RESOLUTION TO ADOPT DESIRED FUTURE CONDITIONS FOR AQUIFERS IN GROUNDWATER MANAGEMENT AREA 12

THE STATE OF TEXAS §
§
GROUNDWATER MANAGEMENT AREA 12 §
§
GROUNDWATER CONSERVATION DISTRICTS §

WHEREAS, Texas Water Code § 36.108 requires the groundwater conservation districts located in whole or in part in a groundwater management area ("GMA") designated by the Texas Water Development Board to adopt desired future conditions for the relevant aquifers located within the management area;

WHEREAS, the groundwater conservation districts located wholly or partially within Groundwater Management Area 12 ("GMA 12"), as designated by the Texas Water Development Board, as of the date of this resolution are as follows: Brazos Valley Groundwater Conservation District, Fayette County Groundwater Conservation District, Lost Pines Groundwater Conservation District, Mid-East Texas Groundwater Conservation District, and Post Oak Savannah Groundwater Conservation District (collectively hereinafter "the GMA 12 Districts");

WHEREAS, the GMA 12 Districts are each a local government operating under Chapter 36, Texas Water Code and their specific enabling act;

WHEREAS, the GMA 12 Districts desire to fulfill the requirements of Texas Water Code §36.108 through mutual cooperation and joint planning efforts;

WHEREAS, the GMA 12 Districts have had numerous public meetings, including stakeholder meetings for the specific purpose of receiving comments and input from stakeholders within GMA 12, and they have engaged in joint planning efforts to promote comprehensive management of the aquifers located in whole or in part in Groundwater Management Area 12;

WHEREAS, GMA 12 held meetings on July 25, 2013; December 19, 2013; June 6, 2014; June 27, 2014; December 4, 2014; February 26, 2015; March 27, 2015; April 30, 2015; May 28, 2015; June 25, 2015; August 13, 2015; September 24, 2015; October 22, 2015; December 17, 2015; February 4, 2016; March 24, 2016; April 15, 2016; October 11, 2016, December 1, 2016; April 27, 2017; and May, 25, 2017, in compliance with its statutory duty to publicly consider the desired future conditions considerations listed in § 36.108(d);

WHEREAS, the GMA 12 Districts have considered the following factors, listed in §36.108(d), in establishing the desired future conditions for the aquifer(s):

(1) groundwater availability models and other data or information for the management area;
(2) aquifer uses or conditions within the management area, including conditions that differ substantially from one geographic area to another;
(3) the water supply needs and water management strategies included in the state water plan;

(4) hydrological conditions, including for each aquifer in the management area the total estimated recoverable storage as provided by the Texas Water Development Board Executive Administrator and the average annual recharge inflows, and discharge;
(5) other environmental impacts, including impacts on spring flow and other interactions between groundwater and surface water;
(6) the impact of subsidence;
(7) socioeconomic impacts reasonably expected to occur;
(8) the impact on the interests and rights in private property, including ownership and the rights of management area landowners and their lessees and assigns in groundwater as recognized under Texas Water Code §36.002;
(9) the feasibility of achieving the desired future conditions; and
(10) any other information relevant to the specific desired future conditions;

WHEREAS, the desired future conditions provide a balance between the highest practicable level of groundwater production and the conservation, preservation, protection, recharging, and prevention of waste of groundwater in the management area;

WHEREAS, after considering the factors listed in 36.108(d), Texas Water Code, the GMA 12 Districts may establish different desired future conditions for: (1) each aquifer, subdivision of an aquifer, or geologic strata located in whole or in part within the boundaries of GMA 12; or (2) each geographic area overlying an aquifer in whole or in part or subdivision of an aquifer within the boundaries of GMA 12;

WHEREAS, the GMA 12 Districts recognize that GMA 12 includes a geographically and hydrologically diverse area with a variety of land uses and a diverse mix of water users;

WHEREAS, at least two-thirds of the GMA 12 Districts had a voting representative in attendance at the April 15, 2016, meeting in accordance with Section 36.108, Texas Water Code; and the following districts had a voting representative in attendance at the meeting: Brazos Valley Groundwater Conservation District, Fayette County Groundwater Conservation District, Lost Pines Groundwater Conservation District, Mid-East Texas Groundwater Conservation District, and Post Oak Savannah Groundwater Conservation District, and;

WHEREAS, the member GCDs in which the Carrizo-Wilcox, Queen City, Sparta, Yegua Jackson and Brazos River Alluvium aquifers are relevant for joint planning purposes held open meetings within each said district between April 18, 2016 and July 20, 2016 to take public comment on the proposed DFCs for that district during the minimum ninety (90) public comment period of April 18, 2016 through July 20, 2016, and;

WHEREAS, on December 1, 2016, the district representatives reconvened to review the reports and consider any district-suggested revisions to the proposed desired future conditions.

WHEREAS, on this day of May 25, 2017, at an open meeting duly noticed and held in accordance with law at the Post Oak Savannah Groundwater Conservation District's office located at 310 East Avenue C, Milano, Texas, the GCDs within GMA 12, having considered at this meeting comments submitted to the individual districts during the comment period and at this meeting, have voted, _____ districts in favor, _____ districts opposed, to adopt the following DFCs for in the following counties and districts through the year 2070 as follows:

NOW, THEREFORE, BE IT RESOLVED BY THE AUTHORIZED VOTING REPRESENTATIVES OF THE GMA 12 DISTRICTS AS FOLLOWS:

1. The above recitals are true and correct.

2. The authorized voting representatives of the GMA 12 Districts hereby establish the desired future conditions of the aquifer(s) as set forth in Attachment B by the vote reflected in the above recitals.

3. The authorized voting representatives of the GMA 12 Districts declare that the following aquifers are non-relevant for the purpose of adopting Desired Future Conditions in Groundwater Management Area 12, as the districts determined that aquifer characteristics, groundwater demands, and current groundwater uses do not warrant adoption of a desired future condition for the: the Gulf Coast Aquifer in Brazos County; the Trinity Aquifer in Bastrop, Lee, and Williamson counties; the Yegua-Jackson Aquifer in Bastrop and Lee counties; and the Wilcox portion of the Carrizo-Wilcox Aquifer in Fayette County. Technical justifications of the non-relevant aquifers, as required by 31 Tex. Admin. Code §356.31, is set forth in Attachment C.

4. The GMA 12 Districts and their agents and representatives, individually and collectively, are further authorized to take all actions necessary to implement this resolution.

5. The desired future conditions of the aquifer(s) adopted by the GMA 12 Districts and attached hereto, along with the explanatory report, and proof of the notice of the meeting in which desired future conditions adoption occurred, shall be submitted to the Texas Water Development Board and sent to the GMA 12 Districts, as required by Section 36.108(d-3), Texas Water Code.

AND IT IS SO ORDERED. PASSED AND ADOPTED on this 25th day of May, 2017.

ATTEST:

Brazos Valley Groundwater Conservation District

Fayette County Groundwater Conservation District

Lost Pines Groundwater Conservation District

Mid-East Texas Groundwater Conservation District

Post Oak Savannah Groundwater Conservation

ATTACHMENTS

A: Copies of notices of May 25, 2017, meeting
B: Desired Future Conditions
C: Non-relevant Aquifers

Attachment A
Notice for May 25, 2017 GMA 12 Meeting

Attachment B
GMA 12 DESIRED FUTURE CONDITIONS

A. Sparta, Queen City, Carrizo, Calvert Bluff, Simsboro, and Hooper Aquifers

The Sparta, Queen City, and Carrizo aquifers are present and used in all GCDs within GMA 12. Therefore, all GCDs submitted DFCs for these aquifers. The Calvert Bluff, Simsboro, and Hooper aquifers are present in all GCDs but not used in Fayette County. Therefore, GMA 12 declared these aquifers not relevant for Fayette County, and Fayette County GCD did not submit a DFC for these aquifers. For the purpose of establishing DFCs, the Groundwater Availability Model (GAM) for the Queen City and Sparta Aquifers (Kelley and others, 2004) was used to determine the compatibility and physical possibility of the DFCs proposed by each GCD. Note that this GAM also includes the Carrizo-Wilcox Aquifer. The DFCs proposed by each GCD for these six aquifers are provided in **Table 2-1**, as well as the DFC adopted by GMA 12 as a whole. The DFC is based on the average drawdown from January 2000 through December 2069.

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

GCD or County	Average Aquifer Drawdown (ft) measured from January 2000 through December 2069					
	Sparta	Queen City	Carrizo	Calvert Bluff	Simsboro	Hooper
Brazos Valley GCD	12	12	61	125	295	207
Fayette County GCD	47	64	110	--	--	--
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	--	--	--	--	-2	27
Limestone County	--	--	--	11	50	50
Navarro County	--	--	--	-1	3	3
Williamson County	--	--	--	-11	47	69
GMA-12	*16*	*16*	*75*	*114*	*228*	*168*

Based on the principle of using the GAM as a joint planning tool and the fact that the GAM predictions contain uncertainty, GMA 12 considered the DFCs to be compatible and physically possible if the difference between modeled drawdown results and the DFC drawdown targets are within a 10 percent or 5-foot variance, whichever is greater, for all aquifers in the Queen City-Sparta/Carrizo-Wilcox GAM with the exception of the Simsboro, which would be held within a 5 percent or 5-foot variance, whichever is greater, of the GAM simulation. Factors considered for determining tolerance criteria include:

- model calibration results and statistics;
- information used to calibrate the GAM;
- aquifer and recharge information collected since the GAM was developed;

- sensitivity of the GAM calibration and GAM predictions to change in the model parameters; and
- range of uncertainty in the model parameters including historical and future pumping, temporal variation in recharge distribution and magnitude.

Reference:
Kelley, V.A., Deeds, N.E. Fryar, D.G., and Nicot, J.P., 2004. Groundwater Availability Models for the Queen City and Sparta Aquifers, prepared for the Texas Water Development Board, Austin, Texas.

B. Yegua-Jackson Aquifer

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

Table 2-2 Adopted DFCs for the Yegua and Jackson Aquifers

GCD	Average Aquifer Drawdown (ft) measured from January 2010 through December 2069		
	Yegua	Jackson	Yegua-Jackson
Brazos Valley GCD	70	114	--
Fayette County GCD	--	--	77
Lost Pines GCD	--	--	--
Mid-East Texas GCD	--	--	7
Post Oak Savannah GCD	--	--	100
GMA-12	--	--	*65*

Based on the principle of using the GAM as a joint planning tool and the fact that the GAM predictions contain uncertainty, GMA 12 considered the DFCs to be compatible and physically possible if the difference between modeled drawdown results and the DFC drawdown targets are within a 10 percent or 5-foot variance, whichever is greater, for both aquifers in the Yegua-Jackson GAM simulation. Factors considered for determining tolerance criteria include:

- model calibration results and statistics;
- information used to calibrate the GAM;
- aquifer and recharge information collected since the GAM was developed;

- sensitivity of the GAM calibration and GAM predictions to change in the model parameters; and
- range of uncertainty in the model parameters including historical and future pumping, temporal variation in recharge distribution and magnitude.

Reference:
Deeds, N.E., Yan, T., Sungh, A., Jones, T.L., Kelley, V.A., Knox, P.R., and Young, S.C., 2010, Groundwater Availability Model for the Yegua-Jackson Aquifer, final report prepared for the Texas Water Development Board, March, 2010, 582 pp.

C. Brazos Alluvium Aquifer

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

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

GCD	County	Brazos River Alluvium Aquifer
Brazos Valley	Brazos & Robertson	North of State Highway 21: Percent saturation shall average at least 30% of total well depth. South of State Highway 21: Percent saturation shall average at least 40% 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.
	Milam	A decrease of 5 feet in average saturated thickness over the period from 2010 to 2070

D. Non-relevant Areas of Aquifers

There are four areas where aquifers were declared non-relevant during the current cycle of joint groundwater planning. The Trinity Aquifer was declared non-relevant in Bastrop, Lee and Williamson counties because of its small areal coverage, great depth and poor water quality. The Yegua-Jackson Aquifer was declared non-relevant in Lost Pines GCD because it has a minimal amount of pumpage within the district. The Gulf Coast Aquifer was declared non-relevant in Brazos Valley GCD within GMA 12 since the small outcrop in the southernmost part of Brazos County is thin, can only provide water in small quantities and is very limited in areal extent. Also, the Wilcox portion of the Carrizo-Wilcox Aquifer in Fayette County was declared non-relevant because of the great depth to these units and the poor water quality.

Attachment C

NON-RELEVANT AQUIFER: GULF COAST AQUIFER IN BRAZOS COUNTY

I. INTRODUCTION

The Texas Water Development Board, in its July 2013 document, Explanatory Report for Submittal of Desired Future Conditions to the Texas Water Development Board, offers the following guidance regarding documentation for aquifers that are to be classified not relevant for purposes of joint planning:

> *Districts in a groundwater management area may, as part of the process for adopting and submitting desired future conditions, propose classification of a portion or portions of a relevant aquifer as non-relevant (31 Texas Administrative Code 356.31 (b)). This proposed classification of an aquifer may be made if the districts determine that aquifer characteristics, groundwater demands, and current groundwater uses do not warrant adoption of a desired future condition.*
>
> *The districts must submit to the TWDB the following documentation for the portion of the aquifer proposed to be classified as non-relevant:*
>
> 1. *A description, location, and/or map of the aquifer or portion of the aquifer;*
> 2. *A summary of aquifer characteristics, groundwater demands, and current groundwater uses, including the total estimated recoverable storage as provided by the TWDB, that support the conclusion that desired future conditions in adjacent or hydraulically connected relevant aquifer(s) will not be affected; and*
> 3. *An explanation of why the aquifer or portion of the aquifer is non-relevant for joint planning purposes.*

This technical memorandum provides the required documentation to classify the Gulf Coast Aquifer as not relevant for purposes of joint planning.

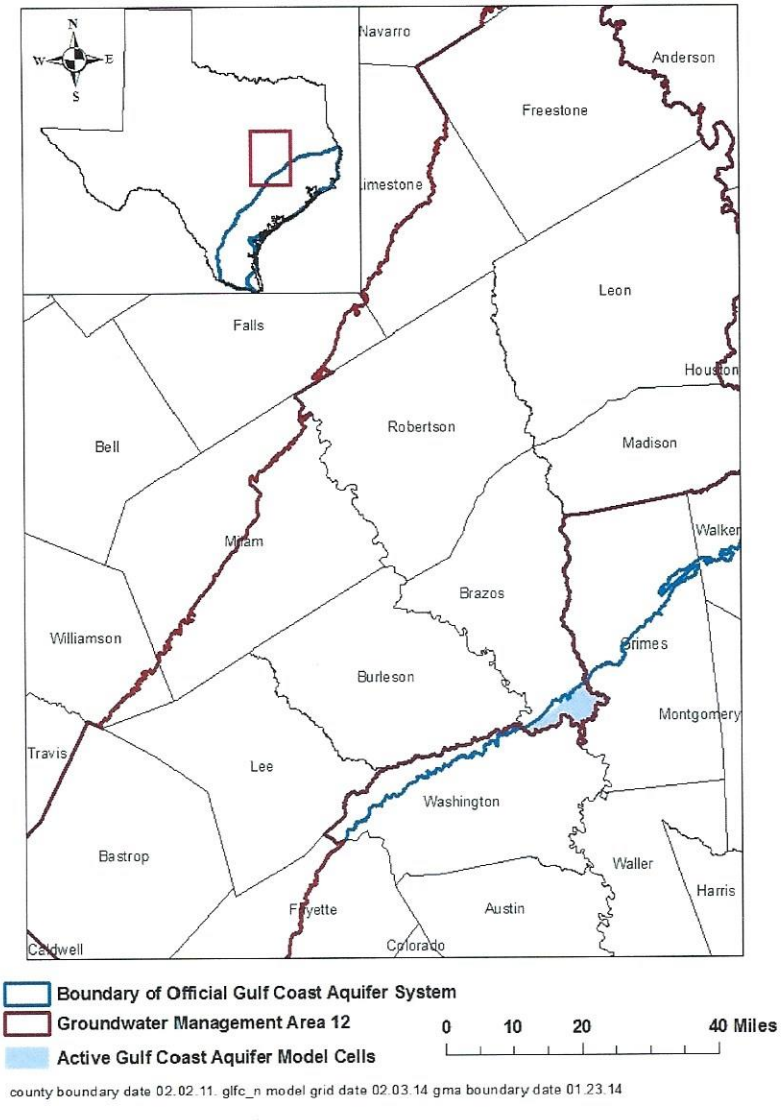
II. AQUIFER DESCRIPTION AND LOCATION

As described in George and others (2011):

> ***The Gulf Coast Aquifer*** *is a major aquifer paralleling the Gulf of Mexico coastline from the Louisiana border to the border of Mexico. It consists of several aquifers, including the Jasper, Evangeline, and Chicot aquifers, which are composed of discontinuous sand, silt, clay, and gravel beds. The maximum total sand thickness of the Gulf Coast Aquifer ranges from 700 feet in the south to 1,300 feet in the north. Freshwater saturated thickness averages about 1,000 feet. Water quality varies with depth and locality: it is generally good in the central and northeastern parts of the aquifer, where the water contains less than 500 milligrams per liter of total dissolved solids, but declines to the south, where*

it typically contains 1,000 to more than 10,000 milligrams per liter of total dissolved solids and where the productivity of the aquifer decreases. High levels of radionuclides, thought mainly to be naturally occurring, are found in some wells in Harris County in the outcrop and in South Texas. The aquifer is used for municipal, industrial, and irrigation purposes. In Harris, Galveston, Fort Bend, Jasper, and Wharton counties, water level declines of as much as 350 feet have led to land subsidence. The regional water planning groups, in their 2006 Regional Water Plans, recommended several water management strategies that use the Gulf Coast Aquifer, including drilling more wells, pumping more water from existing wells, temporary overdrafting, constructing new or expanded treatment plants, desalinating brackish groundwater, developing conjunctive use projects, and reallocating supplies.

Figure 1 (taken from Wade and others, 2014) shows the limited extent of the Gulf Coast Aquifer in GMA 12. Note that it occurs only in a small portion of Brazos County.



II.

Figure 1. Location of Gulf Coast Aquifer in GMA 12

III. AQUIFER CHARACTERISTICS

The Catahoula Sandstone, the very basal unit to the Gulf Coast Aquifer, occurs in the very south part of Brazos County with the outcrop covering the upper part of low rolling hills with the Jackson Group below the Catahoula Sandstone. The Catahoula Sandstone is described as clay, tuff, sand, sandstone in interbedded layers with a capacity to yield small quantities of fresh to slightly saline water. The aquifer covers about 1.3 percent of the Brazos Valley Groundwater Conservation District and is less than 250 feet in thickness.

IV. GROUNDWATER DEMANDS AND CURRENT GROUNDWATER USES

The Texas Water Development Board pumping database lists limited pumping from the Gulf Coast Aquifer in Brazos County that ranged from 6 to 23 acre-feet/year between 2007 and 2012.

V. TOTAL ESTIMATED RECOVERABLE STORAGE

Wade and others (2014) developed total estimated recoverable storage for the Gulf Coast Aquifer in GMA 12 as follows:

County	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
Brazos	450,000	112,500	337,500
Total	450,000	112,500	337,500

Total storage is given in the first column. Lower percentages of storage are given in the next two columns.

VI. EXPLANATION OF NON-RELEVANCE

Due to its very limited areal extent, shallow depth and low use, the Gulf Coast Aquifer is classified as not relevant for purposes of joint planning in Groundwater Management Area 12.

VII. REFERENCES

George, P.G., Mace, R.E., and Petrossian, R., 2011. Aquifers of Texas. Texas Water Development Board Report 380, July 2011, 182p.

Wade, S. and Shi, J., 2014. GAM Task 13-035 Version 2: Total Estimated Recoverable Storage for Aquifers in Groundwater Management Area 12. Texas Water Development Board, Groundwater Resources Division, May 16, 2014, 43p.

NON-RELEVANT AQUIFER: THE TRINITY AQUIFER IN BASTROP, LEE AND WILLIAMSON COUNTIES

I. INTRODUCTION

The Texas Water Development Board, in its July 2013 document, Explanatory Report for Submittal of Desired Future Conditions to the Texas Water Development Board, offers the following guidance regarding documentation for aquifers that are to be classified not relevant for purposes of joint planning:

> *Districts in a groundwater management area may, as part of the process for adopting and submitting desired future conditions, propose classification of a portion or portions of a relevant aquifer as non-relevant (31 Texas Administrative Code 356.31 (b)). This proposed classification of an aquifer may be made if the districts determine that aquifer characteristics, groundwater demands, and current groundwater uses do not warrant adoption of a desired future condition.*
>
> *The districts must submit to the TWDB the following documentation for the portion of the aquifer proposed to be classified as non-relevant:*
>
> 1. *A description, location, and/or map of the aquifer or portion of the aquifer;*
> 2. *A summary of aquifer characteristics, groundwater demands, and current groundwater uses, including the total estimated recoverable storage as provided by the TWDB, that support the conclusion that desired future conditions in adjacent or hydraulically connected relevant aquifer(s) will not be affected; and*
> 3. *An explanation of why the aquifer or portion of the aquifer is non-relevant for joint planning purposes.*

This technical memorandum provides the required documentation to classify the Trinity Aquifer as not relevant for purposes of joint planning.

II. AQUIFER DESCRIPTION AND LOCATION

As described in George and others (2011):

> ***The Trinity Aquifer*** *extends across much of the central and northeastern part of the state. It is composed of several smaller aquifers contained within the Trinity Group. Although referred to differently in different parts of the state, they include the Antlers, Glen Rose, Paluxy, Twin Mountains, Travis Peak, Hensell, and Hosston aquifers. These aquifers consist of limestones, sands, clays, gravels, and conglomerates. Their combined freshwater saturated thickness averages about 600 feet in North Texas and about 1,900 feet in Central Texas. In general, groundwater is fresh but very hard in the outcrop of the aquifer. Total dissolved solids increase from less than 1,000 milligrams per liter in the east and*

southeast to between 1,000 and 5,000 milligrams per liter, or slightly to moderately saline, as the depth to the aquifer increases. Sulfate and chloride concentrations also tend to increase with depth. The Trinity Aquifer discharges to a large number of springs, with most discharging less than 10 cubic feet per second. The aquifer is one of the most extensive and highly used groundwater resources in Texas. Although its primary use is for municipalities, it is also used for irrigation, livestock, and other domestic purposes. Some of the state's largest water level declines, ranging from 350 to more than 1,000 feet, have occurred in counties along the IH-35 corridor from McLennan County to Grayson County. These declines are primarily attributed to municipal pumping, but they have slowed over the past decade as a result of increasing reliance on surface water. The regional water planning groups, in their 2006 Regional Water Plans, recommended numerous water management strategies for the Trinity Aquifer, including developing new wells and well fields, pumping more water from existing wells, overdrafting, reallocating supplies, and using surface water and groundwater conjunctively.

Figure 1 (taken from Wade and others, 2014) shows the limited extent of the Trinity Aquifer in GMA 12. Note that it occurs only in a small portion of Bastrop, Lee, and Williamson Counties.

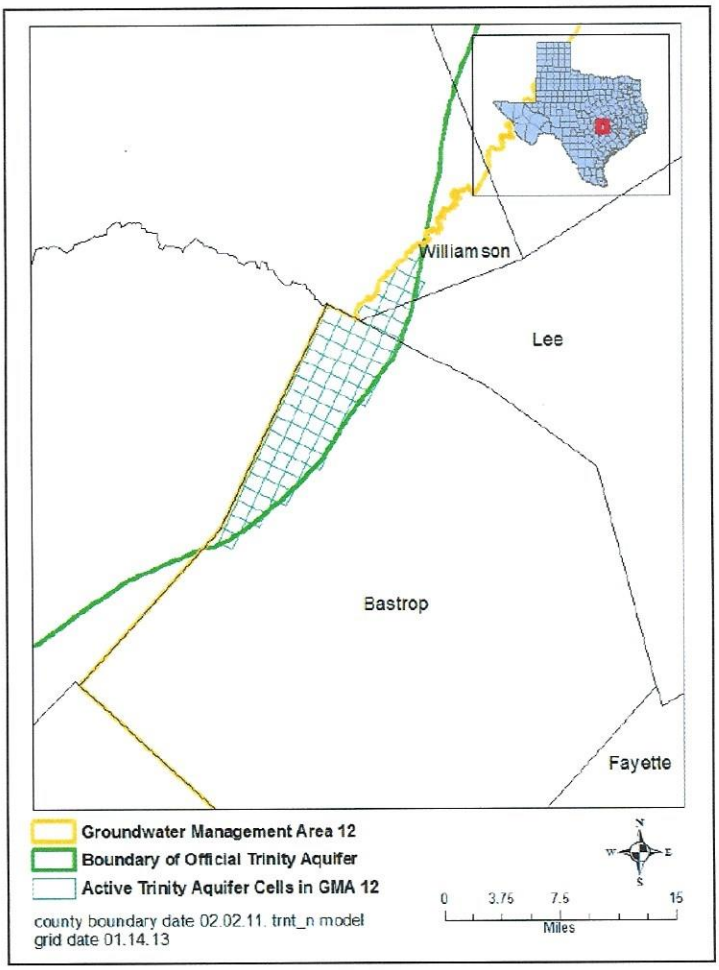


Figure 1. Location of Trinity Aquifer in GMA 12

III. AQUIFER CHARACTERISTICS

The Trinity Aquifer is a highly prolific aquifer across much of the northern part of the state. However, within GMA 12 it is only found at extreme depths in a very small portion of the GMA. There are no known wells in this area that produce from the Trinity, and therefore the aquifer characteristics within GMA 12 are unknown.

IV. GROUNDWATER DEMANDS AND CURRENT GROUNDWATER USES

The Texas Water Development Board pumping database lists limited pumping from the Trinity Aquifer in Williamson County that ranged from 1,353 and 3,116 acre-feet/year between 2007 and 2014. However, all of this is from the portion of Williamson County that lies outside of GMA 12. As noted above, there are no known wells producing from the Trinity Aquifer within GMA 12. The Texas Water Development Board pumping database shows no production from the Trinity Aquifer in Bastrop or Lee Counties.

V. TOTAL ESTIMATED RECOVERABLE STORAGE

Wade and others (2014) developed total estimated recoverable storage for the Trinity Aquifer in GMA 12 as follows:

County	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
Bastrop	9,000,000	2,250,000	6,750,000
Lee	500,000	125,000	375,000
Williamson	1,600,000	400,000	1,200,000
Total	11,100,000	2,775,000	8,325,000

Total storage is given in the first column. Lower percentages of storage are given in the next two columns.

VI. EXPLANATION OF NON-RELEVANCE

Due to its very limited areal extent, extreme depth and no known use within GMA 12, the Trinity Aquifer is classified as not relevant for purposes of joint planning in Groundwater Management Area 12.

VII. REFERENCES

George, P.G., Mace, R.E., and Petrossian, R., 2011. Aquifers of Texas. Texas Water Development Board Report 380, July 2011, 182p.

Wade, S. and Shi, J., 2014. GAM Task 13-035 Version 2: Total Estimated Recoverable Storage for Aquifers in Groundwater Management Area 12. Texas Water Development Board, Groundwater Resources Division, May 16, 2014, 43p.

NON-RELEVANT AQUIFER:
THE YEGUA-JACKSON AQUIFER IN BASTROP AND LEE COUNTIES

I. INTRODUCTION

The Texas Water Development Board, in its July 2013 document, Explanatory Report for Submittal of Desired Future Conditions to the Texas Water Development Board, offers the following guidance regarding documentation for aquifers that are to be classified not relevant for purposes of joint planning:

> *Districts in a groundwater management area may, as part of the process for adopting and submitting desired future conditions, propose classification of a portion or portions of a relevant aquifer as non-relevant (31 Texas Administrative Code 356.31 (b)). This proposed classification of an aquifer may be made if the districts determine that aquifer characteristics, groundwater demands, and current groundwater uses do not warrant adoption of a desired future condition.*
>
> *The districts must submit to the TWDB the following documentation for the portion of the aquifer proposed to be classified as non-relevant:*
>
> 1. *A description, location, and/or map of the aquifer or portion of the aquifer;*
> 2. *A summary of aquifer characteristics, groundwater demands, and current groundwater uses, including the total estimated recoverable storage as provided by the TWDB, that support the conclusion that desired future conditions in adjacent or hydraulically connected relevant aquifer(s) will not be affected; and*
> 3. *An explanation of why the aquifer or portion of the aquifer is non-relevant for joint planning purposes.*

This technical memorandum provides the required documentation to classify the Yegua-Jackson Aquifer as not relevant for purposes of joint planning in Bastrop and Lee Counties (the Lost Pines GCD).

II. AQUIFER DESCRIPTION AND LOCATION

As described in George and others (2011):

> ***The Yegua-Jackson Aquifer*** *is a minor aquifer stretching across the southeast part of the state. It includes water-bearing parts of the Yegua Formation (part of the upper Claiborne Group) and the Jackson Group (comprising the Whitsett, Manning, Wellborn, and Caddell formations). These geologic units consist of interbedded sand, silt, and clay layers originally deposited as fluvial and deltaic sediments. Freshwater saturated thickness averages about 170 feet. Water quality varies greatly owing to sediment composition in the aquifer formations, and in all areas the aquifer becomes highly mineralized with depth. Most groundwater is produced from the sand units of the aquifer, where the water is*

fresh and ranges from less than 50 to 1,000 milligrams per liter of total dissolved solids. Some slightly to moderately saline water, with concentrations of total dissolved solids ranging from 1,000 to 10,000 milligrams per liter, also occurs in the aquifer. No significant water level declines have occurred in wells measured by the TWDB. Groundwater for domestic and livestock purposes is available from shallow wells over most of the aquifer's extent. Water is also used for some municipal, industrial, and irrigation purposes. The regional water planning groups, in their 2006 Regional Water Plans, recommended several water management strategies that use the Yegua-Jackson Aquifer, including drilling more wells and desalinating the water.

Figure 1 (taken from Wade and others, 2014) shows the limited extent of the Yegua-Jackson Aquifer in GMA 12.

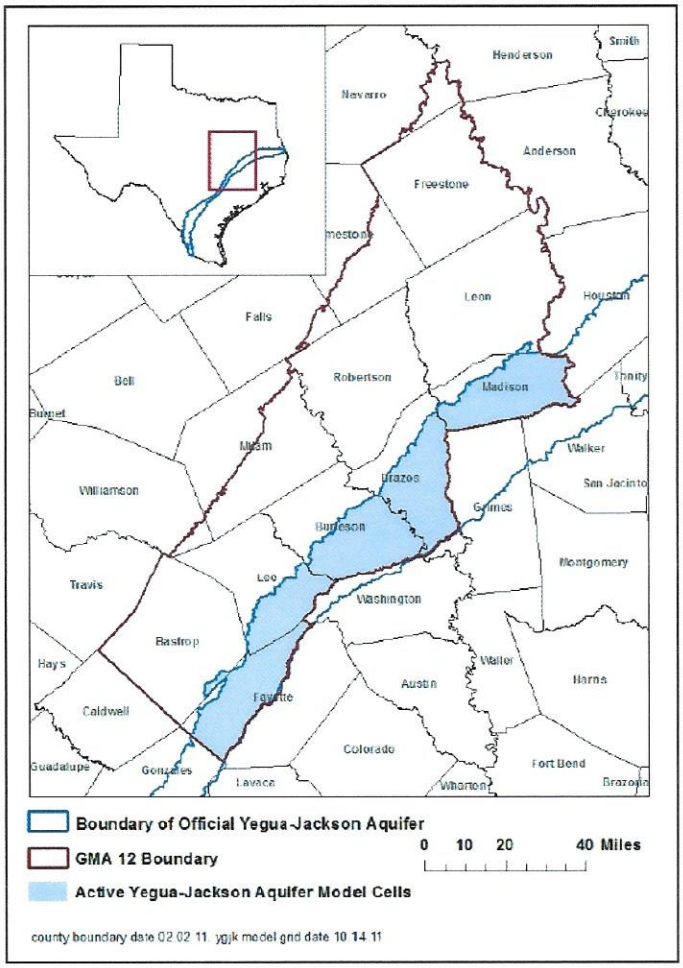


Figure 1. Location of Yegua-Jackson Aquifer in GMA 12

III. AQUIFER CHARACTERISTICS

The Yegua-Jackson Aquifer occurs in the very southern part of Bastrop County and the lower third of Lee County. The aquifer is described as interbedded layers of sand, silt, and clay with a capacity to yield small quantities of fresh to moderately saline water. Wells producing from the Yegua-Jackson Aquifer can produce as much as 500 gpm, although well capacities are typically much lower than that.

IV. GROUNDWATER DEMANDS AND CURRENT GROUNDWATER USES

The Texas Water Development Board pumping database lists limited pumping from the Yegua-Jackson Aquifer in Bastrop County that ranged from 2 to 3 acre-feet/year and 46 to 76 acre-feet/year in Lee County between 2007 and 2014. There is no permitted pumpage from the Yegua-Jackson Aquifer within the Lost Pines GCD and all use listed in the TWDB database is estimated to be rural domestic and livestock use.

V. TOTAL ESTIMATED RECOVERABLE STORAGE

Wade and others (2014) developed total estimated recoverable storage for the Yegua-Jackson Aquifer in the Lost Pines GCD as follows:

County	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
Bastrop	290,000	72,500	217,500
Lee	10,000,000	2,500,000	7,500,000
Total	10,290,000	2,572,500	7,717,500

Total storage is given in the first column. Lower percentages of storage are given in the next two columns.

VI. EXPLANATION OF NON-RELEVANCE

Due to its very low use, lack of permitted production, and no anticipated permitted production in the future, the Yegua-Jackson Aquifer is classified as not relevant for purposes of joint planning in Bastrop and Lee Counties (the Lost Pines GCD) in Groundwater Management Area 12.

VII. REFERENCES

George, P.G., Mace, R.E., and Petrossian, R., 2011. Aquifers of Texas. Texas Water Development Board Report 380, July 2011, 182p.

Wade, S. and Shi, J., 2014. GAM Task 13-035 Version 2: Total Estimated Recoverable Storage for Aquifers in Groundwater Management Area 12. Texas Water Development Board, Groundwater Resources Division, May 16, 2014, 43p.

NON-RELEVANT AQUIFER: THE WILCOX PORTION OF THE CARRIZO-WILCOX AQUIFER IN FAYETTE COUNTY

I. INTRODUCTION

The Texas Water Development Board, in its July 2013 document, Explanatory Report for Submittal of Desired Future Conditions to the Texas Water Development Board, offers the following guidance regarding documentation for aquifers that are to be classified not relevant for purposes of joint planning:

> *Districts in a groundwater management area may, as part of the process for adopting and submitting desired future conditions, propose classification of a portion or portions of a relevant aquifer as non-relevant (31 Texas Administrative Code 356.31 (b)). This proposed classification of an aquifer may be made if the districts determine that aquifer characteristics, groundwater demands, and current groundwater uses do not warrant adoption of a desired future condition.*
>
> *The districts must submit to the TWDB the following documentation for the portion of the aquifer proposed to be classified as non-relevant:*
>
> 1. *A description, location, and/or map of the aquifer or portion of the aquifer;*
> 2. *A summary of aquifer characteristics, groundwater demands, and current groundwater uses, including the total estimated recoverable storage as provided by the TWDB, that support the conclusion that desired future conditions in adjacent or hydraulically connected relevant aquifer(s) will not be affected; and*
> 3. *An explanation of why the aquifer or portion of the aquifer is non-relevant for joint planning purposes.*

This technical memorandum provides the required documentation to classify the Wilcox portion of the Carrizo-Wilcox Aquifer in Fayette County as not relevant for purposes of joint planning.

II. AQUIFER DESCRIPTION AND LOCATION

As described in George and others (2011):

> ***The Carrizo-Wilcox Aquifer*** *is a major aquifer extending from the Louisiana border to the border of Mexico in a wide band adjacent to and northwest of the Gulf Coast Aquifer. It consists of the Wilcox Group and the overlying Carrizo Formation of the Claiborne Group. The aquifer is primarily composed of sand locally interbedded with gravel, silt, clay, and lignite. Although the Carrizo-Wilcox Aquifer reaches 3,000 feet in thickness, the freshwater saturated thickness of the sands averages 670 feet. The groundwater, although hard, is generally fresh and typically contains less than 500 milligrams per liter of total dissolved solids in the outcrop, whereas softer groundwater with total dissolved*

solids of more than 1,000 milligrams per liter occurs in the subsurface. High iron and manganese content in excess of secondary drinking water standards is characteristic of the deeper subsurface portions of the aquifer. Parts of the aquifer in the Winter Garden area are slightly to moderately saline, with total dissolved solids ranging from 1,000 to 7,000 milligrams per liter. Irrigation pumping accounts for slightly more than half the water pumped, and pumping for municipal supply accounts for another 40 percent. Water levels have declined in the Winter Garden area because of irrigation pumping and in the northeastern part of the aquifer because of municipal pumping. The regional water planning groups, in their 2006 Regional Water Plans, recommended several water management strategies that use the Carrizo-Wilcox Aquifer, including developing new wells and well fields, withdrawing additional water from existing wells, desalinating brackish water, using surface water and groundwater conjunctively, reallocating supplies, and transporting water over long distances.

Figure 1 (taken from Wade and others, 2014) shows the extent of the Carrizo-Wilcox Aquifer in GMA 12.

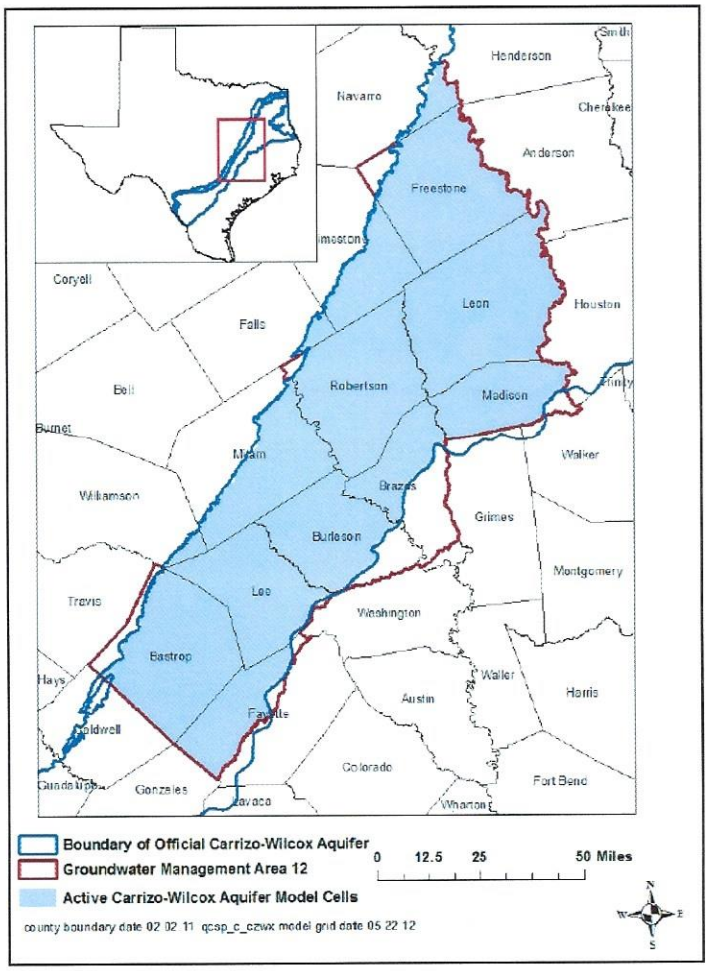


Figure 1. Location of Carrizo-Wilcox Aquifer in GMA 12

III. AQUIFER CHARACTERISTICS

The Wilcox portion of the Carrizo-Wilcox Aquifer occurs below the Carrizo Aquifer. In Fayette County, the depth of wells producing from the Carrizo Aquifer ranges from 1,700 to 3,200 feet. The Wilcox units (including the Calvert Bluff, Simsboro, and Hooper) occur below the Carrizo, and therefore wells producing from these units would be at least 2,000 feet deep. Water quality in these Wilcox units is estimated to be brackish to saline. There are no known wells in the Wilcox units within Fayette County, and therefore the aquifer characteristics within the county are unknown.

IV. GROUNDWATER DEMANDS AND CURRENT GROUNDWATER USES

The Texas Water Development Board pumping database lists limited pumping from the Carrizo-Wilcox Aquifer in Fayette County that ranged from 10 to 126 acre-feet/year between 2007 and 2014. However, this use is all from the Carrizo portion of the Carrizo-Wilcox Aquifer, as there are no known wells producing from the Wilcox units within Fayette County.

V. TOTAL ESTIMATED RECOVERABLE STORAGE

Wade and others (2014) developed total estimated recoverable storage for the Carrizo-Wilcox Aquifer in GMA 12 as follows:

County	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
Fayette	95,000,000	23,750,000	71,250,000
Total	95,000,000	23,750,000	71,250,000

Total storage is given in the first column. Lower percentages of storage are given in the next two columns.

VI. EXPLANATION OF NON-RELEVANCE

Due to its extreme depth, poor water quality, lack of use and zero anticipated use in the future, the Wilcox portion of the Carrizo-Wilcox Aquifer is classified as not relevant for purposes of joint planning in Fayette County in Groundwater Management Area 12.

VII. REFERENCES

George, P.G., Mace, R.E., and Petrossian, R., 2011. Aquifers of Texas. Texas Water Development Board Report 380, July 2011, 182p.

Wade, S. and Shi, J., 2014. GAM Task 13-035 Version 2: Total Estimated Recoverable Storage for Aquifers in Groundwater Management Area 12. Texas Water Development Board, Groundwater Resources Division, May 16, 2014, 43p.