



**PANOLA COUNTY**  
groundwater conservation district

April 27, 2023

Mr. Robert Bradley  
Division Director  
Texas Water Development Board  
1700 North Congress Avenue  
Austin, Texas 78711-3231

VIA: CERTIFIED MAIL

Re: Transmittal of Panola County Groundwater Conservation District Management Plan for  
TWDB Review and Approval

Dear Mr. Bradley:

The Board of Directors of the Panola County Groundwater Conservation District (District) readopted the enclosed management plan after notice and hearing on April 25, 2023. The District submits the enclosed plan for Texas Water Development Board (TWDB) review and approval as required by Section 36.1072(e) of the Texas Water Code. The enclosed plan fulfills the requirements of Chapter 36 of the Texas Water Code and Chapter 356 of the TWDB rules contained in Title 31 of the Texas Administrative Code. The plan will take effect as of the date of TWDB approval.

Documents demonstrating compliance with the regulatory and statutory requirements related to development and adoption of management plans are attached as appendices to the enclosed management plan, including evidence of coordination with surface water management entities, a resolution of the Board of Directors adopting the plan, and proof that the plan was adopted after notice and hearing. The District also enclosed a copy of its rules for TWDB review.

The District appreciates the efforts of TWDB staff during the preparation and review of its revised management plan. Please let me know if you require any additional information in the review of the enclosed management plan.

Sincerely,

Teresa Griffin  
General Manager

Enclosures



**PANOLA COUNTY**  
groundwater conservation district

# **District Management Plan**

Adopted: January 20, 2009  
Amended & Adopted: February 19, 2013  
Amended & Adopted: April 24, 2018

**Amended & Adopted: April 25, 2023**

## TABLE OF CONTENTS

	Page
I. District Mission .....	1
II. Purpose of the Management Plan .....	1
III. District Information .....	1
A. Creation .....	1
B. Directors .....	2
C. Authority .....	2
D. Location and Extent .....	2
E. Groundwater Resources of Panola County .....	2
IV. Criteria for Plan Approval .....	6
A. Planning Horizon .....	6
B. Board Resolution .....	6
C. Plan Adoption .....	6
D. Coordination with Surface Water Management Entities .....	6
V. Estimates of Technical Information Required by TWC § 36.1071 / 31 TAC 356.52 .....	6
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) .....	6
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) .....	7
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) .....	8
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) .....	8
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) .....	8
1. Estimated annual volume of flow into the district within each aquifer in the district .....	8
2. Estimated annual volume of flow out of the district within each aquifer in the district .....	8
3. Estimated net annual volume of flow between each aquifer in the district .....	10
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) .....	9
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) ...	10



VI.	Consider the Water Supply Needs and Water Management Strategies included in the Adopted State Water Plan — TWC §36.1071(E)(4) .....	11
VII.	Details on the District Management of Groundwater .....	13
VIII.	Actions, Procedures, Performance, and Avoidance for Plan Implementation — 31 TAC 356.52 (A)(4); TWC §36.1071(E)(2) .....	14
IX.	Methodology for Tracking Process to Achieve District’s Management Goals — 31 TAC §356.52 (A)(6) .....	15
X.	District Goals, Management Objectives, and Performance Standards —	
	31 TAC §356.52 .....	15
	A. Providing the Most Efficient Use of Groundwater - 31 TAC §356.52 (a)(1)(A); TWC §36.1071(a)(1) .....	15
	B. Controlling and Preventing Waste of Groundwater - 31TAC §356.52 (a)(1)(B); TWC §36.1071(a)(2) .....	16
	C. Addressing Conjunctive Surface Water Management Issues - 31TAC §356.52 (a)(1)(D); TWC §36.1071(a)(4) .....	16
	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) .....	17
	E. Addressing Drought Conditions - 31TAC §356.52 (a)(1)(F); TWC §36.1071(a)(6) .....	17
	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) .....	17
	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) .....	18
XI.	Management Goals Determined Not Applicable to the District .....	20
	A. Controlling and Preventing Subsidence - 31TAC §356.52(a)(1)(C); TWC §36.1071(a)(3) .....	20
	B. Addressing Precipitation Enhancement – 31 TAC §•356.52(a)(1)(G); TWC §36.1071(a)(7) .....	20
	C. Addressing Brush Control – 31 TAC §•356.52(a)(1)(G); TWC §36.1071(a)(7) ....	20
	D. Recharge Enhancement-31 TAC §•356.52(a)(1)(G); TWC §36.1071(a)(7).....	20
	Bibliography .....	21
	Groundwater Management Area 11 Map.....	22
	Appendices .....	23
	Figures 1 - Carrizo – Wilcox Aquifer .....	5



## **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 80<sup>th</sup> 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 and Figure 2, 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 formation 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.

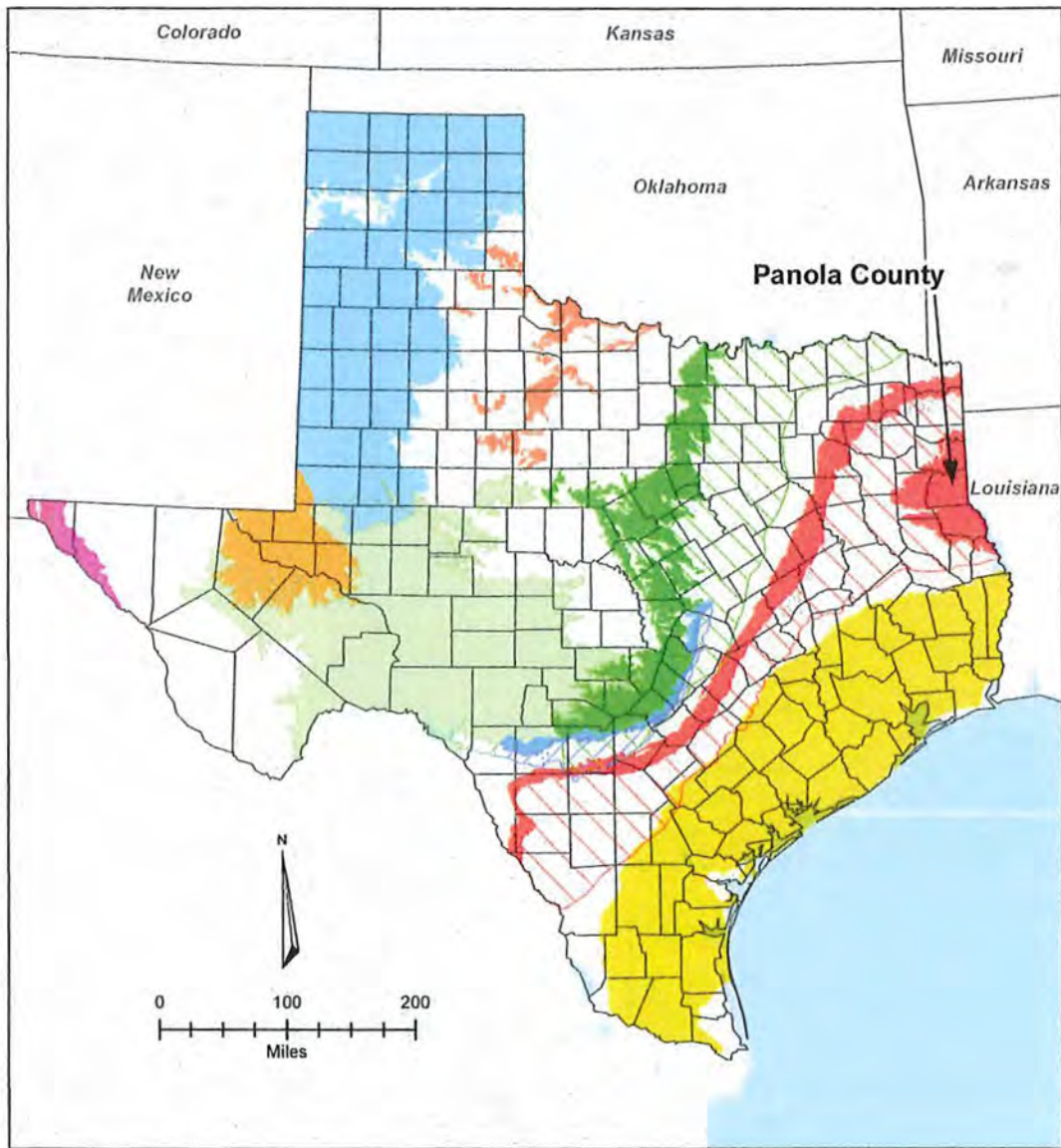
Well yields for the Carrizo-Wilcox Aquifer in Texas are commonly 500 gallons per minute or more, with some areas under artesian pressure supporting well yields up to 3,000 gallons per minute (Ashworth and Hopkins, 1995). This is not the case, however, for Panola County, which is located in an outcrop portion of the aquifer away from these more productive areas to the southwest. Of the over 1,900 wells in the TWDB 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.

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.





**Major Aquifers of Texas**

(Source: TWDB)

Prepared for Panola County Groundwater Conservation District

January 22, 2013

**Legend**

- |                              |                                       |
|------------------------------|---------------------------------------|
| □ Texas Counties/US States   | ■ Ogallala                            |
| ■ Pecos Valley               | ■ Edwards - Trinity Plateau (outcrop) |
| ■ Seymour                    | ▨ Edwards - Trinity Plateau (subcrop) |
| ■ Gulf Coast                 | ■ Edwards BFZ (outcrop)               |
| ■ Carrizo - Wilcox (outcrop) | ▨ Edwards BFZ (subcrop)               |
| ▨ Carrizo - Wilcox (subcrop) | ■ Trinity (outcrop)                   |
| ■ Hueco - Mesilla Bolson     | ▨ Trinity (subcrop)                   |

Figure 1. Major Aquifers of Texas

#### **IV. Criteria for Plan Approval**

##### **A. Planning Horizon**

The Management Plan is adopted to be effective for a five (5) 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 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. On August 11, 2021, the Districts adopted the current DFCs; which 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 (values are in acre-feet):

County	Region	Basin	2020	2030	2040	2050	2060	2070
Panola	I	Cypress	0	0	0	0	0	0
		Sabine	4,999	4,999	4,999	4,999	4,999	4,999

**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 has looked to the TWDB Annual Water Use Survey Data. Because responses to the TWDB survey have been voluntary for years, the TWDB Water Use Survey Data is subject to variations in the completeness or accuracy of the data. The TWDB estimate of the amount of groundwater being used in the District on an annual basis is 6,476 acre-feet per year. The estimate is from the TWDB Annual Water Use Survey for the Year 2019 which is the most recent data available. TWDB data on estimated groundwater use is available from 2004 to 2019. Between 2004 and 2019, 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.

**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 22-017 conducted by the TWDB. GAM Run 22-017 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	25,771

**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 22-017 are as follows:

<b>Aquifer or confining Unit</b>	<b>Results (in acre-feet)</b>
Carrizo-Wilcox Aquifer	5,939

**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 22-017 are as follows:

<b>Aquifer or confining Unit</b>	<b>Results (in acre-feet)</b>
Carrizo-Wilcox Aquifer	3,319

**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 22-017 are as follows:

<b>Aquifer or confining Unit</b>	<b>Results (in acre-feet)</b>
Carrizo-Wilcox Aquifer	1,014

**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 22-017 are as follows:

<b>Aquifer or confining Unit</b>	<b>Results (in acre-feet)</b>
From overlying confining units into the Carrizo-Wilcox Aquifer	3



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 2022 State Water Plan. This indicates a projected surface water supply for Panola County of 11,942 acre-feet per year in 2020 increasing to 12,577 acre-feet per year in 2070.

<b>PANOLA COUNTY</b>				<i>100% (multiplier)</i>					
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	152	152	152	152	152	152
I	Livestock, Panola	Cypress	Cypress Livestock Local Supply	27	27	27	27	27	27
I	Livestock, Panola	Sabine	Cypress Livestock Local Supply	3	3	3	3	3	3
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	168	168	168	168	168	168
I	Mining, Panola	Sabine	Toledo Bend Lake/Reservoir	3,896	4,196	4,496	4,496	5,494	5,494
<b>Sum of Projected Surface Water Supplies (acre-feet)</b>				<b>11,942</b>	<b>12,246</b>	<b>12,091</b>	<b>11,659</b>	<b>12,346</b>	<b>12,577</b>



- 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)**  
 Projected water management strategies listed the TWDB estimated historical. This indicates a projected total water demand for Panola County of 13,554 acre-feet per year in 2020 decreasing to 12,173 acre-feet per year in 2070.

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

**PANOLA COUNTY**

*100% (multiplier)*

All values are in acre-feet

RWPG	WUG	WUG Basin	2020	2030	2040	2050	2060	2070
I	Beckville	Sabine	136	147	153	160	166	171
I	Carthage	Sabine	1,650	1,651	1,644	1,648	1,659	1,669
I	County-Other, Panola	Cypress	6	6	6	6	6	6
I	County-Other, Panola	Sabine	1,589	1,602	1,594	1,607	1,633	1,658
I	Gill WSC	Sabine	94	93	91	92	93	94
I	Irrigation, Panola	Sabine	574	574	574	574	574	574
I	Livestock, Panola	Cypress	27	27	27	27	27	27
I	Livestock, Panola	Sabine	2,625	2,625	2,625	2,625	2,625	2,625
I	Manufacturing, Panola	Sabine	852	1,272	1,272	1,272	1,272	1,272
I	Minden Brachfield WSC	Sabine	4	4	5	5	6	6
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	Panola-Bethany WSC	Sabine	18	21	25	32	36	40
I	Tatum	Sabine	63	73	79	85	89	93
<b>Sum of Projected Water Demands (acre-feet)</b>			<b>13,554</b>	<b>13,954</b>	<b>13,144</b>	<b>12,401</b>	<b>11,806</b>	<b>12,173</b>

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

Projected water supply needs listed in the TWDB historical water use/2022 state water plan data are primarily livestock, State water plan show no change in need from 2020 to 2070.

**2022 State Water Plan Projected Water Needs  
Panola County**

Positive values represent a water surplus.

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

<b>PANOLA COUNTY</b>			All values are in acre-feet						
<b>RWPG</b>	<b>WUG</b>	<b>WUG Basin</b>	<b>2020</b>	<b>2030</b>	<b>2040</b>	<b>2050</b>	<b>2060</b>	<b>2070</b>	
I	Beckville	Sabine	445	434	428	421	415	410	
I	Carthage	Sabine	0	0	0	0	0	1	
I	County-Other, Panola	Cypress	0	0	0	0	0	0	
I	County-Other, Panola	Sabine	205	192	200	187	161	136	
I	Gill WSC	Sabine	65	66	68	67	66	65	
I	Irrigation, Panola	Sabine	28	28	28	28	28	28	
I	Livestock, Panola	Cypress	0	0	0	0	0	0	
I	Livestock, Panola	Sabine	-982	-982	-982	-982	-982	-982	
I	Manufacturing, Panola	Sabine	407	26	65	98	165	196	
I	Minden Brachfield WSC	Sabine	0	0	0	0	0	0	
I	Mining, Panola	Cypress	2	2	2	2	4	4	
I	Mining, Panola	Sabine	3,189	3,511	4,135	4,448	5,705	5,578	
I	Panola-Bethany WSC	Sabine	10	18	14	8	4	0	
I	Tatum	Sabine	2	2	2	2	3	3	
<b>Sum of Projected Water Supply Needs (acre-feet)</b>			<b>-982</b>	<b>-982</b>	<b>-982</b>	<b>-982</b>	<b>-982</b>	<b>-982</b>	



Projected water management strategies listed in the TWDB estimated historical water use 2022 state water plan data packet indicate the drilling of new wells in the Carrizo-Wilcox Aquifer for livestock use. With this, the sum of projected Water Management Strategies ranges from 24 acre-feet in 2020 to 1,038 acre-feet in 2070.

**Projected Water Management Strategies  
Panola County**

<b>PANOLA COUNTY</b>		All values are in acre-feet					
WUG, Basin (RWPG)		2020	2030	2040	2050	2060	2070
Water Management Strategy	Source Name [Origin]						
<b>Carthage, Sabine (I)</b>							
Carthage - Municipal Conservation	DEMAND REDUCTION [Panola]	23	39	41	44	47	50
		<b>23</b>	<b>39</b>	<b>41</b>	<b>44</b>	<b>47</b>	<b>50</b>
<b>Livestock, Panola, Sabine (I)</b>							
PANL-LTK-New Wells in Carrizo-Wilcox Aquifer	Carrizo-Wilcox Aquifer [Panola]	0	982	982	982	982	982
		<b>0</b>	<b>982</b>	<b>982</b>	<b>982</b>	<b>982</b>	<b>982</b>
<b>Panola-Bethany WSC, Sabine (I)</b>							
Drill New Wells (Panola Bethany, Queen City, Sabine)	Queen City Aquifer [Harrison]	0	4	0	14	4	1
Panola-Bethany WSC - Municipal Conservation	DEMAND REDUCTION [Panola]	0	0	0	0	1	2
		<b>0</b>	<b>4</b>	<b>0</b>	<b>14</b>	<b>5</b>	<b>3</b>
<b>Tatum, Sabine (I)</b>							
Tatum - Municipal Conservation	DEMAND REDUCTION [Panola]	1	2	2	2	3	3
		<b>1</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>3</b>
<b>Sum of Projected Water Management Strategies (acre-feet)</b>		<b>24</b>	<b>1,027</b>	<b>1,025</b>	<b>1,042</b>	<b>1,037</b>	<b>1,038</b>



## **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 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: <https://pcgcd.org/wp-content/uploads/2023/01/PCGCD-Approved-Rules.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; or
- g. 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) each fiscal year.

Performance Standard: The attendance at any Region I meeting by a representative of the District will be included in the District's Annual Report and will indicate the dates of attendance.

**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 and collecting water quality 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 along with water quality 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/>

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. annually conduct a local contest on water conservation; or
  - h. 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)**

In the desired future conditions explanatory report, Carrizo-Wilcox/Queen City/Sparta Aquifers for Groundwater Management 11, the following statements are made: "Subsidence has not been an issue historically in these aquifers. The Texas Water Development Board Subsidence Prediction Tool was used to assess the risk of subsidence in the future. This tool provides an overall risk score (0 is low risk and 10 is high risk). The application of this tool assumed the highest drawdown listed in Table 2 for each of the aquifers covered in this explanatory report. For the Carrizo-Wilcox Aquifer, it was assumed that the drawdown from 2010 to 2080 was 176 feet from Table 2 (Cherokee County) The risk score was 4.53 and the predicted subsidence was 0.16 feet in 2080."

<https://www.twdb.texas.gov/groundwater/dfc/2021jointplanning.asp>

This goal is not applicable to the District because it is not appropriate or cost-effective. The TWDB subsidence report (*Identification of the Vulnerability of the Major and Minor Aquifers of Texas to Subsidence with Regard to Groundwater Pumping – TWDB Contract Number 1648302062*, by LRE Water:

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

this report represents the best available science and has been reviewed for applicability to the district. The District will continue to monitor for signs of subsidence and will respond to any reports of substantial subsidence.

**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.

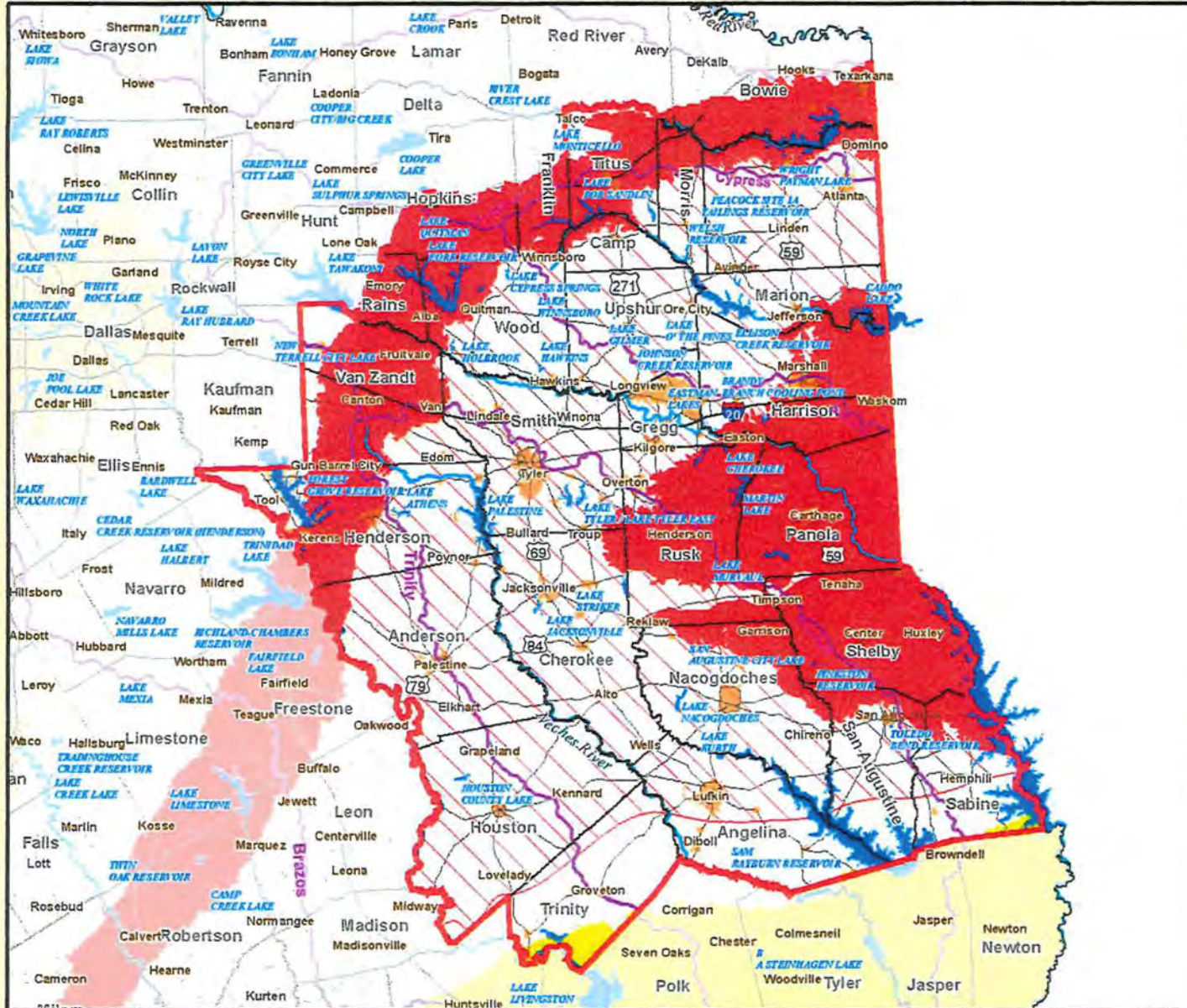


## **BIBLIOGRAPHY**

1. George, P.G., 2009, Geology of the Carrizo-Wilcox Aquifer, *in* Hutchison, W.R., Davidson, S.C., Brown, B.J., and Maces, R.E., eds., Aquifers of the upper coastal plains of Texas, Texas Water Development Board Report 374, p. 17-34.
2. Deeds, N.E, Fryar, D., Dutton, A., and Nicot, J.P., 2009, Hydrogeology of the Carrizo-Wilcox Aquifer, *in* Hutchison, W.R., Davidson, S.C., Brown, B.J., and Maces, R.E., eds., Aquifers of the upper coastal plains of Texas, Texas Water Development Board Report 374, p. 35-60.
3. Kaiser, W.R., 1990, The Wilcox Group (Paleocene-Eocene) in the Sabine Uplift area, Texas: depositional systems and deep-basin lignite, 20 p.
4. Oliver, W.A., and Lupton, D.M., 2013, Wilcox structure, water levels, and water quality in Panola County Groundwater Conservation District. Contracted report prepared by INTERA Inc. for Panola County Groundwater Conservation District, 32 p.
5. Ashworth, John B. and Hopkins, Janie, 1995, Aquifers of Texas; Texas Water Development Board Report 345 <http://pubs.usgs.gov/of/2003/ofr03-315/>
6. Texas Almanac 2002-2003, The Dallas Morning News
7. GAM Run 21-016, Wade, S., Texas water Development Board, February 17, 2022
8. GAM Run 22-017, Grayson Dowlearn, P.G., Texas Water Development Board, February 09, 2022.
8. 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.
9. Chiang, W., and Kinzelbach, W., 2001, Groundwater Modeling with PMWIN, 346 p.
10. Kelley, V.A., Deeds, N.E., Fryar, D.G., and Nicot, J.P., 2004, Groundwater availability models for the Queen City and Sparta aquifers; Contract report to the Texas Water Development Board, 867 p.



# Groundwater Management Area #11



### MAP LEGEND

- GMA #11
- Major river
- River Basin
- Existing reservoirs
- Interstate Highway
- US Highway
- State Highway
- + City
- County

#### Major Aquifers

- Gulf Coast
- Carrizo - Wilcox (outcrop)
- Carrizo - Wilcox (subcrop)
- Trinity (subcrop)

**DISCLAIMER**  
 No claims are made to the accuracy or completeness of the data nor to its suitability for a particular use. The scale and compilation of all information shown here is approximate.  
 Map updated by Mark Hayes  
 Texas Water Development Board  
 GIS Section  
 Updated 02/2007





1 inch equals 30 miles



L:\Projects\RIOT\GIS Projects and files\Groundwater\_Management\_Area\_maps



## **APPENDIX LIST**

- 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 21-016 MAG
- H - Historical Water Use Summary by Groundwater and Surface Water
- I - Estimates for historical groundwater flows – GAM Run 22-017

**APPENDIX A**

**ENABLING ACT FOR PANOLA COUNTY GCD**

H.B. No. 1498

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 45<sup>th</sup> 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.

I 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.

I 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.

I 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 commissioner's 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 commissioner's precinct by the voters of that precinct.

I 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.

I 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.

I 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.

I 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.

I 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

**APPENDIX B**

**RESOLUTION ADOPTING MANAGEMENT PLAN**



Resolution 2023-02

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 and 36.1072 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 public hearing on April 25, 2023, 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, and offered the public the opportunity to provide written comments on the Management Plan changes after the public hearings;

WHEREAS, the District coordinated 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 of the requirements of Chapter 36, Water Code, and 31 Texas Administrative Code Chapter 356; and

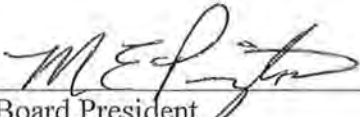
WHEREAS, the Board of Directors met in public meetings on April 25, 2023, properly noticed in accordance with appropriate law, and considered adoption of the attached Management Plan.

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 25<sup>th</sup> DAY OF APRIL, 2023.

ATTEST:

  
Board President

  
Vice President



**APPENDIX C**

**NOTICES OF PUBLIC HEARINGS AND MEETINGS OF THE PANOLA COUNTY  
GCD**

## 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 25, 2023 at 5:30 p.m.

County Clerk's Office Use Only:	
FILED FOR RECORD IN MY OFFICE	
AT 1:55	O'CLOCK P M
APR 14 2023	
BOBBIE DAVIS COUNTY CLERK, PANOLA COUNTY, TEXAS	
BY	DEPUTY

### PUBLIC HEARING AGENDA

#### Operating Permits

1. Call to order.
2. Greg Ransom, located at 165 CR 132, Gary TX 75643 applied to operate two (2) water wells located at or near 165 CR 132, Gary TX 75643 for poultry houses. The total potential maximum combined annual groundwater production from these two (2) wells is 31,536,000 gallons or 96.78 acre-feet annually for the water wells at the estimated rate of withdrawal of 30 GPM.

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

3. Keith Sears, located at 517 CR 172, Longbranch, TX 75669 applied to operate two (2) water wells located at or near 517 CR 172, Longbranch, TX 75669 for poultry houses. The total potential maximum combined annual groundwater production from these two (2) wells is 15,768,000 gallons or 48.39 acre-feet annually for the water wells at the estimated rate of withdrawal of 15 GPM.

The combined total usage applied for is 4,000,000 gallons or 12.27 acre-feet annually.

4. 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 2023 and for resolution 2023-02.
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](http://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 on or before April 14, 2023 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.



Teresa Griffin, General Manager  
Panola County Groundwater Conservation District

WITNESS THE HAND AND SEAL OF THE UNDERSIGNED CLERK ON THIS THE 14TH DAY OF APRIL 2023 AT 1:55 O'CLOCK 1 A.M. 0 P.M.

  
BOBBIE DAVIS, COUNTY CLERK  
PANOLA COUNTY, TEXAS

BY  DEPUTY



# The Panola Watchman

An M. Roberts Media Company | Honesty, Respect and Fairness

04/13/23

109 W Panola  
Carthage, TX 75633

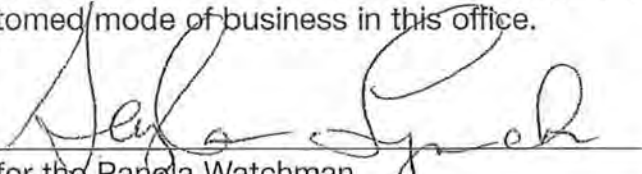
Phone:(903) 693-7888 Fax: Email:glynch@panolawatchman.com

## AFFIDAVIT OF PUBLICATION

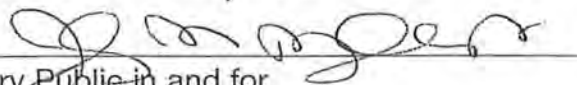
State of Texas)

County of Panola)

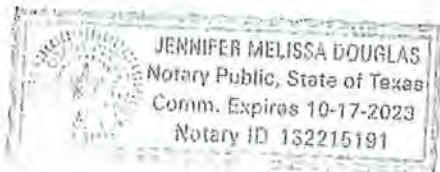
This Affidavit of Publication for the Panola Watchman, a daily newspaper of general circulation, printed and published at Carthage, hereby certifies that the attached legal notice, ad # 1768273, was published in said newspaper on April 11, 2023, and that copies of each paper in which said Public Notice was published were delivered by carriers to the subscribers of said paper, according to their accustomed mode of business in this office.

  
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 17 day of April, 2023

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

My commission expires 10-17-23



### 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 25, 2023, at 5:30 p.m. in the District office located at 419 W. Sabine Street in Carthage, Texas 75633, to discuss, consider, receive public comments, and potentially act upon adoption of the District Management Plan. All interested members of the public are invited to attend.

At any time during the hearing and in compliance with Chapter 551, Government Code, the District Board may meet in executive session on the above agenda item for consultation concerning attorney-client matters. Any subject discussed in executive session may thereafter be subject to action during an open session of the District Board.

The District is committed to compliance with the Americans with Disabilities Act (ADA). Reasonable accommodation and equal opportunity for effective communications will be provided upon request.

Please contact the District office at (903) 690-0143 at least 23 hours in advance if accommodation is needed.



# The Panola Watchman

# CLASSIFIED

LEGAL NOTICES

LEGAL NOTICES

MOBILE HOME

### PUBLIC NOTICE PANOLA COUNTY TEXAS COMMUNITY DEVELOPMENT BLOCK GRANT PROGRAM

Panola County is giving notice of the County's intent to submit a Texas Community Development Block Grant Program grant application for a Community Development Fund grant request of \$500,000 for water main improvements on behalf of Rock Hill WSC. The application is available for review at the County Courthouse during regular business hours. Para obtener una copia en español, comuníquese con Rock Hill WSC General Manager, Wade Allums, al (903) 678-9073.

### 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 25, 2023, at 5:30 p.m. in the District office located at 419 W. Sabine Street in Carthage, Texas 75633, to discuss, consider, receive public comments, and potentially act upon adoption of the District Management Plan. All interested members of the public are invited to attend.

At any time during the hearing and in compliance with Chapter 551, Government Code, the District Board may meet in executive session on the above agenda item for consultation concerning attorney-client matters. Any subject discussed in executive session may thereafter be subject to action during an open session of the District Board.

The District is committed to compliance with the Americans with Disabilities Act (ADA). Reasonable accommodation and equal opportunity for effective communications will be provided upon request.

Please contact the District office at (903) 690-0143 at least 23 hours in advance if accommodation is needed.

### COUNTY OF PANOLA CARTHAGE, TEXAS

### LEGAL NOTICE REQUEST FOR PROPOSALS FOR AMBULANCE SERVICES

In accordance with Texas, Local Government code, Chapter 262, Subchapter C the Commissioners Court of Panola County, Texas will receive proposals for Ambulance Services

### Taking Rental Application

2 bdrm/1 bth 16x60 MH \$ mthly/\$800 dep. 439 CR 319 thage.

3 bdrm/2 bth Dbl Wide MH \$ mthly/\$1000 dep. 437 CR Carthage

**NO PETS ALLOWED  
on both 2 properties above  
(903)622-4650**

## Making the search for the



# PERFECT CAREER easier on YOU!

## FIND YOUR PERFECT JOB BY SEARCHING



**APPENDIX D**

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

Cities in Panola County:

City of Carthage  
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  
Penny Hanson, Manager  
P. O. Box 1387  
Jacksonville, Texas 75766

Pineywoods Groundwater Conservation District  
John McFarland, General Manager  
202 E. Pilar, Room 213  
Nacogdoches, Texas 75961

Rusk County Groundwater Conservation District  
David Miley, General Manager  
P. O. Box 97  
Henderson, Texas 75653

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  
Sammy Peace, President  
638 County Road 1234  
Carthage, Texas 75633-0331



**APPENDIX D**

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

Cities in Panola County:

City of Carthage  
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  
Penny Hanson, Manager  
P. O. Box 1387  
Jacksonville, Texas 75766

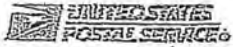
Pineywoods Groundwater Conservation District  
John McFarland, General Manager  
202 E. Pilar, Room 213  
Nacogdoches, Texas 75961

Rusk County Groundwater Conservation District  
David Miley, General Manager  
P. O. Box 97  
Henderson, Texas 75653

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  
Sammy Peace, President  
638 County Road 1234  
Carthage, Texas 75633-0331



**Certificate Of Mailing**

To pay for, and to show  
proper postage here.

This Certificate of Mailing provides evidence that mail has been presented to USPS for mailing.  
This form may be used for domestic and international mail.



Panola County Groundwater  
Conservation District  
419 West Sabine Street  
Carthage, TX 75633

not here



0000

**City of Beckville**  
**Attn: Andy Nixon, Mayor**  
**PO BOX 97**  
**Beckville, TX 75631**

U.S. POSTAGE PAID  
CARTHAGE, TX  
75633  
APR 27, 23  
AMOUNT

**\$1.85**  
R2304E105747-06





**PANOLA COUNTY**  
groundwater conservation district

April 27, 2023

City of Beckville  
Andy Nixon, Mayor  
PO Box 97  
Beckville, TX 75631-0097

Dear Mayor Nixon:

Enclosed please find a copy of the revised Management Plan readopted by the Panola County Groundwater Conservation District (the "District"). The District's mission is to conserve, preserve, and protect the quality and quantity of the groundwater resources for the citizens within Panola County. The Texas Legislature created the District in 2007 and the voters of Panola County confirmed the creation of the District on November 6, 2007.

The District submits the enclosed Management Plan pursuant to Section 36.1071(a) of the Texas Water Code and the Texas Water Development Board's ("TWDB") rules (Title 31 Texas Administrative Code, Section 356.51). A copy of the Management Plan including all attachments can also be viewed electronically at [www.pcgcd.org](http://www.pcgcd.org). The District asks for review and comment on its Management Plan as part of the District's effort to coordinate with surface water management entities and to seek input on the District's comprehensive groundwater management goals. The District Board of Directors ("Board") held a public hearing and subsequently readopted the enclosed Management Plan at its Board meeting on April 25, 2023.

The District is committed to working with you to manage the groundwater resources within its boundaries. Please contact the District at (936) 690-0143 if you have any questions regarding the District's Management Plan or its activities.

Sincerely,

Teresa Griffin  
General Manager

**tgriffin pcgcd.org**

---

**From:** tgriffin pcgcd.org  
**Sent:** Thursday, April 27, 2023 9:15 AM  
**To:** ago@sratx.org  
**Subject:** Panola GCD Management Plan 2023  
**Attachments:** PCGCD Management Plan 2023.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!

*Teresa Griffin*

General Manager  
Panola Co. Groundwater Conservation District  
419 W. Sabine  
Carthage, TX 75633

Phone: (903)690-0143  
Cell: (903) 263-3256

Visit our website! [www.pcgcd.org](http://www.pcgcd.org)

**tgriffin pcgcd.org**

---

**From:** tgriffin pcgcd.org  
**Sent:** Thursday, April 27, 2023 9:00 AM  
**To:** pcfwd1@gmail.com  
**Subject:** Panola GCD Management Plan 2023  
**Attachments:** PCGCD Management Plan 2023.pdf

Dear Panola County Freshwater District 1:

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!

*Teresa Griffin*

General Manager  
Panola Co. Groundwater Conservation District  
419 W. Sabine  
Carthage, TX 75633

Phone: (903)690-0143  
Cell: (903) 263-3256

Visit our website! [www.pcgcd.org](http://www.pcgcd.org)



**From:** tgriffin pcgcd.org  
**Sent:** Thursday, April 27, 2023 8:45 AM  
**To:** jmcfarland@pgcd.org; David Miley; Penny Hanson  
**Subject:** Panola GCD Management Plan 2023  
**Attachments:** PCGCD Management Plan 2023.pdf

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!

*Teresa Griffin*

General Manager  
Panola Co. Groundwater Conservation District  
419 W. Sabine  
Carthage, TX 75633

Phone: (903)690-0143  
Cell: (903) 263-3256

Visit our website! [www.pcgcd.org](http://www.pcgcd.org)

**tgriffin pcgcd.org**

---

**From:** tgriffin pcgcd.org  
**Sent:** Thursday, April 27, 2023 8:43 AM  
**To:** cityoftatum@tatum.texas.gov  
**Subject:** Panola GCD Management Plan 2023  
**Attachments:** PCGCD Management Plan 2023.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!

*Teresa Griffin*

General Manager  
Panola Co. Groundwater Conservation District  
419 W. Sabine  
Carthage, TX 75633

Phone: (903)690-0143  
Cell: (903) 263-3256

Visit our website! [www.pcgcd.org](http://www.pcgcd.org)

**tgriffin pcgcd.org**

---

**From:** tgriffin pcgcd.org  
**Sent:** Thursday, April 27, 2023 8:40 AM  
**To:** garyngs2@hotmail.com  
**Subject:** Panola GCD Management Plan 2023  
**Attachments:** PCGCD Management Plan 2023.pdf

Dear City of Gary:

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!

*Teresa Griffin*

General Manager  
Panola Co. Groundwater Conservation District  
419 W. Sabine  
Carthage, TX 75633

Phone: (903)690-0143  
Cell: (903) 263-3256

Visit our website! [www.pcgcd.org](http://www.pcgcd.org)



**tgriffin pcgcd.org**

---

**From:** tgriffin pcgcd.org  
**Sent:** Thursday, April 27, 2023 8:29 AM  
**To:** 'swilliams@carthagetexas.com'  
**Subject:** Panola GCD Management Plan 2023  
**Attachments:** PCGCD Management Plan 2023.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!

*Teresa Griffin*

General Manager  
Panola Co. Groundwater Conservation District  
419 W. Sabine  
Carthage, TX 75633

Phone: (903)690-0143  
Cell: (903) 263-3256

Visit our website! [www.pcgcd.org](http://www.pcgcd.org)

**APPENDIX E**

**Groundwater Management Areas In Texas**



**APPENDIX F**

**DESIRED FUTURE CONDITIONS ADOPTED BY  
GROUNDATER MANAGEMENT AREA 11**



**RESOLUTION TO ADOPT 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 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**, the GMA 11 Districts have considered the following factors, listed in §36.108(d), in establishing the desired future conditions for the aquifer(s),

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

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

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

**WHEREAS**, after considering the factors listed in 36.108(d), Texas Water Code, the GMA 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**, the GMA 11 Districts voted to propose desired future conditions based on Scenario 33 documented in Technical Memorandum 21-01, at a meeting on April 28, 2021, followed by a 90-day public comment period during which no comments were received, 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 “desired future conditions for the relevant aquifers” within GMA 11 for the Sparta, Queen City, and Carrizo-Wilcox aquifers as described in Table 1, attached hereto and incorporated herein for all purposes;

**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 declare that the following aquifers are classified as not relevant for the purposes of joint planning; Gulf Coast, Nacatoch, Trinity, and Yegua-Jackson aquifers;

**WHEREAS**, at the August 11, 2021 GMA 11 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 in Table 1 by unanimous 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 desired future conditions of the aquifer(s) as set forth in Table 1 by unanimous vote reflected in the above recitals.
3. The GMA 11 Districts and their agents and representatives, individually and collectively, are further authorized to take all actions necessary to implement this resolution.

AND IT IS SO ORDERED.

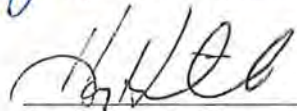
PASSED AND ADOPTED on this 11th day of August, 2021.

ATTEST:

  
\_\_\_\_\_  
Neches & Trinity Valleys Groundwater Conservation District

  
\_\_\_\_\_  
Panola County Groundwater Conservation District

  
\_\_\_\_\_  
Pineywoods Groundwater Conservation District

  
\_\_\_\_\_  
Rusk County Groundwater Conservation District



**Table 1**  
**Desired Future Conditions for Each County-Aquifer Unit in GMA 11**  
**Expressed at Average Drawdown from 2013 to 2080 (ft)**

County	2013-2080 Average Drawdown (ft) Scenario 33, TM 21-01		
	Sparta Aquifer	Queen City Aquifer	Carrizo-Wilcox Aquifer
Anderson	30	44	155
Angelina	6	28	67
Bowie			12
Camp		11	85
Cass	66	34	79
Cherokee	7	31	176
Franklin			102
Gregg		49	109
Harrison		41	26
Henderson		33	106
Hopkins			61
Houston	3	12	86
Marion	123	32	32
Morris		39	78
Nacogdoches	7	22	73
Panola			21
Rains			17
Rusk	26	17	86
Sabine	1	3	9
San Augustine	2	7	22
Shelby	18	12	17
Smith	121	132	265
Titus		9	66
Trinity	5	18	56
Upshur	10	30	149
Van Zandt		73	55
Wood	9	16	122

**From:** TexReg@sos.texas.gov  
**Sent:** Monday, July 26, 2021 10:59 AM  
**To:** tgriffin pcgcd.org  
**Subject:** S.O.S. Acknowledgment of Receipt

Acknowledgment of Receipt

Agency: Groundwater Management Area 11

Liaison: Teresa Griffin

The Office of the Secretary of State has posted

notice of the following meeting:

Board: GMA 11

Committee: GMA 11

Date: 08/11/2021 10:00 AM "TRD# 2021004478"

Notice posted: 07/26/21 10:58 AM

Proofread your current open meeting notice at:

[http://texreg.sos.state.tx.us/public/pub\\_om\\_lookup\\$.startup?Z\\_TRD=2021004478](http://texreg.sos.state.tx.us/public/pub_om_lookup$.startup?Z_TRD=2021004478)

## Open Meeting Submission

**TRD:** 2021004478  
**Date Posted:** 07/26/2021  
**Status:** Accepted  
**Agency Id:** 1148  
**Date of Submission:** 07/26/2021  
**Agency Name:** Groundwater Management Area 11  
**Board:** GMA 11  
**Committee:** GMA 11  
**Date of Meeting:** 08/11/2021  
**Time of Meeting:** 10:00 AM (###:## AM Local Time)  
**Street Location:** 202 E. Pilar  
**City:** Nacogdoches  
**State:** TX  
**Liaison Name:** Teresa Griffin  
**Liaison Id:** 2  
**Additional Information Obtained From:** Teresa Griffin 903-690-0143  
**Agenda:** GROUNDWATER MANAGEMENT AREA 11  
 NOTICE OF OPEN MEETING

Notice is hereby given that the groundwater conservation districts (GCDs) 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 August 11, 2021, in room 119  
 (Commissioners Room) in Nacogdoches City Hall at 202 E. Pilar, Nacogdoches, TX, and via  
 Zoom at: <https://zoom.us/j/95002156603?pwd=Qm5WZm01TS8xcERFWVnUmJzK3huZz09>  
 Via telephone (346)248-7799 Meeting ID: 950 0215 6603 Passcode: 386379

For the following purpose:

1. Call to order.
2. Public comments. i
3. Discussion and possible action to approve the minutes of the April 28, 2021, meeting.
4. Discussion of representatives and alternate appointments from Rusk County.



- 5. Nominations and election of officers in accordance with Section 4.05 of the GMA 11 Bylaws
- 6. Discussion and possible action regarding the public comments received by each District during the DFC comment period.
- 7. Discussion and possible action to approve final proposed DFC's via Resolution.
- 8. Discussion of possible agenda items for the next GMA-11 meeting.
- 9. Set date, time, and place of next meeting.
- 10. Adjourn meeting.

Dated and posted prior to 5:00 PM on or before the 30th day of July 2021.

---

Teresa Griffin, 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) minutes. 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:

Teresa Griffin | Panola County GCD | 419 W. Sabine, Cart

New Submission

HOME	TEXAS REGISTER	TEXAS ADMINISTRATIVE CODE	OPEN MEETINGS
------	----------------	---------------------------	---------------

FILED  
AT 10:51 O'CLOCK A.M.

JUL 21 2021

AMY FINCHER  
County Clerk, County Court at Law  
Angelina County, Texas

## GROUNDWATER MANAGEMENT AREA 11 NOTICE OF OPEN MEETING

Notice is hereby given that the groundwater conservation districts (GCDs) 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 August 11, 2021**, in room 119 (Commissioners Room) in Nacogdoches City Hall at 202 E. Pilar, Nacogdoches, TX, and via Zoom at:  
<https://zoom.us/j/95002156603?pwd=Qm5WZm01TS8xcERFVVVnUjZk3huZz09>

Via telephone (346)248-7799 Meeting ID: 950 0215 6603 Passcode: 386379

For the following purpose:

1. Call to order.
2. Public comments.<sup>1</sup>
3. Discussion and possible action to approve the minutes of the April 28, 2021, meeting.
4. Discussion of representatives and alternate appointments from Rusk County.
5. Nominations and election of officers in accordance with Section 4.05 of the GMA 11 Bylaws
6. Discussion and possible action regarding the public comments received by each District during the DFC comment period.
7. Discussion and possible action to approve final proposed DFC's via Resolution.
8. Discussion of possible agenda items for the next GMA-11 meeting.
9. Set date, time, and place of next meeting.
10. Adjourn meeting.

Dated and posted prior to 5:00 PM on or before the 30th day of July 2021.



Teresa Griffin, 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.*

<sup>1</sup> **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) minutes. 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: Teresa Griffin | Panola County GCD | 419 W. Sabine, Carthage, TX 75633 | (903) 690-0143 / tgriffin@pcgcd.org

# GROUNDWATER MANAGEMENT AREA 11

## NOTICE OF OPEN MEETING

Notice is hereby given that the groundwater conservation districts (GCDs) 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 August 11, 2021**, in room 119 (Commissioner's Room) in Nacogdoches City Hall at 202 E. Pilar, Nacogdoches, TX, and via Zoom at: <https://zoom.us/j/95002156603?pwd=Qm5WZm01TS8xcERFWVVnUmJzK3huZz09>

Via telephone (346)248-7799 Meeting ID: 950 0215:6603 Passcode: 386379

For the following purpose:

1. Call to order.
2. Public comments.<sup>1</sup>
3. Discussion and possible action to approve the minutes of the April 28, 2021, meeting.
4. Discussion of representatives and alternate appointments from Rusk County.
5. Nominations and election of officers in accordance with Section 4.05 of the GMA 11 Bylaws
6. Discussion and possible action regarding the public comments received by each District during the DFC comment period.
7. Discussion and possible action to approve final proposed DFC's via Resolution.
8. Discussion of possible agenda items for the next GMA-11 meeting.
9. Set date, time, and place of next meeting.
10. Adjourn meeting.

Dated and posted prior to 5:00 PM on or before the 30th day of July 2021.



Teresa Griffin, 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.*

<sup>1</sup>**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) minutes. 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: Teresa Griffin | Panola County GCD | 419 W. Sabine, Carthage, TX 75633 | (903) 690-0143 / tgriffin@pcgcd.org

2021 JUL 21 AM 9:38

FILED  
CLERK OF COURTS  
TARRANT COUNTY  
TEXAS



# GROUNDWATER MANAGEMENT AREA 11

## NOTICE OF OPEN MEETING

Notice is hereby given that the groundwater conservation districts (GCDs) 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);

FILED FOR RECORD  
IN MY OFFICE  
AT 11 O'CLOCK P M

JUL 22 2021

BOBBIE DAVIS  
COUNTY CLERK, PANOLA COUNTY, TEXAS  
BY *[Signature]* DEPUTY

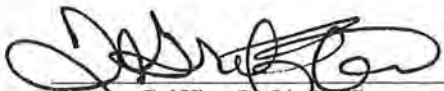
Will hold a **Joint Planning Meeting at 10:00 a.m. on August 11, 2021**, in room 119 (Commissioners Room) in Nacogdoches City Hall at 202 E. Pilar, Nacogdoches, TX, and via Zoom at: <https://zoom.us/j/95002156603?pwd=Qm5WZm01TS8xcERFWVnUmJzK3huZz09>

Via telephone (346)248-7799 Meeting ID: 950 0215 6603 Passcode: 386379

For the following purpose:

1. Call to order.
2. Public comments.<sup>i</sup>
3. Discussion and possible action to approve the minutes of the April 28, 2021, meeting.
4. Discussion of representatives and alternate appointments from Rusk County.
5. Nominations and election of officers in accordance with Section 4.05 of the GMA 11 Bylaws
6. Discussion and possible action regarding the public comments received by each District during the DFC comment period.
7. Discussion and possible action to approve final proposed DFC's via Resolution.
8. Discussion of possible agenda items for the next GMA-11 meeting.
9. Set date, time, and place of next meeting.
10. Adjourn meeting.

Dated and posted prior to 5:00 PM on or before the 30th day of July 2021.



Teresa Griffin, 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.*

<sup>i</sup>**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) minutes. 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: Teresa Griffin | Panola County GCD | 419 W. Sabine, Carthage, TX 75633 | (903) 690-0143 / [tgriffin@pcgcd.org](mailto:tgriffin@pcgcd.org)

# GROUNDWATER MANAGEMENT AREA 11

## NOTICE OF OPEN MEETING

Notice is hereby given that the groundwater conservation districts (GCDs) 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 August 11, 2021**, in room 119 (Commissioners Room) in Nacogdoches City Hall at 202 E. Pilar, Nacogdoches, TX, and via Zoom at: <https://zoom.us/j/95002156603?pwd=Qm5WZm01TS8xcERFVVVnUmJkZk3huZz09>

Via telephone (346)248-7799 Meeting ID: 950 0215 6603 Passcode: 386379

For the following purpose:


1. Call to order.
2. Public comments.<sup>1</sup>
3. Discussion and possible action to approve the minutes of the April 28, 2021, meeting.
4. Discussion of representatives and alternate appointments from Rusk County.
5. Nominations and election of officers in accordance with Section 4.05 of the GMA 11 Bylaws
6. Discussion and possible action regarding the public comments received by each District during the DFC comment period.
7. Discussion and possible action to approve final proposed DFC's via Resolution.
8. Discussion of possible agenda items for the next GMA-11 meeting.
9. Set date, time, and place of next meeting.
10. Adjourn meeting.

Dated and posted prior to 5:00 PM on or before the 30th day of July 2021.

  
Teresa Griffin, GMA-11 Contact  
Panola County Groundwater Conservation District

FILED FOR RECORD  
at 1:14 o'clock P M.

JUL 16 2021

MARK STAPLES  
County Clerk, Anderson County, Texas  
By  Deputy

*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.*

<sup>1</sup> **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) minutes. 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: Teresa Griffin | Panola County GCD | 419 W. Sabine, Carthage, TX 75633 | (903) 690-0143 / tgriffin@pcgcd.org

9575

# GROUNDWATER MANAGEMENT AREA 11 NOTICE OF OPEN MEETING

Notice is hereby given that the groundwater conservation districts (GCDs) 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),
- Pinewoods Groundwater Conservation District (PGCD), and
- Rusk County Groundwater Conservation District (RCGCD);

Will hold a **Joint Planning Meeting at 10:00 a.m. on August 11, 2021**, in room 119 (Commissioners Room) in Nacogdoches City Hall at 202 E. Blair, Nacogdoches, TX, and via Zoom at: <https://zoom.us/j/95002156603?pwd=Qm5WZm01TS8xcERFWAVnUmJzK3huZz09>.

Via telephone (346)248-7799 Meeting ID: 950 0215 6603 Passcode: 386379

For the following purposes:

1. Call to order.
2. Public comments.
3. Discussion and possible action to approve the minutes of the April 28, 2021, meeting.
4. Discussion of representatives and alternate appointments from Rusk County.
5. Nominations and election of officers in accordance with Section 4.05 of the GMA 11 Bylaws
6. Discussion and possible action regarding the public comments received by each District during the DFC comment period.
7. Discussion and possible action to approve final proposed DFC's via Resolution.
8. Discussion of possible agenda items for the next GMA-11 meeting.
9. Set date, time, and place of next meeting.
10. Adjourn meeting.

Dated and posted prior to 5:00 PM on or before the 30th day of July 2021.

Teresa Griffin, GMA-11 Contact  
Panola County Groundwater Conservation District

FILED  
FOR RECORD  
2021 JUL 16 PM 3:06  
LAVENNE LUSK COUNTY CLERK  
CHEROKEE COUNTY, TEXAS  
R.A. DEPUTY

*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.*

**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) minutes. 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: Teresa Griffin | Panola County GCD | 419 W. Sabine, Carthage, TX 75633 | (903) 690-0143 / tgriffin@pcgcd.org



# GROUNDWATER MANAGEMENT AREA 11

## NOTICE OF OPEN MEETING

Notice is hereby given that the groundwater conservation districts (GCDs) 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 August 11, 2021**, in room 119 (Commissioners Room) in Nacogdoches City Hall at 202 E. Pilar, Nacogdoches, TX, and via Zoom at:  
<https://zoom.us/j/95002156603?pwd=Qm5WZm01TS8xcERFWVVnUmJzK3huZz09>

Via telephone (346)248-7799 Meeting ID: 950 0215 6603 Passcode: 386379

For the following purpose:

1. Call to order.
2. Public comments.<sup>1</sup>
3. Discussion and possible action to approve the minutes of the April 28, 2021, meeting.
4. Discussion of representatives and alternate appointments from Rusk County.
5. Nominations and election of officers in accordance with Section 4.05 of the GMA 11 Bylaws
6. Discussion and possible action regarding the public comments received by each District during the DFC comment period.
7. Discussion and possible action to approve final proposed DFC's via Resolution.
8. Discussion of possible agenda items for the next GMA-11 meeting.
9. Set date, time, and place of next meeting.
10. Adjourn meeting.

Dated and posted prior to 5:00 PM on or before the 30th day of July 2021.



Teresa Griffin, 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.*

<sup>1</sup>**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) minutes. 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:  
Teresa Griffin | Panola County GCD | 419 W. Sabine, Carthage, TX 75633 | (903) 690-0143 / tgriffin@pcgcd.org

FILED FOR RECORD  
2021 JUL 19 PM 4:32  
COUNTY CLERK  
HENDERSON COUNTY, TEXAS

FILED FOR RECORD  
PANOLA COUNTY, TEXAS  
2021 JUL 16 PM 1:36

# GROUNDWATER MANAGEMENT AREA 11

## NOTICE OF OPEN MEETING

Notice is hereby given that the groundwater conservation districts (GCDs) 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 August 11, 2021**, in room 119 (Commissioners Room) in Nacogdoches City Hall at 202 E. Pilar, Nacogdoches, TX, and via Zoom at: <https://zoom.us/j/95002156603?pwd=Qm5WZm01TS8xcERFWVnUmJzK3huZz09>

Via telephone (346)248-7799 Meeting ID: 950 0215 6603 Passcode: 386379

For the following purpose:

1. Call to order.
2. Public comments.<sup>1</sup>
3. Discussion and possible action to approve the minutes of the April 28, 2021, meeting.
4. Discussion of representatives and alternate appointments from Rusk County.
5. Nominations and election of officers in accordance with Section 4.05 of the GMA 11 Bylaws
6. Discussion and possible action regarding the public comments received by each District during the DFC comment period.
7. Discussion and possible action to approve final proposed DFC's via Resolution.
8. Discussion of possible agenda items for the next GMA-11 meeting.
9. Set date, time, and place of next meeting.
10. Adjourn meeting.

Dated and posted prior to 5:00 PM on or before the 30th day of July 2021.



Teresa Griffin, 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.*

<sup>1</sup>**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) minutes. 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: Teresa Griffin | Panola County GCD | 419 W. Sabine, Carthage, TX 75633 | (903) 690-0143 / tgriffin@pcgcd.org

**APPENDIX G**  
**MODELED AVAILABLE GROUNDWATER ESTIMATES**  
**GAM RUN 21-016 MAG**



---

# **GAM RUN 21-016 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 Modeling Department  
(512) 936-0883  
February 17, 2022

## ***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 are approximately 251,220 acre-feet per year for each decade from 2020 through 2080. The modeled available groundwater estimates for the Queen City Aquifer are approximately 130,850 acre-feet per year for each decade from 2020 through 2080 (Table 3). The modeled available groundwater estimates for the Sparta Aquifer are approximately 3,260 acre-feet per year for each decade from 2020 to 2080 (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 3.01). 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 August 26, 2021, 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 October 29, 2021.

## ***REQUESTOR:***

Ms. Teresa Griffin, coordinator of Groundwater Management Area 11.

---

**GAM RUN 21-016 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 Modeling Department  
(512) 936-0883  
February 17, 2022



*Shirley C. Wade*  
*2/17/22*

**DESCRIPTION OF REQUEST:**

In an email dated August 26, 2021, 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 listed in Table 1 of the Resolution to Adopt Desired Future Conditions for Aquifers in Groundwater Management Area 11, adopted August 11, 2021, by the groundwater conservation districts within Groundwater Management Area 11. The desired future conditions (Table 1) are county-aquifer average water level drawdowns from 2013 to 2080 and are based on modeling Scenario 33 documented in Technical Memorandum 21-01 (Hutchison, 2021).

**TABLE 1. DESIRED FUTURE CONDITIONS FOR EACH COUNTY-AQUIFER UNIT IN GROUNDWATER MANAGEMENT AREA 11 EXPRESSED AS AVERAGE DRAWDOWN FROM 2013 TO 2080 IN FEET.<sup>1</sup>**

County	Sparta	Queen City	Carrizo-Wilcox
Anderson	30	44	155
Angelina	6	28	67
Bowie	NP <sup>2</sup>	NP	12
Camp	NP	11	85
Cass	66	34	79
Cherokee	7	31	176
Franklin	NP	NP	102
Gregg	NP	49	109
Harrison	NP	41	26
Henderson	NP	33	106
Hopkins	NP	NP	61
Houston	3	12	86
Marion	123	32	32
Morris	NP	39	78
Nacogdoches	7	22	73
Panola	NP	NP	21
Rains	NP	NP	17

<sup>1</sup> Based on table 1 from Resolution to Adopt Desired Future Conditions for Aquifers in Groundwater Management Area 11 dated August 11, 2021.

<sup>2</sup> NP: Aquifer not present in the county.



GAM Run 21-016 MAG: Modeled Available Groundwater for the Carrizo-Wilcox, Queen City, and Sparta aquifers in Groundwater Management Area 11

February 17, 2022

Page 5 of 24

County	Sparta	Queen City	Carrizo-Wilcox
Red River	NP	NP	NR <sup>3</sup>
Rusk	26	17	86
Sabine	1	3	9
San Augustine	2	7	22
Shelby	18	12	17
Smith	121	132	265
Titus	NP <sup>4</sup>	9	66
Trinity	5	18	56
Upshur	10	30	149
Van Zandt	NP	73	55
Wood	9	16	122

<sup>3</sup> Carrizo-Wilcox considered non-relevant in Red River County.

<sup>4</sup> NP: Aquifer not present in the county.

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 in an email on September 9, 2021. The Technical Coordinator confirmed that the Carrizo-Wilcox Aquifer should be considered non-relevant in Red River County, drawdown averages and modeled available groundwater values should be based on the model extent rather than the official aquifer extent, average drawdowns were not area-weighted, and a two-foot tolerance should be used when comparing model calculated drawdown with the desired future condition. Clarification also confirmed that no model cells converted to dry in the simulation.

### ***METHODS:***

The groundwater availability model for the northern part of the Carrizo-Wilcox, Queen City, and Sparta aquifers Version 3.01 (Figures 1 through 4) was run using the model files submitted with the explanatory report (Hutchison, 2021). Model-calculated drawdowns were extracted for the year 2080. Drawdown averages were calculated for each county by aquifer. The calculated drawdown averages were compared with the desired future conditions to verify that the pumping scenario expressed in the model files achieved the desired future conditions within an acceptable tolerance of two feet based on a September 9, 2021 clarification from the Groundwater Management Area 11 Technical Coordinator. The modeled available groundwater values were determined by extracting pumping rates by decade from the model results using ZONEBUDGET for MODFLOW 6 Version 1.01 (U.S. Geological Survey, 2021). 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 3.01 of the groundwater availability model for the northern part of the Carrizo-Wilcox, Queen City, and Sparta aquifers. See Panday and others (2021) 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 nine layers, which represent quaternary alluvium adjacent to rivers and streams, the Sparta Aquifer (Layer 2), the Weches Confining Unit (Layer 3), the Queen City Aquifer (Layer 4), the Reklaw Confining Unit (Layer 5), the Carrizo (Layer 6), the Upper Wilcox (Layer 7), the Middle Wilcox (Layer 8), and the Lower Wilcox (Layer 9). Layers represent equivalent geologic units outside of the official aquifer extents.
- The model was run with MODFLOW 6 (Langevin and others, 2017).
- Drawdown averages and modeled available groundwater values were based on the extent of the model area (Figures 1 through 4).
- County average drawdowns were calculated as the sum of drawdowns for all model cells divided by the number of cells, without an area weighting correction.
- Based on a clarification from the Groundwater Management Area 11 Technical Coordinator, a tolerance of two feet was assumed when comparing desired future conditions (Table 1, average drawdown values per county) to model drawdown results.
- Estimates of modeled available groundwater from the model simulation were rounded to whole numbers.
- The Carrizo-Wilcox Aquifer in Red River County was assumed non-relevant for joint planning purposes.

### **RESULTS:**

The modeled available groundwater estimates for the Carrizo-Wilcox Aquifer are approximately 251,220 acre-feet per year for each decade from 2020 through 2080. The modeled available groundwater estimates for the Queen City Aquifer are approximately 130,850 acre-feet per year for each decade from 2020 through 2080 (Table 3). The modeled available groundwater estimates for the Sparta Aquifer are approximately 3,260 acre-feet per year for each decade from 2020 to 2080 (Table 4). The modeled available groundwater is summarized by groundwater conservation district and county for the



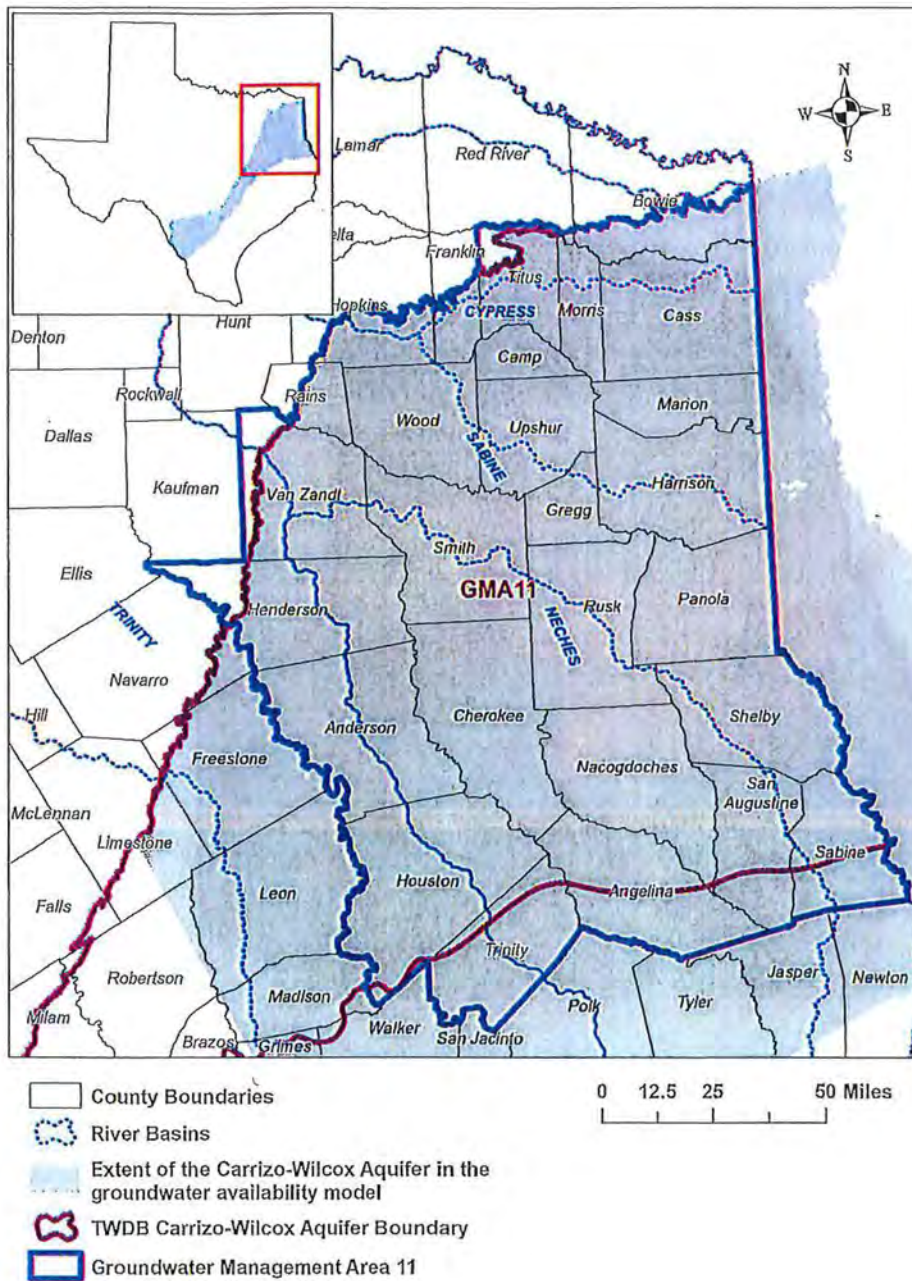
GAM Run 21-016 MAG: Modeled Available Groundwater for the Carrizo-Wilcox, Queen City, and Sparta aquifers in Groundwater Management Area 11

*February 17, 2022*

*Page 8 of 24*

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 and the Carrizo-Wilcox Aquifer in Red River County 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.**



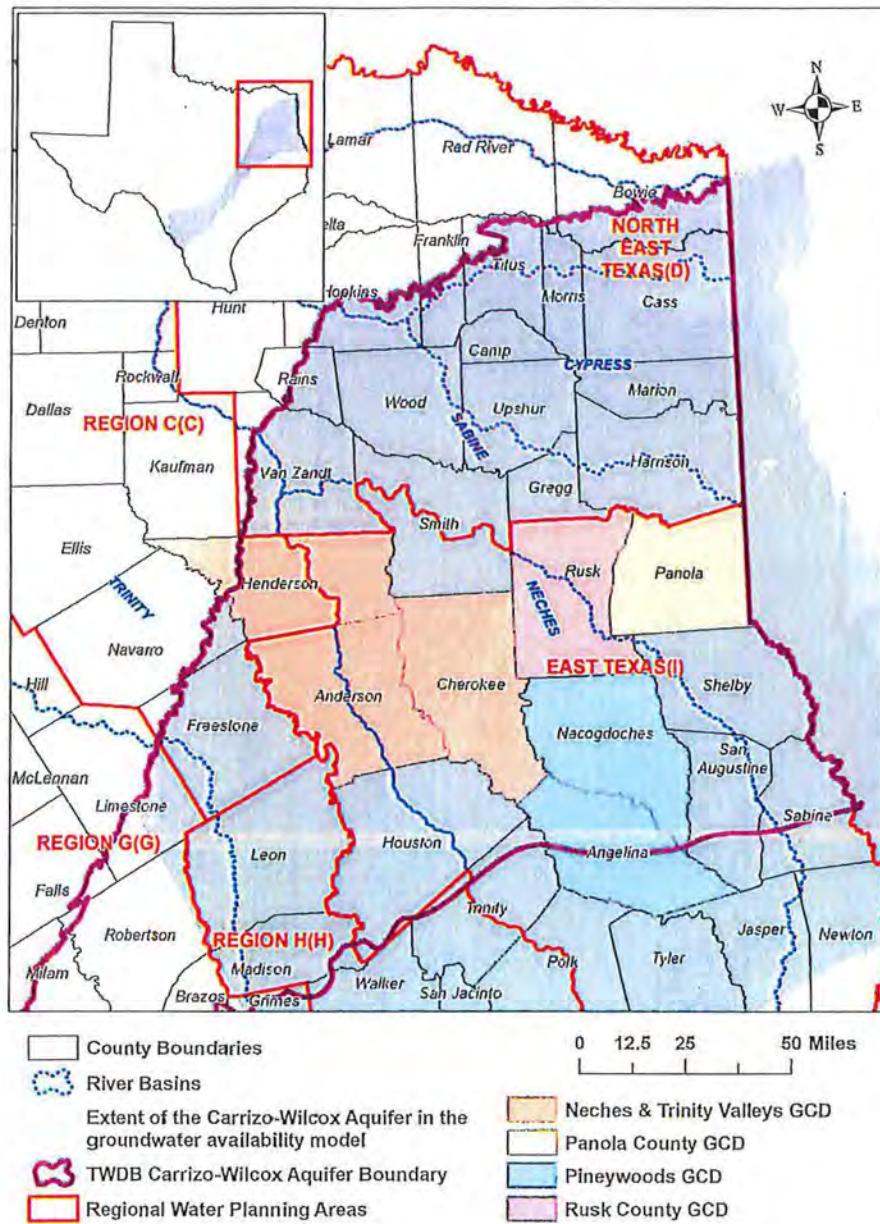
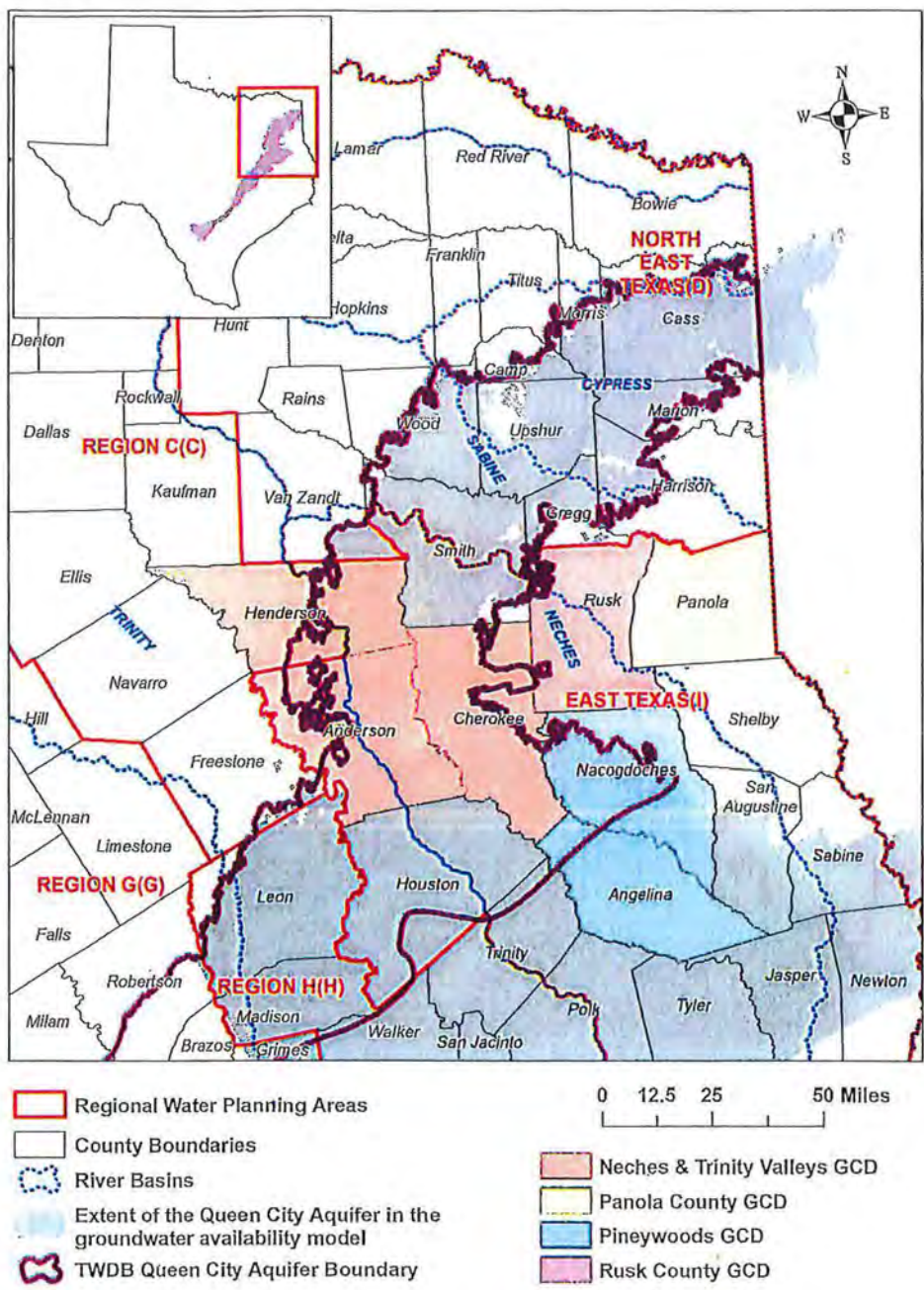
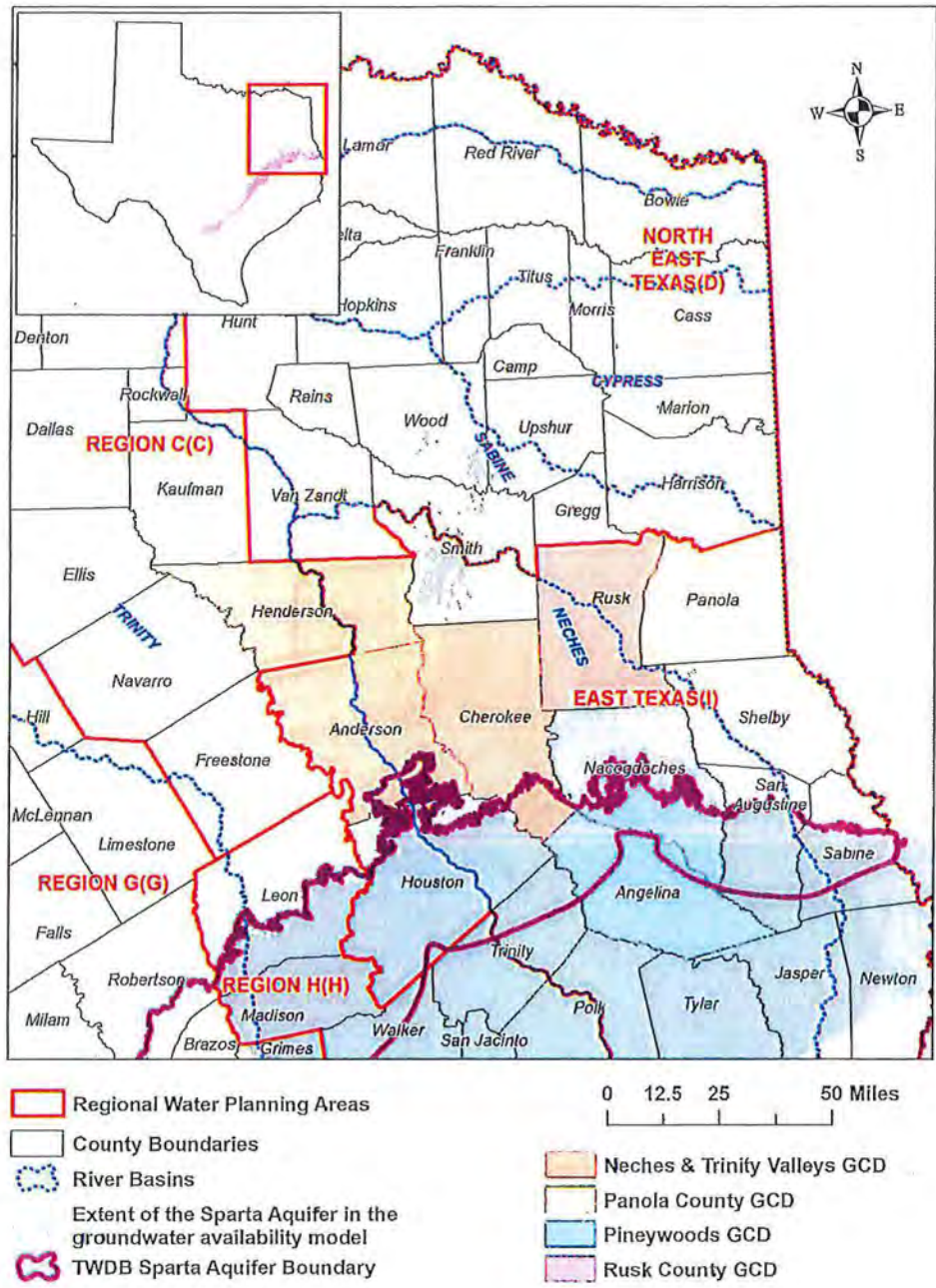


FIGURE 2. REGIONAL WATER PLANNING AREAS (RWPAS), RIVER BASINS, GROUNDWATER CONSERVATION DISTRICTS (GCDs), AND COUNTIES OVERLAIN ON THE EXTENT OF THE CARRIZO-WILCOX AQUIFER IN THE GROUNDWATER AVAILABILITY MODEL FOR THE NORTHERN PORTION OF THE CARRIZO-WILCOX, QUEEN CITY, AND SPARTA AQUIFERS.





**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.**







Groundwater Conservation District	County	Aquifer	2020	2030	2040	2050	2060	2070	2080
No District-County	Morris	Carrizo-Wilcox	2,570	2,570	2,570	2,570	2,570	2,570	2,570
No District-County	Rains	Carrizo-Wilcox	1,411	1,411	1,411	1,411	1,411	1,411	1,411
No District-County	Red River	Carrizo-Wilcox	NR <sup>1</sup>	NR <sup>1</sup>	NR <sup>1</sup>	NR <sup>1</sup>	NR <sup>1</sup>	NR <sup>1</sup>	NR <sup>1</sup>
No District-County	Sabine	Carrizo-Wilcox	1,388	1,388	1,388	1,388	1,388	1,388	1,388
No District-County	San Augustine	Carrizo-Wilcox	587	587	587	587	587	587	587
No District-County	Shelby	Carrizo-Wilcox	6,319	6,319	6,319	6,319	6,319	6,319	6,319
No District-County	Smith	Carrizo-Wilcox	25,547	25,547	25,547	25,547	25,547	25,547	25,547
No District-County	Titus	Carrizo-Wilcox	7,536	7,536	7,536	7,536	7,536	7,536	7,536
No District-County	Trinity	Carrizo-Wilcox	267	267	267	267	267	267	267
No District-County	Upshur	Carrizo-Wilcox	6,658	6,658	6,658	6,658	6,658	6,658	6,658
No District-County	Van Zandt	Carrizo-Wilcox	6,932	6,932	6,932	6,932	6,932	6,932	6,932
No District-County	Wood	Carrizo-Wilcox	17,902	17,902	17,902	17,902	17,902	17,902	17,902
<b>No District-County Total</b>		<b>Carrizo-Wilcox</b>	<b>134,241</b>	<b>134,241</b>	<b>134,241</b>	<b>134,241</b>	<b>134,241</b>	<b>134,241</b>	<b>134,240</b>
<b>Total for GMA 11</b>		<b>Carrizo-Wilcox</b>	<b>251,217</b>	<b>251,217</b>	<b>251,217</b>	<b>251,216</b>	<b>251,216</b>	<b>251,216</b>	<b>251,215</b>

<sup>1</sup>A desired future condition was not specified for the Carrizo-Wilcox Aquifer in Red River County and was declared as not relevant (NR) in a clarification.

**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 2020 AND 2080. VALUES ARE IN ACRE-FEET PER YEAR.**

Groundwater Conservation District	County	Aquifer	2020	2030	2040	2050	2060	2070	2080
Neches & Trinity Valleys GCD	Anderson	Queen City	16,591	16,591	16,591	16,591	16,591	16,591	16,591
Neches & Trinity Valleys GCD	Cherokee	Queen City	8,812	8,812	8,812	8,812	8,812	8,812	8,812
Neches & Trinity Valleys GCD	Henderson	Queen City	10,671	10,671	10,671	10,670	10,670	10,670	10,670
<b>Neches &amp; Trinity Valleys GCD Total</b>		<b>Queen City</b>	<b>36,073</b>	<b>36,073</b>	<b>36,073</b>	<b>36,073</b>	<b>36,073</b>	<b>36,073</b>	<b>36,073</b>
Pineywoods GCD	Angelina	Queen City	1,095	1,095	1,095	1,095	1,095	1,095	1,095
Pineywoods GCD	Nacogdoches	Queen City	2,946	2,946	2,946	2,946	2,946	2,946	2,946
<b>Pineywoods GCD Total</b>		<b>Queen City</b>	<b>4,041</b>	<b>4,041</b>	<b>4,041</b>	<b>4,041</b>	<b>4,041</b>	<b>4,041</b>	<b>4,041</b>
<b>Rusk County GCD Total</b>	<b>Rusk</b>	<b>Queen City</b>	<b>59</b>	<b>59</b>	<b>59</b>	<b>59</b>	<b>59</b>	<b>59</b>	<b>59</b>
<b>Total (GCDs)</b>		<b>Queen City</b>	<b>40,173</b>	<b>40,173</b>	<b>40,173</b>	<b>40,173</b>	<b>40,173</b>	<b>40,173</b>	<b>40,172</b>
No District-County	Camp	Queen City	1,594	1,594	1,594	1,594	1,594	1,594	1,594
No District-County	Cass	Queen City	16,479	16,479	16,479	16,479	16,479	16,479	16,479
No District-County	Gregg	Queen City	2,511	2,511	2,511	2,511	2,511	2,511	2,511
No District-County	Harrison	Queen City	3,537	3,537	3,537	3,537	3,537	3,537	3,537
No District-County	Houston	Queen City	2,295	2,295	2,295	2,295	2,295	2,295	2,295
No District-County	Marion	Queen City	7,389	7,389	7,389	7,389	7,389	7,389	7,389
No District-County	Morris	Queen City	3,278	3,278	3,278	3,278	3,278	3,278	3,278
No District-County	Sabine	Queen City	0 <sup>5</sup>	0	0	0	0	0	0

<sup>5</sup> A zero value indicates the groundwater availability model pumping scenario did not include any pumping in the aquifer.

Groundwater Conservation District	County	Aquifer	2020	2030	2040	2050	2060	2070	2080
No District-County	San Augustine	Queen City	0 <sup>6</sup>	0	0	0	0	0	0
No District-County	Shelby	Queen City	0	0	0	0	0	0	0
No District-County	Smith	Queen City	32,578	32,578	32,578	32,578	32,578	32,578	32,578
No District-County	Titus	Queen City	0	0	0	0	0	0	0
No District-County	Trinity	Queen City	0	0	0	0	0	0	0
No District-County	Upshur	Queen City	12,165	12,165	12,165	12,165	12,165	12,165	12,164
No District-County	Van Zandt	Queen City	2,343	2,343	2,343	2,343	2,343	2,343	2,343
No District-County	Wood	Queen City	6,510	6,510	6,510	6,510	6,510	6,510	6,510
<b>No District-County Total</b>		<b>Queen City</b>	<b>90,681</b>	<b>90,681</b>	<b>90,680</b>	<b>90,680</b>	<b>90,680</b>	<b>90,680</b>	<b>90,679</b>
<b>Total for GMA 11</b>		<b>Queen City</b>	<b>130,854</b>	<b>130,854</b>	<b>130,853</b>	<b>130,853</b>	<b>130,853</b>	<b>130,852</b>	<b>130,852</b>

<sup>6</sup> A zero value indicates the groundwater availability model pumping scenario did not include any pumping in the aquifer.



**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 2020 AND 2080. VALUES ARE IN ACRE-FEET PER YEAR.**

<b>Groundwater Conservation District</b>	<b>County</b>	<b>Aquifer</b>	<b>2020</b>	<b>2030</b>	<b>2040</b>	<b>2050</b>	<b>2060</b>	<b>2070</b>	<b>2080</b>
Neches & Trinity Valleys GCD	Anderson	Sparta	307	307	307	307	307	307	307
Neches & Trinity Valleys GCD	Cherokee	Sparta	352	352	352	352	352	352	352
<b>Neches &amp; Trinity Valleys GCD Total</b>		<b>Sparta</b>	<b>658</b>	<b>658</b>	<b>658</b>	<b>658</b>	<b>658</b>	<b>658</b>	<b>658</b>
Pineywoods GCD	Angelina	Sparta	390	390	390	390	390	390	390
Pineywoods GCD	Nacogdoches	Sparta	362	362	362	362	362	362	362
<b>Pineywoods GCD Total</b>		<b>Sparta</b>	<b>752</b>	<b>752</b>	<b>752</b>	<b>752</b>	<b>752</b>	<b>752</b>	<b>752</b>
<b>Total (GCDs)</b>		<b>Sparta</b>	<b>1,410</b>	<b>1,410</b>	<b>1,410</b>	<b>1,410</b>	<b>1,410</b>	<b>1,410</b>	<b>1,410</b>
No District-County	Cass	Sparta	0 <sup>7</sup>	0	0	0	0	0	0
No District-County	Houston	Sparta	1,482	1,482	1,482	1,482	1,482	1,482	1,482
No District-County	Marion	Sparta	0	0	0	0	0	0	0
No District-County	Sabine	Sparta	49	49	49	49	49	49	49
No District-County	San Augustine	Sparta	166	166	166	166	166	166	166
No District-County	Shelby	Sparta	0	0	0	0	0	0	0
No District-County	Smith	Sparta	0	0	0	0	0	0	0
No District-County	Trinity	Sparta	152	152	152	152	152	152	152
No District-County	Upshur	Sparta	0	0	0	0	0	0	0
No District-County	Wood	Sparta	0	0	0	0	0	0	0
<b>No District-County Total</b>		<b>Sparta</b>	<b>1,848</b>	<b>1,848</b>	<b>1,848</b>	<b>1,848</b>	<b>1,848</b>	<b>1,848</b>	<b>1,848</b>
<b>Total for GMA 11</b>		<b>Sparta</b>	<b>3,259</b>	<b>3,259</b>	<b>3,259</b>	<b>3,259</b>	<b>3,259</b>	<b>3,259</b>	<b>3,259</b>

<sup>7</sup> A zero value indicates the groundwater availability model pumping scenario did not include any pumping in the aquifer.





County	RWPA	River Basin	Aquifer	2020	2030	2040	2050	2060	2070	2080
Panola	I	Cypress	Carrizo-Wilcox	0 <sup>a</sup>	0	0	0	0	0	0
Panola	I	Sabine	Carrizo-Wilcox	4,999	4,999	4,999	4,999	4,999	4,999	4,999
Rains	D	Sabine	Carrizo-Wilcox	1,411	1,411	1,411	1,411	1,411	1,411	1,411
Red River	D	Sulphur	Carrizo-Wilcox	NULL <sup>1</sup>	NULL <sup>1</sup>	NULL <sup>1</sup>	NULL <sup>1</sup>	NULL <sup>1</sup>	NULL <sup>1</sup>	NULL <sup>1</sup>
Rusk	I	Neches	Carrizo-Wilcox	7,111	7,111	7,111	7,111	7,111	7,111	7,111
Rusk	I	Sabine	Carrizo-Wilcox	6,907	6,907	6,907	6,907	6,907	6,907	6,907
Sabine	I	Neches	Carrizo-Wilcox	356	356	356	356	356	356	356
Sabine	I	Sabine	Carrizo-Wilcox	1,032	1,032	1,032	1,032	1,032	1,032	1,032
San Augustine	I	Neches	Carrizo-Wilcox	303	303	303	303	303	303	303
San Augustine	I	Sabine	Carrizo-Wilcox	284	284	284	284	284	284	284
Shelby	I	Neches	Carrizo-Wilcox	2,621	2,621	2,621	2,621	2,621	2,621	2,621
Shelby	I	Sabine	Carrizo-Wilcox	3,698	3,698	3,698	3,698	3,698	3,698	3,698
Smith	D	Sabine	Carrizo-Wilcox	7,939	7,939	7,939	7,939	7,939	7,939	7,939
Smith	I	Neches	Carrizo-Wilcox	17,607	17,607	17,607	17,607	17,607	17,607	17,607
Titus	D	Cypress	Carrizo-Wilcox	5,594	5,594	5,594	5,594	5,594	5,594	5,594
Titus	D	Sulphur	Carrizo-Wilcox	1,942	1,942	1,942	1,942	1,942	1,942	1,942
Trinity	H	Trinity	Carrizo-Wilcox	1	1	1	1	1	1	1
Trinity	I	Neches	Carrizo-Wilcox	266	266	266	266	266	266	266
Upshur	D	Cypress	Carrizo-Wilcox	5,107	5,107	5,107	5,107	5,107	5,107	5,107
Upshur	D	Sabine	Carrizo-Wilcox	1,550	1,550	1,550	1,550	1,550	1,550	1,550
Van Zandt	D	Neches	Carrizo-Wilcox	2,616	2,616	2,616	2,616	2,616	2,616	2,616
Van Zandt	D	Sabine	Carrizo-Wilcox	3,286	3,286	3,286	3,286	3,286	3,286	3,286
Van Zandt	D	Trinity	Carrizo-Wilcox	1,030	1,030	1,030	1,030	1,030	1,030	1,030
Wood	D	Cypress	Carrizo-Wilcox	925	925	925	925	925	925	925
Wood	D	Sabine	Carrizo-Wilcox	16,977	16,977	16,977	16,977	16,977	16,977	16,977
<b>GMA 11 Total</b>			<b>Carrizo-Wilcox</b>	<b>251,217</b>	<b>251,217</b>	<b>251,217</b>	<b>251,216</b>	<b>251,216</b>	<b>251,216</b>	<b>251,215</b>

<sup>a</sup> A zero value indicates the groundwater availability model pumping scenario did not include any pumping in the aquifer.



**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	2080
Anderson	I	Neches	Queen City	11,489	11,489	11,489	11,488	11,488	11,488	11,488
Anderson	I	Trinity	Queen City	5,102	5,102	5,102	5,102	5,102	5,102	5,102
Angelina	I	Neches	Queen City	1,095	1,095	1,095	1,095	1,095	1,095	1,095
Camp	D	Cypress	Queen City	1,594	1,594	1,594	1,594	1,594	1,594	1,594
Cass	D	Cypress	Queen City	15,855	15,855	15,855	15,855	15,855	15,855	15,855
Cass	D	Sulphur	Queen City	624	624	624	624	624	624	624
Cherokee	I	Neches	Queen City	8,812	8,812	8,812	8,812	8,812	8,812	8,812
Gregg	D	Cypress	Queen City	456	456	456	456	456	456	456
Gregg	D	Sabine	Queen City	2,056	2,056	2,056	2,056	2,056	2,056	2,055
Harrison	D	Cypress	Queen City	2,976	2,976	2,976	2,976	2,976	2,976	2,976
Harrison	D	Sabine	Queen City	561	561	561	561	561	561	561
Henderson	C	Trinity	Queen City	154	154	154	154	154	154	154
Henderson	I	Neches	Queen City	10,516	10,516	10,516	10,516	10,516	10,516	10,516
Houston	I	Neches	Queen City	2,080	2,080	2,080	2,080	2,080	2,080	2,080
Houston	I	Trinity	Queen City	216	216	216	216	216	216	216
Marion	D	Cypress	Queen City	7,389	7,389	7,389	7,389	7,389	7,389	7,389
Morris	D	Cypress	Queen City	3,278	3,278	3,278	3,278	3,278	3,278	3,278
Nacogdoches	I	Neches	Queen City	2,946	2,946	2,946	2,946	2,946	2,946	2,946
Rusk	I	Neches	Queen City	39	39	39	39	39	39	39
Rusk	I	Sabine	Queen City	20	20	20	20	20	20	20
Sabine	I	Neches	Queen City	0 <sup>9</sup>	0	0	0	0	0	0
Sabine	I	Sabine	Queen City	0	0	0	0	0	0	0
San Augustine	I	Neches	Queen City	0	0	0	0	0	0	0
Shelby	I	Sabine	Queen City	0	0	0	0	0	0	0

<sup>9</sup> A zero value indicates the groundwater availability model pumping scenario did not include any pumping in the aquifer.

County	RWPA	River Basin	Aquifer	2020	2030	2040	2050	2060	2070	2080
Smith	D	Sabine	Queen City	12,457	12,457	12,457	12,457	12,457	12,457	12,457
Smith	I	Neches	Queen City	20,121	20,121	20,121	20,121	20,121	20,121	20,121
Titus	D	Cypress	Queen City	0 <sup>10</sup>	0	0	0	0	0	0
Trinity	H	Trinity	Queen City	0	0	0	0	0	0	0
Trinity	I	Neches	Queen City	0	0	0	0	0	0	0
Upshur	D	Cypress	Queen City	6,216	6,215	6,215	6,215	6,215	6,215	6,215
Upshur	D	Sabine	Queen City	5,949	5,949	5,949	5,949	5,949	5,949	5,949
Van Zandt	D	Neches	Queen City	2,343	2,343	2,343	2,343	2,343	2,343	2,343
Wood	D	Cypress	Queen City	779	779	779	779	779	779	779
Wood	D	Sabine	Queen City	5,731	5,731	5,731	5,731	5,731	5,731	5,731
<b>GMA 11 Total</b>			<b>Queen City</b>	<b>130,854</b>	<b>130,854</b>	<b>130,853</b>	<b>130,853</b>	<b>130,853</b>	<b>130,852</b>	<b>130,852</b>

<sup>10</sup> A zero value indicates the groundwater availability model pumping scenario did not include any pumping in the aquifer.

**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	2080
Anderson	I	Neches	Sparta Aquifer	109	109	109	109	109	109	109
Anderson	I	Trinity	Sparta Aquifer	198	198	198	198	198	198	198
Angelina	I	Neches	Sparta Aquifer	390	390	390	390	390	390	390
Cass	D	Cypress	Sparta Aquifer	0 <sup>11</sup>	0	0	0	0	0	0
Cherokee	I	Neches	Sparta Aquifer	352	352	352	352	352	352	352
Houston	I	Neches	Sparta Aquifer	505	505	505	505	505	505	505
Houston	I	Trinity	Sparta Aquifer	977	977	977	977	977	977	977
Marion	D	Cypress	Sparta Aquifer	0	0	0	0	0	0	0
Nacogdoches	I	Neches	Sparta Aquifer	362	362	362	362	362	362	362
Rusk	I	Neches	Sparta Aquifer	0	0	0	0	0	0	0
Sabine	I	Neches	Sparta Aquifer	36	36	36	36	36	36	36
Sabine	I	Sabine	Sparta Aquifer	13	13	13	13	13	13	13
San Augustine	I	Neches	Sparta Aquifer	163	163	163	163	163	163	163
San Augustine	I	Sabine	Sparta Aquifer	3	3	3	3	3	3	3
Shelby	I	Sabine	Sparta Aquifer	0	0	0	0	0	0	0
Smith	D	Sabine	Sparta Aquifer	0	0	0	0	0	0	0
Smith	I	Neches	Sparta Aquifer	0	0	0	0	0	0	0
Trinity	H	Trinity	Sparta Aquifer	0	0	0	0	0	0	0
Trinity	I	Neches	Sparta Aquifer	152	152	152	152	152	152	152
Upshur	D	Sabine	Sparta Aquifer	0	0	0	0	0	0	0
Wood	D	Sabine	Sparta Aquifer	0	0	0	0	0	0	0
<b>GMA 11 Total</b>			<b>Sparta Aquifer</b>	<b>3,259</b>	<b>3,259</b>	<b>3,259</b>	<b>3,259</b>	<b>3,259</b>	<b>3,259</b>	<b>3,259</b>

<sup>11</sup> A zero value indicates the groundwater availability model pumping scenario did not include any pumping in the aquifer.



### **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:**

Hutchison, W.R., 2021, GMA 11 Technical Memorandum 21-01, Adjusted Pumping Simulations for Joint Planning with Updated Groundwater Availability Model for the Sparta, Queen City, and Carrizo-Wilcox Aquifers, 31p.

Langevin, C.D., Hughes, J.D., Banta, E.R., Niswonger, R.G., Panday, Sorab, and Provost, A.M., 2017, Documentation for the MODFLOW 6 Groundwater Flow (GWF) Model: U.S. Geological Survey Techniques and Methods, book 6, chap. A55, 197 p., accessed August 4, 2017, at <https://doi.org/10.3133/tm6A55>

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](http://www.nap.edu/catalog.php?record_id=11972).

Panday, S., Rumbaugh, J., Hutchison, W.R., and Schorr, S., 2020, Numerical Model Report: Groundwater Availability Model for the Northern Portion of the Queen City, Sparta, and Carrizo-Wilcox Aquifers. Final Report prepared for Texas Water Development Board, Contact Number #1648302063, 198p.

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

U.S. Geological Survey, 2021, Zonebudget for MODFLOW 6, U.S. Geological Survey Groundwater Software.

**APPENDIX H**

**HISTORICAL WATER USE SUMMARY BY  
GROUNDWATER AND SURFACE WATER**



# Estimated Historical Groundwater Use And 2022 State Water Plan Datasets:

Panola County Groundwater Conservation District

Texas Water Development Board  
Groundwater Division  
Groundwater Technical Assistance Section  
stephen.allen@twdb.texas.gov  
(512) 463-7317  
January 17, 2023

## ***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 Groundwater 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 2022 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 Grayson Dowlearn, [grayson.dowlearn@twdb.texas.gov](mailto:grayson.dowlearn@twdb.texas.gov), (512) 475-1552.

## **DISCLAIMER:**

The data presented in this report represents the most up to date WUS and 2022 SWP data available as of 1/17/2023. 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 2022 SWP. District personnel must review these datasets and correct any discrepancies 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 2022 SWP dataset can be verified by contacting Sabrina Anderson (sabrina.anderson@twdb.texas.gov or 512-936-0886).

The values presented in the data tables of this report are county-based. In cases where groundwater conservation districts cover only a portion of one or more counties the data values are modified with an apportioning multiplier to create new values that more accurately represent conditions within district boundaries. The multiplier used in the following formula is a land area ratio: (data value \* (land area of district in county / land area of county)). For two of the four SWP tables (Projected Surface Water Supplies and Projected Water Demands) only the county-wide water user group (WUG) data values (county other, manufacturing, steam electric power, irrigation, mining and livestock) are modified using the multiplier. WUG values for municipalities, water supply corporations, and utility districts are not apportioned; instead, their full values are retained when they are located within the district and eliminated when they are located outside (we ask each district to identify these entity locations).

The remaining SWP tables (Projected Water Supply Needs and Projected Water Management Strategies) are not modified because district-specific values are not statutorily required. Each district needs only "consider" the county values in these tables.

In the WUS table every category of water use (including municipal) is apportioned. Staff determined that breaking down the annual municipal values into individual WUGs was too complex.

TWDB recognizes that the apportioning formula used is not ideal but it is the best available process with respect to time and staffing constraints. If a district believes it has data that is more accurate it can add those data to the plan with an explanation of how the data were derived. Apportioning percentages that the TWDB used are listed above each applicable table.

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 2020. TWDB staff anticipates the calculation and posting of these estimates at a later date.

### PANOLA COUNTY

*100% (multiplier)*

All values are in acre-feet

Year	Source	Municipal	Manufacturing	Mining	Steam Electric	Irrigation	Livestock	Total
2019	GW	1,718	53	3,616	0	984	105	6,476
	SW	1,460	1,085	1,509	0	0	944	4,998
2018	GW	1,804	61	2,735	0	1,124	103	5,827
	SW	1,709	1,048	2,107	0	0	929	5,793
2017	GW	1,797	60	942	0	1,013	101	3,913
	SW	1,467	1,125	634	0	0	911	4,137
2016	GW	2,056	2	603	0	1,102	114	3,877
	SW	1,487	982	469	0	0	1,028	3,966
2015	GW	2,114	3	1,705	0	1,122	111	5,055
	SW	1,601	1,022	909	0	0	997	4,529
2014	GW	2,173	3	1,944	0	1,630	250	6,000
	SW	1,804	775	1,022	0	0	2,254	5,855
2013	GW	2,447	3	2,127	0	322	255	5,154
	SW	1,932	822	1,286	0	0	2,294	6,334
2012	GW	2,785	3	1,163	0	137	245	4,333
	SW	1,375	849	1,064	0	0	2,204	5,492
2011	GW	3,084	7	1,243	0	383	288	5,005
	SW	1,592	810	1,282	0	0	2,596	6,280
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



# Projected Surface Water Supplies

## TWDB 2022 State Water Plan Data

### PANOLA COUNTY

*100% (multiplier)*

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	152	152	152	152	152	152
I	Livestock, Panola	Cypress	Cypress Livestock Local Supply	27	27	27	27	27	27
I	Livestock, Panola	Sabine	Cypress Livestock Local Supply	3	3	3	3	3	3
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	168	168	168	168	168	168
I	Mining, Panola	Sabine	Toledo Bend Lake/Reservoir	3,896	4,196	4,496	4,496	5,494	5,494
<b>Sum of Projected Surface Water Supplies (acre-feet)</b>				<b>11,942</b>	<b>12,246</b>	<b>12,091</b>	<b>11,659</b>	<b>12,346</b>	<b>12,577</b>

# Projected Water Demands

## TWDB 2022 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

100% (multiplier)

All values are in acre-feet

RWPG	WUG	WUG Basin	2020	2030	2040	2050	2060	2070
I	Beckville	Sabine	136	147	153	160	166	171
I	Carthage	Sabine	1,650	1,651	1,644	1,648	1,659	1,669
I	County-Other, Panola	Cypress	6	6	6	6	6	6
I	County-Other, Panola	Sabine	1,589	1,602	1,594	1,607	1,633	1,658
I	Gill WSC	Sabine	94	93	91	92	93	94
I	Irrigation, Panola	Sabine	574	574	574	574	574	574
I	Livestock, Panola	Cypress	27	27	27	27	27	27
I	Livestock, Panola	Sabine	2,625	2,625	2,625	2,625	2,625	2,625
I	Manufacturing, Panola	Sabine	852	1,272	1,272	1,272	1,272	1,272
I	Minden Brachfield WSC	Sabine	4	4	5	5	6	6
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	Panola-Bethany WSC	Sabine	18	21	25	32	36	40
I	Tatum	Sabine	63	73	79	85	89	93
<b>Sum of Projected Water Demands (acre-feet)</b>			<b>13,554</b>	<b>13,954</b>	<b>13,144</b>	<b>12,401</b>	<b>11,806</b>	<b>12,173</b>

# Projected Water Supply Needs

## TWDB 2022 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	445	434	428	421	415	410
I	Carthage	Sabine	0	0	0	0	0	1
I	County-Other, Panola	Cypress	0	0	0	0	0	0
I	County-Other, Panola	Sabine	205	192	200	187	161	136
I	Gill WSC	Sabine	65	66	68	67	66	65
I	Irrigation, Panola	Sabine	28	28	28	28	28	28
I	Livestock, Panola	Cypress	0	0	0	0	0	0
I	Livestock, Panola	Sabine	-982	-982	-982	-982	-982	-982
I	Manufacturing, Panola	Sabine	407	26	65	98	165	196
I	Minden Brachfield WSC	Sabine	0	0	0	0	0	0
I	Mining, Panola	Cypress	2	2	2	2	4	4
I	Mining, Panola	Sabine	3,189	3,511	4,135	4,448	5,705	5,578
I	Panola-Bethany WSC	Sabine	10	18	14	8	4	0
I	Tatum	Sabine	2	2	2	2	3	3
<b>Sum of Projected Water Supply Needs (acre-feet)</b>			<b>-982</b>	<b>-982</b>	<b>-982</b>	<b>-982</b>	<b>-982</b>	<b>-982</b>



# Projected Water Management Strategies

## TWDB 2022 State Water Plan Data

### PANOLA COUNTY

WUG, Basin (RWPG)

All values are in acre-feet

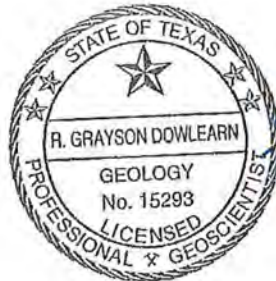
Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
<b>Carthage, Sabine (I)</b>							
Carthage - Municipal Conservation	DEMAND REDUCTION [Panola]	23	39	41	44	47	50
		<b>23</b>	<b>39</b>	<b>41</b>	<b>44</b>	<b>47</b>	<b>50</b>
<b>Livestock, Panola, Sabine (I)</b>							
PANL-LTK-New Wells in Carrizo-Wilcox Aquifer	Carrizo-Wilcox Aquifer [Panola]	0	982	982	982	982	982
		<b>0</b>	<b>982</b>	<b>982</b>	<b>982</b>	<b>982</b>	<b>982</b>
<b>Panola-Bethany WSC, Sabine (I)</b>							
Drill New Wells (Panola Bethany, Queen City, Sabine)	Queen City Aquifer [Harrison]	0	4	0	14	4	1
Panola-Bethany WSC - Municipal Conservation	DEMAND REDUCTION [Panola]	0	0	0	0	1	2
		<b>0</b>	<b>4</b>	<b>0</b>	<b>14</b>	<b>5</b>	<b>3</b>
<b>Tatum, Sabine (I)</b>							
Tatum - Municipal Conservation	DEMAND REDUCTION [Panola]	1	2	2	2	3	3
		<b>1</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>3</b>
<b>Sum of Projected Water Management Strategies (acre-feet)</b>		<b>24</b>	<b>1,027</b>	<b>1,025</b>	<b>1,042</b>	<b>1,037</b>	<b>1,038</b>

**APPENDIX I**  
**ESTIMATES OF HISTORICAL GROUNDWATER FLOWS**  
**GAM RUN 22-017**

---

# GAM RUN 22-017: PANOLA COUNTY GROUNDWATER CONSERVATION DISTRICT MANAGEMENT PLAN

Grayson Dowlearn, P.G.  
Texas Water Development Board  
Groundwater Division  
Groundwater Modeling Department  
512-475-1552  
February 9, 2022



*Grayson Dowlearn*  
2/9/2023



*This page is intentionally blank*

---

# GAM RUN 22-017: PANOLA COUNTY GROUNDWATER CONSERVATION DISTRICT MANAGEMENT PLAN

Grayson Dowlearn, P.G.  
Texas Water Development Board  
Groundwater Division  
Groundwater Modeling Department  
512-475-1552  
February 9, 2022

## ***EXECUTIVE SUMMARY:***

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

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

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

The groundwater management plan for the Panola County Groundwater Conservation District should be adopted by the district on or before April 3, 2023 and submitted to the executive administrator of the TWDB on or before May 3, 2023. The current management plan for the Panola County Groundwater Conservation District expires on July 2, 2023.

We used the groundwater availability model for the northern portion of the Queen City, Sparta, and Carrizo-Wilcox aquifers (Panday and others, 2020; Schorr and others, 2020) to estimate the management plan information for the Carrizo-Wilcox Aquifer within the Panola County Groundwater Conservation District.

This report replaces the results of GAM Run 13-006 (Wade, 2013) because it includes results from the updated groundwater availability model for the northern portion of the Queen City, Sparta, and Carrizo-Wilcox aquifers (Panday and others, 2020, and Schorr and others, 2020). Table 1 summarizes the groundwater availability model data required by statute. Figure 1 shows the area of the model from which the values in Table 1 were extracted. Figure 2 provides a generalized diagram of the groundwater flow components provided in Table 1. Full water budgets for the Carrizo-Wilcox Aquifer within the district are provided in Appendix A. These budgets are included to assist the Panola County Groundwater Conservation District in analyzing the effects of pumping and recharge on the Carrizo-Wilcox Aquifer within the district. If, after review of the figures, the Panola County Groundwater Conservation District determines that the district boundaries used in the assessment do not reflect current conditions, please notify the TWDB at your earliest convenience.

### ***METHODS:***

In accordance with the provisions of the Texas State Water Code, Section 36.1071, Subsection (h), the groundwater availability model mentioned above was used to estimate information for the Panola County Groundwater Conservation District management plan. Water budgets were extracted for the historical model period for the Carrizo-Wilcox Aquifer (1981-2013) using ZONEBUDGET for MODFLOW 6 (Langevin and others, 2021). The average annual water budget values for recharge, surface-water outflow, inflow to the district, outflow from the district, and the flow between aquifers within the district are summarized in this report.



## ***PARAMETERS AND ASSUMPTIONS:***

### ***Carrizo-Wilcox Aquifer***

- We used version 3.01 of the groundwater availability model for the northern portion of the Queen City, Sparta, and Carrizo-Wilcox aquifers to analyze the Carrizo-Wilcox Aquifer. See Panday and others (2020) and Schorr and others (2020) for assumptions and limitations of the model.
- The groundwater availability model for the northern portion of the Queen City, Sparta, and Carrizo-Wilcox aquifers contains nine layers represented a:
  - Layer 1: represents Quaternary Alluvium,
  - Layer 2 represents the Sparta Aquifer and equivalent units,
  - Layer 3 represents the Weches Formation (confining unit),
  - Layer 4 represents the Queen City Aquifer and equivalent units,
  - Layer 5: represents the Reklaw Formation (confining unit),
  - Layer 6: represents the Carrizo Formation,
  - Layer 7: represents the Upper Wilcox member,
  - Layer 8: represents the Middle Wilcox member, and
  - Layer 9: represents the Lower Wilcox member.
- Water budget values for the district were determined for the Carrizo-Wilcox Aquifer (Layers 6 through 9). The Sparta and Queen City aquifers do not occur within the Panola County Groundwater Conservation District and therefore no groundwater budget values are included for those aquifers in this report.
- Water budget values from the Quaternary Alluvium (Layer 1) were combined with the Carrizo-Wilcox Aquifer where Quaternary Alluvium falls within the aquifer outcrop boundaries.
- Water budget terms were averaged for the historical calibration period 1981 to 2013 (stress periods 2 through 34).
- The model was run with MODFLOW 6 (Langevin and others, 2017).

## **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 groundwater availability model results for the Carrizo-Wilcox Aquifer located within the Panola County Groundwater Conservation District and averaged over the historical calibration period, as shown in Table 1.

1. Precipitation recharge—the areally distributed recharge sourced from precipitation falling on the outcrop areas of the aquifer (where the aquifer is exposed at land surface) within the district.
2. Surface-water outflow—the total water discharging from the aquifer (outflow) to surface-water features such as streams, reservoirs, and springs.
3. Flow into and out of district—the lateral flow within the aquifer between the district and adjacent counties.
4. Flow between aquifers—the net vertical flow between the aquifer and adjacent aquifers or confining units. This flow is controlled by the relative water levels in each aquifer and aquifer properties of each aquifer or confining unit that define the amount of leakage that occurs.

The information needed for the district's management plan is summarized in Table 1. Figure 2 provides a generalized diagram of the groundwater flow components provided in Table 1. Full water budgets for the Carrizo-Wilcox Aquifer within the district are provided in Appendix A. These budgets are included to assist Panola County Groundwater Conservation District in analyzing the effects of pumping and recharge on the aquifers within the district.

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

**TABLE 1: SUMMARIZED INFORMATION FOR THE CARRIZO-WILCOX AQUIFER 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.**

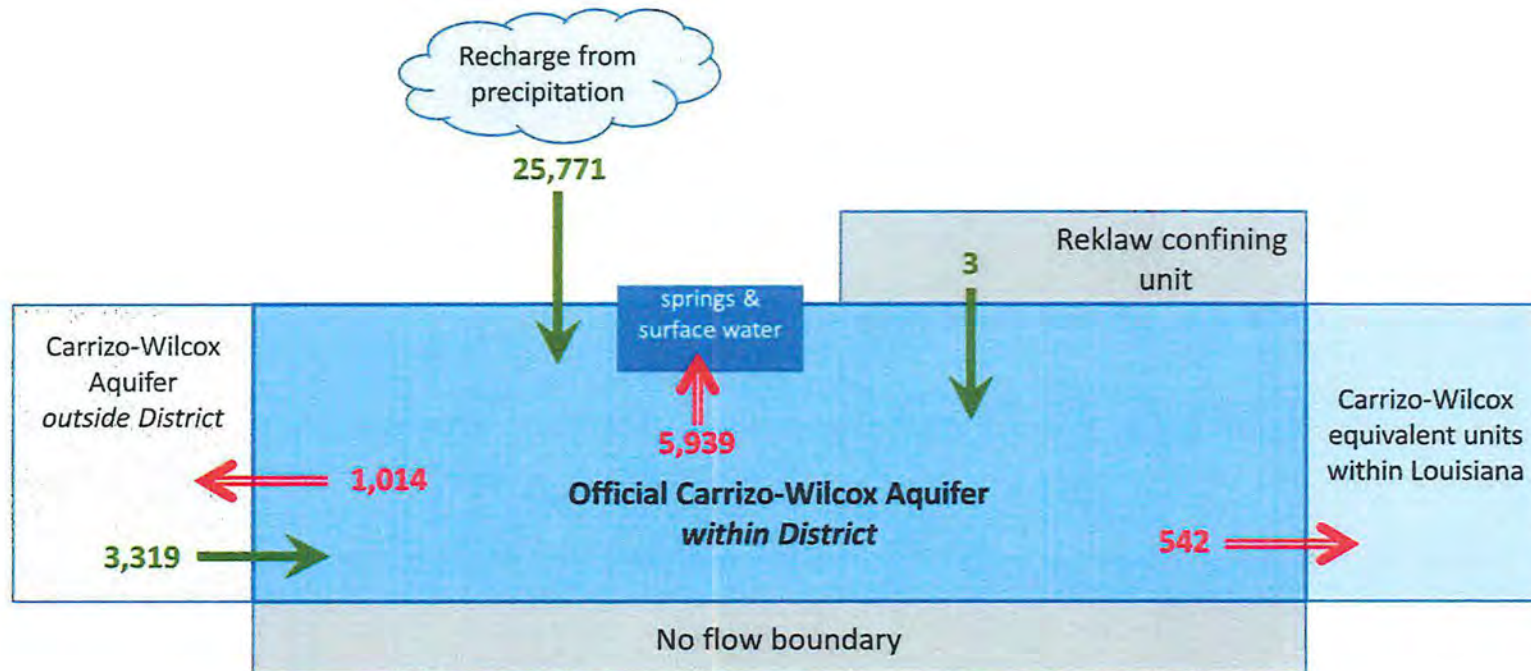
Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Carrizo-Wilcox Aquifer	25,771
Estimated annual volume of water that discharges from the aquifer to springs and any surface water body including lakes, streams, and rivers	Carrizo-Wilcox Aquifer	5,939
Estimated annual volume of flow into the district within each aquifer in the district	Carrizo-Wilcox Aquifer	3,319
Estimated annual volume of flow out of the district within each aquifer in the district	Carrizo-Wilcox Aquifer	1,014
Estimated net annual volume of flow between each aquifer in the district	To the Carrizo-Wilcox Aquifer from the Reklaw Formation	3
	To the Carrizo-Wilcox Aquifer from equivalent units in Louisiana	542





gcd boundary date: 06.26.2020, county boundaries date: 07.19.2019, czwx\_n grid date: 06.07.2021

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



*Caveat: This diagram only includes the water budget items provided in Table 1. A complete water budget would include additional inflows and outflows. Please see Appendix A for a full water budget.*

**FIGURE 2: GENERALIZED DIAGRAM OF THE SUMMARIZED BUDGET INFORMATION FROM TABLE 1, REPRESENTING DIRECTIONS OF FLOW FOR THE CARRIZO-WILCOX AQUIFER WITHIN PANOLA COUNTY GROUNDWATER CONSERVATION DISTRICT. FLOW VALUES EXPRESSED IN ACRE-FEET PER YEAR.**

### **LIMITATIONS:**

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

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

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



**REFERENCES:**

- Panday, S., Rumbaugh, J., Hutchison, W., and Schorr, S., 2020, Numerical Model Report: Groundwater Availability Model for the Northern Portion of the Queen City, Sparta, and Carrizo-Wilcox Aquifers, 201 p., [http://www.twdb.texas.gov/groundwater/models/gam/czwx\\_n/2020\\_12\\_08\\_Numerical\\_Model\\_Report\\_Accessible.pdf](http://www.twdb.texas.gov/groundwater/models/gam/czwx_n/2020_12_08_Numerical_Model_Report_Accessible.pdf)
- Schorr, S., Zivic, M., Hutchison, W., Panday, S., and Rumbaugh, J., 2020, Conceptual Model Report: Groundwater Availability Model for Northern Portion of the Queen city, Sparta, and Carrizo-Wilcox Aquifers, 240 p., [http://www.twdb.texas.gov/groundwater/models/gam/czwx\\_n/North\\_QCSCW\\_GAM\\_Conceptual\\_Model\\_Report\\_FullRpt\\_Appendices.pdf](http://www.twdb.texas.gov/groundwater/models/gam/czwx_n/North_QCSCW_GAM_Conceptual_Model_Report_FullRpt_Appendices.pdf)
- Wade, S., 2013, GAM Run 13-006: Texas Water Development Board, GAM Run 13-006 Report, 13 p., <https://www.twdb.texas.gov/groundwater/docs/GAMruns/GR13-006.pdf>.
- Langevin, C.D., Hughes, J.D., Banta, E.R., Provost, A.M., Niswonger, R.G., and Panday, Sorab, 2021, ZONEBUDGET for MODFLOW 6, 14 p., <https://doi.org/10.5066/F76Q1VQV>
- Langevin, C.D., Hughes, J.D., Banta, E.R., Provost, A.M., Niswonger, R.G., and Panday, Sorab, 2017, MODFLOW 6 Modular Hydrologic Model: U.S. Geological Survey Software, <https://doi.org/10.5066/F76Q1VQV>
- 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](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 A – Full Groundwater Budget Diagrams**

Full water budget diagrams presented in Figures A-1 and A-2 are included to assist the Panola County Groundwater Conservation District in analyzing the effects of pumping and recharge on the aquifers within the district. These diagrams are intended to provide additional insight for groundwater conservation districts to better understand their aquifers and to provide more detailed information to inform groundwater management.

Figure A-1 shows the full water budgets for the years of minimum and maximum pumping within the Carrizo-Wilcox Aquifer in the district during the historical calibration period described in the Parameters and Assumptions section (years 1981 to 2013). Figure A-2 shows the full water budgets for the years of minimum and maximum recharge within the Carrizo-Wilcox Aquifer in the district during the historical calibration period. Table A-1 lists each component and provides an explanation of each component contained in the full water budget diagrams.

**TABLE A-1: EXPLANATION OF EACH BUDGET COMPONENT INCLUDED IN THE FULL WATER BUDGETS FOR PANOLA COUNTY GROUNDWATER CONSERVATION DISTRICT.**

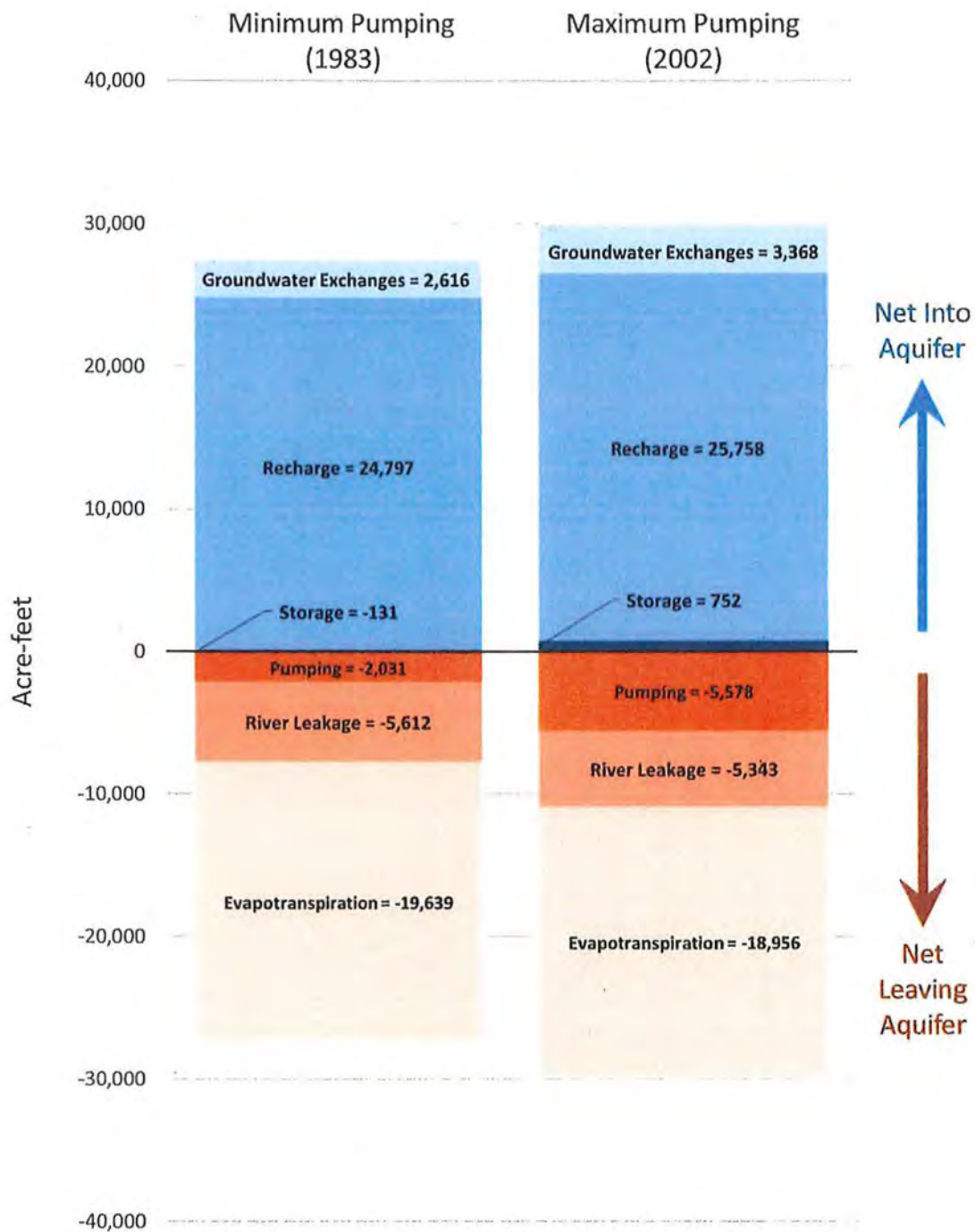
<b>Full water budget component</b>	<b>Explanation</b>
Recharge	Representative of recharge to the aquifer from areally distributed rainfall that reaches the water table of the aquifer.
Pumping	The amount of water pumped out of the aquifer through water wells located within the aquifer.
River Leakage	Only representative of the net exchange of water between the rivers/reservoirs and the aquifer in the model.
Evapotranspiration	Only represents the amount of water removed from the water table by vegetation or direct evaporation from the water table. This does not include total evapotranspiration for all plants or water features covering the modeled area.
Groundwater Exchanges	The sum of the net exchange of groundwater between the aquifer of interest within the district and all geologic units within and outside of the district boundaries.



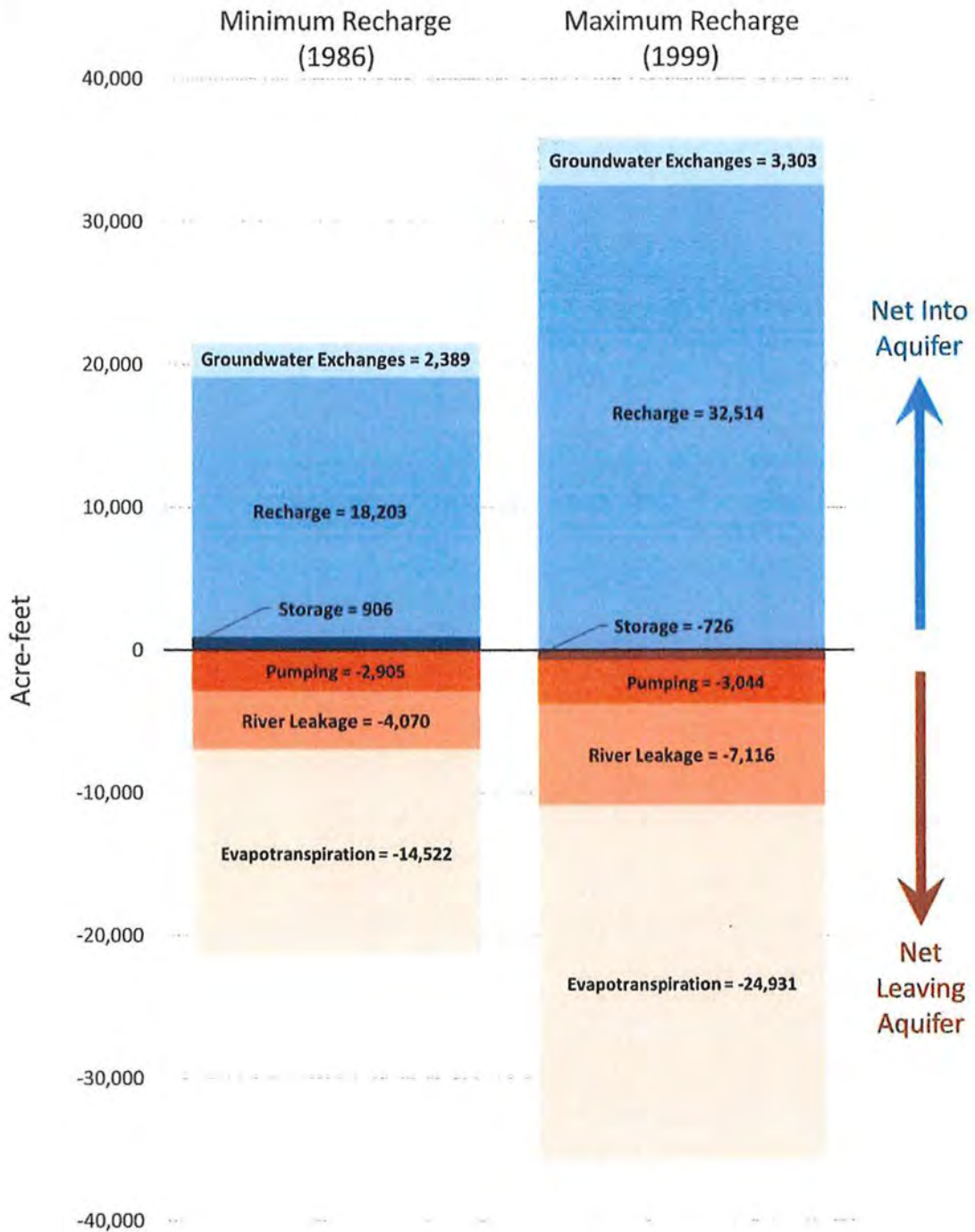
**TABLE A-1: EXPLANATION OF EACH BUDGET COMPONENT INCLUDED IN THE FULL WATER BUDGETS FOR PANOLA COUNTY GROUNDWATER CONSERVATION DISTRICT.**

Full water budget component	Explanation
Storage	<p>Represents the difference from the previous year in the amount of water contained within the aquifer and indicates a relative water level rise (negative Storage value) or water level decline (positive Storage value).</p> <p>Change in storage (<math>dS</math>) is the difference between inflows and outflows (Equation 1). To solve the zero-sum budget over the volume of the aquifer within the district, the term <math>dS</math> must be subtracted from both sides of Equation 1 (Equation 2). If total inflows are greater than outflow, Storage will be negative. If total outflows are greater than total inflows, Storage will be positive.</p> $dS = Inflows - Outflows \quad \text{Equation 1}$ $0 = Inflows - Outflows - dS \quad \text{Equation 2}$





**FIGURE A-1: FULL WATER BUDGETS FOR THE CARRIZO-WILCOX AQUIFER WITHIN THE PANOLA COUNTY GROUNDWATER CONSERVATION DISTRICT SHOWING THE YEAR OF MINIMUM PUMPING AND THE YEAR OF MAXIMUM PUMPING BETWEEN 1981 AND 2013.**



**FIGURE A-2: FULL WATER BUDGETS FOR THE CARRIZO-WILCOX AQUIFER WITHIN THE PANOLA COUNTY GROUNDWATER CONSERVATION DISTRICT SHOWING THE YEAR OF MINIMUM RECHARGE AND YEAR OF MAXIMUM RECHARGE BETWEEN 1981 AND 2013.**