District Management Plan

Adopted: April 24, 2018

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I. District Mission

The Panola County Groundwater Conservation District ("District") seeks to preserve and protect the groundwater resources of Panola County. The District will accomplish this mission by working to minimize the drawdown of the groundwater levels, prevent the waste of groundwater and reduce the degradation of the quality of the groundwater located in the Panola County area. The District will also use the authority granted by state law to protect and maintain the economic vitality of the communities within Panola County. The District believes the economy, environment, and quality of life in Panola County will be benefitted by the work of the District to accomplish its mission.

II. Purpose of the Management Plan

The purpose of the Management Plan is to provide a planning tool for the District as it moves forward with its efforts to manage and conserve the groundwater resources of Panola County. The Management Plan contains the hydrogeological and technical information provided by the Texas Water Development Board ("TWDB") regarding the groundwater resources of Panola County. As the District obtains more site-specific groundwater information, the District will update and amend the Management Plan.

The development of the Management Plan for the District will enable the District to comply with the requirements of state law. The Texas Legislature created a statewide water planning process with the passage of Senate Bill 1 ("SB 1") in 1997 and Senate Bill 2 ("SB 2") in 2001. The development of management plans by each groundwater conservation district ("GCD") in Texas is an integral part of the statewide planning process. The District's Management Plan satisfies all requirements established for GCDs by SB 1, SB 2, the statutory requirements Chapter 36 of the Texas Water Code, and the administrative requirements of the rules of the TWDB.

III. District Information

A. Creation

The District was created by the 80th Texas Legislature in 2007 with the enactment of House Bill 1498 (Appendix A). The creation of the District was confirmed by the citizens of Panola County at an election held on November 6, 2007. The District was provided with the rights and responsibilities specified in its enabling act, Chapter 36 of the Texas Water Code, the TWDB Rules, this Management Plan, and the District Rules.

B. Directors

The Board of Directors consists of nine members who are elected by the voters of Panola County. The District utilizes the same four precinct boundaries which are used for the Panola County Commissioners when filling eight of the District's director positions. One director position for the District is elected at-large from Panola County. Elections are held in November of even-numbered years. The directors for the District each are elected to a four-year term and a director may serve consecutive terms.

C. Authority

The District has the authority and duties given to GCDs by Texas Water Code Chapter 36, 31 Texas Administrative Code (TAC) Chapter 356, and the District's enabling act. The District exercises the authority it has been granted to preserve and protect the groundwater resources of Panola County through the adoption and implementation of rules for the District.

D. Location and Extent

The boundaries of the District are the same as Panola County. This area encompasses approximately 801 square miles (approximately 512,640 acres). The District is bounded by Harrison County to the north, Gregg and Rusk Counties to the west, Shelby County to the south, and the State of Louisiana to the east.

E. Groundwater Resources of Panola County

Panola County Groundwater Conservation District is located over the outcrop of the Carrizo-Wilcox Aquifer. The TWDB has identified the Carrizo-Wilcox Aquifer as the only major aquifer in the District. In general, this means that the aquifer is capable of providing relatively large amounts of water over a large area. A minor aquifer, by comparison, is defined as one capable of providing either a small amount of water over a large area or a large amount of water over a small area. The TWDB does not recognize any other major or minor aquifers in the District.

The Carrizo-Wilcox Aquifer in Texas, shown in Figure 1, extends from the Texas-Mexico border along the Rio Grande River in South Texas to the Texas-Louisiana border in East Texas. Covering such a large area, its character can vary significantly depending on location. It is early Tertiary in age consisting primarily of unconsolidated sands and clays (George, 2009).

In many areas of the state, the Wilcox Group within the aquifer is divided into

upper, middle, and lower units. In central Texas these are known as the Hooper, Simsboro, and Calvert Bluff formations, respectively (Deeds and others, 2009). The Middle Wilcox is the primary unit exposed at land surface in the District, though some areas are overlain by the Upper Wilcox, Carrizo sand, and younger alluvial deposits along rivers and streams (George, 2009). The Lower Wilcox exists below the Middle Wilcox, but is limited in extent to the southern portion of the District (Kaiser, 1990). In the Carrizo-Wilcox, sediments in the District range in thickness from approximately 350 feet in the northeast to over 900 feet in the southwest (Oliver and Lupton, 2013). While most areas of the Carrizo-Wilcox dip to the southeast, this structure is due to Panola County's location in the Sabine Uplift – an area of East Texas and northwestern Louisiana where uplift occurred before and during deposition of the Wilcox (George, 2009).

Water quality samples from wells in the District indicate that water in the aquifer is generally fresh to slightly saline and of a sodium-bicarbonate composition. The water can be corrosive, however, with high iron content (Ashworth and Hopkins, 1995). Additionally, due to the presence of lignite in portions of the Wilcox in the District, dissolved gases such as methane also occur in some areas.

Well yields for the Carrizo-Wilcox Aquifer in Texas are commonly 500 gallons per minute or more, with some areas under artesian pressure supporting well yields up to 3,000 gallons per minute (Ashworth and Hopkins, 1995). This is not the case, however, for Panola County, which is located in an outcrop portion of the aquifer away from these more productive areas to the southwest. Of the over 1,900 wells in the TDLR Submitted Driller Reports Database in the District, the average well yield is 59 gallons per minute and ranges between 1 and 225 gallons per minute. Over 99 percent of the wells reported in the database have well yields of 100 gallons per minute or less for the District.

Irrigation and municipal supply account for approximately 90 percent of the groundwater use of the Carrizo-Wilcox Aquifer in Texas (George and others, 2011). In Panola County, between 2000 and 2015 the TWDB estimates that pumping from the Carrizo-Wilcox Aquifer has varied between approximately 3,000 and 6,500 acre-feet per year, with approximately half of that attributable to municipal supply and the rest a combination of manufacturing, mining, livestock, and oil and gas activities. Production data reported to and estimated by the District indicates that water use from oil and gas activities is the largest use in Panola County. Between 2012 and 2016, District-estimated average water use from oil and gas activities was approximately 1,900 acre-feet per year, or 43 percent of total estimated water use.

Water level measurements by the District indicate that groundwater generally flows toward the Sabine River, which runs through the eastern half of Panola County. Though the District has only been in existence since 2007, water level

measurements are available for several wells back to 1980 and before. Water level trends are not consistent throughout the District. In the southwest portion of the District, water levels are generally steady or steadily declining. Near the Sabine River, most wells show relatively steady water levels historically, which may be due to the influence of the Sabine River interacting with the aquifer. In the northeast and northwest areas of the county, water level measurements are considerably more variable, possibly due to the impact of nearby pumping.

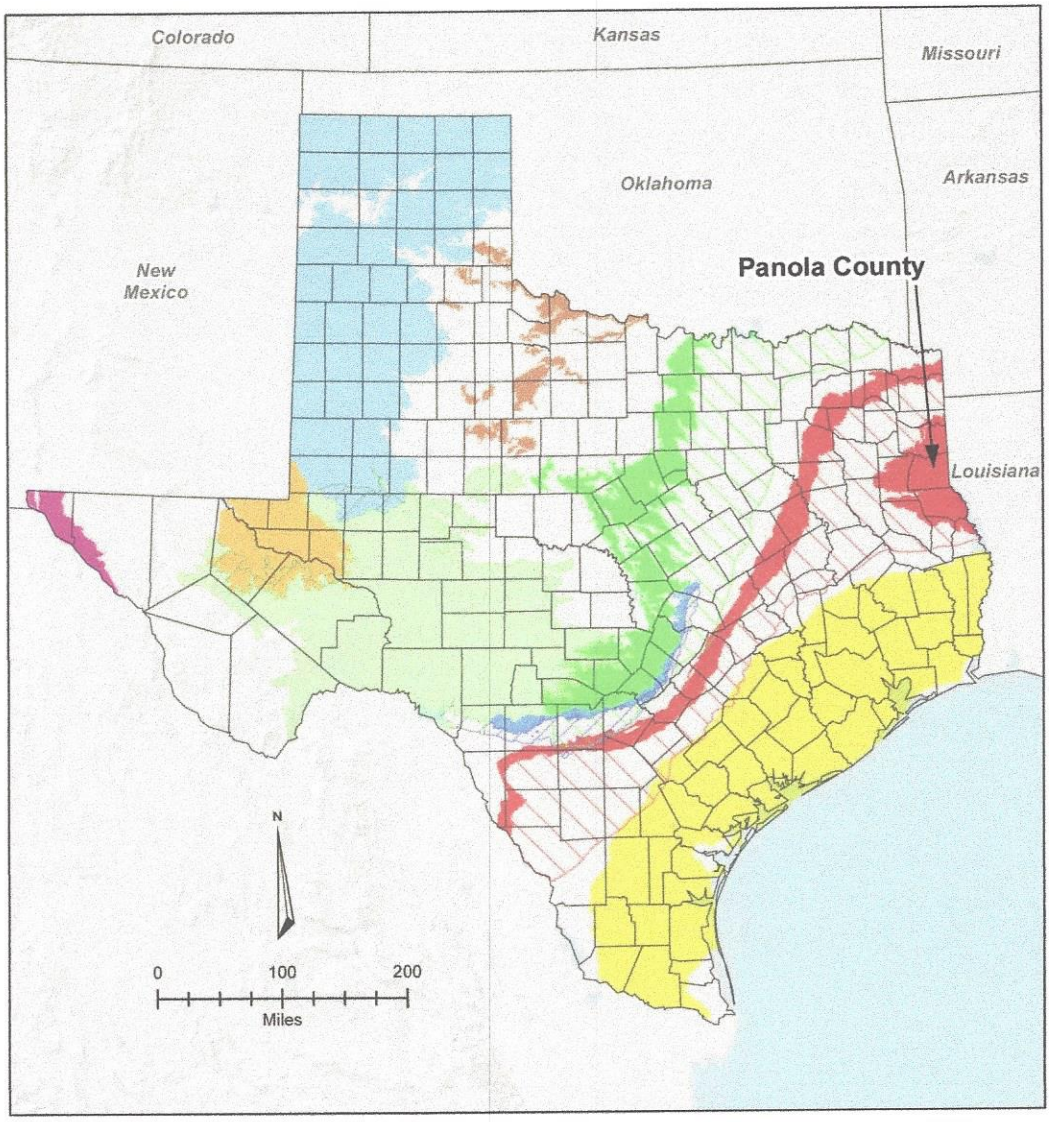

Figure 1. Major Aquifers of Texas

IV. Criteria for Plan Approval

A. Planning Horizon

The Management Plan is adopted to be effective for a ten (10) year planning period. The planning period will begin on the date of approval by the TWDB. In accordance with Section 36.1072(e), the District will review and readopt the Management Plan, with or without amendments, in five years and resubmit the plan for TWDB approval. The Management Plan will be effective until the plan is replaced by a revised plan which has been approved by the TWDB.

B. Board Resolution

A certified copy of the Panola County Groundwater Conservation District Board of Directors resolution adopting the plan is located in Appendix B - District Resolution.

C. Plan Adoption

Public notices which demonstrate the Management Plan was adopted after the required public hearings and meetings were conducted are found in Appendix C – Notice of Hearings and Meetings.

D. Coordination with Surface Water Management Entities

Correspondence with the Sabine River Authority and the Panola County Fresh Water Supply District No. 1 which demonstrate the District provided the pertinent entities with a copy of the Management Plan are found in Appendix D – Correspondence with Surface Water Management Entities.

V. Estimates of Technical Information Required by TWC § 36.1071 / 31 TAC 356.52

A. Modeled Available Groundwater in the District Based on the Desired Future Condition Established under TWC 36.108— 31 TAC 356.52 (a)(5)(A) / TWC § 36.1071(e)(3)(A)

Modeled available groundwater is defined in Section 36.001 of the Texas Water Code as "the amount of water that the executive administrator [of TWDB] determines may be produced on an average annual basis to achieve a desired future condition established under Section 36.108." The desired future condition of the aquifer may only be determined through joint planning with other GCDs in the same groundwater management area (GMA) as required by the 79th Legislature with the enactment of HB 1763. The District is part of GMA 11 (Appendix E). The GCDs of GMA 11 completed the first round of the joint

planning process and adopted DFCs on April 13, 2010. The Districts in GMA 11 proposed new DFCs for adoption as part of the second round of joint planning on April 28, 2016. These currently adopted DFCs are found in Appendix F.

The modeled available groundwater for the Carrizo-Wilcox Aquifer are found in Appendix G and are as follows for Panola County GCD from GAM Run 17-024 MAG (values are in acre-feet):

County	Region	Basin	2020	2030	2040	2050	2060	2070
Panola	I	Cypress	6	6	6	6	6	6
		Sabine	8,370	8,212	8,212	8,212	8,062	8,062

B. Amount of Groundwater Being Used Within the District on an Annual Basis—31 TAC 356.52 (a)(5)(B) / TWC §36.1071(e)(3)(B))

To estimate the annual amount of groundwater being used in the District, the District uses the TWDB Annual Water Use Survey Data as well as develops its own estimates using District reported and estimated usage. The TWDB Water Use Survey Data is subject to variations in the completeness or accuracy of the data due to inconsistent reporting by some water user groups. The TWDB estimate of the amount of groundwater being used in the District on an annual basis is 5,202 acre-feet per year. The estimate is from the TWDB Annual Water Use Survey for the Year 2015 which is the most recent data available. TWDB data on estimated groundwater use is available from 2000 to 2015. Between 2000 and 2015, TWDB estimates of groundwater use range from 3,042 to 6,485 acre-feet per year with an average of 4,458 acre-feet per year. Details of the estimate of the total amount of groundwater use are presented in Appendix H.
District-estimated water use is included below and is considered a supplement to the TWDB estimated water use in Appendix H.

Use Category	2012 (ac-ft)	2013 (ac-ft)	2014 (ac-ft)	2015 (ac-ft)	2016 (ac-ft)	5-year average (ac-ft)	5-year average Percent (%)
Public Water Supply	1,566	1,271	1,169	1,278	1,272	1,311	30%
Oil and Gas	2,204	3,044	2,335	1,562	291	1,887	43%
Irrigation	50	113	90	111	84	90	2%
Industrial	63	150	76	525	75	178	4%
Poultry	102	138	147	199	190	155	3%
Mining	579	589	514	414	244	468	11%
Commercial	7	18	13	9	13	12	<1%
Domestic	278	301	311	326	337	311	7%
Total	**4,849**	**5,624**	**4,655**	**4,424**	**2,506**	**4,412**	**100%**

C. **Annual Amount of Recharge from Precipitation to the Groundwater Resources Within the District—31 TAC 356.52 (a)(5)(C) / TWC §36.1071(e)(3)(C))**

The estimated annual amount of recharge from precipitation to the aquifers within the District is based on Groundwater Availability Model ("GAM") Run 13-006 conducted by the TWDB. GAM Run 13-006 is the most recent GAM run available for Panola County and is included as Appendix I.

Aquifer or Confining Unit	Results (in acre-feet)
Carrizo-Wilcox Aquifer	38,085

D. **For Each Aquifer, the Annual Volume of Water that Discharges from the Aquifer to Springs and any Surface Water Bodies, including Lakes, Streams, and Rivers—31 TAC 356.52 (a)(5)(D) / TWC §36.1071(e)(3)(D)**

The estimated annual amount of water discharged to surface water systems by the groundwater resources of the District based on GAM Run 13-006 are as follows:

Aquifer or Confining Unit	Results (in acre-feet)
Carrizo-Wilcox Aquifer	30,580

E. **Annual Volume of Flow into and out of the District within each Aquifer and between Aquifers in the District, if a Groundwater Availability Model is Available — 31 TAC 356.52 (a)(5)(E) / TWC §36.1071(e)(3)(E)**

1. **Estimated annual volume of flow into the district within each aquifer in the district**

The estimated amount of water flowing into the District within each aquifer in the District based on GAM Run 13-006 are as follows:

Aquifer or Confining Unit	Results (in acre-feet)
Carrizo-Wilcox Aquifer	5,816

2. **Estimated annual volume of flow out of the district within each aquifer in the district**

The estimated amount of water flowing out of the District within each aquifer in the District based on GAM Run 13-006 are as follows:

Aquifer or Confining Unit	Results (in acre-feet)
Carrizo-Wilcox Aquifer	3,122

3. **Estimated net annual volume of flow between each aquifer in the district**

The estimated net annual volume of flow between each aquifer in the District based on GAM Run 13-006 are as follows:

Aquifer or Confining Unit	Results (in acre-feet)
From overlying confining units into the Carrizo-Wilcox Aquifer	16

F. Projected Surface Water Supply in the District, according to the most recently adopted state water plan — 31 TAC 356.52 (a)(5)(F) /TWC §36.1071(e)(3)(F)

The most recently adopted state water plan is the 2017 State Water Plan. This indicates a projected surface water supply for Panola County of 12,109 acre-feet per year in 2020 increasing to 12,744 acre-feet per year in 2070.

RWPG	Water User Group	County	Basin	Source Name	2020	2030	2040	2050	2060	2070
I	Carthage	Panola	Sabine	Murvaul Lake/Reservoir	1,601	1,602	1,595	1,599	1,610	1,621
I	County-Other, Panola	Panola	Sabine	Murvaul Lake/Reservoir	291	291	291	291	291	291
I	Gill WSC	Panola	Sabine	O' The Pines Lake/Reservoir	33	33	33	33	33	33
I	Irrigation, Panola	Panola	Sabine	Sabine Run-of-River	191	191	191	191	191	191
I	Livestock, Panola	Panola	Cypress	Cypress Livestock Local Supply	30	30	30	30	30	30
I	Livestock, Panola	Panola	Sabine	Sabine Livestock Local Supply	1,224	1,224	1,224	1,224	1,224	1,224
I	Manufacturing, Panola	Panola	Sabine	Murvaul Lake/Reservoir	879	917	955	987	1,052	1,081
I	Manufacturing, Panola	Panola	Sabine	Sabine Run-of-River	114	114	114	114	114	114
I	Mining, Panola	Panola	Cypress	Murvaul Lake/Reservoir	4	4	3	2	2	2
I	Mining, Panola	Panola	Cypress	Toledo Bend Lake/Reservoir	4	4	4	4	6	6
I	Mining, Panola	Panola	Sabine	Murvaul Lake/Reservoir	3,546	3,511	3,026	2,559	2,170	2,361
I	Mining, Panola	Panola	Sabine	Sabine Run-of-River	296	296	296	296	296	296
I	Mining, Panola	Panola	Sabine	Toledo Bend Lake/Reservoir	3,896	4,196	4,496	4,496	5,494	5,494
Total Projected Surface Water Supplies (acre-feet per year) =					**12,109**	**12,413**	**12,258**	**11,826**	**12,513**	**12,744**

Source: 2017 State Water Planning Database (Appendix H)

G. Projected Total Demand for Water in the District, according to the most recently adopted state water plan — 31 TAC 356.52 (a)(5)(G) / TWC §36.1071(e)(3)(G)

The most recently adopted state water plan is the 2017 State Water Plan. This indicates a projected total water demand for Panola County of 12,406 acre-feet per year in 2020 decreasing to 10,979 acre-feet per year in 2070.

2017 State Water Plan Projected Water Demands
Panola County

Region	Water User Group	County	River Basin	2020	2030	2040	2050	2060	2070
I	Beckville	Panola	Sabine	133	144	150	156	162	167
I	Carthage	Panola	Sabine	1,650	1,651	1,644	1,648	1,659	1,670
I	County-Other, Panola	Panola	Cypress	5	6	6	6	6	6
I	County-Other, Panola	Panola	Sabine	1,615	1,629	1,623	1,639	1,669	1,696
I	Gill WSC	Panola	Sabine	85	84	82	83	84	85
I	Irrigation, Panola	Panola	Sabine	64	64	64	64	64	64
I	Livestock, Panola	Panola	Cypress	15	15	15	15	15	15
I	Livestock, Panola	Panola	Sabine	1,465	1,465	1,465	1,465	1,465	1,465
I	Manufacturing, Panola	Panola	Sabine	1,393	1,454	1,513	1,564	1,667	1,777
I	Mining, Panola	Panola	Cypress	6	6	5	4	4	4
I	Mining, Panola	Panola	Sabine	5,910	5,853	5,044	4,264	3,616	3,934
I	Tatum	Panola	Sabine	65	75	81	87	92	96
Total Projected Water Demands (acre-feet per year) =				**12,406**	**12,446**	**11,692**	**10,995**	**10,503**	**10,979**

Source: 2017 State Water Planning Database (Appendix H)

VI. Consider the Water Supply Needs and Water Management Strategies included in the Adopted State Water Plan — TWC §36.1071(E)(4)

2017 State Water Plan Projected Water Needs
Panola County

Positive values represent a water surplus
Negative values represent a water need

Region	Water User Group	County	River Basin	2020	2030	2040	2050	2060	2070
I	Beckville	Panola	Sabine	448	437	431	425	419	414
I	Carthage	Panola	Sabine	0	0	0	0	0	0
I	County-Other, Panola	Panola	Cypress	1	0	0	0	0	0
I	County-Other, Panola	Panola	Sabine	179	165	171	155	125	98
I	Gill WSC	Panola	Sabine	74	75	77	76	75	74
I	Irrigation, Panola	Panola	Sabine	510	510	510	510	510	510
I	Livestock, Panola	Panola	Cypress	15	15	15	15	15	15
I	Livestock, Panola	Panola	Sabine	175	175	175	175	175	175
I	Manufacturing, Panola	Panola	Sabine	-134	-156	-176	-194	-230	-309
I	Mining, Panola	Panola	Cypress	2	2	2	2	4	4
I	Mining, Panola	Panola	Sabine	3,317	3,639	4,263	4,576	5,833	5,706
I	Tatum	Panola	Sabine	0	0	0	0	0	0
Total Projected Water Needs (acre-feet per year) =				**-134**	**-156**	**-176**	**-194**	**-230**	**-309**

Source: 2017 State Water Planning Database (Appendix H)

Projected Water Management Strategies
Panola County

RWPG	Water User Group	WUG County	River Basin	Water Management Strategy	Source Name	2020	2030	2040	2050	2060	2070
I	Manufacturing, Panola	Panola	Sabine	PANL-MFG-Infrastructure	Carrizo-Wilcox Aquifer	134	156	176	194	230	309
Total Projected Water Management Strategies (acre-feet per year) =						**134**	**156**	**176**	**194**	**230**	**309**

Source: 2017 State Water Planning Database (Appendix H)

VII. Details on the District Management of Groundwater

The Texas Legislature has determined that GCDs, such as the Panola County Groundwater Conservation District, are the state's preferred method of groundwater management. The Texas Legislature codified its groundwater management policy decision in Section 36.0015 of the Texas Water Code, which provides that GCDs will manage groundwater resources through rules developed and implemented in accordance with Chapter 36 of the Texas Water Code. Chapter 36 establishes directives for GCDs and the statutory authority to carry out such directives to enable GCDs to have the proper tools to protect and preserve the groundwater resources with their boundaries. The District will give strong consideration to the economic and cultural activities which occur within the District and which rely upon the continued use of groundwater.

The District uses the regulatory tools it has been given by Chapter 36 to properly address the groundwater issues within Panola County, such as groundwater quality and groundwater supply. The District believes that the prevention of contamination of its groundwater resources through abandoned and deteriorated water wells is important. Wells that have been abandoned or are not properly maintained provide direct conduits or pathways that allow contamination from the surface to quickly reach groundwater. To address the threats to the water quality of its groundwater resources, the District requires, through its rules, that all abandoned, deteriorated, or replaced wells be plugged in compliance with the Water Well Drillers and Pump Installers Rules of the Texas Department of Licensing and Regulation. The District will also place a priority on the capping of water wells that the well owner plans to use at a later date in order to eliminate waste, prevent pollution, and stop future deterioration of the well casing.

The District has established a monitoring well network to monitor the changing storage conditions of the groundwater supplies within the District. The District will make a regular assessment of water supply and groundwater storage conditions and has reported and will continue to report those conditions to the District Board of Directors and to the public. The District has also worked and will continue to work with local governmental entities and agencies of the State of Texas on any well monitoring efforts and well investigations which are conducted.

The District is using the regulatory tools granted to GCDs by Chapter 36 to preserve and protect the existing and historic users of groundwater within the District. The Texas Legislature empowered the District to protect existing users of groundwater, which are those individuals or entities currently invested in and using groundwater or the groundwater resources within the District for a beneficial purpose, and to preserve historic use by historic users, which are those individuals or entities who used groundwater beneficially in the past. The District strives to protect and preserve such use to the extent practicable under the goals and objectives of this Management Plan.

One of the tools the District is using to protect existing and historic use of groundwater is the permitting process the District has created through the District's rules. Pursuant to legislative authority, such as Section 36.113(e) of the Texas Water Code, the District is protecting existing use by imposing more restrictive permit conditions on new permit applications and increased use by historic users. In protecting existing users, the District has established limitations that apply to all subsequent new permit applications and increased use by historic users, regardless of type or location of use, which bear a reasonable relationship to this Management Plan, and are reasonably necessary to protect existing use. In accordance with Section 36.116(b) of the Texas Water Code, the District is also preserving historic use when implementing its rules to limit groundwater production to the maximum extent practicable consistent with this Management Plan.

In order to better manage the groundwater resources of Panola County, the District may establish management zones for and adopt different rules for each subdivision of an aquifer or geologic strata located in whole or in part within the boundaries of the District or each geographic area overlying a subdivision of an aquifer located in whole or in part within the boundaries of the District. The District has adopted rules to regulate groundwater withdrawals by means of spacing and/or production limits. The relevant factors to be considered in making a determination to grant or deny a permit or limit groundwater withdrawals shall include those set forth in the District's enabling act, Chapter 36 of the Texas Water Code, and the rules of the District.

VIII. Actions, Procedures, Performance, and Avoidance for Plan Implementation — 31 TAC 356.52 (A)(4); TWC §36.1071(E)(2)

The District will use the Management Plan to guide its efforts to preserve and protect the groundwater resources of Panola County. The District will ensure that all of its rules development, regulatory activities, planning effects and daily operations are consistent with the Management Plan.

The rules for the District will be developed in coordination with the management goals and technical information provided in the Management Plan. The rules shall be consistent with the provision of the Management Plan and Chapter 36 of the Texas Water Code. The enforcement of the rules will be driven by the hydrogeological and technical information available to the District, including the information provided in the Management Plan. The District's rules can be found online here: http://pcgcd.org/wp-content/uploads/2013/10/PCGCD-Approved-Rules-08-2017-1.pdf.

The enabling act for the District requires the District to work and plan with other GCDs in its GMA – GMA 11. The District will use the Management Plan as part of its cooperation efforts with the neighboring GCDs.

IX. Methodology for Tracking Process to Achieve District's Management Goals — 31 TAC §356.52 (A)(6)

In order for the District to track its progress in achieving its management goals and objectives, the District will submit an annual report ("Annual Report") for review by its Board of Directors. The Annual Report will be submitted to the Board of Directors no later than 120 days following the end of the District's fiscal year, and will address the District's overall performance regarding each of its management goals and objectives for the previous fiscal year. The District will maintain a copy of the Annual Report for public review at the District office after formal adoption by the Board of Directors.

X. District Goals, Management Objectives, and Performance Standards — 31 TAC §356.52

The District's management goals, objectives and performance standards are addressed as follows:

A. Providing the Most Efficient Use of Groundwater - 31 TAC §356.52 (a)(1)(A); TWC §36.1071(a)(1)

A.1. Objective: The District will require the registration of all water wells, exempt and non-exempt, within the District's boundaries each year in accordance with the District Rules.

Performance Standard: The number of new and existing water wells registered with the District will be provided in the Annual Report submitted to the Board of Directors of the District each fiscal year.

A.2. Objective: The District will require permits for all non-exempt groundwater use within District boundaries each year pursuant to the District Rules.

Performance Standard: The District will accept and process applications for permits for all non-exempt groundwater use pursuant to the permitting process described in the District Rules each year. The Annual Report for each fiscal year will contain a summary of the number of applications for the permitted use of groundwater and the number and type of permits issued.

A.3. Objective: The District will regulate the production of groundwater by maintaining a database of groundwater usage through production volume reports each year according to District rules.

Performance Standard: The District will include a summary of the volume of water produced in the County each year in the annual report.

B. Controlling and Preventing Waste of Groundwater - 31TAC §356.52 (a)(1)(B); TWC §36.1071(a)(2)

B.1. Objective: The District will provide information on an annual basis to the public on the elimination, reduction, and prevention of the waste of groundwater and information focused on water quality protection each year. The District will use one of the following methods to provide information to the public at least once during each fiscal year:

a. distribute literature packets or brochures within Panola County and the surrounding areas;
b. provide public presentations on groundwater and water issues, including waste prevention;
c. sponsor an educational program/course;
d. provide information on the District's web site;
e. submit newspaper articles to local paper for publication;
f. present displays at local public events;
g. post relevant information on social media; or
h. become involved in the distribution of information, such as brochures, in schools in Panola County.

Performance Standard: The District's Annual Report will include a summary of the District's efforts during the fiscal year to provide educational information to the public on the elimination, reduction and prevention of the waste of groundwater.

B.2. Objective: The District will make an annual evaluation of its Rules to determine whether any amendments are necessary to facilitate prevention of waste of the groundwater within District boundaries.

Performance Standard: The District's Annual Report will include a summary of the evaluation of the District Rules and will provide a recommendation as to whether any amendments to the Rules are needed to facilitate prevention of waste.

C. Addressing Conjunctive Surface Water Management Issues - 31TAC §356.52 (a)(1)(D); TWC §36.1071(a)(4)

C.1. Objective: The District will participate in the regional planning process by sending a representative to attend at least one meeting of the East Texas Regional Water Planning Group (Region I) and Region D Planning Group each fiscal year.

Performance Standard: The attendance at any Region I and Region D

meetings by a representative of the District will be included in the District's Annual Report and will indicate the dates of attendance.

D. Addressing Natural Resource Issues which Impact the Use and Availability of Groundwater, and which are Impacted by the Use of Groundwater - 31TAC §356.52 (a)(1)(E); TWC §36.1071(a)(5)

D.1. Objective: The District will monitor water-levels within District boundaries on an annual basis by measuring the water level of at least fifteen (15) water wells.

Performance Standard: The District's Annual Report will include a description of the number of wells measured and the monitoring results of the measured wells for each year.

E. Addressing Drought Conditions - 31TAC §356.52 (a)(1)(F); TWC §36.1071(a)(6)

E.1. Objective: The District will monitor drought conditions at least monthly using a suitable source such as the U.S. Drought Monitor available through the Texas Water Development Board on the following website: https://waterdatafortexas.org/drought/drought-monitor

Performance Standard: The District will make an assessment of the status of drought in the District and prepare a quarterly briefing to the Board of Directors. The drought reports will be included with copies of the quarterly briefings each year in the District Annual Report to the Board of Directors.

E.2. Objective: The District will create and adopt through the Board of Directors a Drought Contingency Plan and monitor drought conditions in the Carrizo-Wilcox Aquifer as outlined in the Drought Contingency Plan. If necessary, the District will update its Drought Contingency Plan when changes are necessary.

Performance Standard: The District's Annual Report to the Board of Directors will provide a summary of any implementations of the Drought Contingency Plan for each year and include an update on any revisions made during that year.

F. Addressing Conservation, Recharge Enhancement, Rainwater Harvesting, Precipitation Enhancement, or Brush Control, Where Appropriate and Cost Effective - 31TAC §356.52 (a)(1)(G); TWC §36.1071(a)(7)

Conservation

F.1. Objective: The District will promote conservation at least once during each fiscal year by one of the following methods:

a. distribute literature packets or brochures;
b. conduct public presentations;
c. sponsor an educational program/curriculum;
d. provide information on the District's web site;
e. submit newspaper articles to local newspaper for publication;
f. present displays at local public events;
g. post relevant information on social media;
h. annually conduct a local contest on water conservation; or
i. conduct classroom presentations on conservation.

Performance Standard: The District's Annual Report will provide a summary of the District efforts and a copy of any information provided by the District to the public during the previous fiscal year to promote conservation.

Rainwater Harvesting

F.2. Objective: The District will advocate rainwater harvesting each year by providing updated information about rainwater harvesting on the District web site at least once each fiscal year.

Performance Standard: The Annual Report for the District will include a copy of the information on rainwater harvesting which has been provided on the District web site within the previous fiscal year.

G. Addressing in a Quantitative Manner the Desired Future Conditions of the Groundwater Resources – 31 TAC §356.52(a)(1)(H); TWC §36.1071(a)(8)

G.1. Objective: Using water levels monitored as part of Objective D.1., the District will evaluate water level trends and quantitatively compare these to the adopted desired future conditions.

Performance Standard: The District's Annual Report will include documentation of water level trends from the monitoring program results described in Objective D.1. and other sources, if applicable. This documentation will include a comparison of these trends to adopted

desired future conditions.

G.2. Objective: The District will consider a reasonable estimate of actual groundwater production on an annual basis through tracking production of all permitted water wells and estimating use in non-permitted wells.

Performance Standard: The District's Annual Report will include the amount of production for each permitted water well within the boundaries of the District each year. The Annual Report will also contain an estimate of use in non-permitted wells and a description of the method used to develop the estimate.

XI. Management Goals Determined Not Applicable to the District

A. Controlling and Preventing Subsidence - 31TAC §356.52(a)(1)(C); TWC §36.1071(a)(3)

This management goal is not applicable to the District because the District is unaware of any issues of subsidence which exist within the boundaries of the District.

B. Addressing Precipitation Enhancement – 31 TAC §·356.52(a)(1)(G); TWC §36.1071(a)(7)

Precipitation enhancement is not an appropriate or cost-effective program for the District since there is not an operational precipitation enhancement program in nearby counties or groundwater conservation districts that the District could participate in and share expenses.

C. Addressing Brush Control – 31 TAC §·356.52(a)(1)(G); TWC §36.1071(a)(7)

Brush control is not an appropriate program for the District due to the geographic location, terrain, and hydrogeologic features of the territory within the District.

D. Recharge Enhancement

Recharge enhancement is not an appropriate or cost-effective activity for enhancing the District's groundwater resources based on the local terrain and hydrogeological conditions of the District.

REFERENCES

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APPENDICES

A. Enabling Act for Panola County Groundwater Conservation District

B. Resolution Adopting Management Plan

C. Notices of Public Hearings and Meetings of Panola County GCD

D. Entities to Notify and Evidence of Coordination with Surface Water Management Entities

E. Groundwater Management Areas in Texas

F. Desired Future Conditions Adopted by Groundwater Management Area 11

G. Modeled Available Groundwater Estimates for Groundwater Management Area 11 – GAM Run 17-024 MAG

H. Historical Water Use Summary by Groundwater and Surface Water

I. Estimates for Historical Groundwater Flows – GAM Run 13-006

APPENDIX A

ENABLING ACT FOR PANOLA COUNTY GCD

AN ACT

relating to the creation of the Panola County Groundwater Conservation District; providing authority to impose a tax and issue bonds.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF TEXAS:

SECTION 1. Subtitle H, Title 6, Special District Local Laws Code, is amended by adding Chapter 8819 to read as follows:

CHAPTER 8819. PANOLA COUNTY GROUNDWATER CONSERVATION DISTRICT

SUBCHAPTER A. GENERAL PROVISIONS

Sec. 8819.001. DEFINITIONS. In this chapter:

(1) "Board" means the board of directors of the district.

(2) "Director" means a member of the board.

(3) "District" means the Panola County Groundwater Conservation District.

Sec. 8819.002. NATURE OF DISTRICT. The district is a groundwater conservation district in Panola County created under and essential to accomplish the purposes of Section 59, Article XVI, Texas Constitution.

Sec. 8819.003. CONFIRMATION ELECTION REQUIRED. If the creation of the district is not confirmed at a confirmation election held on or before December 31, 2008, the district is dissolved on that date, except that:

(1) any debts incurred shall be paid;

(2) any assets that remain after the payment of debts shall be transferred to Panola County; and

(3) the organization of the district shall be maintained until all debts are paid and remaining assets are transferred.

Sec. 8819.004. INITIAL DISTRICT TERRITORY. The initial boundaries of the district are coextensive with the boundaries of Panola County, Texas.

Sec. 8819.005. APPLICABILITY OF OTHER GROUNDWATER CONSERVATION DISTRICT LAW. Except as otherwise provided by this chapter, Chapter 36, Water Code, applies to the district.

[Sections 8819.006-8819.020 reserved for expansion]

SUBCHAPTER A-1. TEMPORARY PROVISIONS

Sec. 8819.021. APPOINTMENT OF TEMPORARY DIRECTORS. (a) Not later than the 45th day after the effective date of this chapter, nine temporary directors shall be appointed as follows:

(1) the Panola County Commissioners Court shall appoint eight temporary directors, with two of the temporary directors appointed from each of the four commissioners precincts in the county to represent the precincts in which the temporary directors reside; and

(2) the county judge of Panola County shall appoint one temporary director who resides in the district to represent the district at large.

(b) Of the temporary directors, at least one director must represent rural water suppliers in the district, one must represent

agricultural interests in the district, and one must represent industrial interests in the district.

(c) If there is a vacancy on the temporary board of directors of the district, the Panola County Commissioners Court shall appoint a person to fill the vacancy in a manner that meets the representational requirements of this section.

(d) Temporary directors serve until the earlier of:

(1) the election of initial directors under Section 8819.023; or

(2) the date this subchapter expires under Section 8819.026.

Sec. 8819.022. ORGANIZATIONAL MEETING OF TEMPORARY DIRECTORS. As soon as practicable after all the temporary directors have qualified under Section 36.055, Water Code, a majority of the temporary directors shall convene the organizational meeting of the district at a location within the district agreeable to a majority of the directors. If an agreement on location cannot be reached, the organizational meeting shall be at the Panola County Courthouse.

Sec. 8819.023. CONFIRMATION AND INITIAL DIRECTORS' ELECTION. (a) The temporary directors shall hold an election to confirm the creation of the district and to elect the initial directors of the district.

(b) The temporary directors shall have placed on the ballot the names of all candidates for an initial director's position who have filed an application for a place on the ballot as provided by Section 52.003, Election Code.

(c) The ballot must be printed to provide for voting for or against the proposition: "The creation of the Panola County Groundwater Conservation District."

(d) If the district levies a maintenance tax for payment of expenses, the ballot must be printed to provide for voting for or against the proposition: "The levy of a maintenance tax at a rate not to exceed _____ cents for each $100 of assessed valuation."

(e) Section 41.001(a), Election Code, does not apply to an election held under this section.

(f) Except as provided by this section, an election under this section must be conducted as provided by Sections 36.017(b)-(i), Water Code, and the Election Code. The provision of Section 36.017(d), Water Code, relating to the election of permanent directors does not apply to an election under this section.

Sec. 8819.024. INITIAL DIRECTORS. (a) If creation of the district is confirmed at an election held under Section 8819.023, the initial directors of the district serve on the board of directors until permanent directors are elected under Section 8819.025 or 8819.053.

(b) The two initial directors representing each of the four commissioners precincts shall draw lots to determine which of the two directors shall serve a term expiring June 1 following the first regularly scheduled election of directors under Section 8819.025, and which of the two directors shall serve a term expiring June 1 following the second regularly scheduled election of directors. The at-large director shall serve a term expiring June 1 following

the second regularly scheduled election of directors.

Sec. 8819.025. INITIAL ELECTION OF PERMANENT DIRECTORS. On the uniform election date prescribed by Section 41.001, Election Code, in May of the first even-numbered year after the year in which the district is authorized to be created at a confirmation election, an election shall be held in the district for the election of four directors to replace the initial directors who, under Section 8819.024(b), serve a term expiring June 1 following that election.

Sec. 8819.026. EXPIRATION OF SUBCHAPTER. This subchapter expires September 1, 2012.

[Sections 8819.027-8819.050 reserved for expansion]

SUBCHAPTER B. BOARD OF DIRECTORS

Sec. 8819.051. DIRECTORS; TERMS. (a) The district is governed by a board of nine directors.

(b) Directors serve staggered four-year terms, with four or five directors' terms expiring June 1 of each even-numbered year.

(c) A director may serve consecutive terms.

Sec. 8819.052. METHOD OF ELECTING DIRECTORS: COMMISSIONERS PRECINCTS. (a) The directors of the district shall be elected according to the commissioners precinct method as provided by this section.

(b) One director shall be elected by the voters of the entire district, and two directors shall be elected from each county commissioners precinct by the voters of that precinct.

(c) Except as provided by Subsection (e), to be eligible to be a candidate for or to serve as director at large, a person must be

a registered voter in the district. To be a candidate for or to serve as director from a county commissioners precinct, a person must be a registered voter of that precinct.

(d) A person shall indicate on the application for a place on the ballot:

(1) the precinct that the person seeks to represent; or

(2) that the person seeks to represent the district at large.

(e) When the boundaries of the county commissioners precincts are redrawn after each federal decennial census to reflect population changes, a director in office on the effective date of the change, or a director elected or appointed before the effective date of the change whose term of office begins on or after the effective date of the change, shall serve in the precinct to which elected or appointed even though the change in boundaries places the person's residence outside the precinct for which the person was elected or appointed.

Sec. 8819.053. ELECTION DATE. The district shall hold an election to elect the appropriate number of directors on the uniform election date prescribed by Section 41.001, Election Code, in May of each even-numbered year.

Sec. 8819.054. COMPENSATION. (a) Sections 36.060(a), (b), and (d), Water Code, do not apply to the district.

(b) A director is entitled to receive compensation of not more than $50 a day for each day the director actually spends performing the duties of a director. The compensation may not

exceed $3,000 a year.

(c) The board may authorize a director to receive reimbursement for the director's reasonable expenses incurred while engaging in activities on behalf of the board.

Sec. 8819.055. BOARD ACTION. A majority vote of a quorum is required for board action. If there is a tie vote, the proposed action fails.

[Sections 8819.056-8819.100 reserved for expansion]

SUBCHAPTER C. POWERS AND DUTIES

Sec. 8819.101. GENERAL POWERS. Except as otherwise provided by this chapter, the district has all of the rights, powers, privileges, functions, and duties provided by the general law of this state applicable to groundwater conservation districts created under Section 59, Article XVI, Texas Constitution.

Sec. 8819.102. GROUNDWATER WELLS UNDER RAILROAD COMMISSION JURISDICTION. (a) Except as provided by this section, a groundwater well drilled or operated within the district under a permit issued by the Railroad Commission of Texas is under the jurisdiction of the railroad commission, and, in respect to such a well, the district has only the authority provided by Chapter 36, Water Code.

(b) Groundwater produced in an amount authorized by a railroad commission permit may be used within or exported from the district without a permit from the district.

(c) To the extent groundwater is produced in excess of railroad commission authorization, the holder of the railroad commission permit:

(1) shall apply to the district for the appropriate permit for the excess production; and

(2) is subject to the applicable regulatory fees.

Sec. 8819.103. PROHIBITION ON DISTRICT PURCHASE, SALE, TRANSPORT, OR DISTRIBUTION OF WATER. The district may not purchase, sell, transport, or distribute surface water or groundwater for any purpose.

Sec. 8819.104. PROHIBITION ON DISTRICT USE OF EMINENT DOMAIN POWERS. The district may not exercise the power of eminent domain.

Sec. 8819.105. REGIONAL COOPERATION. (a) In this section, "designated groundwater management area" means an area designated as a groundwater management area under Section 35.004, Water Code.

(b) To provide for regional continuity, the district shall comply with the requirements of Section 36.108, Water Code, and:

(1) participate as needed in coordination meetings with other groundwater conservation districts in its designated groundwater management area;

(2) coordinate the collection of data with other groundwater conservation districts in its designated groundwater management area in such a way as to achieve relative uniformity of data type and quality;

(3) coordinate efforts to monitor water quality with other groundwater conservation districts in its designated groundwater management area, local governments, and state agencies;

(4) provide groundwater level data to other

groundwater conservation districts in its designated groundwater management area;

(5) investigate any groundwater or aquifer pollution with the intention of locating its source;

(6) notify other groundwater conservation districts in its designated groundwater management area and all appropriate agencies of any groundwater pollution detected;

(7) annually provide to other groundwater conservation districts in its designated groundwater management area an inventory of water wells and an estimate of groundwater production in the district; and

(8) include other groundwater conservation districts in its designated groundwater management area on the mailing lists for district newsletters, seminars, public education events, news articles, and field days.

[Sections 8819.106-8819.150 reserved for expansion]

SUBCHAPTER D. GENERAL FINANCIAL PROVISIONS

Sec. 8819.151. LIMITATION ON TAXES. The district may not impose ad valorem taxes at a rate that exceeds 1.5 cents on each $100 valuation of taxable property in the district.

Sec. 8819.152. FEES. (a) The board by rule may impose reasonable fees on each well:

(1) for which a permit is issued by the district; and

(2) that is not exempt from district regulation.

(b) A production fee may be based on:

(1) the size of column pipe used by the well; or

(2) the amount of water actually withdrawn from the

well, or the amount authorized or anticipated to be withdrawn.

(c) The board shall base the initial production fee on the criteria listed in Subsection (b)(2). The initial production fee:

(1) may not exceed:

(A) 25 cents per acre-foot for water used for agricultural irrigation; or

(B) 6.75 cents per thousand gallons for water used for any other purpose; and

(2) may be increased at a cumulative rate not to exceed three percent per year.

(d) In addition to the production fee authorized under this section, the district may assess an export fee on groundwater from a well that is produced for transport outside the district.

(e) Fees authorized by this section may be:

(1) assessed annually;

(2) used to pay the cost of district operations; and

(3) used for any other purpose allowed under Chapter 36, Water Code.

Sec. 8819.153. LIMITATION ON INDEBTEDNESS. The district may issue bonds and notes under Subchapter F, Chapter 36, Water Code, except that the total indebtedness created by that issuance may not exceed $500,000 at any time.

SECTION 2. (a) The legal notice of the intention to introduce this Act, setting forth the general substance of this Act, has been published as provided by law, and the notice and a copy of this Act have been furnished to all persons, agencies, officials, or entities to which they are required to be furnished

under Section 59, Article XVI, Texas Constitution, and Chapter 313, Government Code.

(b) The governor has submitted the notice and Act to the Texas Commission on Environmental Quality.

(c) The Texas Commission on Environmental Quality has filed its recommendations relating to this Act with the governor, lieutenant governor, and speaker of the house of representatives within the required time.

(d) All requirements of the constitution and laws of this state and the rules and procedures of the legislature with respect to the notice, introduction, and passage of this Act are fulfilled and accomplished.

SECTION 3. This Act takes effect immediately if it receives a vote of two-thirds of all the members elected to each house, as provided by Section 39, Article III, Texas Constitution. If this Act does not receive the vote necessary for immediate effect, this Act takes effect September 1, 2007.

President of the Senate

Speaker of the House

I certify that H.B. No. 1498 was passed by the House on May 2, 2007, by the following vote: Yeas 147, Nays 0, 2 present, not voting; that the House refused to concur in Senate amendments to H.B. No. 1498 on May 24, 2007, and requested the appointment of a conference committee to consider the differences between the two houses; and that the House adopted the conference committee report on H.B. No. 1498 on May 26, 2007, by the following vote: Yeas 140, Nays 0, 2 present, not voting.

Chief Clerk of the House

I certify that H.B. No. 1498 was passed by the Senate, with amendments, on May 21, 2007, by the following vote: Yeas 31, Nays 0; at the request of the House, the Senate appointed a conference committee to consider the differences between the two houses; and that the Senate adopted the conference committee report on H.B. No. 1498 on May 26, 2007, by the following vote: Yeas 30, Nays 0.

_____

Secretary of the Senate

APPROVED: _____

Date

_____

Governor

Chapter 431

S.B. No. 1479

AN ACT

relating to the election of the board of directors of the Panola County Groundwater Conservation District.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF TEXAS:

SECTION 1. Section 8819.053, Special District Local Laws Code, is amended to read as follows:

Sec. 8819.053. ELECTION DATE. The district shall hold an election to elect the appropriate number of directors on the uniform election date prescribed by Section 41.001, Election Code, in November [~~May~~] of each even-numbered year.

SECTION 2. (a) The legal notice of the intention to introduce this Act, setting forth the general substance of this Act, has been published as provided by law, and the notice and a copy of this Act have been furnished to all persons, agencies, officials, or entities to which they are required to be furnished under Section 59, Article XVI, Texas Constitution, and Chapter 313, Government Code.

(b) The governor, one of the required recipients, has submitted the notice and Act to the Texas Commission on Environmental Quality.

(c) The Texas Commission on Environmental Quality has filed its recommendations relating to this Act with the governor, the lieutenant governor, and the speaker of the house of representatives within the required time.

(d) All requirements of the constitution and laws of this state and the rules and procedures of the legislature with respect to the notice, introduction, and passage of this Act are fulfilled and accomplished.

SECTION 3. This Act takes effect September 1, 2017.

President of the Senate

Speaker of the House

I hereby certify that S.B. No. 1479 passed the Senate on April 19, 2017, by the following vote: Yeas 31, Nays 0.

Secretary of the Senate

I hereby certify that S.B. No. 1479 passed the House on May 19, 2017, by the following vote: Yeas 141, Nays 3, two present not voting.

Chief Clerk of the House

Approved:

5-31-2017

Date

Governor

FILED IN THE OFFICE OF THE SECRETARY OF STATE
2:00 PM O'CLOCK
JUN 01 2017
Secretary of State

LEGISLATIVE BUDGET BOARD
Austin, Texas

FISCAL NOTE, 85TH LEGISLATIVE REGULAR SESSION

May 2, 2017

TO: Honorable Lyle Larson, Chair, House Committee on Natural Resources

FROM: Ursula Parks, Director, Legislative Budget Board

IN RE: **SB1479** by Hughes (Relating to the election of the board of directors of the Panola County Groundwater Conservation District.), **As Engrossed**

No fiscal implication to the State is anticipated.

The bill would amend the Special District Local Laws Code relating to the election of the board of directors of the Panola County Groundwater Conservation District. The election for board directors would be held on the uniform election date in November of each even-numbered year.

The bill would take effect September 1, 2017.

Local Government Impact

No fiscal implication to units of local government is anticipated.

Source Agencies:
LBB Staff: UP, SZ, GG, BM

LEGISLATIVE BUDGET BOARD
Austin, Texas

FISCAL NOTE, 85TH LEGISLATIVE REGULAR SESSION

April 11, 2017

TO: Honorable Charles Perry, Chair, Senate Committee on Agriculture, Water & Rural Affairs

FROM: Ursula Parks, Director, Legislative Budget Board

IN RE: **SB1479** by Hughes (relating to the election of the board of directors of the Panola County Groundwater Conservation District.), **Committee Report 1st House, Substituted**

No fiscal implication to the State is anticipated.

The bill would amend the Special District Local Laws Code relating to the election of the board of directors of the Panola County Groundwater Conservation District. The election for board directors would be held on the uniform election date in November of each even-numbered year.

The bill would take effect September 1, 2017.

Local Government Impact

No fiscal implication to units of local government is anticipated.

Source Agencies:
LBB Staff: UP, SZ, GG, BM

LEGISLATIVE BUDGET BOARD
Austin, Texas

FISCAL NOTE, 85TH LEGISLATIVE REGULAR SESSION

April 6, 2017

TO: Honorable Charles Perry, Chair, Senate Committee on Agriculture, Water & Rural Affairs

FROM: Ursula Parks, Director, Legislative Budget Board

IN RE: **SB1479** by Hughes (Relating to the election of the board of directors of the Panola County Groundwater Conservation District.), **As Introduced**

No fiscal implication to the State is anticipated.

The bill would amend the Special District Local Laws Code relating to the election of the board of directors of the Panola County Groundwater Conservation District. The election for board directors would be held on the uniform election date in November of each even-numbered year.

The bill would take effect September 1, 2017.

Local Government Impact

No fiscal implication to units of local government is anticipated.

Source Agencies:
LBB Staff: UP, SZ, GG, BM

The Panola Watchman

The Panola Watchman
109 W Panola
Carthage, TX 75633

Phone:(903) 693-7888 Fax: Email:twall@panolawatchman.com

RECEIVED 02/16/17

FEB 22 2017

Lloyd Gosselink

AFFIDAVIT OF PUBLICATION

State of Texas)

County of Panola)

This Affidavit of Publication for the Panola Watchman, a daily newspaper of general circulation, printed and published at Carthage, hereby certifies that the attached legal notice, ad # 546915, was published in said newspaper on Jan. 29th 2017, and that copies of each paper in which said Public Notice was published were delivered by carriers to the subscribers of said paper, according to their accustomed mode of business in this office.

Tammy Wall

for the Panola Watchman

The above Affidavit and Certificate of Publication was subscribed and sworn to before me by the above-named Tammy Wall, who is personally known to me to be the identical person in the above certificate on this 15th day of Feb, 2017.

Rebecca Kay Barlish

Notary Public in and for
State of Texas)
County of Panola)

REBECCA KAY BARLISH
Notary Public, State of Texas
My Commission Expires
November 19, 2018

My commission expires

NOTICE OF INTENTION TO INTRODUCE A BILL

NOTICE is hereby given that the undersigned intends to apply to the Legislature of the State of Texas, Regular Session to be held in 2017, for the passage of a Bill relating to the election date of the board of directors of the Panola County Groundwater Conservation District (the "District") by amending the District's enabling act and making findings as to compliance with Article XVI, Section 59 of the Texas Constitution.

THIS NOTICE is given in accordance with the requirements of Section 59 of Article XVI of the Texas Constitution, and said legislation will find that said requirements have been met.

ad id: 546915

The Panola Watchman panolawatchman.com/classifieds

CLASSIFIEDS

903.693.7888

TRANSPORTATION

FORD

For Sale- 2010 Ford F-150, 4X4, CNG Tank and gasoline, extended cab with split back seat. $10,500.00 (903)690-3536

ANNOUNCEMENTS

ADOPTIONS

ADOPTION:

LEGAL NOTICES

NOTICE OF INTENTION TO INTRODUCE A BILL

NOTICE is hereby given that the undersigned intends to apply to the Legislature of the State of Texas, Regular Session to be held in 2017, for the passage of a Bill relating to the election date of the board of directors of the Panola County Groundwater Conservation District (the "District") by amending the District's enabling act and making findings as to compliance with Article XVI, Section 59 of the Texas Constitution.

THIS NOTICE is given in accordance with the requirements of Section 59 of Article XVI of the Texas Constitution, and said legislation will find that said requirements have been met.

Legal Notice

LEGAL NOTICES

LEGAL NOTICE:

This Texas Lottery Commission scratch ticket game will close on February 11, 2017. You have until August 10, 2017, to redeem any tickets for this game. **#1814 Holiday Loteria** ($3) overall odds are 1 in 3.96. This Texas Lottery Commission scratch ticket game will close on February 13, 2017. You have until August 12, 2017, to redeem any tickets for this game: **#1781 Casino Cash** ($10) overall odds are 1 in 3.69. This Texas Lottery Commission scratch ticket game will close on February 23, 2017. You have until August 22, 2017, to redeem any tickets for this game: **#1753 100X The Cash** ($20) overall odds are 1 in 3.48 These Texas Lottery Commission scratch ticket games will close on April 5, 2017. You have until October 2, 2017, to redeem any tickets for these games: **#1805 Pitbull** ($2) overall odds are 1 in 4.42, **#1769 $250,000 Extreme Green** ($10) overall odds are 1 in 3.19 The odds listed here are the overall odds of winning any prize in a game, including break-even prizes. Lottery retailers are authorized to redeem prizes of up to and including $599. Prizes of $600 or more must be claimed in person at a lottery claim center or by mail, with a completed Texas Lottery® claim form, however, annuity prizes or prizes over $2,500,000 must be claimed in person at the Commission Headquarters in Austin Call Customer Service at 800-

CONSTRUCTION

HORIZONTAL DIRECTIONAL DRILL, LOCATOR with Class A CDL and clean driving record needed! Insurance benefits available after probation period. Laborer with Class C also needed. **Call for phone interview, 903-630-6308. Please only call if you have experience**

GENERAL EMPLOYMENT

Rural Water Services is now hiring Labors
Come by our office for application.
Office hours
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Looking for certified dental assistant with 2+ yrs of experience. Must be available Mon-Fri. Dental software experience preferred (903)758-3329

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Leaves a hasle? Give me a call today for your leaf removal needs. Se Habla Esp (903)921-8086

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MISCELLANEOUS

For Sale: Little Girls Twin bed, mattress, box springs, headboard, 2 sheet sets, comfrter, bed skirt, pillow sham, lamp and some room decor. $200.00 Stacey (903)521-3684

Messy Bun Hats
crocheted to your specifications. Call or text 903-472-3720 with your color choice.

APARTMENTS UNFURNISHED

APARTMENTS FOR RENT!

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HOUSE UNFURNISHED

FM 123, Deadwood, 3/1 on 2 acres for rent or sale. Under $60,000 owner finance (318)773-3272

FOR RENT- 2/3 BEDROOM HOUSE 1 BATH , NO PETS, IN CARTHAGE $900 MONTH (903)693-1200

LAKEVIEW CABINS FOR RENT
located at Lake Murval on FM 1971. Deposit required. Water & Electric included. Call (903) 657-7777 for more info.

MOBILE HOME

APPENDIX B

RESOLUTION ADOPTING MANAGEMENT PLAN

Resolution 2018-01

A RESOLUTION OF THE BOARD OF DIRECTORS OF PANOLA COUNTY GROUNDWATER CONSERVATION DISTRICT ADOPTING CHANGES TO THE DISTRICTS GROUNDWATER MANAGEMENT PLAN

WHEREAS, the Panola County Groundwater Conservation District ("District") was created by Chapter 8819 of the Texas Special Districts Local Laws Code (Chapter 867, Acts of the 80th Legislature (2007)) ("Enabling Act") and under the authority of Section 59, Article XVI of the Texas Constitution and Chapter 36 of the Texas Water Code;

WHEREAS, under the direction of the Board of Directors of the District (the "Board"), and in accordance with Sections 36.1071, 36.1072, and 36.1073 of the Texas Water Code, and 31 Texas Administrative Code Chapter 356, the District has revised its Management Plan;

WHEREAS, as part of the process of revising its Management Plan, the District requested and received the assistance of the Texas Water Development Board (the "TWDB") and worked closely with the TWDB staff to obtain staff's input and comments on the draft Management Plan and its technical and legal sufficiency;

WHEREAS, the Board and the staff of the District, the District's legal counsel, and the District's hydrogeologist reviewed and analyzed the District's best available data, groundwater availability modeling information, and other information and data required by the TWDB;

WHEREAS, the District issued the notice in the manner required by state law and held a meeting on March 27, 2018 and a public hearing on April 24, 2018, to receive public and written comments on the revised Management Plan at the District's office located at 419 W Sabine St, Carthage, TX 75633;

WHEREAS, the District will coordinate its planning efforts on a regional basis with the appropriate surface water management entities as required by Section 36.1071(a) of the Texas Water Code;

WHEREAS, the Board finds that the Management Plan meets all the requirements of Chapter 36, Water Code, and 31 Texas Administrative Code Chapter 356; and

WHEREAS, the Board of Directors met in public meetings on March 27, 2018 and April 24, 2018, properly noticed in accordance with appropriate law, and considered adoption of the attached Management Plan.

NOW, THEREFORE, BE IT ORDERED BY THE BOARD OF DIRECTORS OF PANOLA COUNTY GROUNDWATER CONSERVATION DISTRICT THAT:

1. The above recitals are true and correct.

2. The Board of Directors for the District hereby adopts the attached Management Plan as the Management Plan for the District;

3. The Board of Directors, the District staff, the District's legal counsel, and the District's hydrogeologist are further authorized to take all steps necessary to implement this resolution and submit the Management Plan to the TWDB for its approval; and

4. The Board of Directors, the District staff, the District's legal counsel, and the District's hydrogeologist are further authorized to take any 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.

5. The President of the Board of Directors and the staff of the District are further authorized to take all necessary action to implement this resolution; and,

6. This resolution shall take effect immediately upon adoption.

PASSED AND APPROVED THE 24th DAY OF APRIL 2018.

ATTEST:

Board President

ATTEST:

Board Secretary

APPENDIX C

NOTICES OF PUBLIC HEARINGS AND MEETINGS OF THE PANOLA COUNTY GCD

The Panola Watchman

The Panola Watchman
109 W Panola
Carthage, TX 75633

Phone:(903) 693-7888 Fax: Email:glynch@panolawatchman.com

04/02/18

AFFIDAVIT OF PUBLICATION

State of Texas)

County of Panola)

This Affidavit of Publication for the Panola Watchman, a daily newspaper of general circulation, printed and published at Carthage, hereby certifies that the attached legal notice, ad # 599272, was published in said newspaper on April 4 2018, and that copies of each paper in which said Public Notice was published were delivered by carriers to the subscribers of said paper, according to their accustomed mode of business in this office.

Gayla Lynch
for the Panola Watchman

The above Affidavit and Certificate of Publication was subscribed and sworn to before me by the above-named Gayla Lynch, who is personally known to me to be the identical person in the above certificate on this 5th day of April, 2018.

Brandi L. Reed
Notary Public in and for
State of Texas)
County of Panola)

My commission expires 3-5-21

BRANDI L. REED
Notary Public
STATE OF TEXAS
ID#12933363-8
My Comm. Exp. Mar. 5, 2021

ad id: 599272

NOTICE OF THE PUBLIC HEARING OF THE PANOLA COUNTY GROUNDWATER CONSERVATION DISTRICT ON DISTRICT MANAGEMENT PLAN

Notice is hereby given that the Board of Directors of the Panola County Groundwater Conservation District ("District") will hold a public hearing on Tuesday April 24, 2018, at 5:30 p.m. in the District office located at 419 W Sabine Street, Carthage, Texas 75633, to discuss, consider, receive public comments, and potentially act upon the revision and readoption of the District Management Plan.

All interested members of the public are invited to attend. Any person who wishes to present comments or other information at the hearing may do so in person, by counsel, or both. Comments may be presented verbally or in written form. Limits may be placed on the amount of time any such person is allowed to present verbal comments at the hearing. The hearing posted in this notice may be recessed from day to day or continued where appropriate. A copy of the proposed revised Management Plan may be requested by email at district@pcgcd.org, may be reviewed or copied at the District office 419 West Sabine Street, Carthage, Texas 75633, or are available on the District's website at www.pcgcd.org.

The 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 (903) 690-0143 at least 24 hours in advance if accommodation is needed.

RECEIVED
APR 10 2018

PUBLIC HEARINGS

Panola County Groundwater Conservation District
419 W Sabine St., Carthage, Texas 75633
Phone: 903.690.0143 Fax: 903.690.0135

Public Hearing
Tuesday, April 24, 2018, at 5:30 p.m.

County Clerk's Office Use Only:
FILED FOR RECORD
IN MY OFFICE
AT 3:45 O'CLOCK P M
APR 12 2018
BOBBIE DAVIS
COUNTY CLERK, PANOLA COUNTY, TEXAS
BY G Gilmore DEPUTY

PUBLIC HEARING AGENDA

Operating and Grandfathered Use Permits.

1. Call to order.

2. Public hearing for an Operating Permit Application:

   Panola Bethany WSC, located at 10908 US 79, Panola, TX 75685; applied to operate one 3" casing water well located at 10908 US 79, Panola, TX 75685, for public water supply. The potential maximum annual groundwater production from this well is 52,560,000 gallons or 161.30-acre feet annually for the water well at the estimated rate of withdrawal of 100 gallons per minute (gpm).

   In addition to the current grandfathered use permit the total usage applied for is 45,000,000 gallons or 138.10-acre feet annually.

3. Public hearing for an Operating Permit Application:

   Panola County Processing, located at 501 CR 407 Carthage, Texas 75633; applied to operate one 4" casing water well located at 501 CR 407 Carthage, Tx 75633, for commercial use. The potential maximum annual groundwater production from this well is 10,512,000 gallons or 32.26-acre feet annually for the water well at the estimated rate of withdrawal of 20 gallons per minute (gpm).

   The total usage applied for is 2,000,000 gallons or 6.14-acre feet annually.

4. Public hearing for a Grandfathered Permit Application:

   Merket Tree Farm, located at 785 FM 1794 W, Beckville, Texas 75631; applied to operate one 4" casing water well located at 785 FM 1794 W, Beckville, Texas 75631, for commercial use (irrigation purposes). The potential maximum annual groundwater production from this well is 10,512,000 gallons or 32.26-acre feet annually for the water well at the estimated rate of withdrawal of 20 gallons per minute (gpm).

   The total usage applied for is 5,000,000 gallons or 15.35-acre feet annually.

5. Public hearing for an Operating Permit Application:

   Gary ISD, located at 132 Bobcat Trail, Gary, TX 75643; applied to operate one 4" casing water well located at 132 Bobcat Trail, Gary, TX 75643, for irrigation. The potential maximum annual groundwater production from this well is 10,512,000 gallons or 32.26-acre feet annually for the water well at the estimated rate of withdrawal of 20 gallons per minute (gpm).

   The total usage applied for is 10,512,000 gallons or 32.26-acre feet annually.

6. Public hearing for an Operating Permit Application:

   Joe Harris, located at 1855 FM 31 N, DeBerry, TX 75639; applied to operate one 4" casing water well located at 1855 FM 31 N, DeBerry, TX 75639 for irrigation. The potential maximum annual groundwater production from this well is 21,024,000 gallons or 64.52-acre feet annually for the water well at the estimated rate of withdrawal of 40 gallons per minute (gpm).

   The total usage applied for is 2,000,000 gallons or 6.14-acre feet annually.

7. Adjourn.

Management Plan Hearing

1. Call to order.

2. Public hearing for the District Management Plan.
   A. Discuss and take action on approval of the District Management Plan for 2018 and for resolution 2018-01.

3. Adjourn.

Rule Change Public Hearing

1. Call to order

2. Public Hearing for the spacing rule change.
   A. Change rule 3.13, dealing with permit amendments.
   B. Change rule 5.1 and 5.2, to set effective date for spacing requirements and to approve, a 10 (ten) feet per gallon per minute spacing requirement.
   C. Discuss and take action on approval of resolution 2018-02.

3. Adjourn.

These public hearings are available to all persons regardless of disability. If you require special assistance to attend or participate in the hearings, please contact the Panola County GCD at (903) 690-0143 at least 24 hours in advance of the meeting.

Any person having an interest in the subject matter of a hearing may file a contested case hearing on an application by submitting in writing prior to the hearing or appear at the hearing and provide reasons opposing the application. A person or entity requesting a contested hearing on more than one application must submit a separate request for each application. Requirements for a contested case hearing can be found in Rule 10.4 of the District rules which are available on request from the District by calling (903) 690-0143 or online at www.pcgcd.org.

At any time during the meeting and in compliance with the Texas Open Meetings Act, Chapter 551, Government Code, Vernon's Texas Codes, Annotated, the Panola County Groundwater Conservation District Board may meet in executive session on any of the above agenda items for consultation concerning attorney-client matters (§551.071); deliberation regarding real property (§551.072); deliberation regarding prospective gift (§551.073); personnel matters (§551.074); and deliberation regarding security devices (§551.076). Any subject discussed in executive session may be subject to action during an open meeting.

Certification

I, the undersigned authority, do hereby certify that our office posted and filed the above notice of meeting at or before April 12, 2018 at 5:00 p.m., with the Panola County Clerk's Office, and also posted a copy near the front door of the Panola County GCD office in a place convenient and readily accessible to the general public at all times and that it will remain so posted continuously for at least 10 days preceding the scheduled time of said meeting in accordance with Texas Government Code, Chapter 551.

Leah Adams, General Manager
Panola County Groundwater Conservation District

WITNESS THE HAND AND SEAL OF THE UNDERSIGNED CLERK ON THIS THE 12TH DAY OF APRIL 2018 AT 3:45 O'CLOCK A.M (P.M)

Bobbie Davis
BOBBIE DAVIS, COUNTY CLERK
PANOLA COUNTY, TEXAS

BY Gina Goldman DEPUTY

APPENDIX D

ENTITIES TO NOTIFY AND EVIDENCE OF COORDINATION WITH SURFACE WATER MANAGEMENT ENTITIES

Cities in Panola County:

Stephen Williams, City Manager
812 W. Panola St.
Carthage, Texas 75633

City of Beckville
P.O. Box 97
Beckville, Texas 75631

City of Gary
P. O. Drawer 160
Gary, Texas 75643

City of Tatum
P. O. Box 1105
Tatum, Texas 75691

Groundwater Management Area 11-Groundwater Conservation Districts:

Neches & Trinity Valleys Groundwater Conservation District
David Alford, General Manager
P. O. Box 1387
Jacksonville, Texas 75766

Pineywoods Groundwater Conservation District
Jackie Risner, General Manager
P. O. Box 635187
Nacogdoches, Texas 75963-5187

Rusk County Groundwater Conservation District
Amanda Maloukis, General Manager
P. O. Box 97
Henderson, Texas 75652

Surface Water Management Entities:
Sabine River Authority
Jerry Clark, General Manager
P.O. Box 579
Orange, Texas 77631-0579

Panola County Fresh Water Supply District No. 1
Eric Pellham, President
P.O. Box 331
Carthage, Texas 75633

Leah Adams

From: Leah Adams <ladams@pcgcd.org>
Sent: Thursday, May 17, 2018 1:28 PM
To: 'swilliams@carthagetexas.com'
Subject: Panola County Management Plan
Attachments: PanolaCoGCD_ManagementPlan_FINAL_2018-05-11_reducedsize.pdf

Mr. Williams:

Attached is a copy of the Board approved management plan for the Panola County Groundwater Conservation District. Please review and let me know if you have any comments or questions. Thank you!

Leah Adams
General Manager
Panola County Groundwater Conservation District
419 West Sabine Street
Carthage, Texas 75633
903-690-0143 Office
903-263-3256 Cell
903-690-0135 Fax
ladams@pcgcd.org
www.pcgcd.org

U.S. Postal Service
Certified Mail Receipt

ARTICLE NUMBER
9402 7118 9956 0309 2580 62

ARTICLE ADDRESS TO:
City of Beckville
Gene Mothershed
PO Box 97
Beckville TX 75631-0097

FEES

Postage per piece	$7.25
Certified Fee	3.45
Return Receipt Fee	2.75
Total Postage & Fees:	**$13.45**

Postmark Here

Leah Adams

From: Leah Adams <ladams@pcgcd.org>
Sent: Thursday, May 17, 2018 1:44 PM
To: 'garyngs2@hotmail.com'
Subject: Panola County Management Plan
Attachments: PanolaCoGCD_ManagementPlan_FINAL_2018-05-11_reducedsize.pdf

Dear City of Gary:

Attached is a copy of our Board approved management plan. Please let me know if you have any questions or comment. Thank you!

Leah Adams
General Manager
Panola County Groundwater Conservation District
419 West Sabine Street
Carthage, Texas 75633
903-690-0143 Office
903-263-3256 Cell
903-690-0135 Fax
ladams@pcgcd.org
www.pcgcd.org

Leah Adams

From: Leah Adams <ladams@pcgcd.org>
Sent: Thursday, May 17, 2018 1:44 PM
To: 'cityoftatum@tatumtel.net'
Subject: Panola County Management Plan
Attachments: PanolaCoGCD_ManagementPlan_FINAL_2018-05-11_reducedsize.pdf

Dear City of Tatum:

Attached is a copy of the Board approved management plan for the Panola County Groundwater Conservation District. Please review and let me know if you have any comments or questions. Thank you!

Leah Adams
General Manager
Panola County Groundwater Conservation District
419 West Sabine Street
Carthage, Texas 75633
903-690-0143 Office
903-263-3256 Cell
903-690-0135 Fax
ladams@pcgcd.org
www.pcgcd.org

Leah Adams

From: Leah Adams <ladams@pcgcd.org>
Sent: Thursday, May 17, 2018 1:00 PM
To: 'Amanda Maloukis'; Jackie Risner; David Alford
Subject: Panola County GCD Management Plan
Attachments: PanolaCoGCD_ManagementPlan_FINAL_2018-05-11_reducedsize.pdf

Hello Everyone!

Attached is the most recent Board approved management plan. Please review and let me know if you have any questions or comments. Thank you!

Leah Adams
General Manager
Panola County Groundwater Conservation District
419 West Sabine Street
Carthage, Texas 75633
903-690-0143 Office
903-263-3256 Cell
903-690-0135 Fax
ladams@pcgcd.org
www.pcgcd.org

Leah Adams

From: Leah Adams <ladams@pcgcd.org>
Sent: Thursday, May 17, 2018 2:00 PM
To: 'dmontagne@sratx.org'
Subject: Panola County Management Plan
Attachments: PanolaCoGCD_ManagementPlan_FINAL_2018-05-11_reducedsize.pdf

Dear Sabine River Authority:

Attached is a copy of the Board approved management plan for the Panola County Groundwater Conservation District. Please review and let me know if you have any comments or questions. Thank you!

Leah Adams
General Manager
Panola County Groundwater Conservation District
419 West Sabine Street
Carthage, Texas 75633
903-690-0143 Office
903-263-3256 Cell
903-690-0135 Fax
ladams@pcgcd.org
www.pcgcd.org

Leah Adams

From: Leah Adams <ladams@pcgcd.org>
Sent: Thursday, May 17, 2018 1:15 PM
To: 'pcfwd1@gmail.com'
Subject: Panola County Management Plan
Attachments: PanolaCoGCD_ManagementPlan_FINAL_2018-05-11_reducedsize.pdf

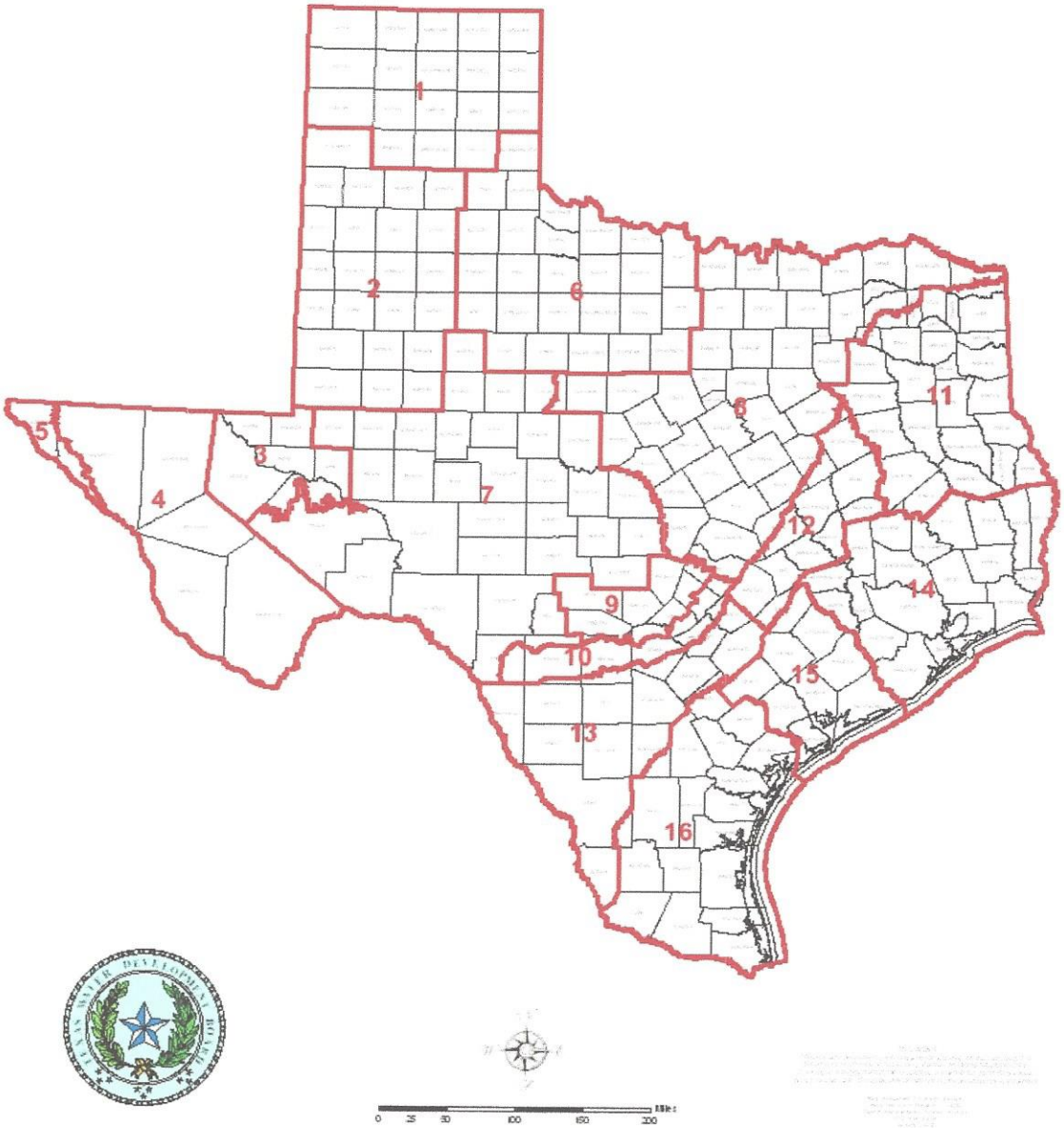
Dear Panola County Freshwater District 1:

Attached is a copy of our Board approved management plan. Please let me know if you have any questions or comment. Thank you!

Leah Adams
General Manager
Panola County Groundwater Conservation District
419 West Sabine Street
Carthage, Texas 75633
903-690-0143 Office
903-263-3256 Cell
903-690-0135 Fax
ladams@pcgcd.org
www.pcgcd.org

APPENDIX E

Groundwater Management Areas In Texas



APPENDIX F

DESIRES FUTURE CONDITIONS ADOPTED BY GROUNDATER MANAGEMENT AREA 11

RESOLUTION TO ADOPT PROPOSED DESIRED FUTURE CONDITIONS FOR AQUIFERS IN GROUNDWATER MANAGEMENT AREA 11

THE STATE OF TEXAS	§
	§
GROUNDWATER MANAGEMENT AREA 11	§
	§
GROUNDWATER CONSERVATION DISTRICTS	§

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

WHEREAS, the groundwater conservation districts located wholly or partially within Groundwater Management Area 11 ("GMA 11"), as designated by the Texas Water Development Board, as of the date of this resolution are as follows: Neches & Trinity Valleys Groundwater Conservation District, Panola County Groundwater Conservation District, Pineywoods Groundwater Conservation District, Rusk County Groundwater Conservation District (collectively hereinafter "the GMA 11 Districts");

WHEREAS, the GMA 11 Districts are each governmental agencies and bodies politic and corporate operating under Chapter 36, Water Code;

WHEREAS, the GMA 11 Districts desire to fulfill the requirements of Texas Water Code §36.108 through mutual cooperation and joint planning efforts;

WHEREAS, the GMA 11 Districts have had numerous public meetings, including stakeholder meetings for the specific purpose of receiving comments and input from stakeholders within GMA 11, and they have engaged in joint planning efforts to promote comprehensive management of the aquifers located in whole or in part in Groundwater Management Area 11;

WHEREAS, GMA 11 held meetings on February 25, 2015; March 26, 2015; April 8, 2015; May 4, 2015; July 15, 2015; September 3, 2015; November 4, 2015; January 19, 2016; March 22, 2016; and April 28, 2016, in compliance with its statutory duty to publically consider the desired future conditions considerations listed in § 36.108(d);

WHEREAS, the GMA 11 Districts have considered the following factors, listed in §36.108(d), in establishing the proposed desired future conditions for the aquifer(s), set forth under Appendix B:

(1) groundwater availability models and other data or information for the management area;

(2) aquifer uses or conditions within the management area, including conditions that differ substantially from one geographic area to another;

(3) the water supply needs and water management strategies included in the state water plan;

(4) hydrological conditions, including for each aquifer in the management area the total estimated recoverable storage as provided by the Texas Water Development Board Executive Administrator and the average annual recharge. inflows, and discharge;

(5) other environmental impacts, including impacts on spring flow and other interactions between groundwater and surface water;

(6) the impact of subsidence;

(7) socioeconomic impacts reasonably expected to occur;

(8) the impact on the interests and rights in private property, including ownership and the rights of management area landowners and their lessees and assigns in groundwater as recognized under Texas Water Code §36.002;

(9) the feasibility of achieving the desired future conditions; and

(10) any other information relevant to the specific desired future conditions;

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

WHEREAS, after considering the factors listed in 36.108(d), Texas Water Code, the GMA 11 Districts may establish different desired future conditions for: (1) each aquifer, subdivision of an aquifer, or geologic strata located in whole or in part within the boundaries of GMA 11; or (2) each geographic area overlying an aquifer in whole or in part or subdivision of an aquifer within the boundaries of GMA 11;

WHEREAS, the GMA 11 Districts recognize that GMA 11 includes a geographically and hydrologically diverse area with a variety of land uses and a diverse mix of water users;

WHEREAS, at least two-thirds of the GMA 11 Districts had a voting representative in attendance at the April 28, 2016, meeting in accordance with Section 36.108, Texas Water Code; and the following districts had a voting representative in attendance at the meeting: Neches & Trinity Valleys Groundwater Conservation District, Panola County Groundwater Conservation District, Pineywoods Groundwater Conservation District, Rusk County Groundwater Conservation District, and;

WHEREAS, it is the intent and purpose of the GMA 11 Districts, by adoption of this resolution, to meet the requirements of Texas Water Code §36.108, and establish proposed "desired future conditions for the relevant aquifers" within GMA 11 for the specific aquifer(s) and desired future conditions described under "Appendix B," attached hereto and incorporated herein for all purposes;

WHEREAS, at the April 28, 2016, meeting, after a motion was duly made and seconded, the GMA 11 Districts adopt this resolution establishing desired future conditions for the aquifer(s) described under "Appendix B", the motion prevailed by the following vote:

NOW, THEREFORE, BE IT RESOLVED BY THE AUTHORIZED VOTING REPRESENTATIVES OF THE GMA 11 DISTRICTS AS FOLLOWS:

1. The above recitals are true and correct.

2. The authorized voting representatives of the GMA 11 Districts hereby establish the proposed desired future conditions of the aquifer(s) as set forth in Appendix B by the vote reflected in the above recitals.

3. The GMA 11 Districts and their agents and representatives, individually and collectively, are further authorized to take any and all actions necessary to implement this resolution.

4. The proposed desired future conditions of the aquifer(s) adopted by the GMA 11 Districts and attached hereto shall be sent to the GMA 11 Districts to commence the public comment and hearing period required by Section 36.108(d-2), Texas Water Code.

AND IT IS SO ORDERED.

PASSED AND ADOPTED on this 28th day of April, 2016.

ATTEST:

Neches & Trinity Valleys Groundwater Conservation District

Panola County Groundwater Conservation District

Pineywoods Groundwater Conservation District

Rusk County Groundwater Conservation District

ATTACHMENTS
Appendix A: Copies of notices of April 28, 2016, meeting
Appendix B: Proposed Desired Future Conditions

Appendix A
April 28, 2016 Meeting Notices

NOTICE OF A MEETING FOR THE GROUNDWATER MANAGEMENT AREA 11

Notice is hereby given that the groundwater conservation districts (GCD) located wholly or partially within the **Groundwater Management Area 11** (GMA-11) as designated by the Texas Water Development Board (TWDB) consisting of:

Neches and Trinity Valleys Groundwater Conservation District (NTVGCD),
Panola County Groundwater Conservation District (PCGCD),
Pineywoods Groundwater Conservation District (PGCD), and
Rusk County Groundwater Conservation District (RCGCD);

Will hold a **Joint Planning Meeting at 10:00 a.m. on Thursday, April 28, 2016** in room 119 (Commissioners Room) in Nacogdoches City Hall at 202 E. Pilar, Nacogdoches, TX, for the following purpose:

1. Call meeting to order and establish a quorum.
2. Public comments. [i]
3. Discussion and possible action to approve the minutes of the January 19, 2016 meeting.
4. Discussion and possible action to approve the minutes of the March 22, 2016 meeting.
5. Discussion and possible action on GMA-11 technical memorandum on non-relevant aquifers.
6. Discussion and possible action on the preliminary explanatory report.
7. Review and possible action on consultant deliverable and invoice for DFC consultant work.
8. Discussion and possible action regarding adoption of proposal for Desired Future Conditions for all relevant aquifers in GMA-11 and accompanying resolution.
9. Review and possible action for the interlocal agreement amendment.
10. Report from the GMA-11 representatives for the Region I and Region D regional water planning groups.
11. Discussion of possible agenda items for the next GMA-11 meeting.
12. Set date, time, and place of next meeting.
13. Adjourn meeting.

Dated and posted prior to 5:00 PM on or before the 15th day of April, 2016.

Leah Adams, GMA-11 Contact
Panola County Groundwater Conservation District

This meeting is available to all persons regardless of disability. If you require special assistance to attend or participate in the meeting, please contact the Panola County GCD at (903) 690-0143 at least 24 hours in advance of the meeting.

[i] **PUBLIC COMMENTS**: Citizens who desire to address GMA-11 on any matter may sign up to do so prior to this meeting. Public comments will be received during this portion of the meeting. Please limit comments to 3 (three) minute. No discussion or final action will be taken by GMA-11.

Questions, Requests for Information and Comments Submission: Citizens who wish to ask questions, to request additional information, or to submit comments may do so by submitting such information to the following person:

Leah Adams, Panola County GCD, 419 W. Sabine Street, Carthage, Texas 75633
(903) 690-0143 / ladams@pcgcd.org

NOTICE OF A MEETING FOR THE GROUNDWATER MANAGEMENT AREA 11

Notice is hereby given that the groundwater conservation districts (GCD) located wholly or partially within the **Groundwater Management Area 11** (GMA-11) as designated by the Texas Water Development Board (TWDB) consisting of:

Neches and Trinity Valleys Groundwater Conservation District (NTVGCD),
Panola County Groundwater Conservation District (PCGCD),
Pineywoods Groundwater Conservation District (PGCD), and
Rusk County Groundwater Conservation District (RCGCD);

Will hold a **Joint Planning Meeting at 10:00 a.m. on Thursday, April 28, 2016** in room 119 (Commissioners Room) in Nacogdoches City Hall at 202 E. Pilar, Nacogdoches, TX, for the following purpose:

1. Call meeting to order and establish a quorum.
2. Public comments. [i]
3. Discussion and possible action to approve the minutes of the January 19, 2016 meeting.
4. Discussion and possible action to approve the minutes of the March 22, 2016 meeting.
5. Discussion and possible action on GMA-11 technical memorandum on non-relevant aquifers.
6. Discussion and possible action on the preliminary explanatory report.
7. Review and possible action on consultant deliverable and invoice for DFC consultant work.
8. Discussion and possible action regarding adoption of proposal for Desired Future Conditions for all relevant aquifers in GMA-11 and accompanying resolution.
9. Review and possible action for the interlocal agreement amendment.
10. Report from the GMA-11 representatives for the Region I and Region D regional water planning groups.
11. Discussion of possible agenda items for the next GMA-11 meeting.
12. Set date, time, and place of next meeting.
13. Adjourn meeting.

Dated and posted prior to 5:00 PM on or before the 15th day of April, 2016.

Leah Adams, GMA-11 Contact
Panola County Groundwater Conservation District

This meeting is available to all persons regardless of disability. If you require special assistance to attend or participate in the meeting, please contact the Panola County GCD at (903) 690-0143 at least 24 hours in advance of the meeting.

[i] **PUBLIC COMMENTS**: Citizens who desire to address GMA-11 on any matter may sign up to do so prior to this meeting. Public comments will be received during this portion of the meeting. Please limit comments to 3 (three) minute. No discussion or final action will be taken by GMA-11.

Questions, Requests for Information and Comments Submission: Citizens who wish to ask questions, to request additional information, or to submit comments may do so by submitting such information to the following person:

Leah Adams, Panola County GCD, 419 W. Sabine Street, Carthage, Texas 75633
(903) 690-0143 / ladams@pcgcd.org

NOTICE OF A MEETING FOR THE GROUNDWATER MANAGEMENT AREA 11

Notice is hereby given that the groundwater conservation districts (GCD) located wholly or partially within the **Groundwater Management Area 11** (GMA-11) as designated by the Texas Water Development Board (TWDB) consisting of:

Neches and Trinity Valleys Groundwater Conservation District (NTVGCD),
Panola County Groundwater Conservation District (PCGCD),
Pineywoods Groundwater Conservation District (PGCD), and
Rusk County Groundwater Conservation District (RCGCD);

Will hold a **Joint Planning Meeting at 10:00 a.m. on Thursday, April 28, 2016** in room 119 (Commissioners Room) in Nacogdoches City Hall at 202 E. Pilar, Nacogdoches, TX, for the following purpose:

1. Call meeting to order and establish a quorum.
2. Public comments.[1]
3. Discussion and possible action to approve the minutes of the January 19, 2016 meeting.
4. Discussion and possible action to approve the minutes of the March 22, 2016 meeting.
5. Discussion and possible action on GMA-11 technical memorandum on non-relevant aquifers.
6. Discussion and possible action on the preliminary explanatory report.
7. Review and possible action on consultant deliverable and invoice for DFC consultant work.
8. Discussion and possible action regarding adoption of proposal for Desired Future Conditions for all relevant aquifers in GMA-11 and accompanying resolution.
9. Review and possible action for the interlocal agreement amendment.
10. Report from the GMA-11 representatives for the Region I and Region D regional water planning groups.
11. Discussion of possible agenda items for the next GMA-11 meeting.
12. Set date, time, and place of next meeting.
13. Adjourn meeting.

FILED FOR RECORD
2016 APR 15 AM 9:14
LAVERNE LUSK COUNTY CLERK
CHEROKEE COUNTY, TEXAS
DEPUTY

Dated and posted prior to 5:00 PM on or before the 15th day of April, 2016.

Leah Adams, GMA-11 Contact
Panola County Groundwater Conservation District

This meeting is available to all persons regardless of disability. If you require special assistance to attend or participate in the meeting, please contact the Panola County GCD at (903) 690-0143 at least 24 hours in advance of the meeting.

[1] **PUBLIC COMMENTS**: Citizens who desire to address GMA-11 on any matter may sign up to do so prior to this meeting. Public comments will be received during this portion of the meeting. Please limit comments to 3 (three) minute. No discussion or final action will be taken by GMA-11.

Questions, Requests for Information and Comments Submission: Citizens who wish to ask questions, to request additional information, or to submit comments may do so by submitting such information to the following person:

Leah Adams, Panola County GCD, 419 W. Sabine Street, Carthage, Texas 75633
(903) 690-0143 / ladams@pcgcd.org

NOTICE OF A MEETING FOR THE GROUNDWATER MANAGEMENT AREA 11

Notice is hereby given that the groundwater conservation districts (GCD) located wholly or partially within the **Groundwater Management Area 11** (GMA-11) as designated by the Texas Water Development Board (TWDB) consisting of:

Neches and Trinity Valleys Groundwater Conservation District (NTVGCD),
Panola County Groundwater Conservation District (PCGCD),
Pineywoods Groundwater Conservation District (PGCD), and
Rusk County Groundwater Conservation District (RCGCD);

Will hold a **Joint Planning Meeting at 10:00 a.m. on Thursday, April 28, 2016** in room 119 (Commissioners Room) in Nacogdoches City Hall at 202 E. Pilar, Nacogdoches, TX, for the following purpose:

1. Call meeting to order and establish a quorum.
2. Public comments. [1]
3. Discussion and possible action to approve the minutes of the January 19, 2016 meeting.
4. Discussion and possible action to approve the minutes of the March 22, 2016 meeting.
5. Discussion and possible action on GMA-11 technical memorandum on non-relevant aquifers.
6. Discussion and possible action on the preliminary explanatory report.
7. Review and possible action on consultant deliverable and invoice for DFC consultant work.
8. Discussion and possible action regarding adoption of proposal for Desired Future Conditions for all relevant aquifers in GMA-11 and accompanying resolution.
9. Review and possible action for the interlocal agreement amendment.
10. Report from the GMA-11 representatives for the Region I and Region D regional water planning groups.
11. Discussion of possible agenda items for the next GMA-11 meeting.
12. Set date, time, and place of next meeting.
13. Adjourn meeting.

Dated and posted prior to 5:00 PM on or before the 15th day of April, 2016.

Leah Adams, GMA-11 Contact
Panola County Groundwater Conservation District

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9. Review and possible action for the interlocal agreement amendment.
10. Report from the GMA-11 representatives for the Region I and Region D regional water planning groups.
11. Discussion of possible agenda items for the next GMA-11 meeting.
12. Set date, time, and place of next meeting.
13. Adjourn meeting.

Dated and posted prior to 5:00 PM on or before the 15th day of April, 2016.

Leah Adams, GMA-11 Contact
Panola County Groundwater Conservation District

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10. Report from the GMA-11 representatives for the Region I and Region D regional water planning groups.
11. Discussion of possible agenda items for the next GMA-11 meeting.
12. Set date, time, and place of next meeting.
13. Adjourn meeting.

FILED FOR RECORD
IN MY OFFICE
AT 9:35 O'CLOCK a M

APR 14 2016

BOBBIE DAVIS
COUNTY CLERK, PANOLA COUNTY, TEXAS
BY [signature] DEPUTY

Dated and posted prior to 5:00 PM on or before the 15th day of April, 2016.

Leah Adams, GMA-11 Contact
Panola County Groundwater Conservation District

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9. Review and possible action for the interlocal agreement amendment.
10. Report from the GMA-11 representatives for the Region I and Region D regional water planning groups.
11. Discussion of possible agenda items for the next GMA-11 meeting.
12. Set date, time, and place of next meeting.
13. Adjourn meeting.

Dated and posted prior to 5:00 PM on or before the 15th day of April, 2016.

FILED FOR RECORD
Apr 14,2016 01:34P
TRUDY HOGILL, COUNTY CLERK
RUSK COUNTY, TEXAS
BY:Randa Rowe, DEPUTY

Leah Adams, GMA-11 Contact
Panola County Groundwater Conservation District

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Leah Adams, Panola County GCD, 419 W. Sabine Street, Carthage, Texas 75633
(903) 690-0143 / ladams@pcgcd.org

Leah Adams

From: Texas Register <TexReg@sos.texas.gov>
Sent: Thursday, April 14, 2016 3:36 PM
To: ladams@pcgcd.org
Subject: S.O.S. Acknowledgment of Receipt

Acknowledgment of Receipt

Agency: Groundwater Management Area 11

Liaison: Leah Adams

The Office of the Secretary of State has posted

notice of the following meeting:

Board: Groundwater Management Area 11

Committee:

Date: 04/28/2016 10:00 AM "TRD# 2016002496"

Notice posted: 04/14/16 03:36 PM

Proofread your current open meeting notice at:

http://texreg.sos.state.tx.us/public/pub_om_lookup$.startup?Z_TRD=2016002496

Appendix B
Proposed Desired Future Conditions

GMA 11 Technical Memorandum 16-02 (Draft 2), dated March 25, 2016, summarizes the how the results of groundwater availability model simulations were used to developed the proposed desired future conditions for the Sparta, Queen City, and Carrizo-Wilcox aquifers for GMA 11.

Table 5 from GMA 11 Technical Memorandum 16-02 (Draft 2), dated March 25, 2016 lists the proposed desired future conditions, and is presented below. As described in the technical memorandum, the proposed desired future conditions are average drawdowns (in feet) from year 2000 conditions to 2070 conditions were largely based on GAM Scenario 4. Based on an analysis of model output and model limitations, the output from the model was modified to develop the proposed desired future conditions as follows:

- Layers 2 and 4 (the confining units) were eliminated, and Table 5 includes only aquifer units. Areas that have no active cells are designated as NP (for not present).
- Layers 5, 6, 7, and 8 are combined, and a single drawdown value for the Carrizo-Wilcox Aquifer are listed
- All areas that are less than 200 square miles are eliminated (noted as NRS, or not relevant for purposes of joint planning due to size of area).
- Areas with negative drawdown that are greater than 200 square miles have had the negative drawdown cells eliminated from the average drawdown calculation, effectively assuming that those cells have a zero drawdown, and that the negative drawdown areas are a result of model limitations, as discussed (designated in yellow).
- The desired future condition in Panola County for the Carrizo-Wilcox Aquifer is listed as 3 feet. The actual average using all data from the model is 2 feet. If the areas with negative drawdown are assumed to be zero, the revised average is 4 feet. As presented at the March 22, 2016 GMA 11 meeting, Mr. Wade Oliver (representing the Panola County GCD) evaluated the average drawdown under Scenario 4 using an alternative analytical modeling approach and concluded that the drawdown was 3 feet. Thus, Mr. Oliver's result is consistent with the midpoint between the two GAM-based drawdown approaches.
- Based on the principle of using the GAM as a joint planning tool and the fact that the GAM predictions contain uncertainty, GMA 11 considered the DFCs to be compatible and physically possible if the difference between modeled drawdown results and the DFC drawdown targets are within a 5 percent range for all aquifers in GMA 11.

Proposed Desired Future Conditions
Average Drawdown (ft) from 2000 to 2070

County	Sparta Aquifer	Queen City Aquifer	Carrizo-Wilcox Aquifer
Anderson	NRS	9	90
Angelina	16	NRS	48
Bowie	NP	NP	5
Camp	NP	NRS	33
Cass	NP	10	68
Cherokee	NRS	14	99
Franklin	NP	NP	14
Gregg	NP	NRS	58
Harrison	NP	1	18
Henderson	NP	5	50
Hopkins	NP	NP	3
Houston	3	6	80
Marion	NP	24	45
Morris	NP	NRS	46
Nacogdoches	5	4	29
Panola	NP	NP	3
Rains	NP	NP	1
Rusk	NP	NRS	23
Sabine	1	NP	9
San Augustine	2	NP	7
Shelby	NP	NP	1
Smith	NP	17	119
Titus	NP	NRS	11
Trinity	9	NRS	51
Upshur	NP	9	77
VanZandt	NP	NRS	21
Wood	NP	5	89
GMA11	4	10	56

Notes: NP = Not present

NRS = Not Relevant due to size (less than 200 square miles)

Yellow Cells represent average drawdown calculations that assume negative drawdown is zero (model artifact and model limitation)

Green Cell represents the recommended DFC for Panola County as described in report

APPENDIX G

MODELED AVAILABLE GROUNDWATER ESTIMATES
GAM RUN 17-024 MAG

GAM RUN 17-024 MAG:
MODELED AVAILABLE GROUNDWATER FOR THE CARRIZO-WILCOX, QUEEN CITY, AND SPARTA AQUIFERS IN GROUNDWATER MANAGEMENT AREA 11

Shirley C. Wade, Ph.D., P.G.
Texas Water Development Board
Groundwater Division
Groundwater Availability Modeling Department
(512) 936-0883
June 19, 2017

Shirley C. Wade
6/19/17

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GAM Run 17-024 MAG: Modeled Available Groundwater for the Carrizo-Wilcox, Queen City, and Sparta Aquifers in Groundwater Management Area 11

Shirley C. Wade, Ph.D., P.G.
Texas Water Development Board
Groundwater Division
Groundwater Availability Modeling Department
(512) 936-0883
June 19, 2017

EXECUTIVE SUMMARY:

The modeled available groundwater for Groundwater Management Area 11 for the Carrizo-Wilcox, Queen City, and Sparta aquifers is summarized by decade for the groundwater conservation districts (Tables 2 through 4 respectively) and for use in the regional water planning process (Tables 5 through 7 respectively). The modeled available groundwater estimates for the Carrizo-Wilcox Aquifer range from approximately 349,000 acre-feet per year in 2010 to approximately 341,000 acre-feet per year in 2070 (Table 2). The modeled available groundwater estimates for the Queen City Aquifer range from approximately 223,000 acre-feet per year in 2010 to approximately 222,000 acre-feet per year in 2070 (Table 3). The modeled available groundwater estimate for the Sparta Aquifer is approximately 2,700 acre-feet per year for each decade from 2010 to 2070 (Table 4). The estimates were extracted from results of a model run using the groundwater availability model for the northern part of the Carrizo-Wilcox, Queen City, and Sparta aquifers (version 2.01). The model run files, which meet the desired future conditions adopted by district representatives of Groundwater Management Area 11, were submitted to the Texas Water Development Board (TWDB) on February 15, 2017, as part of the Desired Future Conditions Explanatory Report for Groundwater Management Area 11. The explanatory report and other materials submitted to the Texas Water Development Board (TWDB) were determined to be administratively complete on March 13, 2017.

REQUESTOR:

Ms. Leah Adams, coordinator of Groundwater Management Area 11.

DESCRIPTION OF REQUEST:

In a letter dated February 15, 2017, Dr. William R. Hutchison, on behalf of Groundwater Management Area 11, provided the TWDB with the desired future conditions of the Carrizo-Wilcox, Queen City, and Sparta aquifers adopted by the groundwater conservation districts in Groundwater Management Area 11. The desired future conditions for the Carrizo-Wilcox, Queen City, and Sparta aquifers are described in Attachment B of the Resolution to Adopt Desired Future Conditions for Aquifers in Groundwater Management Area 11, adopted January 11, 2017, by the groundwater conservation districts within Groundwater Management Area 11. The desired future conditions, excerpted from Attachment B, are presented below:

"Table 5 [Table 1 below] from GMA 11 Technical Memorandum 16-02 (Draft 2), dated March 25, 2016 lists the proposed desired future conditions, and is presented below [Table 1]. As described in the technical memorandum, the proposed desired future conditions are average drawdowns (in feet) from year 2000 conditions to 2070 conditions were largely based on GAM Scenario 4. Based on an analysis of model output and model limitations, the output from the model was modified to develop the proposed desired future conditions as follows:

- Layers 2 and 4 (the confining units) were eliminated, and Table 5 includes only aquifer units. Areas that have no active cells are designated as NP (for not present).
- Layers 5, 6, 7, and 8 are combined, and a single drawdown value for the Carrizo-Wilcox Aquifer are [sic] listed.
- All areas that are less than 200 square miles are eliminated (noted as NRS, or not relevant for purposes of joint planning due to size of area).
- Areas with negative drawdown that are greater than 200 square miles have had the negative drawdown cells eliminated from the average drawdown calculation, effectively assuming that those cells have a zero drawdown, and that the negative drawdown areas are a result of model limitations, as discussed (designated in yellow).
- The desired future condition in Panola County for the Carrizo-Wilcox Aquifer is listed as 3 feet. The actual average using all data from the model is 2 feet. If the areas with negative drawdown are assumed to be zero, the revised average is 4 feet. As presented at the March 22, 2016 GMA 11 meeting, Mr. Wade Oliver (representing the Panola County GCD) evaluated the average drawdown under Scenario 4 using an alternative analytical modeling approach and concluded that the drawdown was 3 feet. Thus, Mr. Oliver's result is consistent with the midpoint between the two GAM-based drawdown approaches."

TABLE 1. DRAWDOWN FOR USE AS DESIRED FUTURE CONDITIONS (2000 TO 2070 IN FEET) [TABLE 5 FROM GMA 11 TECHNICAL MEMORANDUM 16-02 (DRAFT 2), DATED MARCH 25, 2016].).

County	Sparta	Queen City	Carrizo-Wilcox
Anderson	NRS	9	90
Angelina	16	NRS	48
Bowie	NP	NP	5
Camp	NP	NRS	33
Cass	NP	10	68
Cherokee	NRS	14	99
Franklin	NP	NP	14
Gregg	NP	NRS	58
Harrison	NP	1	18
Henderson	NP	5	50
Hopkins	NP	NP	3
Houston	3	6	80
Marion	NP	24	45
Morris	NP	NRS	46
Nacogdoches	5	4	29
Panola	NP	NP	3
Rains	NP	NP	1
Rusk	NP	NRS	23
Sabine	1	NP	9
San Augustine	2	NP	7
Shelby	NP	NP	1
Smith	NP	17	119
Titus	NP	NRS	11
Trinity	9	NRS	51
Upshur	NP	9	77
Van Zandt	NP	NRS	21
Wood	NP	5	89
Grand Total	4	10	56

Notes: NP = Not present
NRS = Not relevant due to size (less than 200 square miles)
Yellow Cells represent average drawdown calculations that assume negative drawdown is zero (model artifact and model limitation)
Green Cell represents the recommended DFC for Panola County as described above

TWDB staff reviewed the model files associated with the desired future conditions and received clarification on procedures and assumptions from the Groundwater Management Area 11 Technical Coordinator on March 13 and 15, 2017. Questions included whether drawdown averages and modeled available groundwater values are based on official aquifer extent or model extent, whether to include dry cells in drawdown averaging, methods for calculating Panola County drawdown, and how to re-calculate average drawdowns for counties with net negative average drawdowns. The clarifications are included in the Parameters and Assumptions Section of this report.

The Groundwater Management Area 11 Technical Coordinator was notified on May 3, 2017 that the modeled available groundwater values for several counties would not necessarily match the pumping values presented in Technical Memorandum 16-02 (Hutchison, 2016). The pumping values presented in Technical Memorandum 16-02 appear to be based on the model extent, while the modeled available groundwater values have been extracted based on the official aquifer.

METHODS:

The groundwater availability model for the northern part of the Carrizo-Wilcox, Queen City, and Sparta aquifers (Figures 1 through 4) was run using the model files submitted with the explanatory report (Hutchison, 2017). Model-calculated drawdowns were extracted for the year 2070. Drawdown averages were calculated for each county by aquifer and for the entire Groundwater Management Area 11 by aquifer. As specified in the desired future condition resolution and further clarification, drawdown for cells that became dry during the simulation (water level dropped below the base of the cell) were excluded from the averaging. The calculated drawdown averages were compared with the desired future conditions to verify that the pumping scenario achieved the desired future conditions within one foot.

The modeled available groundwater values were determined by extracting pumping rates by decade from the model results using ZONEBUDGET Version 3.01 (Harbaugh, 2009). Annual pumping rates by aquifer are presented by county and groundwater conservation district, subtotaled by groundwater conservation district, and then summed for Groundwater Management Area 11 (Tables 2 through 4). Annual pumping rates by aquifer are also presented by county, river basin, and regional water planning area within Groundwater Management Area 11 (Tables 5 through 7).

Modeled Available Groundwater and Permitting

As defined in Chapter 36 of the Texas Water Code (2011), "modeled available groundwater" is the estimated average amount of water that may be produced annually to

achieve a desired future condition. Groundwater conservation districts are required to consider modeled available groundwater, along with several other factors, when issuing permits in order to manage groundwater production to achieve the desired future condition(s). The other factors districts must consider include annual precipitation and production patterns, the estimated amount of pumping exempt from permitting, existing permits, and a reasonable estimate of actual groundwater production under existing permits.

PARAMETERS AND ASSUMPTIONS:

The parameters and assumptions for the modeled available groundwater estimates are described below:

- We used Version 2.01 of the groundwater availability model for the northern part of the Carrizo-Wilcox, Queen City, and Sparta aquifers. See Fryar and others (2003) and Kelley and others (2004) for assumptions and limitations of the groundwater availability model for the northern part of the Carrizo-Wilcox, Queen City, and Sparta aquifers.

- This groundwater availability model includes eight layers, which generally represent the Sparta Aquifer (Layer 1), the Weches Confining Unit (Layer 2), the Queen City Aquifer (Layer 3), the Reklaw Confining Unit (Layer 4), the Carrizo (Layer 5), the Upper Wilcox (Layer 6), the Middle Wilcox (Layer 7), and the Lower Wilcox (Layer 8). Layers represent equivalent geologic units outside of the official aquifer extents. In the case of Layers 6 through 8 in areas where the Upper, Middle, or Lower Wilcox are not distinct, then the corresponding layer represents part of an adjoining Wilcox unit.

- In the Sabine Uplift area, the Simsboro Formation (Middle Wilcox Aquifer) is not distinguishable and the Wilcox Group is informally divided into the Upper Wilcox and the Lower Wilcox aquifers (Fryar and others, 2003). In the current version of the groundwater availability model, layers 6 and 7 represent the Upper Wilcox and Lower Wilcox aquifers in this area. Layer 8 is included in the model in this area, but it is of nominal thickness.

- The model was run with MODFLOW-96 (Harbaugh and others, 1996).

- Drawdown averages and modeled available groundwater values were based on the official aquifer boundaries rather than the extent of the model area (Figures 2, 3, and 4).

- Drawdown for cells where water levels dropped below the base elevation of the cell causing the cell to become inactive (dry cells) were excluded from the averaging.

- If a county with an area greater than 200 square miles had a net negative drawdown average the average was re-calculated by assuming all negative drawdowns were zero. The zero values were included in the averaging. This assumption applies to San Augustine County in the Sparta Aquifer and Wood County in the Queen City Aquifer as noted in Table 1. It also applies to Hopkins and Rains counties in the Carrizo-Wilcox Aquifer although those counties were not noted in Table 1 (Table 1 of the Resolution).

- A tolerance of one foot was assumed when comparing desired future conditions (Table 1, average drawdown values per county) to model drawdown results.

- Drawdown for Panola County was estimated from the groundwater availability modeling results and the average drawdown is within the one foot tolerance of the desired future condition for Panola County (model results drawdown = 2 feet and desired future condition drawdown= 3 feet).

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

RESULTS:

The modeled available groundwater estimates for the Carrizo-Wilcox Aquifer range from approximately 349,000 acre-feet per year in 2010 to approximately 341,000 acre-feet per year in 2070 (Table 2). The modeled available groundwater estimates for the Queen City Aquifer range from approximately 223,000 acre-feet per year in 2010 to approximately 222,000 acre-feet per year in 2070 (Table 3). The modeled available groundwater estimate for the Sparta Aquifer is approximately 2,700 acre-feet per year for each decade from 2010 to 2070 (Table 4). The modeled available groundwater is summarized by groundwater conservation district and county for the Carrizo-Wilcox, Queen City, and Sparta aquifers (Tables 2, 3, and 4 respectively). The modeled available groundwater has also been summarized by county, river basin, and regional water planning area for use in the regional water planning process for the Carrizo-Wilcox, Queen City, and Sparta aquifers (Tables 5, 6, and 7 respectively). Small differences of values between table summaries are due to rounding.

The Gulf Coast, Nacatoch, Trinity, and Yegua-Jackson aquifers were declared non-relevant for the purpose of adopting desired future conditions by the Groundwater Management Area 11 Districts; therefore, modeled available groundwater values were not calculated for those aquifers.

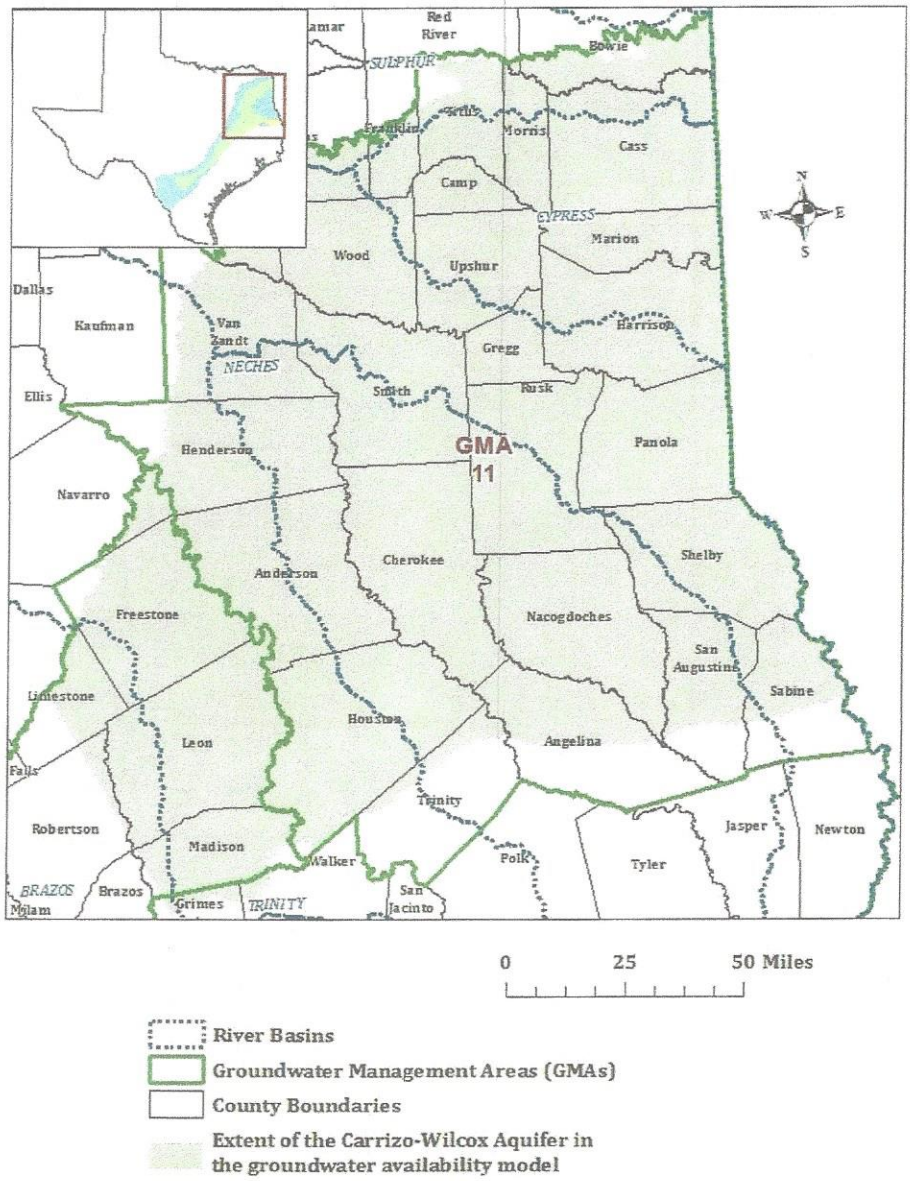

FIGURE 1. **GROUNDWATER MANAGEMENT AREA (GMA) 11 BOUNDARY, RIVER BASINS, AND COUNTIES OVERLAIN ON THE EXTENT OF THE CARRIZO-WILCOX AQUIFER IN THE GROUNDWATER AVAILABILITY MODEL FOR THE NORTHERN PORTION OF THE CARRIZO-WILCOX, QUEEN CITY, AND SPARTA AQUIFERS.**

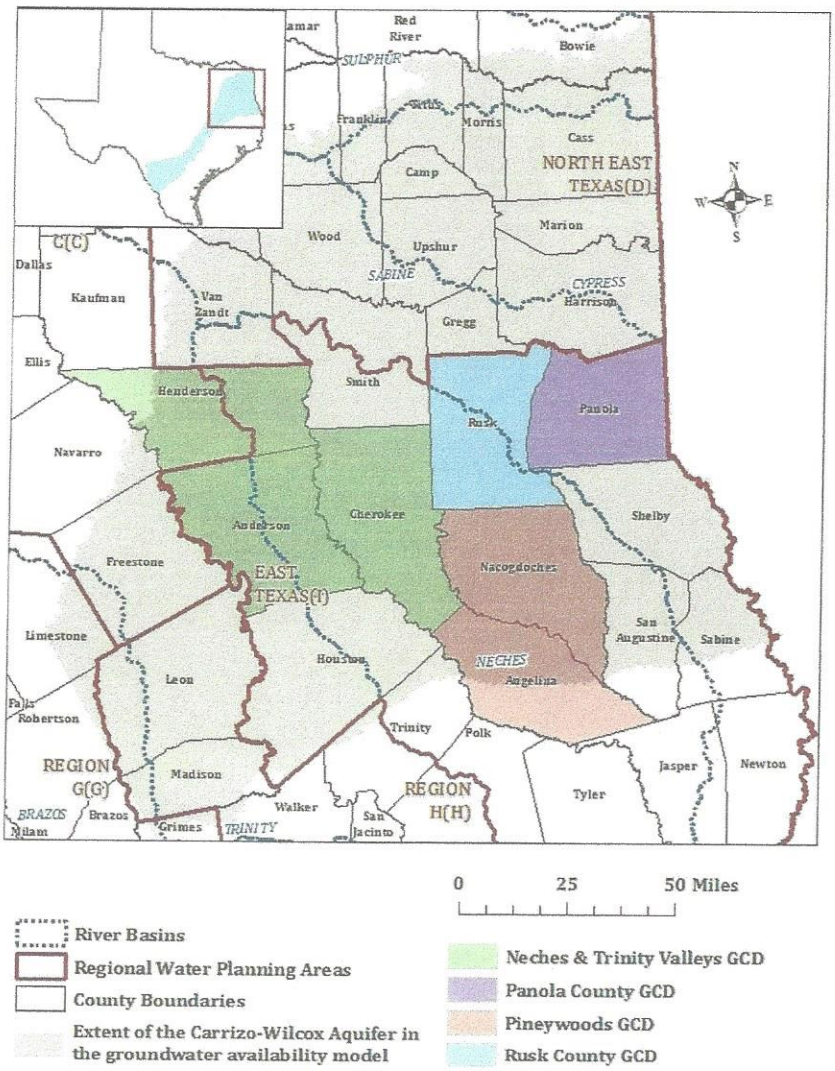

FIGURE 2. **REGIONAL WATER PLANNING AREAS (RWPAS), RIVER BASINS, GROUNDWATER CONSERVATION DISTRICTS (GCDS), AND COUNTIES OVERLAIN ON THE EXTENT OF THE CARRIZO-WILCOX AQUIFER IN THE GROUNDWATER AVAILABILITY MODEL FOR THE NORTHERN PORTION OF THE CARRIZO-WILCOX, QUEEN CITY, AND SPARTA AQUIFERS.**

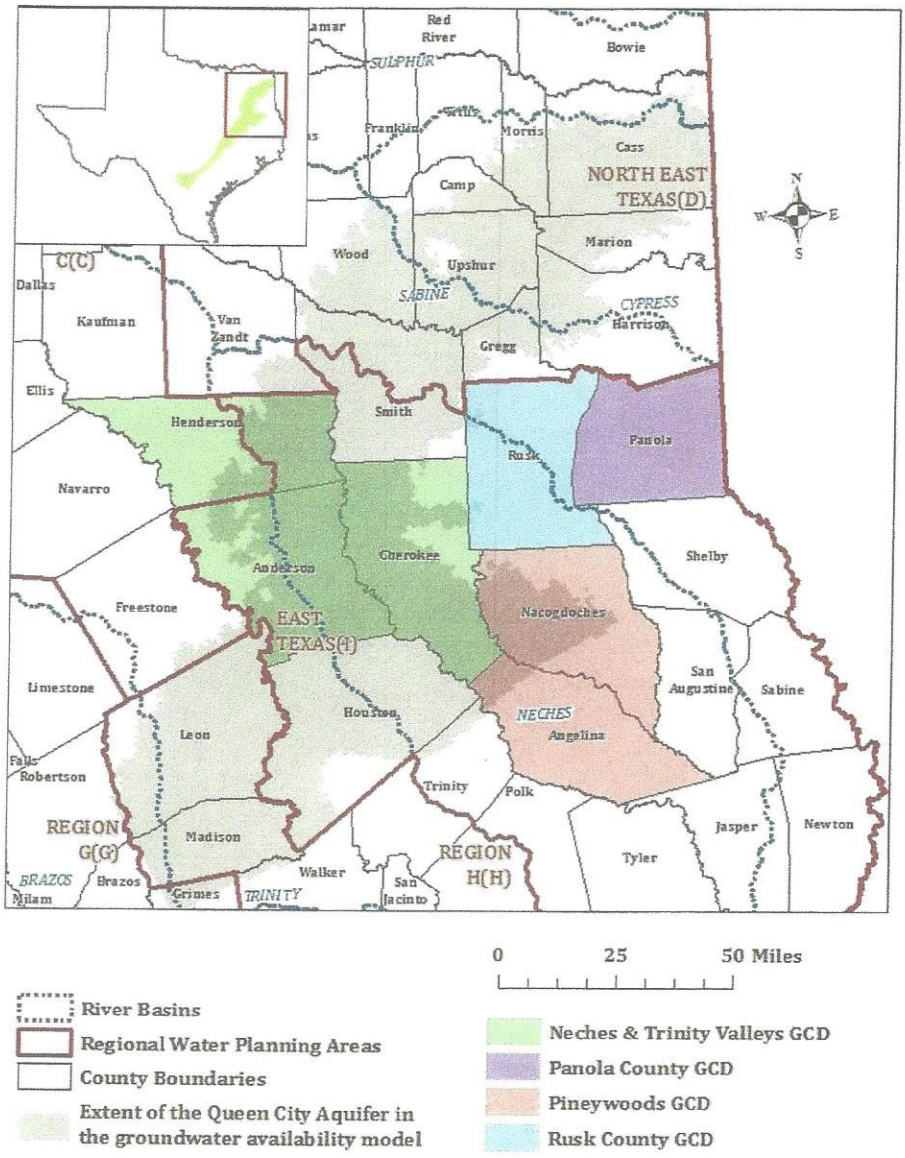

FIGURE 3. REGIONAL WATER PLANNING AREAS (RWPAS), RIVER BASINS, GROUNDWATER CONSERVATION DISTRICTS (GCDS), AND COUNTIES OVERLAIN ON THE EXTENT OF THE QUEEN CITY AQUIFER IN THE GROUNDWATER AVAILABILITY MODEL FOR THE NORTHERN PORTION OF THE CARRIZO-WILCOX, QUEEN CITY, AND SPARTA AQUIFERS.

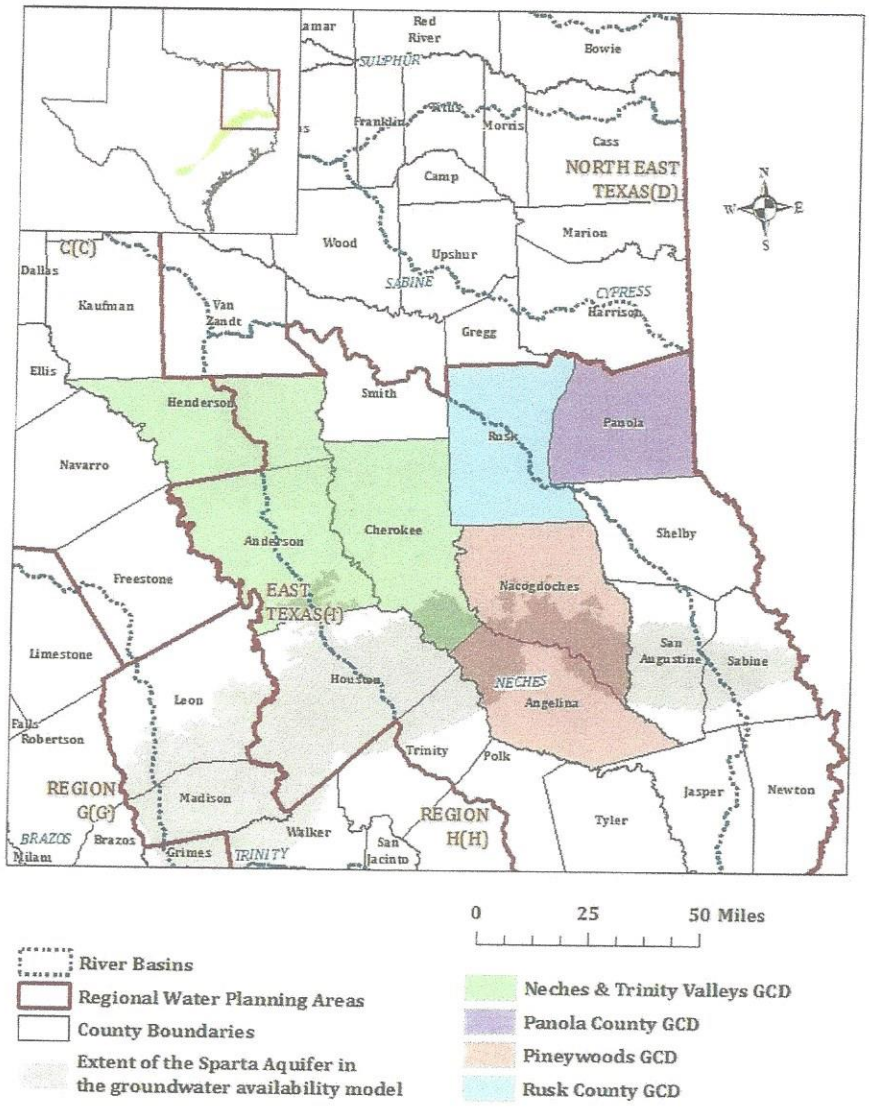

FIGURE 4. **REGIONAL WATER PLANNING AREAS (RWPAS), RIVER BASINS, GROUNDWATER CONSERVATION DISTRICTS (GCDS), AND COUNTIES OVERLAIN ON THE EXTENT OF THE SPARTA AQUIFER IN THE GROUNDWATER AVAILABILITY MODEL FOR THE NORTHERN PORTION OF THE CARRIZO-WILCOX, QUEEN CITY, AND SPARTA AQUIFERS.**

TABLE 2. MODELED AVAILABLE GROUNDWATER FOR THE CARRIZO-WILCOX AQUIFER IN GROUNDWATER MANAGEMENT AREA 11 SUMMARIZED BY GROUNDWATER CONSERVATION DISTRICT (GCD) AND COUNTY FOR EACH DECADE BETWEEN 2010 AND 2070. VALUES ARE IN ACRE-FEET PER YEAR.

Groundwater Conservation District	County	Aquifer	2010	2020	2030	2040	2050	2060	2070
Neches & Trinity Valleys GCD	Anderson	Carrizo-Wilcox	29,088	29,088	29,088	29,088	29,088	29,088	29,088
Neches & Trinity Valleys GCD	Cherokee	Carrizo-Wilcox	20,933	20,933	20,933	20,933	20,933	20,933	20,470
Neches & Trinity Valleys GCD	Henderson	Carrizo-Wilcox	13,866	13,866	13,866	13,866	13,768	13,614	13,585
Neches & Trinity Valleys GCD Total		**Carrizo-Wilcox**	**63,886**	**63,886**	**63,886**	**63,886**	**63,789**	**63,634**	**63,143**
Panola County GCD	Panola	**Carrizo-Wilcox**	**8,376**	**8,376**	**8,218**	**8,218**	**8,218**	**8,068**	**8,068**
Pineywoods GCD	Angelina	Carrizo-Wilcox	27,591	27,591	27,591	27,591	27,591	27,591	27,591
Pineywoods GCD	Nacogdoches	Carrizo-Wilcox	24,181	24,181	24,181	24,181	24,181	24,181	24,181
Pineywoods GCD Total		**Carrizo-Wilcox**	**51,773**	**51,773**	**51,773**	**51,773**	**51,773**	**51,773**	**51,773**
Rusk County GCD Total	Rusk	**Carrizo-Wilcox**	**20,847**	**20,837**	**20,837**	**20,837**	**20,818**	**20,818**	**20,818**
Total (GCDs)		**Carrizo-Wilcox**	**144,882**	**144,872**	**144,714**	**144,714**	**144,598**	**144,293**	**143,801**
No District-County	Bowie	Carrizo-Wilcox	10,845	9,872	9,558	9,278	9,278	8,999	8,999
No District-County	Camp	Carrizo-Wilcox	4,050	4,050	4,050	4,050	4,050	4,050	4,050
No District-County	Cass	Carrizo-Wilcox	18,078	18,023	17,925	17,863	17,786	17,702	17,626
No District-County	Franklin	Carrizo-Wilcox	9,786	9,786	9,786	9,786	9,786	9,786	9,786
No District-County	Gregg	Carrizo-Wilcox	8,041	8,041	8,041	8,041	8,041	8,041	8,041
No District-County	Harrison	Carrizo-Wilcox	11,165	11,035	10,961	10,921	10,873	10,853	10,827
No District-County	Hopkins	Carrizo-Wilcox	6,392	6,392	6,392	6,392	6,392	6,392	6,392
No District-County	Houston	Carrizo-Wilcox	26,294	26,294	26,294	26,294	26,294	26,294	26,294
No District-County	Marion	Carrizo-Wilcox	2,729	2,726	2,726	2,726	2,726	2,726	2,726

Groundwater Conservation District	County	Aquifer	2010	2020	2030	2040	2050	2060	2070
No District-County	Morris	Carrizo-Wilcox	2,627	2,569	2,569	2,569	2,569	2,569	2,569
No District-County	Rains	Carrizo-Wilcox	1,922	1,839	1,839	1,839	1,802	1,802	1,745
No District-County	Red River	Carrizo-Wilcox	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]
No District-County	Sabine	Carrizo-Wilcox	3,606	3,606	3,606	3,606	3,606	3,606	3,606
No District-County	San Augustine	Carrizo-Wilcox	1,439	1,439	1,439	1,439	1,439	1,439	1,439
No District-County	Shelby	Carrizo-Wilcox	11,210	10,894	10,441	10,305	9,723	9,287	9,100
No District-County	Smith	Carrizo-Wilcox	35,951	35,951	35,925	35,925	35,925	35,912	35,889
No District-County	Titus	Carrizo-Wilcox	10,354	10,052	9,902	9,672	9,624	9,573	9,472
No District-County	Trinity	Carrizo-Wilcox	368	368	368	368	368	368	368
No District-County	Upshur	Carrizo-Wilcox	7,132	7,132	7,132	7,132	7,132	7,132	7,132
No District-County	Van Zandt	Carrizo-Wilcox	10,330	10,330	10,330	10,157	10,098	10,098	9,971
No District-County	Wood	Carrizo-Wilcox	21,544	21,457	21,413	21,338	21,316	21,292	21,237
No District-County Total		**Carrizo-Wilcox**	**203,863**	**201,856**	**200,696**	**199,700**	**198,827**	**197,920**	**197,268**
Total for GMA 11		**Carrizo-Wilcox**	**348,745**	**346,728**	**345,410**	**344,414**	**343,424**	**342,213**	**341,069**

[1]A desired future condition was not specified for the Carrizo-Wilcox Aquifer in Red River County; however, other counties with fewer than 200 square miles of aquifer were noted as not relevant due to size (NRS) in the desired future condition statement. Areas which are not relevant due to size are listed with a NULL value for modeled available groundwater.

TABLE 3. MODELED AVAILABLE GROUNDWATER FOR THE QUEEN CITY AQUIFER IN GROUNDWATER MANAGEMENT AREA 11 SUMMARIZED BY GROUNDWATER CONSERVATION DISTRICT (GCD) AND COUNTY FOR EACH DECADE BETWEEN 2010 AND 2070. VALUES ARE IN ACRE-FEET PER YEAR.

Groundwater Conservation District	County	Aquifer	2010	2020	2030	2040	2050	2060	2070
Neches & Trinity Valleys GCD	Anderson	Queen City	19,101	19,101	19,101	19,101	19,101	19,101	19,101
Neches & Trinity Valleys GCD	Cherokee	Queen City	23,211	23,211	23,211	23,211	23,211	23,039	22,866
Neches & Trinity Valleys GCD	Henderson	Queen City	15,412	15,412	15,412	15,412	15,412	15,412	15,412
Neches & Trinity Valleys GCD Total		**Queen City**	**57,725**	**57,725**	**57,725**	**57,725**	**57,725**	**57,552**	**57,380**
Pineywoods GCD	Angelina	Queen City	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]
Pineywoods GCD	Nacogdoches	Queen City	2,985	2,985	2,985	2,985	2,985	2,985	2,985
Pineywoods GCD Total		**Queen City**	**2,985**	**2,985**	**2,985**	**2,985**	**2,985**	**2,985**	**2,985**
Rusk County GCD Total	**Rusk**	**Queen City**	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]
Total (GCDs)		**Queen City**	**60,710**	**60,710**	**60,710**	**60,710**	**60,710**	**60,537**	**60,365**
No District-County	Camp	Queen City	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]
No District-County	Cass	Queen City	38,509	38,509	38,509	38,509	38,509	38,509	38,509
No District-County	Gregg	Queen City	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]
No District-County	Harrison	Queen City	10,071	10,071	10,071	10,071	10,071	10,071	10,071
No District-County	Houston	Queen City	2,301	2,301	2,301	2,301	2,301	2,301	2,301
No District-County	Marion	Queen City	15,407	15,407	15,407	15,407	15,407	15,338	15,271
No District-County	Morris	Queen City	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]
No District-County	Smith	Queen City	59,034	59,034	59,034	59,034	58,904	58,709	58,578
No District-County	Titus	Queen City	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]
No District-County	Trinity	Queen City	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]
No District-County	Upshur	Queen City	27,391	27,391	27,391	27,197	27,197	27,197	27,145

Groundwater Conservation District	County	Aquifer	2010	2020	2030	2040	2050	2060	2070
No District-County	Van Zandt	Queen City	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]
No District-County	Wood	Queen City	10,046	10,046	10,046	10,046	10,046	10,046	10,046
No District-County Total		**Queen City**	**162,759**	**162,759**	**162,759**	**162,566**	**162,435**	**162,172**	**161,922**
Total for GMA 11		**Queen City**	**223,469**	**223,469**	**223,469**	**223,275**	**223,145**	**222,709**	**222,287**

[1]Counties with fewer than 200 square miles of aquifer were noted as not relevant due to size (NRS) in the desired future condition statement. Areas which are not relevant due to size are listed with a NULL value for modeled available groundwater. For additional information in pumping in the model run see Table 6 from Technical Memorandum 16-02 (Hutchison, 2016).

TABLE 4. MODELED AVAILABLE GROUNDWATER FOR THE SPARTA AQUIFER IN GROUNDWATER MANAGEMENT AREA 11 SUMMARIZED BY GROUNDWATER CONSERVATION DISTRICT (GCD) AND COUNTY FOR EACH DECADE BETWEEN 2010 AND 2070. VALUES ARE IN ACRE-FEET PER YEAR.

Groundwater Conservation District	County	Aquifer	2010	2020	2030	2040	2050	2060	2070
Neches & Trinity Valleys GCD	Anderson	Sparta	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]
Neches & Trinity Valleys GCD	Cherokee	Sparta	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]
Neches & Trinity Valleys GCD Total		**Sparta**	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]
Pineywoods GCD	Angelina	Sparta	371	371	371	371	371	371	371
Pineywoods GCD	Nacogdoches	Sparta	365	365	365	365	365	365	365
Pineywoods GCD Total		**Sparta**	**737**	**737**	**737**	**737**	**737**	**737**	**737**
Total (GCDs)		**Sparta**	**737**	**737**	**737**	**737**	**737**	**737**	**737**
No District-County	Houston	Sparta	1,454	1,454	1,454	1,454	1,454	1,454	1,454
No District-County	Sabine	Sparta	197	197	197	197	197	197	197
No District-County	San Augustine	Sparta	166	166	166	166	166	166	166
No District-County	Trinity	Sparta	182	182	182	182	182	182	182
No District-County Total		**Sparta**	**1,999**	**1,999**	**1,999**	**1,999**	**1,999**	**1,999**	**1,999**
Total for GMA 11		**Sparta**	**2,736**	**2,736**	**2,736**	**2,736**	**2,736**	**2,736**	**2,736**

[1]Counties with fewer than 200 square miles of aquifer were noted as not relevant due to size (NRS) in the desired future condition statement. Areas which are not relevant due to size are listed with a NULL value for modeled available groundwater. For additional information in pumping in the model run see Table 6 from Technical Memorandum 16-02 (Hutchison, 2016).

TABLE 5. MODELED AVAILABLE GROUNDWATER BY DECADE FOR THE CARRIZO-WILCOX AQUIFER IN GROUNDWATER MANAGEMENT AREA 11. RESULTS ARE IN ACRE-FEET PER YEAR AND ARE SUMMARIZED BY COUNTY, REGIONAL WATER PLANNING AREA (RWPA), RIVER BASIN, AND AQUIFER.

County	RWPA	River Basin	Aquifer	2020	2030	2040	2050	2060	2070
Anderson	I	Neches	Carrizo-Wilcox	23,335	23,335	23,335	23,335	23,335	23,335
Anderson	I	Trinity	Carrizo-Wilcox	5,753	5,753	5,753	5,753	5,753	5,753
Angelina	I	Neches	Carrizo-Wilcox	27,591	27,591	27,591	27,591	27,591	27,591
Bowie	D	Sulphur	Carrizo-Wilcox	9,872	9,558	9,278	9,278	8,999	8,999
Camp	D	Cypress	Carrizo-Wilcox	4,050	4,050	4,050	4,050	4,050	4,050
Cass	D	Cypress	Carrizo-Wilcox	15,159	15,132	15,132	15,119	15,106	15,094
Cass	D	Sulphur	Carrizo-Wilcox	2,864	2,794	2,731	2,667	2,596	2,532
Cherokee	I	Neches	Carrizo-Wilcox	20,933	20,933	20,933	20,933	20,933	20,470
Franklin	D	Cypress	Carrizo-Wilcox	7,765	7,765	7,765	7,765	7,765	7,765
Franklin	D	Sulphur	Carrizo-Wilcox	2,021	2,021	2,021	2,021	2,021	2,021
Gregg	D	Cypress	Carrizo-Wilcox	862	862	862	862	862	862
Gregg	D	Sabine	Carrizo-Wilcox	7,179	7,179	7,179	7,179	7,179	7,179
Harrison	D	Cypress	Carrizo-Wilcox	6,183	6,109	6,070	6,036	6,016	5,990
Harrison	D	Sabine	Carrizo-Wilcox	4,851	4,851	4,851	4,837	4,837	4,837
Henderson	C	Trinity	Carrizo-Wilcox	7,829	7,829	7,829	7,732	7,577	7,548
Henderson	I	Neches	Carrizo-Wilcox	6,036	6,036	6,036	6,036	6,036	6,036
Hopkins	D	Cypress	Carrizo-Wilcox	313	313	313	313	313	313
Hopkins	D	Sabine	Carrizo-Wilcox	2,842	2,842	2,842	2,842	2,842	2,842
Hopkins	D	Sulphur	Carrizo-Wilcox	3,237	3,237	3,237	3,237	3,237	3,237
Houston	I	Neches	Carrizo-Wilcox	22,488	22,488	22,488	22,488	22,488	22,488
Houston	I	Trinity	Carrizo-Wilcox	3,806	3,806	3,806	3,806	3,806	3,806
Marion	D	Cypress	Carrizo-Wilcox	2,726	2,726	2,726	2,726	2,726	2,726
Morris	D	Cypress	Carrizo-Wilcox	2,166	2,166	2,166	2,166	2,166	2,166
Morris	D	Sulphur	Carrizo-Wilcox	402	402	402	402	402	402
Nacogdoches	I	Neches	Carrizo-Wilcox	24,181	24,181	24,181	24,181	24,181	24,181
Panola	I	Cypress	Carrizo-Wilcox	6	6	6	6	6	6

County	RWPA	River Basin	Aquifer	2020	2030	2040	2050	2060	2070
Panola	I	Sabine	Carrizo-Wilcox	8,370	8,212	8,212	8,212	8,062	8,062
Rains	D	Sabine	Carrizo-Wilcox	1,839	1,839	1,839	1,802	1,802	1,745
Red River	D	Sulphur	Carrizo-Wilcox	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]
Rusk	I	Neches	Carrizo-Wilcox	11,769	11,769	11,769	11,750	11,750	11,750
Rusk	I	Sabine	Carrizo-Wilcox	9,068	9,068	9,068	9,068	9,068	9,068
Sabine	I	Neches	Carrizo-Wilcox	356	356	356	356	356	356
Sabine	I	Sabine	Carrizo-Wilcox	3,249	3,249	3,249	3,249	3,249	3,249
San Augustine	I	Neches	Carrizo-Wilcox	1,149	1,149	1,149	1,149	1,149	1,149
San Augustine	I	Sabine	Carrizo-Wilcox	290	290	290	290	290	290
Shelby	I	Neches	Carrizo-Wilcox	2,577	2,288	2,151	2,018	2,018	2,018
Shelby	I	Sabine	Carrizo-Wilcox	8,317	8,154	8,154	7,705	7,269	7,081
Smith	D	Sabine	Carrizo-Wilcox	13,246	13,220	13,220	13,220	13,206	13,196
Smith	I	Neches	Carrizo-Wilcox	22,705	22,705	22,705	22,705	22,705	22,693
Titus	D	Cypress	Carrizo-Wilcox	7,215	7,064	6,834	6,786	6,735	6,634
Titus	D	Sulphur	Carrizo-Wilcox	2,838	2,838	2,838	2,838	2,838	2,838
Trinity	H	Trinity	Carrizo-Wilcox	99	99	99	99	99	99
Trinity	I	Neches	Carrizo-Wilcox	269	269	269	269	269	269
Upshur	D	Cypress	Carrizo-Wilcox	5,442	5,442	5,442	5,442	5,442	5,442
Upshur	D	Sabine	Carrizo-Wilcox	1,689	1,689	1,689	1,689	1,689	1,689
Van Zandt	D	Neches	Carrizo-Wilcox	4,317	4,317	4,317	4,317	4,317	4,317
Van Zandt	D	Sabine	Carrizo-Wilcox	4,629	4,629	4,456	4,397	4,397	4,270
Van Zandt	D	Trinity	Carrizo-Wilcox	1,384	1,384	1,384	1,384	1,384	1,384
Wood	D	Cypress	Carrizo-Wilcox	2,053	2,053	2,053	2,053	2,053	2,053
Wood	D	Sabine	Carrizo-Wilcox	19,404	19,360	19,285	19,263	19,239	19,184
GMA 11 Total			**Carrizo-Wilcox**	**346,728**	**345,410**	**344,414**	**343,424**	**342,213**	**341,069**

[1] A desired future condition was not specified for the Carrizo-Wilcox Aquifer in Red River County; however, other counties with fewer than 200 square miles of aquifer were noted as not relevant due to size (NRS) in the desired future condition statement. Areas which are not relevant due to size are listed with a NULL value for modeled available groundwater.

TABLE 6. MODELED AVAILABLE GROUNDWATER BY DECADE FOR THE QUEEN CITY AQUIFER IN GROUNDWATER MANAGEMENT AREA 11. RESULTS ARE IN ACRE-FEET PER YEAR AND ARE SUMMARIZED BY COUNTY, REGIONAL WATER PLANNING AREA (RWPA), RIVER BASIN, AND AQUIFER.

County	RWPA	River Basin	Aquifer	2020	2030	2040	2050	2060	2070
Anderson	I	Neches	Queen City	11,828	11,828	11,828	11,828	11,828	11,828
Anderson	I	Trinity	Queen City	7,274	7,274	7,274	7,274	7,274	7,274
Angelina	I	Neches	Queen City	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]
Camp	D	Cypress	Queen City	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]
Cass	D	Cypress	Queen City	35,499	35,499	35,499	35,499	35,499	35,499
Cass	D	Sulphur	Queen City	3,010	3,010	3,010	3,010	3,010	3,010
Cherokee	I	Neches	Queen City	23,211	23,211	23,211	23,211	23,039	22,866
Gregg	D	Cypress	Queen City	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]
Gregg	D	Sabine	Queen City	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]
Harrison	D	Cypress	Queen City	7,762	7,762	7,762	7,762	7,762	7,762
Harrison	D	Sabine	Queen City	2,310	2,310	2,310	2,310	2,310	2,310
Henderson	C	Trinity	Queen City	3,345	3,345	3,345	3,345	3,345	3,345
Henderson	I	Neches	Queen City	12,067	12,067	12,067	12,067	12,067	12,067
Houston	I	Neches	Queen City	2,043	2,043	2,043	2,043	2,043	2,043
Houston	I	Trinity	Queen City	258	258	258	258	258	258
Marion	D	Cypress	Queen City	15,407	15,407	15,407	15,407	15,338	15,271
Morris	D	Cypress	Queen City	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]
Nacogdoches	I	Neches	Queen City	2,985	2,985	2,985	2,985	2,985	2,985
Rusk	I	Neches	Queen City	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]
Rusk	I	Sabine	Queen City	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]
Smith	D	Sabine	Queen City	28,343	28,343	28,343	28,213	28,018	27,887
Smith	I	Neches	Queen City	30,692	30,692	30,692	30,692	30,692	30,692
Titus	D	Cypress	Queen City	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]
Trinity	H	Trinity	Queen City	0	0	0	0	0	0
Trinity	I	Neches	Queen City	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]

County	RWPA	River Basin	Aquifer	2020	2030	2040	2050	2060	2070
Upshur	D	Cypress	Queen City	19,642	19,642	19,448	19,448	19,448	19,396
Upshur	D	Sabine	Queen City	7,749	7,749	7,749	7,749	7,749	7,749
Van Zandt	D	Neches	Queen City	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]
Wood	D	Cypress	Queen City	986	986	986	986	986	986
Wood	D	Sabine	Queen City	9,060	9,060	9,060	9,060	9,060	9,060
GMA 11 Total			**Queen City**	**223,469**	**223,469**	**223,276**	**223,145**	**222,709**	**222,287**

[1]Counties with fewer than 200 square miles of aquifer were noted as not relevant due to size (NRS) in the desired future condition statement. Areas which are not relevant due to size are listed with a NULL value for modeled available groundwater. For additional information in pumping in the model run see Table 6 from Technical Memorandum 16-02 (Hutchison, 2016).

TABLE 7. MODELED AVAILABLE GROUNDWATER BY DECADE FOR THE SPARTA AQUIFER IN GROUNDWATER MANAGEMENT AREA 11. RESULTS ARE IN ACRE-FEET PER YEAR AND ARE SUMMARIZED BY COUNTY, REGIONAL WATER PLANNING AREA (RWPA), RIVER BASIN, AND AQUIFER.

County	RWPA	River Basin	Aquifer	2020	2030	2040	2050	2060	2070
Anderson	I	Neches	Sparta Aquifer	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]
Anderson	I	Trinity	Sparta Aquifer	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]
Angelina	I	Neches	Sparta Aquifer	371	371	371	371	371	371
Cherokee	I	Neches	Sparta Aquifer	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]	NULL[1]
Houston	I	Neches	Sparta Aquifer	477	477	477	477	477	477
Houston	I	Trinity	Sparta Aquifer	977	977	977	977	977	977
Nacogdoches	I	Neches	Sparta Aquifer	365	365	365	365	365	365
Sabine	I	Neches	Sparta Aquifer	37	37	37	37	37	37
Sabine	I	Sabine	Sparta Aquifer	160	160	160	160	160	160
San Augustine	I	Neches	Sparta Aquifer	163	163	163	163	163	163
San Augustine	I	Sabine	Sparta Aquifer	3	3	3	3	3	3
Trinity	H	Trinity	Sparta Aquifer	29	29	29	29	29	29
Trinity	I	Neches	Sparta Aquifer	154	154	154	154	154	154
GMA 11 Total			**Sparta Aquifer**	**2,736**	**2,736**	**2,736**	**2,736**	**2,736**	**2,736**

[1] Counties with fewer than 200 square miles of aquifer were noted as not relevant due to size (NRS) in the desired future condition statement. Areas which are not relevant due to size are listed with a NULL value for modeled available groundwater. For additional information in pumping in the model run see Table 6 from Technical Memorandum 16-02 (Hutchison, 2016).

LIMITATIONS:

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

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

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

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

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

REFERENCES:

Fryar, D., Senger, R., Deeds, N., Pickens, J., Jones, T., Whallon, A.J., Dean, K.E., 2003, Groundwater availability model for the northern Carrizo-Wilcox aquifer: Contract report to the Texas Water Development Board, 529 p.

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National Research Council, 2007, Models in Environmental Regulatory Decision Making Committee on Models in the Regulatory Decision Process, National Academies Press, Washington D.C., 287 p., http://www.nap.edu/catalog.php?record_id=11972.

Texas Water Code, 2011, http://www.statutes.legis.state.tx.us/docs/WA/pdf/WA.36.pdf.

APPENDIX H

HISTORICAL WATER USE SUMMARY BY GROUNDWATER AND SURFACE WATER

Estimated Historical Water Use And 2017 State Water Plan Datasets:

Panola County Groundwater Conservation District

by Stephen Allen
Texas Water Development Board
Groundwater Division
Groundwater Technical Assistance Section
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(512) 463-7317
October 4, 2017

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 10/4/2017. 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 2016. TWDB staff anticipates the calculation and posting of these estimates at a later date.

PANOLA COUNTY

All values are in acre-feet

Year	Source	Municipal	Manufacturing	Mining	Steam Electric	Irrigation	Livestock	Total
2015	GW	2,114	3	1,705	0	1,122	258	5,202
	SW	1,533	1,022	909	0	0	2,323	5,787
2014	GW	2,173	3	1,944	0	1,630	250	6,000
	SW	1,509	775	1,022	0	0	2,254	5,560
2013	GW	2,447	3	2,127	0	322	255	5,154
	SW	1,832	822	1,285	0	0	2,294	6,233
2012	GW	2,785	3	1,568	0	137	245	4,738
	SW	1,375	849	1,219	0	0	2,204	5,647
2011	GW	3,084	7	1,191	0	383	288	4,953
	SW	1,592	810	1,388	0	0	2,596	6,386
2010	GW	3,991	38	1,822	0	346	288	6,485
	SW	387	746	1,346	0	50	2,588	5,117
2009	GW	2,512	410	1,332	0	31	314	4,599
	SW	1,176	1,296	877	0	0	2,827	6,176
2008	GW	2,384	537	1,376	0	64	304	4,665
	SW	1,644	673	1,116	0	0	2,740	6,173
2007	GW	2,254	415	15	0	31	327	3,042
	SW	1,594	652	24	0	0	2,942	5,212
2006	GW	2,825	384	8	0	18	333	3,568
	SW	1,560	608	0	0	0	2,996	5,164
2005	GW	2,400	669	8	0	0	320	3,397
	SW	1,731	945	0	0	0	2,885	5,561
2004	GW	2,108	595	7	0	0	1,270	3,980
	SW	1,401	870	0	0	0	1,913	4,184
2003	GW	2,092	528	7	0	0	1,249	3,876
	SW	1,191	962	0	0	0	1,880	4,033
2002	GW	2,010	488	8	0	0	1,254	3,760
	SW	1,329	1,498	0	0	0	1,888	4,715
2001	GW	2,190	935	8	0	0	1,264	4,397
	SW	1,661	1,413	0	0	0	1,903	4,977
2000	GW	2,239	21	8	0	0	1,238	3,506
	SW	2,047	1,553	0	0	0	1,858	5,458

Projected Surface Water Supplies
TWDB 2017 State Water Plan Data

PANOLA COUNTY

All values are in acre-feet

RWPG	WUG	WUG Basin	Source Name	2020	2030	2040	2050	2060	2070
I	CARTHAGE	SABINE	MURVAUL LAKE/RESERVOIR	1,601	1,602	1,595	1,599	1,610	1,621
I	COUNTY-OTHER, PANOLA	SABINE	MURVAUL LAKE/RESERVOIR	291	291	291	291	291	291
I	GILL WSC	SABINE	O' THE PINES LAKE/RESERVOIR	33	33	33	33	33	33
I	IRRIGATION, PANOLA	SABINE	SABINE RUN-OF-RIVER	191	191	191	191	191	191
I	LIVESTOCK, PANOLA	CYPRESS	CYPRESS LIVESTOCK LOCAL SUPPLY	30	30	30	30	30	30
I	LIVESTOCK, PANOLA	SABINE	SABINE LIVESTOCK LOCAL SUPPLY	1,224	1,224	1,224	1,224	1,224	1,224
I	MANUFACTURING, PANOLA	SABINE	MURVAUL LAKE/RESERVOIR	879	917	955	987	1,052	1,081
I	MANUFACTURING, PANOLA	SABINE	SABINE RUN-OF-RIVER	114	114	114	114	114	114
I	MINING, PANOLA	CYPRESS	MURVAUL LAKE/RESERVOIR	4	4	3	2	2	2
I	MINING, PANOLA	CYPRESS	TOLEDO BEND LAKE/RESERVOIR	4	4	4	4	6	6
I	MINING, PANOLA	SABINE	MURVAUL LAKE/RESERVOIR	3,546	3,511	3,026	2,559	2,170	2,361
I	MINING, PANOLA	SABINE	SABINE RUN-OF-RIVER	296	296	296	296	296	296
I	MINING, PANOLA	SABINE	TOLEDO BEND LAKE/RESERVOIR	3,896	4,196	4,496	4,496	5,494	5,494
	Sum of Projected Surface Water Supplies (acre-feet)			**12,109**	**12,413**	**12,258**	**11,826**	**12,513**	**12,744**

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.

PANOLA COUNTY

All values are in acre-feet

RWPG	WUG	WUG Basin	2020	2030	2040	2050	2060	2070
I	BECKVILLE	SABINE	133	144	150	156	162	167
I	CARTHAGE	SABINE	1,650	1,651	1,644	1,648	1,659	1,670
I	COUNTY-OTHER, PANOLA	CYPRESS	5	6	6	6	6	6
I	COUNTY-OTHER, PANOLA	SABINE	1,615	1,629	1,623	1,639	1,669	1,696
I	GILL WSC	SABINE	85	84	82	83	84	85
I	IRRIGATION, PANOLA	SABINE	64	64	64	64	64	64
I	LIVESTOCK, PANOLA	CYPRESS	15	15	15	15	15	15
I	LIVESTOCK, PANOLA	SABINE	1,465	1,465	1,465	1,465	1,465	1,465
I	MANUFACTURING, PANOLA	SABINE	1,393	1,454	1,513	1,564	1,667	1,777
I	MINING, PANOLA	CYPRESS	6	6	5	4	4	4
I	MINING, PANOLA	SABINE	5,910	5,853	5,044	4,264	3,616	3,934
I	TATUM	SABINE	65	75	81	87	92	96
	Sum of Projected Water Demands (acre-feet)		**12,406**	**12,446**	**11,692**	**10,995**	**10,503**	**10,979**

Projected Water Supply Needs
TWDB 2017 State Water Plan Data

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

PANOLA COUNTY

All values are in acre-feet

RWPG	WUG	WUG Basin	2020	2030	2040	2050	2060	2070
I	BECKVILLE	SABINE	448	437	431	425	419	414
I	CARTHAGE	SABINE	0	0	0	0	0	0
I	COUNTY-OTHER, PANOLA	CYPRESS	1	0	0	0	0	0
I	COUNTY-OTHER, PANOLA	SABINE	179	165	171	155	125	98
I	GILL WSC	SABINE	74	75	77	76	75	74
I	IRRIGATION, PANOLA	SABINE	510	510	510	510	510	510
I	LIVESTOCK, PANOLA	CYPRESS	15	15	15	15	15	15
I	LIVESTOCK, PANOLA	SABINE	175	175	175	175	175	175
I	MANUFACTURING, PANOLA	SABINE	-134	-156	-176	-194	-230	-309
I	MINING, PANOLA	CYPRESS	2	2	2	2	4	4
I	MINING, PANOLA	SABINE	3,317	3,639	4,263	4,576	5,833	5,706
I	TATUM	SABINE	0	0	0	0	0	0
	Sum of Projected Water Supply Needs (acre-feet)		**-134**	**-156**	**-176**	**-194**	**-230**	**-309**

Projected Water Management Strategies
TWDB 2017 State Water Plan Data

PANOLA COUNTY

WUG, Basin (RWPG)

All values are in acre-feet

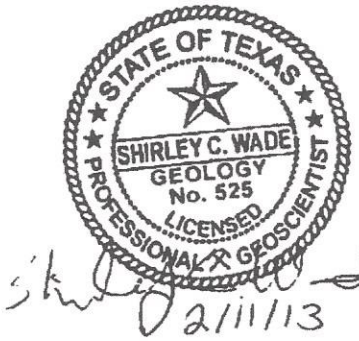
Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
MANUFACTURING, PANOLA, SABINE (I)							
PANL-MFG-INFRASTRUCTURE	CARRIZO-WILCOX AQUIFER [PANOLA]	134	156	176	194	230	309
		134	**156**	**176**	**194**	**230**	**309**
Sum of Projected Water Management Strategies (acre-feet)		**134**	**156**	**176**	**194**	**230**	**309**

APPENDIX I

ESTIMATES OF HISTORICAL GROUNDWATER FLOWS
GAM RUN 13-006

GAM Run 13-006: Panola County Groundwater Conservation District Management Plan

by Shirley Wade, Ph.D., P.G.
Texas Water Development Board
Groundwater Resources Division
Groundwater Availability Modeling Section
(512) 936-0883
February 11, 2013



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by Shirley Wade, Ph.D., P.G.
Texas Water Development Board
Groundwater Resources Division
Groundwater Availability Modeling Section
(512) 936-0883
February 11, 2013

EXECUTIVE SUMMARY:

Texas State Water Code, Section 36.1071, Subsection (h), states that, in developing its groundwater management plan, a groundwater conservation district shall use groundwater availability modeling information provided by the executive administrator of the Texas Water Development Board (TWDB) in conjunction with any available site-specific information provided by the district for review and comment to the executive administrator. Information derived from groundwater availability models that shall be included in the groundwater management plan includes:

- the annual amount of recharge from precipitation to the groundwater resources within the district, if any;
- 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
- the annual volume of flow into and out of the district within each aquifer and between aquifers in the district.

The purpose of this report is to provide Part 2 of a two-part package of information from the TWDB to Panola County Groundwater Conservation District management plan to fulfill the requirements noted above. The groundwater management plan for the Panola County Groundwater Conservation District should be adopted by the district on or before December 9, 2013 and submitted to the executive administrator of the TWDB on or before January 8, 2014. The current management plan for the Panola County Groundwater Conservation District expires on March 9, 2014.

This report discusses the methods, assumptions, and results from a model run using the groundwater availability model for the northern part of the Carrizo-Wilcox, Queen City, and Sparta aquifers. Table 1 summarizes the groundwater availability model data required by the statute, and Figure 1 shows the area of the model from which the values in the table were extracted. This model run replaces the results of GAM Run 08-50. GAM Run 13-006 meets current standards set after the release of GAM Run 08-50. If after review of the figures, Panola County Groundwater Conservation District determines that the district boundaries used in the assessment do not reflect current conditions, please notify the Texas Water Development Board immediately.

METHODS:

In accordance with the provisions of the Texas State Water Code, Section 36.1071, Subsection (h), the groundwater availability model for the northern part of the Carrizo-Wilcox, Queen City, and Sparta aquifers was run for this analysis. Panola County Groundwater Conservation District Water budgets for 1980 through 1999 were extracted using ZONEBUDGET Version 3.01 (Harbaugh, 2009). The average annual water budget values for recharge, surface water outflow, inflow to the district, outflow from the district, net inter-aquifer flow (upper), and net inter-aquifer flow (lower) for the portions of the aquifers located within the district are summarized in this report.

PARAMETERS AND ASSUMPTIONS:

- We used Version 2.01 of the groundwater availability model for the northern part of the Carrizo-Wilcox, Queen City, and Sparta aquifers. See Fryar and others (2003) and Kelley and others (2004) for assumptions and limitations of the groundwater availability model for the northern part of the Carrizo-Wilcox, Queen City, and Sparta aquifers.
- The groundwater availability model includes eight layers, that roughly correspond to:
    - the Sparta Aquifer (Layer 1),
    - the Weches Confining Unit (Layer 2),
    - the Queen City Aquifer (Layer 3),
    - the Reklaw Confining Unit (Layer 4),
    - the Carrizo Aquifer (Layer 5),

  - the Upper Wilcox Aquifer (Layer 6),
  - the Middle Wilcox Aquifer (Layer 7), and
  - the Lower Wilcox Aquifer (Layer 8).

- The Sparta and Queen City aquifers and associated confining units (layers 1 to 4) are not substantively present in the district. The reported water budget values for these layers, therefore, are very small or zero. Accordingly, these values are not presented in Table 1.
- In the Sabine Uplift area, the Simsboro Formation (Middle Wilcox Aquifer) is not distinguishable and the Wilcox Group is informally divided into the Upper Wilcox and the Lower Wilcox aquifers (Fryar and others, 2003). In the current version of the groundwater availability model, layers 6 and 7 represent the Upper Wilcox and Lower Wilcox aquifers in this area. Layer 8 is included in the model in this area, but it is of nominal thickness and is not intended to represent the Lower Wilcox aquifer.
- The model was run with MODFLOW-96 (Harbaugh and McDonald, 1996).

RESULTS:

A groundwater budget summarizes the amount of water entering and leaving the aquifer according to the groundwater availability model. Selected groundwater budget components listed below were extracted from the model results for the aquifers located within the district and averaged over the duration of the calibration and verification portion of the model run in the district, as shown in Table 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.
- Surface water outflow—The total water discharging from the aquifer (outflow) to surface water features such as streams, reservoirs, and drains (springs).
- Flow into and out of district—The lateral flow within the aquifer between the district and adjacent counties.
- Flow between aquifers—The net vertical flow between aquifers or confining units. This flow is controlled by the relative water levels in each aquifer or confining unit and aquifer properties of each aquifer or confining unit that

define the amount of leakage that occurs. "Inflow" to an aquifer from an overlying or underlying aquifer will always equal the "Outflow" from the other aquifer.

The information needed for the District's management plan is summarized in Table 1. 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 (Figure 1).

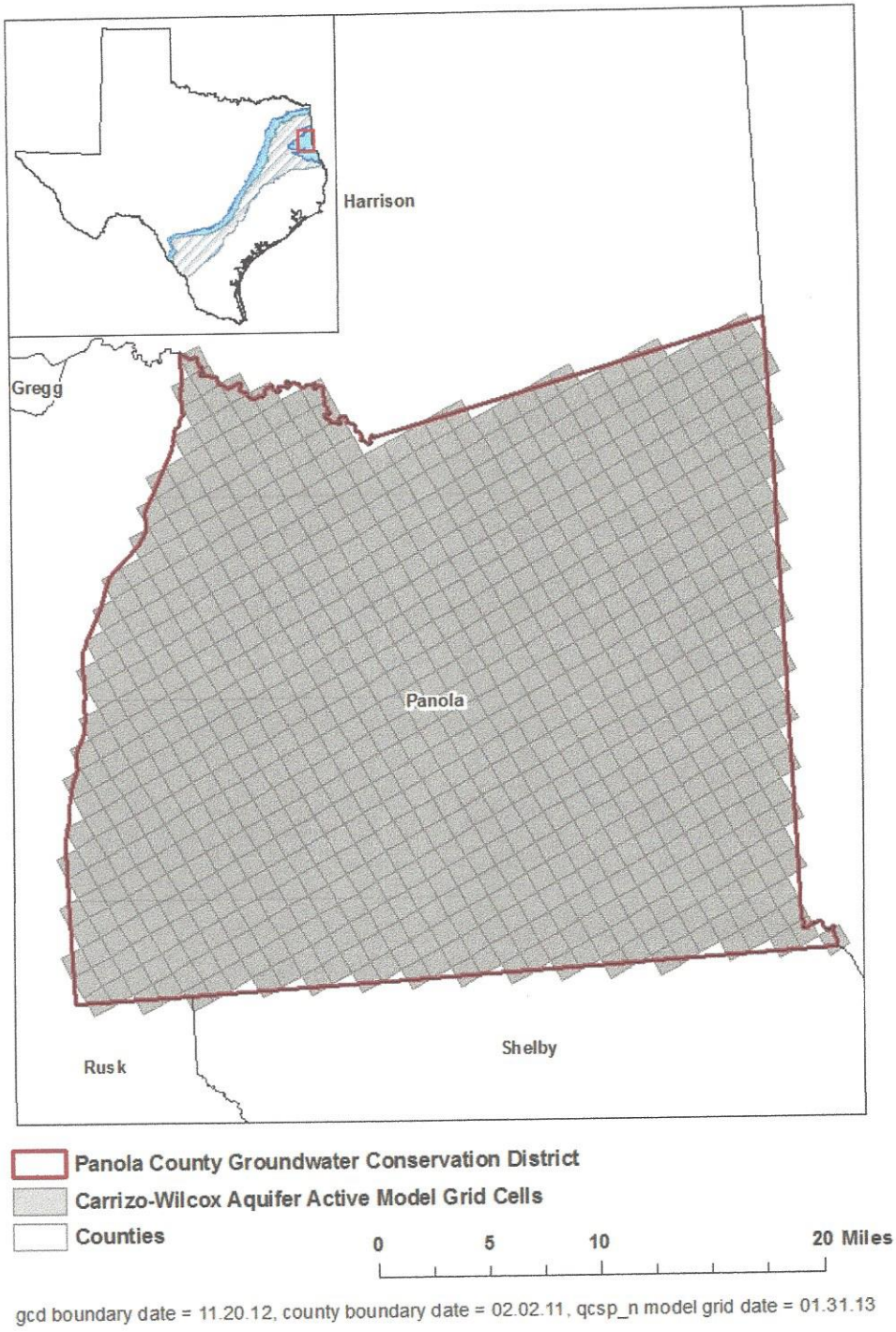

FIGURE 1: AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE CARRIZO-WILCOX, QUEEN CITY, AND SPARTA AQUIFERS FROM WHICH THE INFORMATION IN TABLE 1 WAS EXTRACTED (THE CARRIZO-WILCOX AQUIFER EXTENT WITHIN THE DISTRICT BOUNDARY).

TABLE 1: SUMMARIZED INFORMATION FOR THE CARRIZO-WILCOX AQUIFER THAT IS NEEDED FOR THE PANOLA COUNTY GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT. THESE FLOWS MAY INCLUDE BRACKISH WATERS.

Management Plan requirement	*Aquifer or confining unit*	*Results*
Estimated annual amount of recharge from precipitation to the district	Carrizo-Wilcox Aquifer	38,085
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	30,580
Estimated annual volume of flow into the district within each aquifer in the district	Carrizo-Wilcox Aquifer	5,816
Estimated annual volume of flow out of the district within each aquifer in the district	Carrizo-Wilcox Aquifer	3,122
Estimated net annual volume of flow between each aquifer in the district	From overlying confining units into the Carrizo-Wilcox Aquifer	16

LIMITATIONS

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

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

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

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

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

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