Mid-East Texas

Groundwater

Conservation District

Groundwater Management Plan

Approved Plan
July 30, 2019

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The Mid-East Texas Groundwater Conservation District (the "District") was created by the authority of Section 59, Article XVI, of the Texas Constitution, and in accordance with Chapter 36 of the Texas Water Code ("Water Code"), and by Article 4, House Bill 1784 [Act of May 28, 2001, 77th Leg. R.S., ch. 1307, 2001 Tex. Gen. Laws 3199, 3205] and Article 3, Part 15, Senate Bill 2 [Act of May 27, 2001, 77th Leg. R.S. ch. 967, 2001 Tex Gen Laws 1991, 2055]. The Enabling Act of the District has been codified under Chapter 8866, Special District Local Laws Code.

The District is a governmental agency and a body politic and corporate. The District was created to serve a public use and benefit, and is essential to accomplish the objectives set forth in Section 59, Article XVI, of the Texas Constitution. The District's boundaries are coextensive with the boundaries of Freestone, Leon and Madison Counties, Texas, and lands and other property within these boundaries will benefit from the works and projects that will be accomplished by the District.

District Mission and Purpose of the Groundwater Management Plan

The 75th Texas Legislature in 1997 enacted Senate Bill 1 ("SB 1") to establish a comprehensive statewide water planning process. In particular, SB 1 contained provisions that required groundwater conservation districts to prepare management plans to identify the water supply resources and water demands that will shape the decisions of each district. SB 1 designed the management plans to include management goals for each district to manage and conserve the groundwater resources within their boundaries. In 2001, the Texas Legislature enacted Senate Bill 2 ("SB 2") to build on the planning requirements of SB 1 and to further clarify the actions necessary for districts to manage and conserve the groundwater resources of the state of Texas.

The Texas Legislature enacted significant changes to the management of groundwater resources in Texas with the passage of House Bill 1763 (HB 1763) in 2005. HB 1763 created a long-term planning process in which groundwater conservation districts (GCDs) in each Groundwater Management Area (GMA) are required to meet and determine the Desired Future Conditions (DFCs) for the groundwater resources within their boundaries by September 1, 2010. In addition, HB 1763 required GCDs, to share management plans with the other GCDs in the GMA for review by the other GCDs.

The Mid-East Texas Groundwater Conservation District's management plan satisfies the requirements of SB 1, SB 2, HB 1763, the statutory requirements of Chapter 36 of the Texas Water Code, and the administrative requirements of the Texas Water Development Board's (TWDB) rules.

Technical District Information Required by Texas Administrative Code

Estimate of Modeled Available Groundwater (MAG) in District Based on Desired Future Conditions

Texas Water Code § 36.001 defines modeled available groundwater as "the amount of water that the executive administrator determines may be produced on an average annual basis to achieve a desired future condition established under Section 36.108".

The joint planning process set forth in Texas Water Code § 36.108 must be collectively conducted by all groundwater conservation districts within the same GMA. The District is a member of GMA 12. GMA 12 adopted DFCs for the Carrizo-Wilcox, Queen City, Sparta and Yegua-Jackson aquifers on May 25, 2017. The adopted DFCs were then forwarded to the TWDB. The submittal letter for the DFCs can be found here:

https://www.twdb.texas.gov/groundwater/dfc/docs/GMA12_DFCSubmittalLetter.pdf

The explanatory report along with appendices to the Texas Water Development Board used to convey the most recently adopted DFC's for GMA 12 is found here:

https://www.twdb.texas.gov/groundwater/dfc/docs/GMA12_DFCExpRep.pdf

https://www.twdb.texas.gov/groundwater/dfc/docs/GMA12_DFCExpRep_Apps.pdf

The desired future conditions for the relevant major and minor aquifers as adopted by the Mid-East Texas Groundwater Conservation District are listed below:

Aquifer	Desired Future Condition (DFC) based on average feet of drawdown
Carrizo	80
Calvert Bluff (Upper Wilcox)	90
Simsboro (Middle Wilcox)	138
Hooper (Lower Wilcox)	125
Queen City	2
Sparta	5
Yegua-Jackson	7

The modeled available groundwater (MAG) for the major and minor aquifers were developed based on TWDB GAM Runs as summarized below:

Aquifer	County	Modeled Available Groundwater (MAG) AF/yr						
		2010	2020	2030	2040	2050	2060	2069
Carrizo	Freestone	44	369	366	357	347	346	346
Carrizo	Leon	694	8,108	8,051	8,110	8,193	8,200	8,200
Carrizo	Madison	1,478	2,861	2,770	2,656	2,554	2,543	2,543
Calvert Bluff	Freestone	878	754	734	728	714	714	714
Calvert Bluff	Leon	2,817	2,819	2,953	3,065	3,189	3,201	3,201
Calvert Bluff	Madison	4	0	0	0	0	0	0
Simsboro	Freestone	1,254	3,582	3,589	3,585	3,552	3,550	3,550
Simsboro	Leon	263	3,359	3,457	3,538	3,617	3,623	3,623
Simsboro	Madison	0	0	0	0	0	0	0
Hooper	Freestone	3,006	4,341	4,578	4,814	5,051	5,288	5,501
Hooper	Leon	0	0	0	0	0	0	0
Hooper	Madison	0	0	0	0	0	0	0
Queen City	Freestone	0	0	0	0	0	0	0
Queen City	Leon	624	594	594	594	594	594	594
Queen City	Madison	148	380	380	380	380	380	380
Sparta	Leon	86	21	21	21	21	21	21
Sparta	Madison	1,401	3,320	3,322	3,322	3,322	3,322	3,322
Yegua-Jackson	Leon	0	0	0	0	0	0	0
Yegua-Jackson	Madison	809	809	809	809	809	809	809

MAG values for the Carrizo-Wilcox, Queen City, Sparta and Yegua-Jackson aquifers were documented in TWDB GAM Run 17-030 MAG (Wade & Ballew, December 15, 2017).

Amount of Groundwater Being Used within the District on an Annual Basis

Please refer to Appendix A.

Annual Amount of Recharge From Precipitation to the Groundwater Resources within the District

Please refer to Appendix B.

Annual Volume of Water that Discharges from the Aquifer to Springs and Surface Water Bodies

Please refer to Appendix B.

Estimate of the Annual Volume of Flow into the District, out of the District, and Between Aquifers in the District

Please refer to Appendix B.

Projected Surface Water Supply within the District

Please refer to Appendix A.

Projected Total Demand for Water within the District

Please refer to Appendix A.

Water Supply Needs

Please refer to Appendix A. This document indicates the water supply needs based upon the 2017 State Water Plan. In the District, water supply needs exist for these categories: municipal (Fairfield, Wortham, Teague, county-other), manufacturing, mining, and steam electric.

Water Management Strategies

Please refer to Appendix A. This document indicates water management strategies based upon the 2017 State Water Plan needed to be developed for additional aquifer supplies from the Carrizo-Wilcox Aquifer for the cities of Teague and Wortham, manufacturing, mining and steam electric. However, the city of Wortham utilizes surface water rather than groundwater. Also, there are strategies to expand the use of the Sparta Aquifer for county-other and manufacturing in Madison County. A MAG Peaking Factor has been approved for use in the Sparta Aquifer for Madison County. There are also conservation strategies for demand reduction that may be utilized.

Methodology to Track District Progress in Achieving Management Goals

An annual report ("Annual Report") will be created by the general manager of the District and provided to the members of the Board of the District. The Annual Report will cover the activities of the District including information on the District's performance in regards to achieving the District's management goals and objectives. The Annual Report will be delivered to the Board each year coordinating collection of permitted pumping data, downloaded available drought information, and water level monitoring. A copy of the Annual Report will be kept on file and available for public inspection at the District's offices upon adoption.

Management of Groundwater Supplies

The District will manage the supply of groundwater within the District in order to conserve the resource while seeking to maintain the economic viability of all resource user groups, public and private. The District will monitor water levels for water wells identified by the Texas Water Development Board and the District to ensure that drawdown amounts are within the parameters of the Desired Future Conditions (DFC's) as approved.

The District will adopt and routinely review rules to regulate groundwater withdrawals by means of spacing and production limits. The District may deny a well construction permit or limit groundwater withdrawals in accordance with guidelines stated in the rules of the District. The goal of the District is not to deny permits but to ensure that permits issued represent an achievable quantity of groundwater based on the best science available.

The relevant factors to be considered in making a determination to deny a permit or limit groundwater withdrawals will include:

1. The purpose of the rules of the District.
2. The equitable distribution of the resource.
3. The economic hardship resulting from grant or denial of a permit of the terms prescribed by the permit.

In pursuit of the District's mission of protecting and managing the resource, the District may require reduction of groundwater withdrawals to amounts which will not cause harm to the aquifer. To achieve this purpose, the District may, at the Board's discretion, amend of revoke any permits after notice and hearing. The determination to seek the amendment or revocation of a permit by the District will be based on aquifer conditions observed by the District. The District will enforce the terms and conditions of permits and the rules of the District by enjoining the permit holder in a court of competent jurisdiction as provided for in Section 36.102, Texas Water Code.

Actions, Procedures, Performance, and Avoidance for District Implementation of Management Plan

The District will implement the provisions of this management plan and will utilize the objectives of the plan as a guide for District actions, operations and decision-making. The District will ensure that planning efforts, activities and operations are consistent

with the provisions of this plan.

The District has adopted rules in accordance with Chapter 36 of the Texas Water Code. The development of rules is based on the scientific information and technical evidence available to the District. Current rules are available at:

http://www.mideasttexasgcd.com/rules.htm

The District will encourage cooperation and coordination in the implementation of this plan. All operations and activities will be performed in a manner that encourages the cooperation of the citizens of the District and with the appropriate water management entities at the local, regional and state level.

The geology of the aquifers within the boundaries of the Mid-East Texas Groundwater Conservation District can be found by following the link below to a publication developed by the Texas Water Development Board (TWDB) entitled "*The Aquifers of Texas*". This publication is an excellent resource to use regarding aspects and characteristics of the major and minor aquifers that provide groundwater resources for this District.

http://www.twdb.texas.gov/publications/reports/numbered_reports/doc/R380_AquifersofTexas.pdf

Management Goals

1. Providing for the Most Efficient Use of Groundwater in the District

1.1 Objective – Each year, the District will require all new exempt or non-exempt wells that are constructed within the boundaries of the District to be registered with the District in accordance with the District rules.

1.1 Performance Standard – Each year the number of exempt and non-exempt wells registered by the District for the year will be incorporated into the Annual Report submitted to the Board of Directors of the District.

2. Controlling and Preventing the Waste of Groundwater in the District

2.1 Objective – Each year, the District will make an evaluation of the District Rules to determine whether any amendments are recommended to decrease the amount of waste of groundwater within the District.

2.1 Performance Standard – The District will include a discussion of the annual evaluation of the District Rules and whether any amendments to the rules are recommended to prevent the waste of groundwater in the Annual Report of the District provided to the Board of Directors.

2.2 Objective – The District will provide information to the public on eliminating and reducing wasteful practices in the use of groundwater.

2.2 Performance Standard – The District will post and maintain an article or a link to an article relevant to the public on eliminating and reducing wasteful practices in the use of groundwater at least annually.

3. Controlling and Preventing Subsidence

The District has reviewed a TWDB subsidence risk report indicating addressing the issue of subsidence. A link to this report titled Identification of the *Vulnerability of the Major and Minor Aquifers of Texas to Subsidence with Regard to Groundwater Pumping – TWDB* Contract Number 1648302062 (March 21, 2017) is presented below.

http://www.twdb.texas.gov/groundwater/models/research/subsidence/subsidence.asp

In this report the Yegua-Jackson Aquifer and the Carrizo-Wilcox Aquifer showed medium to high risk of subsidence. The Queen City Aquifer indicated a medium risk found mostly in the southern portion of the aquifer in south Texas. The Sparta Aquifer showed a low to medium risk for subsidence. The Carrizo-Wilcox, Sparta and Yegua-Jackson aquifers in the District have and will continue to provide moderate amounts of water to wells. The formations are composed principally of sand with some clay streaks throughout, particularly in the Calvert Bluff and Yegua-Jackson aquifers. With the minor amounts of

clays in the formations that compose the aquifers, along with the age and thickness of these formations, there is not a significant risk of subsidence occurring due to groundwater pumping. There have been no reported cases of subsidence in the District.

4. Conjunctive Surface Water Management Issues

4.1 Objective – The District will participate in the regional planning process by attending and participating as a voting member for Groundwater Management Area 12 the Region C and Region H Regional Water Planning Group meetings.

4.1 Performance Standard – The attendance of a District representative to Region C and Region H Regional Water Planning Group meetings will be noted in the Annual Report.

5. Addressing Natural Resource Issues Affecting the Use and Availability of Groundwater or affected by the Use of Groundwater

5.1 Objective – The District will require annual groundwater reports from all oil and gas operators within the District that are using groundwater for hydrocarbon drilling and development operations, including hydraulic fracturing, and will maintain a database of groundwater production data for oil & gas development.

5.2 Performance Standard – The general manager will develop an annual summary and assessment of groundwater production related to oil and gas activities and prepare a report for the Board that presents the total oil/gas related groundwater production within the District and within each county.

6. Addressing Drought Conditions

6.1 Objective – Each month, the District will download available drought information, for the counties in the District, from available websites on the internet.

6.1 Performance Standard – Quarterly, the District will make an assessment of the status of drought in the District and prepare a quarterly briefing for the Board of Directors. The downloaded maps, reports and information will be included with copies of the quarterly briefings and combined with results of groundwater monitoring data and permitted pumping data in the District Annual Report to the Board of Directors.

Further information regarding drought conditions may be found at the TWDB website "Water for Texas" at https://waterdatafortexas.org/drought.

7. Addressing Conservation, Recharge Enhancement, Rainwater Harvesting, Precipitation Enhancement, and Brush Control

Conservation

7A.1 Objective – The District will provide information relevant to public education

and awareness regarding water conservation of the use of groundwater annually.

7A.1 Performance Standard – The District will post and maintain an article or a link to an article listed under water conservation on the District website annually.

Recharge Enhancement

This management goal is not applicable to the District due to the cost effectiveness of this objective and that a majority of the recharge area is open land and is therefore subject to natural recharge of the aquifers.

Rainwater Harvesting

7C.1 Objective – The District will provide information relevant to public education and awareness regarding rainwater harvesting.

7C.1 Performance Standard – The District will post and maintain an article or a link to an article listed under rainwater harvesting on the District website annually.

Precipitation Enhancement

This management goal is not applicable to the District. Due to local average rainfall amounts, the cost associated with this objective would be unwarranted and not cost effective.

Brush Control

This management goal is not applicable to the District. Most of the District land area is utilized for grazing livestock or similar agricultural activity. This management goal is therefore unwarranted and is not cost effective for the District.

8. Addressing the desired future conditions (DFC) of the groundwater resources in the District

8.1 Objective – The desired future conditions for the Sparta, Queen City, Carrizo, and Wilcox aquifers established for the District were based on GAM Run 18-020 using the updated groundwater availability model (GAM) for the Central Portion of the Carrizo-Wilcox, Queen City, and Sparta aquifers approved by the TWDB in September of 2018, The model results include cell-by-cell estimates of groundwater elevations and drawdown for each year of the predictive period (2010 to 2060). In order to assess the desired future condition in the District, these model results will be compared annually to groundwater monitoring data that is available from the TWDB groundwater database and from wells currently monitored by METGCD staff.

8.1 Performance Standard – In spring of each year, the District will download groundwater data from the Texas Water Development Board groundwater database for wells within the district as well as for select wells in neighboring counties, including Anderson, Brazos, Limestone, Robertson, and Walker counties. As of spring of 2019 there are 33 wells within the District boundaries (see Table 3 below) and 18 wells located near the borders of the district within the adjacent counties (see Table 4 below) that have multiple water level measurements from around the start of year 2000. The measured water levels and drawdowns in these wells will be compared to the modeled water levels from the corresponding model grid cells. The comparisons will be summarized in tabular and graphical form in an Annual Report, prepared by the general manager and submitted to the board, which can be used to evaluate the measured drawdowns within the district relative to the current accepted desired future conditions.

Table 3. Table of monitoring wells with multiple water level measurements within the Mid East Texas Groundwater Conservation District.

State Well#	County	Casing Depth	Well Depth	Aquifer	*Water Level Measurements* First	Latest	Count
39-14-702	Freestone	90	200	Hooper	11/12/1999	10/13/2017	18
39-15-802	Freestone	416	496	Hooper	11/8/1999	10/10/2018	19
39-23-101	Freestone	169	242	Hooper	11/8/1999	10/10/2018	18
39-23-404	Freestone	260	350	Simsboro	11/8/1999	10/10/2018	17
39-30-605	Freestone	N/A	421	Hooper	9/11/2000	1/6/2016	15
39-31-301	Freestone	266	629	Simsboro	11/8/1999	10/9/2018	20
39-32-205	Freestone	302	324	Calvert Bluff	11/8/1999	10/9/2018	20
38-26-109	Leon	260	367	Carrizo	9/12/2000	10/23/2012	13
38-26-401	Leon	N/A	840	Calvert Bluff	9/12/2000	10/11/2018	13
38-26-706	Leon	N/A	57	Queen City	11/15/1999	10/9/2018	18
38-41-203	Leon	137	169	Queen City	11/15/1999	10/9/2018	17
38-42-705	Leon	583	654	Queen City	11/15/1999	10/8/2018	16
38-43-101	Leon	616	676	Carrizo	11/15/1999	10/8/2018	20
38-49-802	Leon	1016	1120	Carrizo	11/12/1999	10/8/2018	20
38-50-102	Leon	520	550	Queen City	11/12/1999	10/8/2018	17
38-50-301	Leon	205	220	Queen City	11/15/1999	10/8/2018	19
39-40-303	Leon	65	192	Queen City	11/16/1999	10/9/2018	19
39-40-601	Leon	391	400	Carrizo	11/15/1999	1/7/2016	18
39-40-906	Leon	790	840	Calvert Bluff	11/15/1999	10/9/2018	20
39-54-602	Leon	336	356	Carrizo	11/15/1999	10/9/2018	19
39-54-604	Leon	123	200	Carrizo	11/15/1999	10/9/2018	21
39-55-302	Leon	503	544	Carrizo	11/16/2000	10/9/2018	17
39-55-701	Leon	211	253	Queen City	11/15/1999	10/9/2018	18
39-55-902	Leon	685	731	Carrizo	11/15/1999	10/9/2018	18
39-56-301	Leon	407	432	Queen City	11/15/1999	10/9/2018	20
39-64-705	Leon	1080	1202	Carrizo	11/12/1999	10/8/2018	19
38-58-502	Madison	248	270	Yegua-Jackson	11/11/1999	10/8/2018	20
39-64-901	Madison	417	441	Sparta	11/10/1999	10/8/2018	19
59-08-701	Madison	611	645	Sparta	11/10/1999	10/8/2018	19
59-08-903	Madison	305	330	Yegua-Jackson	11/10/1999	10/23/2017	20
59-16-102	Madison	598	682	Yegua-Jackson	11/10/1999	10/8/2018	20
60-01-502	Madison	1016	1060	Sparta	11/10/1999	10/20/2016	17
60-03-102	Madison	240	273	Yegua-Jackson	11/11/1999	10/23/2017	17

Table 4. Table of monitoring wells with multiple water level measurements in areas directly adjacent to the Mid East Texas Groundwater Conservation District.

State Well#	County	Casing Depth	Well Depth	Aquifer	*Water Level Measurements* First	Latest	Count
38-01-102	Anderson	467	510	Hooper	11/6/2000	11/15/2018	20
38-02-402	Anderson	548	630	Calvert Bluff	11/18/1999	11/15/2018	21
38-03-101	Anderson	77	77	Queen City	11/18/1999	11/16/2018	21
38-10-111	Anderson	732	790	Simsboro	11/18/1999	11/15/2018	19
38-10-205	Anderson	630	680	Calvert Bluff	11/18/1999	11/15/2018	17
38-19-802	Anderson	356	408	Carrizo	11/16/1999	11/15/2018	21
59-14-101	Brazos	N/A	133	Sparta	11/8/1999	7/8/2015	50
39-29-801	Limestone	210	250	Hooper	11/12/1999	10/10/2018	23
39-37-601	Limestone	117	353	Simsboro	11/12/1999	10/10/2018	20
39-37-801	Limestone	260	446	Hooper	11/12/1999	10/10/2018	20
39-38-902	Limestone	237	268	Calvert Bluff	11/12/1999	10/9/2018	18
39-45-202	Limestone	370	539	Hooper	11/12/1999	10/10/2018	19
39-46-702	Robertson	620	660	Calvert Bluff	11/9/1999	3/12/2018	52
39-53-703	Robertson	N/A	450	Calvert Bluff	11/9/1999	6/12/2018	22
39-61-501	Robertson	1134	1202	Simsboro	11/9/1999	3/14/2018	59
59-05-101	Robertson	N/A	38	Queen City	11/9/1999	3/14/2018	50
59-05-301	Robertson	255	750	Carrizo	11/9/1999	6/12/2018	23
60-03-902	Walker	2254	2314	Sparta	11/11/1999	1/17/2019	15

Appendix A

TWDB Estimated Historical Water Use and 2017 Texas State Water Plan dataset: Mid-East Texas Groundwater Conservation District *(March 25, 2019)*

Estimated Historical Water Use And 2017 State Water Plan Datasets:

Mid-East Texas Groundwater Conservation District

by Stephen Allen
Texas Water Development Board
Groundwater Division
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March 25, 2019

GROUNDWATER MANAGEMENT PLAN DATA:

This package of water data reports (part 1 of a 2-part package of information) is being provided to groundwater conservation districts to help them meet the requirements for approval of their five-year groundwater management plan. Each report in the package addresses a specific numbered requirement in the Texas Water Development Board's groundwater management plan checklist. The checklist can be viewed and downloaded from this web address:

http://www.twdb.texas.gov/groundwater/docs/GCD/GMPChecklist0113.pdf

The five reports included in this part are:

1. Estimated Historical Water Use (checklist item 2)

   from the TWDB Historical Water Use Survey (WUS)
2. Projected Surface Water Supplies (checklist item 6)
3. Projected Water Demands (checklist item 7)
4. Projected Water Supply Needs (checklist item 8)
5. Projected Water Management Strategies (checklist item 9)

   from the 2017 Texas State Water Plan (SWP)

Part 2 of the 2-part package is the groundwater availability model (GAM) report for the District (checklist items 3 through 5). The District should have received, or will receive, this report from the Groundwater Availability Modeling Section. Questions about the GAM can be directed to Dr. Shirley Wade, shirley.wade@twdb.texas.gov, (512) 936-0883.

DISCLAIMER:

The data presented in this report represents the most up-to-date WUS and 2017 SWP data available as of 3/25/2019. Although it does not happen frequently, either of these datasets are subject to change pending the availability of more accurate WUS data or an amendment to the 2017 SWP. District personnel must review these datasets and correct any discrepancies in order to ensure approval of their groundwater management plan.

The WUS dataset can be verified at this web address:

http://www.twdb.texas.gov/waterplanning/waterusesurvey/estimates/

The 2017 SWP dataset can be verified by contacting Sabrina Anderson (sabrina.anderson@twdb.texas.gov or 512-936-0886).

For additional questions regarding this data, please contact Stephen Allen (stephen.allen@twdb.texas.gov or 512-463-7317).

Estimated Historical Water Use
TWDB Historical Water Use Survey (WUS) Data

Groundwater and surface water historical use estimates are currently unavailable for calendar year 2017. TWDB staff anticipates the calculation and posting of these estimates at a later date.

FREESTONE COUNTY

All values are in acre-feet

Year	Source	Municipal	Manufacturing	Mining	Steam Electric	Irrigation	Livestock	Total
2016	GW	2,543	31	112	137	341	117	3,281
	SW	40	0	2	14,882	0	1,056	15,980
2015	GW	2,786	19	184	158	314	116	3,577
	SW	43	0	3	15,682	5	1,045	16,778
2014	GW	2,689	0	201	143	550	112	3,695
	SW	44	0	34	15,870	8	1,015	16,971
2013	GW	2,968	0	381	102	598	110	4,159
	SW	39	0	24	17,536	8	991	18,598
2012	GW	3,027	0	463	122	680	113	4,405
	SW	39	0	66	16,942	0	1,021	18,068
2011	GW	3,478	0	3,442	152	613	134	7,819
	SW	48	0	201	30,695	70	1,204	32,218
2010	GW	3,245	0	3,749	135	216	134	7,479
	SW	26	0	235	15,435	83	1,203	16,982
2009	GW	3,166	0	3,665	146	76	156	7,209
	SW	28	0	216	14,715	67	1,398	16,424
2008	GW	3,183	0	3,588	241	43	140	7,195
	SW	25	0	213	196	0	1,247	1,681
2007	GW	2,787	0	50	155	0	229	3,221
	SW	277	0	0	0	1,130	2,063	3,470
2006	GW	3,068	0	79	113	38	216	3,514
	SW	277	0	0	149	60	1,942	2,428
2005	GW	2,969	0	31	110	0	187	3,297
	SW	276	0	107	60	76	1,685	2,204
2004	GW	2,727	0	0	95	0	565	3,387
	SW	275	0	129	9,830	21	1,088	11,343
2003	GW	2,847	0	14	99	0	570	3,530
	SW	274	0	46	37	57	1,099	1,513
2002	GW	2,723	0	14	99	0	507	3,343
	SW	151	0	147	2,065	9	976	3,348
2001	GW	2,708	0	14	117	0	511	3,350
	SW	174	0	47	2,955	8	984	4,168

LEON COUNTY

All values are in acre-feet

Year	Source	Municipal	Manufacturing	Mining	Steam Electric	Irrigation	Livestock	Total
2016	GW	2,455	626	38	0	321	152	3,592
	SW	0	0	193	0	0	2,889	3,082
2015	GW	2,523	523	104	0	127	148	3,425
	SW	0	0	739	0	0	2,815	3,554
2014	GW	2,526	657	255	0	491	151	4,080
	SW	0	0	709	0	1	2,865	3,575
2013	GW	2,663	671	253	0	601	148	4,336
	SW	0	0	772	0	0	2,818	3,590
2012	GW	2,783	711	304	0	152	133	4,083
	SW	0	0	770	0	0	2,545	3,315
2011	GW	3,055	819	975	0	223	145	5,217
	SW	0	0	37	0	3	2,771	2,811
2010	GW	2,818	544	717	0	31	147	4,257
	SW	0	0	27	0	0	2,797	2,824
2009	GW	2,627	557	740	0	21	75	4,020
	SW	0	0	28	0	0	1,427	1,455
2008	GW	2,512	687	777	0	208	73	4,257
	SW	0	0	30	0	0	1,378	1,408
2007	GW	2,605	748	32	0	88	111	3,584
	SW	0	0	0	0	0	2,113	2,113
2006	GW	2,642	798	50	0	242	84	3,816
	SW	0	0	0	0	0	1,587	1,587
2005	GW	2,692	766	91	0	285	90	3,924
	SW	0	0	0	0	0	1,700	1,700
2004	GW	2,489	533	124	0	300	702	4,148
	SW	0	0	249	0	0	1,157	1,406
2003	GW	2,324	450	123	0	300	695	3,892
	SW	0	0	248	0	0	1,147	1,395
2002	GW	2,291	430	127	0	542	613	4,003
	SW	0	0	251	0	0	1,011	1,262
2001	GW	2,288	466	131	0	542	634	4,061
	SW	0	0	248	0	0	1,046	1,294

MADISON COUNTY

All values are in acre-feet

Year	Source	Municipal	Manufacturing	Mining	Steam Electric	Irrigation	Livestock	Total
2016	GW	3,121	0	184	0	98	143	3,546
	SW	0	0	46	0	0	1,286	1,332
2015	GW	3,392	0	214	0	101	139	3,846
	SW	0	0	54	0	0	1,244	1,298
2014	GW	3,522	0	576	0	102	145	4,345
	SW	0	0	144	0	20	1,301	1,465
2013	GW	3,599	0	348	0	104	136	4,187
	SW	0	0	86	0	16	1,224	1,326
2012	GW	3,383	0	204	0	96	134	3,817
	SW	0	0	47	0	0	1,201	1,248
2011	GW	3,765	0	116	0	133	143	4,157
	SW	0	0	99	0	0	1,290	1,389
2010	GW	3,316	0	7	0	10	146	3,479
	SW	0	0	6	0	0	1,310	1,316
2009	GW	2,865	212	3	0	7	99	3,186
	SW	0	0	3	0	0	892	895
2008	GW	2,335	192	0	0	7	92	2,626
	SW	0	0	0	0	0	832	832
2007	GW	2,388	197	0	0	5	109	2,699
	SW	0	0	0	0	10	978	988
2006	GW	2,357	227	0	0	0	111	2,695
	SW	0	0	0	0	15	1,000	1,015
2005	GW	2,345	210	0	0	0	113	2,668
	SW	0	0	0	0	16	1,015	1,031
2004	GW	2,134	191	0	0	0	286	2,611
	SW	0	0	0	0	0	685	685
2003	GW	2,032	188	0	0	0	281	2,501
	SW	0	0	0	0	0	676	676
2002	GW	2,097	195	0	0	0	252	2,544
	SW	0	0	0	0	0	605	605
2001	GW	2,044	177	0	0	0	261	2,482
	SW	0	0	0	0	0	626	626

Projected Surface Water Supplies
TWDB 2017 State Water Plan Data

FREESTONE COUNTY

All values are in acre-feet

RWPG	WUG	WUG Basin	Source Name	2020	2030	2040	2050	2060	2070
C	COUNTY-OTHER, FREESTONE	BRAZOS	NAVARRO MILLS LAKE/RESERVOIR	12	7	4	6	10	21
C	COUNTY-OTHER, FREESTONE	BRAZOS	RICHLAND CHAMBERS LAKE/RESERVOIR NON-SYSTEM PORTION	2	1	1	1	2	4
C	COUNTY-OTHER, FREESTONE	BRAZOS	TRINITY RUN-OF-RIVER	5	5	3	4	5	5
C	COUNTY-OTHER, FREESTONE	TRINITY	NAVARRO MILLS LAKE/RESERVOIR	89	55	53	57	82	136
C	COUNTY-OTHER, FREESTONE	TRINITY	RICHLAND CHAMBERS LAKE/RESERVOIR NON-SYSTEM PORTION	18	12	10	12	16	28
C	COUNTY-OTHER, FREESTONE	TRINITY	TRINITY RUN-OF-RIVER	36	36	38	37	36	36
C	IRRIGATION, FREESTONE	BRAZOS	TRINITY RUN-OF-RIVER	10	10	10	10	10	10
C	IRRIGATION, FREESTONE	TRINITY	TRINITY RUN-OF-RIVER	77	77	77	77	77	77
C	LIVESTOCK, FREESTONE	BRAZOS	BRAZOS LIVESTOCK LOCAL SUPPLY	1	1	1	1	1	1
C	LIVESTOCK, FREESTONE	BRAZOS	TRINITY LIVESTOCK LOCAL SUPPLY	11	11	11	11	11	11
C	LIVESTOCK, FREESTONE	TRINITY	BRAZOS LIVESTOCK LOCAL SUPPLY	82	82	82	82	82	82
C	LIVESTOCK, FREESTONE	TRINITY	TRINITY LIVESTOCK LOCAL SUPPLY	949	949	949	949	949	949
C	MINING, FREESTONE	BRAZOS	TRINITY OTHER LOCAL SUPPLY	13	13	13	13	13	13
C	MINING, FREESTONE	TRINITY	TRINITY OTHER LOCAL SUPPLY	107	107	107	107	107	107
C	STEAM ELECTRIC POWER, FREESTONE	TRINITY	FAIRFIELD LAKE/RESERVOIR	870	870	870	870	870	870
C	STEAM ELECTRIC POWER, FREESTONE	TRINITY	LIVINGSTON-WALLISVILLE LAKE/RESERVOIR SYSTEM	20,000	20,000	20,000	20,000	20,000	20,000
C	STEAM ELECTRIC POWER, FREESTONE	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	6,726	6,122	5,411	4,781	4,264	3,806
	Sum of Projected Surface Water Supplies (acre-feet)			**29,008**	**28,358**	**27,640**	**27,018**	**26,535**	**26,156**

Projected Surface Water Supplies
TWDB 2017 State Water Plan Data

LEON COUNTY

All values are in acre-feet

RWPG	WUG	WUG Basin	Source Name	2020	2030	2040	2050	2060	2070
H	IRRIGATION, LEON	TRINITY	TRINITY RUN-OF-RIVER	156	156	156	156	156	156
	Sum of Projected Surface Water Supplies (acre-feet)			**156**	**156**	**156**	**156**	**156**	**156**

MADISON COUNTY

All values are in acre-feet

RWPG	WUG	WUG Basin	Source Name	2020	2030	2040	2050	2060	2070
H	IRRIGATION, MADISON	TRINITY	TRINITY RUN-OF-RIVER	169	169	169	169	169	169
	Sum of Projected Surface Water Supplies (acre-feet)			**169**	**169**	**169**	**169**	**169**	**169**

Projected Water Demands
TWDB 2017 State Water Plan Data

Please note that the demand numbers presented here include the plumbing code savings found in the Regional and State Water Plans.

FREESTONE COUNTY

All values are in acre-feet

RWPG	WUG	WUG Basin	2020	2030	2040	2050	2060	2070
C	COUNTY-OTHER, FREESTONE	BRAZOS	142	134	82	135	263	616
C	COUNTY-OTHER, FREESTONE	TRINITY	1,066	1,029	1,045	1,281	2,069	4,028
C	FAIRFIELD	TRINITY	673	708	730	1,385	1,580	1,974
C	FLO COMMUNITY WSC	TRINITY	40	41	41	42	43	43
C	IRRIGATION, FREESTONE	BRAZOS	33	33	33	33	33	33
C	IRRIGATION, FREESTONE	TRINITY	265	265	265	265	265	265
C	LIVESTOCK, FREESTONE	BRAZOS	21	21	21	21	21	21
C	LIVESTOCK, FREESTONE	TRINITY	1,831	1,831	1,831	1,831	1,831	1,831
C	MANUFACTURING, FREESTONE	TRINITY	100	111	121	130	136	142
C	MINING, FREESTONE	BRAZOS	588	563	578	581	589	614
C	MINING, FREESTONE	TRINITY	4,759	4,552	4,673	4,705	4,767	4,968
C	OAKWOOD	TRINITY	7	7	7	7	7	8
C	STEAM ELECTRIC POWER, FREESTONE	TRINITY	25,000	25,000	25,000	28,712	33,963	40,175
C	TEAGUE	BRAZOS	188	191	255	315	379	445
C	TEAGUE	TRINITY	192	195	260	322	386	454
C	WORTHAM	TRINITY	168	175	179	183	303	343
	Sum of Projected Water Demands (acre-feet)		**35,073**	**34,856**	**35,121**	**39,948**	**46,635**	**55,960**

LEON COUNTY

All values are in acre-feet

RWPG	WUG	WUG Basin	2020	2030	2040	2050	2060	2070
H	BUFFALO	TRINITY	374	375	375	381	389	397
H	CENTERVILLE	TRINITY	180	189	195	207	218	230
H	CONCORD-ROBBINS WSC	BRAZOS	167	168	169	179	188	198
H	CONCORD-ROBBINS WSC	TRINITY	46	47	47	50	53	55
H	COUNTY-OTHER, LEON	BRAZOS	219	221	224	235	246	255
H	COUNTY-OTHER, LEON	TRINITY	462	495	529	587	637	688
H	FLO COMMUNITY WSC	TRINITY	297	286	278	276	280	284
H	IRRIGATION, LEON	BRAZOS	71	71	71	71	71	71
H	IRRIGATION, LEON	TRINITY	213	213	213	213	213	213
H	JEWETT	BRAZOS	63	74	82	94	105	115

Projected Water Demands
TWDB 2017 State Water Plan Data

Please note that the demand numbers presented here include the plumbing code savings found in the Regional and State Water Plans.

RWPG	WUG	WUG Basin	2020	2030	2040	2050	2060	2070
H	JEWETT	TRINITY	175	202	225	259	288	318
H	LIVESTOCK, LEON	BRAZOS	425	425	425	425	425	425
H	LIVESTOCK, LEON	TRINITY	1,303	1,303	1,303	1,303	1,303	1,303
H	MANUFACTURING, LEON	TRINITY	834	958	1,083	1,196	1,301	1,415
H	MINING, LEON	BRAZOS	721	744	623	459	296	190
H	MINING, LEON	TRINITY	1,681	1,737	1,454	1,071	689	444
H	NORMANGEE	BRAZOS	27	28	29	31	33	34
H	NORMANGEE	TRINITY	81	84	86	91	96	102
H	OAKWOOD	TRINITY	74	71	70	70	70	70
	Sum of Projected Water Demands (acre-feet)		**7,413**	**7,691**	**7,481**	**7,198**	**6,901**	**6,807**

MADISON COUNTY

All values are in acre-feet

RWPG	WUG	WUG Basin	2020	2030	2040	2050	2060	2070
H	COUNTY-OTHER, MADISON	BRAZOS	207	216	226	238	251	264
H	COUNTY-OTHER, MADISON	TRINITY	1,601	1,676	1,746	1,841	1,942	2,043
H	IRRIGATION, MADISON	BRAZOS	2	2	2	2	2	2
H	IRRIGATION, MADISON	TRINITY	14	14	14	14	14	14
H	LIVESTOCK, MADISON	BRAZOS	152	152	152	152	152	152
H	LIVESTOCK, MADISON	TRINITY	872	872	872	872	872	872
H	MADISONVILLE	TRINITY	870	909	947	998	1,053	1,107
H	MANUFACTURING, MADISON	TRINITY	226	247	268	287	311	337
H	MINING, MADISON	BRAZOS	119	194	151	108	65	39
H	MINING, MADISON	TRINITY	478	778	603	430	258	155
H	NORMANGEE	TRINITY	14	14	15	16	17	17
H	STEAM ELECTRIC POWER, MADISON	TRINITY	238	278	327	387	459	546
	Sum of Projected Water Demands (acre-feet)		**4,793**	**5,352**	**5,323**	**5,345**	**5,396**	**5,548**

Projected Water Supply Needs
TWDB 2017 State Water Plan Data

Negative values (in red) reflect a projected water supply need, positive values a surplus.

FREESTONE COUNTY

All values are in acre-feet

RWPG	WUG	WUG Basin	2020	2030	2040	2050	2060	2070
C	COUNTY-OTHER, FREESTONE	BRAZOS	-23	-23	-12	-43	-150	-474
C	COUNTY-OTHER, FREESTONE	TRINITY	-175	-176	-158	-408	-1,183	-3,092
C	FAIRFIELD	TRINITY	519	473	441	-223	-476	-976
C	FLO COMMUNITY WSC	TRINITY	0	0	0	0	0	0
C	IRRIGATION, FREESTONE	BRAZOS	10	10	10	10	10	10
C	IRRIGATION, FREESTONE	TRINITY	77	77	77	77	77	77
C	LIVESTOCK, FREESTONE	BRAZOS	0	0	0	0	0	0
C	LIVESTOCK, FREESTONE	TRINITY	0	0	0	0	0	0
C	MANUFACTURING, FREESTONE	TRINITY	0	0	0	0	0	0
C	MINING, FREESTONE	BRAZOS	-461	-436	-451	-454	-462	-487
C	MINING, FREESTONE	TRINITY	-3,874	-3,667	-3,788	-3,820	-3,882	-4,083
C	OAKWOOD	TRINITY	0	0	0	0	0	0
C	STEAM ELECTRIC POWER, FREESTONE	TRINITY	2,748	2,144	1,433	-2,909	-8,677	-15,347
C	TEAGUE	BRAZOS	149	146	83	22	-42	-108
C	TEAGUE	TRINITY	152	149	83	22	-42	-110
C	WORTHAM	TRINITY	-11	-18	-22	-26	-146	-186
	Sum of Projected Water Supply Needs (acre-feet)		**-4,544**	**-4,320**	**-4,431**	**-7,883**	**-15,060**	**-24,863**

LEON COUNTY

All values are in acre-feet

RWPG	WUG	WUG Basin	2020	2030	2040	2050	2060	2070
H	BUFFALO	TRINITY	0	0	0	0	0	0
H	CENTERVILLE	TRINITY	0	0	0	0	0	0
H	CONCORD-ROBBINS WSC	BRAZOS	0	0	0	0	0	0
H	CONCORD-ROBBINS WSC	TRINITY	0	0	0	0	0	0
H	COUNTY-OTHER, LEON	BRAZOS	0	0	0	0	0	0
H	COUNTY-OTHER, LEON	TRINITY	76	76	76	76	76	76
H	FLO COMMUNITY WSC	TRINITY	0	0	0	0	0	0
H	IRRIGATION, LEON	BRAZOS	0	0	0	0	0	0
H	IRRIGATION, LEON	TRINITY	0	0	0	0	0	0
H	JEWETT	BRAZOS	0	0	0	0	0	0
H	JEWETT	TRINITY	0	0	0	0	0	0

Projected Water Supply Needs
TWDB 2017 State Water Plan Data

Negative values (in red) reflect a projected water supply need, positive values a surplus.

RWPG	WUG	WUG Basin	2020	2030	2040	2050	2060	2070
H	LIVESTOCK, LEON	BRAZOS	0	0	0	0	0	0
H	LIVESTOCK, LEON	TRINITY	0	0	0	0	0	0
H	MANUFACTURING, LEON	TRINITY	0	-97	-222	-335	-440	-554
H	MINING, LEON	BRAZOS	0	-23	0	0	0	0
H	MINING, LEON	TRINITY	0	-56	0	0	0	0
H	NORMANGEE	BRAZOS	0	0	0	0	0	0
H	NORMANGEE	TRINITY	0	0	0	0	0	0
H	OAKWOOD	TRINITY	0	0	0	0	0	0
	Sum of Projected Water Supply Needs (acre-feet)		**0**	**-176**	**-222**	**-335**	**-440**	**-554**

MADISON COUNTY

All values are in acre-feet

RWPG	WUG	WUG Basin	2020	2030	2040	2050	2060	2070
H	COUNTY-OTHER, MADISON	BRAZOS	0	0	0	0	-1	-14
H	COUNTY-OTHER, MADISON	TRINITY	0	0	0	0	0	0
H	IRRIGATION, MADISON	BRAZOS	0	0	0	0	0	0
H	IRRIGATION, MADISON	TRINITY	169	169	169	169	169	169
H	LIVESTOCK, MADISON	BRAZOS	0	0	0	0	0	0
H	LIVESTOCK, MADISON	TRINITY	0	0	0	0	0	0
H	MADISONVILLE	TRINITY	0	0	0	0	0	0
H	MANUFACTURING, MADISON	TRINITY	0	-21	-42	-61	-85	-111
H	MINING, MADISON	BRAZOS	0	-75	-32	0	0	0
H	MINING, MADISON	TRINITY	0	-300	-125	0	0	0
H	NORMANGEE	TRINITY	0	0	0	0	0	0
H	STEAM ELECTRIC POWER, MADISON	TRINITY	-238	-278	-327	-387	-459	-546
	Sum of Projected Water Supply Needs (acre-feet)		**-238**	**-674**	**-526**	**-448**	**-545**	**-671**

Projected Water Management Strategies
TWDB 2017 State Water Plan Data

FREESTONE COUNTY

WUG, Basin (RWPG)

All values are in acre-feet

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
COUNTY-OTHER, FREESTONE, BRAZOS (C)							
CONSERVATION - FREESTONE COUNTY	DEMAND REDUCTION [FREESTONE]	0	1	1	2	4	12
CONSERVATION, WATER LOSS CONTROL - FREESTONE COUNTY	DEMAND REDUCTION [FREESTONE]	1	1	0	0	0	0
CORSICANA - HALBERT/RICHLAND CHAMBERS NEW WTP	RICHLAND CHAMBERS LAKE/RESERVOIR NON-SYSTEM PORTION [RESERVOIR]	0	0	0	2	9	24
CORSICANA UNALLOCATED SUPPLY UTILIZATION	NAVARRO MILLS LAKE/RESERVOIR [RESERVOIR]	0	5	3	4	5	11
SULPHUR BASIN SUPPLY	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	196
SULPHUR BASIN SUPPLY	WRIGHT PATMAN LAKE/RESERVOIR [RESERVOIR]	0	0	0	4	21	66
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	22	5	2	4	11	42
TRWD - CEDAR CREEK WETLANDS	INDIRECT REUSE [HENDERSON]	0	11	4	17	40	83
TRWD - TEHUACANA	TEHUACANA LAKE/RESERVOIR [RESERVOIR]	0	0	2	10	12	40
UNM-ROR-NECHES RUN OF RIVER	NECHES RUN-OF-RIVER [ANDERSON]	0	0	0	0	48	0
		23	**23**	**12**	**43**	**150**	**474**
COUNTY-OTHER, FREESTONE, TRINITY (C)							
CONSERVATION - FREESTONE COUNTY	DEMAND REDUCTION [FREESTONE]	4	7	10	17	35	81
CONSERVATION, WATER LOSS CONTROL - FREESTONE COUNTY	DEMAND REDUCTION [FREESTONE]	5	5	0	0	0	0
CORSICANA - HALBERT/RICHLAND CHAMBERS NEW WTP	RICHLAND CHAMBERS LAKE/RESERVOIR NON-SYSTEM PORTION [RESERVOIR]	0	0	0	22	67	158
CORSICANA UNALLOCATED SUPPLY UTILIZATION	NAVARRO MILLS LAKE/RESERVOIR [RESERVOIR]	0	35	41	36	38	73
SULPHUR BASIN SUPPLY	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	1,280

Projected Water Management Strategies
TWDB 2017 State Water Plan Data

WUG, Basin (RWPG) All values are in acre-feet

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
SULPHUR BASIN SUPPLY	WRIGHT PATMAN LAKE/RESERVOIR [RESERVOIR]	0	0	0	39	166	434
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	167	42	25	39	84	273
TRWD - CEDAR CREEK WETLANDS	INDIRECT REUSE [HENDERSON]	0	87	56	165	300	540
TRWD - TEHUACANA	TEHUACANA LAKE/RESERVOIR [RESERVOIR]	0	0	26	91	124	254
UNM-ROR-NECHES RUN OF RIVER	NECHES RUN-OF-RIVER [ANDERSON]	0	0	0	0	369	0
		176	**176**	**158**	**409**	**1,183**	**3,093**

FAIRFIELD, TRINITY (C)

CONSERVATION - FAIRFIELD	DEMAND REDUCTION [FREESTONE]	2	5	7	32	50	78
CONSERVATION, WATER LOSS CONTROL - FAIRFIELD	DEMAND REDUCTION [FREESTONE]	3	3	0	0	0	0
SULPHUR BASIN SUPPLY	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	413
SULPHUR BASIN SUPPLY	WRIGHT PATMAN LAKE/RESERVOIR [RESERVOIR]	0	0	0	22	68	140
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	INDIRECT REUSE [NAVARRO]	0	0	0	17	32	38
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	5	13	50
TRWD - CEDAR CREEK WETLANDS	INDIRECT REUSE [HENDERSON]	0	0	0	95	123	174
TRWD - TEHUACANA	TEHUACANA LAKE/RESERVOIR [RESERVOIR]	0	0	0	52	40	83
UNM-ROR-NECHES RUN OF RIVER	NECHES RUN-OF-RIVER [ANDERSON]	0	0	0	0	151	0
		5	**8**	**7**	**223**	**477**	**976**

FLO COMMUNITY WSC, TRINITY (C)

CONSERVATION - FLO COMMUNITY WSC	DEMAND REDUCTION [FREESTONE]	0	0	0	1	1	1
CONSERVATION, WATER LOSS CONTROL - FLO COMMUNITY WSC	DEMAND REDUCTION [FREESTONE]	0	0	0	0	0	0
		0	**0**	**0**	**1**	**1**	**1**

Projected Water Management Strategies
TWDB 2017 State Water Plan Data

WUG, Basin (RWPG) All values are in acre-feet

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
IRRIGATION, FREESTONE, BRAZOS (C)							
CONSERVATION, IRRIGATION - FREESTONE COUNTY	DEMAND REDUCTION [FREESTONE]	0	0	0	0	0	0
		0	**0**	**0**	**0**	**0**	**0**
IRRIGATION, FREESTONE, TRINITY (C)							
CONSERVATION, IRRIGATION - FREESTONE COUNTY	DEMAND REDUCTION [FREESTONE]	0	0	0	0	1	1
		0	**0**	**0**	**0**	**1**	**1**
OAKWOOD, TRINITY (C)							
CONSERVATION, WATER LOSS CONTROL - OAKWOOD	DEMAND REDUCTION [FREESTONE]	0	0	0	0	0	0
		0	**0**	**0**	**0**	**0**	**0**
STEAM ELECTRIC POWER, FREESTONE, TRINITY (C)							
DWU - MAIN STEM REUSE	INDIRECT REUSE [DALLAS]	0	0	0	0	874	0
SULPHUR BASIN SUPPLY	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	5,297
SULPHUR BASIN SUPPLY	WRIGHT PATMAN LAKE/RESERVOIR [RESERVOIR]	0	0	0	452	782	1,754
TRINITY RIVER AUTHORITY FREESTONE CO. REUSE (SEP)	INDIRECT REUSE [FREESTONE]	0	0	0	6,760	6,760	6,760
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	INDIRECT REUSE [NAVARRO]	0	161	241	172	185	601
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	36	61	51	73	802
TRWD - CEDAR CREEK WETLANDS	INDIRECT REUSE [HENDERSON]	0	407	688	967	709	2,762
TRWD - TEHUACANA	TEHUACANA LAKE/RESERVOIR [RESERVOIR]	0	0	325	536	230	1,305
		0	**604**	**1,315**	**8,938**	**9,613**	**19,281**
TEAGUE, BRAZOS (C)							
CONSERVATION - TEAGUE	DEMAND REDUCTION [FREESTONE]	0	1	2	4	6	9
CONSERVATION, WATER LOSS CONTROL - TEAGUE	DEMAND REDUCTION [FREESTONE]	1	1	0	0	0	0
TEAGUE NEW WELLS IN CARRIZO-WILCOX AQUIFER	CARRIZO-WILCOX AQUIFER [FREESTONE]	0	0	0	99	99	99
		1	**2**	**2**	**103**	**105**	**108**

Projected Water Management Strategies
TWDB 2017 State Water Plan Data

WUG, Basin (RWPG) All values are in acre-feet

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
TEAGUE, TRINITY (C)							
CONSERVATION - TEAGUE	DEMAND REDUCTION [FREESTONE]	1	2	3	4	7	9
CONSERVATION, WATER LOSS CONTROL - TEAGUE	DEMAND REDUCTION [FREESTONE]	1	1	0	0	0	0
TEAGUE NEW WELLS IN CARRIZO-WILCOX AQUIFER	CARRIZO-WILCOX AQUIFER [FREESTONE]	0	0	0	101	101	101
		2	**3**	**3**	**105**	**108**	**110**
WORTHAM, TRINITY (C)							
CARRIZO AQUIFER DEVELOPMENT	CARRIZO-WILCOX AQUIFER [LIMESTONE]	10	16	20	24	141	179
CONSERVATION - WORTHAM	DEMAND REDUCTION [FREESTONE]	1	1	2	2	5	7
CONSERVATION, WATER LOSS CONTROL - WORTHAM	DEMAND REDUCTION [FREESTONE]	0	1	0	0	0	0
		11	**18**	**22**	**26**	**146**	**186**
Sum of Projected Water Management Strategies (acre-feet)		**218**	**834**	**1,519**	**9,848**	**11,784**	**24,230**

LEON COUNTY

WUG, Basin (RWPG) All values are in acre-feet

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
BUFFALO, TRINITY (H)							
MUNICIPAL CONSERVATION, BUFFALO	DEMAND REDUCTION [LEON]	1	3	4	5	7	8
		1	**3**	**4**	**5**	**7**	**8**
CENTERVILLE, TRINITY (H)							
MUNICIPAL CONSERVATION, CENTERVILLE	DEMAND REDUCTION [LEON]	0	1	2	3	4	5
		0	**1**	**2**	**3**	**4**	**5**
CONCORD-ROBBINS WSC, BRAZOS (H)							
MUNICIPAL CONSERVATION, CONCORD-ROBBINS WSC	DEMAND REDUCTION [LEON]	0	1	2	2	3	4
		0	**1**	**2**	**2**	**3**	**4**
CONCORD-ROBBINS WSC, TRINITY (H)							
MUNICIPAL CONSERVATION, CONCORD-ROBBINS WSC	DEMAND REDUCTION [LEON]	0	0	0	1	1	1
		0	**0**	**0**	**1**	**1**	**1**

Projected Water Management Strategies
TWDB 2017 State Water Plan Data

WUG, Basin (RWPG) All values are in acre-feet

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
COUNTY-OTHER, LEON, BRAZOS (H)							
MUNICIPAL CONSERVATION, COUNTY-OTHER - LEON COUNTY	DEMAND REDUCTION [LEON]	1	2	3	3	4	5
		1	**2**	**3**	**3**	**4**	**5**
COUNTY-OTHER, LEON, TRINITY (H)							
MUNICIPAL CONSERVATION, COUNTY-OTHER - LEON COUNTY	DEMAND REDUCTION [LEON]	1	3	6	9	11	13
		1	**3**	**6**	**9**	**11**	**13**
FLO COMMUNITY WSC, TRINITY (H)							
CONSERVATION - FLO COMMUNITY WSC	DEMAND REDUCTION [LEON]	0	0	0	0	0	0
CONSERVATION, WATER LOSS CONTROL - FLO COMMUNITY WSC	DEMAND REDUCTION [LEON]	0	0	0	0	0	0
MUNICIPAL CONSERVATION, FLO COMMUNITY WSC	DEMAND REDUCTION [LEON]	1	2	3	4	5	6
		1	**2**	**3**	**4**	**5**	**6**
JEWETT, BRAZOS (H)							
MUNICIPAL CONSERVATION, JEWETT	DEMAND REDUCTION [LEON]	0	1	1	1	2	2
		0	**1**	**1**	**1**	**2**	**2**
JEWETT, TRINITY (H)							
MUNICIPAL CONSERVATION, JEWETT	DEMAND REDUCTION [LEON]	1	1	2	4	5	7
		1	**1**	**2**	**4**	**5**	**7**
MANUFACTURING, LEON, TRINITY (H)							
EXPANDED USE OF GROUNDWATER, LEON COUNTY	CARRIZO-WILCOX AQUIFER [LEON]	0	200	200	400	400	500
INDUSTRIAL CONSERVATION, LEON COUNTY	DEMAND REDUCTION [LEON]	10	23	40	58	78	101
		10	**223**	**240**	**458**	**478**	**601**
MINING, LEON, BRAZOS (H)							
EXPANDED USE OF GROUNDWATER, LEON COUNTY	CARRIZO-WILCOX AQUIFER [LEON]	0	100	100	100	100	100
		0	**100**	**100**	**100**	**100**	**100**
MINING, LEON, TRINITY (H)							
EXPANDED USE OF GROUNDWATER, LEON COUNTY	CARRIZO-WILCOX AQUIFER [LEON]	0	100	100	100	100	100
		0	**100**	**100**	**100**	**100**	**100**

Projected Water Management Strategies
TWDB 2017 State Water Plan Data

WUG, Basin (RWPG) All values are in acre-feet

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
NORMANGEE, BRAZOS (H)							
MUNICIPAL CONSERVATION, NORMANGEE	DEMAND REDUCTION [LEON]	0	0	0	1	1	1
		0	**0**	**0**	**1**	**1**	**1**
NORMANGEE, TRINITY (H)							
MUNICIPAL CONSERVATION, NORMANGEE	DEMAND REDUCTION [LEON]	0	1	1	1	1	2
		0	**1**	**1**	**1**	**1**	**2**
OAKWOOD, TRINITY (H)							
CONSERVATION, WATER LOSS CONTROL - OAKWOOD	DEMAND REDUCTION [LEON]	0	0	0	0	0	0
MUNICIPAL CONSERVATION, OAKWOOD	DEMAND REDUCTION [LEON]	0	0	1	1	1	1
		0	**0**	**1**	**1**	**1**	**1**
Sum of Projected Water Management Strategies (acre-feet)		**15**	**438**	**465**	**693**	**723**	**856**

MADISON COUNTY

WUG, Basin (RWPG) All values are in acre-feet

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
COUNTY-OTHER, MADISON, BRAZOS (H)							
EXPANDED USE OF GROUNDWATER, MADISON COUNTY	SPARTA AQUIFER [MADISON]	0	0	0	0	0	25
WATER LOSS REDUCTION, COUNTY-OTHER - MADISON COUNTY	DEMAND REDUCTION [MADISON]	3	5	8	8	8	9
		3	**5**	**8**	**8**	**8**	**34**
COUNTY-OTHER, MADISON, TRINITY (H)							
WATER LOSS REDUCTION, COUNTY-OTHER - MADISON COUNTY	DEMAND REDUCTION [MADISON]	20	41	59	62	66	69
		20	**41**	**59**	**62**	**66**	**69**
MADISONVILLE, TRINITY (H)							
WATER LOSS REDUCTION, MADISONVILLE	DEMAND REDUCTION [MADISON]	16	31	46	62	78	94
		16	**31**	**46**	**62**	**78**	**94**
MANUFACTURING, MADISON, TRINITY (H)							
EXPANDED USE OF GROUNDWATER, MADISON COUNTY	SPARTA AQUIFER [MADISON]	0	100	100	100	100	100
INDUSTRIAL CONSERVATION, MADISON COUNTY	DEMAND REDUCTION [MADISON]	3	6	10	14	19	24

Projected Water Management Strategies
TWDB 2017 State Water Plan Data

WUG, Basin (RWPG) All values are in acre-feet

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
		3	**106**	**110**	**114**	**119**	**124**
MINING, MADISON, BRAZOS (H)							
EXPANDED USE OF GROUNDWATER, MADISON COUNTY	CARRIZO-WILCOX AQUIFER [MADISON]	0	100	100	100	100	100
		0	**100**	**100**	**100**	**100**	**100**
MINING, MADISON, TRINITY (H)							
EXPANDED USE OF GROUNDWATER, MADISON COUNTY	CARRIZO-WILCOX AQUIFER [MADISON]	0	300	300	300	300	300
		0	**300**	**300**	**300**	**300**	**300**
NORMANGEE, TRINITY (H)							
WATER LOSS REDUCTION, NORMANGEE	DEMAND REDUCTION [MADISON]	0	0	1	1	1	1
		0	**0**	**1**	**1**	**1**	**1**
STEAM ELECTRIC POWER, MADISON, TRINITY (H)							
EXPANDED USE OF GROUNDWATER, MADISON COUNTY	CARRIZO-WILCOX AQUIFER [MADISON]	300	300	400	400	550	550
		300	**300**	**400**	**400**	**550**	**550**
Sum of Projected Water Management Strategies (acre-feet)		**342**	**883**	**1,024**	**1,047**	**1,222**	**1,272**

Appendix B

TWDB GAM Run 18-020: Mid-East Texas Groundwater Conservation District Management Plan (*February 11, 2019*)

GAM Run 18-020: Mid-East Texas Groundwater Conservation District Groundwater Management Plan

Shirley C. Wade, Ph.D., P.G.
Texas Water Development Board
Groundwater Division
Groundwater Availability Modeling Department
512-936-0883
February 11, 2019

Shirley C. Wade
2/11/19

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GAM RUN 18-020: MID-EAST TEXAS GROUNDWATER CONSERVATION DISTRICT GROUNDWATER MANAGEMENT PLAN

Shirley C. Wade, Ph.D., P.G.
Texas Water Development Board
Groundwater Division
Groundwater Availability Modeling Department
512-936-0883
February 11, 2019

EXECUTIVE SUMMARY:

Texas State Water Code, Section 36.1071, Subsection (h) (Texas Water Code, 2011), states that, in developing its groundwater management plan, a groundwater conservation district shall use groundwater availability modeling information provided by the Executive Administrator of the Texas Water Development Board (TWDB) in conjunction with any available site-specific information provided by the district for review and comment to the Executive Administrator.

The TWDB provides data and information to the Mid-East Texas Groundwater Conservation District in two parts. Part 1 is the Estimated Historical Water Use/State Water Plan dataset report, which will be provided to you separately by the TWDB Groundwater Technical Assistance Department. Please direct questions about the water data report to Mr. Stephen Allen at 512-463-7317 or stephen.allen@twdb.texas.gov. Part 2 is the required groundwater availability modeling information and this information includes:

1. the annual amount of recharge from precipitation, if any, to the groundwater resources within the district;
2. for each aquifer within the district, the annual volume of water that discharges from the aquifer to springs and any surface-water bodies, including lakes, streams, and rivers; and
3. the annual volume of flow into and out of the district within each aquifer and between aquifers in the district.

The groundwater management plan for the Mid-East Texas Groundwater Conservation District should be adopted by the district on or before May 6, 2019 and submitted to the

Executive Administrator of the TWDB on or before June 5, 2019. The current management plan for the Mid-East Texas Groundwater Conservation District expires on August 4, 2019.

We used two groundwater availability models to estimate the management plan information for the aquifers within the Mid-East Texas Groundwater Conservation District. Information for the Carrizo-Wilcox, Queen City, and Sparta aquifers is from version 3.01 of the groundwater availability model for the central part of the Carrizo-Wilcox, Queen City, and Sparta aquifers (Young and others, 2018). Information for the Yegua-Jackson Aquifer is from version 1.01 of the groundwater availability model for the Yegua-Jackson Aquifer (Deeds and others, 2010).

This report replaces the results of GAM Run 13-024 (Jones, 2013). GAM Run 18-020 includes results from the newly released and updated groundwater availability model for the Carrizo-Wilcox, Queen City, and Sparta aquifers (Young and others, 2018). Tables 1 through 4 summarize the groundwater availability model data required by statute and Figures 1 through 4 show the area of the models from which the values in the tables were extracted. If, after review of the figures, the Mid-East Texas Groundwater Conservation District determines that the district boundaries used in the assessment do not reflect current conditions, please notify the TWDB at your earliest convenience.

METHODS:

In accordance with the provisions of the Texas State Water Code, Section 36.1071, Subsection (h), the two groundwater availability models mentioned above were used to estimate information for the Mid-East Texas Groundwater Conservation District management plan. Water budgets were extracted for the historical model periods for the Carrizo-Wilcox, Queen City, and Sparta aquifers (1980 through 2010) and Yegua-Jackson Aquifer (1980 through 1997) using ZONEBUDGET Version 3.01 (Harbaugh, 2009) or ZONEBUDGET-USG (Panday and others, 2013) as applicable. The average annual water budget values for recharge, surface-water outflow, inflow to the district, and outflow from the district for the aquifers within the district are summarized in this report.

PARAMETERS AND ASSUMPTIONS:

Carrizo-Wilcox, Queen City, and Sparta aquifers

- We used version 3.01 of the groundwater availability model for the central part of the Carrizo-Wilcox, Queen City, and Sparta aquifers. See Young and others (2018) for assumptions and limitations of the groundwater availability model for the central part of the Carrizo-Wilcox, Queen City, and Sparta aquifers.

- This groundwater availability model includes ten layers, which represent the Colorado or Brazos River Alluvium (Layer 1), the outcrop and shallow flow zone of all of the underlying aquifers (Layer 2), the Sparta Aquifer (Layer 3), the Weches Formation confining unit (Layer 4), the Queen City Aquifer (Layer 5), the Reklaw Formation confining unit (Layer 6), the Carrizo Formation (Layer 7), the Calvert Bluff Formation (Layer 8), the Simsboro Formation (Layer 9), and the Hooper Formation (Layer 10).

- Individual water budgets for the district were determined for the Sparta Aquifer (Layers 2 and 3), the Queen City Aquifer (Layers 2 and 5), and the Carrizo-Wilcox Aquifer (Layers 2 and 7 through 10, collectively).

- The model was run with MODFLOW-USG (unstructured grid; Panday and others, 2013).

Yegua-Jackson Aquifer

- We used version 1.01 of the groundwater availability model for the Yegua-Jackson Aquifer. See Deeds and others (2010) for assumptions and limitations of the groundwater availability model.

- This groundwater availability model includes five layers, which represent the outcrop of the Yegua-Jackson Aquifer and younger overlying units—the Catahoula Formation (Layer 1), the upper portion of the Jackson Group (Layer 2), the lower portion of the Jackson Group (Layer 3), the upper portion of the Yegua Group (Layer 4), and the lower portion of the Yegua Group (Layer 5).

- An overall water budget for the district was determined for the Yegua-Jackson Aquifer (Layer 1 through Layer 5, collectively, for the portions of the model that represent the Yegua-Jackson Aquifer).

- The model was run with MODFLOW-2000 (Harbaugh and others, 2000).

RESULTS:

A groundwater budget summarizes the amount of water entering and leaving the aquifers according to the groundwater availability model. Selected groundwater budget components listed below were extracted from the groundwater availability model results for the Carrizo-Wilcox, Queen City, Sparta, and Yegua-Jackson aquifers over the historical calibration periods, as shown in Tables 1 through 4.

1. Precipitation recharge—the areally distributed recharge sourced from precipitation falling on the outcrop areas of the aquifers (where the aquifer is exposed at land surface) within the district.

2. Surface-water outflow—the total water discharging from the aquifer (outflow) to surface-water features such as streams, reservoirs, and springs.

3. Flow into and out of district—the lateral flow within the aquifer between the district and adjacent counties.

4. Flow between aquifers—the net vertical flow between the aquifer and adjacent aquifers or confining units. This flow is controlled by the relative water levels in each aquifer and aquifer properties of each aquifer or confining unit that define the amount of leakage that occurs.

The information needed for the district's management plan is summarized in Tables 1 through 4. It is important to note that sub-regional water budgets are not exact. This is due to the size of the model cells and the approach used to extract data from the model. To avoid double accounting, a model cell that straddles a political boundary, such as a district or county boundary, is assigned to one side of the boundary based on the location of the centroid of the model cell. For example, if a cell contains two counties, the cell is assigned to the county where the centroid of the cell is located.

TABLE 1. SUMMARIZED INFORMATION FOR THE CARRIZO-WILCOX AQUIFER FOR MID-EAST TEXAS GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Carrizo-Wilcox Aquifer	105,777
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Carrizo-Wilcox Aquifer	113,293
Estimated annual volume of flow into the district within each aquifer in the district	Carrizo-Wilcox Aquifer	17,377
Estimated annual volume of flow out of the district within each aquifer in the district	Carrizo-Wilcox Aquifer	20,772
Estimated net annual volume of flow between each aquifer in the district	Flow from the Carrizo-Wilcox Aquifer into downdip Carrizo-Wilcox units	523
	Flow into the Carrizo-Wilcox Aquifer from the overlying Reklaw Confining Unit	1,491
	Flow into the Queen City Aquifer from the Carrizo-Wilcox Aquifer	1,394

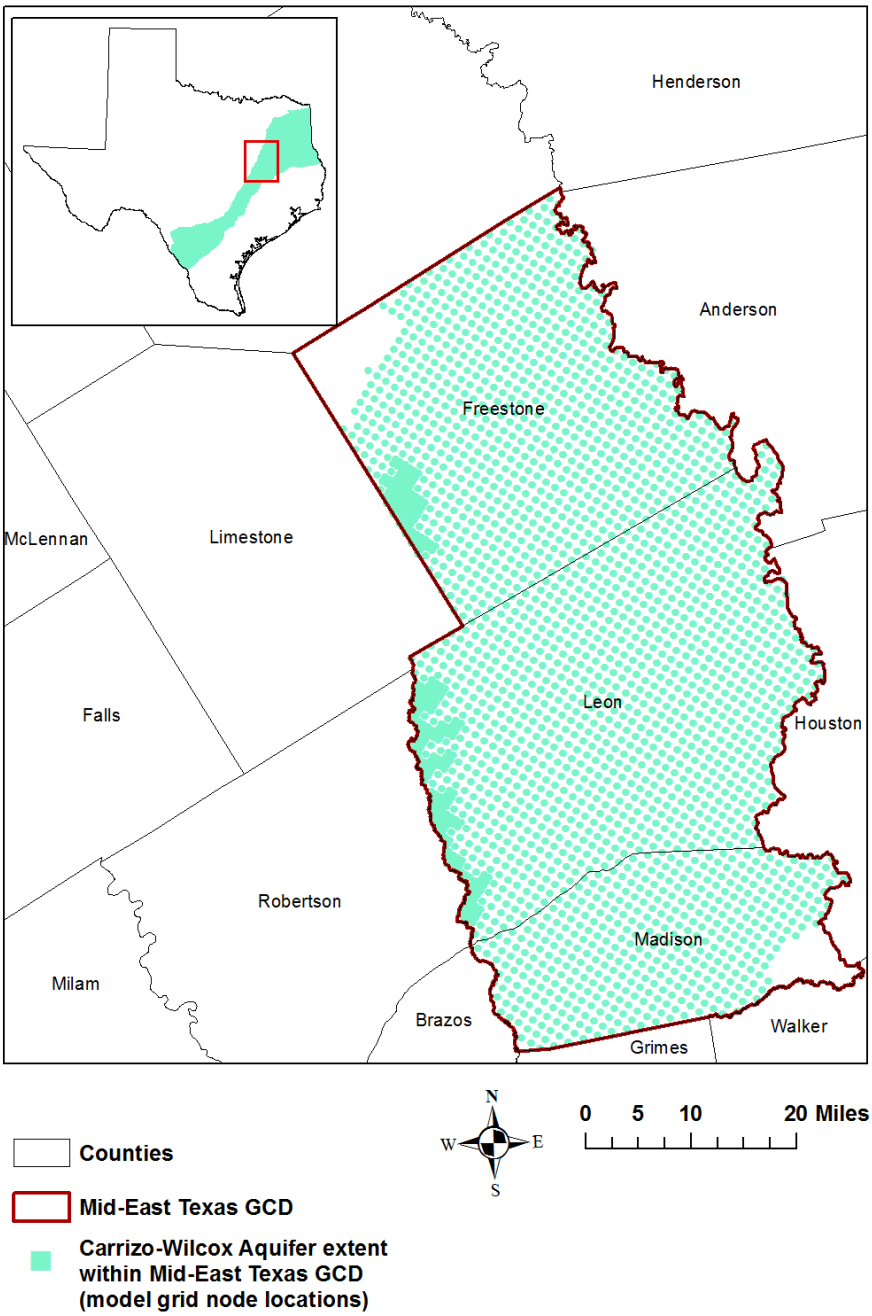

FIGURE 1. AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE CARRIZO-WILCOX AQUIFER FROM WHICH THE INFORMATION IN TABLE 1 WAS EXTRACTED (THE AQUIFER SYSTEM EXTENT WITHIN THE DISTRICT BOUNDARY).

TABLE 2. SUMMARIZED INFORMATION FOR THE QUEEN CITY AQUIFER FOR MID-EAST TEXAS GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Queen City Aquifer	69,600
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Queen City Aquifer	74,582
Estimated annual volume of flow into the district within each aquifer in the district	Queen City Aquifer	4,417
Estimated annual volume of flow out of the district within each aquifer in the district	Queen City Aquifer	3,886
Estimated net annual volume of flow between each aquifer in the district	Flow into the Queen City Aquifer from the Carrizo-Wilcox Aquifer	1,394
	Flow into the Queen City Aquifer from the underlying Reklaw Confining Unit	445
	Flow into the Queen City Aquifer from downdip Queen City units	11
	Flow from the Queen City Aquifer into the overlying Weches Confining Unit	872
	Flow into the Queen City Aquifer from the Sparta Aquifer	802

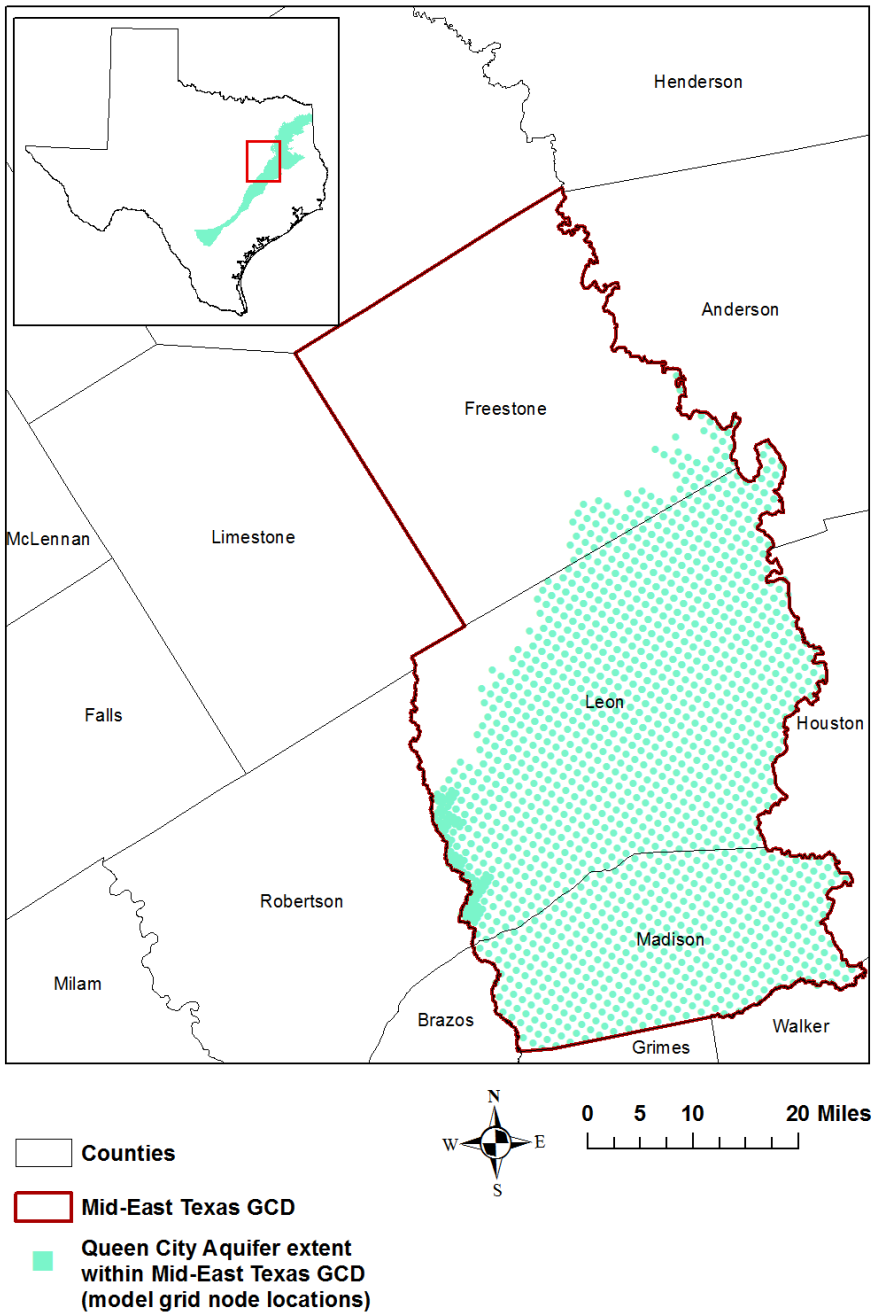

FIGURE 2. AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE QUEEN CITY AQUIFER FROM WHICH THE INFORMATION IN TABLE 2 WAS EXTRACTED (THE AQUIFER SYSTEM EXTENT WITHIN THE DISTRICT BOUNDARY).

TABLE 3. SUMMARIZED INFORMATION FOR THE SPARTA AQUIFER FOR MID-EAST TEXAS GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Sparta Aquifer	21,332
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Sparta Aquifer	24,201
Estimated annual volume of flow into the district within each aquifer in the district	Sparta Aquifer	1,459
Estimated annual volume of flow out of the district within each aquifer in the district	Sparta Aquifer	1,513
Estimated net annual volume of flow between each aquifer in the district	Flow into the Queen City Aquifer from the Sparta Aquifer	725
	Flow into the Sparta Aquifer from the underlying Weches Confining Unit	949
	Flow from the Sparta Aquifer into overlying units	850

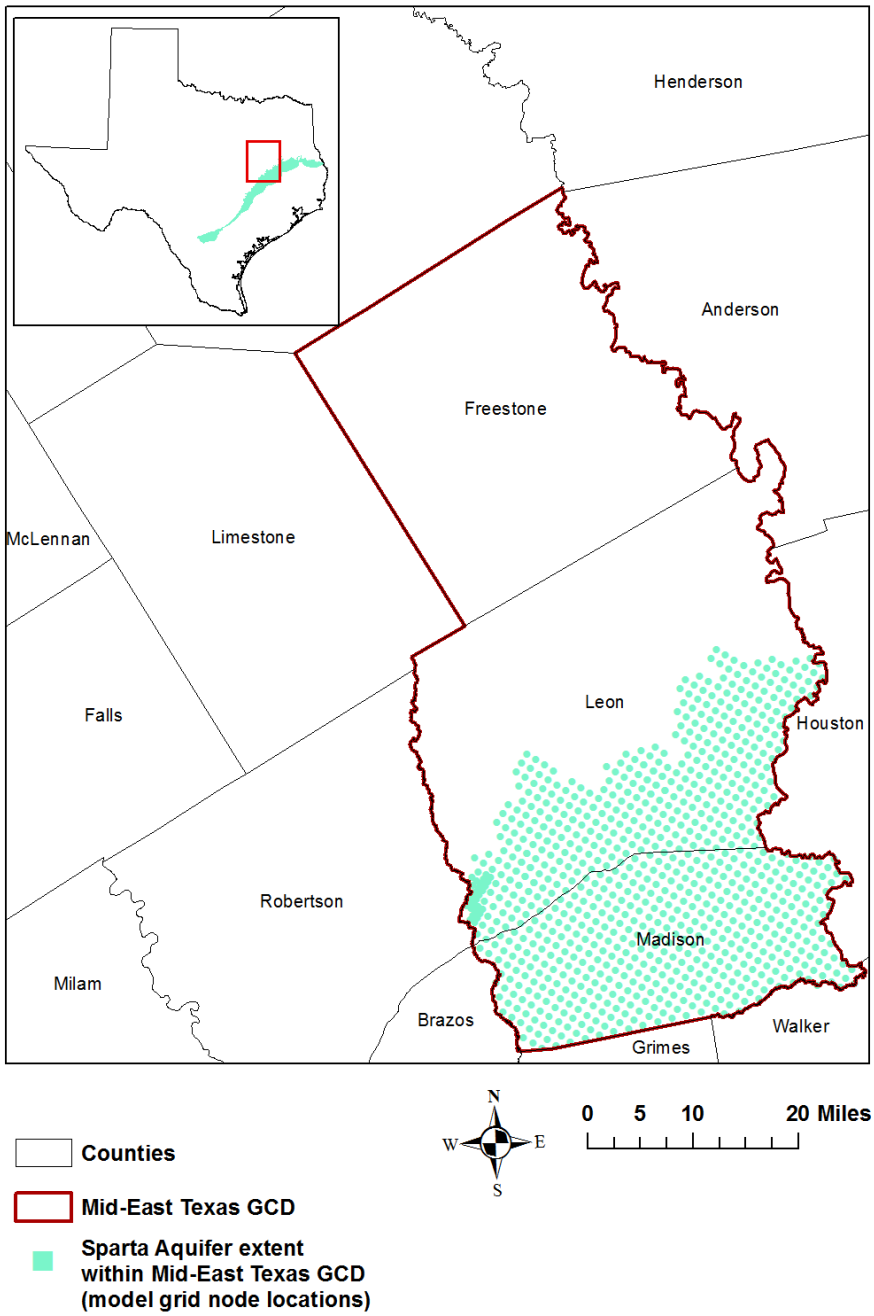

FIGURE 3. AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE SPARTA AQUIFER FROM WHICH THE INFORMATION IN TABLE 3 WAS EXTRACTED (THE AQUIFER SYSTEM EXTENT WITHIN THE DISTRICT BOUNDARY).

TABLE 4. SUMMARIZED INFORMATION FOR THE YEGUA-JACKSON AQUIFER FOR MID-EAST TEXAS GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Yegua-Jackson Aquifer	31,137
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Yegua-Jackson Aquifer	46,448
Estimated annual volume of flow into the district within each aquifer in the district	Yegua-Jackson Aquifer	15,344
Estimated annual volume of flow out of the district within each aquifer in the district	Yegua-Jackson Aquifer	10,411
Estimated net annual volume of flow between each aquifer in the district	Yegua-Jackson Aquifer	0[1]

[1] The model assumptions include no groundwater flow between the Yegua-Jackson Aquifer and underlying units.

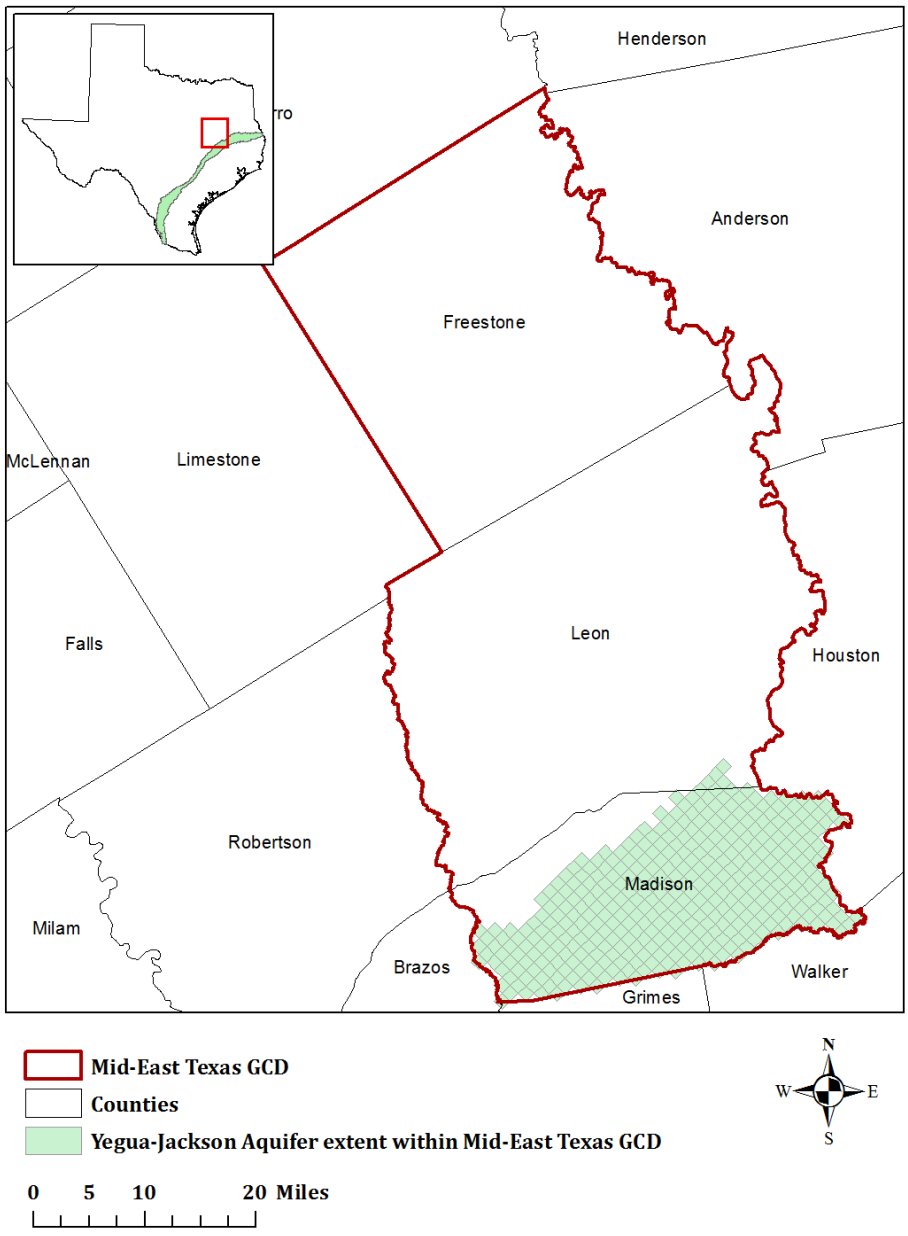

FIGURE 4. AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE YEGUA-JACKSON AQUIFER FROM WHICH THE INFORMATION IN TABLE 4 WAS EXTRACTED (THE AQUIFER SYSTEM EXTENT WITHIN THE DISTRICT BOUNDARY).

LIMITATIONS:

The groundwater models used in completing this analysis are the best available scientific tools that can be used to meet the stated objectives. To the extent that this analysis will be used for planning purposes and/or regulatory purposes related to pumping in the past and into the future, it is important to recognize the assumptions and limitations associated with the use of the results. In reviewing the use of models in environmental regulatory decision making, the National Research Council (2007) noted:

> *"Models will always be constrained by computational limitations, assumptions, and knowledge gaps. They can best be viewed as tools to help inform decisions rather than as machines to generate truth or make decisions. Scientific advances will never make it possible to build a perfect model that accounts for every aspect of reality or to prove that a given model is correct in all respects for a particular regulatory application. These characteristics make evaluation of a regulatory model more complex than solely a comparison of measurement data with model results."*

A key aspect of using the groundwater model to evaluate historical groundwater flow conditions includes the assumptions about the location in the aquifer where historical pumping was placed. Understanding the amount and location of historical pumping is as important as evaluating the volume of groundwater flow into and out of the district, between aquifers within the district (as applicable), interactions with surface water (as applicable), recharge to the aquifer system (as applicable), and other metrics that describe the impacts of that pumping. In addition, assumptions regarding precipitation, recharge, and interaction with streams are specific to particular historical time periods.

Because the application of the groundwater models was designed to address regional-scale questions, the results are most effective on a regional scale. The TWDB makes no warranties or representations related to the actual conditions of any aquifer at a particular location or at a particular time.

It is important for groundwater conservation districts to monitor groundwater pumping and overall conditions of the aquifer. Because of the limitations of the groundwater model and the assumptions in this analysis, it is important that the groundwater conservation districts work with the TWDB to refine this analysis in the future given the reality of how the aquifer responds to the actual amount and location of pumping now and in the future. Historical precipitation patterns also need to be placed in context as future climatic conditions, such as dry and wet year precipitation patterns, may differ and affect groundwater flow conditions.

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Appendix C

Resolution Adopting the Management Plan

MID-EAST TEXAS GROUNDWATER CONSERVATION DISTRICT
RESOLUTION 2019-02

RESOLUTION OF THE BOARD OF DIRECTORS OF THE MID-EAST TEXAS GROUNDWATER CONSERVATION DISTRICT ADOPTING A DISTRICT MANAGEMENT PLAN

THE STATE OF TEXAS §
§
COUNTY OF LEON §

WHEREAS, Mid-East Texas Groundwater Conservation District (District) is a duly created and existing groundwater district created and operating under State Statutes and Chapter 36 of the Texas Water Code, as amended;

WHEREAS, the Management Plan of the District attached hereto as Attachment A, has been developed for the purpose of conserving, preserving, protecting, and recharging the aquifers in the District, and this action is taken under the District's statutory authority to prevent waste and protect rights of owners of interest in groundwater;

WHEREAS, after notice and hearing the Board of Directors (Board) of the District revised and readopted a Management Plan on May 6, 2019; and

WHEREAS, modifications made to the readopted Management Plan as required and suggested by the Texas Water Development Board have been incorporated in the Plan on July 19, 2019; and

WHEREAS, the Management Plan meets the requirements of Texas Water Code § 36.1071 and § 36.1072 and 31 TAC §§ 356.5 and 356.6.

NOW THEREFORE, BE IT RESOLVED AND ORDERED BY THE BOARD OF DIRECTORS OF MID-EAST TEXAS GROUNDWATER CONSERVATION DISTRICT THAT:

1. The facts and recitations found in the preamble of this Resolution are hereby found and declared to be true and correct, and are incorporated by reference herein and expressly made a part hereof, as if copied verbatim.

2. The Board of Directors of the District hereby adopts the attached Management Plan as the Management Plan for the District, subject to those amendments necessary based on comments received from the public at the Board meeting, recommendations from the

District Board, staff, or legal counsel, or to incorporate technical information received from the Texas Water Development Board (TWDB) and/or District consultants.

3. The General Manager of the District is hereby authorized to take all steps necessary to implement this resolution and submit the Management Plan to TWDB for its approval.

4. The General Manager of the District is further authorized to take any and all action necessary to coordinate with the TWDB as may be required in furtherance of TWDB's approval pursuant to the provisions of Section 36.1072 of the Texas Water Code.

PASSED AND APPROVED this the 30th day of July 2019.

John T. Fryer, President, Board of Directors

ATTEST:

William Parten, Secretary, Board of Directors

Appendix D

Evidence that the Management Plan was Adopted after Notice and Hearing

MID-EAST TEXAS GROUNDWATER CONSERVATION DISTRICT

Board Meeting
Tuesday, July 30, 2019 at 6:00 PM
Leon County Courthouse, Annex I
113 W. Main, 3rd Floor
Centerville, Texas

COPY
Original Filed
AT 1:30 O'CLOCK P. M
JUL 25 2019
SUSANNE MORRIS, Madison County Clerk
BY Heidi Ellis DEPUTY
Copies NOT Certified
HEIDI ELLIS

AGENDA

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

1. Call to Order of Board Meeting by presiding Officer.
2. Review and Action of Minutes of May 6, 2019 Board of Directors Meeting/Public Hearing.
3. Public Comments. *
4. Consider and possible action to approve Resolution 2019-02 Revising and Readopting the District Management Plan. Action is to ratify changes incorporated in the Management Plan based on Texas Water Development Board required and suggested changes.
5. Review suggested Rules changes recommended by Gregory M. Ellis and staff for a future Public Hearing and posting these changes for public review before possible adoption.
6. Review of Preliminary Budget and Fee rates for Fiscal Year 2019 – 2020.
7. Manager's Report of District activity since May 6, 2019 and upcoming events:
   a. TCEQ meeting in Austin pertaining to CCR provisions – May 10, 2019.
   b. Meeting with Luminant representative pertaining to CCR provisions, BVGCD office in Hearne – May 10, 2019.
   c. Groundwater Management Area 12 (GMA 12) Joint Planning meeting, Milano – May 30, 2019.
   d. Texas Alliance of Groundwater Districts Business meeting, Austin – June 4-5, 2019.
   e. Freestone County Commissioners Court meeting to provide information on pending permit – June 19, 2019.
   f. Region C Water Planning Group meeting, Arlington – June 24, 2019.
   g. Meeting with Greg Ellis on possible rules changes, Conroe – July 1, 2019.
   h. TAGD Finance & Budget Committee meeting (CC) – July 24, 2019.
   i. District Reports (Drought report, Investment report).
   j. Upcoming Events: GMA 12 Joint Planning mtg, Milano – 8/2/2019; Milam & Burleson County Groundwater Summit, Caldwell – 8/14/2019; TAGD 8th Annual Groundwater Summit & Board meeting, San Antonio – 8/20-22/2019; METGCD Board meeting, Fairfield – 8/27/2019.
8. Bills received and current financial status.
9. Set date, time and location of next meeting.
10. Adjourn.

Signed this 25th day of July 2019

David M. Bailey, General Manager
101 W. Main Ste B-22, Madisonville Texas
Phone: (936) 348-3212

The Mid-East Texas Groundwater Conservation District is committed to compliance with the Americans with Disabilities Act (ADA). Reasonable accommodations and equal opportunity for effective communications will be provided upon request. Please contact the District office at 936-348-3212 at least 24 hours in advance if accommodation is needed.

During the meeting, the Board reserves the right to go into closed session for any of the following purposes: real estate, consultation with an attorney, or personnel matters under V.T.C.A., Government Code Sections 551.072, 551.071, and 551.074, respectively, or for any item on the above agenda for which a closed session is permitted by law.

*Public comments will be limited to three (3) minutes from each individual desiring to speak. Board members are prohibited by law from discussing matters presented under this item, except for placement on a future agenda.

MID-EAST TEXAS GROUNDWATER CONSERVATION DISTRICT

Board Meeting
Tuesday, July 30, 2019 at 6:00 PM
Leon County Courthouse, Annex I
113 W. Main, 3rd Floor
Centerville, Texas

AGENDA

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Board Meeting
Tuesday, July 30, 2019 at 6:00 PM
Leon County Courthouse, Annex I
113 W. Main, 3rd Floor
Centerville, Texas

FILED FOR RECORD
At 9:20 o'clock A M
JUL 25 2019
LINDA JARVIS
Clerk County Court, Freestone County, Texas
BY

AGENDA

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Appendix E

Evidence that the District Coordinated Development of the Management Plan with Surface Water Entities

The attached email was delivered to the following entities in order to coordinate development of the Management Plan with Surface Water Entities. The email address identifies the entity for which delivery was made on July 31, 2019:

Email address:	**Surface Water Entitly:**
wardk@trinityra.org	*Mr. Kevin Ward, Chairman* *Region C Water Planning Group*
jhouston@sjra.net	*Mr. Mark Evans, Chairman* *Region H Water Planning Group*
stevens_jack@msn.com	*Mr. Jack Stevens, General Manager* *Tarrant Regional Water District*
wardk@trinityra.org	*Mr. Kevin Ward, General Manager* *Trinity River Authority*
david.collinsworth@brazos.org	*Mr. David Collinsworth, Manager* *Brazos River Authority*

REVISED Mid-East Texas GCD Management Plan

From: David Bailey (david_metgcd@att.net)

To: wardk@trinityra.org; jhouston@sjra.net; stevens_jack@msn.com; david.collinsworth@brazos.org

Date: Wednesday, July 31, 2019, 09:33 AM CDT

Dear Sirs;

Attached please find a copy of the REVISED Mid-East Texas Groundwater District's Management Plan, as adopted at a District Board of Directors Meeting held on July 30, 2019. This copy is being provided for your files. The Mid-East Texas GCD is required to provide this document to "political subdivisions as defined by Texas Water Code, Chapter 15, and identified from Texas Commission of Environmental Quality records which are granted authority to store, divert, or supply surface water either directly or by contract under Texas Water Code, Chapter 11, for use within the boundaries of a district."

Thank you and very truly yours,

David M. Bailey
General Manager
Mid-East Texas Groundwater Conservation District
P O Box 477
101 W Main, Suite B22
Madisonville, TX 77864
Office: 936 348-3212
Cell: 936-348-1454
Fax: 936 348-3512

2019 Management Plan - METGCD sw.pdf
4.1MB