45,681	50,208	53,404	53,404
Brazos Valley GCD	Robertson	Simsboro	37,236	41,673	42,061	42,468	42,794	42,794	42,794
Brazos Valley GCD Total <sup>1</sup>		Simsboro	72,322	82,788	86,182	88,149	93,002	96,198	96,198
Fayette County GCD <sup>2</sup>	Fayette	Simsboro	NR	NR	NR	NR	NR	NR	NR
Lost Pines GCD	Bastrop	Simsboro	8,508	14,253	15,673	16,311	17,334	15,947	16,279
Lost Pines GCD	Lee	Simsboro	1,860	17,993	17,221	17,031	17,179	14,896	14,024
Lost Pines GCD Total <sup>1</sup>		Simsboro	10,368	32,246	32,895	33,342	34,513	30,843	30,304
Mid-East Texas GCD	Freestone	Simsboro	1,254	3,582	3,589	3,585	3,552	3,550	3,550
Mid-East Texas GCD	Leon	Simsboro	263	3,359	3,457	3,538	3,617	3,623	3,623
Mid-East Texas GCD	Madison	Simsboro	0	0	0	0	0	0	0
Mid-East Texas GCD Total <sup>1</sup>		Simsboro	1,517	6,941	7,046	7,124	7,169	7,173	7,173

Groundwater Conservation District	County	Aquifer	2010	2020	2030	2040	2050	2060	2069
Post Oak Savannah GCD	Burleson	Simsboro	627	17,687	21,616	25,103	28,858	30,409	30,409
Post Oak Savannah GCD	Milam	Simsboro	10,702	20,783	16,284	14,940	17,171	18,094	18,094
Post Oak Savannah GCD Total <sup>1</sup>		Simsboro	11,329	38,470	37,900	40,042	46,028	48,503	48,503
No District-County	Falls	Simsboro	139	140	141	143	146	146	146
No District-County	Limestone	Simsboro	9,801	9,753	9,850	9,992	10,235	10,235	10,235
No District-County	Navarro	Simsboro	6	4	4	4	4	4	4
No District-County	Williamson	Simsboro	2	2	2	2	2	2	2
No District Total		Simsboro	9,948	9,899	9,997	10,141	10,387	10,387	10,387
GMA 12 Total <sup>1</sup>		Simsboro	105,484	170,343	174,020	178,799	191,099	193,104	192,565

1. Individual estimates are rounded and may not always sum up to the total value displayed.

2. NR: Groundwater Management Area 12 declared the Simsboro Aquifer not relevant in these areas.

TABLE 6 MODELED AVAILABLE GROUNDWATER FOR THE CALVERT BLUFF AQUIFER IN GROUNDWATER MANAGEMENT AREA 12  
 SUMMARIZED BY GROUNDWATER CONSERVATION DISTRICT (GCD) AND COUNTY FOR EACH DECADE BETWEEN 2010 AND  
 2069. VALUES ARE IN ACRE-FEET PER YEAR.

Groundwater Conservation District	County	Aquifer	2010	2020	2030	2040	2050	2060	2069
Brazos Valley GCD	Brazos	Calvert Bluff	0	0	0	0	0	0	0
Brazos Valley GCD	Robertson	Calvert Bluff	776	1,764	1,757	1,758	1,757	1,757	1,757
Brazos Valley GCD Total <sup>1</sup>		Calvert Bluff	776	1,764	1,757	1,758	1,757	1,757	1,757
Fayette County GCD <sup>2</sup>	Fayette	Calvert Bluff	NR	NR	NR	NR	NR	NR	NR
Lost Pines GCD	Bastrop	Calvert Bluff	1,534	2,063	2,462	2,970	3,613	3,774	3,873
Lost Pines GCD	Lee	Calvert Bluff	50	161	169	211	296	209	111
Lost Pines GCD Total <sup>1</sup>		Calvert Bluff	1,584	2,224	2,631	3,181	3,909	3,983	3,984
Mid-East Texas GCD	Freestone	Calvert Bluff	878	754	734	728	714	714	714
Mid-East Texas GCD	Leon	Calvert Bluff	2,817	2,819	2,953	3,065	3,189	3,201	3,201
Mid-East Texas GCD	Madison	Calvert Bluff	4	0	0	0	0	0	0
Mid-East Texas GCD Total <sup>1</sup>		Calvert Bluff	3,698	3,573	3,687	3,793	3,903	3,915	3,915

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Groundwater Conservation District	County	Aquifer	2010	2020	2030	2040	2050	2060	2069
Post Oak Savannah GCD	Burleson	Calvert Bluff	0	87	87	87	87	87	87
Post Oak Savannah GCD	Milam	Calvert Bluff	1,713	949	949	949	949	949	949
Post Oak Savannah GCD Total <sup>1</sup>		Calvert Bluff	1,713	1,036	1,036	1,036	1,036	1,036	1,036
No District-County	Limestone	Calvert Bluff	248	218	223	228	235	235	235
No District-County	Navarro	Calvert Bluff	0	0	0	0	0	0	0
No District-County	Williamson	Calvert Bluff	1	2	2	2	3	2	1
No District Total		Calvert Bluff	248	220	225	230	237	237	236
GMA 12 Total <sup>1</sup>		Calvert Bluff	8,020	8,817	9,336	9,998	10,842	10,927	10,927

1. Individual estimates are rounded and may not always sum up to the total value displayed.

2. NR: Groundwater Management Area 12 declared the Calvert Bluff Aquifer not relevant in these areas.

TABLE 7 MODELED AVAILABLE GROUNDWATER FOR THE CARRIZO AQUIFER IN GROUNDWATER MANAGEMENT AREA 12  
 SUMMARIZED BY GROUNDWATER CONSERVATION DISTRICT (GCD) AND COUNTY FOR EACH DECADE BETWEEN 2010 AND  
 2069. VALUES ARE IN ACRE-FEET PER YEAR.

Groundwater Conservation District	County	Aquifer	2010	2020	2030	2040	2050	2060	2069
Brazos Valley GCD	Brazos	Carrizo	1,196	3,717	3,724	3,737	3,761	3,763	3,763
Brazos Valley GCD	Robertson	Carrizo	887	1,707	1,698	1,713	1,730	1,731	1,731
Brazos Valley GCD Total <sup>1</sup>		Carrizo	2,083	5,425	5,422	5,450	5,491	5,494	5,494
Fayette County GCD	Fayette <sup>2</sup>	Carrizo	37	5,474	5,474	5,474	5,474	5,474	5,474
Lost Pines GCD	Bastrop	Carrizo	2,408	4,692	5,308	6,042	7,929	8,205	8,295
Lost Pines GCD	Lee	Carrizo	2,089	2,926	3,050	3,221	3,871	3,847	3,757
Lost Pines GCD Total <sup>1</sup>		Carrizo	4,496	7,618	8,358	9,263	11,800	12,052	12,052
Mid-East Texas GCD	Freestone	Carrizo	44	369	366	357	347	346	346
Mid-East Texas GCD	Leon	Carrizo	694	8,108	8,051	8,110	8,193	8,200	8,200
Mid-East Texas GCD	Madison	Carrizo	1,478	2,861	2,770	2,656	2,554	2,543	2,543
Mid-East Texas GCD Total <sup>1</sup>		Carrizo	2,216	11,339	11,187	11,123	11,095	11,090	11,090
Post Oak Savannah GCD	Burleson	Carrizo	647	4,383	4,821	5,698	5,917	6,575	6,575
Post Oak Savannah GCD	Milam	Carrizo	23	322	355	419	435	484	484
Post Oak Savannah GCD Total <sup>1</sup>		Carrizo	670	4,705	5,176	6,117	6,352	7,058	7,058
GMA 12 Total <sup>1</sup>		Carrizo	9,502	34,560	35,616	37,427	40,211	41,167	41,167

1. Individual estimates are rounded and may not always sum up to the total value displayed.

2. Modeled available groundwater values for Fayette County include all of the county (GMA 12 and GMA 15 portions)

TABLE 8 MODELED AVAILABLE GROUNDWATER FOR THE QUEEN CITY AQUIFER IN GROUNDWATER MANAGEMENT AREA 12  
SUMMARIZED BY GROUNDWATER CONSERVATION DISTRICT (GCD) AND COUNTY FOR EACH DECADE BETWEEN 2010 AND  
2069. VALUES ARE IN ACRE-FEET PER YEAR

Groundwater Conservation District	County	Aquifer	2010	2020	2030	2040	2050	2060	2069
Brazos Valley GCD	Brazos	Queen City	541	836	883	887	891	891	891
Brazos Valley GCD	Robertson	Queen City	0	368	309	309	309	309	309
Brazos Valley GCD Total <sup>1</sup>		Queen City	541	1,204	1,192	1,196	1,200	1,200	1,200
Fayette County GCD	Fayette <sup>2</sup>	Queen City	268	2,708	2,708	2,708	2,708	2,708	2,708
Lost Pines GCD	Bastrop	Queen City	192	558	541	523	505	486	467
Lost Pines GCD	Lee	Queen City	394	757	774	792	810	829	848
Lost Pines GCD Total <sup>1</sup>		Queen City	587	1,315	1,315	1,315	1,315	1,315	1,315
Mid-East Texas GCD	Freestone	Queen City	0	0	0	0	0	0	0
Mid-East Texas GCD	Leon	Queen City	624	594	594	594	594	594	594
Mid-East Texas GCD	Madison	Queen City	148	380	380	380	380	380	380
Mid-East Texas GCD Total <sup>1</sup>		Queen City	772	974	974	974	974	974	974
Post Oak Savannah GCD	Burleson	Queen City	685	416	447	447	447	447	447
Post Oak Savannah GCD	Milam	Queen City	20	53	56	56	56	56	56
Post Oak Savannah GCD Total <sup>1</sup>		Queen City	705	469	504	504	504	504	504
GMA 12 Total <sup>1</sup>		Queen City	2,873	6,669	6,693	6,696	6,700	6,701	6,700

1. Individual estimates are rounded and may not always sum up to the total value displayed.
2. Modeled available groundwater values for Fayette County include all of the county (GMA 12 and GMA 15 portions)

TABLE 9 MODELED AVAILABLE GROUNDWATER FOR THE SPARTA AQUIFER IN GROUNDWATER MANAGEMENT AREA 12 SUMMARIZED  
BY GROUNDWATER CONSERVATION DISTRICT (GCD) AND COUNTY FOR EACH DECADE BETWEEN 2010 AND 2069. VALUES  
ARE IN ACRE-FEET PER YEAR.

Groundwater Conservation District	County	Aquifer	2010	2020	2030	2040	2050	2060	2069
Brazos Valley GCD	Brazos	Sparta	3,745	5,404	6,505	7,507	8,509	8,509	8,509
Brazos Valley GCD	Robertson	Sparta	16	510	510	510	510	510	510
Brazos Valley GCD Total <sup>1</sup>		Sparta	3,760	5,914	7,015	8,017	9,019	9,019	9,019
Fayette County GCD	Fayette <sup>2</sup>	Sparta	1,176	2,831	2,825	2,803	2,794	2,802	2,802
Lost Pines GCD	Bastrop	Sparta	81	907	904	902	898	896	895
Lost Pines GCD	Lee	Sparta	218	1,483	1,487	1,490	1,492	1,495	1,498
Lost Pines GCD Total <sup>1</sup>		Sparta	299	2,390	2,391	2,391	2,391	2,391	2,392
Mid-East Texas GCD	Leon	Sparta	86	21	21	21	21	21	21
Mid-East Texas GCD	Madison	Sparta	1,401	3,320	3,322	3,322	3,322	3,322	3,322
Mid-East Texas GCD Total <sup>1</sup>		Sparta	1,487	3,341	3,343	3,343	3,343	3,343	3,343
Post Oak Savannah GCD	Burleson	Sparta	988	2,246	4,042	5,613	6,735	6,735	6,735
GMA 12 Total <sup>1</sup>		Sparta	7,709	16,721	19,616	22,167	24,282	24,291	24,292

1. Individual estimates are rounded and may not always sum up to the total value displayed.
2. Modeled available groundwater values for Fayette County include all of the county (GMA 12 and GMA 15 portions)

TABLE 10 MODELED AVAILABLE GROUNDWATER FOR THE YEGUA-JACKSON AQUIFER IN GROUNDWATER MANAGEMENT AREA 12  
 SUMMARIZED BY GROUNDWATER CONSERVATION DISTRICT (GCD) AND COUNTY FOR EACH DECADE BETWEEN 2010 AND  
 2069. VALUES ARE IN ACRE-FEET PER YEAR.

Groundwater Conservation District	County	Aquifer	2010	2020	2030	2040	2050	2060	2069
Brazos Valley GCD	Brazos	Jackson	4,411	4,404	4,402	4,402	4,402	4,402	4,402
Brazos Valley GCD	Brazos	Yegua	2,452	2,452	2,452	2,452	2,452	2,452	2,452
Brazos Valley GCD Total <sup>1</sup>		Yegua-Jackson	6,863	6,856	6,854	6,854	6,854	6,854	6,854
Fayette County GCD <sup>1</sup>	Fayette <sup>3</sup>	Yegua-Jackson	9,262	9,262	9,262	9,262	9,262	9,261	9,261
Lost Pines GCD <sup>2</sup>	Bastrop	Yegua-Jackson	NR	NR	NR	NR	NR	NR	NR
Lost Pines GCD <sup>2</sup>	Lee	Yegua-Jackson	NR	NR	NR	NR	NR	NR	NR
Lost Pines GCD Total <sup>1,2</sup>		Yegua-Jackson	NR	NR	NR	NR	NR	NR	NR
Mid-East Texas GCD	Leon	Yegua-Jackson	0	0	0	0	0	0	0
Mid-East Texas GCD	Madison	Yegua-Jackson	809	809	809	809	809	809	809
Mid-East Texas GCD Total <sup>1</sup>		Yegua-Jackson	809	809	809	809	809	809	809
Post Oak Savannah GCD <sup>1</sup>	Burleson	Yegua-Jackson	14,544	14,544	12,576	12,564	12,478	12,326	10,200
GMA 12 Total <sup>1</sup>		Yegua-Jackson	31,478	31,471	29,501	29,489	29,403	29,250	27,124

1. Individual estimates are rounded and may not always sum up to the total value displayed.
2. NR: Groundwater Management Area 12 declared the Yegua-Jackson Aquifer not relevant in these areas.
3. Modeled available groundwater values for Fayette County include all of the county (GMA 12 and GMA 15 portions)

TABLE 11 MODELED AVAILABLE GROUNDWATER FOR THE BRAZOS RIVER ALLUVIUM AQUIFER IN GROUNDWATER MANAGEMENT  
AREA 12 SUMMARIZED BY GROUNDWATER CONSERVATION DISTRICT (GCD) AND COUNTY FOR EACH DECADE BETWEEN  
2013 AND 2070. VALUES ARE IN ACRE-FEET PER YEAR.

Groundwater Conservation District	County	Aquifer	2013	2020	2030	2040	2050	2060	2070
Brazos Valley GCD	Brazos	Brazos River Alluvium	122,785	81,581	80,311	80,081	79,976	79,913	79,872
Brazos Valley GCD	Robertson	Brazos River Alluvium	66,608	61,161	57,959	57,633	57,544	57,503	57,480
Brazos Valley GCD Total <sup>1</sup>		Brazos River Alluvium	189,393	142,742	138,270	137,714	137,520	137,416	137,351
Post Oak Savannah GCD	Burleson	Brazos River Alluvium	28,515	28,472	28,418	28,414	28,414	28,414	28,413
Post Oak Savannah GCD	Milam	Brazos River Alluvium	50,626	47,818	47,785	47,779	47,775	47,773	47,771
Post Oak Savannah GCD Total <sup>1</sup>		Brazos River Alluvium	79,142	76,290	76,203	76,193	76,189	76,186	76,185
No District-County <sup>2</sup>	Falls	Brazos River Alluvium	NR	NR	NR	NR	NR	NR	NR
GMA 12 Total <sup>1</sup>		Brazos River Alluvium	268,535	219,032	214,473	213,907	213,709	213,602	213,536

1. Individual estimates are rounded and may not always sum up to the total value displayed.

2. NR: Groundwater Management Area 12 declared the Brazos River Alluvium Aquifer not relevant in these areas.

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TABLE 12 MODELED AVAILABLE GROUNDWATER BY DECADE FOR THE HOOPER AQUIFER IN GROUNDWATER MANAGEMENT AREA 12. VALUES ARE IN ACRE-FEET PER YEAR AND ARE SUMMARIZED BY COUNTY, REGIONAL WATER PLANNING AREA (RWPA), RIVER BASIN, AND AQUIFER.

County	RWPA	River Basin	Aquifer	2020	2030	2040	2050	2060
Bastrop	K	Brazos	Hooper	0	0	0	0	0
Bastrop	K	Colorado	Hooper	651	781	953	1,176	1,179
Bastrop	K	Guadalupe	Hooper	0	0	0	0	0
Brazos	G	Brazos	Hooper	0	0	0	0	0
Burleson	G	Brazos	Hooper	1,085	1,515	1,623	1,623	1,623
Falls	G	Brazos	Hooper	727	734	741	749	749
Fayette	K	Colorado	Hooper	NR	NR	NR	NR	NR
Fayette	K	Guadalupe	Hooper	NR	NR	NR	NR	NR
Fayette	K	Lavaca	Hooper	NR	NR	NR	NR	NR
Freestone	C	Brazos	Hooper	518	543	568	593	619
Freestone	C	Trinity	Hooper	3,823	4,035	4,246	4,458	4,669
Lee	G	Brazos	Hooper	59	72	90	112	111
Lee	G	Colorado	Hooper	3	4	5	7	6
Leon	H	Brazos	Hooper	0	0	0	0	0
Leon	H	Trinity	Hooper	0	0	0	0	0
Limestone	G	Brazos	Hooper	1,382	1,410	1,444	1,496	1,496
Madison	H	Brazos	Hooper	0	0	0	0	0
Madison	H	Trinity	Hooper	0	0	0	0	0
Milam	G	Brazos	Hooper	1,874	2,623	2,811	2,811	2,800
Navarro	C	Trinity	Hooper	11	11	11	11	11
Robertson	G	Brazos	Hooper	1,446	1,884	1,942	2,000	2,000

Williamson	G	Brazos	Hooper	5	5	5	5	5
Williamson	G	Colorado	Hooper	0	0	0	0	0
GMA 12 Total			Hooper	11,584	13,617	14,439	15,041	15,268

NR: Groundwater Management Area 12 declared the Hooper Aquifer not relevant in these areas.

TABLE 13 MODELED AVAILABLE GROUNDWATER BY DECADE FOR THE SIMSBORO AQUIFER IN GROUNDWATER MANAGEMENT AREA 12. VALUES ARE IN ACRE-FEET PER YEAR AND ARE SUMMARIZED BY COUNTY, REGIONAL WATER PLANNING AREA (RWPA), RIVER BASIN, AND AQUIFER.

County	RWPA	River Basin	Aquifer	2020	2030	2040	2050	2060
Bastrop	K	Brazos	Simsboro	398	529	653	776	765
Bastrop	K	Colorado	Simsboro	13,855	15,145	15,658	16,558	15,182
Bastrop	K	Guadalupe	Simsboro	0	0	0	0	0
Brazos	G	Brazos	Simsboro	41,115	44,120	45,681	50,208	53,404
Burleson	G	Brazos	Simsboro	17,687	21,616	25,103	28,858	30,409
Falls	G	Brazos	Simsboro	140	141	143	146	146
Fayette	K	Colorado	Simsboro	NR	NR	NR	NR	NR
Fayette	K	Guadalupe	Simsboro	NR	NR	NR	NR	NR
Fayette	K	Lavaca	Simsboro	NR	NR	NR	NR	NR
Freestone	C	Brazos	Simsboro	685	673	668	657	657
Freestone	C	Trinity	Simsboro	2,897	2,916	2,917	2,895	2,893
Lee	G	Brazos	Simsboro	17,993	17,221	17,031	17,179	14,896
Lee	G	Colorado	Simsboro	0	0	0	0	0
Leon	H	Brazos	Simsboro	553	555	563	575	576
Leon	H	Trinity	Simsboro	2,807	2,902	2,976	3,042	3,047
Limestone	G	Brazos	Simsboro	9,753	9,850	9,992	10,235	10,235
Madison	H	Brazos	Simsboro	0	0	0	0	0
Madison	H	Trinity	Simsboro	0	0	0	0	0
Millam	G	Brazos	Simsboro	20,783	16,284	14,940	17,171	18,094
Navarro	C	Trinity	Simsboro	4	4	4	4	4

Robertson	G	Brazos	Simsboro	41,673	42,061	42,468	42,794	42,794
Williamson	G	Brazos	Simsboro	2	2	2	2	2
GMA 12 Total			Simsboro	170,345	174,019	178,799	191,100	193,104

NR: Groundwater Management Area 12 declared the Simsboro Aquifer not relevant in these areas.

TABLE 14 MODELED AVAILABLE GROUNDWATER BY DECADE FOR THE CALVERT BLUFF AQUIFER IN GROUNDWATER MANAGEMENT AREA 12. VALUES ARE IN ACRE-FEET PER YEAR AND ARE SUMMARIZED BY COUNTY, REGIONAL WATER PLANNING AREA (RWPA), RIVER BASIN, AND AQUIFER.

County	RWPA	River Basin	Aquifer	2020	2030	2040	2050	2060
Bastrop	K	Brazos	Calvert Bluff	97	104	122	154	134
Bastrop	K	Colorado	Calvert Bluff	1,958	2,349	2,837	3,446	3,627
Bastrop	K	Guadalupe	Calvert Bluff	9	9	11	13	12
Brazos	G	Brazos	Calvert Bluff	0	0	0	0	0
Burleson	G	Brazos	Calvert Bluff	87	87	87	87	87
Fayette	K	Colorado	Calvert Bluff	NR	NR	NR	NR	NR
Fayette	K	Guadalupe	Calvert Bluff	NR	NR	NR	NR	NR
Fayette	K	Lavaca	Calvert Bluff	NR	NR	NR	NR	NR
Freestone	C	Brazos	Calvert Bluff	130	127	126	124	124
Freestone	C	Trinity	Calvert Bluff	624	607	602	590	590
Lee	G	Brazos	Calvert Bluff	161	169	211	296	209
Lee	G	Colorado	Calvert Bluff	0	0	0	0	0
Leon	H	Brazos	Calvert Bluff	585	589	590	590	592
Leon	H	Trinity	Calvert Bluff	2,235	2,364	2,475	2,600	2,609
Limestone	G	Brazos	Calvert Bluff	218	223	228	235	235
Madison	H	Brazos	Calvert Bluff	0	0	0	0	0
Madison	H	Trinity	Calvert Bluff	0	0	0	0	0
Millam	G	Brazos	Calvert Bluff	949	949	949	949	949
Navarro	C	Trinity	Calvert Bluff	0	0	0	0	0
Robertson	G	Brazos	Calvert Bluff	1,764	1,757	1,758	1,757	1,757
Williamson	G	Brazos	Calvert Bluff	2	2	2	3	2
<b>GMA 12 Total</b>			<b>Calvert Bluff</b>	<b>8,819</b>	<b>9,336</b>	<b>9,998</b>	<b>10,844</b>	<b>10,927</b>

NR: Groundwater Management Area 12 declared the Calvert Bluff Aquifer not relevant in these areas.

TABLE 15 MODELED AVAILABLE GROUNDWATER BY DECADE FOR THE CARRIZO AQUIFER IN GROUNDWATER MANAGEMENT AREA 12. VALUES ARE IN ACRE-FEET PER YEAR AND ARE SUMMARIZED BY COUNTY, REGIONAL WATER PLANNING AREA (RWPA), RIVER BASIN, AND AQUIFER.

County	RWPA	River Basin	Aquifer	2020	2030	2040	2050	2060
Bastrop	K	Brazos	Carrizo	257	214	185	303	214
Bastrop	K	Colorado	Carrizo	4,232	4,931	5,721	7,390	7,835
Bastrop	K	Guadalupe	Carrizo	203	163	136	235	155
Brazos	G	Brazos	Carrizo	3,717	3,724	3,737	3,761	3,763
Burleson	G	Brazos	Carrizo	4,383	4,821	5,698	5,917	6,575
Fayette <sup>1</sup>	K	Colorado	Carrizo	4,565	4,565	4,565	4,565	4,565
Fayette <sup>1</sup>	K	Guadalupe	Carrizo	909	909	909	909	909
Fayette <sup>1</sup>	K	Lavaca	Carrizo	0	0	0	0	0
Freestone	C	Trinity	Carrizo	369	366	357	347	346
Lee	G	Brazos	Carrizo	2,249	2,268	2,335	2,881	2,752
Lee	G	Colorado	Carrizo	677	782	886	991	1,095
Leon	H	Brazos	Carrizo	2,474	2,260	2,172	2,186	2,188
Leon	H	Trinity	Carrizo	5,634	5,791	5,938	6,008	6,012
Madison	H	Brazos	Carrizo	381	371	352	335	334
Madison	H	Trinity	Carrizo	2,481	2,399	2,304	2,219	2,210
Millam	G	Brazos	Carrizo	322	355	419	435	484
Robertson	G	Brazos	Carrizo	1,707	1,698	1,713	1,730	1,731
GMA 12								
Total			Carrizo	34,560	35,617	37,427	40,212	41,168

1. Modeled available groundwater values for Fayette County include all of the county (GMA 12 and GMA 15 portions)

TABLE 16 MODELED AVAILABLE GROUNDWATER BY DECADE FOR THE QUEEN CITY AQUIFER IN GROUNDWATER MANAGEMENT AREA 12. VALUES ARE IN ACRE-FEET PER YEAR AND ARE SUMMARIZED BY COUNTY, REGIONAL WATER PLANNING AREA (RWPA), RIVER BASIN, AND AQUIFER.

County	RWPA	River Basin	Aquifer	2020	2030	2040	2050	2060
Bastrop	K	Brazos	Queen City	49	47	46	44	42
Bastrop	K	Colorado	Queen City	353	333	311	288	264
Bastrop	K	Guadalupe	Queen City	156	161	166	173	180
Brazos	G	Brazos	Queen City	836	883	887	891	891
Burleson	G	Brazos	Queen City	416	447	447	447	447
Fayette <sup>1</sup>	K	Colorado	Queen City	2,278	2,278	2,278	2,278	2,278
Fayette <sup>1</sup>	K	Guadalupe	Queen City	430	430	430	430	430
Fayette <sup>1</sup>	K	Lavaca	Queen City	0	0	0	0	0
Freestone	C	Trinity	Queen City	0	0	0	0	0
Lee	G	Brazos	Queen City	709	713	716	721	727
Lee	G	Colorado	Queen City	48	61	75	89	102
Leon	H	Brazos	Queen City	245	245	245	245	245
Leon	H	Trinity	Queen City	349	349	349	349	349
Madison	H	Brazos	Queen City	1	1	1	1	1
Madison	H	Trinity	Queen City	379	379	379	379	379
Millam	G	Brazos	Queen City	53	56	56	56	56
Robertson	G	Brazos	Queen City	368	309	309	309	309
GMA 12			Queen City	6,670	6,692	6,695	6,700	6,700
Total								

1. Modeled available groundwater values for Fayette County include all of the county (GMA 12 and GMA 15 portions)

TABLE 17 MODELED AVAILABLE GROUNDWATER BY DECADE FOR THE SPARTA AQUIFER IN GROUNDWATER MANAGEMENT AREA 12. VALUES ARE IN ACRE-FEET PER YEAR AND ARE SUMMARIZED BY COUNTY, REGIONAL WATER PLANNING AREA (RWPA), RIVER BASIN, AND AQUIFER.

County	RWPA	River Basin	Aquifer	2020	2030	2040	2050	2060
Bastrop	K	Brazos	Sparta	89	87	85	84	82
Bastrop	K	Colorado	Sparta	785	784	783	782	781
Bastrop	K	Guadalupe	Sparta	33	33	33	33	33
Brazos	G	Brazos	Sparta	5,404	6,505	7,507	8,509	8,509
Burleson	G	Brazos	Sparta	2,246	4,042	5,613	6,735	6,735
Fayette <sup>1</sup>	K	Colorado	Sparta	1,659	1,649	1,626	1,612	1,619
Fayette <sup>1</sup>	K	Guadalupe	Sparta	1,172	1,176	1,177	1,182	1,183
Fayette <sup>1</sup>	K	Lavaca	Sparta	0	0	0	0	0
Lee	G	Brazos	Sparta	1,279	1,274	1,269	1,263	1,256
Lee	G	Colorado	Sparta	204	213	221	230	238
Leon	H	Brazos	Sparta	0	0	0	0	0
Leon	H	Trinity	Sparta	21	21	21	21	21
Madison	H	Brazos	Sparta	7	9	9	9	9
Madison	H	Trinity	Sparta	3,313	3,313	3,313	3,313	3,313
Robertson	G	Brazos	Sparta	510	510	510	510	510
GMA 12				16,722	19,616	22,167	24,283	24,289
Total			Sparta					

1. Modeled available groundwater values for Fayette County include all of the county (GMA 12 and GMA 15 portions)

TABLE 18 MODELED AVAILABLE GROUNDWATER BY DECADE FOR THE YEGUA-JACKSON AQUIFER IN GROUNDWATER MANAGEMENT AREA 12. RESULTS ARE IN ACRE-FEET PER YEAR AND ARE SUMMARIZED BY COUNTY, REGIONAL WATER PLANNING AREA (RWPA), RIVER BASIN, AND AQUIFER

County	RWP	River Basin	Aquifer	2020	2030	2040	2050	2060
Bastrop	A	Colorado	Yegua-Jackson	NR	NR	NR	NR	NR
Brazos	K	Colorado	Yegua-Jackson	NR	NR	NR	NR	NR
Brazos	G	Brazos	Yegua-Jackson	6,856	6,854	6,854	6,854	6,854
Burlason	G	Brazos	Yegua-Jackson	14,544	12,576	12,564	12,478	12,326
Fayette <sup>1</sup>	K	Colorado	Yegua-Jackson	7,075	7,075	7,075	7,075	7,074
Fayette <sup>1</sup>	K	Guadalupe	Yegua-Jackson	694	694	694	694	694
Fayette <sup>1</sup>	K	Lavaca	Yegua-Jackson	1,493	1,493	1,493	1,493	1,493
Lee	G	Brazos	Yegua-Jackson	NR	NR	NR	NR	NR
Lee	G	Colorado	Yegua-Jackson	NR	NR	NR	NR	NR
Leon	H	Trinity	Yegua-Jackson	0	0	0	0	0
Madison	H	Brazos	Yegua-Jackson	8	8	8	8	8
Madison	H	Trinity	Yegua-Jackson	802	802	802	802	802
GMA 12 Total			Yegua-Jackson	31,471	29,501	29,489	29,403	29,250

1. Modeled available groundwater values for Fayette County include all of the county (GMA 12 and GMA 15 portions)  
2. NR: Groundwater Management Area 12 declared the Yegua-Jackson Aquifer not relevant in these areas.

TABLE 19 MODELED AVAILABLE GROUNDWATER BY DECADE FOR THE BRAZOS RIVER ALLUVIUM AQUIFER IN GROUNDWATER MANAGEMENT AREA 12. RESULTS ARE IN ACRE-FEET PER YEAR AND ARE SUMMARIZED BY COUNTY, REGIONAL WATER PLANNING AREA (RWPA), RIVER BASIN, AND AQUIFER.

County	RWP A	River Basin	Aquifer	2020	2030	2040	2050	2060	2070
Brazos	G	Brazos	Brazos River Alluvium	81,581	80,311	80,081	79,976	79,913	79,872
Burleson	G	Brazos	Brazos River Alluvium	28,472	28,418	28,414	28,414	28,414	28,413
Falls	G	Brazos	Brazos River Alluvium	NR	NR	NR	NR	NR	NR
Milam	G	Brazos	Brazos River Alluvium	47,818	47,785	47,779	47,775	47,773	47,771
Robertson	G	Brazos	Brazos River Alluvium	61,161	57,959	57,633	57,544	57,503	57,480
GMA 12 Total			Brazos River Alluvium	219,032	214,473	213,907	213,709	213,602	213,536

NR: Groundwater Management Area 12 declared the Brazos River Alluvium Aquifer not relevant in these areas.

*GAM Run 17-030 MAG: Modeled Available Groundwater for the Carrizo-Wilcox, Queen City, Sparta, Yegua-Jackson, and Brazos River Alluvium aquifers in Groundwater Management Area 12*

*December 15, 2017*

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### **LIMITATIONS:**

The groundwater model used in completing this analysis is the best available scientific tool 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 streamflow are specific to a particular historic time period.

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.

It is important for groundwater conservation districts to monitor groundwater pumping and groundwater levels in 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.

*GAM Run 17-030 MAG: Modeled Available Groundwater for the Carrizo-Wilcox, Queen City, Sparta, Yegua-Jackson, and Brazos River Alluvium aquifers in Groundwater Management Area 12*

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*GAM Run 17-030 MAG: Modeled Available Groundwater for the Carrizo-Wilcox, Queen City, Sparta, Yegua-Jackson, and Brazos River Alluvium aquifers in Groundwater Management Area 12*  
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Mar. 20. 2018 5:07PM

Received

Mar 20 2018 05:12pm

No. 0090 P. 62



INTERA Incorporated  
1812 Centre Creek Drive, Suite 300  
Austin, Texas, USA 78754  
512.425.2000

March 15, 2018

Mr. Gary Westbrook, Manager

Post Oak Savannah Groundwater Conservation District

P.O. Box 92

Milano, Texas 76556

**Re: GAM Run 17-030 MAG : Modeled Available Groundwater for the Carrizo-Wilcox, Queen City, Sparta, Yegua-Jackson, and Brazos River Alluvium Aquifers in Groundwater Management Area 12**

Dear Gary:

INTERA has reviewed the MAG report that TWDB provided for interim review entitled "*GAM Run 17-030 MAG: Modeled Available Groundwater for the Carrizo-Wilcox, Queen City, Sparta, Yegua-Jackson, and Brazos River Alluvium Aquifers in Groundwater Management Area 12*" dated December 1, 2017. Our findings are summarized below by report section. The MAG report is consistent with current POSGCD and GMA 12 DFCs. No changes are recommended.

#### HOOPER, SIMSBORO, CALVERT BLUFF, QUEEN CITY AND SPARTA AQUIFERS

- *DFCs*: The DFCs that TWDB used to calculate MAGs in POSGCD agree with the DFCs adopted by POSGCD for these aquifers.
- *Methods*: The Central Queen City-Sparta model (Kelley and others, 2004) and the model files that TWDB used to calculate MAGs in POSGCD are consistent with the methods we used to evaluate the POSGCD DFCs.
- *Parameters & Assumptions*: The parameters and assumptions that TWDB used when running the Central Queen City-Sparta model are consistent with values used by GMA 12.
- *Results*: All MAG values that TWDB calculated for each aquifer in POSGCD reasonably agree (within 3% or less) with POSGCD pumping values applied in the model for those aquifers.

#### YEGUA-JACKSON AQUIFER

- *DFCs*: The DFC that TWDB used to calculate the MAG in POSGCD agrees with the DFC adopted by POSGCD for this aquifer.
- *Methods*: The Yegua-Jackson Aquifer model (Deeds and others, 2010) and the model files that TWDB used to calculate MAGs in POSGCD are consistent with the methods we used to evaluate the POSGCD DFCs.
- *Parameters & Assumptions*: The parameters and assumptions that TWDB used when running the Yegua-Jackson Aquifer model are consistent with values used by GMA 12.
- *Results*: All MAG values that TWDB calculated for this aquifer in POSGCD reasonably agree (within 2% or less) with POSGCD pumping values applied in the model for this aquifer, when accounting for dry cells.

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BRAZOS RIVER ALLUVIUM AQUIFER

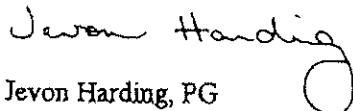
- *DFCs*: The DFC that TWDB used to calculate the MAG in POSGCD agrees with the DFC adopted by POSGCD for this aquifer.
- *Methods*: We did not evaluate the POSGCD DFCs using a model. However, the Brazos River Alluvium Aquifer model (Ewing and Jigmond, 2016) and the extended model files that TWDB used to calculate MAGs in POSGCD are reasonable.
- *Parameters & Assumptions*: The parameters and assumptions that TWDB used when running the Brazos River Alluvium Aquifer model are consistent with the state-of-practice for groundwater modeling.
- *Results*: All MAG values that TWDB calculated for this aquifer in POSGCD are reasonable and are higher than the current permitted amounts in this aquifer in GMA 12 (combination of POSGCD and BVGCD permitted amounts).

Please call us if you have questions regarding our review.

Sincerely,



Steve Young, PG, PE, Ph.D  
Principal Hydrogeologist



Jevon Harding, PG  
Hydrogeologist

	County	Aquifer	2010	2020	2030	2040	2050	2060	2069
MAG	Burleson	Carrizo	647	4,383	4,821	5,698	5,917	6,575	6,575
	Milam	Carrizo	23	322	355	419	435	484	484
	Total	Carrizo	670	4,705	5,176	6,117	6,352	7,058	7,058
INTERA	Burleson	Carrizo	647	4,383	4,821	5,698	5,917	6,575	6,575
	Milam	Carrizo	23	326	358	423	439	488	488
	Total	Carrizo	670	4,709	5,179	6,121	6,357	7,063	7,063
Difference	Burleson	Carrizo	0%	0%	0%	0%	0%	0%	0%
	Milam	Carrizo	0%	-1.2%	-0.8%	-1.0%	-0.9%	-0.8%	-0.8%
	Total	Carrizo	0%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%

	County	Aquifer	2010	2020	2030	2040	2050	2060	2069
MAG	Burleson	Queen City	685	416	447	447	447	447	447
	Milam	Queen City	20	53	56	56	56	56	56
	Total	Queen City	705	469	504	504	504	504	504
INTERA	Burleson	Queen City	685	416	447	447	447	447	447
	Milam	Queen City	20	53	57	57	57	57	57
	Total	Queen City	705	469	505	504	504	504	504
Difference	Burleson	Queen City	0%	0%	0%	0%	0%	0%	0%
	Milam	Queen City	0%	0%	-1.8%	-1.8%	-1.8%	-1.8%	-1.8%
	Total	Queen City	0%	0%	-0.2%	0%	0%	0%	0%

	County	Aquifer	2010	2020	2030	2040	2050	2060	2069
MAG	Burleson	Sparta	988	2,246	4,042	5,613	6,735	6,735	6,735
INTERA	Burleson	Sparta	988	2,249	4,049	5,622	6,747	6,747	6,747
Difference	Burleson	Sparta	0%	-0.1%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%

	County	Aquifer	2010	2020	2030	2040	2050	2060	2069
MAG	Burleson	Yegua-Jackson	14,544	14,544	12,576	12,564	12,478	12,326	10,200
INTERA	Burleson	Yegua-Jackson	14,693	14,693	12,725	12,713	12,627	12,475	10,349
Difference	Burleson	Yegua-Jackson	1.0%	1.0%	1.2%	1.2%	1.2%	1.2%	1.5%

## Supporting Tables for INTERA's Dec 13, 2017 MAG response memo:

	County	Aquifer	2010	2020	2030	2040	2050	2060	2069
MAG	Burleson	Hooper	19	1,085	1,515	1,623	1,623	1,623	1,623
	Milam	Hooper	5,366	1,874	2,623	2,811	2,811	2,800	2,800
	Total	Hooper	5,385	2,960	4,139	4,433	4,433	4,422	4,422
INTERA	Burleson	Hooper	19	1,085	1,515	1,623	1,623	1,623	1,623
	Milam	Hooper	5,366	1,906	2,667	2,858	2,858	2,858	2,858
	Total	Hooper	5,385	2,991	4,183	4,480	4,480	4,480	4,480
Difference	Burleson	Hooper	0%	0%	0%	0%	0%	0%	0%
	Milam	Hooper	0%	-1.7%	-1.7%	-1.7%	-1.7%	-2.1%	-2.1%
	Total	Hooper	0%	-1.0%	-1.1%	-1.1%	-1.1%	-1.3%	-1.3%

	County	Aquifer	2010	2020	2030	2040	2050	2060	2069
MAG	Burleson	Simsboro	627	17,687	21,616	25,103	28,858	30,409	30,409
	Milam	Simsboro	10,702	20,783	16,284	14,940	17,171	18,094	18,094
	Total	Simsboro	11,329	38,470	37,900	40,042	46,028	48,503	48,503
INTERA	Burleson	Simsboro	627	17,687	21,616	25,103	28,858	30,409	30,409
	Milam	Simsboro	10,702	20,783	16,284	14,940	17,171	18,094	18,094
	Total	Simsboro	11,329	38,470	37,900	40,042	46,028	48,503	48,503
Difference	Burleson	Simsboro	0%	0%	0%	0%	0%	0%	0%
	Milam	Simsboro	0%	0%	0%	0%	0%	0%	0%
	Total	Simsboro	0%	0%	0%	0%	0%	0%	0%

	County	Aquifer	2010	2020	2030	2040	2050	2060	2069
MAG	Burleson	Calvert Bluff	0	87	87	87	87	87	87
	Milam	Calvert Bluff	1,713	949	949	949	949	949	949
	Total	Calvert Bluff	1,713	1,036	1,036	1,036	1,036	1,036	1,036
INTERA	Burleson	Calvert Bluff	0	87	87	87	87	87	87
	Milam	Calvert Bluff	1,713	951	951	951	951	951	951
	Total	Calvert Bluff	1,713	1,037	1,037	1,037	1,037	1,037	1,037
Difference	Burleson	Calvert Bluff	0%	0%	0%	0%	0%	0%	0%
	Milam	Calvert Bluff	0%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%
	Total	Calvert Bluff	0%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%



CLAYTON WILLIAMS ENERGY, INC.

JOLYNNE DERIGO  
Legal Assistant  
(432) 688-3424  
[jderigo@claytonwilliams.com](mailto:jderigo@claytonwilliams.com)



February 20, 2015

Mr. Gary Westbrook  
Post Oak Savannah Groundwater Conservation District  
P. O. Box 92  
Milano, TX 76556

Re: Clayton Williams Energy, Inc.  
Invoice # 5308 and Invoice # 5309

Dear Mr. Westbrook:

Enclosed are two checks in payment of the following invoices:

Check No. 316745 for \$1,000.00 in payment of Invoice No. 5308 -- fine for production of groundwater without a permit (Marshall 140)

Check # 316744 for \$426.00 in payment of Invoice No. 5309 -- Application fees for Frac'ing Marshall 140, Leases 1, 2 and 3, and Production Fees, Marshall 140, Leases 1, 2 and 3;

Very truly yours,

A handwritten signature in black ink that reads "Jolynne Derigo". The signature is written in a cursive style.

Jolynne Derigo  
Assistant to T. Mark Tisdale

/jd  
Enclosures

No. 0090 P. 68

Publication No. 17, U. S. ARMY HQ, WASHINGTON, 203107, 576543, 431425, 000000

MIDLAND, TX 79708

THIS CHECK IS VOID WITHOUT A REMITTEE & GRAY BORDER AND BACKGROUND PLUS A MICRONT & FINGERPRINT WATERMARK ON THE BACK - HOLD AT ANGLE TO VIEW

**CLAYTON WILLIAMS ENERGY, INC.**

55-382  
412

Wells Fargo Bank Ohio, N.A.  
Van Wert, OH

8 DESTA DRIVE, STE 1100,  
MIDLAND, TX 79705  
(432) 882-8324

CHECK NO. 316745 DATE 2/20/15

AMOUNT
****1,000.00

\*\*\*\*\*1,000 DOLLARS \*\*\*\*\* CENTS

CLAYTON WILLIAMS ENERGY, INC.

89212

TO THE ORDER OF POST OAK SAVANNAH GROUNDWATER CONSERVATION DISTRICT  
POSGCD  
P O BOX 92  
MILANO TX 76556

*Orla W. Willey*

VOID AFTER 180 DAYS

083167450# 15041203824# 96000053550#

No. 0090 P. 69

MIDLAND, TX 79708

11316744 1041203824 9600005355



## 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  
Email: [posgcd@tconline.net](mailto:posgcd@tconline.net)  
Website: [www.posgcd.org](http://www.posgcd.org)



Gary Westbrook, General Manager

August 6, 2012

Mr. Michael Cardenas  
Anadarko E&P Company, LP  
2870 N. Harvey Mitchell Pkwy  
Bryan, TX 77807

Dear Mr Cardenas:

This letter follows-up on the report made by Anadarko E&P Co., LP, of the total volume of water transported out of the District in prior years. The report shows that you transported groundwater out of the District without a transport permit issued by the District.

The transported groundwater out of the District without a transport permit is a violation of the rules. The minimum fine established by the Board for that violation is \$1,000.00. As general manager, the only authority that I have to resolve this matter requires me to impose and collect the minimum fine. Therefore, the minimum fine of \$1,000.00 is due and payable to the District within thirty (30) days, unless you appeal this matter to the Board. Please note that upon resolution of this matter, and approval of the Board of Directors of your pending application to transported groundwater out of the District which is set for hearing and consideration on August 14, 2012 and contingent upon resolution of this matter, fees due to the District for groundwater transported out of the District will be adjusted accordingly.

Please know that in an effort to find alternative resolutions to this matter I have spoken with the general counsel for the District regarding this, and, because of material future issues and the required equal enforcement of the rules, he strongly recommended the above actions.

Sincerely,

Gary Westbrook  
General Manager  
Post Oak Savannah GCD  
Cc: District files

EXHIBIT

D

## CAUSE NO. 34979

POST OAK SAVANNAH  
GROUNDWATER CONSERVATION  
DISTRICT  
Plaintiff,

V.

ROY DAVID CRUSH, JR.,  
Defendants,

§  
§  
§  
§  
§  
§  
§  
§  
§  
§

IN THE DISTRICT COURT OF

20th JUDICIAL DISTRICT

MILAM COUNTY, TEXAS

FINAL DEFAULT JUDGMENT

On June 17, 2013, came on to be heard Plaintiff's Motion for Default Judgment filed by POST OAK SAVANNAH CONSERVATION DISTRICT (hereinafter "Plaintiff" or "District") after Defendant, ROY DAVID CRUSH, JR. (hereinafter "Defendant") failed to file an answer in this case. Plaintiff appeared through its attorney. Defendant, having been duly served with citation and a copy of Plaintiff's Original Petition, did not appear and answer.

At the hearing, the Court determined it had jurisdiction over the subject matter and the parties in this proceeding, and the citation and proof of service were on file for at least ten days before the motion was filed. After considering the pleadings, the papers on file in this case, and the evidence Plaintiff presented on liability, penalties, and attorney fees, the Court finds Defendant did violate District rules promulgated pursuant to Section 36.102 of the Texas Water Code and grants Plaintiff's motion for default judgment.

The Court hereby RENDERS judgment for Plaintiff POST OAK SAVANNAH GROUNDWATER CONSERVATION DISTRICT.

COPY

1. Accordingly, the Court orders that Plaintiff recover the following from Defendant:
  - a. Penalties in the amount of \$ 100,000<sup>00</sup> (up to \$10,000 per day for each day the violations continued is provided for in the Texas Water Code);
  - b. Prejudgment interest on the penalties awarded at the rate of 10 % from 2/22/12 until the date of this judgment, in the amount of \$ T.B.O.
  - c. Reasonable and necessary attorney fees in the amount of \$ 5000<sup>00</sup> for the prosecution of this case through judgment;
  - d. Court costs; and
  - e. Postjudgment interest on all of the above at the rate of 10 % interest, compounded annually, from the date this judgment is entered until all amounts are paid in full.
2. The Court further orders that if Defendant unsuccessfully appeals this judgment, Plaintiff will additionally recover from Defendant the amount of \$ 10,000<sup>00</sup> representing the anticipated reasonably and necessary fees and expenses that would be incurred by Plaintiff in defending the appeal.
3. This judgment finally disposes of all claims and all parties.
4. The Court orders execution to issue for this judgment.
5. The Court orders the Clerk of the Court to provide a copy of this judgment to Defendant at the following last known address:

Roy David Crumh, Jr.  
4681 FM 811  
Centerville, Texas 75833

6. The Court further orders: \_\_\_\_\_

SIGNED on the JUNE 17<sup>th</sup> of \_\_\_\_\_, 2013.

  
JUDGE PRESIDING

FILED

At 9:45 o'clock A M

JUN 17 2013 *mc*

*Cindy Fechner*  
CINDY FECHNER  
DISTRICT CLERK, MILAM COUNTY, TEXAS

Received  
Mar. 20. 2018 5:08PM

Mar 20 2018 05:14pm

No. 0090 P. 74



Violation of District Rule or Permit (other than § 250.00  
the above listed violations) [Rule 15.4 Added December 9, 2009]

**RULE 15.5. SEALING OF WELLS.** The District may, upon an order being obtained from a court of competent jurisdiction, seal wells that are prohibited by District rule from withdrawing groundwater within the District, to ensure that a well is not operated in violation of these rules. A well may be sealed when: (1) no application has been made for a permit to drill a new well that has not been excluded or exempted by the Board; or (2) no application has been made for an operating permit to withdraw groundwater from an existing well that is not excluded or exempted from the requirement that a permit be obtained in order to lawfully withdraw groundwater; or (3) the Board has denied, canceled or revoked a drilling permit or an operating permit; or (4) no application is made for a certificate of registration for a new exempt well.

The well may be sealed by physical means, and tagged to indicate that the well has been sealed by the District, and other appropriate action may be taken as necessary to preclude operation of the well or to identify unauthorized operation of the well.

Tampering with, altering, damaging, or removing the seal of a sealed well, or in any other way violating the integrity of the seal, or pumping of groundwater from a well that has been sealed constitutes a violation of these rules and subjects the person performing that action, as well as any well owner or primary operator who authorizes or allows that action, to such penalties as provided by these rules. [Rule 15.4 as Renumbered December 9, 2009]

## SECTION 16.

### MANAGEMENT OF WATER AVAILABILITY AND PRODUCTION

**RULE 16.1. MANAGEMENT ZONES.** Groundwater availability will be conserved, preserved and protected by well spacing, permit requirements, and ~~for~~ limiting water drawdown levels within the Management Zones listed in Section 5 of the Management Plan. The District's rules and regulations will be adopted and enforced in compliance with *Chapter 36, Texas Water Code*, and the Board will take action as needed to accomplish the Desired Future Conditions. [Amended June 12, 2012] [Amended May 3, 2017]

**RULE 16.2. GENERAL.** All permits issued by the District that authorize the production of water shall be subject to the terms, conditions and provisions of this Section 16. All other terms, conditions and provisions of these rules shall be and remain in full force and effect. Any conflict between this Section 16 and any other Rule will be resolved by the Board upon a written request being made.

**RULE 16.3. MONITORING OF GROUNDWATER.** The District will monitor estimated total annual production, water quality, and the water levels. An analysis of the monitoring data will be reported at least once every three years. If, within a Management Zone, the drawdown based on monitored groundwater levels, or total estimated annual production, or projected average water level drawdowns, reach a threshold established in Rule 16.4, then, as determined appropriate by the Board, the District will give notice to well permittees in the affected Management Zone(s) as provided in Rule 16.4. After giving notice, the Board will take appropriate action based on the analysis of measured water levels, projected average water level drawdowns, permitted production, current and projected total estimated annual production and relevant hydrogeologic and water resource information including, but not limited to surface water availability and drought conditions, and review and evaluate the current and predicted water availability. The District may reduce ~~both~~ the maximum acre feet of water per acre of land for which the District may issue a permit and/or the volume of water authorized to be produced under any permit, as a result of the groundwater availability, total estimated annual production, and/or groundwater level drawdown within a Management Zone. The District may also adopt rule changes for a Management Zone if production in that Management Zone is shown to adversely impact groundwater conditions in another Management Zones. Once a threshold level has been reached, the corresponding actions in Rules 16.4 and 16.6 will be taken irrespective of any subsequent change to the DFCs for that aquifer or Management Zone. [Amended July 12, 2005] [Amended June 12, 2012] [Amended May 3, 2017]

**RULE 16.4. ACTIONS BASED ON MONITORING RESULTS.** Monitoring and threshold levels will be used to initiate appropriate responses designed to help achieve the DFCs, conserve and preserve groundwater availability and protect groundwater users. Three threshold levels are adopted to help guide these actions. Each threshold level provides for an increased level of response based on the change in production or water levels associated with a Management Zone. The threshold levels are: Level 1; Level 2; and Level 3. [Amended June 12, 2012]

1. Threshold Level 1. Threshold Level 1 will be reached, and additional study and investigation will be undertaken at such time as: [Amended June 12, 2012] [Amended May 3, 2017]
  - a. Total estimated annual production is greater than 60% of the Modeled Available Groundwater (MAG) value listed in Section 8 of the Management Plan;
  - b. An average groundwater drawdown, calculated from monitored water levels for an aquifer, is greater than 50% of the average groundwater drawdown provided in Section 7 of the Management Plan as a DFC for that;
  - c. The average groundwater drawdown, calculated from monitored water levels, for a Shallow Management Zone is greater than 50% of the threshold value, for average drawdown in that Shallow Management Zone, listed in Section 7 of the Management Plan; or

- d. Projected average water level drawdowns, calculated with a District approved methodology, indicate that a DFC listed in Section 7 of the Management Plan will be exceeded within 15 years.
2. Threshold Level 2. Threshold Level 2 will be reached, and a review of the Management Plan, rules and regulations will be initiated, at such time as: [Amended June 12, 2012] [Amended May 3, 2017]
  - a. Total estimated annual production is greater than 70% of the Modeled Available (MAG) value listed in Section 8 of the Management Plan;
  - b. Average groundwater drawdown, calculated from monitored water levels, for an aquifer is greater than 60% of the average groundwater drawdown listed in Section 7 of the Management Plan as the DFC for that aquifer; or
  - c. The average groundwater drawdown, calculated from monitored water levels, for a Shallow Management Zone, is greater than 60% of the threshold value for average drawdown listed in Section 7 of the Management Plan for that Shallow Management Zone;
3. Threshold Level 3. Threshold Level 3 will be reached, and the Board will consider and adopt amendments to the Management Plan, rules and regulations at such time as the average groundwater drawdown, calculated from monitored water levels, for an aquifer is greater than 75% of an average groundwater drawdown listed in Section 7 of the Management Plan as a DFC for that aquifer. [Amended June 12, 2012] [Amended May 3, 2017]
4. The threshold levels will be administered and applied separately to each Management Zone. As part of the evaluations and determinations, the District will consider the pumping-induced impacts to groundwater resources that occur between or among management zones. The evaluation will determine if pumping or production in one management zone is contributing to adverse impacts to groundwater conditions in another management zone. [Amended June 12, 2012] [Amended May 3, 2017]
  - a. If Threshold Level 1 is exceeded, the District will perform studies to provide information on aquifer properties, aquifer recharge, aquifer and surface water interactions, and aquifer pumping. To the extent possible, the studies shall distinguish between the causes and effects of pumping occurring within the District and outside of the District. The results may be used to improve the models, tools, and methodologies used to analyze data and predict future groundwater levels and availability. The District will contract with a professional hydrogeologist to (i) conduct studies and/or (ii) establish the parameters for the studies and review the results of studies. The results of all studies shall be made available to the public in a reasonable manner.

b. If Threshold Level 2 is exceeded, the District will re-evaluate the Management Plan and rules regarding management zones, recharge estimates, the collection and analysis of monitoring data, and proposed changes to DFCs for consideration in the joint planning process. As part of the re-evaluation, the District will hold one or more public meetings and provide a minimum of 90 days for the public to provide written comments in addition to the meeting (s).

c. If Threshold Level 3 is exceeded, the District will conduct a public hearing to discuss the status of the aquifers and develop a Level 3 Response Action Work Plan focused on achieving the District's goals and objectives, including the DFCs. The work plan will be completed within 6 months after the first public hearing and will be made available to the public through the District's web site.

i. The notice will include the cause for the notice, the fact that an additional review, evaluation and study is being made, and that a reduction of the maximum allowable production per acre and/or the permitted production may be approved following the review and evaluation. [Amended July 12, 2005]

ii. The general manager, in consultation with the district professional hydrogeologist, will review and evaluate the permit applications pending, the permits issued and the records of the District, estimated total production by exempt wells, and increase the frequency or locations of water drawdown monitoring within the Management Zone. If the notice is due to the average drawdown based on monitored water levels an evaluation of the reasons for the drawdown will be included in the review. [Amended July 12, 2005] [Amended June 12, 2012]

iii. The general manager will promptly report to the Board that notices have been, or are being, given and the event that required the notice to be given. The general manager will advise the Board of the plan for review and evaluation recommended under (b) and, if the plan will be implemented over a period of more than one month, during the evaluation, review, study and any additional monitoring period, the general manager will keep the Board advised of the progress of the review and evaluation. Upon completion of the review, evaluation and any additional monitoring, the general manager and district professional hydrogeologist will make a final report to the Board, together with their recommendation for action.

iv. If the general manager, in consultation with the district professional hydrogeologist, finds the evaluation, study, review and/or monitoring supports a recommendation that an adjustment of permitted production is recommended for a Management Zone or another Management Zone in which threshold level 3 was reached, the recommendation shall be consistent with the finding and provide supporting documentation for the limitation. [Added July 12, 2005]

[Amended June 12, 2012]

- v. The general manager may, after consultation with the district professional hydrogeologist and in combination with or in addition to the above, recommend any action or combination of actions set forth in Rule 16.4. [Amended June 12, 2012]

5. The terms, provisions and the actions provided for in this Rule 16.4 are in addition to and not in lieu of the terms, conditions and provisions of any other rule or provision of this Section 16. This rule does not limit the authority of the Board to act pursuant to any other rule. The Board shall have the discretion to take any action authorized by this Section 16. [Amended June 12, 2012]

**RULE 16.5. REDUCTIONS REQUIRED BY REGULATORY ACTION.** Notwithstanding any other term or provision of these rules, the Board may proportionately reduce the maximum amount of water that may be permitted per acre and the volume of water authorized to be produced under any permit issued by the District. The Board will adjust the thresholds established in Rule 16.4, as required by state law, a regional plan, or an area or regional agreement mandated by state law and which, by authority of state law, requires water availability or production to be limited or regulated based on water availability within a geographic area that includes land in more than one groundwater conservation district. In the event permitted production or water level drawdown will be reduced by reason of any such state law or regulation, the District will give notices as provided in Rule 16.4, hold one or more public hearings on the resulting limitations, and, to the extent permitted by state law, or the regional plan or agreement, implement any such reductions in a manner and over a period consistent with this Section 16. [Amended June 12, 2012] [Amended May 3, 2017]

**RULE 16.6. ADJUSTING MAXIMUM PRODUCTION PERMITTED.** The District shall adjust the maximum groundwater production permitted per acre and/or the permitted production under any permit issued by the District as follows: [Amended July 12, 2005] [Amended May 3, 2017]

1. If the water drawdown level within a Management Zone, or in any zone within the District in which the water drawdown level is impacted by production in such Management Zone, exceeds the water drawdown Threshold Level 3 in Rule 16.4, the maximum water production permitted per acre for the Management Zone and the water authorized to be produced under any permit issued by the District for that zone will be reduced. The required reduction will be determined by the Board based on the evaluation and the evidence. The production in a Management Zone may be reduced to the extent that production in that Management Zone is impacting water drawdown levels in any Management Zone in the District. [Amended July 12, 2005] [Amended June 12, 2012]
2. The maximum allowable production of 2 acre feet of groundwater per acre of land, provided in Rule 5.1.2, may be reduced, and the maximum allowable production may be established or reduced for any one, or more than one, Management Zone. [Amended July 12, 2005]

3. Production authorized under permits issued by the District for any Management Zone may be reduced on a schedule to, when considered together with future permits for which the authorized production per acre will be at the lower maximum allowable production per acre, generally over a period not to exceed 40 years, reduce groundwater production by an amount required to return the water level in the Management Zone to levels deemed acceptable by the Board based on evidence provided by the general manager, in consultation with the district professional hydrogeologist. [Amended July 12, 2005] [Amended June 12, 2012]
4. The Board may adjust permitted production within a Management Zone, based upon the results of a review, evaluation, study, and monitoring, and any evidence presented at a public hearing, if it finds the adjustment is appropriate. [Amended July 12, 2005] [Amended June 12, 2012]

**RULE 16.7. PERMIT LIMITATIONS AND REDUCTIONS.** The maximum allowable production of water authorized by a permit may be limited, adjusted and reduced as follows:

1. If the maximum allowable production of 2 acre feet of groundwater per acre of contiguous land is reduced for a Management Zone, or if any such reduced maximum of allowable production is thereafter reduced again, a new permit may not be issued for the production of more water than is established under this Section 16 as the maximum allowable production of water per acre of land for the Management Zone; [Amended June 12, 2012]
2. Excluding production authorized by a historic use permit, and production authorized by wells exempt under Rule 7.10(1), the production of water authorized by any permit issued by the District for the production of water is subject to limitation, adjustment and reduction;
3. The volume of water authorized by permit to be produced in a Management Zone may be reduced by up to two percent per year with the reduction beginning twelve months after a decision by the Board that such reduction is reasonably required for the conservation and preservation of groundwater, or the protection of the aquifer or groundwater users, within the Management Zone; and [Amended June 12, 2012]
4. If the Board finds it is necessary to reduce the maximum allowable production per acre, or the permitted production for any Management Zone, by a greater percentage or more quickly than is provided in Rule 16.7(3), to accomplish the desired future conditions, preserve and conserve groundwater or protect groundwater users within a Management Zone, or to implement reductions required under Rule 16.5, the Board shall establish a schedule for a phased reduction in the maximum allowable production or permitted production for the zone. [Amended July 12, 2005] [Amended May 3, 2017]

**RULE 16.8. EXCEPTIONS.** The following are exceptions to the rules set forth in this Section 16 for the limitation and reduction of production:

1. After a reduction of the maximum allowable permitted production per acre in a Management

Zone, the maximum allowable production per acre of land for which a permit may be issued in the Management Zone shall not exceed the maximum allowable production per acre as modified or established under this Section 16; [Amended July 12, 2005]

2. Within the Trinity Zone groundwater availability will be preserved and conserved, and groundwater users will be protected, by well spacing and the maximum allowable production per acre provided in Rule 5.1.2;
3. The Queen City-Sparta and Yegua-Jackson Zones are recharge based zones with relatively low to moderate yield domestic and small municipal wells, and, in lieu of limiting water drawdown levels in this zone, during droughts permitted production may be temporarily reduced to protect groundwater users; and [Amended June 12, 2012]
4. The Board may, in addition to or in combination with any action authorized in this Section 16, take any action authorized by Chapter 36 or in Section 17. [Added June 12, 2012] [Amended May 3, 2017]

**RULE 16.9 NOTICE AND HEARINGS.** A limitation, adjustment or reduction of the maximum allowable production of water per acre, or of the volume of water authorized to be produced under permits issued by the District, may be adopted by the Board at any time after written notice is given to the permit holders as provided in Rule 16.4 and a public hearing held, for which twenty days, or more, notice of such public hearing is published in one or more newspapers of general circulation in Milam County and Burleson County, Texas.

**RULE 16.10. REHEARING.** The owner or the operator of a well or well field for which permitted production is being reduced pursuant to this Section 16 may request a rehearing on a decision by the Board to reduce permitted production by more than ten percent in any five-year period, or to make a reduction that exceeds two percent in any one year period. Except as otherwise specifically provided herein any such motion for rehearing must be in writing, state the nature of material additional evidence to be presented, and filed in the district office within thirty days after the date of the Board decision that is being appealed. Such rehearing request will not stay or abate the required reduction or production while the request is pending.

## **SECTION 17**

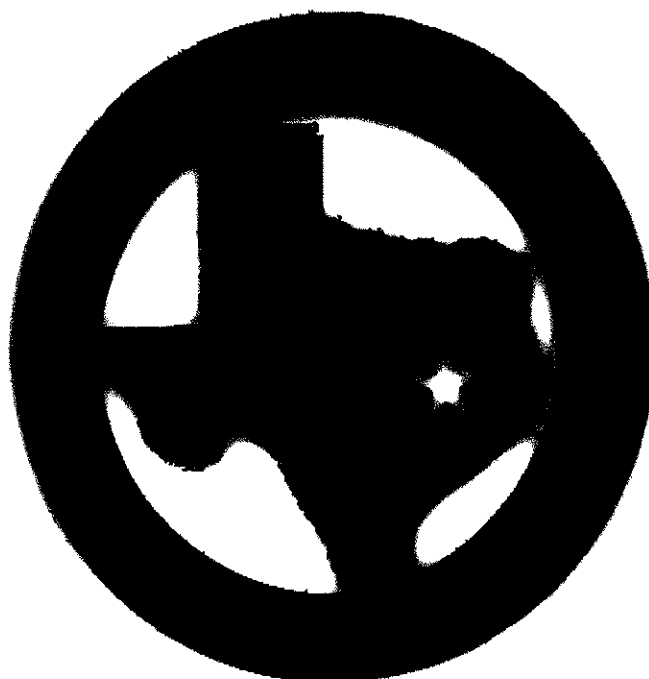
### **DROUGHT CONTINGENCY**

**RULE 17.1. GENERAL.** The Board may, after a public hearing and finding that a drought condition of sufficient severity exists that it may adversely affect the groundwater availability of the aquifers, declare drought conditions. The rules regarding the spacing of wells and production of groundwater, and, to the fullest extent permitted by law, exemption from these rules, shall be subject to the terms, conditions and provisions of this Section 17 during a drought declared by the Board. Any conflict between this Section 17 and any other rule will be resolved by the Board upon written request. [Added June 12, 2012]

**RULE 17.2. DROUGHT MANAGEMENT.** The terms, provisions and conditions of Section 16 that provide for limitation, reduction or adjustment of authorized and permitted groundwater production are applicable and available to the Board for drought management purposes during drought conditions. [Added June 12, 2012]

**RULE 17.3. DROUGHT MANAGEMENT PLANS.** The District may enforce the terms, provisions and conditions of drought management plans adopted by permittees of the District, and by entities that receive groundwater produced pursuant to a permit issued by the District. [Added June 12, 2012]

**RULE 17.4. THRESHOLD MONITORING AND ACTION.** The terms and provisions of Rule 16.7 are available to the Board and applicable during drought conditions. [Added June 12, 2012]



## **Groundwater Management Plan**

**Adopted December 5, 2017**

**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](http://www.posgcd.org)**

***General Manager: Gary Westbrook***

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## **POST OAK SAVANNAH GROUNDWATER CONSERVATION DISTRICT GROUNDWATER MANAGEMENT PLAN**

### **1. DISTRICT MISSION**

The Post Oak Savannah Groundwater Conservation District (POSGCD) mission is to provide for the conservation, preservation, protection, recharging, and prevention of waste of groundwater, and to protect groundwater users, by adopting and enforcing Rules consistent with state law. The District will accomplish this mission by imposing spacing requirements, regulating production, requiring permits for wells and production, establishing water drawdown levels and monitoring groundwater levels and production, making appropriate adjustments to allowable and permitted production, and encouraging conservation.

### **2. TIME PERIOD OF THIS PLAN**

This plan will become effective upon adoption by the POSGCD Board of Directors ("Board") and approval as administratively complete by the Texas Water Development Board. The plan will remain in effect for five (5) years after the date of certification, and thereafter until a revised plan is adopted and approved.

### **3. BACKGROUND**

The POSGCD was created in Milam and Burleson counties by HB 1784, 77th Legislature, 2001, and a local confirmation election in November 2002. The purpose of this bill is to provide a locally controlled groundwater district to conserve and preserve groundwater, protect groundwater users, protect and recharge groundwater, prevent pollution or waste of groundwater in the central Carrizo-Wilcox area, control subsidence caused by withdrawal of water from the groundwater reservoirs in that area, and regulate the transport of water out of the boundaries of the districts. The POSGCD has 10 directors, 5 from each county. It does not have the power to tax and receives all of its revenue from fees imposed on municipal/commercial pumpers and transporters of groundwater. Successful confirmation elections were held in November 2002 in both counties in accordance with Sections 36.017, 36.018, and 36.019, Water Code, and Section 41.001, Election Code.

The POSGCD is a member of Groundwater Management Area 12 (GMA 12) and Groundwater Management Area 8 (GMA 8), whose areal extents are shown in Figure 1. To help establish desired future conditions (DFCs) for the relevant aquifers within the boundaries of GMA 12 and GMA 8, POSGCD will consider groundwater availability models (GAMs) and other data or information. As part of the joint planning process, POSGCD will establish management goals and objectives that are consistent with the DFCs adopted by GMA 8 and GMA 12.

### **4. GROUNDWATER RESOURCES**

Located within the District's boundaries are portions of the Trinity, Wilcox, Carrizo, Queen City, Sparta, Yegua/Jackson, and the Brazos River Alluvium aquifers. Figure 2 shows the locations of the outcrops of these aquifers based on the surface geology mapped by Barnes (1994), Kelley and others (2004), Deeds and others (2010), and Shah and Houston (2007). In Figure 2, the outcrop area for the Carrizo Aquifer includes the

outcrop area associated with the Reklaw Formation, the outcrop area for the Queen City Aquifer includes the outcrop area associated with the Weches Formation, and the outcrop area for the Sparta Aquifer includes the outcrop area for the Catahoula Formation. Within the District, the Trinity Aquifer does not outcrop and is overlaid primarily by the Midway Formation. Table 4-1 provides the area associated with each aquifer outcrop.

**Table 4-1. Aquifer Outcrop Areas in the District**

Midway Formation	346
Wilcox	348
Carrizo/Reklaw	70
Queen City/Weches	159
Sparta	76
Cook Mountain/Yegua-Jackson /Catahoula	321
Brazos River Alluvium	161
Shallow Alluvium	215
Total	1,699

- (a) **Northern Trinity Aquifer.** The northern Trinity Aquifer is located in the northwest corner of Milam County. The Trinity Aquifer comprises five geological formations considered to be relevant aquifers by GMA 8. These geologic formations are the Paluxy Aquifer, the Glen Rose Aquifer, the Travis Peak Aquifer, the Hensell Aquifer, and the Hosston Aquifer. The top and bottom surfaces for these geological formations are defined by the Updated Northern Trinity and Woodbine Aquifers GAM (Kelley and others, 2014).
- (b) **Wilcox Aquifer.** The Wilcox aquifer is a major regional aquifer system. The outcrop of the Wilcox Aquifer forms a southwest to northeast trending belt through central Milam County; the downdip portion of the Wilcox Aquifer underlies southern Milam County and all of Burleson County. Freshwater exists in the Wilcox Aquifer in both Milam County and Burleson County. The Wilcox Aquifer comprises three geological formations that are considered to be relevant aquifers by GMA 12. These three geologic formations are the Hooper, the Simsboro, and the Calvert Bluff. The top and bottom surfaces for these three geological formations are defined by their model layer in the Central Carrizo GAM (Dutton and others, 2003). The Upper Wilcox Aquifer is associated with the Calvert Bluff Formation. The Middle Wilcox Aquifer is associated with the Simsboro Formation. The Lower Wilcox Aquifer is associated with the Hooper Formation.

The unconfined portion of the Upper Wilcox Aquifer is where the Central Carrizo GAM (Dutton and others, 2003) simulates the water level in the Calvert Bluff Formation to be below the top of the Calvert Bluff Formation at January 2000. The unconfined portion of the Middle Wilcox Aquifer is where the Central Carrizo GAM (Dutton and others, 2003) simulates the water level in the Simsboro Formation to be below the top of the Simsboro Formation at January 2000. The unconfined portion of the Lower Wilcox Aquifer is where the Central Carrizo GAM (Dutton and others,

2003) simulates the water level in the Hooper Formation to be below the top of the Hooper Formation at January 2000.

- (c) **Carrizo Aquifer.** The Carrizo Aquifer is a regional aquifer system that occurs throughout most of the District. The outcrop of the Carrizo Aquifer forms a southwest to northeast trending belt through southern Milam County; the downdip portion of the Carrizo Aquifer underlies southern Milam County and all of Burleson County. Freshwater exists in the Carrizo Aquifer in both Milam County and Burleson County. The aquifer is a source of groundwater for numerous domestic wells and several large public water supply systems. The top and bottom surfaces for the Carrizo Aquifer are represented by its model layer in the Central Carrizo GAM (Dutton and others, 2003). The unconfined portion of the Carrizo Aquifer is where the Central Carrizo GAM (Dutton and others, 2003) simulates the water level in the Carrizo Formation to be below the top of the Carrizo Formation at January 2000.
- (d) **Queen City.** The Queen City Aquifer outcrops across a 5- to 8-mile-wide zone that is generally aligned along the Milam-Burleson County line. The aquifer extends down dip in Burleson County and is a source of groundwater for domestic wells and some public water supply wells. Freshwater exists in the Queen City Aquifer in both Milam County and Burleson County. The top and bottom surfaces for the Queen City Aquifer are represented by its model layer in the Central Carrizo GAM (Kelley and others, 2004). The unconfined portion of the Queen City Aquifer is defined as the area where the Central Carrizo GAM (Kelley and others, 2004) simulates the water table to be below the top of the Queen City Aquifer at January 2000.
- (e) **Sparta Aquifer.** The Sparta Aquifer outcrops across a 3- to 5-mile-wide zone trending southwest- northeast just north of Highway 21 in Burleson County. The Sparta extends downdip to the southeast throughout much of Burleson County. Like the Queen City Aquifer, the Sparta is used for numerous domestic water wells and some small public water supply systems in the District. Freshwater exists in the Sparta Aquifer in Burleson County. The top and bottom surfaces for the Sparta Aquifer are represented by its model layer in the Central Carrizo GAM (Kelley and others, 2004). The unconfined portion of the Sparta Aquifer is defined as the area where the Central Carrizo GAM (Kelley and others, 2004) simulates the water table to be below the top of the Sparta Aquifer at January 2000.
- (f) **Yegua/Jackson Aquifer.** The Yegua/Jackson Aquifer outcrops across a 6- to 10-mile-wide zone trending southwest-northeast south of Highway 21 in Burleson County. The Yegua/Jackson Aquifer extends down-dip to the southeast through much of Burleson County. The Yegua/Jackson Aquifer includes to all four geologic units (the upper Yegua, the lower Yegua, the upper Jackson, and the lower Jackson), represented by the model layers in the Yegua/Jackson GAM (Deeds and others, 2010). In Burleson County, the Yegua/Jackson Aquifer provides small to moderate amounts of freshwater to domestic and irrigation wells and to a few public water systems.
- (g) **Brazos River Alluvium Aquifer.** The Brazos River Alluvium Aquifer is comprised of floodplain and terrace deposits of the Brazos River along the eastern boundary of Milam and Burleson counties. The Brazos River Alluvium Aquifer occurs only as an unconfined aquifer in POSGCD, and the majority of it exists in Burleson County. The

Brazos River Alluvium supplies freshwater to many irrigation wells and several domestic wells. For the most part, the water discharges from the alluvium mainly through seepage to the Brazos River, evapotranspiration, and wells. The bottom surface for the Brazos River Alluvium is represented by the Brazos River Alluvium Aquifer GAM (Ewing and Jigmond, 2016).

- (h) **Shallow Alluvium Aquifers.** Shallow alluvium aquifers have not been completely mapped across POSGCD. The aquifers represent floodplain and terrace deposits near major tributaries to the Brazos River. These aquifers are generally less than 30 feet thick, are characterized by mixtures of coarse sands and fine-grain materials, and are often well connected hydrologically to nearby streams. The areas of these aquifers are denoted by alluvium deposits denoted in the Bureau of Economic Geology map of surface geology (Proctor and others, 1974).

## 5. MANAGEMENT ZONES

The District is divided into groundwater management zones for the purpose of evaluating and managing groundwater resources recognizing the different characteristics and anticipated future development of the aquifers in the District.

The District will establish and enforce Rules for the spacing of wells, the maximum allowable production of groundwater per acre of land located over an aquifer, require permits for production, regulate drawdown and provide for a reduction in the maximum allowable production and permitted production of groundwater per acre of land based on the different surface and subsurface characteristics and different evaluation and monitoring within the Management Zones.

The Management Zones are as follows:

- (a) **Brazos River Alluvium Management Zone.** This management zone is located along the eastern boundaries of the District in Milam and Burleson counties and is coterminous with the boundaries of the Brazos Alluvium outcrop in Figure 2. This zone extends to the depth of the water bearing alluvial sediments of the Brazos River Alluvium.
- (b) **Trinity Management Zone.** This management zone includes the northern Trinity Aquifer, which is located beneath the footprint of the Midway outcrop shown in Figure 2. This management zone also includes the Midway Formation, which is generally a clayey deposit with low transmissivity.
- (c) **Sparta Management Zone.** The Sparta Management Zone includes all of the water-bearing formations of the Sparta Aquifer found in the District.
- (d) **Queen City Management Zone.** The Queen City Management Zone includes all of the water-bearing formations of the Queen City Aquifer found in the District.
- (e) **Carrizo Management Zone.** The Carrizo Management Zone includes all of the water-bearing formations of the Carrizo Aquifer found in the District.
- (f) **Upper Wilcox Management Zone.** The Upper Wilcox Management Zone includes all of the water-bearing formations of the Calvert Bluff Formation found in the District.

- (g) **Middle Wilcox Management Zone.** The Middle Wilcox Management Zone includes all of the water-bearing formations of the Simsboro Formation found in the District.
- (h) **Lower Wilcox Management Zone.** The Lower Wilcox Management Zone includes all of the water-bearing formations of the Hooper Formation found in the District.
- (i) **Yegua/Jackson Management Zone.** This zone includes the outcrop and downdip portions of the geologic units of the Yegua and the Jackson formations of the Yegua/Jackson Aquifer, which occur in the southern portion of Burleson County.
- (j) **Shallow Management Zone for each Management Zone listed above items (b) through (i).** This management zone corresponds to all deposits that occur at a depth of 400 feet or less, as measured from land surface, except for deposits associated with the Brazos River Alluvium. The Shallow Management Zone is not mutually exclusive from the aquifer management zones (b) through (i) but the uppermost portion of those management zones. The purpose of monitoring the Shallow Management zone is to characterize the water levels in the unconfined portions of the aquifers.

## 6. MANAGEMENT OF GROUNDWATER SUPPLIES

The District will evaluate and monitor groundwater conditions and regulate production consistent with this plan and the District Rules. Production will be regulated, as needed, to conserve groundwater, and protect groundwater users, in a manner not to unnecessarily and adversely limit production or impact the economic viability of the public, landowners and private groundwater users. In consideration of the importance of groundwater to the economy and culture of the District, the District will identify and engage in activities and practices that will permit groundwater production and, as appropriate, protect the aquifer and groundwater in accordance with this Management Plan and the District's rules. A monitoring well network will be maintained to monitor aquifer conditions within the District. The District will make a regular assessment of water supply and groundwater storage conditions and will report those conditions, as appropriate, in public meetings of the Board or public announcements. The District will undertake investigations, and cooperate with third-party investigations, of the groundwater resources within the District, and the results of the investigations will be made available to the public upon being presented at a meeting of the Board.

The District will adopt rules to regulate groundwater withdrawals by means of well spacing and production limits as appropriate to implement this Plan. In making a determination to grant a permit or limit groundwater withdrawals, the District will consider the available evidence and, as appropriate and applicable, weigh the public benefit against the individual needs and hardship.

The factors that the District may consider in making a determination to grant a drilling and operating or operating permit or limit groundwater withdrawals will include:

1. The purpose of the rules of the District;
2. The equitable distribution of the resource;
3. The economic hardship resulting from grant or denial of a permit, or the terms prescribed by the permit;
4. This Management Plan and DFCs of the District as adopted in Joint Planning under Tex. Water Code, Sec. 36.108; and
5. The potential effect the permit may have on the aquifer, and groundwater users.

The transport of groundwater out of the District will be regulated by the District according to the Rules of the District.

In pursuit of the District's mission of protecting the groundwater resources, the District may require adjustment of groundwater withdrawals in accordance with the Rules and Management Plan. To achieve this purpose, the District may, at the Board's discretion after notice and hearing, amend or revoke any permit for non-compliance, or reduce the production authorized by permit for the purpose of protecting the aquifer and groundwater availability. The determination to seek the amendment of a permit will be based on aquifer conditions observed by the District as stated in the District's rules. The determination to seek revocation of a permit will be based on compliance and non-compliance with the District's rules and regulations. The District will enforce the terms and conditions of permits and the rules of the District, as necessary, by fine and enjoining the permit holder in a court of competent jurisdiction as provided for in Texas Water Code (TWC) Ch. 36.102, etc.

A contingency plan to cope with the effects of water supply deficits due to climatic or other conditions will be developed by the District and will be adopted by the Board after notice and hearing. In developing the contingency plan, the District will consider all relevant factors, including, but not limited to, the economic effect of conservation measures upon all water resource user groups, the local implications of the degree and effect of changes in water storage conditions, the unique hydrogeologic conditions of the aquifers within the District and the appropriate conditions under which to implement the contingency plan.

The District will employ reasonable and necessary technical resources at its disposal to evaluate the groundwater resources available within the District and to determine the effectiveness of regulatory or conservation measures. A public or private user may appeal to the Board for discretion in enforcement of the provisions of the water supply deficit contingency plan on grounds of adverse economic hardship or unique local conditions. The exercise of discretion by the Board shall not be construed as limiting the power of the Board.

## **7. DESIRED FUTURE CONDITIONS**

The District shall participate in the joint planning process in GMAs 8 and 12 as defined per TWC § 36.108, including establishment of DFCs for management areas within the District. In its evaluation of potential DFCs, the District shall consider results from GAMs, scientific reports, and the conditions of the aquifer within the management zones.

- (a) **DFCs Adopted by GMA 12.** The District's DFCs for the area covered by GMA 12 are provided in Tables 7-1, 7-2, and 7-3 for both the 2010 and 2015 Joint Planning cycles. For each of the aquifers, the DFC average drawdowns are for the area covered by each aquifer in Milam and Burleson counties.

For the Queen City, Sparta, Carrizo and Wilcox aquifers (Table 7-1), the stratigraphy was defined using the TWDB GAM for the Queen City and Sparta Aquifers (Kelley and others, 2004) during both planning cycles. The DFCs from the 2010 Joint Planning cycle correspond with the Modeled Available Groundwater (MAG) values provided in Section 8. These DFCs are average drawdowns calculated by the Kelley and others (2004) model for a 60-year period beginning January 2000 and ending December 2059. The DFCs from the 2015 Joint Planning cycle are the most current POSGCD DFCs, but at the time of the current plan, the MAG values have not yet been calculated using these DFCs. These DFCs are average drawdowns calculated by the Kelley and others (2004) model for a 70-year period beginning January 2000 and ending December 2069.

For the Yegua-Jackson Aquifer (Table 7-2), the stratigraphy was defined using the TWDB GAM for the Yegua-Jackson Aquifer (Deeds and others, 2010) during both planning cycles. The DFCs from the 2010 Joint Planning cycle correspond with the MAG values provided in Section 8. These DFCs are average drawdowns calculated by the Deeds and others (2010) model for the 60-year period beginning January 2000 and ending December 2059. The DFCs from the 2015 Joint Planning cycle are the most current POSGCD DFCs, but at the time of the current plan, the MAG values have not yet been calculated using these DFCs. These DFCs are average drawdowns calculated by the Deeds and others (2010) model for a 60-year period beginning January 2010 and ending December 2069.

For the Brazos River Alluvium Aquifer (Table 7-3), there was no TWDB GAM available during the either joint planning period for GMA 12. The DFCs for the 2010 Joint Planning cycle represent declines in the saturated thickness measured in District monitoring well network over a 50-year period. The 50-year period begins January 2010 and ends December 2059. The DFCs for the 2015 Joint Planning cycle represent declines in the saturated thickness measured in District monitoring well network over a 60-year period. The 60-year period begins in January 2010 and ends on December 2069.

**Table 7-1. Adopted DFCs for the Queen City, Sparta, Carrizo and Wilcox aquifers**

	Average Drawdown between January 2000 and December 2059 (ft)	Average Drawdown between January 2000 and December 2069 (ft)
Sparta	30	28
Queen City	30	30
Carrizo	65	67
Upper Wilcox (Calvert Bluff Fm)	140	149
Middle Wilcox (Simsboro Fm)	300	318
Lower Wilcox (Hooper Fm)	180	205

**Table 7-2. Adopted DFCs for the Yegua-Jackson Aquifer**

	Average Drawdown between January 2000 and December 2059 (ft)	Average Drawdown between January 2010 and December 2069 (ft)
Yegua-Jackson	100	100

**Table 7-3. Adopted DFCs for the Brazos River Alluvium Aquifer**

	Average Decrease in Saturated Thickness between January 2010 and December 2059 (ft)	Average Decrease in Saturated Thickness between January 2010 and December 2069 (ft)
Milam in GMA 12	5	5
Burleson in GMA 12	6	6

- (b) **DFCs Adopted by GMA 8.** On the date of this Plan's adoption, the District did not have any permitted wells in the portion of the Brazos River Alluvium Aquifer and the Trinity Aquifer in GMA 8. POSGCD participated in the GMA 8 joint planning process to help establish DFCs for the Brazos River Alluvium Aquifer and the Trinity Aquifer within the District boundaries, but for the purpose of this Plan, the District considers the portion of the Brazos River Alluvium Aquifer within GMA 8 as a non-relevant aquifer. The District will not monitor water levels in the GMA 8 portion of the Brazos River Alluvium until the GMA 8 portion of the Brazos River Alluvium is deemed as a relevant aquifer by the District. The District will also not monitor water levels in the Trinity Aquifer until there is at least one permitted well that pumps from the Trinity Aquifer.

The District's DFCs for the area covered by GMA 8 are provided in Table 7-4 for both the 2010 and 2015 Joint Planning cycles. The DFCs from the 2010 Joint Planning

cycle correspond with the MAG values provided in Section 8. These DFCs are average drawdowns for a 50-year period that begins January 2000 and ends December 2049. The average drawdowns are for areas covered by each aquifer in Milam County as defined by the stratigraphy provided by the TWDB GAM for the Northern Trinity Aquifer (Bené and others, 2004). The DFCs from the 2015 Joint Planning cycle are the most current POSGCD DFCs, but at the time of the current plan, the MAG values have not yet been calculated using these DFCs. These DFCs are average drawdowns for a 60-year period that begins on January 2010 and ends on December 2070. The average drawdowns are for areas covered by each aquifer in Milam County as defined by the stratigraphy provided by the TWDB Updated GAM for the Northern Trinity and Woodbine Aquifers (Kelley and others, 2014).

**Table 7-4. Adopted DFCs for the Trinity Aquifer.**

Aquifer	2000	2010
	Average Drawdown between January 2000 and December 2049 (ft)	Average Drawdown between January 2010 and December 2070 (ft)
Paluxy	252	--
Glen Rose	294	212
Travis Peak	--	345
Hensell	337	229
Hosston	344	345

- (c) **Protective Drawdown Limits (PDLs) for Shallow Management Zone Water Levels** On the date of this Plan's adoption, neither GMA 12 nor 8 has established DFCs for the shallow unconfined sections of the aquifers within the GMAs. The District therefore developed the PDLs in Table 7-5 independently in order to limit drawdown in the shallow up-dip regions of the aquifers within the District. These PDLs were developed to help protect the production capacity of existing wells in the shallow unconfined portions of the aquifer where the water level above the well screen tends to be less than in the deep confined portions of the aquifer.

**Table 7-5 PDL Threshold values for Average Drawdown for the Shallow Management Zones**

Sparta	20
Queen City	20
Canizo	20
Upper Wilcox (Calvert Bluff Fm)	20
Middle Wilcox (Simsboro Fm)	20
Lower Wilcox (Hooper Fm)	20
Yegua	20
Jackson	20

**8. MODELED AVAILABLE GROUNDWATER (MAG)**

Based on DFCs adopted by GMA 8 and GMA 12, the TWDB is required by TWC § 36.108 9(o) to provide the District with a MAG for each DFC. Table 8-1 lists the MAGs received by the District from the TWDB based on DFCs from the 2010 planning cycle. The TWDB has not yet provided GMA 8 nor GMA 12 with revised MAGs based on DFCs from the 2015 joint planning cycle.

**Table 8-1. Modeled Available Groundwater Values Calculated by the TWDB based on the DFCs adopted by GMA 8 and 12**

		2010	2020	2030	2040	2050	2060
<b>Brazos River Alluvium</b>	GMA 8: Declared a Non-Relevant Aquifer	NA	NA	NA	NA	NA	NA
	GMA 12: Milam and Burleson County <sup>1</sup>	25,138	25,138	25,138	25,138	25,138	25,138
<b>Aquifers in Trinity GAM</b>	Paluxy <sup>2</sup>	0	0	0	0	0	0
	Glen Rose <sup>2</sup>	149	149	149	149	149	149
	Hensell <sup>2</sup>	36	36	36	36	36	36
	Hosston <sup>2</sup>	103	103	103	103	103	103
	<i>Subtotal</i>	288	288	288	288	288	288
<b>Aquifers in the Queen City/ Sparta GAM</b>	Sparta <sup>3</sup>	1,570	2,245	4,041	5,612	6,734	6,734
	Queen City <sup>4</sup>	430	468	502	502	502	502
	Carrizo <sup>5</sup>	4,025	4,706	5,177	6,118	6,353	7,059
	Upper Wilcox (Calvert)	502	1,038	1,038	1,038	1,038	1,038
	Middle Wilcox	36,507	38,468	37,899	40,041	46,027	48,501
	Lower Wilcox (Hooper)	899	2,960	4,139	4,433	4,433	4,422
	<i>Subtotal</i>	43,933	49,885	52,796	57,744	65,087	68,256
<b>Yegua-Jackson Aquifer</b>	Yegua-Jackson Aquifer <sup>6</sup>	12,923	12,923	12,923	12,923	12,923	12,923
	<b>TOTAL</b>	<b>82,282</b>	<b>88,234</b>	<b>91,145</b>	<b>96,093</b>	<b>103,43</b>	<b>106,605</b>

<sup>1</sup> OTA Aquifer Assessment 10-20 MAG (Bradley, 2011)

<sup>2</sup> GAM RUN 10-063 MAG (Oliver and Bradley, 2011)

<sup>3</sup> GAM RUN 10-046 MAG (Oliver, 2012c)

<sup>4</sup> GAM RUN 10-045 MAG (Oliver, 2012b)

<sup>5</sup> GAM RUN 10-044 MAG (Oliver, 2012a)

<sup>6</sup> GAM RUN 10-060 MAG (Oliver, 2012d)

NA – not applicable

## 9. WATER WELL INVENTORY

The District will assign permitted wells to a management zone and to an aquifer based on the location of the well's screen or well depth using the Rules of the District. If no well screen information is available, then a permitted well will be assigned to a management zone and to an aquifer based on the total depth of the well. The assignment of the permitted well will be made at the time of permit. The District will assign exempt wells to a management zone and to an aquifer based on available information for the exempt well. The District will use the assignments to help track the permitted pumping and production for each aquifer and for each management zone.

## 10. GROUNDWATER MONITORING

The District will maintain a monitoring well network that will be used by the District to obtain measured water levels. Groundwater monitoring will be designed to monitor changes

in groundwater conditions over time. The District encourages well owners to volunteer wells to be used as part of the monitoring network. The District will accept wells into, or replace an existing well in, the monitoring network. The selection process will consider the well proximity to other monitoring wells, to permitted and exempt wells, to streams, and to geographic and political boundaries. If no suitable well locations can be found to meet the monitoring objectives in a specific aquifer or management zone, the District may evaluate the benefits of converting an oil and gas well to a water well, drilling and installing a new well, or using modeled water levels for that area until such time as a suitable well can be obtained for monitoring.

The District shall perform groundwater monitoring. The monitoring of the wells will be performed under the direction of the general manager, by trained personnel using a Standard Operating Procedure adopted by the District. The District may coordinate with the neighboring groundwater conservation districts for the purpose of supplementing its monitoring data and of improving the consistency in the collection, management, and analysis of hydrogeological data in GMA 12.

#### **11. THRESHOLD LEVELS AND ANALYSIS OF GROUNDWATER LEVEL DATA**

The District shall use threshold levels to help achieve its DFCs and to conserve and preserve groundwater availability and protect groundwater users. The District shall administer separate threshold levels for each management zone based on the Rules of the District. As part of its evaluation and determinations, the District may also consider the pumping-induced impacts to groundwater resources, including production occurring outside of the District. The District will consider threshold levels based on one or more of the following metrics: estimated total annual production, measured water level change, and predicted water level change.

Among the factors to be considered to guide the District's actions are evaluating thresholds for declines in water levels established in the District's Rules. District actions which can be initiated if a threshold level has been exceeded are: additional aquifer studies to collect and analyze additional information, a re-evaluation of the Management Plan or rules, and/or a change in the Management Plan or rules.

#### **12. PRODUCTION AND SPACING OF WELLS**

Production and spacing of all wells within the District will be regulated by the District according to the Rules of the District. Well spacing and the rate of production of the well will be dependent on the management zone and the aquifer associated with the well, and other factors included in the Rules of the District.

#### **13. ACTIONS, PROCEDURES, PERFORMANCE AND AVOIDANCE FOR PLAN IMPLEMENTATION**

The District will implement this plan and utilize it as a guide for the ongoing evaluation, and the planning and establishing, of priorities for all District conservation and regulatory activities. All programs, permits and related operations of the District, and any additional planning efforts in which the District may participate will be consistent with this plan.

The District will adopt rules relating to the permitting of wells, the production and transport of groundwater and reducing permitted production. The rules adopted by the District shall be adopted pursuant to TWC Chapter 36 and provisions of this plan. All rules will be adhered to and enforced. The promulgation and enforcement of the rules will be based on technical data recommended by competent professionals and accepted by the Board.

The District shall treat all citizens equally. Citizens may apply to the District for a variance in enforcement of the rules on grounds of adverse economic effect or unique local conditions. In granting a variance to any rule, the Board shall consider the potential for adverse effect on adjacent landowners and the aquifer(s). The exercise of discretion by the Board shall not be construed as limiting the power of the Board.

The District will endeavor to cooperate with other agencies in the implementation of this plan and the management of groundwater supplies within the District. All activities of the District will be undertaken in a spirit of cooperation and coordination with the appropriate state and regional agencies.

**14. METHODOLOGY FOR TRACKING DISTRICT PROGRESS IN ACHIEVING MANAGEMENT GOALS**

The general manager of the District will prepare and present to the Board an annual report on the District's performance and accomplishment of the management goals and objectives. The presentation of the report will occur during the last monthly Board meeting each fiscal year, beginning after the adoption and certification of this plan. The report will include the number of instances in which each of the activities specified in the management objectives was engaged in during the fiscal year. Each activity will be referenced to the estimated expenditure of staff time and budget in accomplishment of the activity. The notations of activity frequency, staff time and budget will be referenced to the appropriate performance standard for each management objective describing the activity, so that the effectiveness and efficiency of the District's operations may be evaluated. The Board will maintain the adopted report on file, for public inspection, at the District's offices. This methodology will apply to all management goals contained within this plan.

**15. AQUIFER STORAGE AND RECOVERY PROJECTS**

An Aquifer Storage and Recovery (ASR) project involves the injection of water into a geological formation for subsequent recovery and beneficial use. The District acknowledges that ASR projects can help to improve the overall management of water resources in GMA 12. However, the District also recognizes that poorly designed and instrumented ASR project can be operated in such a manner as to adversely affect the production capacity of existing wells located near the ASR project. As ASR projects are identified, the District will coordinate with the Texas Commission on Environmental Quality to provide data and/or technical expertise that could assist with the evaluation of the proposed ASR project.

## **16. MANAGEMENT GOALS, OBJECTIVES, & PERFORMANCE STANDARDS**

### **16.1 Efficient Use of Groundwater**

#### **Management Objectives:**

1. The District will maintain a monitoring well network with at least 100 monitoring wells to provide coverage across management zones and aquifers within the District. The District will measure water levels at the monitoring well locations at least once every calendar year. A written analysis of the water level measurements from the monitoring wells will be made available through a presentation to the Board of the District at least once every three years.
2. The District will provide educational leadership to citizens within the District concerning this subject. The activity will be accomplished annually through at least one printed publication, such as a brochure, and public speaking at service organizations and public schools as provided for in the District's Public Education Program.

#### **Performance Standards:**

1. Maintain a monitoring well network and its criteria, and measure at least 100 monitoring wells at least once every calendar year.
2. Number of monitoring wells measured annually by the District.
3. Written report presented to the Board to document that water levels at these monitoring wells have been measured a minimum of once each year.
4. The number of publications and speaking appearances by the District each year under the District's Public Education Program.

### **16.2 Controlling and Preventing Waste of Groundwater.**

#### **Management Objectives:**

The District will provide educational leadership to citizens within the District concerning this subject. The activity will be accomplished annually through at least one printed publication, such as a brochure, and public speaking at service organizations and public schools as provided for in the District's Public Education Program. During years when District revenues are sufficient, the District will consider funding a grant to obtain a review, study, or report of pertinent groundwater issues, or to sponsor the attendance of students at summer camps/seminars that place emphasis on the conservation of water resources.

#### **Performance Standards:**

The number of publications and speaking appearances by the District each year, and the number of grants considered and students actually accepting and attending an educational summer camp or seminar.

**16.3 Control and Prevent Subsidence****Management Objectives:**

The District will monitor drawdowns with due consideration to the potential for land subsidence. At least once every three years, the District will assess the potential for land subsidence for areas where water levels have decreased more than 100 feet since the year 2000.

**Performance Standards:**

Within three years of the approval of this plan and every three years thereafter, the District will map any region where more than 100 feet of drawdown has occurred since the year 2000 and assess the potential for land subsidence. The results of the assessment will be discussed in a District Board meeting and be document in a presentation or a report.

**16.4 Conservation of Groundwater Including Rainwater Harvesting, Precipitation Enhancement, Brush Control, Conjunctive Use, and/or Recharge Enhancement of Groundwater Resources in the District****Management Objectives:**

1. The District will provide educational leadership to citizens within the District concerning this subject. The educational efforts will be through at least one printed publication, such as a brochure, and at least one public speaking program at a service organization and/or public school as provided for in the District's Public Education Program. Each of the following topics will be addressed in that program:
  - A. Conservation
  - B. Rainwater Harvesting
  - C. Brush Control
  - D. Recharge Enhancement
  - E. Conjunctive Use
  - F. Precipitation Enhancement
2. During years when District revenues are sufficient, the District will consider sponsoring the attendance of students and/or teachers at summer camps/seminars that place emphasis on the conservation of groundwater, rainwater harvesting, brush control, groundwater recharge enhancement, conjunctive use, precipitation enhancement of water resources, or a combination of such groundwater management programs.
3. The District will encourage and support projects and programs to conserve and/or preserve groundwater, and/or enhance groundwater recharge, by annually funding the District's Groundwater Conservation and Enhancement Grant Program, during years when the District's revenues remain at a level sufficient to fund the program. The objective of this program is to obtain the active participation and cooperation of local water utilities, fire departments and

public agencies in the funding and successful completion of programs and projects that will result in the conservation of groundwater and the protection or enhancement of the aquifers in the District. The qualifying water conservation projects and programs will include, as appropriate, projects that: result in the conservation of groundwater, reduce the loss or waste of groundwater, recharge enhancement, rainwater harvesting, precipitation enhancement, brush control, or any combination thereof. The District's objective is to benefit the existing and future users of groundwater in the District by providing for the more efficient use of water, increasing recharge to aquifers, reducing waste, limiting groundwater level declines, and maintaining or increasing the amount of groundwater available, by awarding at least one grant under the program in each county annually.

**Performance Standards:**

1. The number of publications and speaking appearances by the District each year under the District's Public Education Program.
2. The number of students sponsored to attend a summer camp/seminar emphasizing the conservation of water.
3. Annual funding, when applicable, for the District's Groundwater Conservation and Enhancement Grant Program, and the number of projects and programs reviewed, approved, and funded under that program. A written report providing estimated benefit of the amount of groundwater conserved, of the recharge enhancement, and/or of addition groundwater protection provided by the program.
4. The number and content of reports submitted regarding sponsored programs.

**16.5 Conjunctive Use of Surface and Groundwater**

**Management Objective:**

The District will confer annually with the Brazos River Authority (BRA) on cooperative opportunities for conjunctive resource management.

**Performance Standard:**

1. The number of conferences with the BRA on conjunctive resource management.
2. The number of times each year in which the applicant, general manager or the Board considers conjunctive use in the permitting process.

**16.6 Drought Management Strategy**

The aquifers within the District are substantially resistant to water level declines during drought conditions. As a result, the District does not have a drought management strategy based on precipitation metrics such as the Palmer Drought Index. The District management strategy is to review and to verify enforcement of Drought Management Plans adopted by District permit holders and entities that contract to purchase water from District permit holders.

**Management Objective:**

When permits or contracts are issued, as applicable, the District will confirm that all entities have an Drought Management Plan or Drought Contingency Plan that has been approved by the Texas Commission on Environmental Quality or another regulatory agency in the State of Texas.

**Performance Standard:**

State approved Drought Management Plans or Drought Contingency Plans on file at the District Offices.

**16.7 Natural Resource Issues That Impact the Use and Availability of Groundwater and Which are Impacted by the Use of Groundwater**

**Management Objectives:**

1. The District will confer at least once every two years with appropriate agencies on the impact of groundwater resources in the District.
2. The District will evaluate permit applications for new wells and the information submitted by the applicants on those wells prior to drilling. The District will assess the impact of these wells on the groundwater resources in the District.
3. The District will implement the POSGCD Well Closure Program. The objective of the well closure program is to obtain the closure and plugging of derelict and abandoned wells in a manner that is consistent with state law, for the protection of the aquifers, the environment, and the public safety. The District will conduct a program to identify, inspect, categorize and cause abandoned and derelict water, oil and gas wells to be closed and plugged, by annually funding the program or segments or phases of the program appropriate to be funded in such fiscal year. The District will fund the closure of at least one abandoned well during years when the District's revenues remain at a level sufficient to fund the program.

**Performance Standards:**

1. The number of conferences with a representative of appropriate agencies.
2. Reports to the Board on the number of new well permit applications filed, and the possible impacts of those new wells on the groundwater resources in the District.
3. Annual funding, when applicable, for the District's Well Closure Program, and the number of wells closed and plugged as a result of the Well Closure Program.

**16.8 Groundwater Well Assistance Program**

**Management Objective:**

Beginning in 2018, the District will maintain a Groundwater Well Assistance Program (GWAP). The primary purpose of the GWAP is to help restore a water supply to well owners in the District who own wells that have experienced significant adverse impacts, and where applicable to address well conditions to prevent significant adverse impacts, from groundwater level declines caused by aquifer-wide groundwater pumping in GMA 12. A secondary purpose of the GWAP is to improve

the POSGCD monitoring program and the POSGCD's understanding of groundwater aquifer systems in POSGCD by increasing the number of monitoring wells in the monitoring well network and by performing localized hydrogeological studies at these monitoring locations.

**Performance Standard:**

GWAP adopted before the end of 2018.

**16.9 Mitigation**

**Management Objective:**

The District will require filing with the District of mitigation plans required by the District or any State agency regarding impacts caused by groundwater pumping in the District.

**Performance Standards:**

1. Mitigation plans on file at the District that are related to groundwater pumping in the District.
2. Report of impacts and predicted impacts on well owners in the District on file at the District Offices.

**16.10 Desired Future Conditions (DFCs)**

**Management Objective:**

At least once every three years, the District will monitor water levels and evaluate whether the change in water levels is in conformance with the DFCs adopted by the District. The District will estimate total annual groundwater production for each aquifer based on the water use reports, estimated exempted use, and other relevant information, and compare these production estimates to the MAGs listed in Table 8-1.

**Performance Standards:**

1. At least once every three years, the general manager will report to the Board the measured water levels obtained from the monitoring wells within each Management Zone, the average measured drawdown for each Management Zone calculated from the measured water levels of the monitoring wells within the Management Zone, a comparison of the average measured drawdowns for each Management Zone with the DFCs for each Management Zone, and the District's progress in conforming with the DFCs.
2. At least once every three years, the general manager will report to the Board the total permitted production and the estimated total annual production for each aquifer and compare these amounts to the MAGs listed in Table 8-1 for each aquifer.

**17. PROJECTED WATER DEMANDS**

The projected net water demands (in acre-feet) within the District based on the 2017 State Water Plan are compiled in Allen (2017), provided as **Appendix A**. The District also

established future Municipal Groundwater Use Demands in the District for planning purposes. The methodology and results of that effort are as follows:

**Method for Establishing Future Municipal Use Demands of Groundwater.** The District adopted a resolution, dated March 11, 2003, establishing production rights for Local Water Utilities within the District (water supply corporations, special utility districts, ~~municipal~~ utility districts and cities), as a rule. This rule allowed these Local Water Utilities to obtain a permit to produce a volume of water annually according to one of two methods:

1. An amount equal to the highest annual pumpage it reported from wells within the District in any consecutive twelve months prior to September 31, 2001; or
2. The Local Water Utility could present to the Board a Long-Term Plan prepared by a qualified engineer that projects the annualized long-term water needs as the official projection of the water required by that Local Water Utility in the planning period (for not more than forty [40] years) for providing retail water service within that Local Water Utility's defined service area. If a Local Water Utility adopted this plan on or before March 30, 2004, and the Board found the highest annual pumpage projected in the Long-Term Plan (the "Plan Amount") was not unreasonable, the Local Water Utility was authorized to obtain a permit to pump and produce up to the Plan Amount. Table 17-1 below contains the results of this effort.

**Table 17-1 Municipal Use Groundwater Demands Projected through 2044**

<b>Burleson County</b>	
Apache Hills	11
Birch Creek	16
Burl. Co. MUD	73
Burl. Investm.	7
Cade Lakes	123
Centerline	21
Caldwell	1,969
Snook	154
Somerville	670
Clara Hills	5
Clay	7
Cooks Point	10
Deanville	350
Lakeview	21
Little Oak Forrest	5
Lyons	106
Post Oak Hill	11
Shupak Utilities	19
Tunis	108
Whispering Woods	7
Wilderness Sound	15
Total for Burleson Co.	3,708
<b>Milam County</b>	
Alcoa	702
Rockdale	2,129
Gause	74
Marlow	108
Milano	673
Minerva	28
North Milam	369
Southwest Milam	2,492
Total for Milam Co.	6,575
<b>DISTRICT TOTALS</b>	<b>10,283</b>

**18. PROJECTED WATER SUPPLIES WITHIN THE DISTRICT**

The projected surface water supplies (in acre-feet) within the District based on the 2017 State Water Plan are compiled in Allen (2017), provided as **Appendix A**.

Table 18-1 lists the projected groundwater supplies within the District in acre-feet per year according to the 2017 State Water Plan Data. The District has participated and will

participate in future regional water planning, and will consider the water supply needs and water management strategies included in the adopted state water plan.

**Table 18-1. Projected Groundwater Supplies in acre-feet per year Within the District According the 2017 State Water Plan data**

<b>Burleson County</b>								
Caldwell	Carrizo-Wilcox Aquifer	Groundwater	2,352	2,352	2,352	2,352	2,352	2,352
County-Other, Burleson	Carrizo-Wilcox Aquifer	Groundwater	550	550	550	550	550	550
County-Other, Burleson	Queen City Aquifer	Groundwater	323	323	323	323	323	323
Deanville WSC	Carrizo-Wilcox Aquifer	Groundwater	701	701	701	701	701	701
Irrigation, Burleson	Brazos River Alluvium Aquifer	Groundwater	21,640	21,640	21,640	21,640	21,640	21,640
Irrigation, Burleson	Carrizo-Wilcox Aquifer	Groundwater	204	204	204	204	204	204
Irrigation, Burleson	Yegua-Jackson Aquifer	Groundwater	1,118	1,118	1,118	1,118	1,118	1,118
Manufacturing, Burleson	Sparta Aquifer	Groundwater	139	139	139	139	139	139
Milano WSC	Carrizo-Wilcox Aquifer	Groundwater	250	234	232	232	241	245
Mining, Burleson	Carrizo-Wilcox Aquifer	Groundwater	0	0	0	0	0	0
Snook	Sparta Aquifer	Groundwater	475	475	475	475	475	475
Somerville	Sparta Aquifer	Groundwater	891	891	891	891	891	891
Southwest Milam WSC	Carrizo-Wilcox Aquifer	Groundwater	205	184	154	167	167	158
<b>TOTAL</b>			<b>28,848</b>	<b>28,811</b>	<b>28,779</b>	<b>28,792</b>	<b>28,801</b>	<b>28,796</b>
<b>Milam County</b>								
Bell-Milam Falls WSC	Trinity Aquifer	Groundwater	79	79	77	77	76	74
Bell-Milam Falls WSC	Trinity Aquifer	Groundwater	352	349	343	342	336	329
Buckholts	Trinity Aquifer	Groundwater	122	122	122	122	122	122
Irrigation, Milam	Brazos River Alluvium Aquifer	Groundwater	3,082	3,082	3,082	3,082	3,082	3,082
Irrigation, Milam	Carrizo-Wilcox Aquifer	Groundwater	2,221	2,066	1,828	2,043	2,135	2,135
Irrigation, Milam	Queen City Aquifer	Groundwater	53	56	56	56	56	56
Milano WSC	Carrizo-Wilcox Aquifer	Groundwater	260	240	237	237	249	255
Mining, Milam	Carrizo-Wilcox Aquifer	Groundwater	14	14	14	14	14	14
Mining, Milam	Trinity Aquifer	Groundwater	0	0	0	0	0	0
Rockdale	Carrizo-Wilcox Aquifer	Groundwater	2,000	1,860	1,396	1,589	1,672	1,672
Southwest Milam WSC	Carrizo-Wilcox Aquifer	Groundwater	1,625	1,443	1,202	1,307	1,314	1,261

		San Joaquin Hills	San Joaquin Hills	San Joaquin Hills	San Joaquin Hills	San Joaquin Hills	San Joaquin Hills	San Joaquin Hills
Thomdale	Carrizo-Wilcox Aquifer	Groundwater	229	229	229	229	229	229
Steam Electric Power, Milam	Carrizo-Wilcox Aquifer	Groundwater	15,786	13,009	12,943	14,444	15,084	15,074
TOTAL			25,823	22,549	21,529	23,542	24,369	24,303

#### 19. PROJECTED WATER NEEDS AND WATER STRATEGIES

The projected water supply needs and water management strategies (in acre-feet) within the District based on the 2017 State Water Plan are compiled in Allen (2017), provided as **Appendix A**.

#### 20. ESTIMATED GROUNDWATER USE WITHIN THE DISTRICT

The estimated historical water use (in acre-feet) within the District based on the TWDB Historical Water Use Survey is compiled in Allen (2017), provided as **Appendix A**.

#### 21. ESTIMATED ANNUAL RECHARGE OF GROUNDWATER RESOURCES WITHIN THE DISTRICT

The estimated annual recharge from precipitation to groundwater by aquifer (in acre-feet) within the District is compiled in GAM Run 16-015 (Ballew, 2017), provided as **Appendix B**.

#### 22. ESTIMATED ANNUAL DISCHARGES FROM THE AQUIFER TO SPRINGS AND ANY SURFACE WATER BODIES, INCLUDING LAKES, STREAMS AND RIVERS

The estimated annual discharges from each aquifer to springs and any surface water bodies, including lakes, streams, and rivers (in acre-feet) within the District are compiled in GAM Run 16-015 (Ballew, 2017), provided as **Appendix B**.

#### 23. ESTIMATED ANNUAL GROUNDWATER FLOW INTO AND OUT OF THE DISTRICT WITHIN EACH AQUIFER AND BETWEEN AQUIFERS IN THE DISTRICT

The estimated annual groundwater flow into and out of the District within each aquifer and between aquifers (in acre-feet) within the District is compiled in GAM Run 16-015 (Ballew, 2017), provided as **Appendix B**.

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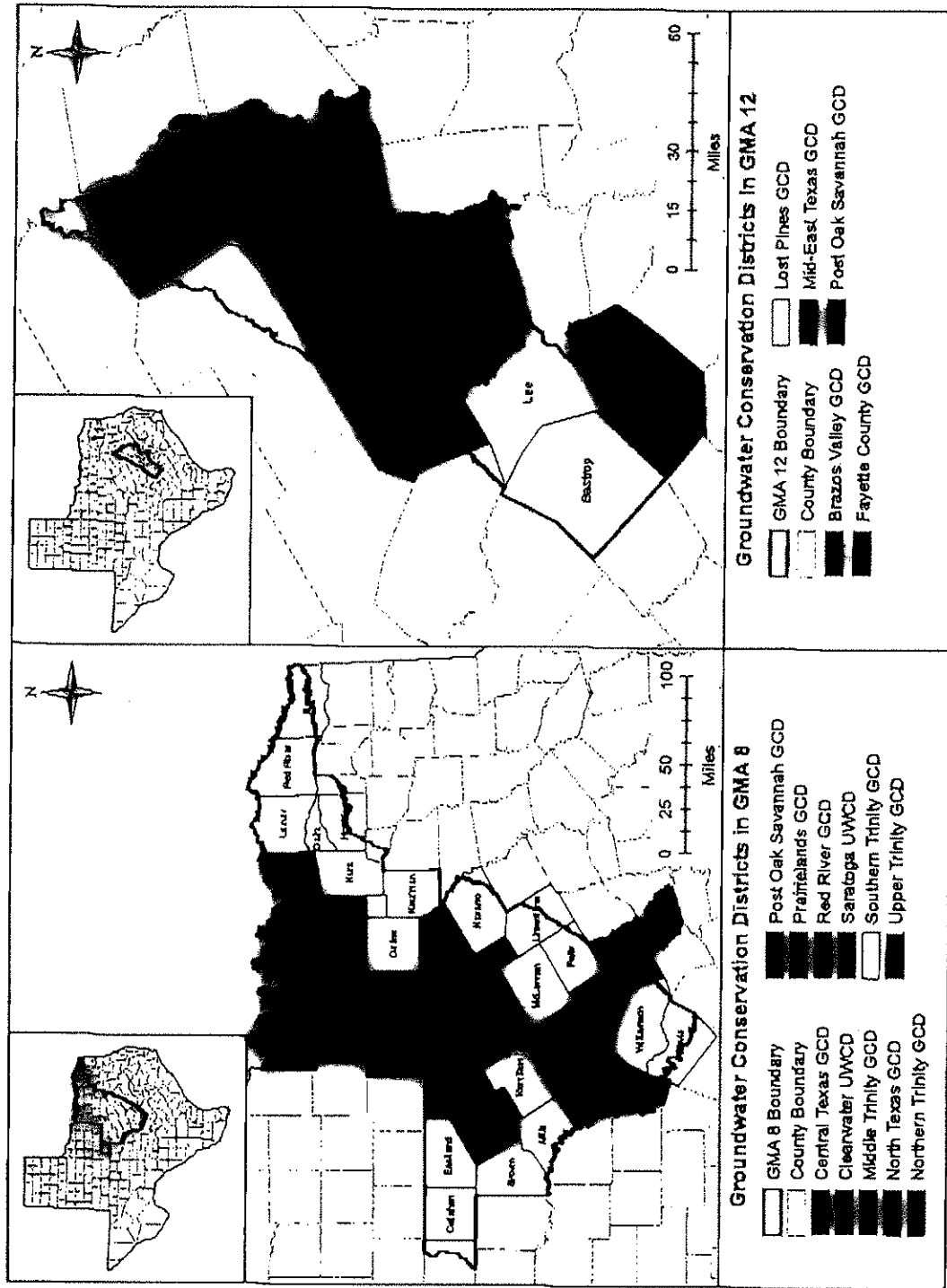


Figure 1. Counties and Groundwater Districts Associated with Groundwater Management Areas 8 and 12

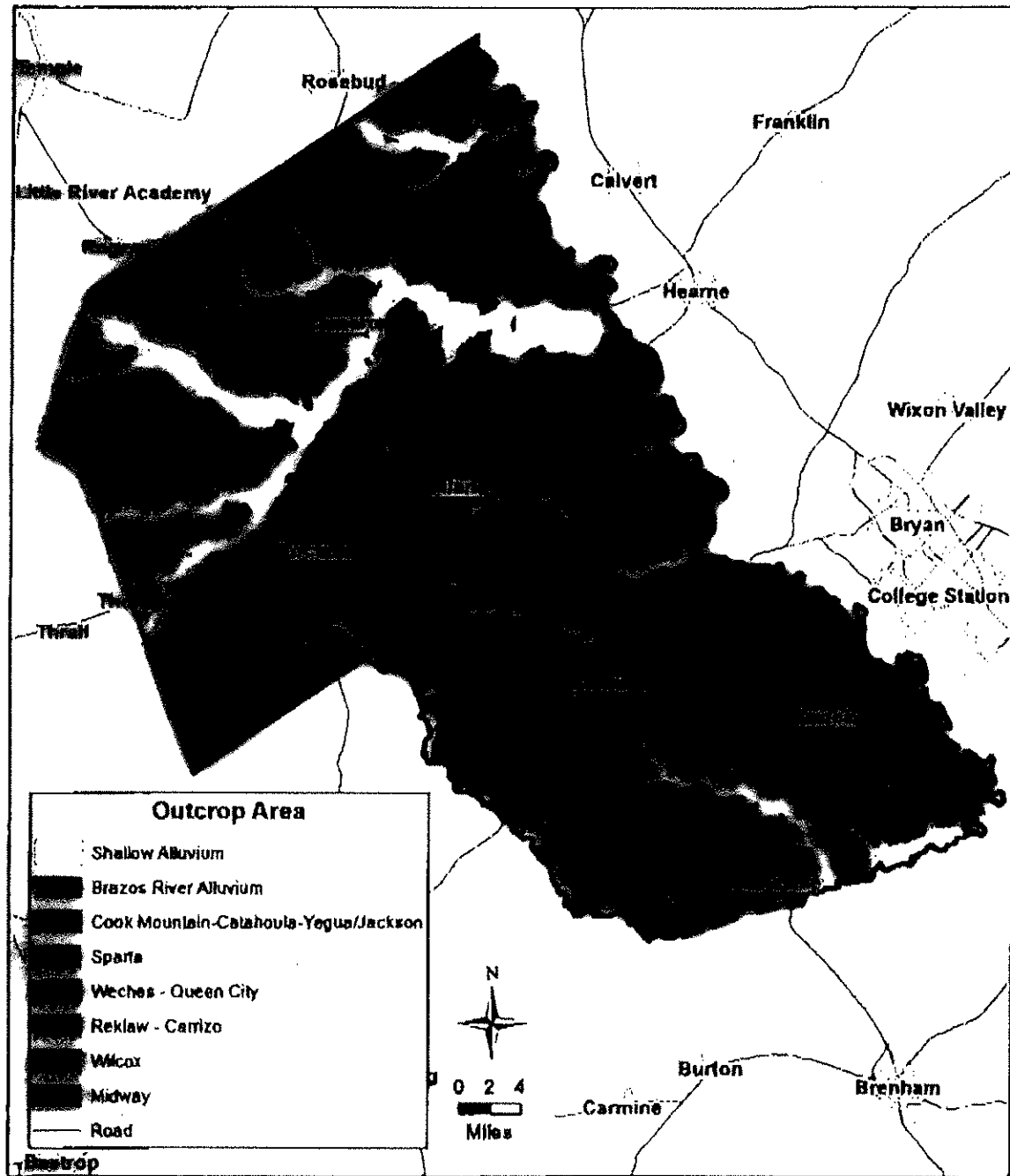
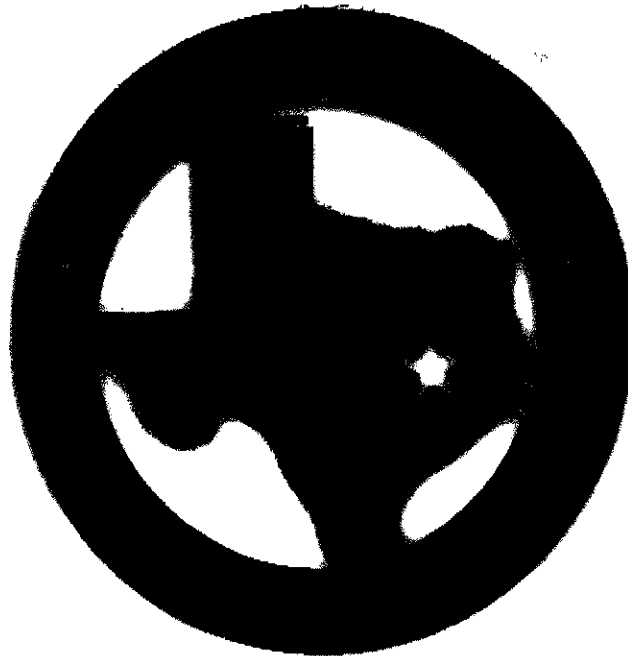


Figure 2. Outcrops Associated with Aquifers and Geological Formations in the District

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# **ANNUAL REPORT**

## **Fiscal Year 2017**

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*General Manager: Gary Westbrook*

## Purpose and Scope

This Annual Report on the Post Oak Savannah Groundwater Conservation District's (District or POSGCD) performance in regards to achieving management goals and objectives for the fiscal year is being presented to the Board of Directors of the District (the Board) in accordance with Section 14 of the District's Management Plan. Texas Water Code, Chapter 36.1071 requires that a District develop a comprehensive management plan which addresses required management goals. The original Management Plan for the District was adopted in 2004. It has since been amended and readopted as of December 5, 2017 pursuant to State Law.

The District was created in 2001 by the 77<sup>th</sup> Legislature to operate in the area covered by Milam and Burleson counties. The District was confirmed by an election held in November 2002. The District is governed by a ten (10) member Board of Directors which serves without pay. Five Board members are appointed by the Commissioners Court of each of the counties composing the District. One member from each county is appointed to represent each of the following interests: agricultural, rural water supply, industry, municipal, and one at large.

The format of this report states the goal, the objective of the goal, the performance standard used to meet each goal and the activity or program the District used to achieve the goal as set out in the Management Plan. The Rules and Management Plan of the District, as well as many other valuable resources are available on the District's website at [www.posgcd.org](http://www.posgcd.org).

HB1784, the District's enabling legislation, requires the Board to meet at least quarterly. Listed here are the meetings and hearings of the Board for the year 2017. Additional information such as Agenda and location may be obtained from the District's website at [www.posgcd.org](http://www.posgcd.org).

### *Board Meetings During the 2017 Calendar Year*

02-07-17	Board Meeting
03-07-17	Board Meeting
03-28-17	Board Meeting & Public Hearing
04-04-17	Board Meeting
04-18-17	Board Meeting
05-03-17	Board Meeting
06-06-17	Board Meeting
08-01-17	Board Meeting
08-16-17	Milam & Burleson Counties Groundwater Summit
09-05-17	Board Meeting & Public Hearing
10-03-17	Board Meeting
11-07-17	Board Meeting & Public Hearings
11-09-17	Board Meeting & Public Hearings
12-05-17	Board Meeting & Public Hearing

**Committee Meetings During the 2017 Calendar Year**

<b><u>Date</u></b>	<b><u>Meeting Type</u></b>
03-07-17	DFC Committee
<del>03-09-17</del>	DFC Committee
<del>03-17-17</del>	Grant Committee
03-28-17	DFC Committee
03-29-17	Rules Committee
<del>04-11-17</del>	DFC Committee
<del>04-27-17</del>	DFC & Rules Committees
05-03-17	DFC Committee
06-06-17	DFC Committee
<del>07-19-17</del>	Grant Committee
<del>07-20-17</del>	Rules Committee
07-27-17	Rules Committee
08-01-17	DFC Committee
<del>08-05-17</del>	DFC Committee
10-03-17	DFC Committee

**Statewide Participation**

The District participates from time to time as appropriate, through Board member, staff or consultants, as a resource or member for groups and associations, both local and statewide, where it is beneficial to the District's goals and mission. POSGCD participation in events in 2017 included:

- General Manager's Annual Reports to the Commissioner's Courts of Milam and Burleson Counties.
- The District's General Manager (GM) served as a resource to legislators concerning efforts in the 85<sup>th</sup> legislature in 2017 working on possible legislative remedies to interim charges including groundwater as identified by the Senate Committee on Agriculture, Water, and Rural Affairs, and House Natural Resources Committee. These legislative issues included brackish groundwater production, aquifer storage and recovery, and groundwater regulation of oil and gas industry.
- The GM served as representative from GMA 12 on Brazos G Regional Water Planning Group
- The GM served on the Texas Alliance of Groundwater District's (TAGD) Legislative Committee to offer expertise regarding legislation related to brackish groundwater production, ASR, and long-term permits during the 85 Legislature.
- The GM served on a panel at the Milam and Burleson Counties Groundwater Summit, August 16, 2017, to discuss the similarities and differences of GCDs within GMA 12.
- The GM served on a panel at the Texas Alliance of Groundwater Districts Groundwater Summit on August 30, 2017 to discuss how GCDs within GMA are similar and how they are different.

- The Water Resource Management Specialist moderated two panels at the Texas Alliance of Groundwater Districts Groundwater Summit on August 29, 2017 and August 30, 2017.
- The GM and Water Resource Management Specialist attended the Texas Aquifers Conference June 9, 2016
- The President's designee served as the acting chairman for GMA 12
- POSGCD maintained its total commitment of \$230,000.00 to TWDB to assist their Groundwater Modeling Availability program to improve the Queen City-Sparta/Carrizo-Wilcox GAM for GMA 12
- District staff and consultants attended meetings where networking and discussions of interest were presented at TAGD in January, May, and August, and at TWCA in March, and October.

### **Requirements of District Management Plan**

#### **Section 5. Management Zones**

The District will establish and enforce Rules for the spacing of wells, the maximum allowable production of groundwater per acre of land located over an aquifer, require permits for production, regulate drawdown and provide for a reduction in the maximum allowable production and permitted production of groundwater per acre of land based on the different surface and subsurface characteristics and different evaluation and monitoring within the Management Zones.

POSGCD maintains Rules to accomplish the objectives and goals expressed in the Management Plan in Section 1- District Mission, and Section 5 Management Zones. In 2017 POSGCD approved the permits listed in Table 1 after finding the applications to be in accordance with district rules and the management plan based on the findings of the District's staff, general counsel, and hydrogeologist. The District also accepted applications to register wells which are exempt, which were either pre-existing or to be drilled, in accordance with district rules and management plan, and state law. These well registrations are listed in Table 3.

#### **Section 6. Management of Groundwater Supplies**

The District will evaluate and monitor groundwater conditions and regulate production consistent with this plan and the District Rules.

The District will adopt rules to regulate groundwater withdrawals by means of well spacing and production limits as appropriate to implement this Plan.

In 2017, POSGCD measured and evaluated water levels in the monitoring wells identified in the District's Well Monitoring Network. These wells provide coverage for all aquifers that are currently being pumped in the District for the purpose of joint planning. At 20 of the monitoring wells, POSGCD used transducers to continuously measure water levels. POSGCD maintains rules to regulate groundwater

withdrawals by means of well spacing, measured water levels, and production limits per acre.

#### **Section 7. Desired Future Conditions**

The District shall participate in the joint planning process in Groundwater Management Area (GMA) 8 and GMA 12 as defined per TWC § 36.108, including establishment of Desired Future Conditions (DFCs) for management areas within the District. In its evaluation of potential DFCs, the District shall consider results from groundwater availability models, scientific reports, and the conditions of the aquifer within the management zones.

POSGCD participates in joint planning for GMA 8 and GMA 12 as required under Chapter 36.108, Texas Water Code.

During 2017, on the dates of January 22, February 17, March 23, April 1, and September 29, the member districts of GMA 8 met in Cleburne, TX to participate in joint planning as required under Chapter 36.108, Texas Water Code.

During 2017, on the dates of March 27 and September 20, the member districts of GMA 12 met in Milano, TX to participate in joint planning as required under Section 36.108, Texas Water Code. The member districts of GMA 12 also met on August 16 in Caldwell to discuss their similarities and differences at the 2017 Milam & Burleson Counties Groundwater Summit. POSGCD continues to host meetings for GMA 12, and serves as the primary contact for GMA 12. The District's General Manager serves as the GMA 12 Representative on the Brazos G Regional Water Planning Group.

Minutes and presentations from the above meetings are available on the District's website, at [www.posgcd.org](http://www.posgcd.org).

#### **Section 8. Modeled Available Groundwater (MAG)**

As referenced in (7) above, Chapter 36 requires the DFCs to be updated every five years.

The DFCs and Explanatory Reports for both GMA 8 and GMA 12 were adopted during 2017 and declared administratively complete by the Executive Administrator of the Texas Water Development Board. Upon the adoption of the DFCs the Executive Administrator of the Texas Water Development Board will establish the MAG and advise the Districts as to the amount of water that may be produced on an average annual basis to achieve each of the DFCs.

#### **Section 9. Water Well Inventory**

The District will assign permitted wells to a management zone and to an aquifer based on the location of the well's screen or well depth using the Rules of the District.

POSGCD assigned permitted wells to management zones and documented these assignments in the District well database. POSGCD also continued discussions with TWDB to reconcile differences between aquifer identifications for monitoring wells in the two databases. This is an ongoing process.

The District's website, [www.posgcd.org](http://www.posgcd.org), now hosts a web application which allows users to query and visualize the location of wells in the District's Water Well inventory.

#### **Section 10. Groundwater Monitoring**

The District will maintain a monitoring well network that will be used by the District to obtain measured water levels.

The District shall perform groundwater monitoring. The monitoring of the wells will be performed under the direction of the general manager, by trained personnel using a Standard Operation Procedure adopted by the District.

In 2017, POSGCD measured and evaluated water levels in the monitoring wells identified in the District's Well Monitoring Network. These wells provide coverage for all aquifers declared relevant by the District for the purpose of joint planning. At 20 of the monitoring wells, POSGCD used transducers to continuously measure water levels.

The District also completed the addition of approximately 50 monitoring wells, including 25 wells that had previously been part of the Texas Railroad Commission's monitoring network for the Sandow Mine. As a result, the District now has monitoring wells located throughout the District, and in adjacent counties, as listed in Table 4, at locations shown on maps located on the District's website at [www.posgcd.org](http://www.posgcd.org)

The District also shares monitoring responsibilities and exchanges monitoring information with neighboring GCDs in an attempt to improve collection, exchange of information, and management of the groundwater resources within GMA 12. The District conducted several meetings with the TWDB to discuss and exchange information and ideas regarding a best approach for associating aquifer assignments to monitoring wells. These discussions will continue into 2018.

#### **Section 11. Threshold levels and analysis of groundwater level data**

The District shall use threshold levels to help achieve its DFCs and to conserve and preserve groundwater availability and protect groundwater users.

As part of its evaluation of the monitoring network in 2017, District staff, in coordination with the District's hydrogeologists, provided reports to the Board on

changes in water levels in monitor wells in the District, and evaluations of those aquifer conditions and compliance with current Desired Future Conditions (DFCs), during public meetings. This topic was revisited at the August 01 and September 05 Board meetings in a comprehensive evaluation of monitoring results compared to the DFCs and management goals identified in the District's management plan.

## **Section 12. Production and Spacing of Wells**

Production and spacing of all wells within the District will be regulated by the District according to the Rules of the District. Well spacing and the rate of production of the well will be dependent on the management zone and the aquifer associated with the well, and other factors included in the Rules of the District.

Each application to drill and operate a non-exempt well filed with the District is reviewed for completeness. In conducting this review, the desired spacing and rate of production are considered within the requirements of the Rules and the management zone spacing and production rates for the applicable management zone identified in the District's Management Plan. All applications were reviewed and approved by one or more of the following, as appropriate: District staff, the District's general counsel, and the District's hydrologist.

## **Section 13. Actions, Procedures, Performance and Avoidance for Plan Implementation.**

The District's Management Plan has been reviewed and approved by the Texas Water Development Board. The plan complies with state and federal law, recognized water conservation and management practices, and provides protections for individual property rights. The District has adopted comprehensive rules pursuant to Chapter 36 as provided in the Management Plan, and those rules have been reviewed, updated and amended as needed to provide more specific protection for individual aquifers, to limit some restrictions on wells that provide water for a household and/or livestock, and to assure consistency with amendments to Chapter 36 and the intent of the Management Plan. As an example, a 2014 amendment of the rules, in response to economic development interests within the District, enabled the District to maintain all the requirements for permitting and production, eliminate delays and serve the best interests of the landowners, the general public and the taxing authorities within the District.

The District offers groundwater and water conservation educational programs to the school districts within the District, and has established a grant program for public water utilities to fund repairs and improvements to water systems to conserve, and limit the loss of water. The District also continues to work proactively with GMA 8, GMA 12, the Texas Water Development Board, Burleson and Milam counties, the Texas Alliance of Groundwater Districts, the Brazos River Authority and other public organizations and private citizens, to assure the implementation of the Management Plan, and the protection of the groundwater supplies, aquifers, and property rights of all landowners. In this respect, it is noted that no amendment to either the Management Plan or the rules has been required as a result of significant court decisions regarding groundwater, the rights of landowners or groundwater districts.

**Section 14. Methodology for Tracking District Progress in Achieving Management Goals**

The general manager of the District will prepare and present to the Board an annual report on the District's performance and accomplishment of the management goals and objectives.

This report satisfies that requirement.

**Section 15. Aquifer Storage and Recovery Projects**

An Aquifer Storage and Recovery (ASR) project involves the injection of water into a geological formation for subsequent recovery and beneficial use. The District acknowledges that ASR projects can help to improve the overall management of water resources in GMA 12. However, the District also recognizes that poorly designed and instrumented ASR project can be operated in such a manner as to adversely affect the production capacity of existing wells located near the ASR project. As ASR projects are identified, the District will coordinate with the Texas Commission on Environmental Quality to provide data and/or technical expertise that could assist with the evaluation of the proposed ASR project.

There were no proposed ASR projects in 2017.

**Section 16. Management Goals, Objectives, & Performance Standards****16.1 Efficient Use of Groundwater****Management Objectives:**

1. The District will maintain a monitoring well network with at least 50 monitoring wells to provide coverage across management zones and aquifers within the District. The District will measure water levels at the monitoring well locations at least once every calendar year. A written analysis of the water level measurements from the monitoring wells will be made available through a presentation to the Board of the District at least once every three years.
2. The District will provide educational leadership to citizens within the District concerning this subject. The activity will be accomplished annually through at least one printed publication, such as a brochure, and public speaking at service organizations and public schools as provided for in the District's Public Education Program.

**Performance Standards:**

1. Maintain a monitoring well network and its criteria, and measure at least 100 monitoring wells at least once every calendar year.

Table 4 lists 110 wells that were a part of POSGCD monitoring well network in 2017, for which water levels were recorded at least once during that year. At 20 of these wells, data loggers coupled with transducers were used to obtain continuous water level measurements. The POSGCD monitoring well network includes additional wells which either did not yield useful measurements or were not available for measurement during 2017. Those wells are identified in Table 4.1 and will be visited during 2018 monitoring efforts to record information for use by the District and forwarded to the Texas Water Development Board.

2. Number of monitoring wells measured annually by the District. Written report presented to the Board to document that water levels at these monitoring wells have been measured a minimum of once each year.

Table 4 lists wells that were a part of POSGCD monitoring well network in 2017 for which water levels were recorded at least once during that year. A report on this monitoring was presented to the Board on August 01, 2017 and on September 05, 2017 in a comprehensive evaluation of monitoring results compared to DFCs and management goals as identified in the District's management plan.

3. The number of publications and speaking appearances by the District each year under the District's Public Education Program.

Table 5 lists the instances and publications where this topic was addressed.

**16.2 Controlling and Preventing Waste of Groundwater.****Management Objectives:**

1. The District will provide educational leadership to citizens within the District concerning this subject. The activity will be accomplished annually through at least one printed publication, such as a brochure, and public speaking at service organizations and public schools as provided for in the District's Public Education Program. During years when District revenues are sufficient, the District will consider funding a grant to obtain a review, study, or report of pertinent groundwater issues, or to sponsor the attendance of students at summer camps/seminars that place emphasis on the conservation of water resources.

Performance Standards:

1. The number of publications and speaking appearances by the District each year, and the number of grants considered and students actually accepting and attending an educational summer camp or seminar.

Table 5 lists the instances and publications where this topic was addressed.

**16.3 Control and Prevent Subsidence**Management Objectives:

1. The District will monitor drawdowns with due consideration to the potential for land subsidence. At least once every three years, the District will assess the potential for land subsidence for areas where water levels have decreased more than 100 feet since the year 2000.

Performance Standards:

1. Within three years of the approval of this plan and every three years thereafter, the District will map any region where more than 100 feet of drawdown has occurred since the year 2000 and assess the potential for land subsidence. The results of this assessment will be presented and discussed in a District Board meeting.

POSGCD evaluated water level measurements from over 110 monitoring wells and did not find any evidence of drawdown that would be sufficient to cause land subsidence has occurred during the last few years or will occur in the next few years.

**16.4 Conservation of Groundwater including Rainwater Harvesting, Precipitation Enhancement, Brush Control, Conjunctive Use, and/or Recharge Enhancement of Groundwater Resources in the District**Management Objectives:

1. The District will provide educational leadership to citizens within the District concerning this subject. The educational efforts will be through at least one printed publication, such as a brochure, and at least one public speaking program at a service organization and/or public school as provided for in the District's Public Education Program. Each of the following topics will be addressed in that program:
  - A. Conservation
  - B. Rainwater Harvesting
  - C. Brush Control
  - D. Recharge Enhancement
  - E. Conjunctive Use

#### F. Precipitation Enhancement

2. During years when District revenues are sufficient, the District will consider sponsoring the attendance of students and/or teachers at summer camps/seminars that place emphasis on the conservation of groundwater, rainwater harvesting, brush control, groundwater recharge enhancement, conjunctive use, precipitation enhancement of water resources, or a combination of such groundwater management programs.
3. The District will encourage and support projects and programs to conserve and/or preserve groundwater, and/or enhance groundwater recharge, by annually funding the District's Groundwater Conservation and Enhancement Grant Program, during years when the District's revenues remain at a level sufficient to fund the program. The objective of this program is to obtain the active participation and cooperation of local water utilities, fire departments and public agencies in the funding and successful completion of programs and projects that will result in the conservation of groundwater and the protection or enhancement of the aquifers in the District. The qualifying water conservation projects and programs will include, as appropriate, projects that: result in the conservation of groundwater, reduce the loss or waste of groundwater, recharge enhancement, rainwater harvesting, precipitation enhancement, brush control, or any combination thereof. The District's objective is to benefit the existing and future users of groundwater in the District by providing for the more efficient use of water, increasing recharge to aquifers, reducing waste, limiting groundwater level declines, and maintaining or increasing the amount of groundwater available, by awarding at least one grant under the program in each county annually.

#### Performance Standards:

1. The number of publications and speaking appearances by the District each year under the District's Public Education Program.

Table 5 lists the instances and publications where this topic was addressed.

2. The number of students sponsored to attend a summer camp/seminar emphasizing the conservation of water.

The District offered the opportunity to students and youth through schools in the District but no applications were received.

3. Annual funding, when applicable, for the District's Groundwater Conservation and Enhancement Grant Program, and the number of projects and programs reviewed, approved, and funded under that program. A written report providing estimated benefit of the amount of groundwater conserved, of the recharge enhancement, and/or of addition groundwater protection provided by the program.

Table 6 lists the successful applications awarded District funds for this purpose.

4. The number and content of reports submitted regarding sponsored programs.

The report regarding Table 6 was given at the Board meeting at which Grant Awards were made on April 4, 2017. The 2016-17 Water Wise report was presented to the Board on September 5, 2017. This report is available on the District's website at [www.posgcd.org](http://www.posgcd.org) and upon request from the District.

The District also provided funding for groundwater conservation efforts by fire departments within the District during 2017, in the total amount of \$1664.

### **16.5 Conjunctive Use of Surface and Groundwater**

#### Management Objective:

1. The District will confer annually with the Brazos River Authority (BRA) on cooperative opportunities for conjunctive resource management.

#### Performance Standard:

1. The number of conferences with the BRA on conjunctive resource management.
2. The number of times each year in which the applicant, general manager or the Board considers conjunctive use in the permitting process.

The District's General Manager discussed this item on August 16, 2017 and November 1, 2017 with representatives of the Brazos River Authority at BRA's offices, during trips to Region G Planning Group Meetings. No applications for conjunctive use were filed with the District.

### **16.6 Drought Management Strategy**

The aquifers within the District are substantially resistant to water level declines during drought conditions. As a result, the District does not have a drought management strategy based on precipitation metrics such as the Palmer Drought Index. The District management strategy is to review and to verify enforcement of Drought Management Plans adopted by District permit holders and entities that contract to purchase water from District permit holders.

#### Management Objective:

1. When permits or contracts are issued, as applicable, the District will confirm that all entities have a Drought Management Plan or Drought Contingency Plan that has been approved by the Texas Commission on Environmental Quality or another regulatory agency in the State of Texas.

Performance Standard:

2. State approved Drought Management Plans or Drought Contingency Plans on file at the District Offices.

The District hydrogeologists have reviewed the monitoring well data during the last ten years and have confirmed that the aquifers of the Districts are substantially resistant to water level declines during drought. The District's Rules require that all permit holders with Drought Plans or Management Strategies are required to abide by those plans and strategies.

**16.7 Natural Resource Issues That Impact the Use and Availability of Groundwater and Which are Impacted by the Use of Groundwater**

The District reviewed applications and approved issuance of 29 permits for non-exempt wells in 2017 (see Tables 1 and 2), of which 8 were limited term permits for Oil and Gas fracturing (see Table 2). None of these permits were deemed to have sufficient pumping to potentially cause significant water level change.

Management Objective:

1. The District will confer at least once every two years with appropriate agencies on the impact of groundwater resources in the District.
2. The District will evaluate permit applications for new wells and the information submitted by the applicants on those wells prior to drilling. The District will assess the impact of these wells on the groundwater resources in the District.
3. The District will implement the POSGCD Well Closure Program. The objective of the well closure program is to obtain the closure and plugging of derelict and abandoned wells in a manner that is consistent with state law, for the protection of the aquifers, the environment, and the public safety. The District will conduct a program to identify, inspect, categorize and cause abandoned and derelict water, oil and gas wells to be closed and plugged, by annually funding the program or segments or phases of the program appropriate to be funded in such fiscal year. The District will fund the closure of at least one abandoned well during years when the District's revenues remain at a level sufficient to fund the program.

Performance Standard:

1. The number of conferences with a representative of appropriate agencies.

The General Manager (GM) participated on TAGD (August 30, 2017) and TWCA (January 13, 2017) committees to discuss oil and gas uses of groundwater, and District regulation of the same.

2. Reports to the Board on the number of new well permit applications filed, and the possible impacts of those new wells on the groundwater resources in the District.

These reports are given at the regular meetings of the Board and are available in the District's meeting minutes, which may be found on the District's website at [www.posgcd.org](http://www.posgcd.org).

3. Annual funding, when applicable, for the District's Well Closure Program, and the number of wells closed and plugged as a result of the Well Closure Program.

The District funded well plugging for 2 qualified wells in 2017.

### **16.8 Groundwater Well Assistance Program**

#### Management Objective:

1. Beginning in 2018, the District will maintain a Groundwater Well Assistance Program (GWAP). The primary purpose of the GWAP is to help restore a water supply to well owners in the District who own wells that have experienced significant adverse impacts, and where applicable to address well conditions to prevent significant adverse impacts, from groundwater level declines caused by aquifer-wide groundwater pumping in GMA 12. A secondary purpose of the GWAP is to improve the POSGCD monitoring program and the POSGCD's understanding of groundwater aquifer systems in POSGCD by increasing the number of monitoring wells in the monitoring well network and by performing localized hydrogeological studies at these monitoring locations.

#### Performance Standard:

1. GWAP adopted before the end of 2018.

The GWAP was posted for a public hearing at the Board Meeting on January 9, 2018 and is set to be adopted before the end of 2018.

### **16.9 Mitigation**

#### Management Objective:

The District will require filing with the District of mitigation plans required by the District or any State agency regarding impacts caused by groundwater pumping in the District.

#### Performance Standard:

1. Mitigation plans on file at the District that are related to groundwater pumping in the District.

During 2013, ALCOA's mitigation plan, required by the Railroad Commission of Texas (TRRC) in conjunction with mining permits from TRRC, and the mitigation plan adopted by Gonzalez Co. UWCD were reviewed by District staff, attorneys, and hydrogeologists. These plans were revisited during 2017 in development of the Groundwater Well Assistance Program.

At the November 10, 2015 Board Meeting a presentation was given to the Board by Mr. Fred Russell, of Gause, TX, concerning the benefits of a District mitigation program. At this time, the District maintains successful management under current District Rules and management strategies negates this need, however, to address this request from citizens, the District has developed a Groundwater Well Assistance Plan during 2017, and will adopt this plan in 2018.

The District will continue to review mitigation plans prepared by other agencies.

2. Report of the Impacts and predicted impacts on well owners in the District on file at the District Offices.

District staff presented reports and/or discussion on this topic during evaluations of compliance with adopted Desired Future Conditions at Board meetings on September 05 and October 03.

#### **16.10 Desired Future Conditions (DFCs)**

##### Management Objective:

1. At least once every three years, the District will monitor water levels and evaluate whether the change in water levels is in conformance with the DFCs adopted by the District. The District will estimate total annual groundwater production for each aquifer based on the water use reports, estimated exempted use, and other relevant information, and compare these production estimates to the MAGs listed in Table 8-1.

##### Performance Standard:

1. At least once every three years, the general manager will report to the Board the measured water levels obtained from the monitoring wells within each Management Zone, the average measured drawdown for each Management Zone calculated from the measured water levels of the monitoring wells within the Management Zone, a comparison of the average measured drawdowns for each Management Zone with the DFCs for each Management Zone, and the District's progress in conforming with the DFCs.
2. At least once every three years, the general manager will report to the Board the total permitted production and the estimated total annual production for each aquifer and compare these amounts to the MAGs listed in Table 8-1 for each aquifer.

The District's staff and hydrologist covered this topic at the May 2016 Board meeting in a comprehensive evaluation of monitoring results compared to the DFCs and management goals identified in the District's management plan, and the results indicated that, at that time, the District was in conformance with the DFCs adopted by the District in 2010 as part of the joint planning process.

The District staff reported results of evaluations of compliance with DFCs during 2017 at the August 01 and September 05 Board Meetings.

The District will continue this process by developing additional methodologies to evaluate these items. The District's Staff will also continue ongoing reports to the Board during public Board Meetings covering all of these factors.

#### **Financial Reports and Annual Financial Audit**

Financial reports are given at each meeting of the District's Board of Directors. The Financial Audit of the District for FY 2016 was presented to the Board at the May 3, 2017 Board Meeting.

#### **Fines levied by the District in 2017**

No fines were levied by the District during 2017.

Table 1

*Production Permits Issued During 2017 Calendar Year*

Owner	Use	Acquire	Type	Permit #	Acres
44 Farms	Irrigation	Hooper	D&O	POS-D&O-0231	20
44 Farms	Irrigation	Hooper	D&O	POS-D&O-0232	20
Abengoa Vista Ridge LLC	Rig Supply	Queen City	D&O	POS-D&O-0233	160
Abengoa Vista Ridge LLC	Rig Supply	Queen City	D&O	POS-D&O-0234	160
Abengoa Vista Ridge LLC	Rig Supply	Queen City	D&O	POS-D&O-0235	160
Abengoa Vista Ridge LLC	Rig Supply	Queen City	D&O	POS-D&O-0236	160
Abengoa Vista Ridge LLC	Rig Supply	Queen City	D&O	POS-D&O-0237	160
James M. Burns	Domestic & Irrigation	Hooper	D&O	POS-D&O-0238	4
Thomas Novosad Jr.	Irrigation	Queen City	D&O	POS-D&O-0239	400
Thomas Novosad Jr.	Irrigation	Queen City	D&O	POS-D&O-0240	500
Thomas Novosad Jr.	Irrigation	Queen City	D&O	POS-D&O-0241	500
Scamardo North Burleson LP	Irrigation	BRAA	D&O	POS-D&O-0242	110
Fred Keith Debault	Irrigation	Simsboro	D&O	POS-D&O-0243	1200
Paul A. Zimmerman	Irrigation	Little River Alluvium	D&O	POS-D&O-0244	20
Paul A. Zimmerman	Irrigation	Little River Alluvium	D&O	POS-D&O-0245	20
Ironhorse Ranch	Livestock	Yegua-Jackson	D&O	POS-D&O-0246	35
Ironhorse Ranch	Domestic	Yegua-Jackson	D&O	POS-D&O-0247	10
Somerville ISD	Irrigation	Yegua-Jackson	D&O	POS-D&O-0248	20
Bonnie & Calvin Cobb Investments, Ltd.	Irrigation	Little River Alluvium	D&O	POS-D&O-0249	260
William Gavranovic	Irrigation	Brazos River Alluvium	D&O	POS-D&O-0250	320
Joe Blaha Trust	Livestock	Sparta	D&O	POS-D&O-0251	10

Table 2

*Oil & Gas Permits Issued During 2017 Calendar Year*

Owner	Well	Type	Permit #	Acres
Wildhorse Resources Management	Goodnight #1	Frac	O&G-0218	128.89
Wildhorse Resources Management	Beseda WL1	Frac	O&G-0219	77.34
Wildhorse Resources Management	Beseda WL2	Frac	O&G-0220	77.34
Wildhorse Resources Management	Miman WL1	Frac	O&G-0221	90.23
Wildhorse Resources Management	Miman WL2	Frac	O&G-0222	90.23
Wildhorse Resources Management	Blaha WL2	Frac	O&G-0223	77.34
Wildhorse Resources Management	Stefka-Aulbaugh WL1	Frac	O&G-0224	148.00
Wildhorse Resources Management	Stefka-Aulbaugh WL2	Frac	O&G-0225	148.00

Note: All permits were 365-day term permits.

Table 3

*Exempt Well Registrations Issued During the 2017 Calendar Year*

POS-EW-3482	Donald W. Lampe - Bar L Ranch	Milam
POS-EW-3483	Louis F. Howard, Sr.	Burleson
POS-EW-3484	Thomas Novosad	Burleson
POS-EW-3485	Jamie T. Kitkoski	Burleson
POS-EW-3486	Clint H. Woodburn, Jr.	Burleson
POS-EW-3487	Leslie E. Carsey	Burleson
POS-EW-3488	Rogelio M. Ruiz	Burleson
POS-EW-3489	John C. Perez	Burleson
POS-EW-3490	Jamie C. Hargrove	Burleson
POS-EW-3491	McLane Ranch	Milam
POS-EW-3492	Rudolph Zalobny	Burleson
POS-EW-3493	Lewis C. Herrmann	Burleson
POS-EW-3494	New Tabor SPJST Hall	Burleson
POS-EW-3495	David Korkmas	Burleson
POS-EW-3496	Douglas Pitts	Burleson
POS-EW-3497	Mark Allen Stuart	Burleson
POS-EW-3498	Todd Anthony Higgins	Burleson
POS-EW-3499	John R. Russell	Burleson
POS-EW-3500	Arthur Garza	Milam
POS-EW-3501	Kevin & Monica Odenbach	Burleson
POS-EW-3502	Richard J. Sebesta	Burleson
POS-EW-3503	Darwin D. Stiles	Milam
POS-EW-3504	Floyd Collins	Burleson
POS-EW-3505	Weldon & Diane Clark	Milam
POS-EW-3506	Ray Fox	Milam
POS-EW-3507	Larry Krenek	Burleson
POS-EW-3508	Ricky Cox	Burleson
POS-EW-3509	William Todd Marsh	Milam
POS-EW-3510	Bruce Alford	Burleson
POS-EW-3511	Bruce Alford	Burleson
POS-EW-3512	Terri Machac	Milam
POS-EW-3513	Kurt Butler	Burleson
POS-EW-3514	Joe C. Foster	Milam
POS-EW-3515	Peggy McNeese	Milam
POS-EW-3516	Eliot & Kim Lawrence	Milam
POS-EW-3517	Michael & Dawn Andrews	Milam
POS-EW-3518	Evrin Ben Flencher, Jr.	Burleson
POS-EW-3519	Joan C. Poel	Burleson
POS-EW-3520	Gary Morgan	Milam
POS-EW-3521	Esmaralda Esparaza	Burleson
POS-EW-3522	Don Wyatt	Milam

Table 3 Continued

Registration ID	Owner	County
POS-EW-3523	Brad & Betty Burkhart Trust	Milam
POS-EW-3524	Cyril M. Matula, III	Burleson
POS-EW-3525	Shane Stanger	Milam
POS-EW-3526	Tanya Richardson	Burleson
POS-EW-3527	James R. Trehern	Burleson
POS-EW-3528	Rayfield Slovacek	Burleson
POS-EW-3529	Andrew Sidney Youngblood	Milam
POS-EW-3530	Craig Scarmardo	Burleson
POS-EW-3531	Charles Nowlin	Milam
POS-EW-3532	Albert Wilhelm	Burleson
POS-EW-3533	Iron Horse Ranch	Burleson
POS-EW-3534	Iron Horse Ranch	Burleson
POS-EW-3535	Malissa S. Dingman	Burleson
POS-EW-3536	Raymond W. Zboril	Burleson
POS-EW-3537	James R. Kirkpatrick	Burleson
POS-EW-3538	William A. Newton III	Burleson
POS-EW-3539	Norman F. Godwin	Milam
POS-EW-3540	Michael & Rita Davis	Milam
POS-EW-3541	Travis Wood	Burleson
POS-EW-3542	Dock Hester	Burleson
POS-EW-3543	Daniel Marek	Milam
POS-EW-3544	Timothy L. Richardson	Milam
POS-EW-3545	Ulises DeLeon	Burleson
POS-EW-3546	Harry J. Young	Milam
POS-EW-3547	Ronald Willard Clawson II	Milam
POS-EW-3548	Ronald Willard Clawson II	Milam
POS-EW-3549	Jeremy L. Finch	Burleson
POS-EW-3550	Cheri H. Teague	Milam
POS-EW-3551	Arpit Shah	Milam
POS-EW-3552	Ceripo Muniz	Burleson
POS-EW-3553	Judith Krause	Burleson
POS-EW-3554	Clarence L. Junek	Burleson
POS-EW-3555	Clarence L. Junek	Burleson
POS-EW-3556	Clarence L. Junek	Burleson

Table 4

*District Monitoring Wells Measured in Early Spring 2017 for and Reported to TWDB*

5917403	25	City of Rockdale (Belton)	170.42	4/17/17	eline
5917403	26	Ralph Summers- Mary Jane Boyd	75.70	2/22/17	tape
5909901	53	Richard Frock	--		
5911402	59	Harold Lange	147.50	2/16/17	tape
5910907	73	Willard Kornegay	130.70	42782	eline
5910902	84	James Ayers	34.60	42783	eline
5925508	99	Larry Sexton	51.20	3/16/17	tape
5925102	107	Noack Family Partnership, Ltd.	116.60	4/17/17	eline
5917715	115	L.B. Kubiak	--		
5917714	121	City of Rockdale (Texas)	--		
5917713	138	City of Rockdale (Tracy)	148.70	3/22/17	eline
5824914	170	Rockdale ISD	126.70	4/17/17	eline
5909605	221	Marlow WSC	136.40	2/21/17	eline
5902706	223	North Milam WSC	35.90	2/16/17	tape
5902309	234	Wendy Breck	37.90	2/16/17	eline
5902307	236	Jared & Heather Campbell	--		
5902901	256	North Milam WSC	121.10	42782	tape
5832101	268	Wayne Diver	5.00	3/16/17	eline
5927716	308	R. B. Wilkens	110.90	42793	tape
5927606	341	Rudy Steck	96.30	2/17/17	eline
5920410	433	Milano WSC- Rita Test	24.30	2/17/17	eline
5920409	434	L. C. Hall, Sr.	--		
5919502	457	Milano WSC - Well 4	284.90	3/1/17	eline
5927204	518	Dale Hill	24.00	2/27/17	tape
5997611	579	Camilla J. Godfrey	32.30	3/15/17	eline
5937329	596	Finley Company	--		
5937101	638	Snook well #1	39.30	42794	eline
5936802	661	Lyons Water Supply	--		
5943608	698	Birch Creek Recreation	52.90	2/28/17	eline
5938701	787	Burnside Services, Inc.	6.30	3/20/17	eline
5935208	791	Juanita Amidon	68.60	2/27/17	tape
5929456	859	Marion Malazzo	9.30	2/28/17	tape
5929457	860	Marion Malazzo	9.20	2/28/17	tape
5928619	877	Tunis Water Supply	--		
5928601	894	P. G. Haines	15.20	3/2/17	eline
5928702	895	Sarah Engleman	--		
5934106	943	Nathan Ausley	138.10	2/23/17	tape
5929537	1023	Texas A & M University	26.70	2/28/17	tape
5934607	1061	Deanville Water Supply Corporation 2	110.60	42796	tape
5918101	1062	Milano WSC - Well # 1	287.20	42795	eline
5918104	1063	Milano WSC - Well # 2	272.60	3/1/17	eline
5918908	1064	Milano WSC - Well # 3	304.20	3/1/17	tape
5918705	1066	Milano WSC - Buer Well	--		
5911703	1082	Gause Water Supply # 1	170.90	2/16/17	tape
5824611	1110	Southwest Milam Water Supply Corp.	141.70	3/17/17	tape
5917712	1117	City of Rockdale (runway)	--	3/22/17	
5917711	1118	City of Rockdale (airport)	154.80	3/22/17	eline
5929410	1166	Holland Porter	7.40	2/28/17	eline
5934107	1197	Nathan C. Ausley	95.90	42789	eline
5934601	1573	Deanville Water Supply Corporation 1	70.80	3/2/17	tape
5927718	1575	Deanville Water Supply Corporation 4	174.80	42796	eline

Table 4 Continued

APN	Area	Owner	DTW (ft)	Date	Method
5811403	1789	Terry & Sheryl Hall	212.70	42787	tape
5832704	1883	Martin Hobbs	91.40	3/16/17	tape
5925409	2152	Glynn Phillips	—		
5917716	2191	L.B. Kubiak	—		
5902804	2423	Gary & Deryl Emola	—		
5827811	6145	Alvin J. Kutach	111.40	42796	tape
5925502	6243	Birdie Kristoff	76.70	3/16/17	tape
5832908	6305	Charles Lee McDaniel	15.00	2/22/17	tape
5926402	6621	Frederick A. Jackson	--	42797	
5926403	6910	Charles & Jacquelin Stone Revocable Living Trust	287.70	3/3/17	eline
5824612	7364	Richard H. Griffith	56.70	2/22/17	tape
5824610	7506	Southwest Millam Water Supply Corp.	—		
5910910	7773	Todd Russell	195.40	3/15/17	tape
5910705	7774	Jay Wise	—		
5925108	7793	Noack Family Partnership, Ltd.	102.50	42842	eline
5929408	7965	Heirs of Mary Anne oliver	+17.80	3/23/17	tape
5910908	7998	Walter D. Fischer	261.40	42787	tape
5831904	8172	Norbert B. Zeschke	108.30	3/21/17	tape
5928804	8239	Providence Baptist Church	28.50	3/2/17	eline
5902311	8274	Dominic Izzo	80.70	2/16/17	tape
5943104	8388	Wayne Edwards	--		
5929433	8415	Portee FLP	--		
5925408	8451	Antonio E. Cantu	85.70	3/16/17	tape
5910706	8658	Randal C. Leo	183.80	3/17/17	eline
5934108	8767	Terry Ausley	197.80	2/23/17	transducer
5901904	8935	Donald R. Schuerman	34.10	2/16/17	tape
5918602	8959	John Pruett	173.70	2/15/17	tape
5928343	9064	Royalty Pecan Farms	93.00	3/2/17	
5910707	9095	Randal C. Leo	154.80	3/17/17	tape
5928342	9104	David L. Hodges	—		
5936809	9157	Burleson County Pct. 4	76.10	2/28/17	tape
5918108	9166	Post Oak Savannah	259.25	4/20/17	tape
5918109	9167	Post Oak Savannah	59.50	4/20/17	tape
5925904	9215	Linda Garrison	--		
5925302	9230	David Pawlowski	--		
5901905	9327	Naomi White	28.70	2/17/17	tape
5925905	9346	David L. Hancock	—		
5925906	9372	David Hancock	--		
5934609	9445	Burleson County Pct. 1	43.70	3/20/17	tape
5925511	9446	Walter Wentzel	--		
5824915		Rodgers	134.70	2/22/17	tape
5824916		Bocenegra (Simmons)	125.70	2/22/17	tape
5831905		Ansley	107.90	3/21/17	eline
5831906		Hirt	130.60	3/21/17	tape
5832304		Young	119.10	2/22/17	tape
5832404		R. Crump	95.00	3/16/17	eline
5832705		K. Blehie	104.00	3/21/17	tape
5832706		Smith	92.30	3/16/17	tape
5839303		Jordan	103.80	3/16/17	tape
5917510		L. Warren	141.60	2/22/17	eline
5917302		J. Denlo	—		
5917411		Caywood	57.50	2/22/17	tape

Table 4 Continued

5917505	Ed Garner	99.40	2/22/17	tape
5917705	Keys	169.70	3/16/17	tape
5917717	Brahm	-		
5917804	Wiggins	63.40	3/16/17	eline
5925410	David Cork	147.30	2/22/17	tape
5925512	E. Crump	114.30	3/16/17	tape
5899510	Hobbs	70.00	3/21/17	tape

Table 4.1

## New Monitor Wells Added During the 2017 Calendar Year

5925505	9346	David L. Hancock	Queen City	80
5925506	9372	David Hancock	Queen City	120
Pending		Gerald Briggs	Calvert Bluff	440
Pending	8037	Lee Walters	Calvert Bluff	430
Pending	1786	Earl Campbell	Calvert Bluff	436
Pending	7614	Robert & Sharon Lefler	Calvert Bluff	460
Pending	6330	Robert & Sharon Lefler	Calvert Bluff	410
Pending		Bruce Brinkmann	Sparta	520
Pending		Darren Broeche	Sparta	269
Pending		Dock Hester	Yegua-Jackson	260
Pending	6153	Andrea Moss	Queen City	620
Pending		Tommy Tietjen	Sparta	532
Pending		New Tabor Brethren Church	Carrizo	1235
Pending		CPS-86-37MS / Luminant	Simsboro	499
Pending		58-39-8A1 / Mary Cain	TBD	135
Pending		58-40-4A6 / Lancaster	TBD	544
Pending		58-40-4A9N / Sorenson	TBD	255
Pending		58-40-704 / Turner	TBD	454
Pending		59-25-7A6 / Art Gary	Calvert Bluff	620
Pending		CPS-86-5MS / Luminant	Simsboro	300
Pending	8865	Billy Ogea	Calvert Bluff	160
Pending		Bill O'Brien	Yegua-Jackson	350
Pending		Bill O'Brien	Yegua-Jackson	400
Pending	7183	Mark Ofczarzak	Queen City	570
Pending	1390	Charles Stone	Calvert Bluff	1120
Pending	1120	Cooks Point WSC	Carrizo	1252
5909701	186	Minerva WSC #1	Hooper	218
5824802	148	Billy Ogea/ Leo Ogea	Hooper	212
Pending		Richard Ramsey	Sparta	520
Pending		Richard Ramsey	Yegua-Jackson	226
Pending		Ronnie Coleman	Calvert Bluff	680
Pending		Ronnie Coleman	Calvert Bluff	700
Pending		Amy Hinnant Jurica	Sparta	550
Pending		Tommy Tietjen - Anthony #1	Sparta	533
5938709		Clay WSC	Yegua-Jackson	513
Pending		Lee Alford	Queen City	199

Table 4.1 Continued

SPN	WID	Owner	Aquifer	Well Depth (ft)
Pending	7838	Durwood Tucker	Hooper	194
Pending	1986	Leroy Stephens	Hooper	412
Pending	8795	Douglas & Michelle Van Meter	Hooper	279
Pending	8772	Douglas & Michelle Van Meter	Hooper	115
Pending	9094	Douglas & Michelle Van Meter	Hooper	315
Pending	9162	Douglas & Michelle Van Meter	Hooper	300
Pending		POSGCD CWM-3	TBD	To be drilled
Pending		POSGCD CWM-4	TBD	To be drilled
Pending		POSGCD CWM-5	TBD	To be drilled
Pending		POSGCD CWM-6	TBD	To be drilled
Pending		POSGCD CWM-7	TBD	To be drilled
Pending		POSGCD CWM-8	TBD	To be drilled

Table 5

*District Education During the 2017 Calendar Year*

		Location
01-03-17	Update to Burleson Co. Commissioner's Court	Caldwell, TX
05-18-17	POSGCD Open House	Milano, TX
05-26-17	Milano Texas A&M AgriLife; Healthy Streams	Cameron, TX
06-06-17	Rockdale Rotary Club	Rockdale, TX
07-03-17	NRCS – Annual Conservation Planning Meeting	Caldwell, TX
07-14-17	Well Water Screening Campaign Results Meeting	Milano; Caldwell, TX
08-16-17	Milam & Burleson Counties Groundwater Summit	Caldwell, TX
08-31-17	TAGD Groundwater Summit	San Marcos, TX
09-03-17	Caldwell Methodist Church Ladies Group	Caldwell, TX
09-26-17	Local Water Utilities Workshop	Milano, TX
10-04-17	Texas A&M University AGCJ 281 Class	College Station, TX
10-10-17	Rainwater Harvesting 101 Workshop	Milano, TX
10-10-17	Burleson County Farm Bureau Meeting	Caldwell, TX
10-18-17	Burleson County Ag Safety Day	Caldwell, TX
10-24-17	Brazos Valley GCD Water Field Day	Franklin, TX
11-06-17	Earth-Kind Water Conservation Workshop	Milano, TX
11-15-17	Bell County Water Symposium	Killeen, TX
11-16; 17-17	TAGD Leadership Training	Salado, TX
11-20-17	Groundwater Educational Outreach Collaborative	Waco, TX
12-02-17	Rainwater Harvesting 101 Workshop	Milano, TX
12-05-17	POSGCD Christmas Open House	Milano, TX
Jan – Dec	Facebook & Twitter posts	
May – Dec	Bi-weekly E-newsletters	
May – Dec	Quarterly Mailed Newsletters	

Table 6

*District Conservation Grants Awarded for Calendar Year 2017 on April 4, 2017*

District Conservation Grants Awarded for Calendar Year 2017 on April 4, 2017		
Milano WSC	\$95,000.00	Replace obsolete water lines
Southwest Milam WSC	\$176,030.00	Replace obsolete water lines and meters
Burleson Co. MUD #1	\$317,421.00	Replace obsolete water lines
City of Somerville	\$216,000.00	Replace obsolete water lines
Lyons WSC	\$108,300.00	Replace obsolete water lines
Marlow WSC	\$34,770.00	Replace obsolete water meters
Total:	\$947,521.00	

During 2017, the District reimbursed fire departments which used groundwater and located in the District for purchase of foam and foam dispersion equipment in the amount of \$1664.

EXHIBIT

H

## Exhibit Z

Estimated predicted drawdown over time for GMA 12 GCDs based on GMA 12 evaluations in joint planning for DFCs adopted in 2010.

Zone/Aquifer		Sparta	Queen City	Carrizo	Calvert Bluff	Simsboro	Hooper
Post Oak GCD	2020	19	28	89	96	106	108
	2040	24	37	109	128	264	147
	2060	27	42	122	154	306	184
Lost Pine GCD	2020	4	10	33	57	161	74
	2040	6	16	49	79	191	105
	2060	8	18	63	102	238	135
Cross Valley GCD	2020	7	8	36	68	161	104
	2040	11	12	51	94	222	144
	2060	12	13	61	117	273	178
East Texas GCD	2020	-1	-2	34	40	68	56
	2040	-2	-3	46	57	93	78
	2060	-3	-5	55	70	115	87
Fayette County	2020	30	27	26	73	139	99
	2040	48	46	47	105	182	138
	2060	60	60	69	133	226	174

Mar. 20. 2018 5:18PM

Received

Mar 20 2018 05:24pm

No. 0090 P. 140

EXHIBIT

I-1

***Amended and Restated Drilling & Operating Permit  
Issued By Direction of the Board of Directors of the  
Post Oak Savannah Groundwater Conservation District***

This Amended and Restated Drilling and Operating Permit ("Amended Permit") is granted to Abengoa Vista Ridge, LLC, ("Permittee"), the assignee of and successor to Blue Water Vista Ridge LLC ("BWVR"), the successor to Blue Water Systems, L.P. ("Blue Water") the successor to Layne Water Development of Texas, LLC ("Layne"), to authorize Permittee to drill and operate thirty-three (33) water wells within the Post Oak Savannah Groundwater Conservation District ("District"), for the purpose of producing water for Municipal Use. The name, location, maximum annual production and maximum gallons of production permitted per minute for each of the thirty-three wells is listed in Exhibit "A". The individual wells listed in Exhibit "A" are referred to herein as the "Well" or "Wells" and the thirty-three Wells are collectively referred to as the "Well System". This Permit is conditioned upon and subject to Permittee complying with the Rules of the District ("Rules"), the orders of the Board, the Management Plan of the District, as amended, and the laws, rules and regulations of the State of Texas, as amended, applicable to drilling, operating and maintaining water wells within the District. This Permit confers only the right to drill and operate the Wells and Well System in compliance with and subject to the Rules and requirements of this Amended Permit. The terms, conditions and authorizations of this Amended Permit may be modified or amended under the Rules.

The Wells are registered with the District and the State of Texas. The Wells are approved for production in the aggregate as a Well System. The Permittee is authorized to drill and operate the Wells at the locations and maximum GPM production set forth in Exhibit "A", and the maximum annual production of the Well System shall not exceed 50,993 acre feet per year.

The Rules are incorporated herein in their entirety by reference, as if set forth herein verbatim, including but not limited to the Rules providing for reducing permitted production. The Permittee shall comply with the Rules and each requirement thereof in operating, maintaining, repairing and altering each of the Wells and the Well System. All application(s) pursuant to which the related original permits and prior amended permits, and this Amended Permit, have been issued, and all written agreements and acknowledgments executed by the Permittee, and/or by BWVR, Blue Water, or Layne, are incorporated into this Amended Permit. This Amended Permit is granted on the basis of, and contingent upon, the accuracy of the information supplied in the application(s), agreements and acknowledgments on file with the District. A finding that false information was supplied to the District in the permitting process for the Wells is grounds for revocation of this Permit.

The issuance of this Permit does not grant Permittee the right to use any public or private property, interfere with any personal or property rights, or violate any federal, state, or local law, rule or regulation. The District makes no representations and has no responsibility with respect to the availability or quality of the water authorized to be produced under this permit.

The term of the Permit, both the Drilling and the Operating Permit, is for a period of forty years from the original issuance date of September 11, 2004, subject to review every fifth year and modification during any such review to conform this Permit with intervening changes in the Management Plan or state law. Unless waived by the Board of the District for a specific review period, applications for review shall be submitted to the District 90 days prior to the fifth anniversary of the issuance date and each subsequent scheduled review date following the fifth anniversary date, until the date of expiration of this Permit. The Board may waive any review if no material change has been made to the Management Plan, or if the changes made do not require modification of this Permit.

This Amended Permit is executed and effective as of June 24, 2015.

Post Oak Savannah Groundwater Conservation District

By: \_\_\_\_\_

Name: Gary Westbrook

Title: General Manager

Permit No. POS-D&O-0001

**Exhibit A**  
**Blue Water Vista Ridge LLC Permitted Water Wells**

Well Designation	Location	Max. GPM
CW-1	30.44108N 96.81247W	1200gpm
CW-2	30.43564N 96.80366W	1200gpm
CW-3	30.42803N 96.80739W	1200gpm
CW-4	30.43169N 96.81623W	1200gpm
CW-5	30.43037N 96.82592W	1200gpm
CW-6	30.42724N 96.83412W	1200gpm
CW-7	30.41233N 96.81705W	1200gpm
CW-8	30.42325N 96.81969W	1200gpm
CW-9	30.42052N 96.81123W	975gpm
CW-10	30.41916N 96.80507W	750gpm
CW-11	30.41392N 96.7928W	750gpm
CW-12	30.41116N 96.79682W	750gpm
CW-13	30.44583N 96.76865W	1200gpm
CW-14	30.40421N 96.7786W	750gpm
CW-15	30.41001N 96.78026W	750gpm
CW-16	30.40794N 96.77606W	750gpm
CW-17	30.41709N 96.77139W	750gpm
CW-18	30.42121N 96.77545W	975gpm
CW-19	30.41838N 96.7668W	750gpm
CW-20	30.43605N 96.76393W	1200gpm
CW-21	30.43899N 96.77173W	1200gpm
PW-9	30.44138N 96.801233W	3000gpm
PW-10	30.43638N 96.80358W	3000gpm
PW-11	30.42851N 96.80668W	3000gpm
PW-12	30.42113N 96.811W	3000gpm
PW-13	30.42394N 96.82004W	3000gpm
PW-14	30.41266N 96.81705W	2500gpm
PW-15	30.42723N 96.83449W	3000gpm
PW-16	30.43059N 96.82576W	3000gpm
PW-17	30.43181n 96.981632w	3000gpm
PW-18	30.41998N 96.7752W	3000gpm
PW-19	30.41001N 96.77979W	3000gpm
PW-20	30.41145N 96.79644W	1800gpm

**Amended Permit to Transport Groundwater From within the  
Post Oak Savannah Groundwater Conservation District  
Of the State of Texas**

By Direction of the Board of Directors of the  
Post Oak Savannah Groundwater Conservation District

**EXHIBIT**

*I-2*

This amended permit is granted to Abengoa Vista Ridge, LLC ("Permittee"), the assignee of and successor to Blue Water Vista Ridge LLC ("BWVR"), successor to Blue Water Systems LP, ("Blue Water") and Layne Water Development of Texas, LLC ("Layne"), for the purpose of transporting groundwater from a system of water wells (wells) within the Post Oak Savannah Groundwater Conservation District (District), to locations outside the District for the non-wasteful purposes of Municipal Use in the counties of Bastrop, Bell, Burnet, Caldwell, Hays, Lee, Travis, Williamson, Comal, Guadalupe, and Bexar, in the State of Texas ("Amended Permit"). The groundwater permitted herein must be put to beneficial use at all times.

The location of each well from which water is authorized to be transported under this Amended Permit is listed in Exhibit "A". The Permittee has issued the water rights that will be produced. In addition, the names and mailing addresses of the owners of the land from which the wells are authorized to produce water are set forth in the application filed by Permittee for this Amended Permit, and otherwise in the records of the District.

Upon issuance of this Amended Permit, the Permittee agrees to abide by the Rules, orders of the Board and Management Plan of the District, as amended, and the laws and rules of the State of Texas, as amended, in transporting groundwater from the water wells to locations outside the District. This permit confers only the right to use the permit under the provisions of the District rules and according to its terms. The permit terms may be modified or amended as provided in the District rules.

These wells are registered with the District and the State of Texas. During any 24 hour period, the amount of groundwater to be transported from the District shall not exceed the aggregate maximum gallons per minute for the wells identified in Exhibit A. The total amount of groundwater to be transported from the District on an annual basis shall not exceed 50,993 acre feet.

This Amended Permit confers only the right to transport groundwater and its terms may be modified or amended. The operation of the wells for the authorized withdrawal must be conducted in a non-wasteful manner. All transport and storage facilities must be accessible to District representatives for inspection, and the Permittee agrees to cooperate fully in any reasonable inspection of these facilities by the District representatives. All application(s) pursuant to which the related original permits and the prior amended permits, and this Amended Permit, have been issued, and all written agreements and acknowledgments executed by the Permittee, and/or by BWVR, Blue Water or Layne, are incorporated into this Amended Permit, which is granted on the basis of, and contingent upon, the accuracy of the information supplied in the application(s). A finding that false information has been supplied is grounds for revocation of this Amended Permit, and a violation of the terms, conditions, requirements, or special provisions of this Amended Permit is punishable by civil penalties as provided by the District Rules and by law.

On or before February 15 of each year, the owner of this Amended Permit must submit an annual report to the District describing the amount of groundwater transported under this Amended Permit. This report shall be filed on a form provided by the District, stating the following: (1) the name of the Permittee; (2) the well numbers of each well for which the Permittee holds a transport permit; (3) the total amount of groundwater transported from each well and well system during the immediately preceding calendar year; (4) the total amount of groundwater transported from each well and well system during each month of the immediately preceding calendar year; (5) the purpose for which the water was transported; (6) any other information related to the operation and production of the wells or transport of water requested by the District.

The issuance of this Amended Permit does not grant to the Permittee the right to use private property, or public property, for the production or conveyance of water. Neither does this Amended Permit authorize the invasion of any personal rights nor the violation of federal, state, or local laws, or any regulations. The District makes no representations and shall have no responsibility with respect to the availability or quality of water authorized to be transported under this Amended Permit.

This Amended Permit expires on September 15, 2034, and is subject to review every fifth year, and during any such review may be modified to conform with intervening changes in the Management Plan of the District or state law. Permittee shall submit to the District 90 days prior to the fifth anniversary of the issuance and each subsequent review, and the date of expiration of the operating permit a full and complete report describing its groundwater transportation system, volumes of water delivered by customer, and the delivery points of groundwater transported, together with such other information that will assist the District's review. The Board may waive any five year review if no material change has been made to the Management Plan, or if the changes made do not require modification of such permits. Despite the term of duration listed in this Amended Permit, the Permittee is authorized to

transport groundwater under this Amended Permit only as long as the Permittee holds a valid operating permit issued by the District for the wells listed in this Amended Permit.

The permit issued September 14, 2004, and amended January 13, 2009, is hereby amended and in effect as of June 24, 2015.

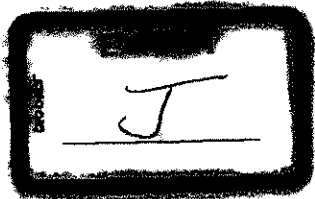
Post Oak Savannah Groundwater  
Conservation District

Gary Westbrook - General Manager

No. POS-T-000\_\_

**Exhibit A**  
**Blue Water Vista Ridge LLC Permitted Water Wells**

Well Designation	Location	Max. GPM
CW-1	30.44108N 96.81247W	1200gpm
CW-2	30.43564N 96.80366W	1200gpm
CW-3	30.42803N 96.80739W	1200gpm
CW-4	30.43169N 96.81623W	1200gpm
CW-5	30.43037N 96.82592W	1200gpm
CW-6	30.42724N 96.83412W	1200gpm
CW-7	30.41233N 96.81705W	1200gpm
CW-8	30.42325N 96.81969W	1200gpm
CW-9	30.42052N 96.81123W	975gpm
CW-10	30.41916N 96.80507W	750gpm
CW-11	30.41392N 96.7928W	750gpm
CW-12	30.41116N 96.79682W	750gpm
CW-13	30.44583N 96.76865W	1200gpm
CW-14	30.40421N 96.7786W	750gpm
CW-15	30.41001N 96.78026W	750gpm
CW-16	30.40794N 96.77606W	750gpm
CW-17	30.41709N 96.77139W	750gpm
CW-18	30.42121N 96.77545W	975gpm
CW-19	30.41838N 96.7668W	750gpm
CW-20	30.43605N 96.76393W	1200gpm
CW-21	30.43899N 96.77173W	1200gpm
PW-9	30.44138N 96.801233W	3000gpm
PW-10	30.43638N 96.80358W	3000gpm
PW-11	30.42851N 96.80668W	3000gpm
PW-12	30.42113N 96.811W	3000gpm
PW-13	30.42394N 96.82004W	3000gpm
PW-14	30.41266N 96.81705W	2500gpm
PW-15	30.42723N 96.83449W	3000gpm
PW-16	30.43059N 96.82576W	3000gpm
PW-17	30.43181n 96.981632w	3000gpm
PW-18	30.41998N 96.7752W	3000gpm
PW-19	30.41001N 96.77979W	3000gpm
PW-20	30.41145N 96.79644W	1800gpm



# THE TERRILL FIRM

A PROFESSIONAL CORPORATION

810 West 10th Street  
Austin, Texas 78701  
Tel (512) 474-9100  
Fax (512) 474-9888

December 3, 2008

Via Facsimile: (512) 323-5773

Mr. Darnay L. Knight

General Counsel - Post Oak Savannah Groundwater Conservation District  
225 West Anderson Lane, Suite A-105  
Austin, Texas 78752

Re: Blue Water System's Application to Amend Operating and Transport Permits

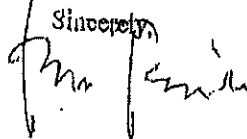
Dear Mr. Knight:

I represent Blue Water Systems LP ("Blue Water") in connection with Blue Water's Application to amend its Post Oak Savannah Groundwater Conservation District ("POSGCD") Operating and Transport Permits. This letter confirms Blue Water's understanding that all POSGCD permits are subject to POSGCD rules regarding potential future proportionate reduction of groundwater permits. Ross Cummings, the President of Blue Water Systems GP, L.C., General Partner of Blue Water Systems, LP, joins in the execution of this letter, as provided below.

Blue Water understands and acknowledges that POSGCD permits are conditioned upon and subject to compliance with the District Rules, and that permit terms may be modified or amended pursuant to the Rules. Sections 5.1, 5.2, and 16.3 of the Rules state that the District may proportionately reduce the volume of water authorized to be produced under any issued permit as a result of the water availability, actual production, permitted production, or water level drawdown within a Management Zone. Blue Water also acknowledges that Section 16.5 states that the District may proportionately reduce the volume of water that may be produced under any permit if state law requires reductions to comply with water availability or requires production in a geographic area to be limited. Further, Blue Water Systems acknowledges the validity of the aforementioned District Rules as presently written, interpreted and applied by the District.

By making this acknowledgment, Blue Water does not waive any rights to review and challenge any changes to the District's rules or management plan, or any future change by the District in the interpretation and application of the District Rules that are inconsistent with the District rules as currently written.

If you have any questions regarding this matter, please do not hesitate to call.

Sincerely,  


Paul M. Terrill III  
THE TERRILL FIRM, P.C.

# Burleson County Tribune

Published for 130 years  
Burleson County, Texas  
No. 20 \$1.25 204 West Hwy 31, Caldwell, Texas 77816-125 • 919-267-3342  
Thursday, December 24, 2015

EXHIBIT

K

## SISD buildings burglarized

Culprits strike for second time, no major cash stolen

Burglars have again broken into Burleson Independent School District buildings, but they were in for a shock this time.

They were looking for cash, but they found a small amount in a cash box.

After a September burglary in which the culprits got away with about \$5,000 in cash, school officials in the district were on edge.

When the district was notified that the school was broken into, the district was alerted.

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## House fire leaves family homeless

A house fire on Friday, Dec. 18, left a family homeless.

The fire started in the living room.

The family was evacuated.

The fire was caused by a faulty heater.

The family is now staying in a hotel.



## Experts: aquifers can handle export

Doubters still skeptical of long-term impact for area

The rock blenders and gravel makers in the area can handle a major water export project, according to experts.

The project would involve pumping water from the aquifers to the coast.

Some people are still skeptical of the long-term impact on the area.

The project is being studied by the state and federal governments.



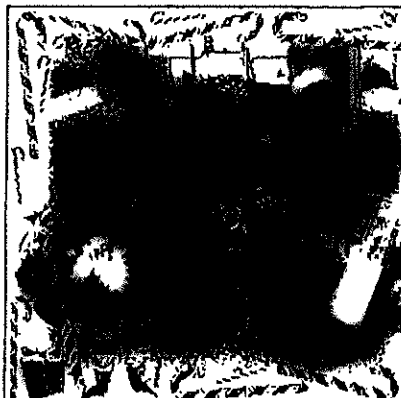
## SPD makes arrest in gun case

A 24-year-old man was arrested on Thursday, Dec. 18, on charges of possession of a firearm.

The man was arrested by the San Antonio Police Department.

The man was charged with possession of a firearm.

The man was charged with possession of a firearm.



IN GOD'S HANDS ministry team members look over their gifts on Thursday, Dec. 18, at the Golden Gate Mission as part of their Christmas program. In God's Hands ministry, community churches and volunteer organizations participate in the program. From left, John Feltner, David Feltner, Mike Galtner and Gordon Feltner.



ADAM SOWDERS was honored on the anniversary of his death by the first responders. He died in a car crash on May 18, 2014. Adam Sowders was a member of the Burleson County Law Enforcement Memorial Service in May.

## Old fire station has two prospects

Caldwell City Council members were briefed on Tuesday, Dec. 15, on two prospects interested in purchasing the old fire station and converting it into a restaurant.

The council is considering the proposals.

The council is considering the proposals.



TWO PROSPECTS are looking at the old fire station on 201 West Street as the best place to open a restaurant. The building is owned by the City of Caldwell. Photo by Ray Sanders.

## Special election Jan. 13

Just hours after last election, a special election is being held on Monday, Dec. 14, for the Burleson County Sheriff's Office.

The election is being held on Monday, Dec. 14.

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