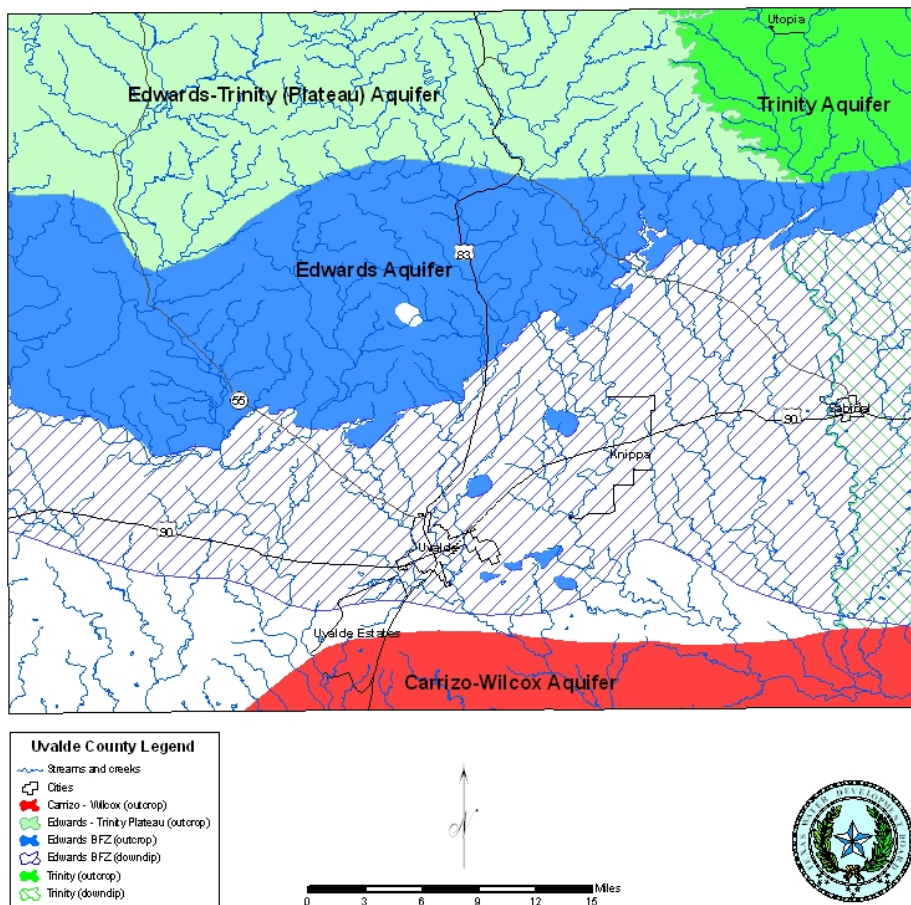


Uvalde County Underground Water Conservation District Groundwater Management Plan 2005 – 2015

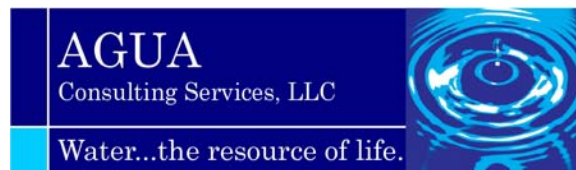
Major Aquifers in Uvalde County

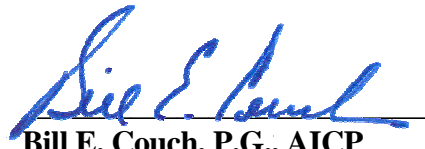


**Adopted
July 26, 2005**

Uvalde County Underground Water Conservation District Groundwater Management Plan 2005 – 2015

Prepared by




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District Mission

The Uvalde County Underground Water Conservation District (UWCD) strives to protect the quality of, conserve, enhance, manage and promote the beneficial use of the groundwater resources of Uvalde County for the benefit of the citizens and the economy and to minimize waste.

Time Period for the Plan

This plan becomes effective upon adoption by the Board of Directors and replaces the previously adopted management plan. This plan will be implemented and will remain in effect for ten years from the date of certification by the Texas Water Development Board (TWDB).

Guiding Principles

The District recognizes that the groundwater resources of this region are of vital importance to the residents and the economy, and that this resource must be managed effectively. A basic understanding of the nature of the aquifers and their hydrogeologic characteristics, as well as the quantity of the groundwater resources, is the foundation from which to develop prudent planning measures. This management plan is intended as a tool to focus the programs and plans of the District to conserve the county's valuable groundwater resources while allowing their prudent use.

About the District

The Uvalde County UWCD was created pursuant to Section 59, Article 16 of the Texas Constitution and validated by the 73rd Legislature under Article 2, Senate Bill 1477. The District has the same boundaries as the County of Uvalde.

The District Board of Directors is composed of eight members elected to staggered four-year terms. Elections for Directors are held in November. Two directors are elected from each of the county precincts. The Board of Directors holds regular quarterly meetings. Called Board meetings are held when necessary, at the District offices in the First State Bank of Uvalde Bank Building located at 200 East Nopal, Suite 203, in Uvalde, Texas. Meetings of the Board of Directors are public. Meetings are noticed and held in accordance with public meeting requirements.

The District is located in three Groundwater Management Areas (GMAs): 7, 10, and 13. Chapter 36 of the Texas Water Code requires the Uvalde County UWCD to coordinate its management of groundwater with other groundwater conservation districts within its GMAs. Uvalde County UWCD is unique in that it is in four GMAs, requiring coordination with 36 groundwater conservation districts (GCDs). These include: 17 GCDs that are located in GMA 7; 4 GCDs in GMA 10; and 6 GCDs in GMA 13 (Figure 1).

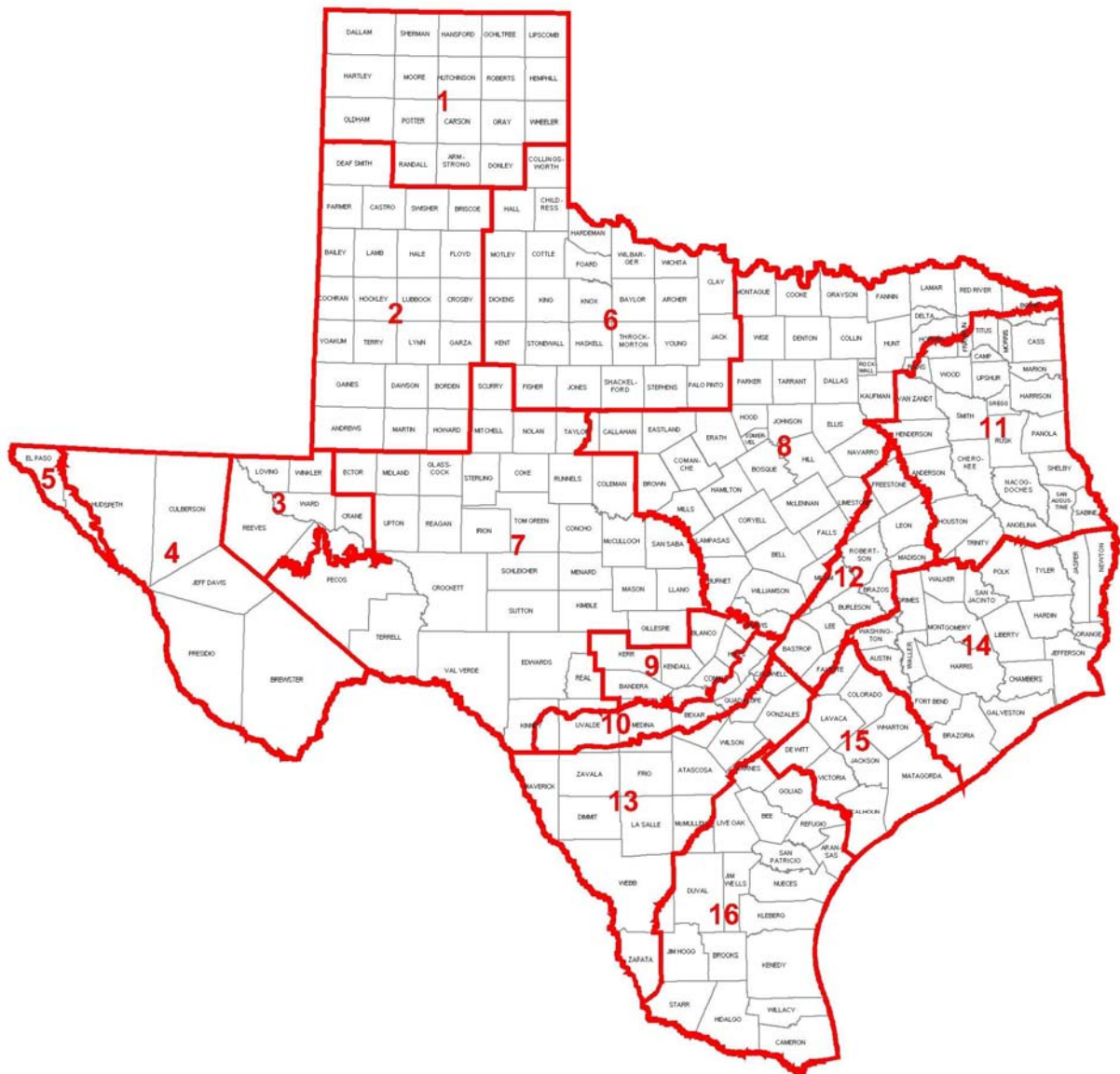


Figure 1. Groundwater Management Areas in Texas

The District will coordinate with these GCDs, and with surface water management entities, by providing written notification via email or U.S. Postal Services when the District's Board of Directors considers for revision and adoption the Management Plan, Rules, and other policy-related matters that impact the operation and management of the groundwater within Uvalde County. The GCDs in the three GMAs, surface water management entities, and other interested parties are encouraged and invited to provide information and written or oral comments on issues of concern to them to the District's Board of Directors. The District will use its standard practices for posting public notice, as established by the Board of Directors, and in accordance with the Texas Open Meeting Acts and related requirements for groundwater conservation districts in Texas.

The District's Authority to Regulate Groundwater

The District derives its authority to manage groundwater use within the District by virtue of the powers granted and authorized in the District enabling act of the 73rd Legislature under Article 2, Senate Bill 1477 (Appendix B). The District, acting under authority of the enabling legislation, assumes all the rights and responsibilities of a groundwater conservation district as specified in Chapter 36 of the Texas Water Code. The District has adopted rules that specify the process, procedures, practices, and requirements for obtaining a permit from the District.

Regulation of the Edwards aquifer within Uvalde County is the responsibility of the Edwards Aquifer Authority (EAA). The Uvalde County UWCD has no jurisdiction over the management of the Edwards aquifer. The District does and will coordinate with the EAA on matters of common interest related to the Edwards aquifer, including monitoring water use and cooperating in research with the EAA and other organizations such as the United States Geological Survey (USGS) and the Natural Resources Conservation Service (NRCS). Table 1 provides information about the projected availability of groundwater in Uvalde County, as determined by the TWDB and Region L.

Water Resources of the District

Surface water in the District comes primarily from the Nueces River and its tributaries. Groundwater is found in both major and minor aquifers in the District. Major aquifers include the Edwards aquifer, the Edwards-Trinity aquifer, the Carrizo aquifer and the Trinity aquifer. Minor or local aquifers include the Leona Gravels, Buda Limestone, Anacacho, Austin Chalk, and Glen Rose Formation. There is probably interaction between the minor aquifers and the major aquifers. However, it is difficult to distinguish how much interaction and leakage occurs between the formations because of the characteristics of the local area, which involve regional fracturing and faulting as well as local erosion and deposition over geologic time.

Groundwater Resources of the District

The aquifers under the jurisdiction of the District include the Carrizo Wilcox, Leona Gravels, Buda Limestone, Anacacho Formation, Austin Chalk, Glen Rose Formation, and various formations of the Trinity Group. Of these aquifers, the Leona Gravel and the Austin Chalk are the most significant, and have yields conducive to producing water for irrigation and other uses. The rest of the aquifers are mostly used for domestic and livestock where water is not available from the Edwards Aquifer.

The District estimates the normal use of irrigation water in Uvalde County at an average of two acre-feet per irrigated acre. The NRCS estimates that there are 15,429 acres of land irrigated by groundwater from the Leona Gravel and Austin Chalk aquifers. The estimated annual use of groundwater within the jurisdiction of the District that is being derived from aquifers other than the Edwards Aquifer is 30,858 acre-feet.

Table 1. Projected Water Availability in Uvalde County as Reported in the Region L Water Plan

Projected Water Availability									
Uvalde County Underground Water Conservation District, Uvalde County									
RWPG	Source Name	Source Type	River Basin	2000	2010	2020	2030	2040	2050
L	Carrizo-Wilcox Aquifer	Groundwater	Nueces	4,448	4,448	4,448	1,615	1,615	1,615
L	Edwards-BFZ Aquifer	Groundwater	Nueces	82,755	82,755	82,755	82,755	82,755	82,755
L	Edwards-Trinity-Plateau Aquifer	Groundwater	Nueces	3,185	3,185	3,185	3,185	3,185	3,185
L	Trinity Aquifer	Groundwater	Nueces	580	580	580	580	580	476
L	Irrigation Local Supply	Surface Water	Nueces	1,231	1,231	1,231	1,231	1,231	1,231
L	Livestock Local Supply	Surface Water	Nueces	1,494	1,494	1,494	1,494	1,494	1,494
Total Projected Water Availability (acre-feet per year) =				93,693	93,693	93,693	90,860	90,860	90,756

Source: Table 4, 2002 State Water Planning Database

TWDB: 04/06/2005

Groundwater Recharge

Based on the fact that groundwater levels in the District are reasonably stable, the District estimates that the average annual recharge to aquifers in the county, other than the Edwards Aquifer, is estimated to be 37,900 acre-feet in the Trinity (Hill Country), Edwards-Trinity (Plateau), and the Carrizo-Wilcox aquifers within Uvalde County. Therefore, the total useable amount of groundwater from these three aquifers is estimated to be 37,900 acre-feet.

The District estimates the normal use of irrigation water in Uvalde County at an average of two acre-feet per irrigated acre. The NRCS estimates that there are 15,429 acres of land irrigated by groundwater from the Leona Gravel and Austin Chalk aquifers. The estimated annual use of groundwater within the jurisdiction of the District that is being derived from these aquifers is estimated to be 30,858 acre-feet. These local aquifers combined with the Carrizo. Edwards Plateau and Trinity aquifers based on available current information from the TWDB GAM Runs and estimated use from the NRCS from the local aquifers allows the District 68,758 acre-feet as the Total Usable Amount of groundwater from all aquifers within the District under the District's jurisdiction.

Based on data obtained from a study by Dr. Bill Dugas in association with the Seco Creek Water Quality Demonstration Project, recharge could be increased by an estimated 40,000 gallons per acre per year through extensive brush management followed by enhanced grazing practices. The implementation of these feasible methods on 500 acres would equate to approximately 62 acre-feet per year of increased recharge.

The District requested that the TWDB perform current Groundwater Availability Model Runs (GAMs) to determine what the average annual recharge rates for the Trinity (Hill Country), Edwards-Trinity (Plateau), and Carrizo-Wilcox aquifers within Uvalde County are.

To determine average annual recharge, the TWDB utilized groundwater availability model run GAM 5-30.

- The model recharge cell values (in feet per day) were extracted from GAMs for the Trinity (Hill Country) aquifer, Edwards-Trinity (Plateau) aquifer, and the southern part of the Queen City and Sparta aquifers. Model stress periods represented average annual recharge conditions. The southern part of the Queen City and Sparta aquifers GAM includes the updated version of the Carrizo-Wilcox aquifer model.
- In order to select all recharge cells within Uvalde County, the model recharge cell values were imported into a Geographic Information System, in which the recharge values were converted into feet per year and intersected with Texas county boundaries.
- The average annual recharge was calculated from each of the three GAMs within Uvalde County as acre-feet per year and inches per year.

Parameters and Assumptions

Recharge for the Trinity (Hill Country) GAM was estimated using baseflow analyses and rainfall distributions for a 27-month period between December 1974 and March 1977, and then refined during the model calibration process (Mace and others, 2000). Recharge for the Edwards-Trinity (Plateau) GAM was estimated as a percentage of average annual rainfall for the period of 1971 to 2000, and then refined during the model calibration process (Anaya and Jones, 2004).

Recharge for the southern part of the Queen City and Sparta aquifers GAM was estimated using a nonlinear function of average annual precipitation adjusted for topography and underlying geologic formation permeabilities, and then refined during the model calibration process (Kelley and others, 2004).

Each of the GAMs includes various uncertainties in the calibration of recharge based on:

- (1) conceptualizations of the recharge process,
- (2) methodologies used to estimate recharge, and
- (3) implementation of recharge within each of the different GAMs.

The reader is encouraged to review the assumptions and limitations for each of the GAMs (Mace and others, 2000; Anaya and Jones, 2004; and Kelly and others, 2004) for more detailed explanations.

Results of GAM Runs

Recharge rates for Uvalde County were calculated as total average annual volume of recharge per year (acre-feet per year), and as average annual depth of recharge per unit area per year (inches per year), from the Trinity (Hill Country), Edwards-Trinity (Plateau), and the

southern part of the Carrizo-Wilcox aquifers. The recharge rate and areas for each the three aquifers within Uvalde County are shown in Table 2.

Table 2. Recharge Rates for Aquifers in Uvalde County

Aquifer	Recharge (acre-feet/year)	Recharge (inches/year)	Recharge area (miles ²)
Trinity (Hill Country)	2,400	1.4	32
Edwards Trinity (Plateau)	31,600	1.6	363
Southern Carrizo-Wilcox	3,900	0.05	155
Total	37,900		550

The spatial distribution of average annual recharge rates for active model cells of the Trinity (Hill Country), Edwards-Trinity (Plateau), and southern part of the Queen City and Sparta aquifers GAMs is shown in Figure 2.

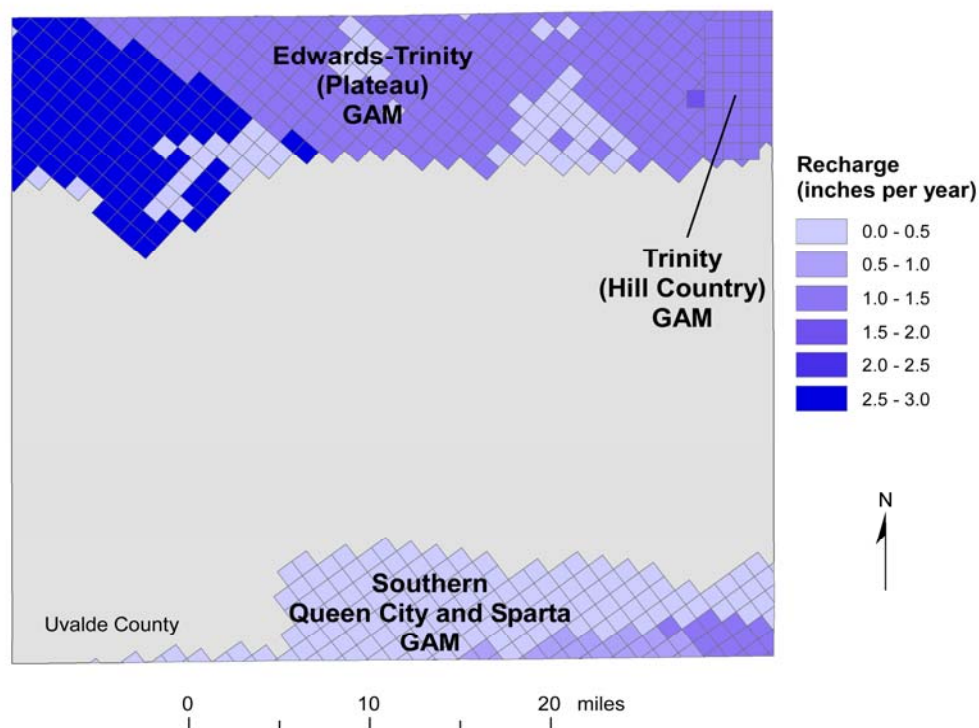


Figure 2. Distribution of average annual recharge rates for active model cells of the Trinity (Hill Country) GAM, Edwards-Trinity (Plateau) GAM, and southern part of the Carrizo-Wilcox aquifer contained within the Queen City and Sparta aquifer GAM within Uvalde County

The District expects no significant increase in irrigation acreage. The Edwards Aquifer Authority enabling legislation allows recharge credits to be obtained by political subdivisions adding recharge to the Edwards Aquifer. Should the Edwards Aquifer Recharge program be implemented by use of *groundwater* from aquifers other than the Edwards Aquifer, groundwater that is now used for other purposes could be diverted to recharge to the Edwards Aquifer, and could therefore materially impact the availability of groundwater for beneficial use within the District, and substantially impact historic use and accepted conservation practices. The District will evaluate such projects, taking into account all applicable statutory and regulatory criteria, to ensure that the yield and quality of groundwater in the District are not jeopardized and the rights and interests of groundwater users in the District are protected.

Based on the fact that irrigation costs are expected to increase, the District anticipates that more efficient irrigation equipment and methods will be employed, which will offset any increase in groundwater water use.

Estimated Amount of Groundwater Annually Used in the District

The estimated amount of groundwater being used in the District on an annual basis is **66,059 acre-feet per year**, including use of the Edwards aquifer. This estimated annual amount is based on the TWDB's "Annual Water Use Survey for the Year 2000," which is the most recent data available. Until recently, response to the TWDB survey was voluntary. As a result, the TWDB water use survey data is subject to variations in completeness and accuracy. TWDB data on estimated groundwater use is available from 1980 to 2000, excepting 1981 to 1983, when no data was collected.

The District has noted variations in the reported amounts of water used from year to year. The reported values for some years in some categories of use appear significantly lower than the preceding or succeeding years. Actual water use may vary from year to year based on differing conditions. However, the degree of variation of the reported values for some years prompts the concern that the water use reported to TWDB may not reflect the full extent of groundwater use in the District. As a result of this concern, the District calculated the average amount of groundwater used for each category over the period of record in the TWDB's annual water use survey data. The average total groundwater use in the District over the period of record is **133,216 acre-feet per year**.

Projected Total Water Demand and Supply within the District

Estimates of projected water demand are based on anticipated patterns of population growth and migrations that are applied to standardized estimated water use rates for the recognized categories of water use. Estimates of projected annual total water demand represent a need for

water that may ultimately be met by a supply of surface water or groundwater. The estimate of projected total water demand over the next 50 years averages **133,216 acre-feet per year**.

The estimate of projected total water demand within the District in the year 2010 is **139,522 acre-feet** (Table 3). The estimate of projected total water supply within the District in the year 2010 is **93,693 acre-feet** (Table 4).

Table 3 Projected Water Demands in Uvalde County from the Regional L Plan

Projected Water Demands									
Uvalde County Underground Water Conservation District, Uvalde County									
RWPG	WUG	River Basin	Category	2000	2010	2020	2030	2040	2050
L	Sabinal	Nueces	Municipal	510	546	573	632	683	739
L	Uvalde	Nueces	Municipal	5,173	5,621	5,921	6,610	7,198	7,871
L	County-Other	Nueces	Municipal	1,027	907	823	777	737	661
L	Irrigation	Nueces	Irrigation	135,168	129,883	124,804	119,924	115,234	110,728
L	Livestock	Nueces	Livestock	1,494	1,494	1,494	1,494	1,494	1,494
L	Manufacturing	Nueces	Manufacturing	600	643	675	700	759	817
L	Mining	Nueces	Mining	444	428	499	576	666	777
Total Projected Water Demands (acre-feet per year) =				144,416	139,522	134,789	130,713	126,771	123,087

Source: Table 2, 2002 State Water Planning Database

TWDB: 04/06/05

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 without waste. In consideration of the economic and cultural activities occurring within the District, the District has developed rules that identify and monitor waste. The District will promote water saving practices and the installation and use of water saving devices and irrigation equipment. All ongoing TWDB, USGS, and EAA observation studies and data collected will be monitored in order to gain additional information regarding changing storage conditions of groundwater supplies within the District jurisdiction. The District will work cooperatively with the investigation of groundwater resources within the District and will make the results of investigations available to the public upon acceptance of the information by the District's Board. Preliminary or draft data may be made available under circumstances where the data is identified as draft and preliminary and where the District believes the information may be useful and beneficial.

The District will employ all technical resources at its disposal to evaluate the groundwater resources available within the District and to determine the effectiveness of conservation measures.

Table 4. Projected Water Supplies in Uvalde County as Reported in the Region L Plan

Projected Water Supplies										
Uvalde County Underground Water Conservation District, Uvalde County										
RWPG	WUG	River Basin	Source Type	Source Name	2000	2010	2020	2030	2040	2050
L	Sabinal	Nueces	Groundwater	Edwards-BFZ Aquifer	263	263	263	263	263	263
L	Uvalde	Nueces	Groundwater	Edwards-BFZ Aquifer	2,738	2,738	2,738	2,738	2,738	2,738
L	County-Other	Nueces	Groundwater	Carrizo-Wilcox Aquifer	512	512	512	284	284	284
L	County-Other	Nueces	Groundwater	Edwards-BFZ Aquifer	81	81	81	81	81	81
L	County-Other	Nueces	Groundwater	Edwards-Trinity-Plateau Aquifer	367	367	367	560	560	560
L	County-Other	Nueces	Groundwater	Trinity Aquifer	67	67	67	102	102	102
L	Irrigation	Nueces	Groundwater	Carrizo-Wilcox Aquifer	3,695	3,704	3,665	1,156	1,129	1,096
L	Irrigation	Nueces	Groundwater	Edwards-BFZ Aquifer	78,563	78,563	78,563	78,563	78,563	78,563
L	Irrigation	Nueces	Groundwater	Edwards-Trinity-Plateau Aquifer	2,646	2,652	2,624	2,284	2,231	2,165
L	Irrigation	Nueces	Surface Water	Irrigation Local Supply	1,231	1,231	1,231	1,231	1,231	1,231
L	Irrigation	Nueces	Groundwater	Trinity Aquifer	482	483	478	416	406	290
L	Livestock	Nueces	Surface Water	Livestock Local Supply	1,494	1,494	1,494	1,494	1,494	1,494
L	Manufacturing	Nueces	Groundwater	Edwards-BFZ Aquifer	1,110	1,110	1,110	1,110	1,110	1,110
L	Mining	Nueces	Groundwater	Carrizo-Wilcox Aquifer	240	232	270	173	200	233
L	Mining	Nueces	Groundwater	Edwards-Trinity-Plateau Aquifer	172	166	194	341	394	460
L	Mining	Nueces	Groundwater	Trinity Aquifer	31	30	35	62	72	84
Total Projected Water Supplies (acre-feet per year) =					93,692	93,693	93,692	90,858	90,858	90,754

Source: Table 5, 2002 State Water Planning Database

TWDB: 04/06/05

The District has a Drought contingency plan it will utilize to help manage the groundwater supplies during drought conditions.

The District has obtained metering equipment from the TWDB for implementation of a program to work with local groundwater users to help them determine groundwater usage from the various groundwater sources and users in the District.

The District shall not allow recharge of an aquifer under its jurisdiction if the water being placed into the aquifer is of inferior quality to water residing in the formation.

Water Management Strategies to Meet Needs of Water User Groups

The projected water supplies and demand estimates for Uvalde County taken from the Regional L Water Plan indicate that projected demands exceed projected supplies. To meet the needs of water user groups in the District, Region L recommended water management strategies to address the shortages in order to meet the identified needs (shortages) within the District. Water management strategies are projects or procedures that if implemented will produce additional water to meet the identified needs of water user groups. The total amount of groundwater and surface water anticipated to result from the implementation of the water management strategies recommended in the Region L Water Plan for Uvalde County is 10,056 acre-feet per year in 2010. Municipal and Agricultural Conservation are the strategies identified in the Regional L plan to address the water supply shortage for the identified Water User Groups (Table 5).

Table 5. Groundwater-Specific Water Management Strategies for Uvalde County
Recommended in the Regional L Water Plan, Exhibit B, Data Table 12.

Groundwater-Specific Water Management Strategies

Uvalde County Underground Water Conservation District, Uvalde County

RWPG	WUG	WUG County	River Basin	Water Management Strategy	Source County	Source Name	2000	2010	2020	2030	2040	2050
L	Irrigation	Uvalde	Nueces	Conservation Irrigation	- Uvalde	Edwards-BFZ Aquifer	5,958	5,958	5,958	5,958	5,958	5,958
L	Sabinal	Uvalde	Nueces		Uvalde	Edwards-BFZ Aquifer	500	500	500	500	500	500
L	Sabinal	Uvalde	Nueces	Conservation Municipal	- Uvalde	Edwards-BFZ Aquifer	4	7	8	6	7	4
L	Uvalde	Uvalde	Nueces		Uvalde	Edwards-BFZ Aquifer	2,500	3,500	3,500	4,500	4,500	5,000
L	Uvalde	Uvalde	Nueces	Conservation Municipal	- Uvalde	Edwards-BFZ Aquifer	19	91	52	87	64	35
Total Projected Groundwater-Based Water Management Strategies (acre-feet per year) =							8,981	10,056	10,018	11,051	11,029	11,497

Source : Table 12, 2002 State Water Planning Database

TWDB: 04/06/05

Actions, Procedures, Performance, and Avoidance For Plan Implementation

The District will implement the provisions of this plan as a guidepost for determining the direction or priority for all District activities. All operations of the District, and 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 shall treat all citizens with equality.

The District will seek cooperation of appropriate state, regional, and local water management entities in the implementation of this plan and the management of groundwater supplies within the District.

Methodology to Track Progress Toward Achieving Management Goals

The General Manager will prepare an annual report on District performance in achieving the management goals. The annual report will be presented to the Board of Directors during the first quarterly Board of Directors meeting each fiscal year. The report will include the number of instances in which each objective activity was engaged in during the year, referenced to the expenditure of staff time and budget, so that the effectiveness and efficiency of each activity may be evaluated. The annual report will be maintained on file at the District office and made available to the public upon adoption by the Board.

Management Goals, Objectives, and Performance Standards

Resource Goals

Goal 1.0: To Control and Prevent the Waste of Groundwater

Management Objective:

Each year the District will provide education materials concerning waste, which is prohibited under the District rule, to the newspapers and to the general public on at least six occasions.

Performance Standards:

(a) The District will provide to a newspaper of general circulation within the District at least six newspaper articles and/or public service announcements on an annual basis, including those that may be posted on the District's Web site.

(b) The District will investigate all written reports of waste of groundwater within five working days from the date the report is filed with the District.

Goal 2.0: Addressing Natural Resource Issues that Impact the Use and Availability of Groundwater and Are Impacted by the Use of Groundwater

Management Objective:

Each year the District will cooperate with interested parties and appropriate agencies to develop additional information on aquifer recharge and weather modification projects.

Performance Standards:

(a) The District will establish terms for all aquifer recharge, transportation, or storage project permits. The District shall take into consideration all applicable factors and requirements of the District's rules and state law.

(b) The District will make all information available to the District on such projects available to the general public and to permit applicants annually.

(c) The District shall require owners or operators of all aquifer pumping, recharge, transportation, or storage projects affecting the district to obtain a permit amendment if the use, volume of groundwater pumped, location of, or means of transportation, recharge, or storage changes from the manner in which it was originally permitted.

Management Objective:

The District will require issuance of a well construction permit, or preregistration of exempt wells not requiring a construction permit, prior to the drilling of all new wells for all aquifers under the District's jurisdiction.

Performance Standard:

All well construction permits in compliance with the District rules will be issued within 20 days. Well construction permits not in compliance with the rules, as determined by the General Manager, will be considered at the next regular board meeting, but within 90 days of the General Manager's determination of the application's compliance with District rules.

Goal 3.0: Providing for the Efficient Use of Groundwater within the District

Management Objective:

Each year the District will make available educational brochures to the public promoting and explaining conservation methods and concepts, on at least one occasion.

Performance Standard:

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

Management Objective:

Each year, the District will provide informative speakers to school and civic groups to raise public awareness of practices that ensure the efficient use of groundwater.

Performance Standard:

Each year, the District will make at least two public speaking appearances to promote the efficient use of groundwater.

Management Goals Not Applicable to the District

Goal 4.0: The Control and Prevention of 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 5.0: Addressing 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.

Conservation and Drought Goals

Goal 6.0: Addressing Conservation

Management Objective:

The District will annually submit an article regarding water conservation for publication to at least one newspaper of general circulation in Uvalde County.

Performance Standard

A copy of the article submitted by the District for publication to a newspaper of general circulation in Uvalde County regarding water conservation will be included in the Annual Report to the Board of Directors.

Goal 7.0: Addressing Drought Conditions

Management 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 (Situation Report) posted on the Texas Water Information Network website www.txwin.net.

Performance Standard :

Quarterly, the District will make an assessment of the status of drought in the District and prepare a quarterly briefing to the Board of Directors. The downloaded PDSI maps and Situation Reports will be included with copies of the quarterly briefing in the District Annual Report to the Board of Directors.

References

- Anaya, R. and Jones, I. C., 2004, Groundwater availability model for the Edwards-Trinity (Plateau) and Cenozoic Pecos Alluvium aquifer systems, Texas: Texas Water Development Board GAM report, 208 p. http://www.twdb.state.tx.us/gam/eddt_p/eddt_p.htm.
- Kelley, V. A., Deeds, N. E., Fryar, D. G., and Nicot, J-P, with Jones, T. L., Dutton, A. R., Bruehl, G., Unger-Holtz, T., and Machin, J. L., 2004, Groundwater Availability Model for the Queen City and Sparta aquifers: Final Report prepared for the Texas Water Development Board.
- Mace, R. E., Chowdhury, A. H., Anaya, R., and Way, S.-C., 2000, Groundwater availability of the Trinity Aquifer, Hill Country Area, Texas: numerical simulations through 2050: Texas Water Development Board Report 353, 117 p

Appendix A

Evidence of the Administrative Processes Required For the Certification of the Groundwater Management Plan as Administratively Complete