Barton Springs/Edwards Aquifer Conservation District Management Plan

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Approved by TWDB – November 21, 2017

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Barton Springs/Edwards Aquifer Conservation District Management Plan

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1. Introduction

1.1 Purpose of the District Management Plan

With the passage of House Bill 162 by the 51st Texas Legislature in 1949, the landmark legislation commonly referred to as the Underground Water Conservation Act that established the original process for creating and establishing groundwater conservation districts (GCDs) in Texas, the requirement for preparation of management plans that included management goals was first established. House Bill 162, Section 3(c)(B)(8) states that GCDs must "develop comprehensive plans, for the most efficient use of underground waters, and for the control and prevention of waste of such waters; which plans shall specify in such detail as may be possible, the Acts, procedure, performance and avoidances which are or may be necessary for the effectuation of such plans, including specification of engineering operations, and methods of irrigation and to publish such plans and information and bring them to the notice and attention of the owners of land within the district." Thus, even before creation of the first GCD, the need for management plans was established.

Nearly 50 years later, the 75th Texas Legislature in 1997 enacted Senate Bill 1 (SB 1) to establish a new comprehensive statewide water planning process. In particular, SB 1 contained provisions that required GCDs to prepare management plans to identify the water supply resources and water demands that will shape the decisions of each district. GCDs are specifically required to develop and adopt management goals, objectives, and performance standards for prescribed efforts such as, but not limited to, providing the most efficient use of groundwater, controlling and preventing the waste of groundwater, and controlling and preventing subsidence. SB 1 designed the management plans to include management goals for each GCD to manage and conserve the groundwater resources within their boundaries.

In 2001, the Texas Legislature enacted Senate Bill 2 (SB 2) to build on the planning requirements of SB 1 and to further clarify the actions necessary for districts to manage and conserve the groundwater resources of the state of Texas. The Texas Legislature enacted significant changes to the management of groundwater resources in Texas with the passage of House Bill 1763 (HB 1763) in 2005. HB 1763 created a long-term planning process in which GCDs in each Groundwater Management Area (GMA) are required to meet and determine the Desired Future Conditions (DFCs) for the groundwater resources within their boundaries by September 1, 2010. In addition, SB 660 in 2011 amended the Texas Water Code to require that GCDs in a common GMA share and review management plans with the other GCDs in the GMA to facilitate coordinated groundwater management. The Barton Springs/Edwards Aquifer Conservation District's (District) management plan satisfies the requirements of SB 1, SB 2, HB 1763, the statutory requirements of Chapter 36 of the Texas Water Code (TWC), and the administrative requirements of the Texas Water Development Board's (TWDB) rules.

1.2 Time Period of the District Management Plan

The time period for this management plan is five years from the date of approval by the TWDB. Although the District must review and readopt the plan at least once every five years, it is not restricted from doing so more frequently if deemed appropriate by the District. In accordance with the provisions of Chapter 36 of the TWC, this management plan (Plan) will be reviewed, updated, and readopted at least once every five years as the District develops site-specific data on local groundwater use and aquifer conditions and as the key management strategies are developed and the overall management

approach evolves. Once adopted, this Plan will remain in effect until it is replaced by a revised management plan approved by the TWDB.

This Plan incorporates relevant regional water management strategies outlined in the current (2016) Regional Water Plans developed by the Lower Colorado Regional Planning Group and the South Central Texas Regional Planning Group, and included in the 2017 State Water Plan. Population and water demand projections cover the 50-year period from 2010 to 2060 and are consistent with those used by the TWDB for this area in statewide water planning.

1.3 Background

Authority and Purpose

The District was created in 1987 by the 70th Texas Legislature, under Senate Bill 988. Its statutory authorities include Chapter 52 (later revised to TWC, Chapter 36), applicable to all GCDs in the state, and the District's enabling legislation, now codified as Chapter 8802, Special District Local Laws Code. The District's legislative mandate is to conserve, protect, and enhance the groundwater resources located within the District boundaries. The District has the power and authority to undertake various studies, assess fees on groundwater pumpage and transport, and to implement structural facilities and non-structural programs to achieve its statutory mandate. The District has rulemaking authority to implement its policies and procedures and to help ensure the management of groundwater resources as directed by the Board. The District is not a taxing authority. Its only sources of income are groundwater production fees, the annual City of Austin water use fee, export fees, administrative fees, and occasional grants from various local, state, and federal programs for special projects.

Jurisdictional Area

Upon creation in 1987, the District's jurisdictional area encompassed approximately 255 square miles including parts of four counties: northwestern Caldwell, northeastern Hays, southeastern Travis Counties, and a small territory in western Bastrop County (in 2011, that small part of Bastrop County was de-annexed from the District and is now in Lost Pines GCD's sole jurisdiction). The jurisdictional area was generally defined to include all the area within the Barton Springs segment of the Edwards Aquifer with an extended area to the east to incorporate the service areas of the Creedmoor-Maha Water Supply Corporation, Goforth Special Utility District, and Monarch Utilities. In this area, designated as the "Exclusive Territory," the District has authority over all groundwater resources.

In 2015, the 84th Texas Legislature (House Bill 3405) expanded the District's jurisdictional area to include the portion of Hays County located within the boundaries of the Edwards Aquifer Authority (EAA) excluding the overlapping area in the Plum Creek Conservation District (see Figures 1-1 and 1-2). The newly annexed area, designated as "Shared Territory," excludes the Edwards Aquifer and includes all other aquifers, including the underlying Trinity Aquifer. The District's jurisdictional area including the Shared Territory encompasses approximately 420 square miles and includes both urban and rural areas. The District shares boundaries with adjacent GCDs to the west, south, and east including the Hays Trinity GCD, Comal Trinity GCD, EAA, Plum Creek GCD, and Lost Pines GCD respectively (see Figure 1-2). The District participates in joint-regional planning with these and other GCDs in GMAs 9 and 10 which are configured generally to encompass the Trinity and Edwards Aquifers respectively (see Figure 1-3).

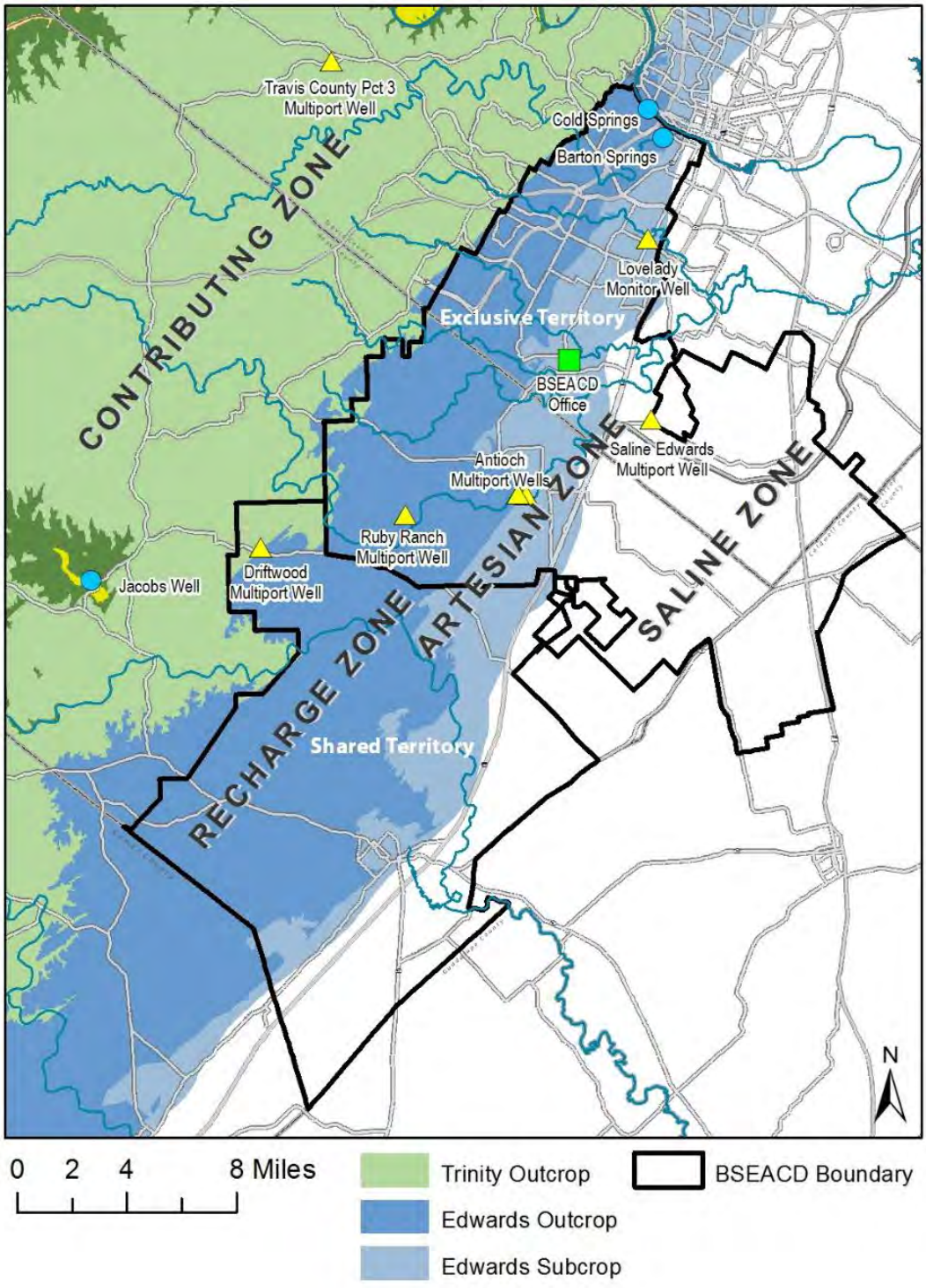


FIGURE 1-1: LOCATION OF THE BARTON SPRINGS/EDWARDS AQUIFER CONSERVATION DISTRICT

This map displays the District's boundaries, major aquifers, hydrogeologic zones, key springs, and monitoring wells.

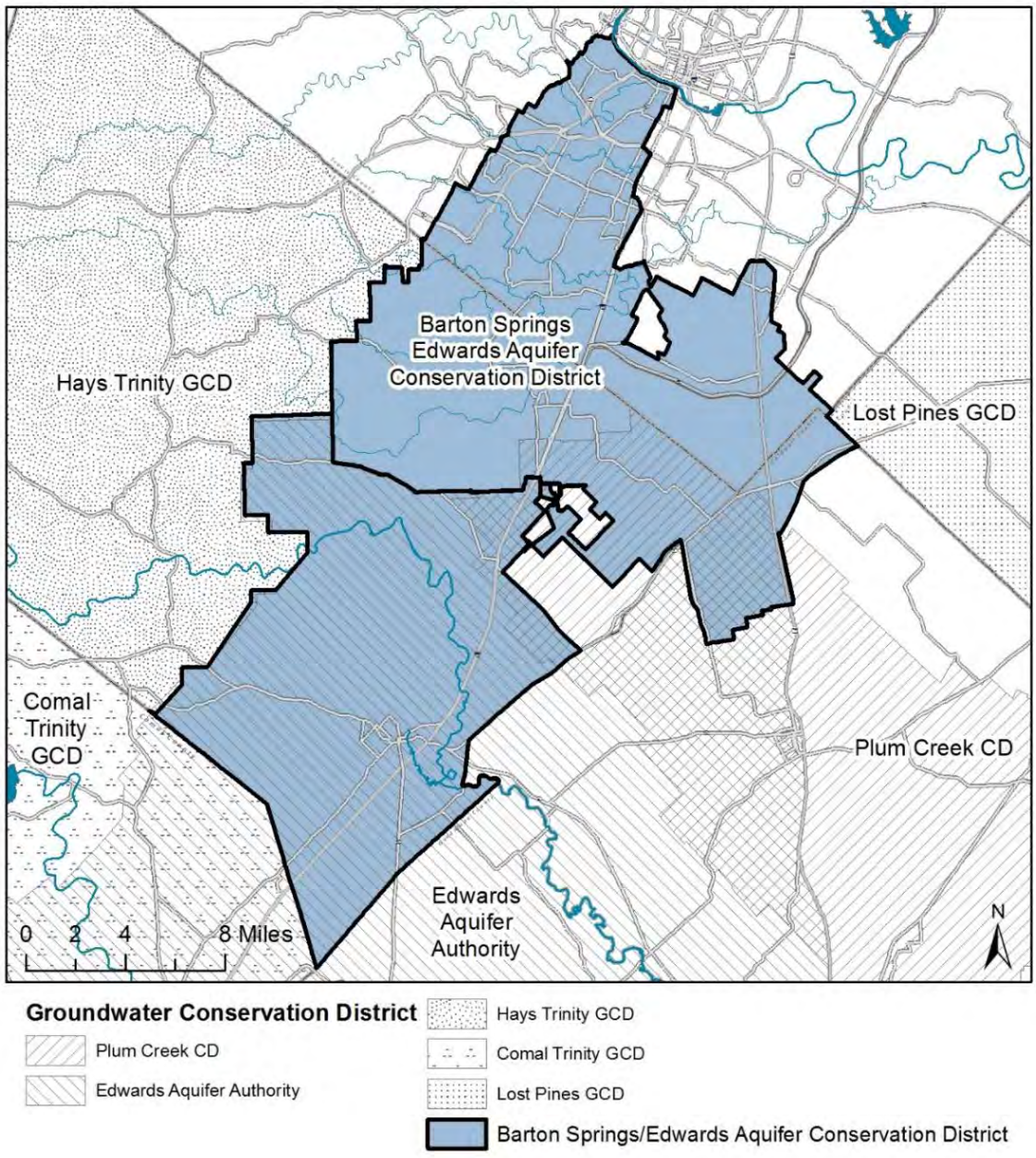


FIGURE 1-2: OTHER GROUNDWATER CONSERVATION DISTRICTS ADJACENT TO THE DISTRICT

This map shows what other groundwater management entities exist in the areas just outside the District and that overlap with the District.

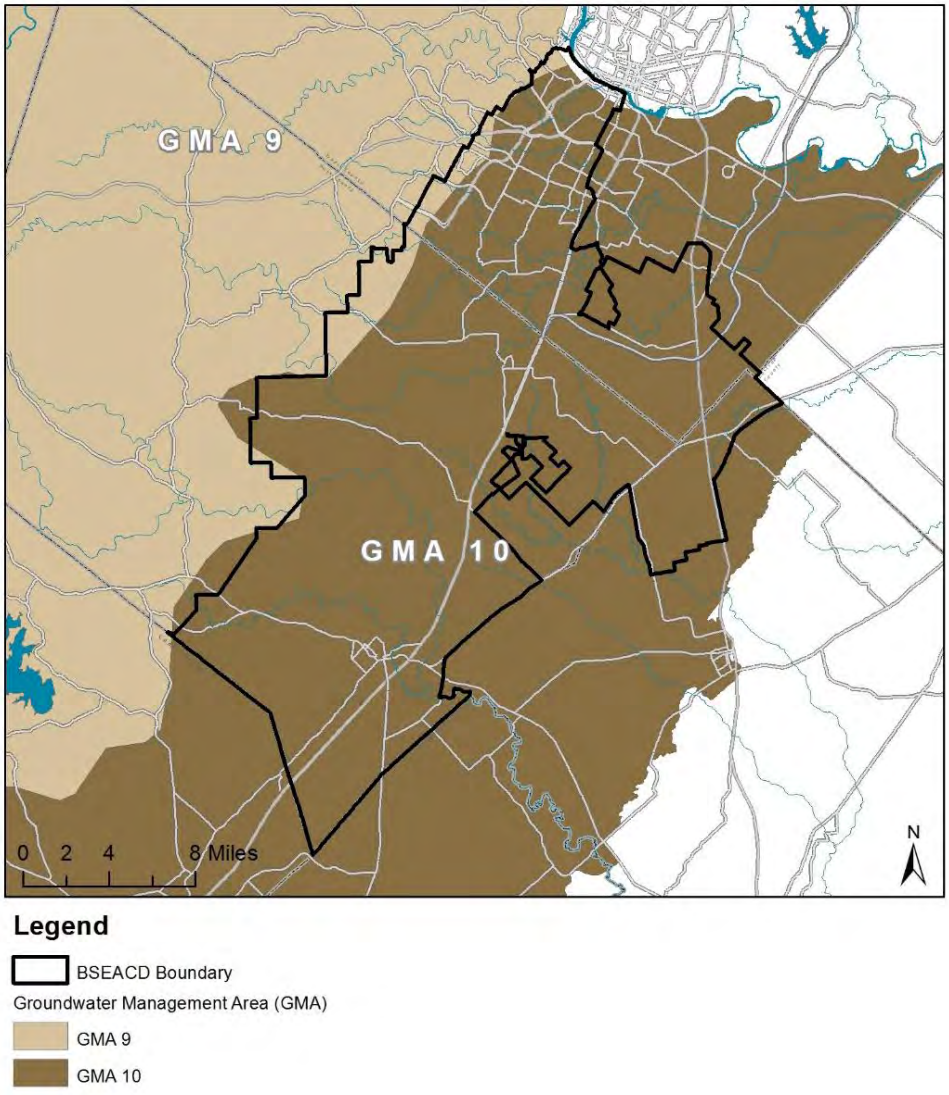


FIGURE 1-3: LOCATION OF THE GROUNDWATER MANAGEMENT AREAS (GMAS) IN THE DISTRICT

This map displays the District's boundaries and the boundaries of the GMAs in which the District actively participates in joint-regional groundwater planning.

Aquifers and Uses

Water from the Barton Springs segment of the Edwards Aquifer serves as the primary water source for public water supply, industrial, and commercial purposes in the District and is a major source of high quality base flow to the Colorado River via discharge through the Barton Springs complex. The Barton Springs complex provides habitat for the Barton Springs salamander (*Eurycea sosorum*) and Austin blind salamander (*Eurycea waterlooensis*) which are both federally listed Endangered Species under the Endangered Species Act requiring all activities that would or could adversely affect the species to represent optimal conservation efforts. The Trinity Aquifer, underlying the Edwards, is an important primary water resource in some parts of the District and is increasingly being developed in both the Exclusive and Shared Territory. Some wells in the District also produce water from the Taylor and Austin Chalk formations as well as various alluvial deposits along river and stream banks.

The area has a long history of farming, ranching, and rural domestic use of groundwater, but it is increasingly and rapidly being converted to residential use owing to suburban and exurban development from Austin and San Marcos. Groundwater in the area is primarily utilized for domestic and public water supply purposes, with lesser amounts also being utilized for commercial, irrigation, and industrial use. See Figure 1-4 for a breakdown of the types of wells in the District and percent of pumping of all wells by authorized use in 2017 for each classification category.

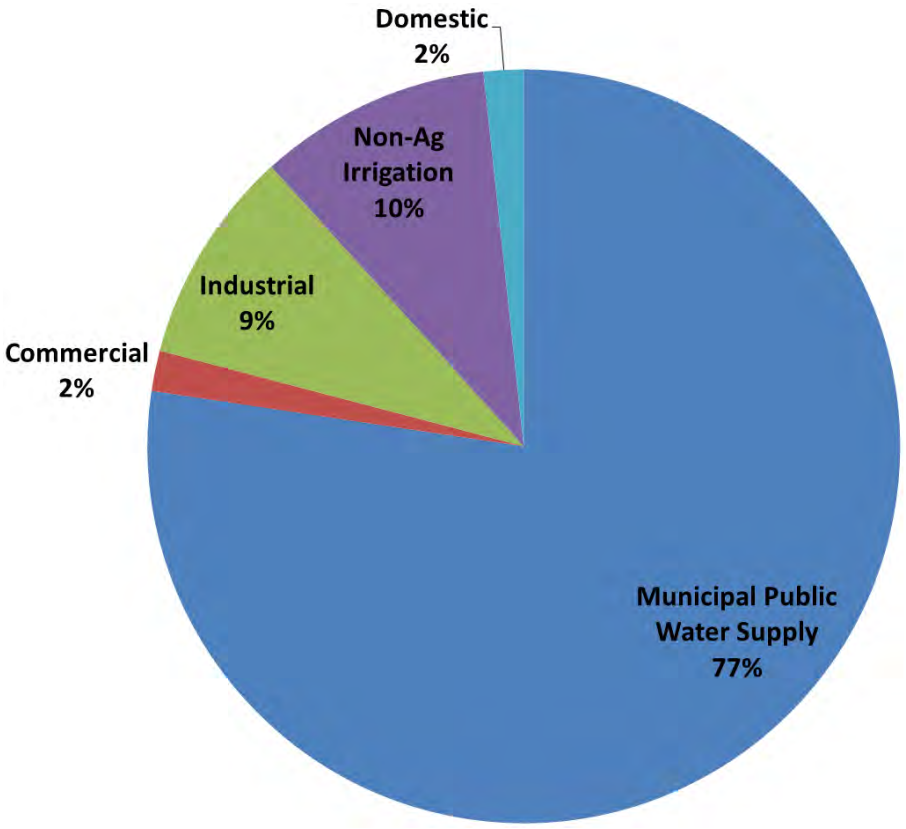


FIGURE 1 -4: TYPES OF GROUNDWATER USE AND THEIR PERCENT OF AUTHORIZED USE FOR PERMITTED WELLS IN THE DISTRICT

Governance

A five-member Board of Directors ("Board") governs the District. The Directors are elected on the November general election date in even-numbered years to staggered four-year terms from the five single-member precincts that comprise the District (see Figure 1-5). Each Director represents a precinct of which two (Precincts 4 and 5) are comprised of territory within or surrounded by the City of Austin as required by the District's enabling legislation. The other three precincts (Precincts 1, 2, and 3) represent the remaining area including the Shared Territory.

The Board sets policies and adopts rules and bylaws to operate the District and takes action in accordance with the Rules and Bylaws in executing the District's mission. The general manager reports to and is directed by the Board and is responsible for the overall operations and day-to-day activities of the District including programmatic planning and administration, stakeholder relations and regional planning, staff management and development, and financial administration.

While the area of the District is very small in comparison to other GCDs, its demographics have produced a rather complex set of legislative districts. Each of the State Senators and State Representatives that share constituencies with the District, as shown in Figures 1-6 and 1-7, represents a differing set of legislative priorities, yet each of them has expressed strong support for groundwater management, either on a general or a specific-issue basis.

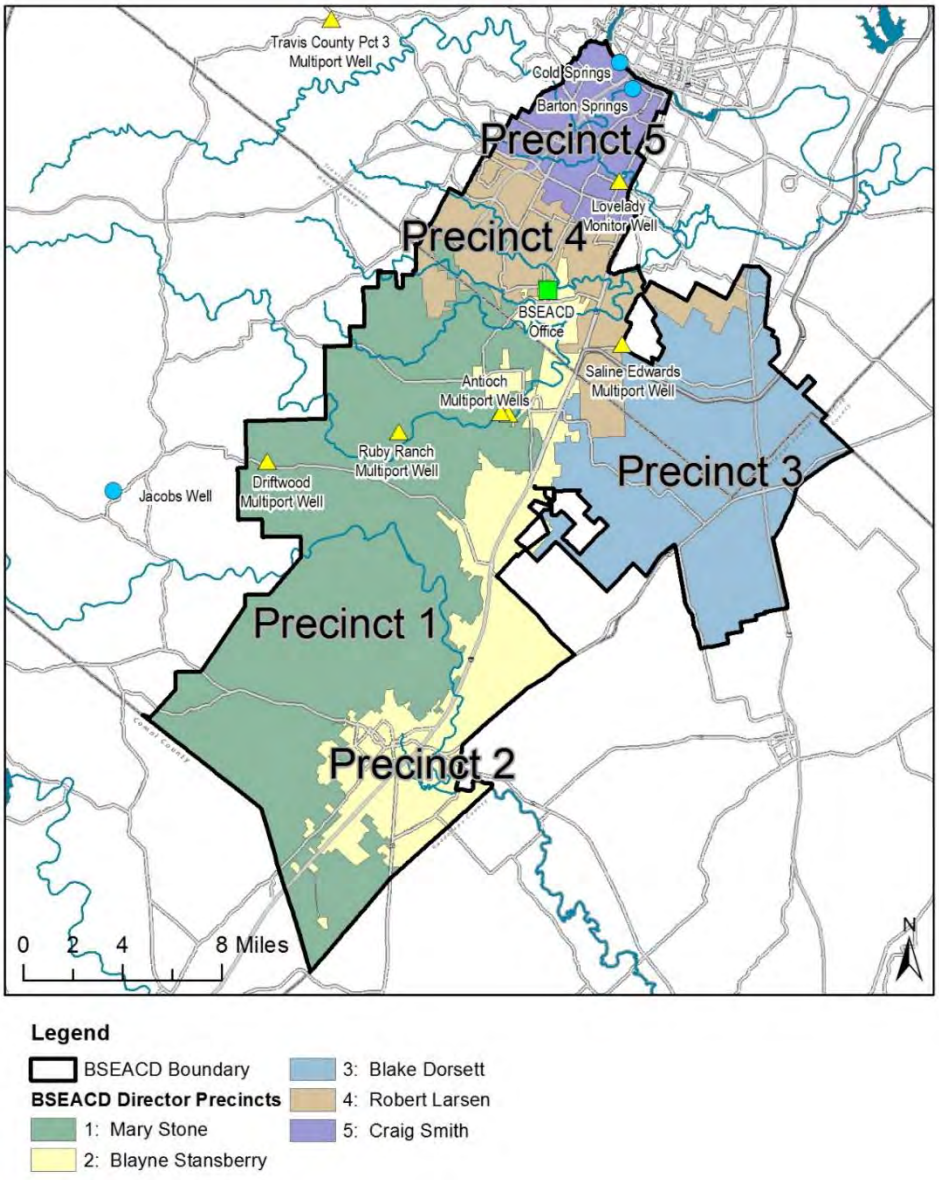


FIGURE 1-5: DIRECTOR PRECINCTS

This map displays the boundaries of five single-member Director Precincts.

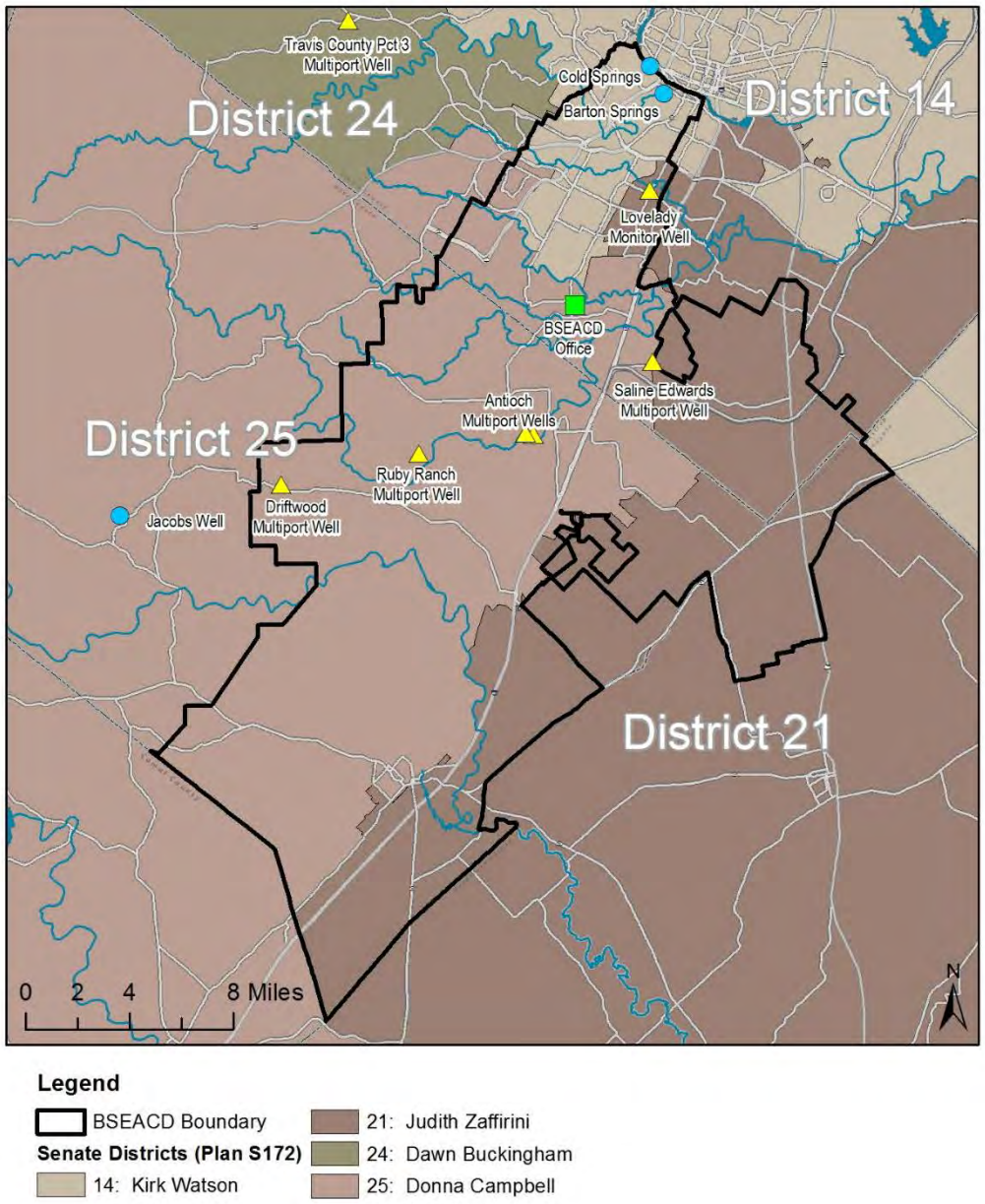


FIGURE 1-6: SENATE DISTRICTS WITHIN OR ADJACENT TO THE DISTRICT'S BOUNDARY

This map displays the boundaries of local Senate Districts in relation to the District's boundary.

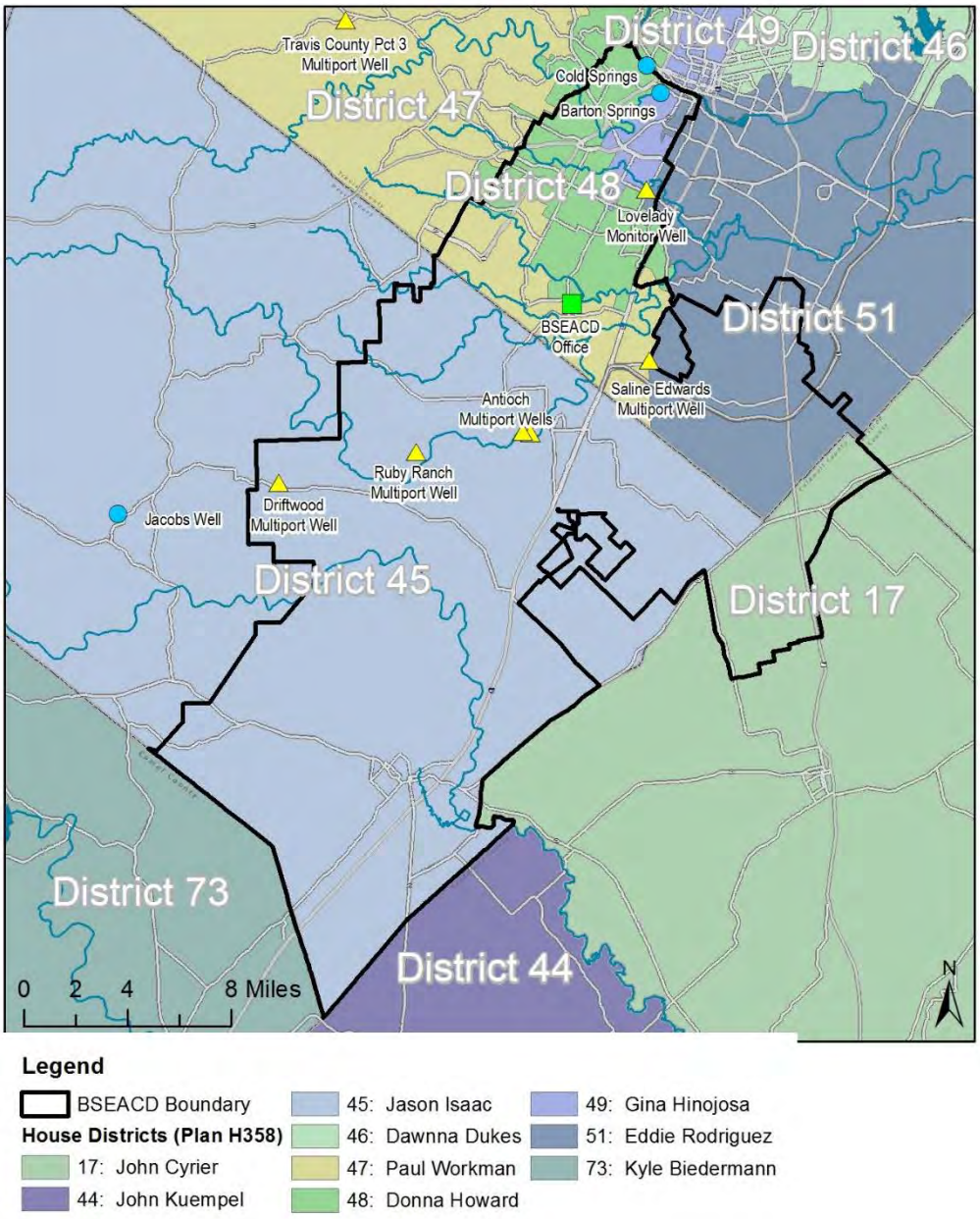


FIGURE 1-7: HOUSE DISTRICTS WITHIN THE DISTRICT'S BOUNDARY

This map displays the boundaries of local House Districts in relation to the District's boundary.

1.4 Mission and Core Values

Through strategic planning efforts by the Board, the District has established the following elements that serve as a backdrop and guide for planning and performance:

Mission

"As the responsible authority, the Barton Springs/Edwards Aquifer Conservation District is committed to conserving, protecting, enhancing recharge, and preventing waste of groundwater and to preserving all aquifers within the District."

Vision

"The Barton Springs/Edwards Aquifer Conservation District will excel in its operations and administration so that it is considered the model and standard for other groundwater districts."

Overarching Strategic Purpose

"We will manage the District aquifers to optimize the sustainable uses of groundwater in satisfying community interests."

The Board has also established the following tenets as the core values of the District that guide all of our internal and external interactions and operations:

- We operate on the basis of the highest integrity.
- We are committed to protection of the aquifers and to prudent stewardship of the groundwater resources of the District.
- We provide exceptional service that is consistently and equitably applied and is responsive to the needs of the public, interest groups, and other governmental agencies.
- We recognize that we are a public trust and operate on a sound legal basis and under a financially responsible philosophy.
- We encourage our employees to succeed by doing what they do best, both individually and as a team, in a supportive working environment.
- We value and work to ensure transparency of our operations and openness in our dealings with various stakeholder groups.
- We strive to communicate useful information on groundwater management when and where needed by the public.

These values have been translated into the following operational guidelines for all District staff:

- **Integrity** - We maintain and exhibit the highest integrity in all of our dealings, both internally and externally.
- **Quality** - We offer high-quality services that meet or exceed our Board's expectations in providing support to their decision-making.

- **Continuous Improvement** - We continuously look for innovative approaches and processes that improve the services we provide.
- **Teamwork** - We build trust in our fellow workers and their roles, cultivate a harmonious and productive relationship among co-workers, and utilize the diversity of knowledge and perspective that reside in all of us to develop workable responses as shared solutions.
- **Problem-solving** - We solve problems at the most immediate level first, while ensuring that problems are pursued to solution and that unresolved issues are elevated to successively higher levels.
- **Decision-making** - In all decisions, we consider impacts on protection of the aquifer, on all users and other stewards of its resources, on District employees and Board members, and on other public and private entities.
- **Working Environment -** We promote a safe, healthy work environment and foster a sense of care about our fellow workers' physical, mental, and emotional well-being.
- **Staff Development** - We take advantage of those opportunities in which employees can grow professionally and/or personally, while allowing the District to apply new knowledge, skills, and expertise in accomplishing its mission.
- **Relationship-building -** We build and maintain effective, bilateral relationships and communication with the regulated community, the scientific community, the public at-large and its special interest groups, and other state, federal, and local regulators.
- **Community Outreach** - We communicate regularly and effectively with stakeholders and the public, to educate and disseminate information about groundwater use, conservation, protection, and resource value.
- **Value Proposition** - As individual staff members, we provide the District with an honest day's work each working day and receive in return a competitive, fair compensation and benefits package and valued, challenging work assignments.

Through its continuing strategic and management planning process, the District Board has established the following as overall Critical Success Factors **(**CSFs**)** for the District that underpin the District's management objectives in this Plan:

- **Scientific CSF -** Providing sound science to support policy and tactical decisions made by the District that affect water supply users and endangered species habitat;
- **Business Administrative CSF -** Being highly efficient, accurate, and fair in administering transactional activities related to all District programs;
- **Regulatory CSF -** Developing and instituting an equitable and consistently administered regulatory program that is required to serve our mission;
- **Political CSF -** Being a respected, effective part of the state and local political landscape for water resource management and its stakeholder communities;
- **Educational CSF -** Serving our permittees, stakeholders, and the public at large as a readily accessible 'source of first resort' for reliable information about local water, groundwater, aquifer science, water use and conservation; and
- **Sustaining CSF -** Providing the programmatic and resource basis for innovative, cost-effective solutions to maintain and augment the sustainable quantity of water in the District and to protect the quality of District waters required for various existing uses.

1.5 Management of Groundwater Resources in the District

Background. Since 1904, the legal framework applied to groundwater resources in Texas has been the common law "Rule of Capture." Although the Rule of Capture remains in effect today, GCDs such as the District have been established across the state and authorized to modify how the Rule of Capture is to be applied within their boundaries, as part of a comprehensive, approved groundwater management plan.

In 1997, the Texas Legislature codified the commitment to GCDs in Chapter 36, Section 36.0015 of the TWC by designating GCDs as the preferred method of groundwater management. This section of Chapter 36 also establishes that GCDs will manage groundwater resources in order to protect property rights, balance the conservation and development of groundwater to meet the needs of this state, and use the best available science through rules developed, adopted, and promulgated in accordance with the Chapter. As the overarching statute governing GCDs, Chapter 36 gives specific directives to GCDs and the statutory authority to carry out such directives. It provides the so-called "tool box" that enables GCDs to promulgate the appropriate rules needed to protect and manage the groundwater resources within their boundaries given consideration to the conditions and factors unique to each GCD.

In addition to Chapter 36 authority, the District has the powers expressly granted by Chapter 8802 of the Special District Local Laws Code ("the District Enabling Legislation"). Applied together, these statutes provide the District with the authority to serve the statutory purpose to provide for the conservation, preservation, protection, recharging, and prevention of waste of groundwater, and of groundwater reservoirs or their subdivisions, and to control subsidence caused by withdrawal of water from those groundwater reservoirs or their subdivisions. This section provides an overview of the District's application of the authority provided to manage the groundwater resources within the District and the fundamental management concepts and strategies that embody the District's regulatory and permitting program.

Evolution of the District's Regulatory Program.

Key Milestones in Regulatory Program

1987-2004: Historical Production Permits
2004: Sustainable Yield Study
2004: Conditional Production Permits
2007: Extreme Drought Withdrawal Limitation (EDWL)
2009: Ecological Flow Reserve
2009: Management Zones
2010: DFC Determination
2014: Habitat Conservation Plan
2015: HB 3405
2016: Unreasonable Impacts

Since its creation in 1987, the District has applied the statutory authority and sound science to manage its groundwater resources. The District established a precedent for developing the governing polices and rules through an initial data-driven evaluation of the science to characterize the District's aquifers followed by a thorough vetting by affected stakeholders and the public. This process has served to inform the Board's direction and policy decisions resulting in the current regulatory program that has evolved to address challenges unique to the District. This evolution has been marked by key milestones producing management strategies that are now integrated within the current regulatory approach. A chronological summary of the milestones and associated management strategies is provided as follows.

Historical Production Permits (1987-2004). After creation of the District in 1987, the initial focus was on issuing permits that addressed historical and existing nonexempt use from the freshwater Edwards Aquifer and collecting data on aquifer conditions. The production permits issued allowed existing well owners, primarily utilities providing public water supply, with existing investments in wells and infrastructure, to continue groundwater production to support their existing uses and water demands. The establishment of a monitor well network provided data on aquifer conditions that would later prove to be integral to establishing policies and rules to accomplish the groundwater management objectives for the Edwards Aquifer. Withdrawals from existing wells that were nonexempt and registered with the District as of September 9, 2004, were designated with Historical-use Status and authorized under permits designated as Historical Production Permits. These permits authorize firm-yield production from the freshwater Edwards Aquifer even during extreme drought conditions.

Sustainable Yield Study (2004). In 2004, the District completed the sustainable yield study to evaluate potential impacts to groundwater availability and spring flows from various rates of groundwater pumping during 1950s drought-of-record (DOR) conditions. To guide the study, the Board defined 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.*

The study concluded that the District had already reached the sustainable yield limits for the Edwards Aquifer with findings indicating that without curtailments in the then-current rate of permitted pumping (~10 cfs), during the recurrence of DOR conditions, Barton Springs would cease to flow and as many as 19% of all Edwards Aquifer wells in the District would be negatively impacted (Hunt and Smith, 2004). These findings effectively unified two core management objectives: 1) preservation of spring flows as habitat for endangered species, and 2) preservation of aquifer levels and groundwater supplies for existing users, by confirming that both objectives would be compromised without active management during extreme drought conditions.

Conditional Permits (2004). In response to the findings of the sustainable yield study, the District modified its Rules effective on September 9, 2004, to limit firm-yield groundwater production from the freshwater Edwards Aquifer. This date marks the endpoint for issuance of firm-yield Historical Production Permits and the beginning of interruptible Conditional Production Permits requiring up to complete cessation of pumping during extreme drought. This Board-adopted policy served to respond to the findings of the sustainable yield study that indicated the limited amount of firm-yield availability during extreme drought, while also allowing for increased or additional groundwater production during no-drought conditions.

Extreme Drought Withdrawal Limitation (2007) and Ecological Flow Reserve (2009). The District experienced a severe drought in 2006 that reinforced the need to further refine the regulatory program to manage the district aquifers pursuant to the sustainable yield polices adopted in 2004. In response, the District initiated a stakeholder driven effort to solicit input and conducted two rounds of rulemaking (January and April, 2007) to adopt rules that would further develop the drought management rules, the conditional permitting program, and establish the Extreme Drought Withdrawal Limitation (EDWL) as a cap on firm-yield groundwater production from the freshwater Edwards Aquifer. The EDWL was set at

8.5 cfs to represent the total amount of aggregate authorized (after curtailments) and exempt groundwater production at that point in time and the maximum amount ever to be authorized going forward. The EDWL was the predecessor to the DFCs adopted in the joint-regional planning process in 2010 and served as the turning point in which the District would commit to further decrease aggregate extreme drought groundwater production.

In 2009, the EDWL was bolstered with the establishment of the Conservation Permit and the Ecological Flow Reserve. The Conservation Permit is a protected, accumulative permit held only by the District to serve as a holding vehicle for all firm-yield permitted production that was previously authorized and since retired and is now permanently dedicated in the Ecological Flow Reserve. Retired permitted production dedicated to the Ecological Flow Reserve may not be re-permitted for firm-yield production during extreme drought and is an integral component of the District's Habitat Conservation Plan (HCP).

Management Zones (2009). With implementation of Conditional Permitting in 2004 and the establishment of the EDWL in 2007, firm-yield availability from the freshwater Edwards Aquifer was effectively fully appropriated. This permitting cap created an impetus to recognize a distinction from the other non-freshwater Edwards aquifers in the District that had additional availability that could continue to be permitted on a firm-yield basis, even during extreme drought. The District recognized the benefit of creating Management Zones that allow for separate permitting and production rules unique to each aquifer and its subdivisions or geographic area. The initial Management Zones (MZs) were created by rule in 2009 and now include the following MZs (see Figures 1-8 and 1-9):

- Western Freshwater Edwards MZ
- Eastern Freshwater Edwards MZ
- Saline Edwards MZ
- Upper Trinity MZ
- Middle Trinity MZ
- Lower Trinity MZ
- Austin Chalk MZ (minor)
- Alluvial MZ (minor)

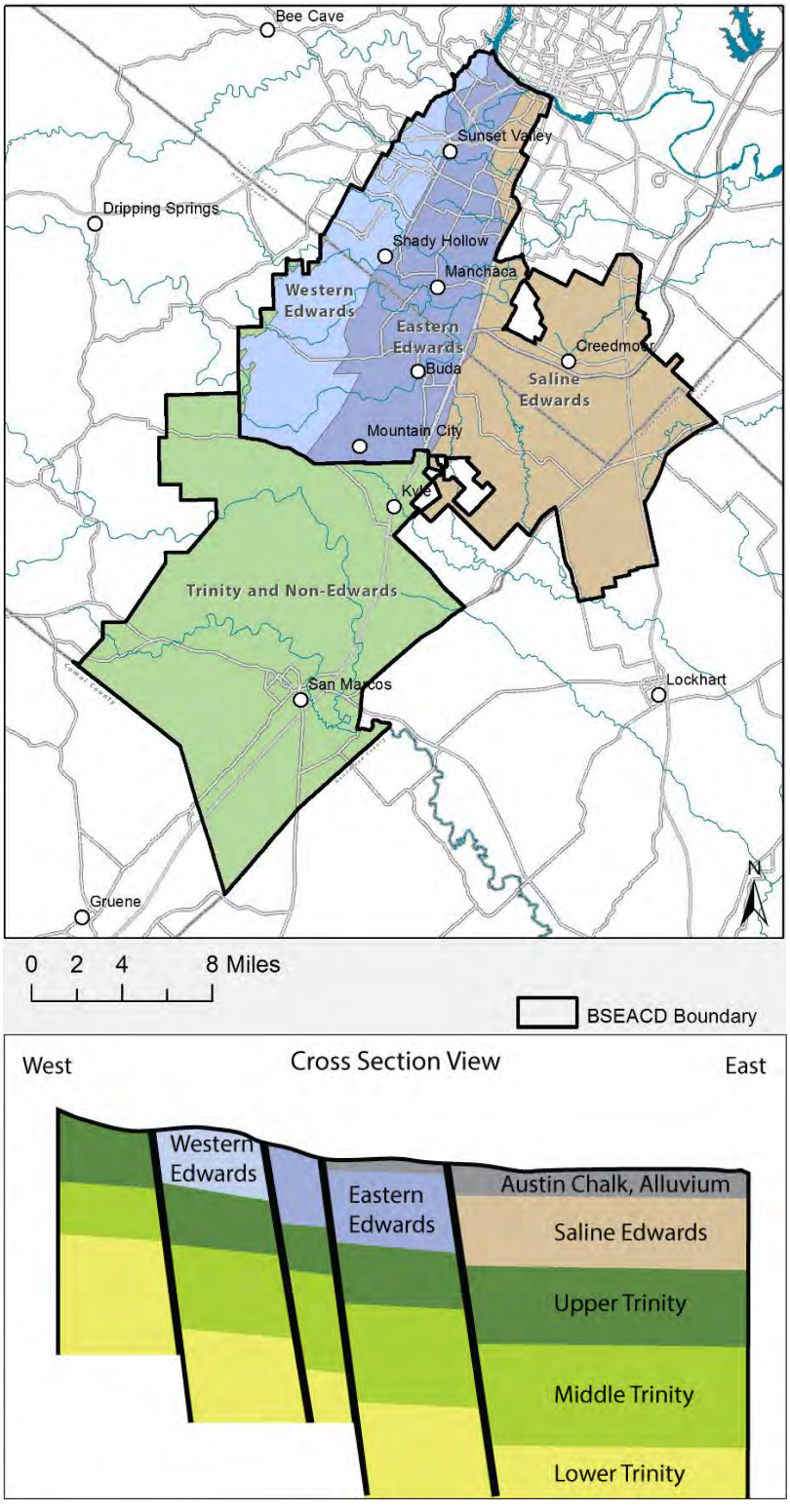
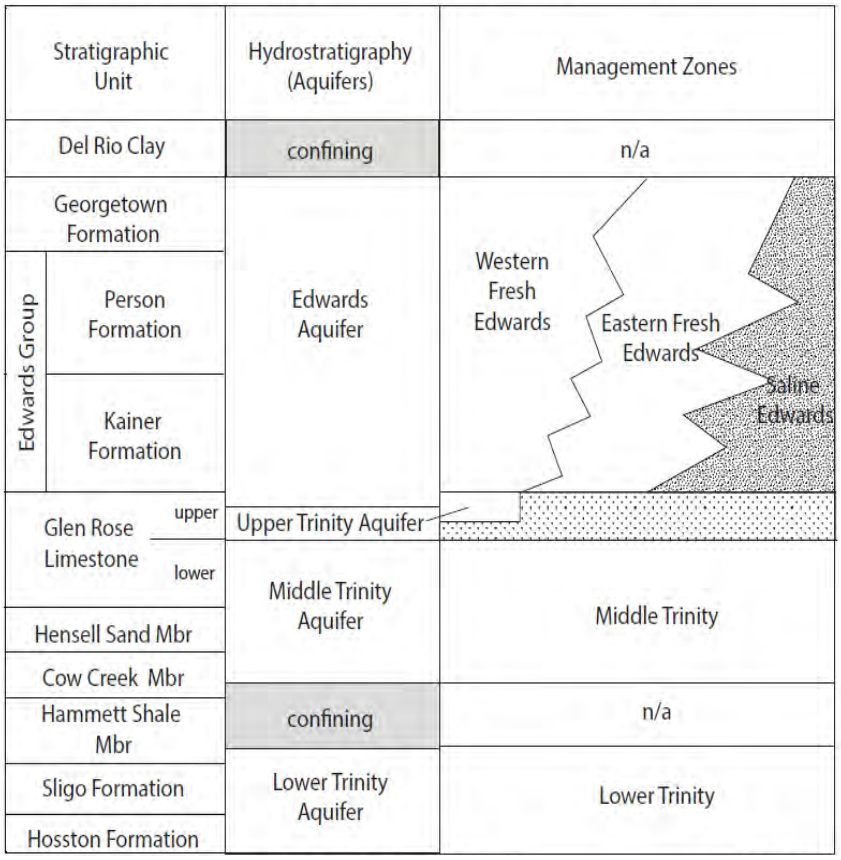


FIGURE 1-8: MANAGEMENT ZONES – MAP VIEW AND CROSS-SECTION

This map above represents the existing District management zones in map view. The cross section view is a schematic representation of the vertical management zone boundaries in the sub surface.



Stratigraphy and hydrostratigraphy modified from Barker and Ardis (1996). July, 16, 2015

FIGURE 1-9 CORRELATION CHART SHOWING STRATIGRAPHIC UNITS, AQUIFERS, AND MAJOR MANAGEMENT ZONES

Desired Future Conditions and Modeled Available Groundwater (2010). The evolution of the District's permitting and drought management program described above set the stage for setting aquifer-based management goals known as DFCs through the joint-regional groundwater planning process put in place with the passage of HB 1763 in 2005 (see Section 1.1, Purpose of the District Management Plan). The DFCs are established by the GCDs within GMAs to collectively determine the quantifiable aquifer condition that will be maintained over a 50-year planning period and to encourage coordinated management of shared aquifers. The maximum amount of groundwater production allowed to preserve that DFC is known as the Modeled Available Groundwater (MAG) estimate, and is determined by the TWDB and provided to the GCDs to be considered as a factor in permitting decisions (see Section 2.2, Modeled Available Groundwater based on DFC). The District has territory and participates in joint planning in both GMA 9 and GMA 10 (see Figure 1-3).

As part of the DFC decision-making in the first round groundwater planning that culminated in 2010, the Board considered studies concerning dissolved oxygen (DO) concentrations and salamander mortality conducted in support of the District's HCP (see below, Habitat Conservation Plan), which suggested that Barton Springs flow needed to be higher during extreme drought than what could be achieved under the then-current permitting and drought management program and the established EDWL. This result informed the District's recommendation to GMA 10 for the northern segment of the GMA (primarily the

District's territory) to adopt an extreme drought DFC for the freshwater Edwards Aquifer to preserve a minimum spring flow rate at Barton Springs of 6.5 cfs during a recurrence of DOR conditions. The corresponding MAG allowing only 5.2 cfs of total aggregate annual pumping was substantially lower than the EDWL of 8.5 cfs established in 2007 and the aggregate production (after curtailments) of the then-current regulatory program (2010) of 6.7 cfs.

The DFCs sets an ambitious goal for maintaining minimum spring flows and water well supplies during DOR. The DFCs, coupled with preparation of the District's HCP beginning in 2004, prompted an expanded focus on conservation and demand management, including exploring the feasibility of alternative water supplies that could be used to substitute for production under Edwards Aquifer historical production permits. In 2012, the District initiated a stakeholder driven effort to develop a plan and implement measures to close the 1.5 cfs gap through adoption of more aggressive drought rules, and encouraging the permanent retirement of historical Edwards Aquifer permits to be dedicated to the Ecological Flow Reserve. To date, the gap has been reduced to 0.3 cfs (see Figure 2-1).

DFCs in GMAs 9 and 10 were also adopted for the other aquifers including the saline Edwards Aquifer (GMA 10) and the Trinity Aquifer (GMAs 9 and 10) reflecting the District's expanded focus and elevated priority to manage all of the aquifers in the District (see Section 2.2, Modeled Available Groundwater based on DFC).

Habitat Conservation Plan (2004-2014). The sustainable yield study in 2004 also indicated that groundwater withdrawals from the freshwater Edwards Aquifer in the District would be accompanied by a rapid, one-for-one volumetric reduction in springflows at Barton Springs during a DOR recurrence. The impact of such reduced springflow on the endangered species of salamanders that use Barton Springs as their sole habitat was then unknown. Although the legal obligations were uncertain, the District opted to commit to managing the Edwards Aquifer groundwater production to avoid or minimize its impact on the endangered species to the greatest extent practicable and on an enduring basis. (Similar conclusions were being drawn at the same time by the federal courts and ultimately the Texas Legislature for the southern segment of the Edwards Aquifer and its own suite of endangered species.) To accomplish this goal, there was a need for a better understanding of the consequences of regulatory program options on the endangered species at Barton Springs.

Consequently, the District began the process of developing an HCP under the federal Endangered Species Act, in anticipation of applying for an Incidental Take Permit from the U.S. Fish & Wildlife Service. As part of the HCP development process, the District initiated several biological and hydrogeological science-based studies to determine how such protection of the salamanders could be most effectively achieved while protecting the rights of groundwater owners. These studies received substantial funding from federal matching grants, administered by the Texas Parks and Wildlife Department, as well as substantial financial and in-kind participation by the District. The supporting studies included: a) a first-of-its-kind laboratory and ecological modeling study of the effects of reduced DO concentrations and increased salinity on the Barton Springs salamander, conducted by the University of Texas Department of Integrated Biology (Poteet and Woods, 2007; Woods et al., 2010); b) development of a more rigorous and meaningful drought trigger methodology to support a new, more stringent drought management program that featured the imposition of a junior-senior permitting scheme ("Conditional Permits" described above); and c) a preliminary integrated HCP and Environmental Impact Statement (EIS) document.

A series of changes in both federal and state laws and regulations, changes in federal personnel providing guidance and oversight, and changes in the drought management program in response to severe droughts in 2006, 2008-2009, and 2011 lengthened the timeline for completing the HCP. But over the decade during which the HCP was developed, the HCP conservation measures that avoided, minimized, and mitigated effects and impacts of groundwater production on the endangered species ultimately became integrally intertwined with the District's groundwater management scheme and its regulatory program. Currently, the goals, objectives, strategies, and performance standards in this Plan (see Section 3.3, Goals and Strategies) are aligned in all material respects with the goals and conservation measures in the 2014 Draft HCP, and therefore link the HCP program with the District's authorized regulatory, science, educational, and other programs during the term of this Plan.

HB 3405 – Unreasonable Impacts (2015 - 2016). In 2015, HB 3405 was passed by the Legislature to extend the jurisdiction of the District, providing authority over all non-Edwards aquifers in the annexed area of the "Shared Territory" within Hays County and to affirm District authority over all aquifers in the "Exclusive Territory" which described the jurisdictional area of the District prior to annexation (see Figure 1-2). HB 3405 also codified a temporary permitting process to allow existing nonexempt well owners to transition into a regular permit. The initial "Temporary Production Permits" were to be issued to existing nonexempt well owners for production not to exceed the "maximum production capacity" and converted to regular permits for the same amount contingent on an evaluation and determination of whether that amount would cause either 1) a failure to achieve the applicable adopted DFCs for the aquifer, or 2) an unreasonable impact on existing wells. These factors triggered two rounds of rulemaking in July 2015 and April 2016 to implement the provisions of HB 3405 to first, establish the procedure for processing Temporary Production Permits and second, further define the second factor involving the evaluation of unreasonable impacts.

The second round of rulemaking would incorporate the concept of avoidance of unreasonable impacts into an updated sustainable yield definition and expand the evaluation of unreasonable impacts from beyond HB 3405 permits to be applied as a principal consideration in all future permit decisions. Such an evaluation is authorized under provisions of Chapter 36. Specifically, Water Code § 36.002(d)(2) allows the District to regulate production under §§ 36.113, 36.116, or 36.122. Section 36.113(d)(2) requires the District to consider whether the proposed use of water "unreasonably affects" existing groundwater and surface water resources or existing permit holders. Section 36.113(f) provides permits may be subject to terms and conditions necessary to "lessen interference." Section 36.116 authorizes the District to regulate production of groundwater by setting production limits on wells to "prevent interference" between wells. Finally, the District's general rulemaking authority under § 36.101 again express authority to address interference and impacts.

This consideration of the potential for unreasonable impacts is dependent principally on the analysis of site-specific aquifer testing using numerical models and the best available analytical tools and avoidance measures as permit conditions if the evaluation of the proposed production amount confirms potential for such impacts. The following statement was adopted by the Board to memorialize this key management strategy as policy:

"The District seeks to manage total groundwater production on a long-term basis while avoiding the occurrence of unreasonable impacts. The preferred approach to achieve this objective is through an evaluation of the potential for unreasonable impacts using the best available science to anticipate such impacts, monitoring and data collection to measure the actual impacts on the aquifer(s) over time once pumping commences, and prescribed response measures to be triggered by defined aquifer conditions and implemented to avoid unreasonable impacts. Mitigation, if agreed to by the applicant, shall be reserved and implemented only after all reasonable preemptive avoidance measures have been exhausted, and shall serve as a contingency for the occurrence of unreasonable impacts that are unanticipated and unavoidable through reasonable measures."

The policy statement affirms the District's preferred approach to consideration of localized impacts in permitting decisions and establishes the preference for avoidance of such impacts reserving any mitigation only for unavoidable or unanticipated impacts. The Board further implemented this approach by adopting rules defining the term "unreasonable impacts" as follows:

"Unreasonable Impacts" – a significant drawdown of the water table or reduction of artesian pressure as a result of pumping from a well or well field, which contributes to, causes, or will cause:

1. well interference related to one or more water wells ceasing to yield water at the ground surface;
2. well interference related to a significant decrease in well yields that results in one or more water wells being unable to obtain either an authorized, historic, or usable volume or rate from a reasonably efficient water well;
3. well interference related to the lowering of water levels below an economically feasible pumping lift or reasonable pump intake level;
4. the degradation of groundwater quality such that the water is unusable or requires the installation of a treatment system;
5. the Desired Future Condition (DFC) to not be achieved;
6. depletion of groundwater supply over a long-term basis, including but not limited to chronic reductions in storage or overdraft of an aquifer;
7. a significant decrease in springflow or baseflows to surface streams including a decrease that may cause an established minimum springflow or environmental flow rate to not be achieved; or
8. land subsidence.

Expansion of the District's territory and confirmation of authority of the Trinity Aquifer and other aquifers in both the previous area and the new Shared Territory would also effectively shift the District's prior emphasis on the Edwards Aquifer as the primary management focus to also include the Trinity Aquifer and other aquifers as aquifers of equal priority.

Synopsis of District's Current Regulatory Approach.

Since its creation in 1987, the District has honored the established precedent of developing policy and management strategies on the basis of statutory compliance, sound science, and stakeholder input. The evolution of the District's policies and strategies chronicled above has produced a regulatory program that is fair, innovative, and customized to objectively address the challenges and management objectives unique to the District. The District's management approach evolved from an initial focus on permitting for historical use from 1987 until the completion of the sustainable yield study in 2004. On the basis of that study, the District began preparation for management under an HCP to protect the endangered salamanders at Barton Springs. To this end, the District implemented rules and policies to:

- cap firm-yield production from the freshwater Edwards Aquifer;
- allow future production from the freshwater Edwards Aquifer only on an interruptible basis through Conditional Production Permits;
- create an Ecological Flow Reserve under the District-held Conservation Permit to support minimum spring flow rates during Extreme Drought;
- create and promulgate rules for MZs to allow production from other aquifers to serve as alternative supplies to the freshwater Edwards Aquifer;
- invest in exploring the feasibility of alternative water supply strategies (e.g. aquifer storage and recovery, brackish groundwater desalination);
- adopt ambitious DFCs to preserve minimum spring flows through the joint-regional groundwater planning process; and
- implement an aggressive drought management program to preserve minimum spring flow rates and groundwater supplies.

After the passage of HB 3405 in 2015, the District's attention then broadened to include the management of the Trinity Aquifer and other non-Edwards aquifers in the Shared Territory, the development of a permitting program with a refined interest in managing to avoid unreasonable impacts, and an updated definition of sustainable yield. Sustainable yield is now defined as:

> *The amount of groundwater available for beneficial uses from an aquifer under a recurrence of drought of record conditions, or worse, without causing unreasonable impacts.*

The integration of these strategies collectively produced a program formed on the basis of demand-based permitting coupled with an evaluation of the potential for localized and regional unreasonable impacts. This permitting approach is bolstered by an active drought management program to abate groundwater depletion during District-declared drought. The current permitting and drought management programs are further described below.

Permitting. The current permitting program in place and supported by this Plan applies a three-part evaluation to: a) affirm beneficial use in accordance with demand-based permitting standards, and b) evaluate the full range of potential impacts for each production permit request. The three-part permit evaluation involves (see Figure 1-10):

1) **Reasonable Non-speculative Demand.** District rules require that all production permit applications indicate the proposed use type of the well and the intended use and the volume of

annual production. The requested volume and use are evaluated to affirm that it is for beneficial use and for an annual volume that is non-speculative and commensurate with reasonable demand to avoid over-permitting and discourage waste. The evaluation involves calculation of annual demand based on accepted standards, planning estimates, and regional trends and assurances that there are actual plans and intent to use the water for beneficial purposes within the near term.

2) **Local-scale Evaluations**. Production permit applications for large-scale groundwater production are also evaluated to assess the potential for localized impacts attributed to the proposed demand-based production volume. The District evaluation is performed on the basis of the results of aquifer testing and a hydrogeological report conducted in accordance with District's guidelines and submitted to support the application. Staff evaluates the results of the test and the report through application of the best available science to predict drawdowns (analytical or numerical models) and the potential for unreasonable impacts to existing wells.

3) **Aquifer-scale Evaluations.** Finally, each production permit application is evaluated to assess the potential for impacts to the applicable DFCs and other more long-term conditions defined as unreasonable impacts. This involves a broader evaluation of the cumulative impacts of the aggregate pumping on a regional scale and beyond the term of a permit. Such evaluations require more complex tools, modeling, and ongoing aquifer monitoring and data collection to assess actual and predicted impacts to the DFC and other indicators. The MAG is also a factor considered in this evaluation.

The extent of the evaluation scales with the magnitude of the requested production volume, with the more comprehensive evaluations reserved for the more complex, larger-scale projects with greater potential to cause unreasonable impacts. Each component of the evaluation is considered individually and collectively to determine the General Manager's action or recommendation to the Board to either 1) deny the permit, 2) approve the permit, or 3) approve with special conditions if necessary to avoid unreasonable impacts.

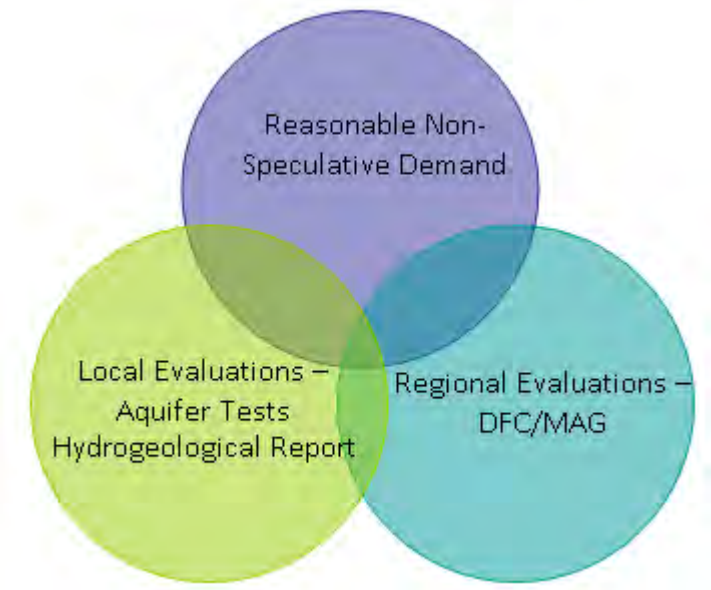


FIGURE 1-10: THREE-PART PERMIT EVALUATIONS

Drought Management. One of the principal responsibilities central to the District's mission is to manage groundwater production during drought conditions when the aquifers are most stressed. After District creation in 1987 and until 2004, the District put into place its initial permitting program and drought management program with a network of drought indicator wells and curtailments linked to percentiles of monthly flow at Barton Springs. With a burgeoning regional population and increasing demand on the District's aquifers coupled with the findings of the sustained yield study, the District recognized a need to improve the drought management program. Significant droughts in 2006, 2008–09, and 2011 provided further impetus for a series of amendments that implemented a more effective science-based drought trigger methodology, and expanded permit-based drought rules and enforcement protocol. The amendments produced milestones in the District's regulatory approach (e.g., conditional permitting, the EDWL, the Ecological Flow Reserve, MZs, as described above) that were the product of numerous scientific studies conducted by the District's hydrogeologists, vetted through technical consultants and advisors, reviewed and commented on by stakeholders and the public, and approved by the Board.

The current drought management program in place and supported by this Plan is implemented through User Drought Contingency Plans (UDCPs) that are an integral component required of each Production Permit. Drought declarations involve continuous evaluation of the aquifer conditions measured at the drought indicators for the Edwards Aquifer that also serve as surrogates indicative of regional drought conditions for all District aquifers. When the designated aquifer conditions are met, permittees are required to implement the prescribed measures of the UDCPs requiring mandatory curtailments of permitted groundwater production based on permit type and aquifer management zones.

Curtailments are implemented on a monthly basis during District-declared drought, and increase with drought severity with maximum curtailments reserved for an Emergency Response Period (see Table 1-1). The curtailments are derived on the basis of a pumping profile representing the average monthly distribution of the demand-based annual permit volume for each groundwater use type, and are calculated as a percentage reduction off of the monthly baseline amount. Authorized permit volumes based on reasonable non-speculative demand, monthly reporting of actual groundwater production by permittees, and active enforcement of monthly curtailments are integral to effective drought management in order to ensure the more immediate and consistent relief in actual pumping pressure needed to sustain spring flows and existing water supplies during District-declared drought until the drought conditions recede and the aquifers recover.

Summary and Future Policy Considerations. Collectively, this Plan and the supporting rules and policies are protective of historical use based on when production exceeds scientifically defined sustainable yield and serve the District's intended purpose pursuant to TWC §36.015. All strategies are integrated and integral to achieving the DFCs in compliance with state law and the measures of the District's HCP in compliance with the prospective Incidental Take Permit (ITP) and with federal law.

As demonstrated above, the regulatory program must be adaptable and able to evolve as the science of the aquifers evolve and, inevitably, as the laws governing GCDs change. As such, the current regulatory program as supported by this Plan may also require updates and changes in the interim prior to subsequent plan updates. Therefore, the current policies and rules shall not be considered static and shall evolve as necessary, provided that such changes are not fundamentally inconsistent with the goals and objectives of this Plan and/or the HCP.

Table 1-1: Mandatory Drought Curtailments.

Curtailments established for different well permit types, aquifers, and drought conditions. (Curtailment expressed as percentage of authorized monthly groundwater production in designated drought stage. For example, freshwater Edwards Aquifer historical permittees would be required to curtail their authorized monthly withdrawal by 30% during Stage III Critical Drought.)

Drought Curtailment Chart											
Aquifer		Edwards Aquifer						Trinity Aquifer			
Management Zone		Eastern/Western Freshwater					Saline	Lower	Middle	Upper	Outcrop
Permit Type		Historical	Conditional				Hist.	Hist.	Hist.	Hist.	Hist.
			Class A	Class B	Class C	Class D					
Drought Stages	No Drought	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Water Conservation (Voluntary)	10%	10%	10%	10%	10%	0%	10%	10%	10%	10%
	Stage II Alarm	20%	20%	50%	100%	100%	0%	20%	20%	20%	20%
	Stage III Critical	30%	30%	75%	100%	100%	0%	30%	30%	30%	30%
	Stage IV Exceptional	40%	50%[1]	100%	100%	100%	0%	30%	30%	30%	30%
	Emergency Response Period	50%[3]	>50%[2]	100%	100%	100%	0%	30%	30%	30%	30%
Percentages indicate the curtailed volumes required during specific stages of drought.											

1 Only applicable to LPPs and existing unpermitted nonexempt wells after A to B reclassification triggered by Exceptional Stage declaration.

2 Curtailment > 50% subject to Board discretion.

3 ERP (50%) curtailments become effective October 11, 2015. ERP curtailments to be measured as rolling 90-day average after first three months of declared ERP.

1.6 TWDB Checklist Reference Table

Texas Water Development Board						
Groundwater Conservation District Management Plan Checklist, effective December 6, 2012						
District name:				☐ Official review	☐ Prereview	
			Date plan received:			
Reviewing staff:			Date plan reviewed:			
A management plan shall contain, unless explained as not applicable, the following elements, 31 TAC §356.52(a):						
	Citation of rule	Citation of statute	Present in plan and administratively complete	Source of data	Evidence that best available data was used	Notes
Is a paper hard copy of the plan available?	31 TAC §356.53(a)(1)					
Is an electronic copy of the plan available?	31 TAC §356.53(a)(2)					
1. Is an estimate of the modeled available groundwater in the District based on the desired future condition established under Section 36.108 included?	31 TAC §356.52(a)(5)(A)	TWC §36.1071(e)(3)(A)				p.
2. Is an estimate of the amount of groundwater being used within the District on an annual basis for at least the most recent five years included?	31 TAC §356.52(a)(5)(B); §356.10(2)	TWC §36.1071(e)(3)(B)				p.
For sections 3-5 below, each district must use the groundwater availability modeling information provided by the TWDB in conjunction with available site-specific information provided by the district when developing the required estimates, 31 TAC §356.52(c):						
3. Is an estimate of the annual amount of recharge, from precipitation, if any, to the groundwater resources within the District included?	31 TAC §356.52(a)(5)(C)	TWC §36.1071(e)(3)(C)				p.
4. For each aquifer in the district, is an estimate of the annual volume of water that discharges from the aquifer to springs and any surface water bodies, including lakes, streams and rivers, included?	31 TAC §356.52(a)(5)(D)	TWC §36.1071(e)(3)(D)				p.
5. Is an estimate of the annual volume of flow	31 TAC §356.52(a)(5)(E)	TWC §36.1071(e)(3)(E)				
a) into the District within each aquifer,						p.
b) out of the District within each aquifer,						p.
c) and between aquifers in the District,						p.
if a groundwater availability model is available, included?						
6. Is an estimate of the projected surface water supply within the District according to the most recently adopted state water plan included?	31 TAC §356.52(a)(5)(F)	TWC §36.1071(e)(3)(F)				p.
7. Is an estimate of the projected total demand for water within the District according to the most recently adopted state water plan included?	31 TAC §356.52(a)(5)(G)	TWC §36.1071(e)(3)(G)				p.
8. Did the District consider and include the water supply needs from the adopted state water plan?		TWC §36.1071(e)(4)				p.
9. Did the District consider and include the water management strategies from the adopted state water plan?		TWC §36.1071(e)(4)				p.
10. Did the district include details of how it will manage groundwater supplies in the district	31 TAC §356.52(a)(4)					p.
11. Are the actions, procedures, performance, and avoidance necessary to effectuate the management plan, including specifications and proposed rules, all specified in as much detail as possible, included in the plan?		TWC §36.1071(e)(2)				p.
12. Was evidence that the plan was adopted, after notice and hearing, included? Evidence includes the posted agenda, meeting minutes, and copies of the notice printed in the newspaper(s) and/or copies of certified receipts from the county courthouse(s).	31 TAC §356.53(a)(3)	TWC §36.1071(a)				p.
13. Was evidence that, following notice and hearing, the District coordinated in the development of its management plan with regional surface water management entities?	31 TAC §356.51	TWC §36.1071(a)				p.
14. Has any available site-specific information been provided by the district to the executive administrator for review and comment before being used in the management plan when developing the estimates required in subsections 31 TAC §356.52(a)(5)(C), (D), and (E)?	31 TAC §356.52(c)	TWC §36.1071(h)				p.
Mark an affirmative response with YES Mark a negative response with NO Mark a non-applicable checklist item with N/A						

Management goals required to be addressed unless declared not applicable	Management goal (time-based and quantifiable) 31 TAC §358.51	Methodology for tracking progress 31TAC §356.52(a)(4)	Management objective(s) (specific and time-based statements of future outcomes) 31 TAC §356.52 (a)(2)	Performance standard(s) (measures used to evaluate the effectiveness of district activities) 31 TAC §356.52 (a)(3)	Notes
Providing the most efficient use of groundwater 31 TAC 356.52(a)(1)(A); TWC §36.1071(a)(1)	15)	16)	17)	18)	p
Controlling and preventing waste of groundwater 31 TAC 356.52(a)(1)(B); TWC §36.1071(a)(2)	19)	20)	21)	22)	p
Controlling and preventing subsidence 31 TAC 356.52(a)(1)(C); TWC §36.1071(a)(3)	23)	24)	25)	26)	p
Addressing conjunctive surface water management issues 31 TAC 356.52(a)(1)(D); TWC §36.1071(a)(4)	27)	28)	29)	30)	p
Addressing natural resource issues that impact the use and availability of groundwater and which are impacted by the use of groundwater 31 TAC 356.52(a)(1)(E); TWC §36.1071(a)(5)	31)	32)	33)	34)	p
Addressing drought conditions 31 TAC 356.52(a)(1)(F); TWC §36.1071(a)(6)	35)	36)	37)	38)	p
Addressing	39)	40)	41)	42)	
a) conservation,	39a)	40a)	41a)	42a)	p
b) recharge enhancement,	39b)	40b)	41b)	42b)	p
c) rainwater harvesting,	39c)	40c)	41c)	42c)	p
d) precipitation enhancement, and	39d)	40d)	41d)	42d)	p
e) brush control	39e)	40e)	41e)	42e)	p
where appropriate and cost effective 31 TAC 356.52(a)(1)(G); TWC §36.1071(a)(7)					
Addressing the desired future conditions established under TWC §36.108. 31 TAC 356.52(a)(1)(H); TWC §36.1071(a)(8)	43)	44)	45)	46)	p
Does the plan identify the performance standards and management objectives for effecting the plan? 31 TAC §356.52(a)(2)&(3); TWC §36.1071(e)(1)			47)	48)	
Mark required elements that are present in the plan with YES Mark any required elements that are missing from the plan with NO Mark plan elements that have been indicated as not applicable to the district with N/A					

2. Planning Data and Required Information

2.1 Hydrological Estimates

Total Estimated Recoverable Storage (TERS), per TWDB

Texas Water Code (TWC), §36.108(d) states that, before voting on the proposed desired future conditions (DFCs) for a relevant aquifer within a groundwater management area (GMA), the groundwater conservation districts (GCDs) shall consider the Total Estimated Recoverable Storage (TERS) as provided by the Executive Administrator of the Texas Water Development Board (TWDB) along with other factors listed in §36.108(d). The TERS, defined in 31 Texas Administrative Code §356.10, is the estimated amount of groundwater within an aquifer that accounts for recovery scenarios that range between 25 percent and 75 percent of the porosity-adjusted aquifer volume.

Table 2-1.a TERS estimates for the BSEACD within the northern subdivision of GMA 10 (Bradley, 2016):

Aquifer	Total Storage (acre-feet)	25% of Total Storage (acre-feet)	75% of Total Storage (acre-feet)
Edwards	130,000	32,500	97,500
Trinity*	1,200,000	300,000	900,000
Saline Edwards	690,000	172, 500	517,000

**Calculation does not include increased area in Hays County since HB 3405.*

Table 2-1.b TERS estimates within GMA 9 for the BSEACD (Jones and Bradley, 2013):

Aquifer	Total Storage (acre-feet)	25% of Total Storage (acre-feet)	75% of Total Storage (acre-feet)
Edwards	15,000	3,750	11,250
Trinity	2,200	550	1,650

2.2 Modeled Available Groundwater Based on DFC (per TWDB)

This Plan has been prepared to include the various DFCs adopted by the Board for aquifers in the District that are coincident with GMA 9 and the northern subdivision of GMA 10 (see Figure 1-1), and were determined to be "relevant" for the purposes of regional planning. These DFCs were established in accordance with the provisions of TWC 36.108 related to the joint-regional groundwater planning process. The TWDB has determined the amount of modeled available groundwater (MAG) that is available from the relevant aquifers being managed by the District and that preserve the DFCs. The DFCs and associated MAGs for GMA 9 and the northern subdivision of GMA 10 are shown below in Table 2-2.

Table 2-2: Summary of DFCs and MAGs

GMA	Aquifer	DFC Summary	MAG	Adoption Date
GMA 10	Northern Subdivision's Fresh Edwards (Balcones Fault Zone) Aquifer	Springflow of Barton Springs during average recharge conditions shall be no less than 49.7 cfs averaged over an 84 month (7-year) period	11,528 acre-feet (16 cfs)[1]	6/26/17
GMA 10	Northern Subdivision's Fresh Edwards (Balcones Fault Zone) Aquifer	Springflow of Barton Springs during extreme drought conditions, including those as severe as a recurrence of the 1950s drought of record, shall be no less than 6.5 cfs average on a monthly basis	3,756 acre-feet (5.2 cfs)[1]	6/26/17
GMA 10	Saline Edwards Aquifer	No more than 75 feet of regional average potentiometric surface drawdown due to pumping when compared to pre-development conditions.	523 acre-feet[4]	6/26/17
GMA 10	Trinity Aquifer	Average regional well drawdown not exceeding 25 feet during average recharge conditions (including exempt and non-exempt use); within Hays-Trinity Groundwater Conservation District; no drawdown; within Uvalde County: 20 feet; not relevant in Trinity-Glen Rose GCD (TWDB, 2015).	1,288 acre-feet[2]	6/26/17
GMA 9	Trinity Aquifer	Trinity Aquifer [Upper, Middle, and Lower undifferentiated] - Allow for an increase in average drawdown of approximately 30 feet through 2060 (throughout GMA 9) consistent with "Scenario 6" in TWDB GAM Task 10- 005.	22 acre-feet[3]	4/28/16

1. Hutchison and Oliver, December 7, 2011
2. Thorkildsen and Backhouse, 2011
3. Jones, 2017
4. Bradley, 2011

Prior to the MAG determination by TWDB for extreme drought conditions in the freshwater Edwards, the District relied on a modeling and water balance approach described in a study of the sustainable yield of the Barton Springs aquifer completed in 2004, and accepted by TWDB (Smith and Hunt, 2004). The results of that study and other numerical modeling efforts support an approximate one-to-one relationship between springflow and pumping under low-flow conditions (Hunt et al., 2011). These studies have informed the determination of the drought MAG. The lowest measured daily value of springflow is 9.6 cfs during the drought of record (DOR); the lowest monthly value is 11 cfs. Withdrawals of 10 cfs would produce a springflow of 1 cfs, and so forth. Any withdrawals more than 11 cfs would further increase impacts to wells as the aquifer is de-watered, and would increase the

duration of no-flow conditions at Barton Springs. These levels of withdrawals have been determined by the Board to lead to unsustainable conditions.

This Plan has been prepared to be consistent with the proposed measures in the District's Habitat Conservation Plan (HCP) submitted to the U.S. Fish and Wildlife Service (Service) pursuant to the pending Incidental Take Permit (ITP) application by the District. The internal Service review of the application is near complete, however, that permit and a supporting Final HCP have not yet been finalized and approved. While considered unlikely at this time, the Service could require the Draft HCP to be modified before the ITP may be approved. The requirements of the Draft HCP have been used to establish the freshwater Edwards Aquifer DFCs in the District and in turn the MAG. The District employs a groundwater management regulatory program that is designed to limit total authorized groundwater production from the freshwater Edwards Aquifer to no more than about 5.2 cfs during a recurrence of the DOR to comply with the DFC expression, including 4.7 cfs of permitted non-exempt production by permittees. This limitation is the MAG for the freshwater Edwards Aquifer drought DFC, and is consistent with the management objectives of the HCP (see Section 1.5, Management of Groundwater Resources in the District).

The current regulatory program maximizes the amount of springflow during the worst part of a drought similar to the DOR. However, if exempt pumpage stays the same as now, aggregate authorized pumping needs to be further reduced by approximately 0.3 cfs to equal the extreme drought MAG. This gap amount was reduced from 1.5 cfs in 2010 and ongoing efforts are on pace to eliminate the gap completely. It is important to note that the gap estimate assumes that all authorized (not actual) pumping will be produced during a recurrence of DOR conditions which is a conservative assumption that will not likely occur. The District has adopted measures to ensure that actual production will not exceed the MAG and that minimum springflow will be preserved. Figure 2-1 is a graphic that depicts the relationship of the DFC, MAGs, and the permitting structure for the freshwater Edwards Aquifer.

Prehistoric climatic data indicate that there may be future droughts that will be worse than the 1950s' DOR. Climate change associated with increased levels of greenhouse gases in the atmosphere may cause future droughts to be more severe than droughts that have occurred during the historic period (IPCC 2007, Nielsen-Gammon, 2008). The District has already begun to review data relating to such conditions and may consider policies in the future that would address the need and options for regulatory responses to more intense droughts. Such responses could include additional curtailments of nonexempt pumpage, but that circumstance is considered highly unlikely during the term of the Plan or even the HCP.

No sustainable yield assessments for the Trinity and Edwards (saline) Aquifers have been conducted prior to this Plan. Initial assessments and evaluations of the Trinity and Edwards (Saline) Aquifer were conducted as part of the DFC and MAG process. An assessment of the suitability of the saline Edwards Aquifer for desalinization and for Aquifer Storage and Recovery (ASR) are presently underway (TWDB Contract #1548321870). In addition, revisions to the conceptual model of the Trinity Aquifer in GMA 9 and GMA 10 is also underway and could lead to revision to the Hill Country Groundwater Availability Model (GAM) numerical model. As more information becomes available, revisions to the DFC expressions and new aquifer assessments are expected.

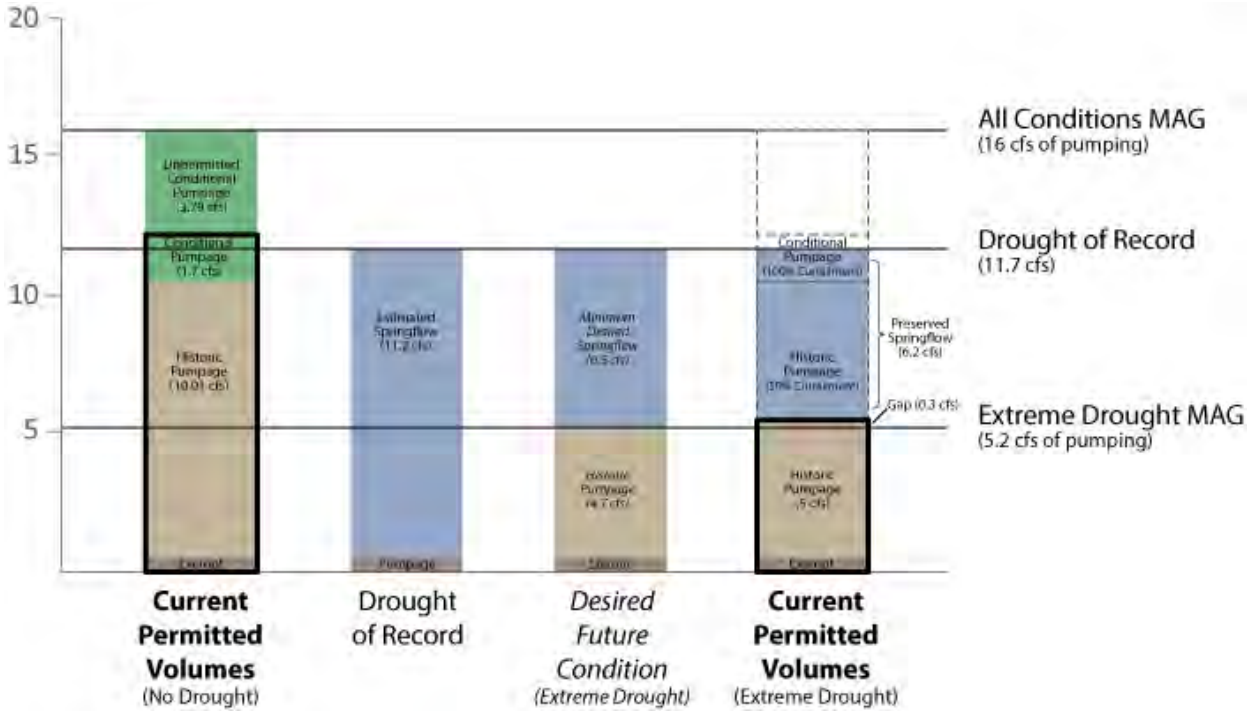


FIGURE 2-1: CONCEPTUAL DIAGRAM OF THE DISTRICT'S MODELED AVAILABLE GROUNDWATER AND THE EQUIVALENT EXTREME DROUGHT WITHDRAWAL LIMITATION FORMULATION FOR THE FRESHWATER EDWARDS AQUIFER

This conceptual diagram shows the components and their restrictions associated with the Extreme Drought Withdrawal Limitation (EDWL) as incorporated in the District's drought management policy.

2.3 Annual Groundwater Use, by aquifer

Groundwater use within the District is comprised primarily of pumpage and use from the freshwater Edwards Aquifers with a much smaller but increasing component of overall pumpage coming from the Trinity Aquifers. An incidental amount of groundwater is derived from the Taylor and Austin Groups and more geologically recent alluvial deposits. Given the current management scheme of conditional permitting and the drought restrictions and curtailment requirements associated with new interruptible pumpage authorizations for the freshwater Edwards Aquifer, it is likely that future groundwater production will trend more towards pumpage from the saline Edwards Aquifer and the Middle and Lower Trinity Aquifers.

The data presented below are a compilation of District monthly meter readings reported by District permittees and are therefore, a more accurate representation of actual in-District groundwater use than was provided by the TWDB in Appendix II. The following tables present the reported use data organized by major aquifer and water use type (using the District's water use type designations) in Table 2-3(a), and by county and management zone in Table 2-3 (b). These data include neither Exempt Use, which is primarily from the Edwards Aquifer and is estimated to be about 118,000,000 gallons (362 AF) annually, nor Limited Production Permits (LPPs) under the District's LPP general permit, which is also primarily from the Edwards Aquifer and is estimated to be about 18,000,000 gallons (55.2 AF) annually.

Table 2-3: Actual Pumpage from Permitted Wells for Last Five Years (in gallons and acre-feet)

(a) By Major Aquifer and Type of Use:

Fiscal Year	PWS	Commercial	Irrigation	Industrial	Total
Edwards Aquifer					
2012	1,342,690,771	6,190,339	99,695,520	196,314,335	**1,644,890,965**
	4,121	19	306	602	**5,048**
2013	1,223,357,684	5,070,988	92,631,818	184,074,250	**1,505,134,740**
	3,754	16	284	565	**4,619**
2014	1,235,581,969	4,573,050	114,352,609	155,014,481	**1,509,522,109**
	3,792	14	351	476	**4,633**
2015	1,115,109,732	3,841,806	100,079,109	145,017,167	**1,364,047,814**
	3,422	12	307	445	**4,186**
2016	1,198,026,790	3,915,430	94,238,904	122,301,561	**1,418,482,685**
	3,677	12	289	375	**4,353**
Trinity Aquifer					
2012	41,162,382	0	12,896,000	0	**54,058,382**
	126	0	40	0	**166**
2013	38,298,032	0	10,326,900	0	**48,624,932**
	118	0	32	0	**149**
2014	36,825,616	0	23,586,300	0	**60,411,916**
	113	0	72	0	**185**
2015	32,429,684	0	19,284,604	625,500	**52,339,788**
	100	0	59	2	**161**
2016	58,926,382	2,001,141	68,725,505	2,267,200	**131,920,228**
	181	6	211	7	**405**
Alluvial/Austin Chalk Aquifer					
2016	0	0	290,260	0	**290,260**
	0	0	1	0	**1**

(b) By County and District Management Zone

Fiscal Year	Edwards Aquifer		Trinity Aquifers			Other Aquifers	
	Freshwater Zones	Saline Zone	Upper Trinity	Middle Trinity	Lower Trinity	Alluvial/Austin Chalk	**Totals**
Hays County							
2012	1,252,248,026	0	0	41,162,382	0	0	**1,293,410,408**
	3,843	0	0	126	0	0	**3,969**
2013	1,162,223,574	0	0	38,298,032	0	0	**1,200,521,606**
	3,567	0	0	118	0	0	**3,684**
2014	1,150,739,221	0	0	36,825,616	0	0	**1,187,564,837**
	3,531	0	0	113	0	0	**3,645**
2015	1,022,534,700	0	0	33,055,184	0	0	**1,055,589,884**
	3,138	0	0	101	0	0	**3,239**
2016	1,079,232,302	0	21,918	63,137,395	0	290,260	**1,142,681,875**
	3,312	0	0.1	194	0	1	**3,507**
Travis County							
2012	392,642,939	0	0	0	12,896,000	0	**405,538,939**
	1,205	0	0	0	40	0	**1,245**
2013	342,911,166	0	0	0	10,326,900	0	**353,238,066**
	1,052	0	0	0	32	0	**1,084**
2014	358,782,888	0	0	15,358,500	8,227,800	0	**382,369,188**
	1,101	0	0	47	25	0	**1,173**
2015	341,513,114	0	0	12,622,504	6,662,100	0	**360,797,718**
	1,048	0	0	39	20	0	**1,107**
2016	339,250,383	0	0	61,981,315	6,779,600	0	**408,011,298**
	1,041	0	0	190	21	0	**1,252**

2.4 Annual Recharge from Precipitation, by aquifer

Edwards Aquifer

For the Barton Springs segment of the Edwards Aquifer, the long-term mean surface recharge should approximately equal the mean natural (i.e., with no well withdrawals) spring discharge, or about 53 cubic feet per second (cfs) at Barton Springs (Slade et al., 1986). The distribution and volume of this recharge have been modeled by many scientists. The report by Scanlon et al. (2001) documents the official TWDB GAM for the Barton Springs segment. A recent draft report by TWDB, GAM Run 08-37 (June 20, 2008), included as Appendix III, summarizes the estimated amount of recharge from precipitation, the amount of spring discharge, and the amount of flow into and out of the District for steady-state conditions in 1989. Annual recharge from precipitation for the modeling was 42,858 acre-ft (59.2 cfs).

The majority (as much as 85 %) of recharge to the aquifer is derived from streams originating on the contributing zone, located up gradient to the west of the recharge zone. Water flowing onto the recharge zone sinks into numerous caves, sinkholes, and fractures along its six major, ephemeral streams and the perennial Blanco River. The remaining recharge (15 %) occurs in the upland areas of the recharge zone (Slade et al., 1986). Site-scale measurements suggested a larger portion of recharge occurs in the uplands (Hauwert, 2009; Hauwert, 2011). Recent water balance studies indicate that stream recharge contributed 56-67% of recharge with upland, and other small sources, contributing the remaining 33-44% (Hauwert, 2016). Studies have shown that recharge is highly variable in space and time, and a large amount can be focused within discrete features (Smith et al., 2001). For example, Onion Creek is the largest contributor of recharge (32-34 %) with maximum recharge rates up to 160 cfs (Slade et al., 1986; Hauwert, 2016). Antioch Cave is located within Onion Creek and is the largest-capacity recharge feature with an average recharge of 46 cfs and a maximum of 95 cfs during one 100-day study (Fieseler, 1998). Recent work at Antioch Cave has also documented greater than 100 cfs of recharge entering the aquifer through the entrance to Antioch Cave (Smith et al., 2011). Dye tracing studies have shown that some of this water flows directly and very rapidly to Barton Springs with an unknown percentage contributing to storage.

Groundwater divides delineate the boundaries of aquifer systems and influence not only the local aquifer hydrodynamics, but also the groundwater budget (recharge). The groundwater divide separating the San Antonio and Barton Springs segments of the Edwards Aquifer has historically been drawn along topographic or surface water divides between the Blanco River and Onion Creek in the recharge zone, and along potentiometric highs in the confined zone between the cities of Kyle and Buda in Hays County. Recent studies reveal that during wet conditions, the groundwater divide is located generally along Onion Creek in the recharge zone, extending easterly along a potentiometric ridge between the cities of Kyle and Buda toward the saline zone boundary (Hunt et al. 2006). During dry conditions, the hydrologic divide moves south and is located along the Blanco River in the recharge zone, extending southeasterly to San Marcos Springs (Johnson et al., 2011). Thus, the groundwater divide is a hydrodynamic feature dependent upon the hydrologic conditions (wet versus dry) and the resulting hydraulic heads between Onion Creek and the Blanco River. Recent studies also reveal that under extreme drought conditions, some groundwater may bypass San Marcos Springs and flow toward Barton Springs (Land et al., 2011), and the Blanco River is the only source of active surface water recharge during drought conditions (Smith et al., 2012).

Trinity Aquifer

The Trinity Aquifer, exposed in the Hill Country region (west of the District), receives recharge from rainfall on the outcrop, losing streams, and perhaps lakes during high levels (Mace et al., 2000). Mace et al. (2001) estimated recharge for the Upper and Middle Trinity Aquifers is equal to 4 to 6% of mean annual rainfall. Some of the Trinity units are recharged by vertical leakage from overlying strata (Ashworth, 1983). There are karst features, faults, and fractures throughout the Hill Country, and such features provide discrete recharge to the Trinity Aquifer. Recent studies characterize the Hill Country landscape as having streams that are hydrologically linked to the aquifer (groundwater) systems (Hunt et al., 2016; Hunt et al., 2017). Aquifers provide spring flows that sustain the streams, and the streams, in turn, recharge the downstream aquifers.

In the Balcones Fault Zone (BFZ), the amount of recharge to the Trinity Aquifer is generally unknown. The Trinity is composed of the Upper, Middle, and Lower Trinity Aquifers. Within the BFZ, recent studies have indicated that portions of the Upper Trinity Aquifer (Upper Glen Rose) are hydrologically connected to the Edwards Aquifer, while the lower portion of the Upper Trinity behaves as an aquitard between the Edwards and Middle Trinity Aquifers (Wong et al., 2014; Hunt et al., 2016). Primary sources of recharge to the Middle Trinity Aquifer include lateral flow from the Hill Country Trinity Aquifer (Hunt et al., 2015). Significant vertical leakage from the Edwards Aquifer (stratigraphically above the Middle Trinity) is not supported by recent studies in the District. These studies indicate that the Middle Trinity is hydrologically separate from the overlying Edwards Aquifer. Geochemical and head data suggest that the Edwards and Middle Trinity Aquifers can be managed independently because of the behavior of the Upper Trinity as an aquitard (Smith and Hunt, 2010; Kromann et al., 2011; Wong et al., 2014).

2.5 Annual Discharges to Springs and Surface-water Bodies, by aquifer

Both the Edwards and Trinity Aquifers of Central Texas have recently been characterized as tributary in nature, meaning that they provide flows to surface-water bodies, and they are not isolated from other aquifers (Anaya et al., 2016). The saline Edwards could be considered a non-tributary aquifer as it does not provide flows to surface-water bodies and appears to be largely isolated from other aquifers.

Edwards Aquifer

The largest natural discharge point of the Barton Springs aquifer is Barton Springs, the fourth largest spring in Texas, and consists of four major outlets: Main, Eliza, Old Mill, and Upper. Main Spring is the largest and discharges directly into Barton Springs Pool. Springflow at Barton Springs is determined and reported by the U.S. Geological Survey (USGS). Discharge reported for Barton Springs is based on a rating-curve correlation between water levels in the Barton Well (State Well Number 5842903) and physical flow measurements from Main, Eliza, and Old Mill. Flow from Upper Barton Springs, which is located about 400 feet upstream of the pool, is not included in the reported discharge, and bypasses the pool. Upper Barton Springs is characterized as an “overflow” spring and only flows when discharge at Barton Springs exceeds about 40 cfs (Hauwert et al., 2004).

Barton Springs has a long period of continuous discharge data, beginning in 1917. Monthly mean data are available from 1917 to 1978 (Slade et al., 1986), and daily mean discharge data are available thereafter. The long-term average springflow at Barton Springs is 53 cfs based on data from 1917 to 1995, and is a widely reported value (Slade et al., 1986; Scanlon et al., 2001; Hauwert et al., 2004).

Indeed a recent study cites an average value of 61 cfs and a median value of 58 cfs for flow from Barton Springs (Anaya et al., 2016)

The maximum and minimum measured discharges are 166 and 9.6 cfs, respectively. The lowest measured spring discharge value occurred on March 26, 1956 during the 1950s drought (Slade et al., 1986). Low flow periods are defined as discharge below 35 cfs, moderate flow conditions occur between 35 to 70 cfs, and high flow conditions correspond to flows greater than 70 cfs (Hauwert et al., 2004). Mahler et al. (2006) define low flow as below 40 cfs. A peak in the daily average flow occurs in June, following the average peak rainfall in May.

Barton Springs flow is typical of a spring in a karst system with dynamic responses to recharge events and integrating a combined conduit, fracture, and matrix flow from the system. Springflow recessions and discharge rates are in large part determined by pre-existing conditions, the magnitude of recharge, and location of recharge. Massei et al. (2007) identify several source water types contributing to the conductivity measured in Barton Springs. Sources include matrix, surface water, saline-water zone, and other unidentified sources. Their relative contribution is dependent upon aquifer response to climatic and hydrologic conditions. Generally speaking, however, base springflow during periods of drought is sustained by the discharge of the matrix flow system into the conduit system (White, 1988; Mahler et al., 2006).

The Barton Springs segment of the Edwards Aquifer contains other smaller springs. Cold Springs discharges directly into the Colorado River and is partially submerged by Lady Bird Lake. There are very few discharge data for Cold Springs, but it is estimated to be about 5% of Barton Springs discharge (Scanlon et al., 2001). A small spring named Rollingwood Spring, near Cold Springs, discharges into the Colorado River at a rate of about 0.02 to 0.06 cfs. Backdoor Spring is a small, perched spring located on Barton Creek and has discharge of about 0.02 cfs. Bee Spring is a small, perched spring and seep horizon discharging along Bee Creek and into Lake Austin and discharges about 0.2 to 0.6 cfs (Hauwert et al., 2004).

The report by TWDB on GAM Run 08-37 (Appendix III) states that discharge from springs (Barton and Cold) was 39,723 acre-ft/year (54.9 cfs) under steady-state conditions in 1989. The amount of water withdrawn from wells was 3,135 acre-ft (4.3 cfs).

Saline Edwards Aquifer

The saline portion of the Edwards BFZ Aquifer is confined above by younger Cretaceous-age formations of the Taylor Group. The saline portion of the aquifer, therefore, does not receive direct recharge from precipitation, nor does it discharge to springs.

Trinity Aquifer

Most of the streams and rivers in the Central Texas Hill Country were historically characterized as net-gaining for the Hill Country Trinity Aquifer region (Ashworth, 1983; Jones et al., 2009). Recent state-wide studies indicate a net gain of average annual flows to surface water from the Trinity Aquifer for Hays and Travis Counties of 57 and 51 cfs, respectively (Anaya et al., 2016). However, recent local studies have documented that surface and groundwater interactions in the Central Texas Hill Country are very complex. Streams and rivers have both losing and gaining reaches (Hunt et al., 2017; Hunt et al., 2017). Losing stream reaches within the Hill Country provide recharge to the Trinity Aquifer. Discharge (gains) into the Hill Country streams and rivers is the source of baseflows that ultimately recharge to the Edwards Aquifer. There are many small springs and seeps throughout the Hill Country that issue from

the Upper and Middle Trinity Aquifers. Two of the larger springs in the study area are Jacob's Well, near Wimberley, and Pleasant Valley Spring near Fischer Store. Both springs are critical to the baseflows of the Blanco River that provide recharge to the Edwards Aquifer.

Potentiometric maps of the Hill Country indicate lateral flow in the Upper and Middle Trinity Aquifers toward the Colorado River in northwestern Hays and western Travis Counties (Mace et al., 2000; Wierman et al., 2010). As described above, most of the lateral flow in the Middle Trinity Aquifer stays within the Middle Trinity Aquifer as it enters the BFZ, and does not discharge as springflow or to surface water bodies in the District (Hunt et al., 2015). Some of the flow within the upper-most portion of the Upper Trinity may flow laterally and vertically into the Edwards Aquifer, and ultimately contribute to wells and Barton Springs. No major springs are known to flow from the Trinity Aquifer within the District, since only an incidental amount of the Trinity crops out in the District.

2.6 Annual Inter-formational Inflows and Outflows

Both the Edwards and Trinity Aquifers of Central Texas have recently been characterized as tributary in nature, meaning that they provide flows to surface-water bodies, and they are not isolated from other aquifers (Anaya et al., 2016). The saline Edwards could be considered a non-tributary aquifer as it does not provide flows to surface-water bodies and appears to be largely isolated from other aquifers.

Edwards Aquifer

The amount of cross-formational inflow (sub-surface recharge) occurring through adjacent aquifers into the Barton Springs aquifer is unknown, although it is thought to be relatively small on the basis of water-budget analysis for surface recharge and discharge (Slade et al., 1985; Hauwert, 2016). TWDB GAM Run 08-37 does not consider flow into or out of the Edwards from other formations. However, recent studies by the District and others have shown the potential for some amount of cross-formational flow both to and from the Barton Springs aquifer. Some sources of cross-formational flow are discussed below and include the saline-water zone, San Antonio segment, the Trinity Aquifer, and urban recharge.

Leakage from the saline-water zone into the freshwater zone is probably minimal, although leakage appears to influence water quality at Barton Springs during low-flow conditions (Senger and Kreitler, 1984; Slade et al., 1986). Recent studies indicate that the fresh-saline zone interface may be relatively stable over time (Lambert et al., 2010; Brakefield et al., 2015). On the basis of a geochemical evaluation, Hauwert et al. (2004) state that the saline-water zone contribution could be as high as 3% for Old Mill Springs and 0.5% for Main and Eliza Springs under low-flow conditions of 17 cfs at Barton Springs. These estimates were independently recalculated and corroborated by Johns (2006) and are similar to the results of Garner and Mahler (2005). Under normal flow conditions contribution from the saline-water zone would be smaller. Massei et al. (2007) noted that specific conductance of Barton Springs increased 20% under the 2000 drought condition, probably from saline-water zone contribution.

Subsurface flow into the Barton Springs aquifer from the adjacent San Antonio segment located to the south is limited when compared with surface recharge (Slade et al., 1985). Hauwert et al. (2004) indicated that flow across the southern boundary is probably insignificant under normal conditions. As discussed previously, recent studies (Smith et al., 2012) have documented that the southern boundary of the Barton Springs aquifer is hydrodynamic in nature and fluctuates between Onion Creek and the Blanco River. Accordingly, groundwater from the recharge zone of the San Antonio segment is flowing

into the Barton Springs segment of the Edwards Aquifer during drought conditions (Johnson et al., 2011). Water recharged along the Blanco River can flow to both San Marcos and Barton Springs. Under extreme drought conditions, the Blanco River would be the only active surface water body providing recharge in the area. Lastly, it was estimated that up to 5 cfs of groundwater flow could bypass (underflow) San Marcos Springs and flow toward Barton Springs (Land et al., 2011).

Changes in land use influence the inflows of aquifers systems. Recent studies have shown that urbanization may increase recharge to the Edwards Aquifer (Sharp, 2010; Sharp et al., 2009). Sources of the increase in recharge include leaking infrastructure such as pressurized potable water lines, wastewater from both collector lines and septic tank drainfields, and stormwater in infiltration basins. Recharge is increased from the return flows of irrigation practices (e.g. lawn watering), and the increase in pervious cover decreases evapotranspiration (Sharp, 2010; Sharp et al., 2009; Passarello, 2011).

Saline Edwards Aquifer

As the saline Edwards (Balcones Fault Zone) Aquifer is not in direct communication with the land surface, any flows into and out of the aquifer must occur as lateral flows from the fresh portion of the aquifer to the east or as vertical flows from overlying or underlying formations. Based on information from a recent USGS study and observations of District technical staff, the saline-freshwater interface is relatively stable (Brakefield et al., 2015). That is, the movement of groundwater into the saline portion of the aquifer from the freshwater portion of the aquifer is small.

The amount of cross-formational inflow (subsurface recharge) occurring through adjacent aquifers into the Barton Springs segment of the Edwards (BFZ) Aquifer is unknown, although it is thought to be relatively small on the basis of water-budget analyses for surface recharge and discharge (Slade et al., 1985; Hauwert, 2016).

Trinity Aquifer

Flow (or leakage) from the Trinity Aquifer into the Barton Springs aquifer is thought to be relatively insignificant when compared with surface recharge (Slade et al., 1985; Hauwert, 2016). However, leakage from the Trinity Aquifer may nevertheless locally impact water quality and influence water levels (Senger and Kreitler, 1984; Slade et al., 1986). Estimates by Hauwert et al., 2004, based on water chemistry at Barton Springs, suggest that a small contribution of flow to the springs is from the Trinity Aquifer. As discussed previously, recent studies utilizing multiport monitoring wells have provided a lot of information about hydrologic communication between the Edwards and Upper and Middle Trinity aquifers. Results of those studies indicate that the top 100 feet of the Upper Trinity appear to be in direct hydrologic communication with the overlying Edwards. However, the remaining 350 feet of the Upper Trinity units behave effectively as an aquitard, and represent a confining unit between the Edwards and the Middle Trinity. These studies indicate that the Middle Trinity is hydrologically separate from the overlying Edwards Aquifer (Smith and Hunt, 2010; Kromann et al., 2011; Wong et al., 2014).

Previously it was presumed that the flow was from the Trinity into the Edwards Aquifer. A groundwater model of the (Hill Country) Trinity Aquifer includes lateral groundwater leakage into the BFZ in order for the model to simulate observed hydrogeologic conditions in the Hill Country Trinity. Steady-state modeling indicates that as much as 8,000 acre-feet/year discharge into the Edwards (BFZ) in Travis and Hays Counties (Mace et al., 2000). However, recent data and studies suggest that the flow within the Middle Trinity units is laterally continuous (e.g. stays within the Middle Trinity) from the Hill Country into the BFZ (Smith and Hunt, 2010; Hunt et al., 2015).

Very little information is available on the Lower Trinity Aquifer and the hydrologic relationship with the overlying Middle Trinity Aquifer in the District. The Hammett Shale is a very good aquitard, perhaps even an aquiclude in the District, and may inhibit flows into, or out of, the lower Trinity (Wierman et al., 2010).

2.7 State Water Plan Projections

As shown in Figure 2-2, the District lies rather evenly between Central Texas Water Planning Region (Region L) and Lower Colorado Water Planning Region (Region K). While the majority of the District lies within Region L, most of the groundwater production is within Region K. The prevailing water strategies applicable to the area of the District in the two regions are similar.

This section of the Plan utilizes information provided by the TWDB in the report titled *Estimated Historical Water Use and 2017 State Water Plan Datasets: BSEACD*. The report provides county-level data that are applicable to the District and is included in this Plan as Appendix II.

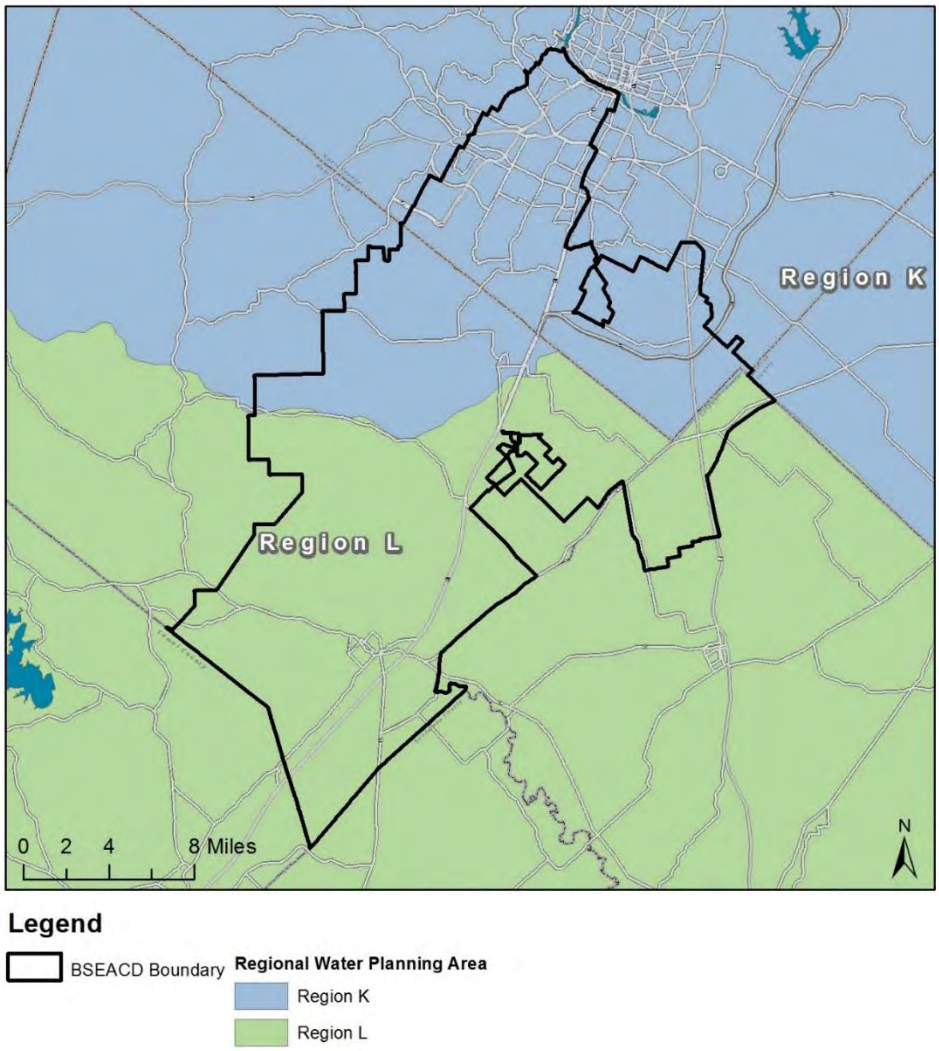


FIGURE 2-2: REGIONAL WATER PLANNING AREAS WITHIN THE DISTRICT'S BOUNDARY
This map displays the District's boundaries in relation to the Region L and Region K boundaries.

2.8 Surface Water Supply in District

The surface water supply in the District is provided primarily by reservoirs in the Colorado River basin. The part of the District in Hays County and Caldwell County is supplied by the Guadalupe-Blanco River system, especially water from main-stem reservoirs like Canyon Lake. Most of this Guadalupe-Blanco water is conveyed to some users in the District by the Hays County Pipeline.

Projected water supply data have been extracted from the 2017 State Water Plan (SWP) database and provided by the TWDB at the county level (Appendix II). The projections are estimated using an apportioning multiplier derived from the ratio of the land area of the District in the county relative to the entire county area. The apportioning multiplier was used for all water user groups (WUGs) except for public water supplies (i.e. municipalities, water supply corporations, and utility districts). The derivation of these apportioning multipliers is shown in Table 2-4.

Table 2-4: Areal Distribution of District by County.

For County:	Total Acres in County	Acres in District	Percent in Co.	Apportioning Multiplier
Travis	656,348	74,311	27%	11.5%
Hays	433,248	184,513	67%	15.4%
Caldwell	350,498	16,777	6%	4.5%
Totals	**1,440,094**	**275,601**	**100%**	**N/A**

The total annual projected surface water supply in the counties of the District is estimated to be **293,017** acre-feet in 2020 (2020 is the closest decadal estimate to 2023, the final year of this Plan). These supplies refer to the firm-yield supplies from surface water sources during a recurrence of the DOR. Water user groups (WUGs) that are located out of the District boundaries have been excluded. For comparison purposes, the projected surface water supplies from the three primary counties comprising the District are provided in the following table by decade in acre-feet.

	2020	2030	2040	2050	2060	2070
Travis	272,646	265,710	250,110	239,028	227,489	214,541
Hays	20,326	20,297	20,286	20,290	20,299	20,302
Caldwell	45	45	45	45	45	45
Total	**293,017**	**286,052**	**270,441**	**259,363**	**247,833**	**234,888**

2.9 Total Demand for Water in District

For estimating total water demand, the District has used data extracted from the SWP and provided by the TWDB (Appendix II). As with projected surface water supply data, county-level water demand data have been apportioned for certain WUGs using the apportioning multipliers described in Table 2-4. WUGs outside of the District boundaries have been excluded. The TWDB provides demand estimates by decade as well as by county. The decadal estimates for 2020 are used to approximate demand for the year 2023, the final year of this Plan.

On these bases, the total annual demand by county for water arising from the District is shown below:

From Travis County in the District:	168,907 acre-feet
From Hays County in the District:	23,943 acre-feet
From Caldwell County in the District:	367 acre-feet
TOTAL DEMAND IN DISTRICT:	**193,217 acre-feet in 2023**

The water demands arising from the County in the prevailing SWP are provided in the following table by decade in acre-feet.

	2020	**2030**	**2040**	**2050**	**2060**	**2070**
Travis	168,907	196,566	225,590	246,926	264,954	286,354
Hays	23,943	30,442	36,755	42,478	49,796	58,347
Caldwell	367	414	460	512	567	619
Total	**193,217**	**227,422**	**262,805**	**289,916**	**315,317**	**345,320**

2.10 Water Supply Needs and Planning Strategies

For estimating projected water supply needs, the District has used data extracted from the SWP and provided by the TWDB (Appendix III). The TWDB provides water supply needs estimates by decade as well as by county. WUGs outside of the District boundaries have been excluded. A summary of the projected water supply needs is provided in the following table by decade in acre-feet.

	2020	**2030**	**2040**	**2050**	**2060**	**2070**
Travis	123,634	86,071	41,961	5,628	-29,768	-70,062
Hays	15,910	8,235	-1,955	-10,740	-24,537	-40,410
Caldwell	1,329	1,266	1,192	1,107	1,008	897
Total	**140,873**	**95,572**	**41,198**	**-4,005**	**-53,297**	**-109,575**

The above projections show that for the SWP planning period (2020-2070), there is a progressively increasing water supply deficit, going from a surplus of 140,873 acre/feet in 2020 to a deficit of 109,575 acre/feet in 2070. These water supply needs in the District arise primarily from and are dominated by the burgeoning growth on the southern fringe of the Austin metropolitan area and I-35 corridor from San Marcos to Austin (Figure 2-3), as well as increasing production and decreasing availability from the major aquifers and the gradual reduction of surface water supplies, as reservoir capacity decreases with time. Accordingly, it is projected that there will be unmet needs in the District, especially under DOR conditions and in the out-years.

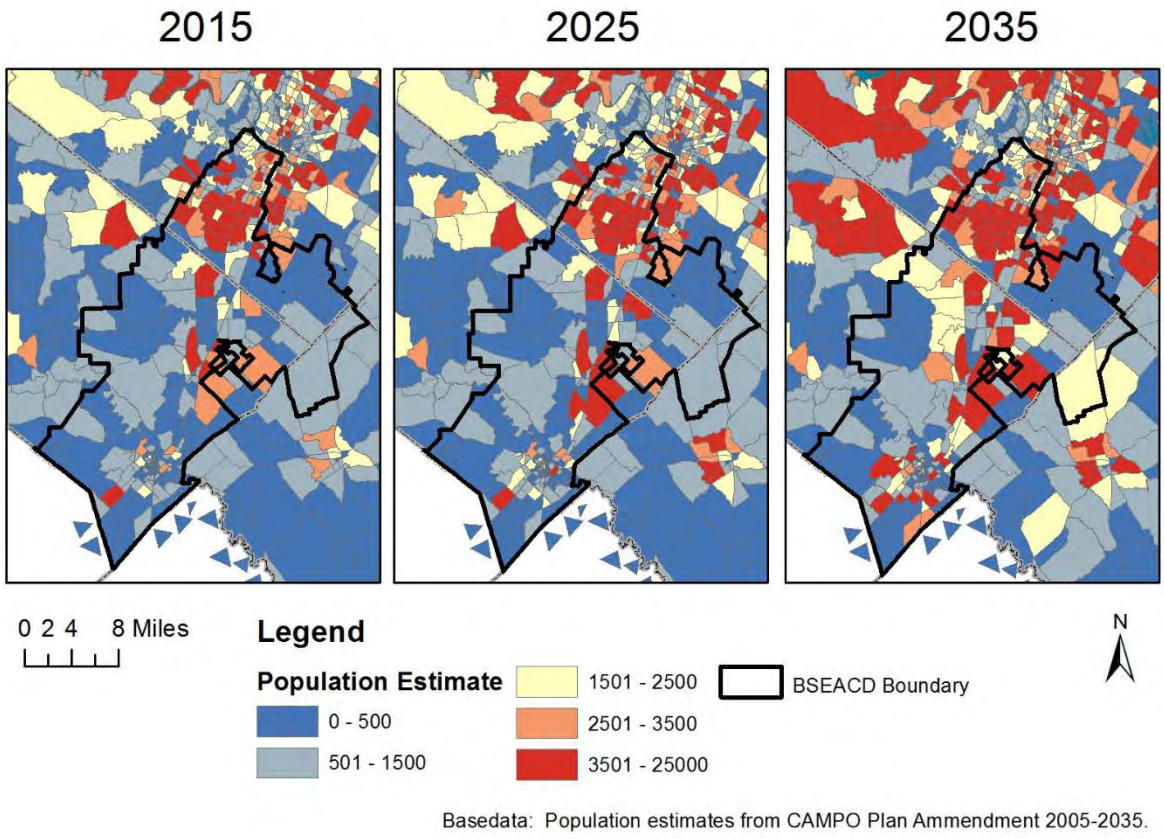


FIGURE 2-3: POPULATION GROWTH PREDICTIONS 2015-2035
Population density mapping based on population estimates from the Capitol Area Metropolitan Planning Organization.

2.11 Water Management Strategies

The strategies to address the supply needs described above are identified in Appendix II. These data -- organized by decade, county, and WUG -- are extracted from the 2017 SWP and have been provided to the District by the TWDB. Key management strategies relevant to WUGs in the District and adjoining areas include:

- (Municipal Water) Conservation
- Drought Management
- Use of/Transfer from Available or Re-allocated Surface Water Supplies
- Purchase of Surface Water from Wholesale Water Providers (WWP)
- Purchase of Carrizo-Wilcox Aquifer Water, via Hays-Caldwell Public Utility Agency
- Development of Saline Zone of Edwards-BFZ Aquifer
- Expansion of Current Groundwater Supplies - Trinity Aquifer
- Direct Reuse
- Indirect Potable Reuse
- Edwards/Middle Trinity Aquifer Storage and Recovery (ASR)
- Saline Edwards ASR
- Rainwater Harvesting

All of the strategies listed above will be beneficial to the District in reducing demand and providing more supplies and more equitable distribution of water supplies.

2.12 Synthesis of Regional Water Supply and Demand for District Planning

The strategies for addressing water supply and demand in the District's jurisdiction identified by the regional water planning groups in the SWP are supported by the District and demonstrate the importance of local factors in determining what is available and feasible in any one area. It is under these conditions that local management of the water resources, such as is provided by local GCDs, is of paramount importance in being a vehicle for making those things happen. Effective communication among local jurisdictions and among local, regional, and state levels of government will be required to meet the water challenges in the future.

In accordance with the District's mission, the SWP strategies supported by the District will serve to facilitate conserving, preserving, and protecting its aquifers, notably the freshwater Edwards Aquifer that is already at its sustainable yield, fully appropriated, and at MAG-level production. Such efforts are necessary to allow the aquifer to continue to serve as a reliable, high-quality water supply for its existing users. Accordingly, many of the WUGs in the current SWP continue to rely on production from the freshwater Edwards Aquifer for existing needs but none have a strategy that involves increased use for future needs.

While the freshwater Edwards Aquifer is fully appropriated, demand and production from the Trinity Aquifer and other aquifers in the District is increasing and will continue to be managed to ensure long-term reliability and availability. This District intends to continue to closely coordinate and to actively participate in regional water supply planning to support the District's mission and objectives identified in this Plan.

3. Management Goals, Objectives, and Performance Standards

3.1 Actions, Procedures, Performance and Avoidance for Plan Implementation

The provisions of this Plan will be implemented by the District and will be used by the District as a guide for determining the direction or priority for all District activities. All operations of the District, all agreements entered into by the District, all District policies and programs, and any additional planning efforts in which the District may participate will be consistent with the provisions of this Plan. The District will encourage cooperation and coordination with relevant entities in the implementation of this Plan. All operations and activities of the District will be performed in a manner that best encourages and fosters cooperation with state, regional, and local water entities.

The District will utilize this Plan as a guide for the on-going establishment and evaluation of District's programmatic activities. The District will adopt rules necessary to support the District's mission including rules related to the permitting of wells, the production and transport of groundwater, and drought management. The rules and policies established by the District shall be consistent with the provisions of this Plan and shall be adopted on the basis of the best available science, public and stakeholder input, and recommendations of competent professionals. Further, the rules shall comply with TWC Chapter 36 and the District's enabling legislation. All rules will be adhered to and enforced in a manner that is fair and objective. A copy of the Rules can be found on the District's website here: http://bseacd.org/about-us/governing-documents/.

3.2 Methodology for Tracking District Progress in Achieving Management Goals

In order to achieve the goals, management objectives, and performance standards adopted in this Plan, the District shall continually work to develop, maintain, review, and update rules, policies, and procedures for the various programs and activities contained in the Plan. As a means to monitor performance, the General Manager will provide direction on activities throughout the year and routinely meet with staff to track interim progress on the various goals, management objectives, and performance standards adopted in this Plan.

On an annual basis, the General Manager will prepare an annual report documenting progress made towards implementation of the management plan and achievement of the goals and objectives. The General Manager will present the annual report to the Board to assist the Board's evaluation of the progress made, and to consider approval. Once approved by the Board, a copy of the annual report will remain on file at the District's office for members of the public to access as well as made available on the website, and then submitted to the relevant entities pursuant to District Rules and Bylaws.

3.3 Goals and Strategies

The Texas Water Development Board (TWDB) has specified eight overarching management goals to be addressed in the groundwater management planning performed by all GCDs in Texas. These goals are prescribed in accordance with TWC Chapter 36.1071, and provide the framework for specific objectives and performance standards defined by each individual GCD. Each of the established TWDB goals are identified and characterized in this Plan by the relevant objectives and performance standards as defined by the District to serve its mission. The strategies embodied in this Plan are integrated and integral to: 1) achieving the DFCs in compliance with state law, and 2) the measures of the District's HCP in compliance with the prospective Incidental Take Permit (ITP) and federal law (see Section 1.5, Management of Groundwater Resources in the District).

This Plan establishes the District's scope of activities, and in concert with legal statutes and enabling authority, will:

- Serve as a planning tool for the District in its management and operations;
- Provide general information about the District and its groundwater resources;
- Provide technical information concerning groundwater resources, water supply, and demand;
- Establish management objectives and performance standards relative to each of the prescribed goals;
- Serve as a resource to help guide the District's development of additional technical information on local groundwater resources, use, and demand; and
- Support the District's development of its regulatory program.

The Board sets policies embodied in this Plan, adopts rules and bylaws, and takes action in accordance with the Rules and Bylaws to implement this Plan and execute the District's mission. The General Manager reports to and is directed by the Board, and is responsible for the overall operations and day-to-day activities of the District.

GOAL 1 - Providing the Most Efficient Use of Groundwater – 31 TAC 356.52(a)(1)(A)/TWC §36.1071(a)(1)

	Management Plan Objectives	Performance Standards
1-1	Provide and maintain on an ongoing basis a sound statutory, regulatory, financial, and policy framework for continued District operations and programmatic needs.	A. Develop, implement, and revise as necessary, the District Management Plan in accordance with state law and requirements. Each year, the Board will evaluate progress towards satisfying the District goals. A summary of the Board evaluation and any updates or revisions to the management plan will be provided in the annual report. B. Review and modify District Rules as warranted to provide and maintain a sound statutory basis for continued District operations and to ensure consistency with both District authority and programmatic needs. A summary of any rule amendments adopted in the previous fiscal year will be included in the annual report.
1-2	Monitor aggregated use of various types of water wells in the District, as feasible and appropriate, to assess overall groundwater use and trends on a continuing basis.	Monitor annual withdrawals from all nonexempt wells through required monthly or annual meter reports to ensure that groundwater is used as efficiently as possible for beneficial use. A summary of the volume of aggregate groundwater withdrawals permitted and actually produced from permitted wells for each Management Zone and permit type will be provided in the annual report.
1-3	Evaluate quantitatively at least every five years the amount of groundwater withdrawn by exempt wells in the District to ensure an accurate accounting of total withdrawals in a water budget that includes both regulated and non-regulated withdrawals, so that appropriate groundwater management actions are taken.	A. Provide an estimate of groundwater withdrawn by exempt wells in the District using TDLR and TWDB databases and District well records, and update the estimate every five years with the District's management plan updates. B. In the interim years between management plan updates, the most current estimates of exempt well withdrawals will be included in a summary of the volume of aggregate groundwater withdrawals permitted and actually produced from permitted wells for each Management Zone and permit type that will be provided in the annual report.
1-4	Develop and maintain programs that inform and educate citizens of all ages about groundwater and springflow-related matters, which affect both water supplies and salamander ecology.	A. Publicize District drought trigger status (Barton Springs 10-day average discharge and Lovelady Monitor Well water level) in monthly eNews bulletins and continuously on the District website. B. Provide summaries of associated outreach and education programs, events, workshops, and meetings in the monthly team activity reports in the publicly-available Board backup. C. A summary of outreach activities and estimated reach will be provided in the annual report.
1-5	Ensure responsible and effective management of District finances such that the District has the near-term and long-term financial means to support its mission.	Receive a clean financial audit each year. A copy of the auditor's report will be included in the annual report. Timely develop and approve fiscal-year budgets and amendments. The dates for public hearings and Board approval of the budget and any amendments will be provided in the annual report.

1-6	Provide efficient administrative support and infrastructure, such that District operations are executed reliably and accurately, meet staff and local stakeholder needs, and conform to District policies and with federal and state requirements.	A. Maintain, retain, and control all District records in accordance with the Texas State Library and Archives Commission-approved District Records Retention Schedule to allow for safekeeping and efficient retrieval of any and all records, and annually audit records for effective management of use, maintenance, retention, preservation and disposal of the records' life cycle as required by the Local Government Code. A summary of records requests received under the PIA, any training provided to staff or directors, or any claims of violation of the Public Information Act will be provided in the annual report. B. Develop, post, and distribute District Board agendas, meeting materials, and backup documentation in a timely and required manner; post select documents on the District website, and maintain official records, files, and minutes of Board meetings appropriately. A summary of training provided to staff or directors or any claims of violation of the Open Meetings Act will be provided in the annual report.
1-7	Manage and coordinate electoral process for Board members.	Ensure elections process is conducted and documented in accordance with applicable requirements and timelines. Elections documents will be maintained on file and a summary of elections-related dates and activities will be provided in the annual report for years when elections occur.

GOAL 2 - Controlling and Preventing Waste of Groundwater – 31 TAC 356.52(a)(1)(B)/TWC §36.1071(a)(2))

	Management Plan Objectives	Performance Standards
2-1	Require all newly drilled exempt and nonexempt wells, and all plugged wells to be registered and to comply with applicable District Rules, including Well Construction Standards.	A summary of the number and type of applications processed and approved for authorizations, permits, and permit amendments including approved use types and commensurate permit volumes for production permits and amendments will be provided in the annual report.
2-2	Ensure permitted wells and well systems are operated as intended by requiring reporting of periodic meter readings, making periodic inspections of wells, and reviewing pumpage compliance at regular intervals that are meaningful with respect to the existing aquifer conditions.	A. Inspect all new wells for compliance with the Rules, and Well Construction Standards, and provide a summary of the number and type of inspections or investigations in the annual report. B. Provide a summary of the volume of aggregate groundwater withdrawals permitted and actually produced from permitted wells for each Management Zone and permit type in the annual report.
2-3	Provide leadership and technical assistance to government entities, organizations, and individuals affected by groundwater-utilizing land use activities, including support of or opposition to legislative initiatives or projects that are inconsistent with this objective.	A. In even-numbered fiscal years, provide a summary of interim legislative activity and related District efforts in the annual report. In odd-numbered fiscal years, provide a legislative debrief to the Board on bills of interest to the District and provide a summary in the annual report. B. Provide a summary of District activity related to other land use activities affecting groundwater in the annual report.
2-4	Ensure all firm-yield production permits are evaluated with consideration given to the demand-based permitting standards including verification of beneficial use that is commensurate with reasonable non-speculative demand.	A summary of the number and type of applications processed and approved for authorizations, permits, and permit amendments including approved use types and commensurate permit volumes for production permits and amendments will be provided in the annual report.

GOAL 3 - Addressing Conjunctive Surface Water Management Issues – 31 TAC 356.52(a)(1)(D)/TWC §36.1071(a)(4)

	Management Plan Objectives	Performance Standards
3-1	Assess the physical and institutional availability of existing regional surface water and alternative groundwater supplies and the feasibility of those sources as viable supplemental or substitute supplies for District groundwater users.	Identify available alternative water resources and supplies that may facilitate source substitution and reduce demand on the Edwards Aquifer, while increasing regional water supplies, and evaluate feasibility by considering: 1. available/proposed infrastructure, 2. financial factors, 3. logistical/engineering factors, and 4. potential secondary impacts (development density/intensity or recharge water quality). A summary of District activity related to this objective will be provided in the annual report.
3-2	Encourage and assist District permittees to diversify their water supplies by assessing the feasibility of alternative water supplies and fostering arrangements with currently available alternative water suppliers.	Identify available alternative water resources and supplies that may facilitate source substitution and reduce demand on the Edwards Aquifer, while increasing regional water supplies, and evaluate feasibility by considering: 1. available/proposed infrastructure, 2. financial factors, 3. logistical/engineering factors, and 4. potential secondary impacts (development density/intensity or recharge water quality). A summary of District activity related to this objective will be provided in the annual report.
3-3	Demonstrate the importance of the relationship between surface water and groundwater, and the need for implementing prudent conjunctive use through educational programs with permittees and public outreach programs.	A. Provide summaries of associated outreach and education programs, events, workshops, and meetings in the monthly team activity reports in the publicly-available Board backup. B. Summarize outreach activities and estimate reach in the annual report.
3-4	Actively participate in the regional water planning process to provide input into policies, planning elements, and activities that affect the aquifers managed by the District.	Regularly attend regional water planning group meetings and annually report on meetings attended.

GOAL 4 - Addressing Natural Resource Issues which Impact the Use and Availability of Groundwater, and which are Impacted by the Use of Groundwater – 31 TAC 356.52 (a)(1)(E)/TWC §36.1071(a)(5)

	Management Plan Objectives	Performance Standards
4-1	Assess ambient conditions in District aquifers on a recurring basis by: 1. sampling and collecting groundwater data from selected wells and springs monthly; 2. conducting scientific investigations as indicated by new data and models to better determine groundwater availability for the District aquifers; and 3. conducting studies as warranted to help increase understanding of the aquifers and, to the extent feasible, detect possible threats to water quality and evaluate their consequences.	A. Review water-level and water-quality data that are maintained by the District and/or TWDB, or other agencies, on a regular basis. B. Improve existing analytical or numerical models or work with other organizations on analytical or numerical models that can be applied to the aquifers in the District. C. A review of the data mentioned above will be assessed for significant changes and reported in the annual report.
4-2	Evaluate site-specific hydrogeologic data from applicable production permits to assess potential impact of withdrawals to groundwater quantity and quality, public health and welfare, contribution to waste, and unreasonable well interference.	This involves evaluations of certain production permit applications for the potential to cause unreasonable impacts as defined by District rule. To evaluate the potential for unreasonable impacts, staff will: 1. Perform a technical evaluation of the application, aquifer test, and hydrogeological report; 2. Use best available science and analytical tools to estimate amount of drawdown from pumping and influence on other water resources; and 3. Recommend proposed permit conditions to the Board for avoiding unreasonable impacts if warranted. A list of permit applications that are determined to have potential for unreasonable impacts will be provided in the annual report.
4-3	Implement separate management zones and, as warranted, different management strategies to address more effectively the groundwater management needs for the various aquifers in the District.	A. Increase the understanding of District aquifers by assessing aquifer conditions, logging wells, and collecting water quality data. A summary of the number of water quality samples performed will be provided in the annual report. B. A summary of the volume of aggregate groundwater withdrawals permitted and actually produced from permitted wells for each Management Zone and permit type will be provided in the annual report.

4-4	Actively participate in the joint planning processes for the relevant aquifers in the District to establish and refine Desired Future Conditions (DFCs) that protect the aquifers and the Covered Species of the District HCP.	Attend at least 75% of the GMA meetings and annually report on meetings attended, GMA decisions on DFCs, and other relevant GMA business.
4-5	Implement the measures of the District Habitat Conservation Plan (HCP) and Incidental Take Permit (ITP) from the U.S. Fish & Wildlife Service (USFWS) for the covered species and covered activity to support the biological goals and objectives of the HCP.	Prior to ITP permit issuance, a progress report summarizing activities related to the USFWS review of the ITP application will be provided in the annual report. Upon ITP issuance, the HCP annual report documenting the District's activities and compliance with ITP permit requirements will be incorporated into the annual report by reference.

GOAL 5 - Addressing Drought Conditions – 31 TAC 356.52 (a)(1)(F)/TWC §36.1071(a)(6)

	Management Plan Objectives	Performance Standards
5-1	Adopt and keep updated a science-based drought trigger methodology, and frequently monitor drought stages on the basis of actual aquifer conditions, and declare drought conditions as determined by analyzing data from the District's defined drought triggers and from existing and such other new drought-declaration factors, especially the prevailing DO concentration trends at the spring outlets, as warranted.	A. During periods of District-declared drought, prepare a drought chart at least monthly to report the stage of drought and the conditions that indicate that stage of drought. During periods of non-drought, prepare the drought charts at least once every three months. B. A summary of the drought indicator conditions and any declared drought stages and duration will be provided in the annual report.
5-2	Implement a drought management program that step-wise curtails freshwater Edwards Aquifer use to at least 50% by volume of 2014 authorized aggregate monthly use during Extreme Drought, and that designs/uses other programs that provide an incentive for additional curtailments where possible. For all other aquifers, implement a drought management program that requires mandatory monthly pumpage curtailments during District-declared drought stages.	During District-declared drought, enforce compliance with drought management rules to achieve overall monthly pumpage curtailments within 10% of the aggregate curtailment goal of the prevailing drought stage. A monthly drought compliance report for all individual permittees will be provided to the Board during District-declared drought, and a summary will be included in the annual report.
5-3	Inform and educate permittees and other well owners about the significance of declared drought stages and the severity of drought, and encourage practices and behaviors that reduce water use by a stage-appropriate amount.	A. During District-declared drought, publicize declared drought stages and associated demand reduction targets in monthly eNews bulletins and continuously on the District website. B. A summary of drought and water conservation related newsletter articles, press releases, and drought updates sent to Press, Permittees, Well Owners and eNews subscribers will be provided in the annual report.

5-4	Assist and, where feasible, incentivize individual freshwater Edwards Aquifer historic-production permittees in developing drought planning strategies to comply with drought rules, including: 1. pumping curtailments by drought stage to at least 50% of the 2014 authorized use during Extreme Drought, 2. "right-sizing" authorized use over the long term to reconcile actual water demands and permitted levels, and 3. as necessary and with appropriate conditions, the source substitution with alternative supplies.	A. Require an updated UCP/UDCP from Permittees within one year of each five-year Management Plan Adoption. B. Provide a summary of any activity related to permit right sizing or source substitution with alternative supplies that may reduce demand on the freshwater Edwards Aquifer in the annual report.
5-5	Implement a Conservation Permit that is held by the District and accumulates and preserves withdrawals from the freshwater Edwards Aquifer that were previously authorized with historic-use status and that is retired or otherwise additionally curtailed during severe drought, for use as ecological flow at Barton Springs during Extreme Drought and thereby increase springflow for a given set of hydrologic conditions.	A summary of the volume of aggregate groundwater withdrawals permitted and actually produced from permitted wells for each Management Zone and permit type including the volume reserved in the freshwater Edwards Conservation Permit for ecological flows will be provided in the annual report.

GOAL 6 - Addressing Conservation and Rainwater Harvesting where Appropriate and Cost-Effective – 31TAC 356.52 (a)(1)(G)/TWC §36.1071(a)(7)

	Management Plan Objectives	Performance Standards
6-1	Develop and maintain programs that inform, educate, and support District permittees in their efforts to educate their end-user customers about water conservation and its benefits, and about drought-period temporary demand reduction measures.	A. A summary of efforts to assist permittees in developing drought and conservation messaging strategies will be provided in annual report. B. Publicize declared drought stages and associated demand reduction targets monthly in eNews bulletins and continuously on the District website.
6-2	Encourage use of conservation-oriented rate structures by water utility permittees to discourage egregious water demand by individual end-users during declared drought.	On an annual basis, the District will provide an informational resource or reference document to all Public Water Supply permittees to serve as resources related to conservation best management strategies and conservation-oriented rate structures.
6-3	Develop and maintain programs that educate and inform District groundwater users and constituents of all ages about water conservation practices and the use of alternate water sources such as rainwater harvesting, gray water, and condensate reuse.	Summarize water conservation related newsletter articles, press releases, and events in the annual report. Summary will describe the preparation and dissemination of materials shared with District groundwater users and area residents that inform them about water conservation and alternate water sources.

GOAL 7 - Addressing Recharge Enhancement where Appropriate and Cost-Effective – 31TAC 356.52 (a)(1)(G)/TWC §36.1071(a)(7)

	Management Plan Objectives	Performance Standards
7-1	Improve recharge to the freshwater Edwards Aquifer by conducting studies and, as feasible and allowed by law, physically altering (cleaning, enlarging, protecting, diverting surface water to) discrete recharge features that will lead to an increase in recharge and water in storage beyond what otherwise would exist naturally.	Maintaining the functionality of the Antioch system will be the principal method for enhancing recharge to the freshwater Edwards Aquifer. Additional activities may be excavating sinkholes and caves within the District. A summary of all recharge improvement activities will be provided in the annual report.
7-2	Conduct technical investigations and, as feasible, assist water-supply providers in implementing engineered enhancements to regional supply strategies, including desalination, aquifer storage and recovery, effluent reclamation and re-use, and recharge enhancement of surface water (including floodwater) to increase the options for water-supply substitution and reduce dependence on the Aquifer.	Assess progress toward enhancing regional water supplies in the annual report.

GOAL 8 - Addressing the Desired Future Conditions of the Groundwater Resources – 31TAC (a)(1)(H)/TWC §36.1071(a)(8)

	Management Plan Objectives	Performance Standards
8-1	**Freshwater Edwards Aquifer All-Conditions DFC**: Adopt rules that restrict, to the greatest extent practicable, the total amount of groundwater authorized to be withdrawn annually from the Aquifer to an amount that will not substantially accelerate the onset of drought conditions in the Aquifer; this is established as a running seven-year average springflow at Barton Springs of no less than 49.7 cfs during average recharge conditions.	A. A summary of the volume of aggregate groundwater withdrawals permitted and actually produced from permitted wells for each Management Zone and permit type will be provided in the annual report. B. Upon ITP issuance, the HCP annual report documenting the District's activities and compliance with ITP permit requirements will be incorporated into the annual report by reference. C. Upon ITP issuance, compile a summary of aquifer data including: 1) the frequency and duration of District-declared drought, 2) levels of the Aquifer as measured by springflow and indicator wells (including temporal and spatial variations), and 3) total annual and daily discharge from Barton Springs will be provided in the annual report.
8-2	**Freshwater Edwards Aquifer Extreme Drought DFC:** Adopt rules that restrict, to the greatest extent practicable and as legally possible, the total amount of groundwater withdrawn monthly from the Aquifer during Extreme Drought conditions in order to minimize take and avoid jeopardy of the Covered Species as a result of the Covered Activities, as established by the best science available. This is established as a limitation on actual withdrawals from the Aquifer to a total of no more than 5.2 cfs on an average annual (curtailed) basis during Extreme Drought, which will produce a minimum springflow of not less than 6.5 cfs during a recurrence of the drought of record (DOR).	A. A summary of the volume of aggregate groundwater withdrawals permitted and actually produced from permitted wells for each Management Zone and permit type will be provided in the annual report. B. Upon ITP issuance, the HCP annual report documenting the District's activities and compliance with ITP permit requirements will be incorporated into the annual report by reference. C. Upon ITP issuance, compile a summary of aquifer data including: 1) the frequency and duration of District-declared drought, 2) levels of the Aquifer as measured by springflow and indicator wells (including temporal and spatial variations), and 3) total annual and daily discharge from Barton Springs will be provided in the annual report.
8-3	Implement appropriate rules and measures to ensure compliance with District-adopted DFCs for each relevant aquifer or aquifer subdivision in the District.	Develop and implement a cost-effective method for evaluating and demonstrating compliance with the DFCs of the relevant aquifers in the District, in collaboration with other GCDs in the GMAs. Prior to method implementation, provide a summary of activities related to method development in the annual report. Once developed, provide a summary of data for each District-adopted DFC for each relevant aquifer indicating aquifer conditions relative to the DFC and provide in the annual report.

3.4 TWDB Goals determined not applicable to the District –

- **Controlling and Preventing Subsidence. – 31TAC (a)(1)(H)/TWC §36.1071(a)(8)**
- **Precipitation Enhancement – 31 TAC 356.52(a)(1)(G); TWC §36.1071(a)(7)**
- **Brush Control – 31 TAC 356.52(a)(1)(G); TWC §36.1071(a)(7)**

This category of management goal is not considered applicable to the District because the formations making up the aquifers of use are consolidated with little potential for subsidence within the District as a result of groundwater usage. Mace et al., (1994) studies the potential for subsidence resulting from the significant historical level declines observed in the northern Trinity Aquifer in Central Texas. They concluded that even in the confined portions of the aquifer, where the largest declines have occurred, the subsidence expected would be only a small amount that would take a very long time to manifest itself.

After review by the Board of Directors, the General Manager, and the District's technical consultants, it has been determined that precipitation enhancement, and brush control are not appropriate groundwater management strategies for the District. This evaluation is based on costs of operating and maintaining these programs and probable lack of effectiveness or constituent participation in these programs, due to the climate, hydrogeology, and physiography of the District.

4. Coordination with Other Water Management Entitles

4.1 Coordination with Regional Planning Entities

The District has actively contributed to and participated in the development of the Lower Colorado Regional Water Plan (Region K). While most of the Edwards Aquifer production within the District occurs within the planning area of Region K, some large Edwards Aquifer production is permitted within the planning area of South Central Texas Regional Water Plan (Region L). Additionally, the District expanded its jurisdictional area over the Trinity Aquifer in 2015 to include central and eastern Hays County which extended the District further into the Region L. As such, the District is also engaged and actively participates in the development of the Region L plan. Figure 2-2 is a map that shows the spatial relationship of the District with these two Regional Water Planning Groups. For regional water planning purposes in both Region K and L, groundwater availability from the District's relevant aquifers is determined by the TWDB-calculated MAG estimates for the District's adopted DFCs. These estimates are shown in Table 2-2.

Letters evidencing District coordination with the Regional Planning Groups on this Plan are in Appendix I. The District intends to continue to participate actively in the regional water planning activities through voting membership representing GMA 10 on Region K and by attending meetings and providing information to Region L during the term of this Plan.

Other Resource Management Agencies

While not strictly a water management entity, the U.S. Fish and Wildlife Service (Service) has applied for and anticipates issuance of a federal Endangered Species Act ITP to the District during the term of this Plan. This permit authorizes the specific groundwater management planning and associated measures used by the District to protect the endangered species that use the natural outflows of the Edwards Aquifer at Barton Springs as key habitat. Changes in the groundwater management measures used by the District must not only be consistent with the prevailing Plan but also potentially must be authorized by the Service via a change to the ITP.

4.2 Coordination with Regional Groundwater Management Entities

The District participates in and contributes to the joint regional planning being conducted by Groundwater Management Areas (GMAs) 9 and 10, as authorized and required by TWC §36.108 (see Figure 1-8). The purpose of this recurring joint planning is to develop and revise, as necessary, feasible Desired Future Conditions (DFCs) for all relevant aquifers being managed by the groundwater conservation districts (GCDs) in the GMA; these represent consensus views of what characteristics are intended that the aquifers should have during and/or at the end of the 50-year planning term. TWDB uses groundwater availability models or the best available analytical tools to convert those DFCs to estimates of the MAG, which comprise the approved volumetric basis for regional water planning, and constitute one of the important considerations in groundwater permitting and related regulatory programs for the GCDs.

GMA 9 focuses on the Trinity Aquifer, especially in the Hill Country Priority Groundwater Management Area, but includes other minor aquifers in the GMA. GMA 10 focuses on the Edwards Aquifer, but includes other major and minor aquifers within its geographic boundaries. For the District, the Trinity Aquifers in GMAs 9 and 10 and the Edwards Aquifers, both its freshwater and saline-water zones in GMA 10, are of regulatory interest and are therefore included in the joint planning.

The joint planning process has produced a set of DFCs that are applicable to and relevant for the District. The TWDB has estimated the corresponding MAGs for the District that are key considerations in its permitting programs. The current DFCs for the District's relevant aquifers and the associated MAGs applicable to the District are shown in Table 2-2. This Plan has regulatory, educational, and scientific programs that are consistent with achieving and/or maintaining these DFCs during the term of the Plan.

APPENDICES

I. Supporting Documentation:
   A. Resolution Adopting the Management Plan
   B. Evidence that the Management Plan was Adopted after Notice and Hearing
   C. Evidence that the District Coordinated Development of the Management Plan with Other Regional Entities (Planning Groups, GMAs, Surface Water Entities, Groundwater Entities)

II. Estimated Historical Water Use and State Water Plan Datasets

III. TWDB Groundwater Availability Model Run

I. Supporting Documentation

A. Resolution Adopting the Management Plan
B. Evidence that the Management Plan was Adopted after Notice and Hearing
C. Evidence that the District Coordinated Development of the Management Plan with Other Regional Entities (Planning Groups, GMAs, Surface Water Entities, Groundwater Entities)

A. Resolution Adopting the Management Plan

STATE OF TEXAS	§	
	§	**RESOLUTION # 092817-01**
COUNTIES OF HAYS, TRAVIS	§	
AND CALDWELL	§	

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE BARTON SPRINGS / EDWARDS AQUIFER CONSERVATION DISTRICT AUTHORIZING ADOPTION OF THE DISTRICT MANAGEMENT PLAN

WHEREAS, the proposed Management Plan of the Barton Springs/Edwards Aquifer Conservation District (District), attached hereto as Attachment A, has been developed for the purpose of serving the District's mission, statutory purpose, and commitment to conserving, preserving, protecting, recharging, and prevention of waste of groundwater and of all aquifers within the District.

WHEREAS, this action to adopt the proposed Management Plan is taken under the District's statutory authority pursuant to Texas Water Code, Chapter 36 and Special District Local Laws, Chapter 8802;

WHEREAS, the proposed Management Plan meets the requirements of Texas Water Code § 36.1071 and § 36.1072 and 31 TAC § 356.52;

WHEREAS, the proposed Management Plan was submitted to the Texas Water Development Board (TWDB) for pre-review and has been revised to comport with the pre-review comments provided by TWDB staff;

WHEREAS, the proposed Management Plan was the subject of a public hearing before the Board of Directors of the District on September 28, 2017; and

WHEREAS, under no circumstances and in no particular case, will the proposed 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" attached hereto as Attachment A is hereby adopted;

2) This Management Plan will take effect upon approval by the TWDB. It will remain in effect as provided under Texas Water Code § 36.1072(e).

AND IT IS SO ORDERED.

In Favor 4 Opposed 0

PASSED AND APPROVED THIS 28th DAY OF SEPTEMBER 2018.

Blayne Stansberry

Blayne Stansberry, President

ATTEST:

Blake Dorsett

Blake Dorsett, Secretary

B. Evidence that the Management Plan was Adopted after Notice and Hearing

FILED
HAYS COUNTY, TEXAS
at 8:23 o'clock A M.
SEP 14 2017
COUNTY CLERK

NOTICE OF PUBLIC HEARING

Notice is given that the Barton Springs/Edwards Aquifer Conservation District Board of Directors will hold a **Public Hearing** on the update and proposed revisions to its Management Plan at its regularly scheduled meeting on **Thursday, September 28, 2017**, at the District Office, 1124 Regal Row, Austin, TX 78748. The public hearing will begin on or about 6:30 p.m. but no earlier.

The proposed revisions to the Management Plan incorporate new planning data, address statutory requirements, and include objectives and standards that support the District's mission and commitment to conserving, protecting, enhancing recharge, and preventing waste of groundwater and to preserving all aquifers within the District.

A copy of the revised and proposed Management Plan is available for inspection at the District office and may be downloaded and copied from the District's website at www.bseacd.org

Came to hand and posted on a Bulletin Board in the Courthouse, Hays County, Texas, on this, the 14th day of September 2017, at 8:23 a.m.

_____, Deputy Clerk

Hays County, TEXAS

Please note:

The Barton Springs/Edwards Aquifer Conservation District 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.

TRV 201781367
2 PGS

STAYS IN FILE

NOTICE OF PUBLIC HEARING

Notice is given that the Barton Springs/Edwards Aquifer Conservation District Board of Directors will hold a **Public Hearing** on the update and proposed revisions to its Management Plan at its regularly scheduled meeting on **Thursday, September 28, 2017**, at the District Office, 1124 Regal Row, Austin, TX 78748. The public hearing will begin on or about 6:30 p.m. but no earlier.

The proposed revisions to the Management Plan incorporate new planning data, address statutory requirements, and include objectives and standards that support the District's mission and commitment to conserving, protecting, enhancing recharge, and preventing waste of groundwater and to preserving all aquifers within the District.

A copy of the revised and proposed Management Plan is available for inspection at the District office and may be downloaded and copied from the District's website at www.bseacd.org

Came to hand and posted on a Bulletin Board in the Courthouse, Travis County, Texas, on this, the_____ day of _____ 2017, at _____ a.m.

_____, Deputy Clerk

Travis County, TEXAS

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Came to hand and posted on a Bulletin Board in the Courthouse, Austin, Travis County, Texas on this the 14th day of September 2017.

Dana DeBeauvoir
County Clerk, Travis County, Texas

By D. Campos Deputy

D. CAMPOS JR.

SEAL OF COUNTY COURT TRAVIS COUNTY, TEXAS

FILED AND RECORDED

OFFICIAL PUBLIC RECORDS

Dana DeBeauvoir

Sep 14, 2017 08:30 AM 201781367

CAMPOSD: $3.00

Dana DeBeauvoir, County Clerk

Travis County TEXAS

NOTICE OF PUBLIC HEARING

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Came to hand and posted on a Bulletin Board in the Courthouse, County, Texas, on this, the_____ day of _____ 2017, at _____ a.m.

_____, Deputy Clerk

County, TEXAS

Please note:

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FILED this 14th day of Sept 2017
10:45 A M
CAROL HOLCOMB
COUNTY CLERK, CALDWELL COUNTY, TEXAS
By _____ Deputy

Hays Free Press

113 West Center Street § P.O. Box 339
Kyle, Texas 78640 § Buda, Texas 78610

(512) 268-7862 • (512) 268-0262 (fax)

State of Texas §
County of Hays §

Affidavit of Publication

My name is Cyndy Slovak-Barton, and I am Publisher of the Hays Free Press. I am over the age of 18, have personal knowledge of the facts stated herein, and am otherwise competent to make this affidavit.

The Hays Free Press is a legal newspaper publication under Texas law, headquartered and regularly published in Hays County, Texas. It is a newspaper of general circulation, and is generally circulated in Hays, Travis, and Caldwell Counties.

The attachment hereto was published in the Hays Free Press on the following dates at or below the classified legals rate:

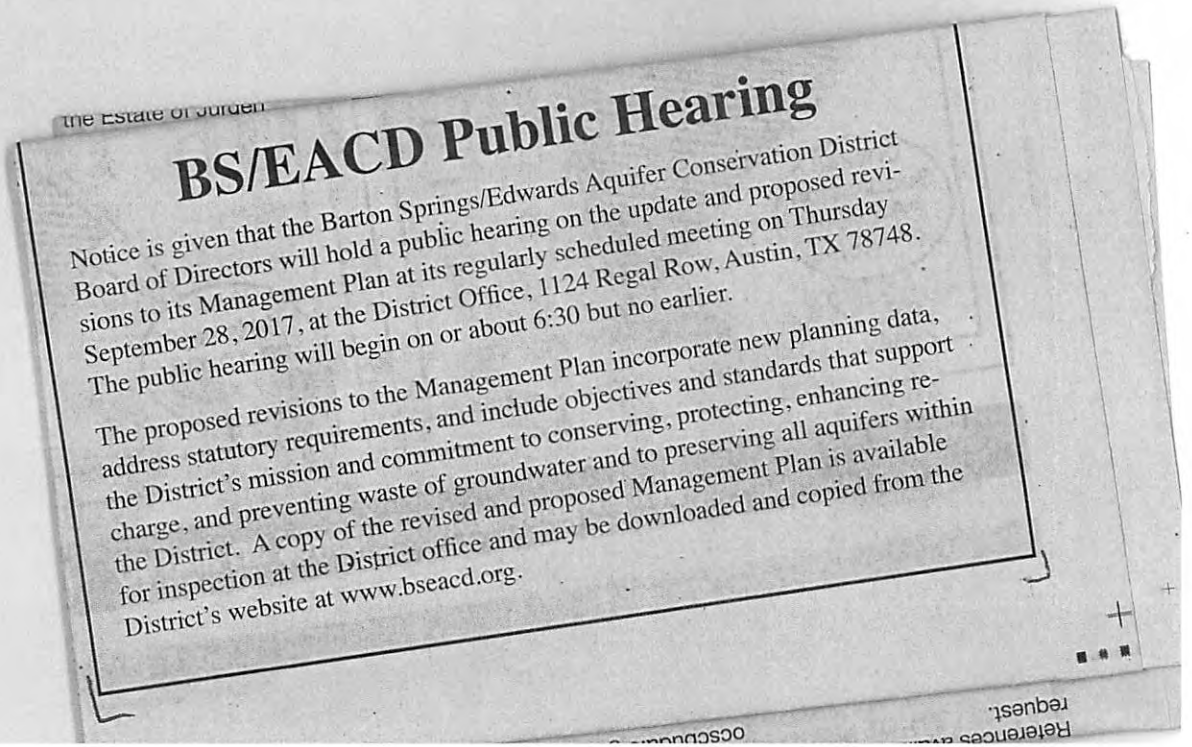
Public Notice of BSEACD Public Hearing on September 28, 2017 ran September 20, 2017

Cyndy Slovak-Barton, Publisher
Hays Free Press

Subscribed and sworn before me this the 21 day of September, 2017.

Notary Public
Christine Thorpe

CHRISTINE THORPE
Notary Public, State of Texas
Notary ID# 13070968-8
My Commission Expires
JUNE 22, 2020



BS/EACD Public Hearing

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The proposed revisions to the Management Plan incorporate new planning data, address statutory requirements, and include objectives and standards that support the District's mission and commitment to conserving, protecting, enhancing recharge, and preventing waste of groundwater and to preserving all aquifers within the District. A copy of the revised and proposed Management Plan is available for inspection at the District office and may be downloaded and copied from the District's website at www.bseacd.org.

BARTON SPRINGS EDWARDS
1124 REGAL ROW
STE A
AUSTIN, TX 78748

Invoice/Order Number:	0000216756
Ad Cost:	$373.52
Paid:	$0.00
Balance Due:	$373.52

Public Hearing

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9-15/2017
0000216756-01

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PROOF OF PUBLICATION

STATE OF TEXAS

PUBLIC NOTICE

Before the undersigned authority personally appeared Alejandro Cado, who on oath says that he/she is a Legal Advertising Agent of the Austin American-Statesman, a daily published newspaper that is generally circulated in Bastrop, Bell, Blanco, Brazos, Burleson, Burnet, Caldwell, Colorado, Comal, Coryell, Fayette, Gillespie, Gonzales, Guadalupe, Hays, Kerr, Lampasas, Lee, Llano, Milam, Nueces, San Saba, Travis, Washington and Williamson Counties, and State of Texas, and that the attached advertisement was published in said newspaper, to wit: Barton Springs Edwards, first date of publication 09/15/2017, last date of publication 09/15/2017, published 1 time(s), and that the attached is a true copy of said advertisement.

BARTON SPRINGS EDWARDS
1124 REGAL ROW
STE A
AUSTIN, TX 78748

Invoice/Order Number:	0000216756
Ad Cost:	$373.52
Paid:	$0.00
Balance Due:	$373.52

Signed _____
(Legal Advertising Agent)

Sworn or affirmed to, and subscribed before me, this 25th day of September, 2017 in Testimony whereof, I have hereunto set my hand and affixed my official seal, the day and year aforesaid.

Signed _____
(Notary)

ROSIE STEPHENS
Notary Public, State of Texas
Comm. Expires 09-26-2020
Notary ID 7831322

Please see Ad on following page(s).

Barton Springs/Edwards Aquifer Conservation District
Board of Directors Meeting Minutes
Regular Meeting
May 25, 2017

Board members present at commencement: Blayne Stansberry, Mary Stone, Bob Larsen, Craig Smith and Blake Dorsett. Staff present: John Dupnik, Vanessa Escobar, Kendall Bell Enders, Robin Gary, Brian Smith, Zack Garza and Tammy Raymond. Bill Dugat of Bickerstaff, Heath, Delgado, Acosta also participated in the meeting. Also present were those on the attached sign-in sheet. These minutes represent a summarized version of the meeting; the complete discussion of the following items is recorded digitally.

1. Call to Order.

President Stansberry called the meeting to order at 6:00 p.m., noting that a quorum of the Board was present.

2. Citizen Communications (Public Comments of a General Nature).

There were no public comments of a general nature.

3. Routine Business.

a. **Consent Agenda.** **Note: These items may be considered and approved as one motion. Directors or citizens may request any consent item be removed from the consent agenda, for consideration and possible approval as an item of Regular Business.**

1. **Approval of Financial Reports under the Public Funds Investment Act, Directors' Compensation Claims, and Specified Expenditures greater than $5,000.**

2. **Approval of minutes of the Board's May 11, 2017 regular Meeting.**

Director Smith moved approval of consent agenda items 1 and 2, noting invoices from Carollo in the amount of $15,684.38 and Bickerstaff in the amount of $10,268.53.

Director Stone seconded the motion and it passed with a vote of 5 to 0.

3. Routine Business.

b. General Manager's Report. *(Note: Topics discussed in the General Manager's Report are intended for general administrative and operational information-transfer purposes. The Directors will not take any action unless the topic is specifically listed elsewhere in this agenda.)*

Topics.

i. **Personnel matters and utilization**
ii. **Upcoming public events of possible interest**
iii. **Aquifer conditions and status of drought indicators**
iv. **Update on District grant projects and other Aquifer Science Team projects**
v. **Update on activities related to area roadway projects**
vi. **Update on Board committee activity**

Mr. Dupnik and staff updated the Board and answered Director's questions on the items listed above.

4. Presentation.

Awarding of the Aquatic Science Adventure Camp scholarships to the selected recipients.

Certificates were given to all of the happy camp scholarship winners and pictures were taken.

5. Discussion and possible action.

5a. Discussion and possible action related to planning and activities to update and revise the District Management Plan.

Mr. Dupnik explained that the TWDB requires that the Management Plan is updated every five years, and that ours is due January of 2018. He went on to say that they also request to have it six months in advance, which would be July of this year, to conduct a pre-review. He went through the checklist of items that need to be addressed, and suggested the need for a work session dedicated to this item.

The Board discussed scheduling a work session on June 21st, unless there is a light agenda at the regular meeting on the 22nd.

5b. Discussion and possible action related to District representation on the General Assembly of the Capital Area Council of Governments (CAPCOG).

Mr. Dupnik provided information on what CAPCOG does and their purpose. He said that his sense is that it's a structure to provide local governments the chance to get together and talk. He said that there are several levels of memberships and that we fall into the category of associate members. The bylaws allow for one appointment from each entity. He said that he was appointed by the Board in August of 2016 to fill the District vacancy left when the previous GM, Mr. Holland, retired from the District. He ended with saying that if anyone else was interested in being the representative of the District that he would be fine with bowing out.

President Stansberry stated that it looks like most of the associate members are staff.

Director Stone said that she would like to be updated after a meeting is attended.

After further discussion, the Board made no changes to the appointment.

5c. Discussion and possible action related to the City of Dripping Springs TPDES permit application to authorize direct discharge of treated wastewater to Onion Creek in the contributing zone of the Barton Springs segment of the Edwards Aquifer.

President Stansberry stated that the Board would meet in Executive Session as authorized by the Texas Government Code Section 551.071 (Consultation with Attorney) at 7:52 p.m. President Stansberry stated that no final actions or decisions would be made while in Executive Session.

The Board reconvened into open session at 8:27 p.m. President Stansberry stated that no final actions or decisions were made while in Executive Session.

5d. Discussion and possible action related to activities in the 85th Legislative session of interest to the District.

Mr. Dupnik gave an update on the outcome of the bills related to the District in this Legislative Session.

6. Directors' Reports. (Note: Directors' comments under this item cannot address an agenda item posted elsewhere on this agenda and no substantive discussion among the Board Members or action will be allowed in this meeting. Communications reported under this item may be used to support Performance Standard 4-1 of the District's Management Plan related to demonstration of effective communication with District constituents.)

Directors may report on their involvement in activities and dialogue that are of likely interest to the Board, in one or more of the following topical areas:

- **Meetings and conferences attended or that will be attended;**
- **Committee formation and updates;**
- **Conversations with public officials, permittees, stakeholders, and other constituents;**
- **Commendations; and**
- **Issues or problems of concern.**

Director Smith reported the following:

Met with Charlie Flatten of HCA
Attended the TX Aquifer Conference
Met with Carollo
Attended the RWQPP group meeting

Director Stone reported the following:

Management Plan Committee meeting
Took numerous calls from constituents regarding legislation

Director Stansberry reported the following:

Legislative hearings
Met with David Baker on Jacobs well

Director Larsen reported the following:

Attended the TX Aquifer Conference
Met with Carollo
Met with Commissioner Mark Jones

Director Dorsett reported the following:

Attended Creedmoor-Maha Board meetings

7. Adjournment.

Without objection, President Stansberry adjourned the meeting at 8:31 p.m.

Approved by the Board on June 22, 2017

By: Blayne Stansberry Attest: Blake Dorsett
Blayne Stansberry, President Blake Dorsett, Board Secretary

Barton Springs/Edwards Aquifer Conservation District
Board of Directors Meeting Minutes
Regular Meeting
June 22, 2017

Board members present at commencement: Blayne Stansberry, Mary Stone, Craig Smith, and Blake Dorsett. Bob Larsen was absent. Staff present: John Dupnik, Dana Wilson, Kendall Bell Enders, Brian Smith and Tammy Raymond. Also present were those on the attached sign-in sheet. These minutes represent a summarized version of the meeting; the complete discussion of the following items is recorded digitally.

1. Call to Order.

President Stansberry called the meeting to order at 6:02 p.m., noting that a quorum of the Board was present.

2. Citizen Communications (Public Comments of a General Nature).

Mr. Ed McCarthy commented that Mr. Dupnik served on a panel with him at the CLE Conference, and that he got superior remarks from attendees and appreciated his participation.

3. Routine Business.

a. **Consent Agenda.** **Note: These items may be considered and approved as one motion. Directors or citizens may request any consent item be removed from the consent agenda, for consideration and possible approval as an item of Regular Business.**

1. **Approval of Financial Reports under the Public Funds Investment Act, Directors' Compensation Claims, and Specified Expenditures greater than $5,000.**

2. **Approval of minutes of the Board's May 25, 2017 regular Meeting.**

3. **Approval of the effectiveness of Directors' communications with stakeholders and constituents for the 3rd Quarter FY 2017 (March - May) per the collective judgment of the Board, as required by the District's Management Plan.**

4. **Approval of an alternate regular Board meeting schedule for the summer months.**

Director Smith moved approval of consent agenda items 1 through 3, noting no change in Item 4.

Director Stone seconded the motion and it passed unanimously with a vote of 4 to 0.

3. Routine Business.

b. General Manager's Report. *(Note: Topics discussed in the General Manager's Report are intended for general administrative and operational information-transfer purposes. The Directors will not take any action unless the topic is specifically listed elsewhere in this agenda.)*

1. **Standing Topics.**

   i. Personnel matters and utilization
   ii. Upcoming public events of possible interest
   iii. Aquifer conditions and status of drought indicators

2. **Special Topics.** *(Note: Individual topics listed below may be discussed by the Board in this meeting, but no action will be taken unless a topic is specifically posted elsewhere in this agenda as an item for possible action. A Director may request an individual topic that is presented only under this agenda item be placed on the posted agenda of some future meeting for Board discussion and possible action.)*

   i. Review of Status Update Report – at directors' discretion
   ii. Update on GMA and regional water planning
   iii. Update on regulatory and enforcement activities
   iv. Update on District grant projects and other Aquifer Science Team projects
   v. Update on Board committee activity

Mr. Dupnik and staff updated the Board and answered Director's questions on the items listed above.

4. Discussion and possible action.

4b. Discussion and possible action related to an amendment to the FY 17 Budget.

Ms. Wilson went through the line items of the proposed budget amendment explaining the needed changes.

After discussion Director Smith moved approval of the amendment to the FY 17 Budget as discussed.

Director Stone seconded the motion and it passed unanimously with a vote of 4 to 0.

4c. Discussion related to the proposed updates and revisions to the preliminary draft of the District's Management Plan.

Mr. Dupnik gave a presentation on the staff-proposed revisions to the preliminary draft of the Management Plan including the updated District management descriptions and the proposed objectives and performance standards. He also went over the proposed project timeline noting that the Management Plan revision presented would be brought back before the Board at the July 13th meeting for Board-consideration to approve for submittal to the TWDB for preliminary review.

The Board discussed the draft plan and generally concurred with the proposed updates and revisions as presented. No formal action was taken.

4a. Presentation, discussion, and possible action related to the 85th Legislative Session Debriefing Report and the Board's collective judgment as to the appropriateness of the District's legislative agenda, actions taken, and outcomes achieved.

4d. Discussion and possible action related to the City of Dripping Springs TPDES permit application to authorize direct discharge of treated wastewater to Onion Creek in the contributing zone of the Barton Springs segment of the Edwards Aquifer.

President Stansberry stated that the Board would meet in Executive Session as authorized by the Texas Government Code Section 551.071 (Consultation with Attorney) on items 4a. and 4d. at 7:35 p.m. President Stansberry stated that no final actions or decisions would be made while in Executive Session.

The Board reconvened into open session at 9:24 p.m. President Stansberry stated that no final actions or decisions were made while in Executive Session.

President Stansberry asked if anyone would like to make a motion on 4a. to satisfy the District's Management Plan.

4a. Director Smith moved that upon receiving a debriefing on the outcome of the 85th legislation; the Board judges that the actions of the District on its legislative agenda and outcomes achieved are appropriate.

Director Stone seconded the motion and it passed unanimously with a vote of 4 to 0.

5. Directors' Reports. *(Note: Directors' comments under this item cannot address an agenda item posted elsewhere on this agenda and no substantive discussion among the Board Members or action will be allowed in this meeting. Communications reported under this item may be used to support Performance Standard 4-1 of the District's Management Plan related to demonstration of effective communication with District constituents.)*

Directors may report on their involvement in activities and dialogue that are of likely interest to the Board, in one or more of the following topical areas:

- Meetings and conferences attended or that will be attended;
- Committee formation and updates;
- Conversations with public officials, permittees, stakeholders, and other constituents;
- Commendations; and

- Issues or problems of concern.

President Stansberry stated that the Directors reports would be moved to the next meeting.

6. Adjournment.

Without objection, President Stansberry adjourned the meeting at 9:27 p.m.

Approved by the Board on July 13, 2017

By: _____ Attest: _____
Blayne Stansberry, President Blake Dorsett, Board Secretary

Barton Springs/Edwards Aquifer Conservation District
Board of Directors Meeting Minutes
Regular Meeting
July 13, 2017

Board members present at commencement: Blayne Stansberry, Mary Stone, Craig Smith, Blake Dorsett and Bob Larsen. Staff present: John Dupnik, Dana Wilson, Vanessa Escobar, Zach Garza and Tammy Raymond. Also present were those on the attached sign-in sheet. These minutes represent a summarized version of the meeting; the complete discussion of the following items is recorded digitally.

1. Call to Order.

President Stansberry called the meeting to order at 6:00 p.m., noting that a quorum of the Board was present.

2. Citizen Communications (Public Comments of a General Nature).

Dr. Joni Charles stated that she is doing research interviews with various Boards of Directors across the state to get people's perceptions and knowledge of groundwater and groundwater management. She invited our Board members to participate in her study.

3. Routine Business.

a. **Consent Agenda.** **Note: These items may be considered and approved as one motion. Directors or citizens may request any consent item be removed from the consent agenda, for consideration and possible approval as an item of Regular Business.**

1. **Approval of Financial Reports under the Public Funds Investment Act, Directors' Compensation Claims, and Specified Expenditures greater than $5,000.**

2. **Approval of minutes of the Board's June 22, 2017 regular Meeting.**

Director Smith moved approval of consent agenda items 1 and 2.

Director Stone seconded the motion and it passed unanimously with a vote of 5 to 0.

3. Routine Business.

b. General Manager's Report. *(Note: Topics discussed in the General Manager's Report are intended for general administrative and operational information-transfer purposes. The Directors will not take any action unless the topic is specifically listed elsewhere in this agenda.)*

1. **Standing Topics.**

   i. Personnel matters and utilization
   ii. Upcoming public events of possible interest
   iii. Aquifer conditions and status of drought indicators

2. **Special Topics.** *(Note: Individual topics listed below may be discussed by the Board in this meeting, but no action will be taken unless a topic is specifically posted elsewhere in this agenda as an item for possible action. A Director may request an individual topic that is presented only under this agenda item be placed on the posted agenda of some future meeting for Board discussion and possible action.)*

   i. Review of Status Update Report – at directors' discretion
   ii. Update on GMA and regional water planning
   iii. Update on regulatory and enforcement activities
   iv. Update on District grant projects and other Aquifer Science Team projects
   v. Update on activities related to area roadway projects
   vi. Update on Board committee activity

Mr. Dupnik and staff updated the Board and answered Director's questions on the items listed above.

4. Discussion and possible action.

4a. Discussion and possible action to adopt FY 2018 fee schedule by Resolution No. 071317-01.

Ms. Wilson stated that the only change in the fee schedule is the production fee for new Class A, B, or C Conditional Permits. She said that the fee was lowered by 2 cents. She explained that the reason for the change is that we align those fees with LCRA's raw water rate which was lowered by that amount.

After discussion, Director Smith moved adoption of Resolution #071317-01 approving the 2018 Fee Schedule.

Director Stone seconded the motion and it passed unanimously with a vote of 5 to 0.

4b. Discussion and possible action related to reviewing the draft FY 2018 annual budget and setting a public hearing.

Mr. Dupnik stated that there was one adjustment needed in the budget. He explained that the Budget Committee caught that the election would not take place until FY 2019 and suggested reducing that line item from $12,000 to $5,000.

The Board then discussed uncommitted dollars left in the budget and how they may be used.

Mr. Dupnik recommended to set a public hearing for August 10th. He said that Board authorization is needed to refine the plan and incorporate the uncommitted dollars into the draft budget that would be the subject of a public hearing.

After further discussion, Director Smith moved to set the public hearing for August 10th and to authorize the Board Budget and Finance subcommittee to make changes to the draft budget for that hearing.

Director Larsen seconded the motion and it passed unanimously with a vote of 5 to 0.

4c. Discussion and possible action related to conditional renewal of annual Production Permits for FY 2018 contingent on compliance with District rules and renewal requirements.

Ms. Escobar explained that this is the time of year to renew annual production permits. She said that all permittees were in compliance with the District's rules, and that staff recommended approval of all permits.

Director Smith moved to approve all the of the District's annual production permits.

Director Stone seconded the motion and it passed unanimously with a vote of 5 to 0.

4d. Discussion and possible action related to approval of the preliminary draft of the 2018 District Management Plan for submittal to the TWDB for pre-review.

Mr. Dupnik gave a quick overview of the changes to the management plan and the description of the management of the District, and the goals and strategies.

Director Larsen suggested that in the mission statement there should be a comma between enhancing and recharge. He said that the comma is in the wrong place and would like it changed to fit into what we are doing.

Director Stone said that she doesn't have a problem with that but suggests looking at it at a later date.

President Stansberry agreed and doesn't feel comfortable with changing it tonight.

Director Larsen said that he disagreed. Director Larsen then pointed out other sections in the draft plan where there were typos to be corrected or that required clarification. Director Larsen also stated his objection to the idea of encouraging the use of conservation-oriented rate structures on permittees as described in the draft Objective 6-2.

The other Directors said that the wording was changed previously and didn't feel a need to change it again.

After further discussion, Director Stone moved approval of the revised management plan with the following changes:

Section 2.9 change language to a five-year plan
Add missing quotation mark on Objective 5-4 on page 52
Table 2.4 in section 2.8 on page 39 revised to equal 100%

Director Smith seconded the motion and it passed with a vote of 4 to 1.

Director Larsen voted nay due to lack of change in the Mission Statement and the overreaching on conservation rates.

4e. Discussion and possible action related to the status of the District's draft Habitat Conservation Plan (HCP) and Incidental Take Permit (ITP) application.

Mr. Holland gave an update on the status of the HCP informing the Board that the application was approved by the USFWS to be published in the federal register on July 18, 2017 for public review and comment which was a major milestone. Mr. Holland also informed the Board of the need for a public meeting to be held during the 60-day comment period. He then laid out the next steps in the process by providing a calendar of remaining activities for the ITP issuance which could extend into late 2018.

No Board action was needed.

4f. Discussion and possible action related to the City of Dripping Springs TPDES permit application to authorize direct discharge of treated wastewater to Onion Creek in the contributing zone of the Barton Springs segment of the Edwards Aquifer.

President Stansberry stated that the Board would meet in Executive Session as authorized by the Texas Government Code Section 551.071 (Consultation with Attorney) on item 4f. at 8:02 p.m. President Stansberry stated that no final actions or decisions would be made while in Executive Session.

The Board reconvened into open session at 8:46 p.m. President Stansberry stated that no final actions or decisions were made while in Executive Session.

5. Directors' Reports. *(Note: Directors' comments under this item cannot address an agenda item posted elsewhere on this agenda and no substantive discussion among the Board Members or action will be allowed in this meeting. Communications reported under this item may be used to support Performance Standard 4-1 of the District's Management Plan related to demonstration of effective communication with District constituents.)*

Directors may report on their involvement in activities and dialogue that are of likely interest to the Board, in one or more of the following topical areas:

- Meetings and conferences attended or that will be attended;
- Committee formation and updates;
- Conversations with public officials, permittees, stakeholders, and other constituents;
- Commendations; and
- Issues or problems of concern.

Director Stone reported the following:

Nothing to report

Director Smith reported the following:

Attended an award ceremony at Barton Springs for the COA HCP
Visited Eliza Spring

Director Stansberry reported the following:

Subcommittee meetings

Director Larsen reported the following:

Subcommittee meetings

Director Dorsett reported the following:

Creedmoor Maha Board meetings

6. Adjournment.

Without objection, President Stansberry adjourned the meeting at 8:47 p.m.

Approved by the Board on August 10, 2017

By: _____ Attest: _____
Blayne Stansberry, President Blake Dorsett, Board Secretary

Barton Springs/Edwards Aquifer Conservation District
Board of Directors Meeting Minutes
Regular Meeting
August 24, 2017

Board members present at commencement: Blayne Stansberry, Craig Smith and Blake Dorsett. Bob Larsen was absent. Staff present: John Dupnik, Brian Smith, Vanessa Escobar and Tammy Raymond. Bill Dugat of Bickerstaff also participated in the meeting. Also present were those on the attached sign-in sheet. These minutes represent a summarized version of the meeting; the complete discussion of the following items is recorded digitally.

1. Call to Order.

President Stansberry called the meeting to order at 6:02 p.m., noting that a quorum of the Board was present.

2. Citizen Communications (Public Comments of a General Nature).

There were no comments of a general nature.

3. Routine Business.

a. **Consent Agenda.** **Note: These items may be considered and approved as one motion. Directors or citizens may request any consent item be removed from the consent agenda, for consideration and possible approval as an item of Regular Business.**

1. **Approval of Financial Reports under the Public Funds Investment Act, Directors' Compensation Claims, and Specified Expenditures greater than $5,000.**

2. **Approval of minutes of the Board's August 10, 2017 regular Meeting and Public Hearing.**

3. **Approval of out-of-state travel for Brian Hunt to attend training on geologic software (RockWorks17) in Golden Colorado in September 2017.**

Director Smith moved approval of consent agenda items 1 through 3, noting invoices from Carollo in the amount of $16,203.00, and Water Monitoring Solutions in the amount of $10,305.00.

Director Dorsett seconded the motion and it passed unanimously with a vote of 3 to 0.

3. Routine Business.

b. General Manager's Report. *(Note: Topics discussed in the General Manager's Report are intended for general administrative and operational information-transfer purposes. The Directors will not take any action unless the topic is specifically listed elsewhere in this agenda.)*

Topics.

i. **Personnel matters and utilization**
ii. **Upcoming public events of possible interest**
iii. **Aquifer conditions and status of drought indicators**
iv. **Update on team activities and highlights**
v. **Update on area roadway projects**
vi. **Update on the District HCP and ITP application**
vii. **Update on legislative activity of interest to the District**

Mr. Dupnik, staff, and Bill Dugat, updated the Board and answered Director's questions on the items listed above.

4a. Discussion and possible action related to selection of the first-choice firm to provide technical services related to development of an integrated groundwater data management and reporting system and authorization to initiate contract negotiations.

Mr. Dupnik stated that the District issued a Request for Qualifications (RFQ) in March and received nine Statements of Qualifications (SOQ) from firms. The list was then narrowed down to five qualified firms that were asked to respond to a Request for Proposals (RFP). After proposals from the five firms were reviewed, the list was further narrowed down the two highest ranked firms for the first round of interviews. An interview panel consisting of the staff database team and the Board subcommittee (Blayne Stansberry and Mary Stone) interviewed the two firms. Both of the interviewed firms were scored on the basis of their proposals and the interviews and Intera was selected as the first-choice firm based on the selection criteria.

Mr. Dupnik recommended that the Board authorize staff to begin contract negotiations with Intera as the highest rated and therefore, the first-choice firm. Mr. Dupnik also recommended that if acceptable terms cannot be negotiated with the first-choice firm, then staff be authorized to initiate negotiations with the next-ranked firm. He ended with saying that this process is consistent with our procurement process.

President Stansberry stated that both firms were quite exceptional and very qualified but suggested that the committee be consulted before initiating any negotiations with the second ranked firm if an agreement with Intera cannot be reached.

Mr. Dupnik stated the modification to the recommendation as:

The Board to authorize staff to begin negotiations with Intera and if an agreement cannot be reached, we would reconvene the subcommittee to discuss the best process for moving forward.

Director Smith moved to follow the staff's recommendation and authorize the opening of negotiations with the first choice firm Intera, and if those negotiations are not fruitful, then the matter would be referred back to the committee for a subsequent recommendation.

Director Dorsett seconded the motion and it passed unanimously with a vote of 3 to 0.

4b. Discussion and possible action related to the revision and update of the District's Management Plan.

Mr. Dupnik explained that earlier in the summer the Board went through several rounds of vetting the preliminary draft of the Management Plan, and was approved for submittal to the TWDB for pre-review. He said that in the backup material is the result of that pre-review and noted that the required and suggested edits were relatively minor. He and Ms. Escobar then went through those edits from the TWDB and the timeline of deadlines.

Ms. Escobar requested the following two action items:

1) Approval of the suggested edits presented
2) Schedule a Public Hearing on September 28th

After discussion, Director Smith moved to authorize the staff to incorporate the edits presented in the backup and set a Public Hearing on the adoption of the Management Plan on September 28th.

Directors' Reports. *(Note: Directors' comments under this item cannot address an agenda item posted elsewhere on this agenda and no substantive discussion among the Board Members or action will be allowed in this meeting. Communications reported under this item may be used to support Performance Standard 4-1 of the District's Management Plan related to demonstration of effective communication with District constituents.)*

Directors may report on their involvement in activities and dialogue that are of likely interest to the Board, in one or more of the following topical areas:

- Meetings and conferences attended or that will be attended;
- Committee formation and updates;
- Conversations with public officials, permittees, stakeholders, and other constituents;
- Commendations; and
- Issues or problems of concern.

Director Smith reported the following:

Attended a City of Austin Subcommittee meeting on Barton Springs.

Webinar on the Texas Water Law Update
Attended the USF&W service HCP meeting
Attended the 30th Anniversary Party
Will attend the RWQPP meeting tomorrow

Director Stansberry reported the following:

Attended two Budget Committee meetings
Attended the 30th Anniversary Party
Attended database interviews
Stated that she vacationed in Wimberley and swam in some Hill Country swimming holes.

Director Dorsett reported the following:

Attended Creedmoor Maha meetings
Attended District Board meetings

4c. Discussion and possible action related to the City of Dripping Springs TPDES permit application to authorize direct discharge of treated wastewater to Onion Creek in the contributing zone of the Barton Springs segment of the Edwards Aquifer.

President Stansberry stated that the Board would meet in Executive Session as authorized by the Texas Government Code Section 551.071 (Consultation with Attorney) at 7:13 p.m. President Stansberry stated that no final actions or decisions would be made while in Executive Session.

The Board reconvened into open session at 7:37 p.m. President Stansberry stated that no final actions or decisions were made while in Executive Session.

No action was taken.

6. Adjournment.

Without objection, President Stansberry adjourned the meeting at 7:37 p.m.

Approved by the Board on September 28, 2017

By: _____ Attest: _____
Blayne Stansberry, President Blake Dorsett, Board Secretary

Barton Springs/Edwards Aquifer Conservation District
Board of Directors Meeting Minutes
Regular Meeting & Public Hearing
September 28, 2017

Board members present at commencement: Blayne Stansberry, Mary Stone, and Bob Larsen. Blake Dorsett arrived at 6:30 p.m. Craig Smith was absent. Staff present: John Dupnik, Brian Smith, Robin Gary, Vanessa Escobar and Tammy Raymond. Also present were those on the attached sign-in sheet. These minutes represent a summarized version of the meeting; the complete discussion of the following items is recorded digitally.

1. Call to Order.

President Stansberry called the meeting to order at 6:03 p.m., noting that a quorum of the Board was present.

2. Citizen Communications (Public Comments of a General Nature).

There were no comments of a general nature.

3. Routine Business.

a. **Consent Agenda.** **Note: These items may be considered and approved as one motion. Directors or citizens may request any consent item be removed from the consent agenda, for consideration and possible approval as an item of Regular Business.**

1. **Approval of Financial Reports under the Public Funds Investment Act, Directors' Compensation Claims, and Specified Expenditures greater than $5,000.**

2. **Approval of minutes of the Board's August 24, 2017 regular Meeting.**

3. **Approval of the effectiveness of Directors' communications with stakeholders and constituents for the 4th Quarter FY 2017 (June-August) per the collective judgment of the Board, as required by the District's Management Plan.**

4. **Approval of issuing the earned Conservation Credits to permittees for FY 2017.**

5. **Approval of out-of-state travel for Brian Smith to attend and present at the Geological Society of America annual meeting in Seattle, Washington from October 22-25.**

6. **Approval of a contract for human resources consulting services to perform a comprehensive classification and compensation analysis.**

Director Larsen moved approval of consent agenda items 1 through 6, noting invoices from Carollo in the amount of $9842.00, Bickerstaff in the amount of $6311.25, and LCRA in the amount of $8404.00.

Director Stone seconded the motion and it passed unanimously with a vote of 3 to 0.

3. Routine Business.

b. General Manager's Report. *(Note: Topics discussed in the General Manager's Report are intended for general administrative and operational information-transfer purposes. The Directors will not take any action unless the topic is specifically listed elsewhere in this agenda.)*

1. **Standing Topics.**
   - i. Personnel matters and utilization
   - ii. Upcoming public events of possible interest
   - iii. Aquifer conditions and status of drought indicators
2. **Special Topics.** *(Note: Individual topics listed below may be discussed by the Board in this meeting, but no action will be taken unless a topic is specifically posted elsewhere in this agenda as an item for possible action. A Director may request an individual topic that is presented only under this agenda item be placed on the posted agenda of some future meeting for Board discussion and possible action.)*
   - i. Review of Status Update Report – at directors' discretion
   - ii. Update on GMA and regional water planning
   - iii. Update on regulatory and enforcement activities
   - iv. Update on District grant projects and other Aquifer Science Team projects
   - v. Update on activities related to area roadway projects
   - vi. Update on the District HCP and ITP application
   - vii. Update on Board committee activity

Mr. Dupnik and staff updated the Board and answered Director's questions on the items listed above.

4. Public Hearing

The Board will hold a Public Hearing on the update and proposed District Management Plan that has been updated and revised to incorporate new planning data, address statutory requirements, and include objectives and standards that support the District's mission and statutory purpose.

President Stansberry opened the Public Hearing at 6:54 p.m.

Mr. Dupnik gave an overview of the Texas Water Development Board's requirements and goal structure.

There were no public comments; therefore, President Stansberry closed the Public Hearing at 7:03 p.m.

5. Discussion and Possible Action.

5a. Discussion and possible action related to approval of Resolution No. 092817-01 adopting the District's management plan and approving the plan for submittal to the Texas Water Development Board.

Director Larsen stated that he would like to see a definition of unreasonable impacts included, as well as a reference to using flood waters to enhance recharge of the aquifer.

The Directors agreed to Director Larsen's additions.

After discussion, Director Stone moved approval of Resolution #092817-01 adopting the District's Management Plan as presented with Director Larsen's additions and approving the plan for submittal to the Texas Water Development Board.

Director Larsen seconded the motion and it passed unanimously with a vote of 4 to 0.

5b. Discussion and possible action related to demonstration of the District's augmented reality app, CleAR Creek Critters and approval of contract to continue development.

Ms. Gary gave a presentation on the new augmented reality game that was created from an idea that she had to bring creeks and critters to the classroom.

The Board loved the idea and was impressed with the concept.

Director Larsen asked what we want out of this app as far as the end product.

Ms. Gary responded that she would like to be able to promote this to classes and community groups, and have it meet our HCP and Management Plan objectives.

Mr. Dupnik stated that the amendment to the contract was not ready for signatures at this time, so there was no need for action.

5c. Discussion and possible action related to planning for the Groundwater Stewardship Awards including establishing a Board subcommittee and setting a date for the awards luncheon.

Ms. Gary explained that we give Groundwater Stewardship Awards every other year and nominations are due by November 7th.

Mr. Dupnik stated that we are looking for three things from the Board tonight. To establish a Board committee, verify a date of Friday, January 26th as the luncheon date, and to encourage Directors to help solicit nominations for the awards.

Director Stone volunteered, and President Stansberry agreed to serve on the committee. The Board agreed on January 26th as the date for the luncheon, and Board members agreed to help with nominations.

No formal action was taken.

5d. Discussion related to identification of possible District goals for FY 2018.

Mr. Dupnik and staff each presented an outlook for the next fiscal year and possible projects that would support the District's mission.

Mr. Dupnik then requested input and direction on the staff's next fiscal year outlook and possible projects. The Board generally concurred with the outlook presented. Mr. Dupnik stated that the staff would draft team-based goals statements that generally encompassed the outlook and projects for consideration by the Board for adoption as District goals for FY 2018.

5e. Discussion and possible action related to the City of Dripping Springs TPDES permit application to authorize direct discharge of treated wastewater to Onion Creek in the contributing zone of the Barton Springs segment of the Edwards Aquifer.

President Stansberry stated that the Board would meet in Executive Session as authorized by the Texas Government Code Section 551.071 (Consultation with Attorney by phone) at 8:24 p.m. President Stansberry stated that no final actions or decisions would be made while in Executive Session.

The Board reconvened into open session at 8:48 p.m. President Stansberry stated that no final actions or decisions were made while in Executive Session.

No action was taken.

Directors' Reports. *(Note: Directors' comments under this item cannot address an agenda item posted elsewhere on this agenda and no substantive discussion among the Board Members or action will be allowed in this meeting. Communications reported under this item may be used to support Performance Standard 4-1 of the District's Management Plan related to demonstration of effective communication with District constituents.)*

Directors may report on their involvement in activities and dialogue that are of likely interest to the Board, in one or more of the following topical areas:

- Meetings and conferences attended or that will be attended;
- Committee formation and updates;
- Conversations with public officials, permittees, stakeholders, and other constituents;
- Commendations; and
- Issues or problems of concern.

Director Stansberry reported the following:

Attended the HCA Summit

Director Larsen reported the following:

Attended the HCP meeting

Director Dorsett reported the following:

Attended Creedmoor Maha meetings

7. Adjournment.

Without objection, President Stansberry adjourned the meeting at 8:55 p.m.

Approved by the Board on October 12, 2017

By: _____ Attest: _____
Blayne Stansberry, President Blake Dorsett, Board Secretary

C. Evidence that the District Coordinated Development of the Management Plan with Other Regional Entities (*Planning Groups, GMAs, Surface Water Entities, Groundwater* Entities)

II. Estimated Historical Water Use and State Water Plan Datasets

Estimated Historical Groundwater Use And 2017 State Water Plan Datasets:

Barton Springs/Edwards Aquifer Conservation District

by Stephen Allen
Texas Water Development Board
Groundwater Division
Groundwater Technical Assistance Section
stephen.allen@twdb.texas.gov
(512) 463-7317
April 7, 2017

GROUNDWATER MANAGEMENT PLAN DATA:

This package of water data reports (part 1 of a 2-part package of information) is being provided to groundwater conservation districts to help them meet the requirements for approval of their five-year groundwater management plan. Each report in the package addresses a specific numbered requirement in the Texas Water Development Board's groundwater management plan checklist. The checklist can be viewed and downloaded from this web address:

http://www.twdb.texas.gov/groundwater/docs/GCD/GMPChecklist0113.pdf

The five reports included in this part are:

1. Estimated Historical Groundwater Use (checklist item 2)

   from the TWDB Historical Water Use Survey (WUS)

2. Projected Surface Water Supplies (checklist item 6)
3. Projected Water Demands (checklist item 7)
4. Projected Water Supply Needs (checklist item 8)
5. Projected Water Management Strategies (checklist item 9)

   from the 2017 Texas State Water Plan (SWP)

Part 2 of the 2-part package is the groundwater availability model (GAM) report for the District (checklist items 3 through 5). The District should have received, or will receive, this report from the Groundwater Availability Modeling Section. Questions about the GAM can be directed to Dr. Shirley Wade, shirley.wade@twdb.texas.gov, (512) 936-0883.

DISCLAIMER:

The data presented in this report represents the most up-to-date WUS and 2017 SWP data available as of 4/7/2017. Although it does not happen frequently, either of these datasets are subject to change pending the availability of more accurate WUS data or an amendment to the 2017 SWP. District personnel must review these datasets and correct any discrepancies in order to ensure approval of their groundwater management plan.

The WUS dataset can be verified at this web address:

http://www.twdb.texas.gov/waterplanning/waterusesurvey/estimates/

The 2017 SWP dataset can be verified by contacting Sabrina Anderson (sabrina.anderson@twdb.texas.gov or 512-936-0886).

The values presented in the data tables of this report are county-based. In cases where groundwater conservation districts cover only a portion of one or more counties the data values are modified with an apportioning multiplier to create new values that more accurately represent conditions within district boundaries. The multiplier used in the following formula is a land area ratio: (data value * (land area of district in county / land area of county)). For two of the four SWP tables (Projected Surface Water Supplies and Projected Water Demands) only the county-wide water user group (WUG) data values (county other, manufacturing, steam electric power, irrigation, mining and livestock) are modified using the multiplier. WUG values for municipalities, water supply corporations, and utility districts are not apportioned; instead, their full values are retained when they are located within the district, and eliminated when they are located outside (we ask each district to identify these entity locations).

The remaining SWP tables (Projected Water Supply Needs and Projected Water Management Strategies) are not modified because district-specific values are not statutorily required. Each district needs only "consider" the county values in these tables.

In the WUS table every category of water use (including municipal) is apportioned. Staff determined that breaking down the annual municipal values into individual WUGs was too complex.

TWDB recognizes that the apportioning formula used is not perfect but it is the best available process with respect to time and staffing constraints. If a district believes it has data that is more accurate it can add those data to the plan with an explanation of how the data were derived. Apportioning percentages that the TWDB used are listed above each applicable table.

For additional questions regarding this data, please contact Stephen Allen (stephen.allen@twdb.texas.gov or 512-463-7317) or Rima Petrossian (rima.petrossian@twdb.texas.gov or 512-936-2420).

Data Definitions*

1. Projected Water Demands*

From the 2012 State Water Plan Glossary: "**WATER DEMAND** Quantity of water projected to meet the overall necessities of a water user group in a specific future year." (See 2012 State Water Plan Chapter 3 for more detail.)

Additional explanation: These are water demand volumes as projected for specific Water User Groups in the 2011 Regional Water Plans. This is NOT groundwater pumpage or demand based on any existing water source. This demand is how much water each Water User Group is projected to require in each decade over the planning horizon.

2. Projected Surface Water Supplies*

From the 2012 State Water Plan Glossary: "**EXISTING *[surface]* WATER SUPPLY -** Maximum amount of *[surface]* water available from existing sources for use during drought of record conditions that is physically and legally available for use." (See 2012 State Water Plan Chapter 5 for more detail.)

Additional explanation: These are the existing surface water supply volumes that, without implementing any recommended WMSs, could be used during a drought (in each planning decade) by Water User Groups located within the specified geographic area.

3. Projected Water Supply Needs*

From the 2012 State Water Plan Glossary: "**NEEDS -**Projected water demands in excess of existing water supplies for a water user group or a wholesale water provider." (See 2012 State Water Plan Chapter 6 for more detail.)

Additional explanation: These are the volumes of water that result from comparing each Water User Group's projected existing water supplies to its projected water demands. If the volume listed is a negative number, then the Water User Group shows a projected need during a drought if they do not implement any water management strategies. If the volume listed is a positive number, then the Water User Group shows a projected surplus. Note that if a Water User Group shows a need in any decade, then they are considered to have a potential need during the planning horizon, even if they show a surplus elsewhere.

4. Projected Water Management Strategies*

From the 2012 State Water Plan Glossary: "**RECOMMENDED WATER MANAGEMENT STRATEGY -** Specific project or action to increase water supply or maximize existing supply to meet a specific need." (See 2012 State Water Plan Chapter 7 for more detail.)

Additional explanation: These are the specific water management strategies (with associated water volumes) that were recommended in the 2011 Regional Water Plans.

**Terminology used by TWDB staff in providing data for 'Estimated Historical Water Use And 2012 State Water Plan Datasets' reports issued by TWDB.*

Estimated Historical Water Use
TWDB Historical Water Use Survey (WUS) Data

Groundwater and surface water historical use estimates are currently unavailable for calendar year 2016. TWDB staff anticipates the calculation and posting of these estimates at a later date.

CALDWELL COUNTY

4.54% (multiplier)

All values are in acre-feet

Year	Source	Municipal	Manufacturing	Mining	Steam Electric	Irrigation	Livestock	Total
2015	GW	82	0	0	0	19	7	108
	SW	133	0	0	0	2	29	164
2014	GW	92	0	0	0	30	7	129
	SW	134	0	0	0	3	28	165
2013	GW	92	0	0	0	26	6	124
	SW	132	0	0	0	2	24	158
2012	GW	107	0	0	0	34	5	146
	SW	142	0	0	0	4	24	170
2011	GW	137	0	1	0	46	6	190
	SW	143	0	2	0	3	27	175
2010	GW	120	0	0	0	32	6	158
	SW	140	0	0	0	2	28	170
2009	GW	123	0	0	0	6	7	136
	SW	130	0	0	0	1	30	161
2008	GW	112	0	0	0	11	8	131
	SW	142	0	0	0	52	32	226
2007	GW	80	0	0	0	3	9	92
	SW	140	0	0	0	53	38	231
2006	GW	92	0	0	0	15	8	115
	SW	123	0	0	0	0	35	158
2005	GW	99	0	0	0	13	12	124
	SW	111	0	0	0	1	49	161
2004	GW	169	0	0	0	7	3	179
	SW	62	0	0	0	1	44	107
2003	GW	176	0	0	0	6	3	185
	SW	59	0	0	0	42	40	141
2002	GW	177	0	0	0	10	3	190
	SW	49	0	0	0	62	40	151
2001	GW	176	0	0	0	10	3	189
	SW	55	0	0	0	62	38	155
2000	GW	179	0	0	0	6	4	189
	SW	50	0	0	0	39	37	126

HAYS COUNTY

15.45% (multiplier)

All values are in acre-feet

Year	Source	Municipal	Manufacturing	Mining	Steam Electric	Irrigation	Livestock	Total
2015	GW	1,353	74	0	0	40	14	1,481
	SW	2,142	0	0	246	29	461	2,878
2014	GW	1,392	87	0	118	96	14	1,707
	SW	2,049	0	0	0	0	497	2,546
2013	GW	1,821	86	0	154	71	12	2,144
	SW	2,030	0	0	0	1	431	2,462
2012	GW	2,008	106	0	0	101	11	2,226
	SW	2,060	0	0	0	13	378	2,451
2011	GW	2,149	79	49	0	136	16	2,429
	SW	2,070	0	50	0	1	361	2,482
2010	GW	1,999	76	52	0	102	16	2,245
	SW	1,351	1	54	0	1	423	1,830
2009	GW	1,859	24	102	0	113	47	2,145
	SW	1,352	0	52	0	0	440	1,844
2008	GW	1,871	27	100	0	111	46	2,155
	SW	1,228	0	51	0	4	985	2,268
2007	GW	1,597	21	52	0	189	49	1,908
	SW	1,077	1	1	0	31	599	1,709
2006	GW	1,899	29	54	0	37	47	2,066
	SW	985	0	0	0	0	530	1,515
2005	GW	1,637	28	54	0	22	44	1,785
	SW	816	1	0	0	5	524	1,346
2004	GW	1,590	25	54	0	19	30	1,718
	SW	742	1	0	0	49	651	1,443
2003	GW	1,609	23	87	0	15	30	1,764
	SW	951	0	0	0	39	369	1,359
2002	GW	1,587	25	113	0	2	35	1,762
	SW	772	0	0	0	34	371	1,177
2001	GW	1,615	32	94	0	2	32	1,775
	SW	701	0	0	0	34	567	1,302
2000	GW	1,540	37	68	0	2	26	1,673
	SW	702	0	0	0	25	561	1,288

TRAVIS COUNTY

11.46% (multiplier)

All values are in acre-feet

Year	Source	Municipal	Manufacturing	Mining	Steam Electric	Irrigation	Livestock	Total
2015	GW	1,933	84	0	0	86	9	2,112
	SW	17,090	1,080	0	109	1,212	37	19,528
2014	GW	1,866	89	0	0	119	9	2,083
	SW	16,980	966	0	309	961	36	19,252
2013	GW	2,182	88	0	0	194	11	2,475
	SW	17,722	1,033	0	371	492	44	19,662
2012	GW	2,137	69	0	0	135	11	2,352
	SW	19,107	1,007	13	422	384	46	20,979
2011	GW	2,711	50	117	0	330	14	3,222
	SW	21,190	900	171	1,018	344	58	23,681
2010	GW	2,132	92	142	0	83	14	2,463
	SW	18,394	776	205	344	344	57	20,120
2009	GW	1,812	87	135	0	32	15	2,081
	SW	19,159	911	310	580	475	61	21,496
2008	GW	1,494	105	128	0	144	14	1,885
	SW	20,174	1,281	318	854	457	54	23,138
2007	GW	1,416	93	0	0	87	13	1,609
	SW	17,252	1,218	108	878	391	53	19,900
2006	GW	1,514	114	0	0	234	13	1,875
	SW	20,768	1,231	185	715	344	51	23,294
2005	GW	1,712	108	0	0	171	15	2,006
	SW	18,388	1,292	362	488	362	60	20,952
2004	GW	1,531	145	0	0	90	30	1,796
	SW	16,621	1,272	221	1,137	534	35	19,820
2003	GW	1,602	137	0	0	97	32	1,868
	SW	17,573	1,532	187	439	500	38	20,269
2002	GW	1,459	113	0	0	156	54	1,782
	SW	17,797	1,626	231	273	3	63	19,993
2001	GW	1,484	115	0	0	156	56	1,811
	SW	17,322	1,506	258	413	3	66	19,568
2000	GW	1,359	92	0	0	137	40	1,628
	SW	17,058	2,068	27	806	3	40	20,002

Projected Surface Water Supplies
TWDB 2017 State Water Plan Data

CALDWELL COUNTY

4.54% (multiplier)

All values are in acre-feet

RWPG	WUG	WUG Basin	Source Name	2020	2030	2040	2050	2060	2070
L	COUNTY LINE WSC	GUADALUPE	CANYON LAKE/RESERVOIR	103	83	61	39	18	0
L	COUNTY-OTHER, CALDWELL	GUADALUPE	GUADALUPE RUN-OF-RIVER	23	23	23	23	23	23
L	GONZALES COUNTY WSC	GUADALUPE	CANYON LAKE/RESERVOIR	19	21	22	23	25	25
L	LIVESTOCK, CALDWELL	COLORADO	COLORADO LIVESTOCK LOCAL SUPPLY	1	1	1	1	1	1
L	LIVESTOCK, CALDWELL	GUADALUPE	GUADALUPE LIVESTOCK LOCAL SUPPLY	21	21	21	21	21	21
L	MARTINDALE	GUADALUPE	CANYON LAKE/RESERVOIR	90	90	90	90	90	90
L	MARTINDALE	GUADALUPE	GUADALUPE RUN-OF-RIVER	100	100	100	100	100	100
L	MAXWELL WSC	GUADALUPE	CANYON LAKE/RESERVOIR	359	368	373	375	376	376
L	MAXWELL WSC	GUADALUPE	GUADALUPE RUN-OF-RIVER	543	557	565	568	569	569
L	SAN MARCOS	GUADALUPE	CANYON LAKE/RESERVOIR	2	2	2	3	3	3
L	UHLAND	GUADALUPE	CANYON LAKE/RESERVOIR	79	94	110	126	142	158
	Sum of Projected Surface Water Supplies (acre-feet)			**1,340**	**1,360**	**1,368**	**1,369**	**1,368**	**1,366**

HAYS COUNTY

15.45% (multiplier)

All values are in acre-feet

RWPG	WUG	WUG Basin	Source Name	2020	2030	2040	2050	2060	2070
K	AUSTIN	COLORADO	COLORADO RUN-OF-RIVER	13	127	249	631	1,519	2,749
K	BUDA	COLORADO	CANYON LAKE/RESERVOIR	1,381	1,292	1,181	1,041	882	701
K	COUNTY-OTHER, HAYS	COLORADO	HIGHLAND LAKES LAKE/RESERVOIR SYSTEM	216	216	216	216	216	216
K	DRIPPING SPRINGS	COLORADO	HIGHLAND LAKES LAKE/RESERVOIR SYSTEM	506	506	506	506	506	506
K	DRIPPING SPRINGS WSC	COLORADO	HIGHLAND LAKES LAKE/RESERVOIR SYSTEM	133	280	461	691	953	1,126

Projected Surface Water Supplies
TWDB 2017 State Water Plan Data

RWPG	WUG	WUG Basin	Source Name	2020	2030	2040	2050	2060	2070
K	LIVESTOCK, HAYS	COLORADO	COLORADO LIVESTOCK LOCAL SUPPLY	30	30	30	30	30	30
K	WEST TRAVIS COUNTY PUBLIC UTILITY AGENCY	COLORADO	HIGHLAND LAKES LAKE/RESERVOIR SYSTEM	4,521	4,521	4,521	4,521	4,521	4,521
L	BUDA	GUADALUPE	CANYON LAKE/RESERVOIR	299	388	499	639	798	979
L	COUNTY LINE WSC	GUADALUPE	CANYON LAKE/RESERVOIR	226	197	161	113	57	0
L	COUNTY-OTHER, HAYS	GUADALUPE	CANYON LAKE/RESERVOIR	599	599	599	599	599	599
L	CRYSTAL CLEAR WSC	GUADALUPE	CANYON LAKE/RESERVOIR	323	317	319	329	340	354
L	GOFORTH SUD	GUADALUPE	CANYON LAKE/RESERVOIR	1,050	1,050	1,050	1,050	1,050	1,050
L	IRRIGATION, HAYS	GUADALUPE	GUADALUPE RUN-OF-RIVER	20	20	20	20	20	20
L	KYLE	GUADALUPE	CANYON LAKE/RESERVOIR	5,743	5,743	5,743	5,743	5,743	5,732
L	LIVESTOCK, HAYS	GUADALUPE	GUADALUPE LIVESTOCK LOCAL SUPPLY	32	32	32	32	32	32
L	MAXWELL WSC	GUADALUPE	CANYON LAKE/RESERVOIR	101	92	87	85	84	84
L	MAXWELL WSC	GUADALUPE	GUADALUPE RUN-OF-RIVER	153	139	131	128	127	127
L	SAN MARCOS	GUADALUPE	CANYON LAKE/RESERVOIR	9,998	9,998	9,998	9,997	9,997	9,997
L	STEAM ELECTRIC POWER, HAYS	GUADALUPE	CANYON LAKE/RESERVOIR	381	381	381	381	381	381
L	UHLAND	GUADALUPE	CANYON LAKE/RESERVOIR	99	133	175	229	290	360
	Sum of Projected Surface Water Supplies (acre-feet)			**25,824**	**26,061**	**26,359**	**26,981**	**28,145**	**29,564**

TRAVIS COUNTY

11.46% (multiplier)

All values are in acre-feet

RWPG	WUG	WUG Basin	Source Name	2020	2030	2040	2050	2060	2070
K	AUSTIN	COLORADO	COLORADO RUN-OF-RIVER	137,829	129,682	112,223	100,459	88,585	75,600
K	AUSTIN	COLORADO	HIGHLAND LAKES LAKE/RESERVOIR SYSTEM	123,626	123,626	123,626	123,626	123,613	123,046
K	BARTON CREEK WEST WSC	COLORADO	HIGHLAND LAKES LAKE/RESERVOIR SYSTEM	760	760	760	760	760	760

Projected Surface Water Supplies
TWDB 2017 State Water Plan Data

RWPG	WUG	WUG Basin	Source Name	2020	2030	2040	2050	2060	2070
K	BEE CAVE	COLORADO	HIGHLAND LAKES LAKE/RESERVOIR SYSTEM	1,552	1,552	1,552	1,552	1,552	1,552
K	BRIARCLIFF	COLORADO	HIGHLAND LAKES LAKE/RESERVOIR SYSTEM	400	400	400	400	400	400
K	CEDAR PARK	COLORADO	HIGHLAND LAKES LAKE/RESERVOIR SYSTEM	1,927	1,638	1,646	1,776	1,677	1,566
K	COUNTY-OTHER, TRAVIS	COLORADO	COLORADO RUN-OF-RIVER	518	471	429	360	263	178
K	COUNTY-OTHER, TRAVIS	COLORADO	HIGHLAND LAKES LAKE/RESERVOIR SYSTEM	1,657	1,657	1,657	1,657	1,657	1,657
K	CREEDMOOR-MAHA WSC	COLORADO	COLORADO RUN-OF-RIVER	241	241	241	241	241	241
K	IRRIGATION, TRAVIS	COLORADO	COLORADO RUN-OF-RIVER	87	87	87	87	87	87
K	IRRIGATION, TRAVIS	COLORADO	HIGHLAND LAKES LAKE/RESERVOIR SYSTEM	298	298	298	298	298	298
K	JONESTOWN	COLORADO	HIGHLAND LAKES LAKE/RESERVOIR SYSTEM	315	315	315	315	315	315
K	LAGO VISTA	COLORADO	HIGHLAND LAKES LAKE/RESERVOIR SYSTEM	3,451	3,451	3,451	3,451	3,451	3,451
K	LAKEWAY	COLORADO	HIGHLAND LAKES LAKE/RESERVOIR SYSTEM	4,249	4,249	4,249	4,249	4,249	4,249
K	LEANDER	COLORADO	HIGHLAND LAKES LAKE/RESERVOIR SYSTEM	1,202	1,684	1,738	1,269	1,079	941
K	LIVESTOCK, TRAVIS	COLORADO	COLORADO LIVESTOCK LOCAL SUPPLY	78	78	78	78	78	78
K	LIVESTOCK, TRAVIS	GUADALUPE	GUADALUPE LIVESTOCK LOCAL SUPPLY	3	3	3	3	3	3
K	LOOP 360 WSC	COLORADO	HIGHLAND LAKES LAKE/RESERVOIR SYSTEM	1,250	1,250	1,250	1,250	1,250	1,250
K	LOST CREEK MUD	COLORADO	COLORADO RUN-OF-RIVER	1,092	1,072	1,057	1,056	1,054	1,054
K	MANOR	COLORADO	COLORADO RUN-OF-RIVER	1,141	0	0	0	0	0
K	MANOR	COLORADO	HIGHLAND LAKES LAKE/RESERVOIR SYSTEM	159	159	159	159	159	159
K	MANUFACTURING, TRAVIS	COLORADO	COLORADO RUN-OF-RIVER	4,060	5,541	7,277	8,324	9,331	10,460

Projected Surface Water Supplies
TWDB 2017 State Water Plan Data

RWPG	WUG	WUG Basin	Source Name	2020	2030	2040	2050	2060	2070
K	MANUFACTURING, TRAVIS	COLORADO	HIGHLAND LAKES LAKE/RESERVOIR SYSTEM	32	32	32	32	32	32
K	MANVILLE WSC	COLORADO	COLORADO RUN-OF-RIVER	2,240	0	0	0	0	0
K	MANVILLE WSC	COLORADO	HIGHLAND LAKES LAKE/RESERVOIR SYSTEM	307	305	299	295	288	281
K	MINING, TRAVIS	COLORADO	COLORADO OTHER LOCAL SUPPLY	246	314	388	458	534	622
K	MINING, TRAVIS	GUADALUPE	COLORADO OTHER LOCAL SUPPLY	4	5	6	6	7	8
K	NORTH AUSTIN MUD #1	COLORADO	COLORADO RUN-OF-RIVER	82	79	77	75	75	75
K	NORTHTOWN MUD	COLORADO	COLORADO RUN-OF-RIVER	691	798	898	1,011	1,111	1,203
K	NORTHTOWN MUD	COLORADO	HIGHLAND LAKES LAKE/RESERVOIR SYSTEM	339	339	339	339	339	339
K	PFLUGERVILLE	COLORADO	HIGHLAND LAKES LAKE/RESERVOIR SYSTEM	10,314	10,314	10,314	10,313	10,284	10,254
K	POINT VENTURE	COLORADO	HIGHLAND LAKES LAKE/RESERVOIR SYSTEM	360	360	360	360	360	360
K	ROLLINGWOOD	COLORADO	COLORADO RUN-OF-RIVER	384	0	0	0	0	0
K	ROUND ROCK	COLORADO	BRAZOS RIVER AUTHORITY LITTLE RIVER LAKE/RESERVOIR SYSTEM	225	203	177	146	123	102
K	ROUND ROCK	COLORADO	HIGHLAND LAKES LAKE/RESERVOIR SYSTEM	0	0	0	0	0	0
K	SHADY HOLLOW MUD	COLORADO	COLORADO RUN-OF-RIVER	779	758	741	731	730	730
K	STEAM ELECTRIC POWER, TRAVIS	COLORADO	COLORADO RUN-OF-RIVER	570	570	570	570	570	570
K	STEAM ELECTRIC POWER, TRAVIS	COLORADO	HIGHLAND LAKES LAKE/RESERVOIR SYSTEM	1,851	1,851	1,851	1,374	629	0
K	SUNSET VALLEY	COLORADO	COLORADO RUN-OF-RIVER	386	499	606	727	834	934
K	THE HILLS	COLORADO	HIGHLAND LAKES LAKE/RESERVOIR SYSTEM	1,533	1,533	1,533	1,533	1,533	1,533
K	TRAVIS COUNTY MUD #4	COLORADO	HIGHLAND LAKES LAKE/RESERVOIR SYSTEM	3,818	3,820	3,822	3,823	3,823	3,823

Projected Surface Water Supplies
TWDB 2017 State Water Plan Data

RWPG	WUG	WUG Basin	Source Name	2020	2030	2040	2050	2060	2070
K	TRAVIS COUNTY WCID #10	COLORADO	COLORADO RUN-OF-RIVER	2,128	0	0	0	0	0
K	TRAVIS COUNTY WCID #17	COLORADO	HIGHLAND LAKES LAKE/RESERVOIR SYSTEM	8,027	8,027	8,027	8,027	8,027	8,027
K	TRAVIS COUNTY WCID #18	COLORADO	HIGHLAND LAKES LAKE/RESERVOIR SYSTEM	1,736	1,736	1,736	1,736	1,736	1,736
K	TRAVIS COUNTY WCID #19	COLORADO	HIGHLAND LAKES LAKE/RESERVOIR SYSTEM	498	496	494	493	493	493
K	TRAVIS COUNTY WCID #20	COLORADO	HIGHLAND LAKES LAKE/RESERVOIR SYSTEM	1,135	1,135	1,135	1,135	1,135	1,135
K	WELLS BRANCH MUD	COLORADO	COLORADO RUN-OF-RIVER	1,638	1,602	1,577	1,563	1,559	1,558
K	WEST LAKE HILLS	COLORADO	COLORADO RUN-OF-RIVER	1,605	0	0	0	0	0
K	WEST TRAVIS COUNTY PUBLIC UTILITY AGENCY	COLORADO	HIGHLAND LAKES LAKE/RESERVOIR SYSTEM	2,615	2,615	2,615	2,615	2,615	2,615
K	WILLIAMSON-TRAVIS COUNTY MUD #1	COLORADO	HIGHLAND LAKES LAKE/RESERVOIR SYSTEM	201	201	201	202	201	202
	Sum of Projected Surface Water Supplies (acre-feet)			**329,639**	**315,806**	**300,294**	**288,934**	**277,140**	**263,977**

Projected Water Demands
TWDB 2017 State Water Plan Data

Please note that the demand numbers presented here include the plumbing code savings found in the Regional and State Water Plans.

CALDWELL COUNTY

4.54% (multiplier)

All values are in acre-feet

RWPG	WUG	WUG Basin	2020	2030	2040	2050	2060	2070
L	AQUA WSC	COLORADO	43	51	60	68	77	86
L	AQUA WSC	GUADALUPE	242	289	336	385	435	484
L	COUNTY LINE WSC	GUADALUPE	82	97	114	132	149	166
L	COUNTY-OTHER, CALDWELL	COLORADO	2	3	3	4	4	5
L	COUNTY-OTHER, CALDWELL	GUADALUPE	31	36	42	48	54	60
L	CREEDMOOR-MAHA WSC	COLORADO	114	133	152	172	195	216
L	CREEDMOOR-MAHA WSC	GUADALUPE	29	34	39	45	50	56
L	GOFORTH SUD	GUADALUPE	41	49	56	64	73	81
L	GONZALES COUNTY WSC	GUADALUPE	58	70	83	95	91	102
L	IRRIGATION, CALDWELL	COLORADO	1	1	1	1	1	0
L	IRRIGATION, CALDWELL	GUADALUPE	27	24	21	19	17	15
L	LIVESTOCK, CALDWELL	COLORADO	3	3	3	3	3	3
L	LIVESTOCK, CALDWELL	GUADALUPE	43	43	43	43	43	43
L	LOCKHART	GUADALUPE	2,251	2,676	3,105	3,547	4,010	4,465
L	LULING	GUADALUPE	950	1,125	1,301	1,484	1,678	1,868
L	MANUFACTURING, CALDWELL	GUADALUPE	0	0	0	0	1	1
L	MARTINDALE	GUADALUPE	187	221	256	292	330	367
L	MAXWELL WSC	GUADALUPE	414	487	561	638	720	802
L	MINING, CALDWELL	COLORADO	0	0	0	0	0	0
L	MINING, CALDWELL	GUADALUPE	5	4	3	2	1	0
L	MUSTANG RIDGE	COLORADO	69	82	95	108	122	136
L	MUSTANG RIDGE	GUADALUPE	2	2	2	3	3	3
L	NIEDERWALD	GUADALUPE	16	19	22	25	28	31
L	POLONIA WSC	COLORADO	282	333	386	440	498	554
L	POLONIA WSC	GUADALUPE	596	707	819	935	1,055	1,175
L	SAN MARCOS	GUADALUPE	2	3	4	5	6	7
L	UHLAND	GUADALUPE	79	94	110	126	142	158
	Sum of Projected Water Demands (acre-feet)		**5,569**	**6,586**	**7,617**	**8,684**	**9,786**	**10,884**

Projected Water Demands
TWDB 2017 State Water Plan Data

Please note that the demand numbers presented here include the plumbing code savings found in the Regional and State Water Plans.

HAYS COUNTY

15.45% (multiplier)

All values are in acre-feet

RWPG	WUG	WUG Basin	2020	2030	2040	2050	2060	2070
K	AUSTIN	COLORADO	13	127	249	631	1,519	2,749
K	BUDA	COLORADO	1,769	2,508	3,420	4,564	5,860	7,338
K	CIMARRON PARK WATER COMPANY	COLORADO	249	241	234	230	229	229
K	COUNTY-OTHER, HAYS	COLORADO	480	571	714	877	1,016	1,154
K	DRIPPING SPRINGS	COLORADO	479	537	610	704	813	938
K	DRIPPING SPRINGS WSC	COLORADO	533	680	861	1,091	1,353	1,652
K	GOFORTH SUD	COLORADO	85	130	185	255	334	425
K	IRRIGATION, HAYS	COLORADO	17	17	17	17	17	17
K	LIVESTOCK, HAYS	COLORADO	34	34	34	34	34	34
K	MANUFACTURING, HAYS	COLORADO	54	61	69	76	83	90
K	MINING, HAYS	COLORADO	131	166	210	223	256	292
K	MOUNTAIN CITY	COLORADO	57	56	54	54	54	54
K	PLUM CREEK WATER COMPANY	COLORADO	163	264	283	300	312	322
K	WEST TRAVIS COUNTY PUBLIC UTILITY AGENCY	COLORADO	4,093	5,758	7,795	10,343	13,226	16,508
L	BUDA	GUADALUPE	299	388	499	639	798	979
L	COUNTY LINE WSC	GUADALUPE	181	231	298	383	478	587
L	COUNTY-OTHER, HAYS	GUADALUPE	319	353	705	969	1,826	2,777
L	CREEDMOOR-MAHA WSC	GUADALUPE	10	12	15	19	23	28
L	CRYSTAL CLEAR WSC	GUADALUPE	632	717	827	973	1,143	1,338
L	GOFORTH SUD	GUADALUPE	1,384	1,753	2,220	2,818	3,504	4,287
L	IRRIGATION, HAYS	GUADALUPE	100	99	99	98	97	96
L	KYLE	GUADALUPE	5,156	7,680	9,133	9,119	9,108	9,104
L	LIVESTOCK, HAYS	GUADALUPE	63	63	63	63	63	63
L	MANUFACTURING, HAYS	GUADALUPE	17	19	21	23	25	28
L	MAXWELL WSC	GUADALUPE	117	122	131	144	160	179
L	MOUNTAIN CITY	GUADALUPE	24	30	38	48	60	73
L	NIEDERWALD	GUADALUPE	59	75	96	122	151	185
L	PLUM CREEK WATER COMPANY	GUADALUPE	736	1,068	1,048	1,032	1,019	1,009
L	SAN MARCOS	GUADALUPE	11,934	13,941	16,430	19,485	23,205	27,655

Projected Water Demands
TWDB 2017 State Water Plan Data

Please note that the demand numbers presented here include the plumbing code savings found in the Regional and State Water Plans.

RWPG	WUG	WUG Basin	2020	2030	2040	2050	2060	2070
L	STEAM ELECTRIC POWER, HAYS	GUADALUPE	113	149	306	418	570	776
L	UHLAND	GUADALUPE	99	133	175	229	290	360
L	WIMBERLEY	GUADALUPE	626	800	1,018	1,300	1,622	1,990
L	WIMBERLEY WSC	GUADALUPE	450	657	919	1,247	1,617	2,039
L	WOODCREEK	GUADALUPE	282	311	349	399	458	525
	Sum of Projected Water Demands (acre-feet)		**30,758**	**39,751**	**49,125**	**58,927**	**71,323**	**85,880**

TRAVIS COUNTY

11.46% (multiplier)

All values are in acre-feet

RWPG	WUG	WUG Basin	2020	2030	2040	2050	2060	2070
K	AQUA WSC	COLORADO	1,089	1,226	1,363	1,524	1,672	1,810
K	AUSTIN	COLORADO	157,445	182,933	209,973	229,887	246,590	266,411
K	BARTON CREEK WEST WSC	COLORADO	432	427	424	423	422	422
K	BEE CAVE	COLORADO	1,777	2,043	2,297	2,582	2,834	3,070
K	BRIARCLIFF	COLORADO	260	295	328	368	403	436
K	CEDAR PARK	COLORADO	2,432	2,579	2,767	2,763	2,761	2,760
K	COUNTY-OTHER, TRAVIS	COLORADO	959	872	794	666	488	330
K	COUNTY-OTHER, TRAVIS	GUADALUPE	3	4	5	5	5	6
K	CREEDMOOR-MAHA WSC	COLORADO	565	623	681	756	828	896
K	CREEDMOOR-MAHA WSC	GUADALUPE	27	30	33	36	40	43
K	ELGIN	COLORADO	251	352	447	556	653	744
K	GOFORTH SUD	GUADALUPE	9	10	11	12	13	14
K	IRRIGATION, TRAVIS	COLORADO	495	456	419	386	355	331
K	JONESTOWN	COLORADO	408	428	448	473	497	521
K	LAGO VISTA	COLORADO	1,868	2,185	2,488	2,832	3,140	3,428
K	LAKEWAY	COLORADO	6,977	9,115	9,093	9,081	9,076	9,075
K	LEANDER	COLORADO	1,134	2,908	5,020	5,422	5,623	5,878
K	LIVESTOCK, TRAVIS	COLORADO	78	78	78	78	78	78
K	LIVESTOCK, TRAVIS	GUADALUPE	3	3	3	3	3	3
K	LOOP 360 WSC	COLORADO	1,174	1,220	1,264	1,316	1,363	1,407
K	LOST CREEK MUD	COLORADO	1,092	1,072	1,057	1,056	1,054	1,054
K	MANOR	COLORADO	1,141	1,559	1,959	2,410	2,810	3,183
K	MANUFACTURING, TRAVIS	COLORADO	4,102	5,582	7,318	8,365	9,372	10,501

Projected Water Demands
TWDB 2017 State Water Plan Data

Please note that the demand numbers presented here include the plumbing code savings found in the Regional and State Water Plans.

RWPG	WUG	WUG Basin	2020	2030	2040	2050	2060	2070
K	MANVILLE WSC	COLORADO	2,984	3,604	4,201	4,885	5,499	6,074
K	MINING, TRAVIS	COLORADO	397	466	540	610	686	773
K	MINING, TRAVIS	GUADALUPE	4	5	6	6	7	8
K	MUSTANG RIDGE	COLORADO	45	46	47	48	50	51
K	MUSTANG RIDGE	GUADALUPE	17	17	17	18	19	20
K	NORTH AUSTIN MUD #1	COLORADO	82	79	77	75	75	75
K	NORTHTOWN MUD	COLORADO	691	798	898	1,011	1,111	1,203
K	PFLUGERVILLE	COLORADO	12,775	17,105	21,243	25,896	30,012	33,851
K	POINT VENTURE	COLORADO	347	443	534	638	729	815
K	ROLLINGWOOD	COLORADO	384	379	376	375	376	378
K	ROUND ROCK	COLORADO	265	301	336	377	414	448
K	SHADY HOLLOW MUD	COLORADO	779	758	741	731	730	730
K	STEAM ELECTRIC POWER, TRAVIS	COLORADO	2,120	2,579	2,579	2,693	2,808	3,037
K	SUNSET VALLEY	COLORADO	386	499	606	727	834	934
K	THE HILLS	COLORADO	1,449	1,444	1,441	1,439	1,438	1,438
K	TRAVIS COUNTY MUD #4	COLORADO	2,611	3,010	3,387	3,810	4,184	4,533
K	TRAVIS COUNTY WCID #10	COLORADO	2,128	2,428	2,715	3,044	3,341	3,619
K	TRAVIS COUNTY WCID #17	COLORADO	8,451	10,053	11,017	11,187	11,479	11,842
K	TRAVIS COUNTY WCID #18	COLORADO	1,123	1,267	1,407	1,573	1,725	1,867
K	TRAVIS COUNTY WCID #19	COLORADO	498	496	494	493	493	493
K	TRAVIS COUNTY WCID #20	COLORADO	590	587	584	583	582	582
K	VOLENTE	COLORADO	76	89	101	116	130	142
K	WELLS BRANCH MUD	COLORADO	1,638	1,602	1,577	1,563	1,559	1,558
K	WEST LAKE HILLS	COLORADO	1,564	1,550	1,539	1,533	1,532	1,532
K	WEST TRAVIS COUNTY PUBLIC UTILITY AGENCY	COLORADO	2,367	2,720	3,057	3,438	3,774	4,088
K	WILLIAMSON-TRAVIS COUNTY MUD #1	COLORADO	153	149	147	147	146	146
	Sum of Projected Water Demands (acre-feet)		**227,645**	**268,474**	**307,937**	**338,016**	**363,813**	**392,638**

Projected Water Supply Needs
TWDB 2017 State Water Plan Data

Negative values (in red) reflect a projected water supply need, positive values a surplus.

CALDWELL COUNTY

All values are in acre-feet

RWPG	WUG	WUG Basin	2020	2030	2040	2050	2060	2070
L	AQUA WSC	COLORADO	43	35	26	18	9	0
L	AQUA WSC	GUADALUPE	242	195	148	99	49	0
L	COUNTY LINE WSC	GUADALUPE	56	19	-22	-64	-104	-141
L	COUNTY-OTHER, CALDWELL	COLORADO	182	173	163	154	143	133
L	COUNTY-OTHER, CALDWELL	GUADALUPE	1,108	986	862	732	596	462
L	CREEDMOOR-MAHA WSC	COLORADO	0	0	0	0	0	0
L	CREEDMOOR-MAHA WSC	GUADALUPE	0	0	0	0	0	0
L	GOFORTH SUD	GUADALUPE	0	0	0	0	0	0
L	GONZALES COUNTY WSC	GUADALUPE	14	11	4	-3	6	-3
L	IRRIGATION, CALDWELL	COLORADO	0	2	4	6	7	8
L	IRRIGATION, CALDWELL	GUADALUPE	34	101	160	213	261	294
L	LIVESTOCK, CALDWELL	COLORADO	0	0	0	0	0	0
L	LIVESTOCK, CALDWELL	GUADALUPE	0	0	0	0	0	0
L	LOCKHART	GUADALUPE	-188	-613	-1,042	-1,484	-1,947	-2,402
L	LULING	GUADALUPE	133	-41	-217	-400	-594	-784
L	MANUFACTURING, CALDWELL	GUADALUPE	5	4	3	2	1	0
L	MARTINDALE	GUADALUPE	3	-31	-66	-102	-140	-177
L	MAXWELL WSC	GUADALUPE	624	578	519	448	368	286
L	MINING, CALDWELL	COLORADO	0	0	0	0	0	0
L	MINING, CALDWELL	GUADALUPE	0	0	0	0	0	0
L	MUSTANG RIDGE	COLORADO	0	0	0	0	0	0
L	MUSTANG RIDGE	GUADALUPE	0	0	0	0	0	0
L	NIEDERWALD	GUADALUPE	-13	-16	-20	-23	-26	-29
L	POLONIA WSC	COLORADO	118	65	11	-45	-104	-164
L	POLONIA WSC	GUADALUPE	262	146	26	-101	-237	-377
L	SAN MARCOS	GUADALUPE	1	0	-1	-1	-2	-3
L	UHLAND	GUADALUPE	0	0	0	0	0	0
	Sum of Projected Water Supply Needs (acre-feet)		**-201**	**-701**	**-1,368**	**-2,223**	**-3,154**	**-4,080**

Projected Water Supply Needs
TWDB 2017 State Water Plan Data

Negative values (in red) reflect a projected water supply need, positive values a surplus.

HAYS COUNTY

All values are in acre-feet

RWPG	WUG	WUG Basin	2020	2030	2040	2050	2060	2070
K	AUSTIN	COLORADO	0	0	0	0	0	0
K	BUDA	COLORADO	161	-667	-1,690	-2,974	-4,429	-6,088
K	CIMARRON PARK WATER COMPANY	COLORADO	0	8	15	19	20	20
K	COUNTY-OTHER, HAYS	COLORADO	983	394	-530	-1,587	-2,489	-3,382
K	DRIPPING SPRINGS	COLORADO	27	-31	-104	-198	-307	-432
K	DRIPPING SPRINGS WSC	COLORADO	0	0	0	0	0	-126
K	GOFORTH SUD	COLORADO	0	0	0	0	0	0
K	IRRIGATION, HAYS	COLORADO	333	333	333	333	333	333
K	LIVESTOCK, HAYS	COLORADO	2	2	2	2	2	2
K	MANUFACTURING, HAYS	COLORADO	236	185	134	88	46	0
K	MINING, HAYS	COLORADO	-531	-761	-1,047	-1,131	-1,340	-1,579
K	MOUNTAIN CITY	COLORADO	0	0	0	0	0	0
K	PLUM CREEK WATER COMPANY	COLORADO	0	0	0	0	0	0
K	WEST TRAVIS COUNTY PUBLIC UTILITY AGENCY	COLORADO	728	-937	-2,974	-5,522	-8,405	-11,687
L	BUDA	GUADALUPE	0	0	0	0	0	0
L	COUNTY LINE WSC	GUADALUPE	122	45	-56	-187	-336	-500
L	COUNTY-OTHER, HAYS	GUADALUPE	3,101	2,881	601	-1,109	-6,654	-12,812
L	CREEDMOOR-MAHA WSC	GUADALUPE	0	0	0	0	0	0
L	CRYSTAL CLEAR WSC	GUADALUPE	84	-13	-118	-243	-388	-551
L	GOFORTH SUD	GUADALUPE	2,763	2,340	1,810	1,133	358	-525
L	IRRIGATION, HAYS	GUADALUPE	88	94	100	106	112	118
L	KYLE	GUADALUPE	1,176	-1,348	-2,801	-2,787	-2,776	-2,783
L	LIVESTOCK, HAYS	GUADALUPE	0	0	0	0	0	0
L	MANUFACTURING, HAYS	GUADALUPE	573	558	542	528	515	501
L	MAXWELL WSC	GUADALUPE	176	144	120	101	83	64
L	MOUNTAIN CITY	GUADALUPE	4	-1	-7	-17	-29	-42
L	NIEDERWALD	GUADALUPE	-49	-65	-85	-111	-140	-174
L	PLUM CREEK WATER COMPANY	GUADALUPE	248	-185	-184	-185	-184	-184
L	SAN MARCOS	GUADALUPE	1,867	-140	-2,629	-5,685	-9,405	-13,855
L	STEAM ELECTRIC POWER, HAYS	GUADALUPE	4,646	4,411	3,394	2,668	1,688	353

Projected Water Supply Needs
TWDB 2017 State Water Plan Data

Negative values (in red) reflect a projected water supply need, positive values a surplus.

RWPG	WUG	WUG Basin	2020	2030	2040	2050	2060	2070
L	UHLAND	GUADALUPE	0	0	0	0	0	0
L	WIMBERLEY	GUADALUPE	218	44	-174	-456	-778	-1,146
L	WIMBERLEY WSC	GUADALUPE	233	26	-236	-564	-934	-1,356
L	WOODCREEK	GUADALUPE	716	687	649	599	540	473
	Sum of Projected Water Supply Needs (acre-feet)		**-580**	**-4,148**	**-12,635**	**-22,756**	**-38,594**	**-57,222**

TRAVIS COUNTY

All values are in acre-feet

RWPG	WUG	WUG Basin	2020	2030	2040	2050	2060	2070
K	AQUA WSC	COLORADO	721	584	447	286	138	0
K	AUSTIN	COLORADO	108,581	74,946	30,447	-1,231	-29,821	-63,194
K	BARTON CREEK WEST WSC	COLORADO	328	333	336	337	338	338
K	BEE CAVE	COLORADO	-225	-491	-745	-1,030	-1,282	-1,518
K	BRIARCLIFF	COLORADO	140	105	72	32	-3	-36
K	CEDAR PARK	COLORADO	-505	-941	-1,121	-987	-1,084	-1,194
K	COUNTY-OTHER, TRAVIS	COLORADO	10,613	10,963	11,278	11,790	12,505	13,139
K	COUNTY-OTHER, TRAVIS	GUADALUPE	94	86	78	75	74	70
K	CREEDMOOR-MAHA WSC	COLORADO	160	59	-43	-171	-309	-445
K	CREEDMOOR-MAHA WSC	GUADALUPE	0	0	0	0	0	0
K	ELGIN	COLORADO	0	-101	-196	-305	-402	-493
K	GOFORTH SUD	GUADALUPE	0	0	0	0	0	0
K	IRRIGATION, TRAVIS	COLORADO	809	1,156	1,474	1,767	2,034	2,246
K	JONESTOWN	COLORADO	-93	-113	-133	-158	-182	-206
K	LAGO VISTA	COLORADO	2,157	1,840	1,537	1,193	885	597
K	LAKEWAY	COLORADO	-1,469	-3,607	-3,585	-3,573	-3,568	-3,567
K	LEANDER	COLORADO	68	-1,224	-3,282	-4,153	-4,544	-4,937
K	LIVESTOCK, TRAVIS	COLORADO	3	3	3	3	3	3
K	LIVESTOCK, TRAVIS	GUADALUPE	0	0	0	0	0	0
K	LOOP 360 WSC	COLORADO	76	30	-14	-66	-113	-157
K	LOST CREEK MUD	COLORADO	0	0	0	0	0	0
K	MANOR	COLORADO	2,316	757	357	-94	-494	-867
K	MANUFACTURING, TRAVIS	COLORADO	0	0	0	0	0	0
K	MANVILLE WSC	COLORADO	3,765	873	182	-568	-1,286	-2,346
K	MINING, TRAVIS	COLORADO	0	0	0	0	0	0

Projected Water Supply Needs
TWDB 2017 State Water Plan Data

Negative values (in red) reflect a projected water supply need, positive values a surplus.

RWPG	WUG	WUG Basin	2020	2030	2040	2050	2060	2070
K	MINING, TRAVIS	GUADALUPE	0	0	0	0	0	0
K	MUSTANG RIDGE	COLORADO	0	0	0	0	0	0
K	MUSTANG RIDGE	GUADALUPE	0	0	0	0	0	0
K	NORTH AUSTIN MUD #1	COLORADO	0	0	0	0	0	0
K	NORTHTOWN MUD	COLORADO	339	339	339	339	339	339
K	PFLUGERVILLE	COLORADO	-605	-4,935	-9,073	-13,727	-17,872	-21,741
K	POINT VENTURE	COLORADO	13	-83	-174	-278	-369	-455
K	ROLLINGWOOD	COLORADO	0	-379	-376	-375	-376	-378
K	ROUND ROCK	COLORADO	3	-60	-126	-202	-265	-323
K	SHADY HOLLOW MUD	COLORADO	0	0	0	0	0	0
K	STEAM ELECTRIC POWER, TRAVIS	COLORADO	2,626	-1,374	-1,374	-6,543	-14,043	-21,530
K	SUNSET VALLEY	COLORADO	27	27	27	27	27	27
K	THE HILLS	COLORADO	84	89	92	94	95	95
K	TRAVIS COUNTY MUD #4	COLORADO	1,207	810	435	13	-361	-710
K	TRAVIS COUNTY WCID #10	COLORADO	0	-2,428	-2,715	-3,044	-3,341	-3,619
K	TRAVIS COUNTY WCID #17	COLORADO	-302	-1,904	-2,868	-3,038	-3,330	-3,693
K	TRAVIS COUNTY WCID #18	COLORADO	613	469	329	163	11	-131
K	TRAVIS COUNTY WCID #19	COLORADO	0	0	0	0	0	0
K	TRAVIS COUNTY WCID #20	COLORADO	545	548	551	552	553	553
K	VOLENTE	COLORADO	0	-13	-25	-40	-54	-66
K	WELLS BRANCH MUD	COLORADO	0	0	0	0	0	0
K	WEST LAKE HILLS	COLORADO	41	-1,550	-1,539	-1,533	-1,532	-1,532
K	WEST TRAVIS COUNTY PUBLIC UTILITY AGENCY	COLORADO	421	68	-269	-650	-986	-1,300
K	WILLIAMSON-TRAVIS COUNTY MUD #1	COLORADO	48	52	54	55	55	56
	Sum of Projected Water Supply Needs (acre-feet)		**-3,199**	**-19,203**	**-27,658**	**-41,766**	**-85,617**	**-134,438**

Projected Water Management Strategies
TWDB 2017 State Water Plan Data

CALDWELL COUNTY

WUG, Basin (RWPG) All values are in acre-feet

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
COUNTY LINE WSC, GUADALUPE (L)							
BRACKISH WILCOX GROUNDWATER FOR CRWA	CARRIZO-WILCOX AQUIFER [WILSON]	0	0	0	64	105	141
CRWA SIESTA PROJECT	DIRECT REUSE [BEXAR]	0	0	10	0	0	0
CRWA SIESTA PROJECT	SAN ANTONIO RUN-OF-RIVER [WILSON]	0	0	12	0	0	0
REUSE - KYLE/COUNTY LINE WSC	DIRECT REUSE [HAYS]	16	15	14	13	12	11
		16	**15**	**36**	**77**	**117**	**152**
COUNTY-OTHER, CALDWELL, COLORADO (L)							
MUNICIPAL WATER CONSERVATION (RURAL)	DEMAND REDUCTION [CALDWELL]	0	0	0	0	0	0
		0	**0**	**0**	**0**	**0**	**0**
COUNTY-OTHER, CALDWELL, GUADALUPE (L)							
MUNICIPAL WATER CONSERVATION (RURAL)	DEMAND REDUCTION [CALDWELL]	0	0	0	0	0	2
		0	**0**	**0**	**0**	**0**	**2**
GOFORTH SUD, GUADALUPE (L)							
GBRA - MBWSP - SURFACE WATER W/ ASR (OPTION 3C)	GUADALUPE RUN-OF-RIVER [GONZALES]	0	0	0	0	0	0
MUNICIPAL WATER CONSERVATION (RURAL)	DEMAND REDUCTION [CALDWELL]	0	0	0	0	0	0
		0	**0**	**0**	**0**	**0**	**0**
GONZALES COUNTY WSC, GUADALUPE (L)							
LOCAL CARRIZO AQUIFER DEVELOPMENT	CARRIZO-WILCOX AQUIFER [GONZALES]	0	0	0	3	3	3
MUNICIPAL WATER CONSERVATION (RURAL)	DEMAND REDUCTION [CALDWELL]	8	12	20	29	32	42
		8	**12**	**20**	**32**	**35**	**45**
LOCKHART, GUADALUPE (L)							
DROUGHT MANAGEMENT - LOCKHART	DEMAND REDUCTION [CALDWELL]	113	0	0	0	0	0
GBRA - MBWSP - SURFACE WATER W/ ASR (OPTION 3C)	GUADALUPE RUN-OF-RIVER [GONZALES]	1,120	1,120	1,120	1,484	1,947	2,402
MUNICIPAL WATER CONSERVATION (SUBURBAN)	DEMAND REDUCTION [CALDWELL]	0	0	0	0	0	72
		1,233	**1,120**	**1,120**	**1,484**	**1,947**	**2,474**

Projected Water Management Strategies
TWDB 2017 State Water Plan Data

WUG, Basin (RWPG) All values are in acre-feet

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
LULING, GUADALUPE (L)							
GBRA - MBWSP - SURFACE WATER W/ ASR (OPTION 3C)	GUADALUPE RUN-OF-RIVER [GONZALES]	1,673	1,674	1,674	1,673	1,678	1,868
MUNICIPAL WATER CONSERVATION (RURAL)	DEMAND REDUCTION [CALDWELL]	0	0	0	0	0	3
		1,673	**1,674**	**1,674**	**1,673**	**1,678**	**1,871**
MARTINDALE, GUADALUPE (L)							
DROUGHT MANAGEMENT - MARTINDALE	DEMAND REDUCTION [CALDWELL]	9	0	0	0	0	0
HAYS/CALDWELL PUA PROJECT	CARRIZO-WILCOX AQUIFER [CALDWELL]	0	31	66	102	140	177
MUNICIPAL WATER CONSERVATION (RURAL)	DEMAND REDUCTION [CALDWELL]	0	0	0	0	0	1
		9	**31**	**66**	**102**	**140**	**178**
MUSTANG RIDGE, COLORADO (L)							
MUNICIPAL WATER CONSERVATION (RURAL)	DEMAND REDUCTION [CALDWELL]	0	0	0	0	0	1
		0	**0**	**0**	**0**	**0**	**1**
MUSTANG RIDGE, GUADALUPE (L)							
MUNICIPAL WATER CONSERVATION (RURAL)	DEMAND REDUCTION [CALDWELL]	0	0	0	0	0	0
		0	**0**	**0**	**0**	**0**	**0**
NIEDERWALD, GUADALUPE (L)							
DROUGHT MANAGEMENT - NIEDERWALD	DEMAND REDUCTION [CALDWELL]	1	0	0	0	0	0
GBRA - MBWSP - SURFACE WATER W/ ASR (OPTION 3C)	GUADALUPE RUN-OF-RIVER [GONZALES]	13	16	20	23	26	29
		14	**16**	**20**	**23**	**26**	**29**
POLONIA WSC, COLORADO (L)							
LOCAL CARRIZO AQUIFER WITH CONVERSION	CARRIZO-WILCOX AQUIFER [CALDWELL]	0	0	0	45	104	164
		0	**0**	**0**	**45**	**104**	**164**
POLONIA WSC, GUADALUPE (L)							
LOCAL CARRIZO AQUIFER WITH CONVERSION	CARRIZO-WILCOX AQUIFER [CALDWELL]	0	0	0	101	237	377
		0	**0**	**0**	**101**	**237**	**377**
SAN MARCOS, GUADALUPE (L)							
GBRA - MBWSP - SURFACE WATER W/ ASR (OPTION 3C)	GUADALUPE RUN-OF-RIVER [GONZALES]	0	0	1	1	1	1
HAYS/CALDWELL PUA PROJECT	CARRIZO-WILCOX AQUIFER [CALDWELL]	0	0	0	1	1	2

Projected Water Management Strategies
TWDB 2017 State Water Plan Data

WUG, Basin (RWPG) All values are in acre-feet

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
MUNICIPAL WATER CONSERVATION (SUBURBAN)	DEMAND REDUCTION [CALDWELL]	0	0	0	0	1	1
REUSE - SAN MARCOS	DIRECT REUSE [HAYS]	0	1	1	1	2	2
		0	**1**	**2**	**3**	**5**	**6**
UHLAND, GUADALUPE (L)							
MUNICIPAL WATER CONSERVATION (RURAL)	DEMAND REDUCTION [CALDWELL]	0	0	0	0	2	6
		0	**0**	**0**	**0**	**2**	**6**
Sum of Projected Water Management Strategies (acre-feet)		**2,953**	**2,869**	**2,938**	**3,540**	**4,291**	**5,305**

HAYS COUNTY

WUG, Basin (RWPG) All values are in acre-feet

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
AUSTIN, COLORADO (K)							
DROUGHT MANAGEMENT	DEMAND REDUCTION [HAYS]	1	13	25	63	152	275
		1	**13**	**25**	**63**	**152**	**275**
BUDA, COLORADO (K)							
DIRECT REUSE - BUDA	DIRECT REUSE [HAYS]	2,240	2,240	1,740	1,740	1,740	1,740
DROUGHT MANAGEMENT	DEMAND REDUCTION [HAYS]	177	251	342	456	586	734
EDWARDS / MIDDLE TRINITY ASR	TRINITY AQUIFER ASR [HAYS]	0	600	600	600	600	600
HCPUA PIPELINE - REGION K RECOMMENDED	CARRIZO-WILCOX AQUIFER [GONZALES]	0	667	1,690	2,467	2,467	2,467
MUNICIPAL CONSERVATION - BUDA	DEMAND REDUCTION [HAYS]	88	206	434	552	709	888
SALINE EDWARDS ASR	EDWARDS AQUIFER ASR [TRAVIS]	0	100	100	100	100	100
SALINE EDWARDS ASR (SALINE)	EDWARDS-BFZ AQUIFER [TRAVIS]	0	400	400	400	400	400
		2,505	**4,464**	**5,306**	**6,315**	**6,602**	**6,929**
COUNTY-OTHER, HAYS, COLORADO (K)							
BRUSH CONTROL	COLORADO RUN-OF-RIVER [HAYS]	425	425	425	425	425	425
DROUGHT MANAGEMENT	DEMAND REDUCTION [HAYS]	466	554	693	852	987	1,121
EDWARDS / MIDDLE TRINITY ASR	TRINITY AQUIFER ASR [HAYS]	0	200	200	200	200	200

Projected Water Management Strategies
TWDB 2017 State Water Plan Data

WUG, Basin (RWPG) All values are in acre-feet

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
HAYS COUNTY PIPELINE - REGION K RECOMMENDED	CARRIZO-WILCOX AQUIFER [GONZALES]	0	2,000	2,000	2,000	2,000	2,000
SALINE EDWARDS ASR	EDWARDS AQUIFER ASR [TRAVIS]	0	100	100	100	100	100
SALINE EDWARDS ASR (SALINE)	EDWARDS-BFZ AQUIFER [TRAVIS]	0	100	100	100	100	100
		891	**3,379**	**3,518**	**3,677**	**3,812**	**3,946**
DRIPPING SPRINGS, COLORADO (K)							
DROUGHT MANAGEMENT	DEMAND REDUCTION [HAYS]	96	107	122	141	163	188
HAYS COUNTY PIPELINE - REGION K RECOMMENDED	CARRIZO-WILCOX AQUIFER [GONZALES]	0	0	0	0	134	407
MUNICIPAL CONSERVATION - DRIPPING SPRINGS	DEMAND REDUCTION [HAYS]	48	67	98	141	195	262
WATER PURCHASE	HIGHLAND LAKES LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	31	104	198	173	0
		144	**205**	**324**	**480**	**665**	**857**
DRIPPING SPRINGS WSC, COLORADO (K)							
DROUGHT MANAGEMENT	DEMAND REDUCTION [HAYS]	107	136	172	218	271	330
HAYS COUNTY PIPELINE - REGION K RECOMMENDED	CARRIZO-WILCOX AQUIFER [GONZALES]	0	1,000	1,000	1,000	866	593
MUNICIPAL CONSERVATION - DRIPPING SPRINGS WSC	DEMAND REDUCTION [HAYS]	54	124	152	187	232	283
		161	**1,260**	**1,324**	**1,405**	**1,369**	**1,206**
GOFORTH SUD, COLORADO (K)							
DROUGHT MANAGEMENT	DEMAND REDUCTION [HAYS]	21	33	46	64	84	106
GBRA - MBWSP - SURFACE WATER W/ ASR (OPTION 3C)	GUADALUPE RUN-OF-RIVER [GONZALES]	0	0	0	0	0	0
MUNICIPAL WATER CONSERVATION (RURAL)	DEMAND REDUCTION [HAYS]	0	0	0	0	0	0
		21	**33**	**46**	**64**	**84**	**106**
MINING, HAYS, COLORADO (K)							
DIRECT REUSE - BUDA	DIRECT REUSE [HAYS]	0	0	500	500	500	500
EDWARDS / MIDDLE TRINITY ASR	TRINITY AQUIFER ASR [HAYS]	0	100	100	100	100	100
EXPANSION OF CURRENT GROUNDWATER SUPPLIES - TRINITY AQUIFER	TRINITY AQUIFER [HAYS]	531	761	1,047	1,047	1,047	1,047
		531	**861**	**1,647**	**1,647**	**1,647**	**1,647**

Projected Water Management Strategies
TWDB 2017 State Water Plan Data

WUG, Basin (RWPG) All values are in acre-feet

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
PLUM CREEK WATER COMPANY, COLORADO (K)							
DROUGHT MANAGEMENT	DEMAND REDUCTION [HAYS]	8	13	14	15	16	16
HAYS/CALDWELL PUA PROJECT	CARRIZO-WILCOX AQUIFER [CALDWELL]	0	37	39	42	43	45
		8	**50**	**53**	**57**	**59**	**61**
WEST TRAVIS COUNTY PUBLIC UTILITY AGENCY, COLORADO (K)							
DROUGHT MANAGEMENT	DEMAND REDUCTION [HAYS]	819	1,152	1,559	2,069	2,645	3,302
HAYS COUNTY PIPELINE - REGION K RECOMMENDED	CARRIZO-WILCOX AQUIFER [GONZALES]	0	1,000	1,000	1,000	1,000	1,000
LCRA - LANE CITY RESERVOIR	LCRA NEW OFF-CHANNEL RESERVOIRS (2020 DECADE) [RESERVOIR]	0	500	2,700	3,000	5,800	5,800
MUNICIPAL CONSERVATION - WEST TRAVIS COUNTY PUA	DEMAND REDUCTION [HAYS]	405	1,070	2,064	3,501	5,348	7,674
		1,224	**3,722**	**7,323**	**9,570**	**14,793**	**17,776**
COUNTY LINE WSC, GUADALUPE (L)							
BRACKISH WILCOX GROUNDWATER FOR CRWA	CARRIZO-WILCOX AQUIFER [WILSON]	0	0	0	187	335	500
CRWA SIESTA PROJECT	DIRECT REUSE [BEXAR]	0	0	25	0	0	0
CRWA SIESTA PROJECT	SAN ANTONIO RUN-OF-RIVER [WILSON]	0	0	31	0	0	0
REUSE - KYLE/COUNTY LINE WSC	DIRECT REUSE [HAYS]	34	35	36	37	38	39
		34	**35**	**92**	**224**	**373**	**539**
COUNTY-OTHER, HAYS, GUADALUPE (L)							
GBRA - MBWSP - SURFACE WATER W/ ASR (OPTION 3C)	GUADALUPE RUN-OF-RIVER [GONZALES]	0	0	0	0	2,029	7,220
TWA REGIONAL CARRIZO AQUIFER DEVELOPMENT	CARRIZO-WILCOX AQUIFER [GONZALES]	0	0	0	1,169	4,685	4,388
TWA TRINITY AQUIFER DEVELOPMENT	TRINITY AQUIFER [COMAL]	0	0	0	0	0	1,263
VISTA RIDGE PROJECT	CARRIZO-WILCOX AQUIFER [BURLESON]	3,781	5,000	5,000	5,000	5,000	5,000
		3,781	**5,000**	**5,000**	**6,169**	**11,714**	**17,871**
CRYSTAL CLEAR WSC, GUADALUPE (L)							
CRWA WELLS RANCH PROJECT PHASE II	CARRIZO-WILCOX AQUIFER [GUADALUPE]	75	261	317	0	0	0
HAYS/CALDWELL PUA PROJECT	CARRIZO-WILCOX AQUIFER [CALDWELL]	124	296	243	577	597	621
MUNICIPAL WATER CONSERVATION (RURAL)	DEMAND REDUCTION [HAYS]	0	0	0	0	0	22

Projected Water Management Strategies
TWDB 2017 State Water Plan Data

WUG, Basin (RWPG) All values are in acre-feet

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
		199	**557**	**560**	**577**	**597**	**643**
GOFORTH SUD, GUADALUPE (L)							
GBRA - MBWSP - SURFACE WATER W/ ASR (OPTION 3C)	GUADALUPE RUN-OF-RIVER [GONZALES]	0	0	0	0	0	525
MUNICIPAL WATER CONSERVATION (RURAL)	DEMAND REDUCTION [HAYS]	0	0	0	0	0	2
		0	**0**	**0**	**0**	**0**	**527**
KYLE, GUADALUPE (L)							
HAYS/CALDWELL PUA PROJECT	CARRIZO-WILCOX AQUIFER [CALDWELL]	0	1,163	2,616	2,602	2,591	2,598
MUNICIPAL WATER CONSERVATION (SUBURBAN)	DEMAND REDUCTION [HAYS]	0	0	0	53	266	480
REUSE - KYLE/COUNTY LINE WSC	DIRECT REUSE [HAYS]	2,329	3,591	4,318	4,284	4,172	4,063
		2,329	**4,754**	**6,934**	**6,939**	**7,029**	**7,141**
MOUNTAIN CITY, GUADALUPE (L)							
DROUGHT MANAGEMENT - MOUNTAIN CITY	DEMAND REDUCTION [HAYS]	1	0	0	0	0	0
EDWARDS / MIDDLE TRINITY ASR	TRINITY AQUIFER ASR [HAYS]	0	44	44	44	44	44
LOCAL TRINITY AQUIFER DEVELOPMENT	TRINITY AQUIFER [HAYS]	60	60	60	60	60	60
MUNICIPAL WATER CONSERVATION (RURAL)	DEMAND REDUCTION [HAYS]	0	0	0	0	0	1
		61	**104**	**104**	**104**	**104**	**105**
NIEDERWALD, GUADALUPE (L)							
DROUGHT MANAGEMENT - NIEDERWALD	DEMAND REDUCTION [HAYS]	3	0	0	0	0	0
GBRA - MBWSP - SURFACE WATER W/ ASR (OPTION 3C)	GUADALUPE RUN-OF-RIVER [GONZALES]	49	65	85	111	140	174
		52	**65**	**85**	**111**	**140**	**174**
PLUM CREEK WATER COMPANY, GUADALUPE (L)							
HAYS/CALDWELL PUA PROJECT	CARRIZO-WILCOX AQUIFER [CALDWELL]	0	148	146	143	142	140
LOCAL TRINITY AQUIFER DEVELOPMENT	TRINITY AQUIFER [HAYS]	0	185	185	185	185	185
		0	**333**	**331**	**328**	**327**	**325**
SAN MARCOS, GUADALUPE (L)							
GBRA - MBWSP - SURFACE WATER W/ ASR (OPTION 3C)	GUADALUPE RUN-OF-RIVER [GONZALES]	0	0	2,379	3,470	4,580	5,716
HAYS/CALDWELL PUA PROJECT	CARRIZO-WILCOX AQUIFER [CALDWELL]	0	0	0	1,964	4,575	7,889
MUNICIPAL WATER CONSERVATION (SUBURBAN)	DEMAND REDUCTION [HAYS]	179	778	1,122	1,684	2,506	3,587

Projected Water Management Strategies
TWDB 2017 State Water Plan Data

WUG, Basin (RWPG) All values are in acre-feet

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
REUSE - SAN MARCOS	DIRECT REUSE [HAYS]	1,932	2,886	3,959	5,206	6,654	8,339
		2,111	**3,664**	**7,460**	**12,324**	**18,315**	**25,531**
UHLAND, GUADALUPE (L)							
MUNICIPAL WATER CONSERVATION (RURAL)	DEMAND REDUCTION [HAYS]	0	0	0	0	3	13
		0	**0**	**0**	**0**	**3**	**13**
WIMBERLEY, GUADALUPE (L)							
GBRA - MBWSP - SURFACE WATER W/ ASR (OPTION 3C)	GUADALUPE RUN-OF-RIVER [GONZALES]	0	0	74	356	678	933
MUNICIPAL WATER CONSERVATION (RURAL)	DEMAND REDUCTION [HAYS]	10	55	78	123	187	272
TWA REGIONAL CARRIZO AQUIFER DEVELOPMENT	CARRIZO-WILCOX AQUIFER [GONZALES]	0	0	100	100	100	100
TWA TRINITY AQUIFER DEVELOPMENT	TRINITY AQUIFER [COMAL]	0	0	0	0	0	113
		10	**55**	**252**	**579**	**965**	**1,418**
WIMBERLEY WSC, GUADALUPE (L)							
GBRA - MBWSP - SURFACE WATER W/ ASR (OPTION 3C)	GUADALUPE RUN-OF-RIVER [GONZALES]	0	0	136	464	834	1,123
TWA REGIONAL CARRIZO AQUIFER DEVELOPMENT	CARRIZO-WILCOX AQUIFER [GONZALES]	0	0	100	100	100	100
TWA TRINITY AQUIFER DEVELOPMENT	TRINITY AQUIFER [COMAL]	0	0	0	0	0	133
		0	**0**	**236**	**564**	**934**	**1,356**
WOODCREEK, GUADALUPE (L)							
MUNICIPAL WATER CONSERVATION (SUBURBAN)	DEMAND REDUCTION [HAYS]	10	25	31	41	57	76
		10	**25**	**31**	**41**	**57**	**76**
Sum of Projected Water Management Strategies (acre-feet)		**14,073**	**28,579**	**40,651**	**51,238**	**69,741**	**88,522**

TRAVIS COUNTY

WUG, Basin (RWPG) All values are in acre-feet

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
AQUA WSC, COLORADO (K)							
DROUGHT MANAGEMENT	DEMAND REDUCTION [TRAVIS]	163	184	204	229	251	272
MUNICIPAL CONSERVATION - AQUA WSC	DEMAND REDUCTION [TRAVIS]	74	94	87	87	96	103

Projected Water Management Strategies
TWDB 2017 State Water Plan Data

WUG, Basin (RWPG) All values are in acre-feet

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
		237	**278**	**291**	**316**	**347**	**375**
AUSTIN, COLORADO (K)							
CITY OF AUSTIN - AQUIFER STORAGE AND RECOVERY	TRINITY AQUIFER ASR [TRAVIS]	10,000	25,000	25,000	50,000	50,000	50,000
CITY OF AUSTIN - CAPTURE LOCAL INFLOWS TO LADY BIRD LAKE	COLORADO RUN-OF-RIVER [TRAVIS]	1,000	1,000	1,000	1,000	1,000	1,000
CITY OF AUSTIN - CONSERVATION	DEMAND REDUCTION [TRAVIS]	22,969	24,559	28,317	31,220	33,822	36,899
CITY OF AUSTIN - DIRECT REUSE	DIRECT REUSE [TRAVIS]	5,429	10,429	20,429	22,929	25,429	27,929
CITY OF AUSTIN - INDIRECT POTABLE REUSE THROUGH LADY BIRD LAKE	INDIRECT REUSE [TRAVIS]	20,000	20,000	20,000	20,000	20,000	20,000
CITY OF AUSTIN - LAKE AUSTIN OPERATIONS	COLORADO RUN-OF-RIVER [TRAVIS]	2,500	2,500	2,500	2,500	2,500	2,500
CITY OF AUSTIN - LAKE LONG ENHANCED STORAGE	LAKE LONG/RESERVOIR [RESERVOIR]	20,000	20,000	20,000	20,000	20,000	20,000
CITY OF AUSTIN - LONGHORN DAM OPERATION IMPROVEMENTS	COLORADO RUN-OF-RIVER [TRAVIS]	3,000	3,000	3,000	3,000	3,000	3,000
CITY OF AUSTIN - OTHER REUSE	DIRECT REUSE [TRAVIS]	1,000	1,000	1,500	2,000	2,500	3,000
CITY OF AUSTIN - RAINWATER HARVESTING	RAINWATER HARVESTING [TRAVIS]	83	828	4,141	8,282	12,423	16,564
CITY OF AUSTIN RETURN FLOWS	INDIRECT REUSE [TRAVIS]	19,258	17,749	22,990	22,874	26,759	30,312
DROUGHT MANAGEMENT	DEMAND REDUCTION [TRAVIS]	15,745	18,293	20,997	22,989	24,659	26,641
		120,984	**144,358**	**169,874**	**206,794**	**222,092**	**237,845**
BARTON CREEK WEST WSC, COLORADO (K)							
DROUGHT MANAGEMENT	DEMAND REDUCTION [TRAVIS]	65	64	64	63	63	63
MUNICIPAL CONSERVATION - BARTON CREEK WEST WSC	DEMAND REDUCTION [TRAVIS]	42	77	108	122	137	152
		107	**141**	**172**	**185**	**200**	**215**
BEE CAVE, COLORADO (K)							
DROUGHT MANAGEMENT	DEMAND REDUCTION [TRAVIS]	355	409	459	516	567	614
LCRA - LANE CITY RESERVOIR	LCRA NEW OFF-CHANNEL RESERVOIRS (2020 DECADE) [RESERVOIR]	300	300	600	600	800	800
MUNICIPAL CONSERVATION - BEE CAVE VILLAGE	DEMAND REDUCTION [TRAVIS]	175	374	608	863	1,136	1,323
		830	**1,083**	**1,667**	**1,979**	**2,503**	**2,737**
BRIARCLIFF, COLORADO (K)							
DROUGHT MANAGEMENT	DEMAND REDUCTION [TRAVIS]	26	30	33	37	40	44
		26	**30**	**33**	**37**	**40**	**44**

Projected Water Management Strategies
TWDB 2017 State Water Plan Data

WUG, Basin (RWPG) All values are in acre-feet

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
CEDAR PARK, COLORADO (K)							
BRUSHY CREEK RUA-EXISTING CONTRACTS	HIGHLAND LAKES LAKE/RESERVOIR SYSTEM [RESERVOIR]	170	175	15	0	0	0
DROUGHT MANAGEMENT	DEMAND REDUCTION [TRAVIS]	486	516	553	553	552	552
MUNICIPAL CONSERVATION - CEDAR PARK	DEMAND REDUCTION [TRAVIS]	246	479	614	724	822	921
MUNICIPAL WATER CONSERVATION (SUBURBAN) - CEDAR PARK	DEMAND REDUCTION [TRAVIS]	89	287	492	542	540	539
		991	**1,457**	**1,674**	**1,819**	**1,914**	**2,012**
COUNTY-OTHER, TRAVIS, COLORADO (K)							
BRUSH CONTROL	COLORADO RUN-OF-RIVER [TRAVIS]	425	425	425	425	425	425
		425	**425**	**425**	**425**	**425**	**425**
CREEDMOOR-MAHA WSC, COLORADO (K)							
DROUGHT MANAGEMENT	DEMAND REDUCTION [TRAVIS]	28	31	34	38	41	45
LCRA - MID BASIN RESERVOIR	LCRA NEW OFF-CHANNEL RESERVOIRS (2020 DECADE) [RESERVOIR]	0	400	400	400	400	400
SALINE EDWARDS ASR	EDWARDS AQUIFER ASR [TRAVIS]	0	101	101	101	101	101
SALINE EDWARDS ASR (SALINE)	EDWARDS-BFZ AQUIFER [TRAVIS]	0	199	199	199	199	199
		28	**731**	**734**	**738**	**741**	**745**
CREEDMOOR-MAHA WSC, GUADALUPE (K)							
DROUGHT MANAGEMENT	DEMAND REDUCTION [TRAVIS]	1	2	2	2	2	2
		1	**2**	**2**	**2**	**2**	**2**
ELGIN, COLORADO (K)							
DROUGHT MANAGEMENT	DEMAND REDUCTION [TRAVIS]	38	53	67	83	98	112
LCRA - LANE CITY RESERVOIR	LCRA NEW OFF-CHANNEL RESERVOIRS (2020 DECADE) [RESERVOIR]	0	48	129	222	304	381
		38	**101**	**196**	**305**	**402**	**493**
GOFORTH SUD, GUADALUPE (K)							
DROUGHT MANAGEMENT	DEMAND REDUCTION [TRAVIS]	2	3	3	3	3	4
GBRA - MBWSP - SURFACE WATER W/ ASR (OPTION 3C)	GUADALUPE RUN-OF-RIVER [GONZALES]	0	0	0	0	0	0

Projected Water Management Strategies
TWDB 2017 State Water Plan Data

WUG, Basin (RWPG) All values are in acre-feet

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
MUNICIPAL WATER CONSERVATION (RURAL)	DEMAND REDUCTION [TRAVIS]	0	0	0	0	0	0
		2	**3**	**3**	**3**	**3**	**4**
JONESTOWN, COLORADO (K)							
DROUGHT MANAGEMENT	DEMAND REDUCTION [TRAVIS]	82	86	90	95	99	104
MUNICIPAL CONSERVATION - JONESTOWN	DEMAND REDUCTION [TRAVIS]	20	36	51	73	96	122
		102	**122**	**141**	**168**	**195**	**226**
LAGO VISTA, COLORADO (K)							
DROUGHT MANAGEMENT	DEMAND REDUCTION [TRAVIS]	374	437	498	566	628	686
MUNICIPAL CONSERVATION - LAGO VISTA	DEMAND REDUCTION [TRAVIS]	187	301	426	604	773	972
		561	**738**	**924**	**1,170**	**1,401**	**1,658**
LAKEWAY, COLORADO (K)							
DROUGHT MANAGEMENT	DEMAND REDUCTION [TRAVIS]	1,395	1,823	1,819	1,816	1,815	1,815
EXPANSION OF CURRENT GROUNDWATER SUPPLIES - TRINITY AQUIFER	TRINITY AQUIFER [TRAVIS]	500	500	500	500	500	500
LCRA - LANE CITY RESERVOIR	LCRA NEW OFF-CHANNEL RESERVOIRS (2020 DECADE) [RESERVOIR]	1,000	1,000	1,000	1,000	1,000	1,000
MUNICIPAL CONSERVATION - LAKEWAY	DEMAND REDUCTION [TRAVIS]	702	1,652	2,408	3,052	3,640	3,921
		3,597	**4,975**	**5,727**	**6,368**	**6,955**	**7,236**
LEANDER, COLORADO (K)							
BRUSHY CREEK RUA-EXISTING CONTRACTS	HIGHLAND LAKES LAKE/RESERVOIR SYSTEM [RESERVOIR]	2,967	4,136	4,588	2,891	2,368	1,988
DROUGHT MANAGEMENT	DEMAND REDUCTION [TRAVIS]	170	436	753	813	843	882
LCRA - LANE CITY RESERVOIR	LCRA NEW OFF-CHANNEL RESERVOIRS (2020 DECADE) [RESERVOIR]	0	0	0	662	1,576	2,349
		3,137	**4,572**	**5,341**	**4,366**	**4,787**	**5,219**
LOOP 360 WSC, COLORADO (K)							
DROUGHT MANAGEMENT	DEMAND REDUCTION [TRAVIS]	176	183	190	197	204	211
MUNICIPAL CONSERVATION - LOOP 360 WSC	DEMAND REDUCTION [TRAVIS]	116	224	333	441	546	648
		292	**407**	**523**	**638**	**750**	**859**

Projected Water Management Strategies
TWDB 2017 State Water Plan Data

WUG, Basin (RWPG) All values are in acre-feet

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
LOST CREEK MUD, COLORADO (K)							
DROUGHT MANAGEMENT	DEMAND REDUCTION [TRAVIS]	218	214	211	211	211	211
MUNICIPAL CONSERVATION - LOST CREEK MUD	DEMAND REDUCTION [TRAVIS]	108	137	171	215	254	294
		326	**351**	**382**	**426**	**465**	**505**
MANOR, COLORADO (K)							
DROUGHT MANAGEMENT	DEMAND REDUCTION [TRAVIS]	171	234	294	362	422	477
EXPANSION OF CURRENT GROUNDWATER SUPPLIES - TRINITY AQUIFER	TRINITY AQUIFER [TRAVIS]	0	600	600	600	600	600
		171	**834**	**894**	**962**	**1,022**	**1,077**
MANVILLE WSC, COLORADO (K)							
DROUGHT MANAGEMENT	DEMAND REDUCTION [TRAVIS]	448	541	630	733	825	911
EXPANSION OF CURRENT GROUNDWATER SUPPLIES - TRINITY AQUIFER	TRINITY AQUIFER [TRAVIS]	0	0	0	1,000	1,000	1,000
LCRA - MID BASIN RESERVOIR	LCRA NEW OFF-CHANNEL RESERVOIRS (2020 DECADE) [RESERVOIR]	0	0	0	500	2,000	2,000
		448	**541**	**630**	**2,233**	**3,825**	**3,911**
MUSTANG RIDGE, COLORADO (K)							
MUNICIPAL WATER CONSERVATION (RURAL)	DEMAND REDUCTION [TRAVIS]	0	0	0	0	0	0
		0	**0**	**0**	**0**	**0**	**0**
MUSTANG RIDGE, GUADALUPE (K)							
MUNICIPAL WATER CONSERVATION (RURAL)	DEMAND REDUCTION [TRAVIS]	0	0	0	0	0	0
		0	**0**	**0**	**0**	**0**	**0**
NORTH AUSTIN MUD #1, COLORADO (K)							
DROUGHT MANAGEMENT	DEMAND REDUCTION [TRAVIS]	12	12	12	11	11	11
		12	**12**	**12**	**11**	**11**	**11**
NORTHTOWN MUD, COLORADO (K)							
DROUGHT MANAGEMENT	DEMAND REDUCTION [TRAVIS]	104	120	135	152	167	180
		104	**120**	**135**	**152**	**167**	**180**

Projected Water Management Strategies
TWDB 2017 State Water Plan Data

WUG, Basin (RWPG) All values are in acre-feet

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
PFLUGERVILLE, COLORADO (K)							
DIRECT REUSE - PFLUGERVILLE	DIRECT REUSE [TRAVIS]	500	1,000	2,000	2,000	4,000	4,000
DROUGHT MANAGEMENT	DEMAND REDUCTION [TRAVIS]	3,194	4,276	5,311	6,474	7,503	8,463
EXPANSION OF CURRENT GROUNDWATER SUPPLIES - EDWARDS-BFZ AQUIFER	EDWARDS-BFZ AQUIFER [TRAVIS]	0	0	1,000	1,000	1,000	1,000
LCRA - LANE CITY RESERVOIR	LCRA NEW OFF-CHANNEL RESERVOIRS (2020 DECADE) [RESERVOIR]	0	0	0	3,000	3,000	4,000
LCRA - MID BASIN RESERVOIR	LCRA NEW OFF-CHANNEL RESERVOIRS (2020 DECADE) [RESERVOIR]	0	0	0	0	0	2,000
MUNICIPAL CONSERVATION - PFLUGERVILLE	DEMAND REDUCTION [TRAVIS]	604	2,105	2,625	3,029	3,514	3,966
		4,298	**7,381**	**10,936**	**15,503**	**19,017**	**23,429**
POINT VENTURE, COLORADO (K)							
DROUGHT MANAGEMENT	DEMAND REDUCTION [TRAVIS]	52	66	80	96	109	122
LCRA - LANE CITY RESERVOIR	LCRA NEW OFF-CHANNEL RESERVOIRS (2020 DECADE) [RESERVOIR]	0	100	100	300	300	300
MUNICIPAL CONSERVATION - POINT VENTURE	DEMAND REDUCTION [TRAVIS]	34	82	139	191	241	301
		86	**248**	**319**	**587**	**650**	**723**
ROLLINGWOOD, COLORADO (K)							
DROUGHT MANAGEMENT	DEMAND REDUCTION [TRAVIS]	58	57	56	56	56	57
LCRA - MID BASIN RESERVOIR	LCRA NEW OFF-CHANNEL RESERVOIRS (2020 DECADE) [RESERVOIR]	0	400	400	400	400	400
MUNICIPAL CONSERVATION - ROLLINGWOOD	DEMAND REDUCTION [TRAVIS]	38	67	79	91	104	118
		96	**524**	**535**	**547**	**560**	**575**
ROUND ROCK, COLORADO (K)							
ADDITIONAL ADVANCED CONSERVATION - ROUND ROCK	DEMAND REDUCTION [TRAVIS]	0	0	10	24	40	59
BRA SYSTEM OPERATIONS-LITTLE RIVER	BRAZOS RIVER AUTHORITY LITTLE RIVER LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	1	3	14	15	17
BRUSHY CREEK RUA-EXISTING CONTRACTS	HIGHLAND LAKES LAKE/RESERVOIR SYSTEM [RESERVOIR]	265	244	219	203	186	170

Projected Water Management Strategies
TWDB 2017 State Water Plan Data

WUG, Basin (RWPG) All values are in acre-feet

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
DROUGHT MANAGEMENT	DEMAND REDUCTION [TRAVIS]	19	21	24	26	29	31
LITTLE RIVER OCR	LITTLE RIVER OFF-CHANNEL LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	25	76
MUNICIPAL CONSERVATION - ROUND ROCK	DEMAND REDUCTION [TRAVIS]	13	11	10	8	9	10
MUNICIPAL WATER CONSERVATION (SUBURBAN) - ROUND ROCK	DEMAND REDUCTION [TRAVIS]	6	1	0	0	0	0
		303	**278**	**266**	**275**	**304**	**363**
SHADY HOLLOW MUD, COLORADO (K)							
DROUGHT MANAGEMENT	DEMAND REDUCTION [TRAVIS]	117	114	111	110	110	110
MUNICIPAL CONSERVATION - SHADY HOLLOW MUD	DEMAND REDUCTION [TRAVIS]	38	16	0	0	0	0
		155	**130**	**111**	**110**	**110**	**110**
STEAM ELECTRIC POWER, TRAVIS, COLORADO (K)							
CITY OF AUSTIN - DIRECT REUSE	DIRECT REUSE [TRAVIS]	3,500	7,500	7,500	8,500	9,500	10,500
LCRA - MID BASIN RESERVOIR	LCRA NEW OFF-CHANNEL RESERVOIRS (2020 DECADE) [RESERVOIR]	0	0	0	0	4,543	11,030
		3,500	**7,500**	**7,500**	**8,500**	**14,043**	**21,530**
SUNSET VALLEY, COLORADO (K)							
DEVELOPMENT OF NEW GROUNDWATER SUPPLIES - TRINITY AQUIFER	TRINITY AQUIFER [TRAVIS]	0	0	200	200	200	200
DROUGHT MANAGEMENT	DEMAND REDUCTION [TRAVIS]	116	150	182	218	250	280
EDWARDS / MIDDLE TRINITY ASR	TRINITY AQUIFER ASR [HAYS]	0	200	200	200	200	200
LCRA - MID BASIN RESERVOIR	LCRA NEW OFF-CHANNEL RESERVOIRS (2020 DECADE) [RESERVOIR]	0	715	715	715	715	715
MUNICIPAL CONSERVATION - SUNSET VALLEY	DEMAND REDUCTION [TRAVIS]	38	90	158	241	305	366
		154	**1,155**	**1,455**	**1,574**	**1,670**	**1,761**
THE HILLS, COLORADO (K)							
DROUGHT MANAGEMENT	DEMAND REDUCTION [TRAVIS]	217	217	216	216	216	216
MUNICIPAL CONSERVATION - THE HILLS	DEMAND REDUCTION [TRAVIS]	144	272	386	487	581	665
		361	**489**	**602**	**703**	**797**	**881**

Projected Water Management Strategies
TWDB 2017 State Water Plan Data

WUG, Basin (RWPG) All values are in acre-feet

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
TRAVIS COUNTY MUD #4, COLORADO (K)							
DROUGHT MANAGEMENT	DEMAND REDUCTION [TRAVIS]	522	602	677	762	837	907
MUNICIPAL CONSERVATION - TRAVIS COUNTY MUD #4	DEMAND REDUCTION [TRAVIS]	262	564	912	1,302	1,705	2,114
		784	**1,166**	**1,589**	**2,064**	**2,542**	**3,021**
TRAVIS COUNTY WCID #10, COLORADO (K)							
DROUGHT MANAGEMENT	DEMAND REDUCTION [TRAVIS]	532	607	679	761	835	905
LCRA - LANE CITY RESERVOIR	LCRA NEW OFF-CHANNEL RESERVOIRS (2020 DECADE) [RESERVOIR]	0	3,000	3,000	3,000	3,000	3,000
MUNICIPAL CONSERVATION - TRAVIS COUNTY WCID #10	DEMAND REDUCTION [TRAVIS]	213	445	707	996	1,316	1,533
		745	**4,052**	**4,386**	**4,757**	**5,151**	**5,438**
TRAVIS COUNTY WCID #17, COLORADO (K)							
DROUGHT MANAGEMENT	DEMAND REDUCTION [TRAVIS]	1,268	1,508	1,653	1,678	1,722	1,776
LCRA - LANE CITY RESERVOIR	LCRA NEW OFF-CHANNEL RESERVOIRS (2020 DECADE) [RESERVOIR]	1,000	2,000	2,000	2,000	2,000	2,000
MUNICIPAL CONSERVATION - TRAVIS COUNTY WCID #17	DEMAND REDUCTION [TRAVIS]	853	1,825	2,399	2,889	3,325	4,645
		3,121	**5,333**	**6,052**	**6,567**	**7,047**	**8,421**
TRAVIS COUNTY WCID #18, COLORADO (K)							
DROUGHT MANAGEMENT	DEMAND REDUCTION [TRAVIS]	168	190	211	236	259	280
MUNICIPAL CONSERVATION - TRAVIS COUNTY WCID #18	DEMAND REDUCTION [TRAVIS]	60	95	87	87	96	104
		228	**285**	**298**	**323**	**355**	**384**
TRAVIS COUNTY WCID #19, COLORADO (K)							
DROUGHT MANAGEMENT	DEMAND REDUCTION [TRAVIS]	100	99	99	99	99	99
MUNICIPAL CONSERVATION - TRAVIS COUNTY WCID #19	DEMAND REDUCTION [TRAVIS]	50	92	131	166	199	229
		150	**191**	**230**	**265**	**298**	**328**
TRAVIS COUNTY WCID #20, COLORADO (K)							
DROUGHT MANAGEMENT	DEMAND REDUCTION [TRAVIS]	118	117	117	117	116	116
MUNICIPAL CONSERVATION - TRAVIS COUNTY WCID #20	DEMAND REDUCTION [TRAVIS]	59	110	153	197	234	268
		177	**227**	**270**	**314**	**350**	**384**

Projected Water Management Strategies
TWDB 2017 State Water Plan Data

WUG, Basin (RWPG) All values are in acre-feet

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
VOLENTE, COLORADO (K)							
DROUGHT MANAGEMENT	DEMAND REDUCTION [TRAVIS]	4	4	5	6	7	7
LCRA - LANE CITY RESERVOIR	LCRA NEW OFF-CHANNEL RESERVOIRS (2020 DECADE) [RESERVOIR]	142	142	142	142	142	142
		146	**146**	**147**	**148**	**149**	**149**
WELLS BRANCH MUD, COLORADO (K)							
DROUGHT MANAGEMENT	DEMAND REDUCTION [TRAVIS]	82	80	79	78	78	78
		82	**80**	**79**	**78**	**78**	**78**
WEST LAKE HILLS, COLORADO (K)							
DROUGHT MANAGEMENT	DEMAND REDUCTION [TRAVIS]	313	310	308	307	306	306
LCRA - MID BASIN RESERVOIR	LCRA NEW OFF-CHANNEL RESERVOIRS (2020 DECADE) [RESERVOIR]	0	1,300	1,300	1,300	1,300	1,300
MUNICIPAL CONSERVATION - WEST LAKE HILLS	DEMAND REDUCTION [TRAVIS]	157	286	398	505	609	700
		470	**1,896**	**2,006**	**2,112**	**2,215**	**2,306**
WEST TRAVIS COUNTY PUBLIC UTILITY AGENCY, COLORADO (K)							
DROUGHT MANAGEMENT	DEMAND REDUCTION [TRAVIS]	473	544	611	688	755	818
LCRA - LANE CITY RESERVOIR	LCRA NEW OFF-CHANNEL RESERVOIRS (2020 DECADE) [RESERVOIR]	0	200	200	400	400	400
MUNICIPAL CONSERVATION - WEST TRAVIS COUNTY PUA	DEMAND REDUCTION [TRAVIS]	234	505	809	1,164	1,526	1,900
		707	**1,249**	**1,620**	**2,252**	**2,681**	**3,118**
WILLIAMSON-TRAVIS COUNTY MUD #1, COLORADO (K)							
DROUGHT MANAGEMENT	DEMAND REDUCTION [TRAVIS]	23	22	22	22	22	22
		23	**22**	**22**	**22**	**22**	**22**
Sum of Projected Water Management Strategies (acre-feet)		**148,005**	**193,633**	**228,203**	**275,798**	**306,286**	**338,800**

III. TWDB Groundwater Availability Model Run

GAM Run 08-37

By Mr. Wade Oliver
Texas Water Development Board
Groundwater Availability Modeling Section
(512) 463-3132
June 20, 2008

EXECUTIVE SUMMARY:

Texas State Water Code, Section 36.1071, Subsection (h), states that, in developing its groundwater management plan, groundwater conservation districts shall use groundwater availability modeling information provided by the Executive Administrator of the Texas Water Development Board in conjunction with any available site-specific information provided by the district for review and comment to the Executive Administrator. Information derived from groundwater availability models that shall be included in groundwater management plans include:

(1) the annual amount of recharge from precipitation to the groundwater resources within the district, if any;
(2) for each aquifer within the district, the annual volume of water that discharges from the aquifer to springs and any surface water bodies, including lakes, streams, and rivers; and
(3) the annual volume of flow into and out of the district within each aquifer and between aquifers in the district.

The purpose of this groundwater availability model run is to provide information to the Barton Springs/Edwards Aquifer Conservation District needed for its groundwater management plan. The groundwater management plan for the Barton Springs/Edwards Aquifer Conservation District is due for approval by the Executive Administrator of the Texas Water Development Board before December 29, 2008.

This report discusses the methods, assumptions, and results from model runs using the groundwater availability model for the Barton Springs segment of the Edwards (Balcones Fault Zone) Aquifer. Table 1 summarizes the groundwater availability model data required by statute for the Barton Springs/Edwards Aquifer Conservation Districts groundwater management plan.

Although the Trinity Aquifer also occurs in Hays and Travis counties, the groundwater availability model for the Hill Country portion of the Trinity Aquifer does not include the segment of the aquifer that underlies the Barton Springs/Edwards Aquifer Conservation District. If the district would like information for the Trinity Aquifer, they may request it from the Groundwater Technical Assistance Section of the Texas Water Development Board.

METHODS:

We ran the groundwater availability model for the Barton Springs segment of the Edwards (Balcones Fault Zone) Aquifer and extracted water budget values for recharge, surface water outflow, inflow to the district, and outflow from the district for the steady-state simulation period for the portions of the Edwards (Balcones Fault Zone) Aquifer located within the district.

PARAMETERS AND ASSUMPTIONS:

- We used version 1.01 of the groundwater availability model for the Barton Springs segment of the Edwards (Balcones Fault Zone) Aquifer.

- We used the steady-state model, which was based on recharge for a twenty year period (1979 through 1998), instead of the transient simulation, which encompassed 1989 to 1998, since the transient simulation represented a timeframe that was wetter than normal. The recharge used for the steady-state model appeared to cover a cycle that represents more average climatic conditions.

- The root mean squared error (a measure of the difference between simulated and measured discharge during model calibration) for Barton Springs is 12 cubic feet per second, which represents 11 percent of the discharge fluctuations measured at Barton Springs during that time (Scanlon and others, 2001).

- The Barton Springs segment of the Edwards (Balcones Fault Zone) Aquifer groundwater availability model is a one-layer model and assumes no interaction with the underlying Trinity Aquifer. The cells are 1,000 feet long parallel to the strike of the faults and 500 feet wide.

- We used Processing Modflow for Windows (PMWIN) version 5.3 (Chiang and Kinzelbach, 2001) as the interface to process model output.

RESULTS:

A groundwater budget summarizes the water entering and leaving the aquifer according to the groundwater availability model. Selected components were extracted from the groundwater budget for the calibrated steady-state portion of the model run. The components of the modified budgets shown in Table 1 include:

- Precipitation recharge—This is the areally distributed recharge sourced from precipitation falling on the outcrop areas of the aquifers (where the aquifer is exposed at land surface) within the district.

- Surface water outflow—This is the total water exiting the aquifer (outflow) to surface water features such as streams, reservoirs, and drains (springs).

- Lateral flow into and out of district—This component describes lateral flow within the aquifer between the district and adjacent counties.

- Net inter-aquifer flow—This describes the vertical flow, or leakage, between aquifers or confining units. This flow is controlled by the relative water levels in each aquifer or confining unit and aquifer properties of each aquifer or confining unit that define the amount of leakage that occurs. "Inflow" to an aquifer from an overlying or underlying aquifer will always equal the "Outflow" from the other aquifer. This model is a single-layer and does not include inter-aquifer flow.

The information needed for the district's management plan is summarized in Table 1. It is important to note that sub-regional water budgets are not exact. This is due to the size of the model cells and the approach used to extract data from the model. To avoid double accounting, a model cell that straddles a political boundary, such as district or county boundaries, is assigned to one side of the boundary based on the location of the centroid of the model cell. For example, if a cell contains two counties, the cell is assigned to the county where the centroid of the cell is located. The orientation of the model cells and the political boundaries of the district do not overlie perfectly, therefore even though the district is larger than the model boundaries, some flow into and out of the district is reported due to the method of data extraction from the model (Scanlon and others, 2001: see figure 2 for an overlay of the model boundaries and the district boundaries http://www.twdb.state.tx.us/gam/ebfz_b/ED-b_final.pdf).

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Table 1: Summarized information needed for the Barton Springs/Edwards Aquifer Conservation District's groundwater management plan. All values are reported in acre-feet per year. All numbers are rounded to the nearest 1 acre-foot. Negative values indicate water is leaving the aquifer system using the parameters or boundaries listed in the table.

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Edwards and associated limestones	42,858[a]
Estimated annual volume of water that discharges from the aquifer to springs and any surface water body including lakes, streams, and rivers	Edwards and associated limestones	-39,723
Estimated annual volume of flow into the district within each aquifer in the district	Edwards and associated limestones	3,191[b]
Estimated annual volume of flow out of the district within each aquifer in the district	Edwards and associated limestones	-2,651[b]
Estimated net annual volume of flow between each aquifer in the district	Edwards into Trinity	0[c]

[a] Recharge value includes concentrated infiltration of water from stream channels. Scanlon and others (2001) postulated that approximately 15 percent of recharge in the model was due to diffuse inter-stream recharge, or direct precipitation, which equates to approximately 6,429 acre-feet per year.

[b] The orientation of the model cells and the political boundaries of the district do not overlie perfectly, therefore even though the district is larger than the model boundaries, some flow into and out of the district is reported due to the method of data extraction from the model.

[c] The model does not consider flow into or out of the Edwards (Balcones Fault Zone) Aquifer from other formations.

Cynthia K. Ridgeway is Manager of the Groundwater Availability Modeling Section and is responsible for oversight of work performed by employees under her direct supervision. The seal appearing on this document was authorized by Cynthia K. Ridgeway, P.G., on June 20, 2008.

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