Brazos Valley Groundwater Conservation District

Groundwater Management Plan

ADOPTED

APPROVED BY THE TEXAS WATER DEVELOPMENT BOARD ON

XXXXXXXXXXX

OBJECTIVES AMENDED BY ACTION OF THE BOARD ON

XXXXXXXXXXX

BRAZOS VALLEY GROUNDWATER CONSERVATION DISTRICT

GROUNDWATER MANAGEMENT PLAN

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1. MISSION STATEMENT:

The Brazos Valley Groundwater Conservation District (BVGCD) was authorized to be created by the Texas Legislature to protect and conserve the groundwater resources of Robertson and Brazos counties through local management in concert with Groundwater Management Area 12 (GMA 12). The District directs its efforts toward preventing waste of water, collecting data, promoting water conservation, protecting existing water rights, and preventing irreparable harm to the aquifers. The District's rules and management plan are based on the best available science, the laws and rules in effect, and the area's beneficial needs.

2. TIME PERIOD FOR THIS PLAN:

This plan becomes effective upon adoption by the BVGCD Board of Directors and subsequent approval by the Texas Water Development Board (TWDB). The Management Plan is based on a ten-year planning period; however, the plan may be revised at any time to ensure that it is consistent with the applicable Regional Water plans, the State Water Plan, and additional science that may be developed. The District's Board of Directors shall re-adopt the management plan, with or without revisions, at least every five years.

3. STATEMENT OF GUIDING PRINCIPLES:

A vast majority of the residents of Brazos and Robertson counties rely solely on the local groundwater supplies to meet their drinking water needs and the majority of their industrial, agricultural, and livestock needs. Therefore, the local groundwater resources are vital to the Brazos Valley's growth, health, economy, and environment. The District believes this valuable resource can be managed in a reasonable manner through conservation, education, and regulation. The overall management goal will be to ensure a sustainable supply of water from local groundwater resources while recognizing the need to balance protection of rights of private landowners with the responsibility of managing the area's groundwater resources for future generations. A basic understanding of local aquifers and their hydrogeological properties, as well as quantification of available water supplies, is the foundation for development of prudent management strategies. The Carrizo-Wilcox Aquifer, as well as the minor aquifers in the area, must be conserved and preserved for future generations to the extent allowed by law and made possible through implementation of scientific data and information collected by the District. This Management Plan is intended as a tool for the District to provide continuity and consistency in decision making and to develop an understanding of local aquifer conditions for implementation of proper groundwater management policies.

The District has a responsibility to continually monitor aquifer conditions. As conditions warrant, this document may be modified to best serve the District in meeting its goals. At a minimum, the District Board will review and re-adopt this plan every five years.

4. DISTRICT INFORMATION

A. Creation

The BVGCD was originally created as a temporary District by the 76th Legislature in 1999 through Senate Bill 1911. The District then operated with all of the powers granted to groundwater conservation districts by Chapter 36 of the Texas Water Code (TWC), except the authority to adopt a management plan or levy an ad-valorem tax. The District was ratified by House Bill 1784 in the 77th Legislative Session in 2001 and was subsequently confirmed by the voters of both Brazos and Robertson counties in a general election held on November 5, 2002. The District was then granted full authorities afforded groundwater conservation districts by Chapter 36 of the TWC, limited only by provisions of the District's enabling legislation. The District's enabling act has been codified in Chapter 8835 of the Special Districts and Local Laws Code.

The District was created to implement proper management techniques at the local level to address groundwater needs that are vital to Brazos and Robertson counties. The District directs its efforts toward preventing waste of groundwater, collecting data, and providing education about water conservation, protecting existing water rights, and preventing irreparable harm to the aquifers. This plan provides a template for the District to follow, aiding in the development of an understanding of local aquifer conditions for implementation of proper groundwater management policies.

B. Location and Extent

The District encompasses Brazos and Robertson counties in Central Texas. The boundaries of the District are coterminous with the counties' boundaries. The District is bordered by Falls and Limestone counties to the North; Grimes and Washington counties to the South; Madison, Leon and Grimes counties to the East; and Milam and Burleson counties to the West. The District comprises an area of approximately 1,456 square miles or 932,000 acres.

C. Background

The District's Board of Directors consists of eight (8) members appointed by their respective County Commissioners Courts. Four (4) members represent Robertson County and four (4) members represent Brazos County. The directors are appointed to represent the following interests:

Robertson County

1. One must represent municipal interests in the county.
2. One must be a bona fide agricultural producer who derives a substantial portion of his or her income from agriculture in the county.
3. One must be an employee or director of a rural water supply corporation in the county.
4. One must represent active industrial interests in the county.

Brazos County

1. One must be an employee or director of a rural water supply corporation in the county.
2. One must be a bona fide agricultural producer who derives a substantial portion of his or her income from agriculture in the county.
3. The governing body of the City of Bryan, with the approval of the Brazos County Commissioners Court, shall appoint one Director.
4. The governing body of the City of College Station, with the approval of the Brazos County Commissioners Court, shall appoint one Director.

D. Authority/Regulatory Framework

In the preparation of its management plan, the District followed all procedures and satisfied all requirements of Chapter 36 of the TWC and Chapter 356 of the TWDB rules contained in Title 30 of the Texas Administrative Code (TAC). The District exercises the powers it was granted and authorized to use by and through the special and general laws that govern it, including Chapter 1307, Acts of the 77th Legislature, Regular Session, 2001, and Chapter 36 of the TWC.

E. Groundwater Resources of the Brazos Valley Groundwater Conservation District

The five significant aquifers within the District's boundaries are the Carrizo-Wilcox, Queen City, Sparta, Yegua-Jackson, and Brazos River Alluvium aquifers. The Simsboro Sand is the most prolific water-yielding unit and is part of the Carrizo-Wilcox Aquifer. The Brazos River Alluvium, located near the Brazos River, is the next most prolific aquifer. The Queen City, Sparta, and Yegua-Jackson aquifers provide small to large pumping rates of useable groundwater to wells, as noted in Groundwater Resources of Brazos and Burleson Counties, Texas, Report 185 (Follett, 1974). A large pumping rate is defined as 200 gallons per minute or more. The vertical sequence of geologic units in descending order is listed in *Figure 1*. The Carrizo-Wilcox (Simsboro Sand) and Sparta aquifers provide water for large capacity public water supply and agricultural wells. Water from the Yegua-Jackson Aquifer is used for domestic, livestock, irrigation, industrial, and some minor retail public water supply use. Brazos River Alluvium wells are used mostly for agricultural irrigation purposes. The outcrop of the Gulf Coast aquifer occurs in the very southern part of the District providing a small amount of water for domestic and livestock wells.

The primary freshwater aquifers consist of sandy fluvial and deltaic sediments, while marine silts and clays act as aquitards separating the water-yielding zones. The Wilcox Group, from the shallowest to the deepest, consists of the Calvert Bluff, Simsboro Sand, and Hooper aquifers. No freshwater aquifers are located below the Midway, which is a thick impermeable clay located at the base of the Hooper Aquifer. The Calvert Bluff Aquifer is comprised of clay, sandy clay, shale, silt, and sand. The Simsboro Sand is generally composed of sand, while the Hooper Aquifer is made up of sand, silt, clay, and

shale. The Simsboro Sand is older than the Calvert Bluff, Carrizo, Queen City, Sparta, and Yegua-Jackson aquifers. The Carrizo Sand and Queen City Sand are separated by the Reklaw, which is a clay rich zone. The Cook Mountain Formation is composed of mostly clay separating the Sparta Sand and Yegua-Jackson aquifers. The Catahoula Sandstone or Catahoula Aquifer of the Gulf Coast Aquifer is composed of clay and sand in cross-bedded lenses. The Brazos River Alluvium can be found in a two-to-six-mile-wide zone of floodplain alluvial deposits along the Brazos River on the western boundary of the District. Sand, small gravel and clay compose the relatively thin Brazos River Alluvium. *Figure 2* illustrates a geologic cross section through Brazos and Robertson Counties and depicts the position, depth, thickness, and dip of the aquifers and confining units.

System	Series	Geologic Unit	Hydrogeologic Unit
Quaternary	Holocene	Flood-plain alluvium	Brazos River alluvium
	Pleistocene	Terrace deposits	
Tertiary	Miocene	Catahoula Sandstone	Gulf Coast aquifer
	Eocene	Jackson Group Whitsett Formation Manning Formation Wellborn Formation Caddell Formation	Yegua-Jackson aquifer
		Yegua Formation	
		Cook Mountain Formation	
		Sparta Sand	Sparta aquifer
		Weches Formation	
		Queen City Sand	Queen City aquifer
		Reklaw Formation	
		Carrizo Sand	Carrizo-Wilcox aquifer
		Wilcox Group Calvert Bluff Simsboro Hooper	

Figure 1: Geologic Units

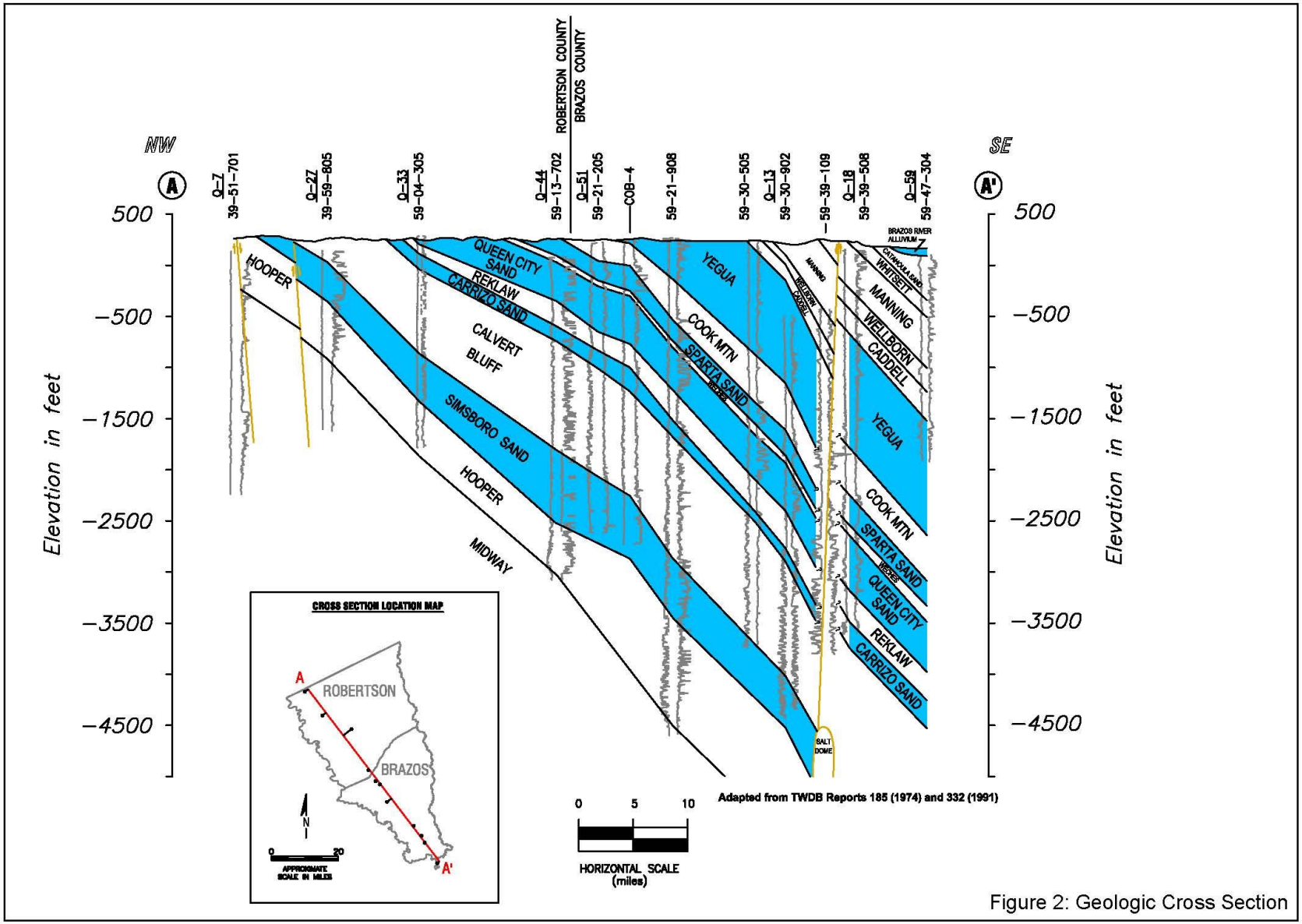
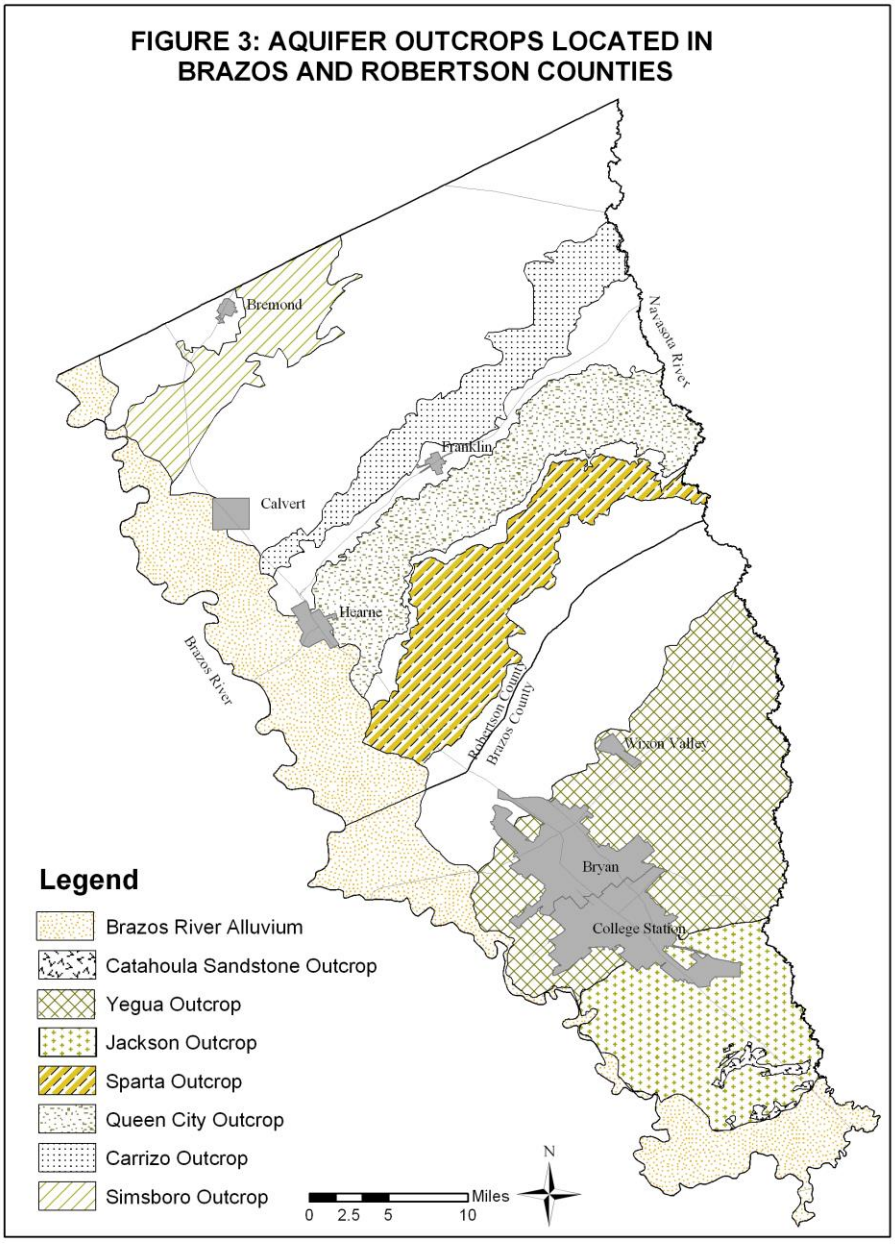


Figure 2: Geologic Cross Section

The Carrizo-Wilcox, Queen City, Sparta, and Yegua-Jackson aquifers outcrop within the District's boundaries in northeast to southwest trending belts paralleling the Gulf coastline. An aquifer outcrop map is included for Brazos and Robertson counties in *Figure 3*. The aquifer outcrops extend outside of the two counties shown on the map.

FIGURE 3: AQUIFER OUTCROPS LOCATED IN BRAZOS AND ROBERTSON COUNTIES



Younger aquifers outcrop closest to the coast. Older aquifers outcrop progressively further inland with increased age of the aquifer. The Catahoula Sandstone, which is the basal sand of the Gulf Coast Aquifer, occurs in a very limited area in the southern tip of Brazos County.

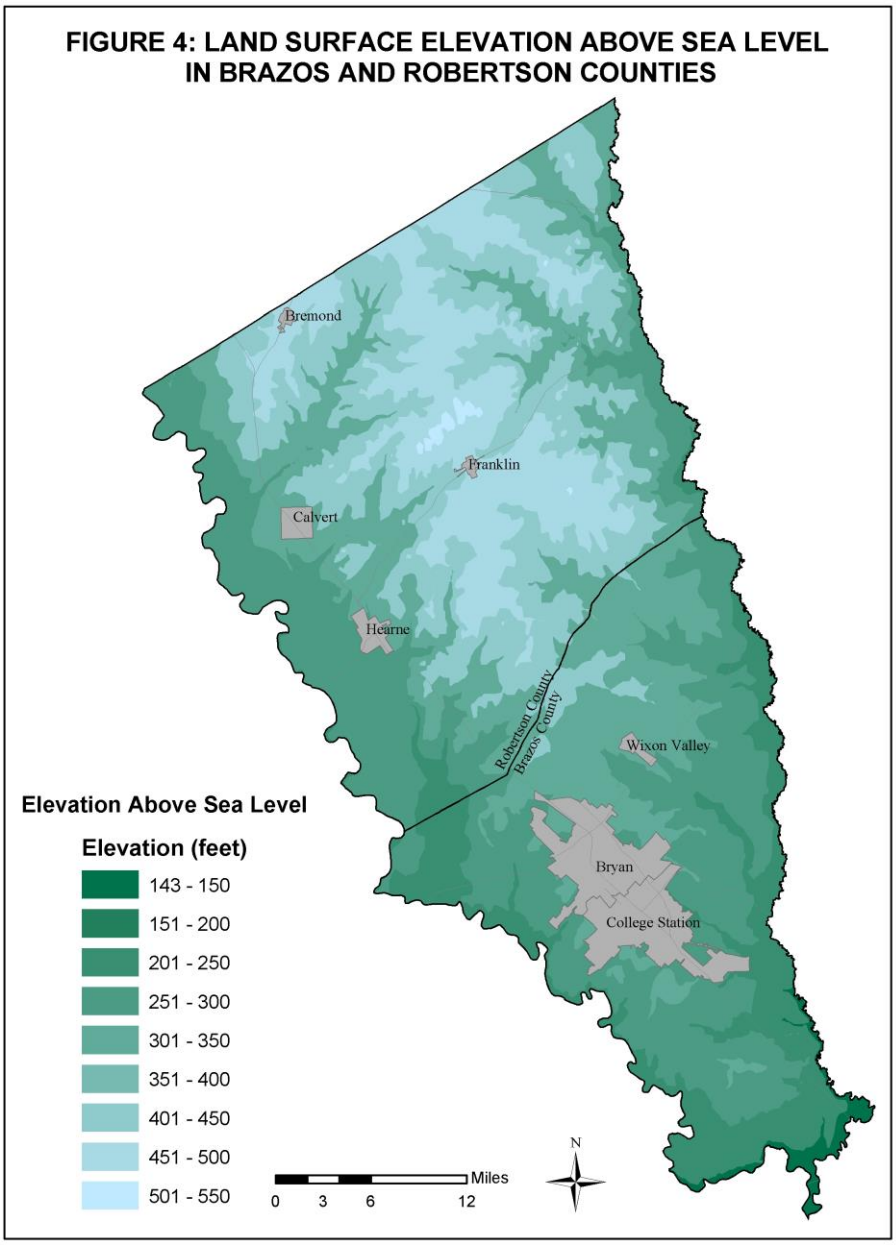
The general trend of the aquifers, except for the Brazos River Alluvium, is to dip underground southeastward towards the Gulf Coast from their surface exposure. The aquifers dip at a maximum rate of about 110 feet per mile. Each aquifer underlies younger aquifers that have a similar dip toward the coast. A salt dome occurs in the southern part of Brazos County. The top of the salt dome occurs at an elevation of about -4,600 feet relative to sea level and the approximate location of the dome is shown on Figure 2. The thickness and position of the Simsboro Sand is influenced by the salt dome, but the dome occurs significantly down dip of the area where the Simsboro Sand contains potable quality groundwater.

Topography and Drainage

Natural topography in Brazos and Robertson counties range from gently hilly terrain in the center of the counties to relatively flat terrain along the Brazos and Navasota river corridors. The western border of the counties is the Brazos River and the eastern is the Navasota River. The land surface elevation above sea level for Brazos and Robertson counties is shown on *Figure 4.* Altitudes in the District range from about 140 feet to 590 feet above mean sea level, with higher elevations in the center of the counties.

Numerous creeks drain runoff into the Brazos River, west of the surface water drainage divide and into the Navasota River east of the divide. At the southernmost tip of Brazos County, the Navasota River merges with the Brazos River. Drainages include Carters Creek, Cedar Creek, Duck Creek, Mud Creek, Peach Creek, Pin Oak Creek, Spring Creek, Thompson Creek, Walnut Creek, Wickson Creek, and the Little Brazos River. The Little Brazos River drains Walnut Creek, Mud Creek, Pin Oak Creek, and Spring Creek into the Brazos River.

Carters Creek has a stream gradient of about 10 feet per mile towards the Navasota River from its origin in central Brazos County. Cedar Creek drains from central Robertson County through Brazos County to the Navasota River and has a stream gradient of about 9 feet per mile. Duck Creek has a stream gradient of about 7 feet per mile and drains northeast Robertson County into the Navasota River. Mud Creek drains central Robertson County into the Little Brazos River and has a stream gradient of about 10 feet per mile. Peach Creek has a stream gradient of about 12 feet per mile and drains southern Brazos County into the Navasota River. Pin Oak Creek drains southern Robertson County into the Little Brazos River and has a stream gradient of about 22 feet per mile. Spring Creek has a stream gradient of about 17 feet per mile and drains southern Robertson County into the Little Brazos River. Thompson Creek drains northwest Brazos County into the Brazos River and has a stream gradient of about 11 feet per mile. Walnut Creek has a stream gradient of about 7 feet per mile and drains northwestern Robertson County into the Little Brazos River. Wickson Creek drains central Brazos County into the Navasota River and has a stream gradient of about 8 feet per mile.



F. Surface Water Supplies of Brazos and Robertson Counties

Brazos and Robertson counties are within the Region G Regional Water Planning Group commonly designated as Brazos G. Each regional water group supplies their specific assessments to TWDB for incorporation into the State water plan.

Projected surface water supplies are the maximum amount of surface water available from existing

sources for use during drought of record conditions that is physically and legally available for use. These are the existing surface water supply volumes that, without implementing any recommended water management strategies, could be used during a drought by water user groups located within the specified geographic area.

Surface water sources include any water resources where water is obtained directly from a surface water body. This would include rivers, streams, creeks, lakes, ponds, and tanks. In the State of Texas, all waters contained in a watercourse (rivers, natural streams and lakes, and storm water, flood water, and rainwater of every river, natural stream, canyon, ravine, depression, and watershed) are waters of the State and thus belong to the State. The State grants individuals, municipalities, water suppliers and industries the right to divert and use this water through water rights permits. Water rights are considered property rights and can be bought, sold, or transferred with state approval. These permits are issued based on the concept of prior appropriation, or "first-in-time, first-in-right." Because of the interruptible nature of these permits, water is not always available to all permit holders when low streamflow occurs. Water rights issued by the State generally fall into two major categories: run-of-river rights and stored water rights.

In addition to the water rights permits issued by the State, individual landowners may use State waters without a specific permit for certain types of uses. The most common of these uses is domestic and livestock use. These types of water sources are generally referred to as "Local Supply Sources". Many individuals with land along a river or stream that still have an old riparian right can also divert a reasonable amount of water for domestic and livestock uses without a permit.

5. REQUIRED ESTIMATES: 31 TAC 356.5(a)(5)(A)-(G

A. DFCs Adopted by GMA 12.

The District's current DFCs for the area covered by GMA 12 are the average drawdowns listed in *Table 1*. The average drawdowns are for a 70-year period beginning January 2000 and ending December 2069. For each of the aquifers, the DFC average drawdowns are for the area covered by each aquifer in Brazos and Robertson counties as defined by the stratigraphy used in the TWDB Groundwater Availability Models (GAMs). The GMA 12 2020 update for the Central portion of the Sparta, Queen City, and Carrizo-Wilcox GAM was used to develop DFCs for the Sparta, Queen City, Carrizo, Calvert Bluff, Simsboro and Hooper aquifers. The Yegua-Jackson Aquifer GAM released in 2010 was used to develop DFCs for the Yegua and Jackson aquifers and the Brazos River Alluvium GAM released in 2016 was used to develop DFCs for the Brazos River Alluvium.

Table 1. Adopted Aquifer DFCs based on the Average Threshold that occurs between 2000 and 2070. Yegua-Jackson (2010-2069), Brazos River Alluvium (2013-2070)	**Artesian Head (ft)** **Adopted DFCs – 2016**	**Artesian Head (ft)** **Adopted DFCs – 2021**
Sparta	12	53
Queen City	12	44
Carrizo	61	84
Upper Wilcox (Calvert Bluff Formation)	125	111

Middle Wilcox (Simsboro Formation)	295	262
Lower Wilcox (Hooper Formation)	207	167
Yegua-Jackson	Yegua – 70 Jackson – 114	67
Brazos Alluvium Aquifer	North of State Highway 21: Percent saturation shall average at least 30% of total well depth from January 2013 to December 2069. South of State Highway 21: Percent saturation shall average at least 40% of total well depth from January 2013 to December 2069.	

A. Resolution to Adopt Desired Future Conditions, November 30, 2021, letter from Gary Westbrook, General Manager, Post Oak Savannah GCD to Jeff Walker, Executive Administrator, Texas Water Development Board (Sparta, Queen City, Carrizo, Upper Wilcox, Middle Wilcox, Lower Wilcox, Yegua,, Jackson, and Brazos River Alluvium). .

B. Changes to the DFCs Between 2016 & 2021

Changes to the DFCs for the Sparta, Queen City, and Carrizo-Wilcox aquifers occurred between the 2016 and 2021 planning cycles and are listed in *Table 1* above. The primary reason for these modifications is the updating of the GAM for the Central portion of the Sparta, Queen City, and Carrizo-Wilcox. Districts had collected static water level measurements from monitoring wells and groundwater pumping data for years indicating the GAM needed to be updated and improved. The TWDB along with GMA 12 funded the 2018 update resulting in a substantially improved GAM followed by a local improvement to the GAM completed in 2020. The improved GAM predicted different amounts of artesian head decline to pumping than the previous GAM resulting in modifications to the DFCs used by the District as part of the 2021 cycle of GMA 12 planning.

The DFCs for the Yegua-Jackson Aquifer changed slightly due to an amalgamation of the DFCs for the Yegua Aquifer and Jackson Aquifer into one DFC for the combined aquifer. This action mirrors the other members of GMA 12 whose DFCs have always seen the Yegua-Jackson as one aquifer for planning purposes.

There was no change in the DFCs for the Brazos River Alluvium Aquifer.

C. Modeled Available Groundwater

Section 36.001 of the TWC defines modeled available groundwater (MAG) as "the amount of water that the Executive Administrator [of the TWDB] determines may be produced on an average annual basis to achieve a desired future condition established under §36.108." Desired future condition (DFC) is defined in §36.001 of the TWC as "a quantitative description, adopted in accordance with §36.108 of the Texas Water Code, of the desired condition of the groundwater resources in a management area at one or more specified future times." The District participates in the joint planning process in GMA 12, as defined per TWC §36.108, and established DFCs for aquifers within the District.

The TWDB's **MAG Estimates** based on GMA 12 adopted DFCs: GAM Run 21-017 MAG

Carrizo

Modeled Available Groundwater for the Carrizo Aquifer summarized by county in GMA 12 for each decade between 2010 and 2070. Results are in ac-ft/yr.

County	2010	2020	2030	2040	2050	2060	2070
Brazos	1,196	864	1,444	2,023	2,603	3,183	3,763
Robertson	887	81	412	743	1,074	1,405	1,736

Calvert Bluff

Modeled Available Groundwater for the Calvert Bluff Aquifer summarized by county in GMA 12 for each decade between 2010 and 2070. Results are in ac-ft/yr.

County	2010	2020	2030	2040	2050	2060	2070
Brazos	0	0	0	0	0	0	0
Robertson	776	252	546	841	1,136	1,430	1,725

Simsboro

Modeled Available Groundwater for the Simsboro Aquifer summarized by county in GMA 12 for each decade between 2010 and 2070. Results are in ac-ft/yr.

County	2010	2020	2030	2040	2050	2060	2070
Brazos	35,086	37,282	42,709	48,137	53,565	58,993	64,421
Robertson	37,236	38,219	47,140	56,061	64,982	73,903	82,824

Hooper

Modeled Available Groundwater for the Hooper Aquifer summarized by county in GMA 12 for each decade between 2010 and 2070. Results are in ac-ft/yr.

County	2010	2020	2030	2040	2050	2060	2070
Brazos	0	0	0	0	0	0	0
Robertson	836	798	1,066	1,334	1,603	1,871	2,139

Queen City

Modeled Available Groundwater for the Queen City Aquifer summarized by county in GMA 12 for each decade between 2010 and 2070. Results are in ac-ft/yr.

County	2010	2020	2030	2040	2050	2060	2070
Brazos	541	133	245	357	469	582	694
Robertson	0	36	144	252	359	467	575

Sparta

Modeled Available Groundwater for the Sparta Aquifer summarized by county in GMA 12 for each decade between 2010 and 2070. Results are in ac-ft/yr.

County	2010	2020	2030	2040	2050	2060	2070
Brazos	3,745	4,483	6,014	7,545	9.076	10,607	12,138
Robertson	16	167	338	509	680	851	1,022

Yegua-Jackson

Modeled Available Groundwater for the Yegua-Jackson Aquifer summarized by county in GMA 12 for each decade between 2010 and 2070. Results are in ac-ft/yr.

County	2010	2020	2030	2040	2050	2060	2070
Brazos	6,863	4,207	6,270	7,092	7,091	7,091	7,091
Robertson	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Brazos River Alluvium

Modeled Available Groundwater for the Brazos River Alluvium Aquifer summarized by county in GMA 12 for each decade between 2013 and 2070. Results are in ac-ft/yr.

County	2013	2020	2030	2040	2050	2060	2070
Brazos	122,785	77,816	76,978	76,393	76,195	76,100	76,039
Robertson	66,608	55,907	55,424	55,157	54,839	54,723	54,6118

D. Compliance with the Adopted 2021 DFCs

Under TWC §36.108.31, TAC 356.52(a)(1)(H) and TWC §36.1071(a)(8), it is incumbent upon the District to remain in compliance with the adopted DFCs. The beginning year of the Desired Future Conditions is 2000 and currently ends in 2070. The District is to remain within the adopted DFC for each of the managed aquifers throughout the 70-year period. District Rules provide that a DFC is non-compliant and curtailment procedures listed in the rules are to be implemented once the adopted DFC has been exceeded in three (3) consecutive years. The estimated average artesian head decline for the three (3) most recent years for each managed aquifers, estimated artesian head decline at the beginning of DFC calculations assumed to be zero, and the adopted DFC for managed aquifer are listed below in *Table 2.* For the Brazos River Alluvium, the matrix is a percent of saturation of the aquifer with the number being either 30 or 40 percent of saturation of the aquifer depending on the location within the District.

Table 2. Estimated Average Artesian Head Decline compared to Adopted DFC from 2021 Cycle of GMA 12 Planning, (ft)

Aquifer	2000	2021	2022	2023	Adopted DFC, Average Feet of Decline
Sparta	0	9	12	16	53
Queen City	0	13	7	0	44
Carrizo	0	7	11	14	84
Calvert Bluff	0	+3	+4	+1	111
Simsboro	0	34	43	58	262
Hooper	0	14	6	5	167
Yegua-Jackson	0	+11	+8	+9	67
Brazos River Alluvium, Ave, Percent Saturation	----	68.5%	65%	64%	≥ 30% - N of Hwy 21 ≥ 40% - S of Hwy 21

E. Historical Water Use Data

Data from the TWDB Historical Water Use Survey, included in *Appendix B1*, provides annual historical water use projections from 2004 to 2019, the most recent years of record availability. The table includes groundwater and surface water accounting for municipal, manufacturing, steam electric, irrigation, mining, and livestock usage. Data presented in *Table 3* reflects groundwater use within the District from metered wells required to report water production to the District.

The data is for the 2015-2022 period and delineated by aquifer. Exempt well use (domestic, livestock, wells used for oil and gas rig supply) are not included. Brazos River Alluvium wells have no requirement to be metered and are not a part of *Table 3.*

Table 3. Metered Groundwater Use by Aquifer (ac-ft/yr)

Aquifer	2015	2016	2017	2018	2019	2020	2021	2022
Hooper	1,084	909	756	809	700	746	918	1,045
Simsboro	56,638	54,237	53,326	55,229	50,528	53,164	51,128	58,313
Calvert Bluff	160	132	272	130	177	230	133	251
Carrizo	666	762	630	825	992	1,062	956	1,575
Queen City	190	100	237	147	401	103	45	93
Sparta	4,122	4,153	4,241	4,500	3,870	3,389	3,161	4,288
Yegua-Jackson	1,664	1,565	1,510	1,183	1,278	1,253	948	1,261
Totals	64,524	61,858	60,972	63,823	57,946	59,947	57,289	66,826

F. Annual Recharge from Precipitation

Scope: This is the recharge to aquifers from precipitation falling on outcrop areas of the aquifers within the District. Additional recharge to aquifers occurs in areas outside the District.

Methodology: Using data from the TWDB GAM Run 23-009, the annual estimated recharge is given in acre-feet per year (ac-ft/yr) in *Table 4.*

G. Annual Volume of Water Discharging to Surface Water

Scope: This includes groundwater discharging from each aquifer within the District to springs and surface water bodies including lakes, streams, and rivers.

Methodology: Using data from the TWDB GAM Run 23-009, *Table 4* summarizes the flow from each aquifer to surface water springs, lakes, streams, and rivers.

Table 4. GAM Recharge & Discharge Estimates

Management Plan Requirements	Aquifer or Confining Unit	Results ac-ft/yr
Estimated annual amount of recharge from precipitation to the District	Gulf Coast Aquifer System	40
	Yegua-Jackson Aquifer	26,560
	Sparta Aquifer	8,333
	Queen City Aquifer	10,105
	Carrizo-Wilcox Aquifer	46,908
	Brazos River Alluvium Aquifer	23,418
Estimated annual volume of water that discharges from the aquifer to springs and any surface water body including lakes, streams, and rivers	Gulf Coast Aquifer System	255
	Yegua-Jackson Aquifer	42,656
	Sparta Aquifer	12,662
	Queen City Aquifer	9,923
	Carrizo-Wilcox Aquifer	54,346
	Brazos River Alluvium Aquifer	34,326

Source: TWDB GAM Run 23-009

GAM Run 23-009 Recharge & Discharge Estimates

H. Annual Flow Into/Out and Between Aquifers

Scope: Flow into and out of the District is described as lateral flow within the aquifers between the District and adjacent counties. Flow between aquifers describes the vertical flow, or leakage, between aquifers. Flow into the District from each aquifer is provided in the *Table 5*.

Methodology: Using data from the TWDB GAM Run 23-009, annual flow into/out and between aquifers was calculated. Groundwater flow results are provided in *Table 5*.

Table 5. GAM Flow Estimates

Management Plan Requirements	Aquifer or Confining Unit	Results ac-ft/yr
Estimated annual volume of flow into the District within each aquifer in the District	Gulf Coast Aquifer System	332
	Yegua-Jackson Aquifer	12,578
	Sparta Aquifer	1,176
	Queen City Aquifer	2,976
	Carrizo-Wilcox Aquifer	33,140
	Brazos River Alluvium Aquifer	24,831
Estimated annual volume of flow out of the District within each aquifer in the District	Gulf Coast Aquifer System	48
	Yegua-Jackson Aquifer	7,122
	Sparta Aquifer	466
	Queen City Aquifer	1,228
	Carrizo-Wilcox Aquifer	10,125
	Brazos River Alluvium Aquifer	21,921
Estimated net annual volume of flow between each aquifer in the District	From Gulf Coast Aquifer System to Yegua-Jack Aquifer*	17
	From Gulf Coast Aquifer System to Brazos River Alluvium**	2,176
	To Yegua-Jackson Aquifer from Yegua-Jackson eqivalent units	134
	To Yegua-Jackson Aquifer from the Gulf Coast Aquifer System	17
	From Yegua-Jackson Aquifer to Brazos River Alluvium Aquifer**	2,431
	From Sparta Aquifer to Sparta Aquifer equivalent units	5
	From Sparta Aquifer to Queen City Aquifer	153
	To Sparta Aquifer from Weches confining unit	3,138
	From Sparta Aquifer to overlying units	165
	From Sparta Aquifer to Brazos River Alluvium Aquifer**	3,860
	To Queen City Aquifer from Queen City Aquifer equivalent units	33
	To Queen City Aquifer from Carrizo-Wilcox Aquifer	5
	To Queen City Aquifer from Reklaw confining unit	451
	From Queen City Aquifer to Weches confining unit	2,372
	To Queen City Aquifer from Sparta Aquifer	153
	From Queen City Aquifer to Brazos River Alluvium Aquifer**	6,262
	To Carrizo-Wilcox Aquifer from Carrizo-Wilcox equivalent units	2,149

	From Carrizo-Wilcox Aquifer to Reklaw confining unit	2,454
	From Carrizo-Wilcox Aquifer to the Queen City Aquifer	5
	From Carrizo-Wilcox Aquifer to Brazos River Alluvium Aquifer**	2,286

Source: TWDB GAM Run 23-009

GAM Run 23-009 Flow Estimates

The same GAMs were used to develop the estimates of recharge from precipitation and other components of the aquifer water flow budgets as were used to develop the DFCs for the aquifers in the 2021 planning cycle with the exception that the GAM for the Central Portion of the Sparta, Queen City and Carrizo-Wilcox Aquifer released by the TWDB in 2018 was used to estimate the water flow budgets for the Sparta, Queen City and Carrizo-Wilcox aquifers. References regarding the GAMs used to develop the flow budgets are also given at the conclusion of TWDB report GAM Run 23-009 included as Appendix C.

I. Projected Surface Water Supply

Surface water is currently allocated by the Texas Commission on Environmental Quality (TCEQ) for the use and benefit of all people of the State. Anyone seeking a new water right must submit an application to the TCEQ. The TCEQ then determines whether or not the permit will be issued and permit conditions. The water right grants a certain quantity of water to be diverted and/or stored, a priority date, and other conditions, which may include a maximum diversion rate and in stream flow restrictions to protect existing water rights and environmental flows.

The Brazos River Authority (BRA) is the largest surface water right holder within the District, holding most of the rights to the water within the Brazos River Basin, including the water in Lake Limestone in northeast Robertson County. There are several water rights within the District consisting primarily of irrigation rights along the rivers, steam electric, and water for public supply rights for surface water. The BRA contracts raw water to various entities for long and short-term supplies for municipal, industrial, and agricultural irrigation uses.

Wellborn Special Utility District (Wellborn) is currently the only retail water supply within the District utilizing surface water in addition to groundwater, holding a permit for 4,000 ac-ft/yr.

Projected surface water supplies are described in the 2022 State Water Plan and are referenced in a table provided by the TWDB in *Appendix B2*.

J. Projected Water Demands

The Brazos G Regional Water Planning Group (BGRWPG) and local water use data indicate that total water demands for the District will be 243,783 acre-feet, by the year 2070. This number includes use from all available groundwater and surface water sources within the District.

Current and projected water demands by user group within each county in the District through the year

2070 are described in *Appendix B3*. These estimates are in the current 2022 State Water Plan. Projected water demands were significantly adjusted in the 2022 State Water Plan regarding agricultural and public water supply needs and addressed the District's concerns relative to projected growth and current usage by these user groups. The District will continue to work to collect accurate data about current production as well as projected demands. This information will be provided to the TWDB for inclusion in future Regional and State water plans. As indicated in the regional water plan, these projections take into account population growth, rainfall, and conservation measures to be taken by each user group.

K. Projected Water Supply Needs

The projected need for additional water supplies stated in the 2022 State Water Plan clearly indicates three primary areas of need; Agricultural irrigation, domestic/municipal use and potentially steam electric production. Each of these sectors faces their own hurdles and will meet their demand needs in different manners.

Agricultural irrigation will continue a pattern of conservation through best management practices. The industry is likely to use several methods to meet their needs including improved irrigation methods, dryland farming, crop selection and utilizing further development of available groundwater resources and potentially some surface water.

Municipalities and rural water supplier face decades of projected population increases. The water supply needs associated with the growth will likely be met using conservation methods including lowered gallons per day use per customer, aquifer storage and recovery, indirect and direct potable reuse projects, and further development of groundwater, with the available supply currently being assessed, and surface water resources.

Steam electric production in northern Robertson County could continue to grow, if it is cost competitive with other sources of electricity, due to the population growth throughout Texas and the favorable locations of the existing power plants with lignite deposits in close proximity or coal from out of state mines. Groundwater and surface water are readily available and likely sources of water to remedy any long-term needs.

The District has considered the future needs projects in the 2022 State Water Plan and believes that further development of groundwater and surface water resources along with conservation practices will meet the projected needs. Monitoring of large-scale production projects in GMA 12 will be an ongoing process.

Projected water supply needs, based on projections in the 2022 State Water Plan, are included in *Appendix B4*. Negative values (listed in red) indicate a projected water supply need, and the plan identifies recommended water strategies for these needs. An updated groundwater availability model (GAM) was developed by the TWDB in 2018 for the Sparta, Queen City and Carrizo-Wilcox aquifers and Brazos River Alluvium for the area encompassing the District and all of GMA 12. The GAM will be used to reassess and most likely result in an increase in the estimates of the availability of groundwater. The anticipated increase in the groundwater supply can be used to help address water supply needs.

L. Projected Water Management Strategies to Meet Future Supply Needs

Demand and supply data developed as part of the Region G planning process in 2022, District records, and GMA 12 planning efforts indicate that groundwater and surface water supplies should be adequate to meet the recommended strategies. There will be a need for infrastructure improvements to provide water at higher rates as water demands increase. However, if current conditions and projected needs from the State Water Plan are low, these shortages will be satisfied by further development of groundwater and surface water resources. While there seems to be sufficient water resources today to meet the 50-year planning horizon, large scale water development projects, both within the District and in neighboring districts, could alter available water supplies. Hydrogeological studies indicate that as groundwater production approaches the estimates of water demands being developed as part of the GMA 12 process, some older production wells in the Simsboro Sand may need to be replaced due to declining water levels and limited available drawdown. As part of its long-range management strategy, the District will review changes in aquifer utilization and well water level changes to help estimate appropriate future well construction and possible need for a change in the water management strategy. Some water management strategies, as given in the 2017 State Water Plan, are included in *Appendix B5*.

M. Natural or Artificial Recharge of Groundwater Resources

1. Estimate of Average Recharge to the Groundwater Resources within the District.

Aquifers within the District receive recharge from infiltration of precipitation and water from streams that cross aquifer outcrops. Estimated locations of aquifer outcrops within the District are shown on *Figure 3*. Recharge to aquifers within the District can occur outside District boundaries as an aquifer outcrop extends to the north into an adjoining county or to the east and west of the District.

Estimates of recharge for the Carrizo-Wilcox Aquifer have been in the range of 3 to 5 inches per year based on groundwater flow modeling work. TWDB GAM Run 23-009 provides estimates of recharge for the aquifer systems. Based on areas of the aquifer outcrops within Robertson County, the resulting estimate of recharge to the Carrizo-Wilcox Aquifer is about 46,908 ac-ft/yr. Additional recharge occurs outside the District that contributes to the total recharge to the aquifer system.

The Queen City Aquifer is composed of fine-grained sands with interbedded clay. The outcrop area also can contain alternating areas of sands and other areas of lower permeability silt or clay. The TWDB GAM Run 23-009, estimates the recharge to the Queen City Aquifer within the District is about 10,105 ac-ft/yr. The Queen City Aquifer outcrop occurs over about 105 square miles in Robertson County.

The Sparta Aquifer is composed of quartz sand with a small amount of interbedded clay within the aquifer thickness. Recharge to the aquifer via infiltrated precipitation and stream flow is estimated at about 8,333 ac-ft/yr in the TWDB GAM Run 23-009. The estimated outcrop of the aquifer encompasses about 100 square miles within the District.

The Yegua-Jackson Aquifer is composed of sandstone, clay, and lignite beds in some areas. The outcrop area is extensive in Brazos County as shown on Figure 3. Estimated recharge to the Yegua-Jackson aquifer is about 26,560 ac-ft/yr, based on the TWDB GAM Run 23-009. The aquifer or overlying fluviatile terrace deposits outcrop over about 350 square miles in Brazos County.

The outcrop for the Catahoula sandstone of the Gulf Coast Aquifer System occurs in the very southern part of the District. In part of the outcrop area, either the Navasota River or Brazos River Alluvium has covered or washed away the surface sediments of the Catahoula sandstone. Most likely, some recharge to the buried sediments of the Gulf Coast Aquifer System occurs via leakage from the Navasota River or Brazos River Alluvium. It is estimated, based on the TWDB GAM Run 23-009 that recharge to the Gulf Coast Aquifer System is about 40 ac-ft/yr.

The Brazos River Alluvium, located in the area of the Brazos River floodplain encompasses about 140 square miles within Brazos and Robertson counties. Recharge to the Brazos River Alluvium is estimated to occur via infiltration of precipitation and stream flow. Recharge to the Brazos River Alluvium is about 23,418 ac-ft/yr based on the TWDB GAM Run 23-009.

GAM Run 23-009 Natural or Artificial Recharge of Groundwater Resources

2. How Natural or Artificial Recharge of Groundwater Within The District Might Be Increased.

Recharge enhancement may increase the amount of groundwater available from the aquifers within the District. Increasing recharge can be difficult in geologic environments that occur within the District because a large percentage of the potential recharge is rejected due to shallow water levels in the sediments of the aquifer outcrops or to the low permeability of sediments in some of the aquifer outcrops. Recharge might be enhanced by the construction of rainfall runoff retention structures on ephemeral streams. Further study of the surface geology and soil characteristics in the District may result in the identification of areas with porous soils that could provide sites for enhanced recharge or test sites for recharge investigations.

The District encourages and supports the use of Aquifer Storage and Recovery projects as a means of water conservation. This most likely would occur in the form of reuse of effluent produced by municipalities or industry.

6. MANAGEMENT OF GROUNDWATER SUPPLIES – 31 TAC 356.5(A)(6)

Groundwater conservation districts have statutorily been designated as Texas' preferred method of groundwater management through the rules developed, adopted, and promulgated by individual groundwater districts, as authorized by Chapter 36 of the TWC and the individual district's enabling act (TWC §36.0015). The BVGCD may manage groundwater supplies, in part, by regulating the spacing and production of wells, to minimize drawdown of the water table or reduction of artesian pressure, to control subsidence, to prevent interference between wells, to prevent degradation of water quality, or to prevent waste (TWC §36.116). The method of groundwater production regulation must be based on

hydrogeological conditions of aquifers in the District. However, the District may preserve historic use (TWC §36.116(b)).

The BVGCD, as authorized by law, has adopted the following groundwater management strategy:

A. Availability Goal

The water availability goals of the District are expressed through the Desired Future Conditions adopted by the GMA 12 pursuant to §36.108 of the TWC.

B. Historic Use

The District shall preserve historic or existing groundwater use in the District before the effective date of the District's rules, to the maximum extent practicable.

C. Pumping Rate Limit

The District will regulate groundwater withdrawal through permitting efforts and by setting a maximum pumping rate limit of 3,300 gpm/well. New wells producing water from all District aquifers, excluding the Brazos River Alluvium, will be required to have land legally assigned to the well in an amount to be determined in relationship to the average annual production rate of the well.

D. Beneficial Use

The District will regulate groundwater withdrawal by setting production limits on wells based on evidence of beneficial use; and the District will continue to study various management methods including regulating groundwater production based on surface acreage which may become appropriate for effective management of groundwater withdrawal.

E. Well Spacing

The District will require well spacing on new water wells as follows:

1. A new well may not be drilled within 50 feet from the property line of any adjoining landowners;
2. Spacing of new wells completed in the Simsboro formation shall be spaced one foot per average annual gallons per minute from existing wells; and
3. Spacing of new wells completed in other formations (other than the Brazos River Alluvium) shall be spaced two feet per average annual gallons per minute from existing wells.

The District will incorporate these management strategies into its rules and will permit wells accordingly.

7. METHODOLOGY TO TRACK DISTRICT PROGRESS IN ACHIEVING MANAGEMENT GOALS 31 TAC 356.5 (a)(6)

An annual report will be developed by the General Manager and District staff and provided to the District's Board of Directors. The Annual Report will cover activities of the District including

information on the District's performance regarding achieving the District's management goals and objectives. The Annual Report will be delivered to the District Board within 60 days following the completion of the District's fiscal year. A copy of the Annual Report will be kept on file and available for public inspection at the District's offices upon adoption.

8. ACTIONS, PROCEDURES, PERFORMANCE, AND AVOIDANCE FOR DISTRICT IMPLEMENTATION OF MANAGEMENT PLAN 31 TAC 356.5 (a)(4)

The District will act on goals and directives established in this District Management Plan. The District will use the objectives and provisions of the Management Plan as a guideline in its policy implementation and decision-making. In both its daily operations and long-term planning efforts, the District will continuously strive to comply with the initiatives and standards created by the Management Plan.

The District will amend rules in accordance with Chapter 36 of the TWC and rules will be followed and enforced. The District may amend the District rules as necessary to comply with changes to Chapter 36 of the TWC and to insure the best management of the groundwater within the District. Development and enforcement of the rules of the District will be based on the best scientific and technical evidence available to the District.

The District will encourage public cooperation and coordination in implementation of the District Management Plan. All operations and activities of the District will be performed in a manner that best encourages cooperation with appropriate state, regional, and local water entities, as well as landowners and the general public. Meetings of the District's Board of Directors will be noticed and conducted in accordance with the Texas Open Meetings Act. The District will also make available for public inspection all official documents, reports, records, and minutes of the District pursuant with the Texas Public Information Act.

For information concerning rules of the District, visit the District's website (https://brazosvalleygcd.org) or use the following hyperlink (Brazos Valley GCD Rules & Regulations).

9. MANAGEMENT GOALS AND OBJECTIVES 31 TAC 356.5(A)(1)

Unless indicated otherwise, performance on goals will be measured annually. The Management Plan will be subject to review at least every five years and modification will be made as deemed appropriate. Information describing programs, policies, and actions taken by the District to meet goals and objectives established by the District will be included in the Annual Report prepared by the General Manager and presented to the District's Board of Directors. Following District Board approval, the report will be made available to the County Commissioners Courts and general public.

A. Management Goals:

1. Implement Strategies Providing For the Most Efficient Use of Groundwater:

1a. **Objective –** Require all existing and new non-exempt wells constructed within the boundaries of the District to be permitted by the District and operated in accordance with District Rules. In addition, the District will encourage all exempt wells constructed within the District boundaries to be registered with the District.

- **Performance Standard** – The number of exempt and permitted wells registered within the District will be reported annually in the District's Annual Report submitted to the District Board of Directors.

1b. **Objective –** Regulate the production of groundwater by permitting wells within the District boundaries based on beneficial use and in accordance with District Rules. Each year the District will accept and process applications for permitted use of groundwater in the District, in accordance with the permitting process established by District rules. The District will regulate production of groundwater from permitted wells by verification of pumpage using meters.

- **Performance Standard –** Number and type of applications made for permitted use of groundwater in the District, number and type of permits issued by the District, and amount of groundwater permitted will be included in the Annual Report given to the District Board of Directors.

- **Performance Standard –** Actual annual pumpage from each metered well within the District will be reported annually and compared to the amount permitted for that well. This information will be included in the District's Annual Report submitted to the District Board of Directors.

1c. **Objective –** Conduct ongoing monitoring of aquifers underlying the District and current groundwater production within the District, and then assess the available groundwater that can be produced from each aquifer within the District after sufficient data are collected and evaluated. Using this data and information developed for GMA 12, the District will re-evaluate availability goals as necessary and will permit wells in accordance with appropriate production goals.

- **Performance Standard –** The District will conduct appropriate studies to identify issues and criteria needed to address groundwater management needs within the District's boundaries. Groundwater availability goals will take into consideration GMA 12 planning and research of hydrogeological and geologic characteristics of the aquifers, which may include, but not necessarily be limited to, amount of water use, water quality, and water level declines.

- **Performance Standard –** A progress report on the work of the District regarding groundwater availability will be written annually, as substantial additional data are developed. The progress report will be included in the Annual Report to the District Board of Directors.

2. <u>Implement Strategies to Control and Prevent Waste of Groundwater</u>:

2a. Objective – Apply a water use fee to the permitted use of groundwater in the District to encourage conservation-oriented use of groundwater resources to eliminate or reduce waste.

- **Performance Standard –** Each year the District will apply a water use fee to the non-exempt permitted use of groundwater produced within the District pursuant to District rules. The amount of fees generated and amount of water produced for each type of permitted use will be a part of the Annual Report presented to the District Board of Directors.

2b. Objective – Evaluate District rules annually to determine whether any amendments are necessary to decrease the amount of waste within the District.

- **Performance Standard –** The District will include a discussion of the annual evaluation of District rules, and determination of whether any amendments to the rules are necessary to prevent waste of groundwater. The evaluation will be included in the Annual Report provided to the District Board of Directors.

2c. Objective – Provide information to the general public and schools within the District promoting water conservation, wise use of water, and the elimination and reduction of wasteful practices.

- **Performance Standard** – The District will include a page on the District's web-site devoted to wise use of water and providing tips to help eliminate and reduce wasteful use of groundwater. The District will provide information to local school districts including providing Texas Education Agency approved water curriculum and in-school presentations to encourage wise use of water and understanding of the significance of aquifers to District residents.

3. Implement Strategies to Assess, Control, and Prevent Subsidence

3a. Objective - The District will monitor changes in water levels in its monitoring wells 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. The District will review the sections in "Identification of the Vulnerability of the Major and Minor Aquifers of Texas to Subsidence with Regard to Groundwater Pumping" report (TWDB Contract Number 1648302062, by LRE Water) when discussing subsidence within the Districts aquifers. Those aquifers can be found on page 4-5, 4-104, 4-187, 4-207, and 4-229 of the report.

- **Performance Standard** – 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 documented in a presentation or a report.

- **Performance Standard** – As outlined in TWC Ch. 36.108 (d), The District will take into consideration the "Identification of the Vulnerability of the Major and Minor Aquifers of Texas to Subsidence with Regard to Groundwater Pumping" when considering subsidence during GMA 12 joint planning.

4. <u>Implement Strategies to Address Conjunctive Surface Water Management Issues:</u>

4a. Objective – Encourage the use of surface water supplies where available, to meet the needs of specific user groups within the District.

- **Performance Standard** – The District will participate in the Region G Regional Water Planning process by attending at least one BGRWPG meeting annually and will encourage the development of surface water supplies where appropriate. This activity will be noted in the Annual Report presented to the District Board of Directors.

5. <u>Implement Strategies to Address Natural Resource Issues which Impact the Use and Availability of groundwater, and which are Impacted by the Use of Groundwater</u>

5a. Objective – Determine if there are any natural spring flows within the District that may be impacted by increased groundwater pumping.

- **Performance Standard –** Annually monitor water levels in at least two (2) wells near natural spring flows, if found, for potential impact from groundwater production. Prepare an annual assessment statement and include in the Annual Report to the District Board of Directors.

6. <u>Implement Strategies to Address Drought Conditions:</u>

6a. Objective – A District staff member will download at least one Palmer Drought Severity Index (PDSI) map monthly. The Palmer Drought Severity Index map will be used to monitor drought conditions and will be used by the Board to determine trigger conditions provided by the District Drought Contingency Plan.

- **Performance Standard** –District staff will make an assessment of drought conditions in the District and will brief the District Board at each regularly scheduled board meeting.

6b. Objective – Require 100 percent of entities that are mandated by the State of Texas to have drought contingency plans, to submit those plans to the District or follow the District's plan when applying for a permit from the District for water production.

- **Performance Standard** – Review 100 percent of the drought contingency plans submitted as a result of permitting, whenever permit applications for water production

are received. The number of drought contingency plans required to be submitted by permitted entities to the District as part of the well permitting process and the number of drought contingency plans actually submitted to the District will be described in the Annual Report to the District Board.

6c. **Objective** – The District drought contingency plan will be reviewed for effectiveness and needed updates at least once every three years.

- **Performance Standard –** A report summarizing findings of the review of the District drought contingency plan will be included in the Annual Report to the District Board of Directors. Additional drought information sources are available at: https://waterdatafortexas.org/drought **.**

7. **Implement Strategies to Promote Water Conservation:**

7a. **Objective -** Require 100 percent of water applicants requesting a permit for water production within the District to submit a water conservation plan, unless one is already on file with the District at the time of the permit application, or agree to comply with the District Water Conservation Plan.

- **Performance Standard** – Review 100 percent of the water conservation plans submitted as a result of permit requirements to ensure compliance with permit conditions. Number of water conservation plans required to be submitted by water permittees to the District that year as part of the well permitting process and number of water conservation plans actually submitted to the District will be reported in the Annual Report to the District Board of Directors. If the water permittee chooses to agree to follow the District Water Conservation Plan in lieu of submitting a water conservation plan, then that number will be indicated in the Annual Report to the District Board.

7b. **Objective** – Develop a system for measurement and evaluation of groundwater supplies.

- **Performance Standard** – Water level monitoring wells will be identified for Brazos River Alluvium, Yegua-Jackson, Sparta, Queen City, Carrizo, Calvert Bluff, Simsboro, and Hooper aquifers. At least two (5) wells per aquifer will be monitored on an annual basis to track changes in static water levels.

- **Performance Standard** – 80% of all monitoring wells designated as Desired Future Condition well will be measured at least annually to track compliance with the Desired Future Condition for the relevant aquifer.

7c. **Objective** – Assist in funding and obtaining grant funds for the implementation of water conservation methods. Work with the appropriate state and federal agencies to facilitate bringing grant funds to various groups within the District boundaries to develop and

implement water conservation methods. Work with local entities to help develop plans for obtaining grant funding from the District. The District will meet with at least one state or federal agency annually to discuss bringing water conservation methods grant funds into the District.

- **Performance Standard** – Number of meetings held annually with at least one state or federal agency and the number of grants for water conservation methods applied for and obtained will be included in the Annual Report to the District Board of Directors.

- **Performance Standard** – The District will address potential District grant funding for water conservation projects upon request by and/or submission to the District. Following proposal submission, applications will be reviewed for possible District Board approval. The number of water conservation projects submitted and the number of projects approved for grant funding by the District will be reported in the Annual Report to the District Board.

8. <u>Implement Strategies to Protect Water Quality:</u>

8a. Objective - Develop baseline water quality data and a system for continued evaluation of groundwater quality.

- **Performance Standard** – Develop general understanding of water quality within aquifers in the District based on TCEQ, TWDB, and other data. Coordinate with TCEQ on water quality issues.

8b. Objective – Require all water permittees that are required by the TCEQ to have well vulnerability studies prior to constructing a well, to provide evidence of the study to the District prior to construction of a well within the District.

- **Performance Standard** – Review all vulnerability studies submitted as a result of permit requirements to help ensure water quality protection.

8c. Objective – Provide information to the general public and schools within the District on the importance of protecting water quality.

- **Performance Standard** – The District will include a page on the District's web-site devoted to water quality issues and will provide information to permittees on wellhead protection. The District will provide in-school presentations addressing aquifer contamination and aquifer protection.

9. <u>Implement Strategies to Assess Adopted Desired Future Conditions</u>

9a. Objective - Annually, the District will evaluate well water level monitoring data and determine whether the change in water levels is in general 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.

- **Performance Standard** – Annually, the General Manager will report to the District Board the water level data obtained from the monitoring wells in each aquifer, the average artesian head change for each aquifer calculated from the water levels of the monitoring wells in each aquifer, a comparison of the average artesian head change for each aquifer with the DFCs for each aquifer, and the District progress in conforming with the DFCs.

- **Performance Standard** – At least once every year, the General Manager will report to the District Board the total permitted groundwater production and the estimated total annual groundwater production for each aquifer and compare these amounts to the MAGs.

B. Management Goals Determined Not to be Applicable to the Brazos Valley Groundwater Conservation District

1. Rainwater Harvesting:

With average annual precipitation in the District about 39 inches, a goal of rainwater harvesting is not applicable at this time.

2. Recharge Enhancement:

With an average annual precipitation of about 39 inches and outcrop areas of the Carrizo-Wilcox limited to the northern part of Robertson County, this goal in not applicable at this time. The exception would be the utilization of Aquifer Storage and Recovery projects.

3. Precipitation Enhancement:

With the high amount of annual rainfall in the District, precipitation enhancement does not appear to be needed. This goal is therefore not applicable at this time.

4. Brush Control:

A significant amount of the District's area is heavily forested with other areas in improved pasture or cultivated land. Brush control, as a goal, in not applicable at this time.