Southwestern Travis County Groundwater Conservation District
Groundwater Management Plan

Adopted by District Board of Directors: June 12, 2025
Approved by TWDB: TBD

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Southwestern Travis County Groundwater Conservation District
Groundwater Management Plan

REVISION RECORD

Date Adopted	Effective Date	Affected Sections of General Comments
06/12/2025	--/--/2025	Original Adoption by SWTCGCD Board of Directors, to be effective upon TWDB approval

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(Reserved for copy of TWDB Approval Certificate)

TABLE OF CONTENTS

<u>List of Figures</u>

List of Tables

Appendices

Southwestern Travis County Groundwater Conservation District
GROUNDWATER MANAGEMENT PLAN

I. DISTRICT MISSION

The Southwestern Travis County Groundwater Conservation District (SWTCGCD, or "District") was created by H.B. 4345 during the 85th Texas Legislature (2017), which serves as the District's enabling legislation. The District is also governed by Chapter 36 of the Texas Water Code and is charged with conserving, preserving, recharging, protecting, and preventing the waste of groundwater from aquifers within southwestern Travis County. To fulfill this mission, the District carries out a range of administrative, regulatory, and technical programs. The District exercises the authority granted by its enabling legislation, Chapter 36, and other applicable state laws to: collect and manage water well and aquifer data; regulate water well drilling and production; promote the capping or plugging of abandoned wells; provide educational resources to local property owners and the public; coordinate with other governmental and organizational entities; and carry out other groundwater-related activities that support the District's mission.

II. PURPOSE OF THIS PLAN

The purpose of this Groundwater Management Plan (Plan or Management Plan) is to serve as a planning and guidance tool for the District in its ongoing efforts to manage, conserve, and protect the groundwater resources of southwestern Travis County. The Plan incorporates hydrogeological and technical information from the Texas Water Development Board (TWDB) and other groundwater professionals. Once approved by TWDB, it also serves as formal authorization for the District to implement the actions described within. These actions aim to enhance understanding of local aquifer conditions, support the development of effective groundwater management strategies, and guide the implementation of appropriate policies, rules, and programs that address groundwater issues within the District. This Management Plan also ensures the District's compliance with applicable state laws and regulations, including its enabling legislation, Chapter 36 of the Texas Water Code, and TWDB administrative rules, and supports the District's role in regional water resource planning.

III. DISTRICT INFORMATION

A. Creation

The SWTCGCD was created by H.B. 4345, Article 2, passed by the 85th Texas Legislature in 2017. Voters confirmed the District's creation on November 5, 2019. The District's authority and responsibilities are established by H.B. 4345 (2017), as amended by S.B. 669 of the 86th Legislature (2019), and by Chapter 36 of the Texas Water Code, which governs groundwater conservation districts (GCDs). The amended enabling legislation is codified in Special District Local Laws Code Chapter 8871, available online at: https://statutes.capitol.texas.gov/Docs/SD/pdf/SD.8871.pdf.

B. Directors

The Board of Directors consists of seven members who are elected by the voters of the District using a hybrid of single-member precincts and at-large methods. The Directors are elected to staggered four-year terms. The Directors' geographic areas are designated by H.B. 4345 (2017) as follows:

- One Director resides in and is elected by voters in the City of Lakeway and Village of the Hills;
- One Director resides in and is elected by voters in the City of Bee Cave;
- One Director resides in and is elected by voters in the City of West Lake Hills; and
- Four Directors are elected at-large by voters residing in those areas within the District but outside the municipal limits of the cities named above. Each of these four Directors must also use groundwater for one or more beneficial uses at their respective residences.

C. Authority

The District exercises the powers and responsibilities granted by its enabling legislation, H.B. 4345 (2017), as well as the applicable provisions of Chapter 36 of the Texas Water Code, provided they do not conflict with H.B. 4345. The District operates under the oversight of the Texas Water Development Board (TWDB), as administered through 31 Texas Administrative Code §356, and is subject to performance review by the Texas Commission on Environmental Quality (TCEQ).

D. Location and Extent

The District's boundaries are defined in its enabling legislation and depicted in Figure 1. The District covers approximately 214 square miles (136,960 acres), representing 20.9% of Travis County's total area. According to 2020 U.S. Census data, the District has a population of 139,403 (U.S. Census Bureau, 2020). Approximately 34,000 residents live within the municipalities of the Village of the Hills, Lakeway, Bee Cave, and West Lake Hills. The remaining population, about 105,000, lives outside municipal limits, primarily in residential developments of varying sizes. A smaller portion resides in rural areas, particularly in the western part of the District, on scattered farms and ranches. The District is bordered by Blanco and Burnet counties to the west, the Colorado River to the north and northeast, the Barton Springs/Edwards Aquifer Conservation District to the southeast, and Hays County to the southwest. It is part of both Groundwater Management Area 9 (GMA 9) and the Lower Colorado Regional Water Planning Group (Region K).

Southwestern Travis County Groundwater Conservation District (SWTCGCD)

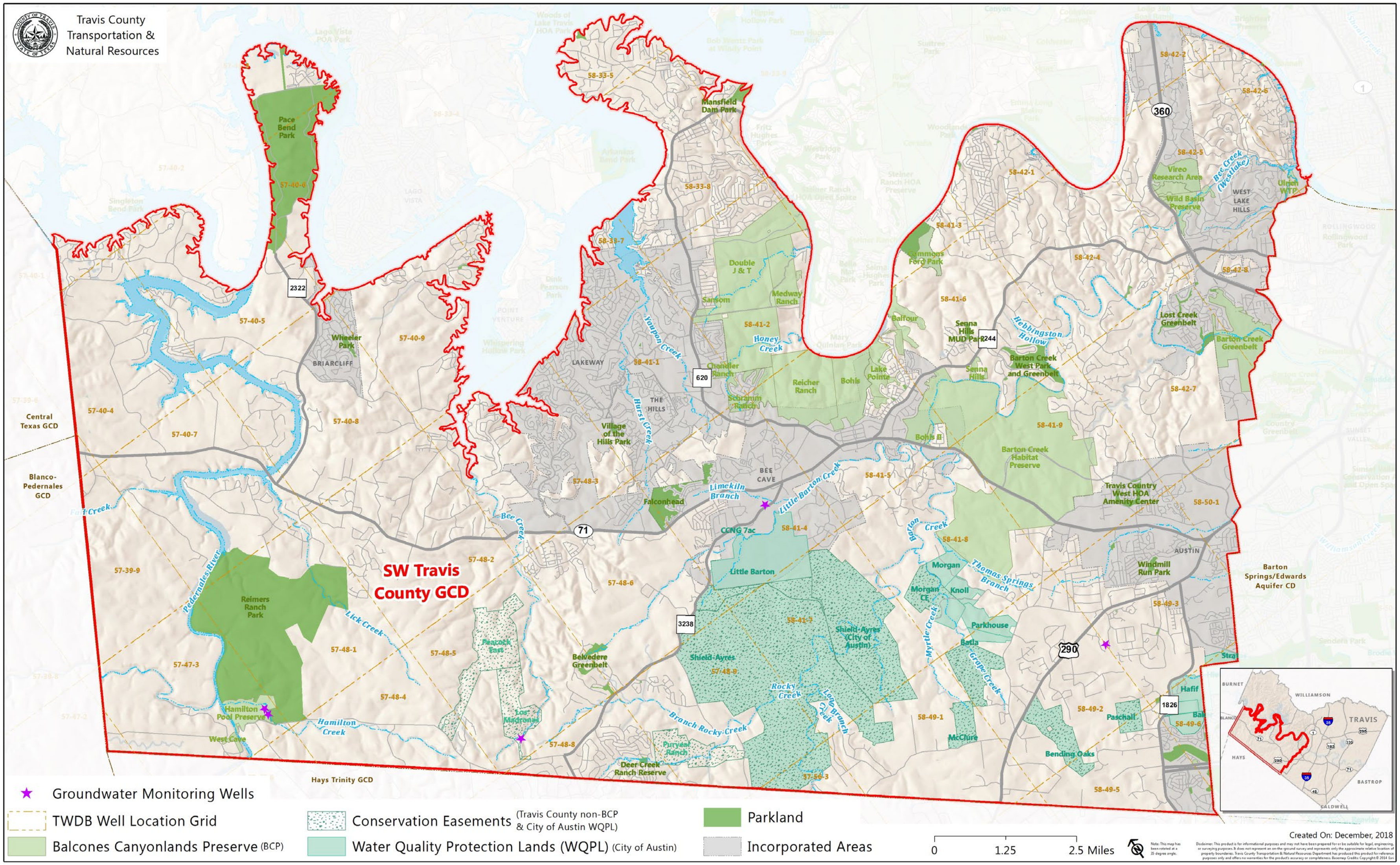

Figure 1. Map of Southwestern Travis County Groundwater Conservation District, showing incorporated areas and conservation lands (Source: Sara Dilbert, GIS Analyst, Travis County, Texas)

E. Statement of Guiding Principles

The SWTCGCD Board of Directors has established the following overarching and enduring principles that will guide the management of groundwater in its jurisdiction under this Plan:

1. Groundwater planning and regulatory decision-making by the District will be consistent with "best available science" (Texas Water Code §36.0015) and relevant data then available.
2. The strategic goal of the District is to manage its groundwater resources in a fashion that tends to improve the sustainability of aquifers as a water supply for the community and to preserve springflows and base-flows of streams.
3. Collaboration with surface-water and groundwater providers and with surface-water and groundwater planning entities will be used to facilitate economically sustainable management of the groundwater resources.
4. The District will encourage voluntary compliance with its rules but will enforce its regulations in a legal, just, and impartial fashion that is equitable to the entire groundwater user community and that protects private property rights.
5. The District will be an educational and relevant data resource for the stakeholder community, other governmental entities, and the public as to aquifer characteristics, conditions and status; groundwater conservation; and drought status and response.
6. The District will strive to prevent waste of groundwater, including its pollution, by timely notifying other decision-makers of information relevant to the effects of waste and pollution on groundwater systems.
7. The District will operate in a highly transparent fashion, encouraging the timely involvement of stakeholders and the public in its activities, and regularly informing the public and stakeholders of the status of ongoing activities.

F. Groundwater Resources of Southwestern Travis County

This section describes the geology and hydrogeology of southwestern Travis County, based primarily on the *Hydrogeologic Atlas of Southwest Travis County, Texas* (Hunt et al., 2020), a collaborative study by Travis County and the Barton Springs/Edwards Aquifer Conservation District. The Atlas is summarized and available electronically in Appendix A and is referred to throughout this Plan as the *Hydrogeologic Atlas.* Other sources of information utilized in developing this section of the Management Plan include the Austin and Llano Sheets of the Geologic Atlas of Texas (Barnes et al., 1974; Barnes et al., 1981); *Hydrogeologic Atlas of the Hill Country Trinity Aquifer, Blanco, Hays, and Travis Counties, Texas* (Wierman et al., 2010); TWDB GAM Run 19-027, Southwestern Travis County (Wade, 2019); TWDB Technical Report 339, *Evaluation of the Ground-water* [sic] *Resources of the Paleozoic and Cretaceous Aquifers in the Hill Country of Central Texas* (Bluntzer, 1992); and TWDB Technical Report LP 212, *Delineation Criteria for the Major and Minor Aquifer Maps of Texas* (Ashworth and Flores, 1991).

1. Topography, Geology, and Drainage

Southwestern Travis County has two primary watersheds: the Pedernales River, which is a major tributary to the Colorado River, and the Colorado River itself. These rivers join within the District and provide surface water for Lake Travis and Lake Austin. Surface drainage within the District is generally from west to east and southwest to northeast.

The District lies in the eastern portion of the Edwards Plateau, an elevated topographic structure primarily comprised of Cretaceous-age limestone, dolomite and marl. The Edwards Plateau extends west into many Hill Country and West Texas counties and it more or less surrounds the much older rocks of the

Llano Uplift (Figure 2). The eastern-most part of the Edwards Plateau is typified by complex faulting, most notably the Balcones Fault Zone (BFZ), the main portion of which overlaps the eastern-most part of the District and farther east. The eastern boundary of the District is essentially coincident with the largest fault in the BFZ, the Mount Bonnell Fault. These are a system of normal faults, are typically downthrown to the east or southeast, and have a general southwest to northeast alignment. The throw on individual faults varies from a few feet to several hundred feet.

Faulting and local geology have a direct impact on groundwater availability in the District, both in quantity and quality. In particular, one individual fault, the Bee Creek Fault, which is aligned on the land surface roughly with Bee Creek, is physically if not genetically distinct from the main BFZ and divides the District into two areas with considerably different hydrogeologic and groundwater characteristics west and east of the fault (Figure 3). The Bee Creek Fault may well have been an early part of the main BFZ faulting, with its location determined by sharp differences in the lithology and geologic structures of the underlying basement rocks east of the Llano Uplift.

Elevations within the District range from a low of approximately 500 feet above sea level at Lake Austin on the eastern side of the District to over 1,400 feet above sea level in the Shingle Hills area near the south-central boundary of the District.

2. Aquifers and Their Usage in Southwestern Travis County

In general, groundwater is available throughout the District. However, water quantity and quality vary greatly within its territory and are highly dependent on local hydrogeological conditions. Owing to rapid population growth within this area (refer to Table 1.1 and Figure 3.1 of the *Hydrogeologic Atlas*), there are extensive parts of southwestern Travis County where increased groundwater demand has stressed those aquifers, or portions thereof, that have low production capability and/or low recharge rates, such that the aquifers are not able to meet the higher demand. In effect, the groundwater cannot be recharged sufficiently to meet the current withdrawal rates, and it is already being mined in those parts of the District. This section of the Plan provides more detailed information on the District's aquifers and groundwater use that will inform future groundwater management. It is largely based on information from the *Hydrogeologic Atlas*.

Much of the population growth that has taken place and continues to occur in southwestern Travis County utilizes surface water as water supplies, provided by municipal systems, public utility authorities, water control and improvement districts, and other utilities. But some of these utilities use groundwater as a sole or supplemental source, as shown by public water supply well locations within or adjacent to their service areas (Figure 4). And substantial amounts of existing and new development in the District are located outside the service areas of these water-supply entities and rely upon groundwater from the Middle Trinity and especially the Lower Trinity aquifers for water supply. Production from both aquifers has increased significantly over the past few decades. Yields and production capacity vary widely across the region, and water quality issues, such as elevated salinity, excessive hardness, and unpleasant odors, may occur in some areas.

Over the next 50 years, groundwater quantity and quality challenges are expected to increase and will likely worsen without active management. Recognizing this, the TCEQ designated the area as part of the Hill Country Priority Groundwater Management Area (PGMA) in 1990. The District is now a member of GMA 9, which includes all but one of the GCDs within the Hill Country PGMA. However, the District's aquifers differ significantly from those in other parts of GMA 9, both in hydrogeology and in the magnitude

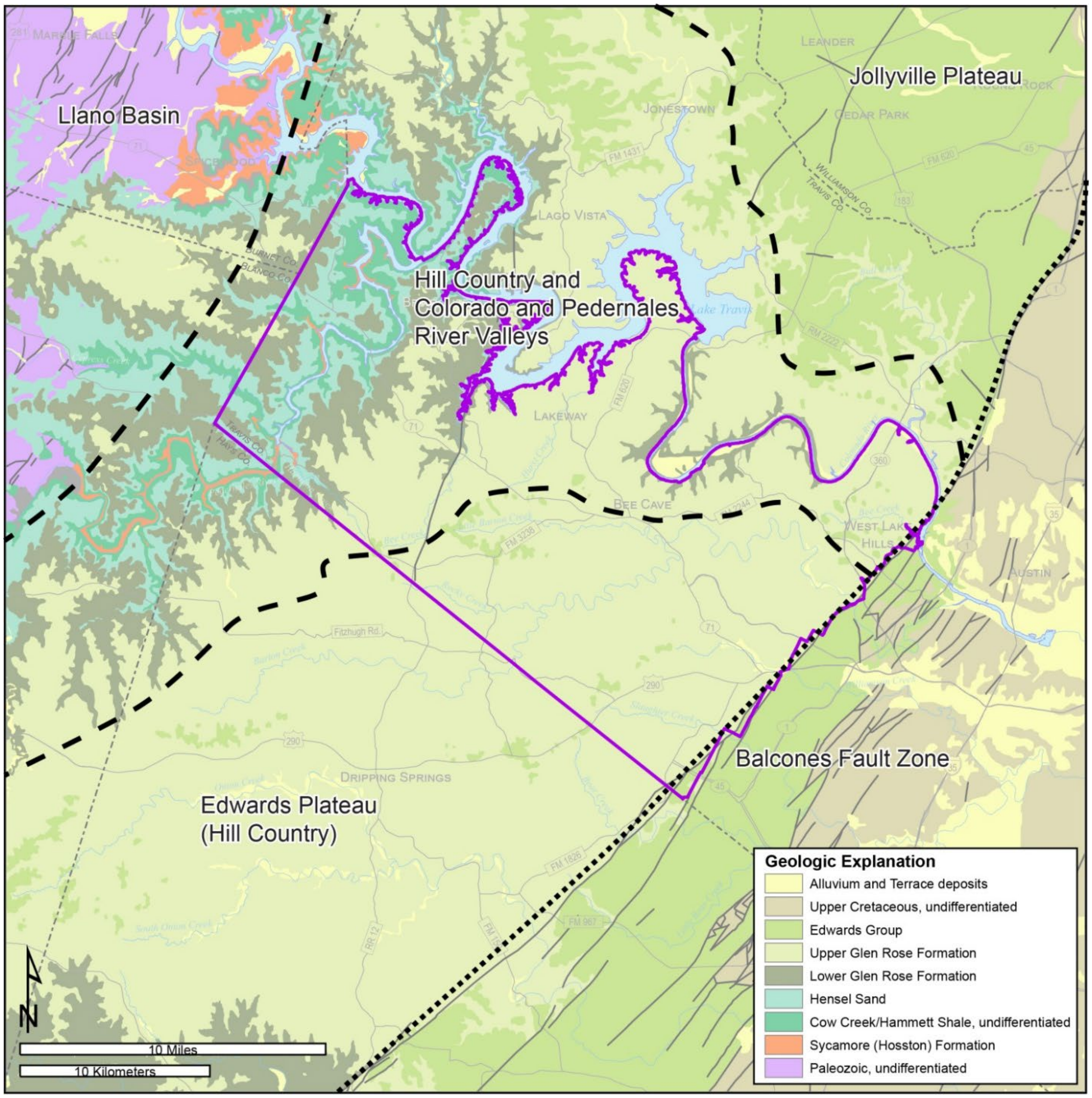

Figure 2. Regional geography of District, showing surface geology and major topographic features. District boundary is outlined in purple. (Source: Hunt et al., 2020)

of observed groundwater depletion, including those in neighboring areas such as Hays County. While the District participates in joint groundwater planning and desired future condition (DFC) development within GMA 9, its unique aquifer conditions require distinct management considerations.

Well depths in the District range from shallow, hand-dug wells 20-30 feet deep to drilled wells more than 1,000 feet deep. Depths are highly variable even within the same aquifer and depend entirely on site-specific topography and geology. Water quality and water quantity also vary throughout the District. Water quality within a specific aquifer can often be defined or characterized in a general sense, but it can still be affected by local geology and hydrology, local withdrawal rates, as well as well construction methods.

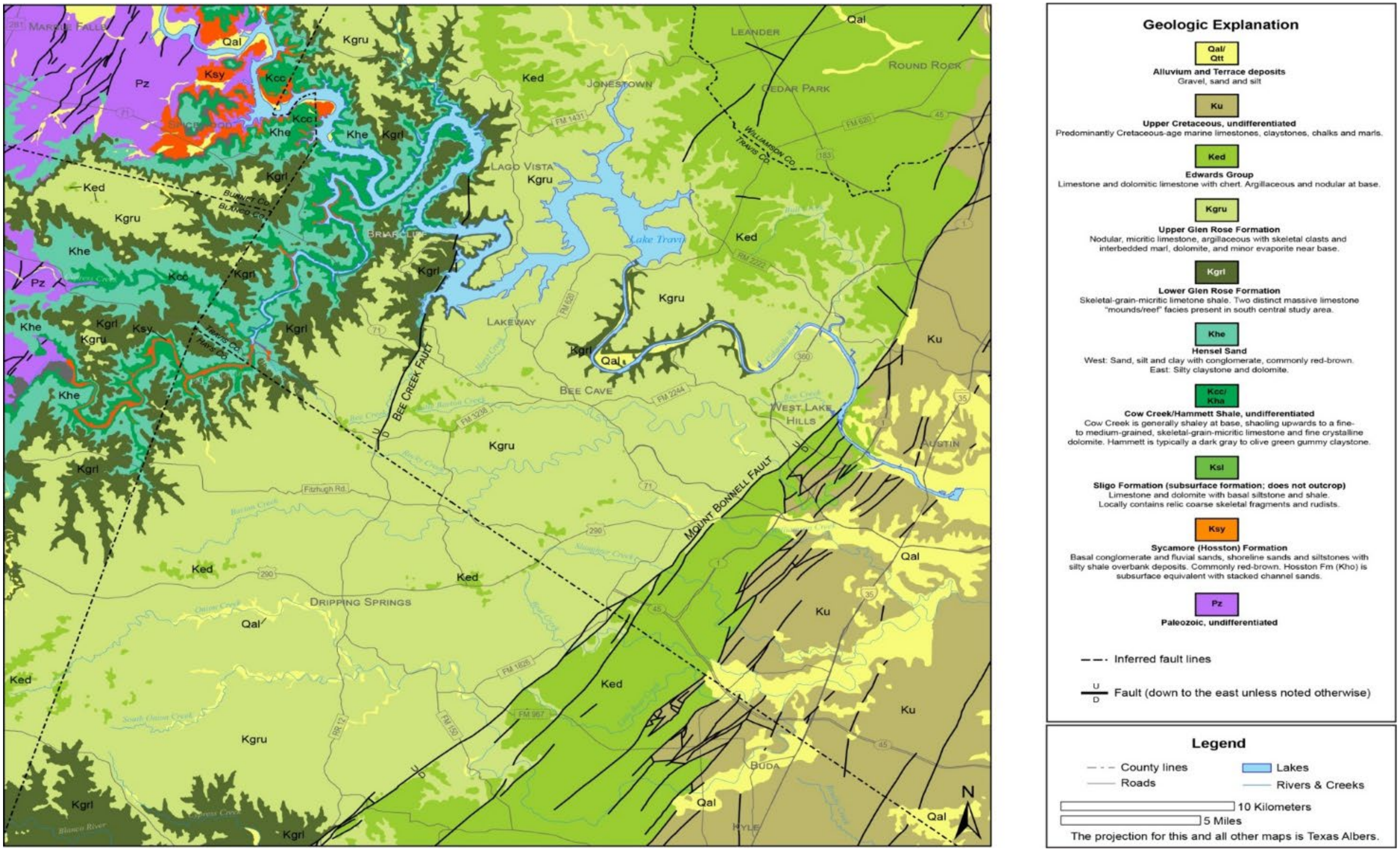

Figure 3. Geologic Basemap, describing geologic units present in District and fault locations. Bee Creek Fault essentially bisects the District. (Source: Hunt et al., 2020)

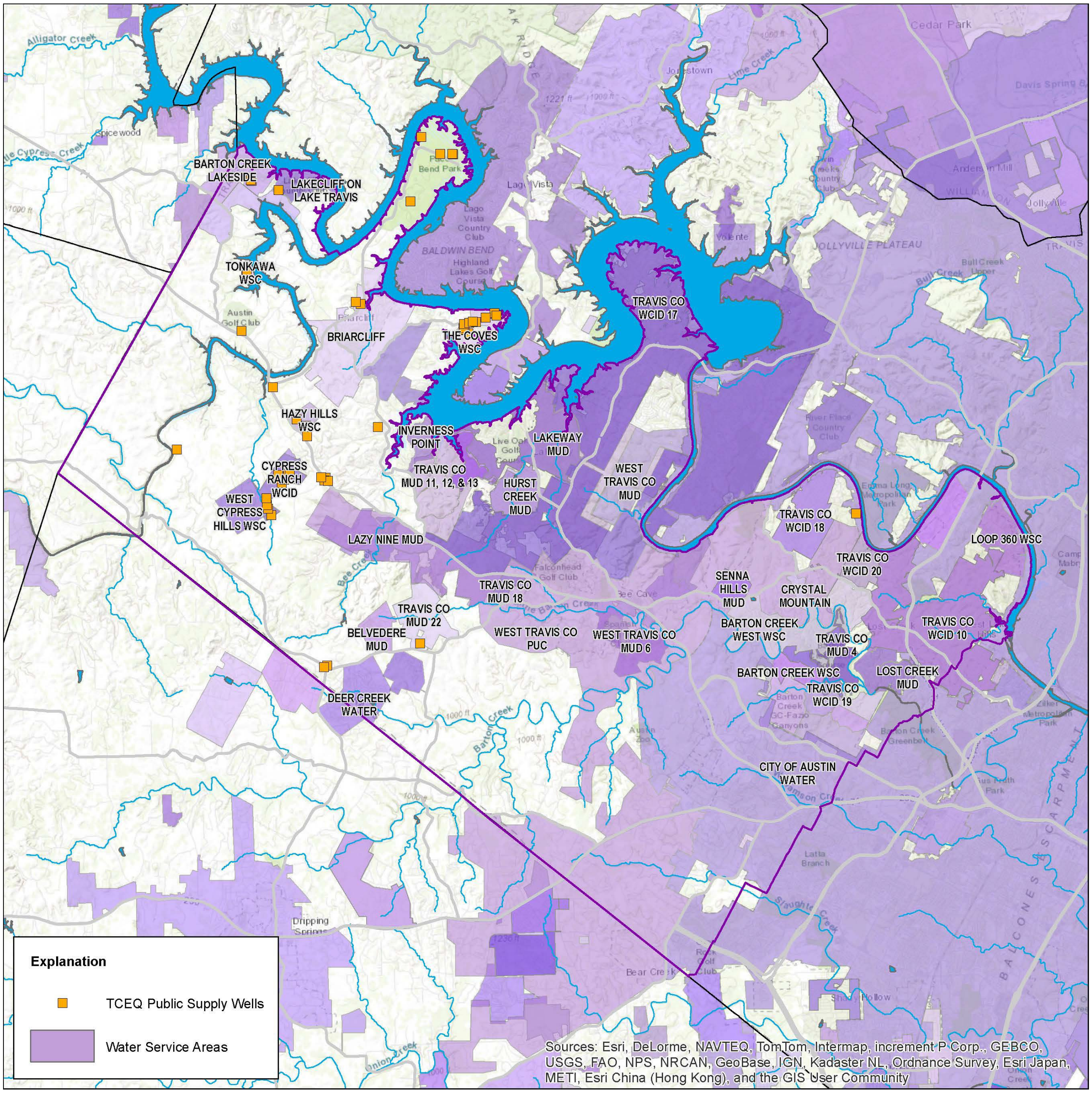

Figure 4. Water utility service areas in the District. Those utilities with water supply wells use groundwater for all or part of their supply, either all or part of the time. (Source: Hunt et al., 2020)

There are five hydrogeologic subdivisions that the SWTCGCD addresses in this Plan. These are shown schematically in the stratigraphic section of Figure 5. Each of the following aquifers are characterized and discussed in subsections below:

- Edwards
- Upper Trinity
- Middle Trinity
- Lower Trinity
- Hickory Aquifer and Other "Paleozoics" Aquifers

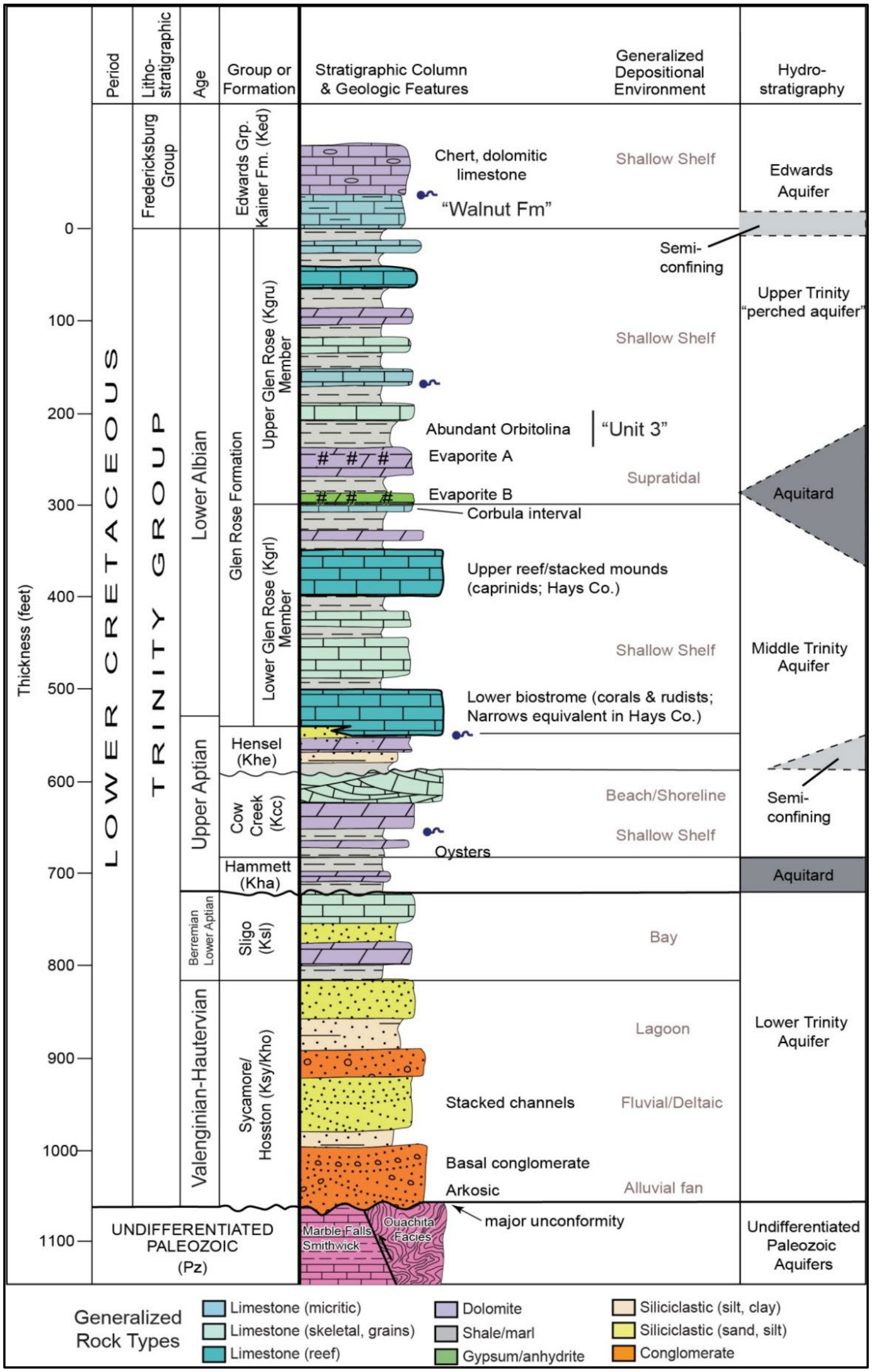

Figure 5. Stratigraphic column showing lithologic and hydrostratigraphic characteristics of the District's aquifers. (Source: Hunt et al., 2020)

Of these, only the three subdivisions of the Trinity Aquifer are currently known to have groundwater production from wells in the District. Both the number of wells and their production are largest in the Lower Trinity Aquifer and those of the Upper Trinity are the smallest (refer to Figures 10.3 and 10.5 in the *Hydrogeologic Atlas*). The Trinity Aquifer extends across nearly all of southwestern Travis County, as shown in Figure 2 of GAM Run 19-027, provided in Appendix G.

a. Edwards Aquifer

To the east and west of the District, the Edwards group of limestones, dolomites, and marls forms major karst aquifer systems. The Edwards-Trinity (Plateau) Aquifer is a major aquifer over large parts of the Hill Country west and southwest of Travis County. The Edwards (Balcones Fault Zone) Aquifer is an important water supply immediately adjacent to the District to the east and southeast. However, within the District, the Edwards rocks have been almost entirely removed by erosion and they only exist on some hilltops[1].

Relatively thin layers of limestone of the Fort Terrett formation of the Edwards Group that are a remnant of the Edwards Plateau to the west are locally present as a cap on the Shingle Hills and Destiny Hills, near Hamilton Pool Road in the south-central part of the District. In the eastern part of the District, another facies of the Edwards Group, the Walnut member of the Kainer formation, is present as a similar cap on certain hills there. Both of these Edwards occurrences form a thin, perched aquifer above the Upper Trinity Aquifer, which is very similar lithologically and hydraulically.

The District has not identified any wells that produce groundwater from these Edwards rocks; if any exist, they will most likely be old shallow, low-yielding wells for rural domestic and livestock use. Recharge will be solely from local precipitation occurring directly on the exceptionally small outcrop area, so within the District this aquifer may be extremely drought-prone. This aquifer exists solely in an unconfined condition, so water not pumped from any wells will generally discharge from small seeps and springs at the base of the outcrop on hillsides. These may provide wet-weather flows to small, local streams within the county, which in turn might provide recharge to underlying aquifers from time to time.

For resource planning and regulatory purposes, the District considers these hilltop Edwards occurrences as the *de facto* uppermost part of the Upper Trinity Aquifer. The District will propose to GMA 9 that these perched aquifers also are to be non-relevant for joint planning purposes. The “non-relevant” designation means that it is unlikely to be significant for regional water planning strategies, not necessarily that it is unimportant as a water supply to the local users in the District.

b. Upper Trinity Aquifer

The Upper Trinity Aquifer consists of the Upper Glen Rose limestone and outcrops over much of southwestern Travis County. It is an unconfined aquifer comprising alternating layers of limestone and calcareous clays. This forms an easily recognizable "stair-step" topography due to the differential weathering of the various layers. The Upper Glen Rose is also characterized by one or more thin layers of gypsum/anhydrite beds which are widely attributed to be the source of the sulfate and "rotten egg smell"

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[1] In addition, several exceedingly small areas in SWTCGCD that are on certain portions of the boundary between SWTCGCD and BSEACD have the Edwards (Balcones Fault Zone) Aquifer mapped at the surface inside SWTCGCD. This circumstance arose from the imprecision in mapping the jurisdictional boundary as an approximation of the recharge zone boundary. SWTCGCD considers these areas as insignificant sources of Edwards (BFZ) groundwater and not germane for its groundwater management.

often found in some wells. The Upper Glen Rose Aquifer is not a major source of groundwater production in southwestern Travis County primarily because of its low yields, with most of its wells used for domestic and other residential (including lawn irrigation) purposes (Hunt et al., 2020). Groundwater yields from wells in the Upper Glen Rose are spatially variable, depending on local subsurface physical characteristics, but are typically small and at times intermittent. This is a usual characteristic of perched aquifers. This aquifer also discharges naturally over most of the District as seeps and springs, which subsequently provide base flow to local creeks and rivers.

For local groundwater management purposes, the District chooses to consider the Upper Trinity as a separate aquifer from the underlying Middle Trinity and Lower Trinity aquifers. The zones of poor water quality in the Upper Trinity Aquifer indicate that it may need to be isolated from underlying aquifers to avoid commingling and to protect water quality. Section VII.B of this Plan describes steps that would protect the groundwater supply used by the relatively few wells in the Upper Trinity, while also improving the base flow of streams in the large outcrop areas of the Upper Trinity in the District.

c. Middle Trinity Aquifer

The Middle Trinity Aquifer is an unconfined to semi-confined aquifer occurring throughout southwestern Travis County. It crops out only in the canyon areas adjacent to the Pedernales and Colorado Rivers and elsewhere is overlain by the Upper Trinity Aquifer. It consists of the Lower Glen Rose limestone, the Hensel sandstone, and the Cow Creek limestone. As noted above and shown in Figure 6, from the *Hydrogeologic Atlas*, the Bee Creek Fault, located in the center of the District and trending roughly north–south from the Colorado River to about the Travis–Hays county line, appears to play a significant role in the hydrogeological characteristics and the hydrologic behavior of both the Middle and Lower Trinity aquifers in the District.

West of the Bee Creek Fault, the Middle Trinity units are partially exposed at the surface and constitute the recharge zone of the Middle Trinity. In some areas, the Middle Trinity may also be hydrologically connected to the river-and-lake systems, where the larger local streams tend to be gaining streams. East of the Bee Creek Fault, localized recharge may occur from adjacent formations and possibly from Lake Travis. In the southeastern-most part of the District, there appears to be higher hydraulic heads near the Balcones Fault Zone. The cause for these areas of higher groundwater pressure is currently unknown but could be from inter-formational flows from the Upper Trinity above, the influence of faulting, or a lack of historical pumping in this area. Groundwater may be produced from all three geologic formations of the Middle Trinity, but the Cow Creek formation at the aquifer's base is generally the most productive and reliable. In some locations, especially to the east, the Hensel serves as a semi-confining to confining layer as it becomes more calcareous and less of a sandstone. Yields from the Middle Trinity are generally low and reflect the dominant primary (matrix) porosity, typically between 10-50 gpm, but can be significantly higher, again depending on subsurface physical characteristics (Figure 7). The Middle Trinity yields in southwest Travis County are considerably smaller than yields in adjacent Hays County, where secondary porosity from dissolution along fractures and faults contributes to higher groundwater production rates. This is a significant difference in the hydrogeology between these two adjacent areas that are otherwise similar. It is the primary reason that the Middle Trinity is the main aquifer used in Hays County but not in southwest Travis County.

It is noteworthy that, in the area east of the Bee Creek Fault, the water levels in both the Middle and Lower Trinity have declined at least since 1978 because of pumping, suggesting groundwater withdrawals exceed recharge. Water levels in the Middle Trinity in large parts of this area are much lower

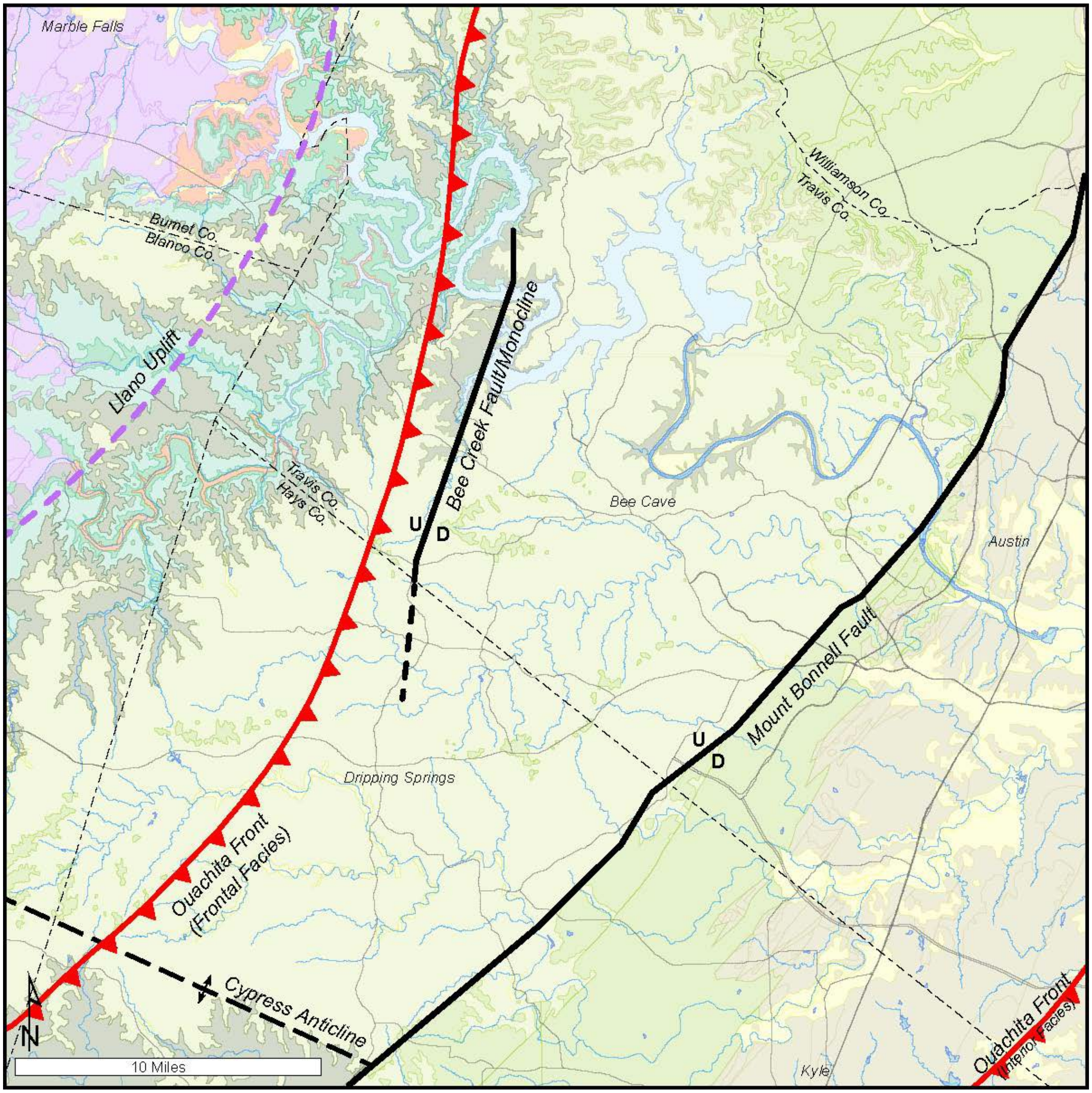
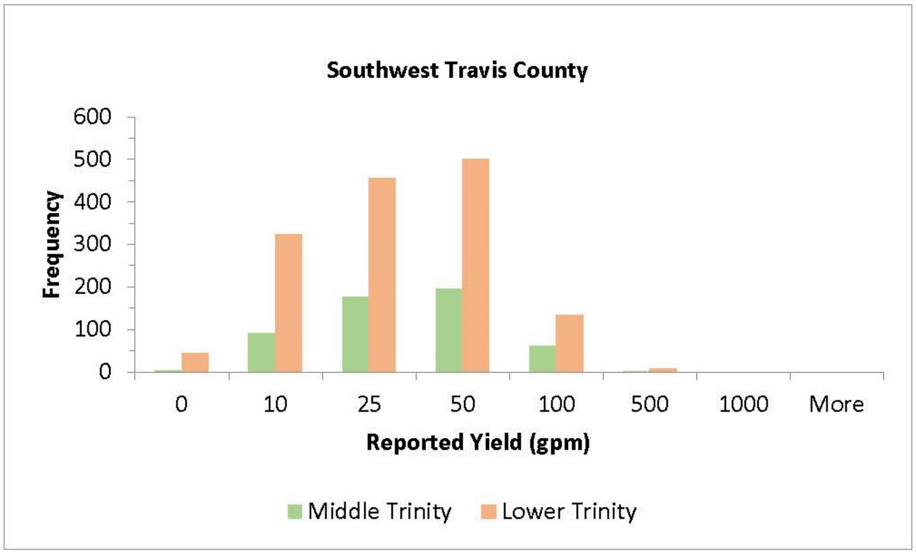


Figure 6. Map of key structural elements that affect the aquifers in the District. Characteristics of the Trinity Aquifer east and west of the Bee Creek Fault are hydrologically different. (Source: Hunt et al., 2020)

than elsewhere (Figure 8) and are now approaching the base of the aquifer, so little additional production from this aquifer is possible.

Water quality of the Middle Trinity varies, with some wells reporting abnormally high levels of sulfate and other constituents. But wells in some areas, especially those west of the Bee Creek Fault, typically have very good quality. Production from Middle Trinity wells is primarily used for community/public water systems, rural domestic, and irrigation demands. Some irrigation demand may be attributed to agricultural crops and livestock, but most is likely to be used for golf course and residential irrigation.



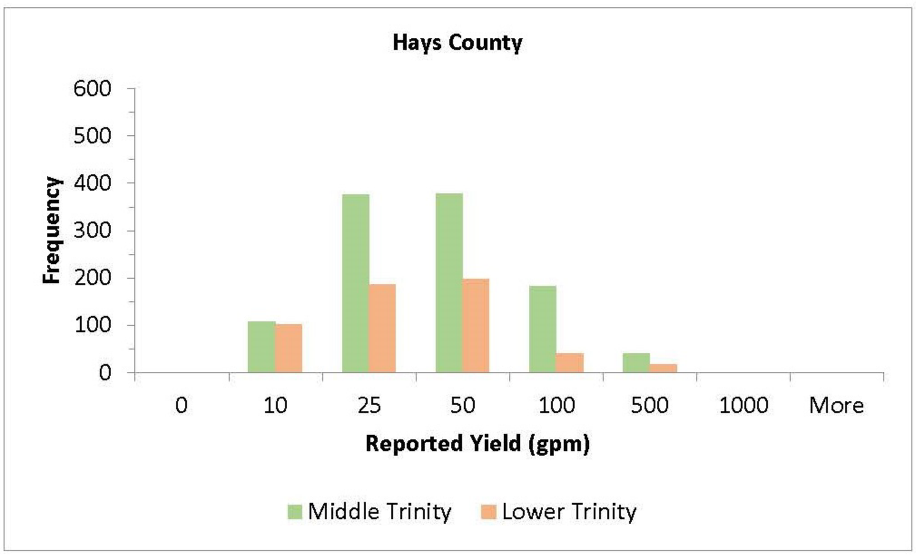


Figure 7. Generalized well drawdown observed and inferred in Lower Trinity Aquifer, 1978-2018. District is outlined in purple. (Source: Hunt et al., 2020)

For local groundwater management purposes, the District chooses to differentiate the Middle Trinity as a separate aquifer from the rest of the Trinity Aquifer, primarily to provide special, differentiated attention in its rulemaking for the areas of the Middle Trinity that are east and west of the Bee Creek Fault. Following the investigation results and conclusions described in the *Hydrogeologic Atlas*, accessible in Appendix A, the District intends to differentiate the areas west and east of the Bee Creek Fault as Areas 1 and 2, respectively, for management of the Middle Trinity Aquifer.

d. Lower Trinity Aquifer

Below the Cow Creek limestone lies the Hammett shale, which acts as a regional confining unit between the Middle Trinity and the Lower Trinity throughout the District, and thickens somewhat toward the east. Below the Hammett, the Lower Trinity in southwestern Travis County consists of the Sligo formation (where present), a sandy dolomitic limestone, and the underlying Sycamore (Hosston) formation, a silty sandstone, but in some areas consisting of a gravel conglomerate. This lower formation is known both as the Sycamore, where it crops out and is unconfined, and as the Hosston, where in the subsurface and confined.

The Lower Trinity is exposed at the surface only in the deeper gorges of the Pedernales River and the Colorado River, where it may recharge at times and discharge at others, depending on relative groundwater and surface-water elevations. The surface water-groundwater interaction of this unit is poorly understood in the District.

Groundwater production from the Lower Trinity requires deeper wells and yields are generally low, again due to the dominant primary (matrix) porosity. Most current production in the area west of the Bee Creek Fault is from the Lower Trinity. East of the Bee Creek Fault, there is pronounced drawdown since 1978 from increased production (Figure 9) for irrigation use (including residential irrigation).

Water quality in the Lower Trinity is generally good west of the Bee Creek Fault but tends to be slightly saline to the east of the fault (Hunt et al., 2020). The mix of uses for the Lower Trinity is similar to the Middle Trinity.

For local groundwater management purposes, the District chooses to differentiate the Lower Trinity as a separate aquifer from the rest of the Trinity Aquifer, primarily to provide special, differentiated attention in its rulemaking to the areas of the Lower Trinity east and west of the Bee Creek Fault. Following the investigation results and conclusions described in the *Hydrogeologic Atlas*, accessible in Appendix A, the District also intends to differentiate the areas west and east of the Bee Creek Fault as Areas 1 and 2, respectively, for management of the Lower Trinity Aquifer.

e. Hickory Aquifer and Other "Paleozoics" Aquifers

The Lower Trinity Aquifer within the District lies unconformably on much older Paleozoic rocks. Paleozoic rocks are divided into two general groups by the Ouachita Thrust Front: [2]

- In the western part of SWTCGCD, and west of the Ouachita Front, the Paleozoic rocks are part of the "Foreland" group of rocks and may provide water to wells and therefore be considered aquifers. Known Paleozoic aquifers include the minor aquifers of the Marble Falls Limestone, Ellenberger-San Saba, and Hickory aquifers. These rocks are faulted and fractured.
- East of the Ouachita Front, the Paleozoic rocks are more deformed and metamorphosed in a complex group of rocks called the "Ouachita Facies", which have very low water-bearing properties.

These aquifers are collectively termed the "Paleozoics" in this plan. West of Travis County, where these aquifers are much more accessible and locally used for water supplies, they are called the Llano Uplift aquifers.

It is not known whether any Paleozoic units can be designated as an aquifer anywhere in southwestern Travis County and, if so, what its reservoir characteristics are, other than being at great

[2] The Ouachita Front is the boundary between the Paleozoic Forelands to the west and the Ouachita Facies to the east, indirectly affecting the younger, Cretaceous-aged rocks that comprise the Trinity Aquifer in the District. The Front reflects local structural differences in the underlying rocks, which may have influenced the location of the Bee Creek Fault.

depth. For example, the elevation of the top of the Hickory Aquifer is estimated in the Llano Uplift Aquifers Conceptual Model report to TWDB (Shi et al., 2016) to range from 742 feet below mean sea level (msl) at the western Travis County line to 2,393 feet below msl at the Ouachita Thrust Front near Bee Creek. The District is not aware of any water wells completed or planned in the Hickory or other Paleozoics aquifers in southwestern Travis County, which is unsurprising because the depths of up to several thousand feet are beyond the capabilities of typical water well drilling equipment in this region. However, on the basis of regional structural information and inference, the TWDB has included data for the Hickory in GAM Run 19-027, Southwestern Travis County (Appendix G), and the District is obligated to acknowledge it as a possible local aquifer, perhaps as an alternative water supply in the future if it proves to be a viable groundwater reservoir.

In this Plan, the District considers the Paleozoics to be an insignificant, if not non-existent, source of water supply at this time. This conclusion is supported by the fact that GMA 9 has previously declared these aquifers to be non-relevant for joint groundwater planning purposes in areas with similar geologic settings, relative to the Llano Uplift (Dowlearn, 2022; Appendix E).

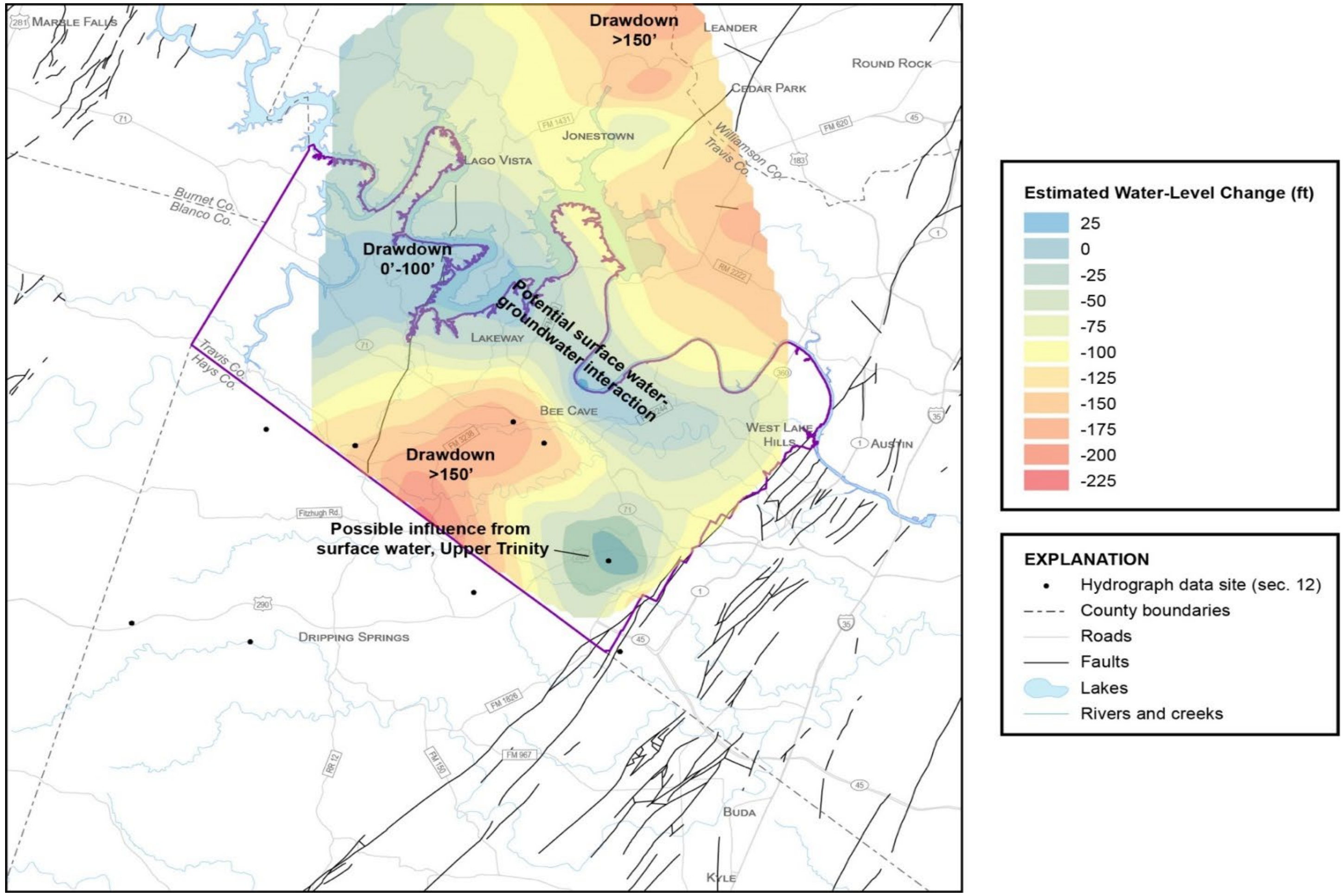


Figure 8. Generalized well drawdown observed and inferred in Middle Trinity Aquifer, 1978-2018. District is outlined in purple. (Source: Hunt et al., 2020)

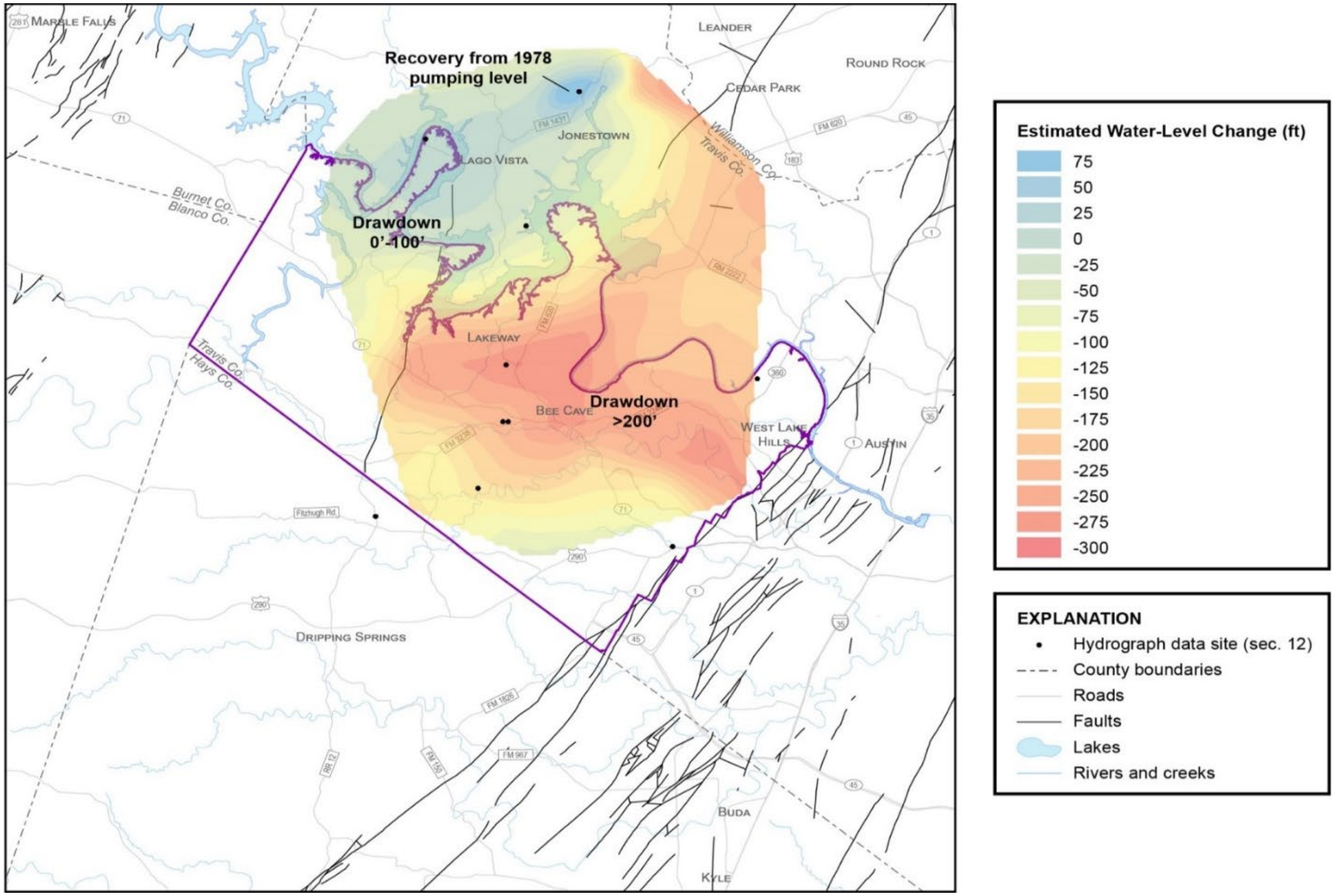


Figure 9. Generalized well drawdown observed and inferred in Lower Trinity Aquifer, 1978-2018. District is outlined in purple. (Source: Hunt et al., 2020)

IV. CRITERIA AND INFORMATION FOR PLAN APPROVAL

A. Planning Horizon

This Plan replaces the District's initial management plan and becomes effective upon adoption by the District's Board of Directors and subsequent approval by the TWDB. The planning horizon extends five years from the date of TWDB approval. In accordance with Texas Water Code §36.1072(e), the District will review and readopt the Plan, with or without amendments, at least once every five years to ensure consistency with the applicable regional water plans and the State Water Plan.

The Plan may be revised at any time to reflect updated data, new or revised groundwater availability models (GAMs), updated DFCs and Modeled Available Groundwater (MAG) from GMA 9, or changes in District management strategies. This Plan will remain in effect until replaced by a revised version approved by the TWDB.

B. Board Resolution

A copy of the SWTCGCD Board of Directors Resolution No. 20250612 adopting this Plan is provided in Appendix B.

C. Notifications Before Plan Adoption [31 TAC §356.53(a)(2); TWC §36.1071(a)]

Documentation demonstrating that the Plan was adopted following proper public notice under Texas Government Code Chapter 551, including copies of the posted agenda, meeting minutes, and the public notice posted on the District website and filed with the Travis County Clerk, is provided in Appendix C.

D. Coordination With Surface Water Management Entities [31 TAC §356.51; TWC §36.1071(a)]

Confirmation that the District provided a copy of this Plan to the appropriate surface water management entities is included in Appendix D.

V. ESTIMATES OF TECHNICAL INFORMATION

The data and information presented in this section and in the relevant appendices are provided by the TWDB and represent the best available information at the time of this Plan's preparation and submission. For convenience, some content from the appendices is transcribed and summarized here. In the event of any discrepancies, the original TWDB reports included in the appendices shall prevail.

A. Modeled Available Groundwater [31 TAC §356.52(a)(6)(A); TWC §36.1071(e)(3)(A)]

Modeled Available Groundwater (MAG) is defined in TWC §36.001 as "the amount of water that the executive administrator [of the TWDB] determines may be produced on an average annual basis to achieve a [DFC] established under TWC §36.108." DFCs can only be established through joint planning among GCDs within a GMA. The District is part of GMA 9.

The current DFCs for GMA 9 were adopted on November 15, 2021, and are included in Appendix E. The corresponding MAG values (in acre-feet per year) for the District are shown in Table 1 below and are based on data from the TWDB MAG report (also included in Appendix E). For regional planning purposes, GMA 9 identified the Trinity Aquifer as the only relevant aquifer in the District. GMA 9 declared the Hickory and Edwards (BFZ) aquifers to be "non-relevant" for joint planning in this area; therefore, no MAGs were established for those aquifers.

Table 1. Modeled Available Groundwater for Southwestern Travis County

GCD	County	Aquifer	2020	2030	2040	2050	2060
Southwestern Travis County GCD	Travis	Trinity	8,559	8,542	8,530	8,515	8,485

B. Annual Groundwater Use Within the District [31 TAC §356.52(a)(6)(B); TWC §36.1071(e)(3)(B)]

To estimate annual groundwater use in the District, the District used TWDB's Historical Water Use Survey data, included in Appendix F and reproduced in Table 2. The data covers the years 2012–2021 and were aggregated by county and apportioned to the District by TWDB using a multiplier of 0.209, based on the District's share of Travis County's total area. Groundwater use in the District is predominantly municipal and has varied from a low of 3,358 acre-feet in 2019 to a high of 4,557 acre-feet in 2017.

Table 2. Estimated Historical Water Use in the District

Estimated Historical Water Use

TWDB Historical Water Use Survey (WUS) Data

TRAVIS COUNTY *20.9% (multiplier)* All values are in acre-feet

Year	Source	Municipal	Manufacturing	Mining	Steam Electric	Irrigation	Livestock	Total
2021	GW	3,678	162	0	24	415	16	4,295
	SW	36,425	1,927	68	426	60	63	38,969
2020	GW	3,810	169	0	24	416	16	4,435
	SW	36,106	2,314	12	736	93	66	39,327
2019	GW	2,803	146	0	17	376	16	3,358
	SW	35,114	2,287	15	597	125	66	38,204
2018	GW	3,445	152	0	17	355	16	3,985
	SW	33,612	2,191	0	291	123	66	36,283
2017	GW	3,988	148	0	17	389	15	4,557
	SW	33,574	2,526	0	166	52	63	36,381
2016	GW	3,789	147	0	17	369	17	4,339
	SW	32,430	2,053	0	154	86	69	34,792
2015	GW	3,335	154	0	0	342	17	3,848
	SW	31,212	1,968	0	198	676	69	34,123
2014	GW	3,268	166	0	0	362	17	3,813
	SW	31,003	1,760	0	564	742	66	34,135
2013	GW	3,979	160	0	0	149	20	4,308
	SW	32,366	1,882	0	677	720	80	35,725
2012	GW	3,901	126	0	0	246	21	4,294
	SW	34,882	1,834	23	769	700	83	38,291

These groundwater-use estimates align reasonably well with other historical estimates for southwestern Travis County, particularly when accounting for regional growth. Brune and Duffin (1983) estimated annual pumping from the undifferentiated Trinity Aquifer in 1975 at approximately 1,540 acre-feet (501 million gallons). A 2011 estimate prepared for GMA 9 modeling indicated pumping of about 3,950 acre-feet per year (1.3 billion gallons) (Hunt, 2011). More recently, the *Hydrogeologic Atlas* (Hunt et al., 2020) estimated total Trinity Aquifer pumping in the area at roughly 4,400 acre-feet per year.

C. Annual Recharge From Precipitation to Each Aquifer Within the District [31 TAC §356.52(a)(6)(C); TWC §36.1071(e)(3)(C)]

Estimated annual recharge from precipitation to the aquifers within the District is based on GAM Run 19-027. The GAM run and aquifer analysis from the TWDB are included in Appendix G and are summarized in Table 3.

Table 3. Recharge from Precipitation in the District

Aquifer	Recharge from Precipitation (Acre-feet per year)	Comment
Edwards (BFZ)	79	Non-relevant
Trinity	12,167	Relevant
Hickory	0	Non-relevant

D. Annual Volume of Water That Discharges From Each Aquifer Within the District to Springs and Surface Water Bodies, Including Lakes, Streams, and Rivers [31 TAC §356.52(a)(6)(D); TWC §36.1071(e)(3)(D)]

Estimated annual discharge to surface water systems from aquifers within the District is based on TWDB GAM Run 19-027. The GAM run and analysis from the TWDB are included in Appendix G and summarized in Table 4.

Table 4. Discharge to Surface Water Bodies

Aquifer	Discharge to Surface Water Bodies (Acre-feet per year)	Comment
Edwards (BFZ)	0	Non-relevant
Trinity	12,654	Relevant
Hickory	0	Non-relevant

E. Annual Volume of Flow Into and Out of the District Within Each Aquifer and Between Aquifers in the District [31 TAC §356.52(a)(6)(E); TWC §36.1071(e)(3)(E)]

Estimated annual flows into and out of each aquifer in the District and between aquifers in the District are based on TWDB GAM Run 19-027. The GAM Run and analysis from the TWDB are included in Appendix G and summarized in Table 5.

Table 5. Flow Into, Out of, and Between Aquifers in District

<table>
<tr><th>Aquifer</th><th>Acre-Feet in:</th><th>Acre-Feet out</th><th>Acre-Feet between Aquifers</th><th>Comment</th></tr>
<tr><td>Edwards (BFZ)</td><td>306</td><td>615</td><td>2,333*</td><td>Non-relevant; From the Hill Country Trinity to the Edwards (BFZ) and the downdip Trinity, per the GAM for the Hill Country Trinity</td></tr>
<tr><td>Trinity</td><td>10,024</td><td>9,205</td><td>2,333</td><td>Relevant; From the Hill Country Trinity to the Edwards (BFZ) and the downdip Trinity</td></tr>
<tr><td rowspan="2">Hickory</td><td rowspan="2">3,121</td><td rowspan="2">1,114</td><td>Into overlying (younger) units: 2,153</td><td rowspan="2">Non-relevant</td></tr>
<tr><td>From underlying (Precambrian) units: 145</td></tr>
</table>

*From the GAM for the Hill Country portion of the Trinity Aquifer.

F. Projected Surface Water Supply Within the District, According to Most Recently Adopted State Water Plan [31 TAC §356.52(a)(6)(F); TWC §36.1071(e)(3)(F)]

The most recently adopted State Water Plan is the 2022 State Water Plan. The 2022 plan incorporates the 2021 Region K Water Plan, which provides projected surface water supplies in the District and Travis County.

Within the District, there are two large surface water impoundments, Lake Travis and Lake Austin, which are operated and managed by the Lower Colorado River Authority (LCRA). These two impoundments are the primary water source for many of the residents and businesses located within the District, including a part of the City of Austin and the City of West Lake Hills, and all of the Village of the Hills, the City of Lakeway, and the City of Bee Cave, as well as multiple surface-water management entities such as the West Travis County Public Utility Agency. Local usage of surface water, usually for livestock watering or limited irrigation from small ponds or small-scale riparian diversions from the Pedernales River and its smaller tributaries, is termed “local supply” in the State and Region K Plans.

The Projected Surface Water Supply Survey dataset from the TWDB for Travis County is included in Appendix F and reproduced in Table 6 below. The dataset has been aggregated by TWDB for Travis County, and then those data for county-level Water User Groups (WUGs), including manufacturing, steam electric power, irrigation, mining, county-other, and livestock, were apportioned to the District by TWDB. An apportionment multiplier of 0.209, calculated on an areal basis, was applied by TWDB to these WUGs. By convention, the values for WUGs that are municipalities, water supply corporations, and utility districts are not apportioned; instead, their full values are retained if any portion of the WUG is located in the District.

This dataset indicates that the surface-water supplies potentially available to users in the District are projected to decline from 361,437 acre-feet in 2020 to 343,194 acre-feet in 2070, representing a 5.0%

decrease. A significant portion of these projected water supplies is attributed to the City of Austin Water Utility, which has not been apportioned based on the District's geographic area, though only a relatively small portion of the utility's actual service area lies within the District's territory.

Table 6. Projected Surface Water Supplies in District

Projected Surface Water Supplies
TWDB 2022 State Water Plan Data

TRAVIS COUNTY *20.9% (multiplier)* All values are in acre-feet

RWPG	WUG	WUG Basin	Source Name	2020	2030	2040	2050	2060	2070
K	Austin	Colorado	Colorado Run-of-River	165,981	160,981	170,904	167,135	163,267	158,745
K	Austin	Colorado	Highland Lakes Lake/Reservoir System	123,607	123,607	123,607	123,607	123,607	123,607
K	Barton Creek West WSC	Colorado	Highland Lakes Lake/Reservoir System	440	440	440	440	440	440
K	Barton Creek WSC	Colorado	Highland Lakes Lake/Reservoir System	307	307	307	307	307	307
K	Briarcliff	Colorado	Highland Lakes Lake/Reservoir System	400	400	400	400	400	400
K	Cedar Park	Colorado	Highland Lakes Lake/Reservoir System	1,638	1,574	1,822	1,888	1,887	1,887
K	County-Other, Travis	Colorado	Highland Lakes Lake/Reservoir System	1,494	1,494	1,494	1,494	1,494	1,494
K	Creedmoor-Maha WSC	Colorado	Colorado Run-of-River	839	839	0	0	0	0
K	Cypress Ranch WCID 1	Colorado	Highland Lakes Lake/Reservoir System	1	1	1	1	1	1
K	Deer Creek Ranch Water	Colorado	Highland Lakes Lake/Reservoir System	125	125	125	125	125	125
K	Hurst Creek MUD	Colorado	Highland Lakes Lake/Reservoir System	1,600	1,600	1,600	1,600	1,600	1,600
K	Irrigation, Travis	Colorado	Colorado Other Local Supply	158	158	158	158	158	158
K	Irrigation, Travis	Colorado	Highland Lakes Lake/Reservoir System	840	840	840	840	840	840
K	Jonestown WSC	Colorado	Highland Lakes Lake/Reservoir System	750	750	750	750	750	750
K	Lago Vista	Colorado	Highland Lakes Lake/Reservoir System	3,451	3,451	3,451	3,451	3,451	3,451
K	Lakeway MUD	Colorado	Highland Lakes Lake/Reservoir System	3,069	3,069	3,069	3,069	3,069	3,069
K	Leander	Colorado	Highland Lakes Lake/Reservoir System	1,202	1,684	1,738	1,269	1,079	941
K	Livestock, Travis	Colorado	Colorado Livestock Local Supply	97	97	97	97	97	97
K	Livestock, Travis	Guadalupe	Guadalupe Livestock Local Supply	4	4	4	4	4	4

K	Loop 360 WSC	Colorado	Highland Lakes Lake/Reservoir System	1,250	1,250	1,250	1,250	1,250	1,250
K	Manor	Colorado	Colorado Run-of-River	1,680	1,680	0	0	0	0
K	Manufacturing, Travis	Colorado	Colorado Run-of-River	2,203	2,494	2,553	2,649	2,649	2,649
K	Manufacturing, Travis	Colorado	Highland Lakes Lake/Reservoir System	16	16	16	16	16	16
K	Manville WSC	Colorado	Highland Lakes Lake/Reservoir System	1,929	1,932	1,930	1,927	1,920	1,910
K	Mining, Travis	Colorado	Colorado Other Local Supply	466	591	727	853	993	1,152
K	Mining, Travis	Guadalupe	Colorado Other Local Supply	7	9	10	11	13	14
K	North Austin MUD 1	Colorado	Colorado Run-of-River	81	78	0	0	0	0
K	Northtown MUD	Colorado	Colorado Run-of-River	728	841	0	0	0	0
K	Oak Shores Water System	Colorado	Highland Lakes Lake/Reservoir System	203	203	203	203	203	203
K	Pflugerville	Colorado	Highland Lakes Lake/Reservoir System	9,513	9,498	9,479	9,458	9,435	9,410
K	Rollingwood	Colorado	Colorado Run-of-River	1,120	1,120	0	0	0	0
K	Rough Hollow in Travis County	Colorado	Highland Lakes Lake/Reservoir System	1,795	1,795	1,795	1,795	1,795	1,795
K	Round Rock	Colorado	Highland Lakes Lake/Reservoir System	278	315	352	395	434	470
K	Senna Hills MUD	Colorado	Highland Lakes Lake/Reservoir System	404	404	404	404	404	404
K	Shady Hollow MUD	Colorado	Colorado Run-of-River	793	775	759	750	749	749
K	Steam-Electric Power, Travis	Colorado	Colorado Run-of-River	1,931	1,931	1,931	1,931	1,931	1,931
K	Steam-Electric Power, Travis	Colorado	Highland Lakes Lake/Reservoir System	1,077	1,077	1,077	1,077	1,077	1,077
K	Sunset Valley	Colorado	Colorado Run-of-River	716	716	0	0	0	0
K	Sweetwater Community	Colorado	Highland Lakes Lake/Reservoir System	1,514	1,514	1,514	1,514	1,514	1,514
K	Travis County MUD 10	Colorado	Highland Lakes Lake/Reservoir System	96	96	96	96	96	96
K	Travis County MUD 4	Colorado	Highland Lakes Lake/Reservoir System	3,560	3,562	3,564	3,565	3,565	3,565
K	Travis County WCID 10	Colorado	Colorado Run-of-River	3,360	3,360	0	0	0	0
K	Travis County WCID 17	Colorado	Highland Lakes Lake/Reservoir System	8,800	8,800	8,800	8,800	8,800	8,800
K	Travis County WCID 18	Colorado	Highland Lakes Lake/Reservoir System	1,400	1,400	1,400	1,400	1,400	1,400

K	Travis County WCID 19	Colorado	Highland Lakes Lake/Reservoir System	449	447	445	444	444	444
K	Travis County WCID 20	Colorado	Highland Lakes Lake/Reservoir System	1,135	1,135	1,135	1,135	1,135	1,135
K	Travis County WCID Point Venture	Colorado	Highland Lakes Lake/Reservoir System	285	285	285	285	285	285
K	Wells Branch MUD	Colorado	Colorado Run-of-River	1,397	1,352	0	0	0	0
K	West Travis County Public Utility Agency	Colorado	Highland Lakes Lake/Reservoir System	4,500	4,500	4,500	4,500	4,500	4,500
K	Williamson Travis Counties MUD 1	Colorado	Highland Lakes Lake/Reservoir System	201	201	201	202	201	202
K	Windermere Utility	Colorado	Colorado Run-of-River	2,240	2,240	0	0	0	0
K	Windermere Utility	Colorado	Highland Lakes Lake/Reservoir System	307	307	307	307	307	307
	Sum of Projected Surface Water Supplies (acre-feet)			**361,437**	**357,345**	**355,540**	**351,602**	**347,692**	**343,194**

G. Projected Total Demand for Water Within the District, According to Most Recently Adopted State Water Plan [31 TAC §356.52(a)(6)(G); TWC §36.1071(e)(3)(G)]

The most recently adopted State Water Plan is the 2022 State Water Plan. This Plan incorporates the 2021 Region K Water Plan, which provides projected Total Demand for Water in the District and Travis County.

These data on water demand are included in Appendix F and reproduced in Table 7 below. Similarly to the treatment of the data on surface-water supplies described in the preceding subsection, this dataset has been aggregated by TWDB at the county level and then the demands by the county-level WUGs have been apportioned to the District by TWDB on an areal basis. An apportionment multiplier of 0.209 was used in these calculations. As with the supply data, the demand values for WUGs that are municipalities, water supply corporations, and utility districts are not apportioned; instead, their full values are retained.

This dataset indicates that the annual water demands by users in the District will increase from 241,043 acre-feet in 2020 to 400,365 acre-feet in 2070, a 66.1% increase. As with the supply data, a large portion of the projected demand is derived from the City of Austin Water Utility, which has not been apportioned to the District's geographic area, though only a relatively small portion of the utility's actual service area lies within the District's territory.

Table 7. Projected Total Water Demand within the District

Projected Water Demands
TWDB 2022 State Water Plan Data

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

TRAVIS COUNTY *20.9% (multiplier)* All values are in acre-feet

RWPG	WUG	WUG Basin	2020	2030	2040	2050	2060	2070
K	Aqua WSC	Colorado	1,088	1,226	1,362	1,524	1,671	1,809
K	Austin	Colorado	170,686	198,992	230,751	252,570	269,954	293,513
K	Barton Creek West WSC	Colorado	436	433	430	428	427	427
K	Barton Creek WSC	Colorado	524	619	709	776	830	893
K	Briarcliff	Colorado	300	340	380	425	466	504
K	Cedar Park	Colorado	2,251	2,387	2,554	2,550	2,547	2,546
K	Cottonwood Creek MUD 1	Colorado	95	107	120	129	138	148
K	County-Other, Travis	Colorado	246	244	243	242	241	241
K	County-Other, Travis	Guadalupe	2	2	2	2	2	2
K	Creedmoor-Maha WSC	Colorado	602	662	721	797	872	944
K	Creedmoor-Maha WSC	Guadalupe	39	42	46	51	56	60
K	Cypress Ranch WCID 1	Colorado	121	134	144	153	164	163
K	Deer Creek Ranch Water	Colorado	43	49	55	59	63	68
K	Elgin	Colorado	255	357	453	563	662	754
K	Garfield WSC	Colorado	199	230	259	281	301	323
K	Goforth SUD	Guadalupe	10	12	16	20	25	31
K	Hornsby Bend Utility	Colorado	594	678	761	823	879	944
K	Hurst Creek MUD	Colorado	1,718	1,709	1,703	1,700	1,699	1,699
K	Irrigation, Travis	Colorado	1,007	1,007	1,007	1,007	1,007	1,007
K	Jonestown WSC	Colorado	675	709	744	787	828	866
K	Kelly Lane WCID 1	Colorado	322	317	313	312	311	311
K	Lago Vista	Colorado	1,868	2,184	2,487	2,832	3,140	3,428
K	Lakeway MUD	Colorado	2,757	2,882	3,019	3,166	3,212	3,211
K	Leander	Colorado	1,519	3,550	3,747	3,953	4,046	4,222
K	Livestock, Travis	Colorado	106	106	106	106	106	106
K	Livestock, Travis	Guadalupe	4	4	4	4	4	4
K	Loop 360 WSC	Colorado	1,225	1,268	1,318	1,363	1,407	1,486
K	Manor	Colorado	1,110	1,517	1,907	2,346	2,736	3,099
K	Manufacturing, Travis	Colorado	2,751	3,104	3,104	3,104	3,104	3,104
K	Manville WSC	Colorado	2,439	2,946	3,435	3,994	4,496	4,966
K	Mining, Travis	Colorado	725	850	985	1,112	1,251	1,411
K	Mining, Travis	Guadalupe	7	9	10	11	13	14
K	North Austin MUD 1	Colorado	81	78	76	75	75	75
K	Northtown MUD	Colorado	728	841	947	1,066	1,171	1,268
K	Oak Shores Water System	Colorado	150	171	170	169	169	169
K	Pflugerville	Colorado	10,403	12,819	15,598	18,364	21,167	21,156

K	Rollingwood	Colorado	383	379	375	374	375	377
K	Rough Hollow in Travis County	Colorado	589	1,213	1,213	1,213	1,213	1,213
K	Round Rock	Colorado	278	315	352	395	434	470
K	Senna Hills MUD	Colorado	420	493	564	616	659	708
K	Shady Hollow MUD	Colorado	793	775	759	750	749	749
K	Steam-Electric Power, Travis	Colorado	2,143	2,143	2,143	2,143	2,143	2,143
K	Sunset Valley	Colorado	368	417	483	559	649	753
K	Sweetwater Community	Colorado	408	862	862	862	862	862
K	Travis County MUD 10	Colorado	74	87	99	108	115	124
K	Travis County MUD 14	Colorado	172	196	220	238	254	273
K	Travis County MUD 2	Colorado	322	372	421	457	489	525
K	Travis County MUD 4	Colorado	1,500	1,728	1,945	2,188	2,402	2,603
K	Travis County WCID 10	Colorado	3,499	3,802	4,094	4,433	4,739	5,026
K	Travis County WCID 17	Colorado	9,370	10,053	11,016	11,186	11,479	11,841
K	Travis County WCID 18	Colorado	1,070	1,207	1,341	1,499	1,643	1,779
K	Travis County WCID 19	Colorado	449	447	445	444	444	444
K	Travis County WCID 20	Colorado	584	581	579	577	577	577
K	Travis County WCID Point Venture	Colorado	255	322	378	456	545	624
K	Wells Branch MUD	Colorado	1,397	1,352	1,321	1,303	1,298	1,297
K	West Travis County Public Utility Agency	Colorado	6,698	7,357	7,925	8,824	9,398	9,914
K	Williamson County WSID 3	Colorado	120	147	145	144	144	144
K	Williamson Travis Counties MUD 1	Colorado	145	141	139	139	138	138
K	Windermere Utility	Colorado	2,920	2,864	2,831	2,815	2,810	2,809
	Sum of Projected Water Demands (acre-feet)		**241,043**	**279,838**	**319,336**	**348,587**	**372,799**	**400,365**

VI. CONSIDERATION OF WATER SUPPLY NEEDS AND WATER MANAGEMENT STRATEGIES INCLUDED IN THE ADOPTED STATE WATER PLAN

The most recently adopted State Water Plan is the 2022 State Water Plan. The 2022 plan incorporates the 2021 Region K Water Plan, which provides the estimated water supply needs in Travis County and the water management strategies planned to meet those needs. This information appears in Appendix F and is reproduced in subsections below. TWDB does not attempt to apportion the needs and strategies from the county level to the District, as the GCD is required only to consider the county-level needs and strategies in its Plan.

A. Water Supply Needs [31 TAC §356.52(a)(7)(A); TWC §36.1071(e)(4)]

Projected water supply needs from the TWDB 2022 State Water Plan Data are provided in Appendix F and reproduced in Table 8. These data identify individual WUGs with projected water supply shortages (represented as negative values in the table) as well as the total aggregated needs for Travis County. Projected water supply needs for Travis County are primarily municipal. Municipal WUGs with identified needs include: Barton Creek WSC, Cedar Park, Goforth SUD, Hurst Creek MUD, Leander, Senna Hills MUD, Travis County WCID 10, and West Travis County PUA. From 2020 to 2070, Travis County's municipal water supply shortfall is projected to increase significantly from approximately 3,100 acre-feet per year to more than 43,000 acre-feet per year.

Table 8. Projected Water Supply Needs Relevant to the District

Projected Water Supply Needs
TWDB 2022 State Water Plan Data

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

TRAVIS COUNTY All values are in acre-feet

RWPG	WUG	WUG Basin	2020	2030	2040	2050	2060	2070
K	Aqua WSC	Colorado	0	0	0	0	0	0
K	Austin	Colorado	121,593	87,987	66,151	40,563	19,311	-8,770
K	Barton Creek West WSC	Colorado	4	7	10	12	13	13
K	Barton Creek WSC	Colorado	-217	-312	-402	-469	-523	-586
K	Briarcliff	Colorado	100	60	20	-25	-66	-104
K	Cedar Park	Colorado	-613	-813	-732	-662	-660	-659
K	Cottonwood Creek MUD 1	Colorado	0	0	0	0	0	0
K	County-Other, Travis	Colorado	10,722	10,719	10,710	10,705	10,702	10,694
K	County-Other, Travis	Guadalupe	101	101	102	102	102	102
K	Creedmoor-Maha WSC	Colorado	555	473	-448	-552	-656	-757
K	Creedmoor-Maha WSC	Guadalupe	21	18	14	9	4	0
K	Cypress Ranch WCID 1	Colorado	102	89	79	70	59	60
K	Deer Creek Ranch Water	Colorado	82	76	70	66	62	57
K	Elgin	Colorado	0	0	0	0	0	0
K	Garfield WSC	Colorado	61	30	1	-21	-41	-63
K	Goforth SUD	Guadalupe	-4	-6	-10	-15	-20	-26
K	Hornsby Bend Utility	Colorado	350	266	183	121	65	0
K	Hurst Creek MUD	Colorado	-12	-3	3	6	7	7
K	Irrigation, Travis	Colorado	908	908	908	908	908	908
K	Jonestown WSC	Colorado	75	41	6	-37	-78	-116
K	Kelly Lane WCID 1	Colorado	66	71	75	76	77	77
K	Lago Vista	Colorado	1,998	1,682	1,379	1,034	726	438
K	Lakeway MUD	Colorado	312	187	50	-97	-143	-142
K	Leander	Colorado	-317	-1,866	-2,009	-2,684	-2,967	-3,281
K	Livestock, Travis	Colorado	0	0	0	0	0	0
K	Livestock, Travis	Guadalupe	0	0	0	0	0	0
K	Loop 360 WSC	Colorado	25	-18	-68	-113	-157	-236
K	Manor	Colorado	2,210	1,903	325	219	310	10
K	Manufacturing, Travis	Colorado	0	0	286	742	742	742
K	Manville WSC	Colorado	2,033	1,608	1,135	577	-476	-1,696
K	Mining, Travis	Colorado	0	0	0	0	0	0
K	Mining, Travis	Guadalupe	0	0	0	0	0	0
K	North Austin MUD 1	Colorado	0	0	-76	-75	-75	-75
K	Northtown MUD	Colorado	0	0	-947	-1,066	-1,171	-1,268
K	Oak Shores Water System	Colorado	135	114	115	116	116	116
K	Pflugerville	Colorado	1,641	-790	-3,589	-6,376	-9,203	-9,220

K	Rollingwood	Colorado	737	741	-375	-374	-375	-377
K	Rough Hollow in Travis County	Colorado	1,206	582	582	582	582	582
K	Round Rock	Colorado	0	0	0	0	0	0
K	Senna Hills MUD	Colorado	-16	-89	-160	-212	-255	-304
K	Shady Hollow MUD	Colorado	0	0	0	0	0	0
K	Steam-Electric Power, Travis	Colorado	4,140	4,140	4,140	4,140	4,140	4,140
K	Sunset Valley	Colorado	388	339	-443	-519	-609	-713
K	Sweetwater Community	Colorado	1,106	652	652	652	652	652
K	Travis County MUD 10	Colorado	22	9	-3	-12	-19	-28
K	Travis County MUD 14	Colorado	52	28	4	-14	-30	-49
K	Travis County MUD 2	Colorado	218	168	119	83	51	15
K	Travis County MUD 4	Colorado	2,060	1,834	1,619	1,377	1,163	962
K	Travis County WCID 10	Colorado	-139	-442	-4,094	-4,433	-4,739	-5,026
K	Travis County WCID 17	Colorado	635	-48	-1,011	-1,181	-1,474	-1,836
K	Travis County WCID 18	Colorado	330	193	59	-99	-243	-379
K	Travis County WCID 19	Colorado	0	0	0	0	0	0
K	Travis County WCID 20	Colorado	551	554	556	558	558	558
K	Travis County WCID Point Venture	Colorado	30	-37	-93	-171	-260	-339
K	Wells Branch MUD	Colorado	0	0	-1,321	-1,303	-1,298	-1,297
K	West Travis County Public Utility Agency	Colorado	-1,784	-2,443	-3,011	-3,910	-4,484	-5,000
K	Williamson County WSID 3	Colorado	20	18	13	9	4	0
K	Williamson Travis Counties MUD 1	Colorado	56	60	62	63	63	64
K	Windermere Utility	Colorado	689	745	-1,462	-1,446	-1,441	-1,440
	Sum of Projected Water Supply Needs (acre-feet)		**-3,102**	**-6,867**	**-20,254**	**-25,866**	**-31,463**	**-43,787**

B. Water Management Strategies [31 TAC §356.52(a)(7)(B); TWC §36.1071(e)(4)]

Projected water supply strategies from the TWDB 2022 State Water Plan Data are provided in Appendix F and reproduced in Table 9. These strategies outline how individual WUGs in Travis County plan to meet their projected water needs, typically through a combination of demand reduction measures and, in some cases, by developing additional water supplies. From 2020 to 2070, total water management strategies in Travis County are projected to increase significantly from approximately 31,000 acre-feet per year to over 241,000 acre-feet per year.

Only two groundwater-related strategies currently involve WUGs located within the District's boundaries: the City of Austin plans to expand its supply through brackish groundwater desalination using the Trinity Aquifer, and Travis County MUD 10 plans to increase its supply using the Trinity Aquifer. Several other WUGs outside the District are projected to implement demand reduction measures, operate aquifer storage and recovery (ASR) systems in the Trinity Aquifer, or develop the Trinity as a new groundwater source. While these projects are not located within the District, the District will monitor their progress for lessons learned and potential opportunities to support or replicate such efforts, where feasible.

Over the course of this planning period, other WUGs within the District may propose new groundwater-related strategies that will be reflected in future updates to the Region K and State Water Plans. These may include: additional drought curtailments; public education on groundwater conservation; recharge enhancement through injection wells and other managed recharge approaches; ASR, potentially in conjunction with surface water or treated wastewater; and development of alternative groundwater sources, such as the Hickory or other Paleozoic aquifers. The District will evaluate and, where appropriate, support strategies that contribute to increasing available water supplies or reducing demand, particularly those involving groundwater resources.

Table 9. Water Management Strategies Relevant to the District

Projected Water Management Strategies
TWDB 2022 State Water Plan Data

TRAVIS COUNTY

WUG, Basin (RWPG)

All values are in acre-feet

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
Aqua WSC, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	208	240	270	304	334	362
Municipal Conservation - Aqua WSC	DEMAND REDUCTION [Travis]	49	26	10	3	0	0
Municipal Water Conservation	DEMAND REDUCTION [Travis]	1	1	2	2	3	3
		258	**267**	**282**	**309**	**337**	**365**
Austin, Colorado (K)							
Austin - Aquifer Storage and Recovery	Carrizo-Wilcox Aquifer ASR [Bastrop]	0	0	7,900	10,500	13,200	15,800
Austin - Blackwater and Greywater Reuse	Direct Reuse [Travis]	0	1,450	3,450	5,400	7,340	9,290
Austin - Brackish Groundwater Desalination	Edwards-BFZ Aquifer [Travis]	0	0	0	0	0	2,700
Austin - Brackish Groundwater Desalination	Trinity Aquifer [Travis]	0	0	0	0	0	2,300
Austin - Capture Local Inflows to Lady Bird Lake	Colorado Run-of-River [Travis]	0	0	3,000	3,000	3,000	3,000
Austin - Centralized Direct Non-Potable Reuse	Direct Reuse [Travis]	500	2,990	10,250	14,583	18,917	23,250
Austin - Community-Scale Stormwater Harvesting	Rainwater Harvesting [Travis]	0	66	158	184	210	236
Austin - Conservation	DEMAND REDUCTION [Travis]	4,910	14,890	24,870	30,120	35,370	40,620
Austin - Decentralized Direct Non-Potable Reuse	Direct Reuse [Travis]	0	1,400	4,160	8,330	12,510	16,680
Austin - Indirect Potable Reuse Through Lady Bird Lake	Indirect Reuse [Travis]	0	0	11,000	14,000	17,000	20,000
Austin - Lake Austin Operations	Colorado Run-of-River [Travis]	1,250	1,250	1,250	1,250	1,250	1,250
Austin - Longhorn Dam Operation Improvements	Colorado Run-of-River [Travis]	0	3,000	3,000	3,000	3,000	3,000
Austin - Off-Channel Reservoir And Evaporation Suppression	Austin Off-Channel Lake/Reservoir [Reservoir]	0	0	0	0	0	25,827
Austin - Onsite Rainwater and Stormwater Harvesting	Rainwater Harvesting [Travis]	0	790	1,880	2,890	3,890	4,900
Drought Management	DEMAND REDUCTION [Travis]	7,766	9,045	10,489	11,480	12,271	13,342
		14,426	**34,881**	**81,407**	**104,737**	**127,958**	**182,195**
Barton Creek West WSC, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	79	71	64	58	52	47
Municipal Conservation - Barton Creek West WSC	DEMAND REDUCTION [Travis]	39	76	109	139	167	193
		118	**147**	**173**	**197**	**219**	**240**

Barton Creek WSC, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	119	127	131	130	125	121
Municipal Conservation - Barton Creek WSC	DEMAND REDUCTION [Travis]	47	110	183	258	330	409
Water Purchase Amendment - Barton Creek WSC	Highland Lakes Lake/Reservoir System [Reservoir]	90	90	90	90	90	90
		256	**327**	**404**	**478**	**545**	**620**
Briarcliff, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	60	68	76	85	93	106
		60	**68**	**76**	**85**	**93**	**106**
Cedar Park, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	410	393	393	393	393	393
Municipal Conservation - Cedar Park	DEMAND REDUCTION [Travis]	203	420	590	586	583	582
		613	**813**	**983**	**979**	**976**	**975**
Cottonwood Creek MUD 1, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	5	5	6	6	7	7
		5	**5**	**6**	**6**	**7**	**7**
County-Other, Travis, Colorado (K)							
Brush Management	Trinity Aquifer [Travis]	0	83	83	83	83	83
Drought Management	DEMAND REDUCTION [Travis]	230	219	212	204	195	190
Municipal Conservation - Travis County-Other (Aqua Texas - Rivercrest)	DEMAND REDUCTION [Travis]	29	55	79	102	123	142
		259	**357**	**374**	**389**	**401**	**415**
County-Other, Travis, Guadalupe (K)							
Drought Management	DEMAND REDUCTION [Travis]	2	2	2	2	2	2
		2	**2**	**2**	**2**	**2**	**2**
Creedmoor-Maha WSC, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	29	31	33	36	39	42
Edwards/Middle Trinity ASR	Trinity Aquifer ASR [Hays]	0	289	289	289	289	289
Municipal Conservation - Creedmoor-Maha WSC	DEMAND REDUCTION [Travis]	30	37	55	86	93	100
Water Purchase Amendment - Creedmoor-Maha WSC	Carrizo-Wilcox Aquifer [Bastrop]	0	0	335	335	335	335
		59	**357**	**712**	**746**	**756**	**766**
Creedmoor-Maha WSC, Guadalupe (K)							
Drought Management	DEMAND REDUCTION [Travis]	2	2	2	2	2	3
Municipal Conservation - Creedmoor-Maha WSC	DEMAND REDUCTION [Travis]	2	2	4	6	6	6
		4	**4**	**6**	**8**	**8**	**9**
Cypress Ranch WCID 1, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	6	6	7	7	7	7

Municipal Conservation - Cypress Ranch WCID 1	DEMAND REDUCTION [Travis]	6	9	14	20	21	20
		12	**15**	**21**	**27**	**28**	**27**
Deer Creek Ranch Water, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	2	2	3	3	3	3
		2	**2**	**3**	**3**	**3**	**3**
Elgin, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	41	45	42	32	37	42
Municipal Conservation - Elgin	DEMAND REDUCTION [Travis]	13	25	47	81	94	107
		54	**70**	**89**	**113**	**131**	**149**
Garfield WSC, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	10	12	13	14	15	16
Expansion of Current Groundwater Supplies - Trinity Aquifer	Trinity Aquifer [Travis]	0	0	0	7	26	47
		10	**12**	**13**	**21**	**41**	**63**
Goforth SUD, Guadalupe (K)							
Drought Management	DEMAND REDUCTION [Travis]	0	1	1	1	1	2
Drought Management – Goforth SUD	DEMAND REDUCTION [Travis]	0	0	0	0	0	0
GBRA Shared Project (Phase 1)	Carrizo-Wilcox Aquifer [Caldwell]	7	6	6	8	13	17
GBRA Shared Project (Phase 1)	Carrizo-Wilcox Aquifer [Gonzales]	7	6	6	6	6	7
		14	**13**	**13**	**15**	**20**	**26**
Hornsby Bend Utility, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	30	34	38	41	44	47
		30	**34**	**38**	**41**	**44**	**47**
Hurst Creek MUD, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	313	281	253	228	205	185
Municipal Conservation - Hurst Creek MUD	DEMAND REDUCTION [Travis]	155	302	437	560	673	776
		468	**583**	**690**	**788**	**878**	**961**
Jonestown WSC, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	124	132	141	150	158	165
Municipal Conservation - Jonestown WSC	DEMAND REDUCTION [Travis]	56	47	41	39	40	41
		180	**179**	**182**	**189**	**198**	**206**
Kelly Lane WCID 1, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	73	66	66	66	66	66
Municipal Conservation - Kelly Lane WCID 1	DEMAND REDUCTION [Travis]	29	52	48	47	46	46
		102	**118**	**114**	**113**	**112**	**112**
Lago Vista, Colorado (K)							
Direct Reuse - Lago Vista	Direct Reuse [Travis]	0	224	336	448	560	673

	Drought Management	DEMAND REDUCTION [Travis]	340	362	373	384	408	446
	Municipal Conservation - Lago Vista	DEMAND REDUCTION [Travis]	168	375	622	914	1,098	1,198
			508	**961**	**1,331**	**1,746**	**2,066**	**2,317**
Lakeway MUD, Colorado (K)								
	Direct Reuse - Lakeway MUD	Direct Reuse [Travis]	0	450	450	900	900	900
	Drought Management	DEMAND REDUCTION [Travis]	502	478	454	430	409	409
	Municipal Conservation - Lakeway MUD	DEMAND REDUCTION [Travis]	248	492	748	1,015	1,169	1,168
			750	**1,420**	**1,652**	**2,345**	**2,478**	**2,477**
Leander, Colorado (K)								
	Drought Management	DEMAND REDUCTION [Travis]	320	594	616	645	659	686
	LCRA - Mid Basin Reservoir	LCRA New Off-Channel Reservoir (2030 Decade) [Reservoir]	0	1,400	1,400	2,600	2,600	2,600
			320	**1,994**	**2,016**	**3,245**	**3,259**	**3,286**
Loop 360 WSC, Colorado (K)								
	Drought Management	DEMAND REDUCTION [Travis]	223	209	196	183	170	161
	Municipal Conservation - Loop 360 WSC	DEMAND REDUCTION [Travis]	110	225	339	450	559	679
			333	**434**	**535**	**633**	**729**	**840**
Manor, Colorado (K)								
	Drought Management	DEMAND REDUCTION [Travis]	161	204	249	302	350	395
			161	**204**	**249**	**302**	**350**	**395**
Manville WSC, Colorado (K)								
	Drought Management	DEMAND REDUCTION [Travis]	488	589	687	799	899	993
	Expansion of Current Groundwater Supplies - Trinity Aquifer	Trinity Aquifer [Travis]	0	0	0	0	0	703
			488	**589**	**687**	**799**	**899**	**1,696**
North Austin MUD 1, Colorado (K)								
	Drought Management	DEMAND REDUCTION [Travis]	4	4	4	4	4	4
	LCRA - Mid Basin Reservoir	LCRA New Off-Channel Reservoir (2030 Decade) [Reservoir]	0	0	80	80	80	80
			4	**4**	**84**	**84**	**84**	**84**
Northtown MUD, Colorado (K)								
	Drought Management	DEMAND REDUCTION [Travis]	36	42	47	53	59	63
	LCRA - Mid Basin Reservoir	LCRA New Off-Channel Reservoir (2030 Decade) [Reservoir]	0	0	900	1,100	1,300	1,300
			36	**42**	**947**	**1,153**	**1,359**	**1,363**
Oak Shores Water System, Colorado (K)								
	Drought Management	DEMAND REDUCTION [Travis]	27	28	26	23	21	20
	Municipal Conservation - Oak Shores Water System	DEMAND REDUCTION [Travis]	14	29	42	54	65	70
			41	**57**	**68**	**77**	**86**	**90**

Pflugerville, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	2,460	3,068	3,748	4,423	5,103	5,103
Expansion of Current Groundwater Supplies - Edwards-BFZ Aquifer	Edwards-BFZ Aquifer [Travis]	0	0	20	20	20	20
LCRA - Mid Basin Reservoir	LCRA New Off-Channel Reservoir (2030 Decade) [Reservoir]	0	0	0	1,300	3,400	3,400
Municipal Conservation - Pflugerville	DEMAND REDUCTION [Travis]	563	549	606	674	754	743
Municipal Water Conservation - Pflugerville	DEMAND REDUCTION [Travis]	0	598	684	789	888	989
		3,023	**4,215**	**5,058**	**7,206**	**10,165**	**10,255**
Rollingwood, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	70	63	57	52	47	46
LCRA - Mid Basin Reservoir	LCRA New Off-Channel Reservoir (2030 Decade) [Reservoir]	0	0	250	250	250	250
Municipal Conservation - Rollingwood	DEMAND REDUCTION [Travis]	34	64	90	116	142	148
		104	**127**	**397**	**418**	**439**	**444**
Rough Hollow in Travis County, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	107	199	179	179	179	179
Municipal Conservation - Rough Hollow in Travis County	DEMAND REDUCTION [Travis]	53	220	319	319	319	319
		160	**419**	**498**	**498**	**498**	**498**
Round Rock, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	68	79	88	99	109	118
Municipal Conservation - Round Rock	DEMAND REDUCTION [Travis]	6	1	0	0	0	0
		74	**80**	**88**	**99**	**109**	**118**
Senna Hills MUD, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	76	82	84	83	80	77
Municipal Conservation - Senna Hills MUD	DEMAND REDUCTION [Travis]	38	85	142	200	258	321
		114	**167**	**226**	**283**	**338**	**398**
Shady Hollow MUD, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	144	137	137	137	137	137
Municipal Conservation - Shady Hollow MUD	DEMAND REDUCTION [Travis]	71	90	74	65	64	64
		215	**227**	**211**	**202**	**201**	**201**
Steam-Electric Power, Travis, Colorado (K)							
Austin - Centralized Direct Non-Potable Reuse	Direct Reuse [Travis]	0	1,750	1,750	1,750	1,750	1,750
		0	**1,750**	**1,750**	**1,750**	**1,750**	**1,750**
Sunset Valley, Colorado (K)							
Development of New Groundwater Supplies - Trinity Aquifer	Trinity Aquifer [Travis]	0	0	300	300	300	300
Drought Management	DEMAND REDUCTION [Travis]	67	69	72	75	79	82

	Expansion of Current Groundwater Supplies - Edwards-BFZ Aquifer	Edwards-BFZ Aquifer [Travis]	0	0	50	50	50	50
	LCRA - Mid Basin Reservoir	LCRA New Off-Channel Reservoir (2030 Decade) [Reservoir]	0	0	300	300	300	300
	Municipal Conservation - Sunset Valley	DEMAND REDUCTION [Travis]	33	73	123	183	256	343
	Rainwater Harvesting - Sunset Valley	Rainwater Harvesting [Travis]	0	2	2	3	3	4
			100	**144**	**847**	**911**	**988**	**1,079**
Sweetwater Community, Colorado (K)								
	Drought Management	DEMAND REDUCTION [Travis]	82	172	172	172	172	172
			82	**172**	**172**	**172**	**172**	**172**
Travis County MUD 10, Colorado (K)								
	Development of New Groundwater Supplies - Trinity Aquifer	Trinity Aquifer [Travis]	0	100	100	100	100	100
	Drought Management	DEMAND REDUCTION [Travis]	17	18	19	20	22	23
	Municipal Conservation - Travis County MUD 10	DEMAND REDUCTION [Travis]	7	15	25	27	28	30
			24	**133**	**144**	**147**	**150**	**153**
Travis County MUD 14, Colorado (K)								
	Drought Management	DEMAND REDUCTION [Travis]	9	10	11	12	13	14
	Water Purchase Amendment - Travis County MUD 14	Carrizo-Wilcox Aquifer [Bastrop]	0	0	0	35	35	35
			9	**10**	**11**	**47**	**48**	**49**
Travis County MUD 2, Colorado (K)								
	Drought Management	DEMAND REDUCTION [Travis]	45	46	48	49	52	56
			45	**46**	**48**	**49**	**52**	**56**
Travis County MUD 4, Colorado (K)								
	Drought Management	DEMAND REDUCTION [Travis]	341	355	360	364	360	351
	Municipal Conservation - Travis County MUD 4	DEMAND REDUCTION [Travis]	135	309	507	731	962	1,198
			476	**664**	**867**	**1,095**	**1,322**	**1,549**
Travis County WCID 10, Colorado (K)								
	Drought Management	DEMAND REDUCTION [Travis]	796	786	766	748	720	688
	LCRA - Mid Basin Reservoir	LCRA New Off-Channel Reservoir (2030 Decade) [Reservoir]	0	0	2,300	2,300	2,300	2,300
	Municipal Conservation - Travis County WCID 10	DEMAND REDUCTION [Travis]	315	660	1,031	1,440	1,858	2,275
			1,111	**1,446**	**4,097**	**4,488**	**4,878**	**5,263**
Travis County WCID 17, Colorado (K)								
	Direct Reuse - Travis County WCID 17	Direct Reuse [Travis]	0	510	510	510	510	510
	Drought Management	DEMAND REDUCTION [Travis]	2,132	2,076	2,056	1,882	1,791	1,848
	Municipal Conservation - Travis County WCID 17	DEMAND REDUCTION [Travis]	843	1,748	2,794	3,658	4,317	4,451
			2,975	**4,334**	**5,360**	**6,050**	**6,618**	**6,809**
Travis County WCID 18, Colorado (K)								

Drought Management	DEMAND REDUCTION [Travis]	263	304	342	385	423	458
Municipal Conservation - Travis County WCID 18	DEMAND REDUCTION [Travis]	75	58	47	43	43	46
		338	**362**	**389**	**428**	**466**	**504**
Travis County WCID 19, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	82	74	66	60	54	48
Municipal Conservation - Travis County WCID 19	DEMAND REDUCTION [Travis]	40	79	114	146	176	203
		122	**153**	**180**	**206**	**230**	**251**
Travis County WCID 20, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	106	96	86	77	70	63
Municipal Conservation - Travis County WCID 20	DEMAND REDUCTION [Travis]	53	103	149	190	228	263
		159	**199**	**235**	**267**	**298**	**326**
Travis County WCID Point Venture, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	46	53	57	62	71	82
LCRA - Mid Basin Reservoir	LCRA New Off-Channel Reservoir (2030 Decade) [Reservoir]	0	0	0	0	0	50
Municipal Conservation - Travis County WCID Point Venture	DEMAND REDUCTION [Travis]	23	55	94	146	189	216
		69	**108**	**151**	**208**	**260**	**348**
Wells Branch MUD, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	70	68	66	65	65	65
LCRA - Mid Basin Reservoir	LCRA New Off-Channel Reservoir (2030 Decade) [Reservoir]	0	0	1,300	1,300	1,300	1,300
		70	**68**	**1,366**	**1,365**	**1,365**	**1,365**
West Travis County Public Utility Agency, Colorado (K)							
Direct Potable Reuse - West Travis County PUA	Direct Reuse [Travis]	0	336	336	336	336	336
Direct Reuse - West Travis County PUA	Direct Reuse [Travis]	0	127	125	120	113	108
Drought Management	DEMAND REDUCTION [Travis]	1,219	1,212	1,178	1,182	1,134	1,077
LCRA - Excess Flows Reservoir	LCRA New Off-Channel Reservoir (2030 Decade) [Reservoir]	0	1,000	1,000	2,100	2,100	2,200
Municipal Conservation - West Travis County PUA	DEMAND REDUCTION [Travis]	603	1,295	2,034	2,914	3,729	4,530
		1,822	**3,970**	**4,673**	**6,652**	**7,412**	**8,251**
Williamson County WSID 3, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	20	22	20	19	19	19
		20	**22**	**20**	**19**	**19**	**19**
Williamson Travis Counties MUD 1, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	22	19	18	18	17	17
		22	**19**	**18**	**18**	**17**	**17**
Windermere Utility, Colorado (K)							

Drought Management	DEMAND REDUCTION [Travis]	560	560	560	560	560	560
LCRA - Mid Basin Reservoir	LCRA New Off-Channel Reservoir (2030 Decade) [Reservoir]	0	0	400	400	400	400
Municipal Conservation - Windermere Utility	DEMAND REDUCTION [Travis]	118	62	29	13	8	7
Water Purchase - Windermere Utility	Carrizo-Wilcox Aquifer [Burleson]	0	500	500	500	500	500
		678	**1,122**	**1,489**	**1,473**	**1,468**	**1,467**
Sum of Projected Water Management Strategies (acre-feet)		**31,385**	**63,916**	**121,452**	**153,681**	**183,330**	**241,184**

VII. HOW THE DISTRICT WILL MANAGE GROUNDWATER [31 TAC §356.52(a)(4)]

A. District Authority and Groundwater Management Rules and Policies

The Texas Legislature has determined that GCDs such as the SWTCGCD are the state's preferred method of groundwater management in their jurisdictional areas. The District was created in 2017 by H.B. 4345 (85th Legislature). This enabling statute provides for specific authorities and duties that are unique to the District and take precedence over certain portions of Chapter 36 of the Texas Water Code.

The Texas Legislature codified its groundwater management policy decision in Section §36.0015 of the Texas Water Code, which provides that GCDs will manage groundwater resources through rules developed and implemented in accordance with Chapter 36 of the Texas Water Code. Chapter 36 establishes directives for GCDs and the statutory authority to carry out such directives to enable GCDs to have the proper tools to protect and preserve the groundwater resources with their boundaries. Unless superseded by H.B. 4345 (2017), the District is required to incorporate applicable provisions of Chapter 36 into its Plan and adopted rules. In doing so, the District has given strong consideration to the economic and cultural activities which occur within the District and which rely upon the continued use of groundwater.

The District will use the Plan to guide its continued efforts to preserve and protect the groundwater resources of southwestern Travis County. The District's adopted rules, regulatory activities, planning efforts, and daily operations are intended to remain consistent with this approved Management Plan and are developed in alignment with its management goals and supporting technical information. District rules will be reviewed and revised as needed for consistency with the provisions of the Plan, the District's enabling statute, and Chapter 36 of the Texas Water Code. Rules implementation will continue to be driven by the best hydrogeological and technical information available to the District, including information provided in the Plan.

The District is committed to working with other GCDs in GMA 9 for joint groundwater planning in the GMA. The District will use the Plan as part of its cooperative efforts with the neighboring GCDs. The District will manage the supply of groundwater within the District on the basis of: 1) applicable DFCs and, to the extent feasible, MAG quantities resulting from the GMA 9 joint planning process; 2) differentiated exempt and non-exempt wells and groundwater demands; and 3) the best science and relevant data available to the District.

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

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

B. Specification of Actions, Procedures, Performance and Avoidance for Plan Implementation [31 §TAC 356.52(a)(5); TWC §36.1071(e)(2)]

The District will use the regulatory authorities and tools granted by its enabling statute (H.B. 4345, 2017), Chapter 36 of the Texas Water Code, and its adopted rules to effectively address groundwater issues within the District, including both groundwater quality and supply. A key component of achieving this goal is the continued implementation of a fair and equitable permitting program for non-exempt users, which includes mandatory metering and self-reporting of actual groundwater use by non-exempt users only, payment of production fees for actual use by non-exempt users, and a regulatory enforcement program.

In addition to the permitting program, the District also intends to regulate groundwater withdrawals and minimize well interference by enforcing its rules that prescribe minimum well spacing for proposed wells. The District's adopted rules are publicly available on its website and can be accessed at: https://swtcgcd.com/governing-documents.

In its joint planning efforts within GMA 9, the District will work to develop and adopt DFCs for the Trinity Aquifer and its subdivisions that reflect the significant differences between local aquifer conditions and those in other GCDs. The District will specifically advocate for district-specific DFCs, rather than GMA-wide DFCs, for aquifer subunits to ensure that management goals are better aligned with local hydrogeologic conditions and groundwater-use needs.

The District will continue to support, undertake, and promote scientific studies of the Trinity Aquifer and its use in order to improve production estimates and develop science-based groundwater policy, including potential production limits as needed.

The District will make maximum use of existing information on drought conditions, including that on the TWDB's drought web-page: https://www.waterdatafortexas.org/drought. To protect the limited groundwater resources in the District, the District will continue implementing its drought-management program that includes defined groundwater drought severity stages, mandatory stage-wise curtailments for non-exempt well users that are defined in their permits, and non-mandatory curtailments for exempt well users.

Through its adopted rules, the District will enforce mandatory well construction standards and spacing requirements that include additional measures beyond those required by the Texas Department of Licensing and Regulation (TDLR). The District will also require proper well maintenance practices to protect higher-quality water zones from contamination by lower-quality zones. Inadequate well construction and maintenance may provide direct conduits or pathways that allow contamination from the surface or adjacent formations to affect the groundwater resources of the District.

The District also recognizes the importance of preventing groundwater contamination from abandoned or deteriorated wells. Wells that have been abandoned may also provide direct conduits or pathways that allow contamination from the surface to quickly reach the groundwater resources of the District. To address potential threats to groundwater quality, the District will require, through its rules, that those abandoned, deteriorated, or replaced wells that are demonstrably problematic in this regard will be either rehabilitated to obviate commingling problems and/or to be part of a monitoring well network, or plugged in compliance with the Water Well Drillers and Pump Installers Rules of the TDLR.

The District will maintain and expand a monitoring well network to assess changes in the groundwater storage conditions of aquifers or aquifer subdivisions on a continuing basis. The District will make a regular assessment of water supply and groundwater storage conditions and will report those conditions to the District Board of Directors and to the public. The District also will work with relevant local governmental entities or agencies of the State of Texas on well monitoring efforts and well investigations that are conducted in the District, including specifically those related to evaluating compliance with applicable DFCs.

The District will use the regulatory tools granted by its enabling legislation and Chapter 36 to preserve existing uses of groundwater within the District and to protect existing users by minimizing adverse effects on water-level or potentiometric surfaces of existing wells and on water quality supporting such use. The Texas Legislature empowered the District to protect existing users of groundwater, which are those individuals or entities currently invested in and using groundwater or the groundwater resources within the District for a beneficial purpose, and to preserve such uses as feasible. The District strives to protect and preserve such use to the extent practicable under the goals and objectives of this Plan. The District is not required, nor does it currently intend, to implement a “grandfathering” program or “historic use” designation as part of protecting existing use. In accordance with TWC §36.116, the District will also protect existing use though District rules on spacing of wells and production limits on groundwater from larger, non-exempt wells to the extent practicable and consistent with this Plan.

The District will continue implementing rules to avoid “speculative demand” and “unreasonable impacts” on the aquifers and uses. It will utilize its authority to limit egregious use of groundwater, including but not limited to wells solely or mainly used for lawn and landscape irrigation, to the extent allowed by statute.

In order to better manage the groundwater resources of southwestern Travis County during times of high demand or within areas of high demand, the District may establish additional management zones and/or Critical Groundwater Depletion Areas, and adopt separate rules for those areas. The District may also adopt different rules for each subdivision of an aquifer or geologic strata located in whole or in part within the boundaries of the District or each geographic area overlying a subdivision of an aquifer located in whole or in part within the boundaries of the District. For example, in order to 1) protect current and future demands by the few existing and anticipated domestic and livestock exempt wells that produce from the Upper Trinity Aquifer, and 2) promote continued flow within creeks and rivers, the District will need to carefully consider the effects of drilling any new larger wells that seek to produce water from the Upper Glen Rose (Upper Trinity) Aquifer under a new permit. Such special considerations may need to be taken into account for the Middle Trinity and Lower Trinity aquifers as well.

The District will define at least annually those specific authorized revenue sources and amounts that are necessary to financially support planned and budgeted District activities to implement this Plan, and it will establish by Board resolution what fees and fee rate schedule should be employed for any particular revenue source, while ensuring equitable fee generation among the sources.

In accomplishing the activities described above and pursuing other initiatives that may be needed in managing the groundwater resources in its territory, the District will strive to develop and exhibit the characteristics of a well-managed organization. The District will promote efficient and sustainable operations by maintaining effective staffing, streamlined management systems, clear internal and external communication, and sound governance and reporting practices, within the limits of available financial resources.

C. Methodology for Tracking Progress [31 TAC §356.52(a)(4)]

To track the District's progress toward achieving its management goals pursuant to this Plan, the District will prepare an annual report on District performance and progress toward achieving each management goal and its objective(s) in each fiscal year. The annual report will be presented in an open meeting to the Board of Directors for its acknowledgment of current status and discussion of whether satisfactory progress is being made and what future actions may be required for continued progress. Annual reports will be presented no later than the second regular District Board meeting of the following *calendar* year. The annual report will be posted on the District website for public review following Board approval.

The Board's consideration of the annual report each year will explicitly include:

- A review of the groundwater management activities undertaken in the fiscal year in terms of the relevant management goals, management objectives, and performance standards, which are identified in the next section of this Plan;
- An assessment of whether the District's progress toward achieving each of the Management Goals is consistent with the Plan and, if not, what changes may be indicated to achieve the Goals; and
- An evaluation of whether operating experience and new information indicate that the Plan should be revised and submitted to TWDB for approval to guide groundwater management activities in the future.

VIII. DISTRICT GOALS, MANAGEMENT OBJECTIVES, AND PERFORMANCE STANDARDS [31 §TAC 356.52(a)(2-3); TWC §36.1071(e)(1)]

The District's management goals coincide with the relevant goals established by the Texas Legislature for all GCDs, as set forth in TWC §36.1071. These are described in the subsections below as to their related management objectives and performance standards as required by the designated statute.

To achieve certain objectives and performance standards, the District has defined and will use what it is calling "tactical milestones," which provide a roadmap of intended activities associated with the operation of this new GCD. They are designed to serve as interim guideposts in accomplishing the applicable objective and standard in a timely, rational fashion. Unlike management objectives and performance standards that are statutorily mandated and require TWDB approval, the tactical milestones are intended to be discretionary internal guidance, able to be revised solely by Board action, provided the applicable performance standard(s) are achieved.

These objectives and performance standards are expected to evolve with future revisions of this Plan as knowledge of the District and its aquifers increases, operational experience grows, and key milestones are reached.

A. Providing the Most Efficient Use of Groundwater [31 TAC §356.52(a)(1)(A); TWC §36.1071(a)(1)]

The "most efficient use of groundwater" is defined [31 TAC §356.10(19)] as "practices, techniques, and technologies that a district determines will provide the least consumption of groundwater for each type of use balanced with the benefits of using groundwater".

A.1 Management Objective – Regulate and account for groundwater withdrawals within the District.

Performance Standards

a. The District will make concerted attempts to register unregistered wells known to exist in the District as soon as possible during the initial 2-year period for this Plan, and then maintain a well inventory thereafter.
b. The District will continue implementing its groundwater production permitting program for existing non-exempt wells, including meter-based reporting of actual groundwater withdrawals, in the initial 2-year period following Plan approval.

A.2 Management Objective – Promulgate and enforce spacing requirements specified in District Rule 4.2(A) to help reduce or prevent interference and unreasonable impacts between nearby wells.

Performance Standard

a. The District will develop an Annual Report that is submitted to and approved by the District Board regarding issues concerning existing well spacing problems, suitability of current (and/or currently being considered) District well spacing rules, and their compatibility with the Water Well Drillers Rules.

A.3 Management Objective – Evaluate groundwater availability on a continuing and recurrent basis by monitoring, reporting, and publicizing water levels on selected wells representative of conditions in the two primary aquifers and their subdivisions within the District.

Performance Standards

a. Water levels will be monitored in accordance with the following monitoring schedule during the term of the approved Plan:

Aquifer	Minimum # of Wells	Minimum Frequency[3]
Middle Trinity	10	4 times per year
Lower Trinity	10	4 times per year

The District will use existing groundwater wells for monitoring whenever possible and may drill new monitoring wells to address data gaps, as financial resources allow.

[3] If and as available and feasible, one or more of the monitoring wells may be deployed with continuous, semi-continuous, and/or on-demand telemetry to some central station accessible by the District for reporting purposes. The statistics derived from telemetered monitoring would replace the specified frequency requirement for such wells.

b. Number of water level monitoring wells in use, the recorded measurements, and their compliance with the schedule above will be reported in the Annual Report to the Board.

B. Controlling and Preventing Waste of Groundwater [31 TAC §356.52(a)(1)(B); TWC §36.1071(a)(2)]

"Waste" of groundwater is considered in this Plan to include 1) egregious use of water in amounts beyond that reasonably needed to achieve the intended beneficial purpose, and 2) the degradation of aquifer water quality caused by accessing and using groundwater without reasonably available safeguards.

B.1 Management Objective – Require new wells, including both exempt and non-exempt wells, to be constructed such that groundwater in zones of poorer quality water cannot intermingle with groundwater in zones of usable high-quality water, as specified in the District's well construction standards (District Rule 4.3).

Performance Standard

a. The District will restrict new non-exempt wells from being completed in the Upper Trinity Aquifer.
b. The District will promulgate well construction standards that case off zones containing poorer-quality water that otherwise would be in hydrologic connection with usable high-quality water.

B.2 Management Objective – Provide District-specific information on the importance of controlling and preventing waste of groundwater to District groundwater users on an ongoing basis.

Performance Standards

a. The Annual Report to the Board will include an analysis of the registered well database, summarizing intended beneficial use(s), nominal production capacity, and estimated reasonable use.
b. Provide information on preventing and controlling groundwater waste through the District website and at least once per year using one or more of the following methods:
    - article to local newspapers
    - distribution of conservation literature handouts
    - public presentation by District staff or directors
    - District exhibit/display booth at a public event

C. Controlling and Preventing Subsidence [31 TAC §356.52(a)(1)(C); TWC §36.1071(a)(3)]

The District has reviewed the TWDB report *Identification of the Vulnerability of the Major and Minor Aquifers of Texas to Subsidence with Regard to Groundwater Pumping – TWDB Contract Number 1648302062* (Furnans et al., 2017). According to the report, the Trinity Aquifer in the District is classified as having low to medium vulnerability to subsidence related to groundwater pumping (Figure 4.49. Trinity Aquifer subsidence risk vulnerability at well locations, pg. 4-79). The report also notes that despite significant water-level declines in the Trinity Aquifer, there has been no documented land surface subsidence (Mace et al., 1994).

While there is currently no evidence of subsidence occurring in the District, the District recognizes the importance of continued observation and monitoring. The District will remain alert to any potential signs of subsidence and will investigate credible reports. If necessary, the District will coordinate with appropriate agencies or experts to assess conditions and determine whether management responses are warranted. The District will continue to rely on the best available science to assess subsidence risk and will update its management strategies accordingly to protect groundwater resources within its jurisdiction.

D. Addressing Conjunctive Surface Water Management Issues [31 TAC §356.52(a)(1)(D); TWC §36.1071(a)(4)]

The term "conjunctive use" is defined [31 TAC §356.10(7)] as "the combined use of groundwater and surface water sources that optimizes the beneficial characteristics of each source, such as water banking, aquifer storage and recovery, enhanced recharge, and joint management". The term "conjunctive surface water management issues" is defined [31 TAC §356.10(8)] as "issues related to conjunctive use such as groundwater or surface water quality degradation and impacts of shifting between surface water and groundwater during shortages".

D.1 Management Objective – Assess opportunities for substitution of surface water or new alternative water supplies, from surface water, reclaimed water, and/or groundwater sources, for District groundwater.

Performance Standard

a. Participate in the Regional Water Planning process by sending a District representative to participate in at least one Region K meeting annually, with the dates and locations of Region K meeting(s) attended and any opportunities or issues associated with alternative water supplies to be reported to the Board of Directors annually.

E. Addressing Natural Resource Issues That Impact the Use and Availability of Groundwater, and Which Are Impacted by the Use of Groundwater [31 TAC §356.52(a)(1)(E); TWC §36.1071(a)(5)]

The term "natural resource issues" is defined [31 TAC §356.10(20)] as "issues related to environmental and other concerns that may be affected by a district's groundwater management plan and rules, such as impacts on endangered species, soils, oil and gas production, mining, air and water quality degradation, agriculture, and plant and animal life". In the District, springs and seeps flowing from outcrop areas of the Upper Trinity Aquifer (including the Ft. Terrett, Walnut, and the Upper Glen Rose outcrops) provide water for local habitat and contribute to base flow to nearby creeks and rivers throughout the GCD. These aquifers are known for low productivity and intermittent availability. They also have zones of poorer quality water that should be isolated from aquifers and zones of significantly better-quality groundwater.

E.1 Management Objective – To help extend the period of spring and seep flow during times of drought or limited rainfall, evaluate the effectiveness of District rules to discourage utilization of the Upper Trinity Aquifer and prevent leakage from that aquifer into other aquifers, and consider how the District may increase the current effectiveness.

Performance Standard

a. The Annual Report will include a summary regarding effectiveness of District rules in protecting springs and seeps and the base flow of streams in the District.

F. Addressing Drought Conditions [31 TAC §356.52(a)(1)(F); TWC §36.1071(a)(6)]

F.1 Management Objective – Monitor drought conditions using information from the TWDB drought webpage (https://www.waterdatafortexas.org/drought) and other relevant data sources. Based on this information, assess the need to declare drought stages and implement the District's drought management rules, as established in District Rule 5.2.

Performance Standard

a. District staff will prepare and submit a monthly report to the Board summarizing current aquifer and drought conditions within the District, along with the drought outlook.
b. The District Board will implement and enforce rules that: require a drought declaration based on District-specific groundwater drought indices and threshold trigger levels; and mandate specified curtailments by non-exempt well owners, in accordance with the terms of their permits, once a drought stage is declared.

F.2 Management Objective – Provide stakeholders and the public with drought-related educational materials and references to additional information sources.

Performance Standards

a. Compile and maintain information on temporary water demand reduction practices. During declared drought conditions, highlight this information on the District website.
b. As part of the Annual Report, staff will provide the Board with a yearly summary of unique visits to the District's drought webpage and any direct requests received for drought-related materials.

G. Addressing Conservation, Recharge Enhancement, Rainwater Harvesting, Precipitation Enhancement, and Brush Control, Where Appropriate and Cost-Effective [31 TAC §356.52(a)(1)(G); TWC §36.1071(a)(7)]

G.1 Groundwater Conservation

Management Objective – Regularly emphasize the importance of water conservation and various water conservation methods available for implementation by groundwater end-users.

Performance Standards

a. Promulgate the District's required Water Conservation Plan for non-exempt users and provide a link to it on the District website.

b. Provide information on groundwater conservation through the District website and at least once per year using one or more of the following methods:
    - article to local newspapers
    - distribution of conservation literature handouts
    - public presentation by District staff or directors
    - District exhibit/display booth at a public event

G.2 Recharge Enhancement

The term "recharge enhancement" is defined [31 TAC §356.10(25)] as "increased recharge accomplished by the modification of the land surface, streams, or lakes to increase seepage or infiltration rates or by the direct injection of water into the subsurface through wells".

Management Objective – Investigate and evaluate potential opportunities for recharge enhancement projects, by natural or artificial means and including ASR, on an ongoing basis.

Performance Standard

a. Beginning at the end of the third year of operating under the Plan, the Annual Report will include the number and type of potential recharge enhancement opportunities identified and pursued each year, and their efficacy, if any.

G.3 Rainwater Harvesting

Management Objective – The District will promote and encourage the use of rainwater harvesting among its constituents and provide advice, information, and literature regarding the benefits of rainwater harvesting.

Performance Standards

a. Provide information on rainwater harvesting through the District website and at least once per year using one or more of the following methods:
    - article to local newspapers
    - distribution of rainwater-harvesting literature handouts
    - public presentation by District staff or directors
    - District exhibit/display booth at a public event

G.4 Precipitation Enhancement

This strategy is not only too costly for consideration by the District at this time, but the District's small geographic area and the imprecision in the delivery location of enhanced precipitation also combine to make such a water management strategy impractical. Therefore, this goal is not applicable to the operations of this District at this time.

G.5 Brush Control

This strategy is not within the District's financial or managerial ability to implement or to be cost-effective. Further, brush is not expected to be a significant factor for groundwater availability in the District's primary, confined aquifers. Therefore, this goal is not considered applicable to the operations of this District at this time.

H. Addressing the Desired Future Conditions Established Under TWC §36.108 [31 TAC §356.52(a)(1)(H); TWC §36.1071(a)(8)]

As with its initial Management Plan, the District has determined that this goal, which is otherwise applicable to all GCD management plans, is not applicable to the Southwestern Travis County GCD at the time of this Plan's submission. This determination is based on several key factors:

1. **Limited Involvement in Prior DFC Development**:
   The current DFC for the Trinity Aquifer, the District's primary aquifer, was adopted by GMA 9 in 2021. Although the District was confirmed by voters in the November 2019 general election and subsequently joined GMA 9, the timing of its confirmation meant that it was only able to participate in a limited portion of the DFC development process during that joint planning cycle. As a result, the District had minimal opportunity to provide input on the DFCs adopted at that time. The District is now actively participating in the current joint planning cycle and will incorporate the updated DFCs into this Management Plan once they are finalized and adopted by GMA 9.
2. **Lack of Relevant Local Science in Current DFCs**:
   The regional DFC for the Trinity Aquifer in GMA 9 was developed without the benefit of more recent, District-specific studies, such as the *Hydrogeologic Atlas* (Hunt et al., 2020) and recent investigations by the University of Texas Bureau of Economic Geology (UT BEG) conducted in collaboration with Travis County and the District. These studies show that the Trinity Aquifer's hydrogeology and aquifer conditions in the District differ substantially from those in the rest of GMA 9. As a result, applying the current DFC and associated MAG to the District is problematic.
3. **Ongoing Need for Joint Planning Adjustments**:
   More time is needed within the GMA 9 joint planning process to address these hydrogeologic differences and determine how best to accommodate them while still supporting the conservation and preservation of groundwater across the region. The appropriate groundwater management response for the District will depend on how GMA 9 resolves these issues. At this time, it would be premature for the District to speculate on potential outcomes.
4. **Absence of Applicable DFCs for Other Aquifers**:
   No DFCs currently apply to the Edwards-Trinity (Plateau), Edwards (BFZ), or Paleozoic aquifers in this portion of GMA 9. Based on currently available data, the District does not believe DFCs are needed for these aquifers at this time.

The District intends to revise or amend this Management Plan once the ongoing joint planning process yields consensus on a more appropriate and effective approach to defining DFCs and MAGs for the Trinity Aquifer throughout GMA 9. At that time, the District will also develop and include specific management objectives and performance standards under this goal to support continued groundwater management. The revised Plan will then be resubmitted to the TWDB for administrative review.

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Appendices

Appendix A

Geological and Hydrogeological Information on Southwest Travis County

Geological and Hydrogeological Information on Southwest Travis County

Southwest Travis County was identified as part of the Hill Country Priority Groundwater Management Area in 1990. This designation signified that problems with groundwater quantity and/or quality either already existed or were expected to develop in the next 25 years. At the same time, the burgeoning growth of the area as part of suburban Austin was placing ever-increasing pressure on this particular area's water resources. Nevertheless, the area's hydrogeology was poorly characterized, with pumping and aquifer conditions largely unmonitored. Responding to this issue required, among other things, additional geoscientific information on the groundwater resources so that they could be effectively managed.

A key element in finally developing this information was an inter-local agreement between Travis County and the Barton Springs/Edwards Aquifer Conservation District, which adjoins the area, to develop what has been called the *Hydrogeologic Atlas of Southwest Travis County.* Quoting from this *Hydrogeologic Atlas*'s introduction:

> "This atlas represents a collaborative groundwater study in cooperation with Travis County Transportation and Natural Resources Division and the Barton Springs/Edwards Aquifer Conservation District. The study represents a compilation of existing and new hydrogeologic date to develop a better understanding of groundwater resources in Southwest Travis County. The scope of the work also included the collection of new data through over 100 site visits and geologic investigations. All of the data generated as part of the study are available as digital spatial datasets.
>
> The goal of this study is to provide a foundation of hydrogeologic data for scientists, residents, and ultimately policy makers. The data and evaluations presented provide a baseline of information for the newly created Southwestern Travis County Groundwater Conservation District…"

Rarely does a new GCD in Texas have the benefit of such an excellent scientific information resource. It underpins this Management Plan and ultimately the rulemaking of the GCD. The *Hydrogeologic Atlas of Southwest Travis County* is a large-format document that has numerous photographs, maps, figures, and tables and therefore a copy of it is not able to be physically included in this appendix. Those seeking more information on this area's hydrogeology should go to this link:

http://dx.doi.org/10.26153/tsw/8570

The scientific citation for the Atlas is:

Hunt, B.B., Cockrell, L.P., Gary, R.H., Vay, J.M., Kennedy, V., Smith, B.A., and Camp, J.P., 2020, Hydrogeologic Atlas of Southwest Travis County, Central Texas: Barton Springs/Edwards Aquifer Conservation District Report of Investigations 2020-0429, April 2020, 80 p. + digital datasets. http://dx.doi.org/10.26153/tsw/8570

Appendix B

Resolution No. 20250612 - Resolution of the Board of Directors of the Southwestern Travis County Groundwater Conservation District to Authorize Readoption of the District's Groundwater Management Plan

RESOLUTION OF THE BOARD OF DIRECTORS OF THE SOUTHWESTERN TRAVIS COUNTY GROUNDWATER CONSERVATION DISTRICT TO AUTHORIZE READOPTION OF THE DISTRICT'S GROUNDWATER MANGEMENT PLAN

RESOLUTION NO. 20250612

WHEREAS, the Southwestern Travis County Groundwater Conservation District ("District"), a political subdivision of the State of Texas, was created by House Bill 4345, Act of the 85th Texas Legislature, Regular Session, codified as Chapter 8871 of the Texas Special District Local Laws Code ("Enabling Act"), and amended by Senate Bill 669, Act of the 86th Texas Legislature, Regular Session, and operates pursuant to the authority of Article XVI, § 59 of the Texas Constitution, as a groundwater conservation district operating under Chapter 36, Texas Water Code, and the District's Enabling Act; and

WHEREAS, the proposed Management Plan of the Southwestern Travis County Groundwater Conservation District (District), attached hereto as Attachment A, has been developed for the purpose of serving the District's mission, statutory purpose, and commitment to conserving, preserving, protecting, recharging, and prevention of waste of groundwater and of aquifers within the District;

WHEREAS, this action to adopt the proposed Groundwater Management Plan is taken under the District's statutory authority pursuant to Texas Water Code, Chapter 36 and Special District Local Laws, Chapter 8827;

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

WHEREAS, the proposed Groundwater Management Plan was the subject of a public hearing before the Board of Directors of the District on June 12, 2025; and

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

NOW, THEREFORE, BE IT RESOLVED by the Board of Directors of the Southwestern Travis County Groundwater Conservation District that:

1. The above recitals are true and correct.

2. The "Groundwater Management Plan of the Southwestern Travis County Groundwater Conservation District" attached hereto as Attachment A is hereby adopted; and

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

PASSED AND APPROVED this 12th day of June 2025, with 5 ayes, 0 nays, 0 abstentions, and 2 absent.

Richard A Scadden

Richard A Scadden, President
Board of Directors

ATTEST:

Tim Van Acke

Tim Van Ackeren, Secretary
Board of Directors

Appendix C

Notices of Hearings and Meetings Addressing Adoption of Management Plan

STAYS IN FILE

1 pg 202580701

SOUTHWESTERN TRAVIS COUNTY
GROUNDWATER CONSERVATION DISTRICT

NOTICE OF PUBLIC HEARING ON PROPOSED MANAGEMENT PLAN

The Southwestern Travis County Groundwater Conservation District will hold a public hearing to receive comments on its proposed Management Plan during the regular Board meeting on Thursday, June 12, 2025, at 9:30 AM at the District office (8656 W Hwy 71, Bldg. A, Ste. 224, Austin, TX 78735).

The Management Plan outlines the District's goals and strategies for conserving, protecting, and managing groundwater resources. The proposed plan will be available for public review at the District office during regular business hours and online at www.swtcgcd.org.

All interested members of the public are invited to participate and comment on the proposal. Comments may be submitted verbally during the hearing or in writing by 5:00 PM on June 7, 2025, by mail to P.O. Box 340595, Austin, TX 78734, or by email to admin@swtcgcd.org.

Following the hearing, the Board may adopt the plan as proposed or with revisions based on public input or recommendations from staff or advisors.

For more information, call (512) 276-2875 or visit www.swtcgcd.org.

CERTIFICATE OF POSTING: Texas Government Code, Open Meetings, Section 551.054. *This Notice was posted May 20, 2025, on the District website and at the District office. Notice was also filed with the Travis County Clerk's Office on May 20, 2025, and published in the Austin American Statesman on May 23, 2025.*

SEAL OF COUNTY COURT TRAVIS COUNTY, TEXAS

Came to hand and posted on a Bulletin Board in the County Recording Office, Austin, Travis County, Texas on this the 20 day of May 2025
Dyana Limon-Mercado
County Clerk, Travis County, Texas
By ________ Deputy
ARIEL HERNANDEZ

FILED AND RECORDED
OFFICIAL PUBLIC RECORDS
Dyana Limon-Mercado
Dyana Limon-Mercado, County Clerk
Travis County, Texas
202580701
May 20, 2025 02:37 PM
Fee: $2.00 HERNANDEZA

NOTICE OF OPEN MEETING
SOUTHWESTERN TRAVIS COUNTY GROUNDWATER CONSERVATION DISTRICT
BOARD OF DIRECTORS

Regular Monthly Meeting
Thursday June 12, 2025, at 9:30 AM
8656 W Highway 71, Building A, Suite 224, Austin, Texas 78735

To access the meeting by phone, call 1-346-248-7799 (Toll Free) and use Meeting ID 371 327 2679. The meeting can also be accessed by computer audio and video at https://zoom.us/j/3713272679 using the same Meeting ID.

MEETING AGENDA

1. **Call to order, declare meeting open to the public, take roll and declare quorum status.**
2. **Announcements.**
3. **Public comments.**
This is an opportunity for the public to address the Board regarding matters not listed on the agenda. Comments on agenda items must be made when those items are considered. Individual comments are limited to three minutes. A spokesperson for a group of five or more may be allotted up to five minutes. Board members will not respond to questions during this portion of the meeting.
4. **Discussion and possible action to approve meeting minutes.**
    a. May 14, 2025 Regular Board Meeting
5. **Public hearing on Operating Permit Application – Archangel Catholic School of Austin.**
Continue public hearing on the application submitted by Archangel Catholic School of Austin for an operating permit to withdraw up to 9.85 million gallons (30.23 acre-feet) of groundwater annually from a Lower Trinity Aquifer well located at 3000 Barton Creek Blvd., Austin, TX 78735. The proposed use of the water is for irrigation at the same location.
6. **Discussion and possible action on Operating Permit Application – Archangel Catholic School of Austin.**
The Board may convene in executive session under Texas Government Code §551.071 (Consultation with Attorney) to discuss this matter. No final action will be taken in executive session; the Board will reconvene in open session before taking any action.
7. **Public hearing on proposed District Management Plan.**
Conduct a public hearing to receive input on the proposed management plan.
8. **Discussion and possible action on adoption of proposed District Management Plan.** (GM Cockrell)
Consider adoption of the proposed Management Plan, including possible action on a resolution to adopt the plan.
9. **Receive update, discuss, and consider possible action on electronic payment processing services.** (Finance Committee, GM Cockrell)
Consider approval of a master service agreement with the recommended vendor, Govolution LLC, to begin implementation of online payments.
10. **Receive update, discuss, and consider possible action on Hamilton Pool Management Zone stakeholder engagement and related meetings.**
11. **Receive update, discuss, and consider possible action on GMA 9 joint planning process, including potential Desired Future Conditions (DFCs) for initial modeling scenarios.** (GM Cockrell)

12. **Receive update and discuss preliminary draft amendments to District Rules.**
    The Board will review and discuss the draft amendments; no action will be taken at this meeting. A public hearing will be held at a future meeting prior to any consideration of adoption.

13. **Receive update, discuss, and consider possible action on the implementation and enforcement of District Rules.** (GM Cockrell)

14. **Receive update, discuss, and consider possible action on ongoing contested case hearings.** (GM Cockrell, General Counsel)
    a. Clancy Utility Holdings, LLC
    b. JPD Backyard Finance, LLC
    c. The Board may convene in executive session under Texas Government Code §551.071 (Consultation with Attorney) to discuss this matter. No final action will be taken in executive session; the Board will reconvene in open session before taking any action.

15. **Receive update, discuss, and consider possible action on proposed new wells requesting Board authorization to reduce required property line setbacks.** (GM Cockrell)

16. **Receive update, discuss, and consider possible action on the District's current drought stage status.** (GM Cockrell)

17. **Discussion and possible action on forming an Administrative Subcommittee of the Board.** (President Scadden, Director Huber)

18. **Receive, discuss, and possibly act on Board Committee Reports.**
    a. Finance – Directors Scadden, Urie, Van Ackeren
    b. Legislative – Director Davis
    c. Science – Directors Leva and Phillips
    d. Outreach – TBD
    e. Rules – Directors Davis, Huber, and Scadden

19. **Receive update, discuss, and consider possible action on FY 2025 Interlocal Cooperation Agreement with Travis County.** (GM Cockrell)

20. **General Manager's Report.** (GM Cockrell)
    a. Summary of permit applications, registrations, and related inquiries
    b. Regulatory updates from TWDB, TCEQ, GMAs, and other agencies
    c. Groundwater science and monitoring program updates
    d. Other informational items of Board interest (no action required)

21. **Discussion on potential agenda items for future meetings.**

22. **Discussion and possible action to set the date, time, and location of the next Board Meeting.**
    a. Regular July Meeting – Wednesday, July 9, 2025, at 9:30 AM at the District office

23. **Adjournment.**

The agenda schedule above is an estimate of the order of items and may be modified at the discretion of the Board's presiding officer. At any time during the meeting, and in accordance with the Texas Open Meetings Act (Chapter 551, Texas Government Code) the Southwestern Travis County Groundwater Conservation District Board of Directors may enter executive session to discuss any listed agenda item or other authorized matters, including: attorney-client consultation (§551.071); real property deliberation (§551.072); prospective gifts (§551.073); personnel matters (§551.074); and security devices (§551.076). Any topic discussed in executive session may be acted upon in open session if properly posted in the agenda.

***CERTIFICATE OF POSTING: Texas Government Code, Open Meetings, Section 551.054.** This Notice was posted June 9, 2025, on the District website and at the District office.*

GUIDELINES FOR PARTICIPATION
SOUTHWESTERN TRAVIS COUNTY GROUNDWATER CONSERVATION DISTRICT BOARD MEETING

June 12, 2025

Members of the public wishing to make comments during the meeting will be provided an opportunity to do so in person at the meeting or by participating in the video conference. The Board President will call on members of the public who wish to speak during the public comment period of the meeting or during the discussion of specific agenda items. Members of the public that wish to speak during the meeting are requested to notify SWTCGCD General Manager Lane Cockrell (generalmanager@swtcgcd.org) by noon on the day before the meeting to help facilitate meeting logistics. This meeting will be recorded, and the audio recording will be available upon request to Mr. Cockrell after the meeting.

You may join the SWTCGCD Board meeting remotely as follows:

Time:

June 12, 2025, 09:20 AM Central Time (US and Canada) – this early access time is to provide meeting participants an opportunity to get logged in. The formal meeting will be called to order at 9:30 AM.

Call-In Details:

To join the meeting from your computer, use the link and Meeting ID below:
https://zoom.us/j/3713272679
Meeting ID: **371 327 2679**

To join the meeting from your phone, dial the number below and follow the prompts:
Dial: 1-346-248-7799 (Toll Free)
Meeting ID: **371 327 2679** (You will be directed to add the # symbol after the Meeting ID.)
Note: You may be prompted to use a PIN in addition to the Meeting ID with the traditional call-in number. Please press # when instructed to bypass this prompt.

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(Reserved for copy of 6/12/2025 Board meeting minutes, to be added upon approval by Board at 7/9/2025 meeting)

Appendix D

Coordination with Surface-Water Management Entities

Lane Cockrell

From:	Lane Cockrell
Sent:	Monday, June 30, 2025 11:30 AM
To:	aaron-briarclifftx@austin.rr.com; tim.williford@nexuswg.com; earlwood@hurstcreekmud.org; efoster@lakewaymud.org; jhoman@wcid17.org; jriechers@wtcpua.org; mmorin@crossroadsus.com; jwills@crossroadsus.com; Foltz, Scot W; wabshire@sienviro.com; gary.chauvin@austintexas.gov; john.hofmann@lcra.org
Subject:	Southwestern Travis County GCD Groundwater Management Plan
Attachments:	SWTCGCD-Management-Plan_Approved-20250612_reformatted.pdf

Good morning,

Attached is the newly adopted groundwater management plan for the Southwestern Travis County Groundwater Conservation District. The District's Board of Directors adopted the plan by resolution on June 12, 2025, following a public hearing.

This email serves to transmit the plan to surface water management entities within the District, as required by 31 TAC §356.51 and Texas Water Code §36.1071(a). You are receiving this email because you are either 1) listed as a public water system contact in TCEQ records for one or more of the following systems located in the District, or 2) identified as an alternate contact by someone listed in TCEQ records.

- Village of Briarcliff
- Inverness Point Water System
- Hurst Creek MUD
- Lakeway MUD
- Travis County WCID 17
- West Travis County PUA
- Travis County WCID 18
- Travis County MUD 4
- Travis County WCID 20
- Rivercrest Water System
- Loop 360 WSC
- City of Austin Water

The plan will be submitted to TWDB later this week for review and approval.

Please don't hesitate to reach out with any questions or comments.

Thank you,

Lane Cockrell
General Manger / Hydrogeologist
Southwestern Travis County GCD
512-276-2875 (office)
www.swtcgcd.org | Facebook | Instagram

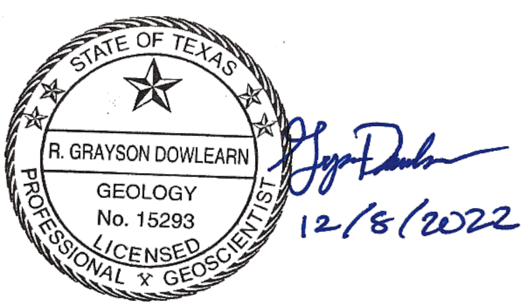
SOUTHWESTERN TRAVIS COUNTY
GROUNDWATER CONSERVATION DISTRICT

Appendix E

TWDB GAM Run 21-014 MAG: Modeled Available Groundwater for the Aquifers in Groundwater Management Area 9

GAM RUN 21-014 MAG: MODELED AVAILABLE GROUNDWATER FOR THE AQUIFERS IN GROUNDWATER MANAGEMENT AREA 9

Grayson Dowlearn, P.G.
Texas Water Development Board
Groundwater Division
Groundwater Modeling Department
512-475-1552
December 8, 2022



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GAM RUN 21-014 MAG: MODELED AVAILABLE GROUNDWATER FOR THE AQUIFERS IN GROUNDWATER MANAGEMENT AREA 9

Grayson Dowlearn, P.G.
Texas Water Development Board
Groundwater Division
Groundwater Modeling Section
512-475-1552
December 8, 2022

EXECUTIVE SUMMARY:

Groundwater Management Area (GMA) 9 adopted the desired future conditions for the Hickory and Ellenburger-San Saba aquifers, for the combined Trinity Aquifer and Trinity Group of the Edwards-Trinity (Plateau) Aquifer, and for the Edwards Group of the Edwards-Trinity (Plateau) Aquifer on November 15, 2021. Groundwater Management Area 9 submitted a Desired Future Conditions Explanatory Report (GMA 9 and others, 2021) and other supporting documents to the Texas Water Development Board (TWDB) on December 9, 2021. The TWDB determined that the explanatory report and other materials submitted by the district representatives were administratively complete on November 8, 2022.

Modeled available groundwater estimates are approximately 140 acre-feet per year for the Hickory Aquifer and approximately 60 acre-feet per year for the Ellenburger-San Saba Aquifer for the period between 2020 and 2080. Modeled available groundwater estimates range between a maximum of 90,264 acre-feet per year in 2020 and a minimum of 89,491 acre-feet per year in 2060 for the combination of Trinity Aquifer and Trinity group of the Edwards-Trinity (Plateau) Aquifer within Groundwater Management Area 9. Modeled available groundwater estimates are approximately 2,210 acre-feet per year for the Edwards Group of the Edwards-Trinity (Plateau) Aquifer for the period between 2020 and 2080. Modeled available groundwater estimates are provided in Tables 2 through 10.

Figure 1 provides the groundwater conservation district and county boundaries within Groundwater Management Area 9. Figure 2 provides the county, regional water planning area, and river basin boundaries within Groundwater Management Area 9.

REQUESTOR:

Mr. Ronald Fieseler, General Manager of Blanco Pedernales Groundwater Conservation District and Administrator of Groundwater Management Area 9.

DESCRIPTION OF REQUEST:

Mr. Ronald Fieseler provided the TWDB with the desired future conditions of the aquifers within Groundwater Management Area 9 on behalf of Groundwater Management Area (GMA) 9 in a letter dated December 9, 2021. Groundwater conservation district representatives in Groundwater Management Area 9 adopted desired future conditions for the aquifers within Groundwater Management Area 9 on November 15, 2021, as described in Resolution No. 111521-01 (Appendix D in GMA 9 and others, 2021). Desired future conditions are listed in Table 1 and represent average water level drawdowns across the specified area until the specified ending year.

TABLE 1. DESIRED FUTURE CONDITIONS FOR GROUNDWATER MANAGEMENT AREA 9 EXPRESSED AS AVERAGE DRAWDOWN (ADAPTED FROM SUBMITTED RESOLUTION).

Major or minor aquifer	Desired future condition
Trinity Aquifer and Trinity Group of the Edwards-Trinity (Plateau) Aquifer	Allow for an increase in average drawdown of approximately 30 feet through 2060 (throughout GMA 9) consistent with “Scenario 6” in TWDB GAM Task 10-005
Edwards Group of Edwards-Trinity (Plateau)	Allow for no net increase in average drawdown in Bandera and Kendall counties through 2080
Ellenburger-San Saba	Allow for an increase in average drawdown of no more than 7 feet in Kendall County through 2080
Hickory	Allow for an increase in average drawdown of no more than 7 feet in Kendall County through 2080

Additionally, Groundwater Management Area 9 voted to declare certain aquifers and/or portions of aquifers to be non-relevant for the purposes of joint planning, as shown in Table 2.

TABLE 2. AQUIFERS AND PORTIONS OF AQUIFERS WHICH WERE DECLARED NON-RELEVANT FOR THE PURPOSES OF JOINT PLANNING WITHIN GROUNDWATER MANAGEMENT AREA 9.

Major or minor aquifer	Non-relevant area
Edwards (Balcones Fault Zone) Aquifer	Entire aquifer (Bexar, Comal, Hays, and Travis counties)
Edwards Group of Edwards-Trinity (Plateau) Aquifer	Portion in Blanco and Kerr counties
Ellenburger-San Saba Aquifer	Portion in Blanco and Kerr counties
Hickory Aquifer	Portion in Blanco, Hays, Kerr, and Travis counties
Marble Falls Aquifer	Entire aquifer (Blanco County)

After reviewing the submitted documents, TWDB staff requested clarifications regarding the methodology and assumptions used in the definitions of desired future conditions. Appendix A includes the responses to these clarifications that Groundwater Management Area 9 provided to the TWDB on October 17, 2022.

METHODS:

Hickory and Ellenburger-San Saba Aquifers

The groundwater availability model for the minor aquifers of the Llano Uplift Region of Texas (Version 1.01; Shi and others, 2016a, 2016b) was used to calculate the drawdown and modeled available groundwater for the Hickory and Ellenburger-San Saba aquifers (Llano Uplift aquifers) within Groundwater Management Area 9. The predictive model files used in the evaluation were originally developed by the TWDB in the previous joint planning cycle for GAM Run 16-023 (Jones, 2017). The evaluation in GAM Run 16-023 only went to 2070, so the TWDB extended the model files to 2080 for this evaluation.

Pumping was distributed evenly across the Kendall County portion of the Llano Uplift aquifers and then varied until the desired future condition was achieved within the accepted tolerance defined by Groundwater Management Area 9. Modeled water levels were extracted for December 2010 (initial water levels equivalent to the final stress period of the historically calibrated model) and December 2080 (stress period 70). Drawdown was calculated as the difference in water levels between those two endpoints. Drawdown averages were calculated by aquifer for each area specified in the desired future conditions. The modeled available groundwater values were determined by extracting pumping rates by decade from the model results using ZONEBUDGET USG Version 1.00 (Panday and others, 2013).

Trinity Aquifer and Trinity Group of the Edwards-Trinity (Plateau) Aquifer

The groundwater availability model for the Hill Country Portion of the Trinity Aquifer (Version 2.01; Jones and others, 2011) was used to calculate the drawdown and modeled available groundwater values for the combination of Trinity Aquifer and Trinity Group of the Edwards-Trinity (Plateau) Aquifer within Groundwater Management Area 9. Predictive model files from TWDB GAM Task 10-005 (Hutchison, 2010) were used, as specified by Resolution No. 111521-01 (Appendix D in GMA 9 and others, 2021). GAM Task 10-005 (Hutchison, 2010) ran a predictive pumping scenario ("Scenario 6") under 387 different recharge conditions. For every model run, modeled water levels were extracted for December 2008 (initial water levels) and December 2060 (stress period 50), and drawdown was calculated as the difference in water level between those two endpoints. The drawdown average across Groundwater Management Area 9 was calculated as the average of the 387 scenarios. The TWDB confirmed that the desired future conditions adopted by Groundwater Management Area 9 are achievable using this methodology. The modeled available groundwater values were determined by extracting pumping rates by decade from each model run's results and then averaging the modeled pumping rates from the 387 scenarios using custom Fortran scripts developed by the TWDB for Task 10-005 (Hutchison, 2010).

Edwards Group of the Edwards-Trinity (Plateau) Aquifer

The groundwater availability model for the Hill Country Portion of the Trinity Aquifer (Version 2.01; Jones and others, 2011) was also used to calculate the drawdown and modeled available groundwater for the Edwards Group of the Edwards-Trinity (Plateau) Aquifer within Groundwater Management Area 9. The predictive model files used in the evaluation were originally developed by the TWDB in the previous joint planning cycle for GAM Run 16-023 (Jones, 2017). The evaluation in GAM Run 16-023 only went to 2070, so the TWDB extended these model files to 2080 for this evaluation.

The TWDB created a predictive pumping scenario by copying “Scenario 6” from TWDB Task 10-005 and then varying Edwards Group pumping by a constant multiplier across Bandera and Kendall counties until the desired future condition was achieved within the accepted tolerance defined by Groundwater Management Area 9. The TWDB used these predictive model files to extract modeled water levels from December 1997 (initial water levels equivalent to the final stress period of the historically calibrated model) and December 2080 (stress period 83) and drawdown was calculated as the difference in water level between those two endpoints. The modeled available groundwater values were determined by extracting pumping rates by decade from the model results using ZONEBUDGET Version 3.01 (Harbaugh, 2009).

Modeled Available Groundwater and Permitting

As defined in Chapter 36 of the Texas Water Code (2011), “modeled available groundwater” is the estimated average amount of water that may be produced annually to achieve a desired future condition. Groundwater conservation districts are required to consider modeled available groundwater, along with several other factors, when issuing permits in order to manage groundwater production to achieve the desired future condition(s). The other factors districts must consider include annual precipitation and production patterns, the estimated amount of pumping exempt from permitting, existing permits, and a reasonable estimate of actual groundwater production under existing permits.

PARAMETERS AND ASSUMPTIONS:

Hickory and Ellenburger-San Saba aquifers

- Version 1.01 of the groundwater availability model for the minor aquifers of the Llano Uplift Region of Texas was the base model for this analysis. See Shi and others (2016a, 2016b) for assumptions and limitations of the historical calibrated model.
- In the previous joint planning cycle, the TWDB created predictive model files to extend the base model to 2070 for planning purposes. For the current analysis, these model files were extended an additional ten years to 2080 using the same assumptions used in the previous cycle. See GAM Run 16-023 (Jones, 2017) for assumptions and limitations of this predictive model simulation.
- The model has eight layers, which represent the Cretaceous age and younger water-bearing units (Layer 1), Permian and Pennsylvanian age confining units (Layer 2), the Marble Falls Aquifer and equivalent (Layer 3), Mississippian age confining units (Layer 4), the Ellenburger-San Saba Aquifer and equivalent (Layer 5), Cambrian age confining units (Layer 6), the Hickory Aquifer and equivalent (Layer 7), and Precambrian age confining units (Layer 8).
- To be consistent with assumptions made by Groundwater Management Area 9 (see GMA 9 and others, 2021), the TWDB assumed a tolerance of five percent of the drawdown when comparing desired future conditions to modeled drawdown results.

- The model was run with MODFLOW-USG (Panday and others, 2013).
- Drawdown averages and modeled available groundwater volumes were calculated based on the extent of the official TWDB aquifer boundary (Figures 3 and 4). The most recent TWDB model grid file dated August 23, 2022 (*lnup_grid_poly082322.csv*) was used to determine model cell entity assignment (county, groundwater management area, groundwater conservation district, river basin, regional water planning area).
- Drawdowns for cells that became dry during the simulation were excluded from the drawdown averages. Pumping in dry cells was excluded from the modeled available groundwater calculations.
- Estimates of modeled available groundwater from the model simulation were rounded to the nearest whole number.

Trinity Aquifer and Edwards-Trinity (Plateau) Aquifer

- Version 2.01 of the groundwater availability model for the Hill Country Portion of the Trinity Aquifer was the base model for this analysis. See Jones and others (2011) for assumptions and limitations of the historical calibrated model.
- The model has four layers which represent the Edwards Group of the Edwards-Trinity (Plateau) Aquifer (Layer 1), the Upper Trinity hydrostratigraphic unit (Layer 2), the Middle Trinity hydrostratigraphic unit (Layer 3), and the Lower Trinity hydrostratigraphic unit (Layer 4).
- The evaluation of the Trinity Aquifer and the Trinity Group of the Edwards-Trinity (Plateau) Aquifer used predictive model files created by the TWDB that extended the base model to 2060 for planning purposes and represented 387 different potential recharge scenarios. See GAM Task 10-005 (Hutchison, 2010) for the assumptions and limitations of these predictive model simulations.
- The evaluation of the Edwards Group of the Edwards-Trinity (Plateau) Aquifer used predictive model files created by the TWDB during the previous joint planning cycle that extended the base model to 2070 for planning purposes. For the current analysis, the TWDB extended these model files an additional ten years to 2080 using the same assumptions used in the previous cycle. See GAM Run 16-023 (Jones, 2017) for assumptions and limitations of this predictive model simulation.
- Although the base model (Jones and others, 2011) was only calibrated to 1997, the TWDB developed a subsequent steady-state version of the model representing observed conditions in the Trinity Aquifer as of 2008 (Chowdhury, 2010). Since that model provided the initial water levels for the GAM Task 10-005 (Hutchison, 2010) predictive model files, the reference year of 2008 can be used for drawdown calculations for the Trinity Aquifer and the Trinity Group of Edwards-Trinity (Plateau) Aquifer. Since this verification did not apply to the Edwards Group of the Edwards-Trinity (Plateau) Aquifer, the original reference year of 1997 from the base model was used for drawdown calculations in that unit.
- Drawdowns for cells that became dry during the simulation were excluded from the drawdown averages. Pumping volumes are reduced to zero if a cell becomes dry during the predictive model run. The modeled available groundwater values do not include dry cells for decades after the cell becomes dry.

- Drawdown averages and modeled available groundwater volumes were calculated based on the extent of active model cells, not the official TWDB aquifer boundary (Figures 5 and 6). The most recent TWDB model grid file dated August 15, 2022 (*trnt_h_grid_poly081522.csv*) was used to determine model cell entity assignment (county, groundwater management area, groundwater conservation district, river basin, regional water planning area).
- To be consistent with Groundwater Management Area 9's assumptions (see GMA 9 and others, 2021), a tolerance of five percent of the desired future condition drawdown was assumed when comparing desired future conditions to modeled drawdown results.
- The model was run with MODFLOW-96 (Harbaugh and McDonald, 1996)
- Estimates of modeled available groundwater from the model simulation were rounded to the nearest whole number.

RESULTS:

The modeled available groundwater estimates that achieve the desired future conditions adopted by Groundwater Management Area 9 are as follows:

- Hickory Aquifer: 140 acre-feet per year (summarized by county and groundwater conservation district in Table 3 and by county, regional water planning area, and river basin in Table 4).
- Ellenburger-San Saba Aquifer: Approximately 60 acre-feet per year for the that (summarized by county and groundwater conservation district in Table 5 and by county, regional water planning area, and river basin in Table 6).
- Combined Trinity Aquifer and Trinity Group of the Edwards-Trinity (Plateau) Aquifer: Ranges from a maximum of 90,264 acre-feet per year in 2020 and a minimum of 89,491 acre-feet per year in 2060 (summarized by county and groundwater conservation district in Table 7 and by county, regional water planning area, and river basin in Table 8).
- Edwards Group of the Edwards-Trinity (Plateau) Aquifer: 2,210 acre-feet per year (summarized by county and groundwater conservation district in Table 9 and by county, regional water planning area, and river basin in Table 10).

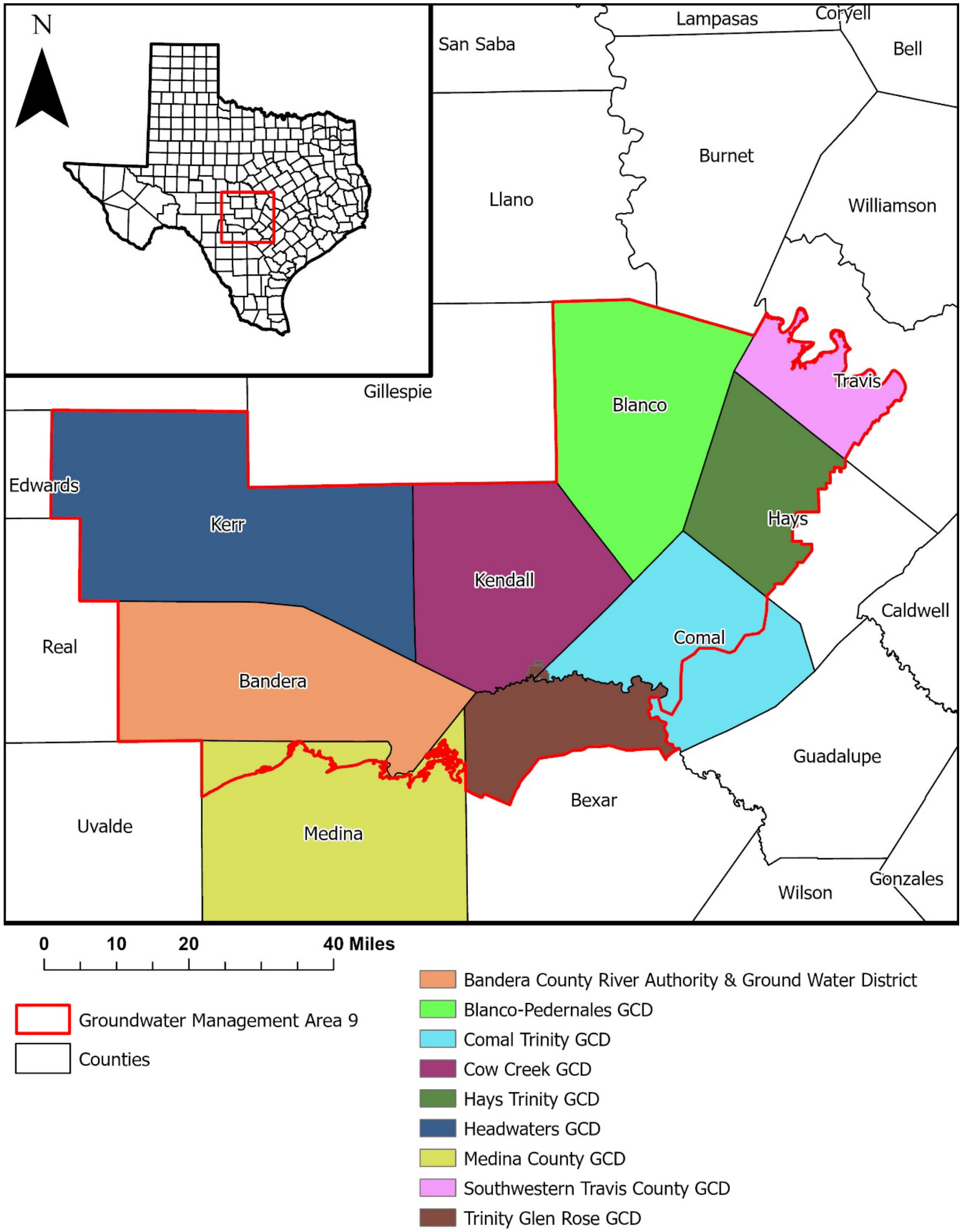

FIGURE 1. MAP SHOWING GROUNDWATER MANAGEMENT AREA 9, GROUNDWATER CONSERVATION DISTRICTS (GCD), AND COUNTY BOUNDARIES.

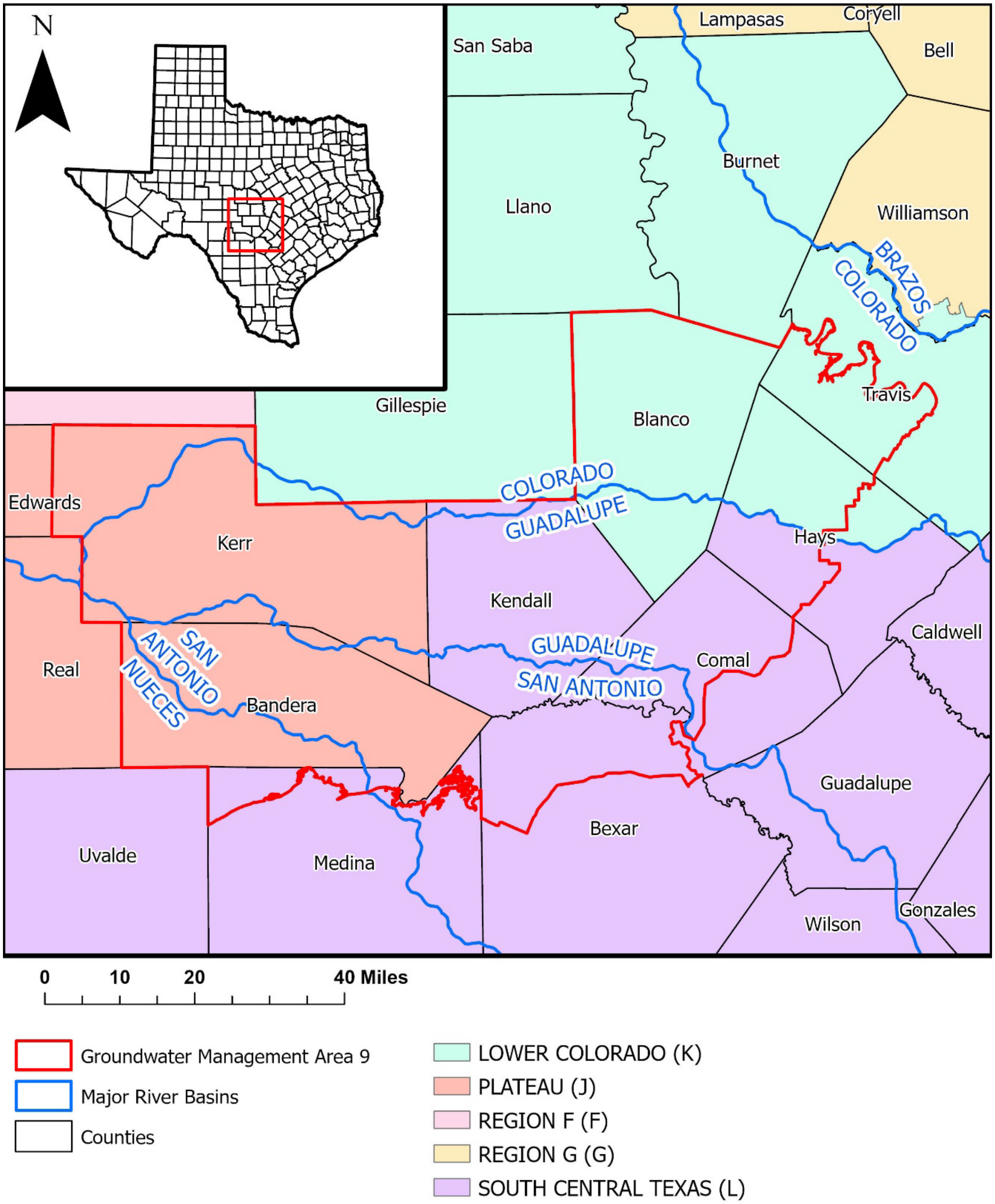

FIGURE 2. MAP SHOWING GROUNDWATER MANAGEMENT AREA 9, REGIONAL WATER PLANNING AREAS, RIVER BASINS, AND COUNTY BOUNDARIES.

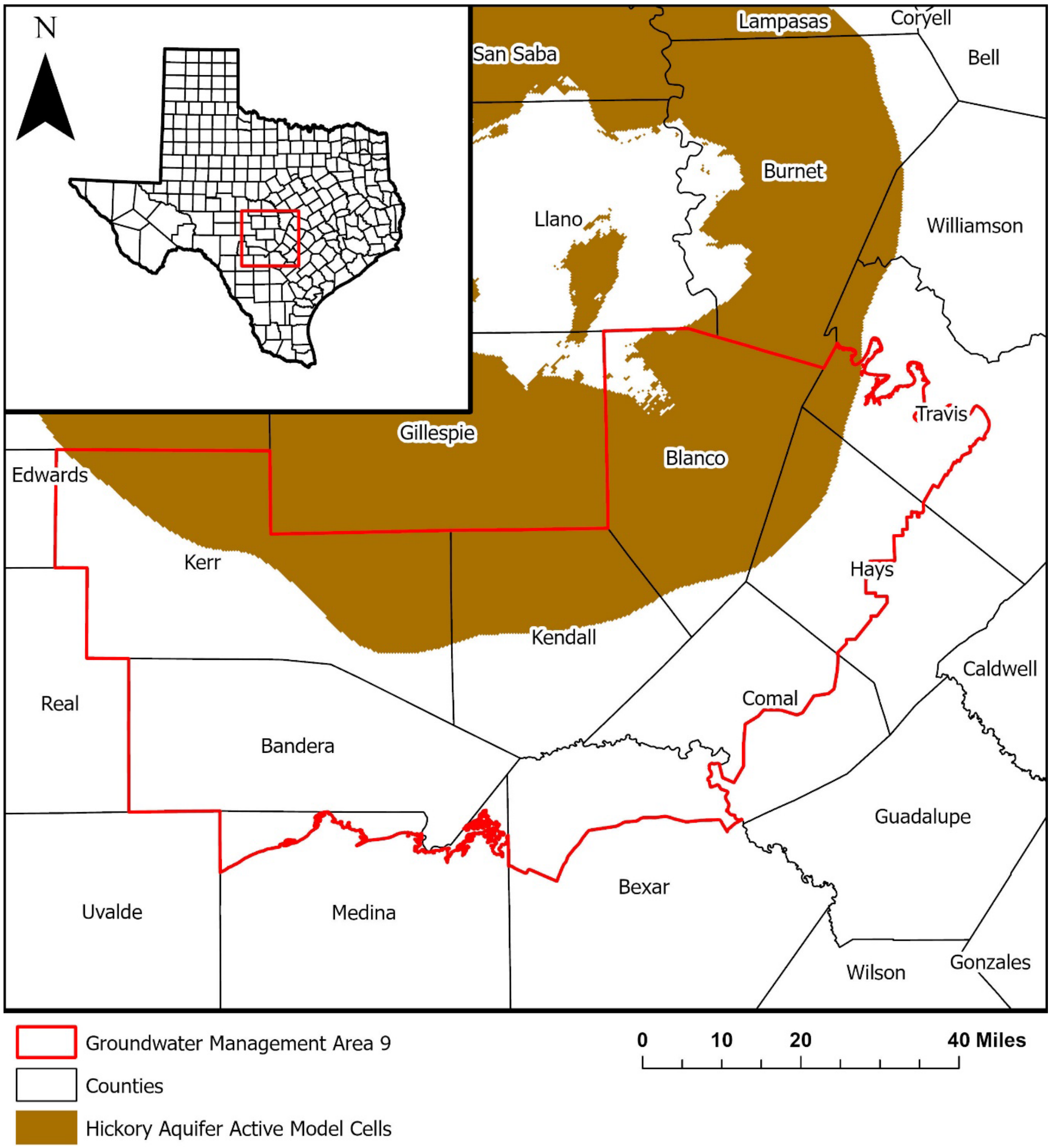

FIGURE 3. MAP SHOWING THE ACTIVE MODEL CELLS REPRESENTING THE HICKORY AQUIFER (LAYER 7) IN THE MINOR AQUIFERS OF THE LLANO UPLIFT REGION OF TEXAS GROUNDWATER AVAILABILITY MODEL IN RELATION TO GROUNDWATER MANAGEMENT AREA 9.

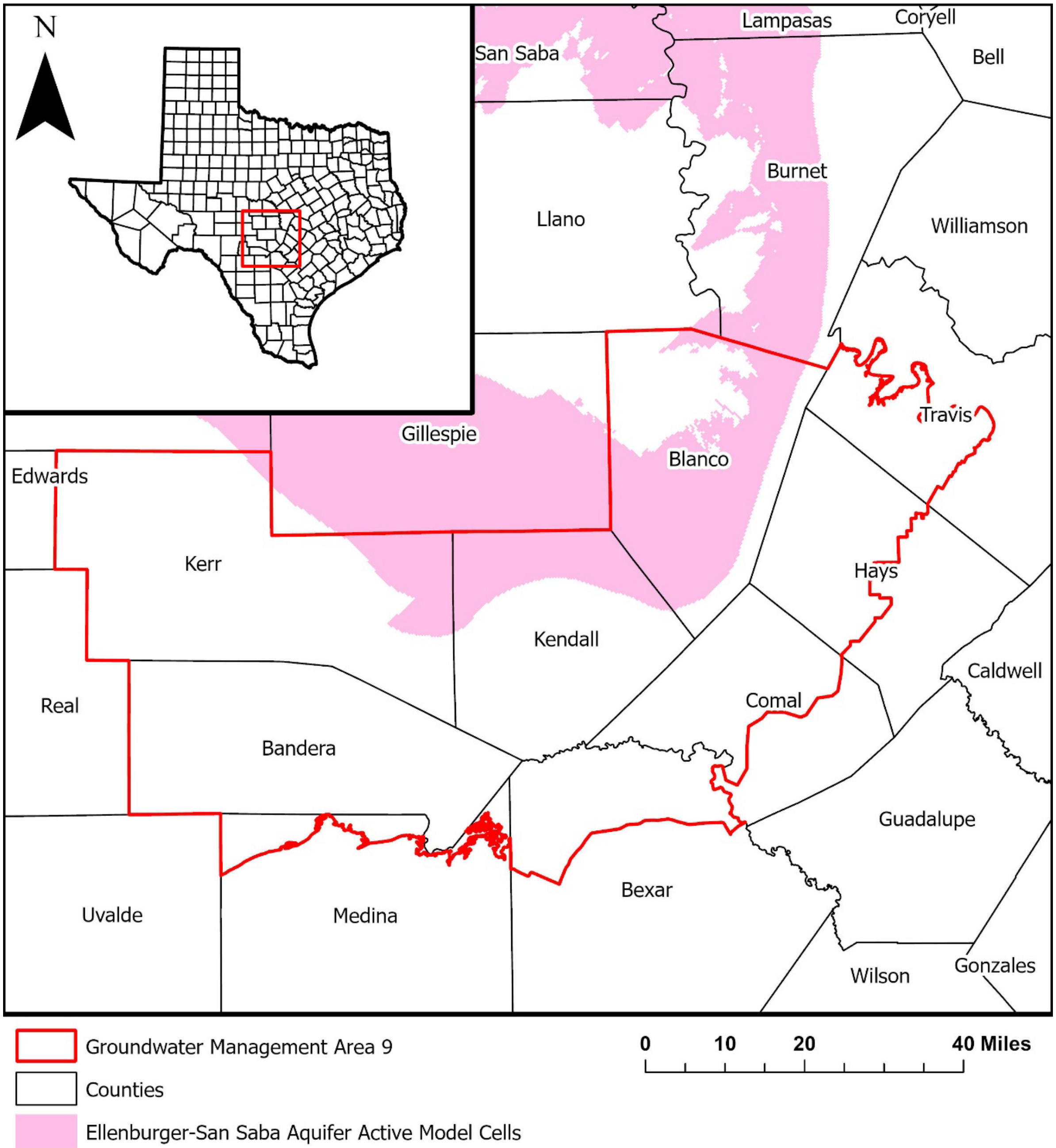

FIGURE 4. MAP SHOWING THE ACTIVE MODEL CELLS REPRESENTING THE ELLENBURGER-SAN SABA AQUIFER (LAYER 5) IN THE MINOR AQUIFERS OF THE LLANO UPLIFT REGION OF TEXAS GROUNDWATER AVAILABILITY MODEL IN RELATION TO GROUNDWATER MANAGEMENT AREA 9.

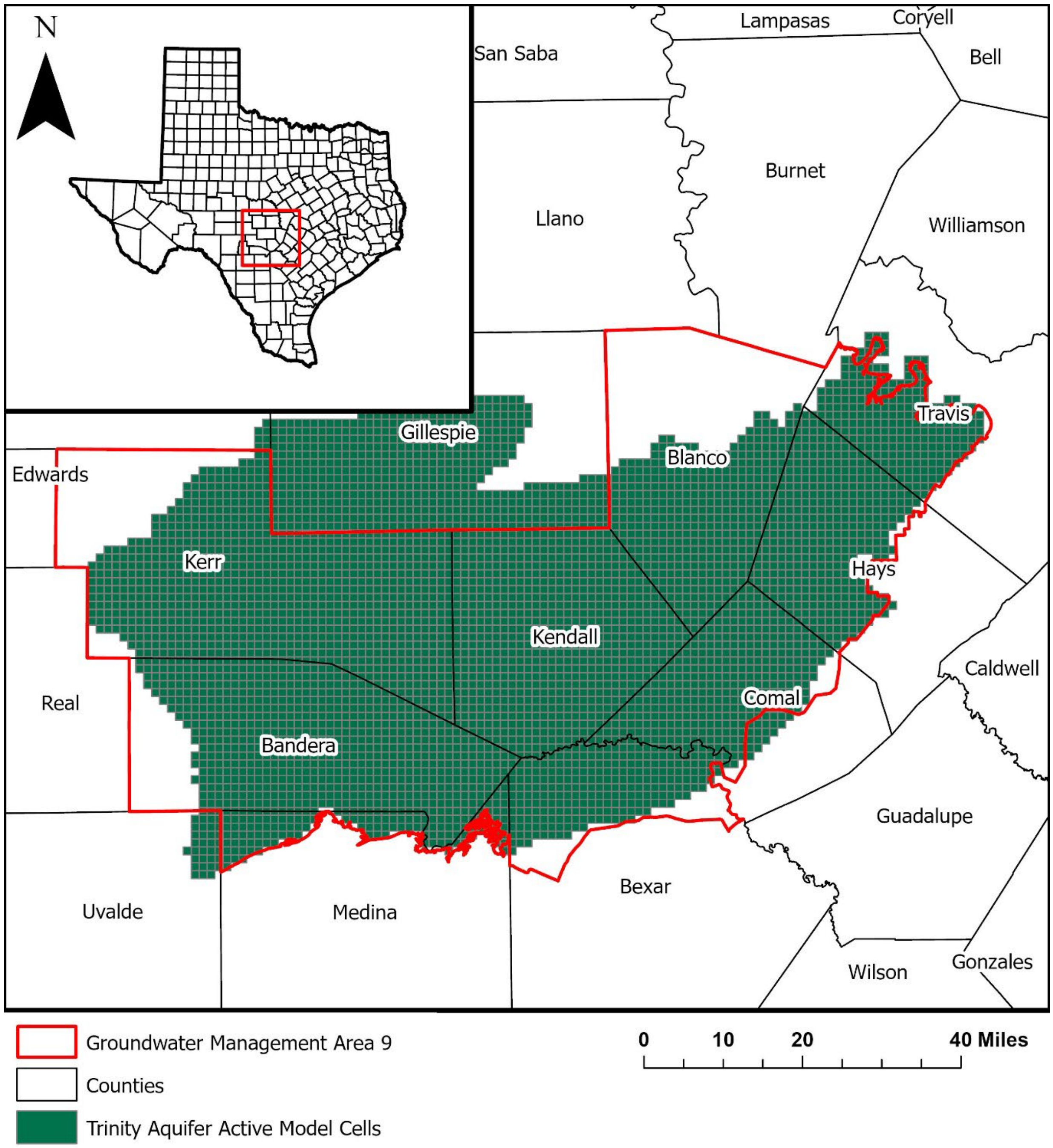

FIGURE 5. MAP SHOWING THE ACTIVE MODEL CELLS REPRESENTING THE TRINITY AQUIFER AND TRINITY GROUP OF THE EDWARDS-TRINITY (PLATEAU) AQUIFER (LAYERS 2, 3, AND 4) IN THE HILL COUNTRY PORTION OF THE TRINITY AQUIFER GROUNDWATER AVAILABILITY MODEL IN RELATION TO GROUNDWATER MANAGEMENT AREA 9.

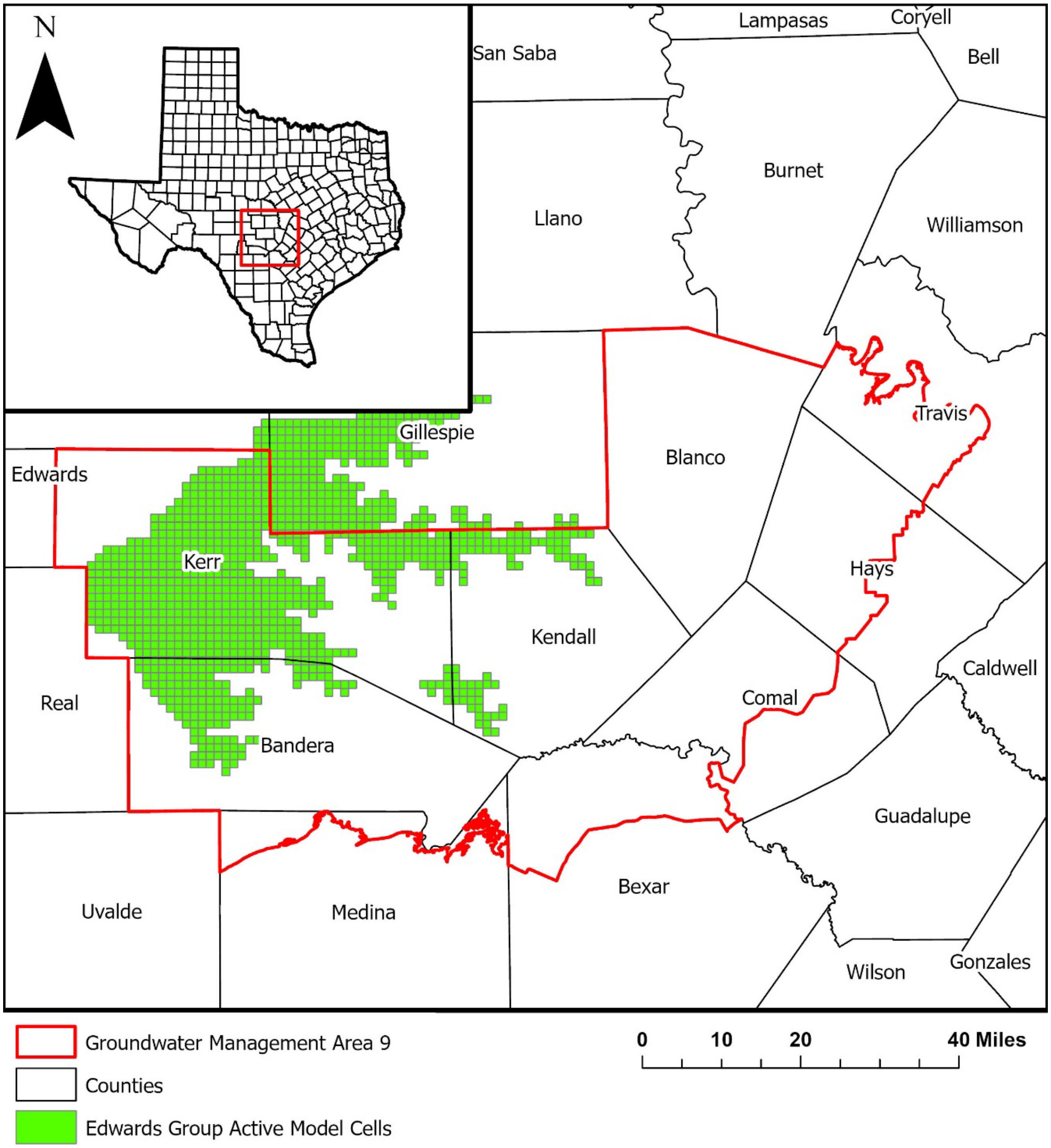

FIGURE 6. MAP SHOWING THE ACTIVE MODEL CELLS REPRESENTING THE EDWARDS GROUP OF THE EDWARDS-TRINITY (PLATEAU) AQUIFER (LAYER 1) IN THE HILL COUNTRY PORTION OF THE TRINITY AQUIFER GROUNDWATER AVAILABILITY MODEL IN RELATION TO GROUNDWATER MANAGEMENT AREA 9.

TABLE 3. MODELED AVAILABLE GROUNDWATER FOR THE HICKORY AQUIFER IN GROUNDWATER MANAGEMENT AREA 9 SUMMARIZED BY GROUNDWATER CONSERVATION DISTRICT AND COUNTY FOR EACH DECADE BETWEEN 2020 AND 2080. VALUES ARE IN ACRE-FEET PER YEAR.

Groundwater Conservation District (GCD)	County	Aquifer	2020	2030	2040	2050	2060	2070	2080
Cow Creek GCD	Kendall	Hickory	141	140	141	140	141	140	141

TABLE 4. MODELED AVAILABLE GROUNDWATER FOR THE HICKORY AQUIFER IN GROUNDWATER MANAGEMENT AREA 9. RESULTS ARE SUMMARIZED BY COUNTY, REGIONAL WATER PLANNING AREA (RWPA), AND RIVER BASIN FOR EACH DECADE FROM 2030 TO 2080. VALUES ARE IN ACRE-FEET PER YEAR.

County	RWPA	Basin	Aquifer	2030	2040	2050	2060	2070	2080
Kendall	L	Colorado	Hickory	12	12	12	12	12	12
Kendall	L	Guadalupe	Hickory	128	128	128	128	128	128
Groundwater Management Area 9 Total			**Hickory**	**140**	**140**	**140**	**140**	**140**	**140**

TABLE 5. MODELED AVAILABLE GROUNDWATER FOR THE ELLENBURGER-SAN SABA AQUIFER IN GROUNDWATER MANAGEMENT AREA 9 SUMMARIZED BY GROUNDWATER CONSERVATION DISTRICT AND COUNTY FOR EACH DECADE BETWEEN 2020 AND 2080. VALUES ARE IN ACRE-FEET PER YEAR.

Groundwater Conservation District (GCD)	County	Aquifer	2020	2030	2040	2050	2060	2070	2080
Cow Creek GCD	Kendall	Ellenberger-San Saba	62	62	62	62	62	62	62

TABLE 6. MODELED AVAILABLE GROUNDWATER FOR THE ELLENBURGER-SAN SABA AQUIFER IN GROUNDWATER MANAGEMENT AREA 9. RESULTS ARE SUMMARIZED BY COUNTY, REGIONAL WATER PLANNING AREA (RWPA), AND RIVER BASIN FOR EACH DECADE FROM 2030 TO 2080. VALUES ARE IN ACRE-FEET PER YEAR.

County	RWPA	Basin	Aquifer	2030	2040	2050	2060	2070	2080
Kendall	L	Colorado	Ellenberger-San Saba	9	9	9	9	9	9
Kendall	L	Guadalupe	Ellenberger-San Saba	53	54	53	54	53	54
Groundwater Management Area 9 Total			**Ellenberger-San Saba**	**62**	**63**	**62**	**63**	**62**	**63**

TABLE 7. MODELED AVAILABLE GROUNDWATER FOR THE TRINITY AQUIFER AND TRINITY GROUP OF THE EDWARDS-TRINITY (PLATEAU) AQUIFER IN GROUNDWATER MANAGEMENT AREA 9 SUMMARIZED BY GROUNDWATER CONSERVATION DISTRICT (GCD) AND COUNTY FOR EACH DECADE BETWEEN 2020 AND 2060. VALUES ARE IN ACRE-FEET PER YEAR.

Groundwater Conservation District	County	Aquifer	2020	2030	2040	2050	2060
Bandera County River Authority & Ground Water District	Bandera	Trinity	7,284	7,284	7,284	7,284	7,284
Blanco-Pedernales GCD	Blanco	Trinity	2,573	2,573	2,573	2,573	2,573
Comal Trinity GCD	Comal	Trinity	9,383	9,383	9,383	9,383	9,383
Cow Creek GCD	Kendall	Trinity	10,622	10,622	10,622	10,622	10,622
Hays Trinity GCD	Hays	Trinity	9,074	9,071	9,070	9,070	9,070
Headwaters GCD	Kerr	Trinity	14,918	14,845	14,556	14,239	14,223
Medina County GCD	Medina	Trinity	2,340	2,340	2,340	2,340	2,340
Southwestern Travis County GCD	Travis	Trinity	8,559	8,542	8,530	8,515	8,485
Trinity Glen Rose GCD	Bexar	Trinity	24,856	24,856	24,856	24,856	24,856
	Comal	Trinity	138	138	138	138	138
	Kendall	Trinity	517	517	517	517	517
Trinity Glen Rose GCD Total		**Trinity**	**25,511**	**25,511**	**25,511**	**25,511**	**25,511**
Groundwater Management Area 9 Total		**Trinity**	**90,264**	**90,171**	**89,869**	**89,537**	**89,491**

TABLE 8 MODELED AVAILABLE GROUNDWATER FOR THE TRINTY AQUIFER AND TRINITY GROUP OF THE EDWARDS-TRINITY (PLATEAU) AQUIFER IN GROUNDWATER MANAGEMENT AREA 9. RESULTS ARE SUMMARIZED BY COUNTY, REGIONAL WATER PLANNING AREA (RWPA), AND RIVER BASIN FOR EACH DECADE FROM 2030 TO 2060. VALUES ARE IN ACRE-FEET PER YEAR.

County	RWPA	Basin	Aquifer	2030	2040	2050	2060
Bandera	J	Guadalupe	Trinity	76	76	76	76
Bandera	J	Nueces	Trinity	903	903	903	903
Bandera	J	San Antonio	Trinity	6,305	6,305	6,305	6,305
Bexar	L	San Antonio	Trinity	24,856	24,856	24,856	24,856
Blanco	K	Colorado	Trinity	1,322	1,322	1,322	1,322
Blanco	K	Guadalupe	Trinity	1,251	1,251	1,251	1,251
Comal	L	Guadalupe	Trinity	6,252	6,252	6,252	6,252
Comal	L	San Antonio	Trinity	3,269	3,269	3,269	3,269
Hays	K	Colorado	Trinity	4,707	4,706	4,706	4,706
Hays	L	Guadalupe	Trinity	4,364	4,364	4,364	4,364
Kendall	L	Colorado	Trinity	135	135	135	135
Kendall	L	Guadalupe	Trinity	6,028	6,028	6,028	6,028
Kendall	L	San Antonio	Trinity	4,976	4,976	4,976	4,976
Kerr	J	Colorado	Trinity	318	318	318	318
Kerr	J	Guadalupe	Trinity	14,056	13,767	13,450	13,434
Kerr	J	Nueces	Trinity	0	0	0	0
Kerr	J	San Antonio	Trinity	471	471	471	471
Medina	L	Nueces	Trinity	1,575	1,575	1,575	1,575
Medina	L	San Antonio	Trinity	765	765	765	765
Travis	K	Colorado	Trinity	8,542	8,530	8,515	8,485
Groundwater Management Area 9 Total			**Trinity**	**90,171**	**89,869**	**89,537**	**89,491**

TABLE 9 MODELED AVAILABLE GROUNDWATER FOR THE EDWARDS GROUP OF THE EDWARDS-TRINITY (PLATEAU) AQUIFER IN GROUNDWATER MANAGEMENT AREA 9 SUMMARIZED BY GROUNDWATER CONSERVATION DISTRICT (GCD) AND COUNTY FOR EACH DECADE BETWEEN 2020 AND 2080. VALUES ARE IN ACRE-FEET PER YEAR.

GCD	County	Aquifer	2020	2030	2040	2050	2060	2070	2080
Bandera County River Authority & Ground Water District	Bandera	Edwards	2,009	2,009	2,009	2,009	2,009	2,009	2,009
Cow Creek GCD	Kendall	Edwards	200	200	200	200	200	200	200
Groundwater Management Area 9 Total		**Edwards**	**2,209**	**2,209**	**2,209**	**2,209**	**2,209**	**2,209**	**2,209**

TABLE 10 MODELED AVAILABLE GROUNDWATER FOR THE EDWARDS GROUP OF THE EDWARDS-TRINITY (PLATEAU) AQUIFER IN GROUNDWATER MANAGEMENT AREA 9. RESULTS ARE SUMMARIZED BY COUNTY, REGIONAL WATER PLANNING AREA (RWPA), AND RIVER BASIN FOR EACH DECADE FROM 2030 TO 2080. VALUES ARE IN ACRE-FEET PER YEAR.

County	RWPA	Basin	Aquifer	2030	2040	2050	2060	2070	2080
Bandera	J	Guadalupe	Edwards	81	81	81	81	81	81
Bandera	J	Nueces	Edwards	38	38	38	38	38	38
Bandera	J	San Antonio	Edwards	1,890	1,890	1,890	1,890	1,890	1,890
Kendall	L	Colorado	Edwards	69	69	69	69	69	69
Kendall	L	Guadalupe	Edwards	130	130	130	130	130	130
Groundwater Management Area 9 Total			**Edwards**	**2,208**	**2,208**	**2,208**	**2,208**	**2,208**	**2,208**

LIMITATIONS:

The groundwater model used in completing this analysis is the best available scientific tool that can be used to meet the stated objectives. To the extent that this analysis will be used for planning purposes and/or regulatory purposes related to pumping in the past and into the future, it is important to recognize the assumptions and limitations associated with the use of the results. In reviewing the use of models in environmental regulatory decision making, the National Research Council (2007) noted:

> *"Models will always be constrained by computational limitations, assumptions, and knowledge gaps. They can best be viewed as tools to help inform decisions rather than as machines to generate truth or make decisions. Scientific advances will never make it possible to build a perfect model that accounts for every aspect of reality or to prove that a given model is correct in all respects for a particular regulatory application. These characteristics make evaluation of a regulatory model more complex than solely a comparison of measurement data with model results."*

A key aspect of using the groundwater model to evaluate historic groundwater flow conditions includes the assumptions about the location in the aquifer where historic pumping was placed. Understanding the amount and location of historic pumping is as important as evaluating the volume of groundwater flow into and out of the district, between aquifers within the district (as applicable), interactions with surface water (as applicable), recharge to the aquifer system (as applicable), and other metrics that describe the impacts of that pumping. In addition, assumptions regarding precipitation, recharge, and streamflow are specific to a particular historic time period.

Because the application of the groundwater model was designed to address regional scale questions, the results are most effective on a regional scale. The TWDB makes no warranties or representations relating to the actual conditions of any aquifer at a particular location or at a particular time.

It is important for groundwater conservation districts to monitor groundwater pumping and groundwater levels in the aquifer. Because of the limitations of the groundwater model and the assumptions in this analysis, it is important that the groundwater conservation districts work with the TWDB to refine this analysis in the future given the reality of how the aquifer responds to the actual amount and location of pumping now and in the future. Historic precipitation patterns also need to be placed in context as future climatic conditions, such as dry and wet year precipitation patterns, may differ and affect groundwater flow conditions.

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Shi, J., Boghici, R., Kohlrenken, W., and Hutchison, W.R., 2016a, Conceptual Model Report: Minor Aquifers of the Llano Uplift Region of Texas. Texas Water Development Board Report, 306 p., http://www.twdb.texas.gov/groundwater/models/gam/llano/Llano_Uplift_Conceptual_Model_Report_Final.pdf.

Shi, J., Boghici, R., Kohlrenken, W., and Hutchison, W.R., 2016b, Numerical Model Report: Minor Aquifers of the Llano Uplift Region of Texas (Marble Falls, Ellenburger-San Saba, and Hickory). Texas Water Development Board Report, 435 p., http://www.twdb.texas.gov/groundwater/models/gam/llano/Llano_Uplift_Numerical_Model_Report_Final.pdf.

APPENDIX A: CLARIFICATIONS

Groundwater Management Area 9 Joint Planning Committee

Bandera County River Authority and Groundwater District
Blanco-Pedernales Groundwater Conservation District
Comal Trinity Groundwater Conservation District
Cow Creek Groundwater Conservation District
Hays-Trinity Groundwater Conservation District
Headwaters Groundwater Conservation District
Medina County Groundwater Conservation District
Trinity Glen Rose Groundwater Conservation District
Southwestern Travis County Groundwater Conservation District

Mr. Micah Voulgaris, GMA 9 Planning Committee Chairman P.O. Box 1557 Boerne, Texas 78006

October 17, 2022

Stephen Allen, P.G., Geoscientist
Groundwater Technical Assistance Team
Groundwater Resources
Texas Water Development Board
P. O. Box 13231
1700 North Congress Avenue
Austin, Texas 78711-3231

Re: Acknowledgement of clarifications needed for the Texas Water Development Board to declare the Groundwater Management Area 9 Desired Future Conditions submittal administratively complete

Mr. Allen,

This letter is in response to your email sent to me on Tuesday, October the 11th.

It was the intent of the Groundwater Management Area 9 Joint Planning Committee to adopt Desired Future Conditions that produced drawdown values consistent with the previous two planning cycles.

GMA 9 acknowledges and accepts all ten of the "other clarifications" and the two "optional clarifications" as outlined in the attached document sent by the TWDB.

Please let us know if you need additional information or if further action is required.

Thank you,
Groundwater Management Area 9

Micah Voulgaris
GMA 9 Chairman

Enclosure: *GMA09_Clarifications_v1*

FIGURE A1: PAGE 1 OF CORRESPONDENCE BETWEEN GROUNDWATER MANAGEMENT AREA 9 AND THE TWDB RELATED TO CLARIFIACTIONS (LETTER FROM GROUNDWATER MANAGEMENT AREA 9 ACKNOWLEDGING AND ACCEPTING CLARIFICATIONS)

Critical Clarifications *(need additional files or an update to Legal DFC Resolution)***:**

- None, unless the GMA disagrees with clarifications and assumptions below.

Other Clarifications (*TWDB will only need acknowledgement for administratively complete*)**:**

Trinity Aquifer:

1. Please confirm that the phrase *"average drawdown of approximately 30 feet through 2060 consistent with Scenario 6 in TWDB GAM Task 10-005"* in the DFC Resolution means *"no more than 30 feet of average water level decline in 2060, as compared to 2008 water levels, averaged over all TWDB GAM Task 10-005 Scenario 6 model iterations."*[1] This method produces drawdown values consistent with the DFC values provided in the Explanatory Report and is consistent with the methodology used in the previous planning cycle.
2. Please confirm that the GMA accepts the following assumptions for calculating modeled drawdown: 1) exclude all cells that become dry and 2) use all active model cells even if they do not fall within the official TWDB aquifer boundary. This method produces drawdown values consistent with the DFC values provided in the Explanatory Report and is consistent with the methodology used in the previous planning cycle.
3. As in the previous planning cycle, we will only provide MAG values calculated within the extent of the TWDB Trinity (Hill Country) Aquifer GAM. Since this model does not extend across the entire GMA, these MAG values will not include any pumping that might occur outside the model extent. Please confirm that this methodology is acceptable to the GMA. Otherwise, please contact TWDB to request additional MAG value calculations.

Edwards Group of the Edwards-Trinity (Plateau) Aquifer:

4. Please confirm that the phrase *"no net increase in average drawdown through 2080"* in the DFC Resolution means *"no average water level decline in 2080, as compared to 1997 water levels."*[2] This method produces drawdown values consistent with the DFC values provided in the Explanatory Report and is consistent with the methodology used in the previous planning cycle.
5. Since the GMA did not provide predictive model files, TWDB used the predictive model files *[based on Trinity (Hill Country) Aquifer GAM]* developed by TWDB during the previous planning cycle (see GAM Run 16-023) and extended them to 2080 by assuming the same recharge rates and the same percentage increase in pumping rates as was used in the previous planning cycle. Please confirm that this methodology is acceptable to the GMA.
6. Please confirm that the GMA accepts the following assumptions for calculating modeled drawdown: 1) exclude all cells that become dry and 2) include all active model cells even if they do not fall within the official TWDB aquifer boundary. This method produces drawdown values consistent with the DFC values provided in the Explanatory Report and is consistent with the methodology used in the previous planning cycle.
7. As in the previous planning cycle, we will only provide MAG values calculated within the extent of the TWDB Trinity (Hill Country) Aquifer GAM. Since this model does not extend across the entire GMA, these MAG values will not include any pumping that might occur outside the model extent.

[1] 2008 is the last calibrated water level available from the TWDB GAM Task 10-005 model
[2] 1997 is the last calibrated water level available from the TWDB Trinity (Hill Country) Aquifer GAM

FIGURE A2: PAGE 2 OF CORRESPONDENCE BETWEEN GROUNDWATER MANAGEMENT AREA 9 AND THE TWDB RELATED TO CLARIFIACTIONS (OTHER CLARIFICATIONS NUMBERS 1 TO 7)

Please confirm that this methodology is acceptable to the GMA. Otherwise, please contact TWDB to request additional MAG value calculations.

Ellenburger-San Saba & Hickory Aquifers:

8. Please confirm that the phrase "*average drawdown of no more than 7 feet in Kendall County through 2080*" in the DFC Resolution means "*average water level decline of no more than 7 feet in 2080, as compared to 2010 water levels.*"[3] This method produces drawdown values consistent with the DFC values provided in the Explanatory Report and is consistent with the methodology used in the previous planning cycle.
9. Since the GMA did not provide predictive model files, TWDB used the predictive model files *[based on Llano Uplift GAM]* developed by TWDB during the previous planning cycle (see GAM Run 16-023) and extended them to 2080 by assuming the same recharge rates and the same pumping rates and distribution as was used in the previous planning cycle. Please confirm that this methodology is acceptable to the GMA.
10. Please confirm that the GMA accepts the following assumptions for calculating modeled drawdown: 1) only include active model cells within the official TWDB aquifer boundary. This method produces drawdown values consistent with the DFC values provided in the Explanatory Report and is consistent with the methodology used in the previous planning cycle.

Optional Clarifications *(Clerical corrections to Explanatory Report)*[4]:

Edwards Group of the Edwards-Trinity (Plateau) Aquifer:

– baseline year for DFC incorrectly listed as 2008 rather than 1997 *(see Clarification #4)*

Ellenburger-San Saba & Hickory Aquifers:

– baseline year for DFC incorrectly listed as 2008 rather than 2010 *(see Clarification #8)*

[3] 2010 is the last calibrated water level available from the TWDB Llano Uplift GAM.

[4] Since TWDB considers the legal DFC Resolution documents, rather than the Explanatory Report, as the official definition of DFCs, TWDB does not officially require corrections to the Explanatory Report. However, because the Explanatory Report is often used as a simplified, more-readable summary of the legal DFC Resolution documents, we recommend correcting the Explanatory Report to match the DFC Resolutions to avoid confusion.

FIGURE A3: PAGE 3 OF CORRESPONDENCE BETWEEN GROUNDWATER MANAGEMENT AREA 9 AND THE TWDB RELATED TO CLARIFIACTIONS (OTHER CLARIFICATIONS NUMBERS 8 TO 10 AND OPTIONAL CLARIFICATIONS)

Appendix F

TWDB Estimated Historical Groundwater Use and 2022 State Water Plan Datasets

TWDB Estimated Historical Groundwater Use and 2022 State Water Plan Datasets

Southwestern Travis County Groundwater Conservation District

Texas Water Development Board
Groundwater Division
Groundwater Technical Assistance Department
stephen.allen@twdb.texas.gov
(512) 463-7317
March 25, 2025

GROUNDWATER MANAGEMENT PLAN DATA

This set of water data tables (part one of a two-part package of information) is being provided to groundwater conservation districts to help them meet the requirements for approval of their five-year groundwater management plan. Each table addresses a specific numbered requirement in the Texas Water Development Board's groundwater management plan review checklist. The checklist can be found at this web address:

Groundwater Management Plan Review Checklist

The five tables included in part one of this data package are:

TWDB Historical Water Use Survey (WUS)

- Estimated Historical Water Use (checklist item 2)

State Water Plan (SWP)

- Projected Surface Water Supplies (checklist item 6),
- Projected Water Demands (checklist item 7),
- Projected Water Supply Needs (checklist item 8),
- Projected Water Management Strategies (checklist item 9)

Part two of the two-part package is the groundwater availability model (GAM) run report for the district (checklist items 3 through 5). The district should have received, or will receive, this report from the TWDB Groundwater Modeling Department. Questions about the GAM can be directed to GAM@twdb.texas.gov

DISCLAIMER:

Data presented in these tables are the most up to date WUS and SWP data available as of 3/25/2025. Although it does not happen often, these data are subject to change pending the availability of more accurate WUS data or an amendment to the 2022 SWP. District personnel should review the data table values and correct any discrepancies to ensure approval of their groundwater management plan.

The WUS data can be verified at this web address:

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

The 2022 SWP data can be verified by contacting WRPdatarequests@twdb.texas.gov.

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

The county values in two of the SWP tables (Projected Water Supply Needs and Projected Water Management Strategies) are not apportioned because district-specific values are not required to be presented in the groundwater management plan. However, a district is required to “consider” the county values in these two tables by drafting a short summary of the needs and strategies values in the groundwater management plan.

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

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

For additional questions regarding these data, please contact stephen.allen@twdb.texas.gov, 512-463-7317 OR GWMPlans@twdb.texas.gov.

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

TRAVIS COUNTY *20.9% (multiplier)* All values are in acre-feet

Year	Source	Municipal	Manufacturing	Mining	Steam Electric	Irrigation	Livestock	Total
2021	GW	3,678	162	0	24	415	16	4,295
	SW	36,425	1,927	68	426	60	63	38,969
2020	GW	3,810	169	0	24	416	16	4,435
	SW	36,106	2,314	12	736	93	66	39,327
2019	GW	2,803	146	0	17	376	16	3,358
	SW	35,114	2,287	15	597	125	66	38,204
2018	GW	3,445	152	0	17	355	16	3,985
	SW	33,612	2,191	0	291	123	66	36,283
2017	GW	3,988	148	0	17	389	15	4,557
	SW	33,574	2,526	0	166	52	63	36,381
2016	GW	3,789	147	0	17	369	17	4,339
	SW	32,430	2,053	0	154	86	69	34,792
2015	GW	3,335	154	0	0	342	17	3,848
	SW	31,212	1,968	0	198	676	69	34,123
2014	GW	3,268	166	0	0	362	17	3,813
	SW	31,003	1,760	0	564	742	66	34,135
2013	GW	3,979	160	0	0	149	20	4,308
	SW	32,366	1,882	0	677	720	80	35,725
2012	GW	3,901	126	0	0	246	21	4,294
	SW	34,882	1,834	23	769	700	83	38,291

Projected Surface Water Supplies
TWDB 2022 State Water Plan Data

TRAVIS COUNTY *20.9% (multiplier)* All values are in acre-feet

RWPG	WUG	WUG Basin	Source Name	2020	2030	2040	2050	2060	2070
K	Austin	Colorado	Colorado Run-of-River	165,981	160,981	170,904	167,135	163,267	158,745
K	Austin	Colorado	Highland Lakes Lake/Reservoir System	123,607	123,607	123,607	123,607	123,607	123,607
K	Barton Creek West WSC	Colorado	Highland Lakes Lake/Reservoir System	440	440	440	440	440	440
K	Barton Creek WSC	Colorado	Highland Lakes Lake/Reservoir System	307	307	307	307	307	307
K	Briarcliff	Colorado	Highland Lakes Lake/Reservoir System	400	400	400	400	400	400
K	Cedar Park	Colorado	Highland Lakes Lake/Reservoir System	1,638	1,574	1,822	1,888	1,887	1,887
K	County-Other, Travis	Colorado	Highland Lakes Lake/Reservoir System	1,494	1,494	1,494	1,494	1,494	1,494
K	Creedmoor-Maha WSC	Colorado	Colorado Run-of-River	839	839	0	0	0	0
K	Cypress Ranch WCID 1	Colorado	Highland Lakes Lake/Reservoir System	1	1	1	1	1	1
K	Deer Creek Ranch Water	Colorado	Highland Lakes Lake/Reservoir System	125	125	125	125	125	125
K	Hurst Creek MUD	Colorado	Highland Lakes Lake/Reservoir System	1,600	1,600	1,600	1,600	1,600	1,600
K	Irrigation, Travis	Colorado	Colorado Other Local Supply	158	158	158	158	158	158
K	Irrigation, Travis	Colorado	Highland Lakes Lake/Reservoir System	840	840	840	840	840	840
K	Jonestown WSC	Colorado	Highland Lakes Lake/Reservoir System	750	750	750	750	750	750
K	Lago Vista	Colorado	Highland Lakes Lake/Reservoir System	3,451	3,451	3,451	3,451	3,451	3,451
K	Lakeway MUD	Colorado	Highland Lakes Lake/Reservoir System	3,069	3,069	3,069	3,069	3,069	3,069
K	Leander	Colorado	Highland Lakes Lake/Reservoir System	1,202	1,684	1,738	1,269	1,079	941
K	Livestock, Travis	Colorado	Colorado Livestock Local Supply	97	97	97	97	97	97
K	Livestock, Travis	Guadalupe	Guadalupe Livestock Local Supply	4	4	4	4	4	4

K	Loop 360 WSC	Colorado	Highland Lakes Lake/Reservoir System	1,250	1,250	1,250	1,250	1,250	1,250
K	Manor	Colorado	Colorado Run-of-River	1,680	1,680	0	0	0	0
K	Manufacturing, Travis	Colorado	Colorado Run-of-River	2,203	2,494	2,553	2,649	2,649	2,649
K	Manufacturing, Travis	Colorado	Highland Lakes Lake/Reservoir System	16	16	16	16	16	16
K	Manville WSC	Colorado	Highland Lakes Lake/Reservoir System	1,929	1,932	1,930	1,927	1,920	1,910
K	Mining, Travis	Colorado	Colorado Other Local Supply	466	591	727	853	993	1,152
K	Mining, Travis	Guadalupe	Colorado Other Local Supply	7	9	10	11	13	14
K	North Austin MUD 1	Colorado	Colorado Run-of-River	81	78	0	0	0	0
K	Northtown MUD	Colorado	Colorado Run-of-River	728	841	0	0	0	0
K	Oak Shores Water System	Colorado	Highland Lakes Lake/Reservoir System	203	203	203	203	203	203
K	Pflugerville	Colorado	Highland Lakes Lake/Reservoir System	9,513	9,498	9,479	9,458	9,435	9,410
K	Rollingwood	Colorado	Colorado Run-of-River	1,120	1,120	0	0	0	0
K	Rough Hollow in Travis County	Colorado	Highland Lakes Lake/Reservoir System	1,795	1,795	1,795	1,795	1,795	1,795
K	Round Rock	Colorado	Highland Lakes Lake/Reservoir System	278	315	352	395	434	470
K	Senna Hills MUD	Colorado	Highland Lakes Lake/Reservoir System	404	404	404	404	404	404
K	Shady Hollow MUD	Colorado	Colorado Run-of-River	793	775	759	750	749	749
K	Steam-Electric Power, Travis	Colorado	Colorado Run-of-River	1,931	1,931	1,931	1,931	1,931	1,931
K	Steam-Electric Power, Travis	Colorado	Highland Lakes Lake/Reservoir System	1,077	1,077	1,077	1,077	1,077	1,077
K	Sunset Valley	Colorado	Colorado Run-of-River	716	716	0	0	0	0
K	Sweetwater Community	Colorado	Highland Lakes Lake/Reservoir System	1,514	1,514	1,514	1,514	1,514	1,514
K	Travis County MUD 10	Colorado	Highland Lakes Lake/Reservoir System	96	96	96	96	96	96
K	Travis County MUD 4	Colorado	Highland Lakes Lake/Reservoir System	3,560	3,562	3,564	3,565	3,565	3,565
K	Travis County WCID 10	Colorado	Colorado Run-of-River	3,360	3,360	0	0	0	0
K	Travis County WCID 17	Colorado	Highland Lakes Lake/Reservoir System	8,800	8,800	8,800	8,800	8,800	8,800
K	Travis County WCID 18	Colorado	Highland Lakes Lake/Reservoir System	1,400	1,400	1,400	1,400	1,400	1,400

K	Travis County WCID 19	Colorado	Highland Lakes Lake/Reservoir System	449	447	445	444	444	444
K	Travis County WCID 20	Colorado	Highland Lakes Lake/Reservoir System	1,135	1,135	1,135	1,135	1,135	1,135
K	Travis County WCID Point Venture	Colorado	Highland Lakes Lake/Reservoir System	285	285	285	285	285	285
K	Wells Branch MUD	Colorado	Colorado Run-of-River	1,397	1,352	0	0	0	0
K	West Travis County Public Utility Agency	Colorado	Highland Lakes Lake/Reservoir System	4,500	4,500	4,500	4,500	4,500	4,500
K	Williamson Travis Counties MUD 1	Colorado	Highland Lakes Lake/Reservoir System	201	201	201	202	201	202
K	Windermere Utility	Colorado	Colorado Run-of-River	2,240	2,240	0	0	0	0
K	Windermere Utility	Colorado	Highland Lakes Lake/Reservoir System	307	307	307	307	307	307
			Sum of Projected Surface Water Supplies (acre-feet)	**361,437**	**357,345**	**355,540**	**351,602**	**347,692**	**343,194**

Projected Water Demands
TWDB 2022 State Water Plan Data

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

TRAVIS COUNTY *20.9% (multiplier)* All values are in acre-feet

RWPG	WUG	WUG Basin	2020	2030	2040	2050	2060	2070
K	Aqua WSC	Colorado	1,088	1,226	1,362	1,524	1,671	1,809
K	Austin	Colorado	170,686	198,992	230,751	252,570	269,954	293,513
K	Barton Creek West WSC	Colorado	436	433	430	428	427	427
K	Barton Creek WSC	Colorado	524	619	709	776	830	893
K	Briarcliff	Colorado	300	340	380	425	466	504
K	Cedar Park	Colorado	2,251	2,387	2,554	2,550	2,547	2,546
K	Cottonwood Creek MUD 1	Colorado	95	107	120	129	138	148
K	County-Other, Travis	Colorado	246	244	243	242	241	241
K	County-Other, Travis	Guadalupe	2	2	2	2	2	2
K	Creedmoor-Maha WSC	Colorado	602	662	721	797	872	944
K	Creedmoor-Maha WSC	Guadalupe	39	42	46	51	56	60
K	Cypress Ranch WCID 1	Colorado	121	134	144	153	164	163
K	Deer Creek Ranch Water	Colorado	43	49	55	59	63	68
K	Elgin	Colorado	255	357	453	563	662	754
K	Garfield WSC	Colorado	199	230	259	281	301	323
K	Goforth SUD	Guadalupe	10	12	16	20	25	31
K	Hornsby Bend Utility	Colorado	594	678	761	823	879	944
K	Hurst Creek MUD	Colorado	1,718	1,709	1,703	1,700	1,699	1,699
K	Irrigation, Travis	Colorado	1,007	1,007	1,007	1,007	1,007	1,007
K	Jonestown WSC	Colorado	675	709	744	787	828	866
K	Kelly Lane WCID 1	Colorado	322	317	313	312	311	311
K	Lago Vista	Colorado	1,868	2,184	2,487	2,832	3,140	3,428
K	Lakeway MUD	Colorado	2,757	2,882	3,019	3,166	3,212	3,211
K	Leander	Colorado	1,519	3,550	3,747	3,953	4,046	4,222
K	Livestock, Travis	Colorado	106	106	106	106	106	106
K	Livestock, Travis	Guadalupe	4	4	4	4	4	4
K	Loop 360 WSC	Colorado	1,225	1,268	1,318	1,363	1,407	1,486
K	Manor	Colorado	1,110	1,517	1,907	2,346	2,736	3,099
K	Manufacturing, Travis	Colorado	2,751	3,104	3,104	3,104	3,104	3,104
K	Manville WSC	Colorado	2,439	2,946	3,435	3,994	4,496	4,966
K	Mining, Travis	Colorado	725	850	985	1,112	1,251	1,411
K	Mining, Travis	Guadalupe	7	9	10	11	13	14
K	North Austin MUD 1	Colorado	81	78	76	75	75	75
K	Northtown MUD	Colorado	728	841	947	1,066	1,171	1,268
K	Oak Shores Water System	Colorado	150	171	170	169	169	169
K	Pflugerville	Colorado	10,403	12,819	15,598	18,364	21,167	21,156

K	Rollingwood	Colorado	383	379	375	374	375	377
K	Rough Hollow in Travis County	Colorado	589	1,213	1,213	1,213	1,213	1,213
K	Round Rock	Colorado	278	315	352	395	434	470
K	Senna Hills MUD	Colorado	420	493	564	616	659	708
K	Shady Hollow MUD	Colorado	793	775	759	750	749	749
K	Steam-Electric Power, Travis	Colorado	2,143	2,143	2,143	2,143	2,143	2,143
K	Sunset Valley	Colorado	368	417	483	559	649	753
K	Sweetwater Community	Colorado	408	862	862	862	862	862
K	Travis County MUD 10	Colorado	74	87	99	108	115	124
K	Travis County MUD 14	Colorado	172	196	220	238	254	273
K	Travis County MUD 2	Colorado	322	372	421	457	489	525
K	Travis County MUD 4	Colorado	1,500	1,728	1,945	2,188	2,402	2,603
K	Travis County WCID 10	Colorado	3,499	3,802	4,094	4,433	4,739	5,026
K	Travis County WCID 17	Colorado	9,370	10,053	11,016	11,186	11,479	11,841
K	Travis County WCID 18	Colorado	1,070	1,207	1,341	1,499	1,643	1,779
K	Travis County WCID 19	Colorado	449	447	445	444	444	444
K	Travis County WCID 20	Colorado	584	581	579	577	577	577
K	Travis County WCID Point Venture	Colorado	255	322	378	456	545	624
K	Wells Branch MUD	Colorado	1,397	1,352	1,321	1,303	1,298	1,297
K	West Travis County Public Utility Agency	Colorado	6,698	7,357	7,925	8,824	9,398	9,914
K	Williamson County WSID 3	Colorado	120	147	145	144	144	144
K	Williamson Travis Counties MUD 1	Colorado	145	141	139	139	138	138
K	Windermere Utility	Colorado	2,920	2,864	2,831	2,815	2,810	2,809
		Sum of Projected Water Demands (acre-feet)	**241,043**	**279,838**	**319,336**	**348,587**	**372,799**	**400,365**

Projected Water Supply Needs
TWDB 2022 State Water Plan Data

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

TRAVIS COUNTY

All values are in acre-feet

RWPG	WUG	WUG Basin	2020	2030	2040	2050	2060	2070
K	Aqua WSC	Colorado	0	0	0	0	0	0
K	Austin	Colorado	121,593	87,987	66,151	40,563	19,311	-8,770
K	Barton Creek West WSC	Colorado	4	7	10	12	13	13
K	Barton Creek WSC	Colorado	-217	-312	-402	-469	-523	-586
K	Briarcliff	Colorado	100	60	20	-25	-66	-104
K	Cedar Park	Colorado	-613	-813	-732	-662	-660	-659
K	Cottonwood Creek MUD 1	Colorado	0	0	0	0	0	0
K	County-Other, Travis	Colorado	10,722	10,719	10,710	10,705	10,702	10,694
K	County-Other, Travis	Guadalupe	101	101	102	102	102	102
K	Creedmoor-Maha WSC	Colorado	555	473	-448	-552	-656	-757
K	Creedmoor-Maha WSC	Guadalupe	21	18	14	9	4	0
K	Cypress Ranch WCID 1	Colorado	102	89	79	70	59	60
K	Deer Creek Ranch Water	Colorado	82	76	70	66	62	57
K	Elgin	Colorado	0	0	0	0	0	0
K	Garfield WSC	Colorado	61	30	1	-21	-41	-63
K	Goforth SUD	Guadalupe	-4	-6	-10	-15	-20	-26
K	Hornsby Bend Utility	Colorado	350	266	183	121	65	0
K	Hurst Creek MUD	Colorado	-12	-3	3	6	7	7
K	Irrigation, Travis	Colorado	908	908	908	908	908	908
K	Jonestown WSC	Colorado	75	41	6	-37	-78	-116
K	Kelly Lane WCID 1	Colorado	66	71	75	76	77	77
K	Lago Vista	Colorado	1,998	1,682	1,379	1,034	726	438
K	Lakeway MUD	Colorado	312	187	50	-97	-143	-142
K	Leander	Colorado	-317	-1,866	-2,009	-2,684	-2,967	-3,281
K	Livestock, Travis	Colorado	0	0	0	0	0	0
K	Livestock, Travis	Guadalupe	0	0	0	0	0	0
K	Loop 360 WSC	Colorado	25	-18	-68	-113	-157	-236
K	Manor	Colorado	2,210	1,903	325	219	310	10
K	Manufacturing, Travis	Colorado	0	0	286	742	742	742
K	Manville WSC	Colorado	2,033	1,608	1,135	577	-476	-1,696
K	Mining, Travis	Colorado	0	0	0	0	0	0
K	Mining, Travis	Guadalupe	0	0	0	0	0	0
K	North Austin MUD 1	Colorado	0	0	-76	-75	-75	-75
K	Northtown MUD	Colorado	0	0	-947	-1,066	-1,171	-1,268
K	Oak Shores Water System	Colorado	135	114	115	116	116	116
K	Pflugerville	Colorado	1,641	-790	-3,589	-6,376	-9,203	-9,220

K	Rollingwood	Colorado	737	741	-375	-374	-375	-377
K	Rough Hollow in Travis County	Colorado	1,206	582	582	582	582	582
K	Round Rock	Colorado	0	0	0	0	0	0
K	Senna Hills MUD	Colorado	-16	-89	-160	-212	-255	-304
K	Shady Hollow MUD	Colorado	0	0	0	0	0	0
K	Steam-Electric Power, Travis	Colorado	4,140	4,140	4,140	4,140	4,140	4,140
K	Sunset Valley	Colorado	388	339	-443	-519	-609	-713
K	Sweetwater Community	Colorado	1,106	652	652	652	652	652
K	Travis County MUD 10	Colorado	22	9	-3	-12	-19	-28
K	Travis County MUD 14	Colorado	52	28	4	-14	-30	-49
K	Travis County MUD 2	Colorado	218	168	119	83	51	15
K	Travis County MUD 4	Colorado	2,060	1,834	1,619	1,377	1,163	962
K	Travis County WCID 10	Colorado	-139	-442	-4,094	-4,433	-4,739	-5,026
K	Travis County WCID 17	Colorado	635	-48	-1,011	-1,181	-1,474	-1,836
K	Travis County WCID 18	Colorado	330	193	59	-99	-243	-379
K	Travis County WCID 19	Colorado	0	0	0	0	0	0
K	Travis County WCID 20	Colorado	551	554	556	558	558	558
K	Travis County WCID Point Venture	Colorado	30	-37	-93	-171	-260	-339
K	Wells Branch MUD	Colorado	0	0	-1,321	-1,303	-1,298	-1,297
K	West Travis County Public Utility Agency	Colorado	-1,784	-2,443	-3,011	-3,910	-4,484	-5,000
K	Williamson County WSID 3	Colorado	20	18	13	9	4	0
K	Williamson Travis Counties MUD 1	Colorado	56	60	62	63	63	64
K	Windermere Utility	Colorado	689	745	-1,462	-1,446	-1,441	-1,440
		Sum of Projected Water Supply Needs (acre-feet)	**-3,102**	**-6,867**	**-20,254**	**-25,866**	**-31,463**	**-43,787**

Projected Water Management Strategies
TWDB 2022 State Water Plan Data

TRAVIS COUNTY

WUG, Basin (RWPG)

All values are in acre-feet

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
Aqua WSC, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	208	240	270	304	334	362
Municipal Conservation - Aqua WSC	DEMAND REDUCTION [Travis]	49	26	10	3	0	0
Municipal Water Conservation	DEMAND REDUCTION [Travis]	1	1	2	2	3	3
		258	**267**	**282**	**309**	**337**	**365**
Austin, Colorado (K)							
Austin - Aquifer Storage and Recovery	Carrizo-Wilcox Aquifer ASR [Bastrop]	0	0	7,900	10,500	13,200	15,800
Austin - Blackwater and Greywater Reuse	Direct Reuse [Travis]	0	1,450	3,450	5,400	7,340	9,290
Austin - Brackish Groundwater Desalination	Edwards-BFZ Aquifer [Travis]	0	0	0	0	0	2,700
Austin - Brackish Groundwater Desalination	Trinity Aquifer [Travis]	0	0	0	0	0	2,300
Austin - Capture Local Inflows to Lady Bird Lake	Colorado Run-of-River [Travis]	0	0	3,000	3,000	3,000	3,000
Austin - Centralized Direct Non-Potable Reuse	Direct Reuse [Travis]	500	2,990	10,250	14,583	18,917	23,250
Austin - Community-Scale Stormwater Harvesting	Rainwater Harvesting [Travis]	0	66	158	184	210	236
Austin - Conservation	DEMAND REDUCTION [Travis]	4,910	14,890	24,870	30,120	35,370	40,620
Austin - Decentralized Direct Non-Potable Reuse	Direct Reuse [Travis]	0	1,400	4,160	8,330	12,510	16,680
Austin - Indirect Potable Reuse Through Lady Bird Lake	Indirect Reuse [Travis]	0	0	11,000	14,000	17,000	20,000
Austin - Lake Austin Operations	Colorado Run-of-River [Travis]	1,250	1,250	1,250	1,250	1,250	1,250
Austin - Longhorn Dam Operation Improvements	Colorado Run-of-River [Travis]	0	3,000	3,000	3,000	3,000	3,000
Austin - Off-Channel Reservoir And Evaporation Suppression	Austin Off-Channel Lake/Reservoir [Reservoir]	0	0	0	0	0	25,827
Austin - Onsite Rainwater and Stormwater Harvesting	Rainwater Harvesting [Travis]	0	790	1,880	2,890	3,890	4,900
Drought Management	DEMAND REDUCTION [Travis]	7,766	9,045	10,489	11,480	12,271	13,342
		14,426	**34,881**	**81,407**	**104,737**	**127,958**	**182,195**
Barton Creek West WSC, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	79	71	64	58	52	47
Municipal Conservation - Barton Creek West WSC	DEMAND REDUCTION [Travis]	39	76	109	139	167	193
		118	**147**	**173**	**197**	**219**	**240**

Barton Creek WSC, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	119	127	131	130	125	121
Municipal Conservation - Barton Creek WSC	DEMAND REDUCTION [Travis]	47	110	183	258	330	409
Water Purchase Amendment - Barton Creek WSC	Highland Lakes Lake/Reservoir System [Reservoir]	90	90	90	90	90	90
		256	**327**	**404**	**478**	**545**	**620**
Briarcliff, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	60	68	76	85	93	106
		60	**68**	**76**	**85**	**93**	**106**
Cedar Park, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	410	393	393	393	393	393
Municipal Conservation - Cedar Park	DEMAND REDUCTION [Travis]	203	420	590	586	583	582
		613	**813**	**983**	**979**	**976**	**975**
Cottonwood Creek MUD 1, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	5	5	6	6	7	7
		5	**5**	**6**	**6**	**7**	**7**
County-Other, Travis, Colorado (K)							
Brush Management	Trinity Aquifer [Travis]	0	83	83	83	83	83
Drought Management	DEMAND REDUCTION [Travis]	230	219	212	204	195	190
Municipal Conservation - Travis County-Other (Aqua Texas - Rivercrest)	DEMAND REDUCTION [Travis]	29	55	79	102	123	142
		259	**357**	**374**	**389**	**401**	**415**
County-Other, Travis, Guadalupe (K)							
Drought Management	DEMAND REDUCTION [Travis]	2	2	2	2	2	2
		2	**2**	**2**	**2**	**2**	**2**
Creedmoor-Maha WSC, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	29	31	33	36	39	42
Edwards/Middle Trinity ASR	Trinity Aquifer ASR [Hays]	0	289	289	289	289	289
Municipal Conservation - Creedmoor-Maha WSC	DEMAND REDUCTION [Travis]	30	37	55	86	93	100
Water Purchase Amendment - Creedmoor-Maha WSC	Carrizo-Wilcox Aquifer [Bastrop]	0	0	335	335	335	335
		59	**357**	**712**	**746**	**756**	**766**
Creedmoor-Maha WSC, Guadalupe (K)							
Drought Management	DEMAND REDUCTION [Travis]	2	2	2	2	2	3
Municipal Conservation - Creedmoor-Maha WSC	DEMAND REDUCTION [Travis]	2	2	4	6	6	6
		4	**4**	**6**	**8**	**8**	**9**
Cypress Ranch WCID 1, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	6	6	7	7	7	7

Municipal Conservation - Cypress Ranch WCID 1	DEMAND REDUCTION [Travis]	6	9	14	20	21	20
		12	**15**	**21**	**27**	**28**	**27**
Deer Creek Ranch Water, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	2	2	3	3	3	3
		2	**2**	**3**	**3**	**3**	**3**
Elgin, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	41	45	42	32	37	42
Municipal Conservation - Elgin	DEMAND REDUCTION [Travis]	13	25	47	81	94	107
		54	**70**	**89**	**113**	**131**	**149**
Garfield WSC, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	10	12	13	14	15	16
Expansion of Current Groundwater Supplies - Trinity Aquifer	Trinity Aquifer [Travis]	0	0	0	7	26	47
		10	**12**	**13**	**21**	**41**	**63**
Goforth SUD, Guadalupe (K)							
Drought Management	DEMAND REDUCTION [Travis]	0	1	1	1	1	2
Drought Management – Goforth SUD	DEMAND REDUCTION [Travis]	0	0	0	0	0	0
GBRA Shared Project (Phase 1)	Carrizo-Wilcox Aquifer [Caldwell]	7	6	6	8	13	17
GBRA Shared Project (Phase 1)	Carrizo-Wilcox Aquifer [Gonzales]	7	6	6	6	6	7
		14	**13**	**13**	**15**	**20**	**26**
Hornsby Bend Utility, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	30	34	38	41	44	47
		30	**34**	**38**	**41**	**44**	**47**
Hurst Creek MUD, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	313	281	253	228	205	185
Municipal Conservation - Hurst Creek MUD	DEMAND REDUCTION [Travis]	155	302	437	560	673	776
		468	**583**	**690**	**788**	**878**	**961**
Jonestown WSC, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	124	132	141	150	158	165
Municipal Conservation - Jonestown WSC	DEMAND REDUCTION [Travis]	56	47	41	39	40	41
		180	**179**	**182**	**189**	**198**	**206**
Kelly Lane WCID 1, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	73	66	66	66	66	66
Municipal Conservation - Kelly Lane WCID 1	DEMAND REDUCTION [Travis]	29	52	48	47	46	46
		102	**118**	**114**	**113**	**112**	**112**
Lago Vista, Colorado (K)							
Direct Reuse - Lago Vista	Direct Reuse [Travis]	0	224	336	448	560	673

	Drought Management	DEMAND REDUCTION [Travis]	340	362	373	384	408	446
	Municipal Conservation - Lago Vista	DEMAND REDUCTION [Travis]	168	375	622	914	1,098	1,198
			508	**961**	**1,331**	**1,746**	**2,066**	**2,317**
Lakeway MUD, Colorado (K)								
	Direct Reuse - Lakeway MUD	Direct Reuse [Travis]	0	450	450	900	900	900
	Drought Management	DEMAND REDUCTION [Travis]	502	478	454	430	409	409
	Municipal Conservation - Lakeway MUD	DEMAND REDUCTION [Travis]	248	492	748	1,015	1,169	1,168
			750	**1,420**	**1,652**	**2,345**	**2,478**	**2,477**
Leander, Colorado (K)								
	Drought Management	DEMAND REDUCTION [Travis]	320	594	616	645	659	686
	LCRA - Mid Basin Reservoir	LCRA New Off-Channel Reservoir (2030 Decade) [Reservoir]	0	1,400	1,400	2,600	2,600	2,600
			320	**1,994**	**2,016**	**3,245**	**3,259**	**3,286**
Loop 360 WSC, Colorado (K)								
	Drought Management	DEMAND REDUCTION [Travis]	223	209	196	183	170	161
	Municipal Conservation - Loop 360 WSC	DEMAND REDUCTION [Travis]	110	225	339	450	559	679
			333	**434**	**535**	**633**	**729**	**840**
Manor, Colorado (K)								
	Drought Management	DEMAND REDUCTION [Travis]	161	204	249	302	350	395
			161	**204**	**249**	**302**	**350**	**395**
Manville WSC, Colorado (K)								
	Drought Management	DEMAND REDUCTION [Travis]	488	589	687	799	899	993
	Expansion of Current Groundwater Supplies - Trinity Aquifer	Trinity Aquifer [Travis]	0	0	0	0	0	703
			488	**589**	**687**	**799**	**899**	**1,696**
North Austin MUD 1, Colorado (K)								
	Drought Management	DEMAND REDUCTION [Travis]	4	4	4	4	4	4
	LCRA - Mid Basin Reservoir	LCRA New Off-Channel Reservoir (2030 Decade) [Reservoir]	0	0	80	80	80	80
			4	**4**	**84**	**84**	**84**	**84**
Northtown MUD, Colorado (K)								
	Drought Management	DEMAND REDUCTION [Travis]	36	42	47	53	59	63
	LCRA - Mid Basin Reservoir	LCRA New Off-Channel Reservoir (2030 Decade) [Reservoir]	0	0	900	1,100	1,300	1,300
			36	**42**	**947**	**1,153**	**1,359**	**1,363**
Oak Shores Water System, Colorado (K)								
	Drought Management	DEMAND REDUCTION [Travis]	27	28	26	23	21	20
	Municipal Conservation - Oak Shores Water System	DEMAND REDUCTION [Travis]	14	29	42	54	65	70
			41	**57**	**68**	**77**	**86**	**90**

Pflugerville, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	2,460	3,068	3,748	4,423	5,103	5,103
Expansion of Current Groundwater Supplies - Edwards-BFZ Aquifer	Edwards-BFZ Aquifer [Travis]	0	0	20	20	20	20
LCRA - Mid Basin Reservoir	LCRA New Off-Channel Reservoir (2030 Decade) [Reservoir]	0	0	0	1,300	3,400	3,400
Municipal Conservation - Pflugerville	DEMAND REDUCTION [Travis]	563	549	606	674	754	743
Municipal Water Conservation - Pflugerville	DEMAND REDUCTION [Travis]	0	598	684	789	888	989
		3,023	**4,215**	**5,058**	**7,206**	**10,165**	**10,255**
Rollingwood, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	70	63	57	52	47	46
LCRA - Mid Basin Reservoir	LCRA New Off-Channel Reservoir (2030 Decade) [Reservoir]	0	0	250	250	250	250
Municipal Conservation - Rollingwood	DEMAND REDUCTION [Travis]	34	64	90	116	142	148
		104	**127**	**397**	**418**	**439**	**444**
Rough Hollow in Travis County, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	107	199	179	179	179	179
Municipal Conservation - Rough Hollow in Travis County	DEMAND REDUCTION [Travis]	53	220	319	319	319	319
		160	**419**	**498**	**498**	**498**	**498**
Round Rock, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	68	79	88	99	109	118
Municipal Conservation - Round Rock	DEMAND REDUCTION [Travis]	6	1	0	0	0	0
		74	**80**	**88**	**99**	**109**	**118**
Senna Hills MUD, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	76	82	84	83	80	77
Municipal Conservation - Senna Hills MUD	DEMAND REDUCTION [Travis]	38	85	142	200	258	321
		114	**167**	**226**	**283**	**338**	**398**
Shady Hollow MUD, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	144	137	137	137	137	137
Municipal Conservation - Shady Hollow MUD	DEMAND REDUCTION [Travis]	71	90	74	65	64	64
		215	**227**	**211**	**202**	**201**	**201**
Steam-Electric Power, Travis, Colorado (K)							
Austin - Centralized Direct Non-Potable Reuse	Direct Reuse [Travis]	0	1,750	1,750	1,750	1,750	1,750
		0	**1,750**	**1,750**	**1,750**	**1,750**	**1,750**
Sunset Valley, Colorado (K)							
Development of New Groundwater Supplies - Trinity Aquifer	Trinity Aquifer [Travis]	0	0	300	300	300	300
Drought Management	DEMAND REDUCTION [Travis]	67	69	72	75	79	82

	Expansion of Current Groundwater Supplies - Edwards-BFZ Aquifer	Edwards-BFZ Aquifer [Travis]	0	0	50	50	50	50
	LCRA - Mid Basin Reservoir	LCRA New Off-Channel Reservoir (2030 Decade) [Reservoir]	0	0	300	300	300	300
	Municipal Conservation - Sunset Valley	DEMAND REDUCTION [Travis]	33	73	123	183	256	343
	Rainwater Harvesting - Sunset Valley	Rainwater Harvesting [Travis]	0	2	2	3	3	4
			100	**144**	**847**	**911**	**988**	**1,079**
Sweetwater Community, Colorado (K)								
	Drought Management	DEMAND REDUCTION [Travis]	82	172	172	172	172	172
			82	**172**	**172**	**172**	**172**	**172**
Travis County MUD 10, Colorado (K)								
	Development of New Groundwater Supplies - Trinity Aquifer	Trinity Aquifer [Travis]	0	100	100	100	100	100
	Drought Management	DEMAND REDUCTION [Travis]	17	18	19	20	22	23
	Municipal Conservation - Travis County MUD 10	DEMAND REDUCTION [Travis]	7	15	25	27	28	30
			24	**133**	**144**	**147**	**150**	**153**
Travis County MUD 14, Colorado (K)								
	Drought Management	DEMAND REDUCTION [Travis]	9	10	11	12	13	14
	Water Purchase Amendment - Travis County MUD 14	Carrizo-Wilcox Aquifer [Bastrop]	0	0	0	35	35	35
			9	**10**	**11**	**47**	**48**	**49**
Travis County MUD 2, Colorado (K)								
	Drought Management	DEMAND REDUCTION [Travis]	45	46	48	49	52	56
			45	**46**	**48**	**49**	**52**	**56**
Travis County MUD 4, Colorado (K)								
	Drought Management	DEMAND REDUCTION [Travis]	341	355	360	364	360	351
	Municipal Conservation - Travis County MUD 4	DEMAND REDUCTION [Travis]	135	309	507	731	962	1,198
			476	**664**	**867**	**1,095**	**1,322**	**1,549**
Travis County WCID 10, Colorado (K)								
	Drought Management	DEMAND REDUCTION [Travis]	796	786	766	748	720	688
	LCRA - Mid Basin Reservoir	LCRA New Off-Channel Reservoir (2030 Decade) [Reservoir]	0	0	2,300	2,300	2,300	2,300
	Municipal Conservation - Travis County WCID 10	DEMAND REDUCTION [Travis]	315	660	1,031	1,440	1,858	2,275
			1,111	**1,446**	**4,097**	**4,488**	**4,878**	**5,263**
Travis County WCID 17, Colorado (K)								
	Direct Reuse - Travis County WCID 17	Direct Reuse [Travis]	0	510	510	510	510	510
	Drought Management	DEMAND REDUCTION [Travis]	2,132	2,076	2,056	1,882	1,791	1,848
	Municipal Conservation - Travis County WCID 17	DEMAND REDUCTION [Travis]	843	1,748	2,794	3,658	4,317	4,451
			2,975	**4,334**	**5,360**	**6,050**	**6,618**	**6,809**
Travis County WCID 18, Colorado (K)								

Drought Management	DEMAND REDUCTION [Travis]	263	304	342	385	423	458
Municipal Conservation - Travis County WCID 18	DEMAND REDUCTION [Travis]	75	58	47	43	43	46
		338	**362**	**389**	**428**	**466**	**504**
Travis County WCID 19, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	82	74	66	60	54	48
Municipal Conservation - Travis County WCID 19	DEMAND REDUCTION [Travis]	40	79	114	146	176	203
		122	**153**	**180**	**206**	**230**	**251**
Travis County WCID 20, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	106	96	86	77	70	63
Municipal Conservation - Travis County WCID 20	DEMAND REDUCTION [Travis]	53	103	149	190	228	263
		159	**199**	**235**	**267**	**298**	**326**
Travis County WCID Point Venture, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	46	53	57	62	71	82
LCRA - Mid Basin Reservoir	LCRA New Off-Channel Reservoir (2030 Decade) [Reservoir]	0	0	0	0	0	50
Municipal Conservation - Travis County WCID Point Venture	DEMAND REDUCTION [Travis]	23	55	94	146	189	216
		69	**108**	**151**	**208**	**260**	**348**
Wells Branch MUD, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	70	68	66	65	65	65
LCRA - Mid Basin Reservoir	LCRA New Off-Channel Reservoir (2030 Decade) [Reservoir]	0	0	1,300	1,300	1,300	1,300
		70	**68**	**1,366**	**1,365**	**1,365**	**1,365**
West Travis County Public Utility Agency, Colorado (K)							
Direct Potable Reuse - West Travis County PUA	Direct Reuse [Travis]	0	336	336	336	336	336
Direct Reuse - West Travis County PUA	Direct Reuse [Travis]	0	127	125	120	113	108
Drought Management	DEMAND REDUCTION [Travis]	1,219	1,212	1,178	1,182	1,134	1,077
LCRA - Excess Flows Reservoir	LCRA New Off-Channel Reservoir (2030 Decade) [Reservoir]	0	1,000	1,000	2,100	2,100	2,200
Municipal Conservation - West Travis County PUA	DEMAND REDUCTION [Travis]	603	1,295	2,034	2,914	3,729	4,530
		1,822	**3,970**	**4,673**	**6,652**	**7,412**	**8,251**
Williamson County WSID 3, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	20	22	20	19	19	19
		20	**22**	**20**	**19**	**19**	**19**
Williamson Travis Counties MUD 1, Colorado (K)							
Drought Management	DEMAND REDUCTION [Travis]	22	19	18	18	17	17
		22	**19**	**18**	**18**	**17**	**17**
Windermere Utility, Colorado (K)							

Drought Management	DEMAND REDUCTION [Travis]	560	560	560	560	560	560
LCRA - Mid Basin Reservoir	LCRA New Off-Channel Reservoir (2030 Decade) [Reservoir]	0	0	400	400	400	400
Municipal Conservation - Windermere Utility	DEMAND REDUCTION [Travis]	118	62	29	13	8	7
Water Purchase - Windermere Utility	Carrizo-Wilcox Aquifer [Burleson]	0	500	500	500	500	500
		678	**1,122**	**1,489**	**1,473**	**1,468**	**1,467**
Sum of Projected Water Management Strategies (acre-feet)		**31,385**	**63,916**	**121,452**	**153,681**	**183,330**	**241,184**

Appendix G

TWDB GAM Run 19-027: Southwestern Travis County Groundwater Conservation District Management Plan

GAM Run 19-027: Southwestern Travis County Groundwater Conservation District Groundwater Management Plan

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Texas Water Development Board
Groundwater Division
Groundwater Availability Modeling Department
512-936-0883
December 13, 2019

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12/13/19

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GAM RUN 19-027: SOUTHWESTERN TRAVIS COUNTY GROUNDWATER CONSERVATION DISTRICT GROUNDWATER MANAGEMENT PLAN

Shirley C. Wade, Ph.D., P.G.
Texas Water Development Board
Groundwater Division
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512-936-0883
December 13, 2019

EXECUTIVE SUMMARY:

Texas State Water Code, Section 36.1071, Subsection (h) (Texas Water Code, 2011), states that, in developing its groundwater management plan, a groundwater conservation district shall use groundwater availability modeling information provided by the Executive Administrator of the Texas Water Development Board (TWDB) in conjunction with any available site-specific information provided by the district for review and comment to the Executive Administrator.

The TWDB provides data and information to the Southwestern Travis County Groundwater Conservation District in two parts. Part 1 is the Estimated Historical Water Use/State Water Plan dataset report, which will be provided to you separately by the TWDB Groundwater Technical Assistance Department. Please direct questions about the water data report to Mr. Stephen Allen at 512-463-7317 or stephen.allen@twdb.texas.gov. Part 2 is the required groundwater availability modeling information and this information includes:

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

The groundwater management plan for the Southwestern Travis County Groundwater Conservation District is due by November 5, 2022.

We used three groundwater availability models to estimate the management plan information for the aquifers within the Southwestern Travis County Groundwater Conservation District. Information for the Hickory Aquifer is from version 1.01 of the groundwater availability model for the minor aquifers in the Llano Uplift Region (Shi and others, 2016a and b). The model does not cover the entire Hickory Aquifer within the district. Please contact Mr. Stephen Allen with the TWDB at (512) 463-7317 or stephen.allen@twdb.texas.gov for additional information on the aquifer in areas not covered by the groundwater availability model. Information for the Trinity Aquifer is from the groundwater availability model for the Hill Country portion of the Trinity Aquifer System (Jones and others, 2011). Information for the Edwards (Balcones Fault Zone) Aquifer is from the groundwater availability model for the Barton Springs Segment of the Edwards (Balcones Fault Zone) Aquifer (Scanlon and others, 2001).

METHODS:

In accordance with the provisions of the Texas State Water Code, Section 36.1071, Subsection (h), the groundwater availability models mentioned above were used to estimate information for the Southwestern Travis Groundwater Conservation District management plan. Water budgets were extracted for the historical model periods for the Trinity Aquifer (1981 through 1997) and Edwards (Balcones Fault Zone) Aquifer (1989 through 1998) using ZONEBUDGET Version 3.01 (Harbaugh, 2009). Water budgets were extracted for the historical model period for the Hickory Aquifer (1981 through 2010) using ZONEBUDGET USG Version 1.00 (Panday and others, 2013). The average annual water budget values for recharge, surface-water outflow, inflow to the district, outflow from the district, and net inter-aquifer flow (lower) for the portion of the aquifer located within the district are summarized in this report.

PARAMETERS AND ASSUMPTIONS:

Hickory Aquifer

- We used version 1.01 of the groundwater availability model for the minor aquifers in the Llano Uplift Region to analyze the Hickory Aquifer. See Shi and others (2016a and b) for assumptions and limitations of the model.

- The groundwater availability model for the minor aquifers in the Llano Uplift Region contains eight active layers (from top to bottom):

    - Layer 1 — the Trinity Aquifer, Edwards-Trinity (Plateau) Aquifer, and younger alluvium deposits,
    - Layer 2 — Permian and Pennsylvanian age confining units,
    - Layer 3 — the Marble Falls Aquifer and equivalent,
    - Layer 4 — Mississippian age confining units,
    - Layer 5 — the Ellenburger-San Saba Aquifer and equivalent,
    - Layer 6 — Cambrian age confining units,
    - Layer 7 — the Hickory Aquifer and equivalent, and
    - Layer 8 — Precambrian age confining units.

- The Hickory Aquifer is the only aquifer from the Llano Uplift Aquifer System present in southwestern Travis County.
- The groundwater availability model does not include the entire Hickory Aquifer within the district boundaries. The area east of the Ouachita Thrust Fault is not active in the model because research suggests the fault wall may likely act as a flow barrier.
- Perennial rivers and reservoirs were simulated using the MODFLOW-USG river package. Springs were simulated using the MODFLOW-USG drain package. However, for this analysis, surface water discharge does not occur from the Hickory Aquifer within the groundwater district boundaries.
- The model was run with MODFLOW-USG (Panday and others, 2013).

Hill Country portion of the Trinity Aquifer System

- We used version 2.01 of the groundwater availability model for the Hill Country portion of the Trinity Aquifer System. See Jones and others (2011) for assumptions and limitations of the groundwater availability model.
- The groundwater availability model includes four layers, representing (from top to bottom):
    - Layer 1 – the Edwards Group of the Edwards-Trinity (Plateau) Aquifer,
    - Layer 2 – the Upper Trinity Aquifer,

  - Layer 3 – the Middle Trinity Aquifer, and
  - Layer 4 – the Lower Trinity Aquifer.

- Layer 1 is not present in the district. An individual water budget for the district was determined for the remaining layers of the Hill Country portion of the Trinity Aquifer System (Layer 2 to Layer 4, collectively).
- The General-Head Boundary (GHB) package of MODFLOW was used to represent flow out of the study area between the Hill Country portion of the Trinity Aquifer and the Edwards (Balcones Fault Zone) Aquifer or the confined parts of the Trinity Aquifer underlying the Edwards (Balcones Fault Zone) Aquifer.
- The model was run with MODFLOW-96 (Harbaugh and McDonald, 1996).

Barton Springs Segment of the Edwards (Balcones Fault Zone) Aquifer

- We used version 1.01 of the groundwater availability model for the Barton Springs segment of the Edwards (Balcones Fault Zone) Aquifer. See Scanlon and others (2001) for assumptions and limitations of the groundwater availability model.
- The transient model has monthly stress periods and covers the time period of 1989 through 1998.
- The groundwater availability model is a one-layer model and assumes no interaction with the underlying Trinity Aquifer. The cells are 1,000 feet long parallel to the strike of the faults and 500 feet wide.
- The model was run with MODFLOW-96 (Harbaugh and McDonald, 1996).

RESULTS:

A groundwater budget summarizes the amount of water entering and leaving the aquifers according to the groundwater availability model. Selected groundwater budget components listed below were extracted from the groundwater availability model results for the Hickory Aquifer, the Hill Country potion of the Trinity Aquifer System, and the Edwards (Balcones Fault Zone) Aquifer located within the Southwestern Travis County Groundwater Conservation District and averaged over the historical calibration periods, as shown in Table 1.

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

2. Surface-water outflow—the total water discharging from the aquifer (outflow) to surface-water features such as streams, reservoirs, and springs.

3. Flow into and out of district—the lateral flow within the aquifer between the district and adjacent counties.

4. Flow between aquifers—the net vertical flow between the aquifer and adjacent aquifers or confining units. This flow is controlled by the relative water levels in each aquifer and aquifer properties of each aquifer or confining unit that define the amount of leakage that occurs.

It is important to note that sub-regional water budgets are not exact. This is due to the size of the model cells and the approach used to extract data from the model. To avoid double accounting, a model cell that straddles a political boundary, such as a district or county boundary, is assigned to one side of the boundary based on the location of the centroid of the model cell. For example, if a cell contains two counties, the cell is assigned to the county where the centroid of the cell is located.

TABLE 1. SUMMARIZED INFORMATION FOR THE HICKORY AQUIFER FOR SOUTHWESTERN TRAVIS COUNTY GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Hickory Aquifer	0
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Hickory Aquifer	0
Estimated annual volume of flow into the district within each aquifer in the district	Hickory Aquifer	3,121
Estimated annual volume of flow out of the district within each aquifer in the district	Hickory Aquifer	1,114
Estimated net annual volume of flow between each aquifer in the district	From the Hickory Aquifer into overlying younger units.	2,153
	To the Hickory Aquifer from underlying Precambrian Formations	145

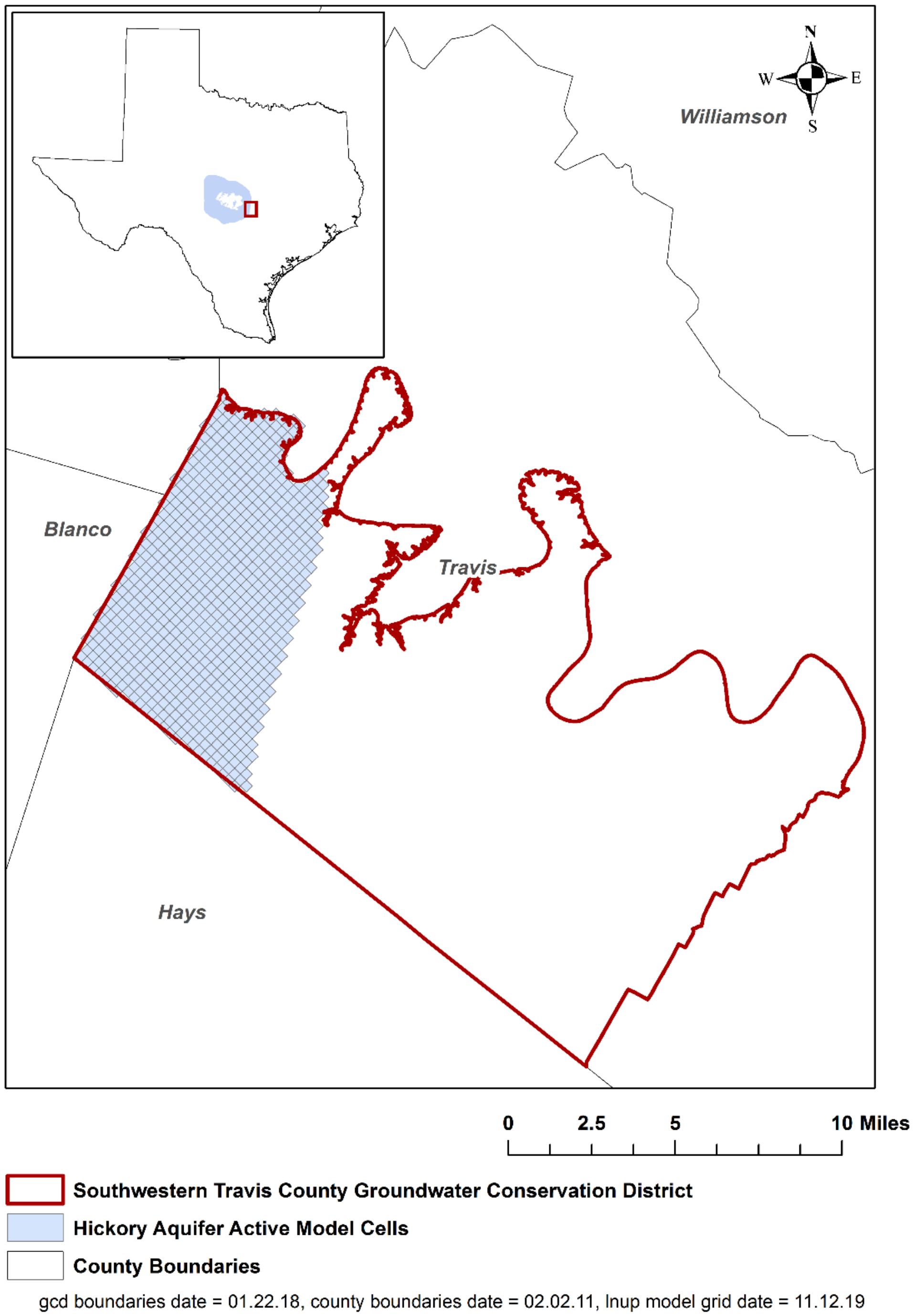

FIGURE 1 AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE MINOR AQUIFERS IN THE LLANO UPLIFT REGION FROM WHICH THE INFORMATION IN TABLE 1 WAS EXTRACTED (THE HICKORY AQUIFER EXTENT WITHIN THE DISTRICT BOUNDARY).

TABLE 2. SUMMARIZED INFORMATION FOR THE HILL COUNTRY PORTION OF THE TRINITY AQUIFER SYSTEM FOR SOUTHWESTERN TRAVIS COUNTY GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Trinity Aquifer	12,167
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Trinity Aquifer	12,654
Estimated annual volume of flow into the district within each aquifer in the district	Trinity Aquifer	10,024
Estimated annual volume of flow out of the district within each aquifer in the district	Trinity Aquifer	9,205
Estimated net annual volume of flow between each aquifer in the district	From the Hill Country portion of the Trinity Aquifer to the Edwards (Balcones Fault Zone) Aquifer and the Trinity Aquifer underlying the Edwards (Balcones Fault Zone) Aquifer.	2,333

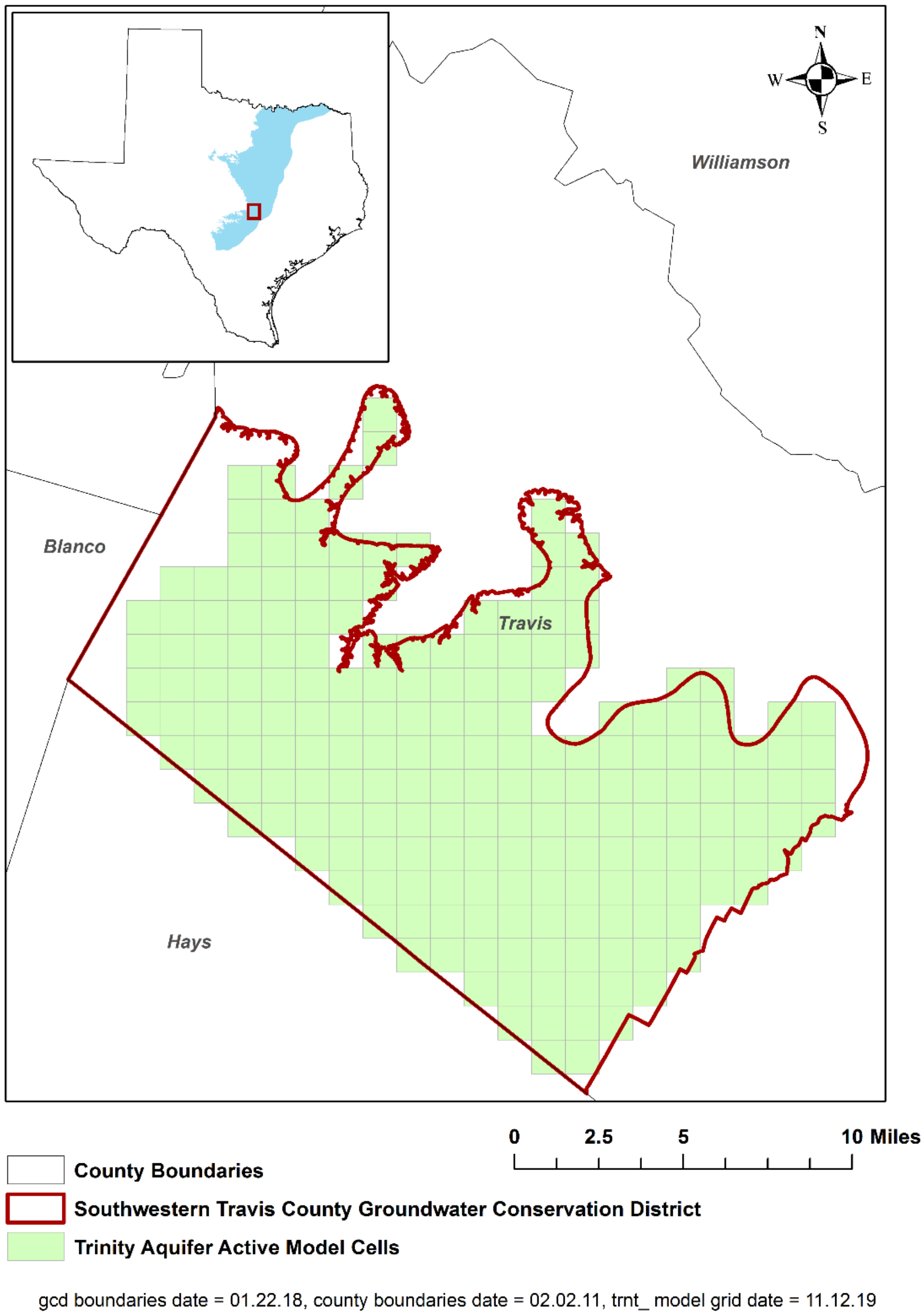

FIGURE 2 AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE HILL COUNTRY PORTION OF THE TRINITY AQUIFER SYSTEM FROM WHICH THE INFORMATION IN TABLE 2 WAS EXTRACTED (THE TRINITY AQUIFER EXTENT WITHIN THE DISTRICT BOUNDARY).

TABLE 3. SUMMARIZED INFORMATION FOR THE BARTON SPRINGS SEGMENT OF THE EDWARDS (BALCONES FAULT ZONE) AQUIFER FOR SOUTHWESTERN TRAVIS COUNTY GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Management Plan requirement	Aquifer or confining unit	Results
Estimated annual amount of recharge from precipitation to the district	Edwards (Balcones Fault Zone) Aquifer	79
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Edwards (Balcones Fault Zone) Aquifer	0
Estimated annual volume of flow into the district within each aquifer in the district	Edwards (Balcones Fault Zone) Aquifer	306
Estimated annual volume of flow out of the district within each aquifer in the district	Edwards (Balcones Fault Zone) Aquifer	615
Estimated net annual volume of flow between each aquifer in the district	From the Hill Country portion of the Trinity Aquifer to the Edwards (Balcones Fault Zone) Aquifer and the Trinity Aquifer underlying the Edwards (Balcones Fault Zone) Aquifer.	2,333[1]

[1] From the Groundwater Availability Model for the Hill Country portion of the Trinity Aquifer

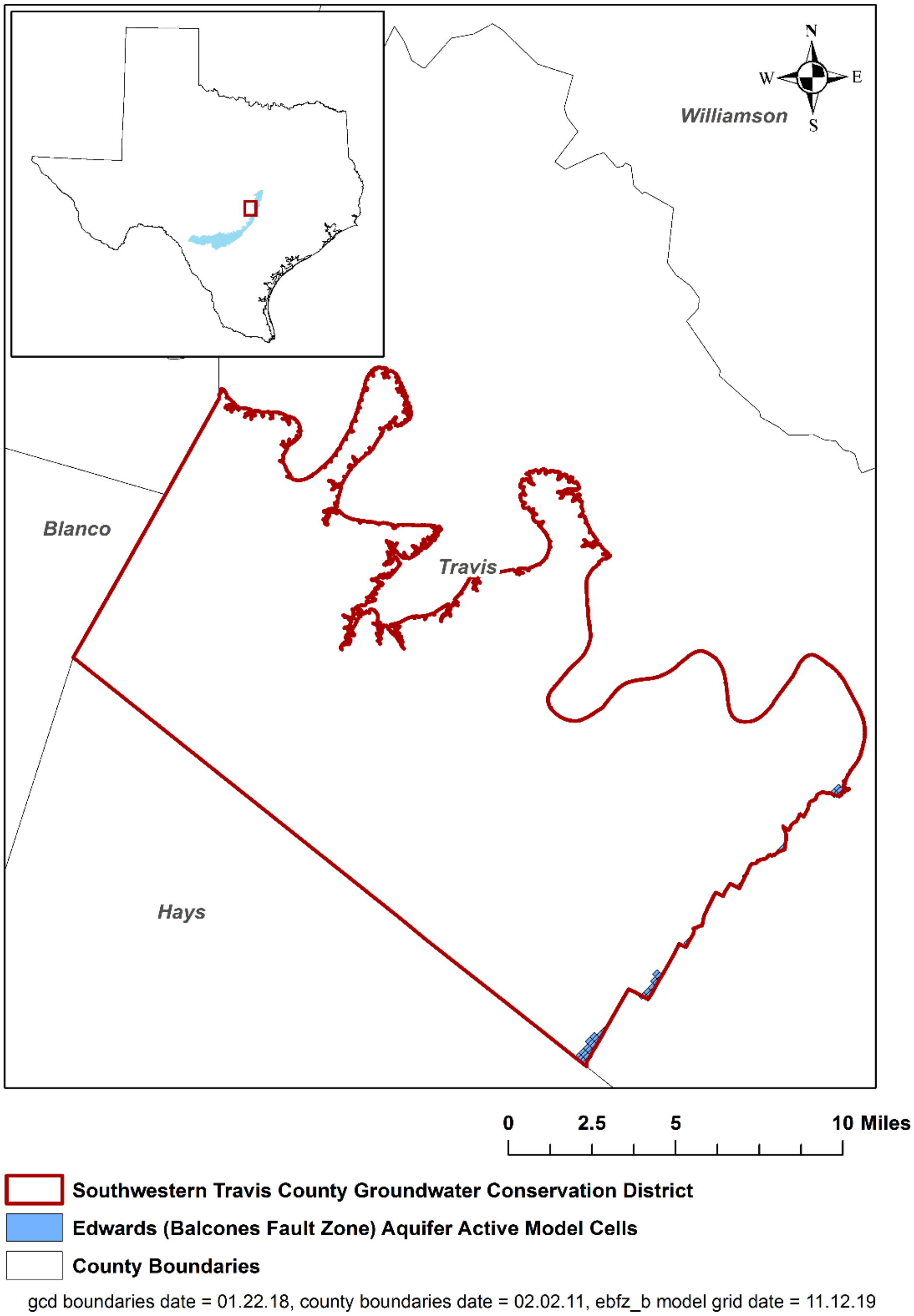

FIGURE 3 AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE BARTON SPRINGS SEGMENT OF THE EDWARDS (BALCONES FAULT ZONE) AQUIFER FROM WHICH THE INFORMATION IN TABLE 3 WAS EXTRACTED (AQUIFER EXTENT WITHIN THE DISTRICT BOUNDARY).

LIMITATIONS:

The groundwater models used in completing this analysis are the best available scientific tools that can be used to meet the stated objectives. To the extent that this analysis will be used for planning purposes and/or regulatory purposes related to pumping in the past and into the future, it is important to recognize the assumptions and limitations associated with the use of the results. In reviewing the use of models in environmental regulatory decision making, the National Research Council (2007) noted:

> *"Models will always be constrained by computational limitations, assumptions, and knowledge gaps. They can best be viewed as tools to help inform decisions rather than as machines to generate truth or make decisions. Scientific advances will never make it possible to build a perfect model that accounts for every aspect of reality or to prove that a given model is correct in all respects for a particular regulatory application. These characteristics make evaluation of a regulatory model more complex than solely a comparison of measurement data with model results."*

A key aspect of using the groundwater model to evaluate historical groundwater flow conditions includes the assumptions about the location in the aquifer where historical pumping was placed. Understanding the amount and location of historical pumping is as important as evaluating the volume of groundwater flow into and out of the district, between aquifers within the district (as applicable), interactions with surface water (as applicable), recharge to the aquifer system (as applicable), and other metrics that describe the impacts of that pumping. In addition, assumptions regarding precipitation, recharge, and interaction with streams are specific to particular historical time periods.

Because the application of the groundwater models was designed to address regional-scale questions, the results are most effective on a regional scale. The TWDB makes no warranties or representations related to the actual conditions of any aquifer at a particular location or at a particular time.

It is important for groundwater conservation districts to monitor groundwater pumping and overall conditions of the aquifer. Because of the limitations of the groundwater model and the assumptions in this analysis, it is important that the groundwater conservation districts work with the TWDB to refine this analysis in the future given the reality of how the aquifer responds to the actual amount and location of pumping now and in the future. Historical precipitation patterns also need to be placed in context as future climatic conditions, such as dry and wet year precipitation patterns, may differ and affect groundwater flow conditions.

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This is the final page of the Southwestern Travis County Groundwater Conservation District Groundwater Management Plan.