**BARTON SPRINGS/EDWARDS AQUIFER CONSERVATION DISTRICT**

# DISTRICT MANAGEMENT PLAN

**ADOPTED –OCTOBER 30, 2003**

This groundwater management plan is in partial fulfillment of the requirements of SB 1, SB 2, and TWDB rules, specifically Texas Administrative Code, Chapter 356 (31TAC s356).


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## DISTRICT MISSION STATEMENT

*The Barton Springs / Edwards Aquifer Conservation District (District) is committed to providing for the conservation, preservation, protection, recharging, and prevention of waste of groundwater.*

## DISTRICT INFORMATION

The District was created in 1987, by the 70th Texas Legislature under Senate Bill 988 and Chapter 52 (revised to Chapter 36) of the Texas Water Code. The District's mandate is to conserve, protect, and enhance the groundwater resources of the Barton Springs segment of the Edwards Aquifer and other groundwater resources located within the District's boundaries. The District has the power and authority to undertake various studies and implement structural facilities and non-structural programs to achieve its statutory mandate. The District has rule-making authority to implement its policies and procedures and to help ensure the management of the groundwater resources.

The District's jurisdictional area is bounded on the west by the western edge of the Edwards aquifer outcrop and on the north by the Colorado River. The eastern boundary is generally formed by the easterly service area limits of the Creedmoor-Maha, Texas Water Services, and Goforth Water Supply Corporations. The District's southern boundary is generally along the established groundwater divide or "hydrologic divide" between the Barton Springs and the San Antonio segments of the Edwards Aquifer. This area encompasses approximately 249 square miles, estimated to be 10 percent urban / suburban, 45 percent ranchland, and 45 percent farmland. The Edwards Aquifer is either a sole source or primary source of drinking water for approximately 44,000 people (estimated in 1997) residing within the District boundaries. Barton Springs provides significant recreational opportunities at Barton Springs Pool in Austin's Zilker Park and receives 1,000,000 visitors per year (Harrison Price Company, 2000). The Springs provide habitat for the endangered Barton Springs salamander, *Eurycea sosorum*, and the Austin Blind salamander, *Eurycea waterlooensis*, a candidate for endangered listing. Spring discharge from the Barton Springs segment contributes to Town Lake, which serves as a source of drinking water for the City of Austin and other municipalities located downstream on the Colorado River. Some wells in the District also produce water from the Taylor and Austin Groups, alluvial deposits, and the Trinity Aquifer. The area has a long history of farming, ranching, and rural domestic use of groundwater.

*Harrison Price Company, 2000, Feasibility and Economic Impact Analysis of the Proposed Technology and Science Museum of Austin,*

## PURPOSE OF THE MANAGEMENT PLAN

As required by Texas Water Code, §36.1071 and §36.1072, a groundwater district shall submit to the Texas Water Development Board (TWDB) executive administrator a management plan that meets the requirements of 31TAC §356.5. Districts may review their plans annually, and shall readopt the plan with or without revisions at least once every five years.

There are 13 specific planning elements required in the plan, and goals, objectives, performance standards and tracking methods are required to be established for 7 management goals. These requirements are detailed in the Plan Requirements Table along with their location in the plan.

This groundwater management plan incorporates relevant regional water management strategies outlined in the Regional Water Plan developed by the Lower Colorado Regional Planning Group.

## PLANNING HORIZON

*Ten year planning period - 31TAC §356.5 (a)*

The Board of Directors of the District adopted this groundwater management plan on October 30, 2003. It is scheduled to be certified by the TWDB in December 2003. It will remain in effect until a revised District Management Plan is certified or December 2008, whichever is earlier.

Population and water demand projections cover the 50-year period from 2000 to 2050.

## BOARD RESOLUTION

*Certified copy of the Barton Springs / Edwards Aquifer Conservation District resolution adopting the plan.31TAC §356.6 (a)(2)*

***See Appendix I - District Resolution***

## PLAN ADOPTION

*Evidence that the plan was adopted after notice and hearing - 31TAC §356.6 (a)(3)*

***See Appendix II - Notice of Meetings and Public Hearings***

## COORDINATION WITH SURFACE WATER MANAGEMENT ENTITIES

*Evidence that following notice and hearing the Barton Springs / Edwards Aquifer Conservation District coordinated in the development of its management plan with surface water management entities - 31TAC §356.6 (a)(4)*

***See Appendix III - Letters to GBRA, LCRA and COA***

## CONSISTENCY WITH REGIONAL WATER PLAN

*Evidence of consistency with and any conflict between proposed management plan and the regional water plan (developed by regional planning groups formed under authority of TWC 16.053 (c)) for each region in which any part of the Barton Springs / Edwards Aquifer Conservation District is located, if such regional water plan has been approved by the TWDB - 31TAC §356.6 (a)(5)*

***See Appendix IV – Letters to Regions K and L***

## EXISTING AND PROJECTED WATER SUPPLY

*Estimate of the total usable amount of groundwater in the Barton Springs / Edwards Aquifer Conservation District - 31TAC §356.5 (a)(4)(A).*

*and*

*Estimate of the projected water supply within the Barton Springs / Edwards Aquifer Conservation District - 31TAC §356.5 (a)(4)(D)*

### BASIC HYDROGEOLOGY OF THE BARTON SPRINGS SEGMENT OF THE EDWARDS AQUIFER:

***Geologic Framework***

The Edwards Aquifer is composed of Cretaceous-age (65-145 million years old) limestone units comprised of the Georgetown Formation and Edwards Group limestones. These units, which are associated with the Balcones Fault Zone, have been fractured and partially dissolved by infiltrating rainwater resulting in the development of a prolific karst aquifer. Recent mapping of the Barton Springs segment has delineated geologic faults and several informal stratigraphic members within the Edwards Group, each having distinctive hydrogeologic characteristics (Small et al., 1996). The limestone units gently dip to the east unless influenced by faulting, where beds may dip more steeply. The majority of faults trend to the northeast and are downthrown to the southeast, with total offset of about 1,100 feet across the aquifer. Where the full thickness of the aquifer is preserved, it averages about 475 feet thick and thickens from north to south. Due to faulting and erosion, the thickness of the exposed geologic units in the area known as the recharge zone ranges from full thickness along the eastern side, to zero along the western side of the recharge zone.

***Hydrogeology***

The aerial extent of the Barton Springs segment of the Edwards Aquifer is about 155 square miles. About 79% of the area is an unconfined aquifer and the remaining 21% is a confined or artesian aquifer (Slade et al., 1986). The majority of groundwater in the aquifer discharges to Barton Springs, though recent groundwater dye tracing studies indicate that approximately 12 square miles of the aquifer discharges primarily to Cold Springs (see Recent Studies). A long-term average of 53 cubic feet per second (cfs) discharges from Barton Springs, which makes up the largest volume discharge of the Barton Springs segment (Slade et al., 1986). The lowest recorded springflow measured 9.6 cfs in 1956 during the drought of record.

The heterogeneous and anisotropic geologic framework strongly influences groundwater storage and flow. Karst aquifers such as the Barton Springs segment are often described as triple porosity systems consisting of matrix, fracture, and conduit porosity (Ford and Williams, 1992; Quinlan et al., 1996). Recent groundwater dye tracing studies indicate that groundwater flow is very rapid and strongly influenced by conduit (rapid, pipe-like) flow relative to diffuse, or slow flow. However, most of the storage of water in the aquifer is within the matrix porosity (Hovorka et al., 1998). The Edwards Aquifer is a very dynamic aquifer with rapid fluctuations in springflow, water levels, and storage reflecting changes in recharge and pumpage.

The majority of the water that recharges the Barton Springs segment originates as rainfall runoff in a 254-square mile area located west of the outcrop of the Edwards Aquifer called the contributing zone. Recharge to the Barton Springs segment occurs in the 98-square mile outcrop area of the Edwards Aquifer called the recharge zone (Figure 1). Water enters the aquifer primarily by infiltration via caves, sinkholes, fractures, and solution cavities within stream channels. A smaller portion of the water recharges the aquifer in the uplands of the recharge zone through soil covering bedrock and other sinkholes and caves (Slade et al., 1986). East of the recharge zone, the Edwards Aquifer is overlain by less permeable limestone and clay units, which serve to confine the aquifer and protect the aquifer from surface contamination. This part of the aquifer is referred to as the Artesian Zone.

Potentiometric (water level) measurements and groundwater dye tracing studies provide good insight into groundwater flow paths from source areas (recharge locations) to discharge points or springs. Results of these studies demonstrate that groundwater recharging the Barton Springs segment generally flows east to west across the recharge zone and then flows north, converging to preferential groundwater flow paths and discharging at either Barton or Cold springs. Flow paths were generally traced along depressions, or troughs, in the potentiometric surface indicating high permeability areas and preferential flow paths.

Groundwater divides and leaky boundaries surround the aquifer. The northern groundwater divide is assumed to be the Colorado River since it is the regional base level and spring discharge location. The eastern boundary is known as the saline or bad water zone of the aquifer and is characterized by a sharp increase in dissolved constituents (greater than 1,000 mg/l) and a decrease in permeability (Flores, 1990). Leakage from the bad-water zone is reported to influence water quality at Barton Springs during low springflow conditions (Senger and Kreitler, 1984; Slade et al., 1986). The western boundary of the aquifer is poorly defined and is limited by the saturated thickness of the exposed Edwards Aquifer units. This boundary may be leaky due to subsurface flow from the Trinity Aquifer. Evidence for this leakage is based on water quality influences attributed to the Trinity Aquifer and the similarity of water levels between the aquifers along the western boundary. Additionally, recent groundwater models for the Trinity Aquifer required significant lateral groundwater leakage into the Edwards Aquifer in order to simulate observed hydrogeologic conditions (Mace, 2000). The southern boundary, or hydrologic divide between the Barton Springs segment of the Edwards Aquifer and San Marcos Springs, is estimated to occur between the cities of Kyle and Buda based on potentiometric-surface elevations. The groundwater divide may shift based on groundwater-flow conditions and pumpage.

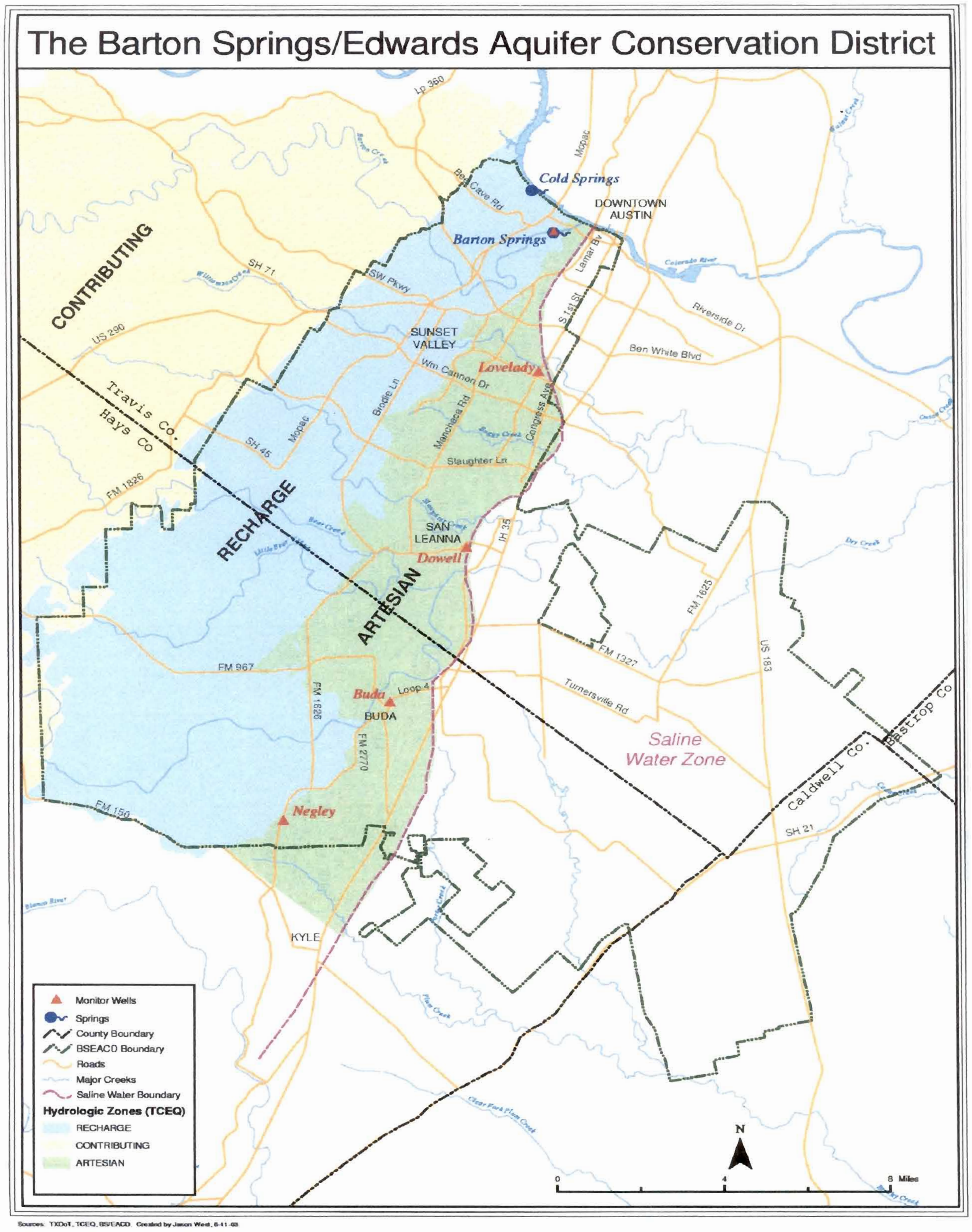


*Figure 1: Location map of the Barton Springs segment of the Edwards Aquifer. This map shows the major hydrologic zones of the aquifer, District boundary and locations of monitor wells and major springs.*

## RECENT STUDIES

***Groundwater Dye Tracing***

The District, in cooperation with the City of Austin (COA), injected non-toxic organic dyes into caves, sinkholes, and wells within the Barton Springs segment of the Edwards Aquifer to trace groundwater flow routes and determine groundwater-flow velocities (Hauwert et al., 2002; BSEACD, 2003). Figure 2 shows the results of this study. Groundwater dye tracing studies were conducted between 1996 and 2002 with 319(h) grant funding through 2001 from the Environmental Protection Agency and the Texas Commission on Environmental Quality (TCEQ). These studies have provided new insight into groundwater flow for this karst aquifer. These studies provide valuable information necessary to improve wellhead protection, anticipate the fate of a hazardous material spill on the recharge zone, assist in developing effective monitoring strategies, prioritize purchases of water quality/quantity protection lands, and evaluate sites for potential recharge enhancement.

Groundwater dye tracing studies indicate that Cold Springs is hydraulically linked to surface water recharging from the upper portions of Williamson and Barton Creeks on the recharge zone. Barton Springs is hydraulically linked to water recharging from Slaughter, Bear, Little Bear, and Onion Creek watersheds and lower portions of Williamson and Barton Creek watersheds on the recharge zone. The Barton Springs segment of the Edwards Aquifer is composed of three primary groundwater basins: the Cold Springs, Sunset Valley, and Manchaca groundwater basins.

Groundwater flow rates from major recharge locations to the springs are very rapid. Groundwater flow rates appear to vary with (1) the proximity and connection to major preferential groundwater flow routes and with (2) varying groundwater flow conditions. Under moderate and high groundwater flow conditions at Barton Springs, groundwater generally travels approximately 4 to 7 miles per day along the major groundwater flow routes, but only about 1 mile per day from the western side of the recharge zone to the eastern side. During low flow conditions at Barton Springs, groundwater moves at rates of about 0.6 miles per day to 1 mile per day across the aquifer.

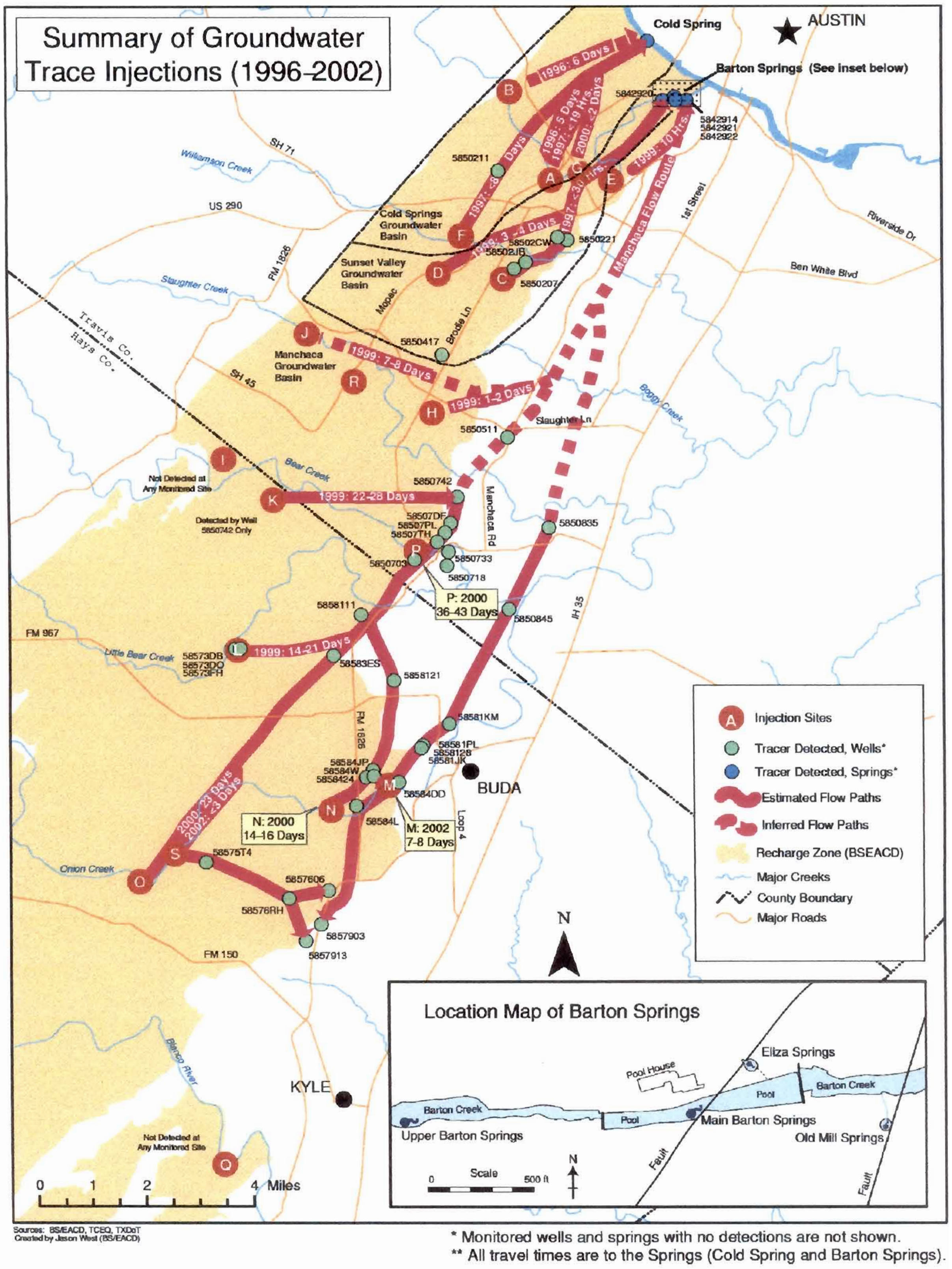


*Figure 2: Results of groundwater dye tracing in the Barton Springs segment of the Edwards Aquifer.*

WATER QUALITY

The District collects and analyzes water quality samples from existing and newly drilled wells within the District as a method to screen ambient conditions within the aquifer. Specific conductivity, temperature, and pH are water quality parameters collected in the field. Alkalinity, chloride, nitrate, iron, sulfate, and fluoride are analyzed in the BSEACD laboratory. District staff use a presence or absence test for pathogenic bacteria and an EPA approved colony count method for *Escherichia coli* and total coliform. Furthermore, the District collects continuous data of specific conductance and temperature from six water wells throughout the District and two springs located in the Barton Springs complex.

In 1990, 1993, and 1994, the District received grant funding from the Texas Water Development Board (TWDB) to analyze groundwater samples for a comprehensive list of groundwater parameters including pesticides, dissolved metals, alkalinity, radionuclides, petroleum hydrocarbons, and organics. Since 1998, the District has partnered with TWDB to sample about 25 wells and springs each year for field parameters (pH, specific conductivity, and temperature), nutrients, alkalinity, and an extensive list of dissolved metals.

In 2001, the District sampled 28 wells and 6 springs for a comprehensive list of groundwater constituents, which was funded through a 319h non-point source grant from the Environmental Protection Agency (EPA) and administered through the TCEQ. The purpose of this study was to establish a water-quality baseline for the Barton Springs segment of the Edwards Aquifer (BSEACD, 2001). Analysis showed that most of the wells sampled were well below EPA maximum contamination levels (MCL) for drinking water, while nine parameters were detected above TCEQ Surface Water Standards.

WATER QUANTITY

Monitoring water levels provides critical information about the aquifer and reflects changes in storage. Furthermore, water levels reflect the hydrologic character and stresses including effects from pumping, climatic events, and groundwater recharge and discharge. The Edwards Aquifer water levels and spring discharge are very dynamic and can fluctuate dramatically due to both short and long-term effects. Therefore, only long-term and systematic collection of water-level data offers the greatest likelihood that these effects will be observed (Taylor and Alley, 2001).

Water-level data are essential to design, implement, and monitor the effectiveness of groundwater management, conservation, and protection programs and to develop and calibrate groundwater models (Taylor and Alley, 2001). The District monitor well program collects continuous water-level data from a network of wells across the aquifer (Figure 1). Many of the District monitor wells have up to 10 years of historic data. The District uses this information for groundwater management through drought declarations triggered by water-level elevations (Figure 3). Evaluations of water-level data have indicated that there are depressions on the potentiometric surface in the Buda-Kyle-San Leanna areas due to high rates of pumping. Water-level records indicate that following periods of drought, water levels throughout the Barton Springs segment recover to previous high levels when rainfall amounts return to normal.

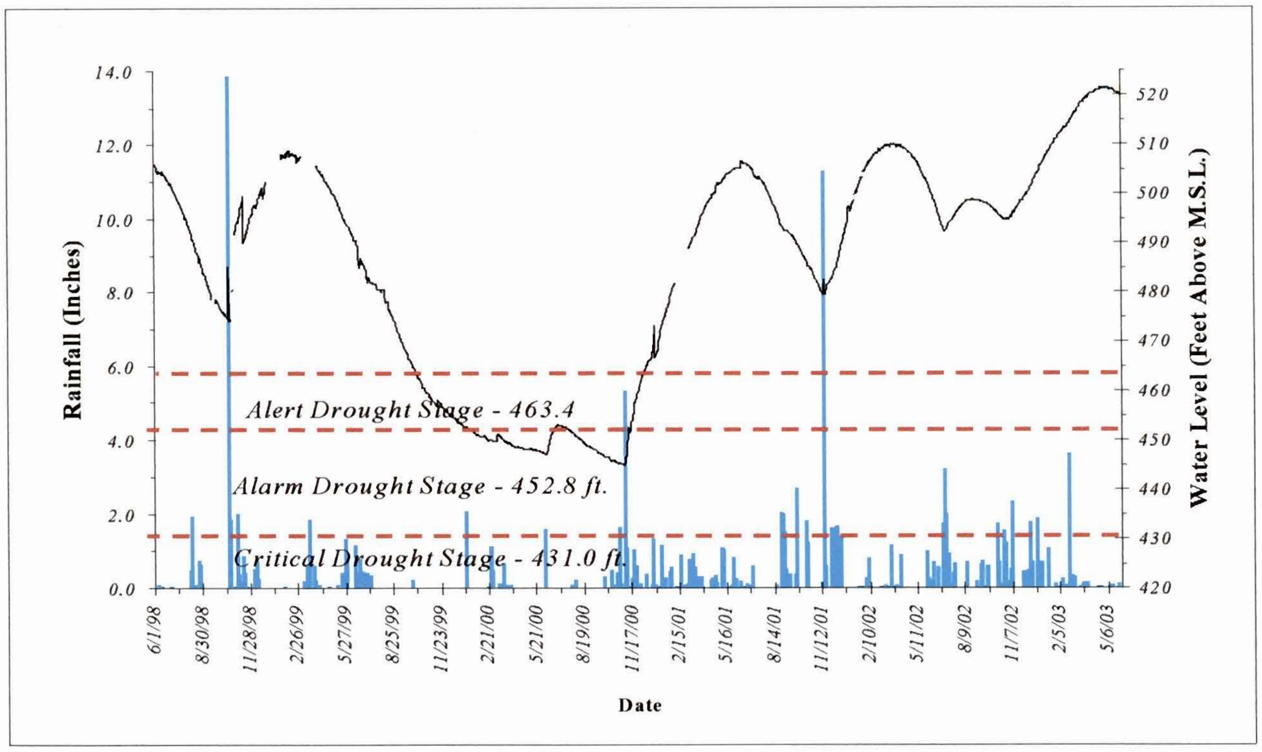


*Figure 3: Lovelady monitor well hydrograph showing the elevation of the water level plotted against rainfall over a 5-year period. This well is one of five District drought trigger wells.*

## GROUNDWATER AVAILABILITY MODELING (GAM)

Groundwater Availability Modeling (GAM) is an initiative by the Texas Water Development Board (TWDB) to develop state-of-the-art, publicly available, numerical groundwater flow models to provide reliable information on groundwater availability in Texas. Several agencies, including the Bureau of Economic Geology, TWDB, and the District worked to develop the model for the Barton Springs segment (Scanlon, et al., 2001). The Lower Colorado River Authority provided funding for this study.

A two-dimensional, numerical groundwater-flow model was developed for the Barton Springs segment of the Edwards Aquifer to evaluate groundwater availability and predict water levels and spring flow in response to increased pumpage and droughts during the period 2001 through 2050. Regional Water Planning Groups are required by Senate Bill 1 to plan for future water needs under drought conditions (Mace, 2000). A steady-state model was developed on the basis of average recharge for a 20-yr period (1979 through 1998) and pumpage values for 1989. Transient simulations were conducted using monthly recharge and pumping data for a 10-yr period (1989 through 1998) that includes periods of low and high water levels. Good agreement was found between measured and simulated flow at Barton Springs and between measured and simulated water. To assess the impact of future pumpage and potential future droughts on groundwater availability, transient simulations were conducted using extrapolated pumpage for five 10-yr periods (2001 through 2050). Each 10-yr period includes a 3-yr period with average recharge and the remaining 7 years with recharge from the 1950s drought (Figure 4). Results of these simulations were compared with those using average recharge and future pumpage. Predicted water-level declines in response to future pumpage under average recharge conditions are small (≤ 35 ft), whereas water-level declines under future drought conditions were much greater (≤270 ft) (Figure 5). Simulated spring discharge in response to future pumpage under average recharge decreased proportionally to future pumpage (2 cfs per decade), whereas spring discharge decreased to 0 cfs in response to future pumpage under drought-of-record conditions (Figure 4).

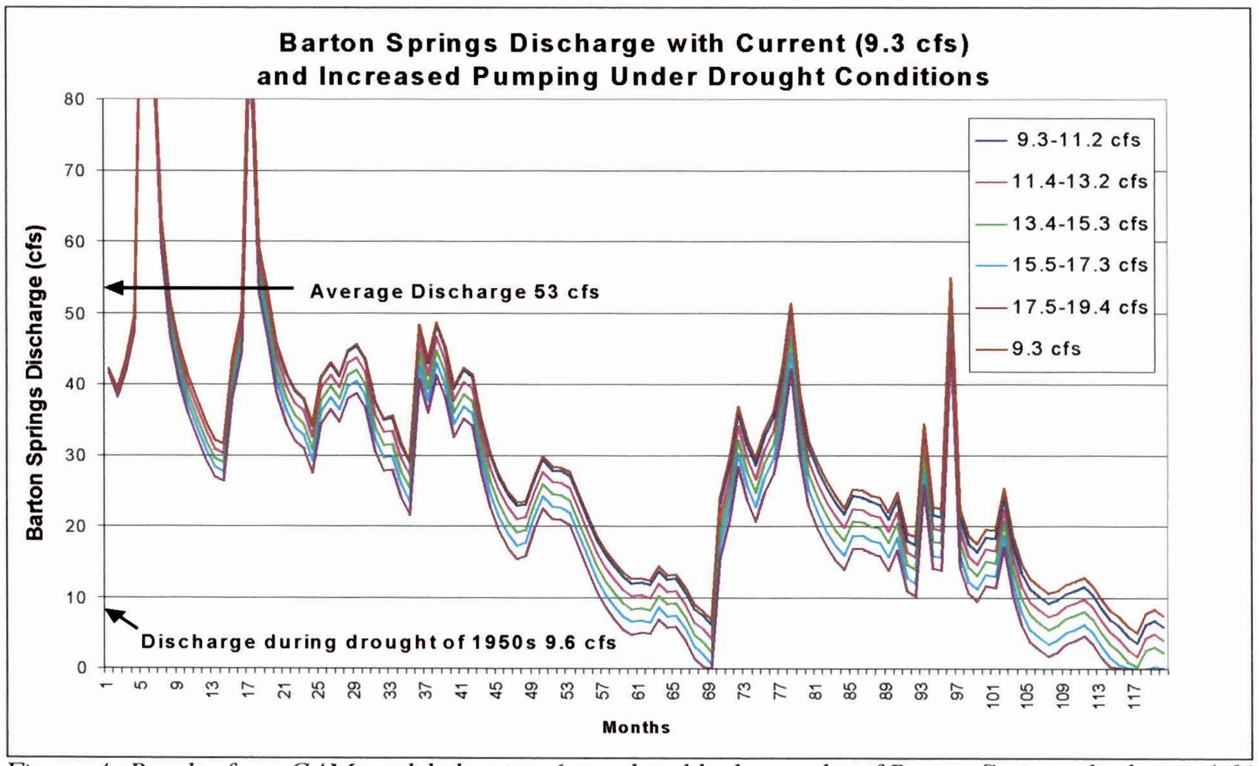


*Figure 4: Results from GAM model showing 6 simulated hydrographs of Barton Springs discharge (cfs) over a ten year period containing an initial three years of average conditions, followed by seven years of drought-of-record conditions. Each simulation represents an increase in pumping (cfs). Model results indicate that there is a direct correlation to springflow and pumpage and under drought conditions and high pumping rates the springs could go dry for a period of time. Figure modified from Scanlon et al. (2001).*

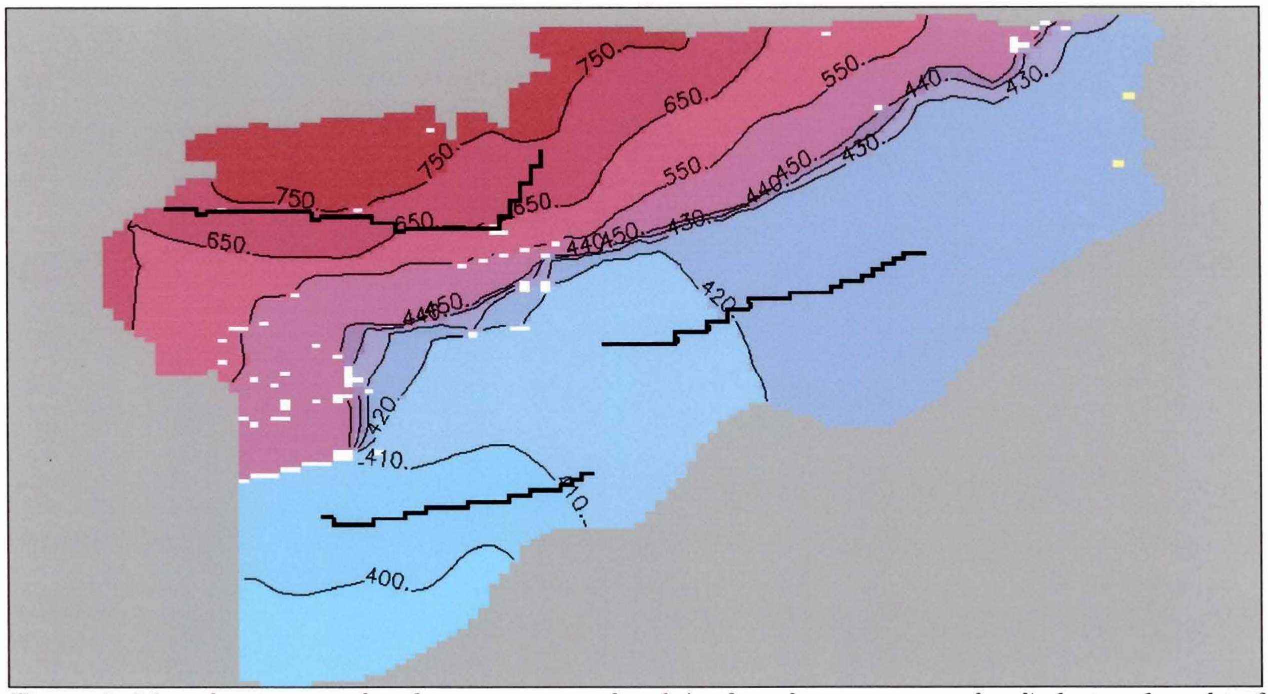


*Figure 5: Map showing simulated potentiometric heads(in feet above mean sea level) during drought of record conditions and pumping 19.4 cfs/year. This figure shows that at this high rate of pumping, groundwater flow will no longer flow toward Barton Springs, but will flow southeast toward the major pumping centers. Simulation using GAM model of Scanlon et al. (2001).*

SUSTAINABLE YIELD

Sustainable or safe yield of most aquifers is generally related directly to the average amount of recharge to the aquifer. Because of the karstic nature of the Edwards Aquifer and the significant amount of conduit flow in the aquifer, sustainable yield of the Barton Springs segment of the Edwards Aquifer is considered to be the amount of water available in the aquifer during drought-of-record conditions. Senate Bill 1 requires water planning for drought-of-record conditions. The District defines sustainable yield as:

> the amount of water that can be pumped for beneficial use from the aquifer under drought of record conditions after considering adequate water levels in water-supply wells and degradation of water quality that could result from low water levels and low spring discharge.

As discussed in the Water Quantity section, the amount of water in the aquifer can fluctuate considerably over a period of a few months. During periods of low rainfall, pumping from the aquifer and drainage from the springs can lower water levels rapidly. The amount of groundwater discharging from the springs decreases at a similar rate. During rainy periods, water levels and spring discharge will quickly recover. One significant rain event over the Contributing and Recharge Zones can provide enough recharge that the aquifer will recover from drought levels.

The GAM is the principal tool the District is using to determine the sustainable yield of the aquifer. Long-term records of rainfall, water levels, and spring discharge are also being evaluated to better understand the aquifer and to help determine sustainable yield. The model has indicated how vulnerable the aquifer is to significant lowering of water levels and to cessation of spring discharge under drought-of-record conditions and high pumping rates. By simulating the low recharge (drought-of-record) conditions of the 1950s and increasing pumping rates, the model presents water level and spring discharge values that would result from these conditions. Under drought-of-record conditions and high pumping rates, water levels could drop as much as 270 ft in some portions of the aquifer. With such a significant drop in water levels, it is likely that some wells would go dry. The District is currently evaluating aquifer conditions and which wells may be affected by low water levels.

Region K considers the annual groundwater availability (total usable amount of groundwater or sustainable yield) in the Barton Springs segment of the Edwards Aquifer to be "based on minimum spring flow at Barton Springs" (LCRWPG Adopted Plan, p. 3-17). During the drought of the 1950s, monthly average spring discharge (as measured by the USGS) reached a low of 11 cfs (Slade and others, 1986). The lowest single measurement for spring discharge was 9.6 cfs (March 29, 1956). The Region K Plan states that one of its management objectives is that spring discharge should not be allowed to reach zero.

Figure 4 shows the model results for future simulations with drought-of-record conditions and increased pumping. When the pumping rate reaches about 13.6 cfs spring discharge would stop. The model simulation of the 1950s indicates that spring discharge would reach a low of about 13 cfs with about 0.7 cfs of pumping from the aquifer at that time. The discrepancy (or bias) between the model results for the 1950s (13 cfs) and the lowest measured average monthly spring discharge in the 1950s (11 cfs) is 2 cfs. Further evaluation of the model is being conducted to determine the amount of bias in the model.

Based on spring discharge data from the 1950s, results of the GAM, and the Region K Management Plan, the total usable amount of groundwater (sustainable yield) in the Barton Springs segment of the Edwards Aquifer is 10 cfs. A sustainable yield value of 10 cfs means that the maximum amount of water that can be pumped from the aquifer during drought-of-record conditions would be limited to 10 cfs (2.35 billion gallon per year, or 7,239 acre-feet per year). Total permitted pumpage plus estimated exempt-well pumpage from the aquifer in 2003 is about 10.5 cfs. Pumping at a rate of 10 cfs would allow some small amount of spring discharge. Using an average monthly flow value of 11 cfs, and adding 0.7 cfs of pumping during the 1950s, 10 cfs of pumping during drought-of-record conditions would yield a spring discharge of 1.7 cfs. Using a single measurement of low discharge from the springs of 9.6 cfs, and adding 0.7 cfs of pumping during the 1950s, 10 cfs of pumping during drought-of-record conditions would yield a spring discharge of 0.3 cfs. Higher spring flows could be obtained if permitted groundwater users are able to conserve groundwater as required in their District approved Drought Contingency Plans that mandate up to 30% reduction in groundwater use during a Critical Stage III drought. Failure to achieve mandatory pumpage reductions shall result in enforcement action by the District per the District's Rules & Bylaws.

A sustainable yield value of 10 cfs does not consider the adverse impacts to water-supply wells and degradation of water quality that would happen as a result of low spring discharge and low water levels. The District is evaluating the impact of pumping during drought-of-record conditions on water-supply wells. Wells in the western portion of the District are particularly vulnerable to going dry during a severe drought. The City of Austin is studying the potential effects of low spring discharge on water quality at Barton Springs. Low spring discharge and the resulting degradation in water quality could threaten the existence of the federally-listed endangered Barton Springs salamander. These studies may indicate that the sustainable yield value should be lower to protect water-supply wells from going dry during a severe drought, and to protect spring discharge and water quality in the aquifer. This Management Plan may be amended as these evaluations are completed.

A pumping limit of 10 cfs would apply during a Stage III drought. A higher pumping limit could be set for periods when the aquifer is close to or above average conditions. The difference between drought pumping limits and average condition pumping limits would be based on the amount of advanced conservation measures that can be achieved by the groundwater users, implementation of alternative water supplies, and other factors. If recharge can be augmented by recharge enhancement structures or other methods, the sustainable yield of the aquifer may be increased.

One such example of recharge enhancement is a management strategy outlined in the Region K Regional Water Plan. The strategy addresses the shortages in the Hays County-Other Water User Group (WUG). It has been evaluated to enhance recharge to the Edwards Aquifer via the construction of a series of small channel dams along Onion Creek. These dams would impound water that could be later released at controlled rates to downstream recharge features. One of the sites is the Rutherford Reservoir. Initial calculations estimate potential firm annual recharge to be 4,000 ac-ft. As of the date of this Management Plan, no feasibility studies have been conducted nor are there immediate construction plans to implement this strategy. Should the Rutherford Reservoir be constructed in the future, the potential 4,000 ac-ft/yr of additional recharge may be combined with the estimated usable amount of groundwater of 7,239 ac-ft/yr, for a total amount of 11,239 ac-ft/yr.

## ESTIMATED PROJECTED GROUNDWATER SUPPLY

Projected groundwater supply is defined as the usable amount of groundwater of acceptable quality that is available per annum as determined by the district using the best available data on full implementation of any applicable, approved regional water plan. The District has determined that the projected groundwater supply in the Barton Springs segment of the Edwards Aquifer is 7,640 ac-ft/yr. Below is a detailed discussion of the derivation of the calculated projected groundwater supply in the District.

*Table 1: Projected Groundwater Supply from the Edwards BFZ in Travis County (2000-2050)*

| WUG Name | County Name | Basin Name | RWPG Water Source | Specific Source Name | Year Supply (ac-ft/yr) |
|---|---|---|---|---|---|
| Pflugerville | Travis | Colorado | K | Edwards-BFZ | 2585 |
| County (Other) | Travis | Colorado | K | Edwards-BFZ | 2585 |
| Manufacturing | Travis | Colorado | K | Edwards-BFZ | 167 |
| Mining | Travis | Colorado | K | Edwards-BFZ | 1591 |
| Irrigation | Travis | Colorado | K | Edwards-BFZ | 795 |
| Livestock | Travis | Colorado | K | Edwards-BFZ | 231 |
| **GRAND TOTAL** | | | | | **7954** |

*Texas Water Development Board, 2002*

Table 1 provides queried data from Table 5 of the 2002 State Water Plan (see Appendix V). While Pflugerville is projected to receive 2,585 ac-ft/yr of groundwater from the Edwards-BFZ Aquifer, that supply will most likely be generated from the northern segment of the Edwards Aquifer. The northern jurisdictional boundary of the Barton Springs segment of the Edwards Aquifer is the Colorado River. The Edwards Aquifer continues north of the river into northern Travis, Williamson, and Bell Counties. This segment is known as the northern segment of the Edwards Aquifer and is not managed by the District. Pflugerville does not currently nor is planned to receive groundwater from the Barton Springs segment of the Edwards Aquifer. Therefore, the supply amount attributed to Pflugerville can be subtracted from the grand total supply amount for the Travis County portion of the District. Further, since the District's jurisdictional boundaries cover roughly half of Travis County, geographically, supply amounts for the remaining WUGs has been divided in half. Therefore, once the supply amounts for Pflugerville, and half of the supply amounts for the remaining WUGs are deducted from the grand total, the new total projected groundwater supply for the Travis County portion of the District is approximately 2,685 ac-ft/yr.

*Table 2: Projected Groundwater Supply from the Edwards BFZ in Hays County (2000-2050)*

| WUG Name | County Name | Basin Name | RWPG Water Source | Specific Source Name | Year Supply (ac-ft/yr) |
|---|---|---|---|---|---|
| Buda | Hays | Colorado | K | Edwards-BFZ | 1855 |
| County (Other) | Hays | Colorado | K | Edwards-BFZ | 614 |
| Manufacturing | Hays | Colorado | K | Edwards-BFZ | 922 |
| Mining | Hays | Colorado | K | Edwards-BFZ | 9 |
| Irrigation | Hays | Colorado | K | Edwards-BFZ | 931 |
| Livestock | Hays | Colorado | K | Edwards-BFZ | 624 |
| **GRAND TOTAL** | | | | | **4955** |

*Texas Water Development Board, 2002*

Table 2 provides queried data from Table 5 of the 2002 State Water Plan (see Appendix V). Unlike Travis County, the LCRWPG portion of the Edwards-BFZ Aquifer lies almost wholly within the Hays County area of the District's boundaries. Therefore, the projected supplies listed in Table 2 have been combined to show an estimated projected groundwater supply to be 4,955 ac-ft/yr. It should be noted that the City of Buda currently holds a groundwater pumpage permit from the District for approximately 614 ac-ft/yr. The city has had this permit since 2001. In 2000, the city was permitted for 307 ac-ft/yr. This yearly supply is inconsistent with the projected groundwater supply values for the Buda WUG.

By combining 2,685 ac-ft/yr, which represents the Travis County portion of the District, and 4,955 ac-ft/yr, which represents the Hays County portion of the District, one can calculate the estimated projected groundwater supply within the District to be 7,640 ac-ft/yr. While the District's jurisdictional boundaries include small areas within Bastrop and Caldwell Counties, Table 5 of the 2002 State Water Plan does not indicate any WUGs in these counties relying on groundwater supply from the Edwards-BFZ Aquifer. Therefore the estimated total supply is comprised of supply values for Travis and Hays Counties.

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*Taylor, C., and W. Alley, 2001, Ground-Water Level Monitoring and the Importance of Long-Term Water level Data. U.S. Geological Survey Circular 1217, Denver Colorado, 68 pp.*

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## EXISTING AND PROJECTED WATER DEMAND

*Estimate of the amount of groundwater being used within the Barton Springs / Edwards Aquifer Conservation District on an annual basis – 31TAC §356.5 (a)(4)(B)*

*and*

*Estimate of the projected water demand within the Barton Springs / Edwards Aquifer Conservation District - 31TAC §356.5 (a)(4)(D)*

### GROUNDWATER USE

The District separates groundwater users and their wells/systems into two categories – non-permitted (or exempt), and permitted (or non-exempt). A non-permitted well is exempt from the requirement of obtaining a permit for the production of groundwater from within the District per the District Rules. A permitted well requires an authorization (or permit) issued by the District allowing the withdrawal of a specific amount of groundwater from a non-exempt well for a designated period of time, generally in the form of a specific number of gallons per District fiscal year.

In 2003, the District has 93 permitted wells/systems totaling an annual permitted pumpage of 2,170,251,250 gallons or 6,660 acre-feet. Groundwater use is classified as public water supply, commercial, industrial, or irrigation. Below is a figure illustrating the percentage of District permits for each use classification.

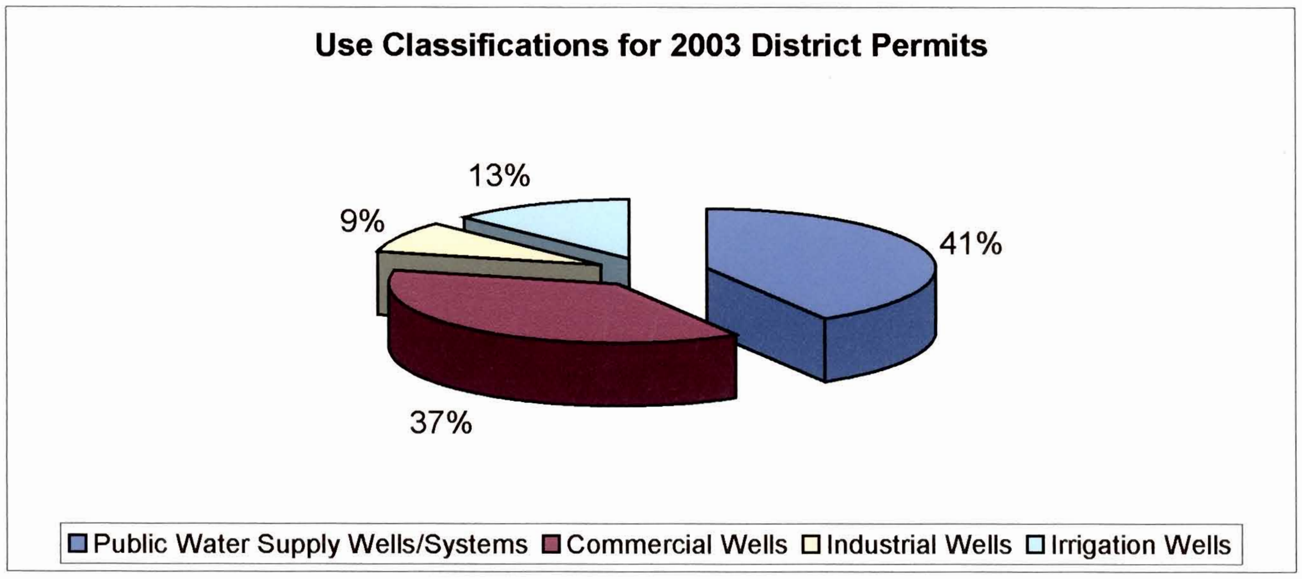


*Figure 6: Use Classifications for 2003 District Permits*

*Public water supply use* is water used primarily for residential use, but may include commercial, industrial or other use, and which is sold or distributed to the users by a retail water utility, which may include non-profit corporations or municipalities.

*Commercial use* is associated with supplying water to properties or establishments, which are in business to build, supply, or sell products, or provide goods, services or repairs and which use water in those processes or water used primarily for employee and customer conveniences.

*Industrial use* is the use of water in the building, production, manufacturing or alteration of a product or good.

*Irrigation use* is the application of water to plants or land in order to promote growth of plants, turf, or trees. This includes the application of water to plants or land in connection with the production of crops for human food, animal feed, seed, fiber, or cover crops, and the practice of floriculture, viticulture, silviculture, and horticulture.

Public water supply wells use the majority of the permitted groundwater withdrawn from the Barton Springs segment of the Edwards Aquifer. They account for approximately 80% of the permitted use in 2003. The remainder of the permittee use is withdrawn by commercial, industrial, and irrigation wells.

The District is comprised of parts of four counties – Hays, Travis, Caldwell, and Bastrop. Of the 93 District permits, 42 are for use in Hays County and total 1,477,282,213 gallons per year or 4,534 acre-feet. Figure 7 illustrates how the permitted groundwater is being used in Hays County.

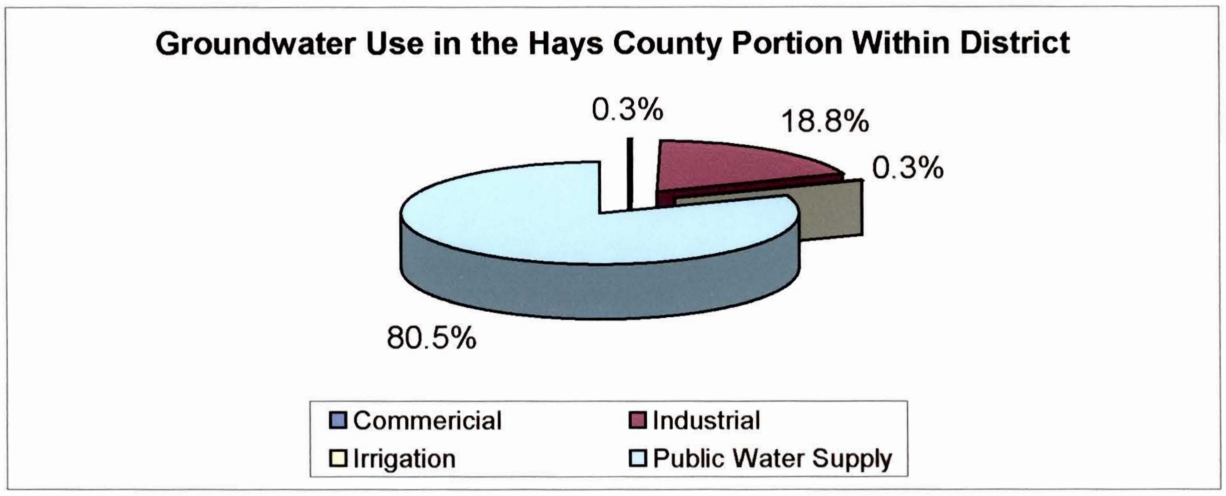


*Figure 7: Groundwater Use in Hays County*

Of the 93 District permits, 48 permits are for use in Travis County and total 634,310,717 gallons per year or 1,947 acre-feet. Figure 8 demonstrates how the permitted groundwater is being used in Travis County.

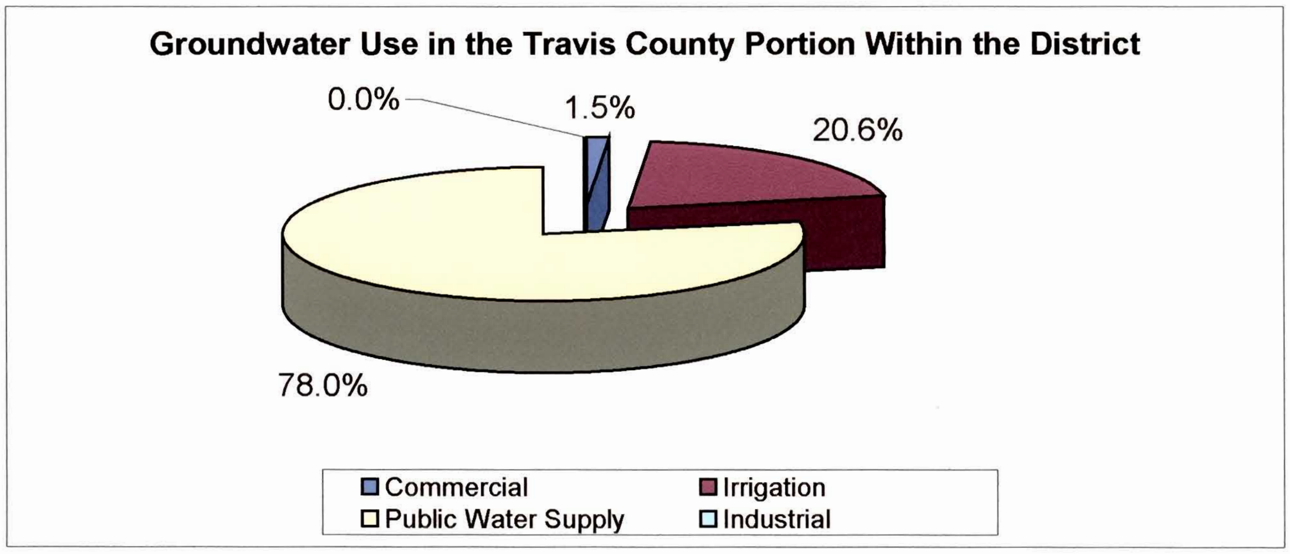


*Figure 8: Groundwater Use in Travis County*

Under two District permits, groundwater is authorized for public water supply use by two permittees in Caldwell County. The permitted pumpage equals 56,521,360 gallons annually or 173 acre-feet. The District has one permit for public water supply use in Bastrop County. This permit authorizes the use of 2,136,960 gallons annually or 7 acre-feet. Figure 9 demonstrates the overall permitted pumpage for each portion of the four counties within the District boundaries.

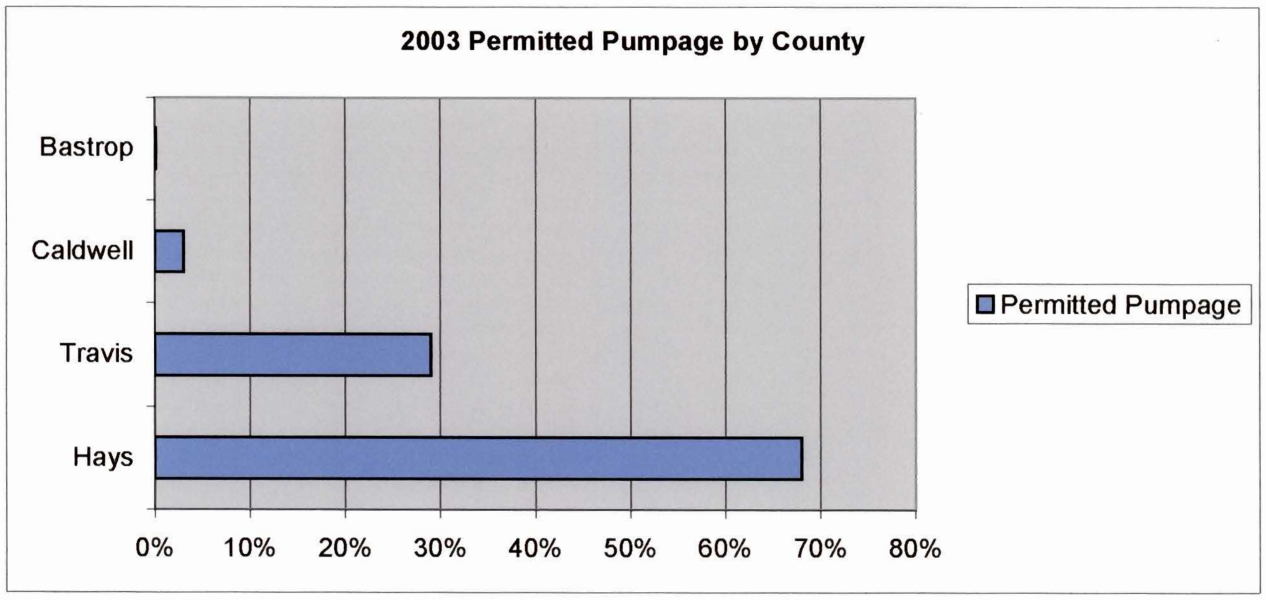


*Figure 9: Permitted pumpage by county within the District boundaries.*

On an annual basis, permitted groundwater pumpage accounts for the majority of the withdrawn amount from the Barton Springs segment of the Edwards Aquifer. In 2003, non-permitted wells (or exempt wells) were estimated to number approximately 825. Assuming a per capita consumption of 172 gallons per day (Mayer et al., 1999) and 2.8 individuals per household being serviced by one well, approximately 145,021,800 gallons or 445 acre-feet are being withdrawn to meet the needs of non-permitted well owners. Combined use from permitted and non-permitted wells totaled approximately 2,315,273,050 gallons annually or 7,105 acre-feet.

Permitted pumpage has the largest impact on the aquifer and as such, consideration of its increase over time must be considered when addressing the projected water demands. Figure 10 demonstrates the permitted pumpage, that is the amount of water that has been authorized to be withdrawn, and the actual pumpage, that is the amount of water actually being withdrawn. Both lines show an upward trend indicating that since 1988, pumpage from the aquifer has increased. As the population and demand for water increase within the District, the current trend will continue unless it is limited by regulation to prevent depletion of wells and springflow.

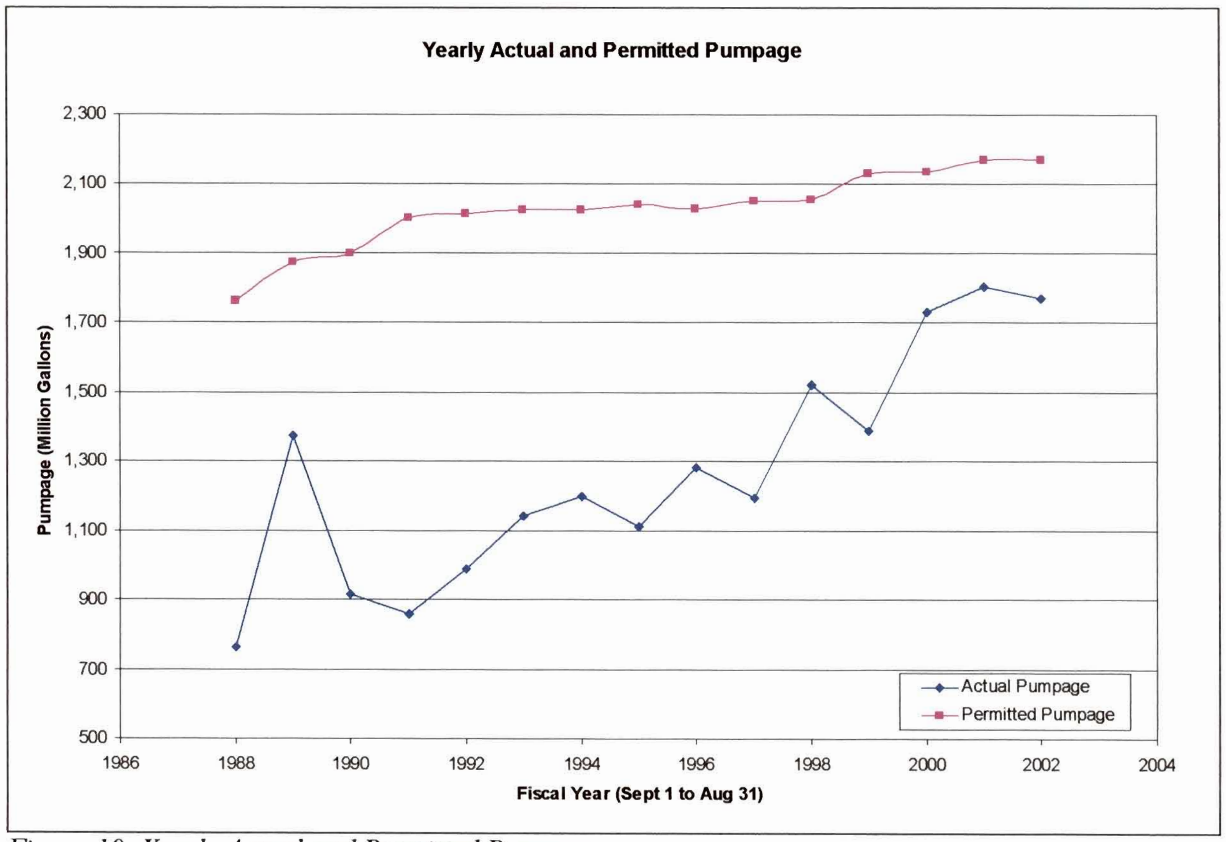


*Figure 10: Yearly Actual and Permitted Pumpage*

<u>POPULATION ESTIMATES</u>

In 2000, approximately 52,200 people lived in the sole source area of the District and 130,700 people lived in the non-sole source area of the District. Combined, approximately 182,500 people lived in the District (U.S. Census Bureau, 2000). Utilizing the Texas Water Development Board's 2002 Regional

Population Projections for 2000-2060, projected growth rates were extrapolated for each portion of the counties in the District's boundaries. Region K and Region L water user groups located in and around the District were identified and the sum of their populations for each decade was calculated to determine a projected growth rate from decade to decade, These projected growth rates were then applied to the population within the District. Table 3 illustrates the projected growth rates for each portion of the counties within the District.

*Table 3: Projected Growth Rates by County Areas in the District*

| County | 2000-2010 | 2010-2020 | 2020-2030 | 2030-2040 | 2040-2050 |
|---|---|---|---|---|---|
| Hays | 107% | 47% | 22% | 18% | 19% |
| Travis | 17% | 21% | 16% | 9% | 8% |
| Caldwell | 42% | 36% | 27% | 21% | 21% |
| Bastrop | 29% | 28% | 26% | 24% | 24% |

Table 4 shows the application of those projected growth rates beginning with the 2000 populations resulting in projected populations for the portions of the counties within the District. While these population projections do not equate to the projected water demand, they may form the basis from which estimates of future water demand within the District can be made or inferred.

*Table 4: Projected Population by County Areas in the District*

| Year | Hays | Travis | Caldwell | Bastrop | Combined |
|---|---|---|---|---|---|
| 2000 | 17,553 | 163,537 | 1,373 | 42 | 182,500 |
| 2010 | 36,335 | 191,338 | 1,950 | 54 | 229,677 |
| 2020 | 53,412 | 231,519 | 2,652 | 69 | 287,652 |
| 2030 | 65,163 | 268,562 | 3,368 | 87 | 337,180 |
| 2040 | 76,892 | 292,733 | 4,075 | 108 | 373,808 |
| 2050 | 91,501 | 316,152 | 4,931 | 134 | 412,718 |

GROUNDWATER DEMAND PROJECTIONS

District boundaries overlap several counties, municipalities, and contain areas that are non-sole source, therefore, future demand estimates are difficult to estimate from population and census figures alone. Any demand from beyond the District's boundaries may adversely impact groundwater users from within the Barton Springs segment of the Edwards Aquifer. While current demands from outside the District's boundaries have been taken into consideration, future demands could prove to be a significant water demand.

The GAM for the Barton Springs segment estimated future groundwater demands beginning in 2000 through 2050. Future pumpage was estimated on the basis of projections made by the Region K Water Planning Group and the Capital Area Metropolitan Planning Organization (CAMPO). The regional planning groups included the implementation of conservation measures as a part of projected water usage but did not consider substitution of surface water for groundwater (conjunctive use) or other alternative water supplies. Estimates of future population and water usage have been made by these groups for cities and counties in and around the District; however, none of these projections could be applied directly to the District (Scanlon et al., 2001). On the basis of estimated total pumpage in the District (permitted and non-permitted wells), a multiplier of 2.1 was used to calculate pumpage in 2050 from the pumpage in 2000. This multiplier is higher than estimates for rural areas, but lower than for towns. Total pumpage in 2001 was 6,754 acre-ft/yr (equivalent to 9.3 cfs), and pumpage in 2050 was estimated to be 14,183 acre-ft/yr (19.6 cfs).

## REFERENCES

*Scanlon, B., R. Mace, B. Smith, S. Hovorka, A. Dutton, 2001, Groundwater Availability of the Barton Springs Segment of the Edwards Aquifer, Texas: Numerical Simulations Through 2050: Bureau of Economic Geology, 34 p.*

*Mayer, Peter W. et al., 1999, Residential End Uses of Water: American Water Works Association Research Foundation, 310 p.*

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## CONSERVATION AND DROUGHT PROGRAMS

*Provide for the most efficient use of groundwater – 31TAC§356.5 (a)(1)(A)*

*and*

*To address natural resource issues which impact the use and availability of groundwater– 31TAC §356.5 (a)(1)(E)*

CONSERVATION

The District is engaged in a wide range of programs to provide for the efficient use of groundwater within the bounds of its legislative authority. Through its regulatory activities in the permitting of groundwater pumpage, the District's Board of Directors may set pumpage amounts based on need and historic use. The annual authorization of annual permits allows the Board and District staff to review pumpage patterns and make modifications to permit amounts, if warranted, to avoid over permitting. This tightening of permit amounts becomes vitally important during periods of drought when reductions are encouraged or mandated as is discussed below.

The efficient use of groundwater is mandated through User Conservation Plans (UCP) and incorporated into incentives through the Conservation Credit Policy. Each permittee is required to have an operationally current UCP that outlines steps the individual or entity will take on a daily or monthly basis to efficiently use the groundwater pumped. The Conservation Credit Policy addresses the potential situation of a remaining credit at the end of a fiscal year for water that was paid for but not pumped. The policy includes a methodology for calculating the potential credit using historical pumpage data and then uses the calculated credit as a financial incentive. Criteria contained in the policy—minimum steps and weighted options—exist as choices for action the permittee can select to earn back the credit while incorporating water conservation practices into their operations.

The District actively educates its regulated community and the public at large. Assistance is provided to public water supply systems to educate their customers through print materials. Water conservation information and devices are displayed and distributed through community events and scheduled presentations.

DROUGHT

Since its creation, the District has developed and implemented its programs for aquifer management during a drought based on the drought of record of the 1950s. Five monitor wells within the District's network of fifteen monitor wells are designated as drought trigger wells due to the existence of historic water level data back to the 1950s. Based on this data, trigger levels for three stages of drought—Stage I

Alert, Stage II Alarm, and Stage III Critical—were established as benchmarks for declining aquifer conditions.

Declaration of a drought stage is guided through District Rule 3-7 (Drought). The District is in "No-Drought" status when the groundwater or potentiometric water level elevations for the drought trigger wells are above the Stage I Alert Status trigger level elevations. The first stage of drought is declared as a local drought when one or more or of the District's drought trigger wells declines below a historical median level elevation for fourteen consecutive days and the District's General Manager determines that conditions warrant the execution of this stage. A regional drought occurs when the aforementioned conditions are true for two or more of the District's drought trigger wells. The District will declare a Stage II Alarm Status when the water level elevation in two or more of the drought trigger wells declines below the historical lower quartile level elevation for fourteen consecutive days and the Board of Directors determine conditions warrant execution of this stage. Similarly, if water level elevations in the drought trigger wells fall below the lowest observed historical level for fourteen consecutive days, the District may declare a Stage III Critical status drought. Typically, declaration of a drought is sought through Board action though it is only required for Stages II and III. Table 5 (below) contains the drought trigger wells and their respective historic median levels.

District Rule 3-7.6 outlines the development of a User Drought Contingency Plan (UDCP) by each permittee to establish steps to be undertaken to achieve a percentage reduction goal and a target volume for each month calculated from a baseline.

District Rule 3-7.8 describes the frequency of monitoring and public education efforts the District will undertake related to declaration of drought stages. Upon each declaration or discontinuance of a drought stage, the District will notify permittees so that they may take appropriate actions per their User Drought Contingency Plan (UDCP). During the Stage I Alert Status, press releases will be provided every two weeks to local newspapers and posted on the District's website and weekly water level monitoring will occur. During Stage II Alarm status and Stage III Critical Status weekly press releases will be provided and monitoring of the drought trigger wells will occur twice a week.

*Table 5: Water Level Elevation Monitor Wells and Drought Severity Stage Parameters*

| Well Name/State Well # | No-Drought Condition Water Level Elevation Above (ft. msl*) | ALERT status water level elevation between (ft. msl) | ALARM status water level elevation between (ft. msl) | CRITICAL status water level elevation below (ft. msl) |
|---|---|---|---|---|
| Mountain City Area (58-57-903) | 596.8 | 596.8 - 584.4 | 584.4 - 554.0 | 554 |
| Buda Area (58-58-101) | 599.8 | 599.8 - 580.2 | 580.2 - 550.7 | 550.7 |
| San Leanna Area (58-50-801) | 564.6 | 564.6 - 541.2 | 541.2 - 505.9 | 505.9 |
| South Austin Area (58-50-301) | 463.4 | 463.4 - 452.8 | 452.8 - 431.0 | 431 |
| Barton Creek/Barton Springs Area (58-42-903) | 431.9 | 431.9 - 430.0 | 430.0 - 426.7 | 426.7 |

*mean sea level

Since approval of the previous management plan in September 1998, the District has encountered drought conditions and declared drought stages per District Rules and Bylaws as follows:

| | |
|---|---|
| September 1, 1998 | District in Stage I – Alert drought declared on July 2, 1998 |
| October 22, 1998 | Drought status changed to No Drought following heavy rains |
| August 12, 1999 | District declared Stage I – Alert drought |
| November 1, 1999 | District declared Stage II – Alarm drought |
| December 14, 2000 | Drought status changed to Stage I – Alert drought following heavy rains |
| February 8, 2001 | Drought status changed to No Drought |
| August 14, 2003 | District declared Stage I – Alert drought |
| October 30, 2003 | District declared Stage II – Alarm drought |

Each permittee submits a User Drought Contingency Plan to the District. Upon declaration of a drought stage, permittees are required to invoke steps in the system-specific plan in order to attain reductions in pumpage, thus conserving decreasing supplies. Analysis of meter readings occurs during periods of mandatory drought reductions to ascertain if compliance is occurring and to what degree enforcement via official communication is warranted.

## GROUNDWATER RECHARGE

*Estimate of the annual amount of recharge to the groundwater resources within the Barton Springs / Edwards Aquifer Conservation District - 31TAC §356.5 (a)(4)(C)*

*and*

*Estimate of the annual amount of additional natural or artificial recharge of groundwater within the Barton Springs / Edwards Aquifer Conservation District that could result from implementation of feasible methods for increasing the natural or artificial recharge - 31TAC §356.5 (a)(4)(C)*

The Barton Springs segment of the Edwards Aquifer is recharged by runoff that enters the aquifer from rainfall that falls in the contributing and recharge zones. The Barton Springs segment has two major watersheds that contribute groundwater recharge. The Barton Creek watershed provides approximately 28% of total recharge to the aquifer, while the Onion Creek watershed provides the remaining 72% of the recharge (Slade, 1986). The Onion Creek watershed is subdivided into five sub-watersheds: Onion, Bear, Little Bear, Williamson and Slaughter Creeks.

Table 6 (below), which was developed with District GIS data, shows the drainage areas of the six different watersheds in the Barton Springs segment that incise through contributing zone, recharge zone, and artesian zone within the District. The Barton and Onion creek watersheds have the greatest aerial extent within the contributing and recharge zones, 99.79% and 74.11%, respectively, which allows these watersheds to sustain creek flow longer and recharge more over the long term. Comparatively, the four smaller watersheds have less drainage area within the contributing and recharge zones, which correlates to lower sustained flows and ultimately less recharge over the long term.

*Table 6: Barton Springs segment of the Edwards Aquifer – Watershed Sizes*

**Barton Springs segment of the Edwards Aquifer**
**Watershed Drainage Areas (sq.mi.)**

| WATERSHED | CONTRIBUTING Zone | RECHARGE Zone | ARTESIAN Zone | TOTAL of All 3 Zones | BSEA Watershed - Combined Contributing & Recharge | |
|---|---|---|---|---|---|---|
| | | | | | Square Miles | Percent of Total |
| Onion Cr. | 137.21 | 30.28 | 58.51 | 226 | 167.49 | 74.11% |
| Barton Cr. | 110.79 | 8.47 | 0.25 | 119.51 | 119.26 | 99.79% |
| Williamson Cr. | 7.76 | 9.5 | 13.49 | 30.75 | 17.26 | 56.13% |
| Slaughter Cr. | 10.96 | 11.16 | 9.2 | 31.32 | 22.12 | 70.63% |
| Bear Cr. | 17.7 | 6.73 | 1.94 | 26.37 | 24.43 | 92.64% |
| Little Bear Cr. | 2.28 | 18.31 | 2.55 | 23.14 | 20.59 | 88.98% |
| ***TOTALS*** | **286.7** | **84.45** | **85.94** | **457.09** | **371.15** | **80.31%** |

Recharge enhancement is a practice used by the District to increase the amount of groundwater entering the aquifer and to reduce the amount of potential contaminants that can threaten the water quality of the Barton Springs segment of the Edwards Aquifer. Thus, by increasing the volume of recharge entering the aquifer, the impacts of pumpage can be reduced. Similarly, adding additional recharge will also help delay the negative impacts of an extended drought on available groundwater supplies and spring flow. Furthermore, recharge enhancement may be one way to help mitigate the adverse impacts associated with increased demand for water within the District.

In March 1998, the District completed its first recharge enhancement structure, or Best Management Practice (BMP), over a natural cave opening in Onion Creek known as Antioch Cave. The Antioch Cave BMP complies with the District's mandate to conserve, protect, and enhance the groundwater of the Barton Springs segment of the Edwards Aquifer in two ways: first by allowing the first storm pulse which is associated with higher total suspended solids to flow by and not recharge; and second, to maintain an unobstructed orifice to maximize recharge, which has been documented to be approximately 20% of the total creek recharge. The Antioch Cave BMP has proven to be effective in reducing the amount of debris, trash, and suspended solids entering the aquifer up to 90% and reductions in bacteria counts from 30% to 90% (Fieseler, 1998). Additionally, the Antioch Cave project has provided valuable information for future recharge enhancement sites for methods and procedures to test and evaluate the effectiveness and structural control of these BMPs.

The District is currently pursuing access and or partnerships with applicable entities for additional recharge enhancement sites within the District's six main watersheds. To be able to quantify the amount of recharge that these potential recharge enhancement sites can produce is impossible without conducting a feasibility study. This type of study can only begin when the potential site has been identified, access has been secured, and funding has been obtained. The amount of recharge can have a high degree of variability due to the type of precipitation event, accommodation space in the vadose zone, geomorphology, and upstream land uses practices. For example, Antioch Cave was reported plugged until 1990, until a flood altered the geomorphology and opened up the largest known recharge feature in Onion creek.

<u>REFERENCES</u>

*Fieseler, Ronald G., 1998, Implementation of Best Management Practices to Reduce Nonpoint Source Loadings to Onion Creek Recharge Features: Barton Springs/Edwards Aquifer Conservation District report.*

*Slade, Raymond M., Dorsey, Michael E., Sheree, Stewart L., 1986, Hydrogeology and Water Quality of the Edwards Aquifer Associated with Barton Springs in the Austin Area, Texas.*

## CONJUNCTIVE WATER MANAGEMENT

*To address conjunctive surface water management issues within the Barton Springs / Edwards Aquifer Conservation District - 31TAC §356.5 (a)(1)(D)*

SURFACE WATER RESOURCES

In addition to groundwater from the Barton Springs segment of the Edwards Aquifer, surface water supplies are currently and will continue to be incorporated in the water management strategy within the District's area. The District's jurisdictional boundary encompasses portions of two river basins – the Lower Colorado River basin and the Guadalupe-Blanco River basin. The portion of the District within Travis and Bastrop Counties lies within the 10-county statutory district of the Lower Colorado River Authority (LCRA). The portion of the District within Hays and Caldwell Counties lies within the district of the 10-county statutory district of the Guadalupe Blanco River Authority (GBRA). These river basin supplies, as well as the surface water the City of Austin provides, create the backbone for conjunctive surface water management in the District. The types of water sources include reservoirs with a firm yield and run-of-river water rights. The City of Austin, LCRA, and GBRA each have significant quantities of surface water that might be available for conjunctive management approaches.

*Table 7: Summary of Surface Water Supply Amounts*

| Provider | Firm Yield (ac-ft) |
|---|---|
| Lower Colorado River Authority (LCRA) – Highland Lakes System | 445,766 |
| Guadalupe-Blanco River Authority (GBRA) – Canyon Lake/Reservoir | 90,000 |
| City of Austin (COA) – Highland Lakes System (Contract w/LCRA) | 191,024 |
| City of Austin (COA) – Colorado River Combined Run-of-River | 179,832 |

*Texas Water Development Board, 2002*

In addition to these firm commitments for water, the LCRA also provides water to users on an interruptible supply basis. Based on the LCRA Water Management Plan, the LCRA will release water from storage on an interruptible basis when the levels in the Highland Lakes are above a prescribed level at the beginning of the year. During drought conditions, this water may not be available for users. Therefore, in accordance with the TWDB guidance, interruptible water supplied by LCRA is not being considered as a "currently available water supply".

The City of Austin's combined run-of-river rights include rights in Lake Austin and Town Lake. While the LCRA and GBRA still have water available from their firm yield supplies, the COA has committed most of its water supplies from both the Highland Lakes system and run-of-river. Therefore, any significant quantities of surface water needed to meet the growing water demand needs of District users, will likely come from the LCRA and GBRA.

The Lower Colorado Regional Water Planning Group (LCRWPG) has identified two key management strategies in its 2000 adopted plan to meet water supply demand in Hays County. One strategy includes obtaining surface water through the LCRA system. The first phase of the proposed project will supply on average 2,240 ac-ft/yr. Another strategy includes obtaining surface water through the GBRA system. While the transmission system would be designed to provide an average day demand of 4.0 mgd to meet Hays County demand, the LCRWPG area would receive approximately 1,680 ac-ft/yr. It is anticipated that implementation of these two management strategies would have the positive benefit of reducing the demand on the Barton Springs segment of the Edwards Aquifer.

CONJUNCTIVE USE OF SURFACE AND GROUNDWATER

Currently, a few District permittees such as the City of Kyle and the City of Sunset Valley are using surface water conjunctively with groundwater through contracts with GBRA and COA respectively. Other permittees, including the City of Buda, Goforth Water Supply Corporation, and Creedmoor-Maha Water Supply Corporation, which represent some of the District's largest permitted groundwater pumpers, are pursuing surface water opportunities to augment groundwater supplies. GBRA has an existing contract with the City of Buda that provides the City with a stored water (Canyon Reservoir) commitment of 1,120 acre-fee of water per year. GBRA and the City of Buda also have an existing water supply agreement that provides for GBRA to treat and deliver up to 1 million gallons of surface water per day when the IH 35 treated water pipeline is completed in the summer of 2005. New development in the District's southwest region, in Hays County, is looking to the LCRA for its water needs. Phase One of the West Travis County Regional System is in place with plans to serve much of the new growth with surface water, if not completely, then conjunctively with groundwater.

Efforts to manage the aquifer in a sustainable manner coupled with the high growth rates expected in these service areas are pushing District permittees to identify and develop alternative water supplies. Groundwater may not be available, depending on aquifer conditions, demand, or any limitation the District may put on permittees to reduce impacts on the groundwater resources overall. Therefore, by having a surface water supply available, some future, potential permittees may choose surface water over groundwater for a more dependable and consistent quantity and quality of water. If surface water is available in the existing high demand areas, most of which are in the deeper artesian portion of the aquifer, it may be possible to manage the groundwater resource, reducing negative consequences by providing an alternative source in these high demand areas. By reducing the demand on the aquifer in these areas, groundwater could remain available to those dependent upon it in the shallower, unconfined portions of the District's western edge. Surface or supplemental water can also be used to help mitigate the adverse impacts associated with in-District use, as well as, out of District groundwater transports.

REGION-WIDE STRATEGIES FOR MEETING WATER SUPPLY DEMANDS

The District's area is comprised of parts of two regional planning groups – Region K (Lower Colorado Regional Water Planning Group or LCRWPG) and Region L (South Central Texas Regional Water Planning Group or SCTRWPG) (see Figure 11). The majority of the District is in Region K's boundaries. Region K has identified methods for meeting identified water supply shortages in its region. The District is actively participating in these efforts and supports their implementation. The supply strategies include the following:

- Obtaining surface water from the West Travis County Regional System.
- Obtaining surface water from GBRA/San Marcos Regional System.
- Obtaining potable water from the COA.
- Enhancing aquifer recharge along Onion Creek.

ALTERNATIVE WATER SUPPLY STRATEGIES

While much investigation is occurring into conjunctive surface water supplies within the District, alternative water supply strategies are also being studied for their feasibility and benefits. The District is currently collaborating with several entities and stakeholders on studying and implementing other solutions to the water management They include Aquifer Storage and Recovery (ASR), rainwater harvesting, reuse, use of the Trinity Aquifer, desalinization, and conservation.

ASR is a method of storing water in an appropriate geologic formation for storage until the water is needed during periods of drought. Edwards Aquifer water can be extracted during periods of high water level conditions and injected into the bad-water zone, generally the area east of IH-35. Water removed from the aquifer during average and above average water level conditions would not have any negative impact on the availability of groundwater during periods of drought. The extracted groundwater would be piped to the east where it would be injected into a well specially designed for both injection and extraction of water. By injecting potable water into the saline portion of the Edwards Aquifer, a bubble of potable water would be created while the saline water is pushed away from the injection well. A small amount of fresh water will mix with the saline water and will no longer be available for extraction and use. During periods of drought, the stored water would be extracted and delivered to the users. Further studies are needed to determine the technical and financial feasibility of such a system.

Rainwater harvesting/collection represents an alternative water supply that could reduce the number of wells drilled within the District if used as a primary water source. It can also reduce dependence on the aquifer if used for outdoor watering needs, which can account for 50% or more of summer water usage. District staff have participated in efforts to explore the development of programs promoting rainwater collection and the study of its use as a potable water source.

Reuse includes options that consider ways to beneficially use reclaimed water from wastewater treatment facilities within the District. Residential use of graywater is another form of reuse that the District is keenly interested in. The creation of rules to address the statewide permitting and regulation of residential graywater systems would allow the District to encourage its use, potentially reducing the use of groundwater.

Another source of additional water in the District is from the Trinity Aquifer the underlies the Edwards Aquifer. The Trinity Aquifer is currently being used by a number of wells on the western side of the District, but is not being used where there is sufficient saturation of the Edwards Aquifer. Average yields of the Trinity Aquifer west of the District can be 250 times lower on average compared to the Edwards Aquifer (Mace, 2000). The water quality of the Trinity Aquifer is highly variable and tends to decrease in quality downdip to the southeast (Brune and Duffin, 1983). In terms of availability, the Trinity Aquifer is reported to be susceptible to pumping and could be unreliable in a drought (Ashworth, 1983; Bluntzer, 1992). Recent groundwater availability modeling indicates that water levels in the Trinity Aquifer will decline with increased demand regardless of hydraulic conditions (Mace, 2000). The GAM modeling for the Trinity Aquifer (Mace, 2000) does not attempt to identify the amount of Trinity water available specifically within the District's jurisdictional boundaries. The District has not undertaken any specific research to quantify the amount of Trinity water available within the District's jurisdictional boundaries. Some uncertainties about making additional use of the Trinity Aquifer within the District is how much might that use impact groundwater availability in the Edwards Aquifer and in the Trinity Aquifer west of the District. Additional studies are needed to answer these and other questions including financial feasibility.

There are large quantities of saline water in the Edwards Aquifer east of IH-35 that could potentially be extracted and treated for use as potable water. Various technologies are available for treating this water, but the cost may be prohibitive. However, a water availability study and a cost analysis could be conducted to evaluate the feasibility of these technologies. The water purveyors in the District should be encouraged to investigate the potential of desalinization of the saline portion of the Edwards Aquifer as a source of potable water.

REFERENCES

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*Mace, R., A. Chowdhury, R. Anaya, S. Way, 2000, Groundwater Availability of the Trinity Aquifer, Hill Country Area, Texas: Numerical Simulations through 2050: Texas Water Development Board, 172 p.*

*Texas Water Development Board, January 2002, Water for Texas – 2002, Document No. GP-7-1.*

# *Regional Water Planning Groups*

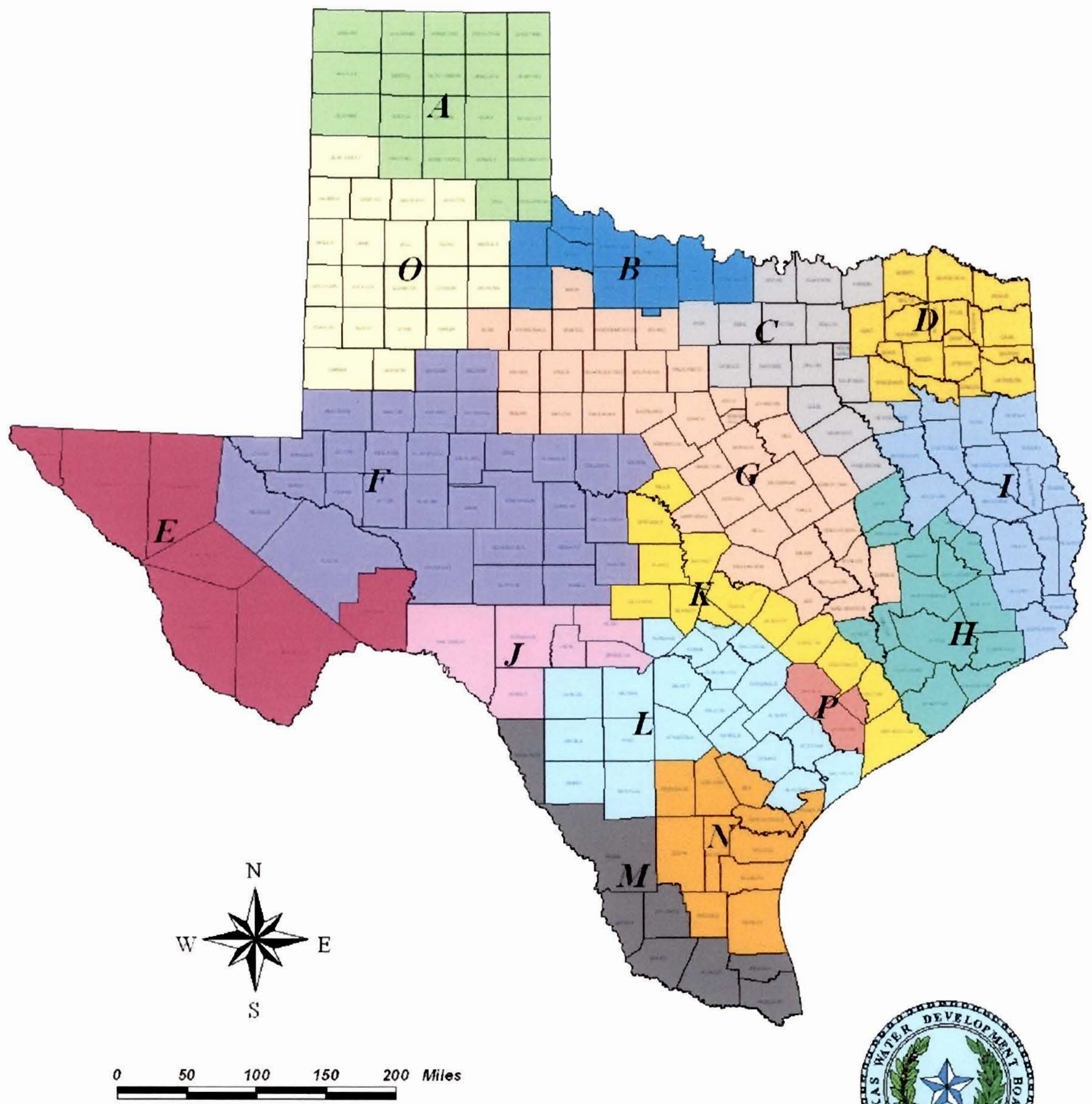


*Figure 11: Regional Water Planning Groups*

## GOALS, MANAGEMENT OBJECTIVES, AND PERFORMANCE STANDARDS

*31TAC §356 requires goals, objectives, performance standards, and tracking methods to be established in seven (7) emphasis areas, six (6) that are specifically applicable to District operations. These requirements are detailed on the following tables along with their location in the plan. The seven (7) management goals are:*

1. **To provide for the most efficient use of groundwater within the Barton Springs / Edwards Aquifer Conservation District;**

2. **To control and prevent waste of groundwater within the Barton Springs / Edwards Aquifer Conservation District;**

3. **To control and prevent subsidence within the Barton Springs / Edwards Aquifer Conservation District;**

4. **To address conjunctive surface water management issues within the Barton Springs / Edwards Aquifer Conservation District;**

5. **To address natural resource issues that impact the use and availability of groundwater and which are impacted by the use of groundwater within the Barton Springs / Edwards Aquifer Conservation District;**

6. **To address drought conditions and;**

7. **To address conservation.**

*Note that the third management goal for controlling and preventing subsidence, as specified in 31TAC §356.5 (a)(1), is not specifically applicable to the operations of the District.*

Many of the programs, projects and activities detailed in the District's 2003 Management Plan are applicable to one or more groundwater management goals listed above. Specific goals, objectives, performance standards, and tracking methods have been developed for this plan and are indicative of the inter-relatedness of District activities. When practicable, goals, objectives, performance standards, and tracking methods have been identified on the following tables that indicate the relationship with the groundwater management goals.

| TAC Reference | PLAN REQUIREMENTS | Page # |
|---|---|---|
| 31TAC §356.5 (a) | Ten year planning period. | 2 |
| 31TAC§356.5 (a)(1)(A-G) | *Requirements listed in A through G are found throughout the management plan.* | |
| 31TAC§356.5 (a)(2) | Management objectives that are specific, quantifiable, and time-based statements of desired future accomplishments or outcomes, each linked to a management goal, which set the individual priority for District strategies. | beginning on 38 |
| 31TAC§356.5 (a)(3) | Performance standards for each management objective that are indicators or measures used to evaluate the effectiveness and efficiency of District activities by quantifying the results of actions. | beginning on 38 |
| 31TAC§356.5 (a)(4) | Actions, procedures, performance, and avoidance, necessary to effectuate the management plan, including specifications and proposed rules, all specified in as much detail as possible. | beginning on 38 |
| 31TAC §356.5 (a)(5)(A) | Estimate of the total usable amount of groundwater in the District. | 4 |
| 31TAC §356.5 (a)(5)(B) | Estimate of the amount of groundwater being used within the District on an annual basis. | 18 |
| 31TAC §356.5 (a)(5)(C) | Estimate of the annual amount of recharge to the groundwater resources within the District. | 27 |
| 31TAC §356.5 (a)(5)(C) | Estimate of the annual amount of additional natural or artificial recharge of groundwater within the District that could result from implementation of feasible methods for increasing the natural or artificial recharge. | 27 |
| 31TAC §356.5 (a)(5)(D) | Estimate of the projected water supply within the District. | 4 & 29 |
| 31TAC §356.5 (a)(5)(D) | Estimate of the projected water demand within the District. | 18 |
| 31TAC §356.5 (a)(6) | Details of how the District will manage groundwater supplies in the district, including a methodology for tracking progress on an annual basis to achieve management goals. | beginning on 38 |
| 31TAC§356.6 (a)(2) | Certified copy of the District resolution adopting the plan. | TBD |
| 31TAC§356.6 (a)(3) | Evidence that the plan was adopted after notice and hearing. | TBD |
| 31TAC§356.6 (a)(4) | Evidence that following notice and hearing the District coordinated the development of its management plan with surface water management entities. | TBD |
| 31TAC§356.6 (a)(5) | Evidence of consistency with and any conflict between proposed management plan and the regional water plan for each region in which any part of the District is located, if such regional water plan has been approved by the Board of Directors. | TBD |

*Note that the management goal for controlling and preventing subsidence, as specified in 31TAC §356.5 (a)(1), is not specifically applicable to the operations of the Barton Springs / Edwards Aquifer Conservation District.*

| CORRELATION MATRIX | | | | | | |
|---|---|---|---|---|---|---|
| District Management Goals | *To provide for the most efficient use of groundwater - 31TAC §356.5 (a)(1)(A).* | *To control and prevent waste of groundwater - 31TAC §356.5 (a)(1)(B).* | *To address conjunctive surface water management issues - 31TAC §356.5 (a)(1)(D).* | *To address natural resource issues - 31TAC §356.5 (a)(1)(E).* | *To address drought condition issues - 31TAC §356.5 (a)(1)(F).* | *To address conservation issues - 31TAC §356.5 (a)(1)(G).* |
| 1.0 Regulation/ Permitting | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
| 2.0 Education and Outreach Program | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
| 3.0 Water Quality Program | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
| 4.0 Groundwater Quantity Program | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
| 5.0 Grants Program | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
| 6.0 Legislative Program | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
| 7.0 Administrative Program | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
| 8.0 Conservation | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
| 9.0 Drought Management | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |

## 1.0 REGULATION / PERMITTING

### 1.0 Management Goal(s):

Maintain the District's regulating and permitting program so that all wells are compliant with the District's Rules and By-Laws.

### 1.1 Management Objective(s):

Each year, maintain a water well program for newly drilled exempt and non-exempt wells, as well as plugged wells, so that they comply with the District's Rules and By-Laws.

**Performance Standard(s):**

1.1.1 Register all new exempt and non-exempt wells that are drilled in the District. Complete well registration forms, approve well drillings, approve pumping permits, and inventory exempt and nonexempt wells within the District.

1.1.2 Perform at least two well site inspection on each new well drilled in the District.

1.1.3 Ensure compliance with the District's Rules and Bylaws and Well Construction Standards during the drilling and completion of new wells as well as the capping or plugging of all identified abandoned wells.

1.1.4 Collect water quality and groundwater level information for new wells to monitor the aquifer's condition, record in databases, and use data to assess water quality and quantity conditions for the well of interest.

1.1.5 Take water level measurements and water samples from selected abandoned wells prior to closure or plugging.

**Methodology To Track Annual Progress:**

Data in District database(s), and hard copy documentation on file when appropriate.

### 1.2 Management Objective(s)

Review requests for modifications and amendments to existing wells and or permits for the District's permittees in accordance with District Rules and Bylaws.

**Performance Standard(s):**

1.2.1 Evaluate a requesting permittee's pumpage history, permit need, and additional information, in accordance with District Rules and Bylaws to inform District Board decisions on permits.

1.2.2 Annually permit all non-exempt wells within the District by September 1.

1.2.3 District staff will evaluate, in accordance with District Rules and Bylaws, requests for permit modifications or amendments to determine if a hydrogeologic test is required.

**Methodology To Track Annual Progress**
Data in District's database(s), pumpage permits, and amendments with related correspondence.

**1.3 Management Objective(s)**

Maintain a program for District's permittees that will address compliance of the District's Rules and By-Laws.

**Performance Standard(s):**

1.3.1 Inspect at least 10% of the District's permittees' systems each fiscal year for compliance with District Rules.

1.3.2 Require monthly meter readings from permitted wells and monitor usage in accordance with District's Rules and Bylaws.

1.3.3 Require a User Conservation Plan and a User Drought Contingency Plan to be on file with the District.

1.3.4 Enforce permittees compliance with District Rules and By-Laws including but not limited to staff conducted spot meter readings and pumpage analysis during District declared droughts.

**Methodology To Track Annual Progress**
Document permittee inspections, meter readings, and compliance violations in hardcopy files and or District's database(s).

**1.4 Management Objective(s)**

As needed, review and modify, with public input, the District Rules and Bylaws.

**Performance Standard(s):**

1.4.1 Schedule and conduct public hearings to solicit public input on proposed changes to District Rules and Bylaws.

1.4.2 The Policy Advisory Committee will be convened, at the will of the Board, to review and comment on proposed Rule revisions.

1.4.3 Upon adoption, the District will make available to the public, the revised District Rules and Bylaws.

**Methodology To Track Annual Progress**
Board meeting agendas, public hearing notices, District Rules and Bylaws.

**1.5 Management Objective(s):**

Each year, the District will review the subject of transporting groundwater out of the District. Of major concern will be the subjects of the impact on the use of wells within the District, supplying needs outside of the District and how the District, if approving such transportation, can ensure that the impact of water resources lost from the District due to the export are addressed.

**Performance Standard(s):**

1.5.1 The District will adopt and implement transport rules in their Rules and Bylaws.

1.5.2 The District's Board of Directors will annually set, adopt and collect fees:

(a) for transport permits to cover all reasonable and necessary costs to the District of processing the application, conducting public hearings and determining the adequacy of the application, and for mitigating the loss of natural resources due to the transport;

(b) for services provided for the transport of groundwater out of the District, which fees will be dedicated to mitigating in District impacts of the transport; and,

(c) for all services provided outside of the boundaries of the District.

1.5.3 Hold a public hearing within 30 days regarding requests for transport of water out of the District once an application is determined to be administratively complete.

1.5.4 In reviewing a proposed transport of groundwater out of the district, the district shall consider:

(a) the availability of water in the district and in the proposed receiving area during the period for which the water supply is requested;

(b) the projected effect of the proposed transport on aquifer conditions, including spring flow, depletion, subsidence, or effects on existing permit holder or other groundwater users within the district;

(c) the availability of feasible and practicable alternative supplies to the applicant;

(d) the amount and purposes of use for which water is needed in the proposed receiving area;

(e) the indirect costs, economic and social impacts, and cost of resource replacement associated with the proposed transport of water from the District;

(f) the approved regional water plan and certified district management plan;

(g) whether the transport is contrary to the District's certified management plan or an approved regional water supply plan;

(h) whether the transport would present the possibility of unreasonable interference with the production of potable water from exempt, existing, or previously permitted wells;

(i) whether the transport would have a beneficial use;

(j) whether the transport would cause or contribute to waste;

(k) whether the transport would be otherwise contrary to the public welfare; and

(l) other facts and considerations considered necessary by the District's Board of Directors for protection of the public health and welfare and conservation and management of natural resources in the District.

1.5.5 Make a decision regarding permits within 35 days following conclusion of a public hearing or any contested hearing held to consider transport applications.

1.5.6 The District Board of Directors may limit a permit issued under this section if conditions in 1.2.4 warrant the limitation.

1.5.7 Identify the use of fees collected to mitigate impacts of the transport of water out of the District in the annual budget for such purposes including: programs identified in paragraph 1.5.8, pursuing grants, loans or contractual payments to achieve, facilitate, or expedite reductions in groundwater pumping or the development or distribution of alternative water supplies.

1.5.8 Each year, establish programs, policies and projects that supplement the enhancement of the groundwater within the Barton Springs segment of the Edwards Aquifer by either educating the public, conserving water, recharging water, investigating alternative surface water supplies or other measures that achieve, facilitate, or expedite reductions in groundwater pumping or the development or distribution of alternative water supplies.

**Methodology To Track Annual Progress:**
Adopted Board policies, adopted annual budget and fee schedule. Board approved transport permits on file, copies of transport permits approved, disapproved or pending.

**1.6 Management Objective(s)**

Limit the total amount of permitted withdrawals from the aquifer to the amount when added to the estimated exempt pumpage, of the aquifer's sustainable yield, once it is established.

**Performance Standard(s):**

1.6.1 Develop and refine a groundwater flow model that meets standards set by the Texas Water Development Board and other commonly accepted standards.

1.6.2 Evaluate water supply wells that may be threatened by low water levels during a drought.

1.6.3 Meet with other parties that have technical capabilities to advise on the validity of the groundwater model and determine if it is the best available science at this time.

**Methodology to Track Annual Progress**

Results of GAM simulations and implementation of a policy that includes pumping limitations; databases, maps and tables; District Rules & Bylaws addressing pumping limits; notices of meetings and public hearings; meeting agendas, sign-up sheets, and minutes.

## 2.0 EDUCATION AND OUTREACH PROGRAM

### 2.0 Management Goal(s)

Initiate, develop, and promote activities, relationships, and programs that will enhance an understanding of the aquifer and its importance as a resource for its users, and promote wise use of the resource.

### 2.1 Management Objective(s)

Maintain and develop programs to inform and educate local citizens about water-related matters of local, state, and national importance using available media.

**Performance Standard**

2.1.1 Each year, distribute information including but not limited to indoor water conservation practices, outdoor conservation practices such as Xeriscape information, aquifer dynamics, drought updates and information to permittees and exempt well owners, public schools, and other residents within the District.

2.1.2 Each year, use the District's website to post current aquifer levels, news, and information, and archive information about District activities and programs.

2.1.3 As needed, distribute press releases to local media regarding District programs and activities, and prepare articles for area newspapers or neighborhood association newsletters that update District residents about water-related issues.

2.1.4 District Directors and staff shall make a minimum of four presentations to neighborhood associations, professional meetings or conferences, and other private or public functions as a public service where information about the aquifer and its management by the District can be presented, promoted, or emphasized.

2.1.5 Each year, assist educators, parents and students to learn about the aquifer and the principles of water quantity / quality protection endangered species concerns and conservation through the development and distribution of educational materials, field trips, and a minimum of four presentations.

**Methodology To Track Annual Progress**

Copies of articles, press releases, advertisements and materials such as letters and flyers, provided to promote District programs and projects, printout of web page directory, scripts or descriptions of presentations, and Annual Report.

### 2.2 Management Objective(s)

Each year, implement award program that seeks to recognize nominated individuals, private corporations, and public organizations that contribute to the aquifer through conservation, research, education, water quality protection, and innovation.

**Performance Standard**

2.2.1 Solicit nominations, determine category winners, and present Conservation Awards to winners.

**Methodology To Track Annual Progress**

Conservation Awards conveyed.

## 2.3 Management Objective(s)

Organize and conduct events that allow the District to work cooperatively with area residents, including youth, in demonstrating the important relationships between surface water and groundwater quality.

**Performance Standard**

2.3.1 Each year, conduct a creek cleanup event independently or in collaboration with another group or entity.

2.3.2 As needed, conduct a cave or recharge feature cleanup independently or in collaboration with another group or entity.

2.3.3 At least every three years, participate in a Household Hazardous Waste Collection Event for rural and suburban residents in cooperation with other public and private interest groups.

**Methodology To Track Annual Progress**

Advertising literature, documentation of participants, volume of trash collected, and a list of materials collected.

## 2.4 Management Objective(s)

Develop cooperative public and private partnerships with agencies, organizations, and entities having areas of mutual interest that will further the District's mission and maximize the effective use of public funds and resources while protecting the aquifer.

**Performance Standard**

2.4.1 Participate in collaborative activities and/or events to educate diverse audiences about water quality and quantity.

**Methodology To Track Annual Progress**

Photographs and documentation of District participation in collaborative activities to educate about and protect the aquifer.

## 3.0 WATER QUALITY PROGRAM

### 3.0 Management Goal(s)

Collect, analyze, and provide information on groundwater quality conditions, and develop and implement programs designed to monitor, prevent, and mitigate pollution of the groundwater within the Barton Springs segment of the Edwards Aquifer.

### 3.1 Management Objective(s)

Collect groundwater samples in order to assess ambient conditions in the Barton Springs segment of the Edwards Aquifer by sampling permitted wells during regularly scheduled inspections, all new wells drilled upon completion, selected abandoned wells, and other wells of interest or upon request.

**Performance Standard**

3.1.1 Sample permitted wells as part of inspections.

3.1.2 Sample newly drilled wells upon completion.

3.1.3 Sample select abandoned wells prior to plugging.

**Methodology To Track Annual Progress**

Water quality data entered into database.

### 3.2 Management Objective(s)

Sample wells where water-quality data is needed or contamination is suspected. Monitor water quality in wells that are characteristic of the bad-water zone.

**Performance Standard**

3.2.1 Sample wells or work with TCEQ where known or suspected contamination has occurred or is suspected.

3.2.2 Collect water samples from wells located in and adjacent to the bad-water zone for further characterization of the water quality and spatial distribution.

**Methodology To Track Annual Progress**

Water quality data entered into database, and associated distribution maps.

**3.3 Management Objective(s)**

Work with other agencies to review groundwater analytical data for any negative groundwater quality impacts and for long-term trends in quality.

**Performance Standard**

3.3.1 Enter new data into database.

3.3.2 Participate in meetings with US. Fish and Wildlife, City of Austin, TCEQ, local fire departments, and pipeline companies to prepare for accidental spills, develop contacts, and delineate agencies contributions and responsibilities.

**Methodology To Track Annual Progress**

Up-to-date water quality database, spill-response supplies, and document packet.

**3.4 Management Objective(s)**

Provide technical assistance to federal, state and local entities, organizations, and individuals on the geology, hydrogeology, and karst features impacted by land use activities in order to minimize those impacts on water quantity and quality.

**Performance Standard**

3.4.1 When feasible, provide information to developers, roadway contractors, the regulated community, and local and state agency personnel about the locations and sources of vulnerability of the District's groundwater resources, and the steps they can take to mitigate the threats of contamination.

3.4.2 Review and provide comments, where applicable, for Water Pollution Abatement Plans or other environmental site assessments submitted to the TCEQ, COA, small cities or other entities in order to mitigate potential degradation to the aquifer from contamination.

**Methodology To Track Annual Progress**

Attend relevant meetings to address District concerns, copies of comments provided to applicable entities, and inspection reports.

## 4.0 GROUNDWATER QUANTITY PROGRAM

### 4.0 Management Goal(s)

Develop, evaluate, and implement management strategies that will protect and enhance the quantity of water in the Barton Springs segment of the Edwards Aquifer. Gather geologic and hydrogeologic information pertaining to the use and the quantity of water in the aquifer that will allow the public, District staff, and elected officials to make more informed decisions on issues involving groundwater resources, such as: determining the sustainable yield of the aquifer, providing for the most efficient use of groundwater, controlling and preventing waste, addressing conjunctive surface water use, and identifying alternative sources of water.

### 4.1 Management Objective(s)

Determination of sustainable yield and development of related policies.

**Performance Standard**

4.1.1 Use GAM to evaluate pumping and drought scenarios so that the sustainable yield of the aquifer can be determined. Two key components of the evaluation are water levels—in order to protect water supply wells from going dry—and springflow—in order to investigate the potential effects of low flow on endangered species.

4.1.2 Test GAM against the drought of the 1950s.

4.1.3 Revise GAM as appropriate to improve its ability to simulate pumping and drought scenarios.

4.1.4 Incorporate GAM results into sustainable yield policies and applicable conservation measures.

**Methodology To Track Annual Progress**

Results of GAM simulations and implementation of a policy that includes, but is not limited to pumping limitations, conservation, and alternative water supplies.

### 4.2 Management Objective(s)

Maintain current recharge enhancement project and pursue future projects.

**Performance Standard**

4.2.1 Continue development and implementation of recharge enhancement projects.

4.2.2 Pursue funding, sponsorship, or partnerships to implement recharge enhancement projects.

**Methodology To Track Annual Progress**

Projects investigated for viability, ongoing sites maintained and applications or proposals submitted for grants, sponsorship, or partnerships.

**4.3 Management Objective(s)**

Research and identify alternative water supply sources to offset groundwater demand and prolong the long-term viability of the Barton Springs segment of the Edwards Aquifer.

**Performance Standard**

4.3.1 Identify alternative or supplemental water supplies for drought and conservation management and for future growth such as ASR, surface water, rainwater harvesting, graywater reuse, Trinity Aquifer, and brackish water use.

**Methodology To Track Annual Progress**

Correspondence with District permittees and other partners on possible alternative water supply projects, and meeting notes and minutes of discussions.

**4.4 Management Objective(s)**

As records become available, obtain historical stream flow gain / loss records, and as feasible, monitor stream flow over the recharge zone in major contributing creeks, and correlate with meteorological data and groundwater levels.

**Performance Standard**

4.4.1 Identification of sites and quantities of recharge into the Barton Springs segment of the Edwards Aquifer during variable flow conditions.

4.4.2 Identify temporary stations suitable for flow measurements to quantify discrete recharge points, and utilize previous USGS sites.

4.4.3 As feasible, install permanent flow meters at appropriate sites on creeks that provide recharge to the aquifer.

**Methodology To Track Annual Progress**

Inventory of sites and data entered in the database.

**4.5 Management Objective(s)**

Obtain hydrogeological reports from permittees.

**Performance Standard**

4.5.1 Involvement in the planning and execution of the pumping test when feasible.

4.5.2 Review of pumping test and potential impacts on water levels and water quality.

**Methodology To Track Annual Progress**

Hydrogeological reports on file.

**4.6 Management Objective(s)**

Monitor groundwater levels in at least 5 wells in the Barton Springs segment of the Edwards Aquifer to describe water level changes, groundwater flow, recharge / discharge relationships, and available water to make drought determinations from selected monitor wells.

**Performance Standard**

4.6.1 Continuous recording of water-level data occurs at each District drought trigger well. Downloading and analysis of data occurs as needed during no-drought periods, bi-weekly when Stage I Alert Status or Stage II Alarm Status conditions are declared, and weekly when a Stage III Critical Status drought condition is declared.

4.6.2 Collect water level information for the Edwards and Trinity Aquifers under varying aquifer conditions in order to create potentiometric (water level) maps to characterize groundwater flow and storage within and between these aquifers.

**Methodology To Track Annual Progress**

Compiled graphs of water levels and associated data in the database, and potentiometric maps on file.

## 5.0 GRANTS PROGRAM

### 5.0 Management Goal(s):

Identify, make application for, and receive grant funding in order to support District programs. Undertake research and implement management strategies that would be difficult to pursue without grant funding support on issues involving groundwater resources, such as: protecting groundwater quality, providing for the most efficient use of the groundwater, controlling and preventing waste, addressing conjunctive surface water use, and addressing natural resource issues.

### 5.1 Management Objective(s):

Each year, identify and determine opportunities to obtain grant funds to support District groundwater research programs in water quality and quantity, conservation, and reuse.

**Performance Standard:**

5.1.1 Each fiscal year, submit at least one application for a grant that supports District programs and objectives, either independently or in collaboration with another agency or group.

5.1.2 Establish mutually beneficial collaborative working relationships and public / private joint ventures to accomplish the District's management objectives that would enhance the District's opportunities for receiving and utilizing grant funds.

**Methodology To Track Annual Progress:**

Grant applications submitted.

### 5.2 Management Objective(s):

Each year, administer existing grants in accordance with their contract requirements.

**Performance Standard:**

5.2.1 Meet or exceed all contractual grant obligations in an efficient, timely manner as per grant requirements.

**Methodology To Track Annual Progress:**

Individual grant contract requirements.

## 6.0 LEGISLATIVE PROGRAM

### 6.0 Management Goal(s)

Monitor pending state legislation or agency rules, provide testimony to legislators or agencies, and inform area residents and public officials about its implications. Work with legislators and agencies to introduce and support legislation or rules that complement or enhance District interests on issues involving groundwater resources, such as: protecting groundwater quality, providing for the most efficient use of the groundwater, controlling and preventing waste, addressing conjunctive surface water use, and addressing natural resource issues.

### 6.1 Management Objective(s)

Monitor legislative activities, encourage or develop legislation favorable to District programs, and work to suppress legislation, which may negatively impact the District, its residents, or programs.

**Performance Standard**

6.1.1 Attend and participate in at least five (5) legislative and agency committee meetings, public hearings, or other opportunities to share District goals and objectives with legislative and agency decision-makers.

6.1.2 Work to obtain at least one (1) piece of legislation, per legislative session, that has been identified by the Board of Directors to be pertinent to the District's mission.

6.1.3 Work to establish legislation, monitor rule-making activities, and develop regulations favorable to District programs, and work to suppress those which may negatively impact the District, its residents, or programs.

**Methodology To Track Annual Progress**

District legislative tracking file, legislative & agency committee meeting agendas, lobbying reports (if applicable), copies of passed legislation related to District activities.

## 7.0 ADMINISTRATIVE PROGRAM

**7.0 Management Goal(s):**

Maintain an effective and efficient administrative role in the routine execution of District activities in accounting, permitting and regulating, elections, and public meetings and public hearings.

**7.1 Management Objective(s):**

Each year, manage District accounting and financial records for maximum precision and accuracy in accordance with Federal and State law, the District's Rules and Bylaws, and Board direction.

**Performance Standard:**

7.1.1 Develop, modify as needed, and implement an annual Board-approved budget.

7.1.2 Maintain, record and update all District financial transactions as funds are accrued or dispersed in order to keep the District's financial records current and accurate.

7.1.3 Maintain District financial resources in a manner that maximizes liquidity while maintaining the greatest return on District fund balances by investing in securities or investment pools that operate in low risk investments and are backed by the State and / or Federal government.

7.1.4 Coordinate acquisition activities ensuring cost-effectiveness and quality. Utilize purchasing procedures that meet or exceed the requirements of State law and District rules.

7.1.5 Obtain contracts for service in accordance with established District standards.

7.1.6 Maintain and renew District insurance policies that include Director and Employee Errors and Omissions, Automobile , Liability, Property, Workers Compensation, and Public Officials Surety Bonds.

7.1.7 Conduct within 120 days of fiscal year end, a complete independent audit of the District's financial records.

7.1.8 Develop within 120 days of fiscal year end, a year-end report of the District's activities.

7.1.9 Develop and maintain an annual inventory of all District property.

7.1.10 Conduct within 180 days of fiscal year-end, a complete independent report of the District's Pension Plan for submission to the state Pension Review Board.

**Methodology To Track Annual Progress :**
Annual budget, annual audit and annual report, copies of inventory, and meeting minutes or audio tapes.

**7.2 Management Objective(s):**
Conduct and attend meetings vital to District operations.

**Performance Standard:**

7.2.1 Maintain official records, files, and minutes of Board meetings. Preserve and protect public documents in accordance with State and Federal laws and District Records Retention Schedule to allow for safekeeping and efficient retrieval.

7.2.2 Develop and distribute District Board meeting agendas, assemble back-up materials and prepare meeting facilities for District Board meetings and public hearings. Prepare meeting minutes after each meeting for approval at a subsequent Board meeting.

7.2.3 Develop and distribute meeting agendas, assemble back-up materials and prepare meeting facilities for the Policy Advisory Committee and the Technical Advisory Committee.

7.2.4 Attend and participate in meetings held by professional organizations or other regulatory agencies which provide training, technical assistance, support and information about topics critical to the District, and / or the professional development of the District employees and Directors.

7.2.5 Develop, modify, implement and enforce the District's Rules and Bylaws, Well Construction Standards, and Board Resolutions and Orders, as necessary to carry out duties as provided in Chapters 35 and 36 of the Texas Water Code and Senate Bill 988 to properly manage the Barton Springs segment of the Edwards Aquifer.

7.2.6 Hold and attend meetings that provide the public with the opportunity to review, discuss, and provide comments on plans, programs, and regulations of the District.

**Methodology To Track Annual Progress:**
Meeting agendas, public comment cards, meeting minutes, agenda back-ups, conference/training reference materials.

**7.3 Management Objective(s):**
Conduct District elections.

**Performance Standard:**

7.3.1 Hold Director elections in even numbered years in accordance with State and Federal Law.

7.3.2 Redistrict Director Precincts as required by State and Federal law and changes in local election precincts.

**Methodology To Track Annual Progress:**
District election and redistricting materials and records, Board meeting agendas and Board minutes.

## 8.0 CONSERVATION

### 8.0 Management Goal(s)

Initiate, develop and promote activities, relationships, and programs that will encourage and incentivise water conservation practices.

### 8.1 Management Objective(s)

Inform and educate permittees and their customers or employees about water-related matters of local, state and national importance using available media.

**Performance Standard(s)**

8.1.1 Each year, distribute information including but not limited to indoor water conservation practices, outdoor conservation practices such as Xeriscape information, to permittees and exempt well owners, public schools, and other residents within the District.

8.1.2 Each year, hold at least one workshop addressing topics including but not limited to leak detection, water audits, irrigation audits, indoor water conservation, native landscaping, or rainwater harvesting.

8.1.3 Incorporate water conservation information into District booth display and into presentations to neighborhood associations, civic groups and school groups.

8.1.4 Assist permittees with the development of User Conservation Plans (UCPs), evaluate plans for achievement of water conservation goals, and oversee plan submission for Board approval in accordance with District Rules.

**Methodology To Track Annual Progress**

Copies of distributed publications, workshop participant list and advertisements, photographs of booth display, scripts or descriptions of presentations, and newly approved UCPs.

### 8.2 Management Objective(s)

Implement a program to incentivise conservation practices among permittees and their customers or employees as well as residents within the District.

Performance Standard

8.2.1 Incorporate conservation based requirements into Conservation Credit Program for permittees.

**Methodology To Track Annual Progress**

Copy of policy for Conservation Credit Program.

### 8.3 Management Objective(s)

Enforce the District's Conservation Credit policy and permittee compliance with User Conservation Plans in accordance with District rules.

**Performance Standard :**

8.3.1 Conduct annual audit of water use and apply Conservation Credit program requirements.

**Methodology To Track Annual Progress**

Annual audit of water use.

## 9.0 DROUGHT MANAGEMENT

**9.0 Management Goal(s)**

Monitor aquifer for drought conditions and implement activities or programs that are proactive and reactive to those conditions to extend available groundwater supplies.

**9.1 Management Objective(s):**

Implement aquifer-monitoring activities in accordance with District Rules and as outlined in "Conservation and Drought Programs" on page 24.

**Performance Standard:**

9.1.1 Monitor water levels in District drought monitor wells and weather conditions to signal need for Board declaration of drought. Continuous recording of water-level data occurs at each District drought trigger well. Downloading and analysis of data occurs as needed during no-drought periods, bi-weekly when Stage I Alert Status or Stage II Alarm Status conditions are declared, and weekly when a Stage III Critical Status drought condition is declared.

**Methodology To Track Annual Progress:**

Monitor-well data and graphs in database.

**9.2 Management Objective(s):**

Declare drought stages based on data analysis of the District's five (5) drought trigger wells.

**Performance Standard:**

9.2.1 The District will declare one of three drought stages when data analysis from the District's five drought trigger wells meet the following water level criteria and it is determined conditions warrant the execution of a given stage either by the District's General Manager for Stage I Alert Status or by the District's Board of Directors for Stage II Alarm Status or Stage III Critical Status.

9.2.2 The District is in a local or regional Stage I Alert Status drought condition if the groundwater or potentiometric water level elevation in one (1) or more of the District's drought trigger wells declines below a historical median level as indicated in Table 1 within Rule 3-7.3 for fourteen (14) consecutive days. A regional drought Alert Status commences when the water level elevation in two (2) or more of the District's drought trigger wells declines below a historical median level elevation for fourteen (14) consecutive days.

9.2.3 The District is in a Stage II Alarm Status drought condition if the water level elevation in two (2) or more of the District's drought trigger wells declines below the historical lower quartile level elevation for fourteen (14) consecutive days.

9.2.4 The District is in a Stage III Critical Status drought condition if the water level elevation in two (2) or more of the District's drought trigger wells declines below the lowest historically observed and established level for fourteen (14) consecutive days.

9.2.5 Each drought stage will be discontinued in progression when water level elevations in the drought trigger wells rise above the trigger conditions associated with each stage for more than fourteen (14) consecutive days or when in the judgment of the District's General Manager or Board of Directors a drought situation no longer exists.

**Methodology To Track Annual Progress:**
Monitor-well data and graphs in database and minutes from Board meetings during which a drought stage was declared

**9.3 Management Objective(s):**
Inform permittees and the public about declared drought stages, the severity of drought, and encourage behaviors to adopt for maintenance of adequate groundwater levels.

**Performance Standard:**

9.3.1 Inform permittees and the public about declared drought stages via correspondence, newspaper advertisements, press releases, the District website, and District newsletter. Letters announcing the declaration of a drought stage will be sent out within 48 hours of the declaration. Press releases shall be sent out bi-weekly during Stage I Alert Status and weekly during Stage II Alarm Status and Stage III Critical Status. Announcement of a drought declaration shall appear on the District's website within three working days of the declaration. Each newsletter published subsequent to a drought declaration shall include information regarding the stage, its goals for reduction, and at least three suggested means for water conservation.

9.3.2 At the request of a permittee, assist in the development of User Drought Contingency Plans (UDCP) by permitted well owners in accordance with District Rules, review the plans and obtain Board approval in accordance with District Rules and Bylaws and State standards.

**Methodology To Track Annual Progress:**
Copies of approved UDCPs on file, copies of correspondence documenting assistance or guidance with UDCP development, copies of presentations, copies of press releases, advertisements and other documents.

**9.4 Management Objective(s):**

Enforce drought contingency plans.

**Performance Standard:**

9.4.1 During mandatory restrictions (Stage II Alarm Status and Stage III Critical Status), analyze monthly meter reading reports against target volumes in UDCPs and notify permittees of non-compliance. Letters of non-compliance will be sent out within one week of approval of analysis by either the General Manager or Board of Directors.

**Methodology To Track Annual Progress:**

Copies of analysis reports during mandatory drought restriction periods, copies of correspondence to permittees regarding non-compliance.

## APPENDIX I – DISTRICT RESOLUTION

**STATE OF TEXAS** §
§ **RESOLUTION #103003-01**
**COUNTY OF TRAVIS** §

**BARTON SPRINGS/EDWARDS AQUIFER CONSERVATION DISTRICT RESOLUTION AUTHORIZING APPROVING MANAGEMENT PLAN**

WHEREAS, the Management Plan of the Barton Springs/Edwards Aquifer Conservation District, attached hereto as Attachment A, has been developed for the purpose of conserving, preserving, protecting, and recharging the underground water in the District, and this action is taken under the District's statutory authority to prevent waste and protect rights of owners of interest in groundwater;

WHEREAS, the Management Plan meets the requirements of Texas Water Code § 36.1071 and § 36.1072 and 31 TAC § 356.5;

WHEREAS, under no circumstances, and in no particular case will this Management Plan, or any part of it, be construed as a limitation or restriction upon the exercise of any discretion where such exists; nor will it in any event be construed to deprive the Board of an exercise of powers, duties and jurisdiction conferred by law, nor to limit or restrict the amount and character of data or information which may be required for the proper administration of the law.

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE BARTON SPRINGS/EDWARDS AQUIFER CONSERVATION DISTRICT THAT:

1) The "Management Plan of the Barton Springs/Edwards Aquifer Conservation District" contained in attachment A is hereby adopted;

2) This Management Plan will take effect upon certification by the Texas Water Development Board. It will remain in effect until a revised District Management Plan is certified, or December 2008, whichever is earlier.

AND IT IS SO ORDERED.

The motion passed with 5 ayes and 0 nays.

PASSED AND APPROVED THIS 30th DAY OF October, 2003.

Jim Camp
Jim Camp, Board President

ATTESTED BY:

Jack Goodman
Jack Goodman, Board Secretary

## APPENDIX II – NOTICE OF MEETINGS AND PUBLIC HEARINGS

# NOTICE OF MEETING

Notice is given that a **Regular Meeting & Public Hearing** of the Board of Directors of the Barton Springs/Edwards Aquifer Conservation District will be held at the District office located at 1124 Regal Row, Austin, Texas on **October 30, 2003, at 6:00 p.m.** for the following purposes:

1. Call to Order.

2. Public Comments.

3. Routine Business.

   a. Consent Agenda. (These items may be considered and approved as one motion. Directors or citizens may request any consent item be removed for consideration and approval as an item of Regular Business)

      1. Approval of Financial Reports under the Public Funds Investment Act, Director's Compensation Claims, and expenditures greater than $5,000.

   b. General Manager's Report. The Interim General Manager or her designee will brief the Board on activities and issues that are pertinent to the management of the Barton Springs segment of the Edwards Aquifer and other groundwater resources within the District's jurisdiction. This will include, but is not limited to, regional current events and staff activities in the District's Administrative, Community Services, Field Operations, Information Systems, and Assessment Programs.

4. Executive Session.

   a. The Board of Directors of the Barton Springs/Edwards Aquifer Conservation District reserves the right to adjourn into Executive Session at any time during the course of this meeting to discuss any of the matters listed on this agenda, as authorized by the Texas Government Code Sections §551.071 (Consultation with Attorney), 551.072 (Deliberations about Real Property), 551.073 (Deliberations about Gifts and Donations), 551.074 (Personnel Matters), 551.076 (Deliberations about Security Devices), 551.087 (Economic Development) 418.183 (Homeland Security). No final action or decision will be made in Executive Session.

5. Public Hearing. (7:00 p.m.)

   a. The Board will hold a public hearing on the following items:

      1) Revisions and the re-adoption of the District Management Plan.
      2) Amendment to the District FY04 Fee Schedule.

Came to hand and posted on a Bulletin Board in the Courthouse, Austin, Travis County, Texas on this the ______ day of OCT 2 4 2003 ______ 20____

Dana DeBeauvoir
County Clerk, Travis County, Texas

By ______ YOLANDA ALJUAREZ ______ Deputy

SEAL OF COUNTY CLERK ★ TEXAS ★ TRAVIS COUNTY

6. Regular Agenda. (New Business)

   a. Discussion and possible action on revisions and the re-adoption of the District Management Plan.

   b. Discussion and possible action on an amendment to the District FY04 Fee Schedule.

   c. Discussion and possible action on an amendment to the FY03 Conservation Credits.

7. Regular Agenda. (Continued Business)

   b. Discussion and possible action the Sustainable Yield Model and related policies.

   c. Discussion and possible action on Drought status.

8. Adjournment.

Came to hand and posted on a Bulletin Board in the Courthouse, Travis County, Texas, on this, the________ day of ________________ 2003, at _________ p.m.

____________________________, Deputy Clerk
Travis County, TEXAS

The Barton Springs/Edwards Aquifer is committed to compliance with the Americans with Disabilities Act (ADA). Reasonable accommodations and equal opportunity for effective communications will be provided upon request. Please contact the District office at 512-282-8441 at least 24 hours in advance if accommodation is needed.

ammy Flow

**From:** omadmin@sos.state.tx.us
**ent:** Friday, October 24, 2003 11:08 AM
**o:** Tammy Flow
**Subject:** S.O.S. Acknowledgment of Receipt

Agency: Barton Springs/Edwards Aquifer Conservation Dist
Liaison: Tammy Flow

cknowledgment of Receipt

The Office of the Secretary of State has posted
otice of the following meeting:

Meeting Information:
arton Springs Edwards Aquifer Conservation District
0/30/2003 06:00 PM "TRD# 2003009384"
Notice posted: 10/24/03 11:07 AM
Proofread your current open meeting notice at:

ttp://info.sos.state.tx.us/pls/pub/pubomquery$omquery.queryTRD?p_trd=2003009384

# Public Notice

The Barton Springs/Edwards Aquifer Conservation District Board of Directors will hold a public hearing **Thursday, October 30, 2003, at 7:00 p.m. at 1124 Regal Row**, Austin, Texas 78748. The Board will call a regularly scheduled meeting to order at 6:00 p.m. to handle routine business prior to the public hearing at 7:00 p.m.

The hearing has been scheduled to address the following issues:

> Revisions to and Re-adoption of District Management Plan.

> Amendment to District FY04 Fee Schedule.

For more information about these issues, please contact the District office at (512) 282-8441.

**NOTICE APPEARED IN THE FREE PRESS NEWSPAPER ON OCTOBER 23, 2003**

## APPENDIX III – LETTERS TO LCRA, GBRA, AND COA

BARTON SPRINGS / EDWARDS AQUIFER CONSERVATION DISTRICT
*Celebrating 15 Years of Aquifer Protection*

October 31, 2003

Mr. Paul Thornhill
Lower Colorado River Authority
P.O. Box 220
Austin, TX 78767-0220

Dear Paul,

At the direction of the Texas Water Development Board (TWDB), The Barton Springs/Edwards Aquifer Conservation District has revised and re-adopted its District Management Plan as required by 31TAC §356. Revisions were made to the Plan that was previously adopted on August 28, 2003. One component of the plan is the evidence of our coordination with surface water management entities pursuant to 31TAC 356.6 (a)(4):

> *Evidence that, following notice and hearing the Barton Springs/Edwards Aquifer Conservation District coordinated in the development of its management plan with surface water management entities.*

Attached you will find notice that the District conducted a public hearing at our office on October 30, 2003, at 7:00 p.m. concerning revisions to and the re-adoption of the management plan. The attached Plan was subsequently approved and adopted by the District Board of Directors.

Please feel free to forward any comments on the Plan to both the TWDB and myself. I am looking forward to your input on our plan.

Sincerely,

Veva McCaig

Veva McCaig
Interim General Manager

BARTON SPRINGS / EDWARDS AQUIFER CONSERVATION DISTRICT
*Celebrating 15 Years of Aquifer Protection*

October 31, 2003

Mr. Fred Blumberg
Deputy General Manager
Guadalupe-Blanco River Authority
933 E. Court Street
Seguin, TX 78155

Dear Fred,

At the direction of the Texas Water Development Board (TWDB), The Barton Springs/Edwards Aquifer Conservation District has revised and re-adopted its District Management Plan as required by 31TAC §356. Revisions were made to the Plan that was previously adopted on August 28, 2003. One component of the plan is the evidence of our coordination with surface water management entities pursuant to 31TAC 356.6 (a)(4):

> *Evidence that, following notice and hearing the Barton Springs/Edwards Aquifer Conservation District coordinated in the development of its management plan with surface water management entities.*

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Please feel free to forward any comments on the Plan to both the TWDB and myself. I am looking forward to your input on our plan.

Sincerely,

Veva McCaig

Veva McCaig
Interim General Manager

BARTON SPRINGS / EDWARDS AQUIFER CONSERVATION DISTRICT
*Celebrating 15 Years of Aquifer Protection*

October 31, 2003

Ms. Nancy McClintock
City of Austin
P.O. Box 1088
WPDRD
Austin, TX 78767

Dear Nancy,

At the direction of the Texas Water Development Board (TWDB), The Barton Springs/Edwards Aquifer Conservation District has revised and re-adopted its District Management Plan as required by 31TAC §356. Revisions were made to the Plan that was previously adopted on August 28, 2003. One component of the plan is the evidence of our coordination with surface water management entities pursuant to 31TAC 356.6 (a)(4):

> *Evidence that, following notice and hearing the Barton Springs/Edwards Aquifer Conservation District coordinated in the development of its management plan with surface water management entities.*

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Please feel free to forward any comments on the Plan to both the TWDB and myself. I am looking forward to your input on our plan.

Sincerely,

Veva McCaig

Veva McCaig
Interim General Manager

BARTON SPRINGS / EDWARDS AQUIFER CONSERVATION DISTRICT
*Celebrating 15 Years of Aquifer Protection*

October 31, 2003

Mr. Craig Bell
City of Austin
P.O. Box 1088
Austin, TX 78767

Dear Craig,

At the direction of the Texas Water Development Board (TWDB), The Barton Springs/Edwards Aquifer Conservation District has revised and re-adopted its District Management Plan as required by 31TAC §356. Revisions were made to the Plan that was previously adopted on August 28, 2003. One component of the plan is the evidence of our coordination with surface water management entities pursuant to 31TAC 356.6 (a)(4):

> *Evidence that, following notice and hearing the Barton Springs/Edwards Aquifer Conservation District coordinated in the development of its management plan with surface water management entities.*

Attached you will find notice that the District conducted a public hearing at our office on October 30, 2003, at 7:00 p.m. concerning revisions to and the re-adoption of the management plan. The attached Plan was subsequently approved and adopted by the District Board of Directors.

Please feel free to forward any comments on the Plan to both the TWDB and myself. I am looking forward to your input on our plan.

Sincerely,

Veva McCaig

Veva McCaig
Interim General Manager

## APPENDIX IV – LETTERS TO REGIONS K AND L

BARTON SPRINGS / EDWARDS AQUIFER CONSERVATION DISTRICT
*Celebrating 15 Years of Aquifer Protection*

October 31, 2003

Mr. John Burke
General Manager
Aqua Water Supply Corporation
P.O. Drawer P
Bastrop, TX 78601

Dear John,

At the direction of the Texas Water Development Board (TWDB), The Barton Springs/Edwards Aquifer Conservation District has revised and re-adopted its District Management Plan as required by 31TAC §356. Revisions were made to the Plan that was previously adopted on August 28, 2003. One component of the plan is the evidence of our coordination with surface water management entities pursuant to 31TAC 356.6 (a)(5):

> *Identification of any potential conflict between the proposed management plan and an approved regional water plan for each region in which any part of the district is located, if such regional water management plan has been approved by the board.*

Attached you will find notice that the District conducted a public hearing at our office on October 30, 2003, at 7:00 p.m. concerning revisions to and the re-adoption of the management plan. The attached Plan was subsequently approved and adopted by the District Board of Directors.

Please feel free to forward any comments on the Plan to both the TWDB and myself. I am looking forward to your input on our plan.

Sincerely,

Veva McCaig

Veva McCaig
Interim General Manager

BARTON SPRINGS / EDWARDS AQUIFER CONSERVATION DISTRICT
*Celebrating 15 Years of Aquifer Protection*

October 31, 2003

Ms. Evelyn Bonavita
League of Women Voters
334 Royal Oaks
San Antonio, TX 78209-9980

Dear Ms. Bonavita:

At the direction of the Texas Water Development Board (TWDB), The Barton Springs/Edwards Aquifer Conservation District has revised and re-adopted its District Management Plan as required by 31TAC §356. Revisions were made to the Plan that was previously adopted on August 28, 2003. One component of the plan is the evidence of our coordination with surface water management entities pursuant to 31TAC 356.6 (a)(5):

> *Identification of any potential conflict between the proposed management plan and an approved regional water plan for each region in which any part of the district is located, if such regional water management plan has been approved by the board.*

Attached you will find notice that the District conducted a public hearing at our office on October 30, 2003, at 7:00 p.m. concerning revisions to and the re-adoption of the management plan. The attached Plan was subsequently approved and adopted by the District Board of Directors.

Please feel free to forward any comments on the Plan to both the TWDB and myself. I am looking forward to your input on our plan.

Sincerely,

Veva McCaig

Veva McCaig
Interim General Manager

**SENDER: COMPLETE THIS SECTION**

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

John Burke
Aqua Water Supply Corp
P.O. Drawer P
Bastrop TX 78601

**COMPLETE THIS SECTION ON DELIVERY**

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by (*Printed Name*)

C. Date of Delivery 11/4

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☒ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (*Extra Fee*) ☐ Yes

2. Article Number
(*Transfer from service label*) 7003 0500 0003 3315 9452

PS Form 3811, August 2001 Domestic Return Receipt 102595-02-M-1540

**SENDER: COMPLETE THIS SECTION**

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Evelyn Bonavita
Legue of Women Voters
334 Royal Oaks
San Antonio, TX
78209-9980

**COMPLETE THIS SECTION ON DELIVERY**

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by (*Printed Name*) Evelyn Bonavita

C. Date of Delivery 11/5/03

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☒ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise

## APPENDIX V – TABLE 5, 2002 STATE WATER PLAN DATABASE

**Projected Water Supplies**
**Barton Springs/Edwards Aquifer Conservation District**
**Bastrop, Caldwell, Hays and Travis Counties**

Bastrop

| WUG | RWPG | River Basin | Source Type | Source Name | 2000 | 2010 | 2020 | 2030 | 2040 | 2050 |
|---|---|---|---|---|---|---|---|---|---|---|
| Bastrop | K | Colorado | Groundwater | Other Aquifer | 1,307 | 1,529 | 1,750 | 2,005 | 2,155 | 2,646 |
| Elgin | K | Colorado | Groundwater | Carrizo-Wilcox Aquifer | 1,014 | 1,113 | 1,226 | 1,374 | 1,442 | 1,736 |
| Garfield | K | Colorado | Groundwater | Other Aquifer | 42 | 42 | 42 | 42 | 42 | 42 |
| Smithville | K | Colorado | Groundwater | Carrizo-Wilcox Aquifer | 794 | 830 | 922 | 1,025 | 1,072 | 1,283 |
| County-Other | K | Brazos | Groundwater | Carrizo-Wilcox Aquifer | 304 | 363 | 422 | 486 | 524 | 536 |
| County-Other | K | Brazos | Groundwater | Queen City Aquifer | 12 | 12 | 12 | 12 | 12 | 12 |
| County-Other | K | Brazos | Groundwater | Other Aquifer | 1 | 1 | 1 | 1 | 1 | 1 |
| County-Other | K | Colorado | Groundwater | Carrizo-Wilcox Aquifer | 5,612 | 6,655 | 7,698 | 8,829 | 9,495 | 9,711 |
| County-Other | K | Colorado | Groundwater | Queen City Aquifer | 50 | 50 | 50 | 50 | 50 | 50 |
| County-Other | K | Guadalupe | Groundwater | Queen City Aquifer | 196 | 196 | 196 | 196 | 196 | 196 |
| Irrigation | K | Brazos | Groundwater | Carrizo-Wilcox Aquifer | 3 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | K | Brazos | Groundwater | Queen City Aquifer | 23 | 23 | 23 | 23 | 23 | 23 |
| Irrigation | K | Brazos | Groundwater | Sparta Aquifer | 5 | 5 | 5 | 5 | 5 | 5 |
| Irrigation | K | Colorado | Surface Water | Highland Lakes System | 892 | 850 | 0 | 0 | 0 | 0 |
| Irrigation | K | Colorado | Surface Water | Irrigation Local Supply | 750 | 750 | 750 | 750 | 750 | 750 |
| Irrigation | K | Colorado | Groundwater | Carrizo-Wilcox Aquifer | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | K | Colorado | Groundwater | Queen City Aquifer | 213 | 213 | 213 | 213 | 213 | 213 |
| Irrigation | K | Colorado | Groundwater | Sparta Aquifer | 500 | 500 | 500 | 500 | 500 | 500 |
| Irrigation | K | Guadalupe | Groundwater | Carrizo-Wilcox Aquifer | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | K | Guadalupe | Groundwater | Queen City Aquifer | 40 | 40 | 40 | 40 | 40 | 40 |
| Irrigation | K | Guadalupe | Groundwater | Sparta Aquifer | 34 | 34 | 34 | 34 | 34 | 34 |
| Livestock | K | Brazos | Surface Water | Livestock Local Supply | 154 | 154 | 154 | 154 | 154 | 154 |
| Livestock | K | Brazos | Groundwater | Carrizo-Wilcox Aquifer | 0 | 0 | 0 | 0 | 0 | 0 |
| Livestock | K | Brazos | Groundwater | Other Aquifer | 7 | 7 | 7 | 7 | 7 | 7 |
| Livestock | K | Brazos | Groundwater | Queen City Aquifer | 141 | 141 | 141 | 141 | 141 | 141 |
| Livestock | K | Brazos | Groundwater | Sparta Aquifer | 39 | 39 | 39 | 39 | 39 | 39 |
| Livestock | K | Colorado | Surface Water | Livestock Local Supply | 696 | 696 | 696 | 696 | 696 | 696 |
| Livestock | K | Colorado | Groundwater | Carrizo-Wilcox Aquifer | 0 | 0 | 0 | 0 | 0 | 0 |
| Livestock | K | Colorado | Groundwater | Other Aquifer | 98 | 98 | 98 | 98 | 98 | 98 |
| Livestock | K | Colorado | Groundwater | Queen City Aquifer | 1,322 | 1,322 | 1,322 | 1,322 | 1,322 | 1,322 |
| Livestock | K | Colorado | Groundwater | Sparta Aquifer | 4,000 | 4,000 | 4,000 | 4,000 | 4,000 | 4,000 |
| Livestock | K | Guadalupe | Surface Water | Livestock Local Supply | 5 | 5 | 5 | 5 | 5 | 5 |
| Livestock | K | Guadalupe | Groundwater | Carrizo-Wilcox Aquifer | 0 | 0 | 0 | 0 | 0 | 0 |
| Livestock | K | Guadalupe | Groundwater | Other Aquifer | 5 | 5 | 5 | 5 | 5 | 5 |
| Livestock | K | Guadalupe | Groundwater | Queen City Aquifer | 125 | 125 | 125 | 125 | 125 | 125 |
| Livestock | K | Guadalupe | Groundwater | Sparta Aquifer | 272 | 272 | 272 | 272 | 272 | 272 |
| Manufacturing | K | Brazos | Groundwater | Carrizo-Wilcox Aquifer | 0 | 0 | 0 | 0 | 0 | 0 |
| Manufacturing | K | Colorado | Surface Water | Other Local Supply | 2 | 2 | 2 | 3 | 3 | 3 |
| Manufacturing | K | Colorado | Groundwater | Carrizo-Wilcox Aquifer | 31 | 38 | 46 | 54 | 64 | 75 |
| Manufacturing | K | Guadalupe | Groundwater | Carrizo-Wilcox Aquifer | 0 | 0 | 0 | 0 | 0 | 0 |
| Mining | K | Brazos | Groundwater | Carrizo-Wilcox Aquifer | 0 | 0 | 0 | 0 | 0 | 0 |
| Mining | K | Brazos | Groundwater | Other Aquifer | 62 | 62 | 62 | 62 | 62 | 62 |
| Mining | K | Brazos | Groundwater | Queen City Aquifer | 23 | 23 | 23 | 23 | 23 | 23 |
| Mining | K | Brazos | Groundwater | Sparta Aquifer | 5 | 5 | 5 | 5 | 5 | 5 |
| Mining | K | Colorado | Surface Water | Other Local Supply | 12 | 10 | 8 | 7 | 7 | 9 |
| Mining | K | Colorado | Groundwater | Carrizo-Wilcox Aquifer | 0 | 0 | 0 | 0 | 0 | 0 |
| Mining | K | Colorado | Groundwater | Other Aquifer | 890 | 890 | 890 | 890 | 890 | 890 |
| Mining | K | Colorado | Groundwater | Queen City Aquifer | 213 | 213 | 213 | 213 | 213 | 213 |
| Mining | K | Colorado | Groundwater | Sparta Aquifer | 500 | 500 | 500 | 500 | 500 | 500 |
| Mining | K | Guadalupe | Groundwater | Carrizo-Wilcox Aquifer | 0 | 0 | 0 | 0 | 0 | 0 |
| Mining | K | Guadalupe | Groundwater | Queen City Aquifer | 40 | 40 | 40 | 40 | 40 | 40 |
| Mining | K | Guadalupe | Groundwater | Other Aquifer | 48 | 48 | 48 | 48 | 48 | 48 |
| Mining | K | Guadalupe | Groundwater | Sparta Aquifer | 34 | 34 | 34 | 34 | 34 | 34 |
| Steam Electric Power | K | Colorado | Surface Water | Bastrop Lake/Reservoir | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 |
| Steam Electric Power | K | Colorado | Surface Water | Highland Lakes System | 10,750 | 10,750 | 10,750 | 10,750 | 10,750 | 10,750 |
| | | | | | | | | | | |
| Total Projected Water Supplies (acre-feet per year) = | | | | | 32,266 | 33,685 | 34,369 | 36,078 | 37,057 | 38,294 |

Caldwell

| WUG | RWPG | River Basin | Source Type | Source Name | 2000 | 2010 | 2020 | 2030 | 2040 | 2050 |
|---|---|---|---|---|---|---|---|---|---|---|
| Lockhart | L | Guadalupe | Groundwater | Carrizo-Wilcox Aquifer | 2,310 | 2,310 | 2,310 | 2,310 | 2,310 | 2,310 |
| Luling | L | Guadalupe | Surface Water | Guadalupe River Run-Of-River | 99 | 99 | 99 | 99 | 99 | 99 |
| Luling | L | Guadalupe | Groundwater | Carrizo-Wilcox Aquifer | 2,730 | 2,730 | 2,730 | 2,730 | 2,730 | 2,730 |
| Martindale | L | Guadalupe | Surface Water | Canyon Lake/Reservoir | 50 | 50 | 50 | 50 | 50 | 50 |
| Martindale | L | Guadalupe | Surface Water | Guadalupe River Run-Of-River | 198 | 198 | 198 | 198 | 198 | 198 |
| County-Other | L | Colorado | Groundwater | Carrizo-Wilcox Aquifer | 158 | 158 | 158 | 158 | 158 | 158 |
| County-Other | L | Guadalupe | Surface Water | Canyon Lake/Reservoir | 258 | 258 | 258 | 258 | 258 | 258 |
| County-Other | L | Guadalupe | Surface Water | Guadalupe River Run-Of-River | 5 | 5 | 5 | 5 | 5 | 5 |
| County-Other | L | Guadalupe | Surface Water | Guadalupe River Run-Of-River | 100 | 100 | 100 | 100 | 100 | 100 |
| County-Other | L | Guadalupe | Surface Water | Guadalupe River Run-Of-River | 8 | 8 | 8 | 8 | 8 | 8 |
| County-Other | L | Guadalupe | Surface Water | Guadalupe River Run-Of-River | 500 | 500 | 500 | 500 | 500 | 500 |
| County-Other | L | Guadalupe | Groundwater | Carrizo-Wilcox Aquifer | 2,879 | 3,015 | 3,106 | 2,446 | 2,540 | 2,622 |
| County-Other | L | Guadalupe | Groundwater | Edwards-BFZ Aquifer | 161 | 161 | 161 | 161 | 161 | 161 |
| County-Other | L | Guadalupe | Groundwater | Queen City Aquifer | 110 | 110 | 110 | 120 | 120 | 120 |
| Irrigation | L | Colorado | Groundwater | Carrizo-Wilcox Aquifer | 18 | 16 | 14 | 13 | 11 | 10 |
| Irrigation | L | Guadalupe | Surface Water | Irrigation Local Supply | 92 | 92 | 92 | 92 | 92 | 92 |
| Irrigation | L | Guadalupe | Groundwater | Carrizo-Wilcox Aquifer | 1,156 | 1,021 | 902 | 796 | 703 | 621 |
| Irrigation | L | Guadalupe | Groundwater | Queen City Aquifer | 41 | 36 | 32 | 28 | 25 | 22 |
| Livestock | L | Colorado | Surface Water | Livestock Local Supply | 139 | 139 | 139 | 139 | 139 | 139 |
| Livestock | L | Guadalupe | Surface Water | Livestock Local Supply | 696 | 696 | 696 | 696 | 696 | 696 |
| Manufacturing | L | Guadalupe | Groundwater | Carrizo-Wilcox Aquifer | 84 | 84 | 84 | 84 | 84 | 84 |
| Manufacturing | L | Guadalupe | Groundwater | Queen City Aquifer | 3 | 3 | 3 | 3 | 3 | 3 |
| Mining | L | Colorado | Groundwater | Carrizo-Wilcox Aquifer | 13 | 9 | 5 | 2 | 0 | 0 |
| Mining | L | Guadalupe | Groundwater | Carrizo-Wilcox Aquifer | 8 | 7 | 5 | 2 | 0 | 0 |
| Mining | L | Guadalupe | Groundwater | Queen City Aquifer | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | | | | | | |
| **Total Projected Water Supplies (acre-feet per year) =** | | | | | **11,816** | **11,805** | **11,765** | **10,998** | **10,990** | **10,986** |

Hays

| WUG | RWPG | River Basin | Source Type | Source Name | 2000 | 2010 | 2020 | 2030 | 2040 | 2050 |
|---|---|---|---|---|---|---|---|---|---|---|
| Buda | K | Colorado | Groundwater | Edwards-BFZ Aquifer | 1,855 | 1,855 | 1,855 | 1,855 | 1,855 | 1,855 |
| Dripping Springs | K | Colorado | Groundwater | Trinity Aquifer | 553 | 553 | 553 | 553 | 553 | 454 |
| Kyle | L | Guadalupe | Surface Water | Canyon Lake/Reservoir | 589 | 589 | 589 | 589 | 0 | 0 |
| Kyle | L | Guadalupe | Groundwater | Edwards-BFZ Aquifer | 279 | 279 | 279 | 279 | 279 | 279 |
| San Marcos | L | Guadalupe | Surface Water | Canyon Lake/Reservoir | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 0 |
| San Marcos | L | Guadalupe | Groundwater | Edwards-BFZ Aquifer | 3,752 | 3,752 | 3,752 | 3,752 | 3,752 | 3,752 |
| Wimberley | L | Guadalupe | Groundwater | Trinity Aquifer | 1,025 | 1,025 | 1,025 | 1,025 | 1,025 | 806 |
| Woodcreek | L | Guadalupe | Groundwater | Trinity Aquifer | 188 | 188 | 188 | 188 | 188 | 188 |
| County-Other | K | Colorado | Groundwater | Edwards-BFZ Aquifer | 614 | 614 | 614 | 614 | 614 | 614 |
| County-Other | K | Colorado | Groundwater | Other Aquifer | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 |
| County-Other | L | Guadalupe | Surface Water | Canyon Lake/Reservoir | 122 | 122 | 122 | 122 | 122 | 122 |
| County-Other | L | Guadalupe | Surface Water | Canyon Lake/Reservoir | 862 | 862 | 862 | 862 | 862 | 862 |
| County-Other | L | Guadalupe | Surface Water | Guadalupe River Run-Of-River | 8 | 8 | 8 | 8 | 8 | 8 |
| County-Other | L | Guadalupe | Surface Water | Guadalupe River Run-Of-River | 513 | 513 | 513 | 513 | 513 | 513 |
| County-Other | L | Guadalupe | Surface Water | Guadalupe River Run-Of-River | 98 | 98 | 98 | 98 | 98 | 98 |
| County-Other | L | Guadalupe | Surface Water | Guadalupe River Run-Of-River | 5 | 5 | 5 | 5 | 5 | 5 |
| County-Other | L | Guadalupe | Groundwater | Edwards-BFZ Aquifer | 109 | 109 | 109 | 109 | 109 | 109 |
| County-Other | L | Guadalupe | Groundwater | Edwards-BFZ Aquifer | 248 | 248 | 248 | 248 | 248 | 248 |
| Irrigation | K | Colorado | Surface Water | Irrigation Local Supply | 41 | 41 | 41 | 41 | 41 | 41 |
| Irrigation | K | Colorado | Groundwater | Edwards-BFZ Aquifer | 931 | 931 | 931 | 931 | 931 | 931 |
| Irrigation | K | Colorado | Groundwater | Trinity Aquifer | 2 | 2 | 2 | 2 | 2 | 2 |
| Irrigation | L | Guadalupe | Surface Water | Irrigation Local Supply | 341 | 341 | 341 | 341 | 341 | 341 |
| Irrigation | L | Guadalupe | Groundwater | Edwards-BFZ Aquifer | 458 | 458 | 458 | 458 | 458 | 458 |
| Livestock | K | Colorado | Surface Water | Livestock Local Supply | 192 | 192 | 192 | 192 | 192 | 192 |
| Livestock | K | Colorado | Groundwater | Edwards-BFZ Aquifer | 624 | 624 | 624 | 624 | 624 | 624 |
| Livestock | K | Colorado | Groundwater | Trinity Aquifer | 30 | 30 | 30 | 30 | 30 | 25 |
| Livestock | L | Guadalupe | Surface Water | Livestock Local Supply | 271 | 271 | 271 | 271 | 271 | 271 |
| Manufacturing | K | Colorado | Groundwater | Edwards-BFZ Aquifer | 922 | 922 | 922 | 922 | 922 | 922 |
| Manufacturing | L | Guadalupe | Surface Water | Other Local Supply | 539 | 539 | 539 | 539 | 539 | 539 |
| Manufacturing | L | Guadalupe | Groundwater | Edwards-BFZ Aquifer | 902 | 902 | 902 | 902 | 902 | 902 |
| Mining | K | Colorado | Groundwater | Edwards-BFZ Aquifer | 9 | 9 | 9 | 9 | 9 | 9 |
| Mining | K | Colorado | Groundwater | Trinity Aquifer | 12 | 12 | 12 | 12 | 12 | 10 |
| Mining | L | Guadalupe | Groundwater | Trinity Aquifer | 0 | 0 | 0 | 0 | 0 | 0 |
| Steam Electric Power | L | Guadalupe | Surface Water | Canyon Lake/Reservoir | 2,500 | 2,500 | 2,500 | 2,500 | 2,500 | 2,500 |
| Steam Electric Power | L | Guadalupe | Surface Water | Direct Reuse | 0 | 3,936 | 3,936 | 3,936 | 3,936 | 3,936 |
| | | | | | | | | | | |
| **Total Projected Water Supplies (acre-feet per year) =** | | | | | **24,594** | **28,530** | **28,530** | **28,530** | **27,941** | **22,616** |

**Travis**

| WUG | RWPG | River Basin | Source Type | Source Name | 2000 | 2010 | 2020 | 2030 | 2040 | 2050 |
|---|---|---|---|---|---|---|---|---|---|---|
| Anderson Mill | K | Colorado | Surface Water | Highland Lakes System | 36 | 0 | 0 | 0 | 0 | 0 |
| Austin | K | Colorado | Surface Water | Highland Lakes System | 123,784 | 123,784 | 123,784 | 123,784 | 123,784 | 123,784 |
| Austin | K | Colorado | Surface Water | Colorado River Combined Run-Of-River | 137,044 | 137,044 | 137,044 | 137,044 | 137,044 | 137,044 |
| Austin | K | Colorado | Surface Water | Colorado River Combined Run-Of-River | 6,101 | 6,101 | 6,101 | 6,101 | 6,101 | 6,101 |
| Garfield | K | Colorado | Groundwater | Other Aquifer | 505 | 505 | 505 | 505 | 505 | 505 |
| Jonestown | K | Colorado | Surface Water | Highland Lakes System | 360 | 360 | 360 | 360 | 0 | 0 |
| Lago Vista | K | Colorado | Surface Water | Highland Lakes System | 6,500 | 6,500 | 6,500 | 0 | 0 | 0 |
| Lakeway | K | Colorado | Surface Water | Highland Lakes System | 1,688 | 1,688 | 0 | 0 | 0 | 0 |
| Manor | K | Colorado | Groundwater | Other Aquifer | 0 | 0 | 0 | 0 | 0 | 0 |
| Manor | K | Colorado | Groundwater | Other Aquifer | 2,620 | 2,620 | 2,620 | 2,620 | 2,620 | 2,620 |
| Pflugerville | K | Colorado | Groundwater | Edwards-BFZ Aquifer | 2,585 | 2,585 | 2,585 | 2,585 | 2,585 | 2,585 |
| Pflugerville | K | Colorado | Surface Water | Colorado River Combined Run-Of-River | 0 | 0 | 0 | 0 | 0 | 0 |
| Rollingwood | K | Colorado | Surface Water | Colorado River Combined Run-Of-River | 1,120 | 1,120 | 1,120 | 0 | 0 | 0 |
| Round Rock | K | Brazos | Surface Water | Colorado River Combined Run-Of-River | 5,498 | 5,439 | 5,389 | 5,346 | 5,305 | 5,269 |
| Wells Branch | K | Colorado | Surface Water | Colorado River Combined Run-Of-River | 1,113 | 1,074 | 1,013 | 0 | 0 | 0 |
| West Lake Hills | K | Colorado | Surface Water | Colorado River Combined Run-Of-River | 2,420 | 2,420 | 2,420 | 0 | 0 | 0 |
| County-Other | K | Brazos | Groundwater | Edwards-BFZ Aquifer | 34 | 34 | 34 | 34 | 34 | 34 |
| County-Other | K | Colorado | Surface Water | Colorado River Combined Run-Of-River | 3,885 | 4,009 | 4,373 | 4,742 | 4,935 | 5,211 |
| County-Other | K | Colorado | Surface Water | Highland Lakes System | 42,169 | 41,441 | 27,658 | 0 | 0 | 0 |
| County-Other | K | Colorado | Groundwater | Edwards-BFZ Aquifer | 2,585 | 2,585 | 2,585 | 2,585 | 2,585 | 2,585 |
| County-Other | K | Colorado | Groundwater | Other Aquifer | 1,929 | 1,929 | 1,929 | 1,929 | 1,929 | 1,929 |
| County-Other | K | Colorado | Groundwater | Trinity Aquifer | 592 | 592 | 592 | 592 | 592 | 485 |
| County-Other | K | Guadalupe | Groundwater | Other Aquifer | 67 | 67 | 67 | 67 | 67 | 67 |
| Irrigation | K | Brazos | Groundwater | Edwards-BFZ Aquifer | 5 | 5 | 5 | 5 | 5 | 5 |
| Irrigation | K | Colorado | Surface Water | Irrigation Local Supply | 880 | 880 | 880 | 880 | 880 | 880 |
| Irrigation | K | Colorado | Groundwater | Edwards-BFZ Aquifer | 795 | 795 | 795 | 795 | 795 | 795 |
| Irrigation | K | Colorado | Groundwater | Other Aquifer | 197 | 197 | 197 | 197 | 197 | 197 |
| Irrigation | K | Colorado | Groundwater | Trinity Aquifer | 85 | 85 | 85 | 85 | 85 | 70 |
| Irrigation | K | Guadalupe | Groundwater | Other Aquifer | 8 | 8 | 8 | 8 | 8 | 8 |
| Livestock | K | Brazos | Groundwater | Edwards-BFZ Aquifer | 1 | 1 | 1 | 1 | 1 | 1 |
| Livestock | K | Colorado | Surface Water | Livestock Local Supply | 870 | 870 | 870 | 870 | 870 | 870 |
| Livestock | K | Colorado | Groundwater | Edwards-BFZ Aquifer | 231 | 231 | 231 | 231 | 231 | 231 |
| Livestock | K | Colorado | Groundwater | Other Aquifer | 226 | 226 | 226 | 226 | 226 | 226 |
| Livestock | K | Colorado | Groundwater | Trinity Aquifer | 2 | 2 | 2 | 2 | 2 | 1 |
| Livestock | K | Guadalupe | Surface Water | Livestock Local Supply | 36 | 36 | 36 | 36 | 36 | 36 |
| Livestock | K | Guadalupe | Groundwater | Other Aquifer | 0 | 0 | 0 | 0 | 0 | 0 |
| Manufacturing | K | Brazos | Surface Water | Colorado River Combined Run-Of-River | 663 | 722 | 722 | 815 | 856 | 892 |
| Manufacturing | K | Colorado | Surface Water | Colorado River Combined Run-Of-River | 16,523 | 18,598 | 20,071 | 21,818 | 23,901 | 26,762 |
| Manufacturing | K | Colorado | Groundwater | Edwards-BFZ Aquifer | 167 | 167 | 167 | 167 | 167 | 167 |
| Manufacturing | K | Colorado | Groundwater | Other Aquifer | 217 | 217 | 217 | 217 | 217 | 217 |
| Manufacturing | K | Guadalupe | Groundwater | Other Aquifer | 0 | 0 | 0 | 0 | 0 | 0 |
| Mining | K | Brazos | Groundwater | Edwards-BFZ Aquifer | 0 | 0 | 0 | 0 | 0 | 0 |
| Mining | K | Colorado | Surface Water | Other Local Supply | 4,880 | 4,746 | 5,246 | 5,791 | 6,407 | 7,116 |
| Mining | K | Colorado | Groundwater | Edwards-BFZ Aquifer | 1,591 | 1,591 | 1,591 | 1,591 | 1,591 | 1,591 |
| Mining | K | Colorado | Groundwater | Other Aquifer | 1,969 | 1,969 | 1,969 | 1,969 | 1,969 | 1,969 |
| Mining | K | Colorado | Groundwater | Trinity Aquifer | 171 | 171 | 171 | 171 | 171 | 140 |
| Mining | K | Guadalupe | Groundwater | Other Aquifer | 8 | 8 | 8 | 8 | 8 | 8 |
| Steam Electric Power | K | Colorado | Surface Water | Colorado River Combined Run-Of-River | 112 | 112 | 112 | 112 | 112 | 112 |
| Steam Electric Power | K | Colorado | Surface Water | Colorado River Combined Run-Of-River | 4,547 | 4,547 | 4,547 | 4,547 | 4,547 | 4,547 |
| Steam Electric Power | K | Colorado | Surface Water | Highland Lakes System | 35,197 | 35,197 | 35,197 | 35,197 | 35,197 | 35,197 |
| Steam Electric Power | K | Colorado | Surface Water | Walter E. Long/Decker Lake/Reservoir | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 |
| Steam Electric Power | K | Colorado | Groundwater | Trinity Aquifer | 3 | 3 | 3 | 3 | 3 | 3 |
| | | | | | | | | | | |
| **Total Projected Water Supplies (acre-feet per year) =** | | | | | **413,019** | **414,281** | **401,036** | **365,036** | **367,568** | **371,260** |

Source: Table 5, 2002 State Water Plan Database

TWDB: 10/27/03