Annual Report for FY 2021 Period (September 2020 - August 2021)

Permit # TE 10607- 0

Endangered Species Act Section l0(a)(1)(B) Permit for the Incidental Take of the Barton Springs Salamander *(Eurycea sosorum)* **and Austin Blind Salamander** *(Eurycea waterlooensis)* **for Managed Groundwater Withdrawals from the Barton Springs Segment of the Edwards Aquifer**

Contents

1.0 Introduction and Background

The Barton Springs/Edwards Aquifer Conservation District's ("District") Habitat Conservation Plan (HCP) and Incidental Take Permit (ITP) require the District to report annually on the status of the District's program implementation and achievement of conservation measures and objectives. This document is the Annual Report for Fiscal Year 2021, covering the period September 1, 2020 – August 31, 2021(reporting period).

According to the Incidental Take Permit, the Annual Report shall cover:

1. Descriptions of Covered Activities undertaken;
2. Reported groundwater withdrawals from permitted wells;
3. Reference well levels;
4. Springflow at Barton Springs;
5. Total Aquifer discharge, measured for permitted wells, estimated for exempt wells, gaged/measured for Barton Springs, and estimated for Cold & Deep Eddy Springs;
6. Drought-stage management reductions;
7. Estimated actual take, if any, for the annual reporting period, and total cumulative take for the ITP term;
8. Minimization measures and actions taken during the prior year;
9. Mitigation actions taken during the year and updates on any ongoing mitigation actions;
10. An evaluation of the effectiveness of the avoidance, minimization, and conservation measures;
11. Adaptive management activities undertaken during the year or indicated as prudent by outcomes of the conservation program;
12. Expenditures by the District on implementation activities;
13. Any species-specific or aquifer research compiled or completed during the prior year;
14. Proposed activities for the next year;
15. Recommendations for improvement; and
16. Any other appropriate information documenting Permittee's compliance with the Permit.

This introduction 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. Included as part of the introduction is a background and an overview of the following:

1.1 General Information about the District
1.2 Management of Groundwater Resources in the District
1.3 Implementation of Management Plan and Habitat Conservation Plan
1.4 Background on District's Incidental Take Permit (ITP)

Other major report sections that follow include a summary of the District's minimization measures and mitigation actions taken during the reporting year, a review of drought management activities, and aquifer status, and an outlook for planned activities.

Additionally, included as Appendix D of this annual report, is a summary of the meeting discussion and comments received from the HCP Management Advisory Committee (MAC). The District established an HCP MAC to advise and assist the Board in coordination of conservation activities affecting Covered Species at Barton Springs, and in monitoring and helping the Board improve implementation of the District HCP. The MAC provides an additional measure to ensure continued improvement of the HCP and compliance with the ITP, and ensures the Board is aware of stakeholder concerns regarding execution of and revisions to the HCP. The primary purpose of the MAC is to review and comment on the District's HCP annual reports, or on selected aspects of those reports, in its role to provide continuing improvement recommendations. At the Board's discretion, the MAC may also be requested to:

- Provide a forum for exchange of information relative to Covered Species,
- Provide ad hoc advice on Covered Species management activities,
- Advise the District on priorities for conservation actions, as warranted, and
- Provide input and recommendations, as warranted, on the development and implementation of actions through the adaptive management program.

The MAC was appointed by the District Board in early 2013 and includes independent, volunteer representatives with biological or natural-resource management responsibilities from designated interest groups. MAC composition focused on perspectives useful to the active management of the Aquifer and habitat of Covered Species at Barton Springs. The U.S. Fish and Wildlife Service (Service) was also requested to provide a non-voting representative to be liaison between the District, the Service, and the MAC. The MAC will convene in some manner appropriate to the purpose of each meeting and no less frequently than annually, and at such other times as they decide or as requested by the Board.

1.1 General Information about 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, groundwater conservation districts (GCDs), such as the District, have been established across the state and authorized to modify how the Rule of Capture shall 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 Texas Water Code (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 Chapter 36. 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 appropriate rules needed to protect and manage groundwater resources within their boundaries given consideration to conditions and factors unique to each GCD.

In addition to Chapter 36 authority, the District has 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.

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 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 as show in Figure 1. 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. The District participates in joint-regional planning with these and other GCDs in Groundwater Management Areas (GMAs) 9 and 10 which are configured generally to encompass the Trinity and Edwards Aquifers, respectively.

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 for some parts of the District, and is a 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 over time the region has become more urban in areas of south Austin, Buda, Kyle, and San Marcos. Groundwater use in the area is now primarily for domestic and public water-supply purposes, with lesser amounts utilized for commercial, irrigation, and industrial use. See Figure 2 for a general breakdown of the types of wells in the District and percentage of permitted production for each classification category.

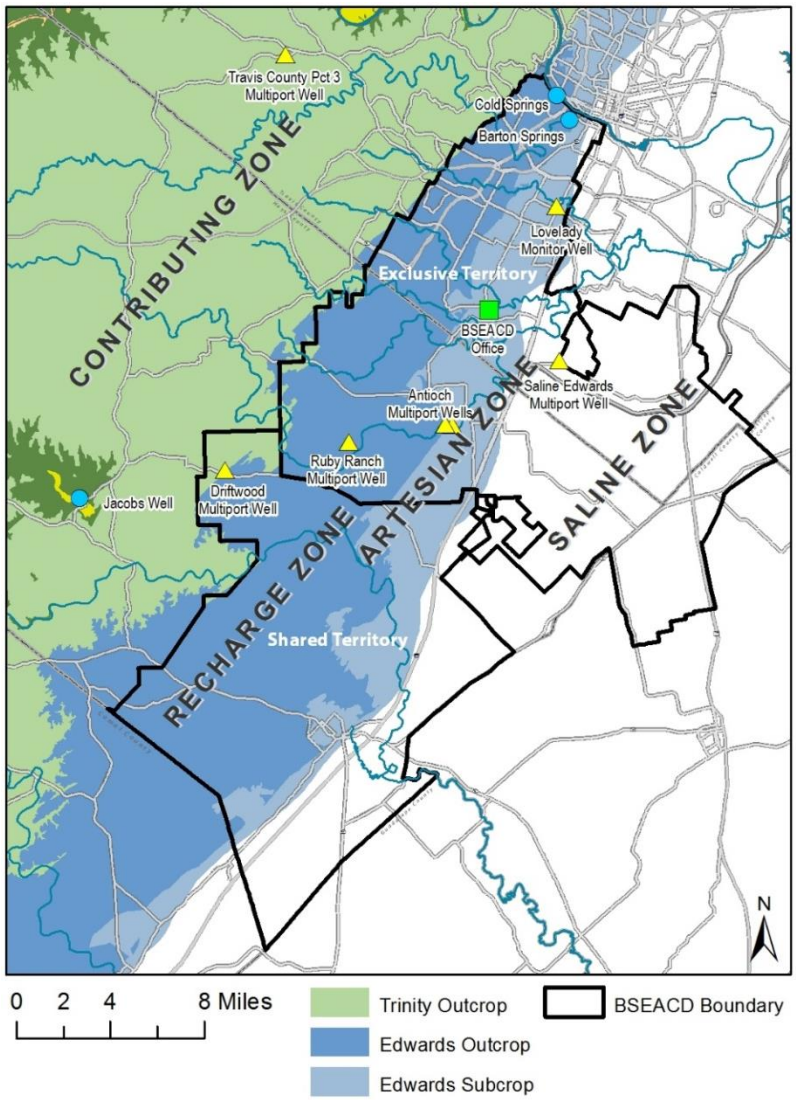

Figure 1. Location of the Barton Springs/Edwards Aquifer Conservation District

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

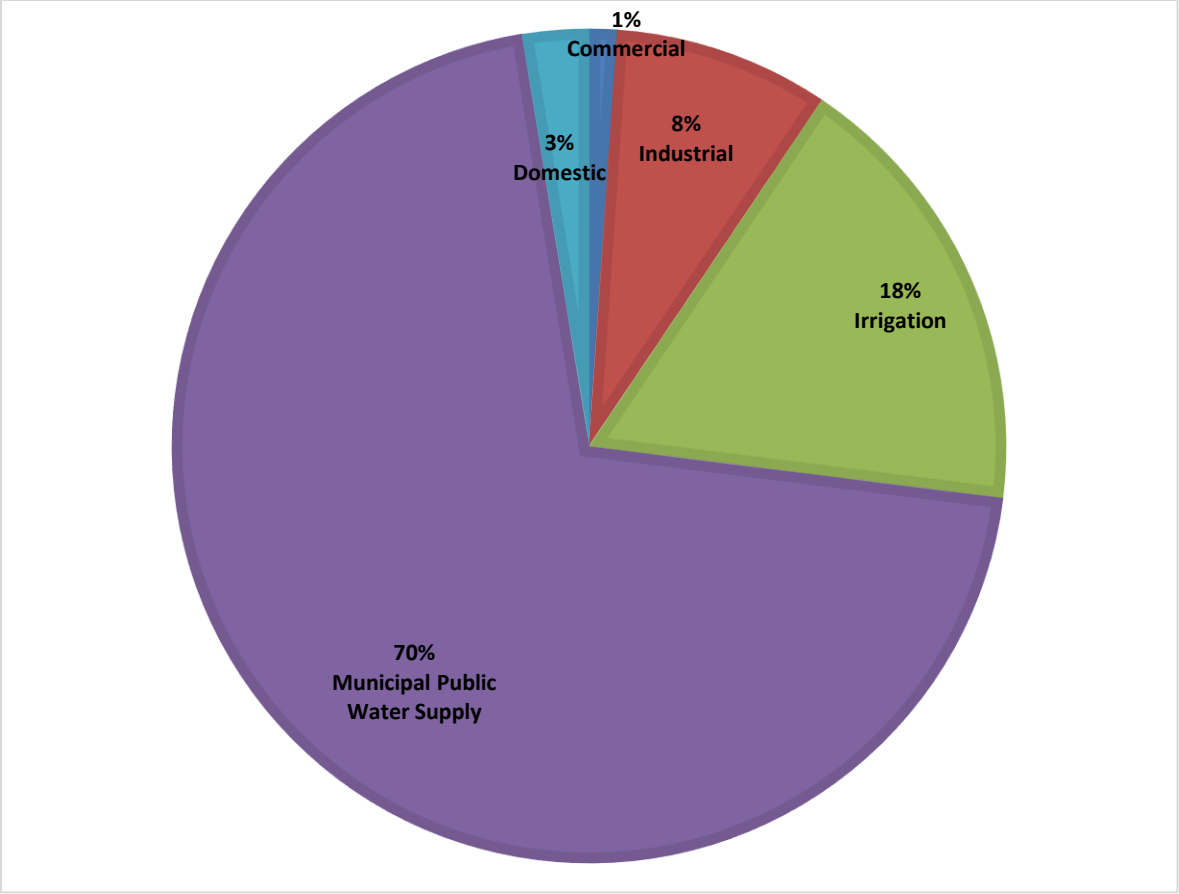

Figure 2. Types of Groundwater Use and Their Percent of Authorized Use for Permitted Wells in the District

1.2 Management of Groundwater Resources in the District

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 District established a precedent for developing the governing policies 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. The evolution of the District's policies and strategies has produced a regulatory program that is fair, innovative, and customized to objectively address 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.

After the passage of HB 3405 in 2015, the District's attention broadened to include management of the Trinity Aquifer and other non-Edwards aquifers in the Shared Territory, development of a permitting program with a refined interest in managing to avoid unreasonable impacts, and an updated definition of sustainable yield. 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 the District's Management Plan (MP) applies a three-part evaluation to affirm beneficial use in accordance with demand-based permitting standards, and to evaluate the full range of potential impacts for each production permit request. The three-part permit evaluation involves an assessment of reasonable non-speculative demand, local scale evaluations, and aquifer scale evaluations. The extent of the evaluation scales with the magnitude of the requested production volume, and the more comprehensive evaluations are reserved for more complex, larger-scale projects that show greater potential to cause unreasonable impacts. More information on the District's permitting program can be found on the District's website here: https://bseacd.org/regulatory/permit-process/

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 creation of the District 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 District aquifers coupled with the findings of the sustainable 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 to implement more effective science-based drought trigger methodology and expand permit-based drought rules and enforcement protocol. The amendments produced milestones in the District's regulatory approach (e.g., conditional permitting, Extreme Drought Withdrawal Limits, the Ecological Flow Reserve, and Management Zones) 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 the District's MP is implemented through User Drought Contingency Plans (UDCPs) that are an integral component required of each production permit. Drought declarations involve continuous evaluation of 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 designated aquifer conditions are met, permittees are required to implement prescribed measures of the UDCPs requiring mandatory curtailments of permitted groundwater production based on permit type (Table 1) and aquifer management zones.

Table 1. Fresh Edwards Permit Types

Permit Type	Use Type	Description
[IPP] NE- Class A Conditional Fresh Edwards	Various Uses: Commercial, Institutional, Industrial, Agricultural, Irrigation, Public Water Supply	This permit applies to the Eastern and Western Fresh Edwards Management zones and is for those registered nonexempt wells approved by the District prior to September 2004. These permits are subject to drought restrictions. These permits have a max curtailment of up to 50%.
[IPP] NE- Class B Conditional Fresh Edwards	Various Uses: Commercial, Institutional, Industrial, Agricultural, Irrigation, Public Water Supply	This permit type applies to the Eastern and Western Fresh Edwards Management zones and is for those registered nonexempt wells approved after April 2007. Wells that have been issued this permit are interruptible and are subject to drought restrictions of up to 100% curtailment during a Stage IV Exceptional Drought.

[IPP] NE- Class C Conditional Fresh Edwards	Various Uses: Commercial, Institutional, Industrial, Agricultural, Irrigation, Public Water Supply, Domestic	This permit type applies to the Eastern and Western Fresh Edwards Management zones and is for those registered nonexempt wells approved after March 2011. Wells that have been issued this permit are interruptible and are subject to drought restrictions of up to 100% curtailment during a Stage IV Exceptional Drought.
[IPP] NE- Class D Conditional Fresh Edwards	Aquifer Storage and Recovery (ASR)	This permit applies to groundwater productions associated with Aquifer Storage and Recovery projects where stored water is recovered and used to supplement or substitute Freshwater Edwards supplies during District Declared Drought.
[IPP] NE – Historical Fresh Edwards	Various Uses: Commercial, Institutional, Industrial, Agricultural, Irrigation, Public Water Supply, Domestic	This permit applies to the Eastern and Western Fresh Edwards Management zones and is for those registered nonexempt wells approved by the District prior to September 2004. **This permit type is no longer issued for new nonexempt wells.** These permits are subject to drought restrictions of up to 50% curtailment during a Stage IV Exceptional Drought

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 as shown in Table 2. 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 as shown in the example drought target chart in Figure 3. 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 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.

Table 2. 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 Management Zone / Permit Type		Edwards Aquifer						Trinity Aquifer			
		Eastern/Western Freshwater					Saline	Lower	Middle	Upper	Outcrop
		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 Limited Production Permits (LPPs) and existing unpermitted nonexempt wells after A to B reclassification triggered by Exceptional Stage declaration.

2 Curtailment > 50% subject to Board discretion.

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

Drought Target Chart

Historic Edwards Production Permit - Permittee

Water Use: Public Water Supply

Permitted Pumpage (GPY): 20,000,000 **UDCP Approved in Fiscal Year:** FY 2020

		Fresh Edwards Management Zone Pumpage Volume Targets During Drought Stages					
	Monthly Volume Allocation	No Drought Baseline	Stage I Water Con. Period (Voluntary)	Stage II Alarm (Mandatory)	Stage III Critical (Mandatory)	Stage IV Exceptional (Mandatory)	Emergency* Response Period (Mandatory)
Fiscal Year		No Reduction	10% Reduction	20% Reduction	30% Reduction	40% Reduction	50% Reduction*
September	10.00%	**2,000,000**	1,800,000	1,600,000	1,400,000	1,200,000	1,000,000
October	8.30%	**1,660,000**	1,494,000	1,328,000	1,162,000	996,000	830,000
November	7.00%	**1,400,000**	1,260,000	1,120,000	980,000	840,000	700,000
December	6.30%	**1,260,000**	1,134,000	1,008,000	882,000	756,000	630,000
January	6.30%	**1,260,000**	1,134,000	1,008,000	882,000	756,000	630,000
February	6.50%	**1,300,000**	1,170,000	1,040,000	910,000	780,000	650,000
March	6.60%	**1,320,000**	1,188,000	1,056,000	924,000	792,000	660,000
April	7.40%	**1,480,000**	1,332,000	1,184,000	1,036,000	888,000	740,000
May	8.00%	**1,600,000**	1,440,000	1,280,000	1,120,000	960,000	800,000
June	9.50%	**1,900,000**	1,710,000	1,520,000	1,330,000	1,140,000	950,000
July	12.10%	**2,420,000**	2,178,000	1,936,000	1,694,000	1,452,000	1,210,000
August	12.00%	**2,400,000**	2,160,000	1,920,000	1,680,000	1,440,000	1,200,000
Annual Totals:	100.00%	**20,000,000**	18,000,000	16,000,000	14,000,000	12,000,000	10,000,000

** ERP(50%) ERP curtailments to be measured as a rolling 90 day average after the first three months of declared ERP.*

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District Representative Date

Permittee Signature Date

Figure 3. Example Permittee Drought Target Chart

1.3 Implementation of Management Plan and Habitat Conservation Plan

The provisions of the District's MP and HCP will be implemented and 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 the District's MP and HCP. The District will encourage cooperation and coordination with relevant entities to implement these plans.

The District adopted and implemented rules necessary to support its mission including rules related to permitting of wells, production and transport of groundwater, and drought management. Rules and policies established by the District are consistent with provisions of these plans and are adopted on the basis of the best available science, public and stakeholder input, and recommendations of competent professionals. Further, the rules comply with TWC Chapter 36 and the District's enabling legislation. All rules are 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/.

In order to achieve the goals, management objectives, and performance standards adopted in these plans, the District continually works to develop, maintain, review, and update rules, policies, and procedures for the various programs and activities described within the MP and HCP. As a means to monitor performance, the District implements

various goals, management objectives, and performance standards adopted in these plans. On an annual basis, the District develops annual reports for the MP and HCP that document progress made towards implementation and achievement of the goals and objectives.

All specific activities undertaken by the District in this FY 2021 reporting period, whether considered as direct or indirect management of the Aquifer are described in more detail in the latest "FY 2021 Management Plan Annual Report," which can be viewed and downloaded at:
https://bseacd.org/uploads/Annual-Report-with-Appendix-A-and-B.pdf

1.4 Background on District's Incidental Take Permit (ITP)

The District is charged with the management of the Barton Springs segment of the Edwards Aquifer ("Aquifer"), which is the primary water supply for more than 60,000 people in the region and the source water for the Barton Springs complex. The District manages this resource by a production permit-based regulatory program for larger, non-exempt wells, and these regulatory program elements constitute the Covered Activities described in the HCP. The overarching strategic purpose of the District is to optimize sustainable uses of groundwater for these users and other community interests.

However, it is established that during drought conditions large amounts of groundwater withdrawals (pumping) will contribute to diminished flow through the Aquifer, smaller springflow rates at Barton Springs, and associated adverse effects to some Aquifer users. The 2004 Sustainable Yield of the Barton Springs Segment report can be viewed at https://bseacd.org/uploads/HR_SustYield_BSEACD_report_2004_web.pdf. The Aquifer and its associated spring outlets are the sole habitat of the federally-protected Barton Springs salamander (BSS) and Austin blind salamander (ABS). The federal Endangered Species Act prohibits the harassment or harm of the salamanders (termed "take") that may incidentally occur as a result of the effect of pumping on decreasing water levels and springflows unless exempted under a federal ITP.

The District's activities that create the need for an HCP and an ITP relate to the District's following programmatic functions for managing groundwater production:

- Adopt, implement, and enforce regulations and management programs that protect existing groundwater supplies, improve aquifer demand management, provide Aquifer and springflow protection during droughts, promote and improve aquifer recharge, and carry out other beneficial management strategies; and

- Avoid, or minimize, and mitigate negative impacts upon federally listed species dependent upon springflow from Barton Springs through adoption and implementation of regulations, management programs, scientific research programs, conservation education programs, and collaborative efforts with other governmental entities.

These activities directly and indirectly affect withdrawals (groundwater production) from the Aquifer. In turn, as a result of the hydrology of the groundwater system, such withdrawals lower the water levels in the Aquifer, which consequently reduces the discharge (springflow or flow) at Barton Springs. There is a well-established relationship, within the observed data range between the flow issuing from the outlets of Barton Springs and the chemistry of the water. As flow decreases, the dissolved oxygen (DO) concentration of the water, which is required by the Covered Species for survival, decreases, and the concentration of dissolved solids increases. This natural variation in water chemistry derives from the physical system of the Aquifer, and it occurs regardless of whether Aquifer water-levels and springflow decreases are due to drought, withdrawals by wells, or both.

During normal and high-flow conditions in the Aquifer, the combined flow of the natural outlets at Barton Springs are minimally affected by the total amount of water that is being withdrawn by wells in the Aquifer. Under these conditions, the District's program elements principally address the long-term sustainability of the Aquifer as a water supply. Under these high-flow conditions, the amount of water withdrawn from the Aquifer by pumping wells and the provisions of the District's regulatory program are believed to have essentially no effect on the chemistry of the springflow. This is because the physical and chemical characteristics of the springflow are mostly attributable to meteorologically-induced stormflows and seasonal factors, and from time to time, other external factors.

Accordingly, essentially no incidental take is attributable to the Covered Activities (lawfully conducted withdrawals from District permitted wells, see HCP Section 4.1, Proposed Covered Activities) when water levels in the Aquifer are above a certain elevation, which determines the flow at the Aquifer's major outlet, Barton Springs.

But during drought, and especially prolonged severe or Extreme Drought, the amount of water naturally discharging from the springs complex (the natural spring outlets taken together) is much smaller, similar in magnitude to the amount of water withdrawn from wells. During these drought conditions, the District's groundwater drought management program is key to preserving groundwater levels in the Aquifer and springflow. The joint and regional water planning conducted by the State, with which the District's MP is integrated, uses a recurrence of the drought of record (DOR) in the 1950s as the planning objective, and the DOR is also the framework for the District's drought management program. The District's integrated regulatory program is designed to protect the water supply of Aquifer users who are most vulnerable to supply interruption during periods of Extreme Drought and to conserve flows at Barton Springs for both ecological and recreational purposes.

During drought periods with low recharge rates, groundwater pumping contributes to diminished rates of springflow at Barton Springs. It is during these drought periods that groundwater levels and springflows decline sufficiently to create conditions in which District-managed activities may create incidental take and the programmatic need for the HCP and the ITP. Circumstances that give rise to such incidental take are discussed in

detail in HCP Section 5.2.2, Spatial and Temporal Extent of Take, and HCP Section 5.2.3, Consideration of Take and Jeopardy.

The cumulative withdrawals of all operating wells in the Aquifer can have significant impact on springflow during drought conditions and can increase the likelihood of low-flow conditions. Since June 2008, despite increased demand for water supplies in the District, withdrawals generally have been reduced as a result of groundwater management policies and regulations of the District and of responses by its permittees to projected shortfalls during severe droughts. As demand for groundwater has increased, the District has gradually changed its drought management and regulatory program to improve the effectiveness of Aquifer and springflow protection, supported by studies and planning for the ongoing HCP development.

The HCP specifies the District's commitment to a set of conservation (avoidance, minimization, and mitigation) measures consistent with statutory authorities of the District and that are based on sound science and effective groundwater management practices. The District's HCP has been formulated and framed in collaboration with other conservation efforts affecting the Covered Species and their respective habitats; that is, the HCP of the City of Austin (COA) for operation and maintenance at Barton Springs Pool and surrounding area, including individual spring outlets (Barton Springs Pool HCP). Well owners and users, especially the District's permittees (the regulated groundwater community), and all citizens who consider Barton Springs an ecological, recreational, and aesthetic resource, are key additional stakeholders for this HCP.

2.0 Descriptions of the Covered Activities Undertaken

The District's ITP allows for continued managed pumping (the covered activity) of the Aquifer by District permittees, provided the proposed HCP measures minimize and mitigate incidental take and avoids jeopardy of salamanders. Ultimately, the HCP measures safeguard continued sustainable use of the Aquifer and survival of the endangered salamanders.

The ITP identifies two categories of Covered Activities: groundwater withdrawals from the Aquifer by nonexempt permittees, and actions necessary to manage potential habitat of the Covered Species in the ITP Area.

Managing Groundwater Withdrawals

Managing groundwater in its jurisdictional area is the primary purpose of a GCD and managing withdrawals of groundwater in accord with its authorities is a primary activity of a GCD. The District employs a set of groundwater-management activities that relate directly to active management of groundwater withdrawals from the Aquifer (and from all aquifers). These active aquifer-management activities are an essential part of the District's groundwater management scheme and generally recur every year, to include:

- Renewal of existing production permits
- Processing of new permit applications

- Installation and operation of wells to monitor groundwater levels and quality
- Participation in joint groundwater planning with other GCDs in relevant groundwater management areas, and monitoring desired future condition (DFC) efficacy and compliance
- Monitoring groundwater drought status and informing the District Board of Directors of changes in drought status and need for responsive action
- Using well site inspections and actual production reports to evaluate compliance with applicable rules and need for potential enforcement actions
- Evaluating permittees' long-term actual withdrawals compared to authorized amounts, and recommending conservation credit awards.
- Assessing the efficacy of existing rules to protect groundwater systems, to promote conservation measures, achieve and maintain applicable DFCs, and as warranted, recommending possible regulatory improvements for Board consideration. (In this reporting period, the Rules were not required to be amended.)

In addition to the recurring activities above, many other important activities conducted are considered as *indirect* management of the Aquifer. Those indirect activities include:

- program-supporting scientific investigations and monitoring, educational and outreach programs, internal and external communications and coordination, and legal support actions;
- initiatives that improve the efficiency and effectiveness of other programs; and
- activities required for governance and administration of a public agency.

Generally, such activities differ in specifics from year to year. Successful groundwater management of the Aquifer under the HCP requires operation and maintenance of a fully functioning GCD in compliance with all applicable statutes and rules in its entire jurisdictional area.

All specific activities undertaken by the District during this reporting period, whether considered as direct or indirect management of the Aquifer, are described in greater detail in Appendix C of this report. Appendix C is intended to reflect the detailed progress, activities and actions implemented by the District to achieve the HCP minimization measures. Appendix C is an excerpt from the FY 2021 Management Plan Annual Report referred to as, *"Appendix B - Assessment of Progress toward Management Plan Goals and Objectives."*

The FY 2021 MP Annual Report comprises a supporting complement to this stand-alone "Habitat Conservation Plan Annual Report" and can be viewed in full and downloaded at: https://bseacd.org/uploads/Annual-Report-with-Appendix-A-and-B.pdf

Managing Potential Habitat of Covered Species

Covered Activities related to managing groundwater withdrawals described above are, by design, intended to protect potential habitat of the Covered Species throughout the Aquifer in an ongoing basis, but especially during critical drought periods when the

endangered species are under additional stress. Covered Activities related more directly to management of potential habitat by the District involve decision-making and actions that support the general Biological Goals and the more explicit, quantitative Biological Objectives expressed in the District HCP's Section 6.1. (https://bseacd.org/uploads/BSEACD_FinalHCPVol.1-Final-for-Submission-to-FWS-4.19.18.pdf). These measures are intended to ensure that reduction in springflow is minimized and corresponding DO concentrations in perennial spring outlets do not fall below specified minimum values under various springflow conditions. Drought indices of Barton Springs coupled with the Lovelady monitor well are the principal method of managing pumping during drought, and thereby preserving habitat.

Both springflow and DO are measured and reported in real-time by the U.S. Geological Survey (USGS). These data can be found online at:
https://waterdata.usgs.gov/tx/nwis/uv/?site_no=08155500&agency_cd=USGS&amp

Water levels are measured and reported in real-time by the USGS. These data can be found online at:
https://waterdata.usgs.gov/tx/nwis/uv/?site_no=301237097464801&PARAmeter_cd=72019

Table 3 provides a summary of DO concentration measured and reported by the USGS. The results are well above the minimum concentrations specified in the Biological Objectives. No unanticipated adverse effects of HCP-related activities on water chemistry were documented in the reporting year. Consequently, no extraordinary District actions, beyond those in the Covered Activities and HCP Conservation Measures, were required to actively manage the potential habitat and comply with the Biological Goals and Objectives.

Table 3. Range of Springflow and Dissolved Oxygen (USGS 08155500)

Month	Historic Mean DO (mg/L)	FY21 DO (mg/L)	Historic Mean Flow (cfs)	FY21 Flow (cfs)
Sep-20	5.6	5.4	59	44
Oct-20	5.8	5.3	58	37
Nov-20	5.8	5.1	59	32
Dec-20	5.9	5.0	60	31
Jan-21	6.2	5.2	63	35
Feb-21	6.1	5.1	65	33
Mar-21	5.9	5.1	67	33
Apr-21	5.9	4.6	68	32
May-21	5.5	5.8	71	63
Jun-21	5.6	5.8	72	87
Jul-21	5.6	6.0	69	80
Aug-21	5.5	5.7	63	76
Mean annual	**5.8**	**5.3**	**65**	**48.5**

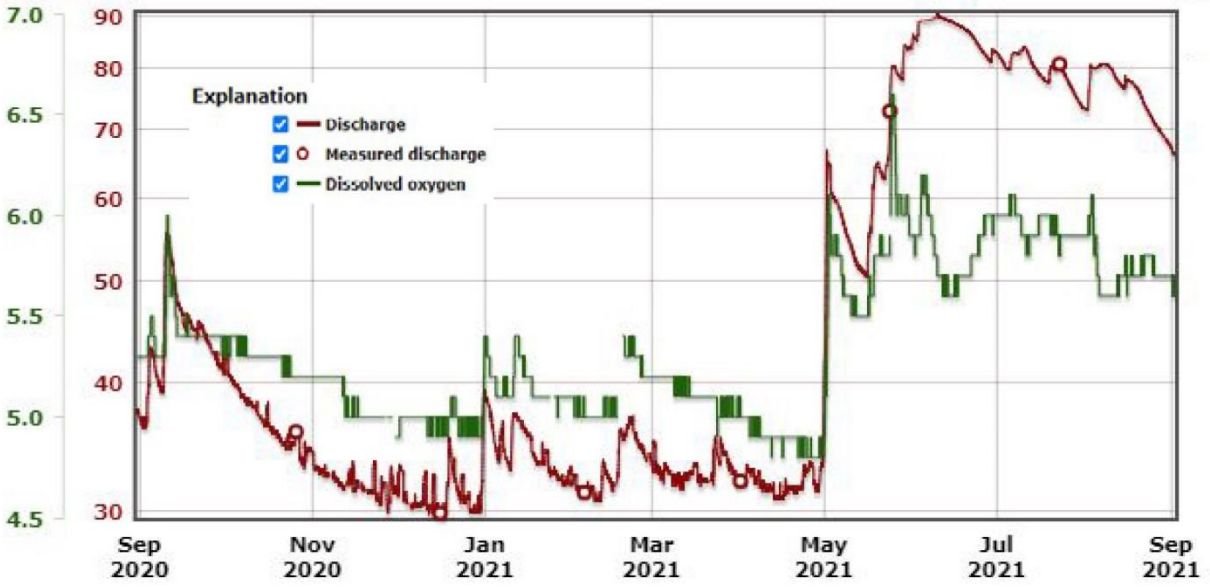


Figure 4. Hydrograph from the USGS of mean daily springflow and DO values.

In addition to considerations arising from the HCP Biological Goals and Objectives, there were two additional activities that specifically relate to management of potential habitat in the reporting period.

1. The District's Validation Monitoring Protocol is used annually to determine if new information suggests that the District's take estimate methodology should be re-evaluated. The results of this evaluation will be part of each HCP Annual Report, Section 16.0 Recommendations for Improvement. The current Validation Monitoring Protocol is included in this Annual Report in Appendix A.
2. In FY 2019, The District and COA executed an Interlocal Agreement (ILA) to facilitate data and information sharing between the parties and collaboration on activities directly related to habitat characterization and protection. The ILA enables more efficient implementation of beneficial HCP Conservation Measures, especially Mitigation Measures. The ILA is included in this Annual Report in Appendix B.

3.0 Reported Groundwater Withdrawals from Permitted Wells

The actual volume of groundwater withdrawn from non-exempt wells, i.e., wells with permits issued by the District, is shown in Table 4, along with the authorized permitted production amounts.

Table 4. Actual and Permitted Nonexempt Production by Management Zone

Table 4a. Individual Production Permits (Nonexempt):

FY 2021 Production from Individual Production Permits		
Production Zone	Actual Production	Permitted Production
Edwards	1,536,470,419 gpy	2,661,877,544 gpy
Trinity	211,451,009 gpy	616,456,117 gpy
Austin Chalk or Alluvial	48,116 gpy	2,500,000 gpy
Total (Gallons)	**1,747,969,544**	**3,280,333,661**
Total (Acre Feet)	5,364.32	10,067

Table 4b. Limited Production Permits (Nonexempt General Permits by Rule):

FY 2021 Production from Limited Production Permits		
Production Zone	Actual Production*	Permitted Production
Edwards	12,641,596	60,500,000
Trinity	5,432,596	26,000,000
Austin Chalk or Alluvial	0	0
Total (Gallons)	**18,074,194**	**86,500,000**
Total (Acre Feet)	55.47	265.46
**Actual production is a volume estimate calculation described in the findings and conclusions of the BSEACD Staff Report 2010. Average annual exempt well production is approximately 104,473 gpy*		

In this reporting period, the volume of groundwater actually withdrawn from the Aquifer was considerably below the permitted volume. In aggregate, the amount of groundwater actually withdrawn from the Edwards Aquifer by permitted wells in the reporting period was **1,549,112,015** gallons compared to the overall permitted volume of 2,722,377,544 gallons.

A summary of the **permitted production volumes** for each Management Zone is provided below in Table 5.

Table 5. Permitted Production by Management Zone

FY 2021 Permitted Production by Management Zone			
Edwards MZs	**Gallons**	**cfs**	**acre-feet**
Historical (Individual)	2,309,582,596	9.79	7,086
Historical (LPP)	2,500,000	0.011	8
Total Historical	*2,312,082,596*	*9.80*	*7,092*
Conditional (Individual)	352,794,948	1.50	1,083
Conditional (LPP)	58,000,000	0.25	178
Total Conditional	***410,794,948***	***1.74***	***1,261***
Total Edwards Aquifer	**2,722,877,544 gal**	**11.54 cfs**	**8,353 ac ft**

Trinity MZs	Gallons	cfs	acre-feet
Historical (Individual)	616,456,117	2.61	1,892
Historical (LPP)	26,000,000	0.11	80
Total Trinity Aquifer	**642,456,117 gal**	**2.72 cfs**	**1,972 ac ft**

Other Aquifers MZs	Gallons	cfs	acre-feet
Historical (Individual)	2,500,000 gal	0.01 cfs	8 ac ft
Historical (LPP)	0	0	0
Total Other Aquifers	2,500,000 gal	0.01 cfs	8 ac ft

Total Permitted (All Aquifers)	3,367,833,661 gal	14.27 cfs	10,332 ac ft

A summary of the **estimated exempt use production volumes** for the Edwards is provided below in Table 6.

Table 6. Exempt Production by Management Zone

Edwards Aquifer - Estimated Exempt Wells Production	
Estimated Volume of Exempt Well Production (gpy)*	105,618,730
Estimated volume in cfs	*0.45*
Estimated number of exempt wells	1010

**2010 BSEACD Staff Report – Avg Exempt Well Use=104,573 gpy*

4.0 Reference Well Levels

The primary reference well that the District uses to gauge overall groundwater levels in the Aquifer, determine drought stages that trigger various elements of the District's drought management program, and estimate take of Covered Species, is the Lovelady well, near the intersection of Stassney Lane and South First Street in South Austin. The hydrograph of this well for the reporting period is shown below.

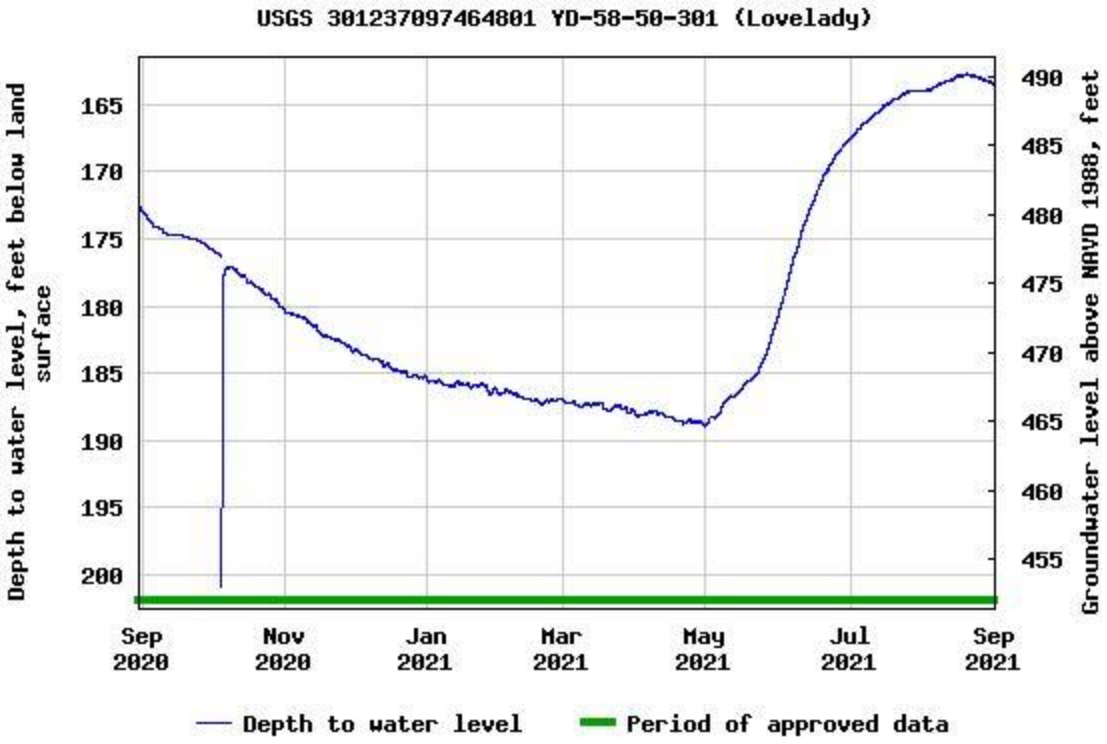


Figure 5. Hydrograph of the Lovelady water level shown as depth to water and elevation. Note: Drawdown event between September and November 2020 is due to Texas State University ecology study using a Grundfos pump to purge the well for several hours.

Data from Barton Springs and the Lovelady well informed the drought management determinations by the District's Board. Following the Drought Trigger Methodology, drought is declared when either Lovelady or Barton Springs reaches their respective thresholds. Non-drought conditions are declared when both Barton Springs and Lovelady well have recovered above the respective drought trigger thresholds. Section 7 describes the drought stage management for this reporting year.

5.0 Springflow at Barton Springs

The hydrograph of the combined springflow at Barton Springs, as indicated by the USGS gage, for the reporting period is shown in Figure 6.

Figure 6. Hydrograph of daily mean Barton Springs flow.

Other statistics concerning spring flows during the reporting period are:

Maximum daily discharge: 97.1 cfs (6/3/2021)
Minimum daily discharge: 28.9 cfs (12/6/2020)
Mean daily discharge: 48 cfs

6.0 Total Aquifer Discharge

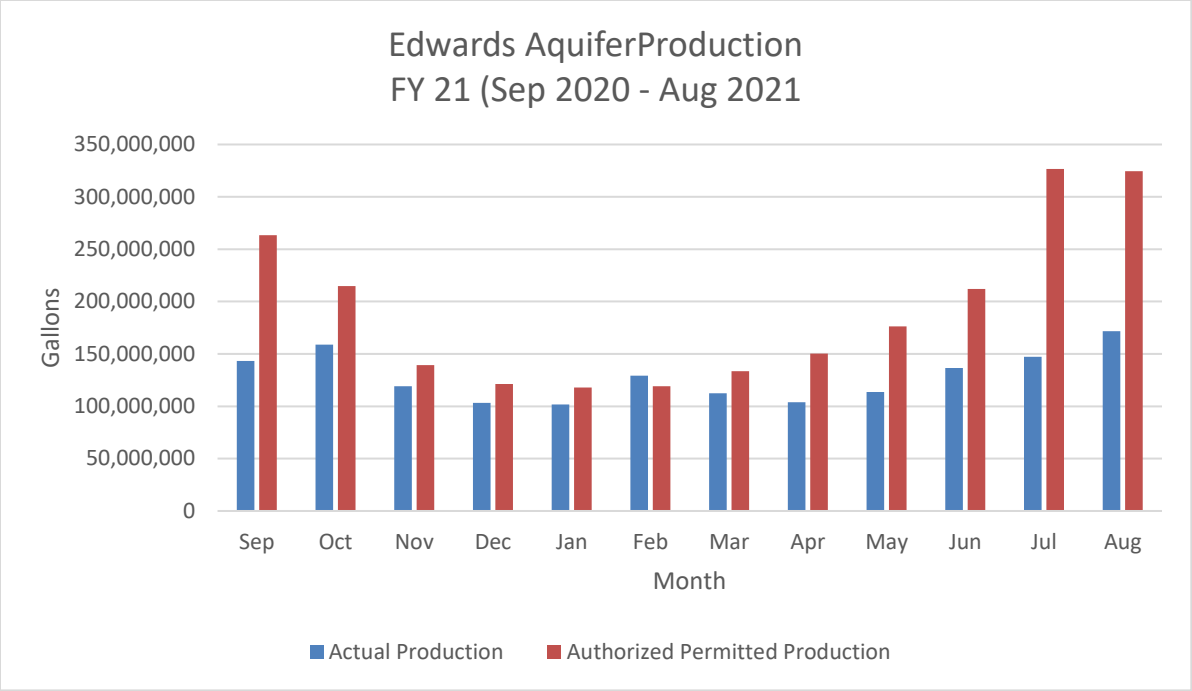
The determination of total Aquifer discharge in any reporting year requires consideration of measured (metered) discharges from permitted wells, the prevailing estimate of use by exempt wells, gaged measurements of combined discharge at Barton Springs, and an estimate of discharge at Cold and Deep Eddy Springs. There is a large degree of uncertainty about the amount of discharge that may flow to the south into the San Antonio segment of the Edwards Aquifer during high-flow conditions. The total actual discharge from the Aquifer by source during FY 2021 is estimated in Table 7.

Table 7. Estimated total discharge from the Barton Springs segment of the Edwards Aquifer

Discharge Source	FY 2021 Actual Volume (gpy)	Equivalent Monthly Mean Flow Rate (cfs)	Comment
Individual Production Permits	1,826,253,544	7.74	Monthly meter measurements; see Section 3 above
Limited Production Permits by Rule	13,779,777	0.06	See Section 3 above
Exempt Wells	105,618,730	0.45	See Section 3 above
Discharge at Barton Springs	11,401,000,000	49	Table 2. Mean daily discharge (USGS)
Discharge at Cold & Deep Eddy Springs	3,490,000,000	15.0	Estimated Mean; cited in Hunt et al., 2019
Total Aquifer Discharge	**19,628,652,051**	**84.3**	

7.0 Drought-stage Management Reductions

The District implements a drought management program that requires mandatory monthly pumpage curtailments during District-declared drought stages for all non-exempt permitted wells with individual production permits.



* The month of February shows an overpumpage of permitted use. This was due to the Winter storm that Texas Experienced. Permittees notified the District of substantial and multiple line breaks from the freeze.

Figure 7. Hydrograph of Monthly Production Limits and Monthly Actual Use.

The District was in Alarm Drought status from October 8, 2020 to July 8, 2021 and no-drought status for the months of September 2020 and August 2021. Figure 7 and Figure 8 reflect the overall trend that collective permittee actual production was on average lower than authorized permitted production allocations, by 758,771,971 gallons, even during Alarm drought.

It should be noted that other factors such as climatic conditions, seasonal trends, and alternative supply sources can contribute to lower actual use trends even in non-drought. However, as stated in the HCP, the District has demonstrated effective drought curtailments and compliance that correspond to longer and more severe drought conditions, such as in 2009 and 2011.

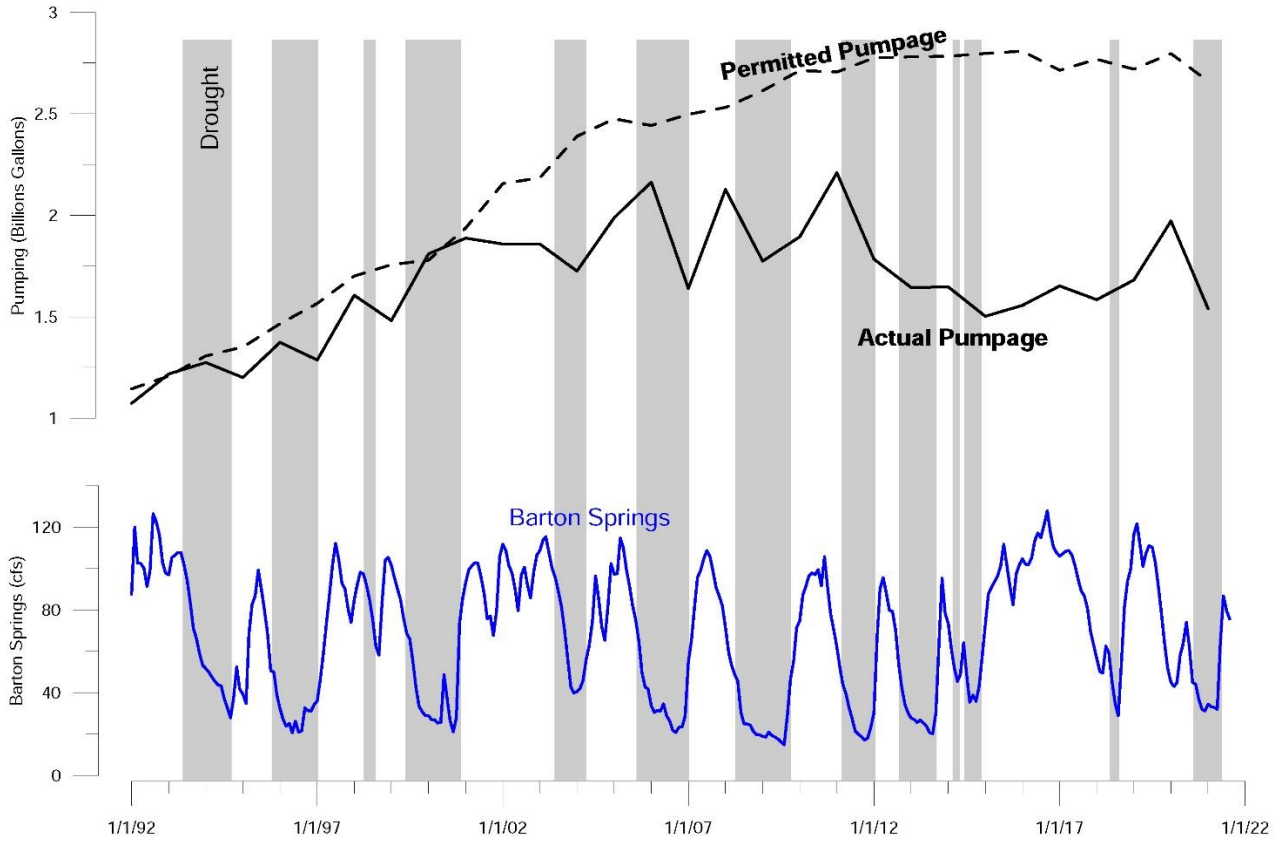


Figure 8 Hydrographs of Edwards Aquifer Production and Barton Springs Flow.

Figure 8 reflects production and spring flow since 1992. The data indicates there has been a trend over the past 20 years of lower total actual production than authorized production in the Edwards Aquifer. This overall trend is likely the result of the District's efforts in public awareness and drought conservation, promotion and support ofPublic Water Suppliers' diversification of source supplies, improved water use efficiencies, and key milestones in the District's science and regulatory framework. Some of those milestones include:

- 2004: Sustainable Yield Study and Conditional Production Permits
- 2005: Drought Trigger Methodology
- 2007: Extreme Drought Withdrawal Limitation (EDWL)
- 2009: Ecological Flow Reserve and Management Zones

8.0 Estimated Annual Take for Reporting Period (if any) and Total Cumulative Take for the ITP Term

The actual annual springflow-related take estimate to be included in the District's Annual Report to the Service involves a straight-forward procedure outlined in Appendix A that indicates the relative percentage of time during which springflow is below a given springflow threshold.

The hydrographs and data presented in Section 2 show that springflow was below the 40 cfs threshold for take for 201 days (6.7 months) during the reporting period. Analysis of the mean daily spring flow and dissolved oxygen hydrograph (figure 4) only indicates take of BSS during the 217-day threshold event during the reporting period. Using the Validation Monitoring protocol proposed by the District and approved by the Service for evaluating take (Appendix A), the District calculates the following amounts of take for the reporting period presented in Table 8.

It is estimated that take of 15 BSS occurs under category A when Barton Springs flow is at or decreases below 40 cfs (Table 8; Circumstance A). This is primarily due to Upper Barton Springs ceasing flow and induces negative behavioral effects. It is further estimated that additional take will occur for both species as a function of the number of months when springflow is between 20 and 30 cfs. Springflow between 20 and 30 cfs did occur for this reporting period. Springflow below 20 cfs (Table 8; Circumstance C) did not occur for this reporting period.

Table 8. Summary of Take

CIRCUMSTANCE	NO. DAYS	NO. MONTHS	BSS TAKE FACTOR	ABS TAKE FACTOR	BSS SUM TAKE	ABS SUM TAKE	COMMENT
A (<40 CFS)	201	6.70	15	0	101	0	Did Occur
B (30-20 CFS)	16	0.53	174	36.6	93	20	Did Occur
C (<20 CFS)	0	0.00	174	36.6	0	0	DId Not Occur
SUM		7.23			194	20	2021 total
					20200	4260	permitted take over 20-yrs
					2	0	Previous year take
					20006	4240	Balance on permit
					1.0%	0.5%	% of total allowed

BSS: Barton Springs salamander; ABS: Austin blind salamander

The estimated take number is derived by the number of months (7.23 months in this case) multiplied by each take factor for each species (Table 8; Circumstance B). Thus, during this reporting period take of BSS is estimated to have been 194 and take of ABS is estimated to have been 20, using the prescribed methodology. We assume that the negative effects were likely behavioral. These amounts of take are added to the previously reported cumulative take amounts, resulting in new cumulative take amounts

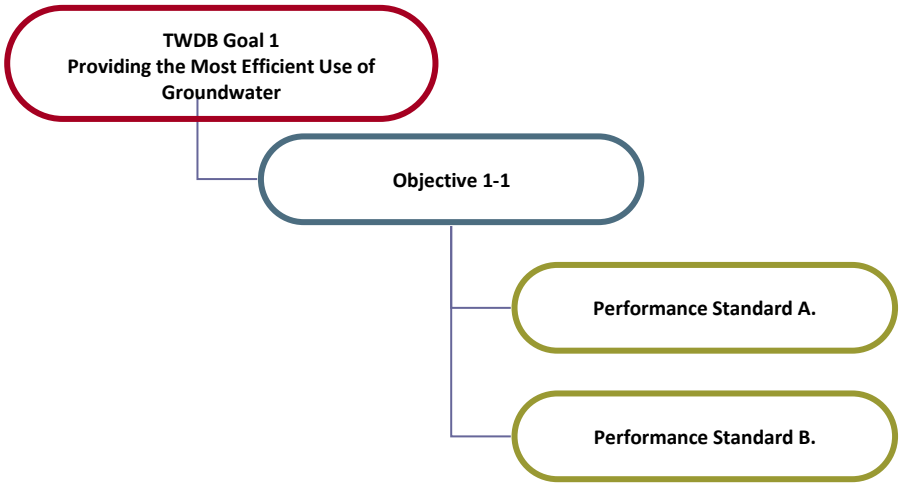
of 242 for BSS and 130 for ABS. For comparison, the authorized total cumulative take estimates for BSS and ABS during the 20-year permit term are 20,200 and 4,260, respectively. This represents 1.0% for BSS and 0.5% for ABS of the authorized total.

There was no take from the DO Augmentation mitigation measure, as those activities in the field have not yet begun.

9.0 Minimization Measures and Action Taken During the Prior Year

Conservation measures to avoid, minimize, and mitigate take by the District are by necessity rooted in the statutory and regulatory requirements for all GCDs in Texas. The Texas Water Development Board (TWDB) has set nine over-arching goals for all GCDs, and in this District, these goals have also been designated as categories of Minimization Measures in its ITP issued by the Service.

Each GCD establishes a hierarchy of objectives and performance standards to achieve its goals that reflect local groundwater management priorities and to ensure its continuing operation as a sustainable organization. The hierarchy is depicted schematically below:



- **Goals** are set by the TWDB. These 9 goals are addressed in the District's Management Plan.
- **Objectives** are set by District Staff/Board. These objectives are the same objectives for the HCP.
- **Performance Standards** are set by District Staff/Board. These performance standards are the same reporting standards that have to be completed for the HCP. Many of these standards have always been reported on in previous Management Plan Annual Reports.

The GCDs' selected objectives and standards are documented in the GCDs' adopted MPs and approved by the TWDB every five years.

As a result of its HCP planning, in its current MP, the District prioritized its objectives and performance standards such that HCP Conservation Measures now coincide with the regular and ongoing groundwater and habitat management activities, i.e., the Covered Activities. Thus, by design and with the TWDB approval of the 2017 Management Plan, the District MP's objectives and performance standards are now aligned with and identical

to the District HCP's conservation measures and their performance standards approved by the Service.

A comprehensive, detailed description of the progress, activities and actions taken by the District in the reporting year for each of the HCP objectives and conservation Measures is included in Appendix C of this HCP Annual Report.

The FY 2021 Management Annual Report can also be viewed at:
https://bseacd.org/uploads/Annual-Report-with-Appendix-A-and-B.pdf

On November 18, 2021, the District's Board of Directors determined that satisfactory progress had been made in FY 2021 toward all goals and objectives of the MP using the relevant performance standards for each. The alignment between the HCP Conservation Measures, the MP objectives and their shared performance standards are provided in Table 9 below.

Table 9. Status and Progress on Management Plan Objectives & Habitat Management Plan Objectives

Teams	General Mgmt. (9 objectives)	Administration (3 objectives)	Education & Outreach (6 objectives)	Aquifer Science (8 objectives)	Reg. Compliance (7 objectives)

TWDB GOAL 1 - Providing the Most Efficient Use of Groundwater – TWC §36.1071(a)(1) [HCP Measures 6.2.1.1 – Providing Most Efficient Use of Groundwater]			
Obj. IDs Mgmt. Plan (HCP ID)	**Management Plan Objectives (HCP Minimization Measure)**	**Performance Standards**	**Objective Status**
1-1 (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.	**MET** *(Appendix C Page 2)*
1-2 (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.	**MET** *(Page 21)*
1-3 (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.	**MET** *(Page 22)*

1-4 (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.	**MET** *(Appendix C Page 4)*
1-5 (NA)	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.	A. Receive a clean financial audit each year. A copy of the auditor's report will be included in the annual report. B. 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.	**MET** *(Appendix C Page 5)*
1-6 (NA)	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.	**MET** *(Appendix C Page 5)*
1-7 (NA)	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.	**MET** *(Appendix C Page 6)*
TWDB GOAL 2 - Controlling and Preventing Waste of Groundwater – TWC §36.1071(a)(2)) [HCP Measures 6.2.1.2 – Controlling and Preventing Waste of Groundwater]			
Obj. IDs Mgmt. Plan (HCP)	**Management Plan Objectives (HCP Minimization Measure)**	**Performance Standards**	**Objective Status**
2-1 (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.	**MET** *(Appendix C Page 7)*

2-2 (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.	**MET** *(Appendix C Page 8)*
2-3 (M-5)	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.	**MET** *(Appendix C Page 9)*
2-4 (NA)	Ensure all firm-yield production permits are evaluated with consideration given to the Reasonable Use doctrine and 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.	**MET** *(Appendix C Page 7)*
TWDB GOAL 3 - Addressing Conjunctive Surface Water Management Issues – TWC §36.1071(a)(4) [HCP Measures 6.2.1.3 – Addressing Conjunctive Surface Water Management Issues]			
Obj. IDs Mgmt. Plan (HCP)	**Management Plan Objectives (HCP Minimization Measure)**	**Performance Standards**	**Objective Status**
3-1 (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.	**MET** *(Appendix C Page 12)*

3-2 (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.	**MET** *(Appendix C Page 12)*
3-3 (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.	**MET** *(Appendix C Page 13)*
3-4 (NA)	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.	**MET** *(Appendix C Page 13)*

TWDB GOAL 4 - Addressing Natural Resource Issues which Impact the Use and Availability of Groundwater, and which are Impacted by the Use of Groundwater – TWC §36.1071(a)(5) [HCP Measures 6.2.1.4 – Addressing Natural Resource Management Issues]			
Obj. IDs Mgmt. Plan (HCP)	**Management Plan Objectives (HCP Minimization Measure)**	**Performance Standards**	**Objective Status**
4-1 (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; **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.	**MET** *(Appendix C Page 14)*
4-2 (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.	**MET** *(Appendix C Page 15)*
4-3 (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.	**MET** *(Appendix C Page 15)*

4-4 (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.	**MET** *(Appendix C Page 16)*
4-5 (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.	**MET** *(Appendix C Page 17)*
TWDB GOAL 5 - Addressing Drought Conditions – TWC §36.1071(a)(6) [HCP Measures 6.2.1.5 – Addressing Drought Conditions]			
Obj. IDs Mgmt. Plan (HCP)	**Management Plan Objectives (HCP Minimization Measure)**	**Performance Standards**	**Objective Status**
5-1 (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.	**MET** *(Page 24 and Appendix C Page 18)*

5-2 (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.	**MET** *(Page 25)*
5-3 (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.	**MET** *(Appendix C Pages 19)*
5-4 (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.	**MET** *(Appendix C Page 20)*

5-5 (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.	**MET** *(Page 21)*
TWDB GOAL 6 - Addressing Conservation & Rainwater Harvesting where Appropriate and Cost Effective –TWC §36.1071(a)(7) **[HCP Measures - 6.2.1.6 Addressing Demand Reduction through Conservation]**			
Obj. IDs Mgmt. Plan (HCP)	**Management Plan Objectives (HCP Minimization Measure)**	**Performance Standards**	**Objective Status**
6-1 (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.	**MET** *(Appendix C Page 22)*
6-2 (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.	**MET** *(Appendix C Page 22)*
6-3 (6-3)	Develop and maintain programs that educate and inform District groundwater users and constituents of all ages about water conservation practices and 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.	**MET** *(Appendix C Page 23)*

TWDB GOAL 7 - Addressing Recharge Enhancement where Appropriate and Cost Effective – TWC §36.1071(a)(7) [HCP Measures - 6.2.1.7 Addressing Supply through Structural Enhancement]			
MP Obj No.	**Management Plan Objectives (HCP Minimization Measure)**	**Performance Standards**	**Objective Status**
7-1 (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.	**MET** *(Appendix C Page 24)*
7-2 (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, and effluent reclamation and re-use, 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.	**MET** *(Appendix C Page 24)*

TWDB GOAL 8 - Addressing the Desired Future Conditions of the Groundwater Resources – TWC §36.1071(a)(8) [HCP Measures - 6.2.1.8 Quantitatively Addressing Established Desired Future Conditions]			
Obj. IDs Mgmt. Plan (HCP)	**Management Plan Objectives (HCP Minimization Measure)**	**Performance Standards**	**Objective Status**
8-1 (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.	**MET** *(Appendix C Page 25)*
8-2 (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.	**MET** *(Appendix C Page 26)*

8-3 (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.	**MET** *(Appendix C Page 26)*

10.0 Mitigation Actions Taken During the Year, and Updates on Any Ongoing Mitigation Measures

In its HCP, the District identified five mitigation measures intended to offset unavoidable take and to otherwise minimize take further. These are characterized in Table 10 below, along with the progress made for each, as of the end of the reporting period.

Most of these mitigation measures require concurrence and/or involvement of other parties, especially the COA.

The District and the COA finalized and executed an ILA in FY 2019. This ILA, provided in Appendix B, will be instrumental in more robustly pursuing certain aspects of the mitigation measures in the upcoming years. Several of the activities characterized in Appendix C, describing progress toward the over-arching HCP goals, also relate to preparation for mitigation actions.

Table 10. Summary of Progress on Mitigation Measures

HCP ID No.	HCP Section 6.2.2.2 Mitigation Measures	Progress or Status as of End of FY 2021
M-1	The District commits to supporting the operations of an existing refugium with facilities capable of maintaining backup populations of the Covered Species to preserve the capacity to re-establish the species in the event of the loss of population due to a catastrophic event such as an unexpected cessation of spring flow or a hazardous materials spill that decimates the species habitat. Such supplemental support would be provided through a commitment of in-kind, contracted support, and/or cash contributions that would contribute to: a. Continuing the study of salamander physiology and/or behavior, and b. Conserving field and captive populations.	Under ILA Section VII.E, the City and District agreed that the District would periodically analyze water chemistry of the source water for the refugium. No sampling and analysis were conducted in the reporting year.
M-2	The District, in cooperation with the City, commits to participating in conducting feasibility studies and, as warranted, pilot and implementation projects to evaluate the potential for beneficial subsurface DO augmentation of flow in the immediate vicinity of the spring outlets and improved surface DO augmentation in the outlets (only) during Extreme Drought conditions. In-kind, contracted support, and/or cash contributions, phased during the term of the permit, may be authorized for feasibility studies and, if a project is feasible, for the pilot study and implementation of the augmentation project.	ILA Section VII.A describes the provisions under which these studies will be conducted. No other progress was made in the reporting year.

M-3	The District commits to extending the currently committed time period to operate the Antioch Recharge Enhancement Facility to continue after the 319(h) grant commitments (September 2014 or later), thereby improving recharge water quality and reducing nonpoint-source pollution at the outlets from runoff events during that time.	The facility continues to be operated by the District. Some upgraded controllers were recently installed to ensure more responsive operation during variable creek flow conditions.
M-4	The District commits to establishing a new reserve fund for plugging abandoned wells to eliminate high-risk abandoned wells as potential conduits for contaminants from the surface or adjacent formations into the aquifer, with priority given to problematic wells close to the Barton Springs outlets and/or associated with water chemistry concerns under severe drought conditions. This reserve fund, which like others under state law has restrictions on its funding and use, would be established within the first year after issuance of the ITP by closing the existing Drought Reserve Account, whose stipulated purpose has been legal defense for drought management, and then by utilizing its current balance to initially fund a new Aquifer Protection Reserve Account. The new account would exist solely to fund plugging of abandoned wells and would be replenished after the first year with any collected enforcement penalties, any drought management fees imposed on larger nonexempt permittees that do not meet their drought curtailments, and an annual budgeted supplement at the discretion of the Board.	Implementation of key elements of this measure will require some additional rulemaking and related Board actions, which haven't yet occurred.

M-5	For the term of the ITP, the District commits to provide leadership and technical assistance to other government entities, organizations, and individuals when prospective land-use and groundwater management activities in those entities' purview will, in the District's assessment, significantly affect the quantity or quality of groundwater in the Aquifer. The District will respond actively and appropriately to legislative initiatives or projects that affect Aquifer characteristics, provided such actions are consistent with established District rules, ongoing initiatives, or existing agreements.	The District has been actively engaged in several activities that relate to this mitigation measure during the reporting period: • Provided technical assistance to GMA 9 related to designing and deploying DFC monitoring networks • Provided technical assistance to Travis County to study hydrogeology of southwestern Travis County and to conduct community outreach as to benefits of groundwater management in this area • Conducted hydrogeologic investigations at Jacob's Well and served on a technical advisory committee to Wimberley Valley Watershed Association on efficacy of Jacob's Well's management zone

11.0 Evaluation of the Effectiveness of the Avoidance, Minimization, and Other Conservation Measures

The District was in Alarm Drought status from October 8, 2020 to July 8, 2021 and no-drought status for the months of September 2020 and August 2021. Figure 7 and Figure 8 reflect the overall trend that collectively, permittees' actual production is on average lower than authorized permitted production allocations even during non-drought conditions. Sustained DO concentrations at the spring outlets have generally been similar to those expected on the basis of the spring flow volumes, which confirms the basis and expected effectiveness for the requisite pumpage reductions for the drought periods.

COA presents data in its 2021 HCP annual report showing that the salamander populations increased during this reporting period, but the increase is within the norms of variability in abundance of such a small population (City of Austin, 2021 Annual Report to Fish and Wildlife Service, January 2022).

As noted in Section 9 above, the District's Board of Directors determined that satisfactory progress was made in FY 2021 toward all HCP MP goals and objectives, using the relevant performance standards for each.

12.0 Adaptive Management Activities Undertaken During the Year, or Indicated as Prudent by Outcomes of the Conservation Program

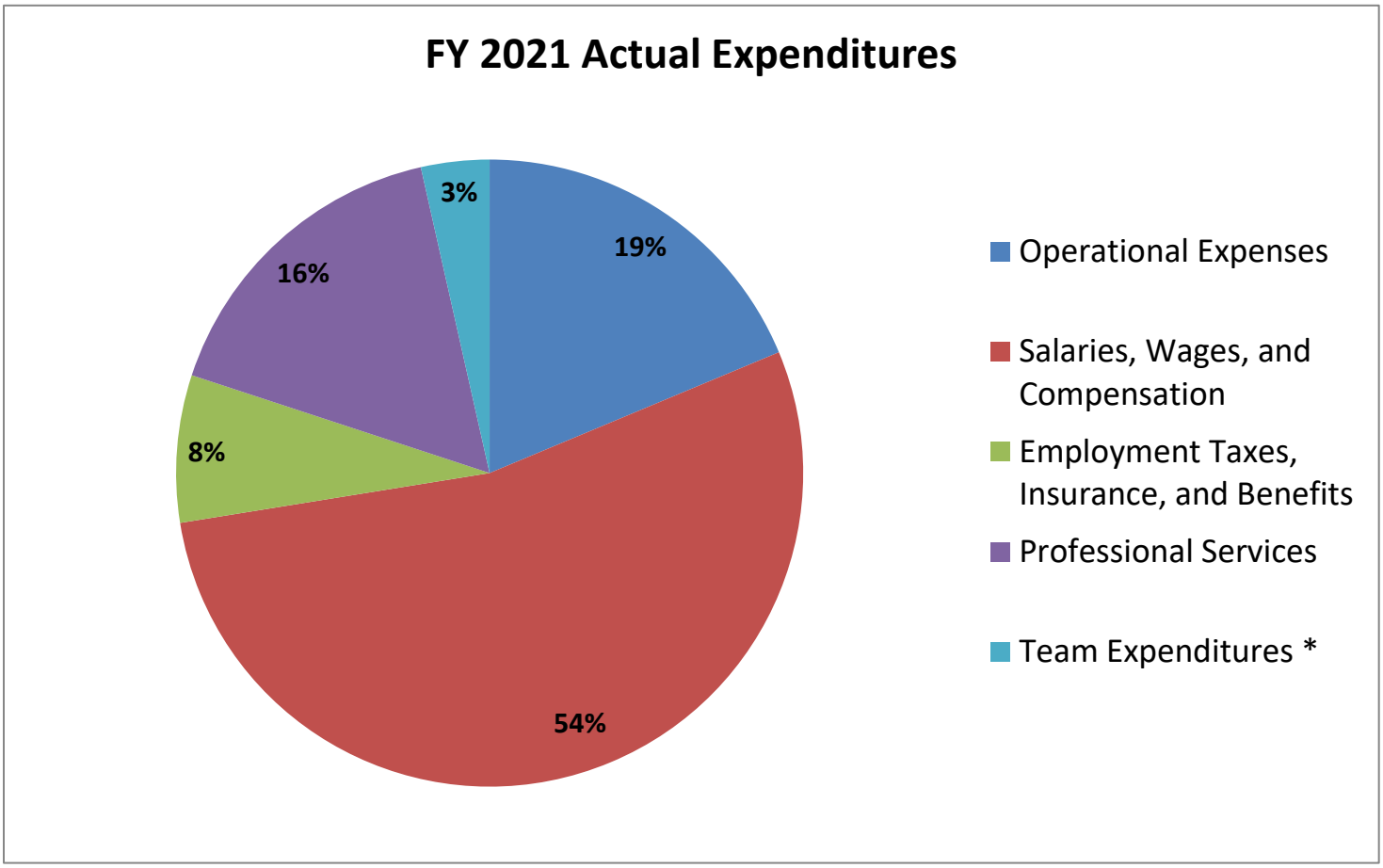
This reporting period was the second one for the District's ITP. No adaptive management activities were identified as needed, and none were undertaken.

13.0 Expenditures by BSEACD on Implementation Activities

By approval of the MP Annual Report, the District's Board of Directors warrants that there were no fiscal year 2021 expenses incurred that were not directly or indirectly related to the execution of this HCP.

Therefore, 100% of the District expenses shown on the accompanying pie chart were considered HCP expenses, and satisfies the minimum commitment funding of no less than 60% of each year's annual budget.

The District's HCP implementation, which integrates the conservation measures and the District's groundwater management program, expended a total of $1,609,369 in FY 2021. The breakdown of these expenses is shown in Figure 9 below.



FY 2021 ACTUAL EXPENDITURES

A.	Operational Expenses	$300,999	18.70%
B.	Salaries, Wages, and Compensation	$865,098	53.75%
C.	Employment Taxes, Insurance, and Benefits	$122,251	7.60%
D.	Professional Services	$264,313	16.42%
E.	Team Expenditures *	$56,707	3.52%
		$1,609,369	**100.00%**

Figure 9. FY 2021 Actual Expenditures.

14.0 Species-specific or Aquifer Research Compiled or Completed During the Prior Year

The District did not conduct species-specific research in the reporting period. It continues to monitor the ongoing salamander-related studies and assessments by the COA, as documented in its own HCP Annual Report. At this time, no additional cooperatively-funded, species-specific research needs have been identified.

Most of the District's hydrogeologic research in the reporting period was focused on the Trinity Aquifer and in areas outside the ITP Area. However, because the Trinity is directly or indirectly hydrologically connected to the Barton Springs segment of the Edwards and improved knowledge of the Trinity Aquifer supports decision-making for managing the Edwards, such research is relevant to the HCP. Published papers and District documents from FY 2018 through FY 2021 are listed below:

- Hunt, B.B. and Smith, B.A., 2021, Same Aquifer, but Different Source of Water: Contrasting the Middle Trinity Aquifer in Central Texas: GeoGulf Transactions, v. 71, p.133-139.

- Smith, B.A., Hunt, B.B., Posso, K., and others, 2021, Highway Construction in the Faulted, Karstic, Cretaceous Edwards Limestone of Southwest Austin, Texas: Association of Environmental and Engineering Geologists, Karst Hazards Forum, Austin, Texas, March 23 to April 1, 2021, abstract.

- Hunt, B.B. and Smith, B.A., 2020, Development of a Steady-State Numerical Model Tool, versions 1.0 and 2.0, Middle Trinity Aquifer, Central Texas: BSEACD Technical Memo 2020-0930.

- Camp, Justin P., Hunt, Brian B., Smith, Brian A., 2020, Evaluating the Potential Groundwater Availability Within A Lower Trinity Aquifer Well Field, Balcones Fault Zone, Hays County, Central Texas: 2020 Abstracts with Programs, Geological Society of America, South-Central Meeting, March 9-10, 2020, Fort Worth, Texas.

- Cockrell, L.P., Gary, R.H., Hunt, B.B., and Smith, B.A., 2020, Data Compilation and Database Structure for the Geodatabase Accompanying the Hydrogeologic Atlas of Southwest Travis County, Central Texas: Barton Springs/Edwards Aquifer Conservation District (BSEACD) Data Series Report 2020-0721, July 2020, 15 p. + digital geodatabase.

- Smith, B.A., Hunt, B.B., Gary R.H., Wierman, D.A. and Watson, J.A., 2020, Springshed Delineation in a Karst Aquifer in Hays County, Central Texas: 16th Sinkhole Conference, NCKRI Symposium 8.

- Tian, L., Smith, B.A., Hunt, B.B., Doster, J.D., Gao, Y., 2020, Geochemical Evaluation of Hydrogeologic Interaction Between the Edwards and Trinity Aquifers Based on Multiport Well Assessment in Central Texas: 16th Sinkhole Conference, NCKRI Symposium 8.

- Cockrell, L.P., Hunt, B.B., Gary, R., Vay, J., Camp. J, and Kennedy, V., 2020, Hydrogeologic Atlas of Southwestern Travis County, Central Texas: Geological Society of America Abstracts with Programs, Vol. 52, No. 1.

- Gary, R.H., Hunt, B.B., and Cockrell, L.P., 2019, Estimating the Number of Trinity Aquifer Exempt Wells in a Recently Annexed Groundwater Conservation District Territory: Geological Society of America Abstracts with Programs, Vol. 51, No. 5.

- Zappitello, S.J., Johns, D.A., and Hunt, B.B., 2019, Summary of Groundwater Tracing in the Barton Springs Edwards Aquifer from 1996 to 2017: City of Austin, Watershed Protection, DR-19-04.

- Hunt, B.B., Smith, B.A., and Hauwert, N.M., 2019, Barton Springs segment of the Edwards (Balcones Fault Zone) Aquifer, central Texas, in Sharp, J.M., Jr., Green, R.T., and Schindel, G.M., eds., The Edwards Aquifer: The Past, Present, and Future of a Vital Water Resource: Geological Society of America Memoir 215, p. 75-100, https://pubs.geoscienceworld.org/books/book/2156/The-Edwards-Aquifer-The-Past-Present-and-Future-of

- Gary, M.O., Hunt, B.B., Smith, B.A., Watson, J.A., and Wierman, D.A., 2019, Evaluation for the Development of a Jacob's Well Groundwater Management Zone Hays County, Texas. Technical Report prepared for the Hays Trinity Groundwater Conservation District, Hays County, Texas. Meadows Center for Water and the Environment, Texas State University at San Marcos, TX. Report: 2019-05. July 2019. 58 p. https://bseacd.org/uploads/JW-Mgmt-Zone-Report_7.30.19.pdf

- Smith, B.A., and Hunt, B.B., 2019, Multilevel monitoring of the Edwards and Trinity Aquifers, in Sharp, J.M., Jr., Green, R.T., and Schindel, G.M., eds., The Edwards Aquifer: The Past, Present, and Future of a Vital Water Resource: Geological Society of America Memoir 215, p. 293-298, https://pubs.geoscienceworld.org/books/book/2156/The-Edwards-Aquifer-The-Past-Present-and-Future-of

- Hunt, Brian B., Brian A. Smith, Robin Gary, and Justin Camp, 2019, March 2018 Potentiometric Map of the Middle Trinity Aquifer, Central Texas. BSEACD Report of Investigations2019-0109. 28 p. https://bseacd.org/uploads/BSEACD_RI_2019-0109_PotMap_FINAL.pdf

- Smith, B.A., B.B. Hunt, D.A. Wierman, and M.O. Gary, 2018, Groundwater Flow Systems of Multiple Karst Aquifers of Central Texas. In I.D. Sasowsky, M.J. Byle, and L. Land (Eds). Proceedings of the 15th Multidisciplinary Conference on Sinkholes and the Engineering and Environmental Impacts of Karst and the 3rd Appalachian Karst Symposium, National Cave and Karst Research Institute (NCKRI) Symposium 6, p 17-29. https://bseacd.org/uploads/Smith-et-al.-2018-GW-Flow-Systems-in-Multiple-Karst-Aquifers-Sinkhole-Conference.pdf

- Smith B.A., Hunt B.B., 2018, Recharge and Water-Quality Controls for a Karst Aquifer in Central Texas. In: White W., Herman J., Herman E., Rutigliano M. (eds) Karst Groundwater Contamination and Public Health. Advances in Karst Science. Springer. https://link.springer.com/chapter/10.1007/978-3-319-51070-5_35

- Cockrell, L., B.B. Hunt, R. Gary., B.A. Smith, 2018, Regional Geologic Geodatabase Project, Central Texas. Barton Springs Edwards Aquifer Conservation District. Data Series Report 2018-1211. December 2018. 14 p. https://bseacd.org/uploads/Cockrell-et-al.-2018_Geology_Geodatabase.pdf

- Wierman, D.A., B.B. Hunt, 2018, Groundwater Level Monitoring Results for HTGCD Transducer Wells and Wimberley Valley Public Water Supply Wells, Hays County, TX. Meadows Center for Water and the Environment, Texas State University at San Marcos, TX. https://bseacd.org/uploads/Wierman-and-Hunt-2018-TSU-Water-Levels_revised.pdf

- Hunt, B.B., B.A. Smith, and J. Camp, 2018, Is the BSEACD's Drought Trigger Methodology Representative of the Middle Trinity Aquifer?. BSEACD Technical Memo 2018-0829. August 2018. 12 p. https://bseacd.org/uploads/BSEACD_Tech-Note-2018-0829_DTM-MiddleTrinity.pdf

- Hunt, B.B., B.A. Smith, and J. Camp, 2018, Dye Trace at Raccoon Cave near Jacob's Well Spring, Hays County, Texas. BSEACD Technical Memo 2018-0831. August 2018. https://bseacd.org/uploads/BSEACD_techmemo_2018_0831_JWS_dyetrace.pdf

- Watson, J., A.S. Broun, B.B. Hunt, B.A. Smith, D.A. Johns, J. Camp, and D.A. Wierman, 2018, Summary of Findings: Upper Onion Creek Dye Trace, Hays County, Texas, Winter 2017. Interagency Memo. May 18, 2018. 19 p. http://bseacd.org/uploads/Upper-Onion-trace-memo_05182018.pdf

- Watson, J.A., A.S. Broun, B. B. Hunt and D.A. Wierman, 2018, Geologic Mapping of the Upper Glen Rose Unit 3 (Lower Cretaceous) in the Onion Creek Basin, Western Hays County, Texas: Implications for Recharge to the Trinity Aquifer. GCAGS Journal, v. 7 (2018), p. 107–120. https://bseacd.org/uploads/Watson.et_.al2018.GCAGS_.Journal.v7.07.p107-120.pdf

- Hunt, B.S. Smith, B.A., Gary, M.O., Watson, J., Broun, A., Wierman, D.A., and Fieseler, R., 2018, Technical Review and Comments: Conceptual Model Update for the Hill Country Potion of the Trinity Aquifer. Letter dated August 31, 2018. 22 p. (comments at end of the GAM report in link below) http://www.twdb.texas.gov/groundwater/models/gam/trnt_h/ConceptualModelReport.pdf?d=4146.700000001147

15.0 Proposed Activities for Next Year

Activities proposed to take place next year generally relate to a continuation of those organizational activities necessary for the District meet its ongoing obligations as a GCD and its current commitments, as well as its planned direct and indirect groundwater management initiatives. In prospect, some of these include:

- Completion of the Hays County and HTGCD ILA Projects
- Completion of Joint Planning Efforts in the GMAs to adopt DFCs
- Continuation of model development to support evaluations of the Trinity aquifer
- Continuation of Trinity Sustainable Yield Study
- Completion of Intera database project
- Utilization of contractual support associated with various technical and professional services, including:
    - technical services to support prospective special projects including ASR pilot projects, continued aquifer characterization, new monitor well installation, and HCP-related projects;
    - technical and consulting services to support prospective implementation of the HCP including initial annual reporting and mitigation measures; and
    - technical and consulting services relating to rulemaking efforts.

Even if certain ones of these are not directly or indirectly related to the HCP, they will affect the financial resources that will be available to conduct special projects. However, none of these prospective activities will impede the implementation of work to comply with the HCP.

16.0 Recommendations for Improvement

The District has not identified any changes needed to improve implementation of the HCP or compliance with the ITP provisions at this time.

The Validation Monitoring Program (specified in HCP Section 6.3.1 and included in this Annual Report in Appendix A) anticipates eventual improved take estimate protocol for future use, based on then-new information and/or analyses concerning gaged springflows, water chemistry, and salamander counts. These characteristics form the basis for the take estimate methodology. In the current reporting period, the District has not identified any new information or analysis that would indicate need for modification of the basis of the take estimate methodology.

17.0 Other Appropriate Information Documenting Compliance with the Permit

None required.

Appendix A - Description of District’s Validation Monitoring Protocol

Appendix B - Interlocal Agreement between the District and City of Austin

Appendix C - Assessment of Progress in FY2021 Toward Plan Goals and Objectives (Management Plan Annual Report FY 2021 – Appendix B)

Appendix D - Meeting Minutes (1/26/2022) of Management Advisory Committee

Appendix A

Description of District's Validation Monitoring Protocol

Barton Springs
Edwards Aquifer
CONSERVATION DISTRICT

1124 Regal Row
Austin, TX 78748
Tel. (512) 282-8441
www.bseacd.org

July 16, 2019

Ms. Tanya Sommer
U.S. Fish and Wildlife Service
Austin Ecological Services Field Office
I 0711 Burnet Rd., Suite 200
Austin, Texas 78758

Subject: Proposed Validation Monitoring Protocol for HCP under Endangered/Threatened Wildlife Incidental Take Permit # TE10607C-0

Dear Ms. Sommer:

Per the District's HCP, Section 6.3.1, the Barton Springs/Edwards Aquifer Conservation District is submitting its proposed protocol of the Validation Monitoring Program for review and approval by the Service. This protocol provides a framework that the District will utilize for the following: to document the conformance of the District's groundwater management program with the expected outcomes in the ITP, to assess the amount of take that occurs during the ITP term, and to evaluate impacts of any new relevant information on the take estimate methodology. Such findings would be a precursor to proposing modifications of its groundwater management actions, as necessary.

Should you have any questions about this proposed protocol, please contact me by phone at 512-282-8448 or by email at areinmund@bseacd.org. We would appreciate your expeditious review, comments, and concurrence.

Sincerely,

Alicia Reinmund-Martinez
General Manager

cc: David A. Johns P.G.
Program Manager/Geologist
City of Austin

Proposed Protocol for the District's Validation Monitoring Program

The District's HCP Section 6.3.1 requires the formulation and approval of a "validation monitoring program" and subsequently its recurrent use to inform annual reporting under the HCP. The purpose of this program is "to measure future success of Aquifer-management activities, and to modify management actions on the basis of new information." Among other things, the program requires the District, in the first year of the ITP term, to "collaborate with the COA to formulate a methodology for monitoring and evaluating take associated with the District's Covered Activities." The program also involves an annual re-examination of "[information from] existing springflow gaging, water chemistry monitoring, and salamander censuses, supplemented by new data collection and analyses by the COA", which in aggregate serve as the basis for the take estimate methodology.

During the extended time required to develop the HCP and in particular the lengthy time between developing the preliminary draft HCP and finalizing the final HCP, the District and COA were able to collaborate on a workable approach to an initial and continuing take estimate methodology that related specifically to the District's Covered Activities and to the cryptic characteristics of these Covered Species. This methodology is synopsized in the "Take Logic Diagram" in the Final HCP (Figure 5-8) and reproduced in this document. The take estimate methodology uses the three elements identified above, viz., gaged springflow, monitored water chemistry, and salamander surveys and censuses, in defining take categories and their estimated amounts. This methodology was used for estimating the total amount of take that was permitted in the initial ITP.

The validation monitoring program requires a re-examination of the take logic methodology as significant new information on these three elements becomes available. Further, the approved Interlocal Agreement between the District and the City's Watershed Protection Department specifically authorizes and requires, among other things, the sharing of new information that will inform this recurrent re-examination process. But until revisions are identified as needed and ultimately approved, the annual reporting of take estimates will utilize the methodology and parameters described in the approved HCP.

Re-examination of Basis for Take Estimate Methodology

At least once per year, nominally beginning two months before the District HCP's annual report is submitted to the Service, the District will explicitly assess whether or not new information indicates that the take estimate methodology needs to be modified to account for factors that would change the Take Logic Diagram. This annual re-examination of the basis for the take estimates will involve considering the following questions related to the three elements used to develop the Take Logic:

1. Does new information indicate that the size and/or distribution of the populations of either Covered Species, whether in the near-field or far-field, is substantively statistically different than that characterized in the HCP and used in estimating take?
2. Does new information indicate that the dissolved-oxygen concentration thresholds for the onset of behavioral and/or physiological effects on the Covered Species are substantively statistically different than those used in the Take Logic Diagram?
3. Does new information indicate that the relationship between sustained dissolved-oxygen concentrations and springflow discharges are substantively statistically different than those used in the Take Logic Diagram?

4. Does new information indicate that there are substantive antagonistic or synergistic effects on the Covered Species that are not adequately included in estimating take, e.g., impacts of other springflow-related water chemistry components on the Covered Species by the District's Covered Activities or Conservation Measures?
5. Does new information indicate that there are new and/or different adverse effects on the Covered Species from non-springflow related activities associated with the District's Covered Activities or Conservation Measures?
6. Does new information indicate that the relationship between groundwater withdrawals and combined springflow during drought periods, e.g., changes in other parameters in the water balance, is significantly different than that used in estimating take during the term of the ITP?

This re-examination will be made by the District's Aquifer Science team and will utilize then-existing data and information provided to the District by the City of Austin under the ILA, public scientific data and reports from the US Geological Survey, other scientific reports and studies, as well as the District's own data collection and analysis activities. New information may arise during the course of each year of the ITP term from new hydrological or biological modeling results, new salamander survey or census data and estimates, or new groundwater sampling and analysis. Any affirmative responses to the questions enumerated above will be elaborated and documented as part of the District's annual reporting to USFWS, including possible recommendations for additional investigations in subsequent years to further assess changes in the take estimate logic and basis. It seems likely that there will be no significant changes to the take estimate basis during the early years of the ITP term. By the same token, it may require multiple years to confirm that some such changes have occurred on a sustained basis and/or additional research to demonstrate how such changes can be best accommodated in revising future take estimates.

Estimation of Take during Each Reporting Period

The actual annual springflow-related take estimate to be included in the District's Annual Report to the Service involves a rather straight-forward procedure:

1. The daily hydrograph from the USGS gage, converted to indicate the calibrated spring flows at Barton Springs, is produced for the 365 days that comprise the current reporting period by the District's Aquifer Science team. The hydrograph may be modified by the District on the basis of manual measurements to supplement the USGS data.
2. The District's Aquifer Science team will disaggregate the hydrograph and identify the cumulative number of days during that reporting period that are in each of the following: No Take, Take Category A, Take Category B, and Take Category C, as defined in the Take Logic Diagram (referring to rate of springflow).
3. The number of months, to two decimal places, that are in each of those four categories is calculated.
4. Category A, regardless of number of months, is assigned a take estimate of a) 15 for the Barton Springs salamander, and b) 0 for the Austin blind salamander.
5. The number of total months assigned to the Categories B and C is multiplied by a) the monthly Take Factor shown in the Take Logic Diagram for the Barton Springs salamander (174/month), and b) the monthly Take Factor for the Austin blind salamander (36.6/month).
6. The estimated springflow-related take of BSS for the reporting period is the sum of the results of Steps 4(a) plus 5(a).

7. The estimated springflow-related take of ABS for the reporting period is simply 5(b), since the take of ABS in Category A is zero (because ABS habitat is not recognized at Upper Barton Springs).

As necessary, the District's Aquifer Science team will also estimate whether and what take of one or both endangered species was generated by occasional, non-springflow-related District activities (like well construction *per se*),and add the springflow and non-springflow take for annual reporting.

The calculated results of this procedure inform and are input into the HCP Annual Report, Section 7 and will be summarized as follows:

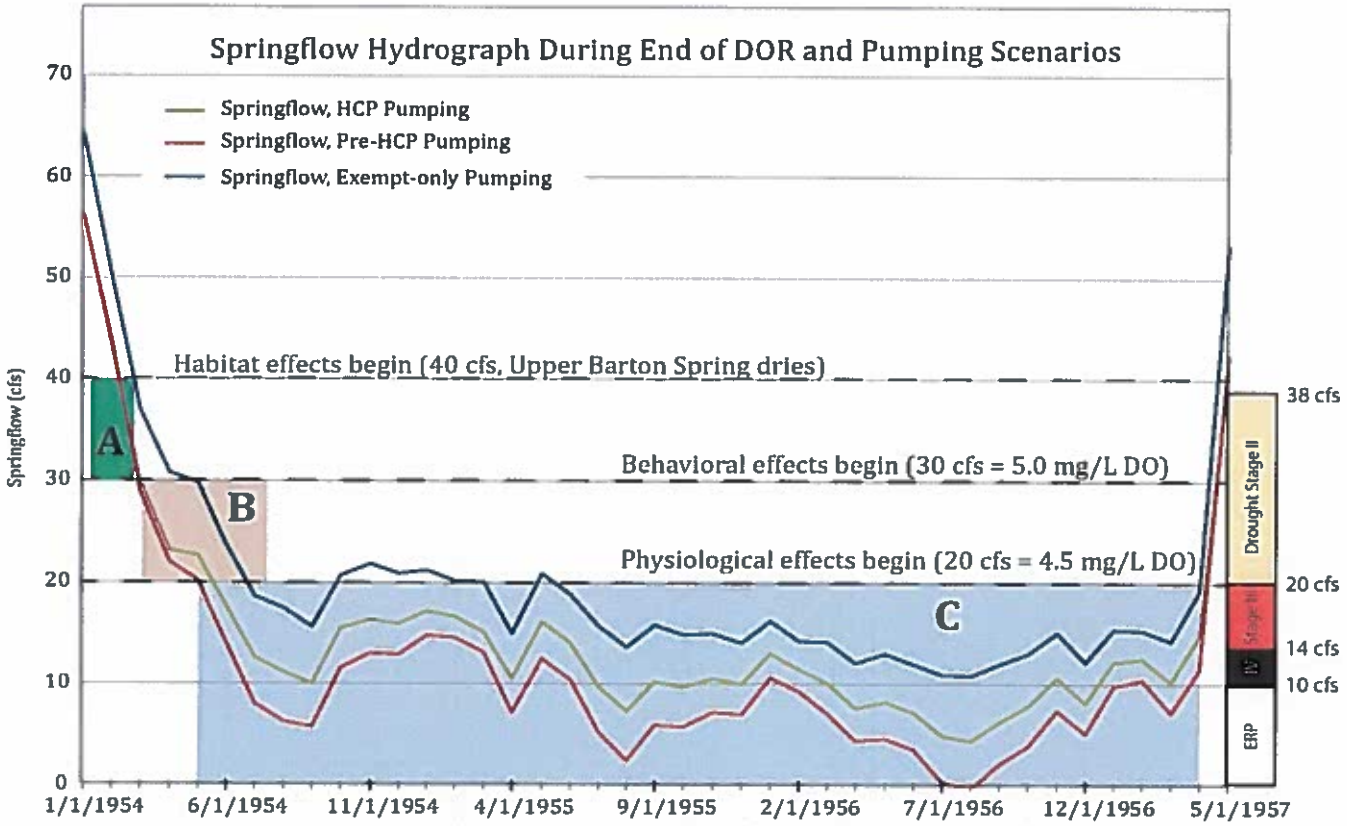
Take Type	Take Category	Inclusive Dates	No. of Months*	BSS Take Factor	Estimated BSS Take	ABS Take Factor	Estimated ABS Take
Springflow-Related	A #1	TBD-TBD	2.25	-	15	0	0
	A #2	TBD-TBD	0.60		15	0	0
	B	TBD-TBD; TBD-TBD	6.45	174	1122	36.6	236
	C	TBD-TBD	2.45	174	426	36.6	90
Occasional, Other	-	MM/DD/YYYY	N/A	N/A	1	N/A	0
Totals			**11.75**		**1579**		**326**

** The values shown for "number of months" are fictitious and are provided for illustrative purposes only. The actual values will be based on the disaggregation of the actual Barton Springs hydrograph for each reporting period by the District's Aquifer Science team.*

During this reporting period, which was nominally in some degree of drought for almost the entire time, the take of Barton Springs salamander would have been estimated to be 1579 and take of Austin blind salamander estimated to have been 326, using the prescribed methodology. These amounts of take would be added to the previously reported cumulative take amounts, resulting in new cumulative take amounts of ____ for BSS and ____ for ABS. (For comparison, the authorized total cumulative take estimates for BSS and ABS during the 20-year permit term are 20,200 and 4,260, respectively.)

Monthly "Take Factor" Logic Diagram

We conservatively estimate total incidents of take from a 37-month period at the end of the Drought of Record. During the springflow recession we qualitatively estimate take relating to various habitat, behavioral, and physiological effects and thresholds. From this discrete drought a monthly take factor was developed to estimate potential monthly take each time springflows is less than 30 cfs (~5.0 mg/L DO), the take initiation threshold.



Species	Stipulated Population	Take Circumstance			Total Take (A+B+C)	Months below 30 cfs	Take Factor (monthly below 30 cfs)
		A	B	C			
		Upper BS	Behavioral Effects	Physiological Effects			
BSS	4988	15	4988	29% x 4998 = 1447	6450	2 + 35 = 37	6450/37 = 174
ABS	1050	0	1050	29% x 1050 = 305	1355	2 + 35 = 37	1355/37 = 36.6

A: Entire stipulated population at Upper Barton Spring experiences mostly sub-lethal take because pumping hastens drying of habitat.

B: Springflow ≤30 cfs (≤ 5.0 mg/L DO): Up to 100% of the stipulated population potentially experiences take because decreased DO from pumping causes adverse behavioral effects that are mostly sub-lethal during these two months.

C: Springflow ≤20 cfs (≤ 4.5mg/L DO): Up to 29% of stipulated population potentially experiences take because decreased DO from pumping contributes to the adverse physiological effects ranging from sub-lethal to lethal as the depth and duration of drought increases. 29% derived from ratio of average permitted pumping to average total discharge over the 35months (4.8 cfs/16.7 cfs = 29%). Note: average DO at Main Springs for the period is 3.7 mg/L.

Take Factor will be used to estimate potential take of the BSS and ABS each month springflow is ≤ 30 cfs, the take initiation threshold.

Appendix B

Interlocal Agreement between the District and City of Austin

LAW DEPARTMENT

MEMORANDUM

TO: Rey Arellano, Assistant City Manager

FROM: Chad Shaw, Assistant City Attorney

DATE: May 7, 2019

SUBJECT: Interlocal Agreement with the Barton Springs Edwards Aquifer Conservation District

Attached for your signature please find two copies of an interlocal agreement between the Barton Springs Edwards Aquifer Conservation District (BSEACD) and the City. This agreement authorizes the parties to coordinate management activities for the protection of the Barton Springs and Austin blind salamander species. These activities are obligations set out in the City's permit from the U.S. Fish and Wildlife Service (USFWS) allowing for the operation and maintenance of Barton Springs.

Council authorized the negotiation and execution of this agreement as Item 88 on their August 7, 2014, agenda. The lengthy delay between authorization and execution was necessary because USFWS only recently approved BSEACD's related habitat conservation plan. Authorized representatives of BSEACD have already signed the agreement.

I have reviewed this agreement, and you are legally authorized to execute this agreement. Please do not hesitate to contact me at extension 42671 if you have any questions.

Please contact Andrew Boone at extension 42848 when the signed documents are ready to be picked up.

INTERLOCAL AGREEMENT BETWEEN
THE BARTON SPRINGS EDWARDS AQUIFER CONSERVATION DISTRICT
AND THE CITY OF AUSTIN

This Interlocal Agreement ("Agreement") is made by and between the Barton Springs Edwards Aquifer Conservation District, a political subdivision of the State of Texas acting by and through its duly elected Board of Directors or designee ("the District") and the City of Austin, Texas, a home-rule municipality and political subdivision of the State of Texas acting by and through its duly authorized City Manager or designee ("the City").

WITNESSETH:

WHEREAS, the Barton Springs segment of the Edwards Aquifer ("the Aquifer") provides drinking water to more than 60,000 Central Texans and withdrawal of most groundwater from the Aquifer is regulated by the District; and

WHEREAS, Barton Springs (the Springs) is owned and managed by the City and is a recreational and cultural asset to the City visited by more than 700,000 people annually, and

WHEREAS, the Barton Springs Complex, herein considered to be the individual outlets of Parthenia (Main) Spring, Eliza Spring, Old Mill (Sunken Garden) Spring, and Upper Barton Spring, in aggregate, is the primary natural discharge point of the Aquifer and both the Springs and the Aquifer provide habitat for the endangered Barton Springs salamander and endangered Austin blind salamander (together, the Covered Species); and

WHEREAS, goals of the City's Watershed Protection Department (WPD) are to maintain or enhance the existing rate of recharge to the Aquifer and to maintain or enhance critical environmental features like Barton Springs; and

WHEREAS, the District is committed to conserving, protecting, enhancing recharge, and preventing waste of groundwater and to preserving all aquifers within the District; and

WHEREAS, a conservation measure of the City's Habitat Conservation Plan for the Operation and Maintenance of Barton Springs and Adjacent Springs requires the expeditious development of a cooperative agreement with the District to formalize collaborative efforts to protect endangered endemic *Eurycea* salamanders and the Aquifer; and

WHEREAS, the conservation measures of the District's Habitat Conservation Plan for groundwater withdrawals by permitted well owners and management of the Barton Springs segment of the Edwards Aquifer require the development of an Inter-local Agreement with the City to formalize collaborative efforts and provide data and analyses important to protection of those endangered species;

WHEREAS, the WPD has been authorized by the City Council and designated by the City Manager to negotiate and execute this Agreement; and

WHEREAS, the City and District have already been successfully collaborating on a range of efforts to protect the quality and quantity of the Aquifer and the Springs on an *ad-hoc* basis:

NOW, THEREFORE, the **District** and the **City** agree to collaborate and coordinate on routine and planned communication, public education, flow/aquifer level measurement, monitoring, regional issues, recharge enhancement, and groundwater pumping matters and to make other related commitments, as follows.

I. Routine and Planned Communication and Public Education

A. The City and the District will meet annually to discuss the status of on-going or planned projects under the respective Habitat Conservation Plans of the City and District and other initiatives that may affect the quality or quantity of groundwater in the Aquifer or that may affect the current status and dynamics associated with the Covered Species and their stewardship.

B. In the spring of even numbered years, the City and the District will consider participation and joint collaboration to support a conference, designated the Kent Butler Summit, to serve as a forum for discussion and sharing of information related to issues affecting the Aquifer and the Covered Species.

C. In the summer of odd-numbered years, the City and the District will collaborate in organizing and hosting an informal technical meeting with other groups and individuals that are conducting studies related to the Barton Springs segment of the Edwards Aquifer. Interested parties will be encouraged to give presentations summarizing their studies.

D. The City and the District will coordinate and collaborate on public education and outreach efforts relating to water quality and quantity preservation of the Aquifer and the endangered species that use the Aquifer as habitat.

E. The City will provide to the District no later than January 31st of each year a copy of the City's scientific research permit (TE833851) report to the U.S. Fish and Wildlife Service ("the Service") as well as any reports and analyses produced by the City during the prior year that pertain to the following:

- Results of surveys of the Covered Species conducted by the City. These may be used to help evaluate responses to groundwater management actions during any low Aquifer water-level and low-flow conditions (herein, less than 30 cfs combined springflow at the Springs);
- Evaluations of Covered-Species habitat during various low-flow conditions,
- Analyses of relative salamander abundance and population characteristics based on observations during low-flow and other conditions
- Water-chemistry characteristics related to flow within the Aquifer and through the spring orifices during normal and low-flow conditions,

The City will also provide digital copies of these data upon request.

F. The City will provide to the District no later than January 31st of each year a copy of the annual report to the U.S. Fish and Wildlife Service ("the Service") for the City's Incidental Take Permit (TE 839031-1) for the operation and maintenance of Barton Springs, or as soon thereafter as made available by the City to the Service.

G. The District will provide to the City no later than the ensuing December 1st after this Agreement is effective and of each year thereafter:

- Reports on aggregate actual groundwater production by permittees by use type for the previous fiscal year and on any estimate of exempt use made by the District for that year,

and if and as requested by the City, supporting and illustrative data and analyses produced during the previous year;

- A summary review of modeling of the Aquifer and of Aquifer water balance modeling, if any, produced during the previous year.
- Laboratory reports or summary spreadsheets of water quality data collected by the District at the Springs during the previous year, and if and as requested by the City, laboratory reports or summary water quality data for sampled springs, wells, or surface sites in the Aquifer area.

H. The District will provide to the City no later than March 15th of each year a copy of the District's Annual Report to the Service for the District's Incidental Take Permit (TE 10607C-0) for Groundwater Use and Management of the Aquifer, or as soon thereafter as made available by the District to the Service.

II. Spring Flow/Aquifer Level Measurement

A. The City will continue to fund the measurement of spring discharge by the United States Geological Survey ("USGS") at Barton Springs (USGS Station 08155500) and real-time telemetry reporting of gage-height and spring dissolved oxygen to the USGS website.

B. The District will continue to fund the measurement and telemetry of water levels in the Lovelady monitor and drought stage indicator well (USGS Station 301237097464801), or some other index well, and real-time telemetry reporting of its water-level data.

C. The City, when Barton Springs combined discharge is estimated to be less than 40 cubic feet per second (cfs) according to the USGS gage at the Springs, will make manual discharge measurements of main Barton Springs, Eliza Spring and Old Mill Spring and of total Barton Springs complex springflow from all outlets at least monthly, and when the discharge is estimated to be 22 cfs or below, twice per month; in both circumstances, the City will share the manual discharge measurements with the District within one week of the measurement date.

D. The District, when Barton Springs combined discharge approaches a drought stage threshold (38 cfs, 20 cfs, 14 cfs, and 10 cfs), as estimated by the corresponding water-level elevations at the USGS gage at the Lovelady monitor and drought-indicator well, will make manual discharge measurements of total springflow of Barton Springs as needed to confirm Barton Springs flow for assessing drought stage status and prognosis, and share the manual discharge measurements with the City within one week of the measurement date.

E. The City and the District will collaborate to improve the accuracy of measurement of combined total discharge from the Barton Springs Complex where feasible. The District and the City will notify the USGS when the gage's reported instantaneous spring flow values differ from the manual measurements made by either party by 20%.

F. The City will consider the District's input into the evaluation of the preliminary engineering feasibility review, design and installation of new flow measurement equipment or construction of an improved flow measurement structure or structures to more accurately measure total discharge from the Barton Springs Complex if the City pursues capital projects to improve spring flow measurement.

G. The City and the District will coordinate on joint flow loss studies in the recharge zone. Such collaboration may involve District contributions of in-kind support or District Board of Directors (Board)-approved and budgeted financial support.

III. Monitoring

A. The City will request permission of, receive authorization from, and coordinate with the District on all City-conducted dye tracing activities of the Aquifer, including documenting shared roles and responsibilities, as applicable.

B. The District will notify the City of dye tracing activities within the Aquifer. The City and the District will determine, in advance of the dye trace and as applicable, which entity will be responsible for sampling designated wells and springs for the term of the trace and document responsibilities in a written plan for each trace.

C. The City will continue Barton Springs salamander and Austin blind salamander surveys, including both routine quarterly surveys and any exception-based surveys, pursuant to the City's federal permits TE 833851 and TE 839031.

D. The City will continue water quality monitoring of the Barton Springs Complex pursuant to the most current version of the City's Texas Pollutant Discharge Elimination System Municipal Separate Storm Sewer System permit and associated Stormwater Management Plan and provide copies of the annual permit report to the District for routine monitoring, and, if and as conducted, any exception-based monitoring. This continued monitoring by the City specifically includes enabling the continuous monitoring of dissolved oxygen at Barton Springs.

E. The City will facilitate District access to the Barton Springs complex for non-biological sampling. The City will determine if the proposed District sampling activity will be consistent with the City's ITP requirements.

F. The City and the District will collaboratively define and evaluate options and assess feasibility, and, if determined feasible, the District will emplace several new subsurface monitors by converting existing and/or installing new wells, including but not limited to:
    - One of the prospective Magellan Longhorn Pipeline monitor wells in the Garrison Park-Amur Street area for multiple use as a sentinel and groundwater/habitat monitoring well;
    - Existing open-hole wells in the recharge zone remote from Zilker Park for conversion to secure habitat monitoring well(s) that allow both groundwater and biological sampling;
    - One or more new multi-port wells in the Edwards/Upper(most) Glen Rose in or near Zilker Park;
    - One or more new open-hole Habitat Monitoring Wells, nearby the new multi-port well in Zilker Park, for periodic or episodic groundwater and biological sampling

G. The City will assess the efficacy of reallocating funds currently used in some or all of its existing groundwater data collection program with the USGS throughout the Barton Springs Zone, herein to include the contributing, recharge, and confined zones of the Aquifer, to provide additional resources for collaborative efforts under this Agreement, including but not limited to installing new "hybrid" wells used for both groundwater and habitat monitoring, periodic sampling of such wells, and analyzing water quality and habitat data from them. .

H. The City will facilitate District access to important existing and future District monitor wells, to include but not be limited to:
    - Lovelady Drought Index well-- assist District and USGS staff with periodic access to the monitor well, if needed;
    - Longhorn Pipeline Monitor Wells—one or more wells to be installed in the Garrison Park-Amur Street area;
    - Ruby Ranch Monitor Well - a multiport well on City property at Ruby Ranch;

- DO Augmentation Wells – mitigation measures, if feasible, in the vicinity of the Barton Springs outlets, as described in subsection VII.A below; and
- Any other groundwater or habitat monitoring wells to be used by the District and/or City that currently exist on City property or that may be installed in the future on City property with the City's concurrence. Such wells may be for groundwater-level monitoring, groundwater chemistry sampling, and/or for habitat characteristics, as described in subsection VII.D below.

IV. Regional Cooperation

A. The City and the District agree to continue to organize and participate in meetings of the Barton Springs Zone Regional Water Quality Protection Plan working group.
B. The City and the District agree to continue to share information and coordinate on studies related to Texas Department of Transportation projects over the Aquifer.
C. The City and the District agree to continue to share information and coordinate actions in response to Texas Commission on Environmental Quality wastewater disposal permit actions within the contributing or recharge zones of the Aquifer.
D. The City and the District agree to continue to share information and coordinate actions in response to proposed State of Texas legislation that may affect the Aquifer.
E. The City has documented its support for service of a District board member or staff person on the City's Environmental Commission in City Code Section 2-1-144 (*Environmental Commission*).
F. The City will add a District staff member knowledgeable in Aquifer hydrogeology and acceptable to the City to the City's Habitat Conservation Plan Scientific Advisory Committee.
G. The District will ensure that a City staff member knowledgeable in Aquifer hydrogeology or salamander biology and acceptable to the District serves on the District's Habitat Conservation Plan Management Advisory Committee.
H. The District will recommend to Groundwater Management Area (GMA) 10 and support the inclusion of a suitable City staff member as an advisory committee member if a GMA 10 advisory committee is formed.

V. Recharge Enhancement

A. The City and the District will coordinate to identify and possibly implement mechanisms to reduce demand on the Aquifer as a water supply or otherwise augment water in the Aquifer.
B. The City and the District will share information and coordinate on planned recharge enhancement or aquifer storage projects.
C. Under the terms of the City's HCP and if requested by the City, the District will agree to provide available in-kind support to recharge enhancement projects conducted on City land, including cave debris cleaning or salamander habitat improvement projects.

VI. Groundwater Withdrawal

A. The District will consider the City's input, including new scientific information, in determining if the current Desired Future Conditions of the Aquifer during drought will be sufficient to maintain discharge and dissolved-oxygen levels at Barton Springs to be protective of endangered salamander populations.

B. The City will evaluate potential options for reducing demand on the Aquifer as a water supply, such as the following:
    - Enabling interconnections to the City water system by certain District Public Water Supply Historic-Use permittees during declared drought as a substitute water supply with a commitment to annexation in exchange for greater than mandatory curtailments during the interconnection period; and
    - Providing treated effluent to certain other District permittees during declared drought as a substitute water supply for non-potable uses.

C. The District will maintain rules that prevent re-permitting of retired historic use and quantified additional recharge from recharge enhancement facilities within the District as additional firm-yield supply.

D. The District will ensure City-designated WPD staff members are provided public notices of administratively complete well applications.

E. The District will notify the City of authorized well drilling activities within the Barton Springs Risk Management Zone, as delineated on the mutually agreed map.

F. The City will ensure District-designated staff members are provided public notices of City activities within and of interest to the District.

VII. Other Related Commitments

A. The City will coordinate with the District on subsurface dissolved oxygen augmentation efforts in improving salamander habitats of the Barton Springs Complex during extreme low flow conditions that result in decreases of dissolved oxygen below the highest threshold demonstrated to compromise survival of endangered salamanders. These dissolved oxygen augmentation activities, including feasibility study, pilot-scale demonstration of concept, and implementation of full-scale system, will require separate and sequential approval by both parties, dependent on the findings and conclusions in the preceding study, and will follow a written procedural plan that is agreed to in advance by the City and the District and approved by the U.S. Fish and Wildlife Service. Dissolved oxygen augmentation must not adversely affect salamander populations or their habitat, as determined solely by the City. City participation and permission of access to Barton Springs by the District are contingent upon determination by the City throughout the process that the project will not substantially and adversely alter existing groundwater flow paths and will not directly or indirectly harm existing salamander habitat. The City shall be responsible for compliance with all City permitting and regulatory requirements associated with such efforts.

B. The City, during Extreme Drought conditions as declared by the District, will maintain the normal operational water level of Barton Springs Pool.

C. The District will coordinate with the City to conduct a study of the distribution of the DO concentrations throughout the surface (epigean) environment, including all then-flowing spring runs in the Barton Springs Complex and the main Barton Springs pool, and in the subsurface within the Aquifer by hydrologic and hydrogeologic zones at both non-storm high (generally defined as when Barton Springs discharge is 75 cfs or greater) and low (generally defined as when Barton Springs discharge is lower than 30 cfs) water levels.

D. The District and the City will partner to investigate the feasibility and, if feasible, study the habitat characteristics of the Aquifer by installing two or more wells, with at least one well proximal to Barton Springs and its salamander habitat and at least one well proximal to the known habitat of the salamander population remote from Barton Springs. The City will

facilitate, as necessary, acquiring and maintaining access to the wells for aquifer and ecology monitoring.

E. To support the City's Austin Salamander Conservation Center captive salamander population research and refugium, the District will collect water quality samples and measure corresponding groundwater levels from the Austin Nature and Science Center well at least five times over five years, including twice during high aquifer water levels and twice during low aquifer water level conditions, and analyze the samples for major cations and anions, DO, nitrates + nitrites, and *E. coli* bacteria and other parameters as mutually agreed to.

VIII. TERM, TERMINATION

A. This Agreement shall be effective from and after the date of execution by all parties and shall expire upon the expiration of the latter of the Incidental Take Permits issued by the U.S. Fish and Wildlife Service to each party, unless previously terminated pursuant to this Agreement.

B. This Agreement may not be altered, amended, or modified except in writing, approved by the Board and the City Manager of the City of Austin or designee.

C. If either party defaults in the performance of any of the terms or conditions of this Agreement, the defaulting party shall have 60 days after receipt of written notice of the default within which to cure the default. If such default is not cured within 60 days, then the offended party shall have the right without further notice to terminate this Agreement.

D. The other subsections of this section notwithstanding, should either the City or the District have their respective Incidental Take Permits from the U.S. Fish and Wildlife Service terminated or amended in such a way that this Agreement is no longer a required provision of the ITP, this Agreement is terminated, and another one may be initiated at the parties' mutual agreement.

IX. MISCELLANEOUS

A. Severability. If any section, subsection, sentence, clause or phrase of this Agreement is for any reason held to be unconstitutional, void, or invalid, the validity of the remaining portions of the Agreement shall not be affected thereby. It is the intent of the parties signing this Agreement that no portion of it, or provision or regulation contained in it shall become inoperative or fail by reason of unconstitutionality or invalidity of any other section, subsection, sentence, clause, phrase, provision or regulation of this Agreement.

B. Law and Venue. This Agreement shall be governed by the laws of the State of Texas. The obligations under this Agreement are performable in Travis County, Texas. It is expressly understood that any lawsuit or litigation arising out of or relating to this contract will take place in Travis County, Texas.

C. Entire Agreement. This Agreement constitutes the entire agreement between the City and the District. No other bilateral agreement, statement or promise relating to the subject matter of this Agreement that is not contained in this Agreement is valid or binding.

D. Notice. Notices to either party shall be in writing and may be either hand delivered or sent by certified or registered mail, postage paid, return receipt requested. If sent to the parties at the addresses designated herein, notice shall be deemed effective upon receipt in the case of hand delivery and three days after deposit in the U.S.P.S. mail in case of mailing.

The address of the City for all purposes under this Agreement and for all notices herein shall be:

City of Austin
Watershed Protection Department
Attn: Jose M. Guerrero, PE, Interim Director
505 Barton Springs Rd, 11th Floor
Austin, TX 78704

The address of the District for all purposes under this Agreement and for all notices herein shall be:

Alicia Reinmund-Martinez, General Manager
Barton Springs Edwards Aquifer Conservation District
1124 Regal Row
Austin, TX 78748

E. Indemnity. To the extent allowed by Texas law, each party agrees that it is responsible to the exclusion of any such responsibility of any other party for its own proportionate share of liability for its negligent acts and omissions for claims, suits, and causes of action, including claims for property damage, personal injury and death, arising out of or connected to this Agreement and as determined by a court of competent jurisdiction, provided that the execution of this Agreement will not be deemed a negligent act.

F. Appropriations. Nothing in this Agreement may be construed to obligate the parties to any current or future expenditures in excess of amounts duly appropriated by their respective governing body.

WHEREFORE, the parties have executed this Agreement hereto, as follows:

CITY OF AUSTIN

BY: _____ DATE: 5/8/2019
Rey Arellano
Assistant City Manager

APPROVED AS TO FORM:

BY: _____
Chad Shaw
Assistant City Attorney

BARTON SPRINGS EDWARDS AQUIFER CONSERVATION DISTRICT

BY: _____ DATE: 4/11/2019
Blayne Stansberry, President
Barton Springs Edwards Aquifer Conservation District

ATTEST: Blake Dorsett DATE: 4/11/19

Blake Dorsett
Board Secretary

APPROVED AS TO FORM:

BY: Bill Dugat DATE: April 11, 2019

Bill Dugat
District General Counsel

INTERLOCAL AGREEMENT BETWEEN
THE BARTON SPRINGS EDWARDS AQUIFER CONSERVATION DISTRICT
AND THE CITY OF AUSTIN

This Interlocal Agreement ("Agreement") is made by and between the Barton Springs Edwards Aquifer Conservation District, a political subdivision of the State of Texas acting by and through its duly elected Board of Directors or designee ("the District") and the City of Austin, Texas, a home-rule municipality and political subdivision of the State of Texas acting by and through its duly authorized City Manager or designee ("the City").

WITNESSETH:

WHEREAS, the Barton Springs segment of the Edwards Aquifer ("the Aquifer") provides drinking water to more than 60,000 Central Texans and withdrawal of most groundwater from the Aquifer is regulated by the District; and

WHEREAS, Barton Springs (the Springs) is owned and managed by the City and is a recreational and cultural asset to the City visited by more than 700,000 people annually, and

WHEREAS, the Barton Springs Complex, herein considered to be the individual outlets of Parthenia (Main) Spring, Eliza Spring, Old Mill (Sunken Garden) Spring, and Upper Barton Spring, in aggregate, is the primary natural discharge point of the Aquifer and both the Springs and the Aquifer provide habitat for the endangered Barton Springs salamander and endangered Austin blind salamander (together, the Covered Species); and

WHEREAS, goals of the City's Watershed Protection Department (WPD) are to maintain or enhance the existing rate of recharge to the Aquifer and to maintain or enhance critical environmental features like Barton Springs; and

WHEREAS, the District is committed to conserving, protecting, enhancing recharge, and preventing waste of groundwater and to preserving all aquifers within the District; and

WHEREAS, a conservation measure of the City's Habitat Conservation Plan for the Operation and Maintenance of Barton Springs and Adjacent Springs requires the expeditious development of a cooperative agreement with the District to formalize collaborative efforts to protect endangered endemic *Eurycea* salamanders and the Aquifer; and

WHEREAS, the conservation measures of the District's Habitat Conservation Plan for groundwater withdrawals by permitted well owners and management of the Barton Springs segment of the Edwards Aquifer require the development of an Inter-local Agreement with the City to formalize collaborative efforts and provide data and analyses important to protection of those endangered species;

WHEREAS, the WPD has been authorized by the City Council and designated by the City Manager to negotiate and execute this Agreement; and

WHEREAS, the City and District have already been successfully collaborating on a range of efforts to protect the quality and quantity of the Aquifer and the Springs on an *ad-hoc* basis:

NOW, THEREFORE, the **District** and the **City** agree to collaborate and coordinate on routine and planned communication, public education, flow/aquifer level measurement, monitoring, regional issues, recharge enhancement, and groundwater pumping matters and to make other related commitments, as follows.

I. Routine and Planned Communication and Public Education

A. The City and the District will meet annually to discuss the status of on-going or planned projects under the respective Habitat Conservation Plans of the City and District and other initiatives that may affect the quality or quantity of groundwater in the Aquifer or that may affect the current status and dynamics associated with the Covered Species and their stewardship.

B. In the spring of even numbered years, the City and the District will consider participation and joint collaboration to support a conference, designated the Kent Butler Summit, to serve as a forum for discussion and sharing of information related to issues affecting the Aquifer and the Covered Species.

C. In the summer of odd-numbered years, the City and the District will collaborate in organizing and hosting an informal technical meeting with other groups and individuals that are conducting studies related to the Barton Springs segment of the Edwards Aquifer. Interested parties will be encouraged to give presentations summarizing their studies.

D. The City and the District will coordinate and collaborate on public education and outreach efforts relating to water quality and quantity preservation of the Aquifer and the endangered species that use the Aquifer as habitat.

E. The City will provide to the District no later than January 31st of each year a copy of the City's scientific research permit (TE833851) report to the U.S. Fish and Wildlife Service ("the Service") as well as any reports and analyses produced by the City during the prior year that pertain to the following:

- Results of surveys of the Covered Species conducted by the City. These may be used to help evaluate responses to groundwater management actions during any low Aquifer water-level and low-flow conditions (herein, less than 30 cfs combined springflow at the Springs);
- Evaluations of Covered-Species habitat during various low-flow conditions,
- Analyses of relative salamander abundance and population characteristics based on observations during low-flow and other conditions
- Water-chemistry characteristics related to flow within the Aquifer and through the spring orifices during normal and low-flow conditions,

The City will also provide digital copies of these data upon request.

F. The City will provide to the District no later than January 31st of each year a copy of the annual report to the U.S. Fish and Wildlife Service ("the Service") for the City's Incidental Take Permit (TE 839031-1) for the operation and maintenance of Barton Springs, or as soon thereafter as made available by the City to the Service.

G. The District will provide to the City no later than the ensuing December 1st after this Agreement is effective and of each year thereafter:

- Reports on aggregate actual groundwater production by permittees by use type for the previous fiscal year and on any estimate of exempt use made by the District for that year,

and if and as requested by the City, supporting and illustrative data and analyses produced during the previous year;

- A summary review of modeling of the Aquifer and of Aquifer water balance modeling, if any, produced during the previous year.
- Laboratory reports or summary spreadsheets of water quality data collected by the District at the Springs during the previous year, and if and as requested by the City, laboratory reports or summary water quality data for sampled springs, wells, or surface sites in the Aquifer area.

H. The District will provide to the City no later than March 15th of each year a copy of the District's Annual Report to the Service for the District's Incidental Take Permit (TE 10607C-0) for Groundwater Use and Management of the Aquifer, or as soon thereafter as made available by the District to the Service.

II. Spring Flow/Aquifer Level Measurement

A. The City will continue to fund the measurement of spring discharge by the United States Geological Survey ("USGS") at Barton Springs (USGS Station 08155500) and real-time telemetry reporting of gage-height and spring dissolved oxygen to the USGS website.

B. The District will continue to fund the measurement and telemetry of water levels in the Lovelady monitor and drought stage indicator well (USGS Station 301237097464801), or some other index well, and real-time telemetry reporting of its water-level data.

C. The City, when Barton Springs combined discharge is estimated to be less than 40 cubic feet per second (cfs) according to the USGS gage at the Springs, will make manual discharge measurements of main Barton Springs, Eliza Spring and Old Mill Spring and of total Barton Springs complex springflow from all outlets at least monthly, and when the discharge is estimated to be 22 cfs or below, twice per month; in both circumstances, the City will share the manual discharge measurements with the District within one week of the measurement date.

D. The District, when Barton Springs combined discharge approaches a drought stage threshold (38 cfs, 20 cfs, 14 cfs, and 10 cfs), as estimated by the corresponding water-level elevations at the USGS gage at the Lovelady monitor and drought-indicator well, will make manual discharge measurements of total springflow of Barton Springs as needed to confirm Barton Springs flow for assessing drought stage status and prognosis, and share the manual discharge measurements with the City within one week of the measurement date.

E. The City and the District will collaborate to improve the accuracy of measurement of combined total discharge from the Barton Springs Complex where feasible. The District and the City will notify the USGS when the gage's reported instantaneous spring flow values differ from the manual measurements made by either party by 20%.

F. The City will consider the District's input into the evaluation of the preliminary engineering feasibility review, design and installation of new flow measurement equipment or construction of an improved flow measurement structure or structures to more accurately measure total discharge from the Barton Springs Complex if the City pursues capital projects to improve spring flow measurement.

G. The City and the District will coordinate on joint flow loss studies in the recharge zone. Such collaboration may involve District contributions of in-kind support or District Board of Directors (Board)-approved and budgeted financial support.

III. Monitoring

A. The City will request permission of, receive authorization from, and coordinate with the District on all City-conducted dye tracing activities of the Aquifer, including documenting shared roles and responsibilities, as applicable.

B. The District will notify the City of dye tracing activities within the Aquifer. The City and the District will determine, in advance of the dye trace and as applicable, which entity will be responsible for sampling designated wells and springs for the term of the trace and document responsibilities in a written plan for each trace.

C. The City will continue Barton Springs salamander and Austin blind salamander surveys, including both routine quarterly surveys and any exception-based surveys, pursuant to the City's federal permits TE 833851 and TE 839031.

D. The City will continue water quality monitoring of the Barton Springs Complex pursuant to the most current version of the City's Texas Pollutant Discharge Elimination System Municipal Separate Storm Sewer System permit and associated Stormwater Management Plan and provide copies of the annual permit report to the District for routine monitoring, and, if and as conducted, any exception-based monitoring. This continued monitoring by the City specifically includes enabling the continuous monitoring of dissolved oxygen at Barton Springs.

E. The City will facilitate District access to the Barton Springs complex for non-biological sampling. The City will determine if the proposed District sampling activity will be consistent with the City's ITP requirements.

F. The City and the District will collaboratively define and evaluate options and assess feasibility, and, if determined feasible, the District will emplace several new subsurface monitors by converting existing and/or installing new wells, including but not limited to:
    - One of the prospective Magellan Longhorn Pipeline monitor wells in the Garrison Park-Amur Street area for multiple use as a sentinel and groundwater/habitat monitoring well;
    - Existing open-hole wells in the recharge zone remote from Zilker Park for conversion to secure habitat monitoring well(s) that allow both groundwater and biological sampling;
    - One or more new multi-port wells in the Edwards/Upper(most) Glen Rose in or near Zilker Park;
    - One or more new open-hole Habitat Monitoring Wells, nearby the new multi-port well in Zilker Park, for periodic or episodic groundwater and biological sampling

G. The City will assess the efficacy of reallocating funds currently used in some or all of its existing groundwater data collection program with the USGS throughout the Barton Springs Zone, herein to include the contributing, recharge, and confined zones of the Aquifer, to provide additional resources for collaborative efforts under this Agreement, including but not limited to installing new "hybrid" wells used for both groundwater and habitat monitoring, periodic sampling of such wells, and analyzing water quality and habitat data from them. .

H. The City will facilitate District access to important existing and future District monitor wells, to include but not be limited to:
    - Lovelady Drought Index well-- assist District and USGS staff with periodic access to the monitor well, if needed;
    - Longhorn Pipeline Monitor Wells—one or more wells to be installed in the Garrison Park-Amur Street area;
    - Ruby Ranch Monitor Well - a multiport well on City property at Ruby Ranch;

- DO Augmentation Wells – mitigation measures, if feasible, in the vicinity of the Barton Springs outlets, as described in subsection VII.A below; and
- Any other groundwater or habitat monitoring wells to be used by the District and/or City that currently exist on City property or that may be installed in the future on City property with the City's concurrence. Such wells may be for groundwater-level monitoring, groundwater chemistry sampling, and/or for habitat characteristics, as described in subsection VII.D below.

IV. Regional Cooperation

A. The City and the District agree to continue to organize and participate in meetings of the Barton Springs Zone Regional Water Quality Protection Plan working group.
B. The City and the District agree to continue to share information and coordinate on studies related to Texas Department of Transportation projects over the Aquifer.
C. The City and the District agree to continue to share information and coordinate actions in response to Texas Commission on Environmental Quality wastewater disposal permit actions within the contributing or recharge zones of the Aquifer.
D. The City and the District agree to continue to share information and coordinate actions in response to proposed State of Texas legislation that may affect the Aquifer.
E. The City has documented its support for service of a District board member or staff person on the City's Environmental Commission in City Code Section 2-1-144 (*Environmental Commission*).
F. The City will add a District staff member knowledgeable in Aquifer hydrogeology and acceptable to the City to the City's Habitat Conservation Plan Scientific Advisory Committee.
G. The District will ensure that a City staff member knowledgeable in Aquifer hydrogeology or salamander biology and acceptable to the District serves on the District's Habitat Conservation Plan Management Advisory Committee.
H. The District will recommend to Groundwater Management Area (GMA) 10 and support the inclusion of a suitable City staff member as an advisory committee member if a GMA 10 advisory committee is formed.

V. Recharge Enhancement

A. The City and the District will coordinate to identify and possibly implement mechanisms to reduce demand on the Aquifer as a water supply or otherwise augment water in the Aquifer.
B. The City and the District will share information and coordinate on planned recharge enhancement or aquifer storage projects.
C. Under the terms of the City's HCP and if requested by the City, the District will agree to provide available in-kind support to recharge enhancement projects conducted on City land, including cave debris cleaning or salamander habitat improvement projects.

VI. Groundwater Withdrawal

A. The District will consider the City's input, including new scientific information, in determining if the current Desired Future Conditions of the Aquifer during drought will be sufficient to maintain discharge and dissolved-oxygen levels at Barton Springs to be protective of endangered salamander populations.

B. The City will evaluate potential options for reducing demand on the Aquifer as a water supply, such as the following:
    - Enabling interconnections to the City water system by certain District Public Water Supply Historic-Use permittees during declared drought as a substitute water supply with a commitment to annexation in exchange for greater than mandatory curtailments during the interconnection period; and
    - Providing treated effluent to certain other District permittees during declared drought as a substitute water supply for non-potable uses.

C. The District will maintain rules that prevent re-permitting of retired historic use and quantified additional recharge from recharge enhancement facilities within the District as additional firm-yield supply.

D. The District will ensure City-designated WPD staff members are provided public notices of administratively complete well applications.

E. The District will notify the City of authorized well drilling activities within the Barton Springs Risk Management Zone, as delineated on the mutually agreed map.

F. The City will ensure District-designated staff members are provided public notices of City activities within and of interest to the District.

VII. Other Related Commitments

A. The City will coordinate with the District on subsurface dissolved oxygen augmentation efforts in improving salamander habitats of the Barton Springs Complex during extreme low flow conditions that result in decreases of dissolved oxygen below the highest threshold demonstrated to compromise survival of endangered salamanders. These dissolved oxygen augmentation activities, including feasibility study, pilot-scale demonstration of concept, and implementation of full-scale system, will require separate and sequential approval by both parties, dependent on the findings and conclusions in the preceding study, and will follow a written procedural plan that is agreed to in advance by the City and the District and approved by the U.S. Fish and Wildlife Service. Dissolved oxygen augmentation must not adversely affect salamander populations or their habitat, as determined solely by the City. City participation and permission of access to Barton Springs by the District are contingent upon determination by the City throughout the process that the project will not substantially and adversely alter existing groundwater flow paths and will not directly or indirectly harm existing salamander habitat. The City shall be responsible for compliance with all City permitting and regulatory requirements associated with such efforts.

B. The City, during Extreme Drought conditions as declared by the District, will maintain the normal operational water level of Barton Springs Pool.

C. The District will coordinate with the City to conduct a study of the distribution of the DO concentrations throughout the surface (epigean) environment, including all then-flowing spring runs in the Barton Springs Complex and the main Barton Springs pool, and in the subsurface within the Aquifer by hydrologic and hydrogeologic zones at both non-storm high (generally defined as when Barton Springs discharge is 75 cfs or greater) and low (generally defined as when Barton Springs discharge is lower than 30 cfs) water levels.

D. The District and the City will partner to investigate the feasibility and, if feasible, study the habitat characteristics of the Aquifer by installing two or more wells, with at least one well proximal to Barton Springs and its salamander habitat and at least one well proximal to the known habitat of the salamander population remote from Barton Springs. The City will

facilitate, as necessary, acquiring and maintaining access to the wells for aquifer and ecology monitoring.

E. To support the City's Austin Salamander Conservation Center captive salamander population research and refugium, the District will collect water quality samples and measure corresponding groundwater levels from the Austin Nature and Science Center well at least five times over five years, including twice during high aquifer water levels and twice during low aquifer water level conditions, and analyze the samples for major cations and anions, DO, nitrates + nitrites, and *E. coli* bacteria and other parameters as mutually agreed to.

VIII. TERM, TERMINATION

A. This Agreement shall be effective from and after the date of execution by all parties and shall expire upon the expiration of the latter of the Incidental Take Permits issued by the U.S. Fish and Wildlife Service to each party, unless previously terminated pursuant to this Agreement.

B. This Agreement may not be altered, amended, or modified except in writing, approved by the Board and the City Manager of the City of Austin or designee.

C. If either party defaults in the performance of any of the terms or conditions of this Agreement, the defaulting party shall have 60 days after receipt of written notice of the default within which to cure the default. If such default is not cured within 60 days, then the offended party shall have the right without further notice to terminate this Agreement.

D. The other subsections of this section notwithstanding, should either the City or the District have their respective Incidental Take Permits from the U.S. Fish and Wildlife Service terminated or amended in such a way that this Agreement is no longer a required provision of the ITP, this Agreement is terminated, and another one may be initiated at the parties' mutual agreement.

IX. MISCELLANEOUS

A. Severability. If any section, subsection, sentence, clause or phrase of this Agreement is for any reason held to be unconstitutional, void, or invalid, the validity of the remaining portions of the Agreement shall not be affected thereby. It is the intent of the parties signing this Agreement that no portion of it, or provision or regulation contained in it shall become inoperative or fail by reason of unconstitutionality or invalidity of any other section, subsection, sentence, clause, phrase, provision or regulation of this Agreement.

B. Law and Venue. This Agreement shall be governed by the laws of the State of Texas. The obligations under this Agreement are performable in Travis County, Texas. It is expressly understood that any lawsuit or litigation arising out of or relating to this contract will take place in Travis County, Texas.

C. Entire Agreement. This Agreement constitutes the entire agreement between the City and the District. No other bilateral agreement, statement or promise relating to the subject matter of this Agreement that is not contained in this Agreement is valid or binding.

D. Notice. Notices to either party shall be in writing and may be either hand delivered or sent by certified or registered mail, postage paid, return receipt requested. If sent to the parties at the addresses designated herein, notice shall be deemed effective upon receipt in the case of hand delivery and three days after deposit in the U.S.P.S. mail in case of mailing.

The address of the City for all purposes under this Agreement and for all notices herein shall be:

City of Austin
Watershed Protection Department
Attn: Jose M. Guerrero, PE, Interim Director
505 Barton Springs Rd, 11th Floor
Austin, TX 78704

The address of the District for all purposes under this Agreement and for all notices herein shall be:

Alicia Reinmund-Martinez, General Manager
Barton Springs Edwards Aquifer Conservation District
1124 Regal Row
Austin, TX 78748

E. Indemnity. To the extent allowed by Texas law, each party agrees that it is responsible to the exclusion of any such responsibility of any other party for its own proportionate share of liability for its negligent acts and omissions for claims, suits, and causes of action, including claims for property damage, personal injury and death, arising out of or connected to this Agreement and as determined by a court of competent jurisdiction, provided that the execution of this Agreement will not be deemed a negligent act.

F. Appropriations. Nothing in this Agreement may be construed to obligate the parties to any current or future expenditures in excess of amounts duly appropriated by their respective governing body.

WHEREFORE, the parties have executed this Agreement hereto, as follows:

CITY OF AUSTIN

BY: _____ DATE: 5/8/2019
Rey Arellano
Assistant City Manager

APPROVED AS TO FORM:

BY: _____
Chad Shaw
Assistant City Attorney

BARTON SPRINGS EDWARDS AQUIFER CONSERVATION DISTRICT

BY: _____ DATE: 4/11/2019
Blayne Stansberry, President
Barton Springs Edwards Aquifer Conservation District

ATTEST: Blake Dorsett DATE: 4/11/19

Blake Dorsett
Board Secretary

APPROVED AS TO FORM:

BY: Bill Dugat DATE: April 11, 2019

Bill Dugat
District General Counsel

Appendix C

Assessment of Progress on HCP Minimization Measures

This Appendix C is intended to reflect the detailed progress, activities and actions implemented by the District to achieve the HCP minimization measures. Appendix C is an excerpt from the FY 2021 Management Plan Annual Report referred to as, *"Appendix B - Assessment of Progress toward Management Plan Goals and Objectives"*

"*Appendix B*" of the District's most recent Management Plan Annual Report is the Board-approved recent assessment by the District staff that describes the activities accomplished and progress made toward achieving the Management Plan and Habitat Conservation Plan goals, objectives, and performance standards. The objectives and their performance standards are described as the HCP Conservation Measures that avoid and minimize take.

That report may be accessed and downloaded via the District's website at:
https://bseacd.org/transparency/reports-audits/

FY 2021

Appendix B

Assessment of Progress Toward Management Plan Goals and Objectives

Board-approved November 18, 2021

GOAL 1 - PROVIDING THE MOST EFFICIENT USE OF GROUNDWATER

31 TAC 356.52(A)(1)(A)/TWC §36.1071(A)(1)

Objective 1-1. Provide and maintain on an ongoing basis a sound statutory, regulatory, financial, and policy framework for continued District operations and programmatic needs.

Performance Standards

Develop, implement, and revise as necessary, the District Management Plan (MP) 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 MP will be provided in the Annual Report.

In FY 2021, the District continued to implement its MP that was approved by the Texas Water Development Board (TWDB) on November 21, 2017. No revisions or amendments were presented or made.

In order to achieve the goals, management objectives, and performance standards adopted in the MP, on November 18, 2021, the District's Board of Directors (Board) evaluated progress made, and approved the District's FY 2021 Annual Report and Appendix B (Assessment of Progress toward Management Plan Goals and Objectives). Appendix A (the annual financial audit) will be presented at the December 9, 2021 Board Meeting.

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.

During FY 2021, Board and staff worked on amendments and additions to the District Rules and the Enforcement Plan. These changes were discussed and considered at the Board meetings in July and August 2021. There were nine topic areas that the proposed rule changes addressed:

1. General Changes – These changes will update the Table of Contents and Title Pages;
2. Definitions – The addition of two definitions; Notice of Violation, and Enforcement Plan;
3. Fee Schedule – Changes to fee language;
4. Conservation Credits – Removal of the Conservation Credit Program;
5. Authorized Drilling Extensions – Adding language that the permittee must file an extension letter with the District 30 calendar days before the drilling authorization expires;
6. Drought Management Fees – Change language to where permittees can pay their Drought Management Fees with their current billing cycle;
7. Drought Enforcement and Penalties – Removal of language from this section and changing of penalties;
8. Annual Overpumpage Enforcement and Penalties – Language added for annual overpumpage enforcement and penalties; and
9. Board Meetings – Language change to how many times the Board can meet.

Objective 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.

Performance Standard

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 (MZ) and permit type will be provided in the Annual Report.

A summary of the actual versus permitted production volumes for each MZ is also provided below.

FY 2021 Production from Individual Permittees		
Production Zone	Actual Production	Permitted Individual Production
Edwards	1,556,550,119	2,661,877,544
Trinity	211,230,909	616,456,117
Austin Chalk or Alluvial	48,116	2,500,000
Total (Gallons)	**1,767,829,144**	**3,280,333,661**
	(5,425.27 ac ft)	(10,067 ac ft)

FY 2021 Production from Limited Production Permits		
Production Zone	Actual Production*	Permitted Limited Production
Edwards	12,641,596	60,500,000
Trinity	5,432,596	26,000,000
Austin Chalk or Alluvial	0	0
Total (Gallons)	**18,074,192**	**86,500,000**
	(55.47 ac ft)	(265.46 ac ft)
**Actual production is a volume estimate calculation described in the findings and conclusions of the BSEACD Staff Report 2010. Average Annual exempt well production is approximately 104,473 gpy*		

Objective 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.

Performance Standards

Provide an estimate of groundwater withdrawn by exempt wells in the District using Texas Department of Licensing and Regulation (TDLR) and TWDB databases, and District well records; and update the estimate every five years with the District's MP updates.

This is a joint effort between the Aquifer Science, Communications and Outreach, and Regulatory Compliance Teams. The next estimation of exempt wells is expected to take place with the next update of the District's MP (2022).

In the interim years between MP 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 MZ and permit type that will be provided in the annual report.

A summary table of the estimated exempt well production volumes for the Edwards and Trinity MZs is provided below.

Edwards Aquifer – Estimated Exempt Wells Production

Average Annual Volume per Exempt Well (gpy)	104,573
Total Est Volume of Exempt Well Production (gpy) *	**105,514,157**
Est # of wells	1009
cfs	0.45
% of Permitted Production	4.26%
Permitted Edwards Production(gpy)	*2,719,277,544*

**2010 BSEACD Staff Report – Avg Exempt Well Use=104,573 gpy*

Trinity Aquifer – Estimated Exempt Wells Production

Average Annual Volume per Exempt Well (gpy)	104,573
Total Est Volume of Exempt Well Production (gpy) *	**120,258,950**
Est # of wells	1150
cfs	0.51
% of Permitted Trinity Production	23%
Permitted Trinity Production (gpy)	*525,881,557*

**2010 BSEACD Staff Report – Avg Exempt Well Use=104,573 gpy*

Objective 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.

Performance Standards

Publicize District drought trigger status (Barton Springs ten-day average discharge and Lovelady Monitor Well water level) in monthly eNews bulletins and continuously on the District website.

The drought status graphic on the District home page was updated frequently to indicate drought trigger levels and associated drought conditions. In addition, both the Lovelady and Barton Springs levels are now shared weekly on the District's social media channels and under the spotlight section of the website. The Aquifer Science/Drought Status website page was visited approximately 1,238 times throughout FY 2021. Drought stage updates were shared as press releases (sent to media) and were sent through the District's eNews both as stand-alone press releases and in the District newsletter. Drought status updates were shared across all District social media channels (Twitter, YouTube, Facebook, Instagram) in written and visual form. The District incorporated video where staff was interviewed about drought status and the impacts to the District. Drought status was also incorporated as a banner on the District's website and was shared on the newly-created District newsroom website page.

When the District came out of drought in July 2021, it was also announced that the regular Water Conservation Period, which extends from May through September, became active. The conservation period was publicized through drought status icons on the District website, included as a banner on the website, and shared in articles in the District's newsletter. Conservation information was also shared on our newly-created District newsroom page and was shared across all social media platforms in written and video form.

Provide summaries of associated outreach and education programs, events, workshops, and meetings in the monthly team activity reports in the publicly-available Board backup.

- Communications and Outreach Manager serves on TAGD's Information & Education Committee. TAGD is using the District's Communications and Outreach plan as a template for other water districts.
- Two virtual classroom presentations.
- Partnered with Wimberley Valley Watershed Association and Trinity Edwards Springs Protection Association (TESPA) for Deep in the Karst of Texas Campaign. (July/August 2021)
- Worked with members of the Hydrogeologic Atlas of Southwest Travis County GCD for well owner education in Travis County.
- National Protect Your Groundwater Day Campaign/Postings. (September 2020)
- Collaborated with Travis County Commissioner Ann Howard for Earth Day. (April 2021)
- Assisted and attended Central Texas Water Efficiency Network Virtual meetings.
- Co-Sponsored Hill Country Explorer Guide Collaboration. (July 2021)
- Co-Sponsored Virtual Rainwater Revival and Hill Country Alliance Event. (October 2020)
- Official Communications and Outreach plan approved by the Board in August 2021.
- District Kent Butler College Scholarships were awarded to three high school winners with the highest scoring groundwater essays. There was no Aquatic Summer Camp this year due to Covid, but the camp will return in 2022. (April 2021)
- Co-Sponsored TAGD's Birthday party at the water summit. (August 2021)
- Attended TAGD Water Summit Conference. (August 2021)
- Attended Texas American Water Works Association (AWWA) and Rogue Water Lab Utility Communication Webcast Series. (April 2021)
- Created the District Newsroom page on the District website to have all District communication in one place. (June 2021)
- Created the District Instagram channel. (August 2021)
- District Twitter posts totaled over 32,000 combined impressions, more than doubling our Twitter impressions for FY 2020 (12,400).
- District website pages were viewed over 39,000 times in FY 2021.
- Increased the District video content. Between March and August, 38 videos were created on the District YouTube channel. These videos were shared on the District's social media channels, website, and some of them were shared in "The Aquifer Zone" newsletter.
- The District has teamed up with My Point TV (https://mypoint.tv/). MyPoint.TV is a new online news company in Austin that uses the public and eyewitness reporting to give everyone the opportunity to publish stories that matter to them. The District is sharing videos and news of importance on their site, like our Science in 60 Seconds segments and drought information. This gives access to a broader audience and allows the District to educate more than just its jurisdiction on aquifer/water related issues. (August 2021)

This summary may also be found in the Education section of the Annual Report.

Objective 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.

Performance Standards

Receive a clean financial audit each year. A copy of the auditor's report will be included in the Annual Report (as Appendix A).

The Board expects to receive and approve the FY 2021 Annual Financial Audit report provided by the District's financial auditor at its Board Meeting on December 9, 2021. It will be included in the Annual Report as Appendix A.

Timely develop and approve fiscal-year budgets and amendments.

In FY 2021, there were two budget versions. The initial budget was brought before the Board in a properly-noticed public hearing held on July 9, 2020 where it was approved. The Board approved Budget Revision 1 on May 13, 2021.

Objective 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.

Performance Standards

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 Public Information Act (PIA), any training provided to staff or directors, or any claims of violation of the PIA will be provided in the Annual Report under the General Management Team Highlights.

The Administration Team is responsible for proper maintenance, management, retention, and disposition of all District records; inventory of District property (asset management); and capital depreciation. Administration preserved and protected all public documents in accordance with state and federal laws, the adopted District Records Retention Schedule, and with the Texas State Library regulations; and maintained the District's reference material library.

District records were maintained effectively, and there were no violations of the PIA.

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.

The Administration Team developed, posted, and distributed all materials and backup documentation for all 12 District Special Meetings (which are regular board meetings that were virtual) held in FY 2021. There were also four Work Sessions and three Public Hearings. All meeting minutes were approved by the Board at a subsequent meeting. Administrative staff maintained the officials records of each meeting on the District's website and in the District's library.

Objective 1-7. Manage and coordinate electoral process for Board members.

Performance Standard

Ensure elections process is conducted and documented in accordance with applicable requirements and timelines. Election 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.

The District holds elections no more often than every two years (in odd-numbered fiscal years, if and when election contests warrant).

The District held an election in FY 2021 (November 2020) for District Director Precincts 1, 3, and 4; one director resigned, one director had no opposition, and one incumbent director up for re-election had opposition.

Having no opposition in Precincts 1 and 3, the election was cancelled for those two precincts, and an election was held for Precinct 4, which is in both Travis and Hays counties.

GOAL 2 - CONTROLLING AND PREVENTING WASTE OF GROUNDWATER

31 TAC 356.52(A)(1)(B)/TWC §36.1071(A)(2))

Objective 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.

Performance Standard

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 also be provided in the Annual Report.

To ensure that all firm-yield production permits are evaluated with consideration given to the District's demand-based and non-speculative permitting standards, staff completed comprehensive administrative and technical reviews of permit application requests. 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, is provided below.

A summary of the processed permitting applications in FY 2021 is provided in the table below.

Processed Permit Applications	FY19	FY20	FY21
Minor Amendment	5	3	4
Major Amendments	0	0	0
New Exempt Well	10	2	9
Limited Production Permit (Nonexempt Domestic Wells)	16	9	15
Individual Production Permit	3	4	1
Individual Well Drilling Authorizations or Well Modification	8	2	1
Test Well	1	0	0
Well Plugging	5	6	5
Replacement Well	0	0	0
TOTAL	48	26	35

A summary of the individual production permits processed in FY 2021 is provided in the table below.

	Annual Volume (gpy)	Production Permits Processed	Permit Type	Use Type	Aquifer
1	700,000	Spicewood, LLC	Historical Trinity	Commercial	Trinity

Objective 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.

Performance Standards

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.

During FY 2021, the Regulatory Compliance Team conducted a number of inspections relating to the processing of permit applications. Staff completed a total of 15 inspections related to special investigations, site permittee inspections, and well permit applications. The Regulatory Compliance Team collected 3 water quality samples during routine permit inspections or from new well construction inspections. There were no formal enforcement actions initiated in FY 2021.

FY 2021 Inspections/ Investigations/ Visits	
Exempt Well Inspections	0
Limited Production Permit Inspections	5
Individual Production Permit Inspections	3
Test Well Inspections	0
Plugging Inspections	2
Special Investigation Inspections	5
Other Permittee Meetings/Visits *	0
**Multiple meetings were held with some permittees.*	
TOTAL	**15**

Provide a summary of the volume of aggregate groundwater withdrawals permitted and actually produced from permitted wells for each MZ and permit type in the Annual Report.

A summary of the actual versus permitted production volumes for each MZ is provided above in the Objective 1-2 Performance Standard update.

Objective 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.

Performance Standards

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.

- During FY 2021, the 87th legislative session convened. The GM worked with SledgeLaw Group to track bill activity that would affect the District and groundwater regulation in general. Furthermore, the GM and staff tracked legislative initiatives and participated in the multiple legislative subcommittees at Texas Water Conservation Association (TWCA) and TAGD such as: Petitioning a GCD to Conduct Rulemaking; Permit Application Notices; Bed and Banks Permit vs "waste" definition; authority to use permit fees for mitigation; similar rules; permitting; and attorney's fees. The District's primary legislative matters of interest included:
    - H.B. 1718 – filed by Eddie Rodriquez relating to the equalization of the rates of production fees charged on certain wells by the District. The bill amended the enabling legislation for the District to prohibit the District from, before September 1, 2021, charging an annual production fee of more than 17 cents per thousand gallons of water authorized by permit if the water is permitted for any use other than agricultural use. The bill authorized the District to increase the annual production fee by not more than 10 cents per thousand gallons per year beginning September 1, 2021, for water permitted for nonagricultural purposes, until the annual production fee is equal to the maximum amount set forth in Section 8802.1045(b)(not more than the greater of: (1) 38 cents per thousand gallons; or (2) the raw surface water cost of other wholesale suppliers serving customers in the District). The bill did not go far and the last action on the bill was March 2021 where it was introduced and referred to the committee on House Natural Resources.
    - S.B. 152 - filed by Senator Perry that is an omnibus groundwater bill. This bill focuses on attorney's fees, petitions to GCDs for rulemaking, and permit notices to affected persons. CSSB 152 removes the attorney's fees component. S.B. 152 did not pass.

Provide a summary of District activity related to other land use activities affecting groundwater in the Annual Report.

Development Activities Over Recharge and Contributing Zones:

The District continues to monitor for proposed Texas Pollutant Discharge Elimination System (TPDES) permits in the contributing and recharge zones of the Barton Springs segment of the Edwards Aquifer. Furthermore, the District continues to track legislation regarding wastewater discharges in the Edwards Aquifer Contributing Zone.

Objective 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.

Performance Standard

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.

To ensure that all firm-yield production permits are evaluated with consideration given to the District's demand-based and non-speculative permitting standards, staff completed comprehensive administrative and technical reviews of permit application requests. 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 is provided below.

A summary of the processed permitting applications in FY 2021 is provided in the table below.

Processed Permit Applications	FY19	FY20	FY21
Minor Amendment	5	3	4
Major Amendments	0	0	0
New Exempt Well	10	2	9
Limited Production Permit (Nonexempt Domestic Wells)	16	9	15
Individual Production Permit	3	4	1
Individual Well Drilling Authorizations or Well Modification	8	2	1
Test Well	1	0	0
Well Plugging	5	6	5
Replacement Well	0	0	0
TOTAL	48	26	35

A summary of the individual production permits processed in FY 2021 is provided in the table below.

	Annual Volume (gpy)	Production Permits Processed	Permit Type	Use Type	Aquifer
1	700,000	Spicewood, LLC	Historical Trinity	Commercial	Trinity

GOAL 3 - ADDRESSING CONJUNCTIVE SURFACE WATER MANAGEMENT ISSUES

31 TAC 356.52(A)(1)(D)/TWC §36.1071(A)(4)

Objective 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.

Performance Standard

A summary of District activity related to this objective will be provided in the Annual Report.

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 available/proposed infrastructure, financial factors, logistical/engineering factors, and potential secondary impacts (development density/intensity or recharge water quality).

Staff worked cooperatively and closely with the Ruby Ranch Water Supply Corporation (RRWSC) and their consultants to conduct phase four of aquifer storage and recovery (ASR) pilot testing initiated in 2017 and ending in 2019 with an ASR application to the TCEQ (the 4th in Texas). The District assisted with hydrogeologic evaluations, and water level and water chemistry sampling throughout all phases of pilot testing. In FY 2020, RRWSC was given a Conditional D permit for Edwards groundwater to inject into the Trinity Aquifer. In FY 2021, RRWSC began their first Conditional D permitted ASR recovery in September 2020 and from June-August 2021, with a total of 3,117,700 gallons recovered from Trinity formations. Water-quality data collected by RRWSC was shared with the District and evaluated by Aquifer Science staff. https://bseacd.org/uploads/RubyRanchASR_Status-Report_FINAL.pdf

Objective 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.

Performance Standard

A summary of District activity related to this objective will be provided in the Annual Report.

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 available/proposed infrastructure, financial factors, logistical/engineering factors, and potential secondary impacts (development density/intensity or recharge water quality).

Staff met with City of Buda staff and their consultant as they prepared a permit application for an ASR system. Staff participated in collecting cuttings and core samples from the ASR test well that Buda installed. In FY 2021, the District received an ASR Pilot Test Plan which was reviewed and found satisfactory by staff to prove the feasibility of the project. Aquifer science staff will work with Buda during the pilot test to ensure adequate data is collected during the test, including monitoring of water levels with the District's Antioch Westbay well to observe potential impacts during pumping from the Buda Trinity ASR well.

Regulatory Compliance and Aquifer Science Teams had discussions with Bill Walters (Gragg Tract) on additional testing of the Lower Trinity Aquifer. Staff continues to assist with data collection and pump testing.

Objective 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.

Performance Standards

Provide summaries of associated outreach and education programs, events, workshops, and meetings in the monthly team activity reports in the publicly-available Board backup.

This information has been presented in the monthly status report section of the Board backups, generally in the first meeting of each month. Visit https://bseacd.org/transparency/agendas-backup/, click on the Agenda hyperlink beneath the month of interest, the page number of the Status Report is listed under the GM Report section of the meeting agenda. Please see bulleted list in Objective 1-4 for a schedule of events and programs.

Summarized outreach activities and estimate reach is in the Annual Report.

Objective 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.

Performance Standard

Regularly attend regional water planning group meetings, and annually report on meetings attended.

In FY 2021, staff attended meetings of the Lower Colorado Regional Water Planning Group (RWPG K) and reported on any key updates at the Board Meetings. Medina County GCD GM served as the liaison to GMA 10 from September 1, 2020 to the end of December 2020. The District GM and the alternate served as the GMA 10 representative on the RWPG through August 31, 2021 and continues to serve as the liasion.

JULY 21, 2021
https://static1.squarespace.com/static/601d9dd86690083c71acdc59/t/60cf4dbc10eba709c1ab7620/1626295742909/2021_7_21_RegionK_Mtg_Agenda.pdf

JANUARY 27, 2021
https://static1.squarespace.com/static/601d9dd86690083c71acdc59/t/60f856c315f8971b4a472fad/1626887876084/2021_1_27_Region_K_Mtg_Agenda.pdf

OCTOBER 14, 2020
https://static1.squarespace.com/static/601d9dd86690083c71acdc59/t/602195811198460bc0111aac/1612813697587/2020_10_14_Region_K_Mtg_Agenda.pdf

SEPTEMBER 15, 2020
https://static1.squarespace.com/static/601d9dd86690083c71acdc59/t/6021b7f3130c690d90e5e017/1612822515806/2020_9_15_Region_K_Mtg_Agenda.pdf

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)

Objective 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.

Performance Standards

Review water-level and water-quality data that are maintained by the District and/or TWDB, or other agencies, on a regular basis.

Staff visits approximately 42 monitor wells quarterly, in addition to numerous other wells throughout the year, including six multiport monitor wells. Data is collected and organized into individual spreadsheets and databases. Staff also regularly samples wells and springs for detailed geochemical analyses as a cooperator for the TWDB (15 sites in FY 2021). All data has been compiled in the TWDB database that is publicly available. In addition, staff has repeatedly visited and sampled numerous wells in areas reporting or anticipating problems such as the Electro Purification LLC (EP), Summer Mountain Ranch, and Permian Highway Pipeline (PHP) areas.

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.

Staff provided key technical support in the development of a conceptual model for the aquifers of the Blanco River watershed. That report (Martin et al., 2019[1]) was published at the end of FY 2019. Since then, staff have continued to work with the modeling team to help with logistics for project start-up. The District took a key role in applying for a grant from the U.S. Bureau of Reclamation to provide some portion of the funding for the model, however, that grant was not awarded to the District.

Aquifer Science staff began development of an in-house numerical groundwater model of the Trinity Aquifer in FY 2020. The model domain covers parts of Travis, Hays, Blanco, and Comal counties. A steady-state version of the model was completed in late 2020. In FY 2021, staff have worked to transition the model from steady-state to transient state. Transient models are substantially more complex than steady-state, and allow for simulation of the aquifer system under changing conditions such as prolonged drought and/or increases in localized pumping. Once completed, the in-house model will provide a valuable tool which will allow policy makers and stakeholders to evaluate the potential impacts of management decisions on the Trinity Aquifer. In addition, development of the in-house Trinity model will be a valuable training exercise for Aquifer Science staff, who will be better equipped to evaluate and interact with other groundwater models which are currently under development (such as the Blanco River Aquifer Assessment Tool and the new TWDB Hill Country Trinity Groundwater Availability Model).

Staff completed Phase 2 of a cooperative study with Travis County on the groundwater resources of Southwestern Travis County. Results provide key insights into the Middle and Lower Trinity Aquifers within and adjacent to the District. These studies will help inform conceptual and numerical models of the region.

- https://bseacd.org/2020/08/data-compilation-and-database-structure-for-the-geodatabase-accompanying-the-hydrogeologic-atlas-of-southwest-travis-county-central-texas/
- https://bseacd.org/2019/11/blanco-river-aquifer-assessment-tool-a-tool-to-assess-how-the-blanco-river-interacts-with-its-aquifers-creating-the-conceptual-model/
- https://bseacd.org/projects/travis-county-groundwater-study/

No significant changes in water-quality data were observed during FY 2021. Aquifer conditions began in "No Drought," but Barton Springs flow and aquifer levels were quickly declining due to a very dry summer 2020. In early October, Barton Springs and Lovelady crossed under Stage II Drought thresholds and the Board declared Stage II Drought on October 8, 2020, and remained in Stage II Drought until above average rainfall in the spring and summer 2021 helped lift Barton Springs and the Lovelady water level above their respective Alarm Stage II Drought thresholds, and the Board declared "No Drought" conditions on July 8, 2021. Additionally, FY 2021 fall rains have bolstered spring flow and water levels in the Edwards and Trinity Aquifers.

Objective 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.

Performance Standard

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.

- The Aquifer Science Team continues to collect data in the EP and Needmore areas, and are working with Hays County and Hays Trinity Groundwater Conservation District (HTGCD) to install additional monitor wells near Jacobs's Well. In FY 2021, Aquifer Science staff assisted Hays County with design and overseeing drilling of a new monitoring well south of the EP wellfield. The well will be added to the District water-level monitoring network. As additional data become available, further analyses will be conducted.
- As indicated above, development of numerical models is underway to assist in the evaluations of potential impacts from pumping from the EP wells and from other pumping and drought scenarious.
- The Aquifer Science Team discussed and presented suggested revisions to the Trinity desired future condition (DFC) statement to increase the ability to accurately monitor and assess its compliance considering large permit requests.

- The Aquifer Science Team continued data collection and analysis on the Trinity Aquifer to further expand the conceptual understanding of the Trinity groundwater system within. These data will be crucial for informing the District's ongoing efforts to develop a sustainable yield policy framework for managing the Trinity Aquifer.

Objective 4-3. Implement separate MZs and, as warranted, different management strategies to address more effectively the groundwater management needs for the various aquifers in the District.

Performance Standards

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.

To increase the understanding of District aquifers and water level conditions, staff collects groundwater data from selected wells and performs field assessments such as logging wells, and collecting water quality samples.

- The Aquifer Science Team collected 32 samples from sample sights including wells and springs from the Edwards and Trinity Aquifers for major ions and isotopes.
- The Regulatory Compliance Team collected 3 water quality samples during routine permit inspections or from new well construction inspections.

A summary of the volume of aggregate groundwater withdrawals permitted and actually produced from permitted wells for each MZ and permit type is provided in the Annual Report.

To ensure that all firm-yield production permits are evaluated with consideration given to the District's demand-based and non-speculative permitting standards, staff completed comprehensive administrative and technical reviews of permit application requests. 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 is provided below.

A summary of the processed permitting applications in FY 2021 is provided in the table below.

Processed Permit Applications	FY19	FY20	FY21
Minor Amendment	5	3	4
Major Amendments	0	0	0
New Exempt Well	10	2	9
Limited Production Permit (Nonexempt Domestic Wells)	16	9	15
Individual Production Permit	3	4	1
Individual Well Drilling Authorizations or Well Modification	8	2	1
Test Well	1	0	0
Well Plugging	5	6	5
Replacement Well	0	0	0
TOTAL	48	26	35

A summary of the individual production permits processed in FY 2021 is provided in the table below.

	Annual Volume (gpy)	Production Permits Processed	Permit Type	Use Type	Aquifer
1	700,000	Spicewood, LLC	Historical Trinity	Commercial	Trinity

Objective 4-4. Actively participate in the joint planning processes for the relevant aquifers in the District to establish and refine DFCs that protect the aquifers and the Covered Species of the District Habitat Conservation Plan (HCP).

Performance Standard

Attend at least 75% of the GMA (groundwater management area) meetings, and annually report on meetings attended, GMA decisions on DFCs, and other relevant GMA business.

Staff attended 100% of the GMA 9 and GMA 10 meetings that were held in FY 2021. The GMA discussions included the following main topics:

- Resolutions regarding administrative boundary of the northern Medina County and the Western boundary of the District.
- Annual review of individual GCD management plans.
- Discussions on possible revisions to the GMA 9 and GMA 10 DFCs, as well as standardization of monitor well analysis and reporting occurred.
- Discussion on the further standardization of monitor well analysis and reporting to aid monitoring compliance of DFCs.
- Administrative work and the selection of consultants to compile the next Explanatory Report.
- Timeline and schedule for proposed DFCs and Explanatory Report.
- Approving and adopting DFCs for GMA 10.

Objective 4-5. Implement the measures of the HCP and Incidental Take Permit (ITP) from the USFWS for the Covered Species and covered activity to support the biological goals and objectives of the HCP.

Performance Standard

Prior to ITP permit issuance, a progress report summarizing activities related to the United States Fish and Wildlife Service (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.

The USFWS approved the District's HCP in July 2018, and published the Record of Decision and the final Environmental Impact Statement (EIS). On September 20, 2018, the USFWS issued a 20-year ITP. On April 11, 2019, the Board approved an Interlocal Agreement (ILA) between the District and the City of Austin (CoA) to collaborate and coordinate on routine and planned activities relative to each entity's respective HCP. On December 10, 2019, the CoA Technical Committee staff and District staff met to discuss commitments of the ILA and exchange scientific research. On February 15, 2020, the first HCP Annual Report was submitted to the USFWS. On January 26, 2021, the CoA Technical Committee staff and District staff met to discuss commitments of the ILA and exchange scientific research. On February 18, 2021, the second HCP Annual Report was submitted to the USFWS.

GOAL 5 - ADDRESSING DROUGHT CONDITIONS

31 TAC 356.52 (A)(1)(F)/TWC §36.1071(A)(6)

Objective 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 dissolved oxygen (DO) concentration trends at the spring outlets, as warranted.

Performance Standards

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.

Staff monitored the District's two drought trigger sites (the Barton Springs and Lovelady monitor wells) plus numerous other indicators of drought conditions relating to the Edwards Aquifer. The District contracts with the United States Geological Survey (USGS) for the Lovelady Well to maintain equipment, collect, and host as real-time data on their website. The CoA contracts with the USGS to maintain the data for Barton Springs.

Staff frequently verified water level values measured by the equipment at the Lovelady monitor well (which has recorded data since 1949) and verified discharge measurements made at Barton Springs. During periods of District-declared drought, and preceding potential drought, staff provided timely updated reports of aquifer conditions at each Board meeting. Data from Trinity monitor wells were also collected and evaluated at these times.

Staff evaluated the current drought trigger methodology as it relates to the Middle Trinity Aquifer. Results were published in a memo, and found that the triggers are indeed representative of drought conditions, regardless of the aquifer.

A summary of the drought indicator conditions and any declared drought stages and duration will be provided in the Annual Report.

FY 2021 began with a status of No Drought due to a very wet May 2020 that narrowly kept spring flow and aquifer levels from dipping below Stage II thresholds. However, below-average rainfall during the summer wasn't enough to keep levels from declining towards Stage II Drought thresholds. By early October 2020, Barton Springs and Lovelady crossed under their Stage II Drought thresholds and the Board declared an Alarm Stage II Drought on October 8. Levels declined throughout the fall and winter as La Niña conditions - beginning in July 2020 - brought warmer and drier climate to the Hill Country.

Calendar year 2021 began with a combined 3.5 inches of rain from January to March (3 inches below historical average), perpetuating the downward spring flow and water level trend. While some relief came with over 3 inches of rainfall in April, little recharge was seen as the dry soils soaked most of it up. The increased soil moisture from April rain set the stage for 8 inches of rain in May to generate enough recharge to reverse the downward spring flow and water level trends. The Climate Prediction Center

(CPC) officially declared the end of La Niña in May 2021, beginning an ENSO-neutral (neither La Niña or El Niño) period that allowed for above average mid-spring and summer rainfall totals of 20.4 inches. Barton Springs and Lovelady water levels began to rise on May 1st for the first time since July 2020.

A combined 15 inches of spring rain fell March - June 2021, providing enough recharge to overcome the dry La Niña winter and reverse the falling spring flow and aquifer trend. With both Barton Springs and Lovelady water levels rising above their respective Alarm Stage II Drought thresholds, the Board declared "No Drought conditions" on July 8, 2021. An additional 7 inches fell in July and August. On August 25, Lovelady water levels began to decline, looking as if the No Drought period would be short-lived. The CPC officially declared the return of La Niña on October 14, 2021, which, oddly coincided with up to 6 inches of rainfall in the Hill Country the day before. This brought considerable recharge as stream gauges on all area creeks showed rises. Spring flow and water levels showed a rising response.

To summarize, the Austin/Hill Country area has received an average 33 inches of rainfall so far in 2021 (through November 2nd), just 2.5 inches below the annual average, which means FY 2021 could finish with an above-average year. This may be due to the 6-month ENSO-Neutral period from March to October 14, 2021. While this might allow getting close to the 35.5 annual average, La Niña has officially developed again and is expected to continue into 2022. This could bring drier and milder-than-normal conditions across Central Texas, which will likely result in further declines as 2022 gets underway. Hopefully, spring of 2022 will bring its usual upward swing of recharge to keep the aquifers well-supplied.

Objective 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.

Performance Standard

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.

The District implements a drought management program that requires mandatory monthly pumpage curtailments during District-declared drought stages. The District was in Alarm Drought status from October 8, 2020 – July 7, 2021 and provided the Board with a monthly compliance spreadsheet that showed which permittees were under or over curtailment targets. The District was in No Drought stage July 8, 2021 – August 31, 2021.

Objective 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.

Performance Standards

During District-declared drought, publicize declared drought stages and associated demand reduction targets in monthly eNews bulletins and continuously on the District website.

The District came out of Stage II Alarm Drought in July 2021 (and had been in drought since October 2020). Once out of Stage II Alarm Drought, it was announced that the regular Water Conservation Period which extends from May through was now active. The conservation period was publicized through drought status icons on the District website, included as a banner on the website, and shared in articles in the District newsletter. Conservation information was also shared on the newly created District newsroom page and was shared across all social media platforms in written and video format.

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.

Articles included:

- September/October 2020 – District Drought Update: Meteorological vs. Hydrological, Ruby Ranch ASR Approved, Spooky Water Leaks, 2020 BSEACD Director – General Election
- November/December 2020 – Welcome New Directors, Winterize Your Well, Annual Report, Staff Update
- March 2021 – Latest Drought Status
- Spring 2021 (April, May) – Drought Conditions, Groundwater Scholarship Essay Contest, Planning for Future Water Needs, Antioch Cave, Staff Update, District Operations Update, Role of the District, District Social Media Channels
- Summer 2021 (June, July) – Aquifer District Lifts Drought Declaration, Aquifer Conditions, Spikes in Turbidity, Groundwater Modeling and the District's Trinity Aquifer Sustainable Yield Study, Meter Reporting, Scholarship Winners, District Newsroom Website Page, Edwards and Trinity Aquifers Monitoring, Borheim Quarry Visit, Science in 60 Seconds: Well Water Check-Up, Residential Limited Production Permitted Wells: Meter Readings Due Between Aug. 15 – Sept. 5,
- August 2021 – District Weather Station Now Online, Job Posting: General Manager

Press Releases included:

- Press Release: Aquifer District Declares Stage II Alarm Drought – October 9, 2020
- Press Release: Aquifer District Welcomes New and Returning Board Members – November 18, 2020
- Press Release: BSEACD and Needmore Water, LLC Enter Settlement Agreement with TESPA over Needmore Water LLC Permit – June 9, 2021
- Press Release: Aquifer District Lifts Drought Declaration, Reminds Permittees of Water Conservation Period; District Approves Changes to Rules & Bylaws – July 8, 2021
- Dorsett Resigns as Secretary of Barton Springs/Edwards Aquifer Conservation District; District Solicits Interest in Filling Precinct 3 Vacancy – July 12, 2021
- General Manager Vanessa Escobar Leaving District to Take on New Career Opportunity; District Accepting General Manager Applications – August 6, 2021

Social Media posts included:

- Stage II Alarm Drought Reminder and Conservation Tips, Rainfall Amounts, TWDB Draft State Water Plan, TWDB Water Weekly reports, Water Wise Wednesday: Lawn and Garden Practices, Barton Springs Pool, shared information about Soil and Water Stewardship Week from Texas State Soil and Water Conservation Board, shared information on rain forecast from National Weather

Service, Water Wise Wednesday – Irrigation Self-Audit, Rain barrels Getting Rain, Science in 60 Seconds: Well Water Check, Drinking Water Week, Well Site Visit Video, Antioch gauge levels/Lovelady and Barton Springs Levels After Rain, Water Wise Wednesday: Pump Protector, Borheim Quarry Visit, Water Wise Wednesday: Rain Barrels, Reminder on State Water Plan Comments due May 26, Science in 60 Seconds: What is pH, Endangered Species Day, TWDB Draft State Water Plan Public Comment Period, Rain Provides Relief, But We Remain in Stage II Alarm Drought, Rain barrel Action Video, Photo of Water Flowing at Bear Creek and 45 Toll Bridge, Summary of Water-Related Bills in the Texas Legislature, Multiport Monitoring Well Video, Article on Texas Groundwater Supplies Shrinking, Do It Yourself Rain Barrels, Types of Karst Features, Water Wise Wednesday: Self Irrigation Audit, Sinkholes are Karst Features, Drought Report, Aquarena Springs-Spring Lake Preserve Trail Photo, Geophysical Logs post, What is Karst?, Karst Regions, Throwback Thursday Barton Springs Photo, Deep in the Karst of Texas Campaign, Texas Karst Waters, Groundwater Modeling Video Preview, Barton Springs Salamander information, Groundwater Modeling Full Video, Onion Creek Peak at Driftwood and Pictures of Antioch Cave, Wise Wednesday: Use Least Toxic Method to Deal with Pests, BSEACD Press Release: Settlement Agreement Over Needmore Water LLC Permit Litigation, Environmental Defense Fund Webinar, Barton Springs & Lovelady Monitor Well Levels, Water Wise Wednesday: Native & Adapted Plants for Central Texas, Throwback Thursday: Cripple Crawfish Cave, Rain Video, Barton Springs Pool Closed, Jacob's Well Visit – Pictures, Prescribed Burn by Austin Water, Groundwater Facts, Water Wise Wednesday: Lawn and Garden Practices, Barton Springs and Lovelady Well levels, Save Barton Creek Association "Explorers Guide to the Hill Country Oasis", How Aquifers Work, Rain Video, BSEACD Weather Station, Zara Environmental Well Barton Springs Salamander

Videos included:

- What is the role of BSEACD – April 6, 2021
- The Antioch Cave – April 9, 2021
- The Barton Springs Pool: An Austin Icon – April 15, 2021
- Well Site Visits – May 3, 2021
- Science in 60 Seconds: Well Water Check Up – May 17, 2021
- Monitoring the Edwards and Trinity Aquifers – May 25, 2021
- Borheim Quarry – June 8, 2021
- GET Decision Support Tool - Groundwater Modeling – June 16, 2021
- How Groundwater Modeling Works – July 6, 2021
- Residential Limited Production Permitted Wells – July 12, 2021
- Drought Declaration Lifted/Drought Outlook – July 15, 2021
- Science in 60 Seconds: Turbidity – July 19, 2021
- What is Dye Tracing and How Is It Used in Groundwater Research – July 23, 2021
- Science in 60 Seconds: What is pH? – August 30, 2021
- Water Conservation Period – August 5, 2021
- BSEACD Weather Station – August 20, 2021

Objective 5-4. GM 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, source substitution with alternative supplies.

Performance Standards

Require an updated User Conservation Plan and User Drought Contingency Plan (UCP/UDCP) from Permittees within one year of each five-year MP Adoption.

In FY 2019, the Regulatory Compliance Team worked with interns to update 136 permit records in order to incorporate updated drought planning documents into their records. According to the District MP, all permittees must update their UDCP and UCP plans at least every five years. Therefore, since all UDCPs were updated in FY 2019, staff did not update them in FY 2021.

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.

After notice and an opportunity for a hearing, the Board may renew a permit with a reduced amount of the authorized production if the authorized withdrawal volume is no longer commensurate with reasonable non- speculative demand, or actual production from a well is substantially less than the authorized permit amount for multiple years without any rationale that reasonably relates to efforts to utilize alternative water supplies, conserve, or improve water use efficiency. Staff typically conducts an overpumpage analysis every few years, and conducted the analysis in FY 2019, therefore staff did not conduct an overpumpage analysis in FY 2021.

The District has been actively encouraging alternative source projects to reduce the dependency on the aquifers during drought. Staff has collaborated with water suppliers on ASR projects in providing regulatory and technical guidance. Staff has been working with the City of Buda on ASR feasibility. The Ruby Ranch ASR project was approved and has been in operation since the summer of FY 2021. Staff also assisted in assessing the feasibility of Lower Trinity Aquifer for water supply.

Objective 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.

Performance Standard

A summary of the volume of aggregate groundwater withdrawals permitted and actually produced from permitted wells for each MZ and permit type including the volume reserved in the freshwater Edwards Conservation Permit for ecological flows will be provided in the Annual Report.

A summary of the actual versus permitted production volumes for each MZ is provided in Objective 1-2. The amount of historical Edwards Aquifer permitted water that has been retired since 2009 is 82,025,125 gallons per year that can be targeted for a conservation permit. Additionally, 1,200,000 gallons per year of Historical Trinity Aquifer permitted water has been retired; no Conditional A permitted water has been retired.

GOAL 6 - Addressing Conservation and Rainwater Harvesting where Appropriate and Cost-Effective

31TAC 356.52 (a)(1)(G)/TWC §36.1071(a)(7)

Objective 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.

Performance Standards

A summary of efforts to assist permittees in developing drought and conservation messaging strategies will be provided in the Annual Report.

Each permittee is required to have an approved UDCP that outlines conservation actions to be taken under each drought stage. Staff provides bill inserts and road signs to all permittees upon request in drought declaration to help them comply with messaging requirements set forth in the UDCP. Staff actively promotes aquifer status through eNews, press releases, the District website, and social media platforms. Permittees are encouraged to share this information with their end users.

Publicize declared drought stages and associated demand reduction targets monthly in eNews bulletins and continuously on the District website.

Due to Covid, Well Water Checkup and Neighborhood Site Visits were cancelled in FY 2021. However, free educational handouts, well owner education, and information on well analysis is provided on the District website and has been shared on social media. There are also hard copies in the office.

The District was in Stage II Alarm Drought from October 9, 2020, through July 9, 2021. When the District came out of drought in July 2021, it was also announced that the regular Water Conservation Period, which extends from May through September, was now active.

The voluntary conservation period was publicized through drought status icons on the District website and included as a banner and articles in the regular eNews. Conservation education webpages were updated regularly with new resources and shared on District social media platforms.

See Objective 5-3 for a summarized list of Articles and Press Releases.

Objective 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.

Performance Standard

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.

The District is part of the CTWEN and sponsors the annual Water Conservation Symposium. Permittees are encouraged to attend. This year the theme was: "Proactive Water Conservation Programs: In It For The Long Haul." Due to Covid, this year's symposium was conducted virtually. The symposium provides water utilities with the information needed to implement successful water conservation programs, effectively engage customers, and plan for the future. This program provides conservation-oriented strategies (including conservation-oriented rate structures) for mayors, city councils, board members of Municipal Utility Districts (MUDs), Regional Water Authorities, City Managers, Water Utility directors and staff, water conservation managers, program staff and other relevant staff, CFOs, finance directors, sustainability directors, business and community leaders, consultants, and advocates.

Objective 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.

Performance Standard

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.

The District sponsors and supports a number of events promoting water conservation and alternate water sources such as the Rainwater Revival and Hill Country Living Festival, the Central Texas Water Conservation Symposium, Austin Cave Festival, LBJ Wildflower Center (LBJWFC) Nature Nights Rocks-Water-Mud, and Groundwater to the Gulf: A Summer Institute for Educators. Conservation education webpages were updated regularly with new resources, and shared on District social media platforms. The District also created a District Newsroom website page with all news/conservation/drought related information.

See Objective 5-3 for a list of summarized Articles and Press Releases.

GOAL 7 - ADDRESSING RECHARGE ENHANCEMENT WHERE APPROPRIATE AND COST-EFFECTIVE

31TAC 356.52 (A)(1)(G)/TWC §36.1071(A)(7)

Objective 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) discrete recharge features that will lead to an increase in recharge and water in storage beyond what otherwise would exist naturally.

Performance Standard

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.

Antioch Cave is a recharge feature on District property that is capable of contributing a significant amount of water to the Edwards Aquifer when Onion Creek is flowing. A vault constructed over the cave entrance, and automated valves allow for clean creek water to enter the cave, and contaminated stormwater to be kept out. This system was maintained by staff in FY 2021 so that the amount of clean creek water entering the cave was maximized. A regular reporting item has been added to the GM Report special topics list to provide a monthly oral update on these and other Aquifer Science activities, and satisfies this reporting requirement.

Operational equipment and hardware at Antioch Cave to improve the operation and performance of the BMP are fully functional and in good performance. Equipment is collecting water-quality readings every 15 minutes and reporting to an organized database via telemetry.

Objective 7-2. Conduct technical investigations and, as feasible, assist water-supply providers in implementing engineered enhancements to regional supply strategies, including desalination, ASR, 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.

Performance Standard

Assess progress toward enhancing regional water supplies.

In FY 2021, the District worked with other entities in the area, such as City of Buda, City of Kyle, and RRWSC, to evaluate the potential for the Trinity Aquifers as reservoirs for ASR facilities. Staff met with City of Buda staff and their consultant as they prepared a permit application for an ASR system. Staff participated in collecting cuttings and core samples from the ASR test well that Buda installed. RRWSC was given a Conditional D permit for Edwards groundwater to inject into the Trinity Aquifer.

https://bscacd.org/uploads/RubyRanchASR_Status-Report_FINAL.pdf

GOAL 8 - ADDRESSING THE DESIRED FUTURE CONDITIONS OF THE GROUNDWATER RESOURCES

31TAC (A)(1)(H)/TWC §36.1071(A)(8)

Objective 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.

Performance Standards

A summary of the volume of aggregate groundwater withdrawals permitted and actually produced from permitted wells for each MZ and permit type will be provided in the Annual Report.

A summary of the actual versus permitted production volumes for each MZ is provided in Objective 1-2.

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.

The USFWS issued the District's ITP in September 2018. The District submitted its second annual report to USFWS on February 18, 2021.

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.

FY 2021 began with a status of No Drought due to a very wet May 2020 that narrowly kept spring flow and aquifer levels from dipping below Stage II thresholds. However, below-average rainfall during the summer wasn't enough to keep levels from declining towards Stage II Drought thresholds. By early October 2020, Barton Springs and Lovelady crossed under their Stage II Drought thresholds and the Board declared an Alarm Stage II Drought on October 8. Levels declined throughout the fall and winter as La Niña conditions - beginning in July 2020 - brought warmer and drier climate to the Hill Country.

Calendar year 2021 began with a combined 3.5 inches of rain from January to March (3 inches below historical average), perpetuating the downward spring flow and water level trend. While some relief came with over 3 inches of rainfall in April, little recharge was seen as the dry soils soaked most of it up. The increased soil moisture from April rain set the stage for 8 inches of rain in May to generate enough recharge to reverse the downward spring flow and water level trends. The CPC officially declared the end of La Niña in May 2021, beginning an ENSO-neutral (neither La Niña or El Niño) period that allowed for above average mid-spring and summer rainfall totals of 20.4 inches. Barton Springs and Lovelady water levels began to rise on May 1st for the first time since July 2020.

A combined 15 inches of spring rain fell March - June 2021, providing enough recharge to overcome the dry La Niña winter and reverse the falling spring flow and aquifer trend. With both Barton Springs and Lovelady water levels rising above their respective Alarm Stage II Drought thresholds, the Board declared "No Drought conditions" on July 8, 2021. An additional 7 inches fell in July and August. On August 25, Lovelady water levels began to decline, looking as if the No Drought period would be short-lived. The CPC officially declared the return of La Niña on October 14, 2021, which, oddly coincided with up to 6 inches of rainfall in the Hill Country the day before. This brought considerable recharge as stream gauges on all area creeks showed rises. Spring flow and water levels showed a rising response.

To summarize, the Austin/Hill Country area has received an average 33 inches of rainfall so far in 2021 (through November 2nd), just 2.5 inches below the annual average, which means FY 2021 could finish with an above-average year. This may be due to the 6-month ENSO-Neutral period from March to October 14, 2021. While this might allow getting close to the 35.5 annual average, La Niña has officially developed again and is expected to continue into 2022. This could bring drier and milder-than-normal conditions across Central Texas, which will likely result in further declines as 2022 gets underway. Hopefully, spring of 2022 will bring its usual upward swing of recharge to keep the aquifers well-supplied.

Objective 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).

Performance Standards

A summary of the volume of aggregate groundwater withdrawals permitted and actually produced from permitted wells for each MZ and permit type will be provided in the Annual Report.

A summary of the actual versus permitted production volumes for each MZ is provided above in Objective 1-2.

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.

The USFWS issued the District's ITP in September 2018. The District submitted its second annual report to USFWS in February 2021.

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.

Please see Objective 8-1 above.

Objective 8-3. Implement appropriate rules and measures to ensure compliance with District-adopted DFCs for each relevant aquifer or aquifer subdivision in the District.

Performance Standard

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.

For the Trinity Aquifer in GMA 9, GCD representatives shared drawdown levels and discussed which way all districts could calculate drawdown that would be consistent with one another. On May 20, 2021, the TWDB granted the GMA 9 and GMA 10 boundary change which removed the District from GMA 9, and now the District is located wholly in GMA 10. Staff will continue to attend GMA 9 meetings.

For the Trinity Aquifer in GMA 10, to determine compliance with the Trinity Aquifer DFC, the data must show that the average regional well drawdown does not exceed 25 feet during average recharge conditions including exempt and nonexempt use. In FY 2021, Michae Redman took the role as GMA 10 Coordinator, and is looking into multiple models that are being developed to determine a better way to measure the Trinity DFC. The District is also looking into completing a sustainable yield study on the Trinity which would give the District more management tools to create a more suitable DFC.

The average daily springflow at Barton Springs over the time period of September 1, 2014 to August 31, 2021 was 77 cfs. The DFC expression is springflow at Barton Springs during average recharge conditions shall be no less than 49.7 cfs over an 84-month period.

For the Saline Edwards, Northern Subdivision, the DFC expression is no more than 75 feet of regional average potentiometric surface drawdown due to pumping when compared to pre-development conditions. Currently, there are no approved permits in the Saline Edwards.

For a summary of aquifer conditions, see Objective 8-1 above.

Performance Standards and Objectives

General Management (9 objectives)	Administration (3 objectives)	Education & Outreach (6 objectives)	Aquifer Science (8 objectives)	Regulatory Compliance (7 objectives)

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.	A. Receive a clean financial audit each year. A copy of the auditor's report will be included in the annual report. B. 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: A. Perform a technical evaluation of the application, aquifer test, and hydrogeological report; B. Use best available science and analytical tools to estimate amount of drawdown from pumping and influence on other water resources; and C. 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.

Appendix D

Meeting Minutes (1/26/2021) of Management Advisory Committee

Barton Springs/Edwards Aquifer Conservation District
Management Advisory Committee Meeting and Comments Summary
HCP Annual Report Review Meeting

Meeting Held Over Zoom Session
January 26, 2022, 1-2pm

Management Advisory Committee (MAC) members present at commencement: Anne Rogers, Blake Neffendorf, Susan Meckel, Clifton Ladd, Dr. Ben Hutchins, and Dr. Jack Sharp. Staff present included: Tim Loftus, Dr. Brian Smith, Justin Camp, Jeff Watson, David Moreno, Erin Swanson, and Michael Redman. These minutes represent a summarized version of the meeting and feedback/comments from the MAC (provided verbally during the meeting and through email); the complete discussion during the meeting was recorded digitally.

Note: Section 6 of the Habitat Conservation Plan (HCP) details the roles of the plan participants, and includes, in Section 6.5.1.2, the development of a District HCP Management Advisory Committee (MAC) to advise and assist in the coordination of conservation activities affecting Covered Species at Barton Springs, and to monitor the implementation of the District HCP, both for the District and for the USFWS, as an additional measure of ensuring continued implementation of the HCP and compliance with the ITP.

1. Background of the MAC

Mr. Redman explained the purpose of the MAC meeting at least annually to receive and review the District's annual progress report and associated other documentation pertaining to the ITP. The HCP MAC's role is to advise and assist the Board in the coordination of conservation activities affecting Covered Species at Barton Springs and ensure continued improvement of the HCP and compliance with the ITP.

2. Overview of Changes Made Due to 2019 and 2020 MAC Comments

Mr. Redman explained the changes made to the District's Annual Report based on comments received from MAC members in FY21.

3. Background of the Annual Report

Mr. Redman reviewed key dates and events throughout the District's HCP creation. He illustrated how the 33 Management Plan objectives are tied to the 25 HCP minimization measures, 5 HCP direct mitigation measures and 2 HCP indirect research measures. He reviewed the Edwards drought management strategies based on sustainable yield studies and explained the Extreme Drought Withdrawal Limits that would protect springflow and habitat. Drought pumpage reductions were in effect from October 2020 through July 2021 during FY2021. Actual production volumes pumped in FY2021 were below the Permitted Volumes of FY2021 for permittees, which has been a trend in more recent years.

4. HCP Expenditures

Mr. Redman reviewed HCP Expenditures for FY2021, explaining that because all District activity was related to fulfilling the Management Plan objectives, and therefore also the HCP measures, all expenditures are considered towards HCP Implementation Activities.

5. Status of the Aquifer

Mr. Camp discussed recorded groundwater levels in the Lovelady monitor well and springflow and dissolved oxygen levels at Barton Springs for the reporting period.

6. Estimated Annual Take

Mr. Camp presented the estimated annual take based on 201 days of Barton Springs springflow remaining below 40 cfs and 16 days remaining between 30 cfs and 20 cfs. The estimated take numbers were 194 for Barton Springs Salamanders and 20 for Austin Blind Salamanders.

7. Mitigation and Research Measures: What's Next

Dr. Smith reviewed status and future plans for DO feasibility studies, installation of monitor wells, possibility of DO augmentation near Barton Springs, groundwater modeling, dye-trace studies, and water quality studies.

8. Comments and Feedback – Q&A

MAC members provided feedback verbally during the meeting and Dr. Jack Sharp, Clifton Ladd, Dr. Ben Hutchins, Blake Neffendorf, and Susan Meckel. Dr. Jack Sharp, Dr. Ben Hutchins, and Susan Meckel submitted written feedback via email. The following is a summary of all MAC comments.

- Does the District have plans to look for the listed species expanded territory?
- Does the District have a map of updated known BSS and ABS locations?
- Has the District recently reviewed the methodology for analyzing take? Or are there any plans to do so?
- Are the feasibility studies something that the District has funded this fiscal year and is planning on moving forward with this year? Or is this an item that will have to be funded next year?
- A comment should be included explaining how mitigation measured that have not been fully addressed will be addressed in the future and what steps will be taken to move forward.
- Exempt well estimates were the same this fiscal year as last year. Does the District keep track of newly drilled exempt wells, and/or old exempt wells that are abandoned and plugged?
- On Table 2, some of the values are listed as N/A. Is this due to COVID limitations or other reasons?