

**MCMULLEN
GROUNDWATER
CONSERVATION
DISTRICT**

MANAGEMENT PLAN

Mr. Kevin Ward
Executive Administrator
Texas Water Development Board
1700 N. Congress
Austin, Texas 78711-3231

Dear Mr. Ward,

The McMullen Groundwater Conservation District (MGCD) is pleased to submit to the Texas Water Development Board (TWDB) a copy of our Management Plan in accordance with chapter 36.1073 as mandated by Senate Bill 2 of the 77th Texas Legislature. The McMullen Groundwater Conservation District Management Plan (MGCD MP) was adopted by the MGCD Board of Directors at their quarterly meeting on August 28, 2003, by unanimous consent. In addition, a certified copy of the MGCD Board of Directors resolution adopting the plan is also attached.

The MGCD, established in 2001, has historically had an excellent working relationship with the TWDB and it is our hope that we can count on your support as we implement the enclosed plan; it is the intent of our Board of Directors that we will begin implementation of this plan immediately to facilitate the success of our efforts.

The MGCD MP was developed during open meetings of the Board of Directors in accordance with all notice and hearing requirements stated in the District's procedures. Documentation that notice and hearing requirements were followed is presented in a separate attachment. The following cross-references are provided as a means of documenting the completeness of our Management Plan as applicable to the statutory requirements of Senate Bill 2 and TAC Chapter 356.

During preparation of the MGCD Management Plan, (MGCD MP) all planning efforts were coordinated with the Nueces River Authority, as mandated by 36.1071 (a) and TAC 356.6(a)(4). Documentation of this coordinated effort, including the resolution acknowledging this coordination, is included in this packet for your review.

36.1071(a)(1) is addressed in MGCD MP Section 2.0.

36.1071(a)(2) is addressed in MGCD MP Section 1.0.

36.1071(a)(3) is addressed in MGCD Section titled SB-2 Management Goals Determined Not-Applicable 1.0

36.1071(a)(4) is addressed in MGCD MP Section 3.0.

36.1071(a)(5) is addressed in MGCD MP Section titled SB-2 Management Goals

Determined Not Applicable 2.0

36.1071(a)(6) is addressed in MGCD MP Section 4.0

36.1071(a)(7) is addressed in MGCD MP Section 5.0

The requirement of 36.1071(e)(1) is met by the submission of the MGCD MP to The TWDB.

36.1071(e)(2) is addressed in MGCD MP Section titled Actions, Procedures, Performance and Avoidance for plan implementation.

36.1071(e)(3)(A) is addressed in MGCD MP Section titled Topography, Drainage

and Groundwater Resources of McMullen County.

36.1071(e)(3)(B) is addressed in MGCD MP Section titled Groundwater use in McMullen County

36.1071(e)(3)(C) is addressed in MGCD MP Section titled Projected Supplies for Water in McMullen County.

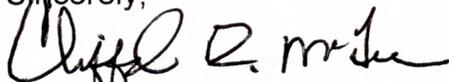
36.1071(e)(3)(D) is addressed in MGCD MP Section titled Projected Demands for water in McMullen County.

Recently we provided your staff with a copy of our District Rules. In accordance with the requirements of 36.1071(f) we are attaching an additional copy of the District Rules in a separate enclosure. These District Rules were adopted by the MGCD Board of Directors at the regularly scheduled meeting on November 1, 1999, and will be used during the implementation of the MGCD MP.

This plan is not in conflict with the approved regional water plan according to 36.1071(e) and TAC 356.6(a)(5).

The MGCD MP will be in force for 10 years from the date of certification. If there is any other documentation we can provide to the TWDB that will ensure the prompt certification of the McMullen Groundwater Conservation District Management Plan, please do not hesitate to call my staff or me. I look forward to working with you and your staff throughout the implementation of the various elements of Senate Bill 1, and Senate Bill 2.

Sincerely,



Clifford McTee
President

DISTRICT MISSION

The McMullen Groundwater Conservation District will strive to develop, promote, and implement water conservation, augmentation, and management strategies to protect water resources for the benefit of the citizens, economy, and environment of the district.

TIME PERIOD FOR THIS PLAN

This plan becomes effective upon certification by the Texas Water Development Board and remains in effect until a revised plan is certified or August 28, 2013, whichever ever is earlier.

STATEMENT OF GUIDING PRINCIPLES

The district recognizes that the groundwater resources of the region are of vital importance. The preservation of this most valuable resource can be managed in a prudent and cost effective manner through regulation and permitting. This management document is intended as a tool to focus the thoughts and actions of those given the responsibility for the execution of district activities.

General Description

The District was created by the citizens of McMullen County through an election, January 2001. The current Board of Directors are Clifford McTee - Chairman, Bud Wheeler- Vice-Chairman, Joe Wheeler – Secretary-Treasurer, C.W. Woods, and Larry Miles, McMullen Groundwater Conservation District (MGCD) has the same aerial extent as that of McMullen County. The county has a vibrant economy dominated by agriculture and petroleum. The agriculture income is derived primarily from McMullen County is cattle production, wheat, corn, sorghum, and some sheep and goat ranching.

Location and Extent

McMullen County, consisting of 1,159 square miles, is located in South Texas. The county is bounded on the east by Live Oak County, on the north by Atascosa County, on the west by La Salle County, and on the south by Duval County. Tilden, which is centrally located in the county, is the county seat.

Topography, Drainage and Groundwater Recharge of McMullen County

McMullen County is on the Gulf Coastal Plain in southern Texas. Most the 1,159 square miles of the county are devoted to farming and ranching, which provide the principal income for the 851 inhabitants. The production of oil is also an important industry.

The principal water-bearing formations underlying the county are the Carrizo sand, Oakville sandstone, Lagarto clay, and Goliad sand, Queen City, and the Sparta Aquifers.

Some livestock supplies were obtained from surface-water sources. Most of McMullen County is rolling to moderately hilly, although some areas are nearly flat. The altitude ranges from about 460 feet in the southwestern part of the county to about 90 feet near the south end of the county. The county is drained by the Nueces River and the Frio River.

The TWDB has determined that the Carrizo-Wilcox does not have any recharge. The TWDB does not have a figure for recharge on the Gulf Coast aquifer. The recharge through direct infiltration is zero because the aquifers do not have any outcrop area in McMullen County. The total amount of cross formational flow for the Carrizo-Wilcox GAM model in McMullen County due to leakage from other units is 8,384 AFY. The leakage broken down by aquifer is, Queen City: 2,618 AFY, and Carrizo-Wilcox: 2,111 AFY. Leakage into the Recklaw confining unit is 3,655 AFY. Recharge could be enhanced by several methods: brush control, more precipitation, and more tanks to catch runoff from excessive precipitation.

Surface Water Resources of McMullen County

No surface water is available within the county, except for stock tanks for livestock and a few surface water rights from the Nueces and Frio Rivers.

Data Procurement

All of the data relating to water usage was derived from the Texas Water Development Board.

	2000	2010	2020	2030	2040	2050
Population Projections	851	920	957	918	866	837
Total Proj. Water Demand	656	545	492	455	423	401
Groundwater Avail. By Aquifer						
Gulf Coast	1200	1200	1200	1200	1200	1200
Queen City	1105	1105	1105	1105	1105	1105
Sparta	600	600	600	600	600	600
Carrizo-Wilcox	7909	7909	7909	7909	7909	7909
Projected Supply by Aquifer						
Carrizo-Wilcox	7074	7074	7074	7074	7074	7074
Gulf Coast	1200	1200	1200	1200	1200	1200
Queen City	1105	1105	1105	1105	1105	1105
Sparta	600	600	600	600	600	600
Total Proj. Water Supplies	9979	9979	9979	9979	9979	9979

Groundwater Use in McMullen County

Year	Aquifer	Muni	Manuf	Power	Mining	Irrigation	Livestock
1995	Gulf Coast	0	0	0	0	0	23
1995	Carrizo-Wilcox	279	0	0	390	0	23
1996	Carrizo-Wilcox	463	0	0	390	0	36
1996	Gulf Coast	0	0	0	0	0	36
1997	Carrizo-Wilcox	473	0	0	399	0	26
1997	Gulf Coast	0	0	0	0	0	26
1998	Carrizo-Wilcox	490	0	0	399	0	24
1998	Gulf Coast	0	0	0	0	0	24
1999	Carrizo-Wilcox	575	0	0	399	0	25
1999	Gulf Coast	0	0	0	0	0	25
2000	Carrizo-Wilcox	231	0	0	176	0	25
2000	Gulf Coast	0	0	0	0	0	25

Methodology for Tracking the District's Progress in Achieving Management Goals

The District manager will prepare and present an annual report to the Board of Directors on District performance in regards to achieving management goals and objectives. The presentation of the report will occur during the last monthly Board meeting each fiscal year, beginning December 31, 2004. The report will include the number of instances in which each of the activities specified in the District's management objectives was engaged in during the fiscal year. The Board will maintain the report on file, for public inspection at the District's offices upon adoption. This methodology will apply to all management goals contained within this plan.

15
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Management of Groundwater Supplies

The District will manage the supply of groundwater within the District in order to conserve the resource while seeking to maintain the economic viability of all resource user groups, public and private. In consideration of the economic and cultural activities occurring within the District, the District will identify and engage in such activities and practices that, if implemented, would result in a reduction of groundwater use. A monitor well observation network shall be established and maintained in order to evaluate changing conditions of groundwater supplies (water in storage) within the District. The District will make a regular assessment of water supply and groundwater storage conditions and will report those conditions to the Board and to the public. The District will undertake, as necessary and cooperate with investigations of the groundwater resources within the District and will make the results of investigations available to the public upon adoption by the Board.

7

The District will adopt rules to regulate groundwater withdrawals by means of well spacing and production limits. The District may deny a well construction permit or limit groundwater withdrawals in accordance with the guidelines stated in the rules of the District. In making a determination to deny a permit or limit groundwater withdrawals, the District will consider the public benefit against individual hardship after considering all appropriate testimony.

In pursuit of the District's mission of protecting the resource, the District may require reduction of groundwater withdrawals to amounts, which will not cause harm to the aquifer. To achieve this purpose, the District may, at the Board's discretion, amend 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 observed by the District. The District will enforce the terms and conditions of permits and the rules of the District by enjoining the permit holder in a court of competent jurisdiction as provided for in Texas Water Code (TWC) 36.102.

Actions, Procedures, Performance and Avoidance for Plan Implementation

8

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.

The District will adopt rules relating to the permitting of wells and the production of groundwater. The rules adopted by the District shall be pursuant to TWC Chapter 36 and the provisions of this 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.

MCMULLEN GROUNDWATER
CONSERVATION DISTRICT
MANAGEMENT PLAN

MISSION STATEMENT

The mission of the McMullen Groundwater Water Conservation District is to protect and assure a sufficient quantity of quality water for our constituents use. We value:

- *Collection and maintenance of data on water quantity and quality
- *Efficient use of groundwater
- *Conjunctive water management issues
- *Development and enforcement of water district rules concerning conservation of ground water.

GOALS, OBJECTIVES, AND ACTION STEPS

Goal 1.0. Controlling and preventing waste of groundwater

1.1. Measurement of water quantity and quality

- a. Take measurements of depth to water level below the land surface on strategic wells on an annual basis.
- b. Take water samples for chemical analysis on strategic wells on an annual basis.
- c. Reports annually, water quality, and quantity data.

*Performance standard: measure depth of water on 1 well annually
measure chemical analysis of 1 well annually*

1.2. Measurement of pollution sources and wells

- a. Identify wells that are polluted and take appropriate Action.
- b. Identify sources of pollution and take appropriate action.
- c. Provide information to the public about wells that are polluted and the sources of pollution.

Performance standard: A report will be provided to the board on all complaints at the next meeting after the complaint is filed.

Goal 2.0 Efficient use of groundwater

2.1. School education

- a. Provide speakers to address water topics.
- b. Distribute water resource education packets for use in the classroom

Performance standard: contact teacher or principle of 1 school annually

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2.2. Farm education

- a. Provide speakers to address water topics at farm meetings.
- b. Distribute water resource education packets to farm leaders and farmers.

Performance standard: contact 1 farm group annually

2.3. Home education

- a. Provide speakers to address water topics.
- b. Distribute water resource education packets to community people.

Performance standard: contact 1 civic group annually

Goal 3.0 Conjunctive water management issues

3.1 Attend meeting with surface water entities in the district, to include but not limited to; conjunctive use, emergency response, drought contingency planning.

26

3.2 Evaluate existing historical data and data derived from new monitoring programs to enhance understanding of aquifer/surface-water relationships.

28

3.3 Evaluate the impact of surface-water usage on groundwater resources within the District as needed. Provide comments regarding surface-water rights requests for those requests affecting the groundwater resources of the district.

29

3.3 Coordinate with other entities on regional planning efforts.

Performance standard: district representative will attend 1 meeting with surface water entities that exist within the district annually. district representative will attend 1 meeting concerning regional water planning annually

Goal 4.0 Drought Conditions

4.1 Participate in the South Texas Weather Modification Program.

34

4.2 Evaluate the performance of the weather modification program.

36

Performance standard: district representative will attend 1 meeting of the South Texas Weather Modification Assn. annually

37

Goal 5.0 Conservation

5.1 Provide information to area residents about water conservation.

5.2 Provide information to agriculture users about water conservation.

38

Performance standard: Provide one water conservation pamphlet to one resident annually.

40

District representative will attend 1 meeting concerning agricultural conservation annually.

41

SB-2 MANAGEMENT GOALS DETERMINED NOT -APPLICABLE

Goal

1.0 Control and prevention of subsidence.

The rigid geologic framework of the region precludes significant subsidence from occurring.

Goal

2.0 Cooperative resolution of natural resource management issues.

The district has no documented occurrences of endangered or threatened species dependent upon groundwater resources.

22

30

MCMULLEN GROUNDWATER CONSERVATION DISTRICT
Tilden, Texas

NOTICE OF HEARING

Notice is hereby given that a meeting of the Board of Directors of the McMullen Groundwater Conservation District will be held at 10:00 AM on Thursday, August 28th, 2003 in the Commissioners Court Room in the McMullen County Courthouse, Tilden, Texas.

AGENDA

1. Declaration of quorum and call to order.
2. Public Comment
3. ACTION ITEMS:
 - A. Reading of the minutes from the previous meeting.
 - B. Public Hearing – Calendar year 2004 Budget.
 - C. Public Hearing – Calendar year 2003 tax rate.
 - D. Public Hearing – District Management Plan.
 - E. Public Hearing – District Rules and Regulations
 - F. Approval of the District Management Plan
 - G. Approval of the District Rules and Regulations
 - H. Approval of the Budget – 2004
 - I. Approval of the Tax Rate for 2003
 - J. Adoption of a Resolution for the current year tax rate.
 - K. Adoption of a Resolution to certify the Appraisal Roll.
 - L. Director's Discussion.
 - M. Adjourn.

Clifford R. McTee
MGCD President

945
POSTED AT 9:45 O'CLOCK A M
THIS 18 DAY OF Aug 2003
BY Doraine [Signature]

Advertising Statement

Beeville Bee-Picayune
 P.O. Box 10
 111 N. Washington Street (78102)
 Beeville, TX 78104-0010
 Phone: (361) 358-2550

Addie Stewart
 731 FM 799
 GEORGE WEST, TX 78022

Customer : 01101375-000
Phone : (361)449-1441
Date : 08/22/03
Page : 1

Date	Reference #	Type	Description	Runs	Lines	Inches	Total
			Stewart Addie				
08/20/03	03550121-001	i	(5)-PUBLIC NOTICE The	1	23	2.71	23.23
						Subtotal	23.23

Remarks

Sub Total:	23.23
Discounts:	0.00
Total Due:	23.23

Current	23.23	1-30	0.00	31-60	0.00	61-90	0.00	91+	0.00
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The McMullen Groundwater Conservation District will hold a public hearing on Thursday, August 28, 2003 at 10:00 a.m. in the commissioners court room of the McMullen County Courthouse in Tilden, TX on the following items:

1. 2004 Budget
2. 2003 Tax Rate of \$0.01 per \$100 valuation
3. District Management Plan
4. Rules Revision

Copies of the above are available at the County Judge's Office in the McMullen County Courthouse in Tilden, TX.

The above items will be approved at the meeting on Thursday, August 28, 2003 by the board of directors of the McMullen Groundwater Conservation District.

WO8-20

newspaper for one

PUBLISHER'S AFFIDAVIT

TEXAS

I, George G. Latcham, resigned authority, on this day personally appeared George G. Latcham, me, who, by me duly sworn, on his oath deposes and says that he is the publisher of Progress, a newspaper published in Live Oak County; that copy of said newspaper containing Public Notice was published in said newspaper for one issues such publication being on the following dates:

August 20, 2003 A.D. and a newspaper copy of which is hereto attached.

George G. Latcham
George G. Latcham, Publisher

Sworn to and subscribed before me by George G. Latcham, this 25th day of August 2003 A.D to certify which witness my hand and official seal.

Sandra Rice
Sandra Rice, Notary Public in and for the State of Texas

My commission expires 3/23/05.



MCMULLEN GROUNDWATER CONSERVATION DISTRICT
P.O. Box 232
Tilden, Texas 78072
Phone (361) 274-3365

The meeting of the McMullen Groundwater Conservation District, held in the McMullen County courthouse at 10:00 a.m., on August 28, 2003, was called to order by President McTee, who noted all directors as being present with the exception of Larry Miles, and represented a quorum. He also noted public notices of the meeting were published in the Progress newspaper of Live Oak County, Texas, and posted on the public bulletin board at the McMullen County courthouse.

President McTee called for a reading of the minutes. The minutes of the previous meeting of June 5, 2003, were read by secretary J.E. Wheeler. A motion was made by Clifton Wheeler, Jr., seconded by C. W. Wood, that the minutes be approved as read. Motion carried.

President McTee noted we had the District's employee, Lonnie Stewart, in attendance today.

President McTee presented the District's budget for the year 2004. A motion was made by J.E. Wheeler, seconded by C. W. Wood, to approve the budget. The motion carried. (A copy of the budget is attached hereto)

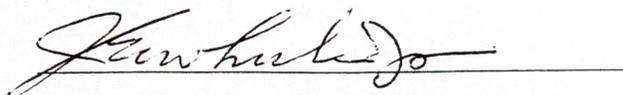
Mr. Stewart presented the District's Management Plan as approved by the Texas Water Development Board. After discussing several items therein, a motion was made by C. W. Wood, seconded by Clifton Wheeler, Jr. to approve the management plan as submitted by Mr. Stewart. The motion carried.

Mr. Stewart presented the District's revised rules and by-laws as amended from the November 1, 1991 rules. After discussion by the directors, a motion was made by Clifton Wheeler, seconded by C. W. Wood, to approve the rules as submitted. The motion carried.

Mr. Stewart presented a bill and related expenses for publishing the meeting notice in The Progress newspaper. Directors agreed to submit the expenses to the commissioners court for reimbursement to Mr. Stewart.

President McTee informed the directors that he would not seek re-election as a director on the District's board at the expiration of his current term.

A motion was made by J. Wheeler, seconded by C. W. Wood, to adjourn, motion carried.



J. E. Wheeler, Jr.
Secretary
McMullen Groundwater Conservation District

RESOLUTION

10

Whereas, the McMullen Groundwater Conservation District has held the appropriate public hearings, and;

Whereas, the District has presented the management plan to the county officials and the Nueces River Authority .

Whereas, the District has followed the rules set forth by SB 2 and the TWDB.

Now, Therefore be it Resolved, that the McMullen Groundwater Conservation District voted to pass the District management plan.

In favor 4 Against 0

Passed and Approved this 28th day of August, 2003.

Cliff R. McTee
Clifford McTee, President

Attest by: Joe Wheeler
Joe Wheeler, Secretary

13
(a)

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AUG 28 2003
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Sent to Ms Carola Serrato
Street, Apt. No.,
or PO Box No. PO Box 1701
City, State, ZIP+4
Kingsville, Tx 78364

PS Form 3800, June 2002 See Reverse for Instructions

7003 0500 0004 8405 2497

McMULLEN GROUNDWATER CONSERVATION DISTRICT
PO BOX 232
TILDEN, TX 78072
361-449-7017
July 1, 2003

12

Nueces River Authority
PO Box 349
Ulvalde, TX 78802-0349
Attn: Con Mims

RE: McMullen District Management Plan

Dear Sirs: I am sending you a copy of the district management plan for the McMullen Groundwater Conservation District. The board passed the district management plan on August 28, 2003.

I would appreciate a letter with your letterhead on it stating that we developed the plan in conjunction with the Nueces River Authority.

If you have any question or comments, please call me at 361-449-7017

Thank you,



Lonnie Stewart
Manager

McMULLEN GROUNDWATER CONSERVATION DISTRICT
PO BOX 232
TILDEN, TX 78072
361-449-7017
July 1, 2003

Ms. Carola Serrato
South Texas Water Authority
PO Box 1701
Kingsville TX 78364
Attn: Ms. Carola Serrato

12

RE: McMullen District Management Plan

Dear Sirs: I am sending you a copy of the district management plan for the McMullen Groundwater Conservation District. The board passed the district management plan on August 28, 2003.

I would appreciate a letter with your letterhead on it stating that we delivered a copy of the plan to your office and ask Region N to review the plan and specify any areas of conflict between the management plan and the regional water plan.

If you have any question or comments, please call me at 361-449-7017

Thank you,



Lonnie Stewart
Manager

McMULLEN GROUNDWATER CONSERVATION DISTRICT

PO BOX 232
TILDEN, TX 78072

361-449-7017

July 1, 2003

County Judge
Tilden, TX

RE: McMullen District Management Plan

Dear Sirs: I am sending you a copy of the district management plan for the McMullen Groundwater Conservation District. The board passed the district management plan on August 28, 2003.

I would appreciate a letter with your letterhead on it stating that we delivered a copy of the plan to your office.

If you have any question or comments, please call me at 361-449-7017

Thank you,



Lonnie Stewart
Manager

12

McMULLEN GROUNDWATER CONSERVATION DISTRICT

PO BOX 232
TILDEN, TX 78072

361-449-7017

July 1, 2003

County Clerk
Tilden, TX

12

RE: McMullen District Management Plan

Dear Sirs: I am sending you a copy of the district management plan for the McMullen Groundwater Conservation District. The board passed the district management plan on August 28, 2003.

I would appreciate a letter with your letterhead on it stating that we delivered a copy of the plan to your office.

If you have any question or comments, please call me at 361-449-7017

Thank you,



Lonnie Stewart
Manager

GAM run 03-30

3

by Shirley Wade

Texas Water Development Board
Groundwater Availability Modeling Section
(512) 463-7847
September 24, 2003

REQUESTOR:

McMullen Groundwater Conservation District

DESCRIPTION OF REQUEST:

The following information from the Southern Carrizo-Wilcox aquifer Groundwater Availability Model (GAM) was requested for the McMullen Groundwater Conservation District (GCD):

- Recharge,
- Water budget, and
- Total storage in the Carrizo aquifer above the limit of potable water which is approximately 5,000 feet below sea level in McMullen County (Deeds and others, 2003; Figure 2-22)

METHODS:

To address the request, we:

- Ran the predictive model (2000 – 2050) under average recharge conditions for the Southern Carrizo-Wilcox aquifer Groundwater Availability Model (Deeds and others, 2003) and queried the budget files for each aquifer layer in McMullen County for 2050.
- Estimated storage by calculating layer thickness for each model cell with bottom elevation greater than 5,000 feet below sea level in the Carrizo aquifer (thickness = layer 3 top elevation minus layer 3 bottom elevation), multiplying by cell area (1 mi²) and specific yield, and summing all of the model cells within McMullen County.

PARAMETERS AND ASSUMPTIONS:

None: Data request.

RESULTS:

Recharge and Water budget

Table 1 shows the 2050 water budget for the Southern Carrizo-Wilcox GAM model in McMullen County. Recharge values from the model are shown in bold text in the table. McMullen County has zero direct recharge because there is no outcrop in that county. However, TWDB rules concerning groundwater management plan certification define recharge as "The addition of water from precipitation or runoff by seepage or infiltration to an aquifer from the land surface, streams, or lakes directly into a formation or indirectly by way of leakage from another formation." Leakage into the aquifers is listed in the columns "upper Z-flow in and lower Z-flow in" (Table 1).

Aquifer Storage

The total volume of storage above 5,000 feet below sea level in the Carrizo aquifer in McMullen County estimated from the Southern Carrizo Wilcox GAM is 64,000,000 acre-feet. This estimate is based on a specific yield of 0.25.

DISCUSSION:

An estimate of total useable groundwater is required for the groundwater conservation district management plan. Total useable groundwater is equivalent to groundwater availability discussed on the TWDB GAM webpage <http://www.twdb.state.tx.us/gam/UsingGAM.htm>. It is up to the district to determine how they wish to define total useable groundwater or groundwater availability. The definition might be based on how the district envisions the future condition of their aquifer. Possibilities include (but are not limited to):

- If the district wants the aquifer to remain in the same state as it is now, then they might consider a conservative estimate of availability or useable groundwater such as recharge.
- If they want to completely deplete the aquifer in 50 years, then they might consider total storage divided by 50 as the yearly availability or useable storage.
- If they want to allow partial depletion, they might divide a percentage of the total storage by a certain number of years.
- If they want to allow a certain drawdown over a certain period of time, the model can be run to determine what pumping level will give that amount of drawdown. This pumping amount then could be considered the limit of useable storage.

For the first three bullets listed above, there is sufficient information in this report to estimate useable storage. However, bullet four would require several additional GAM runs.

REFERENCES:

Deeds, N., Kelley, V., Fryar, D., and Jones, T., 2003, Groundwater Availability Model for the Southern Carrizo-Wilcox Aquifer: Final Report prepared for the Texas Water Development Board.

Table 1. McMullen County flow budget for the Southern Carrizo-Wilcox aquifer model for 2050 with average recharge conditions. Flows are in acre-feet per year.

County	Lyr	Storage	X-flow in	X-flow out	upper		lower		Wells	Recharge	ET	GHB	Stream	Total		% diff
					Z-flow in	Z-flow out	Z-flow in	Z-flow out						In	Out	
McMullen	1	106	2,501	-805	0	0	5,770	-417	-313	0	0	-6,842	0	8,377	-8,377	0
	2	90	693	-90	417	-5,770	6,452	-9	-1,784	0	0	0	0	7,653	-7,653	0
	3	197	7,716	-2,415	9	-6,452	1,376	-363	-68	0	0	0	0	9,298	-9,298	0
	4	74	1,382	-298	363	-1,376	8	-147	-5	0	0	0	0	1,826	-1,826	0
	5	-583	270	-32	147	-8	209	0	-3	0	0	0	0	625	-625	0
	6	-1,256	1,676	-211	0	-209	0	0	-1	0	0	0	0	1,676	-1,676	0
	All	-1,372	14,239	-3,852	935	-13,815	13,815	-935	-2,173	0	0	-6,842	0	29,456	-29,456	0

Notes:

1. Layer 1: Queen City aquifer
2. Layer 2: Reklaw unit
3. Layer 3: Carrizo aquifer
4. Layer 4: Upper Wilcox aquifer
5. Layer 5: Middle Wilcox aquifer
6. Layer 6: Lower Wilcox aquifer
7. All: sum of layers 1, 2, 3, 4, 5, and 6
8. **GHB** refers to flow into or out of the top of the Queen City.
9. **ET** refers to groundwater extraction due to evapotranspiration.
10. **X-flow in** refers to lateral flow into the county.
11. **X-flow out** refers to lateral flow out of the county.
12. **upper - Z-flow in** refers to flow into the layer from the layer above.
13. **upper - Z-flow out** refers to flow out of the layer into the layer above.
14. **lower - Z-flow in** refers to flow into the layer from the layer below.
15. **lower - Z-flow out** refers to flow out of the layer into the layer below.
16. **Wells** is for pumping input.
17. A negative sign refers to flow out of the layer in the county.
18. A positive sign refers to flow into the layer in the county.
19. The numbers are rounded to the nearest 1 acre-ft.