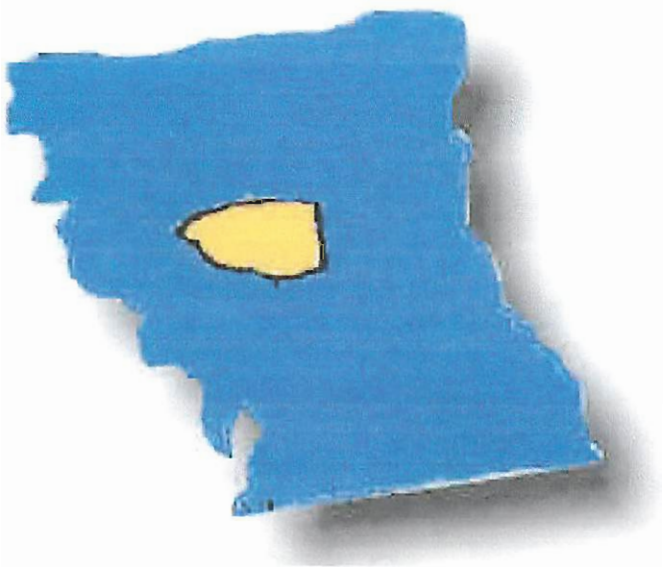
ANDERSON COUNTY
UNDERGROUND WATER CONSERVATION DISTRICT



2007-2012
Water Management Plan

Adopted: July 12, 2007

450 ACR 409, Palestine, Texas 75803 903-729-8066 ACUWCD@gmail.com

Anderson County
Underground Water Conservation District

Water Management Plan 2007-2012

CREATION OF THE DISTRICT

The Anderson County Underground Water Conservation District is created under the authority of Article XVI, Section 59, of the Texas Constitution by Senate Bill 1518 on May 15, 1989.

RIGHTS, POWERS AND DUTIES OF THE DISTRICT

The district was originally governed by Chapter 52, Texas Water Code, which was repealed by the 74th Legislature in 1995. The district is now governed by and subject to Chapter 36, Texas Water Code, and has all the powers, duties, authorities and responsibilities provided by Chapter 36, Texas Water Code. The district is also governed by the Texas Administrative Code: Title 31 Natural Resources and Conservation, Part 10 Texas Water Development Board, Chapter 356 Groundwater Management.

1. The district may prohibit the pumping or use of groundwater if the district determines that the pumping would present an unreasonable risk of pollution.

2. The district may limit the pumping of groundwater to uses determined by the board to benefit the district.

3. The district may require persons holding a permit for an injection well to purchase water from the district.

4. The district may adopt regulations for the disposal of salt dome leachate in the district or may require disposal of salt dome leachate outside the district.

BOARD OF DIRECTORS

Qualifications

To be qualified for election as a director, a person must be:

1. a resident of the district,
2. at least 18 years of age; and
3. not otherwise disqualified by Section 50.026, Water Code

Composition of the Board

The board of the district is composed of nine members.

Election of Directors

An election shall be held on the third Saturday in May every two years to elect the appropriate number of directors to the board.

Terms of Office

Directors shall serve four-year terms of office.

Filling Vacancies on the Board

When a vacancy occurs in the office of a director, the remaining directors shall select a person who meets all the qualifications to serve until the next election.

Quorum

1. A majority of the members of the board constitutes a quorum, and all regular directors have a vote.
2. The district shall act and proceed by resolution adopted by the board, and an affirmative vote of the majority of the board is necessary to adopt any resolution.

LOCATION AND BOUNDARIES OF THE DISTRICT

The District is located in the East Texas (I) Region in north central Anderson County and consists of 34,640 acres. Anderson County consists of 689,280 acres and therefore the District is 0.05% of Anderson County. The District lies within the Region 11 Groundwater Management Area. The boundaries of the ACUWCD include all of the area contained within the following described area:

BEGINNING at the intersection of the center line of U.S. Highway No. 287 with the center line of State Highway No. 19.

THENCE in a Northwesterly direction following the center line of U.S. Highway 287 to the intersection of the center line of F.M. Road No. 321.

THENCE in a Northeasterly direction following the center line of F.M. Road No. 321 to the intersection of the center line of Sate Highway No. 19.

THENCE in an Easterly direction continuing with the center line of F.M. Road No. 321 to the intersection of the center line of F.M. Road No. 315.

THENCE in a Southerly direction following the center line of F.M. Road No. 315 to the intersection of the North line of the Taylor S. Barnes Survey, A-6, and the South line of the Peter Hinds Survey, A-368.

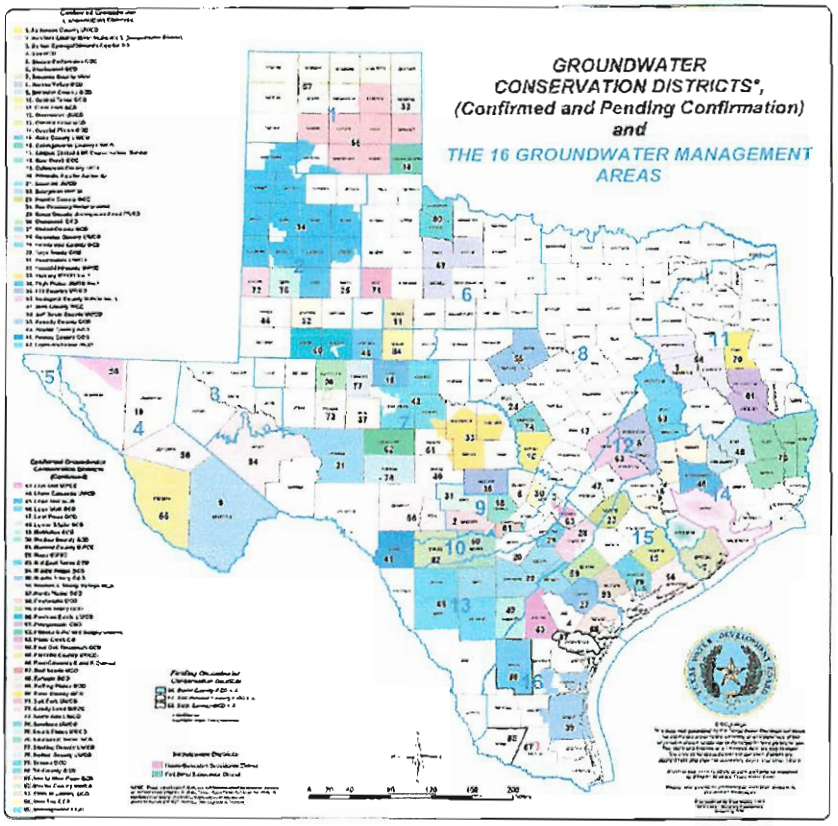
THENCE in a Westerly direction with the South line of the Peter Hinds Survey, A-368, the North line of the Taylor S. Barnes Survey, A-6, to the Southwest corner of the Peter Hinds Survey, A-368, and the Northwest corner of the Taylor S. Barnes Survey, A-6, in the East line of the William Kimbro Survey, A-34.

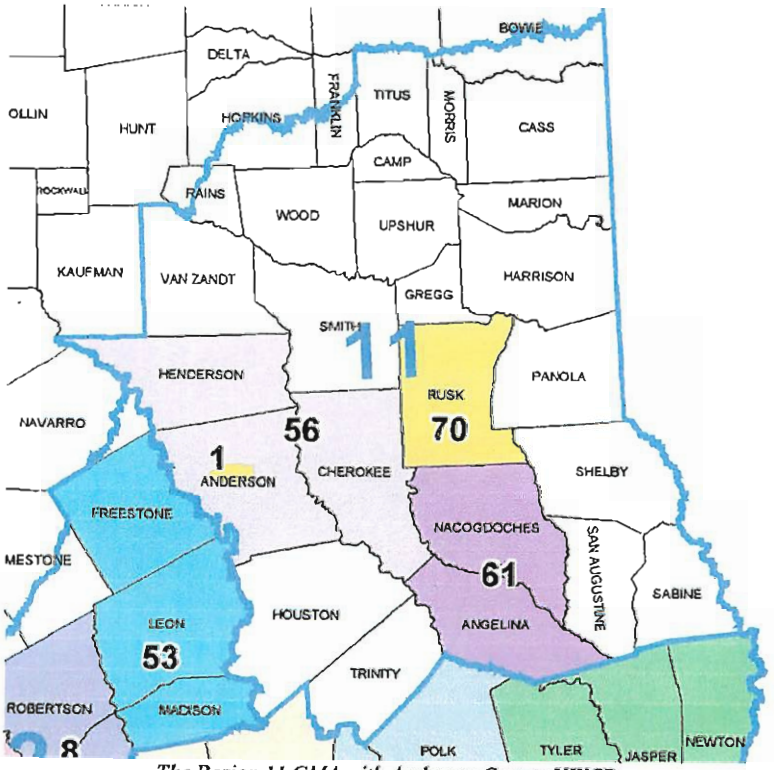
THENCE in a Southerly direction with the East line of the William Kimbro Survey, A-34, and the West line of the Taylor S. Barnes Survey, A-6, to the Southeast corner of the North half of the William Kimbro Survey, A-34, as partitioned in Volume E, page 525 of the Deed Records of Anderson County, Texas.

THENCE in a Westerly direction with the division line of the William Kimbro Survey, A-34, to the Southwest corner of said North half in the West line of the William Kimbro Survey, A-34, and the East line of the George Hanks Survey, A-369.

THENCE in a Southerly direction with the East line of the George Hanks Survey, A-369, and the West line of the William Kimbro Survey, A-34, to the center line of State Highway No. 19.

THENCE in a Southeasterly direction following the center line of State Highway No. 19 to the place of the beginning.

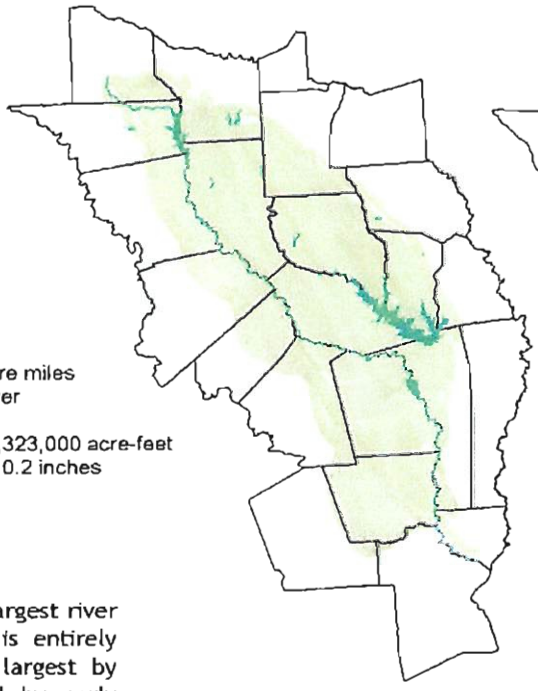


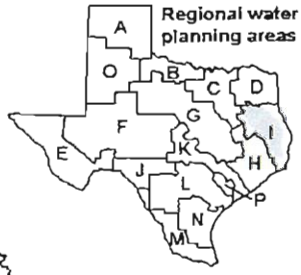


The Region 11 GMA with Anderson County UWCD

The surface water resources are the Neches Basin and the Trinity Basin.

Neches Basin





Basin area: 9,937 square miles
Major river: Neches River
River length: 416 miles
Average annual flow: 4,323,000 acre-feet
Average annual yield: 10.2 inches

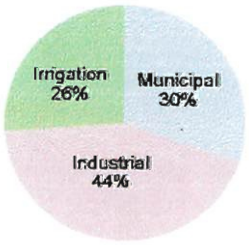
The Neches Basin is the third largest river basin whose watershed area is entirely within Texas and the fourth largest by average flow volume. Named by early explorers after the Neches Indian Tribe, the Neches River flows from headwaters in Van Zandt County to its confluence with Sabine Lake, which drains to the Gulf of Mexico. Smaller rivers and streams within the basin include the Angelina River, Village Creek, and Attoyac, Ayish, and Pine Island bayous. The basin is an important source of surface water supply for growing cities outside the basin. Balancing environmental needs with continued development of surface water supplies is an important issue in the basin.

Reservoir yield Five largest existing reservoirs Name	Conservation storage capacity (acre-feet)	Yield (acre-feet per year)
Sam Rayburn Reservoir	2,857,076	820,000[a]
Palestine, Lake	370,908	220,933[b]
Tyler, Lake	73,256	35,458
Striker, Lake	16,934	20,183
Kurth, Lake	14,769	18,421
Total for 10 major existing reservoirs	**3,506,545**	**1,138,749**
Fastrill Reservoir (recommended)	495,000	148,780
Lake Columbia (permitted)	187,839	75,700

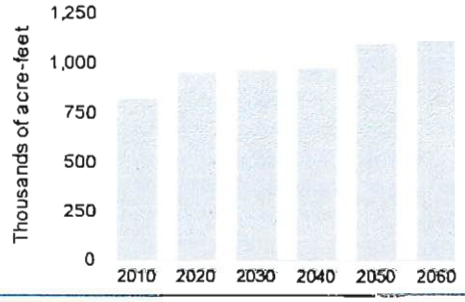
[a] Includes yield from B.A. Steinhagen Lake.
[b] Includes yield from Lake Diversion.

Yield for existing reservoirs is for 2010, and yield for recommended or permitted reservoirs is upon construction.

Surface water rights

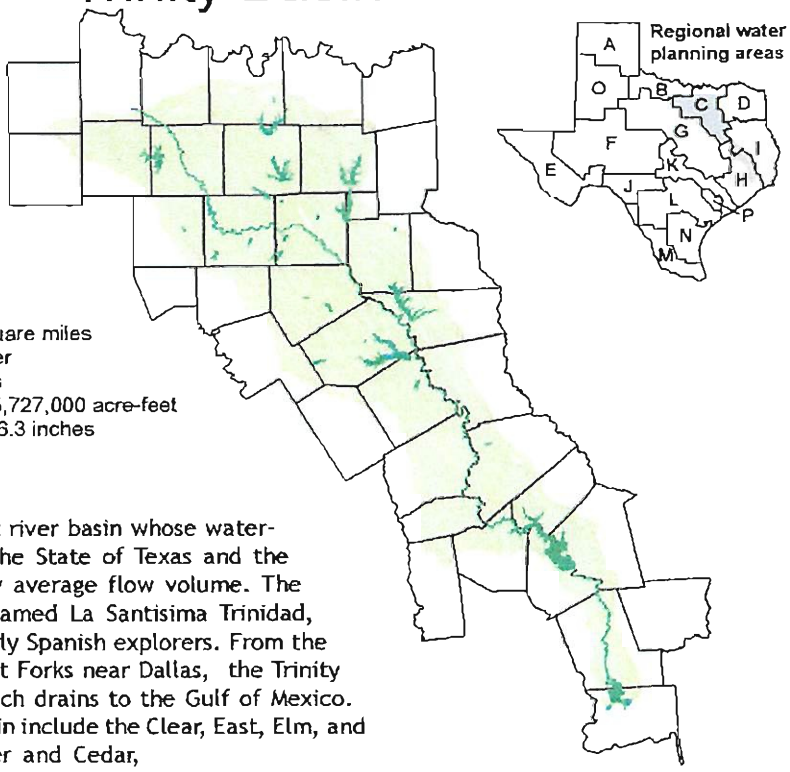


Approximate surface water supply with implementation of water management strategies



Neches River basin (Water for Texas 2007 – Chapter 6 Surface Water Resources, page 149)

Trinity Basin



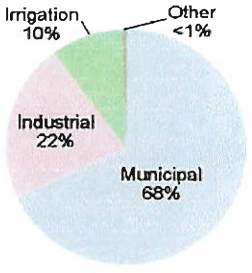
Basin area: 17,913 square miles
Major river: Trinity River
River length: 550 miles
Average annual flow: 5,727,000 acre-feet
Average annual yield: 6.3 inches

The Trinity Basin is the largest river basin whose watershed area is entirely within the State of Texas and the third largest river in Texas by average flow volume. The basin's namesake river was named La Santisima Trinidad, "the Most Holy Trinity," by early Spanish explorers. From the confluence of its Elm and West Forks near Dallas, the Trinity River flows to Trinity Bay, which drains to the Gulf of Mexico. Smaller streams within the basin include the Clear, East, Elm, and West forks of the Trinity River and Cedar, Chambers, and Richland creeks. The Dallas-Fort Worth metropolitan area is located in the upper basin. In the lower basin, water is exported to the Houston area. Water supply demands in both metropolitan areas are increasing. As a result, balancing environmental requirements with these demands is an important issue in the basin.

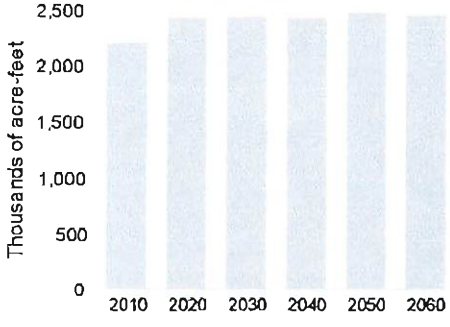
Reservoir yield Five largest existing reservoirs Name	Conservation storage capacity (acre-feet)	Yield (acre-feet per year)
Livingston, Lake	1,741,867[a]	1,344,000
Richland-Chambers Reservoir	1,103,816	222,625
Ray Roberts, Lake	798,758[a]	219,424
Cedar Creek Reservoir Trinity	644,686	175,000
Eagle Mountain Lake	182,500	108,500
Total for 31 major existing reservoirs	7,117,131	2,371,859
No proposed reservoirs		

[a]Total volume up to the top of conservation pool.
Yield for existing reservoirs is for 2010.

Surface water rights



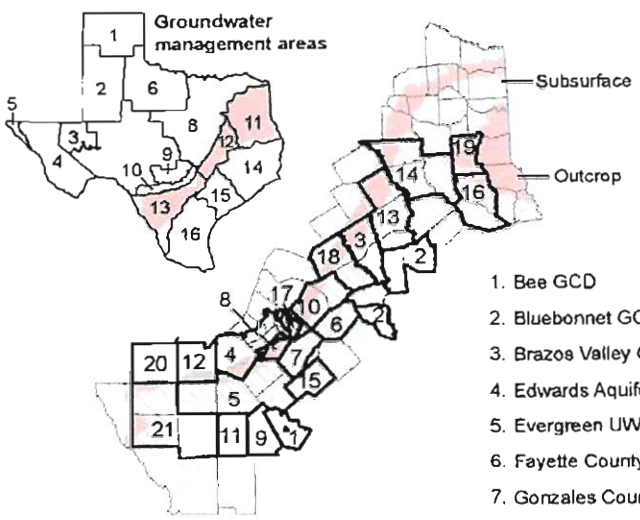
Approximate surface water supply with implementation of water management strategies

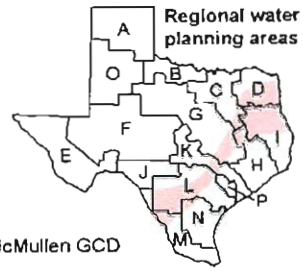


Trinity River basin (Water for Texas 2007 – Chapter 6 Surface Water Resources, page 157)

The groundwater resources are the Carrizo-Wilcox Aquifer, the Queen City Aquifer, and the Sparta Aquifer.

Carrizo-Wilcox Aquifer





1. Bee GCD
2. Bluebonnet GCD
3. Brazos Valley GCD
4. Edwards Aquifer Authority
5. Evergreen UWCD
6. Fayette County GCD
7. Gonzales County UWCD
8. Guadalupe County GCD
9. Live Oak UWCD
10. Lost Pines GCD
11. McMullen GCD
12. Medina County GCD
13. Mid-East Texas GCD
14. Neches & Trinity Valleys GCD
15. Pecan Valley GCD
16. Pineywoods GCD
17. Plum Creek Conservation District
18. Post Oak Savannah GCD
19. Rusk County GCD
20. Uvalde County UWCD
21. Wintergarden GCD

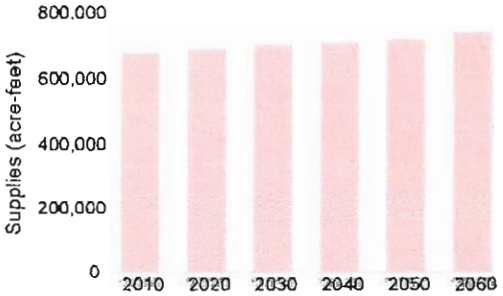
GCD = Groundwater Conservation District
UWCD = Underground Water Conservation District

The Carrizo-Wilcox Aquifer is a major aquifer that extends across much of eastern Texas. It consists of the Wilcox Group and the overlying Carrizo Formation of the Clairborne Group. The aquifer is primarily composed of sand that is locally interbedded with gravel, silt, clay, and lignite deposited during the Tertiary Period. South of the Trinity River and north of the Colorado River, the Wilcox Group is divided into three distinct formations: the Hooper, Simsboro, and Calvert Bluff. Of the three, the Simsboro typically contains the most massive water-bearing sands. Carrizo Springs, located in Dimmitt County, used to flow continuously until 1929 when declining aquifer levels reduced the flow to intermittent. The groundwater, although hard, is generally fresh in the outcrop, whereas softer groundwater with higher total dissolved solids occurs in the subsurface. High iron and manganese content is characteristic of much of the aquifer, and localized saline contamination has affected portions of the aquifer in the Winter Garden area. Pumpage for irrigation accounts for just over half the water pumped, and pumping for municipal supply accounts for another 40 percent. Water level declines have occurred in the Winter Garden area due to irrigation pumping and in the northeastern part of the aquifer due to municipal pumping. The planning groups recommend several water management strategies that use the Carrizo-Wilcox Aquifer, including new wells and well field development, additional withdrawals from existing wells, desalination, conjunctive use of surface water and groundwater, reallocation, and long distance transport.

Aquifer characteristics

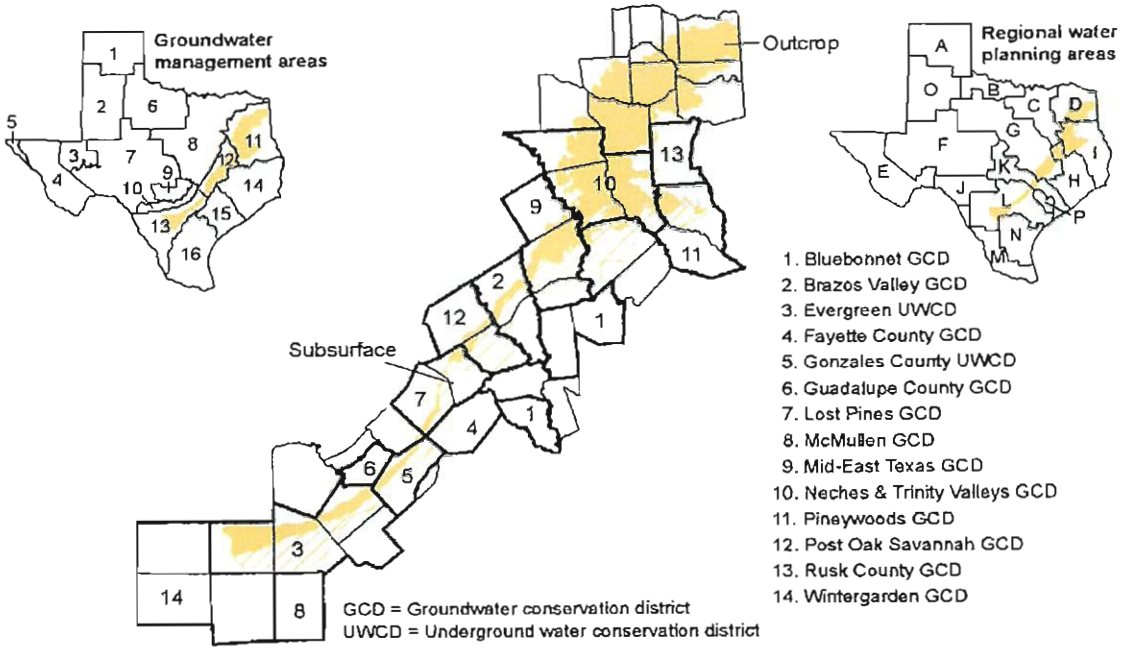
- Area of outcrop: 11,186 square miles
- Area in subsurface: 25,409 square miles
- Availability: 1,014,753 acre-feet per year (2010) to 1,010,793 acre-feet per year (2060)
- Well yield: commonly 500 gallons per minute; some may reach 3,000 gallons per minute downdip
- Proportion of aquifer with groundwater conservation districts: 63 percent
- Number of counties containing the aquifer: 66

Groundwater supplies with implementation of water management strategies



Carrizo-Wilcox Aquifer (Water for Texas 2007 – Chapter 7 Groundwater Resources, page 193)

Queen City Aquifer

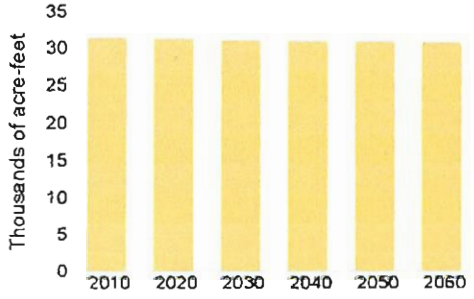


The Queen City Aquifer is a minor but widespread aquifer that stretches across the Texas upper coastal plain. Water is stored in the sand, loosely cemented sandstone, and interbedded clay layers of the Queen City Formation that reaches 2,000 feet in thickness in South Texas. Average freshwater saturation in the Queen City Aquifer is about 140 feet. Water is generally fresh, with an average concentration of total dissolved solids of about 300 milligrams per liter in the recharge zone and about 750 milligrams per liter deeper in the aquifer. Although salinity decreases from south to north, areas of excessive iron concentration and high acidity occur in the northeast. The aquifer is used primarily for livestock and domestic purposes, with significant municipal and industrial use in northeast Texas. However, water levels have remained fairly stable over time in the northern part of the aquifer. Water level declines are more common in the central (10 to 70 feet) and southern (5 to 130 feet) parts of the aquifer. The planning groups recommended several water management strategies that use the Queen City Aquifer, including drilling new and replacement wells, pumping additional water from existing wells, and temporary overdrafting.

Aquifer characteristics

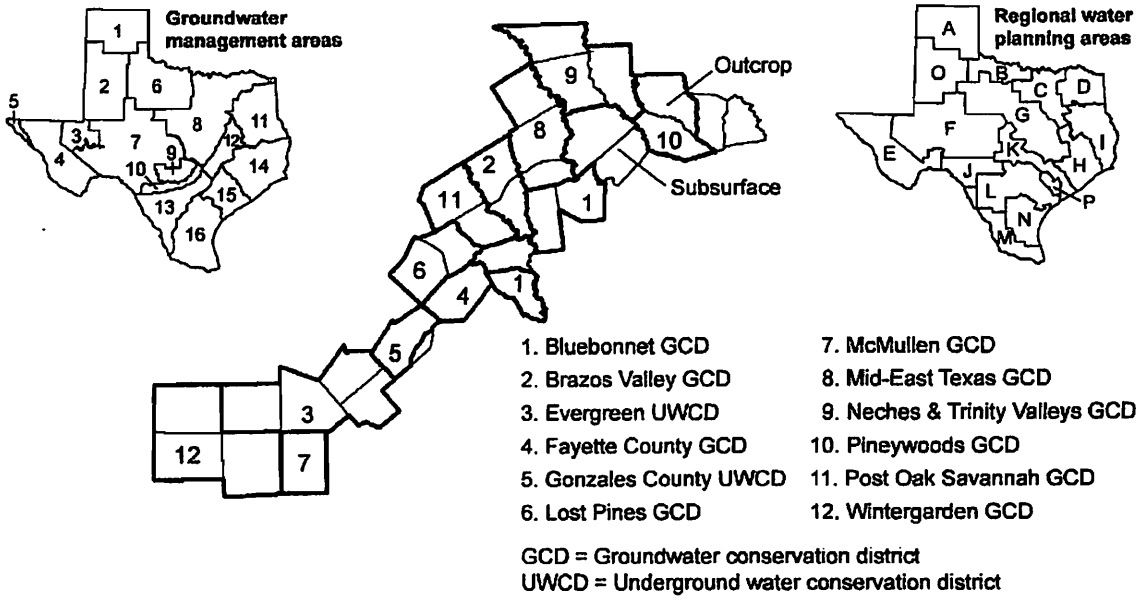
- Area of outcrop: 7,702 square miles
- Area in subsurface: 6,989 square miles
- Availability: 295,791 acre-feet per year (2010 to 2060)
- Proportion of aquifer with groundwater conservation districts: 67 percent
- Number of counties containing the aquifer: 42

Groundwater supplies with implementation of water management strategies



Queen City Aquifer (Water for Texas 2007 – Chapter 7 Groundwater Resources, page 209)

Sparta Aquifer

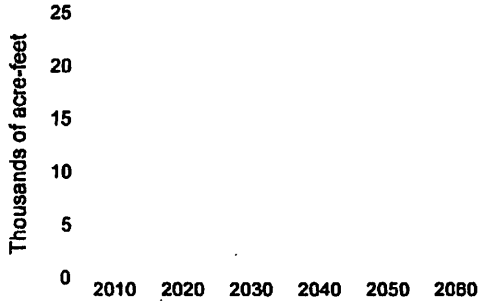


The Sparta Aquifer is a minor aquifer extending across East and South Texas, parallel to the Gulf of Mexico coastline and about 100 miles inland. Water is contained within a part of the Claiborne Group known as the Sparta Formation, a sand-rich unit interbedded with silt and clay layers and with massive sand beds in the bottom section. The thickness of the formation varies gradually from more than 700 feet at the Sabine River to about 200 feet in South Texas. Freshwater saturated thickness averages about 120 feet. In outcrop areas and for a few miles in the subsurface, water quality is usually fresh, with an average concentration of 300 milligrams per liter of total dissolved solids. However, it deteriorates with depth (below about 2,000 feet), with an average concentration of 800 milligrams per liter of total dissolved solids. Excess iron concentrations are common throughout the aquifer. Water from the aquifer is predominantly used for domestic and livestock purposes, and its quality has not been significantly impacted by pumping. Elkhart Creek Springs originates from the Sparta Sands in Houston County and flows up to 3.4 cubic feet per second. In some areas, such as in Houston and Brazos counties, the aquifer is used for municipal, industrial, and irrigation purposes. There have been no significant water level declines throughout the aquifer in wells measured by TWDB. The planning groups recommended several water management strategies that use the Sparta Aquifer, including drilling more wells and increasing withdrawals from existing wells.

Aquifer characteristics

- Area of outcrop: 1,543 square miles
- Area in subsurface: 6,926 square miles
- Availability: 50,511 acre-feet per year (2010 to 2060)
- Proportion of aquifer with groundwater conservation districts: 70 percent
- Number of counties containing the aquifer: 25

Groundwater supplies with implementation of water management strategies



Sparta Aquifer (Water for Texas 2007 – Chapter 7 Groundwater Resources, page 213)

ESTIMATES OF TECHNICAL INFORMATION REQUIRED BY TWC § 36.1071 / 31 TAC 356.5

1. **Estimate of Managed Available Groundwater in the District Based on the Desired Future Condition Established in Joint Planning.**

   The methodology for developing the amount of groundwater available for permitting has changed. Chapter 36.108 Texas Water Code instructs the District to meet annually with other groundwater conservation districts in Groundwater Management Area 11 to conduct joint planning and to review the management plans and accomplishments for the management area. As of the date of the adoption of this plan, the desired future condition of the aquifers in GMA 11 has not been established in accordance with Chapter 36.108 of the Texas Water Code. The districts may establish different desired future conditions for each aquifer, or each geographic area overlying an aquifer in whole or in part, or subdivision of an aquifer within the boundaries of the management area. Other districts in the GMA include the Neches & Trinity Valleys GCD, the Panola County GCD, the Pineywoods GCD, and the Rusk County GCD.

   No later than September 1, 2010 and every five years after, the member districts consider groundwater availability models and other data or information for the management area and must establish desired future conditions for the relevant aquifers within the management area. This results in a quantified amount of groundwater available for permitting by the district, called managed available groundwater. This amount is similar in concept to the usable amount of groundwater.

   To determine estimated groundwater management and availability, the District used information from the GAM supplied by the TWDB and is shown in the two tables on the following page.

2007 State Water Plan - Projected Water Management Strategies										
Anderson County										
WUG	WUG County	River Basin	Water Mgmt. Strategy	Source Name	2010	2020	2030	2040	2050	2060
Steam Electric Power	Anderson	Neches	Purchase Water from Provider (2)	Palestine Lake/Reservoir	0	21,853	21,853	21,853	21,853	21,853
Frankston	Anderson	Neches	New Wells - Carrizo Wilcox Aquifer	Carrizo-Wilcox Aquifer	0	0	121	121	121	121
Mining	Anderson	Neches	New Wells - Carrizo Wilcox Aquifer	Carrizo-Wilcox Aquifer	0	87	87	87	87	87
Frankston	Anderson	Neches	Municipal Conservation	Conservation	0	0	6	7	8	9
County Other	Anderson	Trinity	New Wells - Queen City Aquifer	Queen City Aquifer	0	0	0	0	0	81
Mining	Anderson	Trinity	New Wells - Carrizo Wilcox Aquifer	Carrizo-Wilcox Aquifer	18	34	34	34	34	34
County Other	Anderson	Neches	New Wells - Queen City Aquifer	Queen City Aquifer	0	0	0	0	0	41
Total Projected Water Management Strategies (acre-feet per year) =					**18**	**21,974**	**22,101**	**22,102**	**22,103**	**22,226**

2007 State Water Plan - Projected Water Needs									
Anderson County									
RWPG	WUG	County	River Basin	2010	2020	2030	2040	2050	2060
I	Elkhart	Anderson	Trinity	0	0	0	0	0	0
I	Frankston	Anderson	Neches	0	0	-6	-24	-40	-54
I	Palestine	Anderson	Neches	0	0	0	0	0	0
I	Palestine	Anderson	Trinity	0	0	0	0	0	0
I	County Other	Anderson	Neches	0	0	0	0	0	0
I	County Other	Anderson	Trinity	0	0	0	0	0	0
I	Steam Electric Power	Anderson	Neches	0	-11,306	-13,218	-15,549	-18,390	-21,853
I	Mining	Anderson	Neches	0	0	-20	-43	-65	-87
I	Mining	Anderson	Trinity	-18	-22	-25	-27	-30	-32
I	Irrigation	Anderson	Neches	0	0	0	0	0	0
I	Irrigation	Anderson	Trinity	0	0	0	0	0	0
I	Livestock	Anderson	Neches	0	0	0	0	0	0
I	Livestock	Anderson	Trinity	0	0	0	0	0	0
I	Brushy Creek WSC	Anderson	Neches	0	0	0	0	0	0
I	Brushy Creek WSC	Anderson	Trinity	0	0	0	0	0	0
I	Consolidated WSC	Anderson	Neches	0	0	0	0	0	0
I	Consolidated WSC	Anderson	Trinity	0	0	0	0	0	0
I	Four Pine WSC	Anderson	Trinity	0	0	0	0	0	0
I	Walston Springs WSC	Anderson	Neches	0	0	0	0	0	0
Total Projected Water Needs (acre-feet per year) =				**-18**	**-11,328**	**-13,269**	**-15,643**	**-18,525**	**-22,026**

2. **Amount of groundwater being used within the district on an annual basis – 31TAC356.5(a)(5)(B) (Implementing TWC §36.1071 (e)(3)(B))**

2

The amount of groundwater used in all of Anderson County during the year 2003 is shown in the table below. Data from 1998 to 2003 is provided by the Texas Water Development Board from their Water Use Survey database.

Estimated Historical Groundwater Pumpage for Anderson County

Year	Aquifer	Municipal	Mfg	Power	Mining	Irrigation	Livestock	Total
1998	Carrizo-Wilcox	7820	0	0	411	632	281	9144
	Queen City	674	0	0	0	0	252	926
	Sparta	249	0	0	0	0	94	343
	other	90	0	0	0	0	17	107
1999	**Carrizo-Wilcox**	**7381**	**0**	**0**	**430**	**309**	**288**	**8408**
	Queen City	**636**	**0**	**0**	**0**	**0**	**259**	**895**
	Sparta	**235**	**0**	**0**	**0**	**0**	**97**	**332**
	other	**90**	**0**	**0**	**0**	**0**	**18**	**103**
2000	Carrizo-Wilcox	6164	0	0	423	96	297	6980
	Queen City	531	0	0	0	0	267	798
	Sparta	196	0	0	0	0	96	292
	other	71	0	0	0	0	19	90
2001	**Carrizo-Wilcox**	**6918**	**15**	**0**	**423**	**96**	**292**	**7744**
	Queen City	**680**	**0**	**0**	**0**	**0**	**263**	**943**
	Sparta	**200**	**0**	**0**	**0**	**0**	**98**	**298**
	other	**92**	**0**	**0**	**0**	**0**	**18**	**110**
2002	Carrizo-Wilcox	7095	0	0	430	81	294	7900
	Queen City	702	0	0	0	0	263	965
	Sparta	208	0	0	0	0	99	307
	other	89	0	0	0	0	18	107
2003	**Carrizo-Wilcox**	**7448**	**0**	**0**	**430**	**17**	**106**	**8001**
	Queen City	**710**	**0**	**0**	**0**	**0**	**96**	**806**
	Sparta	**214**	**0**	**0**	**0**	**0**	**36**	**250**
	other	**90**	**0**	**0**	**0**	**0**	**7**	**97**

***NOTE:** All pumpage reported in acre-feet*
***SOURCE:** TWDB Water Use Survey Database*

TWDB: 03/09/2007

3. **Annual amount of recharge from precipitation to the groundwater resources within the district – 31TAC356.5(a)(5)(C) (Implementing TWC §36.1071(e)(3)(C))** 3

The estimate of the annual amount of recharge to the groundwater resources of the District is approximately 2832 acre-feet per year. This estimate is taken from the GAM simulation 07-07 conducted by TWDB for the District.

4. **For each aquifer, annual volume of water that discharges from the aquifer to springs and any surface water bodies, including lakes, streams, and rivers – TWC §36.1071(e)(3)(D)** 4

The estimates of the annual amount of water discharged to surface water systems by the groundwater resources of the District is 1387 acre-feet per year. This estimate is taken from the GAM simulation 07-07 conducted by TWDB for the District.

5. **Annual volume of flow into and out of the district within each aquifer and between aquifers in the district, if groundwater availability model is available – TWC §36.1071(e)(3)(E)** 5

The estimates of flow into and out of the District and between aquifers in the District are given in Table 2, below. These estimates are taken from the GAM simulation 07-07 conducted by TWDB for the District.

Results are reported in acre-feet per year.

Management plan requirement	Aquifer	Results from model simulation
Estimated annual amount of recharge from precipitation to the district	All aquifers and confining units	2832
Estimated annual volume of water that discharges from the aquifer to springs and any surface water body including lakes, streams, and rivers	Sparta, Queen City, Carrizo, and Upper Wilcox aquifers (no discharge from Middle and Lower Wilcox aquifers)	-1387
Estimated annual volume of flow into the district within each aquifer in the district	Sparta Aquifer Queen City Aquifer Carrizo Aquifer Upper Wilcox (Calvert Bluff Formation) Middle Wilcox (Simsboro Formation) Lower Wilcox (Hooper Formation)	0 448 386 272 372 722
Estimated annual volume of flow out of the district within each aquifer in the district	Sparta Aquifer Queen City Aquifer Carrizo Aquifer Upper Wilcox (Calvert Bluff Formation) Middle Wilcox (Simsboro Formation) Lower Wilcox (Hooper Formation)	0 -572 -418 -235 -276 -666
Estimated annual volume of flow between each aquifer in the district	Younger units and Sparta Aquifer Sparta Aquifer and Weches Confining Unit Weches Confining Unit and Queen City Aquifer Queen City Aquifer and Recklaw Confining Unit Recklaw Confining Unit and Carrizo Aquifer Carrizo Aquifer and Upper Wilcox Aquifer Upper Wilcox Aquifer and Middle Wilcox Aquifer Middle Wilcox Aquifer and Lower Wilcox Aquifer	0 0 0 -116 -125 -13 -27 -81

6. Projected surface water supply in the district, according to the most recently adopted state water plan – TWC §36.1071(e)(3)(F)

6

The most recently adopted state water plan is the 2007 State Water Plan (SWP). The estimates of the surface water supplies for Anderson County in the 2007 SWP are presented in the table below.

2007 State Water Plan - Projected Surface Water Supplies Anderson County										
RWPG	Water User Group	River Basin	Source Name	2000	2010	2020	2030	2040	2050	2060
I	Palestine	Neches	Palestine Lake/Reservoir	6,006	2,278	2,278	2,278	2,278	2,278	2,278
I	Palestine	Neches	Palestine Lake/Reservoir	7,961	2,053	2,053	2,053	2,053	2,053	2,053
I	Irrigation	Neches	Neches River Combined Run-of-River Irrigation	178	197	197	197	197	197	197
I	Irrigation	Trinity	Trinity Combined Run-of-River Irrigation	349	1,060	1,060	1,060	1,060	1,060	1,060
I	Livestock	Neches	Livestock Local Supply	599	599	599	599	599	599	599
I	Livestock	Trinity	Livestock Local Supply	684	684	684	684	684	684	684
I	Consolidated WSC	Trinity	Houston County Lake Reservoir	0	20	21	20	20	21	22
I	Consolidated WSC	Trinity	Houston County Lake Reservoir	0	69	68	67	67	69	71
Total Projected Surface Water Supplies (acre-feet per year) =				15,777	6,960	6,960	6,958	6,958	6,961	6,964

7. **Projected total demand for water in the district according to the most recently adopted state water plan – TWC §36.1071(e)(3)(G)**

7

The most recently adopted state water plan is the 2007 State Water Plan (SWP). The estimates of the total water demand in Anderson County in the 2007 SWP are shown in the table below.

2007 State Water Plan - Projected Water Demands									
Anderson County Underground Water Conservation District									
RWPG	River Basin	Category	2000	2010	2020	2030	2040	2050	2060
I	Neches	Irrigation	1	1	1	1	1	1	1
I	Trinity	Irrigation	9	9	9	9	9	9	9
I	Neches	Livestock	35	35	35	35	35	35	35
I	Trinity	Livestock	40	40	40	40	40	40	40
I	Neches	County-Other	33	36	38	39	41	42	43
I	Trinity	County-Other	194	209	221	230	239	246	252
I	Neches	Mining	17	20	22	23	24	25	26
I	Trinity	Mining	2	2	2	3	3	3	3
	Sub-Total Projected Water Demands (acre-feet per year) =		331	353	368	380	392	401	410
	9 Unpermitted Wells (Maximum Allowable 25,000 gpd)		252	252	252	252	252	252	252
	Total Projected Water Demands (acre-feet per year) =		**583**	**605**	**620**	**632**	**644**	**653**	**662**

MANAGEMENT OF GROUNDWATER SUPPLIES

TWC Section 36.0015 states that groundwater conservation districts (GCDs) are the state's preferred method of groundwater management and establishes that GCDs will manage groundwater resources through rules developed and implemented in accordance with TWC Chapter 36. Chapter 36 gives directives to GCDs and the statutory authority to carry out such directives, so that GCDs are provided the proper tools to protect and manage the groundwater resources within their boundaries.

The regulatory tools granted to GCDs by TWC Chapter 36 enable GCDs to preserve historic and existing users of groundwater. The District has plans to protect historic and existing users by granting such groundwater users historic and existing permits that have priority over operating permits. TWC Chapter 36 also allows GCDs to establish management zones within an aquifer or aquifer subdivision.

The District may deny a water well drilling permit or limit groundwater withdrawals in accordance with the requirements stated in the rules of the District. In making a determination to deny a permit or limit groundwater withdrawals, the District will consider criteria identified in TWC Section 36.113.

In accordance with the District's mission of protecting the groundwater resources of the District, the District may require reduction of groundwater withdrawals to amounts that will not cause harm to the aquifer when considering the desired future condition of the District's aquifers and the amount of managed available groundwater within the District. To achieve this purpose, the District may, at the discretion of the Board, amend or revoke any permits after notice and hearing. The determination to seek the amendment or revocation of a permit by the District will be based on aquifer conditions as observed by the District. The District will enforce the terms and conditions of permits and the rules of the District by injunction or other appropriate relief in a court of competent jurisdiction as provided fro in TWC §36.102.

A contingency plan to cope with the effects of water supply deficits due to climatic or other conditions may be developed by the District and adopted by the Board after notice and hearing. In developing the contingency plan, the District will consider the economic effect of conservation measures upon all water resource user groups, the local implications of the extent and effect of changes in water storage conditions, the unique hydrogeologic conditions of the aquifers within the District and the appropriate conditions under which the contingency plan will be implemented. The District will evaluate the groundwater resources available within the District and determine the effectiveness of regulatory or conservation measures. A public or private user may appeal to the Board for discretion in enforcement of the provisions of the water supply deficit contingency plan on grounds of adverse economic hardship or unique local conditions. The exercise of said discretion by the Board shall not be construed as limiting the power of the Board.

ACTIONS, PROCEDURES, PERFORMANCE AND AVOIDANCE FOR PLAN IMPLEMENTATION

9

The District will implement the provisions of this plan and will utilize the provisions of this plan as a guidepost for determining the direction or priority for all District activities. All operations of the District, all agreements entered into by the District, and any additional planning efforts in which the District may participate will be consistent with the provisions of this plan.

Rules adopted by the District for the permitting of wells and the production of groundwater shall comply with TWC Chapter 36, including §36.113, and the provisions of this management plan. All rules will be adhered to and enforced. The promulgation and enforcement of the rules will be based on the best technical evidence available to the District.

METHODOLOGY FOR TRACKING DISTRICT PROGRESS IN ACHIEVING MANAGEMENT GOALS – 31 TAC 356.5(a)(6)

The District Board President will prepare and present an Annual Report to the Board of Directors on District performance in regards to achieving management goals and objectives for the fiscal year. The report will be presented after the regular July meeting, beginning with FY08. The Board will maintain the report on file, for public inspection at the District's offices upon adoption.

GOALS, MANAGEMENT OBJECTIVES AND PERFORMANCE STANDARDS

The management goals, objectives, and performance standards of the District in the areas specified in 31TAC§356.5 are addressed below.

Management Goals

A. Providing the Most Efficient Use of Groundwater – 31TAC356.5(a)(1)(A) (Implementing TWC §36.1071(a)(1))

Objective: The District will begin a process to register all wells within the District's jurisdiction.

Performance Standard: Each year, beginning in FY09, the number of new and existing wells registered with the District will be presented in the District's annual report

B. Controlling and Preventing Waste of Groundwater – 31TAC356.5(a)(1)(B) (Implementing TWC §36.1071(a)(2))

Objective: Each year the District will disseminate educational information on eliminating and reducing the wasteful use of groundwater focusing on water quality protection. This may be accomplished annually by two of the following methods:

a. conduct an annual contest on water quality protection
b. compile literature packets for distribution to schools in Anderson County
c. conduct classroom presentations
d. sponsor an educational program/curriculum
e. post information on the District's website
f. provide newspaper articles for publication
g. publish District newsletter
h. conduct public presentations
i. set up displays at public events
j. distribute brochures/literature

Performance Standard: The annual report will include a summary of the District activities during the year to disseminate educational information on eliminating and reducing the wasteful use of groundwater focusing on water quality protection.

C. Addressing Conjunctive Surface Water Management Issues – 31TAC356.5(a)(1)(D) (Implementing TWC §36.1071(a)(4))

25 27 28

Objective: Each year, the District will participate in the regional planning process by attending at least one meeting of the regional water planning group per fiscal year.

Performance Standard: Each year, attendance at Region I meetings by a representative of the District will be reflected in the District's annual report and will include the number of meetings attended and the dates.

D. Controlling and preventing Subsidence – 31TAC§356.5(a0(1)(C)

Objective: Each year, the District will manage the withdrawal of groundwater.

21 23 24

Performance Standard: Each year, attendance at GMA 11 meetings by a representative of the District will be reflected in the District's annual report and will include the number of meetings attended and the dates.

E. Addressing natural resource issues which impact the use and availability of groundwater, and which are impacted by the use of groundwater – 31TAC§356.5(a)(1)(E) (Implementing TWC §36.1071(a)(5)

29 31 32

Objective: Each year, the District will require permits for all non-exempt use of groundwater in the District as defined in the District rules, in accordance with adopted procedures.

Performance Standard: Each year, a summary of the number of applications for the drilling of non-exempt wells, the number of applications for the permitted use of groundwater and the disposition of the applications will be presented in the District's annual report

F. Addressing Drought Conditions – 31TAC356.5(a)(1)(F) (Implementing TWC §36.1071(a)(6))

33 35 36

Objective: Each month, the District will download the updated Palmer Drought Severity Index (PDSI) map and check for the periodic updates to the Drought Preparedness Council Situation Report posted on the Texas Water Information Network website at www.txwin.net.

Performance Standard: Each year, the downloaded PDSI maps and Situation Reports will be included in the District Annual Report to the Board of Directors.

G. Addressing Conservation, Recharge Enhancement, Rainwater Harvesting, Precipitation Enhancement, or Brush Control, Where Appropriate and Cost Effective – 31TAC356.5(a)(1)(G) (Implementing TWC §36.1071(a)(7))

Precipitation enhancement is not an appropriate or cost-effective program for the District at this time because there is not an existing precipitation enhancement program operating in nearby counties in which the District could participate and share costs. The cost of operating a single-county precipitation enhancement program is prohibitive and would require the District to increase taxes in Anderson County.

1. Objective: Each year, the District will promote conservation by one of the following methods:
   a. conduct an annual contest on water conservation
   b. distribute conservation literature packets to schools in Anderson County
   c. conduct classroom conservation presentations
   d. sponsor and educational conservation program/curriculum
   e. post conservation information on the District's website
   f. provide a newspaper article on conservation for publication
   g. publish an article on conservation in the District newsletter
   h. conduct a public conservation presentation
   i. set up a conservation display at a public event
   j. distribute conservation brochures/literature to the public

   Performance Standard: Each year, the annual report will include a summary of the District activity during the year to promote conservation.

2. Objective: Each year, the District will promote rainwater harvesting by posting information on rainwater harvesting on the District's website.

   Performance Standard: Each year, the annual report will include a copy of the information on rainwater harvesting that is provided on the District's website.

3. Objective: Each year, the District will provide information relating to recharge enhancement and brush control on the District's website.

   Performance Standard: Each year, the District annual report will include a copy of the information that has been provided on the District's website relating to recharge enhancement and brush control

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

This category of management goal is not applicable to the District because the desired future condition of the groundwater resources in GMA 11 has not been defined.

The District intends to coordinate with other groundwater conservation districts in GMA 11 to define the desired future conditions of the aquifers, as required by TWC 36.108. The District also intends to review and evaluate the GAM simulation results and other available data by September 1, 2010 to determine if revisions are needed regarding the total aquifer storage and groundwater availability.

Anderson County Underground Water Conservation District
450 ACR 409
Palestine, Texas 75803

Water Management Plan
2007-2012

Whereas, the Anderson County Underground Water Conservation District was created in accordance with Article 16, Section 59 of the 71st Legislature, S.B. 1518 on May 15, 1989; and

Whereas, the District is required by S.B.1 through Chapter 36.1071 of the Texas Water Code to develop and adopt a new Management Plan; and

Whereas, the District Board of Directors has determined that the new five year Management Plan addresses the requirements of Chapter 36.01071,

Now therefore, be it resolved, that the Board of Directors of the Anderson County Underground Water Conservation District, following notice and hearing, hereby adopts this new five year Management Plan to replace the existing Management Plan; and

Further, be it resolved, that this new Management Plan shall become effective immediately upon adoption.

Adopted this 12th day of July 2007 by the Board of Directors of the Anderson County Underground Water Conservation District.

Tommy Wardell, President

Benjamin Pinson, Vice President

Kathryn Barrett, Secretary

K-Lu Cowan, Member

Craig Webb, Member

Allen Patton, Member

Marjorie Cathey, Member

Absent
Emma Collins, member

Vacant as of July 1, 2007
Member

Appendix A

ORIGINAL – DISTRICT OFFICE

Anderson County Underground Water Conservation District

Application for Water Well Permit

(please type or print)

I, _____ _____
NAME OF APPLICANT (Applicant's Address)

hereby make an application to the ANDERSON COUNTY UNDERGROUND WATER CONSERVATION DISTRICT for a permit to drill a water well at the site described on the attached plat.

I agree that this well will be drilled within thirty (30) feet of the location specified and not closer to any existing well or authorized well site that the District's minimum spacing rule requires and; that I will furnish the District the complete well registration and log immediately upon completion of this well and prior to the production of water for the site identified on the attached plat.

I further agree not to allow water to escape from the land on which this well is located nor to convey water from this well in an open, unlined ditch. I understand that if I violate any of this agreement, the Board of Directors of the District may order that I may no longer use the well for any purpose until the problem is permanently resolved.

_____ _____ _____
Signature of Applicant or Agent Address Telephone

This permit is recommended for approval by the Water District Directors and is subject to Water District Rules.

1._____ 2._____ 3._____
three (3) signatures of ACUWCD Directors required

Date recommended for approval _____

Appendix B, p. 1

ORIGINAL DISTRICT OFFICE

Anderson County Underground Water Conservation District

County.
Permit No. _____
Date Received _____
Pump _____
Maximum in Yield _____

REGISTRATION and LOG of WELL

INSTRUCTIONS Fill out in quadruplet. Submit all copies to District Directors for recommendation (PLEASE TYPE OR PRINT)

Applicant _____ Address _____

County. _____ Survey _____ Abstract No. _____

as described in Vol. _____ Page _____ of the Deed Records of Anderson County, Texas.

Well located as shown on attached plat with bearing and distance from 2 tract lines.

DRILLER'S LOG OF WELL

Method of Drilling: Rotary ____, Reverse Rotary ____, Air ____, Spudder ____, Other ____, Diameter of Well: ____ inches.

FROM (FEET)	TO (FEET)	DESCRIPTION OF FORMATION MATERIAL	FROM (FEET)	TO (FEET)	DESCRIPTION OF FORMATION MATERIAL

Gravel packed: Yes ___ No ___ . Gravel Size _____ Quantity in yards _____

Cementing record: filled with cement between casing and wall of well from _____ feet to surface, including pump base.

Casing: Steel ___, Plastic ___, Other ____ Diameter ____ in. Total casing length including screen or perforated casing _____-ft

Manufactured well screen from _____ ft. to _____ ft. Size _____ Number of rows _____

Casing perforated from _____ ft. to _____ ft. Size _____ Number of rows _____

Latitude Of Well N. _____ deg. ___ min ___ sec. Longitude Of Well: W. _____ deg. ___ min. ___ sec.

I hereby certify that this well was drilled by me (or under my supervision), and that each and all of the statements herein are true to the best of my knowledge and belief.

Driller _____ Address _____ Telephone _____

Texas License No. _____ Date drilled _____

DESCRIPTION OF PERMANENTLY INSTALLED PRODUCTION EQUIPMENT

(This Does Not Mean Testing or Development Pump)

Discharge pipe size _____ in. Pump Column: Size _____ in. Length _____ ft. Suction pipe length _____ ft.

Pump bowls Size _____ Number of stages _____ Pump yield _____ GPM Estimated _____ Measured _____

Depth to static water level _____ ft. Estimated _____ Measured _____ Pumping level: _____ ft.

Power Unit Electrical _____ Natural Gas _____ Other _____ Horsepower _____

Type of Pump: Turbine _____ Submersible _____ Other _____ Well chlorinated after pump installed ____(yes/no)

I hereby certify that this well was equipped as stated above.

Pump Installer: _____ Address _____ Date _____

Texas License No. _____

If this is a replacement well, I certify that the abandoned well is properly capped or filled in accordance with state law and the rules of the district. To the best of my knowledge and belief, all above information is true and accurate.

Applicant _____ Address _____ Date _____

SIGNATURE

GAM Run 07-07

by Richard M. Smith, P.G.
Texas Water Development Board
Groundwater Availability Modeling Section
(512) 936-0877
April 3, 2007

REQUESTOR:

Mr. Tom Wardell of the Anderson County Underground Water Conservation District.

DESCRIPTION OF REQUEST:

Mr. Wardell requested the following information for his district from the groundwater availability model for the northern part of the Queen City, Sparta, and Carrizo-Wilcox aquifers:

1) estimated annual amount of recharge from precipitation to the district;
2) estimated annual volume of water that discharges from the aquifer to springs and any surface water body including lakes, streams, and rivers;
3) estimated annual volume of flow into and out of the district within each aquifer and between each aquifer in the district; and

METHODS:

To address the request, we:

- ran the transient groundwater availability model for the northern part of the Queen City, Sparta, and Carrizo-Wilcox aquifers and extracted water budgets for each year of the 1980 through 1999 period and
- averaged the twenty year period for recharge, surface water inflow, surface water outflow, inflow to the district, outflow from the district, net inter-aquifer flow (upper) and net inter-aquifer flow (lower).

PARAMETERS AND ASSUMPTIONS:

- See Fryar and others (2003) and Kelley and others (2004) for assumptions and limitations of the groundwater availability model for the northern part of the Queen City, Sparta, and Carrizo-Wilcox aquifers.
- The groundwater availability model includes eight layers, representing:
  1. Sparta Aquifer (Layer 1),
  2. Weches Confining Unit (Layer 2),

3. Queen City Aquifer (Layer 3),
4. Reklaw Confining Unit (Layer 4),
5. Carrizo Aquifer (Layer 5),
6. Upper Wilcox Aquifer (Calvert Bluff Formation—Layer 6),
7. Middle Wilcox Aquifer (Simsboro Formation—Layer 7), and
8. Lower Wilcox Aquifer (Hooper Formation—Layer 8).

- The mean absolute error (a measure of the difference between simulated and actual water levels during model calibration) in the groundwater availability model is 16 feet for the Sparta Aquifer, 21 feet for the Queen City Aquifer, 25 feet for the Carrizo Aquifer, and 26 feet for the Middle Wilcox Aquifer (Layer 7) for the calibration period (1980-89) and 15, 24, 28, and 29 feet for the same aquifers respectively in the verification period (1990-99), or between three and six percent of the range of measured water levels (Kelley and others, 2004).

- The results of this analysis only include the aquifers that are in the groundwater availability model. They do not include younger sediments such as the Yegua-Jackson Aquifer that overlie the Sparta Aquifer.

RESULTS:

Recharge and water budget

A groundwater budget summarizes how the model estimates water entering and leaving the aquifer. The groundwater budget for the average values from the transient model (1980 to 1999) is shown in Table 1. The components of the budgets shown in Table 1 include:

- Surface water inflow and outflow—This is the total surface water entering the aquifer (inflow) through streams or reservoirs, or total surface water exiting the aquifer (outflow) to streams, reservoirs, drains (springs), or through evapotranspiration (return of moisture to the air through both evaporation from the soil and transpiration or loss of water vapor by plants).

- Lateral flow into and out of district—This component describes lateral flow within the aquifer between the district and adjacent counties.

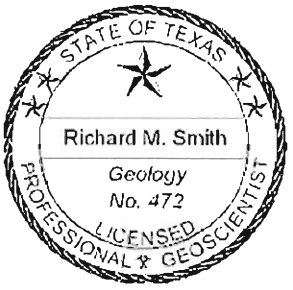
- Net inter–aquifer flow—This describes the vertical flow, or leakage, between aquifers or confining units. This flow is controlled by the relative water levels in each aquifer and aquifer properties of each aquifer that define the amount of leakage that can occur. "Inflow" to an aquifer from an overlying or underlying aquifer will always equal the "Outflow" from the other aquifer, except for the top layer where flow from and to overlying younger aquifers are simulated with a general head boundary condition.

Recharge from precipitation is the areally distributed recharge due to precipitation falling on the outcrop areas of the aquifers (where the aquifer is exposed at land surface) within the district. The information needed for the district's management plan is summarized in Table 2.

REFERENCES:

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

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.



The seal appearing on this document was authorized by Richard M. Smith, P.G. on April 3, 2007.

Table 1: Selected flow terms for each aquifer layer, into and out of the Anderson County Underground Water Conservation District, averaged for the years 1980 to 1999 from the groundwater availability model of the northern part of the Queen City, Sparta, and Carrizo-Wilcox aquifers. Flows are in acre-feet per year. Note: a negative sign refers to flow out of the aquifer in the district. A positive sign refers to flow into the aquifer in the district. All numbers are rounded to the nearest 1 acre-foot and are probably only accurate to two significant figures. Flow into and out of the confining layers are negligible compared to the aquifers and are not included.

Aquifer	Surface water inflow	Surface water outflow	Lateral inflow into district	Lateral outflow from district	Net inter-aquifer flow (upper)	Net inter-aquifer flow (lower)
Sparta Aquifer (Layer 1)	0	0	0	0	0	0
Queen City Aquifer (Layer 3)	0	-1,387	448	572	0	-116
Carrizo Aquifer (Layer 5)	0	0	386	418	125	-13
Upper Wilcox (Calvert Bluff Aquifer—Layer 6)	0	0	272	235	13	-27
Middle Wilcox (Simsboro Aquifer—Layer 7)	0	0	372	276	27	-81
Lower Wilcox (Hooper Aquifer—Layer 8)	0	0	722	666	81	0

Table 2: Summarized information needed for the district's management plan. All values reported in acre-feet per year. All numbers are rounded to the nearest 1 acre-foot and are probably only accurate to two significant figures.

Management plan requirement	Aquifer	Results from model simulation
Estimated annual amount of recharge from precipitation to the district	All aquifers and confining units	2,832
Estimated annual volume of water that discharges from the aquifer to springs and any surface water body including lakes, streams, and rivers	Sparta, Queen City, Carrizo, and Upper Wilcox aquifers (no discharge from Middle and Lower Wilcox aquifers)	-1,387
Estimated annual volume of flow into the district within each aquifer in the district	Sparta Aquifer	0
	Queen City Aquifer	448
	Carrizo Aquifer	386
	Upper Wilcox (Calvert Bluff Formation)	272
	Middle Wilcox (Simsboro Formation)	372
	Lower Wilcox (Hooper Formation)	722
Estimated annual volume of flow out of the district within each aquifer in the district	Sparta Aquifer	0
	Queen City Aquifer	-572
	Carrizo Aquifer	-418
	Upper Wilcox (Calvert Bluff Formation)	-235
	Middle Wilcox (Simsboro Formation)	-276
	Lower Wilcox (Hooper Formation)	-666
Estimated annual volume of flow between each aquifer in the district	Younger units and Sparta Aquifer	0
	Sparta Aquifer and Weches Confining Unit	0
	Weches Confining Unit and Queen City Aquifer	0
	Queen City Aquifer and Reklaw Confining Unit	-116
	Reklaw Confining Unit and Carrizo Aquifer	-125
	Carrizo Aquifer and Upper Wilcox Aquifer	-13
	Upper Wilcox Aquifer and Middle Wilcox Aquifer	-27
	Middle Wilcox Aquifer and Lower Wilcox Aquifer	-81

Committees to comply with Texas Water Law

Permits and well registration	K-Lu Cowan Marjorie Cathey
Injection wells	Ben Pinson Allen Patton
Salt Dome Leachate	Tommy Wardell Kathryn Barrett

All committees will report at the October, 2007 meeting. Each committee report should include guidelines (rules), necessary forms, plan of action with timeline, and cost estimates.

Anderson County Underground Water Conservation District

3259 Anderson County Road 403
Palestine, Texas 75803

Regular Meeting of the Board of Directors

Amended Agenda

Place: Old Foster School, 3259 ACR 403, Palestine, Texas
Date: July 12, 2007
Time: 7:00 PM

Meeting Called to Order, Prayer

Reading of Minutes From Last Meeting

Consider Filling Vacancy on Board

Discuss Five-Year Water Plan

Hold Public Hearing on Five –Year Water Plan

Consider Resolution to Adopt Five –Year Water Plan

Discuss the Financing of Area 11 Water District

Reports/Communications

Appoint Committees

Meeting Adjourn

ANDERSON COUNTY UNDERGROUND WATER CONSERVATION DISTRICT

3259 ANDERSON COUNTY ROAD 403
PALESTINE, TEXAS 75803

REGULAR MEETING OF BOARD OF DIRECTORS

PLACE: OLD FOSTER SCHOOL, 3259 ACR 403, PALESTINE, TX

DATE: JULY 12, 2007

TIME: 7:00 PM

MEETING CALLED TO ORDER. PRAYER.

READING OF MINUTES FROM LAST MEETING.

CONSIDER FILLING VACANCY ON BOARD.

DISCUSS FIVE-YEAR PLAN.

DISCUSS FINANCING OF AREA 11 WATER DISTRICT;
PUBLIC IS URGED TO ATTEND.

REPORTS/ COMMUNICATION

MEETING ADJOURN