

**BEE  
GROUNDWATER  
CONSERVATION  
DISTRICT  
MANAGEMENT PLAN**

**Bee Groundwater Conservation District  
Management Plan  
Adopted 08/05/2008**

**DISTRICT MISSION**

The Bee 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 approval by the Texas Water Development Board and remains in effect until a revised plan is approved or August 05, 2018, which ever is earlier. The planning period for the management plan is ten (10) years, but the plan must be updated and approved every five (5) years.

**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 Bee County through an election, January 2001. The current Board of Directors are Tryne Mengers - Chairman, Bob Awalt- Vice-Chairman, Mark Sugarek - Secretary, David Baker - Treasurer, Ellis McKinney, Bob Gayle, and Bill Fox, Bee Groundwater Conservation District (BGCD) has the same areal extent as that of Bee County except that the Pettus Water Supply Corporation, the Tynan Water Supply Corporation, and the city of Beeville as the boundaries existed on January 1, 1997 for each of these entities is excluded. The county has a vibrant economy dominated by agriculture and petroleum. The agriculture income is derived primarily from beef cattle production, wheat, corn, sorghum, and cotton, with some sheep and goat ranching.

**Location and Extent**

Bee County, consisting of 880 square miles, is located in South Texas. The county is bounded on the east by Karnes, and Goliad Counties, on the north by Karnes County, on the west by Live Oak County, and on the south by San Patricio County. Beeville, which is centrally located

in the county, is the county seat. There are not any municipalities in the county except Beeville which is not within the district's boundaries.

### **Topography, Drainage, Recharge, and Groundwater Resources of Bee County**

Bee County is on the Gulf Coastal Plain in southern Texas. Most the 880 square miles of the county are devoted to farming and ranching, which provide the principal income for the 19,230 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, and range in age from Eocene to Pliocene. The formational dip toward the coast at rates ranging from less than 20 to about 140 feet to the mile.

Some livestock supplies were obtained from surface-water sources. In Bee County the water-bearing sands above a depth of 2,000 feet contain approximately 20 million acre-feet of fresh and slightly saline water. Even though it may be impractical to recover much of the stored water, the rate of withdrawal could be increased several times more than the 1957 rate without appreciably depleting the water available from storage for many decades. A large but unestimated amount of fresh to slightly saline water occurs in the Carrizo sand in the northern and northwestern parts of the county at depths as much as 6,000 feet. Most of the water in the Carrizo sand in Bee County is more than 4,000 feet below land surface and therefore is too deeply buried to be economically developed for most uses.

Most of the ground water in Bee County is substandard in quality for municipal, industrial, and irrigation uses. However, because better water is not available in most areas in the county, users of all three categories have used substandard water successfully. Generally the Goliad sand contains water of better quality than that in any formation except the Carrizo sand. In favorable areas properly constructed wells in the Carrizo, Oakville, Lagarto, and Goliad may yield 1,000 gallons per minute or more. Yields from wells tapping the other water-bearing formations generally are small and the water commonly is suitable only for livestock.

The GAM run for the Carrizo-Wilcox indicates that does not have any direct infiltration recharge in Bee County due to no surficial exposure of the aquifer units. All of the recharge in the District occurs in the Gulf Coast Aquifer and is reported to be 21,177 acre feet per year in GAM 08-01 report. According to TWDB Report 17, Ground-Water Resources of Bee County, Texas, by B.N. Meyers and O.C. Dale, U.S. Geological Survey, February 1966, the approximate recharge to the Gulf Coast aquifer in Bee County is 9,000 acre-feet per year. Enhanced precipitation would improve recharge. However, most of the precipitation that falls in the county runs off in streams, evaporates, or is transpired by plants. The remaining water, probably less than five percent, may reach the zone of saturation where it moves slowly toward an area of discharge such as a well, natural outlet, or, under artesian pressure, it may seep or percolate slowly upward into overlying beds. Recharge could be enhanced by several methods: brush control, additional precipitation, and additional tanks to catch runoff from excessive precipitation.

## Data Procurement

All of the data relating to water usage was derived from the Texas Water Development Board. The data includes the entire county whereas the District excludes the Tynan Water Supply Corp. , Pettus Water Supply Corporation, and the City of Beeville. **These figures do not represent the District amount, but rather the total for Bee County. Given the District encompasses all of Bee County except the City of Beeville, the data included in the following section are the best available estimates.**

	2000	2010	2020	2030	2040	2050	2060
Population Projection	32359	34298	36099	37198	37591	37598	36686

The above estimates were derived from the State Water Plan of 2007

### Bee G.C.D. Areal Extent Estimation

County	County <u>TOTAL</u> Area (acres)	Bee <u>G.C.D.</u> Area (acres)	Percent of Total County Area (%)	Percent of Total County Area
Bee	562337.001	557743.2	99.18	0.9918

The Desired Future Conditions for the aquifers located within the District boundaries and within Groundwater Management Areas 15 and 16 have not been established; therefore, an estimate of the managed available groundwater is not available at this time. The District is actively working with the other member districts within Groundwater Management Areas 15 and 16 towards determining the desired future conditions for each aquifer located within the district. Once these are established an estimate of the managed available groundwater can be calculated.

Table 1: Selected flow terms for each aquifer layer, into and out of the Bee Groundwater Conservation District, averaged for the years 1981 to 1999 from the groundwater availability model of the central part of the Gulf Coast Aquifer. Flows are reported 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. Flows include fresh, brackish, and saline waters.

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)
Chicot (Layer 1)	4,490	-10,917	641	-8,692	0	-2,714
Evangeline (Layer 2)	2,224	-3,617	2,327	-6,794	2,714	-286
Burkeville (Layer 3)	41	0	36	-105	286	-628
Jasper (Layer 4)	16	-186	487	-816	628	0

Table 2: Selected flow terms for each aquifer layer, into and out of the Bee Groundwater Conservation District, averaged for the years 1980 to 1999 from the groundwater availability model of the southern part of the Carrizo-Wilcox, Queen City, and Sparta aquifers. Flows are reported 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. Flows include fresh, brackish, to saline waters.

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 (Layer 1)	0	0	2	-1	0	3
Weches (Layer 2)	0	0	20	-30	-3	21
Queen City (Layer 3)	0	0	2	-1	-21	34
Reklaw (Layer 4)	0	0	29	-26	-34	20
Carrizo (Layer 5)	0	0	163	-174	-20	8
Wilcox (Layer 6)	0	0	12	-8	-8	-1
Wilcox (Layer 7)	0	0	34	-12	1	3
Wilcox (Layer 8)	0	0	230	-150	-3	0

Table 3: Summarized information needed for the Bee Groundwater Conservation District groundwater management plan. All values are reported in acre-feet per year. All numbers are 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	Chicot	16,737
	Evangeline	4,417
	Burkeville	1
	Jasper	22
	Sparta	0
	Weches	0
	Queen City	0
	Reklaw	0
	Carrizo	0
	Wilcox(upper)	0
	Wilcox(middle)	0
	Wilcox(lower)	0
Estimated annual volume of water that discharges from the aquifer to springs and any surface water body including lakes, streams, and rivers	Chicot	-10,917
	Evangeline	-3,617
	Burkeville	0
	Jasper	-186
	Sparta	0
	Weches	0
	Queen City	0
	Reklaw	0
	Carrizo	0
	Wilcox(upper)	0
	Wilcox(middle)	0
	Wilcox(lower)	0
Estimated annual volume of flow into the district within each aquifer in the district	Chicot	641
	Evangeline	2,327
	Burkeville	36
	Jasper	487
	Sparta	2
	Weches	20
	Queen City	2
	Reklaw	29
	Carrizo	163
	Wilcox(upper)	12
	Wilcox(middle)	34
	Wilcox(lower)	230

<b>Management plan requirement</b>	<b>Aquifer or confining unit</b>	<b>Results</b>
Estimated annual volume of flow out of the district within each aquifer in the district	Chicot	-8,692
	Evangeline	-6,794
	Burkeville	-105
	Jasper	-816
	Sparta	-1
	Weches	-30
	Queen City	-1
	Reklaw	-26
	Carrizo	-174
	Wilcox(upper)	-8
	Wilcox(middle)	-12
	Wilcox(lower)	-150
Estimated net annual volume of flow between each aquifer in the district	Chicot into Evangeline	2,714
	Evangeline into Burkeville	286
	Burkeville into Jasper	628
	Sparta into Weches	3
	Weches into Queen City	21
	Queen City into Reklaw	34
	Reklaw into Carrizo	20
	Carrizo into Wilcox (upper)	8
	Wilcox middle into upper	1
	Wilcox middle into lower	3

GAM run 08-01

## Surface Water Resources of Bee County

Surface water is limited in quantity and use within the county, but the City of Beeville uses surface water from Lake Corpus Christi.

### 2007 State Water Plan - Projected Surface Water Supplies Bee County Total County Surface Water Supplies Data

RWPG	Water User Group	County	River Basin	Source Name	2000	2010	2020	2030	2040	2050	2060
N	Beeville	Bee	San Antonio-Nueces	Corpus Christi-Choke Canyon Lake/Reservoir System	2,408	2,619	2,691	2,722	2,699	2,683	2,618
N	Irrigation	Bee	San Antonio-Nueces	San Antonio-Nueces River Combined Run-of-River Irrigation	0	42	42	42	42	42	42
N	Livestock	Bee	San Antonio-Nueces	Livestock Local Supply	366	800	800	800	800	800	800
N	Livestock	Bee	Nueces	Livestock Local Supply	48	107	107	107	107	107	107
<b>Total Projected Surface Water Supplies (ac/ft per year) =</b>					<b>2,822</b>	<b>3,568</b>	<b>3,640</b>	<b>3,671</b>	<b>3,648</b>	<b>3,632</b>	<b>3,567</b>

Source: Volume 3, 2007 State Water Planning Database  
(<http://www.twdb.state.tx.us/DATA/db07/defaultReadOnly.asp>)

3/28/2007



## Groundwater Resources in Bee County

### 2007 State Water Plan Projected Water Needs Bee County

RWPG	WUG	County	River Basin	2010	2020	2030	2040	2050	2060
N	Beeville	Bee	San Antonio-Nueces	0	0	0	0	0	0
N	County Other	Bee	San Antonio-Nueces	0	0	0	0	0	0
N	County Other	Bee	Nueces	0	0	0	0	0	0
N	Manufacturing	Bee	San Antonio-Nueces	0	0	0	0	0	0
N	Mining	Bee	San Antonio-Nueces	0	0	0	0	0	0
N	Mining	Bee	Nueces	0	0	0	0	0	0
N	Irrigation	Bee	San Antonio-Nueces	0	0	0	0	0	0
N	Livestock	Bee	San Antonio-Nueces	0	0	0	0	0	0
N	Livestock	Bee	Nueces	0	0	0	0	0	0
N	El Oso WSC	Bee	Nueces	0	0	0	0	0	0
N	El Oso WSC	Bee	San Antonio-Nueces	0	0	0	0	0	0
N	Irrigation	Bee	Nueces	0	0	0	0	0	0
<b>Total Projected Water Needs (acre-feet per year) =</b>				<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
Source: Volume 3, 2007 State Water Planning Database									<b>4/12/2007</b>

**Projected Water Management Strategies**  
**Bee County**  
**Total County Water Management Strategies Data**

RWPG	WUG	WUG County	River Basin	Water Manage- ment Strategy	Source County	Source Name	2010	2020	2030	2040	2050	2060
N	ND	Bee	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Projected Water Management Strategies (acre-feet per year) =							0	0	0	0	0	0

ND = No data

Source: Volume 3, 2007 State Water Planning Database  
(<http://www.twdb.state.tx.us/DATA/db07/defaultReadOnly.asp>)

TWDB: 03/28/2007

**Historical Groundwater Pumpage Summary for Bee County**

Unit: Acre Feet (ACFT)

Year	Aquifer	Municipal	Manufacturing	Steam Electric	Irrigation	Mining	Livestock	Total
1980	GULF COAST	3,637	72	0	2,000	386	95	6,190
1984	GULF COAST	4,020	1	0	1,335	144	120	5,620
1985	GULF COAST	2,559	1	0	718	121	103	3,502
1986	GULF COAST	1,619	1	0	980	25	109	2,734
1987	GULF COAST	1,603	1	0	654	20	103	2,381
1988	GULF COAST	1,653	1	0	980	21	112	2,767
1989	GULF COAST	1,700	1	0	2,232	20	109	4,062
1990	GULF COAST	1,583	1	0	3,300	20	108	5,012
1991	GULF COAST	1,574	1	0	3,551	29	111	5,266
1992	GULF COAST	1,551	1	0	2,260	29	84	3,925
1993	GULF COAST	1,801	1	0	680	29	88	2,599
1994	GULF COAST	1,809	0	0	711	29	95	2,644
1995	GULF COAST	2,149	1	0	212	29	99	2,490
1996	GULF COAST	2,297	1	0	2,454	29	88	4,869
1997	GULF COAST	2,283	1	0	1,100	29	99	3,512
1998	GULF COAST	2,412	1	0	3,250	29	86	5,778
1999	GULF COAST	2,233	1	0	2,178	29	100	4,541
2000	GULF COAST	2,228	1	0	2,798	29	100	5,156
2001	GULF COAST	2,107	1	0	3,103	29	97	5,337

2002	GULF COAST	2,551	1	0	3,408	29	96	6,085
2003	GULF COAST	2,557	1	0	3,020	29	702	6,309

**NOTE:** All Pumpage reported in acre-feet

TWDB:  
03/28/2007

**Source:** TWDB Water Use Survey Database (<http://www.twdb.state.tx.us/wushistorical/DesktopDefault.aspx?PageID=2>)

**2007 State Water Plan Projected Water Demands  
Bee G.C.D.  
Groundwater Conservation District Water Demands Data**

RWPG	Water User Group	County	River Basin	2000	2010	2020	2030	2040	2050	2060
N	County Other*	Bee	San Antonio-Nueces	1,602	1,698	1,786	1,841	1,861	1,861	1,816
N	County Other*	Bee	Nueces	16	17	18	19	19	19	18
N	Manufacturing*	Bee	San Antonio-Nueces	1	1	1	1	1	1	1
N	Mining*	Bee	San Antonio-Nueces	16	20	22	23	24	25	26
N	Mining*	Bee	Nueces	13	16	18	19	20	21	22
N	Irrigation*	Bee	San Antonio-Nueces	2,497	2,191	1,922	1,686	1,479	1,297	1,138
N	Irrigation*	Bee	Nueces	278	244	213	187	165	144	126
N	Livestock*	Bee	San Antonio-Nueces	869	869	869	869	869	869	869
N	Livestock*	Bee	Nueces	118	118	118	118	118	118	118
N	El Oso WSC	Bee	Nueces	53	57	60	61	62	62	61
N	El Oso WSC	Bee	San Antonio-Nueces	7	8	8	8	8	8	8
<b>Total Projected Water Demands (ac/ft per year) =</b>				<b>5,469</b>	<b>5,238</b>	<b>5,035</b>	<b>4,832</b>	<b>4,624</b>	<b>4,424</b>	<b>4,202</b>

Source: Volume 3, 2007 State Water Planning Database  
(<http://www.twdb.state.tx.us/DATA/db07/defaultReadOnly.asp>)

3/28/2007

\* Since the District does not encompass the entire county and these figures are county wide totals. The figures need to be multiplied by 0.9918 to derive the totals that are within the District.

### **Actions, Procedures, Performance and Avoidance for Plan Implementation**

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.

### **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, 2003. 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 District 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.

### **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 District Board.

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 Districts 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 District Boards 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.

The rules for Bee GCD can be found at our website: [www.beegcd.com](http://www.beegcd.com).

# **BEE GROUNDWATER CONSERVATION DISTRICT MANAGEMENT PLAN**

## **MISSION STATEMENT**

The mission of the Bee Groundwater Water Conservation District is to protect and assure a sufficient quantity and quality of groundwater 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.

## **Management Goals, Objectives, and Performance Standards**

### **Resource Goals**

#### **Goal 1.0: Providing the most efficient use of groundwater**

##### **Management Objective:**

Each year the District will provide education materials concerning the efficient use of groundwater.

##### **Performance standard:**

Provide educational materials to at least one school annually.

#### **Goal 2.0: Controlling and preventing waste of groundwater**

##### **Management Objective:**

Measure water levels from the land surface on strategic wells on an annual basis and report waste to the District Board.

##### **Performance standard:**

(a) Report to the District Board annually the number of water level measurements.

(b) The District will investigate all reports of waste of groundwater within five working days. The number of reports of waste as well as the investigation findings will be reported to the District Board in the annual report.

### **Goal 3.0: Controlling and preventing subsidence**

The geologic framework of the District Area precludes any significant subsidence from occurring. This management goal is not applicable to the operations of the District.

### **Goal 4.0: Conjunctive surface water management issues**

Except as provided in Chapter 36 of the Texas Water Code, the District has no jurisdiction over surface water. The District shall consider the effects of surface water resources as required by Section 36.113 and other state law. This goal is not applicable at this time.

### **Goal 5.0: Natural Resource Issues**

#### **Management Objective:**

The District will cooperate with other interested parties and appropriate agencies to develop additional information on aquifer recharge.

#### **Performance Standard:**

A representative of the District will attend a meeting annually with interested parties and appropriate agencies.

### **Goal 6.0: Drought Conditions**

#### **Management Objective:**

The District will monitor the Palmer Drought Severity Index (PDSI).

#### **Performance Standard:**

A report of the Palmer Drought Severity Index will be presented to the District board on an annual basis.

## **Goal 7.0: Conservation**

### **Management Objective:**

Each year the District will make educational material to the public promoting conservation methods and concepts.

### **Performance Objective:**

The District will make at least one educational brochure available per year through service organizations, and on a continuing basis at the District office.

## **Goal 8.0: Precipitation Enhancement**

### **Management Objective:**

The District will participate in the South Texas Weather Modification Program.

### **Performance Standard:**

A district representative will attend a meeting of the South Texas Weather Modification Assn. annually.

## **Goal 9.0: Recharge Enhancement**

This goal is not applicable to the District because, at the current time, it is cost prohibitive.

## **Goal 10.0: Rainwater Harvesting**

This goal is not applicable to the District because, at the current time, it is cost prohibitive.

## **Goal 11.0: Brush Control**

This goal is not applicable to the District because, at the current time, it is cost prohibitive.



**Goal 12.0: Desired future condition of the groundwater resource**

The desired future conditions of the groundwater within the District have not yet been established in accordance with Chapter 36.108 of the Texas Water Code. The District is actively participating in the joint planning process and the development of a desired future condition for the portion of the aquifer within the District and the GMA area's. Therefore, this goal is not applicable to the District at this time

RESOLUTION 08/05/2008

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

Whereas, the District has presented the management plan to the county officials, the Nueces River Authority, the San Antonio River Authority, and Region N Water Planning Group.

Whereas, the District has followed the rules set forth by the statutes in Chapter 36 of the Texas Water Code and the TWDB.

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

Ayes \_\_\_\_\_ Nays \_\_\_\_\_ Not Present \_\_\_\_\_

Passed and Approved this the 5th day of August, 2008.

\_\_\_\_\_  
Tryne Mengers, President

Attest by: \_\_\_\_\_  
Mark Sugarek, Secretary