

Trinity Glen Rose Groundwater Conservation District



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Trinity Glen Rose Groundwater Conservation District Management Plan

Revision Record

<u>Date Adopted</u>	<u>Effective Date</u>	<u>Version/Resolution</u>
October 14, 2004	October 14, 2004	Original Adoption, TGRGCD Board Resolution
October 14, 2010	October 14, 2010	Re-adoption, TGRGCD Board Resolution

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TIME PERIOD FOR THIS PLAN

This plan becomes effective upon adoption by the Trinity Glen Rose Groundwater Conservation District Board of Directors and subsequent approval by the Texas Water Development Board (TWDB). This plan incorporates a planning period of ten years in accordance with 31TAC §356.5(a). After five years, the plan will be reviewed for consistency with the applicable Regional Water Plans and the State Water Plan and shall be readopted with or without amendments. The plan may be revised at anytime in order to maintain such consistency or as necessary to address any new or revised data, Groundwater Availability Models, Desired Future Conditions, Managed Available Groundwater, or District management strategies.

DISTRICT MISSION

The Trinity Glen Rose Groundwater Conservation District (TGRGCD or District) was created in 2001 during the 77th Texas Legislature and confirmed by voters in 2002. The District was created in response to the Texas Natural Resources Conservation Commission designating a portion of the Trinity Aquifer within Bexar County as a Priority Groundwater Management Area (PGMA). The District was created for the purpose of conserving, preserving, recharging, protecting and preventing waste of groundwater from the Trinity Aquifer in Northern Bexar County. Additionally, the District is charged with developing and implementing regulatory programs for the resources within District boundaries. With continued growth in Northern Bexar County, the District is challenged with balancing the needs of families and business with the need to maintain the water resources in this area. To effectively meet these needs, the District's mission and activities include conducting research, collecting and analyzing well water and aquifer data, issuing permits for well drilling, modification, and plugging, developing education and conservation programming, and working with stakeholders to ensure a comprehensive management strategy.

STATEMENT OF GUIDING PRINCIPLES

The TGRGCD was created in order that appropriate groundwater management techniques and strategies could be implemented at the local level to address groundwater issues or problems within the District. The District has considered data from the TWDB's Groundwater Availability Models (GAMs), input from the Groundwater Management Area 9 cooperative planning process, public input, and the most current and accurate site-specific data available in the development of this plan. This plan serves as a guideline for the District to ensure greater understanding of local aquifer conditions, development of groundwater management concepts and strategies, and subsequent implementation of appropriate groundwater management policies.

COMMITMENT TO IMPLEMENT GROUNDWATER MANAGEMENT PLAN

To address potential groundwater quantity and quality issues, the District is committed to, and will actively pursue, the groundwater management strategies identified in this management plan. These management strategies will be implemented in conjunction with District Rules, policies, and activities in order to effectively manage and regulate the drilling of wells, production of groundwater within the District, protection of recharge features, pollution and waste prevention, and the possible transfer of water out of the District. Additionally, the District will encourage conservation practices and efficient use of water resources, assure compliance with the District Drought Contingency Plan, and provide for the identification of any critical

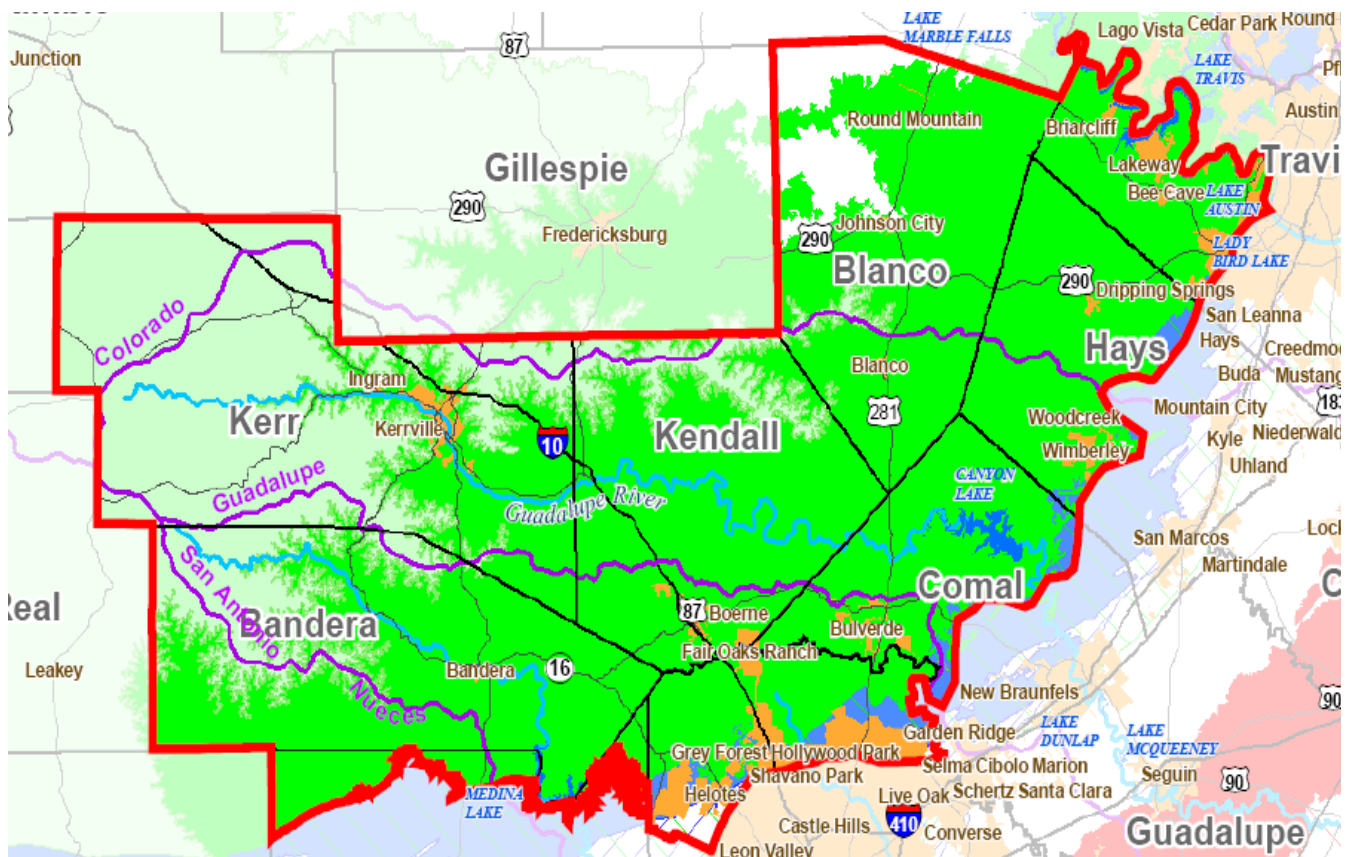
groundwater depletion areas within the District. To the greatest extent practical, the District will cooperate with and coordinate its management plan and regulatory policies with adjacent groundwater districts, Groundwater Management Area 9, Regional Water Planning Groups, local water purveyors and stakeholders, and adjacent counties with similar aquifers and/or groundwater usage.

JOINT PLANNING IN MANAGEMENT AREA

Not later than September 1, 2010, and every five years thereafter, the districts in GMA9 shall consider groundwater availability models and other data or information for the management area and shall establish desired future conditions for the relevant aquifers within the management area. In establishing the desired future conditions of the aquifers under this section, the districts shall consider uses or conditions of an aquifer within the management area that differ substantially from one geographic area to another.

The GMA may establish different desired future conditions for each aquifer, subdivision of an aquifer, or geologic strata located in whole or in part within the boundaries of the management area; or each geographic area overlying an aquifer in whole or in part or subdivisions of an aquifer within the boundaries of the management area. The Texas Water Development Board will calculate the Managed Available Groundwater (MAG) from the adopted Desired Future Conditions (DFC) of the management area.

Map 1: GROUNDWATER MANAGEMENT AREA (GMA) 9:

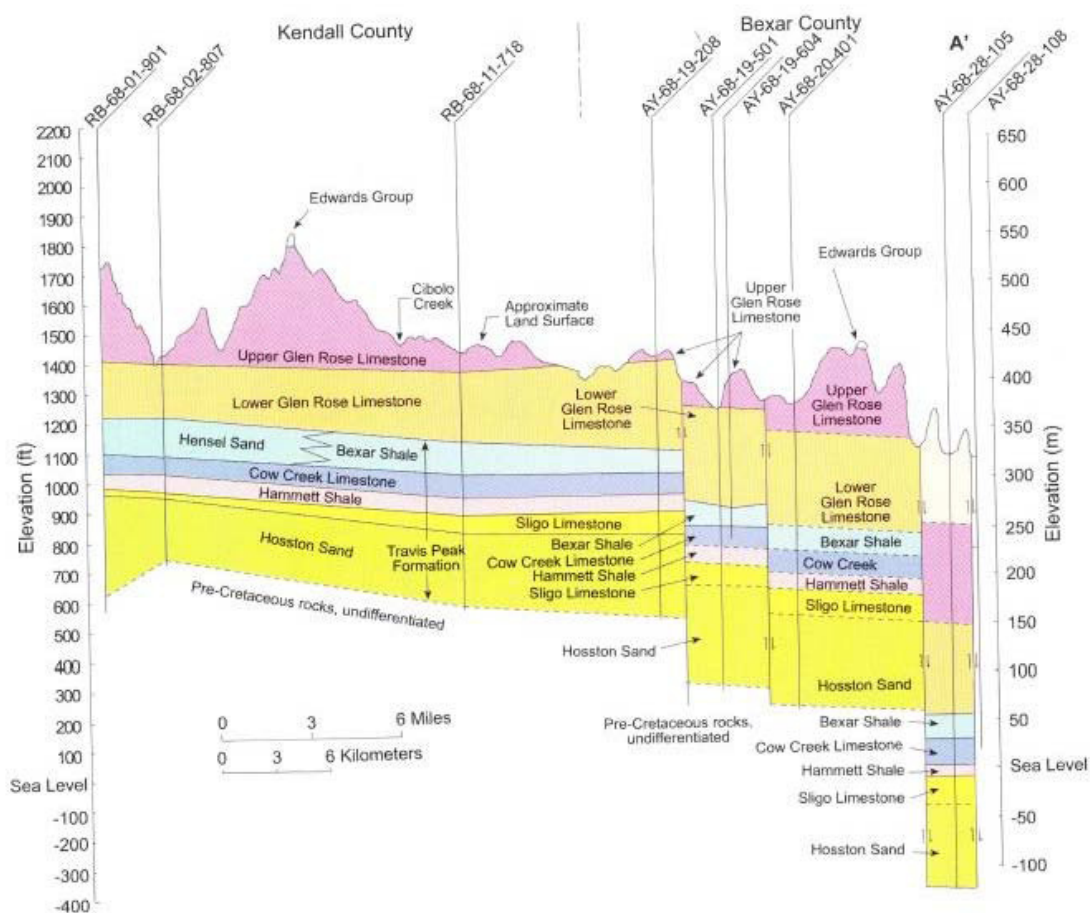


Source: TWDB; http://www.twdb.state.tx.us/mapping/maps/pdf/gma/GMA_9.pdf

ESTIMATE OF MANAGED AVAILABLE GROUNDWATER

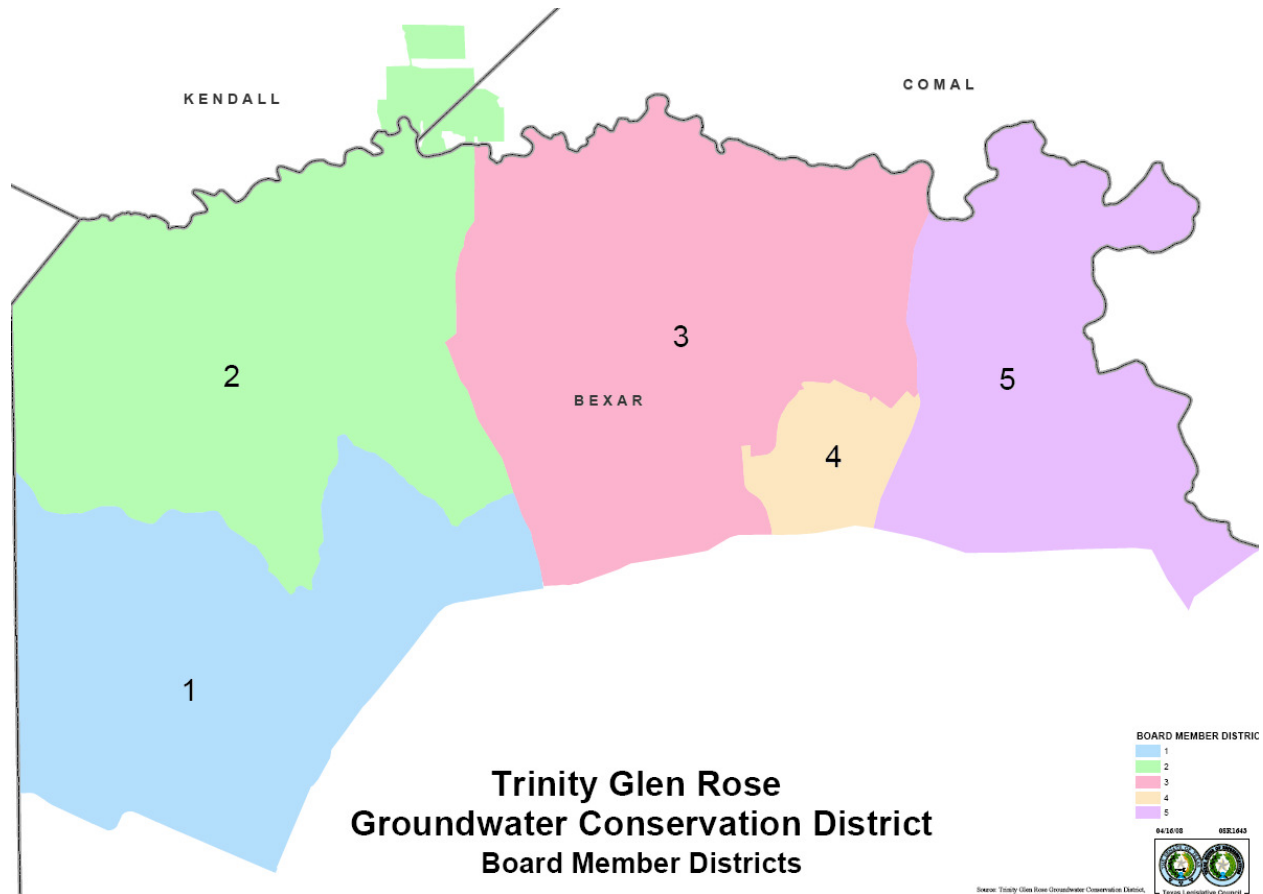
The Desired Future Conditions for the aquifers located within the District boundaries and within Groundwater Management Area 9 has been established by Resolution #072610-01 (see appendix A). TGRGCD will amend this section of the management plan once TWDB provides an estimate of Managed Available Groundwater based on the DFCs.

Map 2: STRATIGRAPHIC CROSS SECTIONS OF THE HILL COUNTRY AREA:



Source: Modified from Ashworth, 1983 and Mace, et al, 2000.

Map 3: DISTRICT BOUNDARY MAP:



Source: Texas Legislative Council, TGRGCD 2000 Census TIGER File

GENERAL DESCRIPTION OF THE DISTRICT

The Trinity Glen Rose Groundwater Conservation District is located in Northern Bexar County and portions of Kendall and Comal Counties. The District covers approximately 311 square miles (199,574 acres). In 2001, the Texas Legislature passed House Bill (HB) 2005 creating the TGRGCD, in part due to a response to the State of Texas (TCEQ) designating the portion of the Trinity Group of Aquifers lying within Bexar County as a Priority Groundwater Management Area (PGMA). HB2005 outlined the District's creation, authority, structure, and funding. In 2004, the City of Fair Oaks Ranch held an election and voted to become a part of the TGRGCD, expanding the District to include those portions of Kendall and Comal Counties within the boundaries of Fair Oaks Ranch. In 2009, the Texas Legislature passed HB1518 allowing an increase of production fees and allowing municipalities to request inclusion of annexed areas into the District as provided by Chapter 36 Texas Water Code, expanding the District boundaries. The District operates under the authority of these house bills, as well as the authority and duties set forth in Chapter 36 of the Texas Water Code.

The District is comprised of a 5-member Board of Directors elected to serve 4 year rotating terms. The District also employs two part-time co-managers and 2 part-time field and administrative staff. The District finalized and approved well registration rules in 2002 and general district rules in 2003. Rules governing well construction standards were finalized and approved in 2005 and Drought Contingency Plan rules were finalized and approved in 2007.

North Bexar County's economy is primarily residential. There are also large ranch holdings and military reservations in the area. The past 15 years has seen a dramatic increase in suburban development and increased residential population density. There is limited agricultural activity in the area that consists of small pastures, grazing, and native grassland open areas.

The largest city within the District is San Antonio with a population of approximately 1.1 million.¹ According to the Texas State Data Center and the State Demographer, the 2009 population for San Antonio was 1.6 million, an increase of over 17% since the national census in 2000. Approximately 111,000 of the 1.1 million residents live within the District's boundaries. The remainder of the District is made up of smaller cities including Fair Oaks Ranch and Grey Forest, as well as smaller subdivisions and rural residential population. The District encompasses a high-growth area with on-going plans for future development.

North Bexar County lies within the San Antonio River basin and for statewide water planning purposes it is part of the South Central Texas Regional Water Planning Group (Region L). The District is also the southernmost portion of the Groundwater Management Area (GMA) 9. The region is unique in comparison to other areas within GMA9 due to the population density, impact of increasing development, and recharge impact from Cibolo Creek Basin.

TOPOGRAPHY AND DRAINAGE

The primary watershed in North Bexar County is the San Antonio River which is a tributary to the Guadalupe River. Surface drainage within the District is generally from northwest to southeast. Cibolo Creek is a tributary of the San Antonio River and drains from northwest to southeast across the Trinity Group of Aquifers and forms a large portion of the boundary between North Bexar County and adjacent counties. Cibolo Creek is a major recharge feature

¹ 2000 US Census

of the Trinity Group of Aquifers in North Bexar County and eventually confluences with the San Antonio River.

The major geologic feature located within the District's boundaries is the Edwards Plateau. This broad, topographically high area is composed of Cretaceous age limestone, dolomite and marl. Deep erosion and down cutting by streams and rivers in the area have resulted in the Edwards Plateau being perceptibly higher than adjacent areas. The plateau is the southernmost extension of the Great Plains, extending westward from the Colorado River to the Pecos, and covers many Central and West Texas counties. It is bordered on the northeast by the pre-Cambrian rocks of the Llano Uplift. North Bexar County lies near the southeastern edge of the Plateau.

Elevation within the District ranges from a low of approximately 730 feet above sea level where the Cibolo Creek leaves North Bexar County to the southeast to approximately 1,892 feet above sea level at Mount Smith in the northwestern portion of the district.

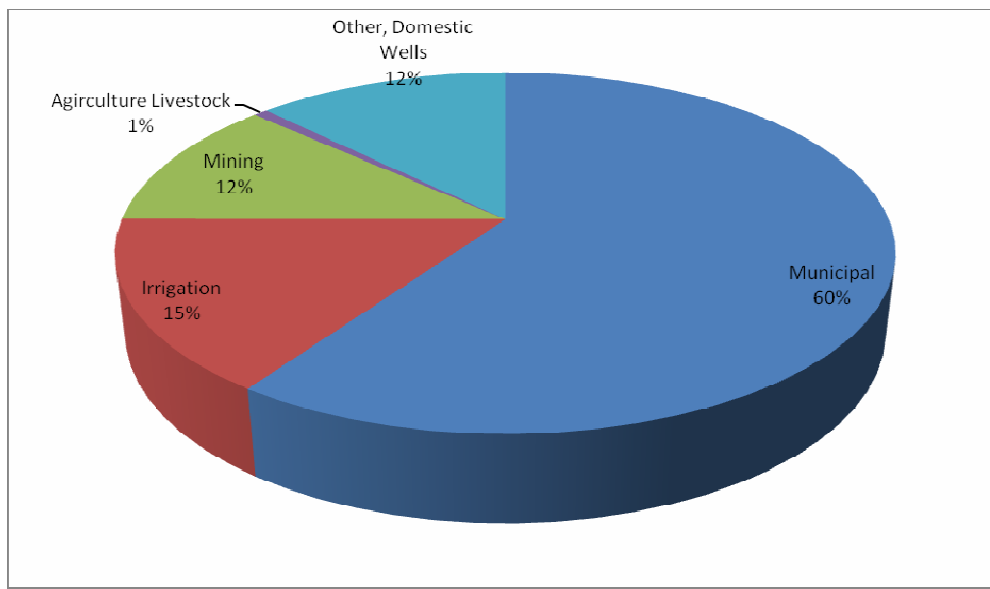
WATER RESOURCES WITHIN THE TGRGCD

GROUNDWATER RESOURCES AND USAGE IN NORTHERN BEXAR COUNTY

Within the TGRGCD, the only major aquifer that provides groundwater to county residents is the Trinity Group of Aquifers consisting of the Upper Glen Rose Limestone, Lower Glen Rose Limestone, Cow Creek Limestone, Sligo Limestone and Hosston Sand. Well depths vary from shallow, hand-dug wells to drilled wells from 100 feet deep to over 1,600 feet deep based on TWDB records for Bexar County. Depths are highly variable even within the same aquifer and depend entirely on site-specific topography and geology, especially faulting. Water quality and water quantity also vary greatly throughout the District. Water quality within a specific aquifer can be defined or characterized in a general sense, but can still be affected by local geology, hydrology and structure.

Table 1: TGRGCD Historical Groundwater Usage (in acre feet) – 2004 - 2009²

	2004	2005	2006	2007	2008	2009	Total
Municipal	6,442	7,779	7,687	6,427	8,405	6,245	42,985
Irrigation	1,327	1,696	2,204	1,458	2,360	2,069	11,114
Mining	867	1,712	1,775	1,698	1,229	1,230	8,511
Agriculture	100	100	100	100	100	100	600
Other	1,500	1,500	1,500	1,500	1,500	1,500	9,000
Total	10,236	12,787	13,266	11,183	13,594	11,144	72,210



The projected total annual water availability in North Bexar County is currently predicted at 70,060 ac-ft of Trinity Group of Aquifers groundwater, 5,350 ac-ft of surface water (2006), with an additional variable surface water supply of 3,500 ac-ft declining over time, and 8,121 ac-ft from other sources. It is important to note that the water available from other sources will

² Trinity Glen Rose Groundwater Conservation District Pumpage Database

increase or decrease depending on demand and the service plans managed by the two major water utilities operating within the District, San Antonio Water System and Bexar Met.

TRINITY GROUP OF AQUIFERS

The Trinity Group of Aquifers in North Bexar County is comprised of the Upper and Lower Glen Rose Limestone, Cow Creek Limestone, Sligo Limestone and the Hosston Sand and is recharged from local precipitation on its outcrop; flow through Cibolo Creek and through the overlying units where it is in the subsurface. Yields vary greatly and are highly dependent on local subsurface physical characteristics. Yields are generally low, less than 20 gpm, but can occasionally be significantly higher, with yields of 600-800 gpm being reported in site-specific areas. Production from Trinity wells is primarily used for municipal, rural domestic, irrigation, and mining demands.

SURFACE WATER RESOURCES AND USAGE IN NORTHERN BEXAR COUNTY

Canyon Lake is the only major surface water supplier within the District. Fair Oaks Ranch has up to 1,850 ac-ft of surface water rights from Canyon Lake (Guadalupe- Blanco River Authority - GBRA), and also claims 39 ac-ft of groundwater from the Trinity Aquifer in Comal County and up to 75 ac-ft of groundwater from Kendall County. San Antonio Water System (SAWS) has up to 4,000 ac-ft of confirmed surface water rights water and up to an additional 4,800 ac-ft of variable term water available from Canyon Lake (GBRA) that declines over time through 2037.

PROJECTED TOTAL WATER DEMAND IN NORTHERN BEXAR COUNTY

The projected total annual water demand in North Bexar County (Table 2) is currently 15,305 ac-ft. Of this total annual water demand, an estimated current annual demand of 8,121 ac-ft is supplied to water users through existing infrastructure from other sources. As future demands increase, changes in the infrastructure will be necessary. It is projected that the greatest demand on water resources will be from municipal suburban users who will rely on groundwater and other supplies provided by municipal providers. The majority of infrastructure improvements necessary to service these new groundwater users will be provided by either developers or municipal water supply companies. Therefore, it is anticipated that the amount of water supplied at any given time will be primarily related to suburban growth patterns.

Table 2: Projected Total Water Demand in North Bexar County³

Aquifer	Basin	Source	YR2000	YR2010	YR2020	YR2030
Trinity Aquifers	SAR	Groundwater	7,184	11,004	15,283	25,181
Other groundwater and Surface Sources	SAR	Groundwater	8,121	17,933	28,348	50,785
Total			15,305	28,937	43,631	75,966

³ SCTRWPG, Region L Regional Water Plan, 2006

RECHARGE OF GROUNDWATER IN NORTHERN BEXAR COUNTY

The annual natural recharge occurring in North Bexar County is thought to be through percolation of rainfall countywide and more localized recharge, along with potentially higher rates of recharge, occurring in the bed of Cibolo Creek and its tributaries. The District is currently unaware of any significant recharge feature in North Bexar County that may be providing a major avenue for recharge other than unnamed sinkholes within Cibolo Creek and some cave/sinkhole structures within the district.

The Draft Cibolo Creek Study prepared by the Army Corp of Engineers in 2005 helps define recharge through the Cibolo Creek area. Additionally, a calculated annual recharge coefficient of approximately 4% of annual rainfall was developed in the September 2000 TWDB report on "Groundwater Availability of the Trinity Group of Aquifers, Hill Country Area, Texas, it seems reasonable for the District to assume a 4% average for North Bexar County Trinity Group Of Aquifers recharge, (Mace, et. al. has done this for the Trinity Group of Aquifers as a whole). John Ashworth also developed a similar annual effective recharge coefficient (also 4% of average annual rainfall of about 29.5 inches) for the Trinity Group of Aquifers in the Texas Department of Water Resources Report 273, Ground-Water Availability of the Lower Cretaceous Formations in the Hill Country of South-Central Texas, January 1983.

These recharge potentials are not to be confused with "recoverable" groundwater. Not all groundwater is recoverable. Some is lost to spring flow and seeps, some is used by plant life while the water is still near the surface, while some is almost permanently retained within the rock itself. However, water retained within the rock itself is a one-time recharge and should not affect available water from further recharge events. For instance, some areas of the Trinity Group of Aquifers may be a rather "tight" formation, particularly in the vertical direction. The Trinity Group of Aquifers in some areas is known to have low porosity and permeability, limited fracturing and faulting, and a complicated stratigraphy that includes layers of rock that reduce transmissivity and retard downward-moving recharge water. In other areas, dissolution of the limestone, cave/sinkhole formation, faulting, fracturing, higher porosity and permeability increase water movement and transmissivities as well as vertical movement. As a result, individual well yields can be very low to very high. Though large quantities of water may be present in the subsurface, much of the groundwater may be unrecoverable in some areas due to these hydrogeologic conditions while in other areas a large portion of the water is recoverable.

As previously mentioned, some water recharging the Trinity Group of Aquifers will be lost, some through biologic uptake and some through discharge at springs and seeps that provide some base flow to local creeks and tributaries. This is water that the aquifer rejects on an average annual basis and is potentially available and can theoretically be retrieved (at least on a short-term basis) without diminishing the average volume of groundwater being recharged to storage or, in other words, without creating a water losing situation within the aquifer. Extensive pumping will also reduce the pressure head and may result in a significantly larger quantity of recharge water actually percolating downward into the aquifer providing recharge that would not be normally available thus providing more reliable, long-term well production. Once pumping exceeds average annual recharge, then the aquifer(s) will be providing water from storage (thought to be a relative large amount) and the groundwater level will decline over time.

Table 3: District Flow Budget and Recharge Variable⁴

Management Plan Requirement	Aquifer	Results (ac-ft/yr)
Estimated annual amount of recharge from precipitation to the District	Trinity Aquifer	41,976
Estimated annual volume of water that discharges from the aquifer to springs and any surface water body, including lakes, streams, and rivers	Trinity Aquifer	10,347
Estimated annual volume of flow into the District within each aquifer in the District	Trinity Aquifer	37,087
Estimated annual volume of flow out of the District within each aquifer in the District	Trinity Aquifer	36,644
Estimated net annual volume of flow between each aquifer in the District	NA	NA

RECHARGE ENHANCEMENT POTENTIAL

The District is just beginning operations and has yet to assess potential recharge projects in North Bexar County. The District will solicit ideas and information and will investigate any potential recharge enhancement opportunity, natural or artificial, that is brought to the District's attention. Such projects may include, but are not limited to: cleanup or site protection projects at any identified significant recharge feature, encouragement of prudent brush control practices, non-point source pollution mitigation projects, aquifer storage and recovery projects, development of recharge ponds or small reservoirs, and the encouragement of appropriate and practical erosion and sedimentation control at construction projects located near surface streams. One project being studied in the area is the Cibolo Creek Enhancement Project under the direction of the U. S. Army Corps of Engineers in conjunction with SARA, GBRA and SAWS. Studies are currently on going with Phase I, data collection completed and Phase II underway. These studies are to determine if flood damage reduction, ecosystem restoration, aquifer recharge and brush clearing activities may be useful and beneficial in the North Bexar County area.

PROJECTED POPULATION AND WATER DEMANDS IN NORTHERN BEXAR COUNTY

Population and water demand projections are given for Bexar County in the Region L Plan. However, the 2000 Census has provided new population data. This data has been incorporated by the TWDB for an upcoming revision. The following table incorporates those revisions and provides updated North Bexar County populations and Trinity Group of Aquifers annual water demand projections for every ten years beginning in 2000 and ending with 2030. Updated

⁴ TWDB, Groundwater Availability Model (GAM) 09-032

annual municipal/rural water demands in Table 3 are based on the new population data multiplied by a Per Capita Rate (calculated from the estimated populations and municipal/rural demands in the original Region L Plan). Estimated demands on Trinity Group of Aquifers groundwater by irrigation, mining, and livestock users have been left unchanged except for estimating the 2030 demands.

Table 4: Population Projections and Trinity Water Demands (acre-feet)

Total Bexar County Population⁵	
2000	1,392,931
2010	1,631,935
2020	1,857,745
2040	2,222,887
2060	2,500,731

North Bexar County Population Projections⁶		2000	2010	2020	2030
North Bexar County Trinity Aquifer		23,242	42,946	63,185	105,087
North Bexar County Non-Trinity Aquifer		33,124	80,580	129,903	225,050
Total		56,366	123,526	193,088	330,137

North Bexar County Trinity-Water Demands		2000	2010	2020	2030
(Per Capita Rate) ⁷	gpd	240	208	201	205
Municipal/Rural (Pop. x Per Capita Rate)	ac-ft/yr	6,400	10,163	14,384	24,288
Irrigation ⁸		158	153	146	140
Mining		113	125	140	140
Livestock		13	13	13	13
Manufacturing		500	550	600	600
Steam Electric		0	0	0	0
Total Trinity Water Demand	ac-ft/yr	7,184	11,004	15,283	25,181

Up to the year 2030, total district wide Trinity Group of Aquifers annual water demand is estimated to increase approximately 350%, from 7,184 ac-ft to 25,181 ac-ft. The estimated amount of Trinity Group of Aquifers groundwater currently available within the county is approximately 70,060 ac-ft per year excluding imported water and estimated to remain such through 2030. As a result, there will be an estimated Trinity Group of Aquifer water surplus of 44,879 ac-ft per year in the year 2030. However, there could be areas of the district where demand will be such that some of the aquifers with lower production capability will be in a stressed condition and may not be able to meet higher demand. These areas should be identified as conditions manifest themselves and alternative water supplies investigated.

⁵ TWDB, Consensus Projections adopted by TWDB, September 17, 2003 (Region L IPP)

⁶ US Census Bureau; US Census (2000)

⁷ TWDB Area GPCD in gallons/day, Water Resources Planning & Information, Water Use Survey

⁸ Irrigation, Mining, Livestock, Manufacturing, and Steam Electric Demands based on 2006 Region L Water Plan in ac-ft/year

Much of the growth now occurring in North Bexar County is focused on the major thoroughfares north of Loop 1604 such as Highway 281 North, Interstate 10 West, and Highway 16 to Bandera as well as along the 1604 North corridor. These areas are generally served by municipal suppliers and private water wells producing from the Upper Glen Rose and Lower Glen Rose stratigraphic units of the Trinity Group of Aquifers and the Cow Creek geologic unit. Municipal water systems and the influx of non-Trinity based water will reduce the dependence on the Trinity Group of Aquifers. Continued growth in the region will have an impact on the Trinity Group of Aquifers and may lead to overextension of the resources available. Water availability will require careful monitoring to assure that impact is managed and minimized to the extent possible.

ACTIONS, PROCEDURES, PERFORMANCE AND AVOIDANCE NECESSARY TO EFFECTUATE THE MANAGEMENT PLAN

The District will manage the supply of groundwater within the District based on the District's best available data and its assessment of water availability and groundwater storage conditions. The most current Groundwater Availability Model and Managed Available Groundwater developed by the TWDB for the Trinity Group of Aquifers or other groundwater models, as well as other studies performed by other entities, will also aid in the decision making process by the District.

The District has adopted Rules that require the permitting of non-exempt wells within the District consistent with the District Management Plan, the provisions of Chapter 36.113, and other pertinent sections of Chapter 36. District Rules can be found at www.trinityglenrose.com/district-rules.

The District is in agreement with the commonly accepted groundwater management principle that opposes the mining of groundwater. Therefore, it shall be the policy of the District to limit withdrawal of groundwater from permitted wells producing from North Bexar County aquifers to no more than the current groundwater availability volumes indicated for the Trinity Group of Aquifers in this Management Plan unless sufficient data is provided to indicate that water can be removed without causing regional reductions to the aquifer. Development or analysis of new or existing groundwater or aquifer data (MAG revisions) may result in changes to the groundwater availability volumes, with a corresponding change in production limits from the affected aquifers.

The District has adopted rules that regulate the production of groundwater consistent with the provisions Chapter 36.116. The District wishes to emphasize that in regulating or limiting groundwater production, it shall be the policy of the District to recognize good scientific data in the development of groundwater usage.

The District will implement and utilize the provisions of this groundwater management plan for all District activities. The District's current and future Rules have and will be promulgated pursuant to the provisions of Texas Water Code Chapter 36 and shall address, implement, and be consistent with the provisions and policies of this plan.

The District shall review and re-adopt this plan, with or without revisions, at least once every five years in accordance with Chapter 36.1072(e). Any amendment to this plan shall be in accordance with Chapter 36.1073.

The District will seek cooperation and coordination in the development and implementation of this plan with the appropriate state, regional or local water management or planning entities.

The District will monitor groundwater conditions through its water level and water quality monitoring programs. If necessary, the District may, through the rule-making process, identify areas within the District which, based on results from District aquifer monitoring, are identified as Critical Groundwater Depletion Areas (CGDA). These areas, when identified by the District in accordance with District Rules, may require specific pumping limits or reduction measures to ensure that groundwater supply is maintained and protected.

The District will encourage cooperative and voluntary Rule compliance, but if Rule enforcement becomes necessary, the enforcement will be legal, fair, and impartial.

METHODOLOGY FOR TRACKING PROGRESS IN ACHIEVING MANAGEMENT GOALS

The District will present an Annual Report to the Board of Directors on District performance and progress in achieving management goals and objectives at the last regular Board meeting of each fiscal year.

GROUNDWATER MANAGEMENT GOALS

1.0 Implement management strategies that will provide for the most efficient use of groundwater.

1.1 Management Objective

Implement and maintain a program of issuing well operating permits for non-exempt wells within the District.

Performance Standards

Annually, the number of well operating permits applications and the number of permits issued for the year will be included in the Annual Report submitted to the Board of Directors of the District.

1.2 Management Objective

Collect meter readings and maintain database of monthly well pumping for non-exempt wells within the District which report pumping in accordance with the District Rules.

Performance Standards

The number of monthly records entered for non-exempt well pumping data.

2.0 Implement strategies that will control and prevent waste of groundwater.

2.1 Management Objective

Each year the District will provide to local newspapers at least one-article describing water efficient practices available for implementation by groundwater users.

Performance Standards

Number of articles describing water efficient practices submitted to local newspapers each year.

2.2 Management Objective

Each year, the District will provide information to the public on eliminating or reducing wasteful practices in the use of groundwater by including information on groundwater waste reduction on the District's website.

Performance Standards

Online resources available on District website addressing groundwater waste reduction practices.

2.3 **Management Objective**

Make a speaker available to local clubs and organizations or a display booth at public events.

Performance Standards

Number of speaking engagements or booth displays offered each year as noted in Annual Report.

2.4 **Management Objective**

The District will make an annual evaluation of the District Rules and determine if amendments to the District Rules are recommended to prevent or reduce the waste of groundwater in the District.

Performance Standards

Agenda item during at least one monthly Board Meeting for discussion of annual evaluation of the District Rules.

3.0 Implement strategies that will control and prevent subsidence.

The rigid geologic framework of the region precludes significant subsidence from occurring. Therefore, this goal is not applicable to the operations of this District.

4.0 Implement management strategies that will address conjunctive surface water management issues.

4.1 **Management Objective**

Collaborate with USGS and other agencies through spring surveys and other research projects regarding correlations between spring flow, surface stream elevations/flows, rainfall, and groundwater levels.

Performance Standard

Evaluate need to conduct research and/or partner with other agencies to gather conjunctive surface water data and submit research recommendations to District Board annually.

5.0 Implement strategies that will address natural resource issues which impact the use and availability of groundwater, or which are impacted by the use of groundwater.

The District is not aware of any such natural resource issues that affect the use and availability of groundwater, or which are impacted by the use of groundwater. Therefore, this goal is not applicable to the operations of the District at this time.

6.0 Implement strategies that will address drought conditions.

6.1 **Management Objective**

Review Palmer Drought Severity Index (PDSI) posted on the National Weather Service - Climate Prediction Center website

www.ncdc.noaa.gov/oa/climate/research/prelim/drought/palmer.html

Monthly and check for updates to the Texas Drought Preparedness Council Situation Report on the Texas Department of Public Safety website

www.txdps.state.tx.us/dem/sitrepindex.htm.

Performance Standards

Report drought status in the District to the Board of Directors at least quarterly.

6.2 Management Objective

Provide and post drought-orientated literature on the District's website.

Performance Standards

Drought-orientated literature posted on the District's website.

6.3 Management Objective

The District will collect water levels on selected monitor wells representative of the major aquifer within the District in accordance with the water level monitoring plan developed by the Board of Directors.

Performance Standard

Number of water level records collected annually.

6.4 Management Objective

Monitor compliance of non-exempt wells with District's Emergency Drought Management Plan once trigger conditions are reached.

Performance Standard

Preparation and distribution of Press Releases and District water restriction requirements to District water users.

7.0 Implement strategies that will address:

Conservation

7.1 Management Objective

Each year the District will provide local newspaper with at least one article identifying the importance of water conservation and water conservation methods.

Performance Standards

A copy of the article(s) regarding water conservation submitted each year will be included in the Annual Report to the District Board of Directors.

7.2 **Management Objective**

Provide water conservation guideline and resource links on the District's website.

Performance Standards

Conservation guidelines and links posted on the District's website.

7.3 **Management Objective**

Provide to the public, upon request, conservation literature handouts.

Performance Standards

Number of conservation handouts requested per year.

Recharge Enhancement

7.4 **Management Objective**

Investigate potential natural or artificial recharge enhancement projects.

Performance Standard

Annually, the General Manager will provide a report to Board of Directors on potential recharge enhancement projects.

Rainwater Harvesting

7.5 **Management Objective**

Support rainwater harvesting efforts by providing information to the public through brochures and the Authorities educational program.

Performance Standard

Maintain brochures that are available to the public at the District office and have brochures available at 100% of educational events.

Precipitation Enhancement

Not applicable at this time.

Brush Control

7.6 **Management Objective**

The District will encourage brush control and Best Management Practices related to the same where appropriate.

Performance Standard

Annually, the District will conduct a review of the policies adopted by the District related to brush control practices and/or the progression of brush control within the District. A copy of the review will be included in the annual report to the

District Board of Directors. If it is found from review that no policies that relate to brush control practices were adopted by the District during the previous year, then a statement of such will be included in the annual report.

8.0 Addressing Desired Future Conditions in a quantitative manner

The District has set Desired Future Conditions and is currently awaiting receipt of Managed Available Groundwater estimates from TWDB. Once MAG estimates are received, the District will adopt a management policy, in conjunction with the GMA 9 Technical Committee recommendations, to address DFCs in a quantitative manner. At this time this goal is not applicable.

REFERENCES

- Ashworth, J. B.**, 1983, Ground-water availability of the lower Cretaceous formations in the Hill Country of south-central Texas. Texas Department of Water Resources Report 273, 65 p.
- 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.
- South Central Texas Regional Water Planning Group** (SCTRWPG), Region L Water Plan, 2006.
- Texas Legislative Council**; TGRGCD 2000 Census TIGER File.
- Texas Water Development Board**,
<http://www.twdb.state.tx.us/DATA/db07/defaultReadOnly.asp>
- Texas Water Development Board**,
http://www.twdb.state.tx.us/mapping/maps/pdf/gma/GMA_9.pdf
- Texas Water Development Board**, Water Resources Planning & Information, Water Use Survey.
- Texas Water Development Board**, Consensus Projections adopted September 17, 2003 (Region L IPP).
- Texas Water Development Board**, Groundwater Availability Model (GAM) 09-032.
- Trinity Glen Rose Groundwater Conservation District**, Pumpage Database.
- U.S. Census Bureau**, United States Census (2000).

APPENDIX A

STATE OF TEXAS

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§

**RESOLUTION #
072610-01**

**GROUNDWATER §
MANAGEMENT AREA 9 §**

Designation of Desired Future Conditions For Groundwater Management Area 9 Aquifers

WHEREAS, Groundwater Conservation Districts (GCDs) located within or partially within Groundwater Management Area 9 (GMA 9) are required under Chapter 36.108, Texas Water Code to conduct joint planning and designate the Desired Future Conditions of aquifers within GMA 9 and;

WHEREAS, the Board Presidents or their Designated Representatives of GCDs in GMA 9 have met as a Committee in various meetings and conducted joint planning in accordance with Chapter 36.108, Texas Water Code since September 2005 and;

WHEREAS, GMA 9, having given proper and timely notice, held an open meeting of the GMA 9 Committee on July 26, 2010 at the Boerne High School Auditorium, 1 Greyhound Lane, Boerne, Texas and;

WHEREAS, since September 20, 2005, GMA 9 has solicited and considered public comment at various GMA 9 Committee meetings, at nine special Public Meetings, one Public Hearing on the Edwards Group of the Edwards Trinity (Plateau), and from a stakeholders section in the University of Texas at Austin LBJ School of Public Affairs Policy Research Project Report 161, and;

WHEREAS, the GMA 9 Committee received and considered technical advice regarding local aquifers, hydrology, geology, recharge characteristics, local groundwater demands and usage, population projections, ground and surface water inter-relationships, and other considerations that affect groundwater conditions from the Texas Water Development Board (TWDB), Regional Water Planning Groups J, K, and L, consultants, hydrologists, geologists, and other groundwater professionals, and;

WHEREAS, following public discussion and due consideration of the current and future needs and conditions of the aquifers in question, the current and projected groundwater demand estimates from local GCDs, the TWDB, and Regional Water Planning Groups J, K, and L, and

the potential effects on springs, surface water, habitat, and water-dependent species for DFCs set through the year 2060, the following motions were made:

Motion #1:

Moved by Tommy Boehme and seconded by Gene Williams to designate the following Desired Future Condition through the year 2060 for the Trinity aquifer located in GMA 9:

- Hill Country Trinity Aquifer -
allow for an increase in average drawdown of approximately 30 feet through 2060
consistent with "Scenario 6" in TWDB Draft GAM Task 10-005

the vote on the motion was 8 ayes, 1 nays, and 0 abstentions, and the Motion Passed.

Motion #2

Moved by Gene Williams and seconded by Luana Buckner to declare the Edwards Group of the Hill Country Aquifer located in Kerr County as a not-relevant aquifer:

the vote on the motion was 7 ayes, 2 nays, and 0 abstentions, and the Motion Passed.

Motion #3

Moved by Micah Voulgaris and seconded by Luana Buckner to declare the Edwards Group of the Hill Country Aquifer located in Kendall County as a relevant aquifer:

the vote on the motion was 9 ayes, 0 nays, and 0 abstentions, and the Motion Passed.

Motion #4

Moved by Jim Chastain and seconded by Luana Buckner to declare the Edwards Group of the Hill Country Aquifer located in Bandera County as a relevant aquifer:

the vote on the motion was 9 ayes, 0 nays, and 0 abstentions, and the Motion Passed.

Motion #5

Moved by Micah Voulgaris and seconded by Jim Chastain to designate the following Desired Future Condition through the year 2060 for the Edwards Group of the Hill Country Aquifer located in Kendall and Bandera County:

- Edward Group of the Edwards Trinity (Plateau) – no net increase in average drawdown for those portions located in Kendall and Bandera County

the vote on the motion was 9 ayes, 0 nays, and 0 abstentions, and the Motion Passed.

Motion #6

Moved by Neill Binford and seconded by Luana Buckner to declare the Edwards Group of the Hill Country Aquifer located in Blanco County as a not-relevant aquifer:

the vote on the motion was 9 ayes, 0 nays, and 0 abstentions, and the Motion Passed, and,

Whereas, the above Motions and votes of each Committee Member have been recorded in the Minutes of the July 26, 2010 GMA 9 Committee Meeting,

NOW THEREFORE BE IT RESOLVED, Groundwater Management Area 9 Committee Members present and voting on July 26, 2010 do hereby document, record, and confirm the above described Motions and votes.

Approved by consensus and signed on July 26, 2010 by the following Voting GMA 9 Committee Members,

Neill Binford - President of the Blanco Pedernales GCD

Jim Chastain - President of the Bandera County River Authority and Groundwater Conservation District

Tommy Boehme - President of the Medina County GCD

Jimmy Skipton - President of the Hays Trinity GCD

Brian Hunt - Designated Representative for the Barton Springs/Edwards Aquifer Conservation District

Micah Voulgaris – General Manager and Designated Representative for the Cow Creek GCD

Jorge Gonzales – Vice President and Designated Representative for the Trinity Glen Rose GCD

Luana Buckner - Chairman of the Edwards Aquifer Authority

Gene Williams - Designated Representative for the Headwaters GCD

**Appendix B – TGRGCD Management Plan Data Export
(Compiled County Wide and TGRGCD Specific Data Sets⁹)**

⁹ Data compiled and distributed to TGRGCD by TWDB, Lance Christian, 12/30/09

**2007 State Water Plan
Projected Water Demands
Trinity Glen Rose Groundwater Conservation District (District Specific)
Water Demands Data**

Bexar County¹⁰

RWPG	Water User Group	County	River Basin	2010	2020	2030	2040	2050	2060
L	Fairoaks Ranch	Bexar	San Antonio	1,090	1,094	1,097	1,101	1,099	1,104
L	Helotes	Bexar	San Antonio	1,537	2,249	2,820	3,264	3,679	4,047
L	San Antonio	Bexar	San Antonio	192,008	213,942	234,864	250,671	265,957	281,204
L	San Antonio	Bexar	San Antonio	24,654	27,471	30,157	32,187	34,150	36,107
L	San Antonio	Bexar	San Antonio	284	317	348	371	394	416
L	Bexar Met Water District	Bexar	San Antonio	8,736	8,869	8,944	8,945	9,081	9,278
L	Water Services Inc.	Bexar	San Antonio	570	697	809	902	982	1,061
L	County Other*	Bexar	San Antonio	176	139	118	185	246	301
L	County Other*	Bexar	San Antonio	1,412	1,433	1,446	1,446	1,467	1,499
L	Manufacturing*	Bexar	San Antonio	6,472	7,357	8,174	8,995	9,718	10,503
L	Steam Electric Power*	Bexar	San Antonio	4,317	4,308	5,037	5,925	7,008	8,327
L	Mining*	Bexar	San Antonio	861	945	997	1,048	1,100	1,145
L	Irrigation*	Bexar	San Antonio	3,489	3,342	3,201	3,065	2,935	2,811
L	Livestock*	Bexar	San Antonio	323	323	323	323	323	323
Total Projected Water Demands (acre-feet per year) =				245,929	272,486	298,335	318,428	338,139	358,126

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

12/10/2009

¹⁰ * Since the District only encompasses a portion of Bexar County, it is recommended that all estimates presented in the management plan be based on (reduced by) a proportional area percentage unless more accurate data is available to the District. One percentage can be derived by dividing the amount of acres or square miles covered by the District by the total number of acres or square miles contained within Bexar County. However, many of the county-wide Water User Groups were subdivided into surface water basins so the apportionment methodology utilized for these data compared the District area to the area of Bexar County that lies within the San Antonio River basin. The percentage derived by the T.W.D.B. is 24.94% (i.e. 0.2494; see the 'Area estimate' tab), but any estimate that the District provides is preferable. Since the basin-wide data (e.g. county other, manufacturing, steam electric power, irrigation, livestock) represent the entire area within a basin and do not represent district-specific estimates, the basin-wide data have been converted to an apportioned value (relative to the size of the District within the San Antonio River basin) by multiplying each value from the 'County Water Demands' worksheet by 0.2494. All of the Water User Groups located within the county data set but outside of the basin boundaries were excluded.

Comal County¹¹

RWPG	Water User Group	County	River Basin	2010	2020	2030	2040	2050	2060
L	Fairoaks Ranch	Comal	San Antonio	58	58	58	58	58	59
L	County Other*	Comal	San Antonio	2.4	3.0	3.5	4.3	5.1	6.1
L	Manufacturing*	Comal	San Antonio	0.02	0.02	0.02	0.04	0.04	0.04
L	Irrigation*	Comal	San Antonio	0.6	0.5	0.5	0.4	0.4	0.3
L	Livestock*	Comal	San Antonio	0.9	0.9	0.9	0.9	0.9	0.9
Total Projected Water Demands (acre-feet per year) =				61.92	62.42	62.92	63.64	64.44	66.34

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

12/10/2009

¹¹ * Since the District only encompasses a portion of Comal County, it is recommended that all estimates presented in the management plan be based on (reduced by) a proportional area percentage unless more accurate data is available to the District. This percentage can be derived by dividing the amount of acres or square miles covered by the District by the total number of acres or square miles contained within Comal County. However, many of the county-wide Water User Groups were subdivided into surface water basins so the apportionment methodology utilized for these data compared the District area to the area of Bexar County that lies within the San Antonio River basin. The percentage derived by the T.W.D.B. is 2.04% (i.e. 0.0204; see the 'Area estimate' tab), but any estimate that the District provides is preferable. Since the basin-wide data (e.g. county other, manufacturing, steam electric power, irrigation, livestock) represent the entire area within a basin and do not represent district-specific estimates, the basin-wide data have been converted to an apportioned value (relative to the size of the District within the San Antonio River basin) by multiplying each value from the 'County Water Demands' worksheet by 0.0204. All of the Water User Groups located within the county data set but outside of the basin boundaries were excluded.

Kendall County¹²

RWPG	Water User Group	County	River Basin	2010	2020	2030	2040	2050	2060
L	Fairoaks Ranch	Kendall	San Antonio	286	296	300	305	310	316
L	County Other*	Kendall	San Antonio	30	42	55	65	74	83
L	Irrigation*	Kendall	San Antonio	5	5	5	5	5	5
L	Livestock*	Kendall	San Antonio	2	2	2	2	2	2
Total Projected Water Demands (acre-feet per year) =				323	345	362	377	391	406

Source: Volume 3, 2007 State Water Planning Database

12/10/2009

(<http://www.twdb.state.tx.us/DATA/db07/defaultReadOnly.asp>)

¹² * Since the District only encompasses a portion of Kendall County, it is recommended that all estimates presented in the management plan be based on (reduced by) a proportional area percentage unless more accurate data is available to the District. This percentage can be derived by dividing the amount of acres or square miles covered by the District by the total number of acres or square miles contained within Kendall County. However, many of the county-wide Water User Groups were subdivided into surface water basins so the apportionment methodology utilized for these data compared the District area to the area of Bexar County that lies within the San Antonio River basin. The percentage derived by the T.W.D.B. is 2.82% (i.e. 0.0282; see the 'Area estimate' tab), but any estimate that the District provides is preferable. Since the basin-wide data (e.g. county other, manufacturing, steam electric power, irrigation, livestock) represent the entire area within a basin and do not represent district-specific estimates, the basin-wide data have been converted to an apportioned value (relative to the size of the District within the San Antonio River basin) by multiplying each value from the 'County Water Demands' worksheet by 0.0282. All of the Water User Groups located within the county data set but outside of the basin boundaries were excluded.

2007 State Water Plan
Projected Surface Water Supply
Trinity Glen Rose Groundwater Conservation District (District Specific)
Surface Water Supply Data

Bexar County¹³

RWPG	Water User Group	County	River Basin	Source Name	2010	2020	2030	2040	2050	2060
L	Fairoaks Ranch	Bexar	San Antonio	Canyon Lake/Reservoir	900	962	1,036	1,036	1,036	1,036
L	San Antonio	Bexar	San Antonio	Canyon Lake/Reservoir	7,500	5,500	4,000	0	0	0
L	San Antonio	Bexar	San Antonio	Canyon Lake/Reservoir	4,000	0	0	0	0	0
L	San Antonio	Bexar	San Antonio	San Antonio River Run-of-River	212	212	212	212	212	212
L	San Antonio	Bexar	San Antonio	San Antonio River Run-of-River	2,921	2,921	2,921	2,921	2,921	2,921
L	San Antonio	Bexar	San Antonio	San Antonio River Run-of-River	100	100	100	100	100	100
L	Bexar Met Water District	Bexar	San Antonio	San Antonio River Run-of-River	574	495	427	370	319	270
L	East Central WSC	Bexar	San Antonio	Canyon Lake/Reservoir	1,170	251	251	251	251	251
L	Green Valley SUD	Bexar	San Antonio	Canyon Lake/Reservoir	214	214	214	257	257	257
L	County Other*	Bexar	San Antonio	Canyon Lake/Reservoir	0	13	13	0	0	0
L	Manufacturing*	Bexar	San Antonio	San Antonio River Run-of-River	0.7	0.7	0.7	0.7	0.7	0.7
L	Steam Electric Power*	Bexar	San Antonio	Calaveras Lake/Reservoir	9,203	9,203	9,203	9,203	9,203	9,203

¹³ * Since the District only encompasses a portion of Bexar County, it is recommended that all estimates presented in the management plan be based on (reduced by) a proportional area percentage unless more accurate data is available to the District. One percentage can be derived by dividing the amount of acres or square miles covered by the District by the total number of acres or square miles contained within Bexar County. However, many of the county-wide Water User Groups were subdivided into surface water basins so the apportionment methodology utilized for these data compared the District area to the area of Bexar County that lies within the San Antonio River basin. The percentage derived by the T.W.D.B. is 24.94% (i.e. 0.2494; see the 'Area estimate' tab), but any estimate that the District provides is preferable. Since the basin-wide data (e.g. county other, manufacturing, steam electric power, irrigation, livestock) represent the entire area within a basin and do not represent district-specific estimates, the basin-wide data have been converted to an apportioned value (relative to the size of the District within the San Antonio River basin) by multiplying each value from the 'County Water Demands' worksheet by 0.2494. All of the Water User Groups located within the county data set but outside of the basin boundaries were excluded.

L	Steam Electric Power*	Bexar	San Antonio	Victor Braunig Lake/Reservoir	2,993	2,993	2,993	2,993	2,993	2,993
L	Irrigation*	Bexar	San Antonio	San Antonio River Combined Run-of-River Irrigation	554	554	554	554	554	554
L	Livestock*	Bexar	San Antonio	Livestock Local Supply	162	162	162	162	162	162
Total Projected Surface Water Supplies (acre-feet per year) =					30,504	23,580	22,086	18,060	18,009	17,960

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

12/11/2009

Comal County¹⁴

RWPG	Water User Group	County	River Basin	Source Name	2010	2020	2030	2040	2050	2060
L	Fairoaks Ranch	Comal	San Antonio	Canyon Lake/Reservoir	48	65	70	70	70	70
L	County Other*	Comal	San Antonio	Canyon Lake/Reservoir	0.9	8.2	8.2	8.2	8.2	8.2
L	Livestock*	Comal	San Antonio	Livestock Local Supply	0.4	0.4	0.4	0.4	0.4	0.4
Total Projected Surface Water Supplies (acre-feet per year) =					49	74	79	79	79	79

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

12/11/2009

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Kendall County¹⁵

RWPG	Water User Group	County	River Basin	Source Name	2010	2020	2030	2040	2050	2060
L	Fairoaks Ranch	Kendall	San Antonio	Canyon Lake/Reservoir	252	273	294	294	294	294
L	County Other*	Kendall	San Antonio	Canyon Lake/Reservoir	21	33	42	42	42	42
L	Livestock*	Kendall	San Antonio	Livestock Local Supply	1	1	1	1	1	1
Total Projected Surface Water Supplies (acre-feet per year) =					274	307	337	337	337	337

Source: Volume 3, 2007 State Water Planning Database

12/11/2009

(<http://www.twdb.state.tx.us/DATA/db07/defaultReadOnly.asp>)

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**2007 State Water Plan
Projected Water Needs
Total County - Projected Water Needs**

Bexar County ¹⁶ (Positive values reflect a water surplus; negative values reflect a water need.)									
RWP G	WUG	County	River Basin	2010	2020	2030	2040	2050	2060
L	Fairoaks Ranch	Bexar	San Antonio	6	64	135	131	98	93
L	Helotes	Bexar	San Antonio	0	0	0	0	0	0
L	San Antonio	Bexar	San Antonio	-53166	-78094	-101583	-122024	-138024	-153980
L	San Antonio	Bexar	San Antonio	-10455	-17272	-19958	-21988	-23951	-25908
L	San Antonio	Bexar	San Antonio	-184	-217	-248	-271	-294	-316
L	Water Services Inc.	Bexar	San Antonio	-544	-671	-783	-876	-956	-1035
L	Bexar Met Water District	Bexar	San Antonio	-6314	-6526	-6889	-6958	-7155	-7410
L	County Other*	Bexar	San Antonio	1870	1908	1642	1556	1488	1423
L	County Other*	Bexar	San Antonio	0	0	0	0	0	0
L	Manufacturing*	Bexar	San Antonio	-813	-1697	-2514	-3336	-4058	-4843
L	Steam Electric Power*	Bexar	San Antonio	7879	7887	7159	6271	5188	3868
L	Mining*	Bexar	San Antonio	0	0	-219	-242	-266	-287
L	Irrigation*	Bexar	San Antonio	1755	1894	1989	2117	2239	2357
L	Livestock*	Bexar	San Antonio	0	0	-20	-21	-22	-23
Total Projected Water Needs (acre-feet per year) =				-71,476	-104,477	-132,214	-155,716	-174,726	-193,802
Source: Volume 3, 2007 State Water Planning Database									12/11/2009

¹⁶ * Since the District only encompasses a portion of Bexar County, it is recommended that all estimates presented in the management plan be based on (reduced by) a proportional area percentage unless more accurate data is available to the District. One percentage can be derived by dividing the amount of acres or square miles covered by the District by the total number of acres or square miles contained within Bexar County. However, many of the county-wide Water User Groups were subdivided into surface water basins so the apportionment methodology utilized for these data compared the District area to the area of Bexar County that lies within the San Antonio River basin. The percentage derived by the T.W.D.B. is 24.94% (i.e. 0.2494; see the 'Area estimate' tab), but any estimate that the District provides is preferable. Since the basin-wide data (e.g. county other, manufacturing, steam electric power, irrigation, livestock) represent the entire area within a basin and do not represent district-specific estimates, the basin-wide data have been converted to an apportioned value (relative to the size of the District within the San Antonio River basin) by multiplying each value from the 'County Water Demands' worksheet by 0.2494. All of the Water User Groups located within the county data set but outside of the basin boundaries were excluded.

(<http://www.twdb.state.tx.us/DATA/db07/defaultReadOnly.asp>)

Comal County¹⁷ (Positive values reflect a water surplus; negative values reflect a water need.)

RWPG	WUG	County	River Basin	2010	2020	2030	2040	2050	2060
L	Fairoaks Ranch	Comal	San Antonio	3	20	25	25	23	22
L	County Other*	Comal	San Antonio	-1.1	6	5	4	3	2
L	Irrigation*	Comal	San Antonio	0.3	0.3	0.4	0.4	0.5	0.5
L	Livestock*	Comal	San Antonio	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4
L	Manufacturing*	Comal	San Antonio	8	8	8	7	7	7
Total Projected Water Needs (acre-feet per year) =				-2	-0.4	-0.4	-0.4	-0.4	-0.4

Source: Volume 3, 2007 State Water Planning Database

12/11/2009

(<http://www.twdb.state.tx.us/DATA/db07/defaultReadOnly.asp>)

Kendall County¹⁸ (Positive values reflect a water surplus; negative values reflect a water need.)

RWPG	WUG	County	River Basin	2010	2020	2030	2040	2050	2060
L	Fairoaks Ranch	Kendall	San Antonio	0	11	28	23	12	6
L	County Other*	Kendall	San Antonio	0	0.1	-3	-13	-23	-32
L	Irrigation*	Kendall	San Antonio	-4	-4	-4	-4	-4	-4
L	Livestock*	Kendall	San Antonio	-0.7	-0.7	-0.7	-0.7	-0.8	-0.8
Total Projected Water Needs (acre-feet per year) =				-5	-5	-8	-18	-28	-37

Source: Volume 3, 2007 State Water Planning Database

12/11/2009

(<http://www.twdb.state.tx.us/DATA/db07/defaultReadOnly.asp>)

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2007 State Water Plan
Projected Water Management Strategies
Trinity Glen Rose GCD Estimates

Bexar County¹⁹

R W P G	WUG	WUG County	River Basin	Water Management Strategy	Source Name	Source County	2010	2020	2030	2040	2050	2060
L	Fairoaks Ranch	Bexar	San Antonio	Municipal Water Conservation	Conservation	Bexar	94	185	269	345	361	382
L	Helotes	Bexar	San Antonio	Municipal Water Conservation	Conservation	Bexar	115	345	539	674	832	993
L	San Antonio	Bexar	San Antonio	Edwards Transfers	Edwards BFZ Aquifer	Uvalde	25,103	48,000	48,000	48,000	48,000	48,000
L	San Antonio	Bexar	San Antonio	Regional Carrizo for Bexar County Supply - Temporary Overdraft	Carrizo-Wilcox Aquifer	Gonzales	1,445	8,433	31,922	45,188	14,485	28,337
L	San Antonio	Bexar	San Antonio	Regional Carrizo for Bexar County Supply - Temporary Overdraft	Carrizo-Wilcox Aquifer	Wilson	7,455	7,224	7,021	6,843	6,684	6,548
L	San Antonio	Bexar	San Antonio	Local Groundwater (Trinity Aquifer)	Trinity Aquifer	Bexar	5,000	5,000	5,000	5,000	5,000	5,000
L	San Antonio	Bexar	San Antonio	Municipal Water Conservation	Conservation	Bexar	4,956	6,320	7,607	9,095	13,710	20,822
L	San Antonio	Bexar	San Antonio	Municipal Water Conservation	Conservation	Bexar	184	217	248	271	294	316
L	San Antonio	Bexar	San Antonio	Municipal Water Conservation	Conservation	Bexar	612	781	940	1,124	1,694	2,573

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L	San Antonio	Bexar	San Antonio	Regional Carrizo for Bexar County Supply - Temporary Overdraft	Carrizo-Wilcox Aquifer	Wilson	1,902	1,912	1,919	1,926	1,933	1,939
L	San Antonio	Bexar	San Antonio	Regional Carrizo for Bexar County Supply - Temporary Overdraft	Carrizo-Wilcox Aquifer	Wilson	1,643	1,864	2,060	2,231	2,383	2,513
L	San Antonio	Bexar	San Antonio	Brackish Groundwater Desalination (Wilcox Aquifer)	Carrizo-Wilcox Aquifer - Brackish	Bexar	5,662	5,662	5,662	5,662	5,662	5,662
L	San Antonio	Bexar	San Antonio	Hays/Caldwell Carrizo Project - Temporary Overdraft	Carrizo-Wilcox Aquifer	Caldwell	0	0	0	0	1,372	4,321
L	San Antonio	Bexar	San Antonio	LCRA/SAWS Water Project	Colorado River Run-of-River	Matagorda	0	0	0	0	37,545	39,648
L	San Antonio	Bexar	San Antonio	LCRA/SAWS Water Project	Highland Lakes Lake/Reservoir System	Reservoir	0	0	0	0	16,333	16,333
L	San Antonio	Bexar	San Antonio	Edwards Transfers	Edwards BFZ Aquifer	Bexar	2,960	2,960	2,960	2,960	2,960	2,960
L	San Antonio	Bexar	San Antonio	Local Groundwater (Carrizo-Wilcox Aquifer) - Temporary Overdraft	Carrizo-Wilcox Aquifer	Bexar	4,000	4,000	4,000	4,000	4,000	4,000
L	San Antonio	Bexar	San Antonio	Local Groundwater (Trinity Aquifer)	Trinity Aquifer	Bexar	3,495	7,539	7,082	6,948	6,688	6,381
L	San Antonio	Bexar	San Antonio	Edwards Aquifer Recharge - Type 2 Projects	San Antonio River Run-of-River Recharge	Bexar	0	719	719	3,130	4,000	4,000
L	San Antonio	Bexar	San Antonio	CRWA Dunlap Project - Temporary Overdraft	Carrizo-Wilcox Aquifer	Gonzales	0	1,273	4,258	3,826	3,237	1,673
L	Bexar Met Water District	Bexar	San Antonio	Wells Ranch Project - Temporary Overdraft	Carrizo-Wilcox Aquifer	Gonzales	1,088	0	0	0	0	0
L	Bexar Met Water District	Bexar	San Antonio	Local Groundwater (Trinity Aquifer)	Trinity Aquifer	Bexar	4,545	5,961	6,418	6,552	6,812	7,119
L	Bexar Met Water District	Bexar	San Antonio	Edwards Transfers	Edwards BFZ Aquifer	Bexar	681	565	471	406	343	291
L	Bexar Met Water District	Bexar	San Antonio	Municipal Water Conservation	Conservation	Bexar	0	0	0	0	0	293
L	Water Services Inc.	Bexar	San Antonio	Municipal Water Conservation	Conservation	Bexar	0	0	0	18	50	105
L	Water Services Inc.	Bexar	San Antonio	Edwards Transfers	Edwards BFZ Aquifer	Medina	544	671	783	876	956	1,035
L	Irrigation *	Bexar	Nueces	Irrigation Water Conservation	Conservation	Bexar	132	132	132	132	132	132

L	Livestock*	Bexar	San Antonio	Local Groundwater (Carrizo-Wilcox Aquifer) - Temporary Overdraft	Carrizo-Wilcox Aquifer	Bexar	0	0	23	23	23	23
L	Manufacturing*	Bexar	San Antonio	SAWS Recycled Water Program - Phased Expansion	Direct Reuse	Bexar	1,067	2,064	2,563	3,561	5,556	5,556
L	County Other*	Bexar	San Antonio	Municipal Water Conservation	Conservation	Bexar	12	24	35	48	77	126
L	Mining*	Bexar	San Antonio	Edwards Aquifer Recharge - Type 2 Projects	San Antonio River Run-of-River Recharge	Bexar	0	0	311	311	311	311
Total Projected Water Management Strategies (acre-feet per year) =							72,695	111,851	140,942	159,150	191,433	217,392

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

12/17/2009

Comal County²⁰

RW PG	WUG	WUG County	River Basin	Water Management Strategy	Source Name	Source County	2010	2020	2030	2040	2050	2060
L	Fairoaks Ranch	Comal	San Antonio	Municipal Water Conservation	Conservation	Bexar	5	10	14	18	19	20
L	Livestock*	Comal	San Antonio	Local Groundwater (Trinity Aquifer)	Trinity Aquifer	Comal	0.4	0.4	0.4	0.4	0.4	0.4
Total Projected Water Management Strategies (acre-feet per year) =							5.4	10.4	14.4	18.4	19.4	20.4

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

12/11/2009

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Kendall County²¹

RW PG	WUG	WUG County	River Basin	Water Management Strategy	Source Name	Source County	2010	2020	2030	2040	2050	2060
L	Fairoaks Ranch	Kendall	San Antonio	Municipal Water Conservation	Conservation	Bexar	26	51	75	97	101	107
L	County Other*	Kendall	San Antonio	LGWSP for GBRA Needs	Guadalupe River Run-of-River LGWSP	Cahoon	0.0	0.0	2.5	13	23	32
L	Irrigation *	Kendall	San Antonio	Local Groundwater (Trinity Aquifer)	Trinity Aquifer	Kendall	4.2	4.2	4.2	4.2	4.2	4.2
L	Livestock *	Kendall	San Antonio	Local Groundwater (Trinity Aquifer)	Trinity Aquifer	Kendall	0.8	0.8	0.8	0.8	0.8	0.8
Total Projected Water Management Strategies (acre-feet per year) =							5.0	5.0	7.5	18.0	28.0	37.0

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

12/11/2009

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Historical Groundwater Pumpage Summary

TWDB - Water Use Survey

Total County Estimates

Unit: Acre Feet (ACFT)

Bexar County²²

Year	Aquifer	Municipal ¹	Manufacturing ¹	Steam Electric ¹	Irrigation ¹	Mining ¹	Livestock ¹	Total
1980	CARRIZO-WILCOX	198	0	0	824	13	7	1,042
	EDWARDS (BFZ)	55,395	1,794	176	2,678	84	49	60,176
	TRINITY	144	0	0	149	32	6	332
Total		55,737	1,794	176	3,651	129	62	61,550
1984	CARRIZO-WILCOX	378	201	0	618	63	4	1,265
	EDWARDS (BFZ)	62,634	917	145	4,831	0	31	68,558
	TRINITY	426	0	0	268	0	4	698
Total		63,439	1,118	145	5,717	63	39	70,522
1985	CARRIZO-WILCOX	190	12	0	248	50	9	509
	EDWARDS (BFZ)	57,556	879	303	3,882	574	12	63,205
	TRINITY	288	612	0	0	0	12	913
Total		58,034	1,503	303	4,130	624	34	64,628
1986	CARRIZO-WILCOX	189	162	0	243	0	10	603
	EDWARDS (BFZ)	58,741	1,075	297	3,800	379	13	64,305
	TRINITY	387	612	0	0	0	13	1,012
Total		59,317	1,849	297	4,043	379	36	65,920
1987	CARRIZO-WILCOX	199	162	0	189	45	8	603
	EDWARDS (BFZ)	56,700	690	271	2,963	289	11	60,923
	TRINITY	404	751	0	0	0	11	1,166
Total		57,304	1,602	271	3,152	333	30	62,692
1988	CARRIZO-WILCOX	248	335	0	228	38	9	858
	EDWARDS (BFZ)	62,536	720	180	3,568	317	11	67,333
	TRINITY	648	961	0	0	0	11	1,621
Total		63,432	2,017	180	3,796	356	31	69,812

²² Since the District does not cover all of Bexar County, and the data are not subdivided into surface water basins, it is recommended that the Historical Groundwater Pumpage estimates presented in the management plan be based on (reduced by) a proportional area percentage unless more accurate data is available to the District. This percentage can be derived by dividing the amount of acres or square miles covered by the District by the total number of acres or square miles contained within Bexar County. The percentage derived by the T.W.D.B. is 24.34% (i.e. 0.2434; see the 'Area' tab), but any estimate that the District provides is preferable. The county-wide data above have been converted to a proportional value (relative to the size of the District) by multiplying each value from the 'County Historical Groundwater Pumpage' worksheet by 0.2434.

1989	CARRIZO-WILCOX	210	6	0	267	36	9	527
	EDWARDS (BFZ)	62,566	697	180	5,538	285	11	69,277
	TRINITY	474	961	0	0	0	11	1,447
Total		63,250	1,664	180	5,805	321	31	71,251
1990	CARRIZO-WILCOX	216	0	0	400	36	9	661
	EDWARDS (BFZ)	56,990	658	169	6,269	304	12	64,402
	TRINITY	408	1,274	0	0	0	12	1,695
Total		57,614	1,933	169	6,669	339	34	66,758
1991	CARRIZO-WILCOX	354	109	0	273	41	9	786
	EDWARDS (BFZ)	53,704	698	112	4,282	754	12	59,561
	TRINITY	519	1,062	0	0	0	12	1,593
Total		54,576	1,869	112	4,555	795	34	61,941
1992	CARRIZO-WILCOX	213	164	0	260	41	10	688
	EDWARDS (BFZ)	54,488	961	83	4,067	808	13	60,421
	TRINITY	381	1,062	0	0	0	13	1,457
Total		55,082	2,187	83	4,327	849	37	62,565
1993	CARRIZO-WILCOX	249	6	0	410	41	11	716
	EDWARDS (BFZ)	57,726	1,496	148	7,782	1,324	14	68,490
	TRINITY	387	1,062	0	0	0	14	1,463
Total		58,363	2,563	148	8,192	1,365	38	70,669
1994	CARRIZO-WILCOX	228	4	0	961	41	8	1,242
	EDWARDS (BFZ)	57,434	1,498	62	6,810	1,324	10	67,137
	TRINITY	482	1,069	0	0	0	10	1,561
Total		58,145	2,570	62	7,772	1,365	27	69,940
1995	CARRIZO-WILCOX	258	10	0	817	41	7	1,133
	EDWARDS (BFZ)	58,575	1,217	66	5,605	1,421	9	66,893
	TRINITY	504	1,069	0	0	0	9	1,582
Total		59,337	2,296	66	6,422	1,462	25	69,608
1996	CARRIZO-WILCOX	359	1	0	870	41	12	1,283
	EDWARDS (BFZ)	59,416	2,103	87	5,968	1,421	16	69,011
	TRINITY	523	1,070	0	0	0	16	1,609
Total		60,297	3,174	87	6,838	1,462	45	71,903
1997	CARRIZO-WILCOX	345	14	0	793	41	12	1,205
	EDWARDS (BFZ)	57,525	1,093	164	5,432	977	16	65,207
	TRINITY	541	1,070	0	0	0	16	1,627
Total		58,411	2,177	164	6,225	1,018	44	68,039
1998	CARRIZO-WILCOX	348	0	0	1,045	18	8	1,419
	EDWARDS (BFZ)	58,005	954	482	7,160	433	10	67,046
	TRINITY	545	526	0	0	0	10	1,082

	Total	58,899	1,481	482	8,205	451	28	69,547
1999	CARRIZO-WILCOX	373	0	0	734	41	8	1,157
	EDWARDS (BFZ)	62,090	1,898	164	5,035	977	11	70,174
	TRINITY	584	1,071	0	0	0	11	1,665
	Total	63,046	2,969	164	5,769	1,018	30	72,996
2000	CARRIZO-WILCOX	358	0	0	296	18	8	680
	EDWARDS (BFZ)	59,553	912	549	2,028	433	10	63,486
	TRINITY	560	526	0	0	0	10	1,097
	Total	60,471	1,438	549	2,324	451	29	65,262
2001	CARRIZO-WILCOX	3	62	0	402	18	8	492
	EDWARDS (BFZ)	58,486	1,639	153	2,165	433	11	62,887
	TRINITY	874	1,069	0	0	0	11	1,954
	Total	59,363	2,770	153	2,566	451	30	65,333
2002	CARRIZO-WILCOX	2	38	0	591	18	8	658
	EDWARDS (BFZ)	54,003	630	87	3,187	433	11	58,351
	TRINITY	973	0	0	0	0	11	984
	Total	54,978	669	87	3,779	451	30	59,993
2003	CARRIZO-WILCOX	2	42	0	271	37	26	377
	EDWARDS (BFZ)	55,253	601	79	1,457	879	34	58,303
	TRINITY	913	0	0	0	0	34	947
	Total	56,168	643	79	1,728	915	93	59,627

NOTE: All Pumpage reported in acre-feet

12/18/2009

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

Comal County²³

Year	Aquifer	Municipal ²	Manufacturing ²	Steam Electric ²	Irrigation ²	Mining ²	Livestock ²	Total
1980	EDWARDS (BFZ)	38	3	0	0	0	0	42
	TRINITY	4	0	0	1	0	1	6
	Total	42	3	0	2	0	1	49
1984	EDWARDS (BFZ)	33	2	0	1	3	0	38
	TRINITY	4	0	0	0	0	1	5
	Total	36	2	0	1	3	1	43
1985	EDWARDS (BFZ)	36	4	0	0	3	0	43
	TRINITY	4	0	0	0	0	1	5
	Total	40	4	0	0	3	1	48
1986	EDWARDS (BFZ)	40	3	0	1	3	0	48
	TRINITY	5	0	0	0	0	1	5
	Total	44	3	0	1	3	1	53
1987	EDWARDS (BFZ)	39	3	0	1	20	0	63
	TRINITY	5	0	0	0	0	1	6
	Total	44	3	0	1	20	1	69
1988	EDWARDS (BFZ)	36	3	0	1	20	0	60
	TRINITY	5	0	0	0	0	1	6
	Total	41	3	0	1	20	1	67
1989	EDWARDS (BFZ)	37	4	0	2	3	0	46
	TRINITY	6	0	0	0	0	1	7
	Total	43	4	0	2	3	1	53
1990	EDWARDS (BFZ)	33	3	0	2	3	0	41
	TRINITY	5	0	0	0	0	1	6
	Total	38	3	0	2	3	1	48
1991	EDWARDS (BFZ)	30	20	0	1	10	0	61
	TRINITY	5	0	0	0	0	1	6
	Total	35	20	0	1	10	1	67
1992	EDWARDS (BFZ)	11	21	0	1	31	0	64
	TRINITY	6	0	0	0	0	1	7
	Total	17	21	0	1	31	1	71

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1993	EDWARDS (BFZ)	11	20	0	0	33	0	64
	TRINITY	7	0	0	0	0	1	8
Total		17	20	0	0	33	1	71
1994	EDWARDS (BFZ)	10	20	0	0	34	0	64
	TRINITY	7	0	0	0	0	1	8
Total		17	20	0	0	34	1	72
1995	EDWARDS (BFZ)	9	20	0	0	30	0	60
	TRINITY	9	0	0	0	0	1	10
Total		19	20	0	0	30	1	70
1996	EDWARDS (BFZ)	11	32	0	0	30	0	73
	TRINITY	7	0	0	0	0	1	8
Total		18	32	0	0	30	1	81
1997	EDWARDS (BFZ)	13	20	0	0	26	0	59
	TRINITY	9	0	0	0	0	1	10
Total		21	20	0	0	26	1	69
1998	EDWARDS (BFZ)	17	21	0	0	8	0	45
	TRINITY	11	0	0	0	0	1	12
Total		28	21	0	0	8	1	57
1999	EDWARDS (BFZ)	20	25	0	0	27	0	72
	TRINITY	13	0	0	0	0	1	14
Total		33	25	0	0	27	1	86
2000	EDWARDS (BFZ)	15	20	0	0	8	0	43
	TRINITY	10	0	0	0	0	1	11
Total		25	20	0	0	8	1	53
2001	EDWARDS (BFZ)	14	6	0	0	8	0	27
	TRINITY	9	0	0	0	0	1	10
Total		23	6	0	0	8	1	37
2002	EDWARDS (BFZ)	17	7	0	0	8	0	31
	TRINITY	9	0	0	0	0	1	10
Total		25	7	0	0	8	1	40
2003	EDWARDS (BFZ)	14	6	0	0	8	0	28
	TRINITY	8	0	0	0	0	0	8
Total		22	6	0	0	8	0	36

NOTE: All Pumpage reported in acre-feet

12/18/2009

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

Kendall County²⁴

Year	Aquifer	Municipal	Manufacturing	Steam Electric	Irrigation	Mining	Livestock	Total
1980	TRINITY	6	0	0	1	0	2	10
1984	TRINITY	9	0	0	2	0	2	12
1985	TRINITY	9	0	0	1	0	2	11
1986	TRINITY	9	0	0	1	0	1	11
1987	TRINITY	8	0	0	1	0	1	10
1988	TRINITY	9	0	0	2	0	2	13
1989	TRINITY	10	0	0	2	0	2	14
1990	TRINITY	9	0	0	2	0	2	13
1991	TRINITY	8	0	0	2	0	2	12
1992	TRINITY	9	0	0	2	0	2	12
1993	TRINITY	10	0	0	5	0	2	17
1994	TRINITY	11	0	0	4	0	2	17
1995	TRINITY	11	0	0	5	0	2	18
1996	TRINITY	12	0	0	5	0	2	19
1997	TRINITY	15	0	0	5	0	2	21
1998	TRINITY	16	0	0	5	0	2	22
1999	TRINITY	17	0	0	5	0	2	24
2000	TRINITY	15	0	0	2	0	2	19
2001	TRINITY	18	0	0	4	0	2	24
2002	TRINITY	15	0	0	4	0	2	21
2003	TRINITY	14	0	0	1	0	2	17

NOTE: All Pumpage reported in acre-feet

12/18/2009

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

²⁴ * Since the District only encompasses a portion of Kendall County, it is recommended that all estimates presented in the management plan be based on (reduced by) a proportional area percentage unless more accurate data is available to the District. This percentage can be derived by dividing the amount of acres or square miles covered by the District by the total number of acres or square miles contained within Kendall County. However, many of the county-wide Water User Groups were subdivided into surface water basins so the apportionment methodology utilized for these data compared the District area to the area of Bexar County that lies within the San Antonio River basin. The percentage derived by the T.W.D.B. is 2.82% (i.e. 0.0282; see the 'Area estimate' tab), but any estimate that the District provides is preferable. Since the basin-wide data (e.g. county other, manufacturing, steam electric power, irrigation, livestock) represent the entire area within a basin and do not represent district-specific estimates, the basin-wide data have been converted to an apportioned value (relative to the size of the District within the San Antonio River basin) by multiplying each value from the 'County Water Demands' worksheet by 0.0282. All of the Water User Groups located within the county data set but outside of the basin boundaries were excluded.

Historical Water Use Estimate Summary

Water Use Survey

Unit: Acre Feet (ACFT)

GW = groundwater; SW = surface water

Bexar County²⁵

Year	Source	Municipal	Manufacturing	Steam Electric	Irrigation	Mining	Livestock	Total
1974	GW	35,814	3,848	571	3,334	731	66	44,365
	SW	0	69	4,108	3,396	0	344	7,918
	Total	35,814	3,918	4,679	6,730	731	411	52,283
1980	GW	53,986	3,361	329	3,651	129	62	61,519
	SW	129	72	6,799	5,087	0	241	12,327
	Total	54,115	3,434	7,128	8,737	129	303	73,846
1984	GW	61,403	2,679	316	5,717	63	39	70,218
	SW	76	107	7,742	4,103	0	359	12,386
	Total	61,479	2,786	8,058	9,820	63	398	82,604
1985	GW	56,175	3,035	480	4,130	624	34	64,479
	SW	58	11	6,198	3,029	48	305	9,649
	Total	56,234	3,046	6,678	7,159	673	338	74,128
1986	GW	57,270	3,330	452	4,043	0	36	65,131
	SW	52	78	5,350	3,675	0	321	9,477
	Total	57,322	3,408	5,803	7,718	0	357	74,607
1987	GW	55,879	2,569	490	3,152	333	30	62,453
	SW	71	26	6,017	2,536	59	269	8,978
	Total	55,949	2,595	6,507	5,688	393	298	71,430
1988	GW	60,915	3,291	341	3,796	356	31	68,731
	SW	72	37	8,002	2,077	65	281	10,534
	Total	60,987	3,328	8,343	5,873	421	312	79,265
1989	GW	60,687	2,991	343	5,805	321	31	70,178
	SW	71	152	7,486	3,296	66	277	11,349
	Total	60,758	3,143	7,829	9,101	387	308	81,527
1990	GW	54,846	3,386	343	6,669	321	33	65,598
	SW	72	34	5,563	2,340	66	302	8,376
	Total	54,917	3,420	5,906	9,009	387	335	73,973
1991	GW	51,400	3,603	280	4,555	795	34	60,666

²⁵ Since the District does not cover all of Bexar County, and the data are not subdivided into surface water basins, it is recommended that the Historical Groundwater Pumpage estimates presented in the management plan be based on (reduced by) a proportional area percentage unless more accurate data is available to the District. This percentage can be derived by dividing the amount of acres or square miles covered by the District by the total number of acres or square miles contained within Bexar County. The percentage derived by the T.W.D.B. is 24.34% (i.e. 0.2434; see the 'Area' tab), but any estimate that the District provides is preferable. The county-wide data above have been converted to a proportional value (relative to the size of the District) by multiplying each value from the 'County Historical Groundwater Pumpage' worksheet by 0.2434.

1	SW	0	10	5,001	2,847	103	304	8,266
Total		51,400	3,613	5,281	7,402	898	338	68,931
199	GW	51,739	3,780	284	4,327	849	36	61,015
2	SW	2	14	4,621	2,262	100	326	7,324
Total		51,741	3,793	4,905	6,589	949	362	68,339
199	GW	51,583	4,431	324	8,192	1,365	39	65,934
3	SW	2	20	6,021	3,900	144	348	10,436
Total		51,585	4,451	6,345	12,092	1,509	386	76,369
199	GW	54,333	4,370	182	7,772	1,365	27	68,047
4	SW	3	9	4,348	3,177	144	242	7,923
Total		54,336	4,379	4,530	10,948	1,509	269	75,971
199	GW	55,933	4,039	174	6,422	1,462	25	68,055
5	SW	40	45	6,446	3,059	144	226	9,959
Total		55,973	4,084	6,620	9,481	1,606	251	78,014
199	GW	56,646	4,984	213	6,838	1,462	44	70,187
6	SW	46	37	6,046	3,256	144	399	9,928
Total		56,692	5,021	6,259	10,094	1,606	443	80,115
199	GW	55,230	3,783	298	6,225	1,018	44	66,599
7	SW	72	53	3,937	2,964	183	396	7,605
Total		55,301	3,836	4,236	9,189	1,201	440	74,204
199	GW	55,691	4,635	482	8,205	451	28	69,492
8	SW	68	39	4,175	3,907	183	252	8,624
Total		55,759	4,674	4,657	12,112	635	280	78,116
199	GW	59,612	4,364	423	5,769	451	30	70,648
9	SW	45	50	5,628	2,747	183	267	8,920
Total		59,657	4,413	6,050	8,516	635	297	79,569
200	GW	57,177	5,050	549	2,324	451	29	65,580
0	SW	126	123	3,686	1,538	255	261	5,988
Total		57,303	5,173	4,235	3,862	706	290	71,568
200	GW	60,906	6,159	358	2,566	553	29	70,570
1	SW	184	86	4,722	1,901	132	268	7,293
Total		61,090	6,245	5,080	4,467	684	296	77,864
200	GW	59,576	6,346	276	3,779	553	29	70,558
2	SW	181	89	3,646	2,519	132	269	6,835
Total		59,757	6,435	3,922	6,298	684	298	77,394
200	GW	60,040	4,936	326	1,728	1,120	24	68,174
3	SW	182	69	4,301	1,201	267	228	6,247
Total		60,222	5,005	4,627	2,929	1,388	252	74,422
200	GW	55,200	4,806	407	2,165	1,027	24	63,630
4	SW	167	67	5,373	215	245	226	6,293
Total		55,367	4,874	5,780	2,380	1,272	250	69,923

NOTE: All Pumpage reported in acre-feet

12/30/09

Source: TWDB Water Use Survey Database

(<http://www.twdb.state.tx.us/wushistorical/DesktopDefault.aspx?PageID=1>)

Comal County²⁶

Year	Source	Municipal ²	Manufacturing ²	Steam Electric ²	Irrigation ²	Mining ²	Livestock ²	Total
1974	GW	17	9	0	1	1	1	30
	SW	0	7	0	0	0	0	8
	Total	17	17	0	1	1	1	37
1980	GW	28	7	0	1	3	1	40
	SW	2	9	0	0	0	0	12
	Total	30	17	0	1	3	1	52
1984	GW	36	7	0	2	0	1	47
	SW	1	8	0	0	0	0	9
	Total	37	15	0	2	0	1	56
1985	GW	38	5	0	0	3	1	48
	SW	1	7	0	0	0	0	8
	Total	39	12	0	0	3	1	55
1986	GW	42	4	0	1	0	1	48
	SW	0	7	0	0	0	0	8
	Total	43	11	0	2	0	1	57
1987	GW	35	4	0	1	20	1	61
	SW	0	8	0	0	0	0	9
	Total	35	12	0	2	20	1	69
1988	GW	39	4	0	1	19	1	64
	SW	0	9	0	0	0	0	10
	Total	39	13	0	2	19	1	74
1989	GW	40	5	0	2	3	1	51
	SW	0	7	0	0	0	0	8
	Total	40	13	0	2	3	1	59
1990	GW	35	4	0	2	3	1	45
	SW	0	7	0	0	0	0	7
	Total	35	11	0	2	3	1	52
1991	GW	32	18	0	1	10	1	62
	SW	1	8	0	0	0	0	10
	Total	33	26	0	1	10	1	72
1992	GW	16	21	0	1	31	1	71
	SW	19	10	0	0	0	0	29
	Total	35	31	0	1	31	1	99

²⁶ Since the District does not cover all of Comal County, and the data are not subdivided into surface water basins, it is recommended that the Historical Groundwater Pumpage estimates presented in the management plan be based on (reduced by) a proportional area percentage unless more accurate data is available to the District. This percentage can be derived by dividing the amount of acres or square miles covered by the District by the total number of acres or square miles contained within Comal County. The percentage derived by the T.W.D.B. is 0.34% (i.e. 0.0034; see the 'Area' tab), but any estimate that the District provides is preferable. The county-wide data above have been converted to a proportional value (relative to the size of the District) by multiplying each value from the 'County Historical Groundwater Pumpage' worksheet by 0.0034.

199	GW	17	20	0	0	33	1	71
3	SW	22	10	0	0	0	0	32
Total		39	30	0	0	33	1	103
199	GW	17	21	0	0	34	1	74
4	SW	23	9	0	0	0	0	33
Total		41	30	0	0	34	1	107
199	GW	19	22	0	0	30	1	72
5	SW	26	9	0	0	0	0	35
Total		45	31	0	0	30	1	107
199	GW	20	33	0	0	30	1	84
6	SW	27	8	0	0	0	0	36
Total		47	41	0	0	30	1	119
199	GW	20	21	0	0	26	1	68
7	SW	23	7	0	0	0	0	31
Total		44	28	0	0	26	1	99
199	GW	27	22	0	0	8	1	57
8	SW	22	7	0	0	0	0	29
Total		48	29	0	0	8	1	86
199	GW	32	26	0	0	8	1	66
9	SW	17	1	0	0	0	0	18
Total		49	27	0	0	8	1	85
200	GW	24	21	0	0	8	1	53
0	SW	26	1	0	0	0	0	27
Total		50	21	0	0	8	1	80
200	GW	18	5	0	0	8	1	31
1	SW	30	2	0	0	0	0	32
Total		48	7	0	0	8	1	63
200	GW	17	5	0	0	8	1	31
2	SW	29	2	0	0	0	0	32
Total		47	7	0	0	8	1	62
200	GW	18	12	0	0	8	1	38
3	SW	31	4	0	2	0	0	38
Total		49	16	0	3	8	1	76
200	GW	19	6	0	1	8	1	34
4	SW	36	2	0	1	0	0	39
Total		55	8	0	2	8	1	73

NOTE: All Pumpage reported in acre-feet

12/30/0
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Source: TWDB Water Use Survey Database

(<http://www.twdb.state.tx.us/wushistorical/DesktopDefault.aspx?PageID=1>)

Kendall County²⁷

Year	Source	Municipal ₃	Manufacturing ₃	Steam Electric ₃	Irrigation ₃	Mining ₃	Livestock ₃	Total
1974	GW	6	0	0	1	0	4	11
	SW	0	0	0	2	0	0	2
	Total	6	0	0	3	0	4	13
1980	GW	6	0	0	1	0	2	10
	SW	2	0	0	2	0	1	5
	Total	8	0	0	3	0	3	14
1984	GW	9	0	0	2	0	2	13
	SW	2	0	0	0	0	0	3
	Total	11	0	0	2	0	2	16
1985	GW	8	0	0	1	0	2	11
	SW	3	0	0	0	0	0	3
	Total	11	0	0	1	0	2	14
1986	GW	9	0	0	1	0	1	11
	SW	3	0	0	0	0	0	3
	Total	12	0	0	1	0	2	15
1987	GW	8	0	0	1	0	1	11
	SW	4	0	0	0	0	0	4
	Total	12	0	0	1	0	2	15
1988	GW	9	0	0	2	0	2	13
	SW	3	0	0	0	0	0	3
	Total	12	0	0	3	0	2	17
1989	GW	10	0	0	2	0	2	14
	SW	3	0	0	1	0	0	4
	Total	13	0	0	3	0	2	18
1990	GW	10	0	0	2	0	2	13
	SW	2	0	0	1	0	0	3
	Total	12	0	0	2	0	2	16
1991	GW	9	0	0	2	0	2	12
	SW	3	0	0	1	0	0	4
	Total	12	0	0	2	0	2	16

²⁷ Since the District does not cover all of Kendall County, and the data are not subdivided into surface water basins, it is recommended that the Historical Groundwater Pumpage estimates presented in the management plan be based on (reduced by) a proportional area percentage unless more accurate data is available to the District. This percentage can be derived by dividing the amount of acres or square miles covered by the District by the total number of acres or square miles contained within Kendall County. The percentage derived by the T.W.D.B. is 0.56% (i.e. 0.0056; see the 'Area' tab), but any estimate that the District provides is preferable. The county-wide data above have been converted to a proportional value (relative to the size of the District) by multiplying each value from the 'County Historical Groundwater Pumpage' worksheet by 0.0056.

199	GW	9	0	0	2	0	2	13
2	SW	4	0	0	1	0	1	5
Total		13	0	0	2	0	3	18
199	GW	10	0	0	5	0	2	17
3	SW	5	0	0	2	0	1	8
Total		15	0	0	7	0	3	25
199	GW	11	0	0	4	0	2	18
4	SW	5	0	0	3	0	1	8
Total		16	0	0	7	0	3	26
199	GW	12	0	0	5	0	2	19
5	SW	5	0	0	2	0	1	7
Total		17	0	0	7	0	3	26
199	GW	14	0	0	5	0	2	20
6	SW	4	0	0	2	0	0	7
Total		18	0	0	7	0	2	27
199	GW	16	0	0	5	0	2	22
7	SW	2	0	0	2	0	0	5
Total		18	0	0	7	0	2	27
199	GW	16	0	0	5	0	2	23
8	SW	3	0	0	2	0	0	6
Total		20	0	0	7	0	2	29
199	GW	18	0	0	5	0	2	24
9	SW	1	0	0	2	0	1	4
Total		18	0	0	7	0	3	28
200	GW	16	0	0	2	0	2	20
0	SW	4	0	0	1	0	0	5
Total		20	0	0	2	0	2	25
200	GW	19	0	0	4	0	1	25
1	SW	1	0	0	2	0	1	4
Total		20	0	0	6	0	2	28
200	GW	16	0	0	4	0	1	22
2	SW	3	0	0	2	0	1	5
Total		19	0	0	6	0	2	27
200	GW	15	0	0	1	0	1	17
3	SW	4	0	0	2	0	1	6
Total		18	0	0	3	0	2	23
200	GW	15	0	0	1	0	1	17
4	SW	4	0	0	1	0	1	5
Total		19	0	0	1	0	2	22

NOTE: All Pumpage reported in acre-feet

12/30/2009

Source: TWDB Water Use Survey Database

(<http://www.twdb.state.tx.us/wushistorical/DesktopDefault.aspx?PageID=1>)